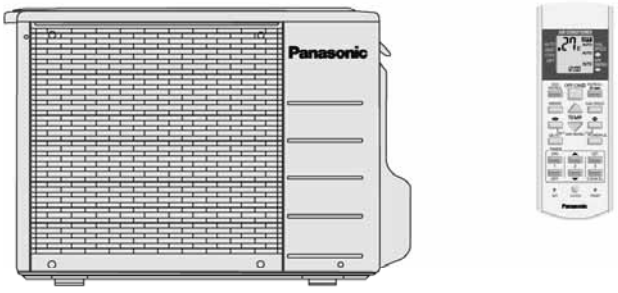
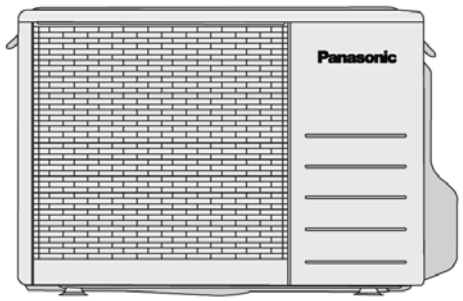
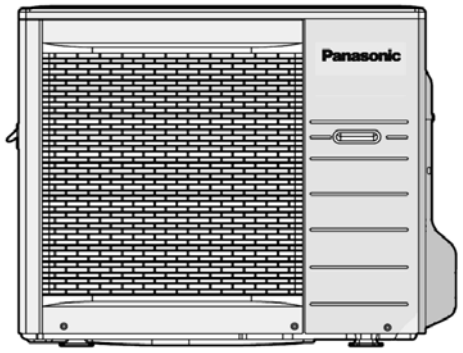
Order No: PHAAM1003127C3

Service Manual

Air Conditioner







Indoor Unit	Outdoor Unit
CS-A9KKD-2	CU-A9KKD-2
CS-A12KKD-2	CU-A12KKD-2
CS-A18KKD-2	CU-A18KKD-2
CS-A24KKD-2	CU-A24KKD-2
CS-A28KKD-2	CU-A28KKD-2

⚠WARNING

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

Panasonic®

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1. Safety Precautions

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

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

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

⃠	This symbol denotes item that is PROHIBITED from doing.

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

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

⚠ WARNING
19. After completion of installation or service, confirm there is no leakage or refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.
20. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when refrigerant contacts with fire.
21. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.
22. Must not use other parts except original parts described in catalog and manual.

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

2. Specification

Model			Indoor	CS-A9KKD-2		CS-A12KKD-2	
			Outdoor	CU-A9KKD-2		CU-A12KKD-2	
Performance Test Condition				NEW JIS		NEW JIS	
Power Supply			Phase, Hz	Single, 50		Single, 50	
			V	220	230	220	230
Cooling	Capacity		kW	2.43	2.43	3.22	3.23
			BTU/h	8300	8300	11000	11030
			kJ/h	2090	2090	2770	2780
	Running Current		A	4.3	4.2	5.0	5.0
	Input Power		W	930	950	1.08k	1.10k
	EER		W/W	2.61	2.56	2.98	2.94
			Btu/hW	8.92	8.74	10.19	10.03
	Power Factor		%	98	98	98	96
	Indoor Noise (H / L)		dB-A	36 / 26	36 / 26	39 / 29	39 / 29
			Power Level dB	-	-	-	-
	Outdoor Noise (H / L)		dB-A	48 / -	49 / -	55 / -	55 / -
			Power Level dB	-	-	-	-
Heating	Capacity		kW	2.64	2.66	3.81	3.83
			BTU/h	9010	9080	13000	13080
			kcal/h	2270	2290	3280	3290
	Running Current		A	3.3	3.3	4.8	4.8
	Input Power		W	710	740	1.03k	1.06k
	COP		W/W	3.72	3.59	3.70	3.61
			Btu/hW	12.69	12.27	12.62	12.34
	Power Factor		%	98	97	98	96
	Indoor Noise (H / L)		dB-A	38 / 28	38 / 28	40 / 29	40 / 29
			Power Level dB	-	-	-	-
	Outdoor Noise (H / L)		dB-A	48 / -	49 / -	56 / -	56 / -
			Power Level dB	-	-	-	-
Max Current (A) / Max Input Power (W)				5.1 / 1.13k		6.0 / 1.35k	
Starting Current (A)				18.0		20.0	
Compressor	Type			Hermetic Motor		Hermetic Motor	
	Motor Type			Induction (2 poles)		Induction (2 poles)	
	Output Power		W	750		950	
Indoor Fan	Type			Cross-Flow Fan		Cross-Flow Fan	
	Material			ASG20K1		ASG20K1	
	Motor Type			Induction (4 poles)		Induction (4 poles)	
	Input Power		W	32.6 - 33.6		41.4 - 42.9	
	Output Power		W	24		24	
	Speed	QLo	rpm	-		-	
		Lo	rpm	Cooling: 730 - 730 Heating: 780 - 780		Cooling: 800 - 800 Heating: 840 - 840	
		Me	rpm	Cooling: 870 - 870 Heating: 870 - 870		Cooling: 950 - 950 Heating: 950 - 950	
		Hi	rpm	Cooling: 1040 - 1040 Heating: 1080 - 1080		Cooling: 1100 - 1100 Heating: 1120 - 1120	
		SHi	rpm	Cooling: 1080 - 1080		Cooling: 1120 - 1120	

Outdoor Fan	Type			Propeller Fan	Propeller Fan
	Material			PP Resin	PP Resin
	Motor Type			Induction (6 poles)	Induction (6 poles)
	Input Power		W	66.0 - 74.8	71.5 - 80.3
	Output Power		W	30	30
	Speed	Hi	rpm	800 - 830	830 - 840
Moisture Removal			L/h (Pt/h)	1.5 (3.2)	1.8 (3.8)
Indoor Airflow		Lo	m^3/min (ft^3/min)	Cooling: 7.2 (253) - 7.2 (253) Heating: 7.7 (270) – 7.7 (270)	Cooling: 7.9 (277) - 7.9 (277) Heating: 8.3 (291) - 8.3 (291)
		Me	m^3/min (ft^3/min)	Cooling: 8.5 (301) - 8.5 (301) Heating: 8.5 (301) – 8.5 (301)	Cooling: 9.3 (329) - 9.3 (329) Heating: 9.3 (329) - 9.3 (329)
		Hi	m^3/min (ft^3/min)	Cooling: 10.2 (360) - 10.2 (360) Heating: 10.6 (374) - 10.6 (374)	Cooling: 10.8 (381) - 10.8 (381) Heating: 11.0 (388) - 11.0 (388)
		SHi	m^3/min (ft^3/min)	Cooling: 10.6 (374) - 10.6 (374)	Cooling: 11.0 (388) - 11.0 (388)
Outdoor Airflow		Hi	m^3/min (ft^3/min)	29.5 (1040) - 30.0 (1060)	32.5 (1150) - 33.0 (1160)
Refrigeration Cycle		Control Device		Capillary Tube	Capillary Tube
		Refrigerant Oil	cm^3	Suniso 4GDID or ATMOS NM56M (350)	Suniso 4GDID or ATMOS NM56M (350)
		Refrigerant Type	g (oz)	R22, 670 (23.7)	R22, 1010 (35.7)
Dimension		Height(I/D / O/D)	mm (inch)	290 (11-7/16) / 510 (20-3/32)	290 (11-7/16) / 540 (21-9/32)
		Width (I/D / O/D)	mm (inch)	870 (34-9/32) / 650 (25-19/32)	870 (34-9/32) / 780 (30-23/32)
		Depth (I/D / O/D)	mm (inch)	204 (8-1/16) / 230 (9-1/16)	204 (8-1/16) / 289 (11-13/32)
Weight		Net (I/D / O/D)	kg (lb)	9 (20) / 27 (60)	9 (20) / 33 (73)
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)	6.35 (1/4) / 12.7 (1/2)
	Standard length		m (ft)	7.5 (24.6)	7.5 (24.6)
	Length range (min – max)		m (ft)	3 ~ 10 (9.8 ~ 32.8)	3 ~ 15 (9.8 ~ 49.2)
	I/D & O/D Height different		m (ft)	5 (16.4)	5 (16.4)
	Additional Gas Amount		g/m (oz/ft)	20 (0.2)	20 (0.2)
	Length for Additional Gas		m (ft)	7.5 (24.6)	7.5 (24.6)
Drain Hose		Inner Diameter	mm	16	16
		Length	mm	650	650
Indoor Heat Exchanger		Fin Material		Aluminium (Pre Coat)	Aluminium (Pre Coat)
		Fin Type		Slit Fin	Slit Fin
		Row x Stage x FPI		2 x 15 x 21	2 x 15 x 21
		Size (W x H x L)	mm	610 x 315 x 25.4	610 x 315 x 25.4
Outdoor Heat Exchanger		Fin Material		Aluminium (Blue coated)	Aluminium (Blue coated)
		Fin Type		Corrugated Fin	Corrugated Fin
		Row x Stage x FPI		1 x 19 x 19	2 x 24 x 19
		Size (W x H x L)	mm	22 x 483 x 567.4	36.38 x 504 x 684.0:713.0
Air Filter		Material		-	-
		Type		-	-
Power Supply				Indoor	Indoor
Power Supply Cord			A	10	10
Thermostat				-	-
Protection Device				2 stage Overload Protector	Overload Protector

			DRY BULB	WET BULB	DRY BULB	WET BULB
Indoor Operation Range	Cooling	Maximum	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	16	11	16	11
	Heating	Maximum	24	18	24	18
		Minimum	-5	-6	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-A18KKD-2		CS-A24KKD-2	
		Outdoor	CU-A18KKD-2		CU-A24KKD-2	
Performance Test Condition			NEW JIS		NEW JIS	
Power Supply		Phase, Hz	Single, 50		Single, 50	
		V	220	230	220	230
Cooling	Capacity	kW	5.15	5.15	6.43	6.43
		Btu/h	17600	17600	22000	22000
		kJ/h	18540	18540	23150	23150
	Running Current	A	8.3	8.1	12.6	12.6
	Input Power	W	1.80k	1.82k	2.62k	2.64k
	EER	W/W	2.86	2.83	2.45	2.44
		Btu/hW	9.78	9.67	8.40	8.33
	Power Factor	%	99	98	95	91
	Indoor Noise (H / L)	dB-A	43 - 38	43 - 38	47 - 41	47 - 41
		Power Level dB	-		-	
	Outdoor Noise (H / L)	dB-A	53 / -	54 / -	53 / -	54 / -
		Power Level dB	-		-	
Heating	Capacity	kW	5.50	5.52	7.15	7.15
		BTU/h	18800	18800	24400	24400
		kJ/h	19800	19870	25740	25740
	Running Current	A	7.8	7.6	12.3	12.4
	Input Power	W	1.68k	1.72k	2.53k	2.55k
	COP	W/W	3.27	3.21	2.83	2.80
		Btu/hW	11.19	10.93	9.64	9.58
	Power Factor	%	98	98	93	89
	Indoor Noise (H / L)	dB-A	42 - 38	42 - 38	46 - 41	46 - 41
		Power Level dB	-		-	
	Outdoor Noise (H / L)	dB-A	54 / -	55 / -	54 / -	54 / -
		Power Level dB	-		-	
Max Current (A) / Max Input Power (W)			10.2 / 2.20k		15.8 / 3.30k	
Starting Current (A)			40.0		65.0	
Compressor	Type		Rotary (1 cylinder) rolling piston type		Rotary (1 cylinder) rolling piston type	
	Motor Type		Induction (2 poles)		Induction (2 poles)	
	Output Power	W	1.5k		2.0k	
Indoor Fan	Type		Cross-Flow Fan		Cross-Flow Fan	
	Material		ASG30K1		ASG30K1	
	Motor Type		Transistor (8 poles)		Transistor (8 poles)	
	Input Power	W	-		-	
	Output Power	W	30		40	
	Speed Lo	rpm	Cooling: 1040 - 1040 Heating: 1100 - 1100		Cooling: 1150 - 1150 Heating: 1230 - 1230	
	Speed Me	rpm	Cooling: 1140 - 1140 Heating: 1140 - 1140		Cooling: 1270 - 1270 Heating: 1270 - 1270	
	Speed Hi	rpm	Cooling: 1240 - 1240 Heating: 1310 - 1310		Cooling: 1390 - 1390 Heating: 1530 - 1530	
	Speed SHi	rpm	Cooling: 1310 - 1310		Cooling: 1530 - 1530	

Outdoor Fan	Type			Propeller Fan	Propeller Fan
	Material			PP Resin	PP Resin
	Motor Type			Induction (6 poles)	Induction (6 poles)
	Input Power		W	138.0 -150.3	138.0 -150.3
	Output Power		W	80	80
	Speed	Lo	rpm	460 - 490	460 - 490
		Hi	rpm	815 - 830	815 - 830
Moisture Removal			L/h (Pt/h)	2.8 (5.9)	3.6 (7.6)
Indoor Airflow		Lo	m^3/min (ft^3/min)	Cooling: 13.8 (486) - 13.8 (486) Heating: 14.4 (507) - 14.4 (507)	Cooling: 15.4 (544) - 15.4 (544) Heating: 16.1 (568) - 16.1 (568)
		Me	m^3/min (ft^3/min)	Cooling: 15.1 (532) - 15.1 (532) Heating: 14.9 (526) – 14.9 (526)	Cooling: 17.0 (600) - 17.0 (600) Heating: 16.6 (586) – 16.6 (586)
		Hi	m^3/min (ft^3/min)	Cooling: 16.4 (579) - 16.4 (579) Heating: 17.1 (604) - 17.1 (604)	Cooling: 18.6 (657) - 18.6 (657) Heating: 20.0 (706) - 20.0 (706)
		SHi	m^3/min (ft^3/min)	17.3 (612) - 17.3 (612)	20.5 (723) - 20.5 (723)
Outdoor Airflow		Lo	m^3/min (ft^3/min)	28.6 (1010) - 30.5 (1080)	28.6 (1010) - 30.5 (1080)
		Hi	m^3/min (ft^3/min)	50.7 (1790) - 51.7 (1830)	50.7 (1790) - 51.7 (1830)
Refrigeration Cycle		Control Device		Capillary Tube	Capillary Tube
		Refrigerant Oil	cm^3	Suniso 4GDID or ATMOS NM56M (700)	Suniso 4GDID or ATMOS M60 (1130)
		Refrigerant Type	g (oz)	R22, 1710 (60.4)	R22, 2050 (72.4)
Dimension		Height(I/D / O/D)	mm (inch)	290 (11-7/16) / 750 (29-17/32)	290 (11-7/16) / 750 (29-17/32)
		Width (I/D / O/D)	mm (inch)	1070 (42-5/32) / 875 (34-15/32)	1070 (42-5/32) / 875 (34-15/32)
		Depth (I/D / O/D)	mm (inch)	235 (9-9/32) / 345 (13-19/32)	235 (9-9/32) / 345 (13-19/32)
Weight		Net (I/D / O/D)	kg (lb)	12 (26) / 60 (132)	12 (26) / 60 (132)
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 (16.4)	5 (16.4)
	Length range (min – max)		m (ft)	3 ~ 25 (9.8 ~ 82.0)	3 ~ 25 (9.8 ~ 82.0)
	I/D & O/D Height different		m (ft)	20.0 (65.6)	20.0 (65.6)
	Additional Gas Amount		g/m (oz/ft)	20 (0.2)	30 (0.3)
	Length for Additional Gas		m (ft)	7.5 (24.6)	7.5 (24.6)
Drain Hose		Inner Diameter	mm	12	12
		Length	mm	560	560
Indoor Heat Exchanger		Fin Material		Aluminium (Pre Coat)	Aluminium (Pre Coat)
		Fin Type		Slit Fin	Slit Fin
		Row x Stage x FPI		2 x 15 x 21	2 x 15 x 21
		Size (W x H x L)	mm	810 x 315 x 25.4	810 x 315 x 25.4
Outdoor Heat Exchanger		Fin Material		Aluminium (Blue coated)	Aluminium (Blue coated)
		Fin Type		Corrugated Fin	Corrugated Fin
		Row x Stage x FPI		2 x 28 x 17	2 x 28 x 17
		Size (W x H x L)	mm	44 x 711.2 x 782.4:816.9	44.0 x 711.2 x 782.4:816.9
Air Filter		Material		-	-
		Type		-	-
Power Supply				Indoor	Indoor
Power Supply Cord			A	16	20
Thermostat				-	-
Protection Device				Inner Protector	Inner Protector

			DRY BULB	WET BULB	DRY BULB	WET BULB
Indoor Operation Range	Cooling	Maximum	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	16	11	16	11
	Heating	Maximum	24	18	24	18
		Minimum	-5	-6	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Specifications are subjected to change without prior notice for further improvement.

Model			Indoor	CS-A28KKD-2	
			Outdoor	CU-A28KKD-2	
Performance Test Condition				NEW JIS	
Power Supply			Phase, Hz	Single, 50	
			V	220	230
Cooling	Capacity		kW	7.20	7.20
			BTU/h	24600	24600
			kJ/h	25920	25920
	Running Current		A	13.1	12.8
	Input Power		W	2.86k	2.87k
	EER		W/W	2.52	2.51
			BTU/hW	8.60	8.57
	Power Factor		%	99	97
	Indoor Noise (H / L)		dB-A	49 / 44	
			Power Level dB	-	
	Outdoor Noise (H / L)		dB-A	65 / -	
			Power Level dB	-	
Heating	Capacity		kW	8.60	8.60
			BTU/h	29400	29400
			kJ/h	30960	30960
	Running Current		A	14.1	13.8
	Input Power		W	3.08k	3.09k
	COP		W/W	2.79	2.78
			BTU/hW	9.55	9.51
	Power Factor		%	99	97
	Indoor Noise (H / L)		dB-A	48 / 44	
			Power Level dB	-	
	Outdoor Noise (H / L)		dB-A	64 / -	
			Power Level dB	-	
Max Current (A) / Max Input Power (W)				16.4 / 3.45k	
Starting Current (A)				40	
Compressor		Type		Hermetic motor	
		Motor Type		Induction (2 poles)	
		Output Power	W	2.4k	
Indoor Fan	Type			Cross-Flow Fan	
	Material			ASG30K1	
	Motor Type			Transistor (8 poles)	
	Input Power		W	94.8 - 94.8	
	Output Power		W	40	
	Speed	Lo	rpm	Cooling: 1250 - 1250 Heating: 1330 - 1330	
		Me	rpm	Cooling: 1380 - 1380 Heating: 1380 - 1380	
		Hi	rpm	Cooling: 1500 - 1500 Heating: 1540 - 1540	
		SHi	rpm	Cooling: 1540 - 1540	

Outdoor Fan	Type			Propeller Fan
	Material			PP
	Motor Type			Induction (8 poles)
	Input Power		W	147.0 -163.1
	Output Power		W	80
	Speed	Lo	rpm	490 - 520
		Hi	rpm	855 - 870
Moisture Removal			L/h (Pt/h)	4.1 (8.7)
Indoor Airflow		Lo	m^3/min (ft^3/min)	Cooling: 16.5 (583) - 16.5 (583) Heating: 17.6 (622) – 17.6 (622)
		Me	m^3/min (ft^3/min)	Cooling: 18.2 (643) - 18.2 (643) Heating: 18.3 (645) – 18.3 (645)
		Hi	m^3/min (ft^3/min)	Cooling: 19.8 (699) - 19.8 (699) Heating: 20.4 (720) – 20.4 (720)
		SHi	m^3/min (ft^3/min)	20.3 (718) - 20.3 (718)
Outdoor Airflow		Lo	m^3/min (ft^3/min)	30.1 (1060) - 32.0 (1130)
		Hi	m^3/min (ft^3/min)	52.5 (1850) - 53.5 (1890)
Refrigeration Cycle		Control Device		Capillary Tube
		Refrigerant Oil	cm^3	SUNISO 4GDID or ATMOS M60 or ATMOS 56M (900)
		Refrigerant Type	g (oz)	R22, 2130 (75.2)
Dimension		Height(I/D / O/D)	mm (inch)	290 (11-7/16) / 750 (29-17/32)
		Width (I/D / O/D)	mm (inch)	1070 (42-5/32) / 875 (34-15/32)
		Depth (I/D / O/D)	mm (inch)	235 (9-9/32) / 345 (13-19/32)
Weight		Net (I/D / O/D)	kg (lb)	12 (26) / 66 (146)
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 ~ 30 (9.8 ~ 98.4)
	I/D & O/D Height different		m (ft)	20.0 (65.6)
	Additional Gas Amount		g/m (oz/ft)	30 (0.3)
	Length for Additional Gas		m (ft)	7.5 (24.6)
Drain Hose		Inner Diameter	mm	12
		Length	mm	560
Indoor Heat Exchanger		Fin Material		Aluminium (Pre coat)
		Fin Type		Slit Fin
		Row x Stage x FPI		2 x 15 x 21
		Size (W x H x L)	mm	810 x 315 x 25.4
Outdoor Heat Exchanger		Fin Material		Aluminium (Blue coated)
		Fin Type		Corrugated Fin
		Row x Stage x FPI		2 x 28 x 17
		Size (W x H x L)	mm	44.0 x 711.2 x 802.4 836.9
Air Filter		Material		Polypropelene
		Type		One-touch
Power Supply				Outdoor
Power Supply Cord			A	20
Thermostat				-
Protection Device				Inner Protector

			DRY BULB	WET BULB
Indoor Operation Range	Cooling	Maximum	32	23
		Minimum	16	11
	Heating	Maximum	30	-
		Minimum	16	-
Outdoor Operation Range	Cooling	Maximum	43	26
		Minimum	16	11
	Heating	Maximum	24	18
		Minimum	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Specifications are subjected to change without prior notice for further improvement.

3. Features

- E-ion Air Purifying System with Patrol Sensor
  - Active e-ions are released to catch dust particles and bring them back the large positively charged filter.
  - Patrol Sensor color changes to indicate the dirt level in the air

- Long Installation Piping
  - CS/CU-A9KK, long piping up to 10 meters.
  - CS/CU-A12KK, long piping up to 15 meters.
  - CS/CU-A18KK, CS/CU-A24KK, long piping up to 25 meters.
  - CS/CU-A28KK, long piping up to 30 meters.

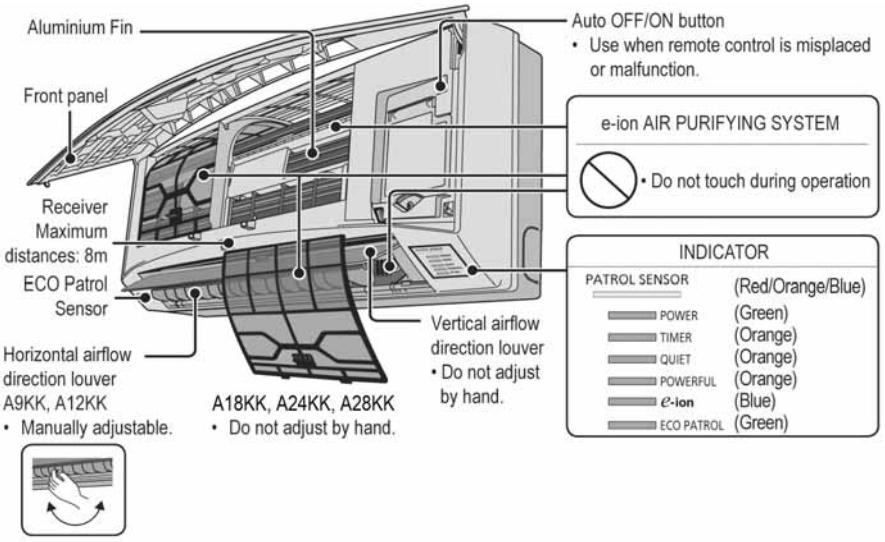
- Easy to use remote control

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

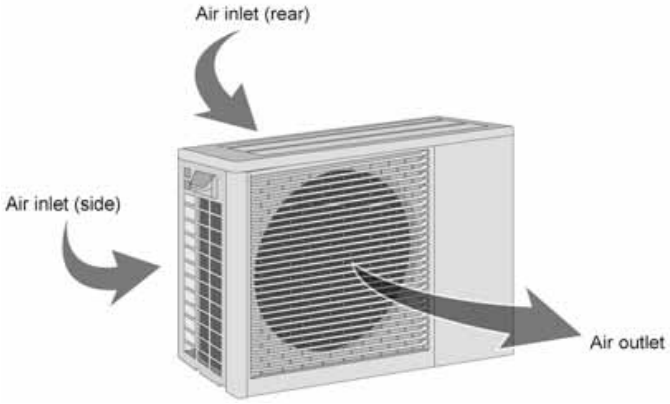
- Operation Improvement
  - Quiet mode to reduce the indoor unit operating sound
  - Powerful mode to reach the desired room temperature quickly
  - 24-hour timer setting

4. Location of Controls and Components

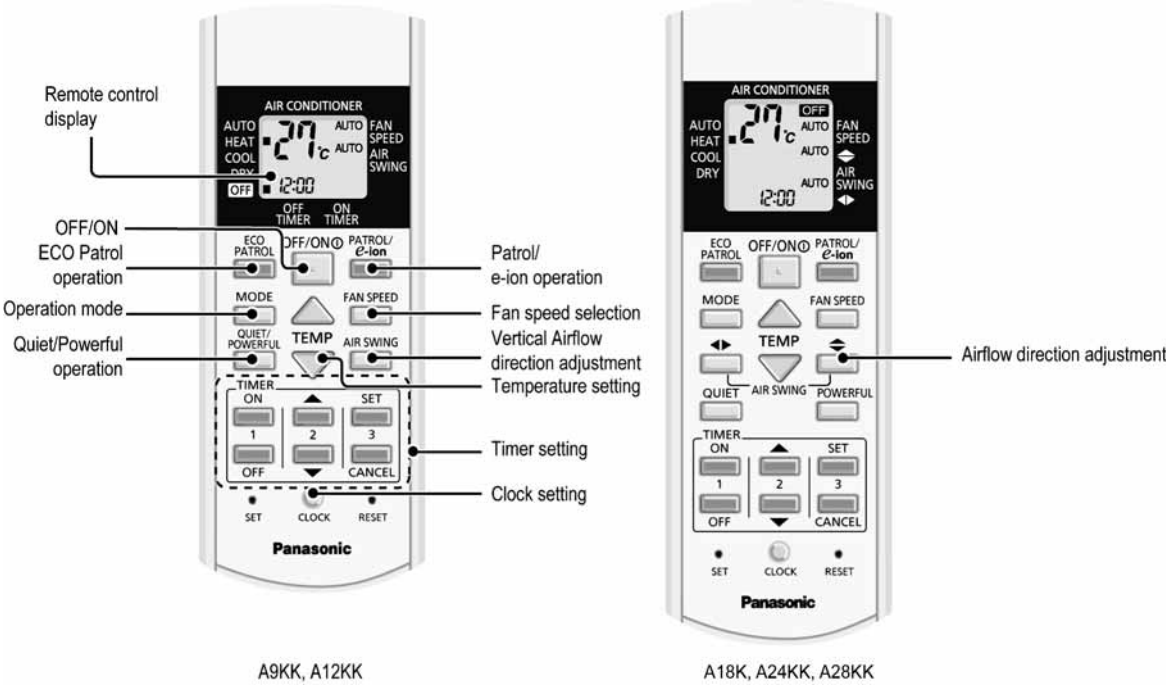
4.1 Indoor Unit



4.2 Outdoor Unit



4.3 Remote Control



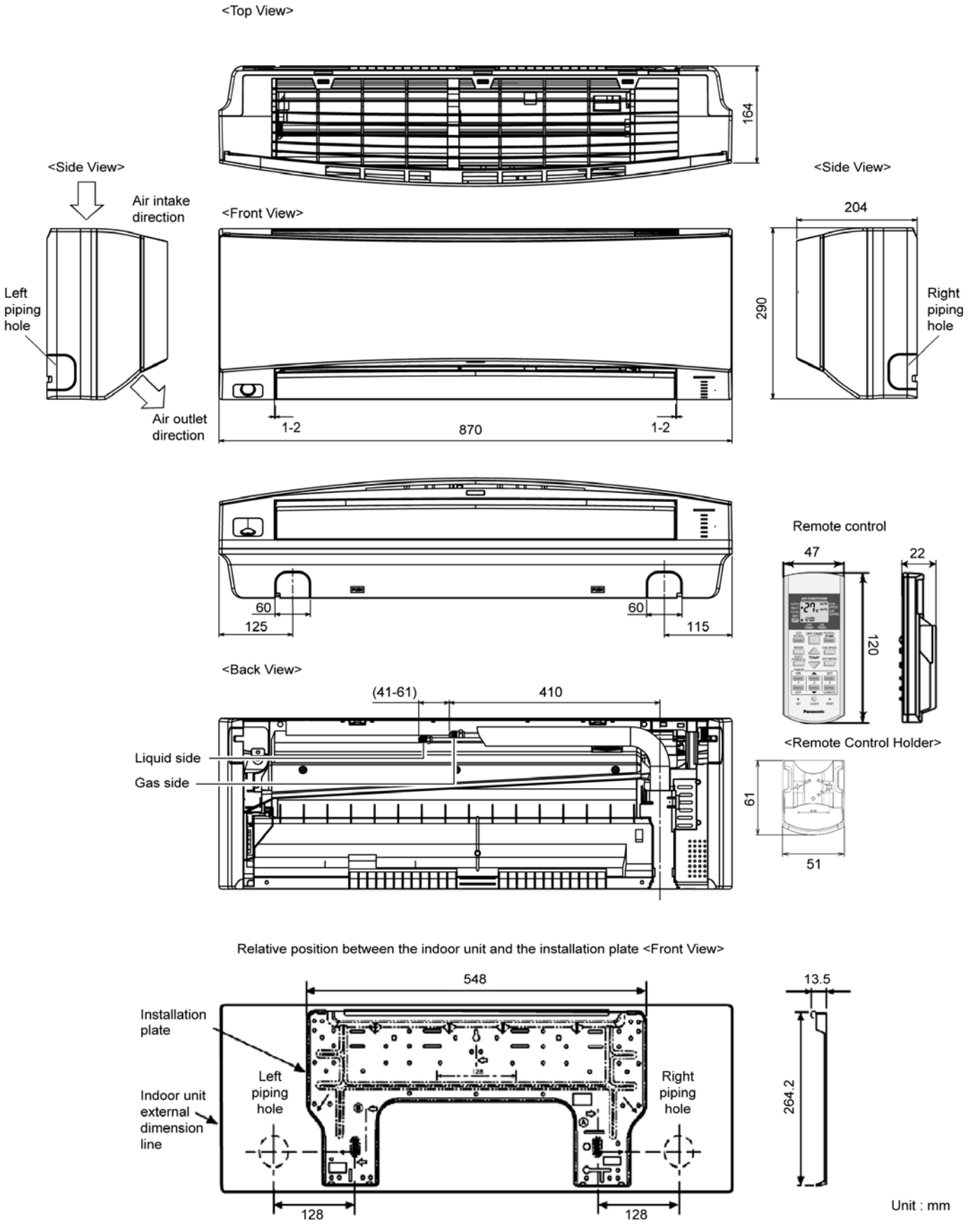
A9KK, A12KK

A18K, A24KK, A28KK

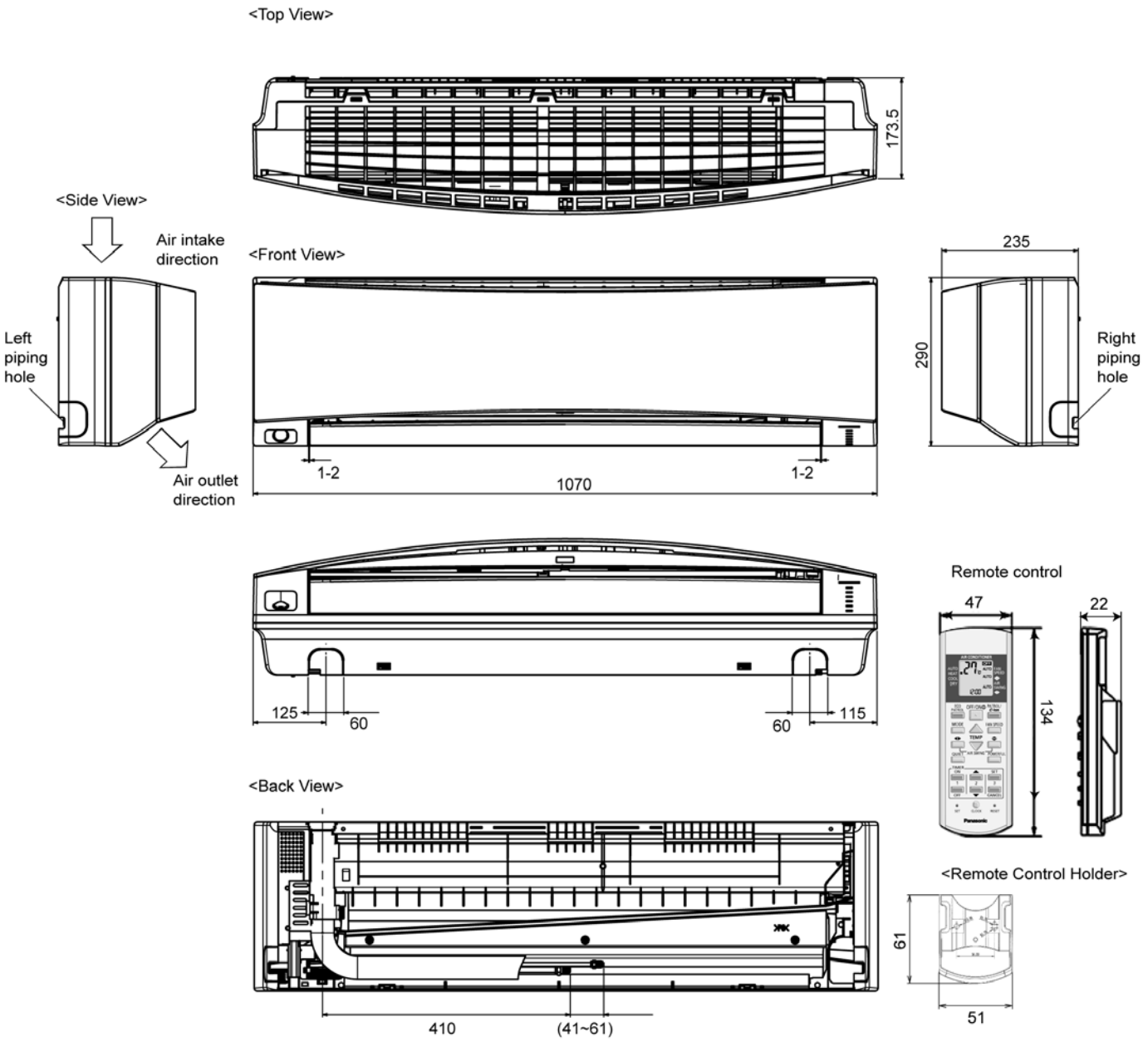
5. Dimensions

5.1 Indoor Unit

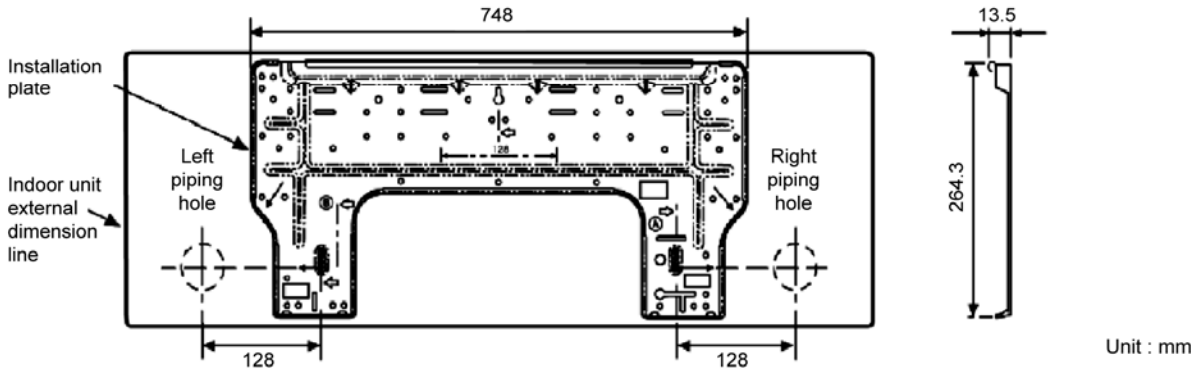
5.1.1 CS-A9KKD-2 CS-A12KKD-2



5.1.2 CS-A18KKD-2 CS-A24KKD-2 CS-A28KKD-2



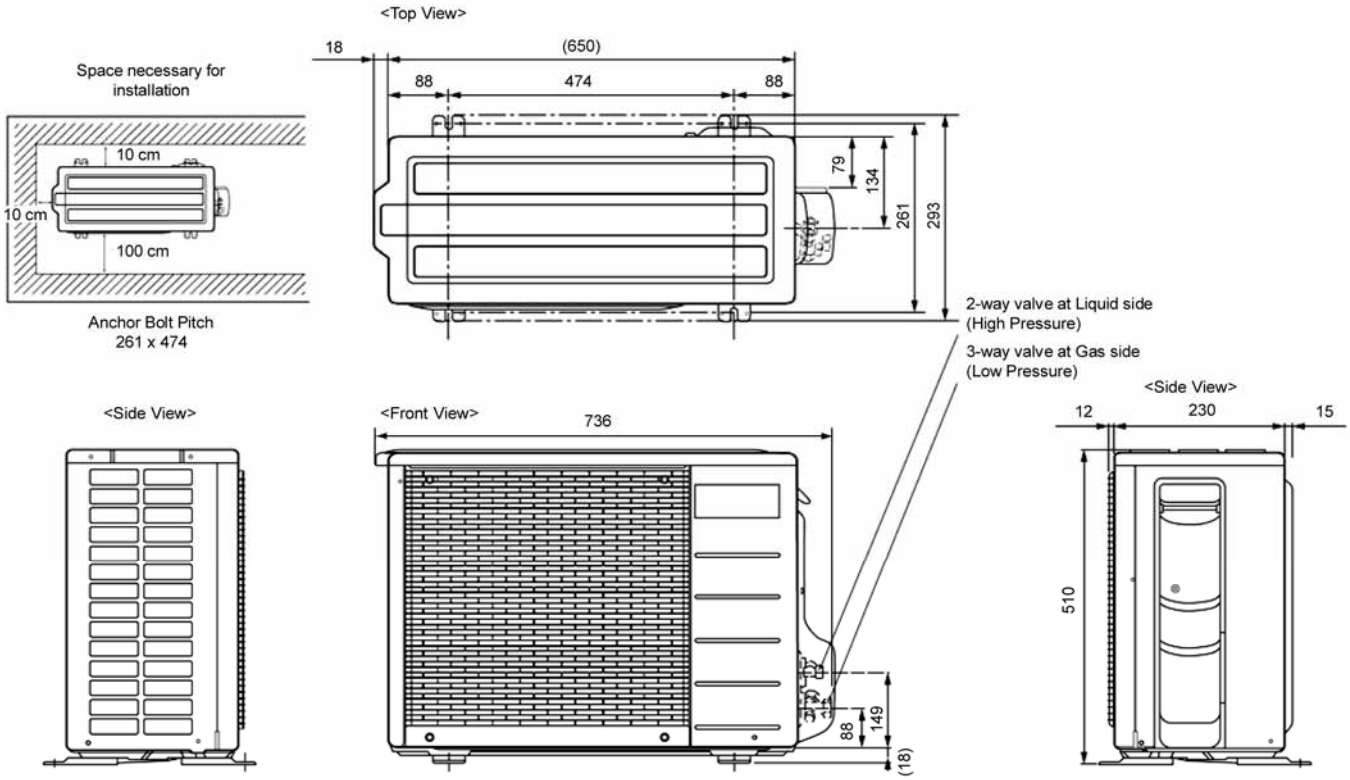
Relative position between the indoor unit and theinstallation plate <FrontView>



Unit : mm

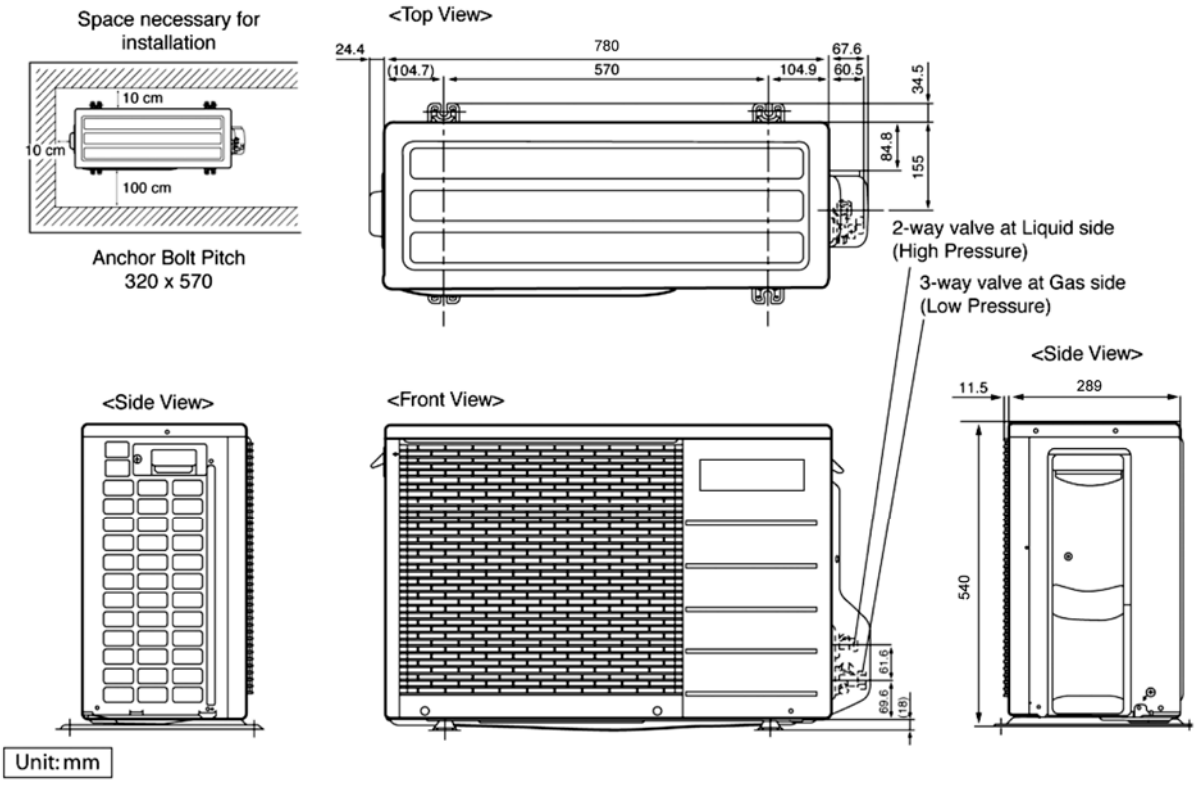
5.2 Outdoor Unit

5.2.1 CU-A9KKD-2



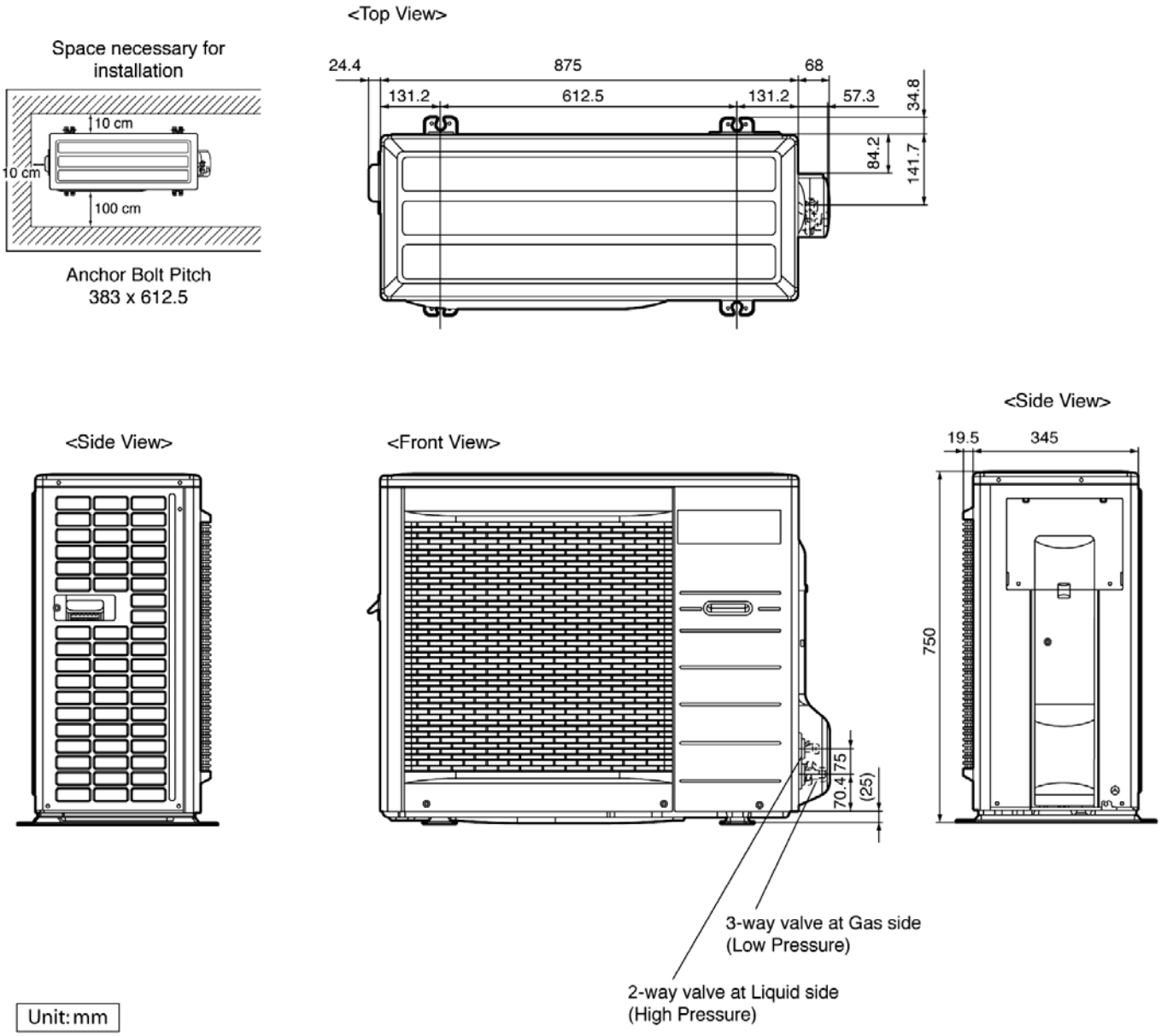
Unit: mm

5.2.2 CU-A12KKD-2



Unit: mm

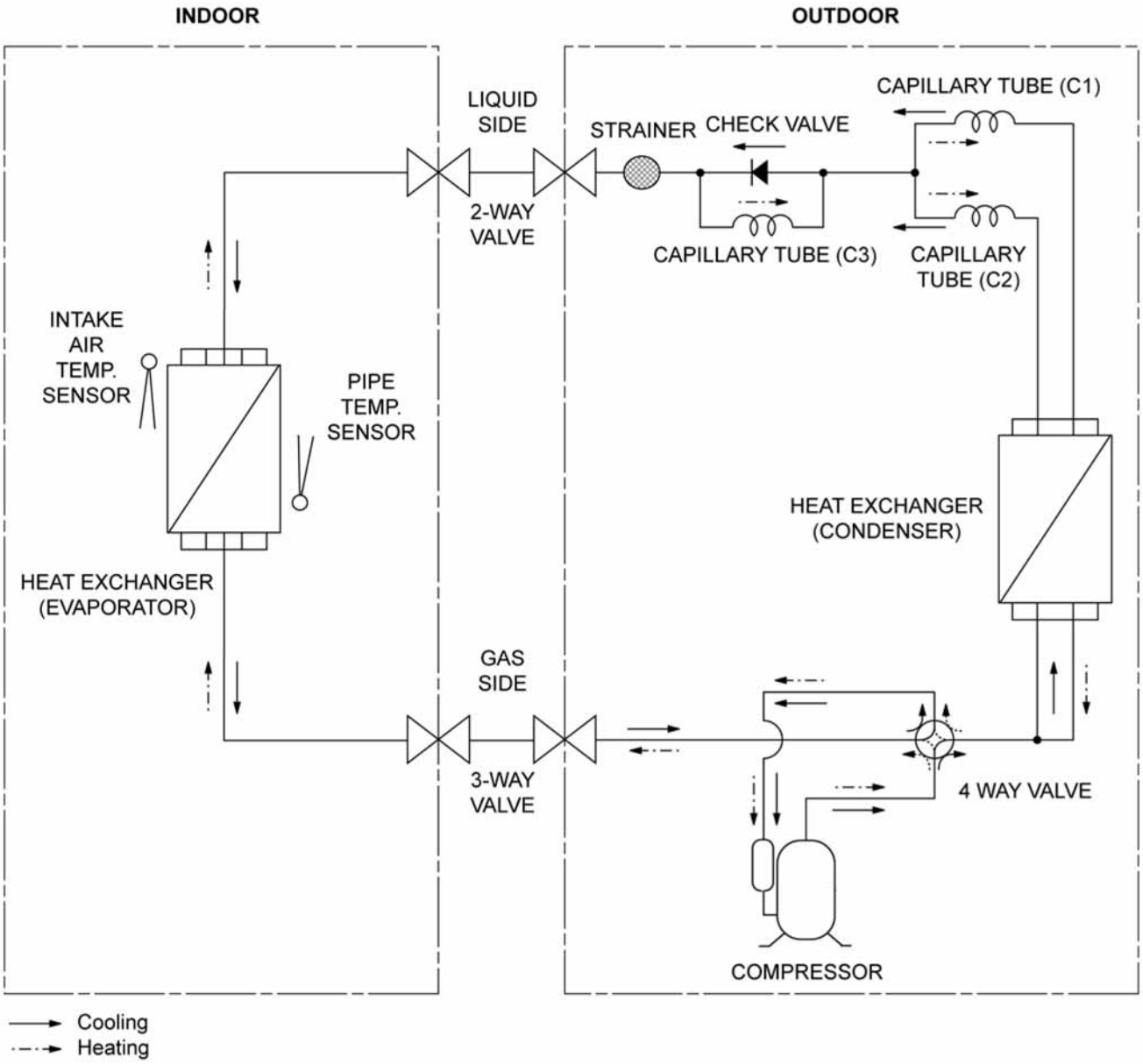
5.2.3 CU-A18KKD-2 CU-A24KKD-2 CU-A28KKD-2



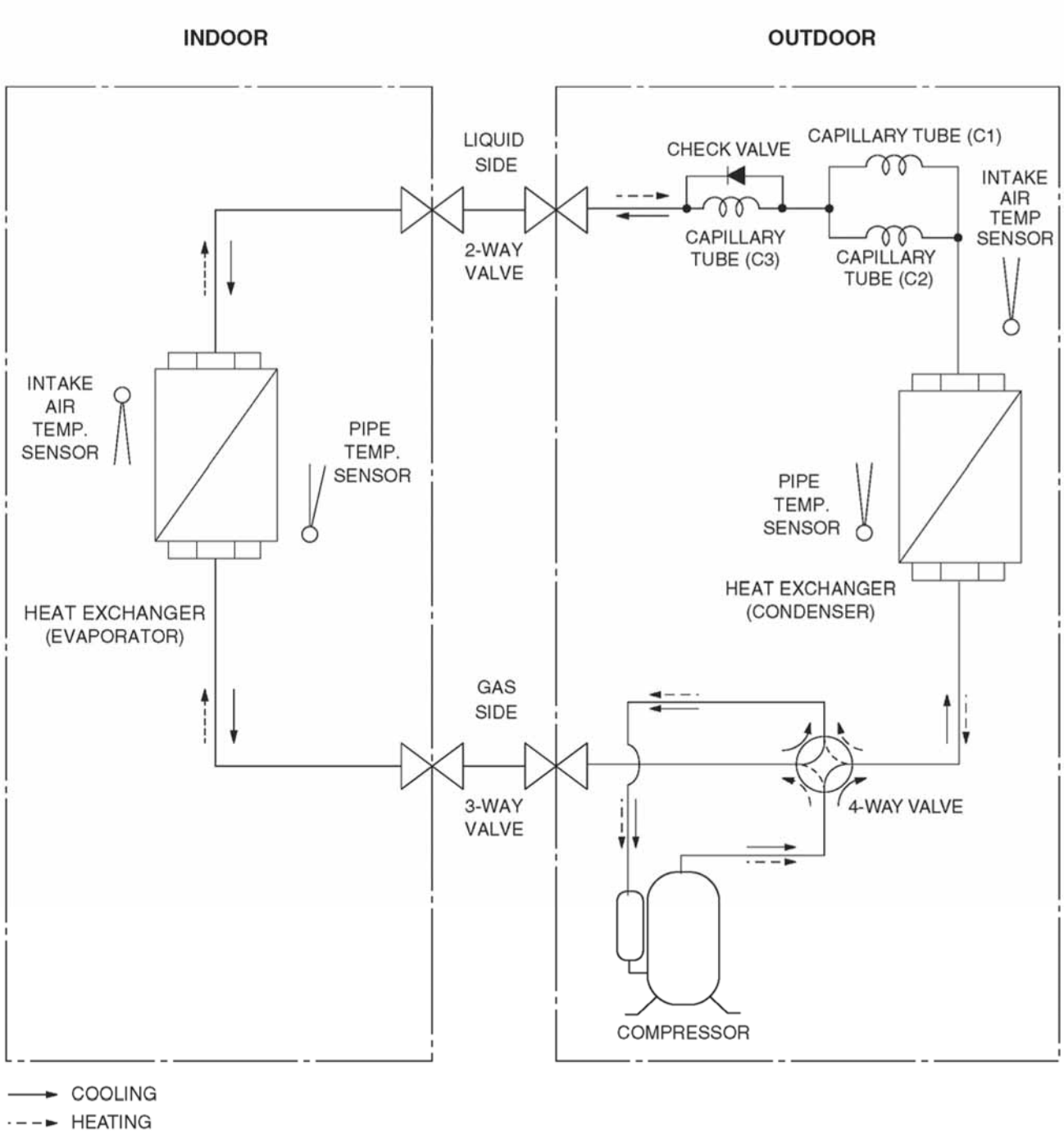
Unit: mm

6. Refrigeration Cycle Diagram

6.1 CS-A9KKD-2 CU-A9KKD-2 CS-A12KKD-2 CU-A12KKD-2

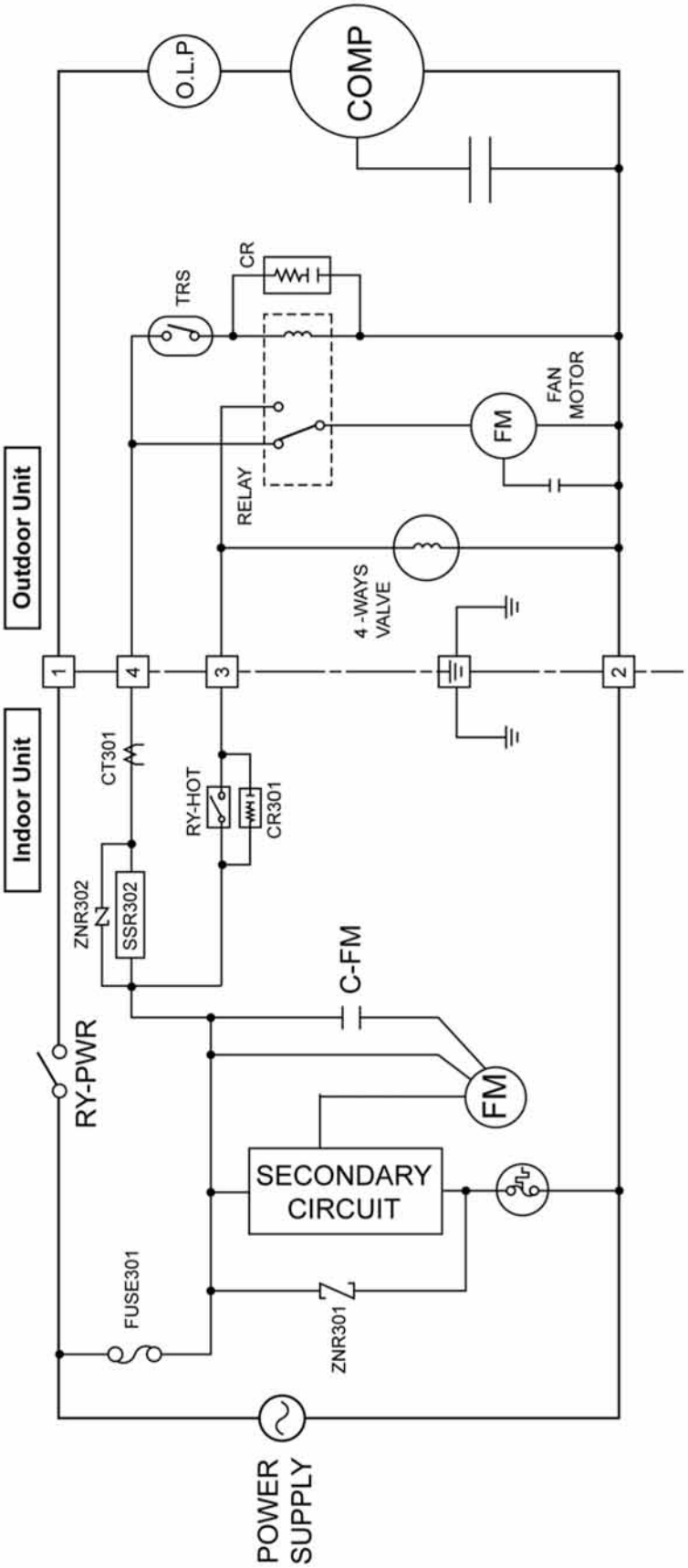


6.2 CS-A18KKD-2 CU-A18KKD-2 CS-A24KKD-2 CU-A24KKD-2 CS-A28KKD-2 CU-A28KKD-2

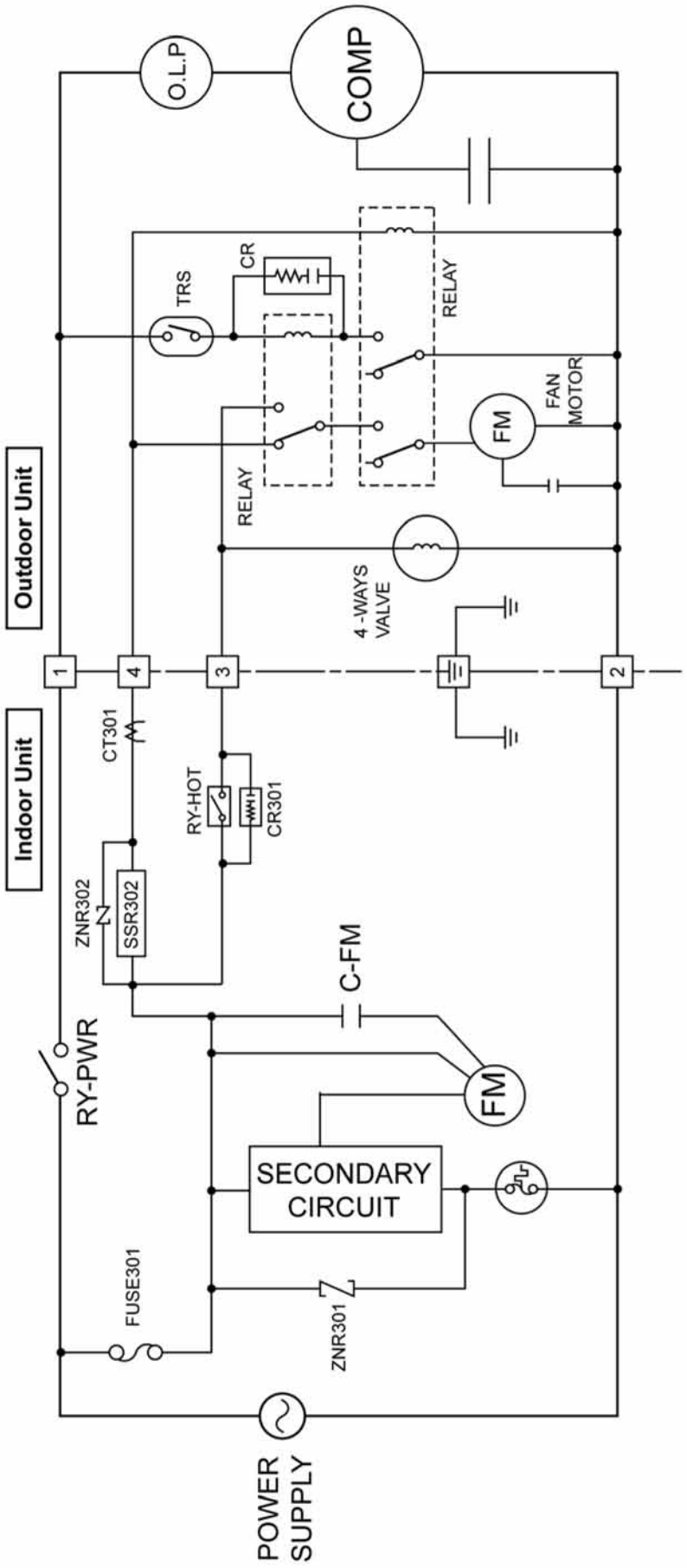


7. Block Diagram

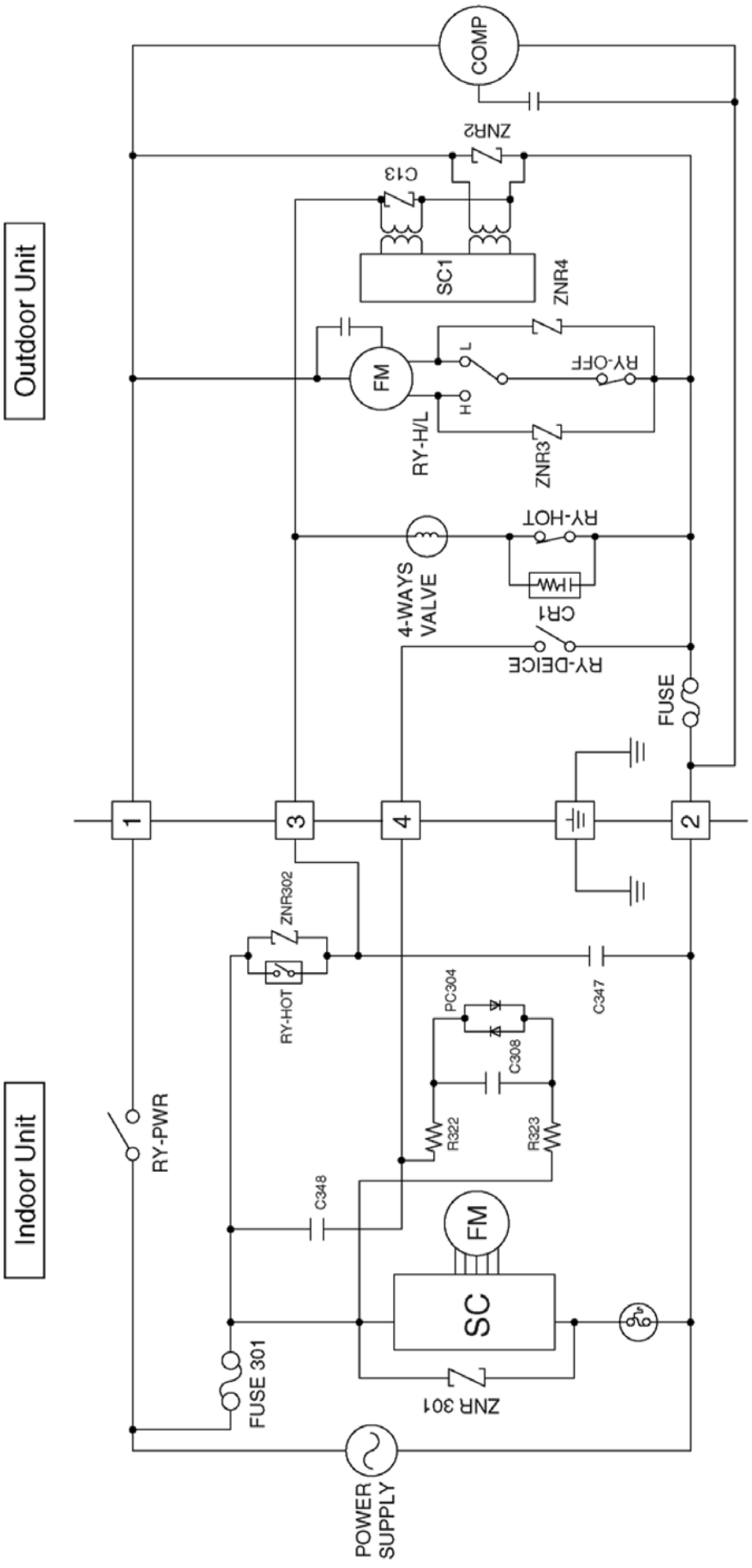
7.1 CS-A9KKD-2 CU-A9KKD-2



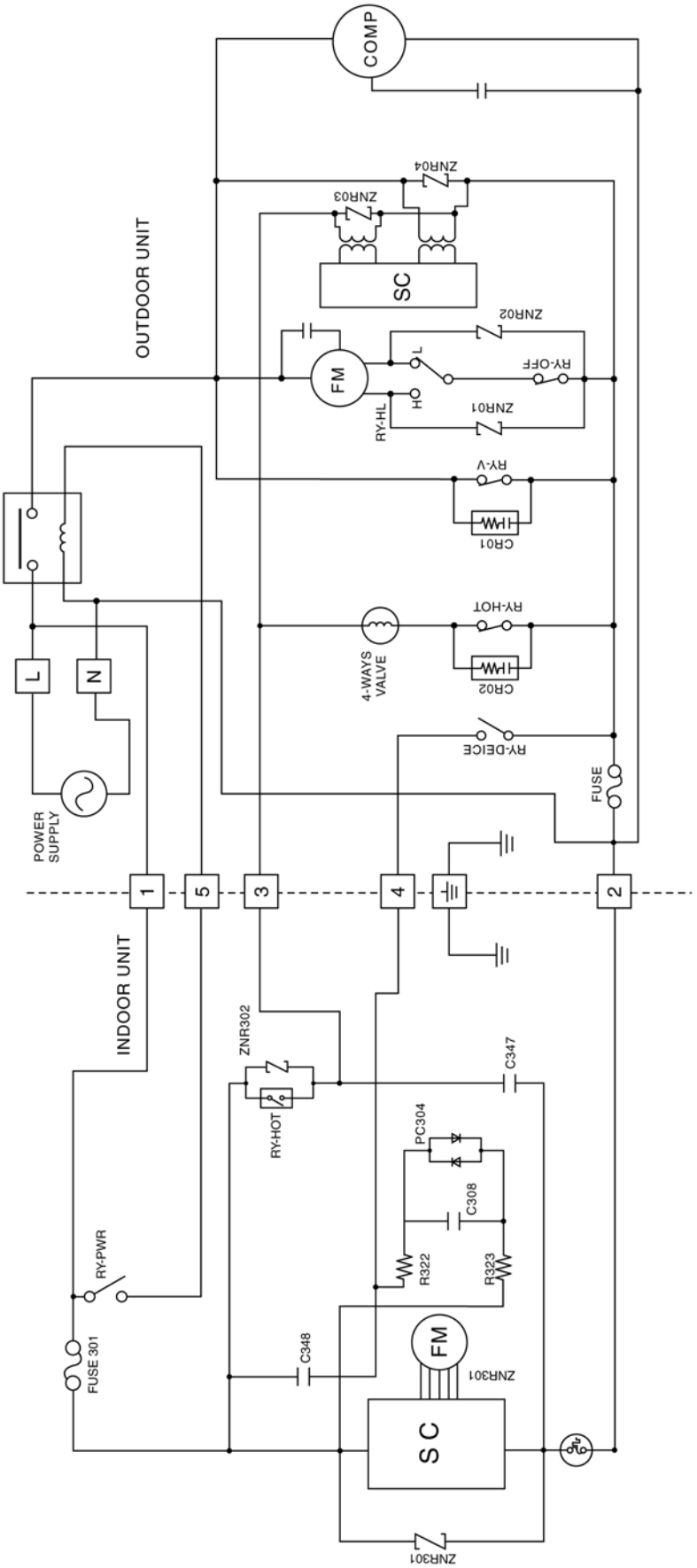
7.2 CS-A12KKD-2 CU-A12KKD-2



7.3 CS-A18KKD-2 CU-A18KKD-2 CS-A24KKD-2 CU-A24KKD-2

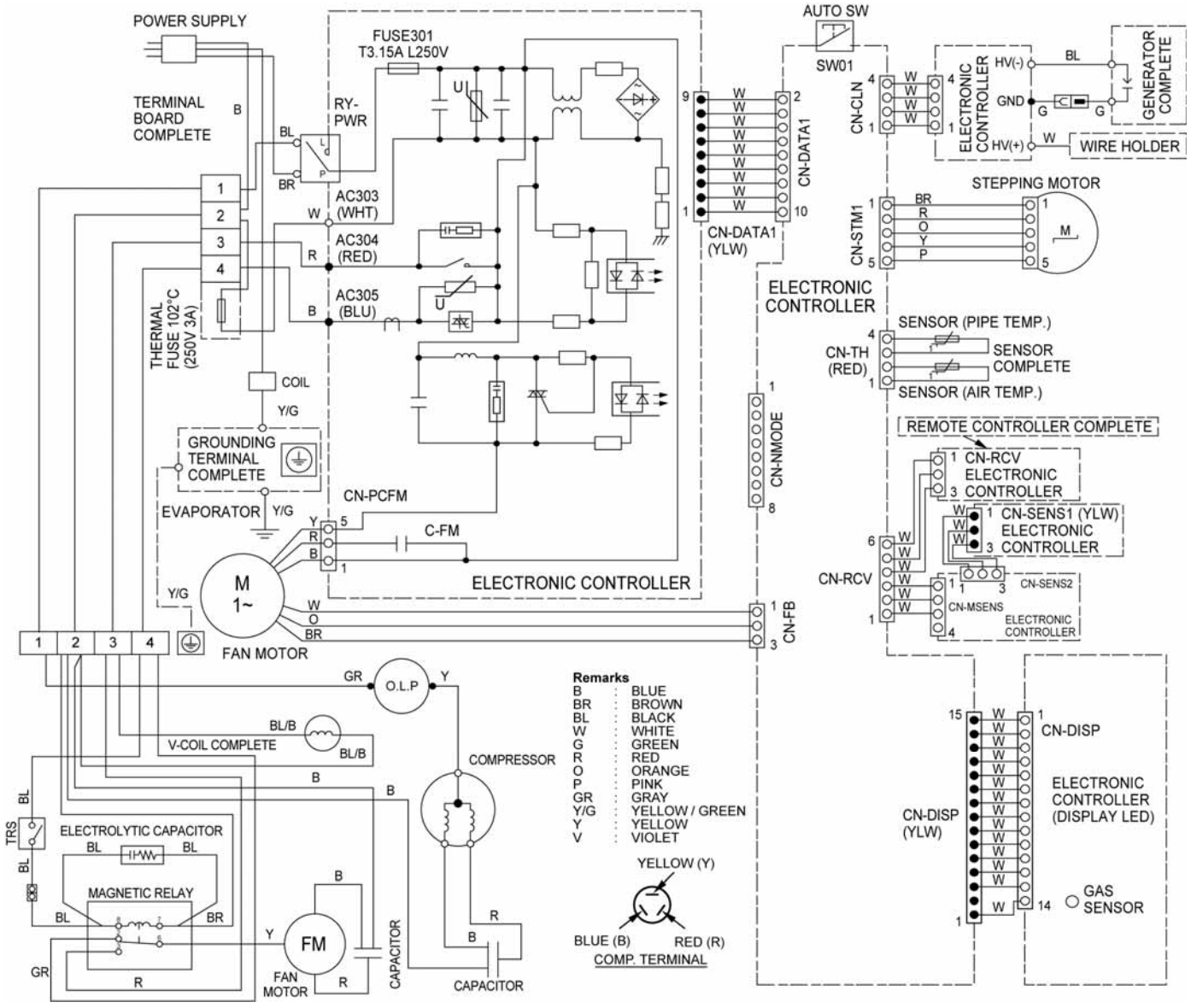


7.4 CS-A28KKD-2 CU-A28KKD-2



8. Wiring Connection Diagram

8.1 CS-A9KKD-2 CU-A9KKD-2



Resistance of Indoor Fan Motor Windings

MODEL	CS-A9KKD-2
CONNECTION	CWA921409
BLUE-YELLOW	457.2Ω
YELLOW-RED	420.5Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A9KKD-2
CONNECTION	2PS156D3DA02
C-R	4.228Ω
C-S	3.841Ω

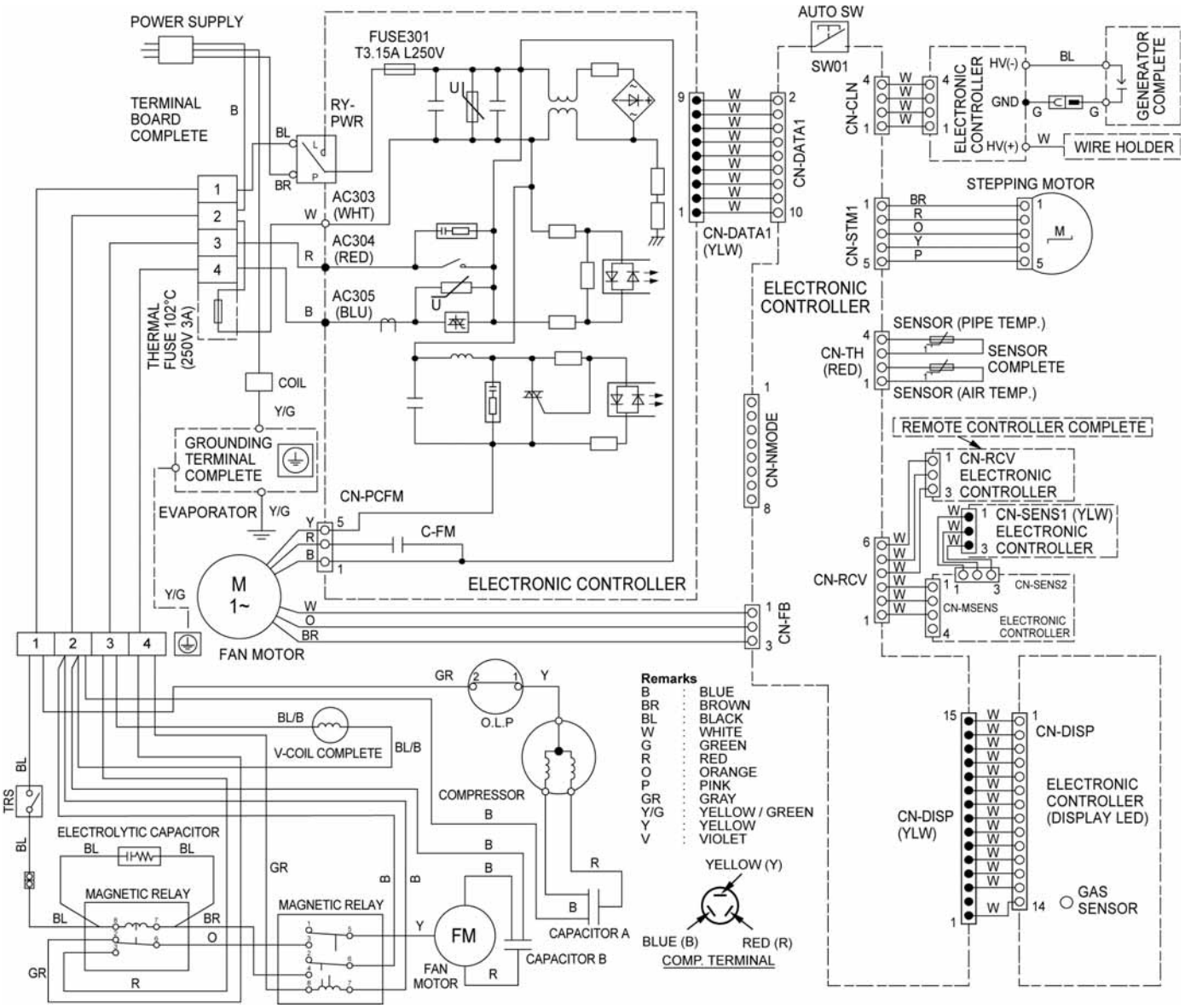
Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-A9KKD-2
CONNECTION	CWA951674
BLUE-YELLOW	396Ω
YELLOW-RED	295Ω

Note: Resistance at 25°C of ambient temperature.

8.2 CS-A12KKD-2 CU-A12KKD-2



Resistance of Indoor Fan Motor Windings

MODEL	CS-A12KKD-2
CONNECTION	CWA921415
BLUE-YELLOW	196Ω
YELLOW-RED	303Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A12KKD-2
CONNECTION	2PS206D2BA02
C-R	3.207Ω
C-S	3.256Ω

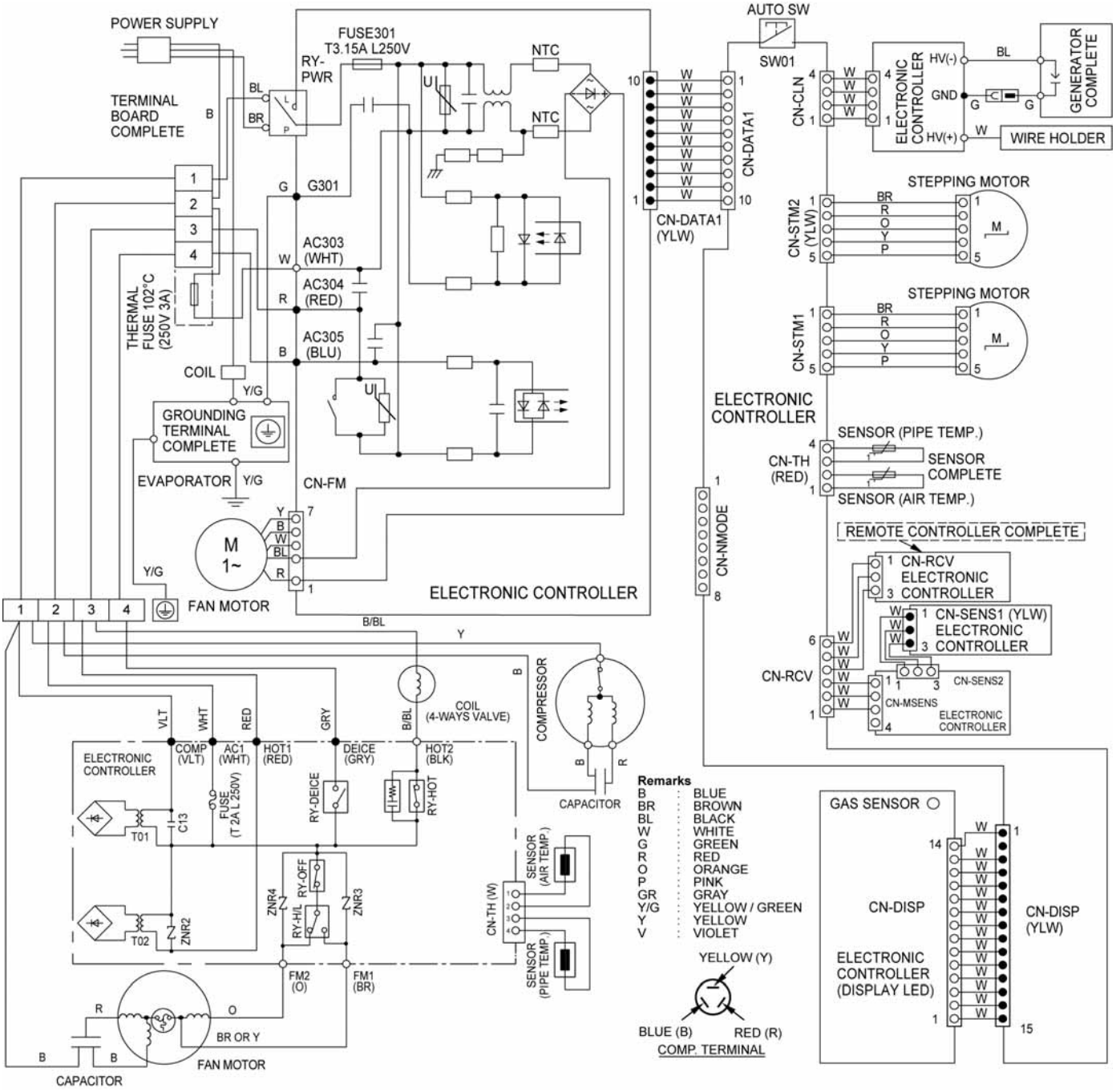
Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-A12KKD-2
CONNECTION	CWA951121J
BLUE-YELLOW	200.4Ω
YELLOW-RED	252.5Ω

Note: Resistance at 25°C of ambient temperature.

8.3 CS-A18KKD-2 CU-A18KKD-2 CS-A24KKD-2 CU-A24KKD-2



Resistance of Outdoor Fan Motor Windings

MODEL	CU-A18KKD-2	CU-A24KKD-2
CONNECTION	CWA951385J	CWA951385J
BLUE-YELLOW	93Ω	93Ω
YELLOW-ORANGE	124Ω	124Ω
YELLOW-RED	98Ω	98Ω

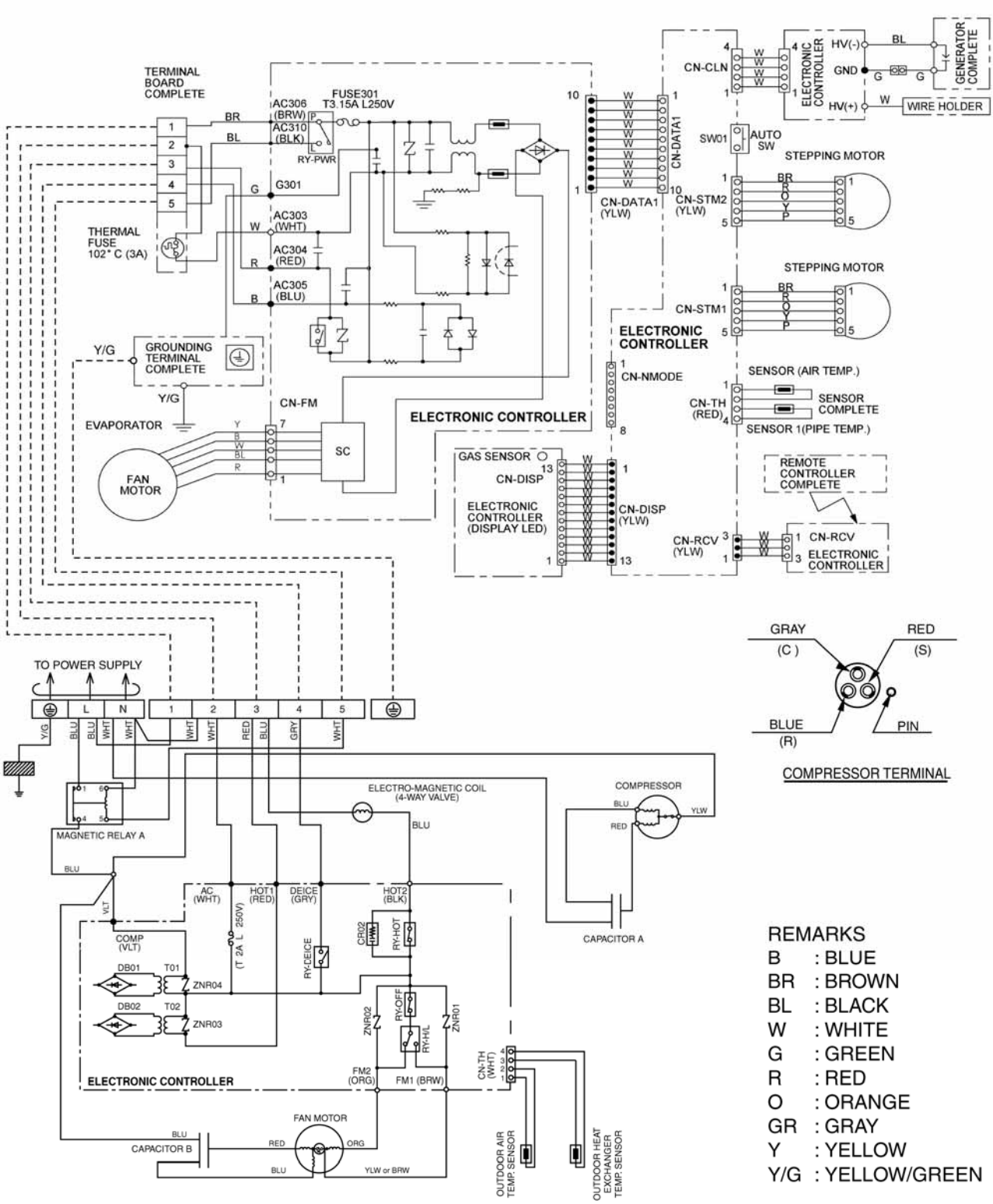
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A18KKD-2	CU-A24KKD-2
CONNECTION	2JS318D3AA04	2JS438D3JA02
C-R	1.618Ω	0.830Ω
C-S	3.718Ω	2.257Ω

Note: Resistance at 20°C of ambient temperature.

8.4 CS-A28KKD-2 CU-A28KKD-2



Resistance of Indoor Fan Motor Windings

MODEL	CU-A28KKD-2
CONNECTION	CWA951294J
BLUE-YELLOW	102Ω
YELLOW-ORANGE	81Ω
YELLOW-RED	108Ω

Note: Resistance at 20°C of ambient temperature.

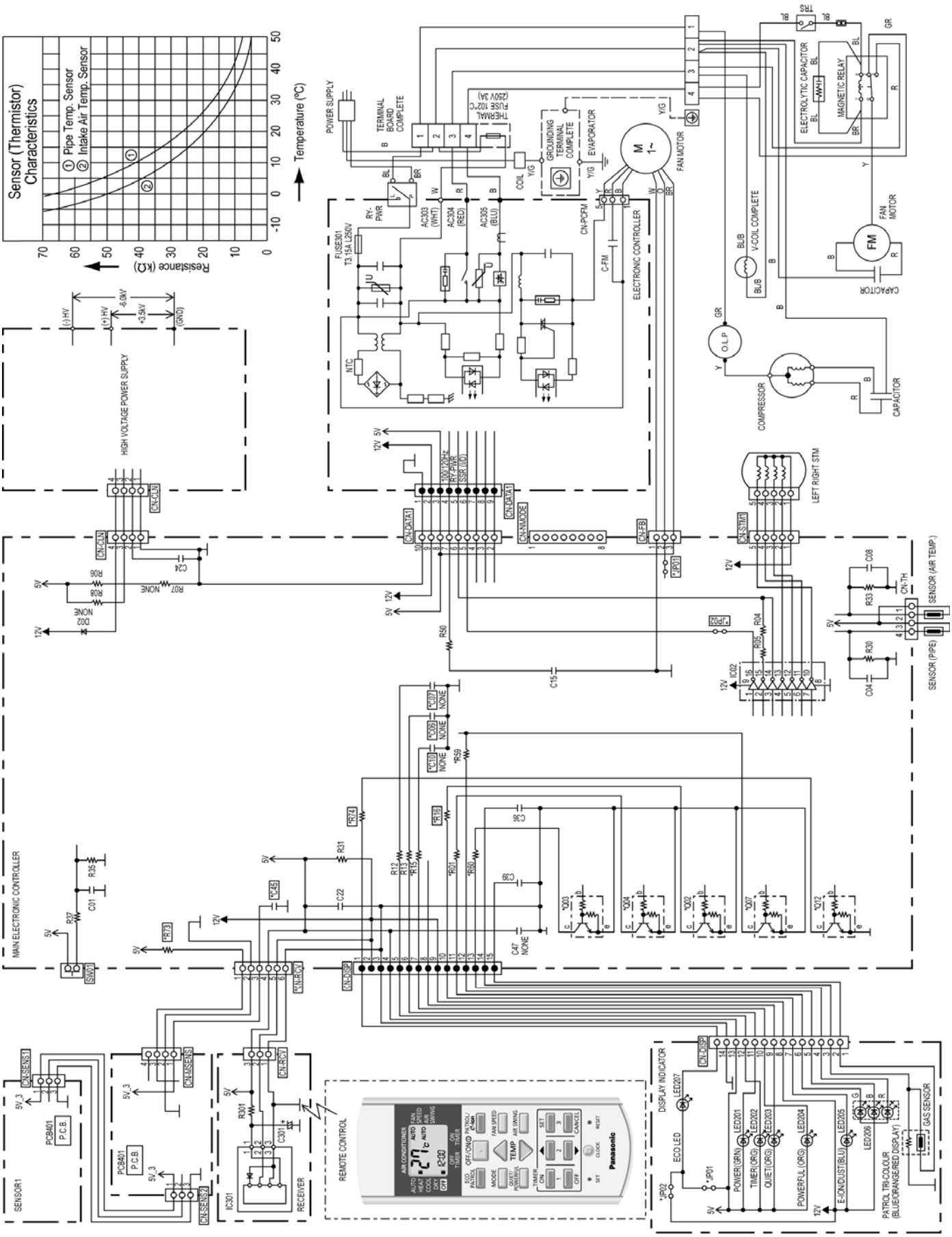
Resistance of Compressor Windings

MODEL	CU-A28KKD-2
CONNECTION	2JD514E3AA03
C-R	1.022Ω
C-S	2.142Ω

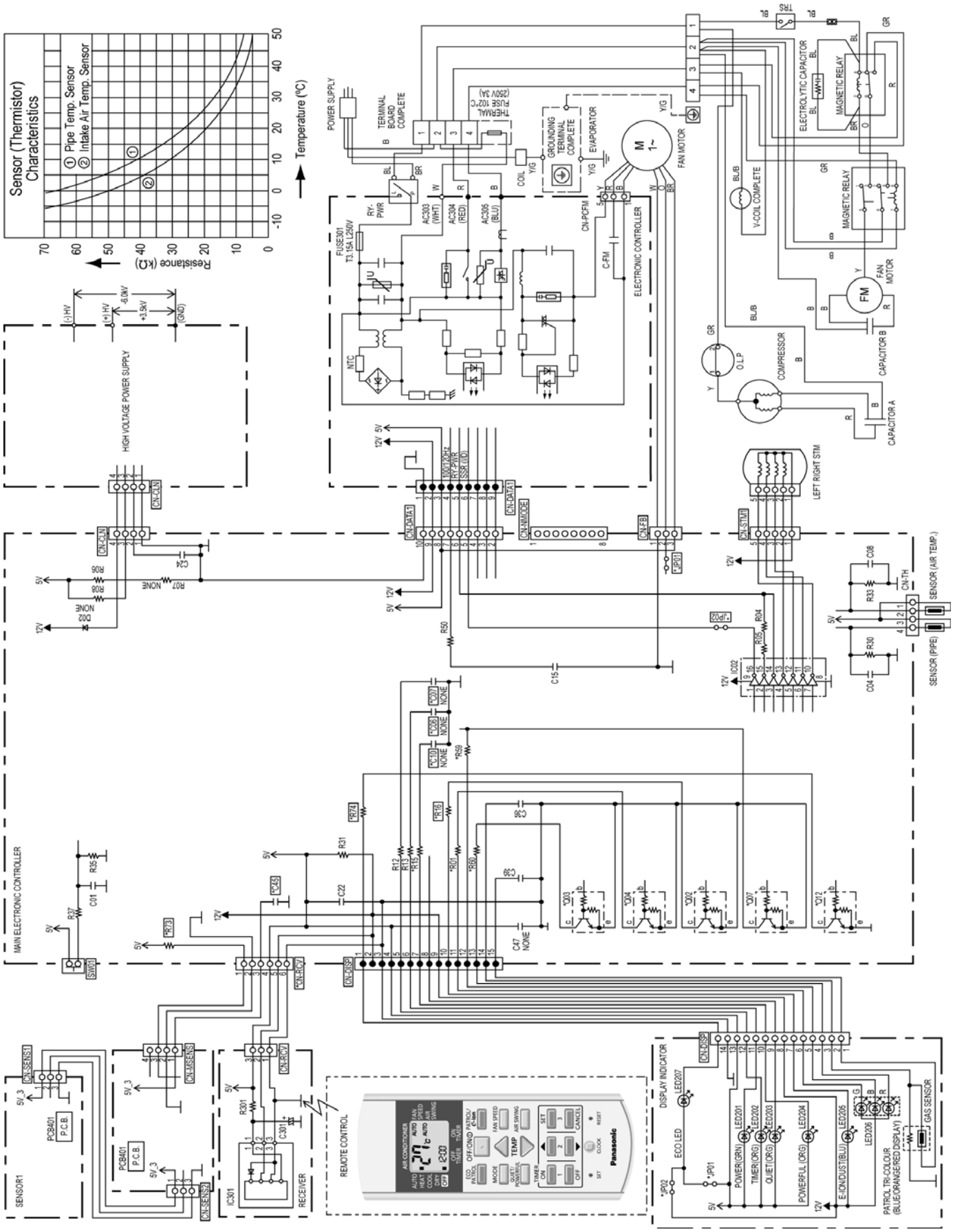
Note: Resistance at 20°C of ambient temperature.

9. Electronic Circuit Diagram

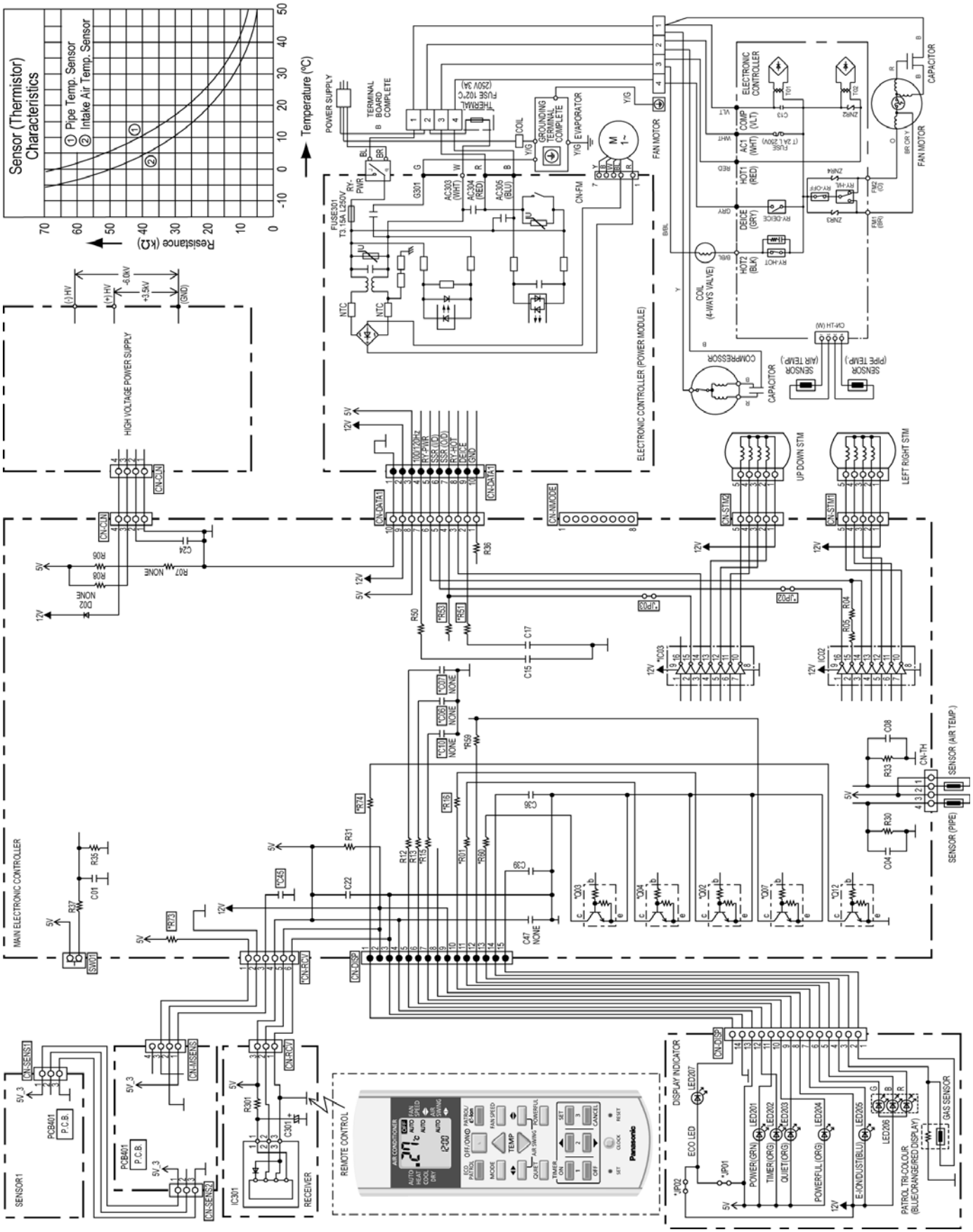
9.1 CS-A9KKD-2 CU-A9KKD-2



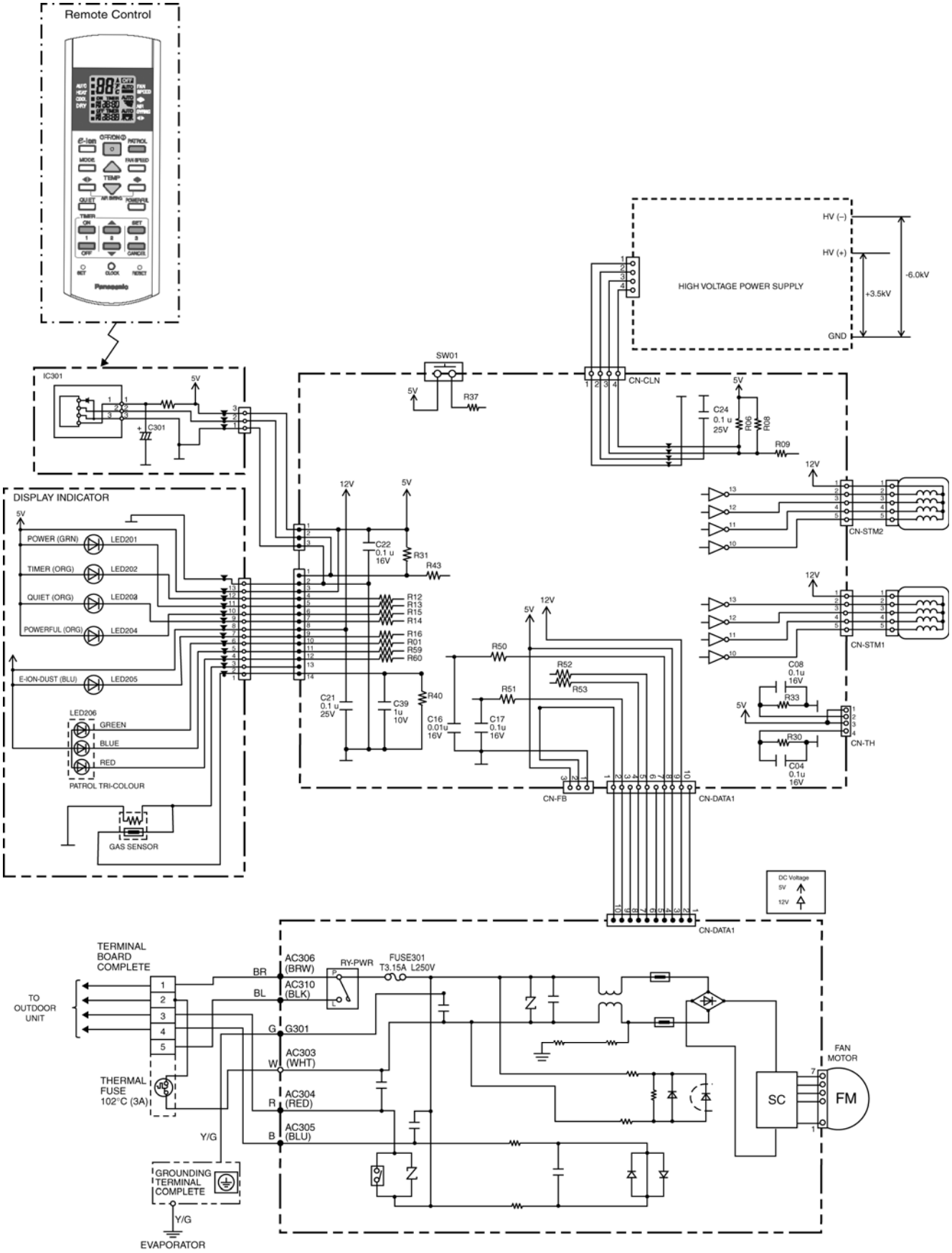
9.2 CS-A12KKD-2 CU-A12KKD-2



9.3 CS-A18KKD-2 CU-A18KKD-2 CS-A24KKD-2 CU-A24KKD-2



9.4 CS-A28KKD-2 CU-A28KKD-2

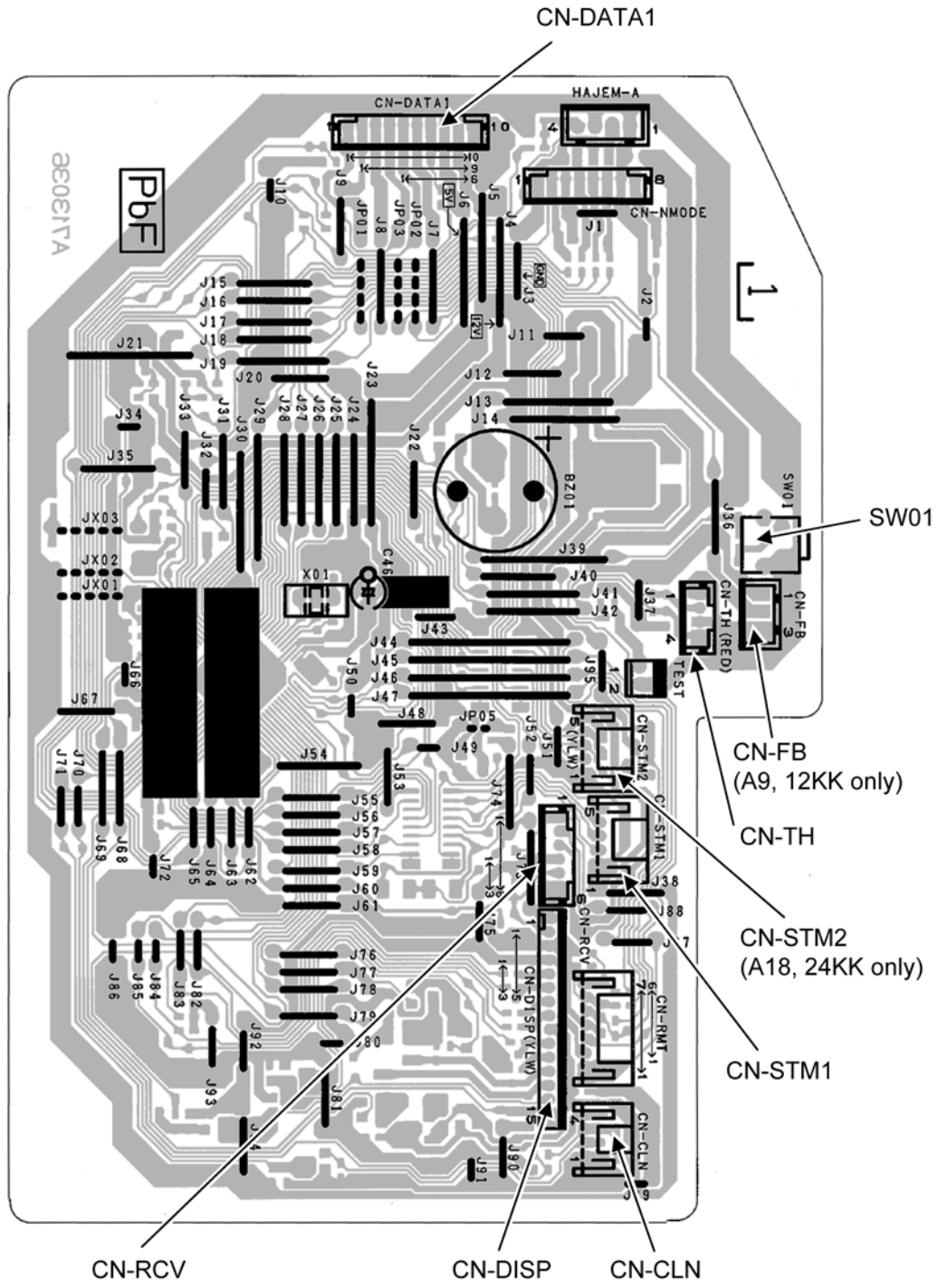


10. Printed Circuit Board

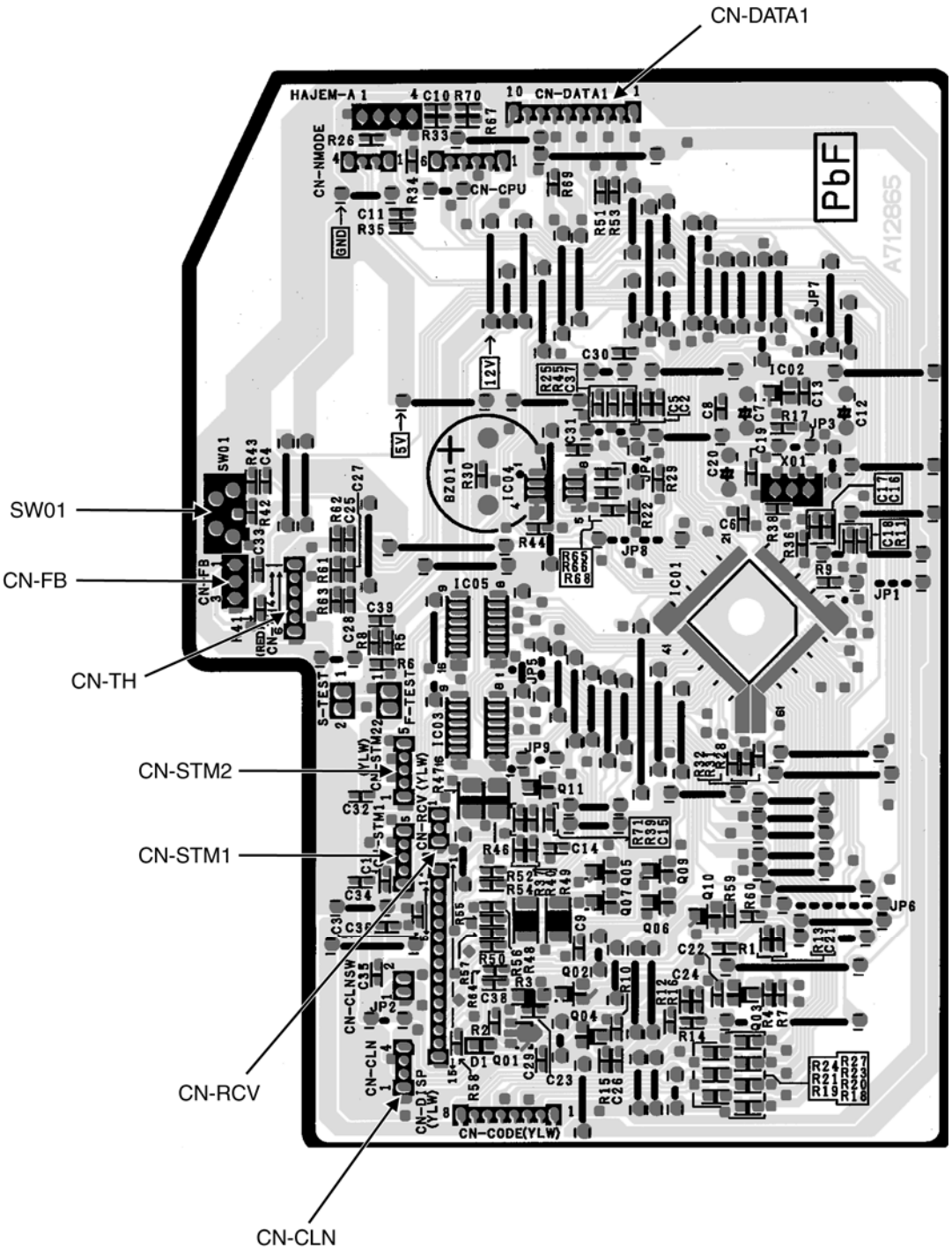
10.1 Indoor Unit

10.1.1 Main Printed Circuit Board

10.1.1.1 CS-A9KKD-2 CS-A12KKD-2 CS-A18KKD-2 CS-A24KKD-2

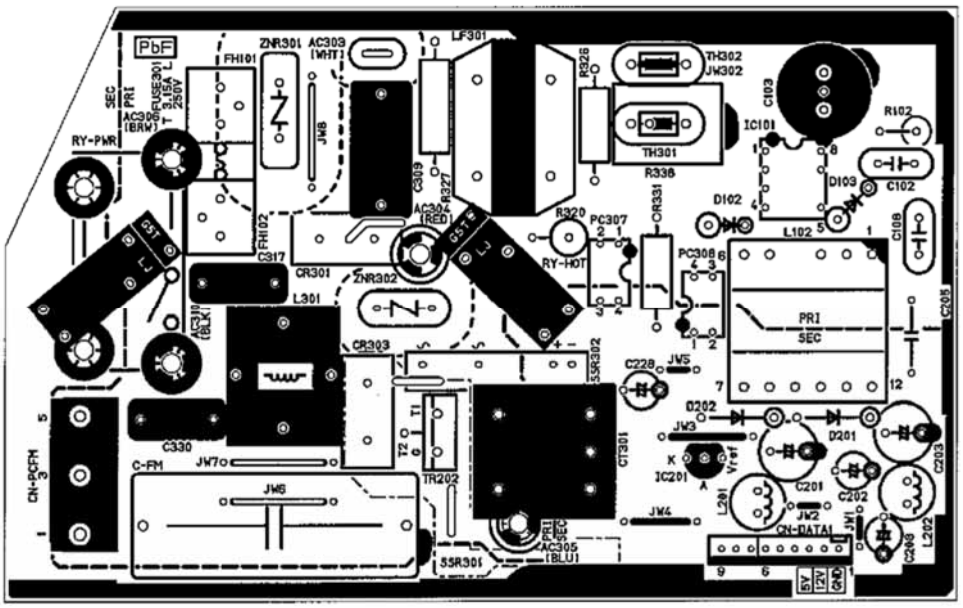


10.1.1.2 CS-A28KKD-2

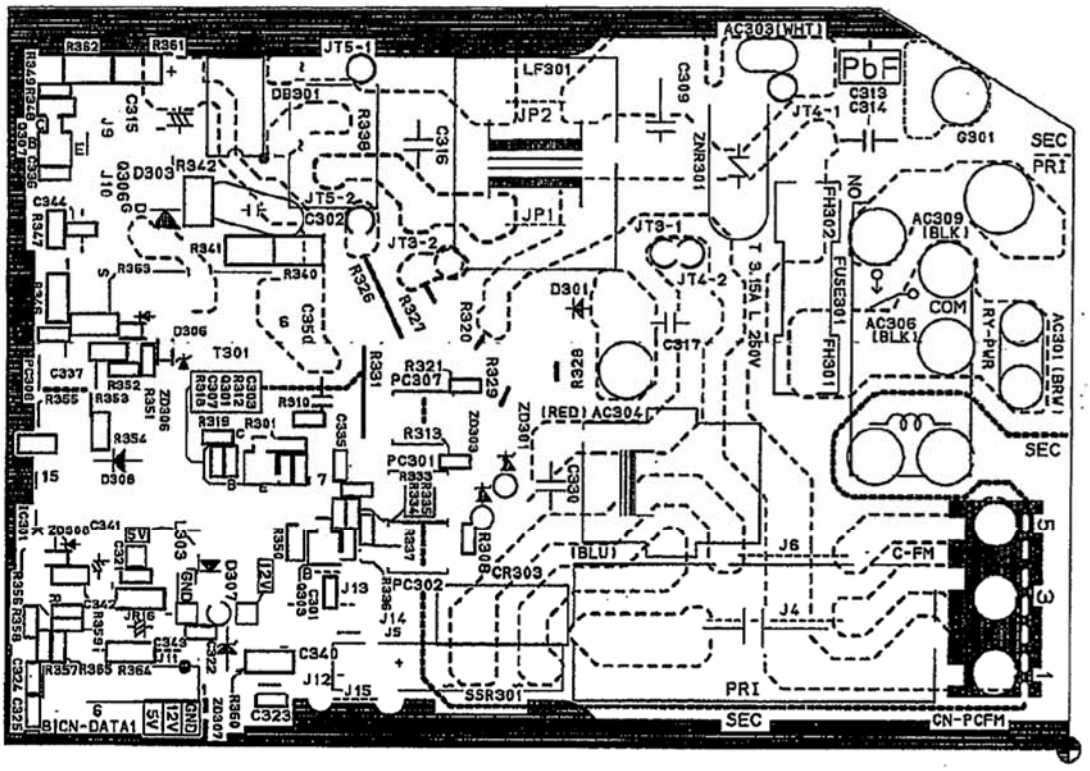


10.1.2 Power Printed Circuit Board

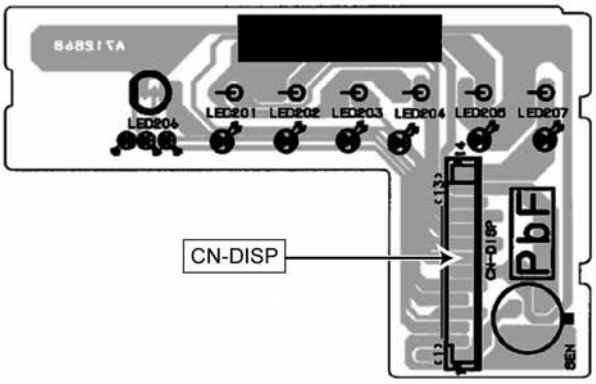
10.1.2.1 CS-A9KKD-2 CS-A12KKD-2



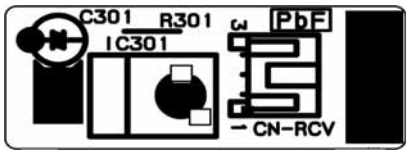
10.1.2.2 CS-A18KKD-2 CS-A24KKD-2 CS-A28KKD-2



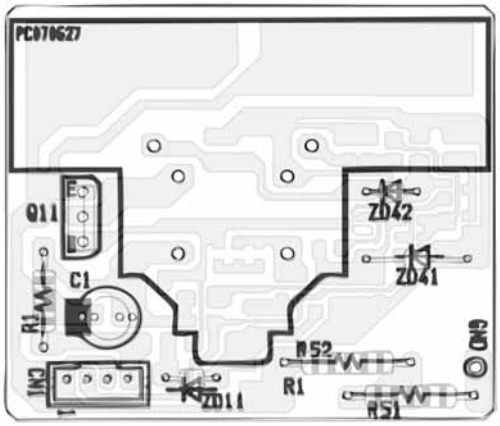
10.1.3 Indicator Printed Circuit Board



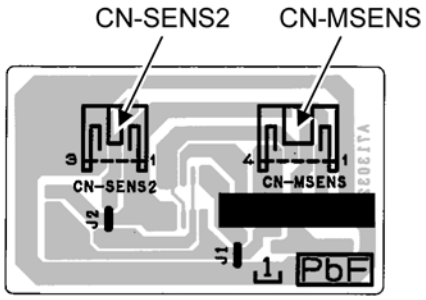
10.1.4 Receiver Printed Circuit Board



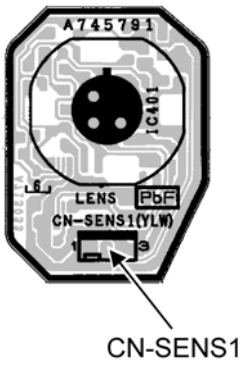
10.1.5 High Voltage Power Supply Printed Circuit



10.1.6 Comparator Printed Circuit Board



10.1.7 Eco Patrol Printed Circuit Board



CN-SENS1

11. Installation Instruction

11.1 Select the Best Location

11.1.1 Indoor Unit

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

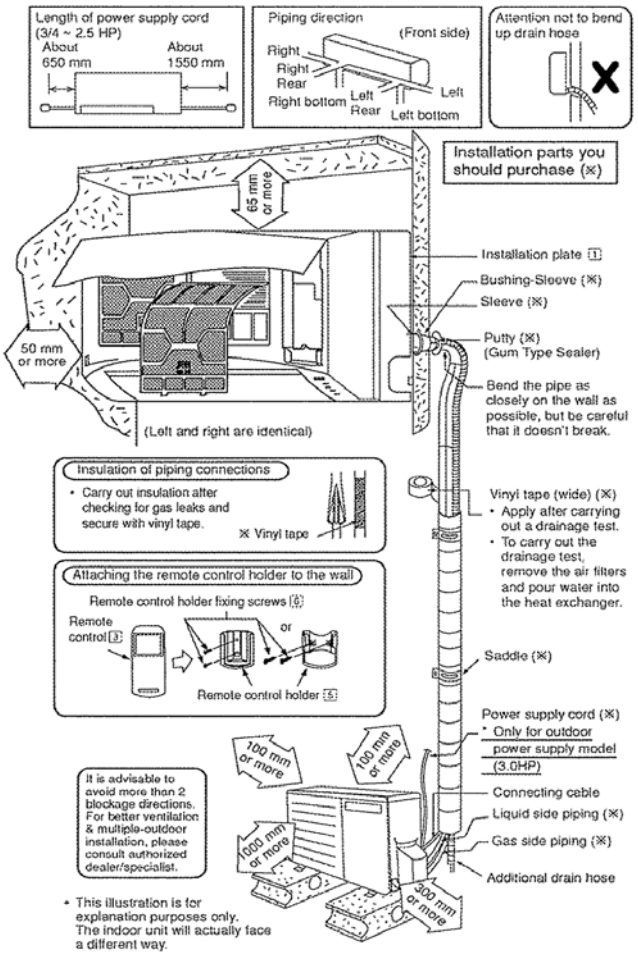
11.1.2 Outdoor Unit

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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)
		Gas	Liquid						
A9***	1.0 ~ 1.5HP	3/8"	1/4"	7.5	5	3	10	20	7.5
A12***		1/2"			5	3	15	20	7.5
A18***	2.0 ~ 2.5HP			5	20	3	25	20	7.5
A24***		5/8"			20	3	25	30	7.5
A28***	3.0HP				20	3	25	30	7.5

Example: For A7***
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 = 50 g.

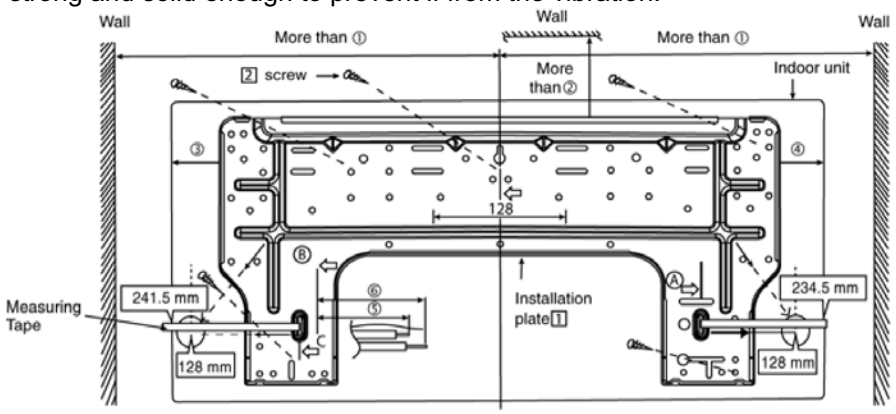
11.1.3 Indoor/Outdoor Unit Installation Diagram



11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
A9***, A12***	485 mm	82 mm	165 mm	158 mm	43 mm	95 mm
A18***, A24***, A28***	585 mm	82 mm	165 mm	158 mm	169 mm	219 mm

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

Ⓑ : For left side piping, piping connection for liquid should be about ⑤ from this line.
: For left side piping, piping connection 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.)
   - Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.

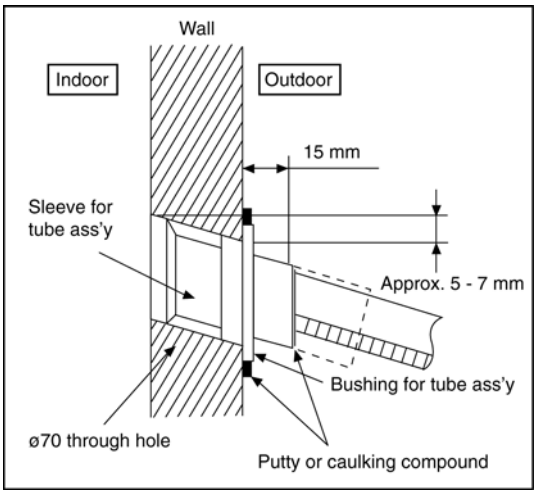
2 Drill the piping plate hole with ø70mm hole-core drill.
   - Putting measuring tape at position as shown in the diagram above.
     The hole centre is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
     The meeting point of the extension arrow mark is the hole center position.
   - Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to step 3)

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

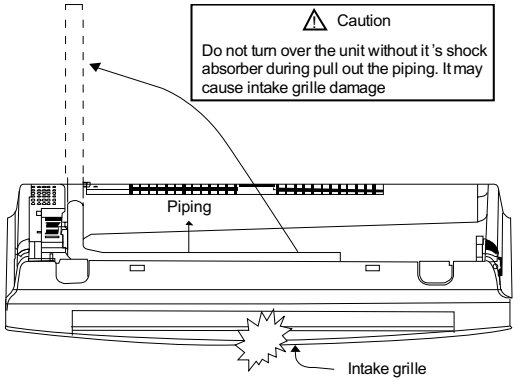
1 Insert the piping sleeve to the hole.
2 Fix the busing to the sleeve.
3 Cut the sleeve until it extrudes about 15mm from the wall.

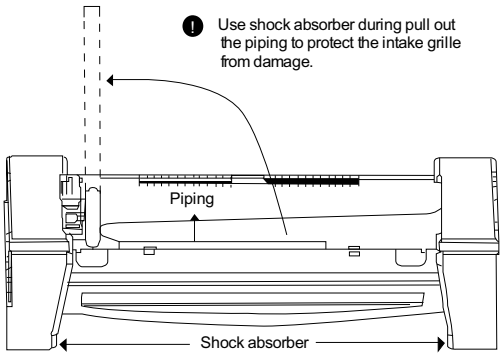
⚠ Caution
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

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



11.2.3 Indoor Unit Installation





11.2.3.1 For the right rear piping

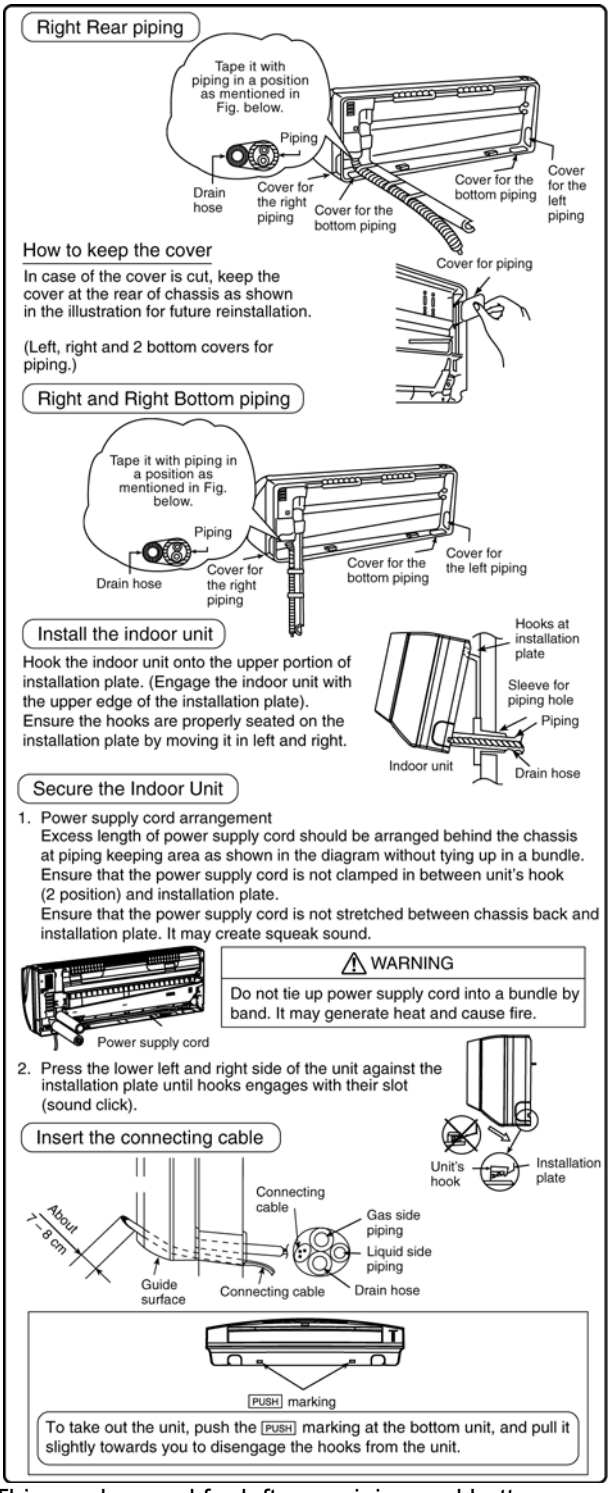
Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Secure the Indoor Unit
	• If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.
Step-4	Insert the connecting cable

11.2.3.2 For the right and right bottom piping

Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Insert the connecting cable
Step-4	Secure the Indoor Unit
	• If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.

11.2.3.3 For the embedded piping

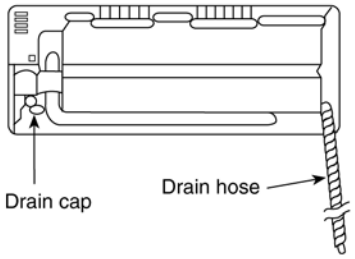
Step-1	Replace the drain hose
Step-2	Bend the embedded piping
	• Use a spring bender or equivalent to bend the piping so that the piping is not crushed.
Step-3	Pull the connecting cable into Indoor Unit
	• The inside and outside connecting cable can be connected without removing the front grille.
Step-4	Cut and flare the embedded piping
	• When determining the dimensions of the piping, slide the unit all the way to the left on the installation plate. • Refer to the section "Cutting and flaring the piping".
Step-5	Install the Indoor Unit
Step-6	Connect the piping
	• Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)
Step-7	Insulate and finish the piping
	• Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.
Step-8	Secure the Indoor Unit

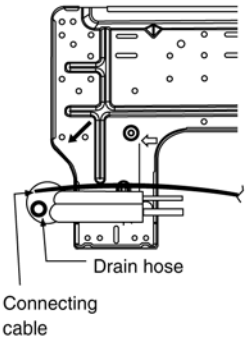


(This can be used for left rear piping and bottom piping also.

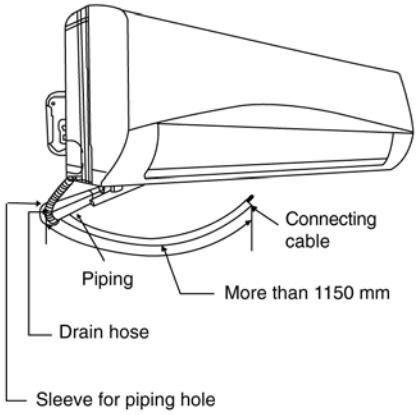
Replace the drain hose

Rear view for left piping installation

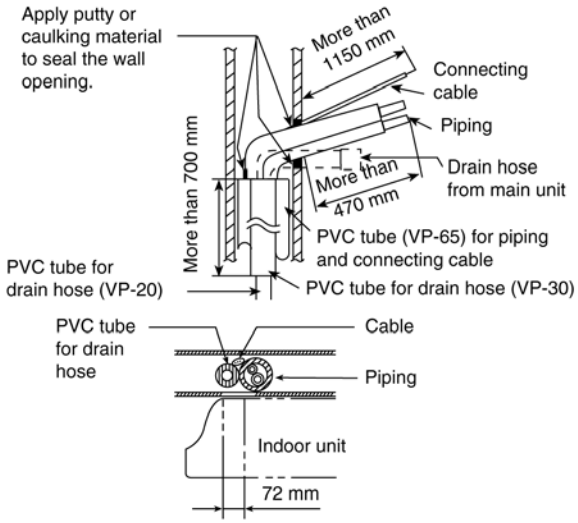




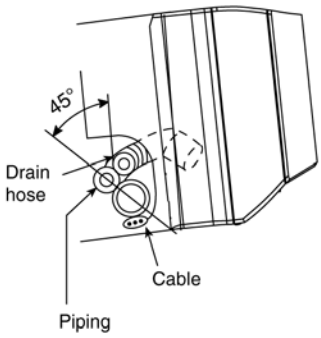
Adjust the piping slightly downwards.



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



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



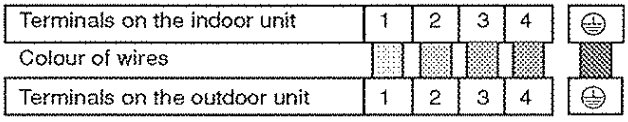
(For the right piping, follow the same procedure)

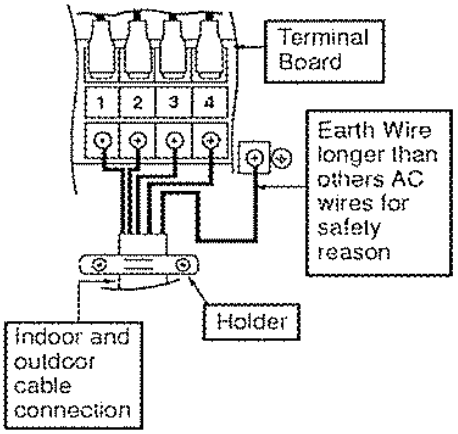
11.2.4 Connect the Cable to the Indoor Unit

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

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

Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 5 x 1.5mm^2 (1.0~1.5HP) or 5 x 2.5mm^2 (2.0~2.5HP) flexible cord, type designation 245 IEC 57 or heavier cord.

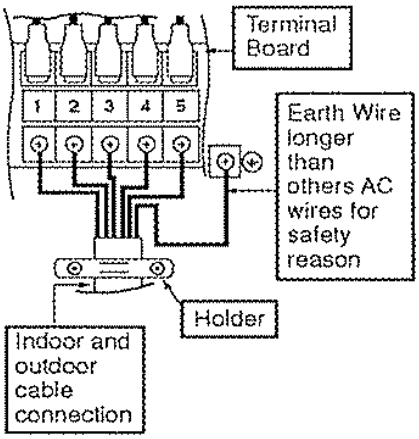




- Secure the connecting cable onto the control board with the holder.
- ⏚ This equipment must be properly earthed.

b) OUTDOOR POWER SUPPLY MODEL (3.0HP)
Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 6 x 1.5mm^2 (3.0HP) flexible cord, type designation 245 IEC 57 or heavier cord.

Terminals on the indoor unit	1	2	3	4	5	⏚
Colour of wires						
Terminals on the outdoor unit	1	2	3	4	5	⏚

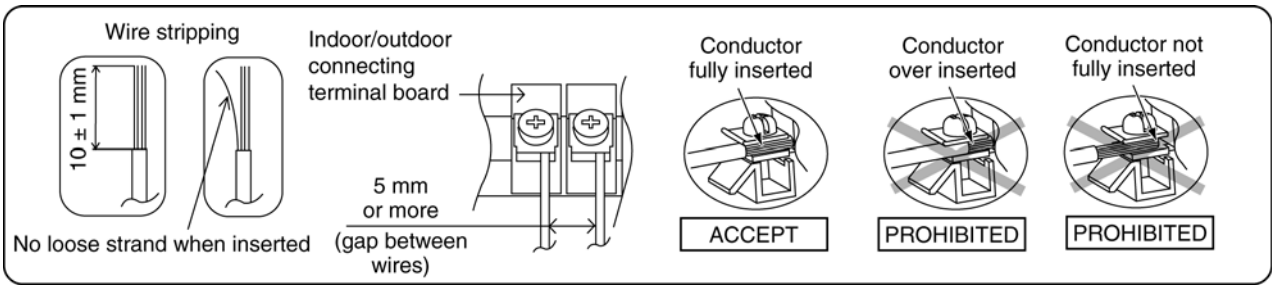


- Secure the connecting cable onto the control board with the holder.

⏚ This equipment must be properly earthed.

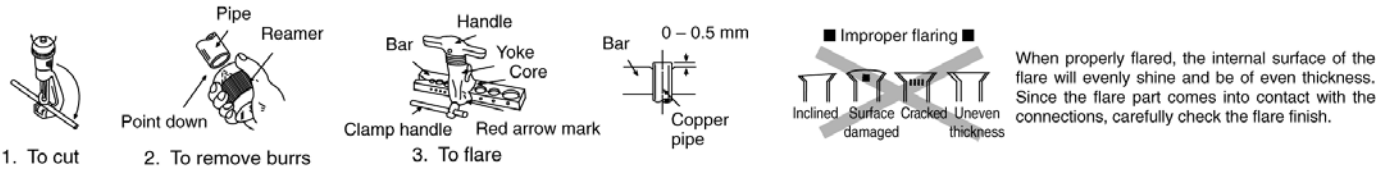
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than the other AC wires for safety reason.

11.2.5 Wire Stripping And Connecting Requirement



11.2.5.1 Cutting and flaring the piping

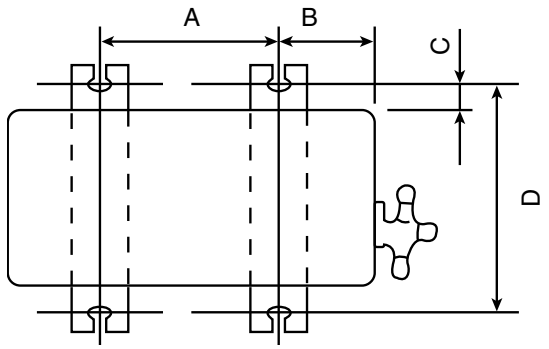
1 Please cut using pipe cutter and then remove the burrs.
2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
3 Please make flare after inserting the flare nut onto the copper pipes.



11.3 Outdoor Unit

11.3.1 Install the Outdoor Unit

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



Model	A	B	C	D
A9***	474 mm	87 mm	18.5 mm	261 mm
A12***	570 mm	105 mm	18.5 mm	320 mm
A18***, A24***, A28***	612.5 mm	131 mm	19 mm	383 mm

11.3.2 Connecting the Piping

11.3.2.1 Connecting the piping to indoor

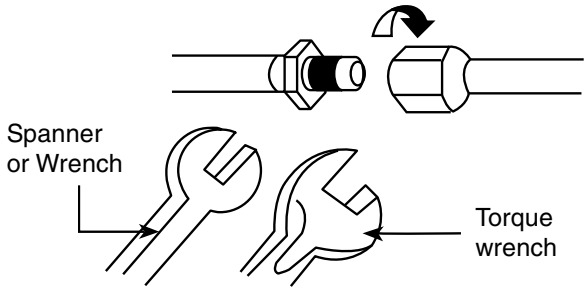
Please make flare after inserting flare nut (locate at joint portion, of tube assembly) onto the copper pipe. (In case of using long piping)

Connect the piping

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

11.3.2.2 Connecting the piping to outdoor

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



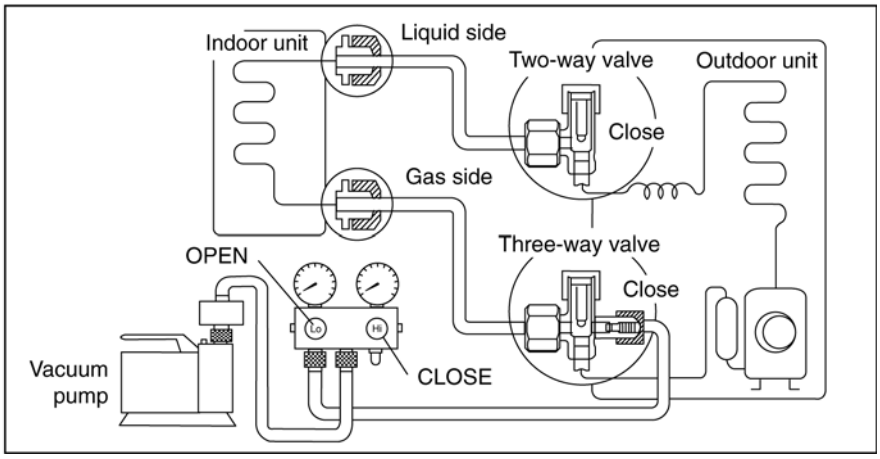
CAUTION

Do not overtighten, overtightening may cause gas leakage.

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

11.3.3 Evacuation of the Equipment

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



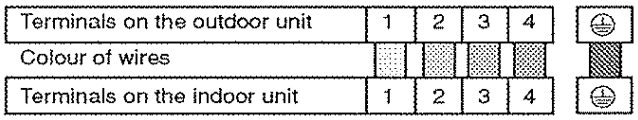
1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
   - o Be sure to connect the end of the charging hose with the push pin to the service port.
2 Connect the center hose of the charging set to a vacuum pump.
3 Turn on the power switch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

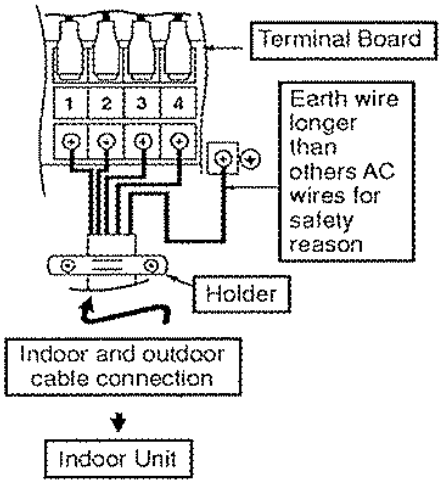
⚠ CAUTION
• If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-01 MPa), in the step ③ above take the following measure: - If the leak stops when the piping connections are tightened further, continue working from step ③. - If the leak does not stop when the connections are retightened, repair location of leak. - Do not release refrigerant during piping work for installation and reinstallation. - Take care of the liquid refrigerant, it may cause frostbite.

11.3.4 Connect the cable to the Outdoor Unit

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

1 Remove the control board cover from the unit by loosening the screw.
2 **Connecting cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 5 x 1.5mm^2 (1.0~1.5HP) or 5 x 2.5mm^2 (2.0~2.5HP) flexible cord, type designation 245 IEC 57 or heavier cord.



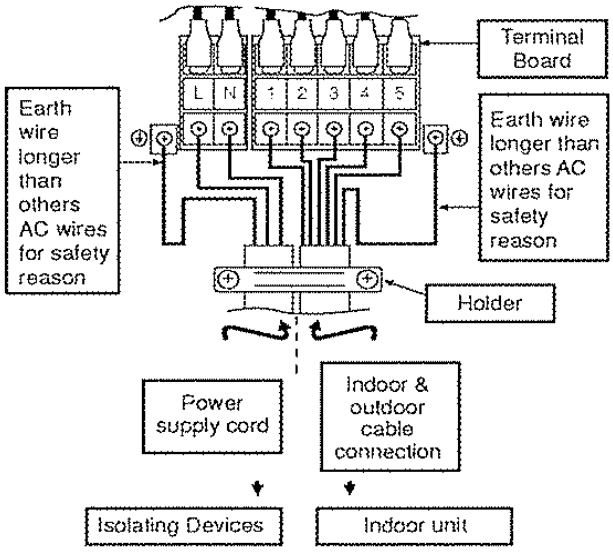


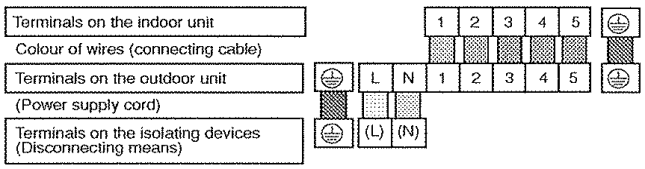
3 Secure the cable onto the control board with the holder.
4 Attach the control board cover back to the original position with the screw.
5 For wire stripping and connection requirement, refer to instruction ⑤ of the indoor unit.

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

b) OUTDOOR POWER SUPPLY MODEL (3.0HP)

1 Remove the control board cover from the unit by loosening the screw.
2 Cable connection to the power supply through Isolating Devices (Disconnecting means).
   - Connecting approved type polychloroprene sheathed **power supply cord** 3 x 4.0mm^2 (3.0HP), type designation 245 IEC 57 or heavier cord to the terminal board, and connect the other end of the cord to Isolating Devices (Disconnecting means).
3 **Connecting cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 6 x 1.5mm^2 flexible cord, type designation 245 IEC 57 or heavier cord.
4 Connect the power supply cord and connecting between indoor unit and outdoor unit according to the diagram below.





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

⏚ This equipment must be properly earthed.
- Note: 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 the other AC wires for safety reason.

11.3.5 Pipe Insulation

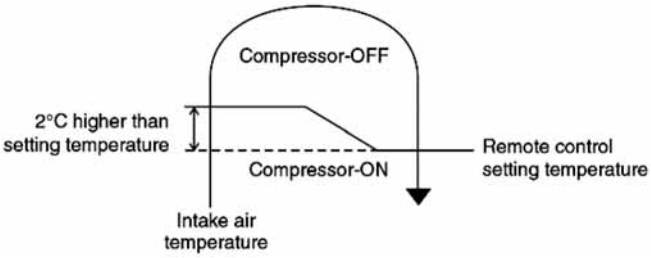
1 Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please wrap the insulated piping end to prevent water from going inside the piping.

2 If drain hose or connecting piping is in the room (where dew may form), please increase the insulation by using POLY-E-FOAM with thickness 6mm or above.

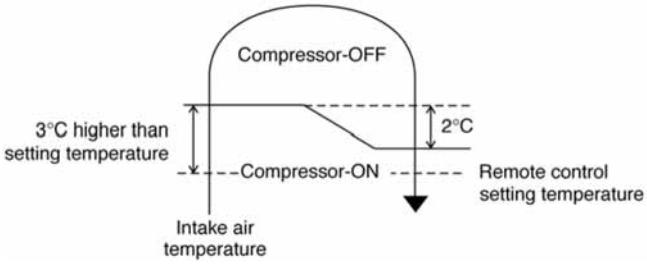
12. Operation Control

12.1 Heating Operation

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

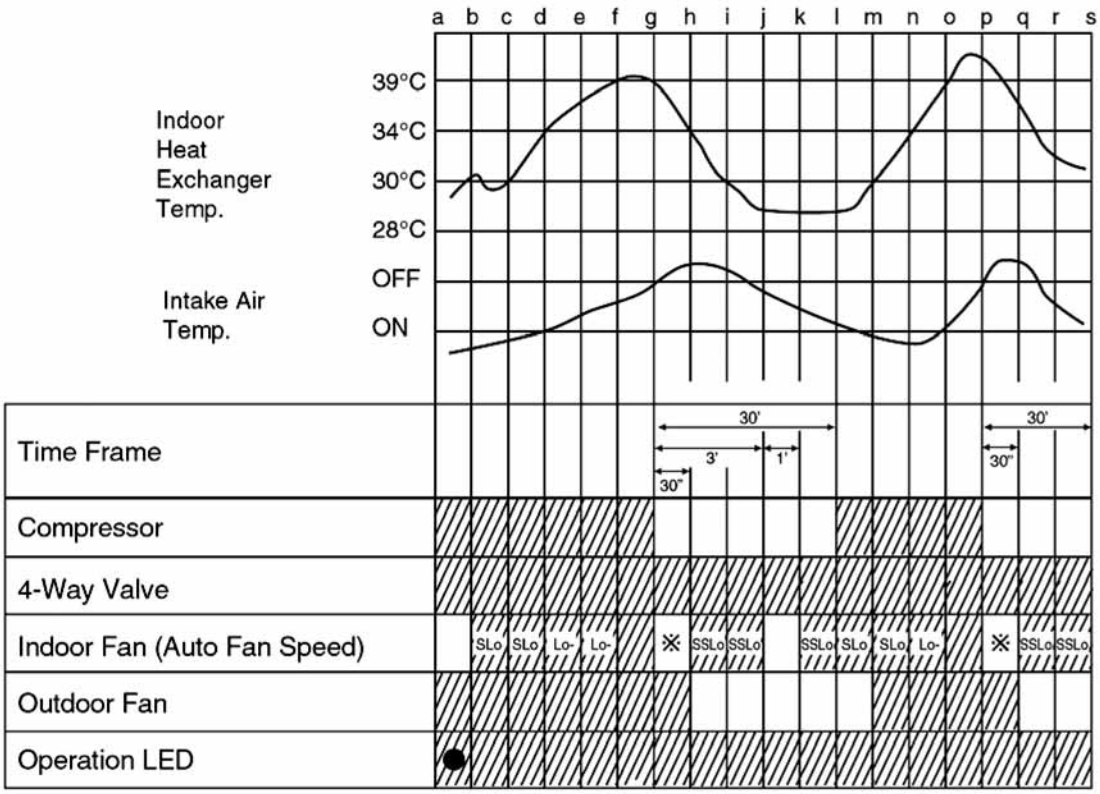


(A9/12KK)



(A18/24/28KK)

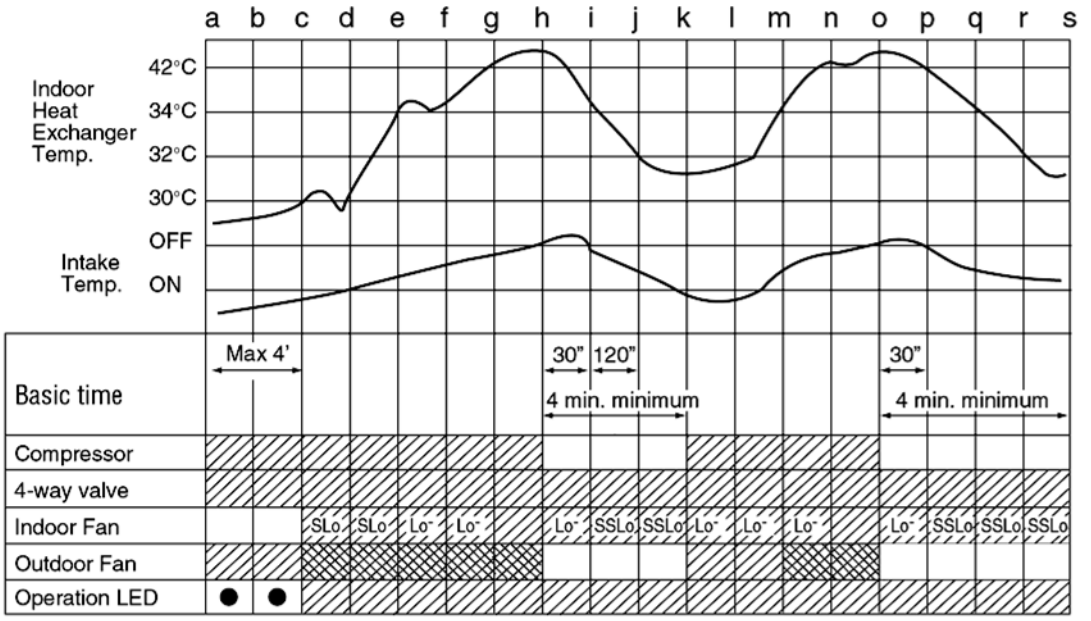
12.1.1 Heating Operation Time Diagram (For CS-A9KKD-2 CU-A9KKD-2 and CS-A12KKD-2 CU-A12KKD-2)



<Description of operation>
a – f, l – o : Hot start
g – l : 30 Minutes Time Save Control/Anti Cold Draft Control
g – h, p – q : Outdoor Fan Motor Control (30 sec. Forced Operation) after compressor stops.

● : Blinking
※ : Fan Speed will follow Indoor heat exchanger temperature.
Operation
Stop

12.1.2 Heating Operation Time Diagram (For CS-A18KKD-2 CU-A18KKD-2, CS-A24KKD-2 CU-A24KKD-2 and CS-A28KKD-2 CU-A28KKD-2)



<Description of operation>

a – c : Hot start (Indoor Fan = OFF)

c – d : Hot start (Indoor Fan = SLo)

h – k, o – s : Anti Cold Draft Control

: Blinking

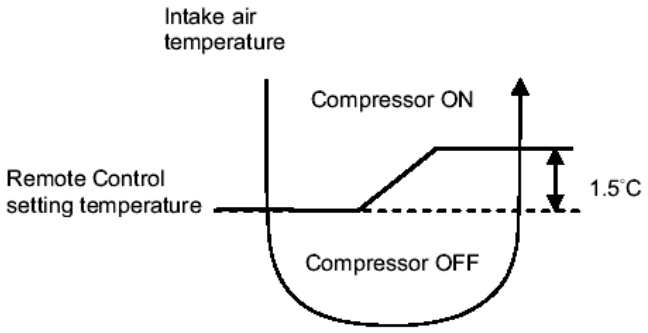
Operation

Stop

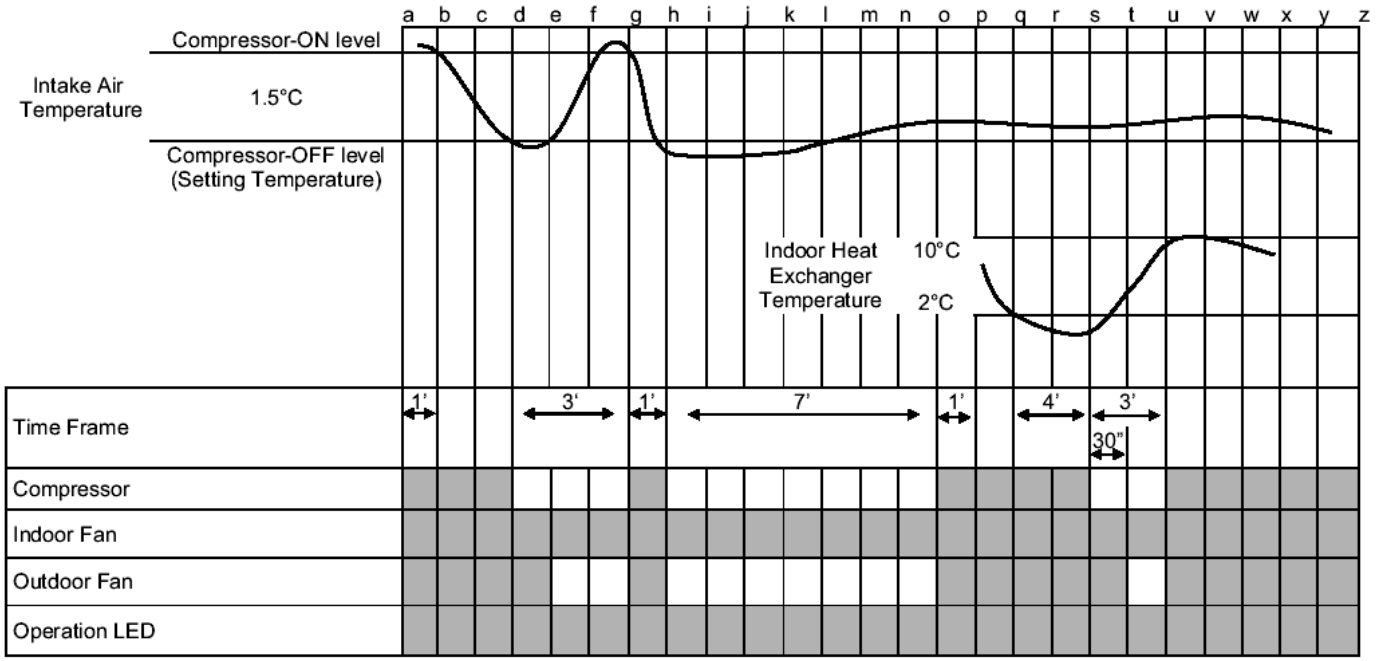
Operation or stop

12.2 Cooling Operation

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



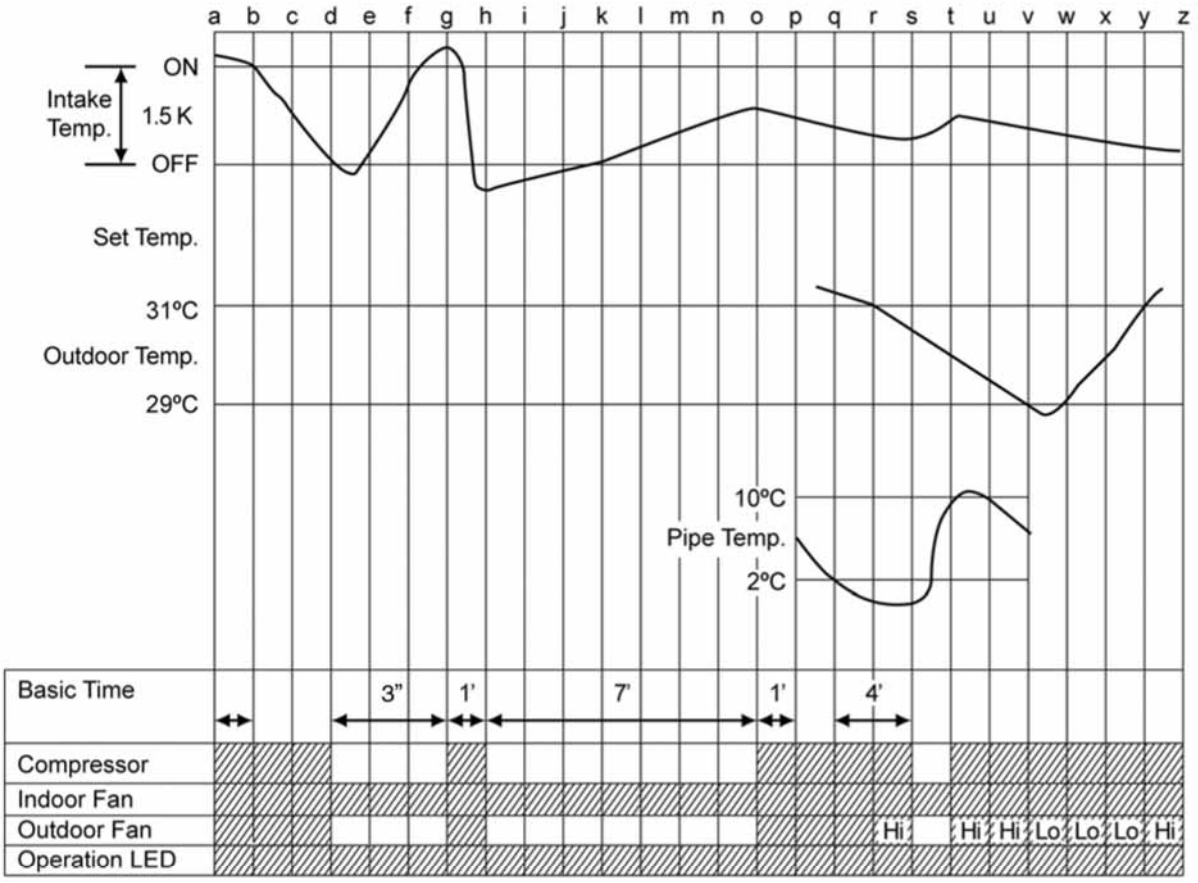
12.2.1 Cooling Operation Time Diagram (For CS-A9KKD-2 CU-A9KKD-2 and CS-A12KKD-2 CU-A12KKD-2)



<Description of operation>

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

12.2.2 Cooling Operation Time Diagram (For CS-A18KKD-2 CU-A18KKD-2, CS-A24KKD-2 CU-A24KKD-2 and CS-A28KKD-2 CU-A28KKD-2)



<Description of operation>

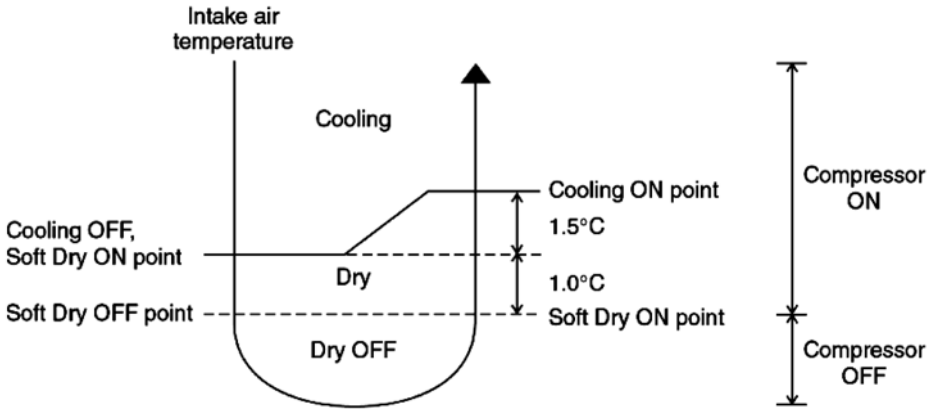
d – g	: restart control (waiting for 3 min.)
a – b, g – h, o – p	: 60 sec. Forcible operation.
h – o	: 7 min. time save control.
q – t	: freeze prevention control.
v – y	: outdoor fan control.

Operation

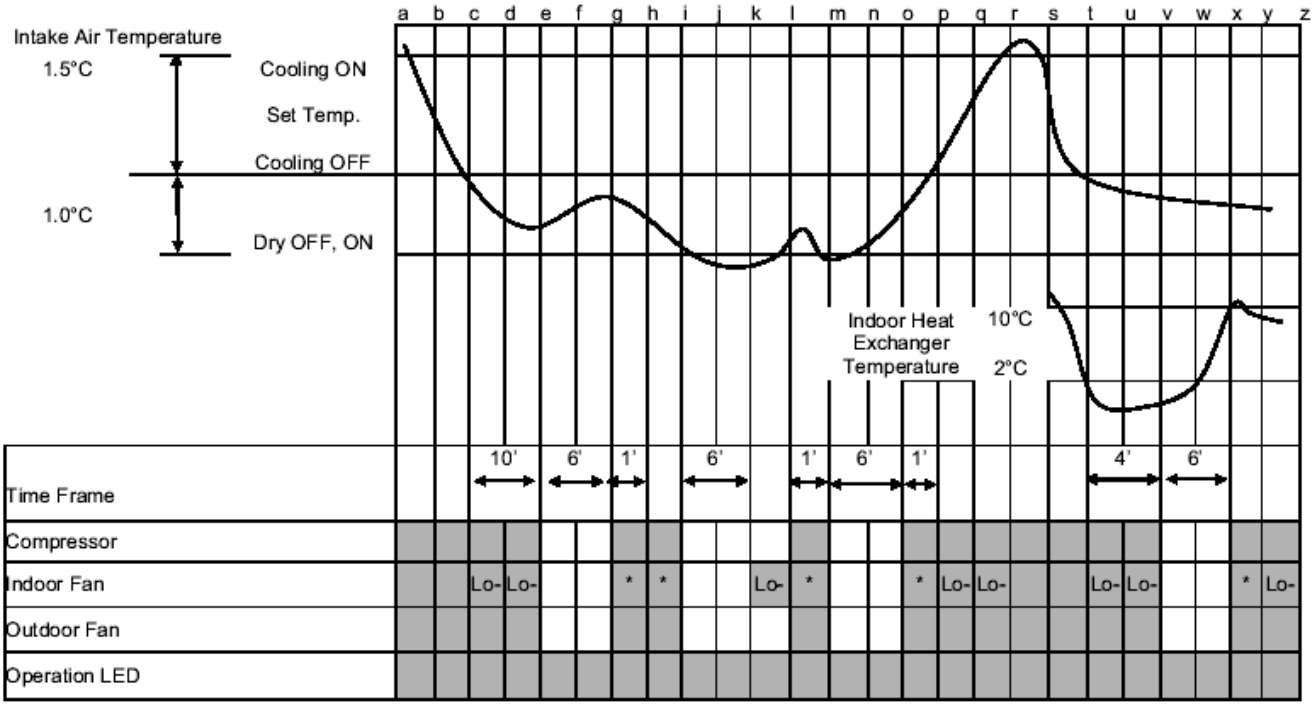
Stop

12.3 Soft Dry Operation

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



12.3.1 Soft Dry Operation Time Diagram (For CS-A9KKD-2 CU-A9KKD-2 and CS-A12KKD-2 CU-A12KKD-2)



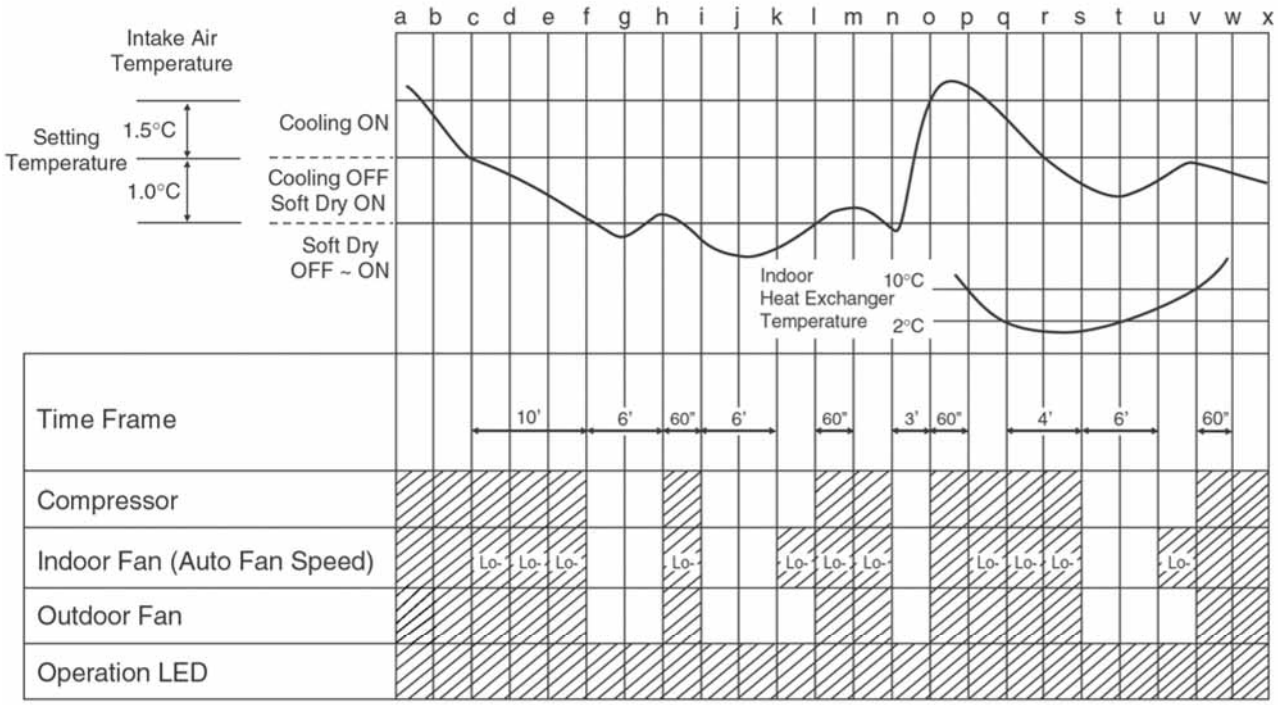
<Description of operation>

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

Operation

Stop

12.3.2 Soft Dry Operation Time Diagram (For CS-A18KKD-2 CU-A18KKD-2 and CS-A24KKD-2 CU-A24KKD-2)



<Description of operation>

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

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

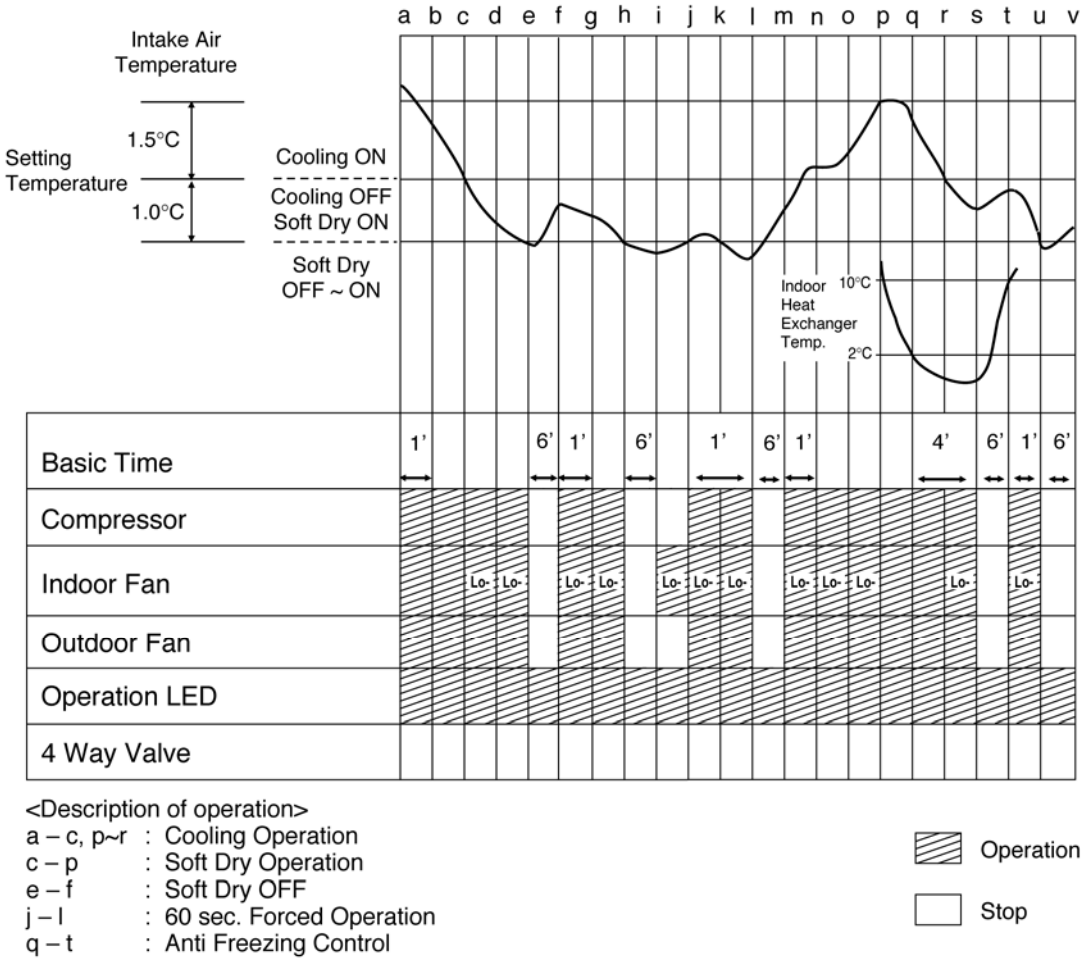
f – h, i – k, s – u : Minimum 6 minutes restart control (Time Delay Safety Control) - Soft dry operation

q – v : Freeze Prevention Control

Operation

Stop

12.3.3 Soft Dry Operation Time Diagram (For CS-A28KKD-2 CU-A28KKD-2)



<Description of operation>
a – c, p~r : Cooling Operation
c – p : Soft Dry Operation
e – f : Soft Dry OFF
j – l : 60 sec. Forced Operation
q – t : Anti Freezing Control

12.4 Automatic Operation

- Automatic operation can be set using remote control.
- This operation starts to operate with indoor fan at SLo speed for 25 seconds to judge the intake air temperature.
- After judged the temperature, the operation mode is determined by referring to the below standard.

↑ Intake Air Temperature	23°C	Cooling Operation
		Soft Dry Operation
	20°C	Heating Operation

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

	Setting Temperature (Standard)
Cooling Operation	25°C
Soft Dry Operation	22°C
Heating Operation	21°C

- Operation mode will be determine again for judgement after 1 hour of operation, if the room temperature reaches to set temperature and compressor off time is over 7 minutes 30 seconds continuously.
  * The present operation mode will be continued, if the room temperature does not reach to set temperature (Compressor keeps running) eventhough after 1 hour from automatic operation mode started.

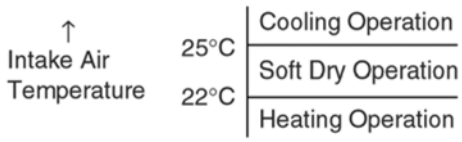
Standard for Determining Operation Mode
2nd Judgement onwards

Present Mode	Judgement		Next Mode		
			Cooling	Soft Dry	Heating
Cooling	23°C	Cooling / Heating	O (Judgement: 23°C & Above)	Not Applicable	O (Judgement: Below 23°C)
Soft Dry	20°C	Soft Dry / Heating	Not Applicable	O (Judgement: 20°C & Above)	O (Judgement: Below 20°C)
Heating	25°C	Cooling / Heating	O (Judgement: 25°C & Above)	Not Applicable	O (Judgement: Below 25°C)

- Automatic Set Temperature
  For each operation, set temperature will automatically set as shown below.
- The setting temperature for all the operations can be changed one level up or one level down from the standard temperature as shown in below table by pressing on the temperature up or temperature down button at remote control.

Operation	Hi	(Standard)	Lo
	(+2°C)	(±0°C)	(-2°C)
Cooling	27°C	25°C	23°C
Soft Dry	24°C	22°C	20°C
Heating	23°C	21°C	19°C

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



	Setting Temperature (Standard)
Cooling Operation	27°C
Soft Dry Operation	24°C
Heating Operation	23°C

12.5 Indoor Fan Speed Control

- Indoor fan speed can be set using remote control.

12.5.1 Fan Speed Rotation Chart

Fan Speed (rpm)	CS-A9KKD-2	CS-A12KKD-2
SHi	1080	1120
Hi	1040	1100
Me	870	950
HLo	770	840
CLo	730	800
Lo-	690	760
SLo	670	740
SSLo	300	300
QSHi	1010	1050
QHi	970	1030
QMe	800	880
QHLo	700	770
QLo	660	730

Speed		CS-A18KKD-2	CS-A24KKD-2	CS-A28KKD-2
Cool, Dry	Heat			
SHi	Hi	1310	1530	1540
Hi		1240	1390	1500
Me	Me	1140	1270	1380
Lo+	Lo	1100	1230	1250
Lo		1040	1150	1030
Lo-	Lo-	850	940	810
SLo	SLo	650	720	300
	SSLo	300	300	300
QSHi	QHi	1220	1440	1450
QHi		1150	1300	1410
QMe	QMe	1050	1180	1290
	QLo	950	1060	1160
QLo		950	1060	1160

12.5.2 Automatic Fan Speed Control

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

For CS-A9KKD-2 and CS-A12KKD-2

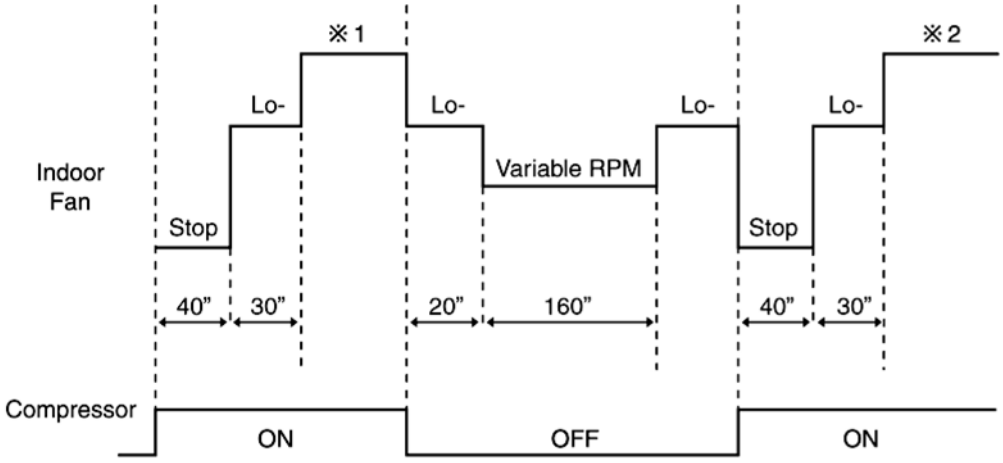
Speed Mode				SHi	Hi	Me	HLo	CLo	Lo-	SLo	SSLo	Stop
Cooling	Normal	Manual	Hi		o							
			Me			o						
			Lo					o				
		Auto			o	o			o			o
	Powerful	Manual		o								
		Auto		o								
Dry		Manual							o			o
		Auto							o			o
Heating	Normal	Manual	Hi	o					o	o	o	o
			Me			o			o	o	o	o
			Lo				o		o	o	o	o
		Auto				o	o		o	o	o	o
	Powerful	Manual		o		o	o		o	o	o	o
		Auto				o	o		o	o	o	o
Normal Mode Judgment										o		
Cooling	Quiet	Manual	QHi		Hi-70							
			QMe			Me -70						
			QLo					CLo -70				
		Auto			Hi-70	Me -70			o			o
Dry	Quiet	Manual							o			o
		Auto							o			o
Heating	Quiet	Manual	QHi	SHi-90					o	o	o	o
			QMe			Me -70			o	o	o	o
			QLo				HLo-70		o	o	o	o
		Auto				Me -70	HLo-70		o	o	o	o

For CS-A18KKD-2, CS-A24KKD-2 and CS-A28KKD-2

Speed Mode				SHi	Hi	Me	Lo+	Lo	Lo-	SLo	SSLo	Stop
Cooling	Normal	Manual	Hi		o							
			Me			o						
			Lo					o				
		Auto			o	o			o			o
	Powerful	Manual		o								
		Auto		o								
Dry		Manual							o			o
		Auto							o			o
Heating	Normal	Manual	Hi	o					o	o	o	o
			Me			o			o	o	o	o
			Lo				o		o	o	o	o
		Auto				o	o		o	o	o	o
	Powerful	Manual		o		o	o		o	o	o	o
		Auto				o	o		o	o	o	o
Auto Mode Judgment										o		
Cooling	Quiet	Manual	QHi		Hi -100							
			QMe			Me -100						
			QLo					Lo -100				
		Auto			Hi -100	Me -100			o			o
Dry	Quiet	Manual							o			o
		Auto							o			o
Heating	Quiet	Manual	QHi	SHi -100					o	o	o	o
			QMe			Me -100			o	o	o	o
			QLo				Lo+ -100		o	o	o	o
		Auto				Me -100	Lo+ -100		o	o	o	o

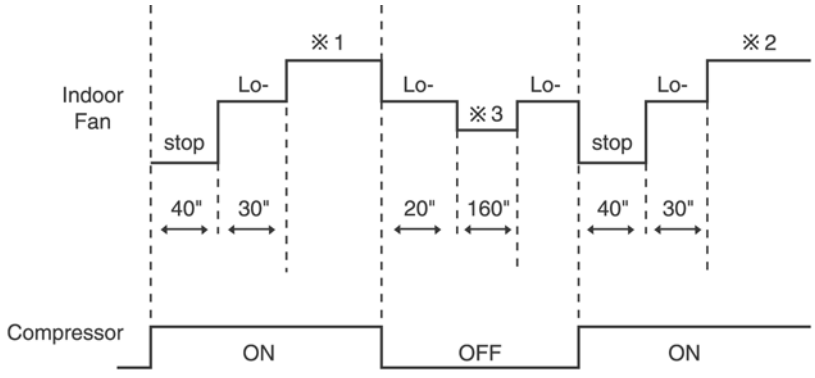
- Auto Fan Speed during cooling operation:
  1 Indoor fan will rotate alternately between off and on as shown in below diagram.
  2 At the beginning of each compressor starts operation, indoor fan speed increases gradually for deodorizing purpose.
  3 For the first time the compressor operates, indoor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

For CS-A9KKD-2, CS-A12KKD-2, CS-A18KKD-2 and CS-A24KKD-2



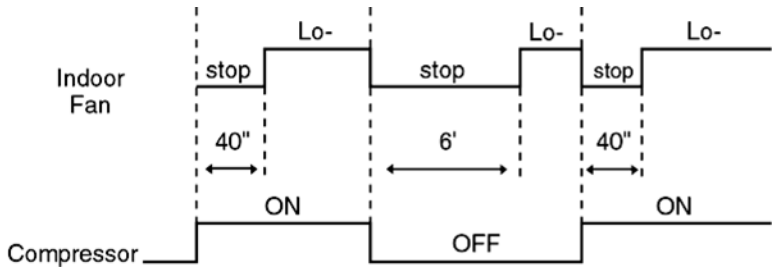
※ 1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).
※ 2 Fan Speed is Me after the compressor restarts.

For CS-A28KKD-2

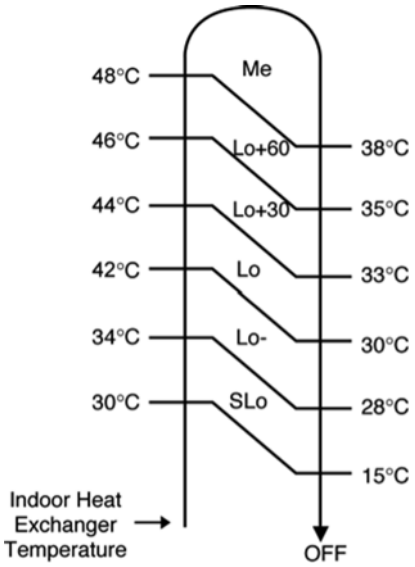


※ 1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).
※ 2 Fan Speed is Me after the compressor restarts.
※ 3 Variable rpm is equivalent to Lo- rpm.

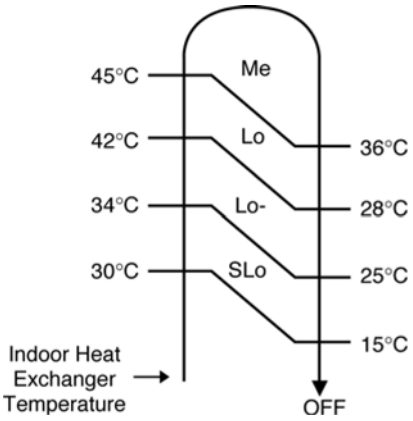
- Auto Fan Speed during Soft Dry operation.
  - Indoor fan will rotate alternately between off and Lo-.
  - At the beginning of each compressor starts operation, indoor fan will increase fan speed gradually for deodorizing purpose.
  - When compressor turned off for 6 minutes, indoor fan will start at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



- Auto Fan Speed during Heating operation.
  - Indoor fan will rotate in the range of SLo → Me according to the heat exchanger temperature.



(For A9KKD-2 and A12KKD-2)



(For A18KKD-2, A24KKD-2 and A28KKD-2)

12.5.3 Manual Fan Speed Control

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

12.5.4 Indoor Fan Motor rpm Abnormal Control

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

12.6 Outdoor Fan Speed Control

- There is only one speed for outdoor fan motor. (Applicable for CU-A9KKD-2 and CU-A12KKD-2)
- There is 2 speeds for outdoor fan motor. Outdoor fan speed can be changed to Hi or Lo according to outdoor temperature. (Applicable for CU-A18KKD-2, CU-A24KKD-2 and CU-A28KKD-2).
- For Cooling and Soft Dry operation, when outdoor temperature reaches to 31°C (Hi-speed), 29°C (Lo-speed). (Applicable for CU-A18KKD-2, CU-A24KKD-2 and CU-A28KKD-2).
- For heating operation, when outdoor temperature reaches to 13.5°C (Hi-speed), 15.5°C (Lo-speed). (Applicable for CU-A18KKD-2, CU-A24KKD-2 and CU-A28KKD-2).
- When air conditioner is turned on, the compressor and the outdoor fan will operate simultaneously.
- Likewise, both compressor and outdoor fan will stop at the same time if the unit is turned off.

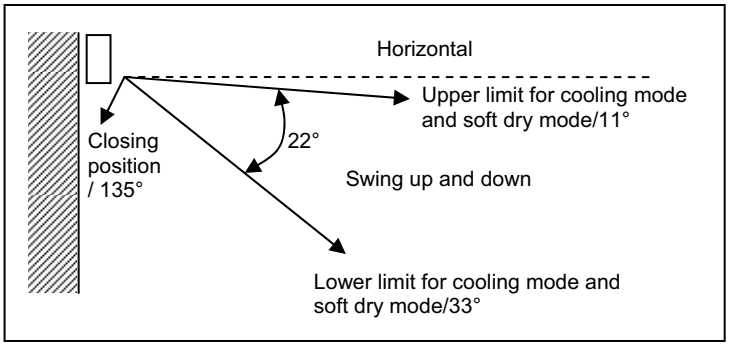
12.7 Vertical Airflow Direction Control

12.7.1 Auto Control

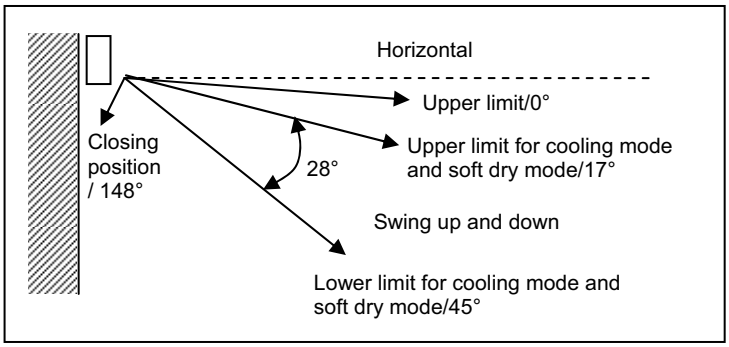
(Cooling and Soft Dry Operation Condition)

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

For CS-A9KKD-2 and CS-A12KKD-2



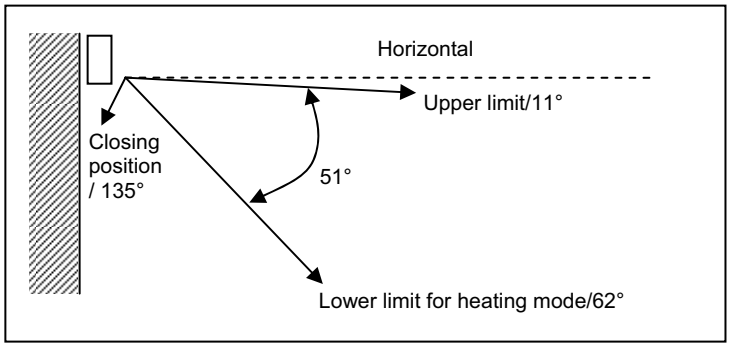
For CS-A18KKD-2, CS-A24KKD-2 and CS-A28KKD-2



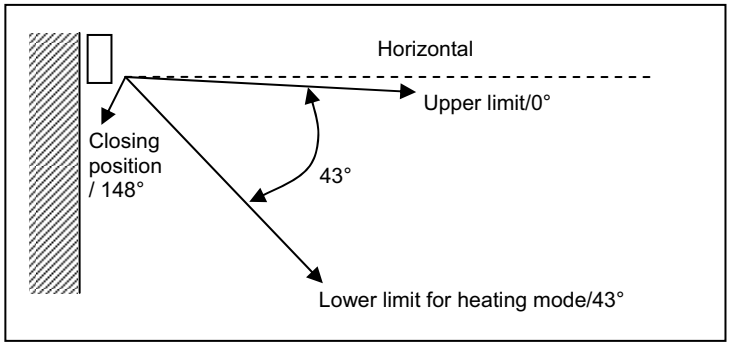
(Heating Operation Condition)

- When the piping air temperature reaches 38°C, the louver is changed from upper to lower limit. When the piping air temperature falls 35°C, the louver is changed from lower to upper limit.

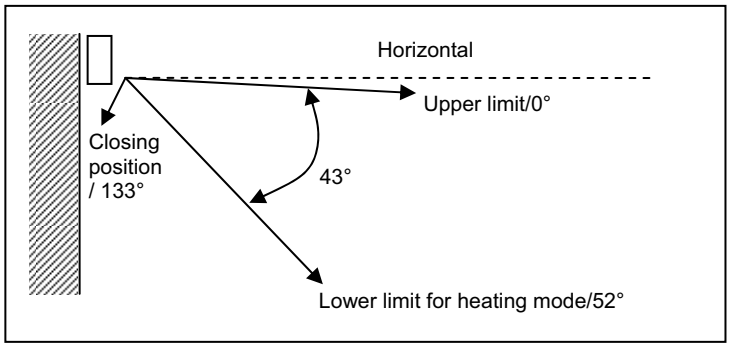
For CS-A9KKD-2 and CS-A12KKD-2



For CS-A18KKD-2 and CS-A24KKD-2



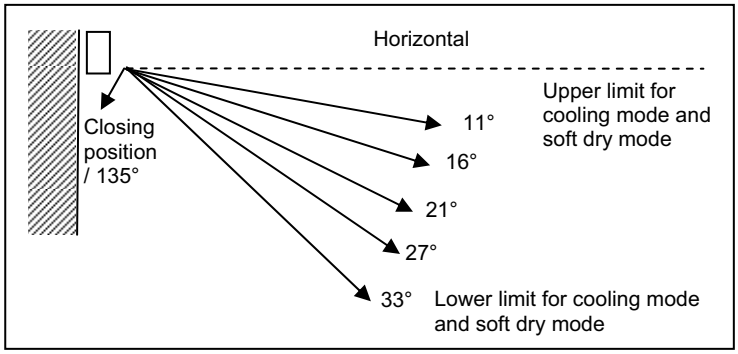
For CS-A28KKD-2



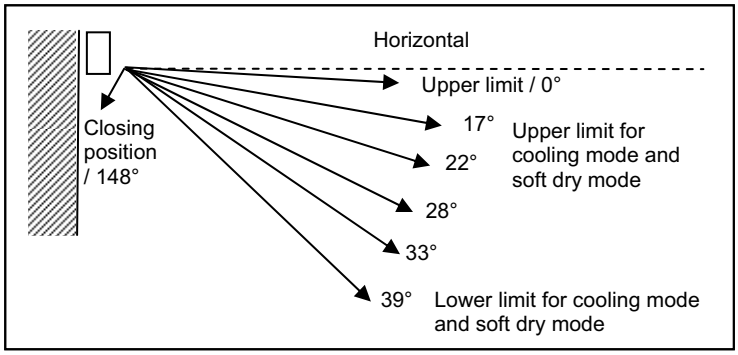
12.7.2 Manual Control

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

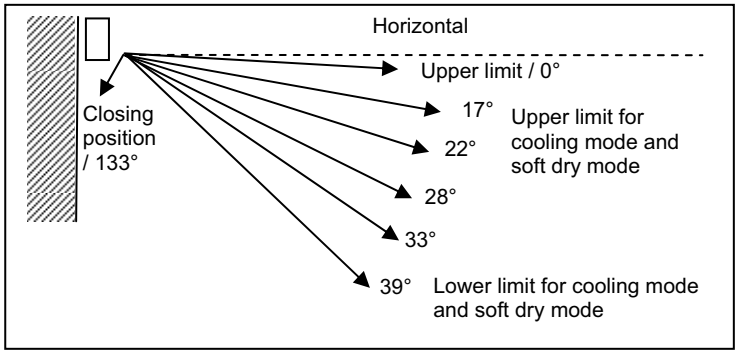
(Cooling and Soft Dry Operation Condition)
For CS-A9KKD-2 and CS-A12KKD-2



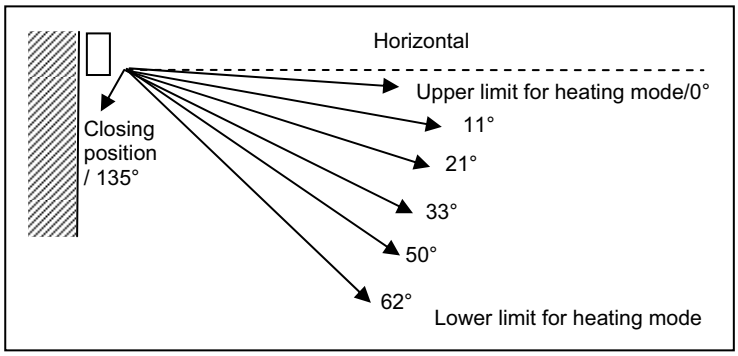
For CS-A18KKD-2 and CS-A24KKD-2



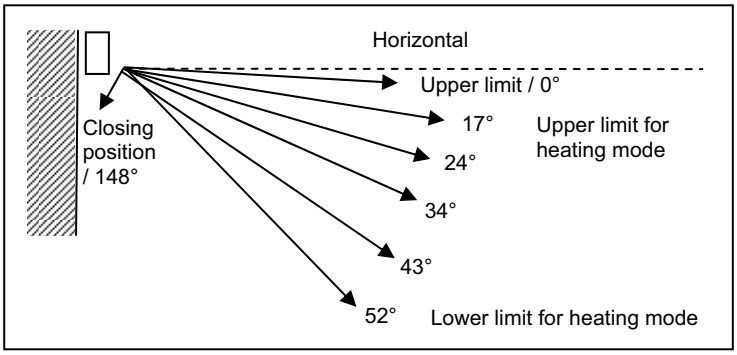
For CS-A28KKD-2



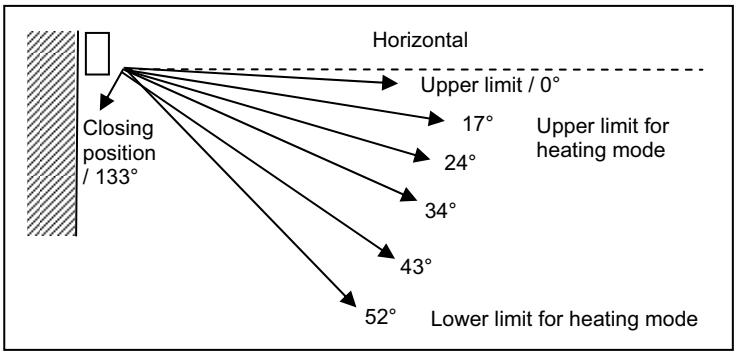
(Heating Operation Condition)
For CS-A9KKD-2 and CS-A12KKD-2



For CS-A18KKD-2 and CS-A24KKD-2



For CS-A28KKD-2

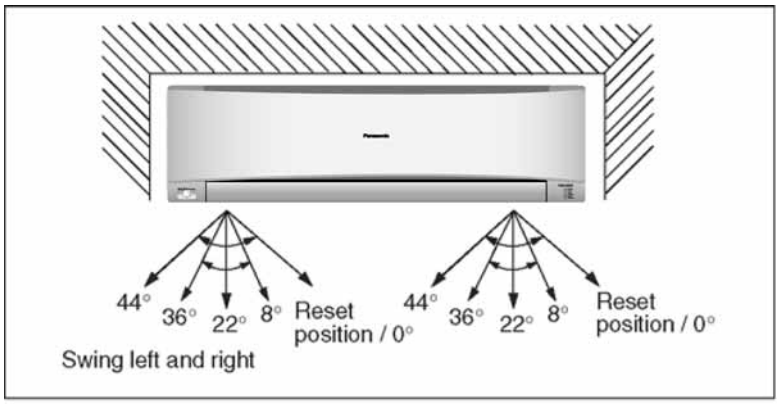


12.8 Horizontal Airflow Direction Control

For CS-A9KKD-2 and CS-A12KKD-2, the horizontal airflow direction louver can be adjusted manually by hand.
For CS-A18KKD-2, CS-A24KKD-2 and CS-A28KKD-2, the horizontal airflow direction louver are as following.

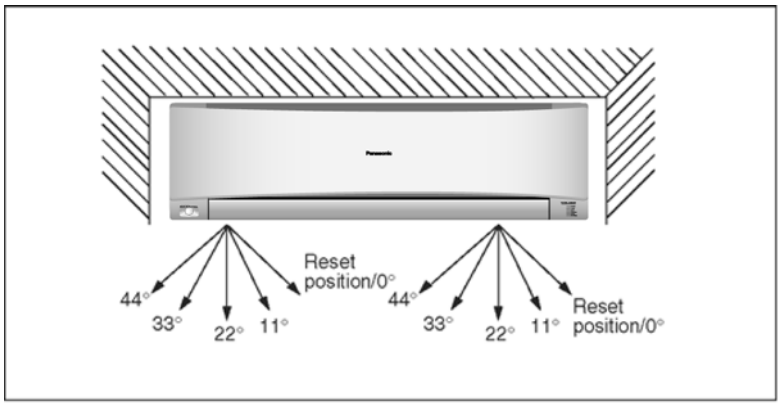
12.8.1 Auto Control

- When the horizontal airflow direction is set to Auto using the remote control, the vanes swings left and right for Cooling and Soft Dry (0°-44°), Heating (8°-36°) as shown in the diagram.
- When stopped with remote control, the discharge vane is reset, and stop at the reset position.
- During Cooling operation or Soft Dry operation, indoor fan motor may stop to rotate at certain periods. At that condition, the vane will stop swinging and rest at 22° angle.
- During Heating operation, the piping air temperature reaches 38°C, the vanes swings left and right. When the piping air temperature falls to 35°C, the vanes will stop swing and rest at 22°.



12.8.2 Manual Control

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



12.9 Powerful Operation

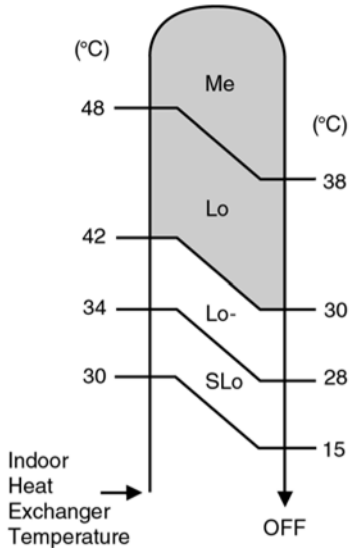
- To achieve the setting temperature quickly.

(Cooling and Soft Dry Operation condition)

- When Powerful operation is set, the setting temperature will be automatically decreased 3°C internally against the present setting temperature (Lower temperature limit: 16°C).
- This operation automatically will be running under SHi Fan Speed (Cooling).
- Vertical Airflow Direction:-
  - In “Manual” setting, the vane will automatically shift down 10° lower than previous setting.
  - In “Auto” setting, the vane will automatically swing up and down. However the lower limit will be shifted 10° downward.

(Heating Operation condition)

- When Powerful operation is set, the setting temperature will be automatically increased 3°C against the present setting temperature (Higher temperature: 30°C).
- The Fan Speed will shift as shown below:



- When the Auto Fan speed is selected, the fan speed will automatically change from SLo to Me depending to the Indoor Heat Exchanger Temperature.
- When the manual Fan Speed is selected, the fan speed will change to the fan speed setting when the Indoor Heat Exchanger Temperature reaches 42°C.

Set Fan Speed

- Vertical Airflow Direction:-
  - In “Manual” setting, the vane will automatically shift down 5° lower than previous setting.
  - In “Auto” setting, the vane will automatically shift between upper and lower limit depending on the intake air temperature as Heating Mode, Airflow Direction Auto-Control. However the upper and lower limit will be shifted 5° downward.

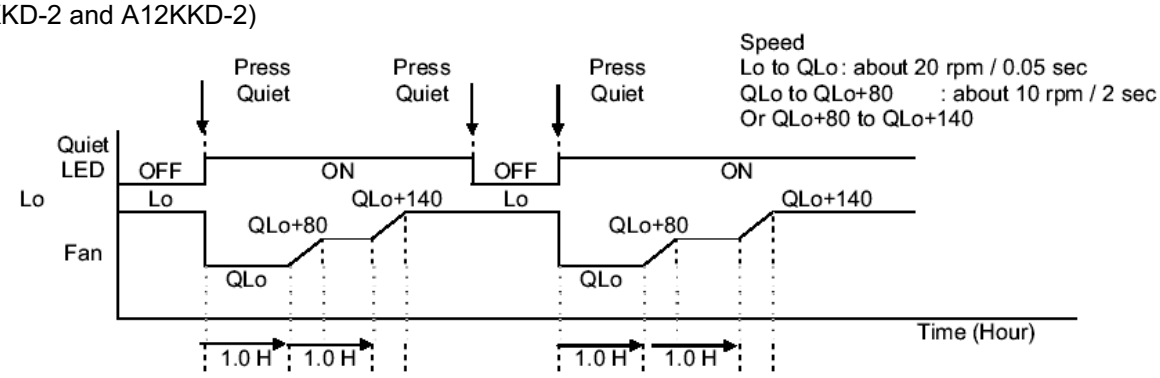
- Powerful operation stops when:-
  - Powerful operation has operate for 15 minutes.
  - Powerful button is pressed again.
  - Quiet button is pressed
  - Stopped by OFF/ON operation button.
  - Timer OFF activates.
  - Operating mode is changed.

12.10 Quiet Operation

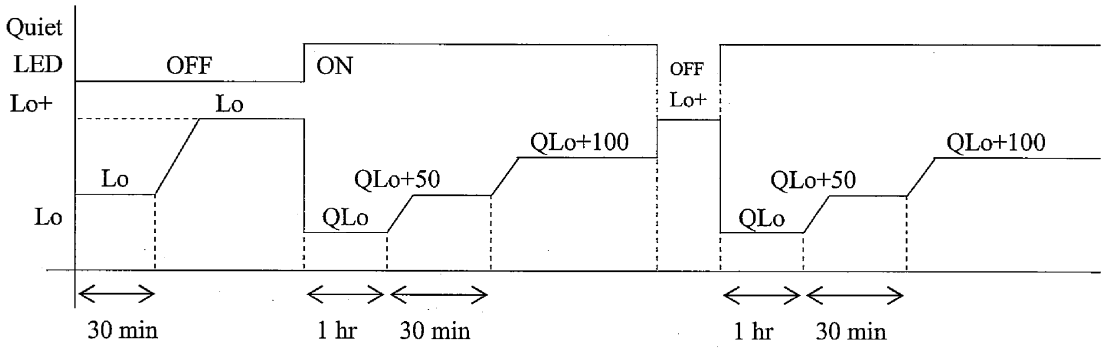
(For Cooling Operation or cooling region of Soft Dry Operation)

- To provide quiet cooling operation condition.
- Once the Quiet Operation is set at the remote control, the Quiet LED illuminated. The sound level will reduce around 2dB(A) for Lo fan speed or 3dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation become severe at Quite Lo Cool, therefore Quiet Lo cool operated only for 2 hours (1 hour QLo, 1 hour QLo + 80rpm) (for A9KKD-2 and A12KKD-2) or only 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 50 rpm) (for A18KKD-2 and A24KKD-2) or only 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 100 rpm) (for A28KKD-2).
- Manual Airflow Direction:
  - RPM control during Lo cool

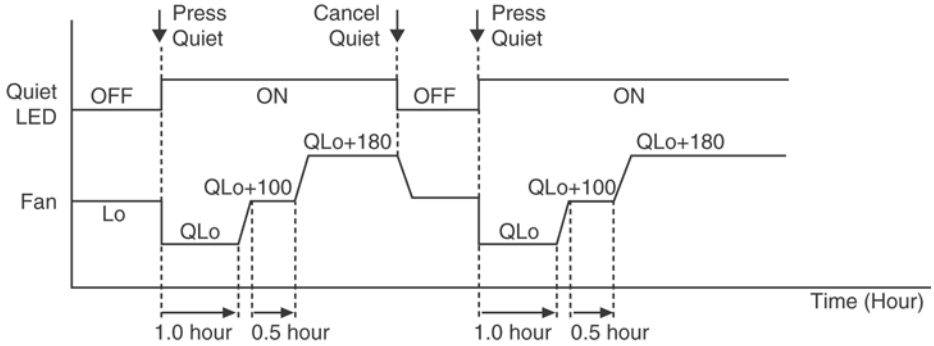
(For A9KKD-2 and A12KKD-2)



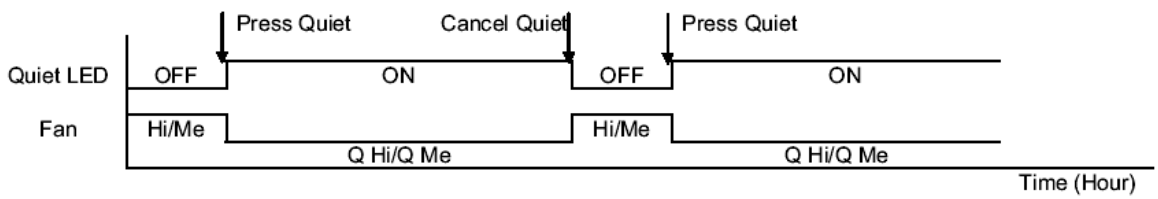
(For A18KKD-2 and A24KKD-2)



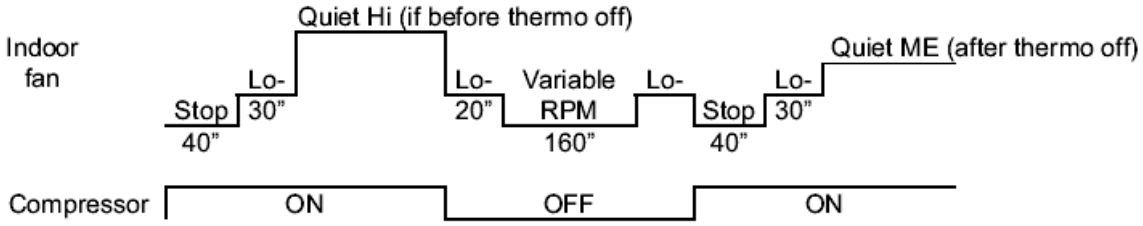
(For A28KKD-2)



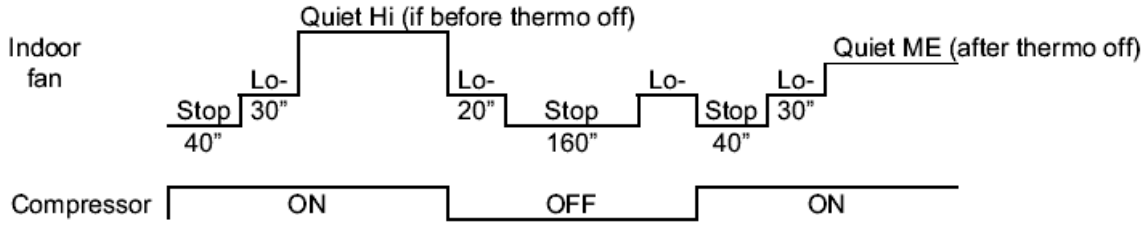
  - RPM control during Hi & Me cool



- Auto Fan Speed
  (For A9KKD-2, A12KKD-2, A18KKD-2 and A24KKD-2)



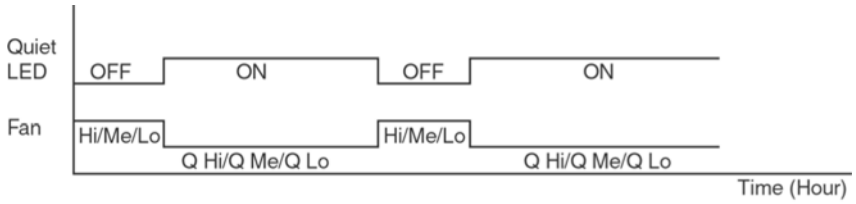
(For A28KKD-2)



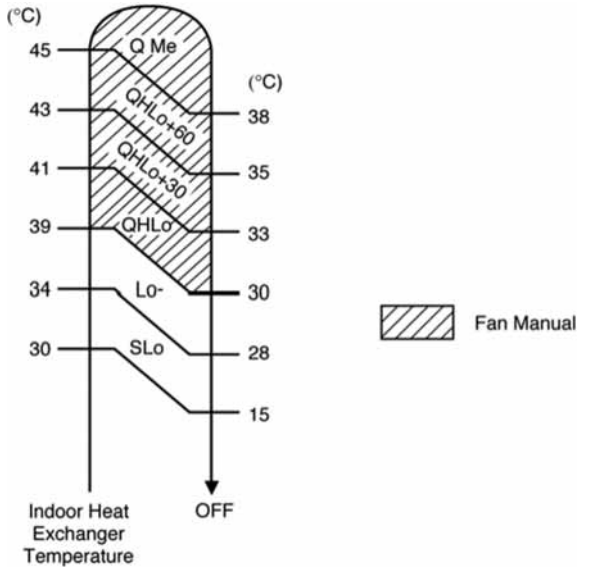
- Quiet operation stops when:
  - Quiet button is pressed again.
  - Stopped by OFF/ON operation button.
  - Timer OFF activates.
  - Operation mode button is changed.

(Heating Operation condition)

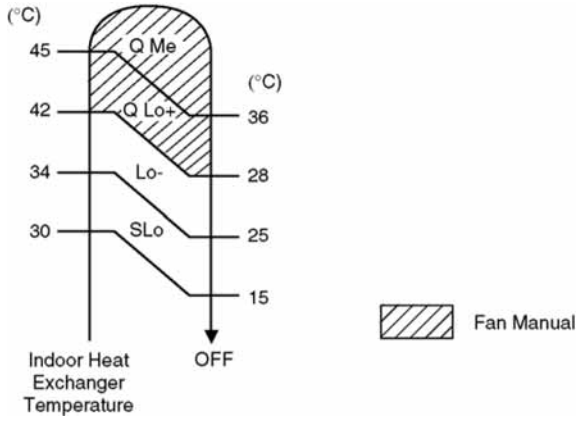
- When the Quiet Mode is set at the remote control, Quiet Mode LED illuminates. The sound level will reduce either around 2 dB (Lo) or 3 dB (Hi, Me), against the present sound level operation.
- Quiet setting of fan speed rpm refer to Indoor Fan Speed Control.
- Manual Fan Speed:-
  - Rpm control during Lo, Me & Hi Cool



- Auto Fan Speed:-
  - Rpm control depends on the piping air temperature sensor of Indoor heat exchanger



(A9/12KK)



(A18/24/28KK)

12.11 Timer Control

12.11.1 ON Timer

- When the ON Timer is set by using the remote control, the unit will start to operate slightly before the set time, so that the room will reach nearly to the set temperature by the set time.
- For Cooling and Soft Dry operation, the operation will start 15 minutes before the set time.
- For Heating operation, the operation will start 30 minutes before the set time.
- For Automatic operation, the indoor fan will operate at SLo speed for 20~25 seconds, 30 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

12.11.2 OFF Timer

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

12.12 Random Auto Restart Control

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

12.13 Remote Control Signal Receiving Sound

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

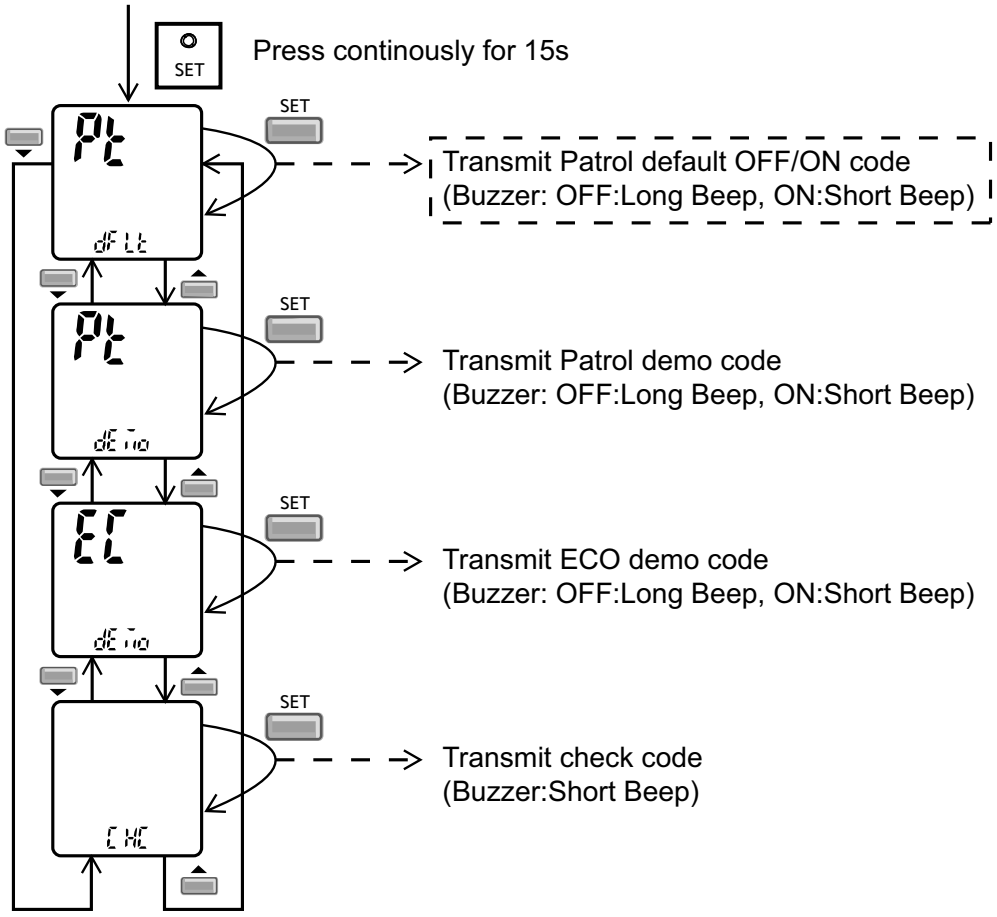
12.14 Patrol Operation

- To monitor air dirtiness level by using Patrol sensor and to maintain air freshness by activates e-ion operation

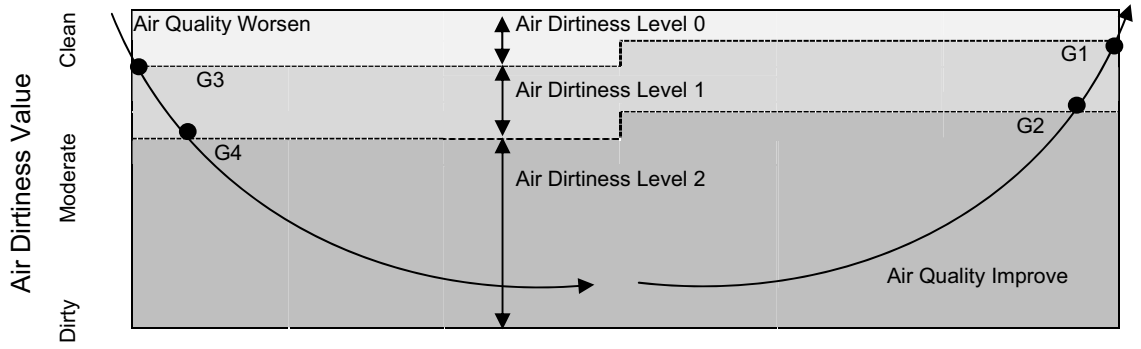
- Patrol operation starts condition
  - When the unit operation is started with “OFF/ON” button
  - When the unit stops, “Patrol” operation is selected, Patrol individual operation will start.
  - During cooling only operation, “Patrol” operation is selected.

- Patrol operation stops condition (when any of the following condition is fulfilled):
  - When “OFF/ON” button is selected.
  - During any operation with Patrol, “PATROL/e-ion” button is pressed.
  - When OFF Timer activates.

- To disable the Patrol Operation during unit starts (default) with “OFF/ON” button
  - Press “Set” button continuously for 15 seconds by using pointer during Air Conditioner is OFF condition to enter internal setting mode.
  - Press “Timer Decrement" button to select “Pt dFLt”.
  - Press “Timer Set” button to toggle Patrol operation default OFF/ON.
    - Long "beep": Turn OFF Patrol operation default.
    - Short "beep": Turn ON Patrol operation default.



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



- Dirtiness level sensitivity adjustment
  It is possible to change the Patrol sensor sensitivity, where the Threshold value (G1 ~ G4) will be shifted accordingly:
  1 Press and release “SET” button.
  2 Press Timer ▲ / Timer ▼ button to select sensitivity.
  (Air 1 “Low Sensitivity” ↔ Air 2 “Standard” (Default) ↔ Air 3 “High Sensitivity”)
  3 Confirm setting by pressing “Timer Set” button. LCD returned to original display after 2 seconds.
  4 LCD returned to original display if remote control does not operate for 30 seconds

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

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

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

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

- Airflow direction (Horizontal, Vertical) Control
  - During any operation mode combines with Patrol operation, airflow direction follows respective operation mode.
  - During Patrol individual operation if e-ion starts, only Auto Air Swing is allowed. Even if “Air Swing” button is pressed, no signal is sent to air conditioner, and no change on LCD display.
  - During Patrol individual operation if e-ion stops, Airflow direction louver closed.

- LED display
  - When Patrol operation is selected, Patrol LED illuminates.
  - During Patrol individual operation, only Patrol LED illuminates. When e-ion air purifying operation starts based on dirtiness level, Power LED, Patrol LED and e-ion LED illuminates.

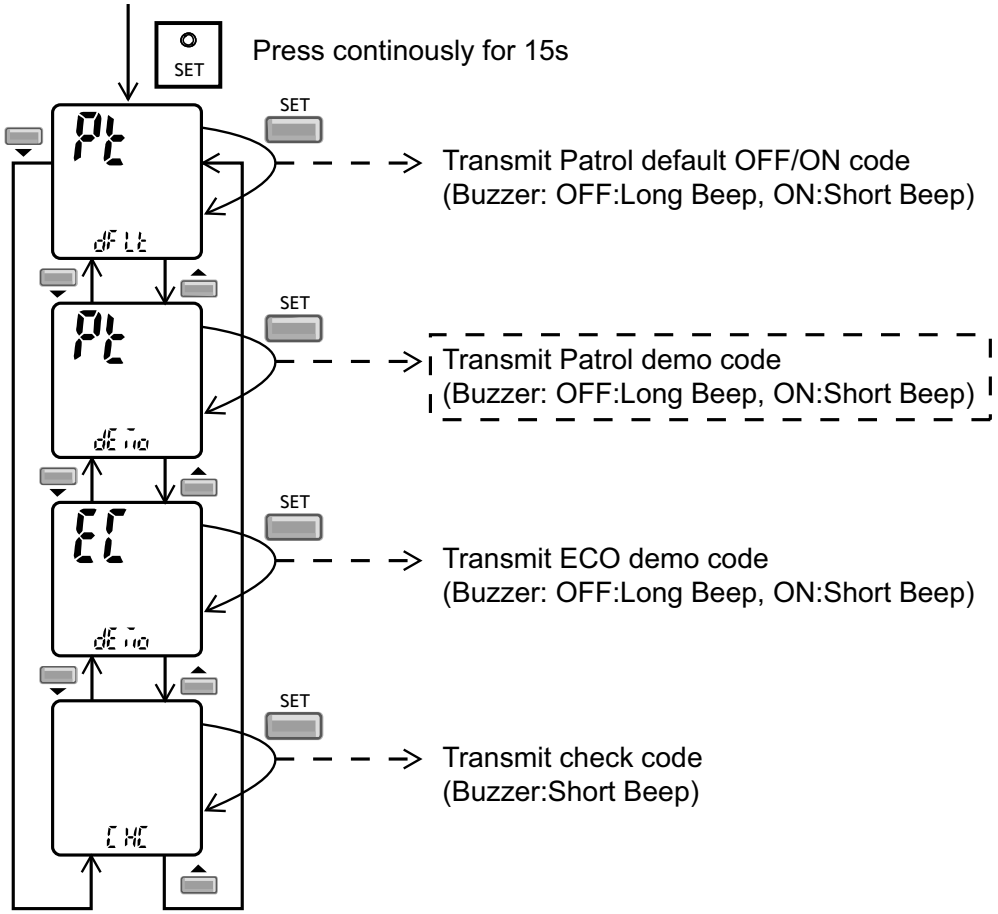
			PATROL LED			E-ION	TIMER
No	**Description**		**BLUE**	**ORANGE**	**RED**	**BLUE**	**ORANGE**
1	When patrol function is not selected		OFF	OFF	OFF	OFF	OFF
2	During gas sensor error detection control		OFF	OFF	Blinking	OFF	OFF
3	During E-ion abnormal discharge error		OFF	OFF	OFF	Blinking	OFF
4	During E-ion breakdown error		OFF	OFF	OFF	Blinking	Blinking
5	During Test Mode		OFF	OFF	OFF	OFF	OFF
6	During stop		OFF	OFF	OFF	OFF	OFF
7	2 minutes gas sensor initial stabilization time (Level 0)		ON	OFF	OFF	OFF	OFF
8	During patrol operation	a. Dirtiness level 0	ON	OFF	OFF	OFF	OFF
		a[1]. Dirtiness level 1 shift to 0	OFF	ON for 10 min.	OFF	ON for 10 min.	OFF
		b. Dirtiness level 1	OFF	ON	OFF	ON	OFF
		c. Dirtiness level 2	OFF	OFF	ON	ON	OFF

- Remote Control Receiving Sound
  - Normal Operation ➔ Patrol Mode : Beep
  - Patrol Mode ➔ Stop : Long Beep
  - Patrol Mode ➔ Normal Operation : Beep
  - Stop ➔ Patrol : Beep

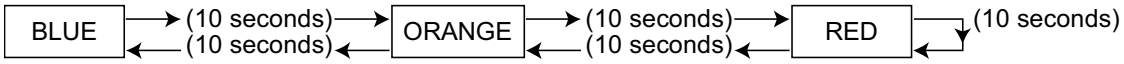
- Timer Control
  - When ON timer activates when unit stops, previous operation resumes and restored last saved Patrol operation status.
  - When ON timer activates during any operation, no change and carry on current operation.
  - When OFF timer activates during any operation, all operation stops and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

- Power Failure Control
  - During Patrol individual operation, if power failure occurs, after power resumes, Patrol individual operation resumes immediately.
  - During combination operation, if power failure occurs, after power resumes combination operation resume immediately.

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



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



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

12.15 E-ion operation

- This operation provides clean air by producing negative ions to attract dust captured at the positively charged active e-ion filters.

- e-ion operation start condition
  - During unit running at any operation mode, if “e-ion” operation is selected, combination operation (operation mode + e-ion operation) starts.
  - During unit is OFF, if “e-ion” operation is selected, e-ion individual operation starts.

- e-ion operation stop condition
  - When “OFF/ON” button is pressed to stop the operation.
  - When “PATROL/e-ion” button is pressed.
  - When OFF Timer activates.

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

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

    Auto Fan Speed for e-ion operation switches from SHi to Hi after 4 hours of operation.

- Airflow direction control
  - During any operation mode combines with e-ion operation, airflow direction follows respective operation mode.
  - During e-ion individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to air conditioner, and no change on LCD display.

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

- Indicator
  - When e-ion operation starts, e-ion indicator ON.

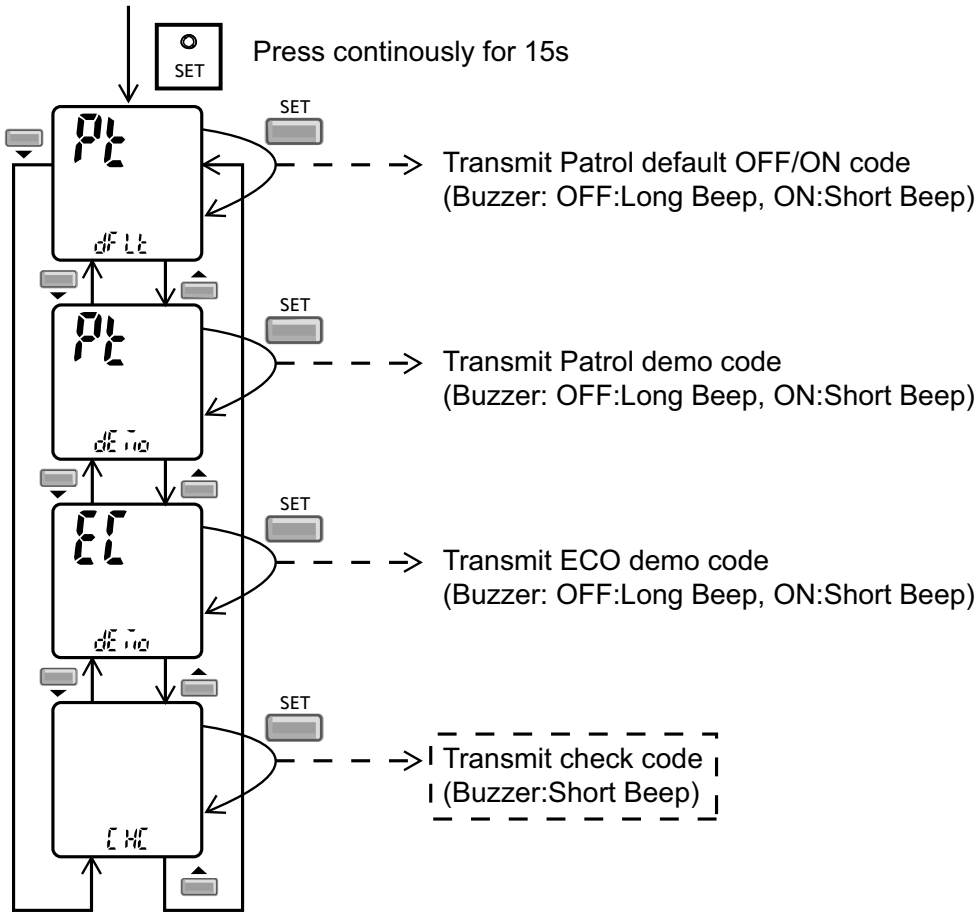
- Remote Control Receiving Sound
  - Normal Operation ➔ e-ion Operation : Beep
  - e-ion Operation ➔ Normal Operation : Beep
  - Stop ➔ e-ion individual Operation : Beep
  - e-ion individual Operation ➔ Stop : Long Beep

- Power failure
  - During e-ion individual operation, if power failure occurs, after power resumes, e-ion individual operation resumes immediately.
  - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.
  - e-ion operation status is not memorized after OFF the unit. After OFF, when the operation is ON again, air conditioner operates without e-ion operation.

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

  (1) Control starting condition

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



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

- Error Detection Control
  When e-ion indicator blink, it indicates error listed below:
  - Active e-ion Air Purifying system PCB main connector open:
    - Judgment Method
      - During e-ion operation (include during Patrol operation), Active e-ion Air Purifying system main connector to PCB is opened.

    - Troubleshooting Methods
      - Connect the connector or stop operation (include during Patrol operation) to cancel the blinking.

  - Abnormal Discharge error:
    - Judgment Method
      - During e-ion operation, feedback voltage is-Lo (at microcontroller) is detected, it is judged abnormal discharge and stops power supplies to the Active e-ion Air Purifying system.
      - Abnormal discharge is caused by ionizer or filter's high voltage power supply short-circuits due to water or dust adhesion, and so forth.
      - When abnormal discharge occurred, every 30 minutes the unit supplies power to the Active e-ion Air Purifying system.
      - When abnormal discharge occurs for 24 times continuously, e-ion indicator blinks (not applicable for e-ion Check Mode, where the error will shows immediately despite the 24 times counter)

    - Troubleshooting Method
      - Press "PATROL/e-ion" button or "OFF/ON" button to stop the operation and check the Active e-ion Air Purifying system main connector to PCB.
      - After that, press "e-ion" button again to confirm the e-ion indicator not blinking.
      - The 24 times counter will be clear after 10 minutes of normal operation or when operation stops.

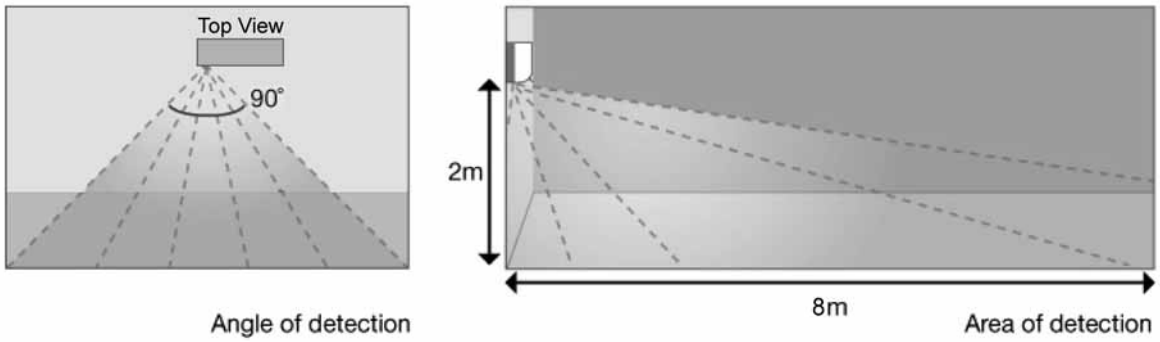
    - Error Reset Method
      - Press "OFF/ON" button to OFF the operation.
      - Press AUTO OFF/ON button at indoor unit to OFF the operation.
      - OFF Timer activates
      - Power supply reset

  - Active e-ion Air Purifying system breakdown error:
    - Judgment Method
      - When hi-feedback voltage (at microcontroller) supplied to filter during e-ion stop, Active e-ion Air Purifying system breakdown error shows immediately.
      - It is due to indoor PCB or filter's high voltage power supply damage.
      - Operations except e-ion continue. Both Timer indicator and e-ion indicator blink.

    - Troubleshooting Method
      - Press "PATROL/e-ion" button or "OFF/ON" button to stop the operation.
      - Change main circuit board or filter's high voltage power supply.
      - When lo-feedback voltage supplied to Active e-ion Air Purifying system during e-ion operation, e-ion indicator and Timer indicator stop blinking.

12.16 ECO Patrol Operation

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



- ECO Patrol operation – Human presence/absence detection outlined flow

  Process infrared sensor output signal

  Human detection (movement) every 3 seconds.

  ▼

  Human detection records

  Records human detection (movement) result for 30 seconds and determine its activity level i.e. Hi/Lo.

  ▼

  Presence / absence detection

  Compares current and previous human detection result every 30 seconds to determine the presence or absence of human.

  ▼

  Presence / absence determination

  Based on human presence / absence detection, if human presence detection showed within 30 minutes, it is recognised that human is present. If human absence detection showed continuously for more than 30 minutes, it is recognised that no human is present.

- ECO Patrol Sensor abnormality detection

  (1) Connnector pulled out (disconnected), Wire cut Abnormality (Fix Output at Hi)

  ① Abnormal judgment start condition.
  Start from ECO Patrol Sensor power ON, and end after 30 seconds.
  ② Control content.
  Judge ECO Patrol Sensor power level every 100ms.
  ③ Abnormal Judgment condition.
  When ECO Patrol Sensor has continues for 25 seconds Hi level.

  (2) Circuit Abnormal (Fix Output Lo)

  ① Abnormal judgment start condition.
  After ECO Patrol Sensor unit power ON, and after pressed 70 seconds.
  ② Control content.
  Judge ECO Patrol Sensor power level every 100ms.
  ③ Abnormal Judgment condition.
  When ECO Patrol Sensor has continues at Lo level for 25 seconds.

  (3) Abnormal treatment

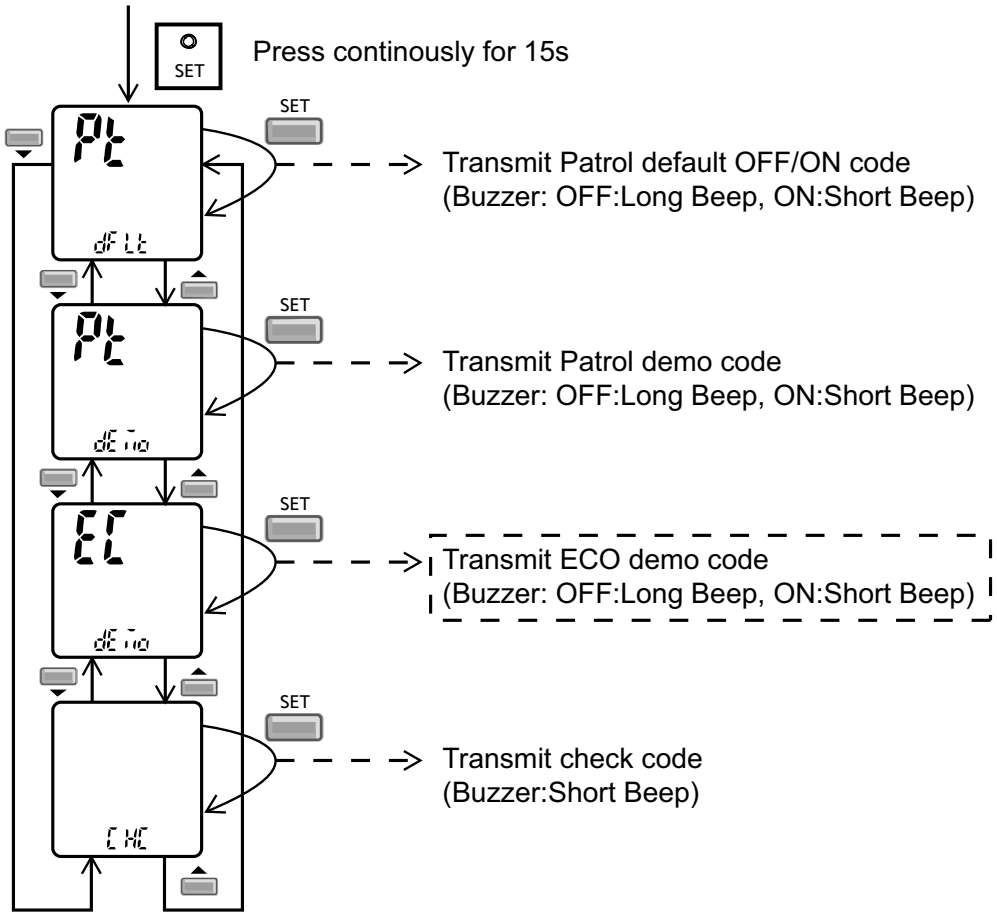
  Any one of the above self-diagnosis result is abnormal

  - Abnormal counter +1 and ECO Patrol Sensor power supply OFF.
  - After ECO Patrol Sensor unit power is OFF for 5 seconds, Retry the ECO Patrol operation.

  - When Abnormal counter reach 4 counts, ECO Patrol sensor abnormality is confirmed.
    (Abnormal counter is cleared when sensor power ON and maintain normal for 120 seconds and above or Clear Anormal counter by power reset)

  - Save ECO Patrol Sensor Abnormality H59 (no Timer LED blinking).
  - ECO Patrol Sensor operation OFF, but ECO Patrol LED maintain ON.
  - The unit still operate as normal.
  - Sensor error counter can be cleared only after power supply reset or AC Reset button on the remote control is pressed.

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



Control details:

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

- During ECO Patrol operation, the internal setting temperature and fan speed are adjusted in order to provide comfort and energy saving.

- ECO Patrol Start condition.
  - Press ECO Patrol button to select ECO1 and ECO2.

- ECO Patrol Stop condition.
  - Press ECO Patrol button again.
  - OFF Timer activates.
  - Press OFF/ON button to turn off the air conditioner.
  - Press AUTO OFF/ON button to turn off the air conditioner.
  - Press POWERFUL/QUIET button.
  - Press Mild Dry Cooling button.

- ECO Patrol operation could ON when any of the following conditions is fulfilled:
  - During forced cooling or forced heating operation.
  - During e-ion or individual patrol operation.

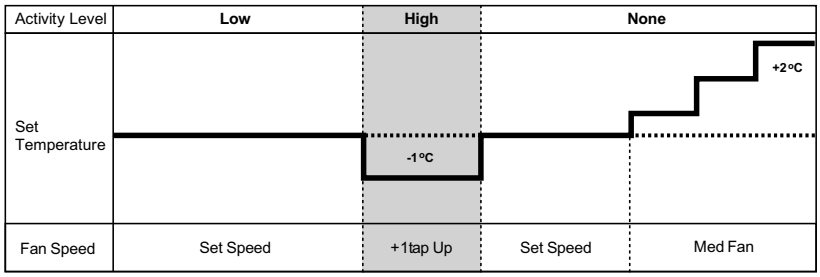
- Power Failure
  - ECO Patrol operation will be resuming after recovered from power failure.

- Timer Operation
  - When unit is turn on by ON Timer and ECO Patrol operation is ON during previous operation before OFF, ECO Patrol operation will not be ON automatically.
  - When unit is turn on by ON Timer and ECO Patrol operation is OFF during previous operation before OFF, ECO Patrol operation will not be ON automatically.

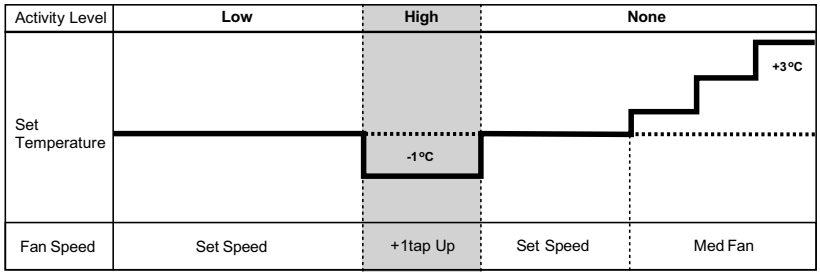
- Other Information
  - ECO Patrol, Powerful, Quiet and Mild Dry Cooling cannot be operated at the same time.
  - ECO Patrol sensor initialized time is 70 seconds from power supplied to ECO Patrol sensor, or 70 seconds from the operation start.

(For Cooling and Soft Dry Operation)

- ECO 1 Operation

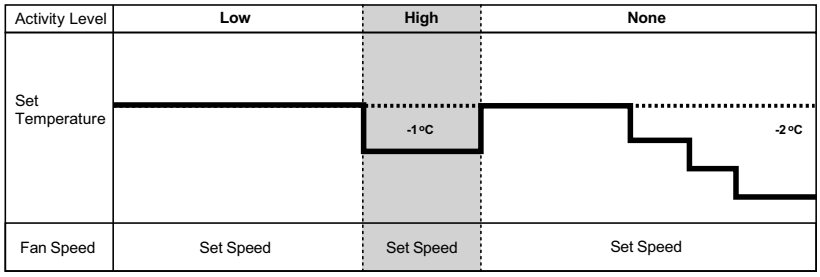


- ECO 2 Operation

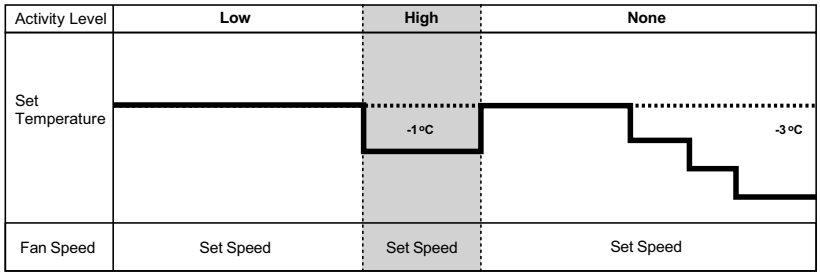


(For Heating Operation)

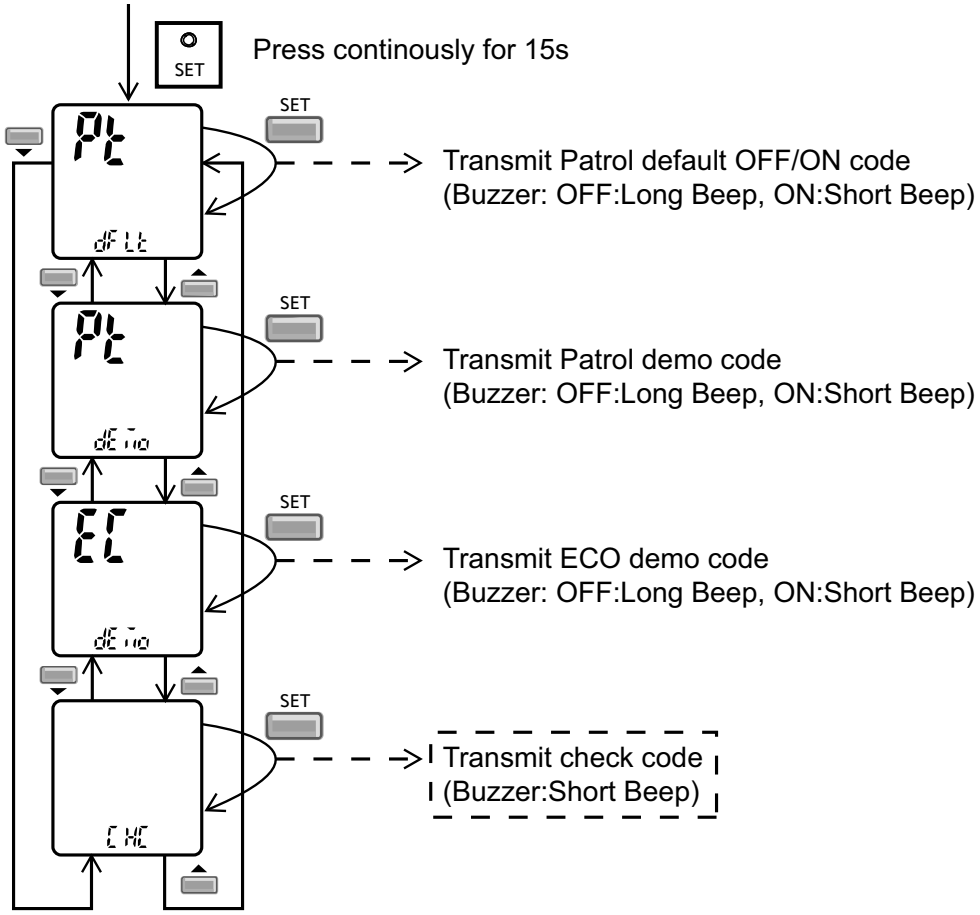
- ECO 1 Operation



- ECO 2 Operation



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



  (2) Control ending condition.
  When any of the conditions are formed
  - Operation stops.
  - “Timer Cancel” button pressed.
  - When ECO Patrol sensor check mode signal is not received for more than 30 seconds.

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

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

13. Protection Control

(For A9/12KK)

13.1 Restart Control (Time Delay Safety Control)

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

13.2 7 Minutes Time Save Control

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

13.3 60 Seconds Forced Operation

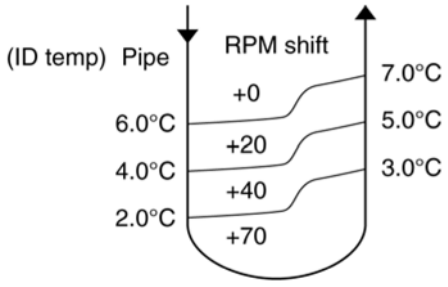
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the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

13.4 Starting Current Control

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

13.5 Freeze Prevention Control

- To protect indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid form return to compressor.
- This control will activate when the temperature of indoor heat exchanger falls below 2°C continuously for more than 4 minutes.
- The current fan speed will change to freeze prevention speed after 70 seconds compressor on. When indoor pipe temperature reaches certain temperature for 5 sec. the speed will be increased as in below figure.



- Compressor will turn off when indoor temperature falls below 2°C for more than 4 minutes. It will restart again when indoor heat exchanger temperature rises to 10°C.
- Restart control (Time Delay Safety Control) will be applied in this control.

13.6 Compressor Reverse Rotation Protection Control

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

▲T = Intake air temperature - Indoor heat exchanger temperature

- This is to prevent compressor from rotate reversely when there is an instantaneous power failure.

13.7 Dew Prevention Control

- To prevent dew formation at indoor unit discharge area.
- This control will be activated if:-
  - Cooling mode or Quiet mode.
  - Remote Control setting temperature is less than 25°C.
  - Fan speed is at CLo or QLo.
  - Room temperature is constant (±1°C) for 30 minutes.
  - Compressor is continuously running.
- Fan speed and angle of horizontal louver (vertical airflow angle) will be adjusted accordingly in this control.
  - Fan speed will be increased slowly if the unit is in quiet mode but no change in normal cooling mode.
- Dew prevention stop condition.
  - Remote control setting temperature is more than 25°C.
  - Fan speed is not set at CLo or QLo.
  - Select Powerful operation.

13.8 30 Minutes Time Save Control

- The compressor will start automatically if it has stopped for 30 minutes and the intake air temperature falls between the compressor OFF temperature and compressor ON temperature during the period.
- This is to maintain the room temperature as set. Despite of this, it is to prevent a wrong judgement of intake air temperature due to poor installation near the sensor area.

13.9 Compressor Overload Protection Control

Outdoor Fan Control

- If the temperature of the indoor heat exchanger rises to 51°C, outdoor fan stops. The outdoor fan restarts when the indoor heat exchanger temperature falls to 49°C.

Compressor high pressure protection

- If the indoor heat exchanger becomes 65°C or more, the compressor will stop and restart automatically. (Time Delay Safety Control - 4 minutes waiting).
- This is to reduce the pressure, as to reduce the indoor heat exchanger temp. Nevertheless, is to protect the compressor from overload of too high temperature.

13.10 4-Way Valve Control

- 4-way valve always on during Heating operation. (except deicing operation)
- When the unit is switched off by remote control during Heating operation, the 4-way valve stay at Heating position for 5 minutes.
- This is to prevent the refrigerant flow process sound for being occur.

13.11 Outdoor Fan Motor Control

- When compressor stops (reaches room temperature), outdoor fan will operate for 30 seconds (forced operation).
- This is to release the heat and to obtain the lowest pressure as fast as possible.

13.12 Hot Start Control

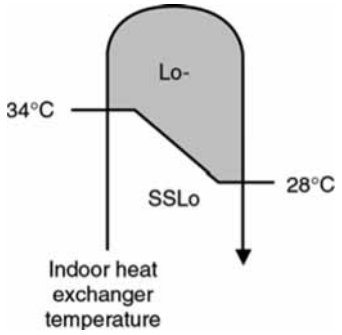
- Hot start control is to prevent cool air discharge into room when heating operating starts.
- Hot start is executed after heating operation starts and deice operation is completed.
- Indoor fan control during hot start is shown below:

Indoor Pipe Temperature	Indoor Fan
≥ 30°C	OFF
30°C < t ≥ 34°C	SLo
t ≥ 34°C	Lo-

- When indoor pipe temperature over 34°C or maximum 40 minutes, hot start is completed.
- During hot start and for hot start completed, intake thermostat is ignored and no Thermo OFF.

13.13 Cold Draft Prevention Control

- This operation is to prevent the Cold Draft during Heating mode operation.
- The operation will start when compressor OFF (Thermo OFF) during Heating operation.
- For the first 30 sec. from compressor OFF (Thermo OFF), Indoor fan speed will operate accordingly to the Indoor heat exchanger temperature as shown below:



- After 30 sec. from compressor OFF (thermo OFF), Indoor fan will run at SSLo speed only.
- Anti Cold Draft Control will stop when:
  - Intake temperature < set temperature. (Time Delay Safety Control 4 minutes waiting is valid)
  - 30 Minutes Time Save Control activates.

13.14 Deice Control

Deice starts to prevent frosting at outdoor heat exchanger.

- Normal Deice
  Deice operations detection commences after 30 minutes of Heating operation starts or 60 minutes after previous deice operation. If the TRS (Thermal Reed Switch) senses the outdoor piping temperature drops to -3°C (TRS CLOSE) or less for 50 sec. continuously during compressor is in operation, deice will start.
  (There is no detection during Outdoor Fan stops.)

- Overload Deice
  During heating operation, if the outdoor Fan OFF duration (due to overload protection control) is accumulated up to 60 minutes and after compressor starts for 1 minutes, deice starts.

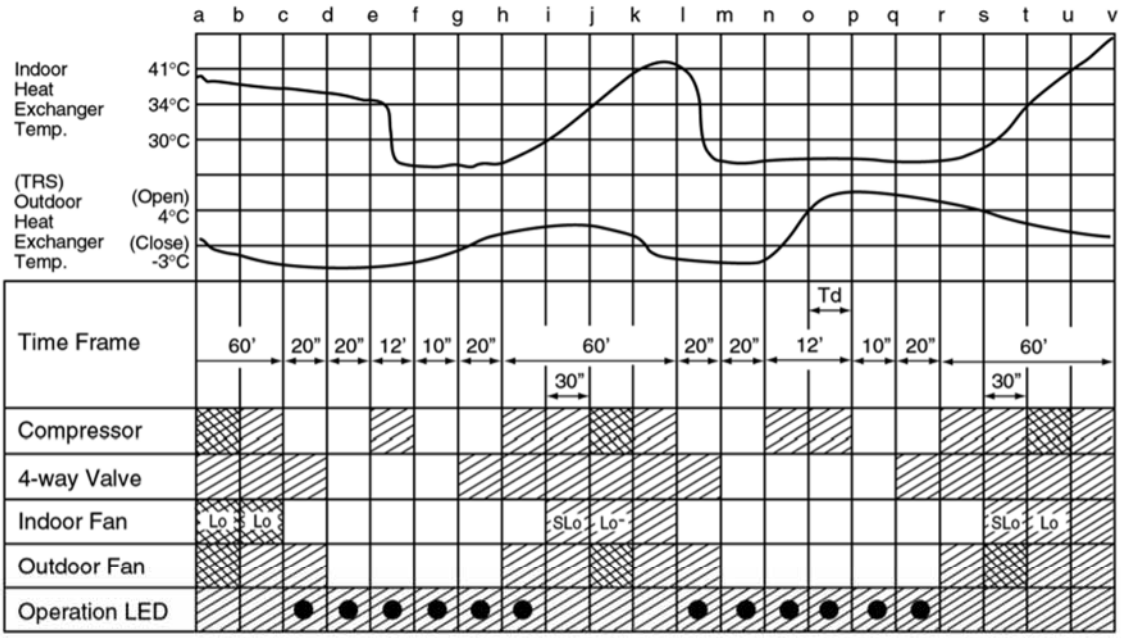
- Deice ends when
  1. 12 minutes after deicing operation starts;
  2. TRS senses the outdoor piping temperature rises to 4°C (TRS OPEN).

  ※ Deice will not end immediately as time delay (Td) is valid as shown below:

Time taken from deicing starts to TRS OPEN (T)	Deice recovery time	Td (seconds)
T ≤ 1 minute	1 min. wait (Min.)	0
1 minutes < T < 3 minutes	T	0
3 minutes < T < 8 minutes	T + 60 sec.	60
8 minutes < T < 11 minutes	T + 120 sec.	120
T > 11 minutes	12 min. wait (Max.)	-

- Once deice operation starts, it will not end for 60 seconds.
- After deice operation, compressor stops for 30 seconds and 4-way valve stays at cooling position for 10 seconds.

Normal Deice Time Diagram

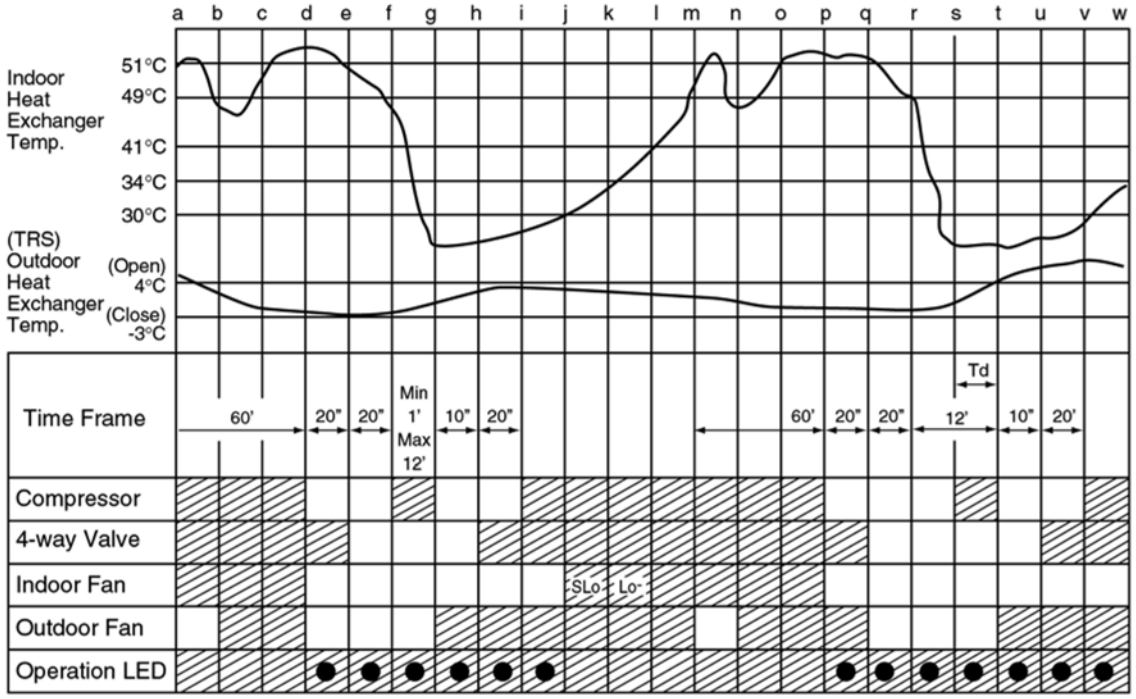


<Description of operation>

a – c	:	Deicing operation judging condition established
c – e, l – n	:	Deicing operation (timer detected)
e – h	:	Deice operation (timer detected)
h – i, r – s	:	Hot start (no thermo OFF)
i – j, s – t	:	No thermo OFF (after finished hot start)
n – r	:	Deicing operation (TRS detected)

● : Blinking
Operation
Stop
Operation or Stop
Td : Time Delay

Overload Deice Time Diagram



<Description of operation>

a – d, m – p	:	Overload control. (intergrate)
d – f, p – r	:	Preparation time for Deicing
f – i	:	Overload deicing (timer detected)
i – j	:	Hot start (indoor fan OFF)
j – k	:	Hot start (indoor fan SLo)
r – t	:	Overload control (TRS detected)

● : Blinking
Operation
Stop
Td : Time Delay

(For A18/24/28KK)

(For 13.15 to 13.21 information applies only to Cooling and Soft Dry Operation)

13.15 Restart Control (Time Delay Safety Control)

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

13.16 7 Minutes Time Save Control

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

13.17 60 Seconds Forced Operation

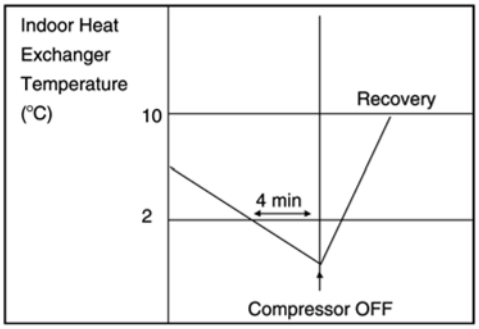
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the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

13.18 Starting Current Control

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

13.19 Freeze Prevention Control

- If the temperature of the indoor heat exchanger falls below 2°C continuously for 4 minutes or more, the compressor turns off.
  The fan speed setting remains the same.
- This phenomenon is to protect the indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid from returning to the compressor.
- Compressor will restart again when the indoor heat exchanger temperature rises to 10°C (Recovery).
- Restart control (Time Delay Safety Control) will be applied in this Control if the recovery time is too short.



13.20 Compressor Reverse Rotation Protection Control

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

s T = Intake air temperature - Indoor heat exchanger temperature

- This is to prevent compressor from rotate reversely when there is an instantaneous power failure.

13.21 Dew Prevention Control

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

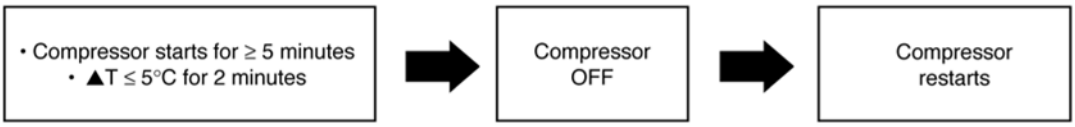
(For 13.22 to 13.23 information applies only to Heating Operation)

13.22 Restart Control (Time Delay Safety Control)

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

13.23 Compressor Reverse Rotation Protection Control

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



s T = Indoor heat exchanger temperature - Intake air temperature

- This is to prevent compressor from rotate reversely when there is an instantaneous power failure.

13.24 Overload Protection Control

- Outdoor Fan Control
  - If the temperature of the Outdoor Heat Exchanger less than -3°C, Outdoor Fan is ON. The Outdoor Fan stop, when Outdoor Heat Exchanger temperature is Tb or more according to Outdoor Air Temperature region as table below:
    The Outdoor Fan restarts when the indoor heat exchanger temperature falls to 49°C.

Outdoor Air Temperature	< 10°C	≥ 10°C ~ < 15°C	≥ 5°C ~ < 20°C	≥ 20°C ~ < 25°C	≥ 25°C	Outdoor Fan OFF
Tb	≥ 5°C	≥ 3°C	≥ 1.5°C	≥ 0.5°C	≥ 0.5°C	

  During starting of Heating mode and after deice, Outdoor Fan ON for 90 sec. (Hi).

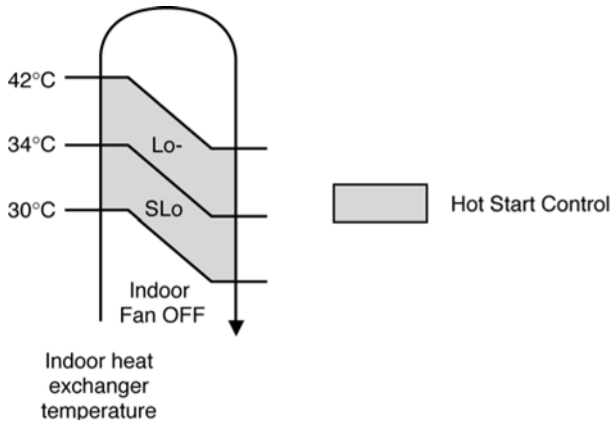
- Compressor High Pressure Control
  - If the indoor heat exchanger becomes 68°C or more, the compressor will stop and restart automatically.
  - Time Delay Safety Control is activated before the compressor restart.

13.25 4-Way Valve Control

- 4-way valve always on during Heating operation. (except deicing operation)
- When the unit is switched off by remote control during Heating operation, the 4-way valve stay at Heating position for 5 minutes.
- This is to prevent the refrigerant flow process sound for being occur.

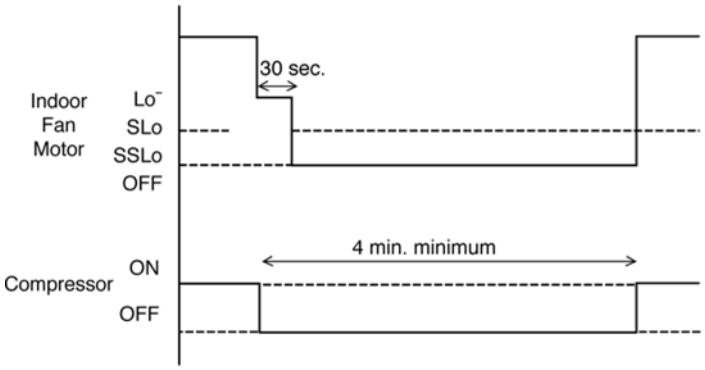
13.26 Hot Start Control

- Hot Start Control is to prevent cool air discharge into the room when heating operation start.
- When Heating operation starts, Indoor fan will not start until the indoor heat exchanger reaches 30°C as diagram shown.



- Hot start is completed when indoor heat exchanger rises to 42°C or operation over 4 minutes.

13.27 Cold Draft Prevention Control



When COMP = Thermal OFF, indoor fan speed immediately changed to Lo⁻ for 30 sec., follow by SSLo speed until COMP = ON.

13.28 Deice Control

Deice starts to prevent frosting at outdoor heat exchanger.

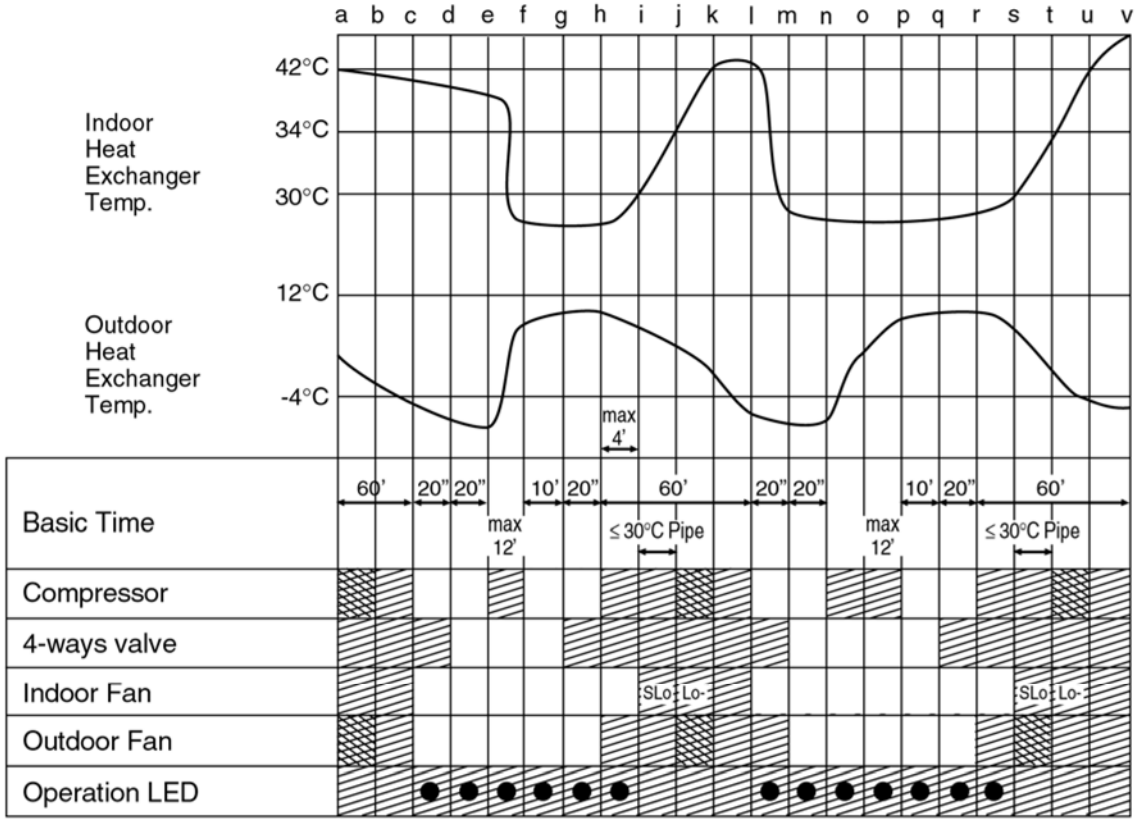
- Normal Deice
  Deice operation detection commences in Heating operation starts or 60 minutes after previous deice operation. If the outdoor piping temperature drops to -4°C for 50 sec. continuously during compressor is in operation, deice will start.
  (There is no detection during Outdoor Fan stops.)

- Overload Deice
  During heating operation, if the outdoor Fan OFF duration (due to overload protection control) is accumulated up to 60 minutes and after compressor starts for 1 minute, deice starts.

- Deice ends when
  (a) 12 minutes after deicing operation starts;
  (b) The outdoor piping temperature rises to about 12°C.

- After deice operation, compressor stops for 30 seconds and 4-way valve stays at cooling position for 10 seconds.

a) Normal Deice Time Diagram

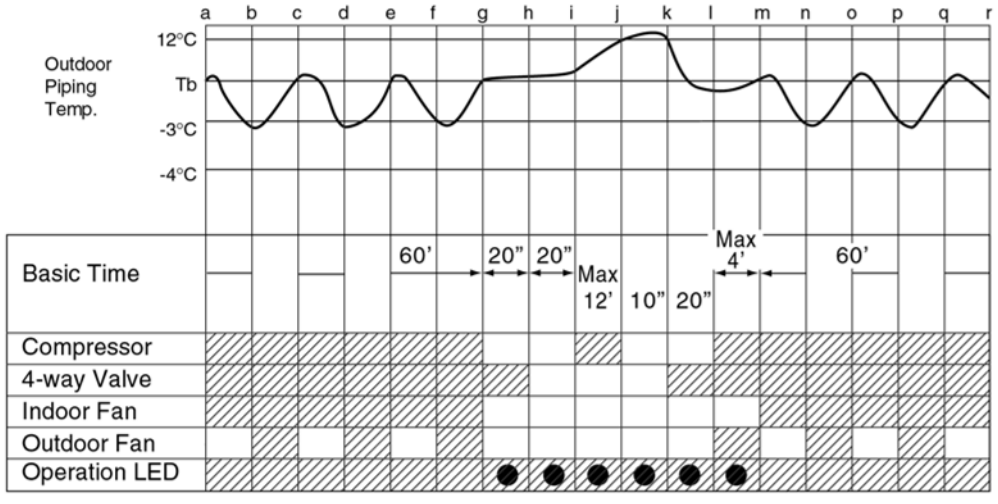


<Description of operation>

a – c : Deicing operation judging condition established
c – e, l – n : Preparation time
e – h : Deicing operation (timer detected)
h – i, r – s : Hot start (no thermo OFF)
i – j, s – t : No thermo OFF (after finished hot start)

● : Blinking
Operation
Stop
Operation or stop

b) Overload Deice Time Diagram



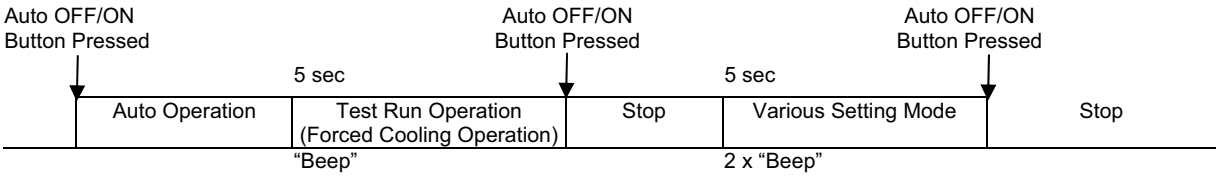
<Description of operation>

a – i : Overload control
i – l : Overload deicing
l – m : Hot start
m – r : Overload control
g – i : Preparation for overload deicing (For normal R22 control, operation for g – i is not included, applicable only for new refrigerant model).

● : Blinking
Operation
Stop

14. Servicing Mode

14.1 Auto OFF/ON Button



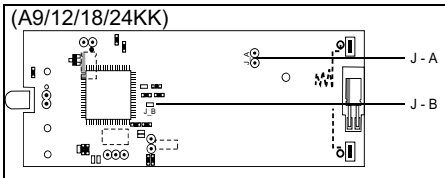
1 AUTO OPERATION MODE
The Auto Operation will be activated immediately once the Auto OFF/ON button is pressed. This operation can be used to operate air conditioner with limited function if remote control is misplaced or malfunction.

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

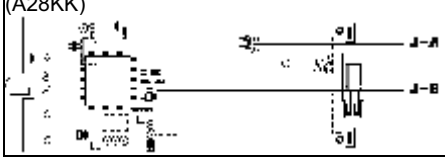
3 VARIOUS SETTING MODE
The Various Setting Mode will be activated if (within 20 seconds of Test Run Operation) the Auto OFF/ON button is pressed for more than 5 seconds. 2 "beep" sounds will be heard to identify the starting of this operation.
Under Various Setting Mode, user could perform the following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

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

(A9/12/18/24KK)



(A28KK)



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

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

14.2 Remote Control Button

14.2.1 SET Button

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

14.2.2 RESET (RC)

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

14.2.3 TIMER ▲

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

14.2.4 TIMER ▼

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

15. Troubleshooting Guide

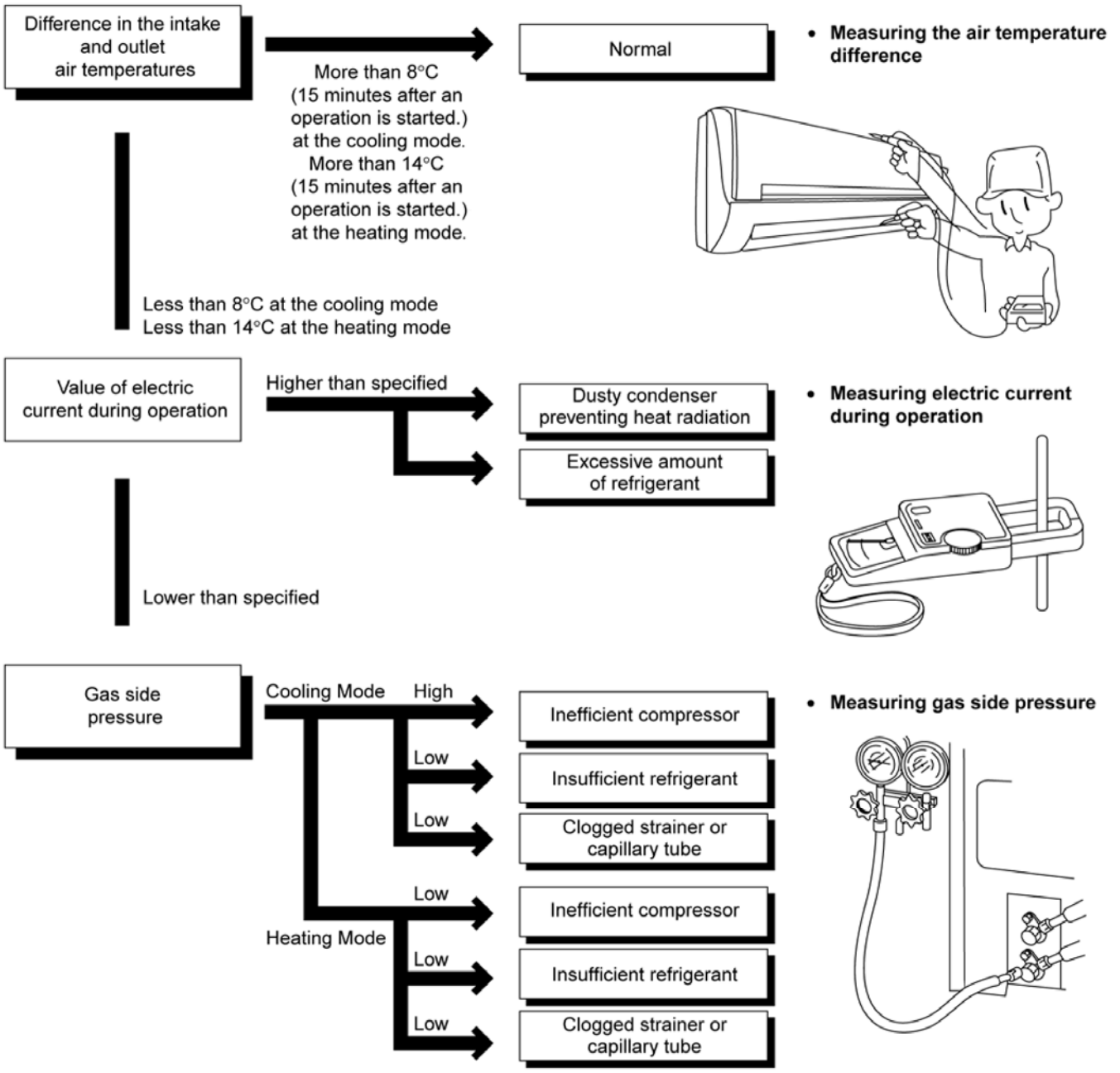
15.1 Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas Pressure Mpa (kg/cm^2G)	Outlet air Temperature (°C)
Cooling Mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16
Heating Mode	1.5 ~ 2.1 (15 ~ 21)	36 ~ 45

Condition: Indoor fan speed = High
Outdoor temperature 35°C at the cooling mode and 7°C at the heating mode



- **Measuring the air temperature difference**

- **Measuring electric current during operation**

- **Measuring gas side pressure**

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

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

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

15.1.2 Diagnosis methods of a malfunction of a compressor and 4-way Valve

Nature of fault	Symptom
Insufficient compressing of a compressor	• Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70°C to 90°C). • The different between high pressure and low pressure becomes almost zero.
Locked compressor	• Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off. • The compressor has a humming sound.
Insufficient switches of the 4-way valve	• Electric current during operation becomes approximately 80% lower than the normal value. • The temperature different between from the discharge tube to the 4-way valve and from suction tube to the 4-way valve becomes almost zero.

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-A9KKD-2 CS-A12KKD-2

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

16.1.1.1 To remove front grille

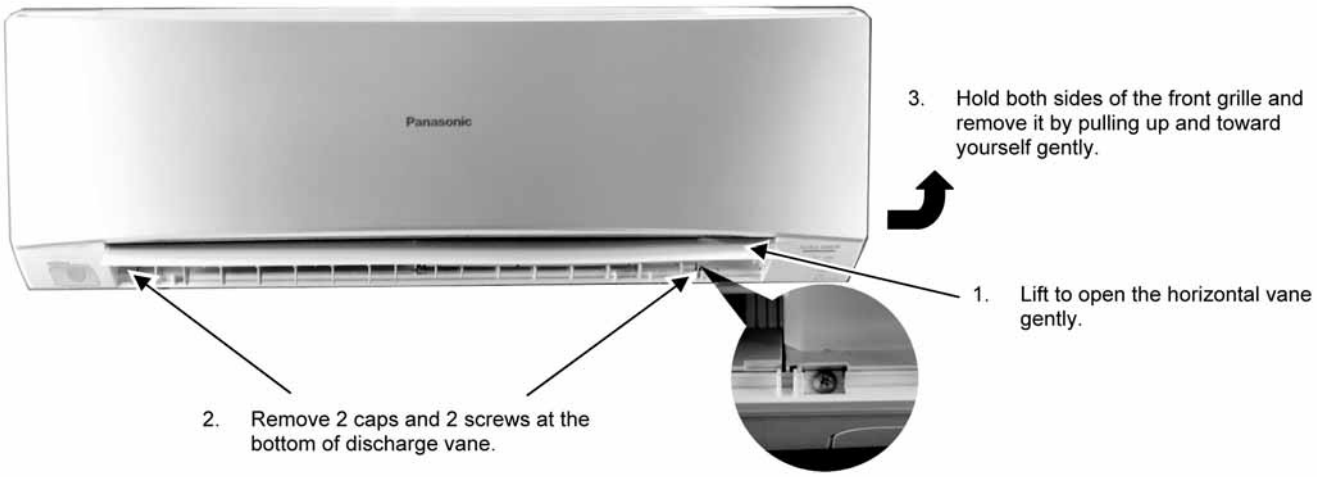


Figure 1

16.1.1.2 To remove power electronic controller

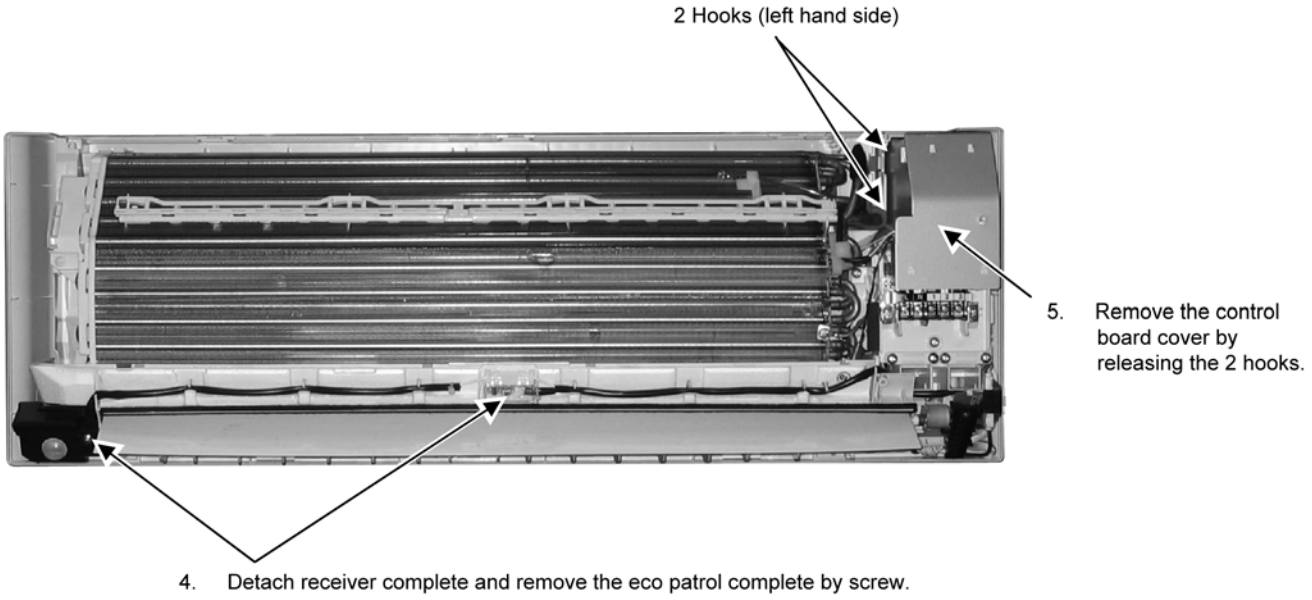


Figure 2

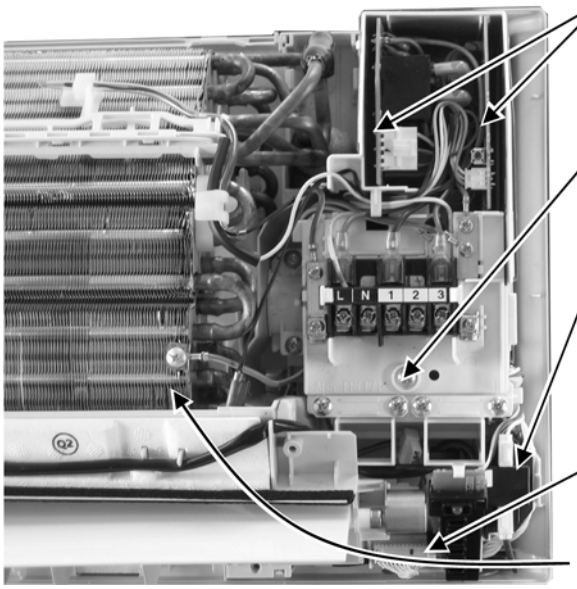


Figure 3

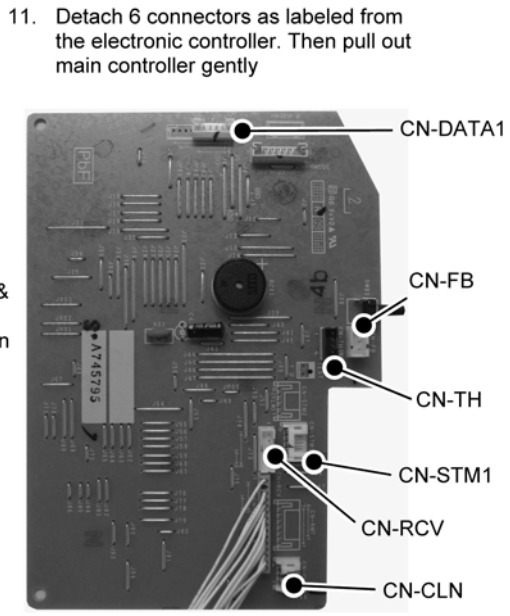


Figure 4

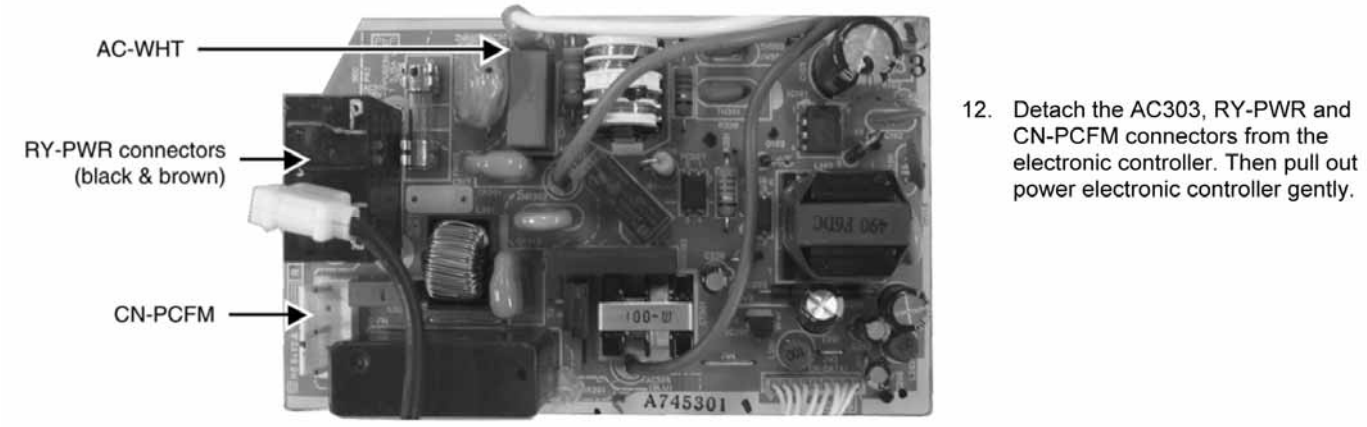


Figure 5

16.1.1.3 To remove discharge grille

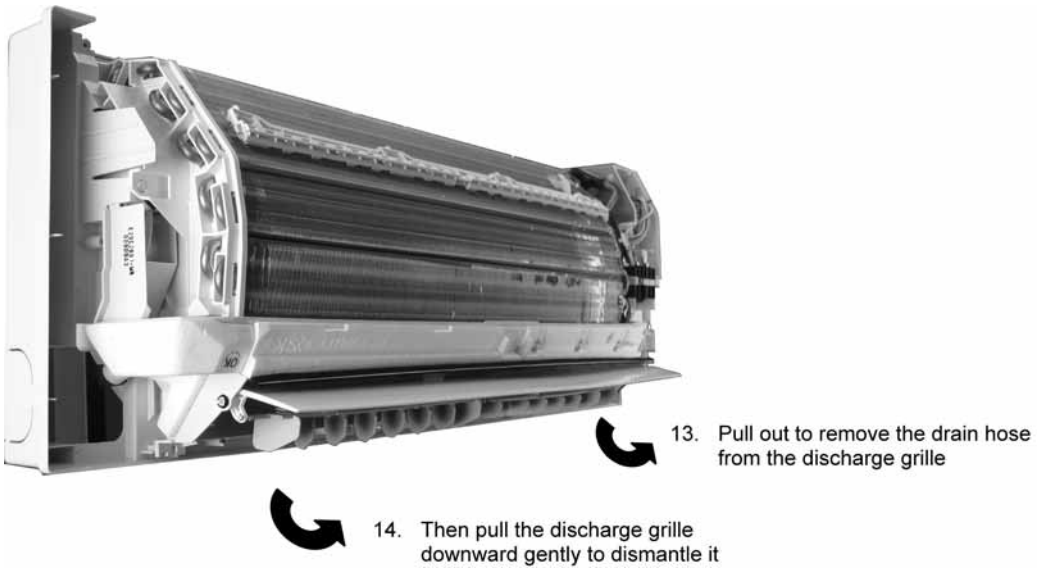


Figure 6

16.1.1.4 To remove control board

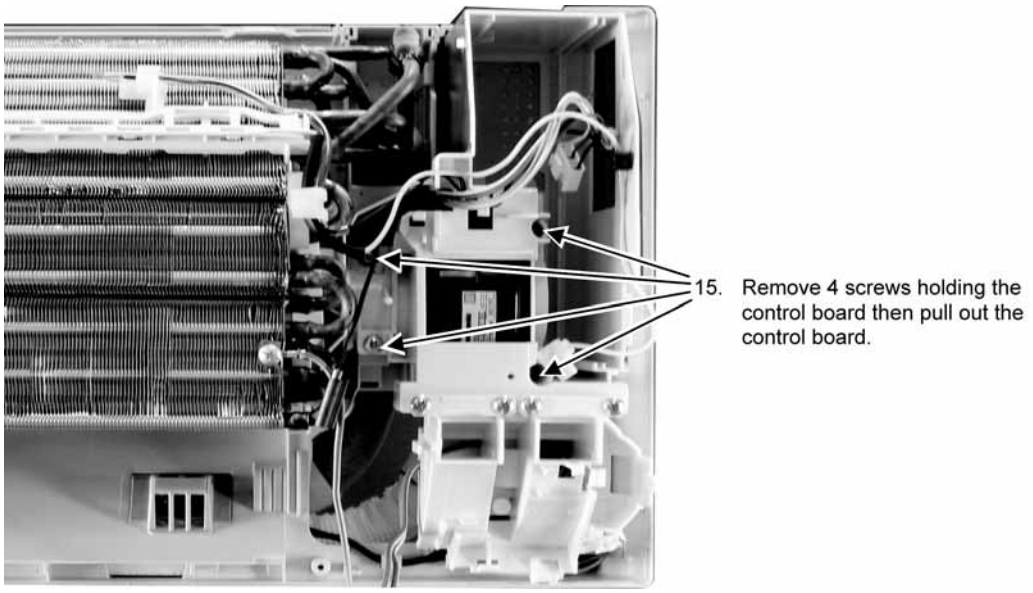


Figure 7

16.1.1.5 To remove cross flow fan and indoor fan motor

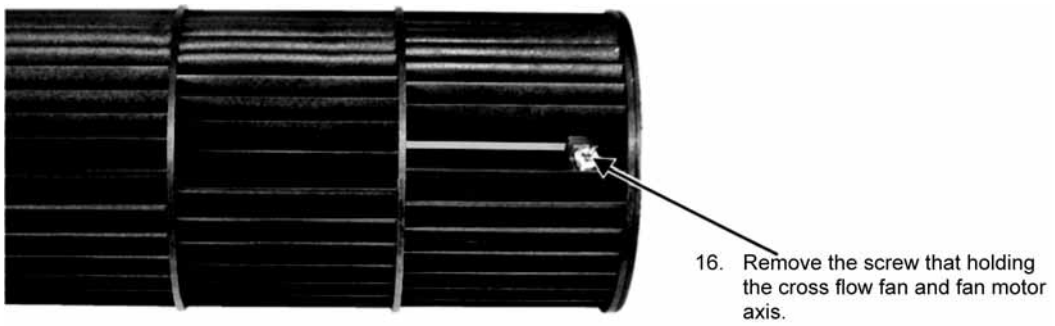


Figure 8

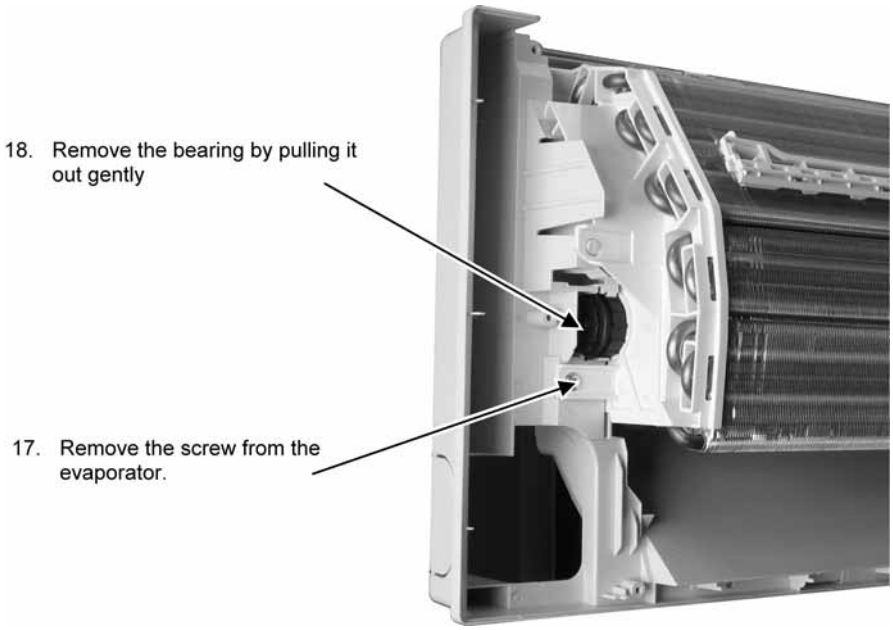


Figure 9

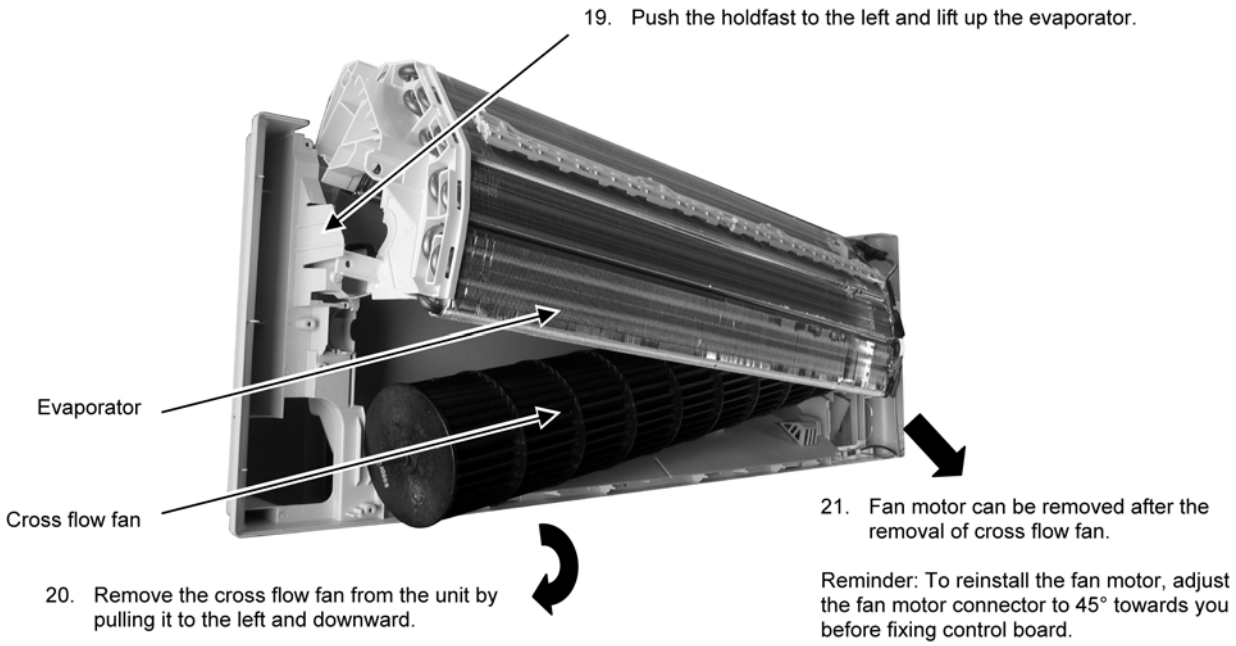


Figure 10

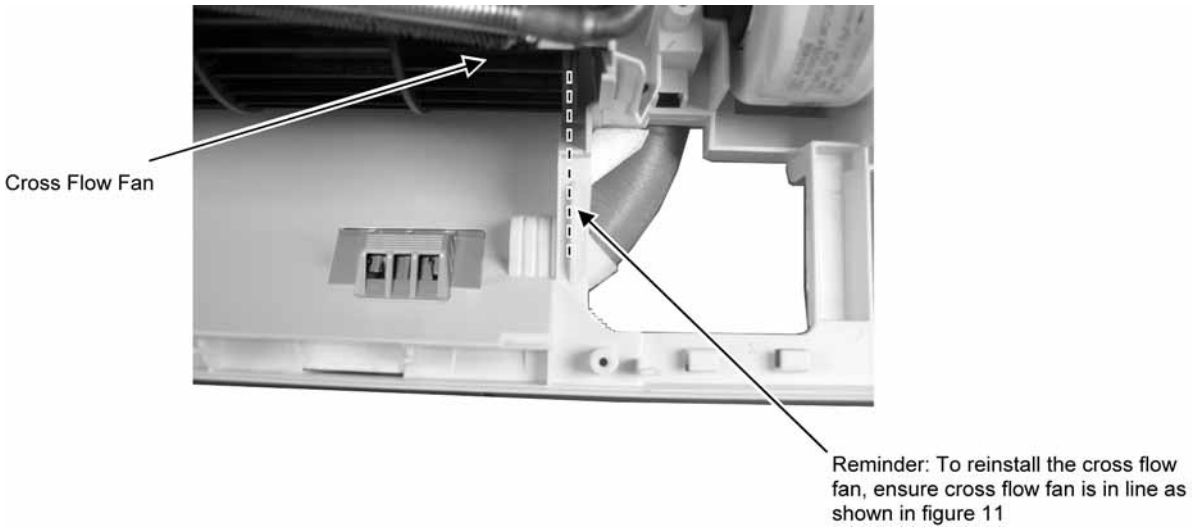


Figure 11

WARNING

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

16.2 CS-A18KKD-2 CS-A24KKD-2 CS-A28KKD-2

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

16.2.1.1 To remove front grille

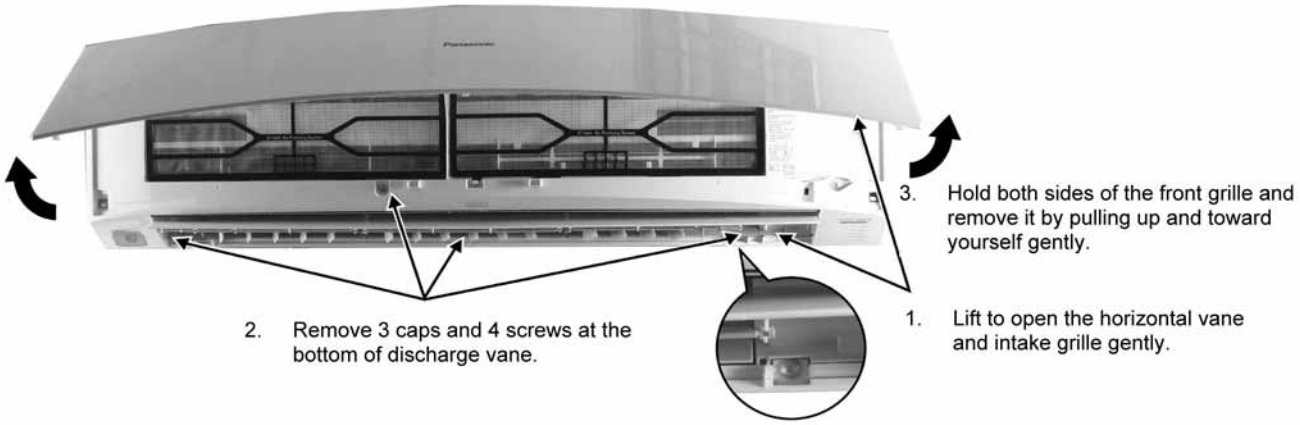


Figure 12

16.2.1.2 To remove horizontal vane

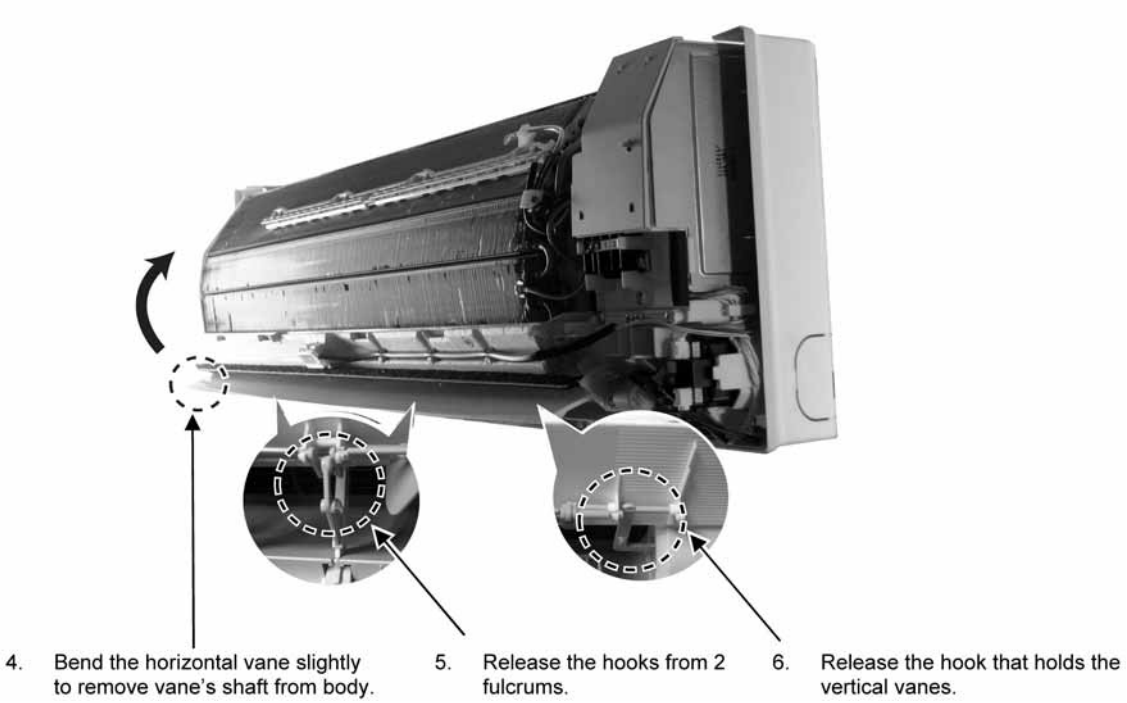


Figure 13

16.2.1.3 To remove power electronic controller

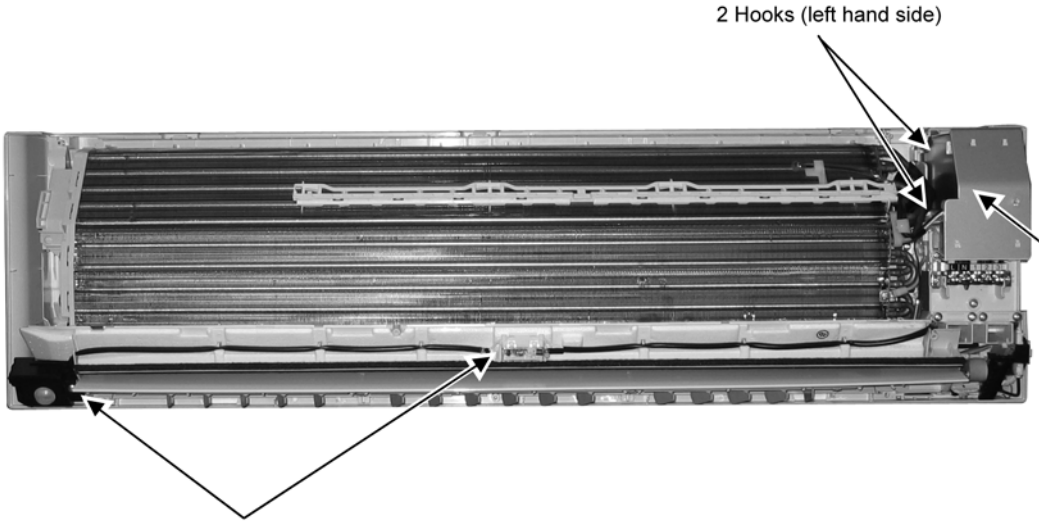


Figure 14

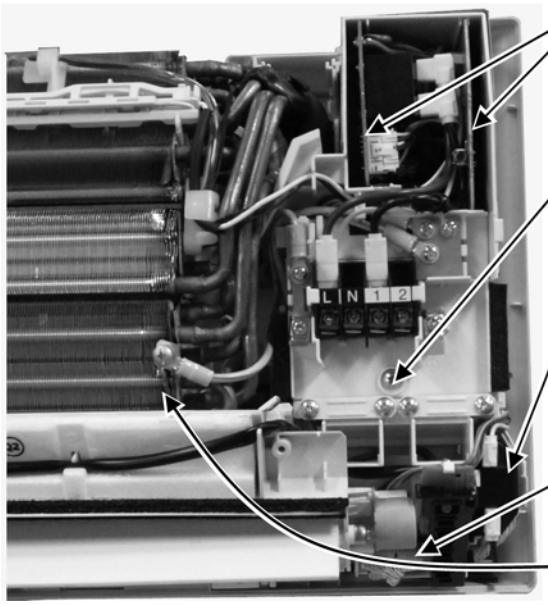


Figure 15

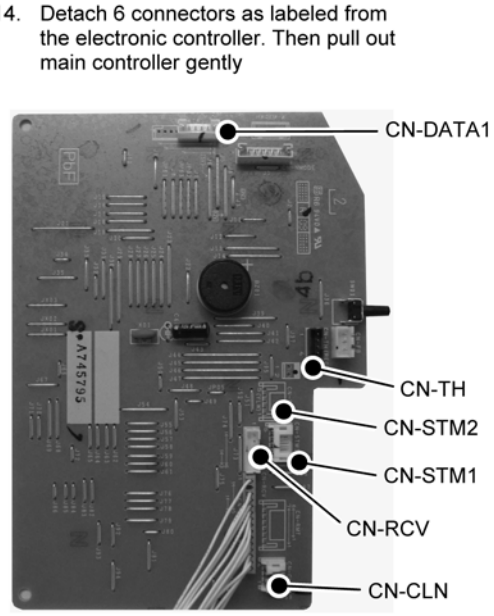


Figure 16

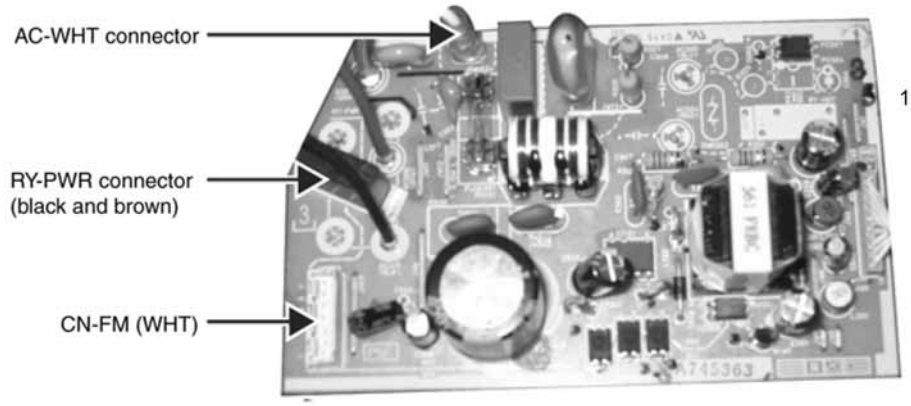


Figure 17

16.2.1.4 To remove discharge grille

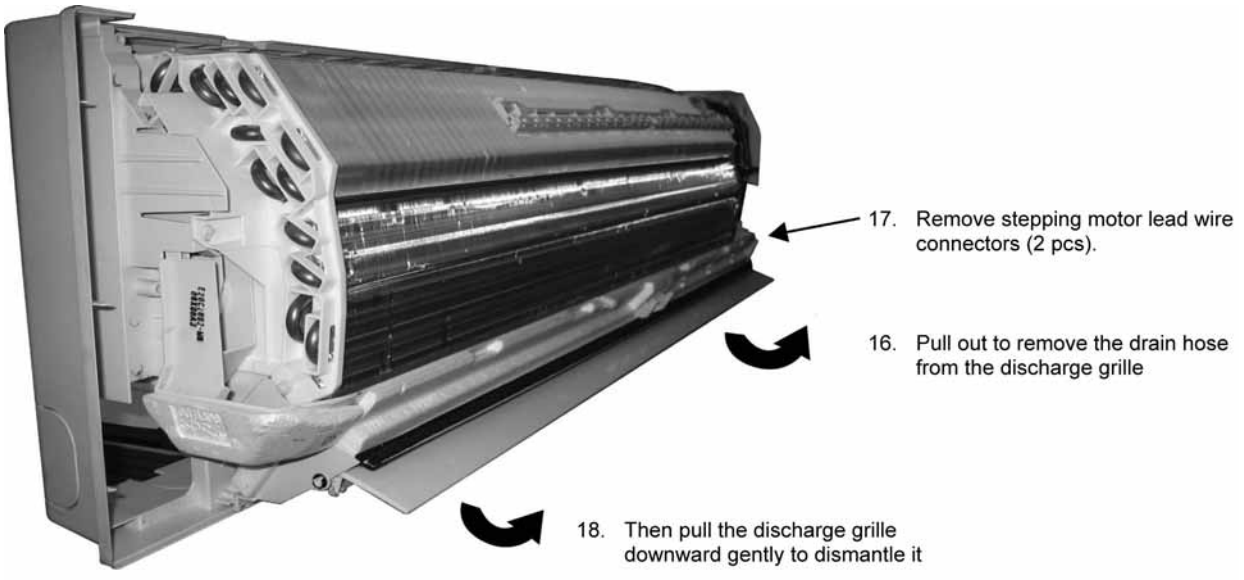


Figure 18

16.2.1.5 To remove control board

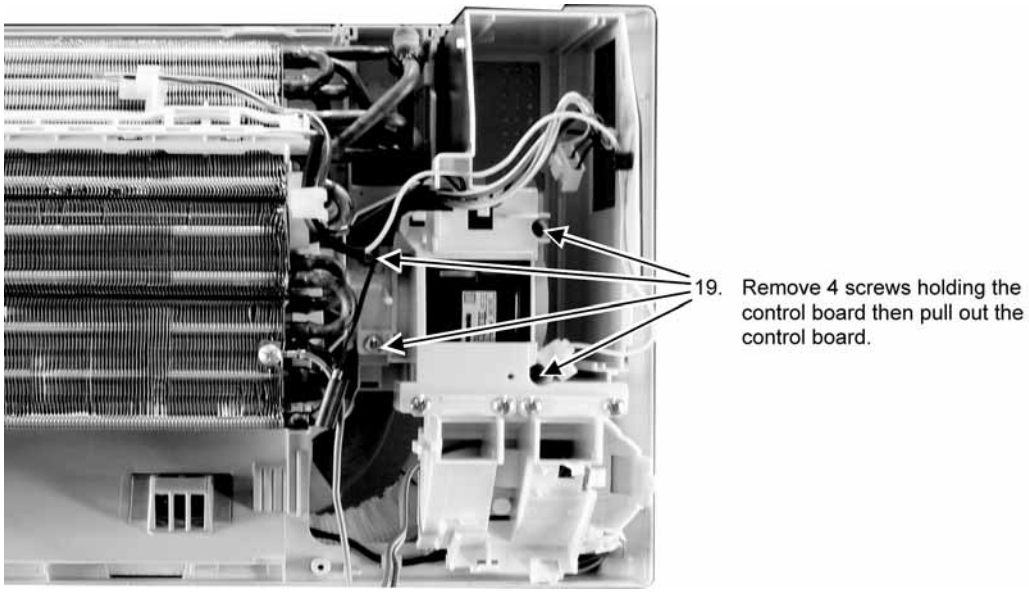


Figure 19

16.2.1.6 To remove cross flow fan and indoor fan motor

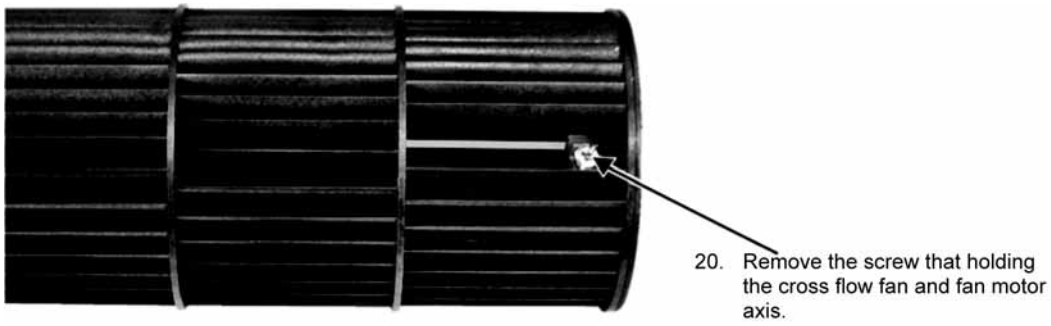


Figure 20

22. Remove the bearing by pulling it out gently

21. Remove the screw from the evaporator.

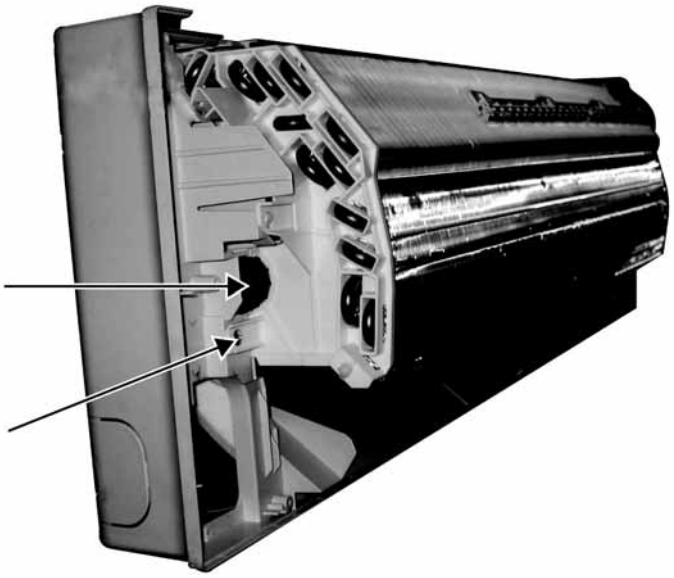
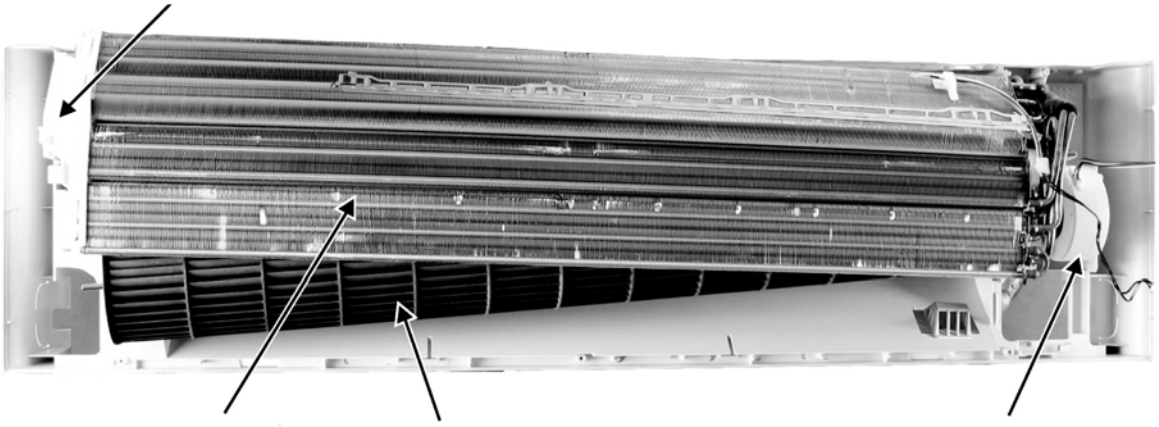


Figure 21

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



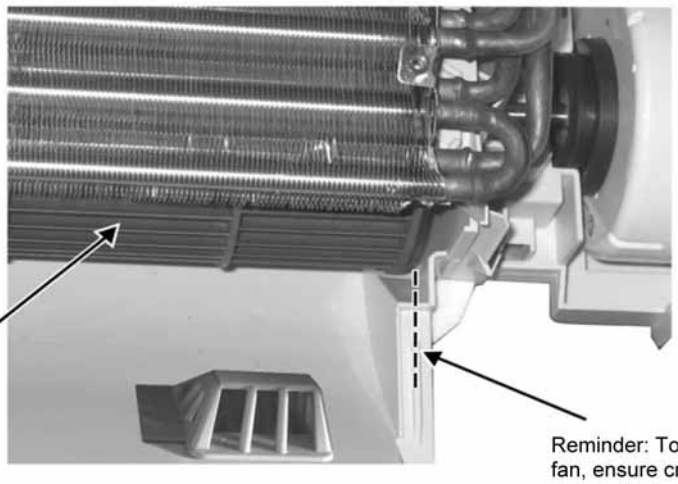
Evaporator

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

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

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

Figure 22



Cross Flow Fan

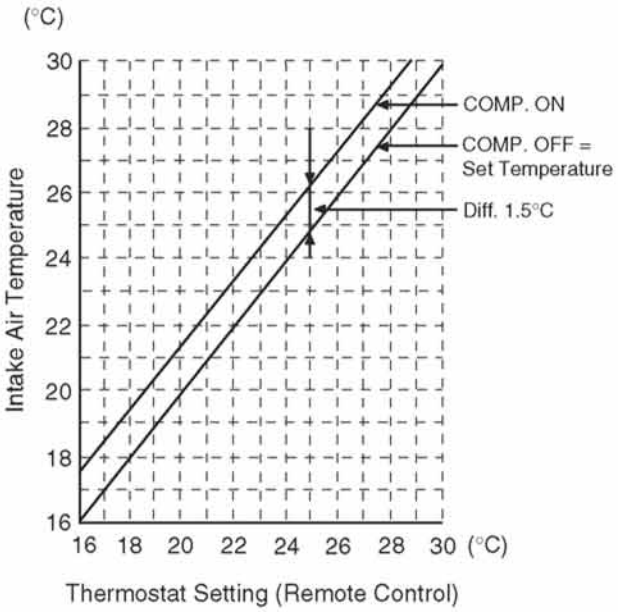
Reminder: To reinstall the cross flow fan, ensure cross flow fan is in line as shown in figure 23.

Figure 23

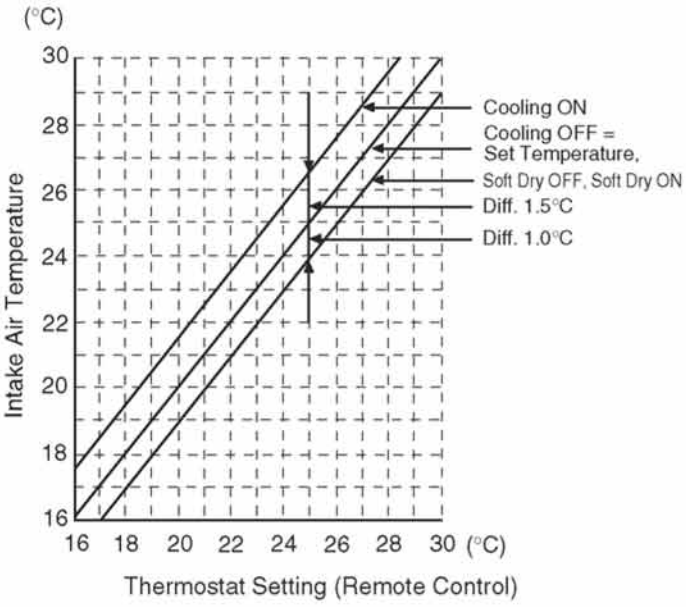
17. Technical Data

17.1 Thermostat Characteristics

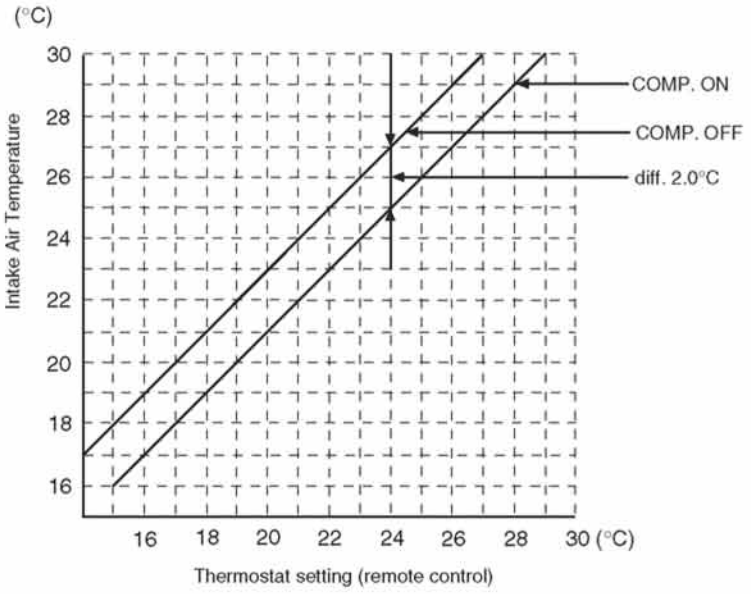
• **Cooling**



• **Soft Dry**



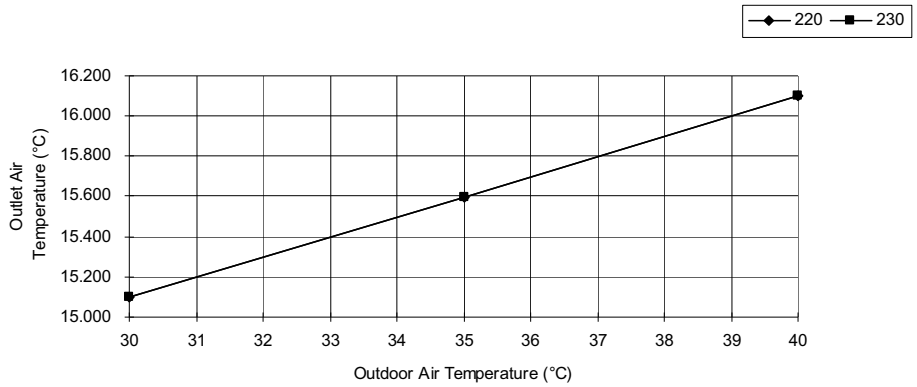
• **Heating**

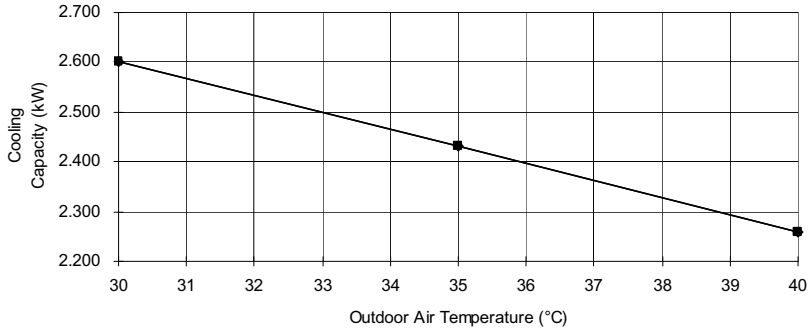


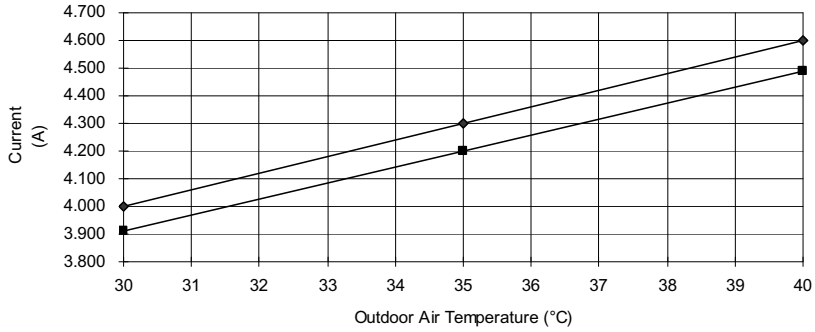
17.2 Operation Characteristics

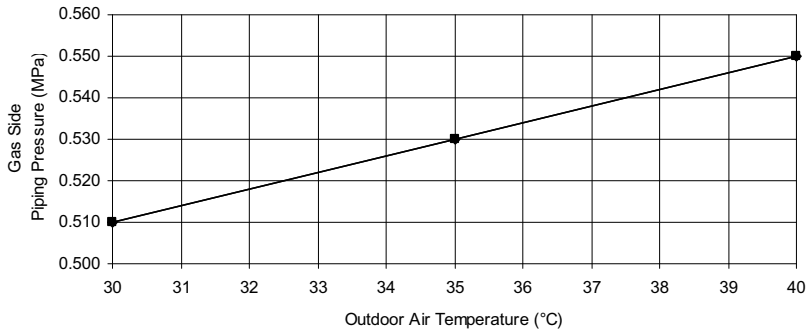
17.2.1 CS-A9KKD-2 CU-A9KKD-2

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

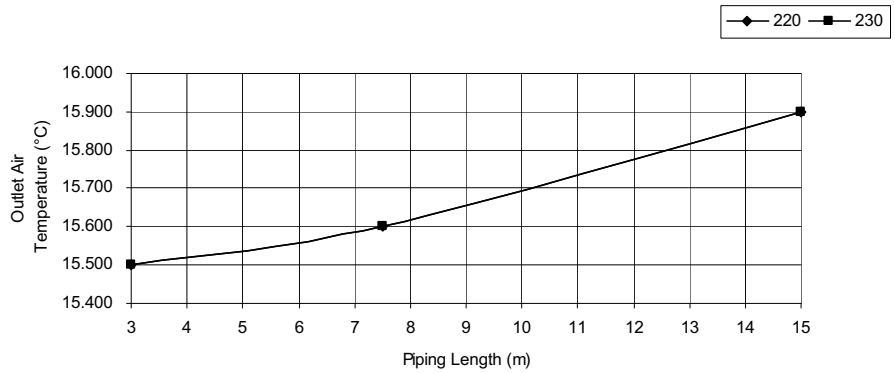


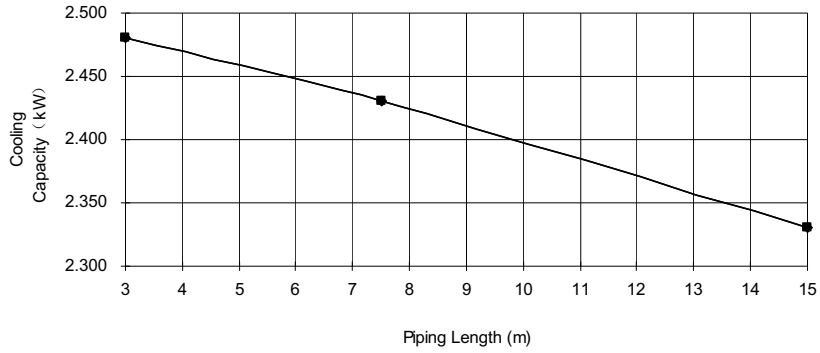


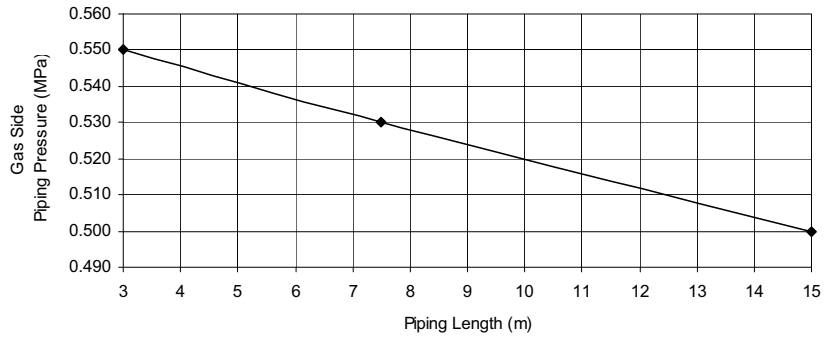


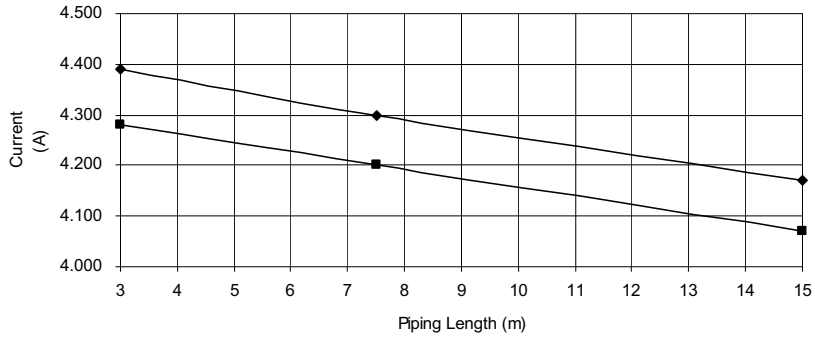


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 7.5m

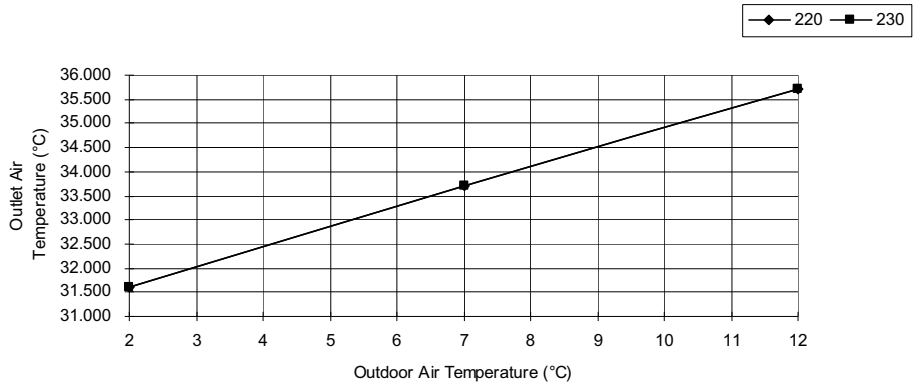


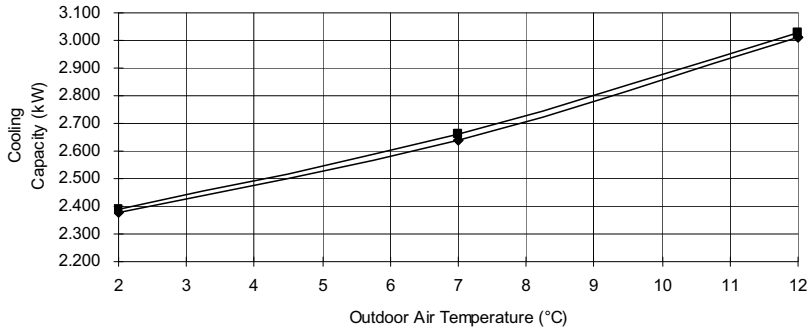


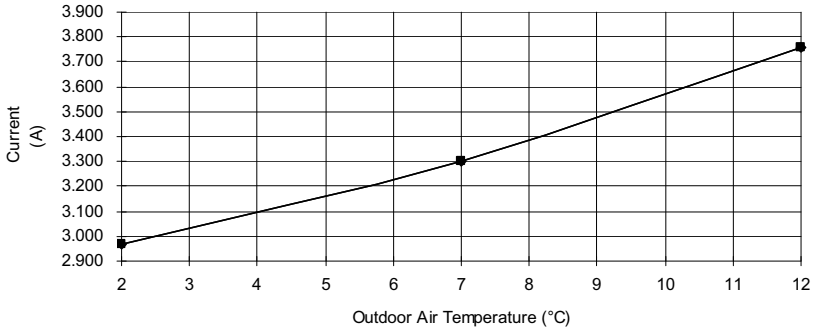


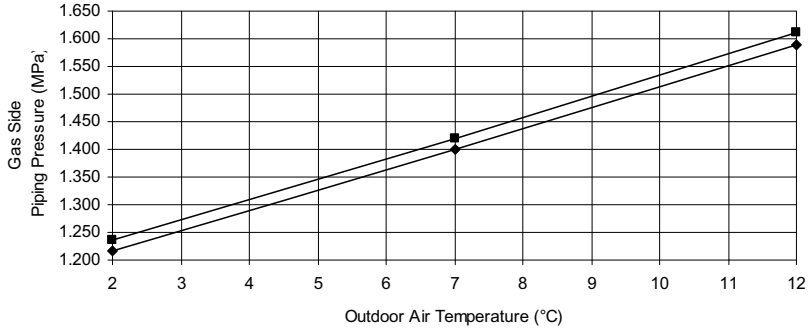


- Heating Characteristic
  - Room temperature: 20°C
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 7.5m

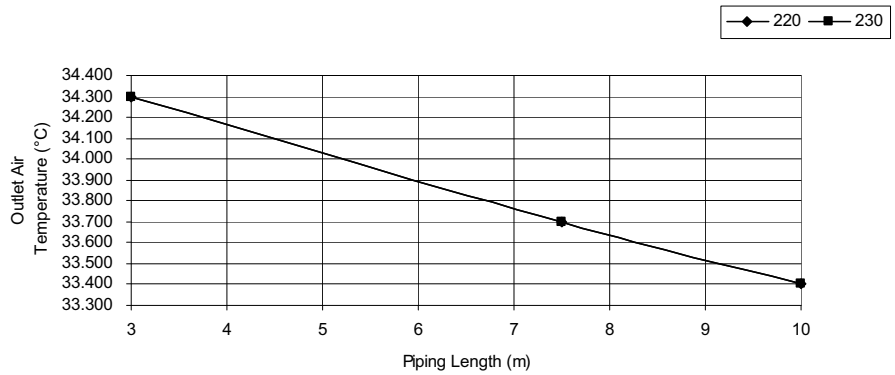


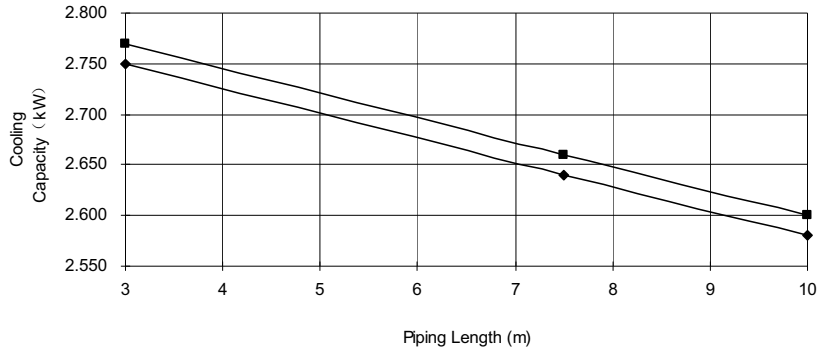


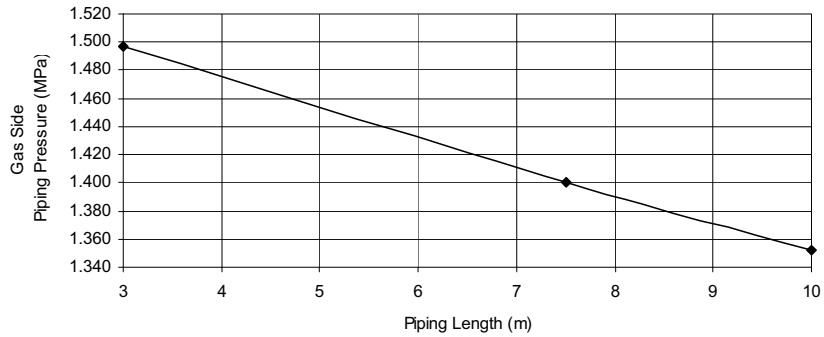


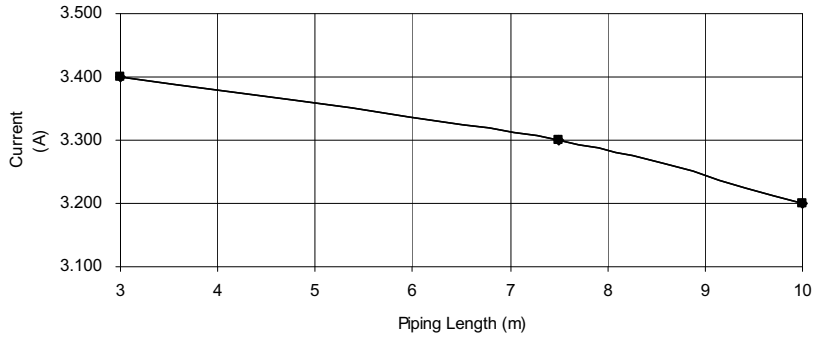


- Piping Length Characteristic
  - Outdoor temperature: 7°C (DBT), 6°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 7.5m



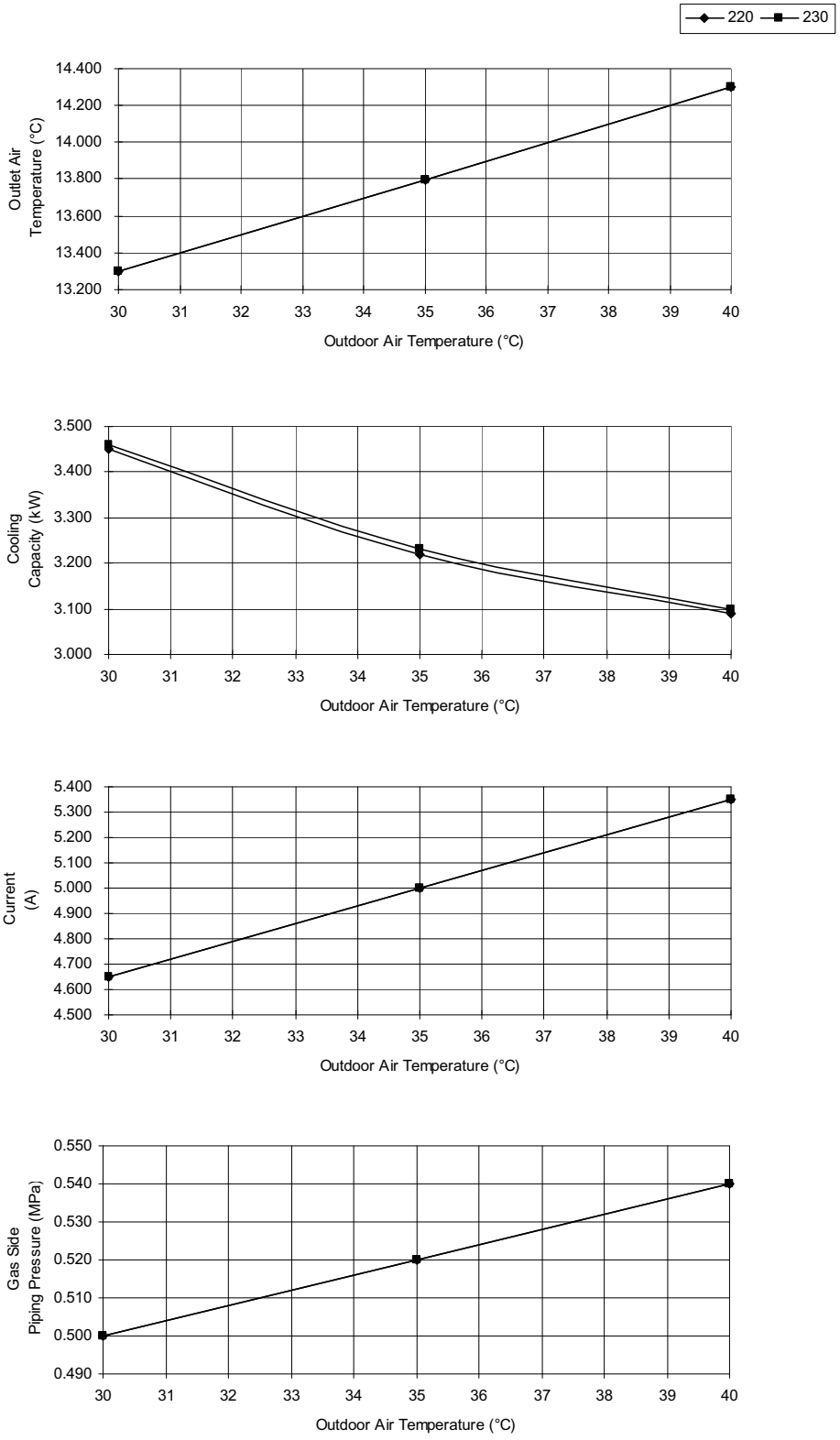




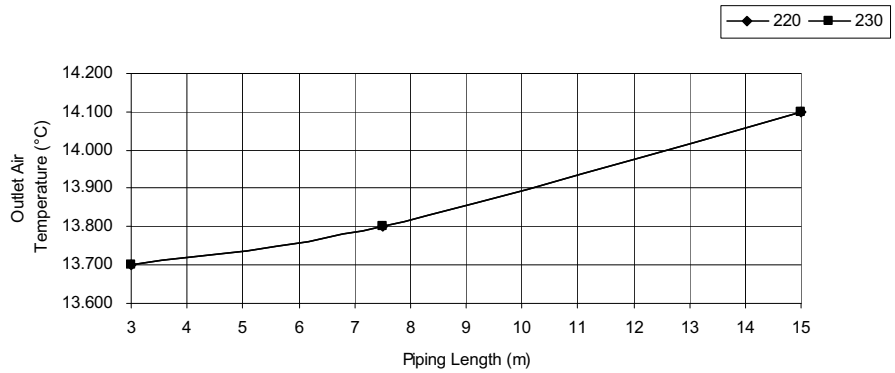


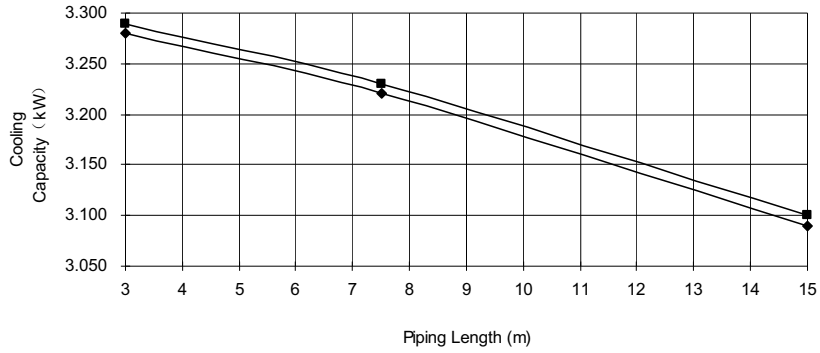
17.2.2 CS-A12KKD-2 CU-A12KKD-2

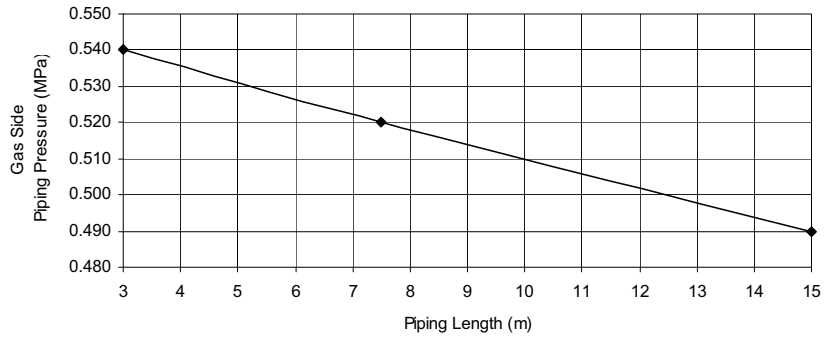
- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

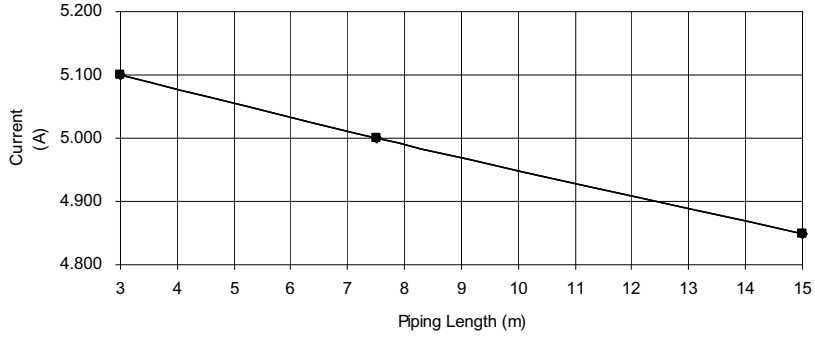


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

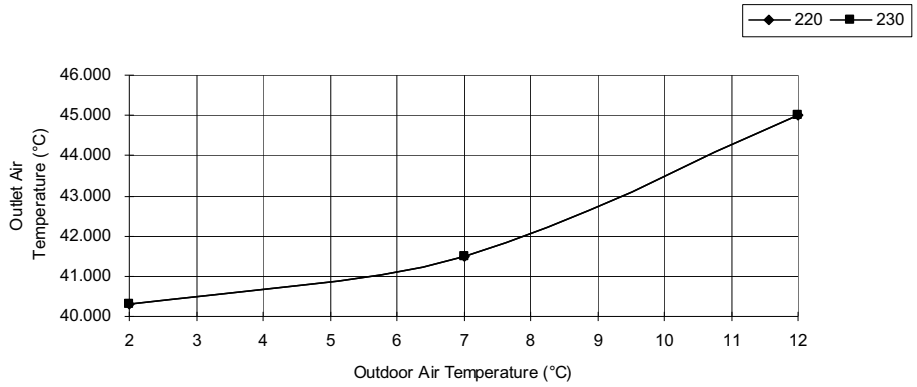


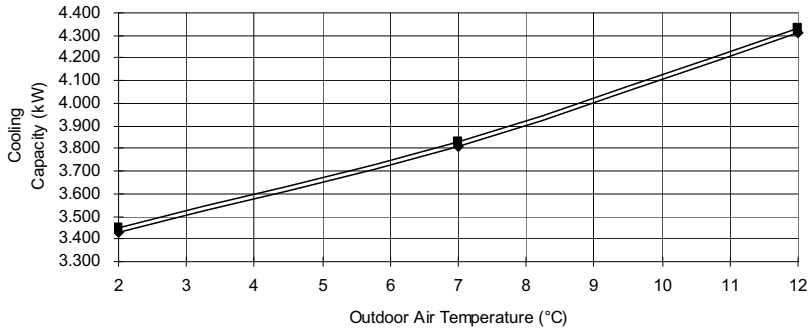


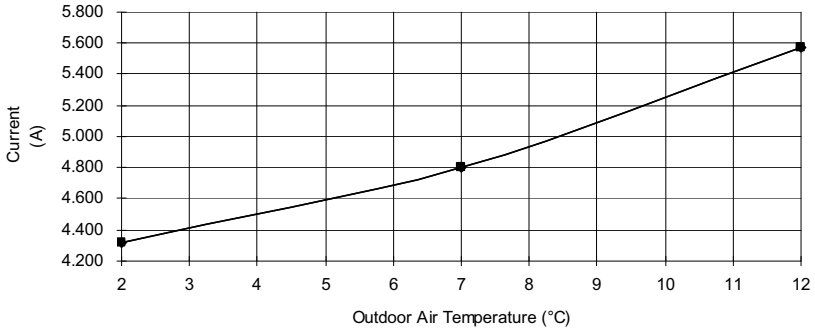


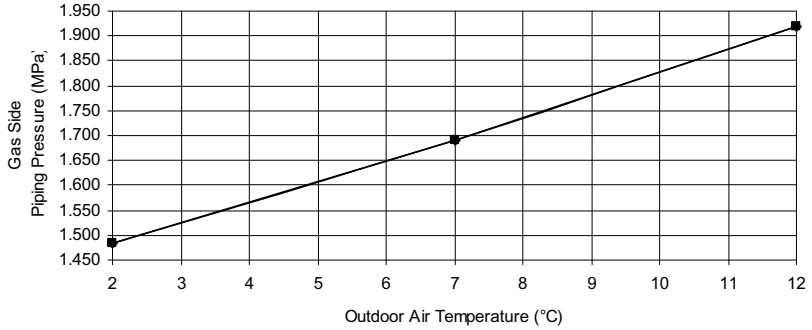


- Heating Characteristic
  - Room temperature: 20°C
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 7.5m

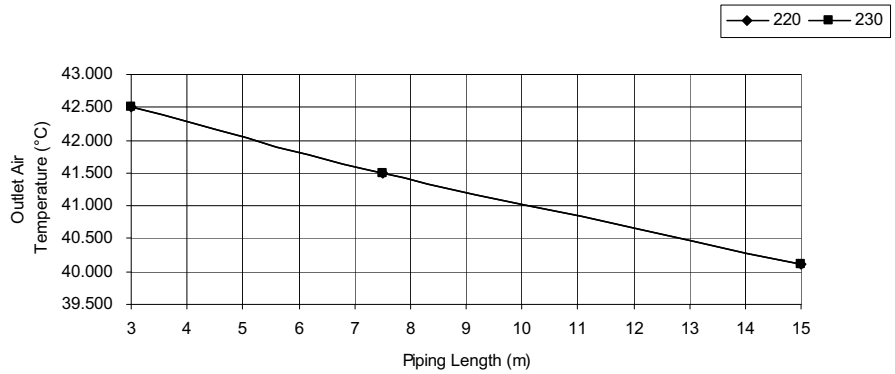


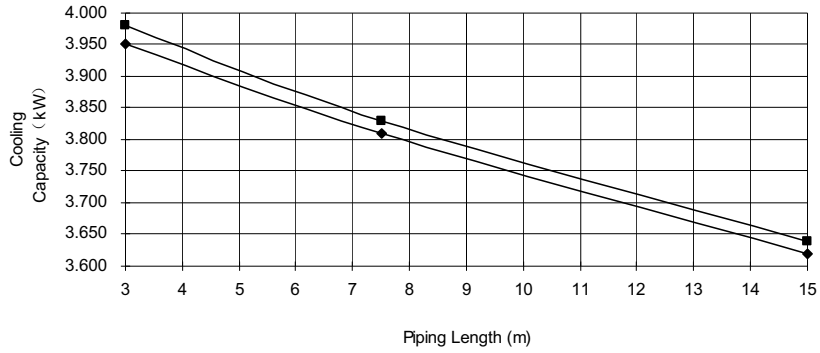


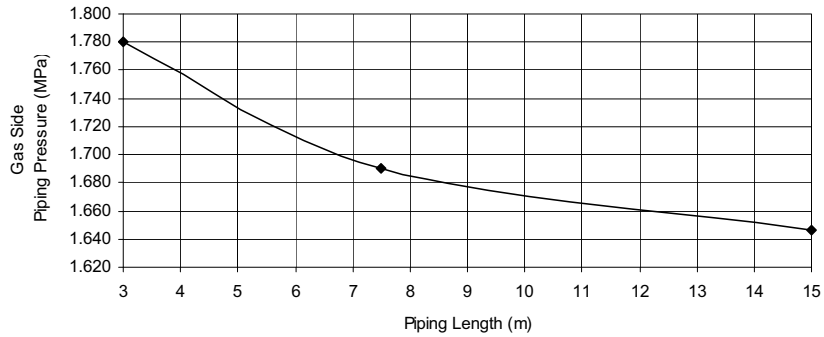


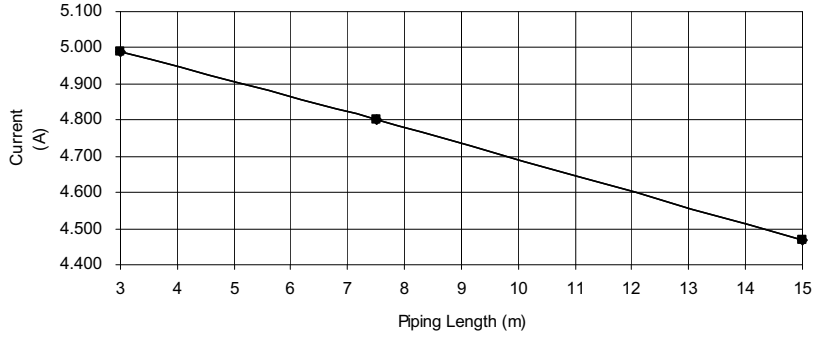


- Piping Length Characteristic
  - Outdoor temperature: 7°C (DBT), 6°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 7.5m



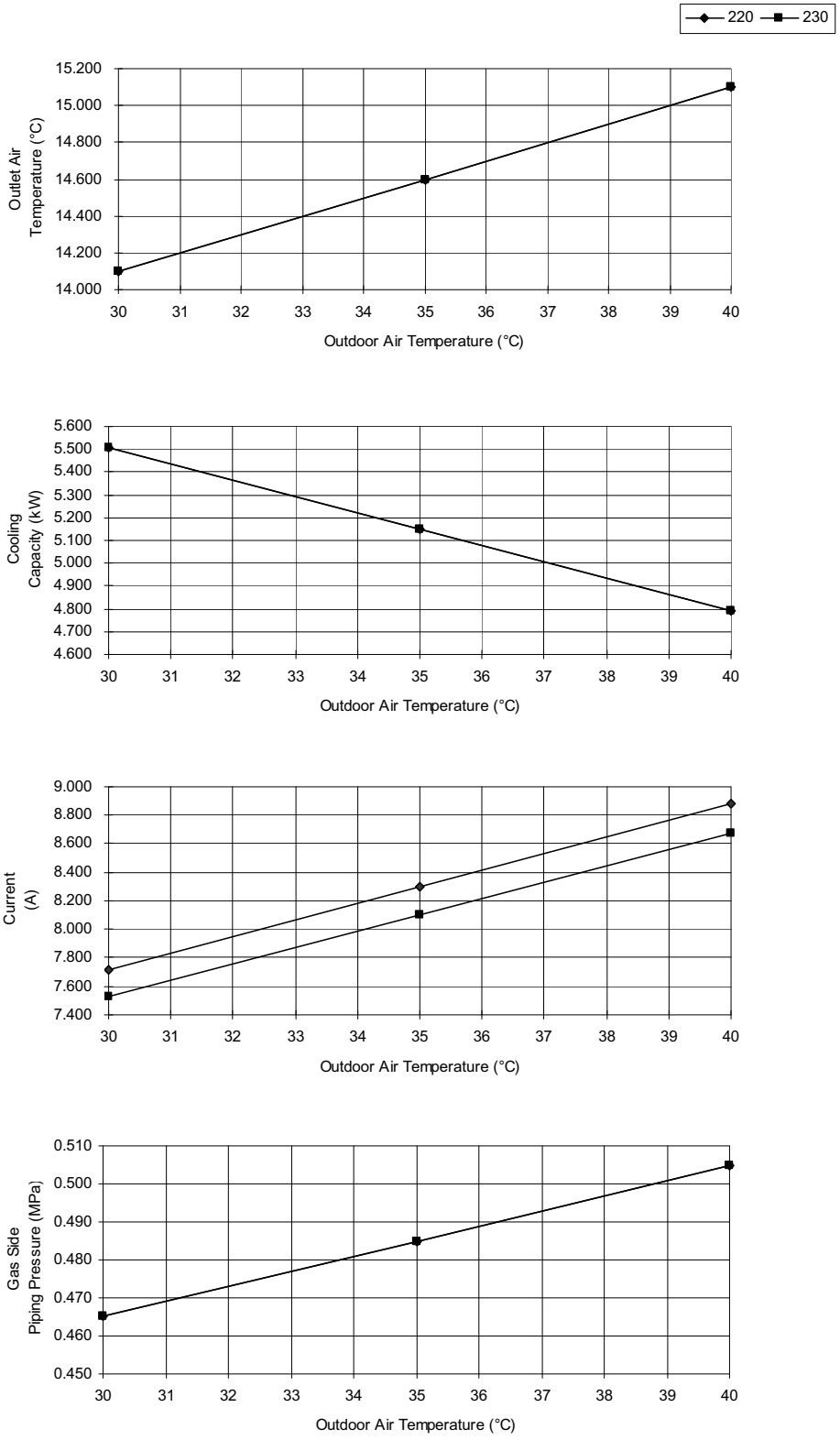




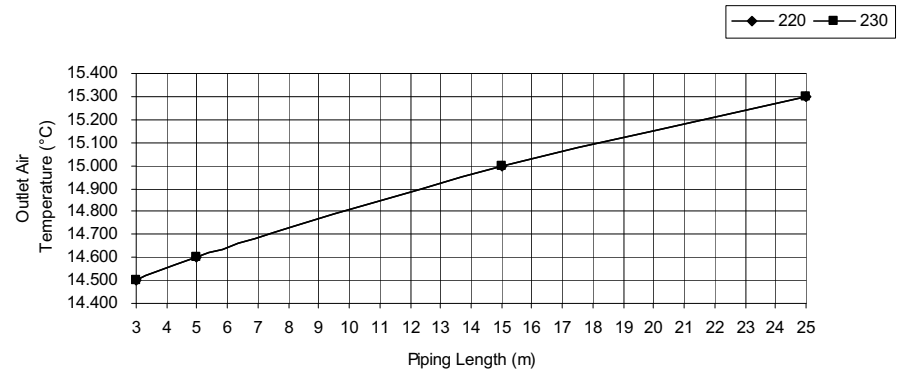


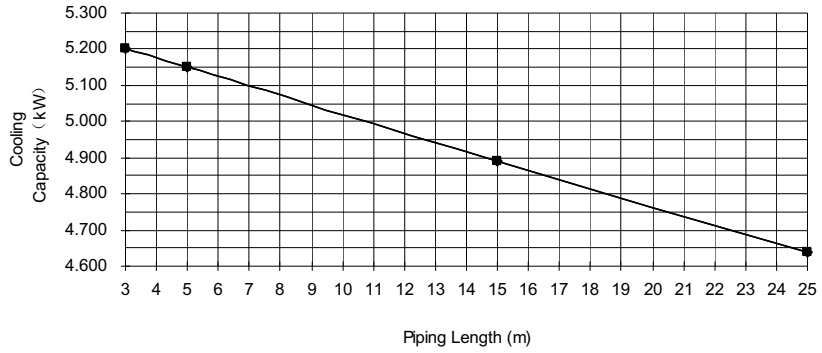
17.2.3 CS-A18KKD-2 CU-A18KKD-2

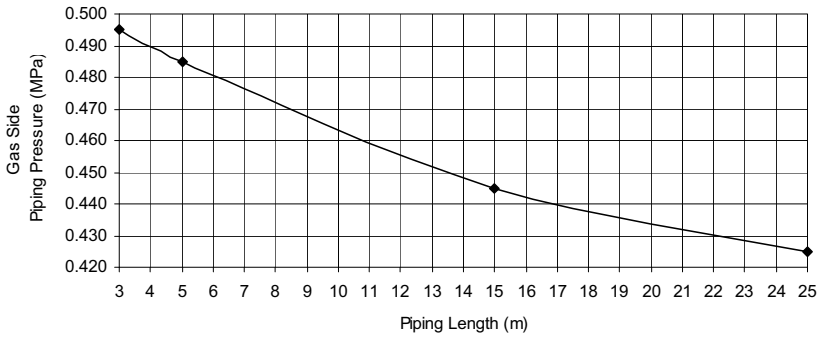
- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

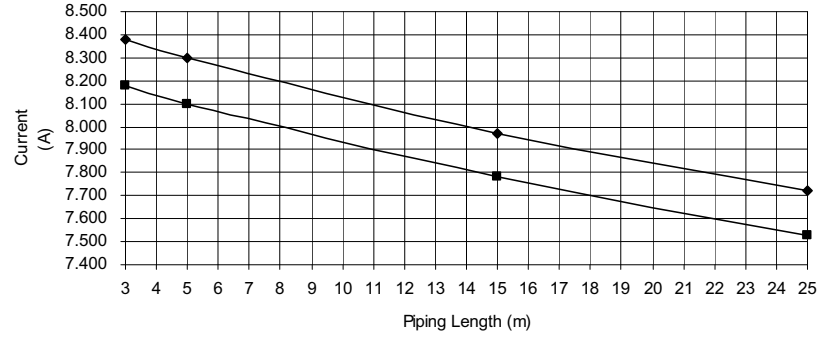


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

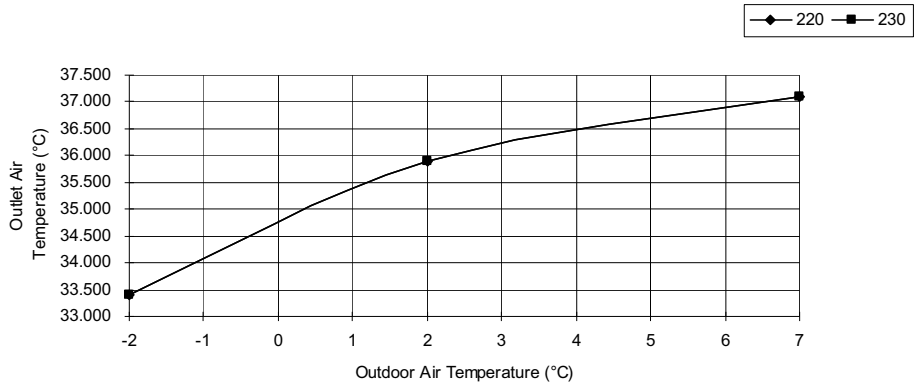


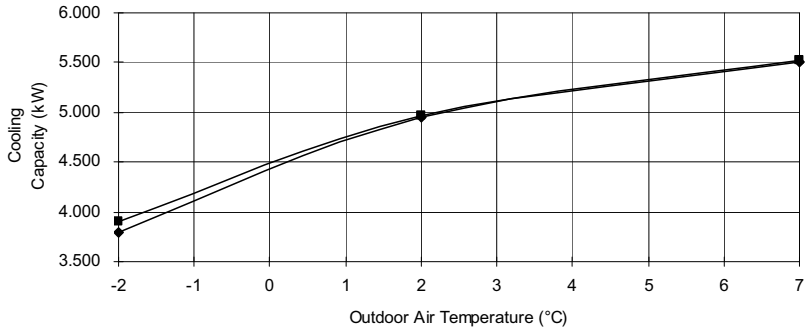


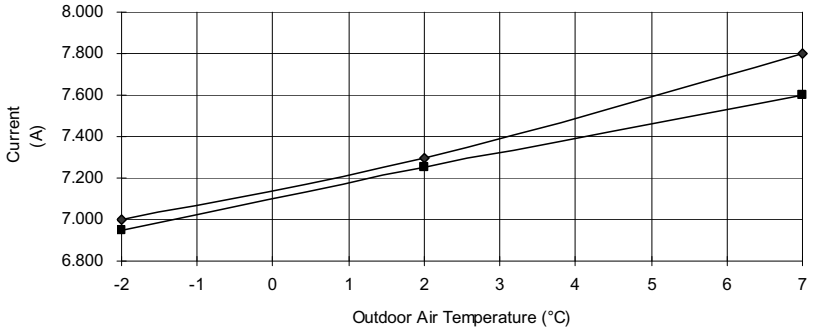


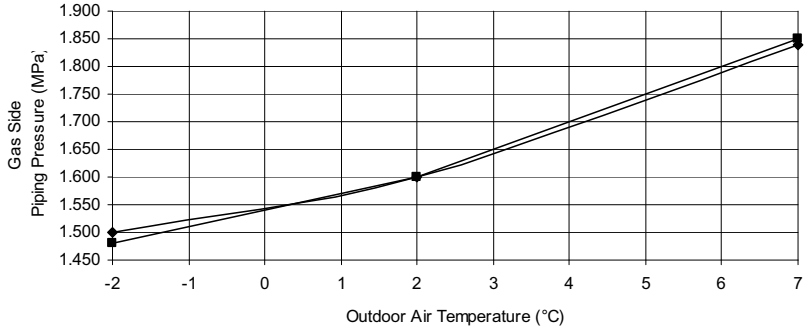


- Heating Characteristic
  - Room temperature: 20°C
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m

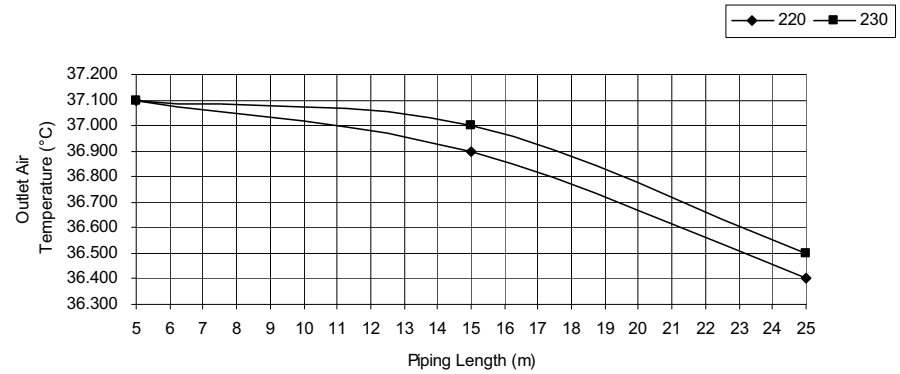


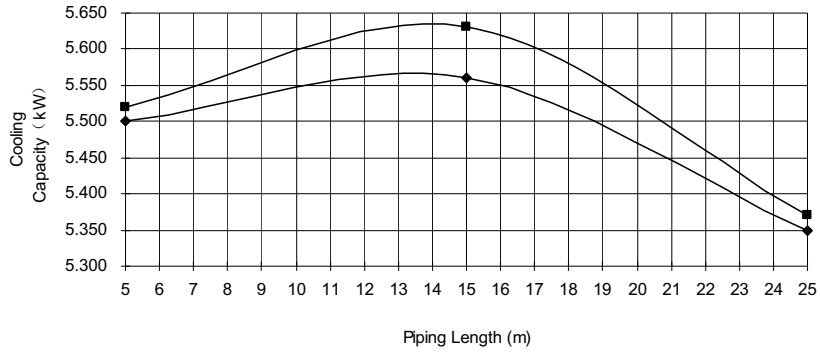


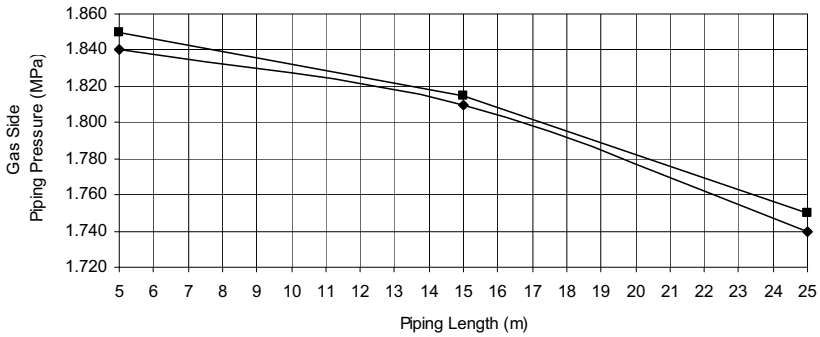


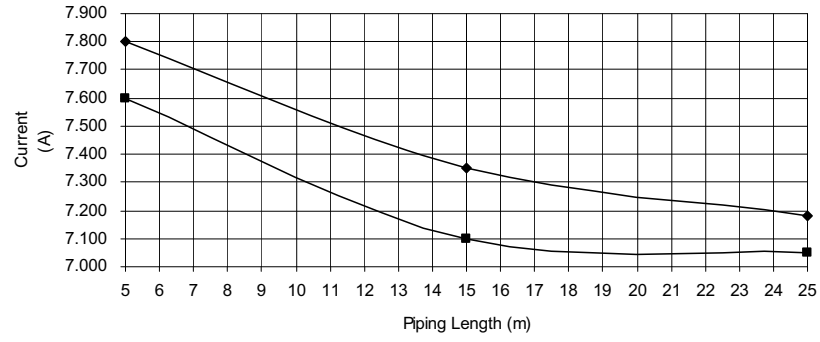


- Piping Length Characteristic
  - Outdoor temperature: 7°C (DBT), 6°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m



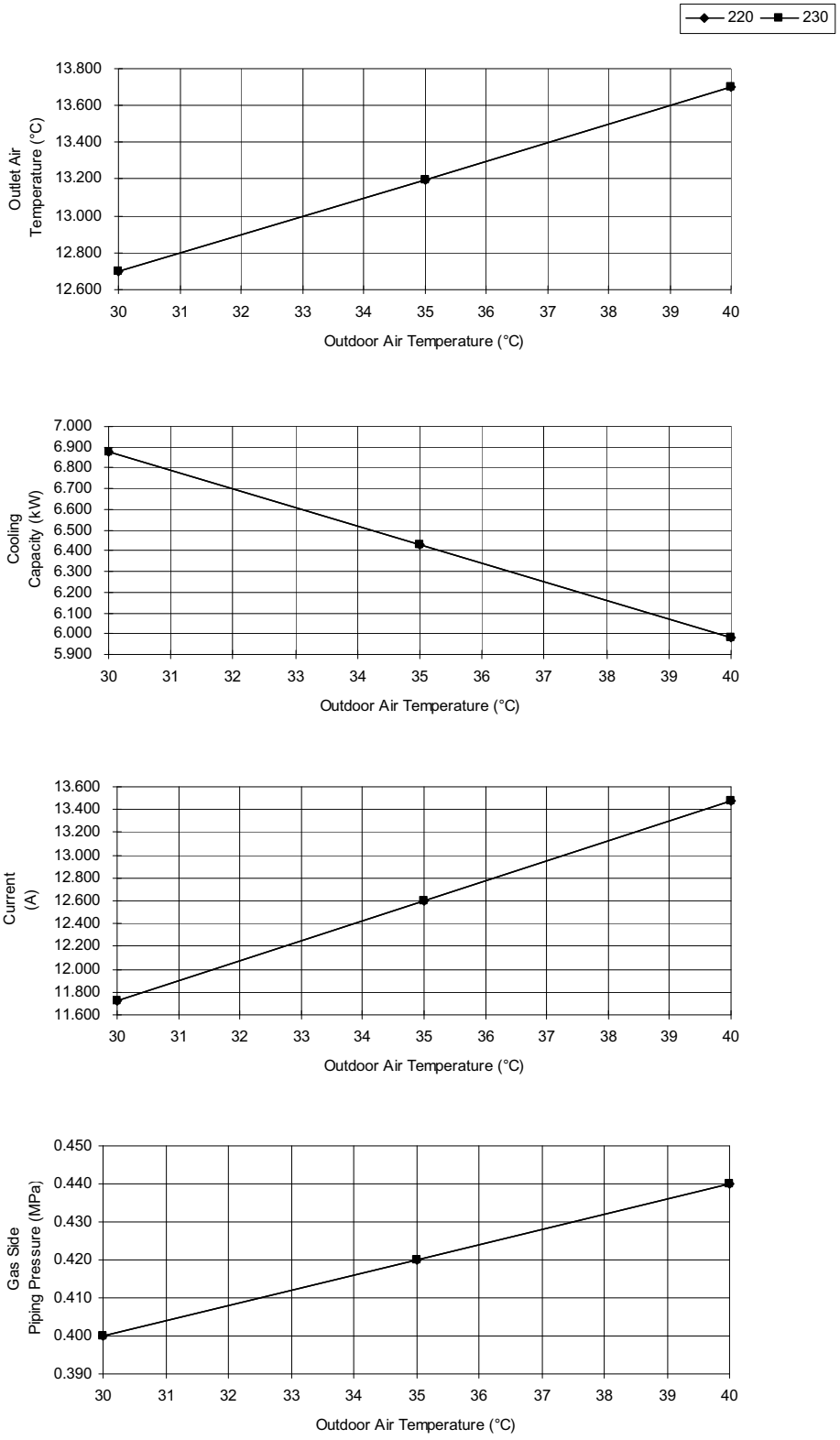




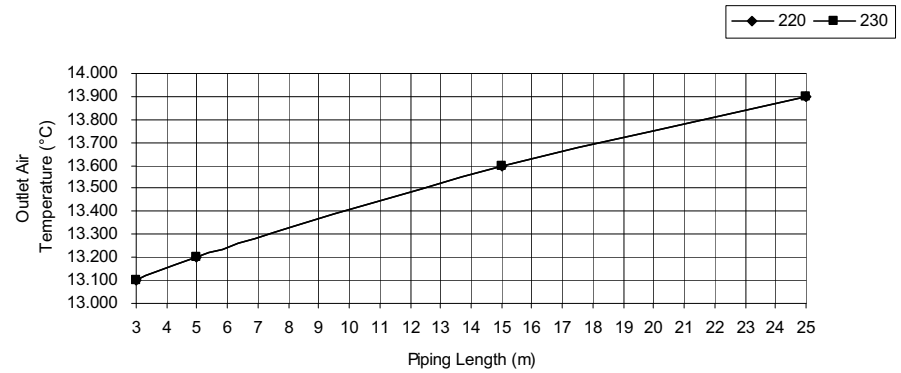


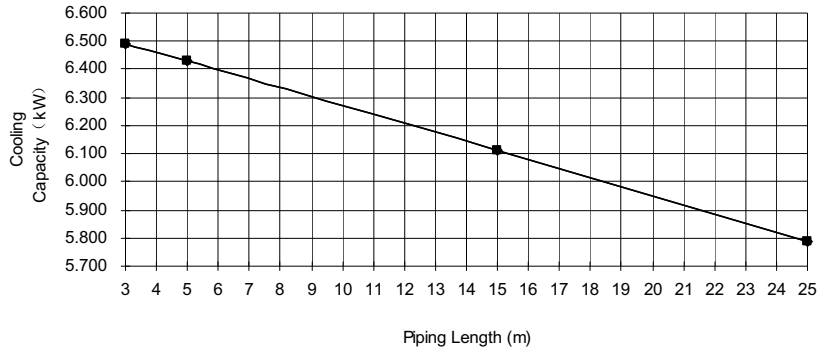
17.2.4 CS-A24KKD-2 CU-A24KKD-2

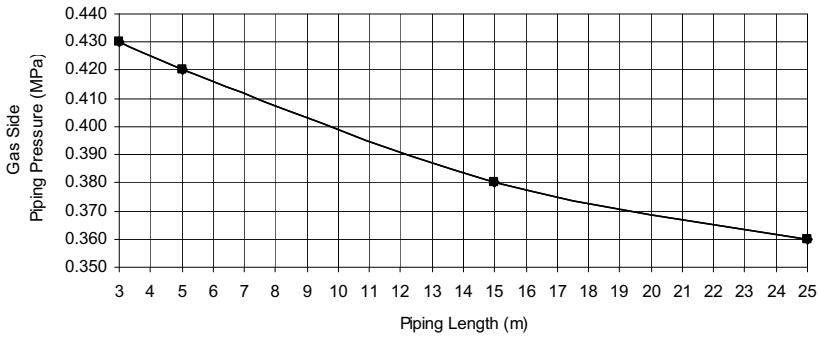
- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

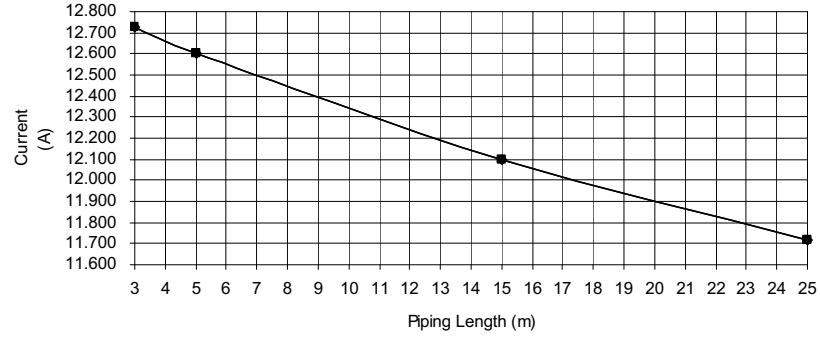


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

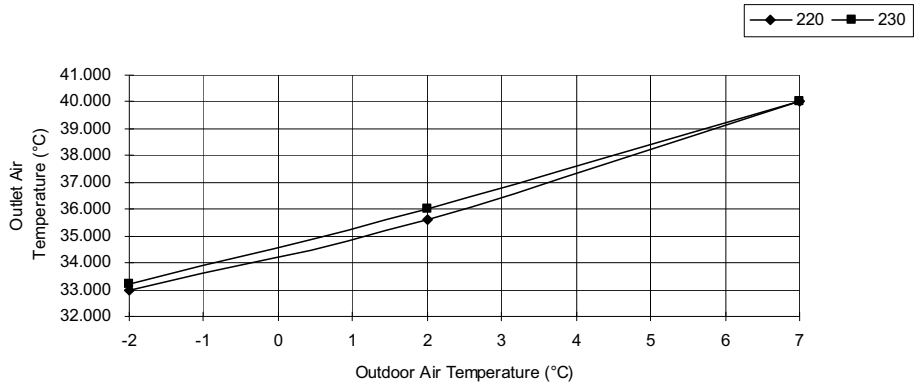


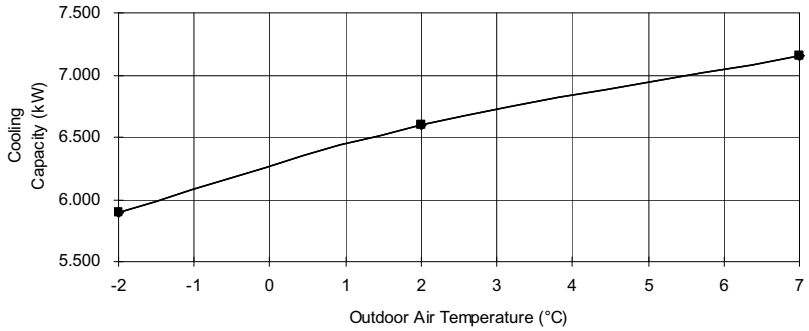


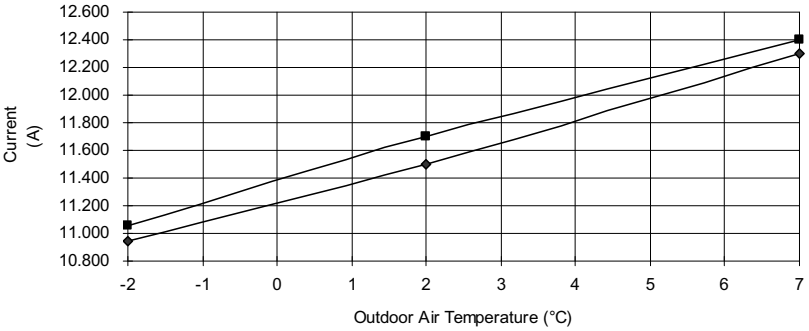


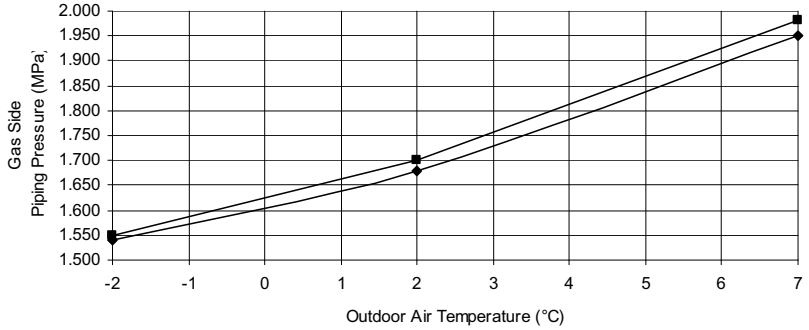


- Heating Characteristic
  - Room temperature: 20°C
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m

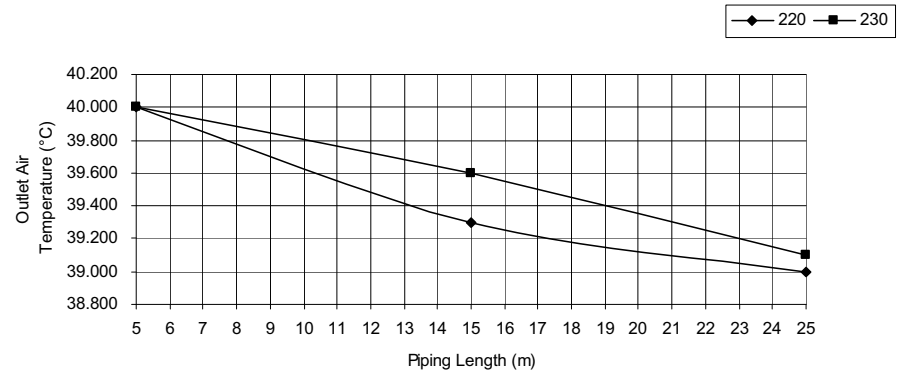


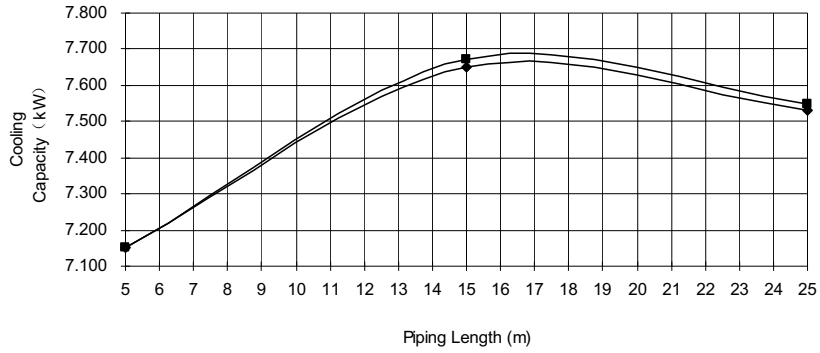


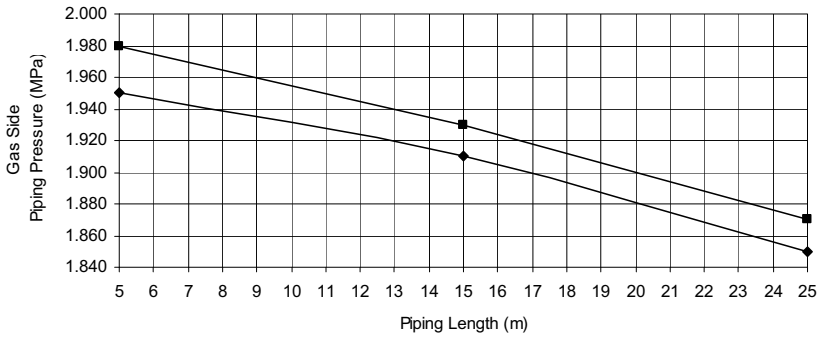


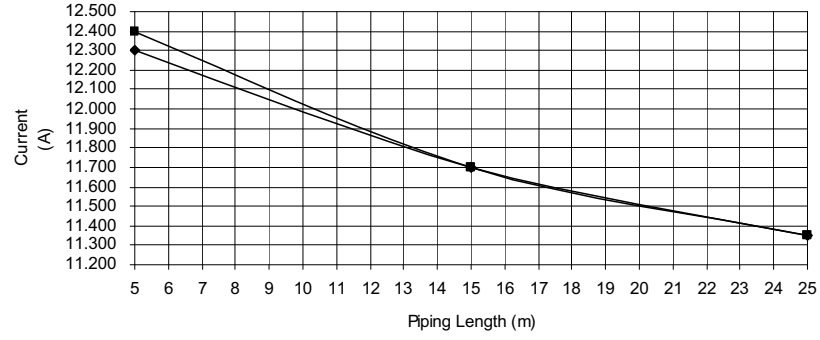


- Piping Length Characteristic
  - Outdoor temperature: 7°C (DBT), 6°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m



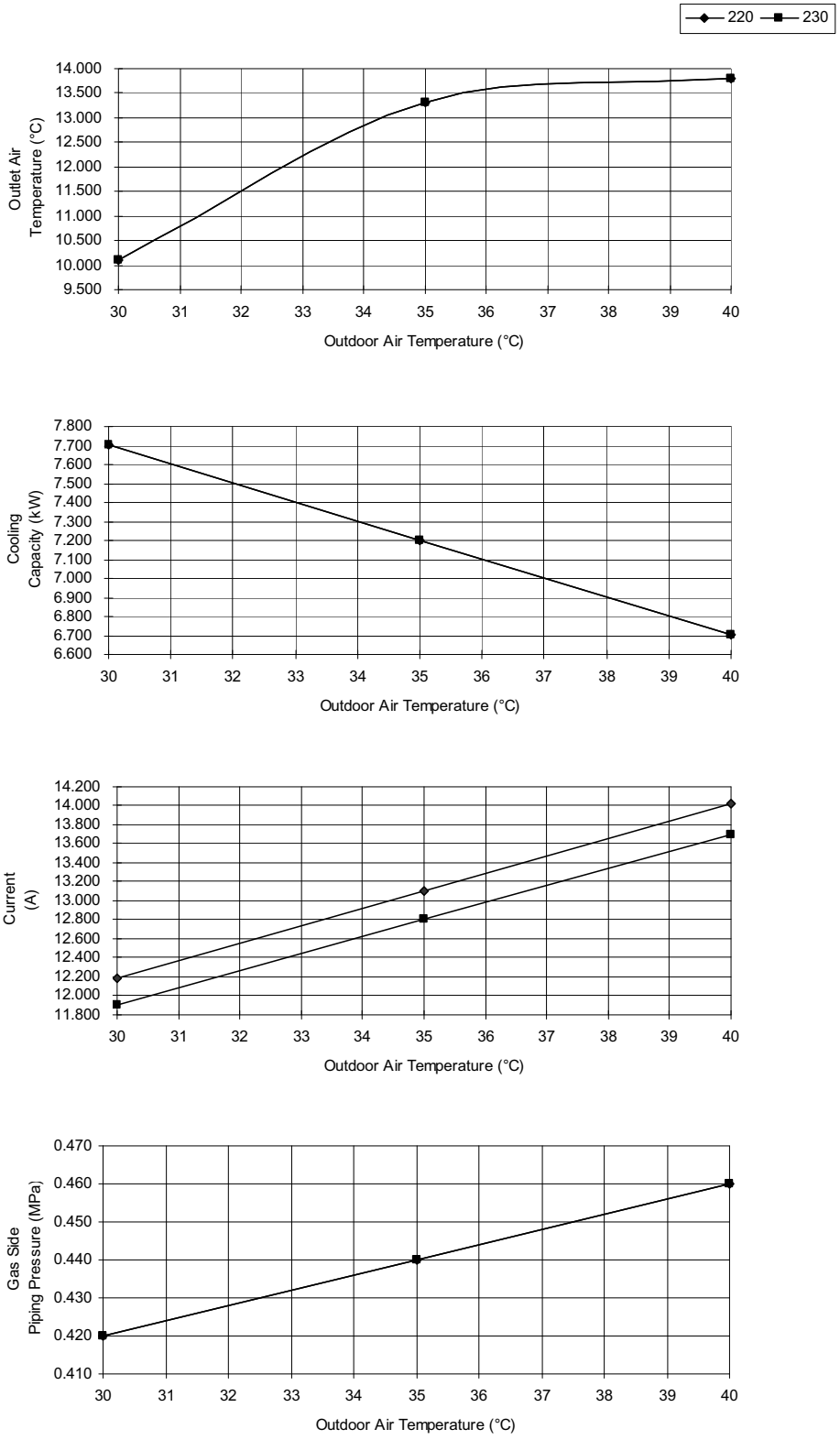




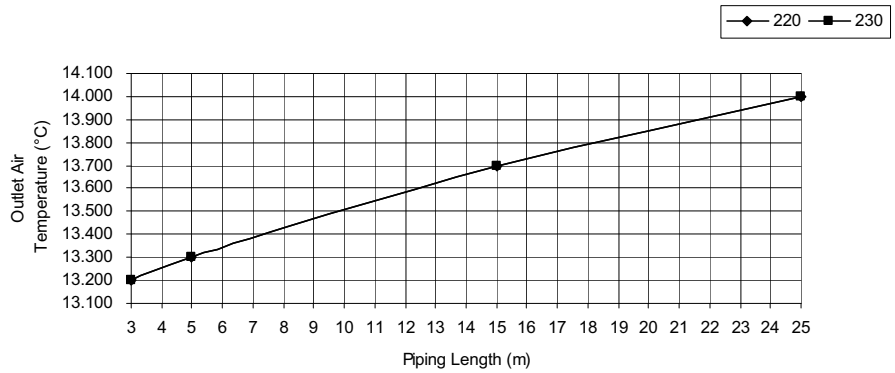


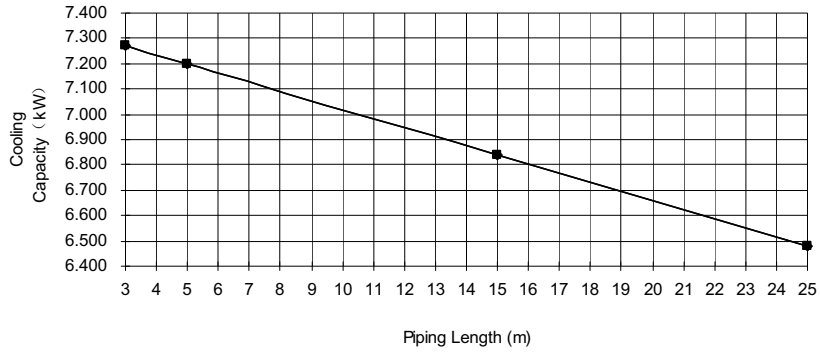
17.2.5 CS-A28KKD-2 CU-A28KKD-2

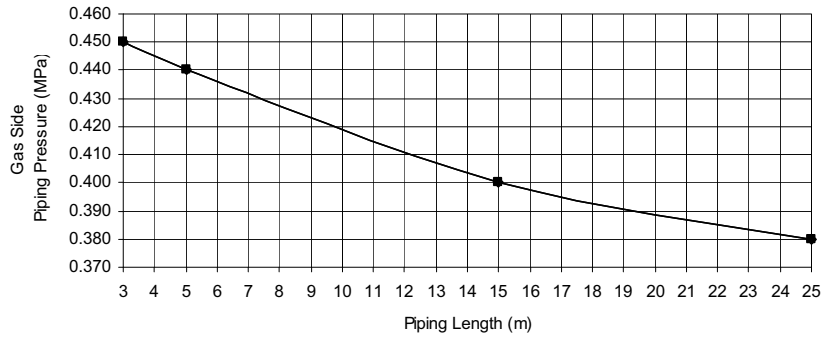
- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

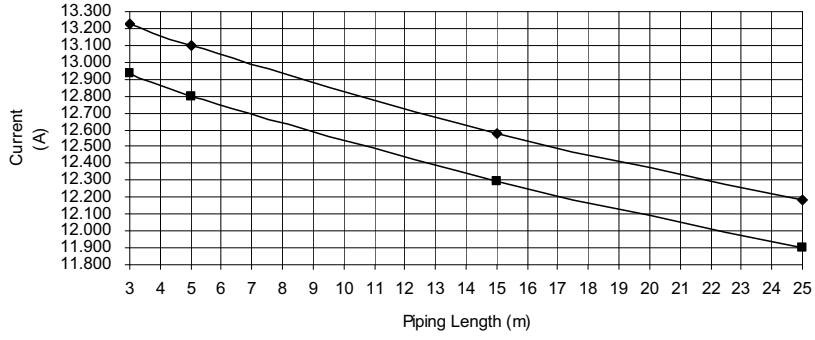


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5m

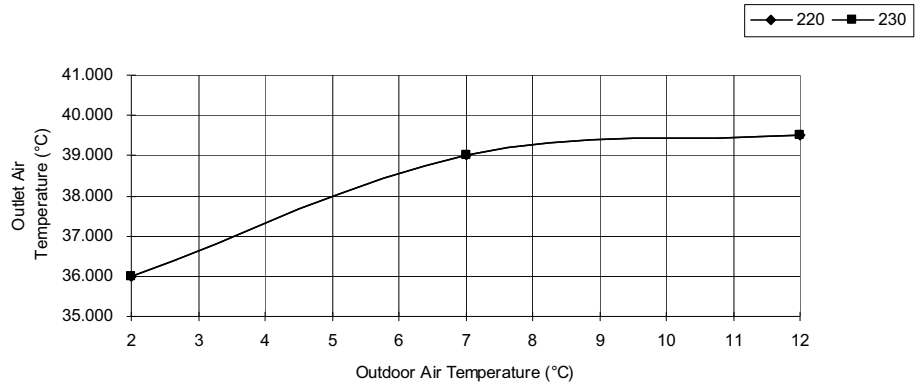


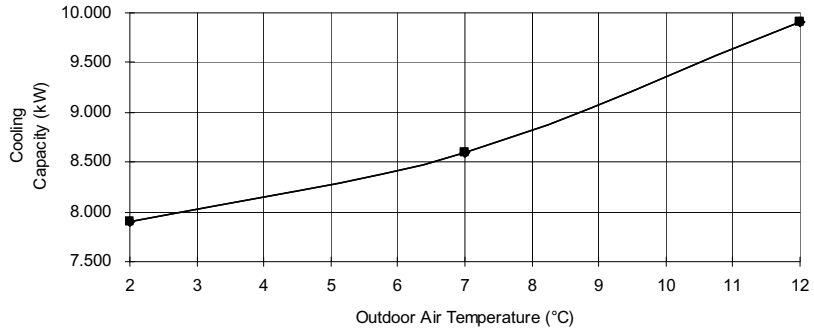


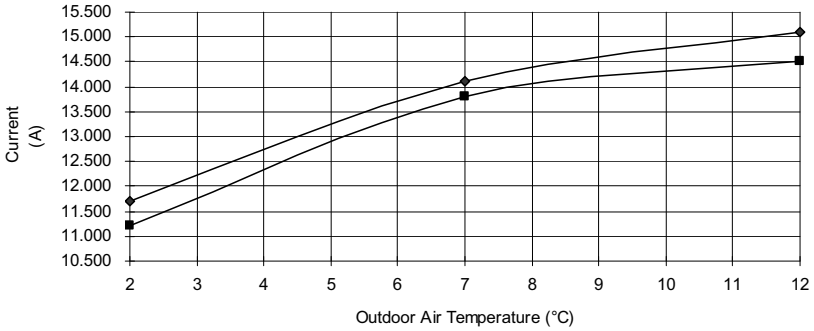


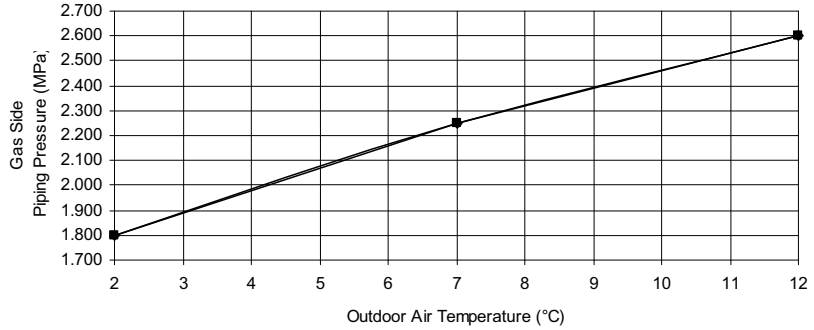


- Heating Characteristic
  - Room temperature: 20°C
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m

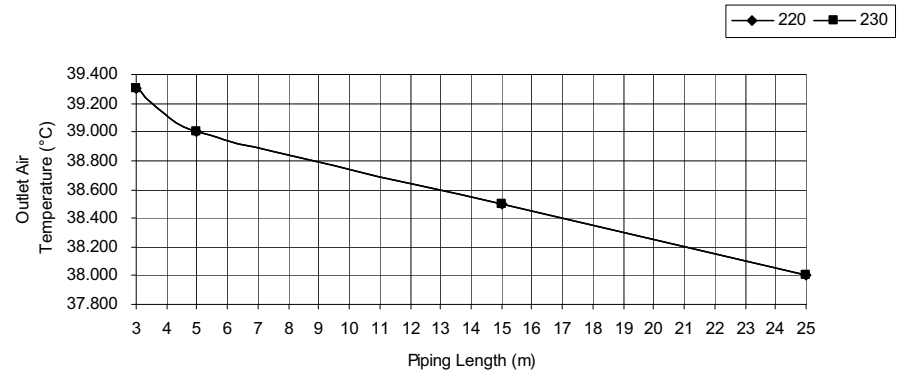


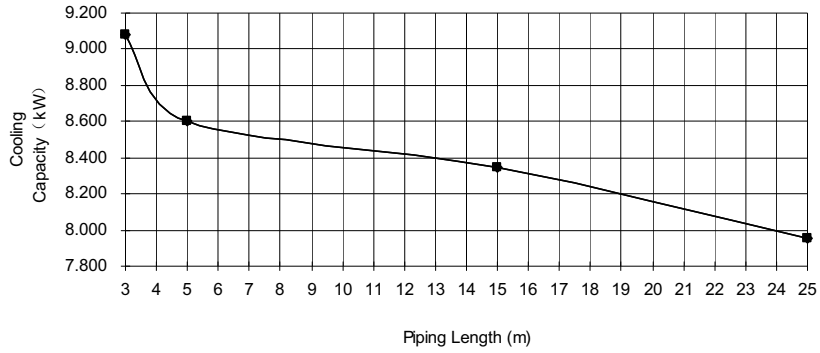


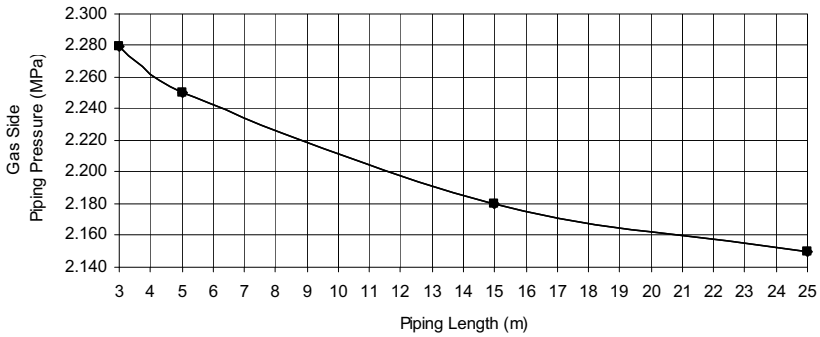


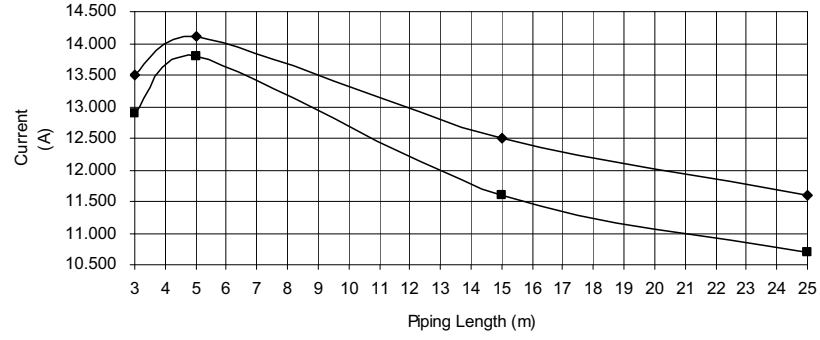


- Piping Length Characteristic
  - Outdoor temperature: 7°C (DBT), 6°C (WBT)
  - Operation condition: High fan speed (Rated Frequency)
  - Piping length: 5m





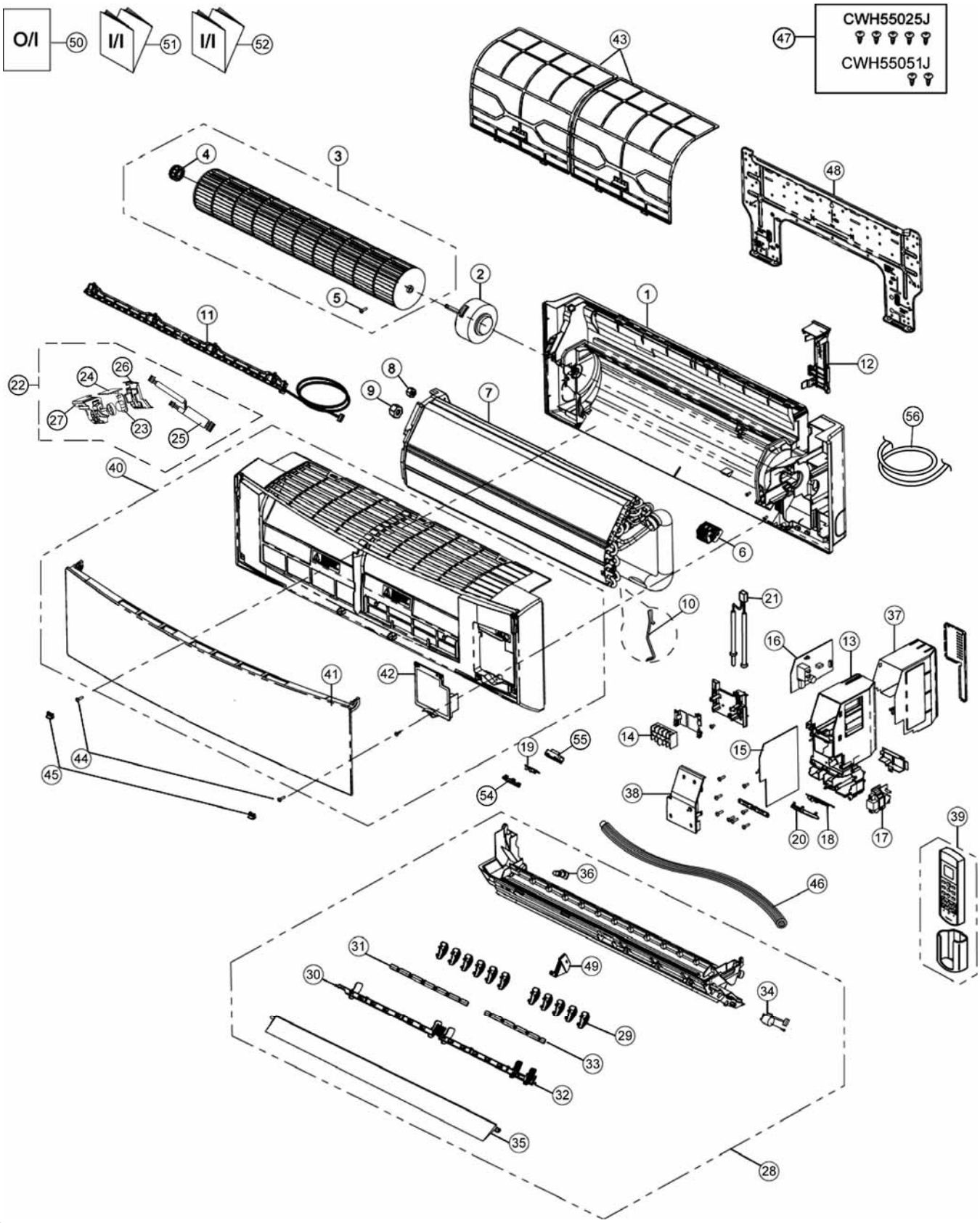




18. Exploded View and Replacement Parts List

18.1 Indoor Unit

18.1.1 CS-A9KKD-2 CS-A12KKD-2



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

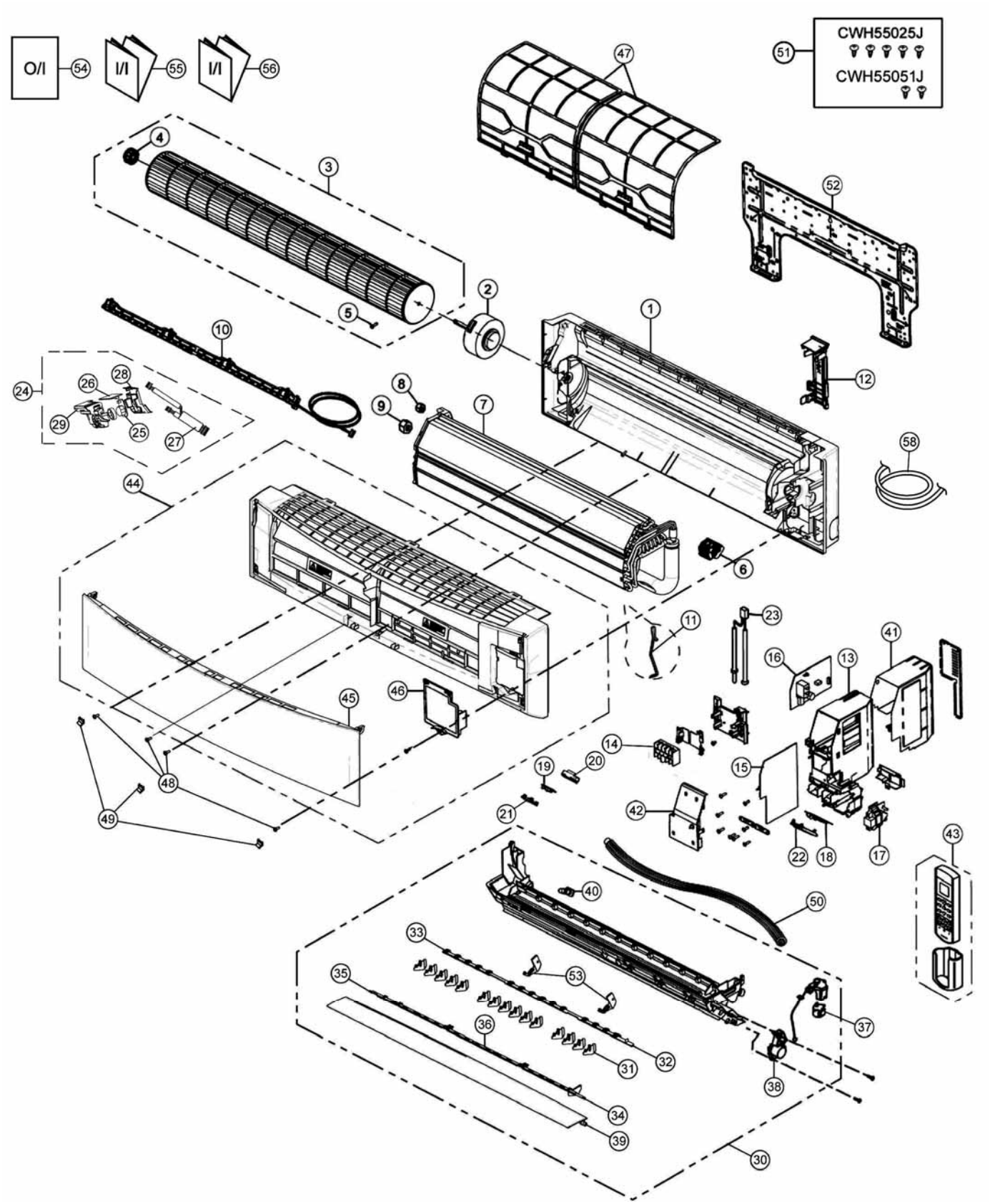
REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-A9KKD-2	CS-A12KKD-2	REMARK
1	CHASSY COMPLETE	1	CWD50C1653	←	
2	FAN MOTOR	1	CWA921409	CWA921415	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1076	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	
6	ION GENERATOR	1	CWH94C0028	←	
7	EVAPORATOR CO.	1	CWB30C3154	CWB30C2945	
8	FLARE NUT (LIQUID)	1	CWT251026	←	
9	FLARE NUT (GAS)	1	CWT251061	CWT251062	
10	CLIP FOR SENSOR	1	CWH32143	←	
11	E-ION AIR PURIFYING SYSTEM	1	CWD93C1090	←	
12	BACK COVER CHASSIS	1	CWD933233	←	
13	CONTROL BOARD CASING	1	CWH102370	←	
14	TERMINAL BOARD COMPLETE	1	CWA28C2426	CWA28C2428	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C4507	CWA73C4506	O
16	ELECTRONIC CONTROLLER - POWER	1	CWA745301	←	O
17	ELECTRONIC CONTROLLER - HVU	1	CWA745348	←	O
18	ELECTRONIC CONTROLLER - INDICATOR	1	CWA745820	←	O
19	ELECTRONIC CONTROLLER - RECEIVER	1	CWA745288	←	O
20	INDICATOR HOLDER	1	CWD933021	←	
21	SENSOR COMPLETE	1	CWA50C2401	←	
22	SENSOR COMPLETE (ECO)	1	CWA50C2708	←	
23	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	←	
24	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA745790	←	
25	LEAD WIRE - PCB ECO	1	CWA67C8483	←	
26	COVER FOR PCB ECO (BOTTOM)	1	CWD933193	←	
27	COVER FOR PCB ECO (UPPER)	1	CWD933192	←	
28	DISCHARGE GRILLE COMPLETE	1	CWE20C3084	←	
29	VERTICAL VANE	11	CWE241287	←	
30	CONNECTING BAR	1	CWE261152	←	
31	CONNECTING BAR	1	CWE261153	←	
32	CONNECTING BAR	1	CWE261154	←	
33	CONNECTING BAR	1	CWE261155	←	
34	A.S.MOTOR DC SINGLE 12V300 OHM	1	CWA981240	←	O
35	HORIZONTAL VANE COMPLETE	1	CWE24C1268	←	
36	CAP - DRAIN TRAY	1	CWH521096	←	
37	CONTROL BOARD TOP COVER	1	CWH131350	←	
38	CONTROL BOARD FRONT COVER	1	CWH13C1183	←	
39	REMOTE CONTROL COMPLETE	1	CWA75C3570	←	O
40	FRONT GRILLE COMPLETE	1	CWE11C4411	←	O
41	INTAKE GRILLE COMPLETE	1	CWE22C1507	←	O
42	GRILLE DOOR COMPLETE	1	CWE14C1029	←	
43	E-ION FILTER	2	CWD00K1014	←	
44	SCREW - FRONT GRILLE	2	XTT4+16CFJ	←	
45	CAP - FRONT GRILLE	2	CWH521194	←	
46	DRAIN HOSE	1	CWH851173	←	
47	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	
48	INSTALLATION PLATE	1	CWH361097	←	
49	FULCRUM	1	CWH621102	←	
50	OPERATING INSTRUCTION	1	CWF567470	←	
51	INSTALLATION INSTRUCTION	1	CWF614251	←	
52	INSTALLATION INSTRUCTION	1	CWF614252	←	
54	COVER FOR RECEIVER (UPPER)	1	CWD933022	←	
55	COVER FOR RECEIVER (BOTTOM)	1	CWD933209	←	

56	P.S. CORD CO.	1	CWA20C2827	←	

(Note)

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

18.1.2 CS-A18KKD-2 CS-A24KKD-2 CS-A28KKD-2



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

REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-A18KKD-2	CS-A24KKD-2	CS-A28KKD-2	REMARK
1	CHASSY COMPLETE	1	CWD50C1654	←	←	
2	FAN MOTOR	1	L6CBYYYL0037	L6CBYYYL0039	←	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1077	←	←	
4	BEARING ASS'Y	1	CWH64K007	←	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	←	
6	ION GENERATOR	1	CWH94C0028	←	←	
7	EVAPORATOR	1	CWB30C2730	CWB30C2779	CWB30C2777	
8	FLARE NUT (LIQUID)	1	CWT251026	←	←	
9	FLARE NUT (GAS)	1	CWT251062	CWT251036	←	
10	E-ION AIR PURIFYING SYSTEM	1	CWD93C1090	←	←	
11	HOLDER SENSOR	1	CWH32143	←	←	
12	BACK COVER CHASSIS	1	CWD933031	←	←	
13	CONTROL BOARD CASING	1	CWH102370	←	←	
14	TERMINAL BOARD COMPLETE	1	CWA28C2358	←	CWA28C2167J	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C4515	CWA73C4514	CWA73C4199	O
16	ELECTRONIC CONTROLLER - POWER	1	CWA745304	←	CWA745364	O
17	ELECTRONIC CONTROLLER-HVU	1	CWA745348	←	←	O
18	ELECTRONIC CONTROLLER-INDICATOR	1	CWA745820	←	←	O
19	ELECTRONIC CONTROLLER-RECEIVER	1	CWA745288	←	←	O
20	COVER FOR RECEIVER(BOTTOM)	1	CWD933209	←	←	
21	COVER FOR RECEIVER(UPPER)	1	CWD933022	←	←	
22	INDICATOR HOLDER	1	CWD933021	←	←	
23	SENSOR COMPLETE	1	CWA50C2401	←	←	O
24	SENSOR COMPLETE(ECO)	1	CWA50C2709	←	←	O
25	ELECTRONIC CONT(ECO SENSOR)	1	CWA745791	←	←	O
26	ELECTRONIC CONT(COMPARATOR)	1	CWA745790	←	←	O
27	LEAD WIRE - PCB ECO	1	CWA67C8484	←	←	
28	COVER FOR PCB ECO(BOTTOM)	1	CWD933193	←	←	
29	COVER FOR PCB ECO(UPPER)	1	CWD933192	←	←	
30	DISCHARGE GRILLE COMPLETE	1	CWE20C3007	←	←	
31	VERTICAL VANE	15	CWE241289	←	←	
32	CONNECTING BAR	1	CWE261156	←	←	
33	CONNECTING BAR	1	CWE261158	←	←	
34	CONNECTING BAR	1	CWE261157	←	←	
35	CONNECTING BAR	1	CWE261159	←	←	
36	CONNECTING BAR	1	CWE261160	←	←	
37	A.S.MOTOR,DC SINGLE 12V 300OHM	1	CWA981241	←	←	O
38	A.S MOTOR,DC SINGLE 12V300 OHM	1	CWA98K1014	←	←	O
39	HORIZONTAL VANE	1	CWE24C1295	←	←	
40	CAP - DRAIN TRAY	1	CWH521096	←	←	
41	CONTROL BOARD TOP COVER	1	CWH131350	←	←	
42	CONTROL BOARD FRONT COVER	1	CWH13C1183	←	←	
43	REMOTE CONTROL COMPLETE	1	CWA75C3562	←	←	O
44	FRONT GRILLE COMPLETE	1	CWE11C4422	CWE11C4416	←	O
45	INTAKE GRILLE COMPLETE	1	CWE22C1483	←	←	O
46	GRILLE DOOR	1	CWE14C1029	←	←	
47	E-ION FILTER	2	CWD00K1017	←	←	
48	SCREW - FRONT GRILLE	4	XTT4+16CFJ	←	←	
49	CAP - FRONT GRILLE	3	CWH521194	←	←	
50	DRAIN HOSE	1	CWH851173	←	←	
51	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	←	
52	INSTALLATION PLATE	1	CWH361098	←	←	
53	FULCRUM	2	CWH621103	←	←	
54	OPERATING INSTRUCTION	1	CWF567470	←	←	
55	INSTALLATION INSTRUCTION	1	CWF614251	←	←	

56	INSTALLATION INSTRUCTION	1	CWF614252	←	←	
58	POWER SUPPLY CORD-COMPLETE	1	CWA20C2829	CWA20C2836	-	

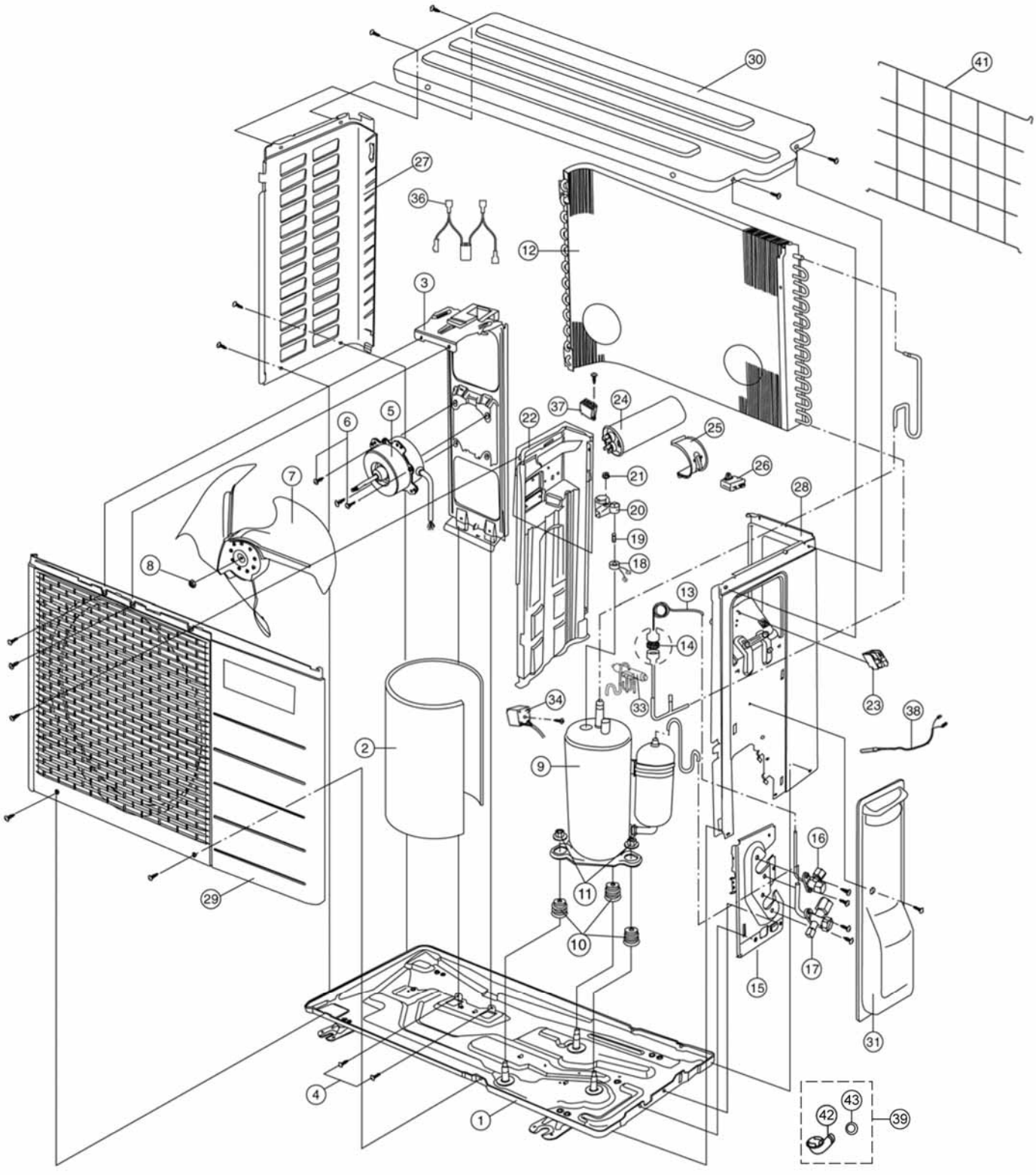
(Note)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 00029488).

“O” marked parts are recommended to be kept in stock.

18.2 Outdoor Unit

18.2.1 CU-A9KKD-2



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

REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-A9KKD-2	REMARK
1	CHASSY ASS'Y	1	CWD50K2112	
2	SOUND PROOF MATERIAL	1	CWG302255	
3	FAN MOTOR BRACKET	1	CWD541075	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	
5	FAN MOTOR	1	CWA951674	O
6	SCREW - FAN MOTOR MOUNT	3	CWH55406J	
7	PROPELLER FAN ASS'Y	1	CWH03K1020	
8	NUT - PROPELLER FAN	1	CWH56053J	
9	COMPRESSOR	1	2PS156D3DA02	O
10	ANTI - VIBRATION BUSHING	3	CWH50077	
11	NUT - COMPRESSOR MOUNT	3	CWH56000J	
12	CONDENSER	1	CWB32C2987	
13	CAPILLARY TUBE ASSY	1	CWB15K1283	
14	STRAINER	1	CWB11025	
15	HOLDER COUPLING	1	CWH351047	
16	2-WAY VALVE (LIQUID)	1	CWB021217	O
17	3-WAY VALVE (GAS)	1	CWB011257	O
18	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C6142	
19	HOLDER - O.L.P.	1	CWH7041200	
20	TERMINAL COVER	1	CWH171011	
21	NUT - TERMINAL COVER	1	CWH7080300J	
22	SOUND PROOF BOARD	1	CWH151074	
23	TERMINAL BOARD ASS'Y	1	CWA28K1021J	
24	CAPACITOR - COM (30μF400V) (30μ/370V)	1	F0GAH306A004	O
25	HOLDER CAPACITOR	1	CWH301035	
26	CAPACITOR - F.M (2.0μF/440V)	1	DS441205NPQA	O
27	CABINET SIDE PLATE	1	CWE041110A	
28	CABINET SIDE PLATE CO.	1	CWE04C1042	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1048	
30	CABINET TOP PLATE	1	CWE031041A	
31	CONTROL BOARD COVER COMP	1	CWH13C1099	
33	4-WAYS VALVE	1	CWB001055	
34	V-COIL COMPLETE	1	CWA43C2187	
36	ELECTROLYTIC CAPACITOR	1	CWA32C1003	
37	ELECTRO MAGNETIC SWITCH	1	CWA00059	
38	OVERHEAT PROTECTOR COMPLETE	1	CWA14C1009	
39	ACCESSORY CO. (DRAIN ELBOW)	1	CWG87C900	
41	WIRE NET	1	CWD041057A	
42	FLEXIBLE PIPE	1	CWH5850080	
43	PACKING - L.TUBE	1	CWB81012	

(Note)

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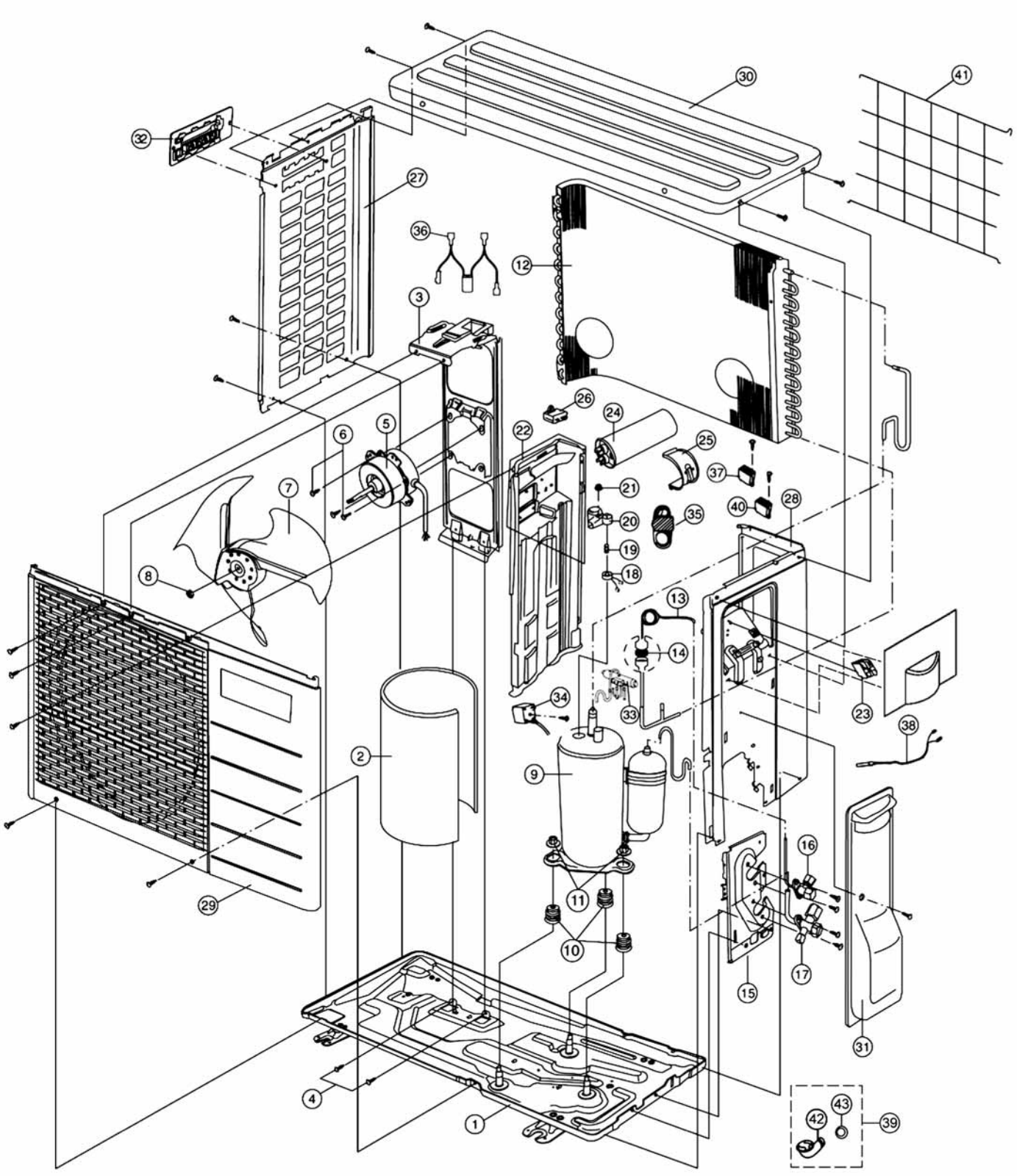
"O" marked parts are recommended to be kept in stock.

18.2.2 CU-A12KKD-2



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

REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-A12KKD-2	REMARK
1	CHASSY ASS'Y	1	CWD50K2074	
2	SOUND PROOF MATERIAL	1	CWG302110	
3	FAN MOTOR BRACKET	1	CWD541030	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	
5	FAN MOTOR	1	CWA951121J	O
6	SCREW - FAN MOTOR MOUNT	3	CWH55406J	
7	PROPELLER FAN ASS'Y	1	CWH03K1006	
8	NUT - PROPELLER FAN	1	CWH56053J	
9	COMPRESSOR	1	2PS206D2BA02	O
10	ANTI - VIBRATION BUSHING	3	CWH50055	
11	NUT - COMPRESSOR MOUNT	3	CWH561049	
12	CONDENSER	1	CWB32C2969	
13	CAPILLARY TUBE ASSY	1	CWB15K1283	
14	STRAINER	1	CWB11025	
15	HOLDER COUPLING	1	CWH351023	O
16	2-WAY VALVE (LIQUID)	1	CWB021117	O
17	3-WAY VALVE (GAS)	1	CWB011482	
18	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C7551	
19	HOLDER - O.L.P.	1	CWH7041200	
20	TERMINAL COVER	1	CWH171011	
21	NUT - TERMINAL COVER	1	CWH7080300J	
22	SOUND PROOF BOARD	1	CWH151023	
23	TERMINAL BOARD ASS'Y	1	CWA28K1021J	O
24	CAPACITOR - COM (30μF400V) (30μ/370V)	1	F0GAH356A001	
25	HOLDER CAPACITOR	1	CWH30060	O
26	CAPACITOR - F.M (2.0μF/440V)	1	DS441205NPQA	
27	CABINET SIDE PLATE	1	CWE041248A	
28	CABINET SIDE PLATE CO.	1	CWE04C1118	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1034	
30	CABINET TOP PLATE	1	CWE031014A	
31	CONTROL BOARD COVER COMP	1	CWH13C1064	
32	HANDLE	1	CWE161010	
33	4-WAYS VALVE	1	CWB001026J	
34	V-COIL COMPLETE	1	CWA43C2273	
35	TUBE ASSY (CHK VALVECAP.TUBE)	1	CWT01C3650	
36	ELECTROLYTIC CAPACITOR	1	CWA32C067	
37	ELECTRO MAGNETIC SWITCH	1	CWA00059	
38	OVERHEAT PROTECTOR COMPLETE	1	CWA14C1009	
39	ACCESSORY CO. (DRAIN ELBOW)	1	CWG87C900	
40	ELECTRO MAGNETIC RELAY	1	K6A2C7A00002	
41	WIRE NET	1	CWD041111A	
42	FLEXIBLE PIPE	1	CWH5850080	
43	PACKING - L.TUBE	1	CWB81012	

(Note)

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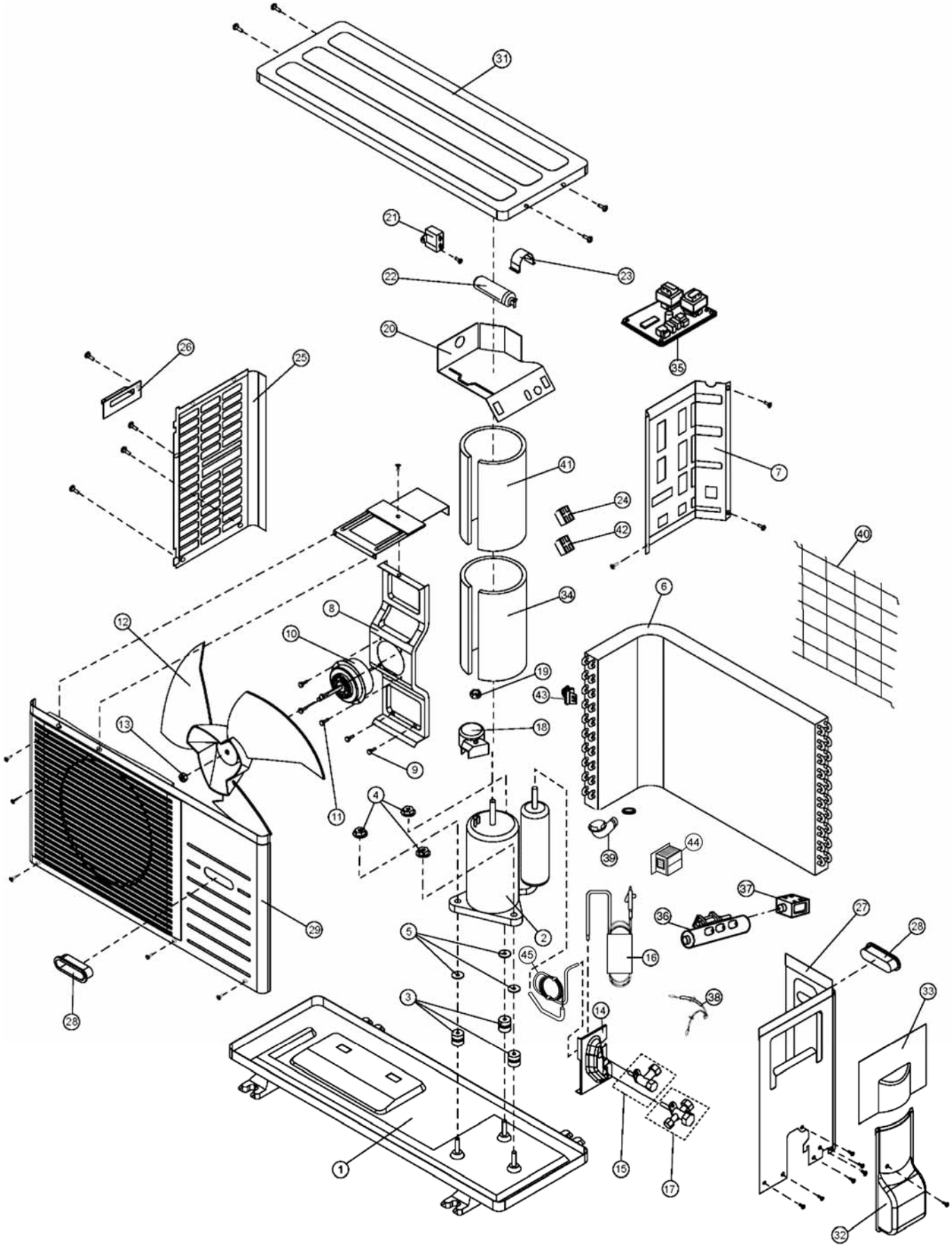
18.2.3 CU-A18KKD-2 CU-A24KKD-2 CU-A28KKD-2



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

REF NO.	DESCRIPTION & NAME	QTY.	CU-A18KKD-2	CU-A24KKD-2	CU-A28KKD-2	REMARK
1	CHASSY ASSY	1	CWD50K2087	←	←	
2	COMPRESSOR	1	2JS318D3AA04	2JS438D3JA02	2JD514E3AA03	O
3	ANTI-VIBRATION BUSHING	3	CWH50055	←	←	
4	NUT-COMPRESSOR MOUNT	3	CWH561049	←	←	
5	PACKING	1	CWB81043	←	←	
6	CONDENSER	1	CWB32C2678	CWB32C2679	CWB32C2681	
7	SOUND PROOF BOARD	1	CWH151051	←	CWH151056	
8	FAN MOTOR BRACKET	1	CWD541055	←	←	
9	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	←	
10	FAN MOTOR	1	CWA951385J	←	CWA951294J	O
11	SCREW - FAN MOTOR MOUNT	3	CWH55252J	←	←	
12	PROPELLER FAN ASSY	1	CWH03K1017	←	←	
13	NUT - PROPELLER FAN	1	CWH561038J	←	←	
14	HOLDER - COUPLING	1	CWH351036	←	←	
15	2 WAYS VALVE (LIQUID)	1	CWB021361	←	←	O
16	TUBE ASSY(CHK.VALVE,CAP.TUBE)	1	CWT01C4945	CWT01C4944	CWT01C4697	
17	3 WAYS VALVE (GAS)	1	CWB011212	CWB011484	CWB011213	O
18	TERMINAL COVER	1	CWH171012	←	←	
19	NUT-TERMINAL COVER	1	CWH7080300J	←	←	
20	CONTROL BOARD CASING	1	CWH102206	←	←	
21	CAPACITOR-FM	1	DS441355NPQA	←	←	O
22	CAPACITOR-COMP	1	CWA312079	←	DS441606CPNA	O
23	HOLDER-CAPACITOR	1	CWH30060	←	CWH30071	
24	TERMINAL BOARD ASSY	1	CWA28K1070J	←	CWA28K1058J	
25	CABINET SIDE PLATE(L)	1	CWE041255A	←	CWE041082A	
26	HANDLE	1	CWE161010	←	←	
27	CABINET SIDE PLATE(R)	1	CWE041083A	←	CWE041100A	
28	HANDLE	2	CWE16000E	←	←	
29	CABINET FRONT PLATE CO.	1	CWE06K1043	←	CWE06K1045	
31	CABINET TOP PLATE	1	CWE03K1009A	←	CWE03K1011A	
32	CONTROL BOARD COVER (BOTTOM)	1	CWH131168	←	←	
33	CONTROL BOARD COVER (TOP)	1	CWH131169A	←	←	
34	SOUND PROOF MATERIAL	1	CWG302221	←	-	
35	ELECTRONIC CONTROLLER - MAIN	1	CWA743367	←	CWA743378	
36	4 WAYS VALVE	1	CWB001026J	←	CWB001046	
37	V-COIL COMPLETE (4-WAYS VALVE)	1	CWA43C2121J	←	CWA43C2321	
38	SENSOR COMPLETE (COMP. DISC.)	1	CWA50C618	←	←	
39	ACCESSORY CO.(DRAIN ELBOW)	1	CWG87C900	←	←	
40	WIRE NET	1	CWD041041A	←	←	
41	SOUND PROOF MATERIAL	2	-	-	CWG302230	
42	TERMINAL BOARD ASSY	1	-	-	CWA28K1170	
43	OIL SEPARATER ASS'Y	1	-	-	CWB16K1018	
44	REACTOR	1	-	-	CWA00192	
45	TUBE ASSY(CAP.TUBE)	1	-	-	CWT025826	

(Note)

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