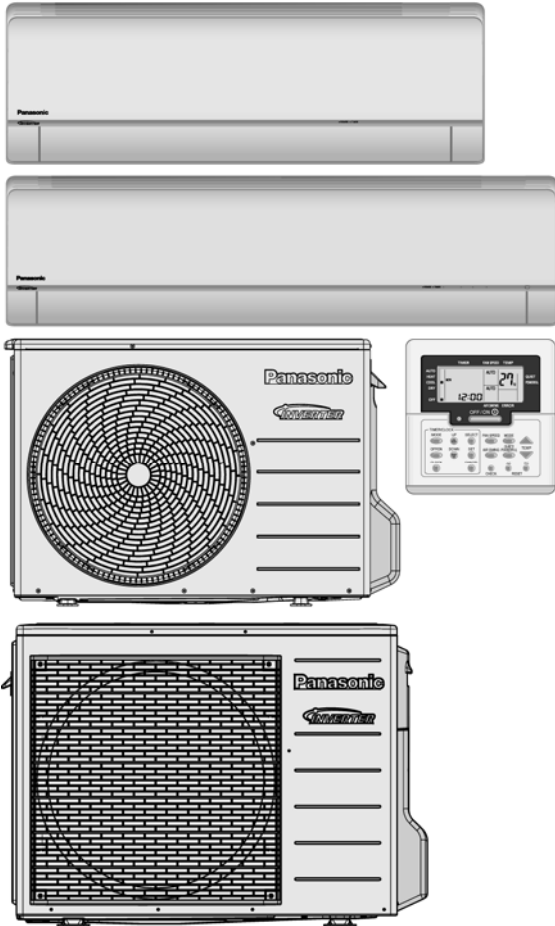


# Service Manual

## Air Conditioner



**Indoor Unit**  
**CS-E9PKEA**  
**CS-E12PKEA**  
**CS-E15PKEA**  
**CS-E18PKEA**


**Outdoor Unit**  
**CU-E9PKEA**  
**CU-E12PKEA**  
**CU-E15PKEA**  
**CU-E18PKEA**

**Destination**  
**Europe**

### WARNING

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

### IMPORTANT SAFETY NOTICE

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

### PRECAUTION OF LOW TEMPERATURE



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

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# 1. Safety Precautions







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

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


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

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

 <b>WARNING</b>	
1.	Do not modify the machine, part, material during repairing service.
2.	If wiring unit is supplied as repairing part, do not repair or connect the wire even only partial wire break. Exchange the whole wiring unit.
3.	Do not wrench the fasten terminal. Pull it out or insert it straightly.
4.	Engage dealer or specialist for installation and servicing. If installation of servicing done by the user is defective, it will cause water leakage, electrical shock or fire.
5.	Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric shock or fire.
6.	Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.
7.	Install at a strong and firm location which is able to withstand the set's weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.
8.	For electrical work, follow the local national wiring standard, regulation and the installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.
9.	This equipment is strongly recommended to install with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.
10.	Do not use joint cable for indoor / outdoor connection cable. Use the specified Indoor/Outdoor connection cable, refer to installation instruction <b>CONNECT THE CABLE TO THE INDOOR UNIT</b> 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 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.	For R410A model, use piping, flare nut and tools which is specified for R410A refrigerant. Using of existing (R22) piping, flare nut and tools may cause abnormally high pressure in the refrigerant cycle (piping), and possibly result in explosion and injury. Thickness or copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm. It is desirable that the amount of residual oil less than 40 mg/10 m. 
19.	During installation, install the refrigerant piping properly before run the compressor. (Operation of compressor without fixing refrigeration piping and valves at opened condition will caused suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc).

 **WARNING**

- |     |   |   |
|-----|---|---|
| 20. | 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.) |   |
| 21. | 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.   |   |
| 22. | Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when refrigerant contacts with fire.   |   |
| 23. | Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.  |  |
| 24. | Must not use other parts except original parts described in catalog and manual.   |   |
| 25. | Using of refrigerant other than the specified type may cause product damage, burst and injury etc.  |   |

 **CAUTION**

- |     |  |   |
|-----|--|---|
| 1.  | Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.  |    |
| 2.  | Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.  |   |
| 3.  | Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.  |   |
| 4.  | Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.  |    |
| 5.  | Select an installation location which is easy for maintenance.   |   |
| 6.  | Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F – 70°F (30°C – 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F / 600°C).  |   |
| 7.  | Power supply connection to the room air conditioner.<br>Use power supply cord 3 × 1.5 mm <sup>2</sup> (1.0 ~ 1.75HP) or 3 × 2.5 mm <sup>2</sup> (2.0HP) type designation 60245 IEC 57 or heavier cord.<br>Connect the power supply cord of the air conditioner to the mains using one of the following method.<br>Power supply point should be in easily accessible place for power disconnection in case of emergency.<br>In some countries, permanent connection of this air conditioner to the power supply is prohibited.<br>1) Power supply connection to the receptacle using power plug.<br>Use an approved 15/16A (1.0 ~ 1.75HP) or 16A (2.0HP) power plug with earth pin for the connection to the socket.<br>2) Power supply connection to a circuit breaker for the permanent connection.<br>Use an approved 16A (1.0 ~ 2.0HP) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap. |   |
| 8.  | Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigerant parts. Take care of the liquid refrigerant, it may cause frostbite.   |  |
| 9.  | Installation or servicing work: It may need two people to carry out the installation or servicing work.  |   |
| 10. | Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.  |  |
| 11. | Do not sit or step on the unit, you may fall down accidentally.  |  |
| 12. | Do not touch the sharp aluminium fins or edges of metal parts.<br>If you are required to handle sharp parts during installation or servicing, please wear hand glove.<br>Sharp parts may cause injury.   |  |

## 2. Specifications

Model		Indoor	CS-E9PKEA			
		Outdoor	CU-E9PKEA			
Performance Test Condition		EUROVENT				
Power Supply		Phase, Hz	Single, 50			
		V	230			
		Min.	Mid.	Max.		
Cooling	Capacity		kW	0.85	2.50	3.00
			BTU/h	2900	8530	10200
			Kcal/h	730	2150	2580
	Running Current		A	–	2.40	–
	Input Power		W	170	515	710
	Annual Consumption		kWh	–	258	–
	EER		W/W	5.00	4.85	4.23
			BTU/hW	17.06	16.56	14.37
			Kcal/hW	4.24	4.17	3.63
	ErP	Pdesign		kW	2.5	
		SEER		(W/W)	7.1	
		Annual Consumption		kWh	123	
		Class			A++	
	Power Factor		%	–	90	–
	Indoor Noise (H / L / QLo)		dB-A	39 / 26 / 23		
			Power Level dB	55 / –		
	Outdoor Noise (H / L)		dB-A	46 / –		
Power Level dB			61 / –			
Heating	Capacity		kW	0.85	3.40	5.40
			BTU/h	2900	11600	18400
			Kcal/h	730	2920	4640
	Running Current		A	–	3.3	–
	Input Power		W	165	700	1.31k
	COP		W/W	5.15	4.86	4.12
			BTU/hW	17.58	16.57	14.05
			Kcal/hW	4.42	4.17	3.54
	ErP	Pdesign		kW	2.8	
		Tbivalent		°C	-10	
		SCOP		(W/W)	4.4	
		Annual Consumption		kWh	891	
		Class			A+	
	Power Factor		%	–	92	–
	Indoor Noise (H / L / QLo)		dB-A	40 / 27 / 24		
			Power Level dB	56 / –		
	Outdoor Noise (H / L)		dB-A	47 / –		
Power Level dB			62 / –			
Low Temp. : Capacity (kW) / I.Power (W) / COP		3.91 / 1.16k / 3.37				
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP		3.33 / 1.29k / 2.58				
Max Current (A) / Max Input Power (W)		7.8 / 1.74k				
Starting Current (A)		3.3				

Model			Indoor	CS-E9PKEA		
			Outdoor	CU-E9PKEA		
Compressor	Type			Hermetic Motor (Rotary)		
	Motor Type			Brushless (4 poles)		
	Output Power		W	900		
Indoor Fan	Type			Cross-Flow Fan		
	Material			ASG33		
	Motor Type			DC / Transistor (8-poles)		
	Input Power		W	44.9		
	Output Power		W	40		
	Speed	QLo	Cool	rpm	630	
			Heat	rpm	690	
		Lo	Cool	rpm	700	
			Heat	rpm	740	
		Me	Cool	rpm	880	
			Heat	rpm	910	
		Hi	Cool	rpm	1060	
			Heat	rpm	1080	
	SHi	Cool	rpm	1120		
		Heat	rpm	1150		
Outdoor Fan	Type			Propeller Fan		
	Material			PP		
	Motor Type			DC (8-poles)		
	Input Power		W	-		
	Output Power		W	40		
	Speed	Hi	Cool	rpm	840	
			Heat	rpm	800	
Moisture Removal			L/h (Pt/h)	1.5 (3.2)		
Indoor Airflow	QLo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	7.45 (263)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	8.26 (292)		
	Lo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	8.40 (297)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	8.94 (316)		
	Me	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	10.83 (382)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	11.24 (397)		
	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	13.3 (470)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.6 (515)		
SHi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.90 (526)			
	Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.44 (545)			
Outdoor Airflow	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	31.3 (1105)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	29.7 (1050)		
Refrigeration Cycle	Control Device			Expansion Valve		
	Refrigerant Oil		cm <sup>3</sup>	FV50S (450)		
	Refrigerant Type		g (oz)	R410A, 1.10k (38.8)		
Dimension	Height (I/D / O/D)		mm (inch)	295 (11-5/8) / 622 (24-1/2)		
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 824 (32-15/32)		
	Depth (I/D / O/D)		mm (inch)	255 (10-1/16) / 299 (11-25/32)		
Weight	Net (I/D / O/D)		kg (lb)	10 (22) / 36 (79)		

Model		Indoor	CS-E9PKEA	
		Outdoor	CU-E9PKEA	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)	
	Standard length	m (ft)	5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different	m (ft)	5.0 (16.4)	
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)	
	Length for Additional Gas	m (ft)	7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.7	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	Fin Type		Slit Fin	
	Row × Stage × FPI		2 × 17 × 19	
	Size (W × H × L)	mm	636.5 × 357 × 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium	
	Fin Type		Corrugated Fin	
	Row × Stage × FPI		2 × 28 × 17	
	Size (W × H × L)	mm	36.4 × 588 × 606.6	
Air Filter	Material		Polypropelene	
	Type		One-touch	
Power Supply			Indoor	
Power Supply Cord		A	Nil	
Thermostat			Electronic Contol	
Protection Device			Electronic Contol	
			Dry Bulb	Wet Bulb
Indoor Operation Range	Cooling	Maximum °C	32	23
		Minimum °C	16	11
	Heating	Maximum °C	30	–
		Minimum °C	16	–
Outdoor Operation Range	Cooling	Maximum °C	43	26
		Minimum °C	-15	–
	Heating	Maximum °C	24	18
		Minimum °C	-15	–

- 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)
- 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)
- Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
- Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
- Standby power consumption ≤0.7w (when switched OFF by remote control, except under self protection control).
- Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E12PKEA			CS-E15PKEA				
		Outdoor	CU-E12PKEA			CU-E15PKEA				
Performance Test Condition			EUROVENT			EUROVENT				
Power Supply		Phase, Hz	Single, 50			Single, 50				
		V	230			230				
			Min.	Mid.	Max.	Min.	Mid.	Max.		
Cooling	Capacity		kW	0.85	3.50	4.00	0.98	4.20	5.00	
			BTU/h	2900	11900	13600	3340	14300	17100	
			Kcal/h	730	3010	3440	840	3610	4300	
	Running Current		A	-	3.8	-	-	5.4	-	
	Input Power		W	170	870	1.12k	280	1.20k	1.58k	
	Annual Consumption		kWh	-	435	-	-	600	-	
	EER		W/W	5.00	4.02	3.57	3.50	3.50	3.16	
			BTU/hW	17.06	13.68	12.14	11.93	11.92	10.82	
			Kcal/hW	4.29	3.46	3.07	3.00	3.01	2.72	
	ErP	Pdesign	kW	3.5			4.2			
		SEER	(W/W)	6.7			6.3			
		Annual Consumption	kWh	183			233			
		Class		A++			A++			
	Power Factor		%	-	95	-	-	97	-	
	Indoor Noise (H / L / QLo)		dB-A	42 / 29 / 26			43 / 32 / 29			
			Power Level dB	58 / -			59 / -			
	Outdoor Noise (H / L)		dB-A	48 / -			46 / -			
			Power Level dB	63 / -			61 / -			
	Heating	Capacity		kW	0.85	4.00	6.60	0.98	5.40	7.10
				BTU/h	2900	13600	22500	3340	18400	24200
Kcal/h				730	3440	5680	840	4640	6110	
Running Current		A	-	4.2	-	-	6.5	-		
Input Power		W	165	920	1.82k	340	1.44k	2.19k		
COP		W/W	5.15	4.35	3.63	2.88	3.75	3.24		
		BTU/hW	17.58	14.78	12.36	9.82	12.78	11.05		
		Kcal/hW	4.42	3.74	3.12	2.47	3.22	2.79		
ErP		Pdesign	kW	3.6			3.6			
		Tbivalent	°C	-10			-10			
		SCOP	(W/W)	4.1			3.9			
		Annual Consumption	kWh	1229			1292			
		Class		A+			A			
Power Factor		%	-	95	-	-	96	-		
Indoor Noise (H / L / QLo)		dB-A	42 / 33 / 30			43 / 35 / 29				
		Power Level dB	58 / -			59 / -				
Outdoor Noise (H / L)		dB-A	50 / -			46 / -				
		Power Level dB	65 / -			61 / -				
Low Temp. : Capacity (kW) / I.Power (W) / COP			4.78 / 1.61k / 2.97			5.14 / 1.94k / 2.65				
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP			4.07 / 1.70k / 2.39			4.10 / 2.08k / 1.97				
Max Current (A) / Max Input Power (W)			8.4 / 1.85k			9.6 / 2.19k				
Starting Current (A)			4.2			6.5				



Model			Indoor	CS-E12PKEA	CS-E15PKEA	
			Outdoor	CU-E12PKEA	CU-E15PKEA	
Compressor	Type			Hermetic Motor (Rotary)	Hermetic Motor (Rotary)	
	Motor Type			Brushless (4 poles)	Brushless (4 poles)	
	Output Power		W	900	900	
Indoor Fan	Type			Cross-Flow Fan	Cross-Flow Fan	
	Material			ASG33	ASG33	
	Motor Type			DC / Transistor (8-poles)	DC / Transistor (8-poles)	
	Input Power		W	44.9	44.9	
	Output Power		W	40	40	
	Speed	QLo	Cool	rpm	710	750
			Heat	rpm	860	800
		Lo	Cool	rpm	760	760
			Heat	rpm	920	980
		Me	Cool	rpm	940	960
			Heat	rpm	1060	1110
		Hi	Cool	rpm	1120	1150
			Heat	rpm	1200	1230
	SHi	Cool	rpm	1200	1190	
		Heat	rpm	1280	1270	
Outdoor Fan	Type			Propeller Fan	Propeller Fan	
	Material			PP	PP	
	Motor Type			Induction (8-poles)	DC (8-poles)	
	Input Power		W	-	-	
	Output Power		W	40	40	
	Speed	Hi	Cool	rpm	880	620
Heat			rpm	860	560	
Moisture Removal			L/h (Pt/h)	2.0 (4.2)	2.4 (5.1)	
Indoor Airflow	QLo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	8.00 (2.82)	8.50 (300)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	10.04 (355)	9.87 (349)	
	Lo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	8.68 (306)	9.59 (339)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	10.86 (383)	12.34 (436)	
	Me	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	11.13 (393)	12.06 (426)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	12.76 (451)	13.98 (494)	
	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	13.6 (480)	14.1 (500)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.7 (520)	15.0 (530)	
	SHi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.70 (519)	15.22 (537)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.75 (556)	15.63 (576)	
Outdoor Airflow	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	32.9 (1160)	34.2 (1205)	
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	32.1 (1135)	33.0 (1165)	
Refrigeration Cycle	Control Device			Expansion Valve	Expansion Valve	
	Refrigerant Oil		cm <sup>3</sup>	FV50S (450)	FV50S (450)	
	Refrigerant Type		g (oz)	R410A, 1.10k (38.8)	R410A, 1.06k (37.4)	
Dimension	Height (I/D / O/D)		mm (inch)	295 (11-5/8) / 622 (24-1/2)	295 (11-5/8) / 695 (27-3/8)	
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 824 (32-15/32)	870 (34-9/32) / 875 (34-15/32)	
	Depth (I/D / O/D)		mm (inch)	255 (10-1/16) / 299 (11-25/32)	255 (10-1/16) / 320 (12-5/8)	
Weight	Net (I/D / O/D)		kg (lb)	10 (22) / 36 (79)	10 (22) / 45 (99)	

Model		Indoor	CS-E12PKEA		CS-E15PKEA	
		Outdoor	CU-E12PKEA		CU-E15PKEA	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)		6.35 (1/4) / 12.70 (1/2)	
	Standard length	m (ft)	5.0 (16.4)		5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)		3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different	m (ft)	5.0 (16.4)		15.0 (49.2)	
	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	16.7		16.7	
	Length	mm	650		650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)		Aluminium (Pre Coat)	
	Fin Type		Slit Fin		Slit Fin	
	Row × Stage × FPI		2 × 17 × 21		2 × 17 × 17	
	Size (W × H × L)	mm	636.5 × 357 × 25.4		636.5 × 357 × 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium		Aluminium	
	Fin Type		Corrugated Fin		Corrugated Fin	
	Row × Stage × FPI		2 × 28 × 17		2 × 31 × 17	
	Size (W × H × L)	mm	36.4 × 588 × 606.6		36.4 × 651 × 640	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Indoor	
Power Supply Cord		A	Nil		Nil	
Thermostat			Electronic Contol		Electronic Contol	
Protection Device			Electronic Contol		Electronic Contol	
			Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
Indoor Operation Range	Cooling	Maximum °C	32	23	32	23
		Minimum °C	16	11	16	11
	Heating	Maximum °C	30	–	30	–
		Minimum °C	16	–	16	–
Outdoor Operation Range	Cooling	Maximum °C	43	26	43	26
		Minimum °C	-15	–	-15	–
	Heating	Maximum °C	24	18	24	18
		Minimum °C	-15	–	-15	–

- 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)
- 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)
- Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
- Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
- Standby power consumption ≤0.7w (when switched OFF by remote control, except under self protection control).
- Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E18PKEA				
		Outdoor	CU-E18PKEA				
Performance Test Condition		EUROVENT					
Power Supply		Phase, Hz	Single, 50				
		V	230				
		Min.	Mid.	Max.			
Cooling	Capacity		kW	0.98	5.00	6.00	
			BTU/h	3340	17100	20500	
			Kcal/h	840	4300	5160	
	Running Current		A	–	6.4	–	
	Input Power		W	280	1.44k	1.99k	
	Annual Consumption		kWh	–	720	–	
	EER		W/W	3.50	3.47	3.02	
			BTU/hW	11.93	11.88	10.30	
			Kcal/hW	3.00	2.99	2.59	
	ErP	Pdesign		kW	5.0		
		SEER		(W/W)	6.9		
		Annual Consumption		kWh	254		
		Class			A++		
	Power Factor		%	–	98	–	
	Indoor Noise (H / L / QLo)		dB-A	44 / 37 / 34			
			Power Level dB	60 / –			
	Outdoor Noise (H / L)		dB-A	47 / –			
			Power Level dB	61 / –			
	Heating	Capacity		kW	0.98	5.80	8.00
				BTU/h	3340	19800	27300
Kcal/h				840	4990	6880	
Running Current		A	–	6.8	–		
Input Power		W	340	1.52k	2.57k		
COP		W/W	2.88	3.82	3.11		
		BTU/hW	9.82	13.03	10.62		
		Kcal/hW	2.47	3.28	2.68		
ErP		Pdesign		kW	4.4		
		Tbivalent		°C	-10		
		SCOP		(W/W)	4.2		
		Annual Consumption		kWh	1467		
		Class			A+		
Power Factor		%	–	97	–		
Indoor Noise (H / L / QLo)		dB-A	44 / 37 / 34				
		Power Level dB	60 / –				
Outdoor Noise (H / L)		dB-A	47 / –				
		Power Level dB	61 / –				
Low Temp. : Capacity (kW) / I.Power (W) / COP				5.80 / 2.27k / 2.56			
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP				4.98 / 2.39k / 2.08			
Max Current (A) / Max Input Power (W)				11.3 / 2.57k			
Starting Current (A)				6.8			

Model			Indoor	CS-E18PKEA		
			Outdoor	CU-E18PKEA		
Compressor	Type			Hermetic Motor (Rotary)		
	Motor Type			Brushless (4 poles)		
	Output Power		W	900		
Indoor Fan	Type			Cross-Flow Fan		
	Material			ASG33		
	Motor Type			DC / Transistor (8-poles)		
	Input Power		W	94.8		
	Output Power		W	40		
	Speed	QLo	Cool	rpm	880	
			Heat	rpm	860	
		Lo	Cool	rpm	900	
			Heat	rpm	970	
		Me	Cool	rpm	1010	
			Heat	rpm	1070	
		Hi	Cool	rpm	1130	
			Heat	rpm	1180	
	SHi	Cool	rpm	1260		
		Heat	rpm	1280		
Outdoor Fan	Type			Propeller Fan		
	Material			PP		
	Motor Type			DC (8-poles)		
	Input Power		W	-		
	Output Power		W	40		
	Speed	Hi	Cool	rpm	640	
			Heat	rpm	640	
Moisture Removal			L/h (Pt/h)	2.8 (5.9)		
Indoor Airflow	QLo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.03 (495)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	13.68 (483)		
	Lo	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.08 (532)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.60 (551)		
	Me	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	16.83 (594)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	17.53 (619)		
	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	17.9 (630)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	19.3 (680)		
	SHi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	19.00 (671)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	20.30 (717)		
Outdoor Airflow	Hi	Cool	m <sup>3</sup> /min (ft <sup>3</sup> /min)	39.2 (1385)		
		Heat	m <sup>3</sup> /min (ft <sup>3</sup> /min)	37.9 (1340)		
Refrigeration Cycle	Control Device			Expansion Valve		
	Refrigerant Oil		cm <sup>3</sup>	FV50S (450)		
	Refrigerant Type		g (oz)	R410A, 1.24k (43.8)		
Dimension	Height (I/D / O/D)		mm (inch)	295 (11-5/8) / 695 (27-3/8)		
	Width (I/D / O/D)		mm (inch)	1070 (42-5/32) / 875 (34-15/32)		
	Depth (I/D / O/D)		mm (inch)	255 (10-1/16) / 320 (12-5/8)		
Weight	Net (I/D / O/D)		kg (lb)	13 (29) / 46 (101)		

Model		Indoor	CS-E18PKEA	
		Outdoor	CU-E18PKEA	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 12.70 (1/2)	
	Standard length	m (ft)	5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 20 (65.6)	
	I/D & O/D Height different	m (ft)	15.0 (49.2)	
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)	
	Length for Additional Gas	m (ft)	7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.7	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)	
	Fin Type		Slit Fin	
	Row × Stage × FPI		2 × 17 × 17	
	Size (W × H × L)	mm	836.5 × 357 × 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium	
	Fin Type		Corrugated Fin	
	Row × Stage × FPI		2 × 31 × 19	
	Size (W × H × L)	mm	36.4 × 651 × 854.5:824.5	
Air Filter	Material		Polypropelene	
	Type		One-touch	
Power Supply			Indoor	
Power Supply Cord		A	Nil	
Thermostat			Electronic Contol	
Protection Device			Electronic Contol	
			Dry Bulb	Wet Bulb
Indoor Operation Range	Cooling	Maximum °C	32	23
		Minimum °C	16	11
	Heating	Maximum °C	30	–
		Minimum °C	16	–
Outdoor Operation Range	Cooling	Maximum °C	43	26
		Minimum °C	-15	–
	Heating	Maximum °C	24	18
		Minimum °C	-15	–

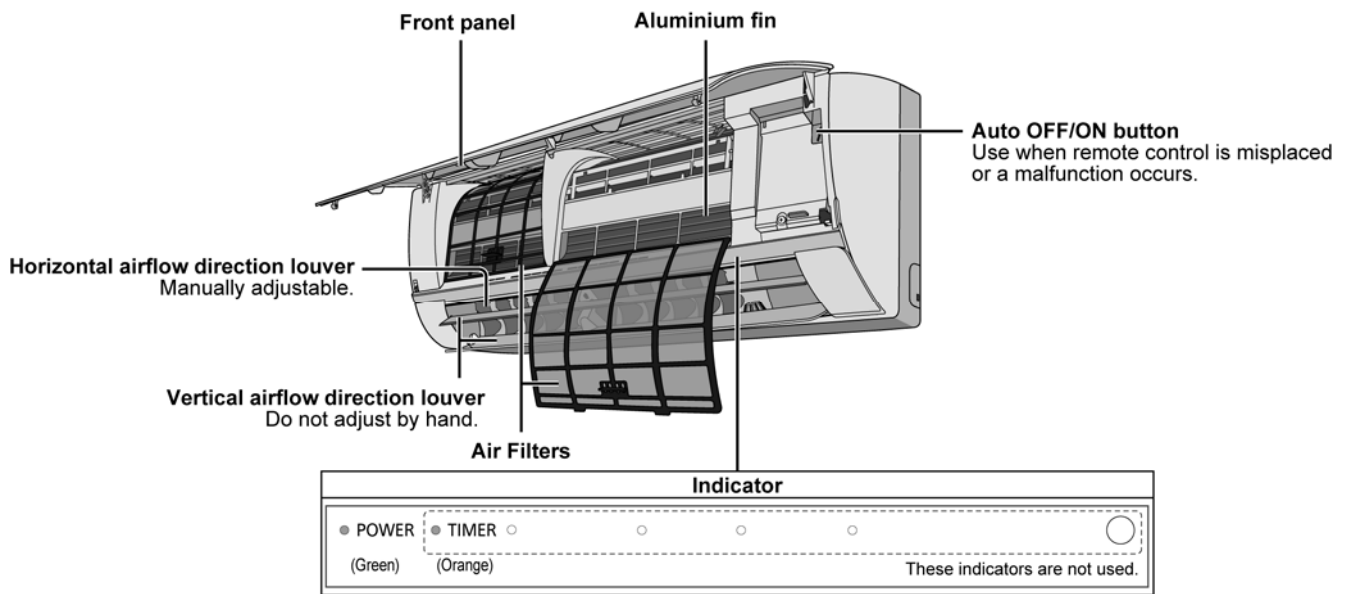
- Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
- Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
- Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
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- Standby power consumption ≤0.7w (when switched OFF by remote control, except under self protection control).
- Specifications are subjected to change without prior notice for further improvement.

### 3. Features

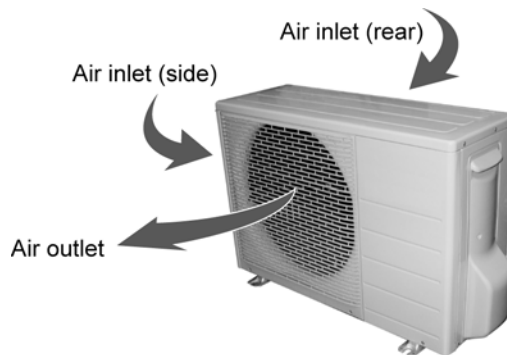
- **Inverter Technology**
  - Wider output power range
  - Energy saving
  - Quick Cooling
  - Quick Heating
  - More precise temperature control
- **Environment Protection**
  - Non-ozone depletion substances refrigerant (R410A)
- **Long Installation Piping**
  - Long piping up to 15 meters (0.75 ~ 1.75HP) and 20 meters (2.0 ~ 2.25HP)
- **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
- **Operation Improvement**
  - Quiet mode to reduce the indoor unit operating sound
  - Powerful mode to reach the desired room temperature quickly
  - 24-hour timer setting
- **Serviceability Improvement**
  - Breakdown Self Diagnosis function

## 4. Location of Controls and Components

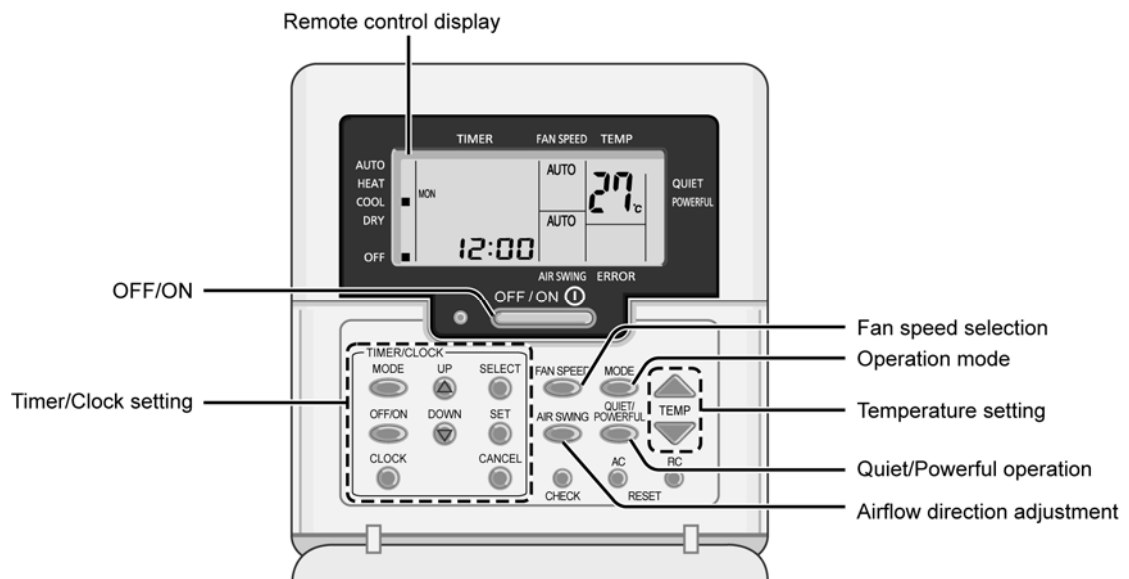
### 4.1 Indoor Unit



### 4.2 Outdoor Unit



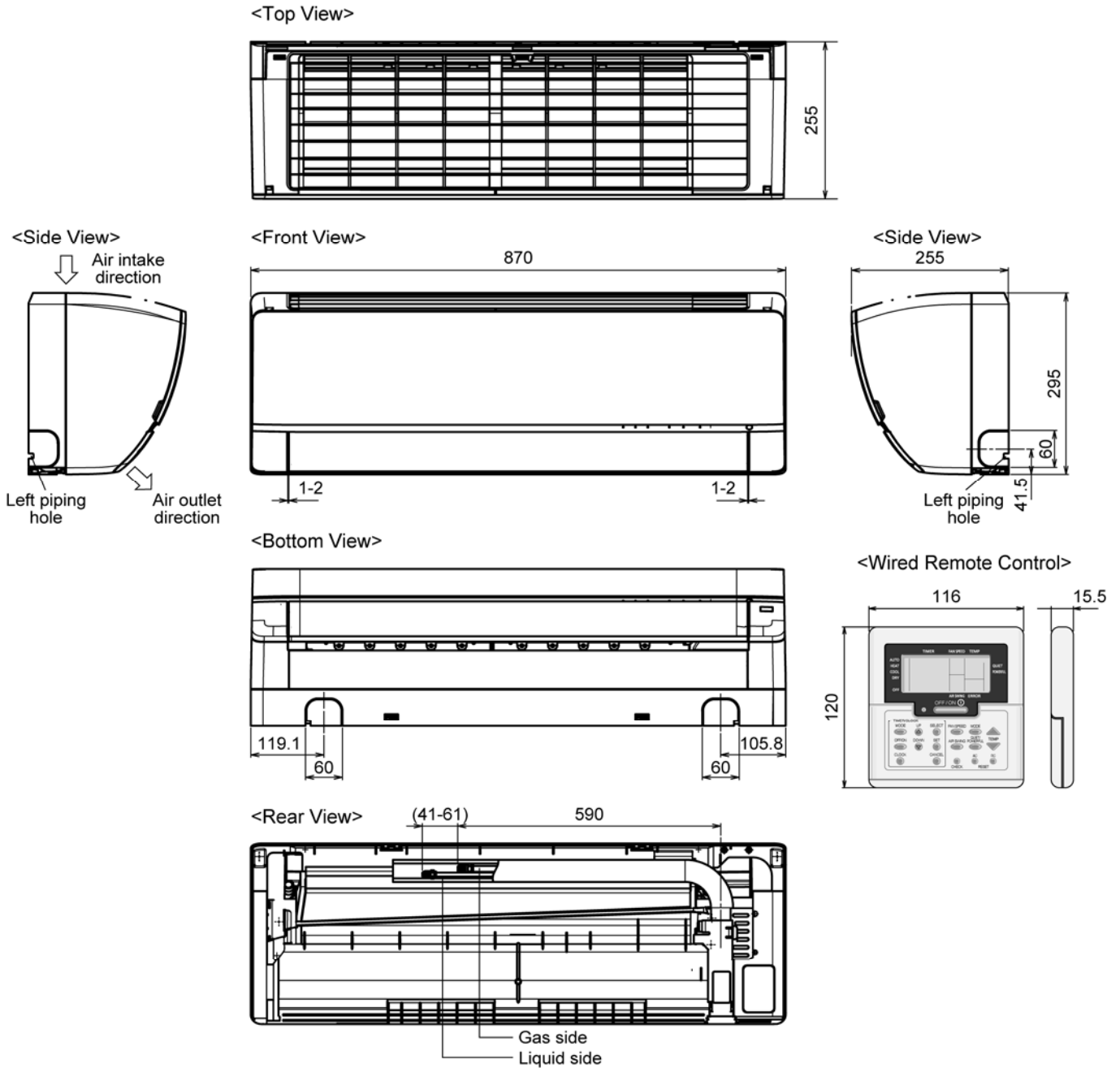
### 4.3 Remote Control



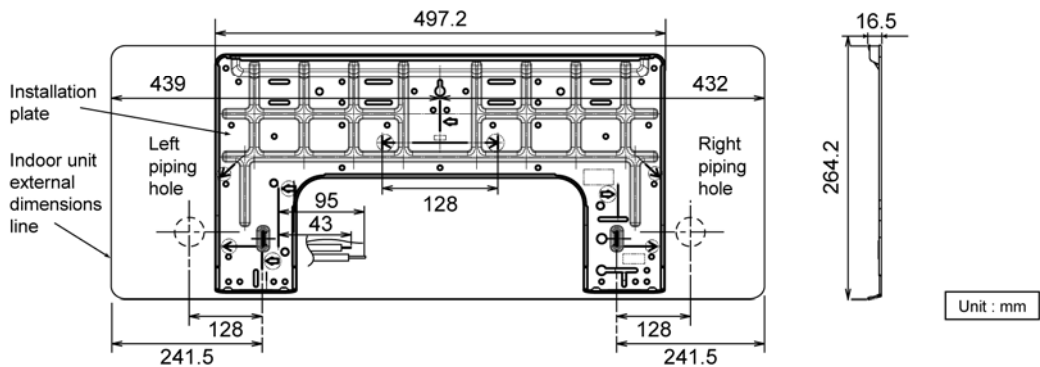
# 5. Dimensions

## 5.1 Indoor Unit

### 5.1.1 CS-E9PKEA CS-E12PKEA CS-E15PKEA

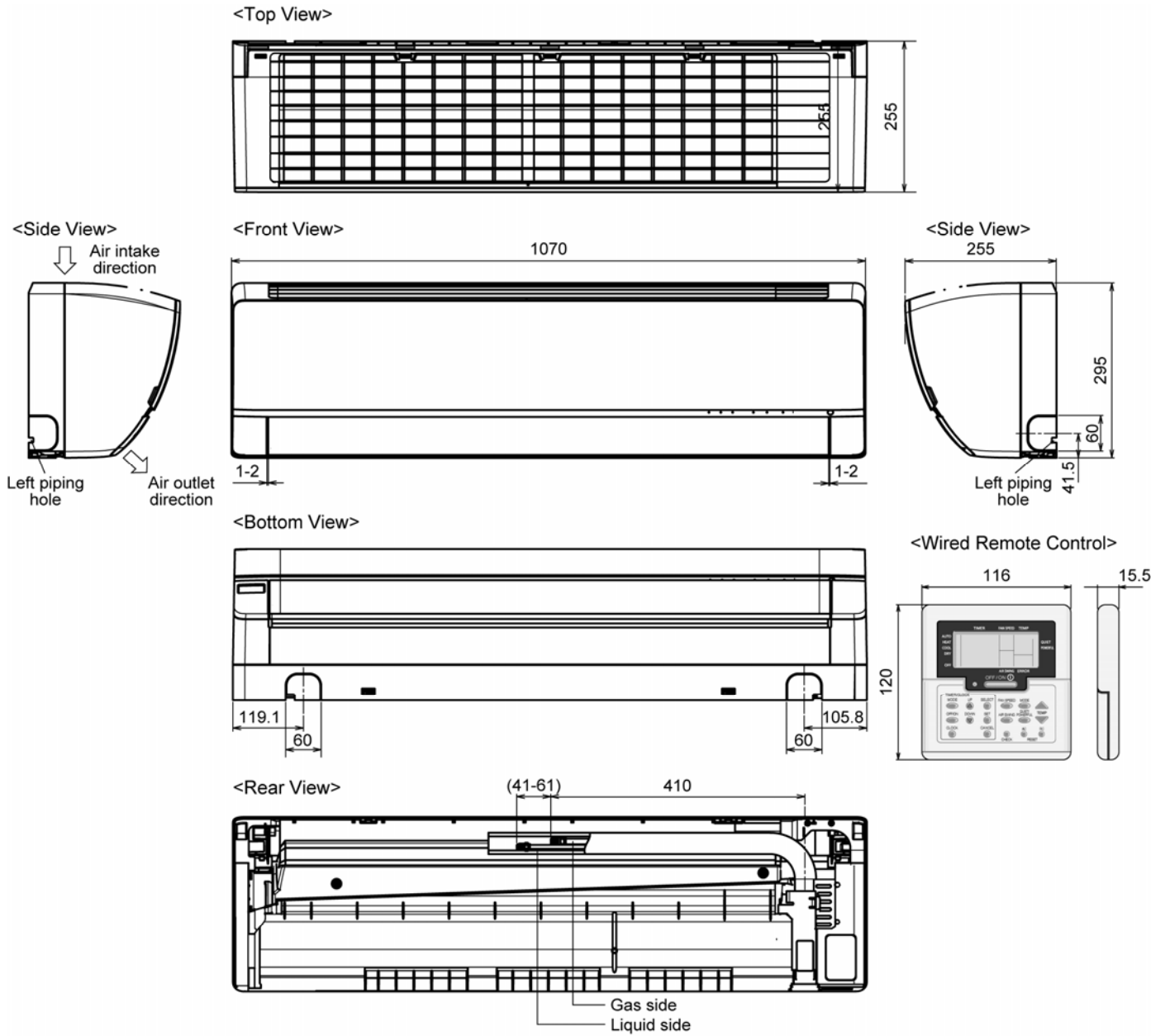


Relative position between the indoor unit and the installation plate <Front View>

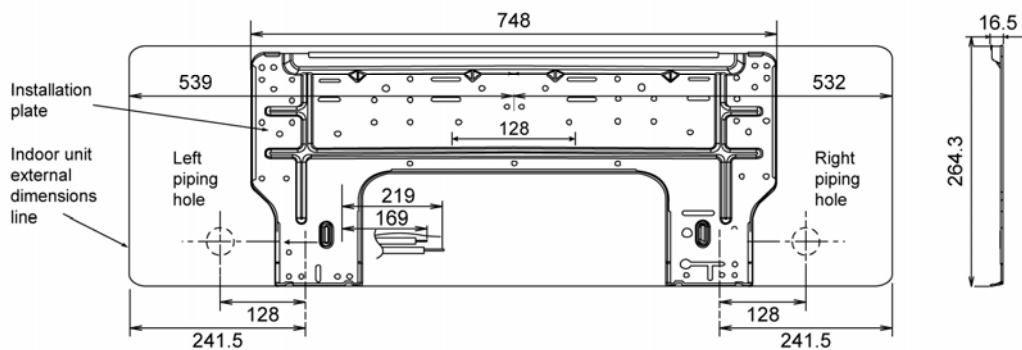




## 5.1.2 CS-E18PKEA

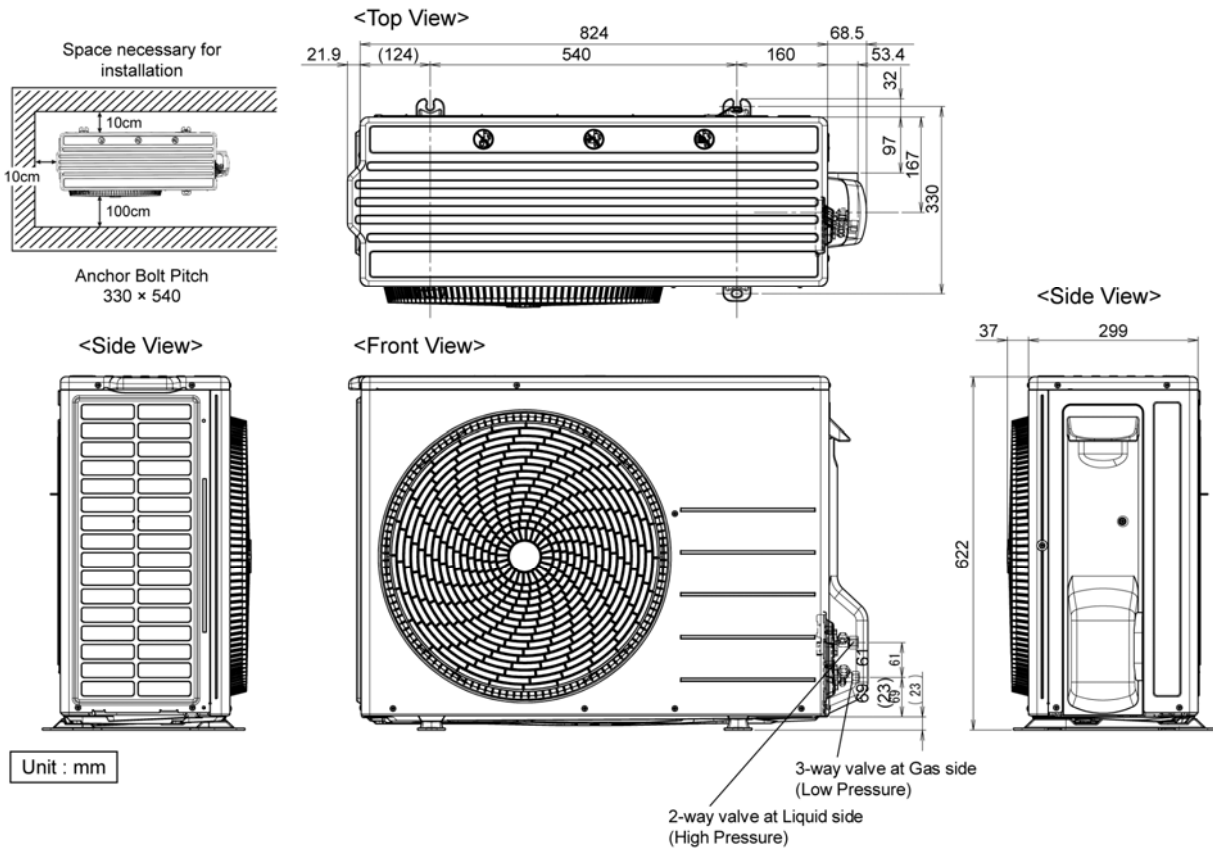


Relative position between the indoor unit and the installation plate <Front View>

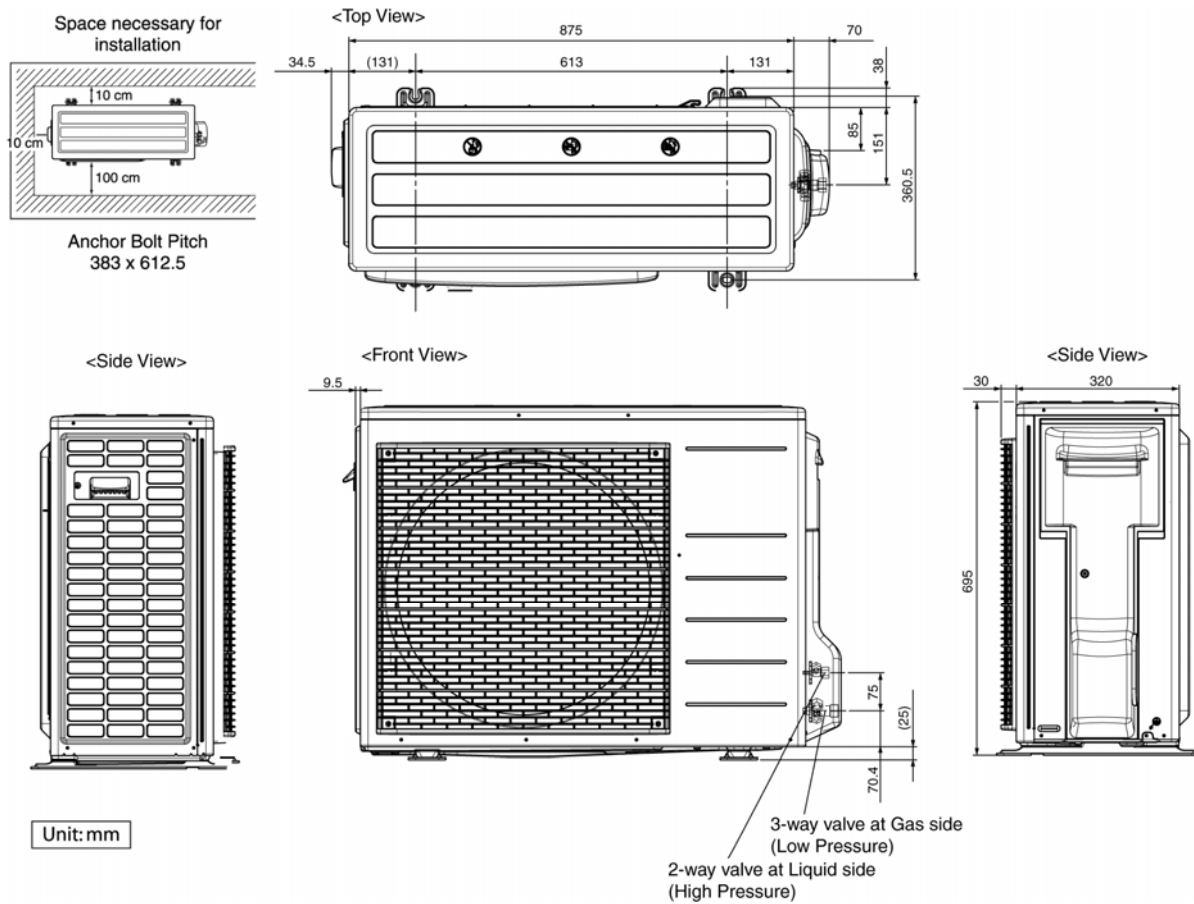


## 5.2 Outdoor Unit

### 5.2.1 CU-E9PKEA CU-E12PKEA

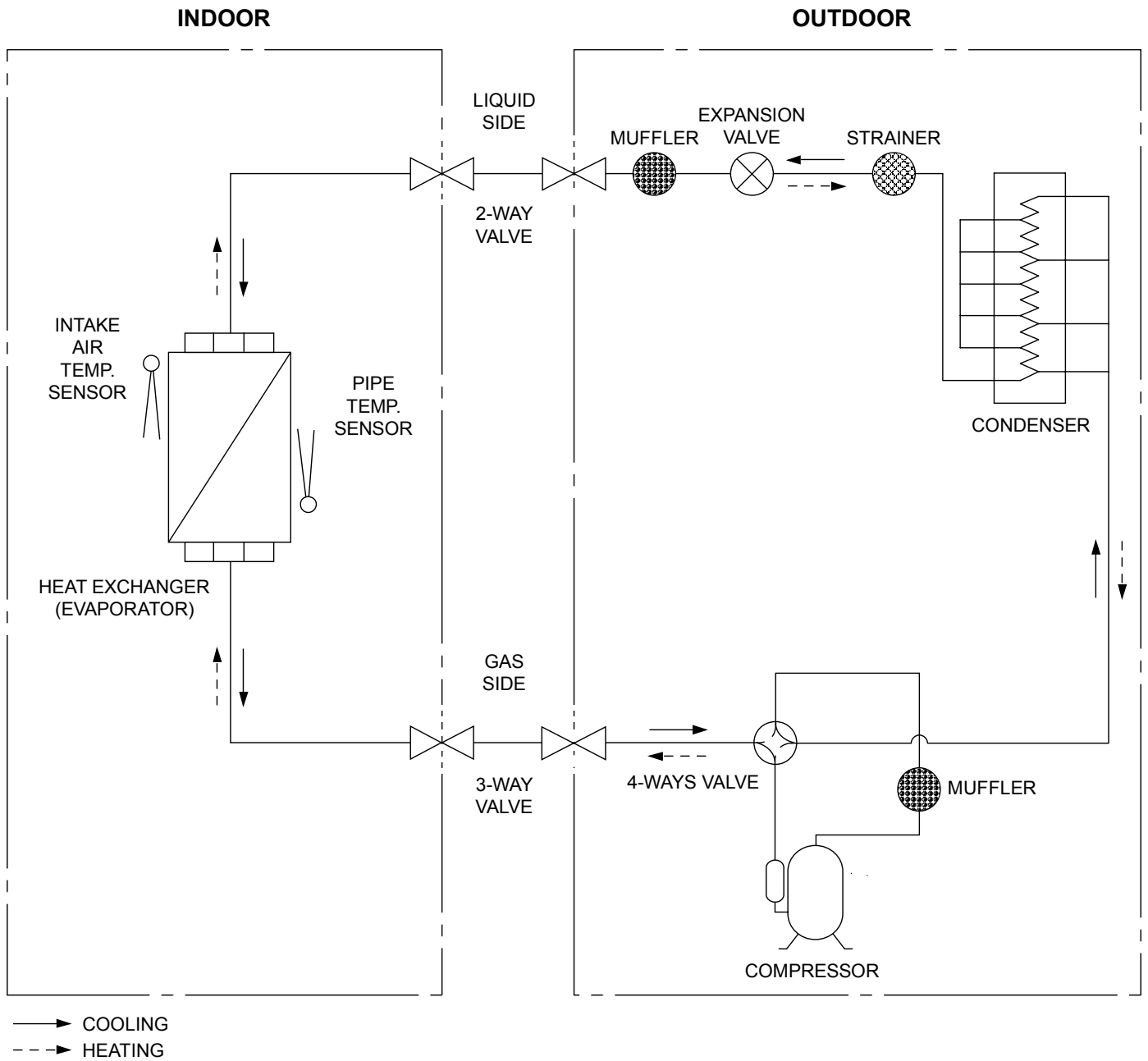


### 5.2.2 CU-E15PKEA CU-E18PKEA

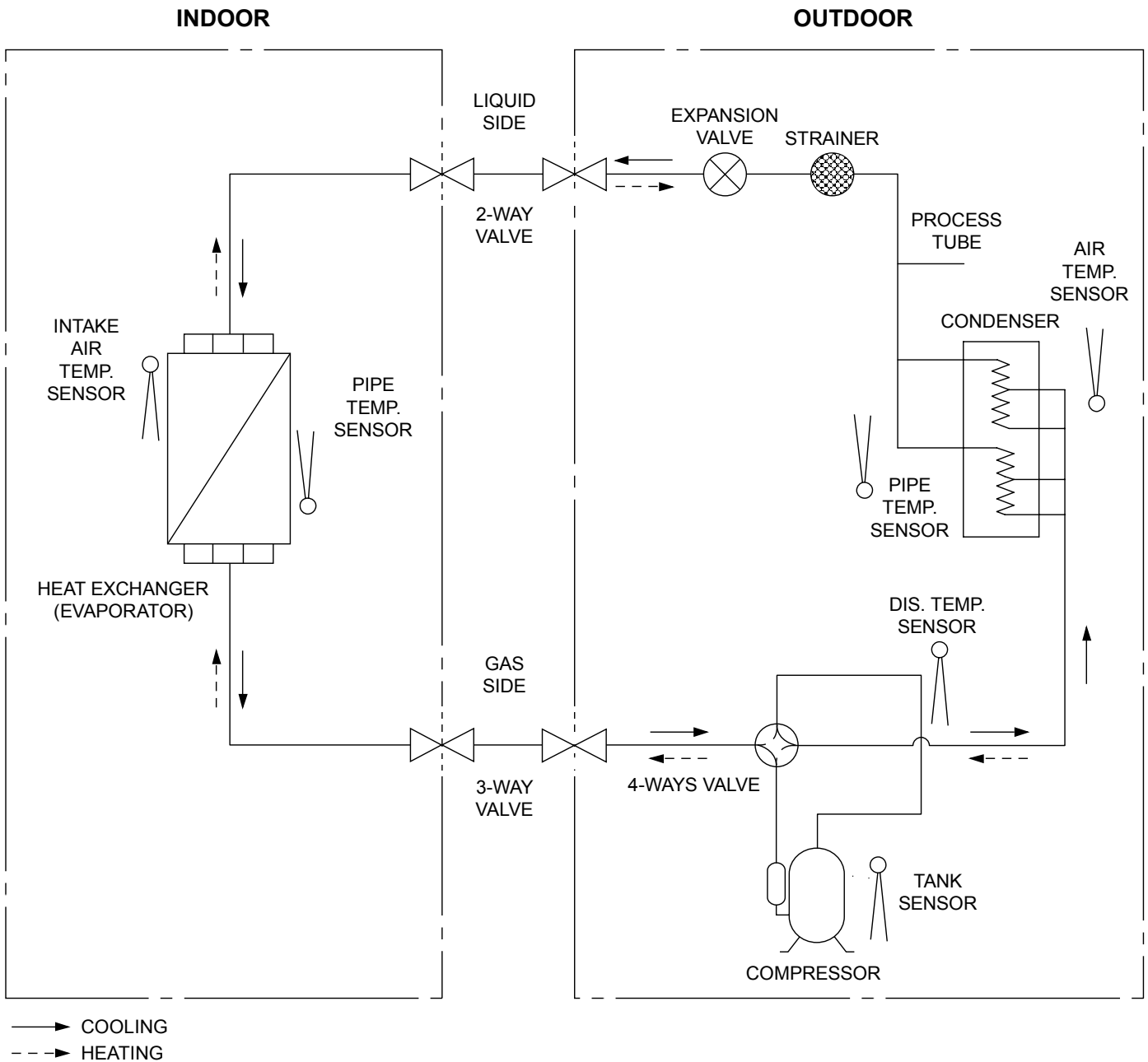


# 6. Refrigeration Cycle Diagram

## 6.1 CU-E9PKEA CU-E12PKEA

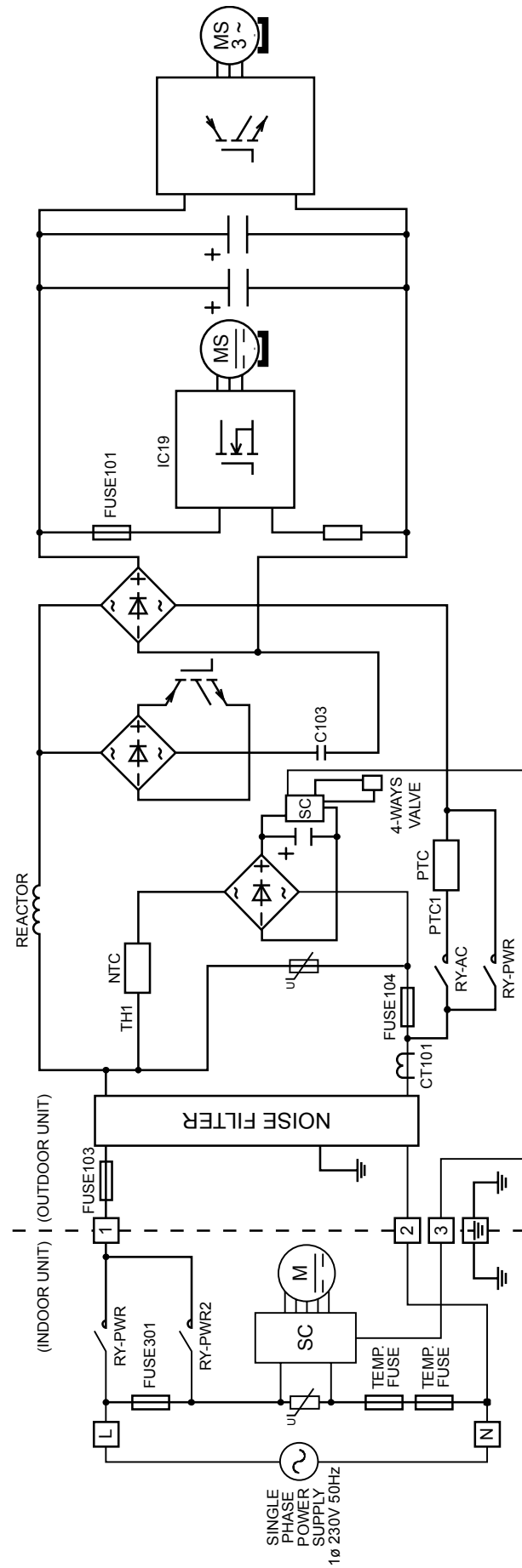


## 6.2 CU-E15PKEA CU-E18PKEA

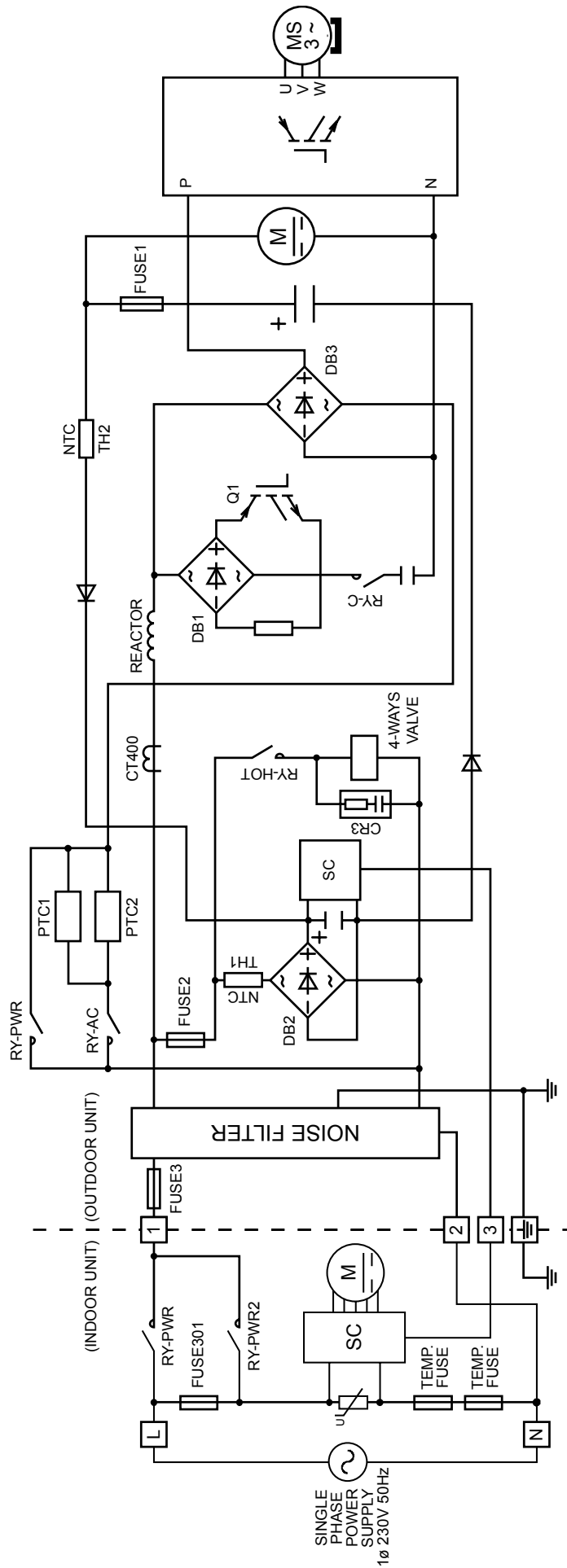


# 7. Block Diagram

## 7.1 CS-E9PKEA CU-E9PKEA CS-E12PKEA CU-E12PKEA

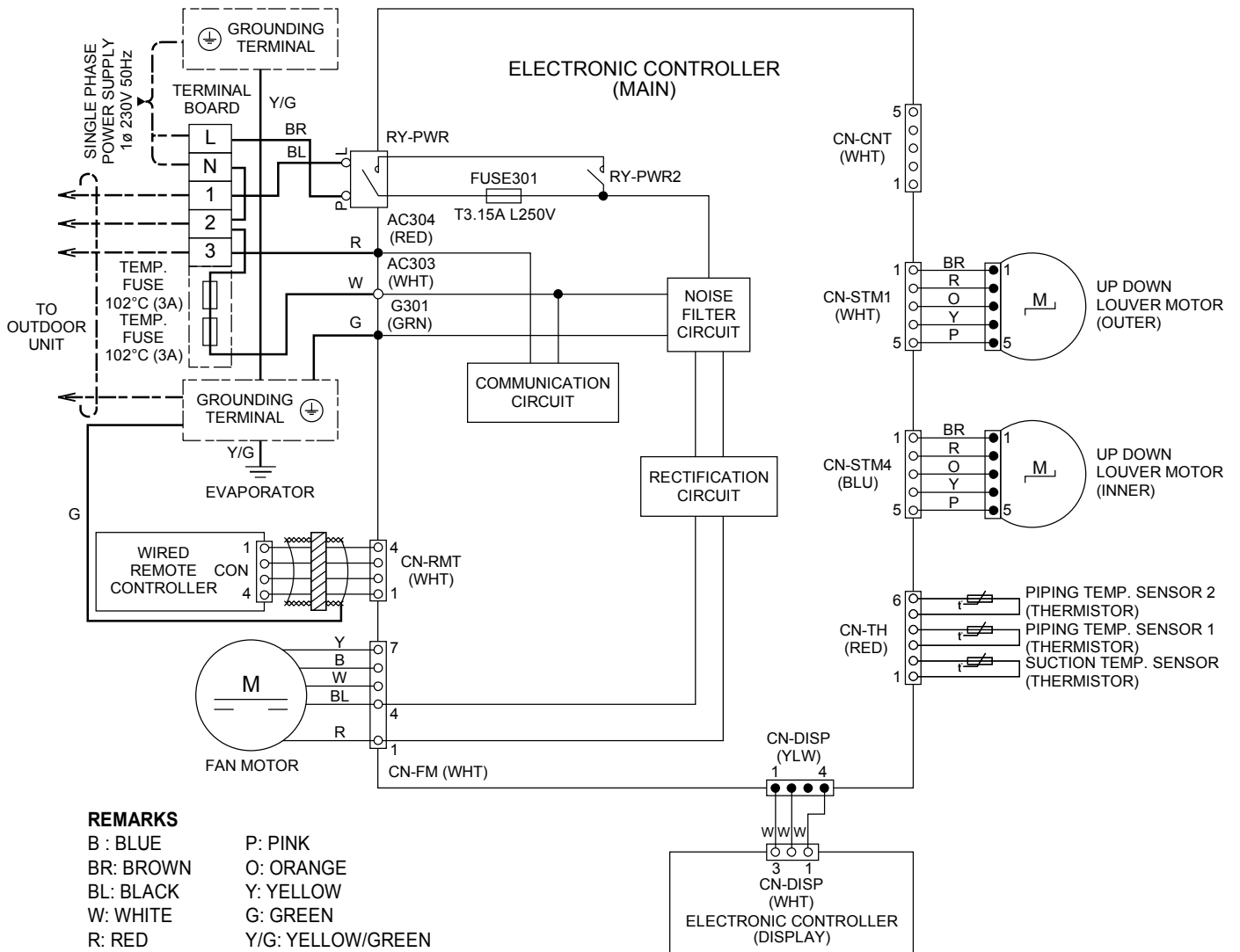


## 7.2 CS-E15PKEA CU-E15PKEA CS-E18PKEA CU-E18PKEA



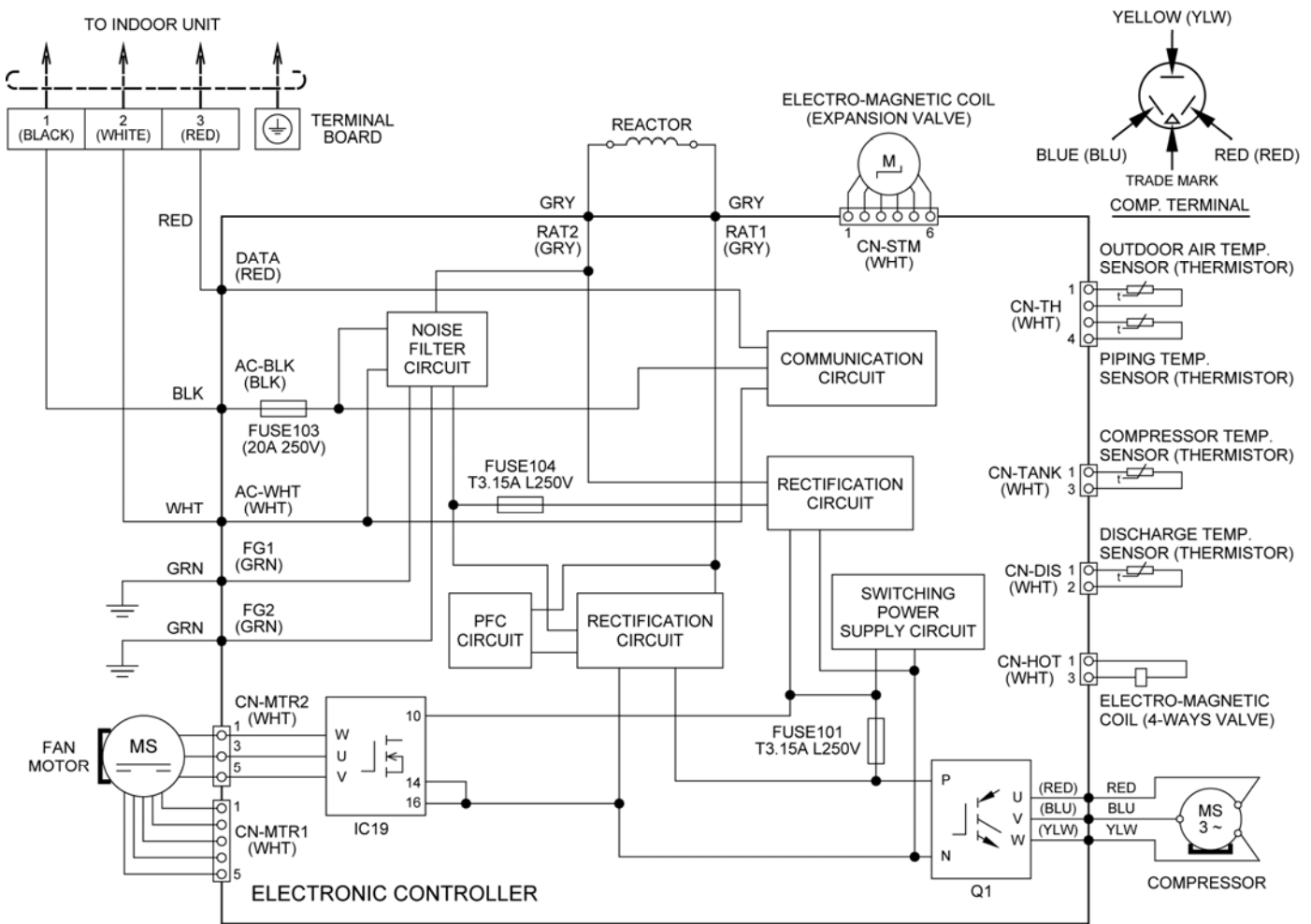
# 8. Wiring Connection Diagram

## 8.1 Indoor Unit



## 8.2 Outdoor Unit

### 8.2.1 CU-E9PKEA CU-E12PKEA



#### REMARKS

BLACK: (BLK) BLUE: (BLU) WHITE: (WHT) RED: (R) YELLOW: (YLW) GRAY: (GRY)  
GREEN: (GRN) BROWN: (BRW) ORANGE: (ORG) YELLOW/GREEN: (YLW/GRN)

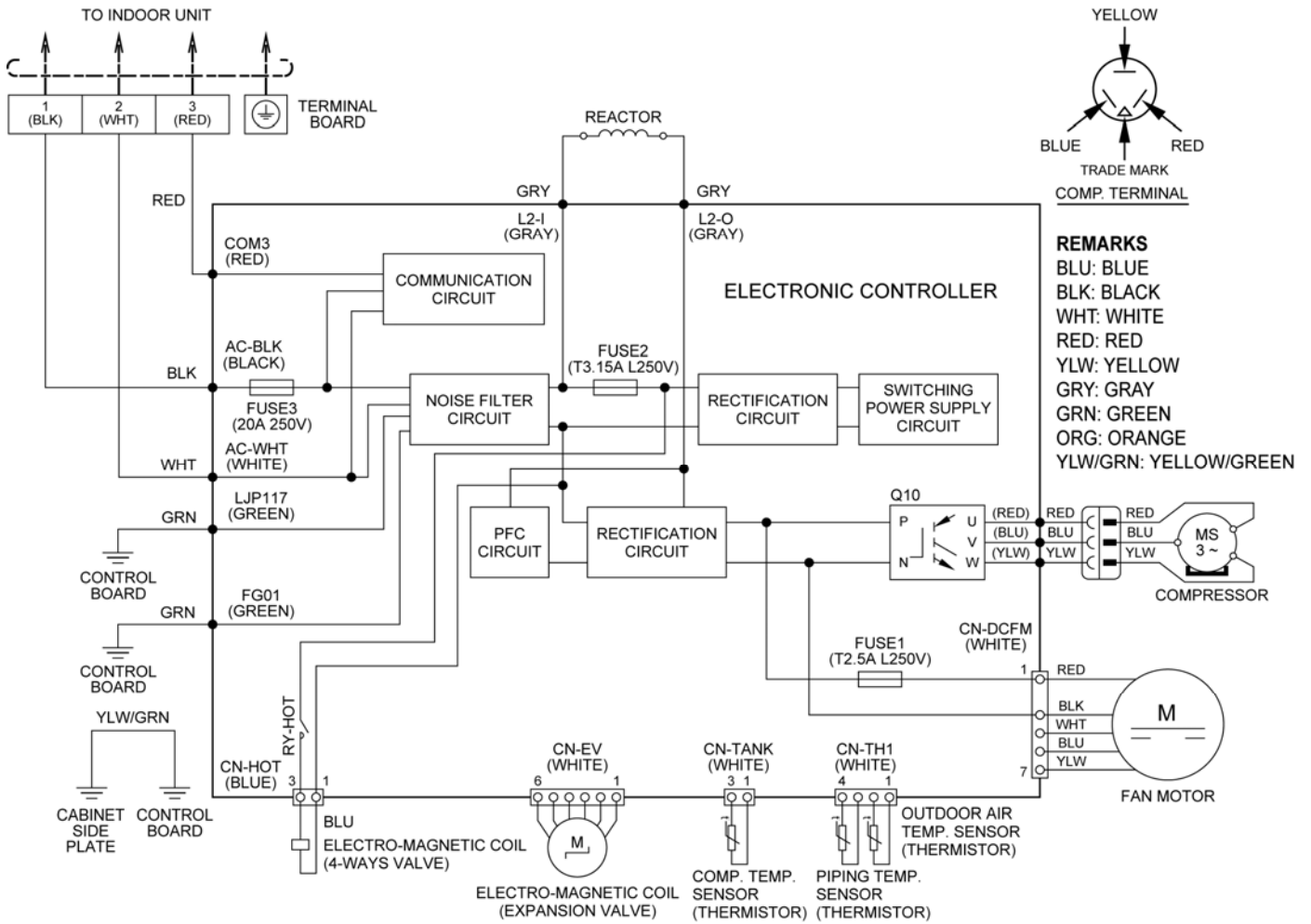
#### Resistance of Compressor Windings

MODEL	CU-E9PKEA / CU-E12PKEA
CONNECTION	5RD102XBE21 (Ω)
U-V	1.897
U-W	1.907
V-W	1.882

Note: Resistance at 20°C of ambient temperature.



## 8.2.2 CU-E15PKEA CU-E18PKEA



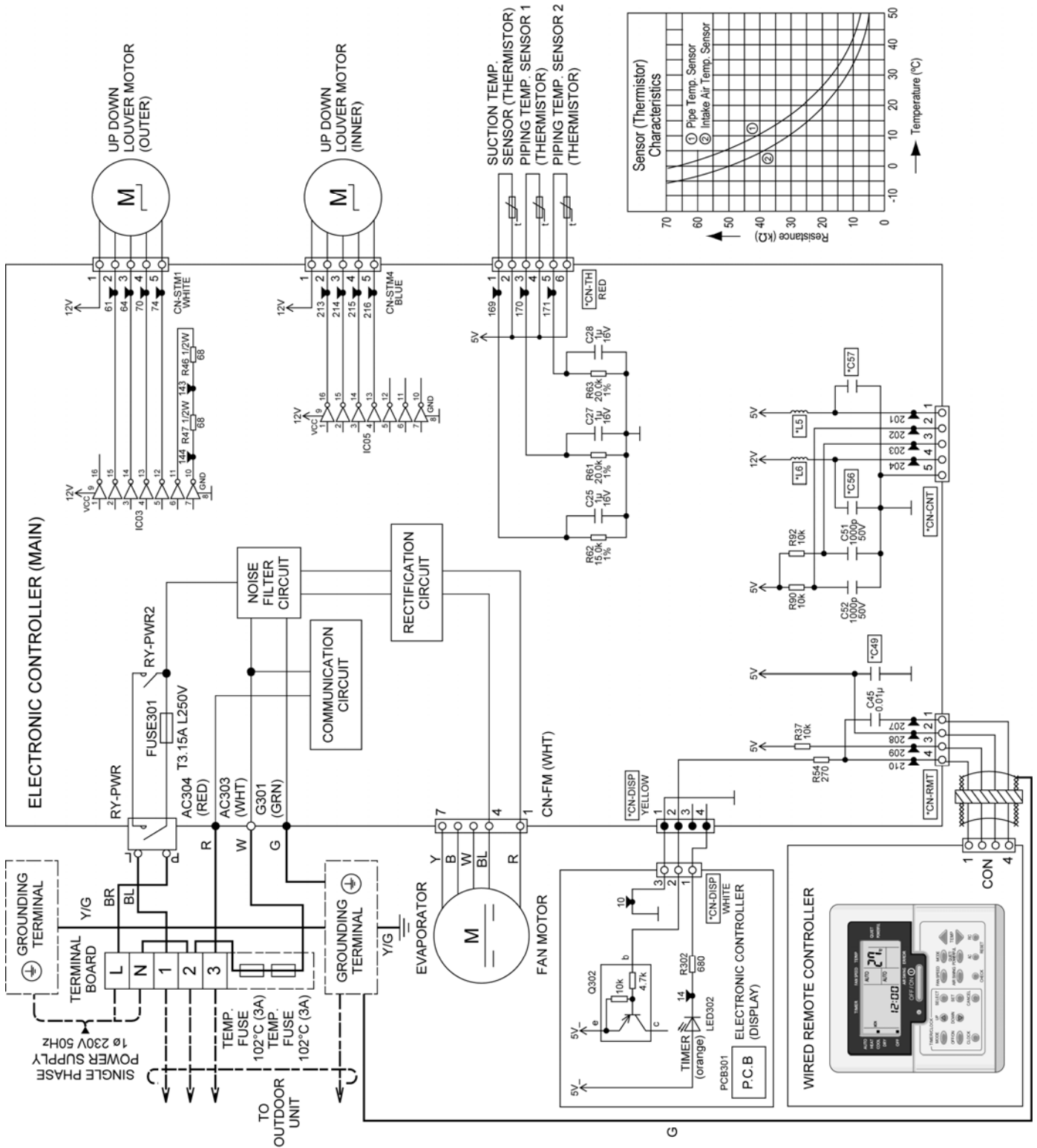
Resistance of Compressor Windings

MODEL	CU-E15PKEA / CU-E18PKEA
CONNECTION	5RD132XBA21 ( $\Omega$ )
U-V	1.897
U-W	1.907
V-W	1.882

Note: Resistance at 20°C of ambient temperature.

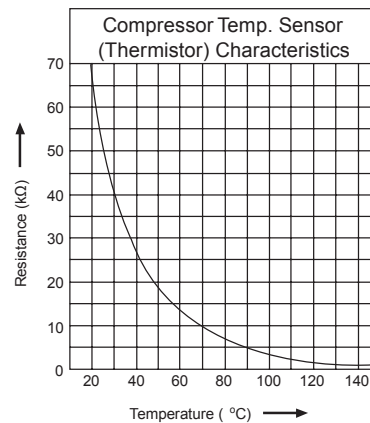
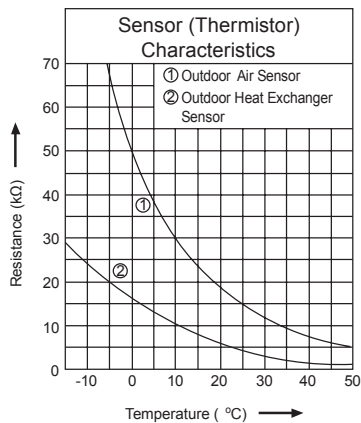
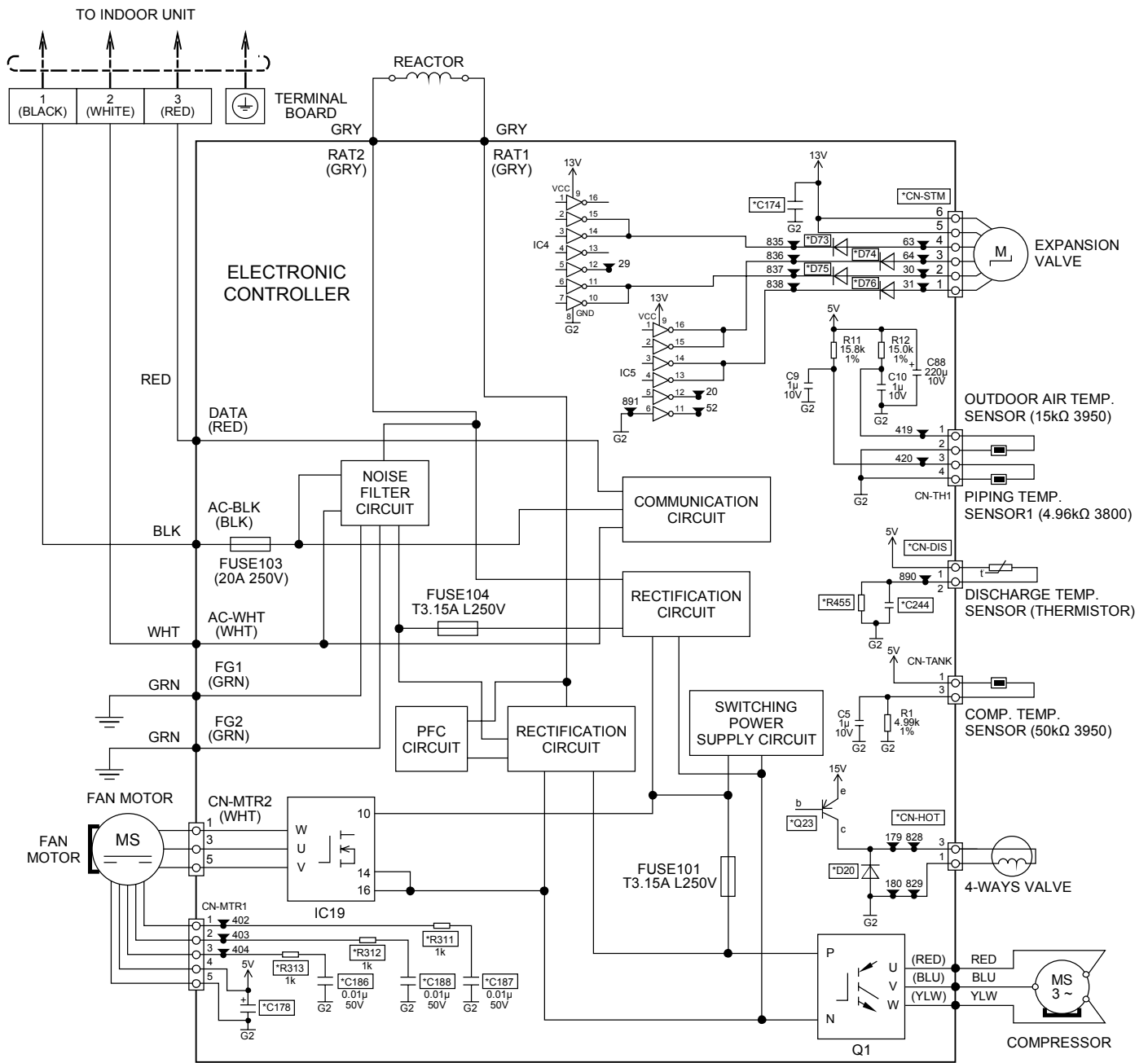
# 9. Electronic Circuit Diagram

## 9.1 Indoor Unit

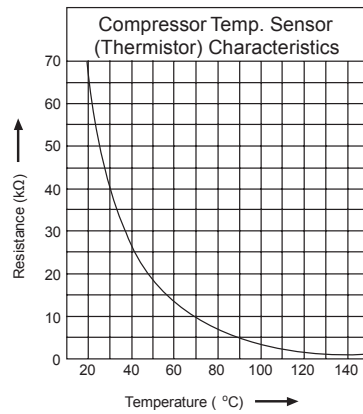
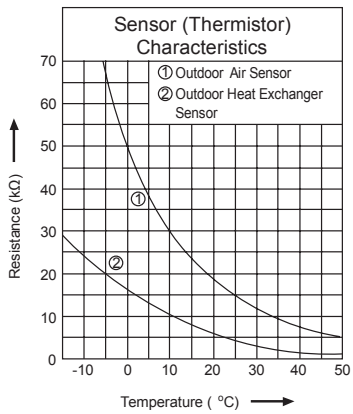
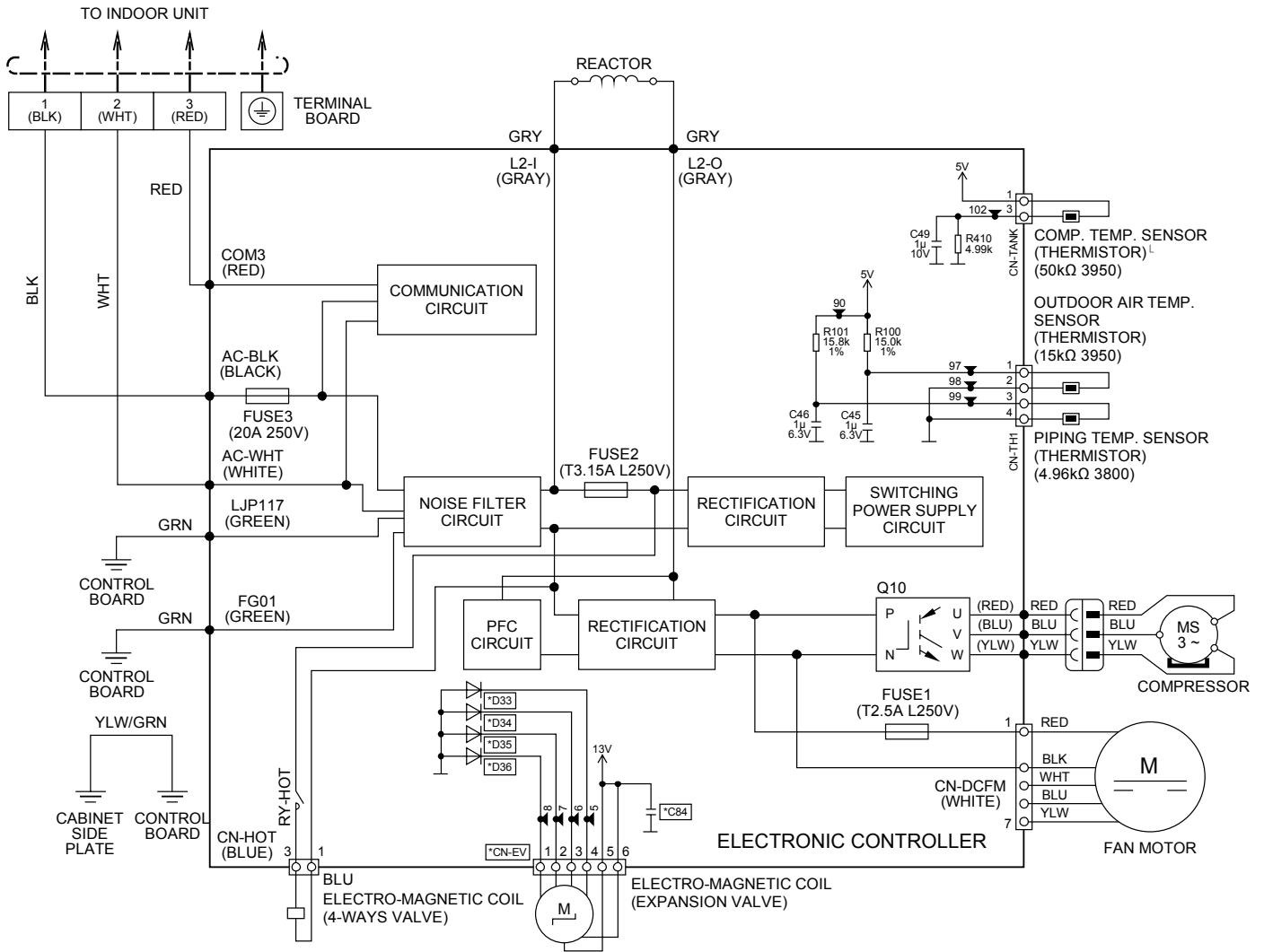


## 9.2 Outdoor Unit

### 9.2.1 CU-E9PKEA CU-E12PKEA



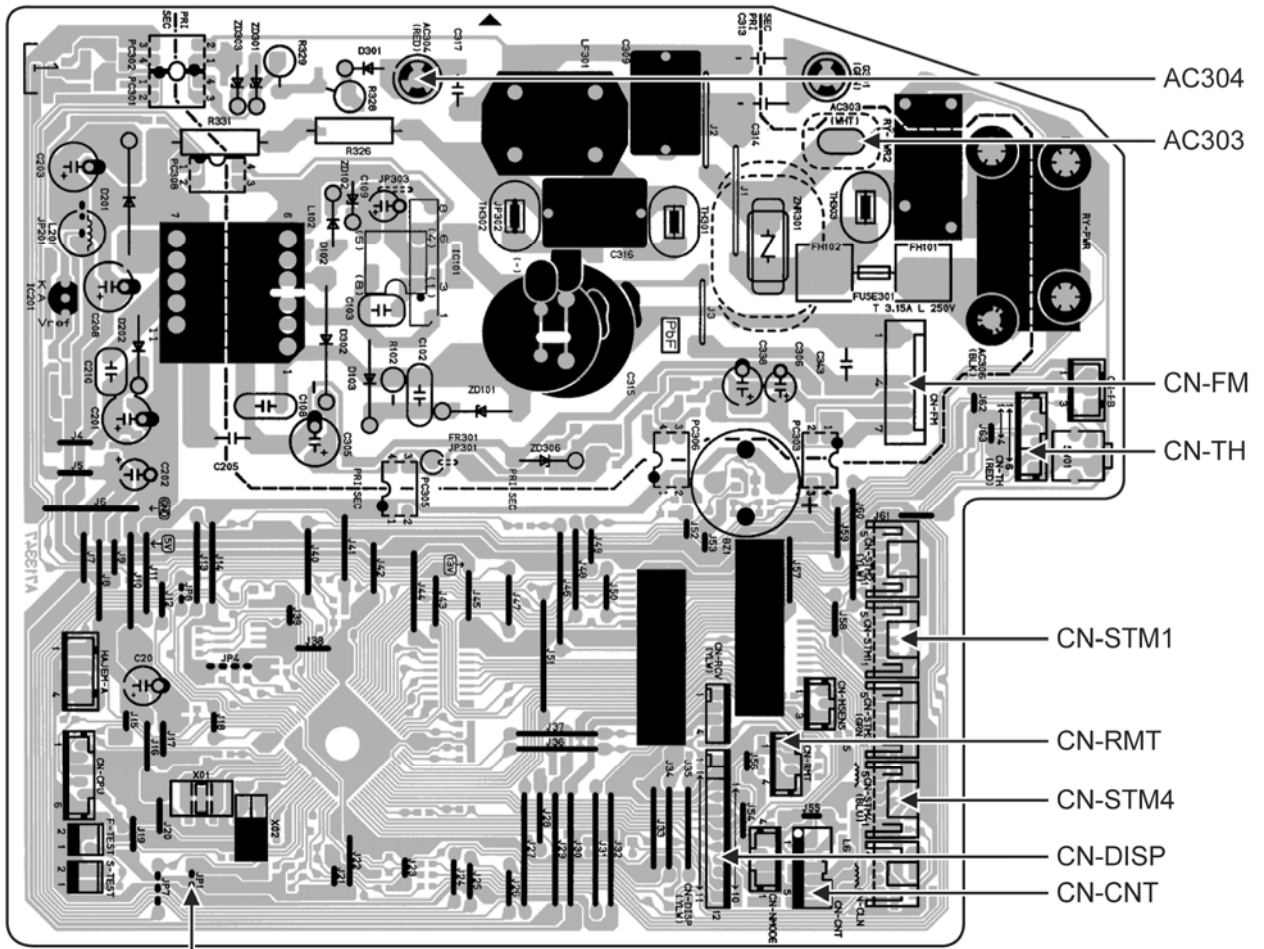
## 9.2.2 CU-E15PKEA CU-E18PKEA



# 10. Printed Circuit Board

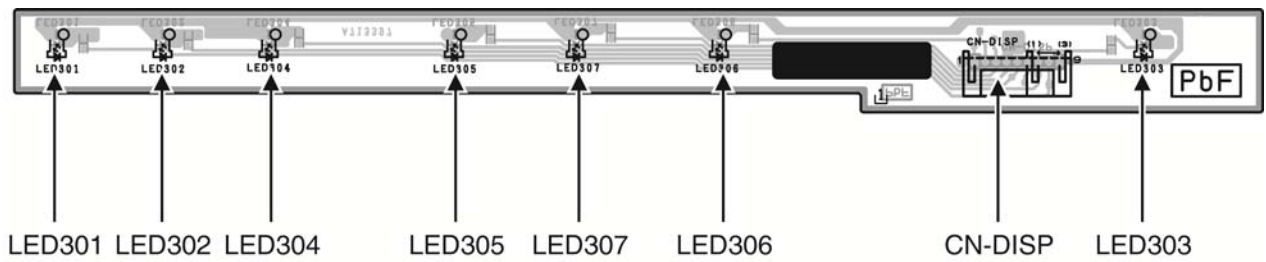
## 10.1 Indoor Unit

### 10.1.1 Main Printed Circuit Board



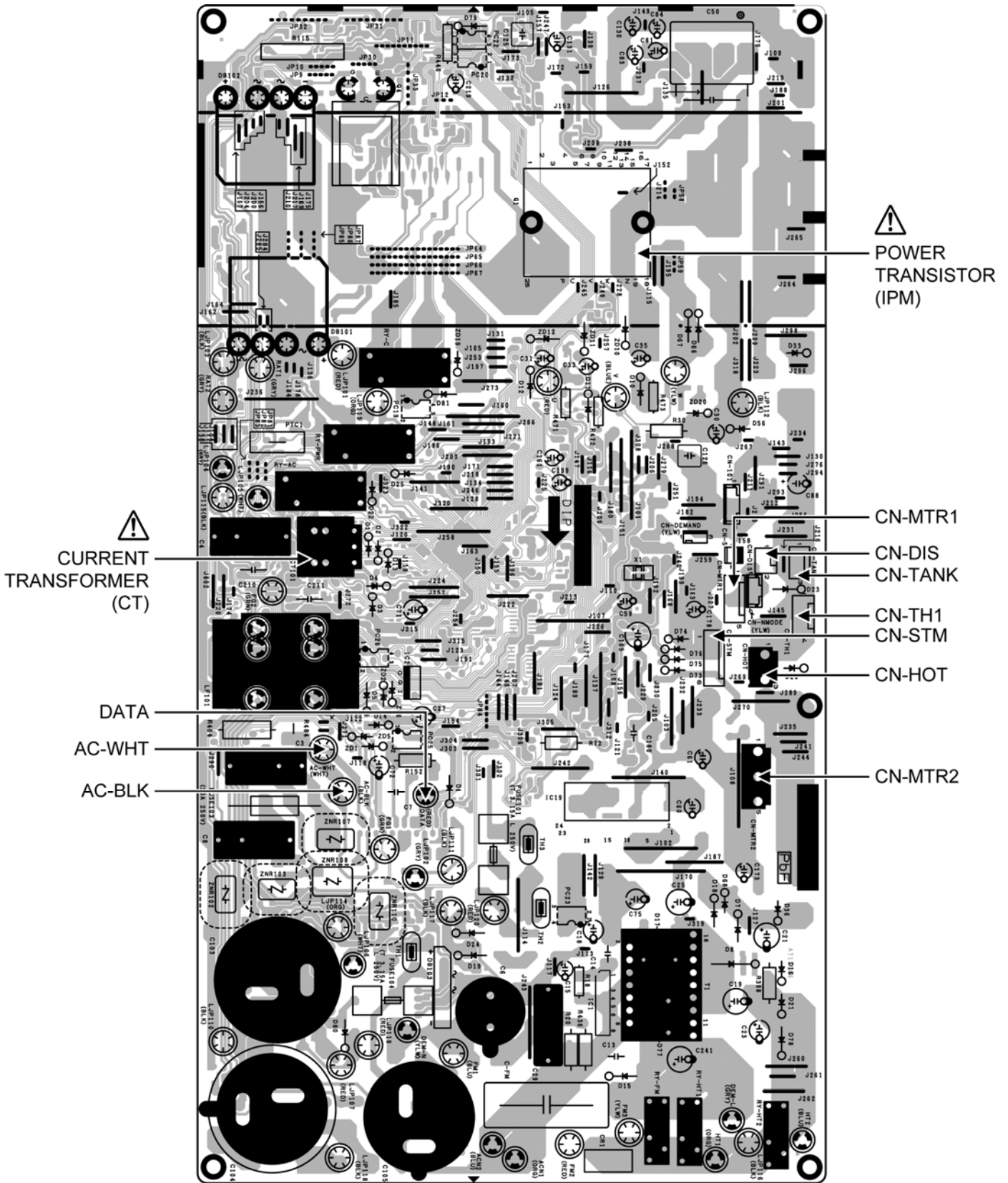
JP1 (Random Auto Restart enable/disable)

### 10.1.2 Indicator Printed Circuit Board

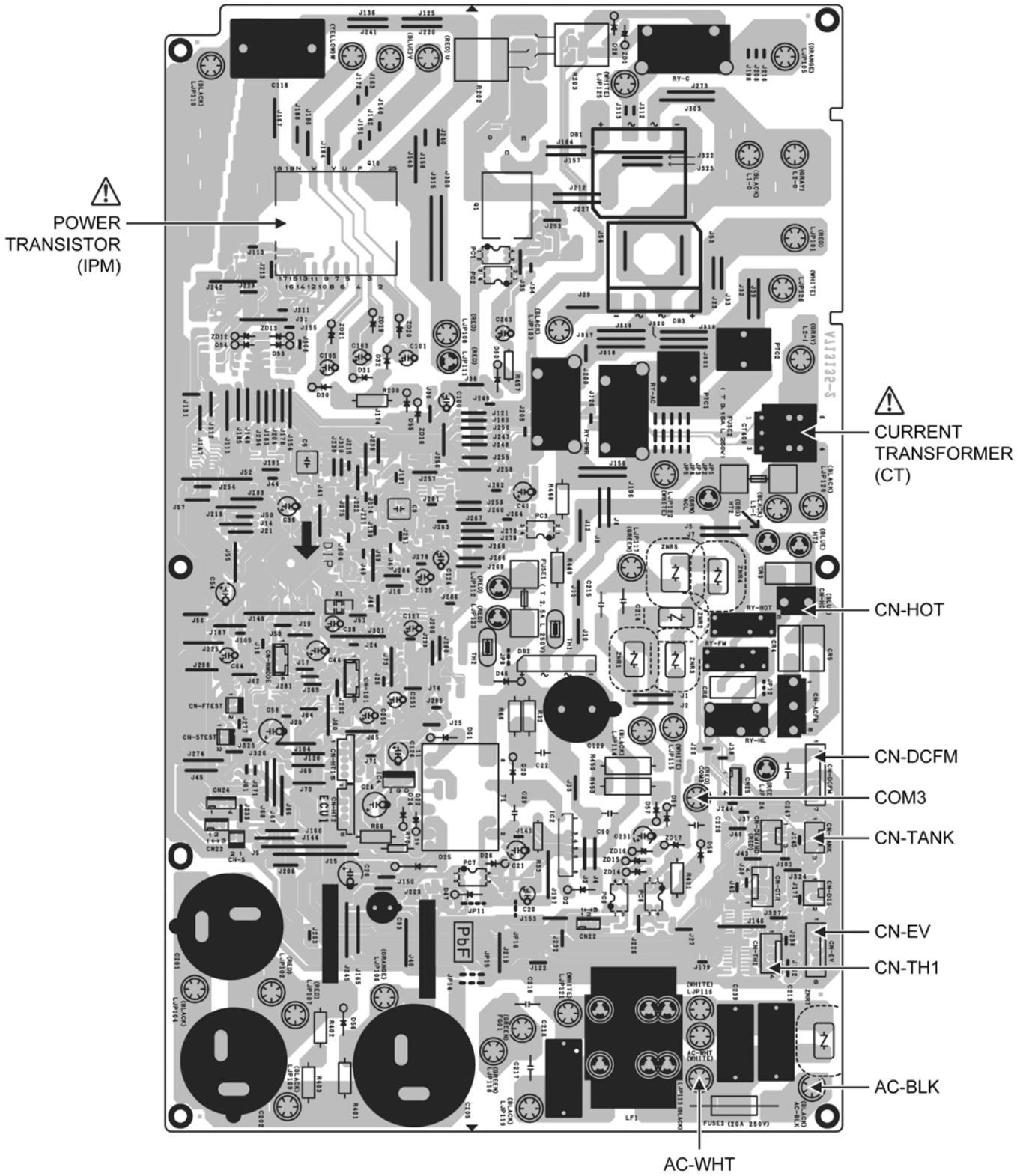


## 10.2 Outdoor Unit

### 10.2.1 CU-E9PKEA CU-E12PKEA



10.2.2 CU-E15PKEA CU-E18PKEA



# 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

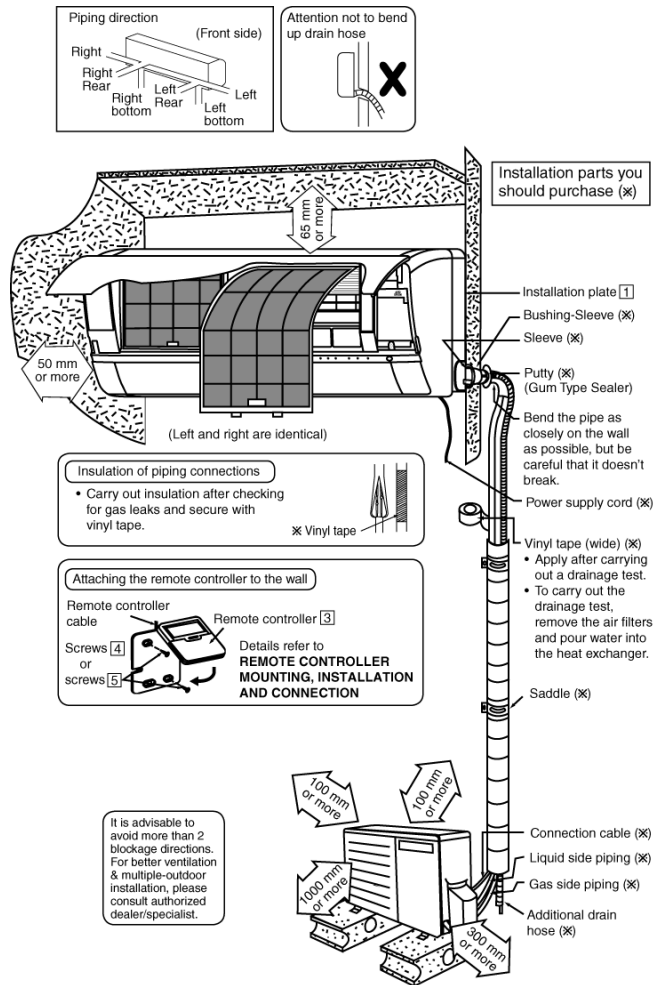
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other 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						
E9****	1.0HP	9.52mm	6.35mm (1/4")	5	5	3	15	20	7.5
E12****	1.5HP (3/8")				5	3	15	20	7.5
E15****	1.75HP	12.7mm			15	3	15	20	7.5
E18****	2.0HP (1/2")				15	3	20	20	7.5

Example: For E9\*\*\*

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

### 11.1.3 Indoor/Outdoor Unit Installation Diagram

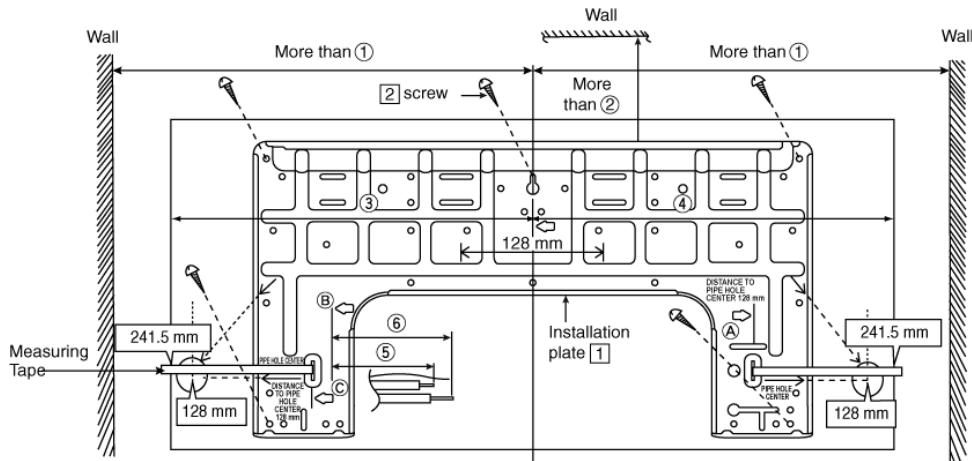


- This illustration is for explanation purposes only. The indoor unit will actually face a different way.



## 11.2 Indoor Unit

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



Model	Dimension					
	①	②	③	④	⑤	⑥
E9****, E12****, E15****	490 mm	82 mm	439 mm	432 mm	43 mm	95 mm
E18****	590 mm	82 mm	539 mm	532 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 center to unit's left side is ③.

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

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

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

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

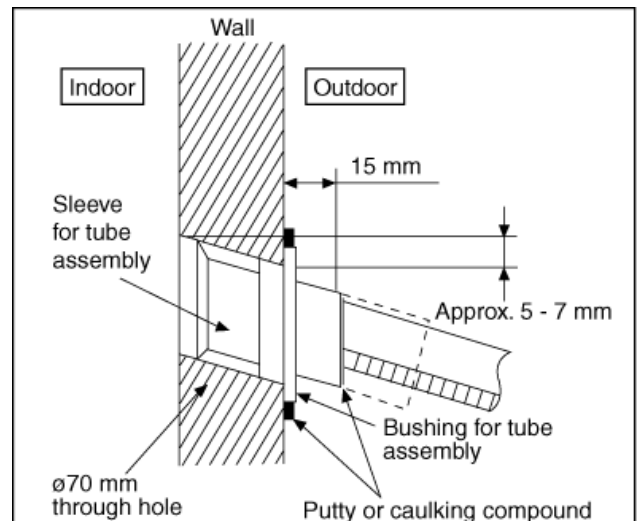
### 11.2.1 To Drill a Hole in the Wall and Install a Sleeve of Piping

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

#### ⚠ CAUTION

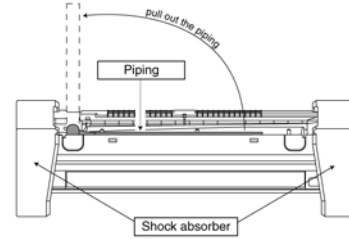
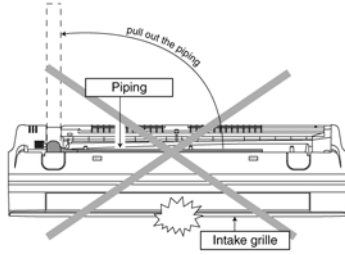
❗ When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connection cable.

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



## 11.2.2 Indoor Unit Installation

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



### 11.2.2.1 For the right rear piping

- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Secure the Indoor Unit
- Step-4** Insert the power supply cord and connection cable
  - Insert the cables from bottom of the unit through the control board hole until terminal board area.

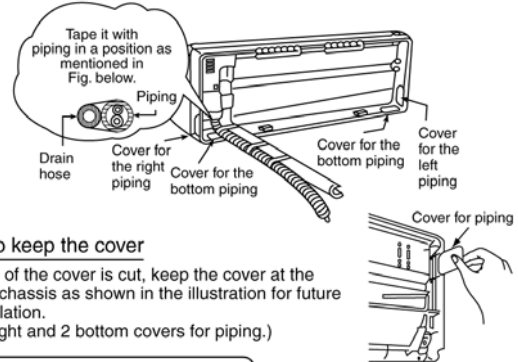
### 11.2.2.2 For the right and right bottom piping

- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Insert the power supply cord and connection cable
  - Insert the cables from bottom of the unit through the control board hole until terminal board area.
- Step-4** Secure the Indoor Unit

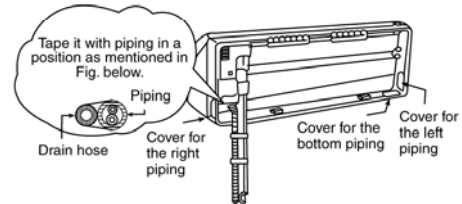
### 11.2.2.3 For the embedded piping

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

#### Right Rear piping

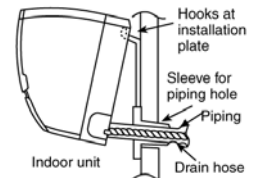


#### Right and Right Bottom piping



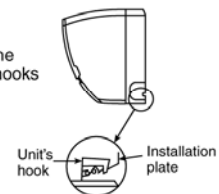
#### Install the indoor unit

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



#### Secure the Indoor Unit

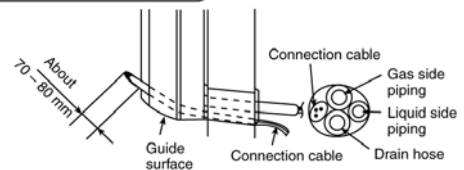
1. Press the lower left and right side of the unit against the installation plate until hooks engages with their slot (sound click).



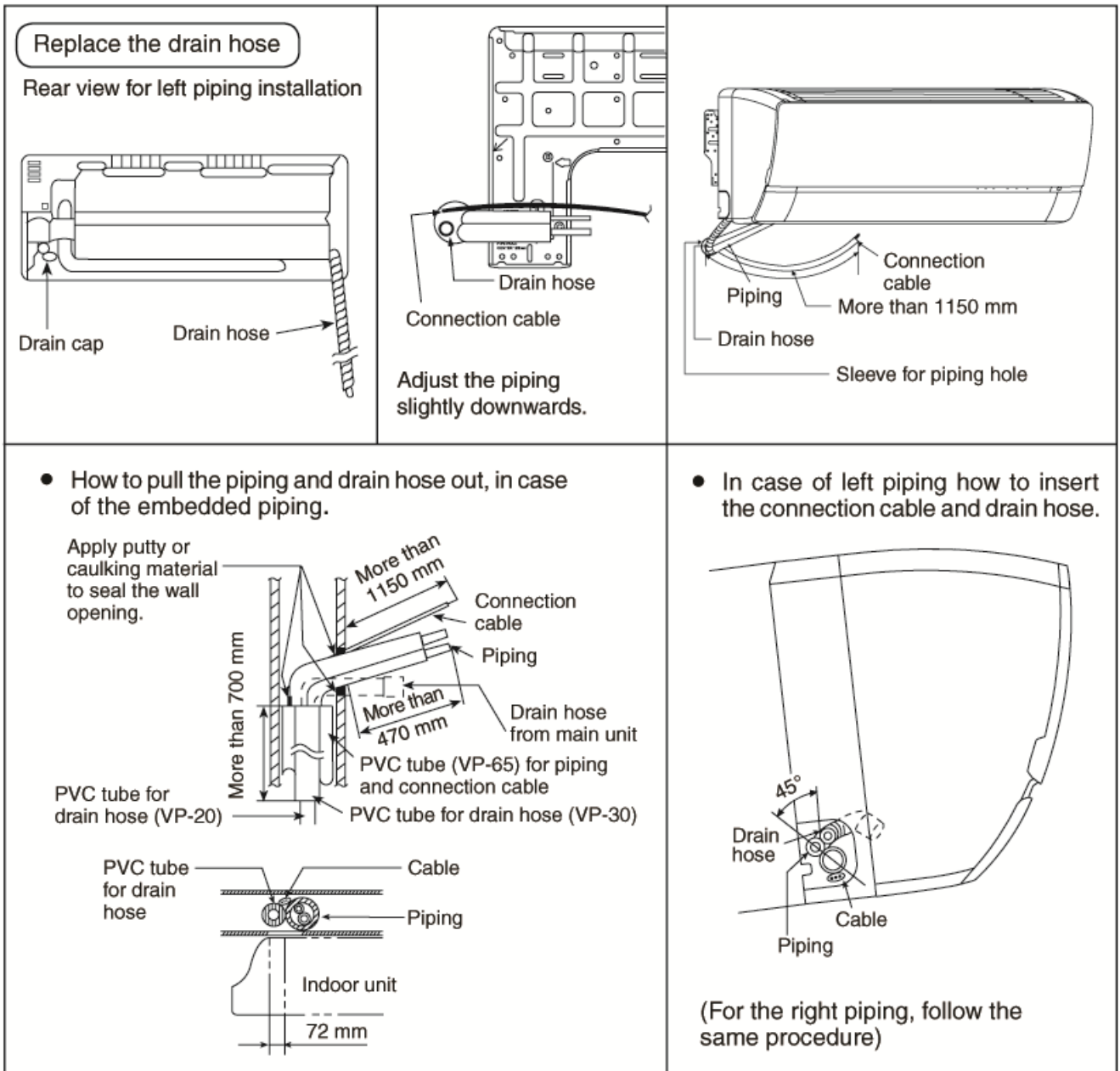
To take out the unit, push the **PUSH** marking at the bottom unit, and pull it slightly towards you to disengage the hooks from the unit.



#### Insert the connection cable



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

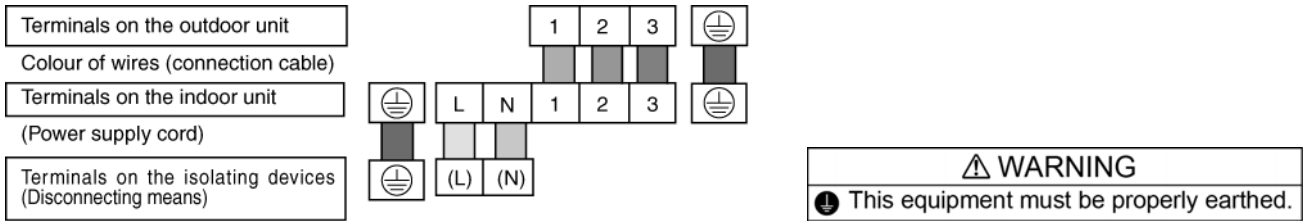


### 11.2.3 Connect the Cable to the Indoor Unit

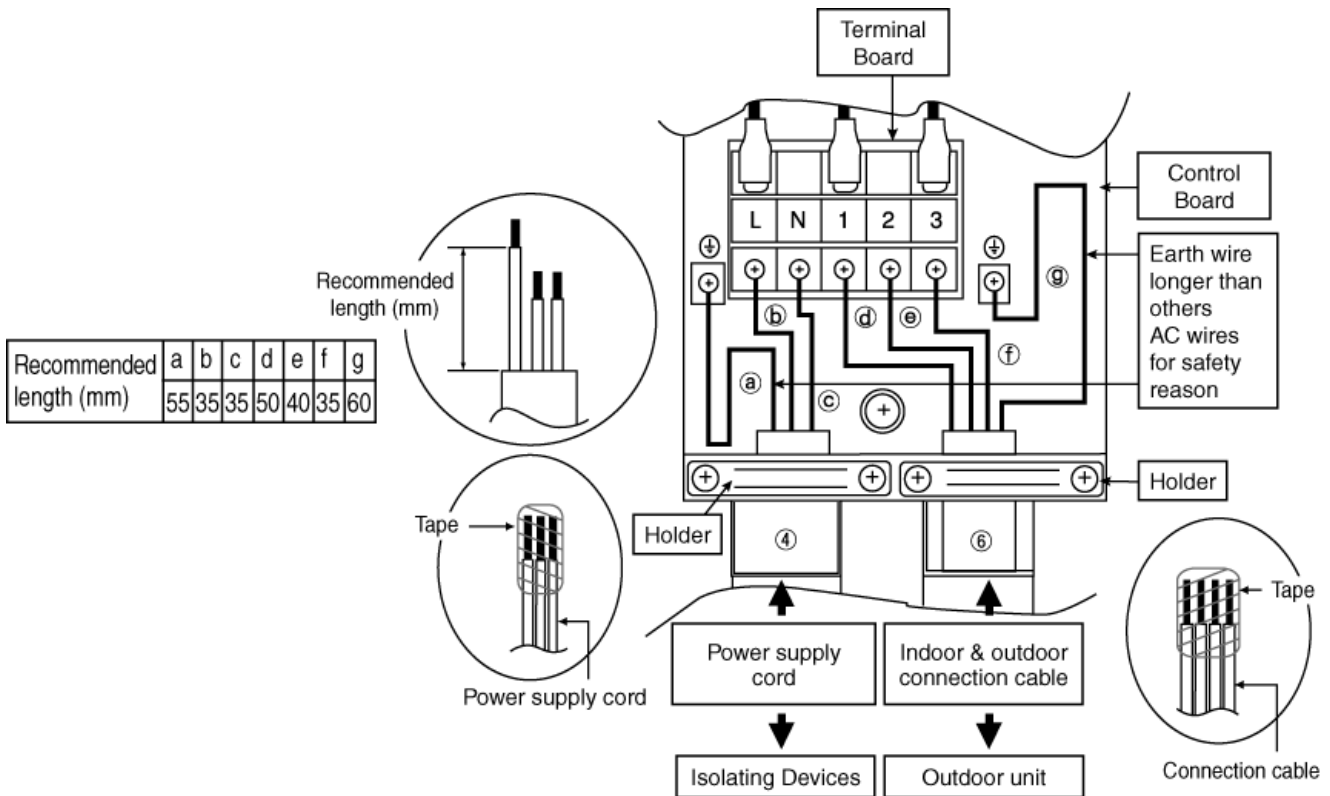
The power supply cord, indoor and outdoor unit connection cable can be connected without removing the front grille.

- 1 Install the indoor unit on the installing holder that mounted on the wall.
- 2 Open the front panel and grille door by loosening the screw.
- 3 Cable connection to the power supply through Isolating Devices (Disconnecting means).
  - Connect the approved polychloroprene sheathed **power supply cord**  $3 \times 1.5 \text{ mm}^2$  (1.0 ~ 1.75HP),  $3 \times 2.5 \text{ mm}^2$  (2.0HP) type designation 60245 IEC 57 or heavier cord to the terminal board, and connect the other end of the cable to Isolating Devices (Disconnecting means).
  - Do not use joint power supply cord. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
  - In unavoidable case, joining of power supply cord between isolating devices and terminal board of air conditioner shall be done by using approved socket and plug rated 15/16A. Wiring work to both socket and plug must follow to national wiring standard.
- 4 Bind all the power supply cord lead wire with tape and route the power supply cord via the left escapement.
- 5 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed  $4 \times 1.5 \text{ mm}^2$  (1.0 ~ 1.75HP) or  $4 \times 2.5 \text{ mm}^2$  (2.0HP) flexible cord, type designation 60245 IEC 57 or heavier cord.
- 6 Bind all the indoor and outdoor connection cable with tape and route the connection cable via the right escapement.

- 7 Remove the tapes and connect the power supply cord and connection cable between indoor unit and outdoor unit according to the diagram below.
- 8 Secure the power supply cord and connection cable onto the control board with the holder.



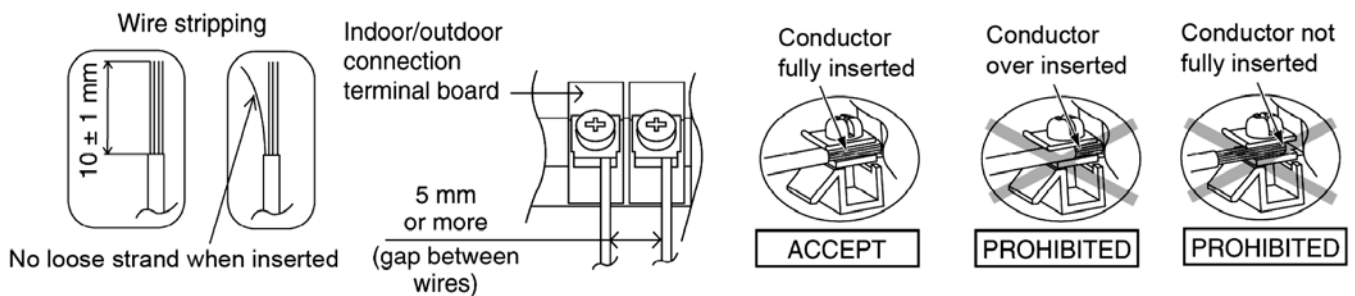
- 9 Close grille door by tighten with screw and close the front panel.




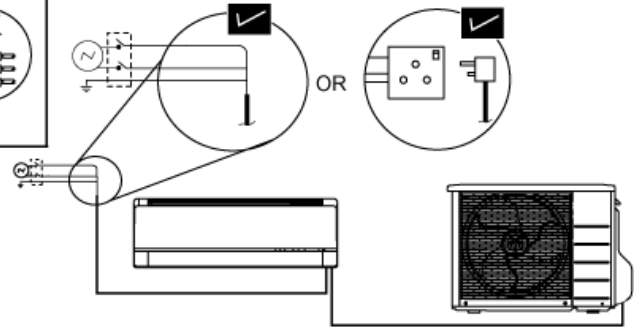
Note:

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

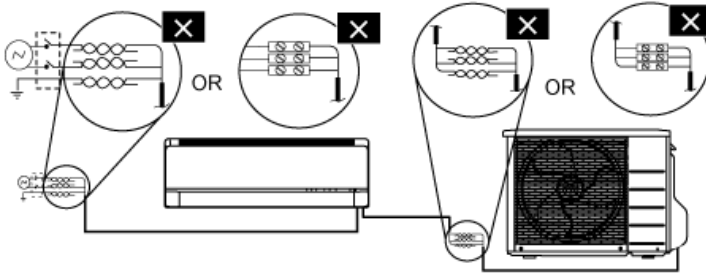
### 11.2.3.1 Wire Stripping, Connecting Requirement



 <b>WARNING</b>	<b>RISK OF FIRE</b> <b>JOINING OF WIRES MAY CAUSE OVERHEATING AND FIRE.</b>
---	--



⊘ Do not joint wires



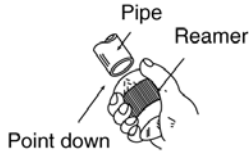
- ❗ Use complete wire without joining.
- ❗ Use approved socket and plug with earth pin.
- ❗ Wire connection in this area must follow to national wiring rules.

### 11.2.3.2 Cutting and flaring the piping

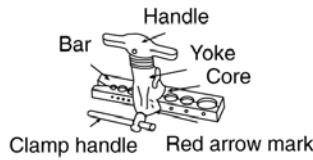
- 1 Please cut using pipe cutter and then remove the burrs.
- 2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- 3 Please make flare after inserting the flare nut onto the copper pipes.



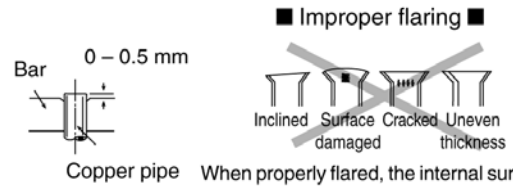
1. To cut



2. To remove burrs



3. To flare

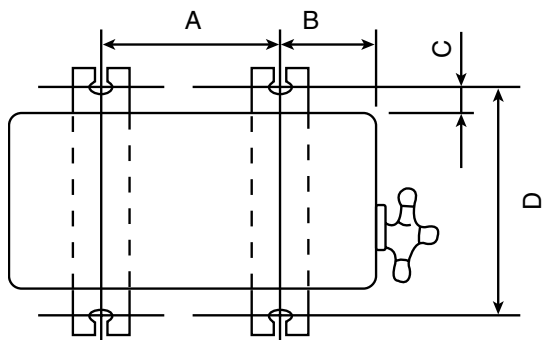


When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish.

## 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 ( $\varnothing 10$  mm).
  - When installing at roof, please consider strong wind and earthquake.  
Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
E9****, E12****	540 mm	160 mm	18.5 mm	330 mm
E15****, E18****	613 mm	131 mm	16 mm	360.5 mm

### 11.3.2 Connect the Piping

#### 11.3.2.1 Connecting the Piping to Indoor

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

Connect the piping

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

#### 11.3.2.2 Connecting the Piping to Outdoor

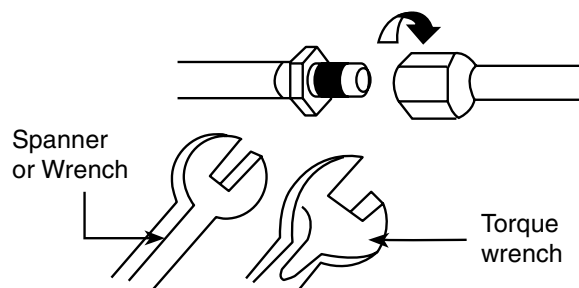
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge.

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

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

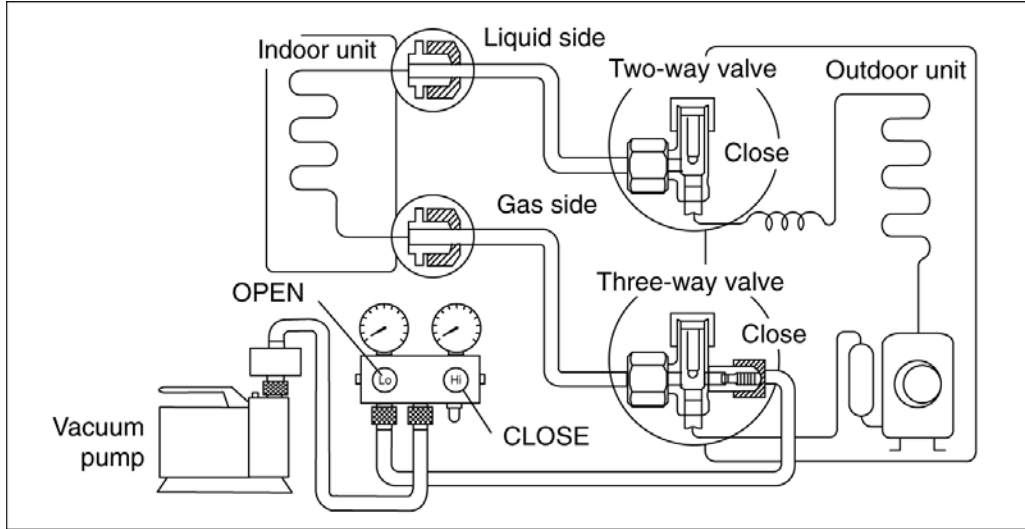
Do not overtighten, overtightening may cause gas leakage

Piping size	Torque
6.35 mm (1/4")	[18 N•m (1.8 kgf.m)]
9.52 mm (3/8")	[42 N•m (4.3 kgf.m)]
12.7 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.

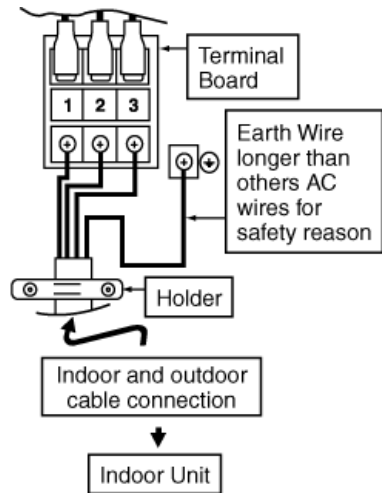
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in the step ③ above take the following measure:
  - If the leak stops when the piping connections are tightened further, continue working from step ③.
  - If the leak does not stop when the connections are retightened, repair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


### 11.3.4 Connect the cable to the Outdoor Unit

- 1 Remove the control board cover from the unit by loosening the screw.
- 2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed  $4 \times 1.5 \text{ mm}^2$  (1.0 ~ 1.75HP) or  $4 \times 2.5 \text{ mm}^2$  (2.0HP) flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.

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

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

### 11.3.5 Piping Insulation

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



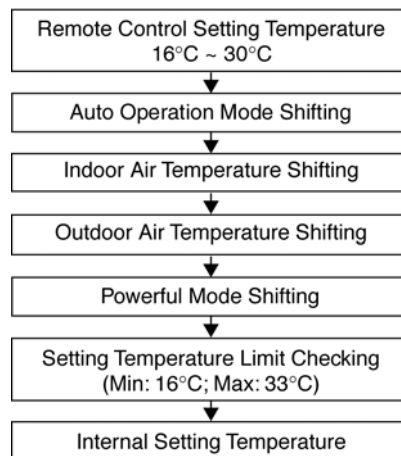
## 12. Operation Control

### 12.1 Basic Function

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

#### 12.1.1 Internal Setting Temperature

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



#### 12.1.2 Cooling Operation

##### 12.1.2.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature  $< -1.5^{\circ}\text{C}$  continue for 3 minutes.
- When compressor is OFF (Thermostat OFF) and AUTO FAN is set, the fan will stop periodically.
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature  $>$  Compressor OFF point.

#### 12.1.3 Soft Dry Operation

##### 12.1.3.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature  $< -2.0^{\circ}\text{C}$  continue for 3 minutes.
- When compressor is OFF (Thermostat OFF) and AUTO FAN is set, the fan will stop periodically.
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature  $>$  Compressor OFF point.

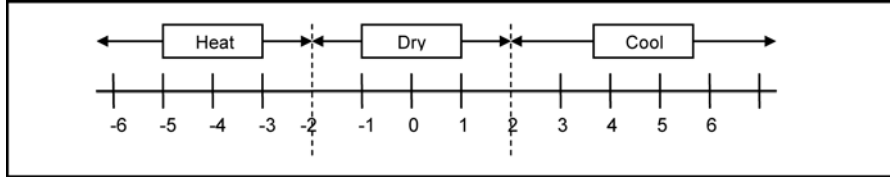
#### 12.1.4 Heating Operation

##### 12.1.4.1 Thermostat control

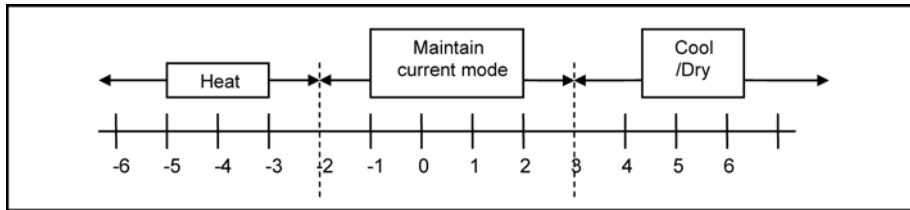
- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature  $> +2.0^{\circ}\text{C}$  continue for 3 minutes.
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature  $<$  Compressor OFF point.

## 12.1.5 Automatic Operation

- This mode can be set using remote control and the operation is decided by remote control setting temperature, remote control operation mode and indoor intake air temperature.
- During operation mode judgment, indoor fan motor (with speed of Lo-) is running for 30 seconds to detect the indoor intake air temperature.
- Every 10 minutes, the indoor temperature is judged.
- For the 1st judgment
  - If indoor intake temperature - remote control setting temperature  $\geq 2^{\circ}\text{C}$ , COOL mode is decided.
  - If  $-2^{\circ}\text{C} \leq$  indoor intake temperature - remote control setting temperature  $< 2^{\circ}\text{C}$ , DRY mode is decided.
  - If indoor intake temperature - remote control setting temperature  $< -2^{\circ}\text{C}$ , HEAT mode is decided.



- For the 2nd judgment onwards
  - If indoor intake temperature - remote control setting temperature  $\geq 3^{\circ}\text{C}$ , if previous operate in DRY mode, then continue in DRY mode. otherwise COOL mode is decided.
  - If  $-2^{\circ}\text{C} \leq$  indoor intake temperature - remote control setting temperature  $< 3^{\circ}\text{C}$ , maintain with previous mode.
  - If indoor intake temperature - remote control setting temperature  $< -2^{\circ}\text{C}$ , HEAT mode is decided.



## 12.2 Indoor Fan Motor Operation

### 12.2.1 Basic Rotation Speed (rpm)

#### A. Basic Rotation Speed (rpm)

##### i. Manual Fan Speed

[Cooling, Dry]

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

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

[Heating]

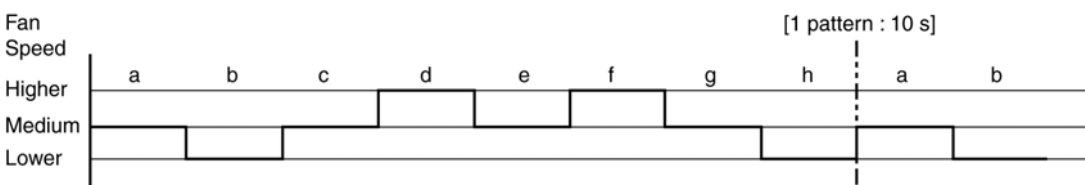
- Fan motor's number of rotation is determined according to remote control setting.

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

##### ii Auto Fan Speed

[Cooling, Dry]

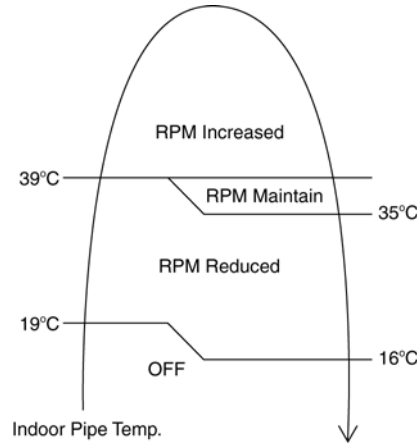
- According to room temperature and setting temperature, indoor fan speed is determined automatically.
- When set temperature is not achieved, the indoor fan will operate according to pattern below.



- When set temperature achieved, the indoor fan speed will be fixed. When thermostat off, the fan stop periodically.

[Heating]

- According to indoor pipe temperature, automatic heating fan speed is determined as follows.

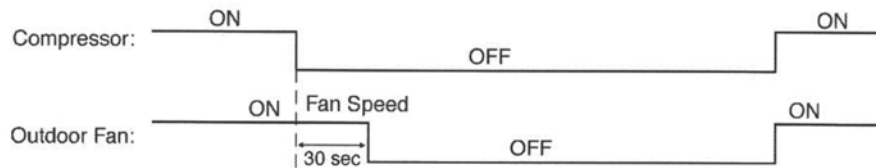


**B. Feedback control**

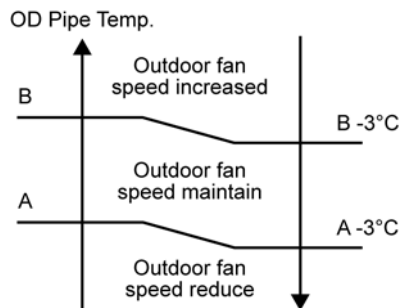
- Immediately after the fan motor started, feedback control is performed once every second.
- During fan motor on, if fan motor feedback  $\geq 2550$  rpm or  $< 50$  rpm continue for 10 seconds, then fan motor error counter increase, fan motor is then stop and restart. If the fan motor counter becomes 7 times, then H19 - fan motor error is detected. Operation stops and cannot on back.

**12.3 Outdoor Fan Motor Operation**

Outdoor fan motor is operated with one fan speed only. It starts when compressor starts operation and it stops 30 seconds after compressor stops operation.



- During cooling operation, and outdoor ambient temperature is below  $8^{\circ}\text{C}$ , outdoor fan speed will be controlled according to outdoor piping temperature as following:



	OD Pipe Temperature
A	$28^{\circ}\text{C}$
B	$33^{\circ}\text{C}$

- During above condition, when indoor heat exchanger temperature is below  $5^{\circ}\text{C}$ , the outdoor fan will stop according to outdoor piping temperature as following:



## 12.4 Airflow Direction

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

### 12.4.1 Vertical Airflow

CS-E9PKEA CS-E12PKEA CS-E15PKEA

Operation Mode	Airflow Direction		Upper Vane Angle (°)					Lower Vane Angle (°)				
			1	2	3	4	5	1	2	3	4	5
Heating	Auto with Heat Exchanger Temperature	A	25					17				
		B	55					37				
		C	25					17				
	Summer House		55					37				
	Manual		20	45	55	65	70	17	27	37	47	56
Cooling	Auto		45 ~ 70					2 ~ 39				
	Manual		20	25	50	55	70	2	7	17	27	39
Soft Dry	Auto		45 ~ 70					2 ~ 39				
	Manual		20	25	50	55	70	2	7	17	27	39

CS-E18PKEA

Operation Mode	Airflow Direction		Upper Vane Angle (°)					Lower Vane Angle (°)				
			1	2	3	4	5	1	2	3	4	5
Heating	Auto with Heat Exchanger Temperature	A	25					17				
		B	55					32				
		C	25					17				
	Summer House		55					37				
	Manual		20	45	55	65	70	17	25	32	42	55
Cooling	Auto		45 ~ 70					2 ~ 36				
	Manual		20	25	50	55	70	2	8	18	27	36
Soft Dry	Auto		45 ~ 70					2 ~ 36				
	Manual		20	25	50	55	70	2	8	18	27	36

1. Automatic vertical airflow direction can be set using remote control; the vane swings up and down within the angles as stated above. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below. It does not swing during fan motor stop. When the air conditioner is stopped using remote control, the vane will shift to close position.
2. Manual vertical airflow direction can be set using remote control; the angles of the vane are as stated above and the positions of the vane are as Figure 2 below. When the air conditioner is stopped using remote control, the vane will shift to close position.

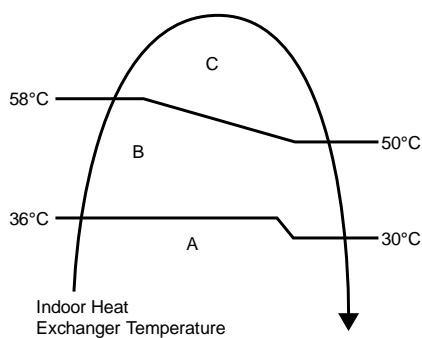


Figure 1

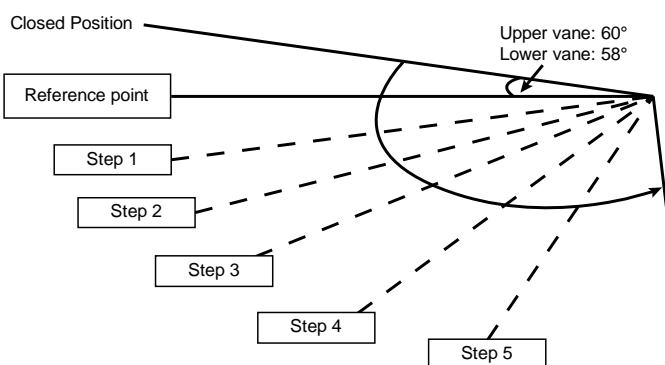


Figure 2

## 12.4.2 Horizontal Airflow

- Automatic horizontal airflow direction can be set using remote control; the vane swings left and right within the angles as stated below. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below. It does not swing during fan motor stop.

Operation Mode		Vane Angle (°)
Heating, with heat exchanger temperature	A	65 ~115
	B	90
Cooling and soft dry		65 ~115

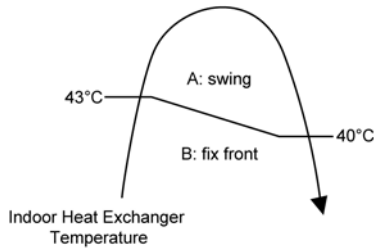


Figure 1

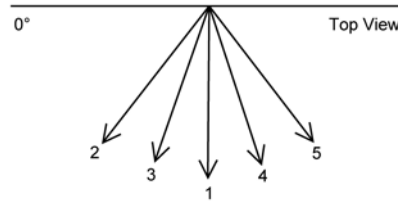


Figure 2

- Manual horizontal airflow direction can be set using remote control; the angles of the vane are as stated below and the positions of the vane are as Figure 2 above.

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

CS-E9/12/15PKEA

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

CS-E18PKEA

## 12.5 Quiet operation (Cooling Mode/Cooling area of Dry Mode)

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

## **12.6 Quiet operation (Heating)**

- Purpose
  - To provide quiet heating operation compare to normal operation.
- Control condition
  - Quiet operation start condition
    - When “POWERFUL/QUIET” button at remote control is pressed.  
POWERFUL/QUIET LED illuminates.
  - Quiet operation stop condition
    - When one of the following conditions is satisfied, quiet operation stops:
      - POWERFUL/QUIET button is pressed again.
      - Stop by OFF/ON switch.
      - Timer “off” activates.
    - When quiet operation is stopped, operation is shifted to normal operation with previous setting.
    - When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.
    - When operation mode is changed, quiet operation is shifted to quiet operation of the new mode, except fan mode only.
    - During quiet operation, if timer “on” activates, quiet operation maintains.
    - After off, when on back, quiet operation is not memorised.
- Control contents
  - Fan speed manual
    - Fan speed is changed from normal setting to quiet setting of respective fan speed.  
Fan speed for quiet operation is reduced from setting fan speed.
  - Fan Speed Auto
    - Indoor FM RPM depends on pipe temp sensor of indoor heat exchanger.

## **12.7 Powerful Mode Operation**

- When the powerful mode is selected, the internal setting temperature will shift lower up to 2°C (for Cooling/Soft Dry) or higher up to 3.5°C (for Heating) than remote control setting temperature for 20 minutes to achieve the setting temperature quickly.

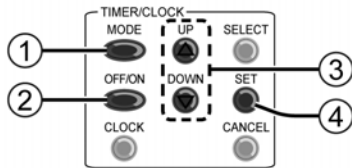
## 12.8 Timer Control

- To turn ON or OFF the unit at a preset time.

### 12.8.1 ON Timer Control

#### Daily timer setting

To turn ON or OFF the unit at a preset time.



- ① **Press TIMER MODE** to enter timer mode
  - Press once to change the display from clock to timer or vice-versa.
  - Press for 4 seconds to change the display from daily timer to weekly timer or vice-versa.

- ② **Select ON or OFF timer** Example:  
OFF at 22:00



- ③ **Set the time**  
UP  
DOWN



- ④ **Confirm** SET



- To cancel, press CANCEL.

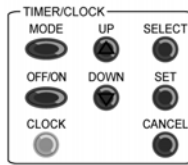
- When ON timer is set, the unit may start early before the actual set time in order to achieve the desired temperature on time.
- Timer operation is based on the clock set in the remote control and repeats daily once set.
- The timer closest to the current time will be activated first.
- If timer is cancelled manually or due to power failure, you can restore the previous setting by pressing SET.

#### Note

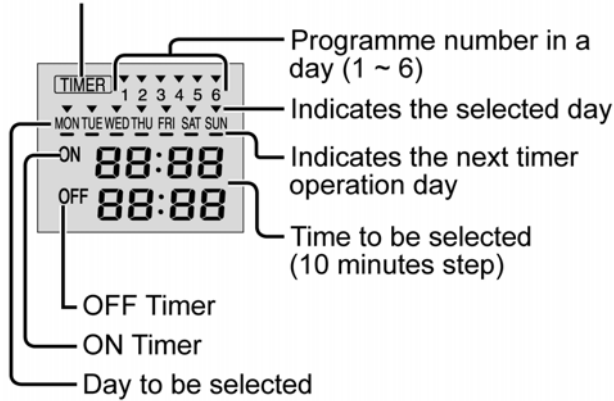
After timer is set, the TIMER indicator at indoor unit does not turn on, it does not indicate malfunction.

## Weekly timer setting

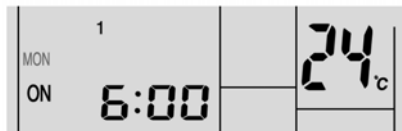
Promotes energy saving by allowing you to set up to 6 programmes in any given day.



Lights up if Timer operation is selected



1. Press **TIMER** <sup>MODE</sup> for 4 seconds to change display to weekly timer.



2. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> to select your desired day.
3. Press <sup>SELECT</sup> to confirm your selection.
4. "1" will be blinking, press <sup>SELECT</sup> to set programme 1.
5. Press **TIMER** <sup>OFF/ON</sup> to select ON or OFF timer.
6. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> to select your desired time.  
If you want to set the timer together with your desired temperature, press <sup>TEMP</sup> to select the temperature.

7. Press <sup>SET</sup> to confirm programme 1. The selected day will be highlighted with ▼.
- After 2 seconds, the display will move to the next programme. Repeat steps 4 to 7 to set programmes 2 to 6.
  - During timer setup, if no button is pressed within 30 seconds, or if the <sup>SET</sup> button is pressed, the setting at that moment is confirmed and timer setup is ended.

## To check current timer programme

1. Press **TIMER** <sup>MODE</sup> to enter timer mode and press <sup>SELECT</sup> to enter day setting.
2. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> until your desired day is shown, press <sup>SELECT</sup> to confirm your selection.
3. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> to check the set programmes.

## To modify current timer programme or add new timer programme

1. Press **TIMER** <sup>MODE</sup> to enter timer mode and press <sup>SELECT</sup> to enter day setting.
2. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> until your desired day is shown.
3. Perform steps 4 to 7 of "Weekly timer setting" to modify existing timer programme, or add any timer programme.

## To cancel current timer programme

1. Press <sup>SELECT</sup> to enter day.
2. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> until your desired day is shown, press <sup>SELECT</sup> to enter programme setting.
3. Press **TIMER** <sup>UP</sup> or <sup>DOWN</sup> until your desired day is shown. Press <sup>CANCEL</sup> to cancel the programme and ▼ will disappear.

## To disable/enable Weekly Timer

- To disable weekly timer setting, press **TIMER** <sup>MODE</sup>, then press <sup>CANCEL</sup>.
- To enable previous weekly timer setting, press **TIMER** <sup>MODE</sup>, then press <sup>SET</sup>.

### Note

- Daily timer and weekly timer could not be set at the same time.
- Same timer programme cannot be set in the same day.
- After timer is set, the **TIMER** indicator at indoor unit does not turn on, it does not indicate malfunction.



## 12.9 Auto Restart Control

- When the power supply is cut off during the operation of air conditioner, the compressor will re-operate within three to four minutes (there are 10 patterns between 2 minutes 58 seconds and 3 minutes 52 seconds to be selected randomly) after power supply resumes.
- This type of control is not applicable during ON/OFF Timer setting.
- This control can be omitted by open the circuit of JP1 at indoor unit printed circuit board.

## 12.10 Indication Panel

LED	POWER	TIMER
Color	Green	Orange
Light ON	Operation ON	Timer Setting ON
Light OFF	Operation OFF	Timer Setting OFF

Note:

- If POWER LED is blinking, the possible operation of the unit are Hot Start, during Deice operation, operation mode judgment, or ON timer sampling.
- If Timer LED is blinking, there is an abnormality operation occurs.

## 13. Protection Control

### 13.1 Protection Control For All Operations

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

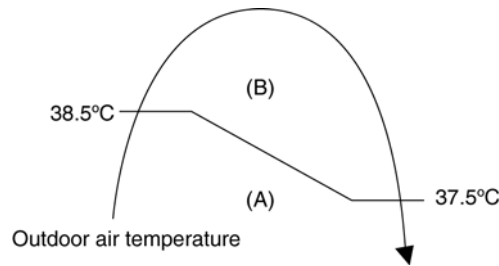
- The Compressor will not turn on within 3 minutes from the moment operation stops, although the unit is turned on again by pressing OFF/ON button at remote control within this period.
- This control is not applicable if the power supply is cut off and on again.
- This phenomenon is to balance the pressure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

#### 13.1.2 Total Running Current

- 1 When the outdoor unit total running current (AC) exceeds X value, the frequency instructed for compressor operation will be decreased.
- 2 If the running current does not exceed X value for 5 seconds, the frequency instructed will be increased.
- 3 However, if total outdoor unit running current exceeds Y value, compressor will be stopped immediately for 3 minutes.

Model	E9PKEA		E12PKEA		E15PKEA		E18PKEA	
Operation Mode	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)
Cooling / Soft Dry (A)	4.12	14.76	5.72	14.76	9.41	14.67	11.81	14.75
Cooling / Soft Dry (B)	3.51	14.76	5.18	14.76	8.91	14.67	8.91	14.75
Heating	5.41	14.76	7.74	14.76	9.33	14.67	10.07	14.75

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

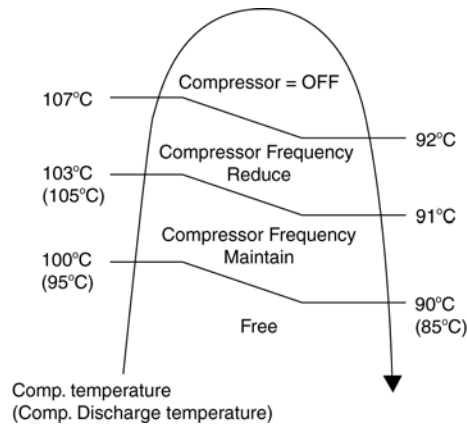


#### 13.1.3 IPM (Power transistor) Prevention Control

- Overheating Prevention Control
  - 1 When the IPM temperature rises to 120°C, compressor operation will stop immediately.
  - 2 Compressor operation restarts after 3 minutes the temperature decreases to 110°C.
  - 3 If this condition repeats continuously 4 times within 20 minutes, timer LED will be blinking ("F96" is indicated).
- DC Peak Current Control
  - 1 When electric current to IPM exceeds set value of 16.0 ± 2.0A (E9/12/15PKEA) and 30.0 ± 3.0A (E18PKEA), the compressor will stop operate. Then, operation will restart after 3 minutes.
  - 2 If the set value is exceeded again more than 30 seconds after the compressor starts, the operation will restart after 1 minute.
  - 3 If the set value exceeded again within 30 seconds after the compressor starts, the operation will restart after 1 minute. If this condition repeats continuously for 7 times, all indoor and outdoor relays will be cut off, timer LED will be blinking ("F99" is indicated).

### 13.1.4 Compressor Overheating Prevention Control

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



### 13.1.5 Low Pressure Prevention Control (Gas Leakage Detection)

- Control start conditions
  - For 5 minutes, the compressor continuously operates and outdoor total current is between 0.75A and 0.95A (E9/12/15PKEA), 1.38A and 1.65A (E18PKEA).
  - During Cooling and Soft Dry operations: Indoor suction temperature - indoor piping temperature is below 4°C.
  - During Heating operations : Indoor piping temperature - indoor suction is under 5°C.
- Control contents
  - Compressor stops (and restart after 3 minutes).
  - If the conditions above happen 2 times within 20 minutes, the unit will:
    - Stop operation
    - Timer LED blinks and “F91” indicated.

### 13.1.6 Low Frequency Protection Control 1

- When the compressor operate at frequency lower than 24 Hz continued for 20 minutes, the operation frequency will be changed to 23 Hz for 2 minutes.

### 13.1.7 Low Frequency Protection Control 2

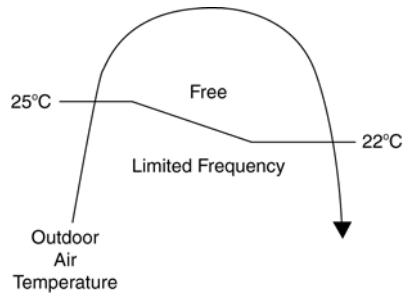
- When all the below conditions comply, the compressor frequency will change to lower frequency.

Temperature, T, for:	Cooling/Soft Dry	Heating
Indoor intake air (°C)	T < 14 or T ≥ 30	T < 14 or T ≥ 28
Outdoor air (°C)	T < 13 or T ≥ 38	T < 4 or T ≥ 24
Indoor heat exchanger (°C)	T < 30	T ≥ 0

## 13.2 Protection Control For Cooling & Soft Dry Operation

### 13.2.1 Outdoor Air Temperature Control

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



### 13.2.2 Cooling Overload Control

- Detects the Outdoor pipe temperature and carry out below restriction/limitation (Limit the compressor Operation frequency).
- The compressor stop if outdoor pipe temperature exceeds 61°C (E9/12/15PKEA), 63°C (E18PKEA).
- If the compressor stops 4 times in 20 minutes, Timer LED blinking (F95 indicated: outdoor high pressure rise protection).

### 13.2.3 Freeze Prevention Control 1

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

### 13.2.4 Freeze Prevention Control 2

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

### 13.2.5 Dew Prevention Control 1

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

### 13.2.6 Odor Cut Control

- To reduce the odor released from the unit.
  - Start Condition
    - AUTO FAN Speed is selected during COOL or DRY operation.
    - During freeze prevention control and timer preliminary operation, this control is not applicable.
  - Control content
    - Depends on compressor conditions:
      1. Compressor OFF → Compressor ON.  
The indoor unit fan stops temporarily and then starts to blow at minimum airflow for 30 seconds.
      2. Compressor ON → Compressor OFF.  
The indoor unit fan stops for 90 seconds and then blows at minimum airflow for 20 seconds.

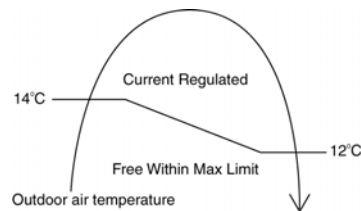
## 13.3 Protection Control For Heating Operation

### 13.3.1 Intake Air Temperature Control

Compressor will operate at limited freq., if indoor intake air temperature is 30°C or above.

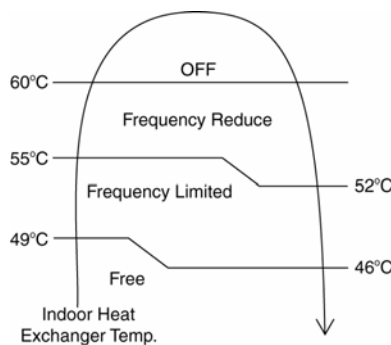
### 13.3.2 Outdoor Air Temperature Control

- The Max current value is regulated when the outdoor air temperature rise above 14°C in order to avoid compressor overloading.



### 13.3.3 Overload Protection Control

- The compressor operating frequency is regulated in accordance to indoor heat exchanger temperature as shown below.
- If the heat exchanger temperature exceeds 60°C, compressor will stop.



### 13.3.4 Low Temperature Compressor Oil Return Control

- In heating operation, if the outdoor temperature falls below -10°C when compressor starts, the compressor frequency will be regulated up to 600 seconds.

### 13.3.5 Cold Draught Prevention Control

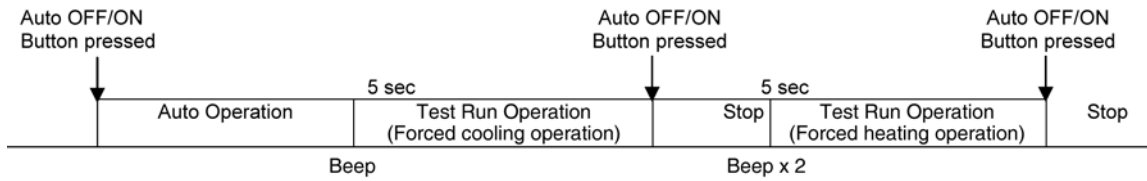
- When indoor pipe temperature is low, cold draught operation starts where indoor fan speed will be reduced.

### 13.3.6 Deice Operation

- When outdoor pipe temperature and outdoor air temperature is low, deice operation start where indoor fan motor and outdoor fan motor stop and operation LED blinks.

# 14. Servicing Mode

## 14.1 Auto OFF/ON Button



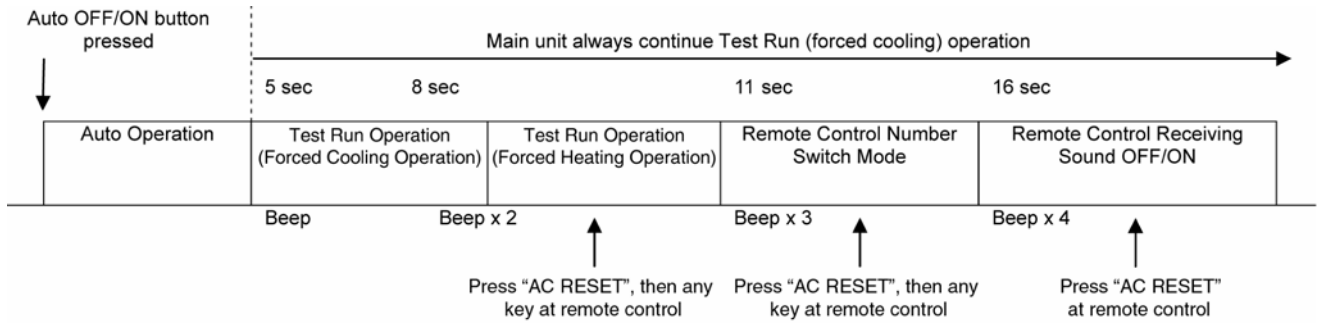
### 1 AUTO OPERATION MODE

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 heard at the fifth seconds, in order to identify the starting of Test Run operation (Forced cooling operation). Within 5 minutes after Forced cooling operation start, the Auto OFF/ON button is pressed for more than 5 seconds. A 2 “beep” sounds will heard at the fifth seconds, in order to identify the starting of Forced heating operation.

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



### 3 REMOTE CONTROL NUMBER SWITCH MODE

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

There are 4 types of remote control transmission code could be selected 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 (cut jumper)	Open	B
Short	Short with diode	C
Open (cut jumper)	Short with diode	D

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

- During Remote Control Number Switch Mode, press any button at remote control to transmit and store the transmission code to the EEPROM.

#### 4 REMOTE CONTROL RECEIVING SOUND OFF/ON MODE

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

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

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

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

## **14.2 Remote Control Button**

### **14.2.1 SET Button**

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

### **14.2.2 RESET (RC)**

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

### **14.2.3 RESET (AC)**

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

### **14.2.4 TIMER ▲**

- To change indoor unit indicator’s LED intensity.
  - Press continuously for 5 seconds.

### **14.2.5 TIMER ▼**

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

# 15. Troubleshooting Guide

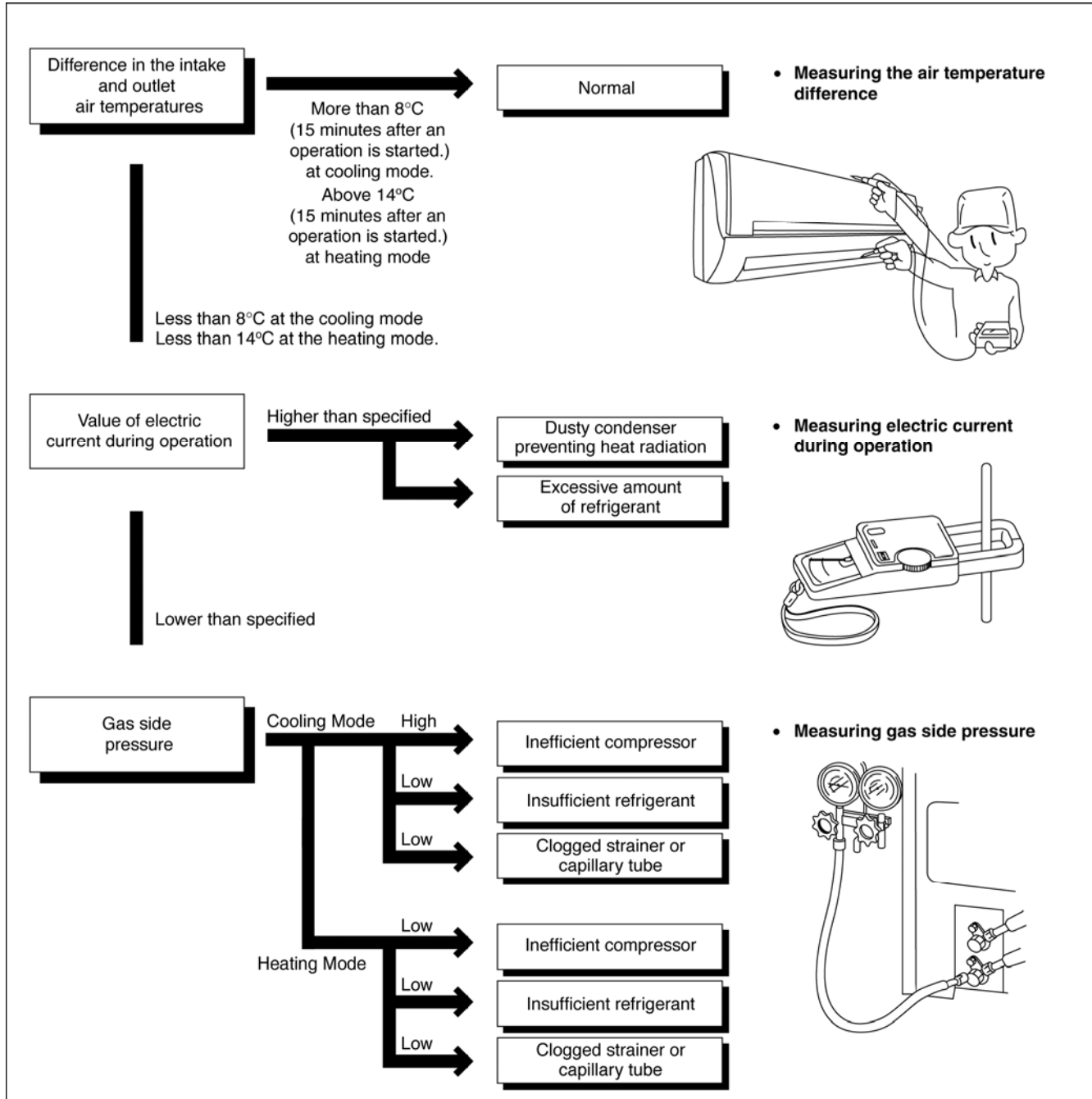
## 15.1 Refrigeration Cycle System

In order to diagnose malfunctions, 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 <sup>2</sup> G)	Outlet air Temperature (°C)
Cooling Mode	0.9 ~ 1.2 (9 ~ 12)	12 ~ 16
Heating Mode	2.3 ~ 2.9 (23 ~ 29)	36 ~ 45

- \*Condition:
- Indoor fan speed = High
  - Outdoor temperature 35°C at the cooling mode and 7°C at the heating mode
  - Compressor operates at rated frequency





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

Condition of the air conditioner	Cooling Mode			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.

## 15.2 Breakdown Self Diagnosis Function

### 15.2.1 Self Diagnosis Function (Three Digits Alphanumeric Code)

- Once abnormality has occurred during operation, the unit will stop its operation, and Timer LED blinks.
  - Although Timer LED goes off when power supply is turned off, if the unit is operated under a breakdown condition, the LED will light up again.
  - In operation after breakdown repair, the Timer LED will no more blink. The last error code (abnormality) will be stored in IC memory.
- 6 When the latest abnormality code on the main unit and code transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.

### 15.2.2 To Make a Diagnosis

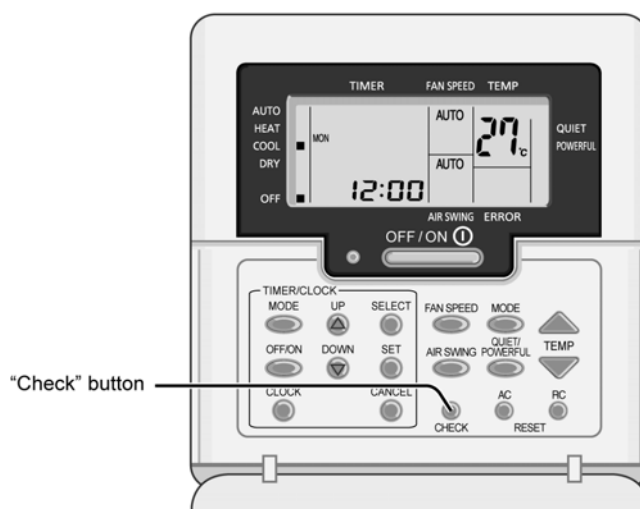
- 1 Timer LED start to blink and the unit automatically stops the operation.
- 2 Press the CHECK button on the remote controller continuously for 5 seconds.
- 3 “- -” will be displayed on the remote controller display.  
Note: Display only for “- -”. (No transmitting signal, no receiving sound and no Power LED blinking.)
- 4 Press the “TIMER” ▲ or ▼ button on the remote controller. The code “H00” (no abnormality) will be displayed and signal will be transmitted to the main unit.
- 5 Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.
- 6 When the latest abnormality code on the main unit and code transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.
- 7 The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
- 8 The LED will be off if the unit is turned off or the RESET button on the main unit is pressed.

### 15.2.3 To Display Memorized Error Code (Protective Operation)

- 1 Turn power on.
- 2 Press the CHECK button on the remote controller continuously for 5 seconds.
- 3 “- -” will be displayed on the remote controller display.  
Note: Display only for “- -”. (No transmitting signal, no receiving sound and no Power LED blinking.)
- 4 Press the “TIMER” ▲ or ▼ button on the remote controller. The code “H00” (no abnormality) will be displayed and signal will be transmitted to the main unit. The power LED lights up. If no abnormality is stored in the memory, three beeps sound will be heard.
- 5 Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.

- 7 The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.

- 8 The same diagnosis can be repeated by turning power on again.



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

- 1 Turn power on (in standby condition).
- 2 Press the AUTO button for 5 seconds (A beep receiving sound) on the main unit to operate the unit at Forced Cooling Operation modes.
- 3 Press the CHECK button on the remote controller for about 1 second with a pointed object to transmit signal to main unit. A beep sound is heard from main unit and the data is cleared.

### 15.2.5 Temporary Operation (Depending On Breakdown Status)

- 1 Press the AUTO button (A beep receiving sound) on the main unit to operate the unit. (Remote control will become possible.)
- 2 The unit can temporarily be used until repaired.

## 15.3 Error Codes Table

Diagnosis display	Abnormality / Protection control	Abnormality Judgment	Protection Operation	Problem	Check location
H00	No memory of failure	—	Normal operation	—	—
H11	Indoor/outdoor abnormal communication	After operation for 1 minute	Indoor fan only operation can start by entering into force cooling operation	Indoor/outdoor communication not establish	<ul style="list-style-type: none"> <li>Indoor/outdoor wire terminal</li> <li>Indoor/outdoor PCB</li> <li>Indoor/outdoor connection wire</li> </ul>
H12	Indoor unit capacity unmatched	90s after power supply	—	Total indoor capability more than maximum limit or less than minimum limit, or number of indoor unit less than two	<ul style="list-style-type: none"> <li>Indoor/outdoor connection wire</li> <li>Indoor/outdoor PCB</li> <li>Specification and combination table in catalogue</li> </ul>
H14	Indoor intake air temperature sensor abnormality	Continuous for 5s	—	Indoor intake air temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Indoor intake air temperature sensor lead wire and connector</li> </ul>
H15	Compressor temperature sensor abnormality	Continuous for 5s	—	Compressor temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Compressor temperature sensor lead wire and connector</li> </ul>
H16	Outdoor current transformer (CT) abnormality	—	—	Current transformer faulty or compressor faulty	<ul style="list-style-type: none"> <li>Outdoor PCB faulty or compressor faulty</li> </ul>
H19	Indoor fan motor mechanism lock	Continuous happen for 7 times	—	Indoor fan motor lock or feedback abnormal	<ul style="list-style-type: none"> <li>Fan motor lead wire and connector</li> <li>Fan motor lock or block</li> </ul>
H23	Indoor heat exchanger temperature sensor abnormality	Continuous for 5s	—	Indoor heat exchanger temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Indoor heat exchanger temperature sensor lead wire and connector</li> </ul>
H24	Indoor heat exchanger temperature sensor 2 abnormality	Continuous for 5s	—	Indoor heat exchanger temperature sensor 2 open or short circuit	<ul style="list-style-type: none"> <li>Indoor heat exchanger temperature sensor 2 lead wire and connector</li> </ul>
H25	Indoor ion device abnormality	Port is ON for 10s during ion device off	—	—	<ul style="list-style-type: none"> <li>ion device PCB</li> </ul>
H27	Outdoor air temperature sensor abnormality	Continuous for 5s	—	Outdoor air temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Outdoor air temperature sensor lead wire and connector</li> </ul>
H28	Outdoor heat exchanger temperature sensor 1 abnormality	Continuous for 5s	—	Outdoor heat exchanger temperature sensor 1 open or short circuit	<ul style="list-style-type: none"> <li>Outdoor heat exchanger temperature sensor 1 lead wire and connector</li> </ul>
H30	Outdoor discharge pipe temperature sensor abnormality	Continuous for 5s	—	Outdoor discharge pipe temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Outdoor discharge pipe temperature sensor lead wire and connector</li> </ul>
H32	Outdoor heat exchanger temperature sensor 2 abnormality	Continuous for 5s	—	Outdoor heat exchanger temperature sensor 2 open or short circuit	<ul style="list-style-type: none"> <li>Outdoor heat exchanger temperature sensor 2 lead wire and connector</li> </ul>
H33	Indoor / outdoor misconnection abnormality	—	—	Indoor and outdoor rated voltage different	<ul style="list-style-type: none"> <li>Indoor and outdoor units check</li> </ul>
H34	Outdoor heat sink temperature sensor abnormality	Continuous for 2s	—	Outdoor heat sink temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Outdoor heat sink sensor</li> </ul>
H36	Outdoor gas pipe temperature sensor abnormality	Continuous for 5s	Heating protection operation only	Outdoor gas pipe temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Outdoor gas pipe temperature sensor lead wire and connector</li> </ul>
H37	Outdoor liquid pipe temperature sensor abnormality	Continuous for 5s	Cooling protection operation only	Outdoor liquid pipe temperature sensor open or short circuit	<ul style="list-style-type: none"> <li>Outdoor liquid pipe temperature sensor lead wire and connector</li> </ul>
H38	Indoor/Outdoor mismatch (brand code)	—	—	Brand code not match	<ul style="list-style-type: none"> <li>Check indoor unit and outdoor unit</li> </ul>
H39	Abnormal indoor operating unit or standby units	3 times happen within 40 minutes	—	Wrong wiring and connecting pipe, expansion valve abnormality, indoor heat exchanger sensor open circuit	<ul style="list-style-type: none"> <li>Check indoor/outdoor connection wire and connection pipe</li> <li>Indoor heat exchanger sensor lead wire and connector</li> <li>Expansion valve and lead wire and connector</li> </ul>

Diagnosis display	Abnormality / Protection control	Abnormality Judgment	Protection Operation	Problem	Check location
H41	Abnormal wiring or piping connection	—	—	Wrong wiring and connecting pipe, expansion valve abnormality	<ul style="list-style-type: none"> <li>• Check indoor/outdoor connection wire and connection pipe</li> <li>• Expansion valve and lead wire and connector</li> </ul>
H59	ECO sensor abnormality	Continuous for 70s	—	ECO sensor open or short circuit	<ul style="list-style-type: none"> <li>• ECO sensor</li> <li>• ECO and Indoor PCB</li> </ul>
H64	Outdoor high pressure sensor abnormality	Continuous for 1 minutes	—	High pressure sensor open circuit during compressor stop	<ul style="list-style-type: none"> <li>• High pressure sensor</li> <li>• Lead wire and connector</li> </ul>
H70	Light sensor abnormality	Continuous for 24 hours	—	Light sensor open or short circuit	<ul style="list-style-type: none"> <li>• Light sensor</li> <li>• Indoor PCB</li> </ul>
H97	Outdoor fan motor mechanism lock	2 times happen within 30 minutes	—	Outdoor fan motor lock or feedback abnormal	<ul style="list-style-type: none"> <li>• Outdoor fan motor lead wire and connector</li> <li>• Fan motor lock or block</li> </ul>
H98	Indoor high pressure protection	—	—	Indoor high pressure protection (Heating)	<ul style="list-style-type: none"> <li>• Check indoor heat exchanger</li> <li>• Air filter dirty</li> <li>• Air circulation short circuit</li> </ul>
H99	Indoor operating unit freeze protection	—	—	Indoor freeze protection (Cooling)	<ul style="list-style-type: none"> <li>• Check indoor heat exchanger</li> <li>• Air filter dirty</li> <li>• Air circulation short circuit</li> </ul>
F11	4-way valve switching abnormality	4 times happen within 30 minutes	—	4-way valve switching abnormal	<ul style="list-style-type: none"> <li>• 4-way valve</li> <li>• Lead wire and connector</li> </ul>
F17	Indoor standby units freezing abnormality	3 times happen within 40 minutes	—	Wrong wiring and connecting pipe, expansion valve leakage, indoor heat exchanger sensor open circuit	<ul style="list-style-type: none"> <li>• Check indoor/outdoor connection wire and pipe</li> <li>• Indoor heat exchanger sensor lead wire and connector</li> <li>• Expansion valve lead wire and connector</li> </ul>
F90	Power factor correction (PFC) circuit protection	4 times happen within 10 minutes	—	Power factor correction circuit abnormal	<ul style="list-style-type: none"> <li>• Outdoor PCB faulty</li> </ul>
F91	Refrigeration cycle abnormality	2 times happen within 20 minutes	—	Refrigeration cycle abnormal	<ul style="list-style-type: none"> <li>• Insufficient refrigerant or valve close</li> </ul>
F93	Compressor abnormal revolution	4 times happen within 20 minutes	—	Compressor abnormal revolution	<ul style="list-style-type: none"> <li>• Power transistor module faulty or compressor lock</li> </ul>
F94	Compressor discharge overshoot protection	4 times happen within 30 minutes	—	Compressor discharge pressure overshoot	<ul style="list-style-type: none"> <li>• Check refrigeration system</li> </ul>
F95	Outdoor cooling high pressure protection	4 times happen within 20 minutes	—	Cooling high pressure protection	<ul style="list-style-type: none"> <li>• Check refrigeration system</li> <li>• Outdoor air circuit</li> </ul>
F96	Power transistor module overheating protection	4 times happen within 30 minutes	—	Power transistor module overheat	<ul style="list-style-type: none"> <li>• PCB faulty</li> <li>• Outdoor air circuit (fan motor)</li> </ul>
F97	Compressor overheating protection	3 times happen within 30 minutes	—	Compressor overheat	<ul style="list-style-type: none"> <li>• Insufficient refrigerant</li> </ul>
F98	Total running current protection	3 times happen within 20 minutes	—	Total current protection	<ul style="list-style-type: none"> <li>• Check refrigeration system</li> <li>• Power source or compressor lock</li> </ul>
F99	Outdoor direct current (DC) peak detection	Continuous happen for 7 times	—	Power transistor module current protection	<ul style="list-style-type: none"> <li>• Power transistor module faulty or compressor lock</li> </ul>

## 15.4 Self-diagnosis Method

### 15.4.1 H11 (Indoor/Outdoor Abnormal Communication)

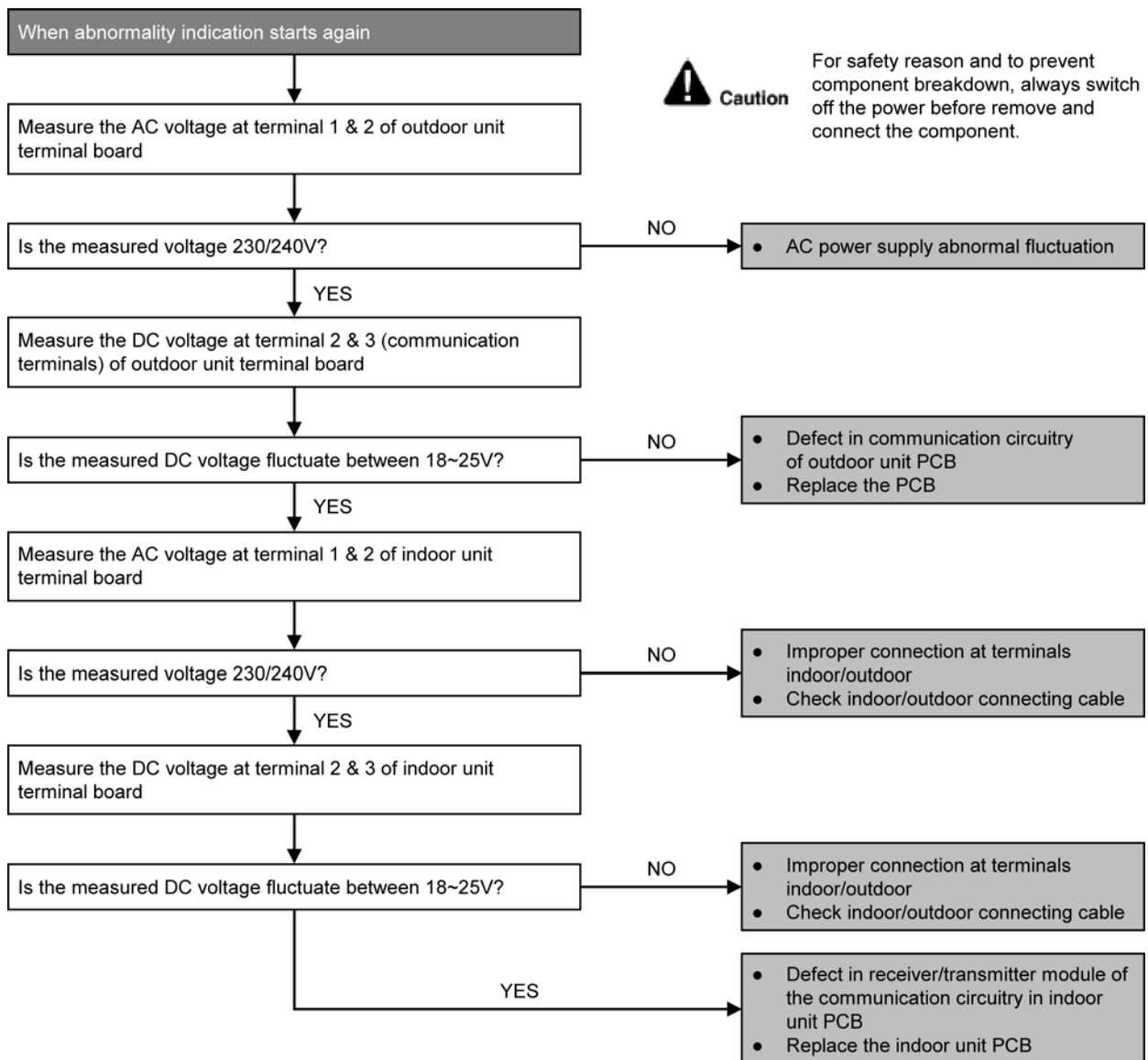
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.2 H12 (Indoor/Outdoor Capacity Rank Mismatched)

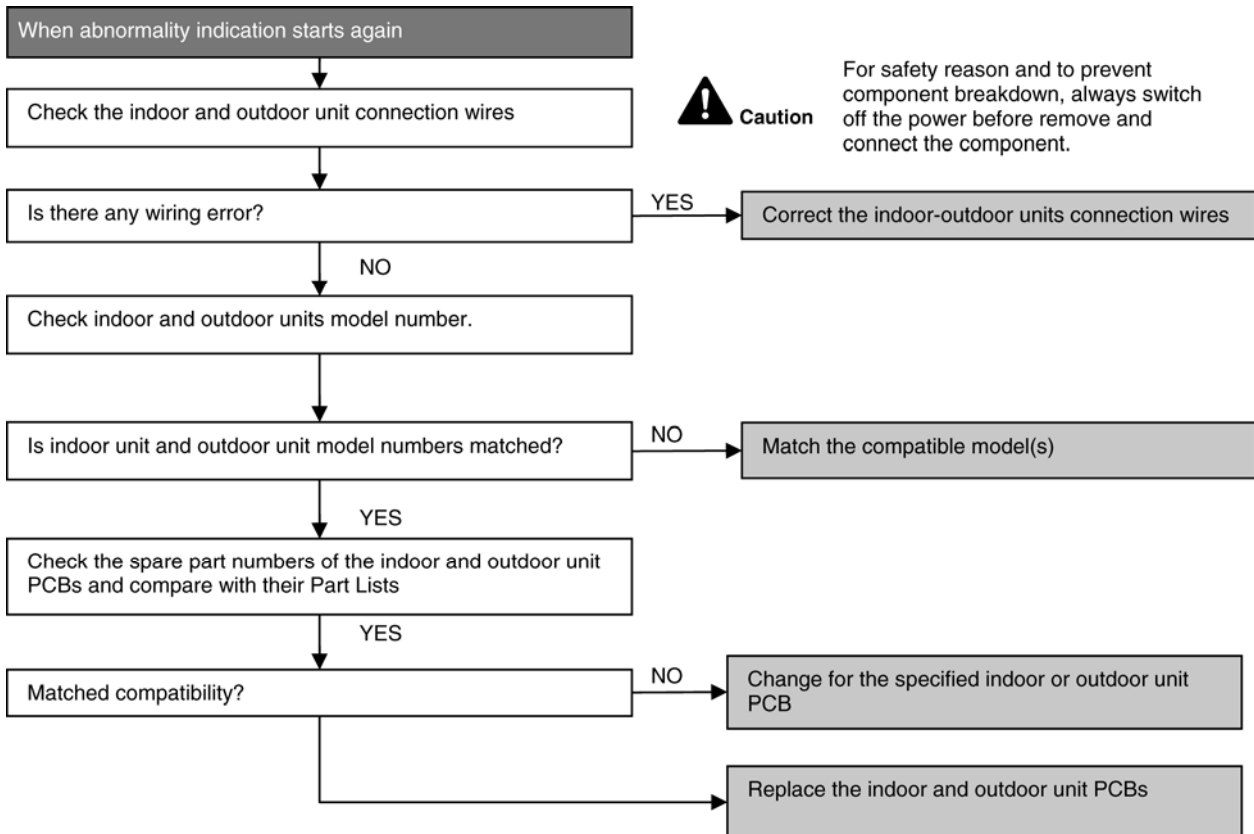
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



### 15.4.3 H14 (Indoor Intake Air Temperature Sensor Abnormality)

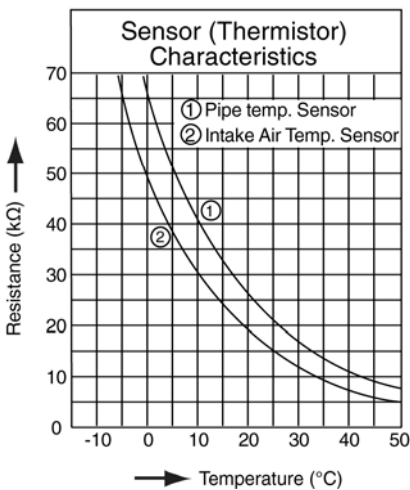
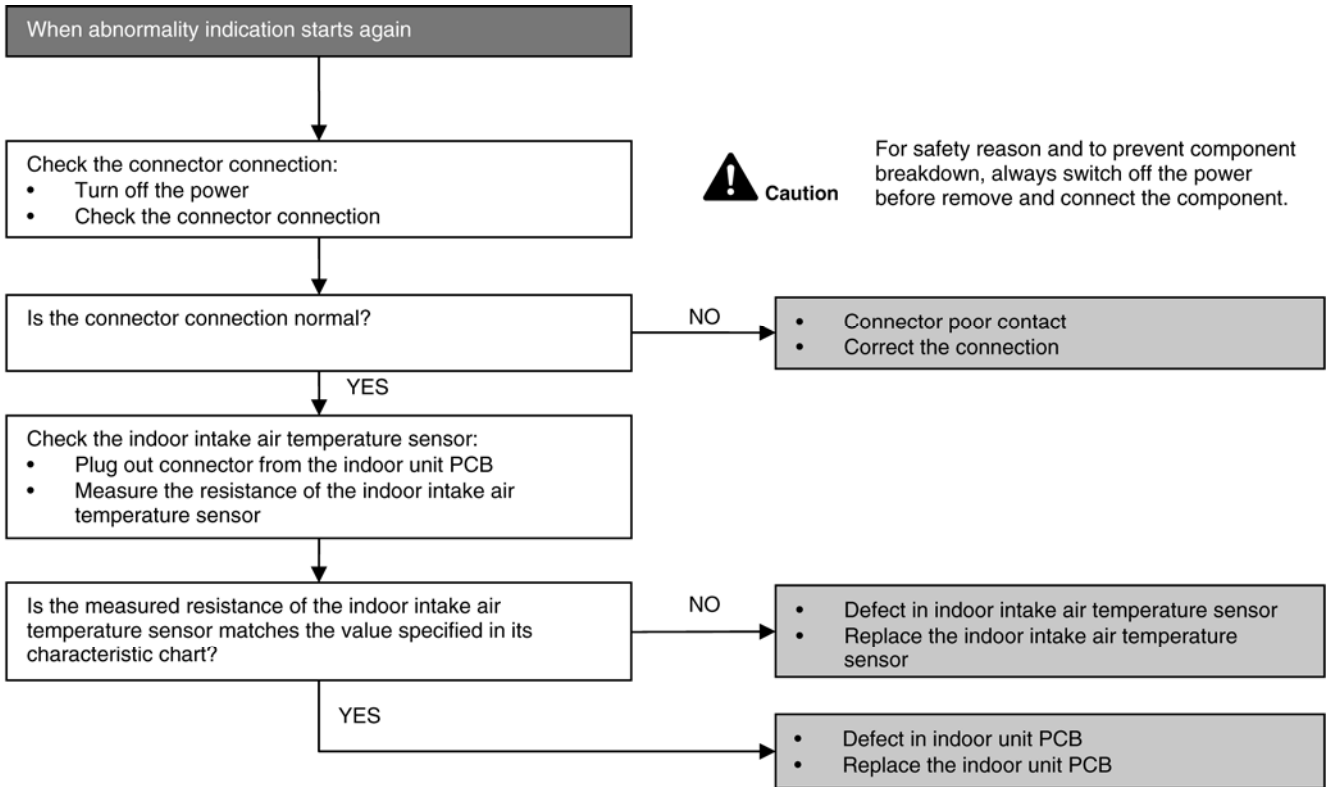
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.4 H15 (Compressor Temperature Sensor Abnormality)

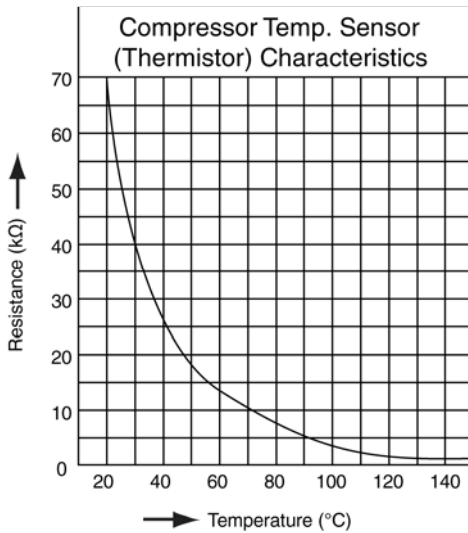
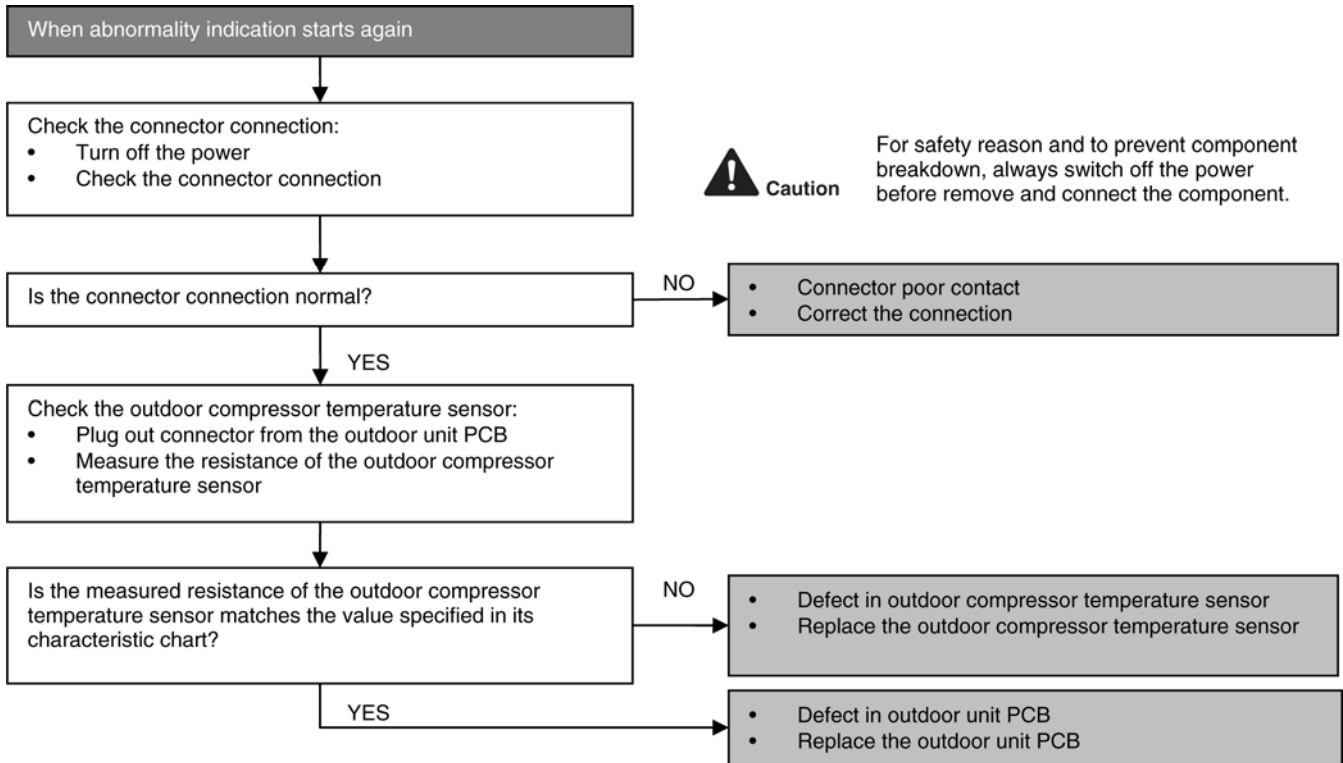
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting





### 15.4.5 H16 (Outdoor Current Transformer)

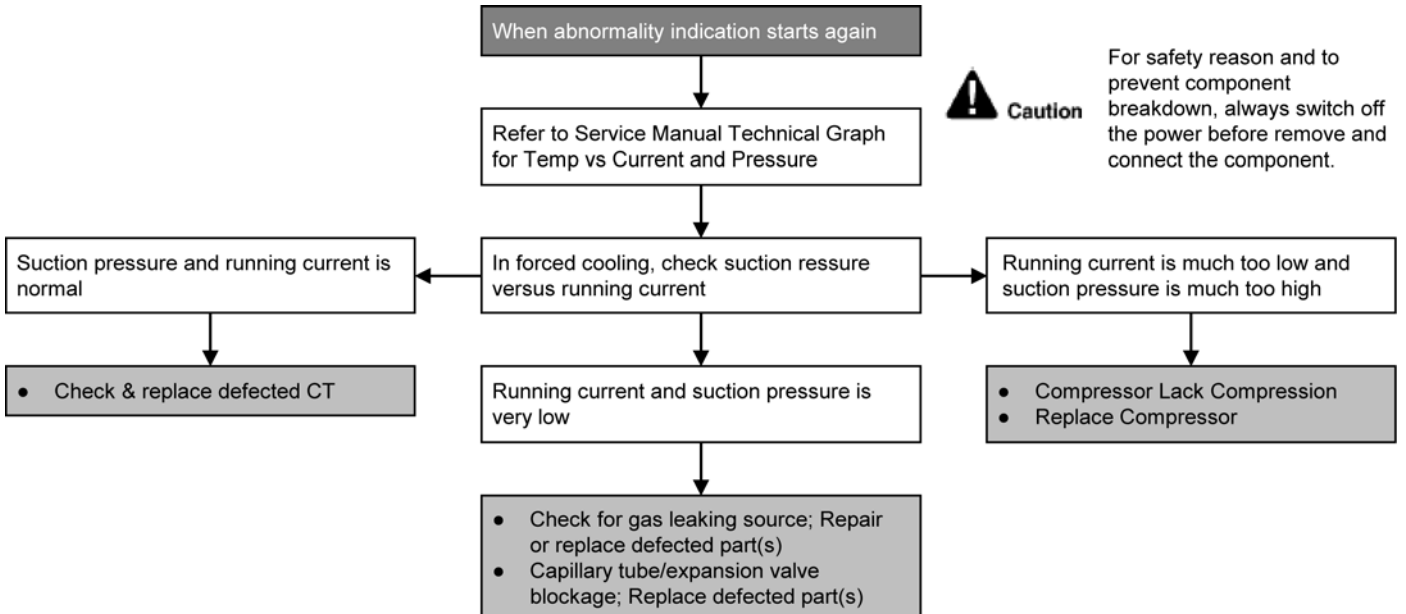
#### Malfunction Decision Conditions

- An input current, detected by Current Transformer CT, is below threshold value when the compressor is operating at certain frequency value for 3 minutes.

#### Malfunction Caused

- Lack of gas
- Broken CT (current transformer)
- Broken Outdoor PCB

#### Troubleshooting



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

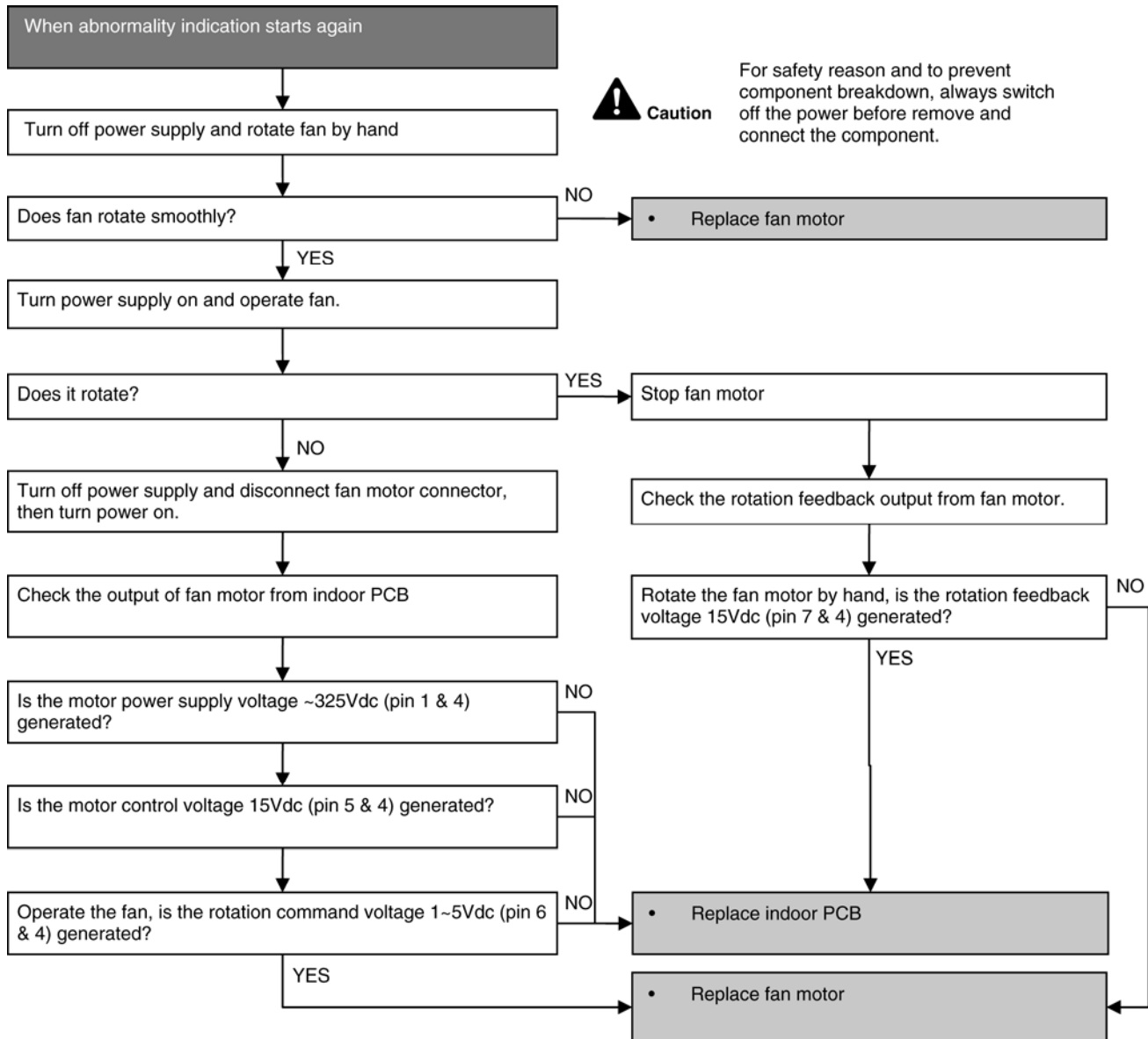
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



## 15.4.7 H23 (Indoor Pipe Temperature Sensor Abnormality)

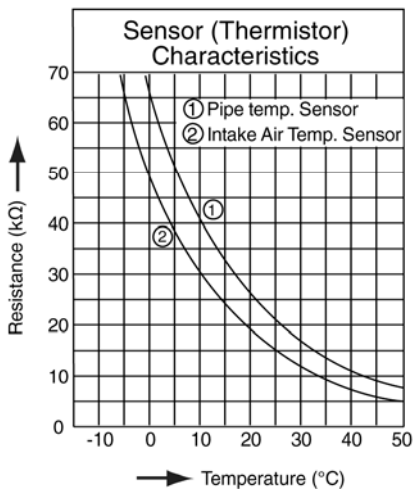
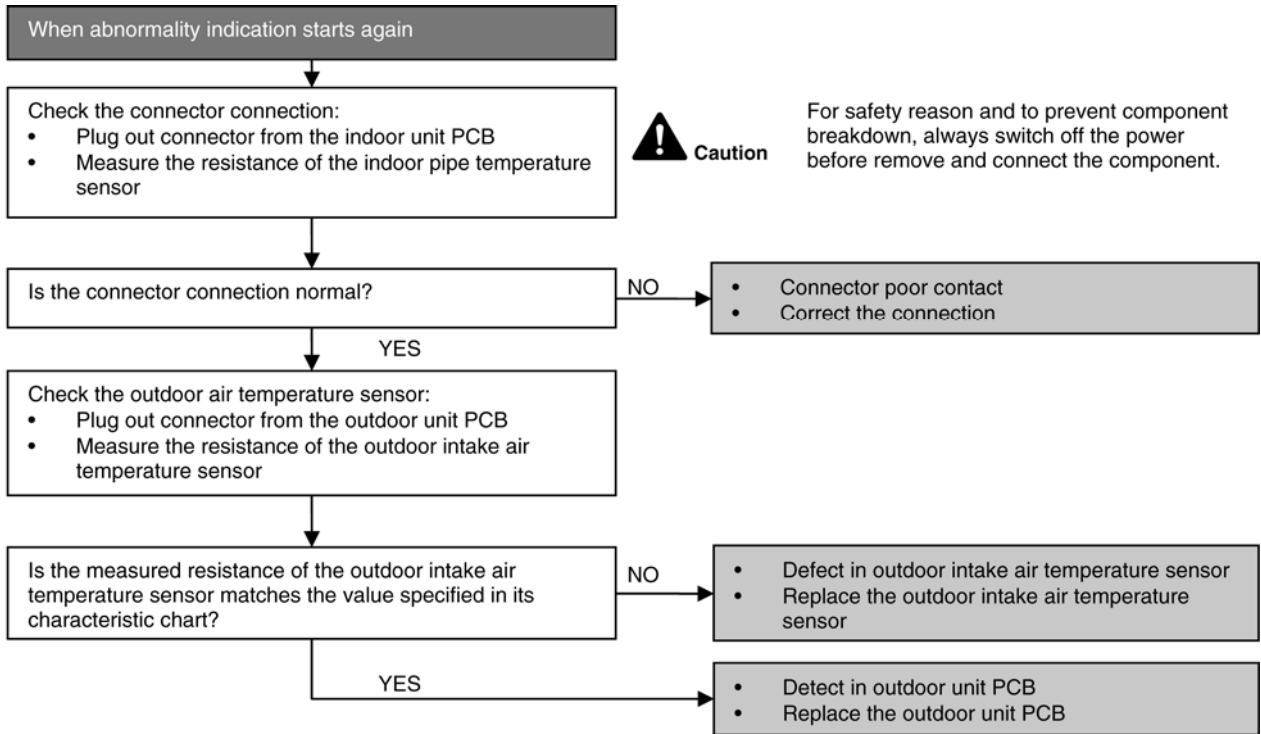
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



## 15.4.8 H27 (Outdoor Air Temperature Sensor Abnormality)

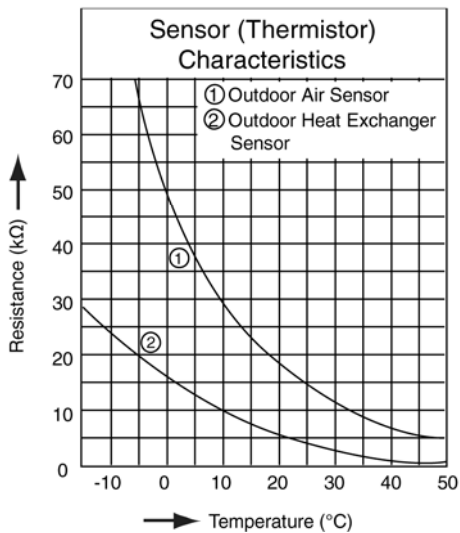
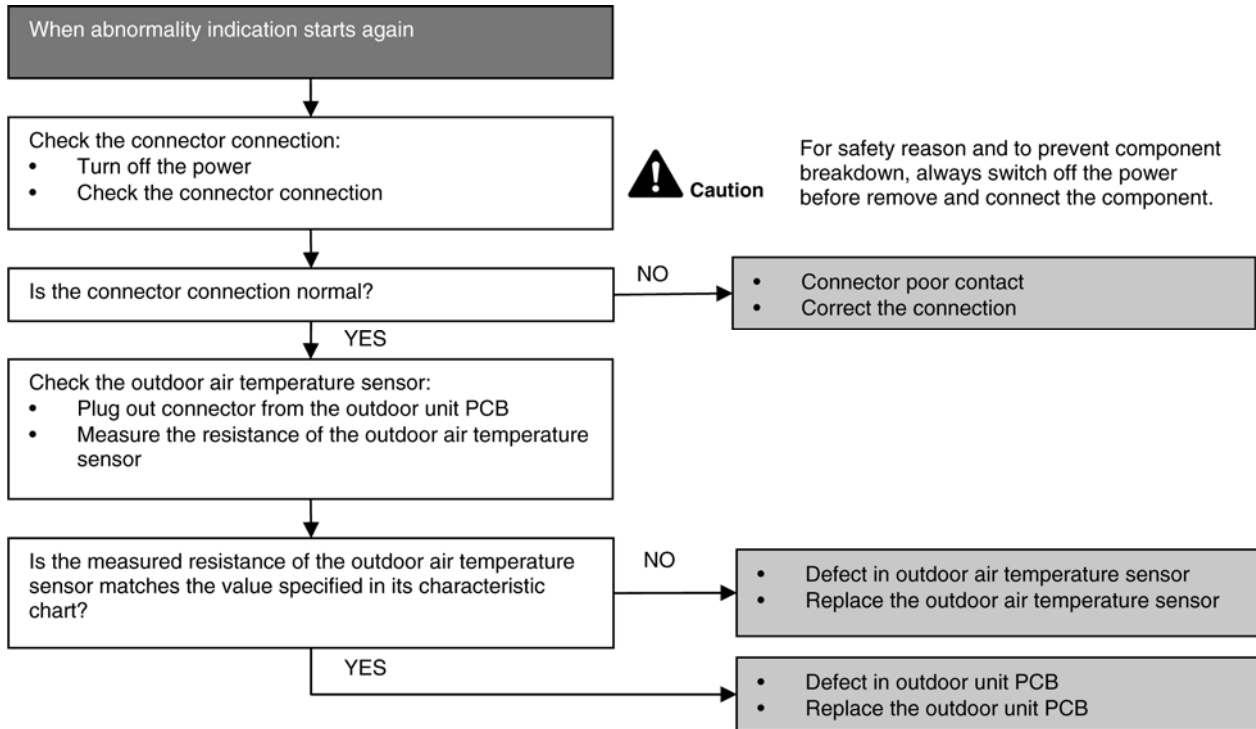
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



### 15.4.9 H28 (Outdoor Pipe Temperature Sensor Abnormality)

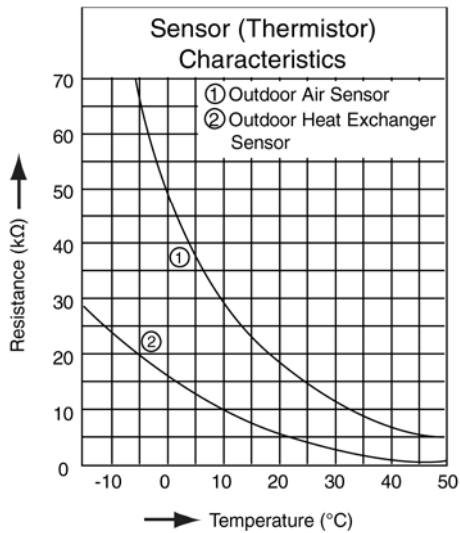
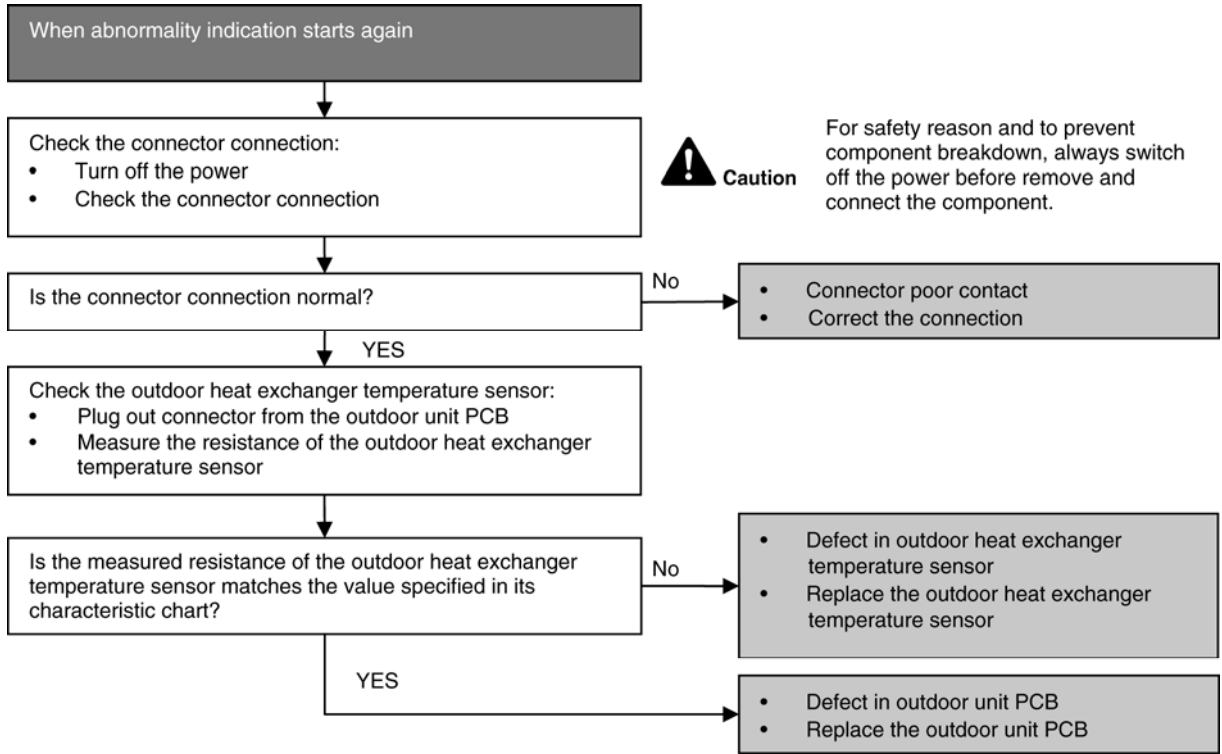
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.10 H30 (Compressor Discharge Temperature Sensor Abnormality)

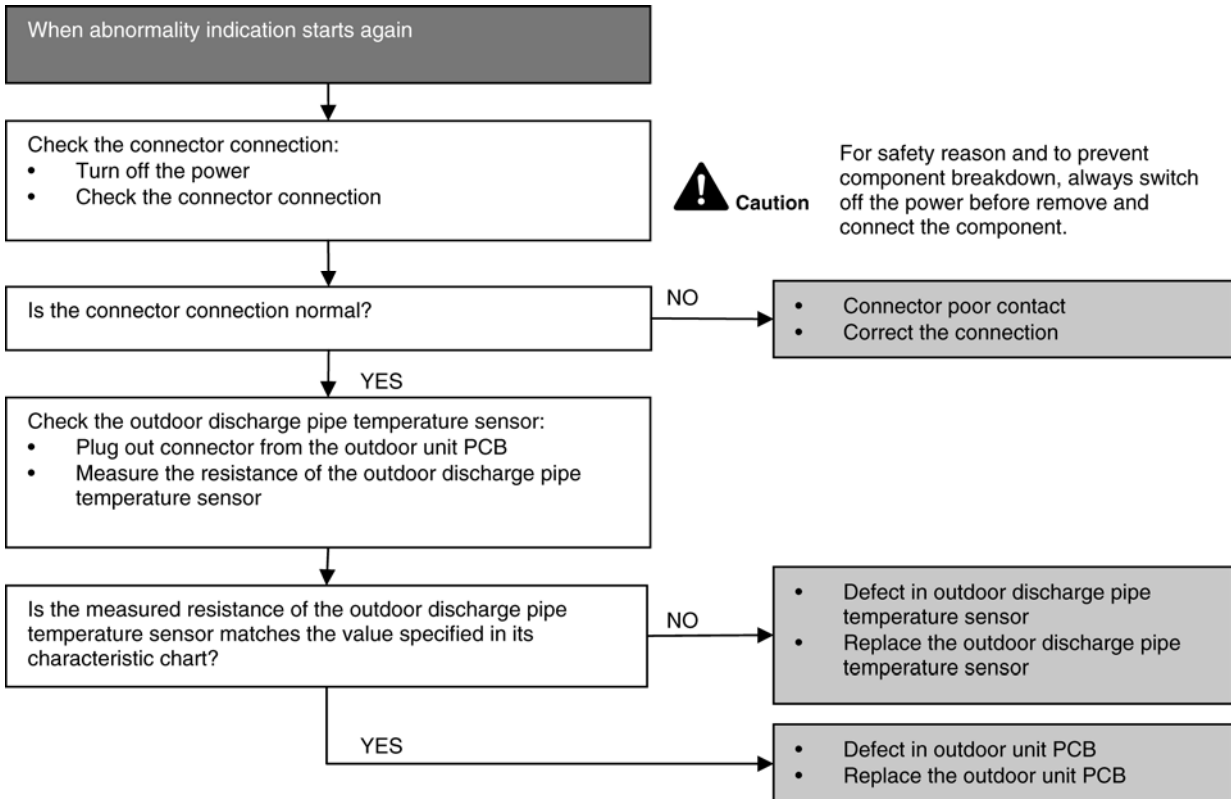
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



### 15.4.11 H32 (Outdoor Heat Exchanger Temperature Sensor 2 Abnormality)

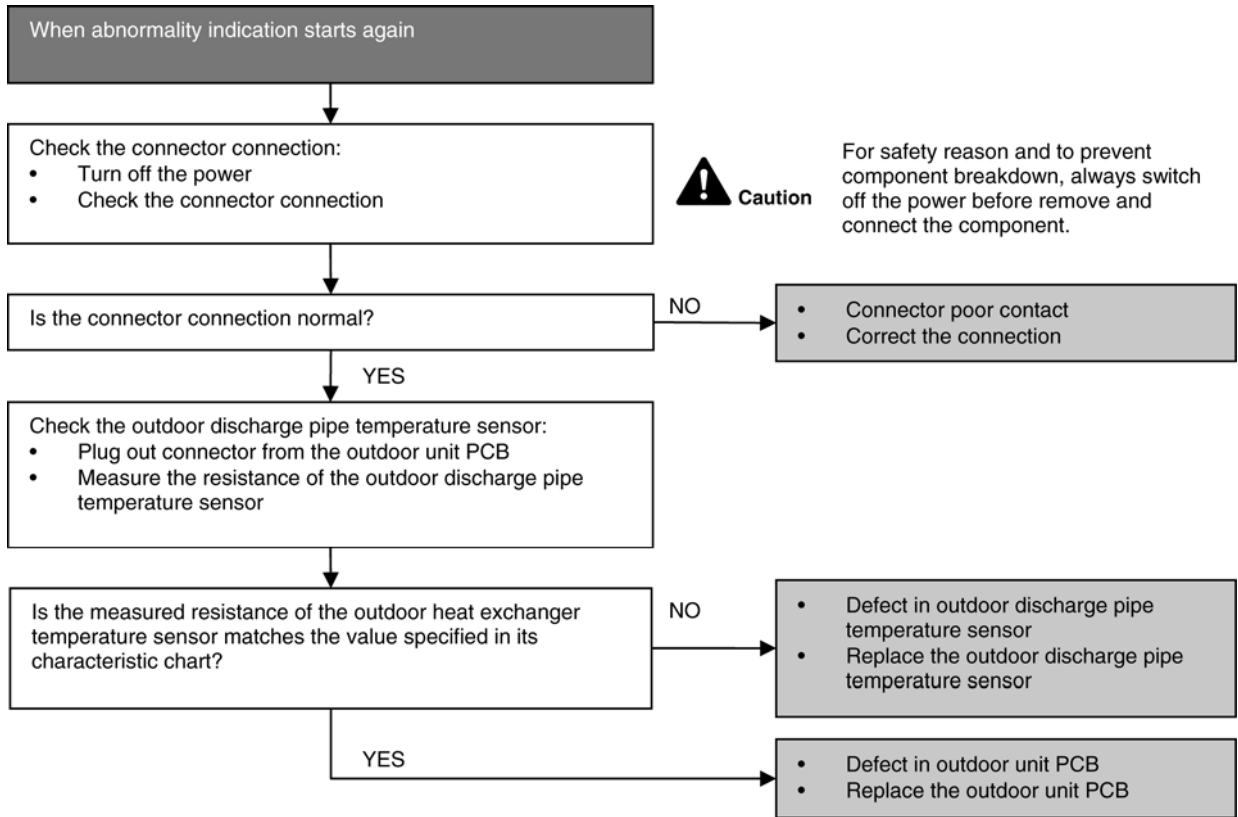
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.12 H33 (Unspecified Voltage between Indoor and Outdoor)

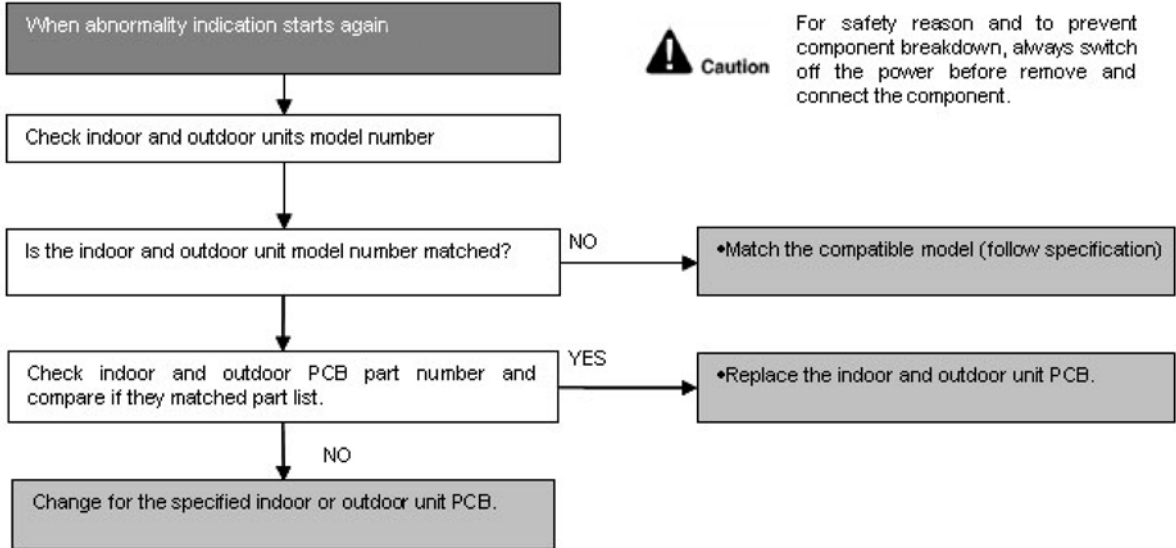
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting





### 15.4.13 H34 (Outdoor Heat Sink Temperature Sensor Abnormality)

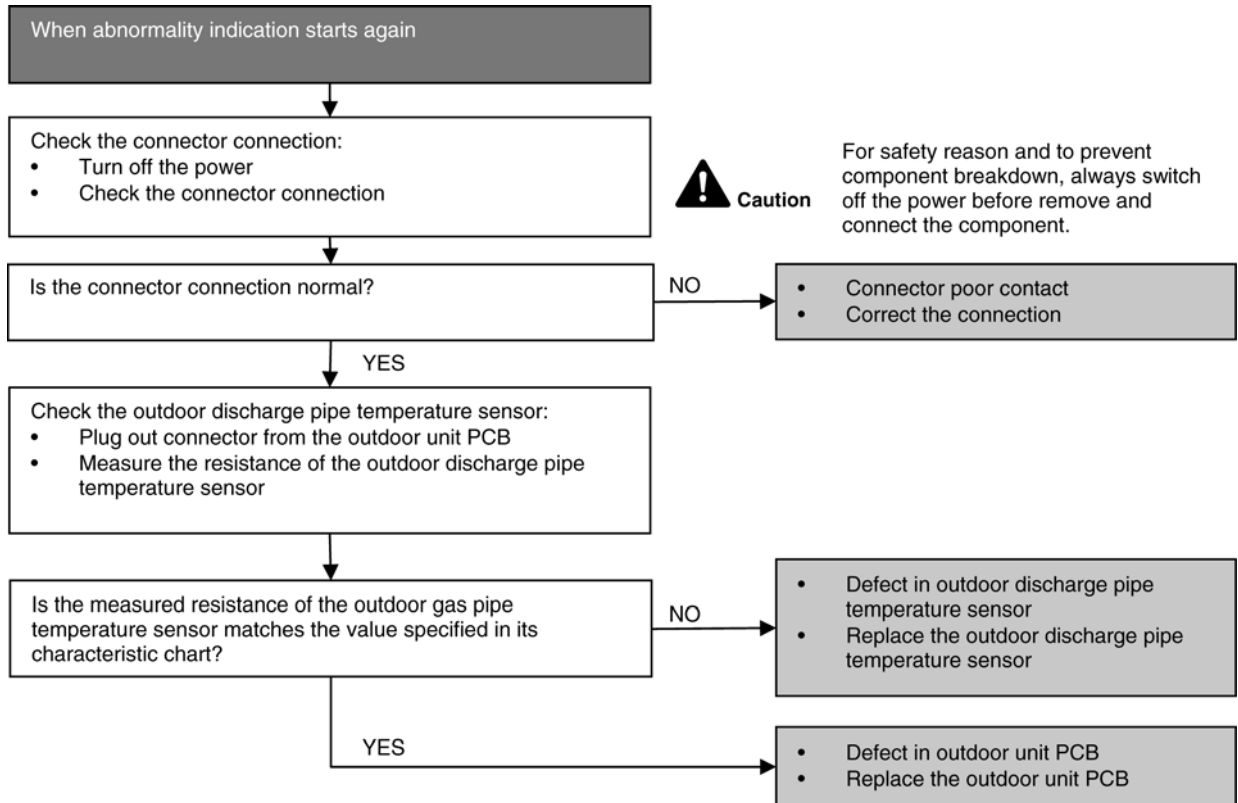
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.14 H36 (Outdoor Gas Pipe Sensor Abnormality)

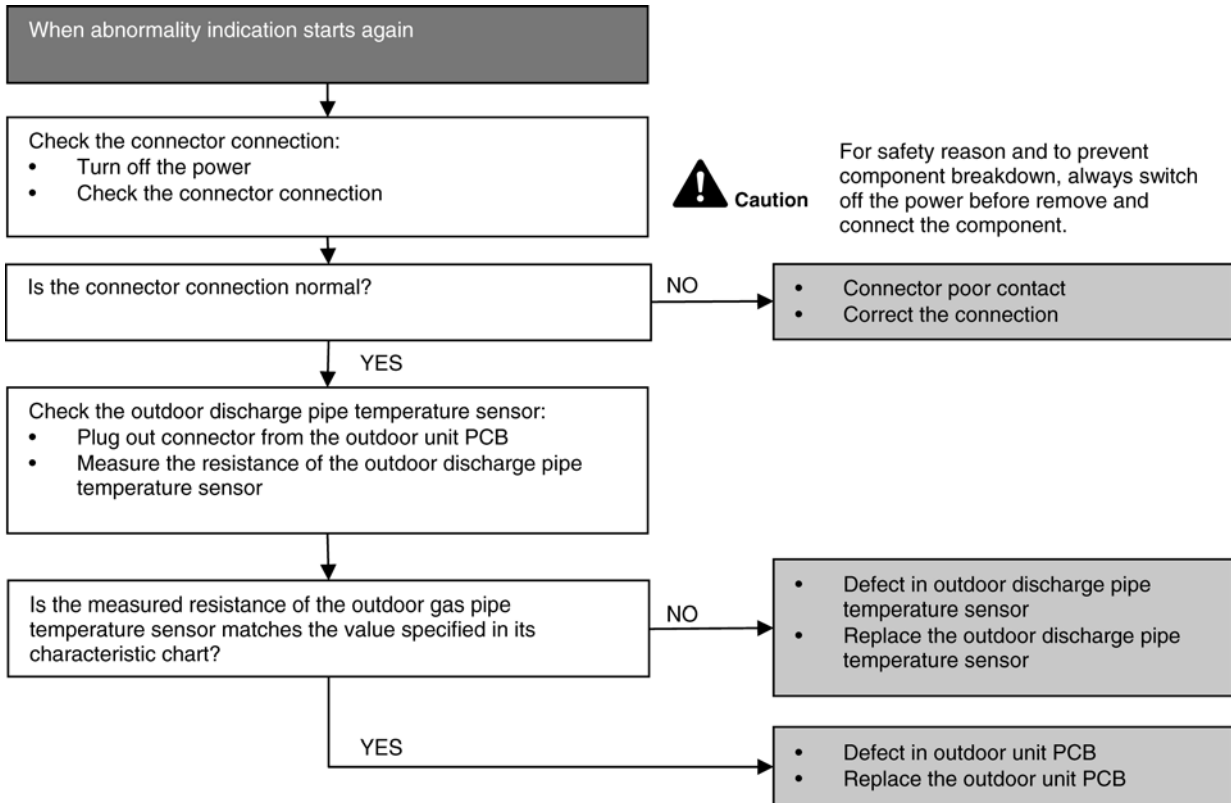
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



### 15.4.15 H37 (Outdoor Liquid Pipe Temperature Sensor Abnormality)

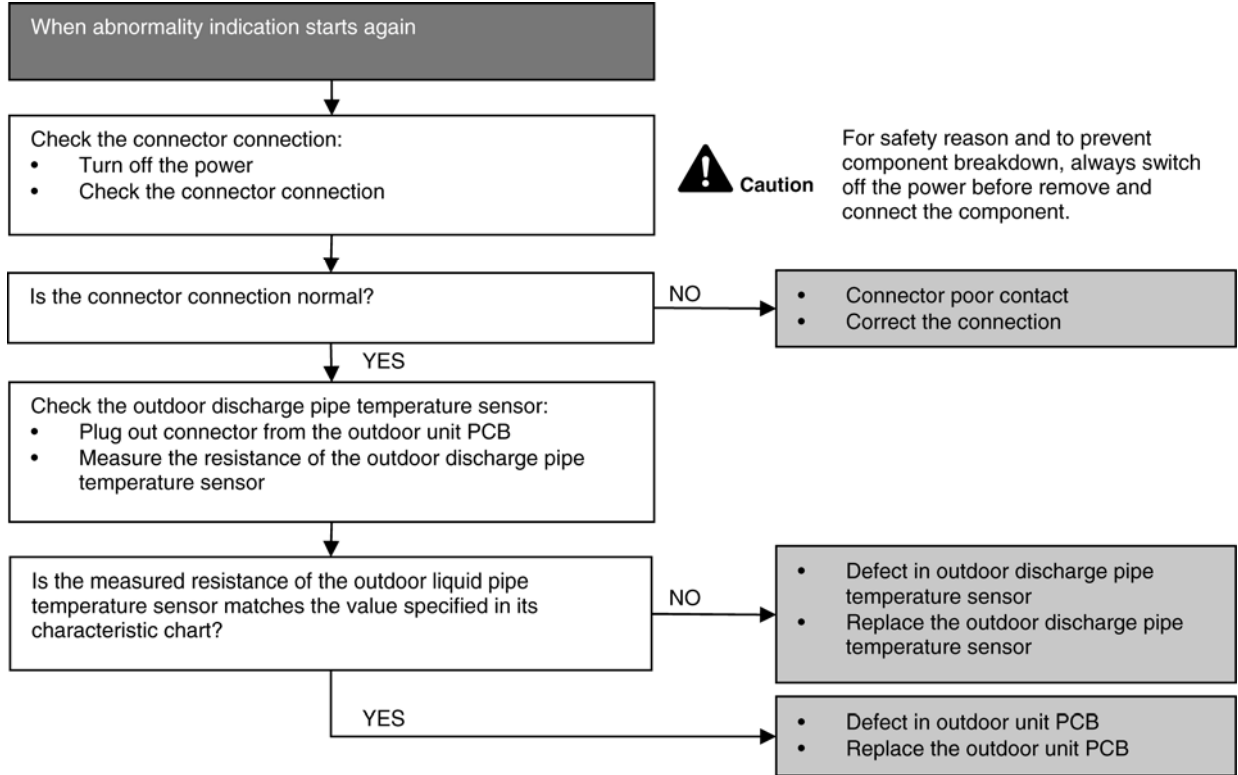
#### Malfunction Decision Conditions

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

#### Malfunction Caused

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

#### Troubleshooting



## 15.4.16 H97 (Outdoor Fan Motor – DC Motor Mechanism Locked)

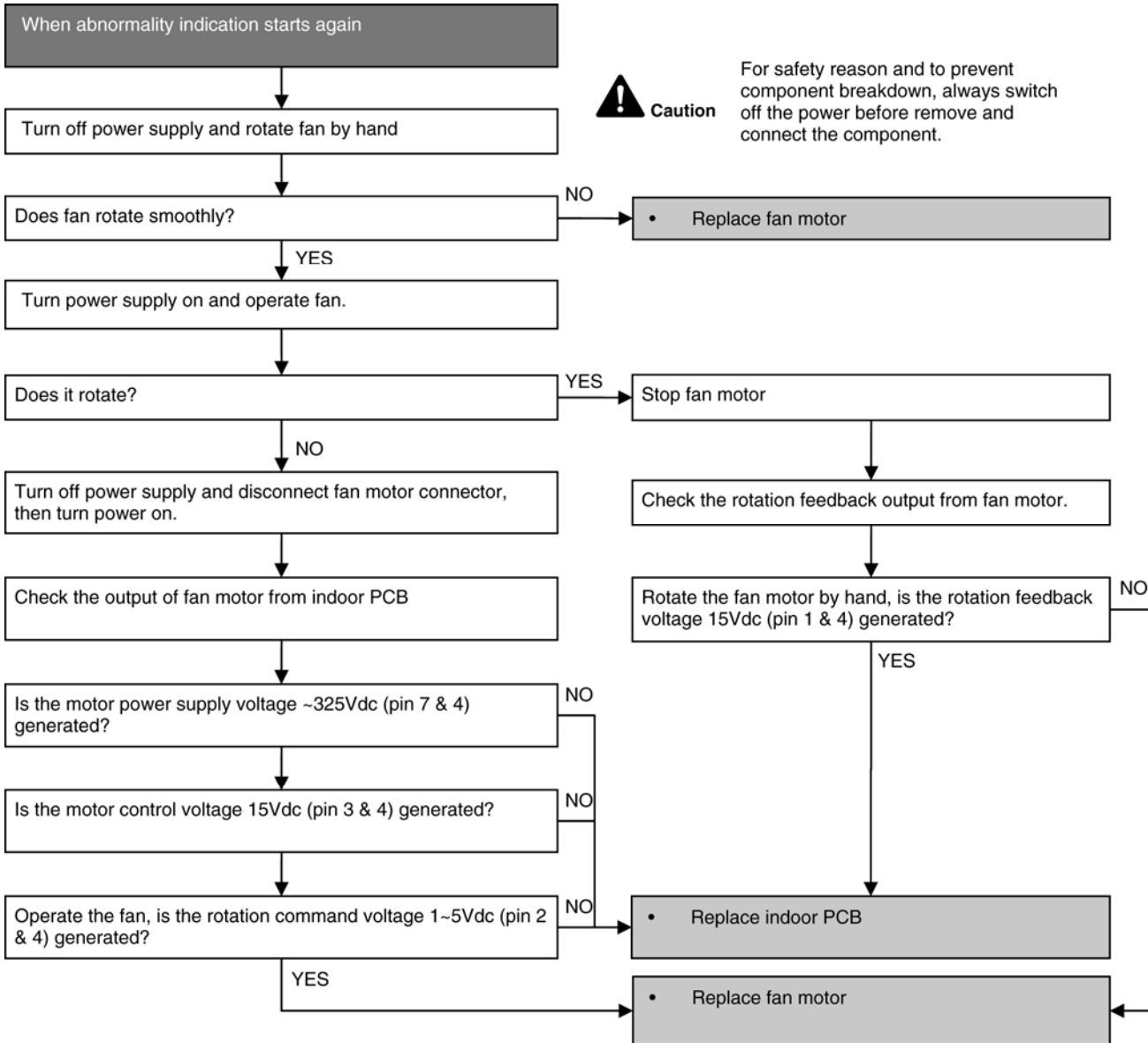
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting



### 15.4.17 H98 (Error Code Stored in Memory and no alarm is triggered / no TIMER LED flashing)

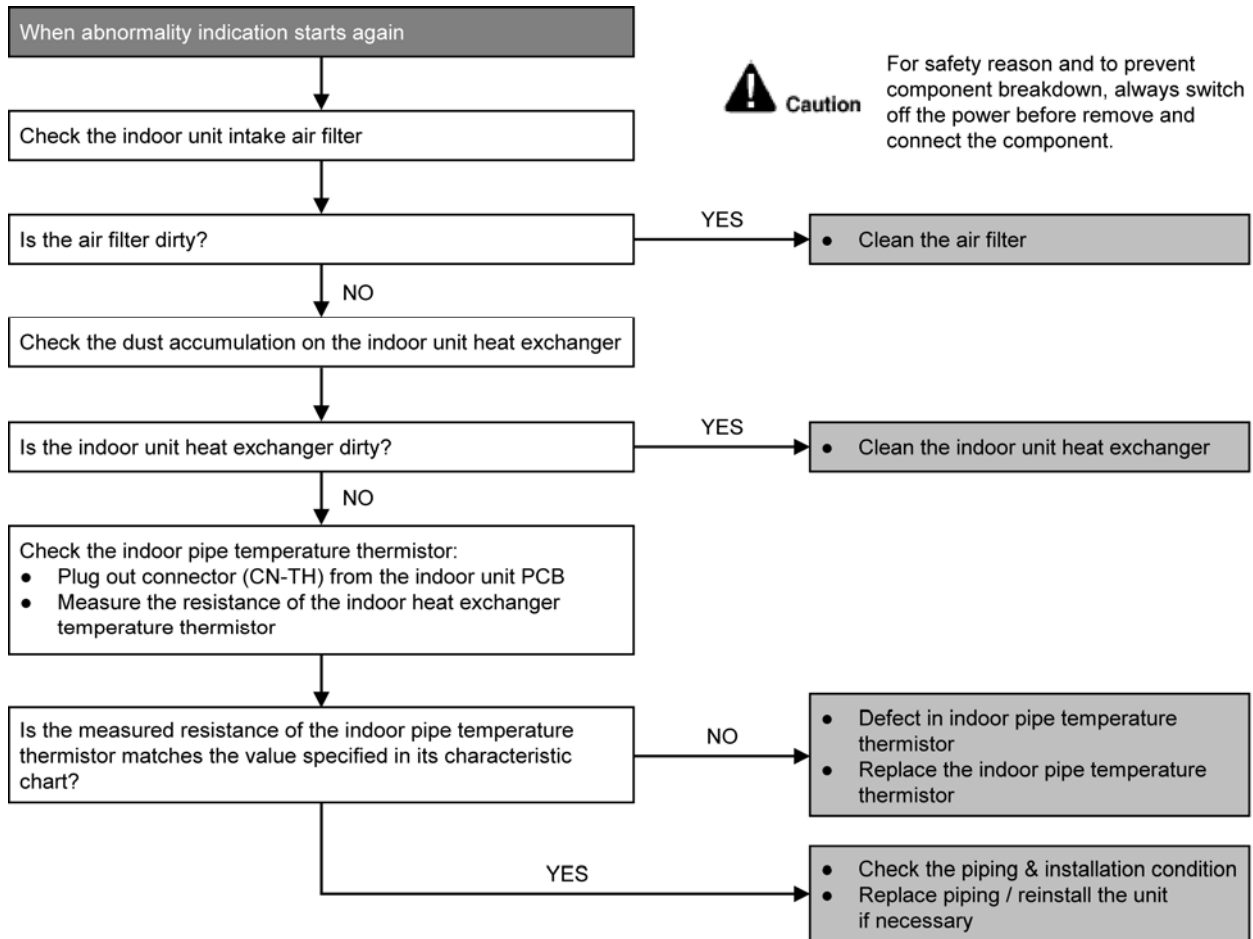
#### Malfunction Decision Conditions

- Indoor high pressure is detected when indoor heat exchanger is detecting very high temperature when the unit is operating in heating operation.
- Phenomena: unit is stopping and re-starting very often in heating mode

#### Malfunction Caused

- Indoor heat exchanger thermistor
- Clogged air filter or heat exchanger
- Over-bent pipe (liquid side)

#### Troubleshooting



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

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

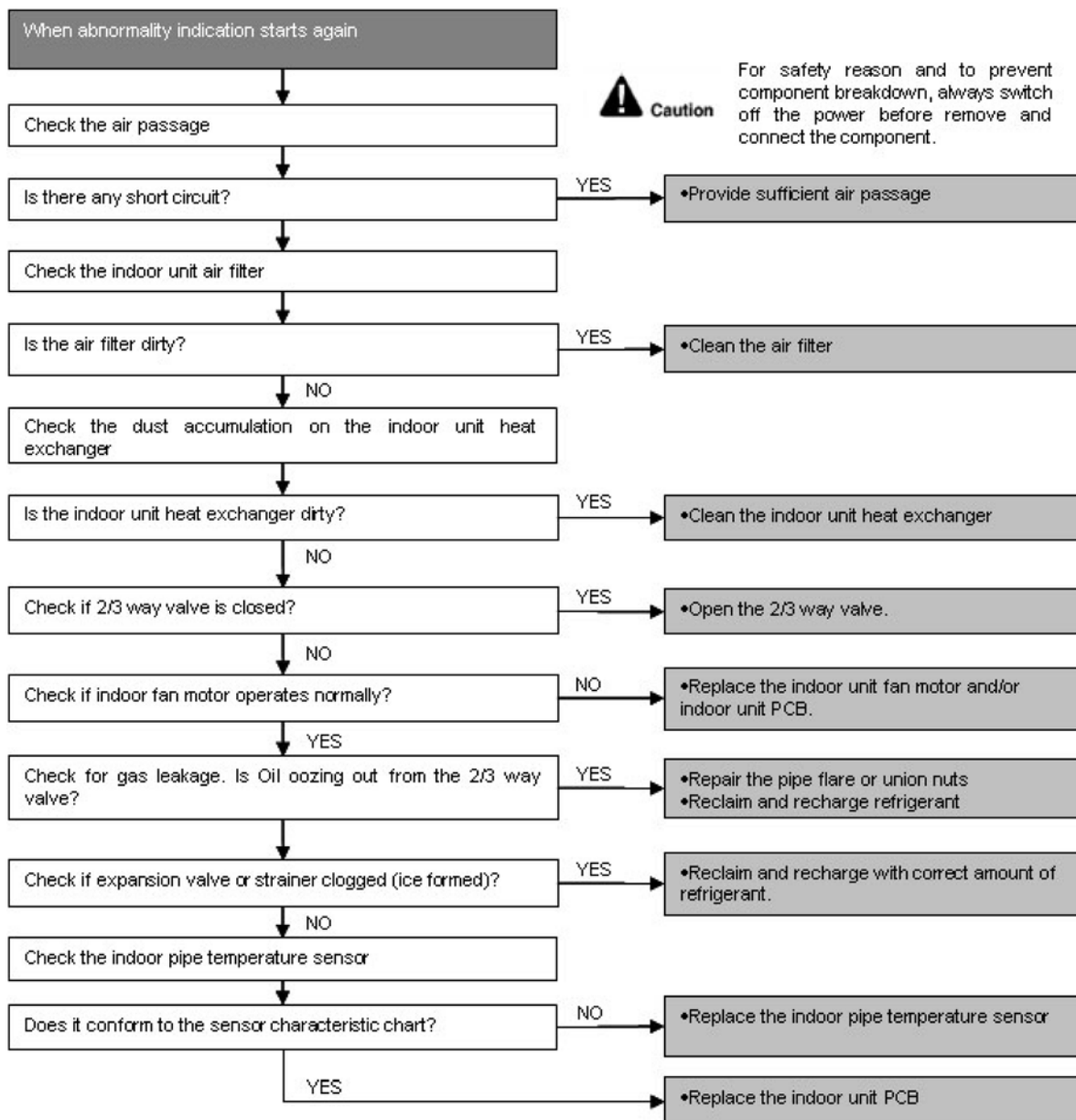
### Malfunction Decision Conditions

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

### Malfunction Caused

- Air short circuit at indoor unit
- Clogged indoor unit air filter
- Dust accumulation on the indoor unit heat exchanger
- 2/3 way valve closed
- Faulty indoor unit fan motor
- Refrigerant shortage (refrigerant leakage)
- Clogged expansion valve or strainer
- Faulty indoor pipe temperature sensor
- Faulty indoor unit PCB

### Troubleshooting



## 15.4.19 F11 (4-way Valve Switching Failure)

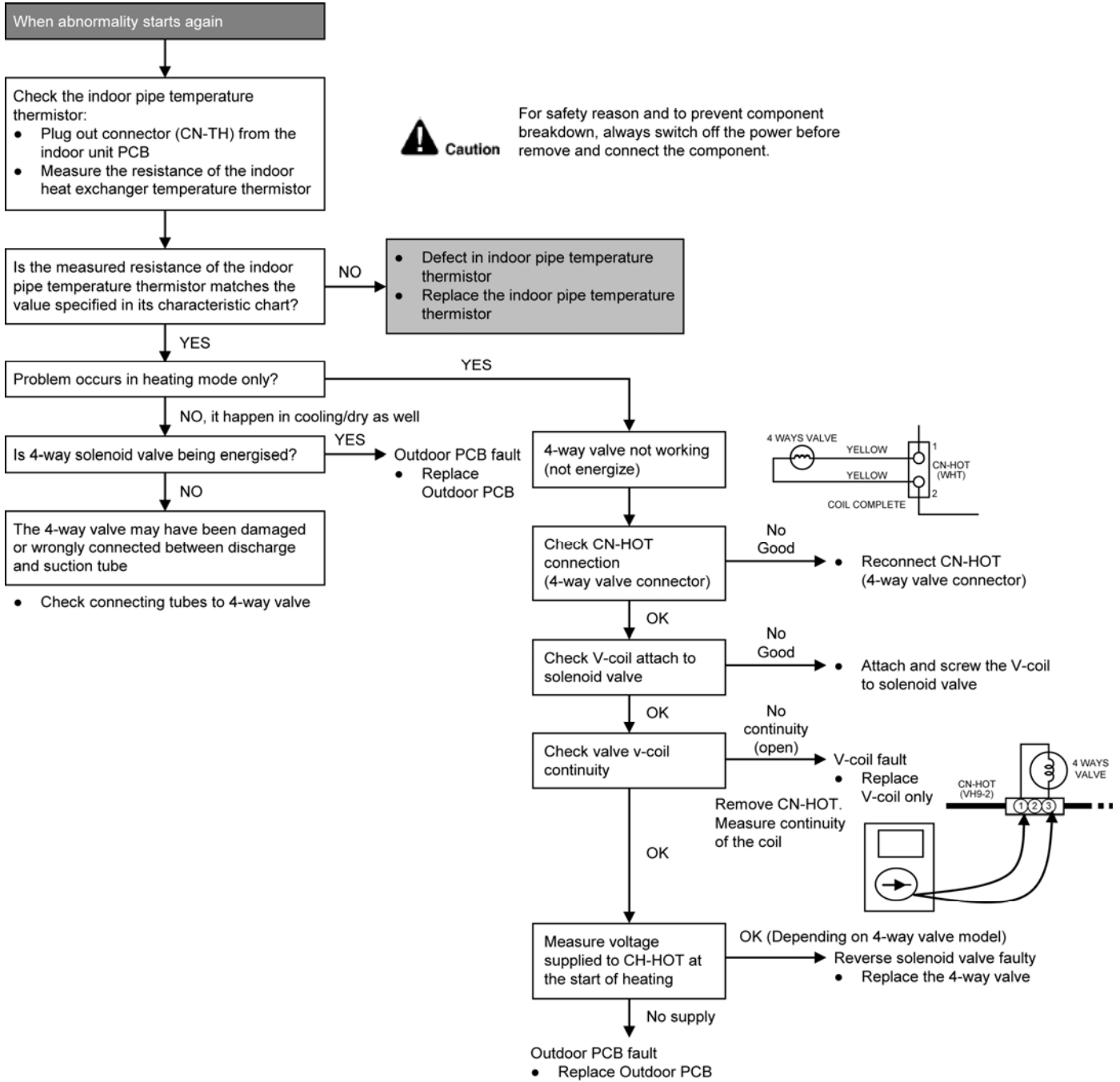
### Malfunction Decision Conditions

- When indoor heat exchanger is cold during heating (except deice) or when indoor heat exchanger is hot during cooling and compressor operating, the 4-way valve is detected as malfunction.

### Malfunction Caused

- Indoor heat exchanger (pipe) thermistor
- 4-way valve malfunction

### Troubleshooting



\* Check gas side pipe – for hot gas flow in cooling mode

## 15.4.20 F17 (Indoor Standby Units Freezing Abnormality)

### Malfunction Decision Conditions

- When the different between indoor intake air temperature and indoor pipe temperature is above 10°C or indoor pipe temperature is below -1.0°C.

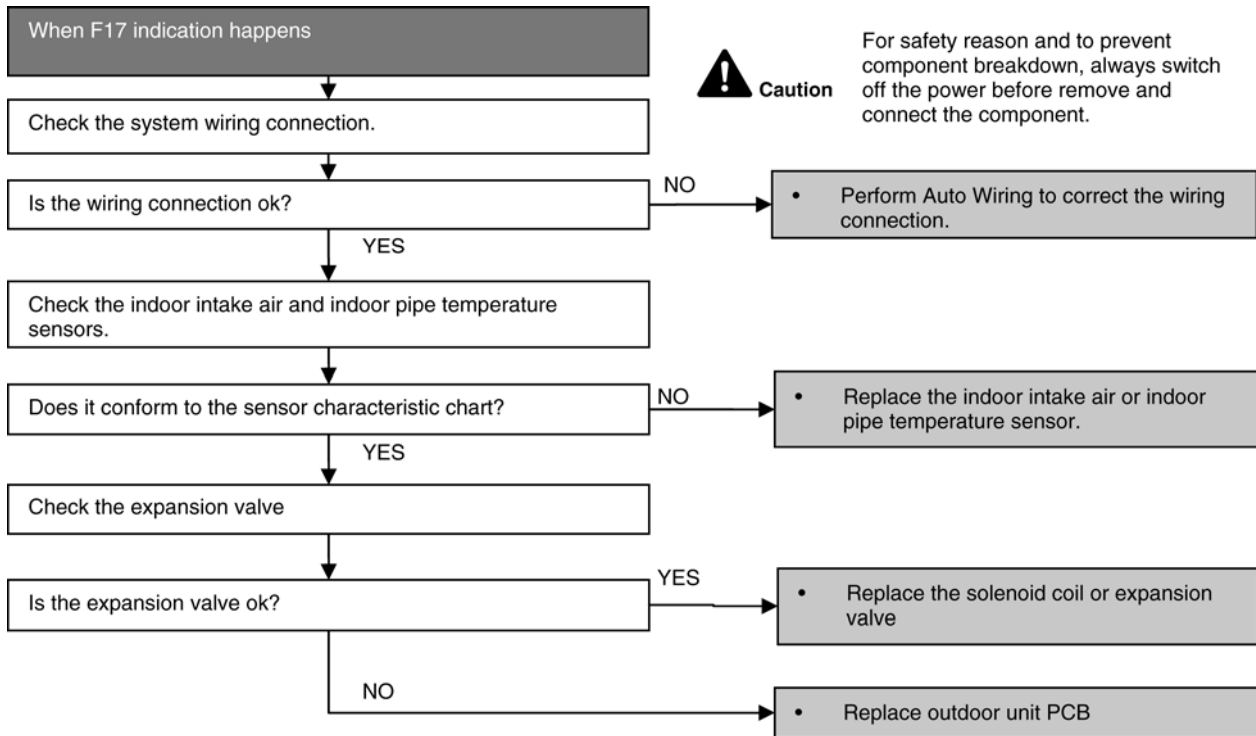
### Remark:

When the indoor standby unit is freezing, the outdoor unit transfers F17 error code to the corresponding indoor unit and H39 to other indoor unit(s).

### Malfunction Caused

- Wrong wiring connection
- Faulty sensor
- Faulty expansion valve

### Troubleshooting





## 15.4.21 F90 (Power Factor Correction Protection)

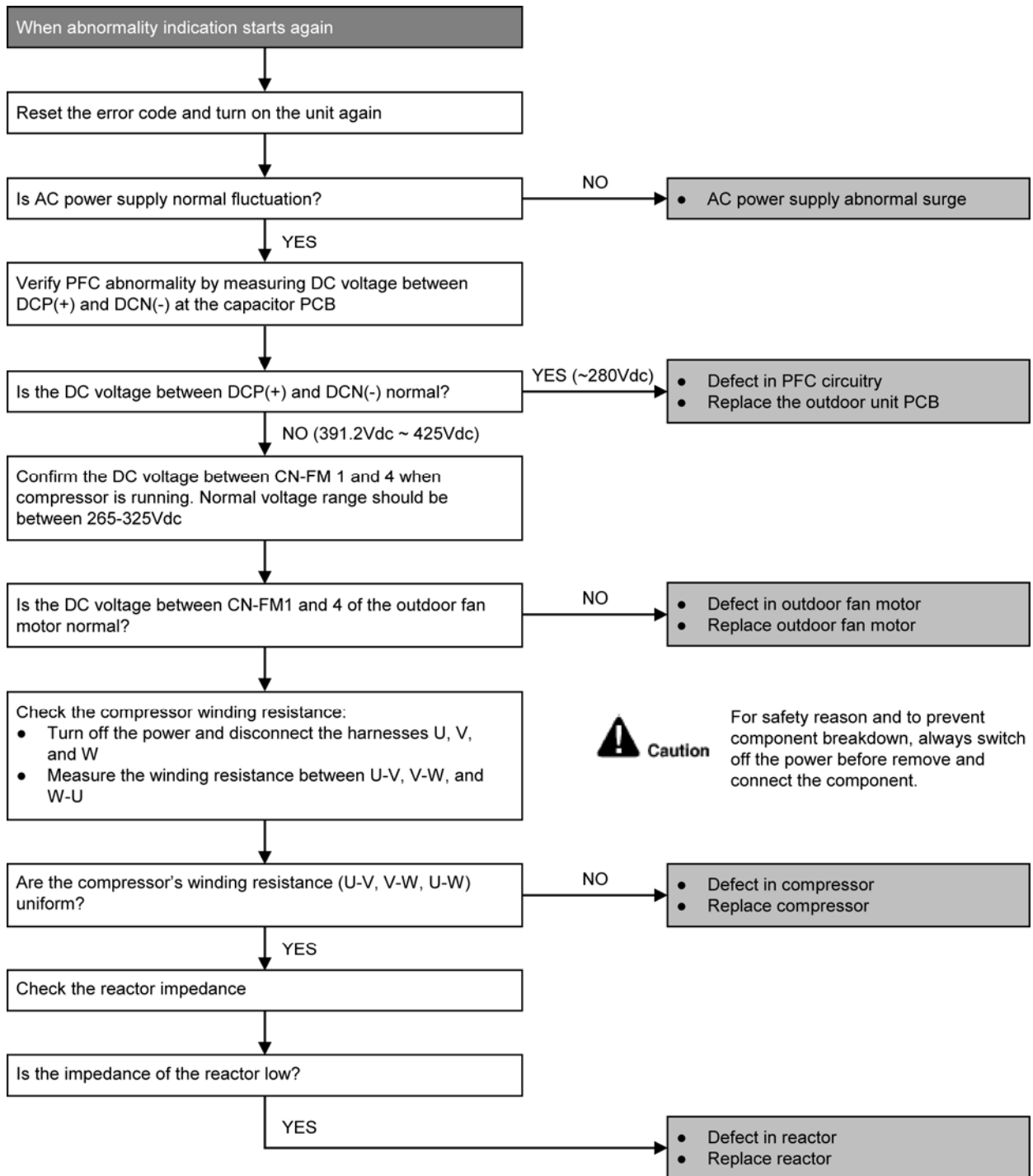
### Malfunction Decision Conditions

- To maintain DC voltage level supply to power transistor.
- To detect high DC voltage level after rectification.

### Malfunction Caused

- During startup and operation of cooling and heating, when Power Factor Correction (PFC) protection circuitry at the outdoor unit main PCB senses abnormal DC voltage level for power transistors.
- When DC voltage detected is LOW, transistor switching will turn ON by controller to push-up the DC level.
- When DC voltage detected is HIGH (391Vdc – 425Vdc), active LOW signal will send by the controller to turn OFF relay RY-C.

### Troubleshooting



## 15.4.22 F91 (Refrigeration Cycle Abnormality)

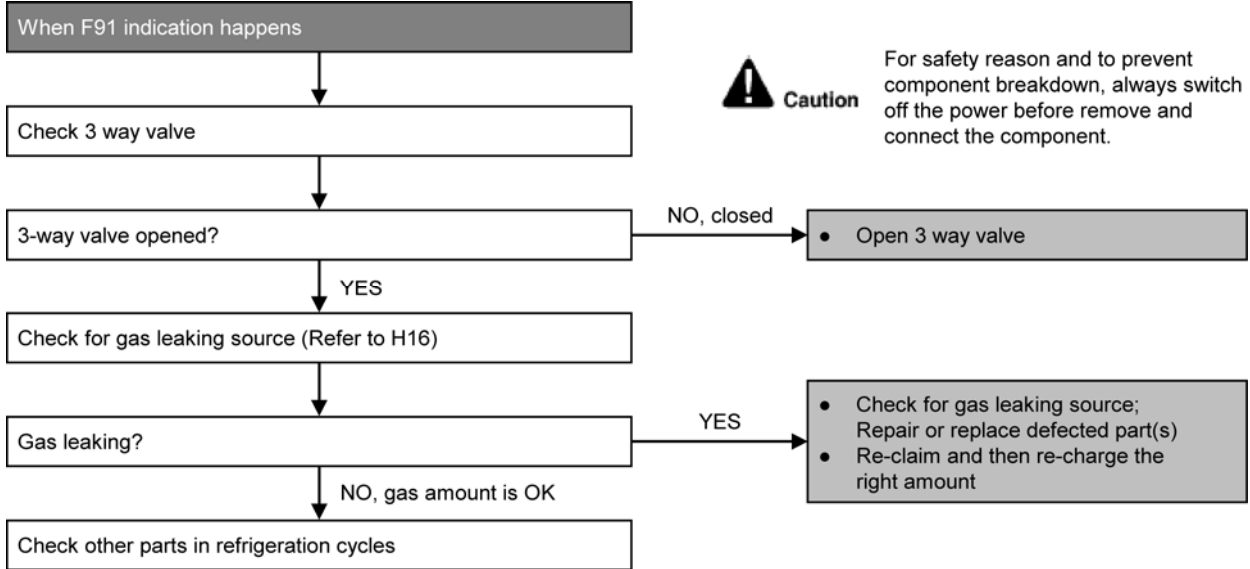
### Malfunction Decision Conditions

- The input current is low while the compressor is running at higher than the setting frequency.

### Malfunction Caused

- Lack of gas.
- 3-way valve close.

### Troubleshooting



### 15.4.23 F93 (Compressor Rotation Failure)

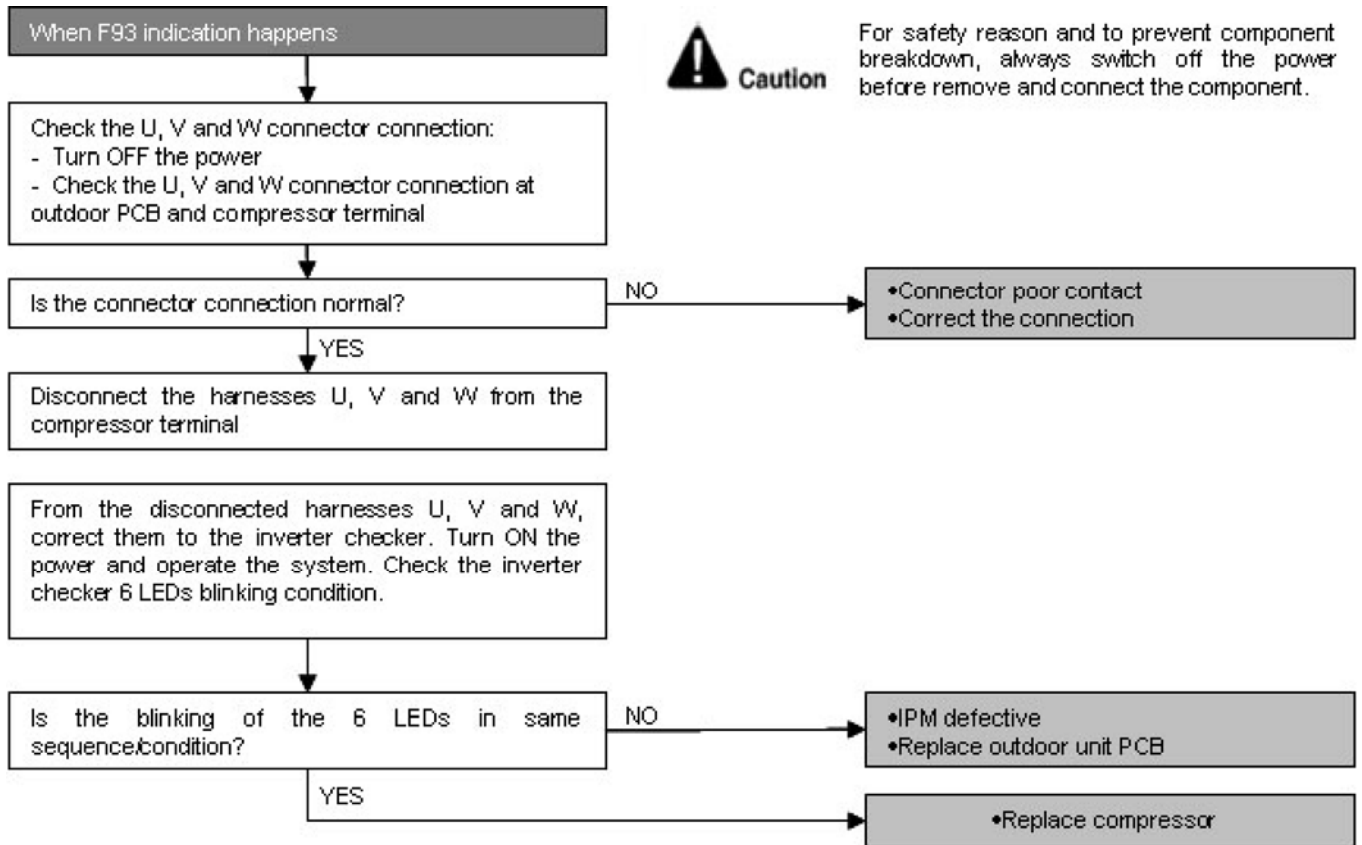
#### Malfunction Decision Conditions

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

#### Malfunction Caused

- Compressor terminal disconnect
- Faulty Outdoor PCB
- Faulty compressor

#### Troubleshooting



## 15.4.24 F95 (Outdoor High Pressure Protection: Cooling or Soft Dry)

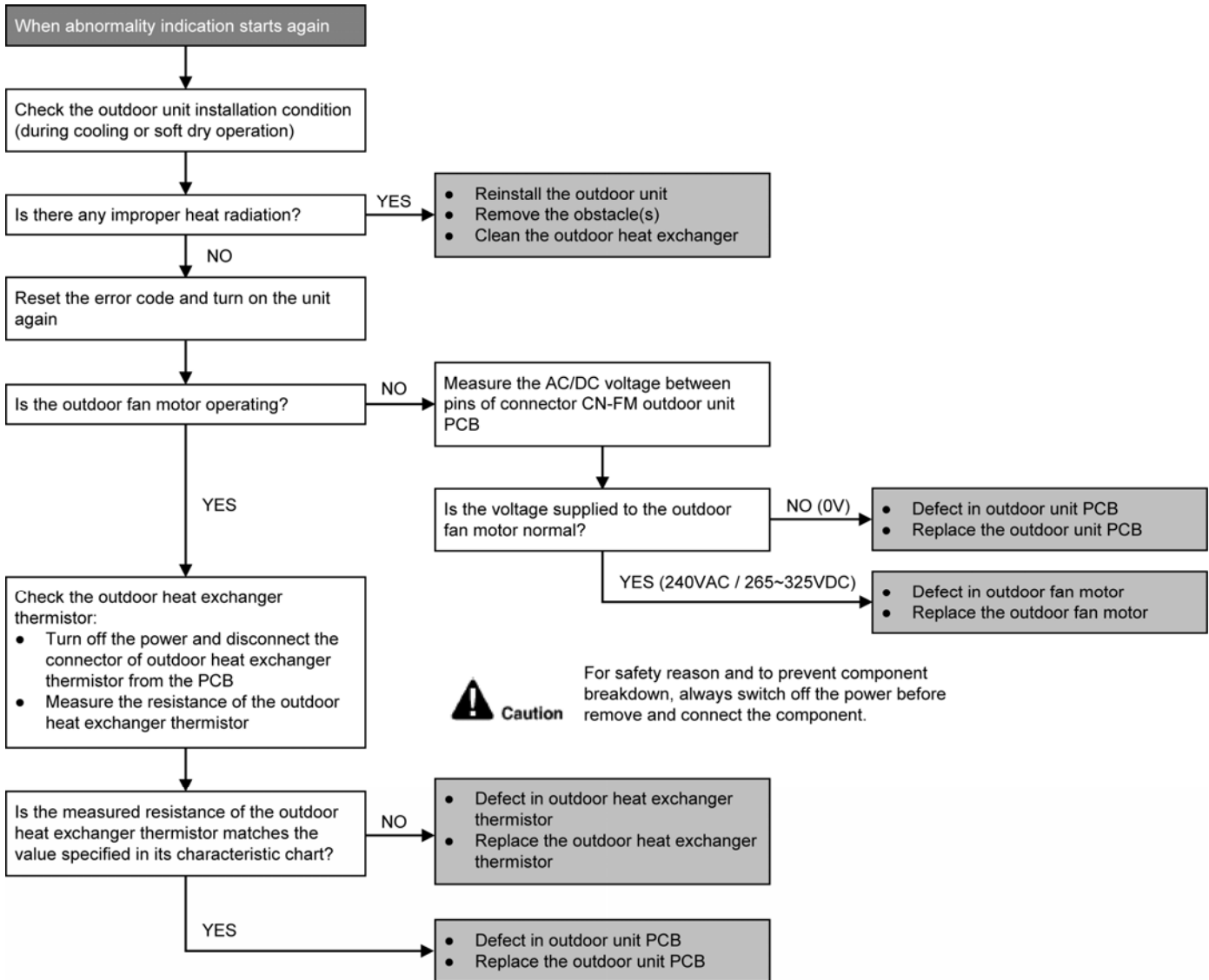
### Malfunction Decision Conditions

- During operation of cooling or soft dry, when outdoor unit heat exchanger high temperature data is detected by the outdoor unit heat exchanger thermistor.

### Malfunction Caused

- Outdoor heat exchanger temperature rise due to short-circuit of hot discharge air flow.
- Outdoor heat exchanger temperature rise due to defective of outdoor fan motor.
- Outdoor heat exchange temperature rise due to defective outdoor heat exchanger thermistor.
- Outdoor heat exchanger temperature rise due to defective of outdoor unit PCB.

### Troubleshooting



### 15.4.25 F96 (IPM Overheating)

#### Malfunction Decision Conditions

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

*Multi Models only*

- Compressor Overheating: During operation of cooling and heating, when the compressor OL is activated.
- Heat Sink Overheating: During operation of cooling and heating, when heat sink temperature data (90°C) is detected by the heat sink temperature sensor.

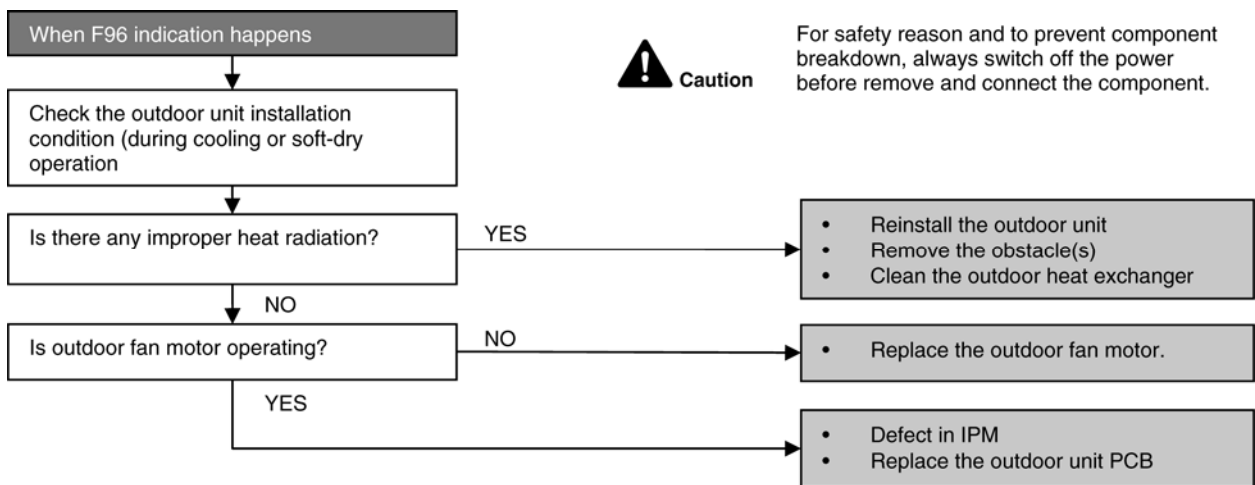
#### Malfunction Caused

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

*Multi Models Only*

- Compressor OL connector poor contact.
- Compressor OL faulty.

#### Troubleshooting



Caution

For safety reason and to prevent component breakdown, always switch off the power before remove and connect the component.

## 15.4.26 F97 (Compressor Overheating)

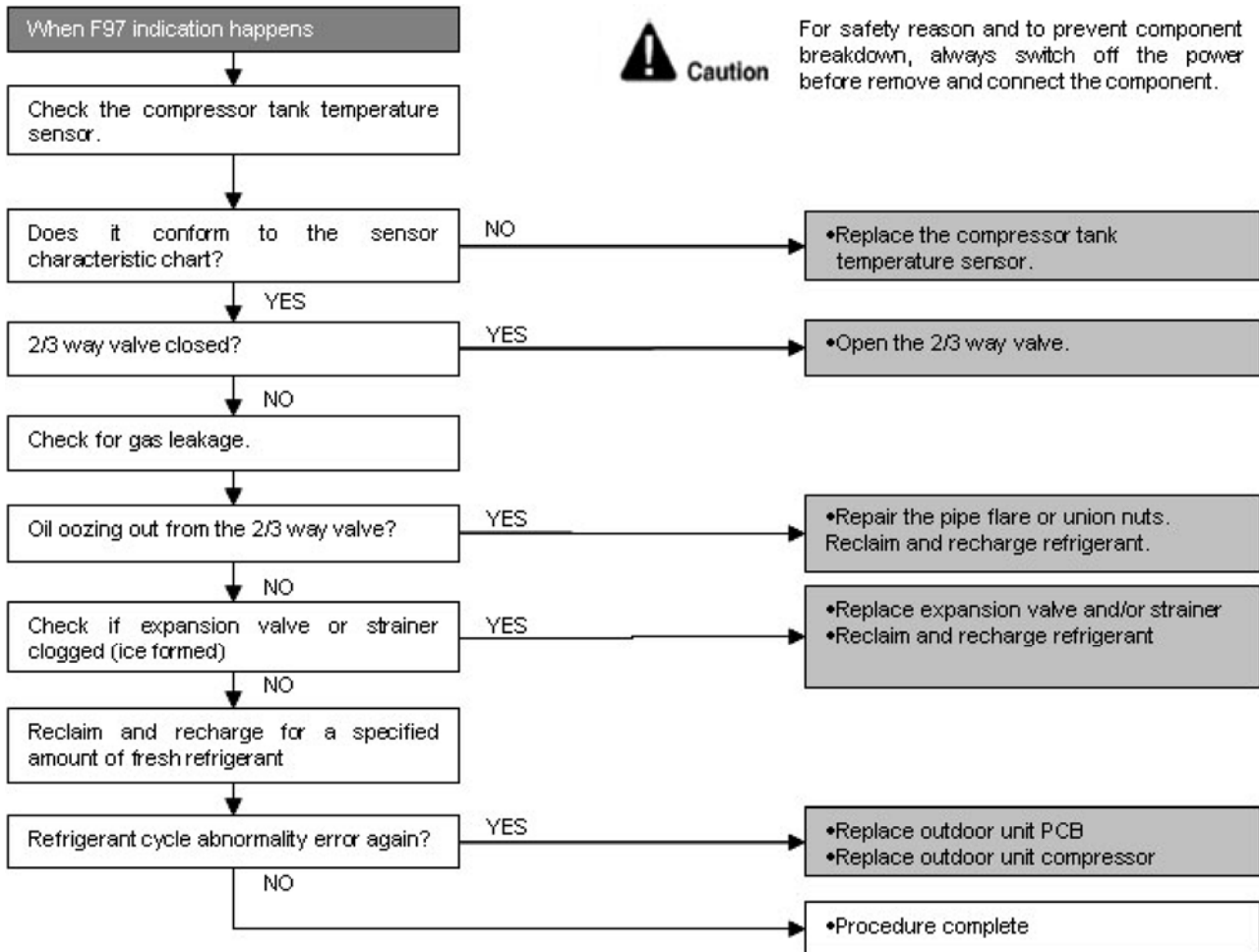
### Malfunction Decision Conditions

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

### Malfunction Caused

- Faulty compressor tank temperature sensor
- 2/3 way valve closed
- Refrigerant shortage (refrigerant leakage)
- Faulty outdoor unit PCB
- Faulty compressor

### Troubleshooting



## 15.4.27 F98 (Input Over Current Detection)

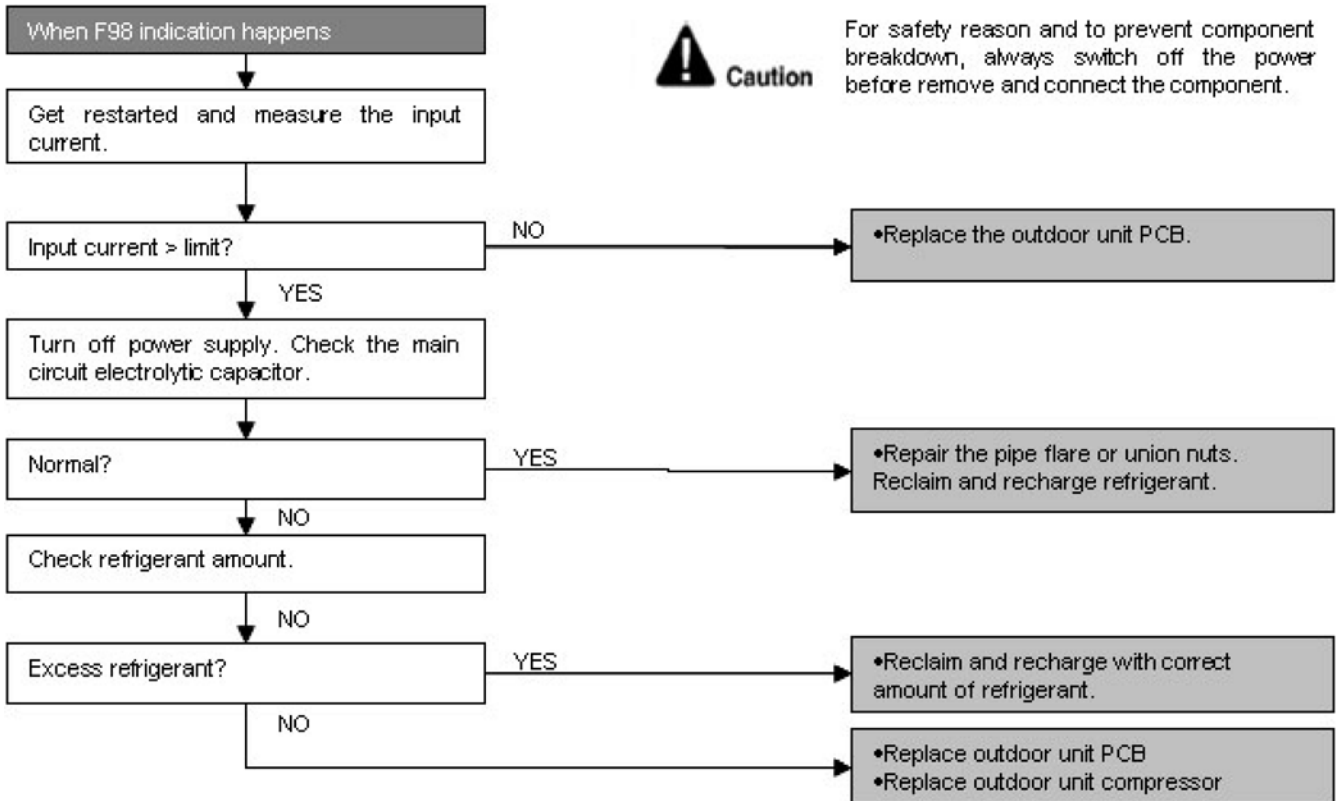
### Malfunction Decision Conditions

- During operation of cooling and heating, when an input over-current (X value in Total Running Current Control) is detected by checking the input current value being detected by current transformer (CT) with the compressor running.

### Malfunction Caused

- Excessive refrigerant.
- Faulty outdoor unit PCB.

### Troubleshooting



## 15.4.28 F99 (DC Peak Detection)

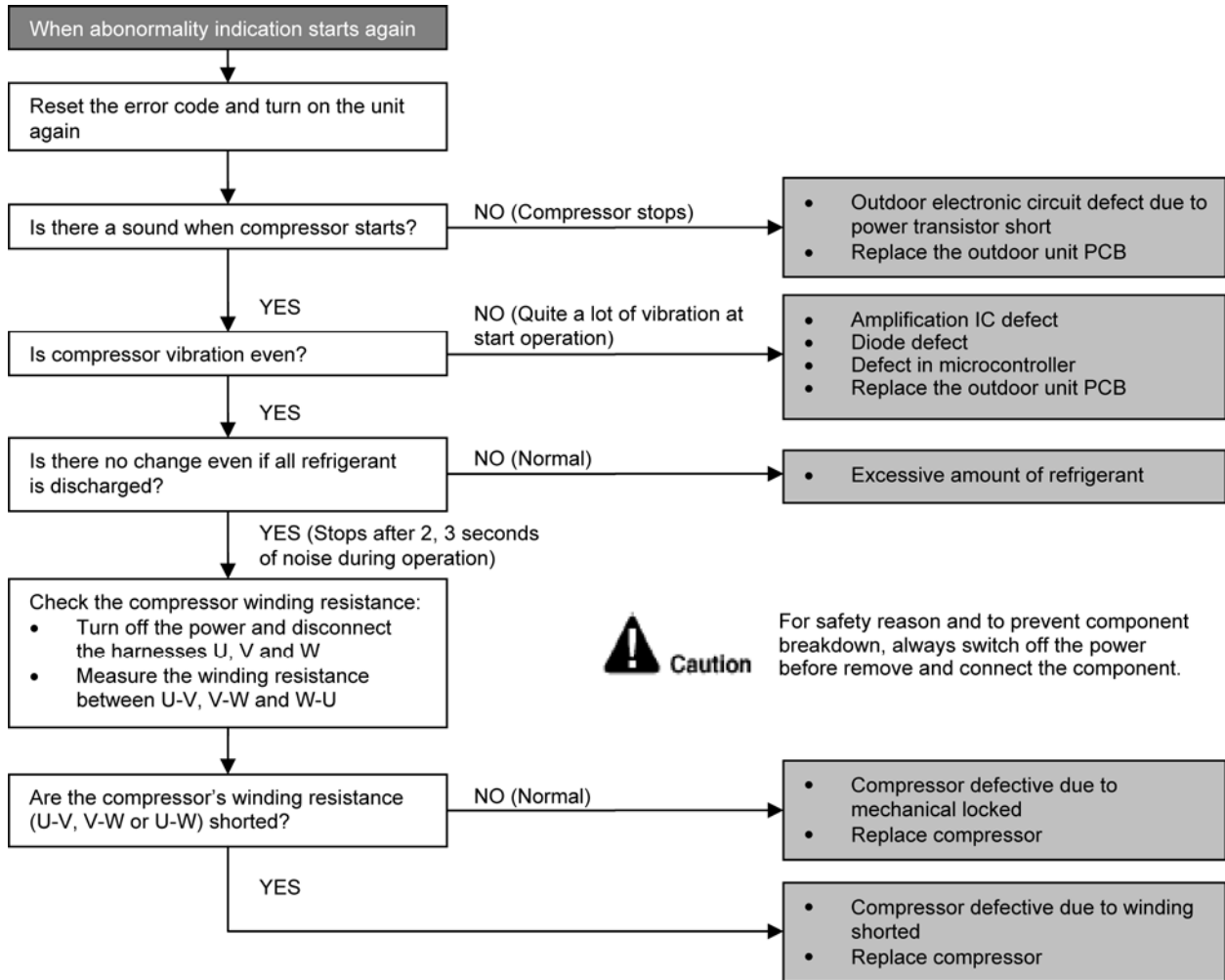
### Malfunction Decision Conditions

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

### Malfunction Caused

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

### Troubleshooting





# 16. Disassembly and Assembly Instructions



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-E9PKEA CS-E12PKEA CS-E15PKEA

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

#### 16.1.1.1 To remove front grille

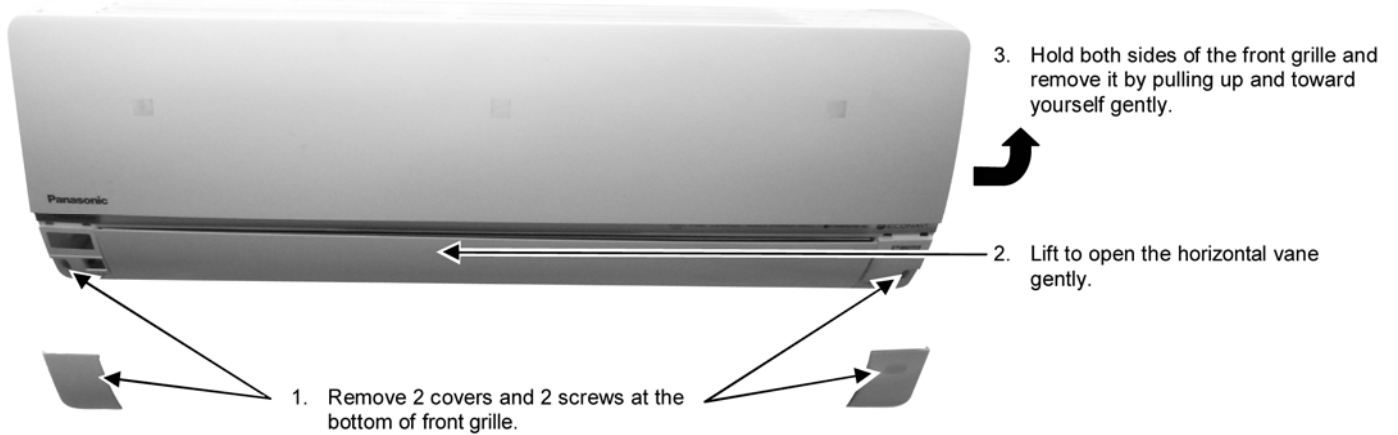


Figure 1

#### 16.1.1.2 To remove electronic controller

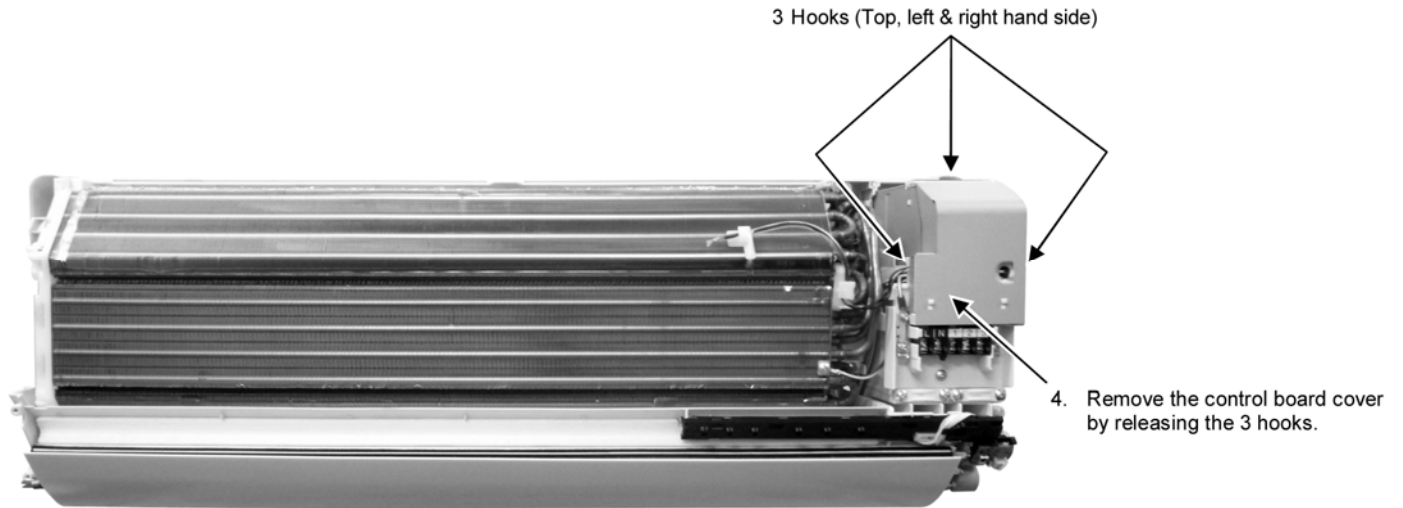


Figure 2

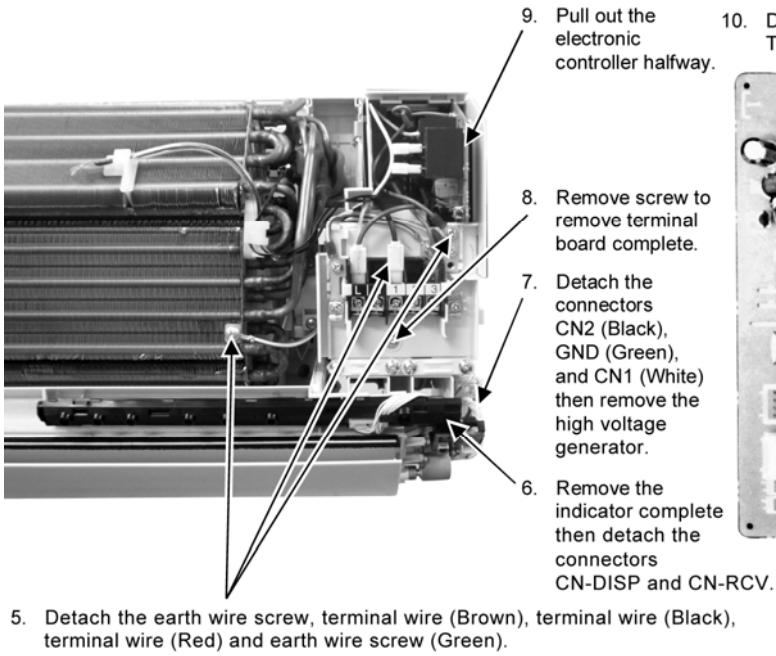


Figure 3

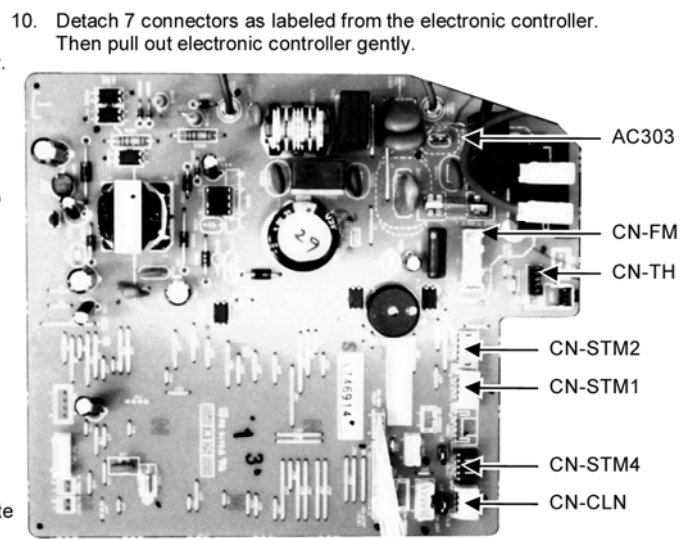


Figure 4

### 16.1.1.3 To remove discharge grille

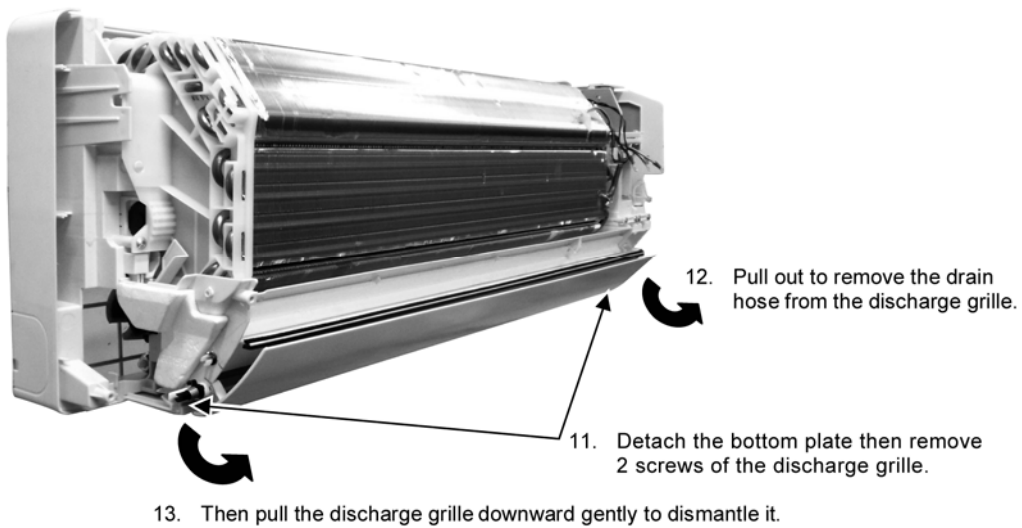
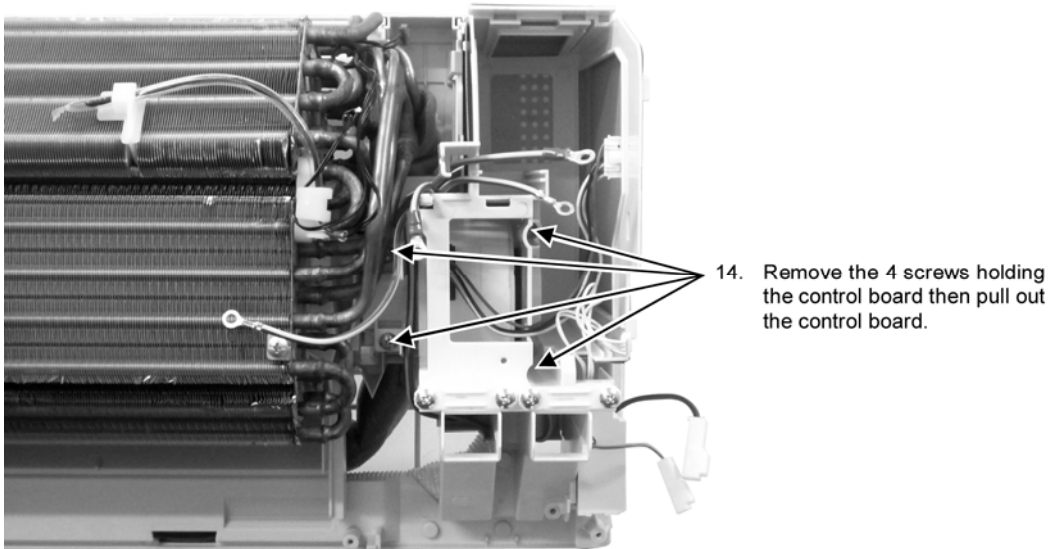


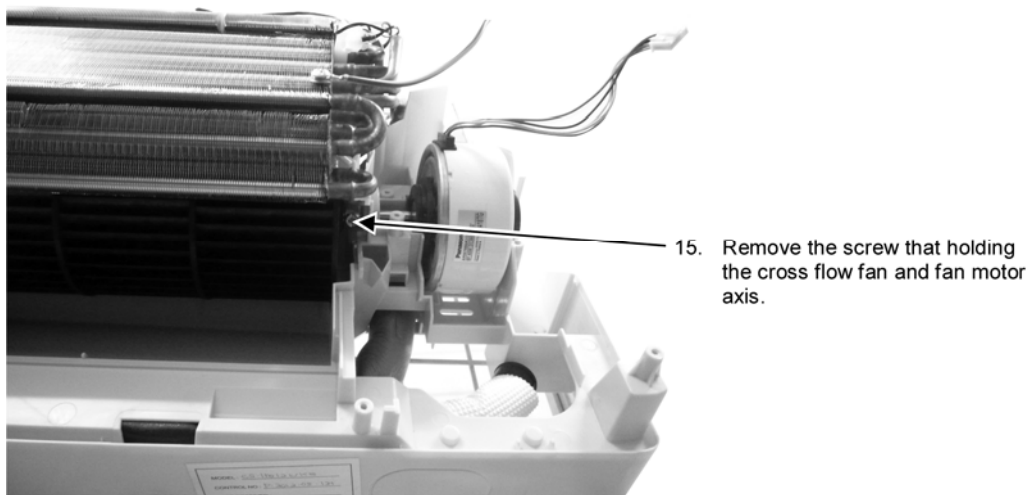
Figure 5

**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**

17. Remove the bearing by pulling it out gently.

16. Remove the screw from the evaporator.

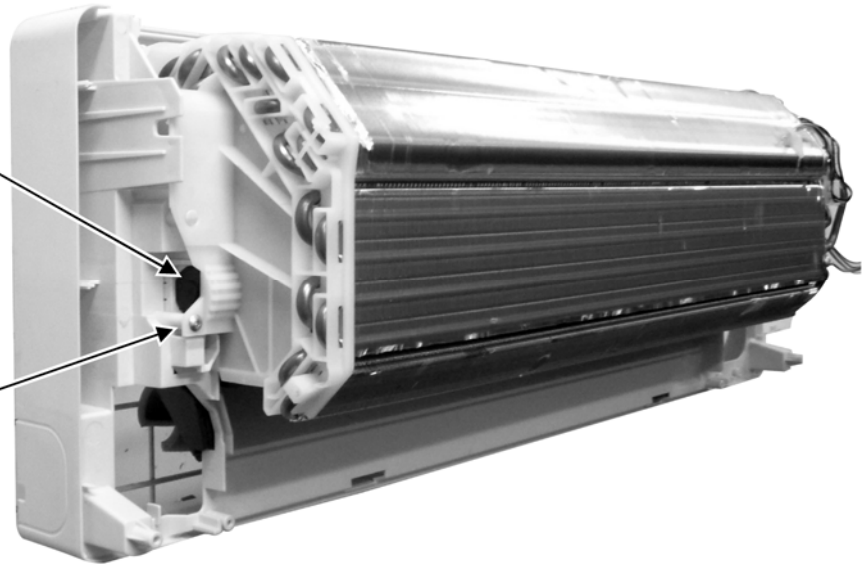
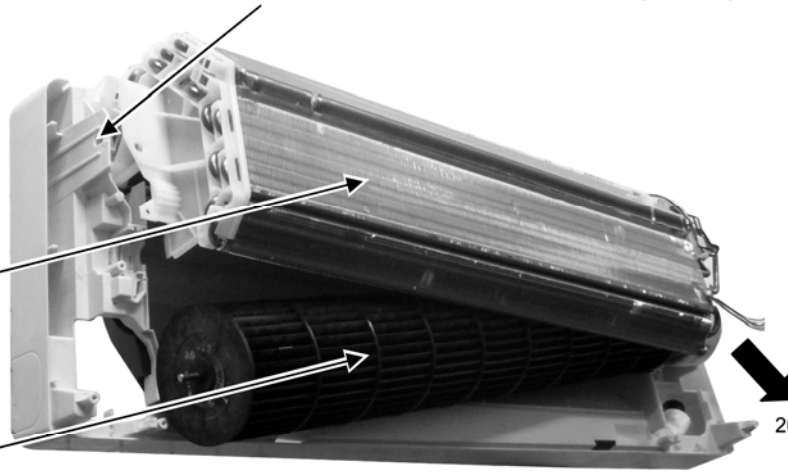


Figure 8

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

Evaporator

Cross flow fan

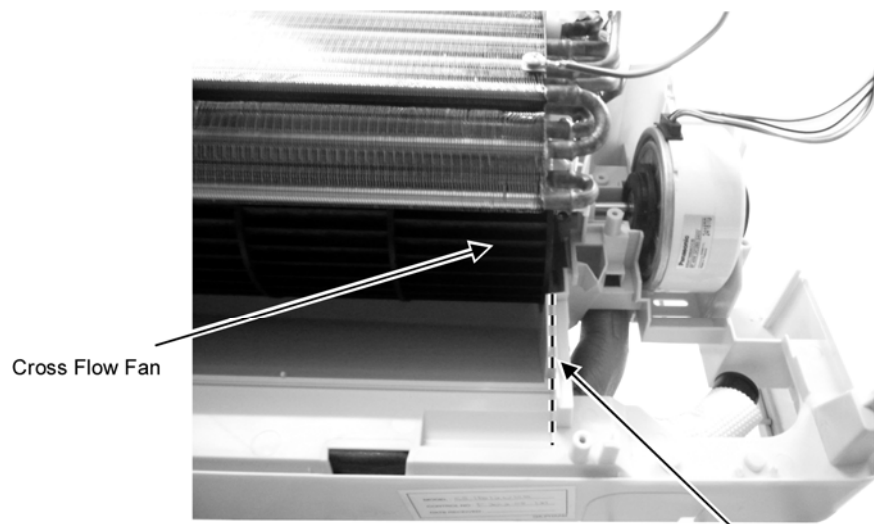


20. Fan motor can be removed after the removal of the cross flow fan.

Reminder: To reinstall the fan motor, adjust the fan motor connector to 90° towards you before fixing control board.

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

Figure 9



Cross Flow Fan

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

**Figure 10**

## 16.2 CS-E18PKEA

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

#### 16.2.1.1 To remove front grille

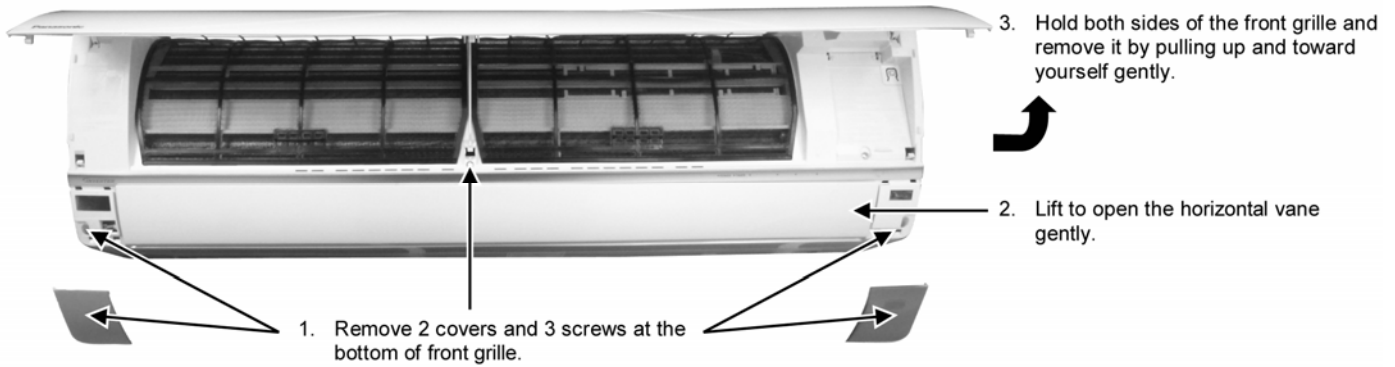


Figure 4

#### 16.2.1.2 To remove electronic controller

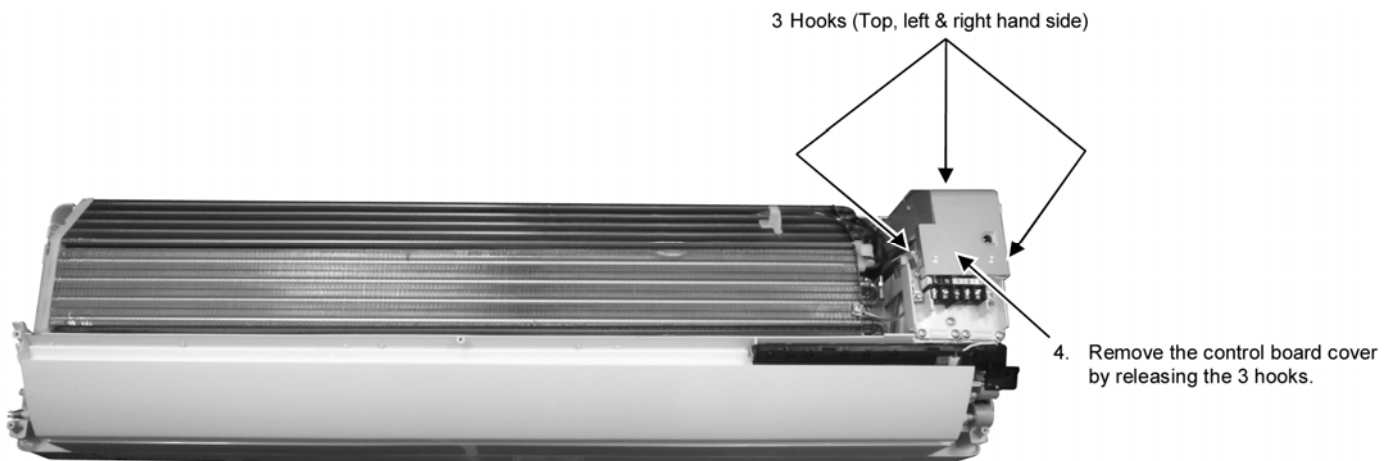


Figure 5

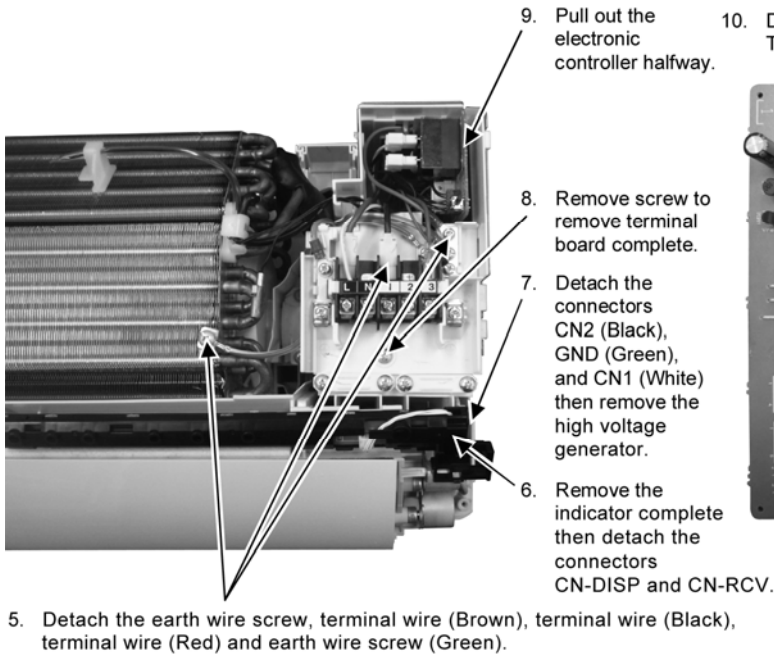


Figure 6

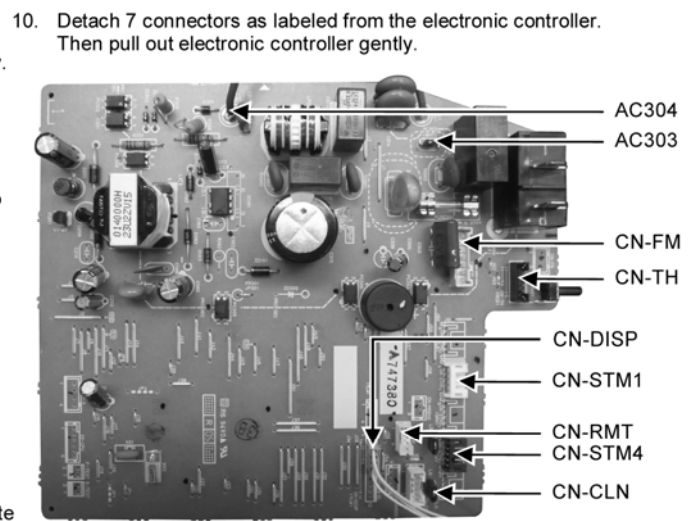


Figure 4

### 16.2.1.3 To remove discharge grille

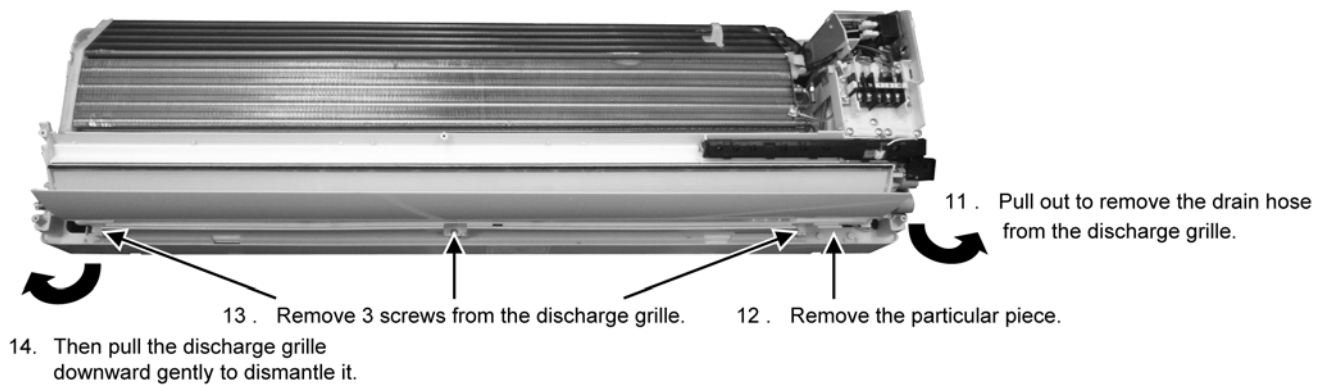


Figure 5

### 16.2.1.4 To remove control board

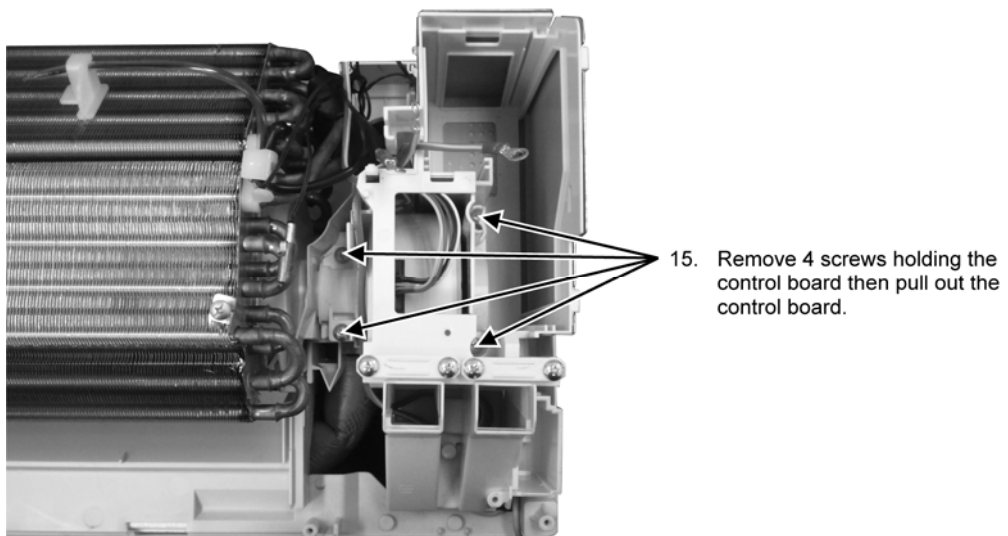
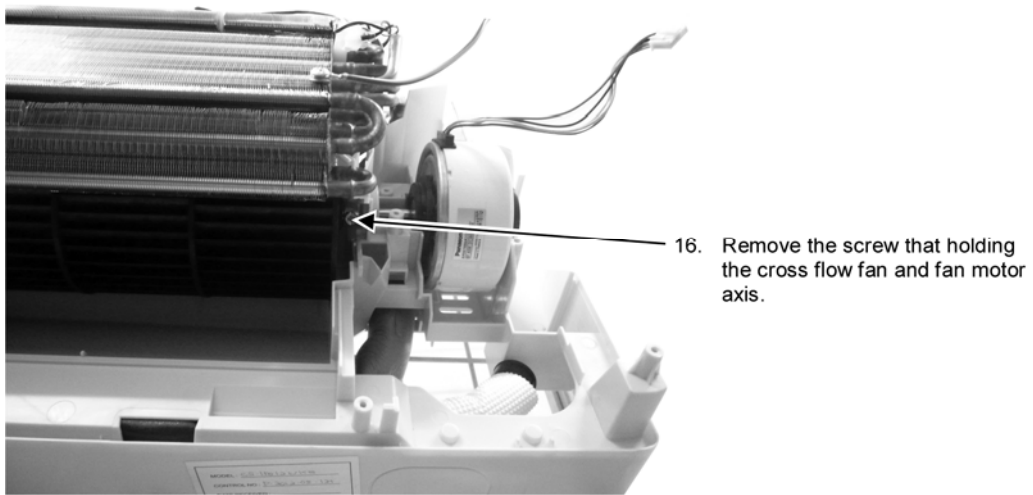
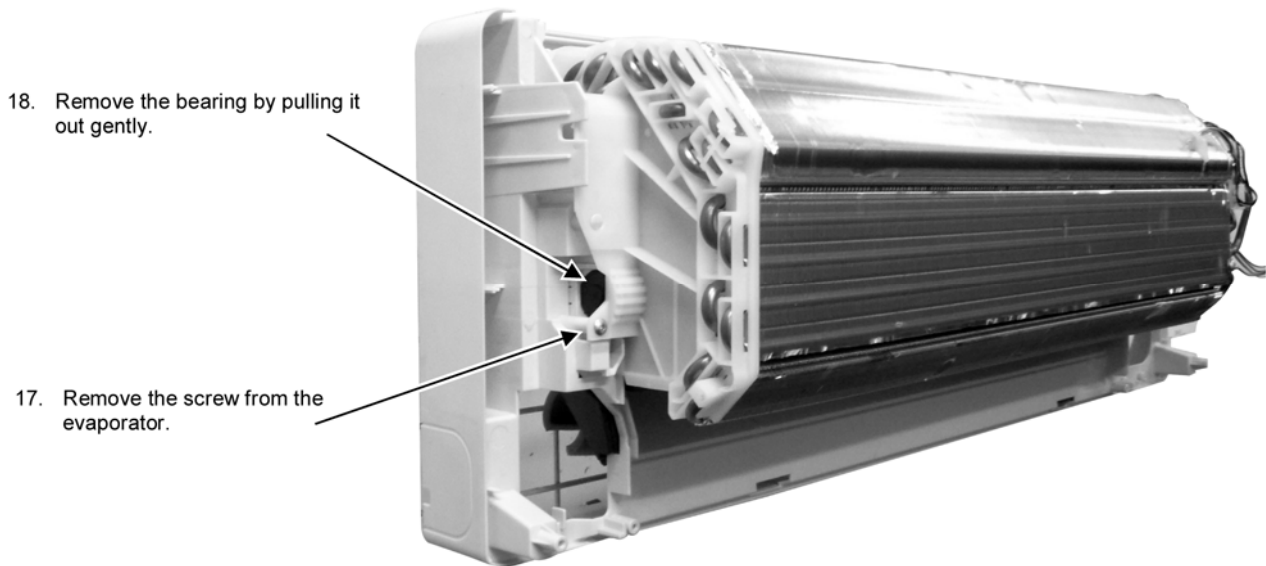


Figure 6

**16.2.1.5 To remove cross flow fan and indoor fan motor**



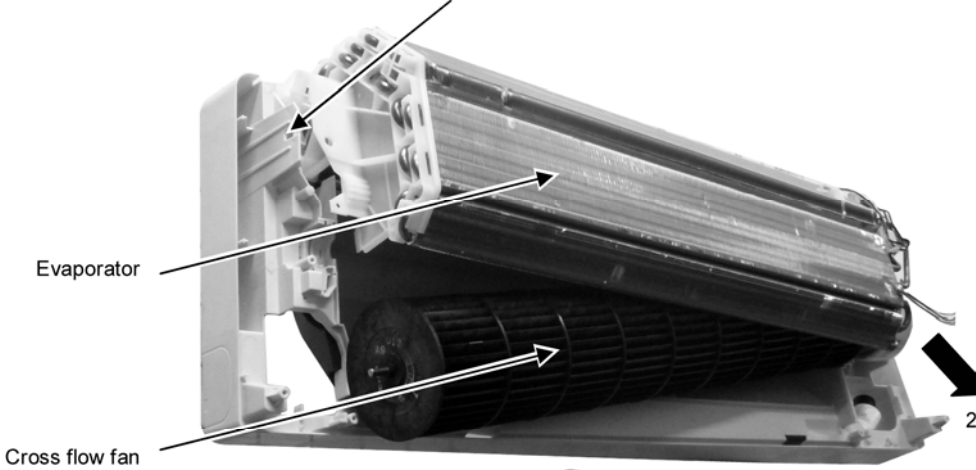
**Figure 7**



**Figure 8**



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



Evaporator

Cross flow fan

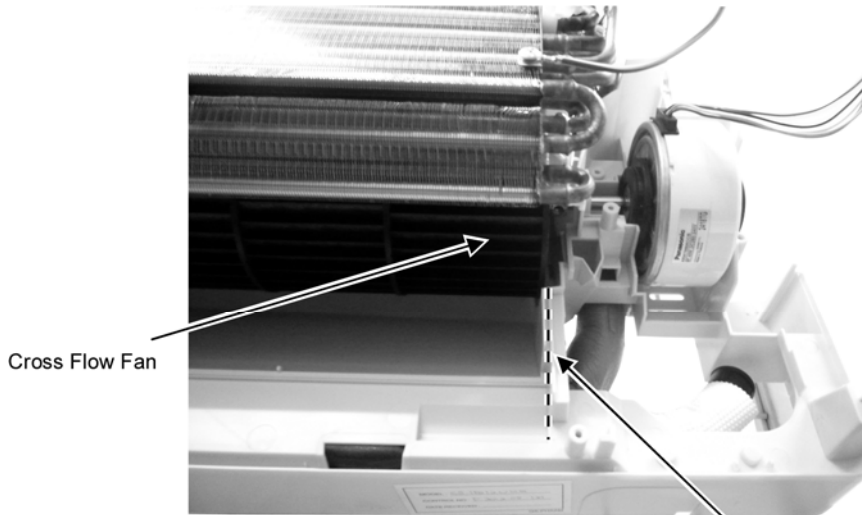
21. Fan motor can be removed after the removal of the cross flow fan.

Reminder: To reinstall the fan motor, adjust the fan motor connector to 90° towards you before fixing control board.



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

Figure 9



Cross Flow Fan

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

Figure 10

## 16.3 Outdoor Electronic Controller Removal Procedure

### 16.3.1 CU-E9PKEA CU-E12PKEA

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

- 1 Remove the 5 screws of the Top Panel.

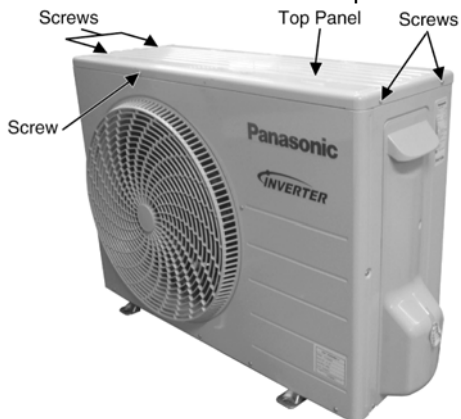


Fig. 1

- 2 Remove the 8 screws of the Front Panel.

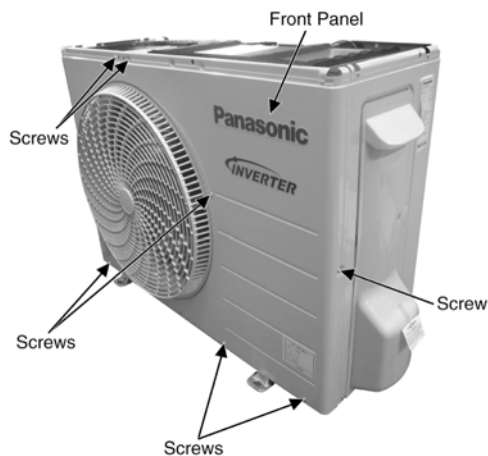


Fig. 2

- 3 Remove the screw of the Terminal Board Cover.

- 4 Remove the Top Cover of the Control Board by 4 hooks.

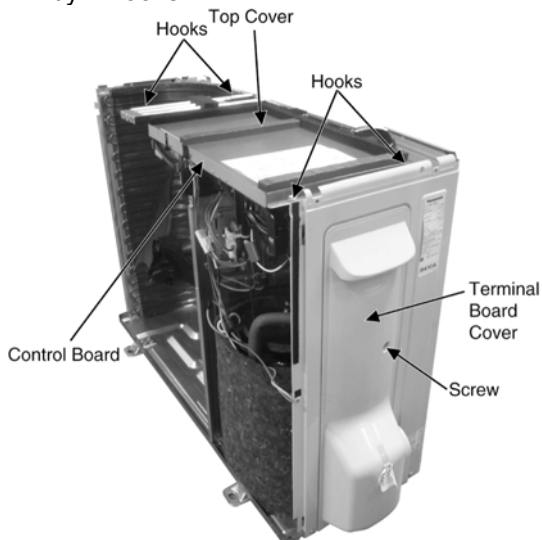


Fig. 3

- 5 Remove the Control Board as follows:

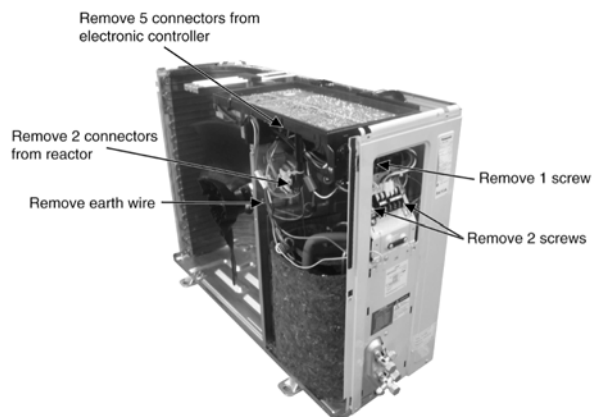


Fig. 4

Remove the Terminal Cover and 3 Terminal Compressor

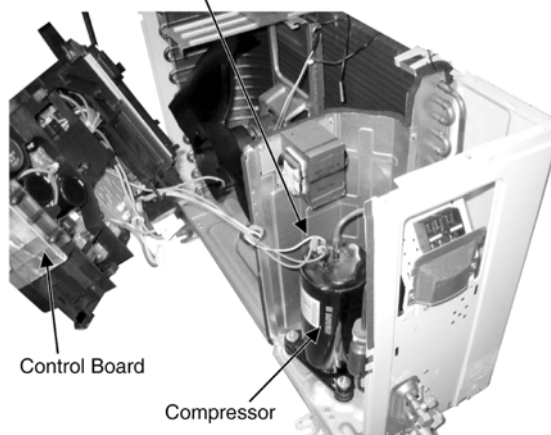


Fig. 5

Electronic Controller Control Board

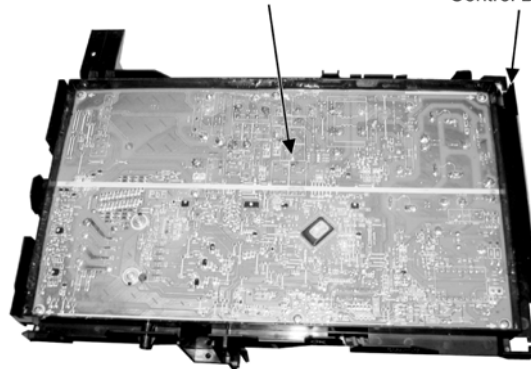


Fig. 6

### 16.3.2 CU-E15PKEA CU-E18PKEA

- 1 Remove the 4 screws of the Top Panel.



Fig. 1

- 2 Remove the 10 screws of the Front Panel.

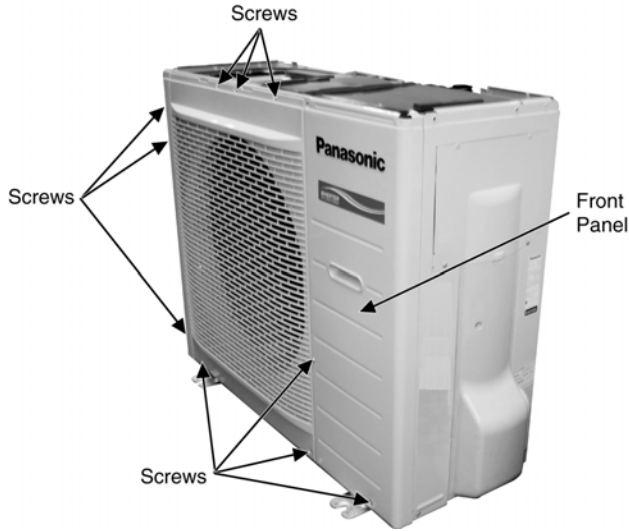


Fig. 2

- 3 Remove the Top Cover of the Electronic Controller.



Fig. 3

- 4 Remove the Control Board.

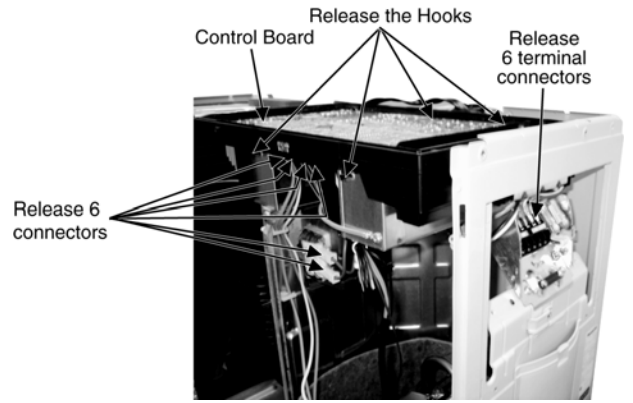


Fig. 4

- 5 Remove the 8 screws of the Electronic Controller.

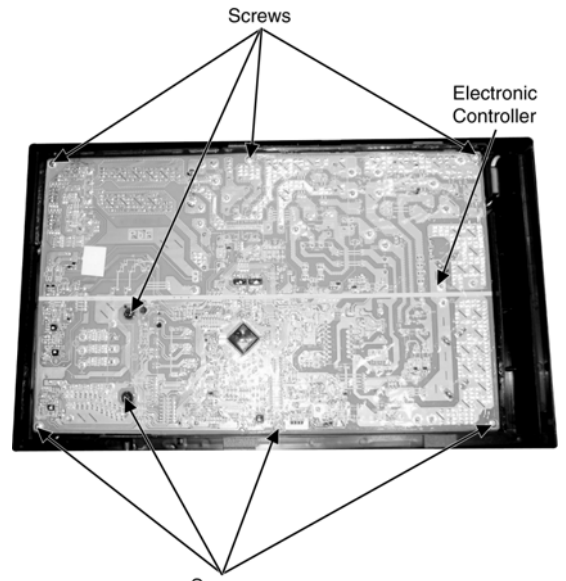


Fig. 5

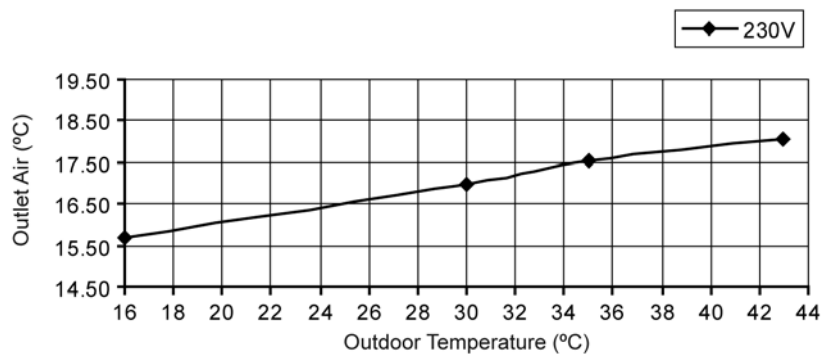
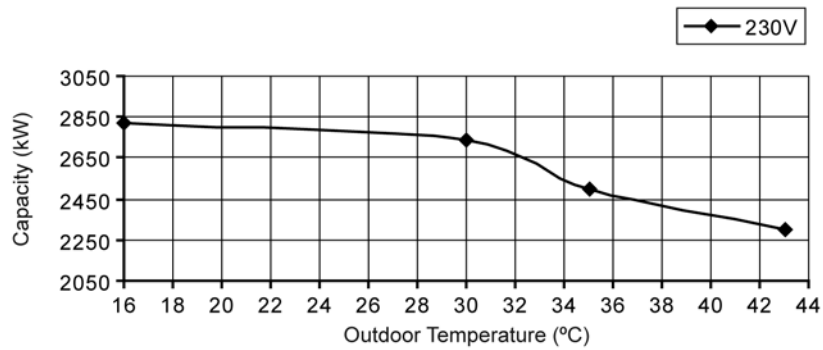
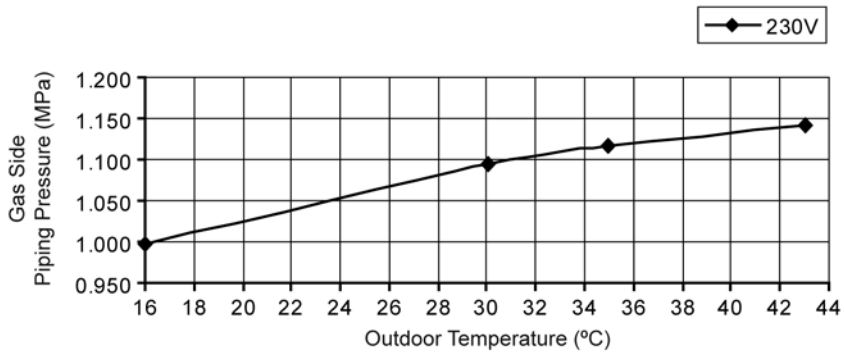
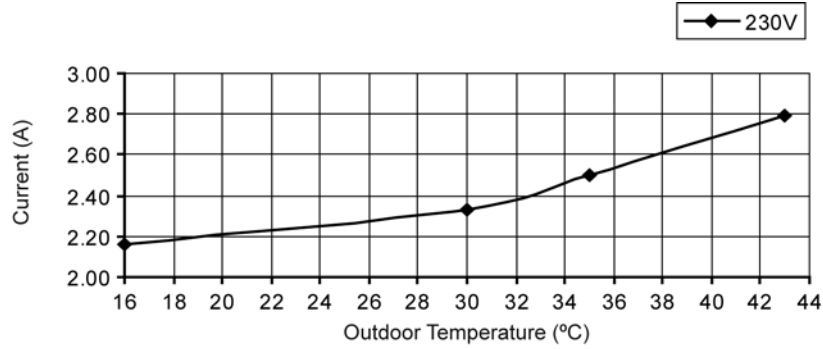
**⚠ Caution!** When handling electronic controller, be careful of electrostatic discharge.

# 17. Technical Data

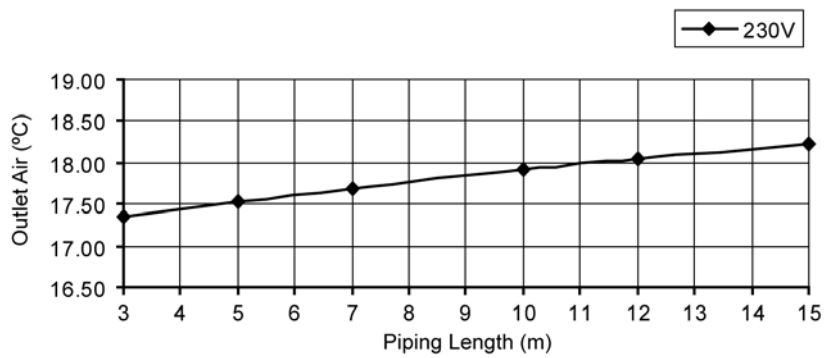
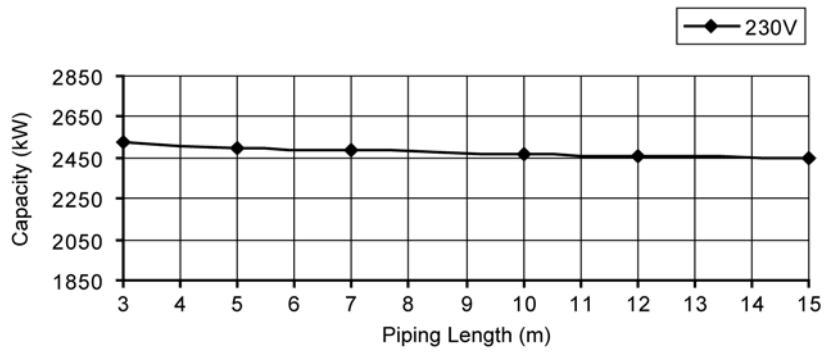
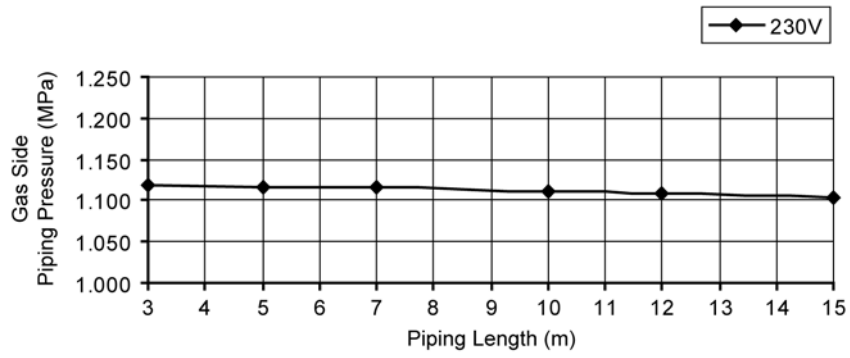
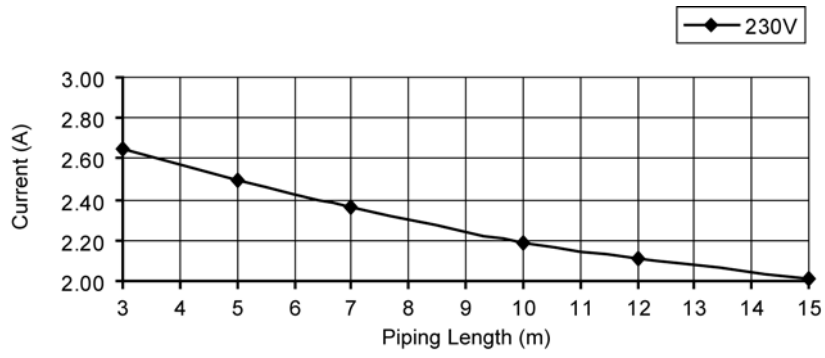
## 17.1 Operation Characteristics

### 17.1.1 CS-E9PKEA CU-E9PKEA

- Cooling Characteristic
- [Condition] Indoor temperature: 27/19°C  
Piping Length: 5m  
Remote condition: High fan speed, Cool 16°C  
Comp. Hz: F<sub>c</sub>



- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 27/19°C, 35/24°C  
 Remote condition: High fan speed, Cool 16°C  
 Comp. Hz: F<sub>c</sub>



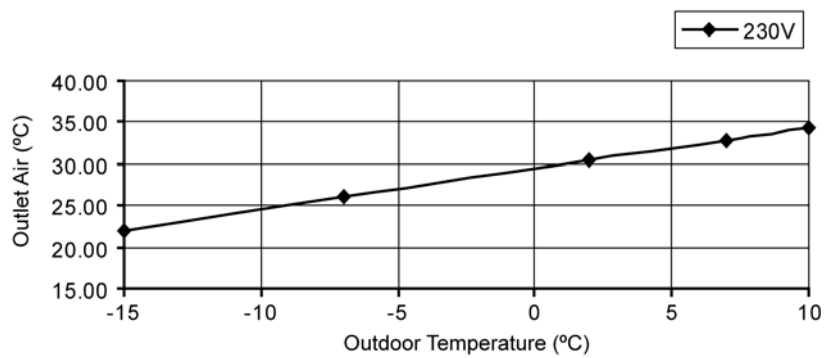
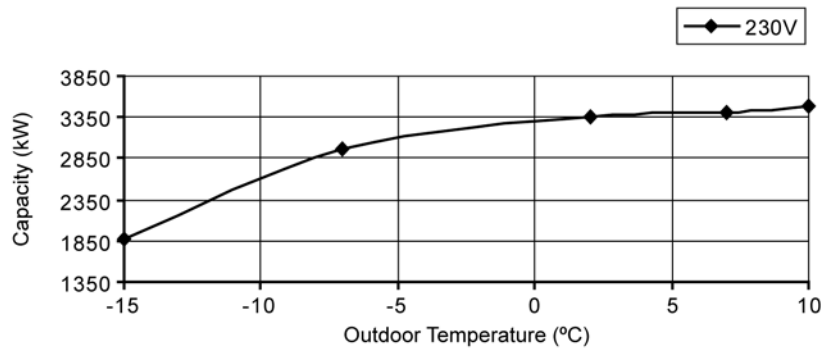
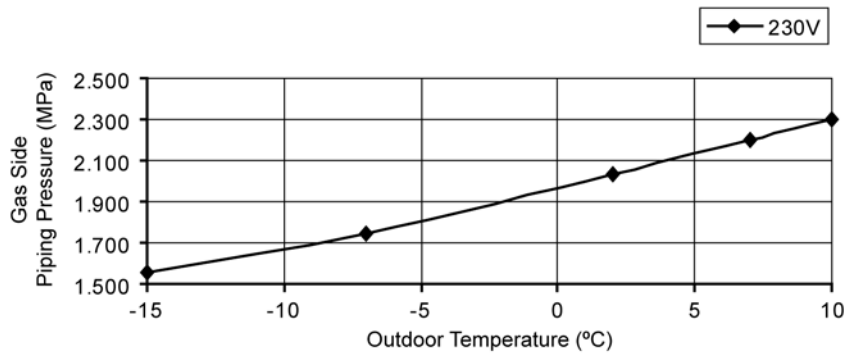
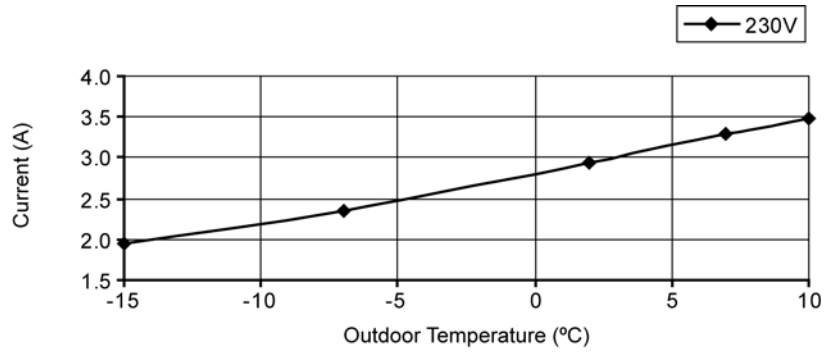
- Heating Characteristic

[Condition] Indoor temperature: 20/-°C

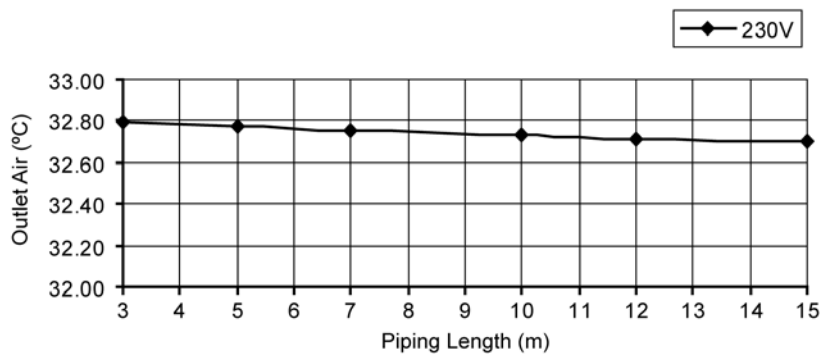
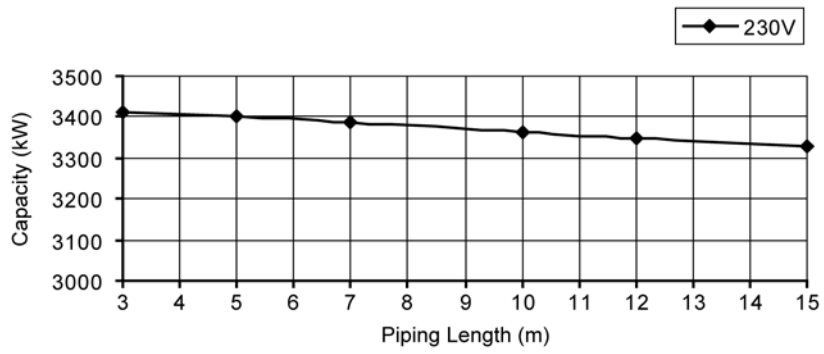
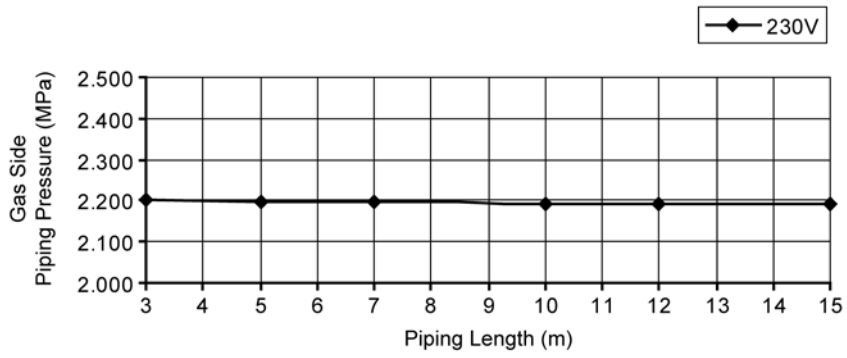
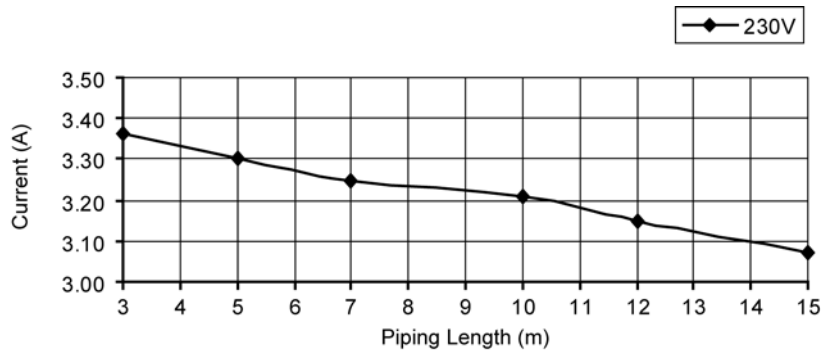
Piping Length: 5m

Remote condition: High fan speed, Heat 30°C

Comp. Hz:  $F_h$



- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 20/-°C, 7/6°C  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz: F<sub>h</sub>



## 17.1.2 CS-E12PKEA CU-E12PKEA

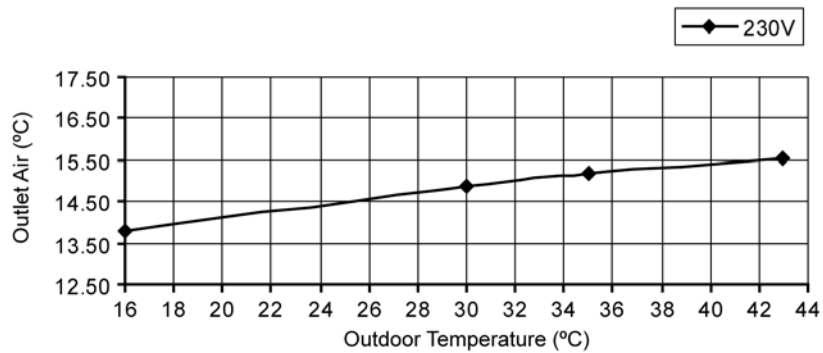
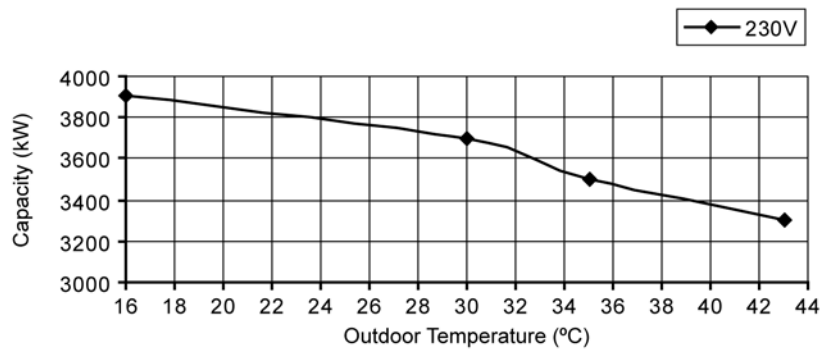
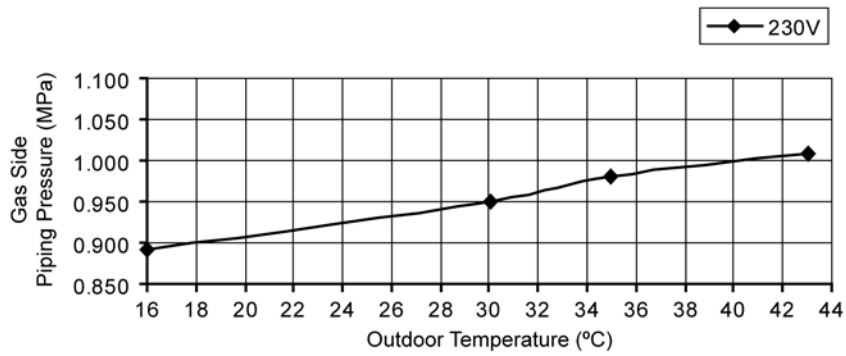
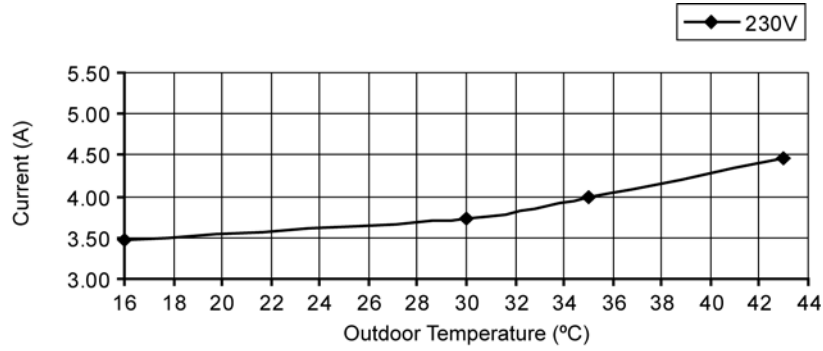
- Cooling Characteristic

[Condition] Indoor temperature: 27/19°C

Piping Length: 5m

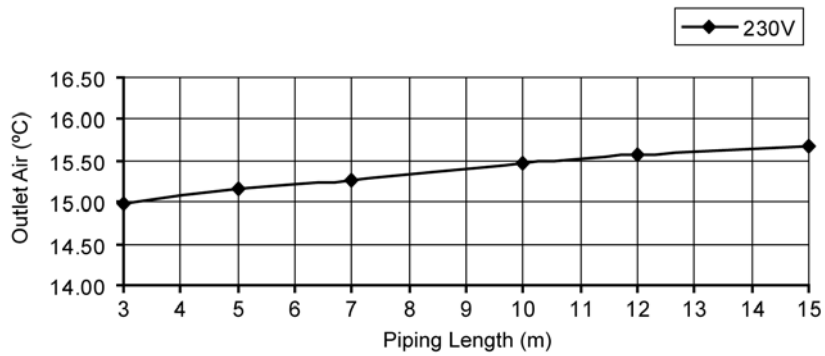
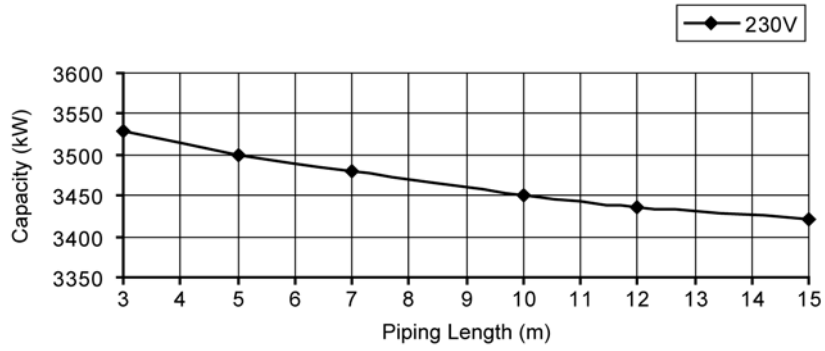
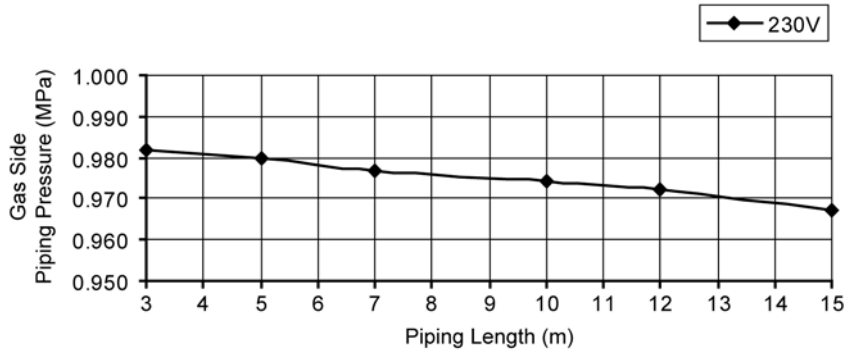
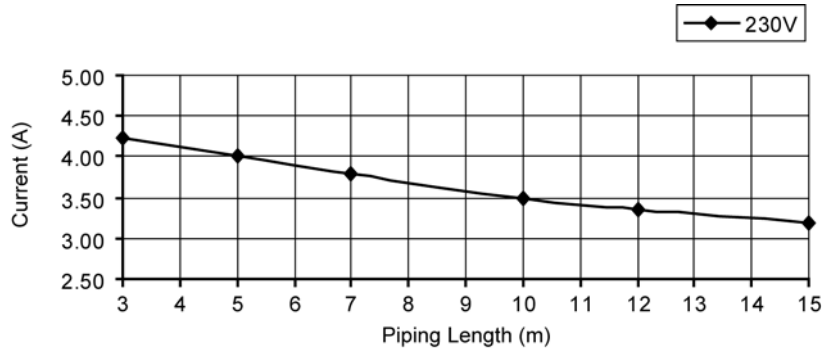
Remote condition: High fan speed, Cool 16°C

Comp. Hz: F<sub>c</sub>





- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 27/19°C, 35/24°C  
 Remote condition: High fan speed, Cool 16°C  
 Comp. Hz: F<sub>c</sub>



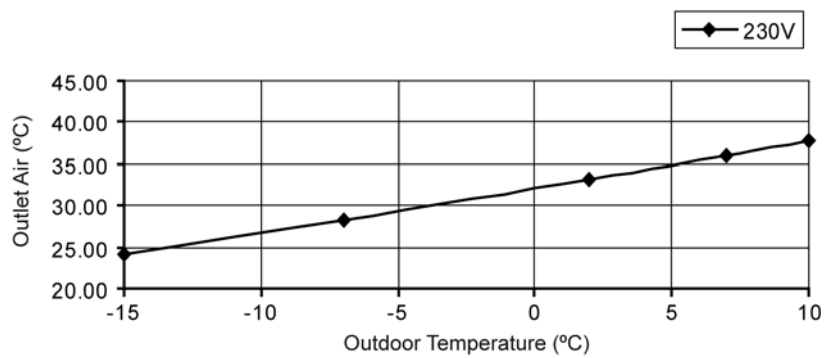
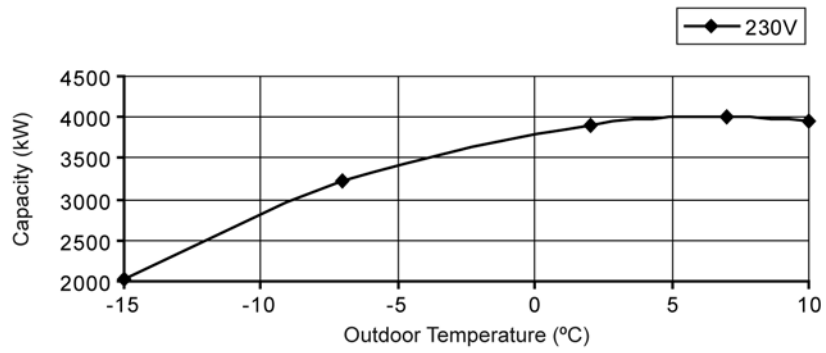
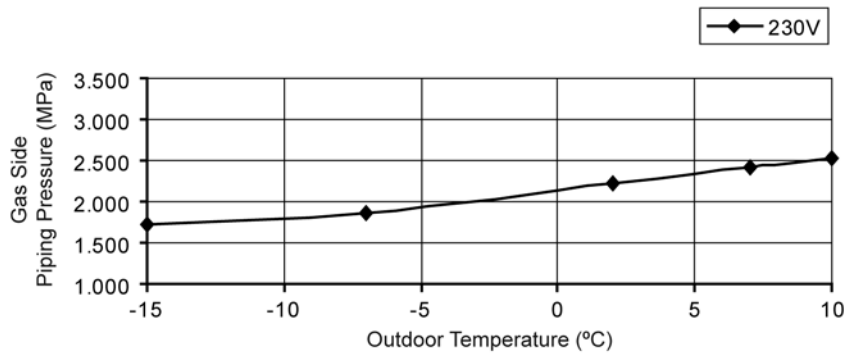
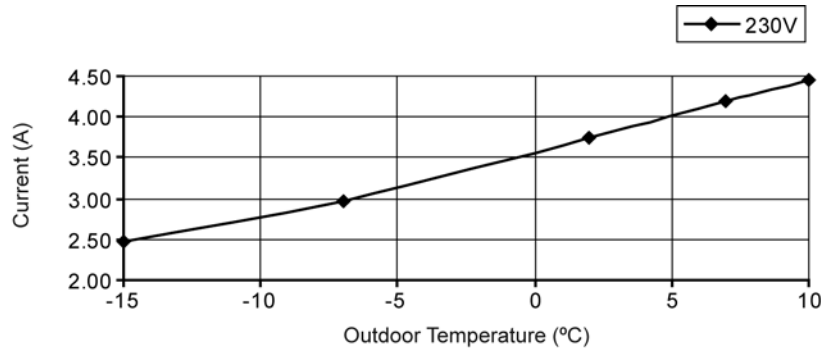
- Heating Characteristic

[Condition] Indoor temperature: 20/-°C

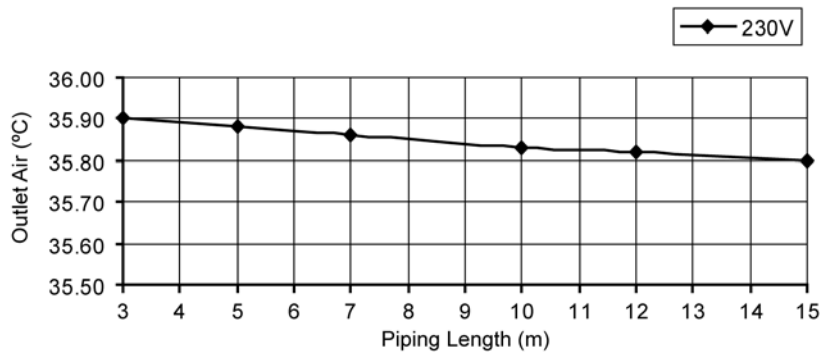
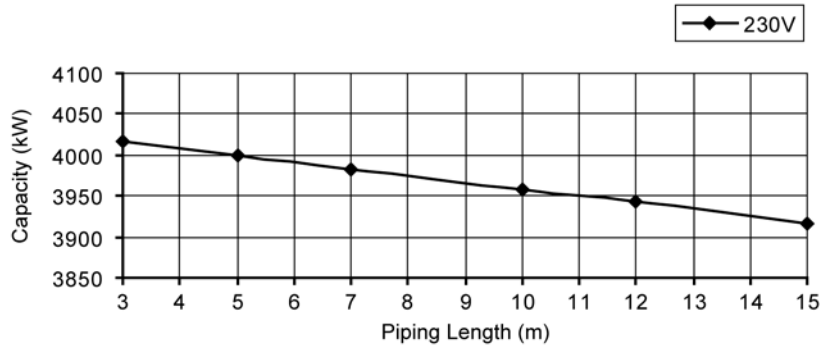
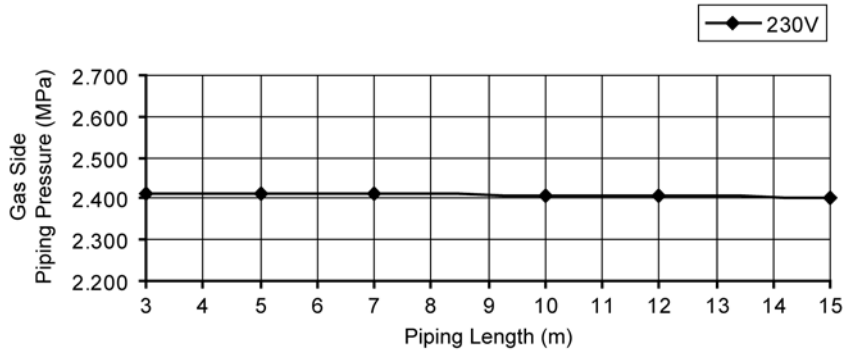
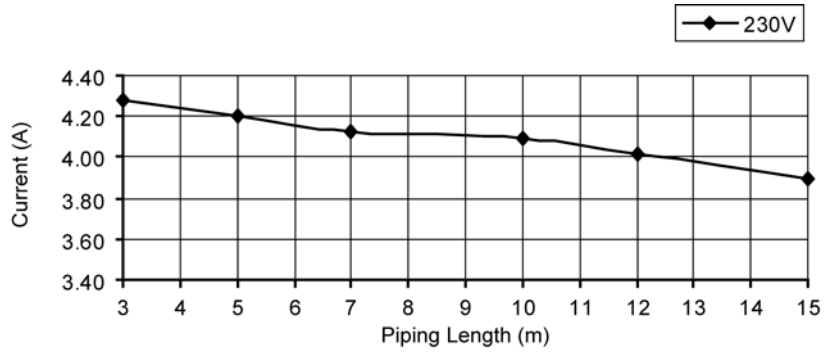
Piping Length: 5m

Remote condition: High fan speed, Heat 30°C

Comp. Hz:  $F_h$



- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 20/-°C, 7/6°C  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz: F<sub>h</sub>



### 17.1.3 CS-E15PKEA CU-E15PKEA

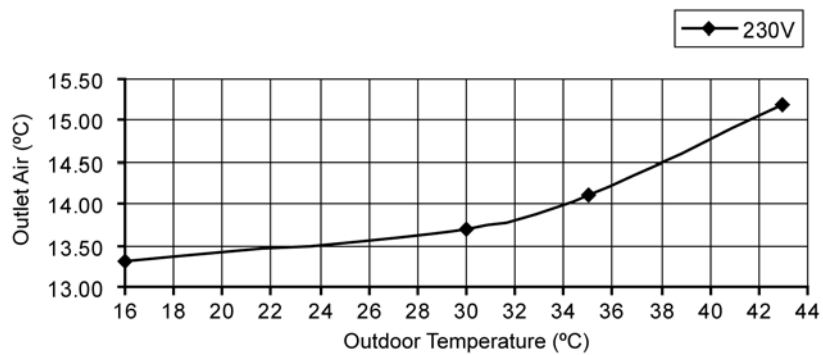
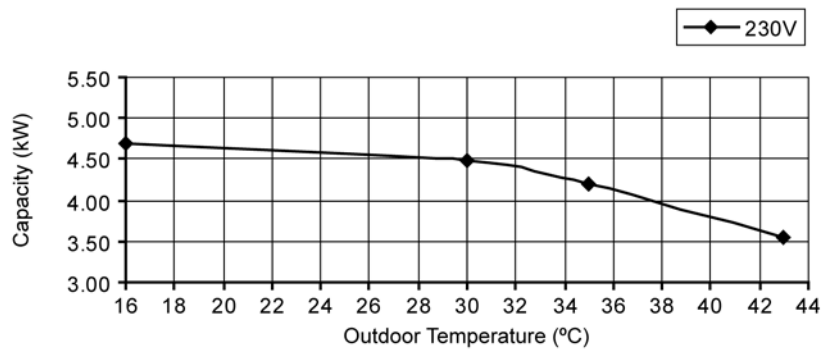
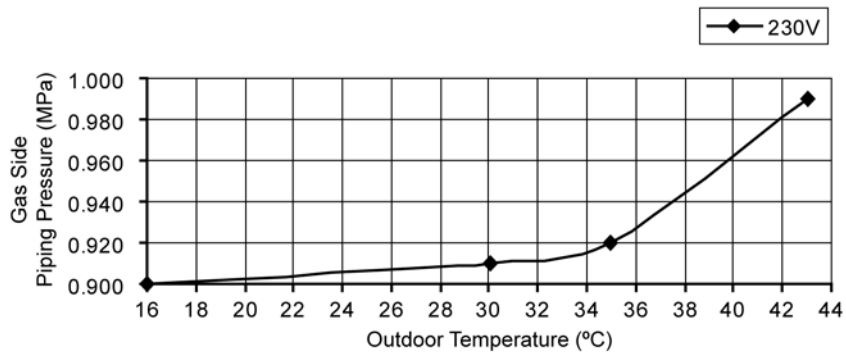
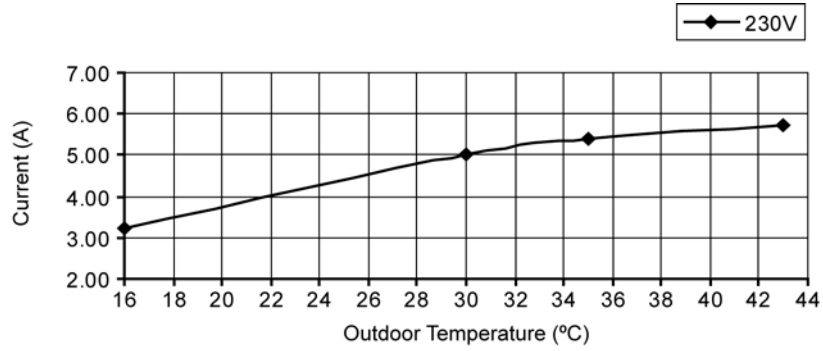
- Cooling Characteristic

[Condition] Indoor temperature: 27/19°C

Piping Length: 5m

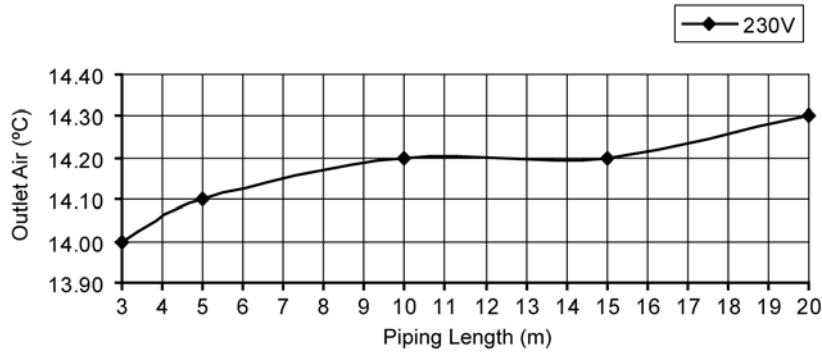
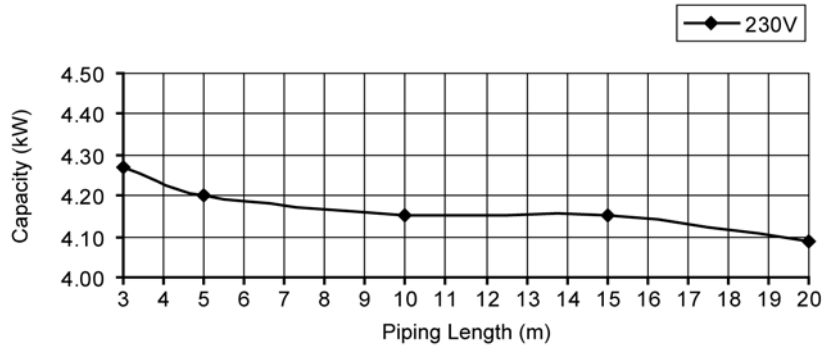
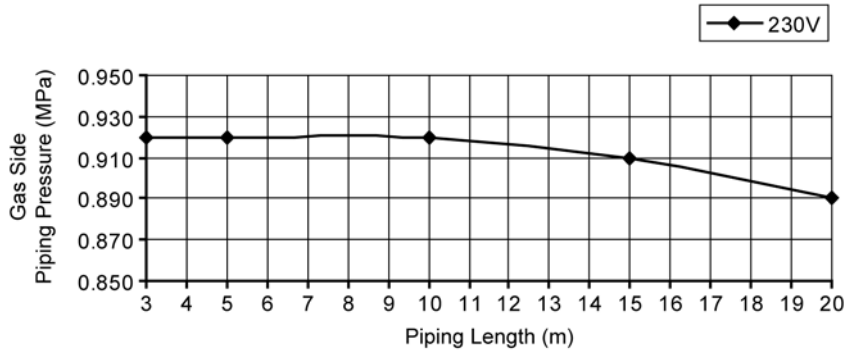
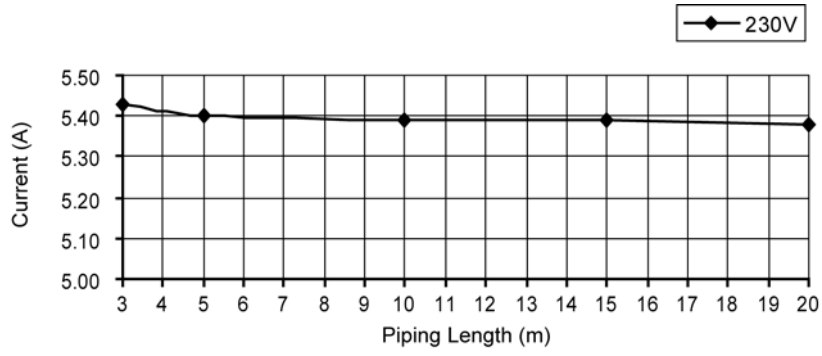
Remote condition: High fan speed, Cool 16°C

Comp. Hz: F<sub>c</sub>

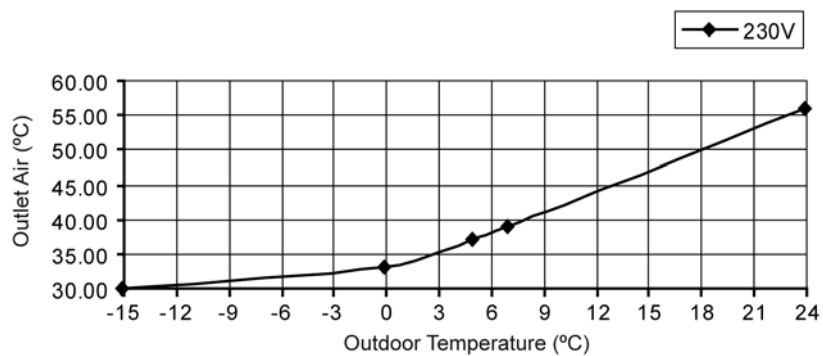
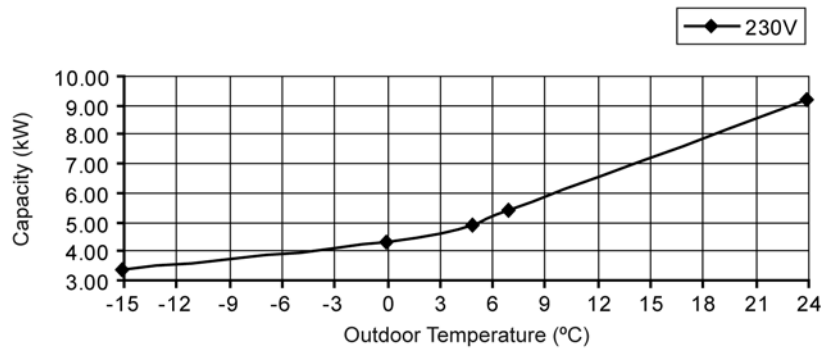
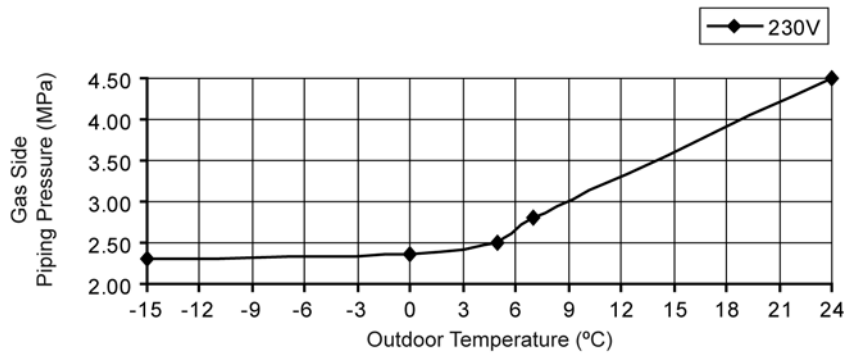
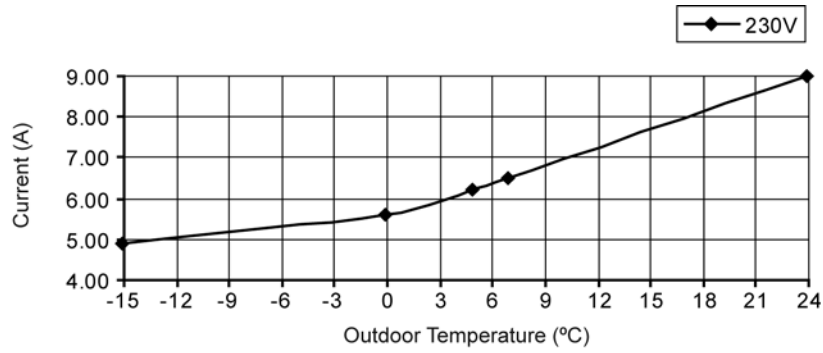


- Piping Length Characteristic

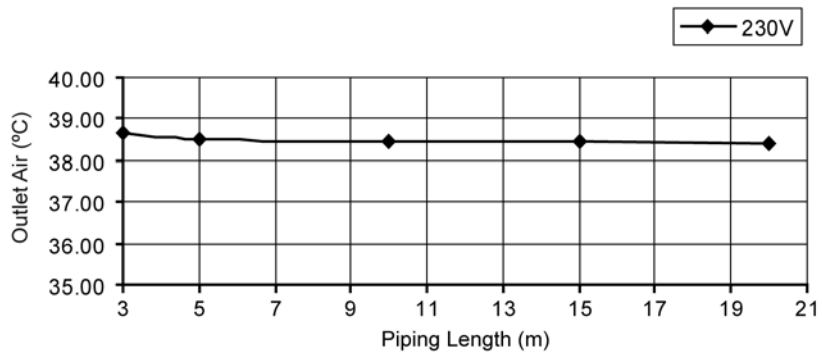
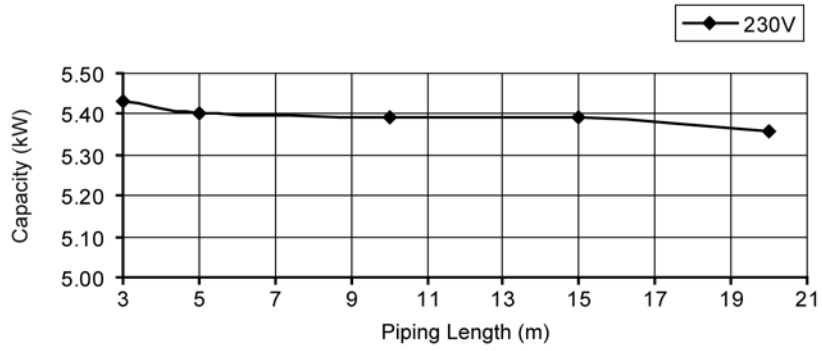
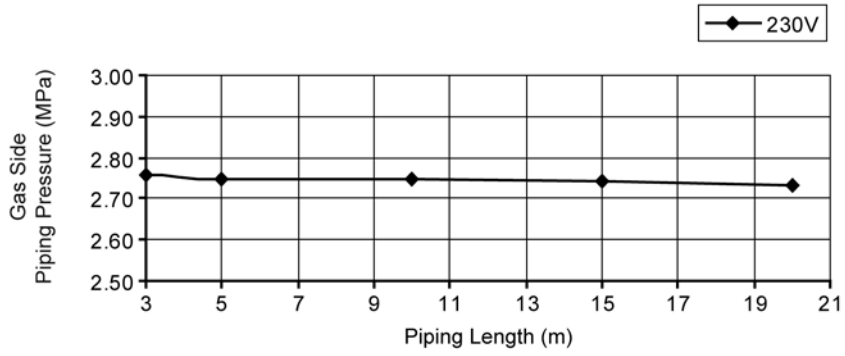
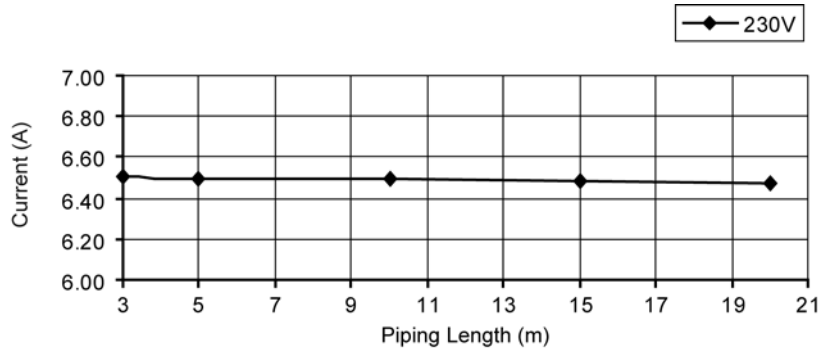
[Condition] Indoor/Outdoor temperature: 27/19°C, 35/-°C  
 Remote condition: High fan speed, Cool 16°C  
 Comp. Hz: F<sub>c</sub>



- Heating Characteristic  
 [Condition] Indoor temperature: 20/-°C  
 Piping Length: 5m  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz:  $F_h$



- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 20/-°C, 7/6°C  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz: F<sub>h</sub>



### 17.1.4 CS-E18PKEA CU-E18PKEA

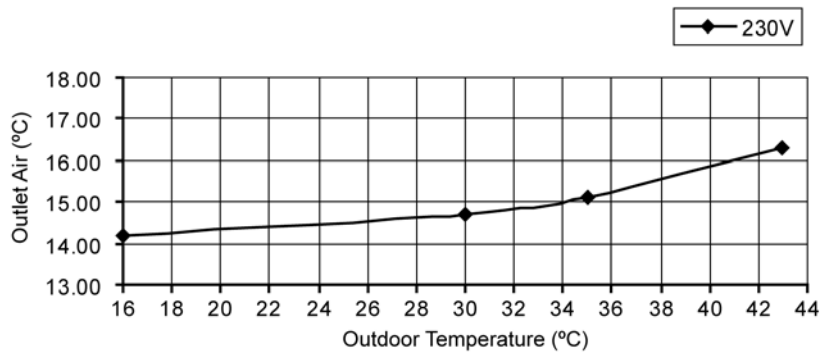
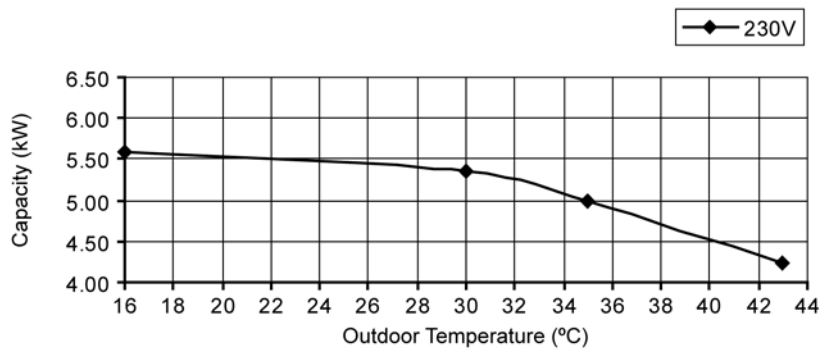
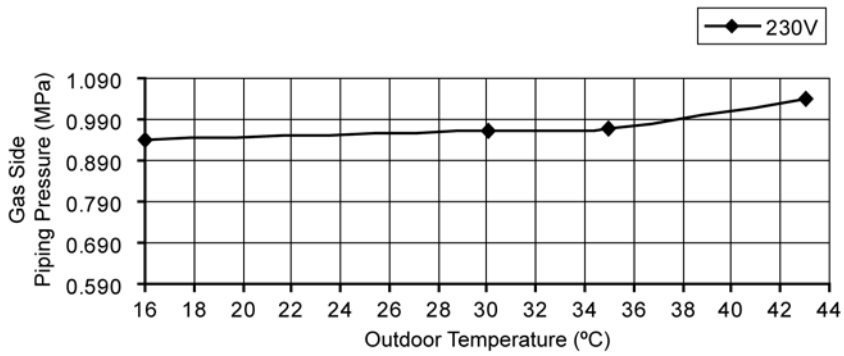
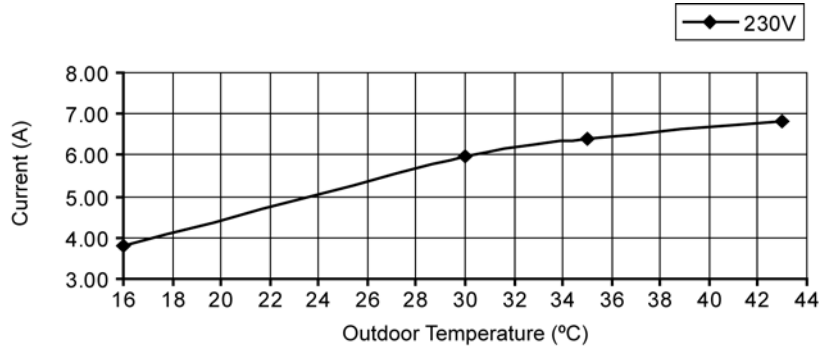
- Cooling Characteristic

[Condition] Indoor temperature: 27/19°C

Piping Length: 5m

Remote condition: High fan speed, Cool 16°C

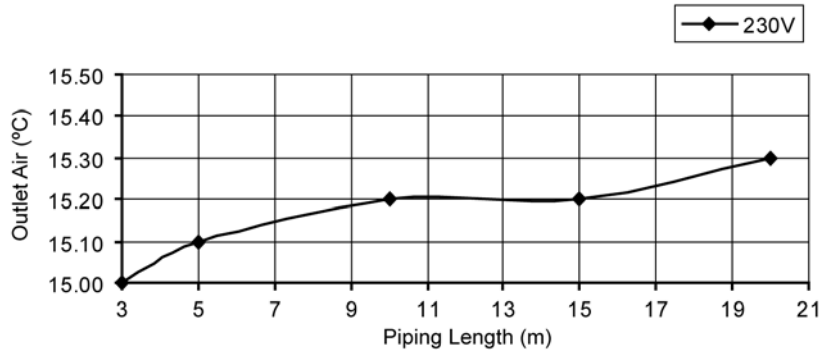
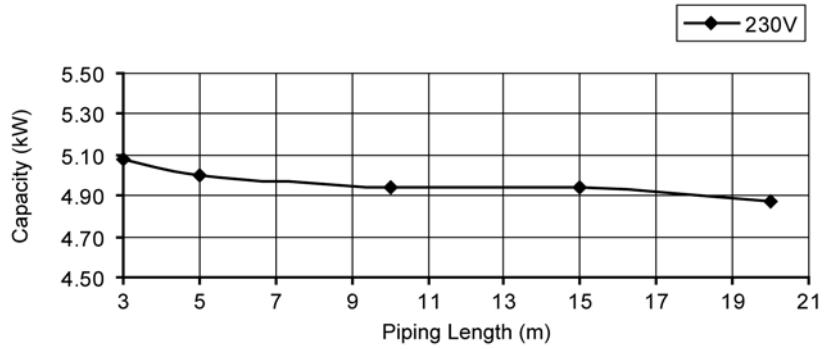
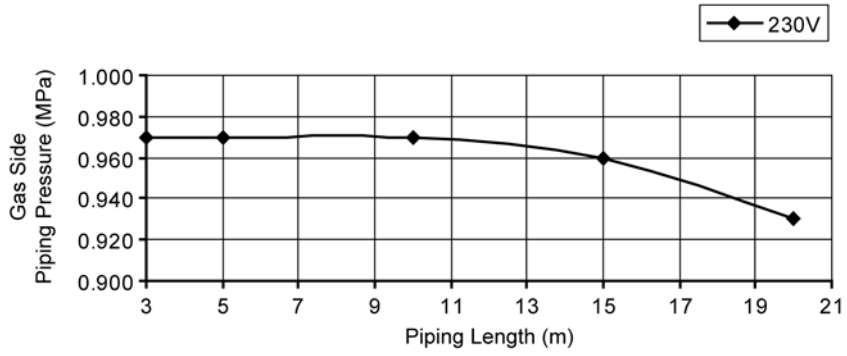
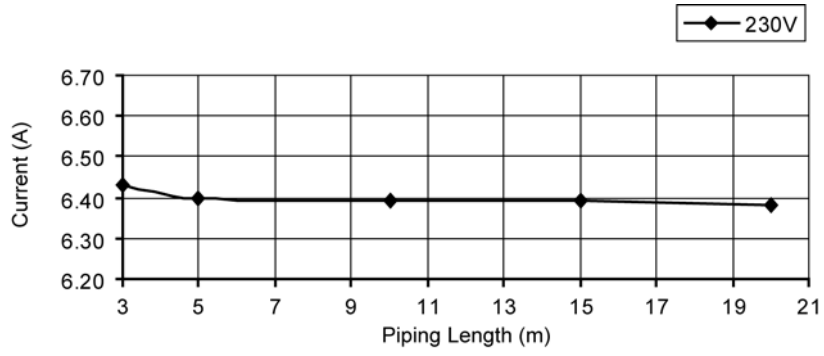
Comp. Hz: F<sub>c</sub>



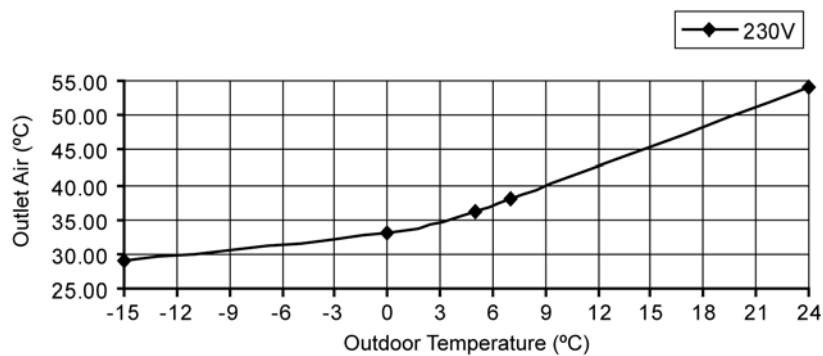
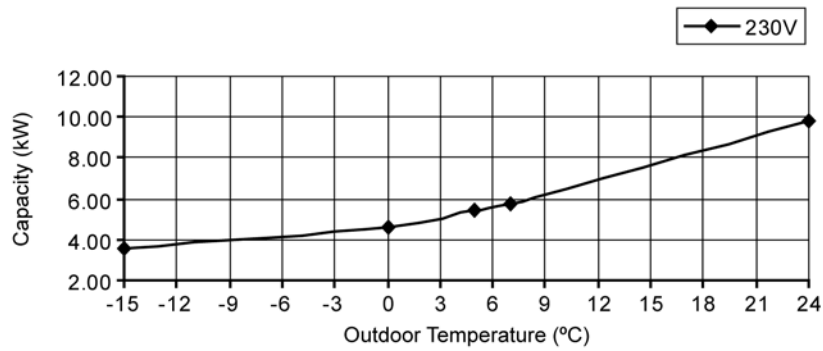
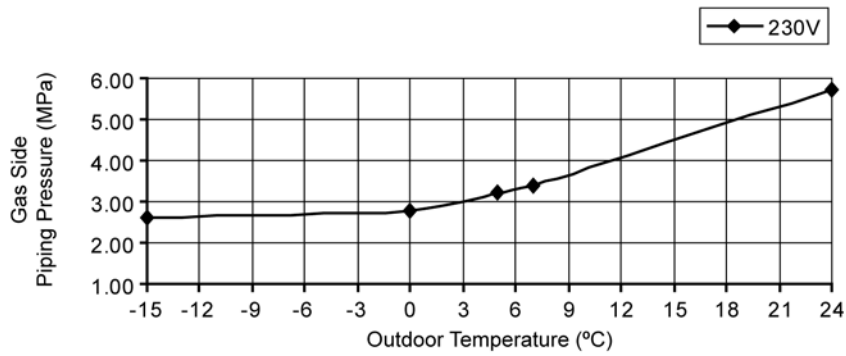
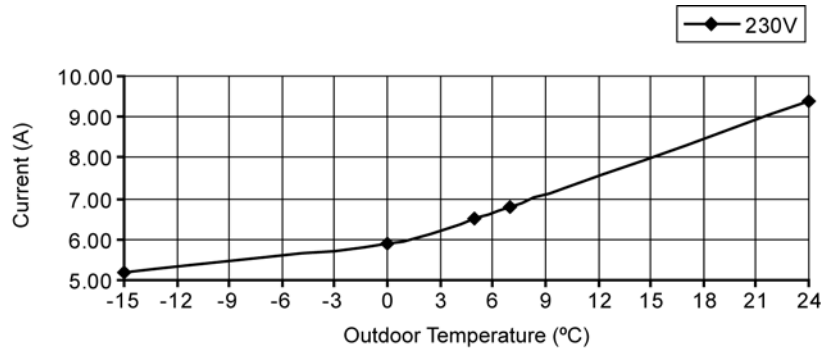


- Piping Length Characteristic

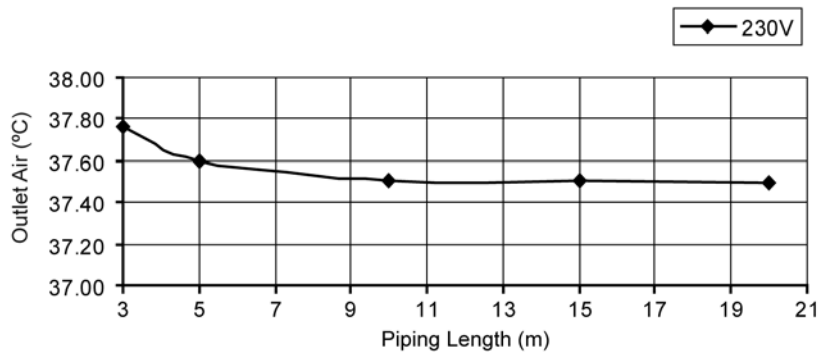
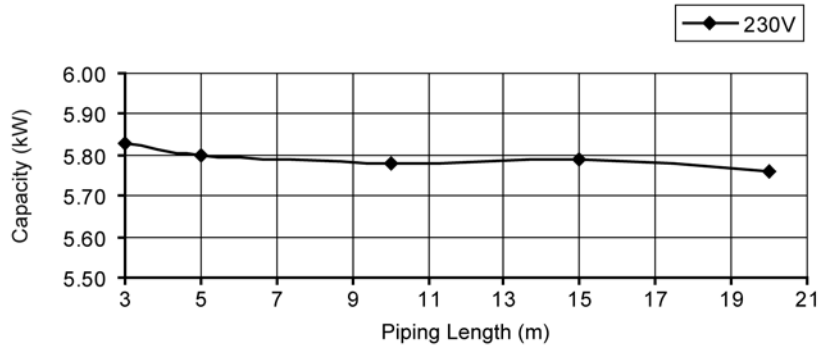
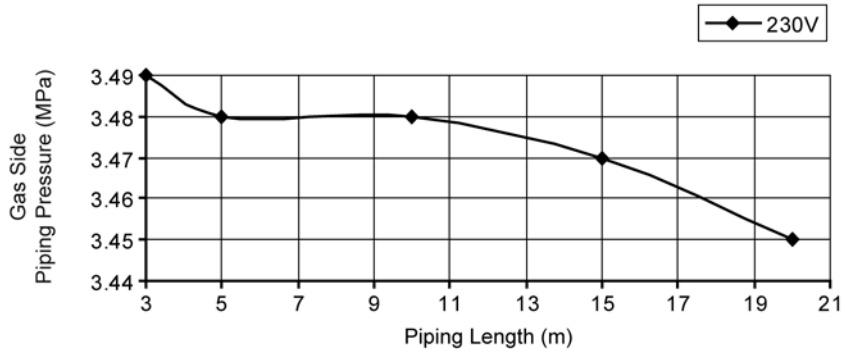
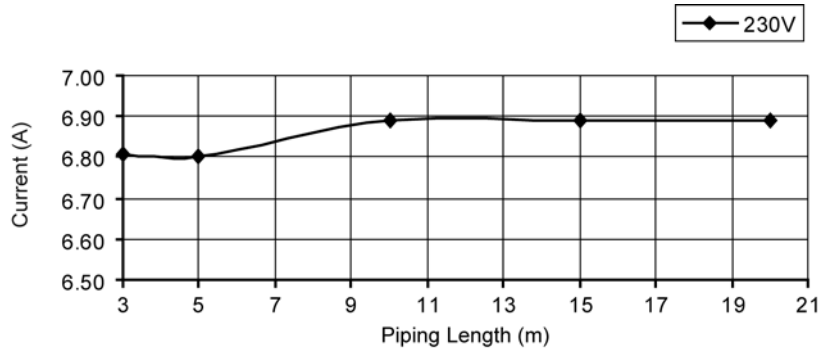
[Condition] Indoor/Outdoor temperature: 27/19°C, 35/-°C  
 Remote condition: High fan speed, Cool 16°C  
 Comp. Hz: F<sub>c</sub>



- Heating Characteristic  
 [Condition] Indoor temperature: 20/-°C  
 Piping Length: 5m  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz:  $F_h$



- Piping Length Characteristic
- [Condition] Indoor/Outdoor temperature: 20/-°C, 7/6°C  
 Remote condition: High fan speed, Heat 30°C  
 Comp. Hz: F<sub>h</sub>



## 17.2 Sensible Capacity Chart

### • CU-E9PKEA

230V Indoor wet bulb	Outdoor Temperature											
	30 °C			35 °C			40 °C			46 °C		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0 °C	2.48	1.88	0.47	2.32	1.80	0.51	2.16	1.73	0.54	1.96	1.65	0.59
19.0 °C				2.50		0.52						
19.5 °C	2.72	1.97	0.48	2.55	1.89	0.52	2.37	1.82	0.55	2.15	1.73	0.60
22.0 °C	2.97	2.04	0.49	2.77	1.96	0.53	2.58	1.89	0.56	2.35	1.81	0.61

### • CU-E12PKEA

230V Indoor wet bulb	Outdoor Temperature											
	30 °C			35 °C			40 °C			46 °C		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0 °C	3.47	2.63	0.80	3.24	2.52	0.86	3.02	2.43	0.92	2.74	2.30	0.99
19.0 °C				3.50		0.87						
19.5 °C	3.81	2.76	0.81	3.56	2.65	0.87	3.31	2.55	0.93	3.01	2.43	1.01
22.0 °C	4.15	2.86	0.83	3.88	2.75	0.89	3.61	2.65	0.95	3.28	2.53	1.03

### • CU-E15PKEA

230V Indoor wet bulb	Outdoor Temperature											
	30 °C			35 °C			40 °C			46 °C		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0 °C	4.17	3.16	1.10	3.89	3.03	1.18	3.62	2.91	1.26	3.29	2.77	1.36
19.0 °C				4.20		1.20						
19.5 °C	4.57	3.31	1.12	4.28	3.18	1.20	3.98	3.06	1.29	3.62	2.91	1.39
22.0 °C	4.99	3.43	1.14	4.66	3.30	1.23	4.33	3.18	1.31	3.94	3.03	1.41

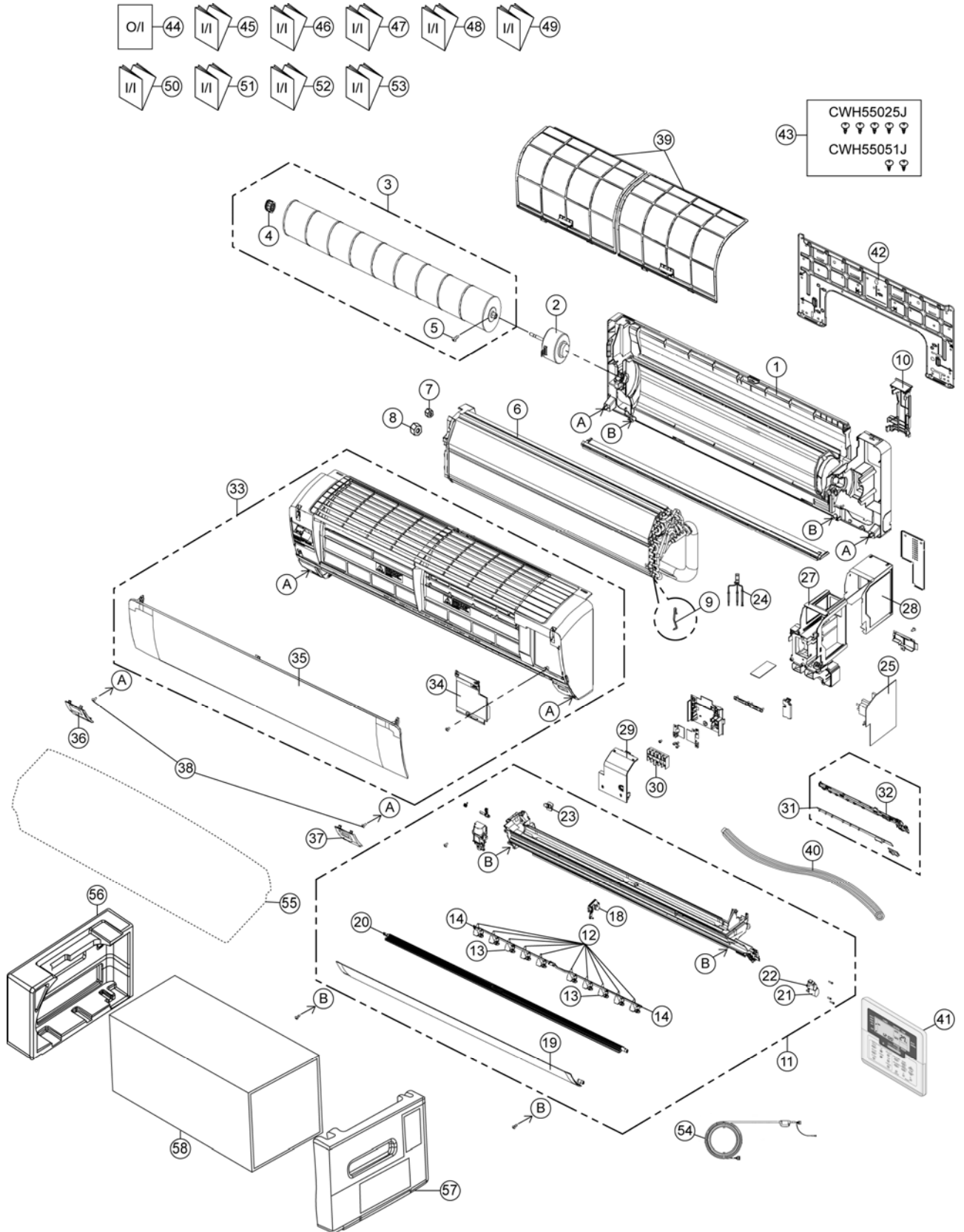
### • CU-E18PKEA

230V Indoor wet bulb	Outdoor Temperature											
	30 °C			35 °C			40 °C			46 °C		
	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP
17.0 °C	4.96	3.76	1.32	4.64	3.61	1.42	4.31	3.47	1.52	3.92	3.29	1.64
19.0 °C				5.00		1.44						
19.5 °C	5.45	3.94	1.34	5.09	3.78	1.45	4.74	3.64	1.55	4.31	3.47	1.67
22.0 °C	5.94	4.08	1.37	5.55	3.93	1.47	5.16	3.79	1.57	4.69	3.61	1.70

# 18. Exploded View and Replacement Parts List

## 18.1 Indoor Unit

### 18.1.1 CS-E9PKEA CS-E12PKEA CS-E15PKEA



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

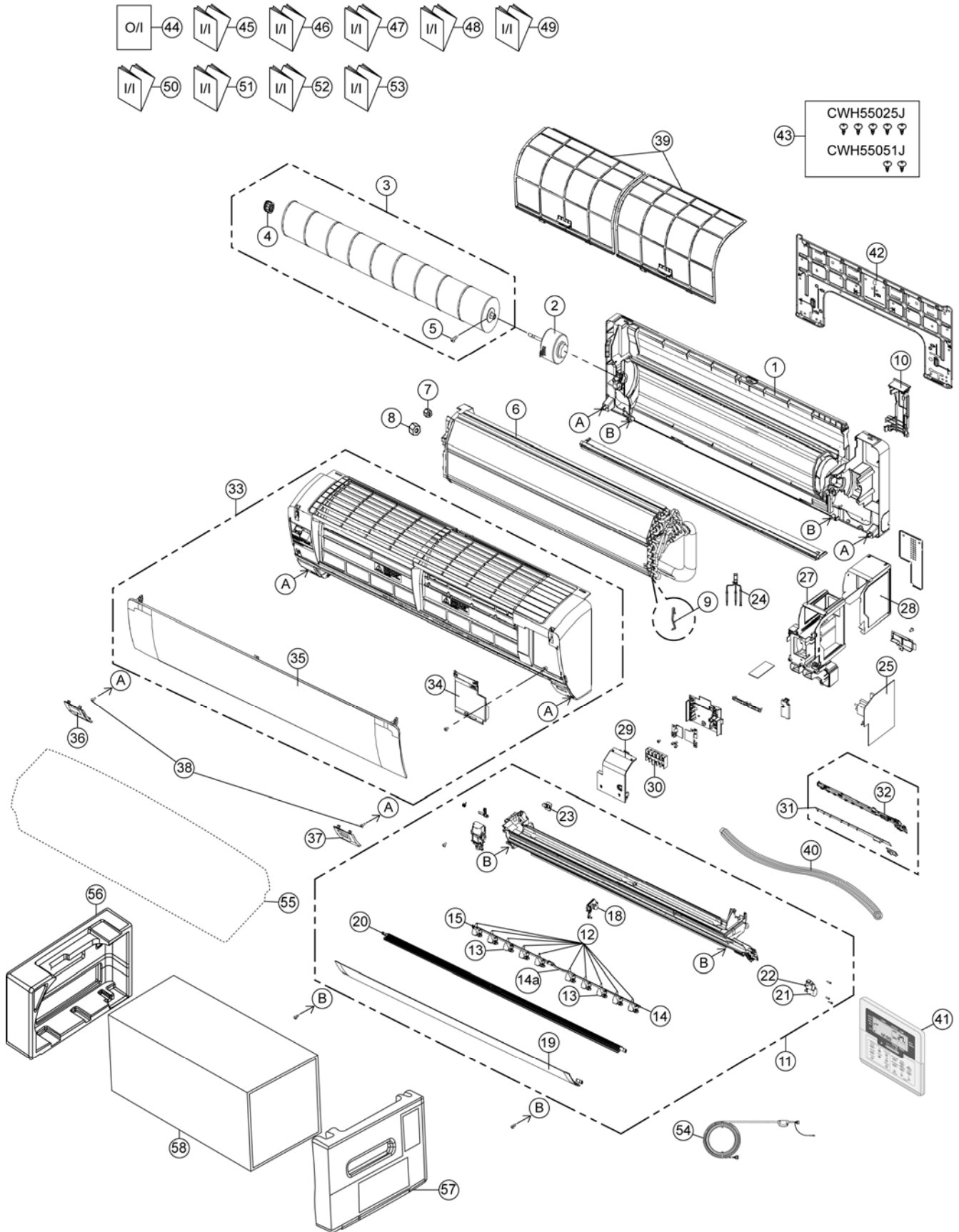
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-E9PKEA	CS-E12PKEA	CS-E15PKEA	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1730	←	←	
⚠	2	FAN MOTOR	1	ARW7666ACCB	←	←	O
	3	CROSS - FLOW FAN COMPLETE	1	CWH02C1135	←	←	
	4	BEARING ASSY	1	CWH64K1010	←	←	
	5	SCREW - CROSS - FLOW FAN	1	CWH551146	←	←	
	6	EVAPORATOR	1	CWB30C4285	CWB30C4257	CWB30C4017	
	7	FLARE NUT (LIQUID)	1	CWT251030	←	←	
	8	FLARE NUT (GAS)	1	CWT251031	←	CWT251032	
	9	CLIP FOR SENSOR	1	CWH711019	←	←	
	10	BACK COVER CHASSIS	1	CWD933463	←	←	
	11	DISCHARGE GRILLE COMPLETE	1	CWE20C3353	←	←	
	12	VERTICAL VANE	8	CWE241389	←	←	
	13	VERTICAL VANE (MAIN)	2	CWE241409	←	←	
	14	CONNECTING BAR	2	CWE261272	←	←	
	18	FULCRUM	1	CWH621157	←	←	
	19	HORIZONTAL VANE COMPLETE	1	CWE24C1422	←	←	
	20	HORIZONTAL VANE COMPLETE	1	CWE24C1421	←	←	
⚠	21	AIR SWING MOTOR	1	CWA981241	←	←	O
⚠	22	AIR SWING MOTOR	1	CWA981299	←	←	O
	23	CAP - DRAIN TRAY	1	CWH521259	←	←	
	24	SENSOR COMPLETE	1	CWA50C2663	←	←	O
⚠	25	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7154	CWA73C7155	CWA73C7162	O
	27	CONTROL BOARD CASING	1	CWH102456	←	←	
	28	CONTROL BOARD TOP COVER	1	CWH131531	←	←	
	29	CONTROL BOARD FRONT COVER CO.	1	CWH13C1286	←	←	
⚠	30	TERMINAL BOARD COMPLETE	1	CWA28C2587	←	←	O
⚠	31	ELECTRONIC CONTROLLER - INDICATOR	1	CWA747322	←	←	O
	32	INDICATOR HOLDER	1	CWD933466	←	←	
	33	FRONT GRILLE COMPLETE	1	CWE11C5514	←	←	
	34	GRILLE DOOR COMPLETE	1	CWE14C1099	←	←	
	35	INTAKE GRILLE COMPLETE	1	CWE22K1610	←	←	
	36	DECORATION BASE (LEFT)	1	CWE351341	←	←	
	37	DECORATION BASE (RIGHT)	1	CWE351326	←	←	
	38	SCREW - FRONT GRILLE	2	XTT4+16CFJ	←	←	
	39	AIR FILTER	2	CWD001326	←	←	
	40	DRAIN HOSE	1	CWH851173	←	←	
	41	REMOTE CONTROL CO. (WIRED)	1	CWA75C3375	←	←	O
	42	INSTALLATION PLATE	1	CWH361134	←	←	
	43	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1942	←	←	
	44	OPERATING INSTRUCTION	1	CWF568897	←	←	
	45	INSTALLATION INSTRUCTION	1	CWF615627	←	←	
	46	INSTALLATION INSTRUCTION	1	CWF615628	←	←	
	47	INSTALLATION INSTRUCTION	1	CWF615629	←	←	
	48	INSTALLATION INSTRUCTION	1	CWF615630	←	←	
	49	INSTALLATION INSTRUCTION	1	CWF615631	←	←	
	50	INSTALLATION INSTRUCTION	1	CWF615632	←	←	
	51	INSTALLATION INSTRUCTION	1	CWF615633	←	←	
	52	INSTALLATION INSTRUCTION	1	CWF615634	←	←	
	53	INSTALLATION INSTRUCTION	1	CWF615635	←	←	
	54	REMOTE CONTROL CABLE	1	CWA221109	←	←	

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-E9PKEA	CS-E12PKEA	CS-E15PKEA	REMARK
	55	BAG	1	CWG861515	←	←	
	56	SHOCK ABSORBER (L)	1	CWG713484	←	←	
	57	SHOCK ABSORBER (R)	1	CWG713485	←	←	
	58	C.C.CASE	1	CWG568509	←	←	

(Note)

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

## 18.1.2 CS-E18PKEA



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



SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-E18PKEA	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1742	
	2	FAN MOTOR	1	ARW7676ACCB	O
	3	CROSS - FLOW FAN COMPLETE	1	CWH02C1136	
	4	BEARING ASSY	1	CWH64K1010	
	5	SCREW - CROSS - FLOW FAN	1	CWH551146	
	6	EVAPORATOR	1	CWB30C4217	
	7	FLARE NUT (LIQUID)	1	CWT251030	
	8	FLARE NUT (GAS)	1	CWT251032	
	9	CLIP FOR SENSOR	1	CWH711019	
	10	BACK COVER CHASSIS	1	CWD933463	
	11	DISCHARGE GRILLE COMPLETE	1	CWE20C3378	
	12	VERTICAL VANE	8	CWE241389	
	13	VERTICAL VANE (MAIN)	2	CWE241409	
	14	CONNECTING BAR (RIGHT)	1	CWE261269	
	14a	CONNECTING BAR (MIDDLE)	1	CWE261268	
	15	CONNECTING BAR (LEFT)	1	CWE261267	
	18	FULCRUM	1	CWH621150	
	19	HORIZONTAL VANE COMPLETE	1	CWE24C1433	
	20	HORIZONTAL VANE COMPLETE	1	CWE24C1434	
	21	AIR SWING MOTOR	1	CWA981304	O
	22	AIR SWING MOTOR	1	CWA981299	O
	23	CAP - DRAIN TRAY	1	CWH521259	
	24	SENSOR COMPLETE	1	CWA50C2663	O
	25	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7163	O
	27	CONTROL BOARD CASING	1	CWH102456	
	28	CONTROL BOARD TOP COVER	1	CWH131531	
	29	CONTROL BOARD FRONT COVER CO.	1	CWH13C1286	
	30	TERMINAL BOARD COMPLETE	1	CWA28C2608	O
	31	ELECTRONIC CONTROLLER - INDICATOR	1	CWA747322	O
	32	INDICATOR HOLDER	1	CWD933466	
	33	FRONT GRILLE COMPLETE	1	CWE11C5443	
	34	GRILLE DOOR COMPLETE	1	CWE14C1099	
	35	INTAKE GRILLE COMPLETE	1	CWE22K1613	
	36	DECORATION BASE (LEFT)	1	CWE351341	
	37	DECORATION BASE (RIGHT)	1	CWE351326	
	38	SCREW - FRONT GRILLE	3	XTT4+16CFJ	
	39	AIR FILTER	2	CWD001338	
	40	DRAIN HOSE	1	CWH851173	
	41	REMOTE CONTROL CO. (WIRED)	1	CWA75C3375	O
	42	INSTALLATION PLATE	1	CWH361098	
	43	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1942	
	44	OPERATING INSTRUCTION	1	CWF568897	
	45	INSTALLATION INSTRUCTION	1	CWF615627	
	46	INSTALLATION INSTRUCTION	1	CWF615628	
	47	INSTALLATION INSTRUCTION	1	CWF615629	
	48	INSTALLATION INSTRUCTION	1	CWF615630	
	49	INSTALLATION INSTRUCTION	1	CWF615631	
	50	INSTALLATION INSTRUCTION	1	CWF615632	
	51	INSTALLATION INSTRUCTION	1	CWF615633	
	52	INSTALLATION INSTRUCTION	1	CWF615634	

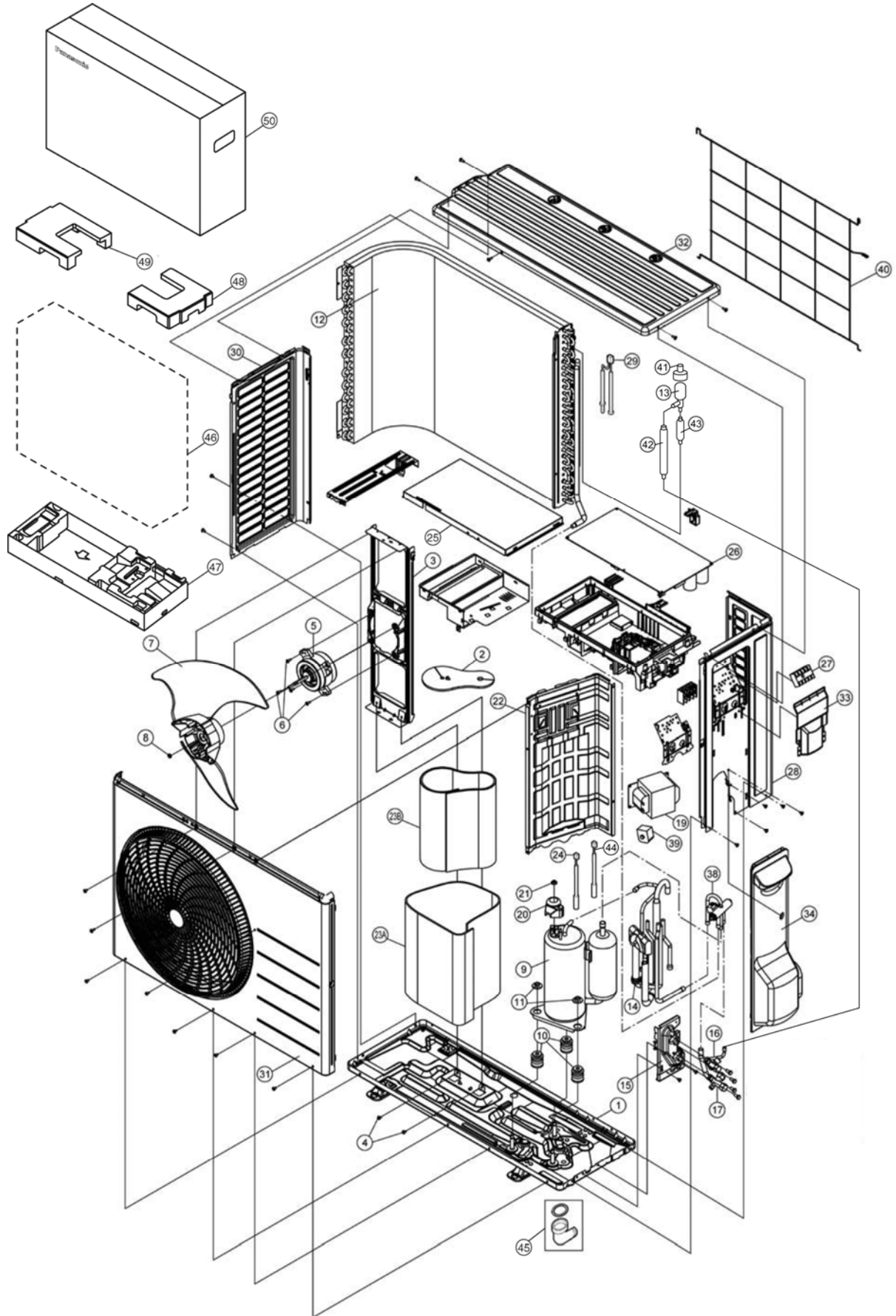
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-E18PKEA	REMARK
	53	INSTALLATION INSTRUCTION	1	CWF615635	
	54	REMOTE CONTROL CABLE	1	CWA221109	
	55	BAG	1	CWG861498	
	56	SHOCK ABSORBER (L)	1	CWG713484	
	57	SHOCK ABSORBER (R)	1	CWG713485	
	58	C.C.CASE	1	CWG569437	

(Note)

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

## 18.2 Outdoor Unit

### 18.2.1 CU-E9PKEA CU-E12PKEA



#### Note

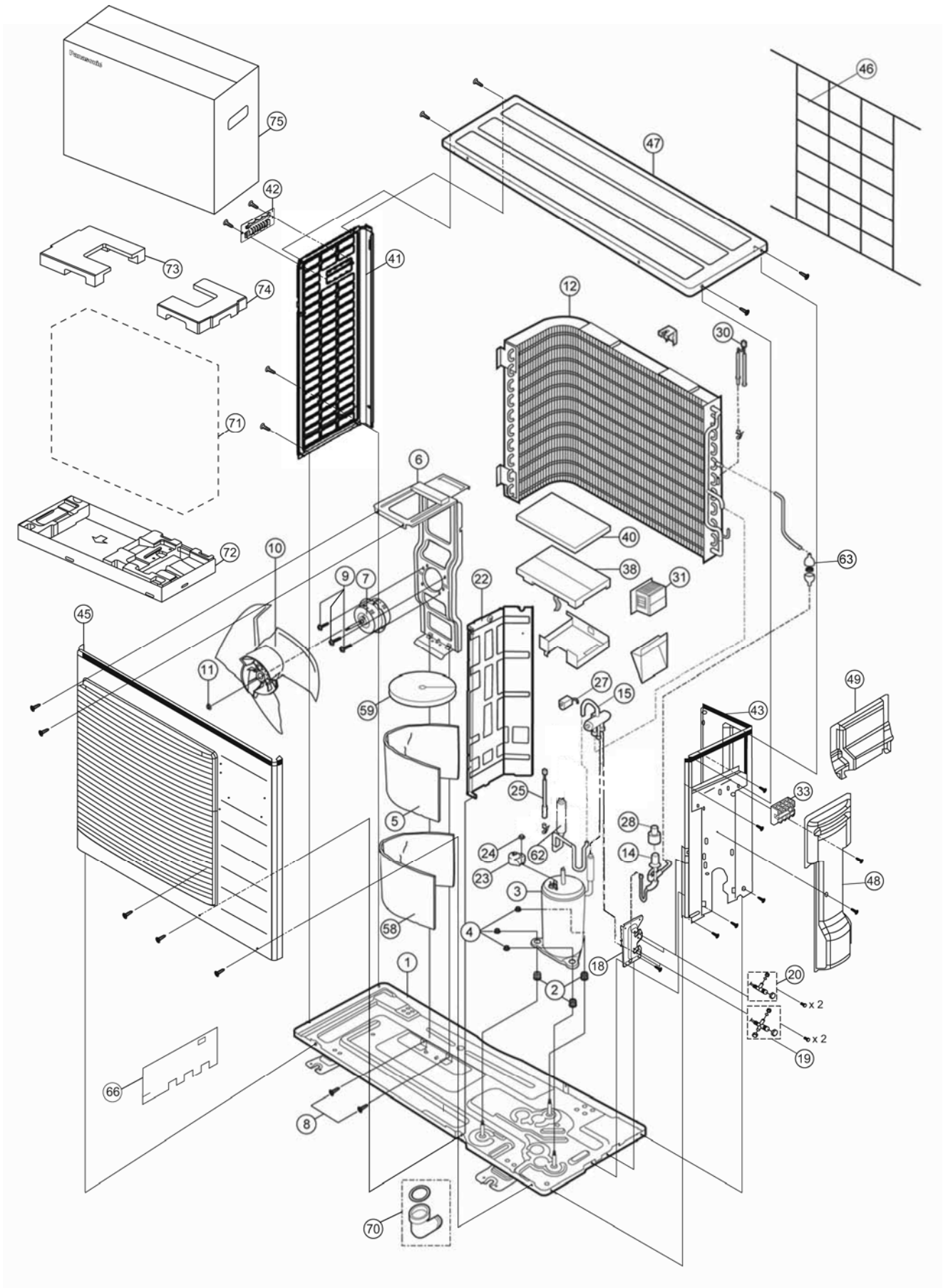
The above exploded view is for the purpose of parts disassembly and replacement. The non-numbered parts are not kept as standard service parts.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-E9PKEA	CU-E12PKEA	REMARK
	1	CHASSIS COMPLETE	1	CWD52K1277	←	
	2	SOUND PROOF MATERIAL	1	CWG302742	←	
	3	FAN MOTOR BRACKET	1	CWD541167	←	
	4	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
⚠	5	FAN MOTOR	1	ARS6411AC	←	O
	6	SCREW - FAN MOTOR MOUNT	4	CWH55252J	←	
	7	PROPELLER FAN ASSY	1	CWH03K1066	←	
	8	NUT - PROPELLER FAN	1	CWH56053J	←	
⚠	9	COMPRESSOR	1	5RD132XBE21	←	O
	10	ANTI - VIBRATION BUSHING	3	CWH50077	←	
	11	NUT - COMPRESSOR MOUNT	3	CWH56000J	←	
	12	CONDENSER	1	CWB32C3559	←	
	13	EXPANSION VALVE	1	CWB051016J	←	
	14	DISCHARGE MUFFLER (4 W.VALVE)	1	CWB121010	←	
	15	HOLDER COUPLING	1	CWH351233	←	
	16	2-WAYS VALVE (LIQUID)	1	CWB021590	←	O
	17	3-WAY VALVE (GAS)	1	CWB011374	←	O
⚠	19	REACTOR	1	G0C193J00004	←	O
	20	TERMINAL COVER	1	CWH171039A	←	
	21	NUT - TERMINAL COVER	1	CWH7080300J	←	
	22	SOUND PROOF BOARD	1	CWH151364	←	
	23A	SOUND PROOF MATERIAL	1	CWG302741	←	
	23B	SOUND PROOF MATERIAL	1	CWG302745	←	
	24	SENSOR CO - COMP TEMP	1	CWA50C2894	←	
	25	CONTROL BOARD COVER - TOP	1	CWH131473	←	
⚠	26	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7185R	CWA73C7186R	O
⚠	27	TERMINAL BOARD ASSY	1	CWA28K1036J	←	O
	28	CABINET SIDE PLATE CO.	1	CWE04C1296	←	
	29	SENSOR - COMPLETE	1	CWA50C2893	←	O
	30	CABINET SIDE PLATE (LEFT)	1	CWE041580A	←	
	31	CABINET FRONT PLATE CO.	1	CWE06C1441	←	
	32	CABINET TOP PLATE	1	CWE031148A	←	
	33	PLATE - C. B. COVER TERMINAL	1	CWH131470A	←	
	34	CONTROL BOARD COVER CO.	1	CWH13C1253	←	
	38	4-WAYS VALVE	1	CWB001063	←	
⚠	39	V-COIL COMPLETE (4-WAY VALVE)	1	CWA43C2431	←	O
	40	WIRE NET	1	CWD041166A	←	
⚠	41	V-COIL COMPLETE (EXP.VALVE)	1	CWA43C2257	←	O
	42	DISCHARGE MUFFLER	1	CWB121058	←	
	43	STRAINER	1	CWB11094	←	
	44	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2656	←	O
	45	BAG - COMPLETE	1	CWG87C900	←	
	46	BAG	1	CWG861078	←	
	47	BASE BOARD - COMPLETE	1	CWG62C1144	←	
	48	SHOCK ABSORBER (RIGHT)	1	CWG713415	←	
	49	SHOCK ABSORBER (LEFT)	1	CWG713416	←	
	50	C.C.CASE	1	CWG566848	←	

(NOTE)

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

## 18.2.2 CU-E15PKEA CU-E18PKEA



### Note

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

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-E15PKEA	CU-E18PKEA	REMARK
	1	CHASSIS COMPLETE	1	CWD52K1261	←	
	2	ANTI - VIBRATION BUSHING	3	CWH50077	←	
⚠	3	COMPRESSOR	1	5RD132XBA21	←	O
	4	NUT - COMPRESSOR MOUNT	3	CWH56000J	←	
	5	SOUND PROOF MATERIAL	1	CWG302630	←	
	6	FAN MOTOR BRACKET	1	CWD541153	←	
⚠	7	FAN MOTOR	1	ARW8401AC	←	O
	8	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
	9	SCREW - FAN MOTOR MOUNT	4	CWH551106J	←	
	10	PROPELLER FAN ASSY	1	CWH03K1065	←	
	11	NUT - PROPELLER FAN	1	CWH56053J	←	
	12	CONDENSER	1	CWB32C3375	CWB32C3764	
	14	EXPANSION VALVE	1	CWB051016J	←	
	15	4-WAYS VALVE	1	CWB001026J	←	
	18	HOLDER COUPLING	1	CWH351227	←	
	19	3-WAY VALVE (GAS)	1	CWB011338	←	O
	20	2-WAYS VALVE (LIQUID)	1	CWB021454	←	O
	22	SOUND PROOF BOARD	1	CWH151257	←	
	23	TERMINAL COVER	1	CWH171039A	←	
	24	NUT - TERMINAL COVER	1	CWH7080300J	←	
	25	SENSOR CO - AIR TEMP AND PIPE TEMP	1	CWA50C2185	←	O
⚠	27	V-COIL COMPLETE (4-WAY VALVE)	1	CWA43C2169J	←	O
⚠	28	V-COIL COMPLETE (EXP.VALVE)	1	CWA43C2257	←	O
	30	SENSOR - COMPLETE	1	CWA50C2517	←	O
⚠	31	REACTOR	1	G0C203J00003	←	O
⚠	33	TERMINAL BOARD ASSY	1	CWA28K1036J	←	O
⚠	38	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7176R	CWA73C7177R	O
	40	CONTROL BOARD COVER - TOP	1	CWH131333	←	
	41	CABINET SIDE PLATE (LEFT)	1	CWE041522A	CWE041520A	
	42	HANDLE	1	CWE161010	←	
	43	CABINET SIDE PLATE (RIGHT)	1	CWE041555A	←	
	45	CABINET FRONT PLATE CO.	1	CWE06K1077	←	
	46	WIRE NET	1	CWD041155A	←	
	47	CABINET TOP PLATE	1	CWE031083A	←	
	48	CONTROL BOARD COVER - COMPLETE	1	CWH13C1238	←	
	49	CONTROL BOARD COVER	1	CWH131409A	←	
	58	SOUND PROOF MATERIAL	1	CWG302636	←	
	59	SOUND PROOF MATERIAL	1	CWG302744	←	
	62	RECEIVER	1	CWB14011	←	
	63	STRAINER	1	CWB11094	←	
	66	SOUND PROOF MATERIAL	1	CWG302632	←	
	70	BAG - COMPLETE	1	CWG87C900	←	
	71	BAG	1	CWG861461	←	
	72	BASE BOARD - COMPLETE	1	CWG62C1131	←	
	73	SHOCK ABSORBER (LEFT)	1	CWG713217	←	
	74	SHOCK ABSORBER (RIGHT)	1	CWG713218	←	
	75	C.C.CASE	1	CWG568360	←	

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