

TOSHIBA

FILE No. A90-9609

SERVICE MANUAL

SPLIT TYPE AIR CONDITIONER

CEILING TYPE, HEAT PUMP

RAV-132CH-PE/RAV-132AH-PE

4 WAY CASSETTE TYPE, HEAT PUMP

RAV-132UH-PE/RAV-132AH-PE

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SUMMARY

- The units referred to within this manual conform with the protection requirements of Directives 89/336/EEC Electromagnetic Compatibility and 73/23/EEC Low Voltage.
- Operating conditions of units are as follows:

OUTDOOR TEMPERATURE	-2 TO 43°C (COOL) -10 TO 21°C (HEAT)
ROOM TEMPERATURE	18 TO 32°C (COOL) 15 TO 29°C (HEAT)
ROOM HUMIDITY	LESS THAN 80% (COOL)

Note 1 : Cooling Capacity is based on the following temperature conditions:

Indoor air inlet temperature 27°C DB, 19°C WB.

Outdoor air inlet temperature 35°C DB.

Note 2: Heating Capacity is based on the following temperature conditions:

Indoor air inlet temperature 20°C DB.

Outdoor air inlet temperature 7°C DB, 6°C WB.

Note 3: For details on the Remote Controller and Control Circuits refer to Service Manual A90-9503.

1. SPECIFICATION

ITEM	MODEL	RAV-132CH-PE	
Cooling capacity	kW	3.6	
Heating capacity	kW	4.2	
Power source	Phase	1	
	V	220-240	
	Hz	50	
		COOLING	HEATING
Power consumption	kW	2.1	2.2
Power factor	%	89	89
Running current	A	10.3	10.7
Starting current	A	60	
Operating noise (SPL)	Indoor unit (High, Med, Low)	dB(A)	
	Outdoor unit	dB(A)	
		41/39/34	
Refrigerant	Name of refrigerant	R-22	
	Charge volume	kg	
	Add. volume (20-30m)	g/m	
		1.2	
		35	
Refrigerant control		Capillary tube & Expansion valve	
Interconnection pipe	Larger side size	mm	ø12.7
	Coupler style		Flare
	Smaller side size	mm	ø6.4
	Coupler style		Flare
	Standard length	m	7.5
	Maximum length (of one way)	*1 m	30
	Maximum height difference		
	If indoor unit higher	m	15
If outdoor unit higher	m	30	
Condensate drain pipe diameter	mm	ø20 (ID)	
INDOOR UNIT Model		RAV-132CH-PE	
Appearance colour		Silky mist	
Dimensions	Height	mm	188
	Width	mm	1,030
	Depth	mm	640
Net weight	kg	23	
Heat exchanger type		Finned tube	
Indoor fan type		Multi-blade fan	
Air volume	m ³ /h	600	
Fan motor output	W	34	
Air filter		Washable	
OUTDOOR UNIT Model		RAV-132AH-PE	
Appearance colour		Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height	mm	740
	Width	mm	880
	Depth	mm	310
Net weight	kg	61	
Heat exchanger type		Finned tube	
Outdoor fan type		Propeller fan	
Air flow volume	m ³ /h	2,700	
Fan motor output	W	39	
Compressor	Model	PH230X3-4LS	
	Output	kW	1.5
Protective device		High pressure switch, Fuse, Crankcase heater, Overload relay, Bimetal thermostat	

Specifications are subject to change without notice.

* Note 1 : These mean actual length.

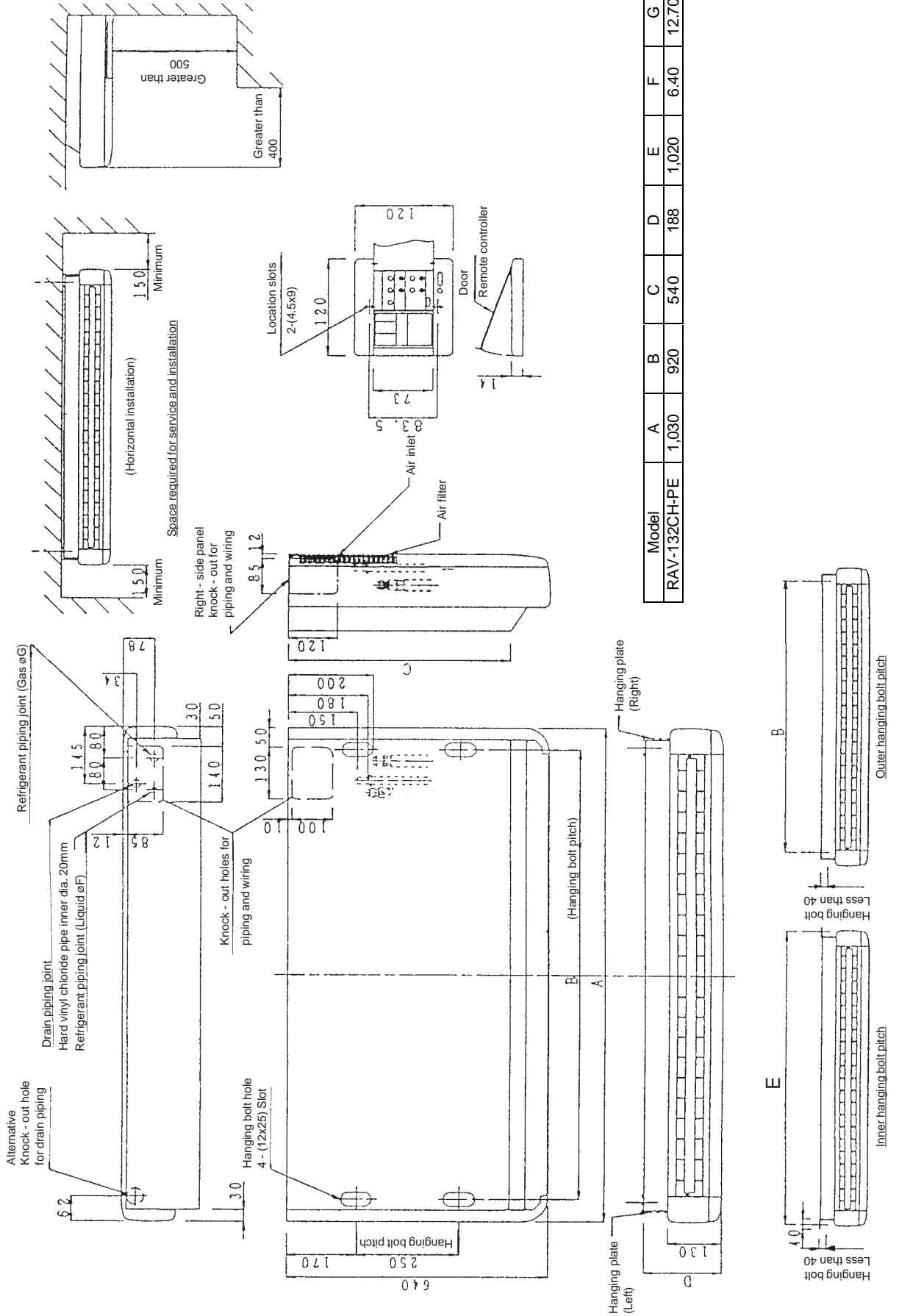
ITEM		MODEL	RAV-132UH-PE	
Cooling capacity	kW		4.5	
Heating capacity	kW		5.0	
Power source	Phase		1	
	V		220-240	
	Hz		50	
			COOLING	HEATING
Power consumption	kW		2.1	2.2
Power factor	%		89	89
Running current	A		10.3	10.7
Starting current	A		60	
Operating noise (SPL)	Indoor unit (High, Med, Low)	dB(A)	41/38/35	
	Outdoor unit	dB(A)	50	
Refrigerant	Name of refrigerant		R-22	
	Charge volume	kg	1.2	
	Add. volume (20-30m)	g/m	35	
Refrigerant control			Capillary tube & Expansion valve	
Interconnection pipe	Larger side size	mm	ø12.7	
	Coupler style		Flare	
	Smaller side size	mm	ø6.4	
	Coupler style		Flare	
	Standard length	m	7.5	
	Maximum length (of one way)	*1 m	30	
	Maximum height difference			
	If indoor unit higher	m	15	
If outdoor unit higher	m	30		
Condensate drain pipe diameter	mm		ø 32 (OD)	
INDOOR UNIT Model			RAV-132UH-PE	
Appearance colour			Black (zinc galvanized steel + thermal insulator)	
Dimensions	Height	mm	300	
	Width	mm	840	
	Depth	mm	740	
Net weight	kg	28		
Heat exchanger type			Finned tube	
Indoor fan type			Radial fan	
Air volume	m ³ /h	630		
Fan motor output	W	25		
Air filter			Washable	
OUTDOOR UNIT Model			RAV-132AH-PE	
Appearance colour			Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height	mm	740	
	Width	mm	880	
	Depth	mm	310	
Net weight	kg	61		
Heat exchanger type			Finned tube	
Outdoor fan type			Propeller fan	
Air flow volume	m ³ /h	2,700		
Fan motor output	W	39		
Compressor	Model	PH230X3-4LS		
	Output	kW	1.5	
Protective device			High pressure switch, Fuse, Crankcase heater, Overload relay, Bimetal thermostat	
CEILING PANEL Model			RBC-U262PG(W)-PE	
Appearance colour			Silky mist (Munsell 1Y8.9/0.5)	
Dimensions	Height	mm	28	
	Width	mm	1,000	
	Depth	mm	840	
Net weight	kg	8.5		
Air filter			Washable	

Specifications are subject to change without notice.

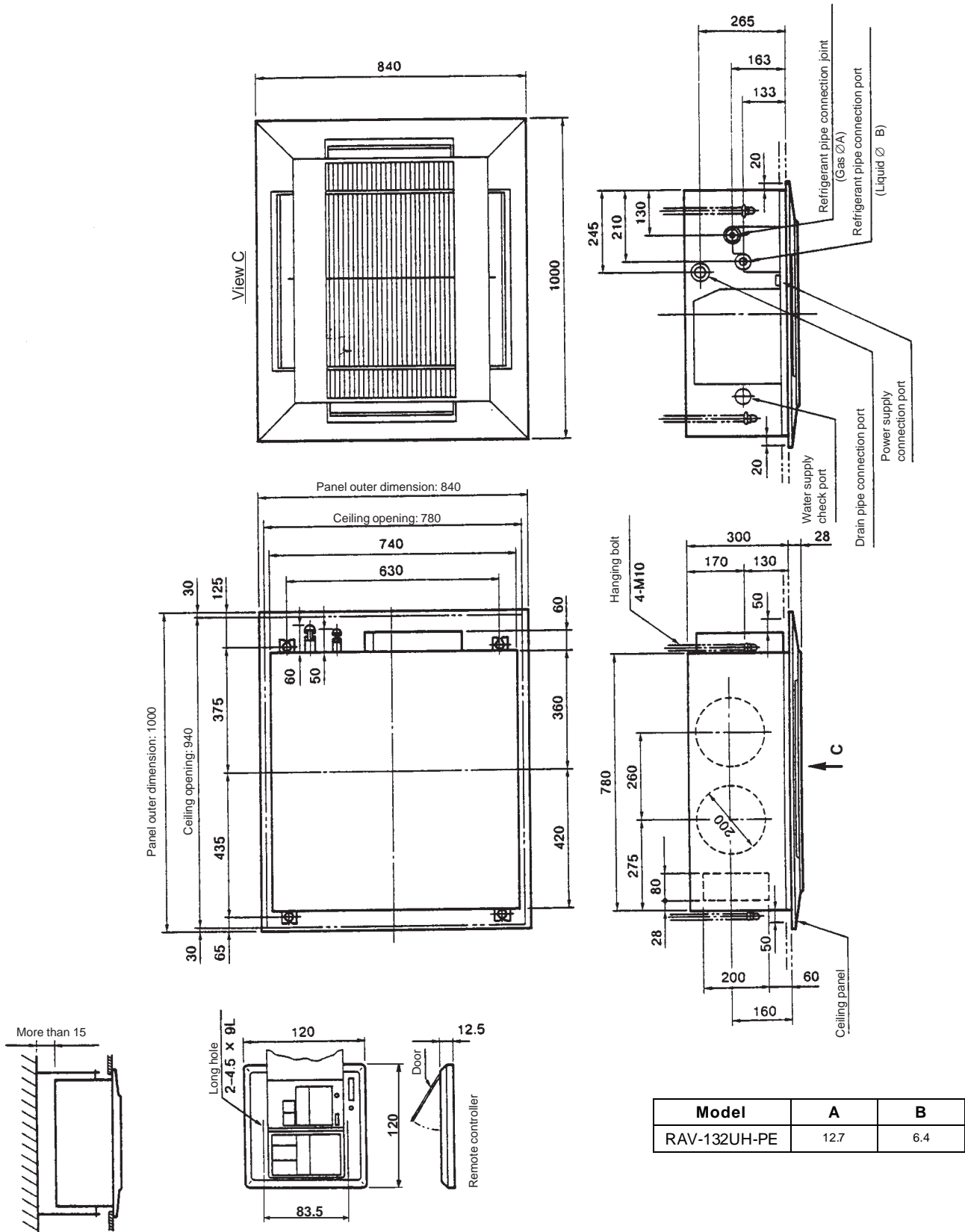
* Note 1 : These mean actual length.

2. CONSTRUCTION VIEWS

2.1 Indoor unit RAV-132CH-PE



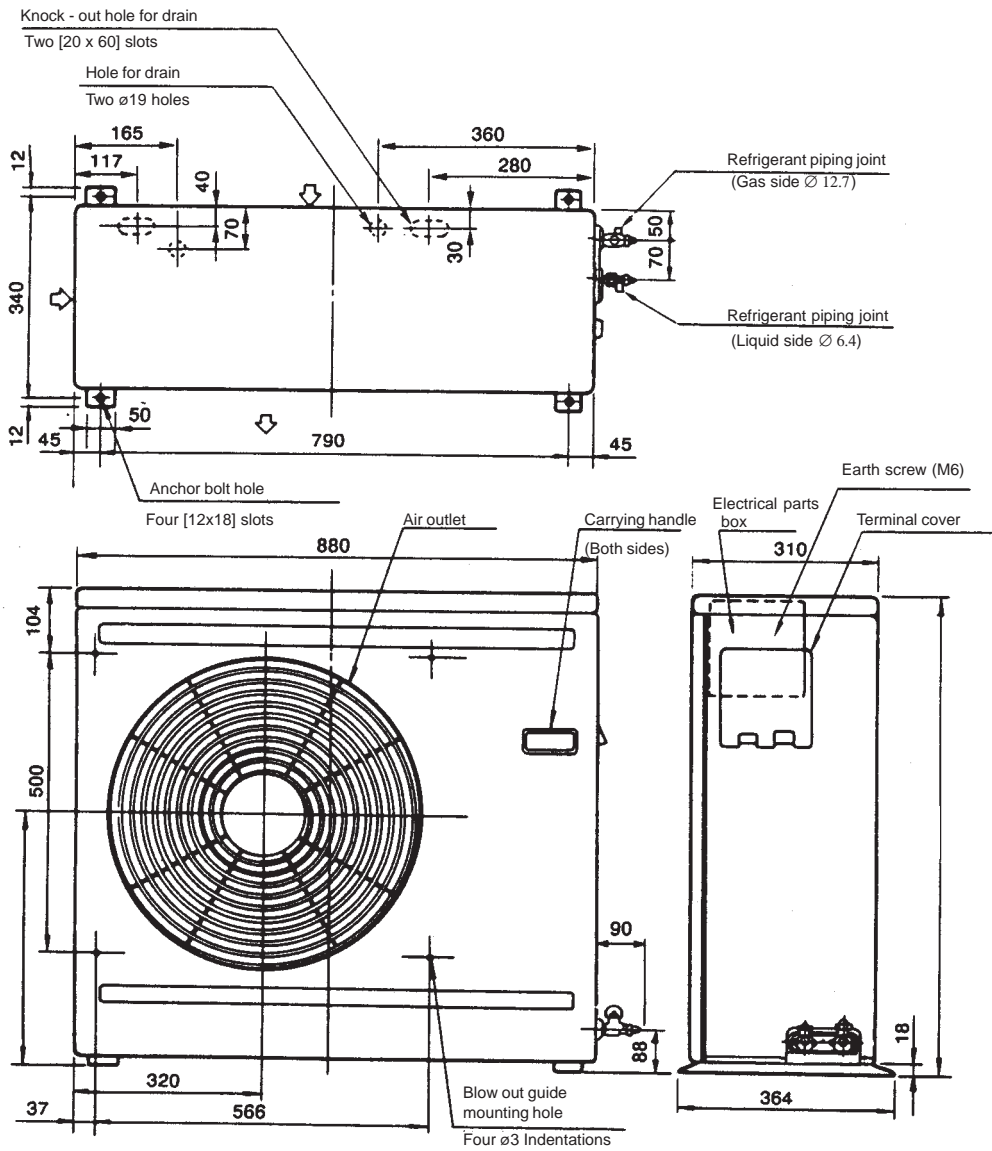
2.2 Indoor Unit
 Unit model
 RAV-132UH-PE
 Panel model
 RBC-262PG(W)-PE



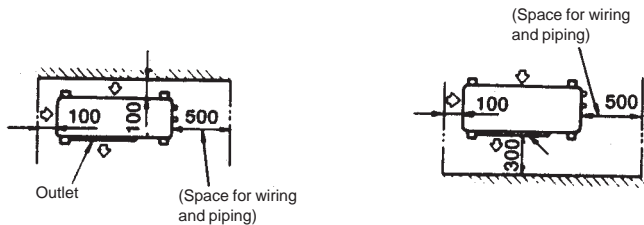
Model	A	B
RAV-132UH-PE	12.7	6.4

(Units : mm)

2.3 Outdoor unit
RAV-132AH-PE



Space required for service



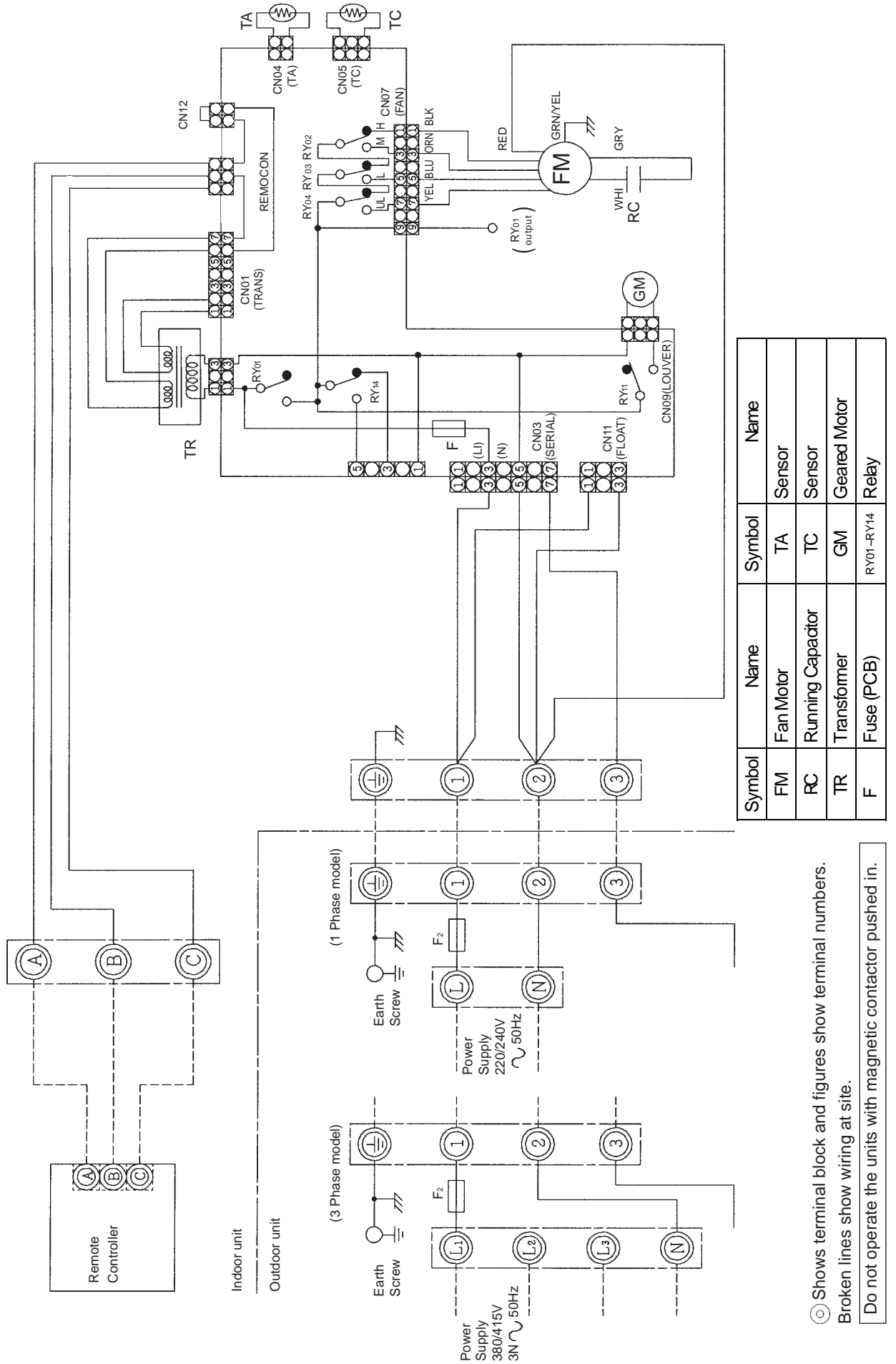
When installed with the inlet faced to the wall side

When installed with the outlet faced to the wall side

(Unit: mm)

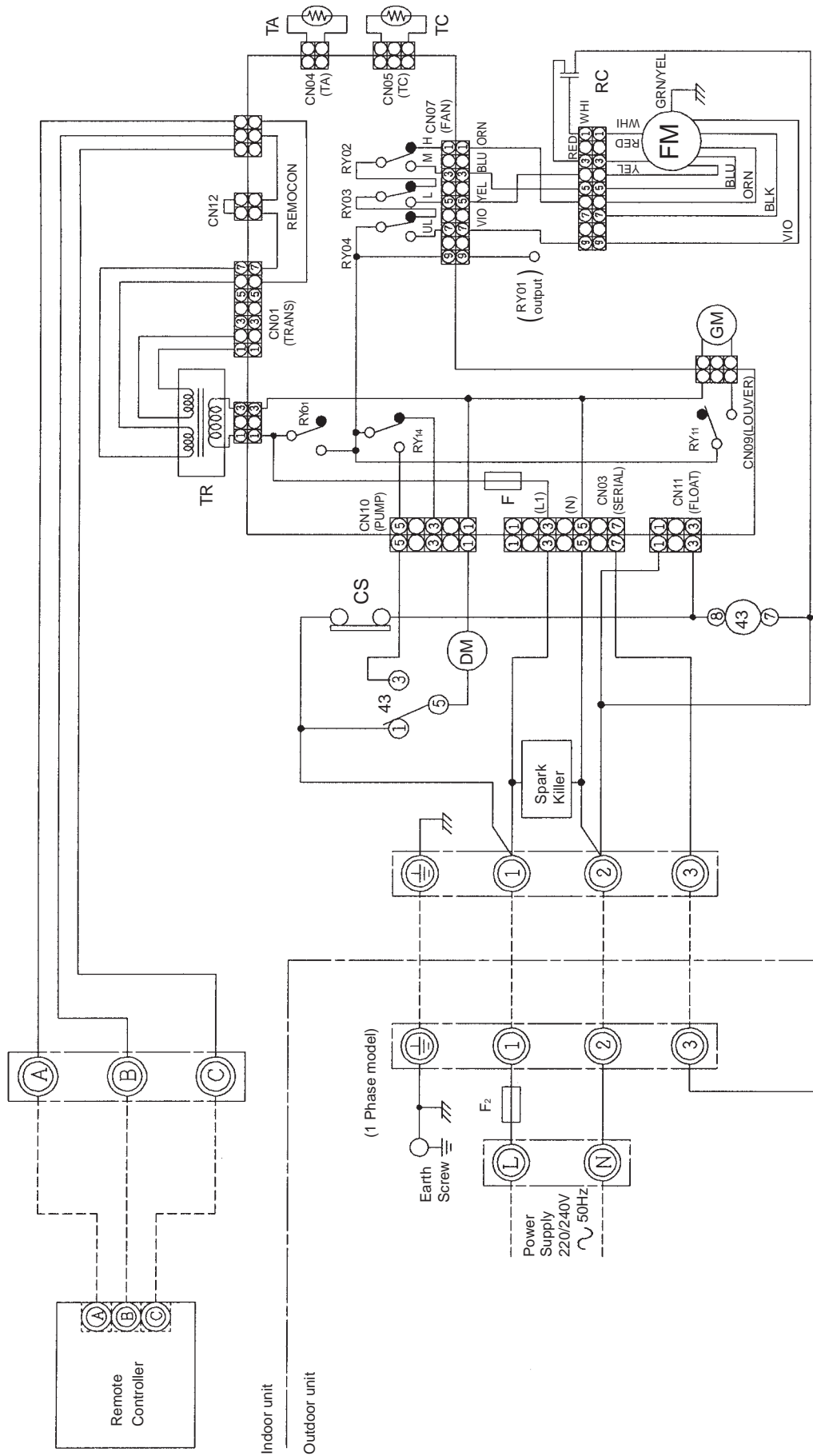
3. WIRING DIAGRAM

3.1 RAV-132CH-PE



⊙ Shows terminal block and figures show terminal numbers.
 Broken lines show wiring at site.
 Do not operate the units with magnetic contactor pushed in.

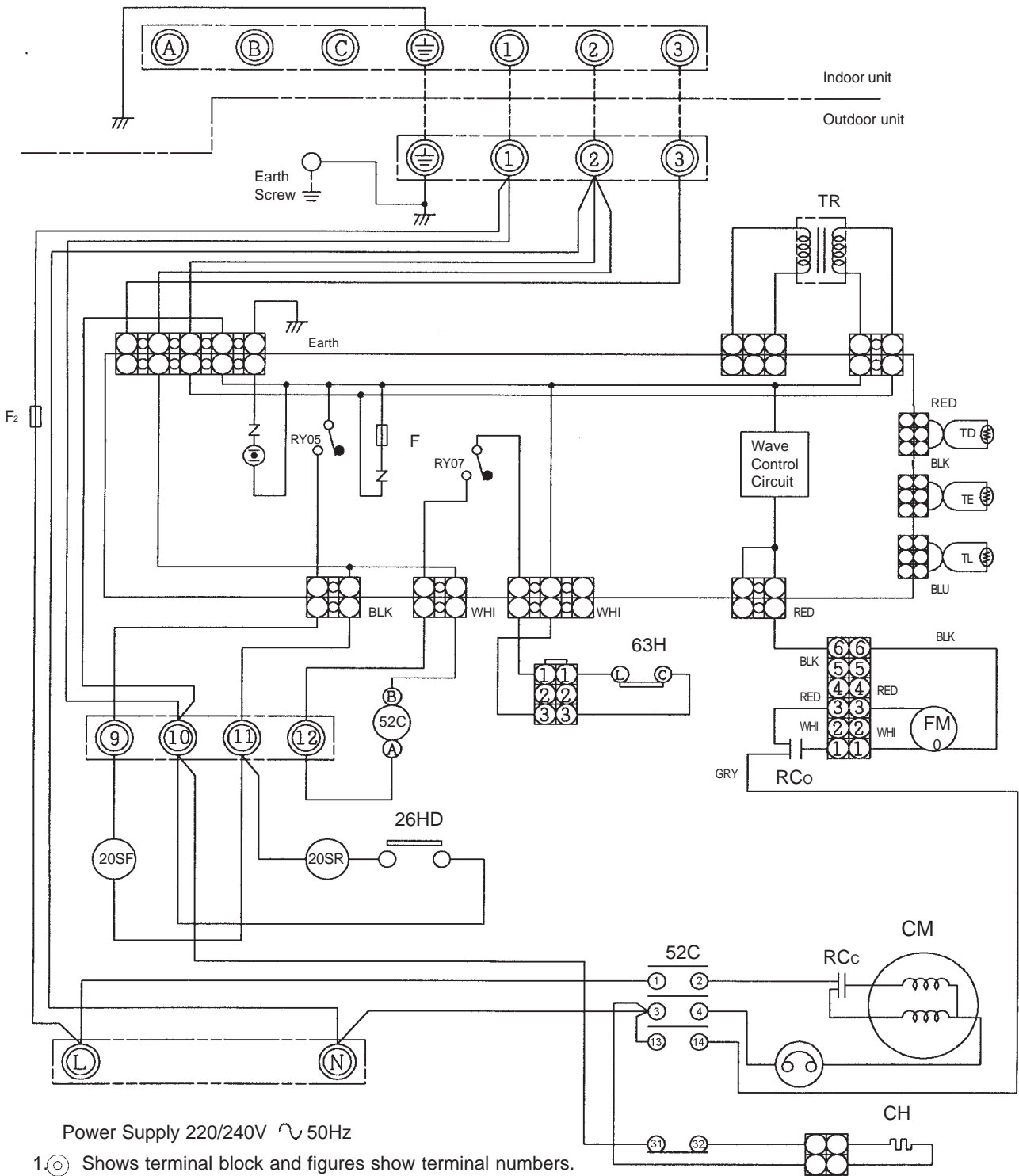
3.2 RAV-132UH-PE



Symbol	Name	Symbol	Name
FM	Fan Motor	43	Relay
RC	Running Capacitor	RY01~RY14	Relay
TR	Transformer	GM	Gear Motor
TA	Sensor	CS	Float Switch
TC	Sensor	DM	Drain Motor
F	Fuse (PCB)		

⊙ Shows terminal block and figures show terminal numbers.
 Broken lines show wiring at site.
 Do not operate the units with magnetic contactor pushed in.

3.3 RAV-132AH-PE



Power Supply 220/240V ~ 50Hz

1. Ⓞ Shows terminal block and figures show terminal numbers.
Broken lines show wiring at site.

Don't operate the units with magnetic contactor pushed.

Symbol	Name	Symbol	Name	Symbol	Name
20SF	Solenoid Coil (4 Way Valve)	CM	Compressor	F2	Fuse (T5A)
RY05, 07	Relay	52C	Magnetic Contactor	63H	High Pressure Switch
51C	Overload Relay	FMo	Fan Motor (Out door)	CH	Crank Case Heater
20SR	Solenoid Coil (2 Way Valve)	TL	Sensor	F	Fuse (on PCB)
RCc	Running Capacitor (Compressor)	TE	Sensor	TR	Transformer
RCo	Running Capacitor (Fan motor)	26HD	Bimetal Thermostat	TD	Sensor

4. SPECIFICATION OF ELECTRICAL PARTS

4.1 RAV-132CH-PE

No.	PARTS NAME	TYPE	SPECIFICATIONS						
1	Indoor unit fan motor	SMF-230-34-4F	Output (Rated) 34W, 4 pole, 230V, 1 phase, 50Hz						
2	Running capacitor for indoor fan motor	EEP2H155HQA	AC 400V, 1.5 μ F						
3	Transformer (Indoor unit)	ST-9586	187~264V						
4	Geared motor	MT8-3-6	AC 240V, 3W						
5	Sensor for room temperature		Maximum input 38mA	$^{\circ}$ C	15	20	25	30	40
				K Ω	16.1	12.6	10.0	8.0	5.2
6	Indoor unit sensor for heat-exchanger temperature.	DTN-C103J40	Maximum input 34mA	$^{\circ}$ C	-12	0	25	50	
				K Ω	62.29	32.82	10.0	3.59	

4.2 RAV-132UH-PE

No.	PARTS NAME	TYPE	SPECIFICATIONS						
1	Indoor unit fan motor	SMF-230-45A	Output (Rated) 45W, 6 pole, 1 phase, 230V, 50Hz						
2	Running capacitor for indoor fan motor	EVM45M305UF	AC 400V, 2.5 μ F						
3	Transformer for Indoor unit	ST-9586	AC187~264V						
4	Relay	LY2F	AC240V, 2ab						
5	Geared motor	MT8-3-3	AC 240V, 3W						
6	Drain pump	PAD-416A34TF	AC230V, 0.2A						
7	Float switch	FS-085-003B	AC230V, 0.5A						
8	Sensor for room temperature		Maximum input 38mA	$^{\circ}$ C	15	20	25	30	40
				K Ω	16.1	12.6	10.0	8.0	5.2
9	Indoor unit sensor for heat-exchanger temperature.	DTN-C103J40	Maximum input 34mA	$^{\circ}$ C	-12	0	25	50	
				K Ω	62.29	32.82	10.0	3.59	

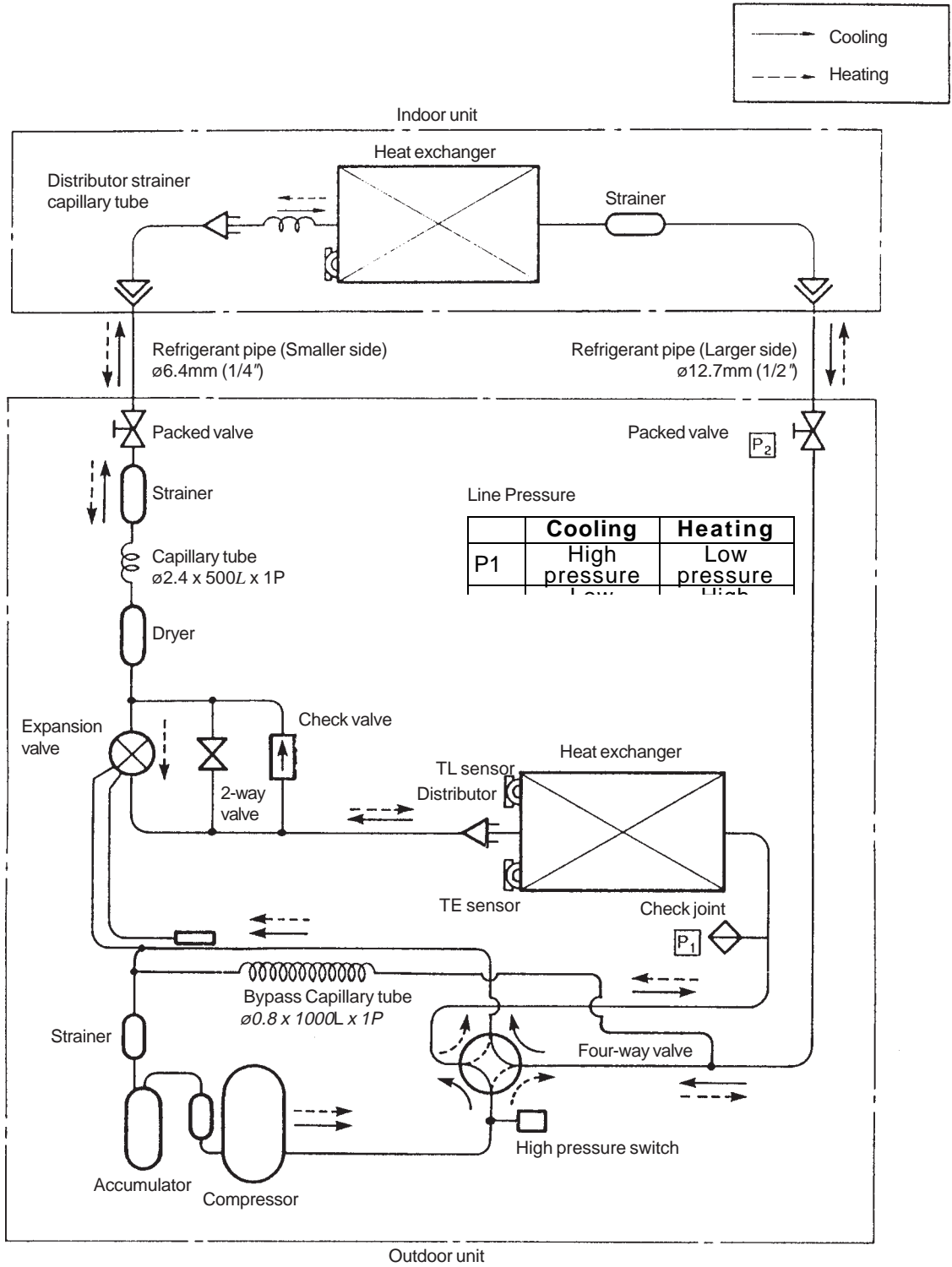
4.3 RAV-132AH-PE

No.	PARTS NAME	TYPE	SPECIFICATIONS						
1	Compressor	PH230X3-4LS	Output (Rated) 1.5 kW, 2 pole, 220/240V, 1 phase, 50Hz						
2	Outdoor unit fan motor	SMF-230-39N-2	Output (Rated) 39W, 6 pole, 230V, 1 phase, 50Hz						
3	Running capacitor for outdoor fan motor	EEP2G405HQ	AC 400V, 4 μ F						
4	Magnetic contactor	FMca-1S	AC 220-240V, 50Hz						
5	High pressure switch	ACB-2TBO4W	Tripping pressure 30kg/cm ² G pressure 23kg/cm ² G				Resetting		
6	Solenoid coil for four-way valve	CHV-AC240V	AC 220-240V						
7	Crankcase heater		AC 240V, 28W						
8	Sensor for defrosting		Maximum input 15.5mA	$^{\circ}$ C	-12	10			
				K Ω	67.5	21.3			
9	Fuse		T5A						
10	Sensor for cooling operation in low ambient temperature		Maximum input 15.5mA	$^{\circ}$ C	-12	10			
				K Ω	67.5	21.3			
11	Solenoid coil for two-way valve	NEV AC 240V	AC 220-240V, 50Hz						
12	Running capacitor for compressor	MT-44MP456W	AC 440V 45 μ F						
13	Transformer (Outdoor unit)	FT-67	AC 187-264V						
14	Overload relay	OL-177GM15	AC 240V, Tripping temp: 165 $^{\circ}$ C, Resetting temp: 80 $^{\circ}$ C						

5. REFRIGERANT PIPING DIAGRAM

5.1 Indoor unit
RAV-132CH-PE
RAV-132UH-PE

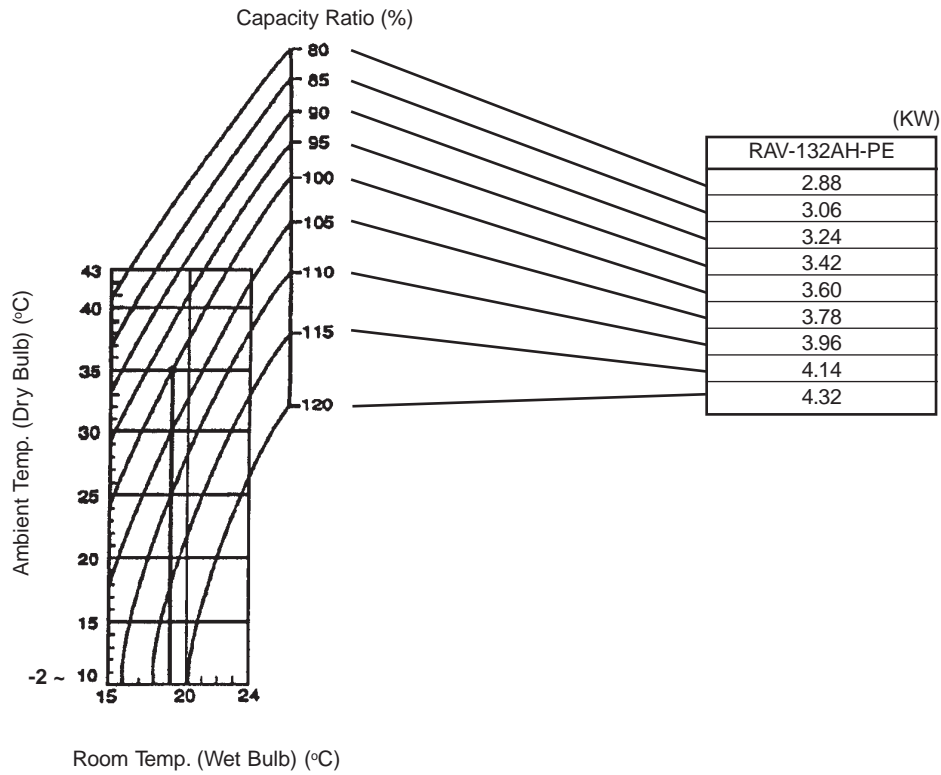
Outdoor unit
RAV-132AH-PE



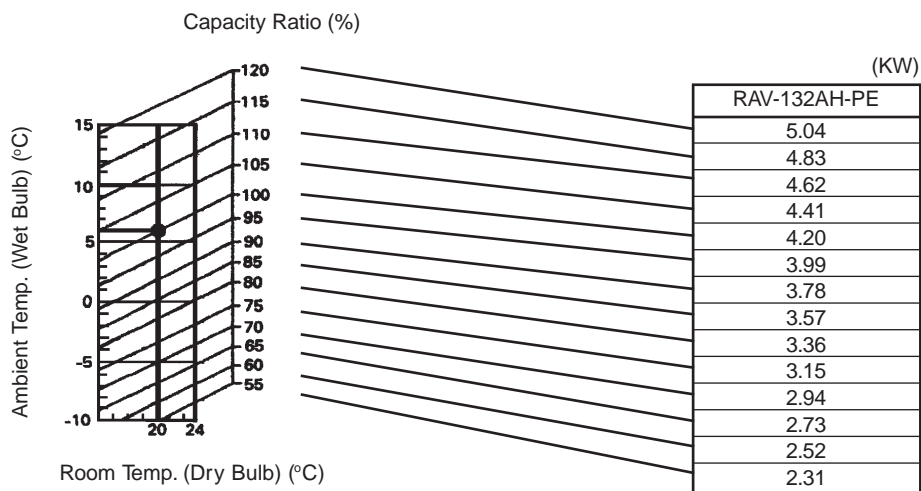
INDOOR UNIT		OUTDOOR UNIT		
MODEL	CAPILLARY	MODEL	MAIN CAPILLARY	BYPASS CAPILLARY
RAV-132CH-PE	IDø 1.7x400 L x4P	RAV-132AH-P	IDø 2.4x500 L x1P	IDø 0.8x1000 L x1P
RAV-132UH-PE	IDø 2.0x200 L x2P			

6. PERFORMANCE CHARACTER

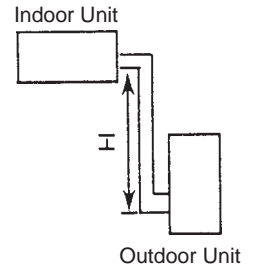
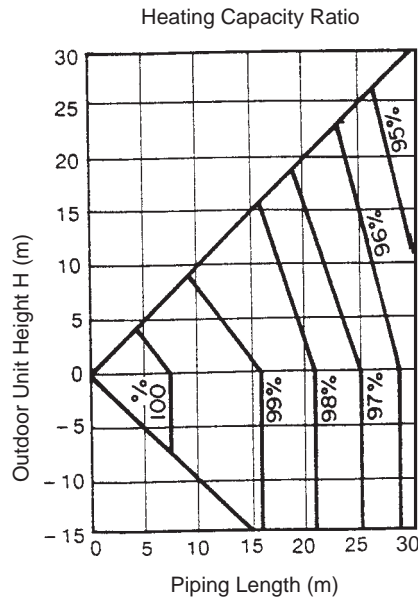
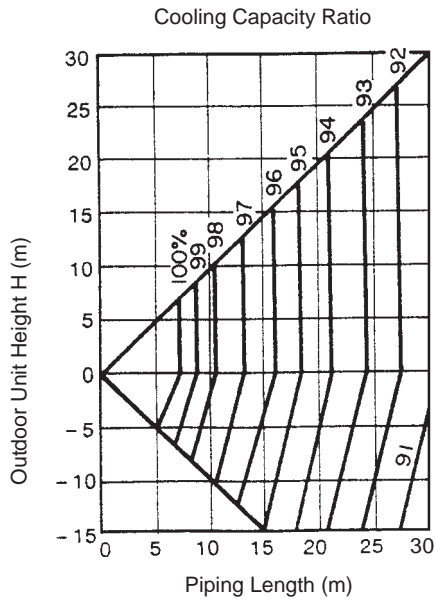
6.1 Cooling capacity



6.2 Heating capacity



**6.3 Cooling capacity
RAV-132AH-PE**



6.4 Piping length/additional refrigerant volume

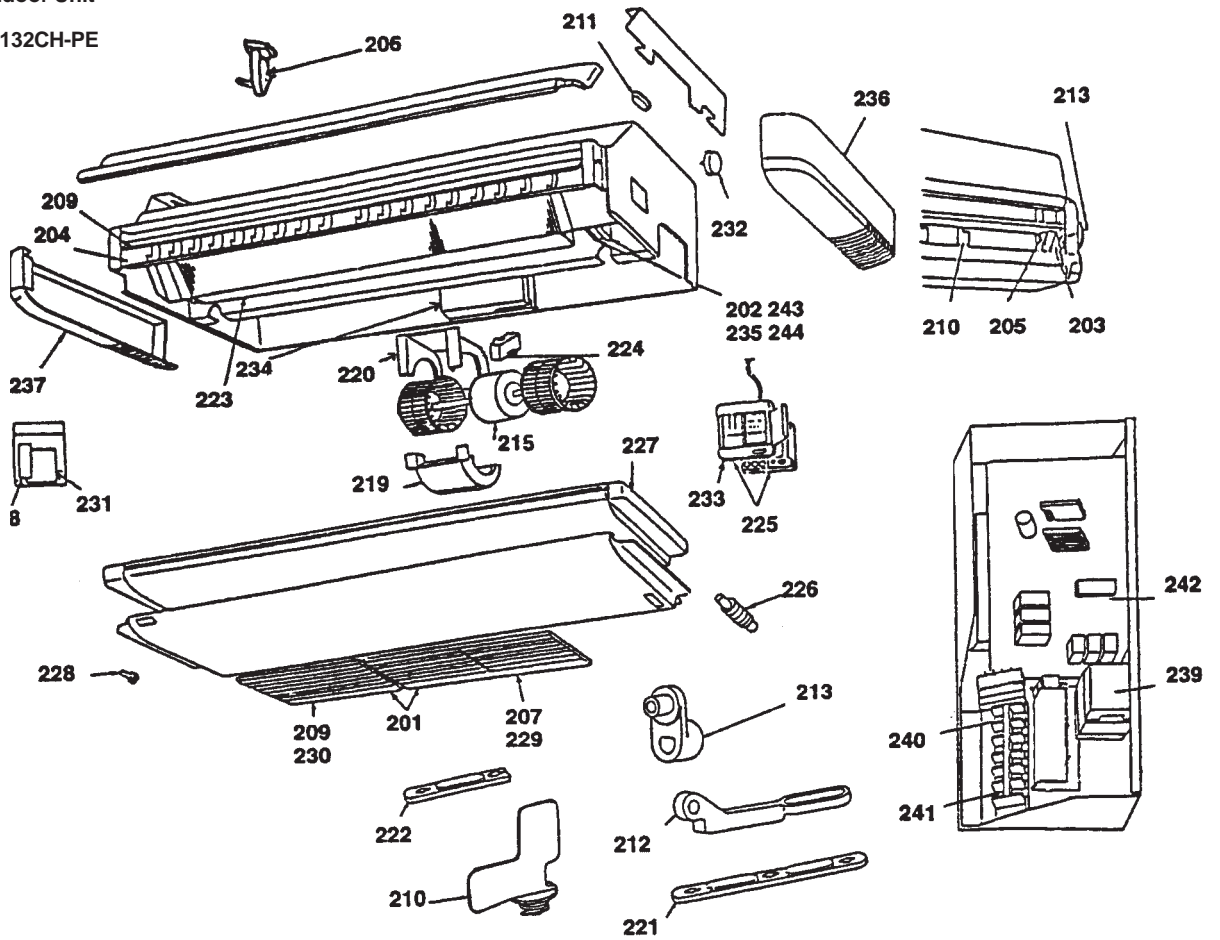
Model	Piping length less than (m)	Additional amount of refrigerant at installation site (kg)						Recharge quantity (kg)						
		20	25	30	35	40	45	50	5	10	15	20	25	30
RAV-132AH-PE	Filled at factory		0.15	0.35					0.95	1.05	1.10	1.20	1.35	1.55

- The amount of refrigerant put into the outdoor unit at the factory is equivalent to that which fills up 20m length of refrigerant pipe.
- If the length of refrigerant pipe is 20m or less, addition of refrigerant at the installation site is unnecessary. If the length of the pipe exceeds 20m, add the refrigerant R-22.
- Overcharge or undercharge of refrigerant in the outdoor unit will cause malfunction of the compressor. The prescribed amount of the replenishment of the refrigerant is shown in the table above. The permissible amount of refrigerant is the prescribed amount $\pm 50g$.

7. EXPLODED VIEWS AND PARTS LIST

7.1 Indoor Unit

RAV-132CH-PE

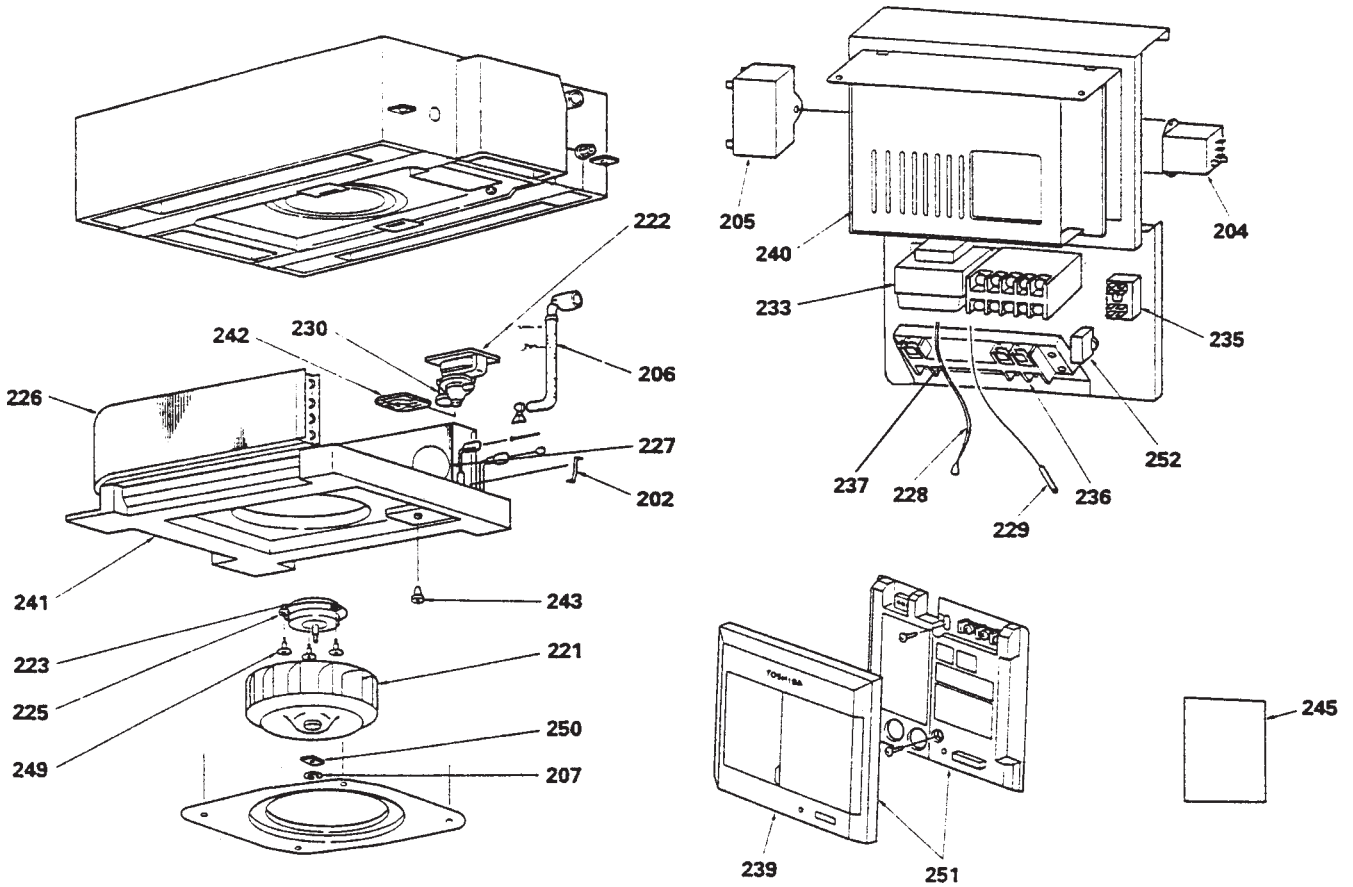


No.	Part No.	Description
201	43107214	Hinge
202	43107215	Sensor Fix Plate
203	43107216	Spring
204	43107223	Grille Shaft Left
205	43107222	Grille Shaft Right
208	43109322	Inlet Grille Small
209	43109324	H Grille Asm
210	43109329	Vertical Grille
211	43119373	Bolt Cover
212	43119393	Shaft Holder
213	43119394	Lever
214	43120172	Fan, Sirocco
215	43A21013	Fan motor
219	43126127	Fan Case Lower
220	43126128	Fan Case Upper
221	43139098	Connect Bar
222	43A39001	Connect Bar
223	43A44009	Asm Evaporator
224	43155101	MF Capacitor

Location No.	Part No.	Description
225	43A69004	Remote Control
226	43170197	Asm Hose
227	43172121	Asm Drain Pan
228	43179107	Plug
230	43180284	Air Filter Large
231	43A88004	Manual
232	43A21008	Geared Motor
233	43A62001	Cover, Remocon
234	43150148	TA Sensor
235	43A50002	TC Sensor
236	43102624	Side Cover Right Asm
237	43102625	Side Cover Left Asm
238	43117812	H Plate
239	43A58002	Transformer
240	43A60002	Terminal 3P
241	43A60001	Terminal 4P
242	43A69002	PC Board
243	43A47004	Asm Distributor
244	43047492	Capillary Tube 1.7Dia

7.2 Indoor Unit

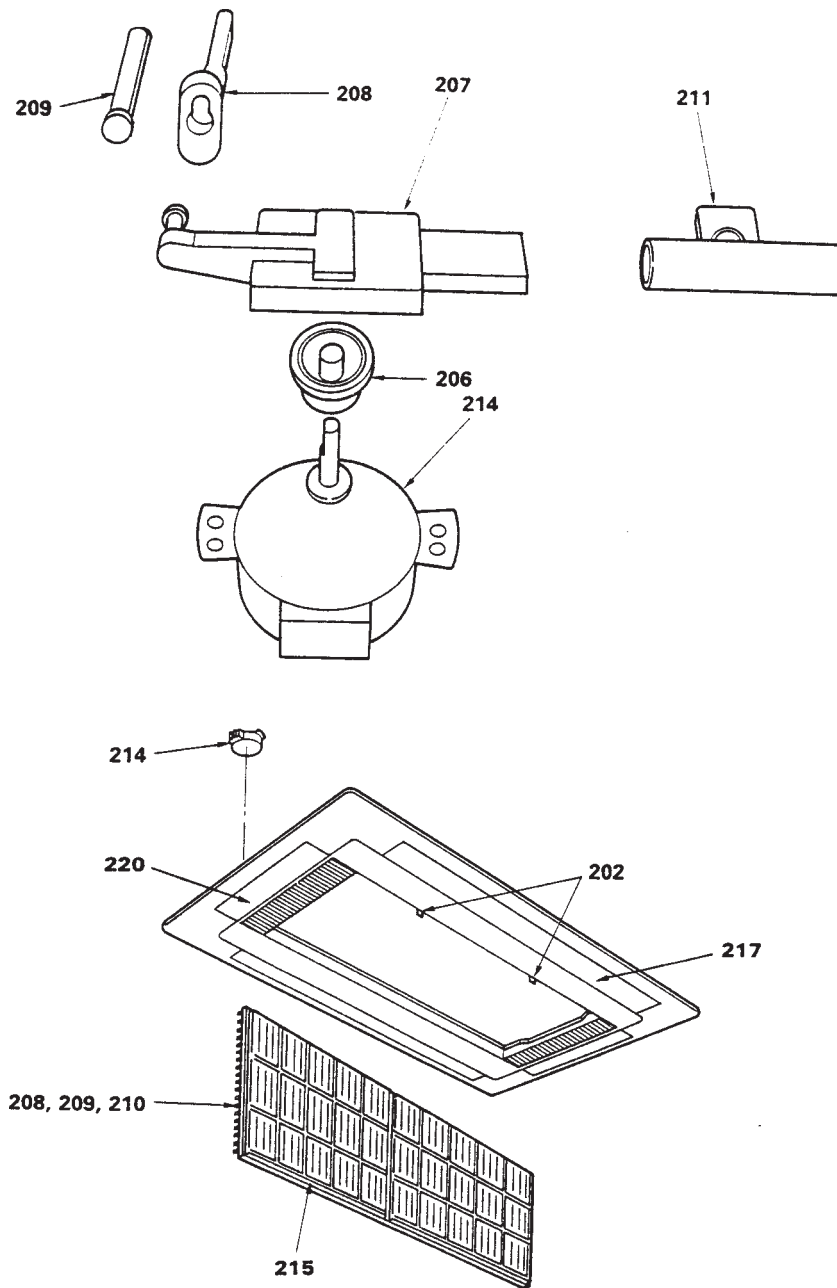
RAV-132UH-PE



No.	Part No.	Description
202	43019604	Holder, Sensor (TC)
204	43154141	Relay
205	43055275	Capacitor, Electrolytic
206	43070146	Hose, Drain
207	43097166	Nut
221	43120166	Radial Fan
222	43121627	Drain, Pump
223	43A21001	Motor, Fan
225	43139103	Rubber, Buffer
226	43A44001	Evaporator
227	43146432	Capillary Tube
228	43150118	Sensor (TA)
229	43150199	Sensor (TC)
230	43151217	Float Switch

Location No.	Part No.	Description
233	43A58002	Transformer, Power
235	43160251	Terminal Block
236	43A60001	Terminal 4P
237	43A60002	Terminal 3P
239	43A62001	Cover, Remocon
240	43A69002	PC Board
241	43172118	Drain Pan
242	43179104	Drain Filter
243	43179105	Plug
245	43A88004	Manual
249	43107212	Bolt
250	43139105	Washer
251	43A69004	Remote Controller
252	43033084	Spark-killer

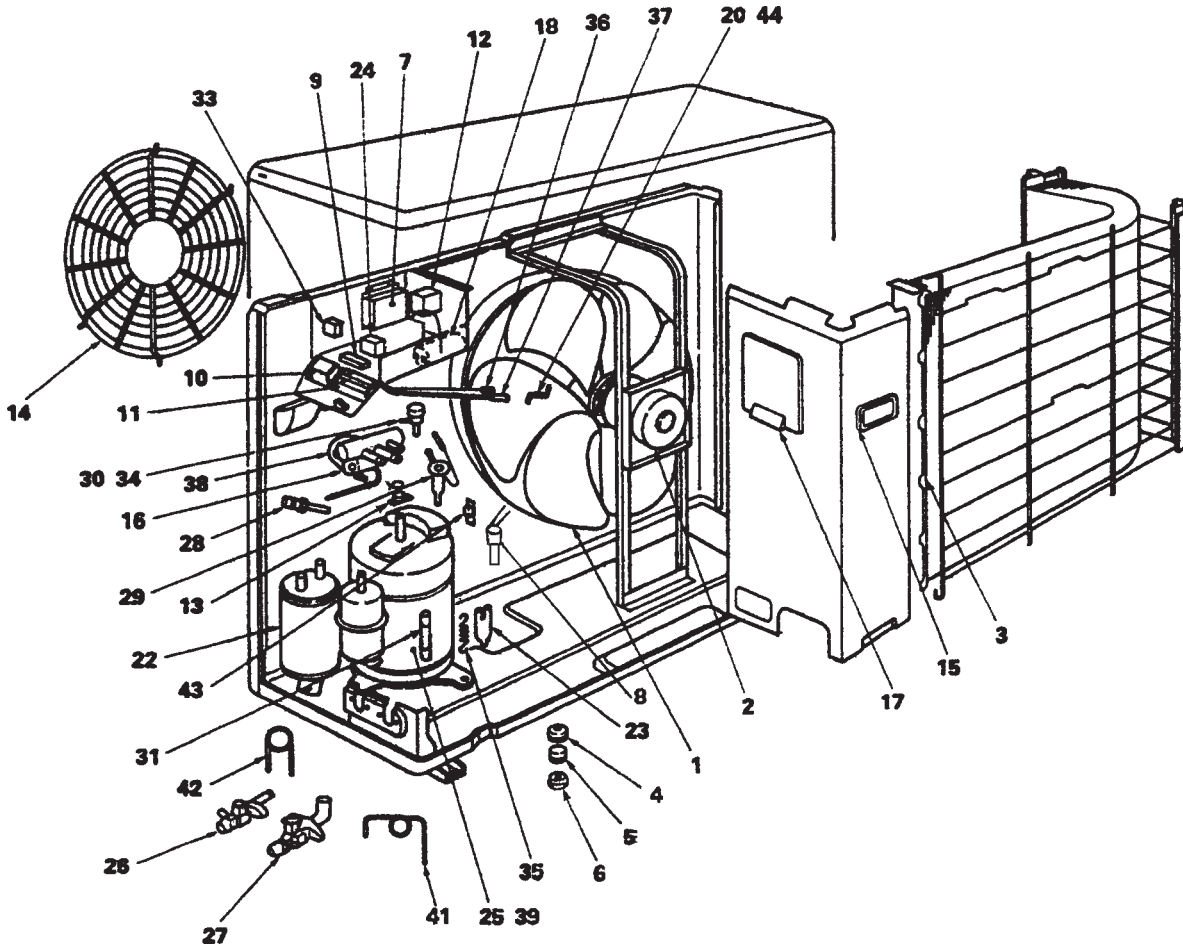
7.3 Ceiling panel
RBC-U262PG(W)-PE



Location No.	Part No.	Description
202	43407009	Grille, Catch
206	43407024	Cam
207	43407014	Slider
208	43407015	Lever
209	37507500	Lever
210	43409063	Intake-Grill Assy

Location No.	Part No.	Description
211	43409067	Holder, Shaft
214	43121550	Geared-Motor
215	43480533	Air-Filter
217	43409070	Grille, Outlet
220	43409075	Grille, Outlet, Small

7.4 Outdoor unit
RAV-132AH-PE



Location No.	Part No.	Description
1	43120156	Fan, Propeller
2	43A21003	Motor, Fan, AC230V, 50Hz
3	43A43001	Condenser
4	43149212	Base, Spring, A
5	43149198	Spring, Buffer
6	43049132	Base, Spring, B
7	43A69003	PC Board
8	43A49001	Switch, High-Pressure
9	43060479	Terminal, 4P
10	43A60003	Terminal, 2P
11	43A60001	Terminal, 4P
12	43152334	Magnetic Contactor
13	43054286	Relay, Overload
14	43A19001	Guard, Fan
15	43119368	Hanger
16	43A46004	Solenoid Coil
17	43162027	Cover, Electric Parts
18	43155115	Capacitor, Plastic Film, 45MFD, 440V
20	43107215	Holder, Sensor (TE)
22	43148105	Accumulator

Location No.	Part No.	Description
23	43145082	Dryer
24	43155080	Capacitor, Electrolytic
25	43041837	Compressor, AC220/240V, 50Hz, PH230X3-4LS
26	43146454	Packed Valve (1/4")
27	43146406	Packed Valve (1/2")
28	43147321	Check Joint
29	43146424	Expansion Valve
30	43046198	Coil, 2-Way Valve
31	43146283	1-Way Valve
33	43A58003	Transformer, Power
34	43046151	Valve, 2-Way
35	43193043	Spring
36	43A50001	Sensor, Cond. Out (TL)
37	43150196	Sensor, Heat Exch. (TE)
38	43146418	Valve 4-Way
39	43157167	Heater, Crankcase
41	43146459	Capillary Tube
42	44246235	Capillary Tube
43	43150122	Thermostat, Bimetal
44	43107215	Holder, Sensor (TL)

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