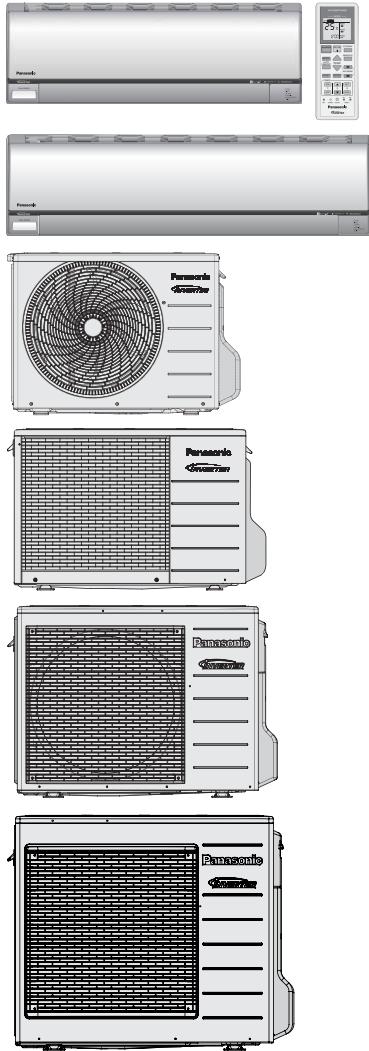


Service Manual

Air Conditioner



Indoor Unit	Outdoor Unit
CS-S9RKV	CU-S9RKV
CS-S12RKV	CU-S12RKV
CS-S18RKV	CU-S18RKV
CS-S24RKV	CU-S24RKV
CS-S28RKV	CU-S28RKV

Destination
Panama
Aruba
Dutch
Antilles
Trinidad & Tobago

⚠ WARNING

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

IMPORTANT SAFETY NOTICE

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

⚠ PRECAUTION OF LOW TEMPERATURE

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

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1. Safety Precautions

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

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

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

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

⚠ WARNING	
1.	Do not 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 authorized 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 be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.
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 electrical 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.	<ul style="list-style-type: none">• For R410A model, use piping, flare nut and tools which is specified for R410A refrigerant. Using of existing (R22) piping, flare nut and tools may cause abnormally high pressure in the refrigerant cycle (piping), and possibly result in explosion and injury.• Thickness or copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.• It is desirable that the amount of residual oil less than 40 mg/10 m.

WARNING

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

CAUTION

1. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire. 
2. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
3. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.
4. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury. 
5. Select an installation location which is easy for maintenance.
6. Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F – 70°F (30°C – 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F / 600°C).

CS-S9/12/18/24RKV CU-S9/12/18/24RKV

Power supply connection to the room air conditioner.

Use power supply cord 3 x 1.5 mm² (1.0 ~ 1.5HP) or 3 x 2.5 mm² (2.0 ~ 2.5HP) type designation 60245 IEC 57 or heavier cord.

Connect the power supply cord of the air conditioner to the mains using one of the following method.

Power supply point should be in easily accessible place for power disconnection in case of emergency.

7. In some countries, permanent connection of this air conditioner to the power supply is prohibited.

1) Power supply connection to the receptacle using power plug.

Use an approved 15/16A (1.0 ~ 1.5HP) or 16A (2.0HP) or 20A (2.5HP) power plug with earth pin for the connection to the socket.

2) Power supply connection to a circuit breaker for the permanent connection.

Use an approved 16A (1.0 ~ 2.0HP) or 20A (2.5HP) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap.

CS-S28RKV CU-S28RKV

Power supply connection to the room air conditioner.

Use power supply cord 3 x 4.0 mm² type designation 60245 IEC 57 or heavier cord.

Connect the power supply cord of the air conditioner to the mains using one of the following method.

Power supply point should be in easily accessible place for power disconnection in case of emergency.

8. In some countries, permanent connection of this air conditioner to the power supply is prohibited.

1) Power supply connection to the receptacle using power plug.

Use an approved 25A power plug with earth pin for the connection to the socket.

2) Power supply connection to a circuit breaker for the permanent connection.

Use an approved 25A circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap.

9. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigerant parts. Take care of the liquid refrigerant, it may cause frostbite. 

10. Installation or servicing work: It may need two people to carry out the installation or servicing work.

11. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc. 

12. Do not sit or step on the unit, you may fall down accidentally. 

13. Do not touch the sharp aluminum fins or edges of metal parts.

13. If you are required to handle sharp parts during installation or servicing, please wear hand glove.

Sharp parts may cause injury. 

2. Specification

Model	Indoor	CS-S9RKV			CS-S12RKV			
	Outdoor	CU-S9RKV			CU-S12RKV			
Performance Test Condition		JIS			JIS			
Power Supply	Phase, Hz	Single, 60			Single, 60			
	V	220		220				
		Min.	Mid.	Max.	Min.	Mid.	Max.	
Cooling	Capacity	kW	0.84	2.65	3.20	0.92	3.23	4.00
		BTU/h	2860	9040	10900	3140	11000	13600
		kJ/h	3020	9540	11520	3310	11630	14400
	Running Current	A	—	3.4	—	—	4.1	—
	Input Power	W	225	695	870	260	855	1.14k
	EER	W/W	3.73	3.81	3.68	3.54	3.78	3.51
		BTU/hW	12.71	13.01	12.53	12.08	12.87	11.93
		kJ/hW	13.42	13.73	13.24	12.73	13.60	12.63
	Power Factor	%	—	93	—	—	95	—
	Indoor Noise (H / L / QLo)	dB-A	36 / 26 / 23			38 / 28 / 25		
	Outdoor Noise (H / L)	dB-A	46 / — / —			47 / — / —		
Max Current (A) / Max Input Power (W)		5.5 / 1.07k			7.4 / 1.37k			
Starting Current (A)		3.4			4.1			
Compressor	Type		Hermetic Motor (Rotary)			Hermetic Motor (Rotary)		
	Motor Type		Brushless (6 poles)			Brushless (6 poles)		
	Output Power	W	500			650		
Indoor Fan	Type		Cross-Flow Fan			Cross-Flow Fan		
	Material		ASG20K1			ASG20K1		
	Motor Type		DC / Transistor (8 poles)			DC / Transistor (8 poles)		
	Input Power	W	47.3			47.3		
	Output Power	W	40			40		
	Speed	QLo	rpm	630			670	
		Lo	rpm	700			740	
		Me	rpm	850			890	
		Hi	rpm	1000			1050	
		SHi	rpm	1120			1170	
Outdoor Fan	Type		Propeller Fan			Propeller Fan		
	Material		PP Resin			PP Resin		
	Motor Type		AC / Induction (6 poles)			AC / Induction (6 poles)		
	Input Power	W	—			—		
	Output Power	W	20			28		
	Speed	Hi	rpm	770			790	
Moisture Removal		L/h (Pt/h)	1.6 (3.4)			1.8 (3.8)		
Indoor Airflow	Indoor Airflow	QLo	m³/min (ft³/min)	5.3 (187)			6.4 (226)	
		Lo	m³/min (ft³/min)	6.1 (215)			7.1 (251)	
		Me	m³/min (ft³/min)	7.9 (279)			8.9 (314)	
		Hi	m³/min (ft³/min)	9.6 (340)			10.5 (370)	
		SHi	m³/min (ft³/min)	11.0 (388)			11.8 (417)	
Outdoor Airflow	Hi	m³/min (ft³/min)	22.0 (775)			33.6 (1190)		

Model		Indoor	CS-S9RKV	CS-S12RKV	
		Outdoor	CU-S9RKV	CU-S12RKV	
Refrigeration Cycle	Control Device		Capillary Tube	Capillary Tube	
	Refrigerant Oil	cm ³	FV50S (250)	FV50S (320)	
	Refrigerant Type	g (oz)	R410A, 820 (28.9)	R410A, 690 (24.4)	
Dimension	Height (I/D / O/D)	mm (inch)	296 (11-21/32)	511 (20-1/8)	296 (11-21/32) 542 (21-11/32)
	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)	236 (9-5/16)	230 (9-1/16)	236 (9-5/16) 289 (11-13/32)
Weight	Net (I/D / O/D)	kg (lb)	9 (20)	21 (46)	9 (20) 27 (60)
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)	5.0 (16.4)		5.0 (16.4)
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)		3 (9.8) ~ 15 (49.2)
	I/D & O/D Height different	m (ft)	5.0 (16.4)		5.0 (16.4)
	Additional Gas Amount	g/m (oz/ft)	15 (0.2)		15 (0.2)
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)
Drain Hose	Inner Diameter	mm	16.7		16.7
	Length	mm	650		650
Indoor Heat Exchanger	Fin Material		Aluminium (Pre coated)		Aluminium (Pre coated)
	Fin Type		Slit Fin		Slit Fin
	Row × Stage × FPI		2 × 15 × 21		2 × 15 × 21
	Size (W × H × L)	mm	610 × 315 × 25.4		610 × 315 × 25.4
Outdoor Heat Exchanger	Fin Material		Aluminium (Blue coated)		Aluminium (Blue coated)
	Fin Type		Slit Fin		Slit Fin
	Row × Stage × FPI		2 × 23 × 17		1 × 24 × 17
	Size (W × H × L)	mm	25.4 × 483.0 × 553.4:573.4		12.7 × 504 × 718.4
Air Filter	Material		Polypropelene		Polypropelene
	Type		One-touch		One-touch
Power Supply		Indoor		Indoor	
Power Supply Cord	A	10		10	
Thermostat		–		–	
Protection Device		–		–	
		DRY BULB	WET BULB	DRY BULB	WET BULB
Indoor Operation Range	Maximum °C	32	23	32	23
	Minimum °C	16	11	16	11
Outdoor Operation Range	Maximum °C	43	26	43	26
	Minimum °C	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°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)

Model	Indoor	CS-S18RKV			CS-S24RKV				
	Outdoor	CU-S18RKV			CU-S24RKV				
Performance Test Condition		JIS			JIS				
Power Supply	Phase, Hz	Single, 60			Single, 60				
	V	220			220				
		Min.	Mid.	Max.	Min.	Mid.	Max.		
Cooling	Capacity	kW	1.10	5.20	6.00	1.12	6.00	7.10	
		BTU/h	3750	17700	20500	3820	20500	24200	
		kJ/h	3960	18720	21600	4030	21600	25560	
	Running Current	A	—	6.4	—	—	7.7	—	
	Input Power	W	290	1.38k	1.68k	320	1.65k	2.00k	
	EER	W/W	3.79	3.77	3.57	3.50	3.64	3.55	
		BTU/hW	12.93	12.83	12.20	11.94	12.42	12.10	
		kJ/hW	13.66	13.57	12.86	12.59	13.09	12.78	
	Power Factor	%	—	98	—	—	97	—	
	Indoor Noise (H / L / QLo)	dB-A	45 / 36 / 33			46 / 37 / 34			
Outdoor Noise (H / L)		dB-A	49 / — / —			49 / — / —			
Max Current (A) / Max Input Power (W)			9.7 / 2.05k			11.5 / 2.45k			
Starting Current (A)			6.4			7.7			
Compressor	Type		Hermetic Motor (Rotary)			Hermetic Motor (Rotary)			
	Motor Type		Brushless (6 poles)			Brushless (6 poles)			
	Output Power	W	900			900			
Indoor Fan	Type		Cross-Flow Fan			Cross-Flow Fan			
	Material		ASG30K1			ASG30K1			
	Motor Type		DC / Transistor (8-poles)			DC / Transistor (8-poles)			
	Input Power	W	94.8			94.8			
	Output Power	W	40			40			
	Speed	QLo	rpm	850			910		
		Lo	rpm	930			1000		
		Me	rpm	1110			1220		
		Hi	rpm	1300			1440		
		SHi	rpm	1420			1560		
Outdoor Fan	Type		Propeller Fan			Propeller Fan			
	Material		PP Resin			PP Resin			
	Motor Type		AC / Induction (6-poles)			AC / Induction (6-poles)			
	Input Power	W	—			—			
	Output Power	W	66			66			
	Speed	Hi	rpm	730			730		
Moisture Removal		L/h (Pt/h)	2.9 (6.1)			3.3 (7.0)			
Indoor Airflow	Indoor Airflow	QLo	m³/min (ft³/min)	11.2 (395)			10.5 (371)		
		Lo	m³/min (ft³/min)	12.4 (438)			11.9 (420)		
		Me	m³/min (ft³/min)	15.4 (544)			15.2 (537)		
		Hi	m³/min (ft³/min)	18.1 (640)			18.5 (655)		
		SHi	m³/min (ft³/min)	20.0 (706)			20.3 (717)		
Outdoor Airflow	Hi	m³/min (ft³/min)	39.1 (1380)			39.1 (1380)			
Refrigeration Cycle	Control Device		Capillary Tube			Capillary Tube			
	Refrigerant Oil	cm³	FV50S (450)			FV50S (450)			
	Refrigerant Type	g (oz)	R410A, 1.18k (41.7)			R410A, 1.42k (50.1)			

Model		Indoor	CS-S18RKV		CS-S24RKV	
		Outdoor	CU-S18RKV		CU-S24RKV	
Dimension	Height (I/D / O/D)	mm (inch)	296 (11-21/32)	695 (27-3/8)	296 (11-21/32)	695 (27-3/8)
	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)	241 (9-1/2)	320 (12-5/8)	241 (9-1/2)	320 (12-5/8)
Weight	Net (I/D / O/D)	kg (lb)	12 (26)	44 (97)	12 (26)	46 (101)
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) ~ 20 (65.6)		3 (9.8) ~ 20 (65.6)	
	I/D & O/D Height different	m (ft)	15 (49.2)		15 (49.2)	
	Additional Gas Amount	g/m (oz/ft)	15 (0.2)		20 (0.2)	
	Length for Additional Gas	m (ft)	10 (32.8)		10 (32.8)	
Drain Hose	Inner Diameter	mm	16.7		16.7	
	Length	mm	650		650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coated)		Aluminium (Pre Coated)	
	Fin Type		Slit Fin		Slit Fin	
	Row × Stage × FPI		2 × 15 × 17		2 × 15 × 21	
	Size (W × H × L)	mm	810 × 315 × 25.4		810 × 315 × 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium (Blue Coated)		Aluminium (Blue Coated)	
	Fin Type		Slit Fin		Slit Fin	
	Row × Stage × FPI		2 × 31 × 17		2 × 31 × 17	
	Size (W × H × L)	mm	25.4 × 651.0 × 861.6:841.6		25.4 × 651.0 × 861.6:841.6	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Indoor	
Power Supply Cord	A		15		20	
Thermostat			–		–	
Protection Device			–		–	
			Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
Indoor Operation Range	Maximum °C	32	23		32	23
	Minimum °C	16	11		16	11
Outdoor Operation Range	Maximum °C	43	26		43	26
	Minimum °C	16	11		16	11

1. Cooling capacities are based on indoor temperature of 27°C DRY BULB (80.6°F DRY BULB), 19.0°C WET BULB (66°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)

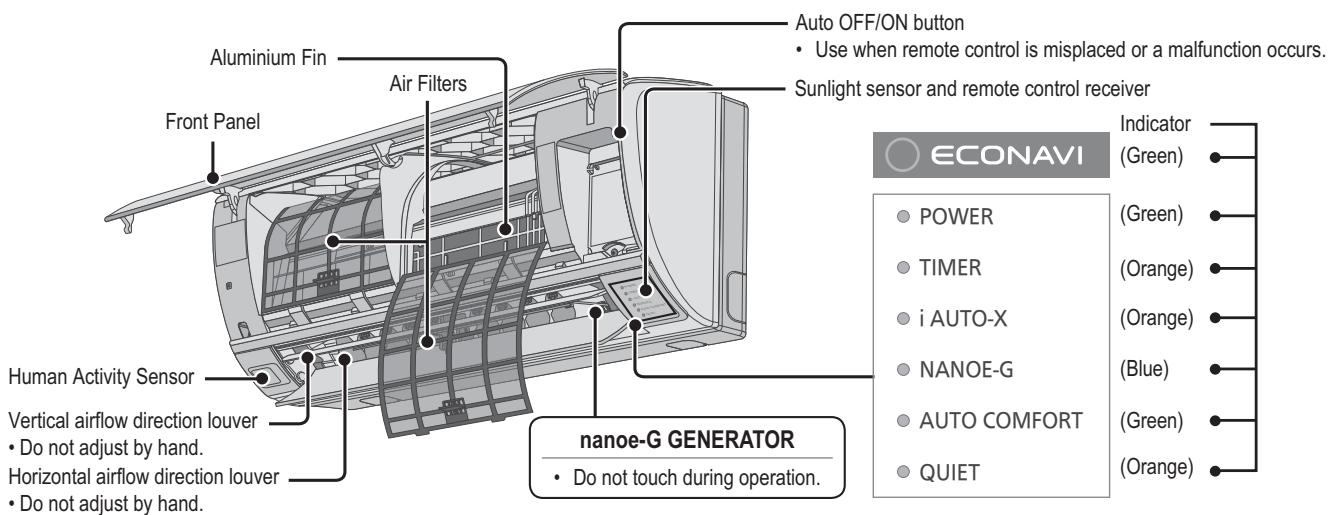
Model	Indoor	CS-S28RKV		
	Outdoor	CU-S28RKV		
Performance Test Condition		JIS		
Power Supply	Phase, Hz	Single, 60		
	V	220		
		Min.	Mid.	Max.
Cooling	Capacity	kW	1.15	7.80
		BTU/h	3920	26600
		kJ/h	4140	28080
	Running Current	A	—	12.6
	Input Power	W	350	2.70k
	EER	W/°W	3.29	2.89
		BTU/h/W	11.20	9.85
		kJ/h/W	11.83	10.40
	Power Factor	%	—	97
	Indoor Noise (H / L / QLo)	dB-A	49 / 38 / 35	
Outdoor Noise (H / L)		dB-A	53 / — / —	
Max Current (A) / Max Input Power (W)			14.6 / 3.26k	
Starting Current (A)			12.6	
Compressor	Type		Hermetic Motor (Rotary)	
	Motor Type		Brushless (4 poles)	
	Output Power	W	1.70k	
Indoor Fan	Type		Cross-Flow Fan	
	Material		ASG30K1	
	Motor Type		DC (8-poles)	
	Input Power	W	94.8	
	Output Power	W	40	
	Speed	QLo	rpm	910
		Lo	rpm	1000
		Me	rpm	1270
		Hi	rpm	1540
		SHi	rpm	1600
Outdoor Fan	Type		Propeller Fan	
	Material		PP Resin	
	Motor Type		AC / Induction (6-poles)	
	Input Power	W	—	
	Output Power	W	62	
	Speed	Hi	rpm	650
Moisture Removal		L/h (Pt/h)	4.6 (9.7)	
Indoor Airflow	QLo	m³/min (ft³/min)	11.5 (406)	
	Lo	m³/min (ft³/min)	12.8 (452)	
	Me	m³/min (ft³/min)	16.6 (586)	
	Hi	m³/min (ft³/min)	20.4 (720)	
	SHi	m³/min (ft³/min)	21.2 (749)	
Outdoor Airflow	Hi	m³/min (ft³/min)	51.8 (1830)	
Refrigeration Cycle	Control Device		Expansion Valve	
	Refrigerant Oil	cm³	FV50S (800)	
	Refrigerant Type	g (oz)	R410A, 1.65k (58.2)	

Model		Indoor	CS-S28RKV	
		Outdoor	CU-S28RKV	
Dimension	Height (I/D / O/D)	mm (inch)	296 (11-21/32)	795 (31-5/16)
	Width (I/D / O/D)	mm (inch)	1070 (42-5/32)	875 (34-15/32)
	Depth (I/D / O/D)	mm (inch)	241 (9-1/2)	320 (12-5/8)
Weight	Net (I/D / O/D)	kg (lb)	12 (26)	57 (126)
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)	10 (32.8)	
Drain Hose	Inner Diameter	mm	16.7	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coated)	
	Fin Type		Slit Fin	
	Row × Stage × FPI		2 × 15 × 21	
	Size (W × H × L)	mm	810 × 315 × 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium (Blue Coated)	
	Fin Type		Slit Fin	
	Row × Stage × FPI		2 × 36 × 17	
	Size (W × H × L)	mm	25.4 × 756 × 905.9:885.9	
Air Filter	Material		Polypropelene	
	Type		One-touch	
Power Supply			Outdoor	
Power Supply Cord	A		–	
Thermostat			–	
Protection Device			–	
			Dry Bulb	Wet Bulb
Indoor Operation Range	Maximum °C	32	23	
	Minimum °C	16	11	
Outdoor Operation Range	Maximum °C	43	26	
	Minimum °C	16	11	

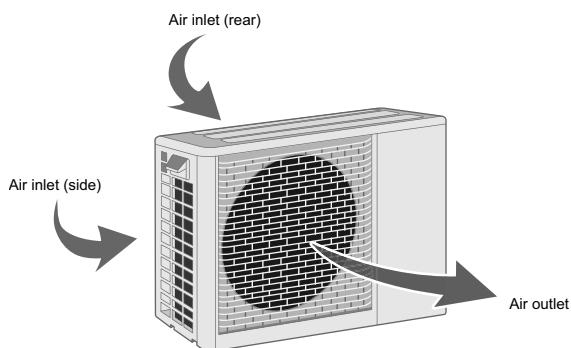
1. Cooling capacities are based on indoor temperature of 27°C DRY BULB (80.6°F DRY BULB), 19.0°C WET BULB (66°F WET BULB) and outdoor air temperature of 35°C DRY BULB (95°F DRY BULB), 24°C WET BULB (75.2°F WET BULB)

3. Location of Controls and Components

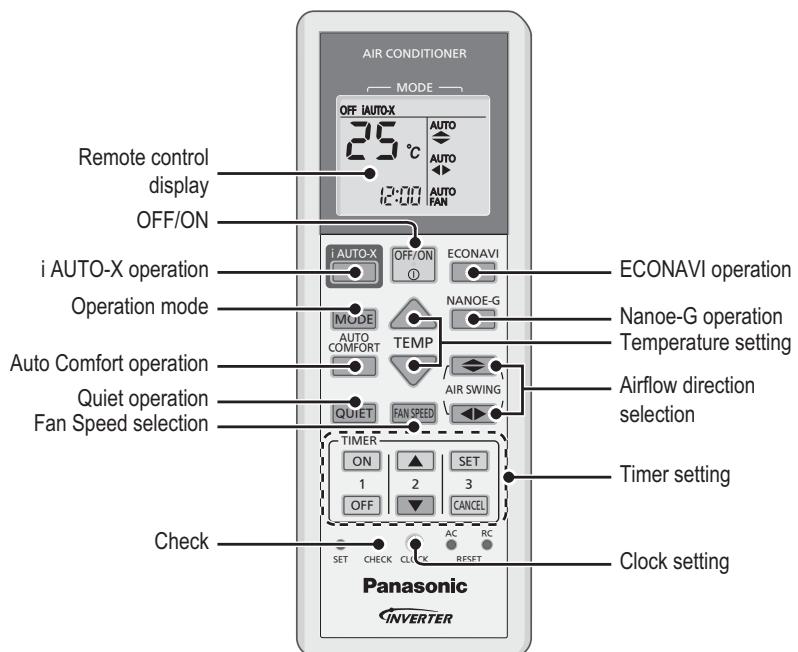
3.1 Indoor Unit



3.2 Outdoor Unit



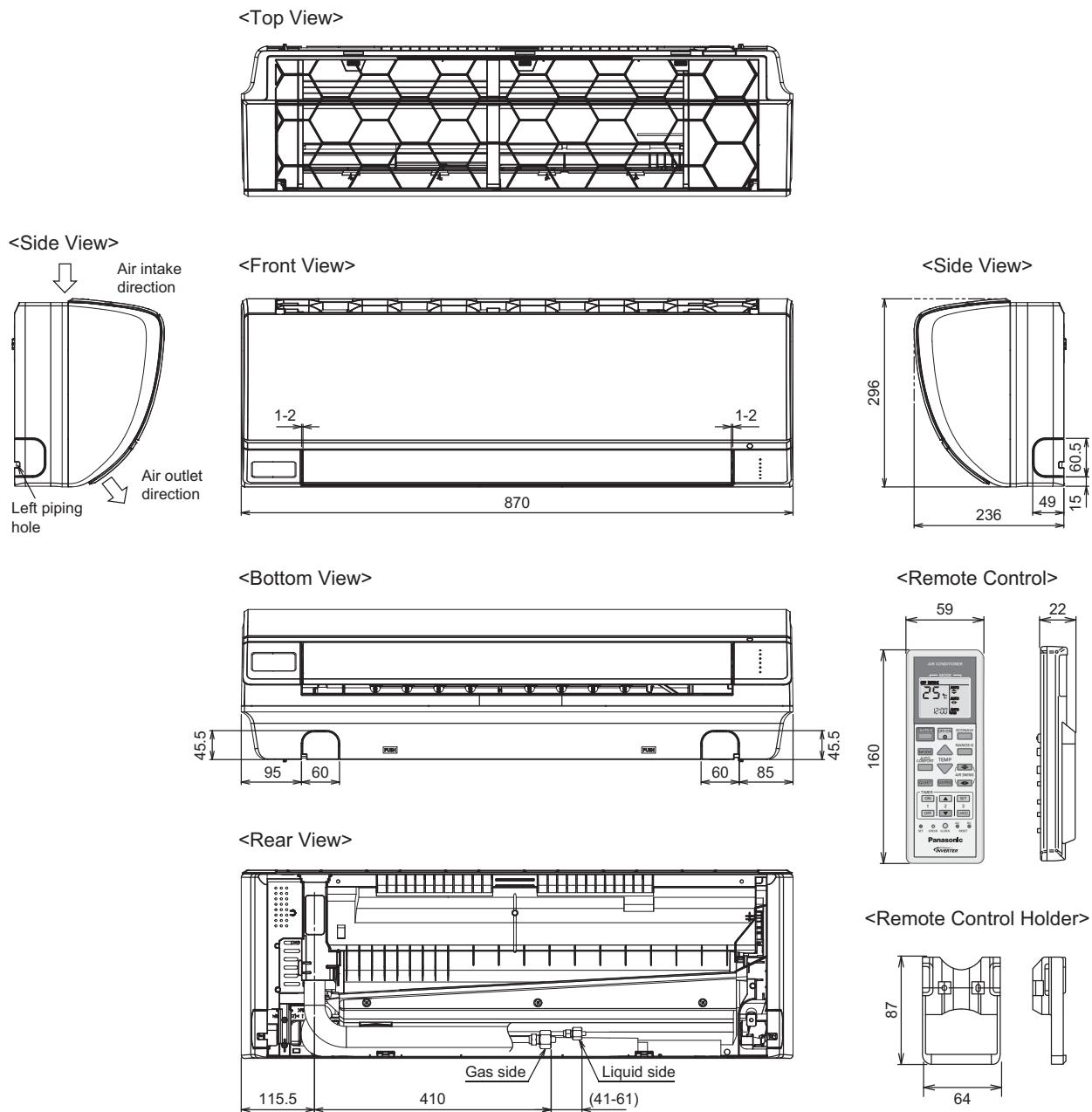
3.3 Remote Control



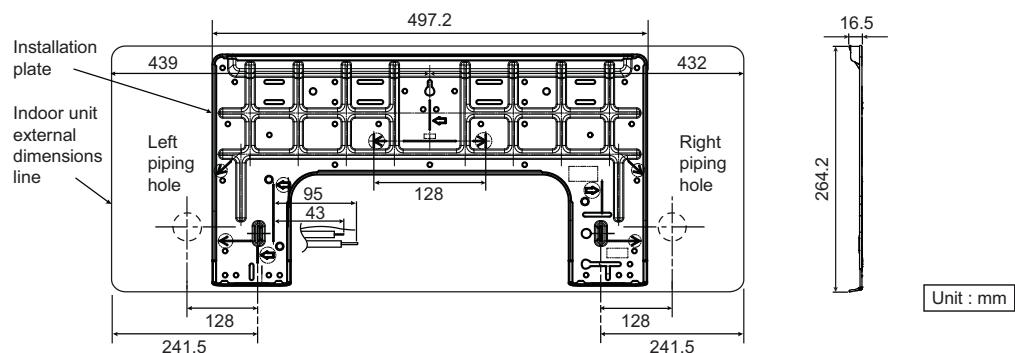
4. Dimensions

4.1 Indoor Unit

4.1.1 CS-S9RKV CS-S12RKV

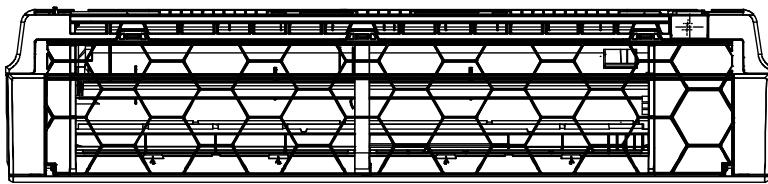


Relative position between the indoor unit and the installation plate <Front View>

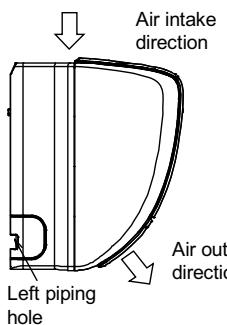


4.1.2 CS-S18RKV CS-S24RKV CS-S28RKV

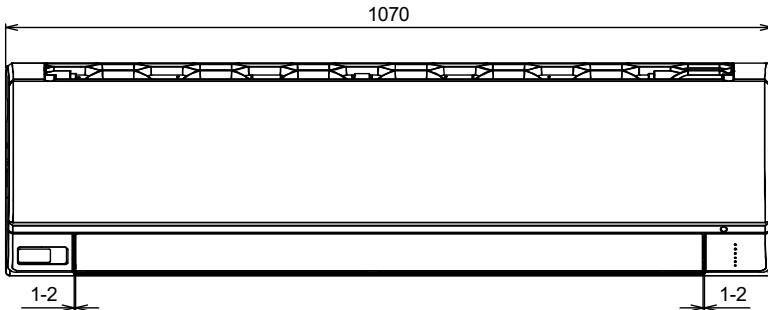
<Top View>



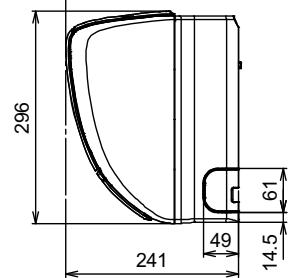
<Side View>



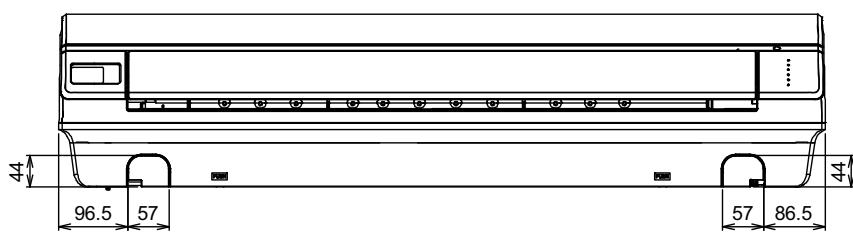
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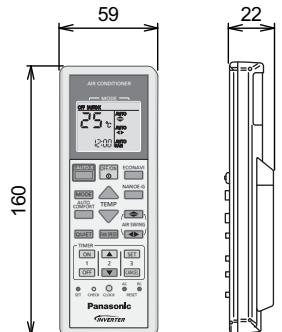
<Side View>



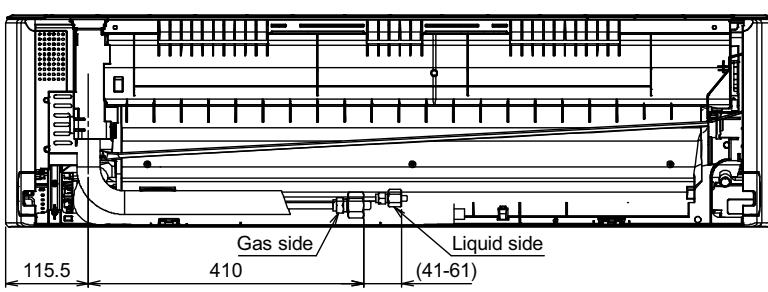
<Bottom View>



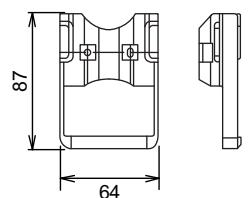
<Remote Control>



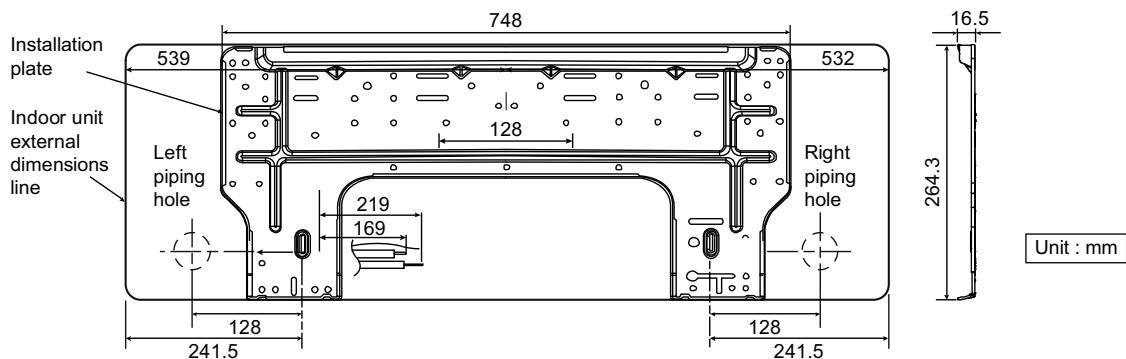
<Rear View>



<Remote Control Holder>

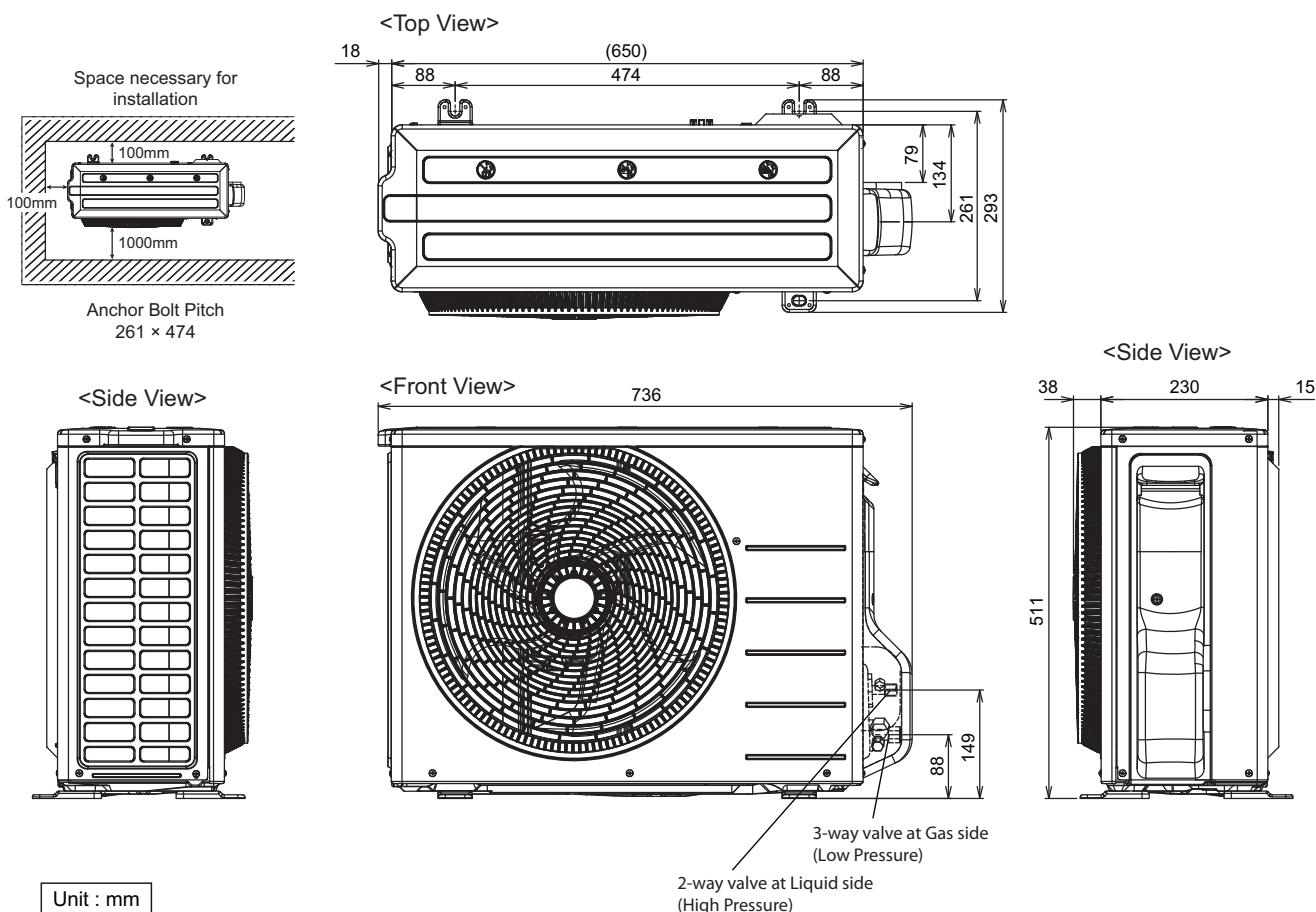


Relative position between the indoor unit and the installation plate <Front View>

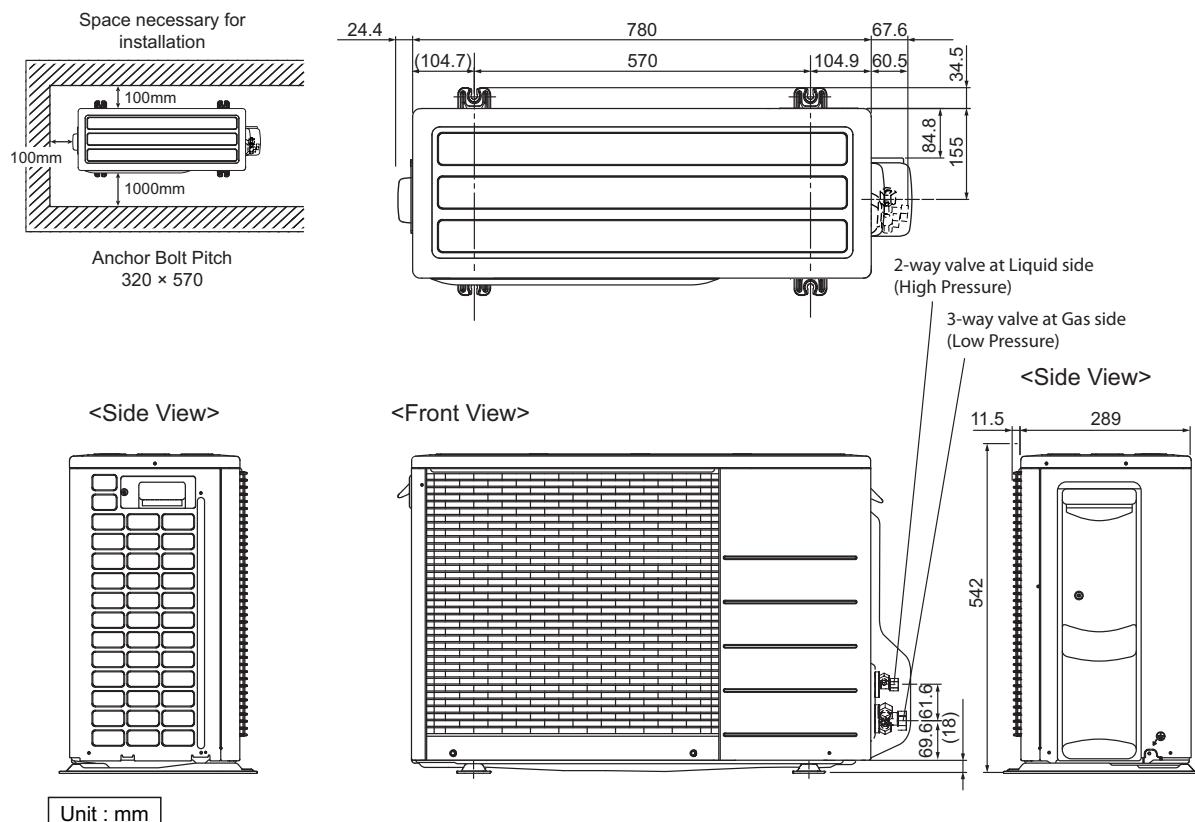


4.2 Outdoor Unit

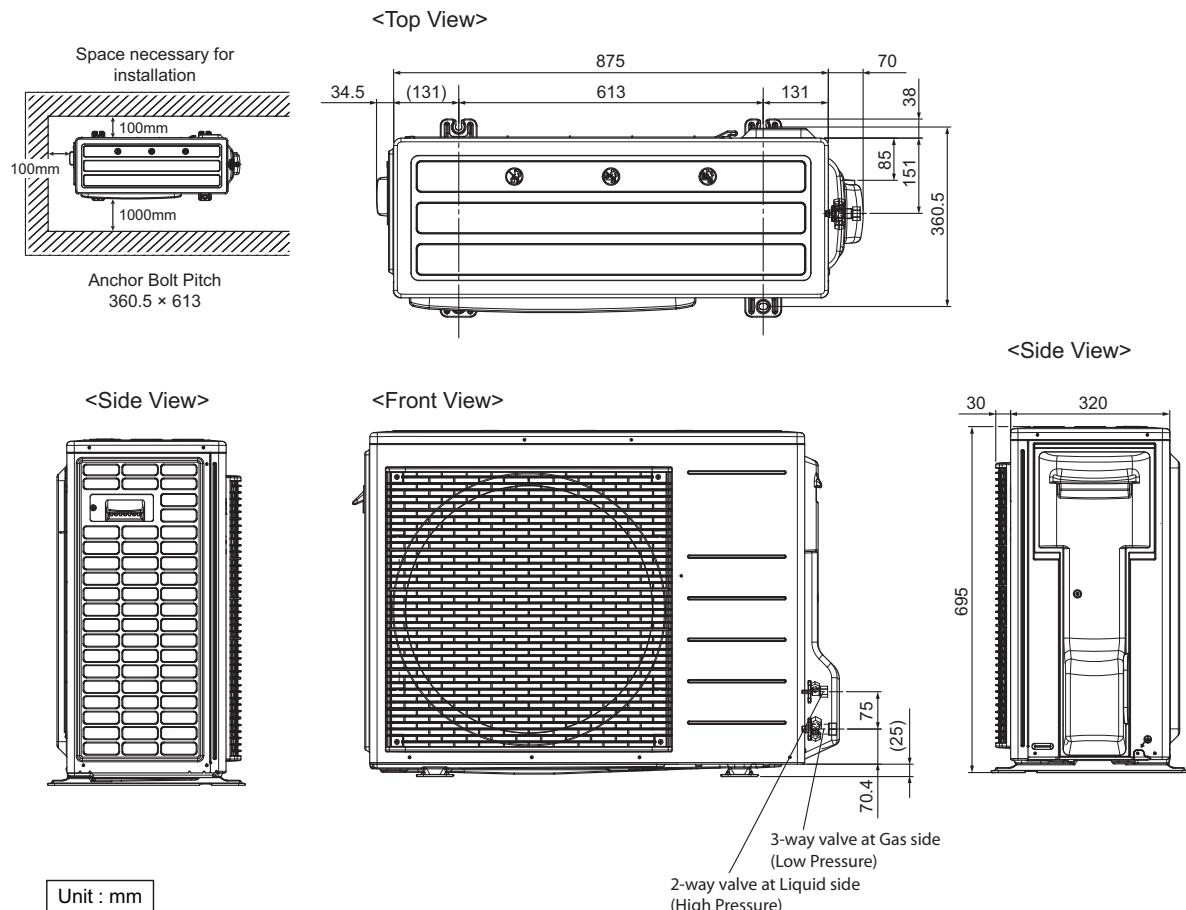
4.2.1 CU-S9RKV



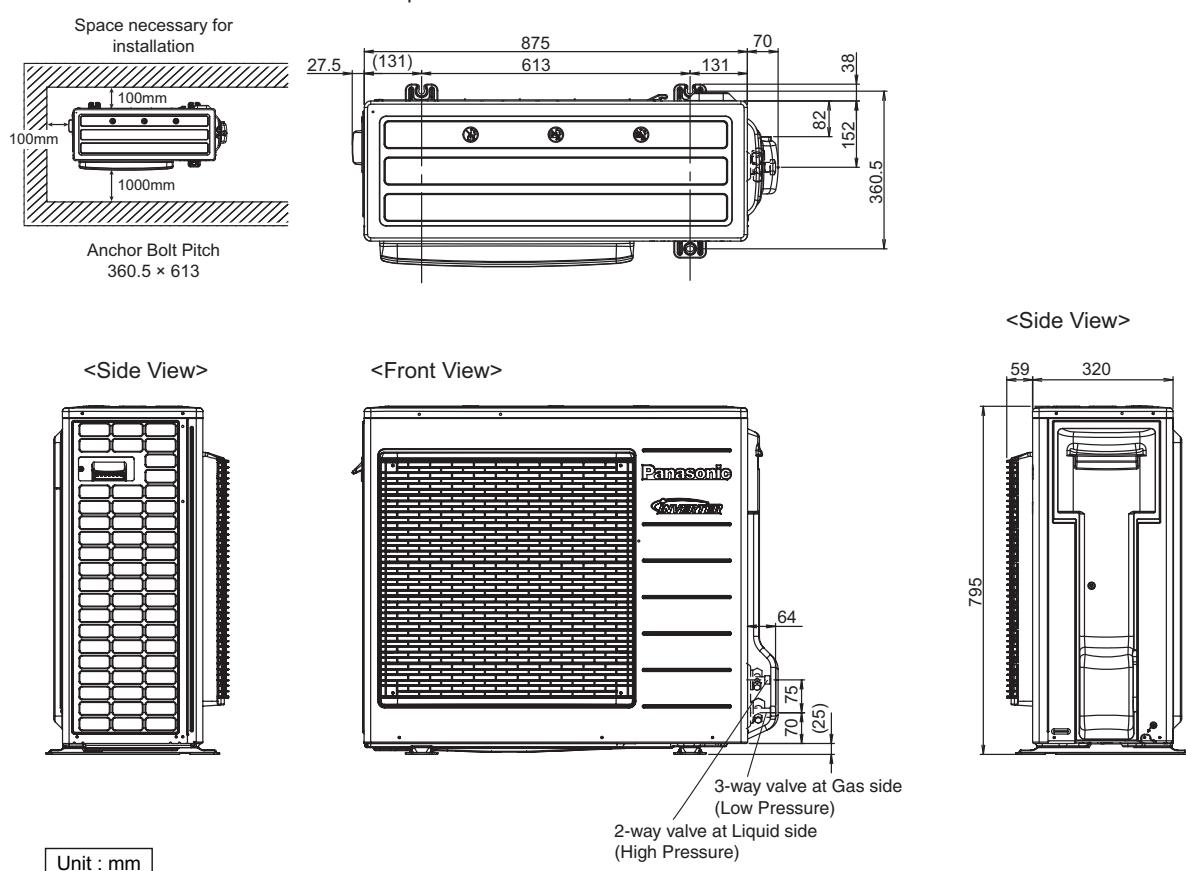
4.2.2 CU-S12RKV



4.2.3 CU-S18RKV CU-S24RKV

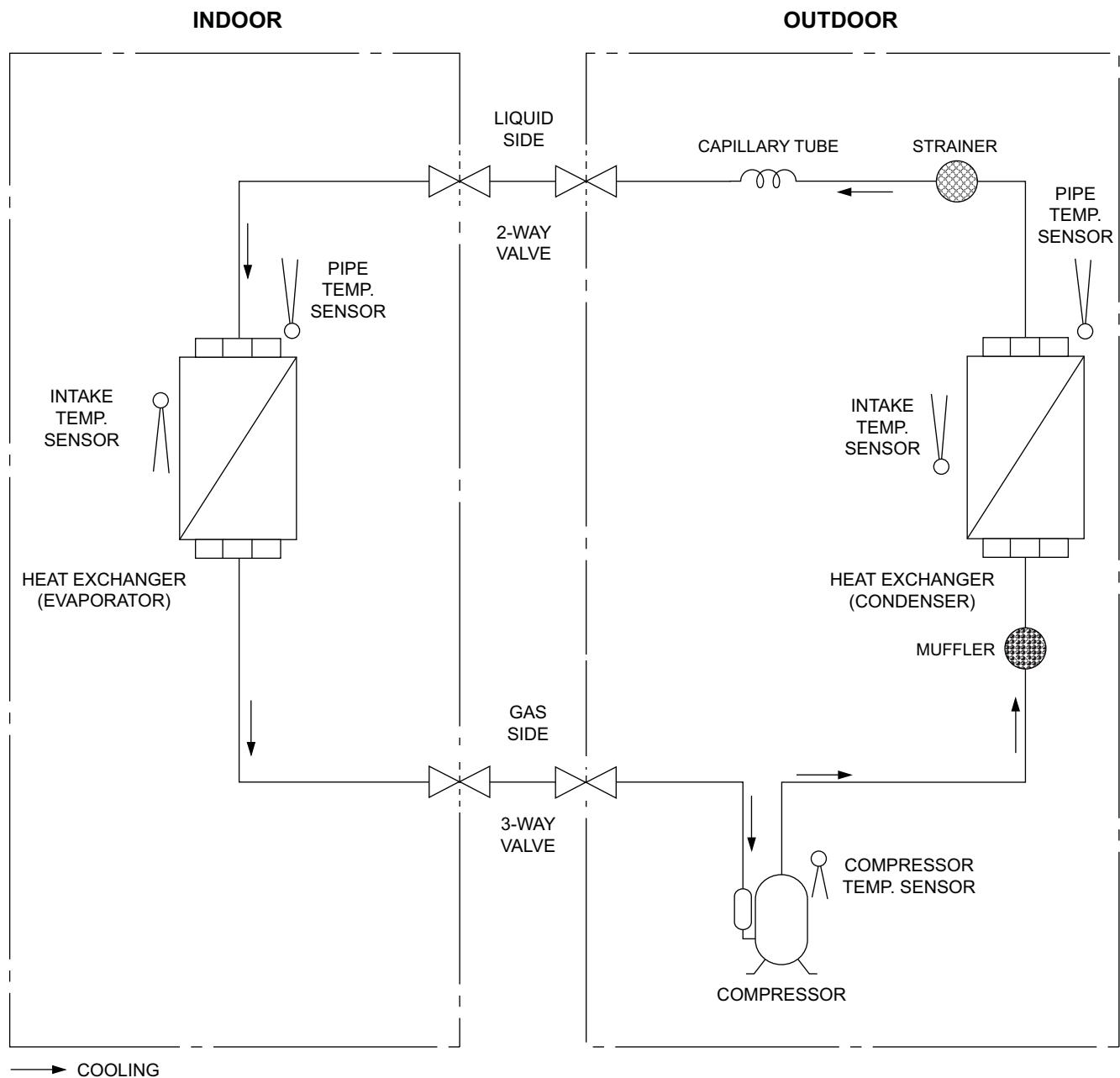


4.2.4 CU-S28RKV

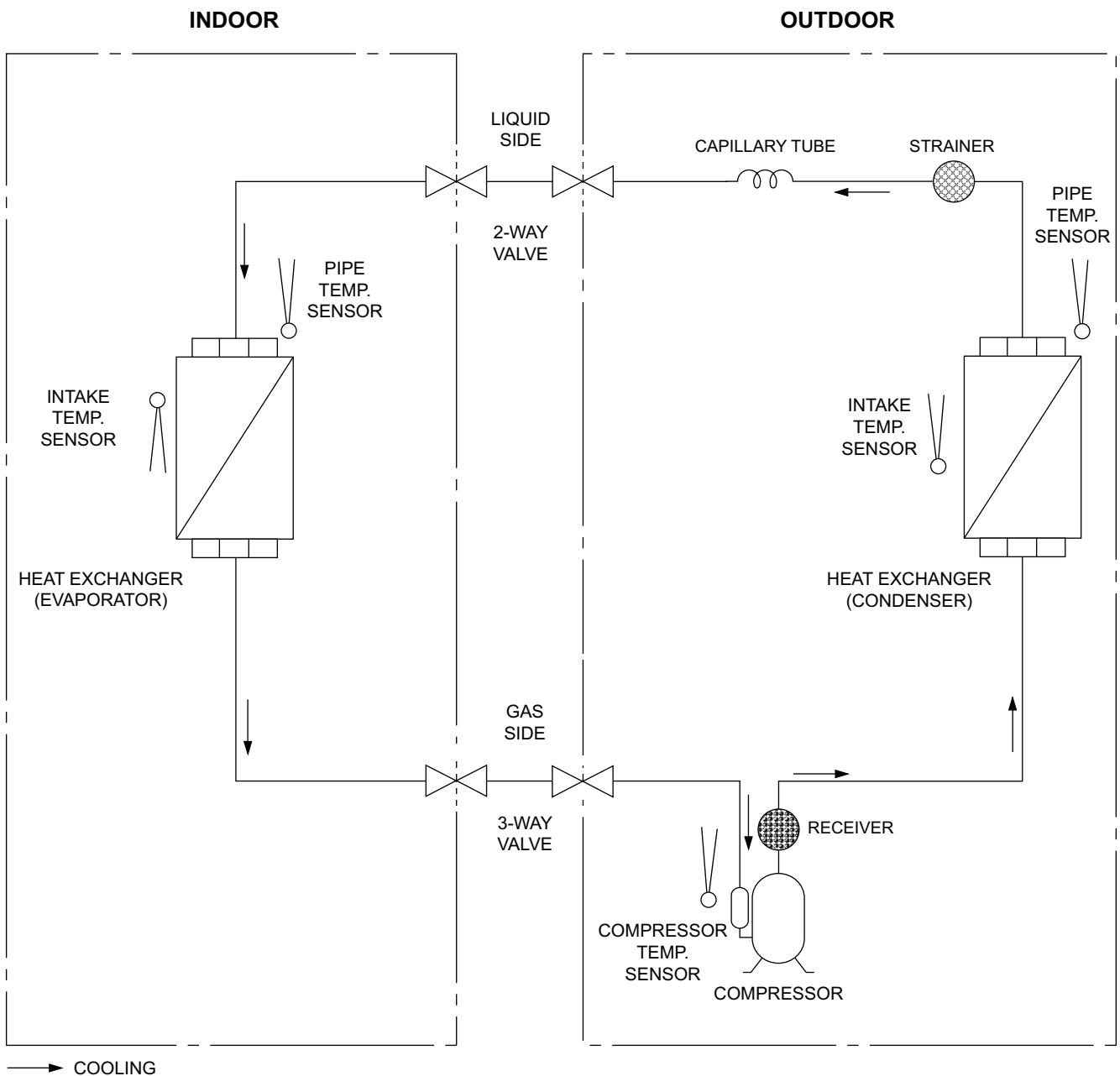


5. Refrigeration Cycle Diagram

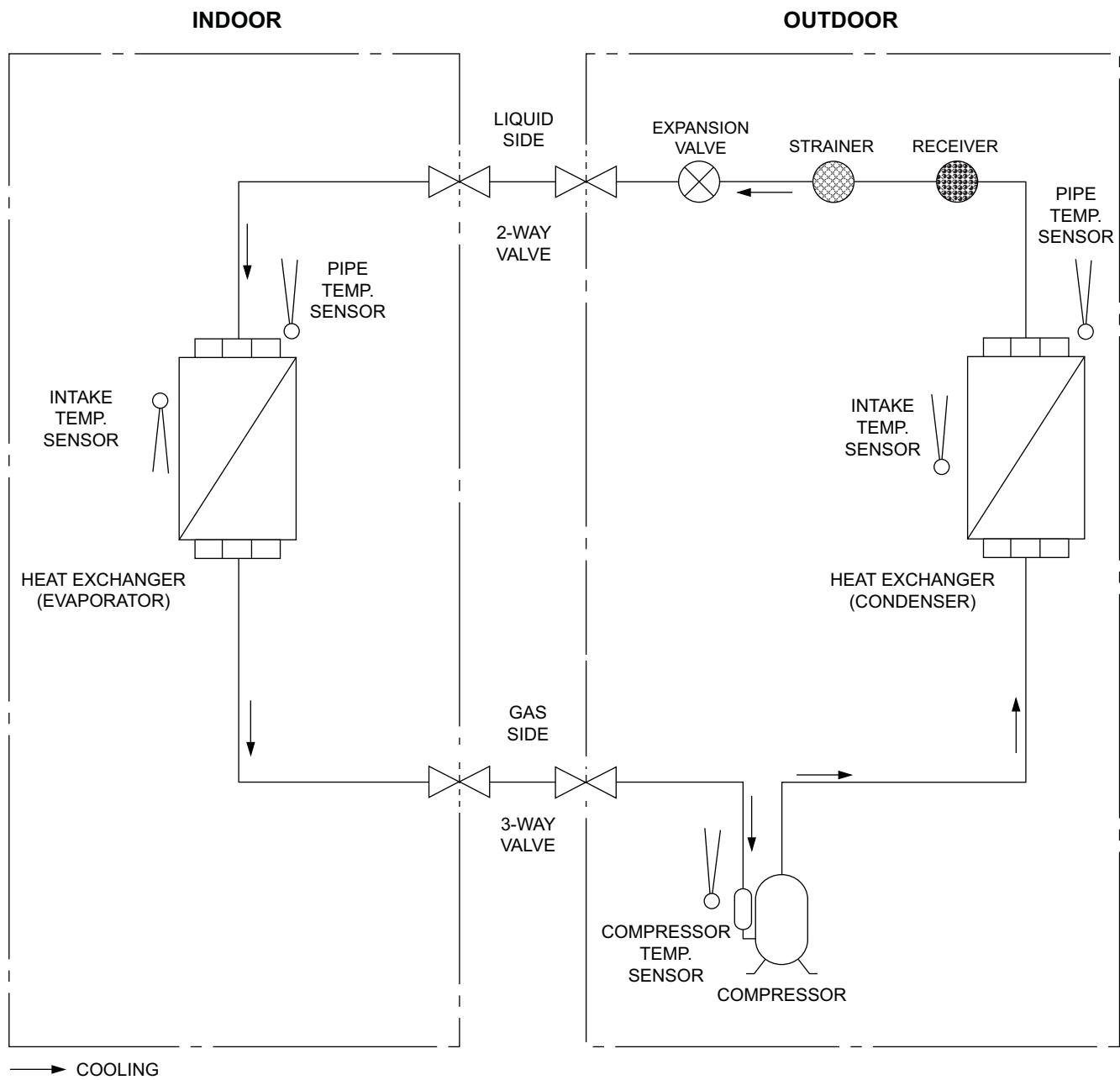
5.1 CS-S9RKV CU-S9RKV CS-S12RKV CU-S12RKV



5.2 CS-S18RKV CU-S18RKV CS-S24RKV CU-S24RKV

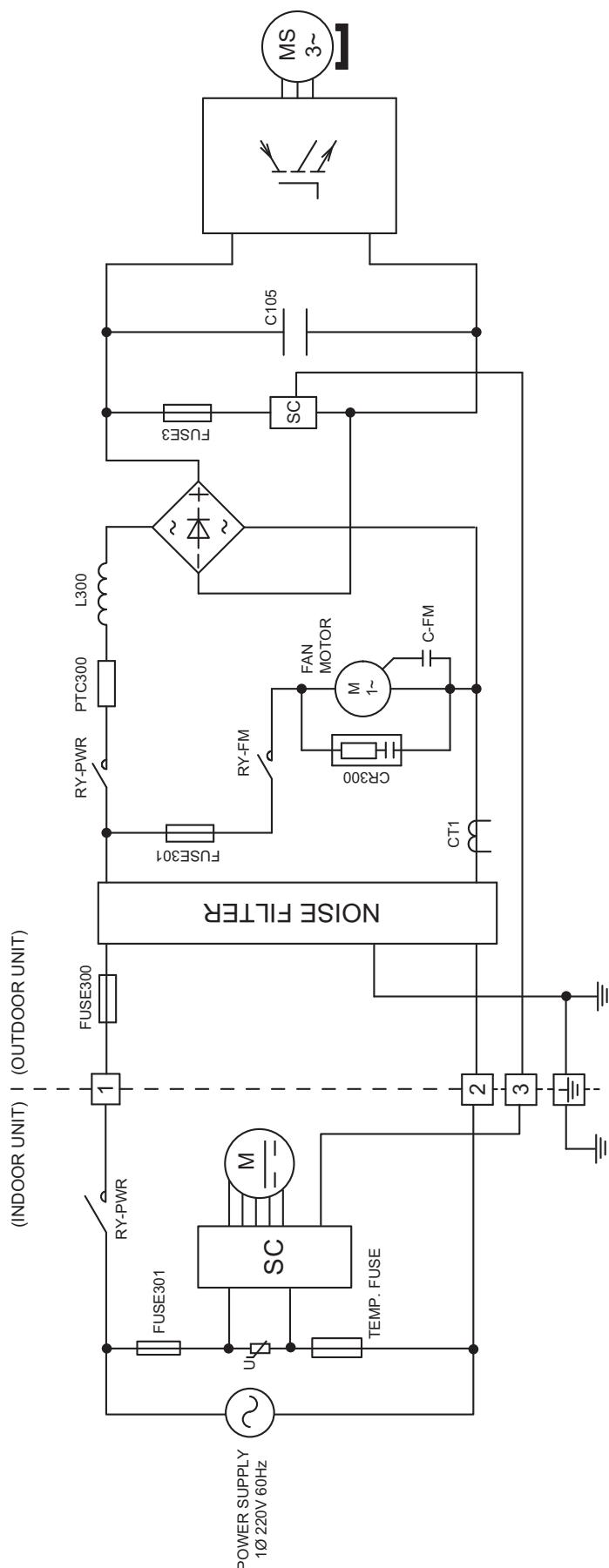


5.3 CS-S28RKV CU-S28RKV

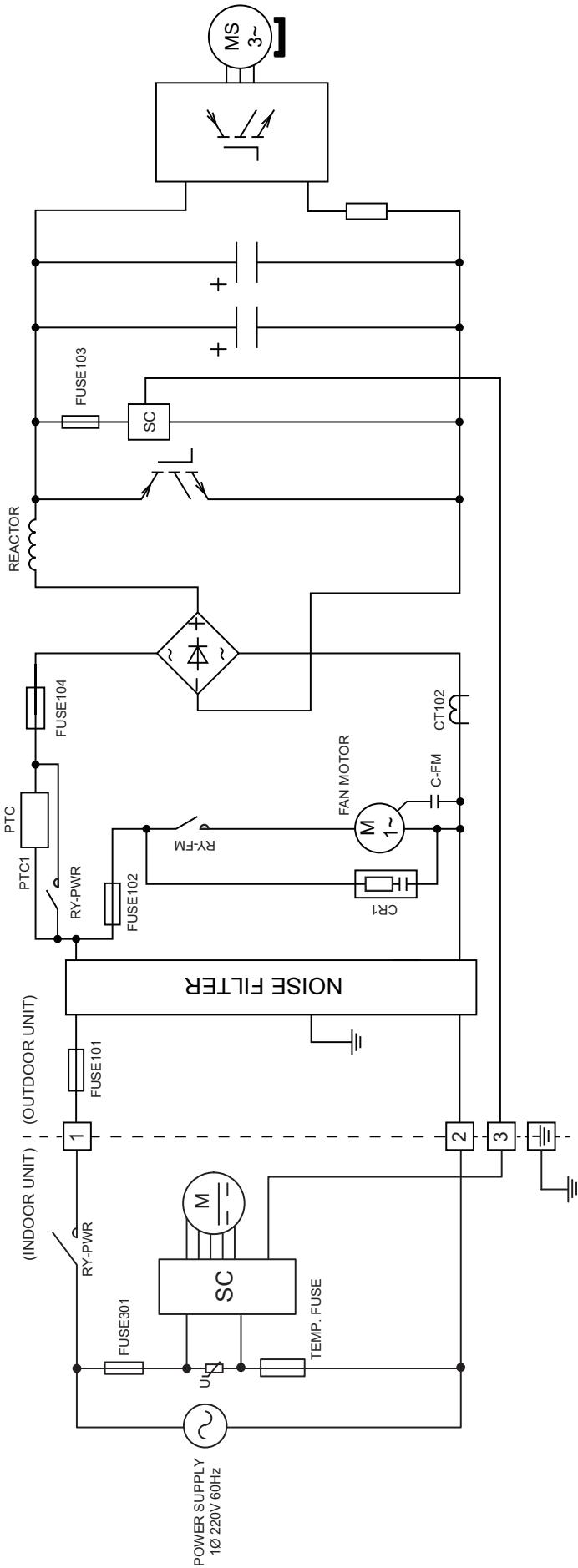


6. Block Diagram

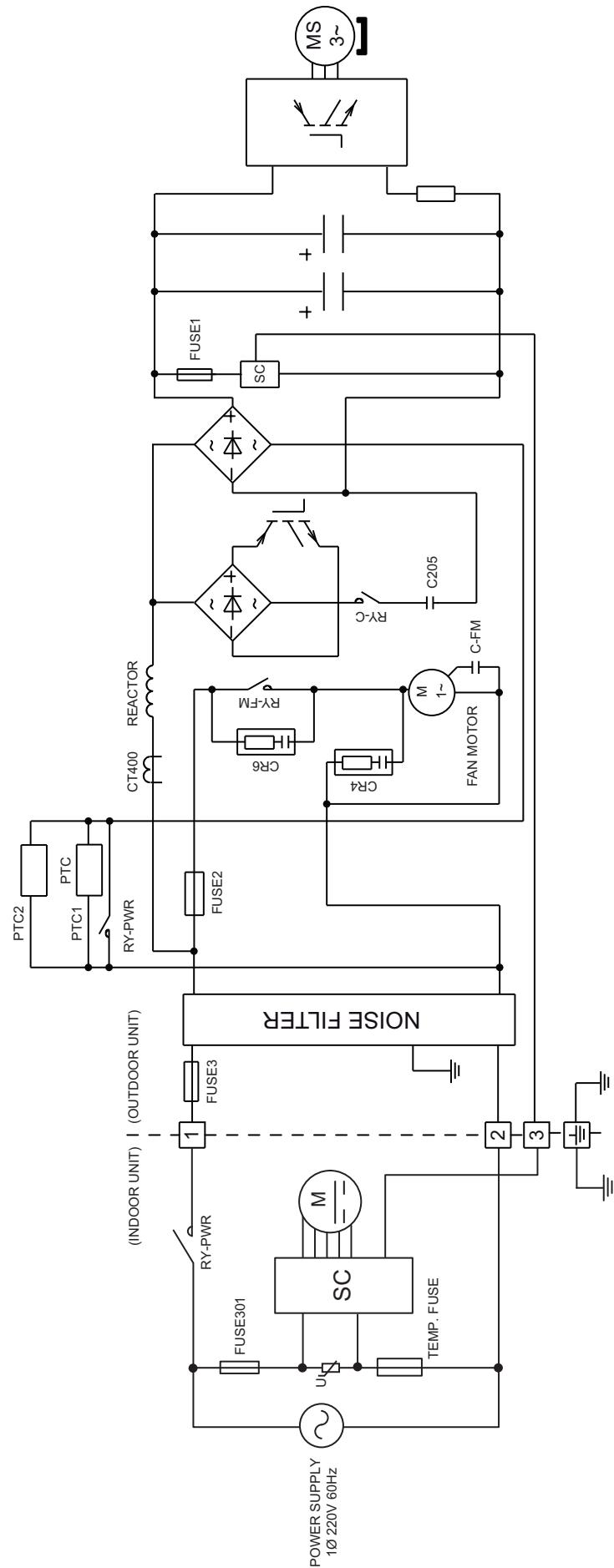
6.1 CS-S9RKV CU-S9RKV



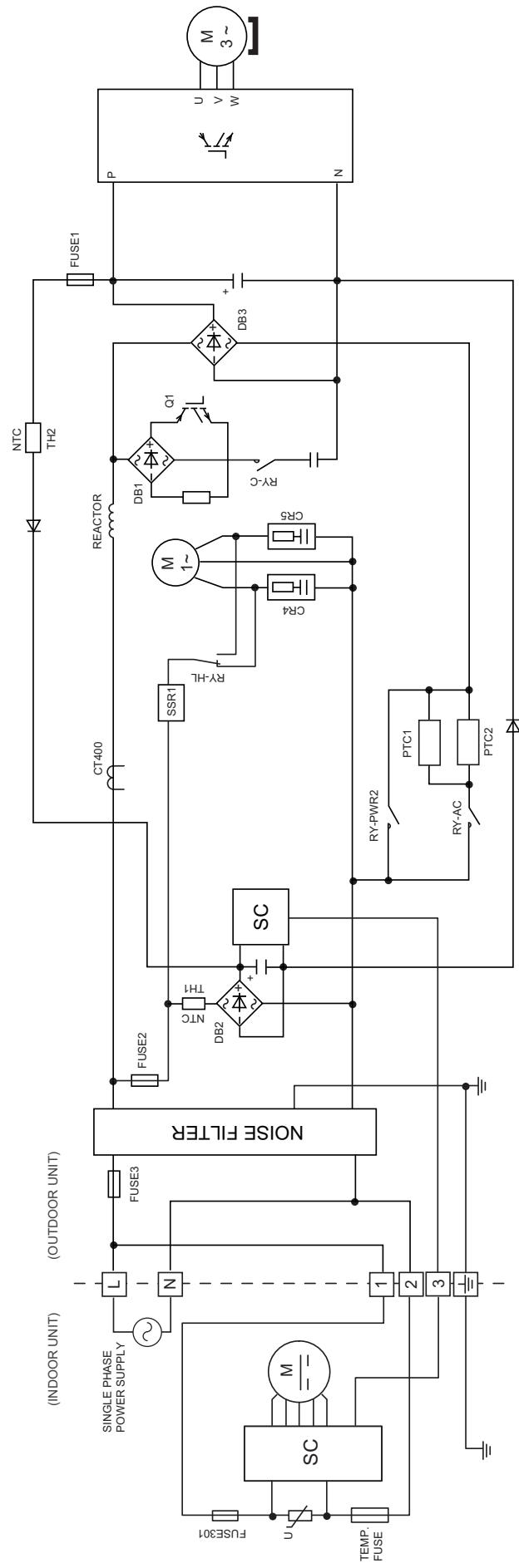
6.2 CS-S12RKV CU-S12RKV



6.3 CS-S18RKV CU-S18RKV CS-S24RKV CU-S24RKV



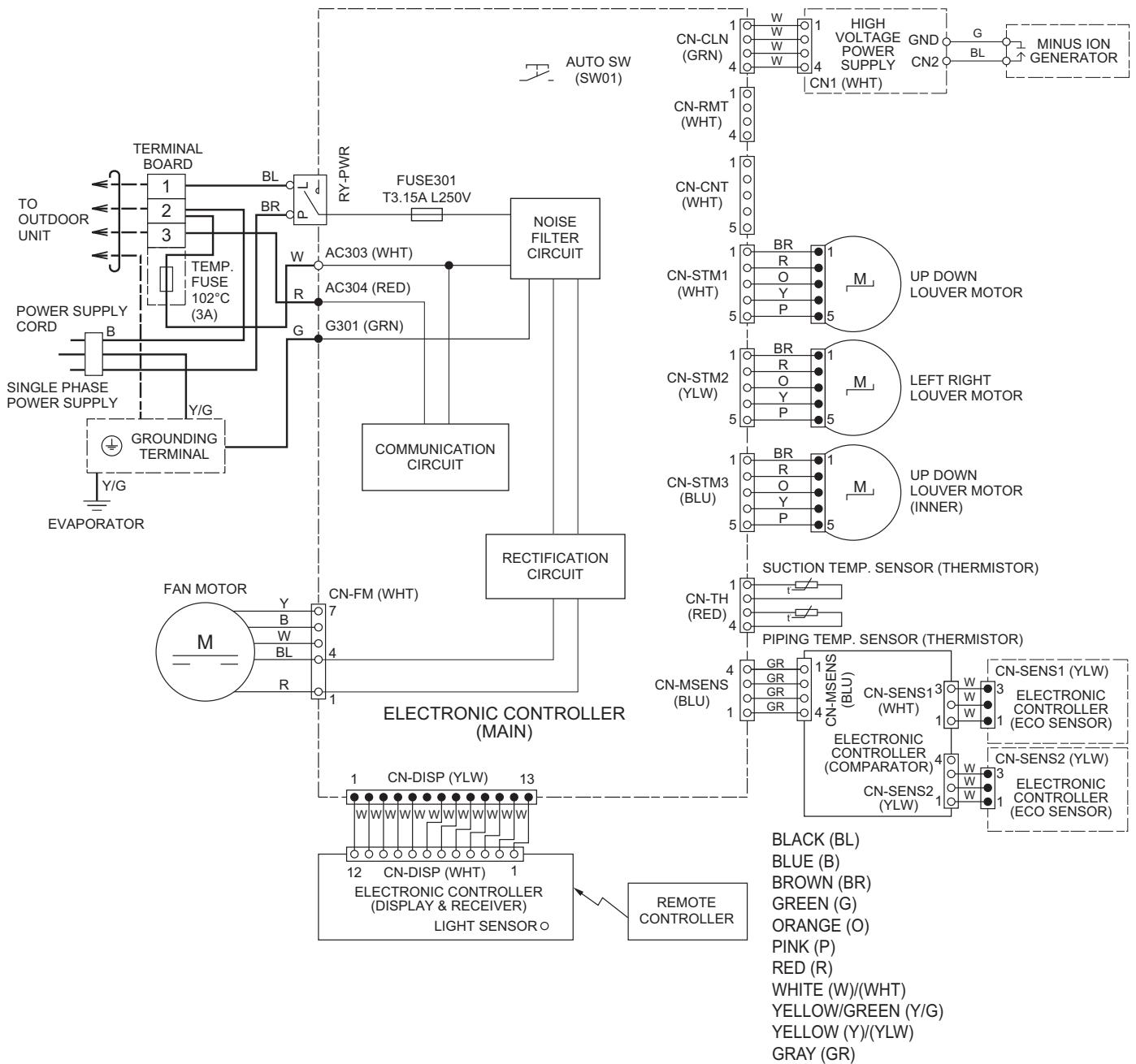
6.4 CS-S28RKV CU-S28RKV



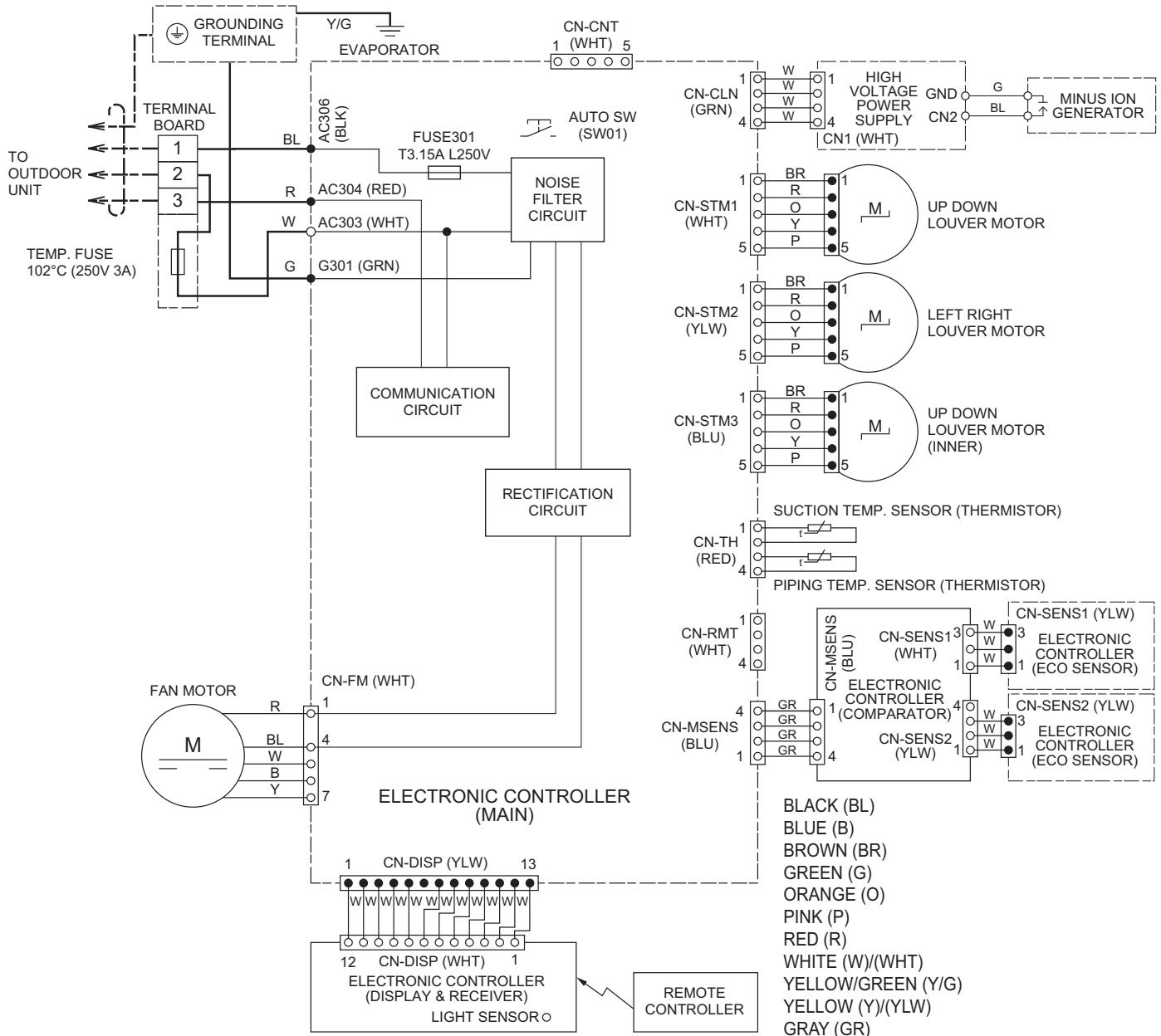
7. Wiring Connection Diagram

7.1 Indoor Unit

7.1.1 CS-S9RKV CS-S12RKV CS-S18RKV CS-S24RKV

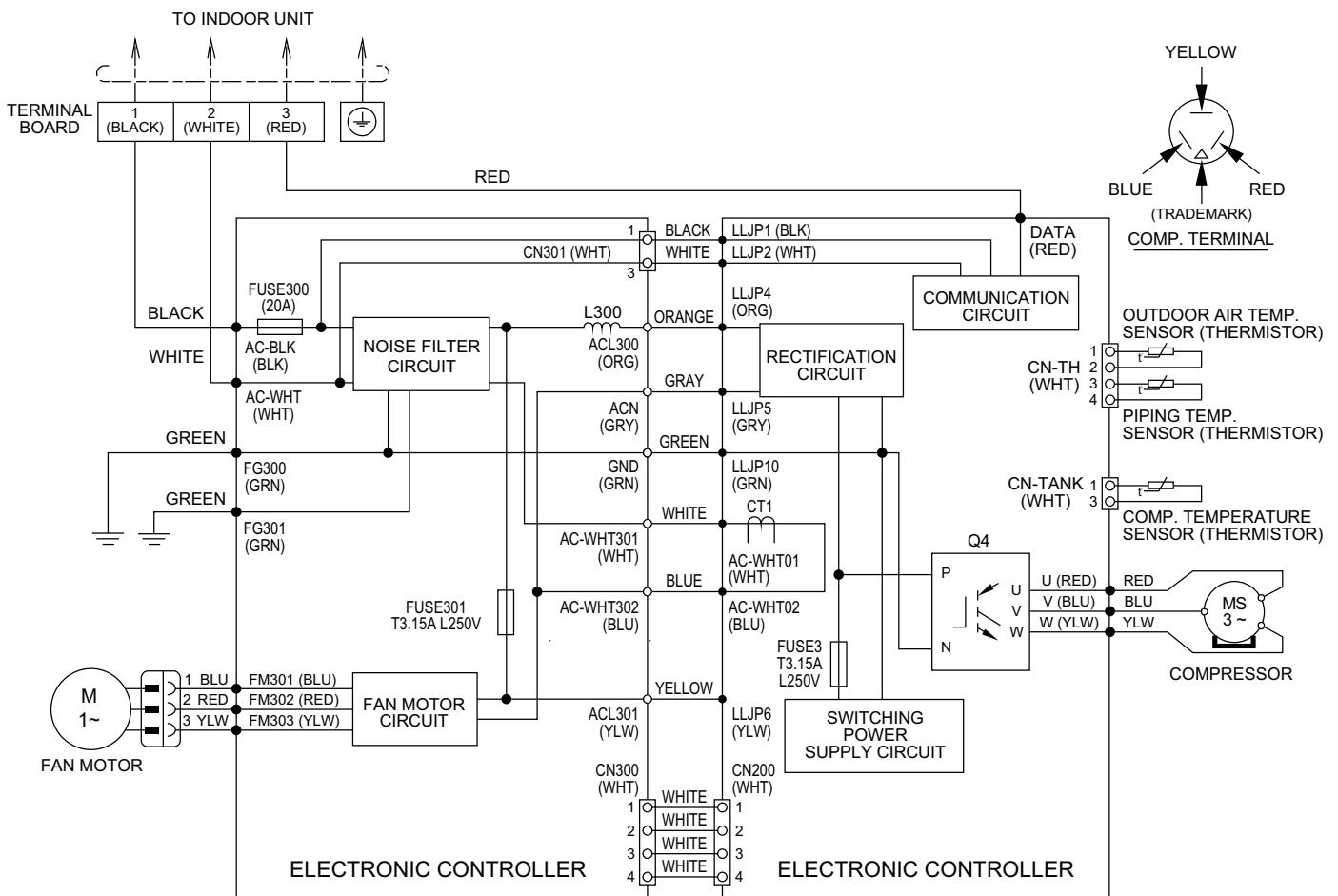


7.1.2 CS-S28RKV



7.2 Outdoor Unit

7.2.1 CU-S9RKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-S9RKV
CONNECTION	CWA951734
BLUE-YELLOW	338 Ω
BLUE-RED	180 Ω

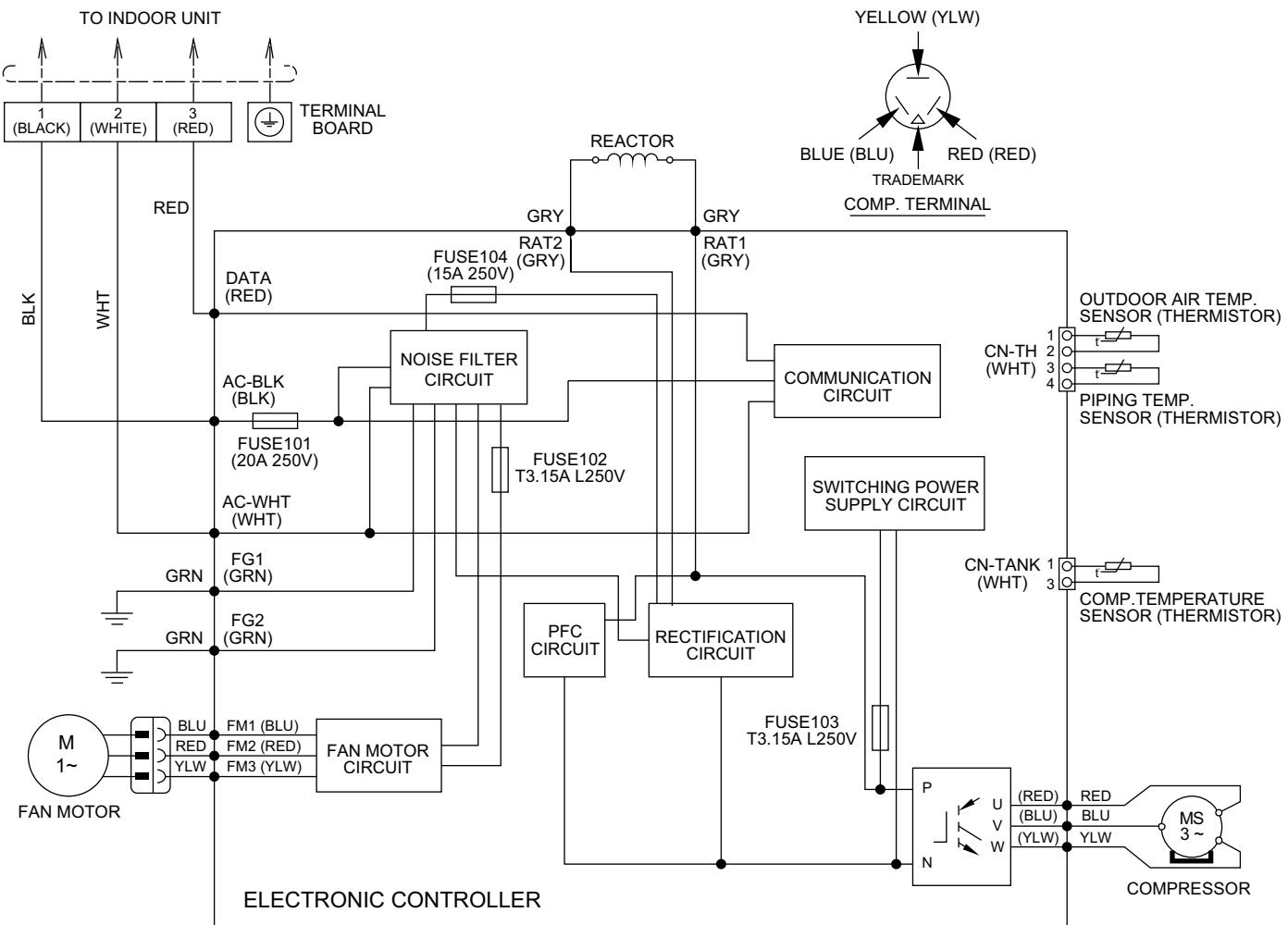
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-S9RKV
CONNECTION	5SS072XGA21
U-V	3.034 Ω
U-W	3.021 Ω
V-W	3.009 Ω

Note: Resistance at 20°C of ambient temperature.

7.2.2 CU-S12RKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-S12RKV
CONNECTION	CWA951466
BLUE-YELLOW	262.7 Ω
BLUE-RED	271.0 Ω

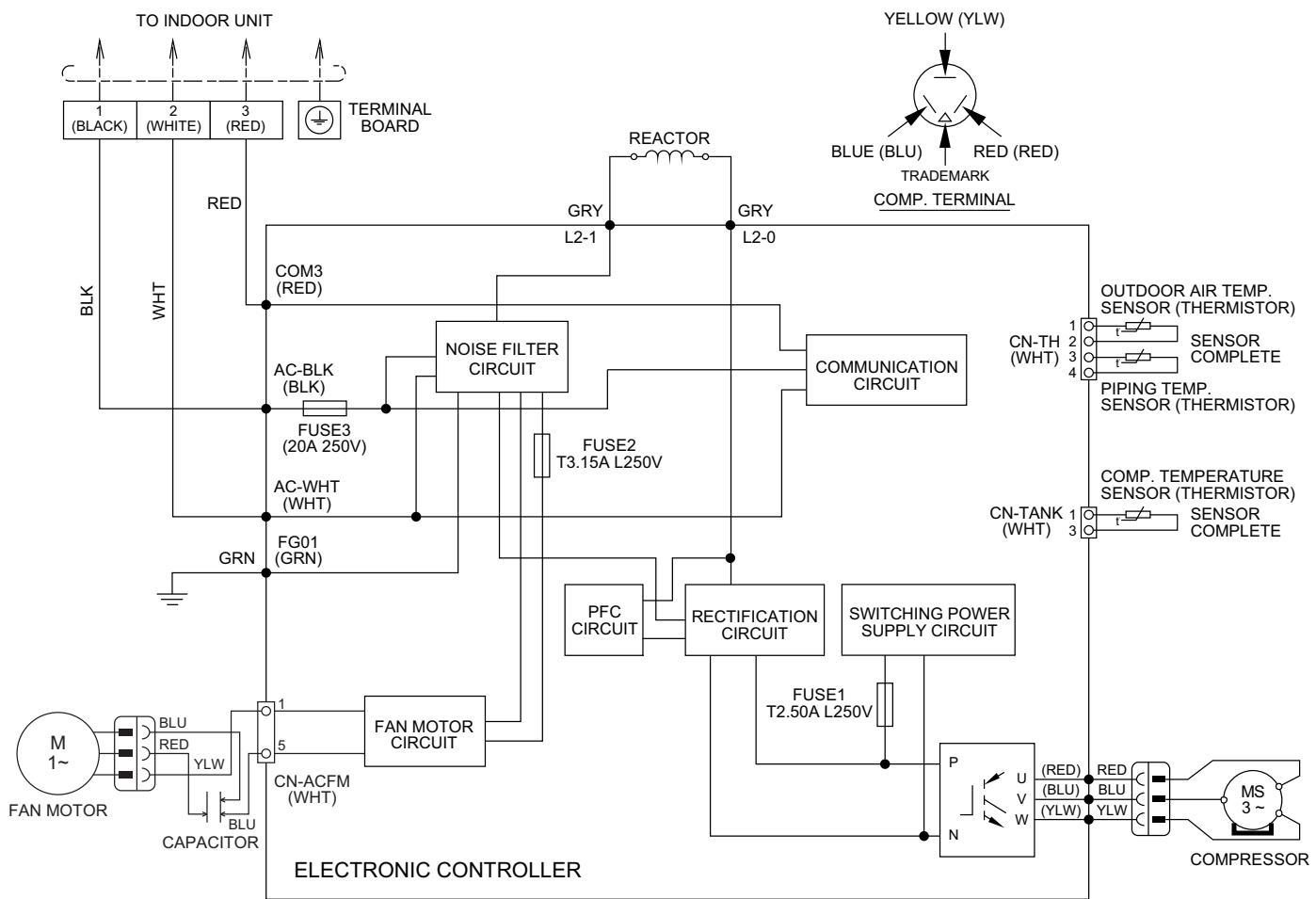
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-S12RKV
CONNECTION	5RS092XJA21
U-V	1.152 Ω
U-W	1.152 Ω
V-W	1.152 Ω

Note: Resistance at 20°C of ambient temperature.

7.2.3 CU-S18RKV CU-S24RKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-S18RKV/CU-S24RKV
CONNECTION	CWA951762
BLUE-YELLOW	75 Ω
BLUE-RED	74 Ω

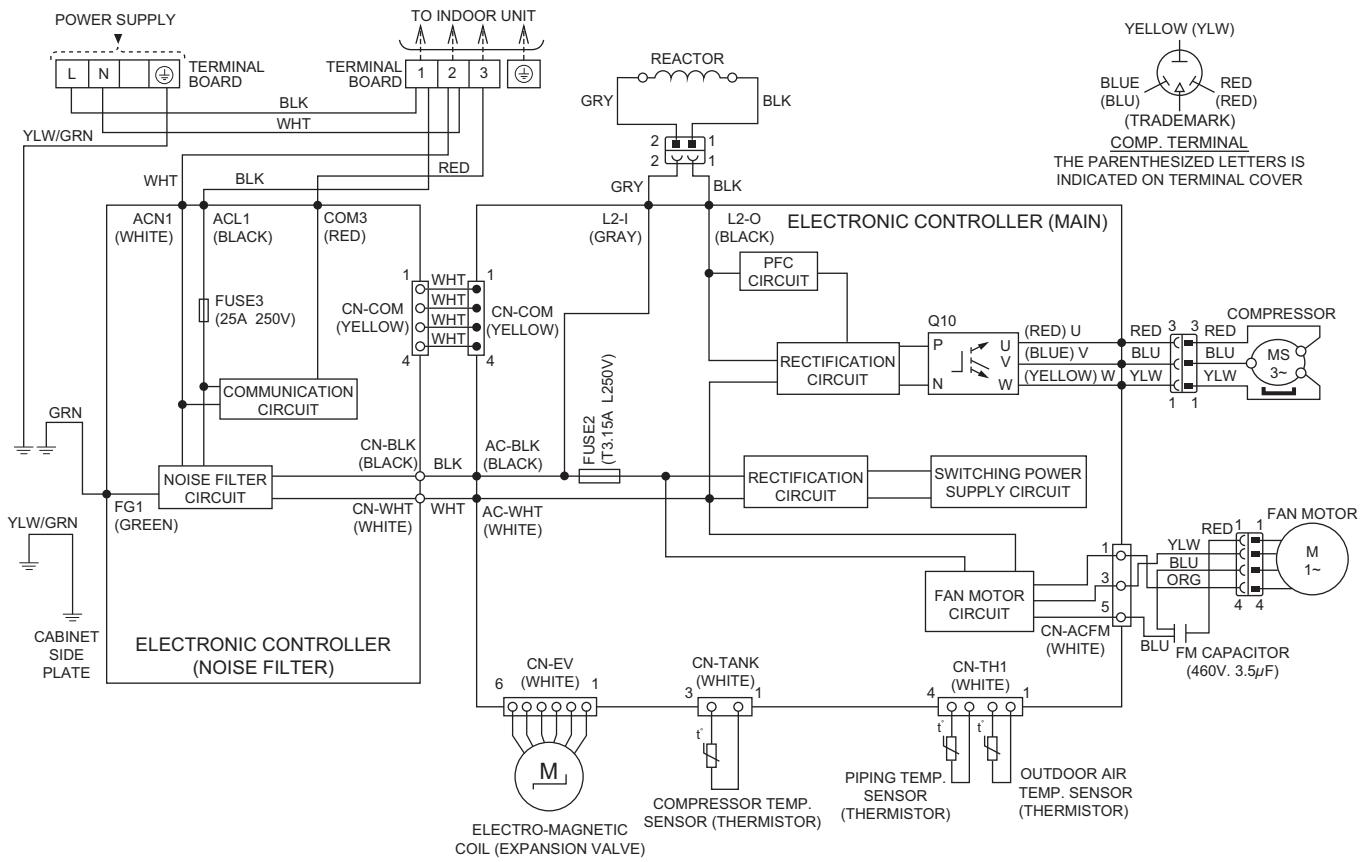
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-S18RKV/CU-S24RKV
CONNECTION	5RD132XHA21
U-V	1. 276 Ω
U-W	1. 276 Ω
V-W	1. 276 Ω

Note: Resistance at 20°C of ambient temperature.

7.2.4 CU-S28RKV



Resistance of Outdoor Fan Motor Windings

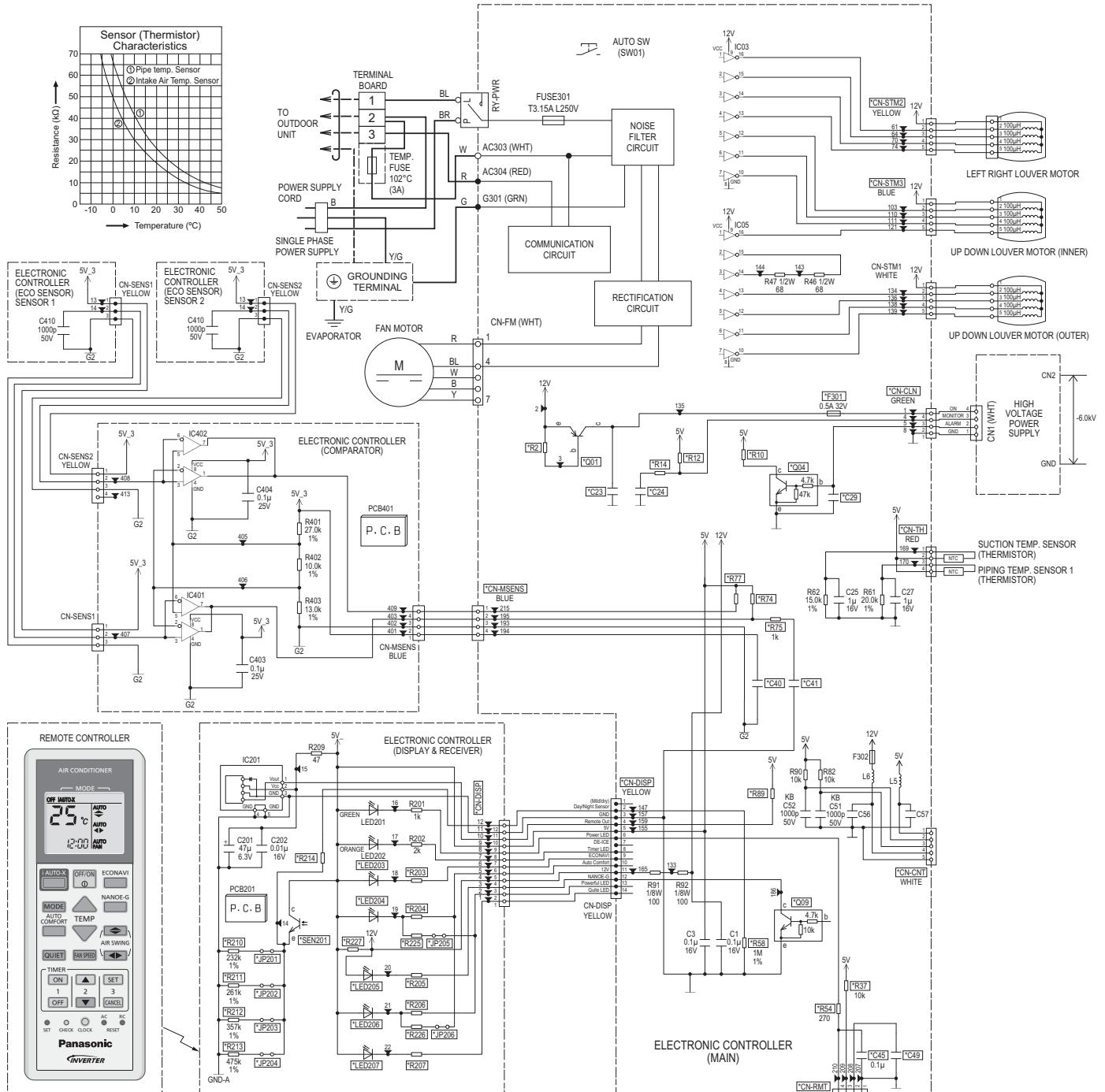
MODEL	CU-S28RKV
CONNECTION	CWA951712
BLUE-YELLOW	55.1 Ω
RED-YELLOW	54.3 Ω
ORANGE-YELLOW	28.2 Ω

Note: Resistance at 20°C of ambient temperature.

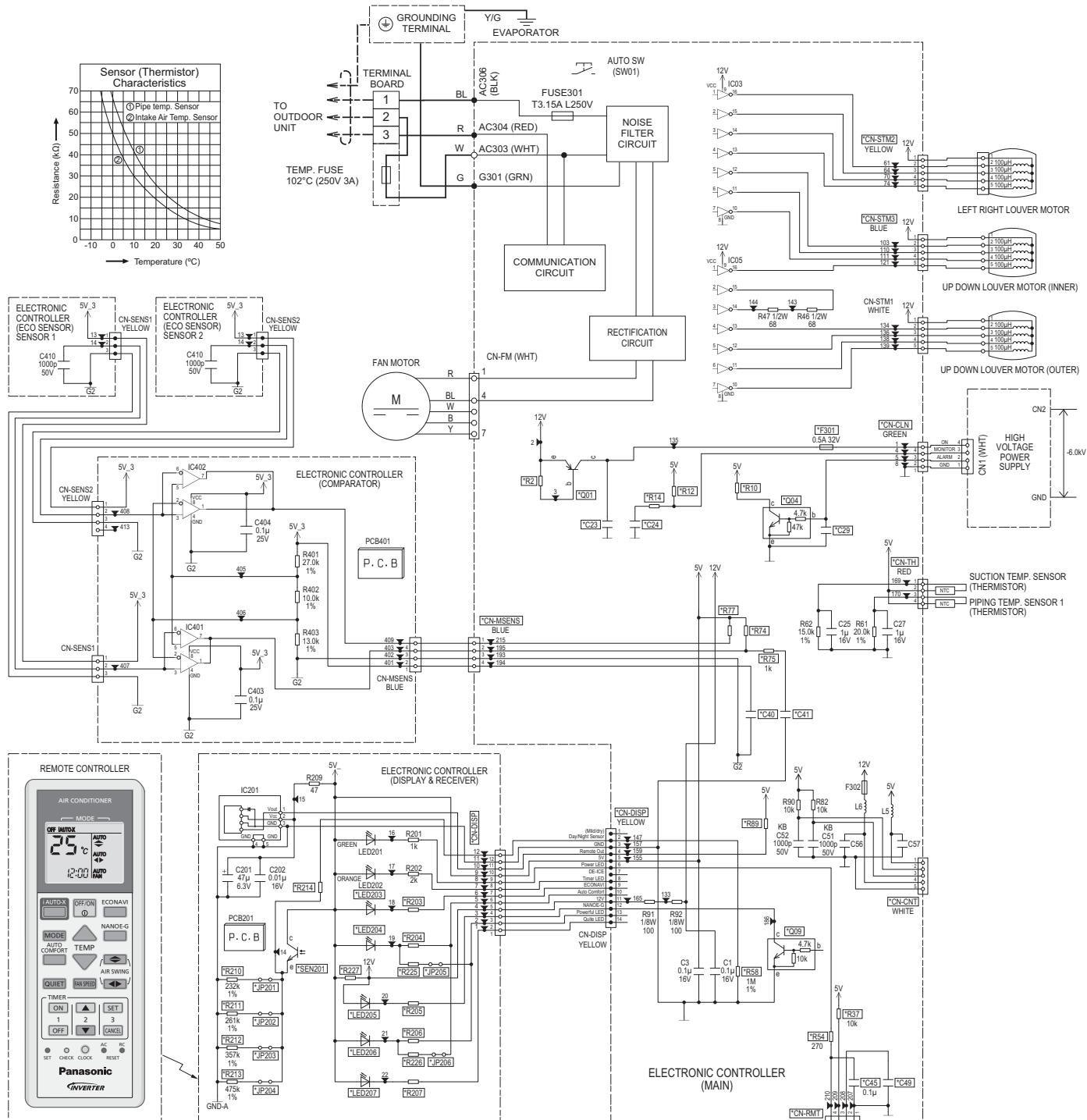
8. Electronic Circuit Diagram

8.1 Indoor Unit

8.1.1 CS-S9RKV CS-S12RKV CS-S18RKV CS-S24RKV

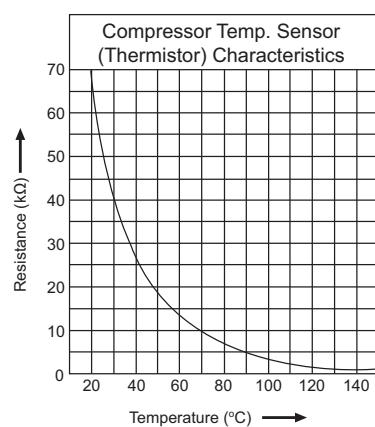
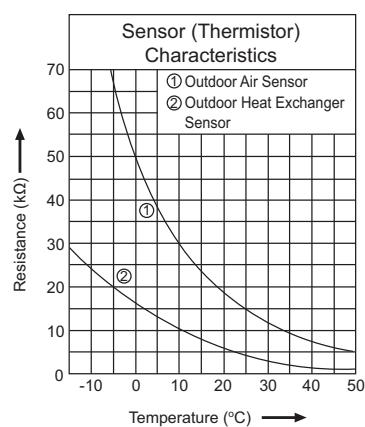
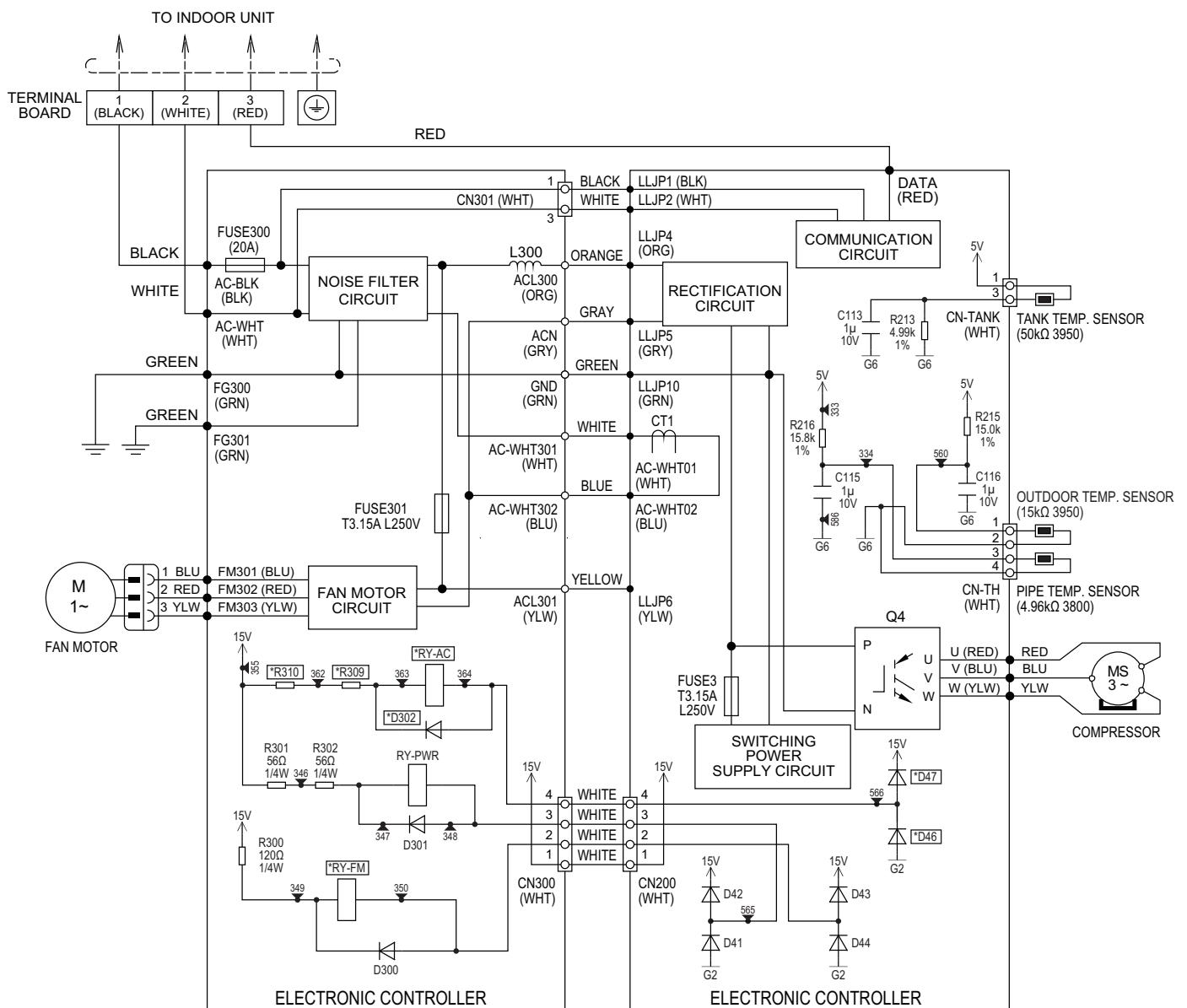


8.1.2 CS-S28RKV

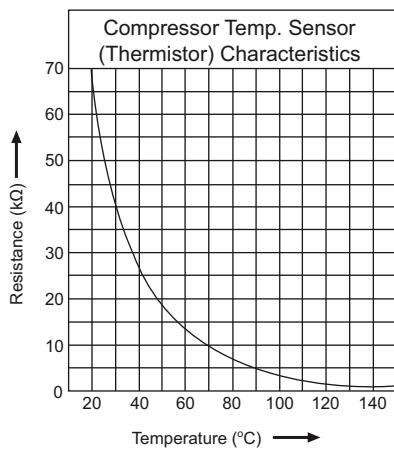
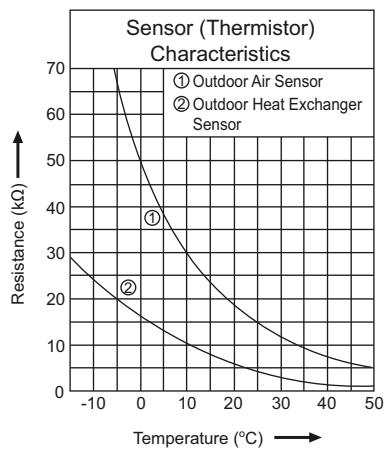
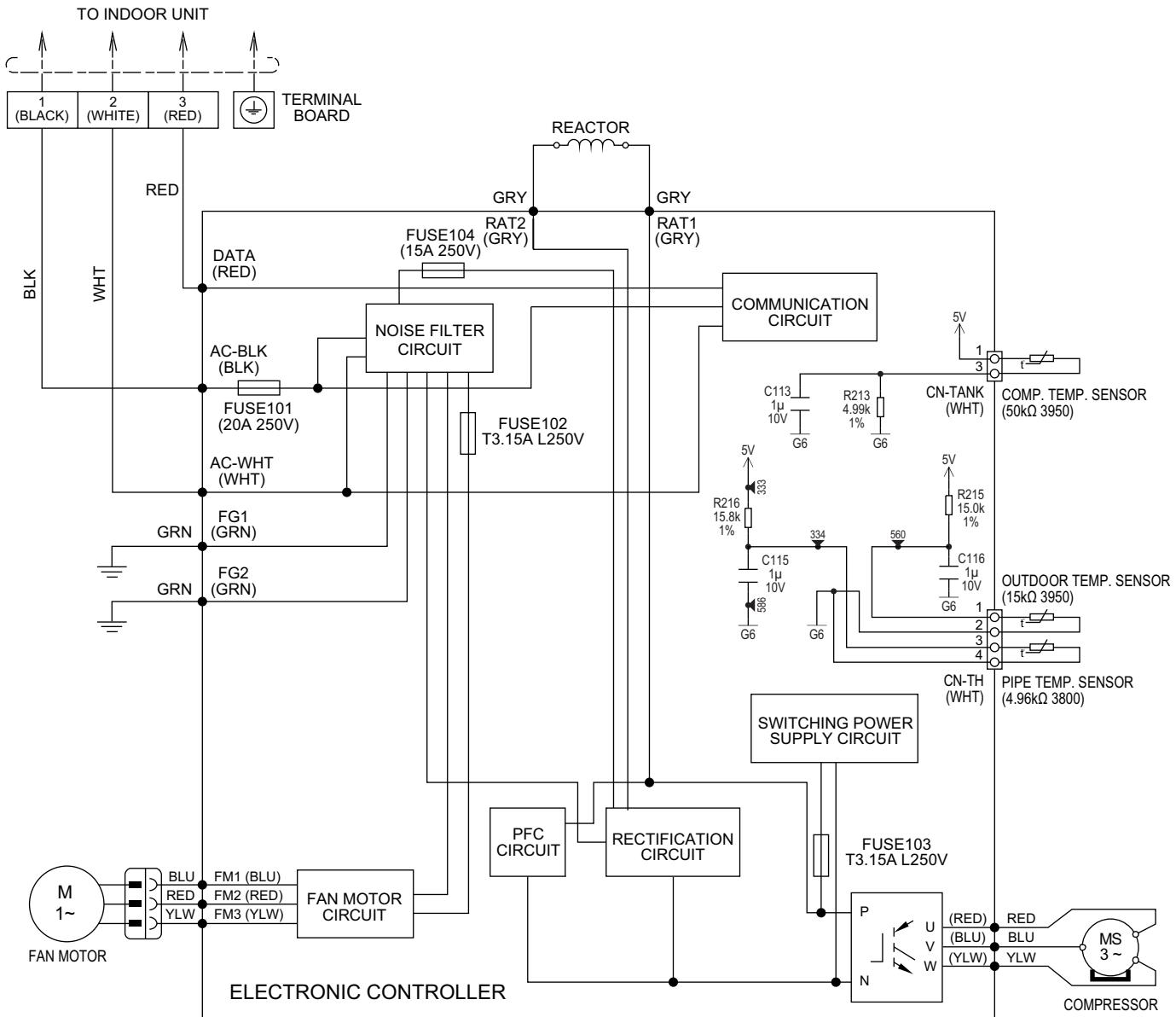


8.2 Outdoor Unit

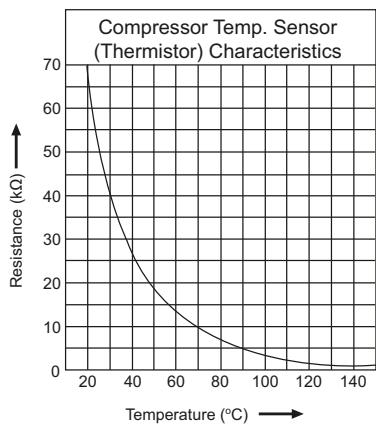
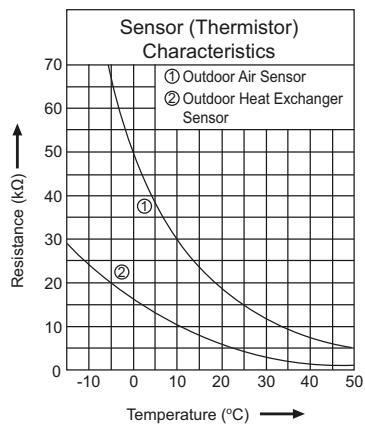
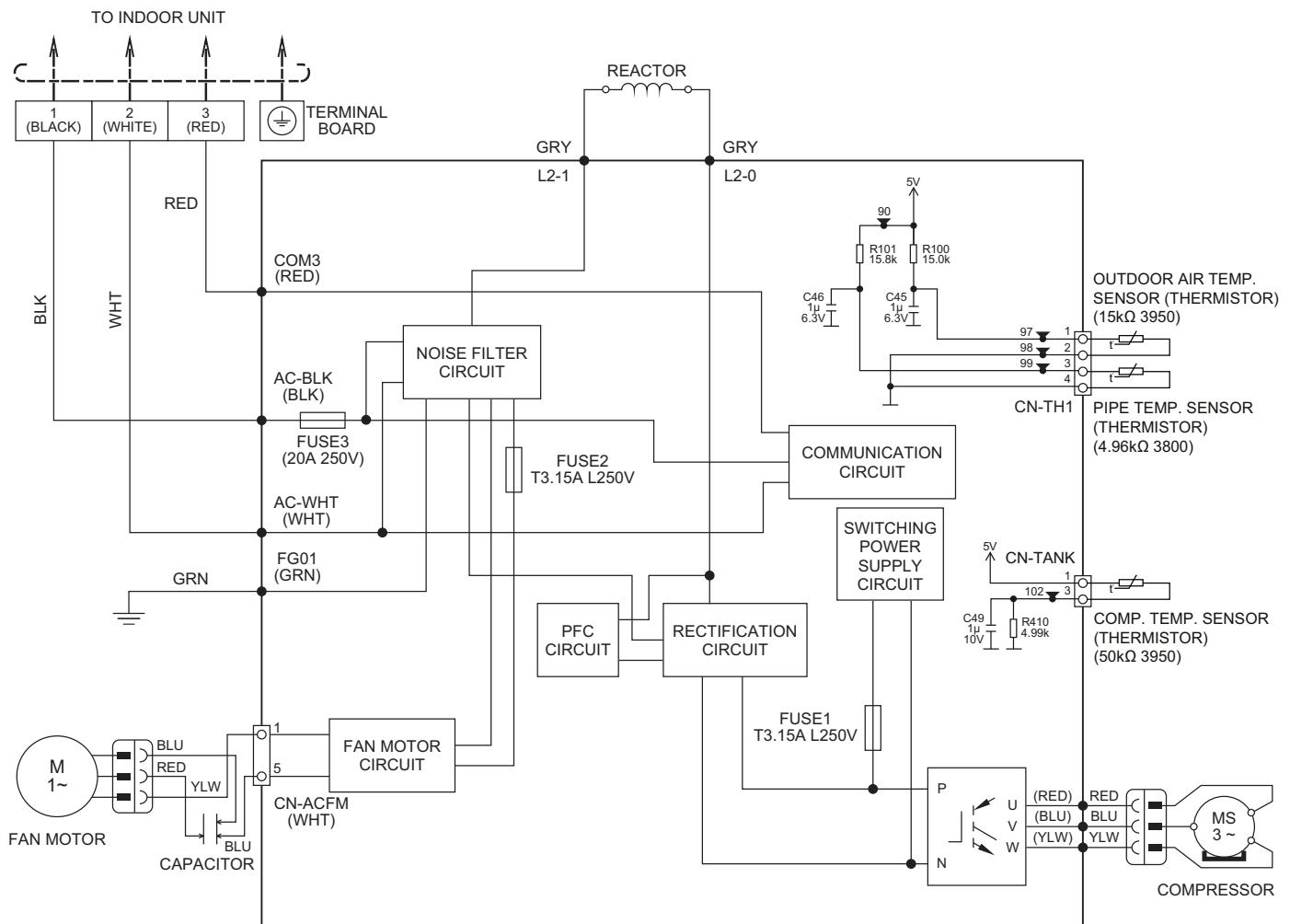
8.2.1 CU-S9RKV



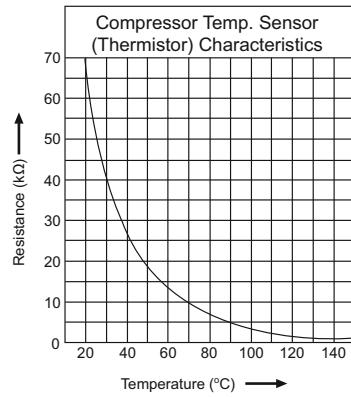
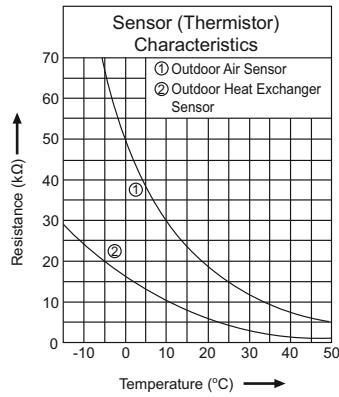
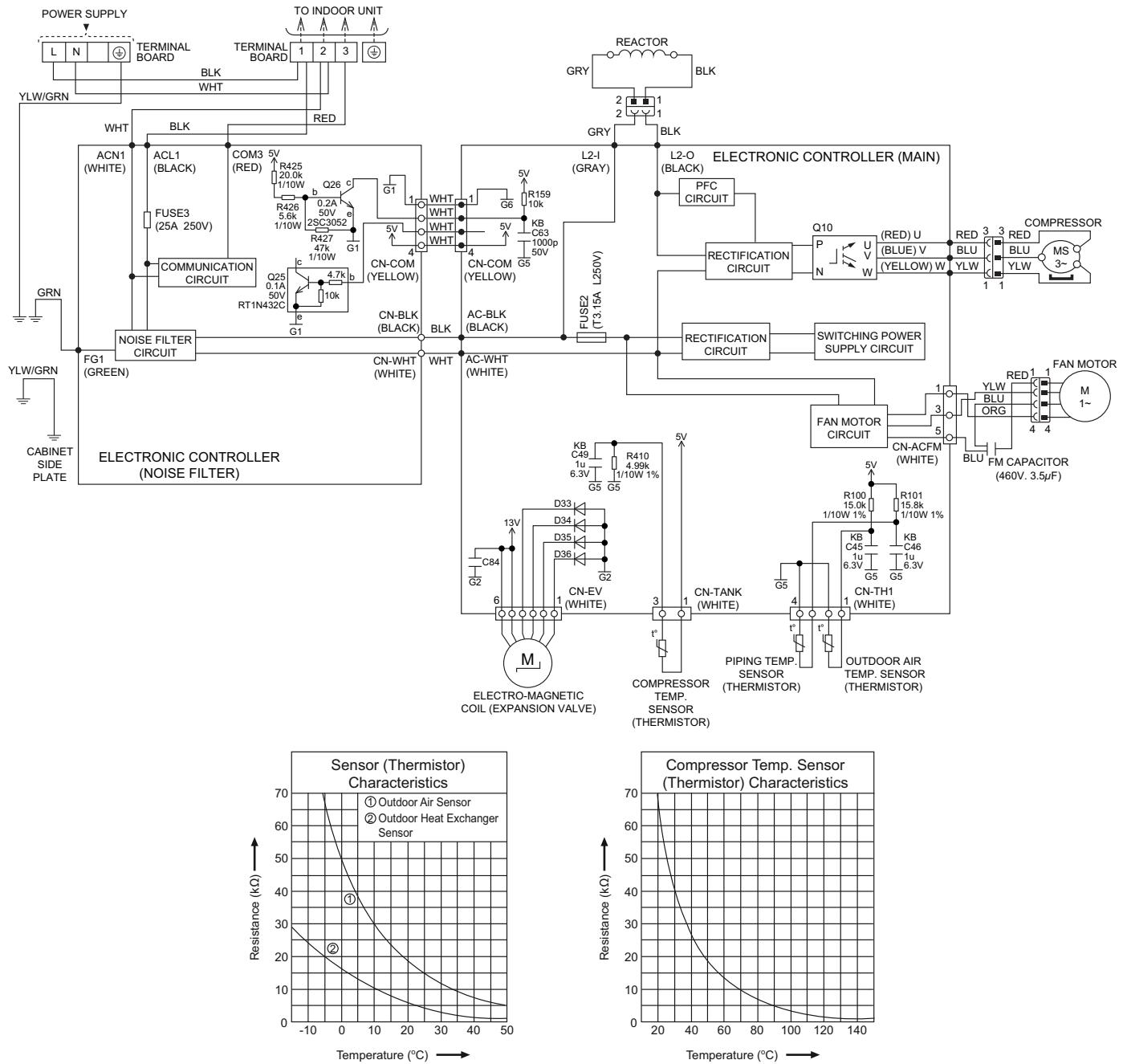
8.2.2 CU-S12RKV



8.2.3 CU-S18RKV CU-S24RKV



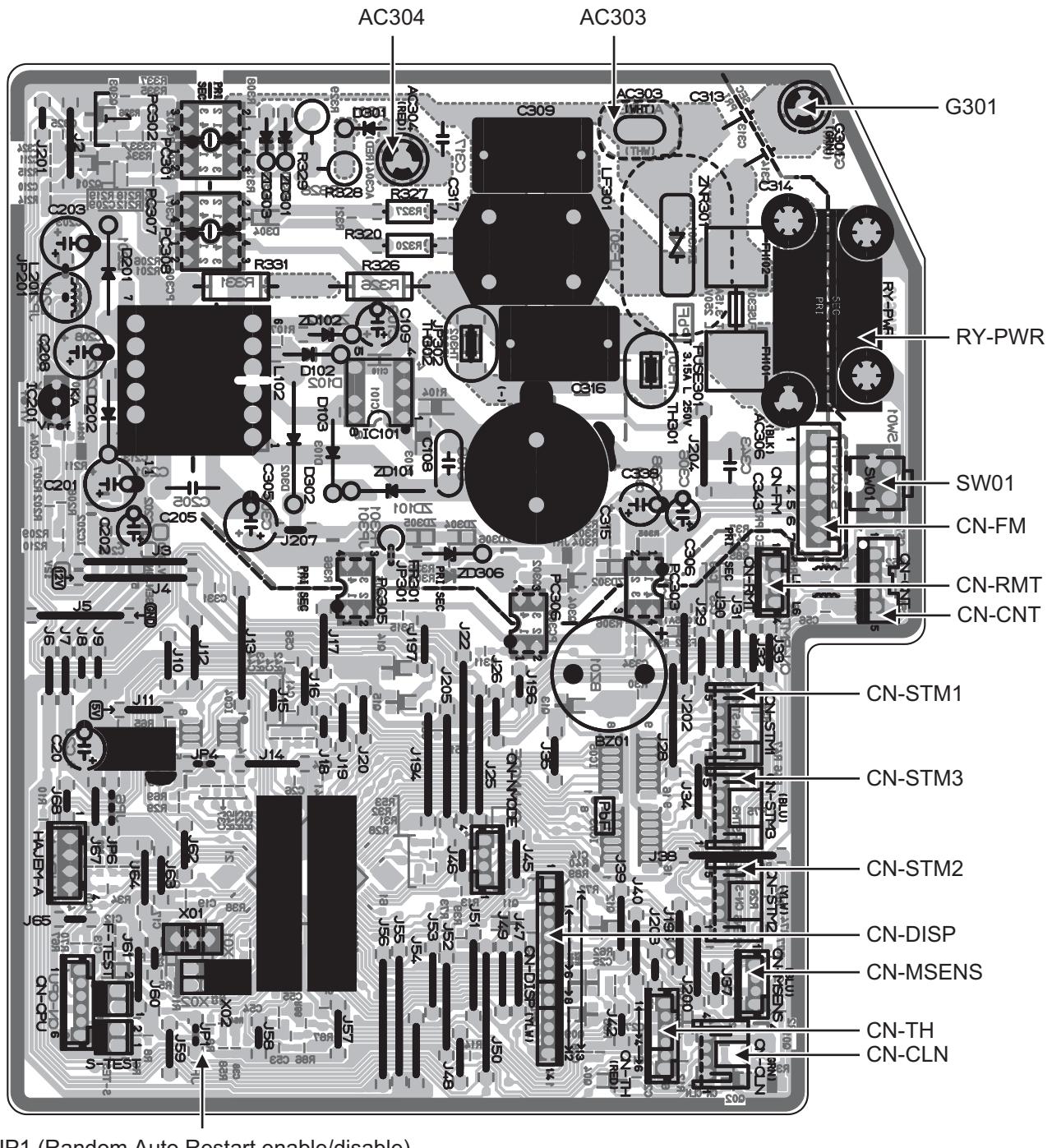
8.2.4 CU-S28RKV



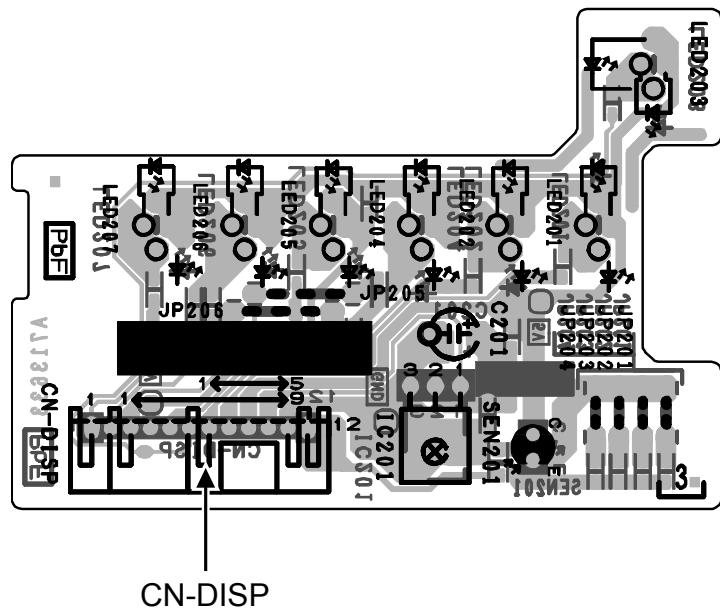
9. Printed Circuit Board

9.1 Indoor Unit

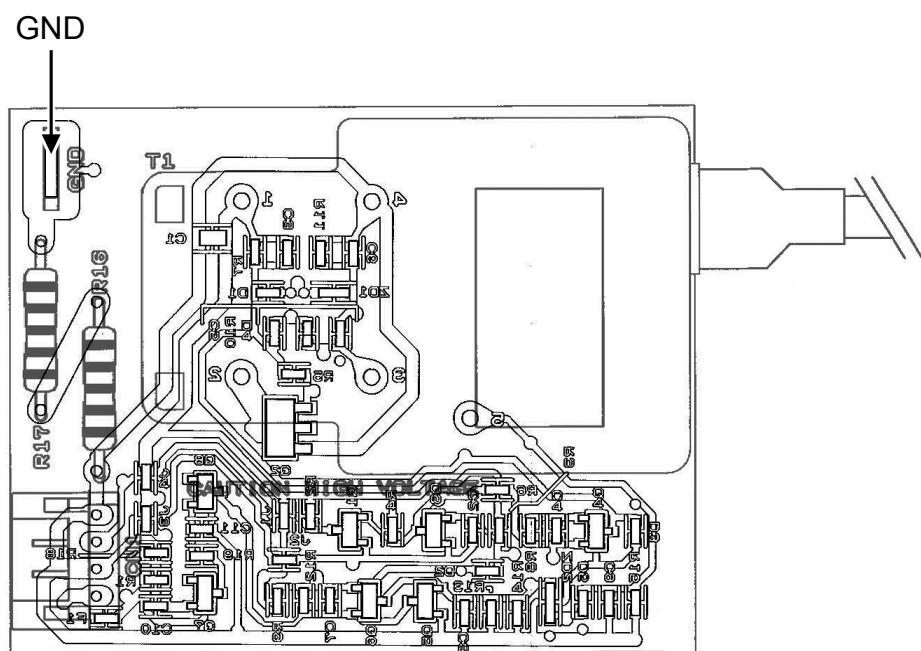
9.1.1 Main Printed Circuit Board



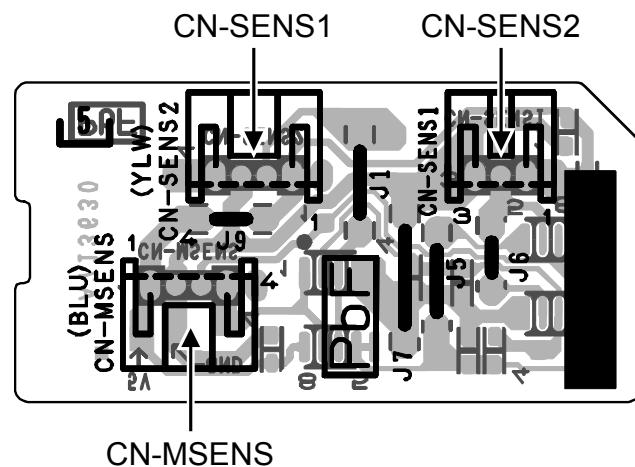
9.1.2 Indicator Printed Circuit Board



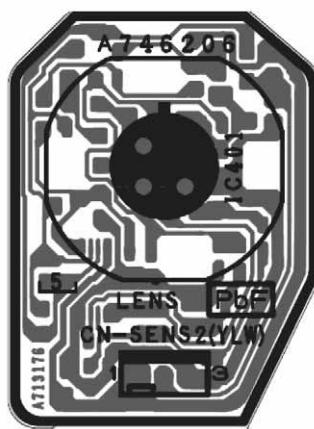
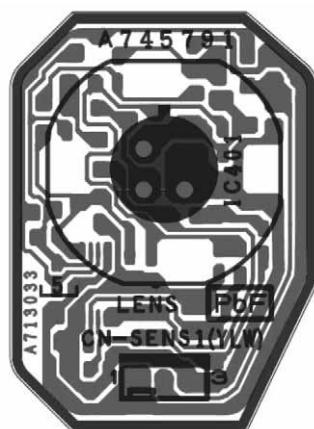
9.1.3 High Voltage Power Supply Printed Circuit Board



9.1.4 Comparator Printed Circuit Board



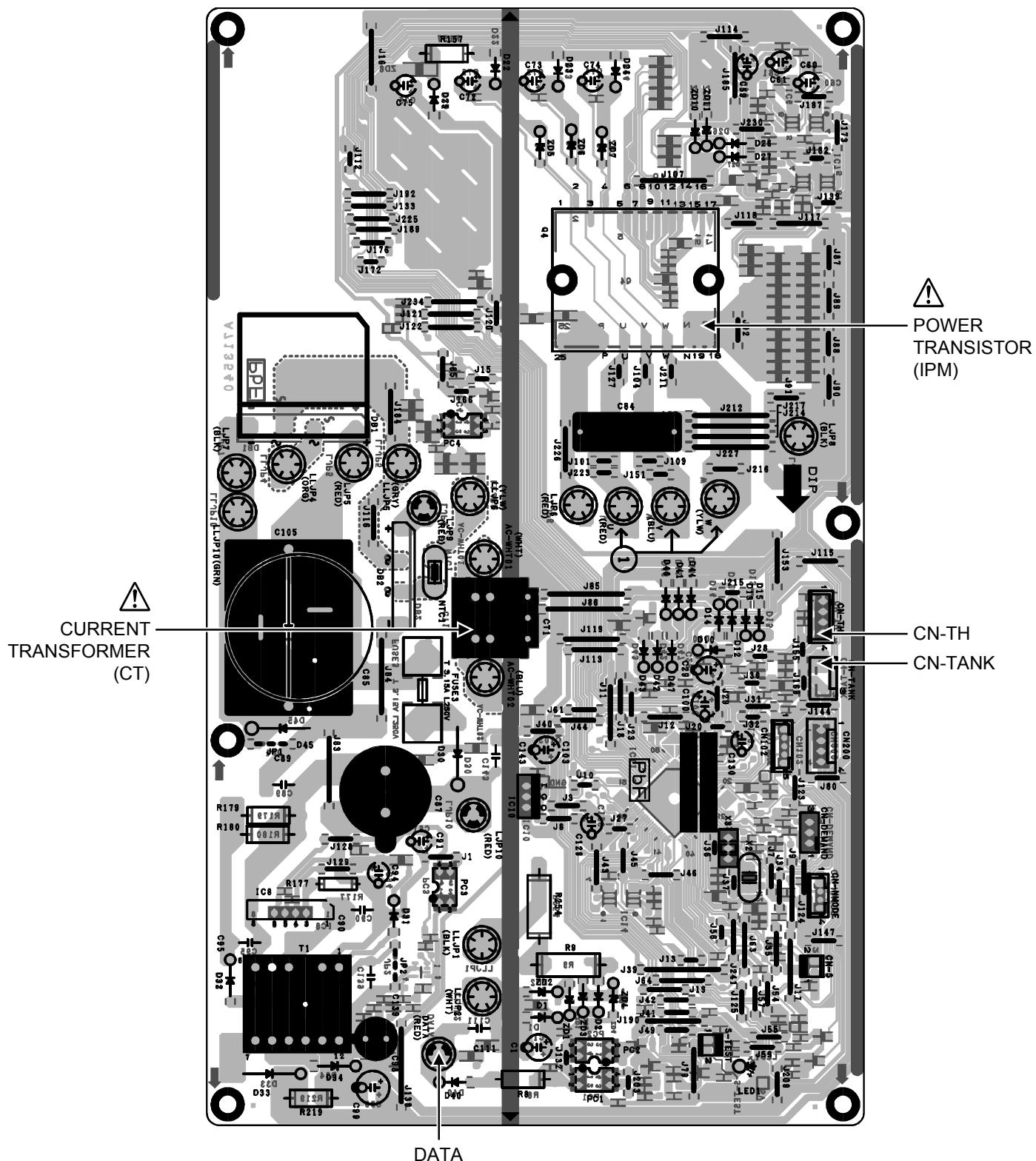
9.1.5 Human Activity Sensor Printed Circuit Board



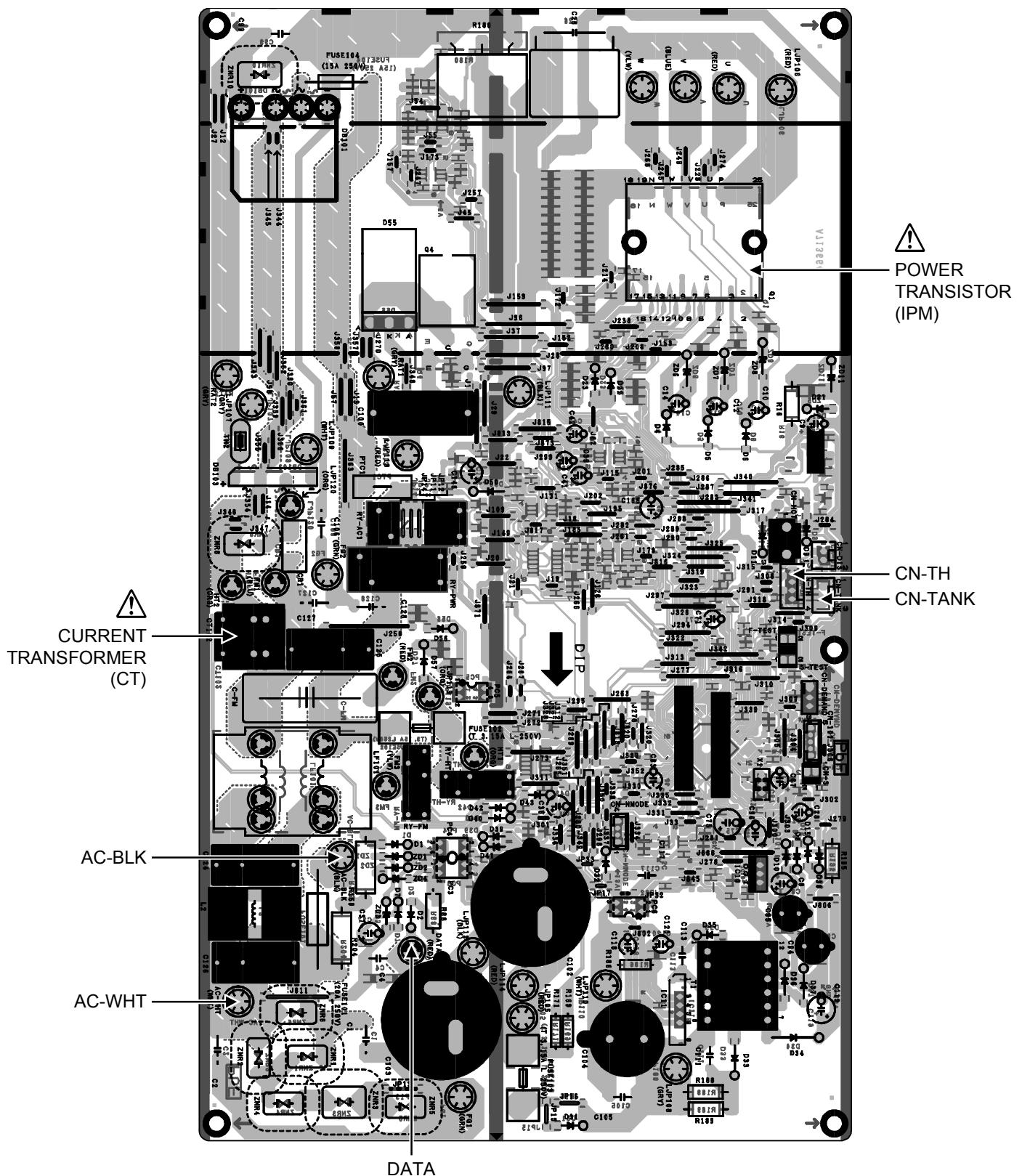
9.2 Outdoor Unit

9.2.1 Main Printed Circuit Board

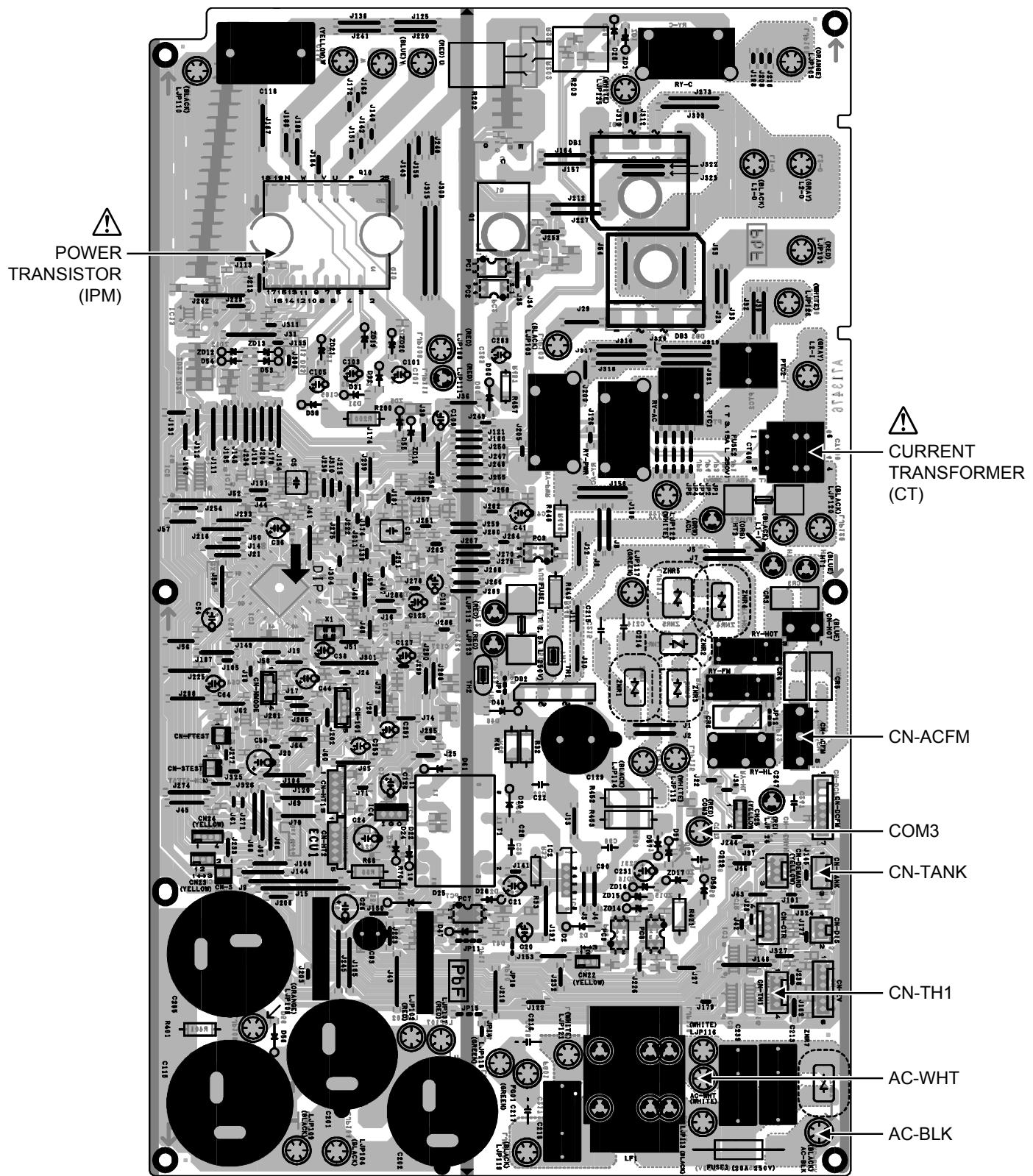
9.2.1.1 CU-S9RKV



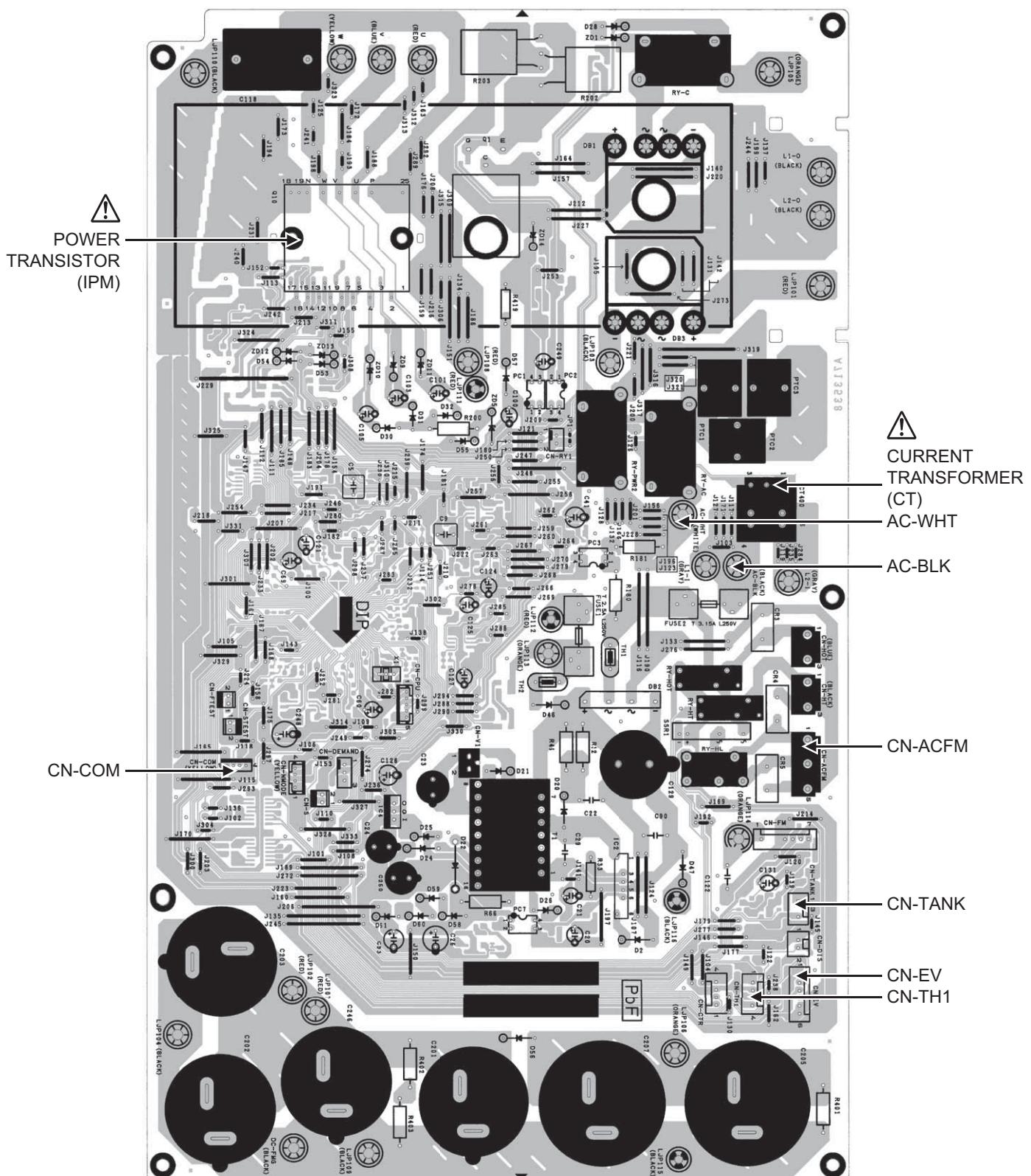
9.2.1.2 CU-S12RKV



9.2.1.3 CU-S18RKV CU-S24RKV

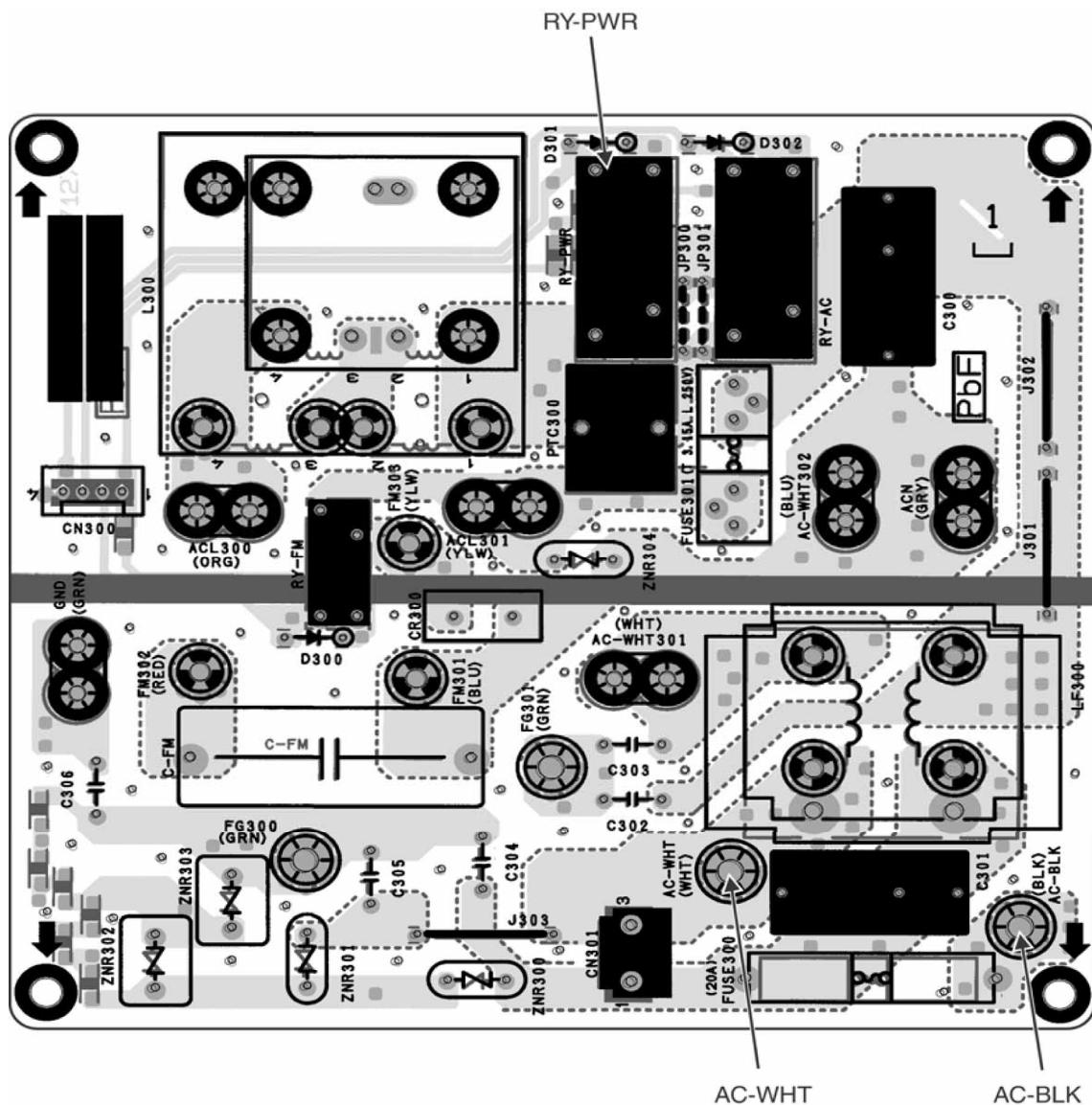


9.2.1.4 CU-S28RKV

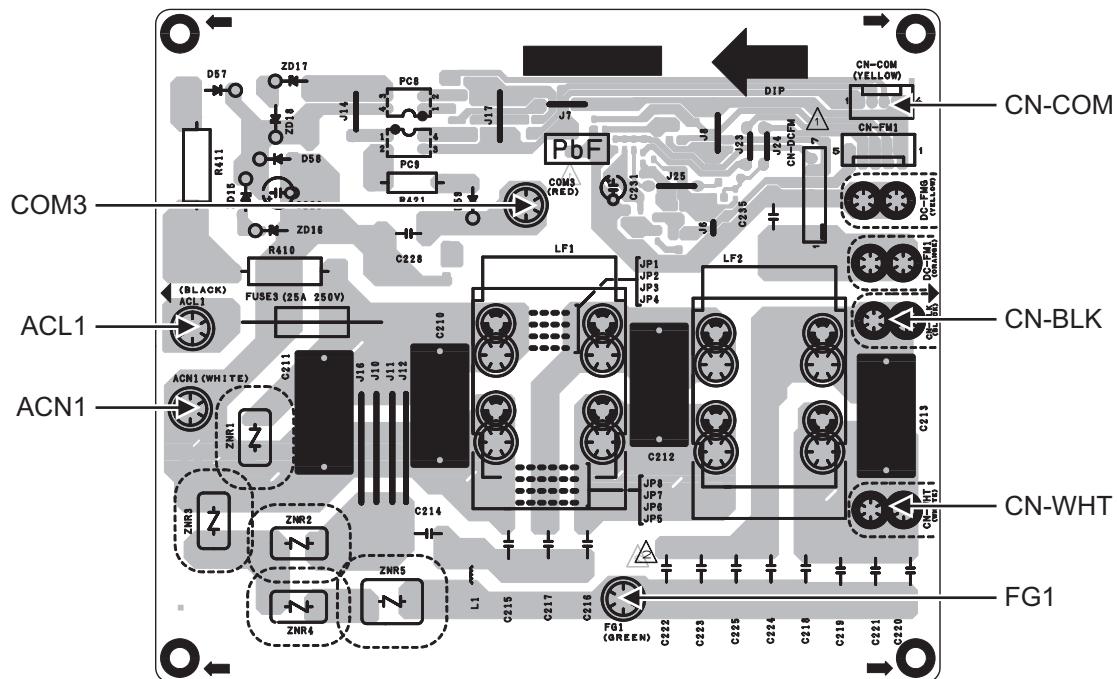


9.2.2 Noise Filter Printed Circuit Board

9.2.2.1 CU-S9RKV



9.2.2.2 CU-S28RKV



10. Installation Instruction

(For CS/CU-S9/12/18/24RKV only)

10.1 Select The Best Location

10.1.1 Indoor Unit

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

10.1.2 Outdoor Unit

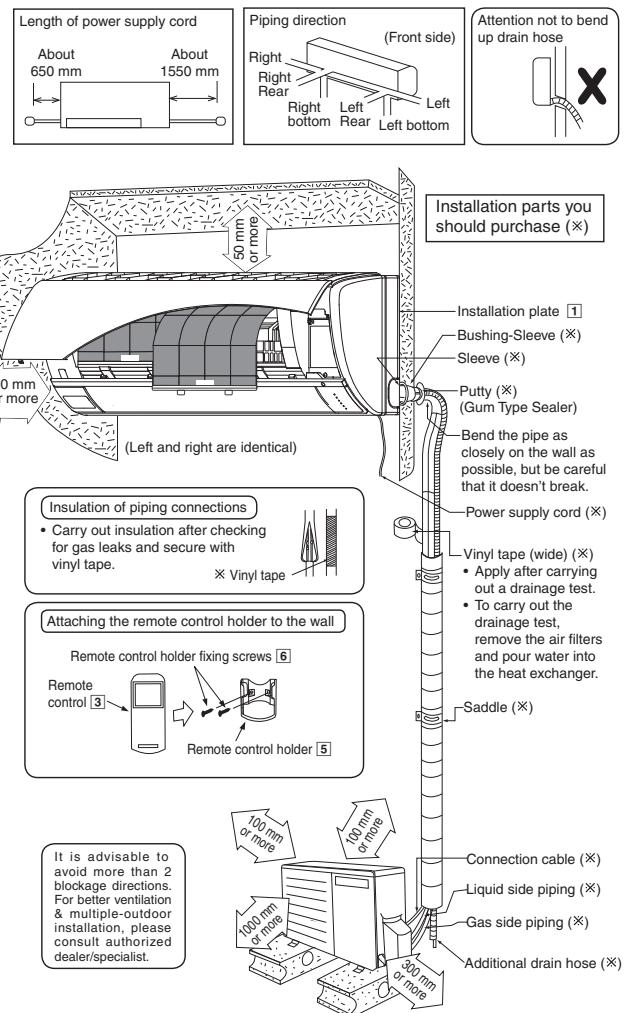
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- 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						
S9***	1.0HP	9.52 mm (3/8")	6.35 mm (1/4")	5	5	3	15	15	7.5
S12***	1.5HP	12.7 mm (1/2")			5	3	15	15	7.5
S18***	2.0HP	15.88 mm (5/8")			15	3	20	15	10
S24***	2.5HP	15.88 mm (5/8")			15	3	20	20	10

Example: For S9***

If the unit is installed at 10 m distance, the quantity of additional refrigerant should be 50 g (10-7.5) m x 20 g/m = 38 g

10.1.3 Indoor/Outdoor Unit Installation Diagram

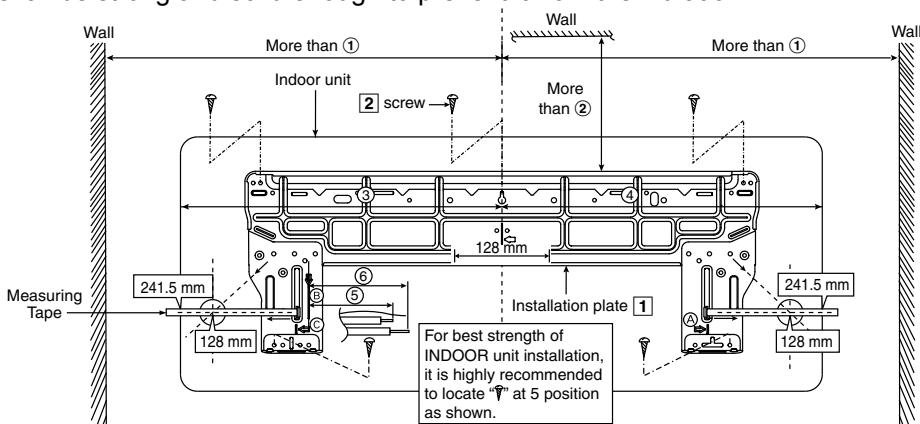


- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

10.2 Indoor Unit

10.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
S9***, S12***	490 mm	82 mm	439 mm	432 mm	43 mm	95 mm
S18***, S24***	590 mm	82 mm	539 mm	532 mm	169 mm	219 mm

The center of installation plate should be at more than ① at right and left of the wall.

The distance from installation plate edge to ceiling should more than ②.

From installation plate center to unit's left side is ③.

From installation plate center to unit's right side is ④.

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

- 1 Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete wall, consider using anchor bolts.)
 - o Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.
- 2 Drill the piping plate hole with ø70 mm hole-core drill.
 - o Line according to the left and right side of the installation plate. The meeting point of the extended line is the center of the hole. Another method is by putting measuring tape at position as shown in the diagram above. The hole center is obtained by measuring the distance namely 128 mm for left and right hole respectively.
 - o Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to 10.2.2)

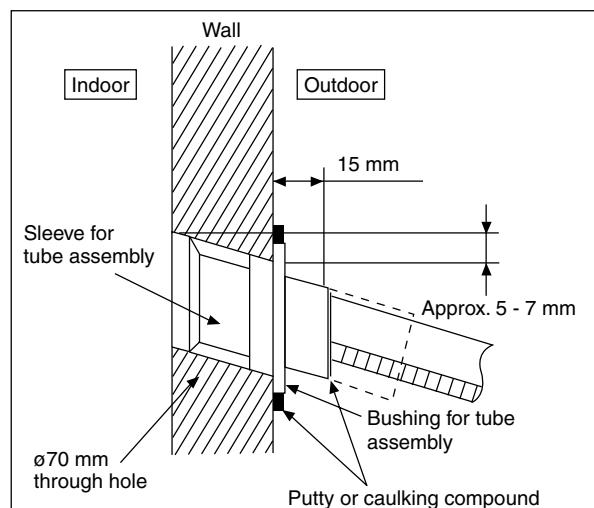
10.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

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

CAUTION

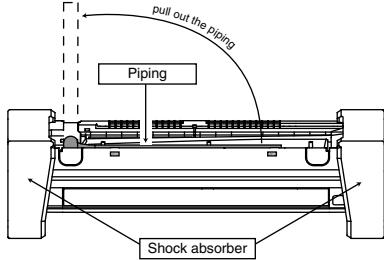
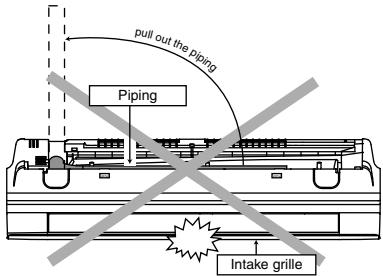
- ! When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connection cable.

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



10.2.3 Indoor Unit Installation

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



10.2.3.1 For the Right Rear Piping

Step-1 Pull out the Indoor piping

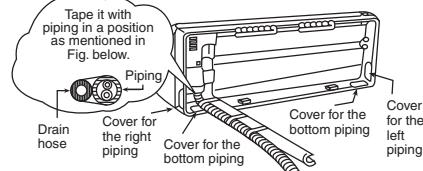
Step-2 Install the Indoor Unit

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 connection cable

Right Rear piping



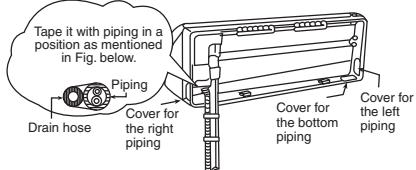
How to keep the cover

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.)

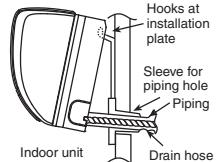


Right and Right Bottom piping



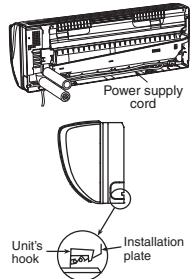
Install the indoor unit

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.



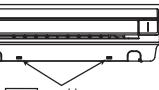
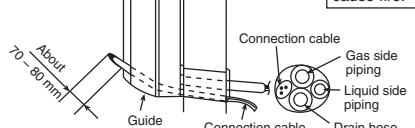
Secure the Indoor Unit

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



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

Insert the connection 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.

10.2.3.2 For the Right and Right Bottom Piping

Step-1 Pull out the Indoor piping

Step-2 Install the Indoor Unit

Step-3 Insert the connection 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.

10.2.3.3 For the Embedded Piping

Step-1 Replace the drain hose

Step-2 Bend the embedded piping

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

Step-3 Pull the connection cable into Indoor Unit

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

Step-4 Cut and flare the embedded piping

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

Step-5 Install the Indoor Unit

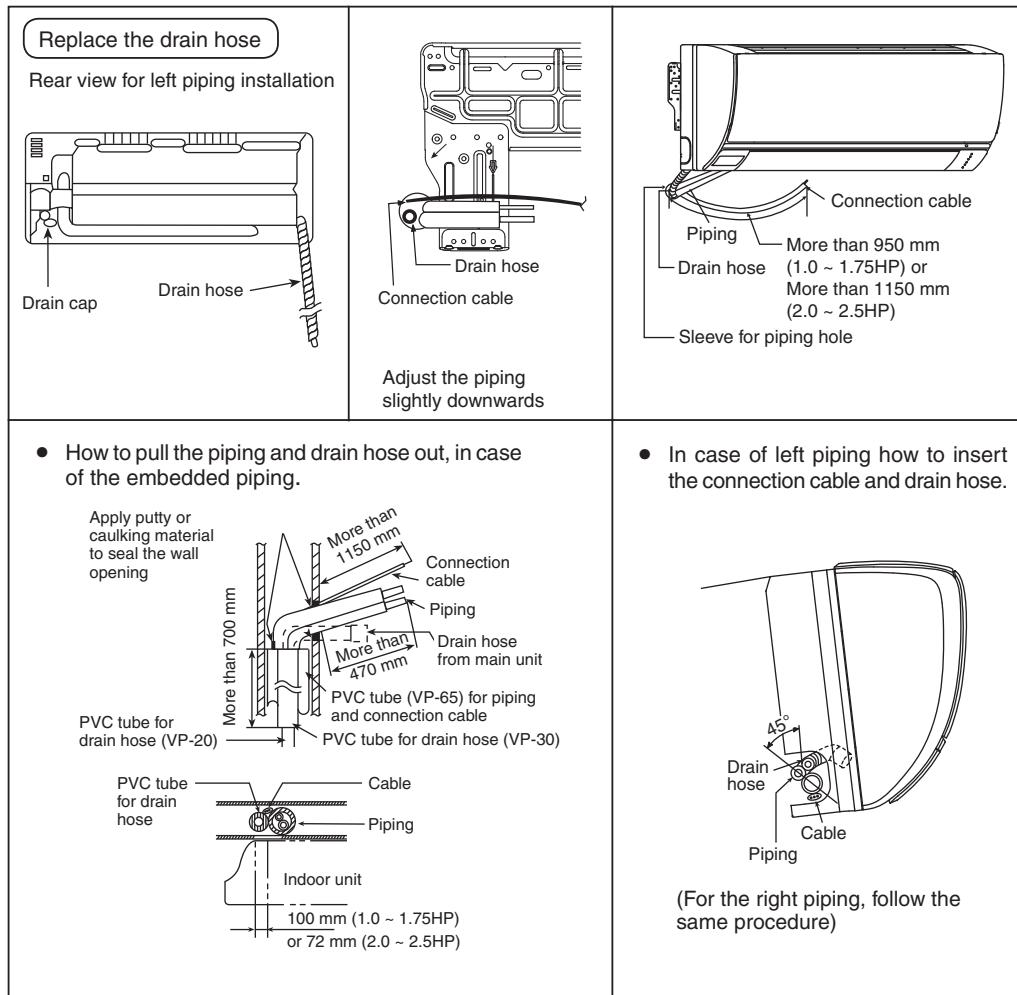
Step-6 Connect the piping

Step-7 Insulate and finish the piping

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

Step-8 Secure the Indoor Unit

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

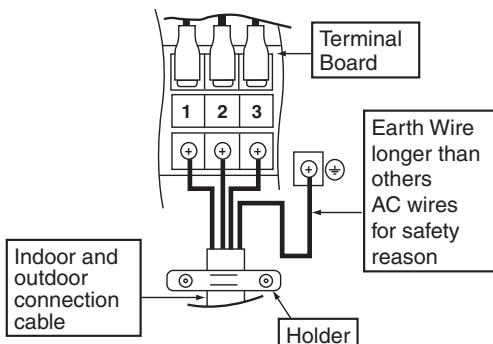


10.2.4 Connect the Cable to the Indoor Unit

- 1 The inside and outside connection cable can be connected without removing the front grille.
- 2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed $4 \times 1.5 \text{ mm}^2$ (1.0 ~ 1.5HP) or $4 \times 2.5 \text{ mm}^2$ (2.0 ~ 2.5HP) flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.

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

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



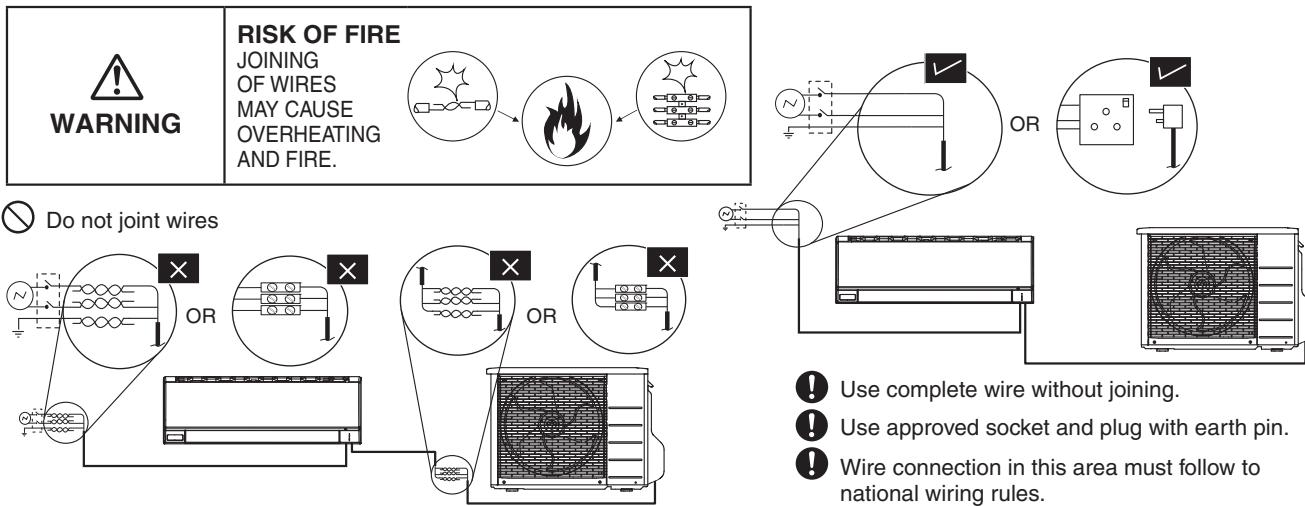
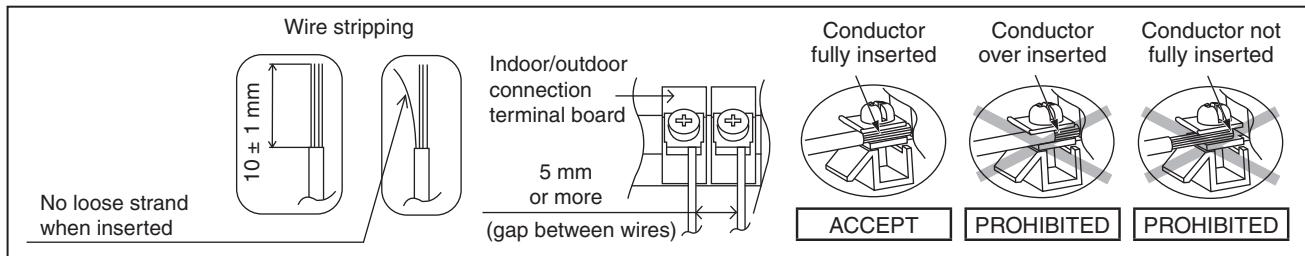
WARNING

This equipment must be properly earthed.

Note:

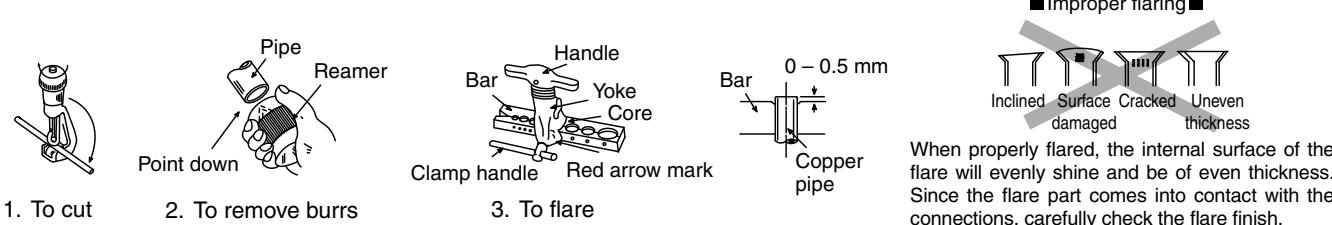
- Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires as shown in the figure for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

10.2.4.1 Wire Stripping and Connecting Requirement



10.2.5 Cutting and Flaring the Piping

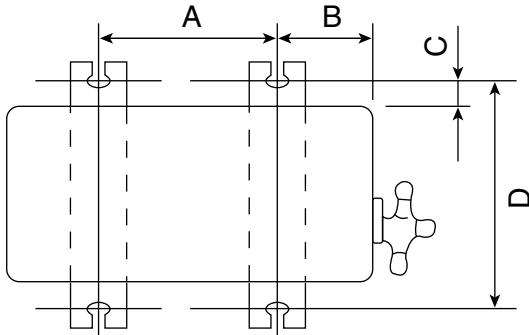
- 1 Please cut using pipe cutter and then remove the burrs.
- 2 Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- 3 Please make flare after inserting the flare nut onto the copper pipes.



10.3 Outdoor Unit

10.3.1 Install the Outdoor Unit

- After selecting the best location, start installation to Indoor/Outdoor Unit Installation Diagram.
 - Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut ($\phi 10$ 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
S9***	474 mm	87 mm	18.5 mm	261 mm
S12***	570 mm	105 mm	18.5 mm	320 mm
S18***, S24***	613 mm	130 mm	24 mm	360.5 mm

10.3.2 Connect the Piping

10.3.2.1 Connecting the Piping to Indoor

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

Connect the piping

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

Do not overtighten, overtightening may cause gas leakage.

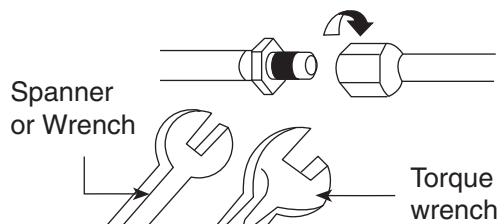
Piping size	Torque
6.35 mm (1/4")	[18 N·m (1.8 kgf·m)]
9.52 mm (3/8")	[42 N·m (4.3 kgf·m)]
12.7 mm (1/2")	[55 N·m (5.6 kgf·m)]
15.88 mm (5/8")	[65 N·m (6.6 kgf·m)]
19.05 mm (3/4")	[100 N·m (10.2 kgf·m)]

10.3.2.2 Connecting the Piping to Outdoor

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

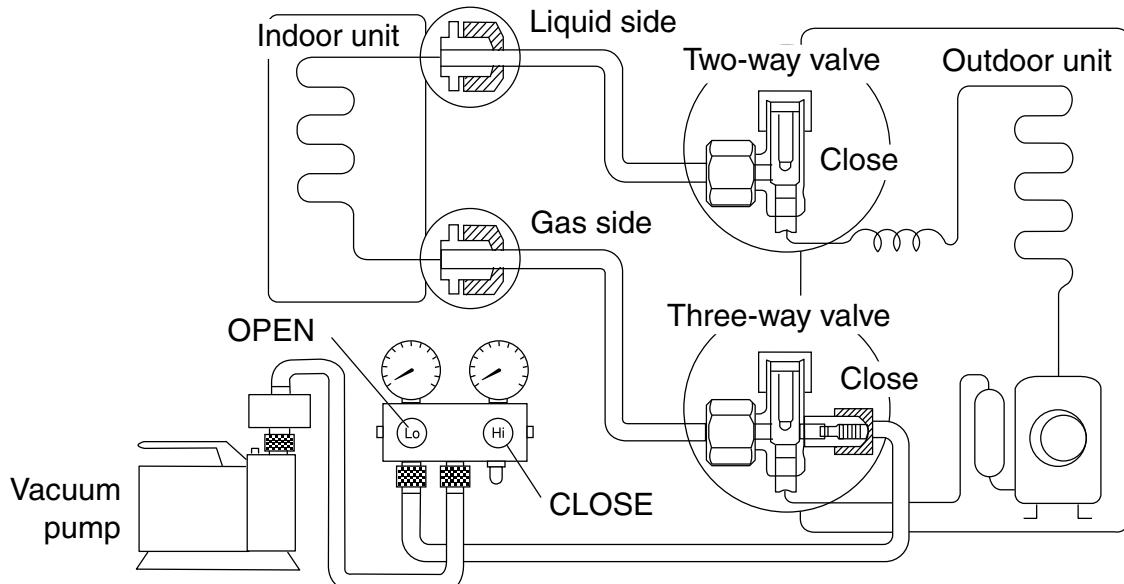
Make flare after inserting the flare nut (locate at valve) onto the copper pipe.

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



10.3.3 Evacuation of the Equipment

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



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

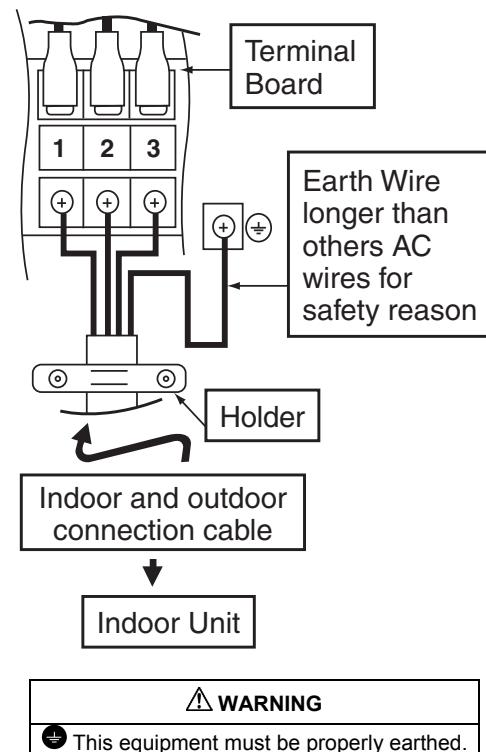
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in step ③ above take the following measure:
 - If the leak stops when the piping connections are tightened further, continue working from step ③.
 - If the leak does not stop when the connections are retightened, repair location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

10.3.4 Connect the cable to the Outdoor Unit

- 1 Remove the control board cover from the unit by loosening the screw.
- 2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed $4 \times 1.5 \text{ mm}^2$ (1.0 ~ 1.5HP) or $4 \times 2.5 \text{ mm}^2$ (2.0 ~ 2.5HP) flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.

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

- 3 Secure the cable onto the control board with the holder (clamper).
- 4 Attach the control board cover back to the original position with screw.
- 5 For wire stripping and connection requirement, refer to instruction 10.2.4 of indoor unit.



WARNING

This equipment must be properly earthed.

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

10.3.5 Piping Insulation

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

11. Installation Instruction

(For CS/CU-S28RKV only)

11.1 Select The Best Location

11.1.1 Indoor Unit

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

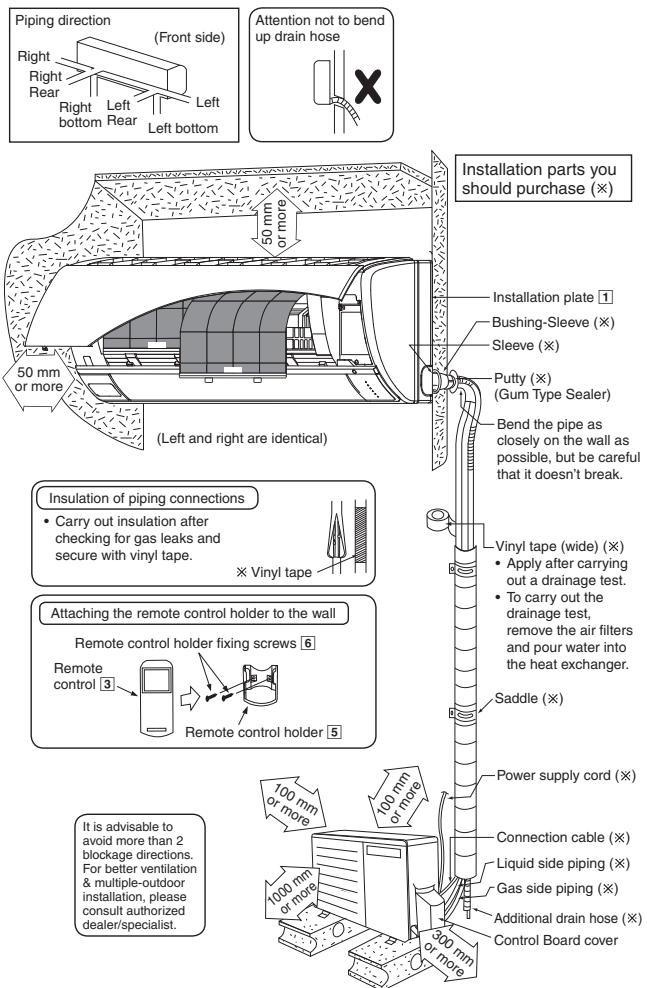
11.1.2 Outdoor Unit

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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)
		Gas	Liquid						
S28***	3.0HP	15.88 mm (5/8")	6.35 mm (1/4")	5	20	3	30	30	10

If the unit is installed at 15 m distance, the quantity of additional refrigerant should be 150 g (15-10) m x 30 g/m = 150 g.

11.1.3 Indoor/Outdoor Unit Installation Diagram

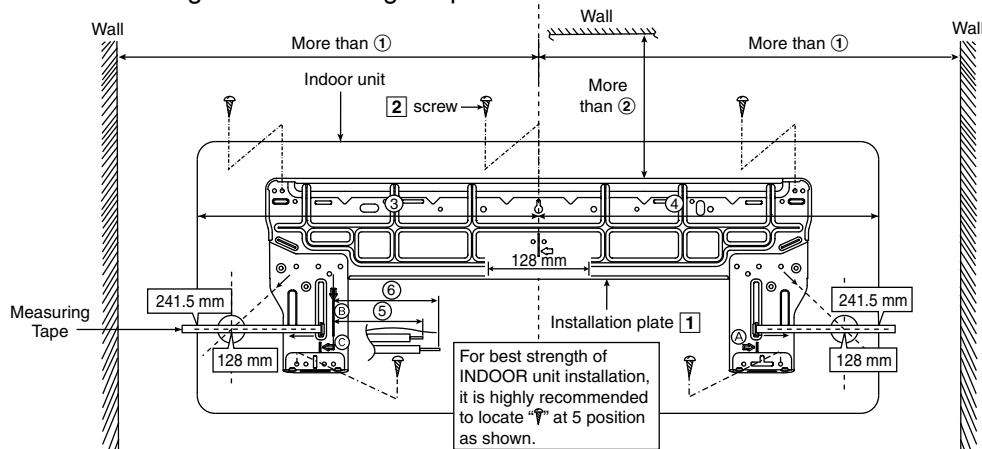


- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
S28***	590 mm	82 mm	539 mm	532 mm	169 mm	219 mm

The center of installation plate should be at more than ① at right and left of the wall.

The distance from installation plate edge to ceiling should more than ②.

From installation plate center to unit's left side is ③.

From installation plate center to unit's right side is ④.

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

- 1 Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete wall, consider using anchor bolts.)
 - o Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.
- 2 Drill the piping plate hole with ø70 mm hole-core drill.
 - o Putting measuring tape at position as shown in the diagram above.
The hole center is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
The meeting point of the extension arrow mark is the hole center position.
 - o Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to 11.2.2)

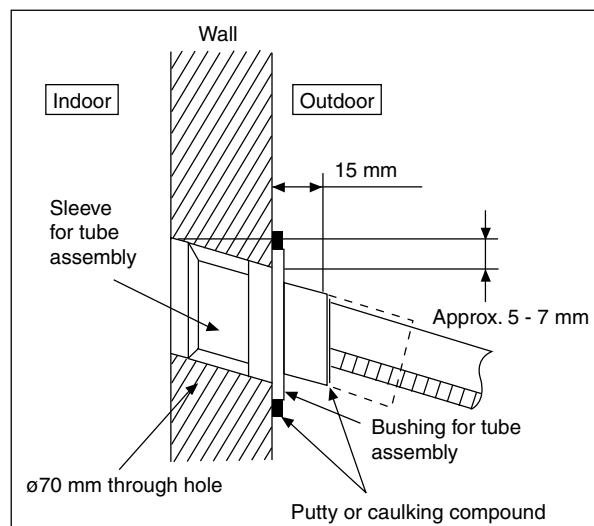
11.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

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

CAUTION

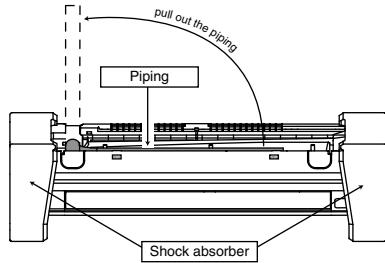
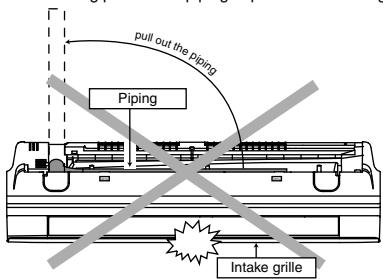
- ! When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connection cable.

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



11.2.3 Indoor Unit Installation

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



11.2.3.1 For the Right Rear Piping

Step-1 Pull out the Indoor piping

Step-2 Install the Indoor Unit

Step-3 Secure the Indoor Unit

Step-4 Insert the connection 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 connection cable

Step-4 Secure the Indoor Unit

11.2.3.3 For the Embedded Piping

Step-1 Replace the drain hose

Step-2 Bend the embedded piping

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

Step-3 Pull the connection cable into Indoor Unit

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

Step-4 Cut and flare the embedded piping

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

Step-5 Install the Indoor Unit

Step-6 Connect the piping

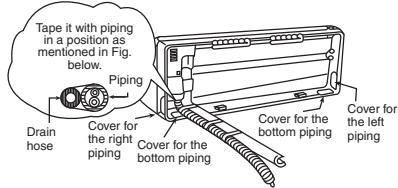
- Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation).

Step-7 Insulate and finish the piping

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

Step-8 Secure the Indoor Unit

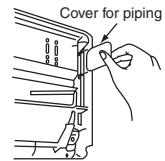
Right Rear piping



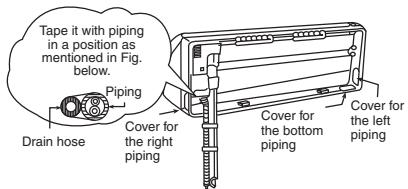
How to keep the cover

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.)

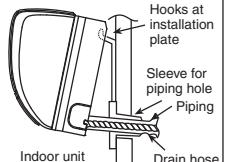


Right and Right Bottom piping



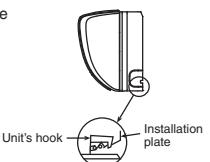
Install the indoor unit

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.

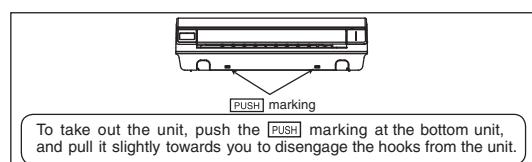
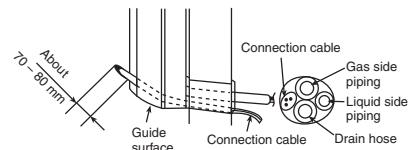


Secure the Indoor Unit

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



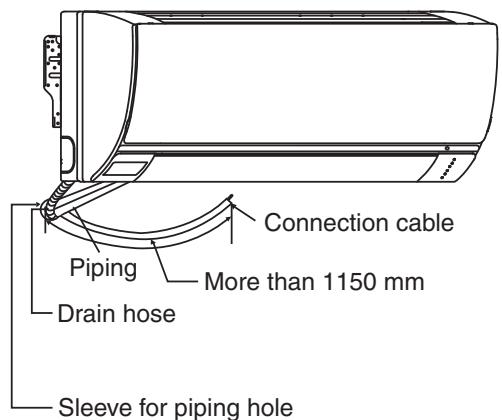
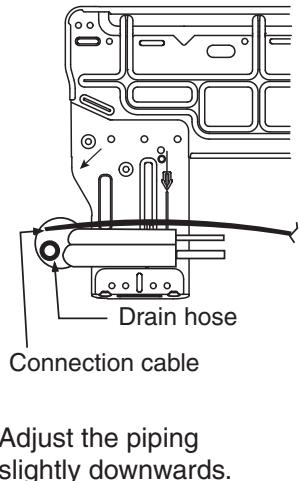
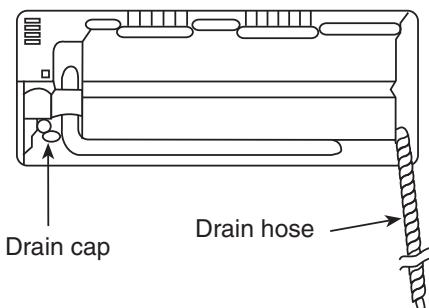
Insert the connection cable



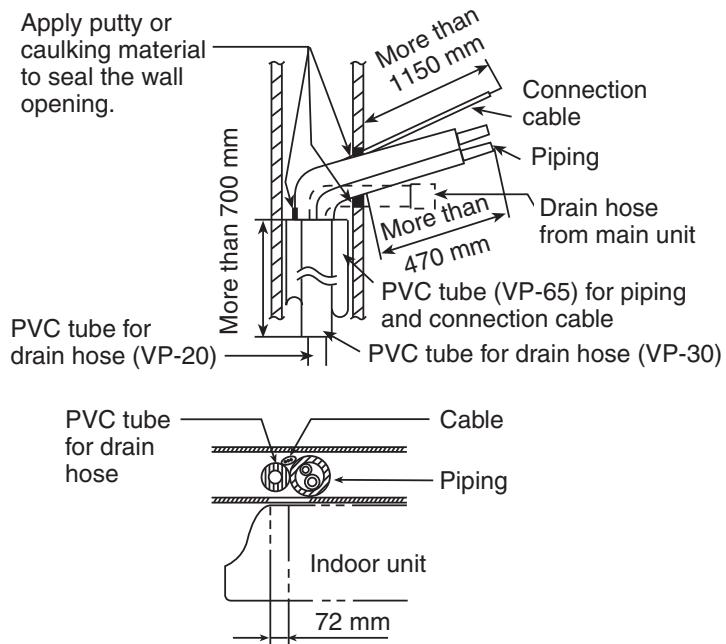
(This can be used for left rear piping and bottom piping also.)

Replace the drain hose

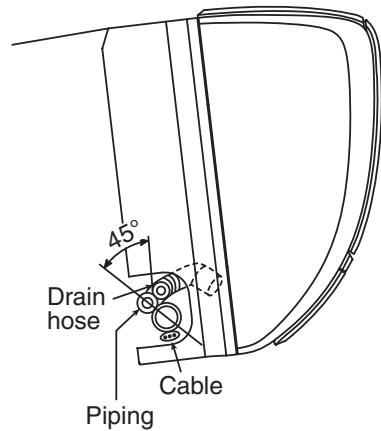
Rear view for left piping installation



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



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

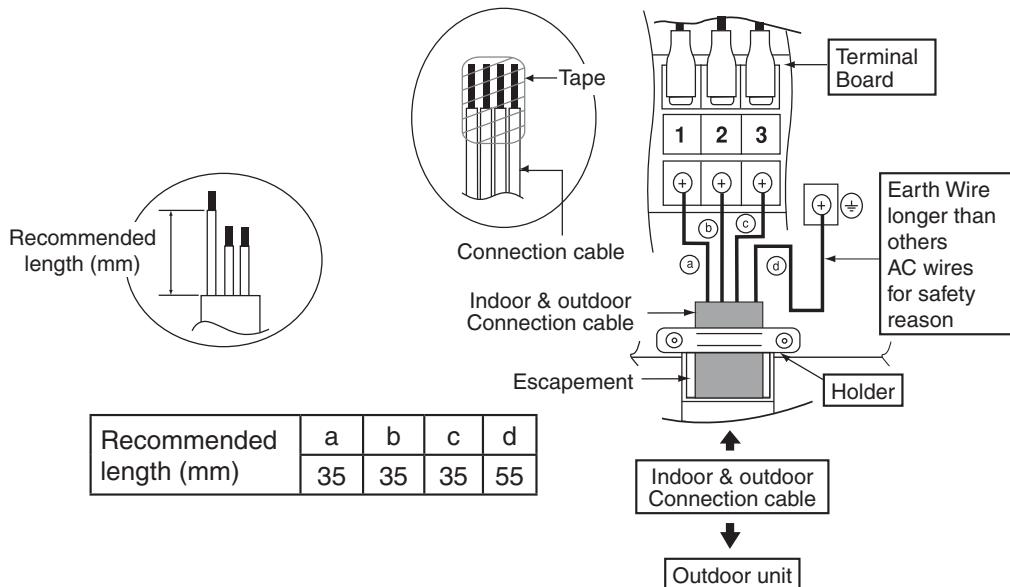


(For the right piping, follow the same procedure)

11.2.4 Connect the Cable to the Indoor Unit

- 1 The inside and outside connection cable can be connected without removing the front grille.
- 2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed $4 \times 1.5 \text{ mm}^2$ flexible cord, type designation 60245 IEC 57 or heavier cord.
- 3 Bind all the indoor and outdoor connection cable with tape and route the connection cable via the escapement.
- 4 Remove the tapes and connect the connection cable between indoor unit and outdoor unit according to the diagram below.

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



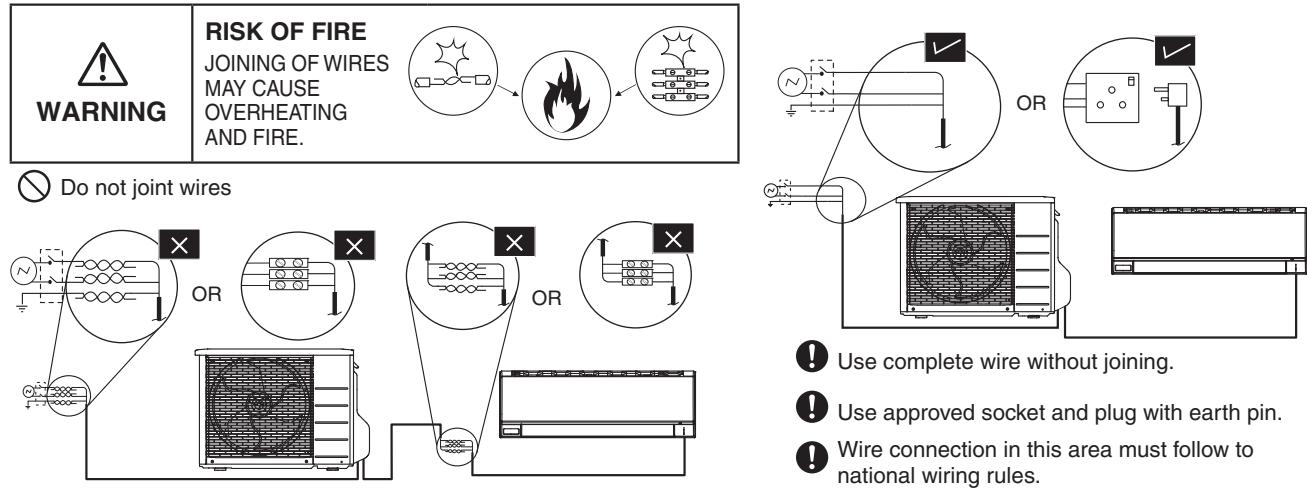
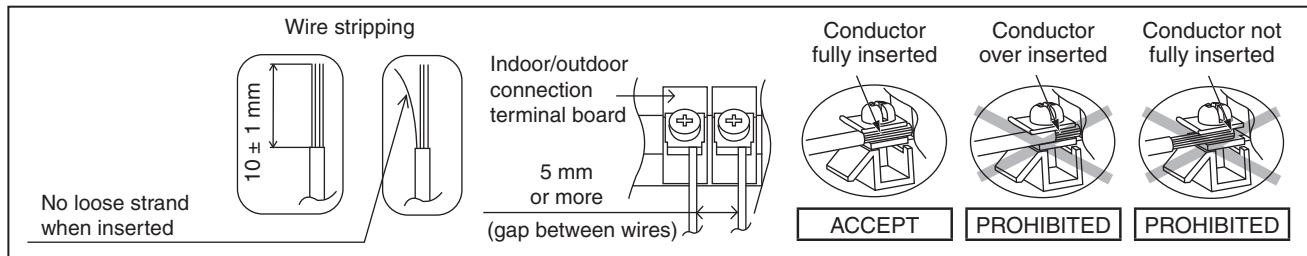
⚠️ WARNING

⚡ This equipment must be properly earthed.

Note:

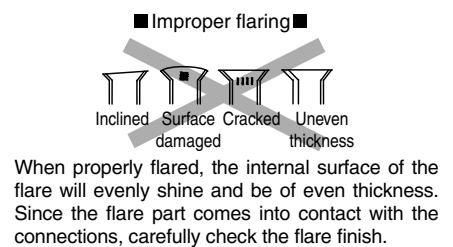
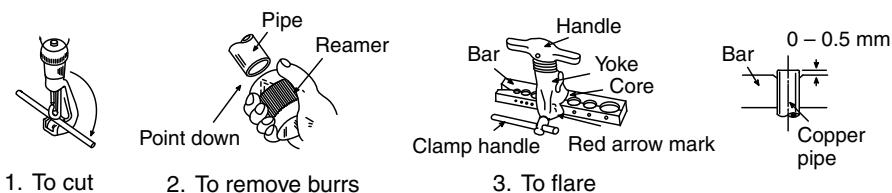
- Secure the connection cable onto the control board with the holder.
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires for safety reason.

11.2.4.1 Wire Stripping and Connecting Requirement



11.2.5 Cutting and Flaring the Piping

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



11.3 Outdoor Unit

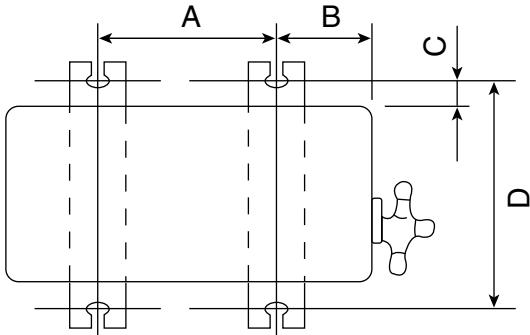
11.3.1 Install the Outdoor Unit

- After selecting the best location, start installation to Indoor/Outdoor Unit Installation Diagram.

1 Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut ($\varnothing 10$ mm).

2 When installing at roof, please consider strong wind and earthquake.

Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
S28***	613 mm	130 mm	24 mm	360.5 mm

11.3.2 Connect the Piping

11.3.2.1 Connecting the Piping to Indoor

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

Connect the piping

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

11.3.2.2 Connecting the Piping to Outdoor

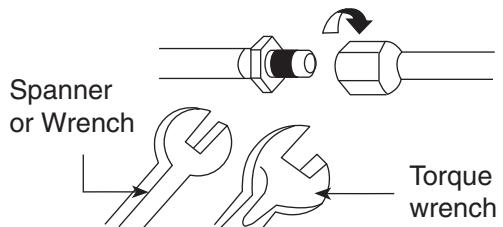
Decide piping length and then cut by using pipe cutter.
Remove burrs from cut edge.

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

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

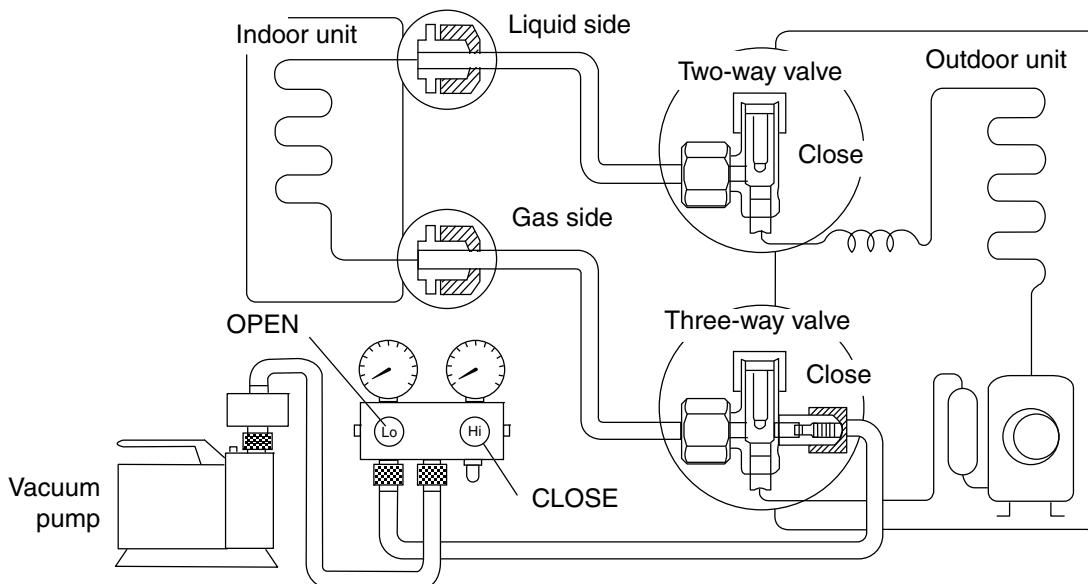
Do not overtighten, overtightening may cause gas leakage.

Piping size	Torque
6.35 mm (1/4")	[18 N·m (1.8 kgf·m)]
9.52 mm (3/8")	[42 N·m (4.3 kgf·m)]
12.7 mm (1/2")	[55 N·m (5.6 kgf·m)]
15.88 mm (5/8")	[65 N·m (6.6 kgf·m)]
19.05 mm (3/4")	[100 N·m (10.2 kgf·m)]



11.3.3 Evacuation of the Equipment

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

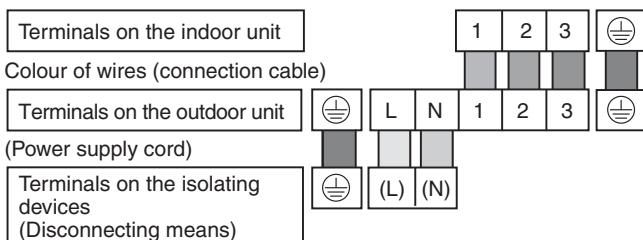


- 1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
 - Be sure to connect the end of the charging hose with the push pin to the service port.
- 2 Connect the center hose of the charging set to a vacuum pump.
- 3 Turn on the power switch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

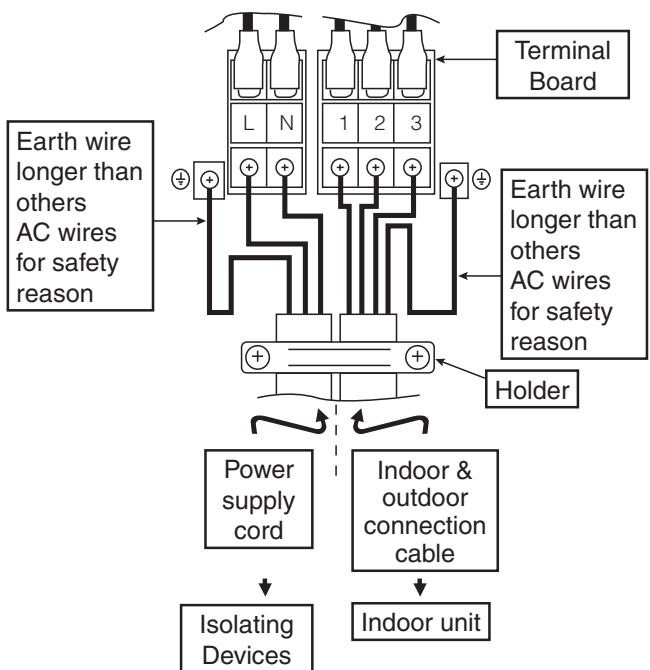
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in step ③ above take the following measure:
 - If the leak stops when the piping connections are tightened further, continue working from step ③.
 - If the leak does not stop when the connections are retightened, repair location 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 Connect the cable to the Outdoor Unit

- 1 Remove the control board cover from the unit by loosening the screw.
- 2 Cable connection to the power supply through Isolating Devices (Disconnecting means).
 - Connect approved type polychloroprene sheathed **power supply cord** 3 x 4.0 mm² type designation 60245 IEC 57 or heavier cord to the terminal board, and connect the others end of the cord to Isolating Devices (Disconnecting means).
 - Do not use joint power supply cord. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
 - In unavoidable case, joining of power supply cord between isolating devices and terminal board of air conditioner shall be done by using approved socket and plug rated 25A. Wiring work to both socket and plug must follow to national wiring standard.
- 3 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm² flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
- 4 Connect the power supply cord and connection cable between indoor unit and outdoor unit according to the diagram below.



- 5 Secure the power supply cord and connection cable onto the control board with the holder.
- 6 Attach the control board cover back to the original position with screw.
- 7 For wire stripping and connection requirement, refer to instruction 11.2.4 of indoor unit.



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

11.3.5 Piping Insulation

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

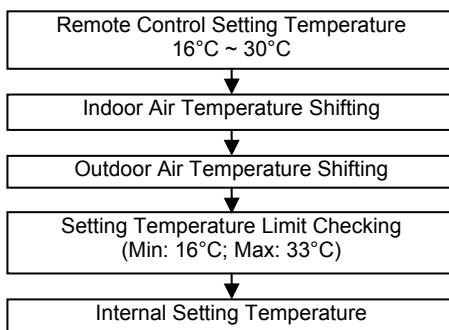
12. Operation Control

12.1 Basic Function

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

12.1.1 Internal Setting Temperature

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



12.1.2 Cooling Operation

12.1.2.1 Thermostat control

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

12.1.3 Soft Dry Operation

12.1.3.1 Thermostat control

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

12.1.3.2 iAUTO-X Operation

- iAUTO-X operation can be set using remote control.
- This operation is applied to faster cool down time of the room and comfort feel by thermal shift and fan speed control.
- Thermal control
 - The internal setting temperature will shift 1°C lower than remote control setting temperature for maximum 4 hours to provide extra cool and better comfort.
- Fan speed control
 - Fan speed selection is prohibited. Fan speed display at remote control is fixed at AUTO.
 - The internal fan speed will set to be SHi + iAUTO-X fan speed shift, it is slightly higher than SHi fan speed initially for maximum 30 minutes to achieve the setting temperature quickly. Then it will shift between SHi ~ Lo fan speed depends on intake and setting temperature.
- Vane control is follow remote control setting. Except for Auto horizontal vane, when room temperature more than 27°C, it will give a spot airflow (inner and outer vanes will be in a smaller distance). When room temperature cool down, it will either fixed at step 3 or step 1 (Showering effect for better comfort after room temperature cooled down) depends on the "intake - setting temperature".

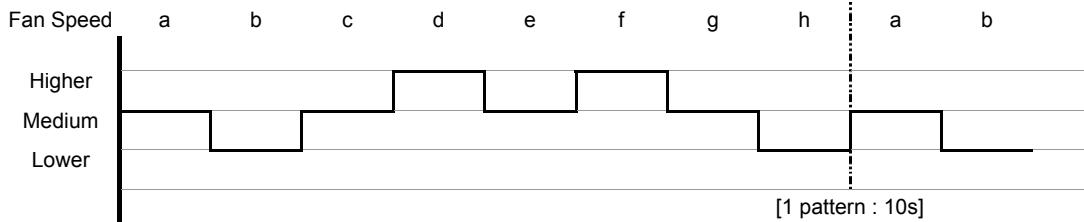
12.2 Indoor Fan Motor Operation

12.2.1 Basic Rotation Speed

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

Remote control	○	○	○	○	○
Tab	Hi	Me+	Me	Me-	Lo

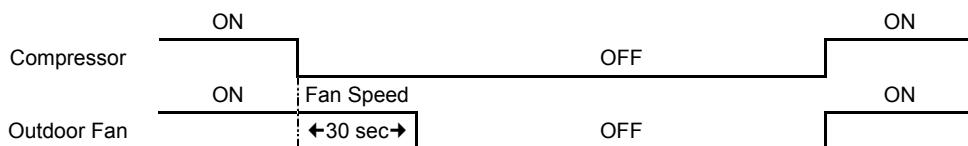
- Auto Fan Speed
 - According to room temperature and setting temperature, indoor fan speed is determined automatically.
 - The indoor fan will operate according to pattern below.



- Feedback control
 - Immediately after the fan motor is started, feedback control is performed once 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 H19 – fan motor error is detected. Operation stopped and could not be restarted.

12.3 Outdoor Fan Motor Operation

Outdoor fan motor is operated with one fan speed only. Outdoor fan turns on when compressor starts to operate. But outdoor fan will turns off 30 seconds after compressor stops to operate.



12.4 Airflow Direction

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

12.4.1 Vertical Airflow

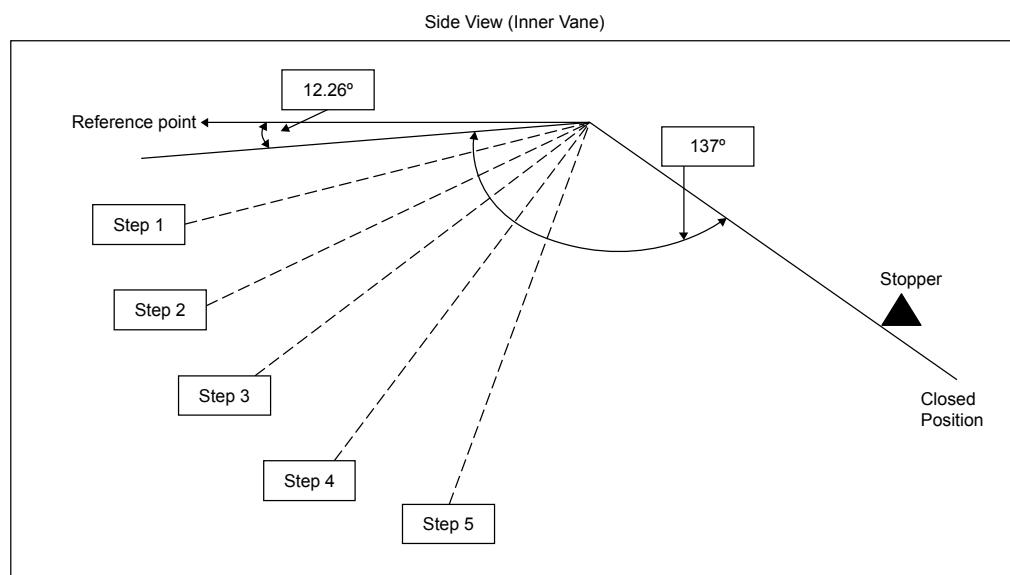
CS-S9/12RKV

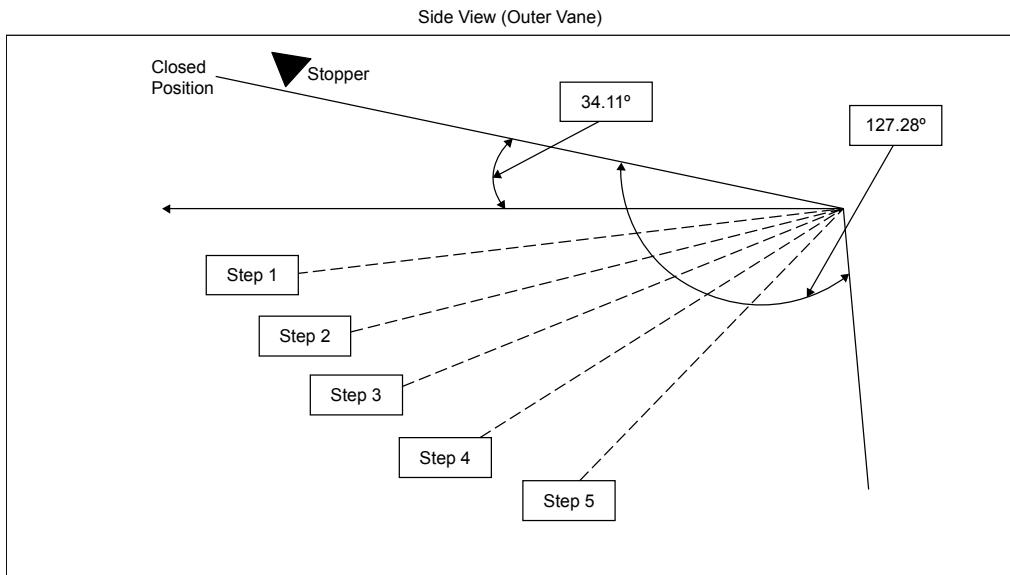
Operation Mode	Airflow Direction	Inner Vane Angle (°)					Outer Vane Angle (°)				
		1	2	3	4	5	1	2	3	4	5
Cooling	Auto	125 ~ 60					55 ~ 90				
	Manual	125	120	100	80	60	55	65	72	82	90
Soft Dry	Auto	125 ~ 60					55 ~ 90				
	Manual	125	120	100	80	60	55	65	72	82	90

CS-S18/24/28RKV

Operation Mode	Airflow Direction	Inner Vane Angle (°)					Outer Vane Angle (°)				
		1	2	3	4	5	1	2	3	4	5
Cooling	Auto	125 ~ 65					60 ~ 90				
	Manual	125	120	100	82	65	60	70	77	83	90
Soft Dry	Auto	125 ~ 65					60 ~ 90				
	Manual	125	120	100	82	65	60	70	77	83	90

- Automatic vertical airflow direction can be set using remote control; the vane swings up and down within the angles as stated above. It does not swing during fan motor stop. When the air conditioner is stopped using remote control, the vane will shift to close position.
- Manual vertical airflow direction can be set using remote control; the angles of the vane are as stated above and the positions of the vane are as figure below. When the air conditioner is stopped using remote control, the vane will shift to close position.





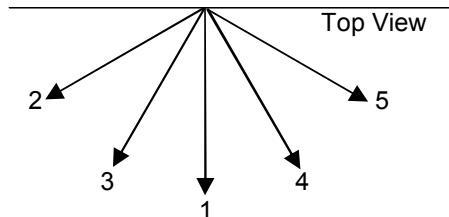
* The horizontal vane angle tolerance is within +/- 5 degree.

12.4.2 Horizontal Airflow

- Automatic airflow direction can be set using remote control; the vane swings left and right within the angles as stated below. It does not swing during fan motor stop.

Operation Mode	Vane Angle (°)
Cooling and soft dry	65 ~ 115 (S9/12RK) 70 ~ 110 (S18/24/28RK)

- Manual airflow direction can be set using remote control; the angles of the vane are as stated below and the positions of the vane are as figure below:



CS-S9/12RKV

Pattern	1	2	3	4	5
Airflow Direction Patterns at Remote Control					
Vane Angle (°)	90	65	77.5	102.5	115

CS-S18/24/28RKV

Pattern	1	2	3	4	5
Airflow Direction Patterns at Remote Control					
Vane Angle (°)	90	70	80	100	110

* The vertical vane angle tolerance is within +/- 5 degree.

12.5 Quiet Operation (Cooling Mode/Cooling Area of Dry Mode)

- Purpose
 - To provide quiet cooling operation compare to normal operation.
- Control condition
 - Quiet operation start condition
 - When Quiet button at remote control is pressed Quiet INDICATOR illuminates.
 - Quiet operation stop condition
 - When one of the following conditions is satisfied, quiet operation stops:
 - ECONAVI button is pressed.
 - iAUTO-X button is pressed.
 - AUTO COMFORT button is pressed.
 - Stop by OFF/ON button.
 - OFF Timer activates.
 - Quiet button is pressed again.
 - When quiet operation is stopped, operation is shifted to normal operation with previous setting.
 - When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.
 - When operation mode is changed, quiet operation is shifted to quiet operation of the new mode.
 - During quiet operation, if ON timer activates, quiet operation maintains.
 - After off, when on back, quiet operation is not memorized.
- Control content
 - Fan speed is changed from normal setting to quiet setting of respective fan speed.
 - Fan speed for quiet operation is reduced from setting fan speed.

12.6 Timer Control

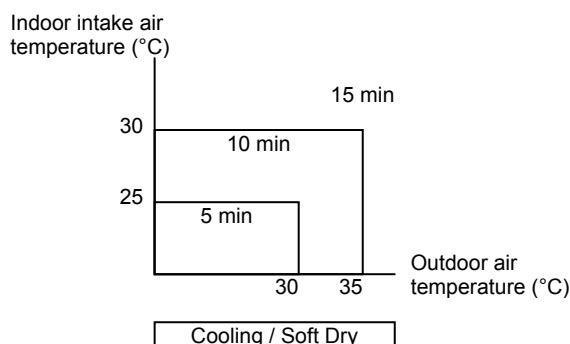
- There are 2 sets of ON and OFF timer is available to turn the unit ON or OFF at different preset time.
- If more than one timer had been set, the upcoming timer will be display and will activated in sequence.

12.6.1 ON Timer Control

ON Timer 1 and ON Timer 2 can be set using remote control, where the unit with timer set will start operation earlier than the setting time. This is to provide a comfortable environment when reaching the set ON time.

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

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



12.6.2 OFF Timer Control

OFF Timer 1 and OFF Timer 2 can be set using remote control, where the unit with timer set will stop at set OFF time.
Notes:

- 1 By pressing ON/OFF operation button, the ON Timer or OFF Timer setting will not be cancelled.
- 2 To cancel the previous timer setting, press CANCEL button.
- 3 To activate the previous timer setting, press SET button.
- 4 If main power supply is switched off, the Timer setting will be cancelled.

12.7 Random Auto Restart Control

- When the power supply is cut off during the operation of air conditioner, the compressor will re-operate within three to four minutes. There are 10 patterns to be selected randomly after power supply resumes.
- This control is not applicable during OFF/ON Timer setting.
- This control can be omitted by open the circuit of JP1 at indoor unit printed circuit board.

12.8 Indication Panel

LED	POWER	TIMER	AUTO COMFORT	NANOE-G	QUIET	iAUTO-X	ECONAVI
Color	Green	Orange	Green	Blue	Orange	Orange	Green
Light ON	Operation ON	Timer Setting ON	AUTO COMFORT Mode ON	NANOE-G Mode ON	QUIET Mode ON	iAUTO-X Mode ON	ECONAVI Mode ON
Light OFF	Operation OFF	Timer Setting OFF	AUTO COMFORT Mode OFF	NANOE-G Mode OFF	QUIET Mode OFF	iAUTO-X Mode OFF	ECONAVI Mode OFF

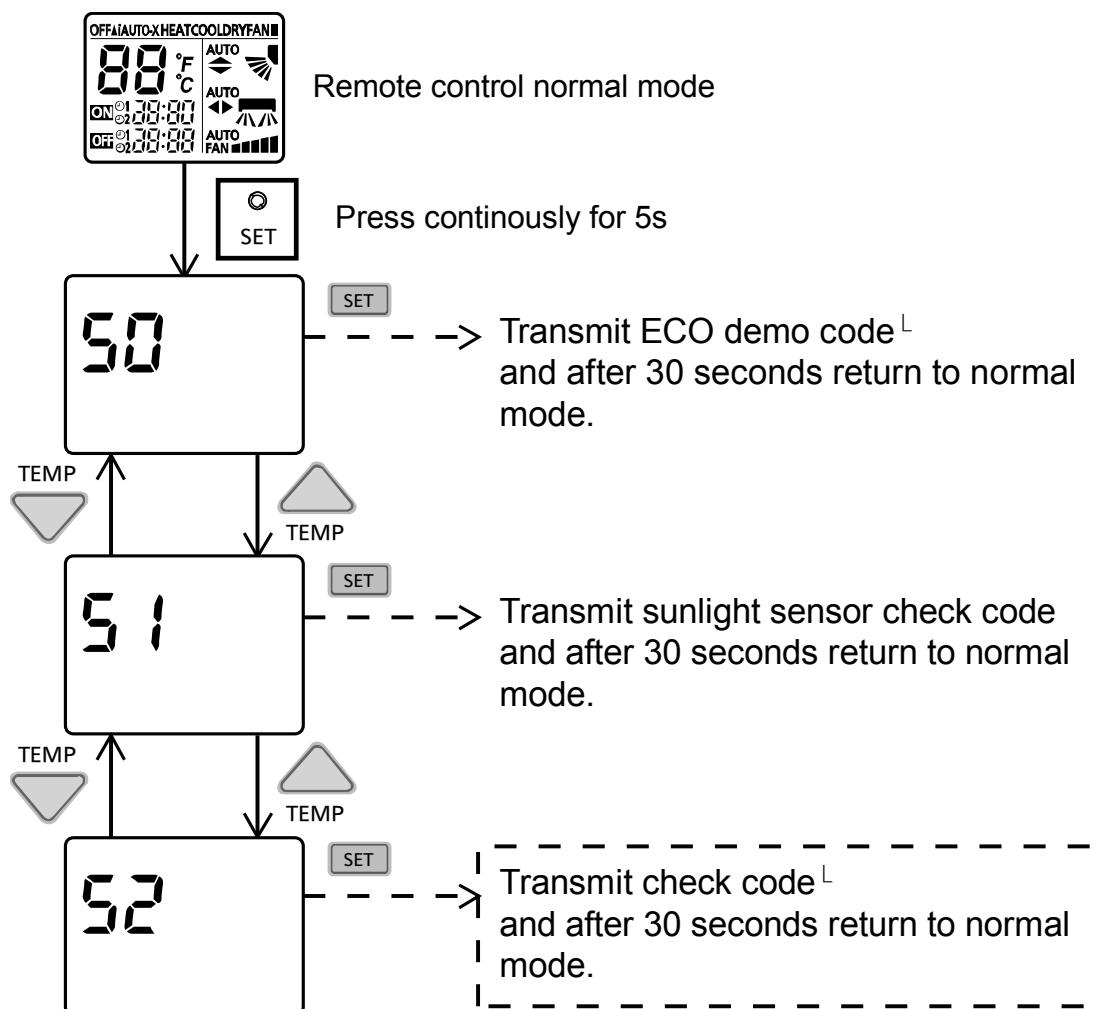
Note:

- If POWER LED blinks, the possible operation of the unit is operation mode judgment, or ON timer sampling.
- If TIMER LED blinks, there is an abnormal operation occurs.

12.9 nanoe-G Operation

- This operation provides clean air by producing great amount of negative ions and distribute through the discharge airflow to capture or deactivate molds, bacteria or viruses.
- nanoe-G operation start condition
 - During unit running at any operation mode, if nanoe-G operation is activated, combination operation (operation mode + nanoe-G operation) starts.
 - During unit is OFF, if nanoe-G operation is activated, nanoe-G individual operation starts.
- nanoe-G operation stop condition
 - When OFF/ON button is pressed to stop the operation.
 - When nanoe-G button is pressed.
 - When OFF Timer activates.
- nanoe-G operation pause condition
 - When indoor fan stop (during deice, odor cut control, thermostat off, etc.). nanoe-G operation resume after indoor fan restarts.
 - When indoor intake temperature $\geq 40^{\circ}\text{C}$. nanoe-G operation resume after indoor intake temperature $< 40^{\circ}\text{C}$ continuously for 30 minutes.
- Indoor fan control
 - During any operation mode combines with nanoe-G operation, fan speed follows respective operation mode. However, nanoe-G system enabled when fan speed ≥ 500 rpm to ensure proper negative ion distribution, nanoe-G system disabled when fan speed < 500 rpm.
 - During nanoe-G individual operation, only Auto Fan Speed is allowed. Even if Fan Speed button is pressed, no signal is sent to the unit and no change on remote control display.
- Airflow direction control
 - During any operation mode combines with nanoe-G operation, airflow direction follows respective operation mode.
 - During nanoe-G individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to the unit and no change on remote control display.
- Timer control
 - When ON Timer activates when unit stops, previous operation resumes and restored last saved nanoe-G operation status.
 - When ON Timer activates during any operation, no change on current operation.
 - When OFF Timer activates during any operation, all operation stops and the latest nanoe-G operation status is saved.
- Indicator
 - When nanoe-G starts, nanoe-G indicator ON.
- Remote control receiving sound
 - Normal operation → nanoe-G operation : Beep
 - Nanoe-G operation → Normal operation : Beep
 - Stop → nanoe-G individual operation : Beep
 - Nanoe-G individual operation → Stop : Long Beep
- Power failure
 - During nanoe-G individual operation, if power failure occurs, after power resumes, nanoe-G individual operation resumes immediately.
 - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.

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



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

When nanoe-G indicator blinks, it indicates error listed below:

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

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

12.10 In-filter Deactivation Operation

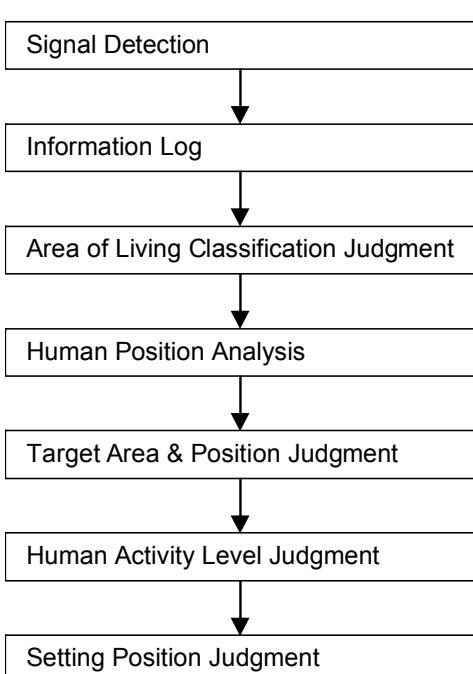
- This operation helps to deactivate virus and bacteria on filter after the unit turned off using nanoe-G generator.
- In-filter deactivation start condition
 - nanoe-G is in ON condition before the unit is turned off either by OFF/ON button or OFF Timer.
 - Elapsed time from previous in-filter deactivation operation is more than 24 hrs.
 - Unit operation time before unit is turned off is more than 2 hours or accumulated unit operation time achieves 4hrs if unit operation time less than 2 hours.
- In-filter deactivation stop condition
 - The unit is turned on.
 - nanoe-G generator operation time during in-filter deactivation operation has achieved 120 minutes.
 - The unit received disable signal from remote control.
 - Nanoe-G abnormality occurs.
- Control contents:
 - When the unit operate in Cool or Dry mode before turned off.
 1. The unit will operate fan operation, fan motor will operate at 500 rpm for 30 minutes then stop.
 2. During fan operation, horizontal vane will fixed at 30° (outer vane) and 63° (inner vane) for 30 minutes then close.
 3. After 30 minutes the unit will continue with common control.
 - Common control.
 - nanoe-G generator will operate for 120 minutes.
- Timer control
 - When ON Timer activates during in filter deactivation operation, in-filter deactivation operation stops.
 - When OFF Timer activates during in filter deactivation operation, in-filter operation will continue.
- Indicator
 - nanoe-G indicator ON.
 - Power indicator OFF.
- Enable or disable selection
 - Press NANOE-G button continuously for 5 seconds to disable or enable in-filter deactivation operation.
- Remote control receiving sound
 - Enable in-filter deactivation operation : Beep
 - Disable in-filter deactivation operation : Long beep
- Power failure
 - During in-filter operation, if power failure occurs, after power resumes in-filter deactivation operation will not resume.

12.11 AUTO COMFORT and ECONAVI Operation

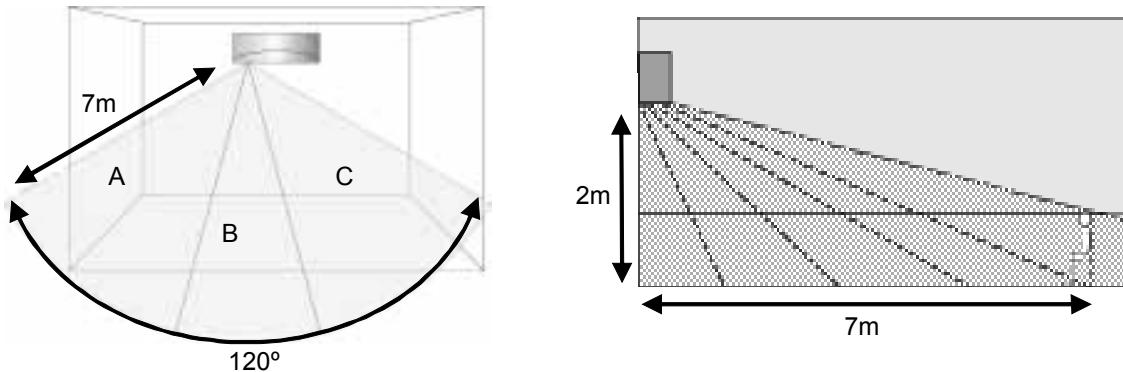
- Area of human availability, activity level and absent is judged based on pulses by using 2 infrared sensors. The internal setting temperature shift, fan speed and horizontal airflow direction are adjusted in order to provide comfort environment while maintain the energy saving level.
- AUTO COMFORT start condition:
 - When AUTO COMFORT button is pressed.
- AUTO COMFORT stop conditions:
 - When AUTO COMFORT button is pressed again.
 - When unit is OFF by OFF/ON button.
 - When unit is OFF when OFF TIMER activates.
 - When unit is OFF by AUTO OFF/ON button at indoor unit.
 - When QUIET operation activates.
 - When $\blacktriangleleft\triangleright$ button is pressed.
 - When iAUTO-X mode is selected.
 - When ECONAVI mode is selected.
- ECONAVI start condition:
 - When ECONAVI button is pressed.
- ECONAVI stop conditions:
 - When ECONAVI button is pressed again.
 - When unit is OFF by OFF/ON button.
 - When unit is OFF when OFF TIMER activates.
 - When unit is OFF by AUTO OFF/ON button at indoor unit.
 - When QUIET operation activates.
 - When $\blacktriangleleft\triangleright$ button is pressed.
 - When iAUTO-X mode is selected.
 - When AUTO COMFORT mode is selected.

12.11.1 Human Activity Sensor

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



12.11.1.1 Signal Detection



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

Signal detection		Possible detected human position area
Sensor 1	Sensor 2	
1	0	C
0	1	A
		B
1	1	A & B
		B & C
		A & C
		A, B & C
0	0	-

12.11.1.2 Information Log

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

12.11.1.3 Area of Living Classification Judgment

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

12.11.1.4 Human Position Analysis

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

12.11.1.5 Target Area and Position Judgment

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

12.11.1.6 Human Activity Level Judgment

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

12.11.1.7 Setting Position Judgment

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

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

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

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

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

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

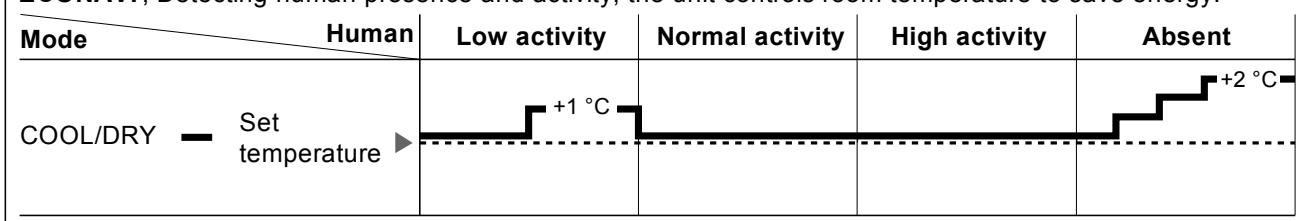
- When 3 activity areas have same activity level, the horizontal airflow direction louver will swing left and right.

12.11.1.8 Setting Temperature and Fan Speed Shift

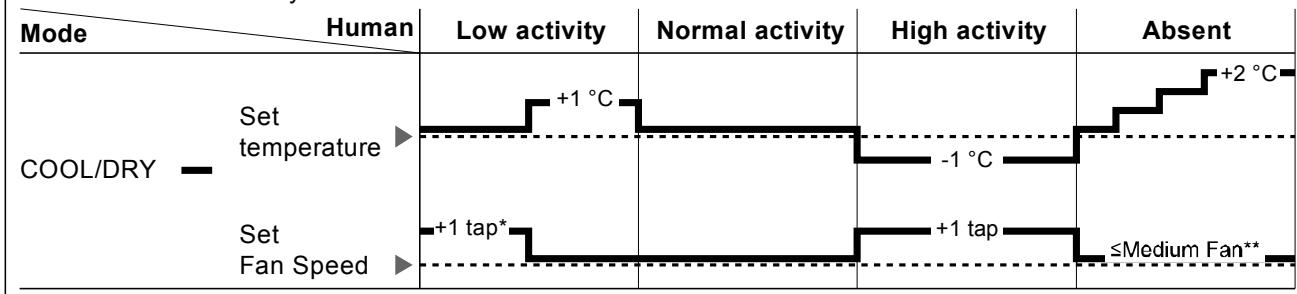
- Cooling Dual Sensor



ECONAVI; Detecting human presence and activity, the unit controls room temperature to save energy.



AUTO COMFORT; Detecting human presence and activity, the unit controls room temperature to keep human comfortable consistently.

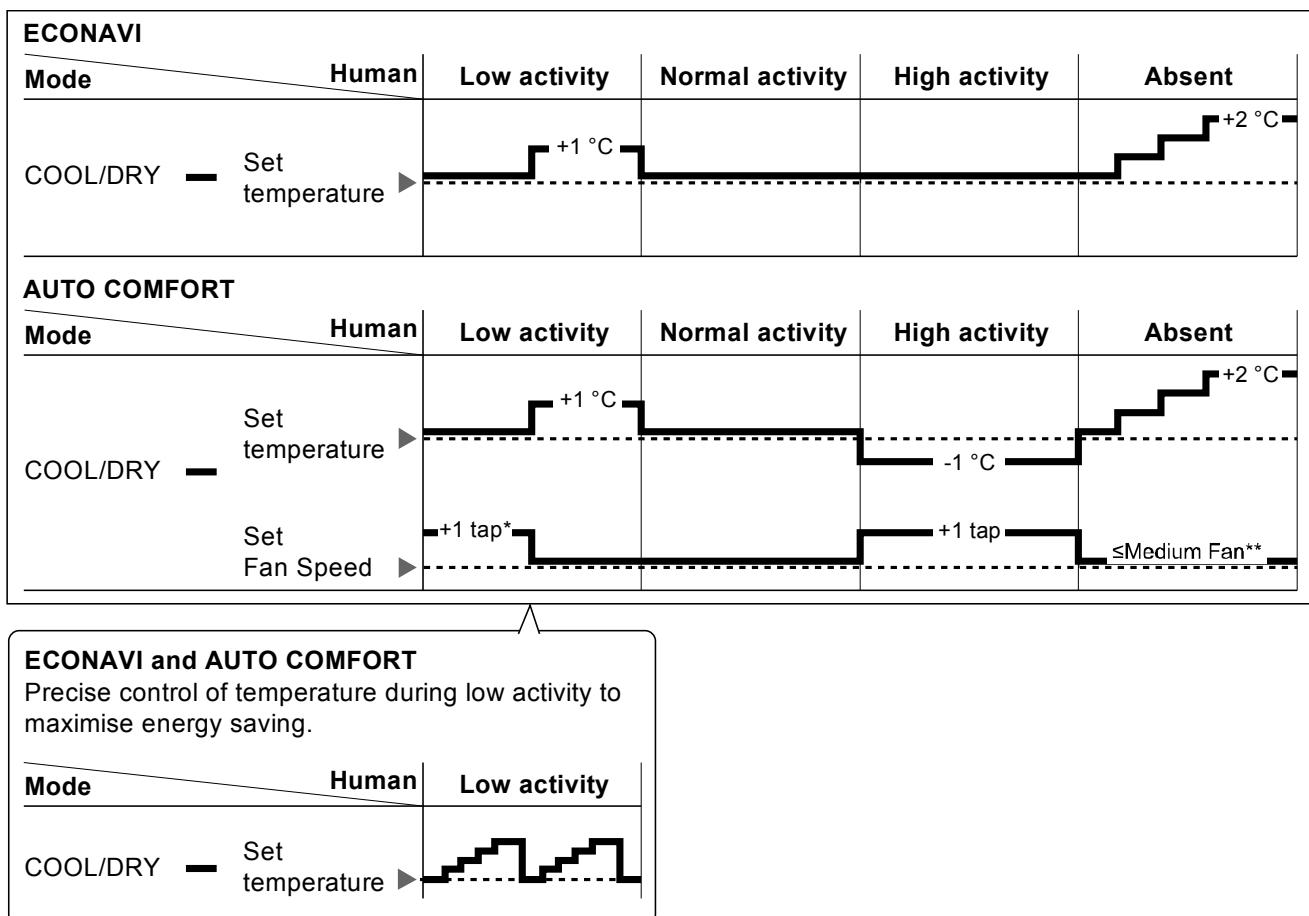


* During low activity, fan speed 1 tap up for first 15 minutes or until set temperature is reached.

** During human absence, maximum fan speed for COOL/DRY mode is medium fan.

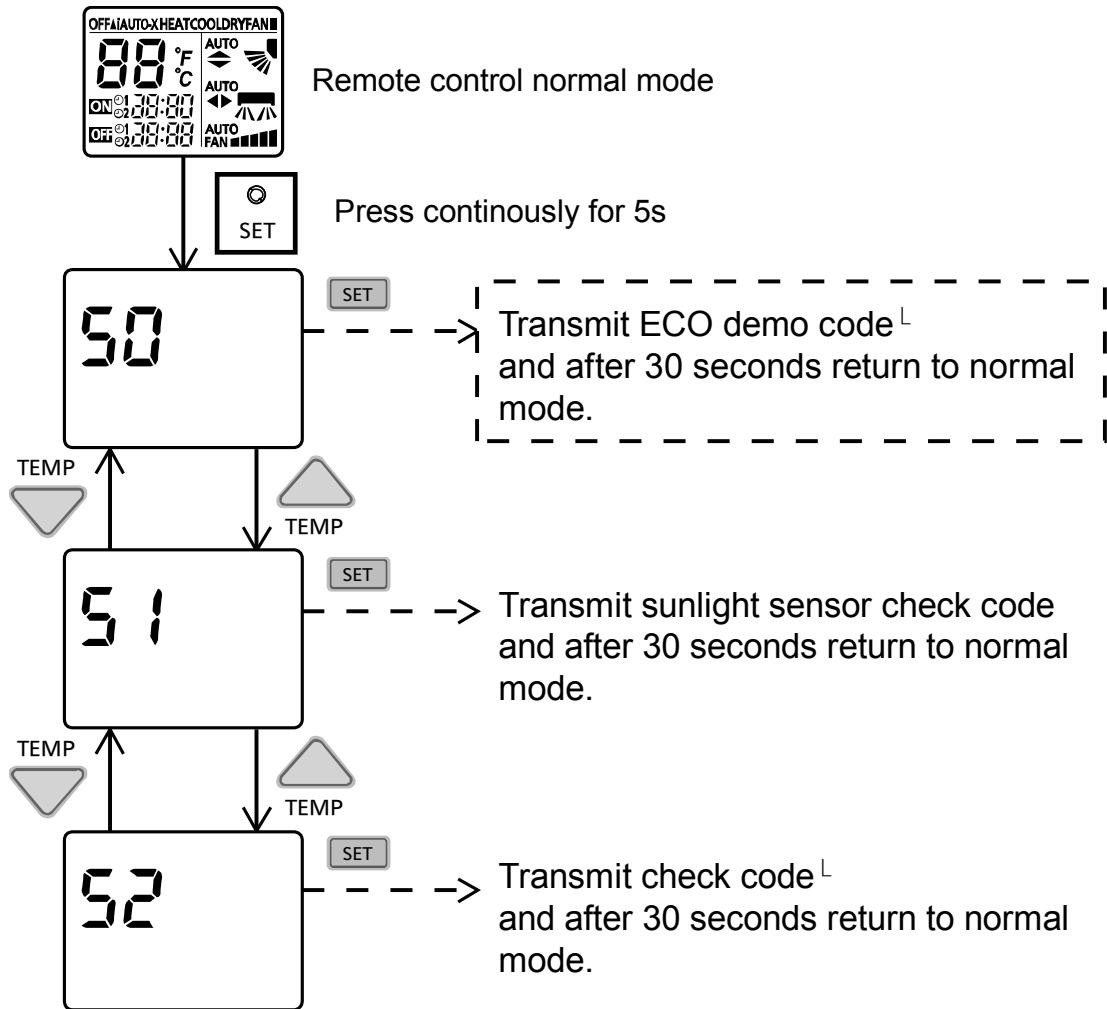
12.11.1.9 Rhythmic Temperature Wave Operation

- To further maximize the energy saving during ECONAVI or AUTO COMFORT operates at low activity level.
- Start condition
 - The unit is operates in Cool or Dry mode under ECONAVI or AUTO COMFORT operation, and
 - Human activity sensor detects low activity level continuously for 60 minutes, and
 - ON Timer is not activated.
- Stop condition
 - Unit is off, or
 - ECONAVI or AUTO COMFORT is off, or
 - Human activity sensor detects high activity level or absent, or
 - ON Timer is activated.
- Control contents
 - When all start conditions complied, set temperature will shift accordingly as following:



12.11.1.10 ECONAVI and AUTO COMFORT Demo Mode

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



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

Infrared Sensor		Vane Position	Fan Speed
Sensor 1	Sensor 2		
1	0	5	HI
1	1	Auto Swing	HI
0	1	2	HI
0	0	Auto Swing	LO

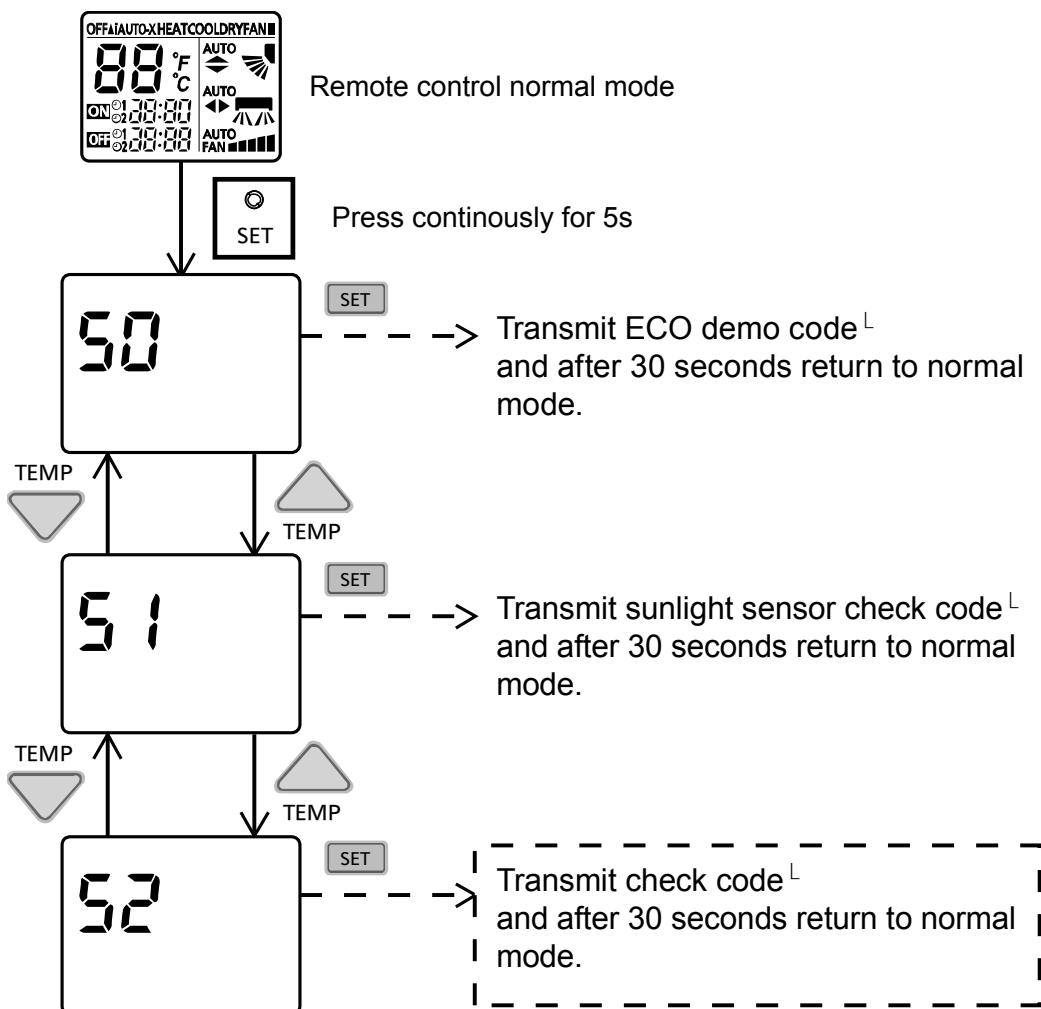
- The target area will maintain for 5 seconds before changeover to next detection.
- If no activity detection, the last action will maintain for 30 seconds before changeover to human absence status.

12.11.1.11 Human Activity Sensor Abnormality

- Abnormality detection:
 - Connector disconnection / Wire cut abnormality
 - Sensor judge Hi level continuously for 25 seconds
 - Circuit abnormality
 - 70 seconds after power ON, if human activity sensor judge Lo level continuously for 25 seconds
- Error Code judgment
 - When abnormality happened, internal counter increase by 1 time.
 - Human activity sensor power OFF, retry after 5 seconds.
 - When the human activity sensor maintains normal condition for 120 seconds, the counter reset or AC reset.
 - When abnormality counter reached 4 times, H59 occurred – No TIMER indicator blinking.
- When error code happened, the unit is able to operate without AUTO COMFORT / ECONAVI.

12.11.1.12 Human Activity Sensor Check Mode

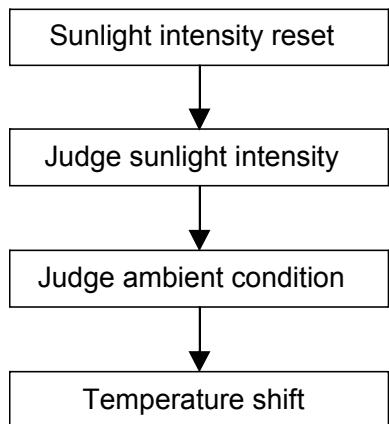
- To enable Human Activity sensor abnormality check mode, during ECONAVI operation ON:



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

12.11.2 Sunlight Sensor

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

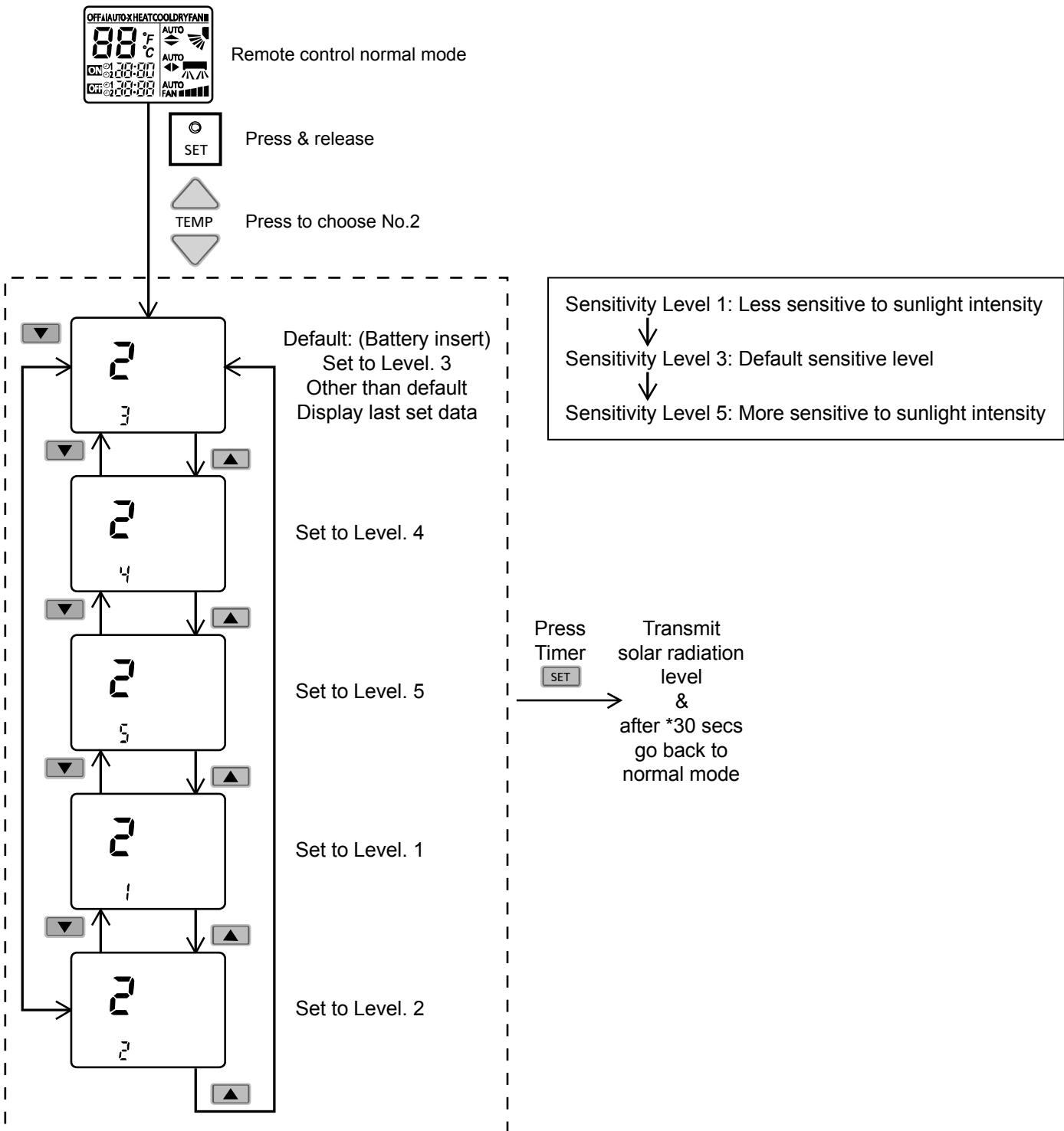


12.11.2.1 Sunlight Intensity Reset

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

12.11.2.2 Judge Sunlight Intensity

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

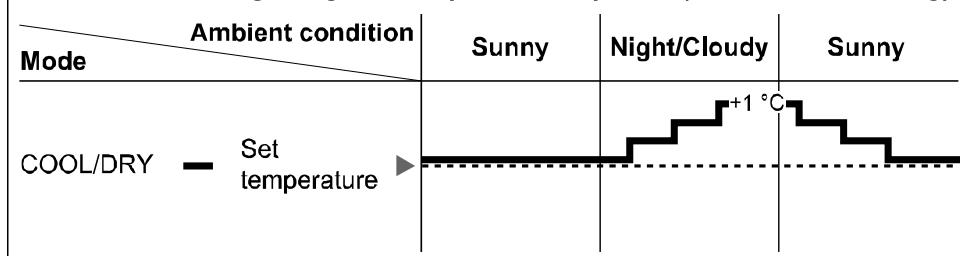


12.11.2.3 Judge Ambient Condition

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

12.11.2.4 Temperature Shift

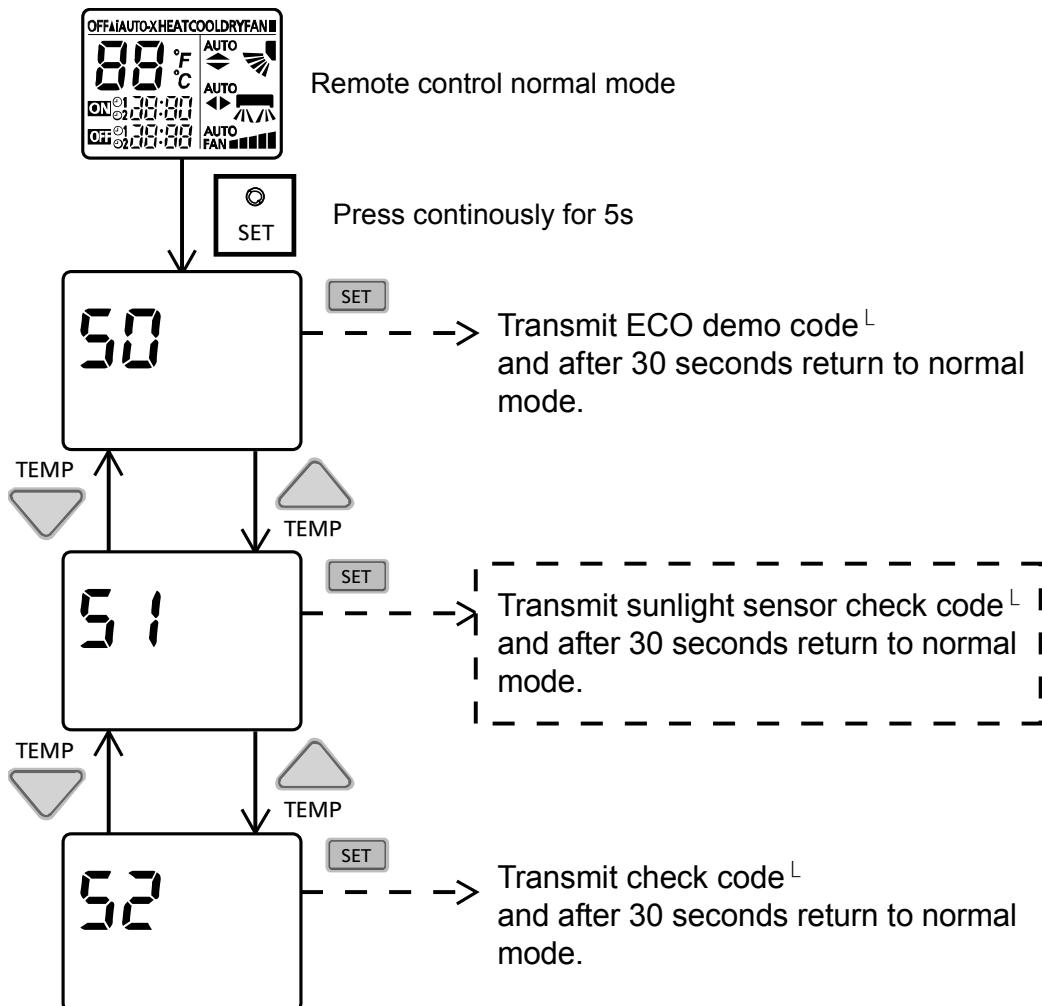
ECONAVI ; Detecting sunlight intensity, the unit adjust temperature to save energy.



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

12.11.2.5 Sunlight Sensor Check Mode

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



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

12.11.2.6 Sunlight Sensor Abnormality

- Abnormality detection:
 - When ECONAVI is ON, if the sunlight intensity value below minimum level continuously for 24 hours, the sunlight sensor disconnection error counter will increase by 1 time. If the ECONAVI is OFF, the 24 hours timer will be reset, but the sunlight sensor disconnection error counter will not be reset.
 - Error Code judgment
 - When sunlight sensor disconnection error counter reached 15 times. H70 occurred.
 - No TIMER indicator or ECONAVI indicator blink.
 - When error code happened, the unit is able to operate without sunlight sensor.

13. Protection Control

13.1 Restart Control (Time Delay Safety Control)

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

13.2 30 Seconds Forced Operation

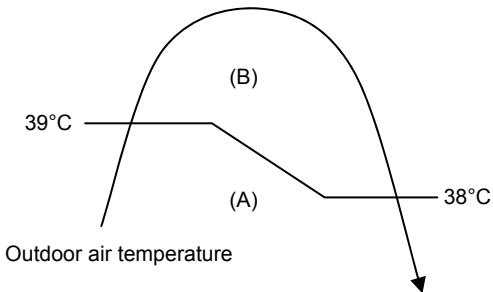
- Once the air conditioner is turned on, the compressor will not stop within 30 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON button at the remote control is permitted or the Auto OFF/ON button at indoor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

13.3 Total Running Current Control

- When the outdoor unit total running current (AC) exceeds X value, the frequency instructed for compressor operation will be decreased.
- If the running current does not exceed X value for 10 seconds, the frequency instructed will be increased.
- However, if total outdoor unit running current exceeds Y value, compressor will be stopped immediately for 3 minutes.

Model	S9***		S12***		S18***		S24***		S28***	
Operation Mode	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)
Cooling / Soft Dry (A)	5.7	17	7.6	15.0	12.0	15.0	12.0	19.0	13.3	19.0
Cooling / Soft Dry (B)	5.2	17	7.0	15.0	11.6	15.0	11.6	19.0	12.3	19.0

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

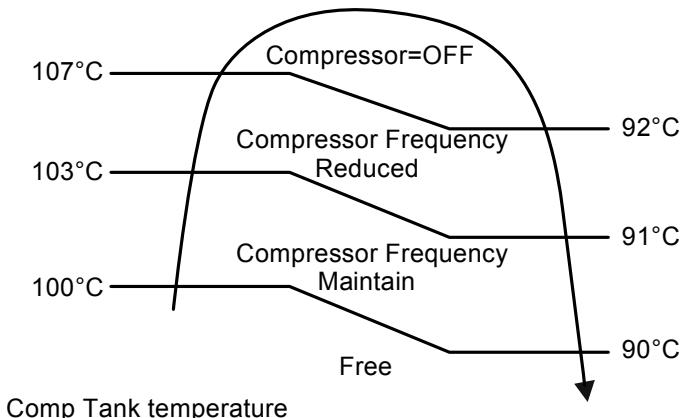


13.4 IPM (Power Transistor) Prevention Control

- DC Peak Current Control
 - When electric current to IPM exceeds set value of 13.2 A (S9RK), 13.1 A (S12RK), 17.1 A (S18RK), 27.7 A (S24RK), 18.5 A (S28RK) within 30 seconds, the compressor will stop operation. Then, operation will restart after 1 minute.
 - For second occurrence onwards, if the set value exceeds again within 30 seconds, the compressor will stop operation. Then, operation will restart after 3 minutes.
 - If this condition repeats continuously for 7 times, all indoor and outdoor relays will be cut off, timer LED will be blinking ("F99" is indicated).
- Overheating prevention
 - When the IPM temperature rises to 120°C the compressor will stop immediately.
 - Compressor operation restarts after 3 minutes the temperature decreases to 110°C.
 - If this condition repeats continuously 4 times within 20 minutes, timer LED will be blinking ("F96" is indicated).

13.5 Compressor Overheating Prevention Control

- Instructed frequency for compressor operation will be regulated by compressor temperature. The changes of frequency are as below.
- If compressor temperature exceeds 107°C, compressor will be stopped, occurs 4 times per 20 minutes, timer LED will be blinking. "F97" is indicated.



13.6 Low Pressure Prevention Control (Gas Leakage Detection)

- Control start conditions
 - For 5 minutes, the compressor continuously operates and outdoor total current is between 0.65 A and 1.65 A.
 - During Cooling and Soft Dry operation:
Indoor suction temperature - indoor piping temperature is below 4°C.
- Control contents
 - Compressor stops (and restart after 3 minutes).
 - If the conditions above happened 2 times within 20 minutes, the unit will:
 - Stop operation.
 - Timer LED blinks and "F91" indicated.

13.7 Low Frequency Protection Control 1

- When the compressor operates at frequency lower than 24 Hz continued for 240 minutes, the operation frequency will be changed to 23 Hz for 2 minutes.

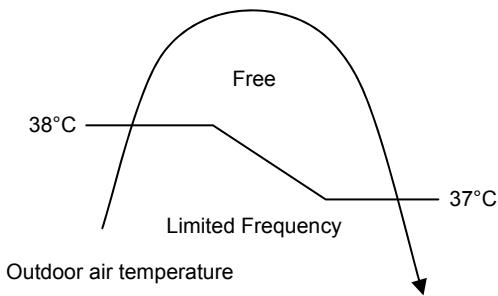
13.8 Low Frequency Protection Control 2

- When all below conditions comply, the compressor frequency will changed to lower frequency.

Temperature, T, for:	Cooling / Soft Dry
Indoor intake air (°C)	T < 14 or T ≥ 30
Outdoor air (°C)	T < 13 or T ≥ 38
Indoor heat exchanger (°C)	T < 30

13.9 Outdoor Air Temperature Control

- The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below.
- This control will begin 1 minute after the compressor starts.
- Compressor frequency will adjust based on outdoor air temperature.



13.10 Cooling Overload Control

- Pipe temperature limitation / restriction.
 - Detects the outdoor pipe temperature and carry out restriction / limitation below (Limit the compressor operation frequency).
 - The compressor stops if outdoor pipe temperature exceeds 61°C (S9RK), 63°C (S12, 18, 24, 28RK).
 - If the compressor stops 4 times in 20 minutes, Timer LED blinks ("F95" indicated: Outdoor high pressure rise protection).

13.11 Freeze Prevention Control 1

- When indoor heat exchanger temperature is lower than 0°C continuously for 6 minutes, compressor will stop operation.
- Compressor will resume its operation 3 minutes after the indoor heat exchanger is higher than 5°C.
- At the same time, indoor fan speed will be higher than during its normal operation.
- If indoor heat exchanger is higher than 5°C for 5 minutes, the fan speed will return to its normal operation.

13.12 Freeze Prevention Control 2

- Control start conditions
 - During Cooling operation and soft dry operation.
 - During thermo OFF condition, indoor intake temperature is less than 10°C or
 - Compressor stops for freeze prevention control
 - Either one of the conditions above occurs 5 times in 60 minutes.
- Control contents
 - Operation stops.
 - Timer LED blinks and "H99" indicated.

13.13 Dew Prevention Control

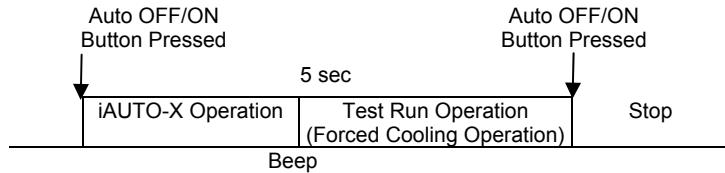
- To prevent dew formation at indoor unit discharge area.
- This control will be activated if:
 - Outdoor air temperature and indoor pipe temperature judgment by microcontroller is fulfilled.
 - When COOL or DRY mode is operated more than 20 minutes or more.
- This control stopped if
 - Compressor stopped.
 - Remote Control setting changed (fan speed / temperature).
 - Outdoor air temperature and indoor intake temperature changed.
- Fan speed will be adjusted accordingly in this control.

13.14 Odor Cut Control

- To reduce the odor released from the unit.
 - Start condition
 - AUTO FAN Speed is selected during COOL or DRY operation.
 - During freeze prevention control and timer preliminary operation, this control is not applicable.
 - Control content
 - Depends on compressor conditions:
 1. Compressor OFF → Compressor ON.
The indoor unit fan stops temporarily and then starts to blow at minimum airflow for 50 seconds.
 2. Compressor ON → Compressor OFF.
The indoor unit fan stops for 90 seconds and then blows at minimum airflow for 20 seconds.

14. Servicing Mode

14.1 Auto Off/On Button



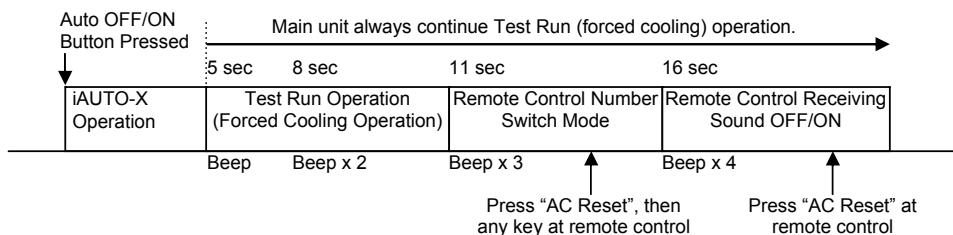
1 iAUTO-X OPERATION MODE

The iAUTO-X 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.

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



3 REMOTE CONTROL NUMBER SWITCH MODE

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

There are 4 types of remote control transmission code could be selected. 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 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

4 REMOTE CONTROL RECEIVING SOUND OFF/ON MODE

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

Press Auto OFF/ON button to toggle remote control receiving sound.

- Short “beep”: Turn OFF remote control receiving sound.
- Long “beep”: Turn ON remote control receiving sound.

After Auto OFF/ON button is pressed, the 20 seconds counter for Remote Control Receiving Sound OFF/ON Mode is restarted.

14.2 Remote Control Button

14.2.1 SET Button

- To check remote control transmission code and store the transmission code to EEPROM.
 - Press “Set” button by using pointer.
 - Press “Timer Set” button until a “beep” sound is heard as confirmation of transmission code change.
 - LCD returns to original display if remote control does not operate for 30 seconds.
- To limit set temperature range for iAUTO-X, COOL & DRY mode.
 - Press “Set” button by using pointer.
 - Press TEMP increment or decrement button to choose No. 3.
 - Press Timer increment or decrement button to select desired temperature low limit of set temperature for iAUTO-X, COOL & DRY mode.
 - Press Timer Set button to confirm low limit selection.
 - Press TEMP increment or decrement button to choose No. 4.
 - Press Timer decrement or increment button to select desired temperature high limit of set temperature for iAUTO-X, COOL & DRY mode.
 - Press Timer Set button to confirm high limit selection.
 - LCD returns to original display if remote control does not operate for 30 seconds or press Timer Cancel button.

14.2.2 RESET (RC)

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

14.2.3 RESET (AC)

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

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.

14.2.6 TEMP ▽

- To change remote control set temperature range from 16°C ~ 30°C (60°F ~ 86°F) to 20°C ~ 30°C (68°F ~ 86°F).
 - Press continuously for 15 seconds.

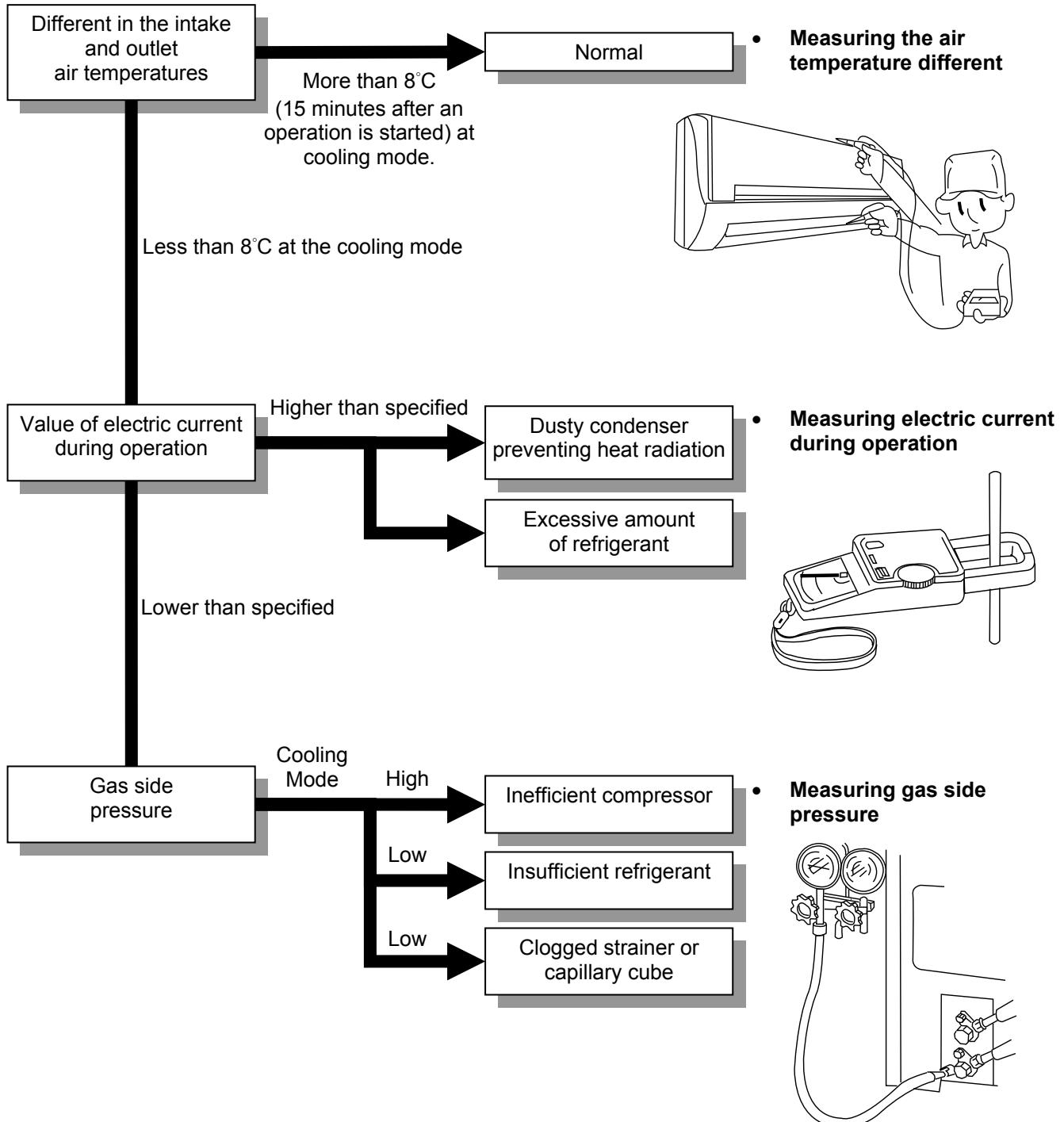
15. Troubleshooting Guide

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.

	Gas Pressure MPa (kg/cm ² G)	Outlet air Temperature (°C)
Cooling Mode	0.9 ~ 1.2 (9 ~ 12)	12 ~ 16

Condition: Indoor fan speed = High
Outdoor temperature = 35°C at cooling mode.
Compressor operate at rated frequency



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.

15.2 Breakdown Self Diagnosis Function

15.2.1 Self Diagnosis Function (Three Digits Alphanumeric Code)

- Once error occurred during operation, the unit will stop its operation, and Timer LED blinks.
- Although Timer LED goes off when power supply is turned off, if the unit is operated under a breakdown condition, the LED will ON again.
- In operation after breakdown repair, the Timer LED will not blink. The last error code (abnormality) will be stored in IC memory.

15.2.2 To Make a Diagnosis

- Timer LED starts to blink and the unit automatically stops the operation.
- Press the CHECK button on the remote control continuously for 5 seconds.
- "--" will be displayed on the remote control display.
Note: Display only for "--" (No signal transmission, no receiving sound and no Power LED blinking)
- Press the TIMER ▲ or ▼ button on the remote control. The code "H00" (no abnormality) will be displayed and signal will be transmit to the main unit.
- Each press of the button (▲ or ▼) will increase error code number and transmit error code signal to the main unit.
- When the latest abnormality code on the main unit and code transmitted from the remote control are matched, Power LED will light up for 30 seconds and a "beep" sound (continuously for 4 seconds) will be heard. If no codes are matched, Power LED will light up for 0.5 seconds and no sound will be heard.
- The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
- The LED will be off if the unit is turned off or the RESET button on the main unit is pressed.



15.2.3 To Display Memorized Error Code (Protective Operation)

- Turn power on.
- Press the CHECK button on the remote control
- "--" will be displayed on the remote control display.
Note: Display only for "--" (No signal transmission, no receiving sound and no Power LED blinking)
- Press the TIMER ▲ or ▼ button on the remote control. The code "H00" (no abnormality) will be displayed and signal will be transmit to the main unit.
- Each press of the button (▲ or ▼) will increase error code number and transmit error code signal to the main unit.
- When the latest abnormality code on the main unit and code transmitted from the remote control are matched, Power LED will light up for 30 seconds and a "beep" sound (continuously for 4 seconds) will be heard. If no codes are matched, Power LED will light up for 0.5 seconds and no sound will be heard.
- The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
- The same diagnosis can be repeated by turning power on again.

15.2.4 To Clear Memorized Error Code after Repair (Protective Operation)

- Turn power on (in standby condition).
- Press the AUTO button for 5 seconds (a "beep" sound is heard) on the main unit to operate the unit at Forced Cooling Operation Mode.
- Press the CHECK button on the remote control for about 1 second with a pointed object to transmit signal to main unit. A "beep" sound is heard, and the Error Code is cleared.

15.2.5 Temporary Operation (Depending On Breakdown Status)

- Press the Auto OFF/ON button on the main unit (a "beep" sound is heard) to operate the unit. (Remote control is enable again).
- The unit can be temporarily be used until repaired.

Error Code	Operation	Temporary items
H23	Cooling	Emergency Operation
H27, H28	Cooling	with limited power

15.3 Error Code Table

Diagnosis display	Abnormality / Protection control	Abnormality Judgment	Emergency Operation	Primary location to verify
H00	No abnormality detected	-	Normal operation	
H11	Indoor / Outdoor abnormal communication	> 1 min after starting operation	Indoor fan operation only	<ul style="list-style-type: none"> • Internal / external cable connection • Indoor / outdoor PCB
H12	Connection capability rank abnormality	Continuously for 90 sec after power supplied	-	-
H14	Indoor intake air temperature sensor abnormality	Continue for 5 sec.	-	<ul style="list-style-type: none"> • Intake air temperature sensor (defective or disconnected)
H15	Outdoor compressor temperature sensor abnormality	Continue for 5 sec.	-	<ul style="list-style-type: none"> • Compressor temperature sensor (defective or disconnected)
H16	Outdoor current transformer open circuit	-	-	<ul style="list-style-type: none"> • Outdoor PCB • IPM (Power transistor) module
H19	Indoor fan motor mechanism locked	7 occurrences continuously	-	<ul style="list-style-type: none"> • Indoor PCB • Fan motor
H23	Indoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	○	<ul style="list-style-type: none"> • Heat exchanger temperature sensor (defective or disconnected)
H25	nanoe-G abnormality	-	○	<ul style="list-style-type: none"> • Indoor PCB • nanoe-G PCB
H27	Outdoor air temperature sensor abnormality	Continue for 5 sec.	○	<ul style="list-style-type: none"> • Outdoor temperature sensor (defective or disconnected)
H28	Outdoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	○	<ul style="list-style-type: none"> • Outdoor heat exchanger temperature sensor (defective or disconnected)
H30	Discharge temperature sensor abnormality	Continue for 5 sec.		<ul style="list-style-type: none"> • Outdoor discharge temperature sensor (defective or disconnected)
H33	Indoor / outdoor wrong connection	-	-	<ul style="list-style-type: none"> • Indoor / outdoor supply voltage
H38	Indoor / outdoor mismatch (brand code)	-	-	-
H59	ECONAVI sensor abnormality	Continue for 25 sec.	○	<ul style="list-style-type: none"> • ECONAVI sensor (defective or disconnected) • ECONAVI PCB
H70	Light sensor abnormal	Low output continue for 24hours, 15days	-	<ul style="list-style-type: none"> • Light sensor (defective or disconnected)
H97	Outdoor fan lock abnormality	2 occurrences within 30 minutes		<ul style="list-style-type: none"> • Outdoor fan motor locked
H98	Indoor temperature rise abnormality	-	-	<ul style="list-style-type: none"> • Air filter dirty • Air circulation short circuit
H99	Indoor heat exchanger freeze prevention protection	-	-	<ul style="list-style-type: none"> • Insufficient refrigerant • Air filter dirty
F11	4 way valve switching failure *	4 occurrences within 30 minutes	-	<ul style="list-style-type: none"> • 4-way valve • v-coil
F90	System and compressor microcomputer communication error(for S10*** only)	2 occurrences within 5 seconds	-	<ul style="list-style-type: none"> • Compressor • Outdoor PCB
F90	Power factor correction abnormality	4 occurrences within 20 minutes	-	<ul style="list-style-type: none"> • Outdoor PCB
F91	Refrigerant cycle abnormal	2 occurrences within 20 minutes	-	<ul style="list-style-type: none"> • No refrigerant (3-way valve is closed)
F93	Outdoor compressor abnormal revolution	4 occurrences within 20 minutes	-	<ul style="list-style-type: none"> • Outdoor compressor
F95	Cooling high pressure protection	4 occurrences within 20 minutes	-	<ul style="list-style-type: none"> • Outdoor refrigerant circuit
F96	Intelligent power transistor overheating protection	-	-	<ul style="list-style-type: none"> • Excess refrigerant • Improper heat radiation • IPM (Power transistor)
F97	Compressor temperature rise protection control	4 times occurrence within 20 minutes	-	<ul style="list-style-type: none"> • Insufficient refrigerant • Compressor
F98	Total running current protection	3 times occurrence within 20 minutes	-	<ul style="list-style-type: none"> • Excess refrigerant • Improper heat radiation
F99	Outdoor direct current (DC) peak detection	7 times occurrence continuously	-	<ul style="list-style-type: none"> • Outdoor PCB • IPM (Power transistor) • Compressor

Note:

“○” – Frequency measured and fan speed fixed

“*” – For cooling only model, it is the indication when indoor heat exchanger sensor or indoor air intake sensor has abnormality.

The memory data of error code is erased when the power supply is cut off, or press the Auto Switch until “beep” sound heard following by pressing the CHECK button at remote control.

Although operation forced to stop when abnormality detected, emergency operation is possible for certain errors (refer to Error Code Table) by using remote control or Auto OFF/ON button at indoor unit. However, the remote control signal receiving sound is changed from one “beep” to four “beep” sounds.

15.4 Troubleshooting Flowchart

15.4.1 H11 (Indoor/Outdoor Abnormal Communication)

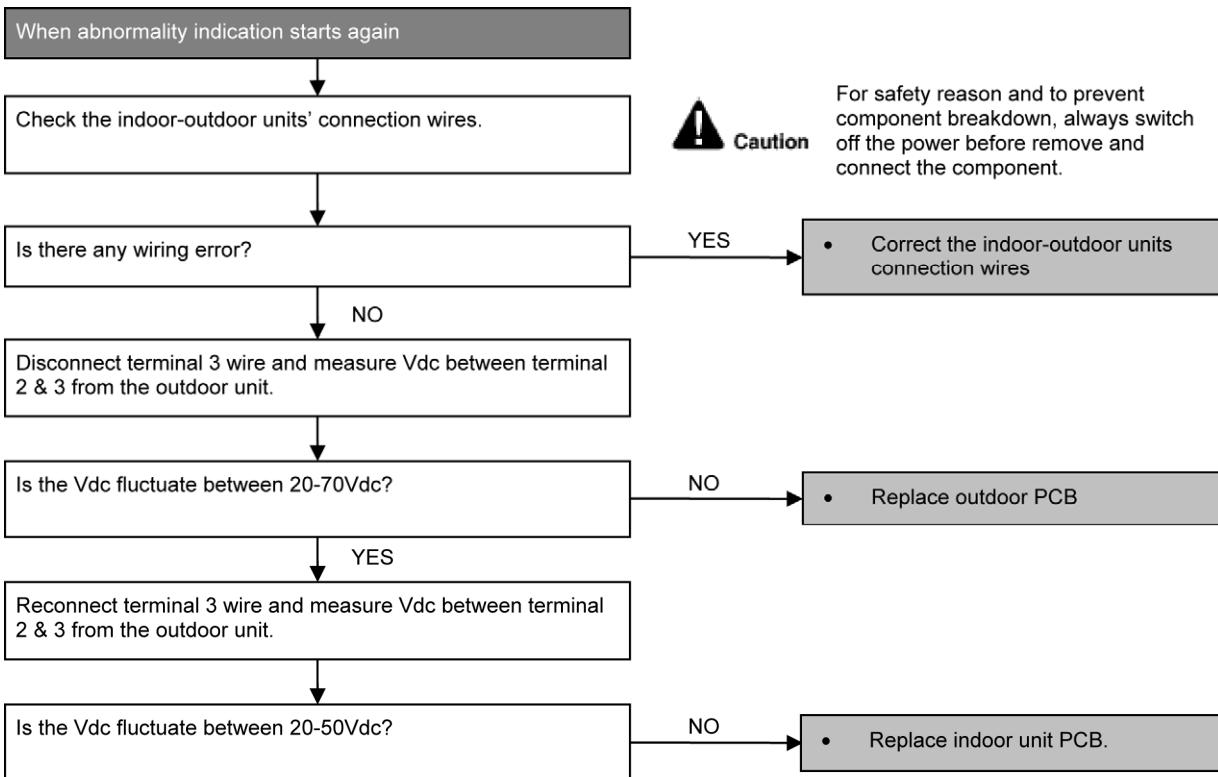
Malfunction Decision Conditions

- During startup and operation of cooling, the data received from outdoor unit in indoor unit signal transmission is checked whether it is normal.

Malfunction Caused

- Faulty indoor unit PCB.
- Faulty outdoor unit PCB.
- Indoor unit-outdoor unit signal transmission error due to wrong wiring.
- Indoor unit-outdoor unit signal transmission error due to breaking of wire in the connection wires between the indoor and outdoor units.
- Indoor unit-outdoor unit signal transmission error due to disturbed power supply waveform.

Troubleshooting



15.4.2 H12 (Indoor/Outdoor Capacity Rank Mismatched)

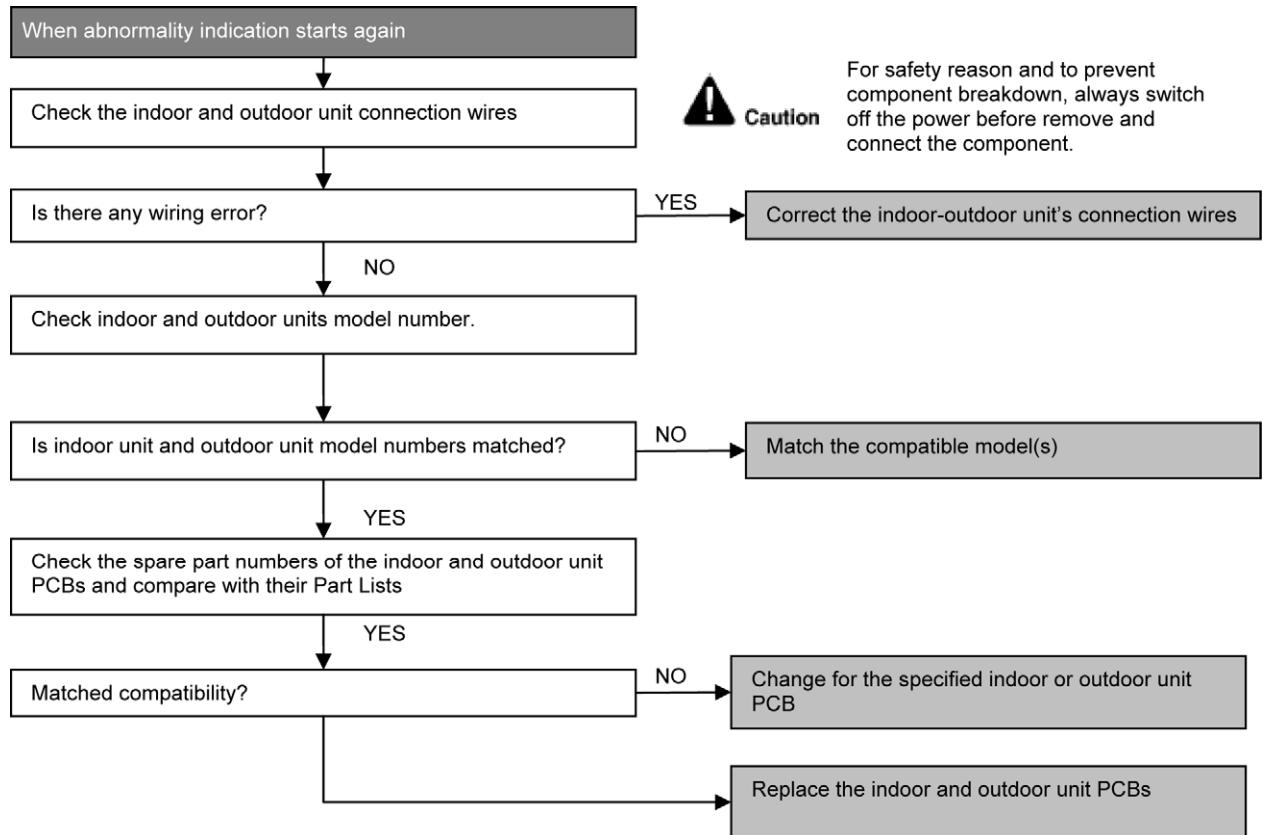
Malfunction Decision Conditions

- During startup, error code appears when different types of indoor and outdoor units are interconnected.

Malfunction Caused

- Wrong models interconnected.
- Wrong indoor unit or outdoor unit PCBs mounted.
- Indoor unit or outdoor unit PCBs defective.
- Indoor-outdoor unit signal transmission error due to wrong wiring.
- Indoor-outdoor unit signal transmission error due to breaking of wire 3 in the connection wires between the indoor and outdoor units.

Troubleshooting



15.4.3 H14 (Indoor Intake Air Temperature Sensor Abnormality)

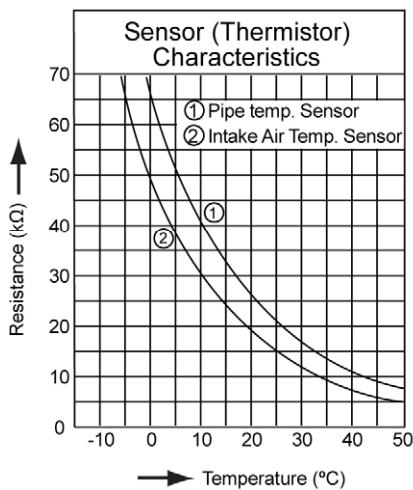
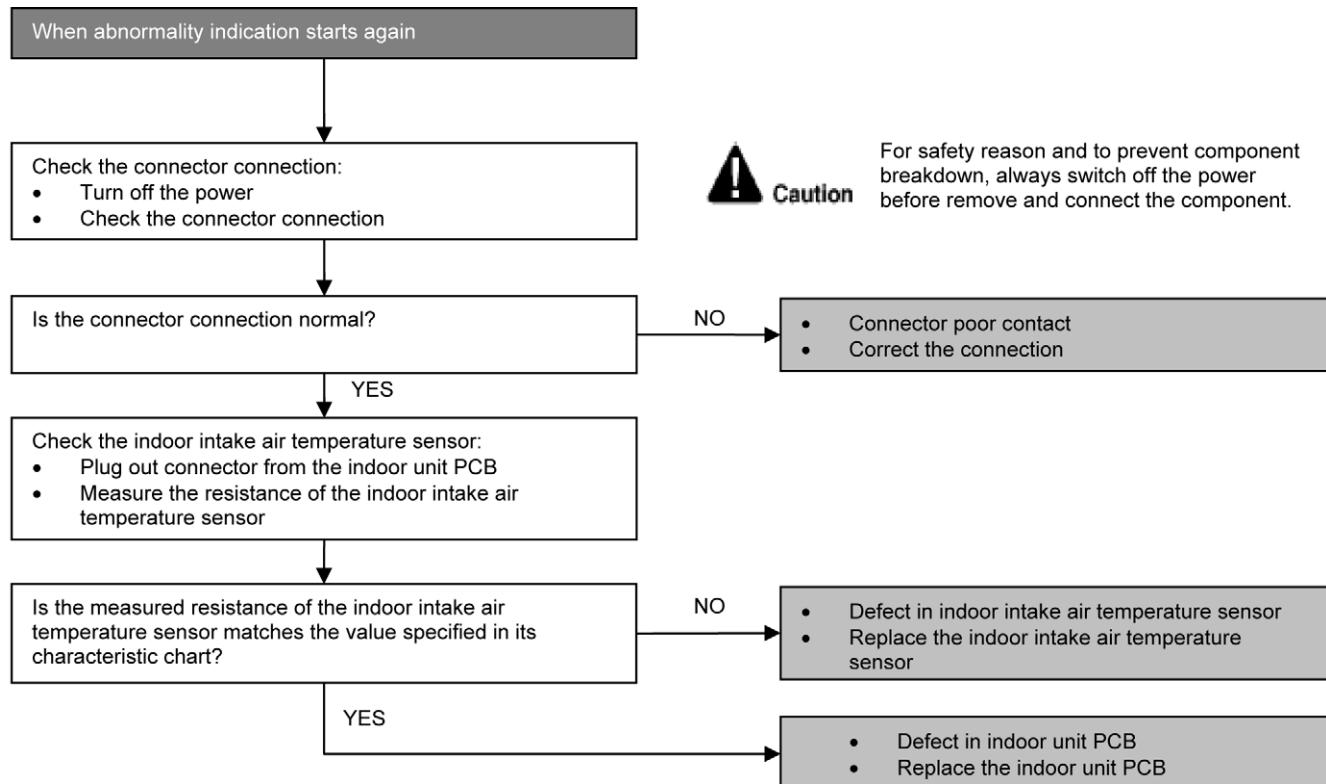
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the indoor intake air temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.4 H15 (Compressor Temperature Sensor Abnormality)

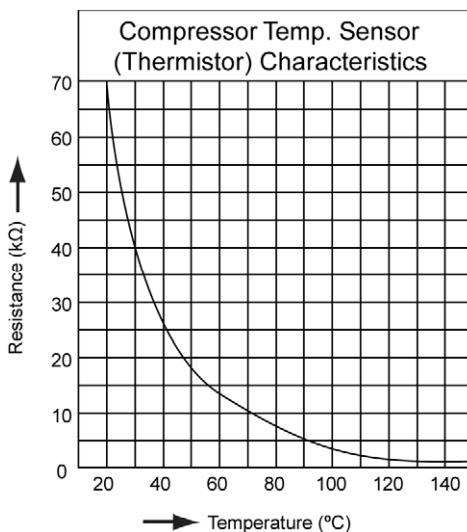
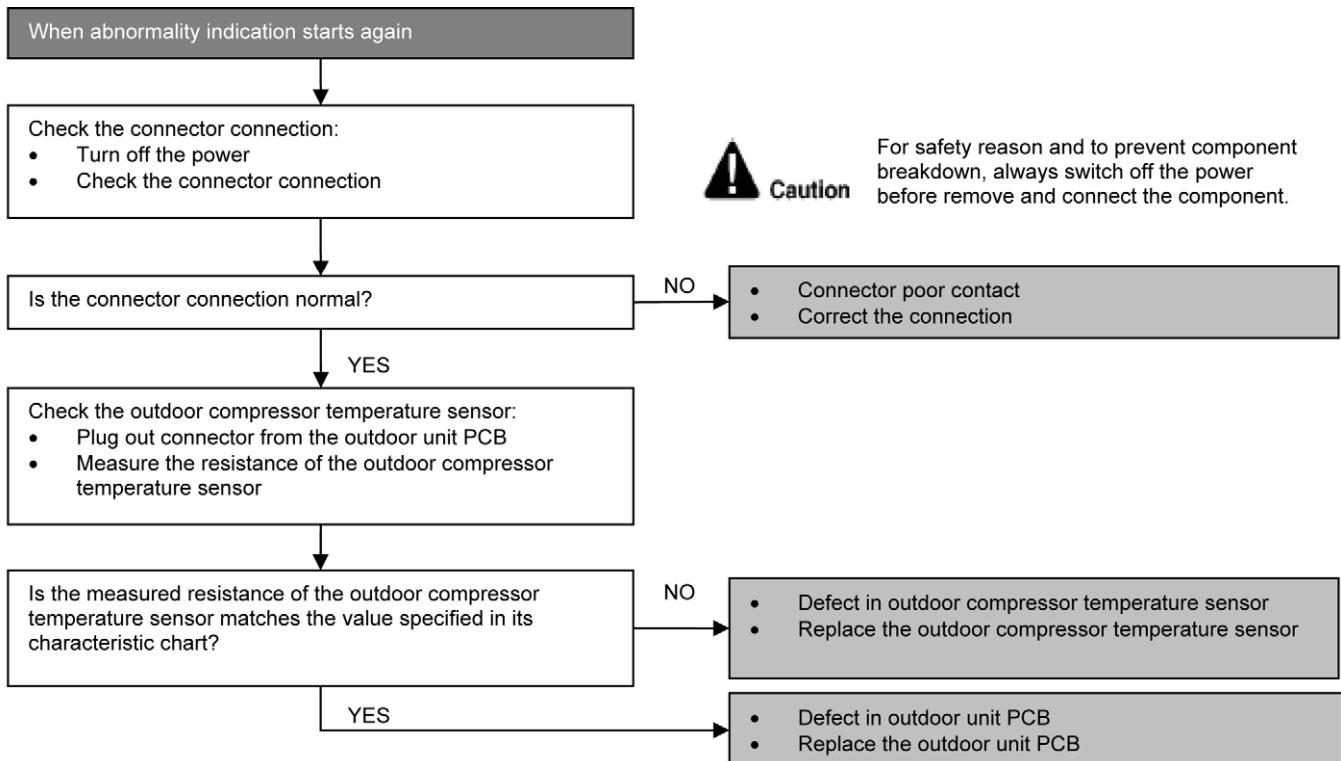
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the outdoor compressor temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.5 H16 (Outdoor Current Transformer Open Circuit)

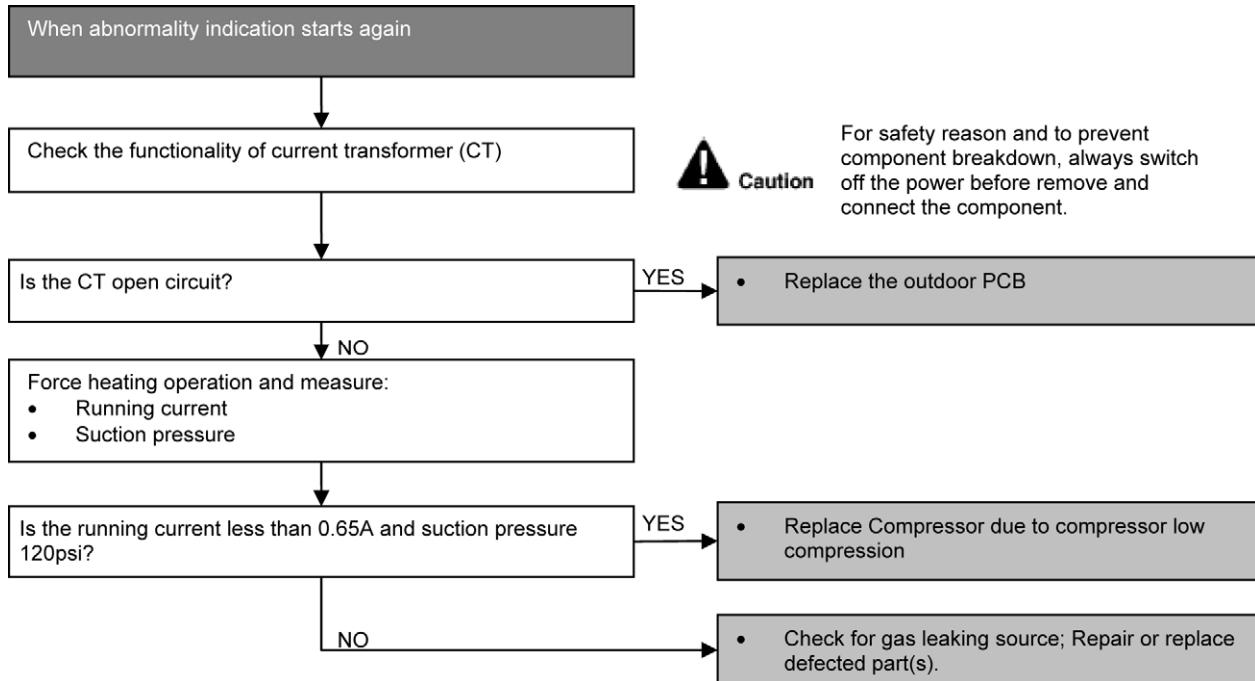
Malfunction Decision Conditions

- A current transformer (CT) is detected by checking the compressor running frequency (\geq rated frequency) and CT detected input current (less than 1.14A) for continuously 20 seconds.

Malfunction Caused

- CT defective
- Outdoor PCB defective
- Compressor defective (low compression)

Troubleshooting



15.4.6 H19 (Indoor Fan Motor – DC Motor Mechanism Locked)

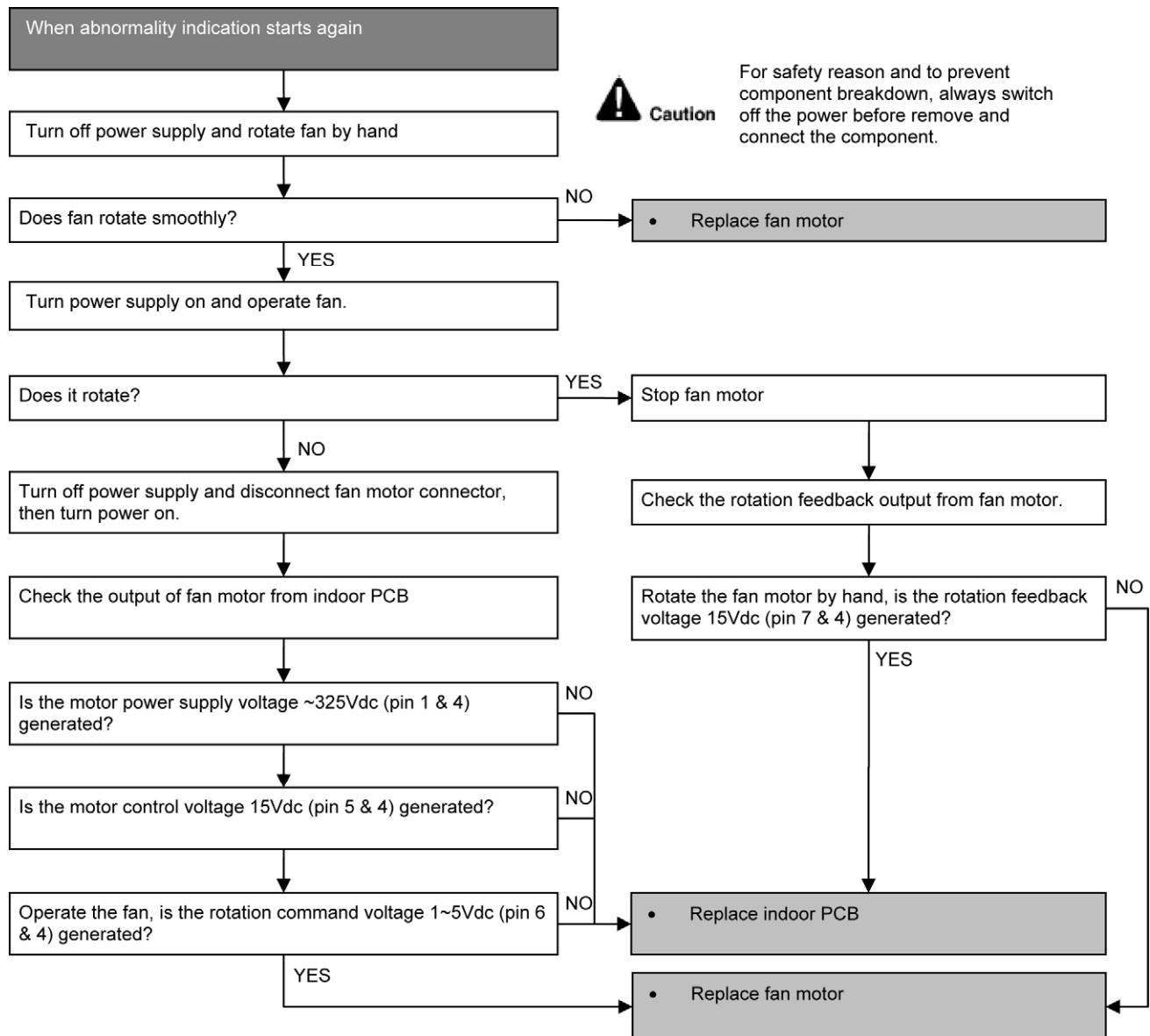
Malfunction Decision Conditions

- The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor (feedback of rotation > 2550rpm or < 50rpm)

Malfunction Caused

- Operation stops due to short circuit inside the fan motor winding.
- Operation stops due to breaking of wire inside the fan motor.
- Operation stops due to breaking of fan motor lead wires.
- Operation stops due to Hall IC malfunction.
- Operation error due to faulty indoor unit PCB.

Troubleshooting



15.4.7 H23 (Indoor Pipe Temperature Sensor Abnormality)

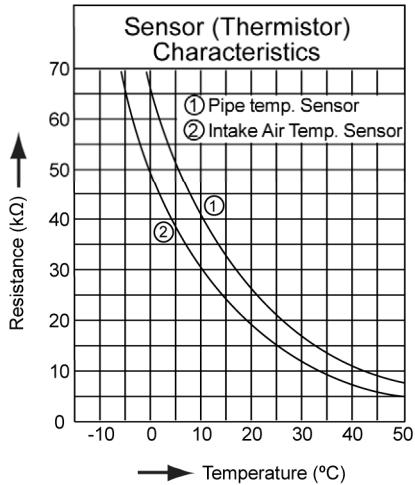
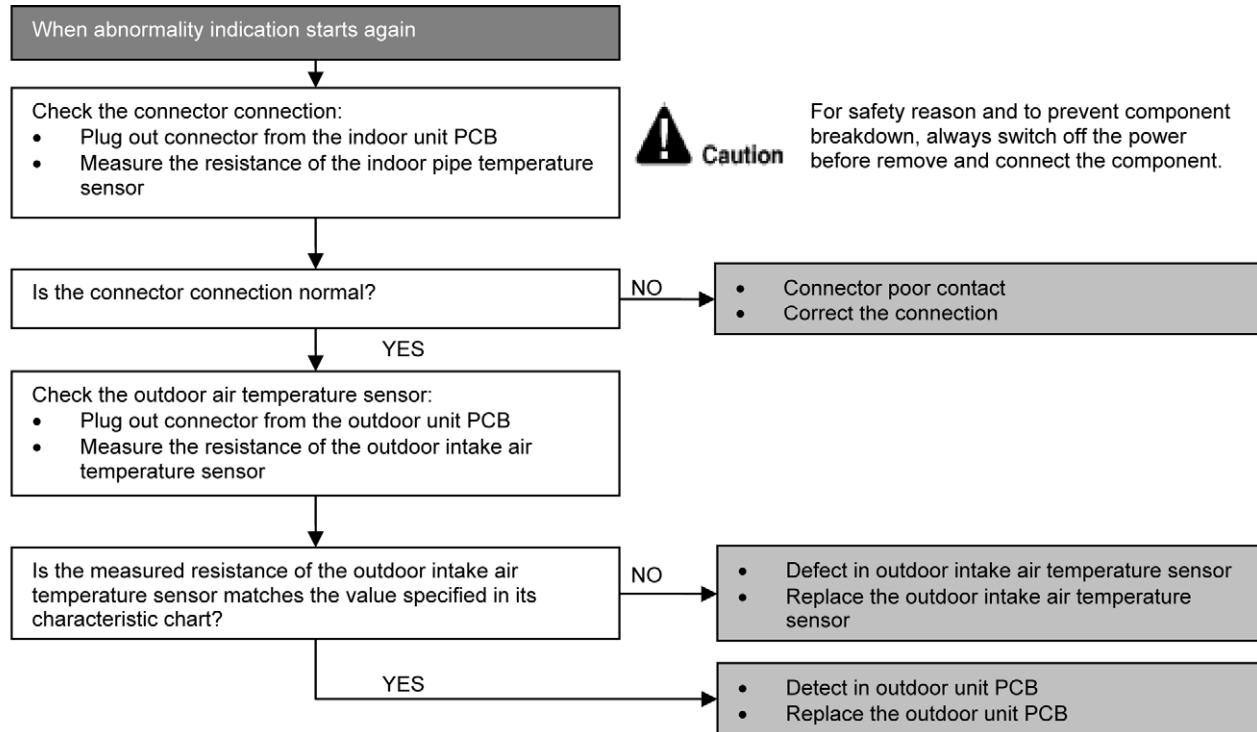
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the indoor heat exchanger temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.8 H25 (nanoe-G Air Purifying System Abnormal)

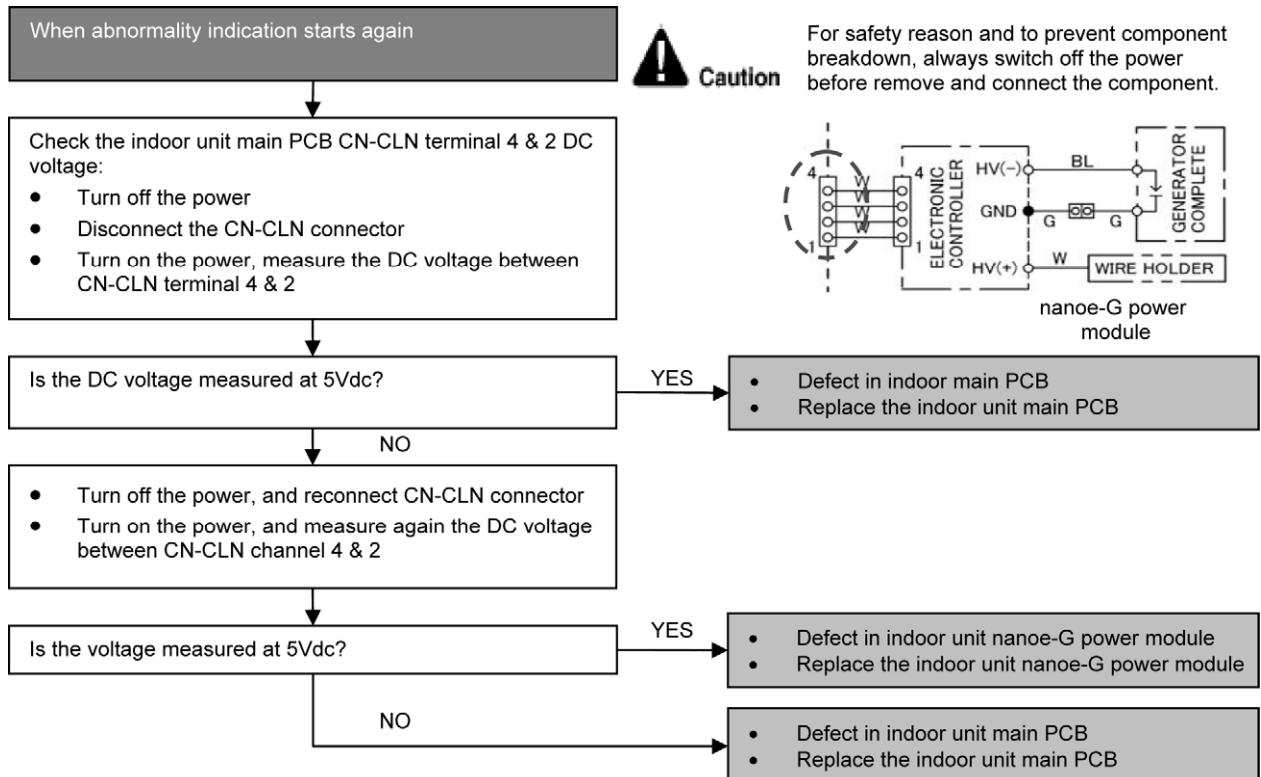
Malfunction Decision Conditions

- During standby of cooling operation, nanoe-G breakdown occurs and air conditioner stops operation.

Malfunction Caused

- Faulty indoor main PCB.
- Faulty indoor nanoe-G power module.

Troubleshooting



15.4.9 H27 (Outdoor Air Temperature Sensor Abnormality)

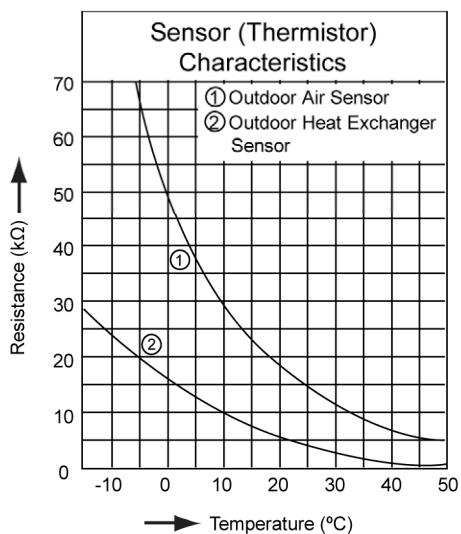
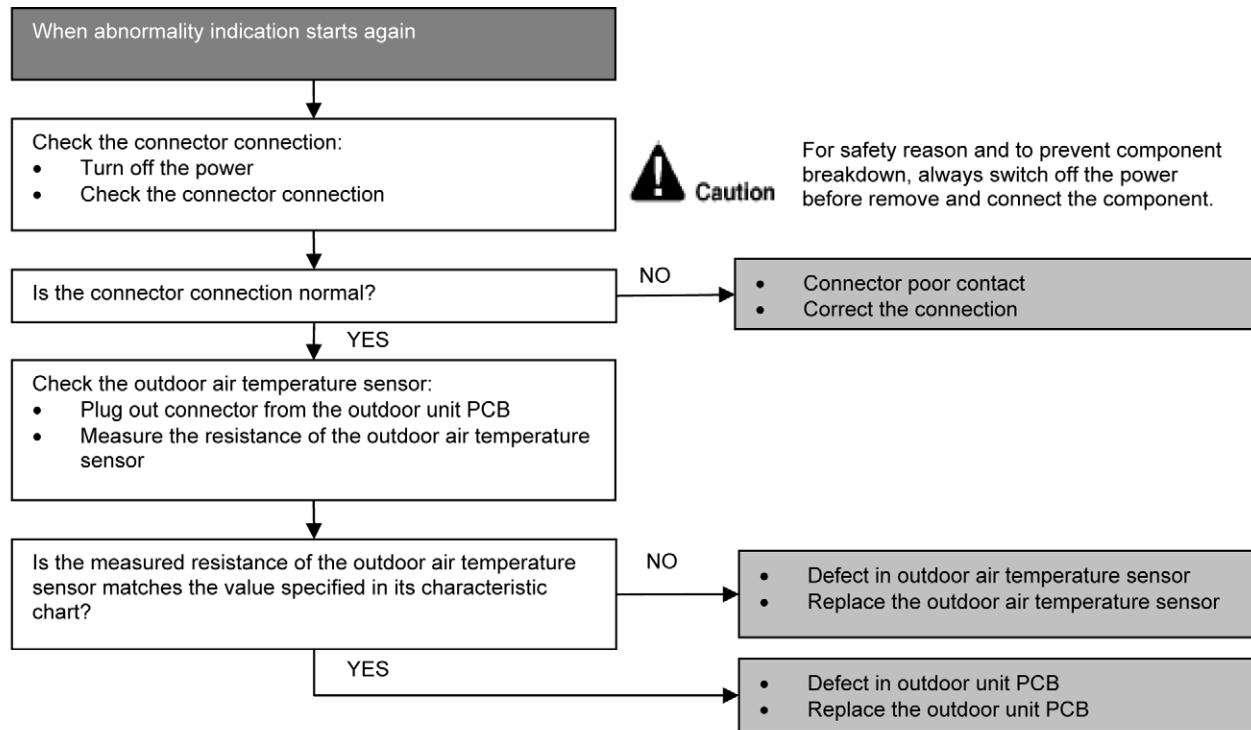
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the outdoor air temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.10 H28 (Outdoor Pipe Temperature Sensor Abnormality)

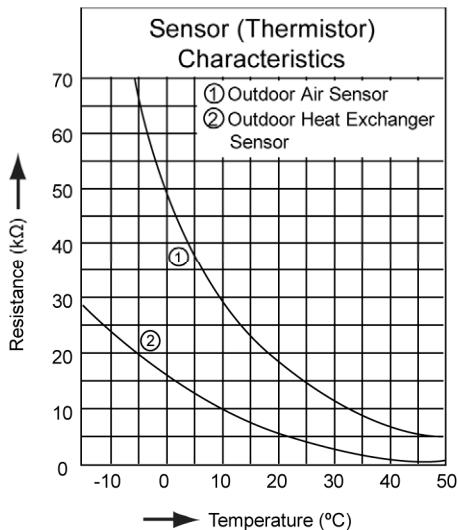
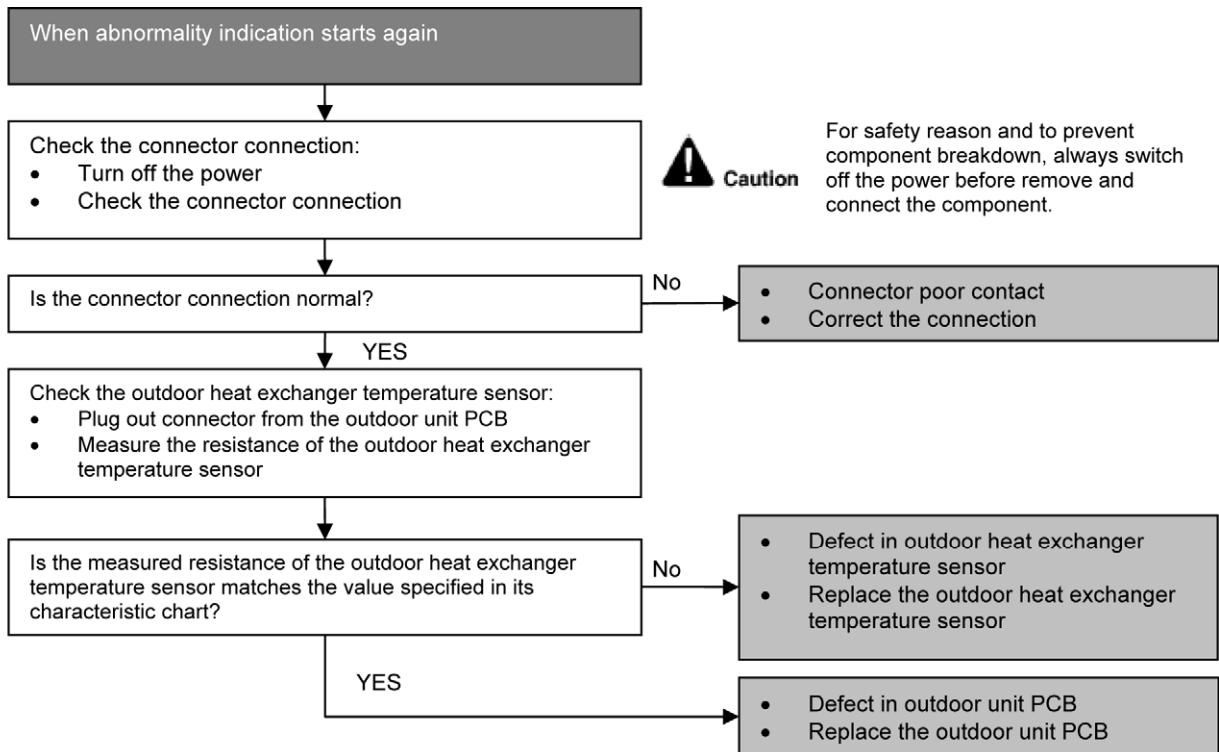
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the outdoor pipe temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.11 H30 (Compressor Discharge Temperature Sensor Abnormality)

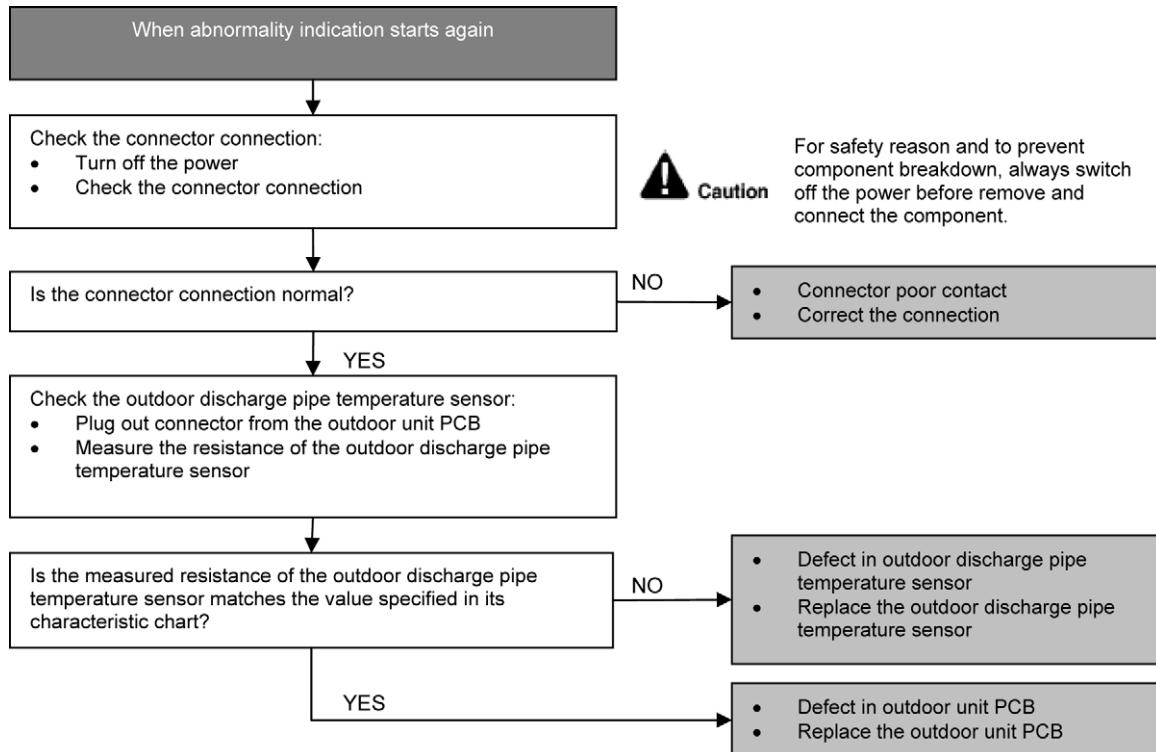
Malfunction Decision Conditions

- During startup and operation of cooling, the temperatures detected by the outdoor discharge pipe temperature sensor are used to determine sensor errors.

Malfunction Caused

- Faulty connector connection.
- Faulty sensor.
- Faulty PCB.

Troubleshooting



15.4.12 H33 (Unspecified Voltage between Indoor and Outdoor)

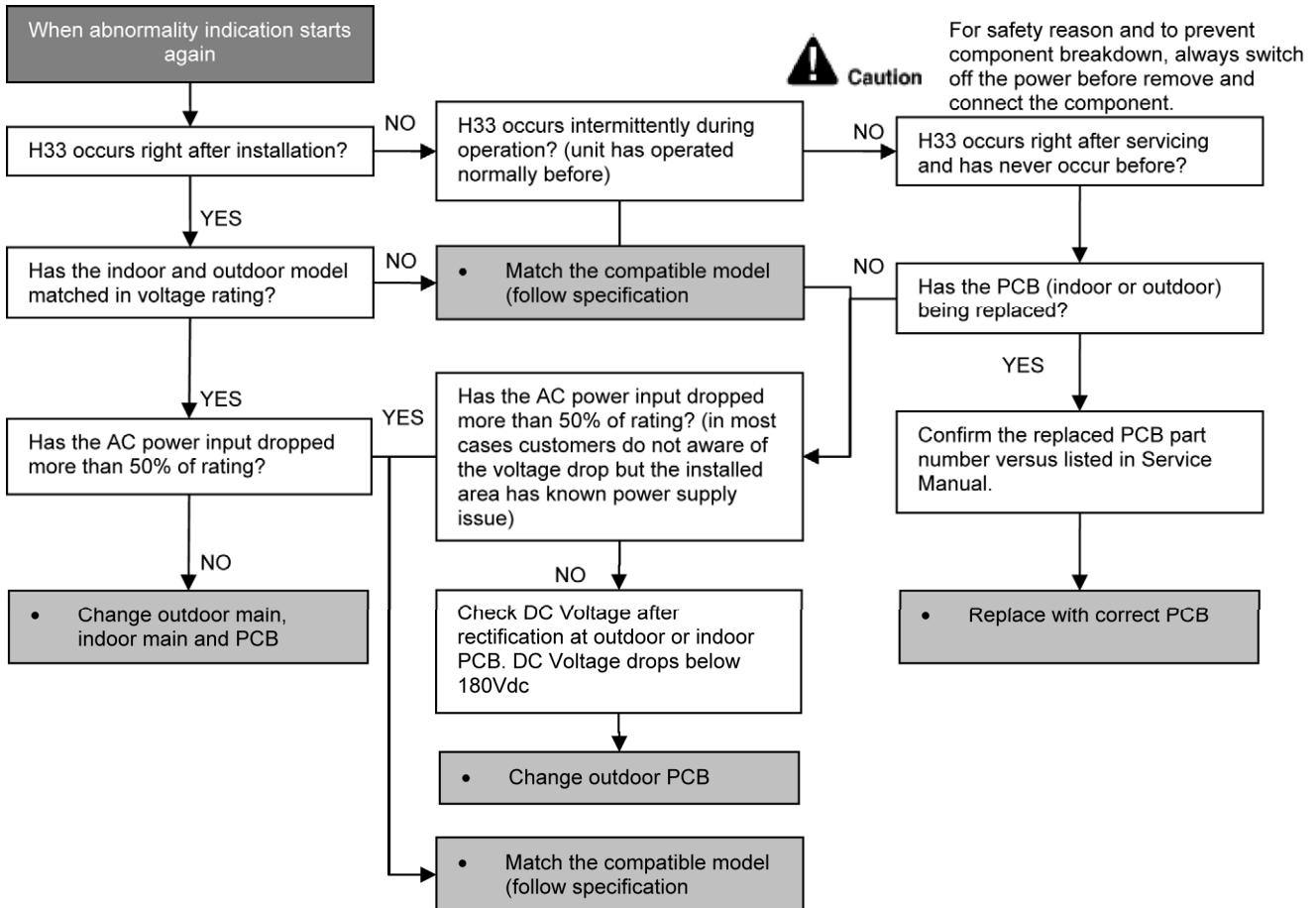
Malfunction Decision Conditions

- The supply power is detected for its requirement by the indoor/outdoor transmission.

Malfunction Caused

- Wrong models interconnected.
- Wrong indoor unit and outdoor unit PCBs used.
- Indoor unit or outdoor unit PCB defective.

Troubleshooting



15.4.13 H59 (Human Activity Sensor Abnormality)

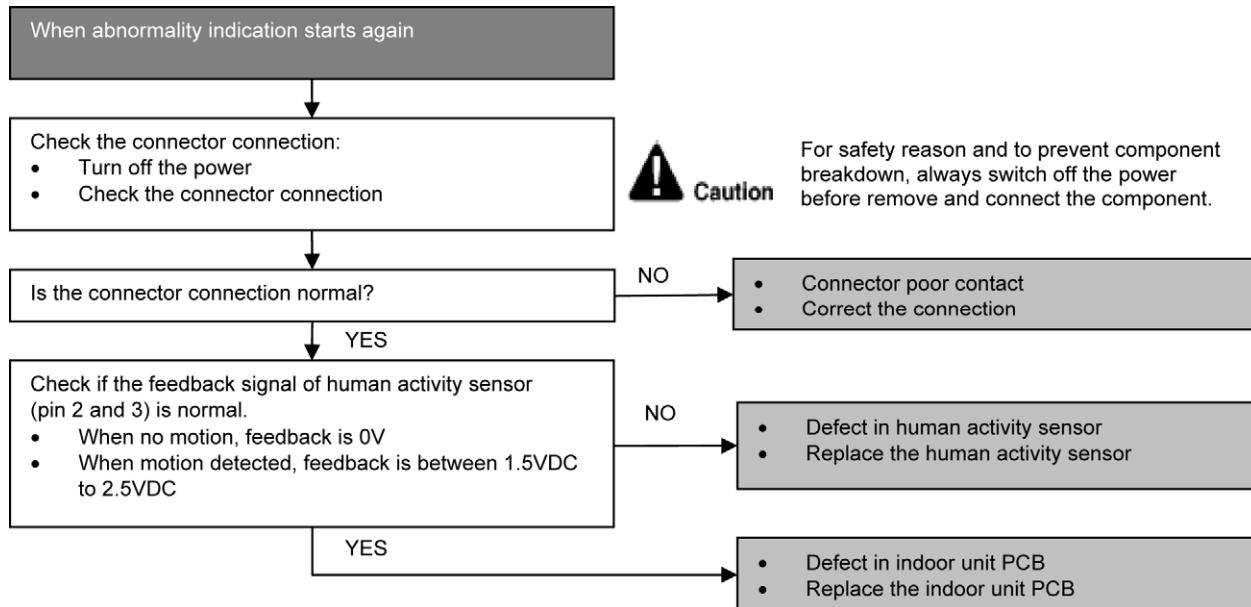
Malfunction Decision Conditions

- Feedback signal of human activity sensor.

Malfunction Caused

- Feedback signal is fixed at 0VDc or 5VDc continuously for 25 seconds during ECONAVI or AUTO COMFORT operation.
- Feedback signal is detected during ECONAVI or AUTO COMFORT off.

Troubleshooting



15.4.14 H70 (Light Sensor Abnormality)

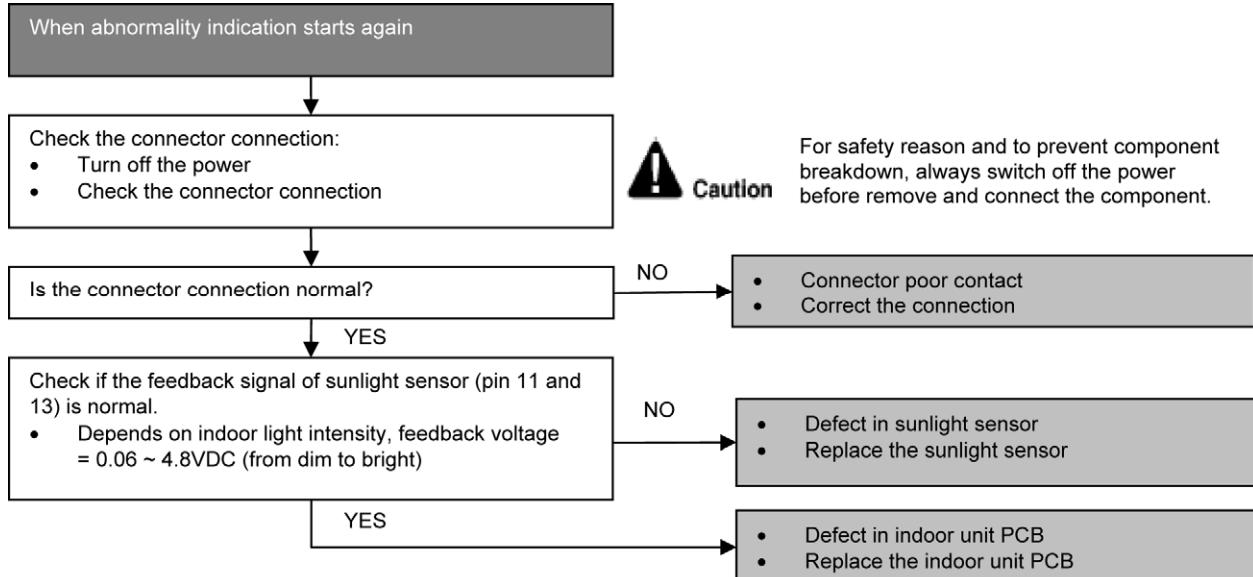
Malfunction Decision Conditions

- Feedback signal of light sensor.

Malfunction Caused

- Feedback value is 0VDC continuously.

Troubleshooting



15.4.15 H97 (Outdoor Fan Motor – DC Motor Mechanism Locked)

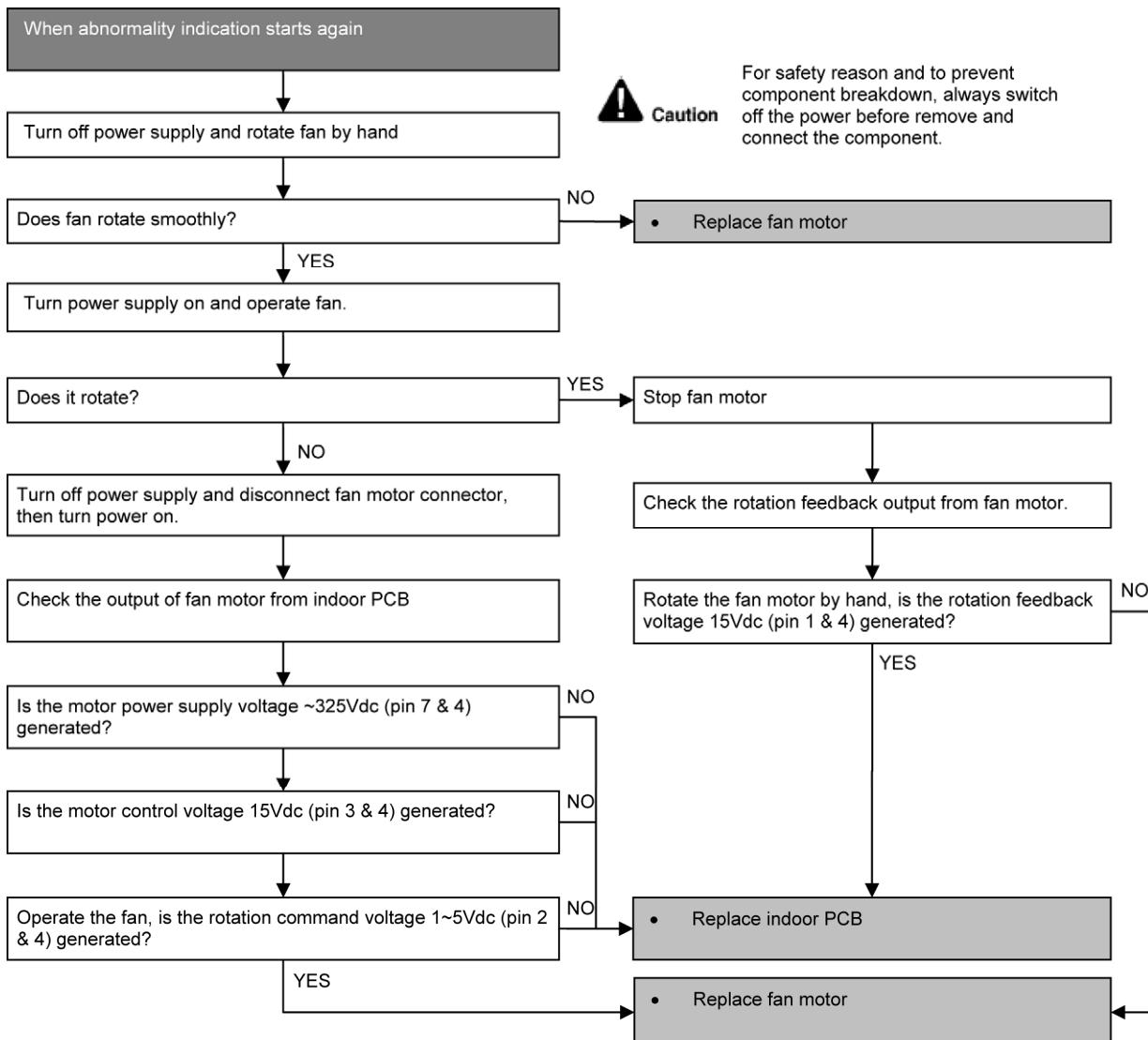
Malfunction Decision Conditions

- The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor.

Malfunction Caused

- Operation stops due to short circuit inside the fan motor winding.
- Operation stops due to breaking of wire inside the fan motor.
- Operation stops due to breaking of fan motor lead wires.
- Operation stops due to Hall IC malfunction.
- Operation error due to faulty outdoor unit PCB.

Troubleshooting



15.4.16 H98 (Indoor High Pressure Protection)

Error Code will not display (no Timer LED blinking) but store in EEPROM

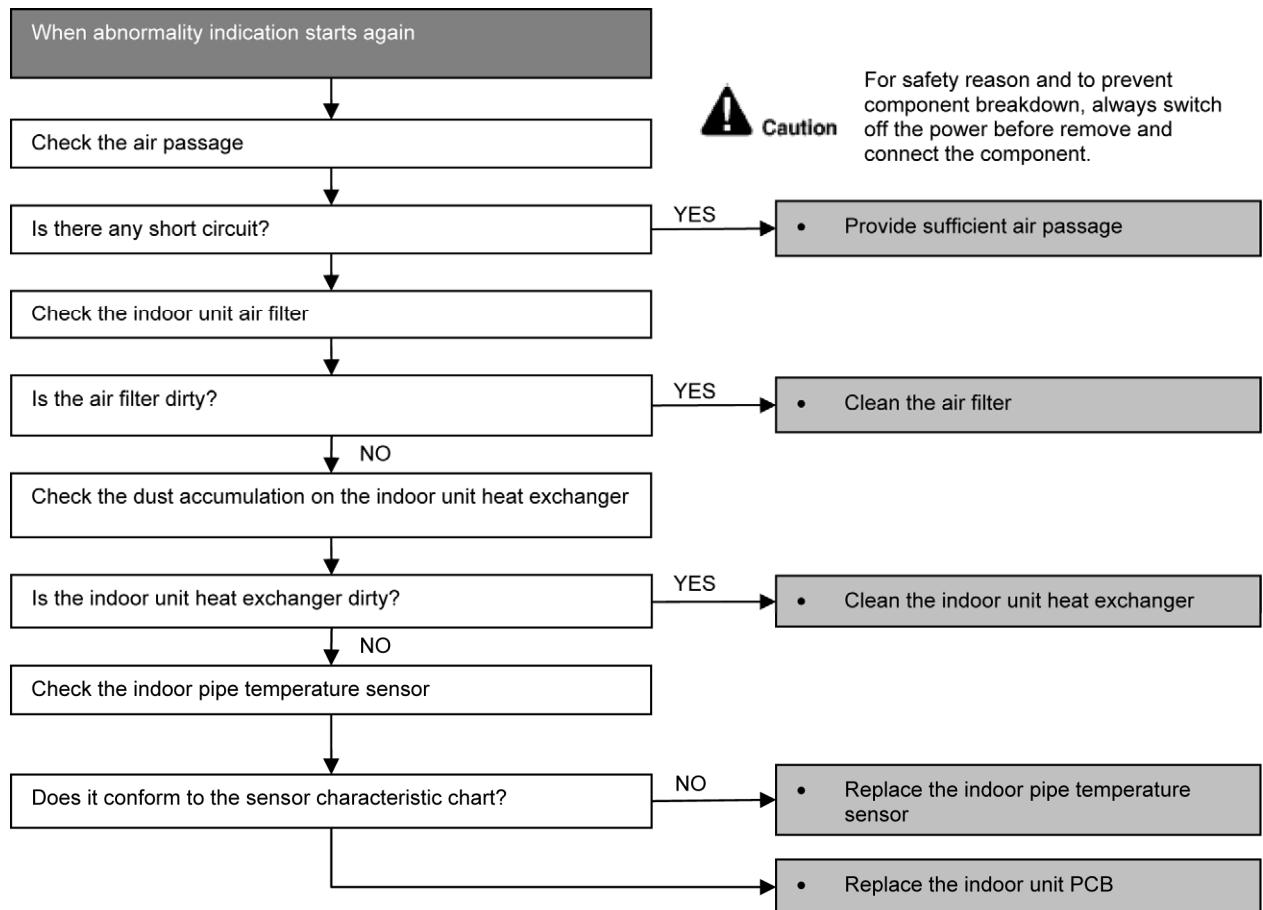
Malfunction Decision Conditions

- The temperature detected by the indoor pipe temperature sensor is abnormal.

Malfunction Caused

- Clogged air filter of the indoor unit
- Dust accumulation on the indoor unit heat exchanger
- Air short circuit
- Detection error due to faulty indoor pipe temperature sensor
- Detection error due to faulty indoor unit PCB

Troubleshooting



15.4.17 H99 (Indoor Freeze Prevention Protection: Cooling or Soft Dry)

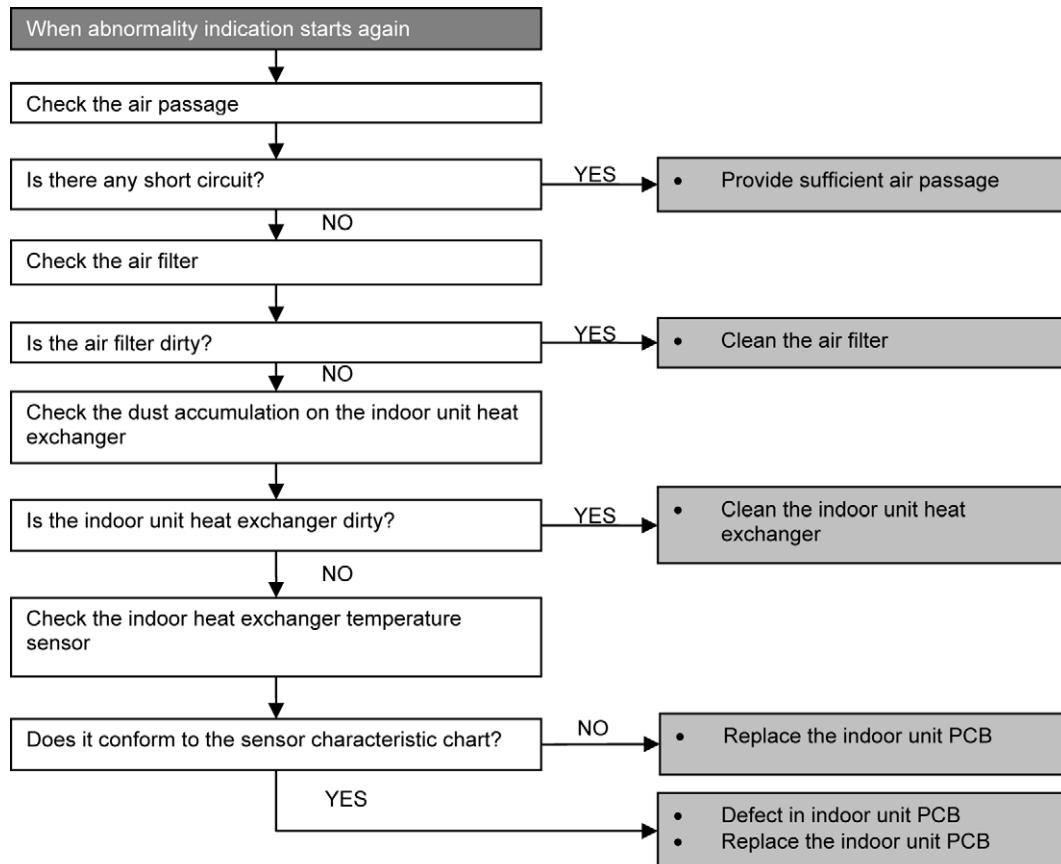
Malfunction Decision Conditions

- Freeze prevention control takes place (when indoor pipe temperature is lower than 2°C)

Malfunction Caused

- Clogged air filter of the indoor unit
- Dust accumulation on the indoor unit heat exchanger
- Air short circuit
- Detection error due to faulty indoor pipe temperature sensor
- Detection error due to faulty indoor unit PCB

Troubleshooting



15.4.18 F11 (Indoor Pipe Temperature Sensor Abnormality)

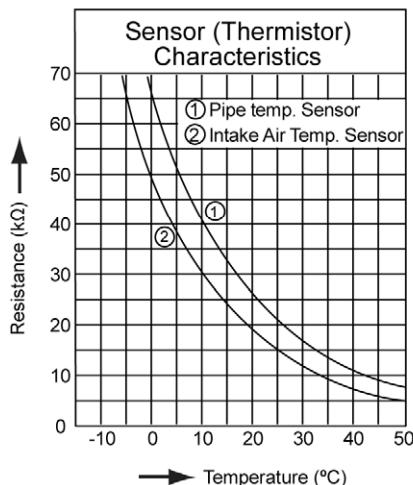
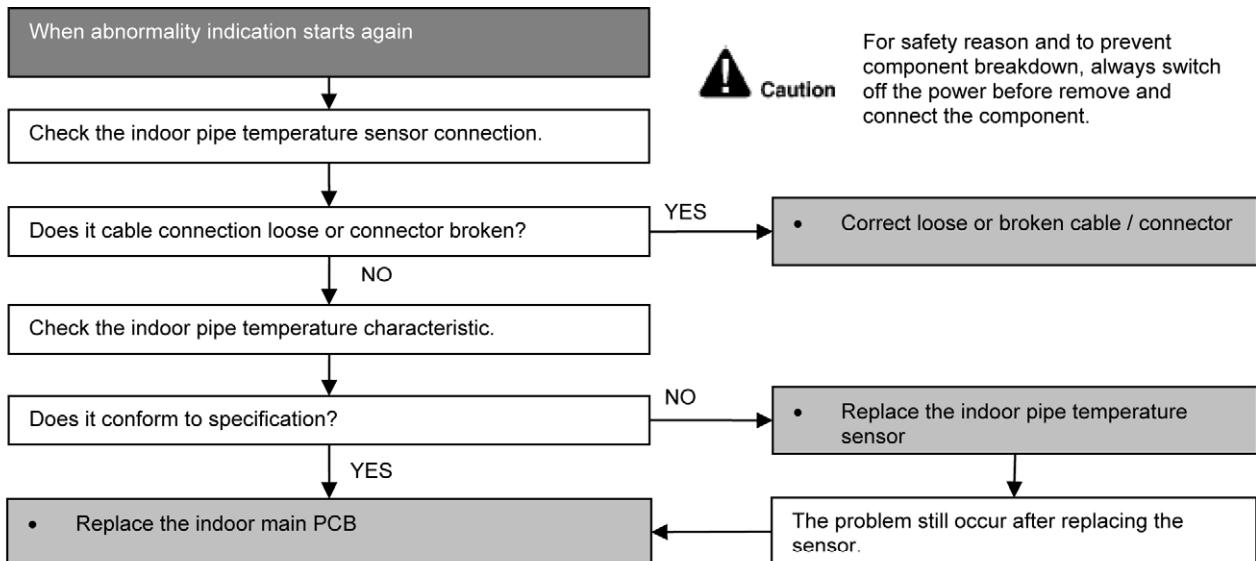
Malfunction Decision Conditions

- When cooling operation, when indoor pipe temperature or indoor heat exchanger temperature sensor is above 45°C.

Malfunction Caused

- Faulty connector connection.
- Faulty indoor pipe temperature sensor.
- Faulty indoor main PCB.

Troubleshooting



15.4.19 F90 (Power Factor Correction Protection)

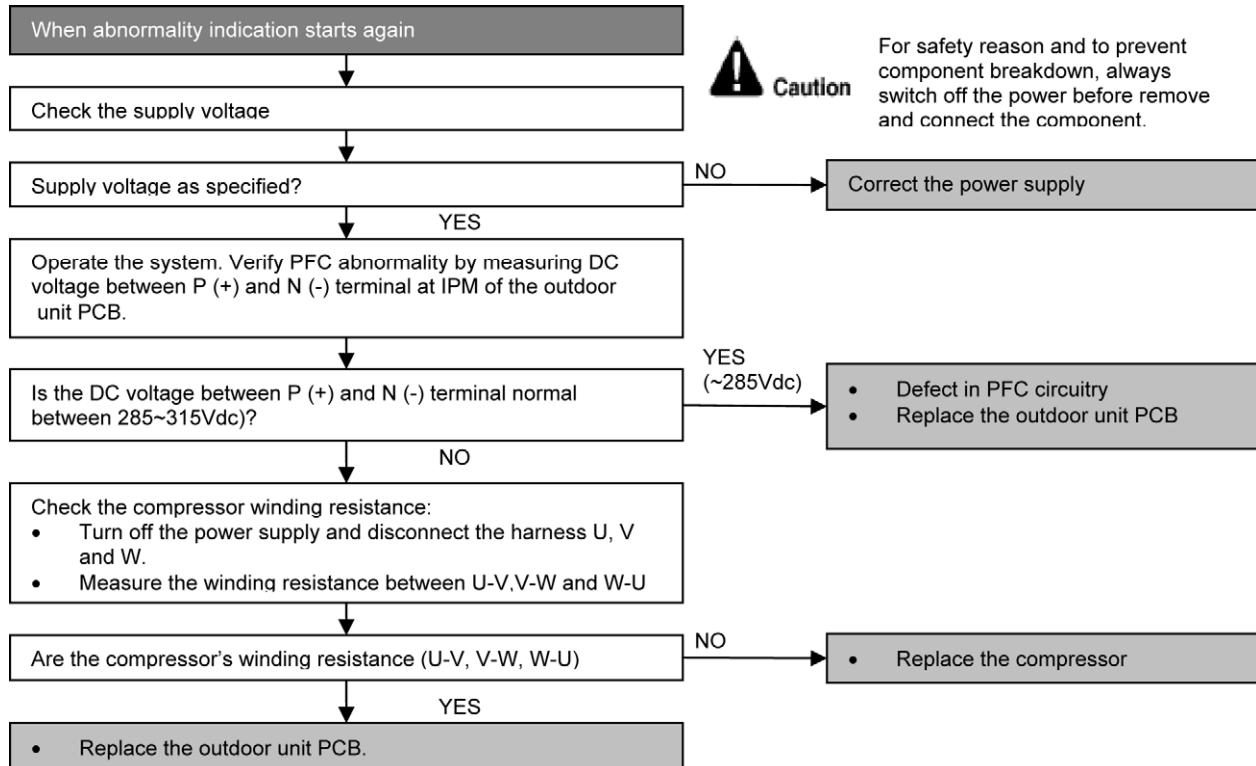
Malfunction Decision Conditions

- During startup and operation of cooling, when Power Factor Correction (PFC) protection circuitry at the outdoor unit main PCB senses abnormal high DC voltage level.

Malfunction Caused

- DC voltage peak due to power supply surge.
- DC voltage peak due to compressor windings not uniform.
- Faulty outdoor PCB.

Troubleshooting



15.4.20 F91 (Refrigeration Cycle Abnormality)

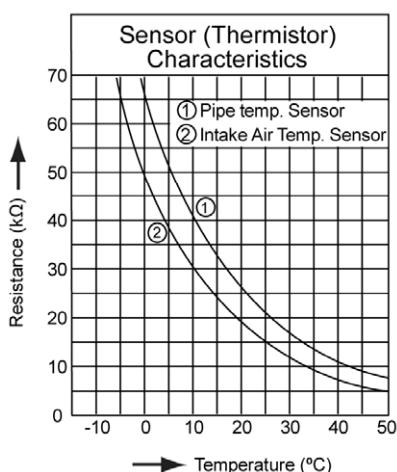
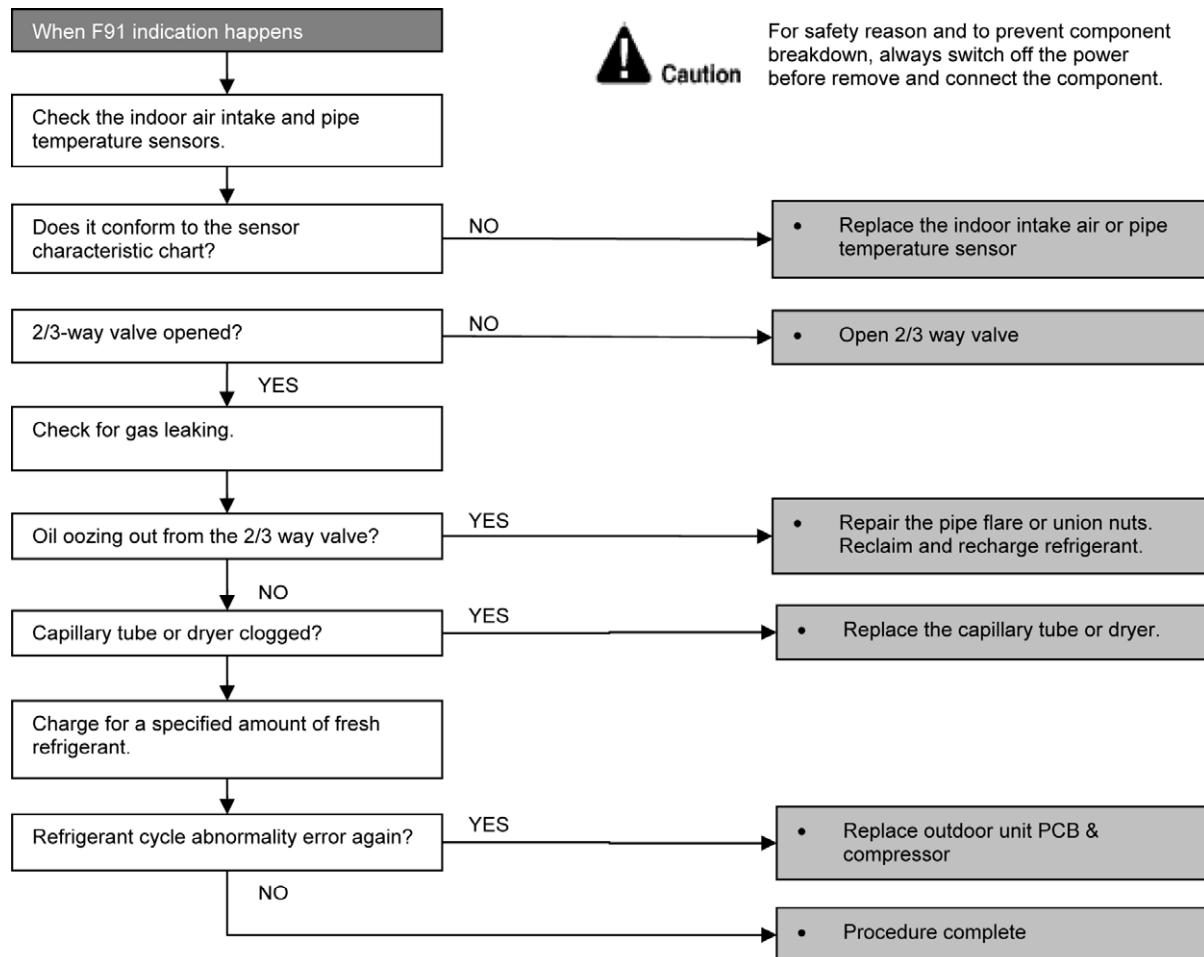
Malfunction Decision Conditions

- During cooling, compressor frequency = Fcmax.
- During cooling and heating operation, running current: $0.65A < I < 1.65A$.
- During cooling, indoor intake - indoor pipe $< 4^{\circ}C$.

Malfunction Caused

- Refrigerant shortage (refrigerant leakage)
- Poor compression performance of compressor.
- 2/3 way valve closed.
- Detection error due to faulty indoor intake air or indoor pipe temperature sensors.

Troubleshooting



15.4.21 F93 (Compressor Rotation Failure)

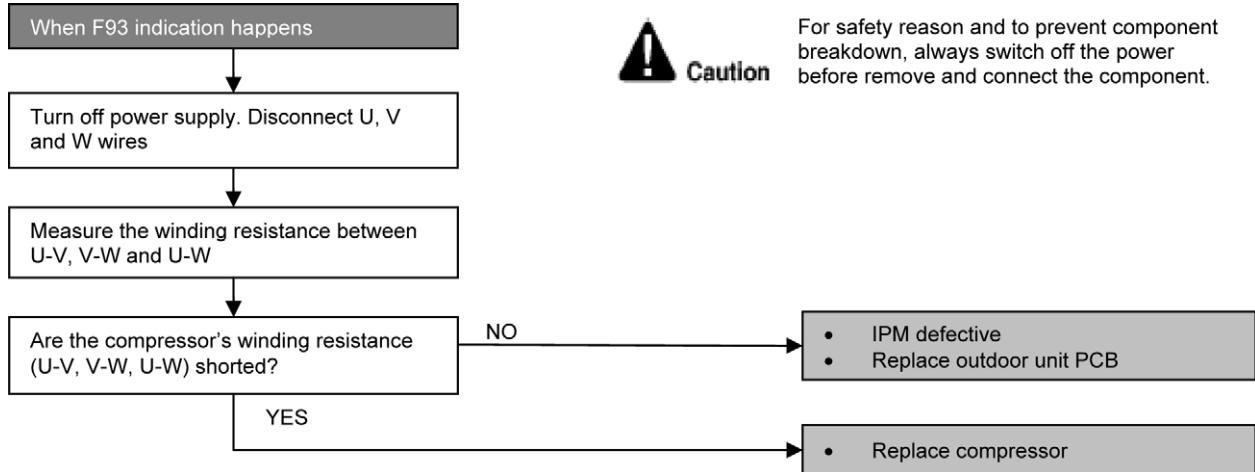
Malfunction Decision Conditions

A compressor rotation failure is detected by checking the compressor running condition through the position detection circuit.

Malfunction Caused

- Compressor terminal disconnect
- Outdoor PCB malfunction

Troubleshooting



15.4.22 F95 (Cooling High Pressure Abnormality)

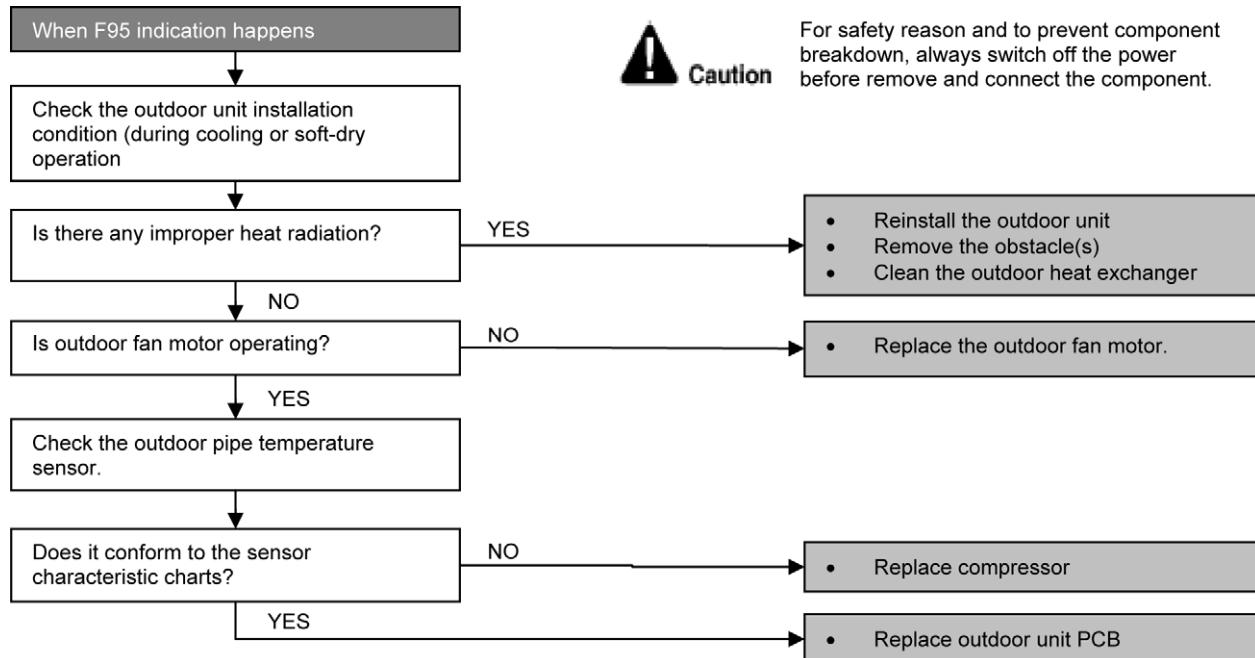
Malfunction Decision Conditions

During operation of cooling, when outdoor unit heat exchanger high temperature data (61°C) is detected by the outdoor pipe temperature sensor.

Malfunction Caused

- Outdoor pipe temperature rise due to short circuit of hot discharge air flow.
- Outdoor pipe temperature rise due to defective of outdoor fan motor.
- Outdoor pipe temperature rise due to defective outdoor pipe temperature sensor.
- Outdoor pipe temperature rise due to defective outdoor unit PCB.

Troubleshooting



15.4.23 F96 (IPM Overheating)

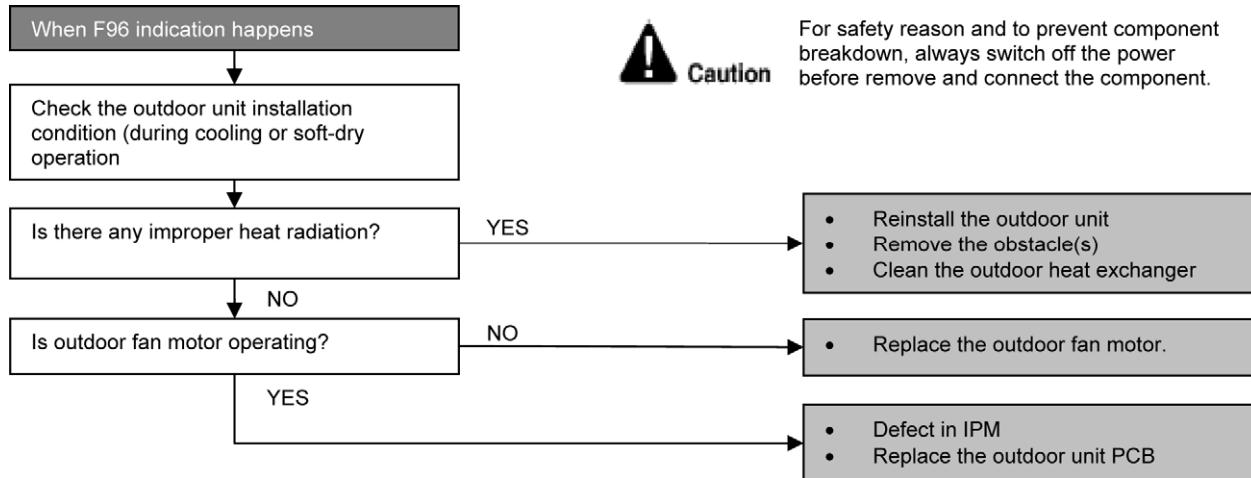
Malfunction Decision Conditions

During operating of cooling, when IPM temperature data (100°C) is detected by the IPM temperature sensor.

Malfunction Caused

- IPM overheats due to short circuit of hot discharge air flow.
- IPM overheats due to defective of outdoor fan motor.
- IPM overheats due to defective of internal circuitry of IPM.
- IPM overheats due to defective IPM temperature sensor.

Troubleshooting



15.4.24 F97 (Compressor Overheating)

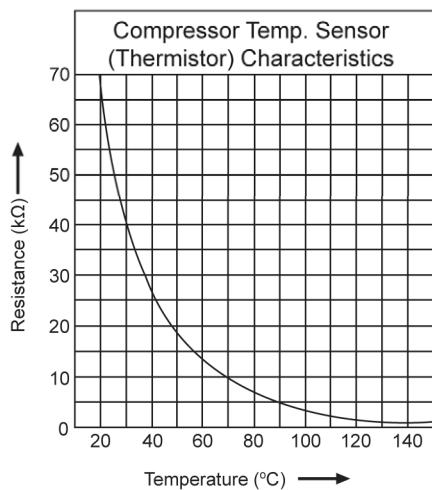
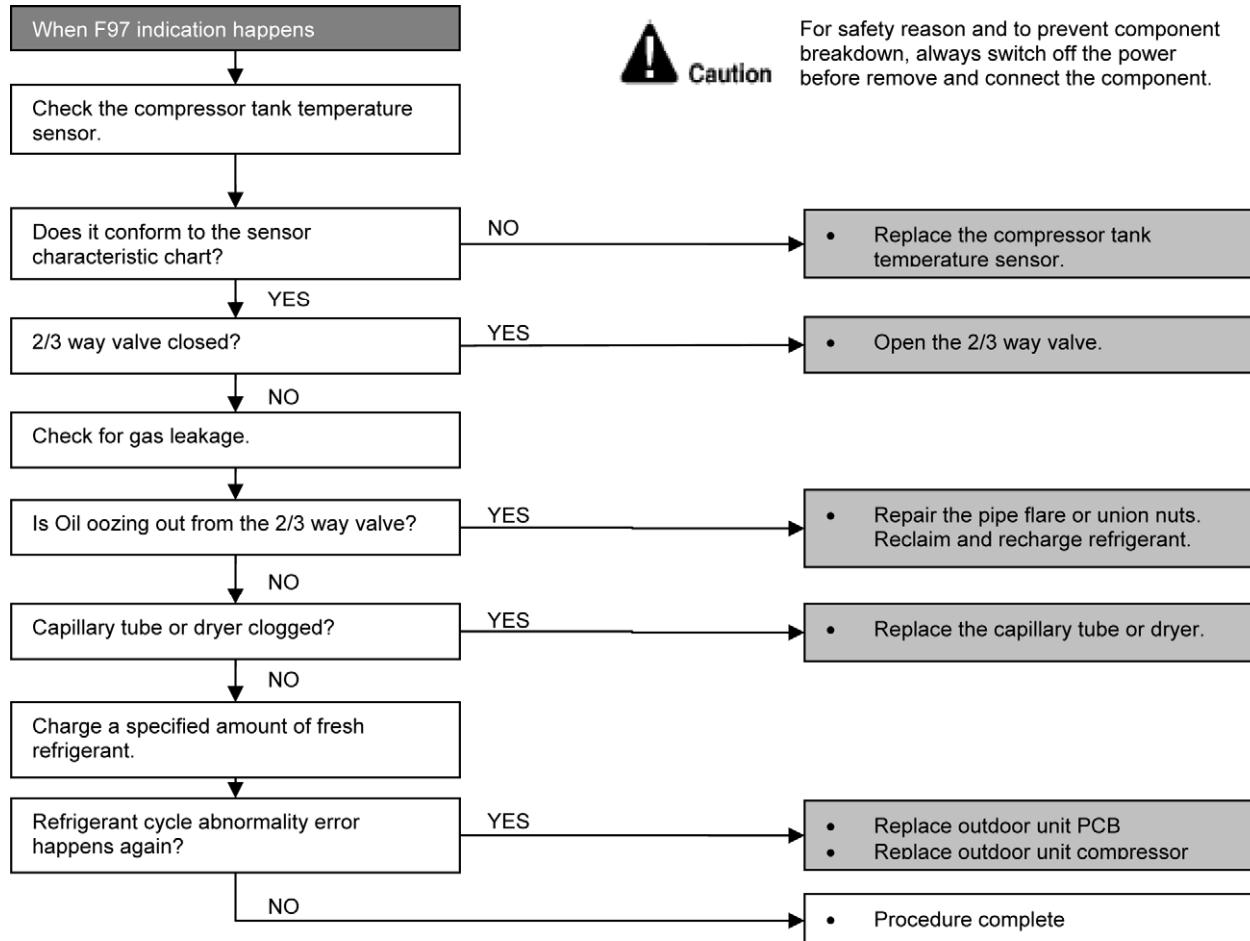
Malfunction Decision Conditions

During operation of cooling, when compressor tank temperature data (112°C) is detected by the compressor tank temperature sensor.

Malfunction Caused

- Refrigerant shortage (refrigerant leakage).
- 2/3 way valve closed.
- Detection error due to faulty compressor tank temperature sensor.

Troubleshooting



15.4.25 F98 (Input Over Current Detection)

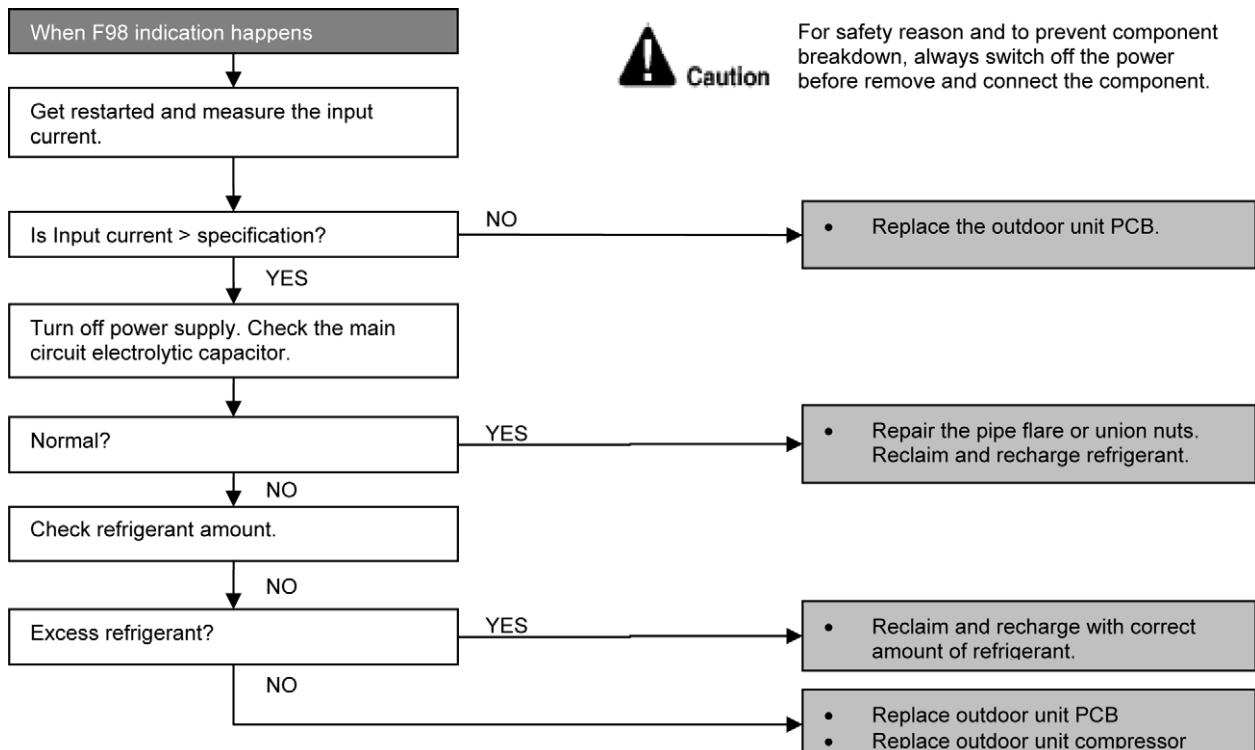
Malfunction Decision Conditions

During cooling operation, when an input over-current is detected by checking the input current value being detected by current transformer (CT) with the compressor running.

Malfunction Caused

- Over-current due to compressor failure.
- Over-current due to defective outdoor unit PCB.
- Over-current due to defective inverter main circuit electrolytic capacitor.
- Over-current due to excessive refrigerant.

Troubleshooting



Model	S9**	S12**	S18**	S24**	S28**
Over-current value (A)	17	15.0	15.0	19.0	19.0

15.4.26 F99 (DC Peak Detection)

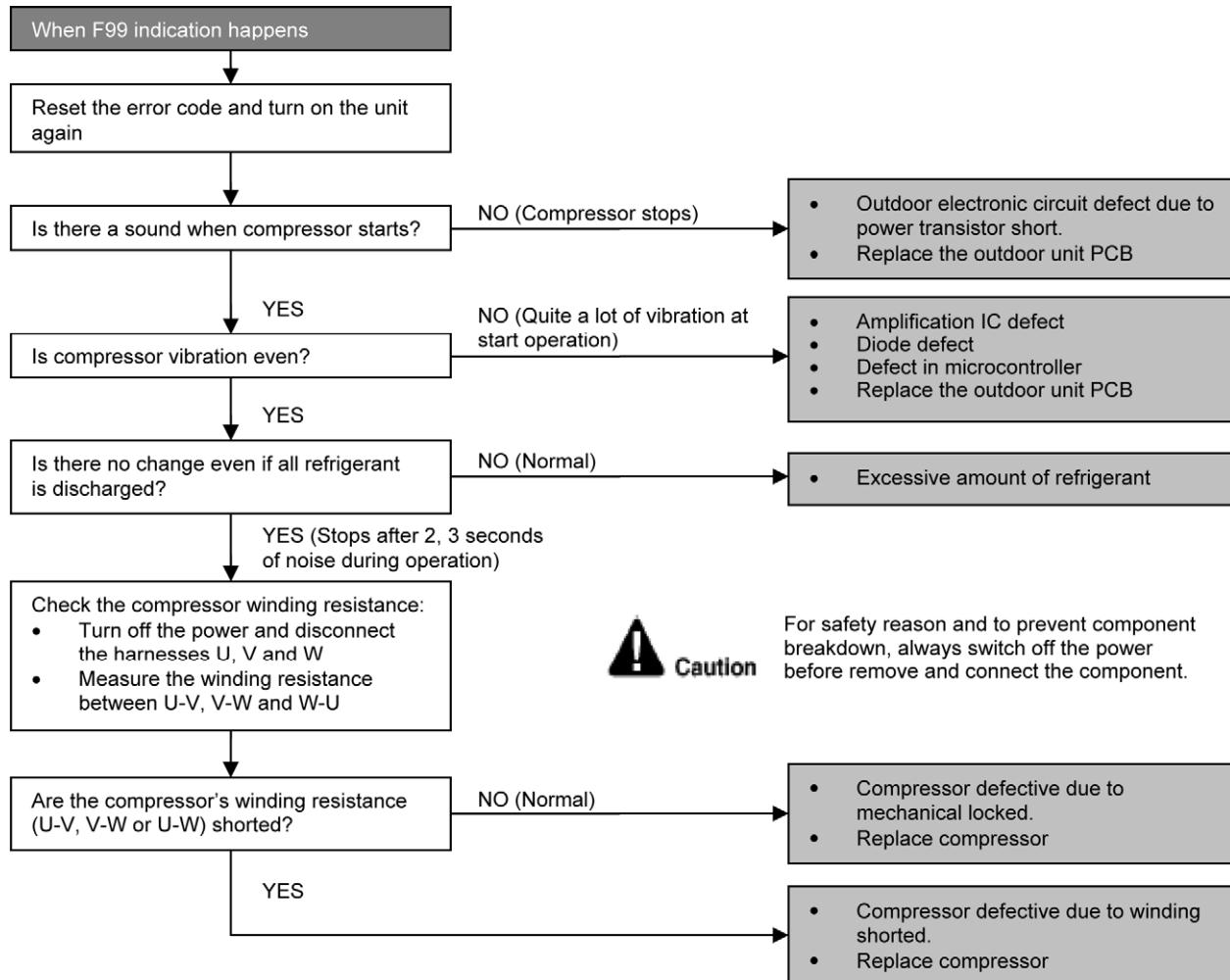
Malfunction Decision Conditions

During startup and operation of cooling, when inverter DC peak data is received by the outdoor internal DC peak sensing circuitry.

Malfunction Caused

- DC current peak due to compressor failure.
- DC current peak due to defective power transistor (IPM).
- DC current peak due to defective outdoor unit PCB.
- DC current peak due to short circuit.

Troubleshooting



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-S9RKV CS-S12RKV

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

16.1.1.1 To Remove Front Grille

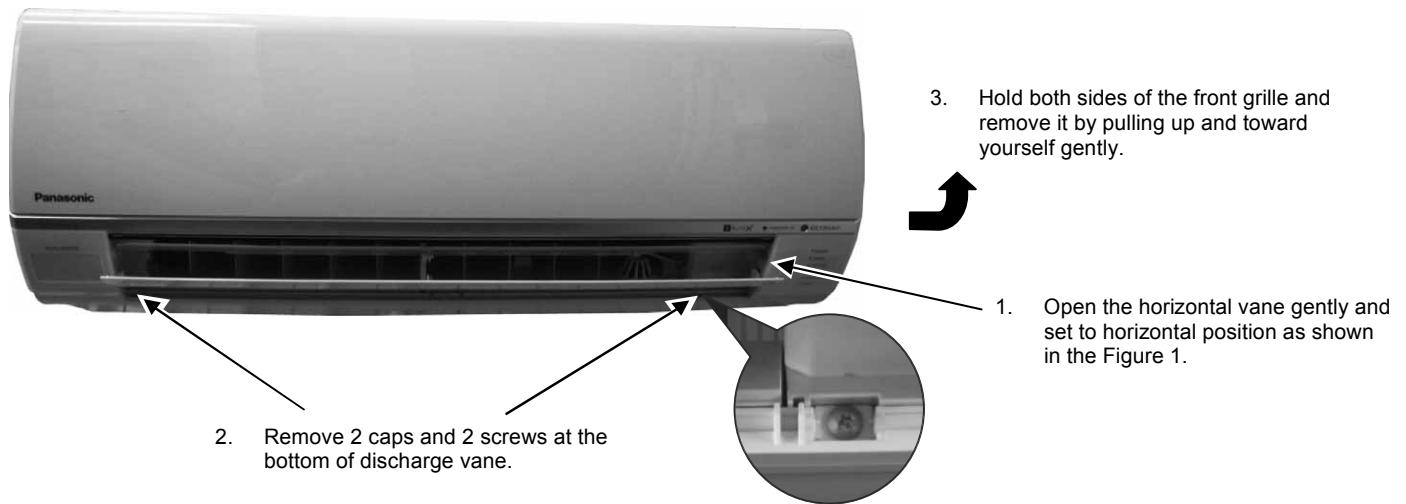


Figure 1



CAUTION

- a. Use a manual screw driver with at least 150 mm shaft length. Do not use a hand drill type.
- b. Slightly tilt the screw driver handle downward so that the shaft does not touch the flap. Be careful not to scratch the flap while undoing the screws.

16.1.1.2 To Remove Electronic Controller

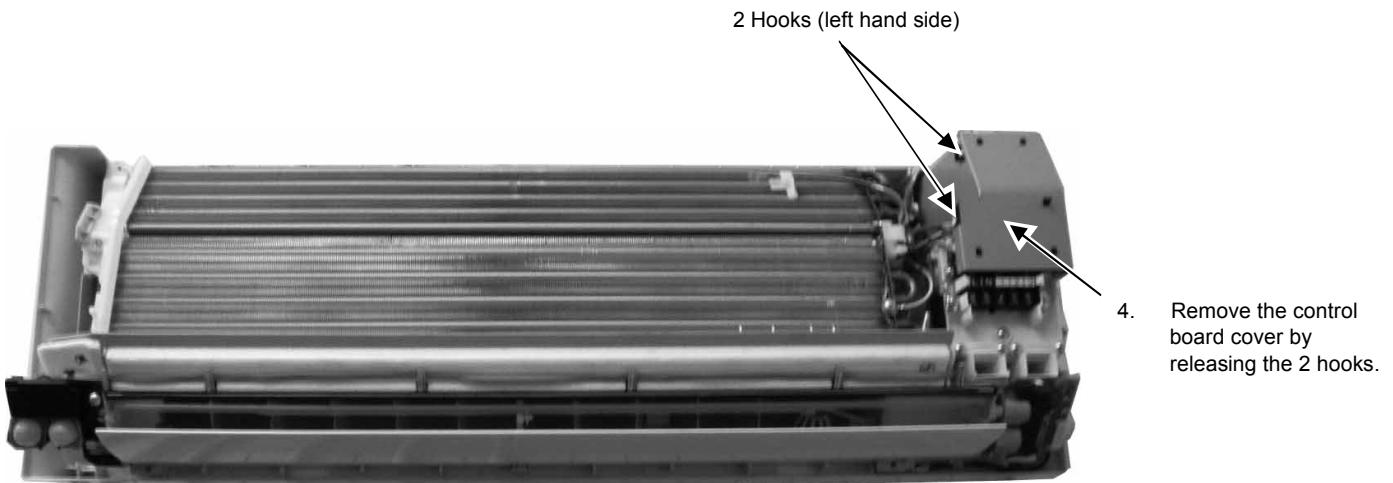


Figure 2

5. Detach the terminal wire (Brown), terminal wire (Black), terminal wire (Red) and earth wire screw.

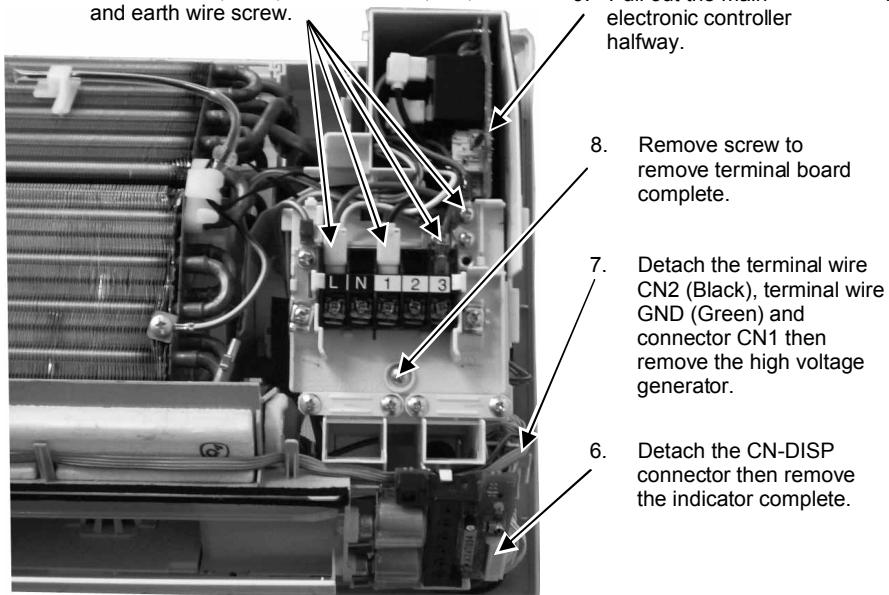


Figure 3

10. Detach all connectors as labeled from the electronic controller. Then pull out main controller gently

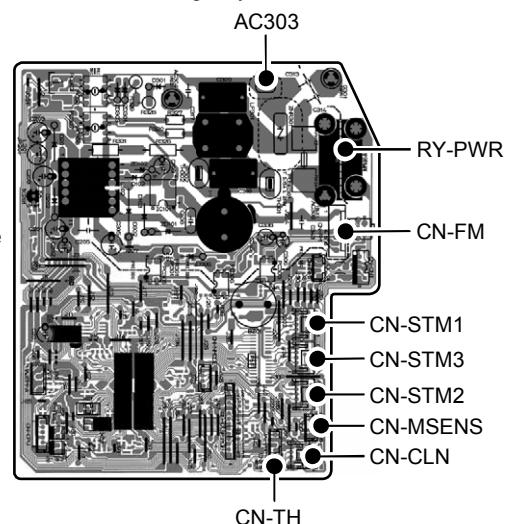
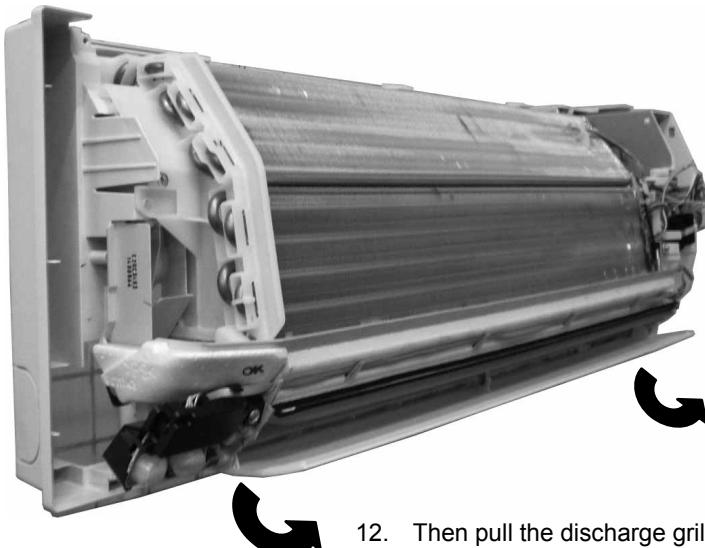


Figure 4

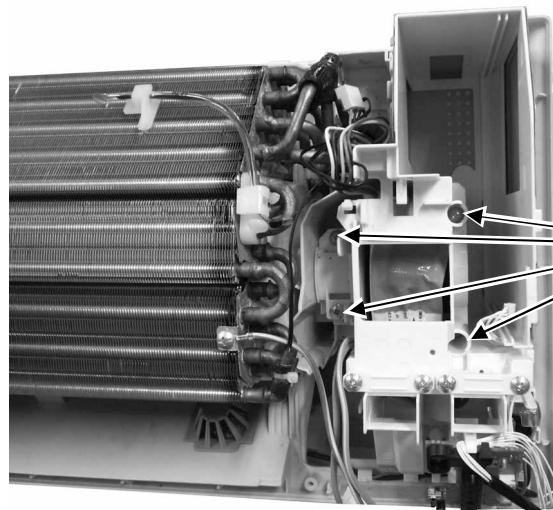
16.1.1.3 To Remove Discharge Grille



11. Pull out to remove the drain hose from the discharge grille
12. Then pull the discharge grille downward gently to dismantle it

Figure 5

16.1.1.4 To Remove Control Board



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

Figure 6

16.1.1.5 To Remove Cross Flow Fan and Indoor Fan Motor



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

Figure 7

16. Remove the bearing by pulling it out gently

15. Remove the screw from the evaporator.

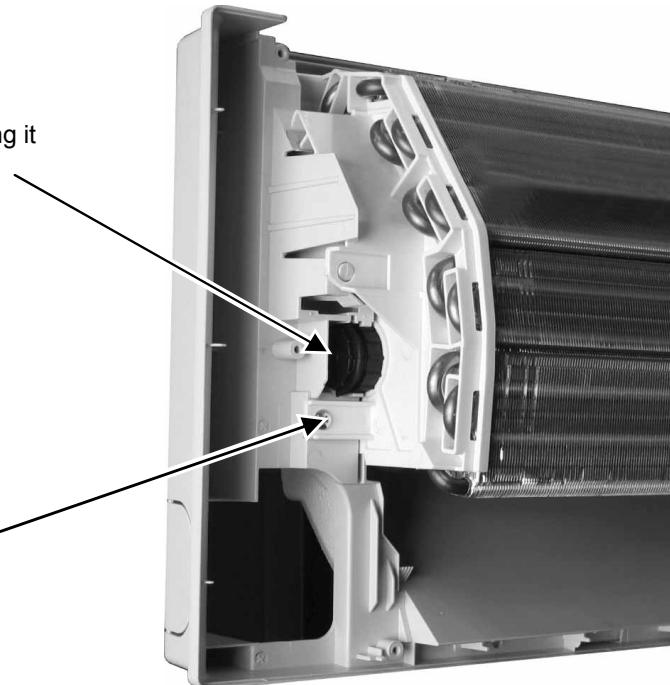
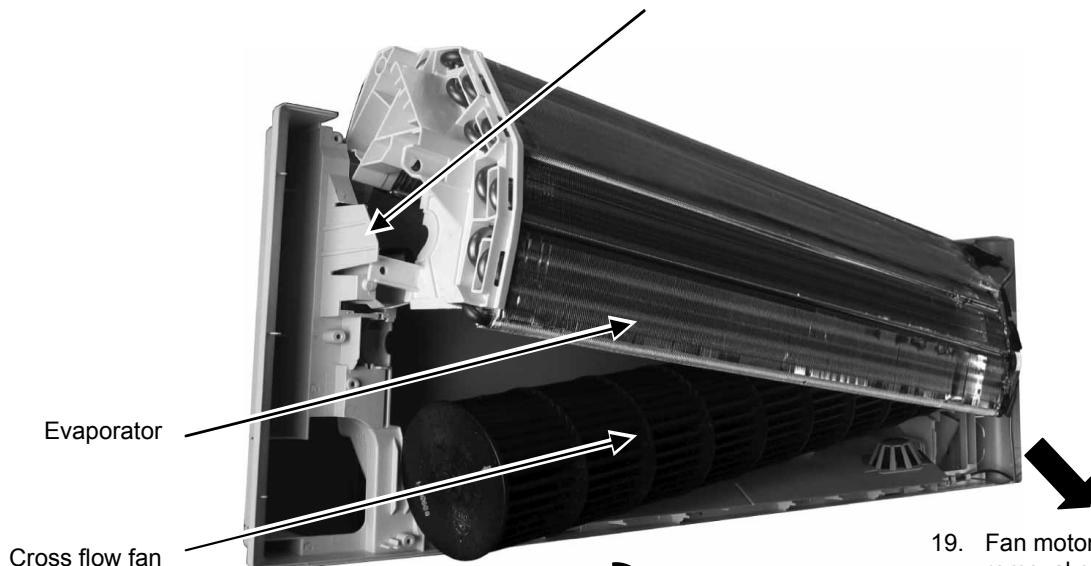


Figure 8

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



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

19. 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 9

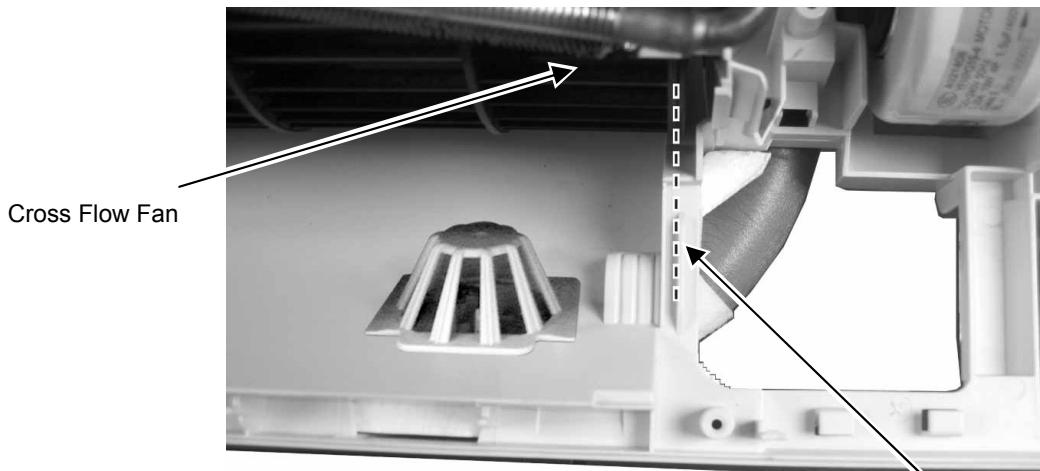


Figure 10

Reminder: To reinstall the cross flow fan, ensure cross flow fan is in line as shown in Figure 10.

⚠️ WARNING

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

16.2 CS-S18RKV CS-S24RKV CS-S28RKV

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

16.2.1.1 To Remove Front Grille

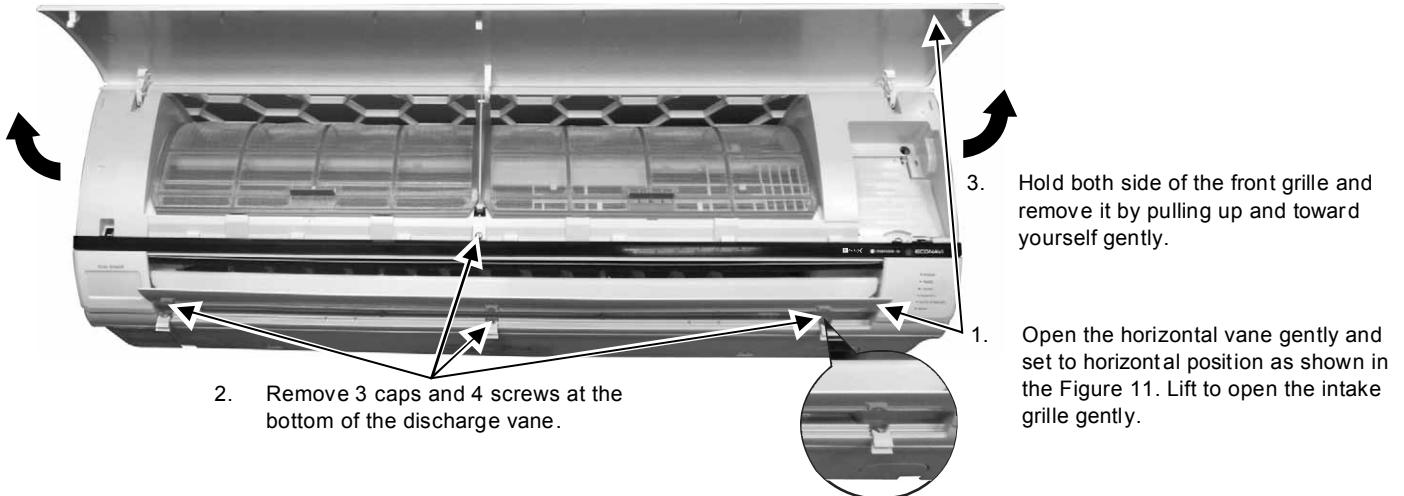


Figure 11



⚠️ CAUTION

- a. Use a manual screw driver with at least 150 mm shaft length. Do not use a hand drill type.
- b. Slightly tilt the screw driver handle downward so that the shaft does not touch the flap. Be careful not to scratch the flap while undoing the screws.

16.2.1.2 To Remove Horizontal Vane

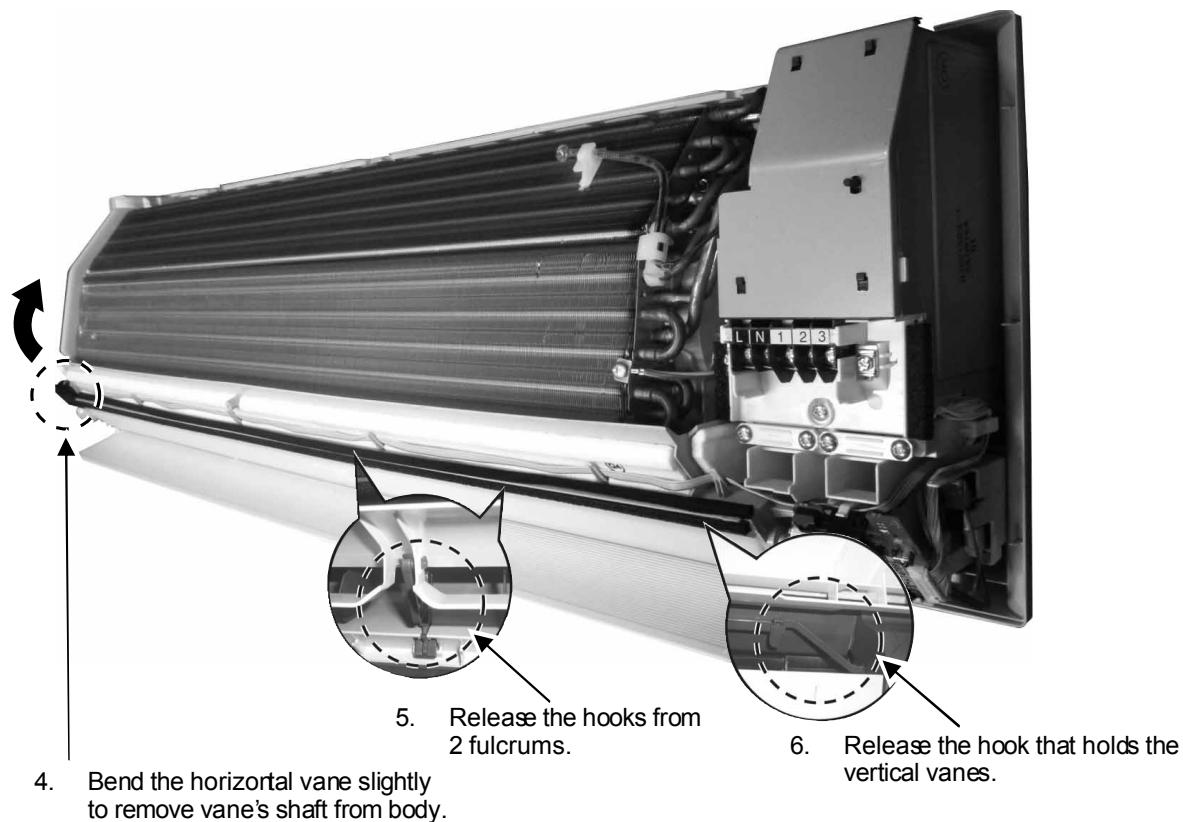


Figure 12

16.2.1.3 To Remove Electronic Controller



Figure 13

8. Detach the terminal wire (Brown), terminal wire (Black), terminal wire (Red) and earth wire screw.



Figure 14

9. Detach the CN-DISP connector then remove the indicator complete.
10. Detach the terminal wire CN2 (Black), terminal wire GND (Green) and connector CN1 then remove the high voltage generator.
11. Remove screw to remove terminal board complete.
12. Pull put the main electronic controller halfway.

13. Detach all the connectors as labeled from the electronic controller. Then pull out main controller gently.

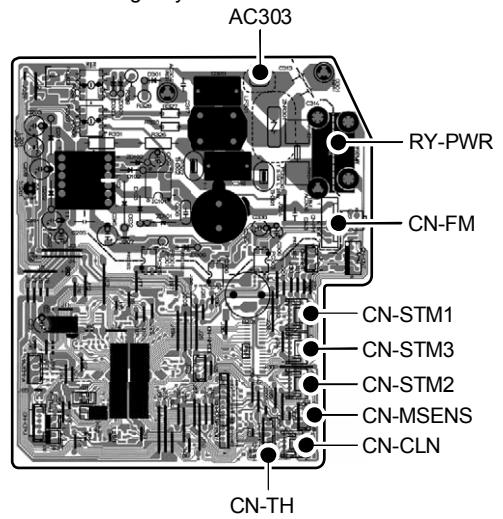
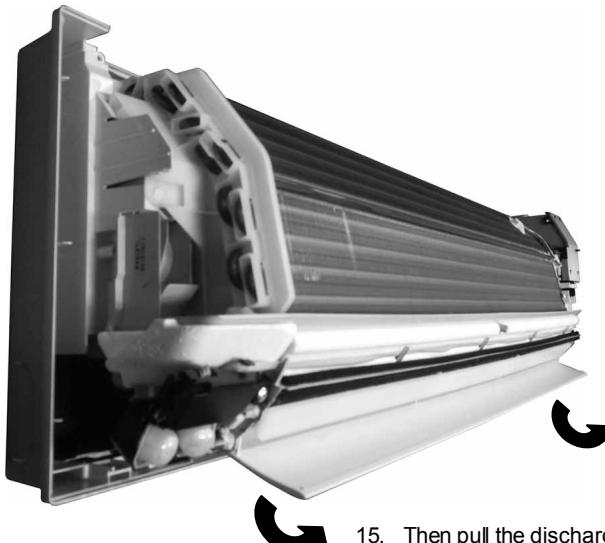


Figure 15

16.2.1.4 To Remove Discharge Grille



14. Pull out to remove the drain hose from the discharge grille.
15. Then pull the discharge grille downward gently to dismantle it.

Figure 16

16.2.1.5 To Remove Control Board

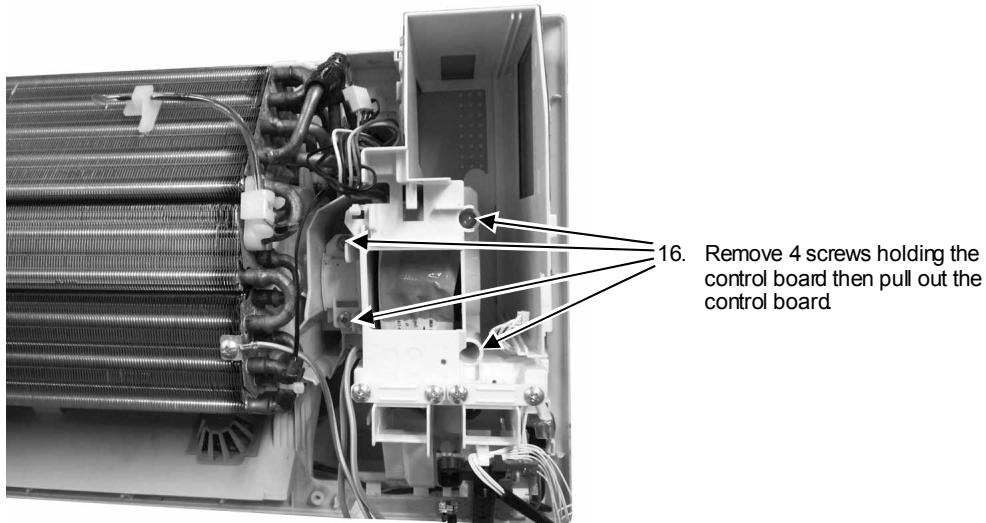


Figure 17

16.2.1.6 To Remove Cross Flow Fan and Indoor Fan Motor

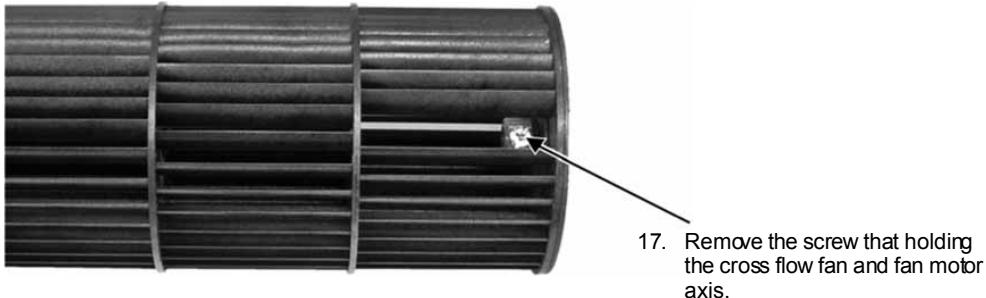


Figure 18

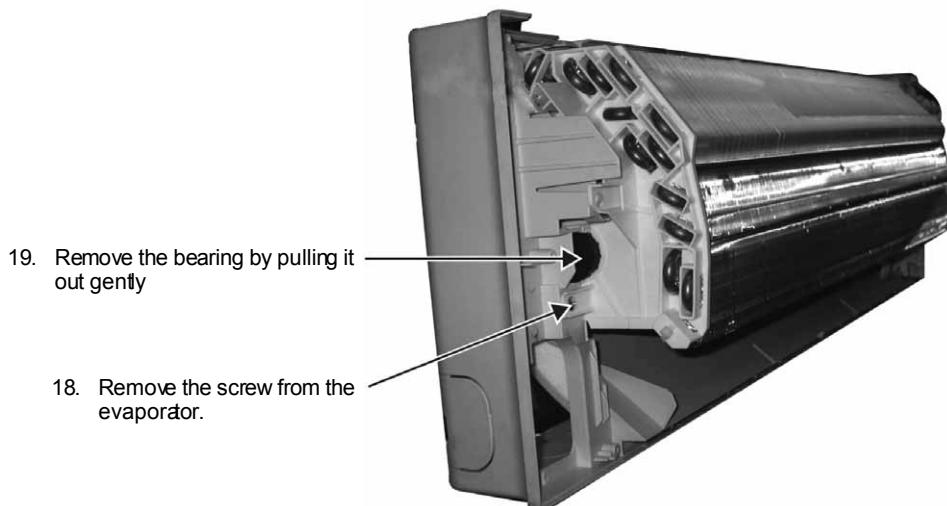
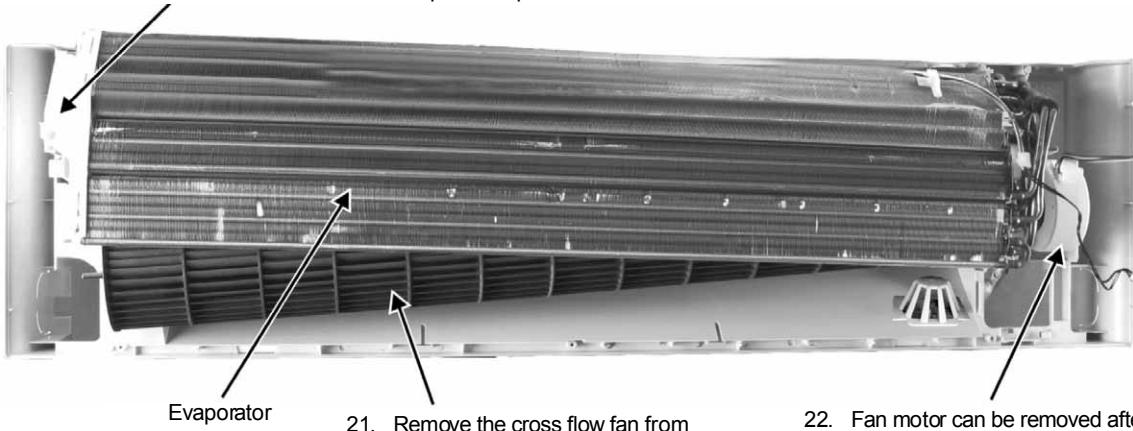


Figure 19

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



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

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

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

Figure 20

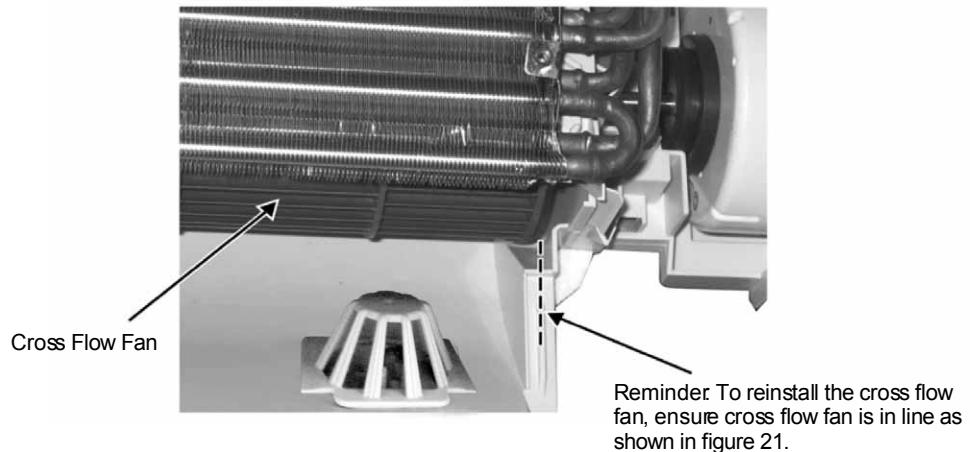


Figure 21

16.3 Outdoor Electronic Controller Removal Procedure

16.3.1 CU-S9RKV

Caution! When handling electronic controller, be careful of electrostatic discharge.

1. Remove the 4 screws of the Top Panel.

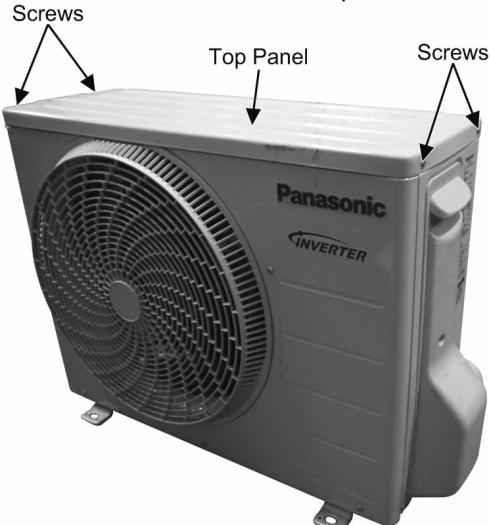


Fig.1

2. Remove the 7 screws of the Front Panel.

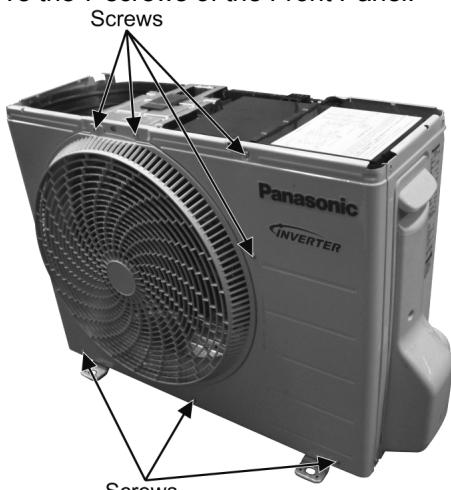


Fig.2

3. Remove the screw of the Terminal Board Cover.
4. Remove the Top Cover of the Control Board by 2 hooks.

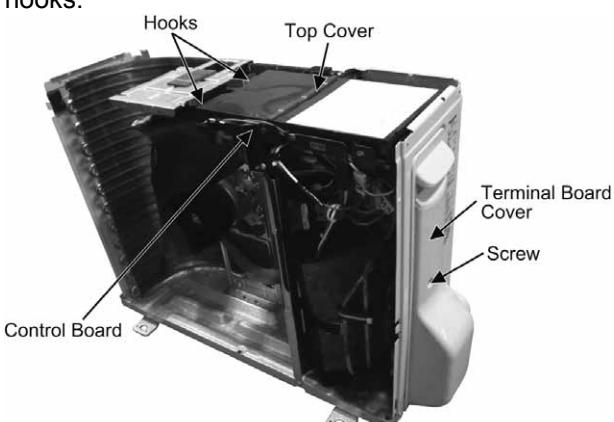


Fig.3

5. Remove the Control Board as follows.

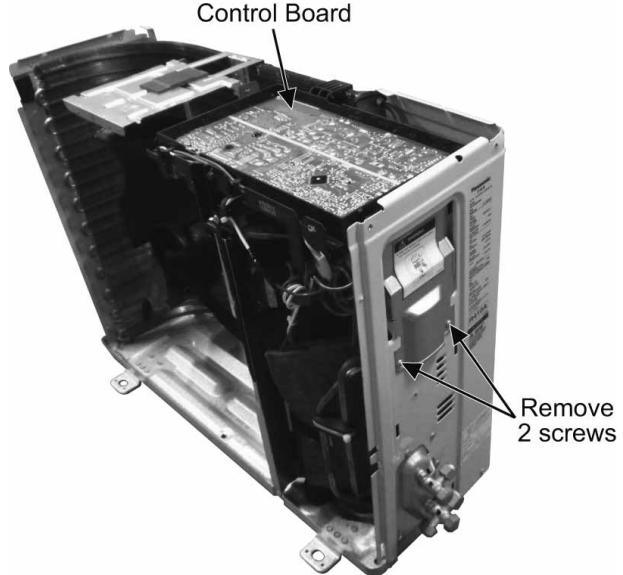


Fig.4

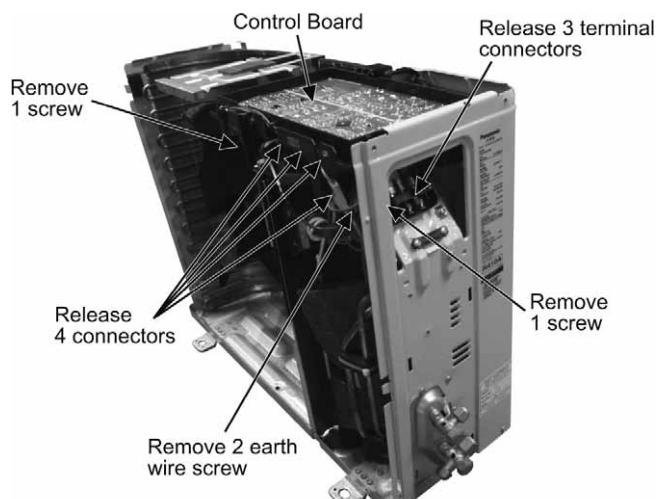


Fig.5

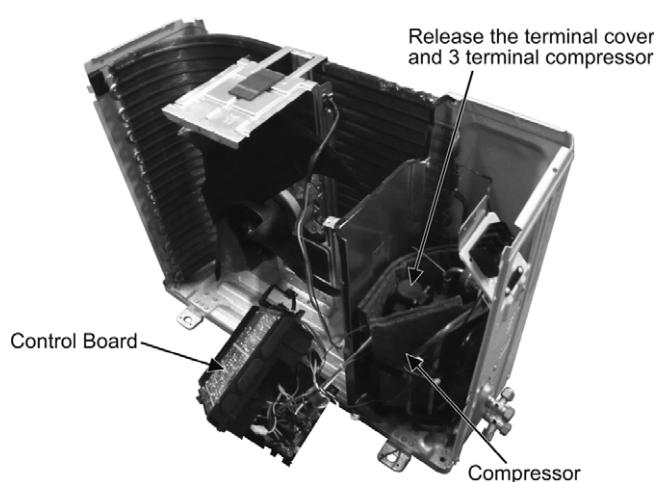


Fig.6

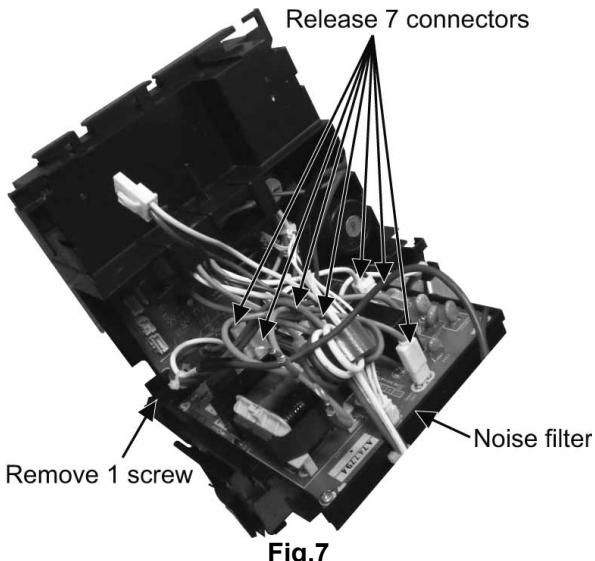


Fig.7

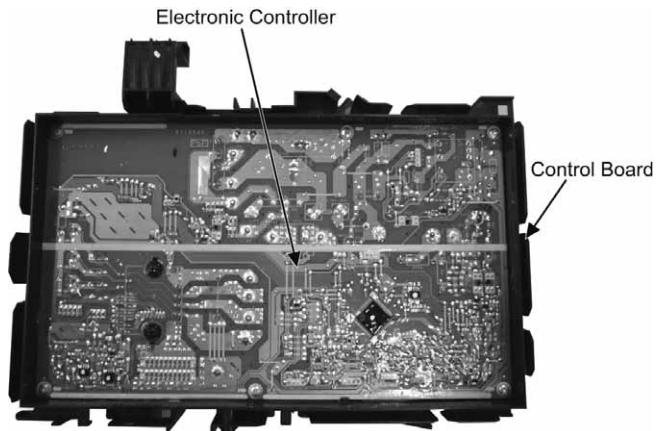


Fig.9

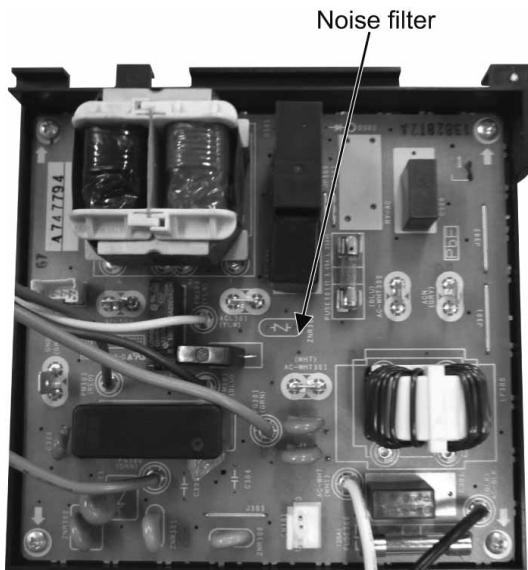


Fig.8

16.3.2 CU-S12RKV

Caution! When handling electronic controller, be careful of electrostatic discharge.

1. Remove the 3 screws of the Top Panel.

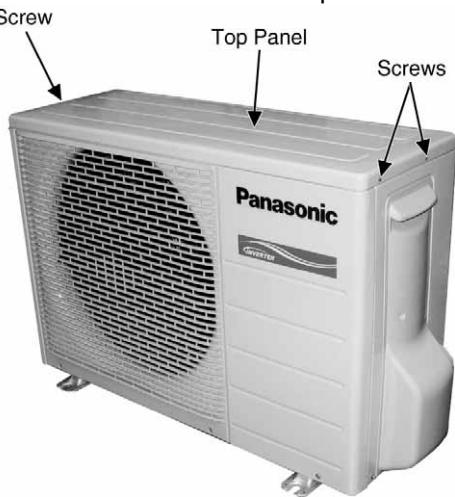


Fig.1

2. Remove the 6 screws of the Front Panel.

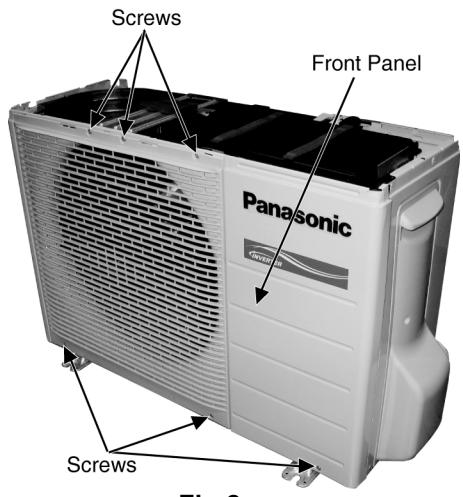


Fig.2

3. Remove the screw of the Terminal Board Cover.
4. Remove the Top Cover of the Control Board by 4 hooks.

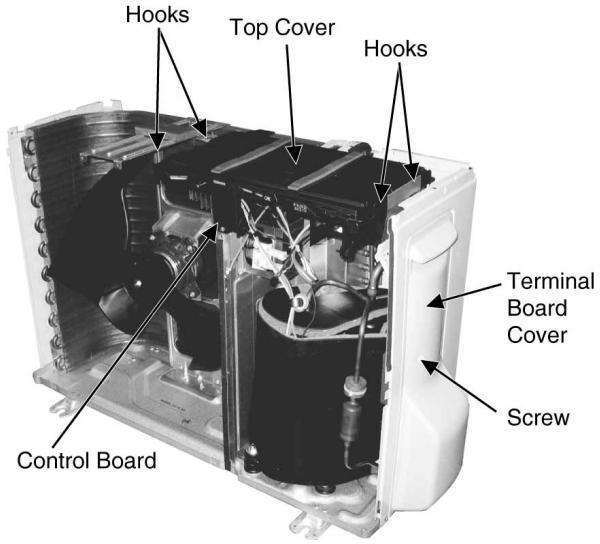


Fig.3

5. Remove the Control Board as follows.

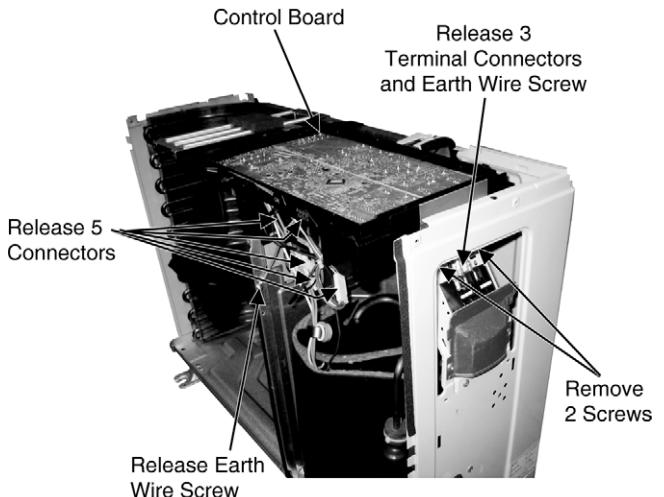


Fig.4

Remove the Terminal Cover and 3 Terminal Compressor

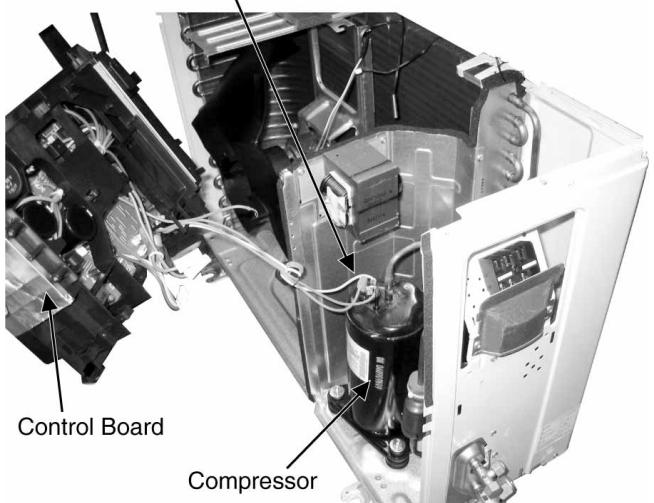


Fig.5

Electronic Controller Control Board

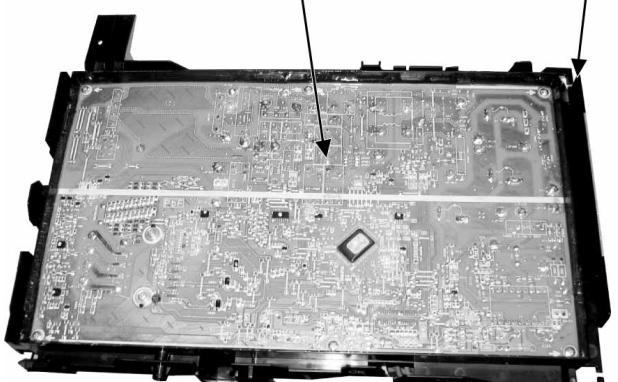


Fig.6

16.3.3 CU-S18RKV CU-S24RKV

 Caution! When handling electronic controller, be careful of electrostatic discharge.

1. Remove the 4 screws of the Top Panel.

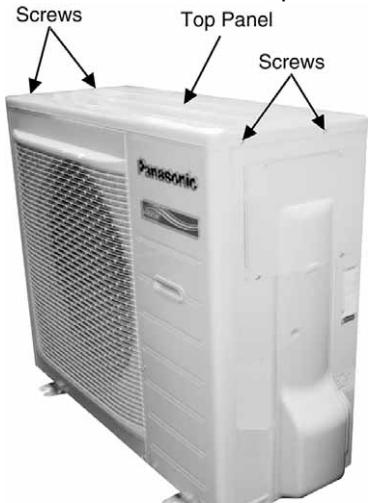


Fig.1

4. Remove the Control Board.

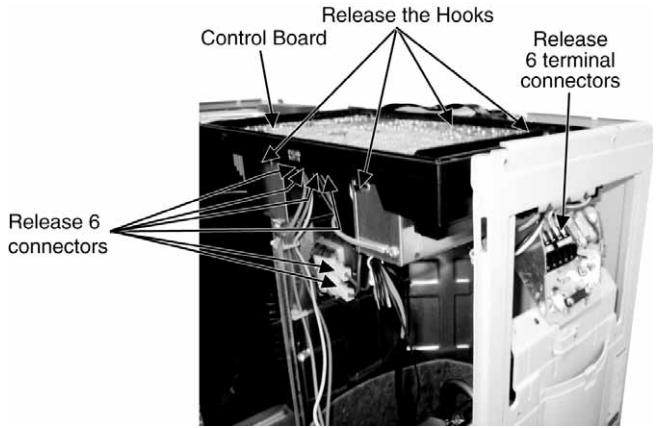


Fig.4

2. Remove the 10 screws of the Front Panel.

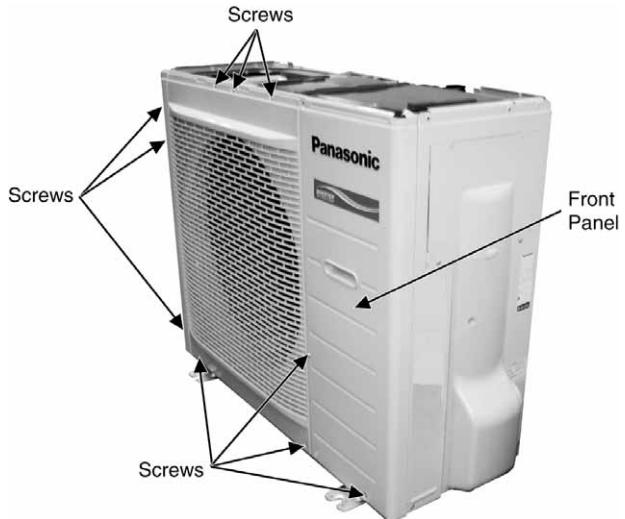


Fig.2

5. Remove the 8 screws of the Electronic Controller.

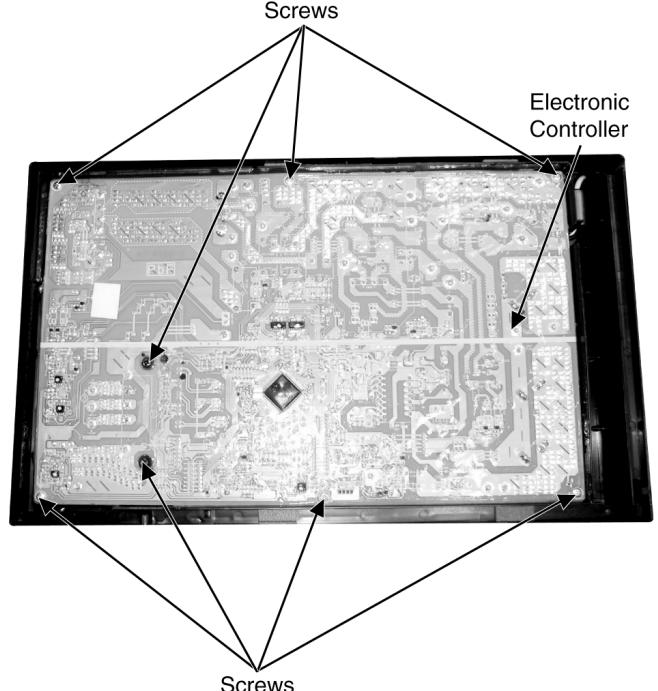


Fig.5

3. Remove the Top Cover of the Electronic Controller.



Fig.3

16.3.4 CU-S28RKV



Caution! When handling electronic controller, be careful of electrostatic discharge.

1. Remove the 4 screws of the Top Panel.

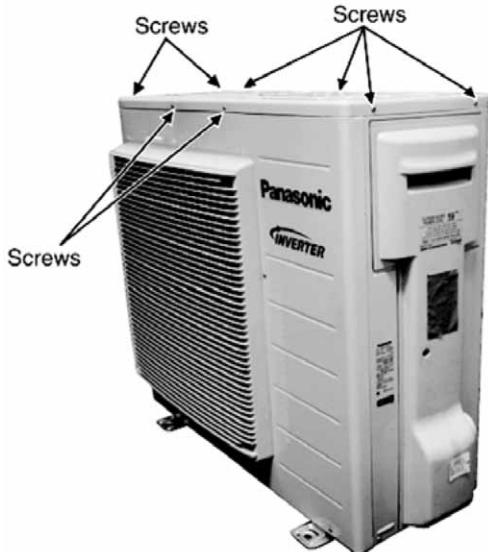


Fig.1

2. Remove the 10 screws of the Front Panel.

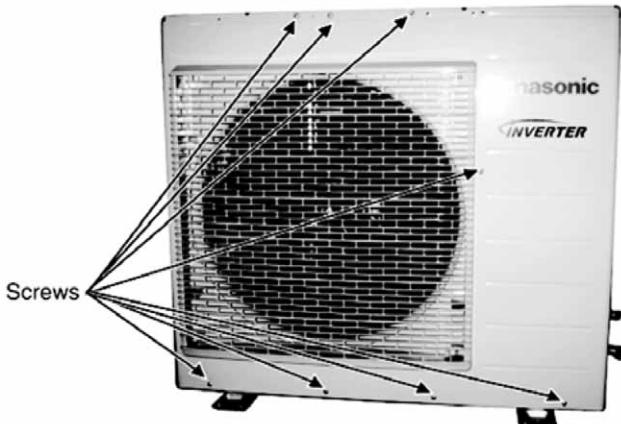


Fig.2

3. Remove the Top Cover of the Electronic Controller.

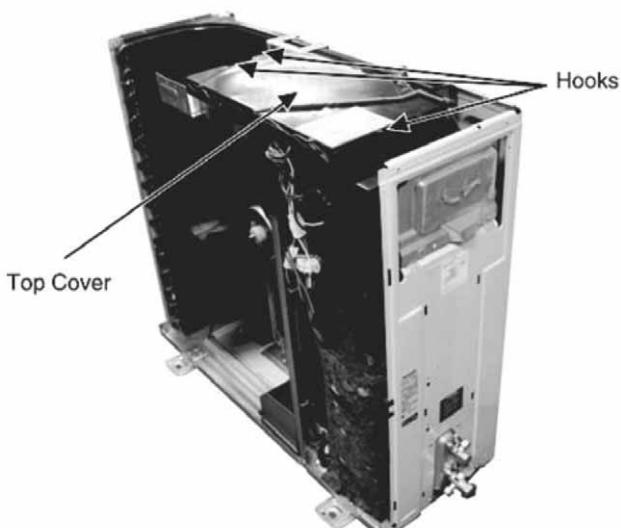


Fig.3

4. Remove the Control Board.

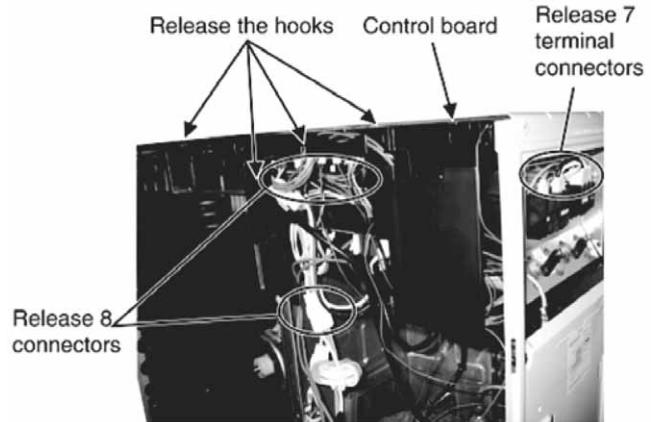


Fig.4

5. Remove the 8 screws of the Electronic Controller.

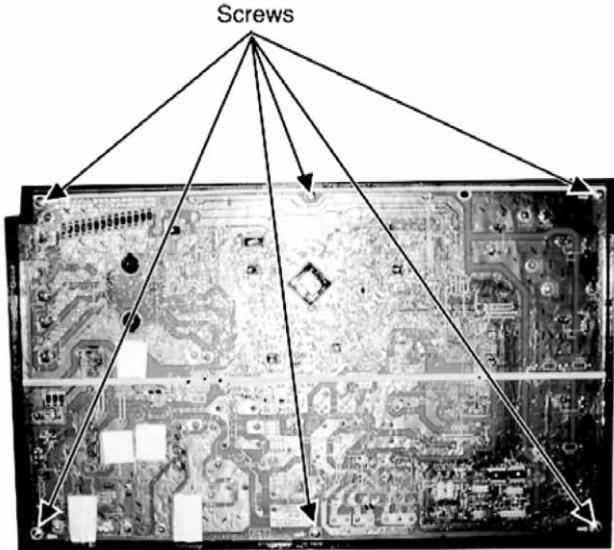


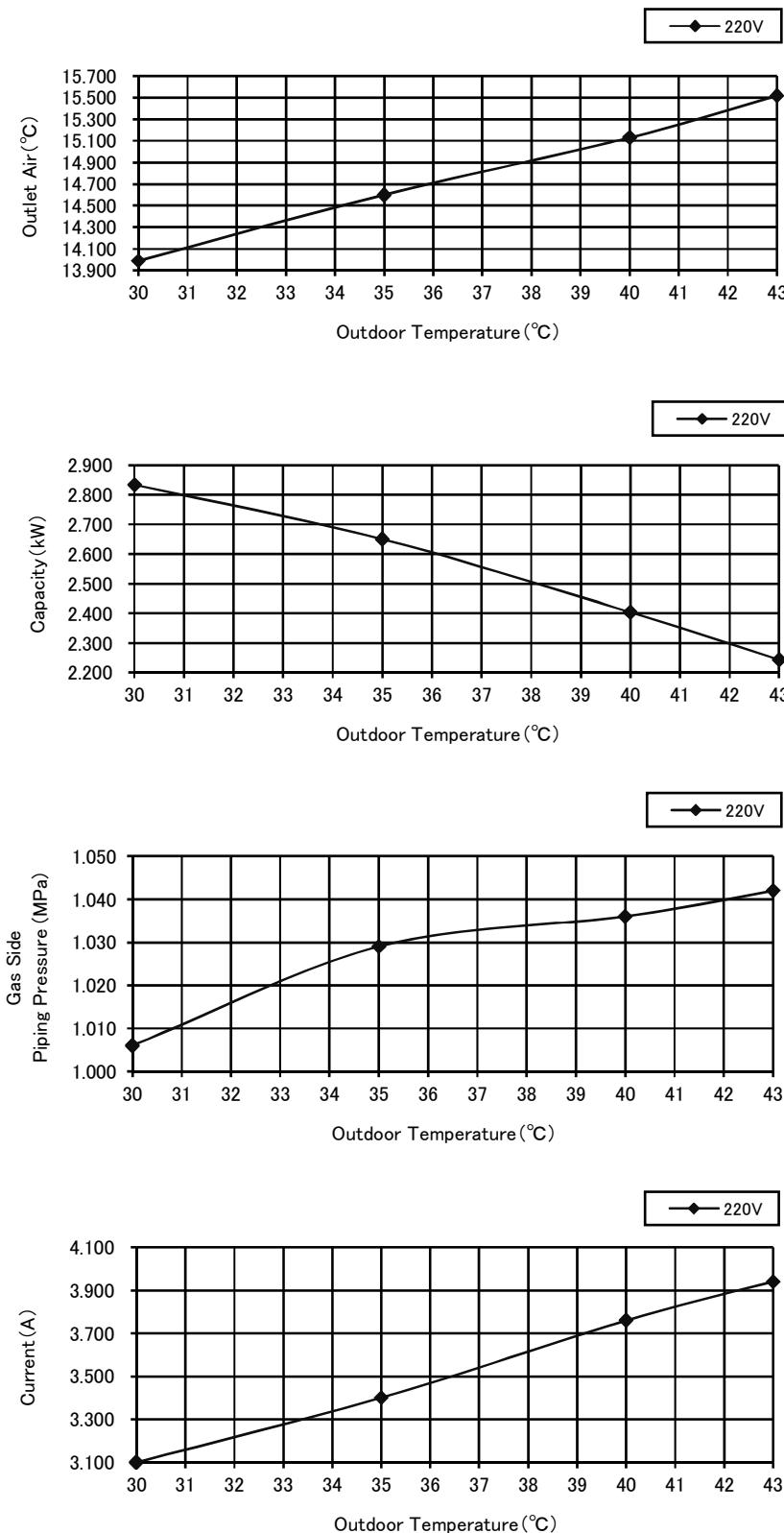
Fig.5

17. Technical Data

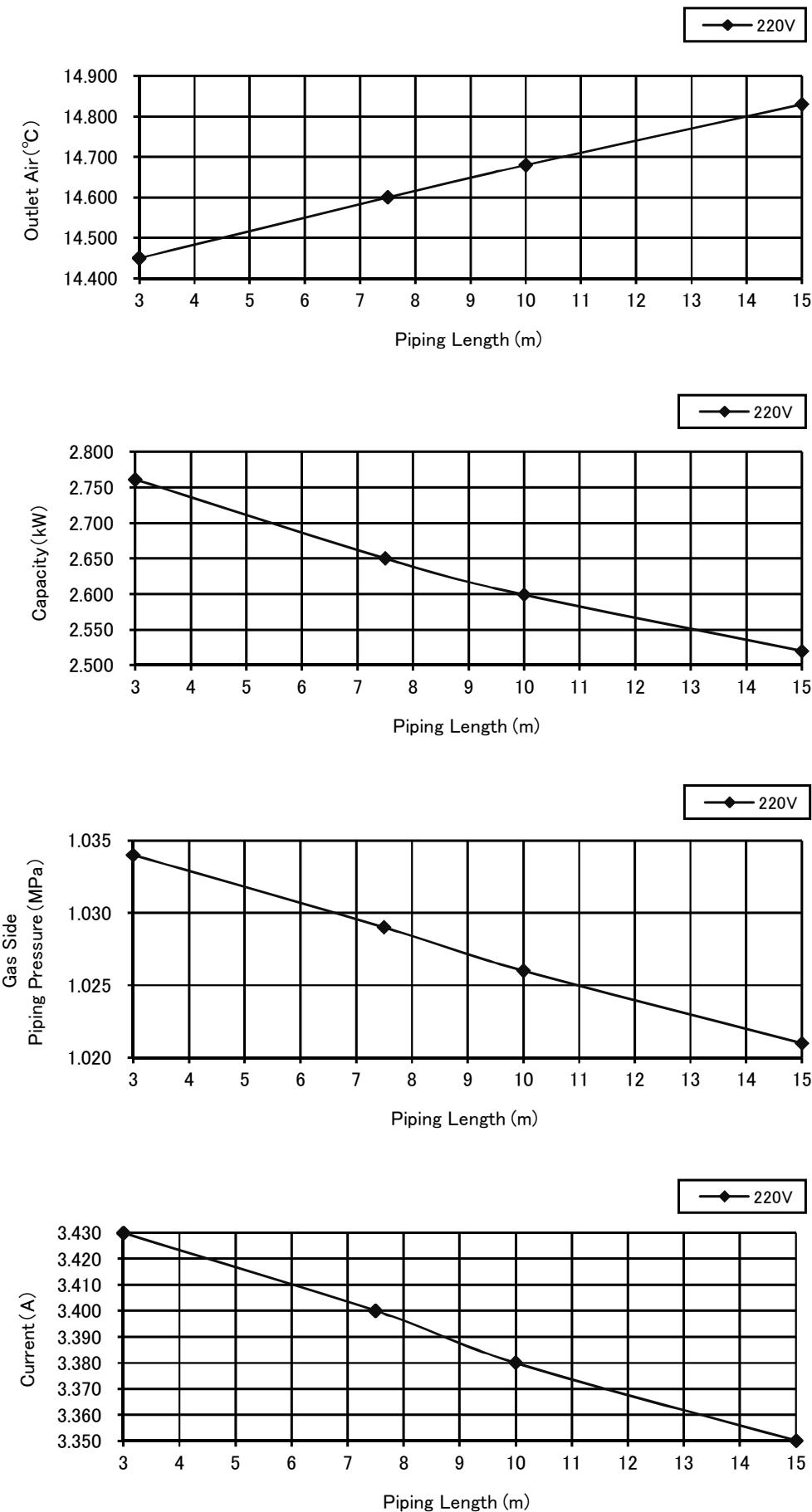
17.1 Operation Characteristics

17.1.1 CS-S9RKV CU-S9RKV

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

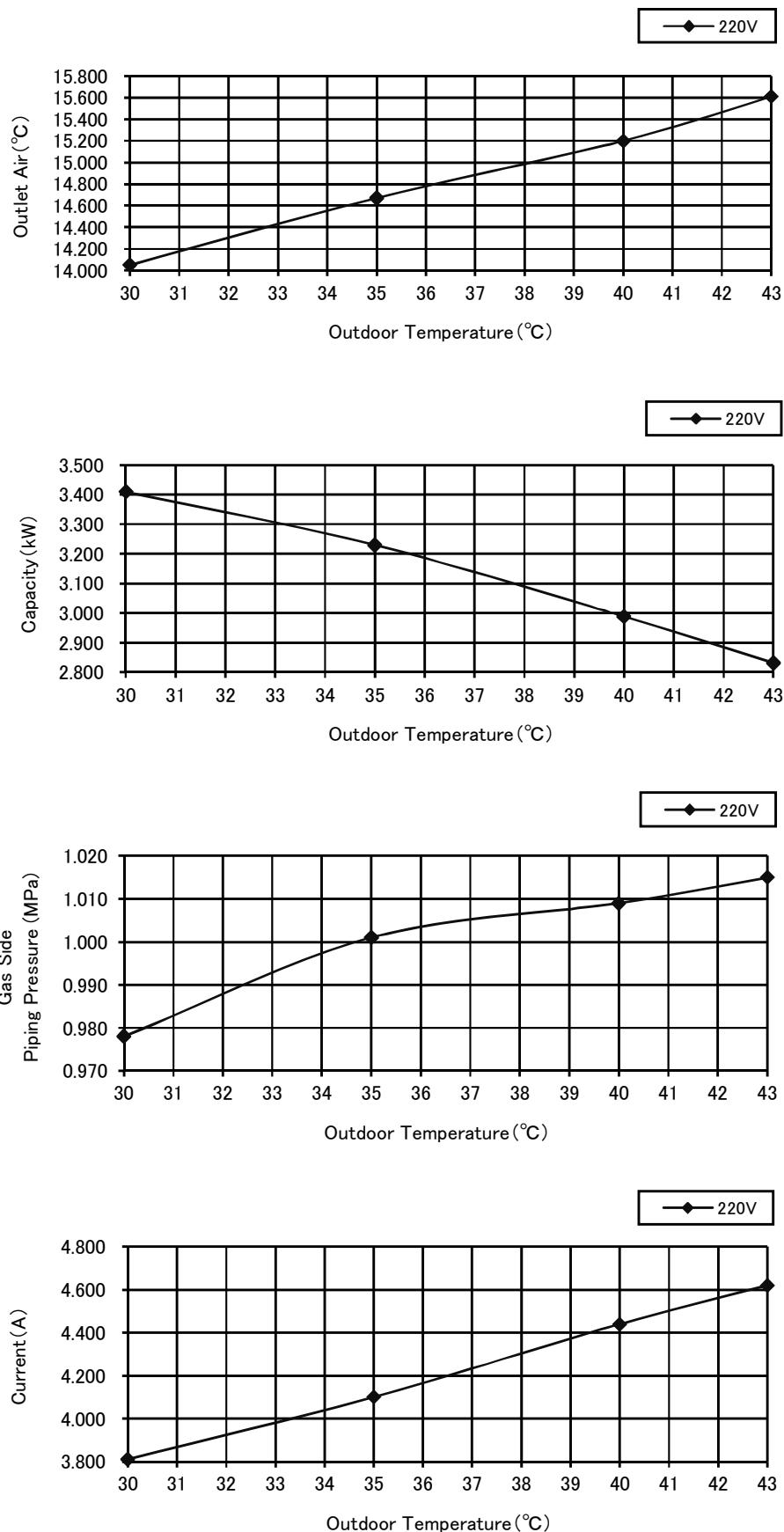


- Piping Length Characteristic Cooling
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Compressor Frequency = Fc

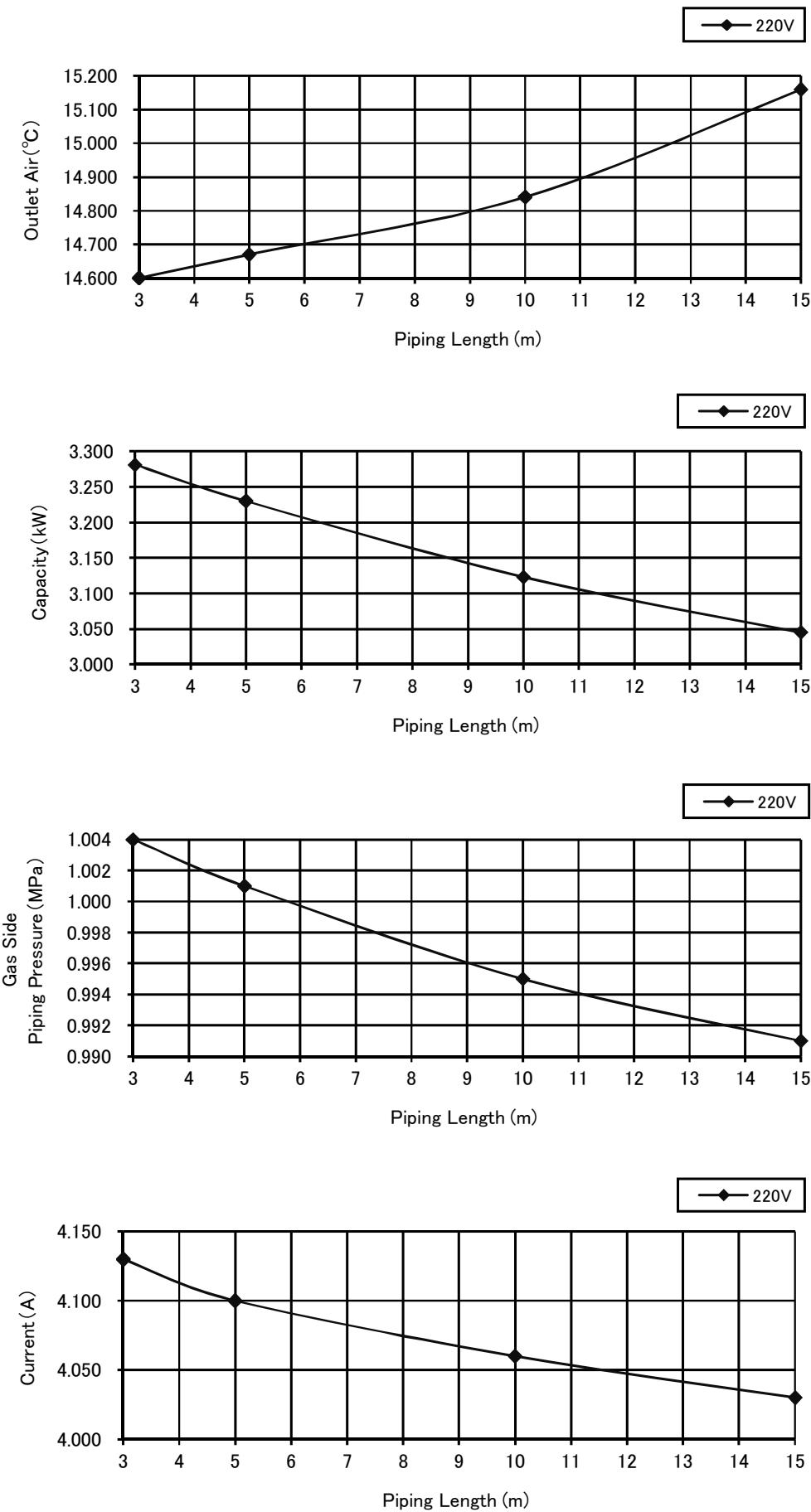


17.1.2 CS-S12RKV CU-S12RKV

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

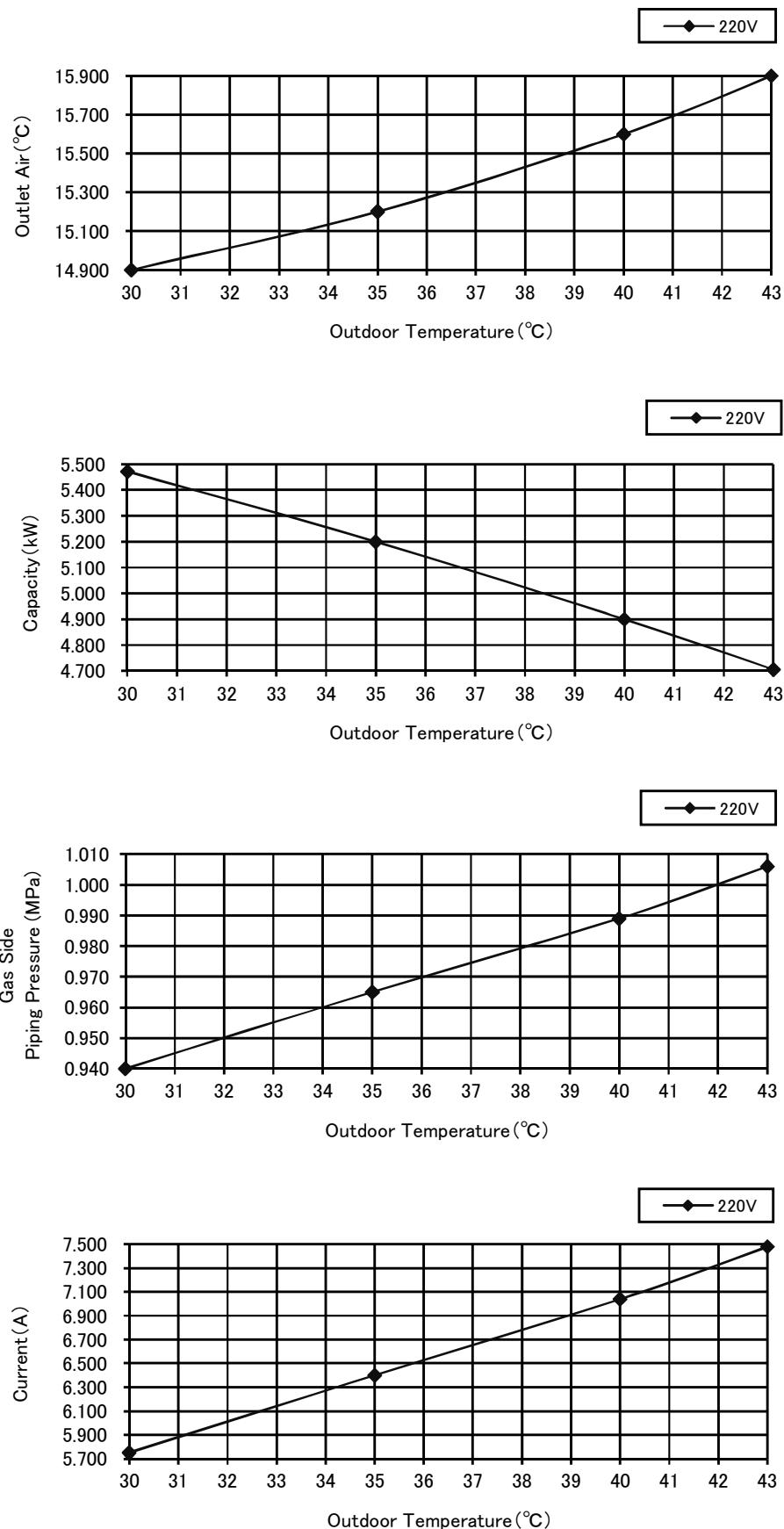


- Piping Length Characteristic Cooling
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Compressor Frequency = Fc



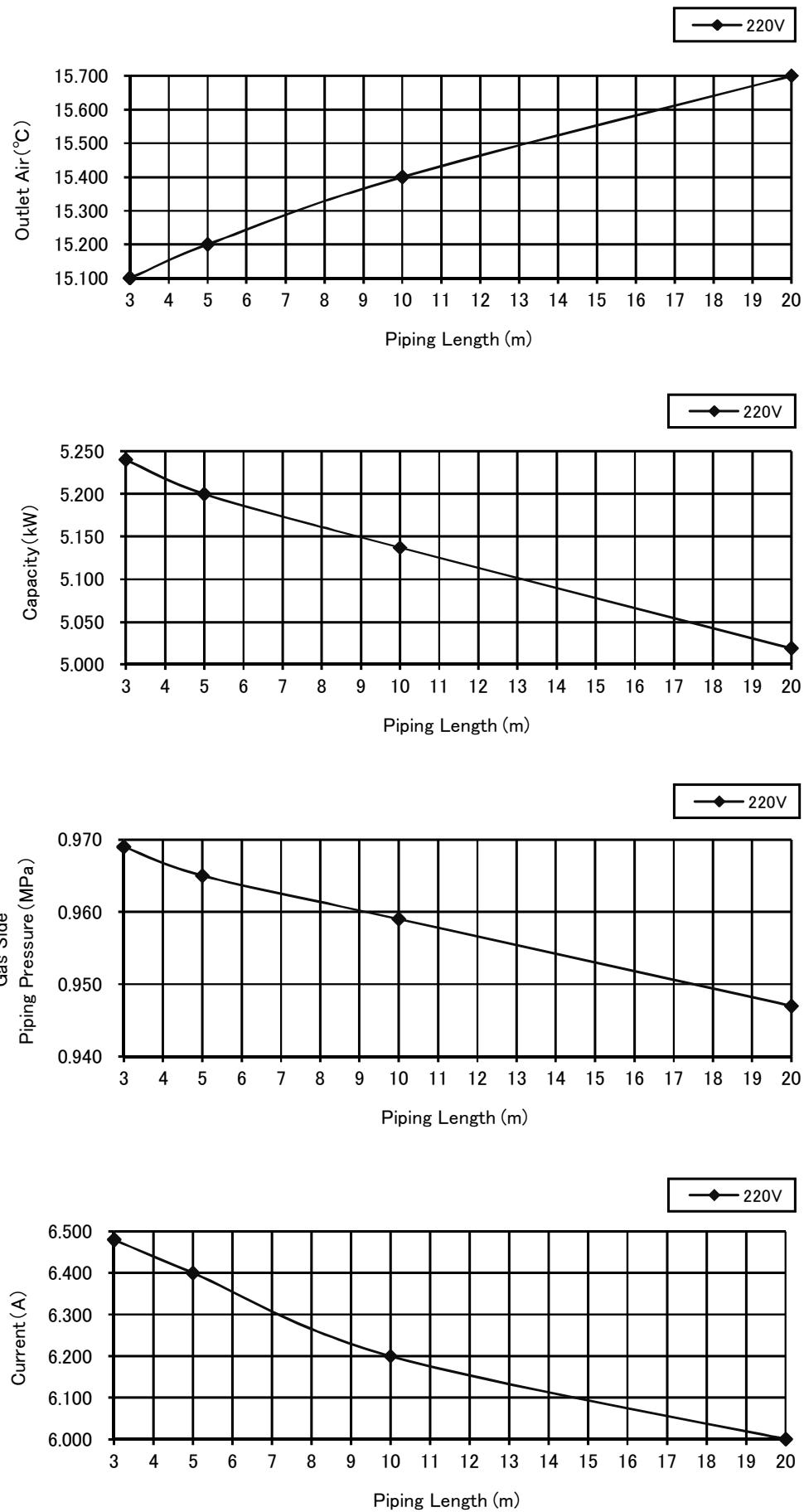
17.1.3 CS-S18RKV CU-S18RKV

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



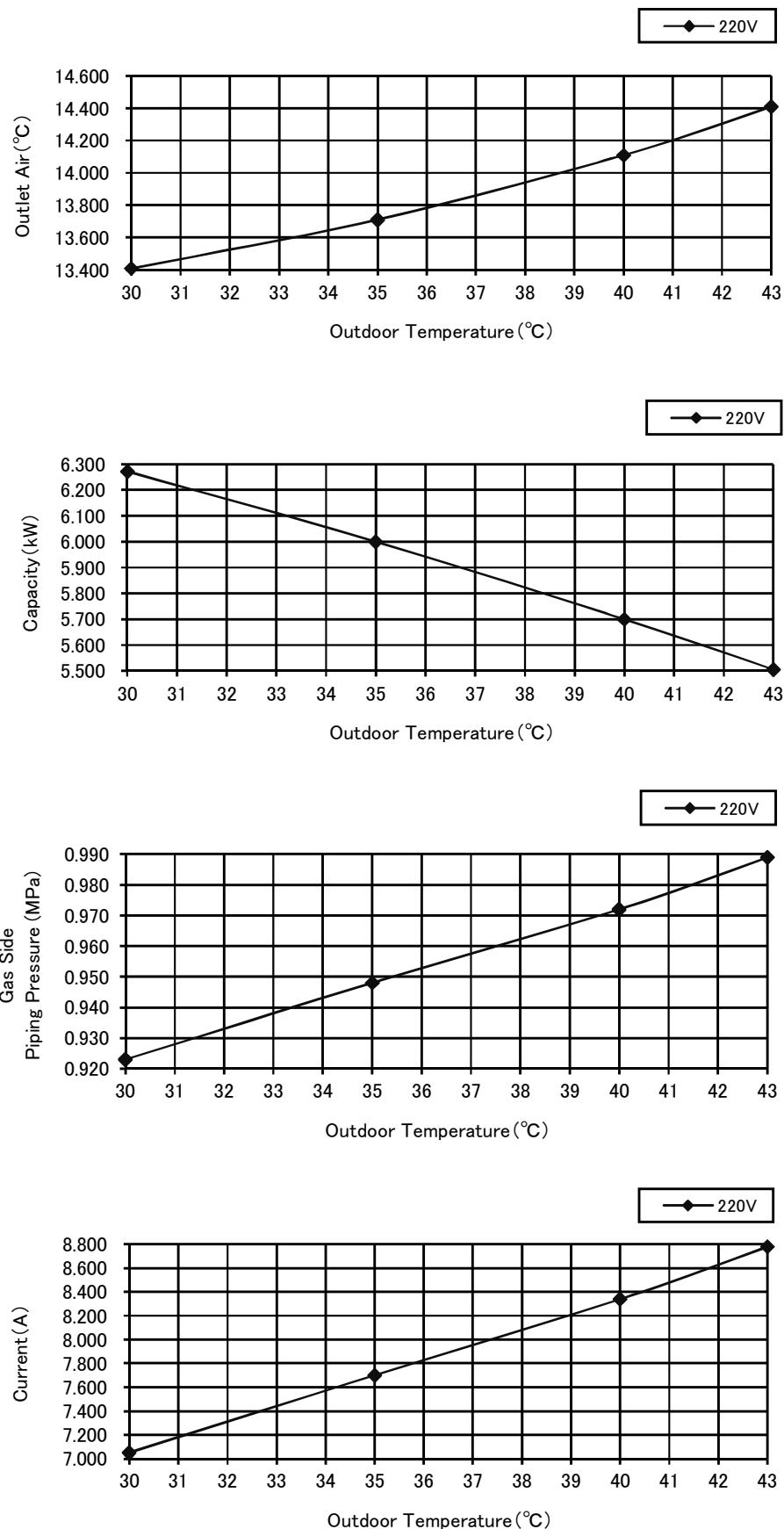
- Piping Length Characteristic Cooling

- Room temperature: 27°C (DBT), 19°C (WBT)
- Outdoor temperature: 35°C (DBT), 24°C (WBT)
- Operation condition: High fan speed
- Compressor Frequency = Fc



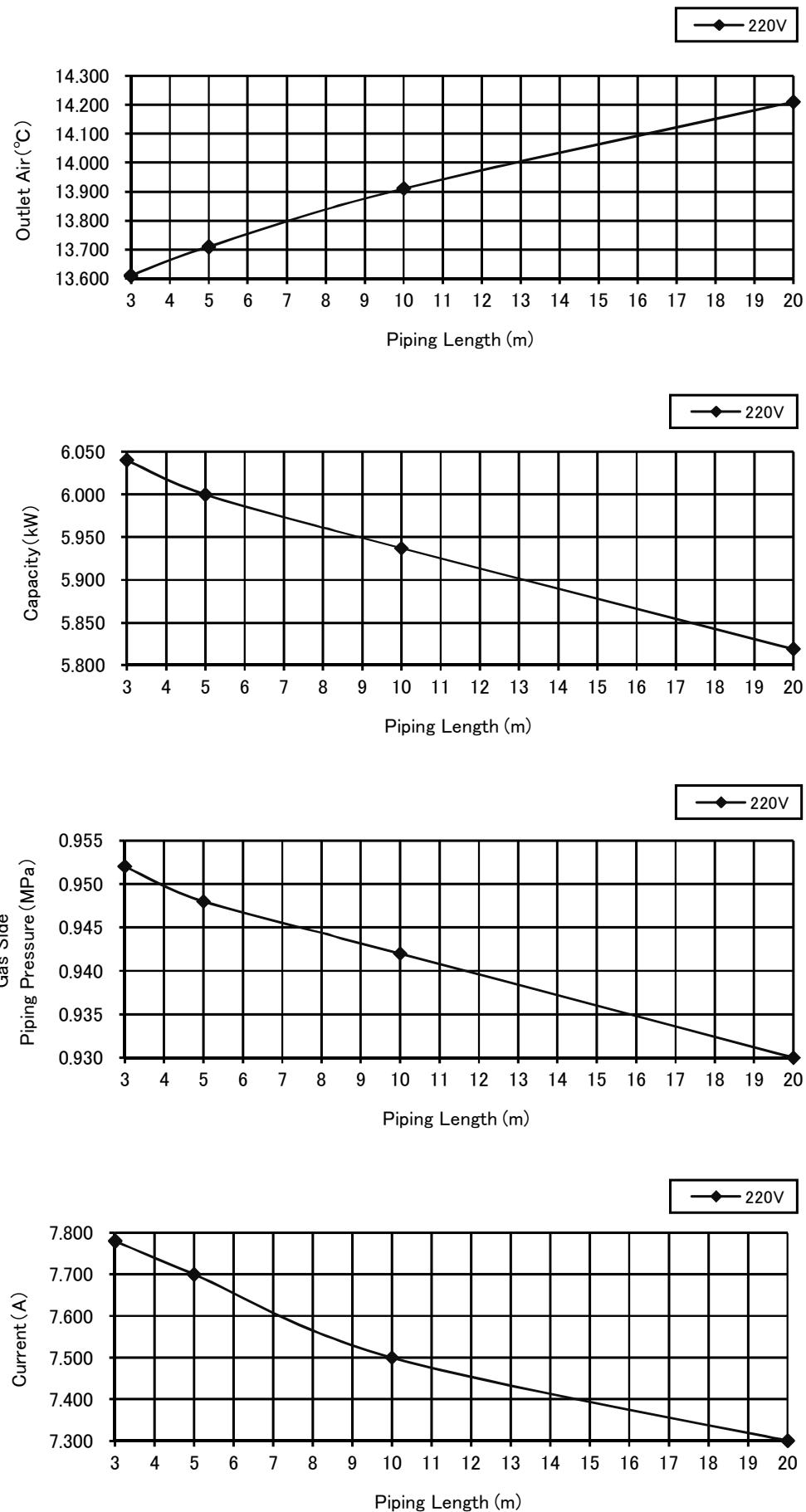
17.1.4 CS-S24RKV CU-S24RKV

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



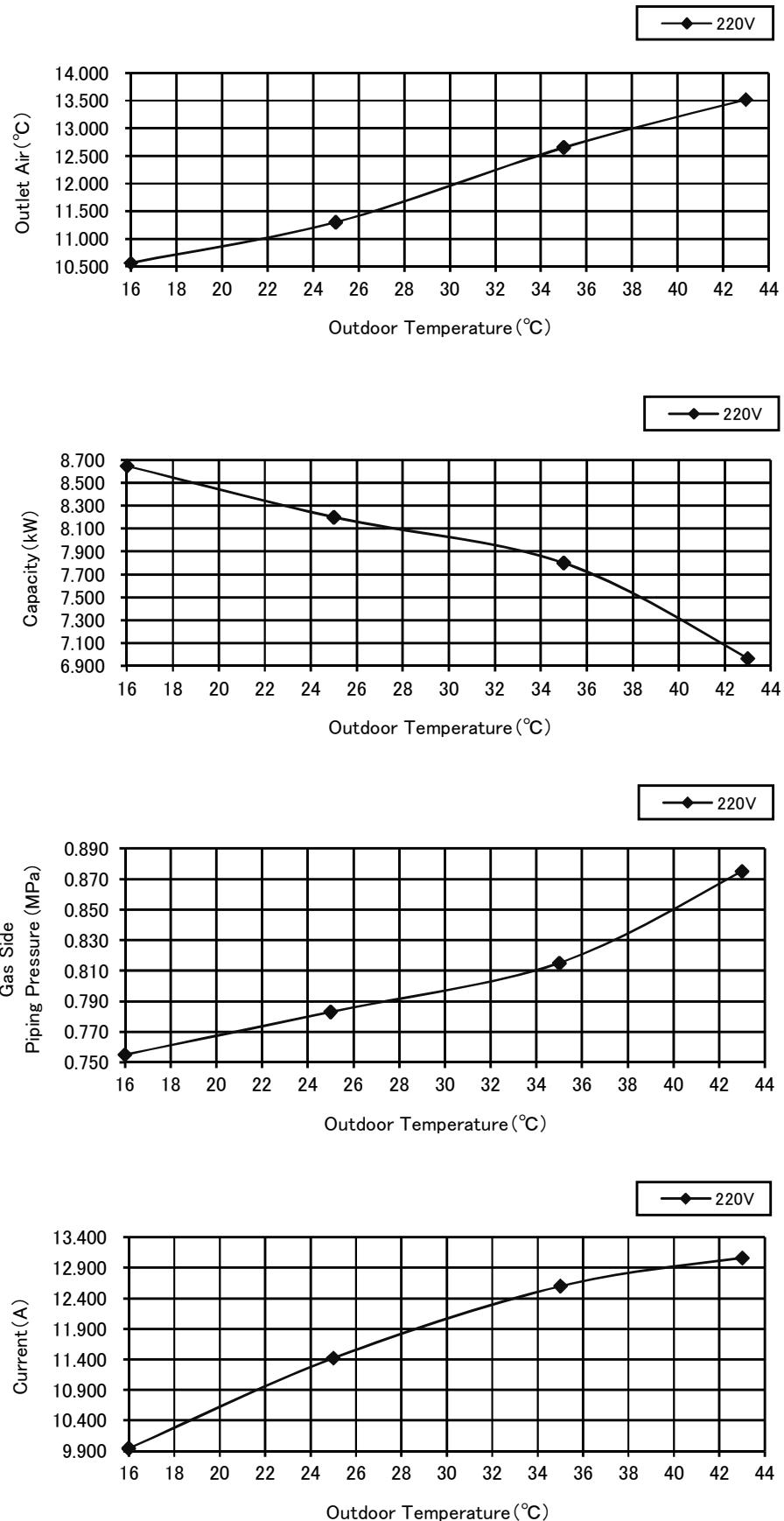
- Piping Length Characteristic Cooling

- Room temperature: 27°C (DBT), 19°C (WBT)
- Outdoor temperature: 35°C (DBT), 24°C (WBT)
- Operation condition: High fan speed
- Compressor Frequency = Fc



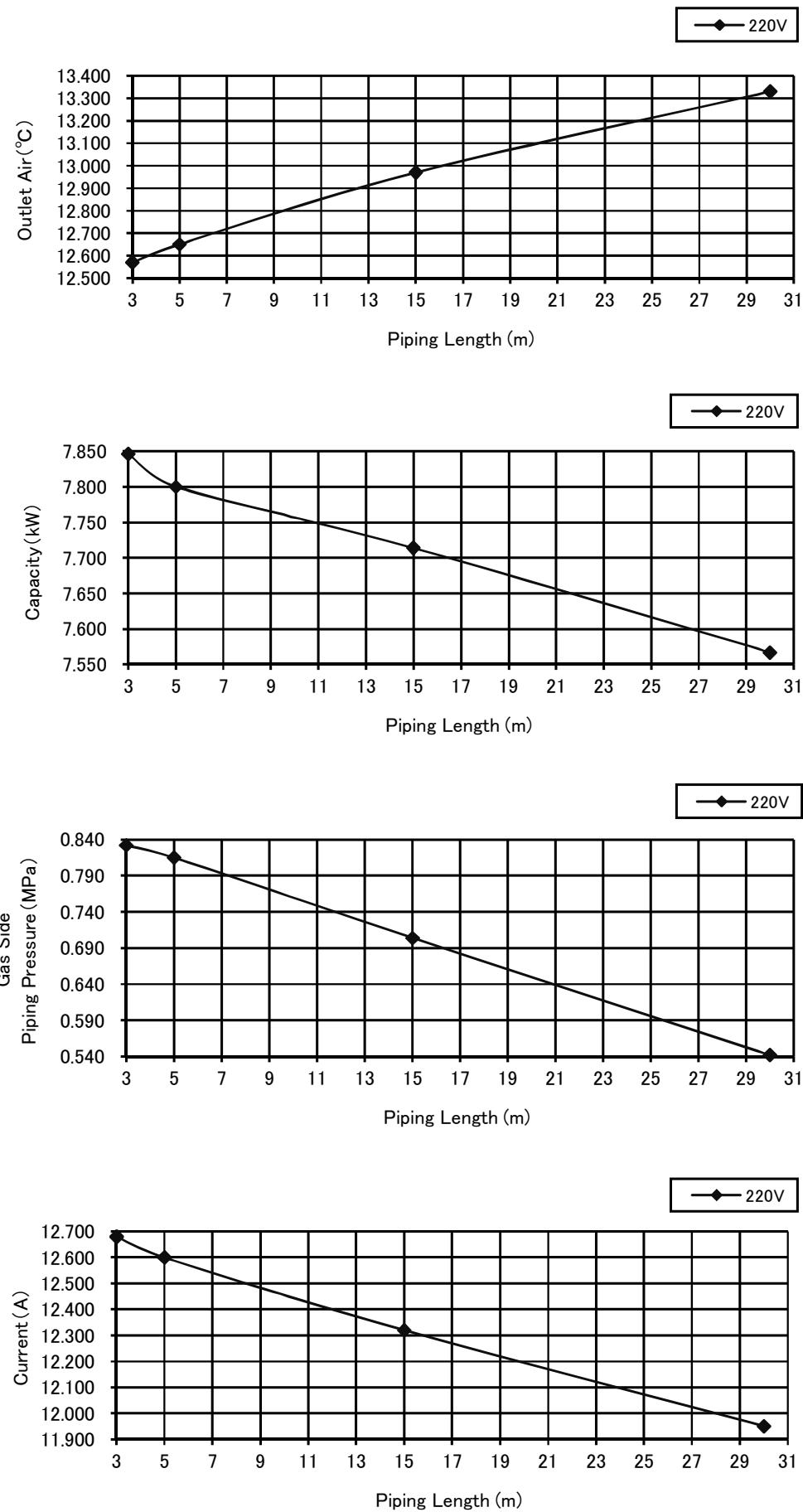
17.1.5 CS-S28RKV CU-S28RKV

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



- Piping Length Characteristic Cooling

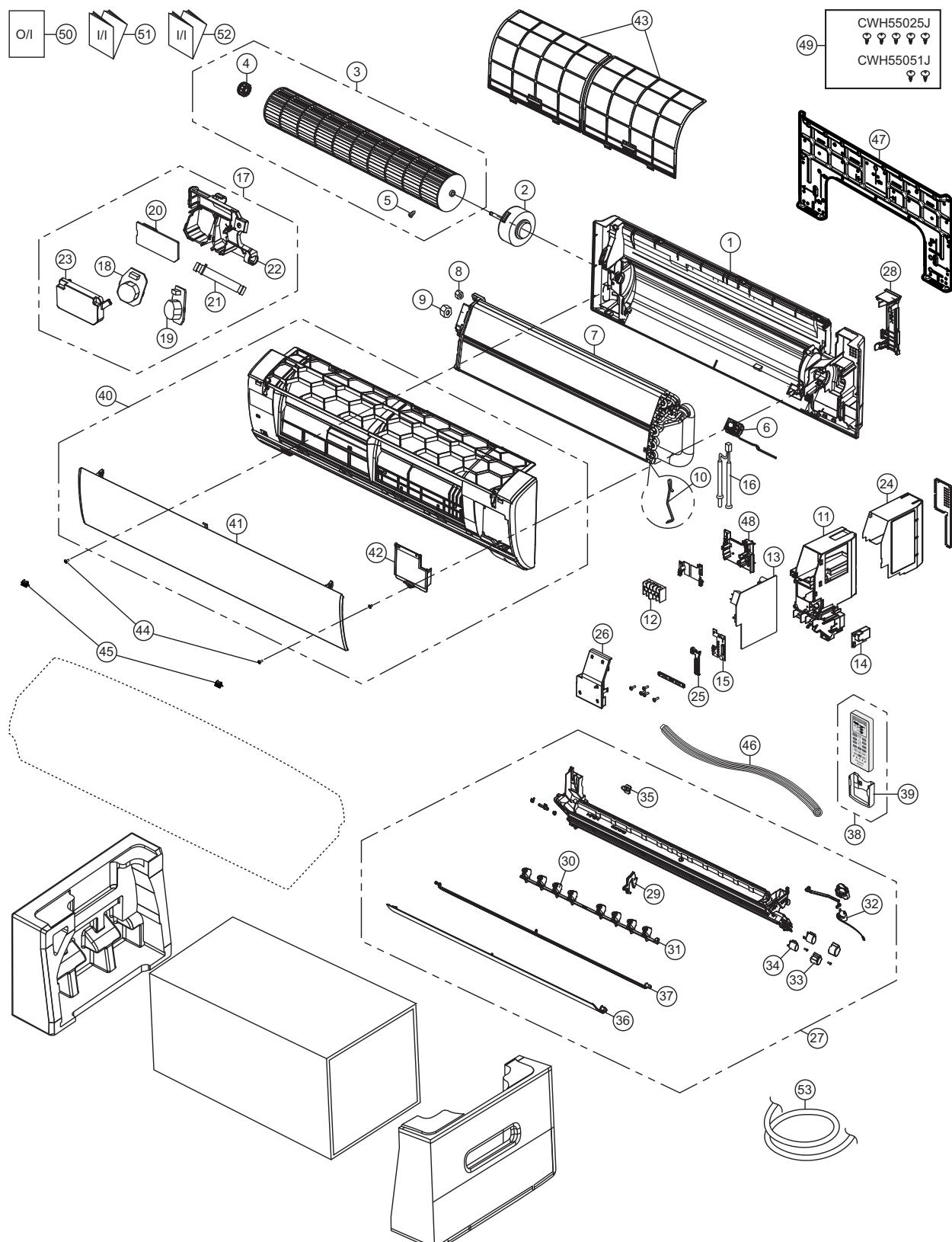
- Room temperature: 27°C (DBT), 19°C (WBT)
- Outdoor temperature: 35°C (DBT), 24°C (WBT)
- Operation condition: High fan speed
- Compressor Frequency = Fc



18. Exploded View and Replacement Parts List

18.1 Indoor Unit

18.1.1 CS-S9RKV CS-S12RKV



Note

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

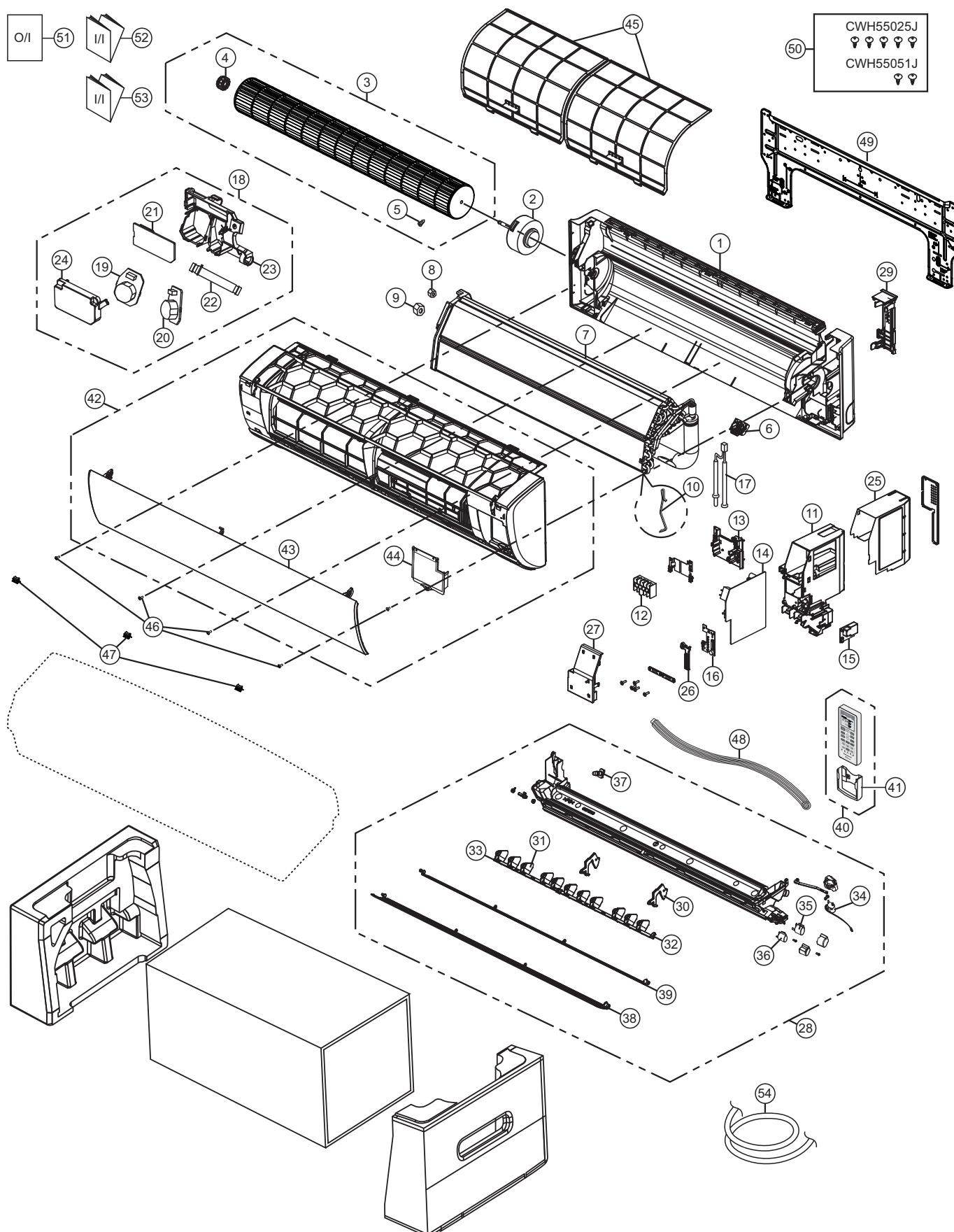
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-S9RKV	CS-S12RKV	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1605	←	
⚠	2	FAN MOTOR	1	L6CBYYYL0037	←	O
	3	CROSS-FLOW FAN COMPLETE	1	CWH02C1076	←	
	4	BEARING ASSY	1	CWH64K007	←	
	5	SCREW - CROSS-FLOW FAN	1	CWH551146	←	
	6	GENERATOR COMPLETE	1	CWH94C0063	←	
	7	EVAPORATOR	1	CWB30C4941	CWB30C4942	
	8	FLARE NUT (LIQUID)	1	CWT251030	←	
	9	FLARE NUT (GAS)	1	CWT251031	CWT251073	
	10	CLIP FOR SENSOR	1	CWH32142	←	
	11	CONTROL BOARD CASING	1	CWH102449	←	
⚠	12	TERMINAL BOARD COMPLETE	1	CWA28C2435	CWA28C2357	
⚠	13	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8826	CWA73C8827	O
⚠	14	ELECTRONIC CONTROLLER - HVU	1	N0GE1F000007	←	O
⚠	15	ELECTRONIC CONTROLLER - INDICATOR	1	CWA747894	←	O
	16	SENSOR COMPLETE	1	CWA50C2401	←	O
	17	SENSOR COMPLETE (ECO)	1	CWA50C3265	←	O
⚠	18	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	←	O
⚠	19	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA746206	←	O
⚠	20	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA747891	←	O
	21	LEAD WIRE - PCB ECO	1	CWA68C1926	←	
	22	CONTROL BOARD CASING FOR PCB ECO	1	CWD933929	←	
	23	CONTROL BOARD CASING FOR PCB ECO	1	CWD933930	←	
	24	CONTROL BOARD TOP COVER	1	CWH131467	←	
	25	INDICATOR HOLDER	1	CWD933928	←	
	26	CONTROL BOARD FRONT COVER CO.	1	CWH13C1247	←	
	27	DISCHARGE GRILLE COMPLETE	1	CWE20C3544	←	
	28	BACK COVER CHASSIS	1	CWD933233A	←	
	29	FULCRUM	1	CWH621166	←	
	30	VERTICAL VANE	8	CWE241457	←	
	31	CONNECTING BAR	1	CWE261314	←	
⚠	32	AIR SWING MOTOR	1	CWA98K1025	←	O
⚠	33	AIR SWING MOTOR	1	CWA981241	←	O
⚠	34	AIR SWING MOTOR	1	CWA981299	←	O
	35	CAP - DRAIN TRAY	1	CWH521259	←	
	36	HORIZONTAL VANE COMPLETE	1	CWE24C1555	←	
	37	HORIZONTAL VANE COMPLETE	1	CWE24C1514	←	
	38	REMOTE CONTROL COMPLETE	1	CWA75C4543	←	O
	39	REMOTE CONTROL HOLDER	1	CWH361162	←	
	40	FRONT GRILLE COMPLETE	1	CWE11C6133	←	O
	41	INTAKE GRILLE COMPLETE	1	CWE22K1670	←	
	42	GRILLE DOOR COMPLETE	1	CWE14C1091	←	
	43	AIR FILTER	2	CWD001389	←	O
	44	SCREW - FRONT GRILLE	2	XTT4+16CFJ	←	
	45	CAP - FRONT GRILLE	2	CWH521294A	←	
	46	DRAIN HOSE	1	CWH851173	←	
	47	INSTALLATION PLATE	1	CWH361134	←	
	48	PARTICULAR PIECE - TERMINAL	1	CWD933137	←	
	49	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	
	50	OPERATING INSTRUCTION	1	CWF569797	←	

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-S9RKV	CS-S12RKV	REMARK
	51	INSTALLATION INSTRUCTION	1	CWF616620	←	
	52	INSTALLATION INSTRUCTION	1	CWF616621	←	
	53	POWER SUPPLY CORD - COMPLETE	1	CWA20C3054	←	

(Note)

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

18.1.2 CS-S18RKV CS-S24RKV CS-S28RKV



Note

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

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-S18RKV	CS-S24RKV	CS-S28RKV	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1604	←	←	
⚠	2	FAN MOTOR	1	L6CBYYYL0037	L6CBYYYL0039	←	O
	3	CROSS-FLOW FAN COMPLETE	1	CWH02C1077	←	←	
	4	BEARING ASSY	1	CWH64K007	←	←	
	5	SCREW - CROSS-FLOW FAN	1	CWH551146	←	←	
	6	GENERATOR COMPLETE	1	CWH94C0063	←	←	
	7	EVAPORATOR	1	CWB30C4905	CWB30C4911	CWB30C4913	
	8	FLARE NUT (LIQUID)	1	CWT251030	←	←	
	9	FLARE NUT (GAS)	1	CWT251032	CWT251033	←	
	10	CLIP FOR SENSOR	1	CWH32142	←	←	
	11	CONTROL BOARD CASING	1	CWH102449	←	←	
⚠	12	TERMINAL BOARD COMPLETE	1	CWA28C2439	CWA28C2357	CWA28C2305	O
	13	PARTICULAR PIECE - TERMINAL	1	CWD933137	←	←	
⚠	14	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8828	CWA73C8829	CWA73C8830	O
⚠	15	ELECTRONIC CONTROLLER - HVU	1	N0GE1F000007	←	←	O
⚠	16	ELECTRONIC CONTROLLER - INDICATOR	1	CWA747894	←	←	O
	17	SENSOR COMPLETE	1	CWA50C2401	←	CWA50C2782	O
	18	SENSOR COMPLETE (ECO)	1	CWA50C3292	←	←	O
⚠	19	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	←	←	O
⚠	20	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA746206	←	←	O
⚠	21	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA747891	←	←	O
	22	LEAD WIRE - PCB ECO	1	CWA68C1985	←	←	
	23	CONTROL BOARD CASING FOR PCB ECO	1	CWD933929	←	←	
	24	CONTROL BOARD CASING FOR PCB ECO	1	CWD933930	←	←	
	25	CONTROL BOARD TOP COVER	1	CWH131467	←	←	
	26	INDICATOR HOLDER	1	CWD933928	←	←	
	27	CONTROL BOARD FRONT COVER CO.	1	CWH13C1247	←	←	
	28	DISCHARGE GRILLE COMPLETE	1	CWE20C3545	←	←	
	29	BACK COVER CHASSIS	1	CWD933031A	←	←	
	30	FULCRUM	2	CWH621166	←	←	
	31	VERTICAL VANE	11	CWE241457	←	←	
	32	CONNECTING BAR (RIGHT)	1	CWE261322	←	←	
	33	CONNECTING BAR (LEFT)	1	CWE261316	←	←	
⚠	34	AIR SWING MOTOR	1	CWA98K1027	←	←	O
⚠	35	AIR SWING MOTOR	1	CWA981304	←	←	O
⚠	36	AIR SWING MOTOR	1	CWA981299	←	←	O
	37	CAP - DRAIN TRAY	1	CWH521259	←	←	
	38	HORIZONTAL VANE COMPLETE	1	CWE24C1556	←	←	
	39	HORIZONTAL VANE COMPLETE	1	CWE24C1520	←	←	
	40	REMOTE CONTROL COMPLETE	1	CWA75C4543	←	←	O
	41	REMOTE CONTROL HOLDER	1	CWH361162	←	←	
	42	FRONT GRILLE COMPLETE	1	CWE11C6134	←	CWE11C6135	O
	43	INTAKE GRILLE COMPLETE	1	CWE22K1671	←	←	
	44	GRILLE DOOR COMPLETE	1	CWE14C1091	←	←	
	45	AIR FILTER	2	CWD001393	←	←	O

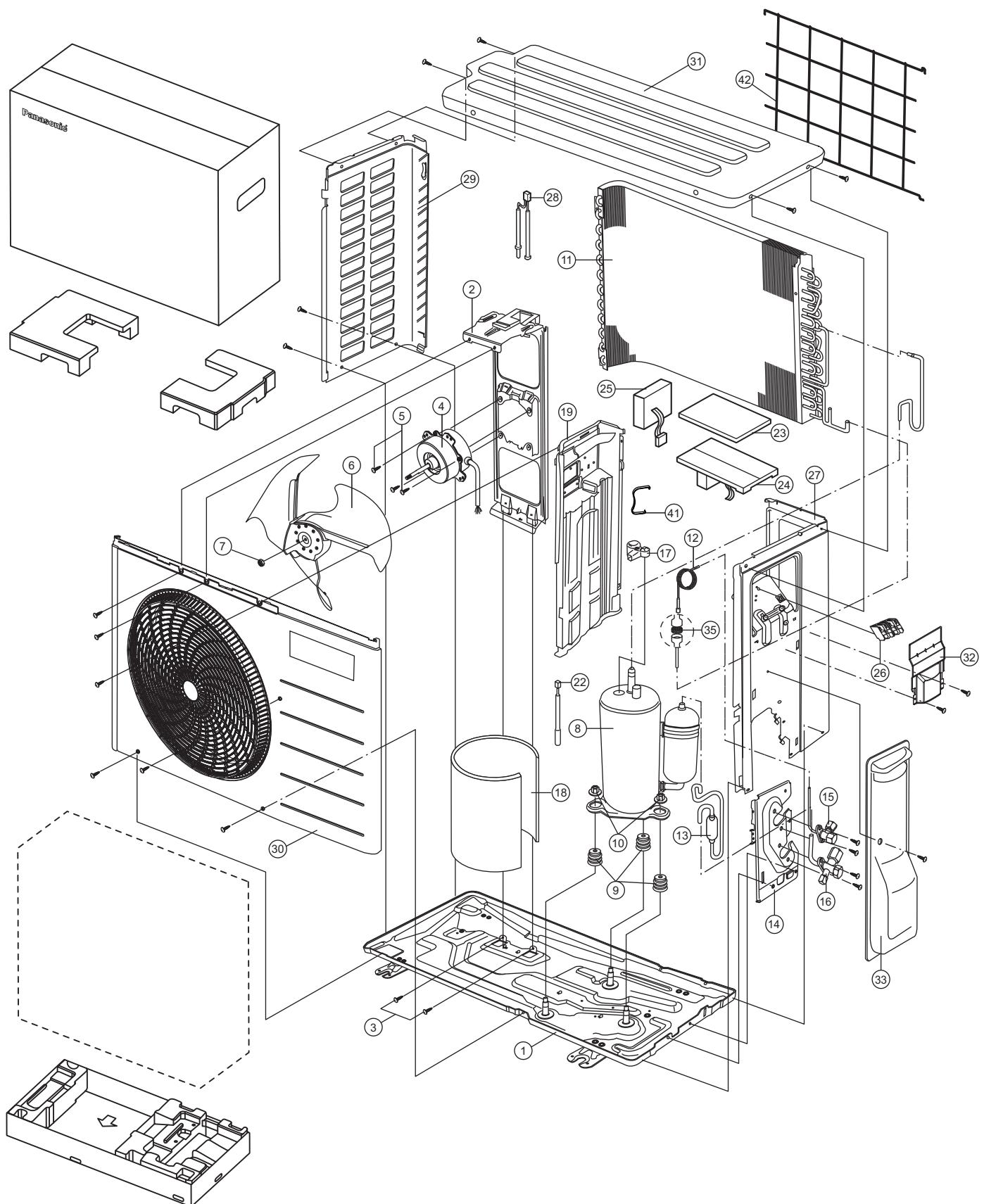
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-S18RKV	CS-S24RKV	CS-S28RKV	REMARK
	46	SCREW - FRONT GRILLE	3	XTT4+16CFJ	←	←	
	47	CAP - FRONT GRILLE	3	CWH521294A	←	←	
	48	DRAIN HOSE	1	CWH851173	←	←	
	49	INSTALLATION PLATE	1	CWH361098	←	←	
	50	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	←	
	51	OPERATING INSTRUCTION	1	CWF569797	←	←	
	52	INSTALLATION INSTRUCTION	1	CWF616620	←	CWF616622	
	53	INSTALLATION INSTRUCTION	1	CWF616621	←	CWF616623	
	54	POWER SUPPLY CORD - COMPLETE	1	CWA20C2851	CWA20C2853	←	

(Note)

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

18.2 Outdoor Unit

18.2.1 CU-S9RKV



Note

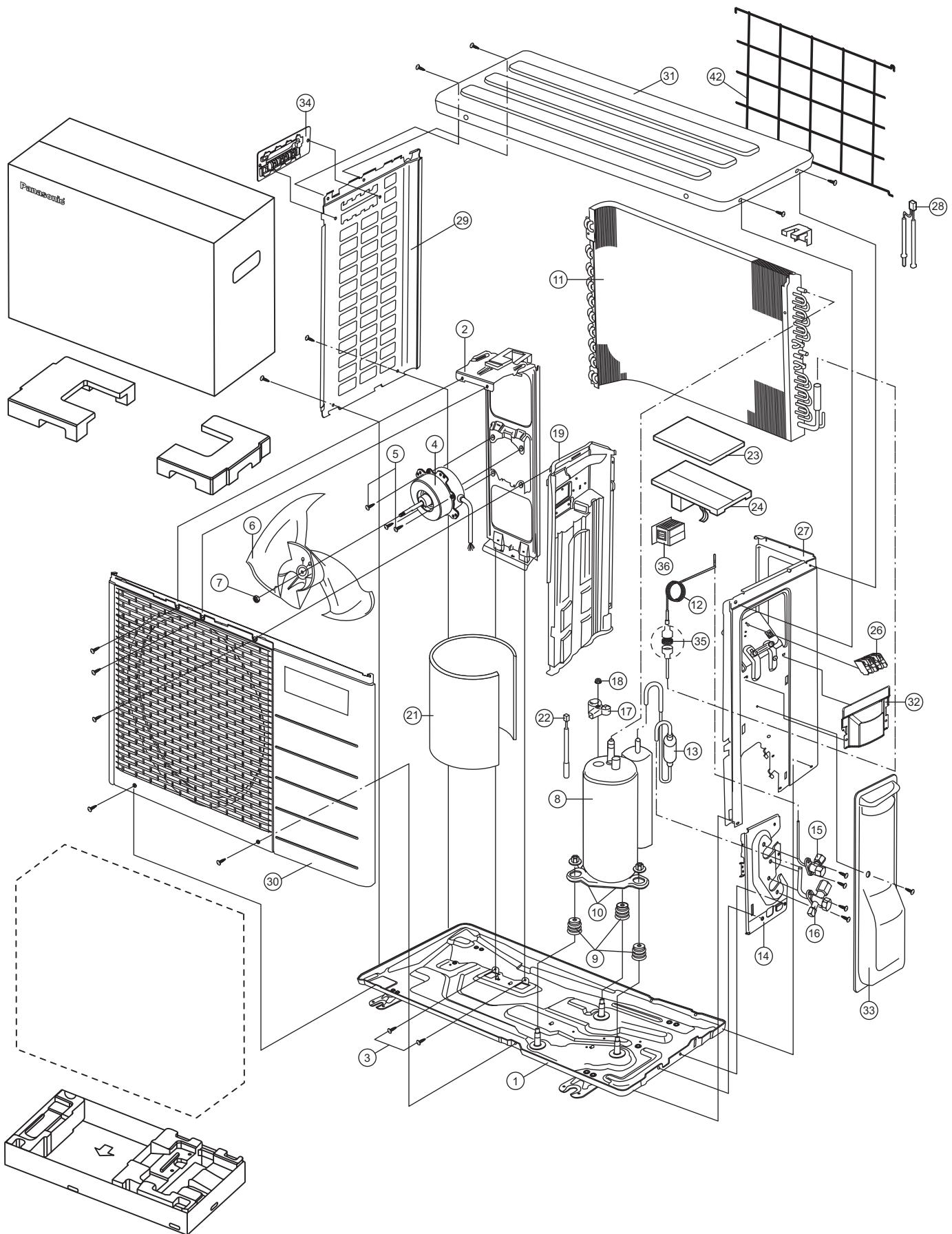
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-S9RKV	REMARK
	1	CHASSIS ASSY	1	CWD50K2240	
	2	FAN MOTOR BRACKET	1	CWD541235	
	3	SCREW - FAN MOTOR BRACKET	2	CWH551217	
⚠	4	FAN MOTOR	1	CWA951734	O
	5	SCREW - FAN MOTOR MOUNT	4	CWH55252J	
	6	PROPELLER FAN ASSY	1	CWH03K1020	
	7	NUT - PROPELLER FAN	1	CWH56053J	
⚠	8	COMPRESSOR	1	5SS072XGA21	O
	9	ANTI - VIBRATION BUSHING	3	CWH501038	
	10	NUT - COMPRESSOR MOUNT	3	CWH561096	
	11	CONDENSER	1	CWB32C4227	
	12	CAPILLARY TUBE ASSY	1	CWB15K1488	
	13	DISCHARGE MUFFLER	1	CWB121010	
	14	HOLDER COUPLING	1	CWH351222	
	15	2-WAYS VALVE (LIQUID)	1	CWB021422	O
	16	3-WAY VALVE (GAS)	1	CWB011343	O
	17	TERMINAL COVER	1	CWH171041	
	18	SOUND PROOF NATERIAL	1	CWG302700	
	19	SOUND PROOF BOARD	1	CWH151389	
	22	SENSOR CO - COMP TEMP	1	CWA50C3062	O
	23	CONTROL BOARD COVER - TOP	1	CWH131637	
⚠	24	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8789R	O
⚠	25	ELECTRONIC CONTROLLER - NF	1	CWH16C0945	O
⚠	26	TERMINAL BOARD ASSY	1	CWA28K1036J	
	27	CABINET SIDE PLATE CO.	1	CWE04C1404	
	28	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2502	O
	29	CABINET SIDE PLATE (LEFT)	1	CWE041778A	
	30	CABINET FRONT PLATE CO.	1	CWE06K1106	
	31	CABINET TOP PLATE	1	CWE031041A	
	32	CONTROL BOARD COVER	1	CWH131325	
	33	CONTROL BOARD COVER - COMPLETE	1	CWH13C1186	
	35	STRAINER	1	CWB11025	
	41	PLATE SPRING	1	CWH71044	
	42	WIRE NET	1	CWD041057A	

(Note)

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

18.2.2 CU-S12RKV



Note

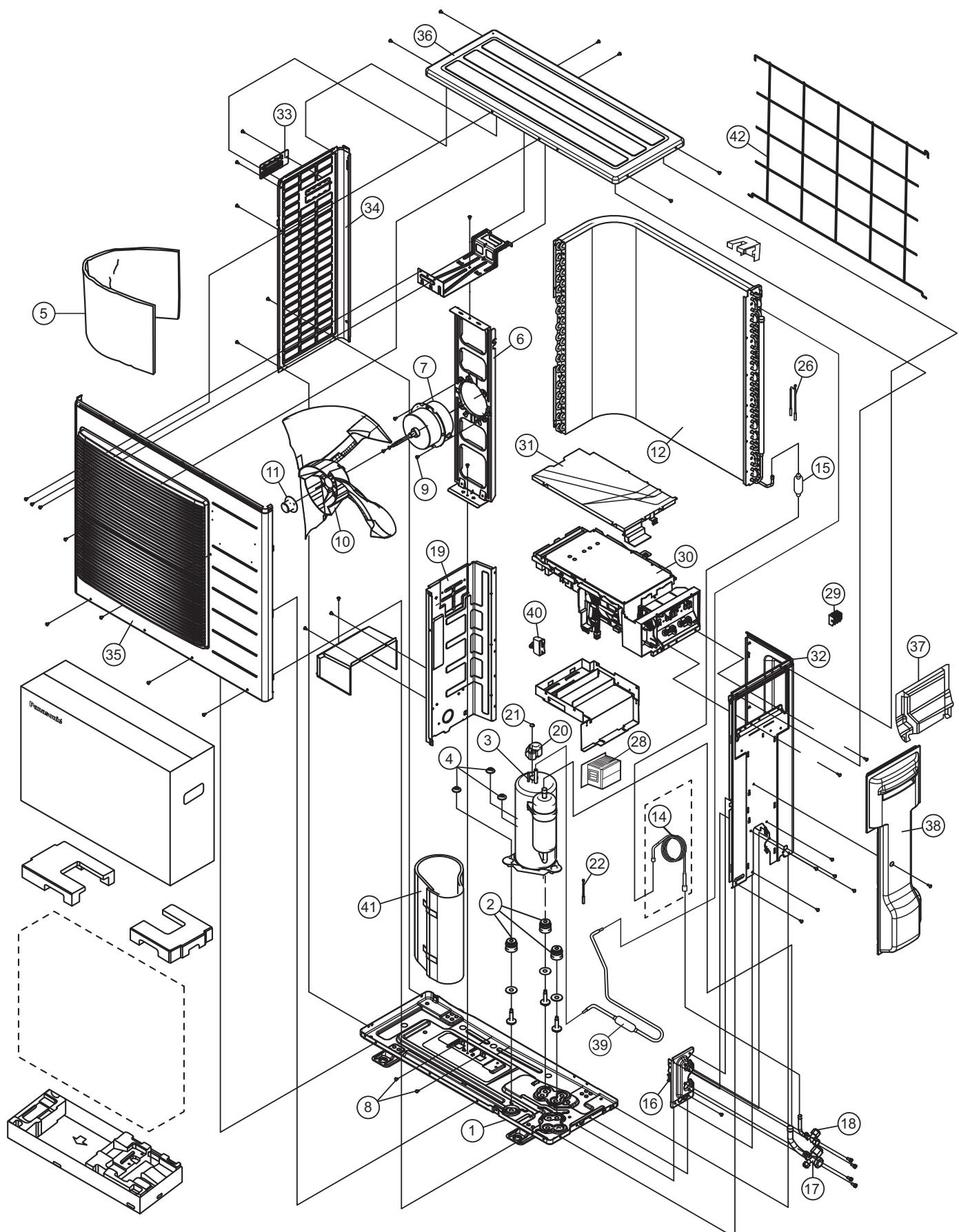
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-S12RKV	REMARK
	1	CHASSIS ASSY	1	CWD50K2071	
	2	FAN MOTOR BRACKET	1	CWD541030	
	3	SCREW - FAN MOTOR BRACKET	2	CWH551217	
⚠	4	FAN MOTOR	1	CWA951466	O
	5	SCREW - FAN MOTOR MOUNT	4	CWH55406J	
	6	PROPELLER FAN ASSY	1	CWH03K1010	
	7	NUT - PROPELLER FAN	1	CWH56053J	
⚠	8	COMPRESSOR	1	5RS092XJA21	O
	9	ANTI - VIBRATION BUSHING	3	CWH50077	
	10	NUT - COMPRESSOR MOUNT	3	CWH561096	
	11	CONDENSER	1	CWB32C4214	
	12	CAPILLARY TUBE ASSY	1	CWB15K1521	
	13	DISCHARGE MUFFLER	1	CWB121010	
	14	HOLDER COUPLING	1	CWH351233	
	15	2-WAYS VALVE (LIQUID)	1	CWB021564	O
	16	3-WAY VALVE (GAS)	1	CWB011663	O
	17	TERMINAL COVER	1	CWH171039A	
	18	NUT - TERMINAL COVER	1	CWH7080300J	
	19	SOUND PROOF BOARD	1	CWH151172	
	21	SOUND PROOF MATERIAL	1	CWG302431	
	22	SENSOR CO - COMP TEMP	1	CWA50C2205	O
	23	CONTROL BOARD COVER - TOP	1	CWH131264	
⚠	24	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8986R	O
⚠	26	TERMINAL BOARD ASSY	1	CWA28K1036J	O
	27	CABINET SIDE PLATE CO.	1	CWE04C1116	
	28	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2764	O
	29	CABINET SIDE PLATE (LEFT)	1	CWE041248A	
	30	CABINET FRONT PLATE CO.	1	CWE06C1039	
	31	CABINET TOP PLATE	1	CWE031014A	
	32	CONTROL BOARD COVER	1	CWH131301	
	33	CONTROL BOARD COVER - COMPLETE	1	CWH13C1211	
	34	HANDLE	1	CWE161010	
	35	STRAINER	1	CWB11025	
⚠	36	REACTOR	1	G0C752K00001	
	42	WIRE NET	1	CWD041111A	

(Note)

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

18.2.3 CU-S18RKV CU-S24RKV



Note

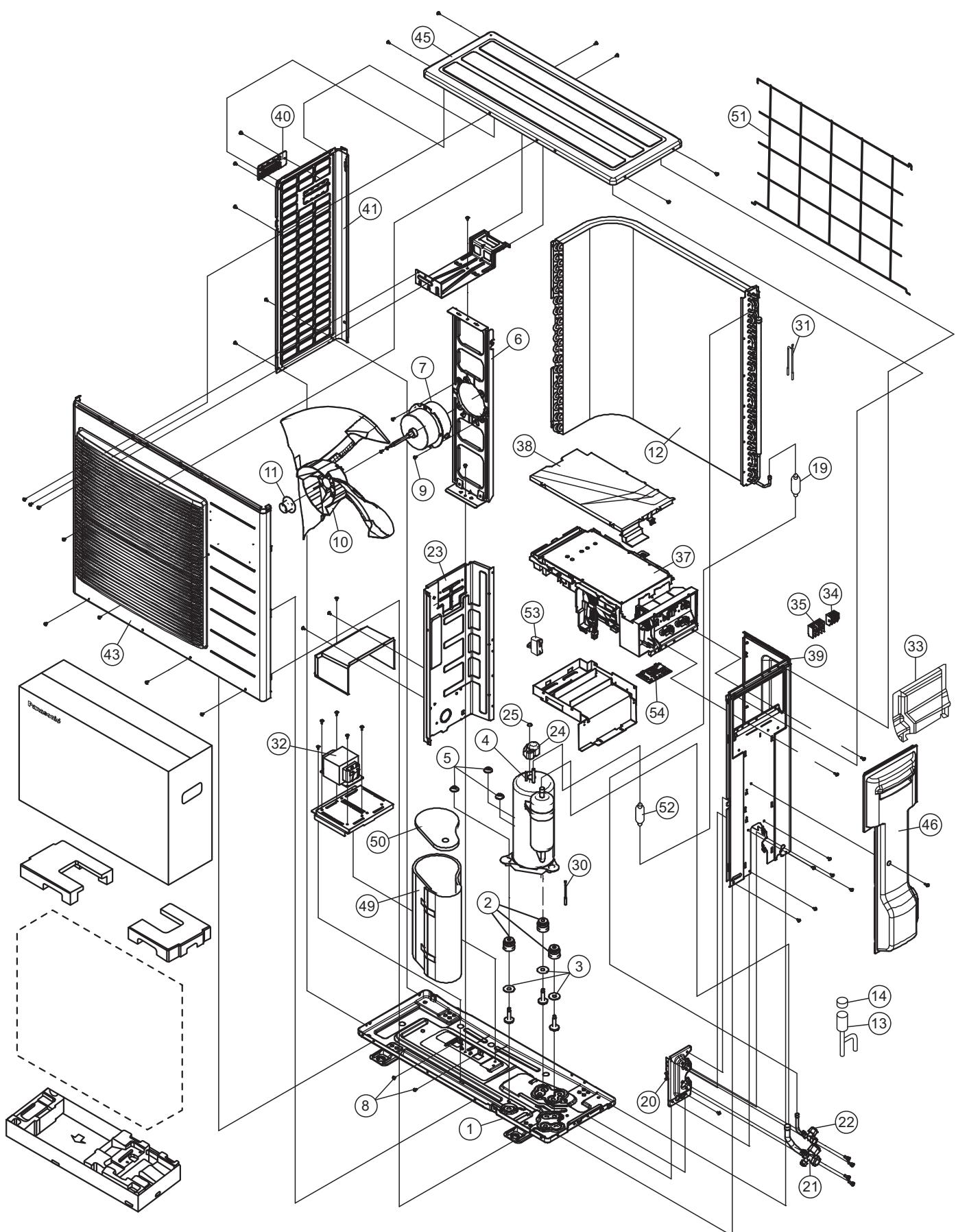
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-S18RKV	CU-S24RKV	REMARK
	1	CHASSIS ASSY	1	CWD52K1249	←	
	2	ANTI - VIBRATION BUSHING	3	CWH50077	←	
⚠	3	COMPRESSOR	1	5RD132XHA21	←	O
	4	NUT - COMPRESSOR MOUNT	3	CWH561096	←	
	5	SOUND PROOF MATERIAL	1	CWG302600	←	
	6	FAN MOTOR BRACKET	1	CWD541154	←	
⚠	7	FAN MOTOR	1	CWA951762	←	O
	8	SCREW - FAN MOTOR BRACKET	3	CWH551217	←	
	9	SCREW - FAN MOTOR MOUNT	4	CWH55252J	←	
	10	PROPELLER FAN ASSY	1	CWH03K1017	←	
	11	NUT - PROPELLER FAN	1	CWH561092	←	
	12	CONDENSER	1	CWB32C3085	CWB32C3089	
	14	CAPILLARY TUBE ASSY	1	CWB15K1362	CWB15K1363	
	15	STRAINER	1	CWB11025	←	
	16	HOLDER COUPLING	1	CWH351225	←	
	17	3-WAY VALVE (GAS)	1	CWB011670	CWB011656	O
	18	2-WAYS VALVE (LIQUID)	1	CWB021462	←	O
	19	SOUND PROOF BOARD	1	CWH151257	←	
	20	TERMINAL COVER	1	CWH171039A	←	
	21	NUT - TERMINAL COVER	1	CWH7080300J	←	
	22	SENSOR CO - COMP TEMP	1	CWA50C2185	←	O
	26	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2517	←	O
⚠	28	REACTOR	1	G0C153J00005	←	O
⚠	29	TERMINAL BOARD ASSY	1	CWA28K1036J	←	
⚠	30	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8987R	CWA73C8988R	O
	31	CONTROL BOARD COVER - TOP	1	CWH131333	←	
	32	CABINET SIDE PLATE	1	CWE041555A	←	
	33	HANDLE	1	CWE161010	←	
	34	CABINET SIDE PLATE CO.	1	CWE041520A	←	
	35	CABINET FRONT PLATE CO.	1	CWE06K1077	←	
	36	CABINET TOP PLATE	1	CWE031083A	←	
	37	CONTROL BOARD COVER	1	CWH131409A	←	
	38	CONTROL BOARD COVER - COMPLETE	1	CWH13C1238	←	
	39	RECEIVER	1	CWB14011	←	
⚠	40	CAPACITOR	1	DS461305QP-A	←	O
	41	SOUND PROOF MATERIAL	1	CWG302292	←	
	42	WIRE NET	1	CWD041155A	←	

(Note)

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

18.2.4 CU-S28RKV



Note

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

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-S28RKV	REMARK
	1	CHASSIS ASSY	1	CWD52K1230	
	2	ANTI - VIBRATION BUSHING	3	CWH50055	
	3	PACKING	1	CWB81043	
⚠	4	COMPRESSOR	1	5KD240XAF21	O
	5	NUT - COMPRESSOR MOUNT	3	CWH561049	
	6	FAN MOTOR BRACKET	1	CWD541126	
⚠	7	FAN MOTOR	1	CWA951712	O
	8	SCREW - FAN MOTOR BRACKET	3	CWH551217	
	9	SCREW - FAN MOTOR MOUNT	4	CWH551040J	
	10	PROPELLER FAN ASSY	1	CWH001019	
	11	NUT - PROPELLER FAN	1	CWH561092	
	12	CONDENSER	1	CWB32C3508	
	13	EXPANSION VALVE	1	CWB051018J	
	14	V-COIL COMPLETE	1	CWA43C2258	
	19	STRAINER	1	CWB111032	
	20	HOLDER COUPLING	1	CWH351228	
	21	3-WAY VALVE (GAS)	1	CWB011363	O
	22	2-WAYS VALVE (LIQUID)	1	CWB021464	O
	23	SOUND PROOF BOARD	1	CWH151197	
	24	TERMINAL COVER	1	CWH171039A	
	25	NUT - TERMINAL COVER	1	CWH7080300J	
	30	SENSOR CO - COMP TEMP	1	CWA50C2185	O
	31	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2517	O
⚠	32	REACTOR	1	G0C452J00002	
	33	CONTROL BOARD COVER	1	CWH131332	
⚠	34	TERMINAL BOARD ASSY	1	CWA28K1076J	
⚠	35	TERMINAL BOARD ASSY	1	CWA28K1162	
⚠	37	ELECTRONIC CONTROLLER - MAIN	1	CWA73C8989R	O
	38	CONTROL BOARD COVER-TOP	1	CWH131333	
	39	CABINET SIDE PLATE (RIGHT)	1	CWE041319A	
	40	HANDLE	1	CWE161010	
	41	CABINET SIDE PLATE CO. (LEFT)	1	CWE041317A	
	43	CABINET FRONT PLATE CO.	1	CWE06K1063	
	45	CABINET TOP PLATE	1	CWE031083A	
	46	CONTROL BOARD COVER - COMPLETE	1	CWH13C1185	
	49	SOUND PROOF MATERIAL	1	CWG302951	
	50	SOUND PROOF MATERIAL	1	CWG302246	
	51	WIRE NET	1	CWD041128A	
	52	RECEIVER	1	CWB14017	
⚠	53	CAPACITOR	1	DS461355QP-A	O
⚠	54	ELECTRONIC CONTROLLER - NF	1	CWA746924	O

(Note)

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

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