

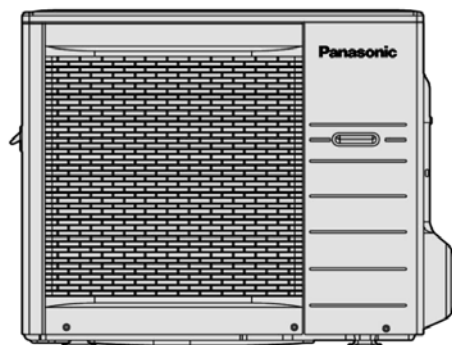
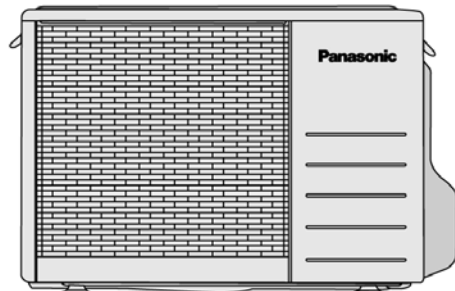
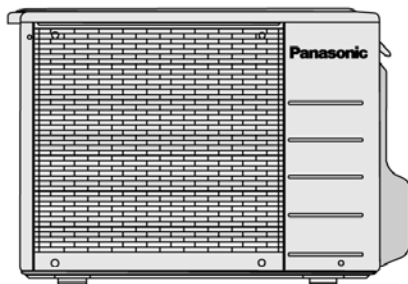
Service Manual

Air Conditioner



Indoor Unit
CS-A9MKD
CS-A12MKD
CS-A18MKD
CS-A24MKD
CS-A28MKD

Outdoor Unit
CU-A9MKD
CU-A12MKD
CU-A18MKD
CU-A24MKD
CU-A28MKD



WARNING



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

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1. Safety Precautions







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

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


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

	This symbol denotes item that is PROHIBITED from doing.
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- Carry out test 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**

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

**CAUTION**

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

2. Specification

Model			Indoor	CS-A9MKD		CS-A12MKD	
			Outdoor	CU-A9MKD		CU-A12MKD	
Performance Test Condition				NEW JIS		NEW JIS	
Power Supply		Phase, Hz	Single, 50		Single, 50		
		V	220	230	220	230	
Cooling	Capacity	kW	2.65	2.65	3.52	3.54	
		BTU/h	9040	9040	12000	12100	
		Kcal/h	2280	2280	3030	3040	
	Running Current	A	4.1	4.0	5.1	5.1	
	Input Power	W	860	890	1.08k	1.12k	
	EER	W/W	3.08	2.98	3.26	3.16	
		Btu/hW	10.5	10.2	11.1	10.8	
	Power Factor	%	95	97	96	95	
	Indoor Noise (H / L)	dB-A	36 / 26	36 / 26	39 / 29	39 / 29	
		Power Level dB	52 / -	52 / -	55 / -	55 / -	
	Outdoor Noise (H / L)	dB-A	48 / -	49 / -	48 / -	49 / -	
		Power Level dB	63 / -	64 / -	63 / -	64 / -	
Heating	Capacity	kW	2.80	2.85	4.00	4.05	
		BTU/h	9550	9720	13640	13810	
		Kcal/h	2410	2450	3440	3480	
	Running Current	A	3.3	3.3	5.2	5.1	
	Input Power	W	700	740	1.09k	1.12k	
	EER	W/W	4.00	3.85	3.67	3.62	
		Btu/hW	13.6	13.1	12.5	12.3	
	Power Factor	%	96	97	95	95	
	Indoor Noise (H / L)	dB-A	38 / 28	38 / 28	40 / 29	40 / 29	
		Power Level dB	54 / -	54 / -	56 / -	56 / -	
	Outdoor Noise (H / L)	dB-A	48 / -	49 / -	48 / -	49 / -	
		Power Level dB	64 / -	65 / -	64 / -	65 / -	
Max Current (A) / Max Input Power (W)			5.1 / 1.13k		6.1 / 1.36k		
Starting Current (A)			18		23		
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	Cooling: 660 Heating: 700		Cooling: 730 Heating: 770	
		Lo	rpm	Cooling: 730 Heating: 770		Cooling: 800 Heating: 840	
		Me	rpm	Cooling: 870 Heating: 870		Cooling: 950 Heating: 950	
		Hi	rpm	Cooling: 1040 Heating: 1080		Cooling: 1100 Heating: 1120	
		SHi	rpm	Cooling: 1080		Cooling: 1120	

Outdoor Fan	Type			Propeller Fan		Propeller Fan	
	Material			PP Resin		PP Resin	
	Motor Type			Induction (6 poles)		Induction (6 poles)	
	Input Power		W	55.6 - 63.1		65 - 73	
	Output Power		W	30		30	
	Speed	Hi	rpm	800 - 830		835 - 845	
Moisture Removal			L/h (Pt/h)	1.6 (3.4)		2.0 (4.2)	
Indoor Airflow	QLo	m ³ /min (ft ³ /min)		Cooling: 5.40 (191) Heating: 5.80 (205)		Cooling: 6.10 (215) Heating: 6.60 (233)	
	Lo	m ³ /min (ft ³ /min)		Cooling: 6.10 (215) Heating: 6.60 (233)		Cooling: 6.90 (244) Heating: 7.40 (261)	
	Me	m ³ /min (ft ³ /min)		Cooling: 7.70 (272) Heating: 7.70 (272)		Cooling: 8.60 (304) Heating: 8.60 (304)	
	Hi	m ³ /min (ft ³ /min)		Cooling: 10.20 (360) Heating: 10.60 (374)		Cooling: 10.80 (381) Heating: 11.00 (388)	
	SHi	m ³ /min (ft ³ /min)		Cooling: 10.60 (374)		Cooling: 11.00 (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, 960 (33.9)	
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) / 26 (57)		9 (20) / 31 (68)	
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 coated)		Aluminium (Pre coated)	
	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		22.0 x 482.6 x 567.4		36.38 x 504 x 684:715	
Air Filter	Material			Polypropelene		Polypropelene	
	Type			One-touch		One-touch	
Power Supply				Indoor		Indoor	
Power Supply Cord			A	10		10	
Thermostat				-		-	
Protection Device				2 stage Overload Protector		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-A18MKD		CS-A24MKD		
			Outdoor	CU-A18MKD		CU-A24MKD		
Performance Test Condition				NEW JIS		NEW JIS		
Power Supply			Phase, Hz	Single, 50		Single, 50		
			V	220	230	220	230	
Cooling	Capacity		kW	5.30	5.30	7.03	7.03	
			BTU/h	18100	18100	24000	24000	
	Running Current		A	8.0	7.8	12.3	12.2	
	Input Power		W	1.72k	1.76k	2.54k	2.58k	
	EER		W/W	3.08	3.01	2.77	2.72	
			Btu/hW	10.52	10.28	9.45	9.30	
	Power Factor		%	98	98	94	92	
	Indoor Noise (H / L)		dB-A	43 - 43 / 38 - 38		47 - 47 / 41 - 41		
			Power Level dB	59 - 59 / -		63 - 63 / -		
	Outdoor Noise (H / L)		dB-A	53 - 54 / -		53 - 54 / -		
Power Level dB			68 - 69 / -		68 - 69 / -			
Heating	Capacity		kW	5.65	5.70	7.80	7.80	
			BTU/h	19300	19400	26600	26600	
	Running Current		A	7.7	7.6	12.2		
	Input Power		W	1.65k	1.71k	2.53k	2.56k	
			EER		W/W	3.42	3.33	3.08
	Btu/hW	11.70			11.35	10.51	10.39	
	Power Factor		%	97	98	94	91	
	Indoor Noise (H / L)		dB-A	42 - 42 / 38 - 38		46 - 46 / 41 - 41		
			Power Level dB	58 - 58 / -		62 - 62 / -		
	Outdoor Noise (H / L)		dB-A	54 - 55 / -		54 - 55 / -		
			Power Level dB	70 - 71 / -		70 - 71 / -		
	Max Current (A) / Max Input Power (W)				10.2 / 2.20k		14.6 / 3.25k	
	Starting Current (A)				40		60	
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			DC Motor (8-poles)		DC Motor (8-poles)		
	Input Power		W	-		-		
	Output Power		W	40		40		
	Speed	QLo	rpm	Cooling: 950 Heating: 950		Cooling: 1060 Heating: 1060		
		Lo	rpm	Cooling: 1040 Heating: 1100		Cooling: 1150 Heating: 1230		
		Me	rpm	Cooling: 1140 Heating: 1140		Cooling: 1270 Heating: 1270		
		Hi	rpm	Cooling: 1240 Heating: 1310		Cooling: 1390 Heating: 1530		
		SHi	rpm	Cooling: 1310		Cooling: 1530		

Outdoor Fan	Type			Propeller Fan	Propeller Fan
	Material			PP Resin	PP Resin
	Motor Type			Induction (6 poles)	Induction (6 poles)
	Input Power		W	116 - 122	116 - 122
	Output Power		W	75	75
	Speed	Lo	rpm	460 - 490	460 - 490
		Hi	rpm	815 - 830	815 - 830
Moisture Removal		L/h (Pt/h)	2.9 (6.1)	4.0 (8.5)	
Indoor Airflow	QLo	m³/min (ft³/min)	Cooling: 11.60 (409) Heating: 11.60 (409)	Cooling: 12.90 (455) Heating: 12.90 (455)	
	Lo	m³/min (ft³/min)	Cooling: 13.00 (459) Heating: 14.00 (494)	Cooling: 14.30 (505) Heating: 15.60 (551)	
	Me	m³/min (ft³/min)	Cooling: 14.60 (515) Heating: 14.60 (515)	Cooling: 16.20 (572) Heating: 16.20 (572)	
	Hi	m³/min (ft³/min)	Cooling: 16.40 (579) Heating: 17.10 (604)	Cooling: 18.60 (657) Heating: 20.00 (706)	
	SHi	m³/min (ft³/min)	Cooling: 17.10 (604)	Cooling: 20.00 (706)	
Outdoor Airflow	Lo	m³/min (ft³/min)	28.6 (1010) - 30.5 (1080)	28.6 (1010) - 30.5 (1080)	
	Hi	m³/min (ft³/min)	50.7 (1790) - 51.7 (1830)	50.7 (1790) - 51.7 (1830)	
Refrigeration Cycle	Control Device		Capillary Tube	Capillary Tube	
	Refrigerant Oil	cm³	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) / 57 (126)	12 (26) / 60 (132)	
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 12.7 (1/2)	6.35 (1/4) / 15.8 (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 coated)	Aluminium (Pre coated)
	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 x 711.2 x 782.4:816.9
Air Filter	Material			Polypropelene	Polypropelene
	Type			One-touch	One-touch
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-A28MKD		
		Outdoor	CU-A28MKD		
Performance Test Condition			NEW JIS		
Power Supply		Phase, Hz	Single, 50		
		V	220	230	
Cooling	Capacity	kW	8.00	8.00	
		BTU/h	27300	27300	
		kJ/h	28800	28800	
	Running Current	A	13.2	12.7	
	Input Power	W	2.86k	2.88k	
	EER	W/W	2.80	2.78	
		Btu/hW	9.55	9.48	
	Power Factor	%	98	99	
	Indoor Noise (H / L)	dB-A	49 / 44		
		Power Level dB	65 / -		
	Outdoor Noise (H / L)	dB-A	55 / -		
		Power Level dB	70 / -		
Heating	Capacity	kW	8.80	8.80	
		BTU/h	30000	30000	
		kJ/h	31680	31680	
	Running Current	A	13.1	12.6	
	Input Power	W	2.84k	2.86k	
	EER	W/W	3.10	3.08	
		Btu/hW	10.56	10.49	
	Power Factor	%	99	99	
	Indoor Noise (H / L)	dB-A	48 / 44		
		Power Level dB	64 / -		
	Outdoor Noise (H / L)	dB-A	55 / -		
		Power Level dB	71 / -		
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		94.8 - 94.8		
	Output Power		40		
	Speed	QLo	rpm	Cooling: 1160 Heating: 1160	
		Lo	rpm	Cooling: 1250 Heating: 1330	
		Me	rpm	Cooling: 1380 Heating: 1380	
		Hi	rpm	Cooling: 1500 Heating: 1540	
		SHi	rpm	Cooling: 1540	

Outdoor Fan	Type			Propeller Fan
	Material			PP
	Motor Type			Induction (6 poles)
	Input Power		W	146.7 - 154.9
	Output Power		W	80
	Speed	Lo	rpm	460 - 490
		Hi	rpm	840 - 855
Moisture Removal		L/h (Pt/h)	4.7 (9.9)	
Indoor Airflow	QLo	m³/min (ft³/min)	Cooling: 14.50 (512) Heating: 14.50 (512)	
	Lo	m³/min (ft³/min)	Cooling: 15.90 (561) Heating: 17.10 (604)	
	Me	m³/min (ft³/min)	Cooling: 17.90 (632) Heating: 17.90 (632)	
	Hi	m³/min (ft³/min)	Cooling: 19.80 (699) Heating: 20.40 (720)	
	SHi	m³/min (ft³/min)	Cooling: 20.40 (720)	
Outdoor Airflow	Lo	m³/min (ft³/min)	30.1 (1060) - 32.0 (1130)	
	Hi	m³/min (ft³/min)	52.5 (1850) - 53.5 (1890)	
Refrigeration Cycle	Control Device		Capillary Tube	
	Refrigerant Oil	cm³	SUNISO 4GDID or ATMOS M60 (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 coated)
	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

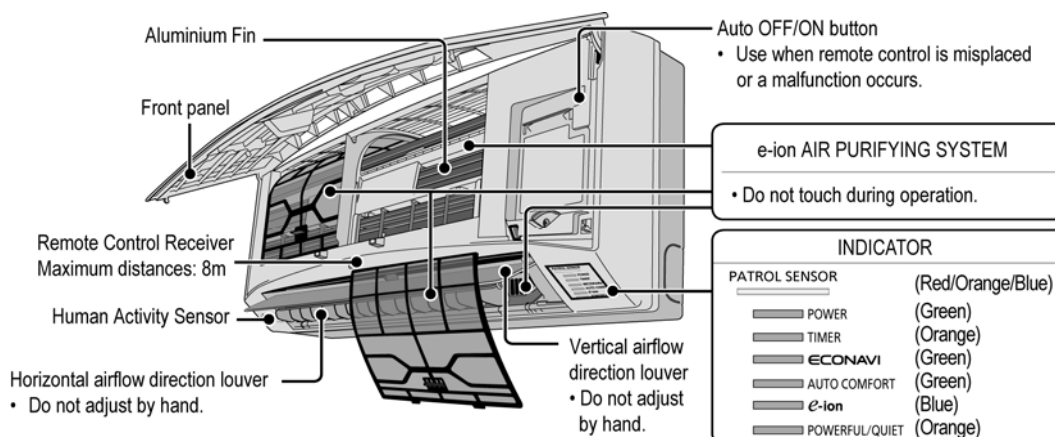
1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) 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

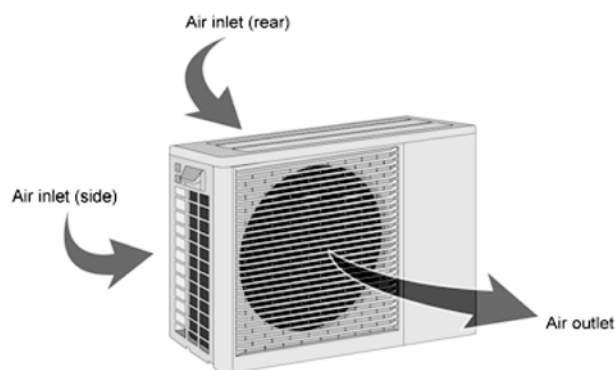
- E-ion Air Purifying System with Patrol Sensor
 - Active e-ions are released to catch dust particles and bring them back the large positively charged filter.
 - Patrol Sensor color changes to indicate the dirt level in the air
- Long Installation Piping
 - CS/CU-A9MK, long piping up to 10 meters.
 - CS/CU-A12MK, long piping up to 15 meters.
 - CS/CU-A18MK, CS/CU-A24MK, long piping up to 25 meters.
 - CS/CU-A28MK, long piping up to 30 meters.
- Easy to use remote control
- Quality Improvement
 - Random auto restart after power failure for safety restart operation
 - Gas leakage protection
 - Prevent compressor reverse cycle
 - Inner protector to protect compressor
 - Noise prevention during soft dry operation
 - Blue coated condenser for high resistance to corrosion
- Operation Improvement
 - Quiet mode to reduce the indoor unit operating sound
 - Powerful mode to reach the desired room temperature quickly
 - 24-hour timer setting

4. Location of Controls and Components

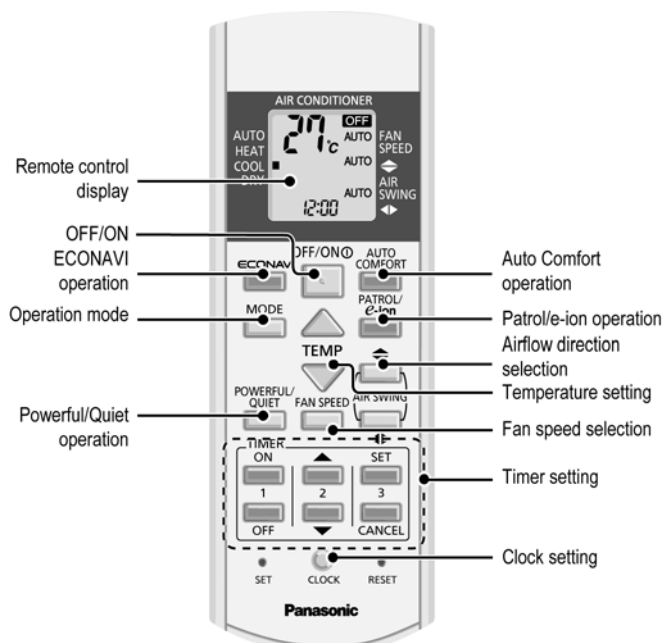
4.1 Indoor Unit



4.2 Outdoor Unit



4.3 Remote Control

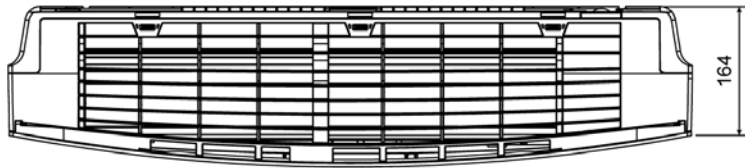


5. Dimensions

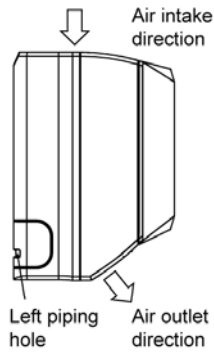
5.1 Indoor Unit

5.1.1 CS-A9MKD CS-A12MKD

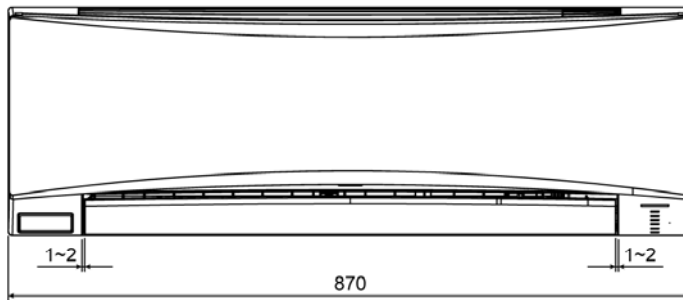
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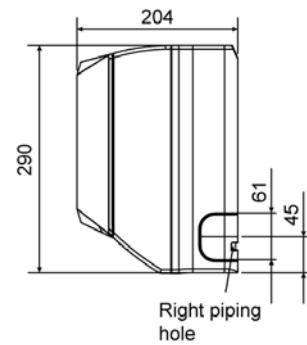
<Side View>



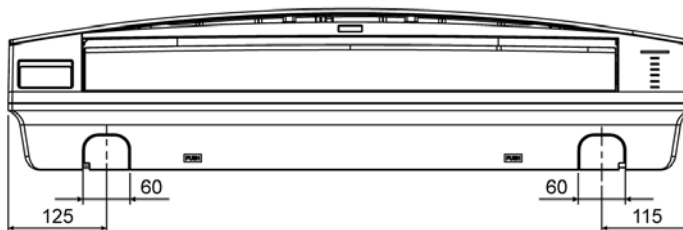
<Front View>



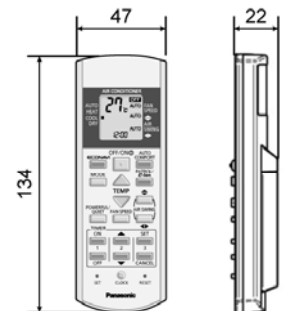
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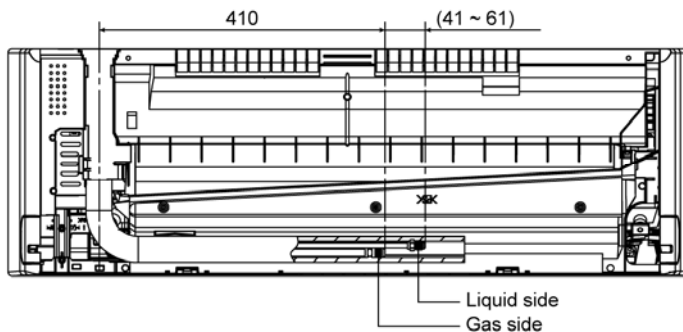
<Bottom View>



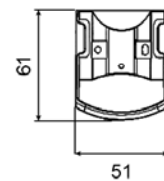
<Remote Control>



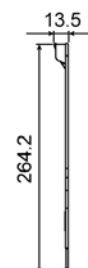
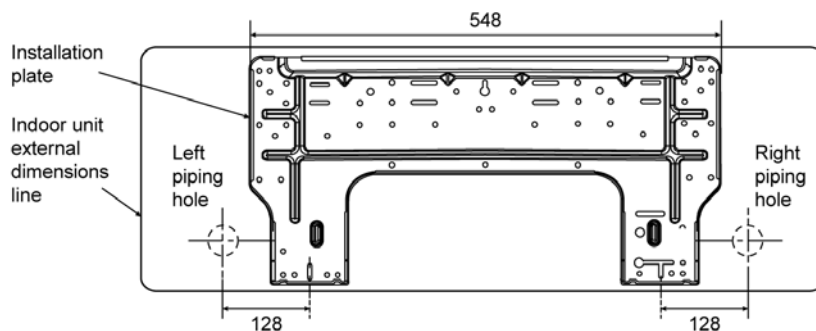
<Rear View>



<Remote Control Holder>

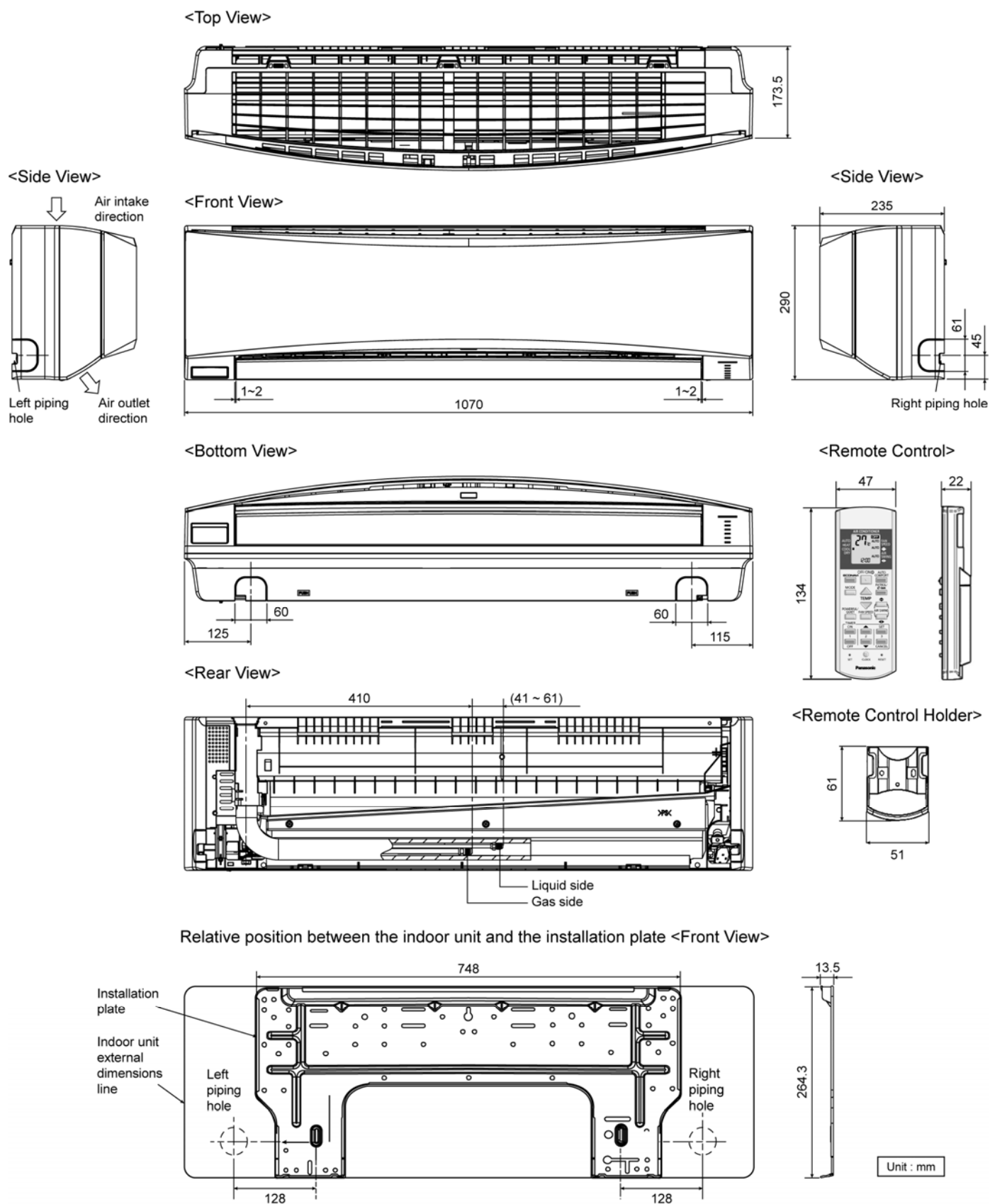


Relative position between the indoor unit and the installation plate <Front View>



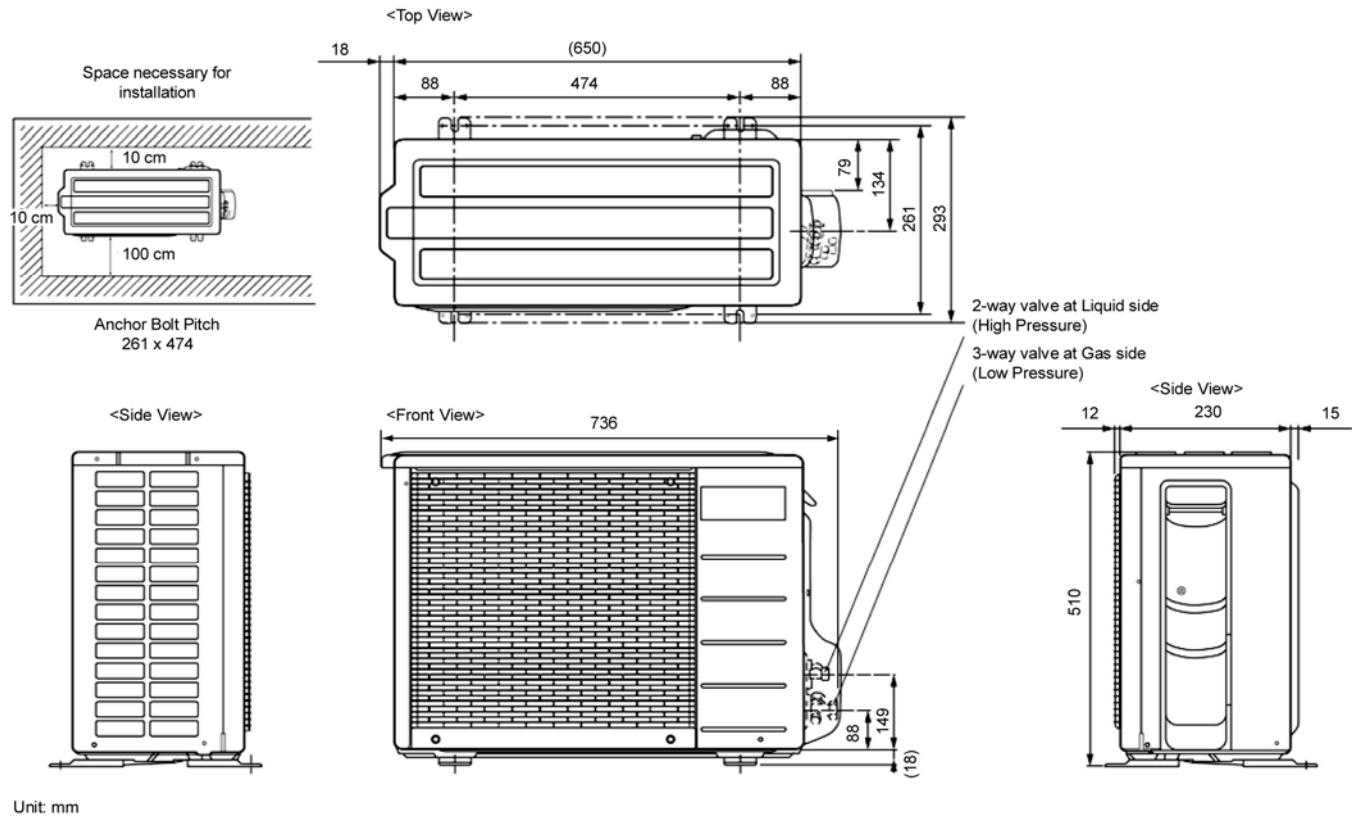
Unit : mm

5.1.2 CS-A18MKD CS-A24MKD CS-A28MKD

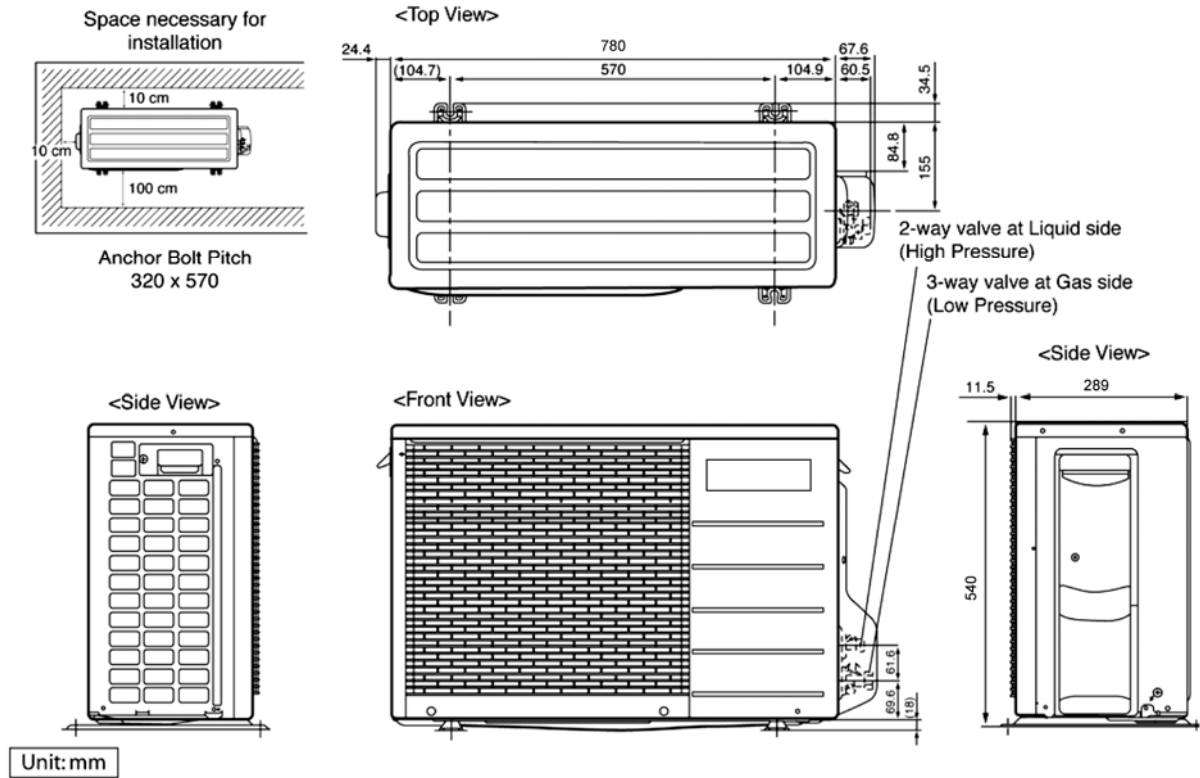


5.2 Outdoor Unit

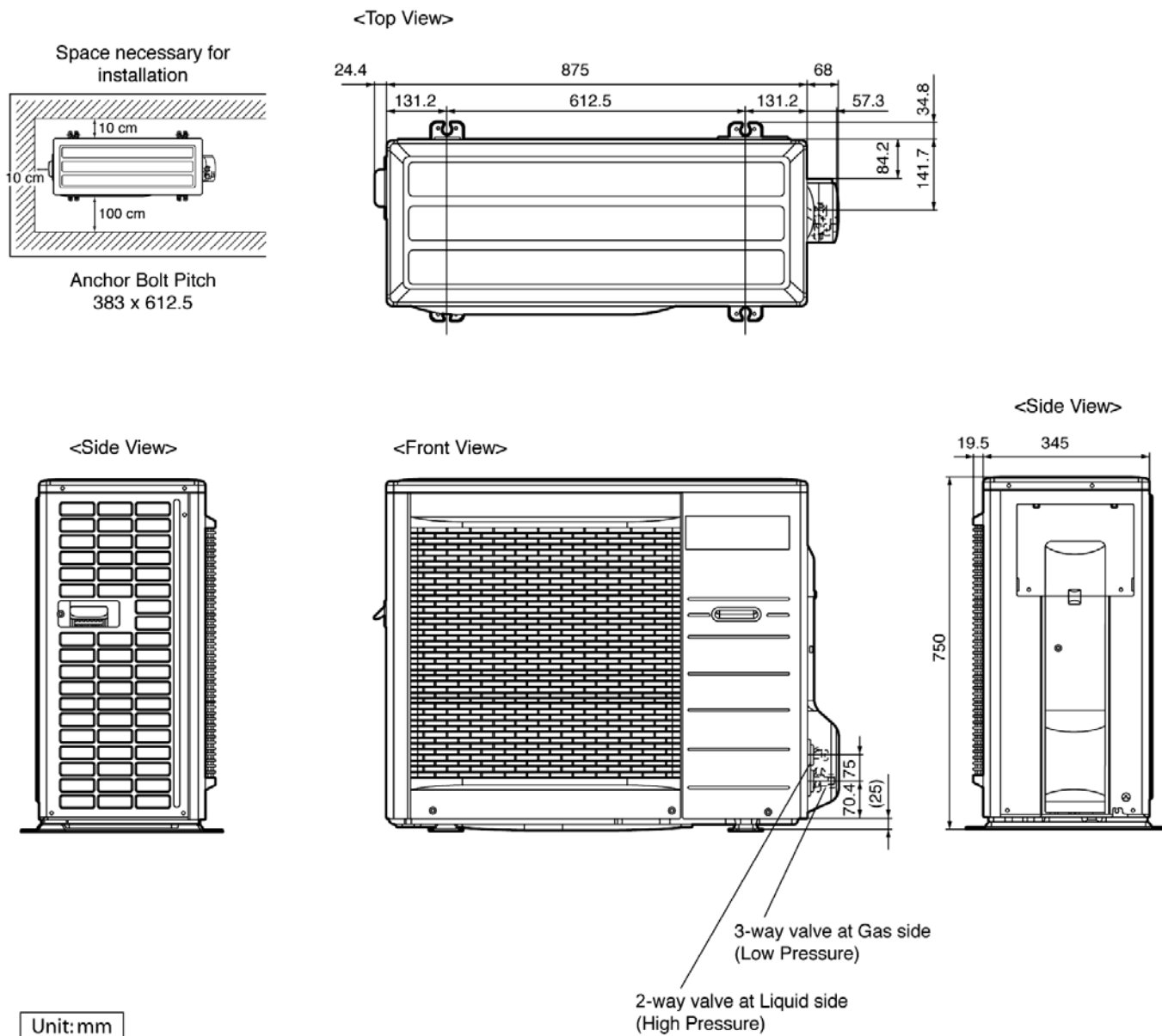
5.2.1 CU-A9MKD



5.2.2 CU-A12MKD

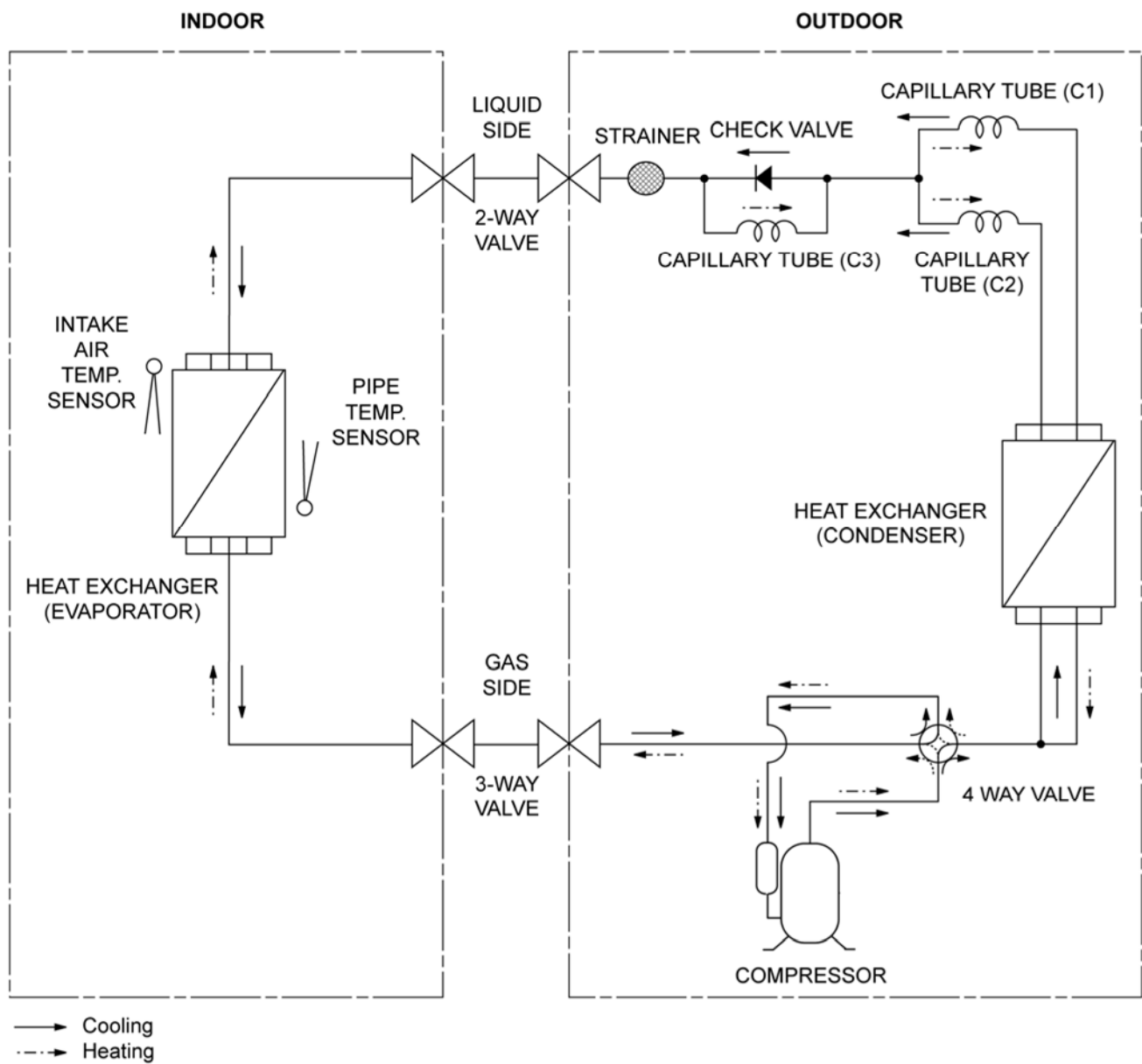


5.2.3 CU-A18MKD CU-A24MKD CS-A28MKD

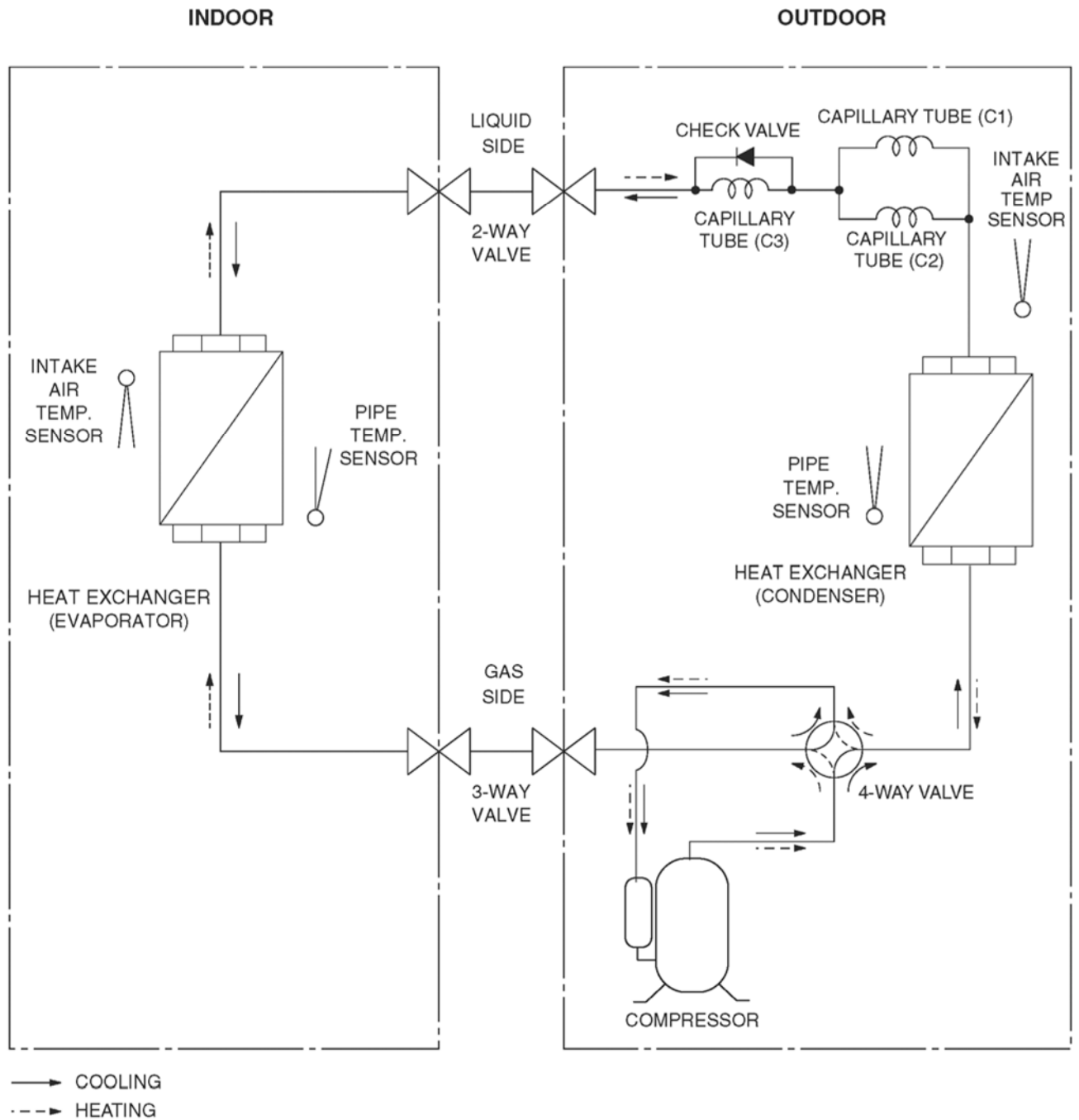


6. Refrigeration Cycle Diagram

6.1 CS-A9MKD CU-A9MKD CS-A12MKD CU-A12MKD

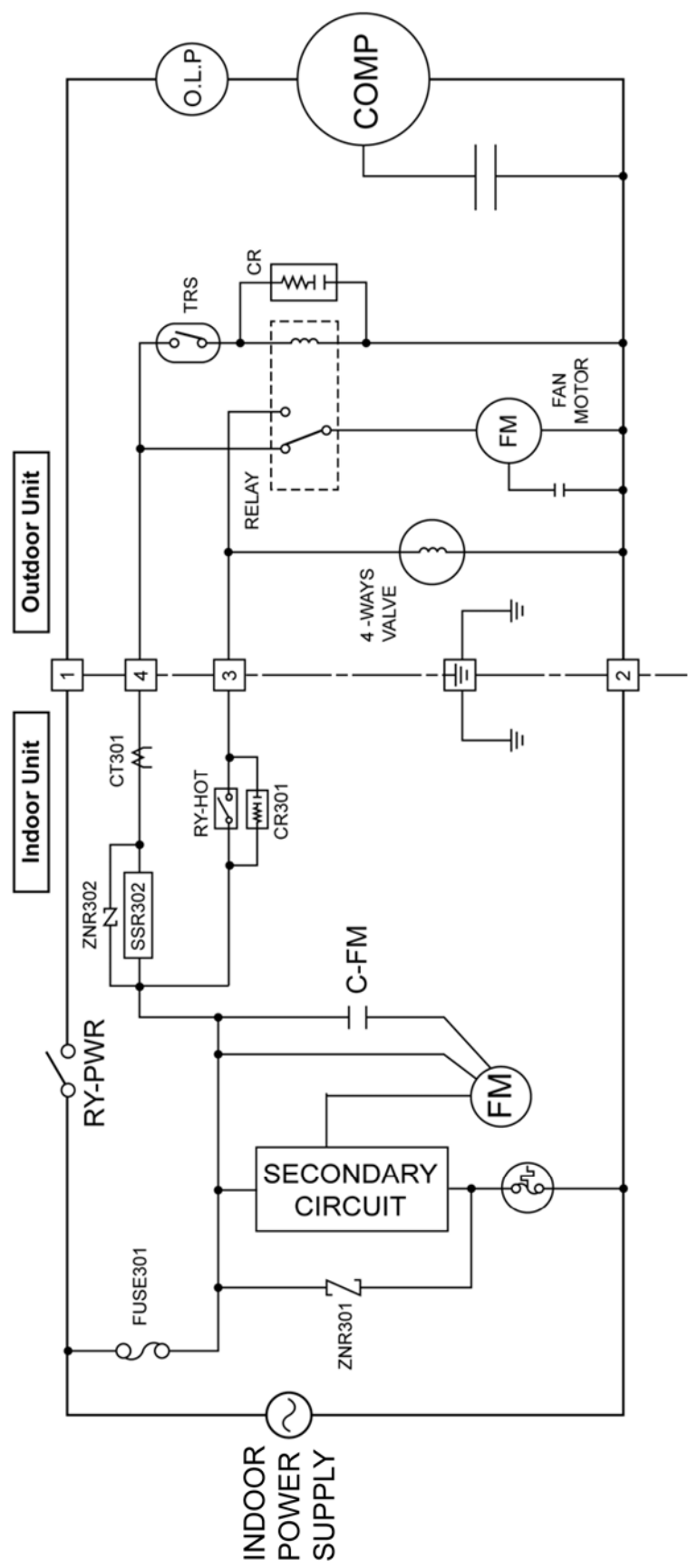


6.2 CS-A18MKD CU-A18MKD CS-A24MKD CU-A24MKD CS-A28MKD CU-A28MKD

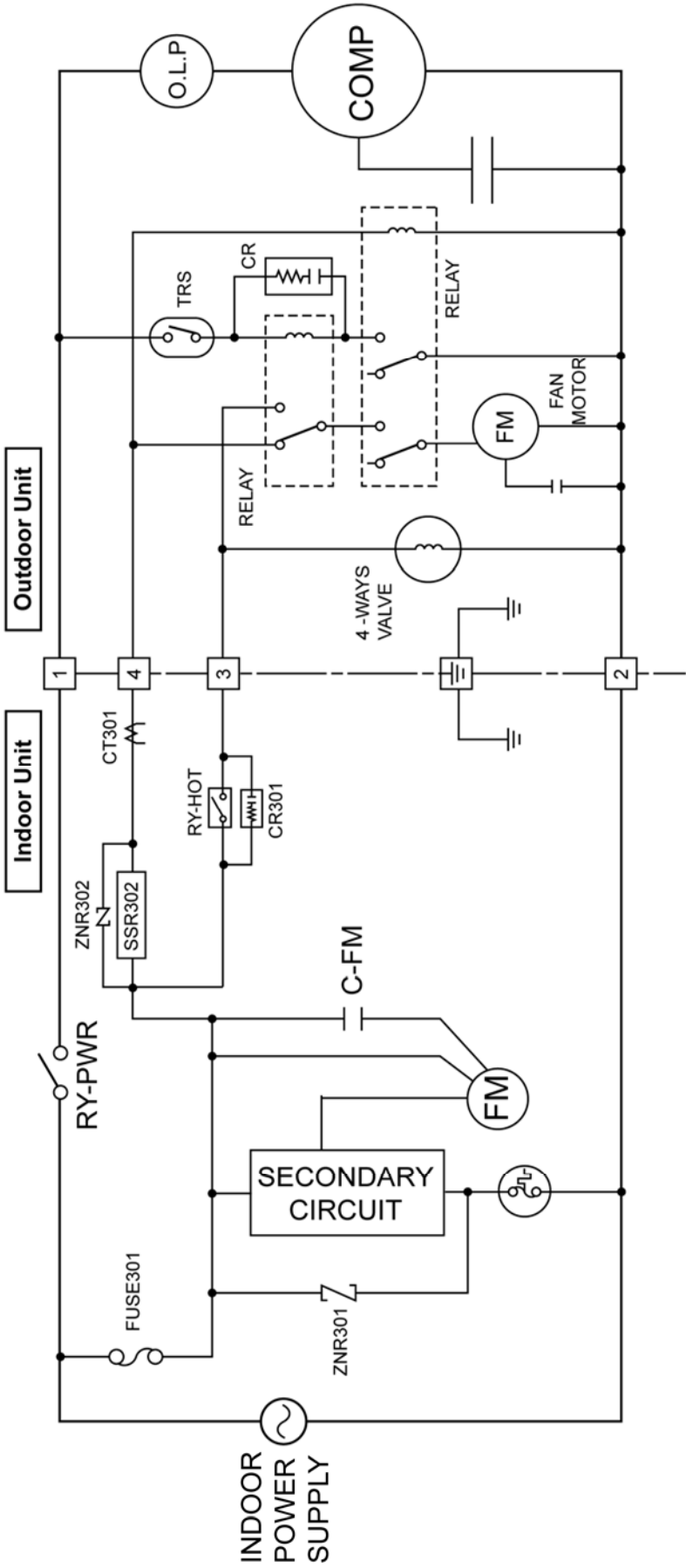


7. Block Diagram

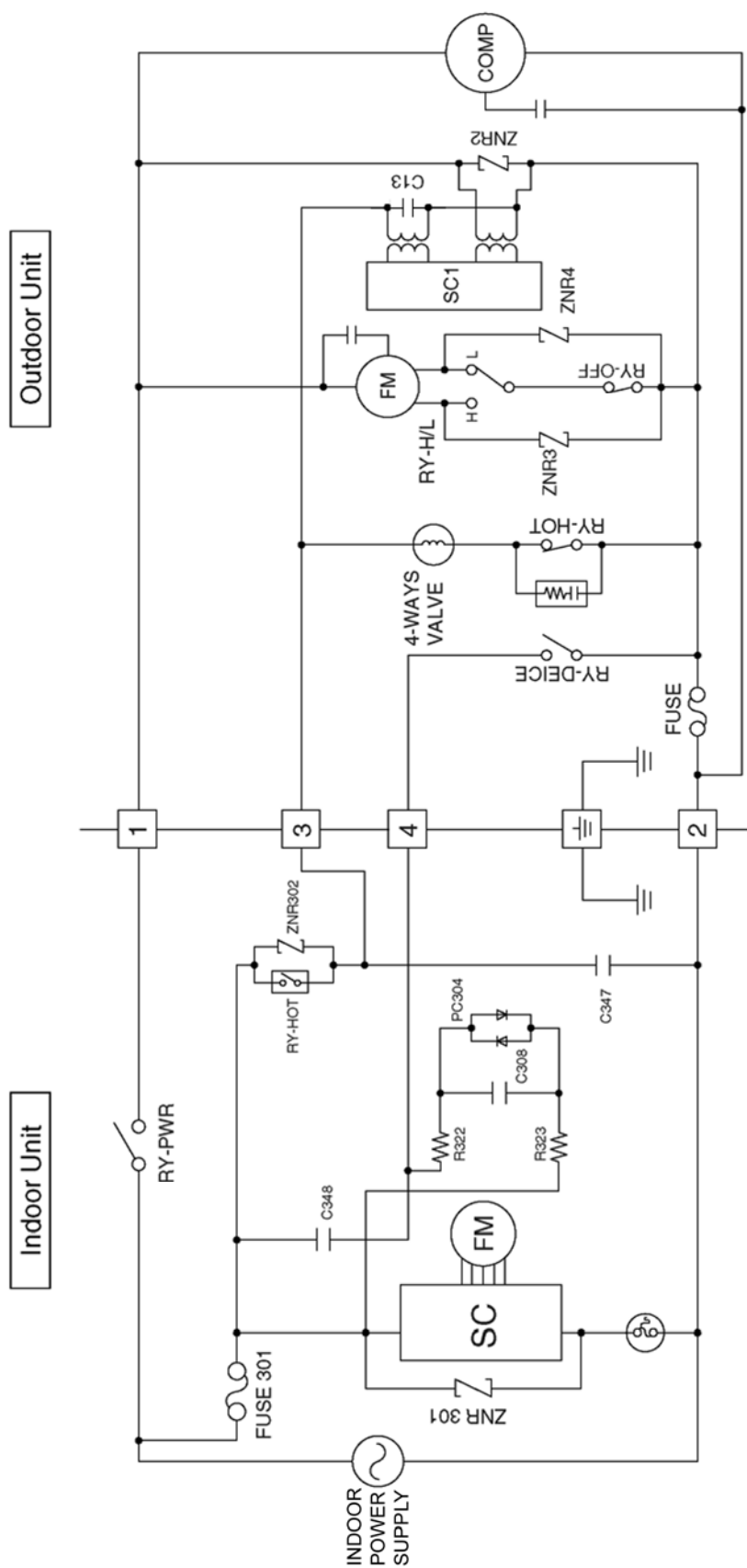
7.1 CS-A9MKD CU-A9MKD



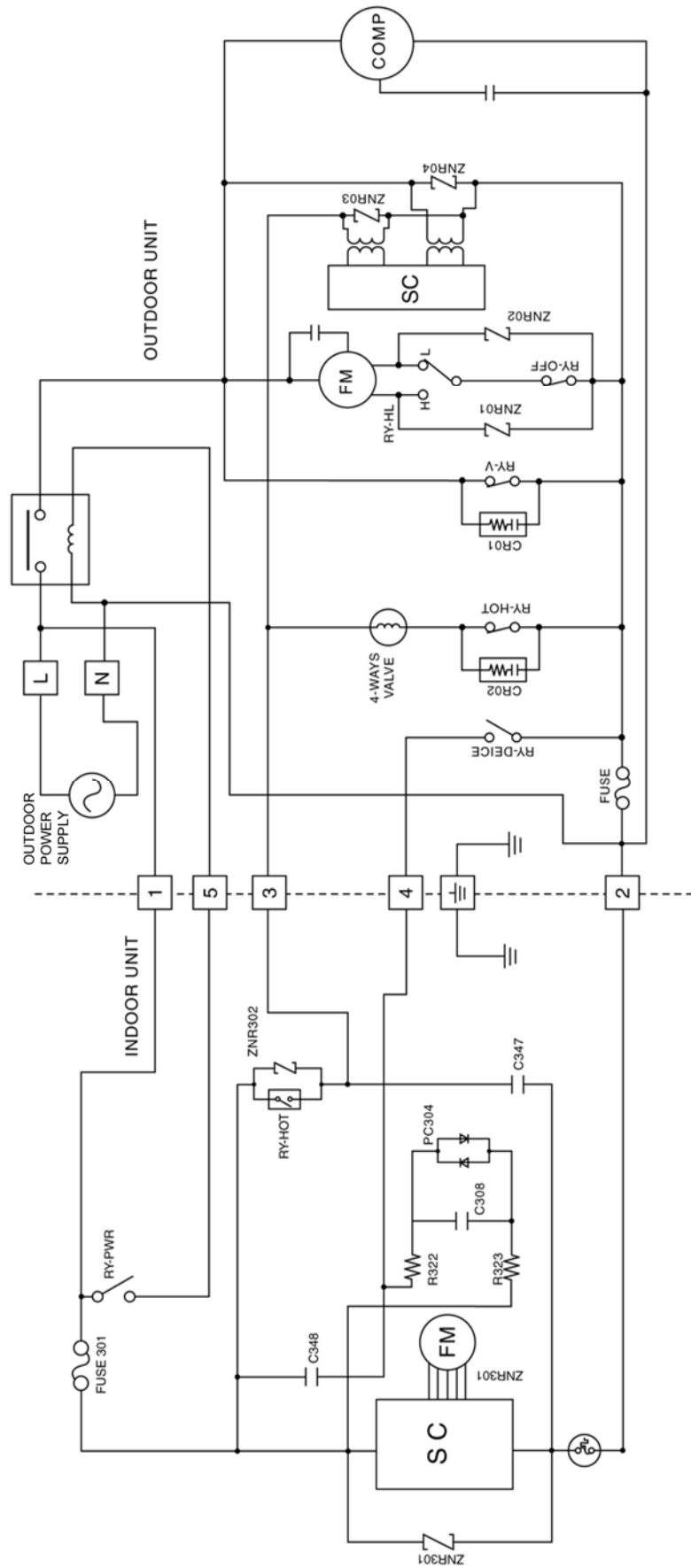
7.2 CS-A12MKD CU-A12MKD



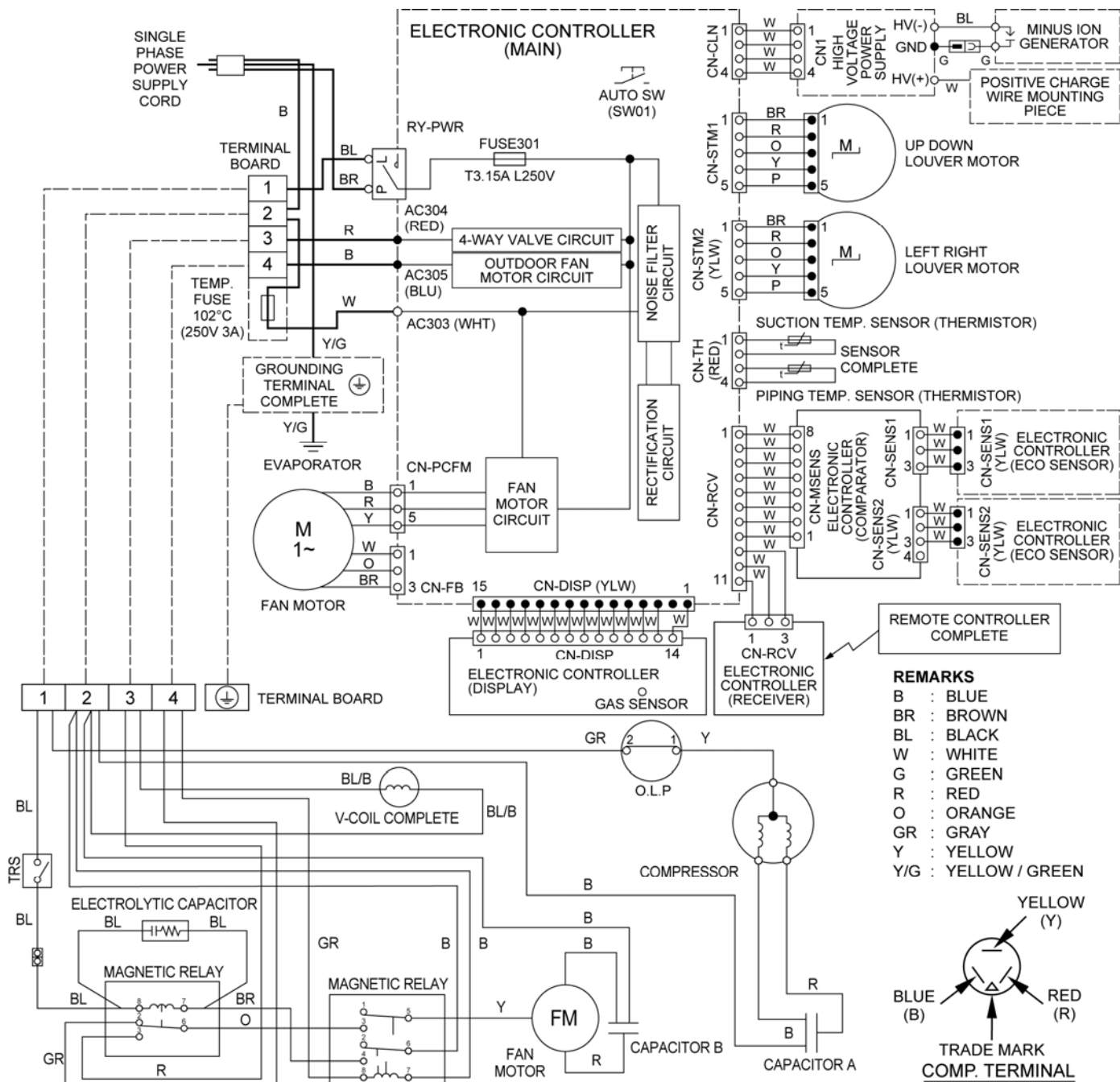
7.3 CS-A18MKD CU-A18MKD CS-A24MKD CU-A24MKD



7.4 CS-A28MKD CU-A28MKD



8.2 CS-A12MKD CU-A12MKD



Resistance of Indoor Fan Motor Windings

MODEL	CS-A12MKD
CONNECTION	CWA921434
BLUE-YELLOW	351.3Ω
YELLOW-RED	343.9Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-A12MKD
CONNECTION	CWA951121J
BLUE-YELLOW	200.4Ω
YELLOW-RED	252.5Ω

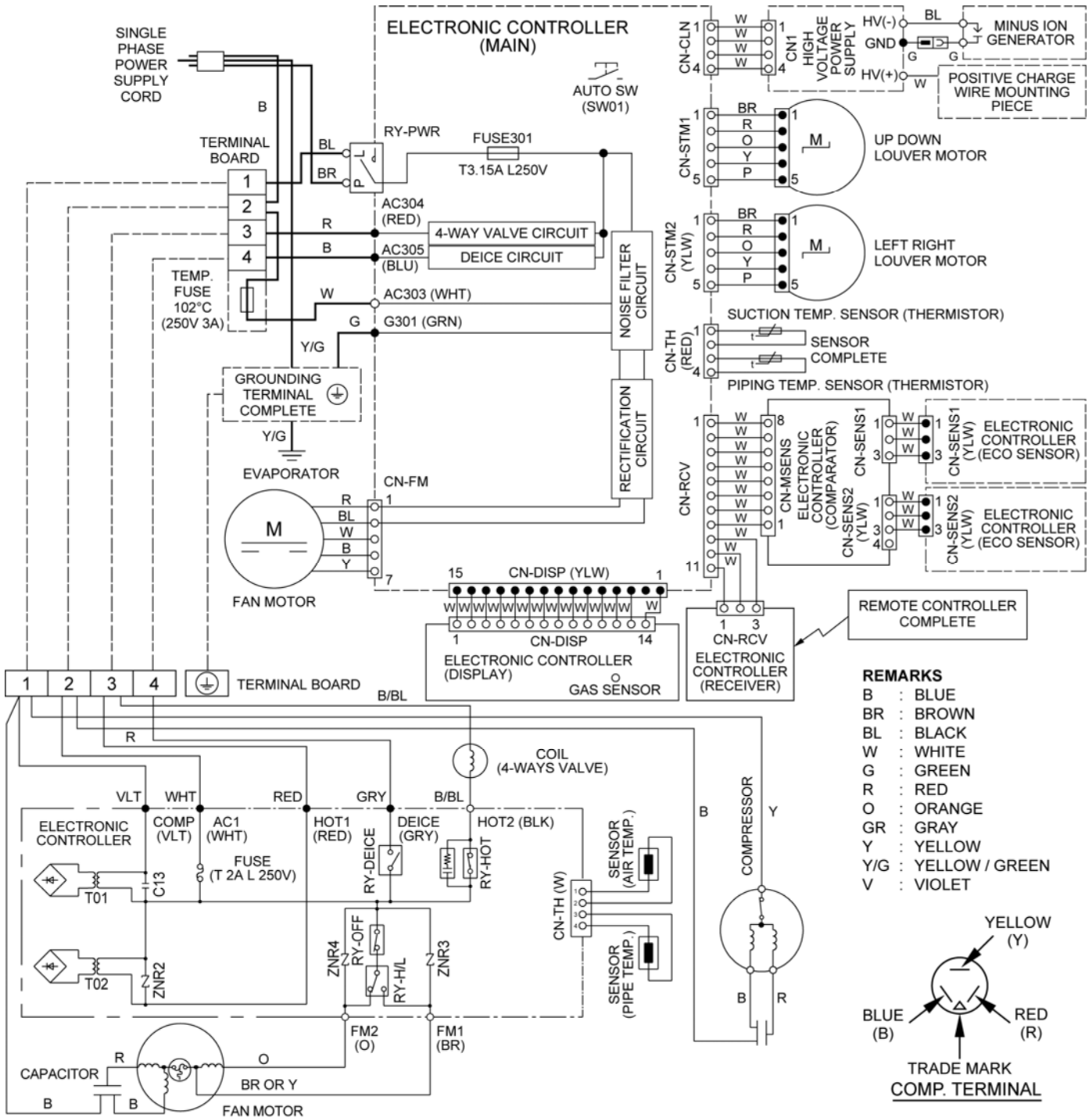
Note: Resistance at 25°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A12MKD
CONNECTION	2PS206D2BA06
C-R	3.252Ω
C-S	4.313Ω

Note: Resistance at 20°C of ambient temperature.

8.3 CS-A18MKD CU-A18MKD CS-A24MKD CU-A24MKD



Resistance of Outdoor Fan Motor Windings

MODEL	CU-A18MKD	CU-A24MKD
CONNECTION	CWA951353J	CWA951353J
BLUE-YELLOW	74.60Ω	74.60Ω
YELLOW-ORANGE	122.20Ω	122.20Ω
YELLOW-RED	83.40Ω	83.40Ω

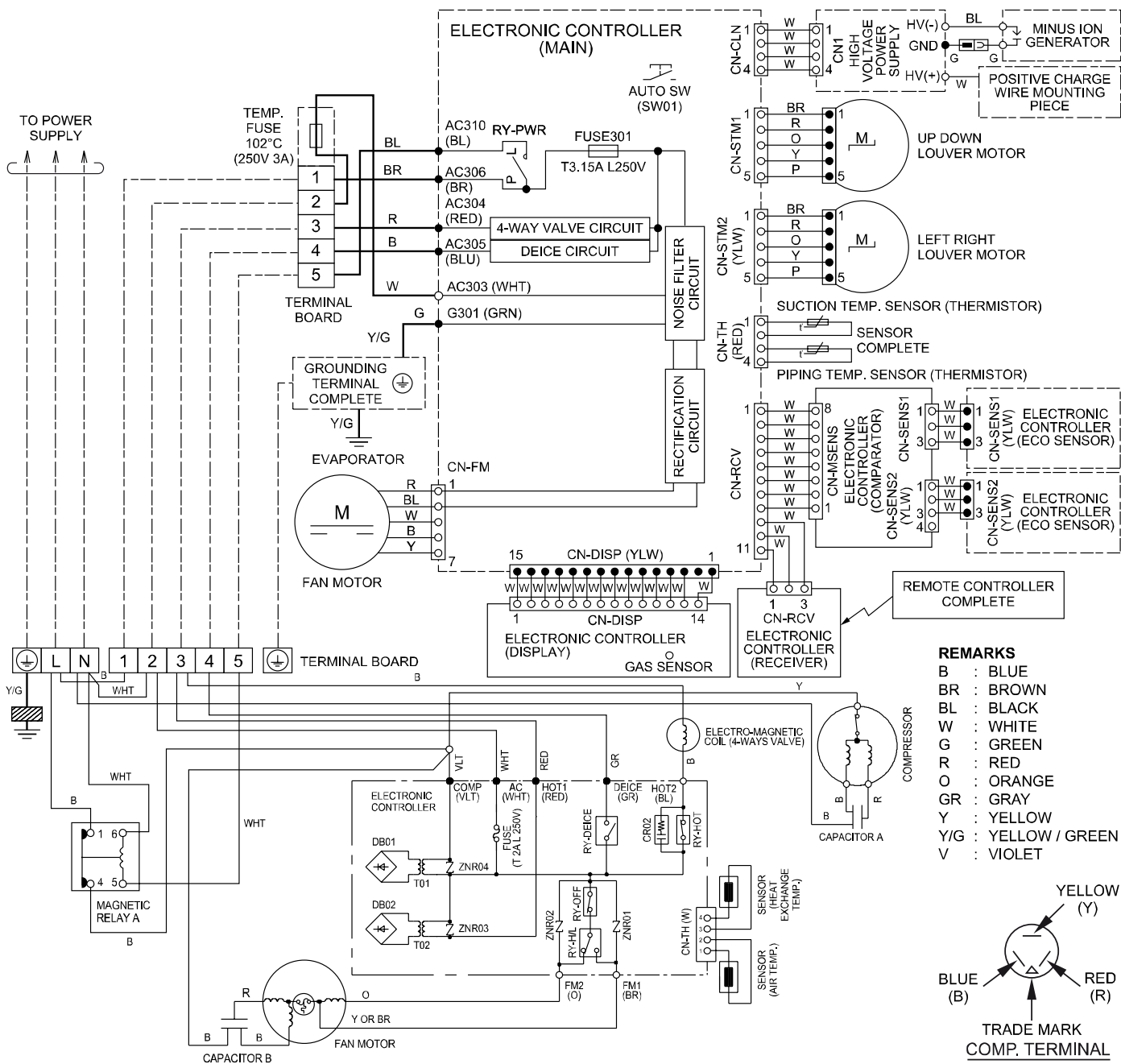
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A18MKD	CU-A24MKD
CONNECTION	2JS318D3AA04	2JS438D3CC04
C-R	1.618Ω	1.121Ω
C-S	3.718Ω	2.535Ω

Note: Resistance at 20°C of ambient temperature.

8.4 CS-A28MKD CU-A28MKD



Resistance of Outdoor Fan Motor Windings

MODEL	CU-A28MKD
CONNECTION	CWA951294J
BLUE-YELLOW	102Ω
YELLOW-ORANGE	81Ω
YELLOW-RED	108Ω

Note: Resistance at 25°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-A28MKD
CONNECTION	2JD514E3AA03
C-R	1.022Ω
C-S	2.142Ω

Note: Resistance at 20°C of ambient temperature.

9.1 CS-A9MKD CU-A9MKD



Sensor (Thermistor) Characteristics

① Pipe Temp. Sensor
② Intake Air Temp. Sensor

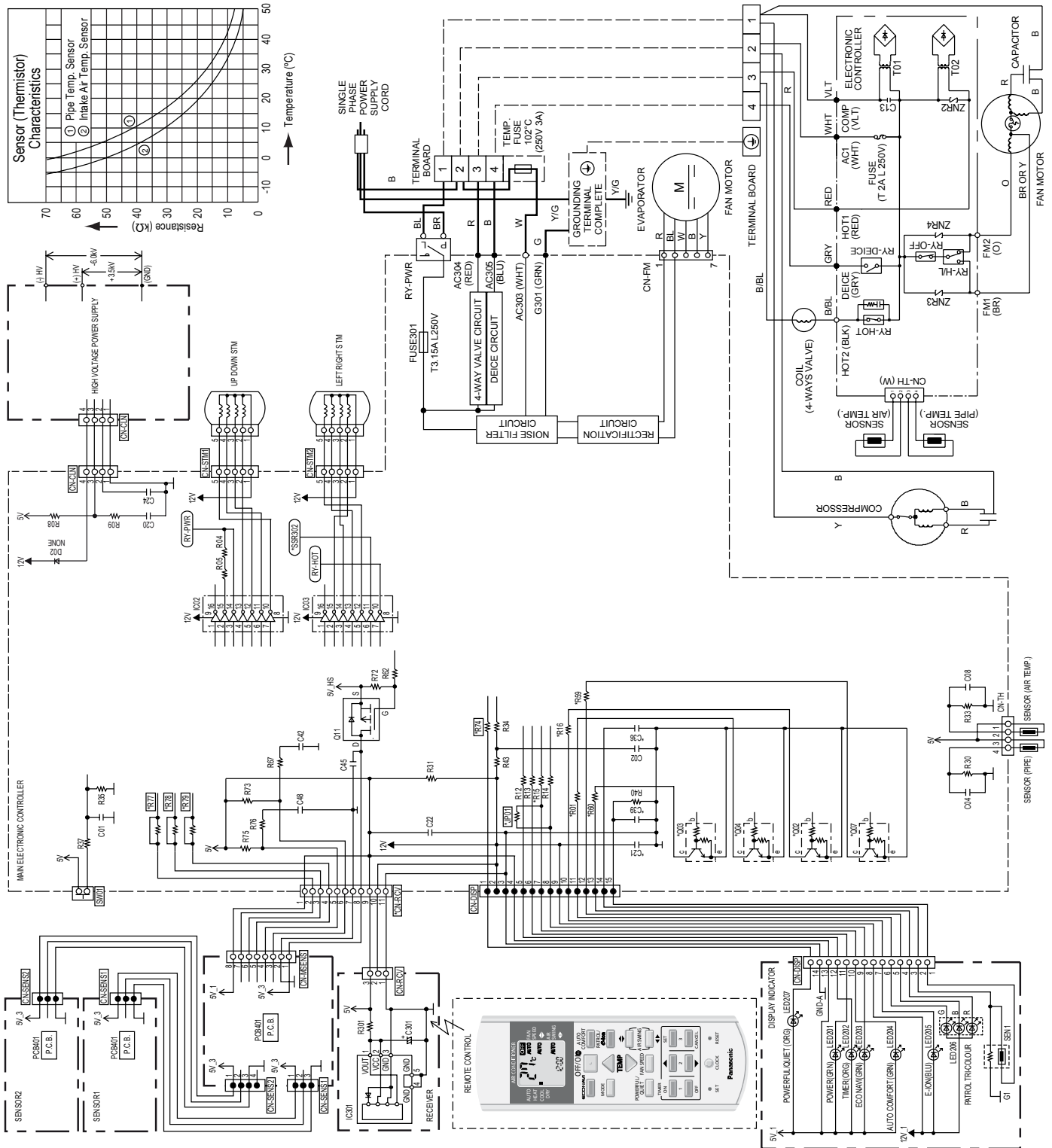
Resistance (kΩ)

Temperature (°C)

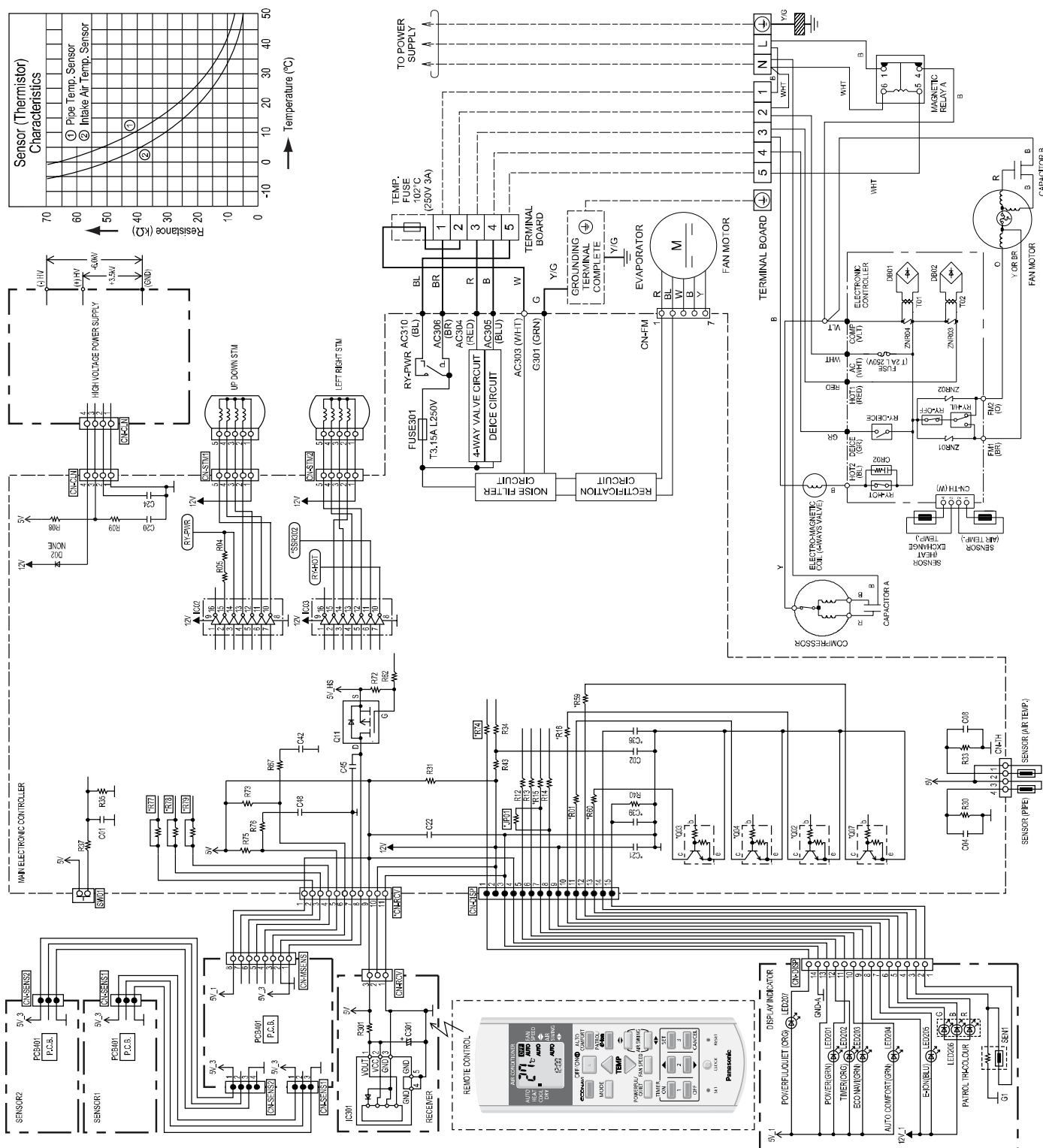
Temperature (°C)	Pipe Temp. Sensor (1) Resistance (kΩ)	Intake Air Temp. Sensor (2) Resistance (kΩ)
-10	65	55
0	55	45
10	48	38
20	42	32
30	36	26
40	30	20
50	24	14



9.3 CS-A18MKD CU-A18MKD CS-A24MKD CU-A24MKD



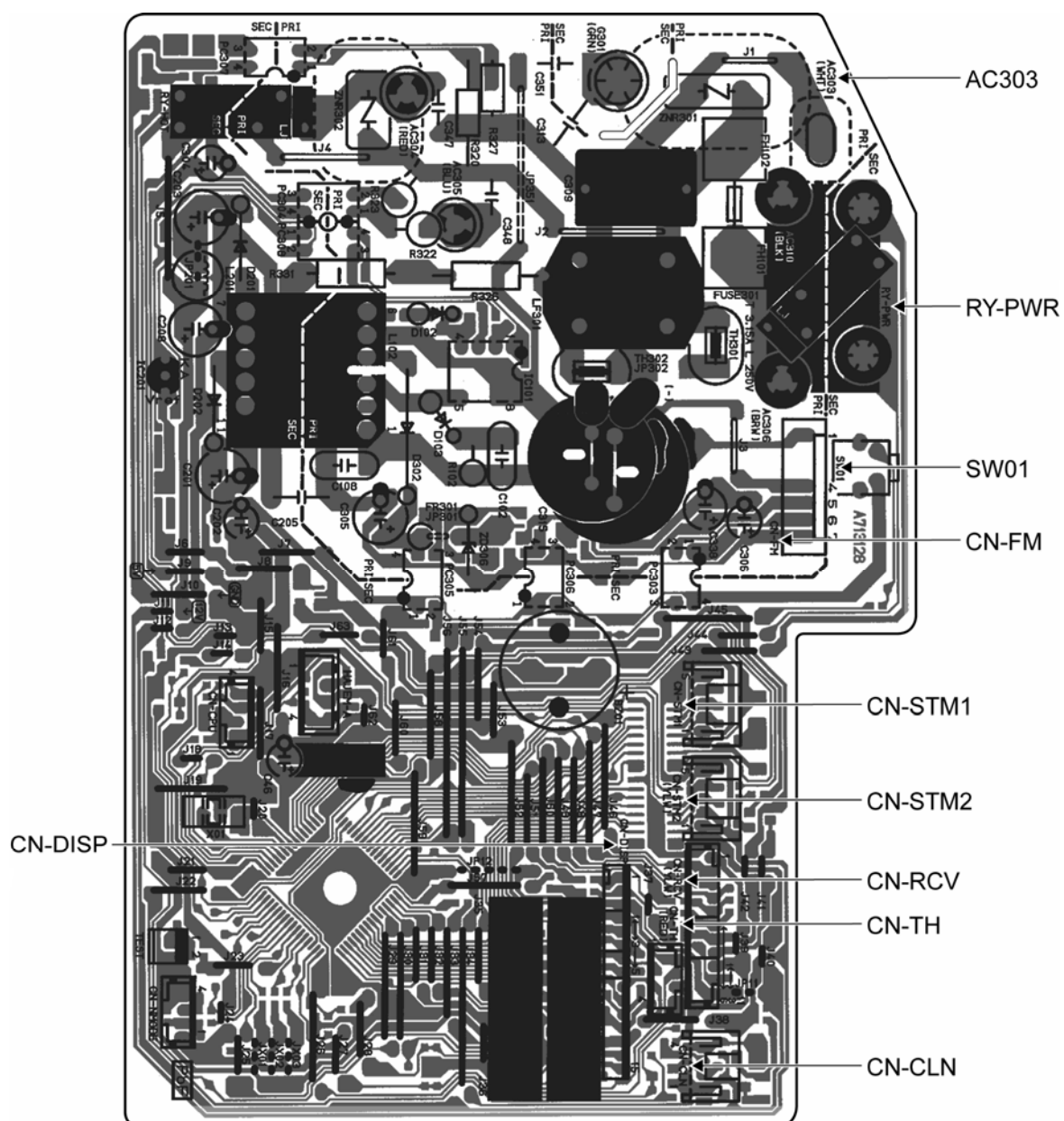
9.4 CS-A28MKD CU-A28MKD



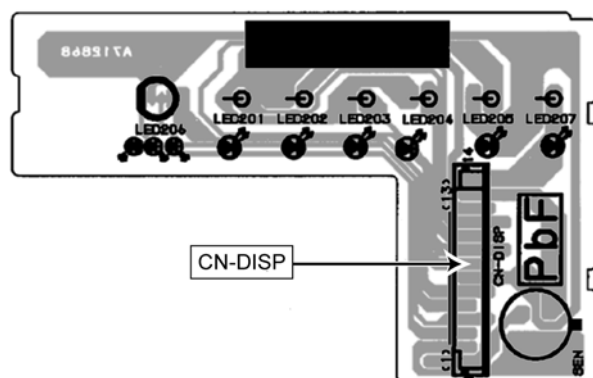
10.1.1.1 CS-A9MKD CS-A12MKD



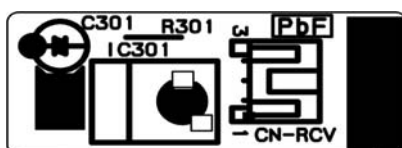
10.1.1.2 CS-A18MKD CS-A24MKD CS-A28MKD



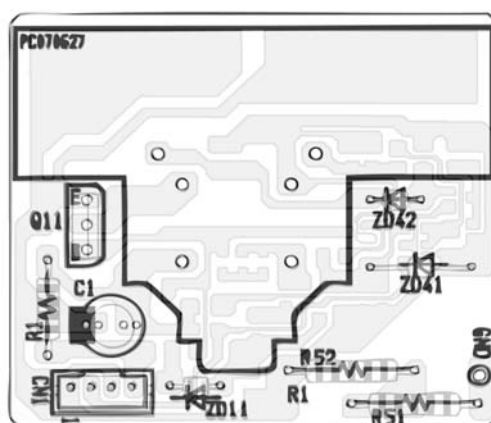
10.1.2 Indicator Printed Circuit Board



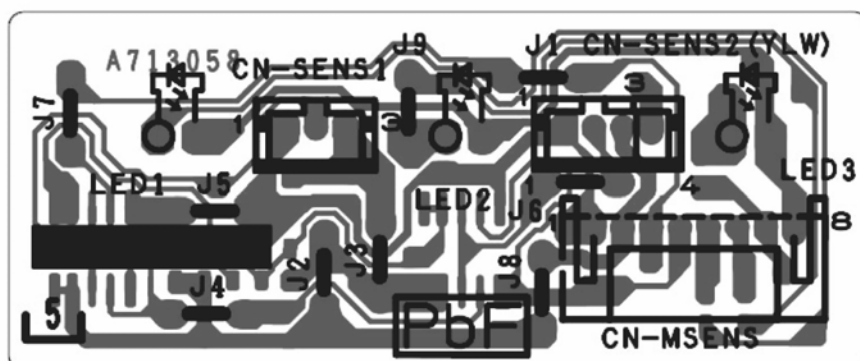
10.1.3 Receiver Printed Circuit Board



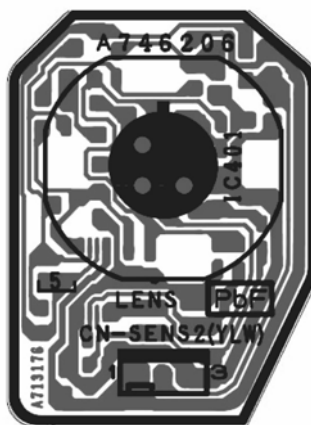
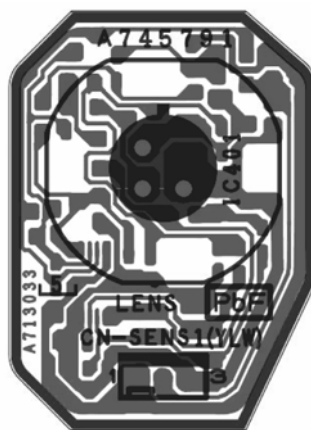
10.1.4 High Voltage Power Supply Printed Circuit Board



10.1.5 Comparator Printed Circuit Board



10.1.6 Human Activity Sensor Printed Circuit Board



11. Installation Instruction

11.1 Select the Best Location

11.1.1 Indoor Unit

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

11.1.2 Outdoor Unit

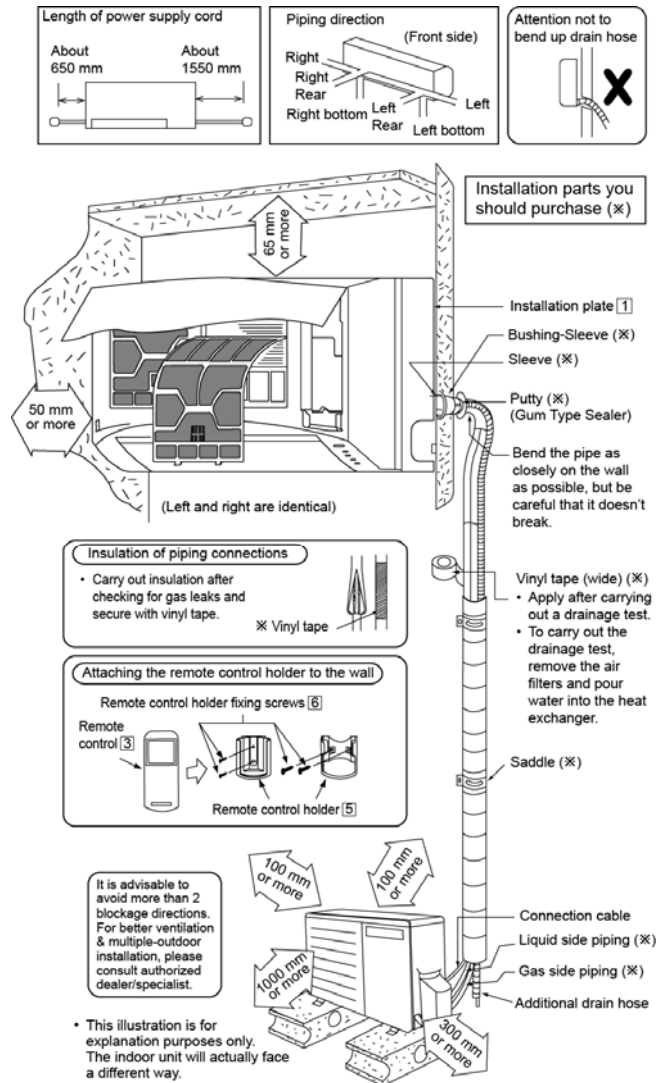
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)	
		Gas	Liquid							
A9***	1.0 ~ 1.5HP	9.52mm (3/8")	6.35mm (1/4")	7.5	5	3	10	20	7.5	
A12***		12.7mm (1/2")			5	3	15	20	7.5	
A18***	2.0 ~ 2.5HP	15.88mm (5/8")		5	20	3	25	20	7.5	
A24***					20	3	25	30	7.5	
A28***	3.0HP					20	3	30	30	7.5

Example: For A9***

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

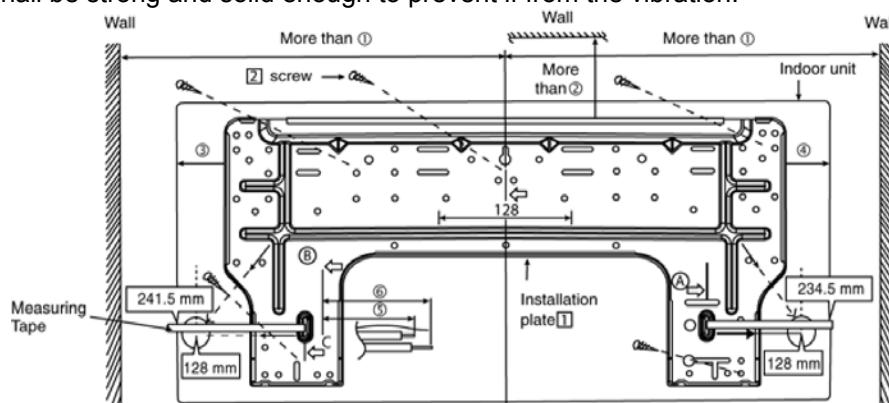
11.1.3 Indoor/Outdoor Unit Installation Diagram



11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

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

- ⑤ : 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.

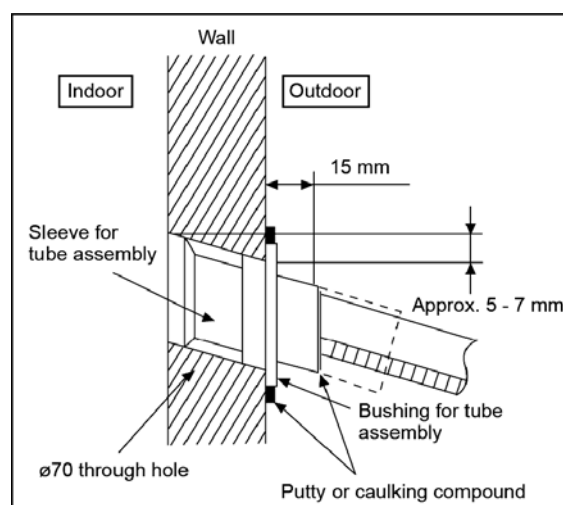
- Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
 (If mounting the unit on the concrete wall, consider using anchor bolts.)
 - Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.
- Drill the piping plate hole with $\phi 70$ mm hole-core drill.
 - Putting measuring tape at position as shown in the diagram above.
 The hole centre is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
 The meeting point of the extension arrow mark is the hole center position.
 - Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to step 11.2.2)

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

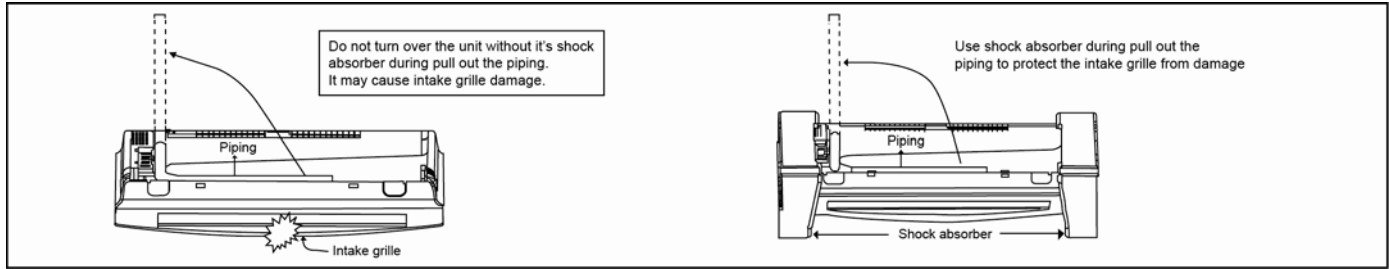
- Insert the piping sleeve to the hole.
- Fix the busing to the sleeve.
- Cut the sleeve until it extrudes about 15mm from the wall.

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

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



11.2.3 Indoor Unit Installation



11.2.3.1 For the right rear piping

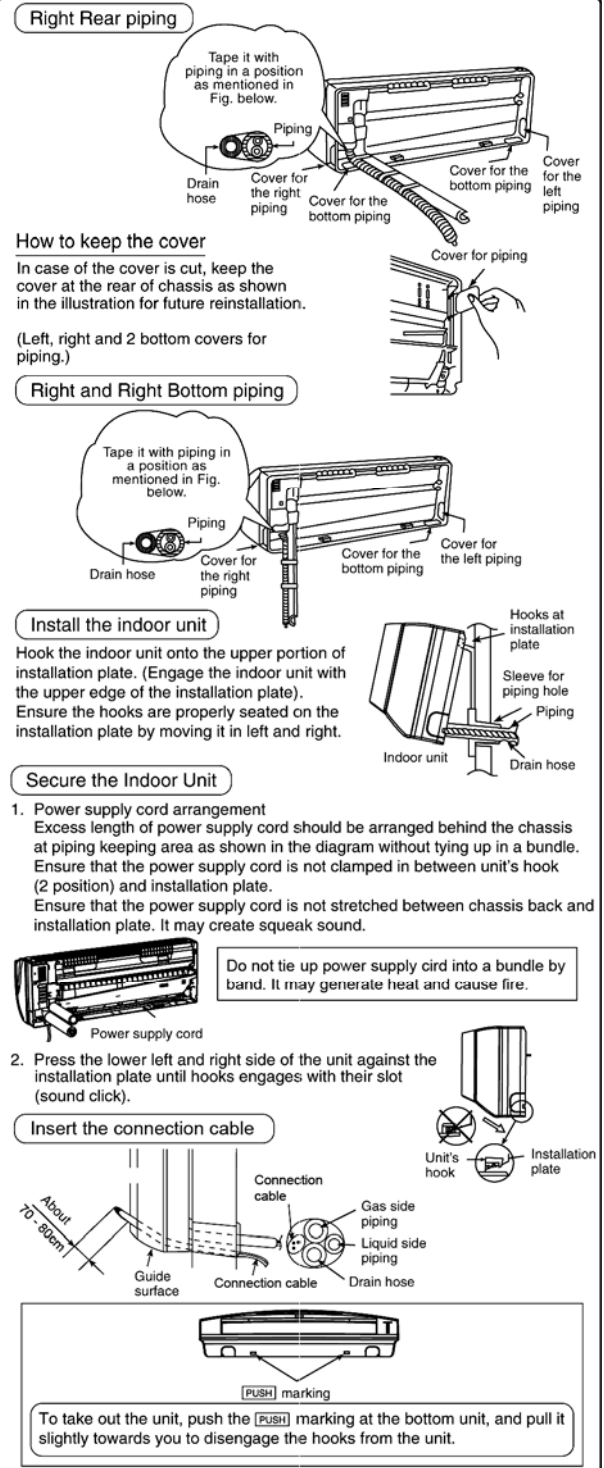
- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Secure the Indoor Unit
 - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.
- Step-4** Insert the connection cable

11.2.3.2 For the right and right bottom piping

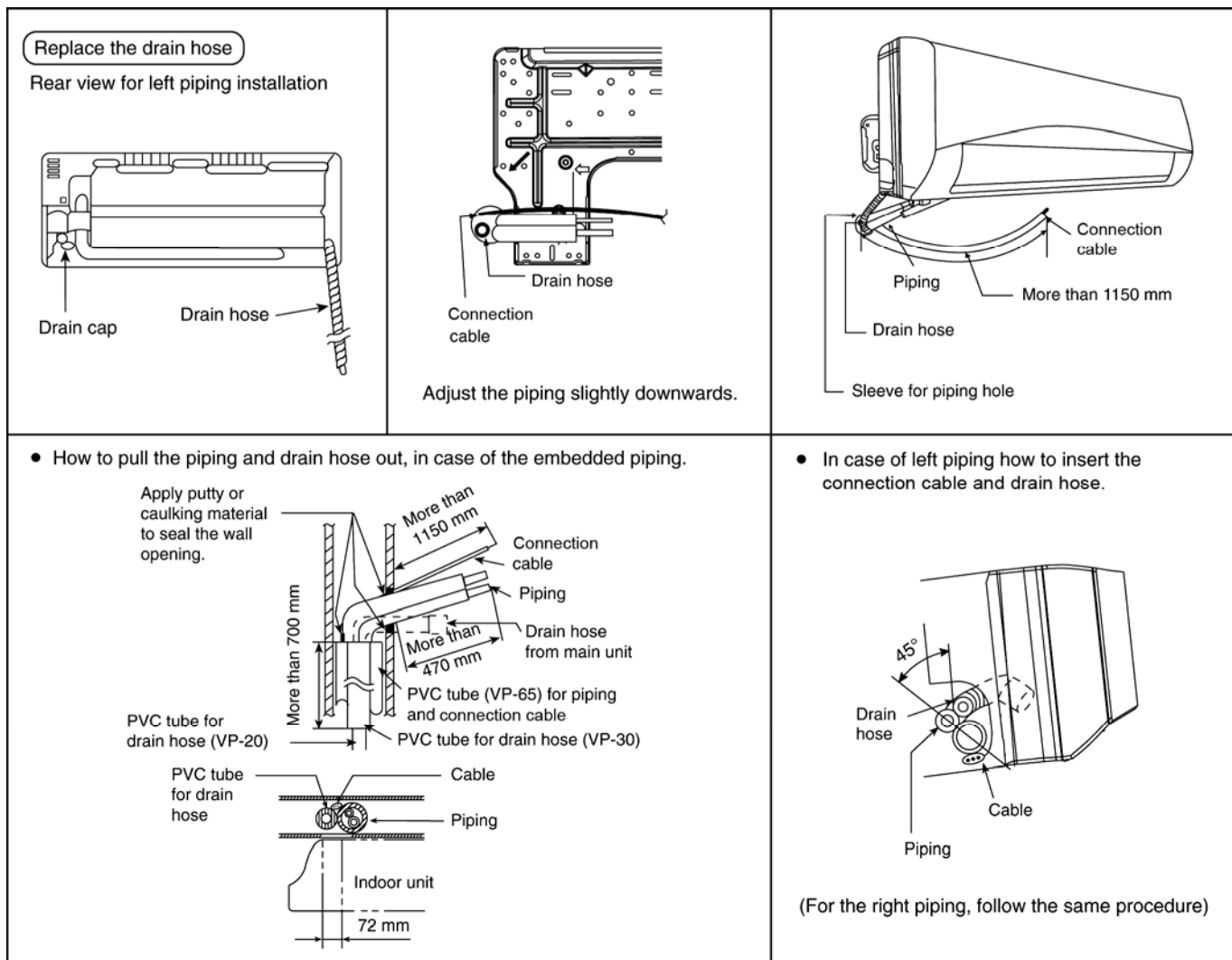
- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Insert the connection cable
- Step-4** Secure the Indoor Unit
 - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.

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 connection cable into Indoor Unit
 - The inside and outside connection cable can be connected without removing the front grille.
- Step-4** Cut and flare the embedded piping
 - When determining the dimensions of the piping, slide the unit all the way to the left on the installation plate.
 - Refer to the section "Cutting and flaring the piping"
- Step-5** Install the Indoor unit
- Step-6** Connect the piping
 - Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation).
- Step-7** Insulate and finish the piping
 - Please refer to "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.
- Step-8** Secure the indoor unit



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

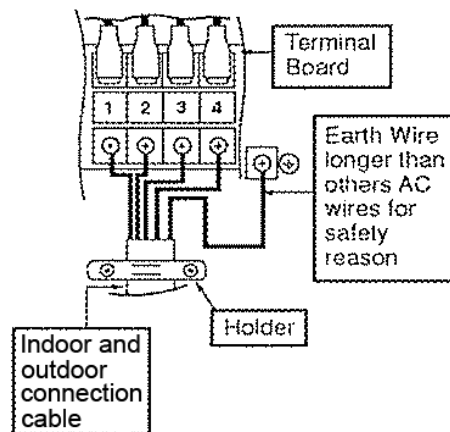


11.2.4 Connect the Cable to the Indoor Unit

- 1 The inside and outside connection cable can be connected without removing the front grille.
- 2 a) INDOOR POWER SUPPLY MODEL (1.0 ~ 2.5HP)

Connection cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed $5 \times 1.5\text{mm}^2$ (1.0~1.5HP) or $5 \times 2.5\text{mm}^2$ (2.0~2.5HP) flexible cord, type designation 245 IEC 57 or heavier cord.

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



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

⚠ WARNING

⚡ 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.

b) OUTDOOR POWER SUPPLY MODEL (3.0HP)

Connection cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed $6 \times 1.5\text{mm}^2$ (3.0HP) flexible cord, type designation 245 IEC 57 or heavier cord.

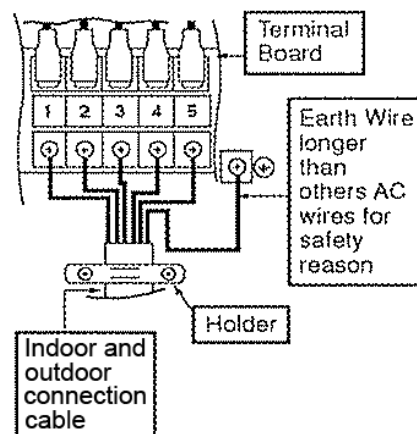
Terminals on the indoor unit	1	2	3	4	5	
Colour of wires						
Terminals on the outdoor unit	1	2	3	4	5	

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

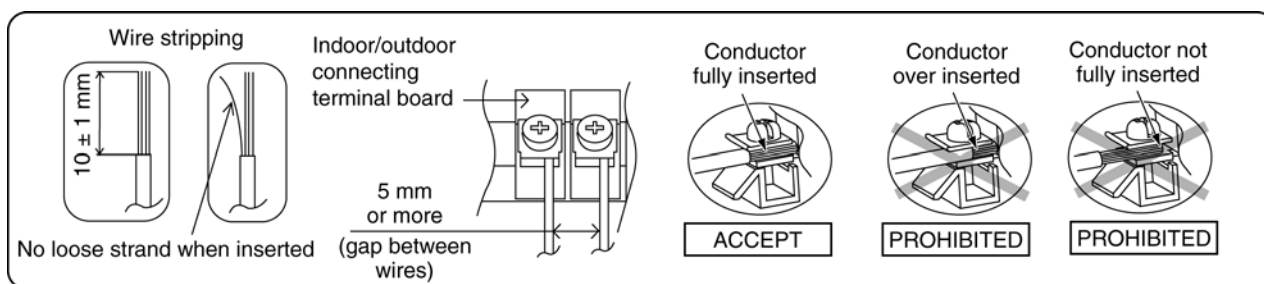
⚠ WARNING

⚡ 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.

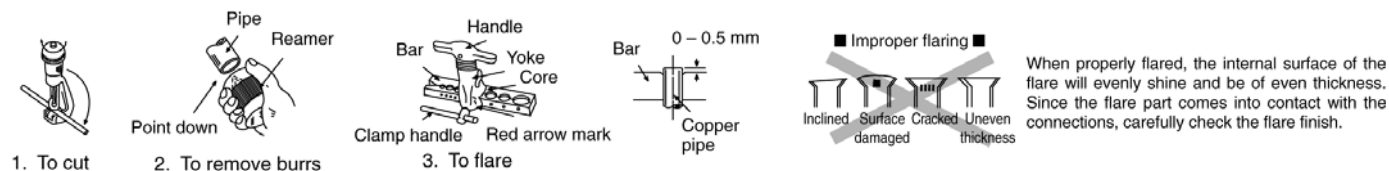


11.2.5 Wire Stripping And Connecting Requirement



11.2.5.1 Cutting and flaring the piping

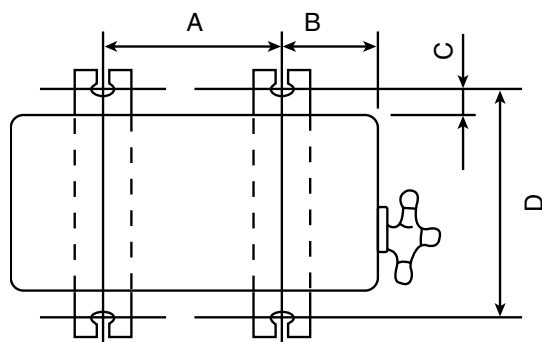
- Please cut using pipe cutter and then remove the burrs.
- Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- Please make flare after inserting the flare nut onto the copper pipes.



11.3 Outdoor Unit

11.3.1 Install the Outdoor Unit

- After selecting the best location, start installation according to Indoor/Outdoor Unit Installation Diagram.
 - Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut ($\phi 10\text{mm}$).
 - When installing at roof, please consider strong wind and earthquake.
Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
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

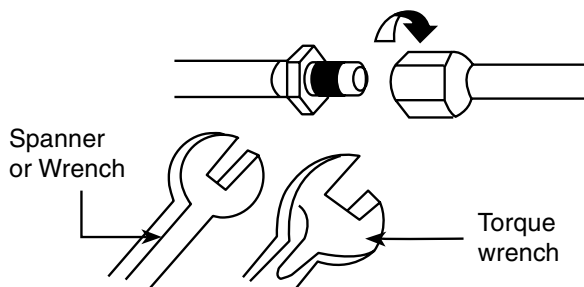
- Align the center of piping and sufficiently tighten the flare nut with fingers.
- Further tighten the flare nut with torque wrench in specified torque as stated in the table.

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.

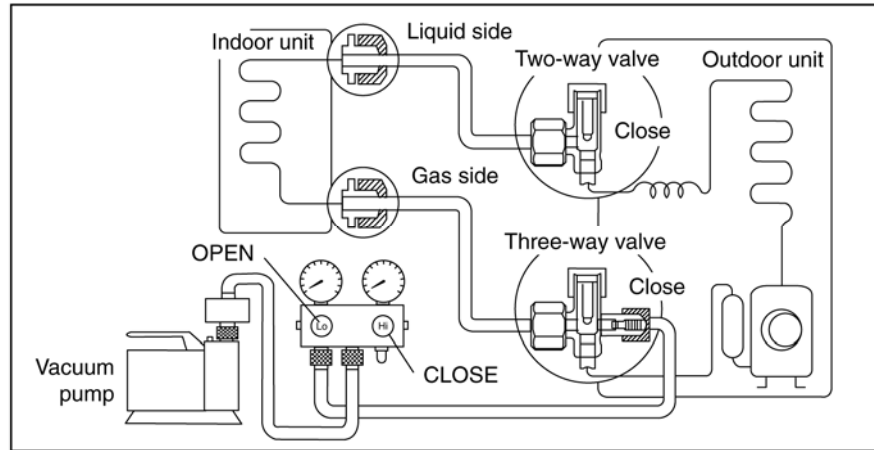
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.



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

11.3.3 Evacuation of the Equipment

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



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

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

11.3.4 Connect the cable to the Outdoor Unit

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 $5 \times 1.5\text{mm}^2$ (1.0~1.5HP) or $5 \times 2.5\text{mm}^2$ (2.0~2.5HP) flexible cord, type designation 245 IEC 57 or heavier cord.

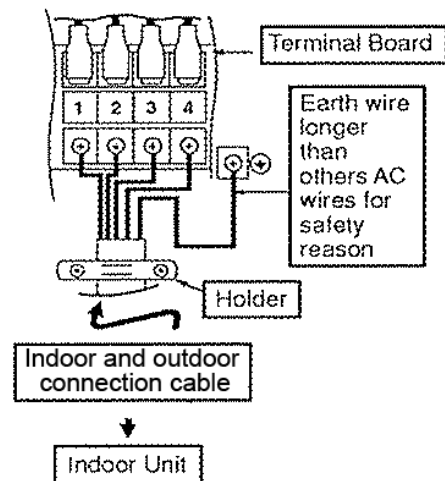
Terminals on the outdoor unit	1	2	3	4	
Colour of wires					
Terminals on the indoor unit	1	2	3	4	

- 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.

⚠ WARNING

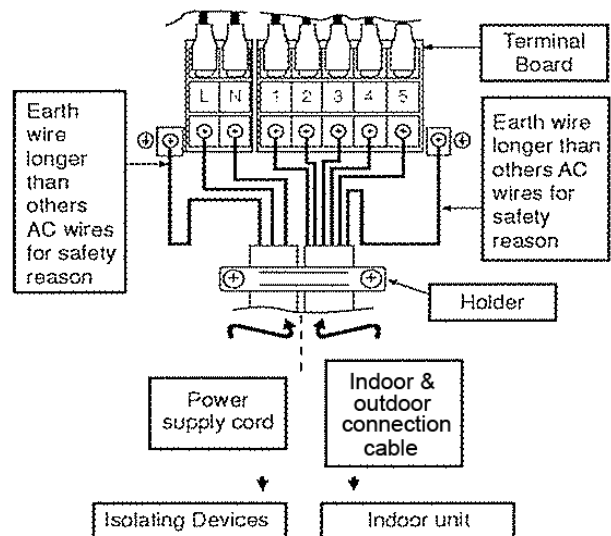
⚡ This equipment must be properly earthed.

- 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** $3 \times 4.0\text{mm}^2$ (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 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed $6 \times 1.5\text{mm}^2$ 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.



Terminals on the indoor unit	1	2	3	4	5	
Colour of wires (connecting cable)						
Terminals on the outdoor unit (Power supply cord)	L	N	1	2	3	4
Terminals on the isolating devices (Disconnecting means)	(L)	(N)				

- 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.

⚠ WARNING

⚡ 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.

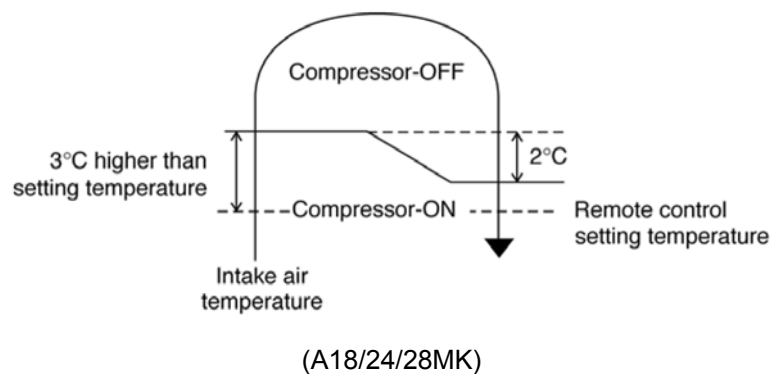
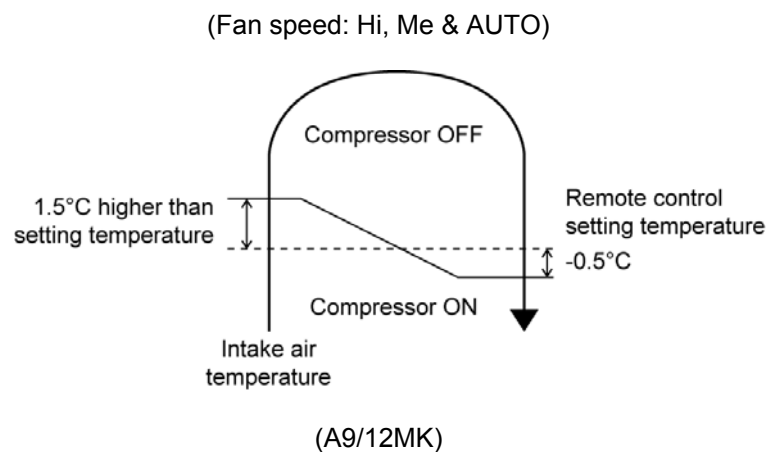
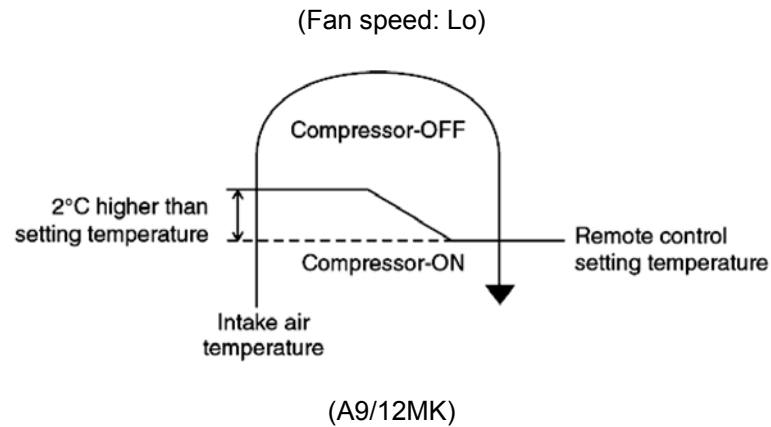
11.3.5 Pipe Insulation

- 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.

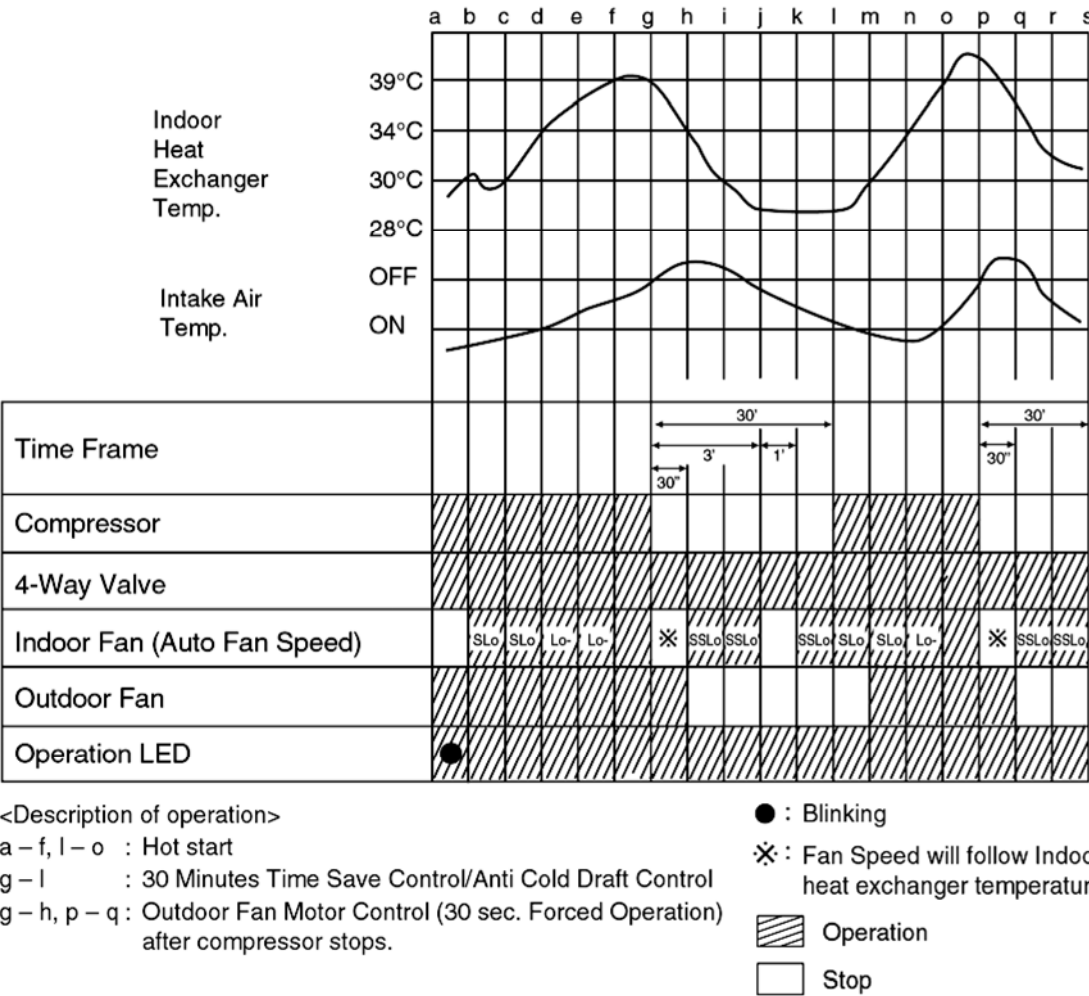
12. Operation Control

12.1 Heating Operation

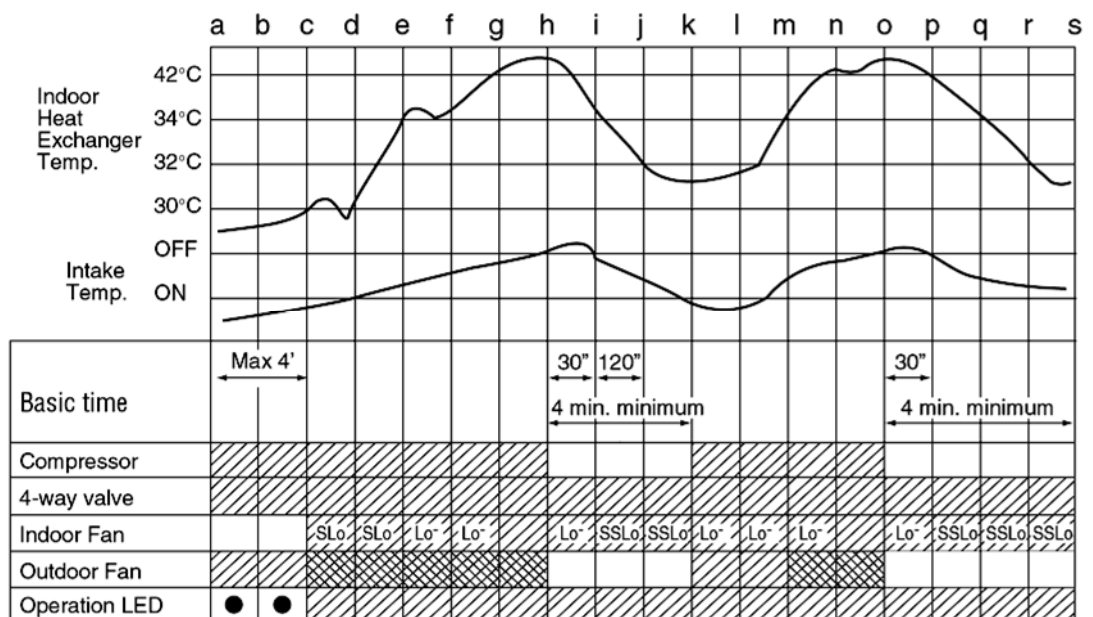
- Heating operation can be set using remote control.
- This operation is applied to warm the room temperature reaches the setting temperature set on the remote control.
- The remote control setting temperature, which takes the reading of intake air temperature sensor, can be adjusted from 16°C to 30°C.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



12.1.1 Heating Operation Time Diagram (For CS-A9MKD CU-A9MKD and CS-A12MKD CU-A12MKD)



12.1.2 Heating Operation Time Diagram (For CS-A18MKD CU-A18MKD, CS-A24MKD CU-A24MKD and CS-A28MKD CU-A28MKD)



<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

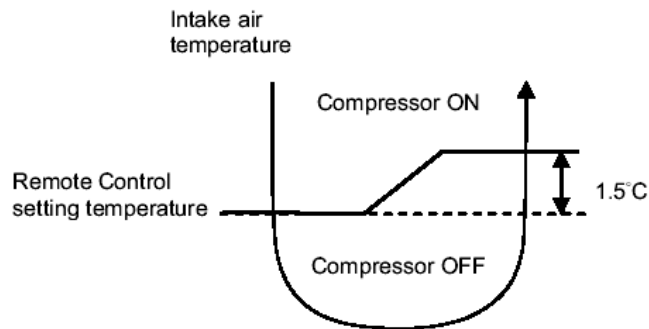
▨ : Operation

□ : Stop

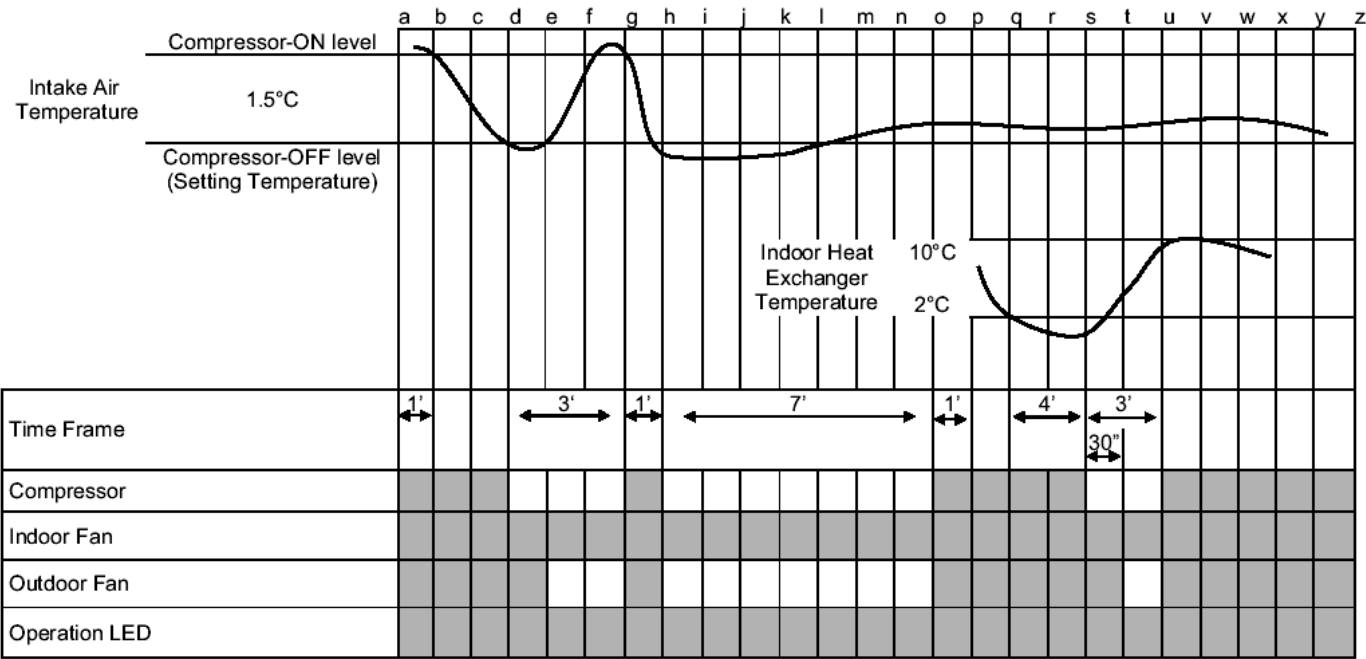
▩ : Operation or stop

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-A9MKD CU-A9MKD and CS-A12MKD CU-A12MKD)



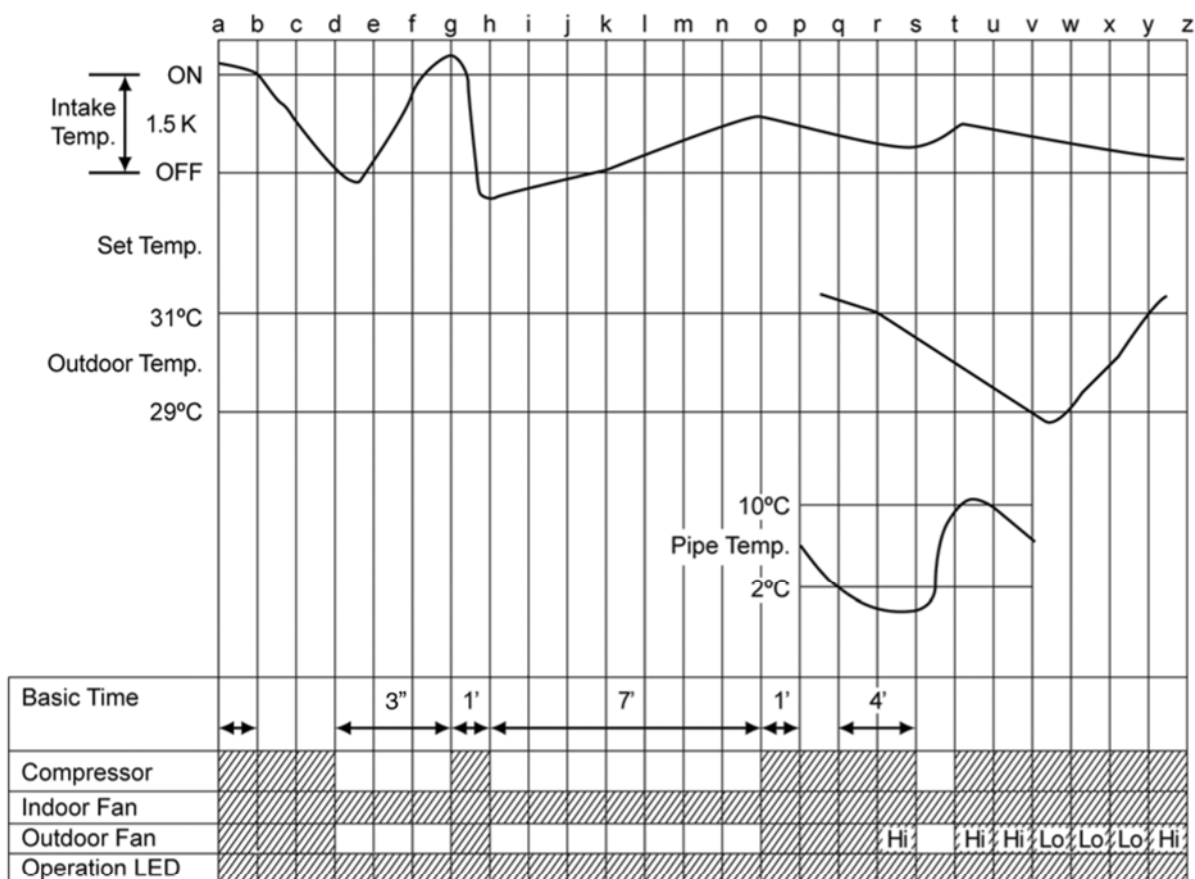
<Description of operation>

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

Operation

Stop

12.2.2 Cooling Operation Time Diagram (For CS-A18MKD CU-A18MKD, CS-A24MKD CU-A24MKD and CS-A28MKD CU-A28MKD)

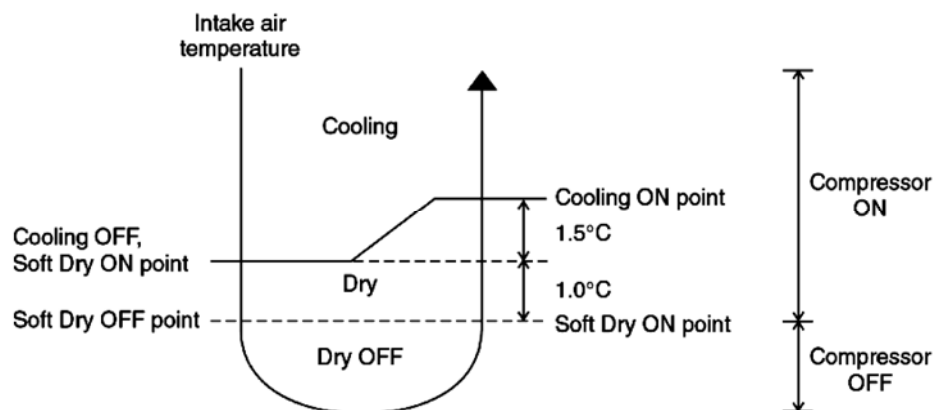


<Description of operation>

- 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

- 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.

[illegible]

Operation

Stop

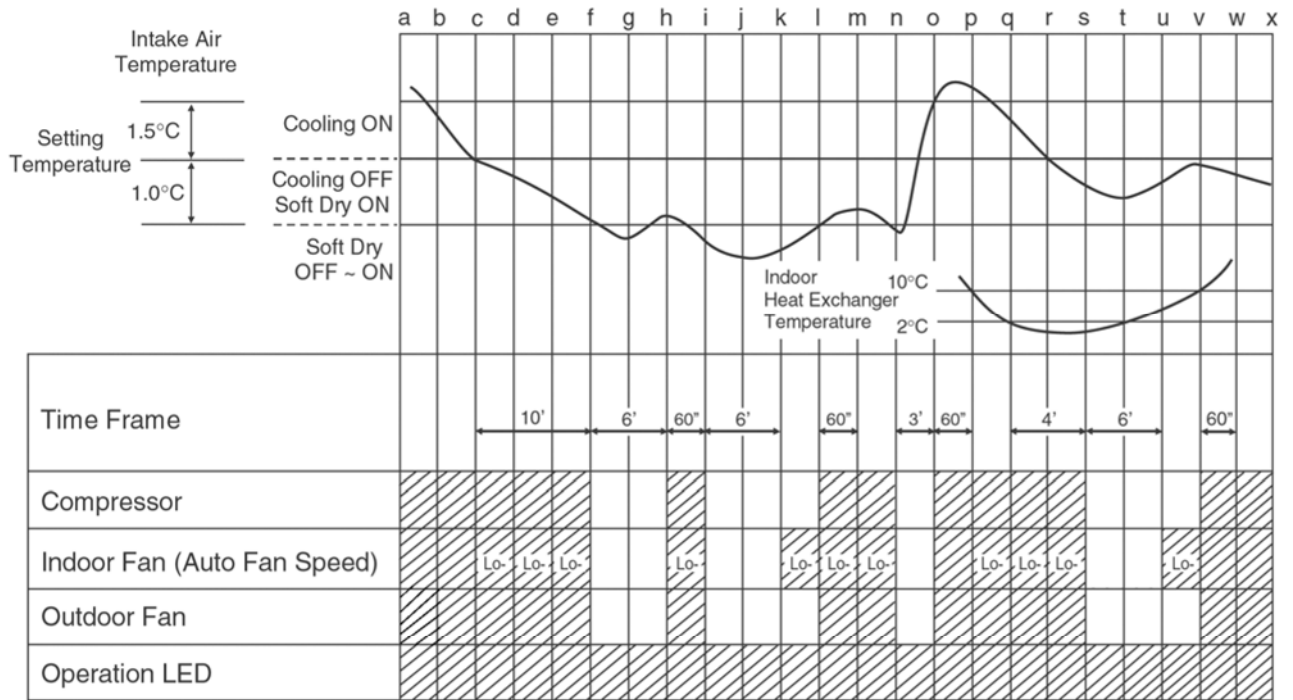
: 10 minutes dry operation

: Minimum 6 minutes restart control (Time Delay Safety Control) – Soft dry operation

: Freeze Prevention Control

: Indoor fan OFF for 40" and then rotates at Lo-

12.3.2 Soft Dry Operation Time Diagram (For CS-A18MKD CU-A18MKD, CS-A24MKD CU-A24MKD and CS-A28MKD CU-A28MKD)



<Description of operation>

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

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

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

q - v : Freeze Prevention Control

Operation

Stop

12.4 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
	20°C	Soft Dry Operation
		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	○ (Judgement: 23°C & Above)	Not Applicable	○ (Judgement: Below 23°C)
Soft Dry	20°C Soft Dry Heating	Not Applicable	○ (Judgement: 20°C & Above)	○ (Judgement: Below 20°C)
Heating	25°C Cooling Heating	○ (Judgement: 25°C & Above)	Not Applicable	○ (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.

↑ Intake Air Temperature	25°C	Cooling Operation
	22°C	Soft Dry Operation
		Heating Operation

	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-A9MKD	CS-A12MKD
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

Fan Speed (rpm)	CS-A18MKD	CS-A24MKD	CS-A28MKD
SHi	1310	1530	1540
Hi	1240	1390	1500
Me	1140	1270	1380
HLo	1100	1230	1330
CLo	1040	1150	1250
Lo-	850	940	1030
SLo	650	720	810
SSLo	300	300	300
QSHi	1220	1440	1450
QHi	1150	1300	1410
QMe	1050	1180	1290
QHLo	950	1060	1160
QLo	950	1060	1160

12.5.2 Automatic Fan Speed Control

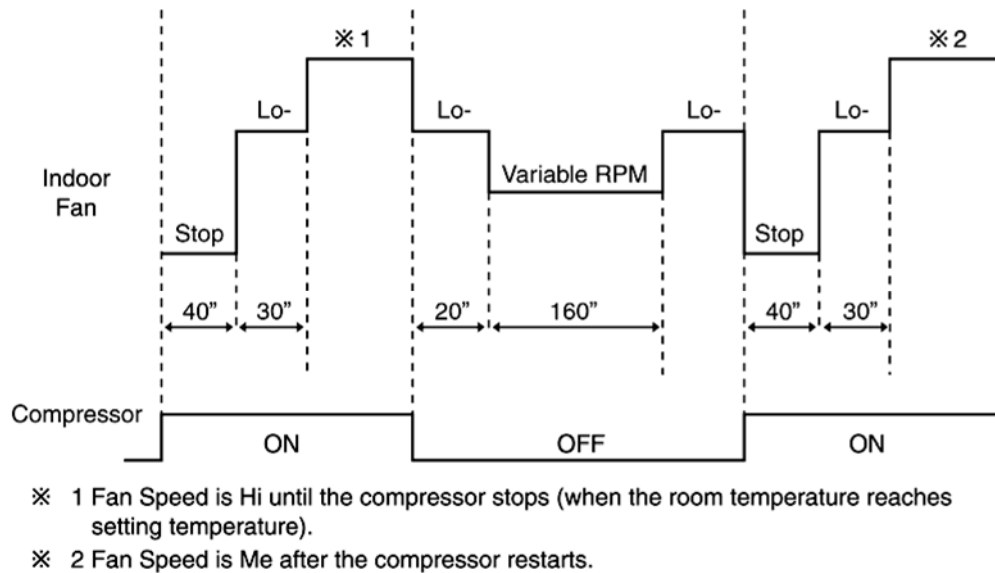
- When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
 - Fan speed rotates in the range of Hi, Me and Lo-.
 - Deodorizing Control will be activated.

For CS-A9MKD and CS-A12MKD

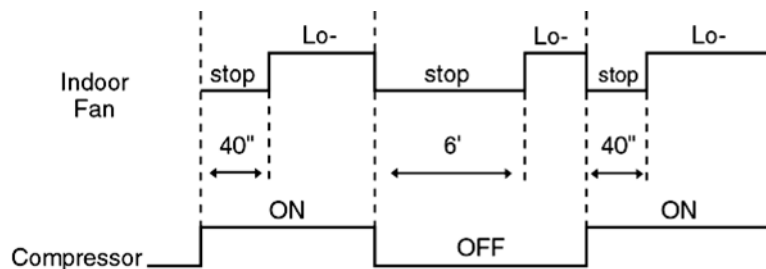
Speed Mode				SHi	Hi	Me	HLo	CLo	Lo-	SLo	SSLo	Stop
Cooling	Normal	Manual	Hi		o							
			Me			o						
			Lo					o				
		Auto			o	o			o			o
	Powerful	Manual		o								
		Auto		o								
Dry		Manual							o			o
		Auto							o			o
Heating	Normal	Manual	Hi	o					o	o	o	o
			Me			o			o	o	o	o
			Lo				o		o	o	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-70					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

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
Auto Mode Judgment										o		
Cooling	Quiet	Manual	QHi		Hi -90							
			QMe			Me -90						
			QLo					CLo -90				
		Auto			Hi -90	Me -90			o			o
Dry	Quiet	Manual							o			o
		Auto							o			o
Heating	Quiet	Manual	QHi	SHi -100					o	o	o	o
			QMe			Me -90			o	o	o	o
			QLo				HLo -170		o	o	o	o
		Auto				Me -90	HLo -170		o	o	o	o

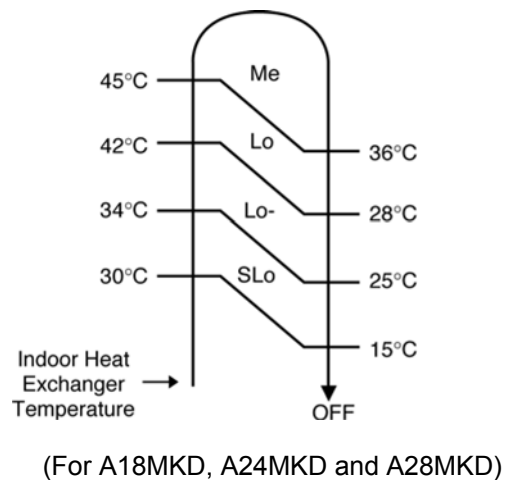
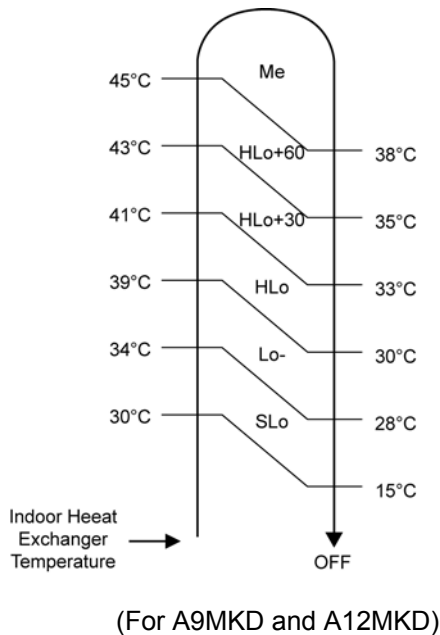
- Auto Fan Speed during cooling operation:
 - Indoor fan will rotate alternately between off and on as shown in below diagram.
 - At the beginning of each compressor starts operation, indoor fan speed increases gradually for deodorizing purpose.
 - For the first time the compressor operates, indoor fan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



- 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.



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-A9MKD and CU-A12MKD)
- 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-A18MKD, CU-A24MKD and CU-A28MKD).
- For Cooling and Soft Dry operation, when outdoor temperature reaches to 31°C (Hi-speed), 29°C (Lo-speed). (Applicable for CU-A18MKD, CU-A24MKD and CU-A28MKD).
- For heating operation, when outdoor temperature reaches to 13.5°C (Hi-speed), 15.5°C (Lo-speed). (Applicable for CU-A18MKD, CU-A24MKD and CU-A28MKD).
- 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.

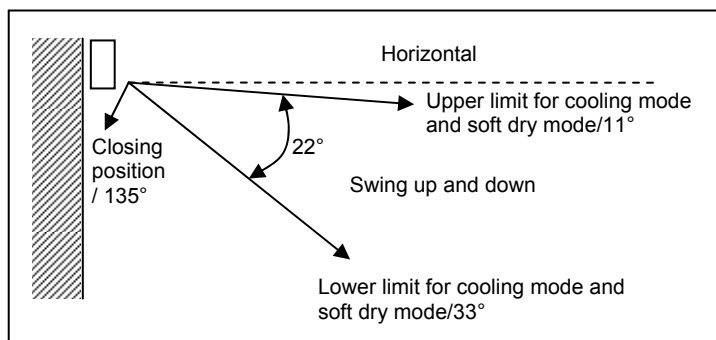
12.7 Vertical Airflow Direction Control

12.7.1 Auto Control

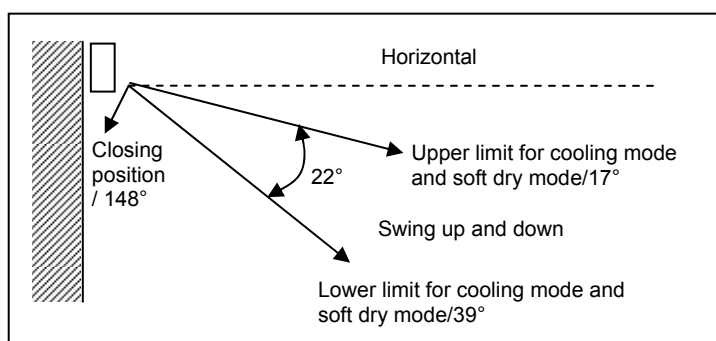
(Cooling and Soft Dry Operation Condition)

- 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-A9MKD and CS-A12MKD



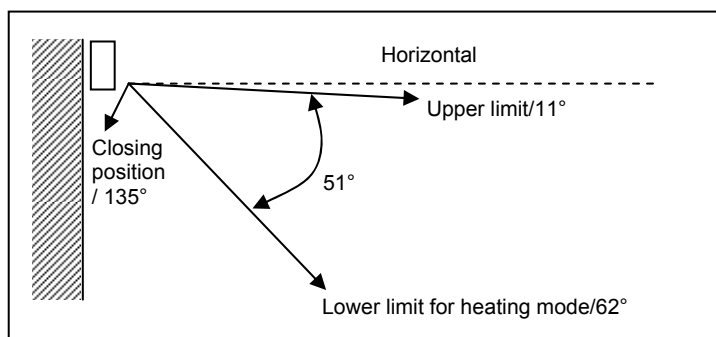
For CS-A18MKD, CS-A24MKD and CS-A28MKD



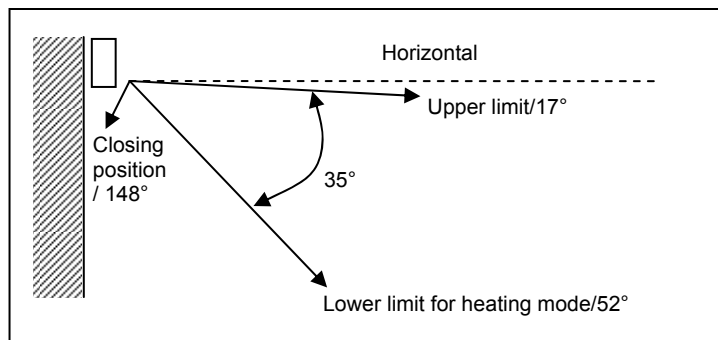
(Heating Operation Condition)

- 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-A9MKD and CS-A12MKD



For CS- A18MKD, CS-A24MKD and CS-A28MKD

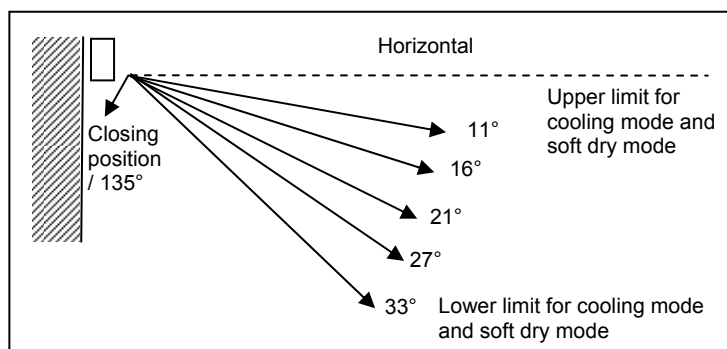


12.7.2 Manual Control

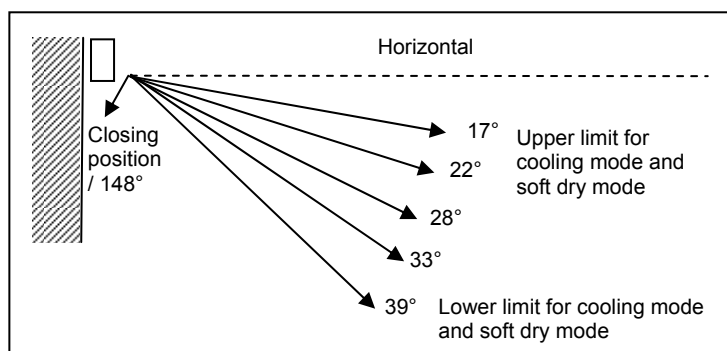
- When the vertical airflow direction is set to Manual using the remote control, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
- The louver can be adjusted by pressing the button to the desired louver position.
- When stop operation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

(Cooling and Soft Dry Operation Condition)

For CS-A9MKD and CS-A12MKD

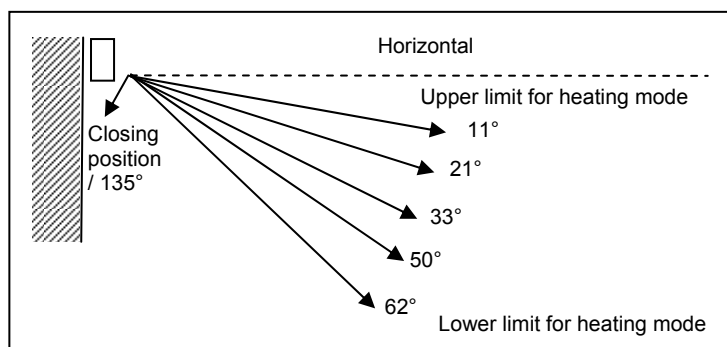


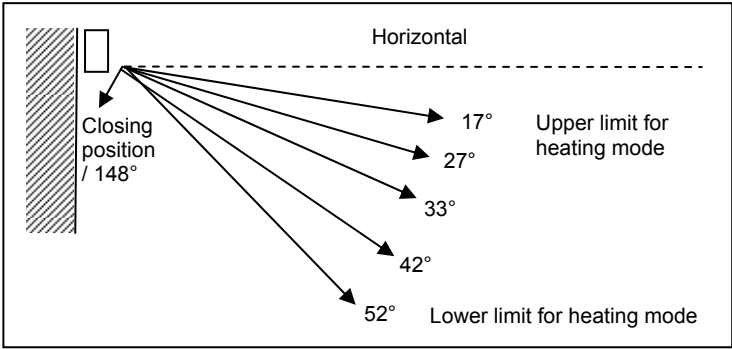
For CS-A18MKD, CS-A24MKD and CS-A28MKD



(Heating Operation Condition)

For CS-A9MKD and CS-A12MKD

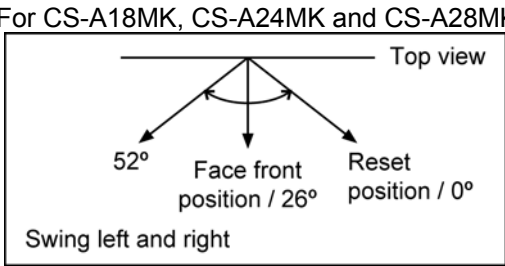
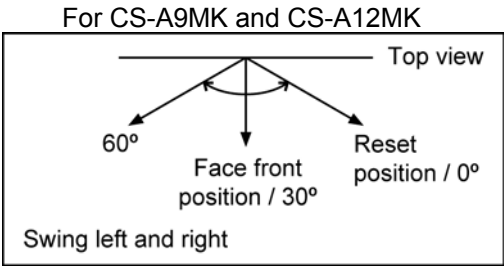




12.8 Horizontal Airflow Direction Control

12.8.1 Auto Control

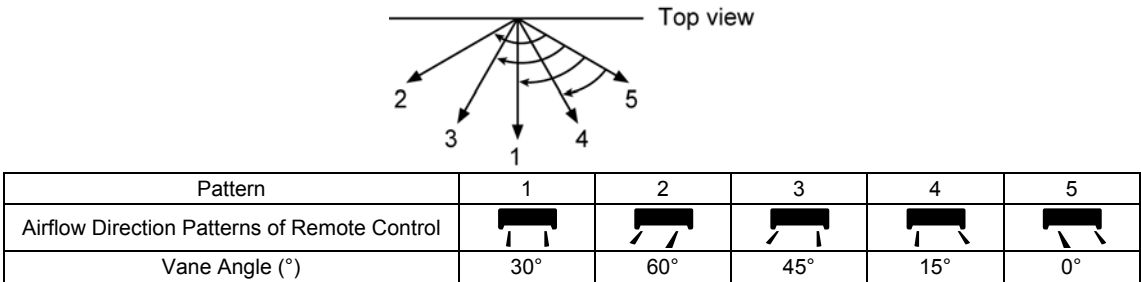
- When the horizontal airflow direction is set to Auto using the remote control, the vanes swings left and right as shown in the diagram.
- When stopped with remote control, the discharge vane is reset, and stop at the reset position.
- During Cooling operation or Soft Dry operation, indoor fan motor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



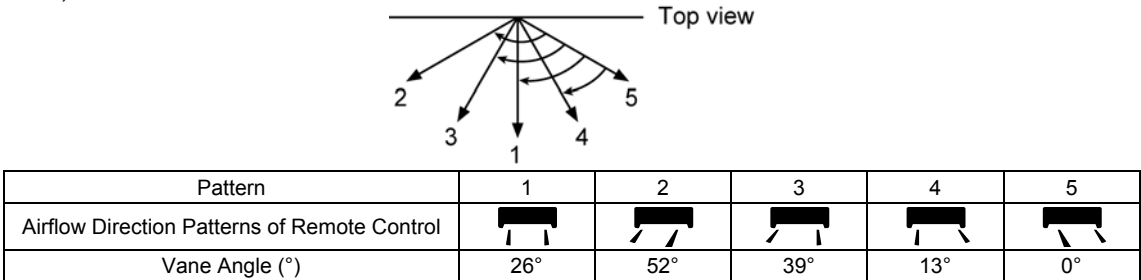
12.8.2 Manual Control

- 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.

For CS- A9MK and CS-A12MK



For CS-A18MK, CS-A24MK and CS-A28MK



12.9 Powerful Operation

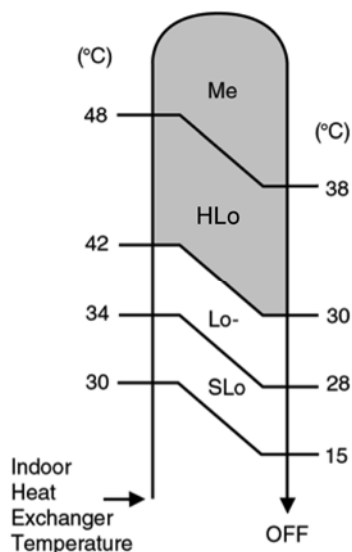
- To achieve the setting temperature quickly.

(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

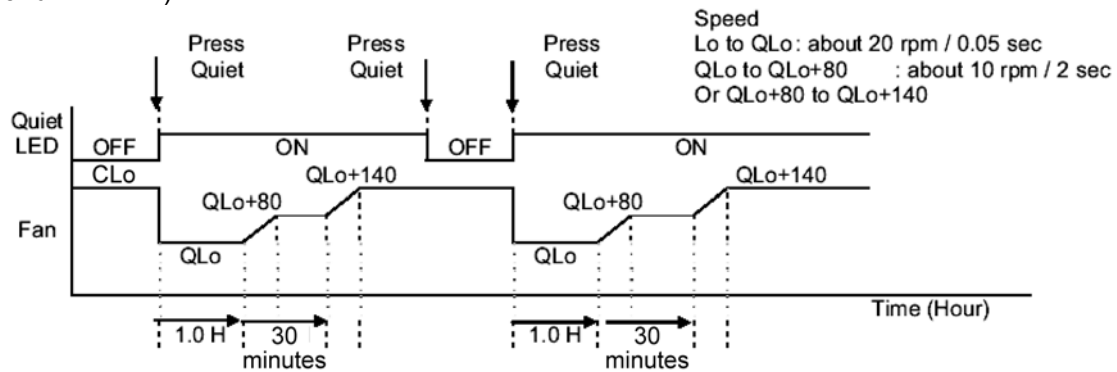
- Vertical Airflow Direction:-
 - In "Manual" setting, the vane will automatically shift down 5° lower than previous setting.
 - In "Auto" setting, the vane will automatically shift between upper and lower limit depending on the intake air temperature as Heating Mode, Airflow Direction Auto-Control.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

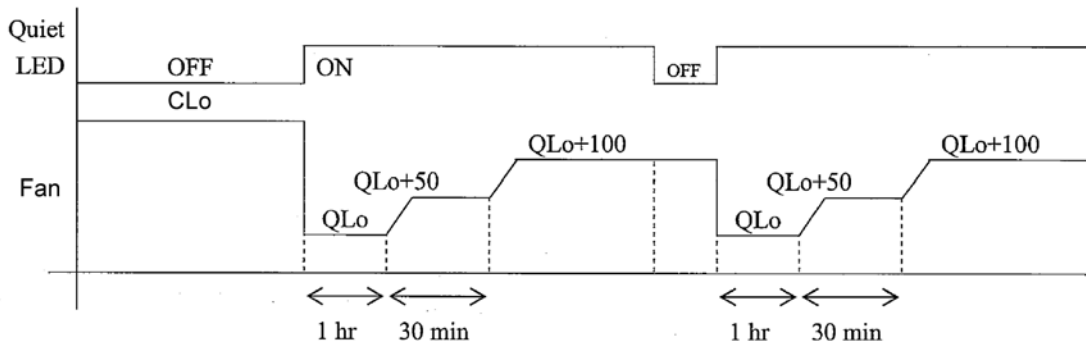
(For Cooling Operation or cooling region of Soft Dry Operation)

- To provide quiet cooling operation condition.
- Once the Quiet Operation is set at the remote control, the Quiet LED brightness will be dimmed. The sound level will reduce around 2dB(A) for Lo fan speed or 3dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation become severe at Quite Lo Cool, therefore Quiet Lo cool operated only for 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 80rpm)(for A9MKD and A12MKD) and Quiet Lo cool operated only 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 50 rpm) (for A18MKD, A24MKD and A28MKD).
- Manual Airflow Direction:
 - RPM control during Lo cool

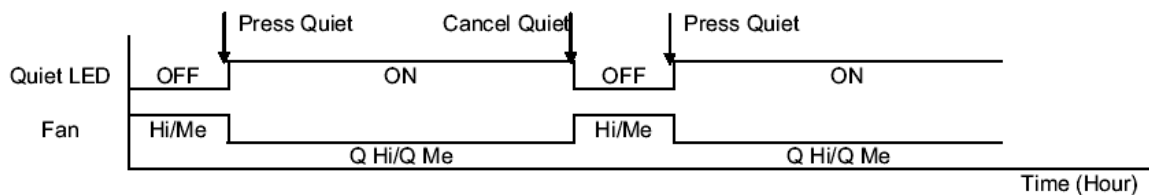
(For A9MKD and A12MKD)



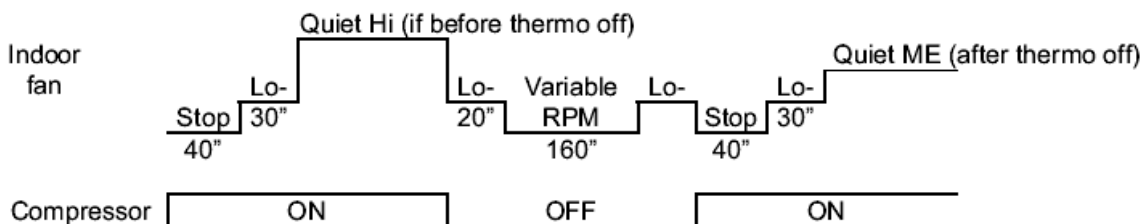
(For A18MKD, A24MKD and A28MKD)



- RPM control during Hi & Me cool



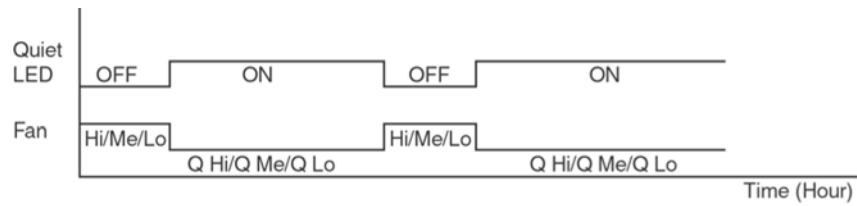
- Auto Fan Speed



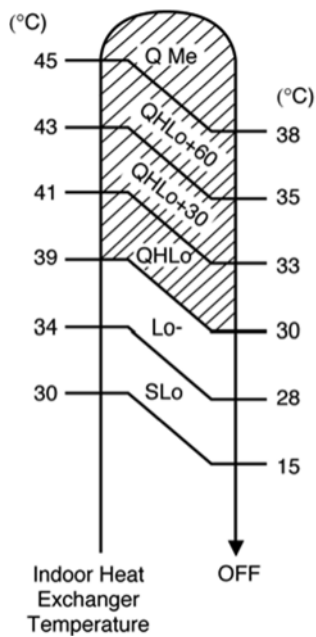
- Quiet operation stops when:
 - Quiet button is pressed again.
 - Stopped by OFF/ON operation button.
 - Timer OFF activates.
 - Operation mode button is changed.

(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

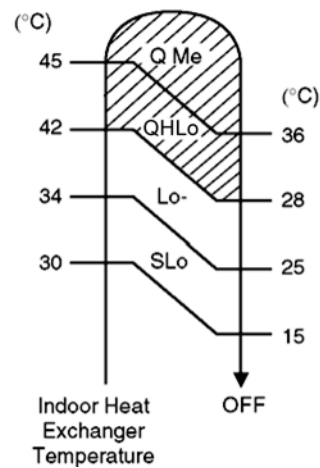


- Auto Fan Speed:-
 - Rpm control depends on the piping air temperature sensor of Indoor heat exchanger



(A9/12MK)

Fan Manual



(A18/24/28MK)

Fan Manual

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 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*

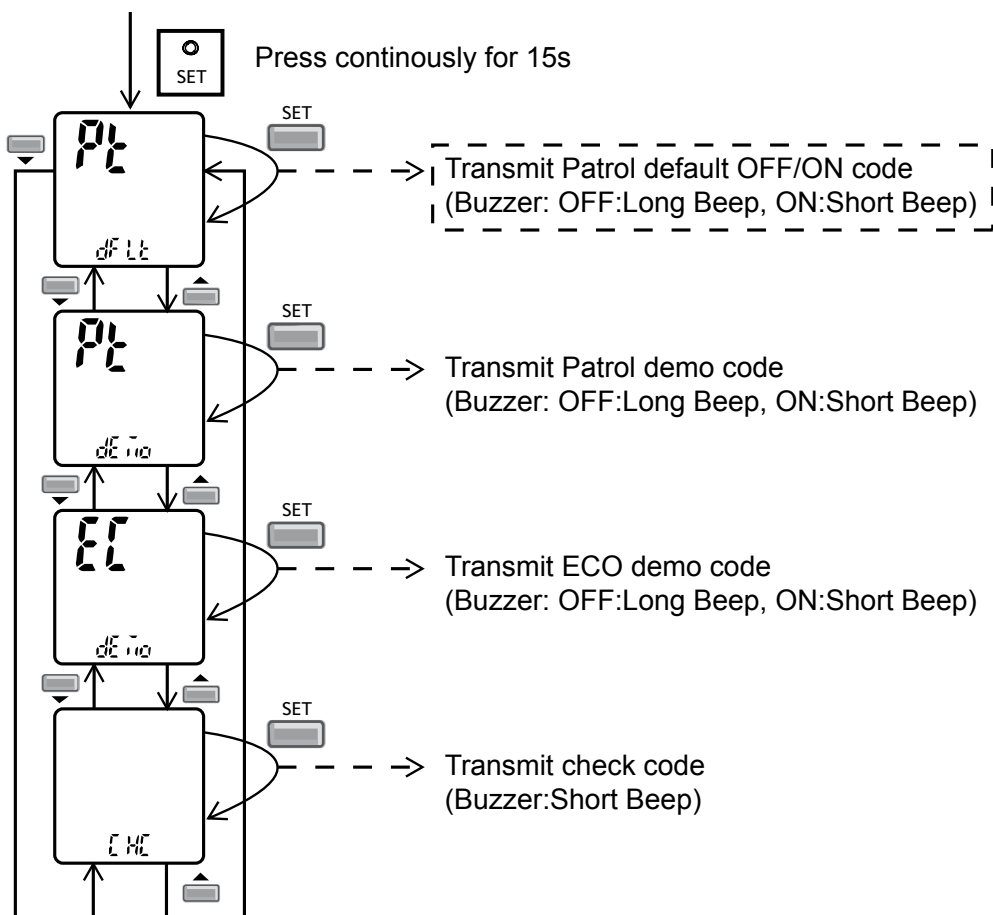
- If there is a power failure during operation, the air conditioner will automatically restart after 3 to 4 minutes when the power is resumed.
- It will start with previous operation mode and airflow direction.
- If there are more than one air conditioner unit in operation and power failure occur, restart 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.
- This control can be omitted by open the circuit of JX02 at indoor unit printed circuit board.

12.13 *Remote Control Signal Receiving Sound*

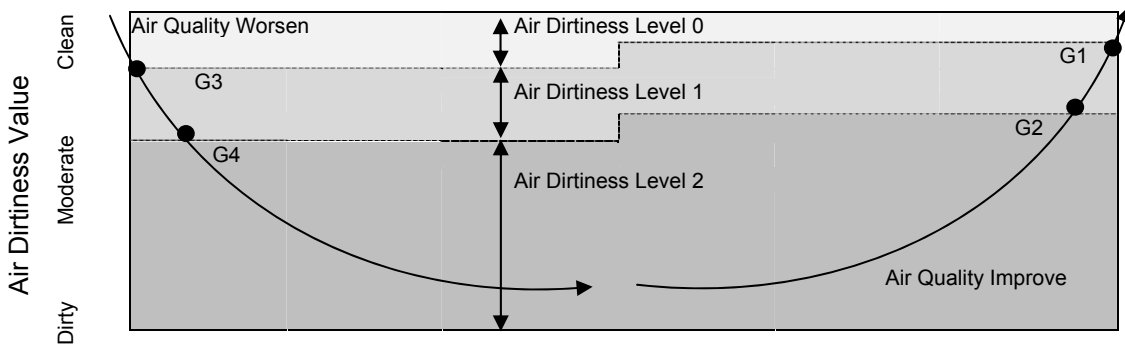
- Short beep sound will be heard when turn ON the air conditioner or enabling other operations.
- Long beep sound will be heard when turn OFF the air conditioner or disabling other operations.

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.

No	Description	PATROL LED			E-ION	TIMER
		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
		a ¹ . Dirtiness level 1 shift to 0	OFF	ON for 10 min.	OFF	ON for 10 min.
		b. Dirtiness level 1	OFF	ON	OFF	ON
		c. Dirtiness level 2	OFF	OFF	ON	ON

- 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.

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 $\geq 40^{\circ}\text{C}$. e-ion operation resume after indoor intake temperature $< 40^{\circ}\text{C}$ continuously for 30 minutes.
- Indoor fan control
 - During any operation mode combines with e-ion operation, fan speed follows respective operation mode.
 - During e-ion individual operation – only Auto Fan Speed and no Powerful operation is allowed. Even if Fan Speed button is pressed, no signal is sent to air conditioner, and no change on LCD display.

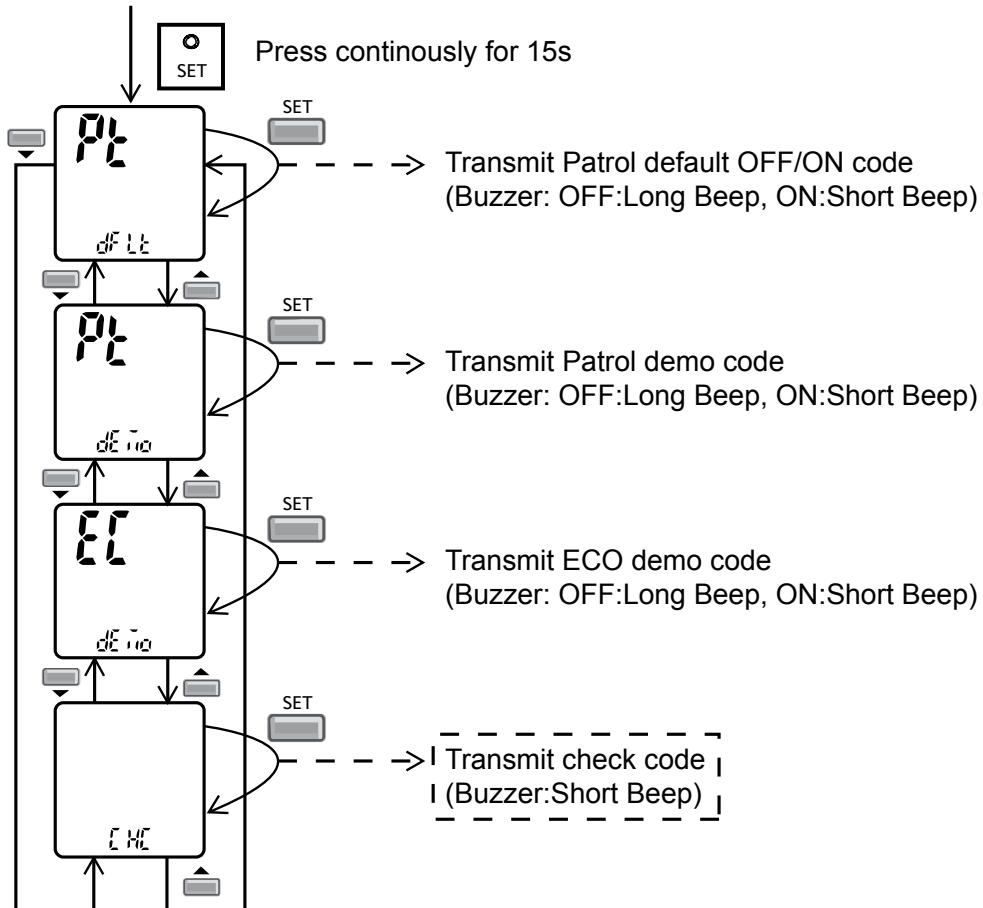
Auto Fan Speed for e-ion operation switches from SHi to Hi after 4 hours of operation.
- Airflow direction control
 - During any operation mode combines with e-ion operation, airflow direction follows respective operation mode.
 - During e-ion individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to air conditioner, and no change on LCD display.
- Timer control
 - When ON timer activates when unit stops, previous operation resumes and restored last saved e-ion operation status.
 - When ON timer activates during any operation, no change and carry on current operation.
 - When OFF timer activates during any operation, all operation stops and the latest e-ion operation status is saved.
- Indicator
 - When e-ion operation starts, e-ion indicator ON.
- Remote Control Receiving Sound

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

- e-ion Check Mode
 - e-ion abnormality check mode
 - Purpose is to improve sensor serviceability when sensor is malfunction.
- (1) Control starting condition

When all of the conditions are formed

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



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

- Error Detection Control

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

 - Active e-ion Air Purifying system PCB main connector open:
 - Judgment Method
 - During e-ion operation (include during Patrol operation), Active e-ion Air Purifying system main connector to PCB is opened.
 - Troubleshooting Methods
 - Connect the connector or stop operation (include during Patrol operation) to cancel the blinking.
 - Abnormal Discharge error:
 - Judgment Method
 - During e-ion operation, feedback voltage is-Low (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 show 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.

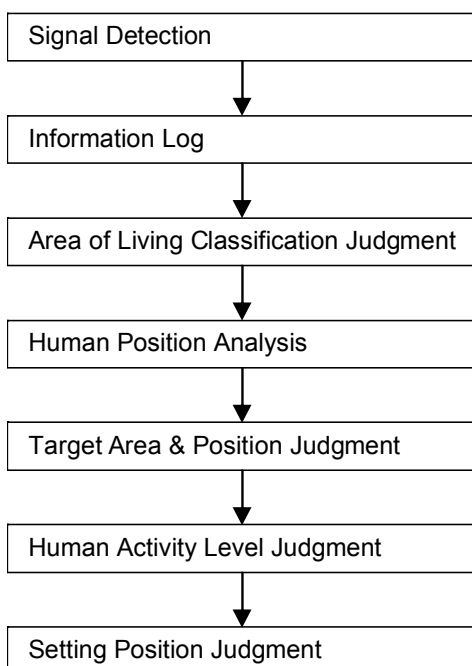
12.16 AUTO COMFORT and ECO NAVI Operation

- Area of human availability, activity level and absent is judged based on pulses by using 2 infrared sensors. The internal setting temperature shift, fan speed and horizontal airflow direction are adjusted in order to provide comfort environment while maintain the energy saving level.
- AUTO COMFORT start condition:
 - When AUTO COMF button is pressed.
- AUTO COMFORT stop conditions:
 - When AUTO COMF button is pressed again.
 - When unit is OFF by OFF/ON button.
 - When unit is OFF when OFF TIMER activates.
 - When unit is OFF by AUTO OFF/ON button at indoor unit.
 - When POWERFUL or QUIET operation activates.
 - When ◀▶ button is pressed.
- ECO NAVI start condition:
 - When ECO NAVI button is pressed.
- ECO NAVI stop conditions:
 - When ECO NAVI button is pressed again.
 - When unit is OFF by OFF/ON button.
 - When unit is OFF when OFF TIMER activates.
 - When unit is OFF by AUTO OFF/ON button at indoor unit.
 - When POWERFUL or QUIET operation activates.
 - When ◀▶ button is pressed.
- AUTO COMFORT / ECO NAVI initialization

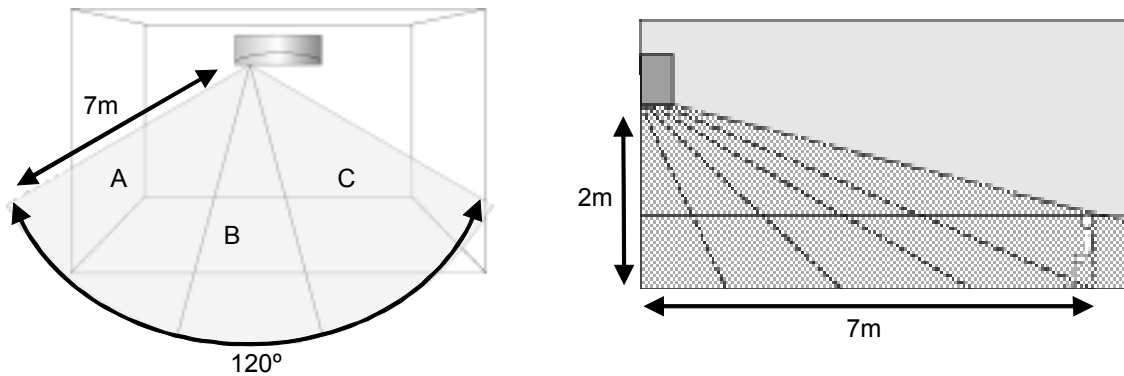
	Initialize indication	Human Activity Indicator		
1	0 – 2 seconds	□	□	□
2	2 – 3 seconds	■	■	■
3	3 – 70 seconds	I	■	□
		II	■	■
		III	■	□
		IV	□	■
		Repeat Step I to IV		

* □ Indicator ON, ■ Indicator OFF

- Human activity judgment is as following



12.16.1 Signal Detection



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

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

* □ Indicator ON, ■ Indicator OFF

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

12.16.2 Information Log

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

12.16.3 Area of Living Classification Judgment

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

12.16.4 Human Position Analysis

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

12.16.5 Target Area and Position Judgment

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

12.16.6 Human Activity Level Judgment

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

12.16.7 Setting Position Judgment

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

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

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

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

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

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

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

12.16.8 Setting Temperature and Fan Speed Shift

- Heating Dual Sensor

ECONAVI — To optimize energy saving

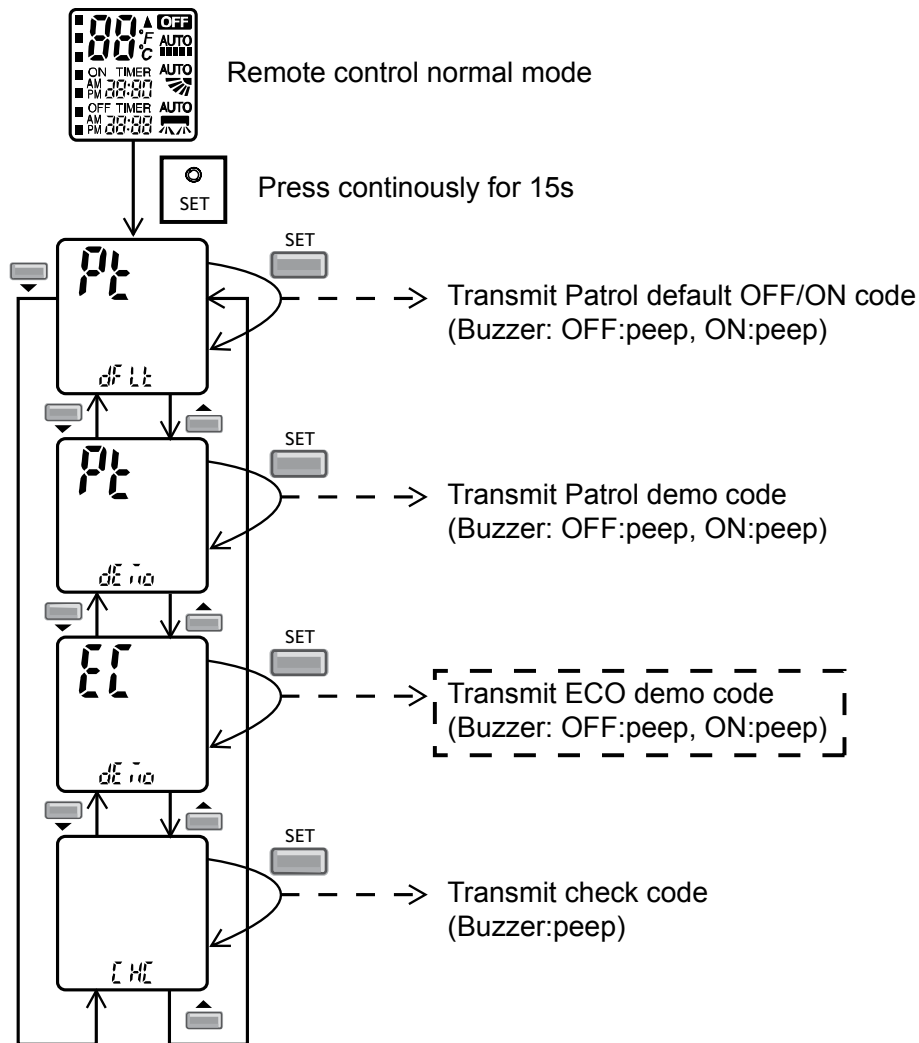
AUTO COMFORT ----- To maximize comfort

Heat Source & Movement	Low	High	Normal	None
Cool/Dry Mode Set Temperature	+1°C			+2°C
Set Fan Speed	+1 tap*	-1°C +1 tap		≤ Medium Fan
Heat Mode Set Temperature	+0.3°C			
Set Fan Speed		-2°C		-2°C

* For first 15 minutes or until set temperature is reached.

12.16.9 ECO NAVI and AUTO COMF Demo Mode

- To enable ECO DEMO mode:



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

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

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

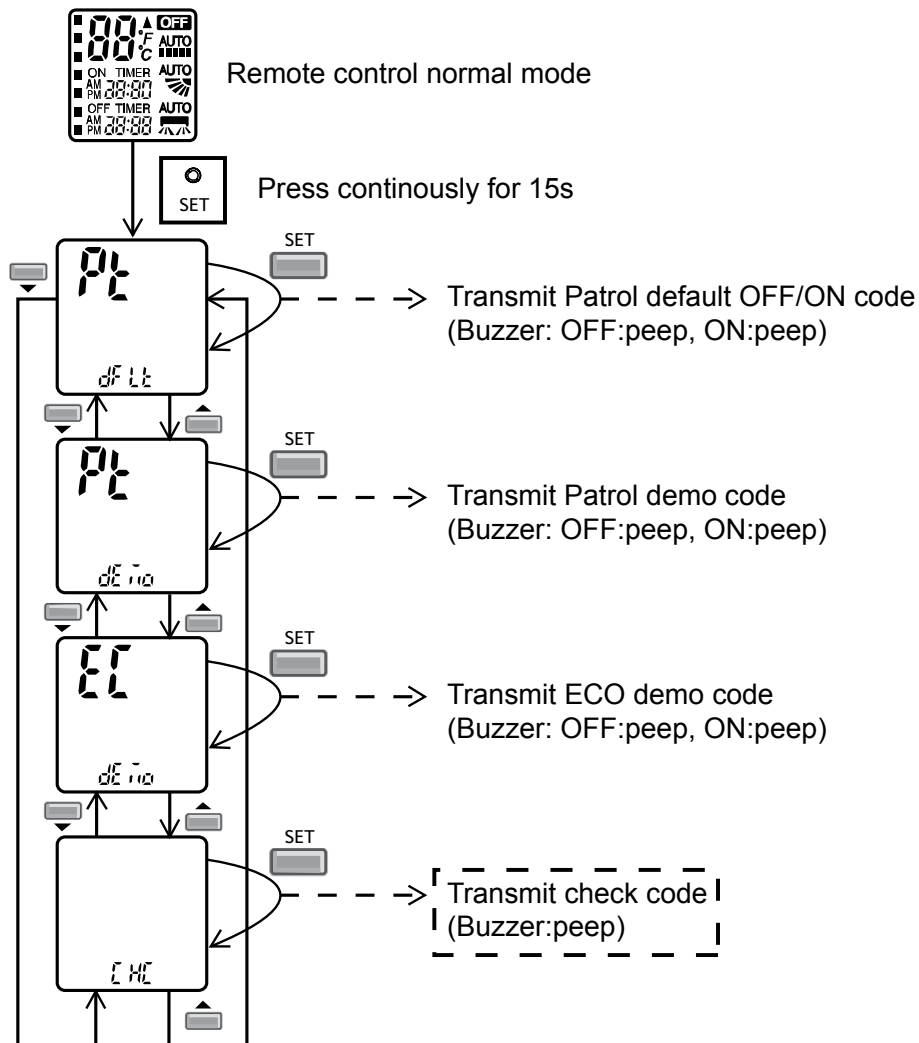
12.16.10 Infrared Sensor Abnormality

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

12.16.11 Infrared Sensor Check Mode

- To enable Infrared sensor abnormality check mode:

“VARIOUS SETTING” mode:



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

13. Protection Control

(For A9/12MK)

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

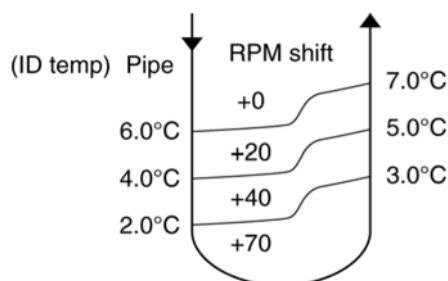
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the 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 ($\pm 1^{\circ}\text{C}$) 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

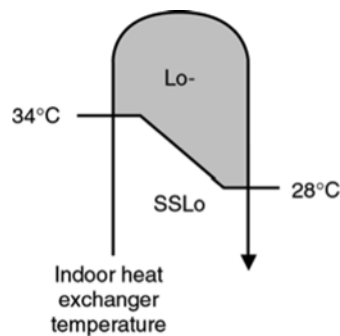
- Hot start control is to prevent cool air discharge into room when heating operating starts.
- Hot start is executed after heating operation starts and deice operation is completed.
- Indoor fan control during hot start is shown below:

Indoor Pipe Temperature	Indoor Fan
$\leq 30^{\circ}\text{C}$	OFF
$30^{\circ}\text{C} < t \leq 34^{\circ}\text{C}$	SLo
$t \geq 34^{\circ}\text{C}$	Lo-

- When indoor pipe temperature over 34°C or maximum 240 seconds, hot start is completed.
- During hot start and for 30 seconds after 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 SLo 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.

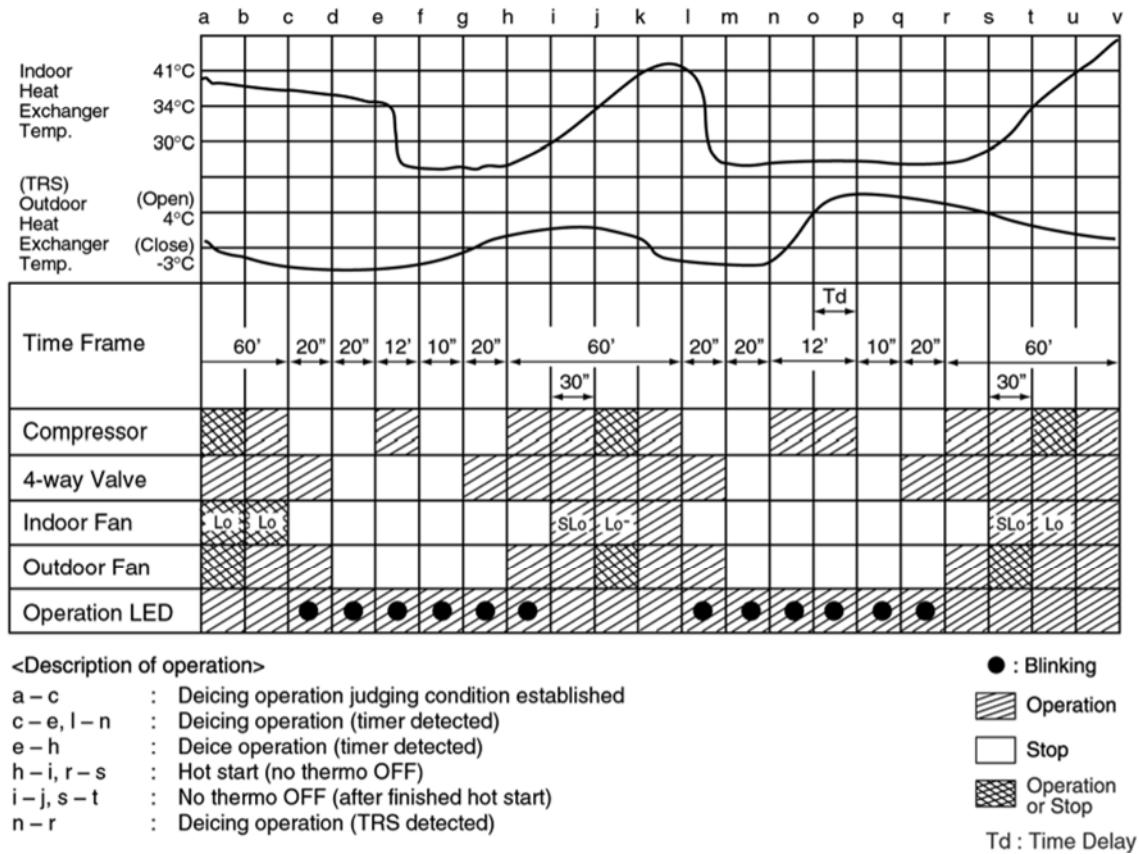
- Normal Deice
Deice operations detection commences after 30 minutes of Heating operation starts or 60 minutes after previous deice operation. If the TRS (Thermal Reed Switch) senses the outdoor piping temperature drops to -3°C (TRS CLOSE) or less for 50 sec. continuously during compressor is in operation, 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:

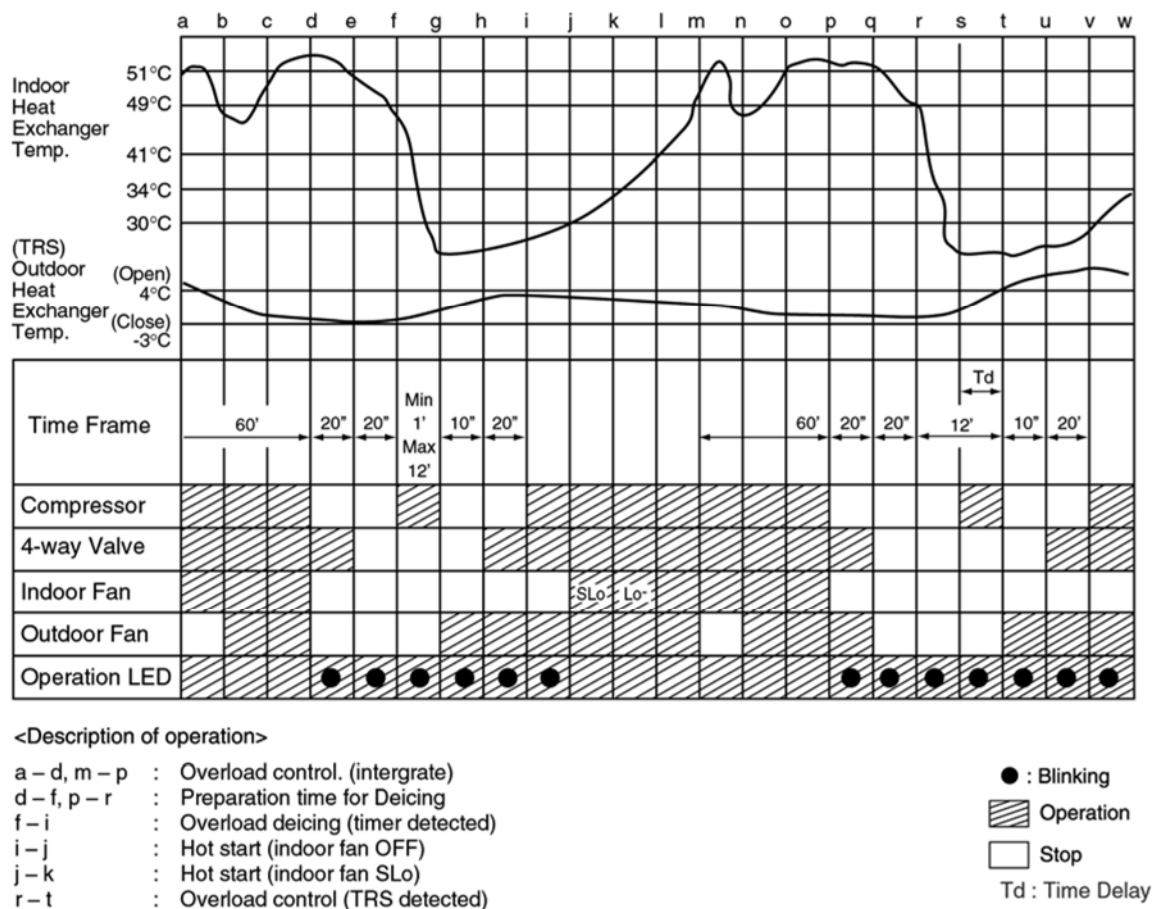
Time taken from deicing starts to TRS OPEN (T)	Deice recovery time	Td (seconds)
$T \leq 1 \text{ minute}$	1 min. wait (Min.)	0
$1 \text{ minutes} < T < 3 \text{ minutes}$	T	0
$3 \text{ minutes} < T < 8 \text{ minutes}$	$T + 60 \text{ sec.}$	60
$8 \text{ minutes} < T < 11 \text{ minutes}$	$T + 120 \text{ sec.}$	120
$T > 11 \text{ minutes}$	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



Overload Deice Time Diagram



(For A18/24/28MK)

(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

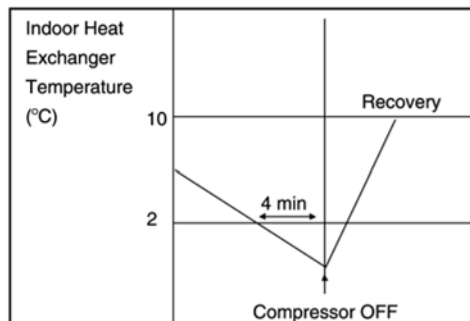
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the 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 of 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 form 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 ($\pm 1^{\circ}\text{C}$) 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.

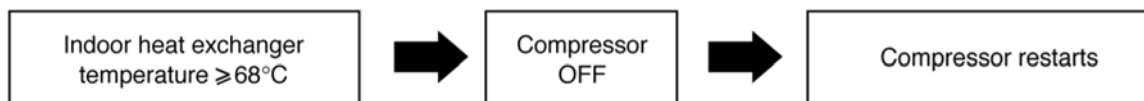
13.24 Overload Protection Control

- 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 T_b 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	$< 10^{\circ}\text{C}$	$\geq 10^{\circ}\text{C} \sim < 15^{\circ}\text{C}$	$\geq 5^{\circ}\text{C} \sim < 20^{\circ}\text{C}$	$\geq 20^{\circ}\text{C} \sim < 25^{\circ}\text{C}$	$\geq 25^{\circ}\text{C}$	Outdoor Fan OFF
T_b	$\geq 5^{\circ}\text{C}$	$\geq 3^{\circ}\text{C}$	$\geq 1.5^{\circ}\text{C}$	$\geq 0.5^{\circ}\text{C}$	$\geq -0.5^{\circ}\text{C}$	

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.

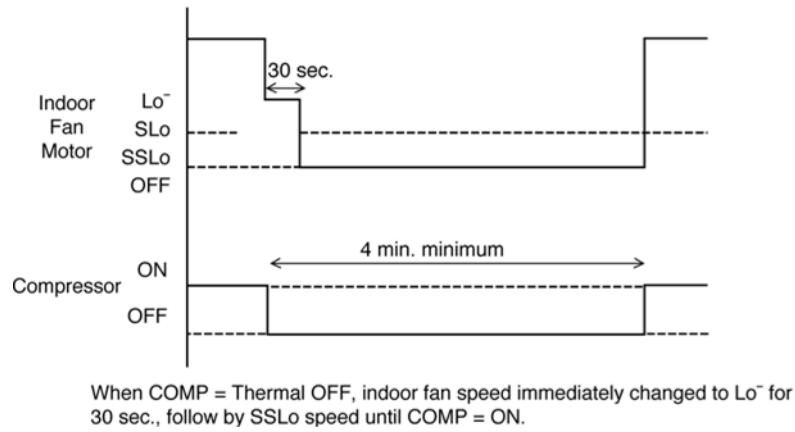
13.26 Hot Start Control

- Hot start control is to prevent cool air discharge into 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
$\leq 30^{\circ}\text{C}$	OFF
$30^{\circ}\text{C} < t \leq 34^{\circ}\text{C}$	SLo
$t \geq 34^{\circ}\text{C}$	Lo-

- When indoor pipe temperature over 34°C or maximum 240 seconds, hot start is completed.
- During hot start and for 2 minutes after hot start completed, intake thermostat is ignored and no Thermo OFF.

13.27 Cold Draft Prevention Control

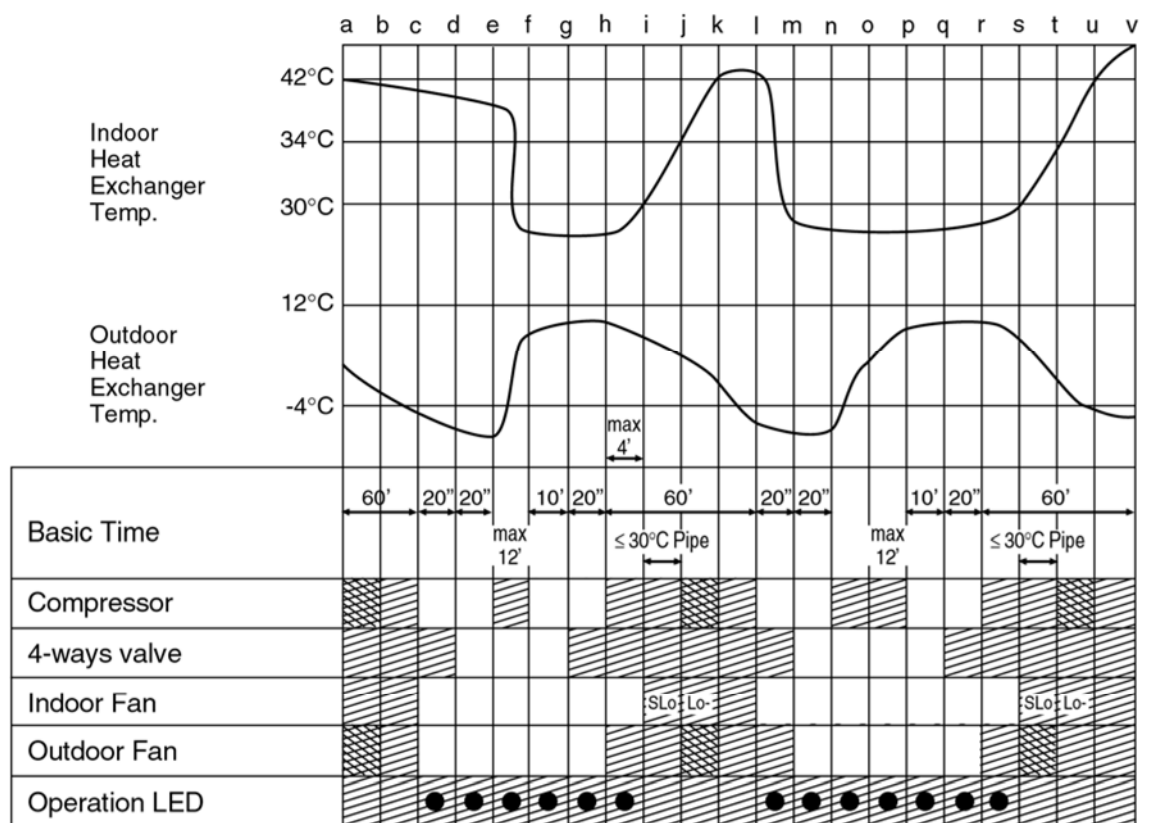


13.28 Deice Control

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

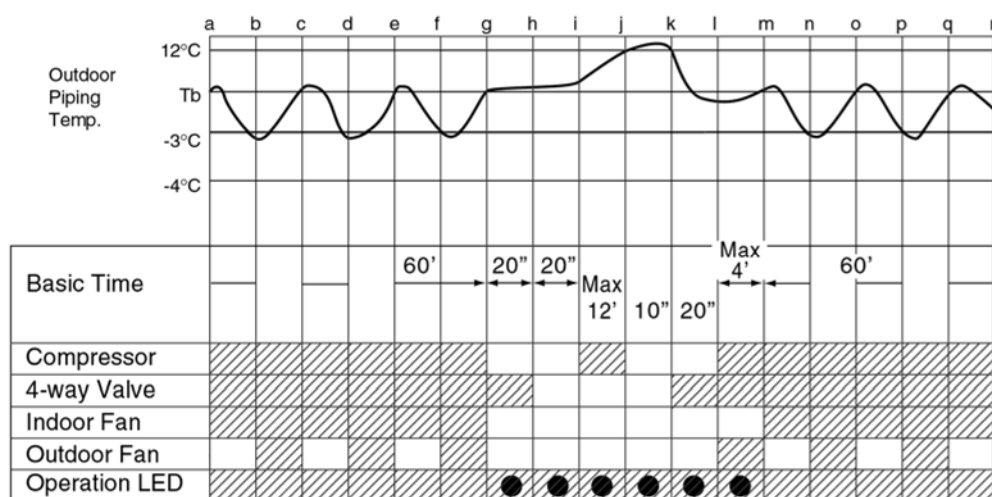


<Description of operation>

- 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



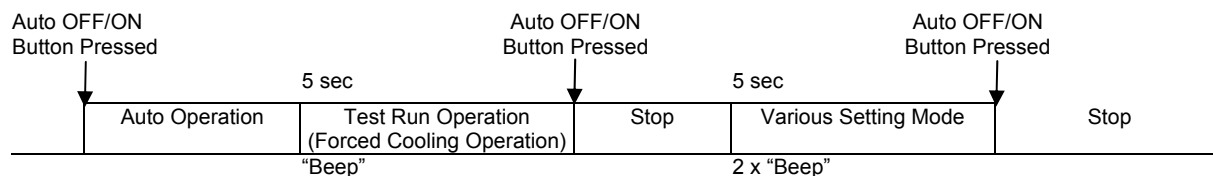
<Description of operation>

- 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:

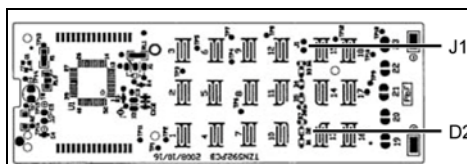
i. Press Auto OFF/ON button to toggle remote control receiving sound.

- 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.

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

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

14.2 Remote Control Button

14.2.1 SET Button

- To check current remote control transmission code and store the transmission code to EEPROM:
 - Press “Set” button 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

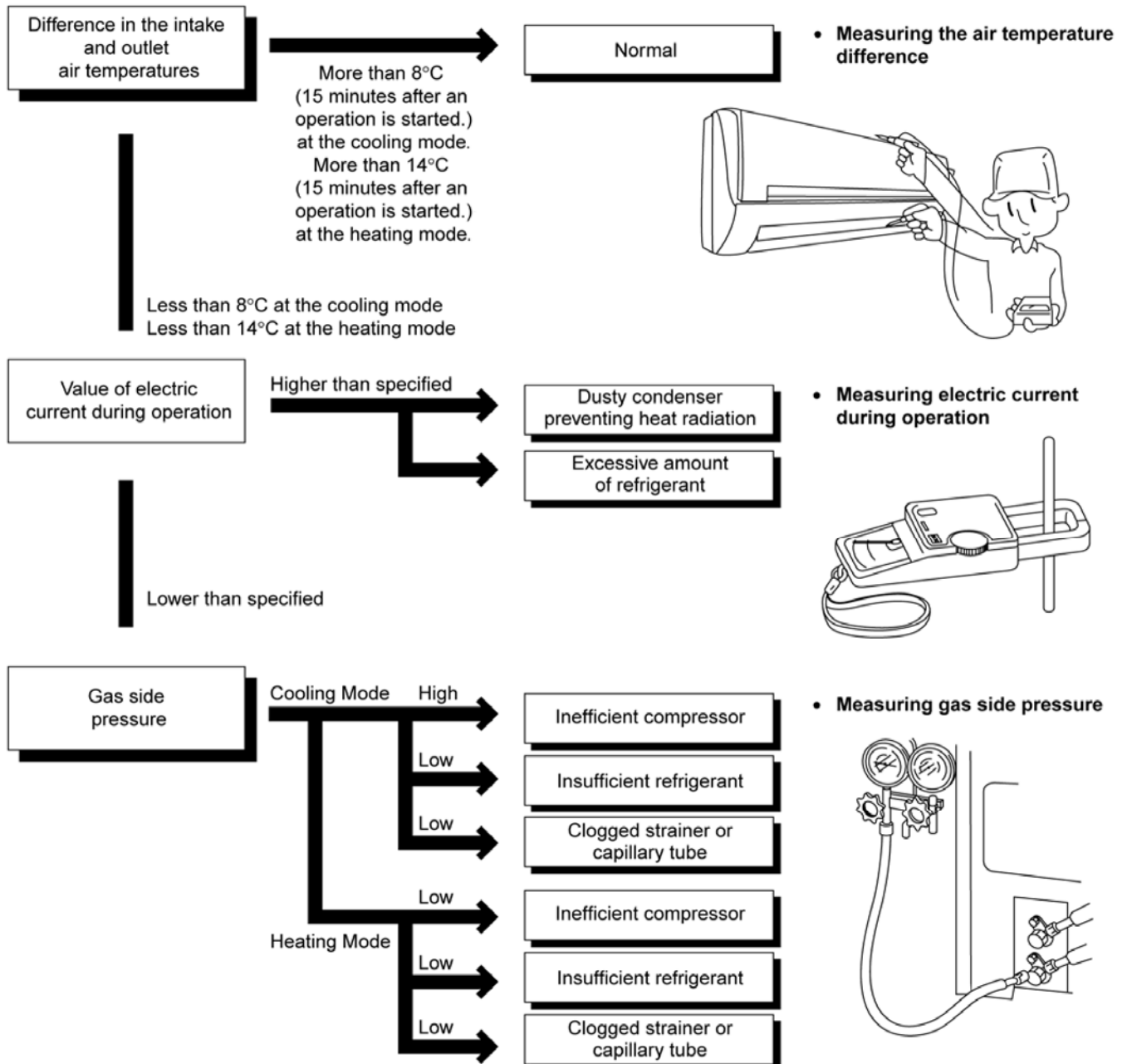
15.1 Refrigeration cycle system

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 ² G)	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



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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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-A9MKD CS-A12MKD

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

16.1.1.1 To remove front grille

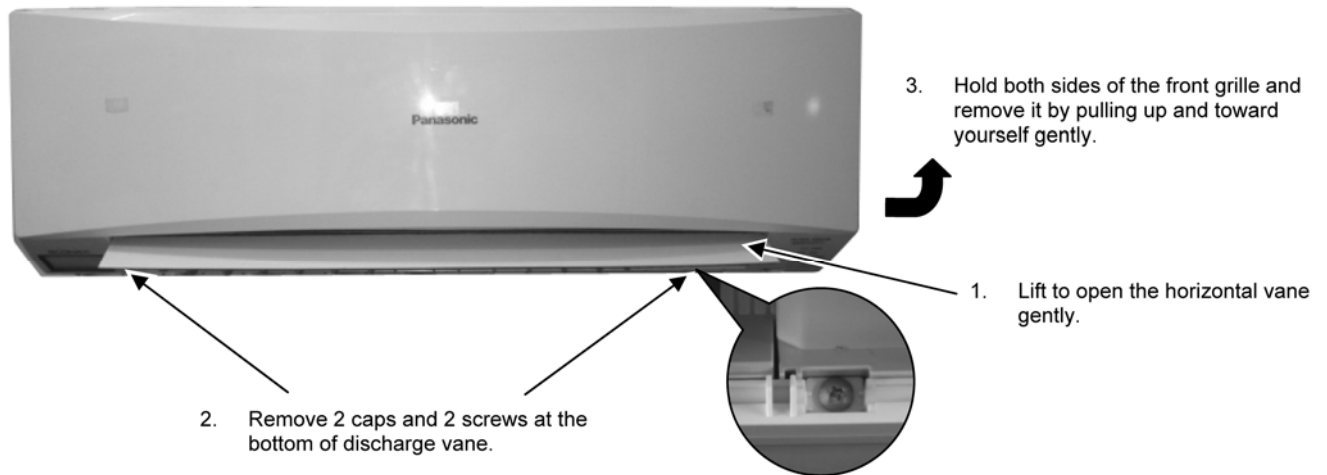


Figure 1

16.1.1.2 To remove power electronic controller

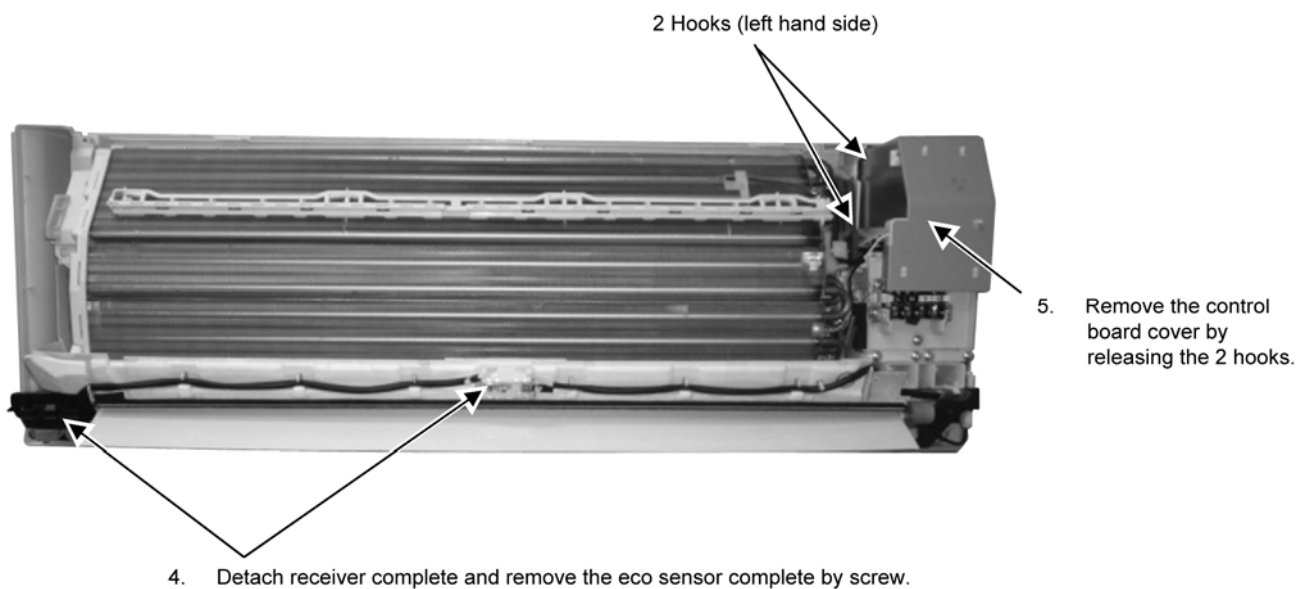


Figure 2

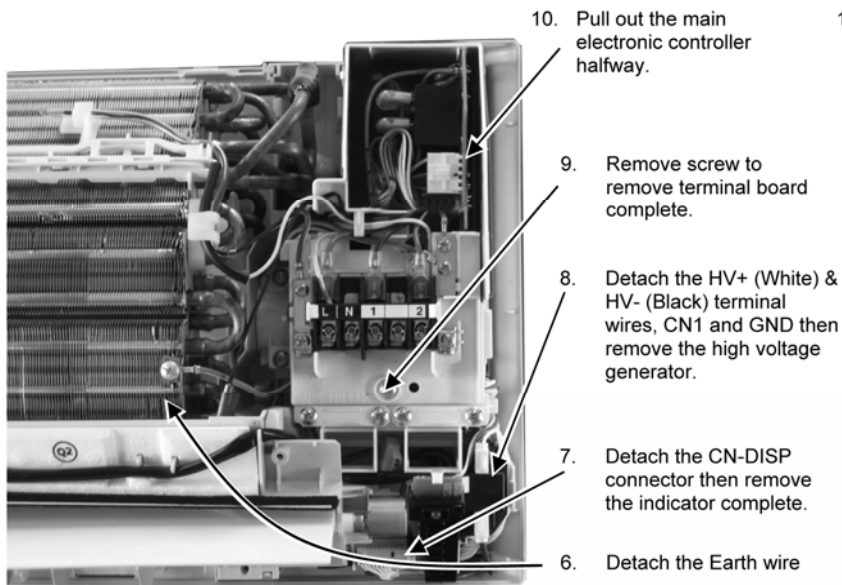


Figure 3

11. Detach the AC303, RY-PWR, CN-PCFM, CN-FB, CN-STM1, CN-STM2, CN-RCV, CN-TH and CN-CLN from the main electronic controller. Then pull out main electronic controller gently.

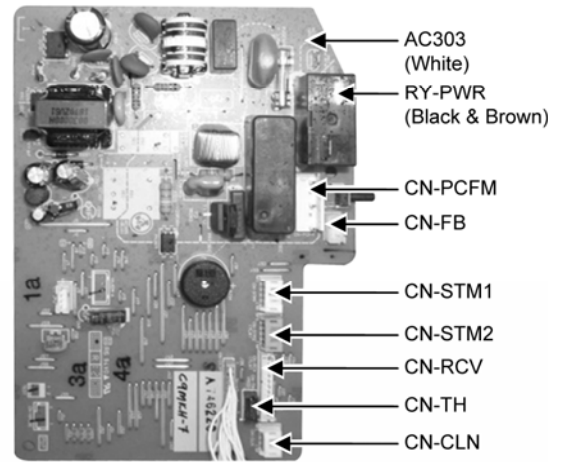


Figure 4

16.1.1.3 To remove discharge grille

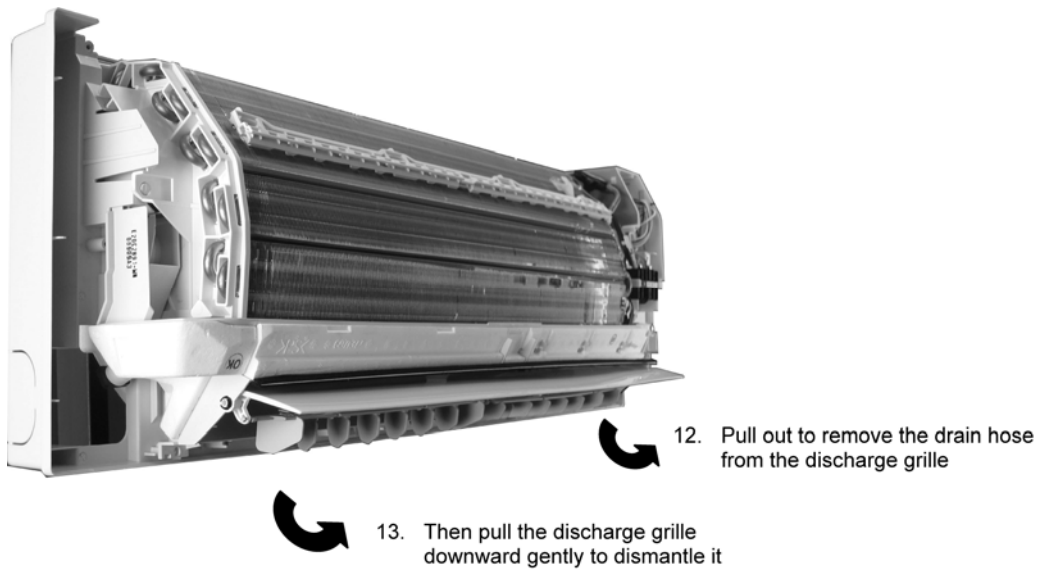


Figure 5

16.1.1.4 To remove control board

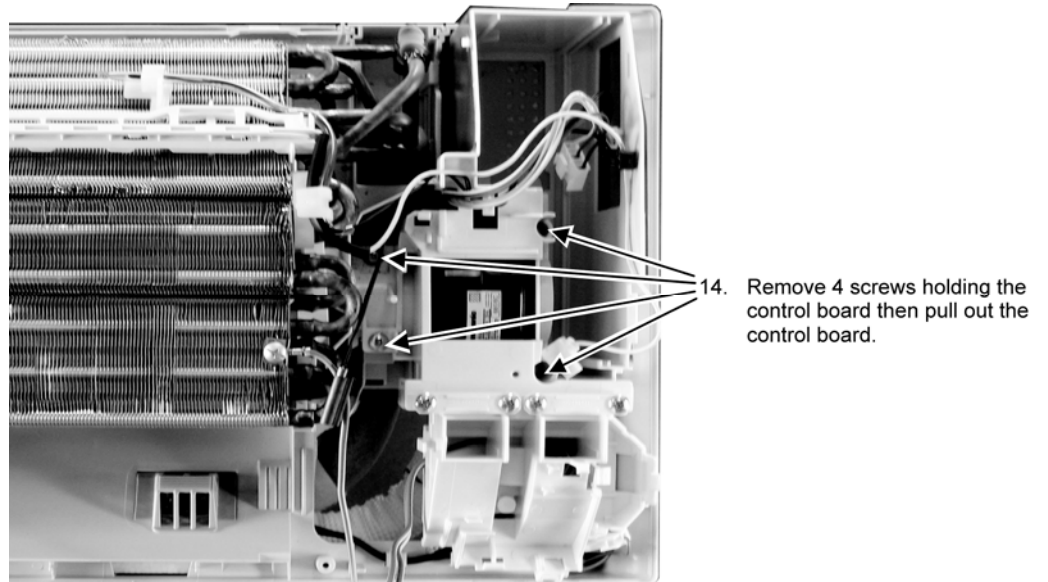


Figure 6

16.1.1.5 To remove cross flow fan and indoor fan motor

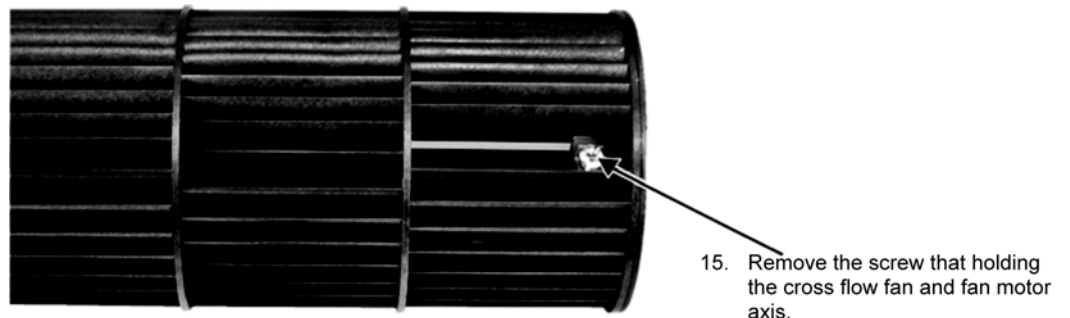


Figure 7

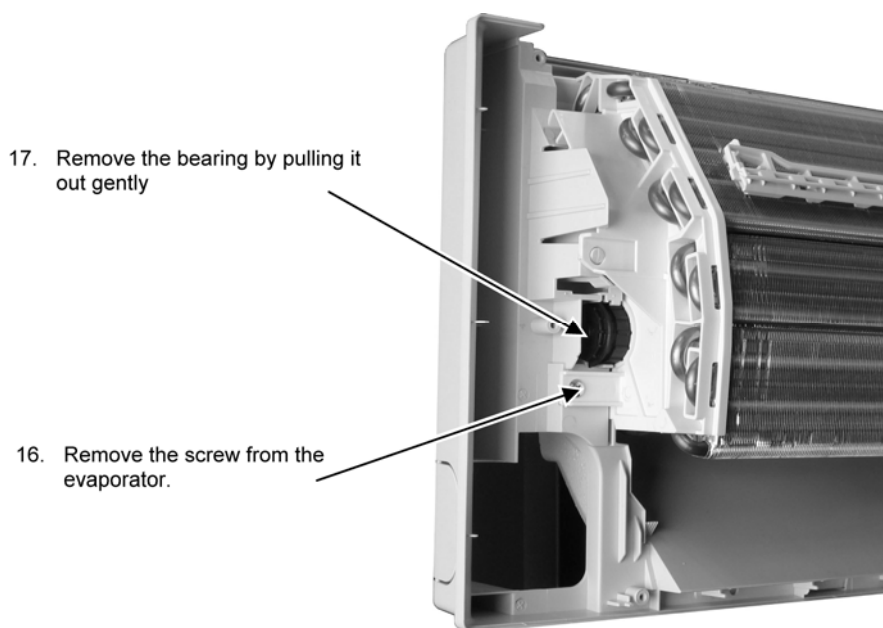


Figure 8

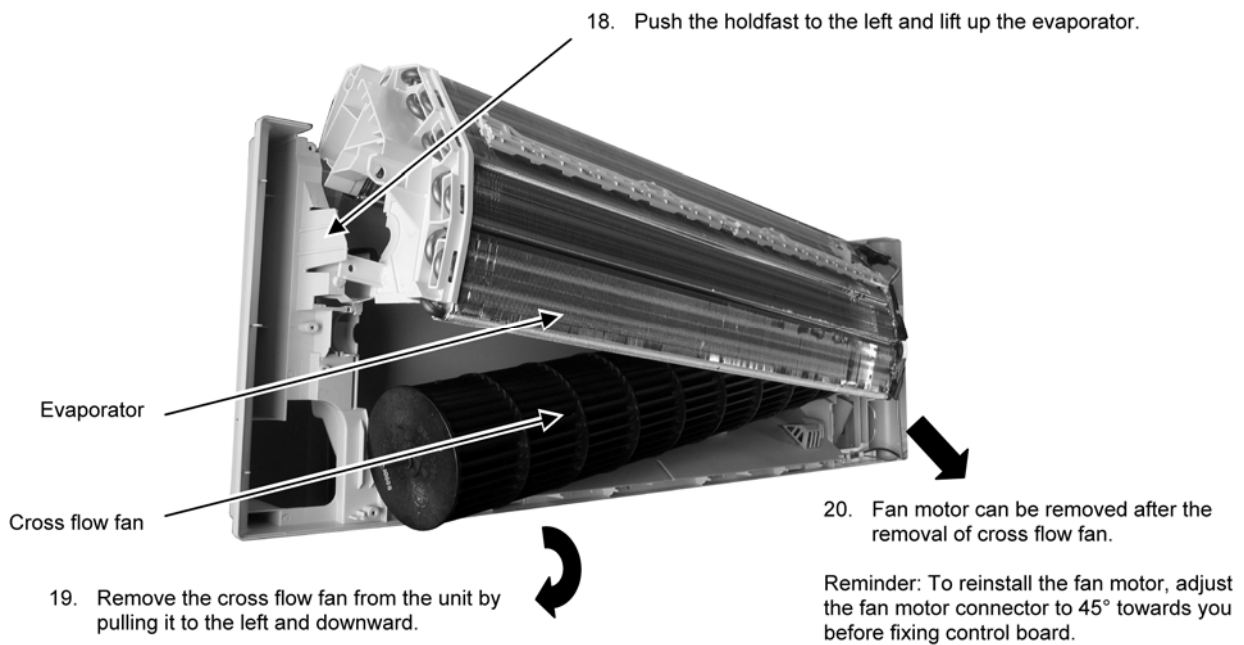


Figure 9

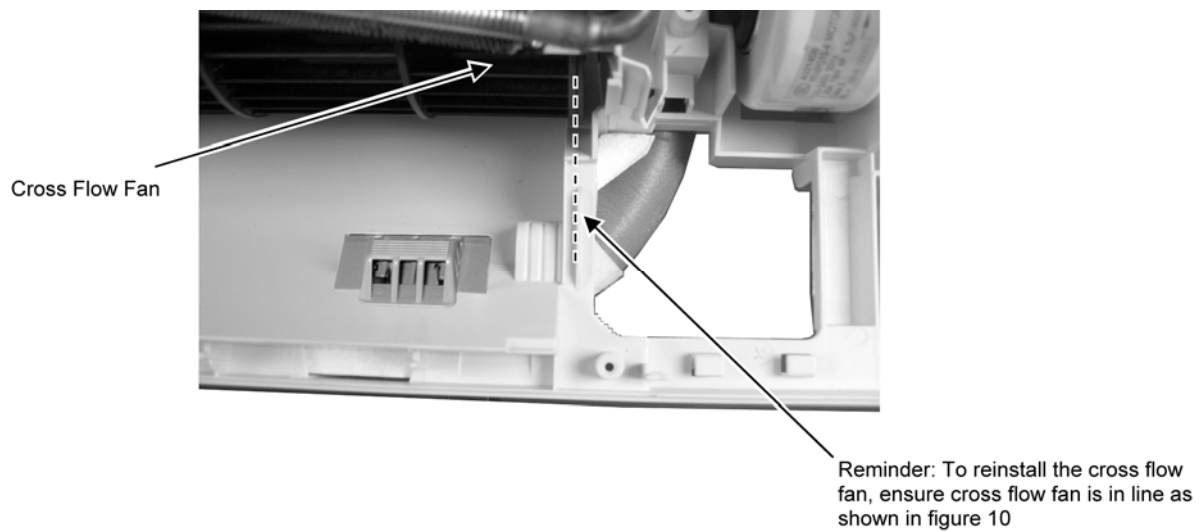


Figure 10



WARNING

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

16.2 CS-A18MKD CS-A24MKD CS-A28MKD

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

16.2.1.1 To remove front grille

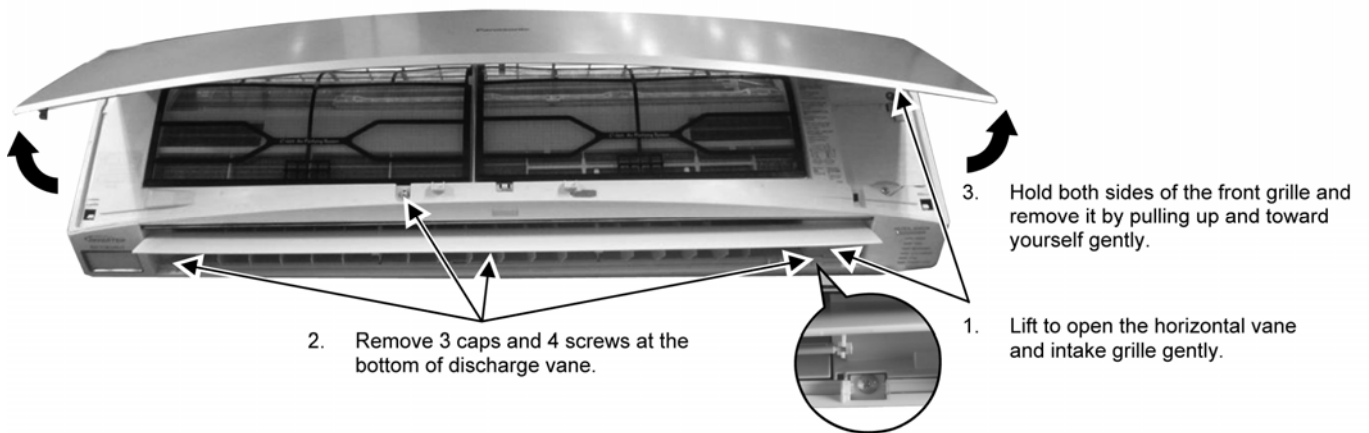


Figure 11

16.2.1.2 To remove horizontal vane

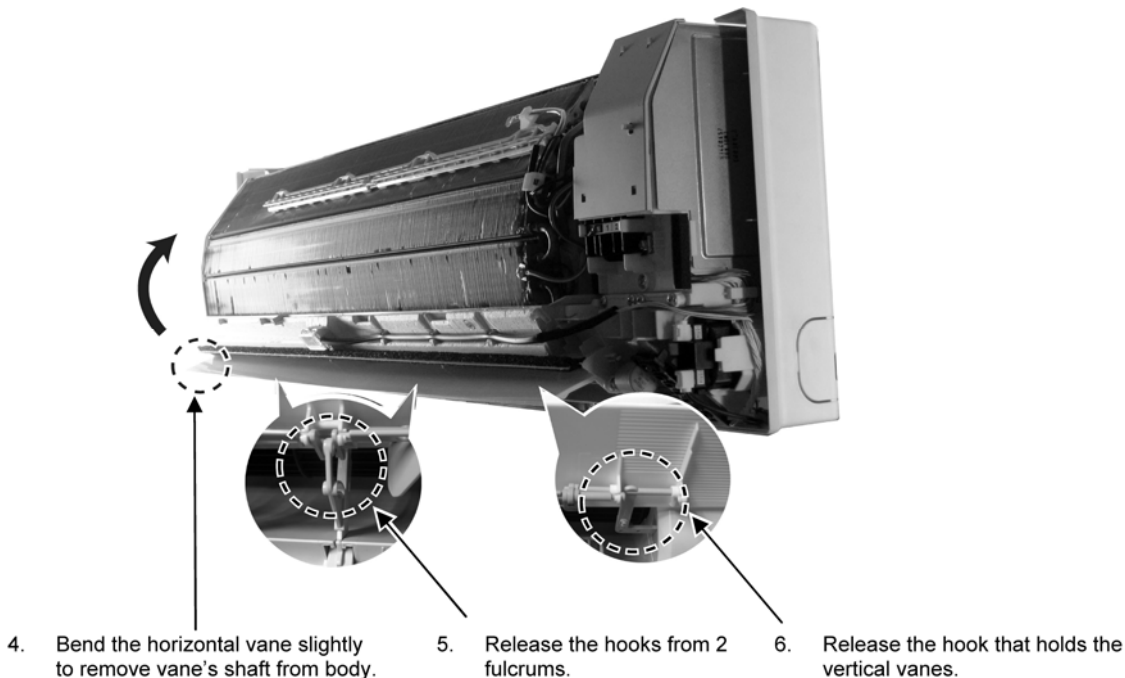


Figure 12

16.2.1.3 To remove power electronic controller

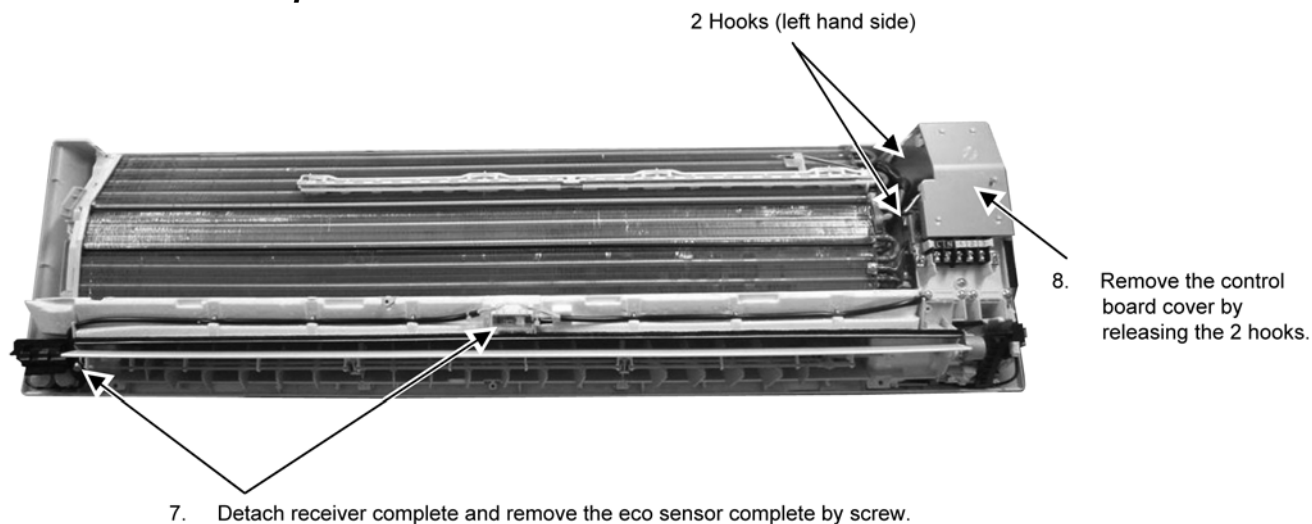


Figure 13

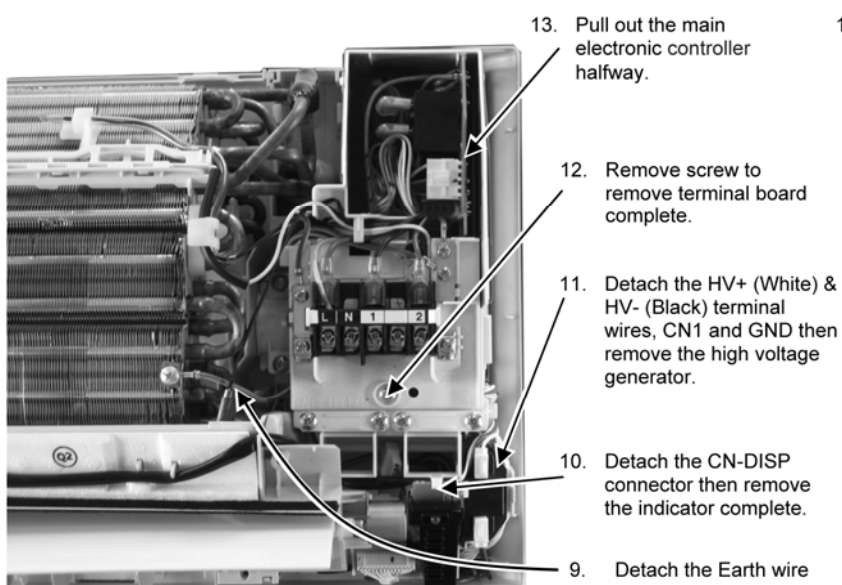


Figure 14

14. Detach the AC303, RY-PWR, CN-FM, CN-STM1, CN-STM2, CN-RCV, CN-TH and CN-CLN from the main electronic controller. Then pull out main electronic controller gently.

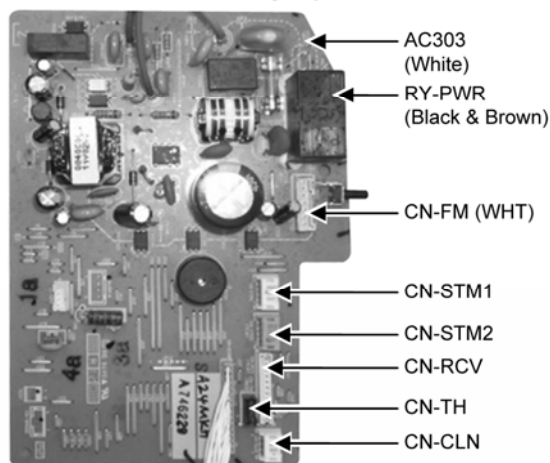


Figure 15

16.2.1.4 To remove discharge grille

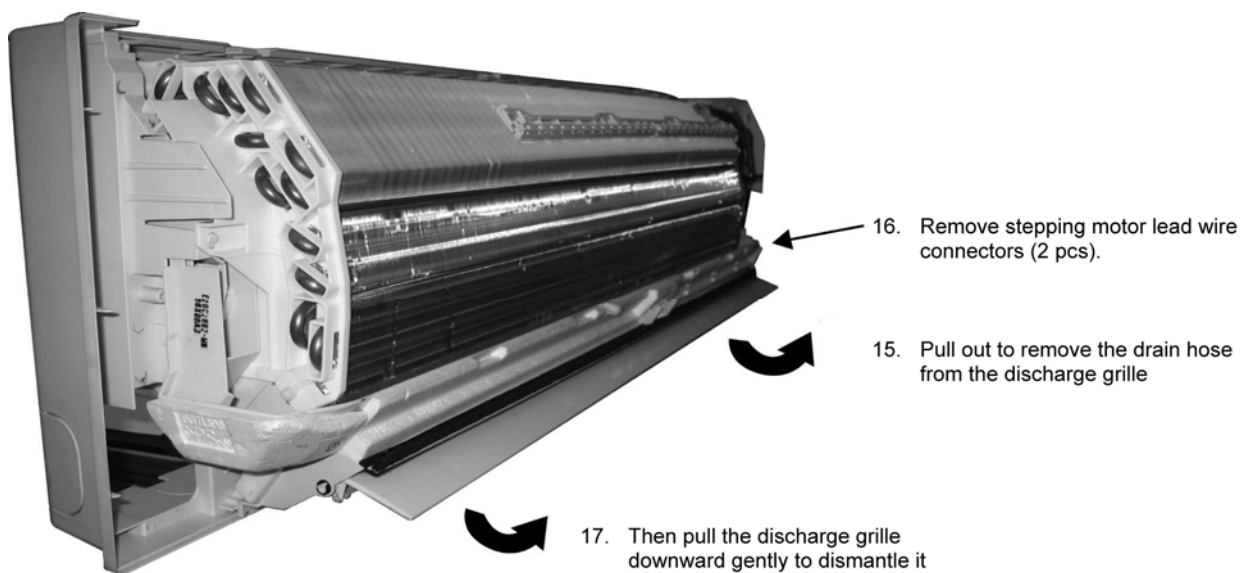


Figure 16

16.2.1.5 To remove control board

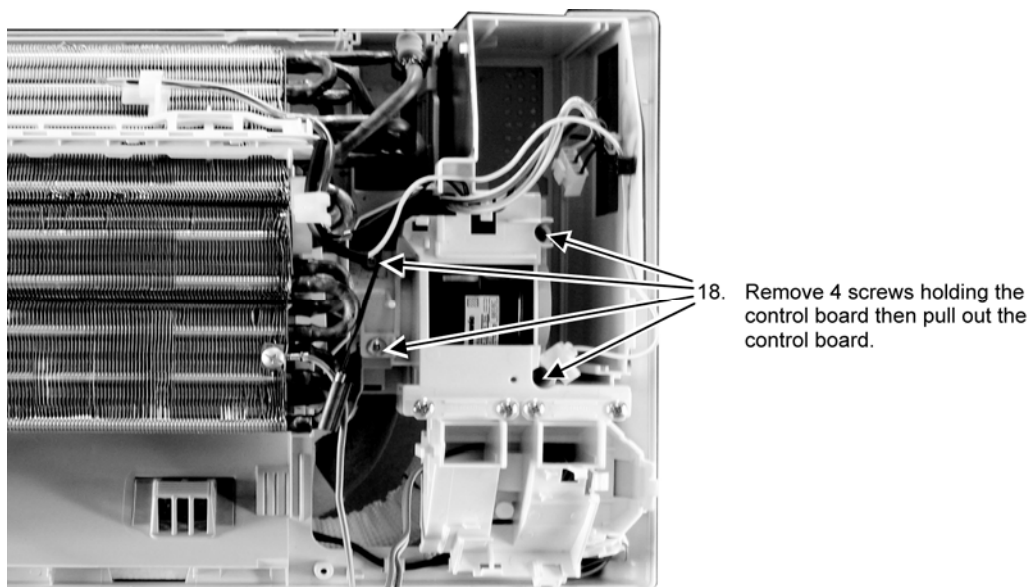


Figure 17

16.2.1.6 To remove cross flow fan and indoor fan motor

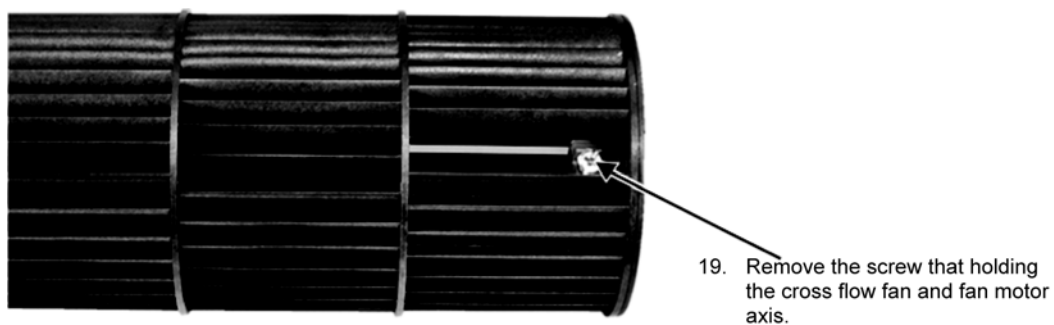
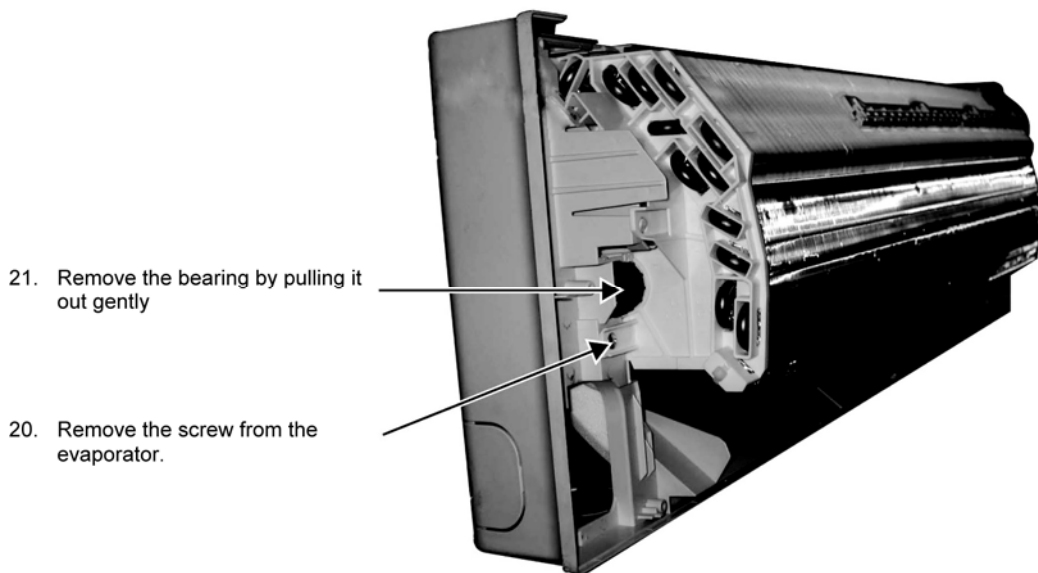


Figure 18

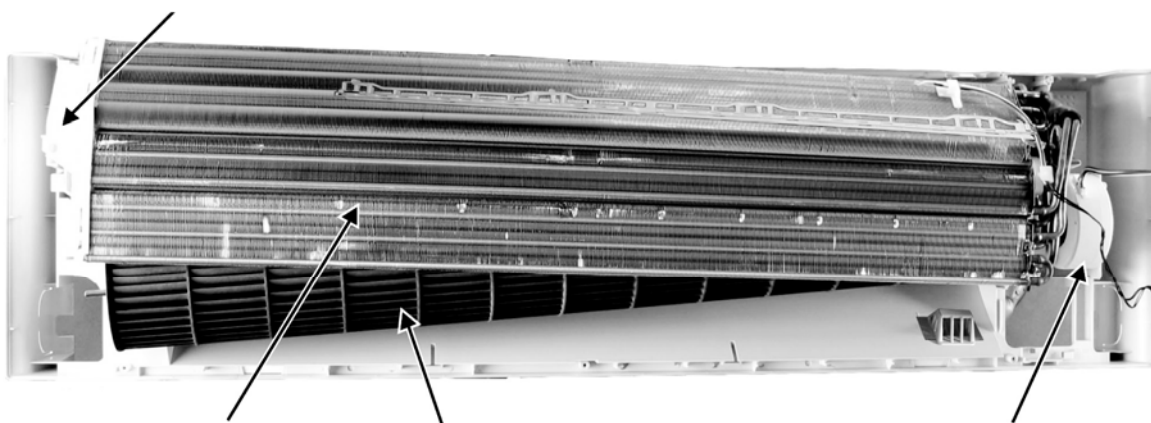


21. Remove the bearing by pulling it out gently

20. Remove the screw from the evaporator.

Figure 19

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



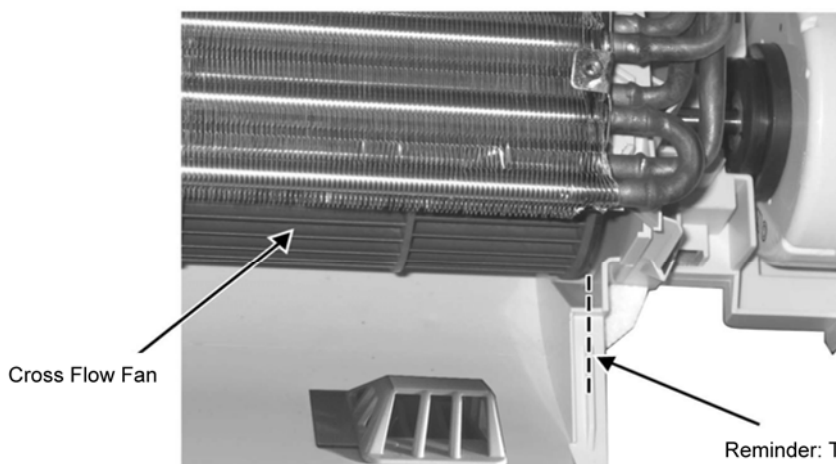
Evaporator

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

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

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

Figure 20



Cross Flow Fan

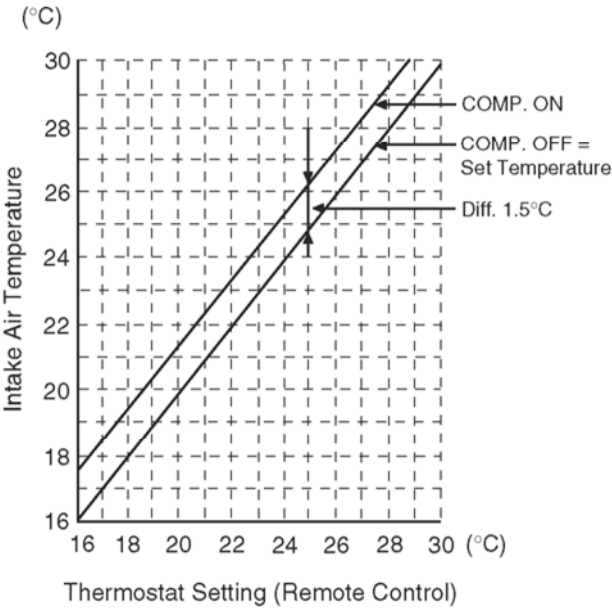
Reminder: To reinstall the cross flow fan, ensure cross flow fan is in line as shown in figure 21.

Figure 21

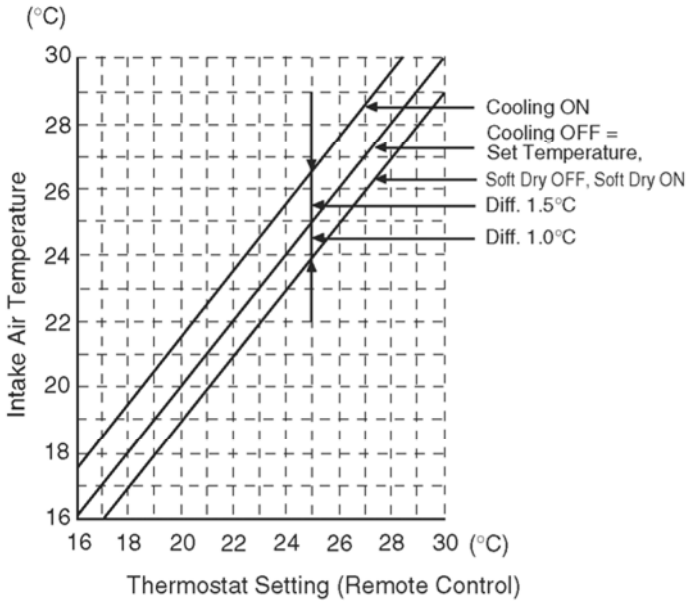
17. Technical Data

17.1 Thermostat Characteristics

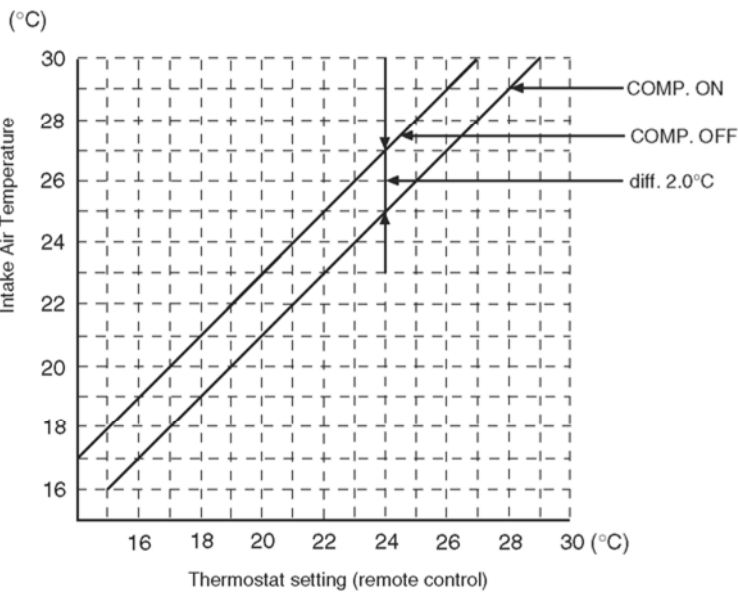
• Cooling



• Soft Dry



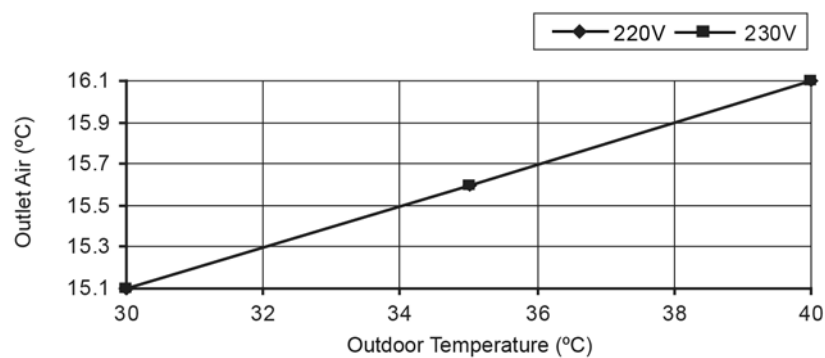
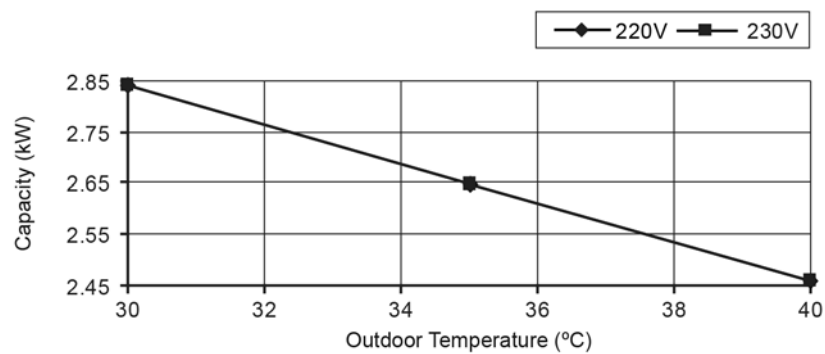
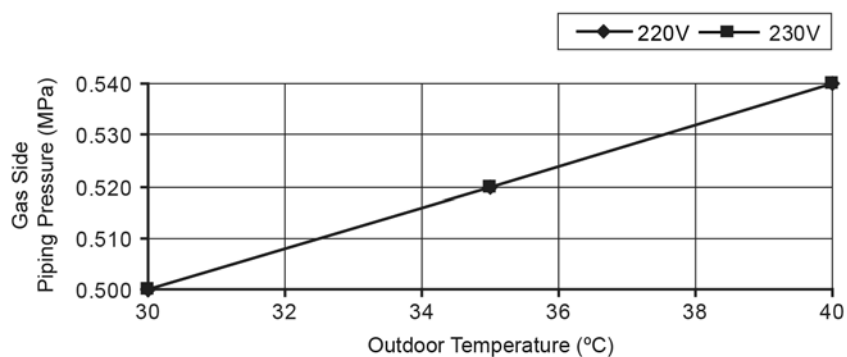
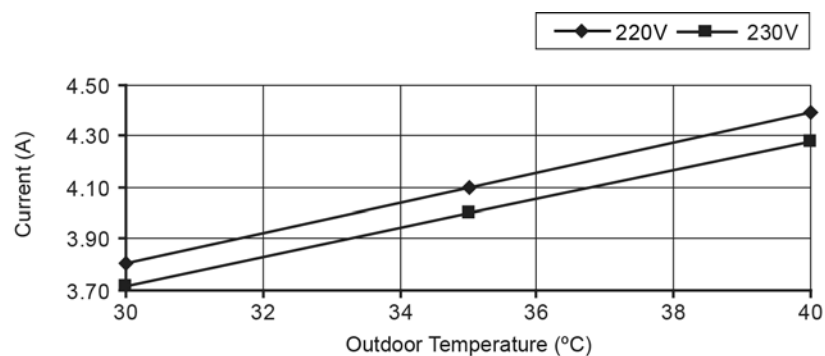
• Heating



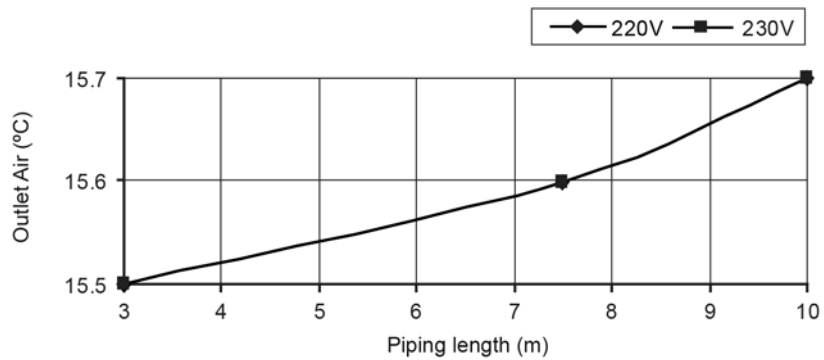
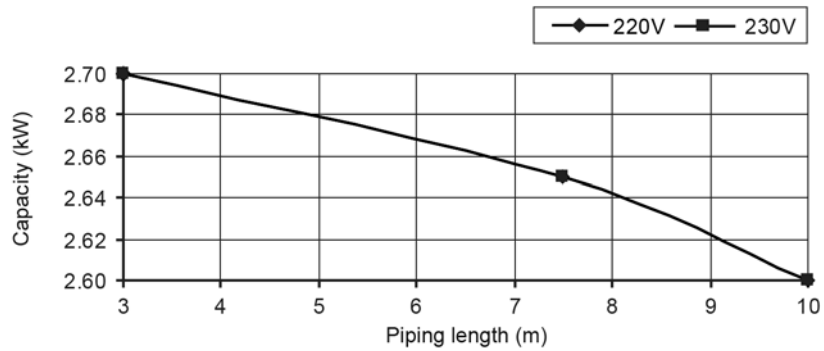
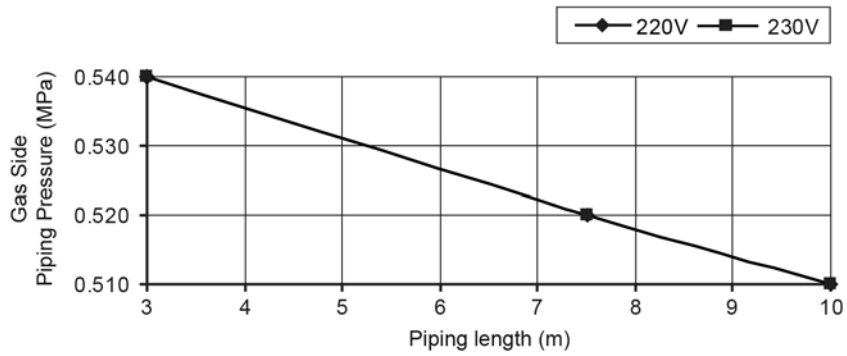
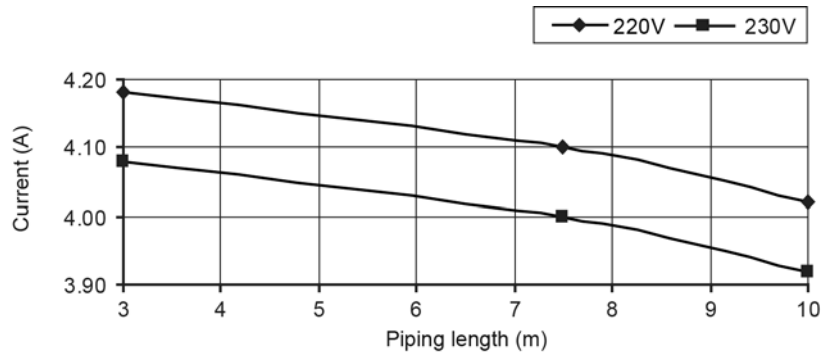
17.2 Operation Characteristics

17.2.1 CS-A9MKD CU-A9MKD

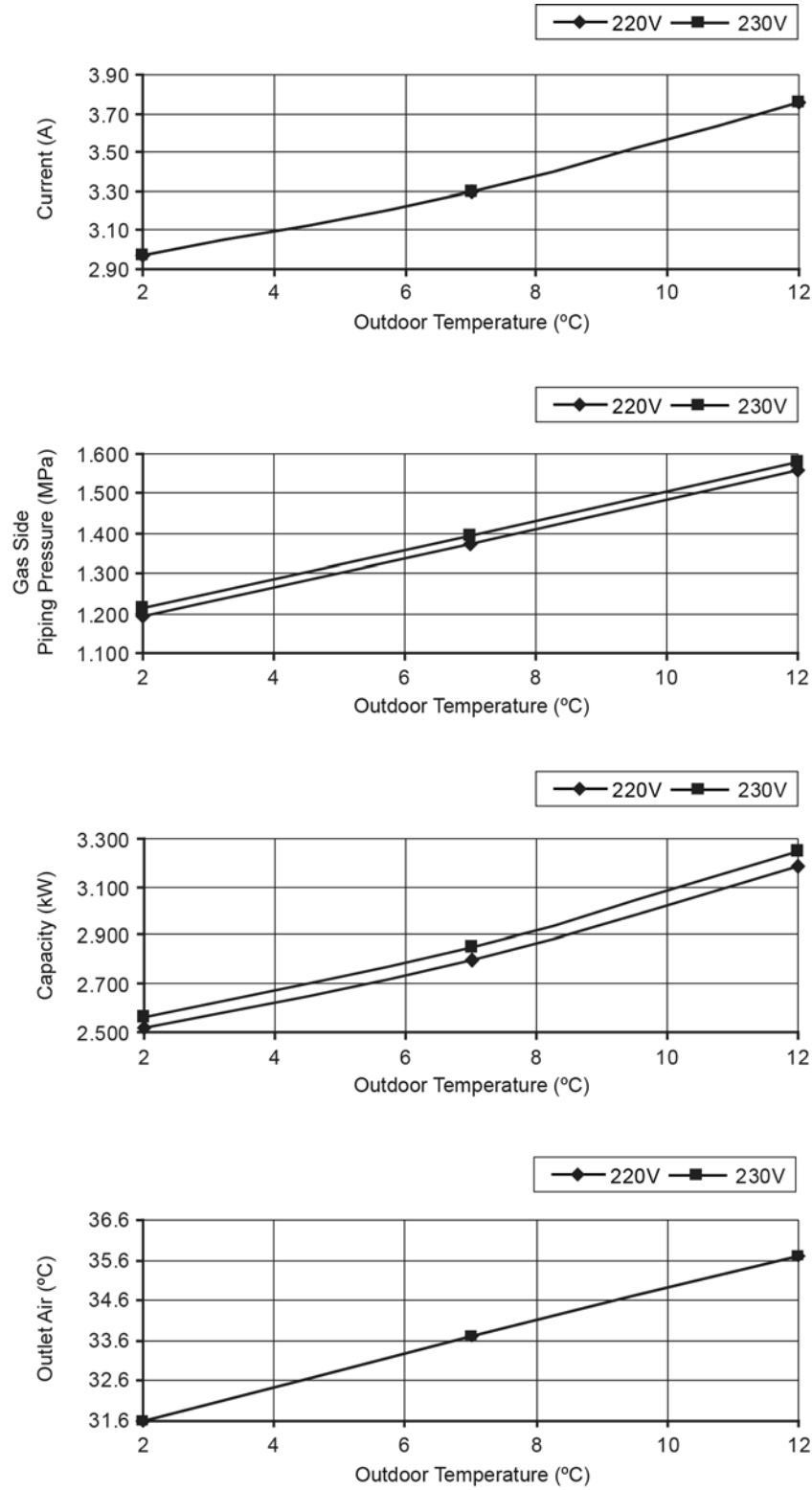
- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m



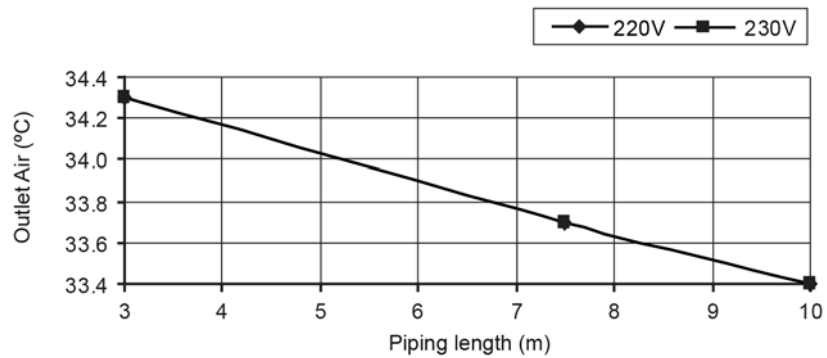
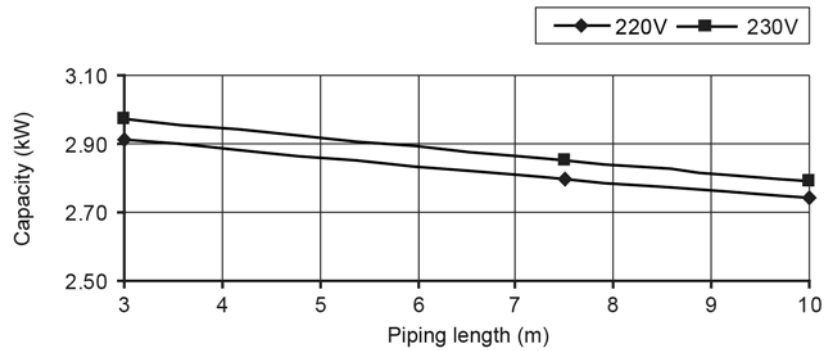
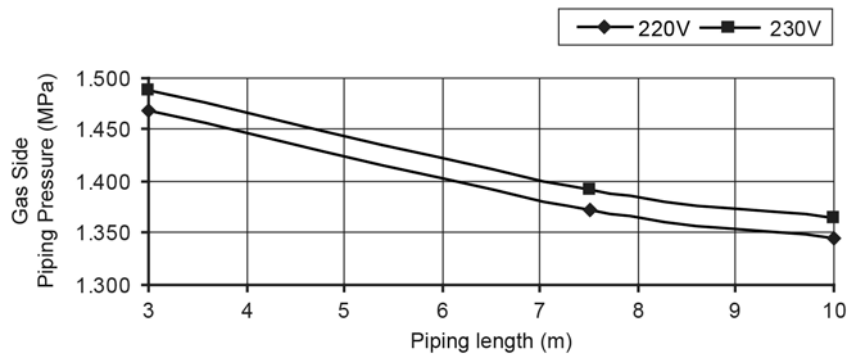
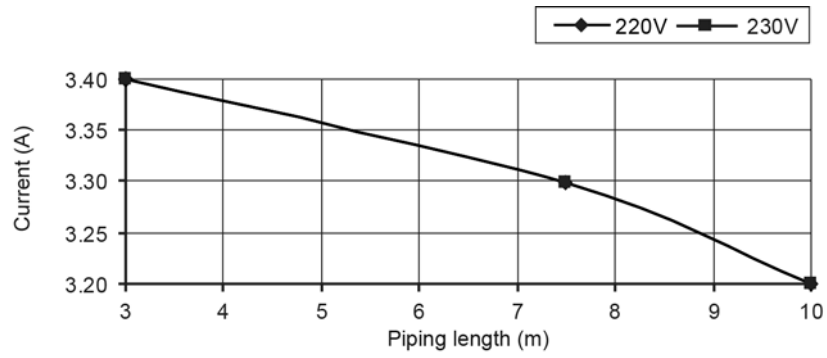
- Piping Length Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed



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

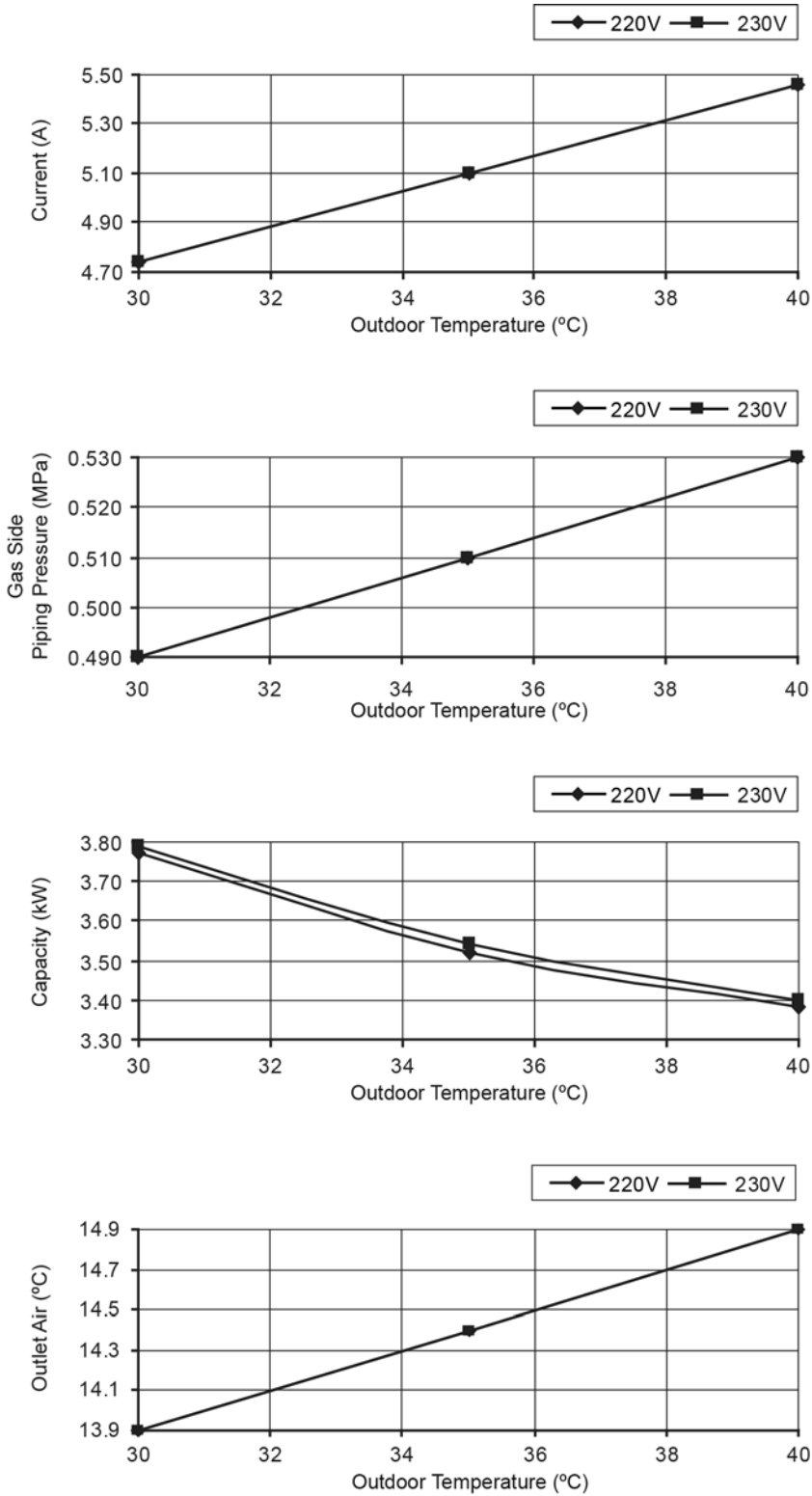


- Piping Length Characteristic
 - Room temperature: 20°C
 - Outdoor temperature: 7°C (DBT), 6°C (WBT)
 - Operation condition: High fan speed

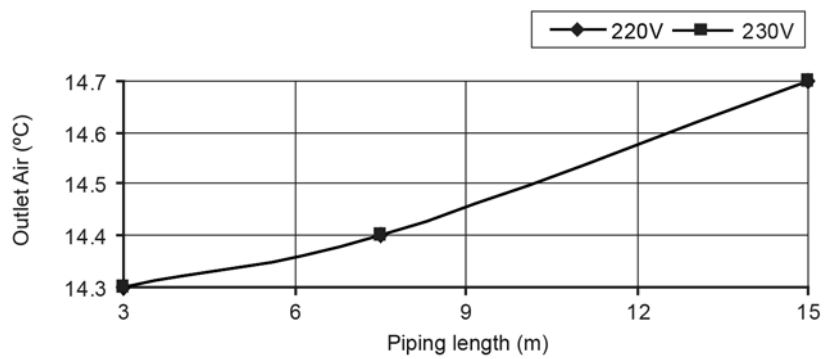
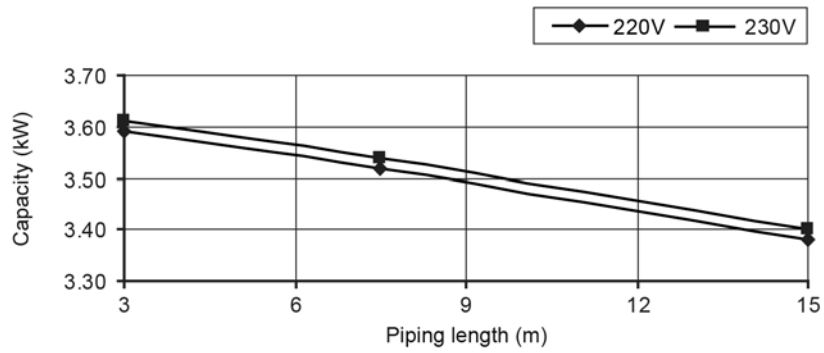
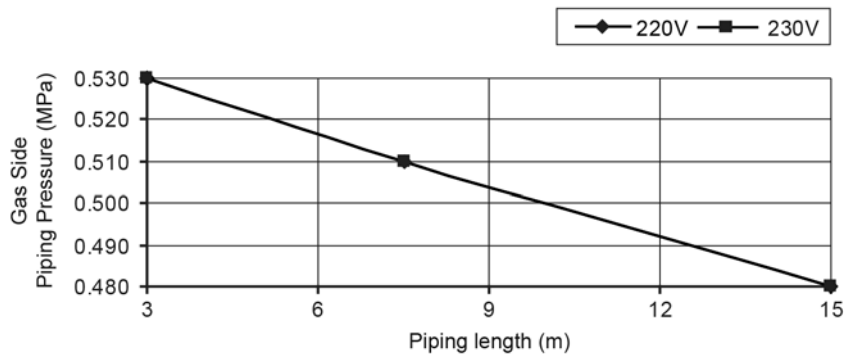
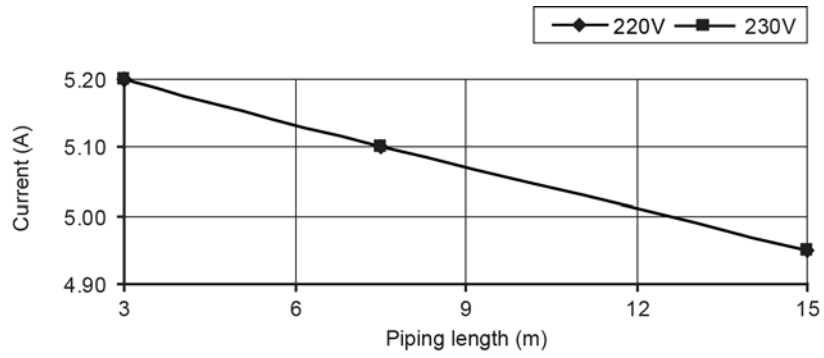


17.2.2 CS-A12MKD CU-A12MKD

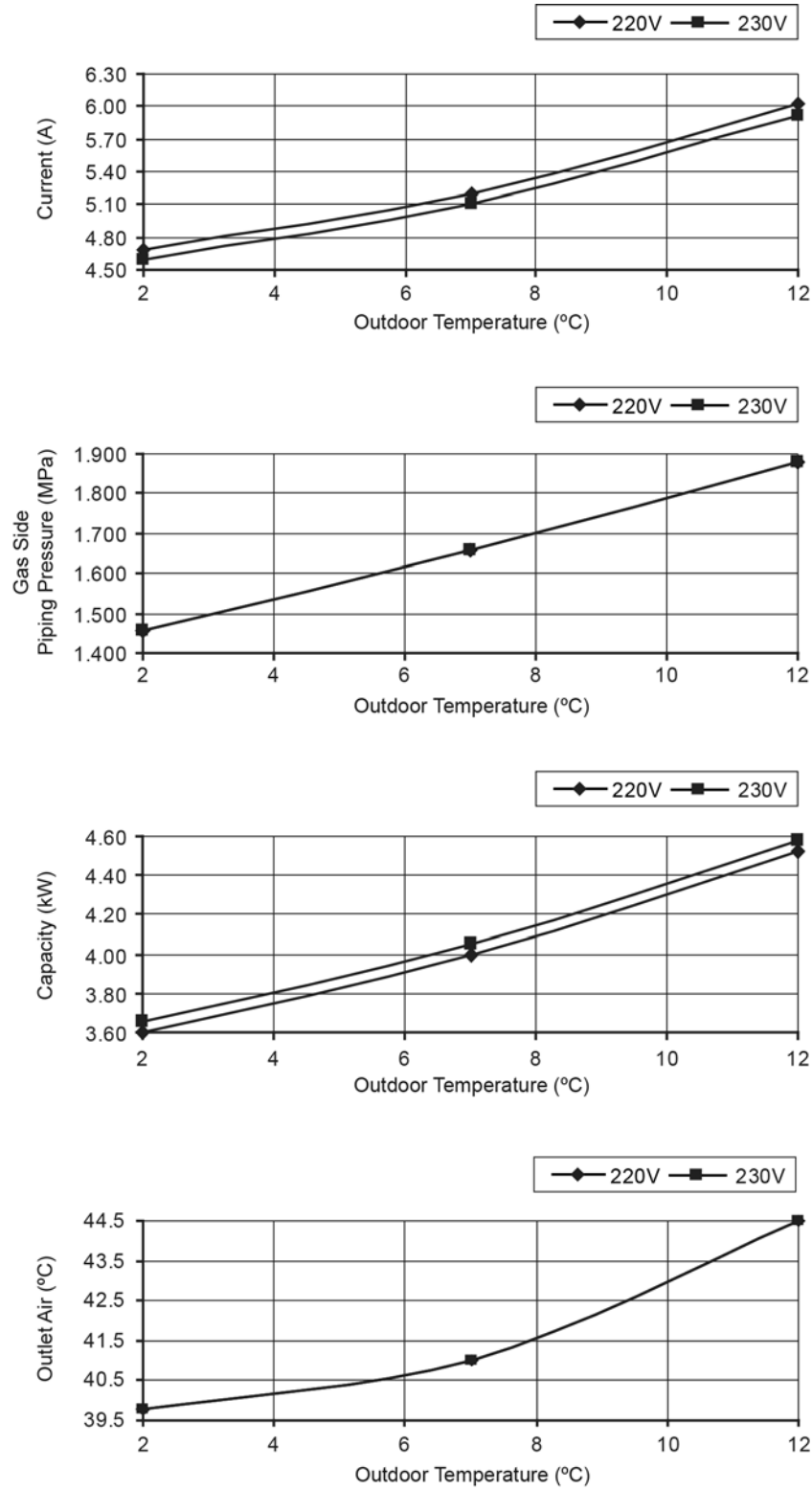
- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m



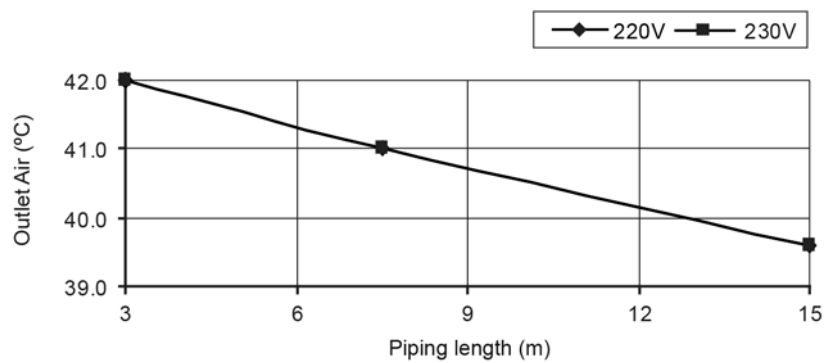
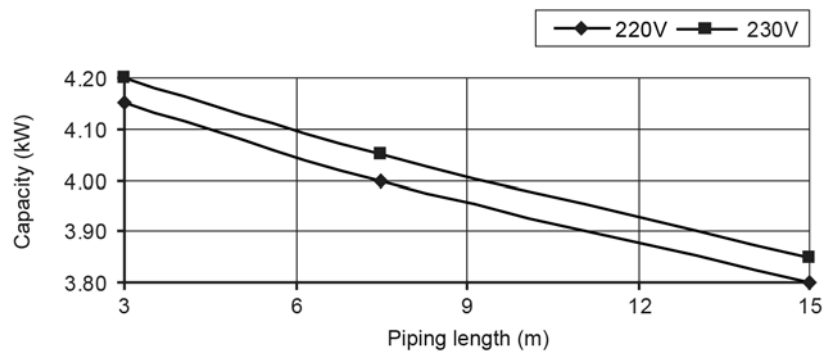
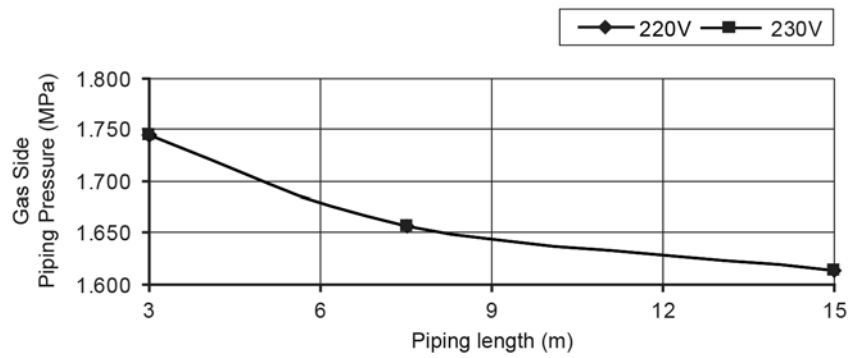
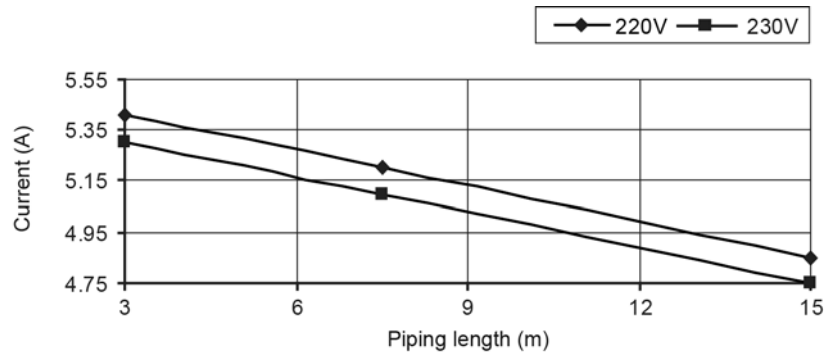
- Piping Length Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed



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

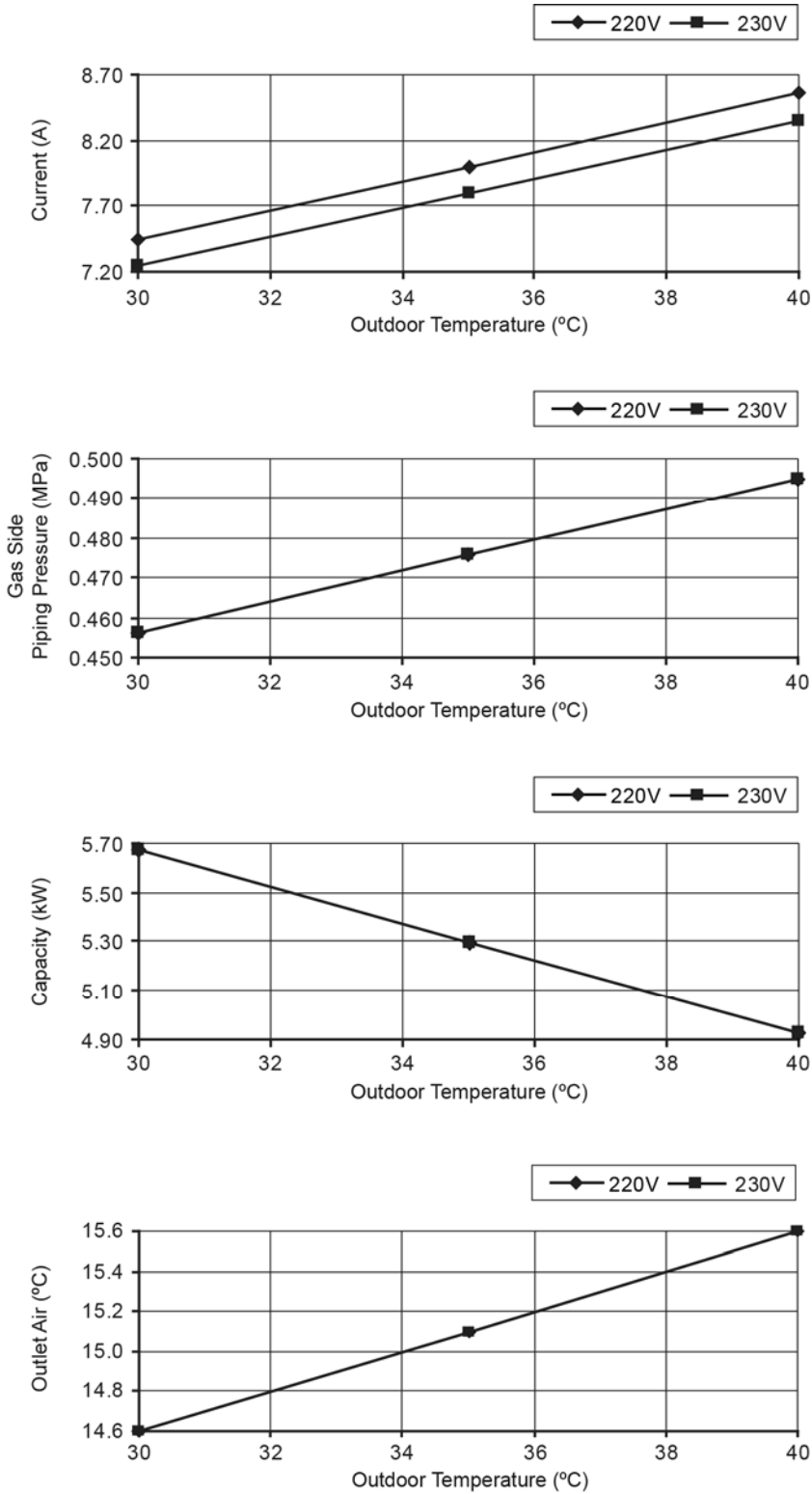


- Piping Length Characteristic
 - Room temperature: 20°C (DBT)
 - Outdoor temperature: 7°C (DBT), 6°C (WBT)
 - Operation condition: High fan speed

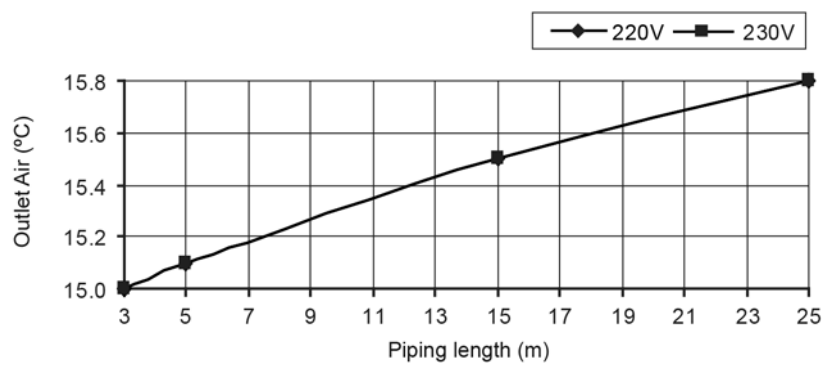
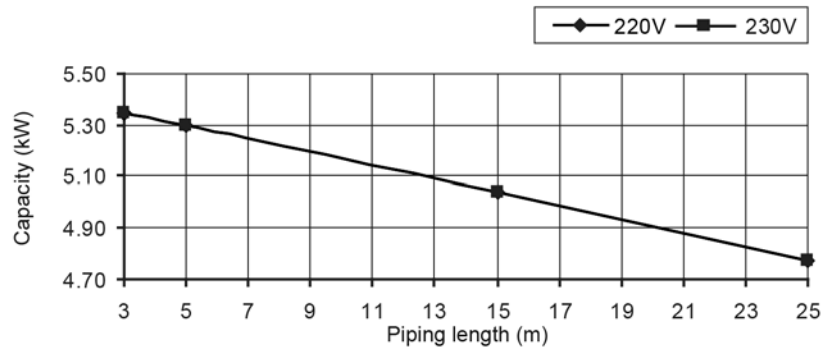
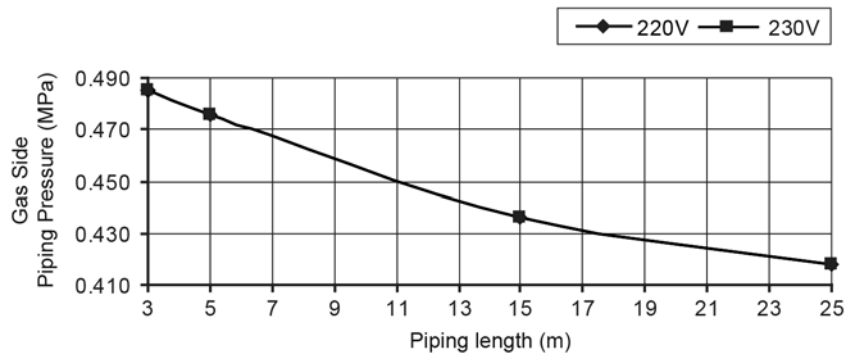
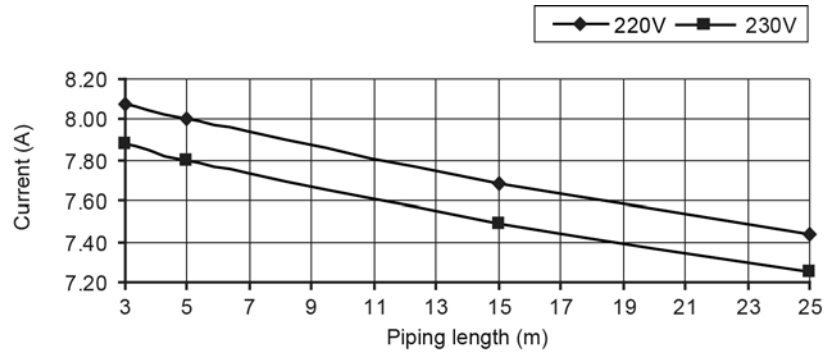


17.2.3 CS-A18MKD CU-A18MKD

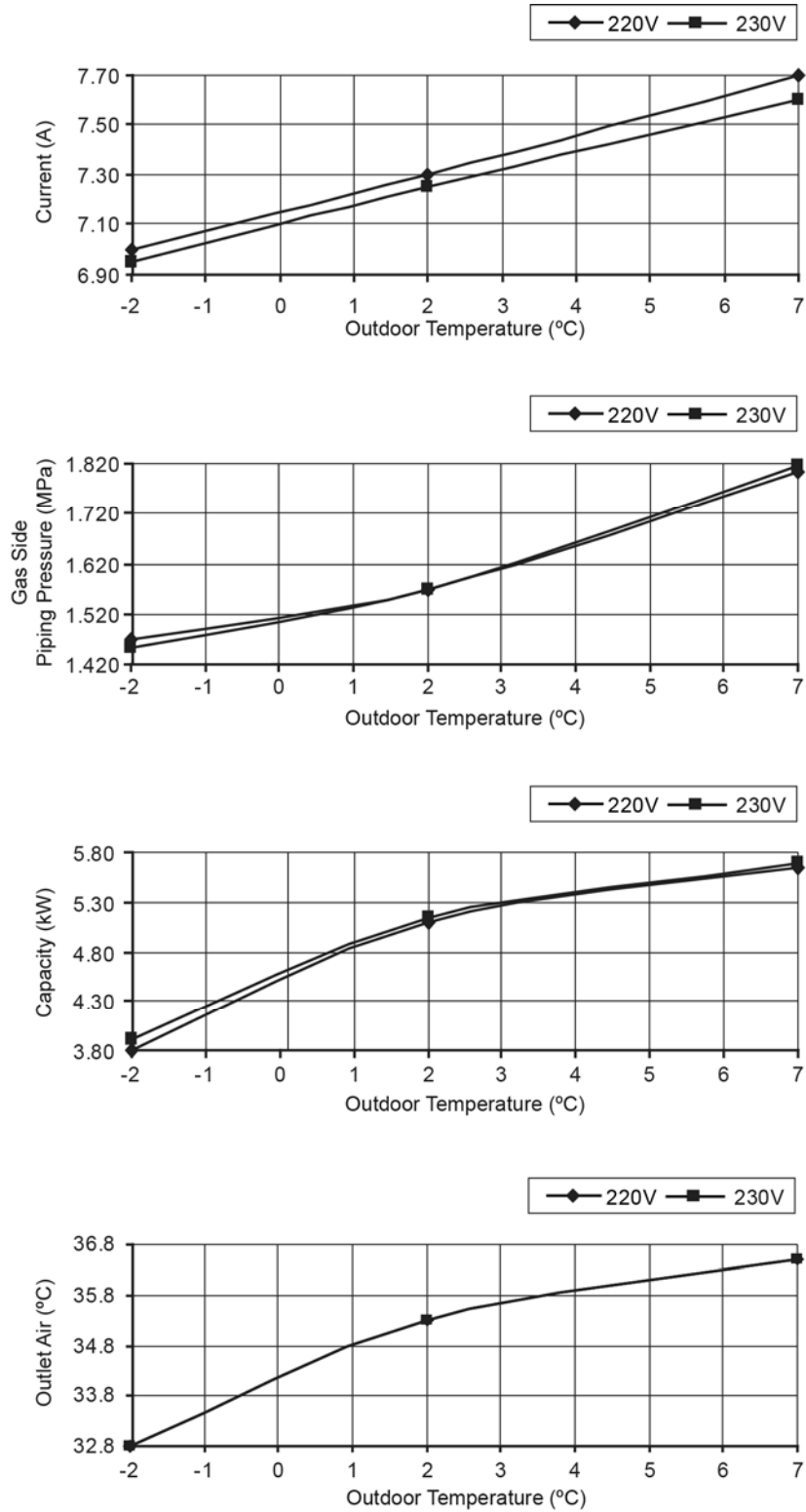
- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



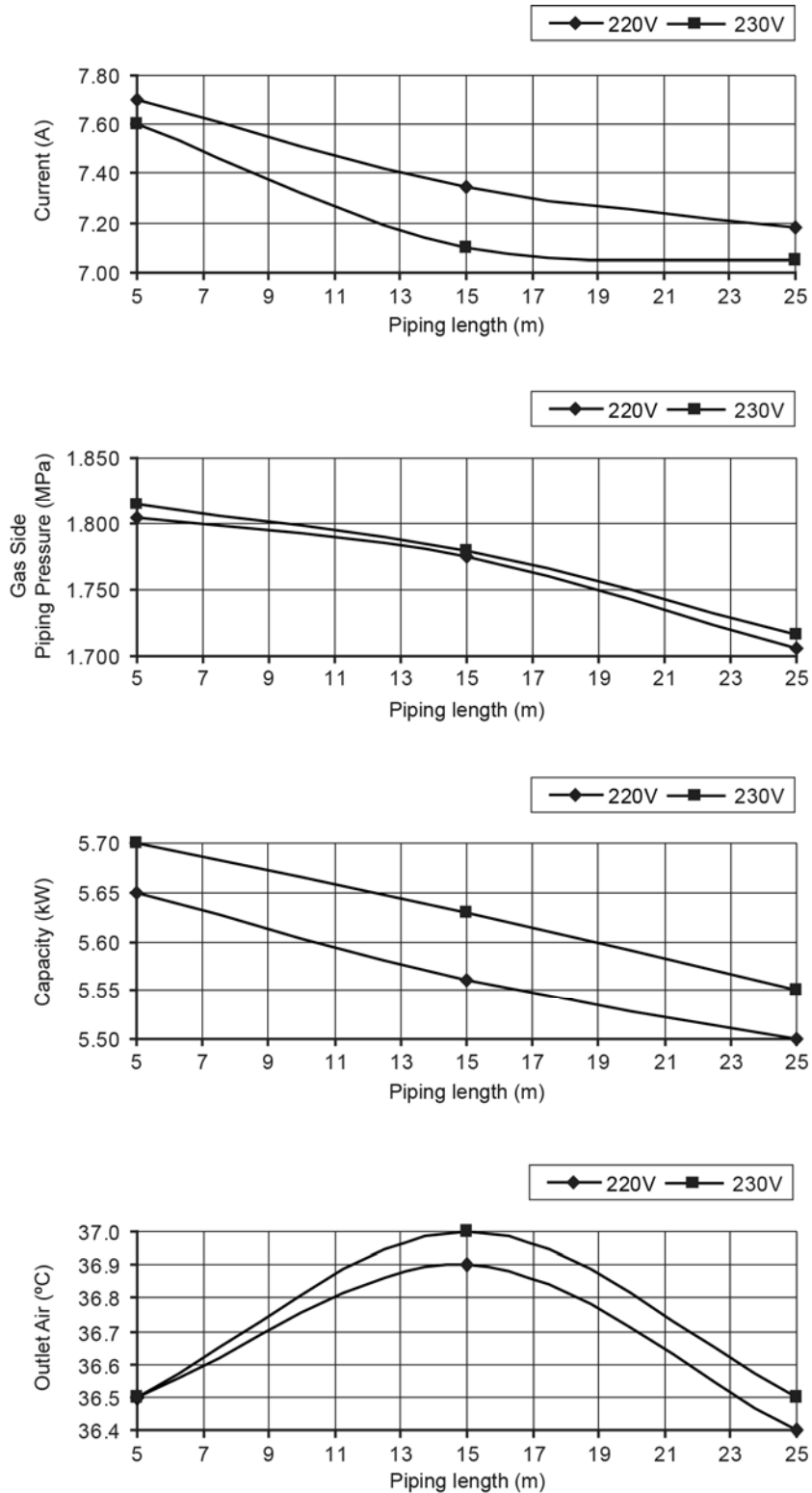
- Piping Length Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



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

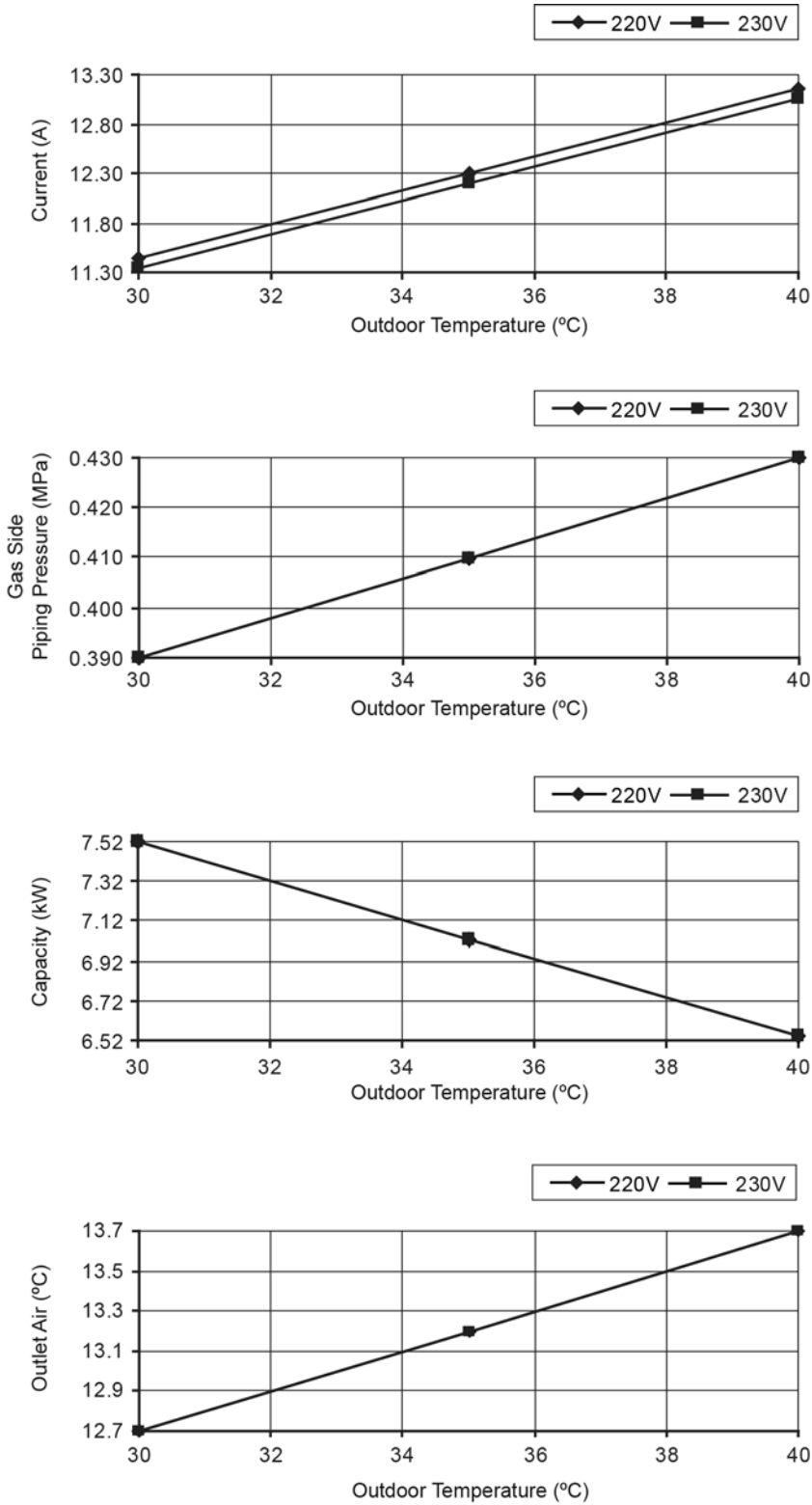


- Piping Length Characteristic
 - Room temperature: 20°C (DBT)
 - Outdoor temperature: 7°C (DBT), 6°C (WBT)
 - Operation condition: High fan speed (Rated Frequency)
 - Piping length: 5m

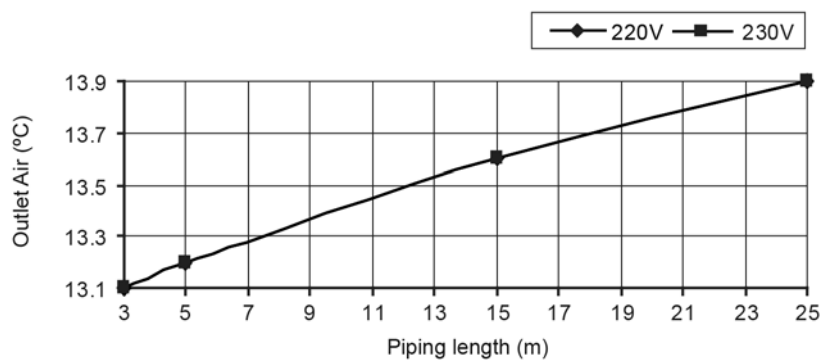
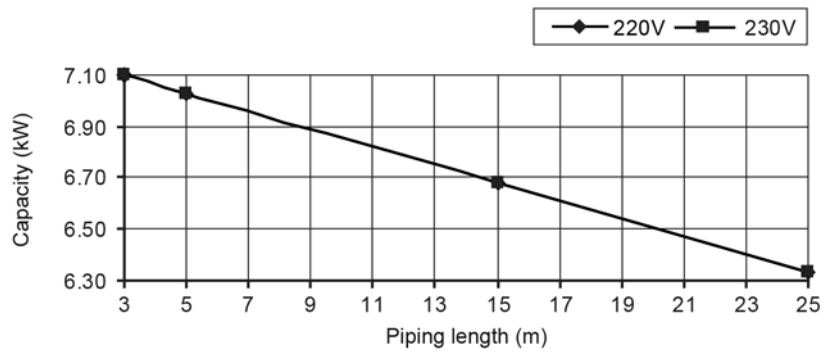
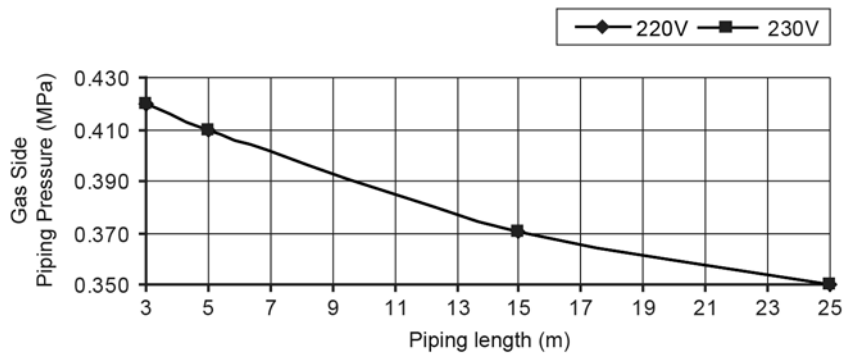
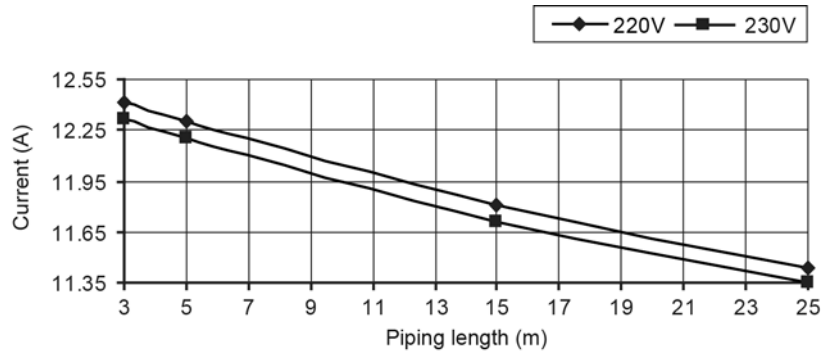


17.2.4 CS-A24MKD CU-A24MKD

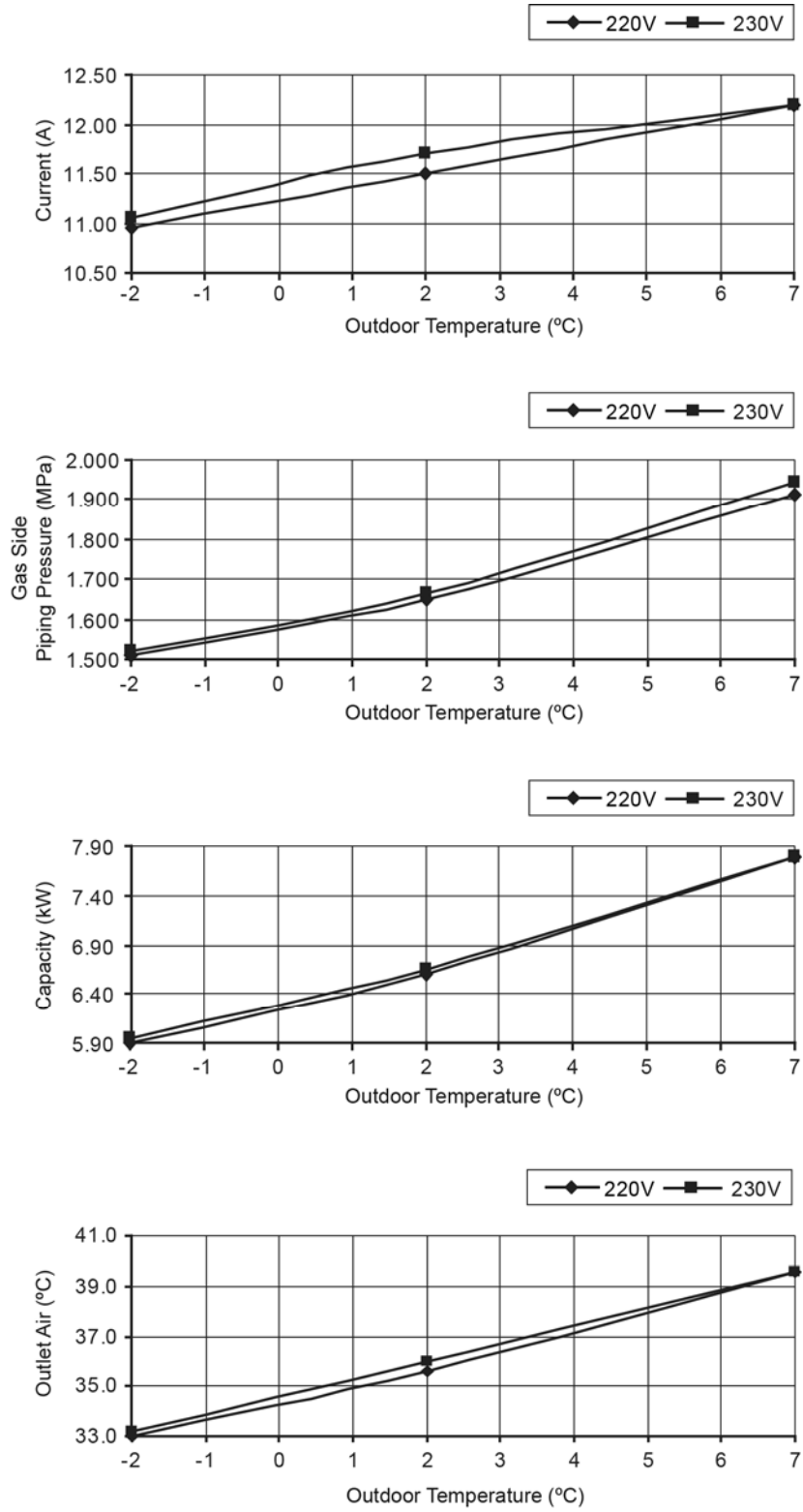
- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



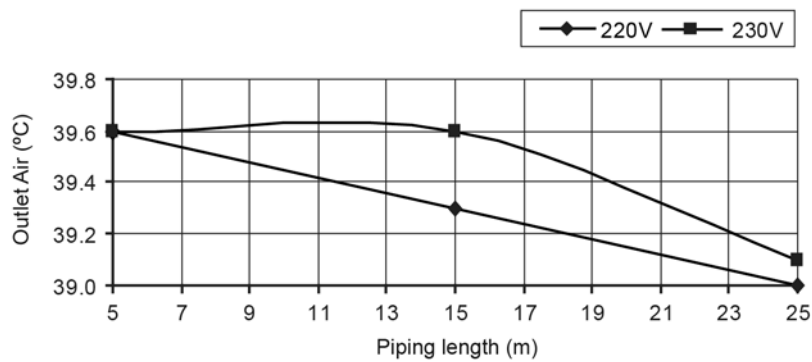
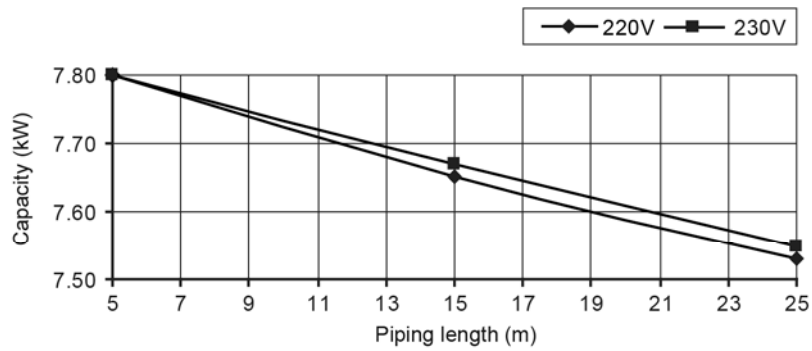
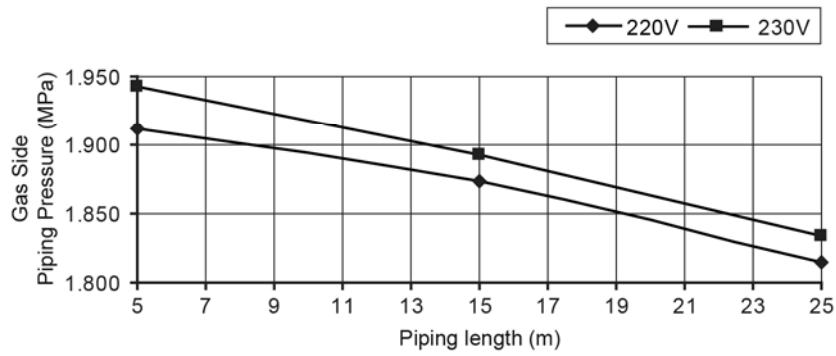
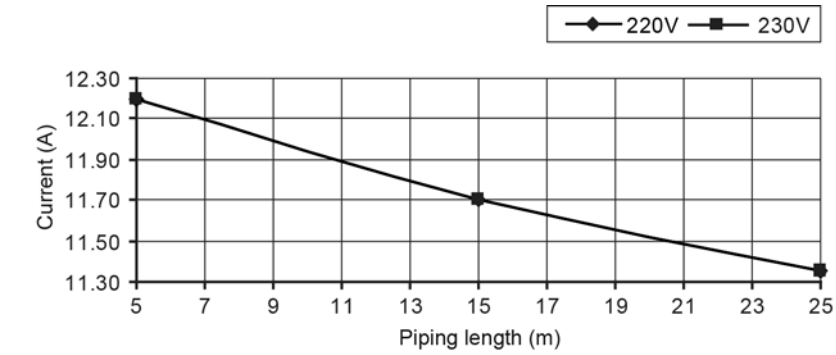
- Piping Length Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



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

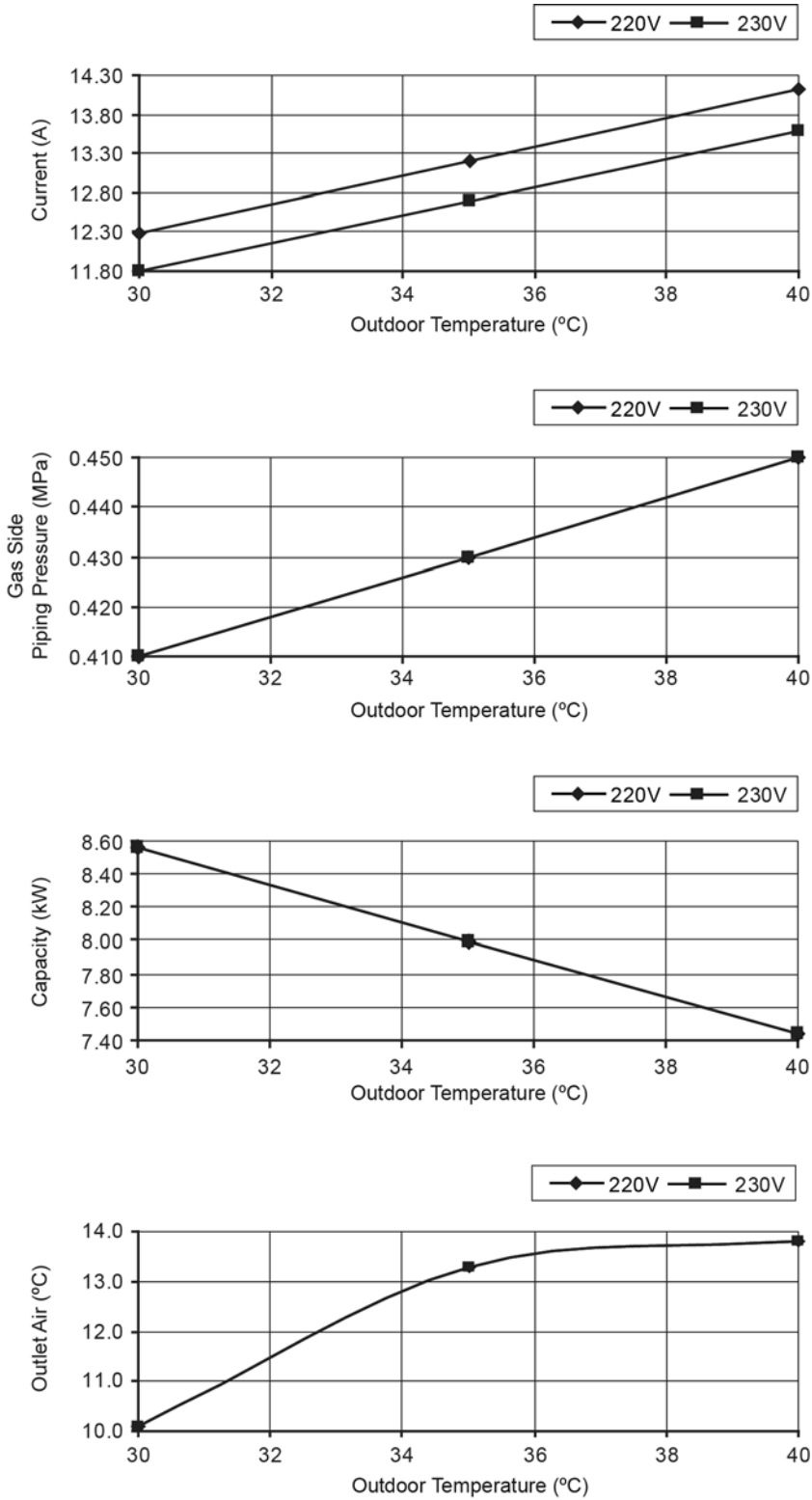


- Piping Length Characteristic
 - Room temperature: 20°C (DBT)
 - Outdoor temperature: 7°C (DBT), 6°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m

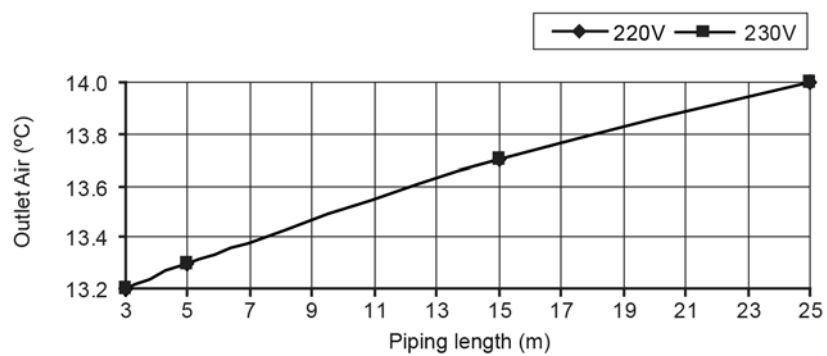
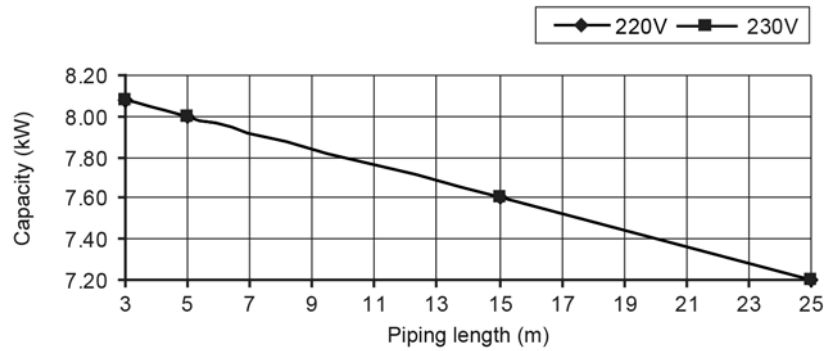
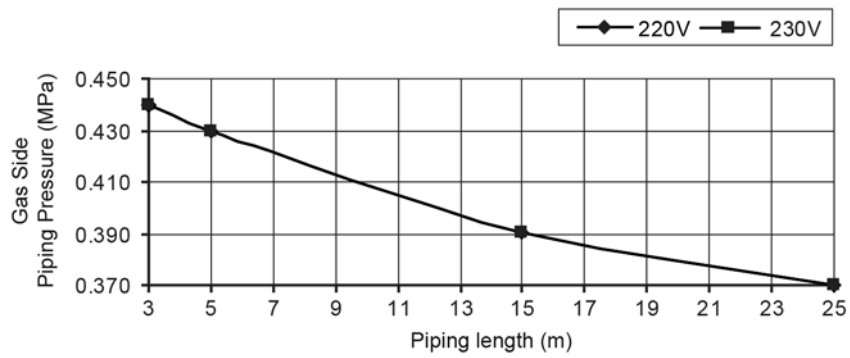
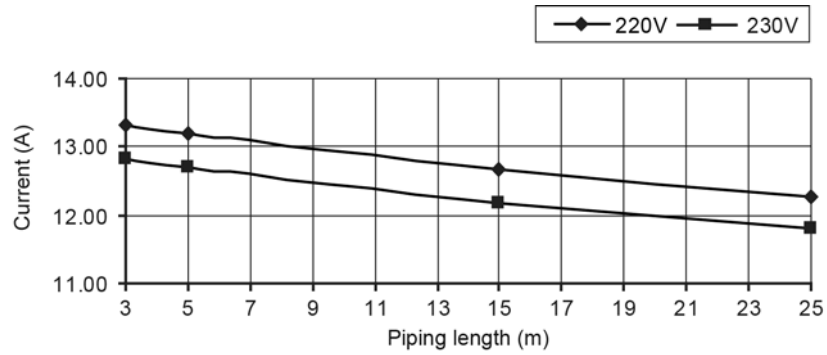


17.2.5 CS-A28MKD CU-A28MKD

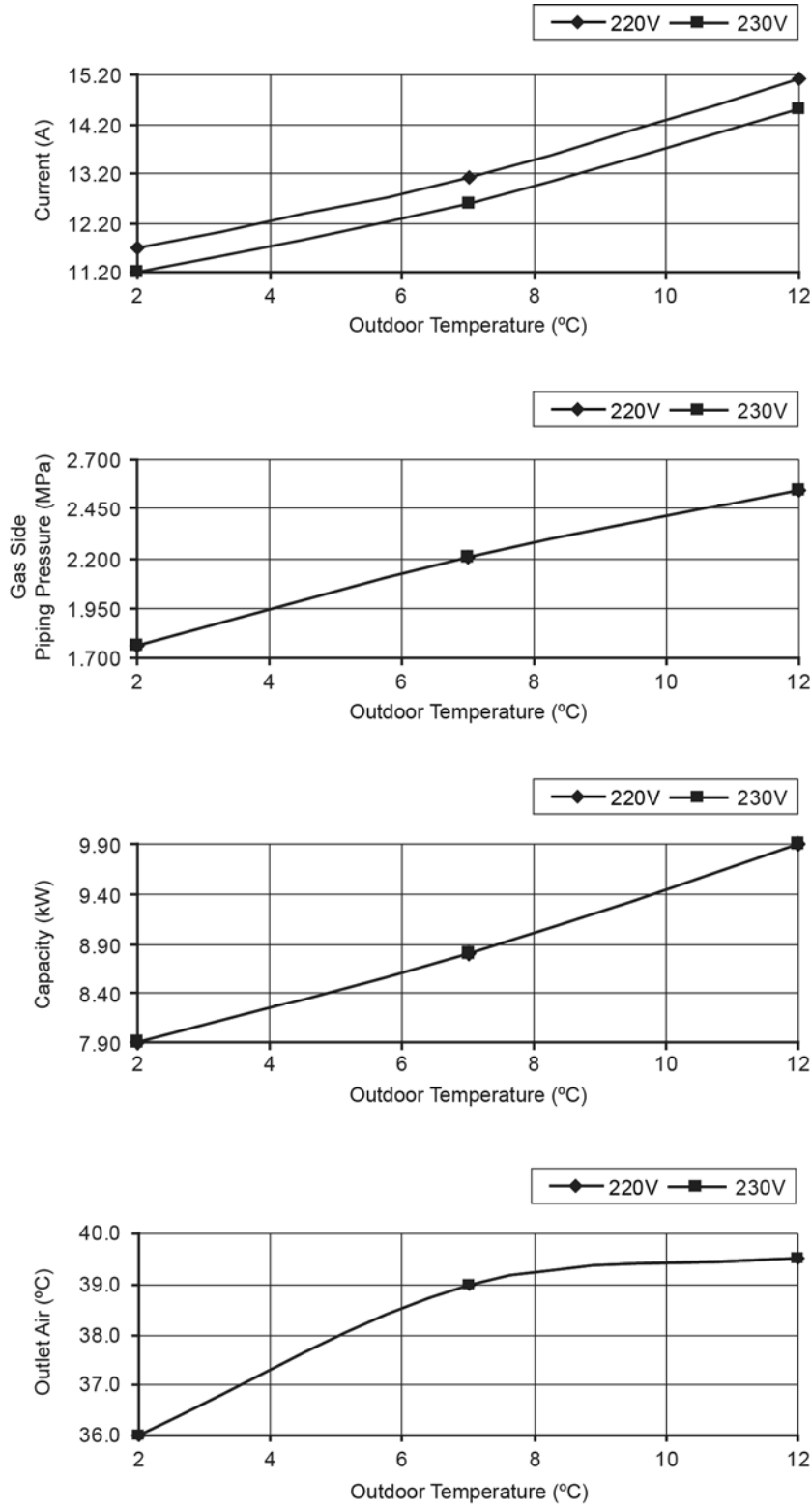
- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



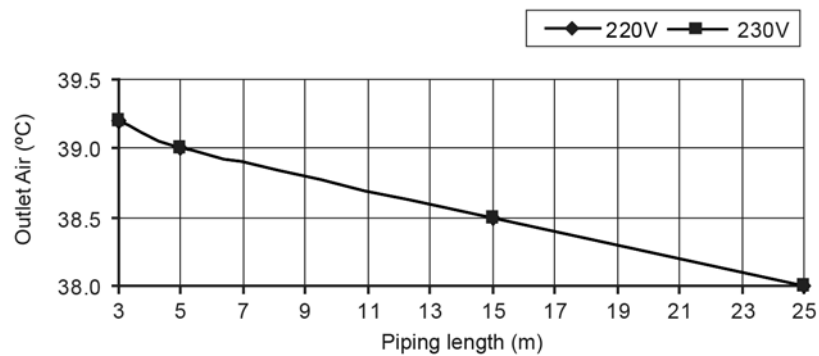
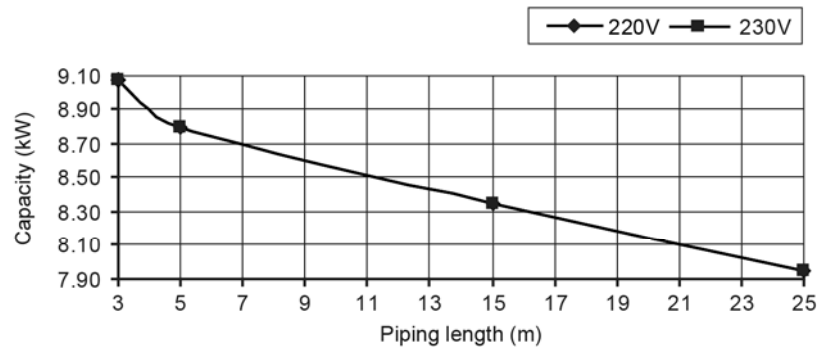
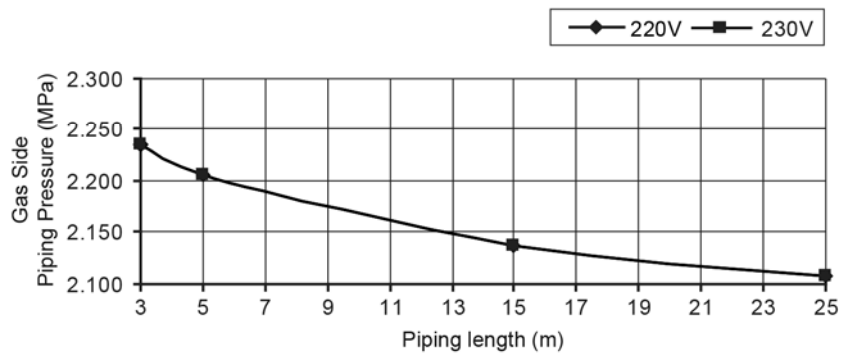
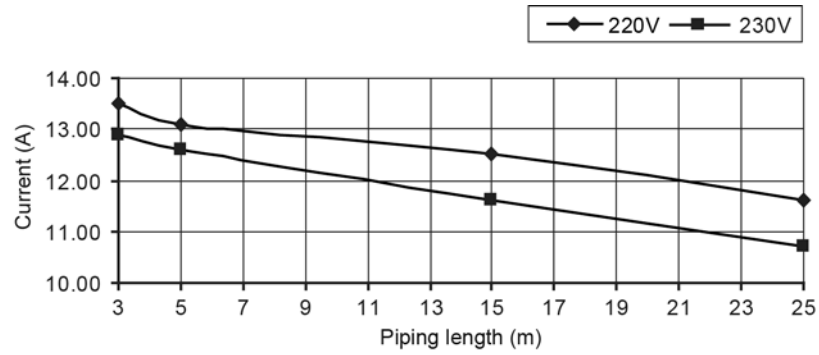
- Piping Length Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



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



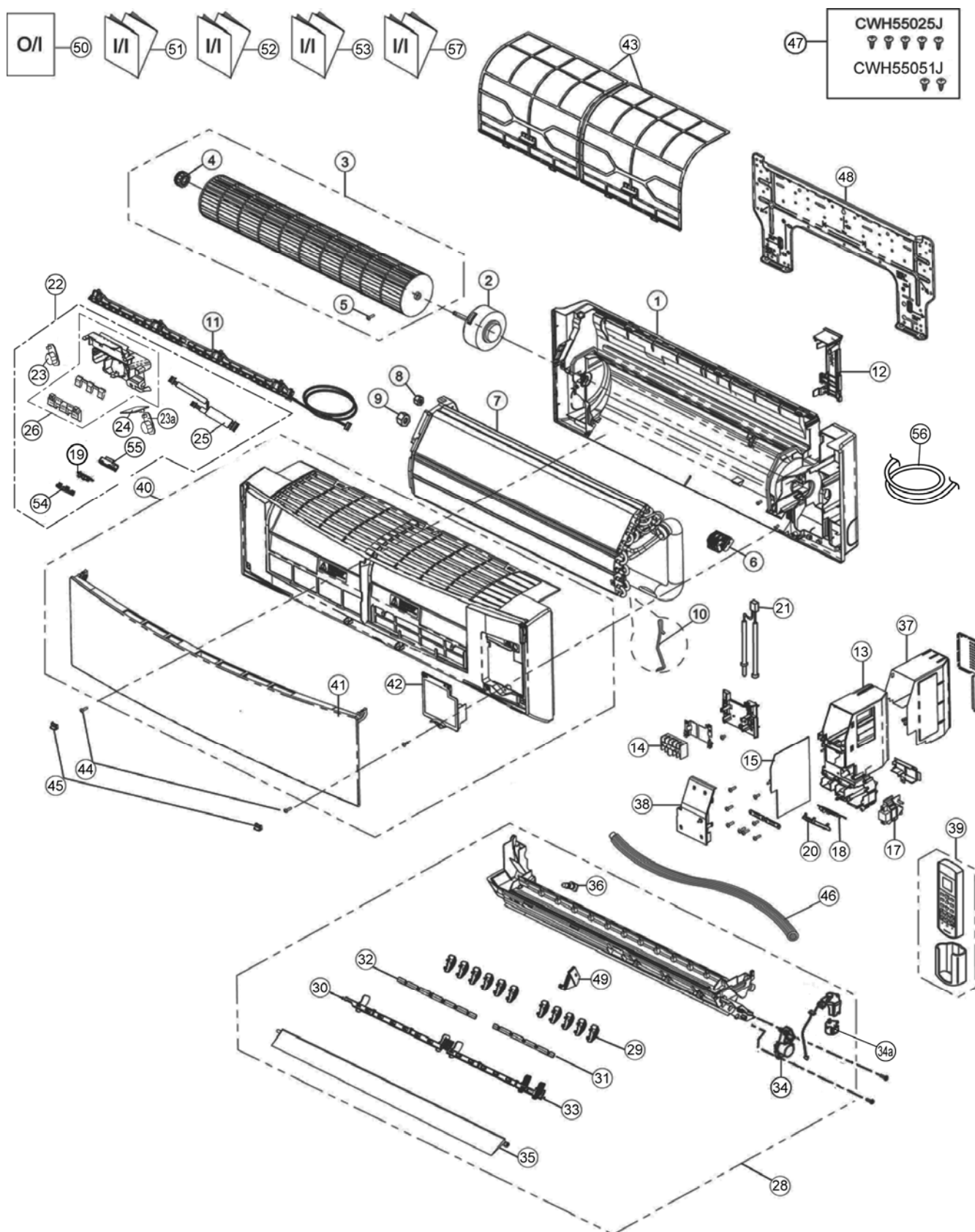
- Piping Length Characteristic
 - Room temperature: 20°C (DBT)
 - Outdoor temperature: 7°C (DBT), 6°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 5m



18. Exploded View and Replacement Parts List

18.1 Indoor Unit

18.1.1 CS-A9MKD CS-A12MKD



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.

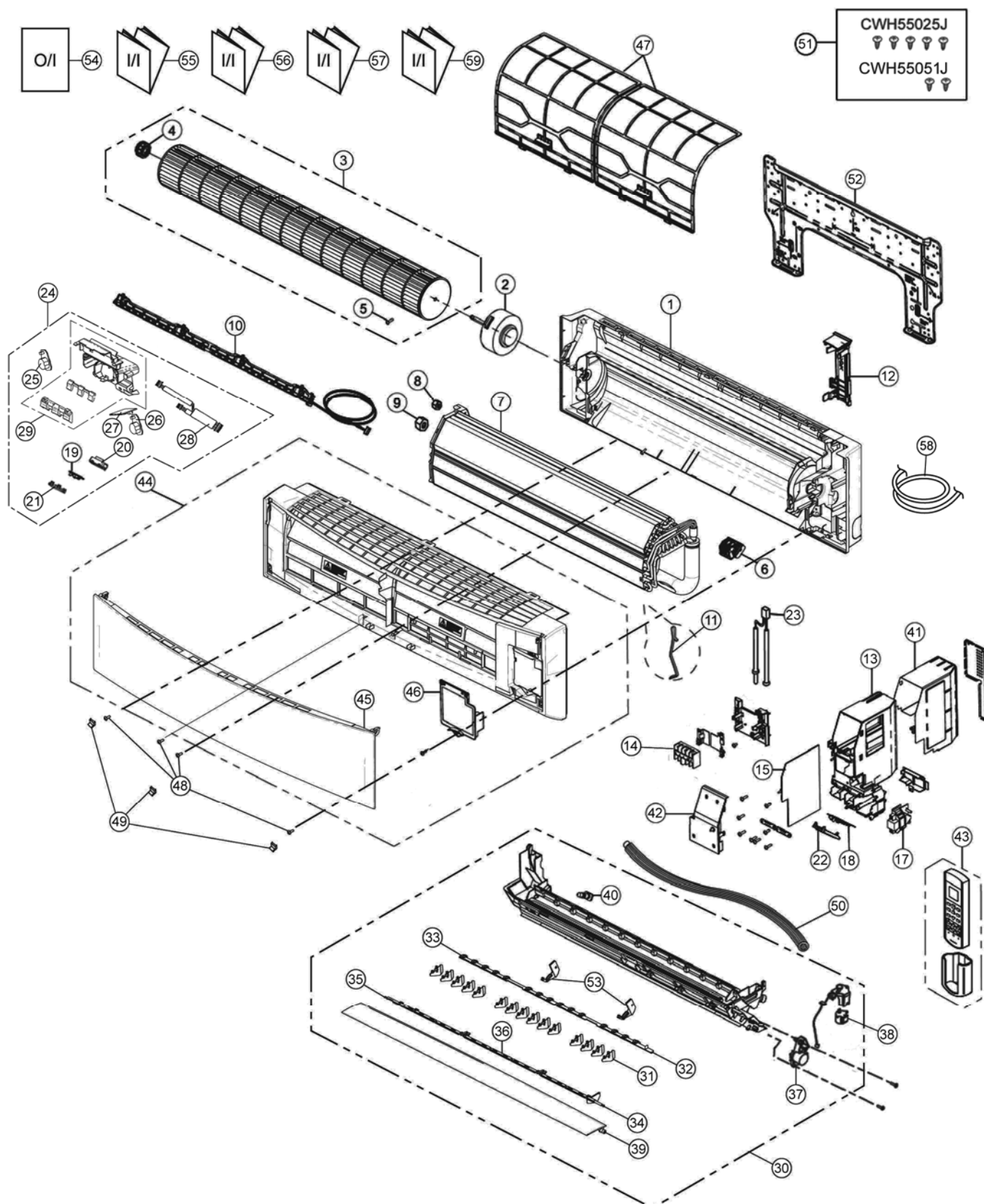
REF. NO.	PART NAME & DESCRIPTION	QTY	CS-A9MKD	CS-A12MKD	REMARK
1	CHASSIS COMPLETE	1	CWD50C1599	←	
2	FAN MOTOR	1	CWA921434	←	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1076	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	
6	GENERATOR COMPLETE	1	CWH94C0028	←	
7	EVAPORATOR	1	CWB30C3154	CWB30C3360	
8	FLARE NUT (LIQUID)	1	CWT251026	←	
9	FLARE NUT (GAS)	1	CWT251061	CWT251062	
10	HOLDER 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	CWA73C5185	CWA73C5183	O
17	ELECTRONIC CONTROLLER - HVU	1	CWA745348	←	O
18	ELECTRONIC CONTROLLER - INDICATOR	1	CWA746280	←	O
19	ELECTRONIC CONTROLLER - RECEIVER	1	CWA745288	←	O
20	INDICATOR HOLDER	1	CWD933021	←	O
21	SENSOR COMPLETE	1	CWA50C2401	←	
22	SENSOR COMPLETE (ECO)	1	CWA50C2758	←	
23	ELECTRONIC CONTROLLER (ECO SENSOR - L)	1	CWA745791	←	
23a	ELECTRONIC CONTROLLER (ECO SENSOR - R)	1	CWA746206	←	
24	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA746205	←	
25	LEAD WIRE - PCB ECO	1	CWA67C9160	←	
26	CONTROL BOARD CASING FOR PCB ECO	1	CWD93C1108	←	
28	DISCHARGE GRILLE COMPLETE	1	CWE20C3123	←	
29	VERTICAL VANE	11	CWE241350	←	
30	CONNECTING BAR	1	CWE261152	←	
31	CONNECTING BAR	1	CWE261216	←	
32	CONNECTING BAR	1	CWE261215	←	
33	CONNECTING BAR	1	CWE261217	←	
34	AIR SWING MOTOR	1	CWA981264	←	
34a	AIR SWING MOTOR	1	CWA98K1015	←	O
35	HORIZONTAL VANE	1	CWE24C1365	←	
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	CWA75C3710	←	O
40	FRONT GRILLE COMPLETE	1	CWE11C4820	←	O
41	INTAKE GRILLE COMPLETE	1	CWE22C1678	←	O
42	GRILLE DOOR	1	CWE14C1029	←	
43	E-ION FILTER	2	CWD00K1016	←	
44	SCREW - FRONT GRILLE	2	XTT4+16CFJ	←	
45	CAP - FRONT GRILLE	2	CWH521194	←	
46	DRAIN HOSE	1	CWH851173	←	
47	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	
48	INSTALLATION PLATE	1	CWH361097	←	
49	FULCRUM	1	CWH621102	←	

50	OPERATING INSTRUCTION	1	CWF567875	←	
51	INSTALLATION INSTRUCTION	1	CWF614767	←	
52	INSTALLATION INSTRUCTION	1	CWF614768	←	
53	INSTALLATION INSTRUCTION	1	CWF614769	←	
54	COVER FOR RECEIVER (UPPER)	1	CWD933022	←	
55	COVER FOR RECEIVER (BOTTOM)	1	CWD933209	←	
56	POWER SUPPLY CORD	1	CWA20C2827	←	
57	INSTALLATION INSTRUCTION	1	CWF614770	←	

(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-A18MKD CS-A24MKD CS-A28MKD



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-A18MKD	CS-A24MKD	CS-A28MKD	REMARK
1	CHASSIS COMPLETE	1	CWD50C1623	←	←	
2	FAN MOTOR	1	ARW7628AC	ARW7627AC	←	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	CWA28C2359	CWA28C2360	CWA28C2167J	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C5227	CWA73C5222	CWA73C5221	O
17	ELECTRONIC CONTROLLER - HVU	1	CWA745348	←	←	O
18	ELECTRONIC CONTROLLER - INDICATOR	1	CWA746280	←	←	O
19	ELECTRONIC CONTROLLER - RECEIVER	1	CWA745288	←	←	O
20	COVER FOR RECEIVER (BOTTOM)	1	CWD933209	←	←	O
21	COVER FOR RECEIVER (UPPER)	1	CWD933022	←	←	
22	INDICATOR HOLDER	1	CWD933021	←	←	
23	SENSOR COMPLETE	1	CWA50C2401	CWA50C2782	←	
24	SENSOR COMPLETE (ECO)	1	CWA50C2759	←	←	O
25	ELECTRONIC CONTROLLER (ECO SENSOR - L)	1	CWA745791	←	←	O
26	ELECTRONIC CONTROLLER (ECO SENSOR - R)	1	CWA746206	←	←	O
27	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA746205	←	←	O
28	LEAD WIRE - PCB ECO	1	CWA67C9218	←	←	
29	CONTROL BOARD CASING FOR PCB ECO	1	CWD93C1108	←	←	
30	DISCHARGE GRILLE COMPLETE	1	CWE20C3124	←	←	
31	VERTICAL VANE	15	CWE241355	←	←	
32	CONNECTING BAR	1	CWE261220	←	←	
33	CONNECTING BAR	1	CWE261158	←	←	
34	CONNECTING BAR	1	CWE261221	←	←	
35	CONNECTING BAR	1	CWE261159	←	←	
36	CONNECTING BAR	1	CWE261160	←	←	
37	A.S.MOTOR, DC SINGLE 12V 300OHM	1	CWA981241	←	←	
38	A.S MOTOR, DC SINGLE 12V 300OHM	1	CWA98K1015	←	←	O
39	HORIZONTAL VANE	1	CWE24C1364	←	←	O
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	CWA75C3710	←	←	
44	FRONT GRILLE COMPLETE	1	CWE11C4798	CWE11C4795	←	O
45	INTAKE GRILLE COMPLETE	1	CWE22C1680	←	←	O
46	GRILLE DOOR	1	CWE14C1029	←	←	O
47	E-ION FILTER	2	CWD00K1017	←	←	
48	SCREW - FRONT GRILLE	4	XTT4+16CFJ	←	←	
49	CAP - FRONT GRILLE	3	CWH521194	←	←	
50	DRAIN HOSE	1	CWH851173	←	←	

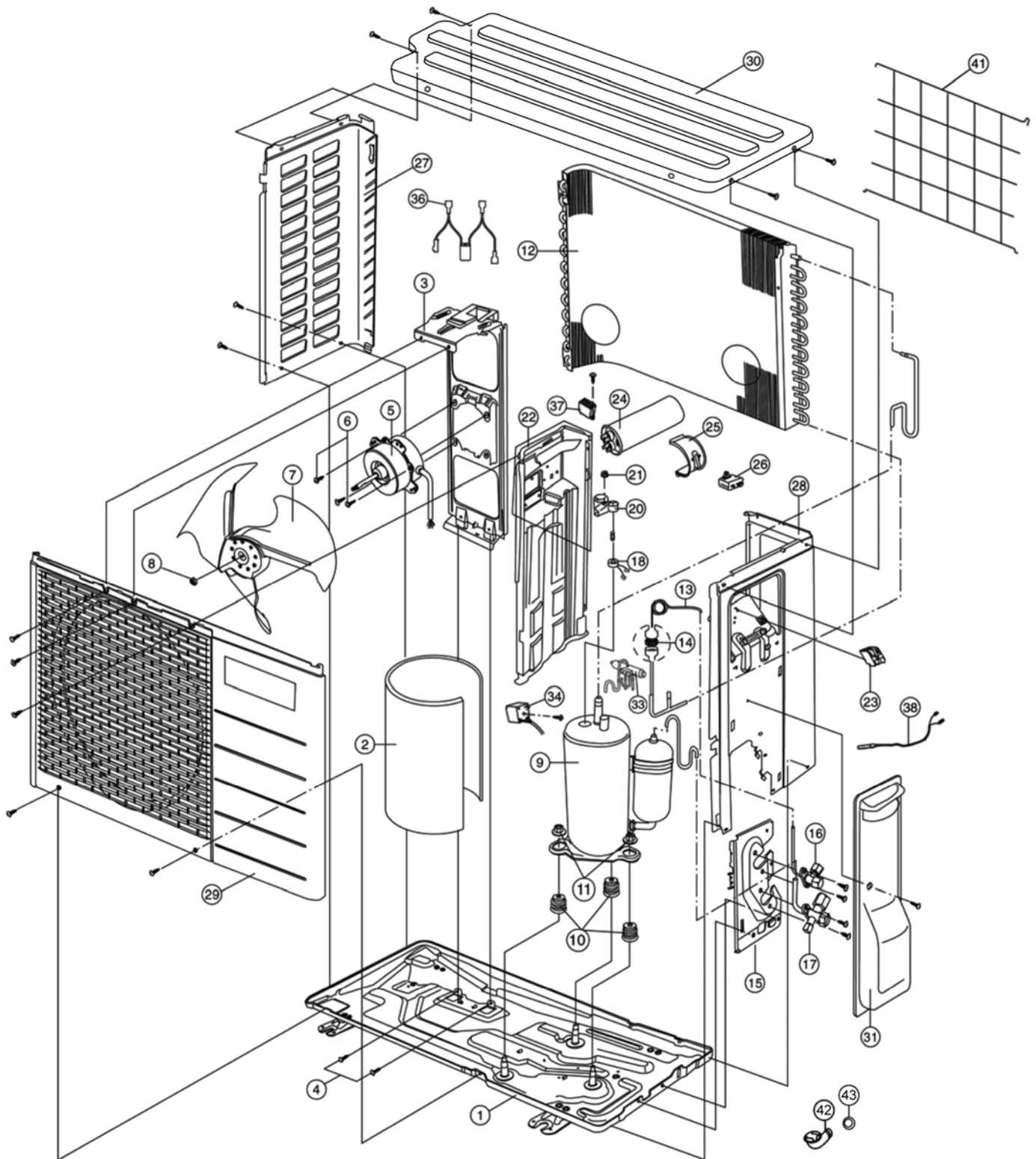
51	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	←	
52	INSTALLATION PLATE	1	CWH361098	←	←	
53	FULCRUM	2	CWH621103	←	←	
54	OPERATING INSTRUCTION	1	CWF567875	←	←	
55	INSTALLATION INSTRUCTION	1	CWF614767	←	←	
56	INSTALLATION INSTRUCTION	1	CWF614768	←	←	
57	INSTALLATION INSTRUCTION	1	CWF614769	←	←	
58	POWER SUPPLY CORD	1	CWA20C2829	CWA20C2836	-	
59	INSTALLATION INSTRUCTION	1	CWF614770	←	←	

(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-A9MKD



Note

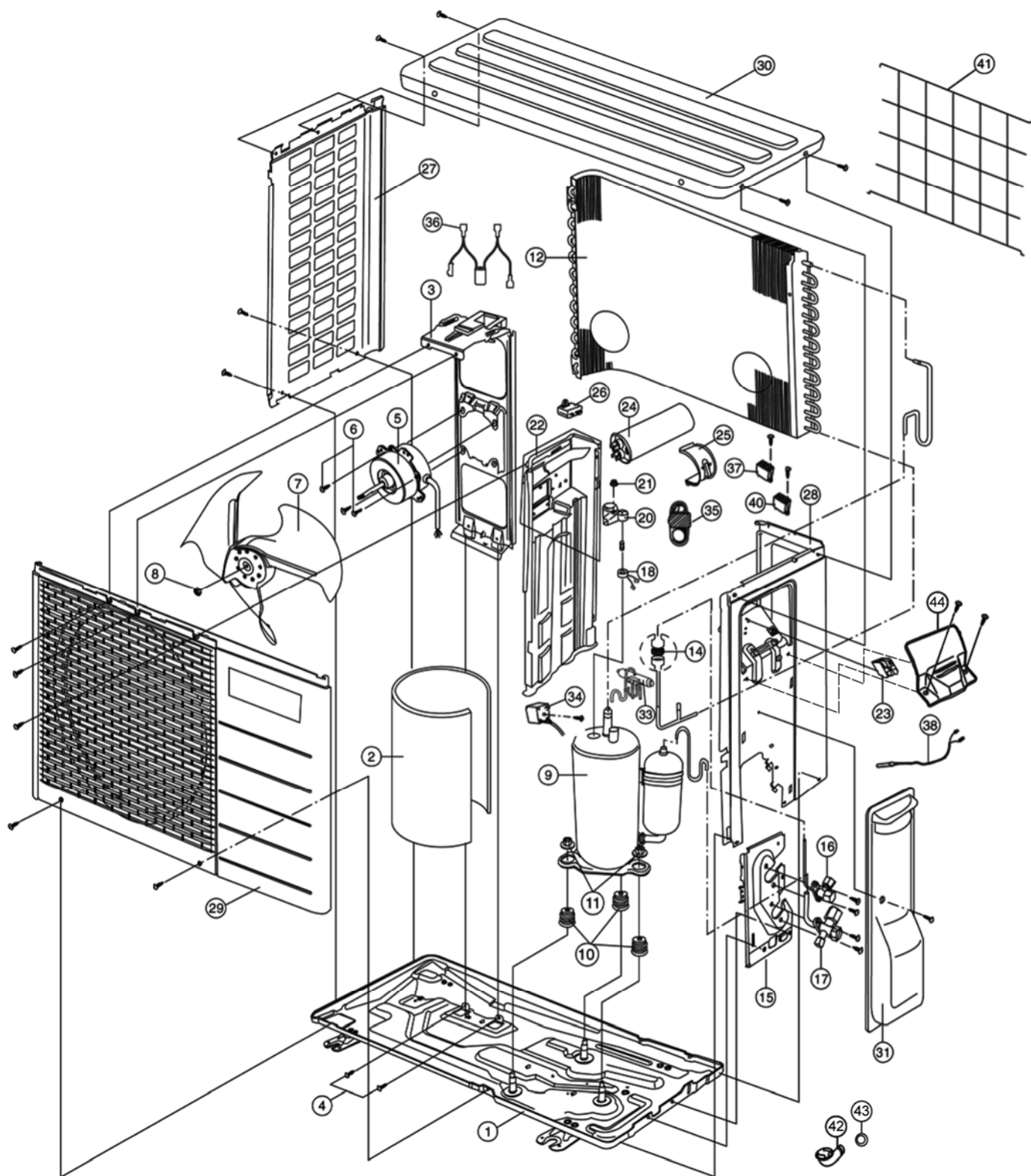
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY	CU-A9MKD	REMARK
1	CHASSIS 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	CWA951388J	O
6	SCREW - FAN MOTOR MOUNT	4	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 ASS'Y	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	
20	TERMINAL COVER	1	CWH171011	
21	NUT - TERMINAL COVER	1	CWH7080300J	
22	SOUND PROOF BOARD	1	CWH151074	
23	TERMINAL BOARD ASS'Y	1	CWA28K1034J	
24	CAPACITOR - COM.	1	F0GAH306A004	O
25	HOLDER CAPACITOR	1	CWH301035	
26	CAPACITOR - F.M	1	DS441205NPQA	O
27	CABINET SIDE PLATE	1	CWE041110A	
28	CABINET SIDE PLATE COMPLETE	1	CWE04C1042	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1048	
30	CABINET TOP PLATE	1	CWE031041A	
31	CONTROL BOARD COVER COMPLETE	1	CWH13C1099	
33	4-WAY 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	
41	WIRE NET	1	CWD041057A	
42	FLEXIBLE PIPE	1	CWH5850080	
43	PACKING - L.TUBE	1	CWB81012	

(Note)

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

18.2.2 CU-A12MKD



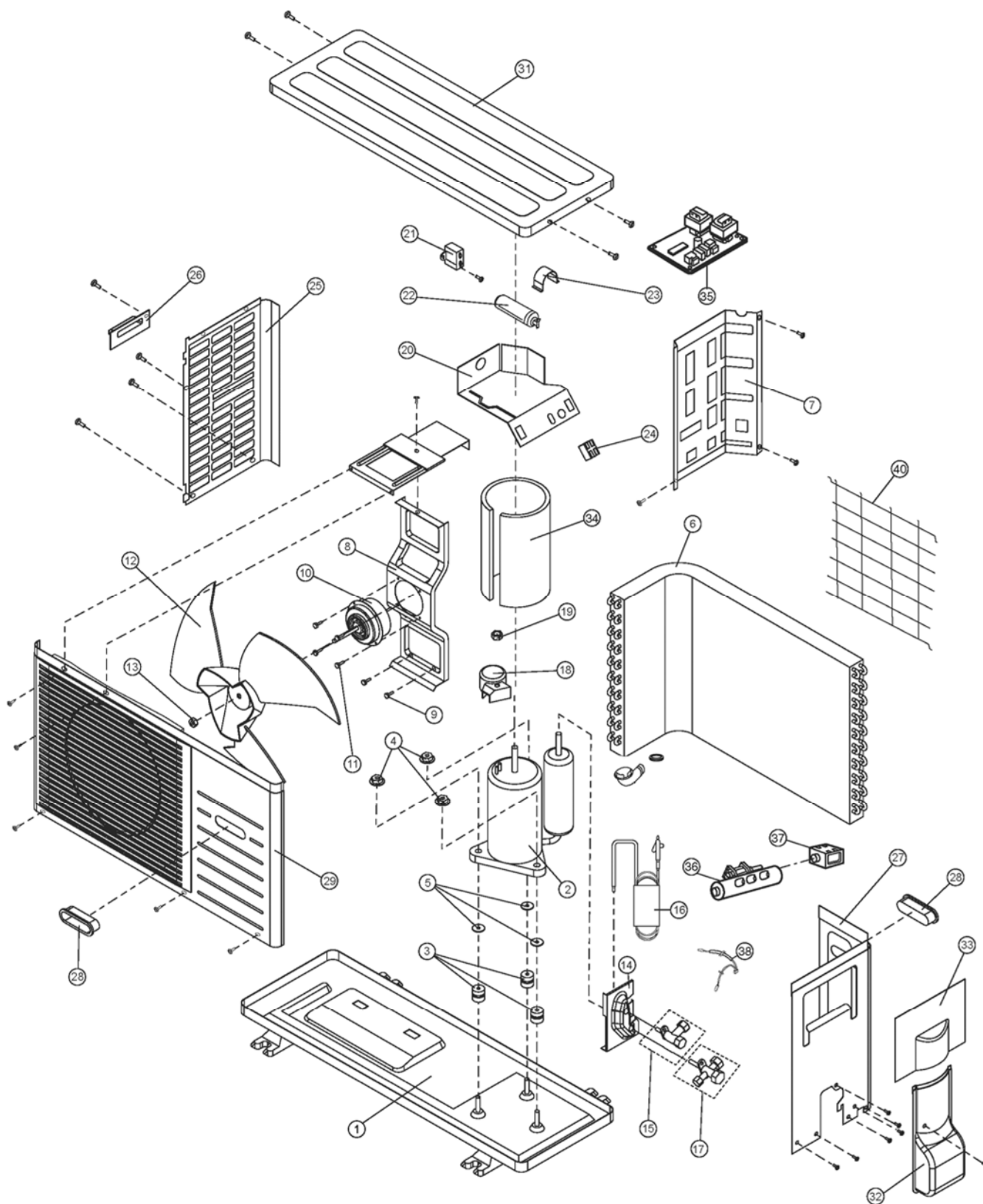
Note
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY	CU-A12MKD	REMARK
1	CHASSIS 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	4	CWH55406J	
7	PROPELLER FAN ASS'Y	1	CWH03K1006	
8	NUT - PROPELLER FAN	1	CWH56053J	
9	COMPRESSOR	1	2PS206D2BA06	O
10	ANTI - VIBRATION BUSHING	3	CWH50055	
11	NUT - COMPRESSOR MOUNT	3	CWH561049	
12	CONDENSER	1	CWB32C2969	
14	STRAINER	1	CWB11025	
15	HOLDER COUPLING	1	CWH351023	
16	2-WAY VALVE (LIQUID)	1	CWB021117	O
17	3-WAY VALVE (GAS)	1	CWB011148	O
18	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C8526	
20	TERMINAL COVER	1	CWH171011	
21	NUT - TERMINAL COVER	1	CWH7080300J	
22	SOUND PROOF BOARD	1	CWH151023	
23	TERMINAL BOARD ASS'Y	1	CWA28K1034J	
24	CAPACITOR - COM.	1	F0GAH306A004	O
25	HOLDER CAPACITOR	1	CWH30060	
26	CAPACITOR - F.M	1	DS441205NPQA	O
27	CABINET SIDE PLATE	1	CWE041248A	
28	CABINET SIDE PLATE COMPLETE	1	CWE04C1118	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1034	
30	CABINET TOP PLATE	1	CWE031014A	
31	CONTROL BOARD COVER COMPLETE	1	CWH13C1064	
33	4-WAY VALVE	1	CWB001026J	
34	V-COIL COMPLETE	1	CWA43C2273	
35	TUBE ASSY (CHK VALVE CAP. TUBE)	1	CWT01C5473	
36	ELECTROLYTIC CAPACITOR	1	CWA32C067	
37	ELECTRO MAGNETIC SWITCH	1	CWA00059	
38	OVERHEAT PROTECTOR COMPLETE	1	CWA14C1009	
40	ELECTRO MAGNETIC RELAY	1	K6A2C7A00002	
41	WIRE NET	1	CWD041111A	
42	FLEXIBLE PIPE	1	CWH5850080	
43	PACKING – L.TUBE	1	CWB81012	
44	CONTROL BOARD COVER	1	CWH131295	

(Note)

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

18.2.3 CU-A18MKD CU-A24MKD



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.

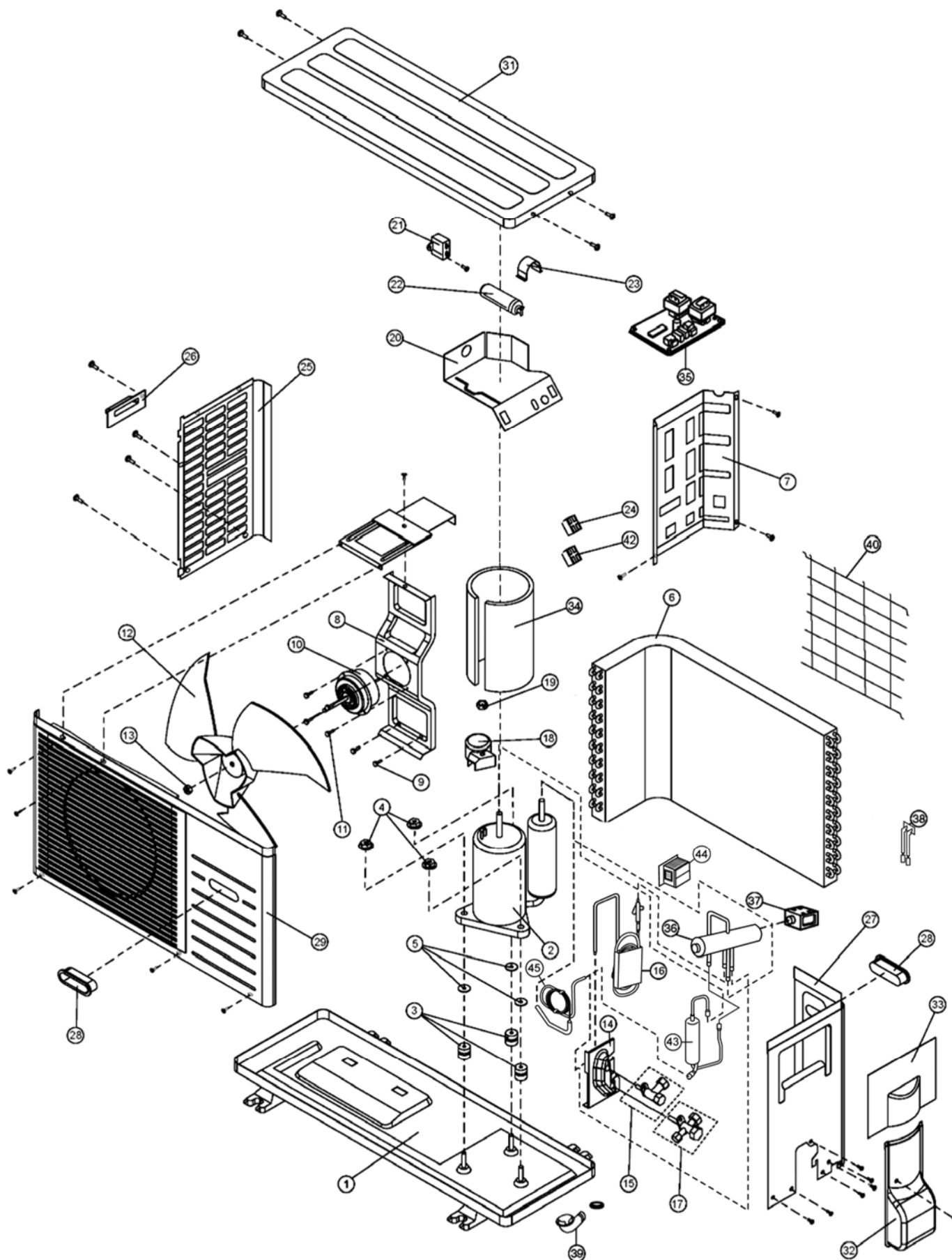
REF. NO.	PART NAME & DESCRIPTION	QTY	CU-A18MKD	CU-A24MKD	REMARK
1	CHASSIS ASS'Y	1	CWD50K2087	←	
2	COMPRESSOR	1	2JS318D3AA04	2JS438D3CC04	O
3	ANTI - VIBRATION BUSHING	3	CWH50055	←	
4	NUT - COMPRESSOR MOUNT	3	CWH561049	←	
5	PACKING	3	CWB81043	←	
6	CONDENSER	1	CWB32C2678	CWB32C2679	
7	SOUND PROOF BOARD	1	CWH151051	←	
8	FAN MOTOR BRACKET	1	CWD541055	←	
9	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
10	FAN MOTOR	1	CWA951353J	←	O
11	SCREW - FAN MOTOR MOUNT	3	CWH55252J	←	
12	PROPELLER FAN ASS'Y	1	CWH03K1017	←	
13	NUT - PROPELLER FAN	1	CWH561038J	←	
14	HOLDER COUPLING	1	CWH351036	←	
15	2-WAY VALVE (LIQUID)	1	CWB021483	←	O
16	TUBE ASS'Y (CAPILLARY TUBE & CHECK VALVE)	1	CWT01C4945	CWT01C4944	
17	3-WAY VALVE (GAS)	1	CWB011212	←	O
18	TERMINAL COVER	1	CWH171012	←	
19	NUT - TERMINAL COVER	1	CWH7080300J	←	
20	CONTROL BOARD	1	CWH102206	←	
21	CAPACITOR - F.M	1	DS441355NPQA	←	O
22	CAPACITOR - COM.	1	CWA312079	←	O
23	HOLDER CAPACITOR	1	CWH30060	←	
24	TERMINAL BOARD ASS'Y	1	CWA28K1070J	←	
25	CABINET SIDE PLATE (L)	1	CWE041255A	←	
26	HANDLE	1	CWE161010	←	
27	CABINET SIDE PLATE (R)	1	CWE041083A	←	
28	HANDLE	2	CWE16000E	←	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1043	←	
31	CABINET TOP PLATE ASS'Y	1	CWE03K1009A	←	
32	CONTROL BOARD COVER (BOTTOM)	1	CWH131168	←	
33	CONTROL BOARD COVER (TOP)	1	CWH131169A	←	
34	SOUND PROOF MATERIAL	1	CWG302221	←	
35	ELECTRONIC CONTROLLER	1	CWA743367	←	
36	4-WAY VALVE	1	CWB001026J	←	
37	V-COIL COMPLETE	1	CWA43C2121J	←	
38	SENSOR COMPLETE	1	CWA50C2396	←	
40	WIRE NET	1	CWD041041A	←	

(Note)

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

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

18.2.4 CU-A28MKD



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-A28MKD	REMARK
1	CHASSIS ASSY	1	CWD50K2087	
2	COMPRESSOR	1	2JD514E3AA03	O
3	ANTI-VIBRATION BUSHING	3	CWH50055	
4	NUT-COMPRESSOR MOUNT	3	CWH561049	
5	PACKING	1	CWB81043	
6	CONDENSER	1	CWB32C2681	
7	SOUND PROOF BOARD	1	CWH151056	
8	FAN MOTOR BRACKET	1	CWD541055	
9	SCREW - FAN MOTOR BRACKET	2	CWH551217	
10	FAN MOTOR	1	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	CWT01C4697	
17	3 WAYS VALVE (GAS)	1	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	DS441606CPNA	O
23	HOLDER-CAPACITOR	1	CWH30071	
24	TERMINAL BOARD ASSY	1	CWA28K1058J	
25	CABINET SIDE PLATE(L)	1	CWE041082A	
26	HANDLE	1	CWE161010	
27	CABINET SIDE PLATE(R)	1	CWE041100A	
28	HANDLE	2	CWE16000E	
29	CABINET FRONT PLATE CO.	1	CWE06K1045	
31	CABINET TOP PLATE	1	CWE03K1011A	
32	CONTROL BOARD COVER (BOTTOM)	1	CWH131168	
33	CONTROL BOARD COVER (TOP)	1	CWH131169A	
34	SOUND PROOF MATERIAL	1	CWG302230	
35	ELECTRONIC CONTROLLER - MAIN	1	CWA743378	
36	4 WAYS VALVE	1	CWB001046	
37	V-COIL COMPLETE (4-WAYS VALVE)	1	CWA43C2321	
38	SENSOR COMPLETE (COMP. DISC.)	1	CWA50C2396	
39	ACCESSORY CO.(DRAIN ELBOW)	1	CWG87C900	
40	WIRE NET	1	CWD041041A	
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)

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