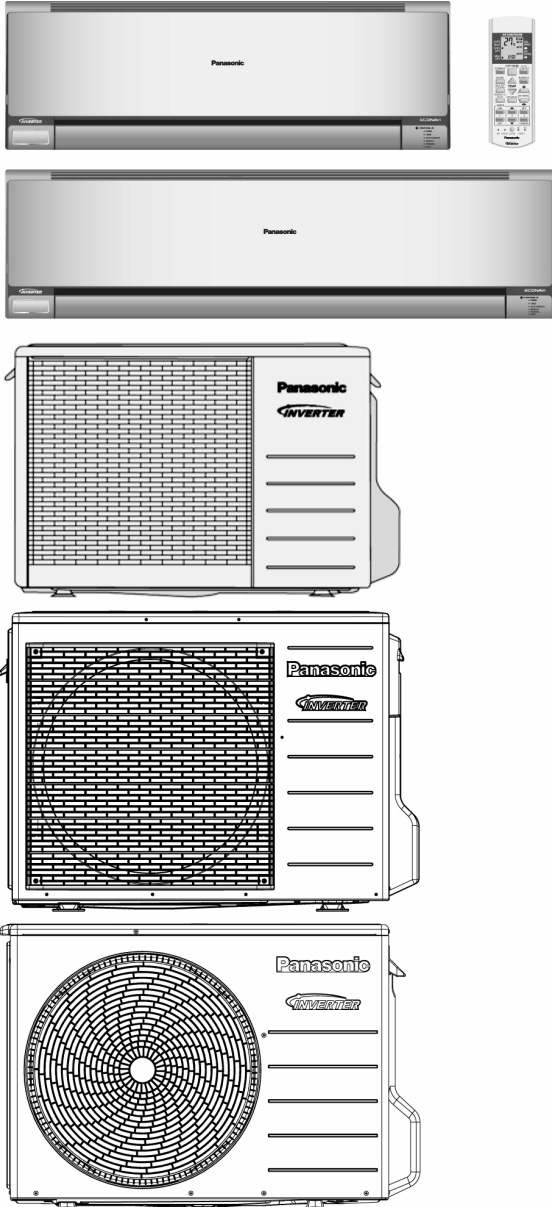


Service Manual

Air Conditioner



Indoor Unit

CS-E7NKEW
 CS-E7NKEW
 CS-E9NKEW
 CS-E9NKEW
 CS-E12NKEW
 CS-E12NKEW
 CS-E15NKEW
 CS-E18NKEW
 CS-E21NKEW
 CS-XE7NKEW
 CS-XE7NKEW
 CS-XE9NKEW
 CS-XE9NKEW
 CS-XE12NKEW
 CS-XE12NKEW
 CS-XE15NKEW
 CS-XE18NKEW
 CS-XE21NKEW

Outdoor Unit

CU-E7NKE
 CU-E7NKE-3
 CU-E9NKE
 CU-E9NKE-3
 CU-E12NKE
 CU-E12NKE-3
 CU-E15NKE
 CU-E18NKE
 CU-E21NKE
 CU-E7NKE
 CU-E7NKE-3
 CU-E9NKE
 CU-E9NKE-3
 CU-E12NKE
 CU-E12NKE-3
 CU-E15NKE
 CU-E18NKE
 CU-E21NKE

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.

PRECAUTION OF LOW TEMPERATURE

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

Panasonic®



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1. Safety Precautions







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

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


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

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

 WARNING	
1. Do not modify the machine, part, material during repairing service.	
2. If wiring unit is supplied as repairing part, do not repair or connect the wire even only partial wire break. Exchange the whole wiring unit.	
3. Do not wrench the fasten terminal. Pull it out or insert it straightly.	
4. Engage authorized dealer or specialist for installation and servicing. If installation or servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
5. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric shock or fire.	
6. Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.	
7. Install at a strong and firm location which is able to withstand the set's weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.	
8. For electrical work, follow the local national wiring standard, regulation and the installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.	
9. This equipment is strongly recommended to install with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.	
10. Do not use joint cable for indoor/outdoor connection cable. Use the specified indoor/outdoor connection cable, refer to installation instruction CONNECT THE CABLE TO THE INDOOR UNIT and connect tightly for indoor/outdoor connection. Clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat up or fire at the connection.	
11. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat-up or fire at the connection point of terminal, fire or electrical shock.	
12. When install or relocate air conditioner, do not let any substance other than the specified refrigerant, eg. air etc. mix into refrigeration cycle (piping). (Mixing of air etc. will cause abnormal high pressure in refrigeration cycle and result in explosion, injury etc.).	
13. Do not install outdoor unit near handrail of veranda. When installing air-conditioner unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.	
14. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electric shock in case equipment breakdown or insulation breakdown.	
15. Keep away from small children, the thin film may cling to nose and mouth and prevent breathing.	
16. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.	
17. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.	
18. For R410A models, when connecting the piping, do not use any existing (R22) pipes and flare nuts. Using such same may cause abnormally high pressure in the refrigeration cycle (piping), and possibly result in explosion and injury. Use only R410A materials. Thickness of copper pipes used with R410A must be more than 0.8mm. Never use copper pipes thinner than 0.8mm. It is desirable that the amount of residual oil is less than 40 mg/10m.	

 **WARNING**

- | | |
|---|---|
| 19. During installation, install the refrigerant piping properly before run the compressor. (Operation of compressor without fixing refrigeration piping and valves at opened condition will caused suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc). | |
| 20. During pump down operation, stop the compressor before remove the refrigeration piping. (Removal of 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 air conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following methods.
Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency. In some countries, permanent connection of this room air conditioner to the power supply is prohibited.
i. Power supply connection to the receptacle using a power plug. Use an approved 15/16A (3/4~1.75HP) or 16A (2.0HP) or 20A (2.5HP) or 25A (3.0HP) power plug with earth pin for the connection to the socket.
ii. Power supply connection to a circuit breaker for the permanent connection. Use an approved 16A (3/4~2.0HP), 20A (2.5HP) or 25A (3.0HP) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap. | |
| 8. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigerant parts. Take care of the liquid refrigerant, it may cause frostbite. |  |
| 9. Installation or servicing work: It may need two people to carry out the installation or servicing work. | |
| 10. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc. |  |
| 11. Do not sit or step on the unit, you may fall down accidentally. |  |
| 12. Do not touch the sharp aluminium fins or edges of metal parts.
If you are required to handle sharp parts during installation or servicing, please wear hand glove.
Sharp parts may cause injury. |  |

2. Specifications

Model		Indoor	CS-E7NKEW, CS-XE7NKEW			CS-E9NKEW, CS-XE9NKEW		
		Outdoor	CU-E7NKE			CU-E9NKE		
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	0.75	2.05	2.40	0.85	2.50	3.00
		BTU/h	2560	6990	8180	2900	8530	10200
		Kcal/h	650	1760	2060	730	2150	2580
	Running Current	A	-	2.2	-	-	2.5	-
	Input Power	W	240	470	580	245	535	730
	Annual Consumption	kWh	-	235	-	-	268	-
	EER	W/W	3.13	4.36	4.14	3.47	4.67	4.11
		BTU/hW	10.67	14.87	14.10	11.84	15.94	13.97
		Kcal/hW	2.71	3.74	3.55	2.98	4.02	3.53
	Power Factor	%	-	93	-	-	93	-
	Indoor Noise (H / L / QLo)	dB-A	37 / 24 / 20			39 / 25 / 20		
		Power Level dB	53 / -			55 / -		
	Outdoor Noise (H / L)	dB-A	45 / -			46 / -		
Power Level dB		60 / -			61 / -			
Heating	Capacity	kW	0.75	2.80	4.00	0.85	3.40	5.00
		BTU/h	2560	9550	13600	2900	11600	17100
		Kcal/h	650	2410	3440	730	2920	4300
	Running Current	A	-	3.0	-	-	3.4	-
	Input Power	W	230	635	1.02k	240	735	1.30k
	COP	W/W	3.26	4.41	3.92	3.54	4.63	3.85
		BTU/hW	11.13	15.04	13.33	12.08	15.78	13.15
		Kcal/hW	2.83	3.80	3.37	3.04	3.97	3.31
	Power Factor	%	-	92	-	-	94	-
	Indoor Noise (H / L / QLo)	dB-A	38 / 25 / 20			40 / 27 / 20		
		Power Level dB	54 / -			56 / -		
	Outdoor Noise (H / L)	dB-A	46 / -			47 / -		
		Power Level dB	61 / -			62 / -		
Low Temp. : Capacity (kW) / I.Power (W) / COP		2.90 / 900 / 3.22			3.62 / 1.15k / 3.15			
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP		2.35 / 930 / 2.53			2.88 / 1.18k / 2.44			
Max Current (A) / Max Input Power (W)		4.7 / 1.02k			5.8 / 1.30k			
Starting Current (A)		3.0			3.4			
Compressor	Type	Hermetic Motor (Rotary)			Hermetic Motor (Rotary)			
	Motor Type	Brushless (6 poles)			Brushless (6 poles)			
	Output Power	W	650			700		

Indoor Fan	Type			Cross-Flow Fan	Cross-Flow Fan	
	Material			ASG20K1	ASG20K1	
	Motor Type			Transistor (8-poles)	Transistor (8-poles)	
	Input Power		W	94.8	94.8	
	Output Power		W	40	40	
	Speed	QLo	Cool	rpm	560	600
			Heat	rpm	600	640
		Lo	Cool	rpm	640	700
			Heat	rpm	700	790
		Me	Cool	rpm	845	930
			Heat	rpm	895	1015
		Hi	Cool	rpm	1050	1160
			Heat	rpm	1090	1240
SHi	Cool	rpm	1080	1210		
	Heat	rpm	1120	1250		
Outdoor Fan	Type			Propeller Fan	Propeller Fan	
	Material			PP	PP	
	Motor Type			Induction (6-poles)	Induction (6-poles)	
	Input Power		W	-	-	
	Output Power		W	25	25	
	Speed	Hi	rpm	750	770	
Moisture Removal		L/h (Pt/h)	1.3 (2.7)	1.5 (3.2)		
Indoor Airflow	QLo	Cool	m ³ /min (ft ³ /min)	5.15 (182)	5.00 (177)	
		Heat	m ³ /min (ft ³ /min)	5.60 (198)	5.00 (177)	
	Lo	Cool	m ³ /min (ft ³ /min)	6.10 (215)	6.15 (217)	
		Heat	m ³ /min (ft ³ /min)	6.80 (240)	6.65 (235)	
	Me	Cool	m ³ /min (ft ³ /min)	8.50 (300)	8.70 (307)	
		Heat	m ³ /min (ft ³ /min)	9.10 (321)	9.20 (325)	
	Hi	Cool	m ³ /min (ft ³ /min)	10.9 (385)	11.3 (400)	
		Heat	m ³ /min (ft ³ /min)	11.4 (400)	11.7 (415)	
	SHi	Cool	m ³ /min (ft ³ /min)	11.60 (410)	11.70 (413)	
		Heat	m ³ /min (ft ³ /min)	12.00 (424)	12.10 (427)	
Outdoor Airflow	Hi	Cool	m ³ /min (ft ³ /min)	33.9 (1195)	29.8 (1050)	
		Heat	m ³ /min (ft ³ /min)	33.9 (1195)	29.8 (1050)	
Refrigeration Cycle	Control Device			Check Valve & Capillary Tube	Check Valve & Capillary Tube	
	Refrigerant Oil		cm ³	FV50S (320)	FV50S (320)	
	Refrigerant Type		g (oz)	R410A, 830 (29.3)	R410A, 950 (33.5)	
Dimension	Height(I/D / O/D)		mm (inch)	290 (11-7/16) / 542 (21-11/32)	290 (11-7/16) / 542 (21-11/32)	
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 780 (30-23/32)	870 (34-9/32) / 780 (30-23/32)	
	Depth (I/D / O/D)		mm (inch)	214 (8-7/16) / 289 (11-13/32)	214 (8-7/16) / 289 (11-13/32)	
Weight	Net (I/D / O/D)		kg (lb)	9 (20) / 32 (71)	9 (20) / 33 (73)	
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)	6.35 (1/4) / 9.52 (3/8)	
	Standard length		m (ft)	5 (16.4)	5 (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)	15.0 (49.2)	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 x Stage x FPI		2 x 15 x 17		2 x 15 x 21	
	Size (W x H x L)	mm	610 x 315 x 25.4		610 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium		Aluminium	
	Fin Type		Corrugated Fin		Corrugated Fin	
	Row x Stage x FPI		1 x 20 x 19		2 x 24 x 17	
	Size (W x H x L)	mm	22 x 508 x 708.4		36.4 x 504 x 713.684	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Outdoor Power Supply		Outdoor Power Supply	
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	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	5	4	5	4
	Heating	Maximum	24	18	24	18
		Minimum	-5	-6	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
4. Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
5. Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E12NKEW, CS-XE12NKEW			CS-E15NKEW, CS-XE15NKEW		
		Outdoor	CU-E12NKE			CU-E15NKE		
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	0.85	4.20	5.00
		BTU/h	2900	11900	13600	2900	14300	17100
		Kcal/h	730	3010	3440	730	3610	4300
	Running Current	A	-	4.0	-	-	5.7	-
	Input Power	W	250	855	1.13k	260	1.26k	1.57k
	Annual Consumption	kWh	-	428	-	-	630	-
	EER	W/W	3.40	4.09	3.54	3.27	3.33	3.18
		BTU/hW	11.60	13.92	12.04	11.15	11.35	10.89
		Kcal/hW	2.92	3.52	3.04	2.81	2.87	2.74
	Power Factor	%	-	93	-	-	96	-
	Indoor Noise (H / L / QLo)	dB-A	42 / 28 / 20			43 / 31 / 25		
		Power Level dB	58 / -			59 / -		
	Outdoor Noise (H / L)	dB-A	48 / -			49 / -		
		Power Level dB	63 / -			64 / -		
Heating	Capacity	kW	0.85	4.00	6.00	0.85	5.30	6.80
		BTU/h	2900	13600	20500	2900	18100	23200
		Kcal/h	730	3440	5160	730	4560	5850
	Running Current	A	-	4.3	-	-	6.6	-
	Input Power	W	245	930	1.71k	255	1.44k	1.94k
	COP	W/W	3.47	4.30	3.51	3.33	3.68	3.51
		BTU/hW	11.84	14.62	11.99	11.37	12.57	11.96
		Kcal/hW	2.98	3.70	3.02	2.86	3.17	3.02
	Power Factor	%	-	94	-	-	95	-
	Indoor Noise (H / L / QLo)	dB-A	42 / 33 / 20			43 / 35 / 29		
		Power Level dB	58 / -			59 / -		
	Outdoor Noise (H / L)	dB-A	50 / -			51 / -		
		Power Level dB	65 / -			66 / -		
	Low Temp. : Capacity (kW) / I.Power (W) / COP			4.47 / 1.48k / 3.02			4.92 / 1.72k / 2.86	
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP			3.37 / 1.49k / 2.26			4.11 / 1.73k / 2.38		
Max Current (A) / Max Input Power (W)			7.8 / 1.71k			9.0 / 1.94k		
Starting Current (A)			4.3			6.6		
Compressor	Type	Hermetic Motor (Rotary)			Hermetic Motor (Rotary)			
	Motor Type	Brushless (6-poles)			Brushless (6-poles)			
	Output Power	700			700			

Indoor Fan	Type			Cross-Flow Fan	Cross-Flow Fan	
	Material			ASG20K1	ASG20K1	
	Motor Type			Transistor (8-poles)	Transistor (8-poles)	
	Input Power		W	94.8	94.8	
	Output Power		W	40	40	
	Speed	QLo	Cool	rpm	600	700
			Heat	rpm	640	870
		Lo	Cool	rpm	800	840
			Heat	rpm	980	1050
		Me	Cool	rpm	1030	1050
			Heat	rpm	1140	1200
		Hi	Cool	rpm	1260	1270
			Heat	rpm	1300	1350
SHi	Cool	rpm	1290	1310		
	Heat	rpm	1310	1370		
Outdoor Fan	Type			Propeller Fan	Propeller Fan	
	Material			PP	PP	
	Motor Type			DC Motor (8-poles)	Induction (6-poles)	
	Input Power		W	-	-	
	Output Power		W	40	30	
	Speed	Hi	rpm	900	910	
Moisture Removal		L/h (Pt/h)	2.0 (4.2)	2.4 (5.1)		
Indoor Airflow	QLo	Cool	m ³ /min (ft ³ /min)	5.10 (180)	6.10 (215)	
		Heat	m ³ /min (ft ³ /min)	5.40 (191)	8.00 (282)	
	Lo	Cool	m ³ /min (ft ³ /min)	7.35 (260)	7.70 (272)	
		Heat	m ³ /min (ft ³ /min)	9.20 (325)	10.05 (355)	
	Me	Cool	m ³ /min (ft ³ /min)	9.90 (350)	10.10 (357)	
		Heat	m ³ /min (ft ³ /min)	11.00 (388)	11.70 (413)	
	Hi	Cool	m ³ /min (ft ³ /min)	12.5 (440)	12.5 (440)	
		Heat	m ³ /min (ft ³ /min)	12.8 (450)	13.4 (475)	
	SHi	Cool	m ³ /min (ft ³ /min)	13.10 (463)	13.30 (470)	
		Heat	m ³ /min (ft ³ /min)	13.30 (470)	13.60 (480)	
Outdoor Airflow	Hi	Cool	m ³ /min (ft ³ /min)	33.3 (1175)	33.3 (1175)	
		Heat	m ³ /min (ft ³ /min)	33.3 (1175)	33.3 (1175)	
Refrigeration Cycle	Control Device			Check Valve & Capillary Tube	Check Valve & Capillary Tube	
	Refrigerant Oil		cm ³	FV50S (320)	FV50S (400)	
	Refrigerant Type		g (oz)	R410A, 1.01k (35.7)	R410A, 1.01k (35.7)	
Dimension	Height(I/D / O/D)		mm (inch)	290 (11-7/16) / 619 (24-3/8)	290 (11-7/16) / 619 (24-3/8)	
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 824 (32-15/32)	870 (34-9/32) / 824 (32-15/32)	
	Depth (I/D / O/D)		mm (inch)	214 (8-7/16) / 299 (11-25/32)	214 (8-7/16) / 299 (11-25/32)	
Weight	Net (I/D / O/D)		kg (lb)	9 (20) / 34 (75)	9 (20) / 33 (73)	
	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)	6.35 (1/4) / 12.70 (1/2)	
Piping	Standard length		m (ft)	5 (16.4)	5 (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)	15.0 (49.2)	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 x Stage x FPI		2 x 15 x 21		2 x 15 x 21	
	Size (W x H x L)	mm	610 x 315 x 25.4		610 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium		Aluminium	
	Fin Type		Corrugated Fin		Corrugated Fin	
	Row x Stage x FPI		2 x 28 x 17		2 x 28 x 17	
	Size (W x H x L)	mm	36.4 x 588 x 607		36.4 x 588 x 607	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Outdoor Power Supply		Outdoor Power Supply	
Power Supply Cord		A	Nil		Nil	
Thermostat			Electronic Contol		Electronic Contol	
Protection Device			Electronic Contol		Electronic Contol	
			Dry Bilb	Wet Bulb	Dry Bulb	Wet Bulb
Indoor Operation Range	Cooling	Maximum	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	5	4	5	4
	Heating	Maximum	24	18	24	18
		Minimum	-5	-6	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
4. Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
5. Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E7NKEW, CS-XE7NKEW			CS-E9NKEW, CS-XE9NKEW		
		Outdoor	CU-E7NKE-3			CU-E9NKE-3		
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	0.75	2.05	2.40	0.85	2.50	3.00
		BTU/h	2560	6990	8180	2900	8530	10200
		Kcal/h	650	1760	2060	730	2150	2580
	Running Current	A	-	2.2	-	-	2.5	-
	Input Power	W	240	470	580	245	535	730
	Annual Consumption	kWh	-	235	-	-	268	-
	EER	W/W	3.13	4.36	4.14	3.47	4.67	4.11
		BTU/hW	10.67	14.87	14.10	11.84	15.94	13.97
		Kcal/hW	2.71	3.74	3.55	2.98	4.02	3.53
	Power Factor	%	-	93	-	-	93	-
	Indoor Noise (H / L / QLo)	dB-A	37 / 24 / 20			39 / 25 / 20		
		Power Level dB	53 / -			55 / -		
	Outdoor Noise (H / L)	dB-A	45 / -			46 / -		
		Power Level dB	60 / -			61 / -		
Heating	Capacity	kW	0.75	2.80	4.00	0.85	3.40	5.00
		BTU/h	2560	9550	13600	2900	11600	17100
		Kcal/h	650	2410	3440	730	2920	4300
	Running Current	A	-	3.0	-	-	3.4	-
	Input Power	W	230	635	1.02k	240	735	1.30k
	COP	W/W	3.26	4.41	3.92	3.54	4.63	3.85
		BTU/hW	11.13	15.04	13.33	12.08	15.78	13.15
		Kcal/hW	2.83	3.80	3.37	3.04	3.97	3.31
	Power Factor	%	-	92	-	-	94	-
	Indoor Noise (H / L / QLo)	dB-A	38 / 25 / 20			40 / 27 / 20		
		Power Level dB	54 / -			56 / -		
	Outdoor Noise (H / L)	dB-A	46 / -			47 / -		
		Power Level dB	61 / -			62 / -		
	Low Temp. : Capacity (kW) / I.Power (W) / COP			2.90 / 900 / 3.22			3.62 / 1.15k / 3.15	
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP			2.35 / 930 / 2.53			2.88 / 1.18k / 2.44		
Max Current (A) / Max Input Power (W)			4.7 / 1.02k			5.8 / 1.30k		
Starting Current (A)			3.0			3.4		
Compressor	Type	Hermetic Motor (Rotary)			Hermetic Motor (Rotary)			
	Motor Type	Brushless (6-poles)			Brushless (6-poles)			
	Output Power	W	650			700		

Indoor Fan	Type			Cross-Flow Fan	Cross-Flow Fan	
	Material			ASG20K1	ASG20K1	
	Motor Type			Transistor (8-poles)	Transistor (8-poles)	
	Input Power		W	94.8	94.8	
	Output Power		W	40	40	
	Speed	QLo	Cool	rpm	560	600
			Heat	rpm	600	640
		Lo	Cool	rpm	640	700
			Heat	rpm	700	790
		Me	Cool	rpm	845	930
			Heat	rpm	895	1015
		Hi	Cool	rpm	1050	1160
			Heat	rpm	1090	1240
SHi	Cool	rpm	1080	1210		
	Heat	rpm	1120	1250		
Outdoor Fan	Type			Propeller Fan	Propeller Fan	
	Material			PP	PP	
	Motor Type			Induction (6-poles)	Induction (6-poles)	
	Input Power		W	-	-	
	Output Power		W	25	25	
	Speed	Hi	rpm	750	770	
Moisture Removal		L/h (Pt/h)	1.3 (2.7)	1.5 (3.2)		
Indoor Airflow	QLo	Cool	m ³ /min (ft ³ /min)	5.15 (182)	5.00 (177)	
		Heat	m ³ /min (ft ³ /min)	5.60 (198)	5.00 (177)	
	Lo	Cool	m ³ /min (ft ³ /min)	6.10 (215)	6.15 (217)	
		Heat	m ³ /min (ft ³ /min)	6.80 (240)	6.65 (235)	
	Me	Cool	m ³ /min (ft ³ /min)	8.50 (300)	8.70 (307)	
		Heat	m ³ /min (ft ³ /min)	9.10 (321)	9.20 (325)	
	Hi	Cool	m ³ /min (ft ³ /min)	10.9 (385)	11.3 (400)	
		Heat	m ³ /min (ft ³ /min)	11.4 (400)	11.7 (415)	
	SHi	Cool	m ³ /min (ft ³ /min)	11.60 (410)	11.70 (413)	
		Heat	m ³ /min (ft ³ /min)	12.00 (424)	12.10 (427)	
Outdoor Airflow	Hi	Cool	m ³ /min (ft ³ /min)	33.9 (1195)	29.8 (1050)	
		Heat	m ³ /min (ft ³ /min)	33.9 (1195)	29.8 (1050)	
Refrigeration Cycle	Control Device			Check Valve & Capillary Tube	Check Valve & Capillary Tube	
	Refrigerant Oil		cm ³	FV50S (320)	FV50S (320)	
	Refrigerant Type		g (oz)	R410A, 830 (29.3)	R410A, 950 (33.5)	
Dimension	Height(I/D / O/D)		mm (inch)	290 (11-7/16) / 542 (21-11/32)	290 (11-7/16) / 542 (21-11/32)	
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 780 (30-23/32)	870 (34-9/32) / 780 (30-23/32)	
	Depth (I/D / O/D)		mm (inch)	214 (8-7/16) / 289 (11-13/32)	214 (8-7/16) / 289 (11-13/32)	
Weight	Net (I/D / O/D)		kg (lb)	9 (20) / 32 (71)	9 (20) / 35 (77)	
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)	6.35 (1/4) / 9.52 (3/8)	
	Standard length		m (ft)	5 (16.4)	5 (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)	15.0 (49.2)	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 x Stage x FPI		2 x 15 x 17		2 x 15 x 21	
	Size (W x H x L)	mm	610 x 315 x 25.4		610 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium		Aluminium	
	Fin Type		Corrugated Fin		Corrugated Fin	
	Row x Stage x FPI		1 x 20 x 19		2 x 24 x 17	
	Size (W x H x L)	mm	22 x 508 x 708		36.4 x 504 x 713:684	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Outdoor Power Supply		Outdoor Power Supply	
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	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	5	4	5	4
	Heating	Maximum	24	18	24	18
		Minimum	-15	-16	-15	-16

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
4. Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
5. Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E12NKEW, CS-XE12NKEW		
		Outdoor	CU-E12NKE-3		
Performance Test Condition		EUROVENT			
Power Supply		Phase, Hz	Single, 50		
		V	230		
		Min.	Mid.	Max.	
Cooling	Capacity	kW	0.85	3.50	4.00
		BTU/h	2900	11900	13600
		Kcal/h	730	3010	3440
	Running Current	A	-	4.1	-
	Input Power	W	250	905	1.18k
	Annual Consumption	kWh	-	453	-
	EER	W/W	3.40	3.87	3.39
		BTU/hW	11.60	13.15	11.53
		Kcal/hW	2.92	3.33	2.92
	Power Factor	%	-	96	-
	Indoor Noise (H / L / QLo)	dB-A	42 / 28 / 20		
		Power Level dB	58 / -		
	Outdoor Noise (H / L)	dB-A	48 / -		
		Power Level dB	63 / -		
Heating	Capacity	kW	0.85	4.40	6.70
		BTU/h	2900	15000	22800
		Kcal/h	730	3780	5760
	Running Current	A	-	5.1	-
	Input Power	W	245	1.09k	1.93k
	COP	W/W	3.47	4.04	3.47
		BTU/hW	11.84	13.76	11.81
		Kcal/hW	2.98	3.47	2.98
	Power Factor	%	-	93	-
	Indoor Noise (H / L / QLo)	dB-A	42 / 33 / 20		
		Power Level dB	58 / -		
	Outdoor Noise (H / L)	dB-A	50 / -		
		Power Level dB	65 / -		
	Low Temp. : Capacity (kW) / I.Power (W) / COP		4.85 / 1.67k / 2.90		
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP		3.75 / 1.68k / 2.23			
Max Current (A) / Max Input Power (W)		8.9 / 1.93k			
Starting Current (A)		5.1			
Compressor	Type	Hermetic Motor (Rotary)			
	Motor Type	Brushless (6-poles)			
	Output Power	W	700		

Indoor Fan	Type		Cross-Flow Fan		
	Material		ASG20K1		
	Motor Type		Transistor (8-poles)		
	Input Power		W	94.8	
	Output Power		W	40	
	Speed	QLo	Cool	rpm	600
			Heat	rpm	640
		Lo	Cool	rpm	800
			Heat	rpm	980
		Me	Cool	rpm	1030
			Heat	rpm	1140
		Hi	Cool	rpm	1260
			Heat	rpm	1300
SHi	Cool	rpm	1290		
	Heat	rpm	1310		
Outdoor Fan	Type		Propeller Fan		
	Material		PP		
	Motor Type		DC Motor (6-poles)		
	Input Power		W	-	
	Output Power		W	30	
	Speed	Hi	rpm	830	
Moisture Removal		L/h (Pt/h)	2.0 (4.2)		
Indoor Airflow	QLo	Cool	m ³ /min (ft ³ /min)	5.10 (180)	
		Heat	m ³ /min (ft ³ /min)	5.40 (191)	
	Lo	Cool	m ³ /min (ft ³ /min)	7.35 (260)	
		Heat	m ³ /min (ft ³ /min)	9.20 (325)	
	Me	Cool	m ³ /min (ft ³ /min)	9.90 (350)	
		Heat	m ³ /min (ft ³ /min)	11.00 (388)	
	Hi	Cool	m ³ /min (ft ³ /min)	12.5 (440)	
		Heat	m ³ /min (ft ³ /min)	12.8 (450)	
	SHi	Cool	m ³ /min (ft ³ /min)	13.10 (463)	
		Heat	m ³ /min (ft ³ /min)	13.30 (470)	
Outdoor Airflow	Hi	Cool	m ³ /min (ft ³ /min)	31.0 (1095)	
		Heat	m ³ /min (ft ³ /min)	31.0 (1095)	
Refrigeration Cycle	Control Device		Check Valve & Capillary Tube		
	Refrigerant Oil		cm ³	FV50S (320)	
	Refrigerant Type		g (oz)	R410A, 970 (34.2)	
Dimension	Height(I/D / O/D)		mm (inch)	290 (11-7/16) / 542 (21-11/32)	
	Width (I/D / O/D)		mm (inch)	870 (34-9/32) / 780 (30-23/32)	
	Depth (I/D / O/D)		mm (inch)	214 (8-7/16) / 289 (11-13/32)	
Weight	Net (I/D / O/D)		kg (lb)	9 (20) / 35 (77)	
	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)	
Piping	Standard length		m (ft)	5 (16.4)	
	Length range (min – max)		m (ft)	3 (9.8) ~ 15 (49.2)	
	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 x Stage x FPI		2 x 15 x 21	
	Size (W x H x L)	mm	610 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium	
	Fin Type		Corrugated Fin	
	Row x Stage x FPI		2 x 24 x 17	
	Size (W x H x L)	mm	36.4 x 504 x 713:684	
Air Filter	Material		Polypropelene	
	Type		One-touch	
Power Supply			Outdoor Power Supply	
Power Supply Cord		A	Nil	
Thermostat			Electronic Contol	
Protection Device			Electronic Contol	
			Dry Bulb	Wet Bulb
Indoor Operation Range	Cooling	Maximum	32	23
		Minimum	16	11
	Heating	Maximum	30	-
		Minimum	16	-
Outdoor Operation Range	Cooling	Maximum	43	26
		Minimum	5	4
	Heating	Maximum	24	18
		Minimum	-15	-16

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
4. Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
5. Specifications are subjected to change without prior notice for further improvement.

Model		Indoor	CS-E18NKEW, CS-XE18NKEW			CS-E21NKEW, CS-XE21NKEW		
		Outdoor	CU-E18NKE			CU-E21NKE		
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	0.98	5.00	6.00	0.98	6.30	7.10
		BTU/h	3340	17100	20500	3340	21500	24200
		Kcal/h	840	4300	5160	840	5420	6110
	Running Current	A	-	6.6	-	-	9.9	-
	Input Power	W	280	1.47k	2.03k	280	2.21k	2.54k
	Annual Consumption	kWh	-	735	-	-	1105	-
	EER	W/W	3.50	3.40	2.96	3.50	2.85	2.80
		BTU/hW	11.93	11.63	10.10	11.93	9.73	9.53
		Kcal/hW	3.00	2.93	2.54	3.00	2.45	2.41
	Power Factor	%	-	97	-	-	97	-
	Indoor Noise (H / L / QLo)	dB-A	44 / 37 / 34			45 / 37 / 34		
		Power Level dB	60 / -			61 / -		
	Outdoor Noise (H / L)	dB-A	47 / -			48 / -		
		Power Level dB	61 / -			62 / -		
Heating	Capacity	kW	0.98	5.80	8.00	0.98	7.20	8.50
		BTU/h	3340	19800	27300	3340	24600	29000
		Kcal/h	840	4990	6880	840	6190	7310
	Running Current	A	-	6.9	-	-	9.4	-
	Input Power	W	340	1.54k	2.60k	340	2.10k	2.75k
	COP	W/W	2.88	3.77	3.08	2.88	3.43	3.09
		BTU/hW	9.82	12.86	10.50	9.82	11.71	10.55
		Kcal/hW	2.47	3.24	2.65	2.47	2.95	2.66
	Power Factor	%	-	97	-	-	97	-
	Indoor Noise (H / L / QLo)	dB-A	44 / 37 / 34			45 / 37 / 34		
		Power Level dB	60 / -			61 / -		
	Outdoor Noise (H / L)	dB-A	47 / -			49 / -		
		Power Level dB	61 / -			63 / -		
	Low Temp. : Capacity (kW) / I.Power (W) / COP			5.80 / 2.35k / 2.47			6.16 / 2.43k / 2.53	
Extr Low Temp. : Capacity (kW) / I.Power (W) / COP			4.98 / 2.41k / 2.07			5.24 / 2.54k / 2.06		
Max Current (A) / Max Input Power (W)			11.4 / 2.60k			12.1 / 2.75k		
Starting Current (A)			6.9			9.9		
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			ASG20K1	ASG20K1	
	Motor Type			Transistor (8-poles)	Transistor (8-poles)	
	Input Power		W	94.8	94.8	
	Output Power		W	40	40	
	Speed	QLo	Cool	rpm	880	880
			Heat	rpm	990	960
		Lo	Cool	rpm	960	970
			Heat	rpm	1070	1040
		Me	Cool	rpm	1080	1145
			Heat	rpm	1190	1240
		Hi	Cool	rpm	1200	1320
			Heat	rpm	1310	1440
SHi	Cool	rpm	1390	1460		
	Heat	rpm	1430	1480		
Outdoor Fan	Type			Propeller Fan	Propeller Fan	
	Material			PP	PP	
	Motor Type			Induction (6-poles)	Induction (6-poles)	
	Input Power		W	-	-	
	Output Power		W	40	40	
	Speed	Hi	Cool	rpm	640	700
			Heat	rpm	640	680
Moisture Removal		L/h (Pt/h)	2.8 (5.9)	3.5 (7.4)		
Indoor Airflow	QLo	Cool	m ³ /min (ft ³ /min)	11.40 (403)	10.60 (374)	
		Heat	m ³ /min (ft ³ /min)	13.00 (459)	11.20 (395)	
	Lo	Cool	m ³ /min (ft ³ /min)	12.65 (447)	11.95 (422)	
		Heat	m ³ /min (ft ³ /min)	14.25 (503)	12.40 (437)	
	Me	Cool	m ³ /min (ft ³ /min)	14.45 (510)	14.60 (516)	
		Heat	m ³ /min (ft ³ /min)	16.05 (567)	15.45 (546)	
	Hi	Cool	m ³ /min (ft ³ /min)	16.3 (575)	17.3 (610)	
		Heat	m ³ /min (ft ³ /min)	17.9 (630)	18.5 (655)	
	SHi	Cool	m ³ /min (ft ³ /min)	18.1 (639)	19.1 (675)	
		Heat	m ³ /min (ft ³ /min)	18.5 (653)	19.4 (685)	
Outdoor Airflow	Hi	Cool	m ³ /min (ft ³ /min)	39.2 (1385)	41.7 (1470)	
		Heat	m ³ /min (ft ³ /min)	37.9 (1340)	40.4 (1425)	
Refrigeration Cycle	Control Device			Expansion Valve	Expansion Valve	
	Refrigerant Oil		cm ³	FV50S (450)	FV50S (450)	
	Refrigerant Type		g (oz)	R410A, 1.22k (43.1)	R410A, 1.28k (45.2)	
Dimension	Height(I/D / O/D)		mm (inch)	290 (11-7/16) / 695 (27-3/8)	290 (11-7/16) / 695 (27-3/8)	
	Width (I/D / O/D)		mm (inch)	1070 (42-5/32) / 875 (34-15/32)	1070 (42-5/32) / 875 (34-15/32)	
	Depth (I/D / O/D)		mm (inch)	240 (9-15/32) / 320 (12-5/8)	240 (9-15/32) / 320 (12-5/8)	
Weight	Net (I/D / O/D)		kg (lb)	12 (26) / 46 (101)	12 (26) / 47 (104)	
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 12.70 (1/2)	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) ~ 20 (65.6)	3 (9.8) ~ 20 (65.6)	
	I/D & O/D Height different		m (ft)	15.0 (49.2)	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 x Stage x FPI		2 x 15 x 17		2 x 15 x 17	
	Size (W x H x L)	mm	810 x 315 x 25.4		810 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Aluminium (Pre Coat)		Aluminium (Pre Coat)	
	Fin Type		Corrugated Fin		Corrugated Fin	
	Row x Stage x FPI		2 x 31 x 19		2 x 31 x 19	
	Size (W x H x L)	mm	36.4 x 651 x 854.5:824.5		36.4 x 651 x 854.5:824.5	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Outdoor Power Supply		Outdoor Power Supply	
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	32	23	32	23
		Minimum	16	11	16	11
	Heating	Maximum	30	-	30	-
		Minimum	16	-	16	-
Outdoor Operation Range	Cooling	Maximum	43	26	43	26
		Minimum	5	4	5	4
	Heating	Maximum	24	18	24	18
		Minimum	-5	-6	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C DRY BULB (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)
3. Heating low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor 2/1°C
4. Heating extreme low temperature capacity, Input Power and COP measured at 230 V, indoor temperature 20°C, outdoor -7/-8°C
5. Specifications are subjected to change without prior notice for further improvement.

• **Multi Split Combination Possibility:**

- A single outdoor unit enables air conditioning of up to two separate rooms for CU-2E15LBE, CU-2E18LBE.
- A single outdoor unit enables air conditioning of up to three separate rooms for CU-3E18LBE.
- A single outdoor unit enables air conditioning of up to four separate rooms for CU-4E23LBE, CU-4E27CBPG.

CONNECTABLE INDOOR UNIT			OUTDOOR UNIT														
			CU-2E15LBE		CU-2E18LBE		CU-3E18LBE			CU-4E23LBE				CU-4E27CBPG			
Type	ROOM		A	B	A	B	A	B	C	A	B	C	D	A	B	C	D
Wall	2.0kW	CS-E7NKEW CS-XE7NKEW	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	2.5kW	CS-E9NKEW CS-XE9NKEW	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	3.2kW	CS-E12NKEW CS-XE12NKEW	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	4.0kW	CS-E15NKEW CS-XE15NKEW	—	—	—	—	●	●	●	●	●	●	●	●	●	●	●
	5.0kW	CS-E18NKEW CS-XE18NKEW	—	—	—	—	●	●	●	●	●	●	●	●	●	●	●
	6.0kW	CS-E21NKEW CS-XE21NKEW	—	—	—	—	—	—	—	●	●	●	●	—	—	—	—
Capacity range of connectable indoor units			From 4.0kW to 5.6kW		From 4.0kW to 6.4kW			From 4.5kW to 9.0kW			From 4.5kW to 11.0kW		From 4.5kW to 13.6kW				
Pipe length	1-room maximum pipe length (m)		20		20			25			25		25				
	Allowable elevation (m)		10		10			15			15		15				
	Total allowable pipe length (m)		30		30			50			60		70				
	Total pipe length for maximum chargeless length (m)		20		20			30			30		40				
	Additional gas amount over chargeless length (g/m)		20		20			20			20		20				
Note: "●" : Available																	
Remarks for CU-2E15LBE / CU-2E18LBE 1. At least two indoor units must be connected. 2. The total nominal cooling capacity of indoor units that will be connected to outdoor unit must be within connectable capacity range of indoor unit. (as shown in the table above) Example: The indoor units' combination below is possible to connect to CU-2E15LBE. (Total nominal capacity of indoor units is between 4.0kW to 5.6kW) 1) Two CS-E7NKEW only (Total nominal cooling capacity is 4.0kW) 2) One CS-E7NKEW and one CS-E9NKEW. (Total nominal cooling capacity is 4.5kW)																	
Remarks for CU-3E18LBE / CU-4E23LBE / CU-4E27CBPG 1. At least two indoor units must be connected. 2. The total nominal cooling capacity of indoor units that will be connected to outdoor unit must be within connectable capacity range of indoor unit. (as shown in the table above) Example: The indoor units' combination below is possible to connect to CU-3E18LBE. (Total nominal capacity of indoor units is between 4.5kW to 9.0kW) 1) Two CS-E9NKEW only (Total nominal cooling capacity is 5.0kW) 2) Three CS-E12NKEW. (Total nominal cooling capacity is 9.6kW)																	

• Outdoor Unit : CU-2E15LBE

Indoor unit capacity		Total	Cooling Capacity (kW)				Input Power (W)				EER		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h		
Cooling			Room A	Room B	Total	min	~	max	Rating	min	~	max				W/W	CLASS
1 Room	20	20	2.00		2.00	1.1	~	2.9	520	220	~	750	3.85	A	260	2.45	1.3
	25	25	2.50		2.50	1.1	~	3.5	670	220	~	1000	3.73	A	335	3.15	1.5
	28	28	2.80		2.80	1.1	~	3.5	750	220	~	1000	3.73	A	375	3.50	1.6
	32	32	3.20		3.20	1.1	~	4.0	920	220	~	1220	3.48	A	460	4.30	1.8
2 Room	20 + 20	40	2.00	2.00	4.00	1.5	~	5.0	1090	250	~	1350	3.66	A	545	5.10	1.3 + 1.3
	20 + 25	45	2.00	2.50	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.3 + 1.5
	20 + 28	48	1.85	2.65	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.2 + 1.6
	20 + 32	52	1.75	2.75	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.1 + 1.6
	25 + 25	50	2.25	2.25	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.5 + 1.5
	25 + 28	53	2.10	2.40	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.4 + 1.5
	28 + 28	56	2.25	2.25	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.5 + 1.5
	28 + 32	56	2.25	2.25	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.5 + 1.5

Indoor unit capacity		Total	Heating Capacity (kW)				Input Power (W)				COP		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h		
Heating			Room A	Room B	Total	min	~	max	Rating	min	~	max				W/W	CLASS
1 Room	20	20	3.20		3.20	0.7	~	4.8	850	170	~	1410	3.76	A	425	3.75	
	25	25	3.60		3.60	0.7	~	5.5	1030	170	~	1700	3.50	B	515	4.55	
	28	28	4.00		4.00	0.7	~	5.5	1150	170	~	1700	3.48	B	575	5.10	
	32	32	4.50		4.50	0.7	~	6.2	1250	170	~	1810	3.60	B	625	5.55	
2 Room	20 + 20	40	2.70	2.70	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 25	45	2.40	3.00	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 28	48	2.25	3.15	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 32	52	2.10	3.30	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	25 + 25	50	2.70	2.70	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	25 + 28	53	2.55	2.85	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	28 + 28	56	2.70	2.70	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	28 + 32	56	2.70	2.70	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	

• Outdoor Unit : CU-2E18LBE

Indoor unit capacity		Total	Cooling Capacity (kW)				Input Power (W)				EER		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h		
Cooling			Room A	Room B	Total	min	~	max	Rating	min	~	max				W/W	CLASS
1 Room	20	20	2.00		2.00	1.1	~	2.9	520	220	~	750	3.85	A	260	2.45	1.3
	25	25	2.50		2.50	1.1	~	3.5	670	220	~	1000	3.73	A	335	3.15	1.5
	28	28	2.80		2.80	1.1	~	3.5	750	220	~	1000	3.73	A	375	3.50	1.6
	32	32	3.20		3.20	1.1	~	4.0	920	220	~	1220	3.48	A	460	4.30	1.8
2 Room	20 + 20	40	2.00	2.00	4.00	1.5	~	5.0	1090	250	~	1350	3.66	A	545	5.10	1.3 + 1.3
	20 + 25	45	2.00	2.50	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.3 + 1.5
	20 + 28	48	1.85	2.65	4.50	1.5	~	5.2	1230	250	~	1520	3.66	A	615	5.75	1.2 + 1.6
	20 + 32	52	1.85	2.95	4.80	1.5	~	5.3	1310	250	~	1540	3.66	A	655	6.10	1.2 + 1.7
	25 + 25	50	2.40	2.40	4.80	1.5	~	5.2	1310	250	~	1520	3.66	A	655	6.10	1.5 + 1.5
	25 + 28	53	2.25	2.55	4.80	1.5	~	5.2	1310	250	~	1520	3.66	A	655	6.10	1.5 + 1.6
	25 + 32	57	2.20	2.80	5.00	1.5	~	5.3	1490	250	~	1540	3.36	A	745	6.95	1.4 + 1.6
	28 + 28	56	2.40	2.40	4.80	1.5	~	5.2	1310	250	~	1520	3.66	A	655	6.10	1.5 + 1.5
28 + 32	60	2.35	2.65	5.00	1.5	~	5.3	1490	250	~	1540	3.36	A	745	6.95	1.5 + 1.6	
32 + 32	64	2.60	2.60	5.20	1.5	~	5.4	1520	250	~	1580	3.42	A	760	7.10	1.6 + 1.6	

Indoor unit capacity		Total	Heating Capacity (kW)				Input Power (W)				COP		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h		
Heating			Room A	Room B	Total	min	~	max	Rating	min	~	max				W/W	CLASS
1 Room	20	20	3.20		3.20	0.7	~	4.8	850	170	~	1410	3.76	A	425	3.75	
	25	25	3.60		3.60	0.7	~	5.5	1030	170	~	1700	3.50	B	515	4.55	
	28	28	4.00		4.00	0.7	~	5.5	1150	170	~	1700	3.48	B	575	5.10	
	32	32	4.50		4.50	0.7	~	6.2	1250	170	~	1810	3.60	B	625	5.55	
2 Room	20 + 20	40	2.70	2.70	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 25	45	2.40	3.00	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 28	48	2.25	3.15	5.40	1.1	~	7.0	1170	210	~	1670	4.62	A	585	5.20	
	20 + 32	52	2.15	3.45	5.60	1.1	~	7.2	1230	210	~	1720	4.55	A	615	5.45	
	25 + 25	50	2.80	2.80	5.60	1.1	~	7.2	1250	210	~	1740	4.48	A	625	5.55	
	25 + 28	53	2.65	2.95	5.60	1.1	~	7.2	1250	210	~	1740	4.48	A	625	5.55	
	25 + 32	57	2.45	3.15	5.60	1.1	~	7.2	1230	210	~	1720	4.55	A	615	5.45	
	28 + 28	56	2.80	2.80	5.60	1.1	~	7.2	1250	210	~	1740	4.48	A	625	5.55	
28 + 32	60	2.60	3.00	5.60	1.1	~	7.2	1230	210	~	1720	4.55	A	615	5.45		
32 + 32	64	2.80	2.80	5.60	1.1	~	7.2	1210	210	~	1700	4.63	A	605	5.35		

• Outdoor Unit : CU-3E18LBE

Indoor unit capacity		Total	Cooling Capacity (kW)				Input Power (W)				EER		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h	
Cooling			Room A	Room B	Room C	Total	min	max	Rating	min	max	W/W				CLASS
1 Room	20	2.00				2.00	1.8	2.9	600	340	810	4.00	A	250	2.5	1.3
	25	2.50				2.50	1.8	2.9	630	340	810	4.00	A	315	3.0	1.5
	28	2.80				2.80	1.8	2.9	700	340	810	4.00	A	350	3.3	1.6
	32	3.20				3.20	1.8	3.8	800	340	1360	4.00	A	400	3.7	1.8
	40	4.00				4.00	1.8	4.9	1240	340	1990	3.23	A	620	6.6	2.3
	50	5.00				5.00	1.9	6.9	1550	340	2130	3.23	A	775	6.8	2.7
	20 + 20	4.00	2.00			4.00	1.9	6.2	1010	350	2100	3.96	A	505	4.5	1.3 + 1.3
	20 + 25	4.50	2.00	2.50		4.50	1.9	6.2	1270	350	2100	3.55	A	635	5.6	1.3 + 1.5
	20 + 28	4.80	2.00	2.80		4.80	1.9	6.2	1350	350	2100	3.55	A	675	6.0	1.3 + 1.6
	20 + 32	5.20	2.00	3.20		5.20	1.9	6.3	1490	350	2110	3.49	A	745	6.6	1.3 + 1.8
2 Room	20 + 40	6.00	1.73	3.47		5.20	1.9	6.4	1450	350	2110	3.59	A	725	6.4	1.1 + 2.0
	20 + 50	7.00	1.49	3.71		5.20	1.9	6.8	1290	360	2150	4.03	A	645	5.7	0.9 + 2.2
	25 + 25	5.00	2.50	2.50		5.00	1.9	6.2	1540	350	2100	3.25	A	770	6.8	1.5 + 1.5
	25 + 28	5.30	2.45	2.75		5.20	1.9	6.2	1540	350	2100	3.38	A	770	6.8	1.5 + 1.6
	25 + 32	5.70	2.28	2.92		5.20	1.9	6.3	1480	350	2110	3.51	A	740	6.5	1.5 + 1.7
	25 + 40	6.50	2.00	3.20		5.20	1.9	6.4	1440	350	2110	3.61	A	720	6.4	1.3 + 1.8
	25 + 50	7.50	1.73	3.47		5.20	1.9	6.8	1290	360	2150	4.03	A	645	5.7	1.1 + 2.0
	28 + 28	5.60	2.60	2.60		5.20	1.9	6.2	1540	350	2100	3.38	A	770	6.8	1.6 + 1.6
	28 + 32	6.00	2.43	2.77		5.20	1.9	6.3	1480	350	2110	3.51	A	740	6.5	1.5 + 1.6
	28 + 40	6.80	2.14	3.06		5.20	1.9	6.4	1440	350	2110	3.61	A	720	6.4	1.4 + 1.7
3 Room	28 + 50	7.80	1.87	3.33		5.20	1.9	6.8	1290	360	2150	4.03	A	645	5.7	1.2 + 1.9
	32 + 32	6.40	2.60	2.60		5.20	1.9	6.2	1450	350	2120	3.59	A	725	6.4	1.6 + 1.6
	32 + 40	7.20	2.31	2.89		5.20	1.9	6.5	1410	350	2120	3.69	A	705	6.3	1.5 + 1.7
	32 + 50	8.20	2.03	3.17		5.20	1.9	6.9	1250	360	2150	4.16	A	625	5.5	1.3 + 1.8
	40 + 40	8.00	2.60	2.60		5.20	1.9	6.5	1410	350	2120	3.69	A	705	6.2	1.6 + 1.6
	40 + 50	9.00	2.31	2.89		5.20	1.9	6.9	1250	360	2160	4.16	A	625	5.5	1.5 + 1.7
	20 + 20 + 20	6.00	1.73	1.73	1.73	5.19	1.9	7.2	1220	360	2170	4.25	A	610	5.3	1.1 + 1.1 + 1.1
	20 + 20 + 25	6.50	1.60	1.60	2.00	5.20	1.9	7.2	1220	360	2170	4.26	A	610	5.3	1.0 + 1.0 + 1.3
	20 + 20 + 28	6.80	1.53	1.53	2.14	5.20	1.9	7.2	1220	360	2170	4.26	A	610	5.3	1.0 + 1.0 + 1.4
	20 + 20 + 32	7.20	1.44	1.44	2.32	5.20	1.9	7.2	1210	360	2180	4.30	A	605	5.3	0.9 + 0.9 + 1.5

Indoor unit capacity		Total	Heating Capacity (kW)				Input Power (W)				COP		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME l/h	
Heating			Room A	Room B	Room C	Total	min	max	Rating	min	max	W/W				CLASS
1 Room	20	3.20				3.20	1.2	4.1	740	300	1230	4.32	A	370	3.7	
	25	3.60				3.60	1.2	4.3	940	300	1230	3.83	A	470	4.5	
	28	4.00				4.00	1.2	4.3	1050	300	1230	3.81	A	525	5.0	
	32	4.50				4.50	1.2	5.8	1230	300	2100	3.66	A	615	5.8	
	40	5.60				5.60	1.2	6.8	1720	300	2930	3.26	C	860	7.7	
	50	6.80				6.80	1.2	6.9	2100	300	2520	3.24	C	1050	9.2	
	20 + 20	4.00	2.90	2.90		5.80	1.4	7.0	1450	310	2550	4.00	A	725	6.4	
	20 + 25	4.50	2.84	3.56		6.40	1.4	7.0	1720	310	2550	3.72	A	860	7.6	
	20 + 28	4.80	2.67	3.73		6.40	1.4	7.0	1720	310	2550	3.72	A	860	7.6	
	20 + 32	5.20	2.62	4.18		6.80	1.4	7.3	1840	310	2520	3.70	A	920	8.2	
2 Room	20 + 40	7.00	2.27	4.53		6.80	1.4	7.3	1800	310	2510	3.78	A	900	8.0	
	20 + 50	8.00	1.94	4.86		6.80	1.4	8.0	1520	310	2200	4.47	A	760	6.7	
	25 + 25	5.00	3.40	3.40		6.80	1.4	7.0	1930	310	2550	3.52	B	965	8.5	
	25 + 28	5.30	3.21	3.59		6.80	1.4	7.0	1930	310	2550	3.52	B	965	8.5	
	25 + 32	5.70	2.98	3.82		6.80	1.4	7.3	1840	310	2520	3.70	A	920	8.1	
	25 + 40	6.50	2.62	4.18		6.80	1.4	7.3	1800	310	2510	3.78	A	900	8.0	
	25 + 50	7.50	2.27	4.53		6.80	1.4	8.0	1520	310	2200	4.47	A	760	6.7	
	28 + 28	5.60	3.40	3.40		6.80	1.4	7.0	1930	310	2550	3.52	B	965	8.5	
	28 + 32	6.00	3.17	3.63		6.80	1.4	7.3	1840	310	2520	3.70	A	920	8.1	
	28 + 40	6.80	2.80	4.00		6.80	1.4	7.3	1800	310	2510	3.78	A	900	8.0	
3 Room	28 + 50	7.80	2.44	4.36		6.80	1.4	8.0	1520	310	2200	4.47	A	760	6.7	
	32 + 32	6.40	3.40	3.40		6.80	1.4	7.5	1750	310	2490	3.89	A	875	7.7	
	32 + 40	7.20	3.02	3.78		6.80	1.4	7.5	1750	310	2470	3.89	A	875	7.8	
	32 + 50	8.20	2.65	4.15		6.80	1.4	8.0	1500	310	2180	4.53	A	750	6.6	
	40 + 40	8.00	3.40	3.40		6.80	1.4	7.5	1710	310	2470	3.98	A	855	7.5	
	40 + 50	9.00	3.02	3.78		6.80	1.4	8.0	1500	310	2170	4.53	A	750	6.6	
	20 + 20 + 20	6.00	2.26	2.26	2.26	6.78	1.5	8.1	1510	320	2120	4.49	A	755	6.7	
	20 + 20 + 25	6.50	2.09	2.09	2.62	6.80	1.5	8.1	1510	320	2120	4.50	A	755	6.7	
	20 + 20 + 28	6.80	2.00	2.00	2.80	6.80	1.5	8.1	1510	320	2120	4.50	A	755	6.7	
	20 + 20 + 32	7.20	1.89	1.89	3.02	6.80	1.4	8.3	1470	320	2110	4.63	A	735	6.5	

Indoor unit capacity		Total	Heating Capacity (kW)				Input Power (W)				COP		ANNUAL ENERGY CONSUMPTION (kWh)	Current, 230V (A)	MOISTURE REMOVAL VOLUME 1/h	
Heating			Room A	Room B	Room C	Room D	Total	min	max	Rating	min	max				W/W
1 Room	20	3.20				3.20	1.2	4.1	740	300	1230	4.32	A	370	3.7	
	25	3.60				3.60	1.2	4.3	940	300	1230	3.83	A	470	4.7	
	28	4.00				4.00	1.2	4.3	1050	300	1230	3.81	A	525	5.2	
	32	4.50				4.50	1.2	5.8	1230	300	2100	3.66	A	615	6.0	
	40	5.60				5.60	1.2	6.8	1720	300	2930	3.26	C	860	8.0	
	50	6.80				6.80	1.2	6.9	2100	300	3520	3.24	C	1050	9.7	
	60	8.50				8.50	1.3	9.0	2400	620	3520	3.54	B	1200	11.1	
	20 + 20	4.0	2.90	2.90			5.80	2.7	9.8	1450	610	2800	4.00	A	725	6.7
	20 + 25	45	2.71	3.39			6.10	2.7	9.8	1640	610	2800	3.72	A	820	7.6
	20 + 28	48	2.67	3.73			6.40	2.7	9.8	1720	610	2800	3.72	A	860	8.0

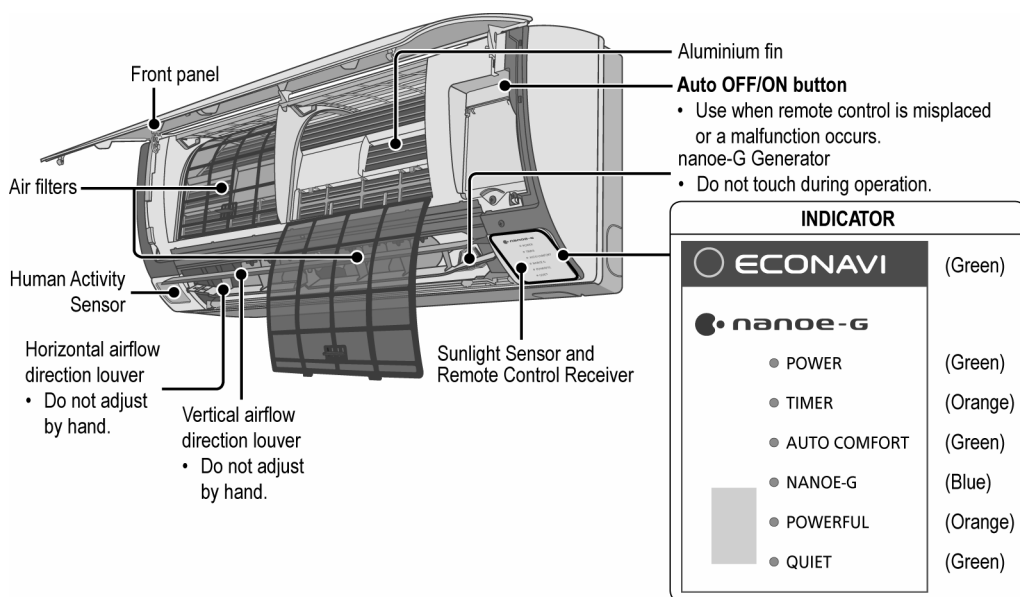
	Indoor unit capacity	Heating	Heating Capacity (kW)								Input Power (W)		COP	CLASS	ANNUAL ENERGY CONSUMPTION (AWP)	Current (A)	MOISTURE REMOVAL VOLUME l/h				
			Room A				Room B				Total	min						max	Rating	min	max
			Room A	Room B	Room C	Room D	Room A	Room B	Room C	Room D											
1 Room	20	20	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00				
1 Room	25	25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50				
1 Room	30	30	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00				
1 Room	35	35	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50				
1 Room	40	40	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00				
1 Room	45	45	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50				
1 Room	50	50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00				
2 Room	20+20	40	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20				
2 Room	25+25	50	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75				
2 Room	30+30	60	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30				
2 Room	35+35	70	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85				
2 Room	40+40	80	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40				
2 Room	45+45	90	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95				
2 Room	50+50	100	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50				
2 Room	20+20+20	60	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87	2.87				
2 Room	25+25+25	75	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42				
2 Room	30+30+30	90	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97				
2 Room	35+35+35	105	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52				
2 Room	40+40+40	120	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.07				
2 Room	45+45+45	135	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62				
2 Room	50+50+50	150	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17				
3 Room	20+20+20+20	80	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51				
3 Room	25+25+25+25	100	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06	4.06				
3 Room	30+30+30+30	120	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61				
3 Room	35+35+35+35	140	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16				
3 Room	40+40+40+40	160	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71				
3 Room	45+45+45+45	180	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26	6.26				
3 Room	50+50+50+50	200	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81				
4 Room	20+20+20+20+20	100	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25				
4 Room	25+25+25+25+25	125	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80				
4 Room	30+30+30+30+30	150	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35	5.35				
4 Room	35+35+35+35+35	175	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90	5.90				
4 Room	40+40+40+40+40	200	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45				

3. Features

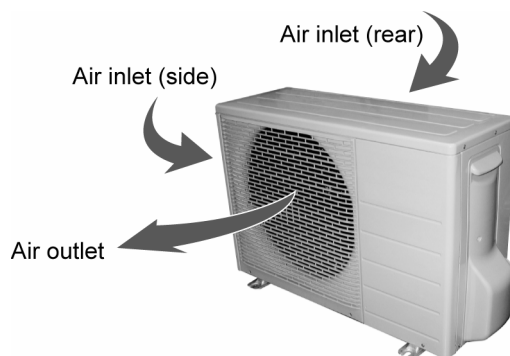
- **Inverter Technology**
 - Wider output power range
 - Energy saving
 - Quick Cooling
 - Quick Heating
 - More precise temperature control
- **Environment Protection**
 - Non-ozone depletion substances refrigerant (R410A)
- **Long Installation Piping**
 - Long piping up to 15 meters (0.75 ~ 1.75HP) and 20 meters (2.0 ~ 2.25HP) during single split connection only
- **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

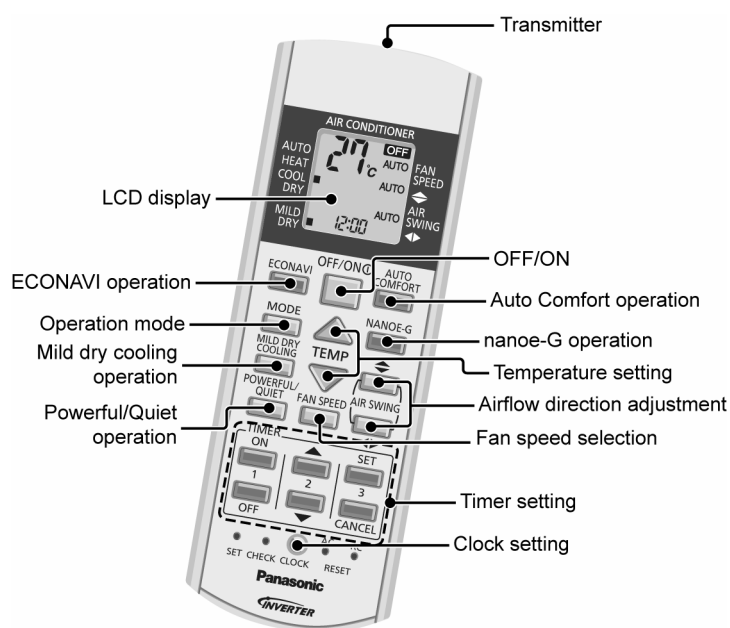
4.1 Indoor Unit



4.2 Outdoor Unit



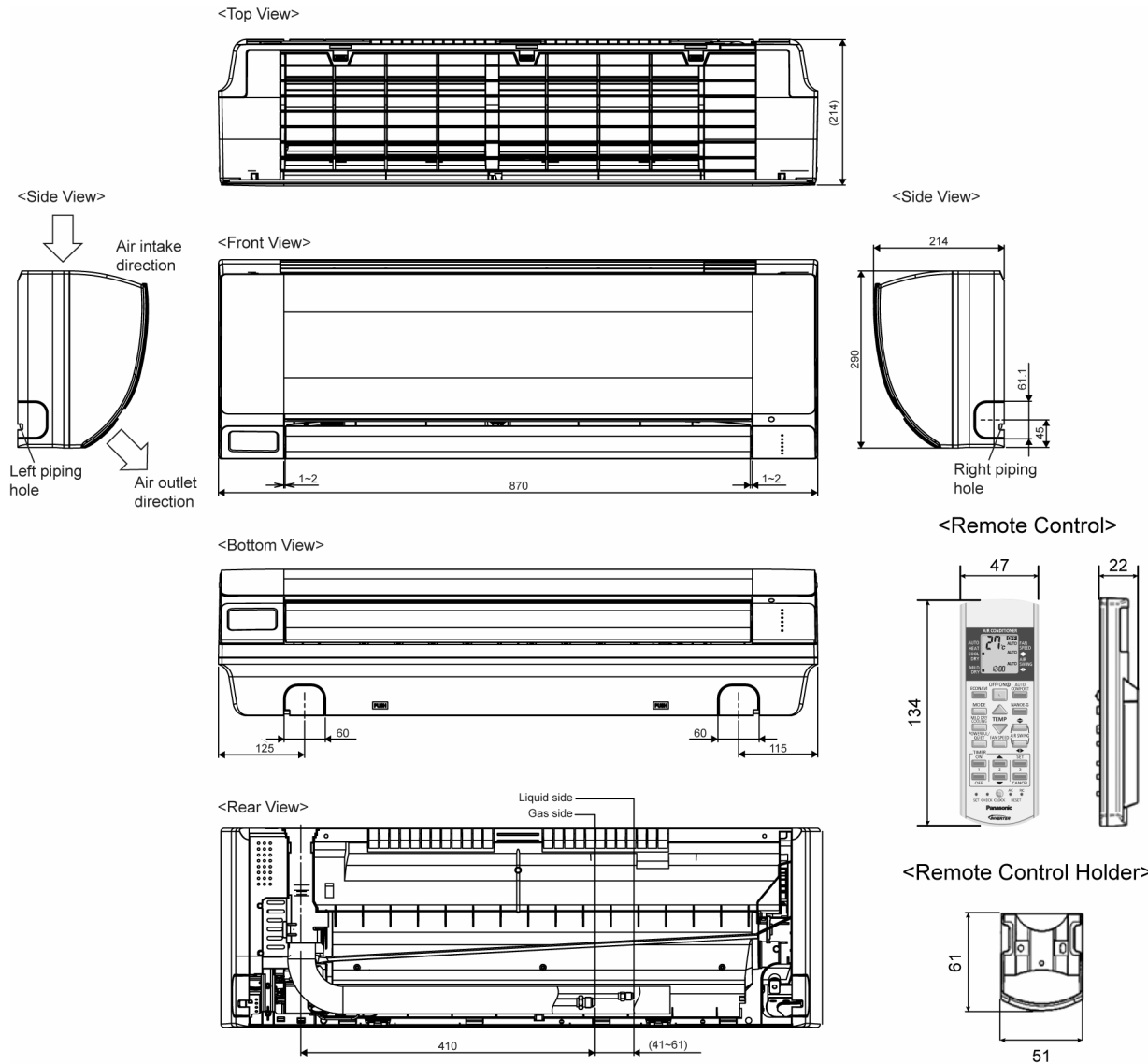
4.3 Remote Control



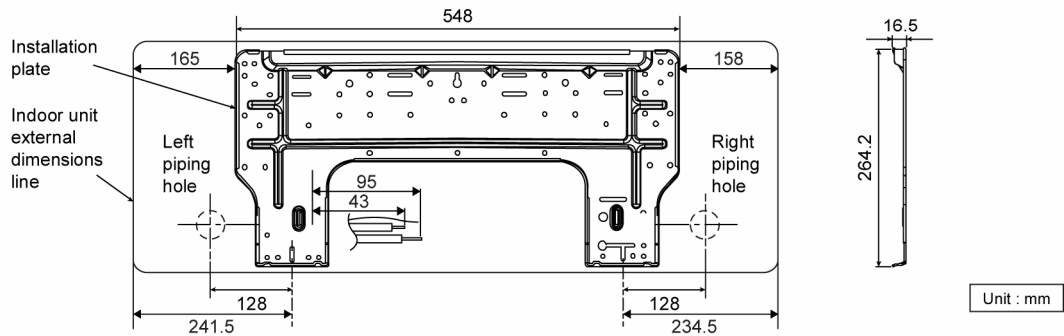
5. Dimensions

5.1 Indoor Unit

5.1.1 CS-E7NK CS-E9NK CS-E12NK CS-E15NK CS-XE7NK CS-XE9NK CS-XE12NK CS-XE15NK

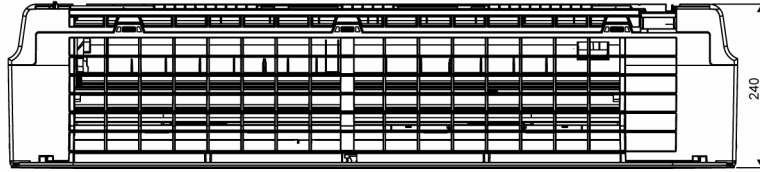


Relative position between the indoor unit and the installation plate <Front View>

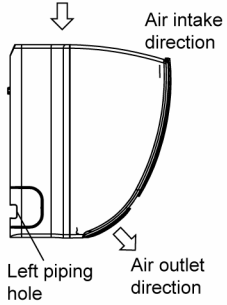


5.1.2 CS-E18NK CS-E21NK CS-XE18NK CS-XE21NK

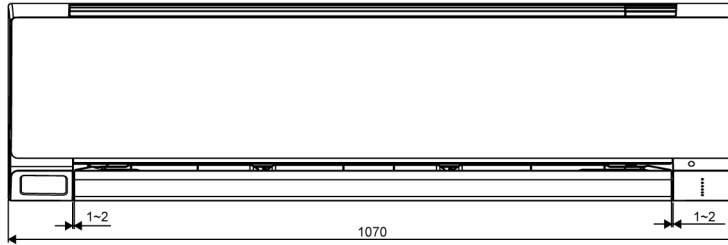
<Top View>



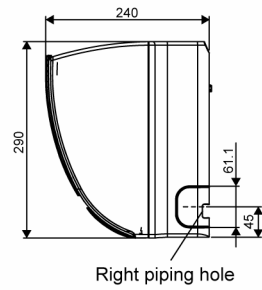
<Side View>



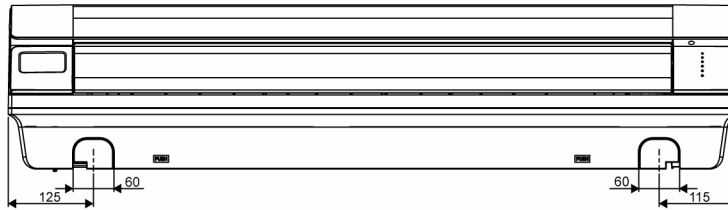
<Front View>



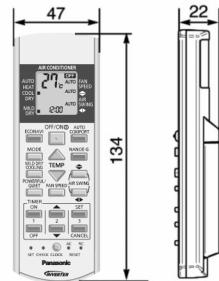
<Side View>



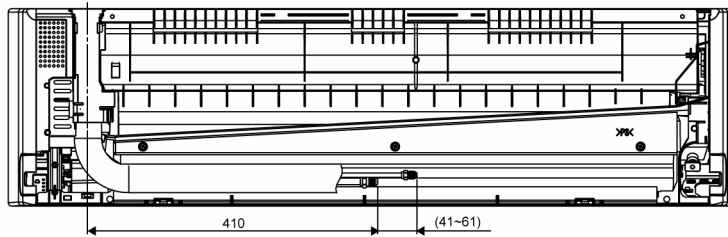
<Bottom View>



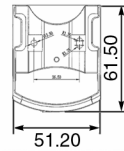
Remote control transmitter



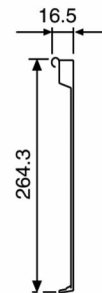
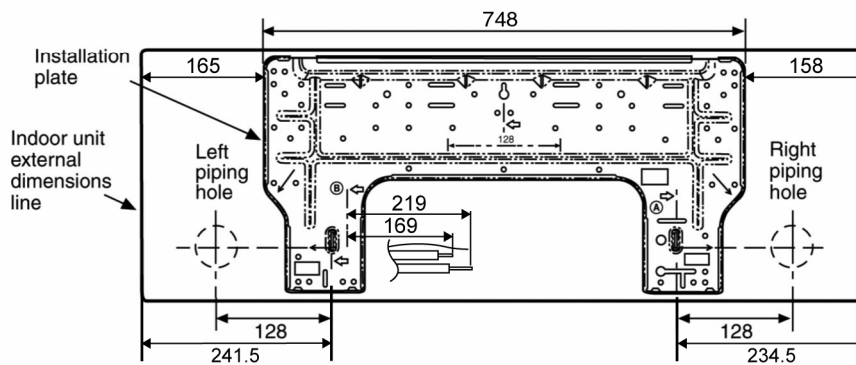
<Back View>



Remote control holder



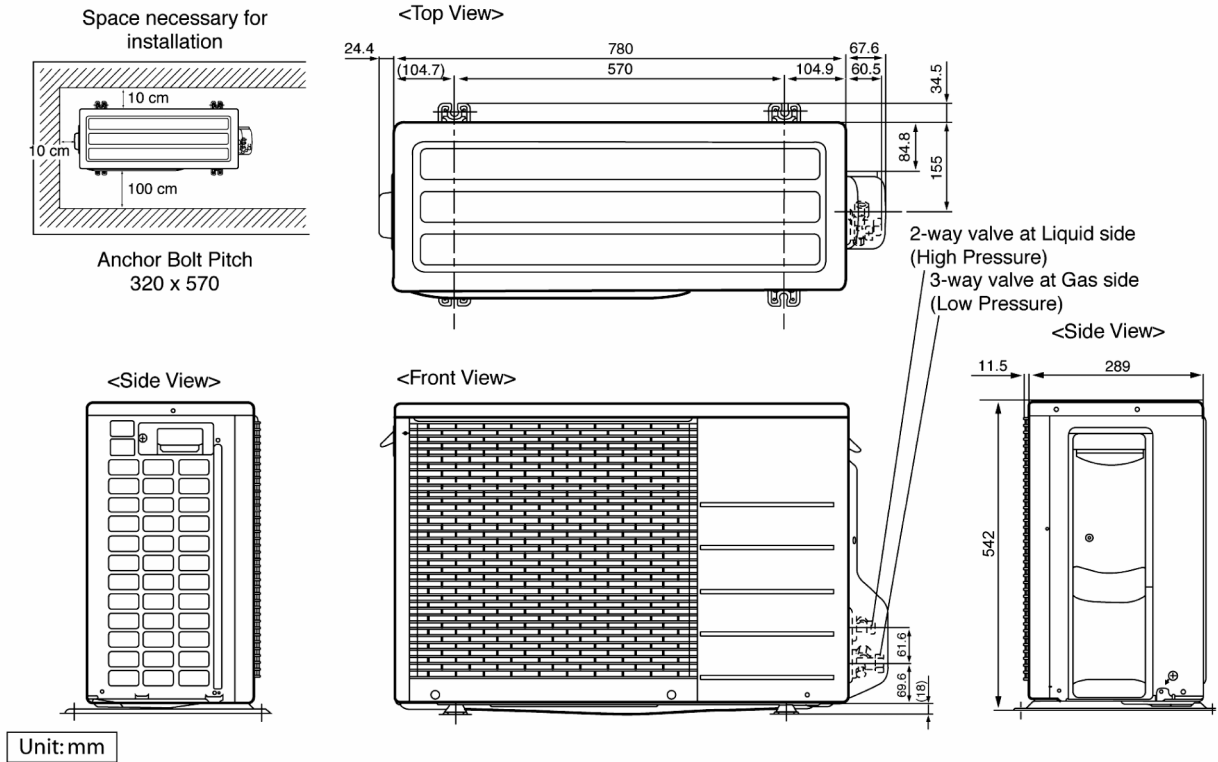
Relative position between the indoor unit and the installation plate <Front View>



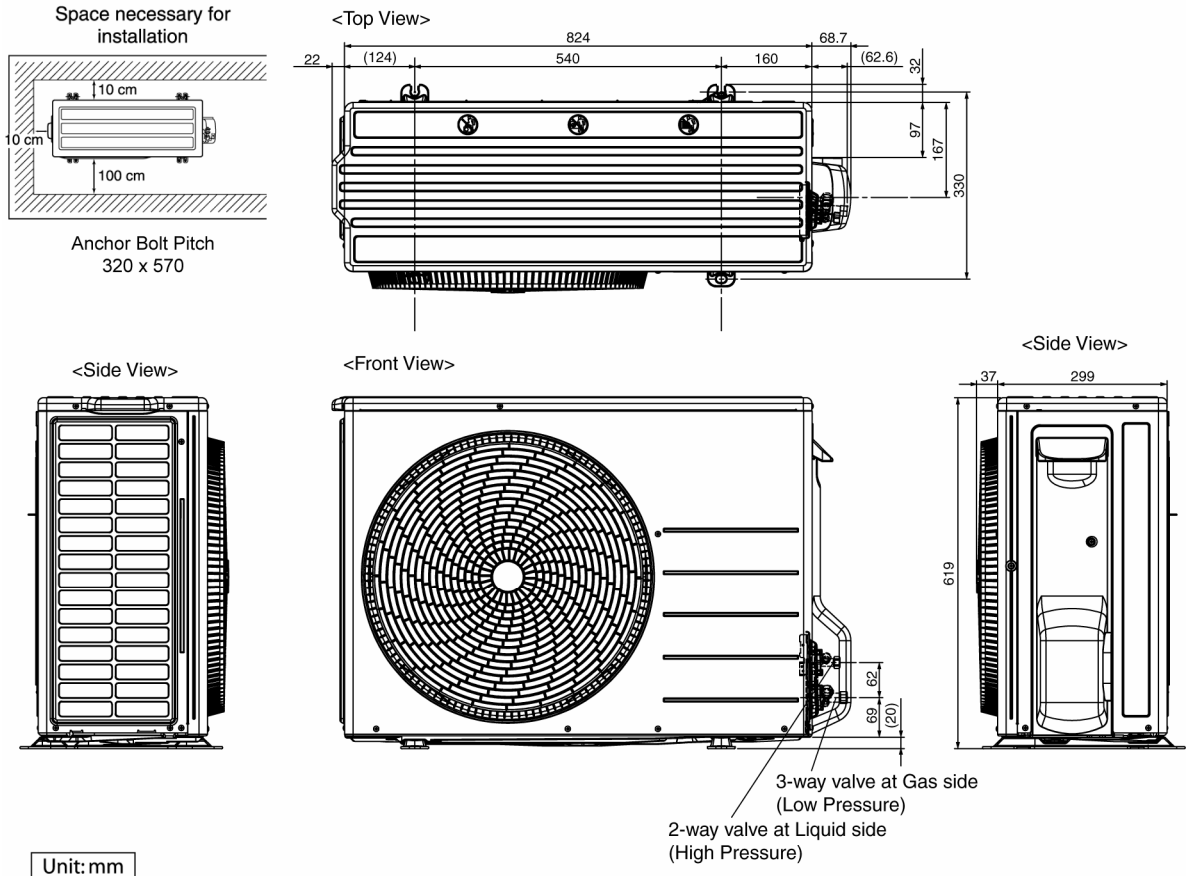
Unit : mm

5.2 Outdoor Unit

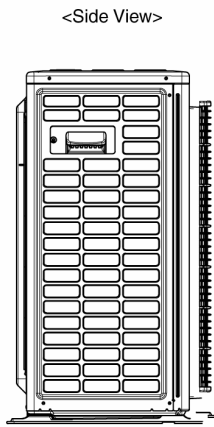
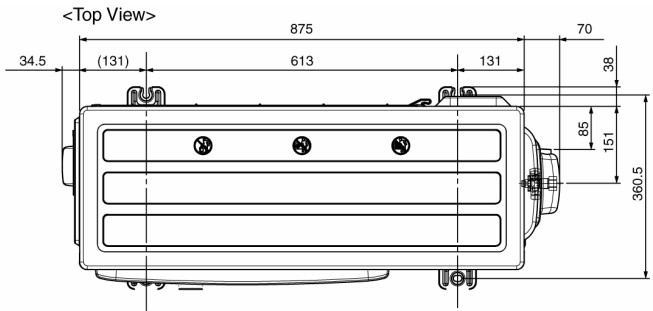
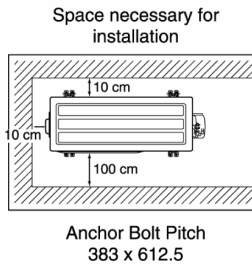
5.2.1 CU-E7NKE CU-E9NKE CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3



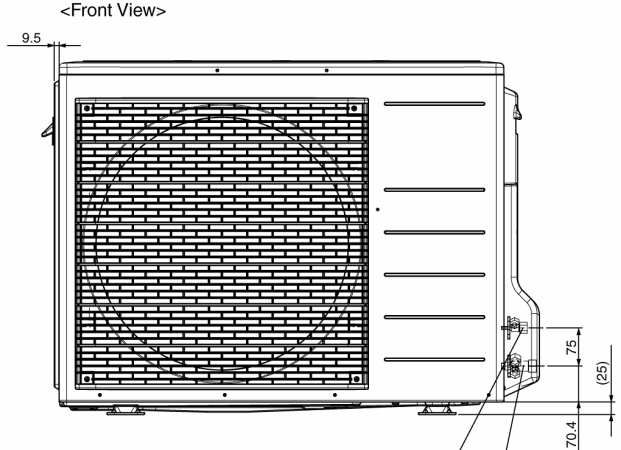
5.2.2 CU-E12NKE CU-E15NKE



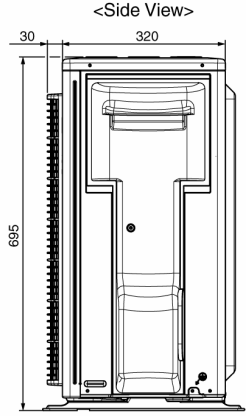
5.2.3 CU-E18NKE CU-E21NKE



Unit: mm

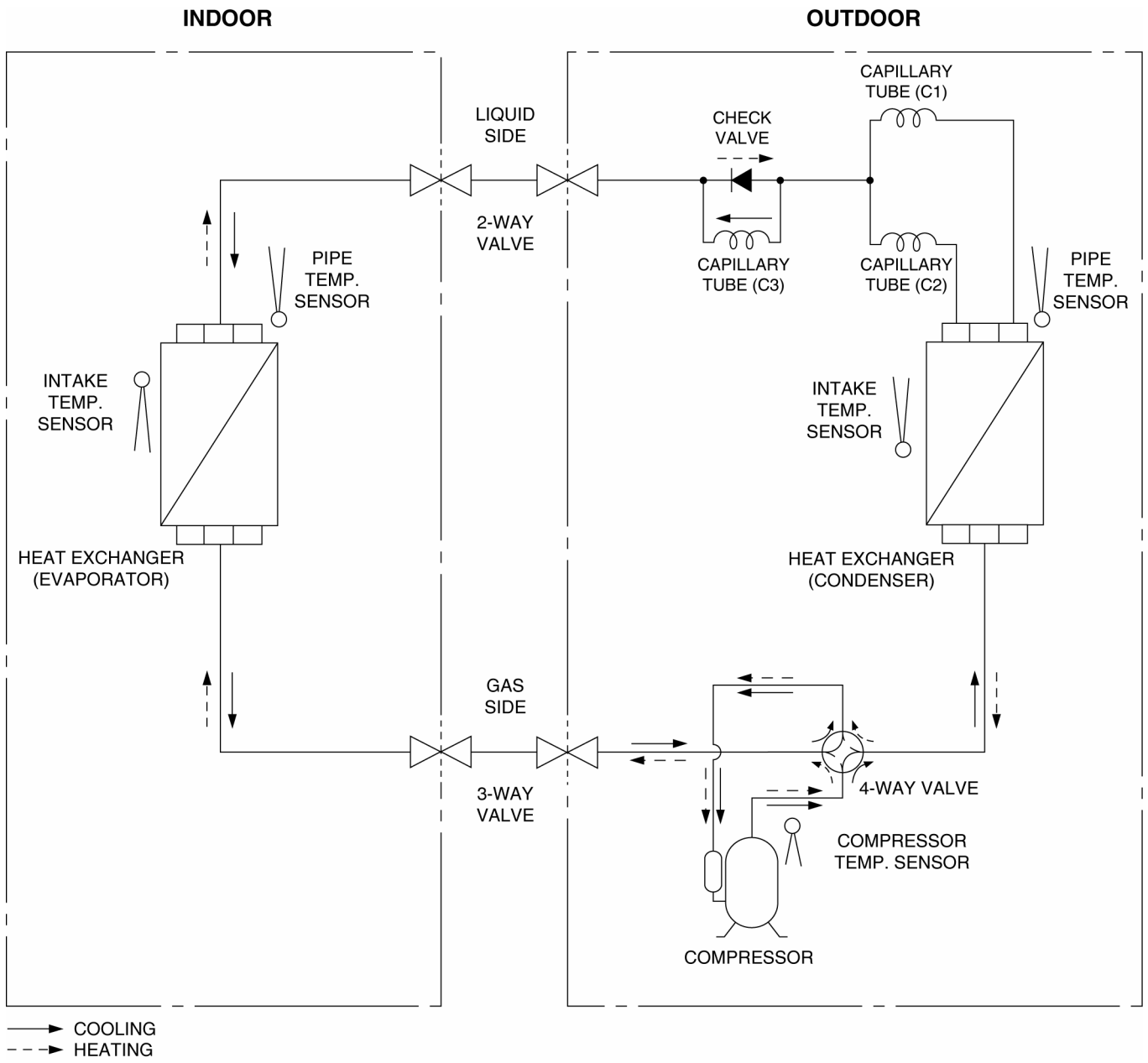


3-way valve at Gas side (Low Pressure)
2-way valve at Liquid side (High Pressure)

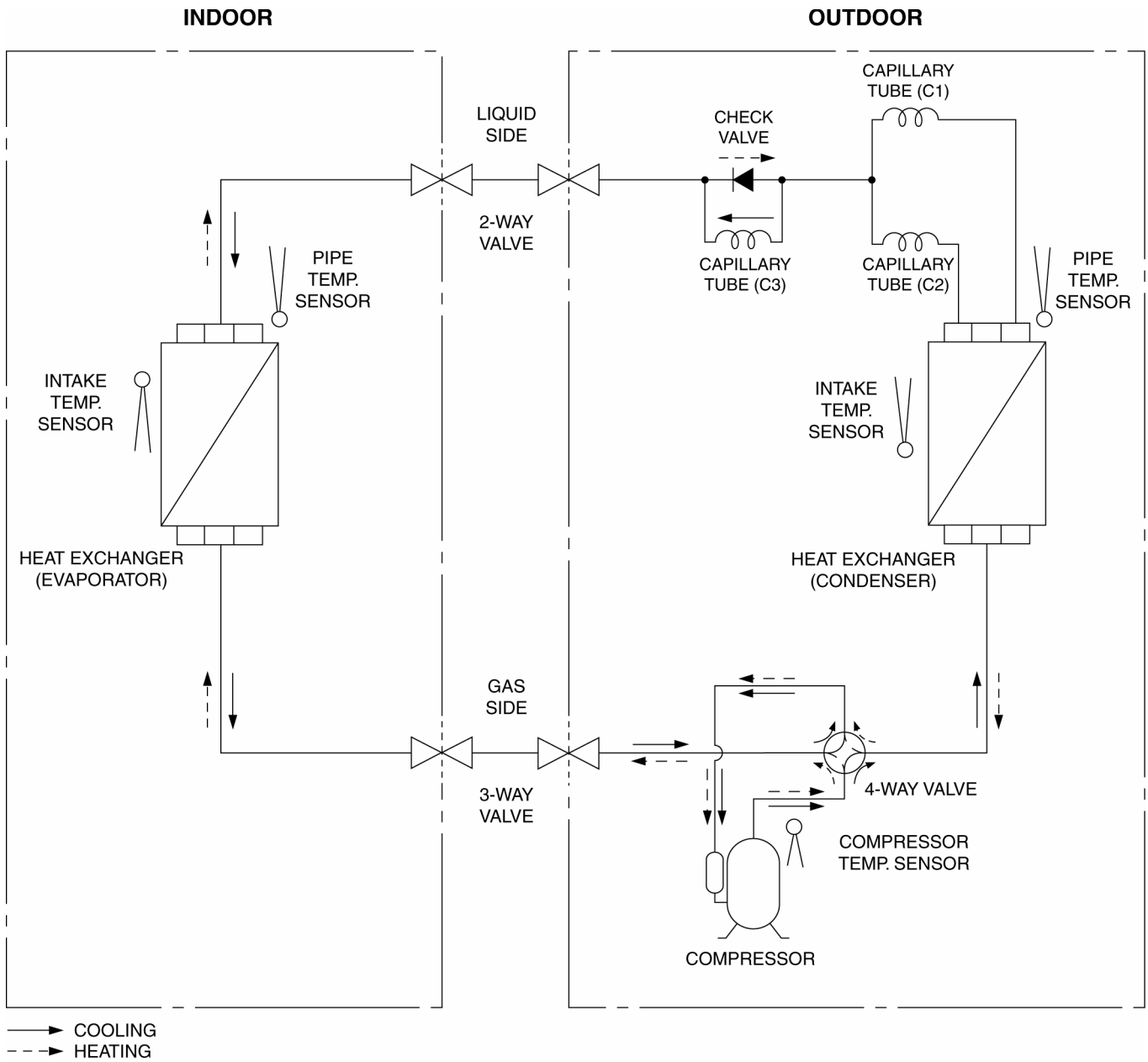


6. Refrigeration Cycle Diagram

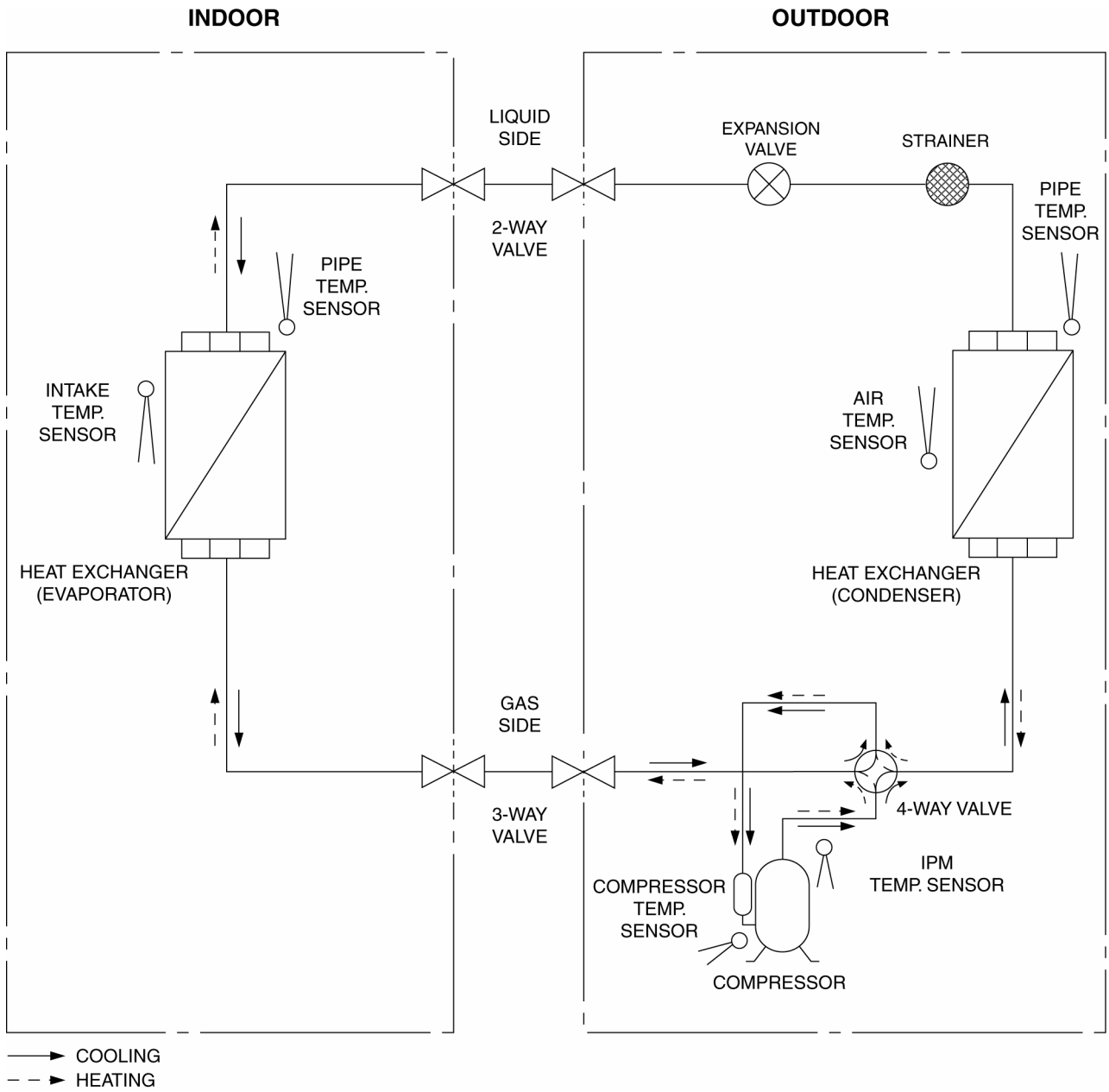
6.1 CU-E7NKE CU-E9NKE CU-E12NKE CU-E15NKE



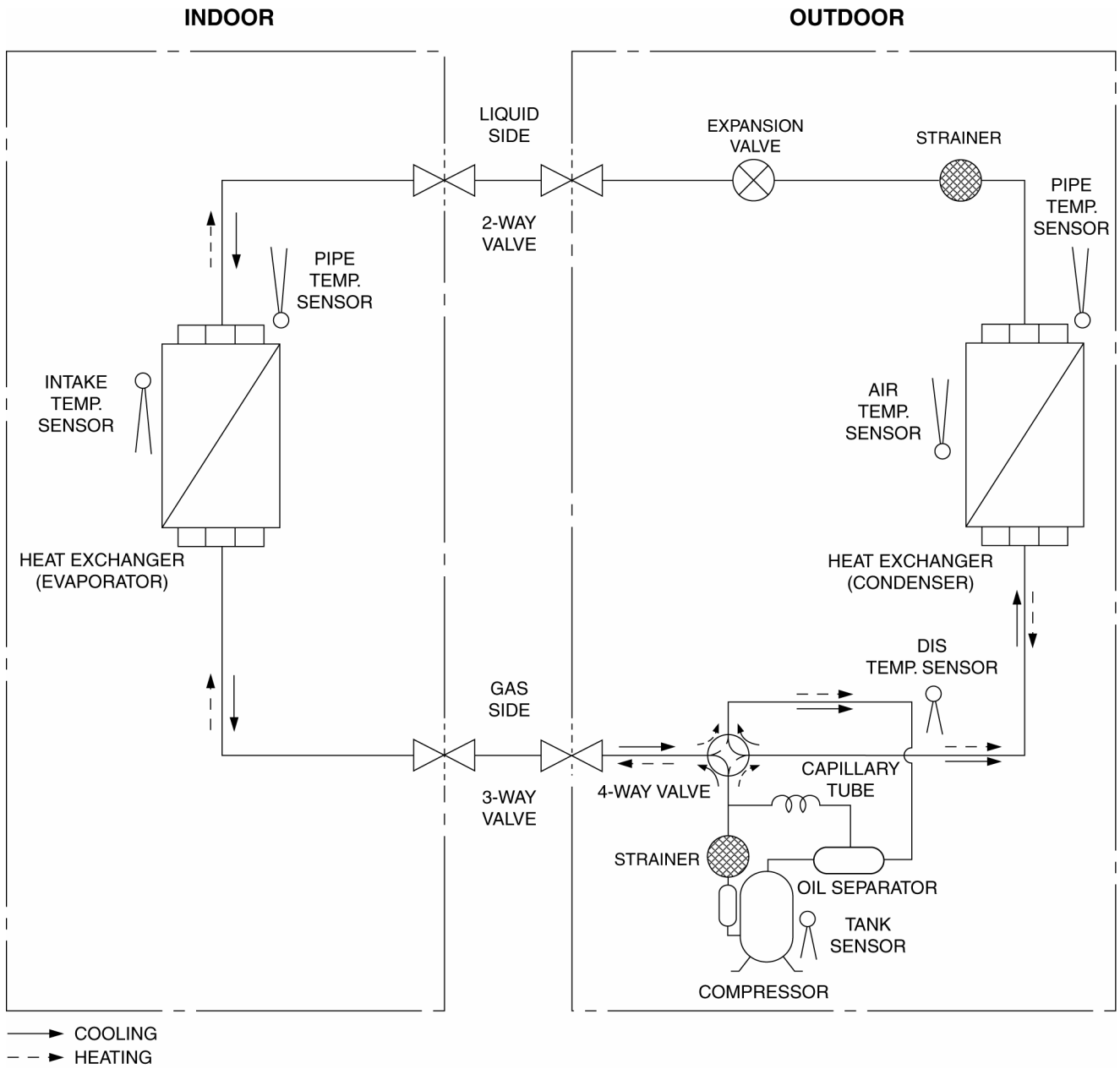
6.2 CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3



6.3 CU-E18NKE

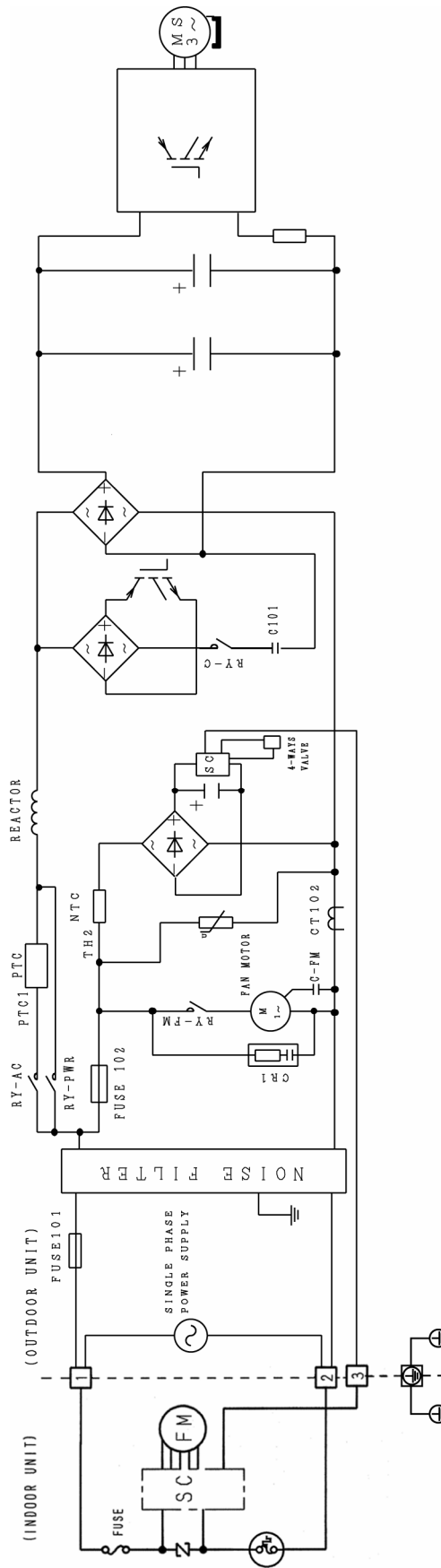


6.4 CU-E21NKE

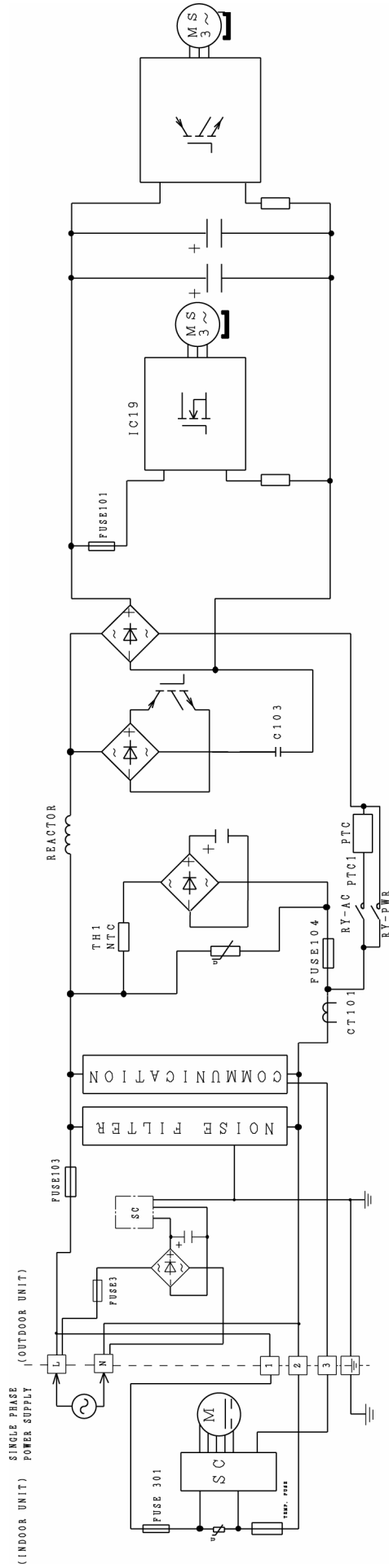


7. Block Diagram

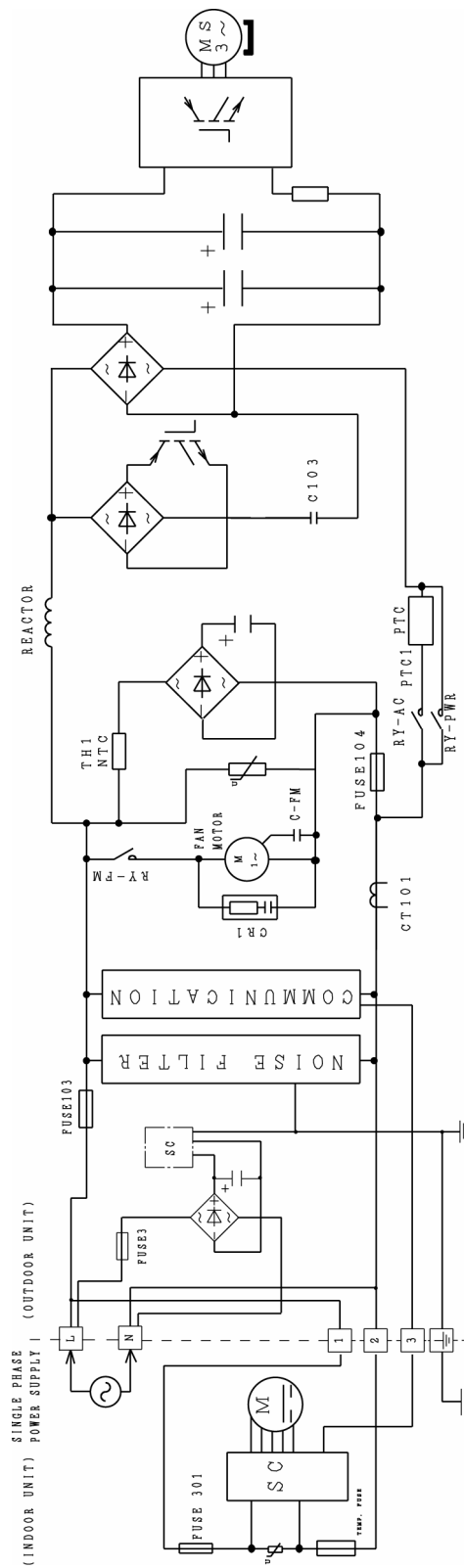
7.1 CU-E7NKE CU-E9NKE



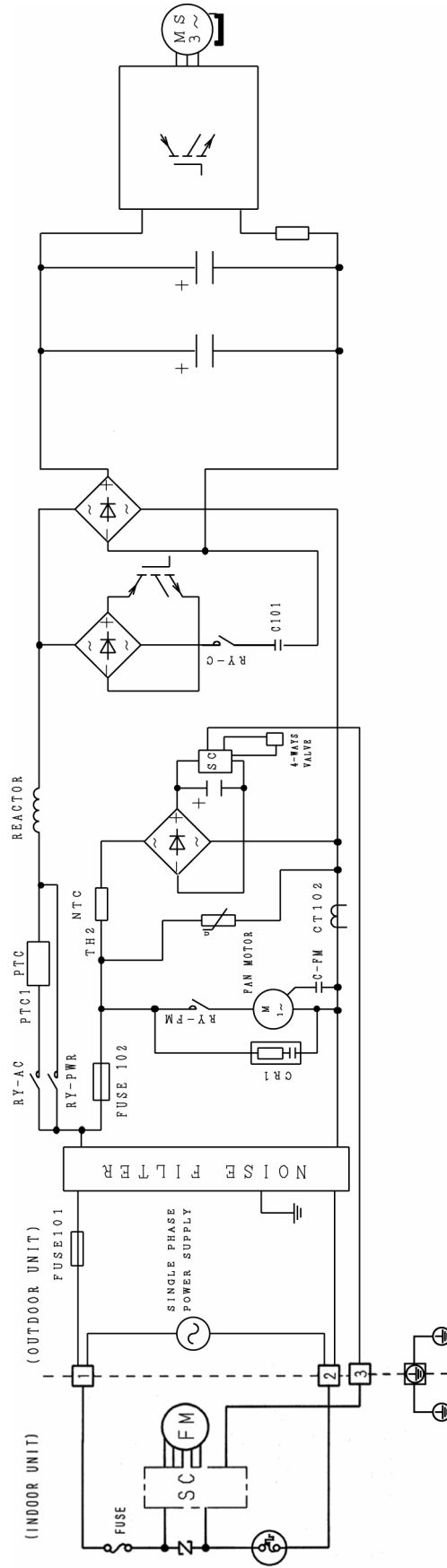
7.2 CU-E12NKE



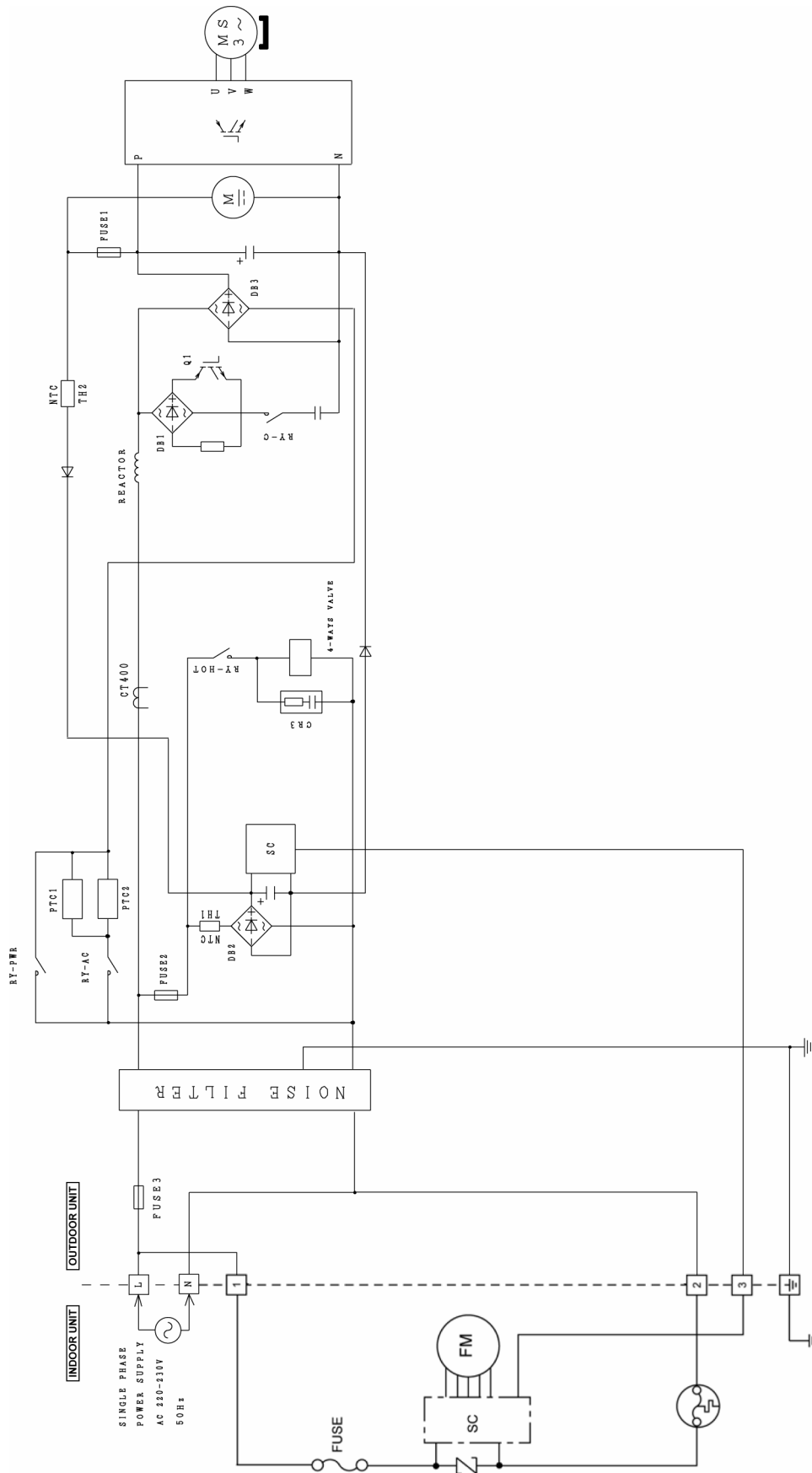
7.3 CU-E15NKE



7.4 CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3

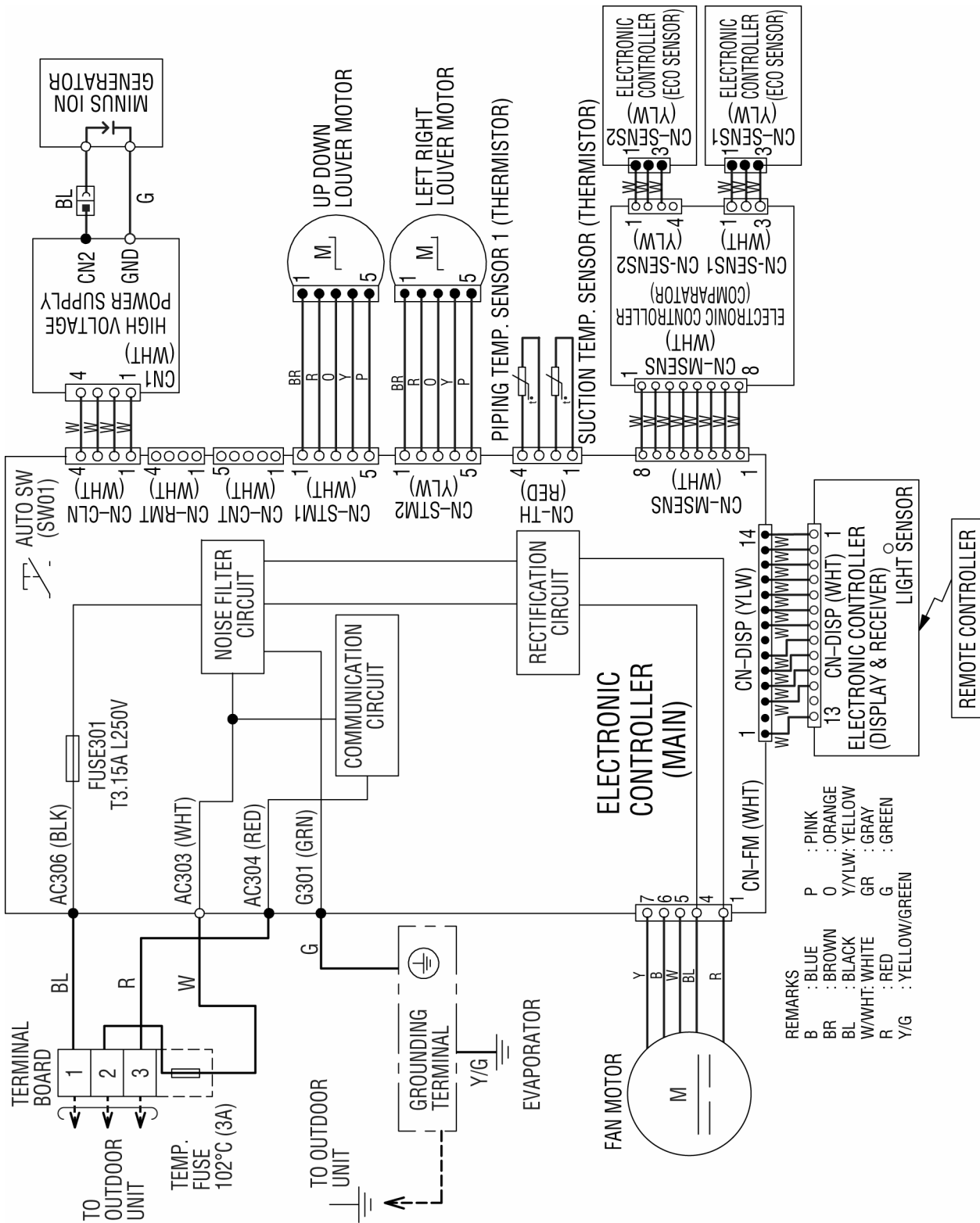


7.5 CU-E18NKE CU-E21NKE



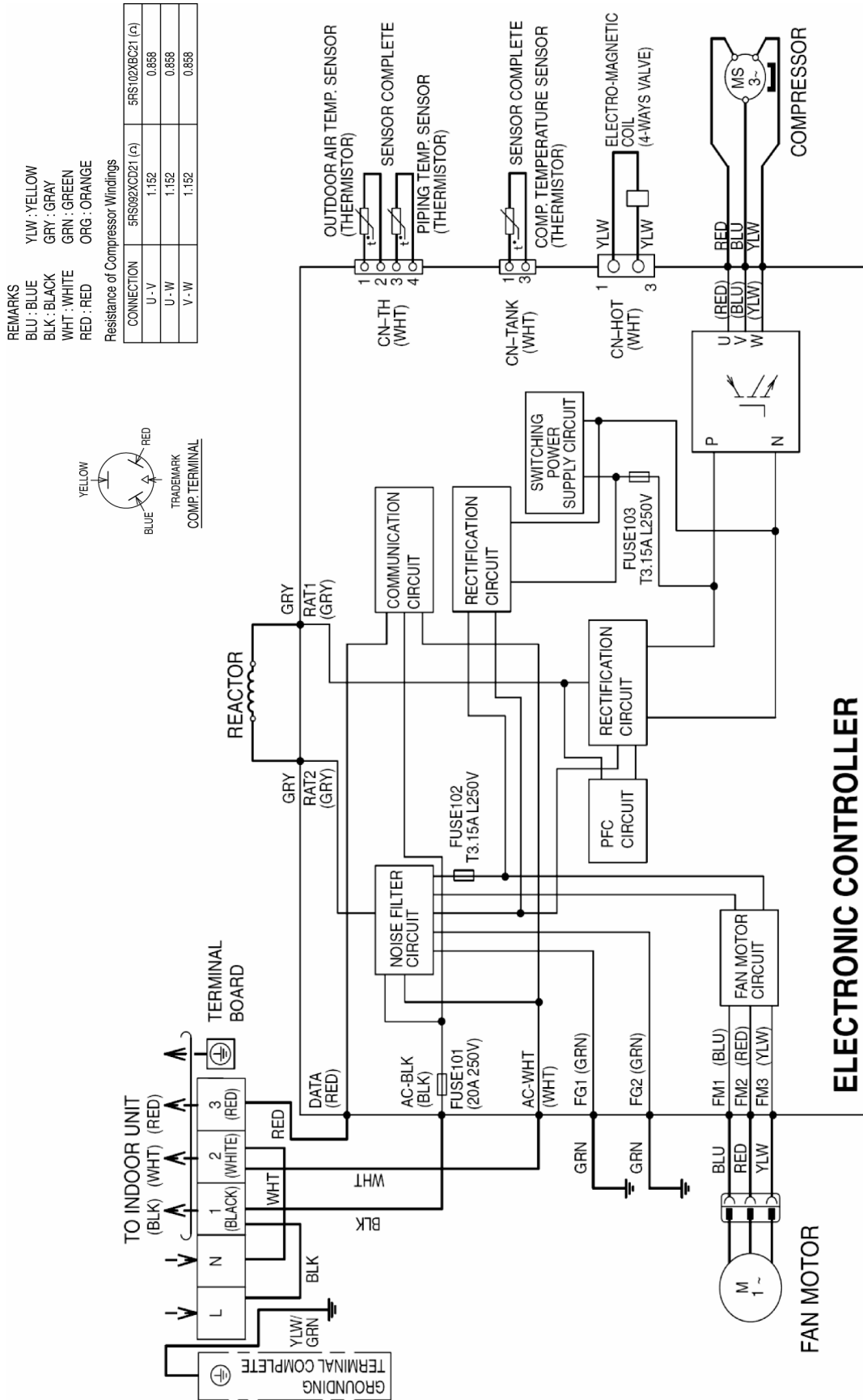
8. Wiring Connection Diagram

8.1 Indoor Unit

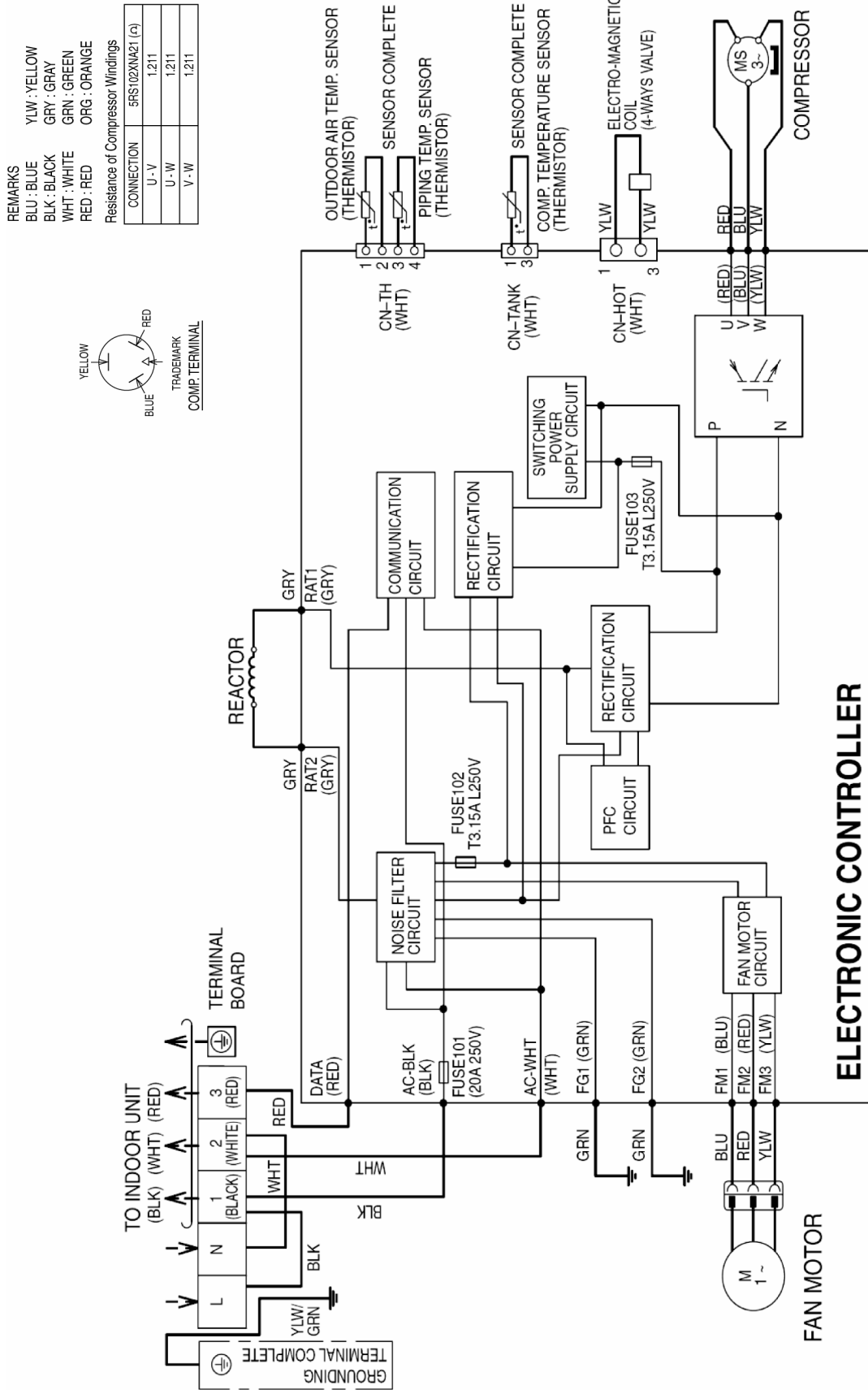


8.2 Outdoor Unit

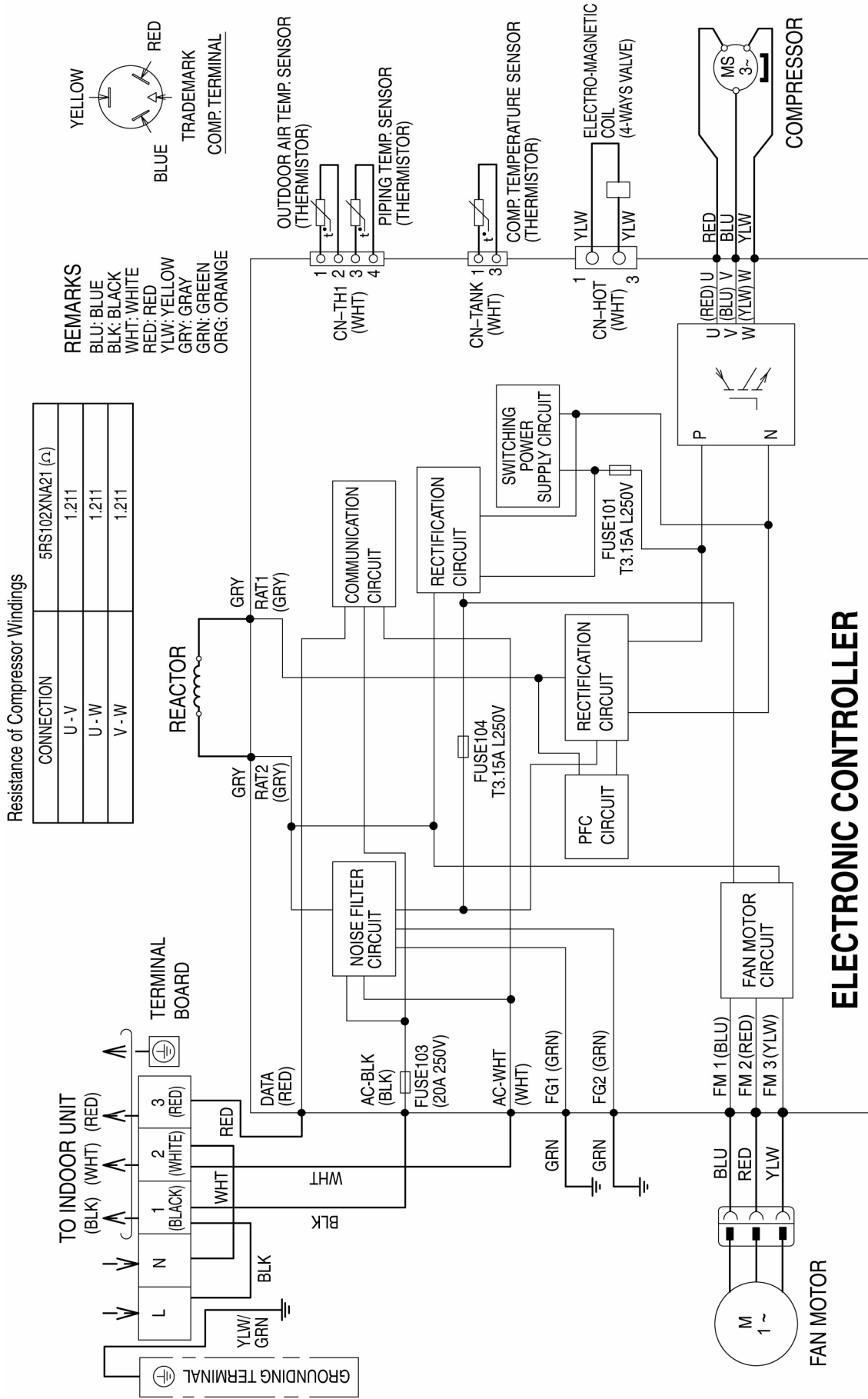
8.2.1 CU-E7NKE CU-E9NKE



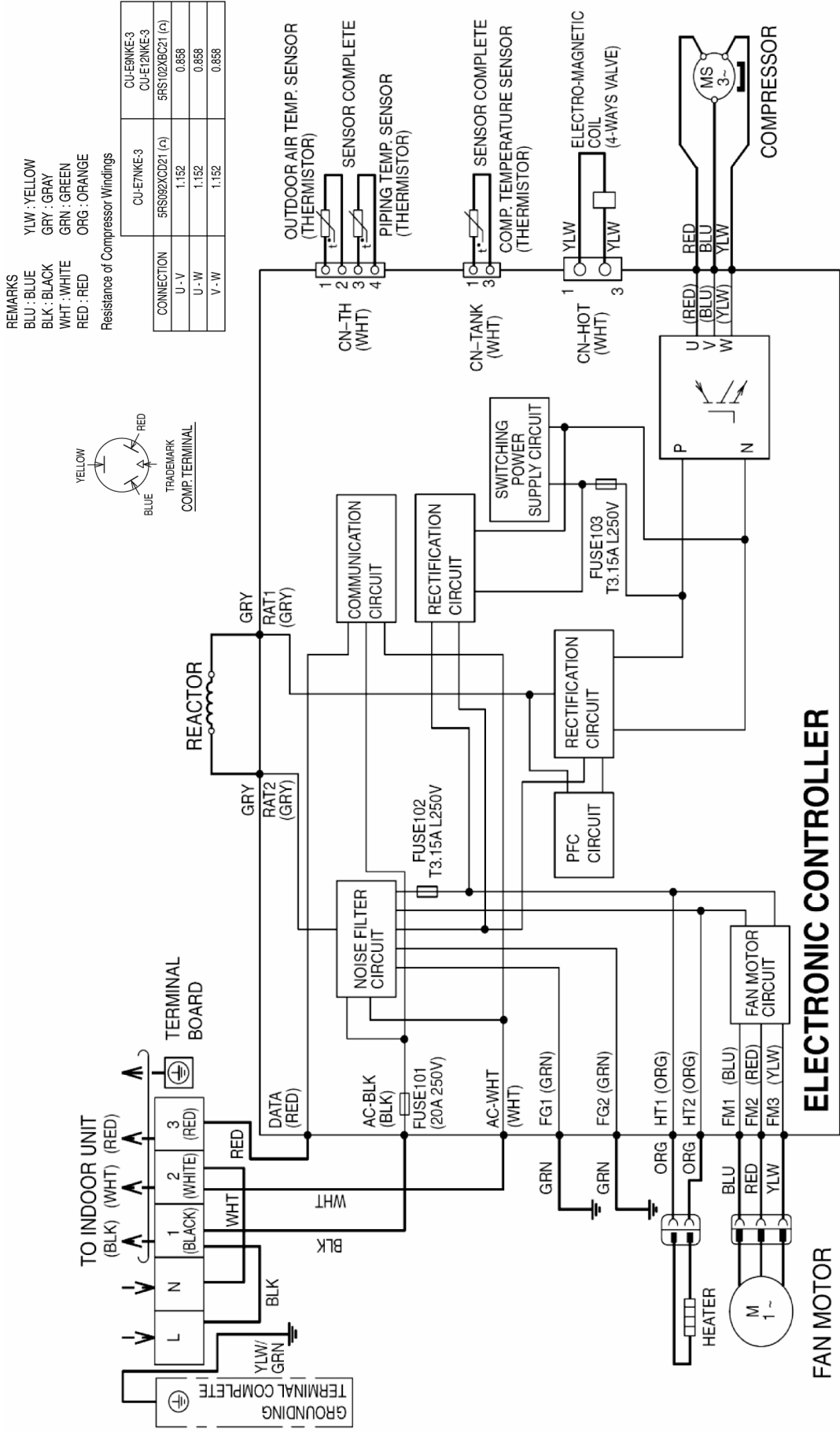
8.2.2 CU-E12NKE



8.2.3 CU-E15NKE



8.2.4 CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3

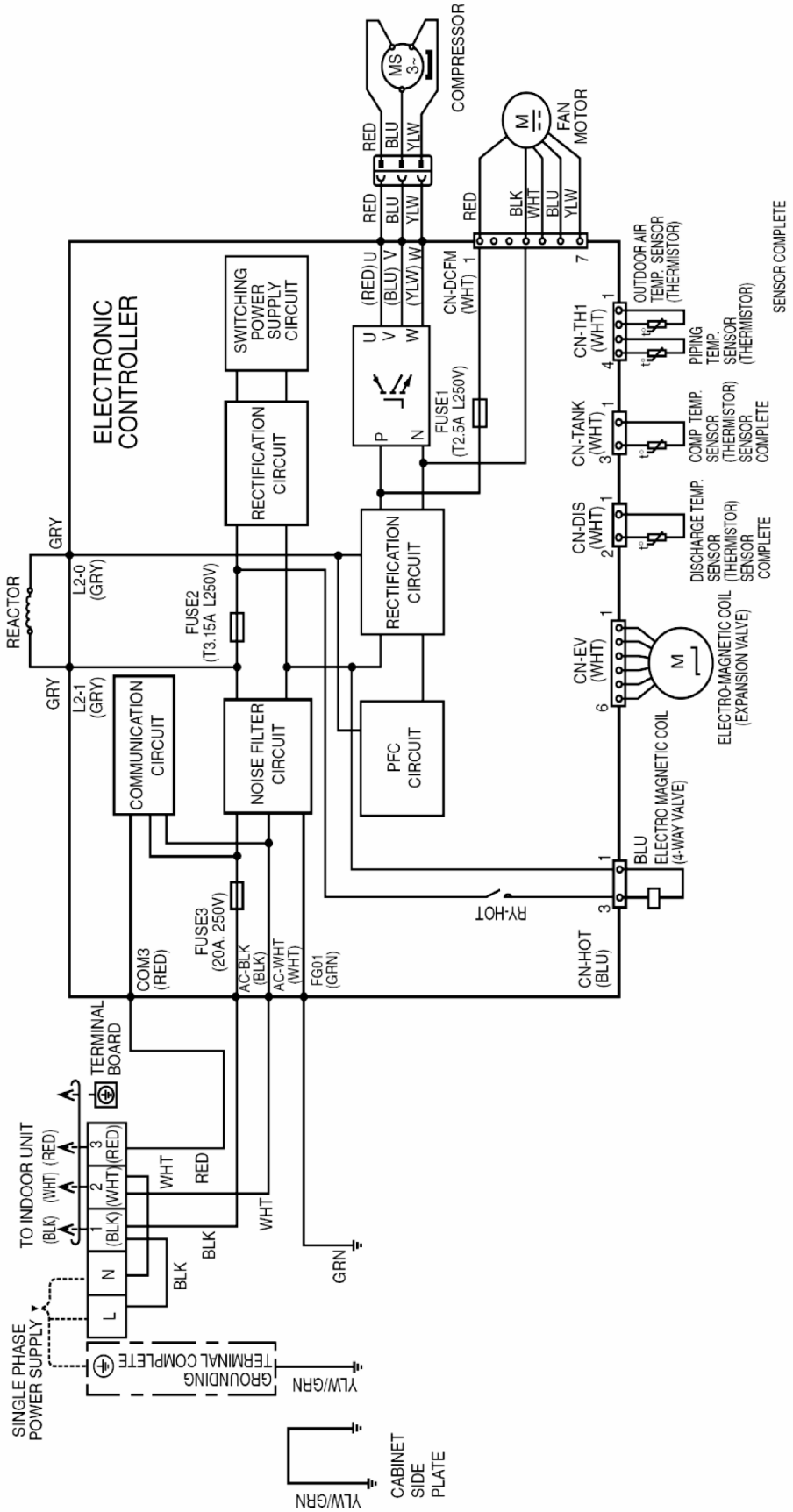
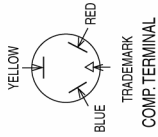


8.2.5 CU-E18NKE CU-E21NKE

REMARKS
 BLU : BLUE
 BLK : BLACK
 WHT : WHITE
 RED : RED
 YLW : YELLOW
 GRY : GRAY
 GRN : GREEN
 ORG : ORANGE

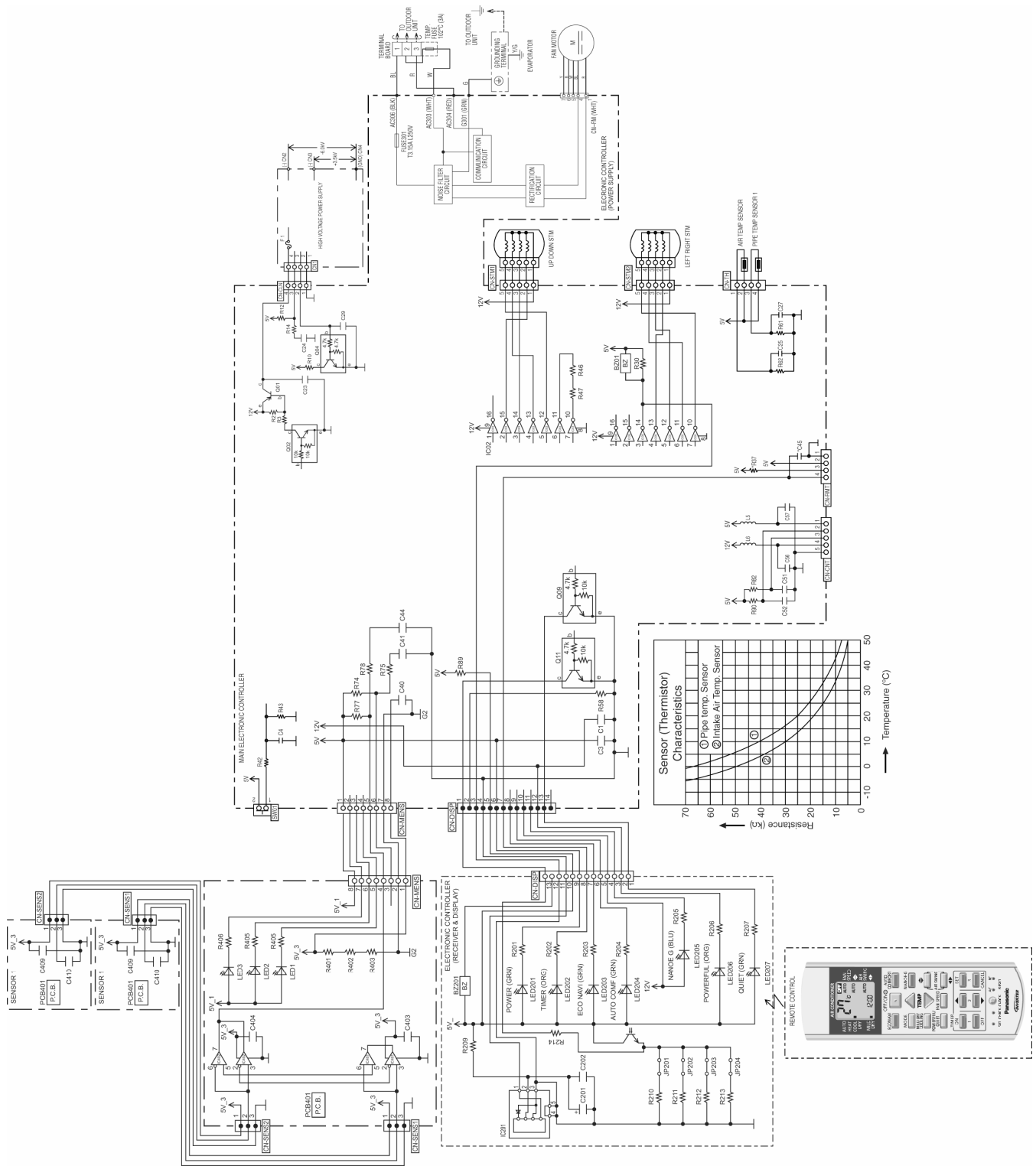
Resistance of Compressor Windings

CONNECTION	5RD132XB421 (a)
U - V	1.887
U - W	1.907
V - W	1.882



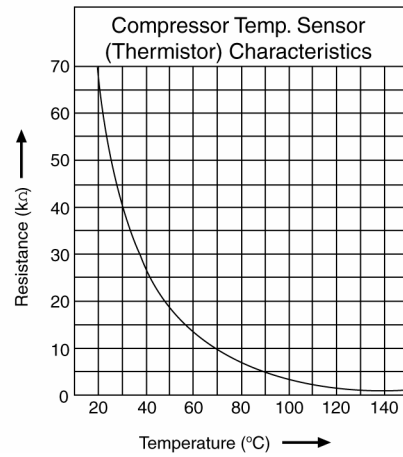
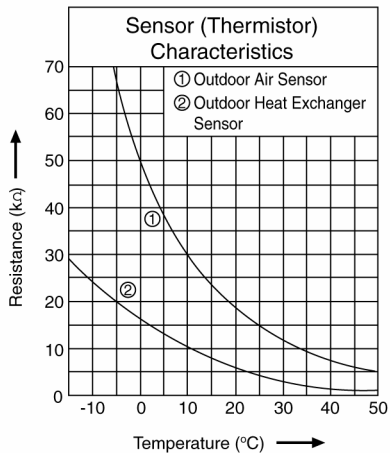
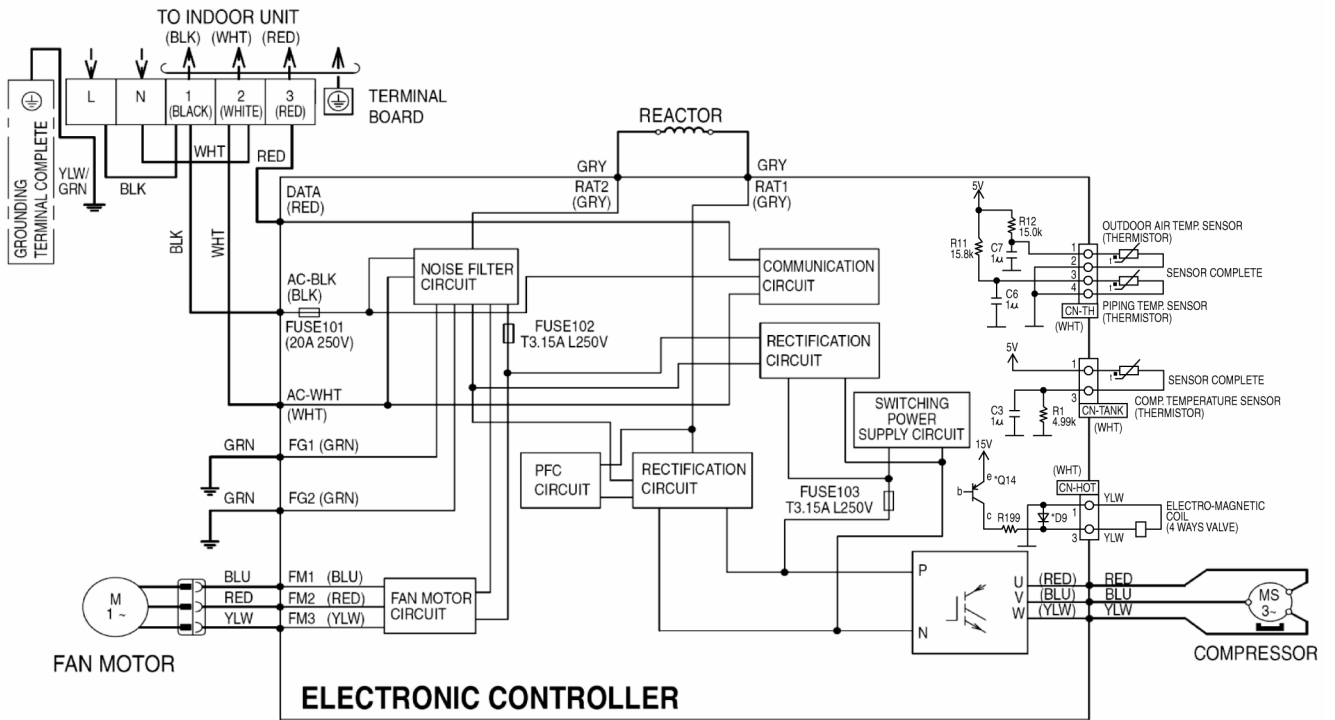
9. Electronic Circuit Diagram

9.1 Indoor Unit

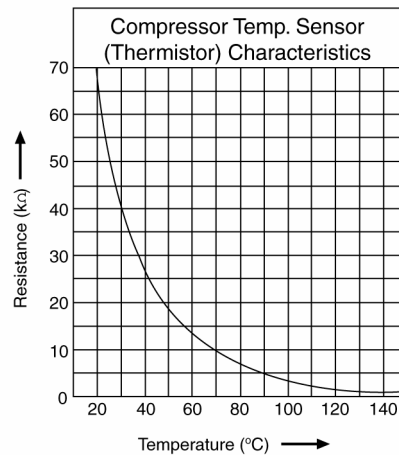
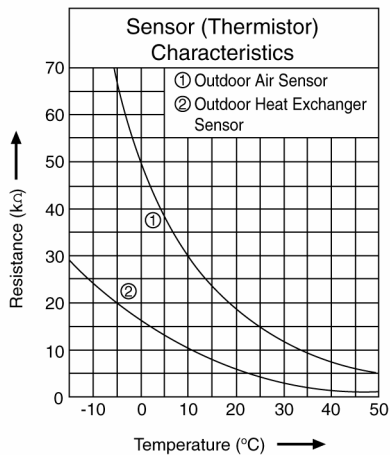
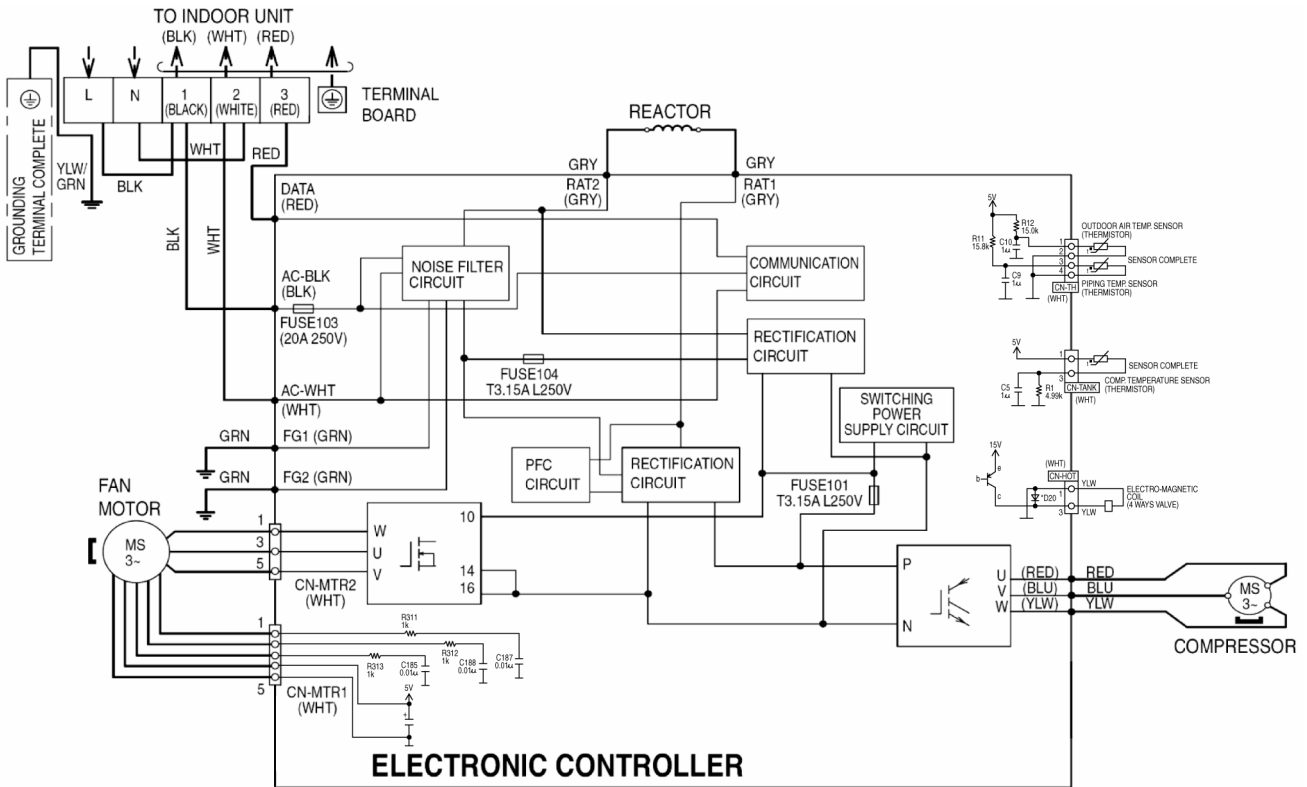


9.2 Outdoor Unit

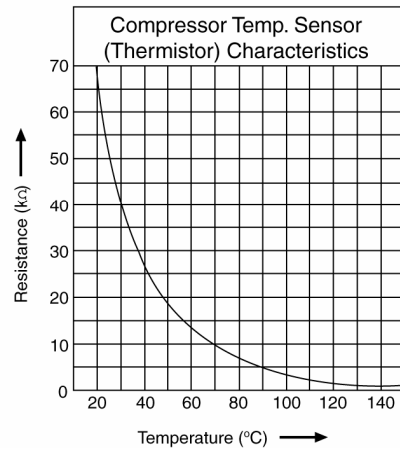
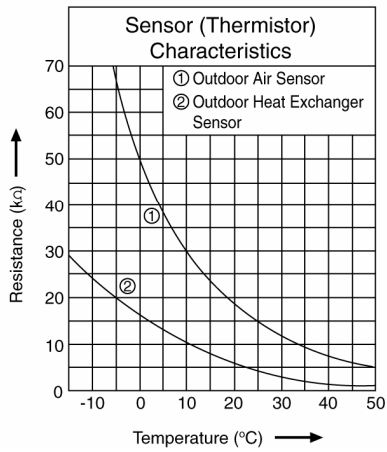
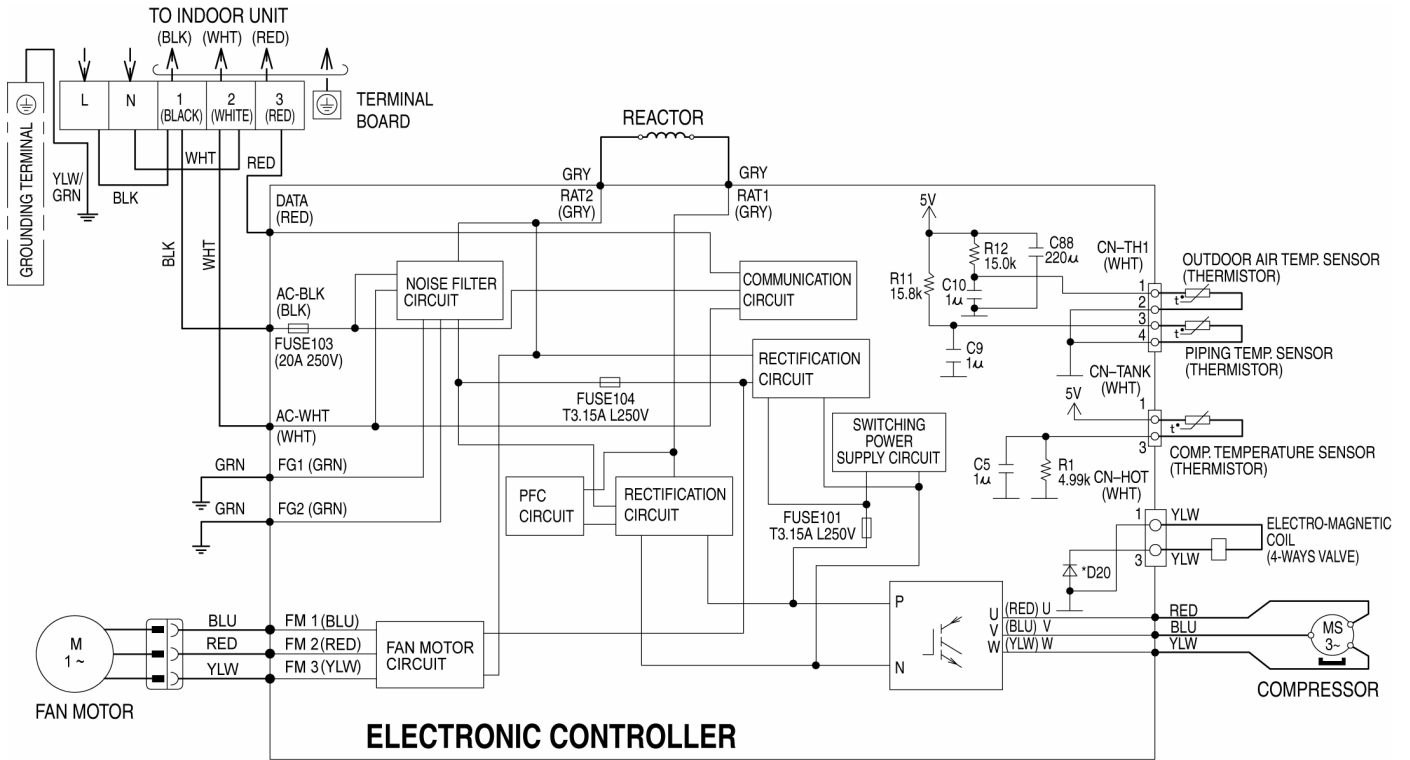
9.2.1 CU-E7NKE CU-E9NKE



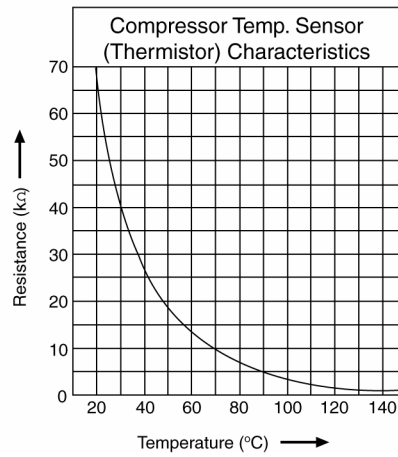
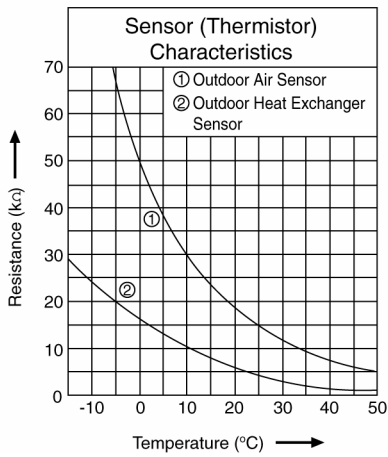
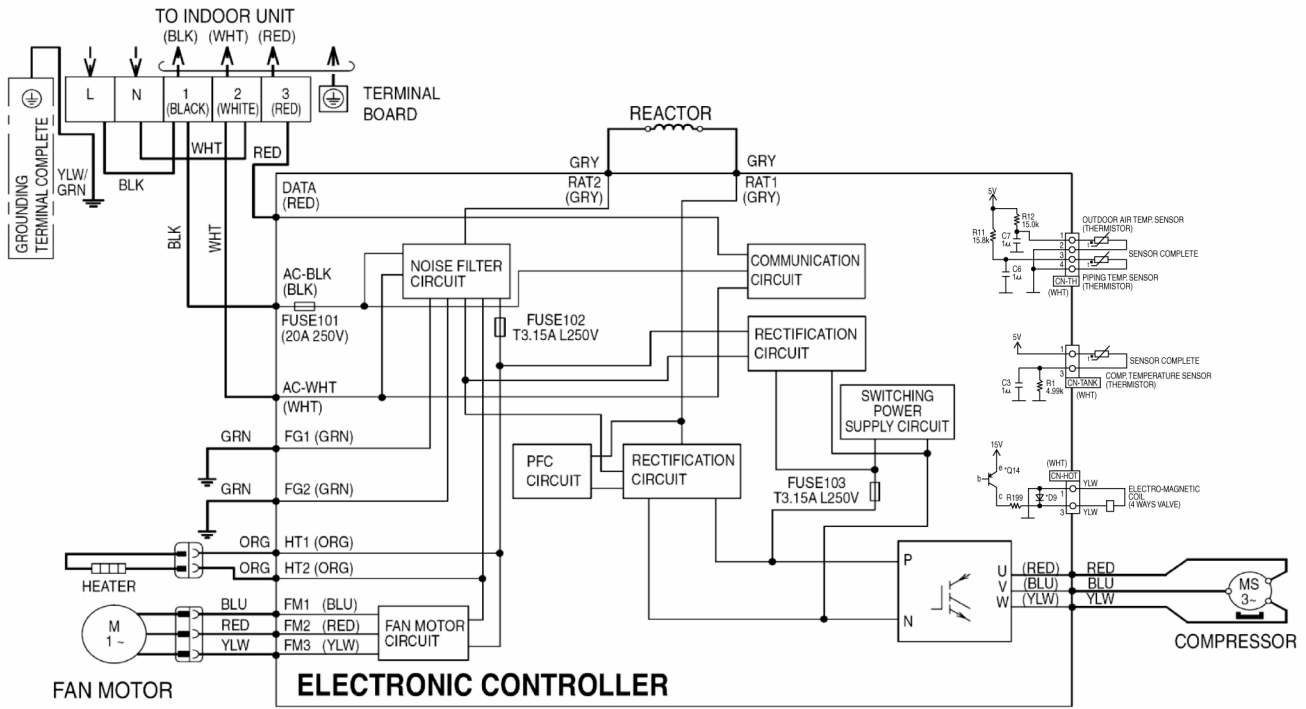
9.2.2 CU-E12NKE



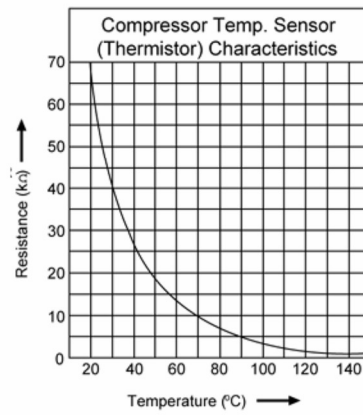
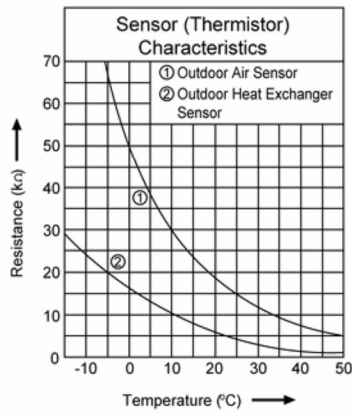
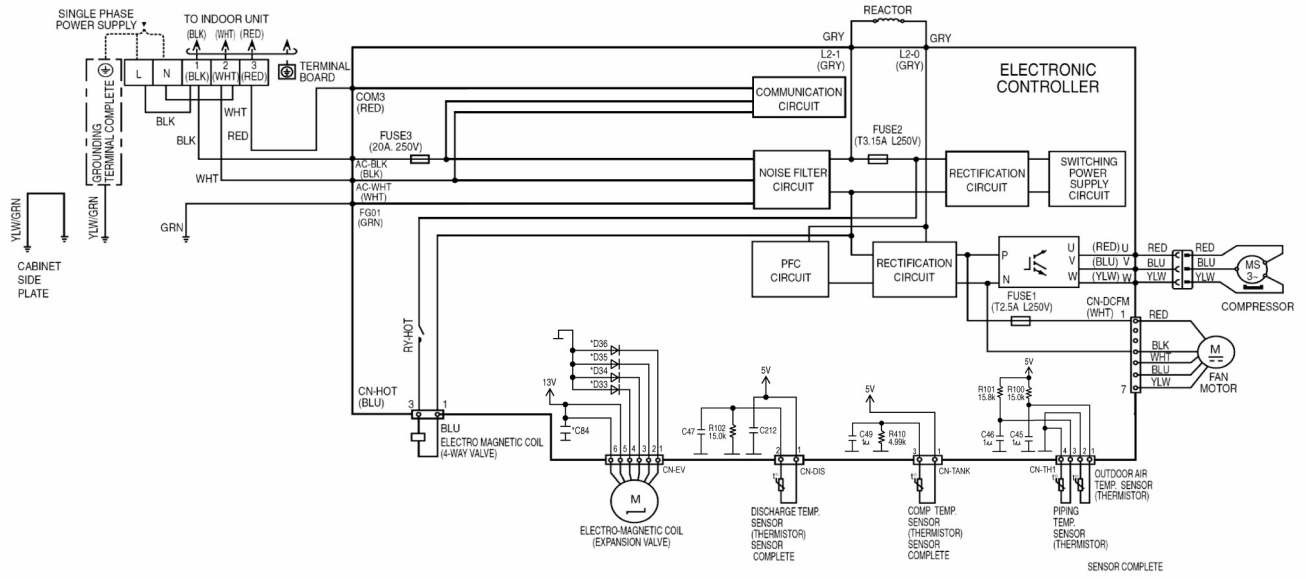
9.2.3 CU-E15NKE



9.2.4 CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3



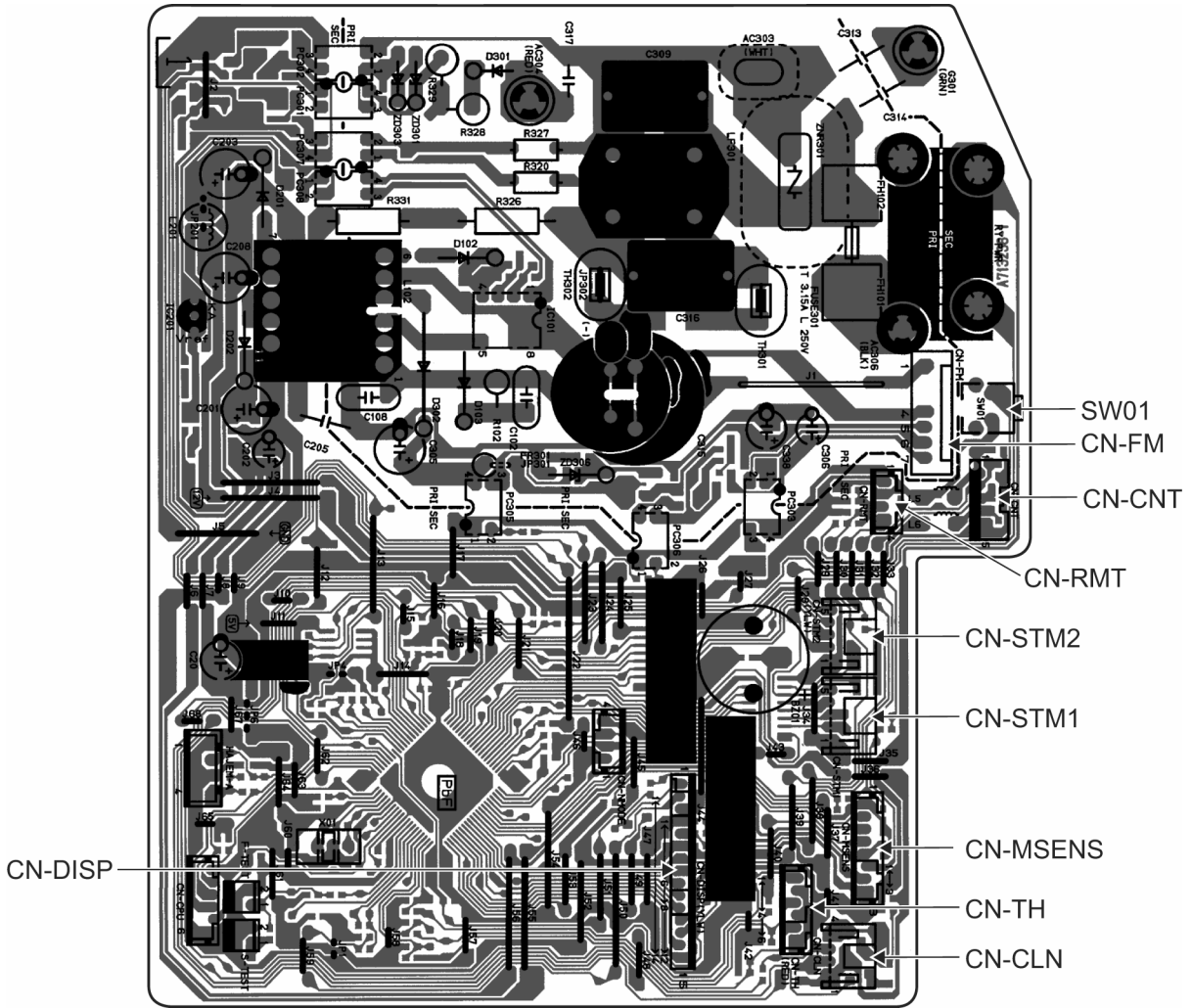
9.2.5 CU-E18NKE CU-E21NKE



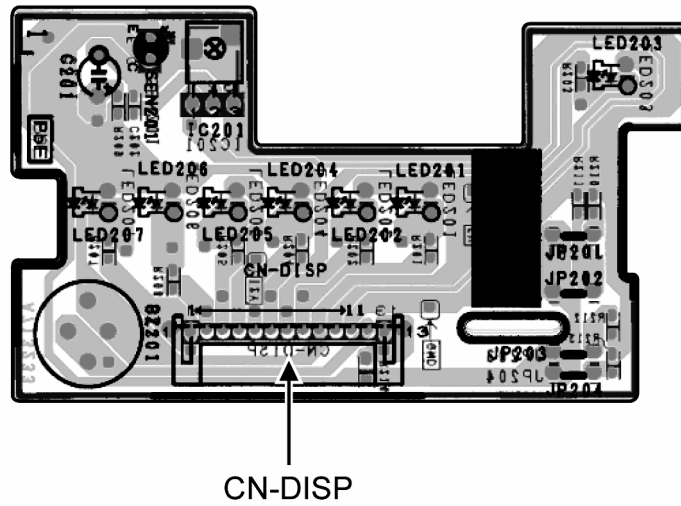
10. Printed Circuit Board

10.1 Indoor Unit

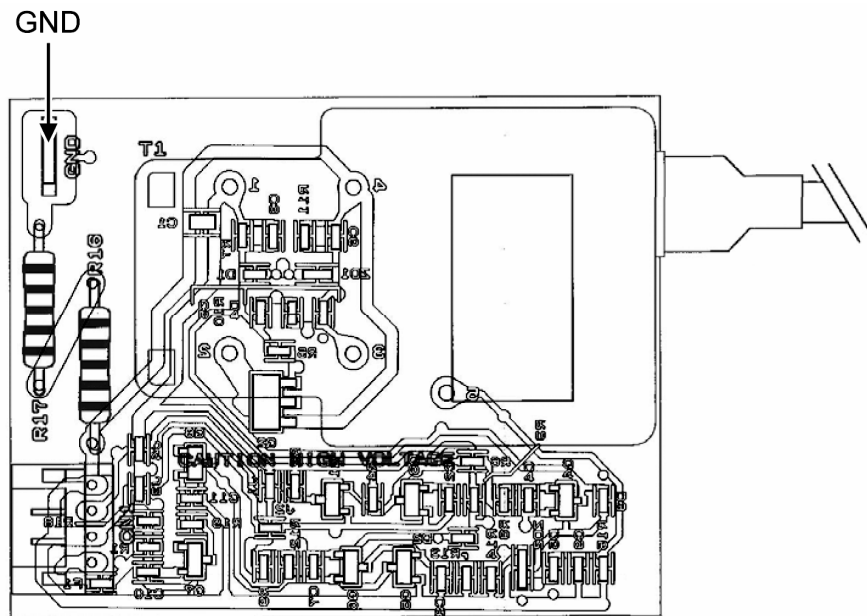
10.1.1 Main Printed Circuit Board



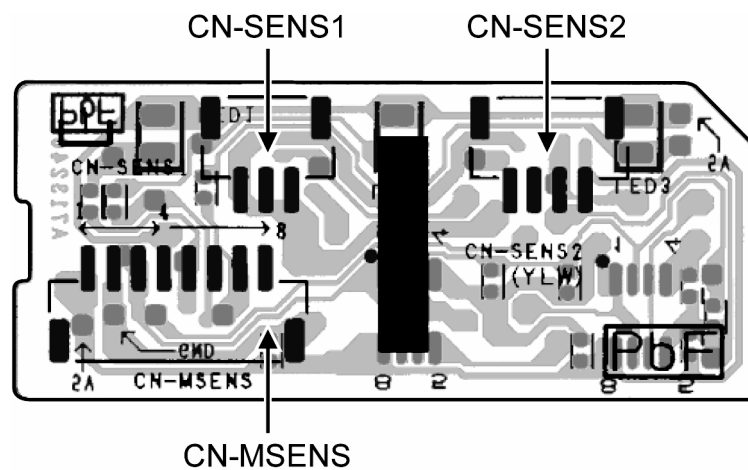
10.1.2 Indicator Printed Circuit Board



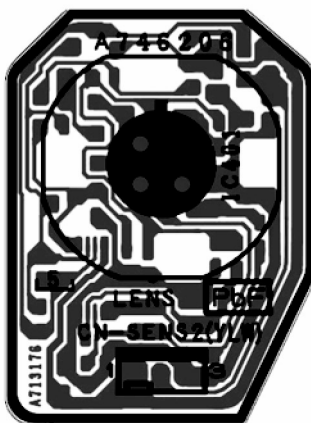
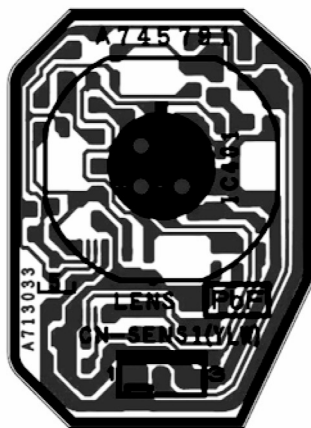
10.1.3 High Voltage Power Supply Printed Circuit Board



10.1.4 Comparator Printed Circuit Board

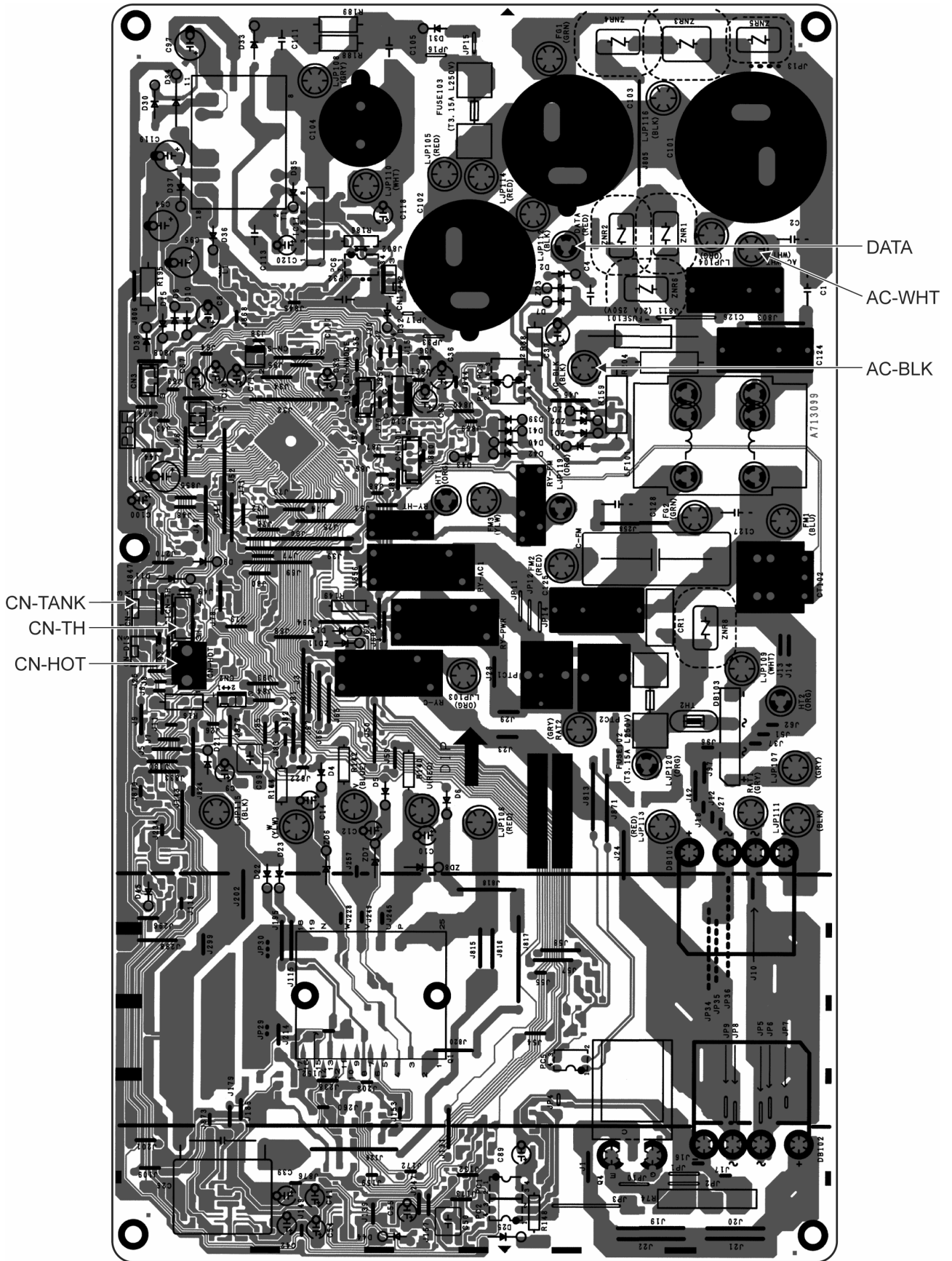


10.1.5 Human Activity Sensor Printed Circuit Board

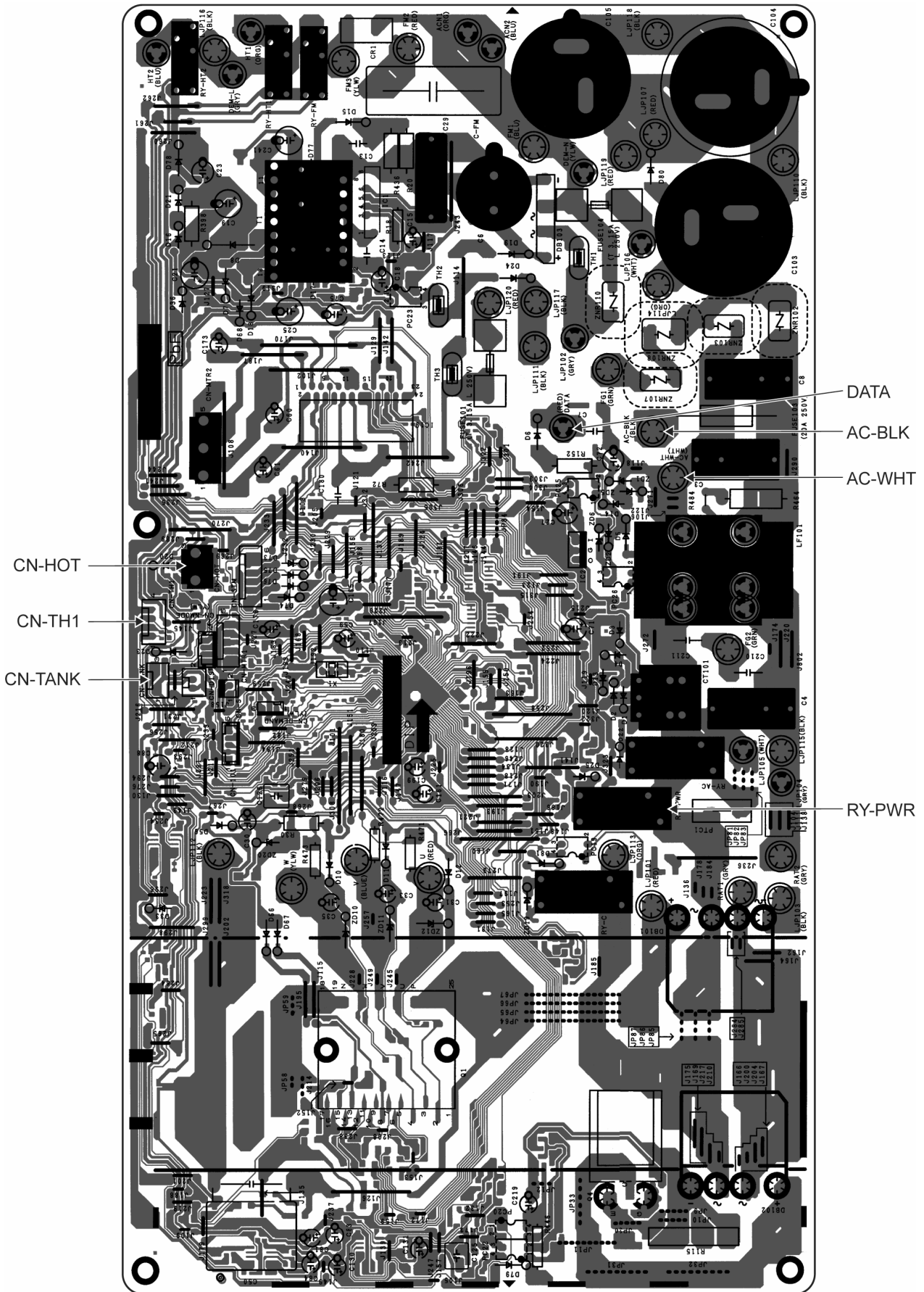


10.2 Outdoor Unit

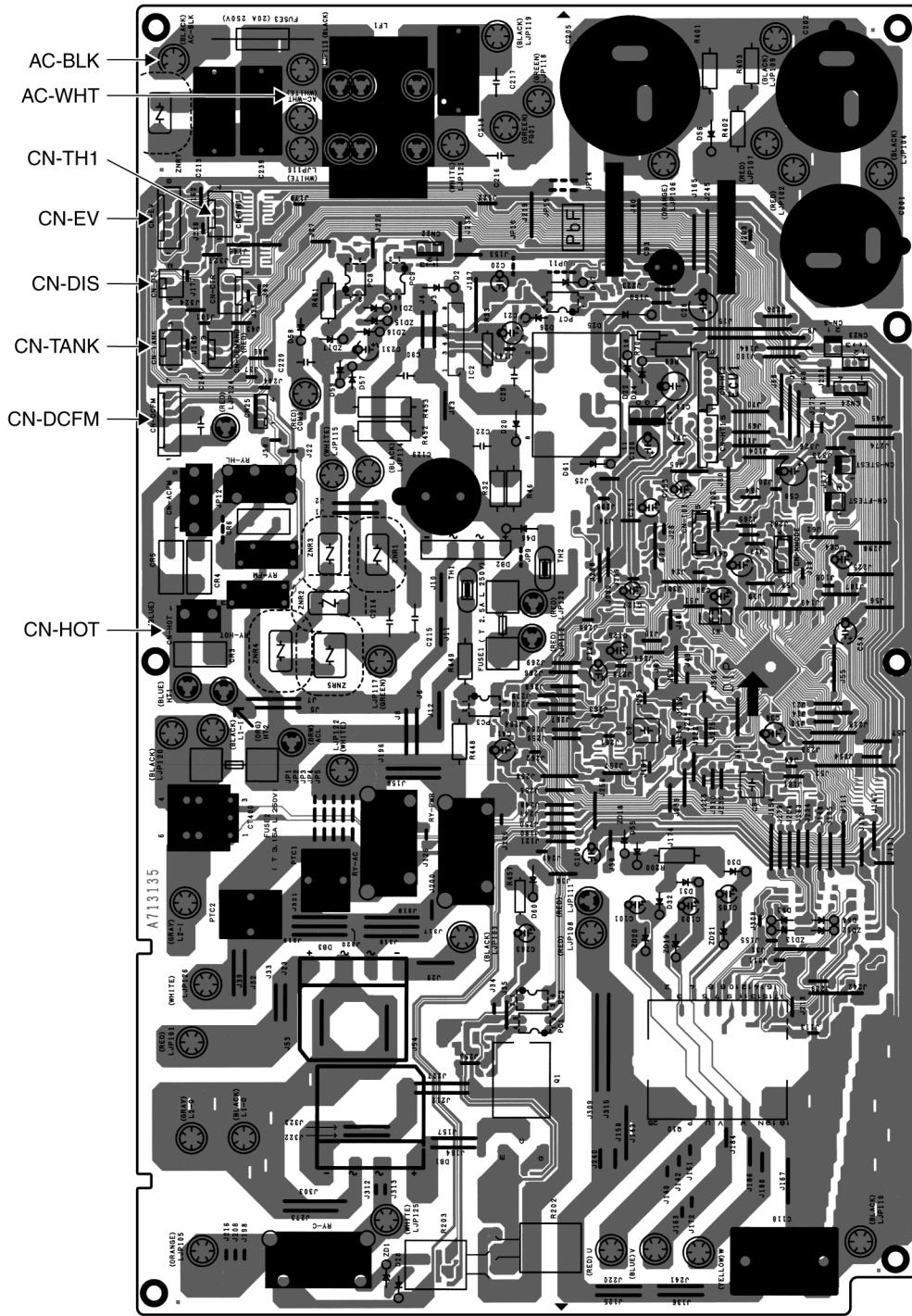
10.2.1 CU-E7NKE CU-E9NKE CU-E7NKE-3 CU-E9NKE-3 CU-E12NKE-3



10.2.2 CU-E12NKE CU-E15NKE



10.2.3 CU-E18NKE CU-E21NKE



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

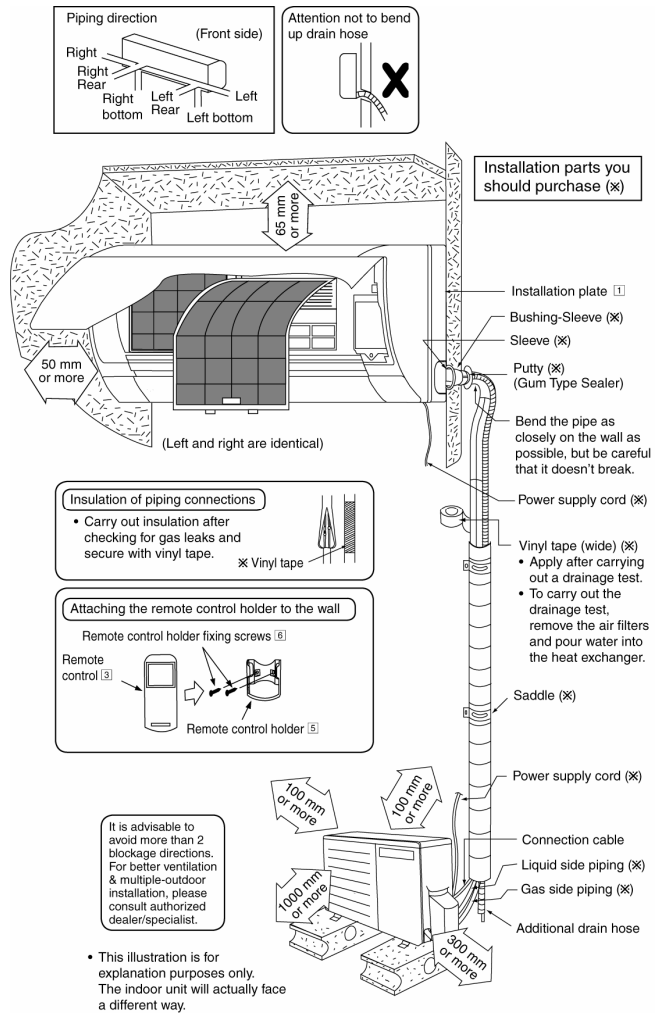
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other 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						
E7***, XE7***	3/4HP	9.52mm (3/8")	6.35mm (1/4")	5	15	3	15	20	7.5
E9***, XE9***	1.0HP								
E12***, XE12***	1.5HP								
E15***, XE15***	1.75HP	12.7mm (1/2")	6.35mm (1/4")	5	15	3	15	20	7.5
E18***, XE18***	2.0HP								
E21***, XE21***	2.25HP								
E24***	2.5HP	15.88mm (5/8")	6.35mm (1/4")	5	20	3	30	30	10
E28***	3.0HP								

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 x 20 g/m = 50 g

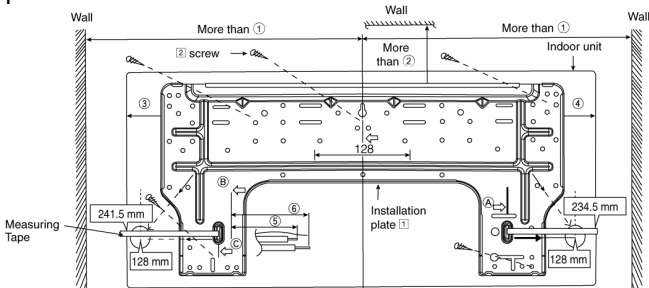
11.1.3 Indoor/Outdoor Unit Installation Diagram



11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
E7***, XE7*** E9***, XE9*** E12***, XE12*** E15***, XE15***	485 mm	82 mm	165 mm	158 mm	43 mm	95 mm
E18***, XE18*** E21***, XE21*** E24***, E28***	585 mm	82 mm	165 mm	158 mm	169 mm	219 mm

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

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

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

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

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.

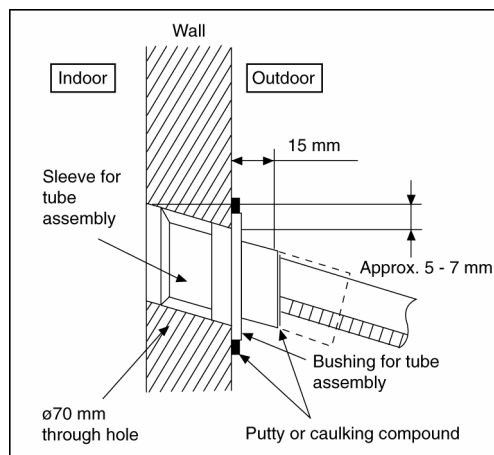
11.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

- 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

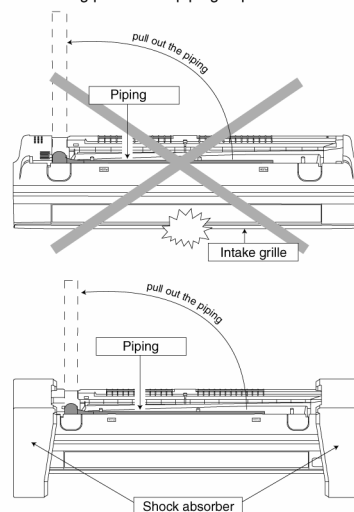
- Ⓛ When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connection cable.

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



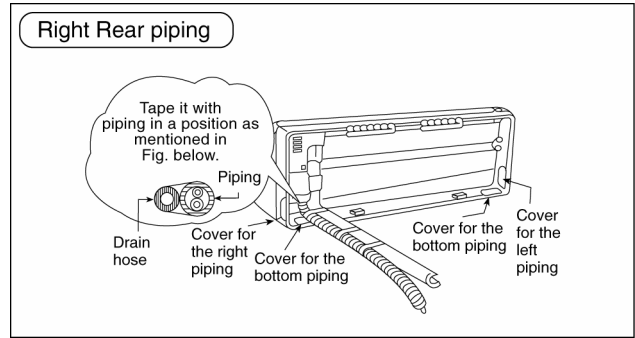
11.2.3 Indoor Unit Installation

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



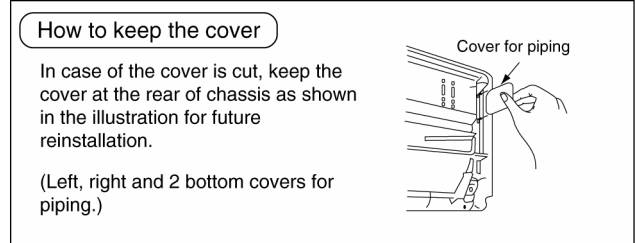
11.2.3.1 For the right rear piping

- Step-1** Pull out the Indoor piping
- ↓
- Step-2** Install the Indoor Unit
- ↓
- Step-3** Secure the Indoor Unit
- ↓
- Step-4** Insert the connection cable



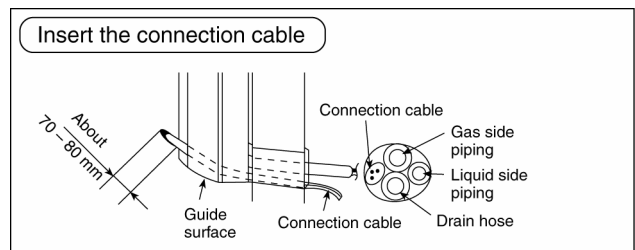
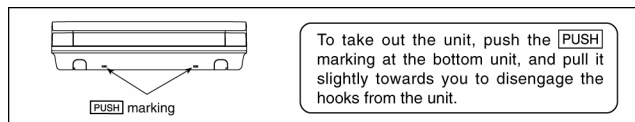
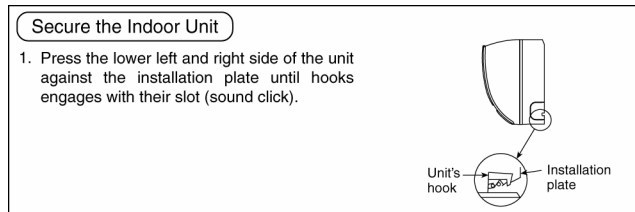
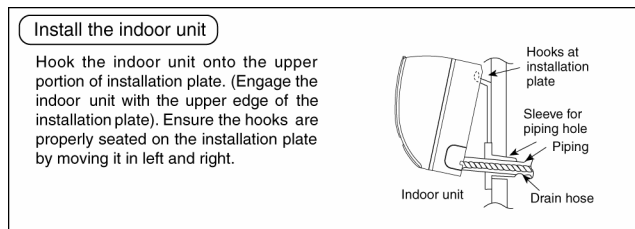
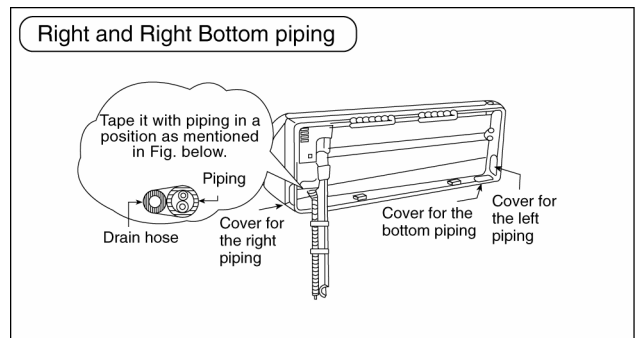
11.2.3.2 For the right and right bottom piping

- Step-1** Pull out the Indoor piping
- ↓
- Step-2** Install the Indoor Unit
- ↓
- Step-3** Insert the connection cable
- ↓
- Step-4** Secure the Indoor Unit

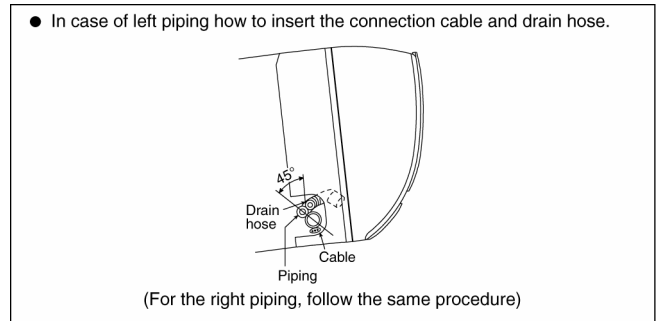
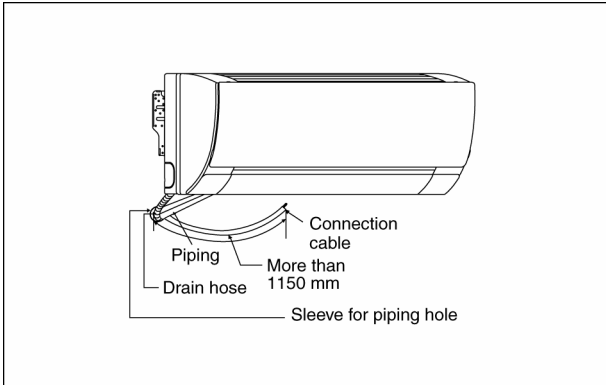
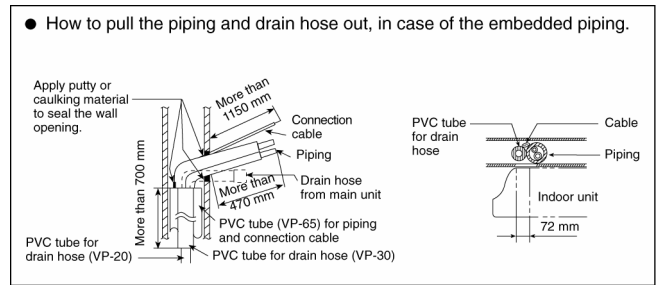
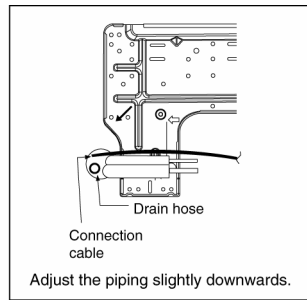
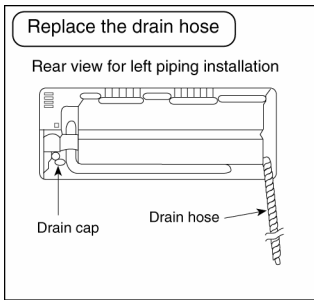


11.2.3.3 For the embedded piping

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

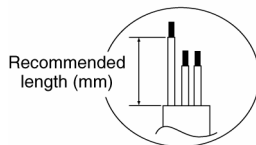
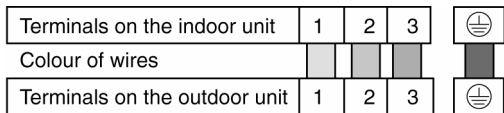


(This can be used for left rear piping and bottom piping also.)



11.2.4 Connect the Cable to the Indoor Unit

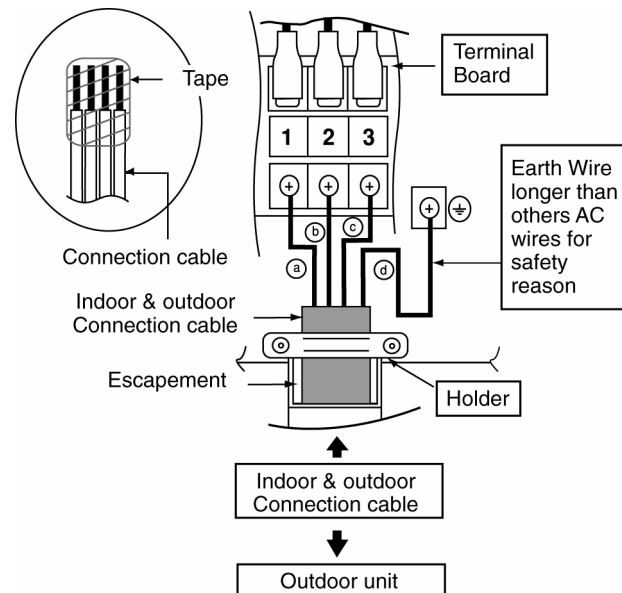
- 1 The inside and outside connecting cable can be connected without removing the front grille.
- 2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed $4 \times 1.5 \text{ mm}^2$ flexible cord, type designation 245 IEC 57 or heavier cord.
- 3 Bind all the indoor and outdoor connection cable with tape and route the connection cable via the escapement.
- 4 Remove the tapes and connect the connection cable between indoor unit and outdoor unit according to the diagram below.



Recommended length (mm)	a	b	c	d
	35	35	35	55

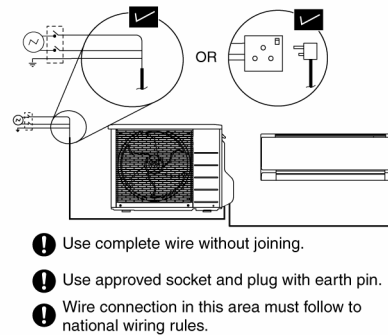
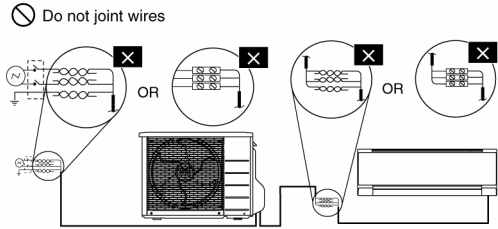
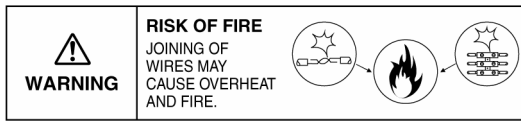
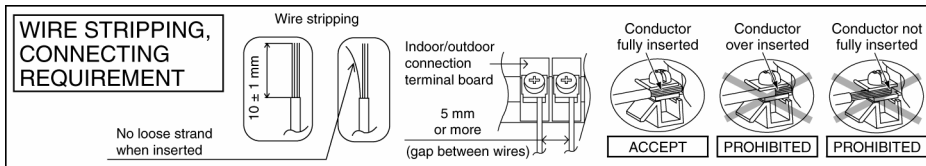
⚠ WARNING

⊕ This equipment must be properly earthed.



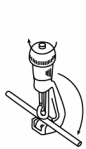
Note:

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

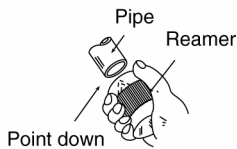


11.2.4.1 Cutting and flaring the piping

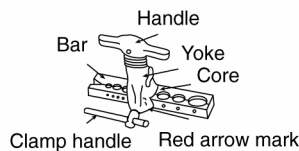
- 1 Please cut using pipe cutter and then remove the burrs.
- 2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- 3 Please make flare after inserting the flare nut onto the copper pipes.



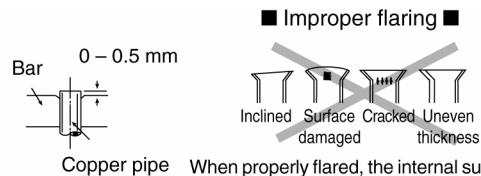
1. To cut



2. To remove burrs



3. To flare

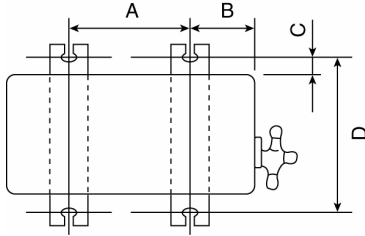


When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish.

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
E7***	570 mm	105 mm	18.5 mm	320 mm
E9***				
E12***-3				
E15***	540 mm	160 mm	18.5 mm	330 mm
E15***-3				
E18***	613 mm	131 mm	16 mm	360.5 mm
E21***				
E24***				
E28***				

11.3.2 Connect the Piping

Connecting the Piping to Indoor

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

Connect the piping

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

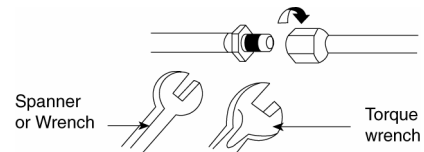
Do not over tighten, over tightening may cause gas leakage.	
Piping size	Torque
6.35 mm (1/4")	[18 N•m (1.8 kgf.m)]
9.52 mm (3/8")	[42 N•m (4.3 kgf.m)]
12.7 mm (1/2")	[55 N•m (5.6 kgf.m)]
15.88 mm (5/8")	[65 N•m (6.6 kgf.m)]
19.05 mm (3/4")	[100 N•m (10.2 kgf.m)]

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.

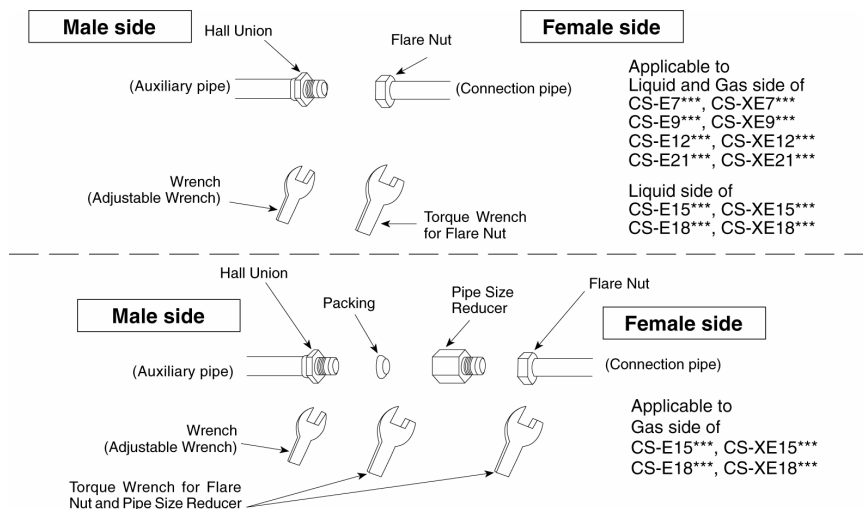
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.



Connecting the Piping to Outdoor Multi

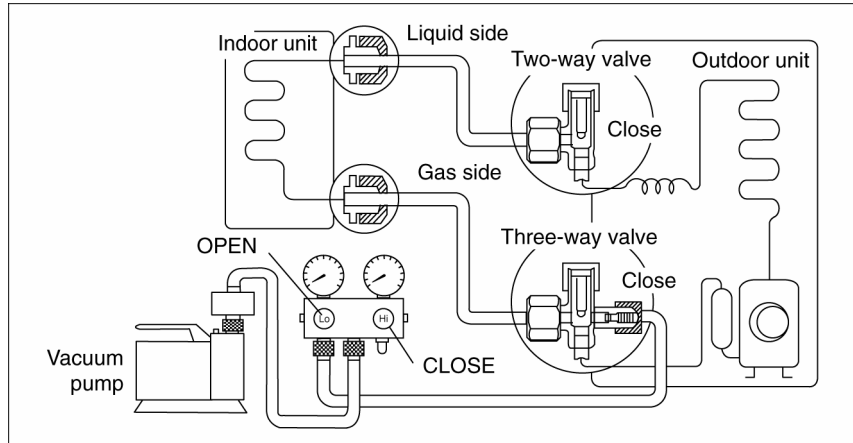
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (located at valve) onto the copper pipe.

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



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.



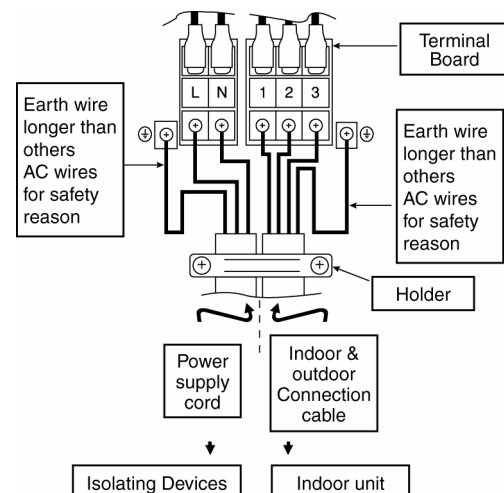
- 1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
 - Be sure to connect the end of the charging hose with the push pin to the service port.
- 2 Connect the center hose of the charging set to a vacuum pump.
- 3 Turn on the power switch 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.

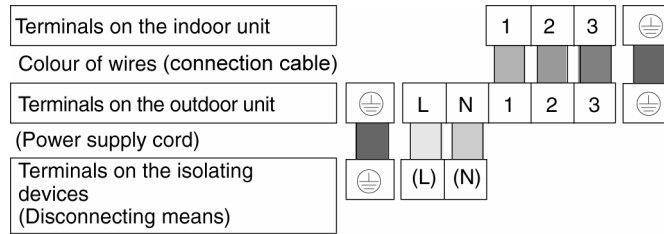
Note: BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID REFRIGERANT GAS LEAKAGE.
- 5 Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.
- 6 Tighten the service port caps of the 3-way valve at a torque of 18 N·m with a torque wrench.
- 7 Remove the valve caps 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 Cable connection to the power supply through Isolating Devices (Disconnecting means).
 - Connect approved type polychloroprene sheathed **power supply cord** 3 x 1.5 mm² (3/4 ~ 1.75HP), 3 x 2.5 mm² (2.0 ~ 2.5HP) or 3 x 4.0 mm² (3.0HP) type designation 245 IEC 57 or heavier cord to the terminal board, and connect the others end of the cord to Isolating Devices (Disconnecting means).
- 3 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm² flexible cord, type designation 245 IEC 57 or heavier cord.
- 4 Connect the power supply cord and connection cable between indoor unit and outdoor unit according to the diagram below.





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

⚠ WARNING
⚡ This equipment must be properly earthed.

- Note: Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than 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.

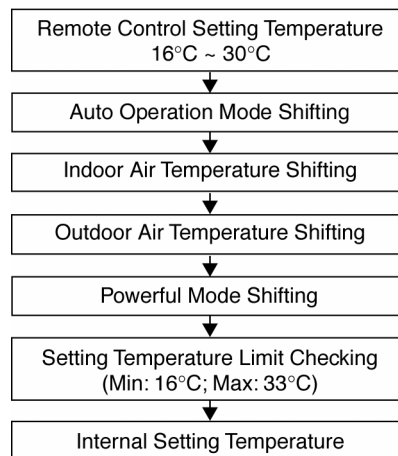
12. Operation Control

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

12.1.3 Soft Dry Operation

12.1.3.1 Thermostat control

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

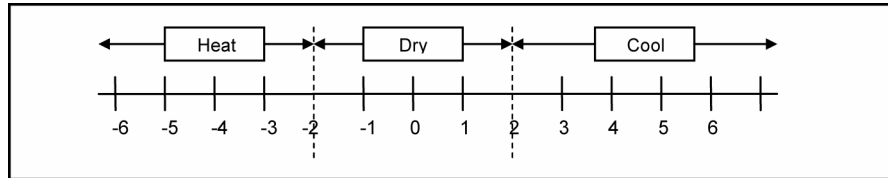
12.1.4 Heating Operation

12.1.4.1 Thermostat control

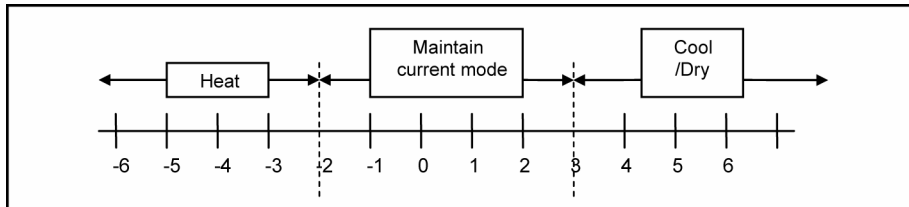
- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature > +2.0°C continue for 3 minutes.
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature < Compressor OFF point.

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]

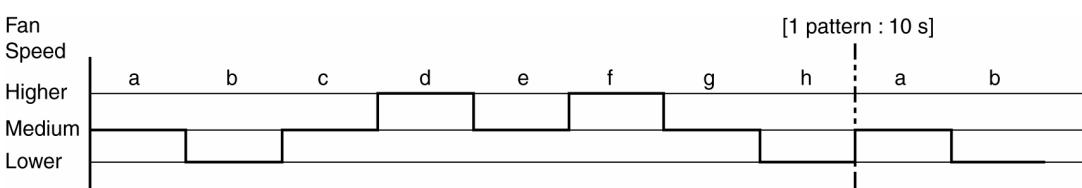
- Fan motor's number of rotation is determined according to remote control setting.

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

ii Auto Fan Speed

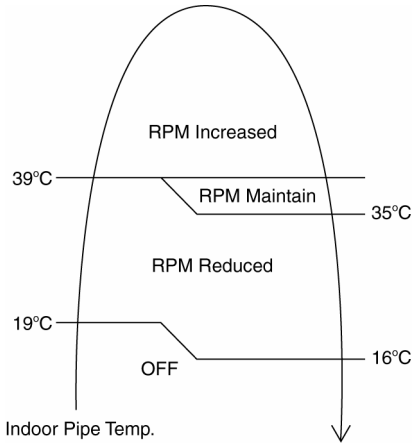
[Cooling, Dry]

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



[Heating]

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

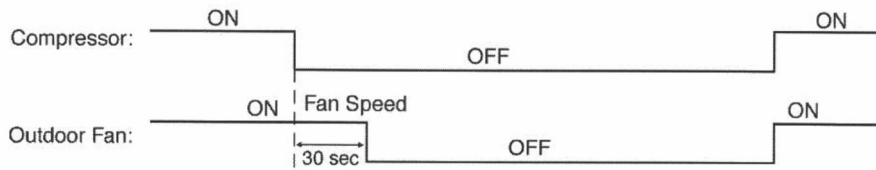


B. Feedback control

- Immediately after the fan motor started, feedback control is performed once every second.
- During fan motor on, if fan motor feedback ≥ 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.



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

Operation Mode			Vane Angle (°)				
			1	2	3	4	5
Cooling	Auto	Usual (Ventilation)	10 ~ 40				
		Control with dew	10 ~ 40				
	Manual	Usual (Ventilation)	10	17.5	25	32.5	40
		Control with dew	10	17.5	25	32.5	40
Dry	Auto	Usual	10 ~ 40				
		Control with dew	10 ~ 40				
	Manual	Usual	10	17.5	25	32.5	40
		Control with dew	10	17.5	25	32.5	40
Heating	Manual		10	21.2	32.5	43.8	55

E7~15NK

Operation Mode			Vane Angle (°)				
			1	2	3	4	5
Cooling	Auto	Usual (Ventilation)	5 ~ 35				
		Control with dew	5 ~ 35				
	Manual	Usual (Ventilation)	5	12.5	20	27.5	35
		Control with dew	5	12.5	20	27.5	35
Dry	Auto	Usual	5 ~ 35				
		Control with dew	5 ~ 35				
	Manual	Usual	5	12.5	20	27.5	35
		Control with dew	5	12.5	20	27.5	35
Heating	Manual	Usual	5	17.5	30	42.5	55

E18~21NK

- 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.
- 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.

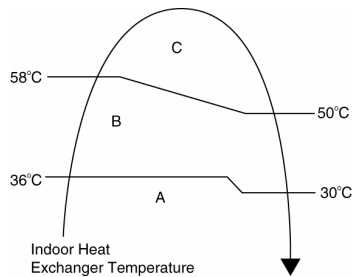


Figure 1

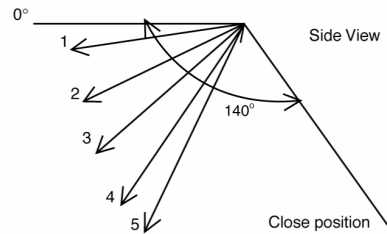


Figure 2

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

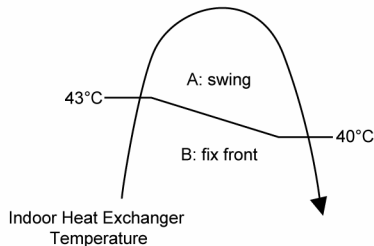


Figure 1

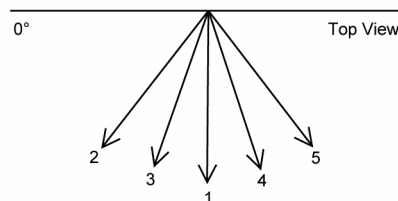







Figure 2

- 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-E7, 9, 12, 15NK CS-XE7, 9, 12, 15NK

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

CS-E18, 21NK CS-XE18, 21NK

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.
 - AUTO COMFORT button is pressed.
 - ECONAVI button is pressed.
 - Mild Dry Cooling button is pressed.
 - 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. This is to reduce sound of Hi, Me, Lo for 3dB (some models more than 3dB).
 - 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.
 - AUTO COMFORT button is pressed.
 - ECONAVI button is pressed.
 - Mild Dry Cooling button is pressed.
 - 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. This is to reduce sound of Hi, Me, Lo for 3dB.
 - 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

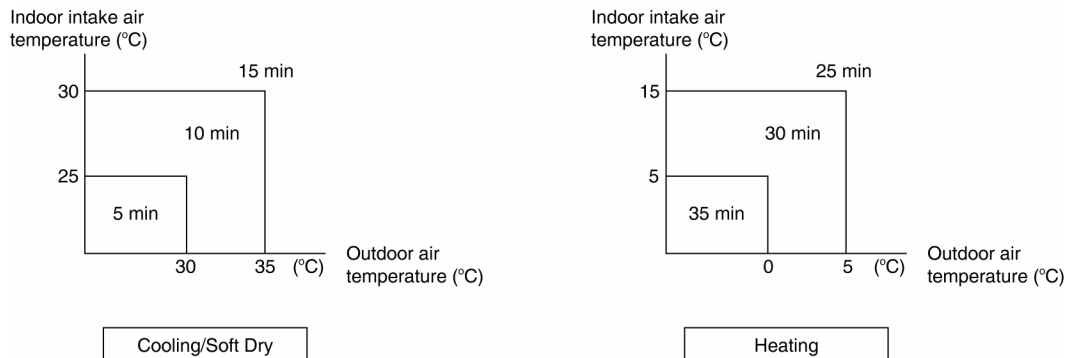
- When the powerful mode is selected, the internal setting temperature will shift lower up to 2°C (for Cooling/Soft Dry) or higher up to 3.5°C (for Heating) than remote control setting temperature for 20 minutes to achieve the setting temperature quickly.

12.8 Timer Control

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

12.8.1 ON Timer Control

- ON timer 1 and ON timer 2 can be set using remote control, the unit with timer set will start operate earlier than the setting time. This is to provide a comfortable environment when reaching the set ON time.
- 60 minutes before the set time, indoor (at fan speed of Lo-) and outdoor fan motor start operate for 30 seconds to determine the indoor intake air temperature and outdoor air temperature in order to judge the operation starting time.
- From the above judgment, the decided operation will start operate earlier than the set time as shown below.



12.8.2 OFF Timer Control

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

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	POWERFUL/QUIET	nanoe-G	ECONAVI	AUTO COMFORT
Color	Green	Orange	Orange	Blue	Green	Green
Light ON	Operation ON	Timer Setting ON	POWERFUL/QUIET Mode ON	nanoe-G ON	ECONAVI ON	AUTO COMFORT ON
Light OFF	Operation OFF	Timer Setting OFF	POWERFUL/QUIET Mode OFF	nanoe-G OFF	ECONAVI OFF	AUTO COMFORT OFF

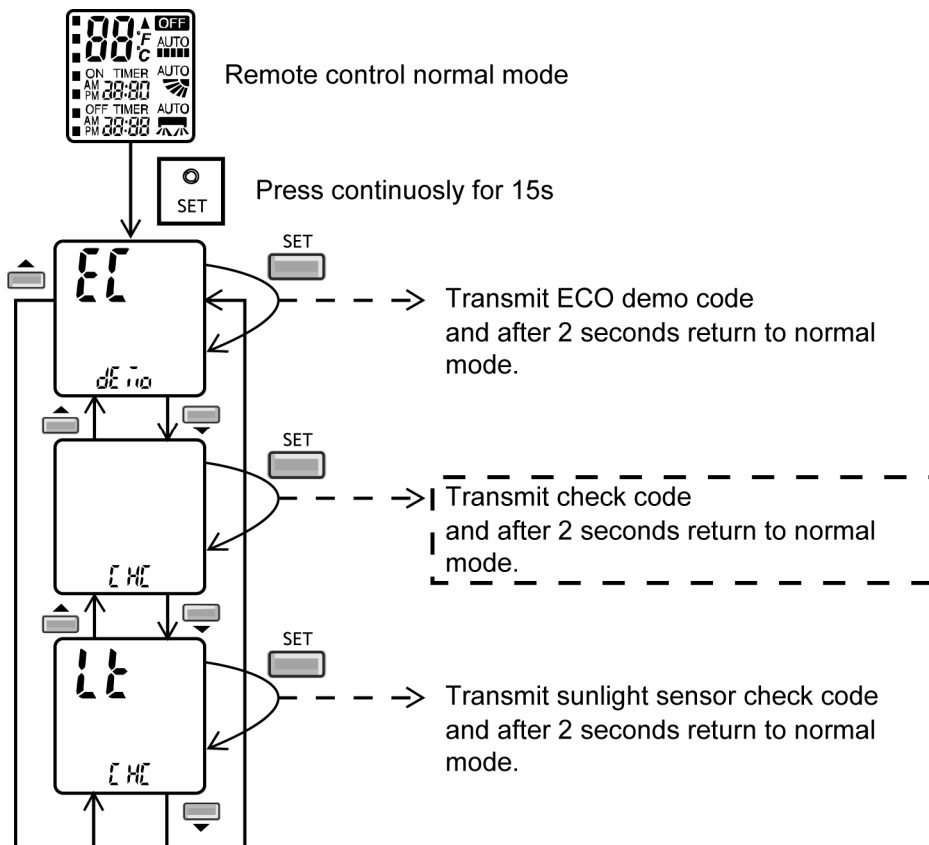
Note:

- 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.

12.11 nanoe-G Operation

- This operation provides clean air by producing great amount of negative ions and distribute through the discharge airflow to capture or deactivate molds, bacteria or viruses.
- nanoe-G operation start condition
 - During unit running at any operation mode, if nanoe-G operation is activated, combination operation (operation mode + nanoe-G operation) starts.
 - During unit is OFF, if nanoe-G operation is activated, nanoe-G individual operation starts.
- nanoe-G operation stop condition
 - When OFF/ON button is pressed to stop the operation.
 - When nanoe-G button is pressed.
 - When OFF Timer activates.
- nanoe-G operation pause condition
 - When indoor fan stop (during deice, odor cut control, thermostat off, etc.). nanoe-G operation resume after indoor fan restarts.
 - When indoor intake temperature $\geq 40^{\circ}\text{C}$. nanoe-G operation resume after indoor intake temperature $\leq 40^{\circ}\text{C}$ continuously for 30 minutes.
- Indoor fan control
 - During any operation mode combines with nanoe-G operation, fan speed follows respective operation mode. However, nanoe-G system enabled when fan speed $\geq 500\text{rpm}$ to ensure proper negative ion distribution, nanoe-G system disabled when fan speed $< 500\text{rpm}$.
 - During nanoe-G individual operation, only Auto Fan Speed and no Powerful operation is allowed. Even if Fan Speed button is pressed, no signal is sent to the unit and no change on remote control display. Auto Fan Speed for nanoe-G operation changes from SHi to Hi after 4 hours of operation.
- Airflow direction control
 - During any operation mode combines with nanoe-G operation, airflow direction follows respective operation mode.
 - During nanoe-G individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to the unit and no change on remote control display.
- Timer control
 - When ON Timer activates when unit stops, previous operation resumes and restored last saved nanoe-G operation status.
 - When ON Timer activates during any operation, no change on current operation.
 - When OFF Timer activates during any operation, all operation stops and the latest nanoe-G operation status is saved.
- Indicator
 - When nanoe-G starts, nanoe-G indicator ON.

- Remote Control Receiving Sound
 - Normal Operation → nanoe-G Operation : Beep
 - Nanoe-G Operation → Normal Operation : Beep
 - Stop → nanoe-G individual Operation : Beep
 - Nanoe-G individual Operation → Stop : Long Beep
- Power failure
 - During nanoe-G individual operation, if power failure occurs, after power resumes, nanoe-G individual operation resumes immediately.
 - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.
 - nanoe-G operation status is not memorized after OFF the unit. After OFF the unit, when the operation is ON again, air conditioner operates without nanoe-G operation.
- nanoe-G check mode
 - To enable nanoe-G check mode, during nanoe-G operation ON:



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

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

 - nanoe-G connector at main PCB open
 - Judgment method
 - During nanoe-G operation, nanoe-G connector at main PCB is opened.
 - Troubleshooting method
 - Connect the connector or stop operation to cancel the blinking
 - Abnormal discharge error
 - Judgment method
 - During nanoe-G operation, the nanoe-G system has abnormal discharge due to short-circuit caused by water or dust adhesion and so forth, with Lo-feedback voltage (at microcontroller).
 - When abnormal discharge occurred, every 30 minutes the unit supplies power to the nanoe-G system.
 - When abnormal discharge occurs for 24 times continuously, nanoe-G indicator blinks.

- Troubleshooting method
 - Press nanoe-G button or OFF/ON button to stop the operation and check the nanoe-G connector at PCB.
 - After that, press nanoe-G button again to confirm the nanoe-G indicator do not blinks.
 - The 24 timer counter will be clear after 10 minutes of normal operation or when operation stops.
- Error reset method
 - Press OFF/ON button to OFF the operation.
 - Press AUTO OFF/ON button at indoor unit to OFF the operation.
 - OFF Timer activates
 - Power supply reset.
- nanoe-G breakdown error
 - Judgment method
 - Hi-feedback voltage (at microcontroller) supplied to the nanoe-G system when nanoe-G operation is OFF; nanoe-G breakdown error show immediately.
 - It is due to indoor PCB or nanoe-G high voltage power supply damage.
 - Operations except nanoe-G continue. Both Timer indicator and nanoe-G indicator blink.
 - Troubleshooting method
 - Press nanoe-G button or OFF/ON button to stop the operation.
 - Change nanoe-G high voltage power supply or main PCB.
 - When Lo-feedback voltage supplied to nanoe-G system during nanoe-G operation ON, nanoe-G indicator and Timer indicator stop blinking.

12.12 Mild Dry Cooling Operation

- This operation helps to prevent decreases in room humidity while maintaining the setting temperature.
- During unit running at Cooling operation mode, if “Mild Dry Cooling” button is pressed, Mild Dry Cooling operation starts and Mild Dry Cooling indicators turns ON at remote control display.
- Mild dry cooling operation is unavailable when the unit is operating Auto mode and Soft Dry model operation.
- Mild dry cooling operation is cancelled when the unit turned OFF, Mild Dry Cooling button is pressed again or when the operation mode changed from Cooling to other mode.
- ECONAVI, Powerful, Quiet and Mild Dry Cooling mode cannot function at the same time, the unit will follows the operation according to the last signal received.
- During this operation, the compressor frequency changes according to operating condition to prevent room humidity decreases and when AUTO AIR SWING is set, the vertical airflow direction fixed at lower limit position.

12.13 AUTO COMFORT and ECO NAVI Operation

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

- ECO NAVI stop conditions:
 - When ECO NAVI button is pressed again.
 - When unit is OFF by OFF/ON button.
 - When unit is OFF when OFF TIMER activates.
 - When unit is OFF by AUTO OFF/ON button at indoor unit.
 - When POWERFUL, QUIET operation activates.
 - When ◀▶ button is pressed.
- AUTO COMFORT / ECO NAVI initialization

Initialize indication		Human Activity Sensor		
1	0 – 2 seconds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	2 – 3 seconds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	3 – 70 seconds	I	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		II	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		III	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		IV	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Repeat Step I to IV				

* Indicator ON, Indicator OFF

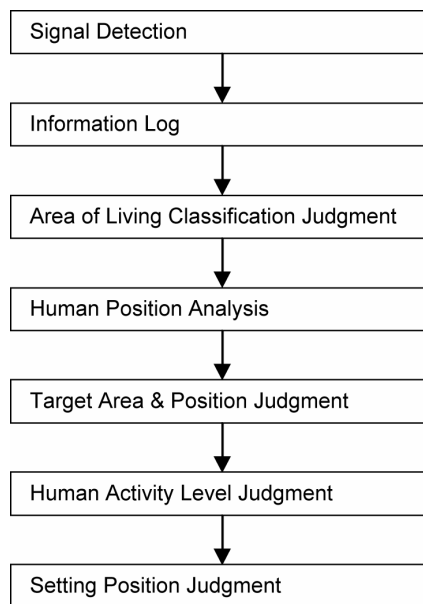
12.13.1 Human Activity Sensor

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

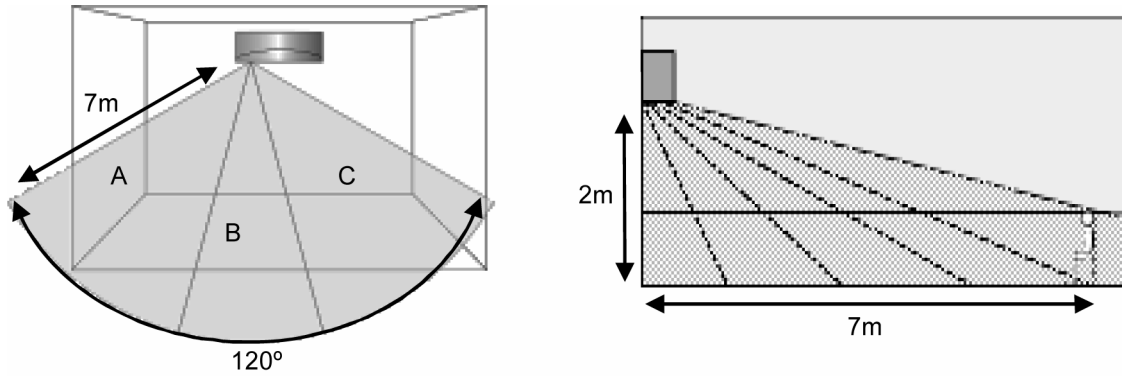
Initialize indication		Human Activity Sensor		
1	0 – 2 seconds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	2 – 3 seconds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	3 – 70 seconds	I	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		II	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		III	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		IV	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Repeat Step I to IV				

* Indicator ON, Indicator OFF

- Human activity judgment is as following



12.13.1.1 Signal Detection



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

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

* □ Indicator ON, ■ Indicator OFF

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

12.13.1.2 Information Log

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

12.13.1.3 Area of Living Classification Judgment

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

12.13.1.4 Human Position Analysis

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

12.13.1.5 Target Area and Position Judgment

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

12.13.1.6 Human Activity Level Judgment

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

12.13.1.7 Setting Position Judgment

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

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

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

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

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

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

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

12.13.2 Setting Temperature and Fan Speed Shift

- Cooling Dual Sensor

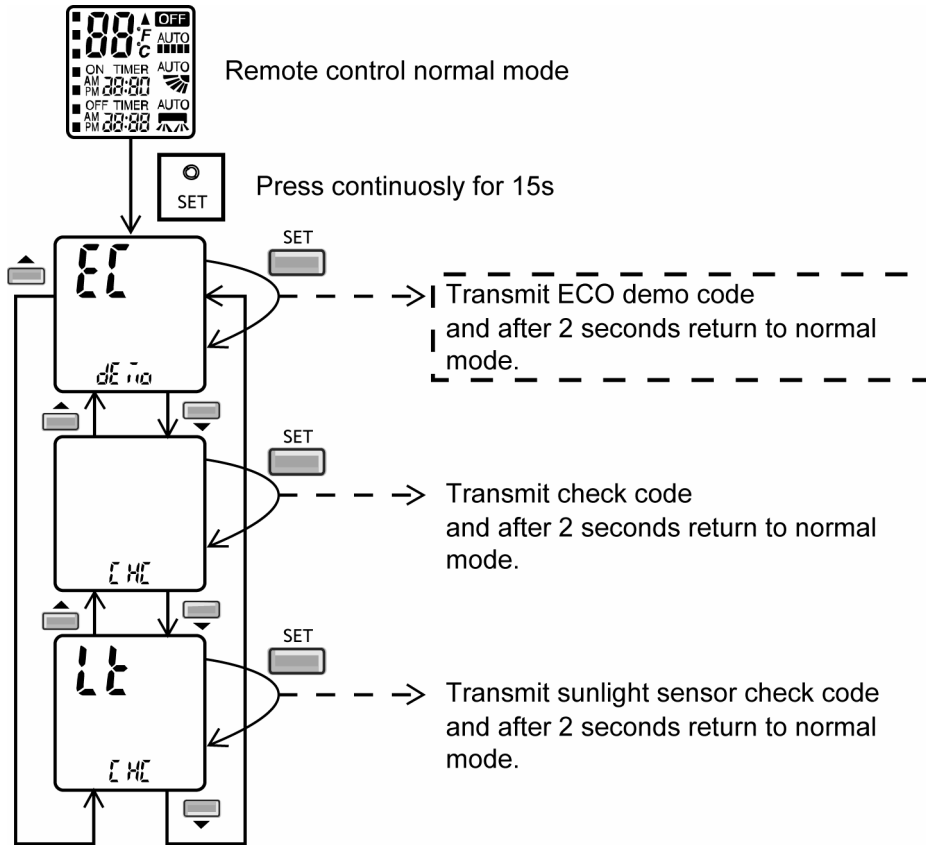
ECONAVI — To optimize energy saving
AUTO COMFORT ----- To maximize comfort

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

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

12.13.2.1 ECO NAVI and AUTO COMF Demo Mode

- To enable ECO DEMO mode:



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

Infrared sensor		Human Activity Sensor			Vane position	Fan speed
Sensor 1	Sensor 2	Left	Center	Right		
1	0	■	■	□	5	HI
1	1	■	□	■	Auto Swing	HI
0	1	□	■	■	1	HI
0	0	■	■	■	Auto Swing	LO

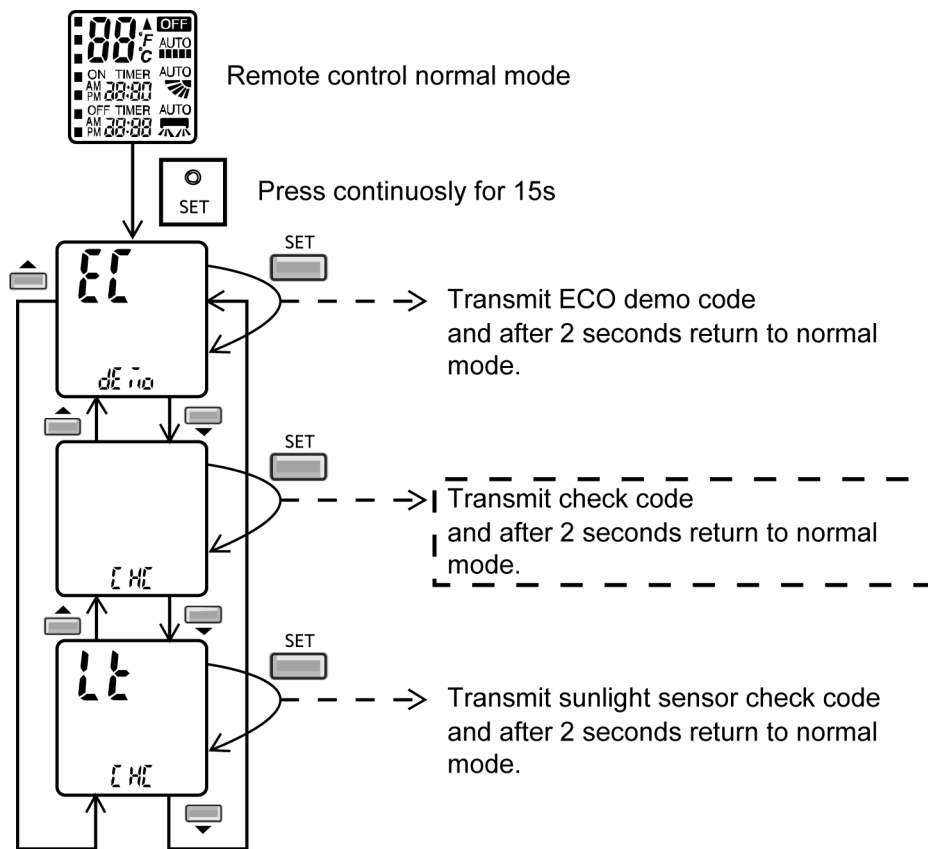
- The target area will maintain for 5 seconds before changeover to next detection.
- If no activity detection, the last action will maintain for 30 seconds before changeover to human absence status.

12.13.2.2 Infrared Sensor Abnormality

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

12.13.2.3 Infrared Sensor Check Mode

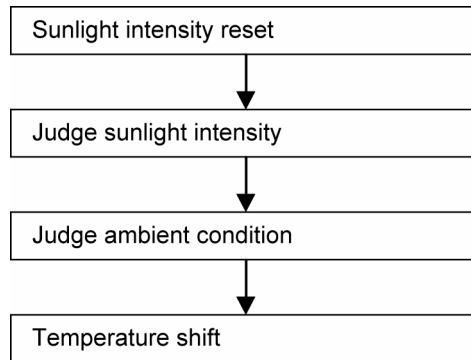
- To enable Infrared sensor abnormality check mode:



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

12.13.3 Sunlight Sensor

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

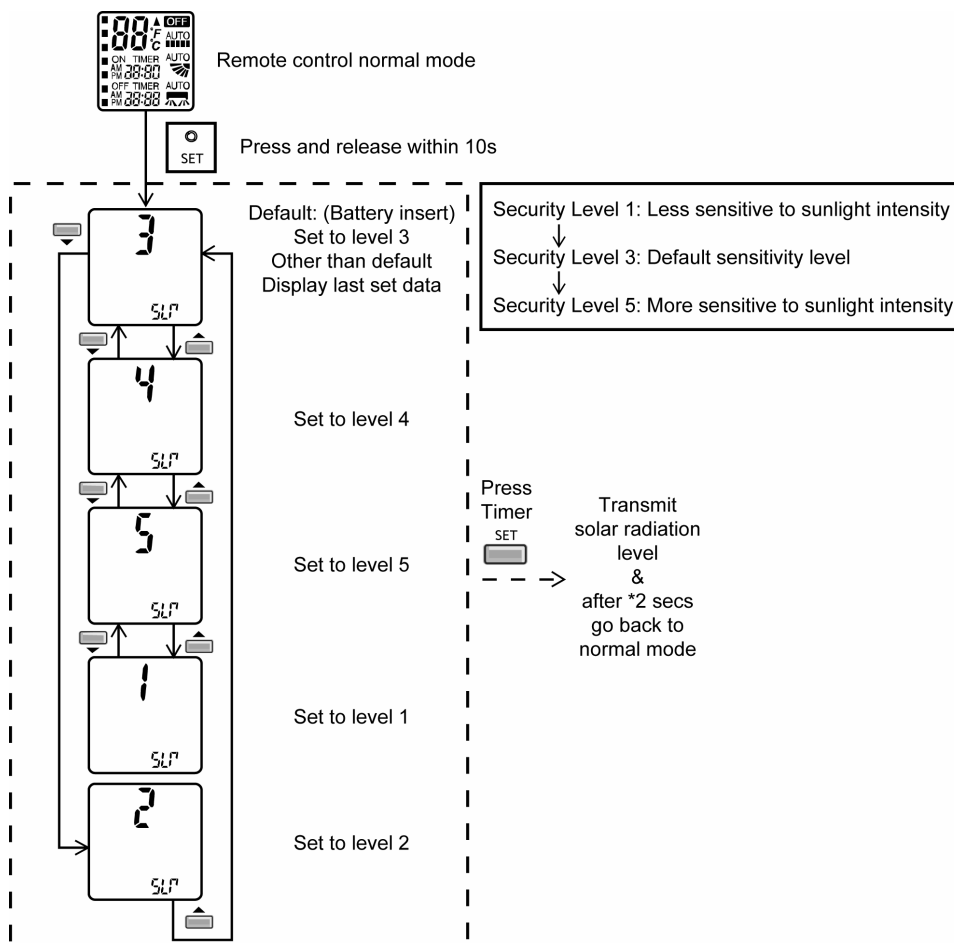


12.13.3.1 Sunlight Intensity Reset

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

12.13.3.2 Judge Sunlight Intensity

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



12.13.3.3 Judge Ambient Condition

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

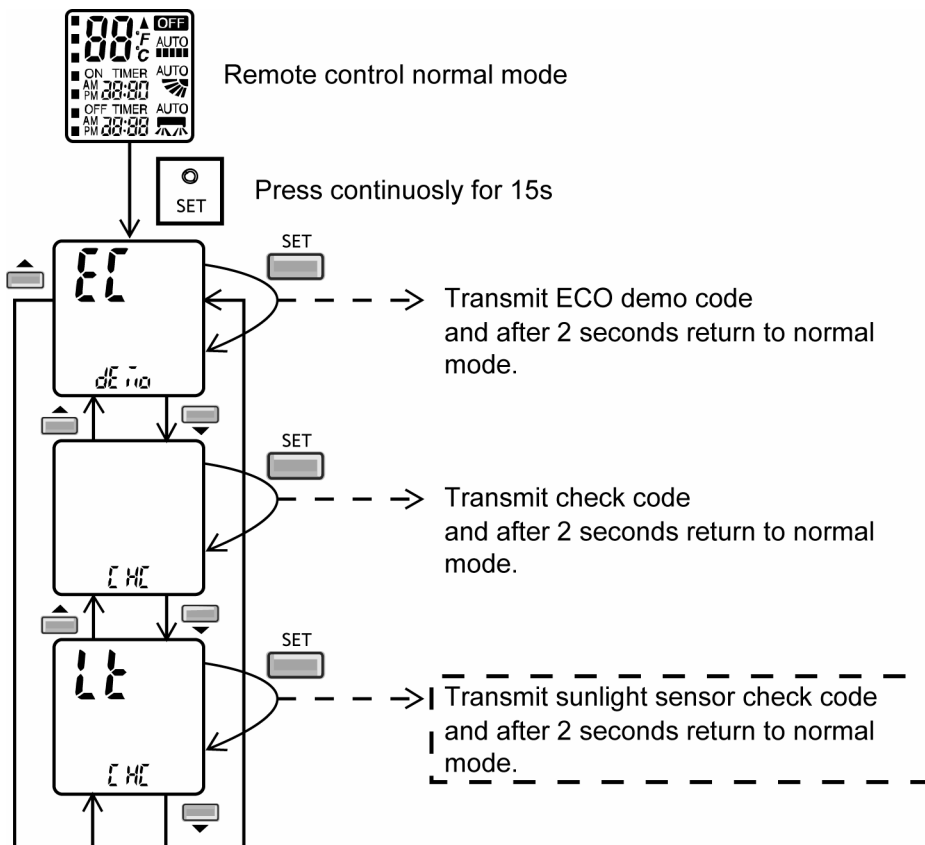
12.13.3.4 Temperature Shift

Ambient condition	Cloudy/ Night	Sunny	Cloudy/ Night	Sunny
COOL/DRY Mode Set Temperature	○	●	+1°C	○
HEAT Mode Set Temperature	○	●	-1°C	○

- — ECONAVI is activated while it is cloudy / night
- — ECONAVI is activated while it is sunny

12.13.3.5 Sunlight Sensor Check Mode

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



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

12.13.3.6 Sunlight Sensor Abnormality

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

13. Operation Control (For Multi Split Connection)

During multi split connection, indoor unit's operation controls are same with single split connection unless specified in this chapter.

13.1 Cooling operation

13.1.1 Thermostat control

- Capability supply to indoor unit is OFF (Expansion valve closed) when Intake Air Temperature — Internal setting temperature $< -2.0^{\circ}\text{C}$.
- Capability resume supply to indoor unit after waiting for 3 minutes, if the Intake Air temperature — Internal setting temperature $>$ Capability supply OFF point.

13.2 Soft Dry Operation

13.2.1 Thermostat control

- Capability supply to indoor unit is OFF (Expansion valve closed) when Intake Air Temperature — Internal setting temperature $< -3.0^{\circ}\text{C}$.
- Capability resume to indoor unit after waiting for 3 minutes, if the Intake Air temperature — Internal setting temperature $>$ Capability supply OFF point.

13.3 Heating Operation

13.3.1 Thermostat control

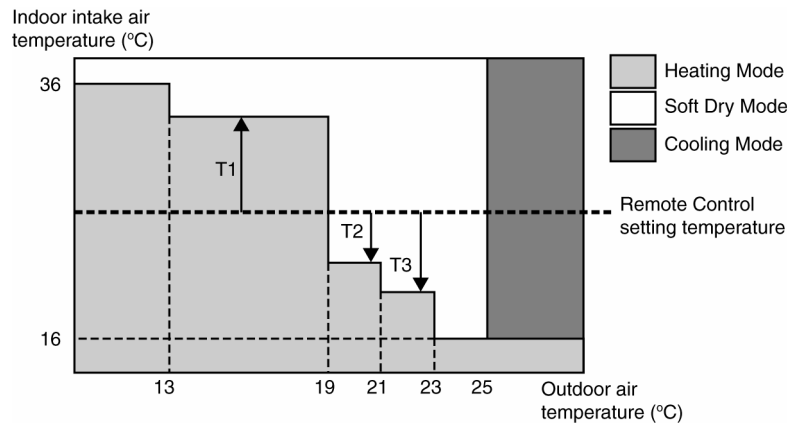
- Capability supply to indoor unit is OFF (Expansion valve closed) when Intake Air Temperature — Internal setting temperature $> +1.0^{\circ}\text{C}$.
- During this condition, the indoor fan is stopped if compressor is ON.
- Capability resume supply to indoor unit after waiting for 3 minutes, if the Intake Air Temperature — Internal setting temperature $<$ Capability supply OFF point.

13.3.2 Temperature Sampling Control

- Temperature sampling is controlled by outdoor unit where room temperature for all power supply ON indoor unit could be obtained.
- When capability supply to the indoor unit is OFF and the compressor is ON, the indoor fan motor is stopped. During this condition, 15 seconds after sampling signal from outdoor unit is received, the indoor fan start operation at low fan speed.
- However, within first 4 minutes of capability stopped supply to the indoor unit, even sampling signal is received, the sampling control is cancelled.

13.4 Automatic Operation

- This mode can be set using remote control and the operation is decided by remote control setting temperature, remote control operation mode, indoor intake and outdoor air temperature.
- During operation mode judgment, indoor fan motor (with speed of -Lo) and outdoor fan motor are running for 30 seconds to detect the indoor intake and outdoor air temperature. The operation mode is decided based on below chart.



- Every 180 minutes, the indoor and outdoor temperature is judge. Based on remote control setting temperature, the value of T1 will increase up to 10°C, T2 will decrease by 3°C and T3 will decrease up to 8°C.

13.5 Indoor Fan Motor Operation

13.5.1 Residual Heat Removal Control

- To prevent high pressure at indoor unit, when heating mode thermostat-off condition or power supply OFF, indoor fan continue to operate at controlled fan speed for maximum 30 seconds then stop.

13.6 Powerful Mode Operation

- When the power mode is selected, the internal setting temperature will shift lower up to 4°C for Cooling/Soft Dry or higher up to 6°C for heating than remote control setting temperature, the powerful operation continue until user cancel the Powerful operation by pressing powerful button again.

13.7 Auto restart control

- When the power supply is cut off during the operation of air conditioner, the compressor will re-operate between three to four minutes (10 patterns to be selected randomly) after power resume.
- During multi split connection, Indoor unit will resume previous mode, include unit standby mode.

13.8 Indication Panel

LED	POWER	TIMER	POWERFUL/QUIET	nanoe-G	ECONAVI	AUTO COMFORT
Color	Green	Orange	Orange	Blue	Green	Green
Light ON	Operation ON	Timer Setting ON	POWERFUL/QUIET Mode ON	nanoe-G ON	ECONAVI ON	AUTO COMFORT ON
Light OFF	Operation OFF	Timer Setting OFF	POWERFUL/QUIET Mode OFF	nanoe-G OFF	ECONAVI OFF	AUTO COMFORT OFF

Note:

- If POWER LED is blinking (0.5 seconds ON, 0.5 second OFF), the possible operation of the unit are during Indoor Residual Heat Removal, Hot Start, during Deice operation, operation mode judgment, or ON timer sampling.
- If POWER LED is blinking (2.5 seconds ON, 0.5 second OFF), the unit is in standby mode.
- If TIMER LED is blinking, there is an abnormality operation occurs.

13.9 Mild Dry Cooling Operation

- During multi split connection, Mild Dry Cooling Operation is disabled.

14. Protection Control

14.1 Protection Control For All Operations

14.1.1 Restart Control (Time Delay Safety Control)

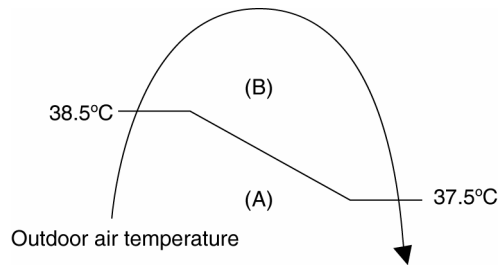
- The Compressor will not turn on within 3 minutes from the moment operation stops, although the unit is turned on again by pressing OFF/ON button at remote control within this period.
- This control is not applicable if the power supply is cut off and on again.
- This phenomenon is to balance the pressure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

14.1.2 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	E7NKE/E-3		E9NKE/E-3		E12NKE		E12NKE-3		E15NKE		E18NKE		E21NKE	
	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)	X (A)	Y (A)
Cooling / Soft Dry (A)	3.78	15.06	4.62	15.06	6.64	15.06	6.93	15.06	8.25	15.06	11.81	14.75	12.27	14.75
Cooling / Soft Dry (B)	3.33	15.06	4.20	15.06	6.20	15.06	6.42	15.06	7.74	15.06	8.91	14.75	11.10	14.75
Heating	4.46	15.06	5.57	15.06	7.30	15.06	8.10	15.06	8.40	15.06	10.07	14.75	11.58	14.75

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

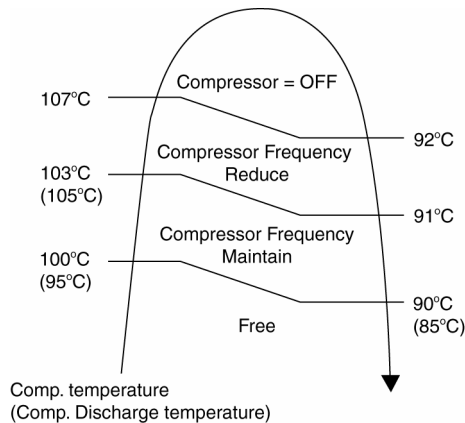


14.1.3 IPM (Power transistor) Prevention Control

- 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 18.5 A (E7 ~ 15NK) and 30.0 ± 5.0A (E18 ~ 21NK), 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).

14.1.4 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.)



14.1.5 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 (E7/9/12/15NK), 1.38A and 1.65A (E18/21NK).
 - 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.

14.1.6 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.

14.1.7 Low Frequency Protection Control 2

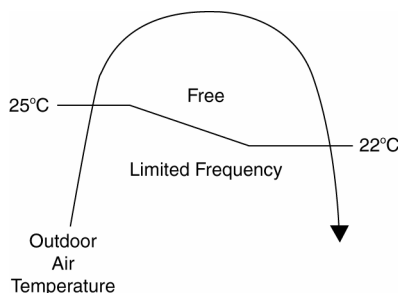
- When all the below conditions comply, the compressor frequency will change to lower frequency.

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

14.2 Protection Control For Cooling & Soft Dry Operation

14.2.1 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.



14.2.2 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 (E7 ~ 15NK), 63°C (E18NK ~ E21NK).
- If the compressor stops 4 times in 20 minutes, Timer LED blinking (F95 indicated: outdoor high pressure rise protection).

14.2.3 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.

14.2.4 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

14.2.5 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.

14.2.6 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.

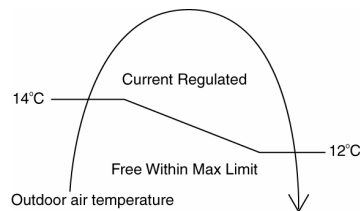
14.3 Protection Control For Heating Operation

14.3.1 Intake Air Temperature Control

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

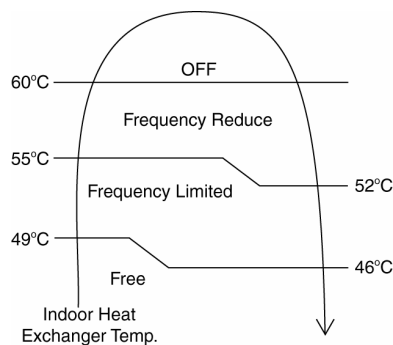
14.3.2 Outdoor Air Temperature Control

- The Max current value is regulated when the outdoor air temperature rise above 16°C (E7 ~ 15NK) and 14°C (E18 ~ 21NK) in order to avoid compressor overloading.



14.3.3 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.



14.3.4 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.

14.3.5 Cold Draught Prevention Control

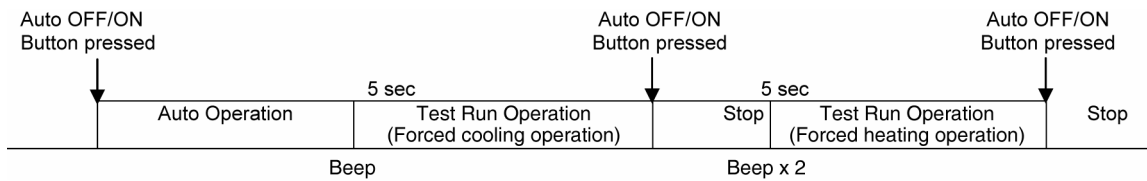
- When indoor pipe temperature is low, cold draught operation starts where indoor fan speed will be reduced.

14.3.6 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.

15. Servicing Mode

15.1 Auto OFF/ON Button



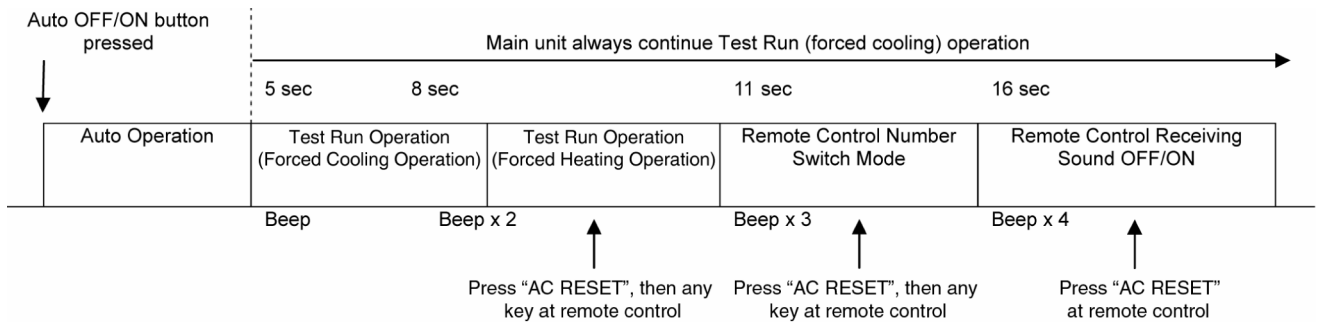
1 AUTO OPERATION MODE

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.

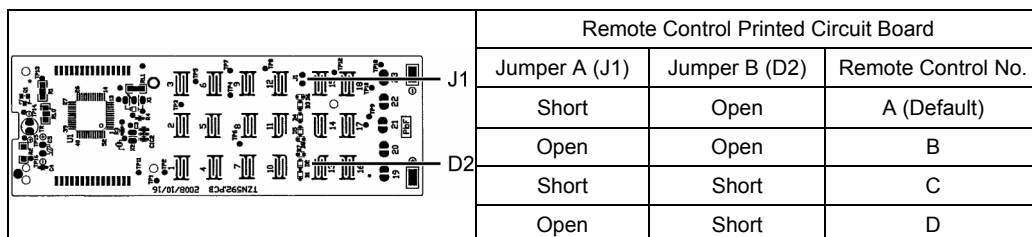
The Auto OFF/ON button may be used together with remote control to set / change the advance setting of air conditioner operation.



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.



- 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.

15.2 Remote Control Button

15.2.1 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.

15.2.2 RESET (RC)

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

15.2.3 RESET (AC)

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

15.2.4 TIMER ▲

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

15.2.5 TIMER ▼

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