

TOSHIBA

FILE NO. A90-9608

SERVICE MANUAL

AIR-CONDITIONER

SPLIT BUILT-IN DUCT TYPE

RAV-362B-PE/RAV-363A8-PE

RAV-462B-PE/RAV-463A8-PE

SPLIT CEILING TYPE

RAV-362C-PE/RAV-363A8-PE

RAV-462C-PE/RAV-463A8-PE

SPLIT CASSETTE TYPE

RAV-362U-PE/RAV-363A8-PE

RAV-462U-PE/RAV-463A8-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
ROOM TEMPERATURE	18 TO 32°C
ROOM HUMIDITY	LESS THAN 80%

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: Specifications are subject to change without notice.

1. IMPORTANT NOTES

a. Refer to Service Manual, **File No. A90-9504** for details of indoor units and control circuits.

b. **Reverse Phase Protector**

The Scroll Compressor used in this unit can only rotate in one direction. For this reason a protective device (Reverse Phase Protector) is fitted to prevent incorrect wiring of electrical phases. If the red LED on the remote controller does not flash when the system is switch on, then the wiring to the outdoor unit should be checked to ensure that the three phases are wired in the correct sequence.

c. **Inner Overload Relay**

If the Inner Overload Relay operates, the Magnetic contactor will remain energised, but the compressor will stop. In this event fault Code '09' will appear on the Remote Controller.

d. **Delivery Temperature Thermostat.**

In the unlikely event of a gas leak a bi-metal thermostat is fitted to this unit to prevent the compressor from overheating. During such abnormal conditions, the thermostat operates and power to the indoor unit and remote controller is disconnected.

e. **Special Refrigerant Reclaim Procedure for Scroll Compressors**

When the refrigerant charge is reclaimed only from the discharge side of the Scroll Compressor, it is possible that the suction side of the compressor remains pressurised. If a brazing torch is applied to the suction side the pressurised refrigerant and oil mixture could ignite.

THIS COULD RESULT IN A FIRE AND / OR SEVERE PERSONAL INJURY.

The refrigerant gas **MUST** be reclaimed simultaneously from the discharge and the suction sides of the outdoor unit to avoid this potential problem.

2. SPECIFICATIONS

ITEM		MODEL	RAV-362B-PE	RAV-462B-PE	
Cooling capacity		kW	10.0	12.5	
Power source		Phase	3	3	
		V	380 – 415	380 – 415	
		Hz	50	50	
			COOLING	COOLING	
Power consumption		kW	3.9	5.0	
Power Factor		%	87	86	
Running current		A	6.5	8.4	
Starting current		A	42	50	
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	45/42/39	46/43/40	
	Outdoor unit	dB(A)	55	59	
Refrigerant		Name of refrigerant	R-22	R-22	
		Charge volume	kg	2.7	3.7
		Add. volume (20-50m)	g/m	50	50
Refrigerant control			Capillary tube	Capillary tube	
Inter-connection pipe		Large side size *1	mm	ø 19 (ø 22)	ø 19 (ø 22)
		Coupler style		Flare	Flare
		Smaller side size	mm	ø 9.5	ø 9.5
		Coupler style		Flare	Flare
		Standard length	m	7.5	7.5
		Maximum pipe lengths	m	50	50
		Max. height difference if indoor unit higher	m	20	20
		Outdoor unit higher	m	50	50
Condensate drain pipe diameter		mm	ø 32 (OD)	ø 32 (OD)	
INDOOR UNIT Model			RAV-362B-PE	RAV-462B-PE	
Appearance colour			Black (Zinc galvanized steel + Thermal insulation)		
Dimensions		Height	mm	345	345
		Width	mm	1350	1350
		Depth	mm	800	800
Net weight		kg	53	62	
Heat exchanger type			Finned tube	Finned tube	
Indoor fan type			Multi-blade fan	Multi-blade fan	
Air flow volume		m ³ /h	1820	2100	
Fan motor output		W	120	140	
External Static Pressure		STANDARD	mmAq	4	4
		MAX. MOTOR	mmAq	10	10
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE	
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)	
Dimensions		Height	mm	1240	1240
		Width	mm	930	930
		Depth	mm	385	385
Net Weight		kg	103	111	
Heat exchange type			Finned tube	Finned tube	
Outdoor fan type			Propeller fan	Propeller fan	
Air flow volume		m ³ /h	6000	6000	
Fan motor output			39 + 63	39 + 63	
Compressor		Model		ZR49K3-TFD	ZR61K3-TFD
		Output	kW	3.0	3.75
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat	
Built-in duct filter kit			RBC-RK462BE-PE		
Air filter			Washable		

Note 1: (ø22) should be used when the length of pipe exceeds 30m.

Metric/Imperial Pipe Comparisons

Diameter (mm)	6.4	9.5	12.7	15.9	19	22
Nominal Diameter (inch)	1/4	3/8	1/2	5/8	3/4	7/8

ITEM		MODEL	RAV-362C-PE	RAV-462C-PE	
Cooling capacity	kW		10.0	12.5	
	Phase		3	3	
Power source	V		380 – 415	380 – 415	
	Hz		50	50	
			COOLING	COOLING	
Power consumption	kW		3.9	5.0	
Power Factor	%		87	86	
Running current	A		6.5	8.4	
Starting current	A		42	50	
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	47/43/40	49/45/41	
	Outdoor unit	dB(A)	55	59	
Refrigerant	Name of refrigerant		R-22	R-22	
	Charge volume	kg	2.7	3.7	
	Add. volume (20-50m)	g/m	50	50	
Refrigerant control			Capillary tube	Capillary tube	
Inter-connection pipe	Large side size *1	mm	∅ 19 (∅ 22)	∅ 19 (∅ 22)	
	Coupler style		Flare	Flare	
	Smaller side size	mm	∅ 9.5	∅ 9.5	
	Coupler style		Flare	Flare	
	Standard length		m	7.5	7.5
	Maximum pipe lengths		m	50	50
	Max. height difference if indoor unit higher		m	20	20
	Outdoor unit higher		m	50	50
Condensate drain pipe diameter		mm	∅ 20 (ID)	∅ 20 (ID)	
INDOOR UNIT Model			RAV-362C-PE	RAV-462C-PE	
Appearance colour			Silky mist	Silky mist	
Dimensions	Height	mm	240	240	
	Width	mm	1430	1630	
	Depth	mm	640	640	
Net weight	kg		39	44	
Heat exchanger type			Finned tube	Finned tube	
Indoor fan type			Multi-blade fan	Multi-blade fan	
Air flow volume	m ³ /h		1680	2100	
Fan motor output	W		75	75	
Air filter			Washable	Washable	
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE	
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)	
Dimensions	Height	mm	1240	1240	
	Width	mm	930	930	
	Depth	mm	385	385	
Net Weight	kg		103	111	
Heat exchange type			Finned tube	Finned tube	
Outdoor fan type			Propeller fan	Propeller fan	
Air flow volume	m ³ /h		6000	6000	
Fan motor output			39 + 63	39 + 63	
Compressor	Model		ZR49K3-TFD	ZR61K3-TFD	
	Output	kW	3.0	3.75	
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bi-metal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat	

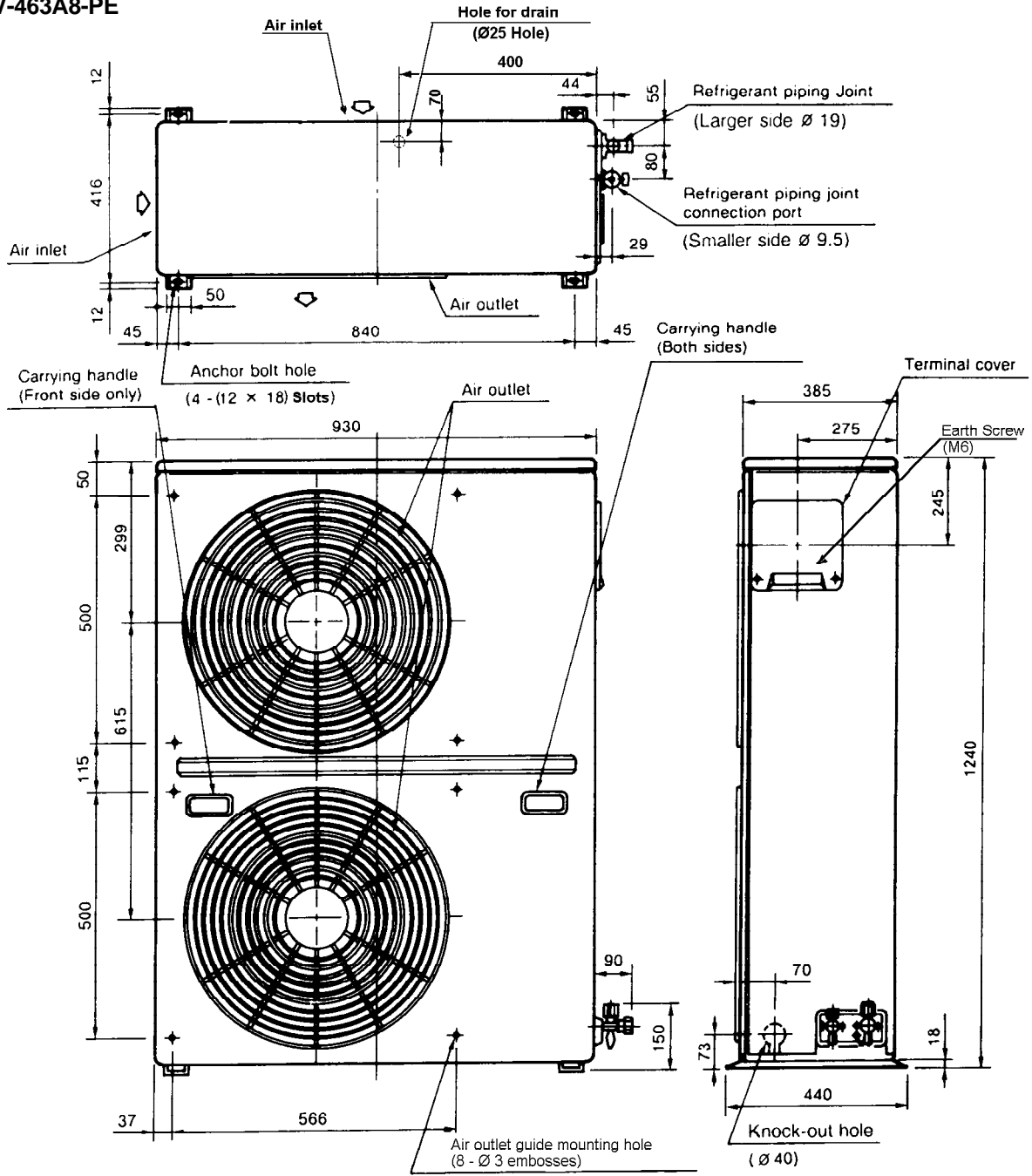
Note 1: (∅22) should be used when the length of pipe exceeds 30m.

ITEM		MODEL	RAV-362U-PE	RAV-462U-PE
Cooling capacity	kW		10.0	12.5
Power source	Phase		3	3
	V		380 – 415	380 – 415
	Hz		50	50
			COOLING	COOLING
Power consumption	kW		3.9	5.0
Power Factor	%		87	86
Running current	A		6.5	8.4
Starting current	A		42	50
Operating noise (SPL)	Indoor unit (High/Med./Low)	dB(A)	50/45/42	52/47/44
	Outdoor unit	dB(A)	55	59
Refrigerant	Name of refrigerant		R-22	R-22
	Charge volume	kg	2.7	3.7
	Add. volume (20-50m)	g/m	50	50
Refrigerant control			Capillary tube	Capillary tube
Inter-connection pipe	Large side size *1	mm	∅ 19 (∅ 22)	∅ 19 (∅ 22)
	Coupler style		Flare	Flare
	Smaller side size	mm	∅ 9.5	∅ 9.5
	Coupler style		Flare	Flare
	Standard length	m	7.5	7.5
	Maximum pipe lengths	m	50	50
	Max. height difference if indoor unit higher	m	20	20
	Outdoor unit higher	m	50	50
Condensate drain pipe diameter	mm		∅ 32 (OD)	∅ 32 (OD)
INDOOR UNIT Model			RAV-362U-PE	RAV-462U-PE
Appearance colour			Black (Zinc galvanized steel + Thermal insulation)	
Dimensions	Height	mm	350	350
	Width	mm	1130	1130
	Depth	mm	740	740
Net weight	kg		53	53
Heat exchanger type			Finned tube	Finned tube
Indoor fan type			Centrifugal Fan	Centrifugal Fan
Air flow volume	m ³ /h		1680	1860
Fan motor output	W		80	90
CEILING PANEL Model			RBC-U462PG(W)-PE	RBC-U462PG(W)-PE
Appearance colour			Silky mist (Munsell 1Y8.9/0.5)	Silky mist (Munsell 1Y8.9/0.5)
Dimensions	Height	mm	28	28
	Width	mm	1290	1290
	Depth	mm	840	840
Net Weight	kg		10	10
Air filter			Washable	Washable
OUTDOOR UNIT Model			RAV-363A8-PE	RAV-463A8-PE
Appearance colour			Bronze white (Munsell 6Y7.5/1)	Bronze white (Munsell 6Y7.5/1)
Dimensions	Height	mm	1240	1240
	Width	mm	930	930
	Depth	mm	385	385
Net Weight	kg		103	111
Heat exchange type			Finned tube	Finned tube
Outdoor fan type			Propeller fan	Propeller fan
Air flow volume	m ³ /h		6000	6000
Fan motor output			39 + 63	39 + 63
Compressor	Model		ZR49K3-TFD	ZR61K3-TFD
	Output	kW	3.0	3.75
Protective device			Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat	Fuse, Crankcase heater, Reverse Phase Protector, Inner overload relay Bimetal thermostat

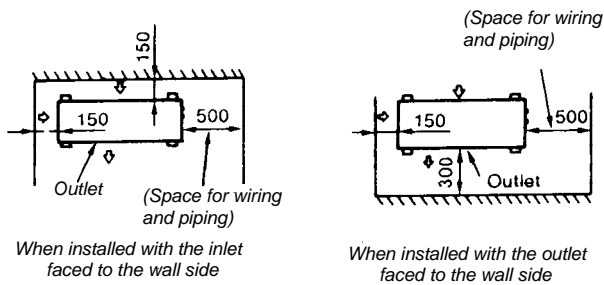
Note 1: (∅22) should be used when the length of pipe exceeds 30m.

3. CONSTRUCTION VIEWS

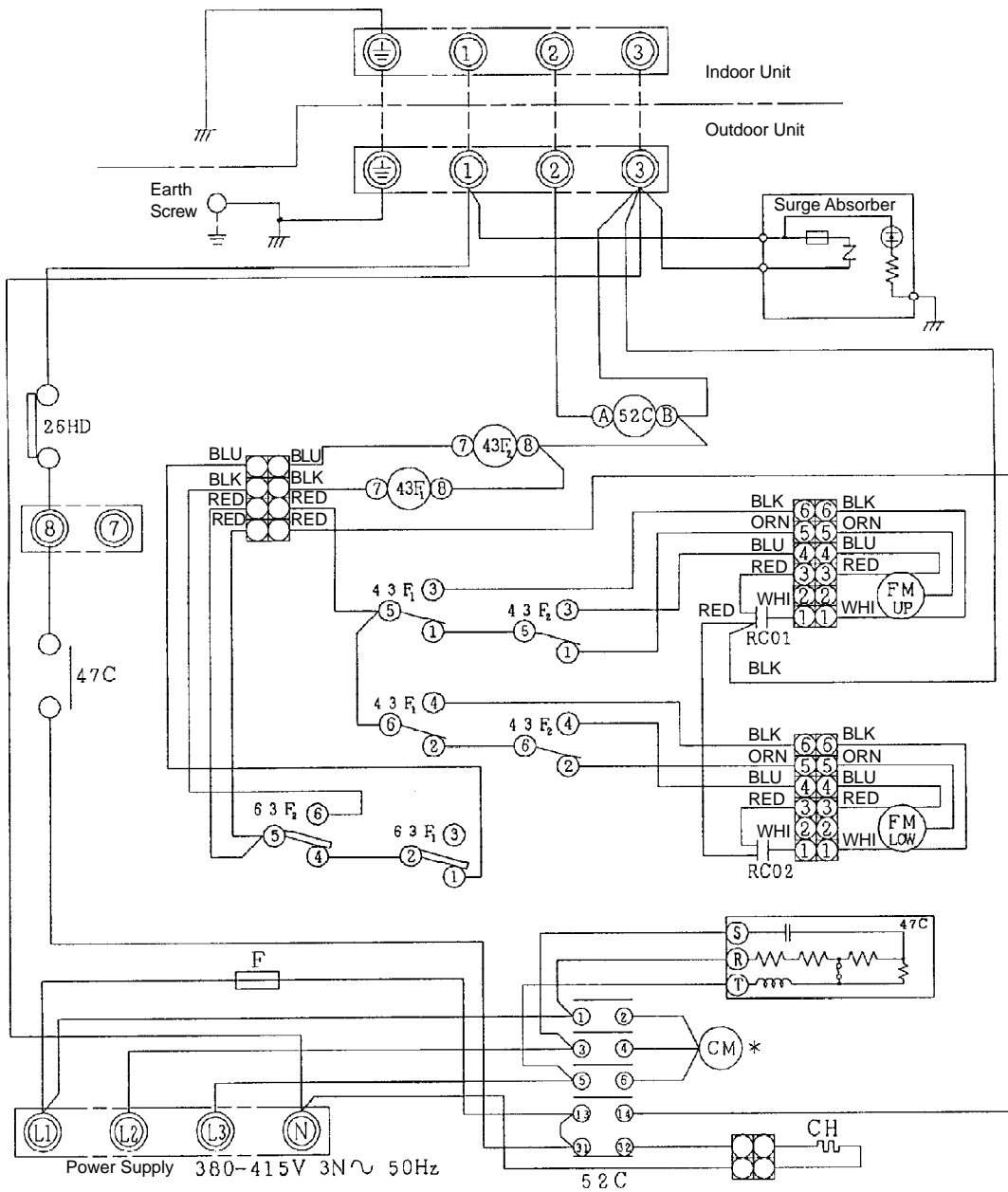
RAV-363A8-PE
RAV-463A8-PE



Space required for service



4. WIRING DIAGRAM



⊙ shows terminal block and figures show terminal numbers.
 Broken lines show wiring at site.

Do not operate the units with the magnetic contactor pushed in.

* Compressor has internal thermal protection.

Symbol	Name	Symbol	Name	Symbol	Name
63F _{1,2}	2 Stage Pressure Switch	CM	Compressor	RC01,02	Running Capacitor
43F _{1,2}	Relay	52C	Magnetic Contactor	CH	Crankcase Heater
26HD	Bimetal Thermostat	FM UP,LOW	Fan Motor (Outdoor)	F	Fuse (T5A)
47C	Reverse Phase Protector				

5. SPECIFICATIONS OF ELECTRICAL PARTS

5.1 RAV-363A8-PE

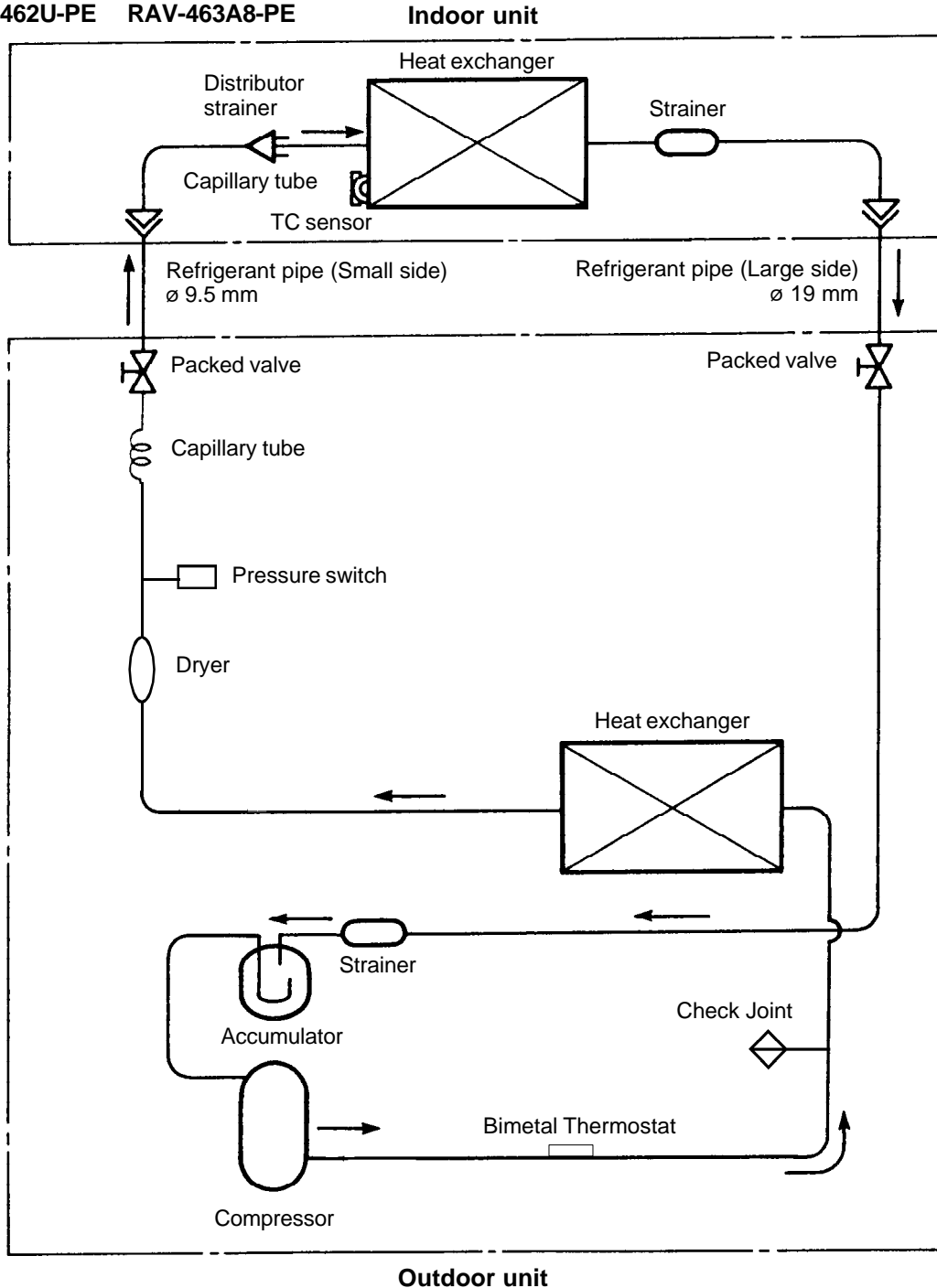
No.	Parts Name	Type	Specifications
1	Compressor	ZR49K3-TFD	Output (Rated) 3.0kW, 2 pole, 3 phase, 380/415V, 50 Hz
			Winding resistance 3.73Ω, at 20 °C
2	Outdoor unit fan motor	SMF-230-63N-3	Output (Rated) 63W, 6 pole, 1 phase, 230V, 50 Hz
		SMF-230-39N-3	Output (Rated) 39W, 6 pole, 1 phase, 230V, 50 Hz
3	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 μF
4	Magnetic contactor	FMCa-1S	AC 230V, 50Hz,
5	Pressure switch (2-stage)	STB-X602	Tripping pressure 19 kg/cm ² G, 21 kg/cm ² G Resetting pressure 13 kg/cm ² G, 15 kg/cm ² G
6	Bimetal Thermostat	CS-7	Tripping temperature 135°C Resetting temperature 110°C
7	Crankcase heater		AC 240V, 28W
8	Fuse		T5A
9	Reverse Phase Protector	STR-4AB	

5.2 RAV-463A8-PE

No.	Parts Name	Type	Specifications
1	Compressor	ZR61K3-TFD	Output (Rated) 3.75kW, 2 pole, 3 phase, 380/415V, 50 Hz
			Winding resistance 2.91Ω, at 20 °C
2	Outdoor unit fan motor	SMF-230-63N-3	Output (Rated) 63W, 6 pole, 1 phase, 230V, 50 Hz
		SMF-230-39N-3	Output (Rated) 39W, 6 pole, 1 phase, 230V, 50 Hz
3	Running capacitor for outdoor fan motor	EEP2G405HQA114	AC 400V, 4 μF
4	Magnetic contactor	FMCa-1S	AC 230V, 50Hz,
5	Pressure switch (2-stage)	STB-X602	Tripping pressure 19 kg/cm ² G, 21 kg/cm ² G Resetting pressure 13 kg/cm ² G, 15 kg/cm ² G
6	Bimetal Thermostat	CS-7	Tripping temperature 135°C Resetting temperature 110°C
7	Crankcase heater		AC 240V, 28W
8	Fuse		T5A
9	Reverse Phase Protector	STR-4AB	

6. REFRIGERANT PIPING DIAGRAM

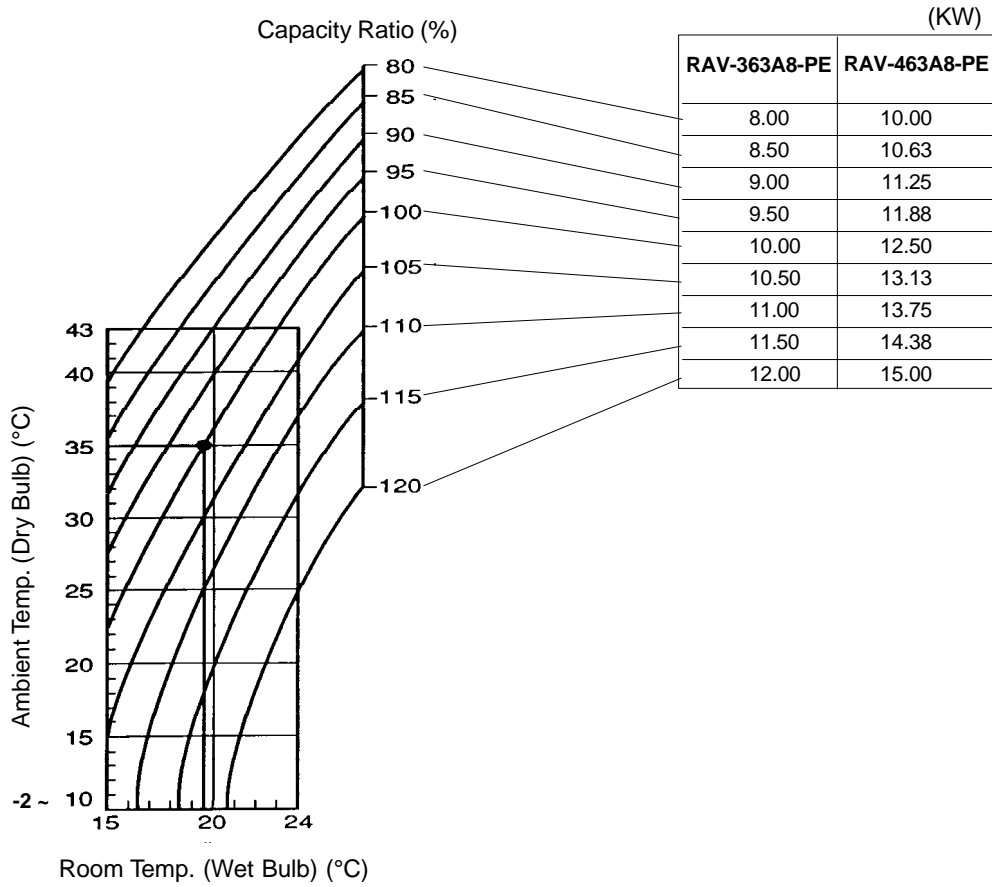
Indoor unit	Outdoor unit
RAV-362B-PE	RAV-363A8-PE
RAV-362C-PE	RAV-363A8-PE
RAV-362U-PE	RAV-363A8-PE
RAV-462B-PE	RAV-463A8-PE
RAV-462C-PE	RAV-463A8-PE
RAV-462U-PE	RAV-463A8-PE



Indoor Unit		Outdoor Unit	
Model	Capillary	Model	Capillary
RAV-362B-PE	IDø2.0 x 400L x 6P	RAV-363A8-PE	IDø2.4 x 500L x 1P
RAV-362C-PE	IDø2.0 x 300L x 7P		
RAV-362U-PE	IDø2.0 x 300L x 8P		
RAV-462B-PE	IDø2.2 x 200L x 6P	RAV-463A8-PE	IDø2.6 x 700L x 1P
RAV-462C-PE	IDø2.0 x 200L x 8P		
RAV-462U-PE	IDø2.0 x 300L x 8P		

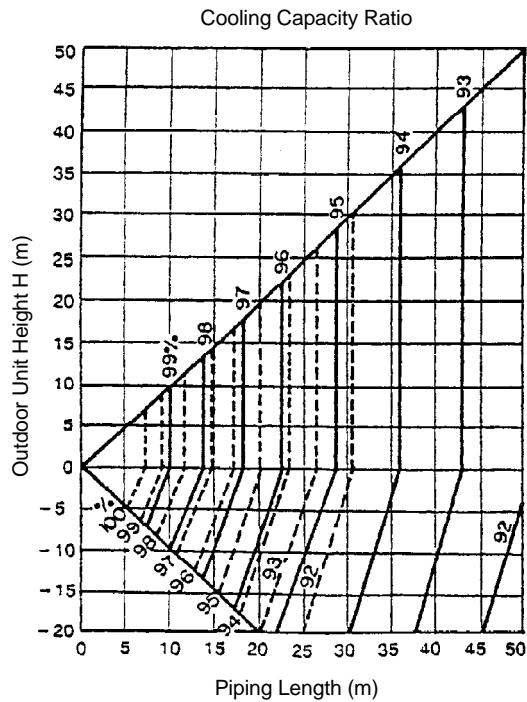
7. PERFORMANCE CHARACTERISTICS

7.1 Cooling capacity



7.2 Piping length/cooling capacity

RAV-363A8-PE
RAV-463A8-PE



The broken line shows in case the piping length is 30m or less.

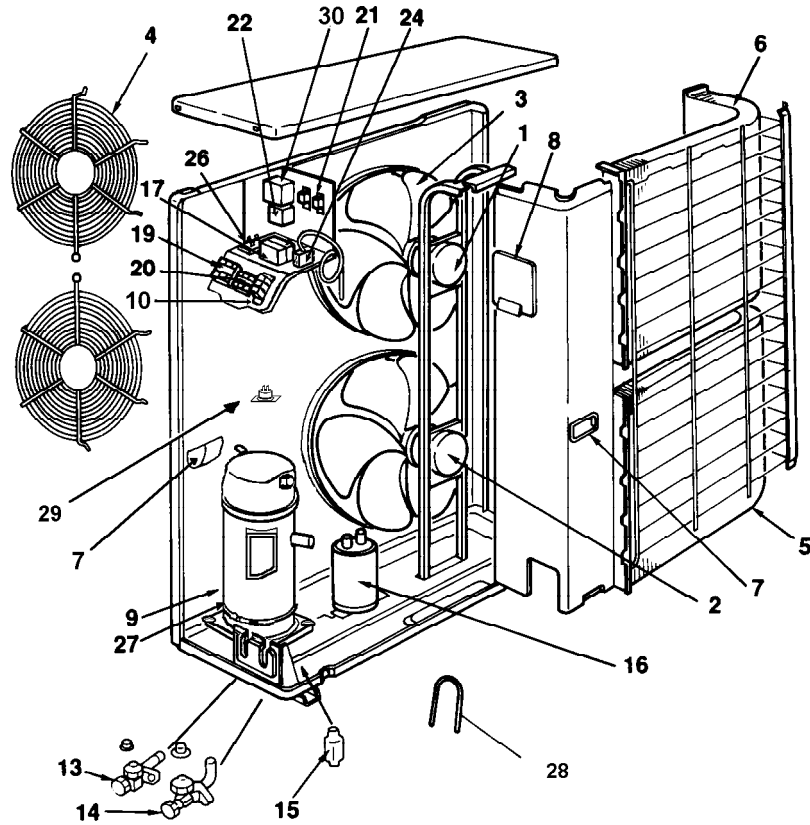
7.3 Piping length/additional refrigerant volume

Model	Piping length less than (m)	20	Additional amount of refrigerant at installation site (kg)					Recharge quantity (kg)										
			25	30	35	40	45	50	5	10	15	20	25	30	35	40	45	50
RAV-463A8-PE	Filled at factory		0.25	0.5	0.75	1.0	1.25	1.5	3.3	3.45	3.55	3.7	3.95	4.2	4.45	4.7	4.95	5.2
RAV-363A8-PE	Filled at factory		0.25	0.5	0.75	1.0	1.25	1.5	2.3	2.45	2.55	2.7	2.95	3.2	3.45	3.7	3.95	4.2

- 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 to recharge the unit with refrigerant is shown in the table above.
The permissible amount of refrigerant is the prescribed amount $\pm 50g$.
- For RAV-363A8-PE and RAV-463A8-PE, if the length of pipe exceeds 30m the diameter of the gas pipe must be increased by one rank (i.e. $\varnothing 19.0$ to $\varnothing 22.2$).

8. EXPLODED VIEWS AND PARTS LISTS

RAV-363A8-PE
RAV-463A8-PE



Location No.	Part No.	Description
1	43A21011	Motor, Fan, SMF-230-63N-3
2	43A21012	Motor, Fan, SMF-230-39N-3
3	43120156	Fan, Propeller
4	43A19001	Guard-Fan
5	43143649	Condenser, Lower (RAV-363A8-PE)
5	43A43006	Condenser, Lower (RAV-463A8-PE)
6	43143651	Condenser, Upper (RAV-363A8-PE)
6	43A43005	Condenser, Upper (RAV-463A8-PE)
7	43119368	Hanger
8	43162027	Cover, Electric Parts
9	43A41500	Compressor, ZR49K3-TFD (RAV-363A8-PE)
9	43A41501	Compressor, ZR61K3-TFD (RAV-463A8-PE)
10	43A60006	Fuse F2 (T5A)
13	43146451	Packed Valve (3/8")

Location No.	Part No.	Description
14	43146416	Packed Valve (3/4")
15	43145064	Dryer
16	43148096	Accumulator
17	43155080	Capacitor, Plastic Film
19	43A60005	Terminal, 4P
20	43A60001	Terminal, 4P
21	43154141	Relay
22	43152334	Magnetic Contactor
24	43A49002	Pressure Switch, 2-stage
26	43169584	Surge Absorber
27	43157167	Heater, Crk. Case
28	43146430	Capillary Tube (RAV-363A8-PE)
28	43146459	Capillary Tube (RAV-463A8-PE)
29	43150112	Bimetal Thermostat
30	43154148	Reverse Phase Protector STR-4AB

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