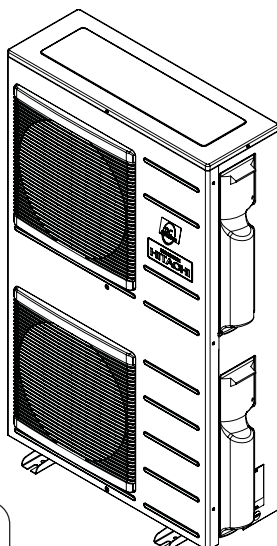


HITACHI

PM**NO. 0365E****RAM-130QH5**

SERVICE MANUAL

TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY**RAM-130QH5****NOTE:**

This manual describes only points that differ from RAF-25, 35, 50NH5, RAD-25, 35NH5, RAD-25, 35NH5 and RAM-80QH5 (TC No. 0771EF), RAI-25, 35NH5 (PM No. 0271E), RAI-50NH5 and RAC-50NH5 (PM No. 0274E), RAK-18, 25, 35NH5 (PM No. 0269E), RAK-50NH5 and RAC-50NH5 (PM No. 0302E) for items not described in this manual.

SPECIFICATIONS

TYPE		DC INVERTER DUAL SYSTEM MULTI	
		OUTDOOR UNIT	
MODEL		RAM-130QH5	
POWER SOURCE		1ø, 220 - 240V, 50Hz	
TOTAL INPUT (W)		REFER TO THE SPECIFICATIONS PAGE	
TOTAL AMPERES (A)			
COOLING CAPACITY (kW)			
HEATING CAPACITY (B.T.U.)			
DIMENSIONS (mm)	W	855	
	H	1450	
	D	308	
NET WEIGHT (kg)		113	

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

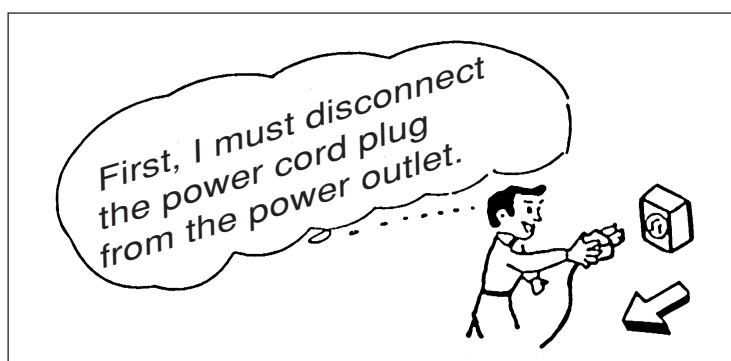
ROOM AIR CONDITIONER

OUTDOOR UNIT**MARCH 2007 Refrigeration & Air-Conditioning Division**

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SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them.



3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by user himself should absolutely be prohibited.
6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit. The insulation resistance should be $1\text{M}\Omega$ or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being and safe enough to support the repaired unit again. If it is found not so strong and safe, the unit should be installed at the initial location reinforced or at a new location.
10. Any inflammable thing should never be placed about the location of installation.
11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufacturers during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned).

2. Object parts

- (1) Micro computer
- (2) Integrated circuits (IC)
- (3) Field-effect transistors (FET)
- (4) P.C. boards or the like on which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

- (1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way).

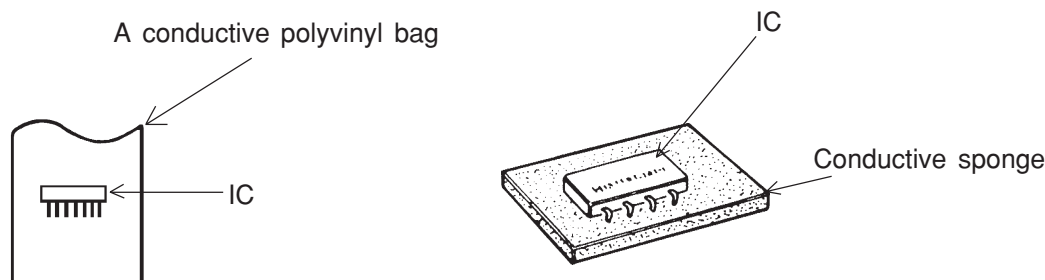


Fig. 1. Conductive Container

- (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet).
- (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.
- (4) Be sure to place a part on a metal plate with grounding.
- (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

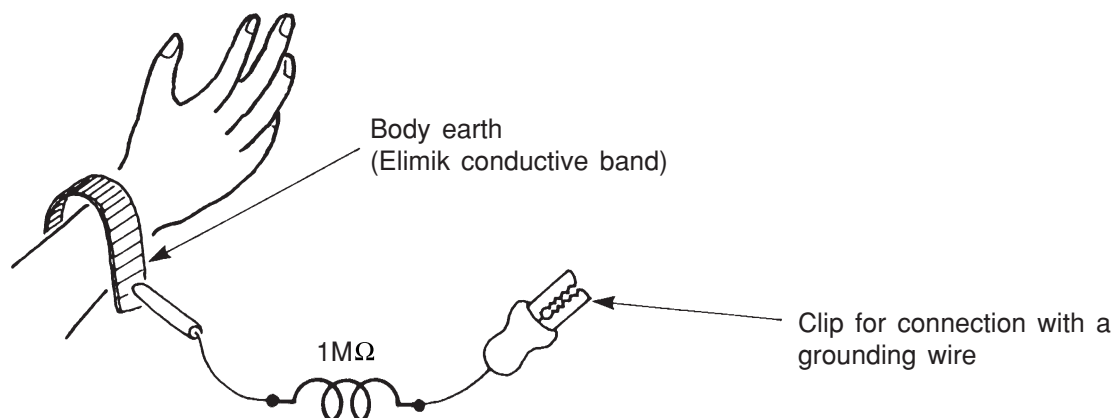


Fig. 2. Body Earth

- (6) Use a three wire type soldering iron including a grounding wire.

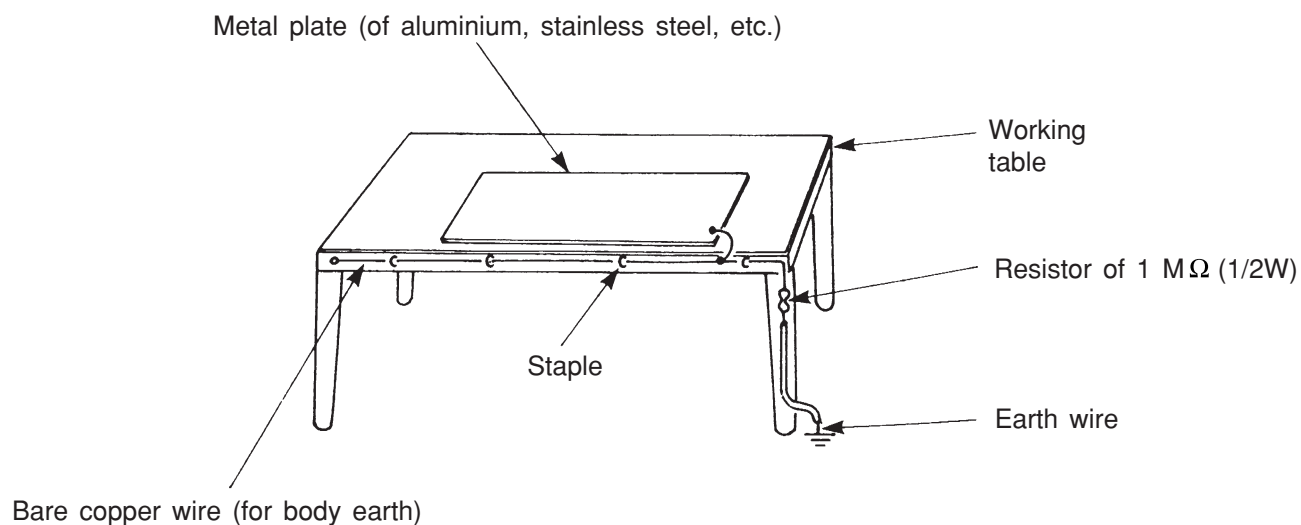


Fig. 3. Grounding of the working table

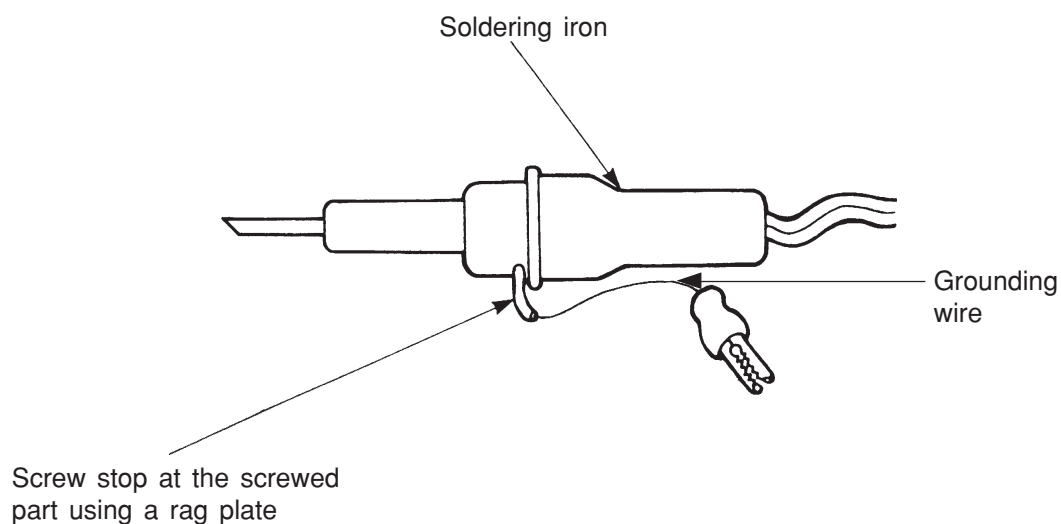


Fig. 4. Grounding a soldering iron

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

- (7) In checking circuits for maintenance, inspection or some others, be careful not to have the test probes of the measuring instrument shortcircuit a load circuit or the like.

⚠ CAUTION

1. In quiet operation or stopping the running, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.
2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.
3. The room air conditioner does not start automatically after recovery of the electric power failure for preventing fuse blowing. Re-press START/STOP button after 3 minutes from when unit stopped.
4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.
5. This room air conditioner should not be used at the cooling operation when the outside temperature is below -10°C (14°F).
6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below -15°C (5°F). If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.
7. When the outside heat exchanger is frosted, the frost is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.
8. This outdoor room airconditioner contain two refregeremt cycle with two compessor separately. Unit 1, 2, 3 and unit 4, 5, 6 are with different cycle
9. Unit 3 and unit 6 has to be connected to ensure no frost or ice remain at bottom of condensor.
10. Unit 2, 3 and unit 5, 6 has to be connected at least to ensure the compessor liability last longer.

SPECIFICATIONS

MODEL		RAM-130QH5	
FAN MOTOR		40 W	
FAN MOTOR CAPACITOR		NO	
FAN MOTOR PROTECTOR		NO	
COMPRESSOR		JU1013D2	
COMPRESSOR MOTOR CAPACITOR		NO	
OVERLOAD PROTECTOR		YES	
OVERHEAT PROTECTOR		YES	
FUSE (for MICROPROCESSOR)		5.0A	
POWER RELAY		G4A	
POWER SWITCH		NO	
TEMPORARY SWITCH		NO	
SERVICE SWITCH		YES	
TRANSFORMER		NO	
VARISTOR		450NR	
NOISE SUPPRESSOR		YES	
THERMOSTAT		YES(IC)	
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		NO	
REFRIGERANT CHARGING VOLUME (Refrigerant 410A)	UNIT	1650g + 1650g	
	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.		
	PIPES	INDOOR 1, 2, 3	INDOOR 4, 5, 6
		MAX. 45m	MAX. 45m

※ This outdoor unit has two separated refrigerant cycle with two compressors which indoor units 1, 2, 3 are for upper refrigerant cycle and indoor units 4, 5, 6 are for lower refrigerant cycle. In case the total pipe length of each cycle is more than 35m, add refrigerant R410A at 20 gram per every meter exceeded.

SPECIFICATIONS FOR INDOOR UNITS COMBINATION

TYPE		DC INVERTER SIX SYSTEM MULTI COOLING AND HEATING
MODEL	OUTDOOR UNIT	RAM-130QH5
PHESE/VOLTAGE/FREQUENCY		1ø, 220 - 240V, 50Hz
CIRCUIT AMPERES TO CONNECT (A)		30
COOLING (SIX UNITS)	CAPACITY (kW) (B.T.U./h)	12.60 (1.50 - 13.20)
		43,010 (5,120 - 45,060)
	TOTAL INPUT (W)	4,190 (200 - 4,400)
	EER (B.T.U./hW)	10.26
	TOTAL AMPERES (A)	19.2 - 17.6
	POWER FACTOR (%)	99
HEATING (SIX UNITS)	CAPACITY (kW) (B.T.U./h)	14.40 (1.50 - 14.40)
		49,140 (5,120 - 49,140)
	TOTAL INPUT (W)	3,800 (200 - 4,220)
	EER (B.T.U./hW)	12.93
	TOTAL AMPERES (A)	17.40 - 16.00
	POWER FACTOR (%)	99
MAXIMUM LENGTH OF PIPING		MAX. 45m (EACH CYCLE)
STANDARD		CE (EMC&LVD)

MODEL		RAM-130QH5
PACKING (mm)	W	1,070
	H	1,590
	D	450
	cu.ft.	27.04
GROSS WEIGHT (kg)		130
FLARENUTSIZE (SMALL/LARGE)		6.35D/9.52DX6

OPERATION SCOPE

	INDOOR SUCTION TEMPERATURE (°C)	OUTDOOR SUCTION TEMPERATURE (°C)	INDOOR SUCTION HUMIDITY (%)
COOLING OPERATION SCOPE	16 - 32	22 - 41	BELOW 80
DEHUMIDIFYING OPERATION	16 - 32	22 - 42	BELOW 80
HEATING OPERATION SCOPE	BELOW 27	-15 - 23	—

SIX ROOM SYSTEM MULTI R.A.C. RAM-130QH5

COOL / HEAT CAPACITY SPEC. FOR INDOOR UNITS

COMBINATIONS TO BE ABLE TO OPERATE SIMULTANEOUSLY

Whichever indoor units are installed, cooling and heating capacity depends on how many and which indoor units are operating at that time.

6 ROOM MULTI-SPLIT INVERTER TYPE RAM-130QH5
POSSIBLE COMBINATION TO OPERATE (SAME TIME OPERATION)

POSSIBLE COMBINATIONS TO OPERATE			COOLING				HEATING				
			CAPACITY REATING (KW) (RANGE)	OUTDOOR UNIT		COP	CAPACITY REATING (KW) (RANGE)	OUTDOOR UNIT			
				POWER CONSUMPTION (W)	AMPERE (A) @ 230V			POWER CONSUMPTION (W)	AMPERE (A) @ 230V		
ONE UNIT	1.8	1.80 (1.00 - 2.50)	1.80	560 (200 - 750)	2.5	3.21	2.50 (1.10 - 3.20)	2.50	750 (200 - 1050)	3.3	3.33
	2.5	2.50 (1.00 - 2.80)	2.50	780 (200 - 980)	3.4	3.21	3.30 (1.10 - 4.70)	3.90	1145 (200 - 1380)	5.0	3.41
	3.5	3.50 (1.00 - 3.90)	3.50	1160 (200 - 1280)	5.1	3.02	4.80 (1.10 - 5.80)	4.80	1550 (200 - 1870)	6.8	3.10
	5.0	5.00 (1.00 - 5.60)	5.00	1780 (200 - 1960)	7.8	2.81	6.50 (1.10 - 7.20)	6.50	2400 (200 - 2660)	10.5	2.71
TWO UNITS	1.8 + 1.8	1.80 + 1.80 (1.50 - 4.00)	3.60	1190 (200 - 1300)	5.2	3.03	2.50 + 2.50 (1.50 - 5.20)	5.00	1460 (200 - 1550)	6.4	3.42
	1.8 + 2.5	1.80 + 2.40 (1.50 - 4.60)	4.20	1310 (200 - 1450)	5.8	3.21	2.40 + 3.80 (1.50 - 6.30)	6.20	1820 (200 - 1920)	8.0	3.41
	1.8 + 3.5	1.70 + 3.30 (1.50 - 5.60)	5.00	1650 (200 - 1820)	7.2	3.03	2.30 + 4.50 (1.50 - 7.20)	6.80	1995 (200 - 2100)	8.8	3.41
	1.8 + 5.0	1.40 + 4.00 (1.50 - 5.90)	5.00	1795 (200 - 1980)	7.9	3.01	2.00 + 5.00 (1.50 - 7.20)	7.00	2050 (200 - 2100)	9.0	3.41
	2.5 + 2.5	2.50 + 2.50 (1.50 - 5.60)	5.00	1650 (200 - 1820)	7.2	3.03	3.40 + 3.40 (1.50 - 7.20)	6.80	2015 (200 - 2100)	8.8	3.37
	2.5 + 3.5	2.17 + 3.03 (1.50 - 5.70)	5.20	1730 (200 - 1900)	7.6	3.01	3.15 + 3.85 (1.50 - 7.20)	7.00	2070 (200 - 2100)	9.1	3.38
	3.5 + 3.5	2.70 + 2.70 (1.50 - 5.90)	5.40	1795 (200 - 1980)	7.9	3.01	3.60 + 3.60 (1.50 - 7.20)	7.20	2110 (200 - 2110)	9.3	3.41
	2.5 + 5.0	1.80 + 3.60 (1.50 - 5.90)	5.40	1795 (200 - 1980)	7.9	3.01	2.70 + 4.50 (1.50 - 7.20)	7.20	2110 (200 - 2110)	9.3	3.41
	3.5 + 5.0	2.20 + 3.20 (1.50 - 5.90)	5.40	1995 (200 - 2200)	8.8	2.71	3.05 + 4.15 (1.50 - 7.20)	7.20	2110 (200 - 2110)	9.3	3.41
	THREE UNITS	1.8 + 1.8 + 1.8	1.80 + 1.80 + 1.80 (1.50 - 6.00)	5.40	1780 (200 - 2200)	7.8	3.03	2.33 + 2.33 + 2.33 (1.50 + 7.20)	7.00	1850 (200 - 2110)	8.2
1.8 + 1.8 + 2.5		1.80 + 1.80 + 2.50 (1.50 - 6.40)	6.10	2020 (200 - 2200)	8.9	3.02	2.00 + 2.00 + 3.20 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
1.8 + 1.8 + 3.5		1.60 + 1.80 + 3.10 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	1.85 + 1.85 + 3.50 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
1.8 + 1.8 + 5.0		1.30 + 1.30 + 3.70 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	1.60 + 1.60 + 4.00 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
1.8 + 2.5 + 2.8		1.70 + 2.30 + 2.30 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	1.80 + 2.70 + 2.70 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
1.8 + 2.5 + 3.5		1.50 + 2.00 + 2.80 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	1.80 + 2.50 + 3.10 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
1.8 + 3.5 + 3.5		1.30 + 2.50 + 2.50 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	1.40 + 2.90 + 2.90 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
2.5 + 2.5 + 2.5		2.10 + 2.10 + 2.10 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	2.40 + 2.40 + 2.40 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
2.5 + 2.5 + 3.5		1.85 + 1.85 + 2.60 (1.50 - 6.60)	6.30	2095 (200 - 2200)	9.2	3.01	2.23 + 2.23 + 2.74 (1.50 + 7.20)	7.20	1900 (200 - 2110)	8.4	3.79
FOUR UNITS		1.8, 1.8, 1.8, 1.8	(1.8 + 1.8) + (1.8 + 1.8)	7.20	2380 (200 - 2600)	10.5	3.03	(2.50 + 2.50) + (2.50 + 2.50)	10.00	2920 (200 - 3100)	12.8
	1.8, 1.8, 1.8, 2.5	(1.8 + 1.8) + (1.8 + 2.5)	7.80	2500 (200 - 2750)	11.0	3.12	(2.50 + 2.50) + (2.40 + 3.80)	11.20	3280 (200 - 3470)	14.4	3.41
	1.8, 1.8, 2.5, 2.5	(1.8 + 2.5) + (1.8 + 2.5)	8.40	2620 (200 - 2900)	11.5	3.21	(2.40 + 3.80) + (2.40 + 3.80)	12.40	3640 (200 - 3840)	16.0	3.41
	1.8, 1.8, 1.8, 3.5	(1.8 + 1.8) + (1.8 + 3.5)	8.60	2840 (200 - 3120)	12.5	3.03	(2.50 + 2.50) + (2.30 + 4.50)	11.80	3455 (200 - 3650)	15.2	3.42
	1.8, 1.8, 2.5, 3.5	(1.8 + 2.5) + (1.8 + 3.5)	9.20	2960 (200 - 3270)	13.0	3.11	(2.40 + 3.80) + (2.30 + 4.50)	13.00	3815 (200 - 4020)	16.8	3.41
	1.8, 1.8, 1.8, 5.0	(1.8 + 1.8) + (1.8 + 5.0)	9.00	2985 (200 - 3280)	13.1	3.02	(2.50 + 2.50) + (2.00 + 5.00)	12.00	3510 (200 - 3650)	15.4	3.42
	1.8, 1.8, 2.5, 5.0	(1.8 + 2.5) + (1.8 + 5.0)	9.60	3105 (200 - 3430)	13.6	3.09	(2.40 + 3.80) + (2.00 + 5.00)	13.20	3870 (200 - 4020)	17.0	3.41
	1.8, 1.8, 3.5, 3.5	(1.8 + 3.5) + (1.8 + 3.5)	10.00	3300 (200 - 3640)	14.5	3.03	(2.30 + 4.50) + (2.30 + 4.50)	13.60	3990 (200 - 4200)	17.5	3.41
	1.8, 1.8, 3.5, 5.0	(1.8 + 3.5) + (1.8 + 5.0)	10.40	3445 (200 - 3800)	15.1	3.02	(2.30 + 4.50) + (2.00 + 5.00)	13.80	4045 (200 - 4200)	17.8	3.41
	1.8, 1.8, 5.0, 5.0	(1.8 + 5.0) + (1.8 + 5.0)	10.80	3590 (200 - 3960)	15.8	3.01	(2.00 + 5.00) + (2.00 + 5.00)	14.00	4100 (200 - 4200)	18.0	3.41
	1.8, 2.5, 2.5, 2.5	(1.8 + 2.5) + (2.5 + 2.5)	9.20	2960 (200 - 3270)	13.0	3.11	(2.40 + 3.80) + (3.40 + 3.40)	13.00	3835 (200 - 4020)	16.8	3.39
	1.8, 2.5, 2.5, 5.0	(1.8 + 5.0) + (2.5 + 2.5)	10.40	3445 (200 - 3800)	15.1	3.02	(2.00 + 5.00) + (3.40 + 3.40)	13.80	4065 (200 - 4200)	17.9	3.39
	1.8, 2.5, 3.5, 3.5	(1.8 + 3.5) + (2.5 + 3.5)	10.20	3380 (200 - 3720)	14.8	3.02	(2.30 + 4.50) + (3.15 + 3.85)	13.60	4065 (200 - 4200)	17.9	3.39
	1.8, 2.5, 3.5, 5.0	(1.8 + 5.0) + (2.5 + 3.5)	10.60	3525 (200 - 3880)	15.5	3.01	(2.00 + 5.00) + (3.15 + 3.85)	14.00	4120 (200 - 4200)	18.1	3.40
	1.8, 2.5, 5.0, 5.0	(1.8 + 5.0) + (2.5 + 5.0)	10.80	3590 (200 - 3960)	15.8	3.01	(2.00 + 5.00) + (2.70 + 4.50)	14.20	4160 (200 - 4210)	18.3	3.41
	1.8, 3.5, 3.5, 3.5	(1.8 + 3.5) + (3.5 + 3.5)	10.40	3445 (200 - 3800)	15.1	3.02	(2.30 + 4.50) + (3.60 + 3.60)	14.00	4105 (200 - 4210)	18.0	3.41
	1.8, 3.5, 3.5, 5.0	(1.8 + 5.0) + (3.5 + 3.5)	10.80	3590 (200 - 3960)	15.8	3.01	(2.00 + 5.00) + (3.60 + 3.60)	14.20	4160 (200 - 4210)	18.3	3.41
	1.8, 3.5, 5.0, 5.0	(1.8 + 5.0) + (3.5 + 5.0)	10.80	3790 (200 - 4180)	16.6	2.85	(2.00 + 5.00) + (3.05 + 4.15)	14.20	4160 (200 - 4210)	18.3	3.41
	2.5, 2.5, 2.5, 2.5	(2.5 + 2.5) + (2.5 + 2.5)	10.00	3300 (200 - 3640)	14.5	3.03	(3.40 + 3.40) + (3.40 + 3.40)	13.60	4030 (200 - 4200)	17.7	3.37
	2.5, 2.5, 2.5, 3.5	(2.5 + 2.5) + (2.5 + 3.5)	10.20	3380 (200 - 3720)	14.8	3.02	(3.40 + 3.40) + (3.15 + 3.85)	13.80	4085 (200 - 4200)	17.9	3.38
2.5, 2.5, 2.5, 5.0	(2.5 + 2.5) + (2.5 + 5.0)	10.40	3445 (200 - 3960)	15.1	3.02	(3.40 + 3.40) + (2.70 + 4.50)	14.00	4125 (200 - 4210)	18.1	3.39	
2.5, 2.5, 3.5, 3.5	(2.5 + 3.5) + (2.5 + 3.5)	10.40	3460 (200 - 3800)	15.2	3.01	(3.15 + 3.85) + (3.15 + 3.85)	14.00	4140 (200 - 4200)	18.2	3.38	
2.5, 2.5, 3.5, 5.0	(2.5 + 5.0) + (2.5 + 3.5)	10.60	3525 (200 - 3880)	15.5	3.01	(2.70 + 4.50) + (3.15 + 3.85)	14.20	4180 (200 - 4210)	18.4	3.40	
2.5, 2.5, 5.0, 5.0	(2.5 + 5.0) + (2.5 + 5.0)	10.80	3590 (200 - 3960)	15.8	3.01	(2.70 + 4.50) + (2.70 + 4.50)	14.40	4220 (200 - 4220)	18.5	3.41	
2.5, 3.5, 3.5, 3.5	(2.5 + 3.5) + (3.5 + 3.5)	10.60	3525 (200 - 3880)	15.5	3.01	(3.15 + 3.85) + (3.60 + 3.60)	14.20	4180 (200 - 4210)	18.4	3.40	
2.5, 3.5, 3.5, 5.0	(2.5 + 5.0) + (3.5 + 3.5)	10.80	3590 (200 - 3960)	15.8	3.01	(2.70 + 4.50) + (3.60 + 3.60)	14.40	4220 (200 - 4220)	18.5	3.41	
3.5, 3.5, 3.5, 3.5	(3.5 + 3.5) + (3.5 + 3.5)	10.80	3790 (200 - 4180)	16.6	2.85	(3.60 + 3.60) + (3.05 + 4.15)	14.40	4220 (200 - 4220)	18.5	3.41	
3.5, 3.5, 5.0, 5.0	(3.5 + 5.0) + (3.5 + 5.0)	10.80	3990 (200 - 4400)	17.5	2.71	(3.05 + 4.15) + (3.05 + 4.15)	14.40	4220 (200 - 4220)	18.5	3.41	

SIX ROOMS SYSTEM MULTI R.A.C. *RAM-130QH5* INDOOR UNITS COMBINATIONS TO BE ABLE TO INSTALL

Four or more indoor units can be installed with one outdoor unit.
And total nominal cooling capacity should not be more than 18.0kW

INDOOR UNIT MODEL	NOMINAL COOLING CAPACITY (kW)	CAPACITY (kW) at one unit operation		SUITABLE ROOM SIZE (m ²) at one unit operation	
		COOLING	HEATING	COOLING	HEATING
RAK-18NH5 RAK-18NH6	1.8	1.00 - 2.50	1.10 - 3.20	8 - 12	9 - 11
RAK-25NH5 RAK-25NH6	2.5	1.00 - 2.80	1.10 - 4.70	11 - 17	14 - 18
RAF-25NH5	2.5	1.00 - 2.80	1.10 - 4.70	11 - 17	14 - 18
RAD-25NH5 RAD-25NH7	2.5	1.00 - 2.80	1.10 - 4.70	11 - 17	14 - 18
RAI-25NH5	2.5	1.00 - 2.80	1.10 - 4.70	11 - 17	14 - 18
RAK-35NH5 RAK-35NH6	3.5	1.00 - 3.90	1.10 - 5.80	16 - 24	17 - 22
RAF-35NH5	3.5	1.00 - 3.90	1.10 - 5.80	16 - 24	17 - 22
RAD-35NH5 RAD-35NH7	3.5	1.00 - 3.90	1.10 - 5.80	16 - 24	17 - 22
RAI-35NH5	3.5	1.00 - 3.90	1.10 - 5.80	16 - 24	17 - 22
RAK-50NH5 RAK-50NH6	5.0	1.00 - 5.60	1.10 - 7.20	23 - 34	23 - 29
RAF-50NH5	5.0	1.00 - 5.60	1.10 - 7.20	23 - 34	23 - 29
RAI-50NH5	5.0	1.00 - 5.60	1.10 - 7.20	23 - 34	23 - 29
RAD-50NH7	5.0	1.00 - 5.60	1.10 - 7.50	23 - 34	23 - 29

Be sure to connect four or more indoor units to this outdoor unit. If not, condensed water may drop, resulting in trouble.

At least four indoor unit to be connected to the outdoor unit which means two indoor units for each cycle (upper and lower). Anyway indoor unit 3 and 6 must be connected.

SIX ROOM SYSTEM MULTI R.A.C. RAM-130QH5

CONNECTING POSISION TO BE ABLE TO INSTALL

6 ROOM MULTI-SPLIT INVERTER TYPE RAC : RAM-130QH5
POSSIBLE COMBINATION TO OPERATE (SAME TIME OPERATION)

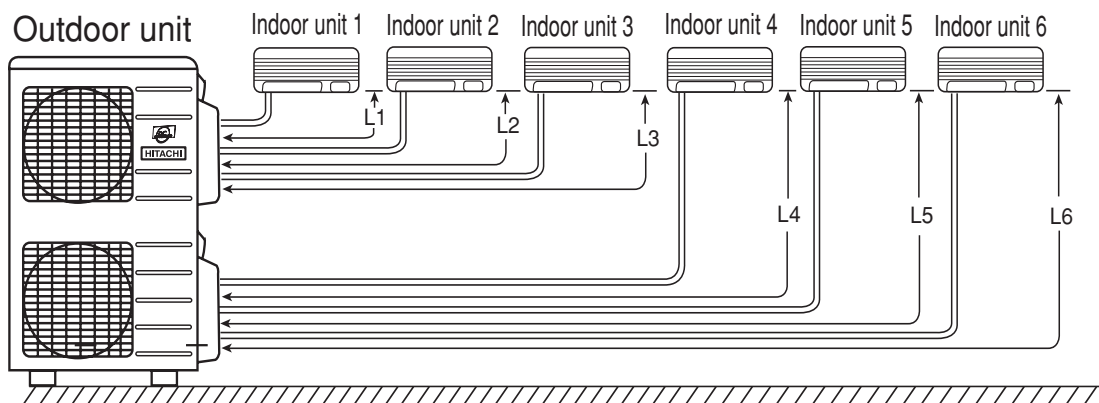
POSSIBLE COMBINATIONS TO INSTALL	SUITABLE ROOM SIZE TO INSTALL (m ²)	CONNECTION POSITION ON OUTDOOR UNIT (VALVE DIAMETER) (mm)					
		NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6
		6.35/9.520	6.35/9.520	6.35/9.520	6.35/9.520	6.35/9.520	6.35/9.520
(1.8 + 1.8) + (1.8 + 1.8)	(8-12) + (8-12) + (8-12) + (8-12)		1.8	1.8		1.8	1.8
(1.8 + 1.8) + (1.8 + 2.5)	(8-12) + (8-12) + (8-12) + (10-16)		1.8	1.8		1.8	2.5
(1.8 + 2.5) + (1.8 + 2.5)	(8-12) + (10-16) + (8-12) + (10-16)		1.8	2.5		1.8	2.5
(1.8 + 1.8) + (1.8 + 3.5)	(8-12) + (8-12) + (7-9) + (15-22)		1.8	1.8		1.8	3.5
(1.8 + 2.5) + (1.8 + 3.5)	(8-12) + (10-16) + (7-9) + (15-22)		1.8	2.5		1.8	3.5
(1.8 + 1.8) + (1.8 + 5.0)	(8-12) + (8-12) + (6-9) + (18-27)		1.8	1.8		1.8	5.0
(1.8 + 2.5) + (1.8 + 5.0)	(8-12) + (10-16) + (6-9) + (18-27)		1.8	2.5		1.8	5.0
(1.8 + 3.5) + (1.8 + 3.5)	(7-9) + (15-22) + (7-9) + (15-22)		1.8	3.5		1.8	3.5
(1.8 + 3.5) + (1.8 + 5.0)	(7-9) + (15-22) + (6-9) + (18-27)		1.8	3.5		1.8	5.0
(1.8 + 5.0) + (1.8 + 5.0)	(6-9) + (18-27) + (6-9) + (18-27)		1.8	5.0		1.8	5.0
(1.8 + 2.5) + (2.5 + 2.5)	(8-12) + (10-16) + (12-15) + (12-15)		1.8	2.5		2.5	2.5
(1.8 + 5.0) + (2.5 + 2.5)	(6-9) + (18-27) + (12-15) + (12-15)		1.8	5.0		2.5	2.5
(1.8 + 3.5) + (2.5 + 2.5)	(7-9) + (15-22) + (12-15) + (12-15)		1.8	3.5		2.5	2.5
(1.8 + 3.5) + (2.5 + 3.5)	(7-9) + (15-22) + (11-14) + (14-18)		1.8	3.5		2.5	3.5
(1.8 + 5.0) + (2.5 + 3.5)	(6-9) + (18-27) + (11-14) + (14-18)		1.8	5.0		2.5	3.5
(1.8 + 5.0) + (2.5 + 5.0)	(6-9) + (18-27) + (10-12) + (18-20)		1.8	5.0		2.5	5.0
(1.8 + 3.5) + (3.5 + 3.5)	(7-9) + (15-22) + (13-16) + (13-16)		1.8	3.5		3.5	3.5
(1.8 + 5.0) + (3.5 + 3.5)	(6-9) + (18-27) + (13-16) + (13-16)		1.8	5.0		3.5	3.5
(1.8 + 5.0) + (3.5 + 5.0)	(6-9) + (18-27) + (11-14) + (16-18)		1.8	5.0		3.5	5.0
(2.5 + 2.5) + (2.5 + 2.5)	(12-15) + (12-15) + (12-15) + (12-15)		2.5	2.5		2.5	2.5
(2.5 + 2.5) + (2.5 + 3.5)	(12-15) + (12-15) + (11-14) + (14-18)		2.5	2.5		2.5	3.5
(2.5 + 2.5) + (2.5 + 5.0)	(12-15) + (12-15) + (10-12) + (18-20)		2.5	2.5		2.5	5.0
(2.5 + 3.5) + (2.5 + 3.5)	(11-14) + (14-18) + (11-14) + (14-18)		2.5	3.5		2.5	3.5
(2.5 + 5.0) + (2.5 + 3.5)	(10-12) + (18-20) + (11-14) + (14-18)		2.5	5.0		2.5	3.5
(2.5 + 5.0) + (2.5 + 5.0)	(10-12) + (18-20) + (10-12) + (18-20)		2.5	5.0		2.5	5.0
(2.5 + 3.5) + (3.5 + 3.5)	(11-14) + (14-18) + (13-16) + (13-16)		2.5	3.5		3.5	3.5
(2.5 + 5.0) + (3.5 + 3.5)	(10-12) + (18-20) + (13-16) + (13-16)		2.5	5.0		3.5	3.5
(3.5 + 3.5) + (3.5 + 3.5)	(13-16) + (13-16) + (13-16) + (13-16)		3.5	3.5		3.5	3.5
(3.5 + 3.5) + (3.5 + 5.0)	(13-16) + (13-16) + (11-14) + (16-18)		3.5	3.5		3.5	5.0
(3.5 + 5.0) + (3.5 + 5.0)	(11-14) + (16-18) + (11-14) + (16-18)		3.5	5.0		3.5	5.0
(1.8 + 1.8) + (1.8 + 1.8 + 1.8)	(8-12) + (8-12) + (8-12) + (8-12) + (8-12)		1.8	1.8	1.8	1.8	1.8
(1.8 + 1.8) + (1.8 + 1.8 + 2.5)	(8-12) + (8-12) + (8-12) + (8-12) + (11-17)		1.8	1.8	1.8	1.8	2.5
(1.8 + 3.5) + (1.8 + 1.8 + 1.8)	(7-9) + (15-22) + (8-12) + (8-12) + (8-12)		1.8	3.5	1.8	1.8	1.8
(1.8 + 5.0) + (1.8 + 1.8 + 1.8)	(6-9) + (18-27) + (8-12) + (8-12) + (8-12)		1.8	5.0	1.8	1.8	1.8
(1.8 + 2.5) + (1.8 + 1.8 + 2.5)	(8-12) + (10-16) + (8-12) + (8-12) + (11-17)		1.8	2.5	1.8	1.8	2.5

FIVE UNITS	(1.8 + 2.5) + (1.8 + 1.8 + 2.5)	(8-12) + (10-16) + (8-12) + (8-12) + (11-17)		1.8	2.5	1.8	1.8	2.5
	(1.8 + 3.5) + (1.8 + 1.8 + 2.5)	(7-9) + (15-22) + (8-12) + (8-12) + (11-17)		1.8	3.5	1.8	1.8	2.5
	(1.8 + 5.0) + (1.8 + 1.8 + 2.5)	(6-9) + (18-27) + (8-12) + (8-12) + (11-17)		1.8	5.0	1.8	1.8	2.5
	(1.8 + 3.5) + (1.8 + 1.8 + 3.5)	(7-9) + (15-22) + (7-11) + (7-11) + (14-21)		1.8	3.5	1.8	1.8	3.5
	(1.8 + 5.0) + (1.8 + 1.8 + 3.5)	(6-9) + (18-27) + (7-11) + (7-11) + (14-21)		1.8	5.0	1.8	1.8	3.5
	(1.8 + 5.0) + (1.8 + 1.8 + 5.0)	(6-9) + (18-27) + (5-8) + (5-8) + (16-25)		1.8	5.0	1.8	1.8	5.0
	(2.5 + 2.5) + (1.8 + 1.8 + 2.5)	(12-15) + (12-15) + (8-12) + (8-12) + (11-17)		2.5	2.5	1.8	1.8	2.5
	(2.5 + 3.5) + (1.8 + 1.8 + 2.5)	(11-14) + (14-18) + (8-12) + (8-12) + (11-17)		2.5	3.5	1.8	1.8	2.5
	(1.8 + 5.0) + (1.8 + 2.5 + 2.5)	(6-9) + (18-27) + (7-11) + (10-15) + (10-15)		1.8	5.0	1.8	2.5	2.5
	(3.5 + 3.5) + (1.8 + 1.8 + 3.5)	(13-16) + (13-16) + (8-12) + (8-12) + (11-17)		3.5	3.5	1.8	1.8	2.5
	(2.5 + 2.5) + (1.8 + 2.5 + 2.5)	(12-15) + (12-15) + (7-11) + (10-15) + (10-15)		2.5	2.5	1.8	2.5	2.5
	(2.5 + 3.5) + (1.8 + 2.5 + 2.5)	(11-14) + (14-18) + (7-11) + (10-15) + (10-15)		2.5	3.5	1.8	2.5	2.5
	(1.8 + 5.0) + (2.5 + 2.5 + 2.5)	(6-9) + (18-27) + (10-11) + (10-11) + (10-11)		1.8	5.0	2.5	2.5	2.5
	(3.5 + 3.5) + (1.8 + 2.5 + 2.5)	(13-16) + (13-16) + (7-11) + (10-15) + (10-15)		3.5	3.5	1.8	2.5	2.5
	(2.5 + 5.0) + (1.8 + 2.5 + 3.5)	(10-12) + (18-20) + (6-10) + (9-13) + (12-19)		2.5	5.0	1.8	2.5	3.5
	(3.5 + 3.5) + (1.8 + 2.5 + 3.5)	(13-16) + (13-16) + (6-10) + (9-13) + (12-19)		3.5	3.5	1.8	2.5	3.5
	(3.5 + 3.5) + (1.8 + 3.5 + 3.5)	(13-16) + (13-16) + (5-8) + (11-17) + (11-17)		3.5	3.5	1.8	3.5	3.5
	(2.5 + 2.5) + (2.5 + 2.5 + 2.5)	(12-15) + (12-15) + (10-11) + (10-11) + (10-11)		2.5	2.5	2.5	2.5	2.5
	(2.5 + 3.5) + (2.5 + 2.5 + 2.5)	(11-14) + (14-18) + (10-11) + (10-11) + (10-11)		2.5	3.5	2.5	2.5	2.5
	(2.5 + 5.0) + (2.5 + 2.5 + 2.5)	(10-12) + (18-20) + (10-11) + (10-11) + (10-11)		2.5	5.0	2.5	2.5	2.5
	(3.5 + 3.5) + (2.5 + 2.5 + 2.5)	(13-16) + (13-16) + (10-11) + (10-11) + (10-11)		3.5	3.5	2.5	2.5	2.5
	(2.5 + 5.0) + (2.5 + 2.5 + 3.5)	(10-12) + (18-20) + (8-10) + (8-10) + (12-12)		2.5	5.0	2.5	2.5	3.5
	(3.5 + 3.5) + (2.5 + 2.5 + 3.5)	(13-16) + (13-16) + (8-10) + (8-10) + (12-12)		3.5	3.5	2.5	2.5	3.5
	(3.5 + 5.0) + (2.5 + 2.5 + 3.5)	(11-14) + (16-18) + (8-10) + (8-10) + (12-12)		3.5	5.0	2.5	2.5	3.5
SIX UNITS	(1.8 + 1.8 + 1.8) + (1.8 + 1.8 + 1.8)	(8-12) + (8-12) + (8-12) + (8-12) + (8-12) + (8-12)	1.8	1.8	1.8	1.8	1.8	1.8
	(1.8 + 1.8 + 1.8) + (1.8 + 1.8 + 2.5)	(8-12) + (8-12) + (8-12) + (8-12) + (8-12) + (11-17)	1.8	1.8	1.8	1.8	1.8	2.5
	(1.8 + 1.8 + 1.8) + (1.8 + 1.8 + 3.5)	(8-12) + (8-12) + (8-12) + (7-11) + (7-11) + (14-21)	1.8	1.8	1.8	1.8	1.8	3.5
	(1.8 + 1.8 + 1.8) + (1.8 + 1.8 + 5.0)	(8-12) + (8-12) + (8-12) + (5-8) + (5-8) + (16-25)	1.8	1.8	1.8	1.8	1.8	5.0
	(1.8 + 1.8 + 2.5) + (1.8 + 1.8 + 2.5)	(8-12) + (8-12) + (11-17) + (8-12) + (8-12) + (11-17)	1.8	1.8	2.5	1.8	1.8	2.5
	(1.8 + 1.8 + 2.5) + (1.8 + 1.8 + 3.5)	(8-12) + (8-12) + (11-17) + (7-11) + (7-11) + (14-21)	1.8	1.8	2.5	1.8	1.8	3.5
	(1.8 + 1.8 + 2.5) + (1.8 + 1.8 + 5.0)	(8-12) + (8-12) + (11-17) + (5-8) + (5-8) + (16-25)	1.8	1.8	2.5	1.8	1.8	5.0
	(1.8 + 1.8 + 3.5) + (1.8 + 1.8 + 3.5)	(7-11) + (7-11) + (14-21) + (7-11) + (7-11) + (14-21)	1.8	1.8	3.5	1.8	1.8	3.5
	(1.8 + 1.8 + 3.5) + (1.8 + 1.8 + 5.0)	(7-11) + (7-11) + (14-21) + (5-8) + (5-8) + (16-25)	1.8	1.8	3.5	1.8	1.8	5.0
	(1.8 + 1.8 + 5.0) + (1.8 + 1.8 + 5.0)	(5-8) + (5-8) + (16-25) + (5-8) + (5-8) + (16-25)	1.8	1.8	5.0	1.8	1.8	5.0
	(1.8 + 1.8 + 2.5) + (1.8 + 2.5 + 2.5)	(8-12) + (8-12) + (11-17) + (7-11) + (10-15) + (10-15)	1.8	1.8	2.5	1.8	2.5	2.5
	(1.8 + 1.8 + 2.5) + (1.8 + 2.5 + 3.5)	(8-12) + (8-12) + (11-17) + (6-10) + (9-13) + (12-19)	1.8	1.8	2.5	1.8	2.5	3.5
	(1.8 + 1.8 + 5.0) + (1.8 + 2.5 + 2.5)	(5-8) + (5-8) + (16-25) + (7-11) + (10-15) + (10-15)	1.8	1.8	5.0	1.8	2.5	2.5
	(1.8 + 1.8 + 3.5) + (1.8 + 2.5 + 3.5)	(7-11) + (7-11) + (14-21) + (6-10) + (9-13) + (12-19)	1.8	1.8	3.5	1.8	2.5	3.5
	(1.8 + 1.8 + 5.0) + (1.8 + 2.5 + 3.5)	(5-8) + (5-8) + (16-25) + (6-10) + (9-13) + (12-19)	1.8	1.8	5.0	1.8	2.5	3.5
	(1.8 + 1.8 + 3.5) + (1.8 + 3.5 + 3.5)	(7-11) + (7-11) + (14-21) + (5-8) + (11-17) + (11-17)	1.8	1.8	3.5	1.8	3.5	3.5
	(1.8 + 1.8 + 5.0) + (1.8 + 3.5 + 3.5)	(5-8) + (5-8) + (16-25) + (5-8) + (11-17) + (11-17)	1.8	1.8	5.0	1.8	3.5	3.5
	(1.8 + 2.5 + 2.5) + (1.8 + 2.5 + 2.5)	(7-11) + (10-15) + (10-15) + (7-11) + (10-15) + (10-15)	1.8	2.5	2.5	1.8	2.5	2.5
	(1.8 + 2.5 + 2.5) + (1.8 + 2.5 + 3.5)	(7-11) + (10-15) + (10-15) + (6-10) + (9-13) + (12-19)	1.8	2.5	2.5	1.8	2.5	3.5
	(1.8 + 1.8 + 5.0) + (2.5 + 2.5 + 2.5)	(5-8) + (5-8) + (16-25) + (10-11) + (10-11) + (10-11)	1.8	1.8	5.0	2.5	2.5	2.5
	(1.8 + 2.5 + 3.5) + (1.8 + 2.5 + 3.5)	(6-10) + (9-13) + (12-19) + (6-10) + (9-13) + (12-19)	1.8	2.5	3.5	1.8	2.5	3.5
	(1.8 + 1.8 + 5.0) + (2.5 + 2.5 + 3.5)	(5-8) + (5-8) + (16-25) + (8-10) + (8-10) + (12-12)	1.8	1.8	5.0	2.5	2.5	3.5
	(1.8 + 2.5 + 3.5) + (1.8 + 3.5 + 3.5)	(6-10) + (9-13) + (12-19) + (5-8) + (11-17) + (11-17)	1.8	2.5	3.5	1.8	3.5	3.5
	(1.8 + 3.5 + 3.5) + (1.8 + 3.5 + 3.5)	(5-8) + (11-17) + (11-17) + (5-8) + (11-17) + (11-17)	1.8	3.5	3.5	1.8	3.5	3.5
	(1.8 + 2.5 + 2.5) + (2.5 + 2.5 + 2.5)	(7-11) + (10-15) + (10-15) + (10-11) + (10-11) + (10-11)	1.8	2.5	2.5	2.5	2.5	2.5
	(1.8 + 2.5 + 3.5) + (2.5 + 2.5 + 2.5)	(6-10) + (9-13) + (12-19) + (10-11) + (10-11) + (10-11)	1.8	2.5	3.5	2.5	2.5	2.5
	(1.8 + 2.5 + 3.5) + (2.5 + 2.5 + 3.5)	(6-10) + (9-13) + (12-19) + (8-10) + (8-10) + (12-12)	1.8	2.5	3.5	2.5	2.5	3.5
	(1.8 + 3.5 + 3.5) + (2.5 + 2.5 + 3.5)	(5-8) + (11-17) + (11-17) + (8-10) + (8-10) + (12-12)	1.8	3.5	3.5	2.5	2.5	3.5
	(2.5 + 2.5 + 2.5) + (2.5 + 2.5 + 2.5)	(10-11) + (10-11) + (10-11) + (10-11) + (10-11) + (10-11)	2.5	2.5	2.5	2.5	2.5	2.5
	(2.5 + 2.5 + 2.5) + (2.5 + 2.5 + 3.5)	(10-11) + (10-11) + (10-11) + (8-10) + (8-10) + (12-12)	2.5	2.5	2.5	2.5	2.5	3.5
	(2.5 + 2.5 + 3.5) + (2.5 + 2.5 + 3.5)	(8-10) + (8-10) + (12-12) + (8-10) + (8-10) + (12-12)	2.5	2.5	3.5	2.5	2.5	3.5

INSTALLATION

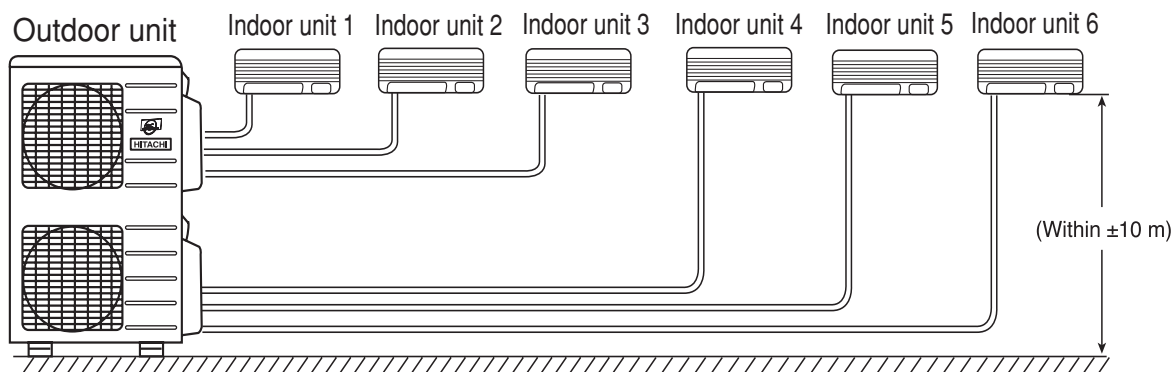
PIPE LENGTH

- (1) Total 45m maximum pipe length for each refrigerant cycle (upper cycle and lower cycle).
- (2) Pipe length for one indoor unit : maximum 25m.



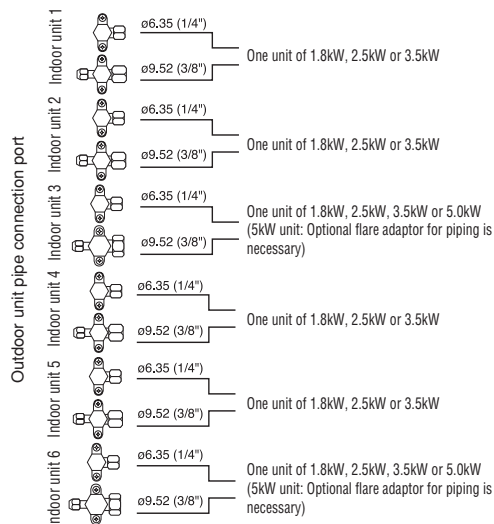
$(L1 + L2 + L3) = (L4 + L5 + L6) = \text{Maximum } 45\text{m}$
Minimum piping length for each indoor unit is 5m.
Maximum piping length for one indoor unit is 25m.

Height Difference between indoor units should be not more than 5m



- To the outdoor unit, up to three indoor units can be connected until the total value of capacity from 5.0kW to 9.0kW for each refrigerant cycle (upper cycle and lower cycle).
- Make sure to connect to two or three indoor units for each refrigerant cycle.

MODEL: RAM-130QH5



CAUTION

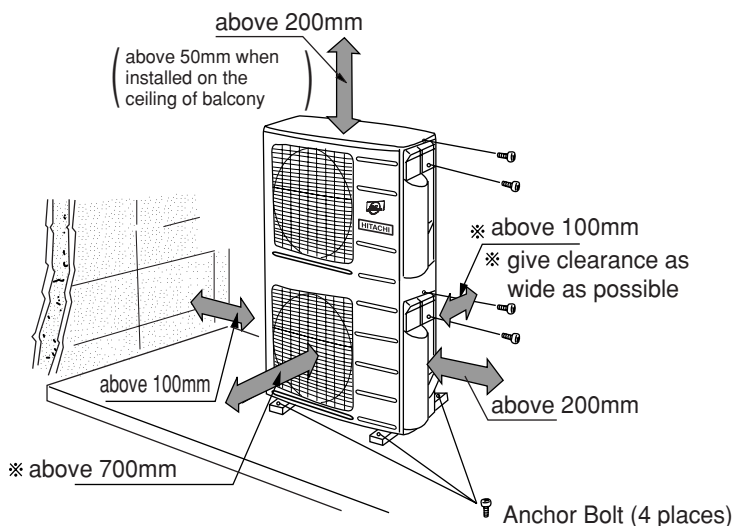
- This outdoor unit contain 2 difference refrigerant cycle with two compressors and two separated electrical.
- For refrigerant cycle at upper side of unit, shall be for connection for indoor 1, 2 and 3.
- For refrigerant cycle at lower side of unit, shall be for connection for indoor 4, 5 and 6.
- Each refrigerant cycle must be connected indoor units at least 2 connections.
- And connection no. 3 and no. 6 are compulsory. if not, there will be an icing at the condensor base during winter season.

Flare adaptor for piping

The flare adaptor for piping is required depending on combination of indoor units.

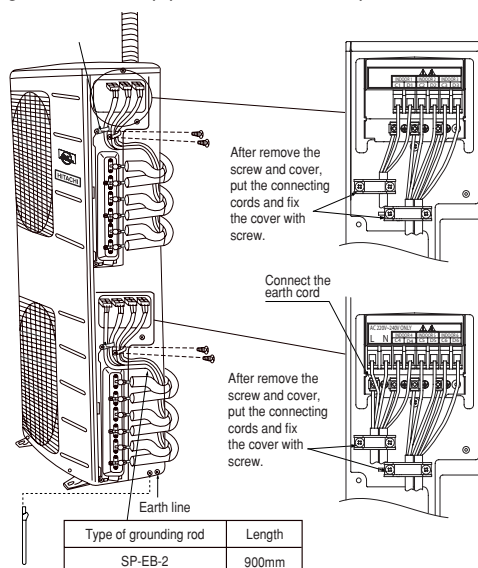
- ø9.52 (3/8") → ø12.7 (1/2") parts number TA261D-4 001

- Remove the side cover.
- For installation, refer as shown below.
- The space indicated with a ⇔ mark is required to guarantee the air conditioner's performance. Install the air conditioner in a place big enough to provide ample space for servicing and repairs later on.



Connecting the pipe

- Install the unit in a stable place to minimize vibration or noise.
- After arranging the cord and pipes, secure them in place.



- Hold the handle of the side cover. Slide down and takeoff the corner hook, then pull. Reverse these steps when installing.

1. Remove flare nut from service valve.
2. Apply refrigerant oil to flare nut sections of service valve and pipings.
3. Match center of piping to large diameter side service valve and tank assembly, and tighten flarenut first by hand, then securely tighten using torque wrench.
4. Perform air purge and gas leak inspection.
5. Wrap the provided insulating material around side piping using vinyl tape.

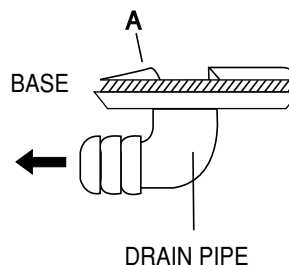
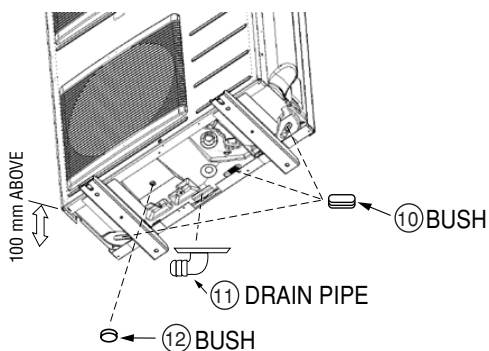
Condensed water disposal of outdoor unit

- There is holes on the base of outdoor unit for condensed water to exhaust.
- To lead condensed water to the drain hole, place the outdoor unit on the mounting stand (optional) or on blocks to raise its level more than 100mm from the ground surface. Connect the drain pipe as shown in the figure. Cover two other water drain holes with the bushings included. (To insall a bushing, push in both ends of the bushing so that it aligns with the drain hole.)
- When connecting the drain pipe, make sure that the bushing does not lift off or deviate from the base.
- Install the outdoor unit on a stable, flat surface and check to see that the condensed water drains.

When Using and Installing in Cold Areas

When the air conditioner is used in low temperature and in snowy conditions, water from the heat exchanger may freeze on the base surface to cause poor drainage. When using the air conditioner in such areas, do not install the bushings. Keep a minimum of 250mm between the drain hole and the ground. When using the drain pipe, consult your sales agent.

※ For more details, refer to the Installation Manual for Cold Areas.



Connection of the connecting cords and power cord. (Outdoor unit)

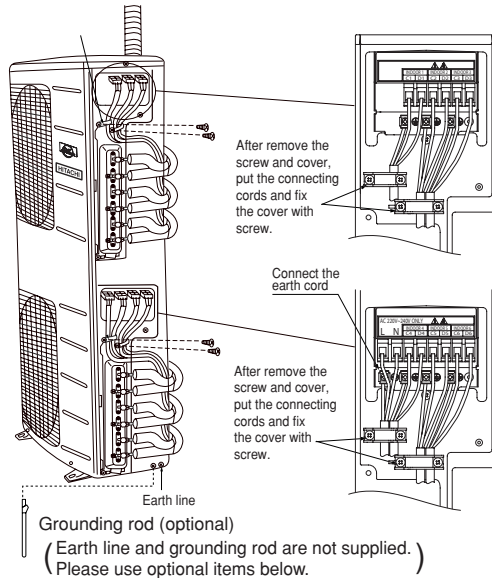
⚠ WARNING

- Connecting cord should be connected according to Fig.1, that the Indoor unit No. shall match with terminal board No. of Outdoor unit.
- Be sure to fix the connecting cord with the band as shown below. Otherwise water leakage causes short circuit or faults.

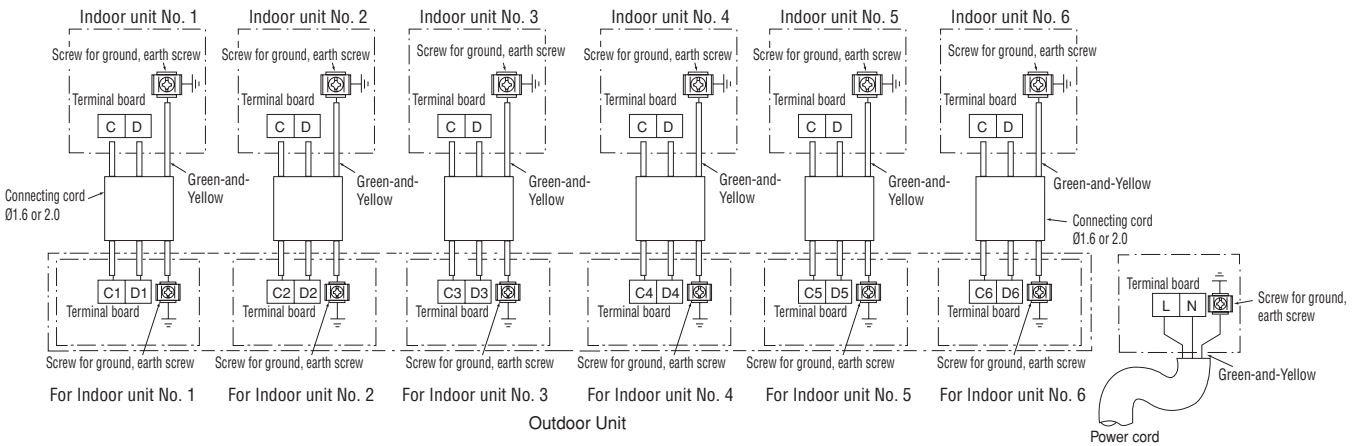
Type of grounding rod	Length
SP-EB-2	900mm

⚠ CAUTION

- If earth line cannot be taken from the power supply connection, use the optional grounding rod to do earthing.

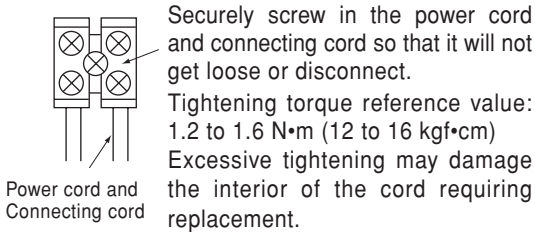


Wiring Pattern Indoor Unit



⚠ WARNING

Connection of the power cord and connecting cord

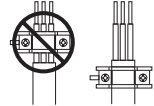


CAUTION

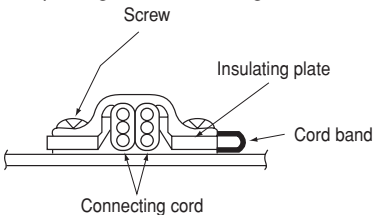
- To prevent a connection error, connecting cords should be bundled and taped to each respective pipe. If connecting cords are mixed with other indoor units, a refrigeration cycle abnormality may occur, causing dripping.

! WARNING

- Leave some space in the connecting cord for maintenance purpose and be sure to secure it with the cord band.
 - Secure the connecting cord along the coated part of the wire using the cord band. Do not exert pressure on the wire as this may cause overheating or fire.
-



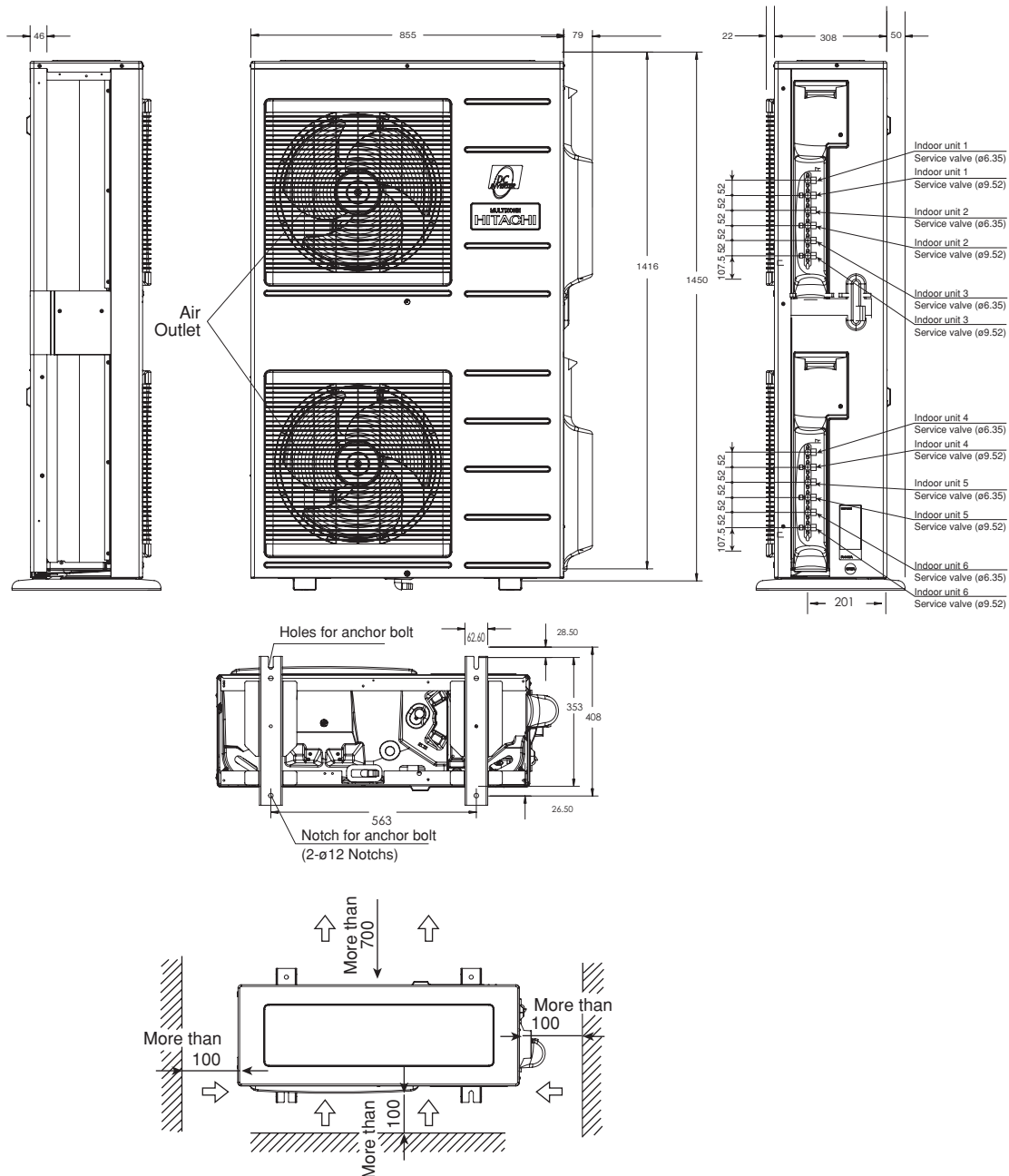
- When putting two connecting cords through the band.



- Hold the handle of the side cover, slide down and take off the corner hook, then pull. Reverse these steps when installing.

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAM-130QH5



Note:

Service space

1. Insulated pipes should be used for both small and large diameter pipes.
2. Piping length should be within 25m for one room and within 45m in total.
3. Height difference of piping between indoor unit and outdoor unit should be within 10m.
4. Overhead clearance of outdoor unit should be 200mm to allow servicing.
5. For electrical connection, please refer to the installation manual.

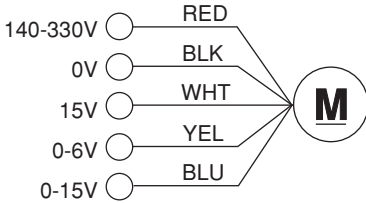
ATTENTION

During service, before opening the side cover, please switch off power supply.

MAIN PARTS COMPONENT

FAN MOTOR

Fan Motor Specifications

MODEL		RAM-130QH5
POWER SOURCE		DC : 140-330V
OUTPUT		40W
CONNECTION		 (Control circuit built in)
RESISTANCE VALUE (Ω)	20°C (68°F)	—
	75°C (167°F)	—

BLU : BLUE

YEL : YELLOW

BRN : BROWN

WHT : WHITE

GRY : GRAY

ORN : ORANGE

GRN : GREEN

RED : RED

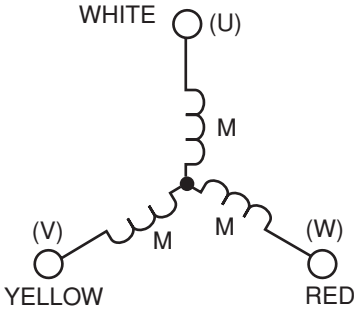
BLK : BLACK

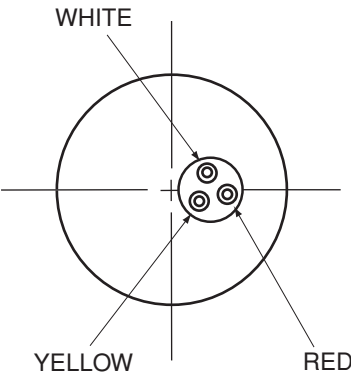
PNK : PINK

VIO : VIOLET

COMPRESSOR

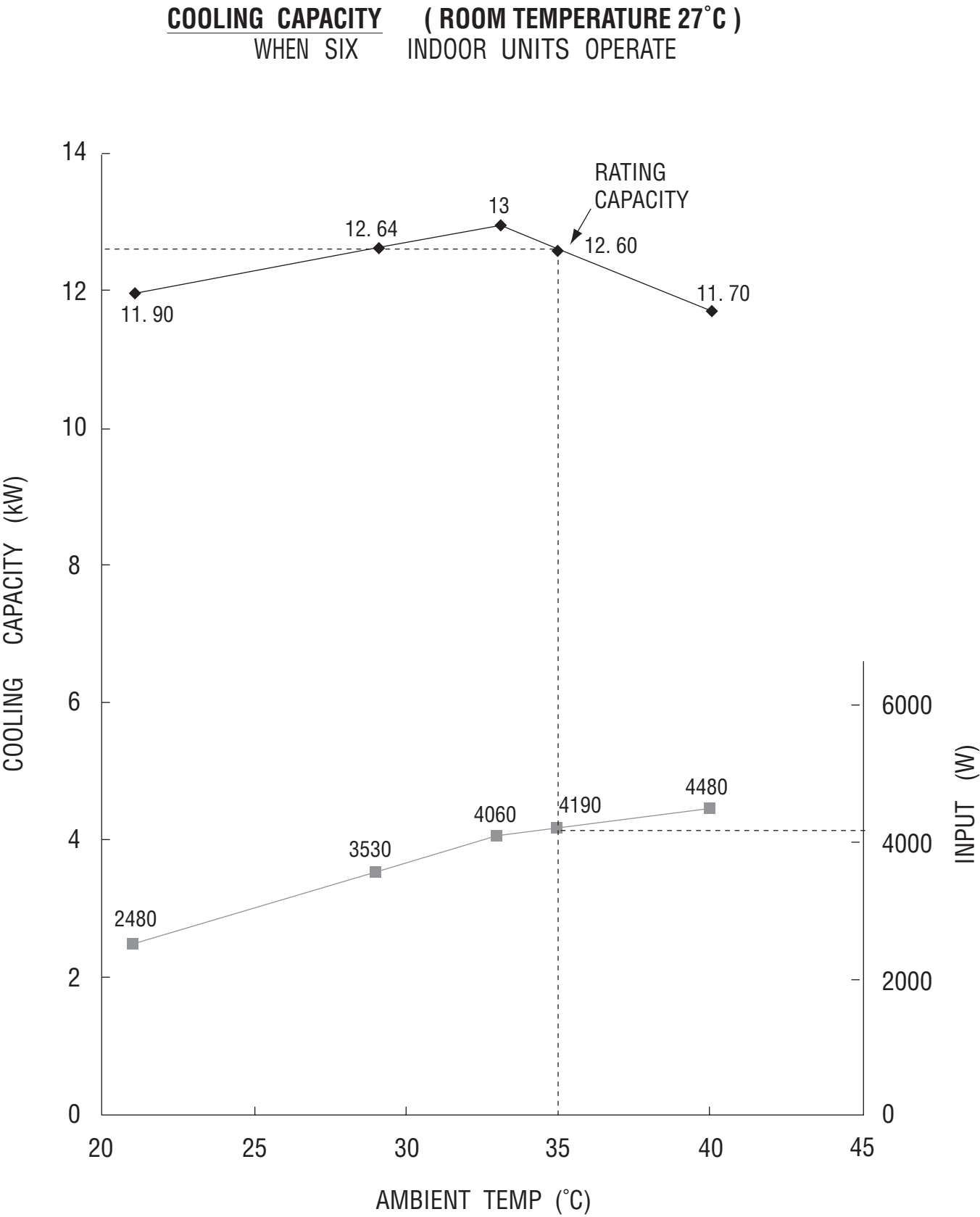
Compressor Motor Specifications

MODEL		RAM-130QH5
COMPRESSOR MODEL		JU1013D2
PHASE		SINGLE
RATED VOLTAGE		DC: 280-330V
RATED FREQUENCY		50Hz
POLE NUMBER		4
CONNECTION		
RESISTANCE VALUE (Ω)	25°C (68°F)	2M = 1.063
	75°C (167°F)	2M = 1.268



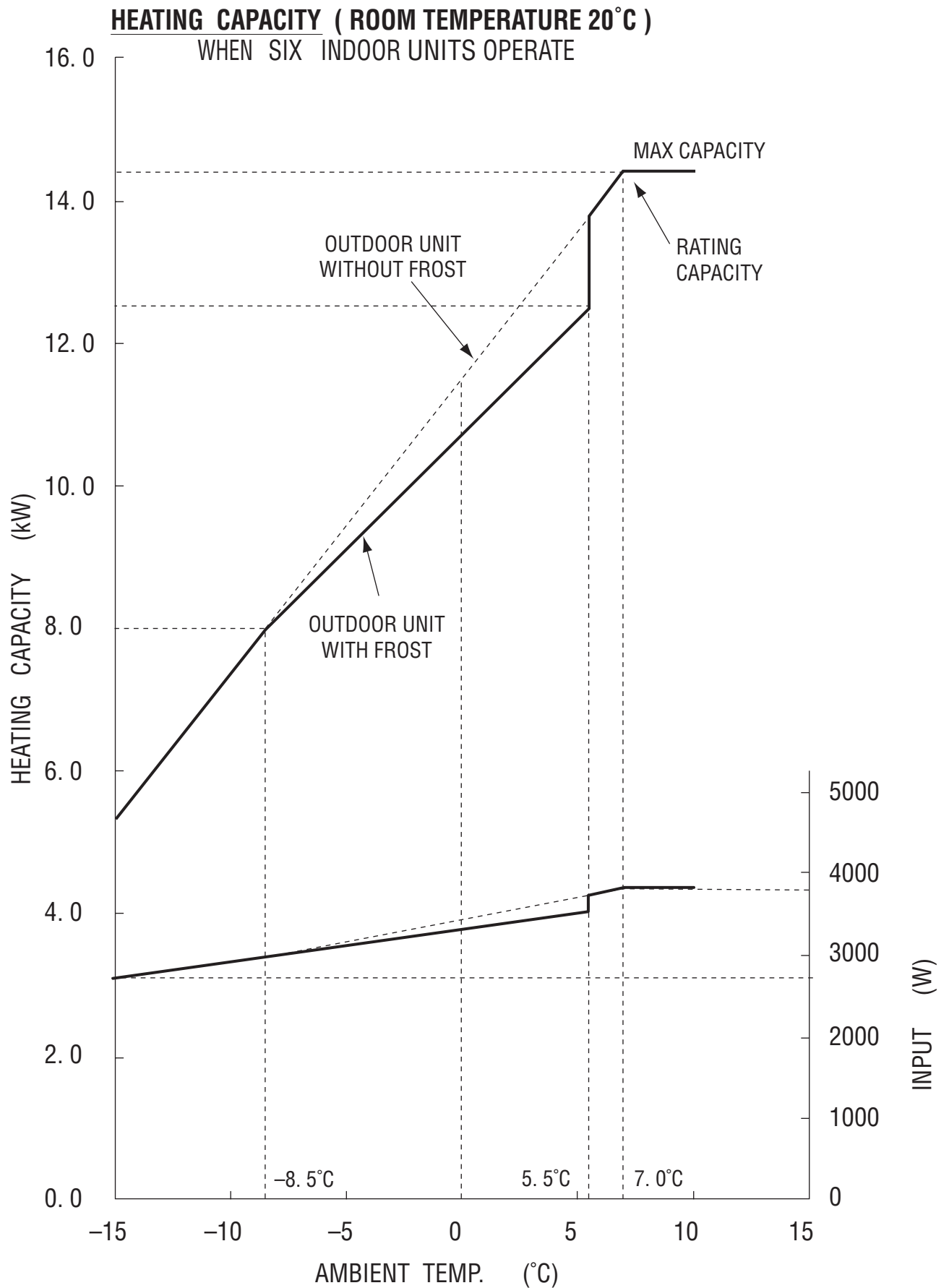
CAPACITY DIAGRAM (RELATED TO THE AMBIENT TEMPERATURE)

MODEL : RAM-130QH5



CAPACITY DIAGRAM (RELATED TO THE AMBIENT TEMPERATURE)

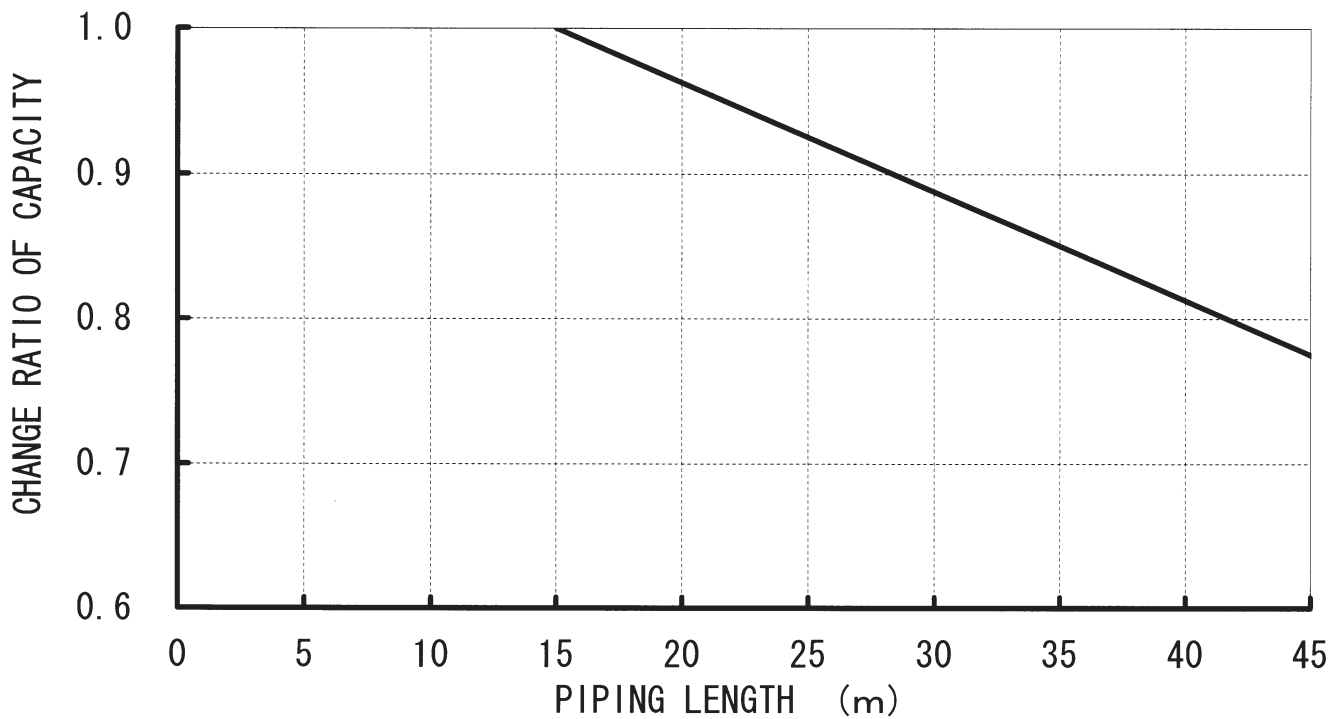
MODEL : RAM-130QH5



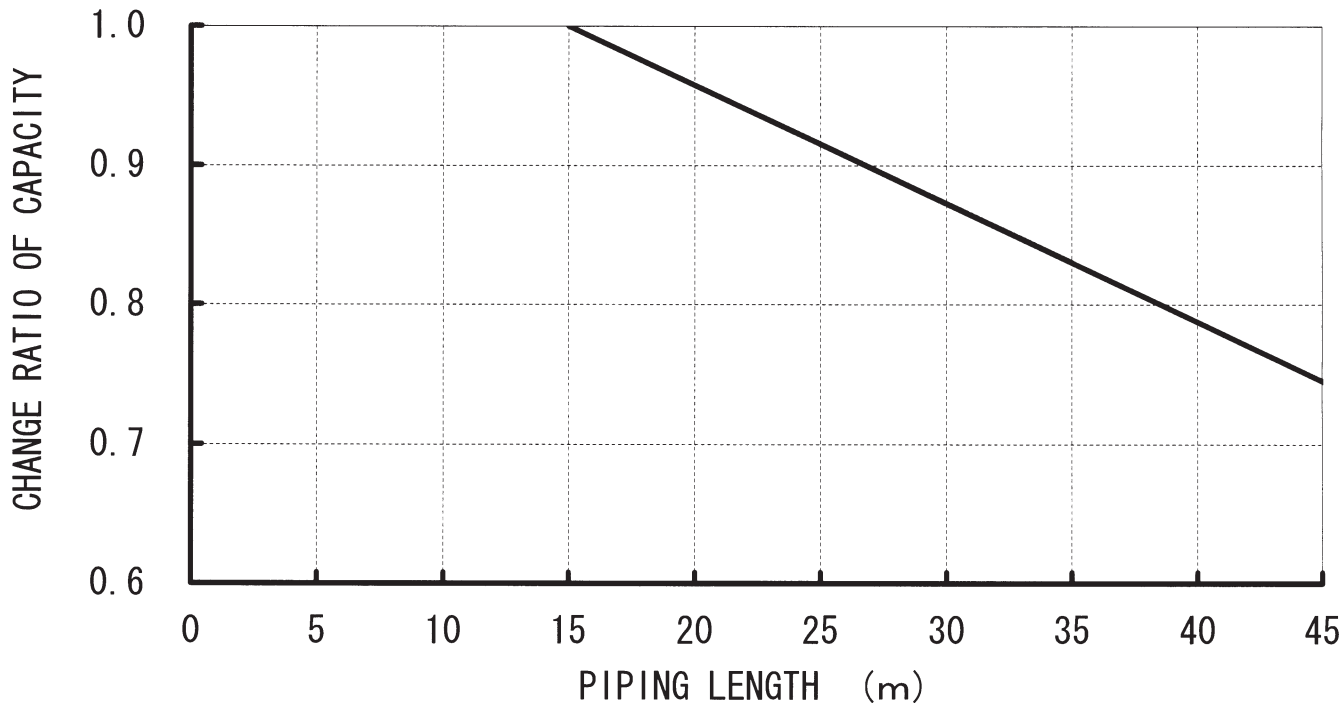
CAPACITY DIAGRAM (RELATED TO THE PIPING LENGTH)

MODEL : RAM-130QH5

COOLING

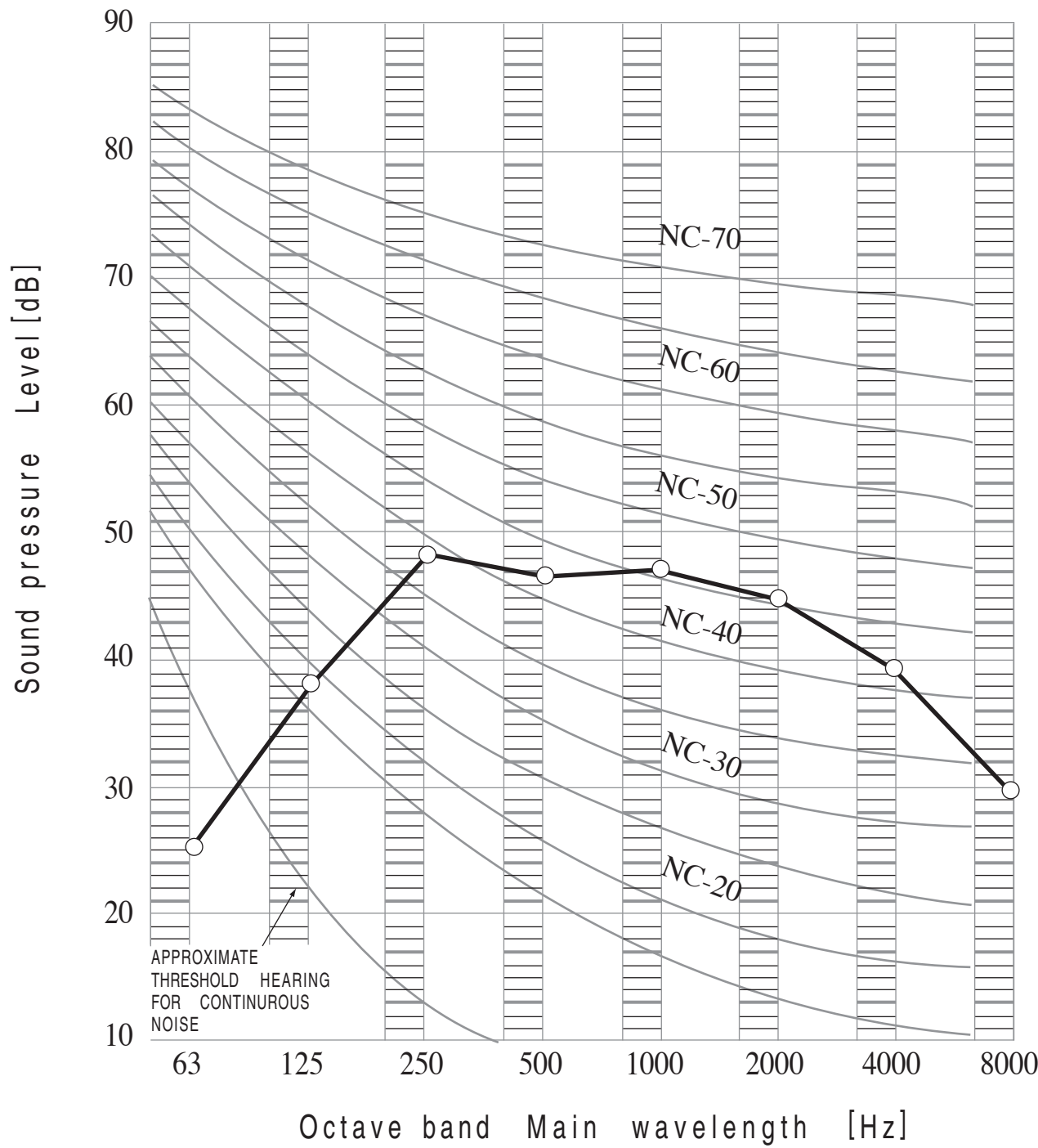


HEATING



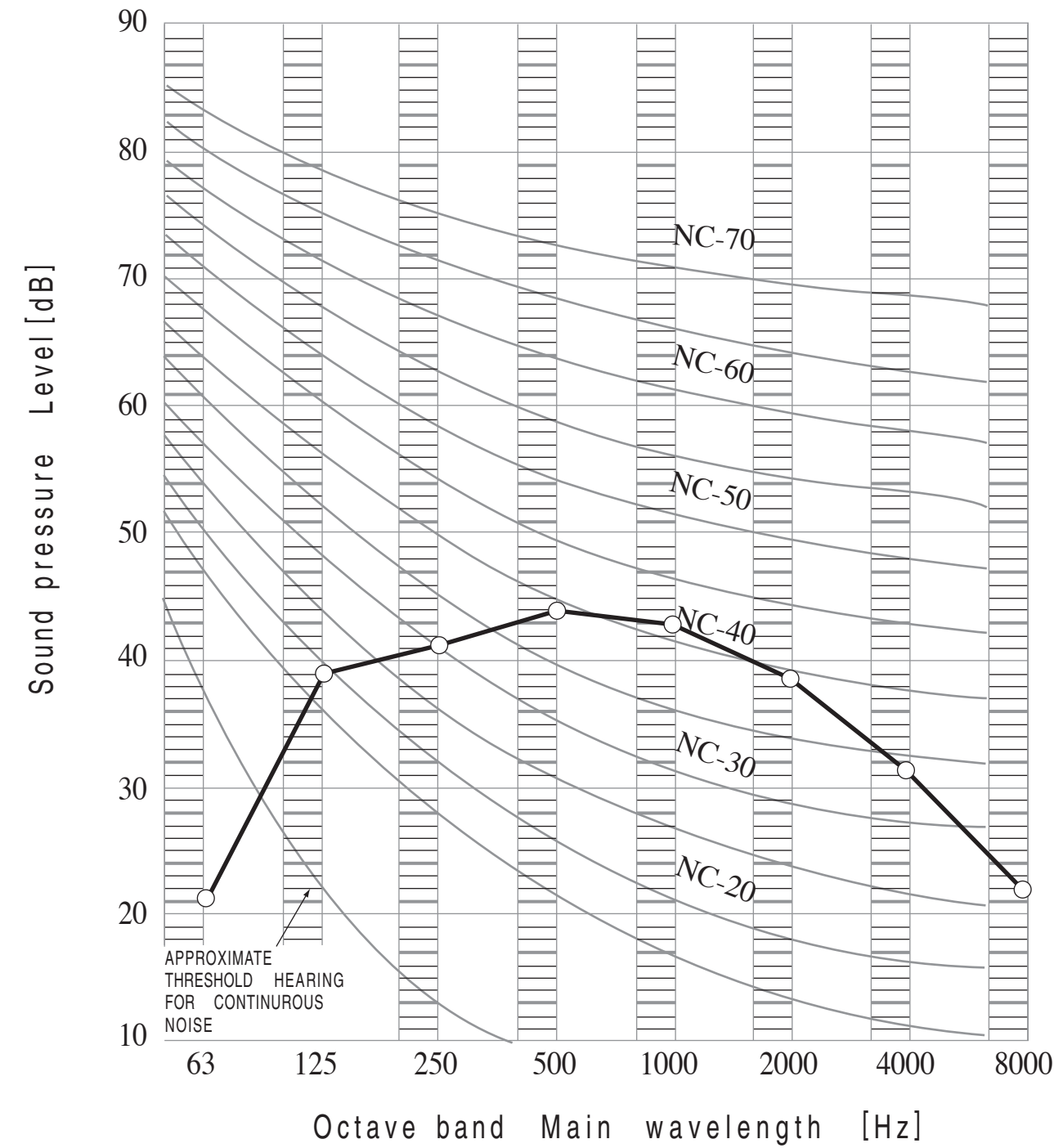
SOUND PRESSURE LEVEL

MODEL : RAM-130QH5 (Heating)

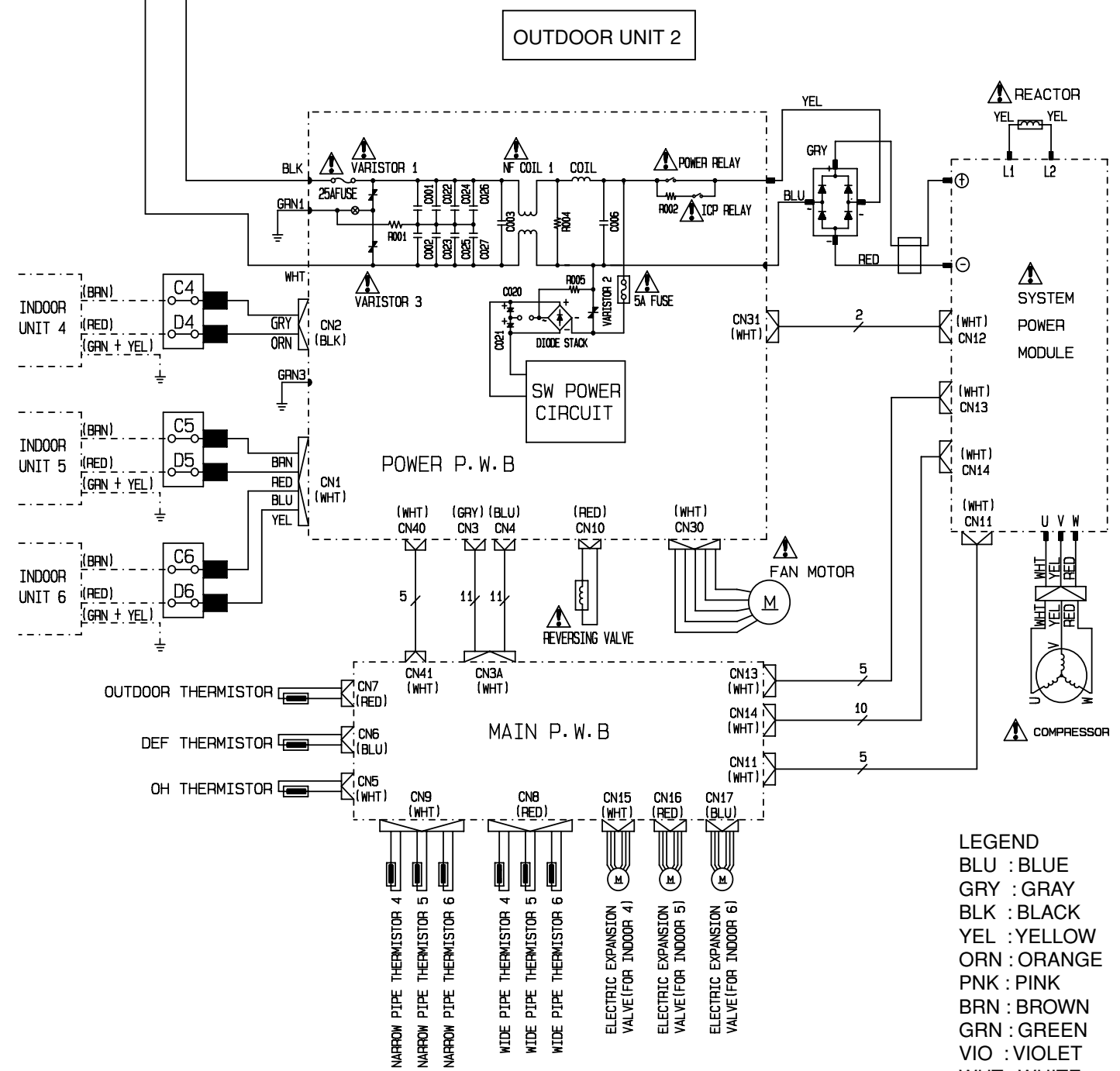
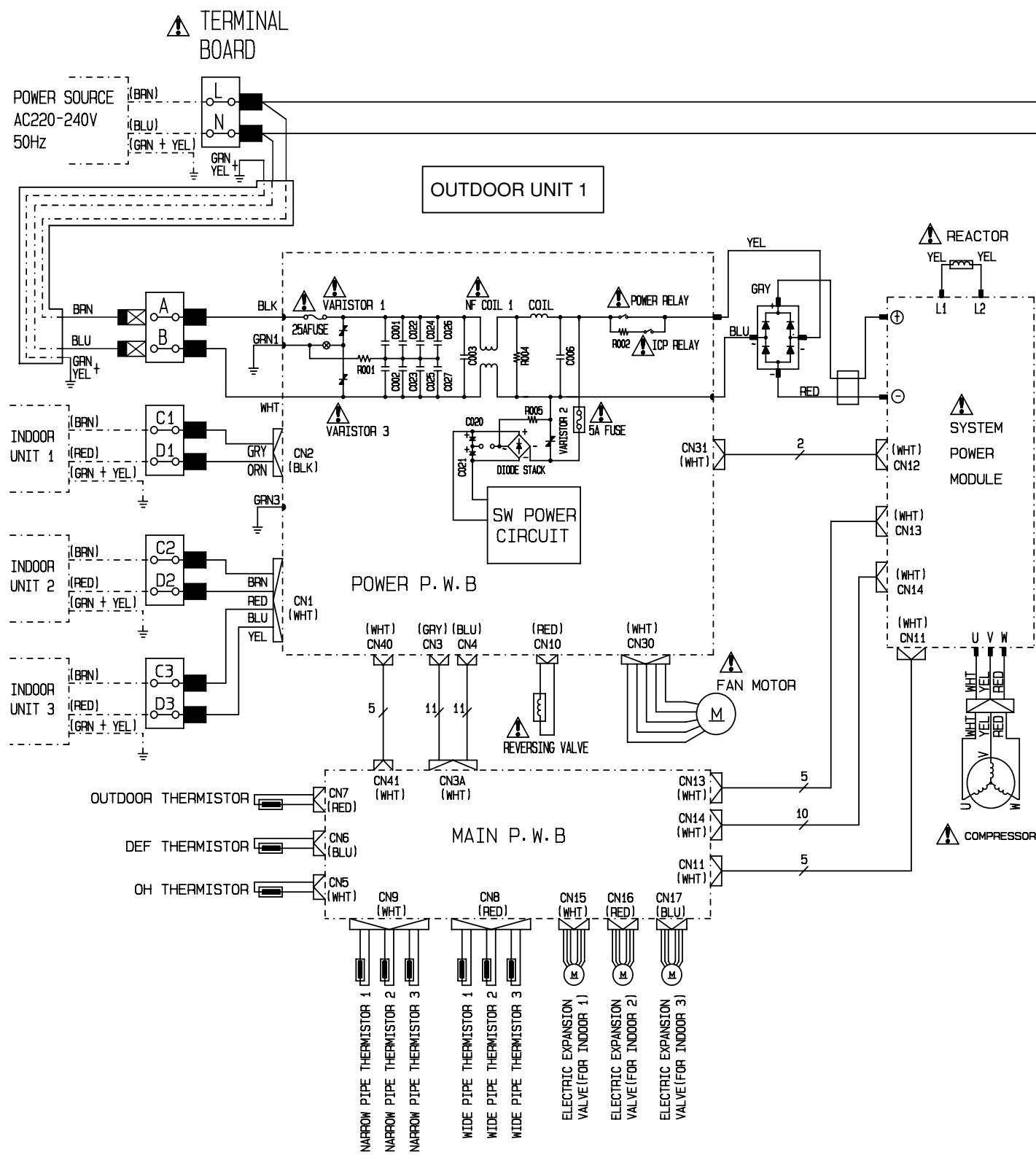


SOUND PRESSURE LEVEL

MODEL : RAM-130QH5 (Cooling)



WIRING DIAGRAM

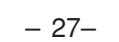


- LEGEND
- BLU : BLUE
 - GRY : GRAY
 - BLK : BLACK
 - YEL : YELLOW
 - ORN : ORANGE
 - BRN : BROWN
 - GRN : GREEN
 - VIO : VIOLET
 - WHT : WHITE
 - RED : RED

CAUTION

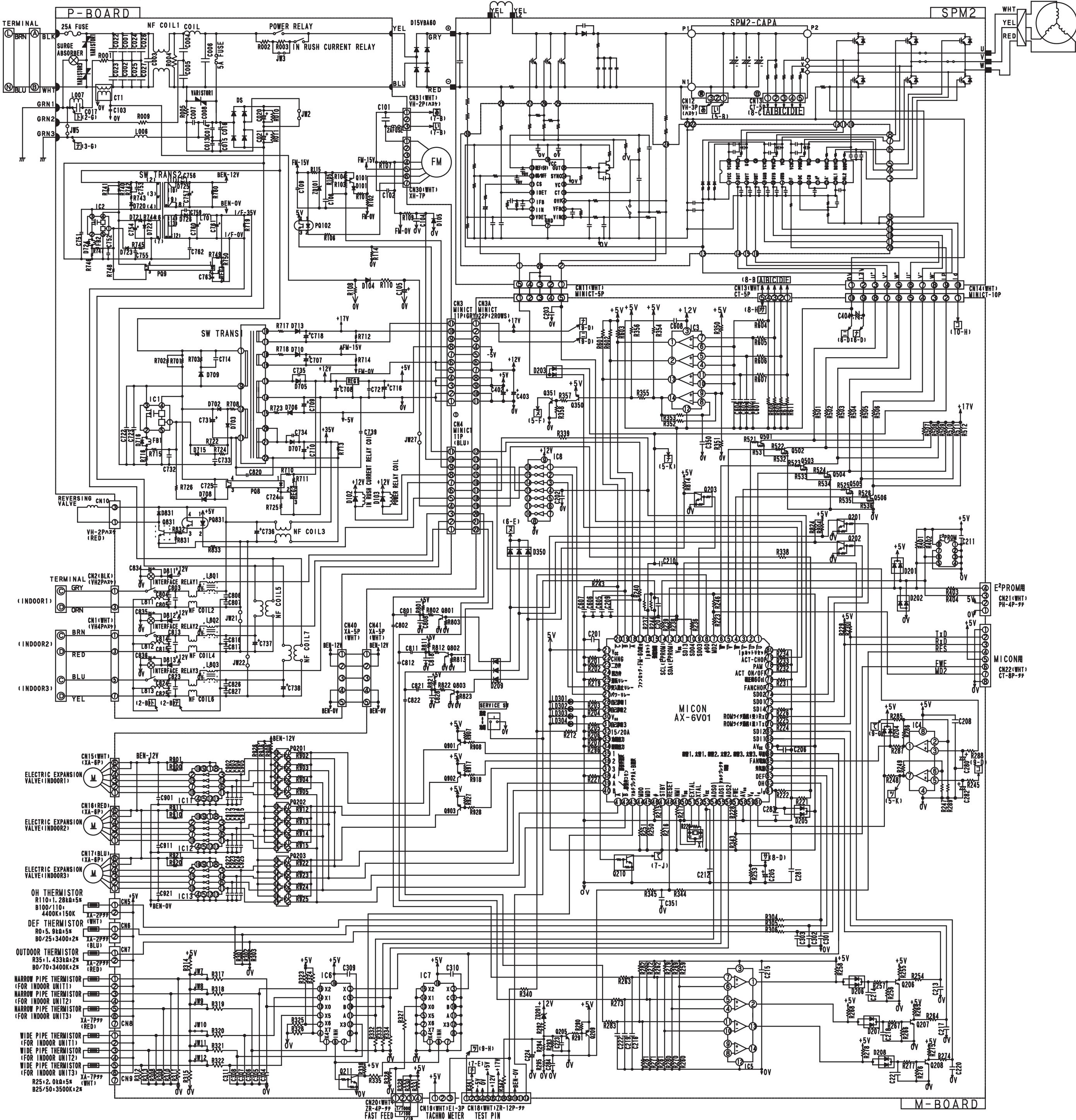
The marked parts ⚡ are very important ones for safety

Remote Control



CIRCUIT DIAGRAM

OUTDOOR UNIT 1



MOUNTING
R – RADIAL
C – CHIP
A -- AXIAL
H -- HAND INSERT

PCB SET
NO MARKING ---#M-BOARDAS
P ---#P-BOARDAS

TYPE _____
F -- FILM
C -- CERAMIC
D -- ELECTROLYTIC

RESISTOR									
MARK	RATING				TEMP. COEFF.	TOL.	SPECIAL	SPECIAL	SPECIAL
	Ω	K	M	W					
R001	JUMPER								
R002	100	5k	1/4	W	10	1/4			
R003					10	1/4			
R004	470K	5k	1/2	A	15	1/4			
R005	2.2	5k	5	1/4	10	1/4			
R010	470K	5k	1/2	A	15	1/4			
R011	470K	5k	1/2	A	15	1/4			
R101	3.9k	1k	1/4	A	15	1/4			
R102	3k	1k	1/4	A	15	1/4			
R103	30k	5k	1/4	A	15	1/4			
R104	3.9k	5k	1/4	A	15	1/4			
R105	7.5k	5k	1/4	A	15	1/4			
R106	2.4k	5k	1/4	A	15	1/4			
R107	1	1k	2	B	15	1/4			
R108	1k	1k	1/4	A	15	1/4			
R109	510	5k	1/4	A	15	1/4			
R110	1.5k	1k	1/4	A	15	1/4			
R114	1k	5k	1/4	A	15	1/4			
R115	JUMPER WIRE								
R201	10k	5k	1/4	C	10	1/4			
R202	10k	5k	1/4	C	10	1/4			
R203	2k	5k	1/4	C	10	1/4			
R204	2k	5k	1/4	C	10	1/4			
R205	2k	5k	1/4	C	10	1/4			
R206	2k	5k	1/4	C	10	1/4			
R207	10k	5k	1/4	C	10	1/4			
R212	2k	5k	1/4	C	10	1/4			
R215	10k	5k	1/4	C	10	1/4			
R216	10k	5k	1/4	C	10	1/4			
R217	10k	5k	1/4	C	10	1/4			
R219	10k	5k	1/4	C	10	1/4			
R220	1k	5k	1/4	C	10	1/4			
R221	10k	1k	1/4	C	10	1/4			
R222	510	5k	1/4	C	10	1/4			
R223	10k	5k	1/4	C	10	1/4			
R224	10k	5k	1/4	C	10	1/4			
R225	10k	5k	1/4	C	10	1/4			
R226	10k	5k	1/4	C	10	1/4			
R227	10k	5k	1/4	C	10	1/4			
R228	10k	5k	1/4	C	10	1/4			
R229	10k	5k	1/4	C	10	1/4			
R230	10k	5k	1/4	C	10	1/4			
R231	10k	5k	1/4	C	10	1/4			
R232	10k	5k	1/4	C	10	1/4			
R233	10k	5k	1/4	C	10	1/4			
R234	10k	5k	1/4	C	10	1/4			
R236	10k	5k	1/4	C	10	1/4			
R237	5.1k	5k	1/4	C	10	1/4			
R238	10k	5k	1/4	C	10	1/4			
R239	10k	5k	1/4	C	10	1/4			
R240	1k	5k	1/4	C	10	1/4			
R243	10k	5k	1/4	C	10	1/4			
R244	2k	5k	1/4	C	10	1/4			
R245	5.1k	5k	1/4	C	10	1/4			
R246	10k	5k	1/4	C	10	1/4			
R247	3.18k	1k	1/4	C	10	1/4			
R248	1k	5k	1/4	C	10	1/4			
R249	20k	1k	1/4	C	10	1/4			
R250	10k	5k	1/4	C	10	1/4			
R251	10k	5k	1/4	C	10	1/4			
R252	3k	5k	1/4	C	10	1/4			
R254	10k	5k	1/4	C	10	1/4			
R255	2k	5k	1/4	C	10	1/4			
R256	10k	5k	1/4	C	10	1/4			
R257	3k	5k	1/4	C	10	1/4			
R258	6.25k	1k	1/4	C	10	1/4			
R259	6.25k	1k	1/4	C	10	1/4			
R260	10k	1k	1/4	C	10	1/4			
R261	10k	1k	1/4	C	10	1/4			
R262	10k	1k	1/4	C	10	1/4			
R263	1k	5k	1/4	C	10	1/4			
R264	10k	5k	1/4	C	10	1/4			
R265	2k	5k	1/4	C	10	1/4			
R266	10k	5k	1/4	C	10	1/4			
R267	3k	5k	1/4	C	10	1/4			
R268	1k	5k	1/4	C	10	1/4			
R269	6.25k	1k	1/4	C	10	1/4			
R270	2k	5k	1/4	C	10	1/4			
R271	10k	1k	1/4	C	10	1/4			
R272	10k	1k	1/4	C	10	1/4			
R273	1k	5k	1/4	C	10	1/4			
R274	10k	5k	1/4	C	10	1/4			
R275	2k	5k	1/4	C	10	1/4			
R276	10k	5k	1/4	C	10	1/4			
R277	3k	5k	1/4	C	10	1/4			
R278	1k	5k	1/4	C	10	1/4			
R279	6.25k	1k	1/4	C	10	1/4			
R280	2k	5k	1/4	C	10	1/4			
R281	10k	1k	1/4	C	10	1/4			
R282	10k	1k	1/4	C	10	1/4			
R283	1k	5k	1/4	C	10	1/4			
R285									
R286	2k	1k	1/4	C	10	1/4			
R287	2k	5k	1/4	C	10	1/4			
R288	1k	5k	1/4	C	10	1/4			
R289	1k	1k	1/4	C	10	1/4			
R290	10k	5k	1/4	C	10	1/4			
R291	4.7k	5k	1/4	C	10	1/4			
R292	3.9k	1k	1/4	C	10	1/4			
R293	1.6k	5k	1/4	C	10	1/4			
R294	27k	5k	1/4	C	10	1/4			
R295	5.1k	5k	1/4	C	10	1/4			
R296	10k	5k	1/4	C	10	1/4			
R301	3.74k	1k	1/4	C	10	1/4			
R302	3.81k	1k	1/4	C	10	1/4			
R303	5.1k	1k	1/4	C	10	1/4			
R304	10k	5k	1/4	C	10	1/4			
R305	10k	5k	1/4	C	10	1/4			

RESISTOR				
MARK	RATING	W	TEMP	
	Ω	W	°C	
R308	10 5k	1/16	0.1	175
R309	2k 2k	1/16	0.1	175
R310	2k 2k	1/16	0.1	175
R311	2k 2k	1/16	0.1	175
R312	2k 2k	1/16	0.1	175
R313	2k 2k	1/16	0.1	175
R314	2k 2k	1/16	0.1	175
R315	1k 1k	1/16	0.1	175
R317	1k 5k	1/16	0.1	175
R318	1k 5k	1/16	0.1	175
R319	1k 5k	1/16	0.1	175
R320	1k 5k	1/16	0.1	175
R321	1k 5k	1/16	0.1	175
R322	1k 5k	1/16	0.1	175
R323	1k 5k	1/16	0.1	175
R324	1k 5k	1/16	0.1	175
R325	10k 5k	1/16	0.1	175
R326	10k 5k	1/16	0.1	175
R327	1k 5k	1/16	0.1	175
R328	2.7k 5k	1/16	0.1	175
R329	2.7k 5k	1/16	0.1	175
R330	1k 5k	1/16	0.1	175
R331	4.7k 5k	1/16	0.1	175
R332	10k 5k	1/16	0.1	175
R333	10k 5k	1/16	0.1	175
R334	10k 5k	1/16	0.1	175
R335	10k 5k	1/16	0.1	175
R336	10k 5k	1/16	0.1	175
R338	2k 5k	1/16	0.1	175
R339	IMP 5k	1/16	0.1	175
R340	10k 5k	1/16	0.1	175
R341	10k 5k	1/16	0.1	175
R342	10k 5k	1/16	0.1	175
R343	10k 5k	1/16	0.1	175
R344	10k 5k	1/16	0.1	175
R345	10k 5k	1/16	0.1	175
R350	1.5k 1k	1/16	0.1	175
R351	1.5k 1k	1/16	0.1	175
R352	1.5k 1k	1/16	0.1	175
R353	1.5k 1k	1/16	0.1	175
R354	4.7k 2k	1/16	0.1	175
R355	4.7k 2k	1/16	0.1	175
R356	10k 5k	1/16	0.1	175
R357	2k 5k	1/16	0.1	175
R358	3k 5k	1/16	0.1	175
R401	5.1k 5k	1/16	0.1	175
R402	1.5k 5k	1/16	0.1	175
R403	390 5k	1/16	0.1	175
R404	390 5k	1/16	0.1	175
R501	1k 5k	1/16	0.1	175
R502	1k 5k	1/16	0.1	175
R503	1k 5k	1/16	0.1	175
R504	1k 5k	1/16	0.1	175
R505	1k 5k	1/16	0.1	175
R506	1k 5k	1/16	0.1	175
R508	1k 5k	1/16	0.1	175
R507	1k 5k	1/16	0.1	175
R508	1k 5k	1/16	0.1	175
R509	1k 5k	1/16	0.1	175
R510	1k 5k	1/16	0.1	175
R511	1k 5k	1/16	0.1	175
R512	1k 5k	1/16	0.1	175
R521	10k 5k	1/16	0.1	175
R522	10k 5k	1/16	0.1	175
R523	10k 5k	1/16	0.1	175
R524	10k 5k	1/16	0.1	175
R525	10k 5k	1/16	0.1	175
R526	10k 5k	1/16	0.1	175
R531	1k 5k	1/16	0.1	175
R532	1k 5k	1/16	0.1	175
R533	1k 5k	1/16	0.1	175
R534	1k 5k	1/16	0.1	175
R535	1k 5k	1/16	0.1	175
R536	1k 5k	1/16	0.1	175
R538	1k 5k	1/16	0.1	175
R601	2k 5k	1/16	0.1	175
R602	2k 5k	1/16	0.1	175
R603	2k 5k	1/16	0.1	175
R604	10k 5k	1/16	0.1	175
R605	10k 5k	1/16	0.1	175
R606	10k 5k	1/16	0.1	175
R607	10k 5k	1/16	0.1	175
R608	0.2k 1k	1/16	0.1	175
R610	0.2k 1k	1/16	0.1	175
R611	0.2k 1k	1/16	0.1	175
R701	1W 5k	1/2 A P	0.5	175
R702	1W 5k	1/2 A P	0.5	175
R703	100k 5k	2 A P	0.5	175
R708	10 5k	1/4 A P	0.5	175
R710	1.8k 5k	1/4 A P	0.5	175
R711	1.8k 5k	1/4 A P	0.5	175
R712	3k 5k	1/4 A P	0.5	175
R713	2k 5k	1/4 A P	0.5	175
R714	3.3k 5k	1/4 A P	0.5	175
R715	80k 5k	1/4 A P	0.5	175
R719	0.5k 5k	1 A P	0.5	175
R720	0.5k 5k	1 A P	0.5	175
R718	0.5k 5k	1 A P	0.5	175
R719	0.5k 5k	1 A P	0.5	175
R722	2.7k 5k	1/4 A P	0.5	175
R723	3k 5k	1/4 A P	0.5	175
R724	3k 5k	1/4 A P	0.5	175
R725	IMP 5k	1/4 A P	0.5	175
R726	3.3k 5k	1/4 A P	0.5	175
R740	820k 5k	1/2 A P	0.5	175
R741	820k 5k	1/2 A P	0.5	175
R742	820k 5k	1/4 A P	0.5	175
R743	47k 5k	1/2 A P	0.5	175
R744	10 2k	1/4 A P	0.5	175
R745	10 2k	1/4 A P	0.5	175
R746	3.3k 5k	1/4 A P	0.5	175
R747	80k 5k	1/4 A P	0.5	175
R748	3.3k 5k	1/4 A P	0.5	175

RESISTOR									
MARK	RATING		W	H	L	T	S	F	E
	W	P							
R749	4.7K	5W	1/4	A	1	0	0	0	0
R750	150	5W	1/4	A	1	0	0	0	0
R760	100K	5W	1/4	A	1	0	0	0	0
R801	3K	5W	1/4	C	1	0	0	0	0
R802	3K	5W	1/4	C	1	0	0	0	0
R803	3K	5W	1/4	C	1	0	0	0	0
R804	3K	5W	1/4	C	1	0	0	0	0
R811	3K	5W	1/4	C	1	0	0	0	0
R812	3K	5W	1/4	C	1	0	0	0	0
R813	3K	5W	1/4	C	1	0	0	0	0
R814	3K	5W	1/4	C	1	0	0	0	0
R821	3K	5W	1/4	C	1	0	0	0	0
R822	3K	5W	1/4	C	1	0	0	0	0
R823	3K	5W	1/4	C	1	0	0	0	0
R824	3K	5W	1/4	C	1	0	0	0	0
R831	10K	5W	1/4	C	1	0	0	0	0
R832	5.5K	5W	1/2	A	1	0	0	0	0
R833	620	5W	1/4	A	1	0	0	0	0
R900	200	5W	1/4	C	1	0	0	0	0
R901	200	5W	1/4	C	1	0	0	0	0
R902	510	5W	1/4	C	1	0	0	0	0
R903	510	5W	1/4	C	1	0	0	0	0
R904	510	5W	1/4	C	1	0	0	0	0
R905	510	5W	1/4	C	1	0	0	0	0
R906	1K	5W	1/4	C	1	0	0	0	0
R907	10K	5W	1/4	C	1	0	0	0	0
R908	3K	5W	1/4	C	1	0	0	0	0
R910	200	5W	1/4	C	1	0	0	0	0
R911	200	5W	1/4	C	1	0	0	0	0
R912	510	5W	1/4	C	1	0	0	0	0
R913	510	5W	1/4	C	1	0	0	0	0
R914	510	5W	1/4	C	1	0	0	0	0
R915	510	5W	1/4	C	1	0	0	0	0
R916	1K	5W	1/4	C	1	0	0	0	0
R917	10K	5W	1/4	C	1	0	0	0	0
R918	3K	5W	1/4	C	1	0	0	0	0
R920	200	5W	1/4	C	1	0	0	0	0
R921	200	5W	1/4	C	1	0	0	0	0
R922	510	5W	1/4	C	1	0	0	0	0
R923	510	5W	1/4	C	1	0	0	0	0
R924	510	5W	1/4	C	1	0	0	0	0
R925	510	5W	1/4	C	1	0	0	0	0
R926	510	5W	1/4	C	1	0	0	0	0
R927	10K	5W	1/4	C	1	0	0	0	0
R928	3K	5W	1/4	C	1	0	0	0	0
CAPACITOR									
MARK	RATING		W	H	L	T	S	F	E
	W	P							
C001	0.01K	0.125V	C	1	0	0	0	0	0
C002	0.01K	0.125V	C	1	0	0	0	0	0
C003	0.001	50V	D	1	0	0	0	0	0
C005			C	1	0	0	0	0	0
C006	3.3K	0.125V	F	1	0	0	0	0	0
C007	0.01K	0.125V	C	1	0	0	0	0	0
C008	0.01K	0.125V	C	1	0	0	0	0	0
C009	0.01K	0.125V	C	1	0	0	0	0	0
C011			C	1	0	0	0	0	0
C012	0.01K	0.125V	C	1	0	0	0	0	0
C014	0.01K	0.125V	C	1	0	0	0	0	0
C015	0.01K	0.125V	C	1	0	0	0	0	0
C016	0.01K	0.125V	C	1	0	0	0	0	0
C017	0.01K	0.125V	C	1	0	0	0	0	0
C018	220	250	D	1	0	0	0	0	0
C021	220	250	D	1	0	0	0	0	0
C022	0.01K	0.125V	C	1	0	0	0	0	0
C023	0.01K	0.125V	C	1	0	0	0	0	0
C024	0.01K	0.125V	C	1	0	0	0	0	0
C025	0.01K	0.125V	C	1	0	0	0	0	0
C026	0.01K	0.125V	C	1	0	0	0	0	0
C101	0.002	430V	F	1	0	0	0	0	0
C102			C	1	0	0	0	0	0
C103	0.1	50V	D	1	0	0	0	0	0
C104	1000	50V	D	1	0	0	0	0	0
C105	100	10	D	1	0	0	0	0	0
C106			C	1	0	0	0	0	0
C109	0.1	50V	D	1	0	0	0	0	0
C201	0.1	25V	C	1	0	0	0	0	0
C202	2200	25V	C	1	0	0	0	0	0
C203	2200	25V	C	1	0	0	0	0	0
C205	0.1	50V	D	1	0	0	0	0	0
C206	0.1	25V	C	1	0	0	0	0	0
C207	0.1	25V	C	1	0	0	0	0	0
C208	0.1	25V	C	1	0	0	0	0	0
C209	0.1	25V	C	1	0	0	0	0	0
C210	0.047	50V	C	1	0	0	0	0	0
C211	0.1	25V	C	1	0	0	0	0	0
C212	0.047	50V	C	1	0	0	0	0	0
C213	0.047	50V	C	1	0	0	0	0	0
C214	0.001	50V	D	1	0	0	0	0	0
C215	0.1	25V	C	1	0	0	0	0	0
C216	4700	50V	C	1	0	0	0	0	0
C217	0.001	50V	D	1	0	0	0	0	0
C218	0.001	50V	D	1	0	0	0	0	0
C219	4700	50V	C	1	0	0	0	0	0
C220	0.047	50V	C	1	0	0	0	0	0
C221	0.001	10V	C	1	0	0	0	0	0
C222	4700	50V	C	1	0	0	0	0	0
C223	0.001	10V	C	1	0	0	0	0	0
C224	10	10V	C	1	0	0	0	0	0
C280	2.2	50V	D	1	0	0	0	0	0
C281	0.01	50V	C	1	0	0	0	0	0
C282	220	8V	D	1	0	0	0	0	0
C283	0.01	50V	C	1	0	0	0	0	0
C284	0.1	25V	C	1	0	0	0	0	0
C301	0.1	25V	C	1	0	0	0	0	0
C302	0.1	25V	C	1	0	0	0	0	0
C303	0.1	25V	C	1	0	0	0	0	0
C304	0.1	25V	C	1	0	0	0	0	0
C305	1	10V	C	1	0	0	0	0	0
C308	1	10V	C	1	0	0	0	0	0
C307	1	10V	C	1	0	0	0	0	0
C309	0.1	25V	C	1	0	0	0	0	0
C310	0.1	25V	C	1	0	0	0	0	0

CAPACITOR									
MARK	F	V	I _p	R	C	E	RATING		REMARK
							WV	TEMP	
C350	150	50	C	C					CH 100
C351	0.1	0.41V	50	C	C				CH 100
C402	100	10	C	C					CH 100
C403	100	25	C	C					CH 100
C404	350	25	C	C					CH 100
C601	800	50	C	C					CH 125
C602	800	50	C	C					CH 125
C603	800	50	C	C					CH 125
C604	800	50	C	C					CH 125
C605	1000	50	C	C					CH 125
C606	1000	50	C	C					CH 125
C607	1000	50	C	C					CH 125
C608	0.1	25	C	C					CH 100
C707	330	25	D	P					CH 100
C708	330	25	D	P					CH 100
C709	100	10	D	P					CH 100
C710	330	50	D	P					CH 100
C714	0.1	1KV	C	C					CH 100
C716	330	10	D	P					CH 100
C718	220	25	D	P					CH 100
C721	0.1	50	C	P					CH 100
C722			C	P					CH 100
C723	470	25V	C	P					CH 100
C724	0.1	50	C	P					CH 100
C725	0.1	50	C	P					CH 100
C731	330	25	D	P					CH 100
C732	470	50	D	P					CH 100
C733	1000	50	C	P					CH 100
C734	1000	AC25V	C	P					CH 100
C735	1000	AC25V	C	P					CH 100
C736	80	50	D	P					CH 100
C737	80	50	D	P					CH 100
C738	80	50	D	P					CH 100
C739	470	AC25V	C	P					CH 100
C751	10000	2X	C	P					CH 100
C752	470	50	D	P					CH 100
C753	0.01	AC25V	C	P					CH 100
C754	330	25	D	P					CH 100
C755	10000	50	C	P					CH 100
C756	1000	50	D	P					CH 100
C757	330	25	D	P					CH 100
C759	0.01	AC25V	C	P					CH 100
C760	470	50	D	P					CH 100
C761	470	50	D	P					CH 100
C762	100	50	D	P					CH 100
C763	0.1	50	C	P					CH 100
C801	0.15u	50	C	P					CH 100
C802	0.022	18	C	P					CH 100
C803	0.15u	50	C	P					CH 100
C804	0.01	AC25V	C	P					CH 100
C805	0.01	AC25V	C	P					CH 100
C806	0.01	AC25V	C	P					CH 100
C807	0.01	AC25V	C	P					CH 100
C808	0.1	25	C	C					CH 100
C811	0.15u	50	C	P					CH 100
C812	0.022	18	C	P					CH 100
C813	0.15u	50	C	P					CH 100
C814	0.01	AC25V	C	P					CH 100
C815	0.01	AC25V	C	P					CH 100
C816	0.01	AC25V	C	P					CH 100
C817	0.01	AC25V	C	P					CH 100
C818	0.1	25	C	C					CH 100
C820	470	AC25V	C	P					CH 100
C821	470	50	D	P					CH 100
C822	0.022	18	C	P					CH 100
C824	0.01	AC25V	C	P					CH 100
C825	0.01	AC25V	C	P					CH 100
C826	0.01	AC25V	C	P					CH 100
C827	0.01	AC25V	C	P					CH 100
C828	0.1	25	C	C					CH 100
C834	100u	25	D	P					CH 100
C835	100u	25	D	P					CH 100
C839	100u	25	D	P					CH 100
C901	0.1	25	C	C					CH 100
C902	0.01	50	C	P					CH 100
C903	0.01	50	C	P					CH 100
C904	0.01	50	C	P					CH 100
C905	0.01	50	C	P					CH 100
C911	0.1	25	C	C					CH 100
C912	0.01	50	C	P					CH 100
C913	0.01	50	C	P					CH 100
C914	0.01	50	C	P					CH 100
C915	0.01	50	C	P					CH 100
C921	0.1	25	C	C					CH 100
C922	0.01	50	C	P					CH 100
C923	0.01	50	C	P					CH 100
C924	0.01	50	C	P					CH 100
C925	0.01	50	C	P					CH 100
FUSE									
MARK	MODEL	WV	TEMP	REMARK					
2AFRSE	RM250250	1	P	C					
3AFRSE	RM250250	1	P	C					
25AFRSE	RM12501	1	P	C					
DIODE STACK									
MARK	MODEL	WV	TEMP	REMARK					
DS	DS15000H	1	P	C					
RELAY									
MARK	MODEL	WV	TEMP	REMARK					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
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RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
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RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					
RY	RY10010	1	P	C					

TRANSISTOR

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
0101	25A873	R	P	C	RE	SE	TE	RE	SE
0201	1N1402	C	P	C	RE	SE	TE	RE	SE
0202	1N1402	C	P	C	RE	SE	TE	RE	SE
0203	1N1402	C	P	C	RE	SE	TE	RE	SE
0206	25C2482L	C	P	C	RE	SE	TE	RE	SE
0208	25C2482L	C	P	C	RE	SE	TE	RE	SE
0210	25C2482L	C	P	C	RE	SE	TE	RE	SE
0210	25A1119C	C	P	C	RE	SE	TE	RE	SE
0210	C	P	C	RE	SE	TE	RE	SE	TE
0210	1N1402	C	P	C	RE	SE	TE	RE	SE
0350	25A11219C	C	P	C	RE	SE	TE	RE	SE
0351	25C2482L	C	P	C	RE	SE	TE	RE	SE
0501	25C2482L	C	P	C	RE	SE	TE	RE	SE
0502	25C2482L	C	P	C	RE	SE	TE	RE	SE
0503	25C2482L	C	P	C	RE	SE	TE	RE	SE
0504	25C2482L	C	P	C	RE	SE	TE	RE	SE
0505	25C2482L	C	P	C	RE	SE	TE	RE	SE
0506	25C2482L	C	P	C	RE	SE	TE	RE	SE
0601	25C26198C	C	P	C	RE	SE	TE	RE	SE
0602	25C26198C	C	P	C	RE	SE	TE	RE	SE
0603	25C26198C	C	P	C	RE	SE	TE	RE	SE
0831	25C1214C	R	P	C	RE	SE	TE	RE	SE
0901	25A11219C	C	P	C	RE	SE	TE	RE	SE
0902	25C26198C	C	P	C	RE	SE	TE	RE	SE
0903	25A11219C	C	P	C	RE	SE	TE	RE	SE
0904	25A11219C	C	P	C	RE	SE	TE	RE	SE
0905	25A11219C	C	P	C	RE	SE	TE	RE	SE

ZENER DIODE

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
Z101	A	P	C	RE	SE	TE	RE	SE	TE
Z102	RL76.8A	C	P	C	RE	SE	TE	RE	SE

LED

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
L301	LT1067A	C	P	C	RE	SE	TE	RE	SE
L302	LT1067A	C	P	C	RE	SE	TE	RE	SE
L303	LT1067A	C	P	C	RE	SE	TE	RE	SE

INDUCTOR

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
000	FX152110	H	P	C	RE	SE	TE	RE	SE
007	FX1045H	A	P	C	RE	SE	TE	RE	SE
L701	JUMPER WIRE	A	P	C	RE	SE	TE	RE	SE
L711	P-9-WH1L	A	P	C	RE	SE	TE	RE	SE
L712	P-9-WH1L	A	P	C	RE	SE	TE	RE	SE
L713	P-9-WH1L	A	P	C	RE	SE	TE	RE	SE
F82	BL010R1	A	P	C	RE	SE	TE	RE	SE
F82	BL010R1	A	P	C	RE	SE	TE	RE	SE
CT1	SIF-22M6	H	P	C	RE	SE	TE	RE	SE

PHOTO COUPLER

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
P08	PS2501	H	P	C	RE	SE	TE	RE	SE
P09	PS2501	H	P	C	RE	SE	TE	RE	SE
P102	PS2501	H	P	C	RE	SE	TE	RE	SE
P201	PS2501	H	P	C	RE	SE	TE	RE	SE
P202	PS2501	H	P	C	RE	SE	TE	RE	SE
P203	PS2501	H	P	C	RE	SE	TE	RE	SE
P803	PC817X	H	P	C	RE	SE	TE	RE	SE

JUMPER WIRE

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
JW2	NONE	A	P	C	RE	SE	TE	RE	SE
JW3	NONE	A	P	C	RE	SE	TE	RE	SE
JW5	NONE	A	P	C	RE	SE	TE	RE	SE
JW7	NONE	C	P	C	RE	SE	TE	RE	SE
JW8	NONE	C	P	C	RE	SE	TE	RE	SE
JW9	NONE	C	P	C	RE	SE	TE	RE	SE
JW10	NONE	C	P	C	RE	SE	TE	RE	SE
JW11	NONE	C	P	C	RE	SE	TE	RE	SE
JW12	NONE	C	P	C	RE	SE	TE	RE	SE
JW21	NONE	A	P	C	RE	SE	TE	RE	SE
JW22	NONE	A	P	C	RE	SE	TE	RE	SE
JW23	W0V17A	A	P	C	RE	SE	TE	RE	SE

SWITCH

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
SW16	W10M1510	R	P	C	RE	SE	TE	RE	SE

OSCILLATOR

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
X1	100K10K	H	P	C	RE	SE	TE	RE	SE

IF COIL

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
CR11	RMH3681	H	P	C	RE	SE	TE	RE	SE
CR12	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR13	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR14	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR15	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR16	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR17	RMH3573	H	P	C	RE	SE	TE	RE	SE
CR18	RMH3442	H	P	C	RE	SE	TE	RE	SE

IC

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
W100N	AX-8500	W	P	C	RE	SE	TE	RE	SE
EP7001	S2C20287-F-1	W	P	C	RE	SE	TE	RE	SE
IC1	S17-1623	H	P	C	RE	SE	TE	RE	SE
IC2	S17-50873	H	P	C	RE	SE	TE	RE	SE
IC3	IL40010H-1E1	W	P	C	RE	SE	TE	RE	SE
IC4	IL40010H-1E3	W	P	C	RE	SE	TE	RE	SE
IC5	IL40010H-1E1	W	P	C	RE	SE	TE	RE	SE
IC6	1074HC4051FPM	W	P	C	RE	SE	TE	RE	SE
IC7	1074HC4051FPM	W	P	C	RE	SE	TE	RE	SE
IC8	IL40010H	W	P	C	RE	SE	TE	RE	SE
IC11	1054325P	W	P	C	RE	SE	TE	RE	SE
IC12	1054325P	W	P	C	RE	SE	TE	RE	SE
IC13	1054325P	W	P	C	RE	SE	TE	RE	SE
RE01	107096C1	H	P	C	RE	SE	TE	RE	SE
RE02	96310N	H	P	C	RE	SE	TE	RE	SE
RE04	96354N	H	P	C	RE	SE	TE	RE	SE

D IODE

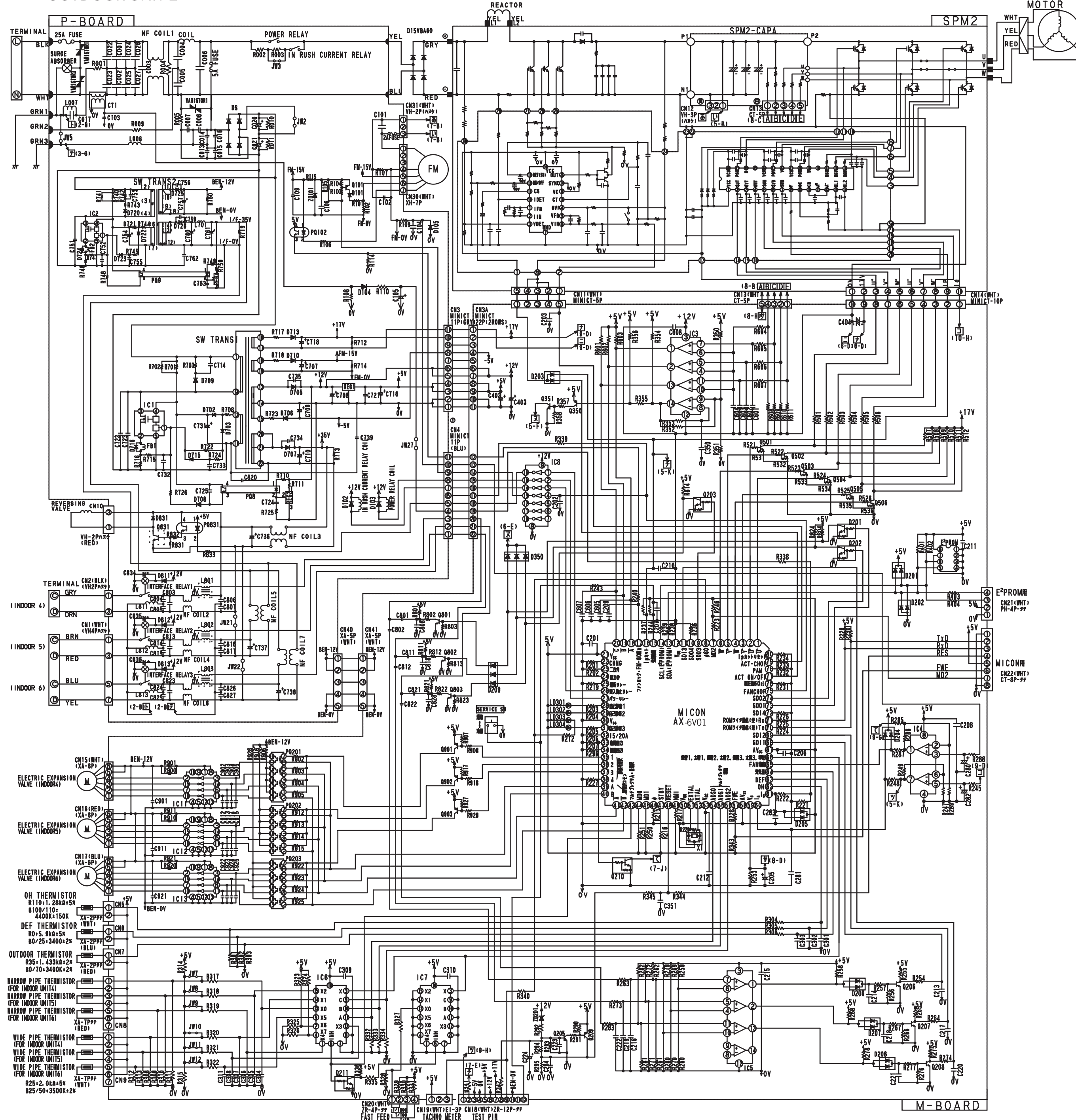
MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
D101	1G646	A	P	C	RE	SE	TE	RE	SE
D102	1S2076A	A	P	C	RE	SE	TE	RE	SE
D103	1S2076A	A	P	C	RE	SE	TE	RE	SE
D104	1S2076A	A	P	C	RE	SE	TE	RE	SE
D105	1S5120	A	P	C	RE	SE	TE	RE	SE
D201	DAR202K	C	P	C	RE	SE	TE	RE	SE
D202	DAP202K	C	P	C	RE	SE	TE	RE	SE
D203	DAP202K	C	P	C	RE	SE	TE	RE	SE
D204	DAR202K	C	P	C	RE	SE	TE	RE	SE
D205	DAR202K	C	P	C	RE	SE	TE	RE	SE
D206	DAR202K	C	P	C	RE	SE	TE	RE	SE
D207	DAR202K	C	P	C	RE	SE	TE	RE	SE
D208	DAR202K	C	P	C	RE	SE	TE	RE	SE
D209	RM2010V-1083L	C	P	C	RE	SE	TE	RE	SE
D301	RM2010V-1083L	C	P	C	RE	SE	TE	RE	SE
D702	1G646	A	P	C	RE	SE	TE	RE	SE
D703	1S5120	A	P	C	RE	SE	TE	RE	SE
D705	RN22	H	P	C	RE	SE	TE	RE	SE
D706	A004	A	P	C	RE	SE	TE	RE	SE
D707	RN32	H	P	C	RE	SE	TE	RE	SE
D708	JUMPER WIRE	A	P	C	RE	SE	TE	RE	SE
D709	RUIP	A	P	C	RE	SE	TE	RE	SE
D710	1G646	A	P	C	RE	SE	TE	RE	SE
D713	1G646	A	P	C	RE	SE	TE	RE	SE
D715	1S5120	A	P	C	RE	SE	TE	RE	SE
D716	DAR202K	C	P	C	RE	SE	TE	RE	SE
D720	SAS431	A	P	C	RE	SE	TE	RE	SE
D721	AG012	A	P	C	RE	SE	TE	RE	SE
D722	AG012	A	P	C	RE	SE	TE	RE	SE
D723	AG012	A	P	C	RE	SE	TE	RE	SE
D724	S2473	A	P	C	RE	SE	TE	RE	SE
D725	RN22	H	P	C	RE	SE	TE	RE	SE
D726	FLW-6225	A	P	C	RE	SE	TE	RE	SE
D811	1S5120	A	P	C	RE	SE	TE	RE	SE
D812	1S5120	A	P	C	RE	SE	TE	RE	SE
D813	1S5120	A	P	C	RE	SE	TE	RE	SE
D815	1S5120	A	P	C	RE	SE	TE	RE	SE

SURGE ARRESTER

MARK	MODEL	PC	RE	SE	TE	RE	SE	TE	RE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE	SE	TE	RE	SE	TE
450N	450N-120	P	C	RE</					

CIRCUIT DIAGRAM

OUTDOOR UNIT 2



MOUNTING
R -- RADIAL
C -- CHIP
A -- AXIAL
H -- HAND INSERT

PCB SET
NO MARKING ---#M-BOARDAS
P ---#P-BOARDAS

TYPE
F -- FILM
C -- CERAMIC
D -- ELECTROLYTIC

RESISTOR									
MARK	RATING				W	T	P	S	TOL
	Ω	W	V	P					
R001	JUMPER WIRE								
R002	100	5%	10	A	P	10			
R003						10	H	P	
R004	470K	5%	1/2	A	P	10			
R005	2.2	5%	5	H	P	10			
R006						1/2	A	P	
R010	470K	5%	1/2	A	P	10			
R011	470K	5%	1/2	A	P	10			
R101	3.6K	1%	1/8	A	P	25			
R102	3K	1%	1/8	A	P	25			
R103	3K	5%	1/8	A	P	25			
R104	3.6K	5%	1/8	A	P	25			
R105	7.5K	5%	1/8	A	P	25			
R108	2.4K	5%	1/8	A	P	25			
R107	1	1%	2	R	P	25			
R108	1K	1%	1/8	A	P	25			
R109	510K	5%	1/8	A	P	25			
R110	1.68K	1%	1/8	A	P	25			
R114	1K	5%	1/8	A	P	25			
R115	JUMPER WIRE								
R201	10K	5%	1/16	C		1000			
R202	10K	5%	1/16	C		1000			
R203	10K	5%	1/16	C		1000			
R204	2K	5%	1/16	C		1000			
R205	2K	5%	1/16	C		1000			
R208	10K	5%	1/16	C		1000			
R207	10K	5%	1/16	C		1000			
R212	2K	5%	1/16	C		1000			
R215	10K	5%	1/16	C		1000			
R216	10K	5%	1/16	C		1000			
R217	10K	5%	1/16	C		1000			
R220	1M	5%	1/16	C		1000			
R221	10K	1%	1/16	C		1000			
R222	510	5%	1/16	C		1000			
R223	10K	5%	1/16	C		1000			
R224	10K	5%	1/16	C		1000			
R225	10K	5%	1/16	C		1000			
R226	10K	5%	1/16	C		1000			
R227	10K	5%	1/16	C		1000			
R228	10K	5%	1/16	C		1000			
R229	10K	5%	1/16	C		1000			
R231	10K	5%	1/16	C		1000			
R232	10K	5%	1/16	C		1000			
R233	10K	5%	1/16	C		1000			
R234	10K	5%	1/16	C		1000			
R238	10K	5%	1/16	C		1000			
R237	5.1K	5%	1/16	C		1000			
R238	10K	5%	1/16	C		1000			
R239	10K	5%	1/16	C		1000			
R240	1K	5%	1/16	C		25000			
R243	10K	5%	1/16	C		1000			
R244	2K	5%	1/16	C		100			
R245	5.1K	5%	1/16	C		1000			
R246	10K	5%	1/16	C		1000			
R247	3.16K	1%	1/16	C		1000			
R248	1K	5%	1/16	C		25000			
R249	20K	1%	1/16	C		1000			
R250	10K	5%	1/16	C		1000			
R251	10K	5%	1/16	C		1000			
R252	3.32K	1%	1/16	C		25000			
R254	10K	5%	1/16	C		1000			
R255	2K	5%	1/16	C		1000			
R256	3K	5%	1/16	C		1000			
R257	10K	5%	1/16	C		1000			
R258	1K	5%	1/16	C		25000			
R259	6.25K	1%	1/16	C		25000			
R260	10K	1%	1/16	C		1000			
R261	10K	1%	1/16	C		1000			
R262	10K	1%	1/16	C		1000			
R263	1K	5%	1/16	C		25000			
R264	10K	5%	1/16	C		1000			
R265	2K	5%	1/16	C		1000			
R268	10K	5%	1/16	C		1000			
R267	3K	5%	1/16	C		1000			
R268	10K	5%	1/16	C		1000			
R269	6.25K	1%	1/16	C		25000			
R270	10K	1%	1/16	C		1000			
R271	10K	1%	1/16	C		1000			
R272	10K	1%	1/16	C		1000			
R273	10K	1%	1/16	C		1000			
R274	10K	5%	1/16	C		1000			
R275	2K	5%	1/16	C		1000			
R276	10K	5%	1/16	C		1000			
R277	3K	5%	1/16	C		25000			
R278	10K	5%	1/16	C		1000			
R279	6.25K	1%	1/16	C		25000			
R280	10K	1%	1/16	C		1000			
R281	10K	1%	1/16	C		1000			
R282	10K	1%	1/16	C		1000			
R283	1K	5%	1/16	C		25000			
R285						1000			
R286	2K	1%	1/16	C		25000			
R287	2K	5%	1/16	C		1000			
R288	1K	5%	1/16	C		25000			
R289	1K	1%	1/16	C		25000			
R290	10K	5%	1/16	C		1000			
R291	4.7K	5%	1/16	C		25000			
R292	3K	5%	1/16	C		25000			
R293	1.1K	5%	1/16	C		25000			
R294	27K	5%	1/16	C		25000			
R295	5.1K	5%	1/16	C		25000			
R298	10K	5%	1/16	C		1000			
R301	3.74K	1%	1/16	C		25000			
R302	3.01K	1%	1/16	C		25000			
R303	3.1K	5%	1/16	C		25000			
R304	10K	5%	1/16	C		1000			
R305	10K	5%	1/16	C		1000			

RESISTOR									
MARK	RATING			W	T	C	F	S	M
	Ω	W	V						
R308	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R309	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R309	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R310	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R311	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R312	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R313	2K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R314	5K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R315	5K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R317	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R318	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R319	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R320	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R321	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R322	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R323	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R324	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R325	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R326	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R327	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R328	2.7K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R329	470	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R330	1.6K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R331	4.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R332	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R333	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R334	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R335	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R336	2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R337	JUMPER	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R340	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R341	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R342	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R343	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R344	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R345	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R350	120K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R351	120K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R352	120K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R353	120K	1	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R354	4.3K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R355	4.3K	2	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R356	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R357	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R358	5K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R401	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R402	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R403	390	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R404	390	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R501	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R502	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R503	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R504	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R505	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R506	1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R507	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R508	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R509	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R510	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R511	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R512	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R521	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R522	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R523	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R524	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R525	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R526	10K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R531	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R532	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R533	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R534	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R535	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R536	5.1K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R601	2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R602	2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R603	2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R604	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R605	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R606	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R607	100	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R608	4.02K	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R609	4.02K	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R610	4.02K	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R711	4.02K	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R701	1M	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R702	1M	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R703	100K	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R704	100K	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R710	1.8K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R711	75	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R712	3.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R713	6.2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R714	6.2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R715	680	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R716	0.5K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R717	JUMPER	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R718	8.2	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R719	8.2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R722	2.7K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R723	3.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R724	2.7K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R725	JUMPER	1.6	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R729	3.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R740	320K	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R741	320K	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R742	320K	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R743	47	5	1/2	1/4	1/4	1/4	1/4	1/4	1/4
R744	10	2K	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R745	2K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R746	3.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R747	680	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4
R748	3.3K	5	1/4	1/8	1/4	1/4	1/4	1/4	1/4

RESISTOR									
MARK	RATING		W	P	T	S	C	F	V
	Ω	K							
R74X	4.7K	5m 1/4A	P	33	1	1	1	1	1
R750	150	5m 1/4A	P	33	1	1	1	1	1
R760	100K	5m 1/4A	P	33	1	1	1	1	1
R801	3K	5m 1/4C		23	1	1	1	1	1
R802	3K	5m 1/4C		23	1	1	1	1	1
R803	3K	5m 1/4C		23	1	1	1	1	1
R804	3K	5m 1/4C		23	1	1	1	1	1
R811	3K	5m 1/4C		23	1	1	1	1	1
R812	3K	5m 1/4C		23	1	1	1	1	1
R813	3K	5m 1/4C		23	1	1	1	1	1
R814	3K	5m 1/4C		23	1	1	1	1	1
R821	3K	5m 1/4C		23	1	1	1	1	1
R822	3K	5m 1/4C		23	1	1	1	1	1
R823	3K	5m 1/4C		23	1	1	1	1	1
R824	3K	5m 1/4C		23	1	1	1	1	1
R831	10K	5m 1/2A	P	33	1	1	1	1	1
R832	1.5K	5m 1/2A	P	33	1	1	1	1	1
R833	620	5m 1/2A	P	33	1	1	1	1	1
R900	200	5m 1/16C		23	1	1	1	1	1
R901	200	5m 1/16C		23	1	1	1	1	1
R902	510	5m 1/16C		23	1	1	1	1	1
R903	510	5m 1/16C		23	1	1	1	1	1
R904	510	5m 1/16C		23	1	1	1	1	1
R905	510	5m 1/16C		23	1	1	1	1	1
R906	510	5m 1/16C		23	1	1	1	1	1
R907	10K	5m 1/16C		23	1	1	1	1	1
R908	3K	5m 1/16C		23	1	1	1	1	1
R910	200	5m 1/16C		23	1	1	1	1	1
R911	200	5m 1/16C		23	1	1	1	1	1
R912	510	5m 1/16C		23	1	1	1	1	1
R913	510	5m 1/16C		23	1	1	1	1	1
R914	510	5m 1/16C		23	1	1	1	1	1
R915	510	5m 1/16C		23	1	1	1	1	1
R916	3K	5m 1/16C		23	1	1	1	1	1
R917	10K	5m 1/16C		23	1	1	1	1	1
R918	3K	5m 1/16C		23	1	1	1	1	1
R919	10K	5m 1/16C		23	1	1	1	1	1
R920	200	5m 1/16C		23	1	1	1	1	1
R921	200	5m 1/16C		23	1	1	1	1	1
R922	510	5m 1/16C		23	1	1	1	1	1
R923	510	5m 1/16C		23	1	1	1	1	1
R924	510	5m 1/16C		23	1	1	1	1	1
R925	510	5m 1/16C		23	1	1	1	1	1
R926	3K	5m 1/16C		23	1	1	1	1	1
R927	10K	5m 1/16C		23	1	1	1	1	1
R928	3K	5m 1/16C		23	1	1	1	1	1
CAPACITOR									
MARK	RATING		W	P	T	S	C	F	V
	F	V							
C001	0.01	250V	C	R	F	75	1	1	1
C002	0.01	250V	C	R	F	75	1	1	1
C003	0.04	350V	C	R	F	75	1	1	1
C005									
C006	3.3	100V	F	I	P	68	1	1	1
C007	0.01	250V	C	R	F	75	1	1	1
C008	0.01	250V	C	R	F	75	1	1	1
C010			D	I	P	1	1	1	1
C011			D	I	P	1	1	1	1
C013	0.01	250V	C	R	F	75	1	1	1
C014	0.01	250V	C	R	F	75	1	1	1
C015	0.01	250V	C	R	F	75	1	1	1
C016	0.01	250V	C	R	F	75	1	1	1
C017	0.01	250V	C	R	F	75	1	1	1
C020	220	250V	D	I	P	68	1	1	1
C021	0.01	250V	C	R	F	75	1	1	1
C022	0.01	250V	C	R	F	75	1	1	1
C023	0.01	250V	C	R	F	75	1	1	1
C024	0.01	250V	C	R	F	75	1	1	1
C025	0.01	250V	C	R	F	75	1	1	1
C026	0.01	250V	C	R	F	75	1	1	1
C027	0.01	250V	C	R	F	75	1	1	1
C028	0.01	630V	C	R	F	75	1	1	1
C030									
C103	0.1	50V	C	R	F	68	1	1	1
C104	1000	50V	D	I	P	68	1	1	1
C105	100	10V	D	R	P	63	1	1	1
C106									
C109	0.1	50V	C	R	F	68	1	1	1
C201	0.1	25V	C	C	F	67	1	1	1
C202	2200	25V	C	C	F	68	1	1	1
C203	2200	25V	C	C	F	68	1	1	1
C205	0.1	25V	C	C	F	68	1	1	1
C206	0.1	25V	C	C	F	68	1	1	1
C207	0.047	50V	C	C	F	68	1	1	1
C208	0.1	25V	C	C	F	68	1	1	1
C209	0.1	25V	C	C	F	68	1	1	1
C210	0.1	25V	C	C	F	68	1	1	1
C211	0.1	25V	C	C	F	68	1	1	1
C212	0.1	25V	C	C	F	68	1	1	1
C213	0.047	50V	C	C	F	68	1	1	1
C214	0.068	16V	C	C	F	68	1	1	1
C215	0.1	25V	C	C	F	68	1	1	1
C217	4700	50V	C	C	F	68	1	1	1
C218	0.047	50V	C	C	F	68	1	1	1
C219	4700	50V	C	C	F	68	1	1	1
C220	4700	50V	C	C	F	68	1	1	1
C221	4700	50V	C	C	F	68	1	1	1
C222	4700	50V	C	C	F	68	1	1	1
C223	0.1	25V	C	C	F	68	1	1	1
C224	16	16V	C	C	F	68	1	1	1
C280	2.2	50V	D	C	F	68	1	1	1
C281	0.01	50V	C	C	F	68	1	1	1
C282	22	6.3V	D	C	F	68	1	1	1
C283	0.1	25V	C	C	F	68	1	1	1
C284	0.1	25V	C	C	F	68	1	1	1
C301	0.1	25V	C	C	F	68	1	1	1
C302	0.1	25V	C	C	F	68	1	1	1
C303	0.1	25V	C	C	F	68	1	1	1
C304	1	16V	C	C	F	68	1	1	1
C305	1	16V	C	C	F	68	1	1	1
C306	10	16V	C	C	F	68	1	1	1
C307	1	16V	C	C	F	68	1	1	1

CAPACITOR	
MARK	RATING
	F V
C311	1
C350	150V 50
C351	400V 100
C402	100V 10
C403	100V 10
C404	33V 25
C601	680V 50
C602	680V 50
C603	680V 50
C604	680V 50
C605	1000V 50
C606	100V 50
C607	1000V 50
C608	0.1 μ F 25
C701	330V 25
C708	330V 25
C709	330V 25
C710	330V 50
C711	0.01 μ F 1KV
C716	330V 10
C718	22V 25
C721	0.1 μ F 50
C722	0.1 μ F 50
C723	0.01 μ F 2KV
C724	0.01 μ F 50
C725	0.01 μ F 50
C731	330V 25
C732	470V 50
C733	470V 50
C734	470V 50
C735	100V 50
C736	68V 50
C737	68V 50
C738	68V 50
C739	470V 50
C751	0.0001 μ F 25
C752	0.01 μ F 50
C753	0.01 μ F 50
C754	330V 25
C755	100V 50
C756	100V 50
C757	330V 25
C801	0.1 μ F 50
C802	0.022 μ F 16
C803	0.1 μ F 50
C805	0.1 μ F 50
C806	0.01 μ F 25
C807	0.01 μ F 25
C808	0.1 μ F 25
C811	0.1 μ F 50
C812	0.022 μ F 16
C813	0.1 μ F 50
C814	0.01 μ F 25
C815	0.01 μ F 25
C816	0.01 μ F 25
C817	0.01 μ F 25
C818	0.1 μ F 25
C820	470V 50
C821	0.1 μ F 50
C822	0.022 μ F 16
C823	0.1 μ F 50
C824	0.01 μ F 25
C825	0.01 μ F 25
C826	0.01 μ F 25
C827	0.01 μ F 25
C828	0.1 μ F 25
C834	100V 25
C835	100V 25
C836	100V 25
C901	0.1 μ F 25
C902	0.01 μ F 25
C903	0.01 μ F 25
C904	0.01 μ F 50
C905	0.01 μ F 50
C911	0.1 μ F 25
C912	0.01 μ F 25
C913	0.01 μ F 25
C914	0.01 μ F 50
C915	0.01 μ F 50
C921	0.1 μ F 25
C922	0.01 μ F 25
C923	0.01 μ F 50
C924	0.01 μ F 50
C925	0.01 μ F 50
FUSE	
MARK	MARK
10A	10A
20A	20A
30A	30A
40A	40A
50A	50A
60A	60A
70A	70A
80A	80A
90A	90A
100A	100A
110A	110A
120A	120A
130A	130A
140A	140A
150A	150A
160A	160A
170A	170A
180A	180A
190A	190A
200A	200A
210A	210A
220A	220A
230A	230A
240A	240A
250A	250A
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360A	360A
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390A	390A
400A	400A
410A	410A
420A	420A
430A	430A
440A	440A
450A	450A
460A	460A

DIODE STACK	
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391S	391S
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403S	403S
404S	404S
405S	405S
406S	406S
407S	407S
408S	408S
409S	409S
410S	410S
411S	411S
412S	412S
413S	413S
414S	414S
415S	415S
416S	416S
417S	41

[illegible]

TRANSISTOR									
MARK	MODEL	TYPE	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18
0201	2SA73	R	P	C	100	100	100	100	100
0201	1N1402	C	P	C	100	100	100	100	100
0202	1N1402	C	P	C	100	100	100	100	100
0203	2SC2482L1	C	P	C	100	100	100	100	100
0204	2SC2482L1	C	P	C	100	100	100	100	100
0205	2SC2482L1	C	P	C	100	100	100	100	100
0206	2SC2482L1	C	P	C	100	100	100	100	100
0207	2SC2482L1	C	P	C	100	100	100	100	100
0208	2SC2482L1	C	P	C	100	100	100	100	100
0209	2SC2482L1	C	P	C	100	100	100	100	100
0210	2SC2482L1	C	P	C	100	100	100	100	100
0211	1N1402	C	P	C	100	100	100	100	100
0350	2SA1219C	C	P	C	100	100	100	100	100
0351	2SC2482L1	C	P	C	100	100	100	100	100
0501	2SC2482L1	C	P	C	100	100	100	100	100
0502	2SC2482L1	C	P	C	100	100	100	100	100
0503	2SC2482L1	C	P	C	100	100	100	100	100
0504	2SC2482L1	C	P	C	100	100	100	100	100
0505	2SC2482L1	C	P	C	100	100	100	100	100
0506	2SC2482L1	C	P	C	100	100	100	100	100
0601	2SC2482L1	C	P	C	100	100	100	100	100
0602	2SC2482L1	C	P	C	100	100	100	100	100
0603	2SC2482L1	C	P	C	100	100	100	100	100
0831	2SC1214C1	R	P	C	100	100	100	100	100
0901	2SA1219C	C	P	C	100	100	100	100	100
0902	2SA1219C	C	P	C	100	100	100	100	100
0903	2SA1219C	C	P	C	100	100	100	100	100
ZENER DIODE									
MARK	MODEL	TYPE	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18
ZNR1	100V	A	P	C	100	100	100	100	100
ZNR2	100V	A	P	C	100	100	100	100	100
LED									
MARK	MODEL	TYPE	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18
L301	1N1078A	C	P	C	100	100	100	100	100
L302	1N1078A	C	P	C	100	100	100	100	100
L303	1N1078A	C	P	C	100	100	100	100	100
L304	1N1078A	C	P	C	100	100	100	100	100
INDUCTOR									
MARK	MODEL	TYPE	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18	TO-18
L006	FC10455V	A	P	C	100	100	100	100	100
L007	FC10455V	A	P	C	100	100	100	100	100
L711	100V	A	P	C	100	100	100	100	100
L812	100V	A	P	C	100	100	100	100	100
L813	100V	A	P	C	100	100	100	100	100
L814	100V	A	P	C	100	100	100	100	100
F82	100V	A	P	C	100	100	100	100	100
CT1	100V	A	P	C	100	100	100	100	100

IC

MARK	MODEL	TYPE	TEMP	MAX	MAX	MAX	MAX	MAX	MAX
IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10
IC11	IC12	IC13	IC14	IC15	IC16	IC17	IC18	IC19	IC20
IC21	IC22	IC23	IC24	IC25	IC26	IC27	IC28	IC29	IC30
IC31	IC32	IC33	IC34	IC35	IC36	IC37	IC38	IC39	IC40
IC41	IC42	IC43	IC44	IC45	IC46	IC47	IC48	IC49	IC50
IC51	IC52	IC53	IC54	IC55	IC56	IC57	IC58	IC59	IC60
IC61	IC62	IC63	IC64	IC65	IC66	IC67	IC68	IC69	IC70
IC71	IC72	IC73	IC74	IC75	IC76	IC77	IC78	IC79	IC80
IC81	IC82	IC83	IC84	IC85	IC86	IC87	IC88	IC89	IC90
IC91	IC92	IC93	IC94	IC95	IC96	IC97	IC98	IC99	IC100
IC101	IC102	IC103	IC104	IC105	IC106	IC107	IC108	IC109	IC110
IC111	IC112	IC113	IC114	IC115	IC116	IC117	IC118	IC119	IC120
IC121	IC122	IC123	IC124	IC125	IC126	IC127	IC128	IC129	IC130
IC131	IC132	IC133	IC134	IC135	IC136	IC137	IC138	IC139	IC140
IC141	IC142	IC143	IC144	IC145	IC146	IC147	IC148	IC149	IC150
IC151	IC152	IC153	IC154	IC155	IC156	IC157	IC158	IC159	IC160
IC161	IC162	IC163	IC164	IC165	IC166	IC167	IC168	IC169	IC170
IC171	IC172	IC173	IC174	IC175	IC176	IC177	IC178	IC179	IC180
IC181	IC182	IC183	IC184	IC185	IC186	IC187	IC188	IC189	IC190
IC191	IC192	IC193	IC194	IC195	IC196	IC197	IC198	IC199	IC200
IC201	IC202	IC203	IC204	IC205	IC206	IC207	IC208	IC209	IC210
IC211	IC212	IC213	IC214	IC215	IC216	IC217	IC218	IC219	IC220
IC221	IC222	IC223	IC224	IC225	IC226	IC227	IC228	IC229	IC230
IC231	IC232	IC233	IC234	IC235	IC236	IC237	IC238	IC239	IC240
IC241	IC242	IC243	IC244	IC245	IC246	IC247	IC248	IC249	IC250
IC251	IC252	IC253	IC254	IC255	IC256	IC257	IC258	IC259	IC260
IC261	IC262	IC263	IC264	IC265	IC266	IC267	IC268	IC269	IC270
IC271	IC272	IC273	IC274	IC275	IC276	IC277	IC278	IC279	IC280
IC281	IC282	IC283	IC284	IC285	IC286	IC287	IC288	IC289	IC290
IC291	IC292	IC293	IC294	IC295	IC296	IC297	IC298	IC299	IC300
IC301	IC302	IC303	IC304	IC305	IC306	IC307	IC308	IC309	IC310
IC311	IC312	IC313	IC314	IC315	IC316	IC317	IC318	IC319	IC320
IC321	IC322	IC323	IC324	IC325	IC326	IC327	IC328	IC329	IC330
IC331	IC332	IC333	IC334	IC335	IC336	IC337	IC338	IC339	IC340
IC341	IC342	IC343	IC344	IC345	IC346	IC347	IC348	IC349	IC350
IC351	IC352	IC353	IC354	IC355	IC356	IC357	IC358	IC359	IC360
IC361	IC362	IC363	IC364	IC365	IC366	IC367	IC368	IC369	IC370
IC371	IC372	IC373	IC374	IC375	IC376	IC377	IC378	IC379	IC380
IC381	IC382	IC383	IC384	IC385	IC386	IC387	IC388	IC389	IC390
IC391	IC392	IC393	IC394	IC395	IC396	IC397	IC398	IC399	IC400
IC401	IC402	IC403	IC404	IC405	IC406	IC407	IC408	IC409	IC410
IC411	IC412	IC413	IC414	IC415	IC416	IC417	IC418		

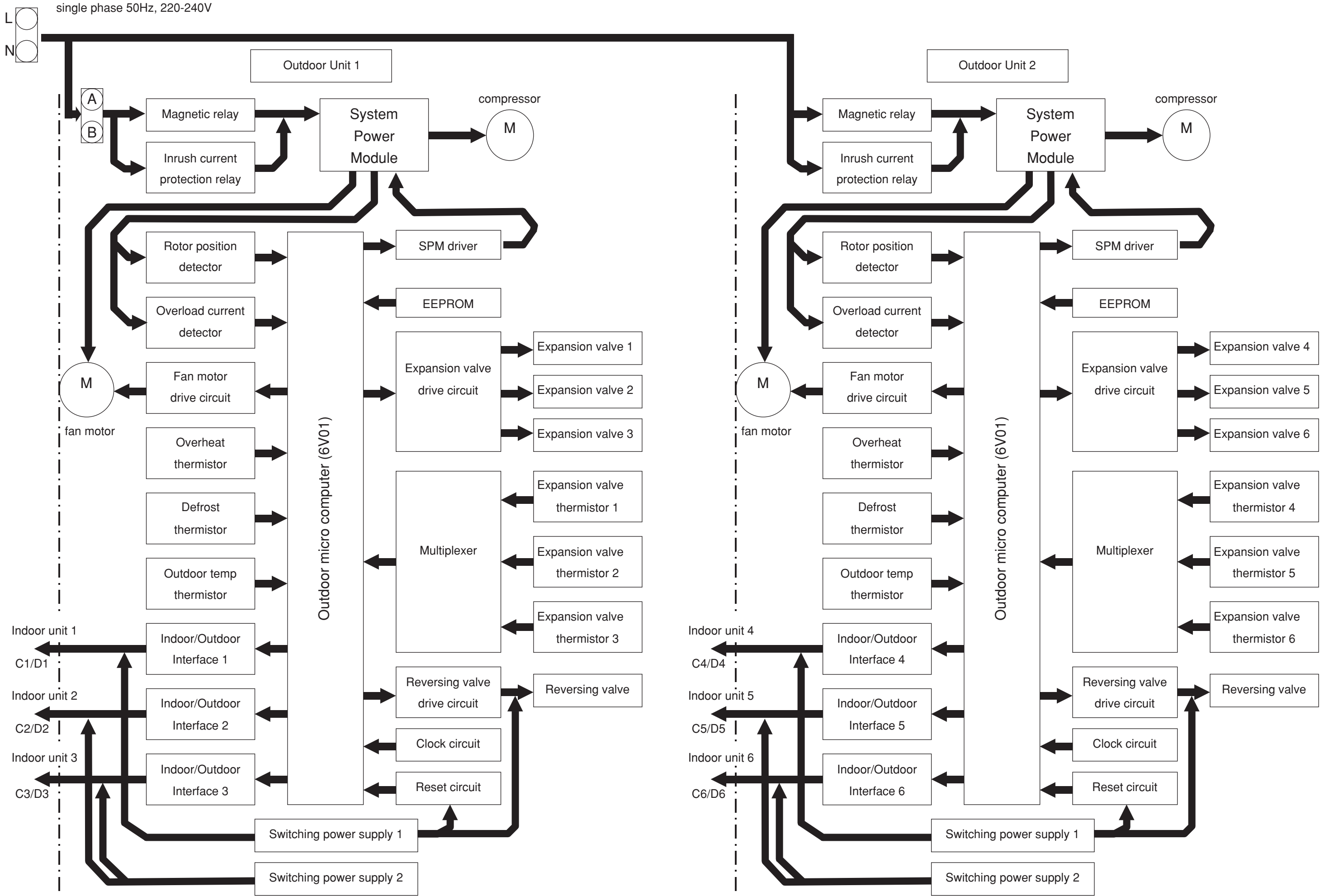
DIO

MARK	MODEL	TYPE	TEMP	MAX	MAX	MAX	MAX	MAX	MAX
D101	D102	D103	D104	D105	D106	D107	D108	D109	D110
D111	D112	D113	D114	D115	D116	D117	D118	D119	D120
D121	D122	D123	D124	D125	D126	D127	D128	D129	D130
D131	D132	D133	D134	D135	D136	D137	D138	D139	D140
D141	D142	D143	D144	D145	D146	D147	D148	D149	D150
D151	D152	D153	D154	D155	D156	D157	D158	D159	D160
D161	D162	D163	D164	D165	D166	D167	D168	D169	D170
D171	D172	D173	D174	D175	D176	D177	D178	D179	D180
D181	D182	D183	D184	D185	D186	D187	D188	D189	D190
D191	D192	D193	D194	D195	D196	D197	D198	D199	D200
D201	D202	D203	D204	D205	D206	D207	D208	D209	D210
D211	D212	D213	D214	D215	D216	D217	D218	D219	D220
D221	D222	D223	D224	D225	D226	D227	D228	D229	D230
D231	D232	D233	D234	D235	D236	D237	D238	D239	D240
D241	D242	D243	D244	D245	D246	D247	D248	D249	D250
D251	D252	D253	D254	D255	D256	D257	D258	D259	D260
D261	D262	D263	D264	D265	D266	D267	D268	D269	D270
D271	D272	D273	D274	D275	D276	D277	D278	D279	D280
D281	D282	D283	D284	D285	D286	D287	D288	D289	D290
D291	D292	D293	D294	D295	D296	D297	D298	D299	D300
D301	D302	D303	D304	D305	D306	D307	D308	D309	D310
D311	D312	D313	D314	D315	D316	D317	D318	D319	D320
D321	D322	D323	D324	D325	D326	D327	D328	D329	D330
D331	D332	D333	D334	D335	D336	D337	D338	D339	D340
D341	D342	D343	D344	D345	D346	D347	D348	D349	D350
D351	D352	D353	D354	D355	D356	D357	D358	D359	D360
D361	D362	D363	D364	D365	D366	D367	D368	D369	D370
D371	D372	D373	D374	D375	D376	D377	D378	D379	D380
D381	D382	D383	D384	D385	D386	D387	D388	D389	D390
D391	D392	D393	D394	D395	D396	D397	D398	D399	D400
D401	D402	D403	D404	D405	D406	D407	D408	D409	D410
D411	D412	D413	D414	D415	D416	D417	D418	D419	D420
D421	D422	D423	D424	D425	D426	D427	D428	D429	D430
D431	D432	D433	D434	D435	D436	D437	D438	D439	D440
D441	D442	D443	D444	D445	D446	D447	D448	D449	D450
D451	D452	D453	D454	D455	D456	D457	D458	D459	D460
D461	D462	D463	D464	D465	D466	D467	D468	D469	D470
D471	D472	D473	D474	D475	D476	D477	D478	D479	D480
D481	D482	D483	D484	D485	D486	D487	D488	D489	D490
D491	D492	D493	D494	D495	D496	D497	D498	D499	D500
D501	D502	D503	D504	D505	D506	D507	D508	D509	D510
D511	D512	D513	D514	D515	D516	D517	D518	D519	D520
D521	D522	D523	D524	D525	D526	D527	D528	D529	D530
D531	D532	D533	D534	D535	D536	D537	D538	D539	D540
D541	D542	D543	D544	D545	D546	D547	D548	D549	D550
D551	D552	D553	D554	D555	D556	D557	D558	D559	D560
D561	D562	D563	D564	D565	D566	D567	D568	D569	D570
D571	D572	D573	D574	D575	D576	D577	D578	D579	D580
D581	D582	D583	D584	D585	D586	D587	D588	D589	D590
D591	D592	D593	D594	D595	D596	D597	D598	D599	D600
D601	D602	D603	D604	D605	D606	D607	D608	D609	D610
D611	D612	D613	D614	D615	D616	D617	D618	D619	D620
D621	D622	D623	D624	D625	D626	D627	D628	D629	D630
D631	D632	D633	D634	D635	D636	D637	D638	D639	D640
D641	D642	D643	D644	D645	D646	D647	D648	D649	D650
D651	D652	D653	D654	D655	D656	D657	D658	D659	D660
D661	D662	D663	D664	D665	D666	D667	D668	D669	D670
D671	D672	D673	D674	D675	D676	D677	D678	D679	D680
D681	D682	D683	D684	D685	D686	D687	D688	D689	D690
D691	D692	D693	D694	D695	D696	D697	D698	D699	D700
D701	D702	D703	D704	D705	D706	D707	D708	D709	D710
D711	D712	D713	D714	D715	D716	D717	D718	D719	D720
D721	D722	D723	D724	D725	D726	D727	D728	D729	D730
D731	D732	D733	D734	D735	D736	D737	D738	D739	D740
D741	D742	D743	D744	D745	D746	D747	D748	D749	D750
D751	D752	D753	D754	D755	D756	D757	D758	D759	D760
D761	D762	D763	D764	D765	D766	D767	D768	D769	D770
D771	D772	D773	D774	D775	D776	D777	D778	D779	D780
D781	D782	D783	D784	D785	D786	D787	D788	D789	D790
D791	D792	D793	D794	D795	D796	D797	D798	D799	D800
D801	D802	D803	D804	D805	D806	D807	D808	D809	D810
D811	D812	D813	D814	D815	D816	D817	D818	D819	D820
D821	D822	D823	D824	D825	D826	D827	D828	D829	D830
D831	D832	D833	D834	D835	D836	D837	D838	D839	D840
D841	D842	D843	D844	D845	D846	D847	D848	D849	D850
D851	D852	D853	D854	D855	D856	D857	D858	D859	D860
D861	D862	D863	D864	D865	D866	D867	D868	D869	D870
D871	D872	D873	D874	D875	D876	D877	D878	D879	D880
D881	D882	D883	D884	D885	D886	D887	D888	D889	D890
D891	D892	D893	D894	D895	D896	D897	D898	D899	D900
D901	D902	D903	D904	D905	D906	D907	D908	D909	D910
D911	D912	D913	D914	D915	D916	D917	D918	D919	D920
D921	D922	D923	D924	D925	D926	D927	D928	D929	D930
D931	D932	D933	D934	D935	D936	D937	D938	D939	D940
D941	D942	D943	D944	D945	D946	D947	D948	D949	D950
D951	D952	D953	D954	D955	D956	D957	D958	D959	D960
D961	D962	D963	D964	D965	D966	D967	D968	D969	D970
D971	D972	D973	D974	D975	D976	D977	D978	D979	D980
D981	D982	D983	D984	D985	D986	D987	D988	D989	D990
D991	D992	D993	D994	D995	D996	D997	D998	D999	D1000

CON

MARK	MODEL	TYPE	TEMP	MAX	MAX	MAX	MAX	MAX	MAX
CN1	CN2	CN3	CN4	CN5	CN6	CN7	CN8	CN9	CN10
CN11	CN12	CN13	CN14	CN15	CN16	CN17	CN18	CN19	CN20
CN21	CN22	CN23	CN24	CN25	CN26	CN27	CN28	CN29	CN30
CN31	CN32	CN33	CN34	CN35	CN36	CN37	CN38	CN39	CN40
CN41	CN42	CN43	CN44	CN45	CN46	CN47	CN48	CN49	CN50
CN51	CN52	CN53	CN54	CN55	CN56	CN57	CN58	CN59	CN60
CN61	CN62	CN63	CN64	CN65	CN66	CN67	CN68	CN69	CN70
CN71	CN72	CN73	CN74	CN75	CN76	CN77	CN78	CN79	CN80
CN81	CN82	CN83	CN84	CN85	CN86	CN87	CN88	CN89	CN90
CN91	CN92	CN93</							

BLOCK DIAGRAM



BASIC MODE

Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto	
Basic operation of start / stop switch		Start / stop switch Operation lamp					

Combination of operations:

When operation mode is selected:

- You cannot operate the indoor units in the following combinations.
- The indoor unit which is switched on first continues to operate, but other indoor units which is switched on later, does not operate while the lamp lights.

One unit	Other unit
Heating	Cooling Dehumidifying Circulating (fan)

During automatic operation:

- When heating operation is automatically selected for the first indoor unit, the next indoor unit will then start to heat. Also, if cooling or dehumidifying is automatically selected for the first indoor unit, the next indoor unit will also start to cool or dehumidify.

Notes:

- Refer to the PWRITE-ZU data for the constants expressed by capital alphabet letters in the drawing.
- The speed set of rotation for the fan motor in each operation mode are as shown in Table 1.
- The set room temperatures in the diagram include the shift values in Table 2.

MODEL	RAK-18NH5	RAK-25NH5	RAK-35NH5	RAK-50NH5
PROM NO.	LABEL NAME	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE
0A2	RTOTSA	0 °C	0 °C	2.00 °C
120	WMAX_M	5300 min ⁻¹	5300 min ⁻¹	5000 min ⁻¹
121	WMAX2_M	5300 min ⁻¹	5300 min ⁻¹	5000 min ⁻¹
122	WSTD_M	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹
123	WJKMAX_M	3700 min ⁻¹	3700 min ⁻¹	3700 min ⁻¹
124	WBEMAX_M	3500 min ⁻¹	3500 min ⁻¹	3500 min ⁻¹
127	CMAX_M	3300 min ⁻¹	3300 min ⁻¹	3300 min ⁻¹
128	CMAX2_M	3300 min ⁻¹	3300 min ⁻¹	3300 min ⁻¹
129	CSTD_M	3250 min ⁻¹	3250 min ⁻¹	3150 min ⁻¹
12A	CKYMAX_M	2800 min ⁻¹	2800 min ⁻¹	2800 min ⁻¹
12B	CJKMAX_M	2750 min ⁻¹	2750 min ⁻¹	2750 min ⁻¹
12C	CBEMAX_M	2500 min ⁻¹	2500 min ⁻¹	2500 min ⁻¹
12F	SDMAX_M	2400 min ⁻¹	2400 min ⁻¹	1550 min ⁻¹
130	SDRPM_M	2100 min ⁻¹	2100 min ⁻¹	1400 min ⁻¹
138	WMIN_M	800 min ⁻¹	800 min ⁻¹	800 min ⁻¹
139	CMINHL_M	800 min ⁻¹	800 min ⁻¹	800 min ⁻¹
13A	CMIN_M	1200 min ⁻¹	1200 min ⁻¹	1200 min ⁻¹
13B	DMIN_M	1200 min ⁻¹	1200 min ⁻¹	1200 min ⁻¹
13C	PKOU_M	550 min ⁻¹	550 min ⁻¹	550 min ⁻¹
13D	FZZY_GN_M	1.5	1.5	1.5
13E	FZZYTM_M	4 min.	4 min.	4 min.
144	SHIFTW_M	2.00 °C	2.00 °C	2.00 °C
145	SFTSZW_M	2.00 °C	2.00 °C	2.00 °C
146	SHIFTC_M	1.33 °C	1.33 °C	1.33 °C
147	SHIFTD_M	3.33 °C	3.33 °C	3.33 °C
148	CLMXTM_M	30.00 °C	30.00 °C	30.00 °C
149	YNEOF_M	25.00 °C	25.00 °C	25.00 °C
14E	TEION_M	2.00 °C	2.00 °C	2.00 °C
14F	TEIOF_M	9.00 °C	9.00 °C	9.00 °C
157	CMNLMT_M	0 min ⁻¹	0 min ⁻¹	0 min ⁻¹
178	FWSS_M	500 min ⁻¹	500 min ⁻¹	500 min ⁻¹
179	FWSOY_M	600 min ⁻¹	600 min ⁻¹	700 min ⁻¹
17A	FWS_M	720 min ⁻¹	750 min ⁻¹	820 min ⁻¹
17B	FWKAF_M	840 min ⁻¹	850 min ⁻¹	920 min ⁻¹
17C	FWL_M	840 min ⁻¹	850 min ⁻¹	920 min ⁻¹
17D	FWAH_M	940 min ⁻¹	1050 min ⁻¹	1120 min ⁻¹
17E	FWH_M	940 min ⁻¹	1050 min ⁻¹	1120 min ⁻¹
17F	FWHH_M	1030 min ⁻¹	1170 min ⁻¹	1250 min ⁻¹
180	FCSOY_M	550 min ⁻¹	600 min ⁻¹	680 min ⁻¹
181	FCS_M	650 min ⁻¹	750 min ⁻¹	780 min ⁻¹
182	FCL_M	740 min ⁻¹	870 min ⁻¹	950 min ⁻¹
183	FCAH_M	850 min ⁻¹	980 min ⁻¹	1030 min ⁻¹
184	FCH_M	890 min ⁻¹	1030 min ⁻¹	1170 min ⁻¹
185	FCHH_M	990 min ⁻¹	1030 min ⁻¹	1200 min ⁻¹
186	FDOY_M	600 min ⁻¹	600 min ⁻¹	680 min ⁻¹
187	FDS1_M	720 min ⁻¹	750 min ⁻¹	780 min ⁻¹
188	FDS2_M	720 min ⁻¹	750 min ⁻¹	780 min ⁻¹

Table 1 Fan speed by mode

Operation mode	Fan speed mode		Label name
Heating operation	Ultra Lo		FWSS_M
	Sleep		FWSOY_M
	Lo		FWS_M
	Overload		FWKAF_M
	Med		FWL_M
	Hi	Set fan speed "AUTO"	FWAH_M
	Hi	Set fan speed "HI"	FWH_M
Cooling operation	Ultra Hi		FWHH_M
	Sleep		FCSOY_M
	Lo		FCS_M
	Med		FCL_M
	Hi	Set fan speed "AUTO"	FCAH_M
	Hi	Set fan speed "HI"	FCH_M
Dehumidifying operation	Ultra Hi		FCHH_M
	Sleep		FDOY_M
	Lo 1		FDS1_M
	Lo 2		FDS2_M

Table 2 Room temperature shift value

Operation mode	Fan speed mode		Label name
Heating operation	Fan speed "AUTO, Hi, Med"		SHIFTW_M
	Fan speed "Lo, Sleep"		SFTSZW_M
Cooling operation			SHIFTC_M
Dehumidifying operation			SHIFTD_M

	MODEL	RAF-25NH5	RAF-35NH5	RAF-50NH5
N O .	LABEL NAME	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE
09C	RTOTSA	2.00 °C	2.00 °C	2.00 °C
120	WMAX_M	5300 min ⁻¹	5000 min ⁻¹	4500 min ⁻¹
121	WMAX2_M	5300 min ⁻¹	5000 min ⁻¹	4500 min ⁻¹
122	WSTD_M	4000 min ⁻¹	4000 min ⁻¹	4000 min ⁻¹
123	WJKMAX_M	3700 min ⁻¹	3700 min ⁻¹	4000 min ⁻¹
124	WBEMAX_M	3500 min ⁻¹	3500 min ⁻¹	3700 min ⁻¹
125	CMAX_M	3500 min ⁻¹	3300 min ⁻¹	4000 min ⁻¹
126	CMAX2_M	3500 min ⁻¹	3300 min ⁻¹	4000 min ⁻¹
127	CSTD_M	3250 min ⁻¹	3150 min ⁻¹	3100 min ⁻¹
128	CKYMAX_M	2800 min ⁻¹	2800 min ⁻¹	2800 min ⁻¹
129	CJKMAX_M	2750 min ⁻¹	2750 min ⁻¹	2750 min ⁻¹
12A	CBEMAX_M	2500 min ⁻¹	2500 min ⁻¹	2500 min ⁻¹
12B	SDMAX_M	2400 min ⁻¹	2400 min ⁻¹	1800 min ⁻¹
12C	SDRPM_M	2000 min ⁻¹	2000 min ⁻¹	1100 min ⁻¹
132	WMIN_M	800 min ⁻¹	800 min ⁻¹	800 min ⁻¹
133	CMINHI_M	800 min ⁻¹	800 min ⁻¹	800 min ⁻¹
134	CMIN_M	1200 min ⁻¹	1200 min ⁻¹	1200 min ⁻¹
135	DMIN_M	1200 min ⁻¹	1200 min ⁻¹	1100 min ⁻¹
136	PKOU_M	500 min ⁻¹	500 min ⁻¹	500 min ⁻¹
137	FZZY_GN.M	1.0	1.0	1.0
138	FZZYTM_M	3 min.	3 min.	3 min.
13E	SHIFTW_M	2.33 °C	2.33 °C	2.33 °C
13F	SFTSZW_M	0.66 °C	0.66 °C	0.66 °C
140	SHIFTO_M	-0.66 °C	-0.66 °C	-0.66 °C
141	SHIFTD_M	-0.66 °C	-0.66 °C	-0.66 °C
142	CLMXTP_M	30.00 °C	30.00 °C	30.00 °C
143	YNEOF_M	23.00 °C	23.00 °C	23.00 °C
148	TEION_M	2.00 °C	2.00 °C	2.00 °C
149	TEIOF_M	9.00 °C	9.00 °C	9.00 °C
150	CMNLMT_M	1900 min ⁻¹	1900 min ⁻¹	1900 min ⁻¹
16D	FWSS_M	400 min ⁻¹	400 min ⁻¹	400 min ⁻¹
16E	FWSOY_M	710 min ⁻¹	720 min ⁻¹	740 min ⁻¹
16F	FWS_M	710 min ⁻¹	800 min ⁻¹	820 min ⁻¹
170	FWKAF_M	790 min ⁻¹	880 min ⁻¹	950 min ⁻¹
171	FWL_M	790 min ⁻¹	880 min ⁻¹	950 min ⁻¹
172	FWAH_M	830 min ⁻¹	960 min ⁻¹	1040 min ⁻¹
173	FWH_M	870 min ⁻¹	1000 min ⁻¹	1080 min ⁻¹
174	FWHM_M	960 min ⁻¹	1050 min ⁻¹	1100 min ⁻¹
175	FWHH_M	960 min ⁻¹	1050 min ⁻¹	1110 min ⁻¹
176	FCSOY_M	670 min ⁻¹	670 min ⁻¹	670 min ⁻¹
177	FCS_M	670 min ⁻¹	770 min ⁻¹	730 min ⁻¹
178	FCL_M	750 min ⁻¹	860 min ⁻¹	920 min ⁻¹
179	FCAH_M	790 min ⁻¹	950 min ⁻¹	1000 min ⁻¹
17A	FCH_M	830 min ⁻¹	1000 min ⁻¹	1050 min ⁻¹
17B	FCHM_M	880 min ⁻¹	1040 min ⁻¹	1090 min ⁻¹
17C	FCHH_M	880 min ⁻¹	1040 min ⁻¹	1090 min ⁻¹
17D	FDOY_M	670 min ⁻¹	700 min ⁻¹	730 min ⁻¹
17E	FDS1_M	670 min ⁻¹	700 min ⁻¹	730 min ⁻¹
17F	FDS2_M	670 min ⁻¹	700 min ⁻¹	730 min ⁻¹
180	FCLN_M	600 min ⁻¹	600 min ⁻¹	600 min ⁻¹
186	FWOPN_M	1060 min ⁻¹	960 min ⁻¹	1250 min ⁻¹
187	FCOPN_M	1020 min ⁻¹	880 min ⁻¹	1090 min ⁻¹
188	FWCLD_M	1060 min ⁻¹	960 min ⁻¹	1250 min ⁻¹
189	FCCLD_M	1020 min ⁻¹	880 min ⁻¹	1090 min ⁻¹
18A	FWUDSS_M	400 min ⁻¹	400 min ⁻¹	400 min ⁻¹
18B	FWUDSOY_M	640 min ⁻¹	640 min ⁻¹	660 min ⁻¹
18C	FWUDS_M	640 min ⁻¹	720 min ⁻¹	740 min ⁻¹
18D	FWUDKAF_M	710 min ⁻¹	780 min ⁻¹	860 min ⁻¹
18E	FWUDL_M	710 min ⁻¹	780 min ⁻¹	860 min ⁻¹
18F	FWUDAH_M	750 min ⁻¹	880 min ⁻¹	950 min ⁻¹
190	FWUDH_M	780 min ⁻¹	900 min ⁻¹	970 min ⁻¹
191	FWUDHH_M	870 min ⁻¹	950 min ⁻¹	990 min ⁻¹
192	FCUDSOY_M	600 min ⁻¹	630 min ⁻¹	660 min ⁻¹
193	FCUDS_M	600 min ⁻¹	630 min ⁻¹	660 min ⁻¹
194	FCUDL_M	680 min ⁻¹	780 min ⁻¹	820 min ⁻¹
195	FCUDAH_M	710 min ⁻¹	860 min ⁻¹	900 min ⁻¹
196	FCUDH_M	750 min ⁻¹	900 min ⁻¹	940 min ⁻¹
197	FCUDHH_M	790 min ⁻¹	940 min ⁻¹	980 min ⁻¹
19D	FWUDOPN_M	950 min ⁻¹	870 min ⁻¹	1100 min ⁻¹
19E	FCUDOPN_M	900 min ⁻¹	790 min ⁻¹	980 min ⁻¹

Table 1 Fan speed by mode

Operation mode	Fan speed mode	Label name
Heating operation	Upper Fan	Ultra Lo
		FWSS_M
		Sleep
		FWSOY_M
		Lo
		FWS_M
		Overload
		FWKAF_M
	Lower Fan	Med
		FWL_M
		Hi
		Set fan speed "HI"
		FWH_M
		Ultra Hi
		(When AIR OUTLET SWITCH "ON")
		FWHM_M
Cooling operation	Upper Fan	Ultra Hi
		(When AIR OUTLET SWITCH "OFF")
		FWHM_M
		Hi
		Set fan speed "AUTO"
		FWAH_M
	Lower Fan	Ultra Lo
		FWUDSS_M
		Sleep
		FWUDSOY_M
		Lo
		FWUDS_M
		Overload
		FWUDKAF_M
Dehumidifying operation	Upper Fan	Med
		FWUDL_M
		Hi
		Set fan speed "HI"
		FWUDH_M
		Ultra Hi
		(When AIR OUTLET SWITCH "OFF")
		FWUDHH_M
	Lower Fan	Hi
		Set fan speed "AUTO"
		FWUDAH_M
		Sleep
		FCSOY_M
		Lo
		FCS_M
		Med
		FCL_M
	Lower Fan	Hi
		Set fan speed "HI"
		FCH_M
		Ultra Hi
		(When AIR OUTLET SWITCH "ON")
		FCHM_M
		(When AIR OUTLET SWITCH "OFF")
		FCHH_M
	Lower Fan	Hi
		Set fan speed "AUTO"
		FCAH_M
		Sleep
		FCUDSOY_M
		Lo
		FCUDS_M
		Med
		FCUDL_M
	Lower Fan	Hi
		Set fan speed "HI"
		FCUDH_M
		Ultra Hi
		(When AIR OUTLET SWITCH "OFF")
		FCUDHH_M
		Hi
		Set fan speed "AUTO"
		FCUDAH_M
Dehumidifying operation	Lower Fan	Sleep
		FDOY_M
		Lo1
Dehumidifying operation	Lower Fan	Lo2
		FDS1_M
Dehumidifying operation	Lower Fan	Lo2
		FDS2_M

Table 2 Room temperature shift value

Operation mode	Shift value
Heating operation	Fan speed "AUTO, Hi, Med"
Cooling operation	Fan speed "Lo, Sleep"
Dehumidifying operation	SHIFTW
	SFTSZW
	SHIFTC
	SHIFTD

MODEL		RAD-25NH5	RAD-35NH5
PROM NO.	LABEL NAME	REQUIRED VALUE OF UNIT SIDE	REQUIRED VALUE OF UNIT SIDE
0A2	RTOTSA	2.00 °C	2.00 °C
120	WMAX_M	5300 min ⁻¹	5000 min ⁻¹
121	WMAX2_M	5300 min ⁻¹	5000 min ⁻¹
122	WSTD_M	4000 min ⁻¹	4000 min ⁻¹
123	WJMAX_M	3600 min ⁻¹	3700 min ⁻¹
124	WBEMAX_M	3200 min ⁻¹	3500 min ⁻¹
127	CMAX_M	3300 min ⁻¹	3300 min ⁻¹
128	CMAX2_M	3300 min ⁻¹	3300 min ⁻¹
129	CSTD_M	3000 min ⁻¹	3150 min ⁻¹
12A	CKYMAX_M	2500 min ⁻¹	2800 min ⁻¹
12B	CJKMAX_M	2300 min ⁻¹	2750 min ⁻¹
12C	CBEMAX_M	1900 min ⁻¹	2500 min ⁻¹
12F	SDMAX_M	2050 min ⁻¹	2400 min ⁻¹
130	SDRPM_M	1800 min ⁻¹	2000 min ⁻¹
138	WMIN_M	800 min ⁻¹	800 min ⁻¹
139	CMINHI_M	800 min ⁻¹	800 min ⁻¹
13A	CMIN_M	1000 min ⁻¹	1200 min ⁻¹
13B	DMIN_M	1000 min ⁻¹	1200 min ⁻¹
13C	PKOU_M	500 min ⁻¹	500 min ⁻¹
13D	FZZY_GN_M	1.0	1.0
13E	FZZYTM_M	3 min.	3 min.
144	SHIFTW_M	5.00 °C	5.00 °C
145	SFTSZW_M	5.00 °C	5.00 °C
146	SHIFTC_M	1.66 °C	1.66 °C
147	SHIFTD_M	1.66 °C	1.66 °C
148	CLMXTM_M	30.00 °C	30.00 °C
149	YNEOF_M	20.00 °C	20.00 °C
14E	TEION_M	0.00 °C	0.00 °C
14F	TEIOF_M	9.00 °C	9.00 °C
157	CMNLMT_M	0 min ⁻¹	0 min ⁻¹
178	FWSS_M	13.1 V	13.1 V
179	FWSOY_M	17.6 V	17.6 V
17A	FWS_M	20.3 V	20.3 V
17B	FWKAF_M	22.9 V	22.9 V
17C	FWL_M	22.9 V	22.9 V
17D	FWAH_M	27.9 V	27.9 V
17E	FWH_M	28.3 V	28.3 V
17F	FWHH_M	28.3 V	28.3 V
180	FCSOY_M	18.0 V	18.0 V
181	FCS_M	20.5 V	20.5 V
182	FCL_M	25.0 V	25.0 V
183	FCAH_M	27.9 V	27.9 V
184	FCH_M	27.9 V	27.9 V
185	FCHH_M	27.9 V	27.9 V
186	FDOY_M	18.0 V	18.0 V
187	FDS1_M	20.5 V	20.5 V
188	FDS2_M	20.5 V	20.5 V

Table 1 Fan speed by mode

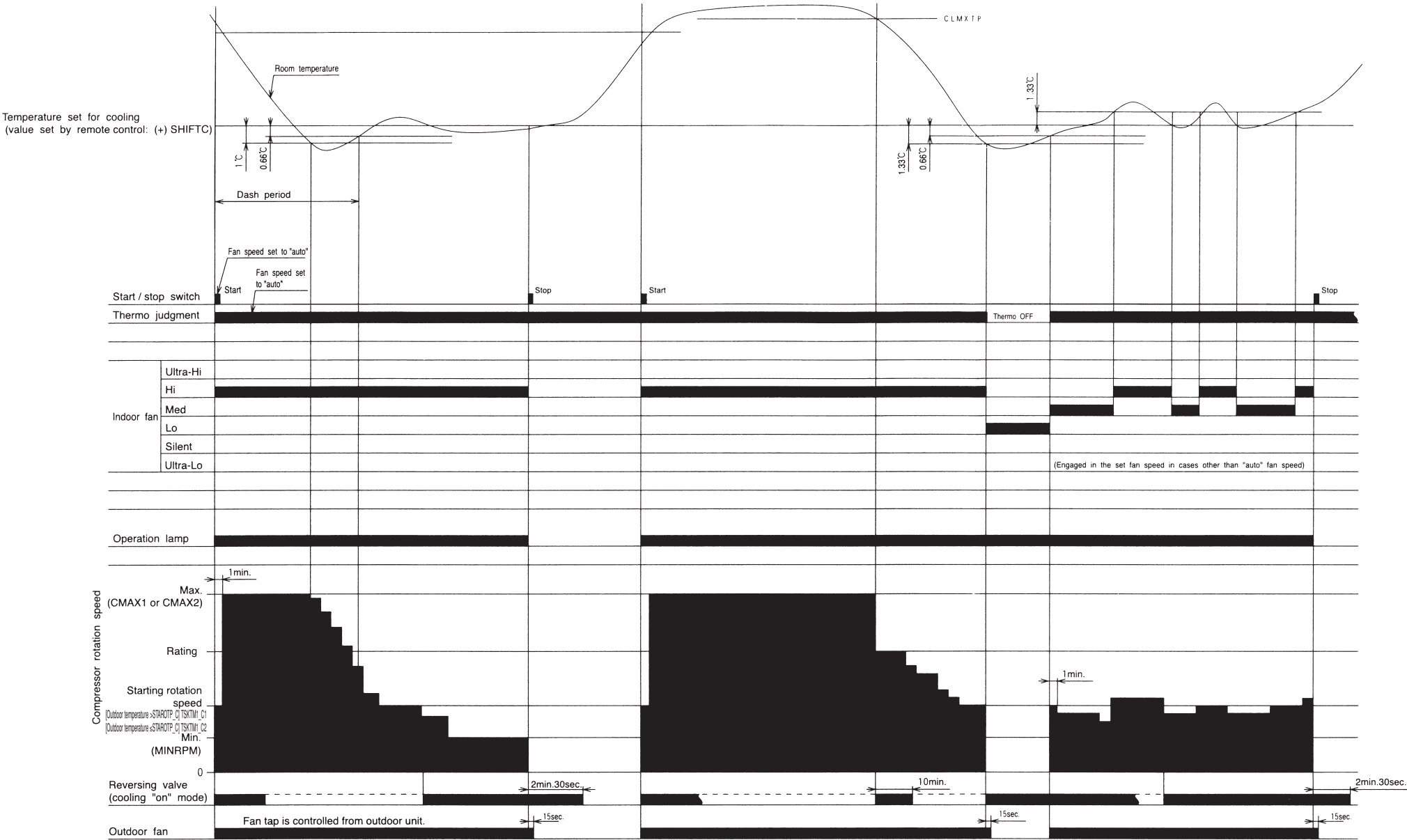
Operation mode	Fan speed mode		Label name
Heating operation	Ultra Lo		FWSS_M
	Sleep		FWSOY_M
	Lo		FWS_M
	Overload		FWKAF_M
	Med		FWL_M
	Hi	Set fan speed "AUTO"	FWAH_M
	Hi	Set fan speed "HI"	FWH_M
Cooling operation	Ultra Hi		FWHH_M
	Sleep		FCSOY_M
	Lo		FCS_M
	Med		FCL_M
	Hi	Set fan speed "AUTO"	FCAH_M
	Hi	Set fan speed "HI"	FCH_M
Dehumidifying operation	Ultra Hi		FCHH_M
	Sleep		FDOY_M
	Lo 1		FDS1_M
	Lo 2		FDS2_M

Table 2 Room temperature shift value

Operation mode	Label name	
Heating operation	Fan speed "AUTO, Hi, Med"	SHIFTW_M
	Fan speed "Lo, Sleep"	SFTSZW_M
Cooling operation		SHIFTC_M
Dehumidifying operation		SHIFTD_M

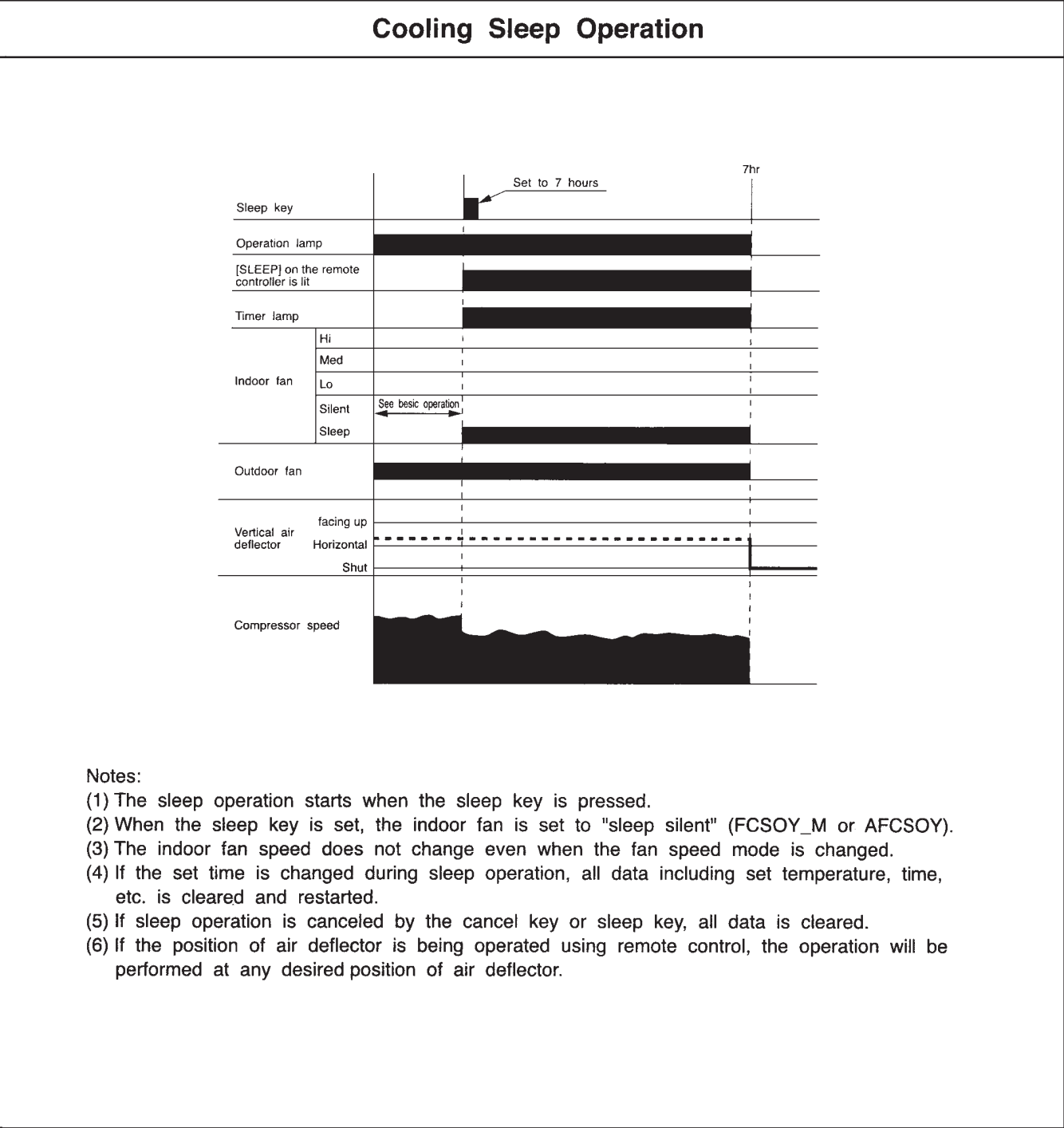
MODEL		RAM-130QH5	
PROM NO.	LABEL NAME	REQUIRED VALUE OF UNIT SIDE	
03A	PSTARTC1\$	250	pulse
03B	PSTARTC1K\$	300	pulse
03C	PSTARTC2\$	150	pulse
03D	PSTARTC2K\$	300	pulse
03E	PSTARTC3\$	150	pulse
03F	PSTARTC3K\$	300	pulse
040	PSTARTH1\$	200	pulse
041	PSTARTH1S\$	250	pulse
042	PSTARTH2\$	100	pulse
043	PSTARTH2S\$	150	pulse
044	PSTARTH3\$	250	pulse
045	PSTARTH3S\$	250	pulse
046	PMIN\$	30	pulse
047	DFCTPS\$	100	pulse
048	DFCTPN\$	240	pulse
049	DFSPPS\$	44	pulse
04A	DFPSMX\$	480	pulse
04B	PCLOSH\$	60	pulse
0FD	CMAX1	5400	min ⁻¹
0FE	CMAX2	6100	min ⁻¹
101	CMAX3	6200	min ⁻¹
104	CMAX4	6300	min ⁻¹
108	WMAX1	6200	min ⁻¹
109	WMAX2	6200	min ⁻¹
10C	WMAX3	6200	min ⁻¹
10F	WMAX4	6300	min ⁻¹
11E	STAROTP_C	25.0	°C
11F	SDRCT1_C1	2000	min ⁻¹
120	TSKTM1_C1	40	sec
121	SDRCT1_C2	3000	min ⁻¹
122	TSKTM_C2	60	sec
123	STAROTP_W	4.8	°C
124	SDRCT1_W1	2000	min ⁻¹
125	TSKTM1_W1	60	sec
126	SDRCT1_W2	3000	min ⁻¹
127	TSKTM1_W2	60	sec
128	SDSTEP	1000	min ⁻¹
129	TSKSPT	8	sec
12A	KYO_RPM	3000	min ⁻¹
198	TDF414	90	sec
199	DFMXTM	12	min ⁻¹
19A	SDRCT2	2000	min ⁻¹
19B	TSKTM2	60	sec
19C	DFSTEP	600	min ⁻¹
19D	TDFSPT	60	sec
19E	DEFMAX	6000	min ⁻¹
19F	TDF415	120	sec
1A0	DFSTMB	55	min.
1A1	DFSTMB2	60	min.
1A2	DEFONH	-1.9	°C
1A3	DEFON	-5.1	°C
1A4	DEFONL	-23.9	°C
1A5	DEF_a1	112/128	
1A6	DEF_a2	138/128	
1A7	DEFOFF	15.0	°C

Basic Cooling Operation



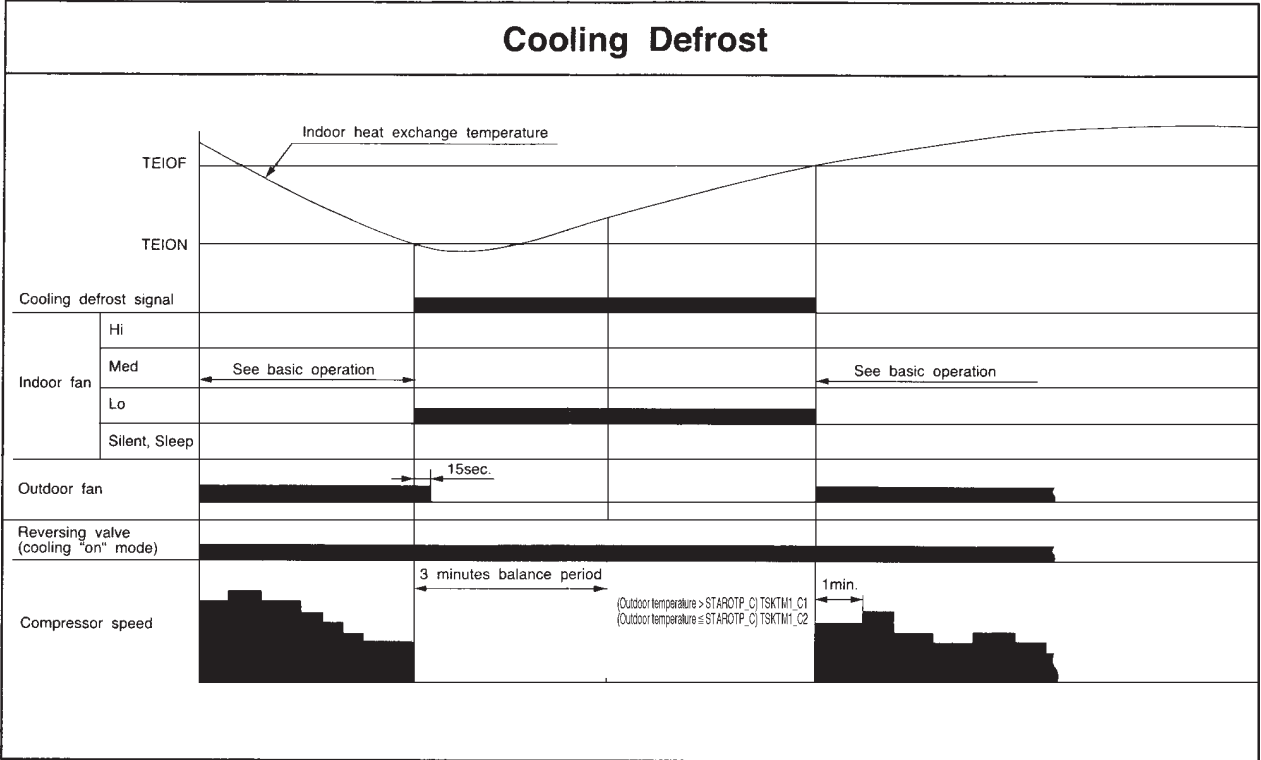
Notes:

- (1) Cool dash is started when the operation is started at fan speed "AUTO" or "HI" or when the fan speed is changed to "AUTO" or "HI" during cooling operation, and when the compressor speed (P item) reaches (CMAX1 or CMAX2) or higher.
- (2) The maximum compressor speed period during cool dash is finished ① when 25 minutes have elapsed after cool dash was started ② when the room temperature reaches the cooling set temperature -1°C (including cooling shift) and then becomes lower than the preset temperature by 0.66°C after the steady speed period, ③ when thermo is OFF.
(If cool dash finished in the above ①, the compressor does not go through the steady speed period but it starts fuzzy control.)
- (3) The thermo OFF temperature during cool dash is cooling set temperature (including cooling shift) -3°C . After thermo OFF, cool dash is finished and fuzzy control starts.
- (4) The compressor minimum ON time and minimum OFF time is 3 minutes.
- (5) The time limit for which the maximum compressor speed (CMAX1 or CMAX2) during normal cooling can be maintained is less than 60 minutes when the room temperature is less than CLMXTP: it is not provided when the room temperature is CLMXTP or more.
- (6) Compressor speed is determined by instruction sent from indoor unit and corrected by outdoor unit according to such factors as capacity, fan speed, number of units being operated, outdoor temperature, etc.
- (7) If another indoor unit is doing heating operation, cooling operation cannot be done.

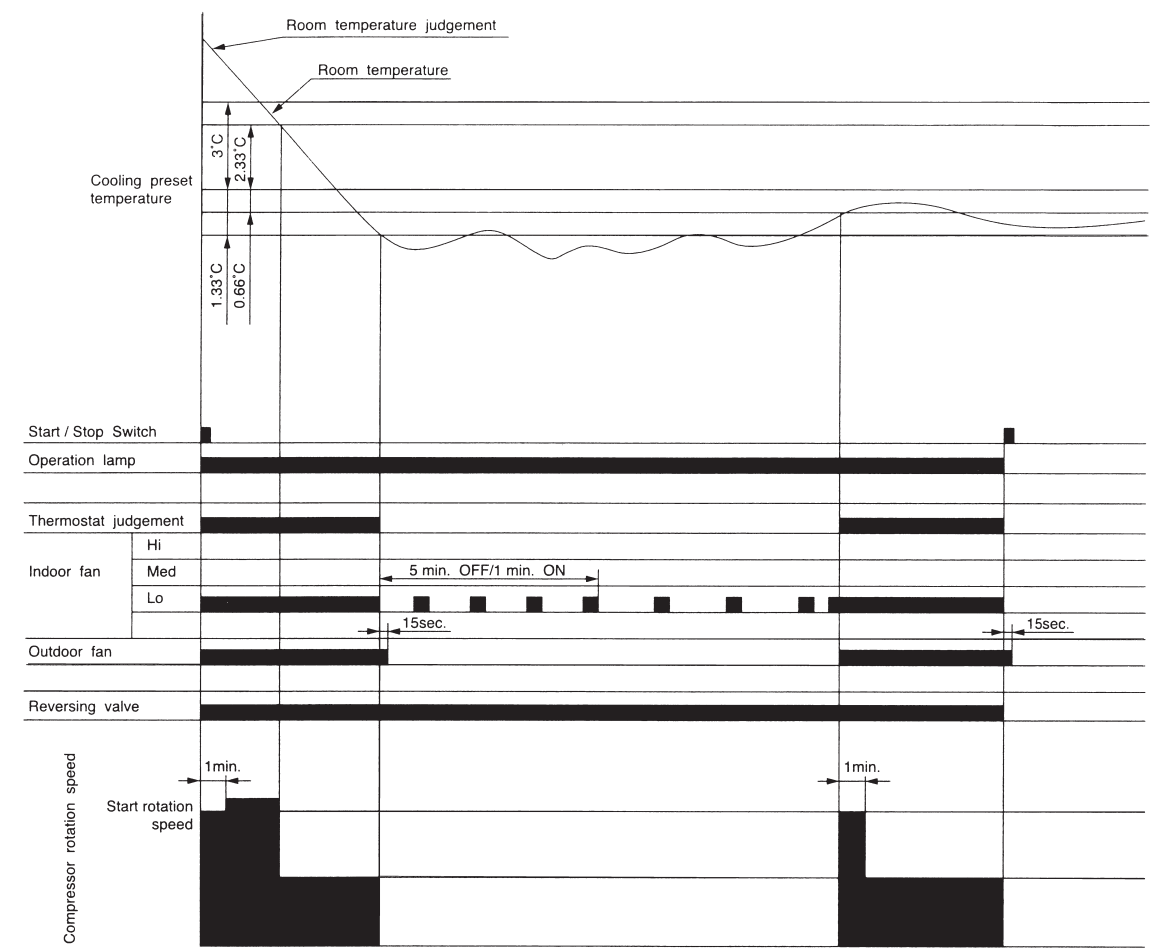


Note:

1. Refer to the PWRITE-ZU data for the constants expressed by capital alphabet letters in the drawing.



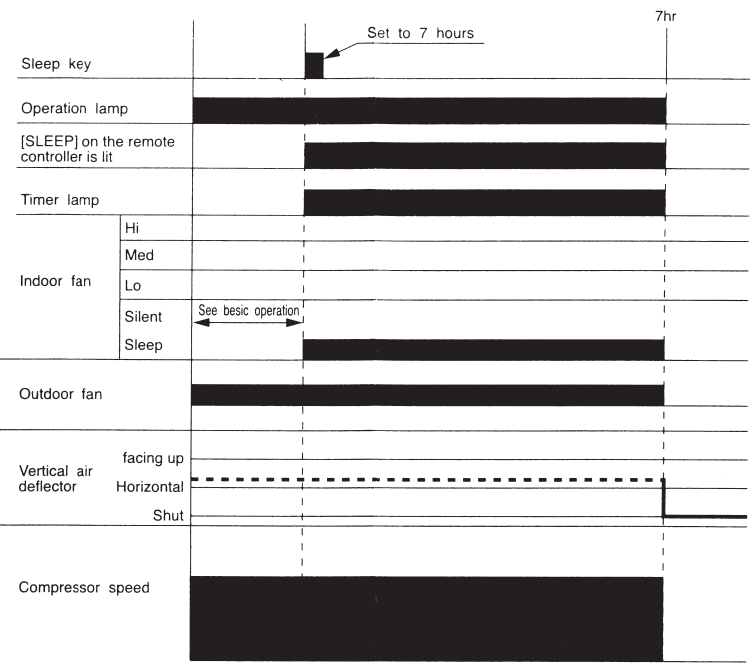
Dehumidifying



Notes:

- (1) The indoor fan is operated in the "Lo" mode, OFF for 5 minutes and ON for 1 minute, repeatedly according to the humidity judgement when the thermostat is turned OFF.
- (2) The compressor is operated forcedly for 3 minutes after operation is started.
- (3) The minimum ON time and OFF time of the compressor are 3 minutes.
- (4) At the start of operation, the thermostat will be off when room temperature $\leq$ setting temperature -1.33°C ; the thermostat will be on when room temperature $\geq$ setting temperature -0.66°C .
- (5) The following procedure is performed to prevent excessive cooling during operation other than start. However, this procedure applies only when the thermostat is intermittent:
 - Whether THERMO ON is to continue or not depends on the thermal condition when the 3-minute forced operation ceases.
 - ① "THERMO ON continues" when room temperature $\geq$ setting temperature $+1^{\circ}\text{C}$: (The THERMO operation value is usually the same as that at "start of operation")
 - ② "Forced THERMO OFF" when room temperature $<$ setting temperature $+1^{\circ}\text{C}$: (The same THERMO operation value as that at "start of operation" is usually used for recovery)Therefore, if the air-conditioner is stabilized under this thermal condition, it will enter intermittent operation, which is "3-minute operation/3-minute stop".
- (6) Compressor speed is determined by instruction sent from indoor unit and corrected by outdoor unit according to such factors as capacity, fan speed, number of units being operated, outdoor temperature, etc.

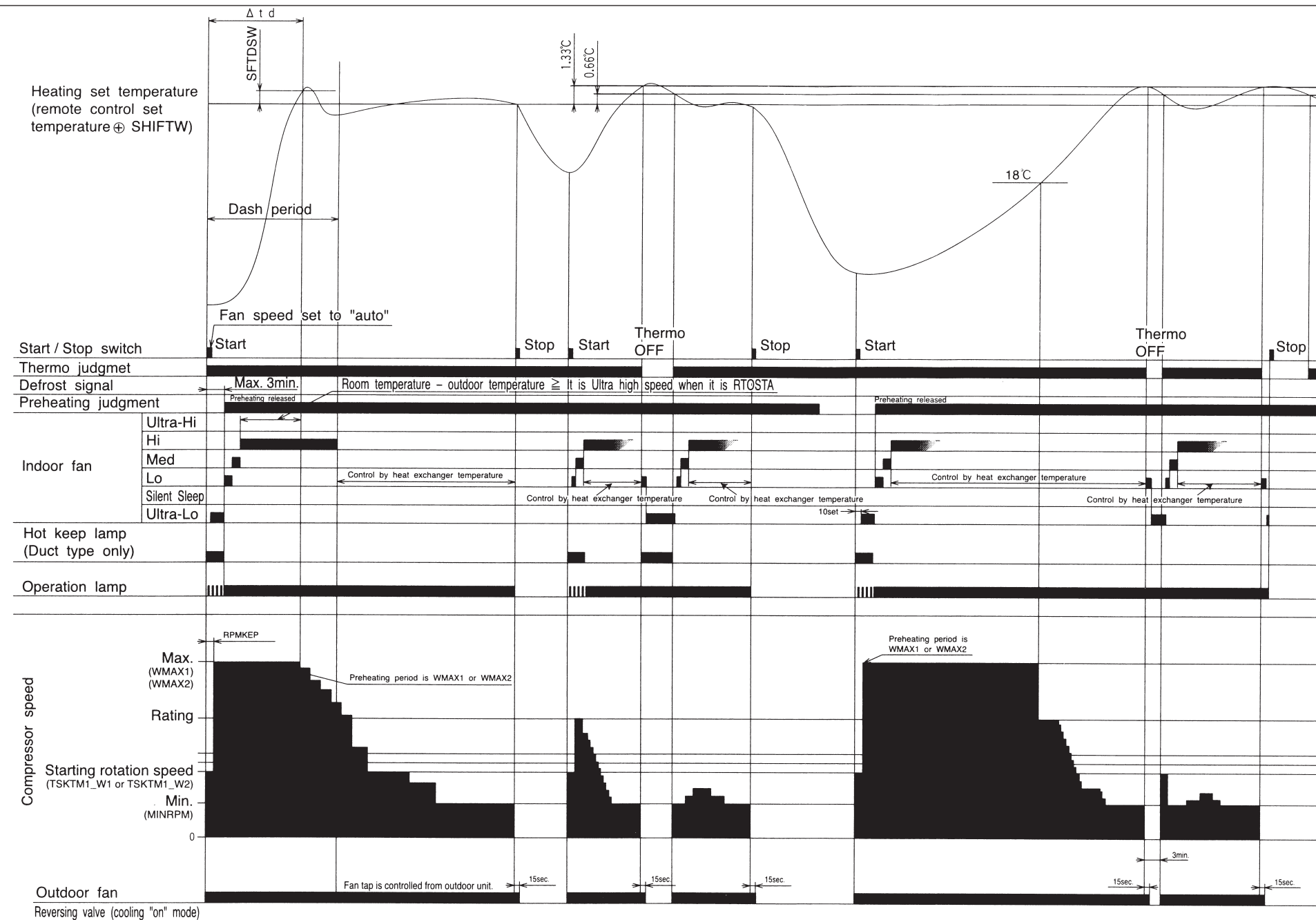
Dehumidifying Sleep Operation



Notes:

- (1) The sleep operation starts when the sleep key is pressed.
- (2) When the sleep key is set, the indoor fan is set to "sleep silent" (FDOY_M or AFDOY).
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (5) If sleep operation is canceled by the cancel key or sleep key, all data is cleared.
- (6) If the position of air deflector is being operated using remote control, the operation will be performed at any desired position of air deflector.

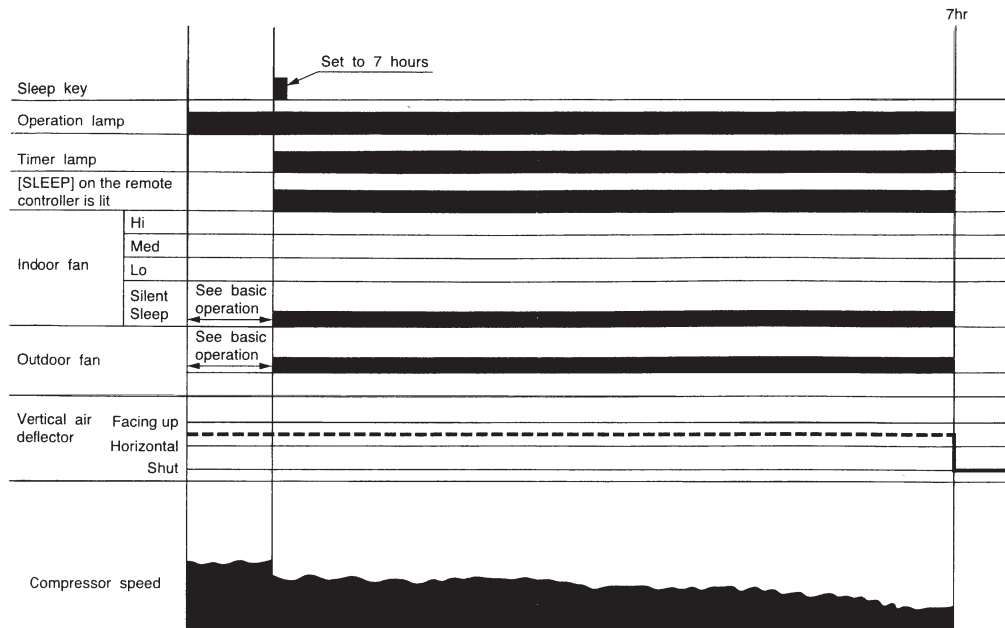
Heating Basic Operation



Notes:

- (1) Hot Dash is started when the operation is started at fan speed "AUTO" or "HI" or when the fan speed is changed to "AUTO" or "HI" during heating operation, and when the compressor speed (P item) reaches (WMAX1 or WMAX2) or higher with the room temperature at 8°C or less and outdoor temperature at 10°C or less.
- (2) The maximum compressor speed period during hot dash is finished (1) when the room temperature reaches the heating set temperature (including heating shift) plus SFTDSW or (2) when the thermo is off.
- (3) The thermo OFF temperature during hot dash is heating set temperature (including heating shift) plus 3°C. After thermo OFF, hot dash finishes, and PI control starts.
- (4) The compressor minimum ON time and minimum OFF time is 3 minutes.
- (5) The time limit for which the maximum compressor speed (WMAX1 or WMAX2) during normal heating (except for hot dash) can be maintained is less than 120 minutes when the room temperature is 18°C or more; it is not provided when the room temperature is less than 18°C and outdoor temperature is less than 4°C.
- (6) The operation indicator will blink every second during initial cycle operation, preheating, defrosting (including balance time after defrost is finished), or auto fresh defrosting. However, with duct type models, operation indicator does not blink, but Hot Keep indicator will light. And Hot Keep indicator will also light in "Thermo OFF" mode.
- (7) For preheating judgment, preheating starts if the heat exchange temperature is lower than YNEOFC and is cancelled if the heat exchange temperature is YNEOF plus 0.33°C or higher at the start of operation using the START / STOP button.
- (8) If the room temperature falls to less than 18°C in the "Ultra-Lo" mode, the indoor fan stops. When the room temperature is 18°C+0.33°C or more, the ultra-Lo operation restarts. However, the ultra-Lo operation during preheating or preheating after defrosting does not stop if the room temperature is less than 18°C.
- (9) Compressor speed is determined by instruction sent from indoor unit and corrected by outdoor unit according to such factors as capacity, fan speed, number of units being operated, outdoor temperature, etc.
- (10) If another indoor unit is doing cooling operation, dehumidifying operation or fan operation, heating operation cannot be done.

Heating Sleep Operation



Notes:

- (1) The sleep operation starts when the sleep key is pressed.
- (2) When the sleep key is set, the indoor fan is set to "Sleep Silent" (FWSOY_M or AFWSOY).
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) When defrosting is to be set during sleep operation, defrosting is engaged and sleep operation is restored after defrosting.
- (5) If the set time is changed during sleep operation, all data including set temperature, time, etc. is cleared and restarted.
- (6) If sleep operation is canceled by the cancel key or sleep key all data is cleared.
- (7) If the position of air deflector is being operated using remote control, the operation will be performed at any desired position of air deflector.

NOTE:

1. Refer to the PWRITE-ZU data for the constats expressed by capital alphabet letters in the drawing.

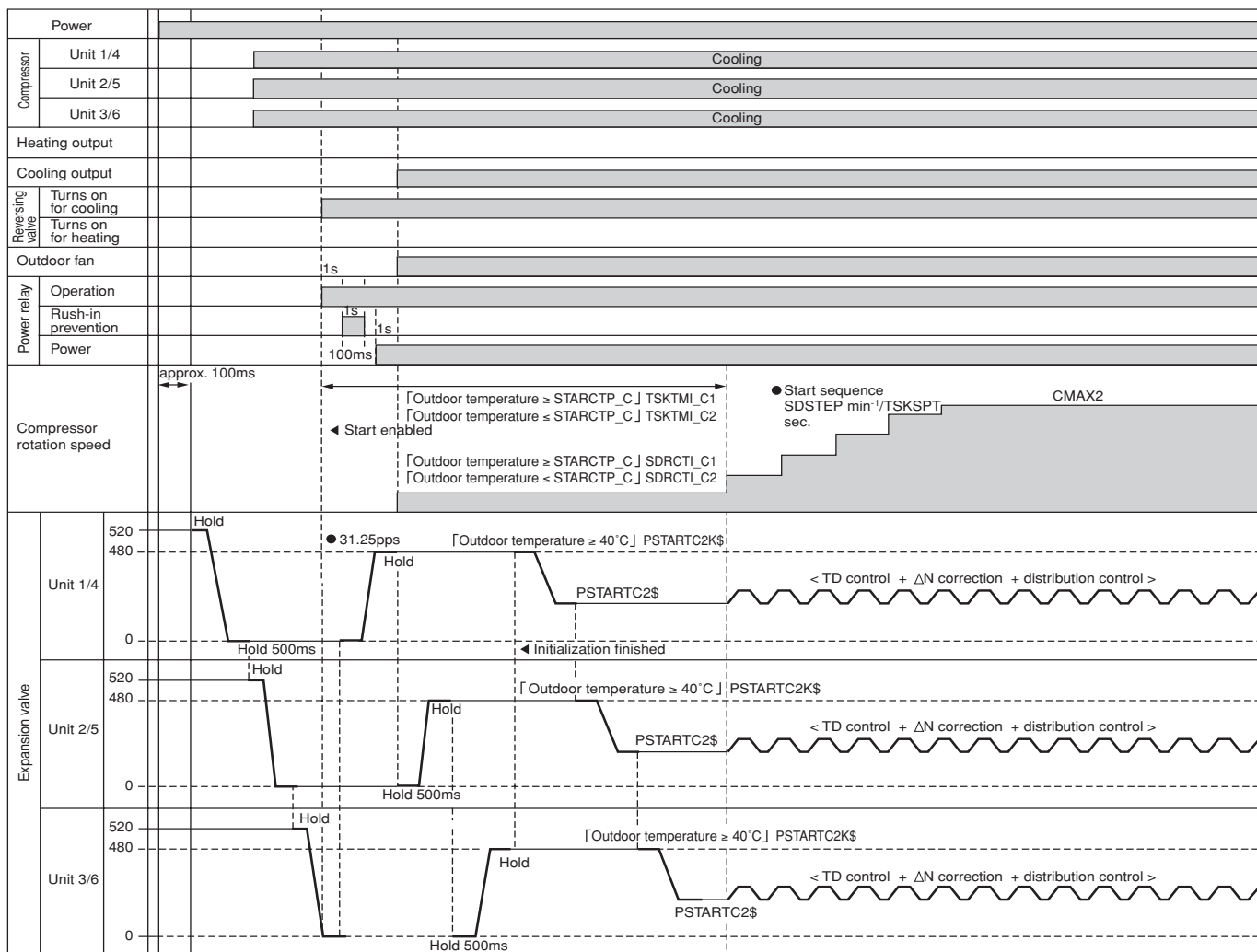
MODEL RAM-130QH5

◇ Expansion valves

- The expansion valves are initialized when power is supplied. The valve for unit 1 is fully closed (–520 pulses), and then that for unit 2 is fully opened (480 pulses). The valve for unit 2 is fully closed (–520 pulses), and then that for unit 3 is fully opened (480 pulses). When the valve for unit 1, 2, 3 is fully closed (0 pulse), start-up is possible.
- The start openings are held during the steady speed period when the compressor is started. After the steady speed period is finished, the TD control is entered. The start openings are set to PSTARTH when the outdoor temperature at start 40°C or more, and to PSTART when it is less than 40°C.
- This unit contain 2 separated refrigerant cycle. The explanation on expansion Valve for unit 1, 2 and 3 is for one refrigerant cycle, which is the Upper Side of the unit. And for the second refrigerant cycle which is the lower side of the unit, the explanation of expansion valve for unit 4, 5 and 6 shall be the same as unit 1, 2, and 3
- Also, this 2 refrigerant cycles are controlled by totally separated eletrical assembly with 2 separated micon.

◇ Compressor rotation speed

- When the compressor is started, the SDRCT1 speed / TSTKTM1 second is held.
After the steady speed period is finished, the speed increases at the rate of SDSTEP speed / TSKSPT second until the target speed is resched.



※ TSKTM1, SDRCT1, SDSTEP, TSKSPT, CMAX2, PSTART and PSTARTH are EEPROM data.

DEFROST

• Reversing valve defrost system is employed: it consists of balancing period → reversing cycle period → balancing period.

(1) Defrost start condition

- When all the following conditions are established defrost is executed:
 - ① Normal operation
 - ② Heat exchange temperature is within defrost range specified by outdoor temperature and heat exchange temperature.
 - ③ Defrost inhibit period linked to outdoor temperature has passed.

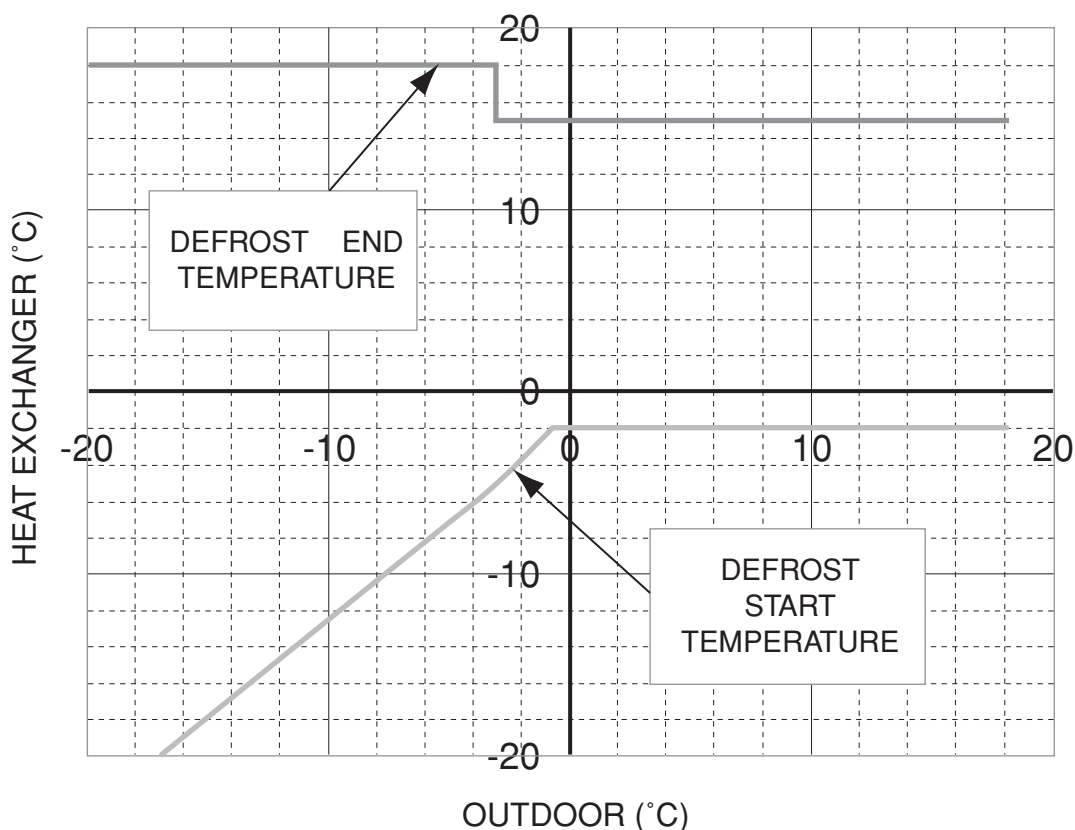
(2) Defrost release condition

- If any one of the following conditions is established, defrost is released:
 - ① Heat exchange temperature returns (heat exchange temperature $\geq$ DEFOFF).
 - ② Defrost max time of 12 minutes has elapsed.
- Released by condition ① during balancing period: When remaining balancing period has elapsed, returned to initial condition (ASTUS=0).
- Released by condition ① or ② during reversing cycle period: [TDF415] Shifted to balancing period.

(3) Outputs during defrost

- Indoor defrost request: Transmitted to all units being operated in heating mode.
- Compressor : Balancing period for [TDF414] seconds → Starting of reversing cycle period by [SDRCT2] min^{-1} for [TSKTM2] seconds → Accelerating by [DFSTEP] min^{-1} / [TDFSPT] seconds in remaining reversing cycle period until defrost MAX speed [DEFMAX] is reached → Balancing period for [TDF415] seconds
- Electric expansion valve
 - Unit being stopped : [FULL CLOSE] 30 seconds after balancing period has passed → [FULL CLOSE] during reversing cycle period → [PCLOSH\$] 15 seconds before balancing period is finished
 - Unit being operated : [DFCTPS] 30 seconds before balancing period is finished → Synchronized with step-up of rotation speed of compressor, opened by [DFSPPS] pulses and reaches MAX opening degree [DEFSMX] when rotation speed of compressor reaches [DEFMAX].

RAM-130QH5 DEFROST TEMPERATURE



* above graph is showing the ideal value by micon program.

* guaranteed temperature range of this model is -15°C to $+27^{\circ}\text{C}$ at heating.

AUTO-FRESH DEFROST

- During heating operation is stopped, and when auto-fresh condition is established, defrost operation will be performed while operation is stopped.

Auto-fresh consists of balancing period at start of defrost for [TDF414] seconds → Reverse cycle period for MAX 12 minutes.

(1) Start conditions for auto-fresh

- When all the following conditions are established, auto-fresh is executed:
 - Defrost request signal is present.
 - All indoor units are stopped.
 - 15 minutes of auto-fresh inhibit period has elapsed.
 - Compressor is ON when operation is stopped.
 - Compressor delay command is sent from indoor unit when operation is stopped.

(2) Release condition of auto-fresh

- If any one of following conditions is established, auto-fresh is released:
 - Heat exchange temperature returns (heat exchange temperature $\geq$ DEFOFF)
 - 12 minutes of defrost MAX time has elapsed.
 - Failure occurred.
 - Either unit 1 or unit 2 or unit 3 or unit 4 or unit 5 or unit 6 started operation.
- Released during start of balancing period : Stopped or started after remaining balancing period has elapsed.
- Released during reverse cycle period : Stopped or started after balancing for 3 minutes.

(3) Outputs during auto-fresh

[Indoor unit defrost request]: Transmitted only to unit to which auto-fresh is applied (indoor unit stopped last).

[Compressor]: Accelerated by DFSTEP $\text{min}^{-1}/\text{TDFSPT}$ seconds and reaches defrost MAX speed [DEFMAX].

[Electric expansion valve]:

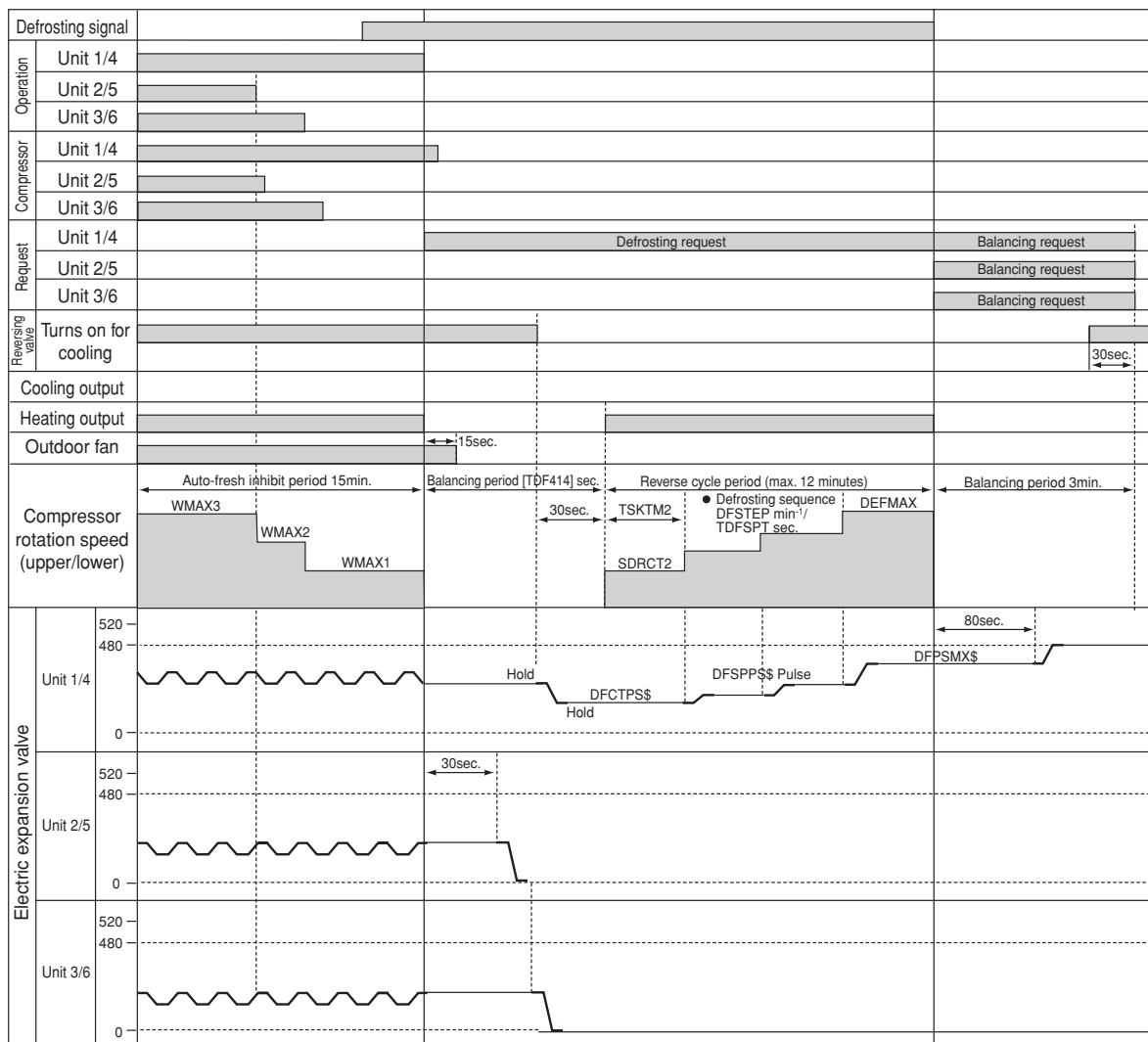
Unit auto-fresh not applied: FULL CLOSE when balancing for 30 seconds has elapsed at start of defrost.

Unit auto-fresh applied : Synchronized with step-up of rotation speed of compressor, opened by [DFSPPS] pulses and reaches MAX opening degree [DEFMAX] when rotation speed of compressor reaches [DEFMAX].

(4) Note

- Shifted to auto-fresh in defrost mode when operation is stopped.
 - All indoor units must be stopped to fulfill condition for auto-fresh.
- If signal is delayed, auto-fresh condition will not be established.

MODEL RAM-130QH5



MODEL RAM-130QH5

FORCED COOLING

- In order to accumulate refrigerant, units operate in cooling cycle.

Execution condition and operation status are shown below.

[Execution condition]

- With neither indoor unit 1, 2, 3, 4, 5 and 6 not operated, when forced cooling switch is turned ON, forced cooling will be performed.
- Always operation status of indoor units are monitored and forced cooling is inhibited when operation of any unit is detected.

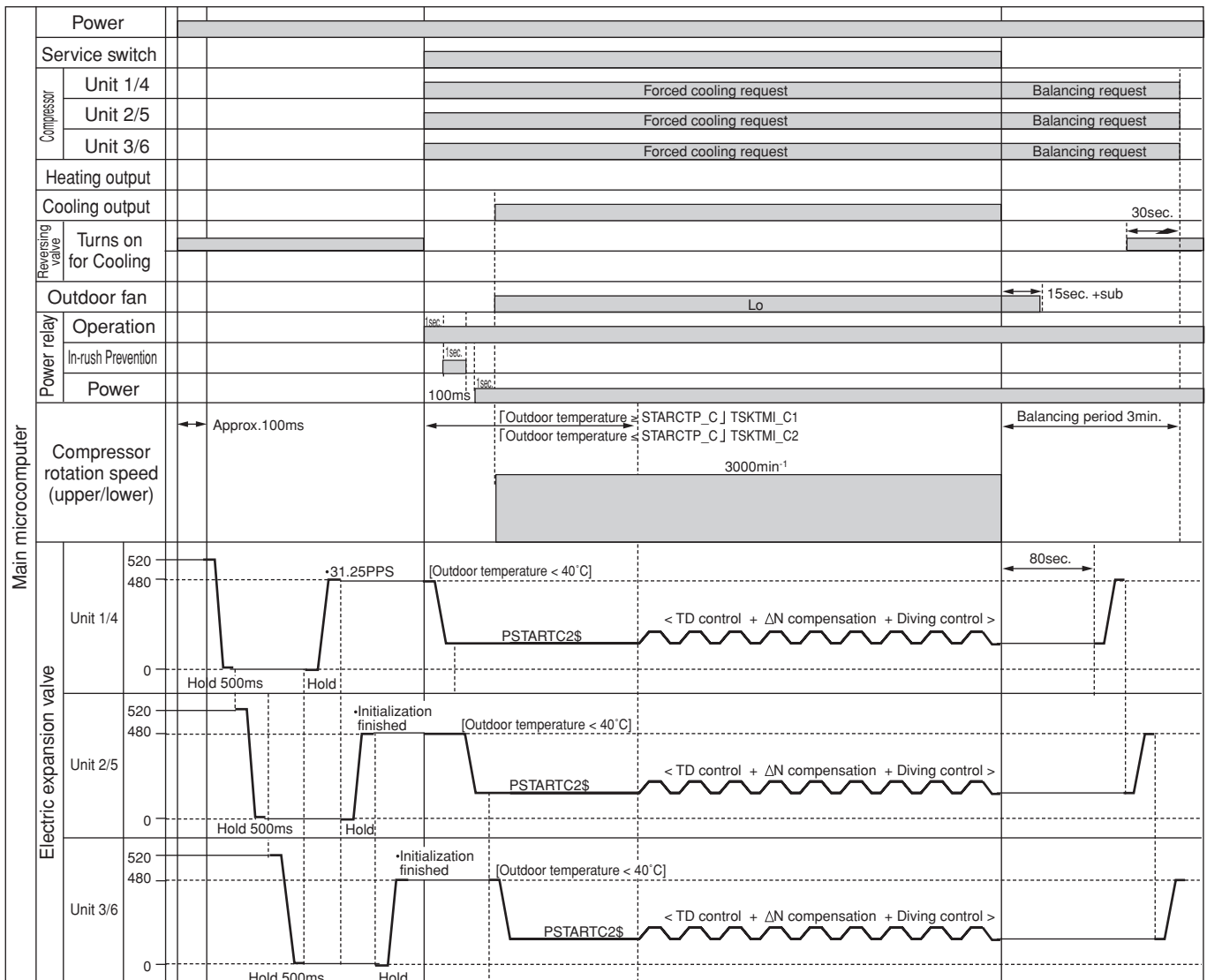
[Operation status]

- Outdoor unit fan: Fixed in LO.
- Compressor rotation speed: Fixed in 3000min⁻¹.
- Expansion valve/reversing valve : Set in normal conditions.

[Note]

- During forced cooling, if failure occurs in outdoor unit, thermostat is turned off. However, it is not counted.
- Since rotation speed of compressor is fixed in 3000min⁻¹ during forced cooling, compressor fixed speed control at start is not performed.

- The following shows the operation state of forced cooling.

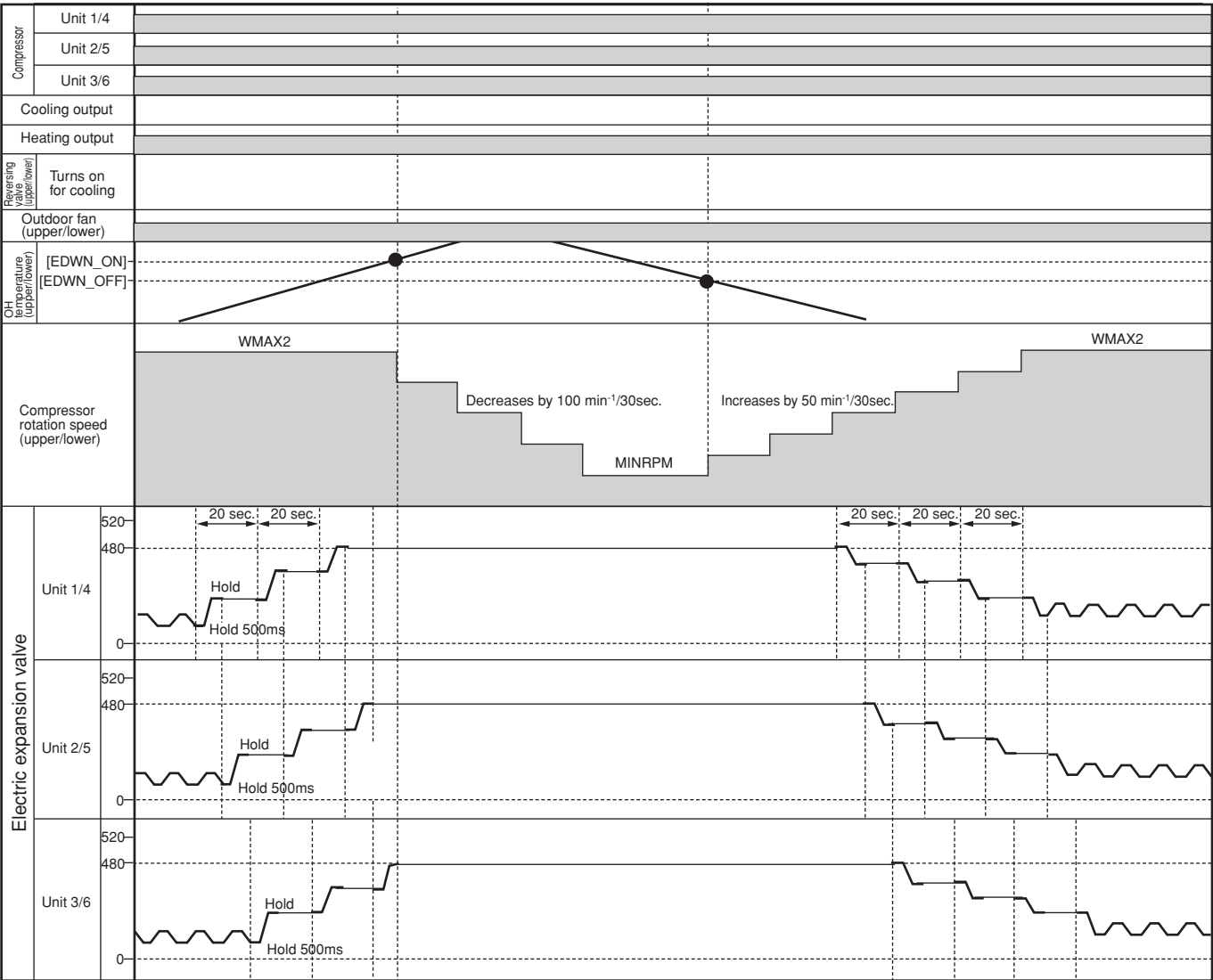


※TSKTM1_C and PSTARTC2\$ are EEPROM data.

MODEL RAM-130QH5
PROCESSING AT OVERHEAT THERMISTOR (OH) HIGH TEMPERATURE

- ◇ Restriction Start Conditions
 - If any expansion valve is operated at 480 pulses and the OH temperature > [NDOWN_ON], the compressor speed will be reduced at a rate of 100 min⁻¹/30 seconds.
 - This reduced rotation speed is based on the speed when the reduction started, and will be maintained until the reduction is finished. However, the reference speed will be exchanged only if the target speed is lower than the speed when the reduction started.
 - If [NDOWN_OFF] ≤ OH temperature ≤ [NDOWN_ON] and the OH temperature does not rise from that 20 seconds before, the reduction of compressor speed will not occur.
- ◇ Restriction Release Condition (in common for all)
 - The restriction will be released when OH temperature < [NDOWN_OFF], and the compressor speed will be increased at a rate of 50 min⁻¹/30 seconds to restore the target speed.

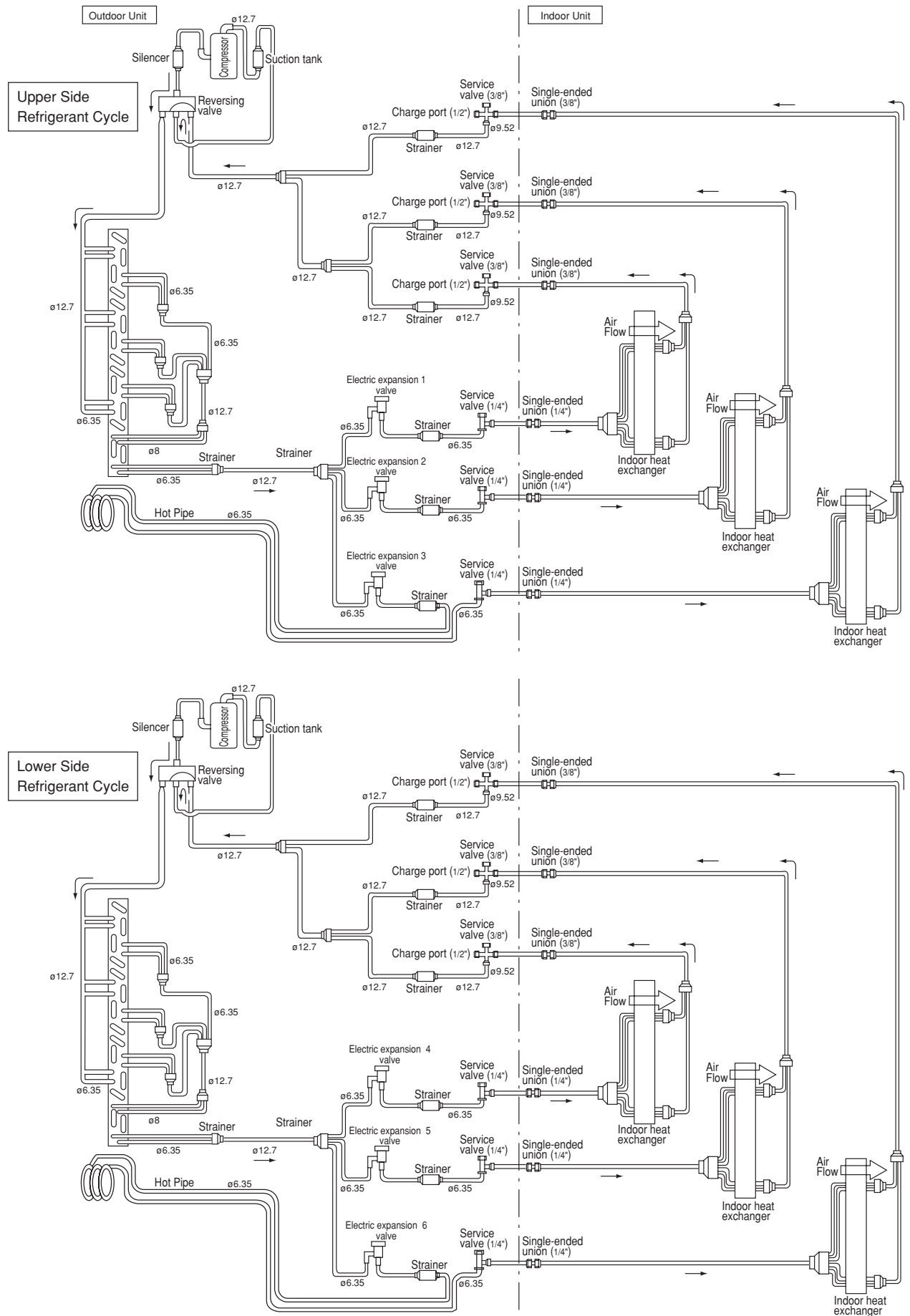
When three units are operated for heating:



※• Operation with one unit in heating or cooling mode and with two units in cooling mode is the same as in the above diagram.
• WMAX2 and MINRPM are EEPROM data.

REFRIGERATING CYCLE DIAGRAM RAM-130QH5

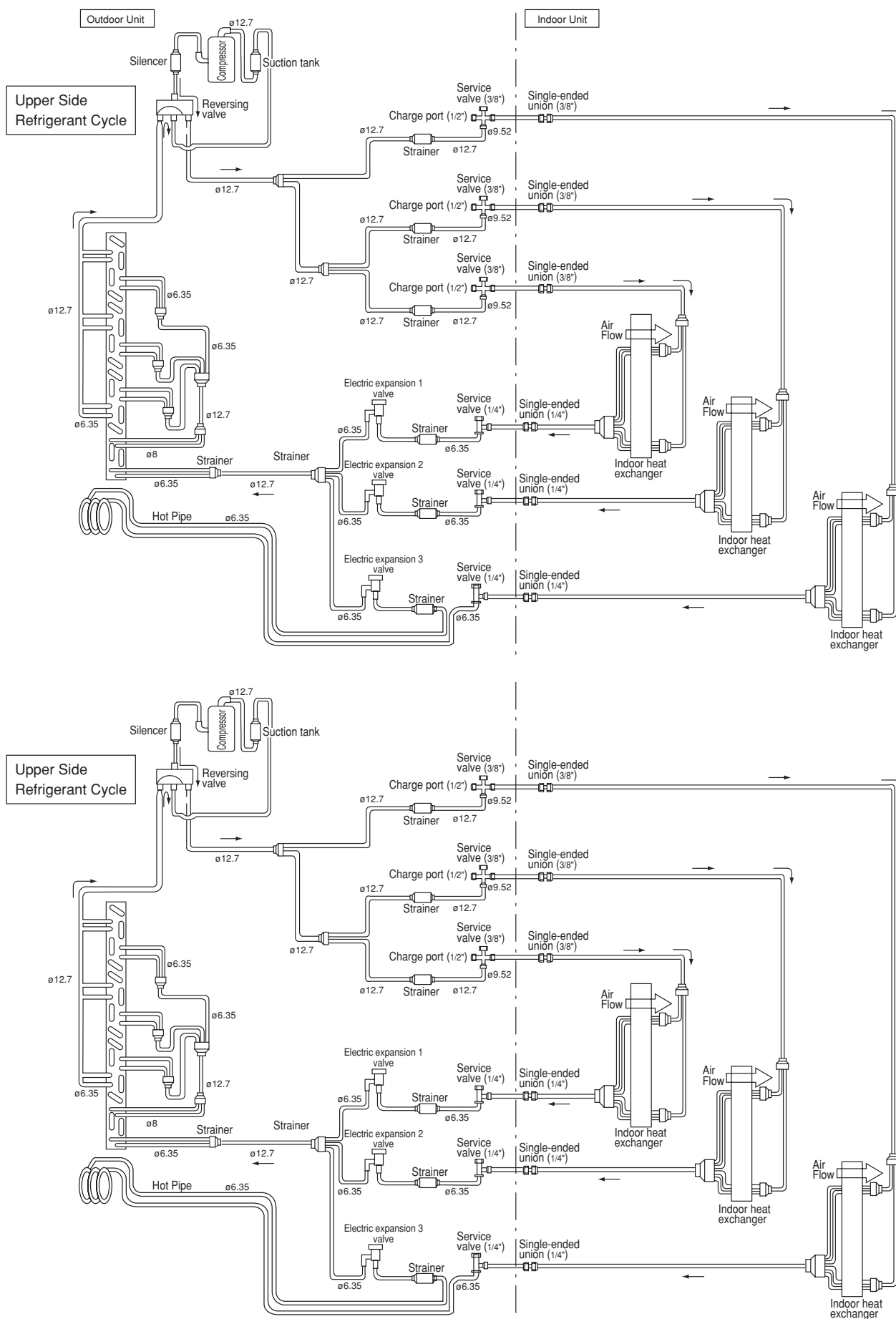
Cooling, Dehumidifying, Defrosting



REFRIGERATING CYCLE DIAGRAM

RAM-130QH5

Heating



DESCRIPTION OF MAIN CIRCUIT OPERATION

RAM-130QH5

1. Power Circuit

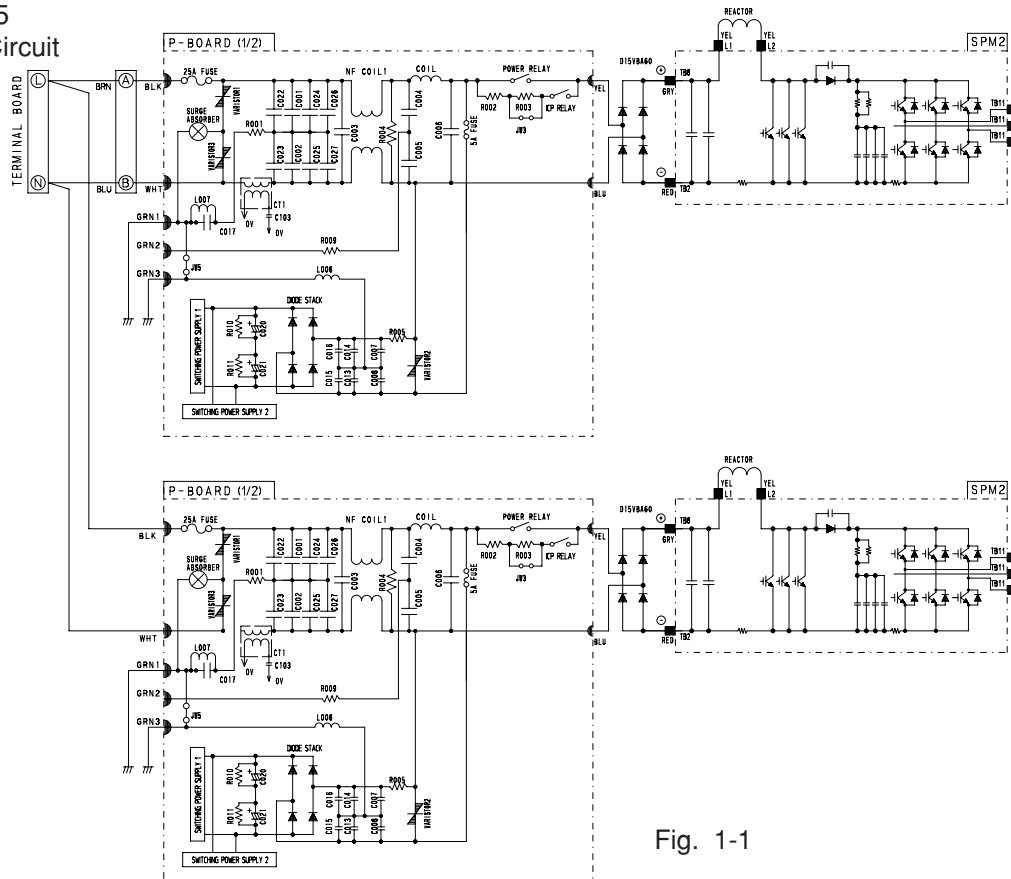


Fig. 1-1

- This circuit full-wave rectifies 220-240 AC applied between terminals L and N, and boosts it to a required voltage with the active module, to create a DC voltage.

The voltage becomes 320-360V when the compressor is operated.

(1) System power module (SPM)

(Current ACT module, smoothing capacitors and power module are combined into one unit)

① Active module

The active filter, consisting of a reactor and switching element, eliminates higher harmonic components contained in the current generated when the compressor is operated, and improves the power-factor. Smoothing capacitor smoothes voltage, which has been rectified by diode stack and boosted at ACT section.

② Power module section

Refer to Item 3 System Power Module Circuit.

(2) These rectify the 220-240V AC from terminals L and N to a DC power supply.

< Reference >

- In case of malfunction or defective connection: Immediately after the compressor starts, it may stop due to "abnormally low speed" active error, etc.

The compressor may continue to operate normally, but the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

- In case of active module faulty or defective connection:

Although the compressor continues to operate normally, the power-factor will decrease, the operation current will increase, and the overcurrent breaker of the household power board will probably activate.

< Reference >

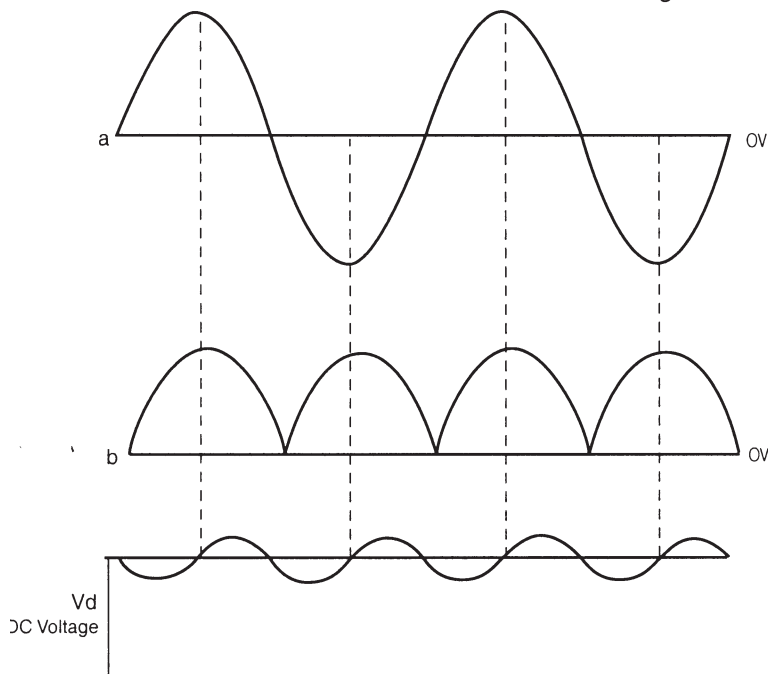
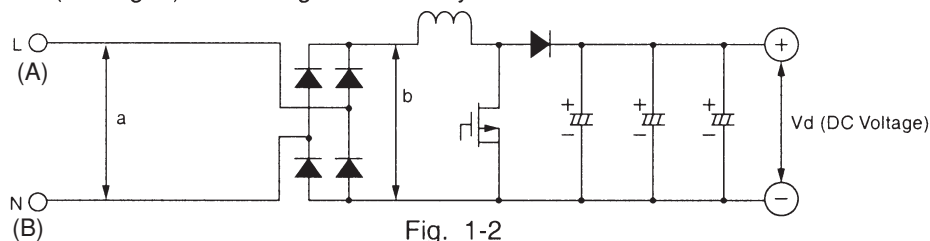
- If D15VBA60 is faulty, the compressor may stop due to "lp", "abnormally low speed", etc. immediately after it starts, or it may not operate at all because no DC voltage is generated between the positive e and negative d terminals.

If diode bridge 1 is faulty, be aware that the 25A fuse might also have blown.

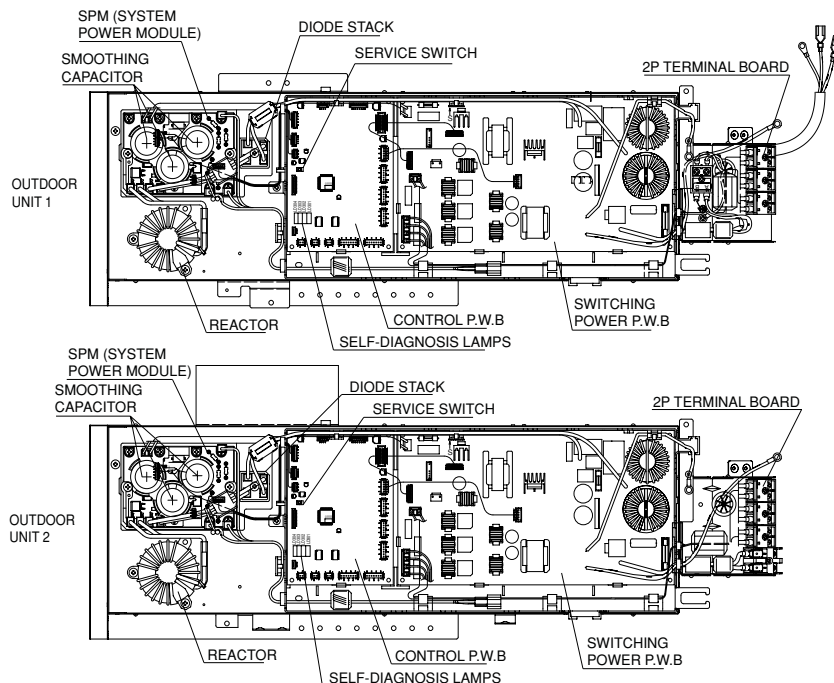
- If diode stack is faulty, DC voltage may be not generated and the compressor may not operate at all. Also, be aware that the 5A fuse might have blown.

(3) Smoothing capacitor (C501, C502, C503, 400 μ F, 450V)

This smoothes (averages) the voltage rectified by the diode stacks.



(Approx. 300-330V during operation)



- Be careful to avoid an electric shock as a high voltage is generated. Also take care not to cause a short-circuit through incorrect connection of test equipment terminals. The circuit board could be damaged.

(4) Smoothing capacitor (C020, C021, 220 μ F, DC 250V)

This smoothes (averages) the voltage rectified by the diode stacks.

A DC voltage is generated in the same way as in Fig. 1-3. Voltage between C020 $\oplus$ side and C021 $\ominus$ side is about 330V.

(5) C001 to C016, NF COIL1

These absorb electrical noise generated during operation of compressor, and also absorb external noise entering from power line to protect electronic parts.

※ Be sure to ground outdoor unit.
If not grounded, noise filter circuit does not operate correctly.

(6) Surge absorber, Varistor 1, 2, 3,
These absorb external power surge.

※ If outdoor unit is not grounded, "surge absorber", "varistors 1 and 3" do not operate.
Be sure to perform grounding.

(7) Inrush protective resistor (R020)
This works to protect from overcurrent when power is turned on.

< Reference >

- When inrush protective resistor is defective, D15VBA60 may malfunction. As a result, DC voltage is not generated and no operation can be done. In this case, 5A fuse may have been blown. Take care.

2. Indoor/Outdoor Interface Circuit

- The interface circuit superimposes an interface signal on the 35V DC line supplied from the outdoor unit to perform communications between indoor and outdoor units. This circuit consists of a transmitting circuit which superimposes an interface signal transmit from the microcomputer on the 35V DC line and a transmitting circuit which detects the interface signal on the 35V DC line and outputs it to the microcomputer.
- Communications are performed by mutually transmitting and receiving the 4-frame outdoor request signal one frame of which consists of a leader of approx. 100 ms., start bit, 8-bit data and stop bit and the command signal with the same format transmit from the indoor unit.
- From outdoor microcomputer to indoor microcomputer.
The request signal output from microcomputer pin (73), (74), (9) is input to the transmitting circuit. The transmitting circuit modulates this signal by approx. 38kHz high-frequency. This high-frequency signal is amplified by a transistor, superimposed on the DC 35V line via C801 (or C811, C821) and L801 (or L802, L803), and supplied to the indoor unit.
To prevent erroneous reception, the outdoor microcomputer is designed so that it cannot receive a signal while it is outputting a request signal.
The receiving circuit in the indoor unit consists of a comparator and transistor. The interface signal from the outdoor unit on the DC 35V line is supplied to C821, where DC components are eliminated, and is then shaped by the comparator. The shaped signal is detected by diode, amplified by amp, and supplied to receiving input of the indoor microcomputer.
Fig. 2-2 shows the voltages at each component when data is transferred from the outdoor microcomputer to the indoor microcomputer.
- Indoor microcomputer to outdoor microcomputer.
The communications from the indoor microcomputer to the outdoor micro computer are the same. Fig. 2-3 shows the voltages and waveforms at each circuit.

- Fig. 2-1 shows the interface circuit used for the indoor and outdoor microcomputers to communicate with each other.

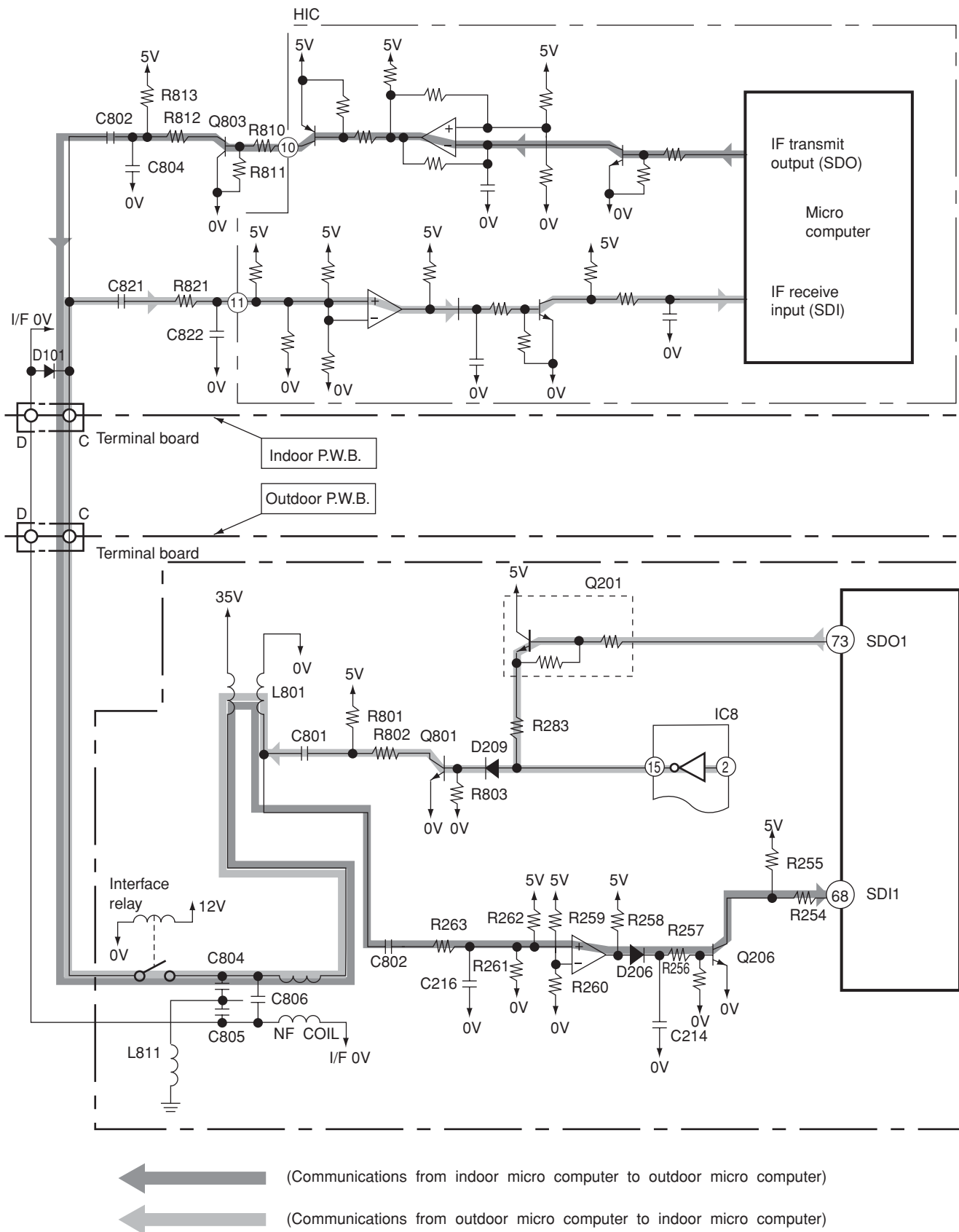


Fig. 2-1 Indoor / Outdoor interface Circuit

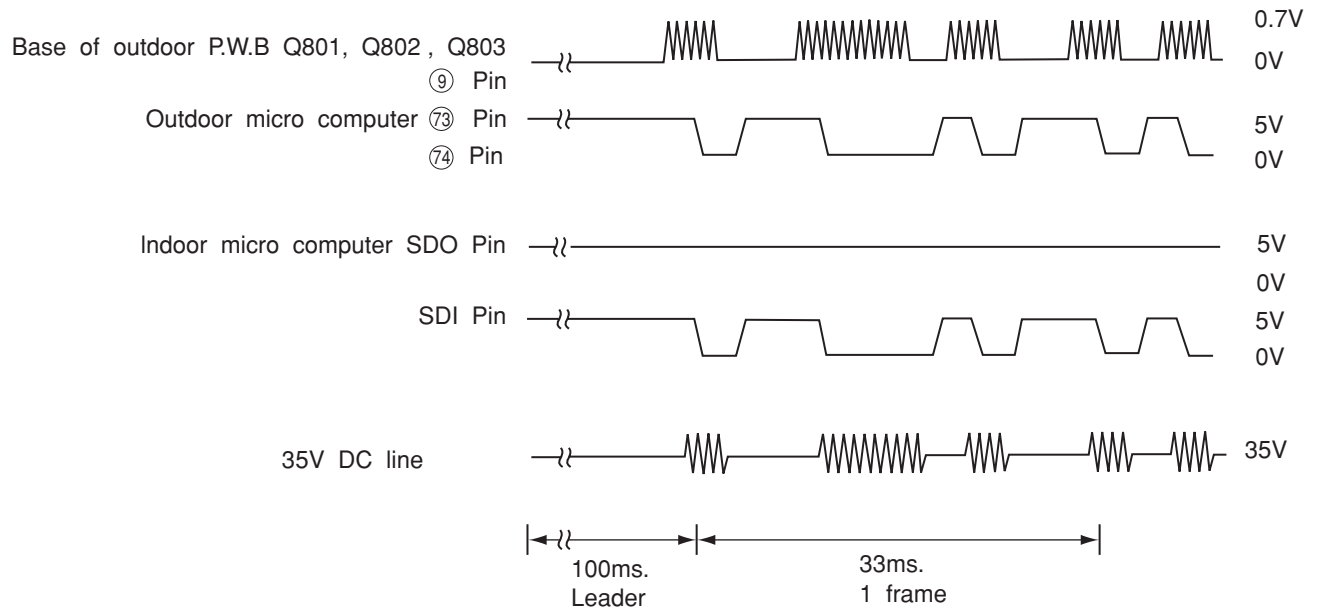


Fig. 2-2 Voltages Waveforms of indoor / Outdoor Micro computers (Outdoor to Indoor Communications)

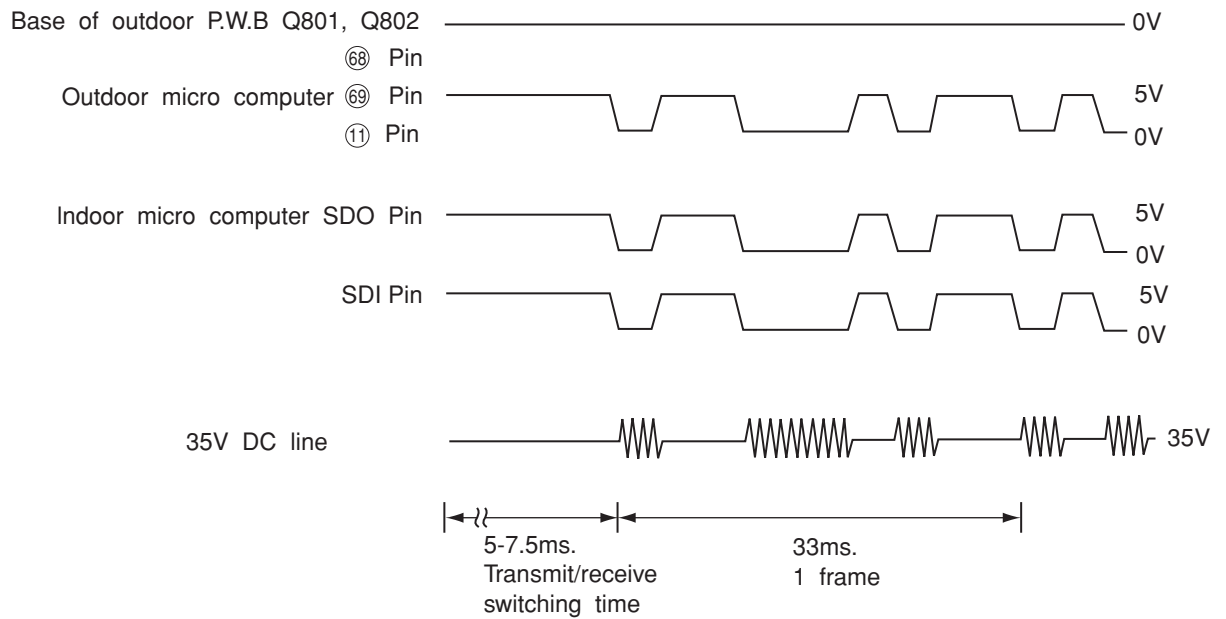


Fig. 2-3 Voltages Waveforms of indoor / Outdoor Micro computers (Indoor to Outdoor Communications)

3. System power Module Circuit

- Fig. 3-1 shows the system power module and its peripheral circuits. (Current ACT module and power module are combined into one unit.) The three transistors on the positive ⊕ side are called the upper arm, and the three transistors on the negative ⊖ side, the lower arm.

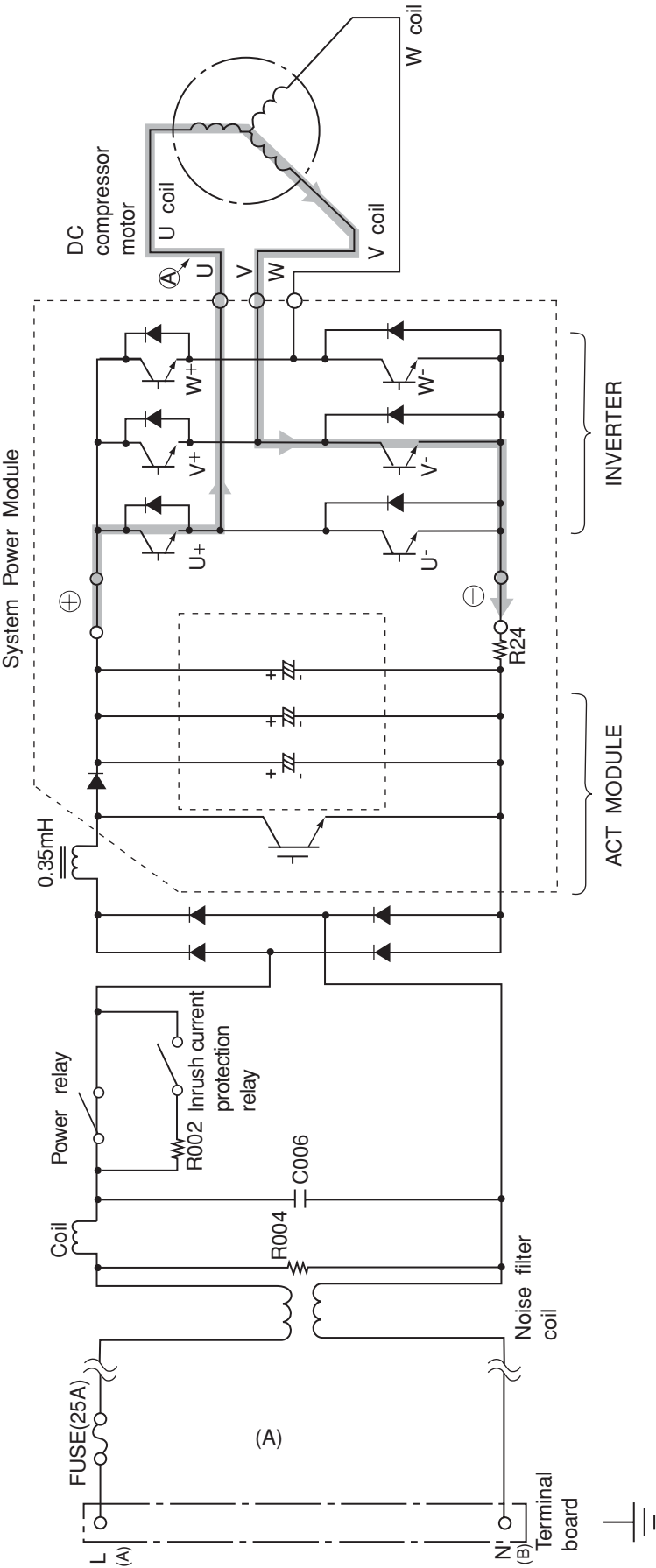


Fig. 3-1 System power module circuit (U⁺ is ON, V⁻ is ON)

- DC 320-360V is input to power module and power module switches power supply current according to rotation position of magnet rotor. The switching order is as shown in Fig. 3-2.

※ At point E: U⁺ is ON, V⁻ is ON (circuit in Fig. 3-1)
 ※ At point F: U⁺ is chopped (OFF), V⁻ is ON (circuit in Fig. 3-4)

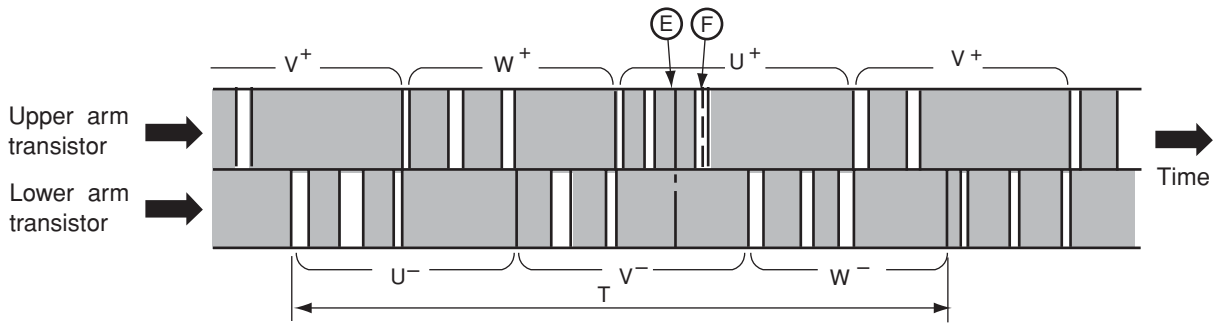


Fig. 3-2 Switching order of power module

- Upper arm transistor is controlled to ON/OFF by 3.2kHz chopper signal. Rotation speed of the compress is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.
- Time T in Fig. 3-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

- Fig. 3-3 shows voltage / current waveform at each point shown in Figs. 3-1 and 3-4. First half of upper arm is chopper, second half is ON, and first half of lower arm is chopper, second half is ON.

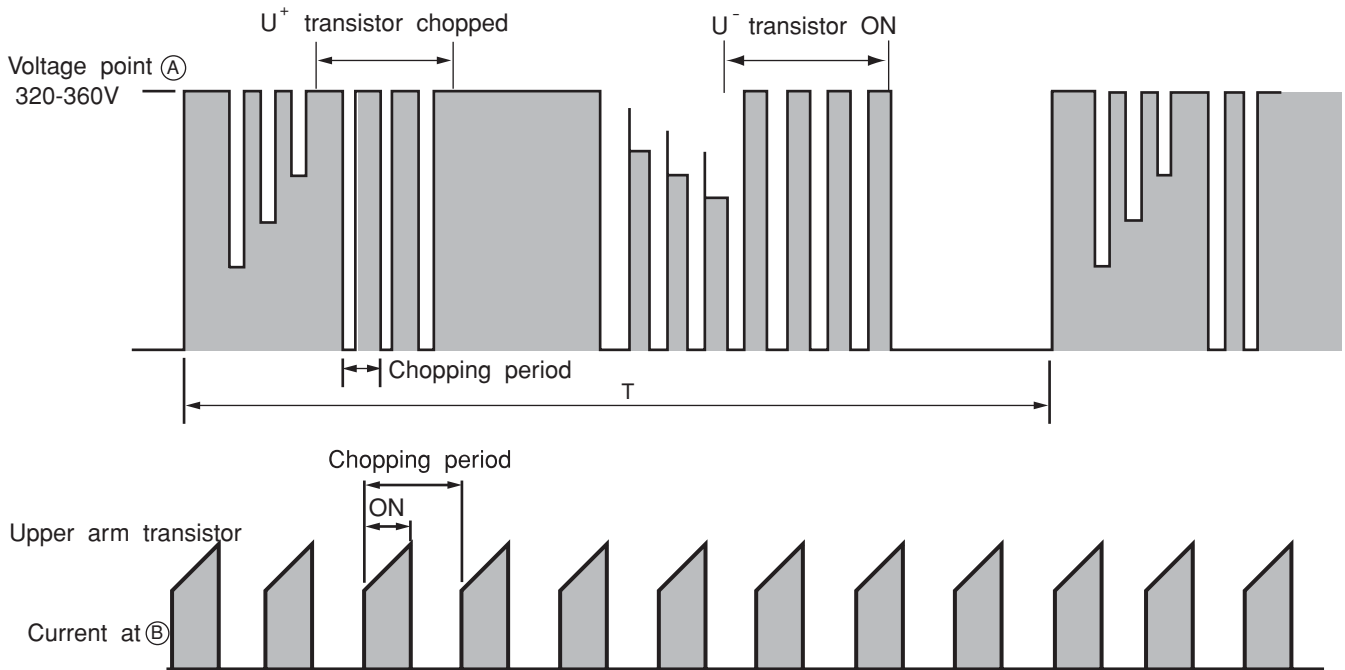


Fig. 3-3 Voltage waveform at each point

- When power is supplied U⁺ → U⁻, because of that U⁺ is chopped, current flows as shown below; ㊸
 - (1) When U⁺ transistor is ON: U⁺ transistor → U coil → V coil → V⁻ transistor → DC current detection resistor → Point ㊸ (Fig. 3-1)
 - (2) When U⁺ transistor is OFF: (by inductance of motor coil) U coil → V coil → V⁻ transistor → Return diode → Point ㊸ (Fig. 3-4)

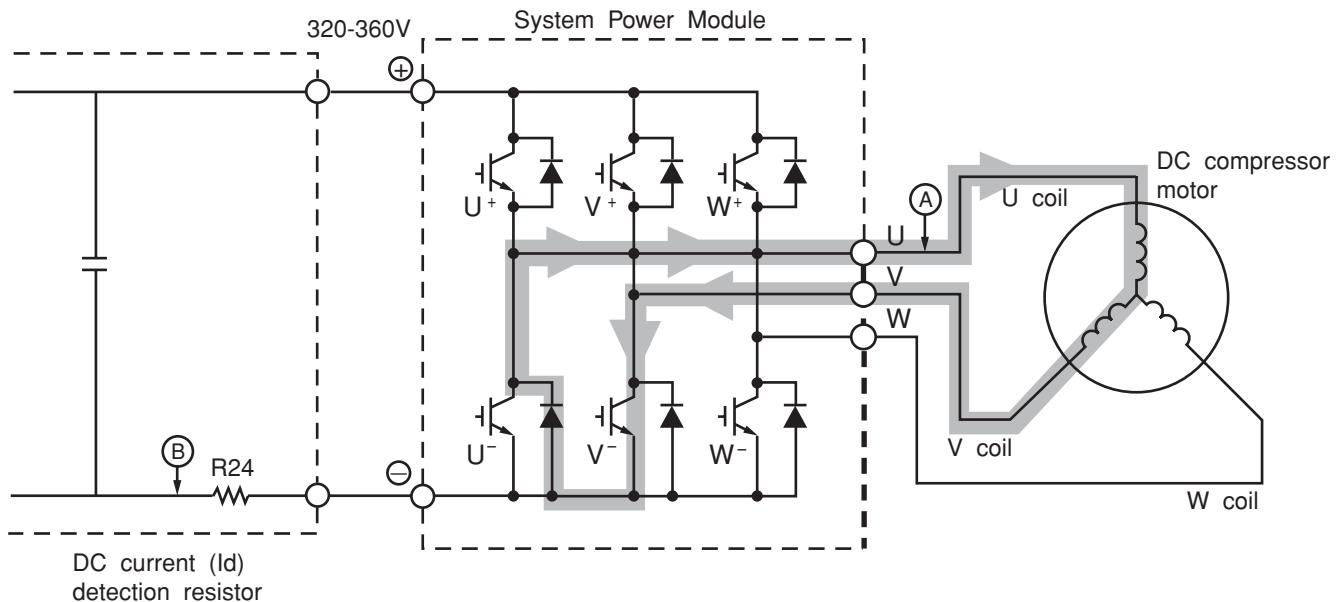


Fig. 3-4 System Power module circuit (U⁺ is OFF, V⁻ is ON)

- Since current flows at point ⓑ only when U⁺ transistor and V⁻ transistor is ON, the current waveform at point ⓑ becomes intermittent waveform as shown in Fig. 3-3. Since current at point ⓑ is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (Id) detection resistor.

<Reference>

If power module is defective, self diagnosis lamps on the control P.W.B. may indicate as shown below:

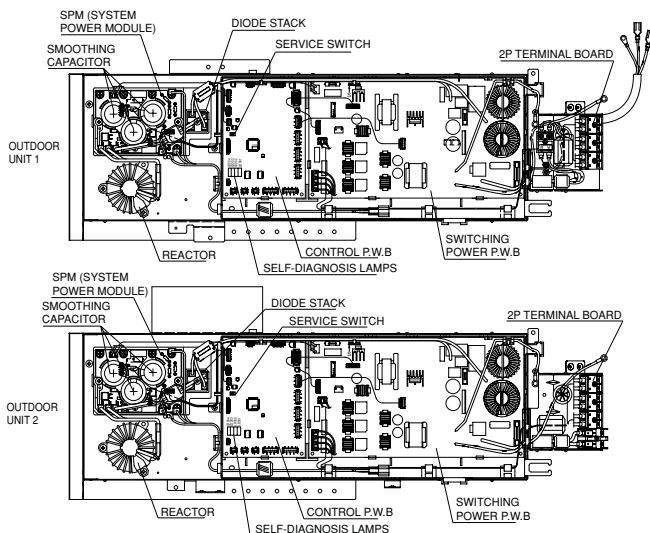


Fig. 3-5

Table 3-1

Self-diagnosis	Self-diagnosis lamp and mode	
I _p (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

※ From results of power module simple inspection (inspection mode when operated with compressor lead disconnected), LD310 blinks four times about 2 seconds later: Unit has not entered the normal operation.

4. Power Supply Circuit

- Fig. 4-1 shows the power circuit.

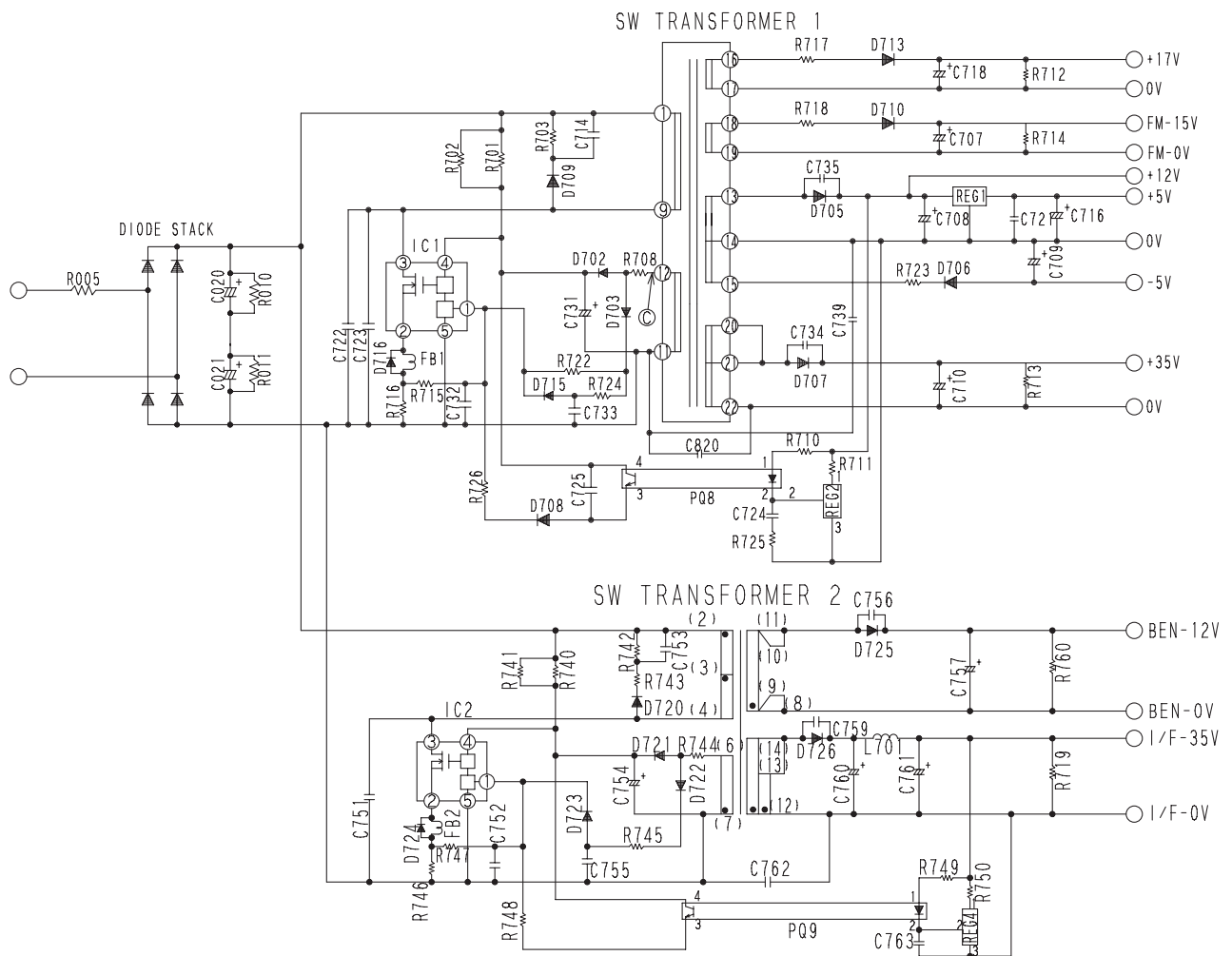


Fig. 4-1 Power circuit for P.W.B.

- There are two switching power supply in Power PWB.
- Switching power supply 1 is generating the secondary power for control circuits and DC35V indoor unit 1.
- Switching power supply 2 is generating the DC12V for expansion valve and DC35V for indoor unit 2 and 3.
- Switching power supply performs voltage conversion effectively by switching transistor IC1 to convert DC330V to high frequency of approximately 20kHz to 200kHz.
- Transistor IC1 operates as follows:

(1) Shifting from OFF to ON

- DC about 330V is applied from smoothing capacitors C020 ⊕ and C021 ⊖ in the control power circuit. With this power, current flows to pin ④ of IC1 via R701 and IC1 starts to turn ON. Since voltage in the direction of arrow generates at point ③ at the same time, current passing through R708 and D702 is positive-fed back to IC1.

(2) During ON

- The drain current at IC1 increases linearly. During this period, the gate voltage and current become constant because of the saturation characteristics of the transformer.

(3) Shifting from ON to OFF

- This circuit applies a negative feedback signal from the 12V output. When the voltage across C708 reaches the specified value, REG2 turns on and current flows to PQ8 ①-②. This turns the secondary circuits on, sets IC1 pin ① to "Hi", and turns IC1 off.

(4) During OFF

- While IC1 is on, the following energy charges the primary windings of the transformer:

Energy=LI²/2. Here, L : Primary inductance

I : Current when IC1 is off

This energy discharges to the secondary windings during power off. That is, C707-C710, C718 is charged according to the turn ratio of each winding.

- At the start, an overcurrent flows to IC1 because of the charged current at C707-C710, C718.
- The drain current at IC1 generates a voltage across R716. If it exceeds the IC1 base voltage, it sets the IC gate voltage to "Hi".
- R716 limits the gate voltage to prevent excessive collector current from flowing to IC1.
- This SW power circuit uses a frequency as low as 20kHz, especially at a low load (when both the indoor and outdoor units stop): This reduces power loss in standby status.

<Reference>

- If the power circuit for P.W.B. seems to be faulty:

(1) Make sure that 5V, 12V, 15V, 17V and -5V on the control P.W.B. power voltage are the specified values.

(2) When only the 5V output is low:

REG 1 (regulator) faulty, 5V-0V shorted, output is too high, or REG 1 is abnormal.

(3) When 12V and 5V are abnormal:

The following defects can be considered:

① Fan, operation, power, rush prevention relay (shorting in relay, etc.)

② REG 1 (regulator is abnormal), etc.

Shorting on primary circuits.

When shorting occurs in the secondary circuits, there is no abnormality in the primary circuits because of overcurrent protection.

The voltage rises when an opening occurs in the primary circuits, or the feedback system is abnormal.

(4) When 15V and 17V power supply is abnormal:

D710, D713 or Drive circuit is abnormal.

(5) When all voltage are abnormal:

IC1, R716, may possibly be defective. Also D cable may possibly be reverse connected.

If IC1 is abnormal, be aware that other components, such as the power module, REG (regulator), etc. are possibly defective.

[When the switching power supply seems to be abnormal, the voltage between IC1 pin ④ (to be measured at the leads of R9701 and R702) and IC1 pin ⑤ (to be measured at R216 lead) may be between 11 and 16V. This is because the protection circuit of IC1 is operating.]

5. Reversing valve control circuit

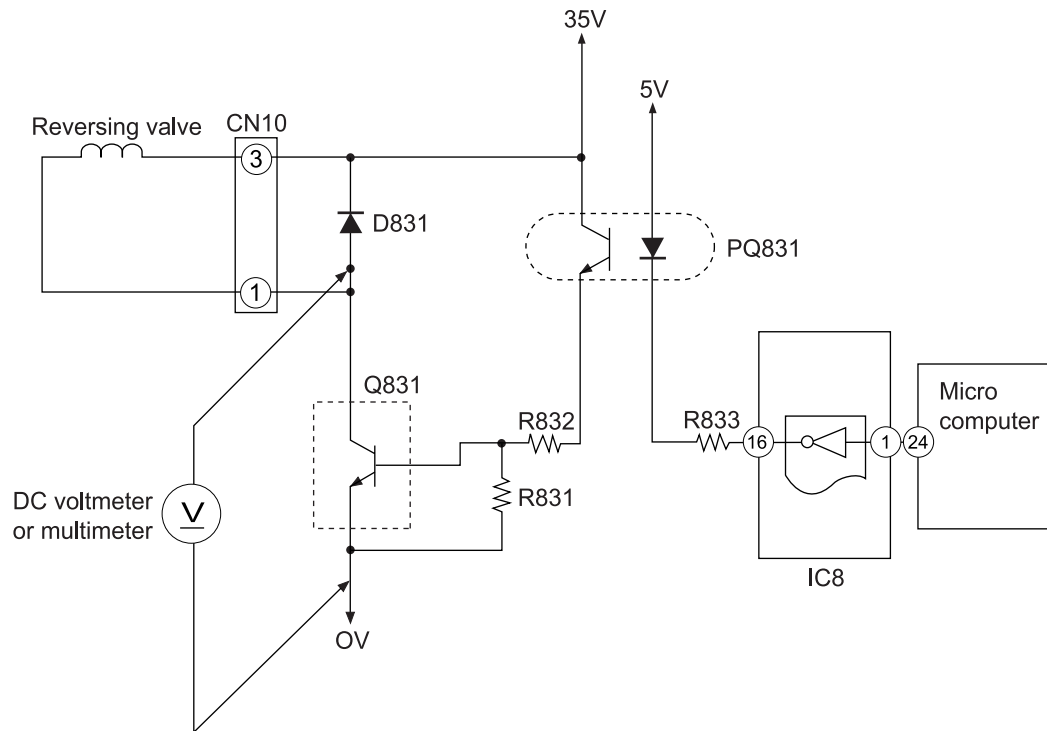


Fig. 5-1

Since the reversing valve is differential pressure system, even when reversing valve is ON (collector of Q831 is about 0.8V normally), compressor rotation speed instructed by indoor microcomputer exceeds 3300min⁻¹, signal at pin of ②④ microcomputer changes, and collector voltage of Q831 will be about 35V. This does not indicate trouble. When rotation speed is reduced under 2700min⁻¹, collector voltage of Q831 will fall to about 0.8V again. To measure voltage, connect ⊕ terminal of tester to D831 anode and ⊖ terminal to D line on the terminal board.

- By reversing valve control circuit you can switch reversing valve ON/OFF (cooling ON) according to instruction from indoor microcomputer and depending on operation condition.
Voltage at each point in each operation condition is approximately as shown below when measured by tester. (When collector voltage of Q831 is measured)

Table 5-1

Operation condition		Collector voltage of Q831
Cooling	General operation of cooling	About 0.8V
Heating	In normal heating operation	About 35V
	MAX. rotation speed instructed by indoor microcomputer after defrost is completed	About 35V
	Defrosting	About 0.8V
Dehumidifying	Sensor dry	About 0.8V

6. Rotor magnetic pole position detection circuit

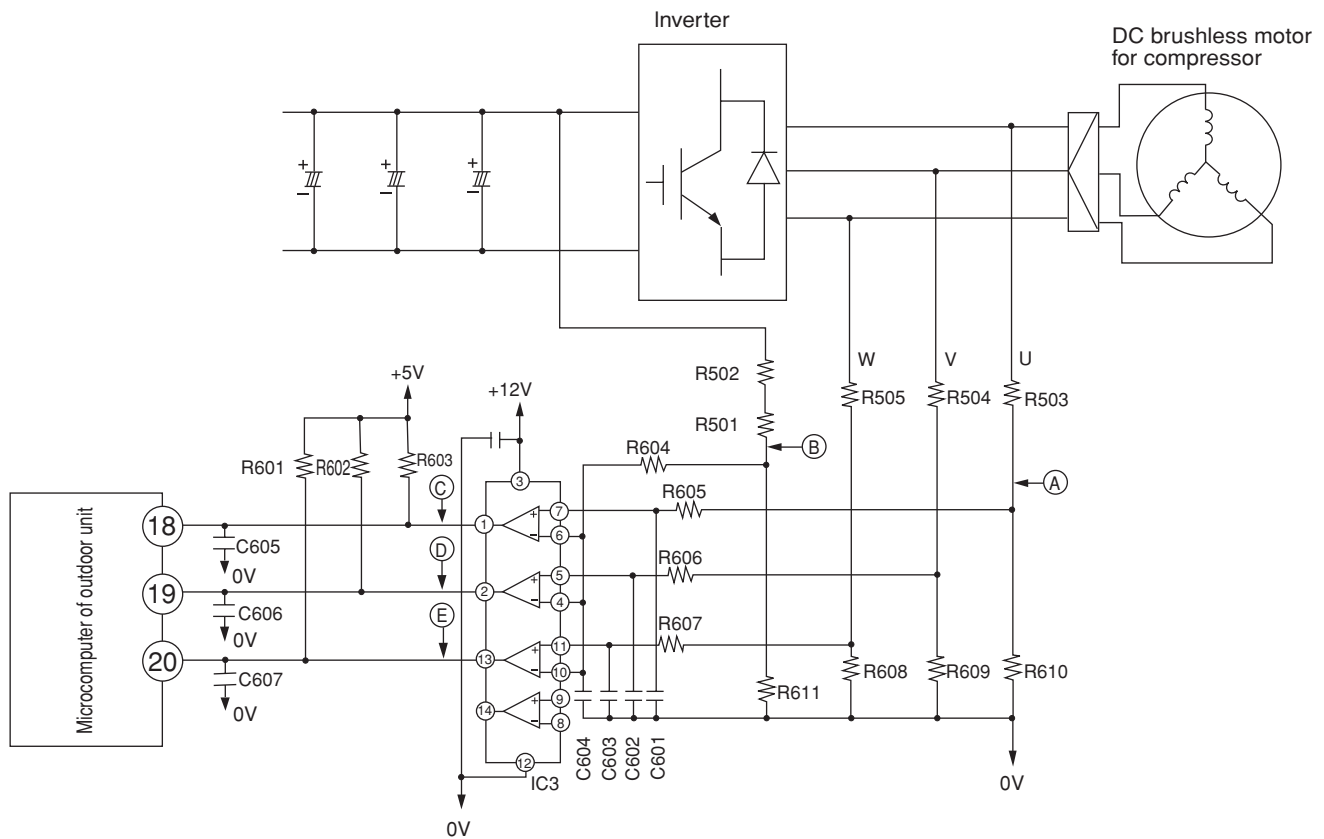


Fig. 6-1 Rotor magnetic pole position detection circuit

When the DC brushless motor is rotated, it also operates as power generator, generating reverse electromotive force according to number of rotations. This reverse electromotive force is voltage-divided by R503 - R505 and R608 - R610, and appears as point ① voltage. IC3 compares and digitalizes point ① voltage with point ② voltage (in which DC voltage (Vd) is voltage-divided by R501, R502 and R611), and inputs this to microcomputer as position detection signals for points ③, ④ and ⑤. Microcomputer switches inverter using optimum timing based on position detection signals, in order to control the rotation of the brushless motor.

7. Peripheral circuit of microcomputer

- Fig. 7-1 shows the microcomputer and its peripheral circuits.

Table 7-1, the basic operations of each circuit block, and Fig. 7-2, the system configuration.

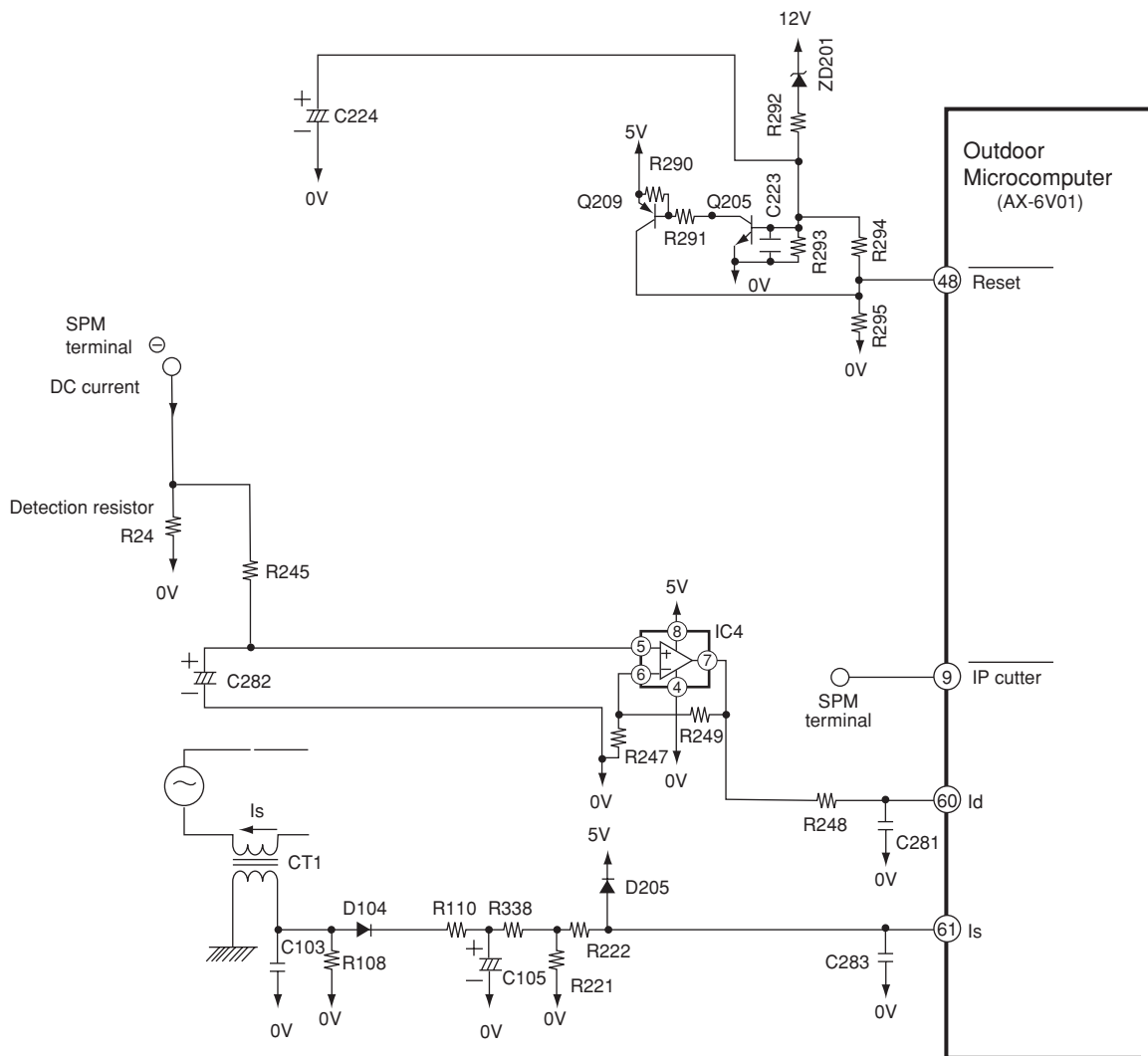


Fig. 7-1 Peripheral circuit of microcomputer (AX-6V01)

Table 7-1

Circuit block	Basic operation
Peak current cut off circuit	This circuit detects DC current flowing power module: When over-current (instantaneous value) flows, it stops upper and lower arm drive circuit and also produces Ip signal to stop microcomputer.
Overload external judgment circuit	This circuit detects DC current flowing to power module and produces signal to notify microcomputer of overload status.
Voltage amplifier circuit	This circuit voltage-amplifies DC current level detected by detection resistor and sends it to microcomputer. In addition, setting of internal/external overload judgment is performed.
Reset circuit	This circuit produces reset voltage.

8. Overload control circuit (OVL control circuit)

- Overload control is to decrease the speed of the compressor and reduce the load when the load on the air conditioner increases to an overload state, in order to protect the compressor, electronic components and power breaker.
- Overloads are judged by comparing the DC current level and set value.
- Fig. 8-1 shows the overload control system configuration and Fig. 8-2 is a characteristic diagram of overload judgement values. There are two judgement methods-external judgement which compares the externally set value with the DC current value regardless of the rotation speed and internal judgement which compares the set value that according to the rotation speed programmed in the micro computer software with the DC current value.

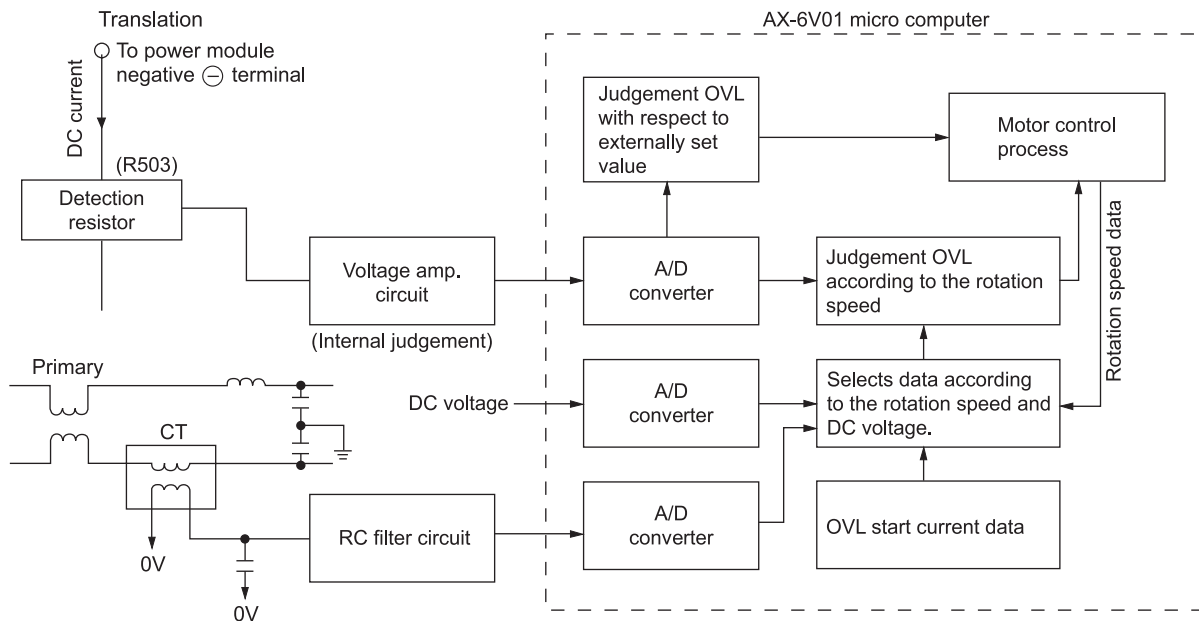


Fig. 8-1 Overload Control System Configuration

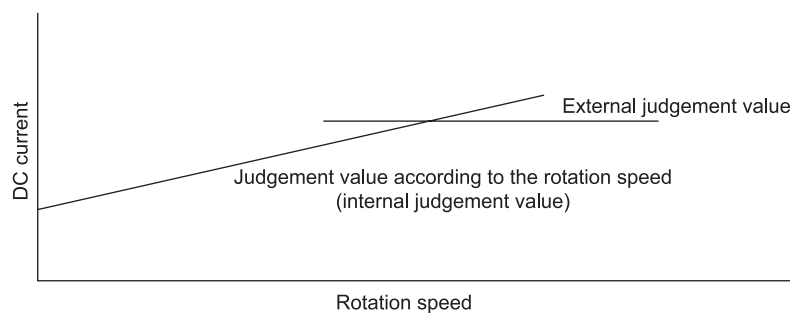


Fig. 8-2

9. Reset circuit

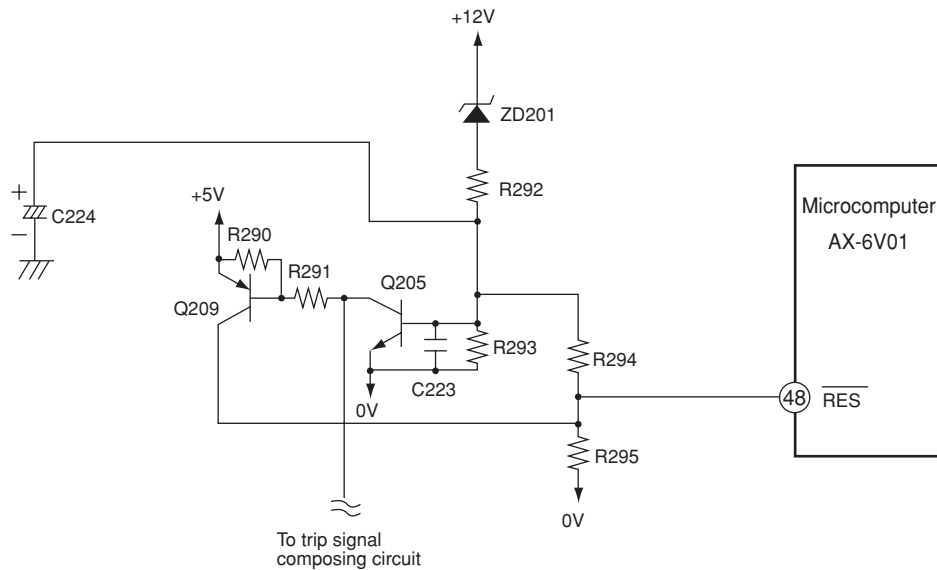


Fig. 9-1 [outdoor unit 1 or outdoor unit 2]

- Reset circuit performs initial setting of microcomputer program when power is turned on.
- Microcomputer resets program with reset voltage set to Lo, to enable operation at Hi level.
- Fig. 9-1 shows reset circuit, and Fig. 9-2 shows waveforms at each point when power is turned on and off.
- After power is turned on, 12V line and 5V line voltages rise: When 12V line voltage reaches 7.2V (Zener voltage of ZD201) ZD201 turns ON and Q208 and Q205 turn on, and reset voltage becomes Hi. Reset voltage is not set to Hi until VDD of microcomputer rises to 5V, enabling operation, due to ZD201.
- After power turns off, when 12V line voltage drops, ZD201 also turns OFF. However, Q208 is left ON since reset voltage is fed back by R294, until 12V line drops to about 7.6V. This prevents chattering of reset voltage due to voltage change in 12V line.

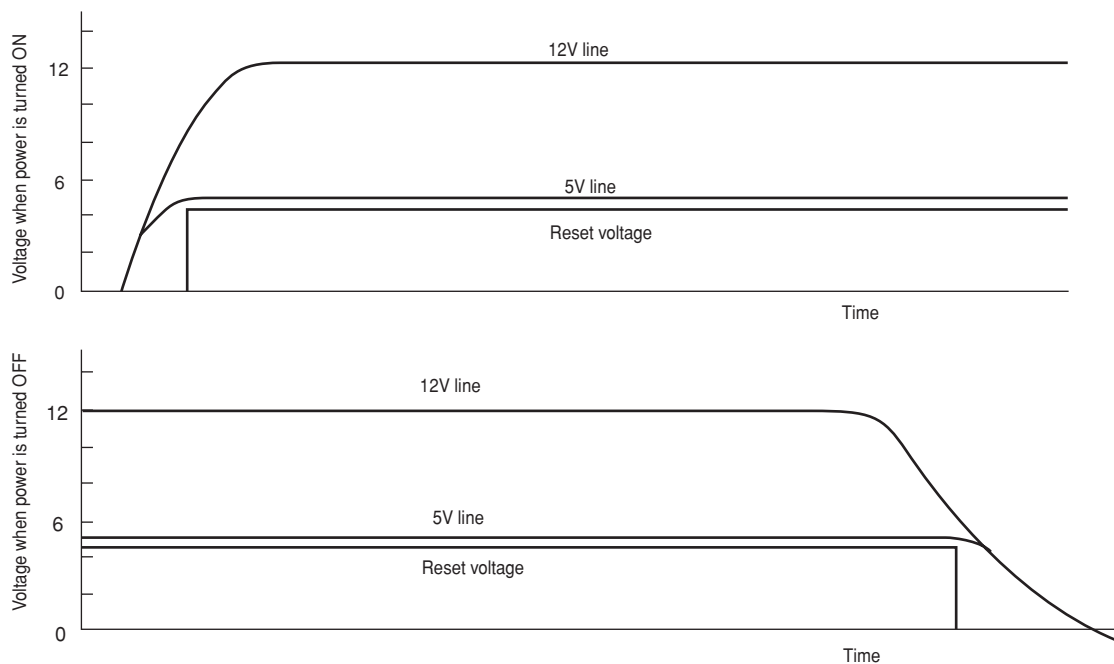


Fig. 9-2

10. Temperature Detection Circuit

- The outdoor units (at PWB OUTDOOR ELECTRICAL UNIT 1 and 2) provides with the outdoor temperature thermistor, DEF (defrost) thermistor, OH (overheat) thermistor and electric expansion valve thermistor so that they detect the temperatures of the unit and control the system.
- The circuit of the thermistors is shown as Fig. 10-1 and their roles and temperature measuring points are shown as Table 10-1.

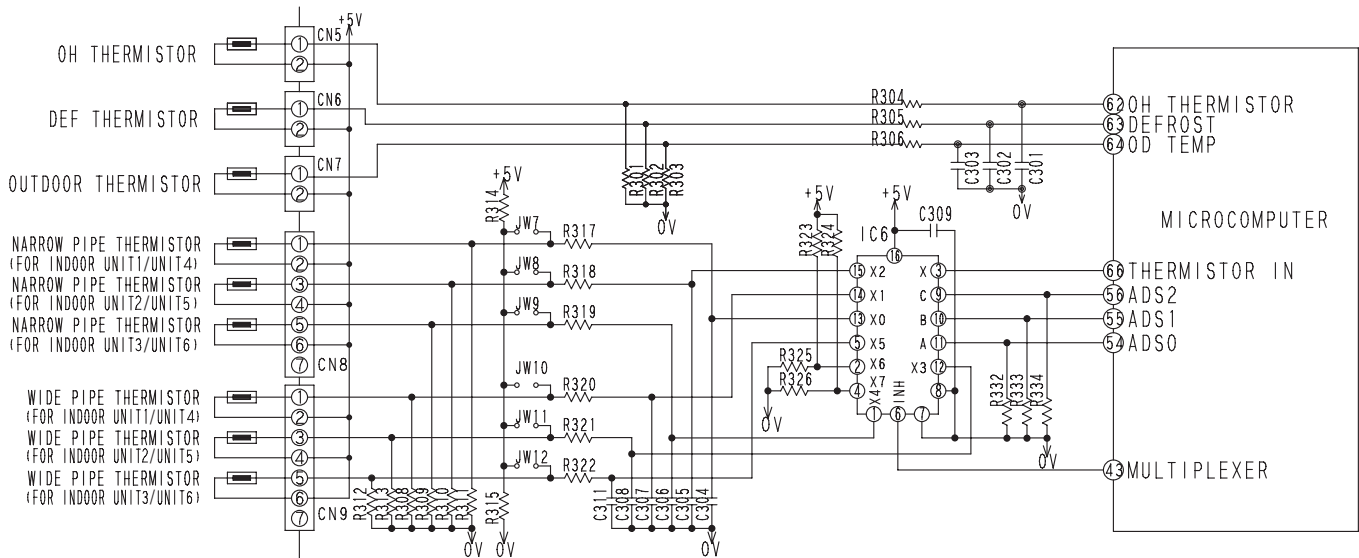


Fig. 10-1 Temperature Detection Circuit

Table 10-1 Name and Role of each thermistor

Name	Connector No	Measuring Point	Role
OH thermistor	CN5	Compressor head	If the temperature of the compressor rises abnormally (118°C), the compressor will be stopped. The temperature is used to decide the operation of the valve.
DEF thermistor	CN6	Heat exchanger	The thermistors decide the defrost operation during heating combined the data of the outside temperature and its data.
Outdoor temperature thermistor	CN7	Outside temperature	Outdoor temperature is used to decide the various operations of the air conditioner.
Electric expansion valve thermistor (NARROW PIPE 1)	CN8	Indoor unit 1 (NARROW PIPE)	The thermistors detect the temperatures of the piping to the indoor units. The temperatures are used to decide how much the expansion valve is opened.
Electric expansion valve thermistor (NARROW PIPE 2)		Indoor unit 2 (NARROW PIPE)	
Electric expansion valve thermistor (NARROW PIPE 3)		Indoor unit 3 (NARROW PIPE)	
Electric expansion valve thermistor (NARROW PIPE 4)		Indoor unit 4 (NARROW PIPE)	
Electric expansion valve thermistor (NARROW PIPE 5)		Indoor unit 5 (NARROW PIPE)	
Electric expansion valve thermistor (NARROW PIPE 6)		Indoor unit 6 (NARROW PIPE)	
Electric expansion valve thermistor (WIDE PIPE 1)	CN9	Indoor unit 1 (WIDE PIPE)	
Electric expansion valve thermistor (WIDE PIPE 2)		Indoor unit 2 (WIDE PIPE)	
Electric expansion valve thermistor (WIDE PIPE 3)		Indoor unit 3 (WIDE PIPE)	
Electric expansion valve thermistor (WIDE PIPE 4)		Indoor unit 4 (WIDE PIPE)	
Electric expansion valve thermistor (WIDE PIPE 5)		Indoor unit 5 (WIDE PIPE)	
Electric expansion valve thermistor (WIDE PIPE 6)		Indoor unit 6 (WIDE PIPE)	

Table 10-2 Correspondence between each thermistor's resistance and temperature (reference value)

- Table 10-2 shows the correspondence between the thermistor's resistance and the temperature. They should be used as reference values. The value, which you measure, may be slightly difference from that in the table. It depends on the instrument.
- When you measure the resistance, pull out the connector after turning off the power supply. Pulling out the connector while the power supply is turned on will cause troubles.

Electric expansion valve thermistor DEF thermistor	Temperature	Resistance	Microcomputer pin potential
	-15°C	12.6kΩ	1.0V
	0°C	6.1kΩ	1.7V
	25°C	2.2kΩ	3.0V
	50°C	860Ω	3.9V
	75°C	400Ω	4.4V
Outdoor temperature thermistor	Temperature	Resistance	Potential
	-15°C	12.6kΩ	1.0V
	0°C	6.1kΩ	1.7V
	15°C	3.2kΩ	2.4V
	30°C	2kΩ	3.1V
OH thermistor	Temperature	Resistance	Potential
	25°C	33.9kΩ	0.5V
	50°C	10.8kΩ	1.3V
	75°C	4.1kΩ	2.4V
	100°C	1.7kΩ	3.4V
	105°C	1.5kΩ	3.6V
	118°C	1kΩ	3.9V

- When the connectors of the thermistors are disconnected or the thermistors is open or short, LD301 (red) lights and LD302 (red) blinks so that they indicate troubled parts. Combinations of LD301 and LD302 are set up for indicating troubled thermistors. The correspondences between the number of blink time and troubled parts are shown as Table 10-3. Look in the table (LD301 and LD302 blink) for troubled parts, and if the disconnections of them are checked out, they are replaced.
- If you can see two or more troubled thermistors, a small number of blink takes precedence of others.
- The electric expansions valve thermistor is put together with 3 pieces, when replacing the thermistor, replace one set of 3 pieces as taking care of positioning. If you don't do so, the unit may not operate normally and its cooling and heating performance may drop.
- Be ware that only an open-circuit for OH thermistor has to be checked in 5 minutes after the compressor starts.
- If the unit operates abnormally after replacing the thermistor, replace the control P.W.B. because it malfunctions.

Table 10-3 LED lighting mode at the thermistors troubled

LED lighting mode		Troubled thermistor	Judgement	
LD301	LD302		Open	Short
Lights	1 blink	OH thermistor	0.04V or less	4.96V or more
Lights	2 blinks	DEF thermistor	0.04V or less	4.94V or more
Lights	3 blinks	Outdoor temperature thermistor		
Lights	4 blinks	Electric expansion value thermistor (thin pipe 1 or thin pipe 4)		
Lights	5 blinks	Electric expansion value thermistor (thick pipe 1 or thin pipe 4)		
Lights	6 blinks	Electric expansion value thermistor (thin pipe 2 or thin pipe 5)		
Lights	7 blinks	Electric expansion value thermistor (thick pipe 2 or thin pipe 5)	0.04V or less	4.94V or more
Lights	8 blinks	Electric expansion value thermistor (thin pipe 3 or thin pipe 6)		
Lights	9 blinks	Electric expansion value thermistor (thick pipe 3 or thin pipe 6)		

- The OH thermistors are detecting the compressor head temperatures. If the temperature rises over 118°C, the compressor in the cycle will be stopped to protect itself and LD301 will blink 6 times (OH STOP). When the compressor temperature falls under 105°C, the compressor will restart. During OH STOP, the fan continues to spin. The other cycles without a trouble operates normally.
- If OH STOP often occurs, the refrigerant may be leaking.

11. Electric expansion valve

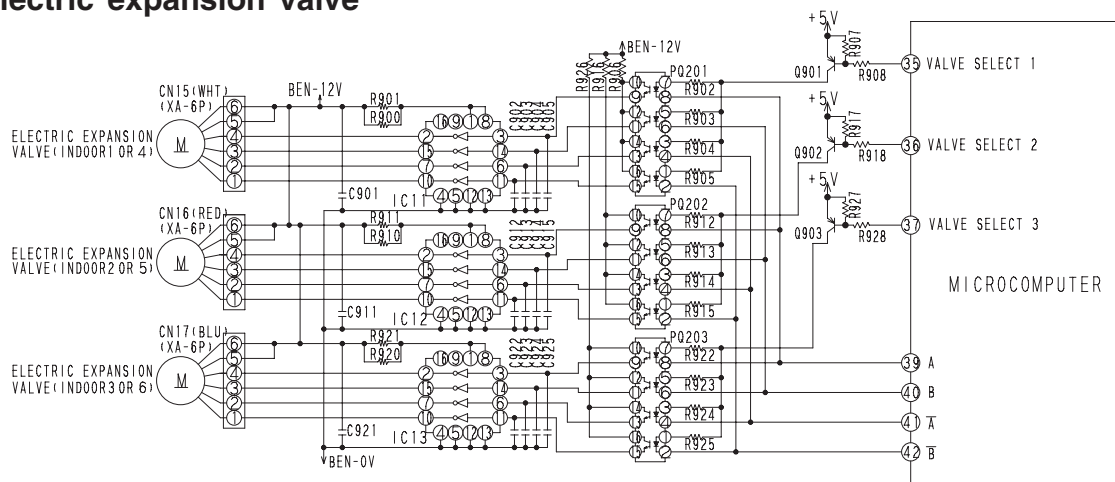


Table 11-1

- The electric expansion valve is driven by DC 12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below.
When power is supplied, voltages at pins 4 to 1 of CN15~CN17 are about 0.9V; they are about 12V when no power is supplied. When power is reset, initialization is performed for 10 or 20 seconds.
During initialization, measure all voltages at pins 4 to 1 of CN15~CN17 using mutimeter. If there is any pin with voltage that has not changed from around 0.9V or 12V, expansion valve or microcomputer is defective.
- Fig. 11-2 shows logic waveform when expansion valve is operating.

Table 11-2

Pin phase No.	Lear wire	Drive status							
		1	2	3	4	5	6	7	8
④	White	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
③	Yellow	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
②	Orange	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
①	Blue	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Operation mode 1→2→3→4→5→6→7→8 VALVE CLOSE 8→7→6→5→4→3→2→1 VALVE OPEN									

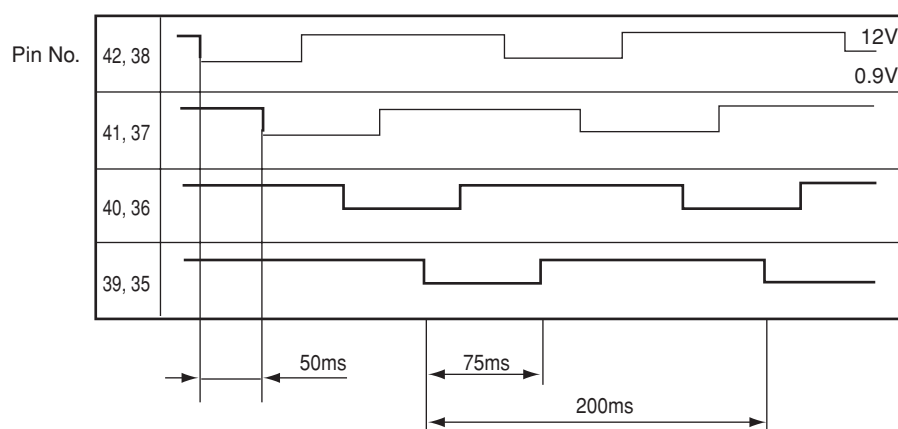


Fig. 11-2

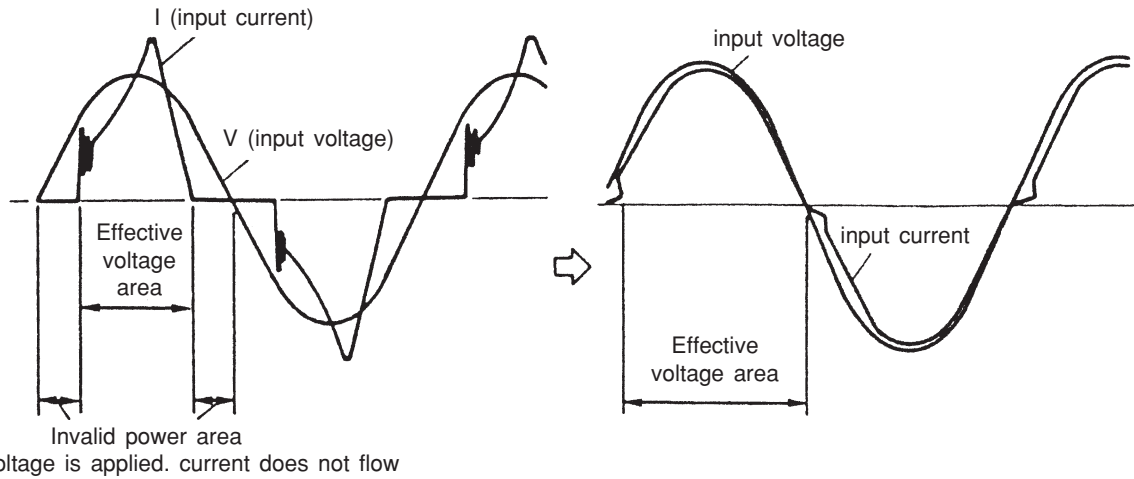
With expansion valve control, opening degree is adjusted to stabilize target temperature, by detecting temperature of compressor head.

The period of control is about once per 20 seconds, and output a few pulses.

12. Power Factor Control Circuit

Power factor is controlled by almost 100%. (Effective use of power)

With IC in ACT module, control is performed so that input current waveform will be similar to waveform of input voltage.

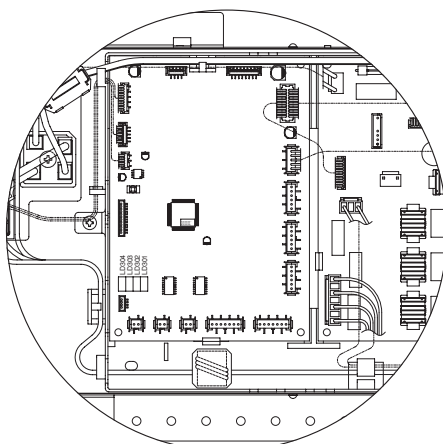


*Assuming the same current capacity (20A), power can be used about 10% effective, comparing with current use (power factor of 90%), and maximum capacity is thereby improved.

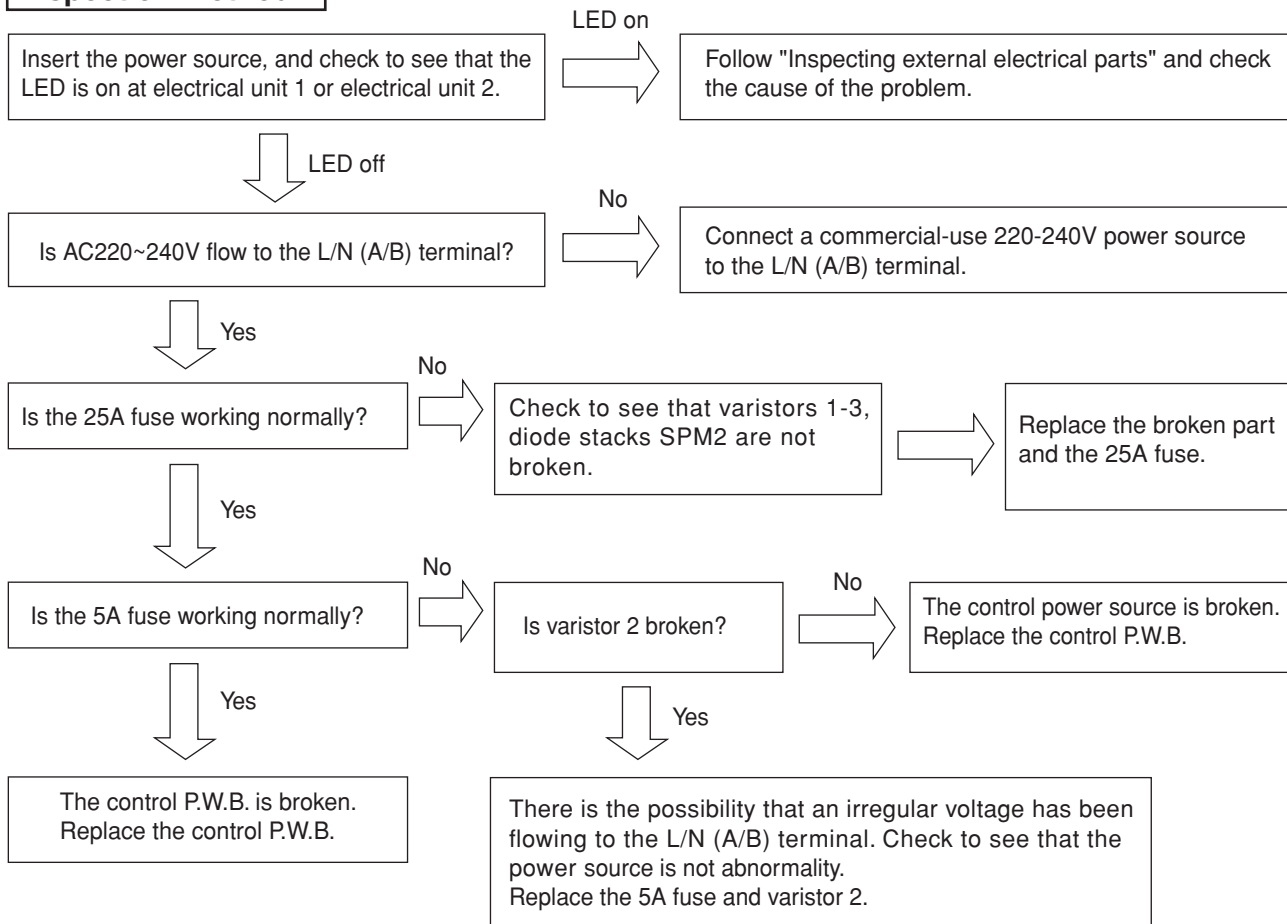
INSPECTING OUTDOOR ELECTRICAL PARTS

- Check to see that the LED is either on or blinking outdoor electrical unit 1 and electrical unit 2.
- Carry out inspections by examining the on/blinking status of LEDs 301-304.

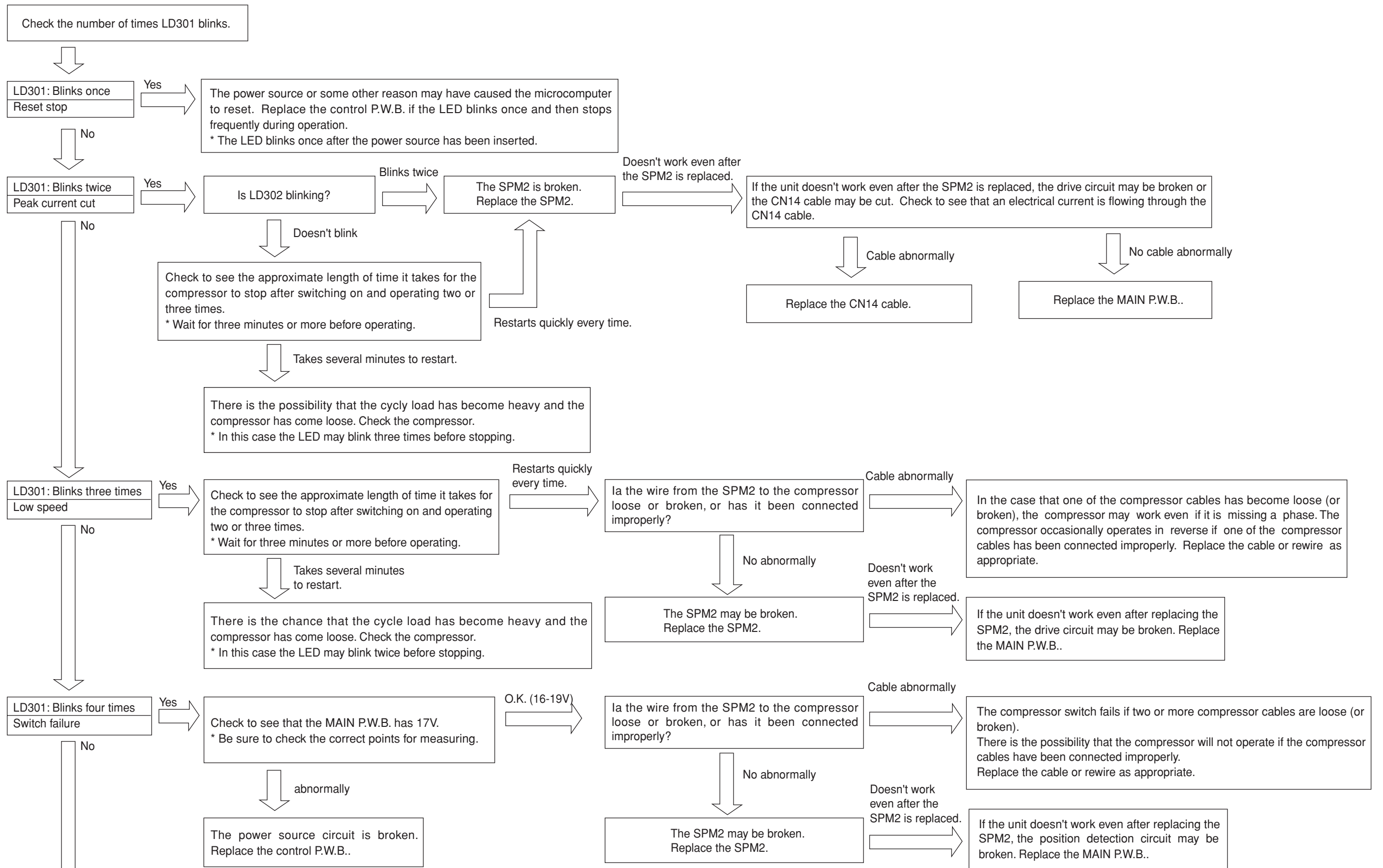
LED number	LD301	LD302	LD303	LD304	Status	Checkpoints
Name	Diagnosis lamp 1	Diagnosis lamp 2	Communications lamp	Operation lamp		
Case 1	Off	Off	Off	Off	Normal off status or unconnected microcomputer power source	If the LED is not on even when the power source is connected the microcomputer power source is unconnected. → Inspection method 1
Case 2	Blinks once	Off	Off	Off	Microcomputer reset status (immediately after inserting power source or immediately after power source abnormally)	If is normal for LD301 to blink once after the power source has been inserted. If the unit stops when it is in operation and LD301 blinks once, it is possible that the power source has been temporarily interrupted by lightening or for some other reason. Replace the control PCB if this occurs frequently.
Case 3	Blinks	Off	Off	Off	Abnormally stop	Abnormally stop is shown by the number of times the LED blinks. → Inspection method 2
Case 4	On	Blinks	Off	Off	Thermistor abnormally	Thermistor abnormally is shown by the number of times the LED blinks. → Inspection method 3
Case 5	Off (blinks once)	Off	Blinks	Off (blinks)	Communications error	Communications error is shown by the number of times the LED blinks. → Inspection method 4 *In the case that an internal unit is not connected, the number of connected internal units is shown by the number of times the LED blinks. This is not a abnormally. The internal unit has no communications error and is able to operate normally.
Case 6	Off	Off	On	Off	Normal operation	Normal operation
Case 7	On	Off	On	Off	OVL1 operation	Normal operation
Case 8	Off	On	On	Off	OVL2 operation	Normal operation
Case 9	On	On	On	Off	OVL3 operation	Normal operation

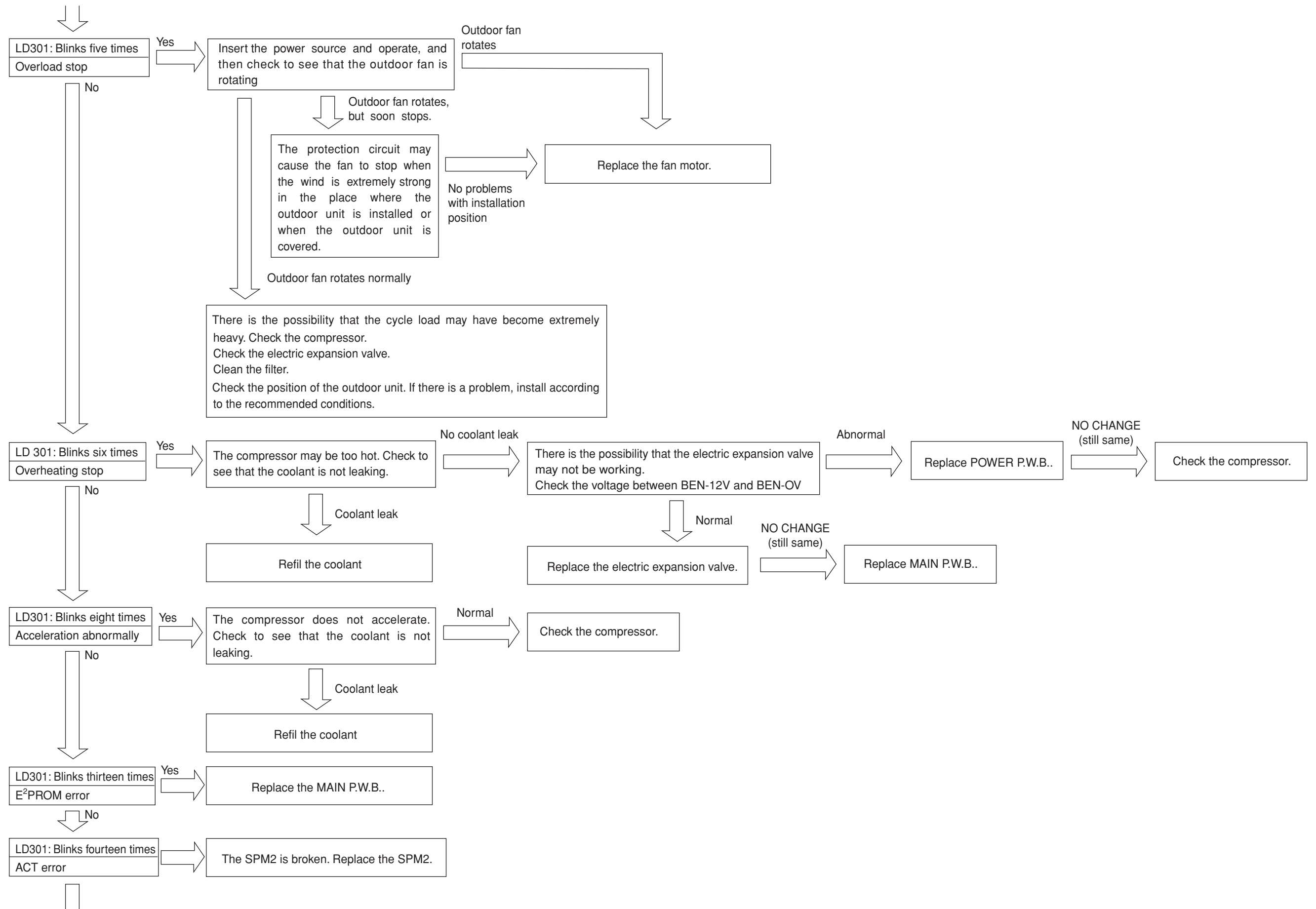


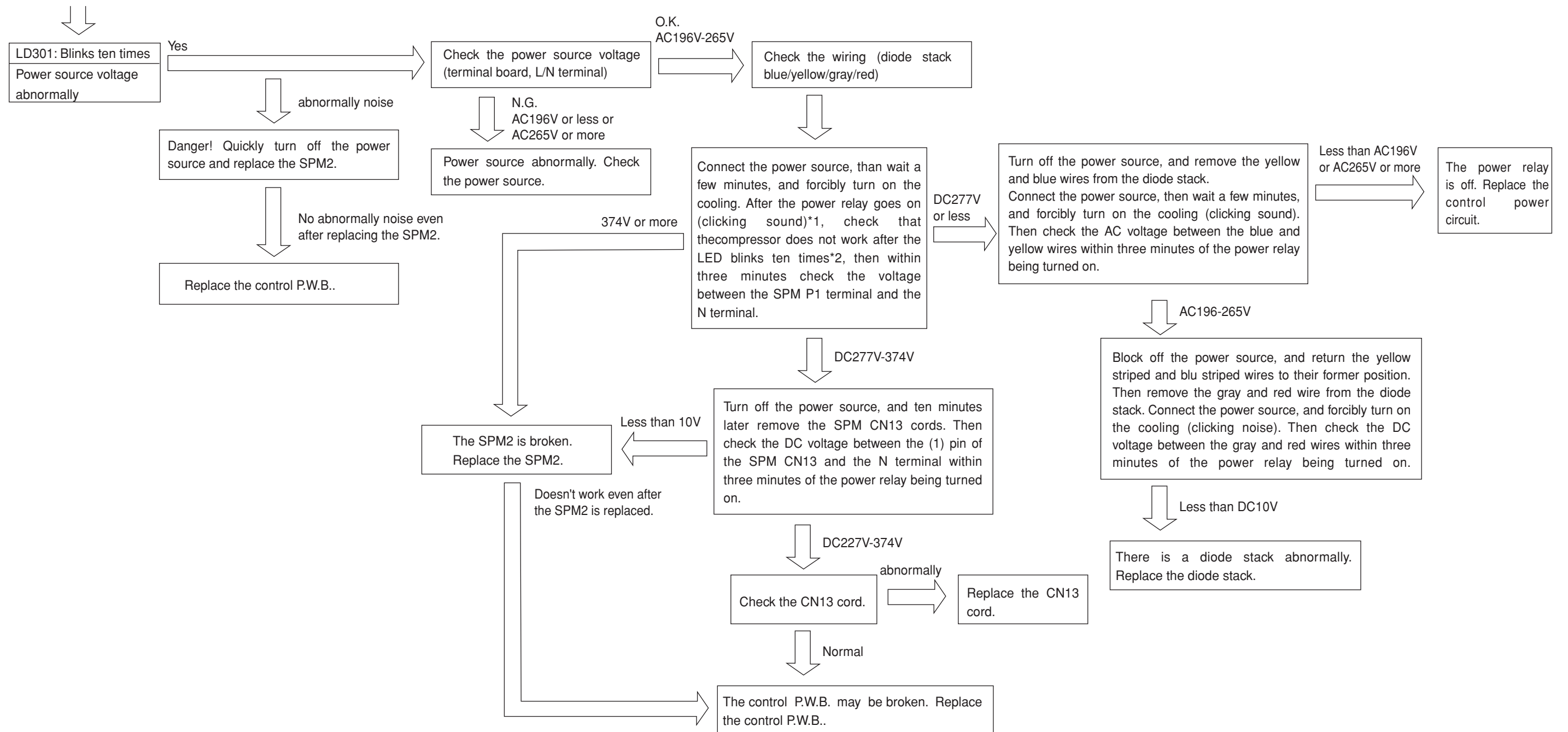
Inspection method 1



Inspection method 2





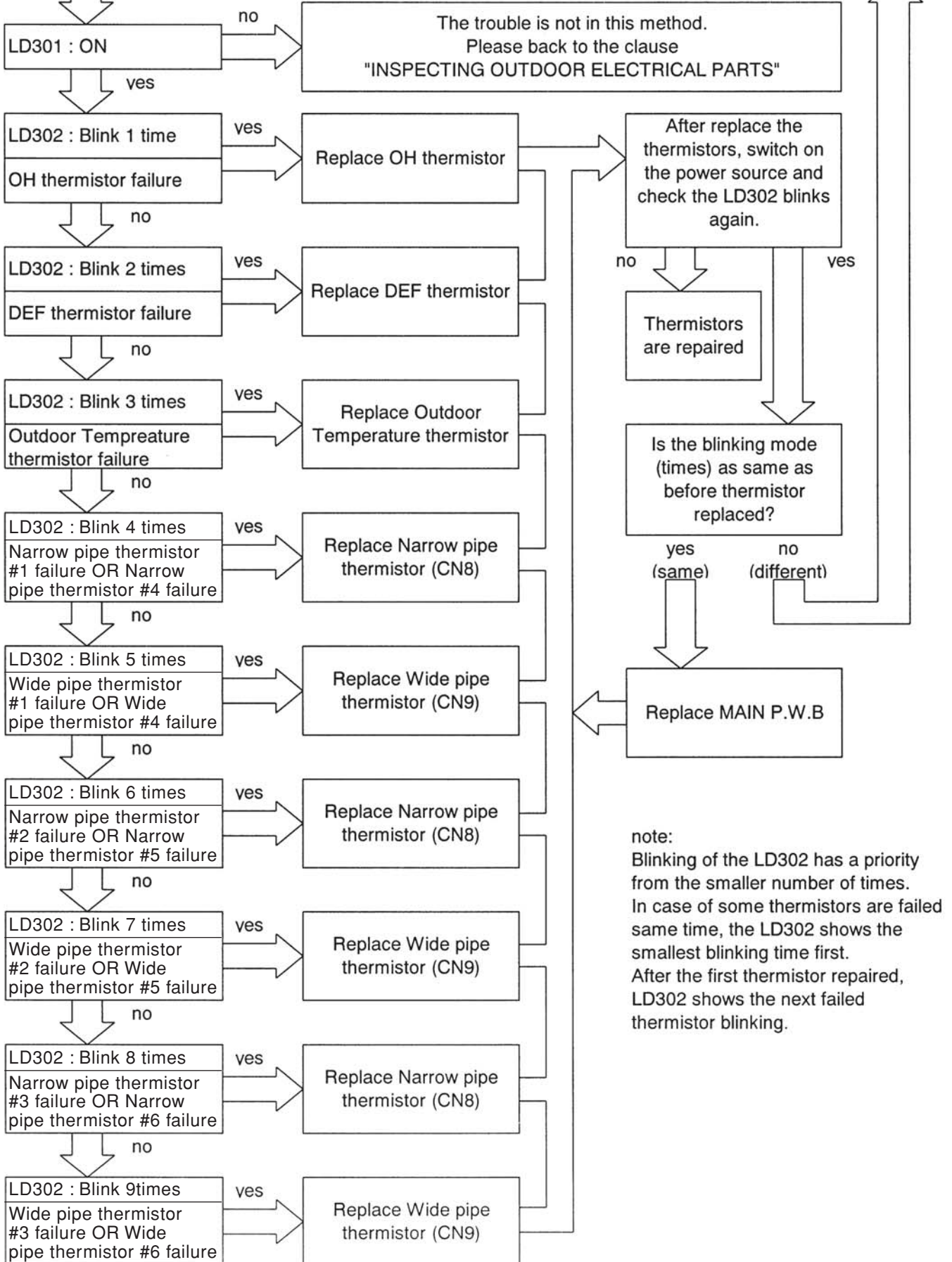


* 1 The power relay does not turn on without an operation order. In the case of a abnormally stop, the power relay turns off after approximately three minutes.

* 2 Carry out each of the voltage checks in the three minutes between the power relay turning on and turning off.

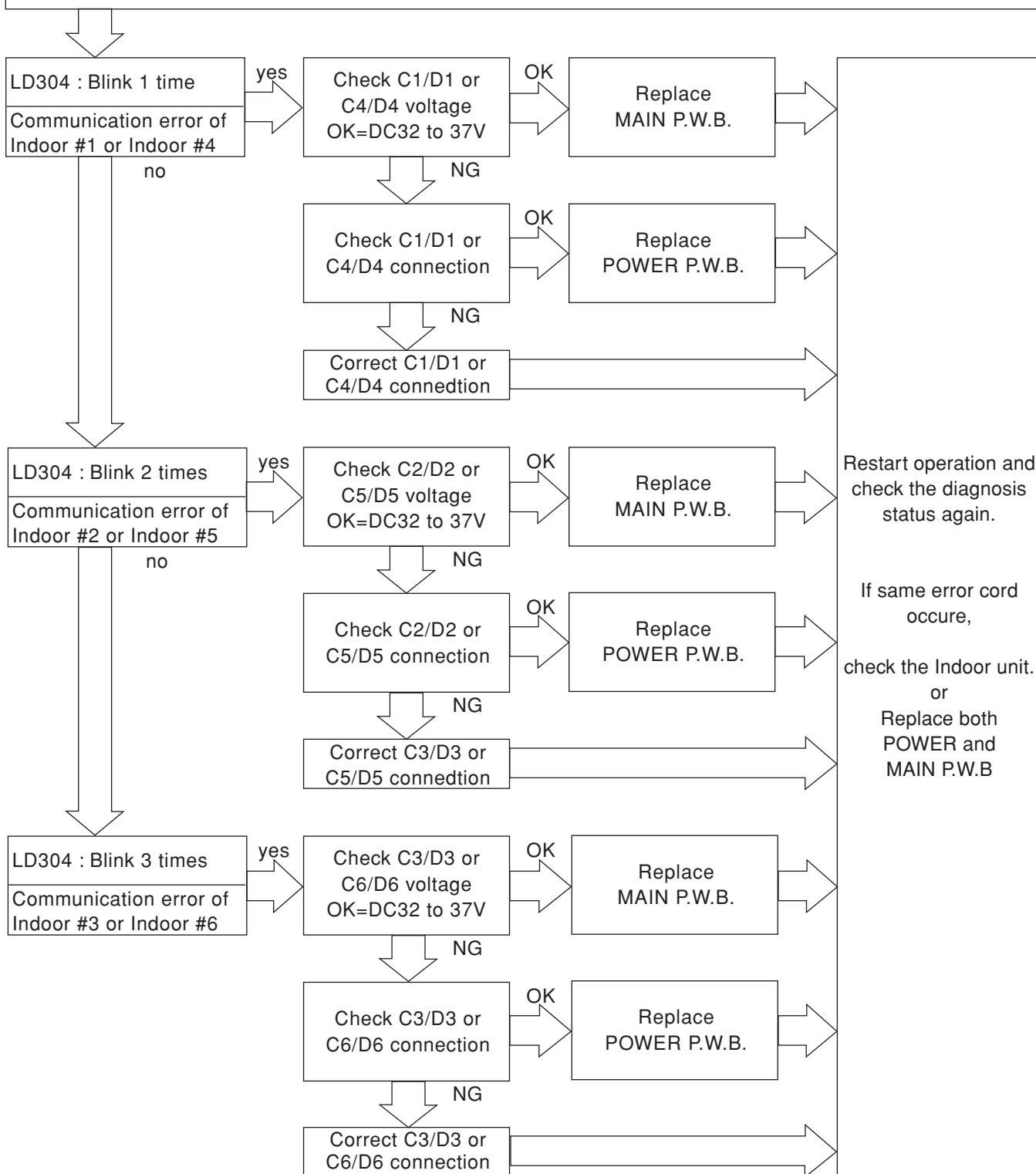
Inspection method 3

Check the light status of LD301 and LD302



Inspection method 4

Check the light status of LD304



note:

If Indoor unit is not installed, the correspond error cord will be generated.

Blinking of the LD304 has a priority from the smaller number of times.

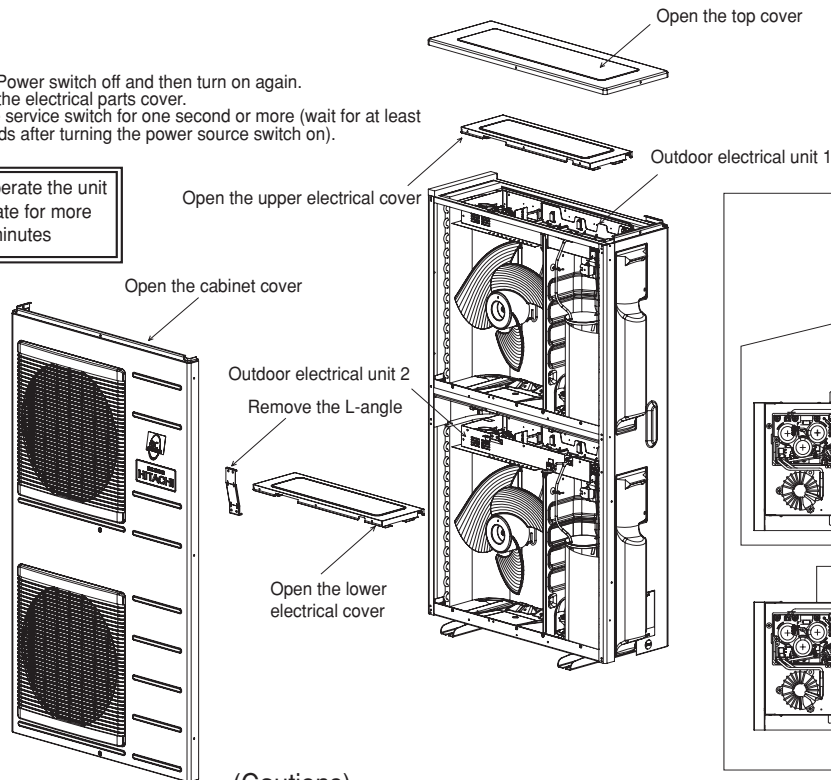
In case of some indoors are failed at same time, the LD304 shows the smallest blinking time first.

After the first failure repaired, LD304 shows the next fail.

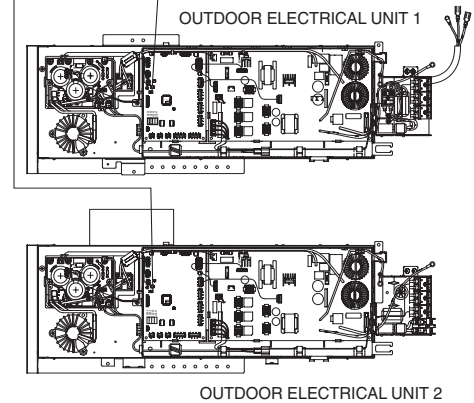
HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

1. Turn the Power switch off and then turn on again.
2. Remove the electrical parts cover.
3. Press the service switch for one second or more (wait for at least 30 seconds after turning the power source switch on).

Never operate the unit in this state for more than 5 minutes



Service switch
(forced-cooling mode is set by pressing for one second or more and stopped by pressing again)



(Cautions)

- (1) If interface signal (35V DC) terminals C and D are not connected when the outdoor unit service switch is used for checking, the outdoor defects indicator (LD304) will blink to indicate communication error
- (2) If you do this with the compressor connector in a removed state, LD301 will blink four times, and the unit will not work.

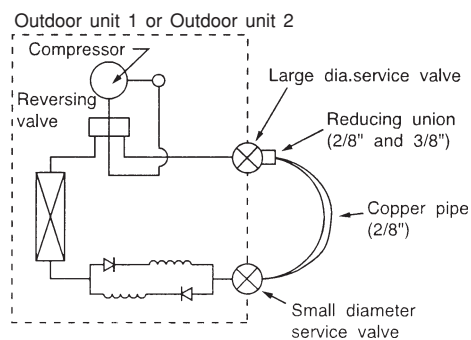
Be sure to return the service switch to 'normal' after checking with service operation is completed.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Connect the large dia. pipe side and small dia. pipe side service valves using a pipe.

Connect the small diameter service valve and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (*1)



Parts to be prepared

- (1) Reducing union
2/8" (6.35mm)
3/8" (9.52mm)
- (2) Copper pipe (2/8" and 3/8")

Do not operate for 5 minutes or more

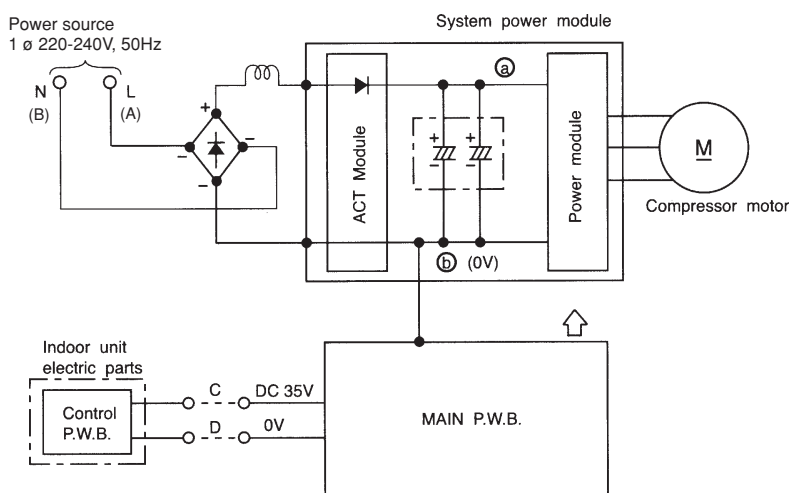
The operation method is the same as "How to operate using the connector to servicing the outdoor unit"

*1 The charging amount of 300g is equivalent to the load in normal operation.

Model

DANGER

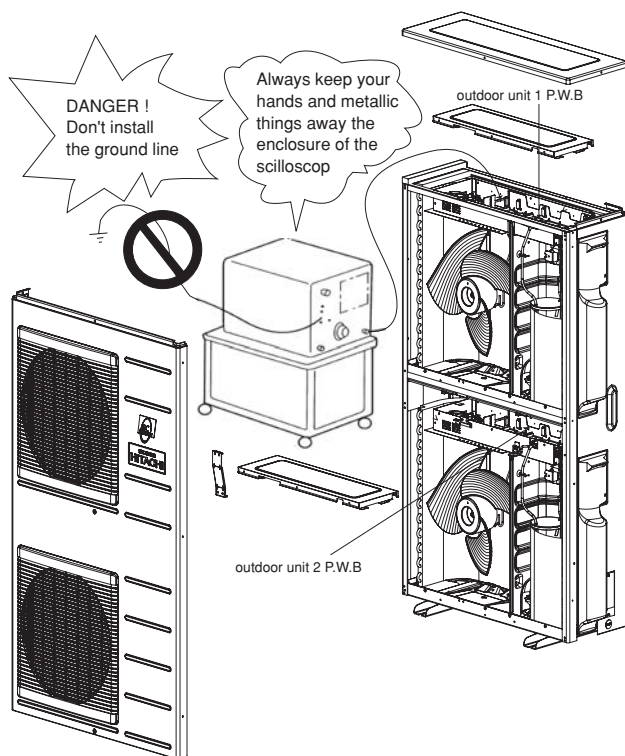
1. Remember that the 0V line is biased to 162V in reference to the ground level.
2. Also note that it takes about 10 minutes until the voltage fall after the power switch is turned off.



Across (a) – (b) (0V line)..... approx 360V
 Across (a) – ground..... approx 155-170V
 Across (b) (0V line)– ground..... approx 155-170V



When using an oscilloscope, never ground it. Don't forget that high voltages as noted above may apply to the oscilloscope.



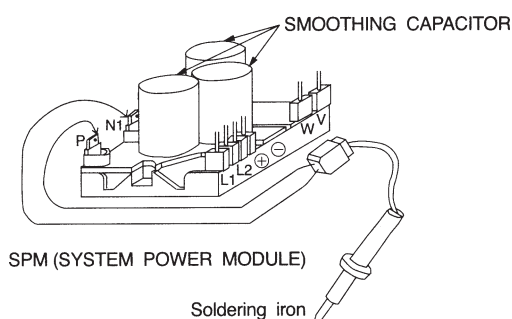
Discharge procedure and how to cut off power to power circuit



Caution

- Voltage of about 360V is charged at both ends of smoothing capacitor 330 μ F x 3.
- High voltage (DC 360V) is also charged at screw and terminal sections of system power module.
- During continuity check of each circuit of electrical parts in outdoor unit is performed, to prevent secondary trouble, disconnect red/gray wire connected to system power module (SPM) from diode stack. (Also be sure to perform discharging of smoothing capacitor.)

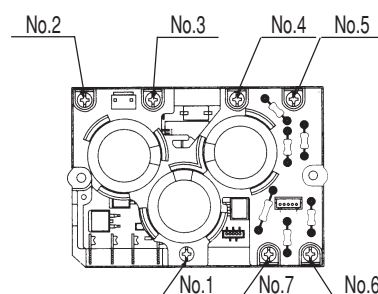
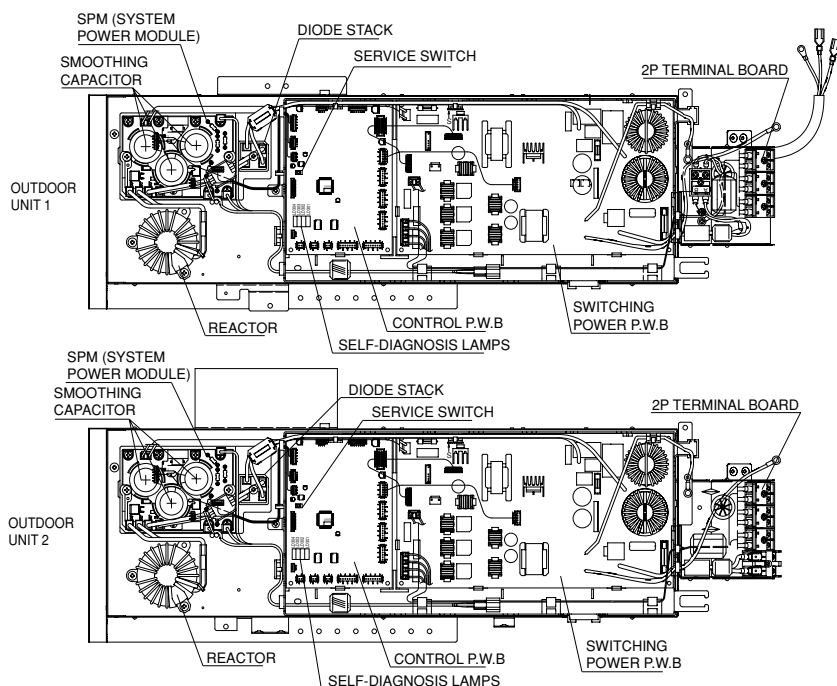
1. Disconnect power plug.
2. Wait for 10 minutes or more after power is turned off and then remove electrical parts box lid. As shown below. Apply soldering iron of 30-75W for 15 seconds or more to P1 and N1 black/white lead receptacles on system power module to discharge voltage from smoothing capacitor.
Do not loosen or remove screws of system power module: If screw is loose, voltage will not be discharged.
3. Before operation check of each part of circuit, remove receptacle of red/gray lead connected to system power module from diode stack.



Do not use soldering iron with transformer: Doing so will blow thermal fuse inside transformer.

As shown left, apply soldering iron to metal parts (receptacles) in sleeve corresponding to P and N1 terminals of system power module.

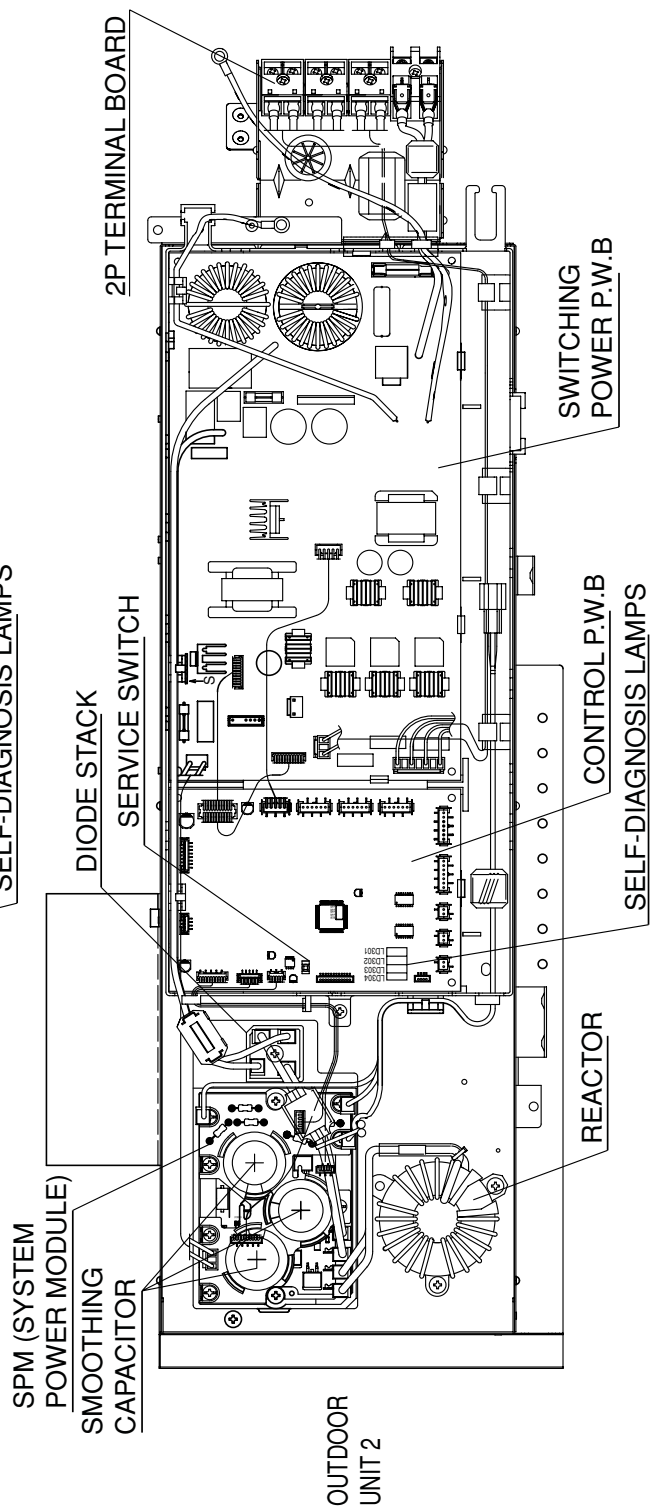
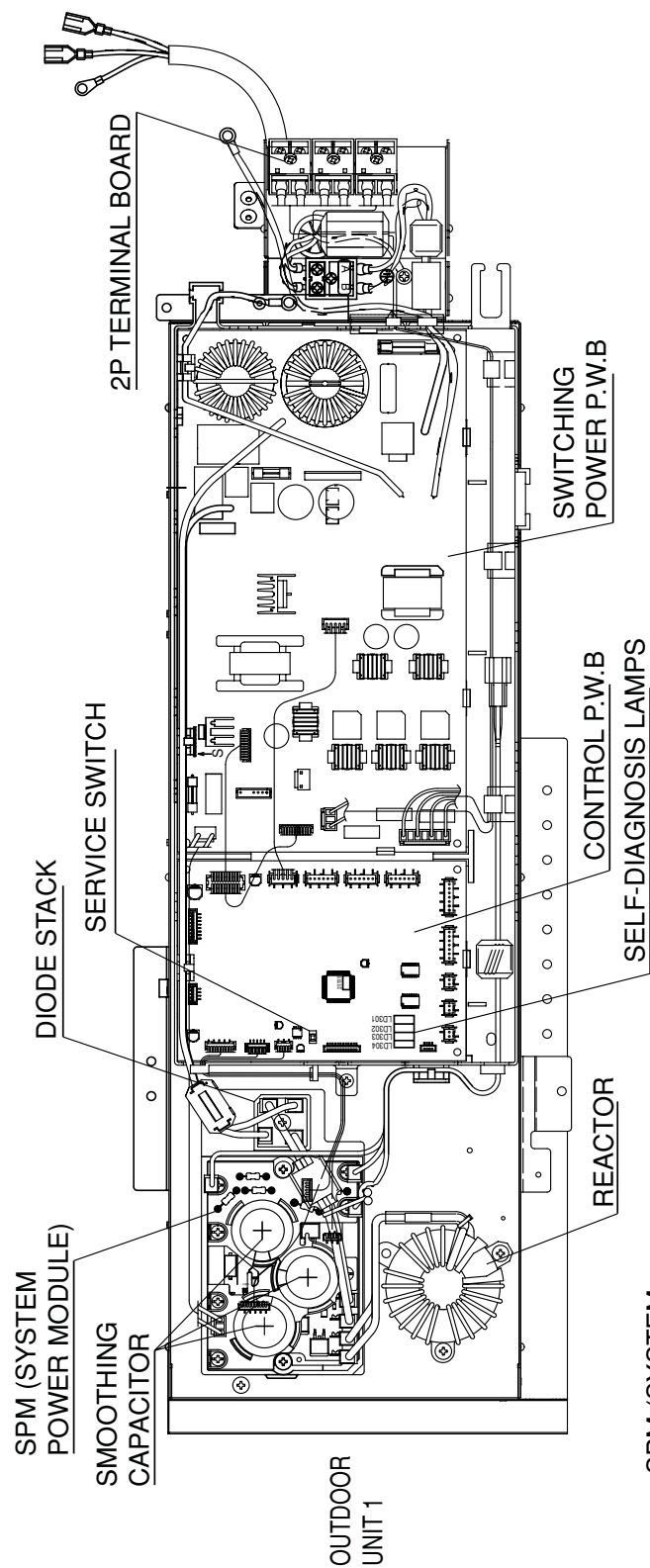
Screws of system power module are live parts: Do not touch them. Screw tightening torque and method are strictly specified. When the screw is loosened or removed once, be sure to tighten according to the procedure shown on the right, with tightening torque of $0.8 \pm 0.2 \text{ N} \cdot \text{m}$.



Lighting mode self-diagnosis lamp

RAM-130QH5

1 Location of self-diagnosis lamp



2 Lighting mode self-diagnosis lamp

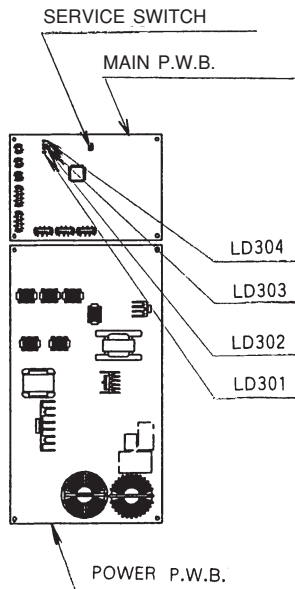
RAM-130QH5

DANGER
(DC360V)

●WAIT FOR TEN-MINUTE (MIN) AFTER TURNING OFF THE POWER SWITCH WHEN SERVICE WORK IS BEING DONE.

SERVICE OPERATION

REFRIGERANT WITHDRAWAL OR SINGLE OPERATION OF THE OUTDOOR UNIT, SHALL SWITCH OFF THE EXCLUSIVE BREAKER FIRST.
PUT THE SWITCH TO ON POSITION BACK AND WAIT AT LEAST 20 SECONDS.
THEN PUSH THE SERVICE SWITCH WHICH IS ON THE CIRCUIT BOARD FOR MORE THAN 1 SECOND.
(THERE WILL BE A COOLING CYCLE) TO PRESERVE PARTS FROM DAMAGE, MUST NOT OPERATE IT FOR MORE THAN 5 MINUTES.
TO PAUSE, PUSH THE SERVICE SWITCH AT LEAST 1 SECOND IN CASE TO START OPERATING ONCE AGAIN PLEASE SWITCH OFF THE POWER BACK.



SELF-DIAGNOSIS LIGHTING MODE				■:LIT ▨:BLINKING □:OFF				
LD301 RED	LD302 RED	LD303 RED	LD304 GRN	SELF-DIAGNOSIS NAME	DETAILS	MAIN CHECK POINT		
[1] DURING OPERATION								
□	□	■	□	NORMAL OPERATION	COMPRESSOR OPERATION	NOT MALFUNCTION		
■	□	■	□	OVERLOAD (1)	THE ROTATION SPEED IS AUTOMATICALLY CONTROLLED TO PROTECT THE COMPRESSOR IN THE OVERLOAD CONDITION.	THIS SHOWS AN OVERLOAD, NOT MALFUNCTION.		
□	■	■	□	OVERLOAD (2)				
■	■	■	□	OVERLOAD (3)				
[2] DURING STOP								
□	□	□	□	NORMAL STOP	INDOOR THERMOSTAT OFF, MAIN OPERATION OFF.	NOT MALFUNCTION.		
▨	□	□	□	RESET STOP	WHEN STOPPED WITH POWER RESET. (NORMAL WHEN POWER HAS BEEN TURNED ON.)	P.W.B.s (POWER CIRCUIT, MICROCOMPUTER, ETC.)		
1TIMES				PEAK CURRENT CUT	OVERCURRENT IS DETECTED.	⊙COMPRESSOR ⊙P.W.B.s		
2TIMES						⊙SYSTEM POWER MODULE ⊙P.W.B.s		
2TIMES								
▨				ABNORMAL LOW SPEED ROTATION	POSITION DETECTION SIGNAL IS NOT INPUT DURING OPERATION.	⊙SYSTEM POWER MODULE ⊙COMPRESSOR ⊙P.W.B.s		
3TIMES								
▨				SWITCHING FAILURE	SWITCHING FROM LOW FREQUENCY SYNC START TO POSITION DETECTION OPERATION FAILURE.	⊙SYSTEM POWER MODULE ⊙COMPRESSOR ⊙P.W.B.s		
4TIMES								
▨				OVERLOAD LOWER LIMIT CUT	UNDER THE LOWER LIMIT OF ROTATION SPEED WITH OVERLOAD CONTROL CIRCUIT OPERATED.	⊙OUTDOOR UNIT IS EXPOSED TO DIRECT SUNLIGHT OR ITS AIRFLOW BLOCKED. ⊙FAN MOTOR ⊙FAN MOTOR CIRCUIT		
5TIMES								
▨				OH THERMISTOR TEMP. RISE	OH THERMISTOR OPERATED.	⊙LEAK OF REFRIGERANT ⊙COMPRESSOR ⊙OH THERMISTOR CIRCUIT ⊙FAN MOTOR ⊙FAN MOTOR CIRCUIT		
6TIMES								
▨				ACCELERATION DEFECTIVE	NO ACCELERATION OVER THE LOWER LIMIT OF THE ROTATION SPEED.	⊙LEAK OF REFRIGERANT ⊙COMPRESSOR		
8TIMES								
▨				ABNORMAL POWER VOLTAGE	POWER VOLTAGE IS ABNORMALLY LOW.	⊙POWER VOLTAGE ⊙CONNECTION OF REACTOR		
10TIMES								
▨				FAN DEFECTIVE	OUTDOOR FAN ROTATION IS ABNORMAL.	⊙OUTDOOR FAN MOTOR ⊙P.W.B.s (FUSE)		
12TIMES								
▨				EEPROM READ ERROR	MICROCOMPUTER CANNOT READ THE DATA IN EEPROM.	MAIN P.W.B.		
13TIMES								
▨				ACTIVE CONVERTER DEFECTIVE	OVERVOLTAGE IS DETECTED BY SYSTEM POWER MODULE	SYSTEM POWER MODULE		
14TIMES								
■	▨	□	□	THERMISTOR ABNORMAL	THERMISTOR IS OPEN OR SHORTED. *REFER TO THE FOLLOWING "CORRESPONDENCE TABLE FOR ABNORMAL THERMISTOR"	⊙THERMISTOR ⊙CONNECTION OF THERMISTOR DEFECTIVE ⊙THERMISTOR CIRCUIT		
LIT 1-9TIMES								
□	□	□	▨			COMMUNICATIONS ERROR BETWEEN INDOOR UNIT AND OUTDOOR UNIT	EVEN WHEN THE INDOOR UNIT IS NOT CONNECTED, IT BLINKS SIMILARLY. (NOT MALFUNCTION.)	⊙CABLE IS WRONG CONNECTED ⊙CABLE IS OPEN ⊙INTERFACE CIRCUIT OF BETWEEN INDOOR UNIT AND OUTDOOR UNIT
1TIME								
□	□	□	▨					
2TIMES								
□	□	□	▨					
3TIMES								
*EXAMPLE OF BLINKING (5 TIMES) ■■■■■ 2SEC ■								
· LIGHTS FOR 0.25 SEC AT INTERVAL OF 0.25 SEC.								

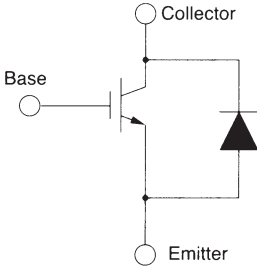
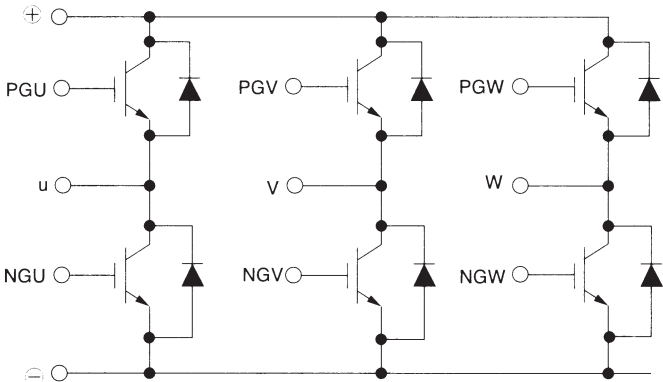
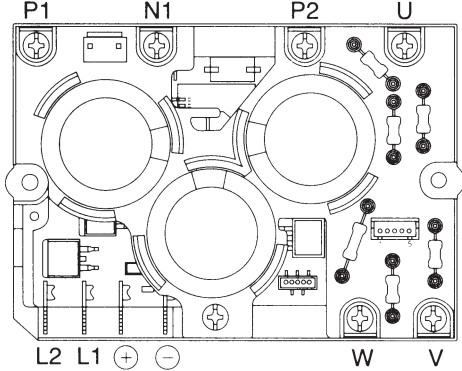
*EXAMPLE OF BLINKING (5 TIMES)



■ LIGHTS FOR 0.25 SEC AT INTERVAL OF 0.25 SEC.

BLINKING TIMES	CORRESPONDENCE TABLE FOR ABNORMAL THERMISTOR
1 TIME	OVER HEAT THERMISTOR
2 TIMES	DEFROST THERMISTOR
3 TIMES	OUTDOOR THERMISTOR THERMISTOR
4 TIMES	NARROW PIPE THERMISTOR (INDOOR 1 OR INDOOR 4)
5 TIMES	WIDE PIPE THERMISTOR (INDOOR 1 OR INDOOR 4)
6 TIMES	NARROW PIPE THERMISTOR (INDOOR 2 OR INDOOR 5)
7 TIMES	WIDE PIPE THERMISTOR (INDOOR 2 OR INDOOR 5)
8 TIMES	NARROW PIPE THERMISTOR (INDOOR 3 OR INDOOR 6)
9 TIMES	WIDE PIPE THERMISTOR (INDOOR 3 OR INDOOR 6)

TROUBLESHOOTING OF THE SYSTEM POWER MODULE

Type	GT15V31ISM
Element circuit	
Internal circuit of the module	
Terminal symbol of system module ※ See next page for values measured by tester	 ※ Do not disassemble the system power module when troubleshooting is performed.

HOW TO CHECK POWER MODULE

Checking power module using tester

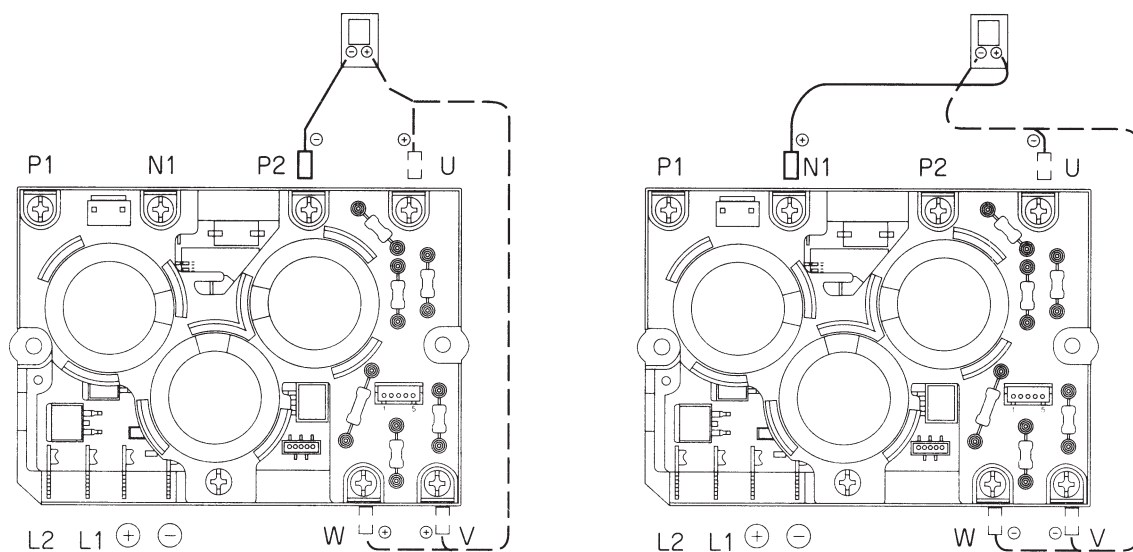
Set tester to resistance range ($\times 100$)

If indicator does not swing in the following conductivity check, the power module is normal.

(In case of digital tester, since built-in battery is set in reverse direction, $\oplus$ and $\ominus$ terminals are reversed.)

CAUTION

If inner circuit of power module is disconnected (open), the indicator of tester will not swing and this may assumed as normal. In this case, if indicator swings when $\oplus$ and $\ominus$ terminals are connected in reverse of diagram below, it is normal. Furthermore, compare how indicator swings at U, V and W phases. If indicator swings the same way at each point, it is normal.



CHECKING THE REFRIGERATING CYCLE

(JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

Troubleshooting procedure (No operation, No heating, No cooling)

If the indoor pipe or service valve becomes frosted during heating of one unit, check the operation of Reversing valve.



Connect U.V.W phase leads to the power module again and operate the air conditioner.



Is the self-diagnosis lamp mode as shown on the right?

YES

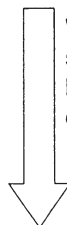


Stop to operate and check the gas pressure in balancing mode.

Normal

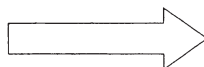


Checking the power module.



When the self-diagnosis lamp lights in the same condition as above.

The compressor is defective. Replace it and seal refrigerant.
(If the compressor checker for an inverter type air conditioner is available, re-check using it.)



Perform a final check of operation.

Lighting mode Selfdiagnosis Lamp	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times	Blinks 8 times
LD301						
LD302						
Time until the lamp lights	2-3 seconds			Approx 10 seconds	Within approx 30 minutes	Approx 10 seconds
Possible malfunctioning part	Compressor				Gas leakage	Compressor

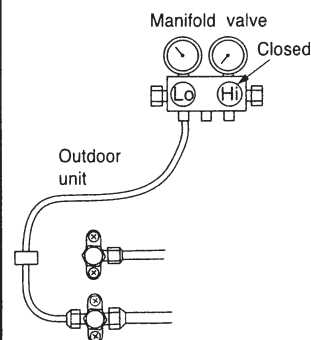
Blinking Off

Outdoor air temperature (°C)	Charge port pressure	
	Mpa(G)	kgf/cm²(G)
50	2.96	{30.14}
45	2.62	{26.72}
40	2.31	{23.58}
35	2.03	{20.73}
30	1.78	{18.14}
25	1.55	{15.79}
20	1.34	{13.66}
15	1.15	{11.74}
10	0.98	{10.02}
5	0.83	{8.48}
0	0.70	{7.10}
-5	0.58	{5.89}
-10	0.47	{4.81}

(R410A)

Abnormal
Gas leaking

Gas leaks.
Repair and seal refrigerant.



DISASSEMBLY AND REASSEMBLY

MODEL RAM-130QH5

1. Electric parts

- (1) Remove the screw on both sides of upper cover, and then remove the upper cover.
- (2) Remove the screws holding the electric part cover, and then remove the cover.

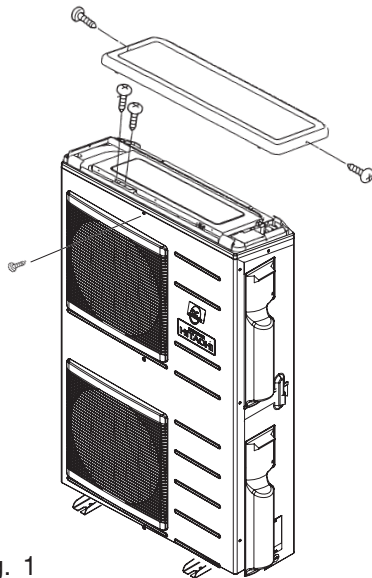


Fig. 1

- (3) Slightly widen the electric part cover to the left and right, and then lift the cover to remove it.

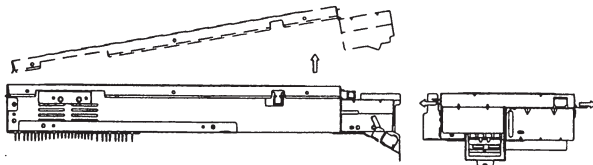


Fig. 2

- (4) Unplug the connectors of each lead wire and disconnect the ground wire from the P.W.B.; widen the tabs of supports at the front of P.W.B., and then lift the P.W.B. to remove it. (At this time, also remove 2P terminal board [LN terminal].)
- (5) Disconnect each lead wire from the system power module (SPM) assembly, and then remove the screws on left and right.

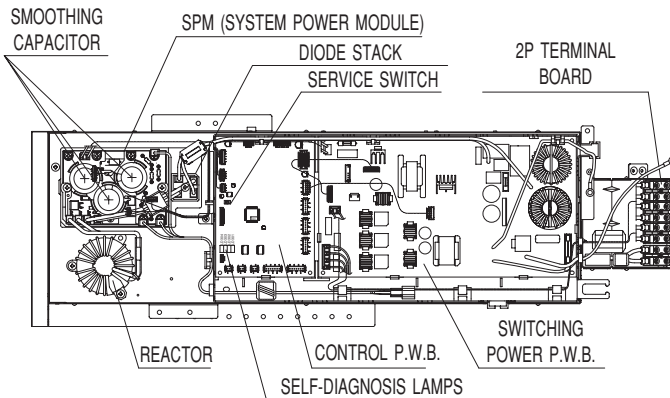


Fig. 3

- (6) When installing the electric part cover, fit the cover approximately horizontally so that it does not catch the terminal board or resin sleeve of cord.

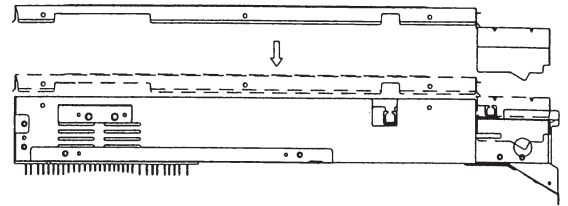


Fig. 4

2. Front cover

- (1) Remove the upper cover.
- (2) Remove the screw on right side.
- (3) Remove the screws from the bottom of front cover.
- (4) Remove the screws holding the front cover and electric parts.
- (5) Slightly open the right side, and lift the cover up to release it from the hook.

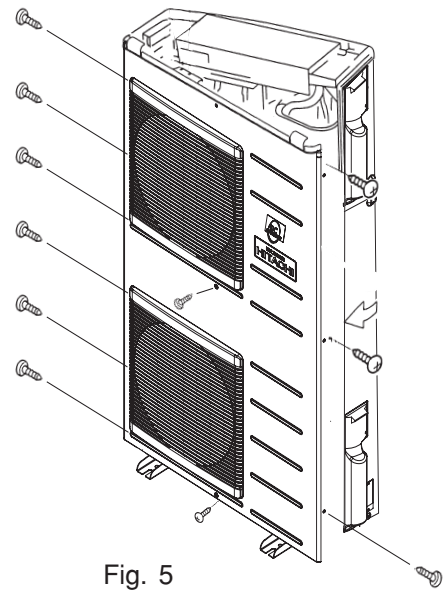


Fig. 5

<Repairing Refrigerating Cycle>

1. Electric expansion valve

and **Service valve assembly (with valve base)**

- (1) Remove the upper plate, side plate, front cover, both side covers and electric part box.
- (2) Remove the two screws holding the partition (one on base and one on top of condenser).
- (3) Remove the support that holds the lead wire, both of which are attached to the partition.
- (4) Pull the three Electric expansion valve coils up to remove them.
- (5) Use a pipe cutter, etc. to cut off the three pipes at the side of Electric expansion valve and condenser outlet pipe.
- (6) Remove the screws holding the valve base.
- (7) Lift the valve base to remove it from the base.

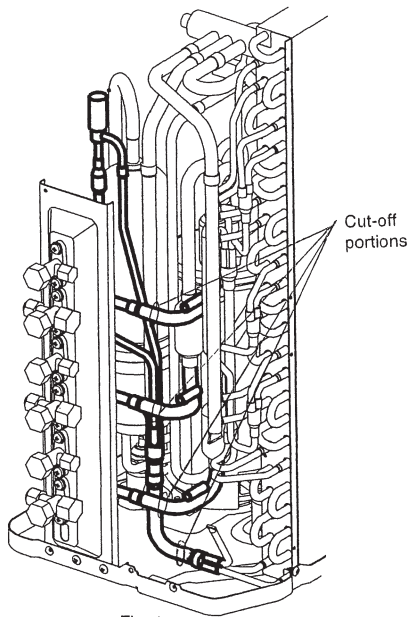


Fig. 1

2. Condenser

- (1) Remove the covers, electric part box, partition and supports (see steps (1)-(3) of item 1).
- (2) Remove the net at the back.
- (3) Cut off the condenser outlet pipe.
- (4) Cut off the condenser inlet pipe.
- (5) Remove the screws holding the condenser on both sides of base.

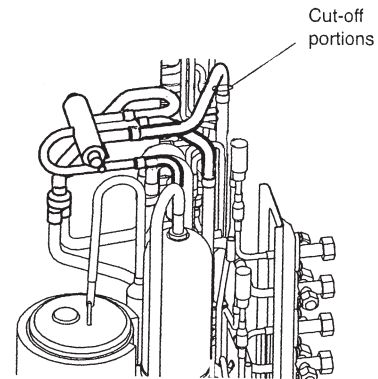


Fig. 2

3. Reversing valve

- (1) Remove the covers, electric part box, partition and supports (see steps (1)-(3) of item 1).
- (2) Remove the Reversing valve coil.
- (3) Cut off the three pipes at the side and bottom of Reversing valve.
- (4) Pull out the soldered portion of D-pipe.

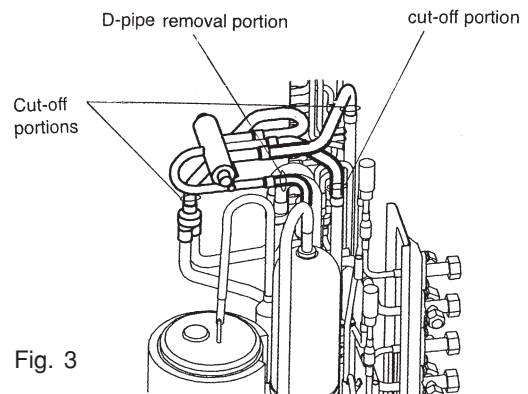
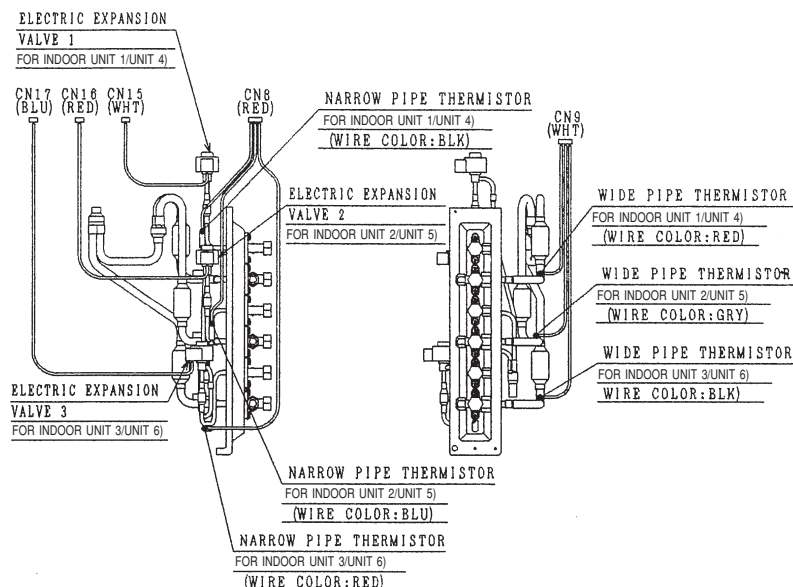


Fig. 3

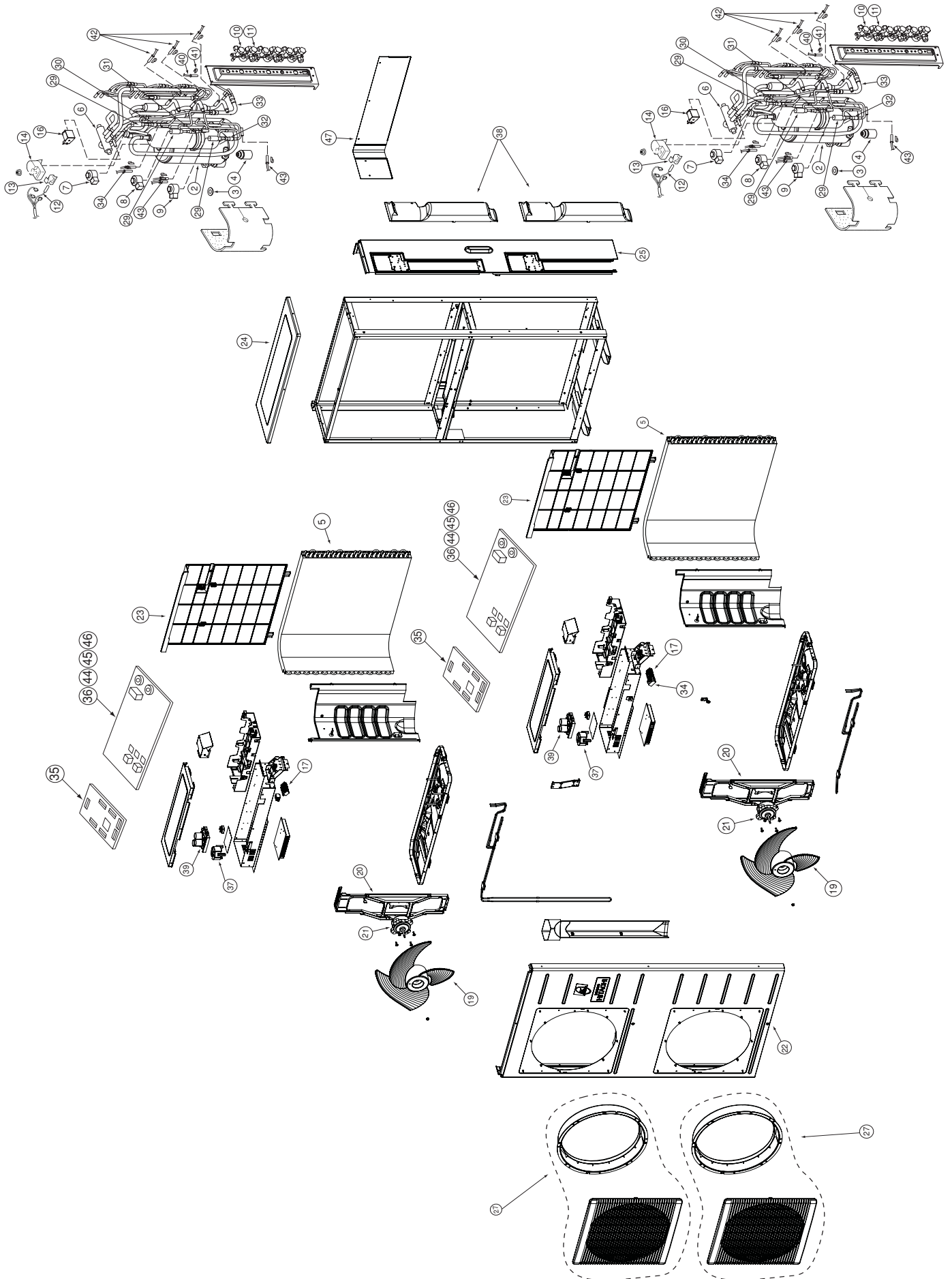
ELECTRIC EXPANSION VALVE & PIPE THERMISTOR POSITION CHARTS

MODEL RAM-130QH5



PARTS LIST AND DIAGRAM

MODEL RAM-130QH5



MODEL RAM-130QH5

NO.	PART NO.		Q'TY / UNIT	PARTS NAME
2	PMRAM-65QH4	S01	2	COMPRESSOR
3	KPNT1	001	6	PUSH NUT
4	RAC-2226HV	805	6	COMPRESSOR RUBBER
5	PMRAC-50NH4	S02	2	CONDENSER
6	PMRAC-50YHA1	905	2	REVERSING VALVE
7	PMRAM-65QH4	S04	2	EXPANSION VALVE COIL (W)
8	PMRAM-65QH4	S05	2	EXPANSION VALVE COIL (R)
9	PMRAM-65QH4	S06	2	EXPANSION VALVE COIL (B)
10	PMRAM-65QH4	S15	6	VALVE (2S)
11	PMRAM-65QH4	S16	6	VALVE (3S)
12	PMRAC-40CNH2	S14	2	THERMISTOR(OH)
13	PMRAC-25NH4	S09	2	THERMISTOR SUPPORT (OH)
14	PMRAC-25NH4	910	2	OLR COVER
16	PMRAM-22NHZ4	S02	2	MG-COIL (REVERSING VALVE)
17	PMRAM-90QH5	901	7	2P TERMINAL FOR C-D LINE
19	PMRAC-40CNH2	S17	2	PROPELLER FAN
20	PMRAC-40CNH2	S18	2	SUPPORT (FAN MOTOR)
21	PMRAC-40CNH2	S19	2	FAN MOTOR
22	PMRAM-130QH5	903	1	CABINET
23	PMRAM-130QH5	904	2	NET
24	PMRAM-130QH5	908	1	TOP COVER
25	PMRAM-130QH5	906	1	SIDE PLATE R
27	PMRAC-51CHA1	S07	2	D-GRILL-AS (INCL. MOUTH RING)
29	PMRAM-65QH4	S03	6	ELECTRICAL EXPANSION VALVE
30	PMRAM-65QH4	917	2	STRAINER (ST-PIPE-AS 1)
31	PMRAM-65QH4	918	2	STRAINER (ST-PIPE-AS 2)
32	PMRAM-130QH5	907	2	STRAINER (ST-PIPE-AS 3)
33	PMRAM-65QH4	920	2	STRAINER (CO-PIPE-AS 1)
34	PMRAC-18CVP2	S01	1	2P TERMINAL FOR L-N LINE
35	PMRAM-65QH5	S01	2	P.W.B. (MAIN)
36	PMRAM-130QH5	905	2	PWB (POWER)
37	PMRAC-18SH4	S01	2	REACTOR
38	PMRAM-65QH4	921	2	SV-COVER
39	PMRAC-40CNH2	S01	2	SYSTEM POWER MODULE (SPM2)
40	PMRAM-65QH4	S12	2	THERMISTOR (DEFROST)
41	PMRAM-65QH4	S07	2	THERMISTOR SUPPORT
42	PMRAM-65QH4	S13	2	THERMISTOR-V (W)
43	PMRAM-65QH4	S14	2	THERMISTOR-V (R)
44	PMRA-108CHLXA	S08	1	VARISTOR (450NR)
45	PMRAC-40CNH2	S05	1	FUSE (2.5A)
46	PMRAM-55QH4	S08	1	FUSE (5A)
47	PMRAM-130QH5	909	1	MID COVER

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