

TOSHIBA

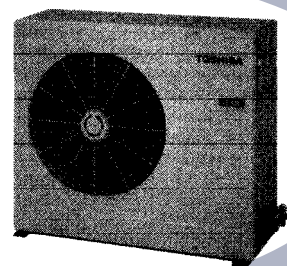
FILE NO. A90-9605

SERVICE MANUAL

AIR-CONDITIONER

SPLIT WALLTYPE, HEAT PUMP

RAV-202KH(W)-PE/RAV-202AH-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:

| TEMPERATURE | |
|---------------------|---|
| 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

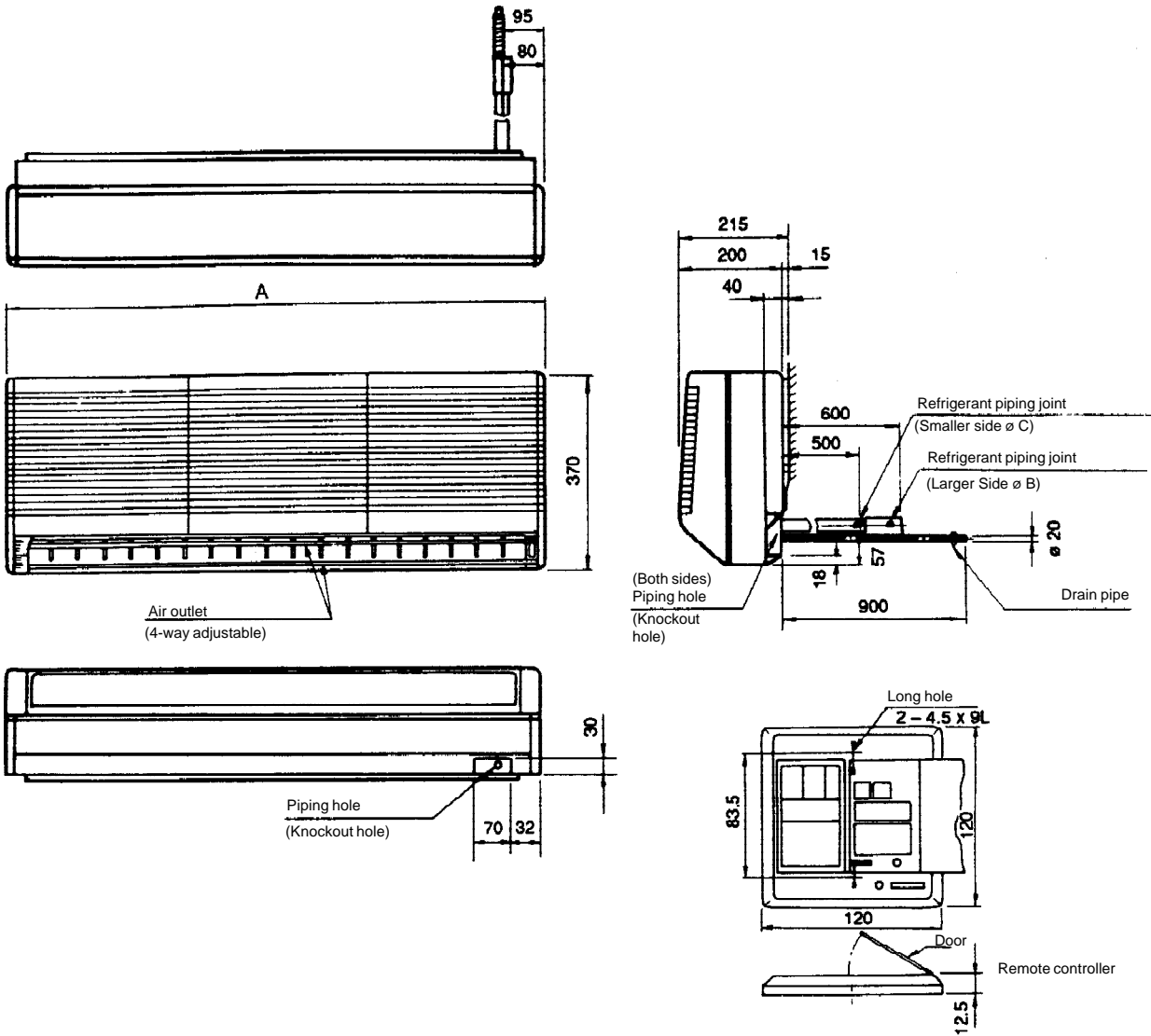
| ITEM | MODEL | RAV-202KH(W)-PE | |
|-----------------------|--------------------------------|--|----------|
| Cooling capacity | kW | 6.0 | |
| Heating capacity | kW | 7.3 | |
| Power source | Phase | 1 | |
| | V | 220-240 | |
| | Hz | 50 | |
| | | COOLING | HEATING |
| Power consumption | kW | 2.5 | 2.48 |
| Power factor | % | 90.6 | 91.4 |
| Running current | A | 12.0 | 11.8 |
| Starting current | A | 80 | |
| Operating noise (SPL) | Indoor unit (High, Med, Low) | dB(A) | |
| | Outdoor unit | dB(A) | |
| | | 46/42/38 | |
| Refrigerant | Name of refrigerant | R-22 | |
| | Charge volume | kg | |
| | Add. volume (20-30m) | g/m | |
| | | 2.2 | |
| | | 50 | |
| 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: | | |
| | Indoor unit height | m | 15 |
| | Outdoor unit height | m | 30 |
| | Condensate drain pipe diameter | mm | ø20 (ID) |
| INDOOR UNIT Model | | RAV-202KH(W)-PE | |
| Appearance colour | | Silky mist | |
| Dimensions | Height | mm | 370 |
| | Width | mm | 1,350 |
| | Depth | mm | 200 |
| Net weight | kg | 25 | |
| Heat exchanger type | | Finned tube | |
| Indoor fan type | | Transverse flow fan | |
| Air volume | m ³ /h | 1,200 | |
| Fan motor output | W | 27 | |
| Air filter | | Washable | |
| OUTDOOR UNIT Model | | RAV-202AH-PE | |
| Appearance colour | | Bronze white (Munsell 6Y7.5/1) | |
| Dimensions | Height | mm | 790 |
| | Width | mm | 880 |
| | Depth | mm | 310 |
| Net weight | kg | 80 | |
| Heat exchanger type | | Finned tube | |
| Outdoor fan type | | Propeller fan | |
| Air flow volume | m ³ /h | 3,000 | |
| Fan motor output | W | 63 | |
| Compressor | Model | PH330X3-4MS | |
| | Output | kW | 2.2 |
| 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.

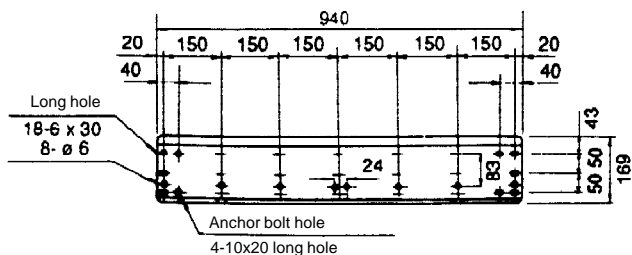
2. CONSTRUCTION VIEWS

2.1 Indoor Unit RAV-202KH(W)-PE

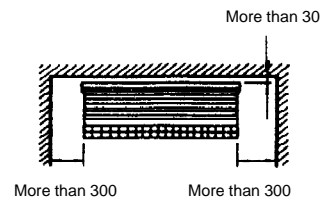


| Model | A | B | C |
|-----------------|------|------|-----|
| RAV-202KH(W)-PE | 1350 | 12.7 | 6.4 |

RAV-202KH(W)-PE

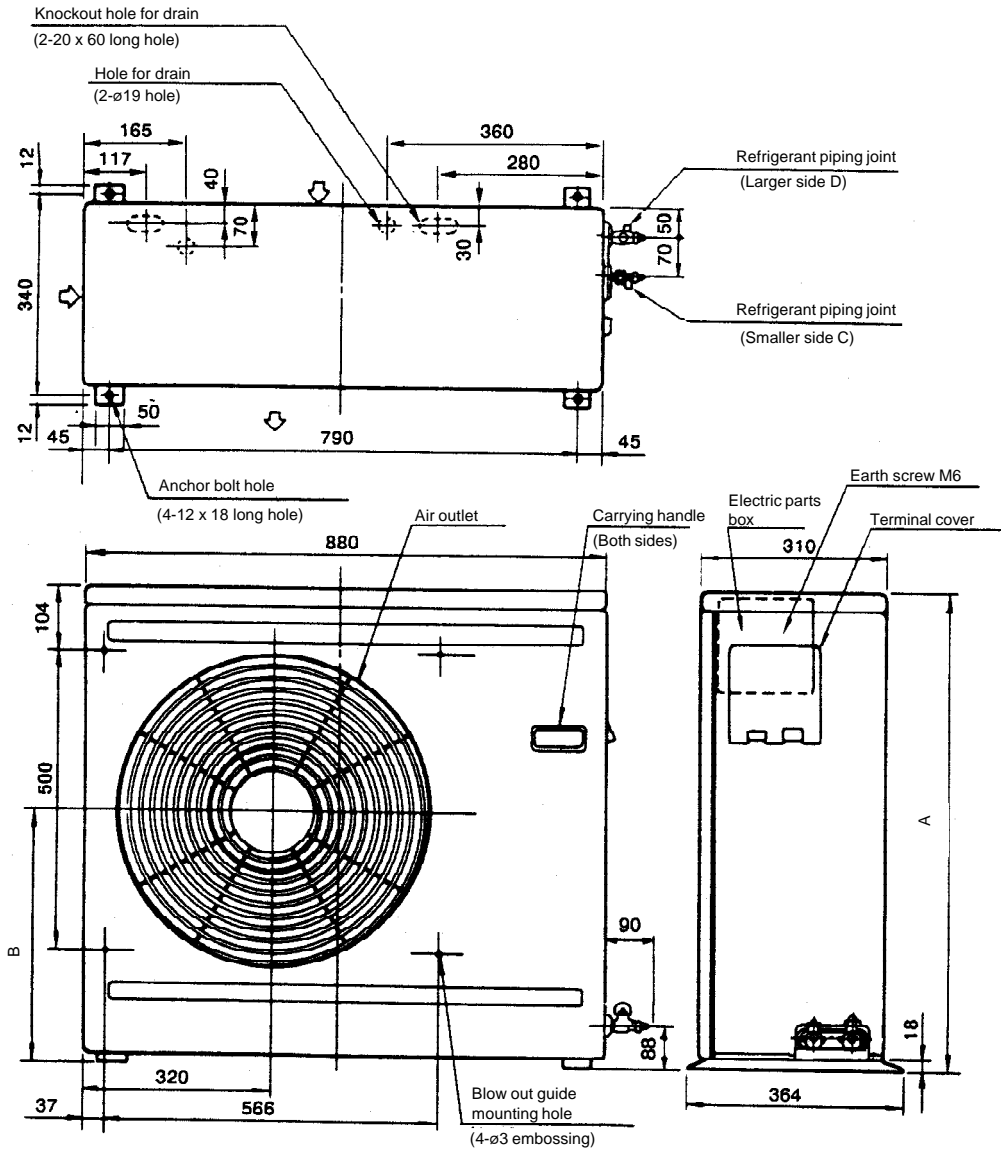


Installation board mounting bolt hole location

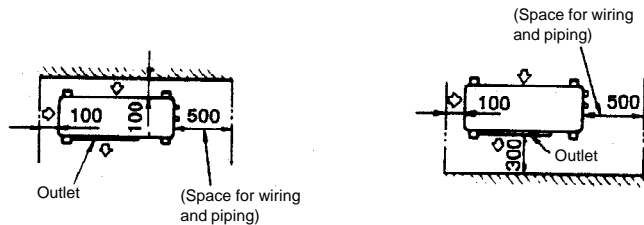


Space required for service

**2.2 Outdoor unit
RAV-202AH-PE**



Space required for service



When installed with the inlet faced to the wall side

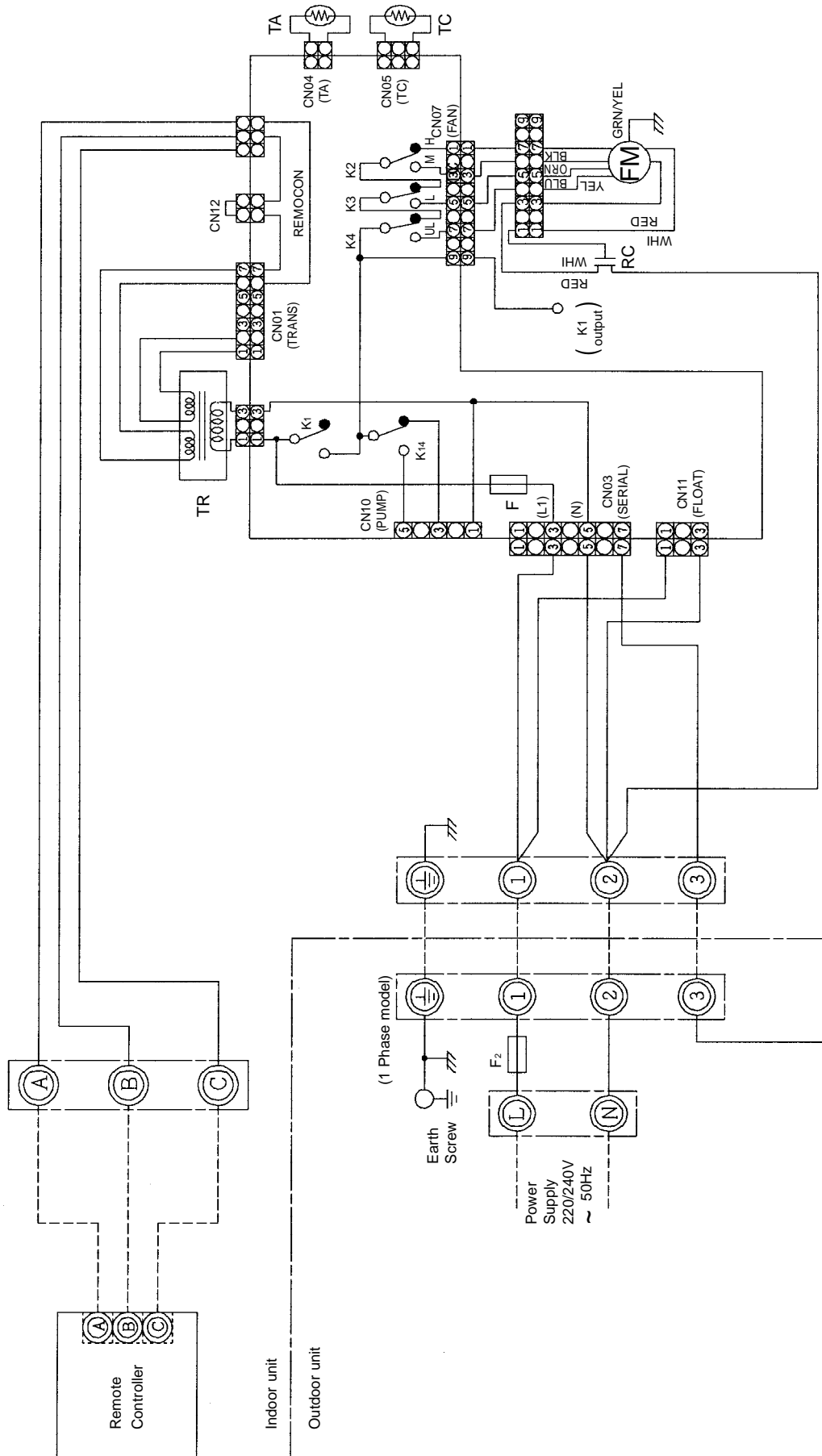
When installed with the outlet faced to the wall side

(Unit: mm)

| Model | A | B | C | D |
|--------------|-----|-----|------|-------|
| RAV-202AH-PE | 790 | 430 | ø6.4 | ø12.7 |

3. WIRING DIAGRAM

3.1 RAV-202KH(W)-PE

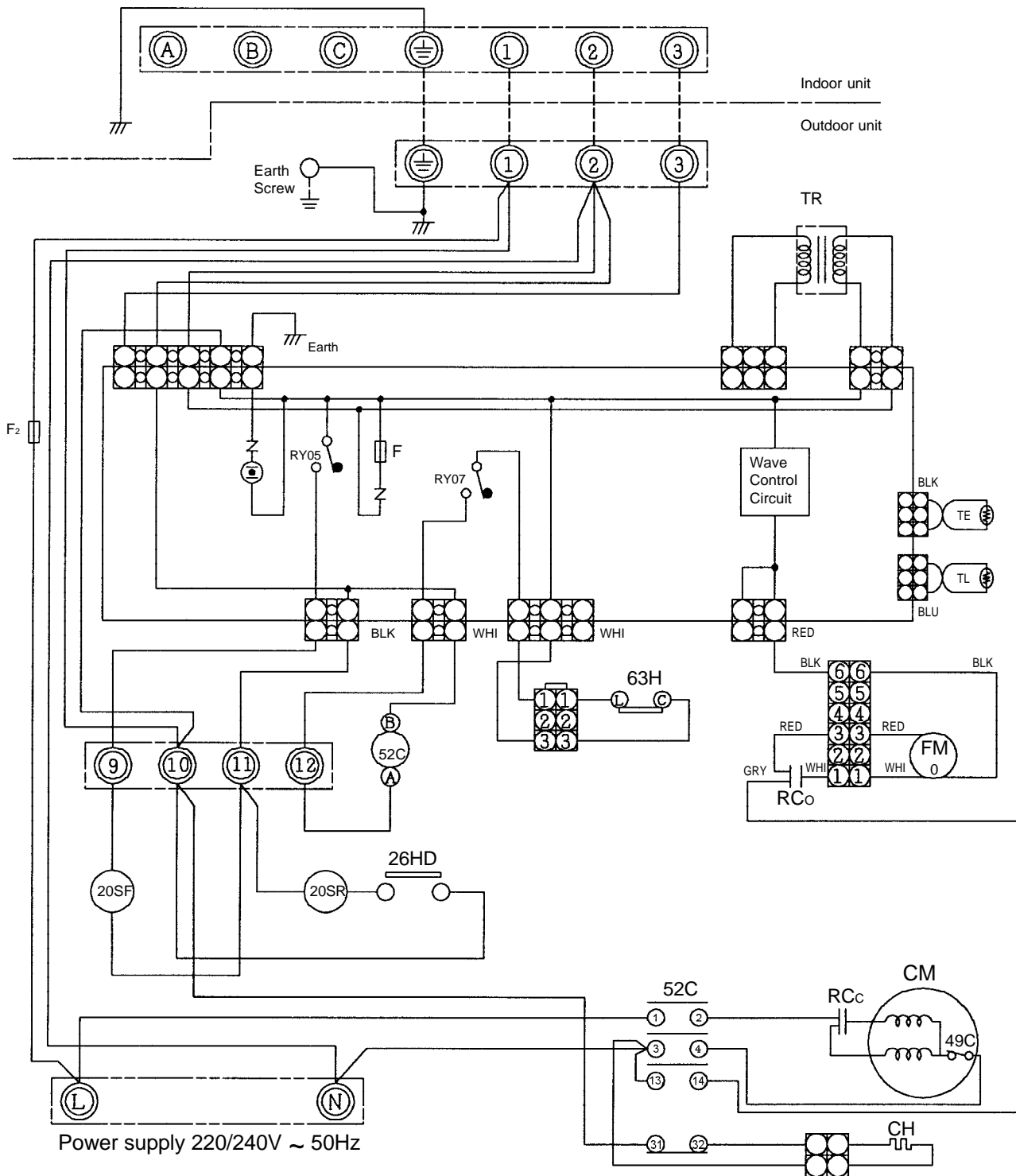


| Symbol | Name | Symbol | Name |
|--------|-------------------|---------|--------|
| FM | Fan Motor | TA | Sensor |
| RC | Running Capacitor | TC | Sensor |
| TR | Transformer | K1~ K14 | Relay |
| F | Fuse (PCB) | | |

⊙ 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.

3.2 RAV-202AH-PE



⊙ 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.

| 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 |
| 49C | Inner Overload Relay | FMo | Fan Motor (Outdoor) | CH | Crankcase 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 | | |

4. SPECIFICATIONS OF ELECTRICAL PARTS

4.1 RAV-202KH(W)-PE

| No. | PARTS NAME | TYPE | SPECIFICATIONS | | | | | | |
|-----|---|----------------|--|------------|-------|-------|------|------|-----|
| 1 | Indoor unit fan motor | AF230-27-4R | Output (Rated) 27W, 4 pole, 230V, 1 phase, 50 Hz | | | | | | |
| 2 | Running capacitor for indoor fan motor | EEP2H155HQA107 | AC 400V, 1.5 μ F | | | | | | |
| 3 | Transformer (Indoor unit) | ST-9586 | 187 ~ 264V | | | | | | |
| 4 | Sensor for room temperature | | Maximum input 38 mA | °C | 15 | 20 | 25 | 30 | 40 |
| | | | | k Ω | 16.1 | 12.6 | 10.0 | 8.0 | 5.2 |
| 5 | Indoor unit sensor for heat-exchanger temp. | DTN-C103J40 | Maximum input 34 mA | °C | -12 | 0 | 25 | 50 | |
| | | | | k Ω | 62.29 | 32.82 | 10.0 | 3.59 | |

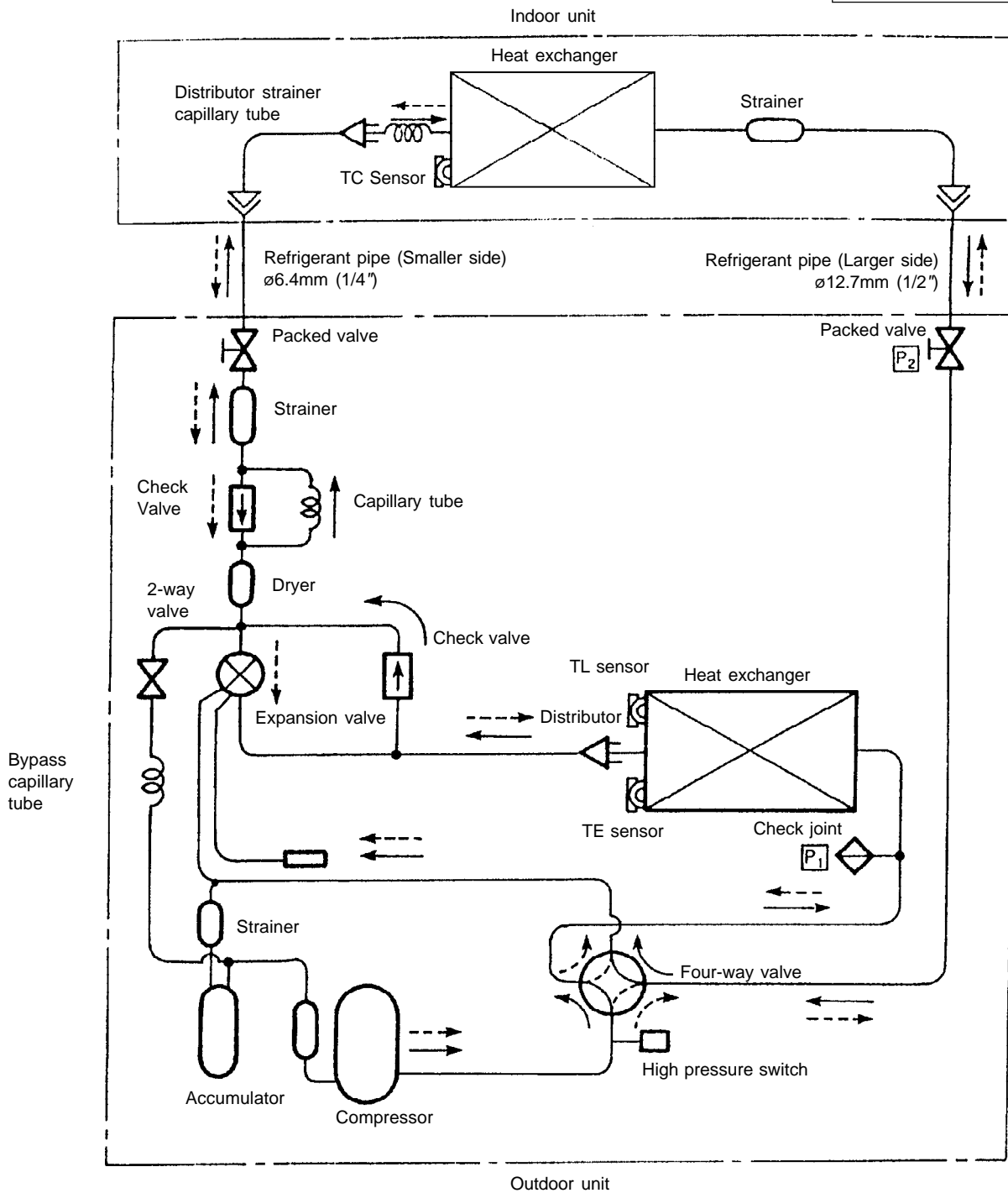
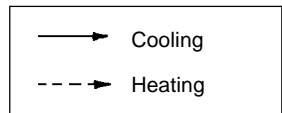
4.2 RAV-202AH-PE

| No. | PARTS NAME | TYPE | SPECIFICATIONS | | | | | | |
|-----|---|----------------|---|------------|------|------|--|--|--|
| 1 | Compressor | PH330X3-4MS | Output (Rated) 2.2 kW, 2 pole, 220/240V, 3 phase, 50 Hz | | | | | | |
| 2 | Outdoor unit fan motor | SMF-230-63N-2 | Output (Rated) 63W, 6 pole, 230V, 1 phase, 50 Hz | | | | | | |
| 3 | Running capacitor for outdoor fan motor | EEP2G405HQA114 | AC 400V, 4 μ F | | | | | | |
| 4 | Magnetic contactor | FMca-1S | AC 220~240V, 50 Hz | | | | | | |
| 5 | High pressure switch | ACB-2TBO4W | Tripping pressure 30 kg/cm ² G Resetting pressure 23 kg/cm ² G | | | | | | |
| 6 | Solenoid coil for four-way valve | CHV-AC240V | AC 220~240V | | | | | | |
| 7 | Crankcase heater | | AC 240V, 28W | | | | | | |
| 8 | Sensor for defrosting | | Maximum input 15.5 mA | °C | -12 | 10 | | | |
| | | | | k Ω | 67.5 | 21.3 | | | |
| 9 | Fuse | | 5A | | | | | | |
| 10 | Sensor for cooling operation in low ambient temperature | | Maximum input 15.5 mA | °C | -12 | 10 | | | |
| | | | | k Ω | 67.5 | 21.3 | | | |
| 11 | Bimetal thermostat | CS-7 | Tripping temperature: 110°C Resetting temperature: 90°C | | | | | | |
| 12 | Solenoid coil for two-way valve | NEV202DXF | AC 220~240V, 50Hz | | | | | | |
| 13 | Transformer for outdoor unit | FT-67 | AC 187~264V | | | | | | |
| 14 | Running capacitor for compressor | EAR42M606UF | AC 420V, 60 μ F | | | | | | |

5. REFRIGERANT PIPING DIAGRAM

5.1 Indoor unit
RAV-202KH(W)-PE

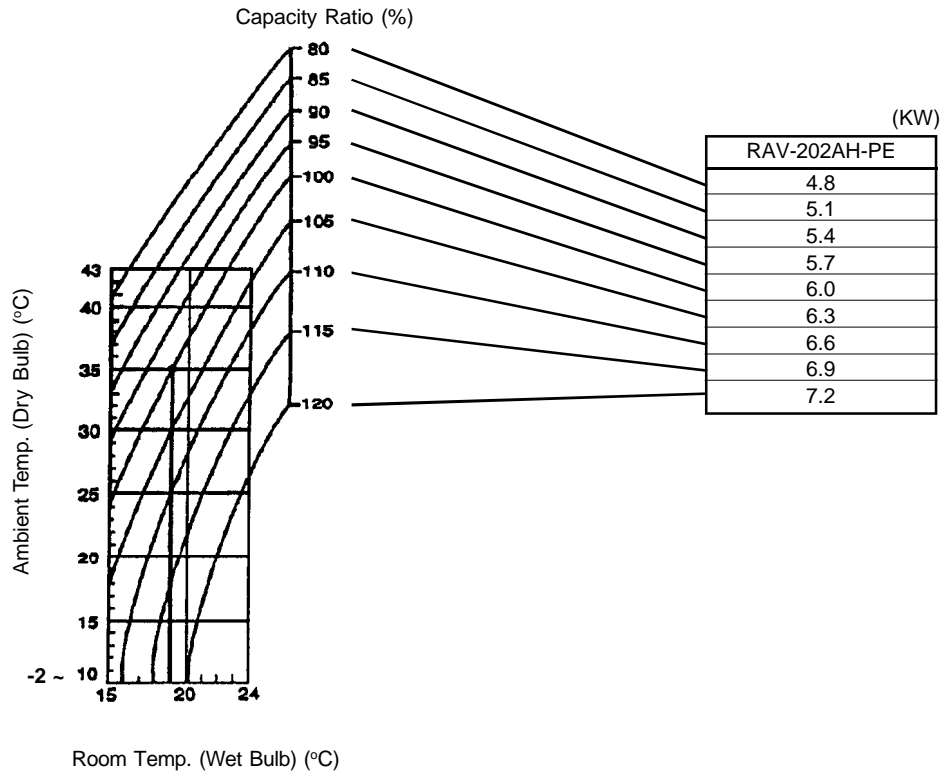
Outdoor unit
RAV-202AH-PE



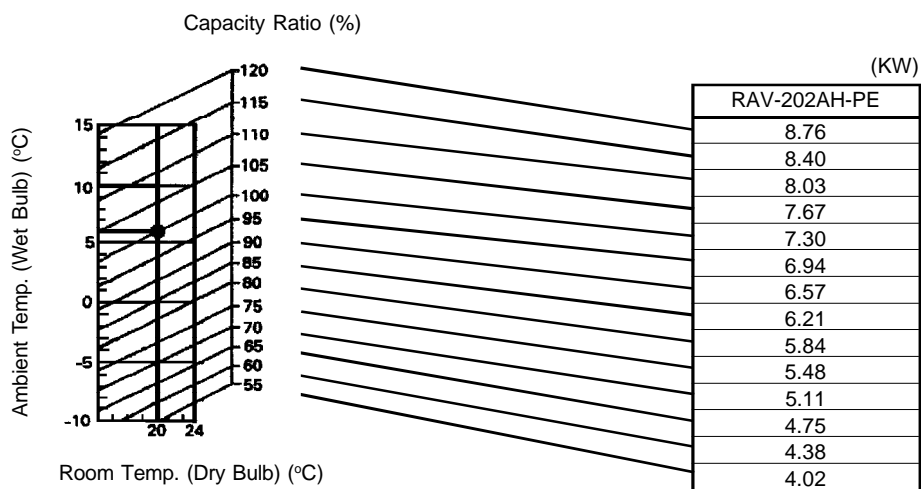
| INDOOR UNIT | | OUTDOOR UNIT | | |
|-----------------|-----------------|--------------|-----------------|------------------|
| MODEL | CAPILLARY | MODEL | MAIN CAPILLARY | BYPASS CAPILLARY |
| RAV-202KH(W)-PE | IDø 1.7x150Lx3P | RAV-202AH-PE | IDø 2.6x900Lx1P | IDø 1x500Lx1P |

6. PERFORMANCE CHARACTER

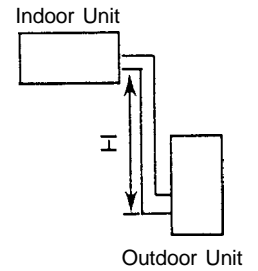
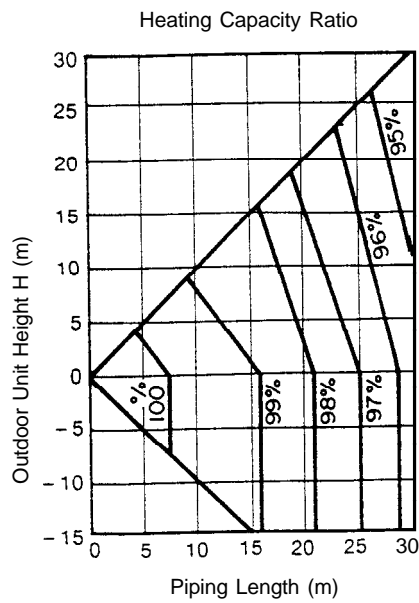
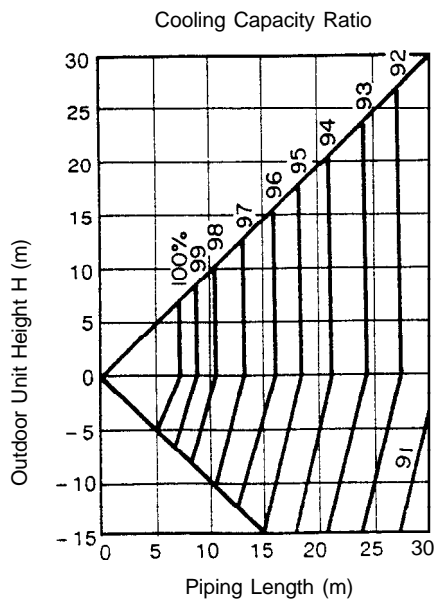
6.1 Cooling capacity



6.2 Heating capacity



**6.3 Cooling capacity
RAV-202AH-PE**



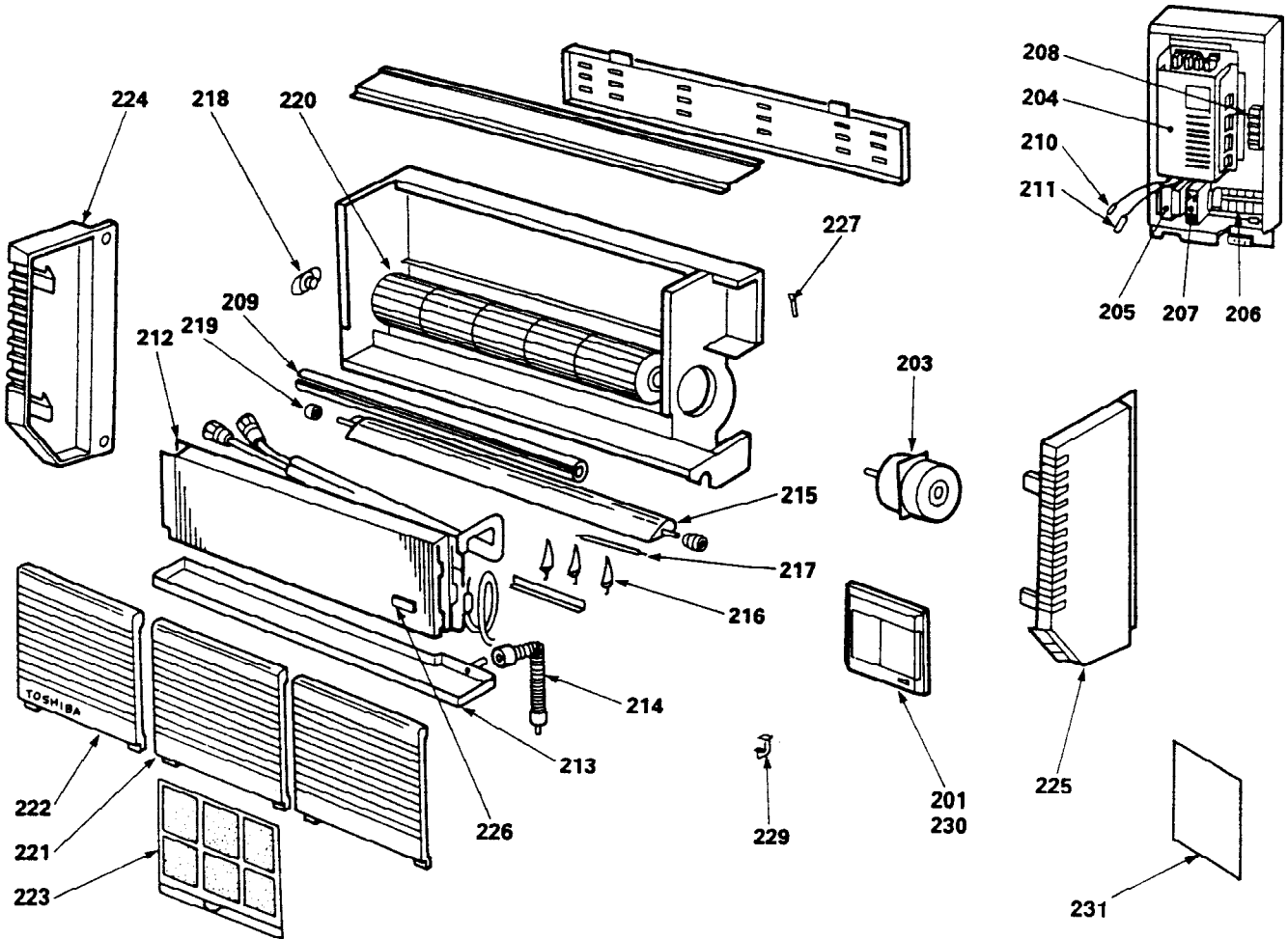
6.4 Piping length/additional refrigerant volume

| 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 |
| RAV-202AH-PE | Filled at factory | | 0.25 | 0.5 | | | | | 0.45 | 1.7 | 1.95 | 2.2 | 2.45 | 2.7 |

- 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 LISTS

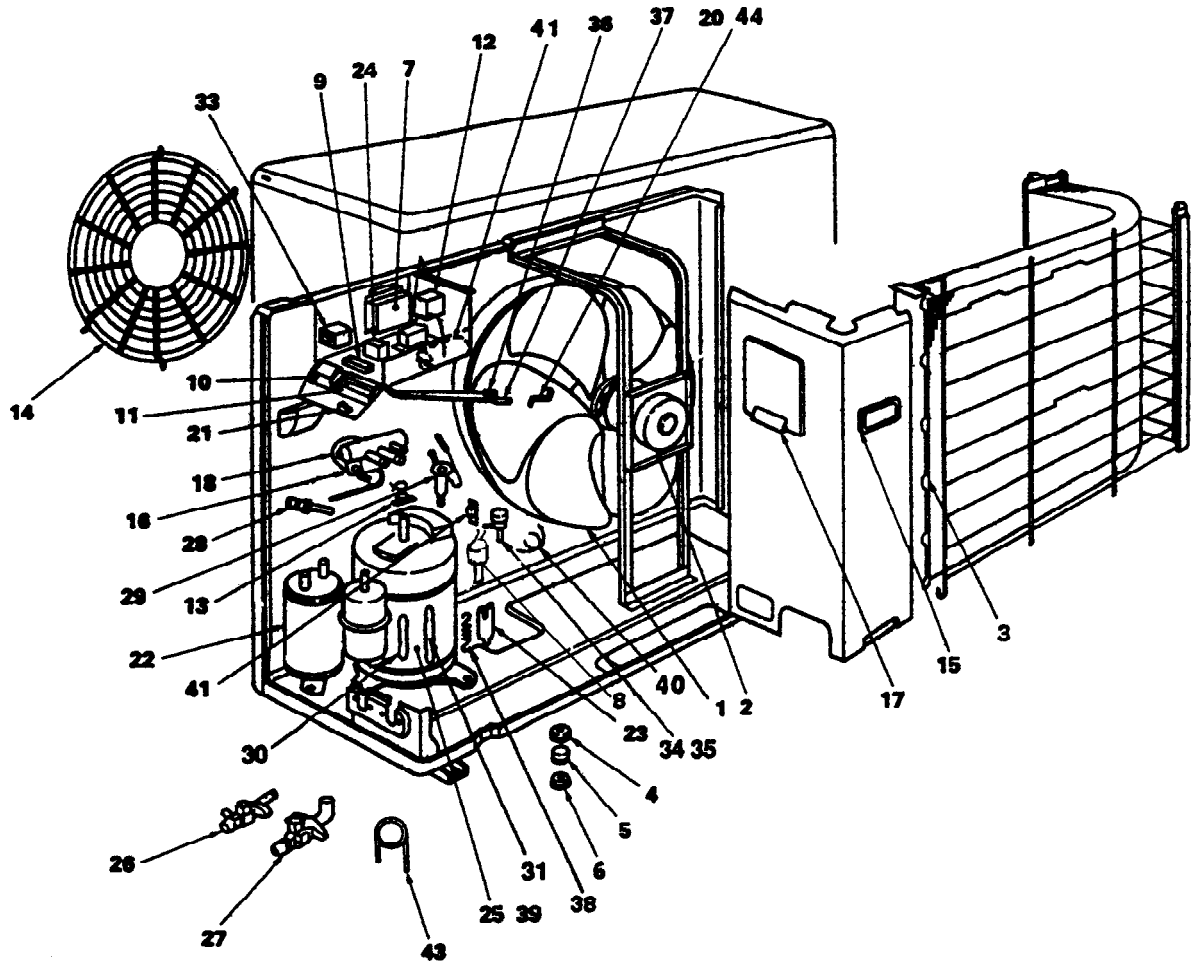
7.1 Indoor Unit RAV-202KH(W)-PE



| Location No. | Part No. | Description |
|--------------|----------|-------------------------|
| 201 | 43A69004 | Remote Controller |
| 203 | 43121491 | Motor |
| 204 | 43A69002 | PC Board |
| 205 | 43A58002 | Transformer, Power |
| 206 | 43A60001 | Terminal, 4P |
| 207 | 43155101 | Capacitor, Electrolytic |
| 208 | 43A60002 | Terminal, 3P |
| 209 | 43122029 | Nose, Fan Case |
| 210 | 43150118 | Sensor, Room Temp. |
| 211 | 43150116 | Sensor, Heat Exch. |
| 212 | 43144666 | Evaporator |
| 213 | 43172114 | Drain Pan |
| 214 | 43170182 | Hose, Drain |
| 215 | 43109364 | Grille |
| 216 | 43109280 | Grille, Vertical |

| Location No. | Part No. | Description |
|--------------|----------|---------------------|
| 217 | 43139098 | Connection Rod |
| 218 | 43022189 | Bearing |
| 219 | 43196083 | Bushing |
| 220 | 43120136 | Fan, Cross Flow |
| 221 | 43109361 | Grille, Inlet |
| 222 | 43109362 | Grille, Inlet |
| 223 | 43180290 | Air-Filter |
| 224 | 43102629 | Cabinet, Side Left |
| 225 | 43102628 | Cabinet, Side Right |
| 226 | 43063175 | Holder, Sensor |
| 227 | 43019604 | Holder, Sensor |
| 229 | 43107234 | Holder, Grille |
| 230 | 43A62001 | Cover, Remocon |
| 231 | 43A88002 | Manual |

7.2 RAV-202AH-PE



| Location No. | Part No. | Description |
|--------------|----------|---------------------------|
| 1 | 43120156 | Fan, Propeller |
| 2 | 43A21002 | Motor, Fan, AC 230V, 50Hz |
| 3 | 43A43002 | Condenser |
| 4 | 43049132 | Base, Spring, B |
| 5 | 43149198 | Spring, Buffer |
| 6 | 43149212 | Base, Spring, A |
| 7 | 43A69003 | PC Board |
| 8 | 43A49001 | Switch, High-Pressure |
| 9 | 43060479 | Terminal, 4P |
| 10 | 43A60004 | Terminal, 2P |
| 11 | 43A60001 | Terminal, 4P |
| 12 | 43152334 | Magnetic Contactor |
| 13 | 43150122 | Thermostat, Bimetal |
| 14 | 43A19001 | Guard, Fan |
| 15 | 43119368 | Hanger |
| 16 | 43A46004 | Solenoid Coil |
| 17 | 43162027 | Cover, Electric Parts |
| 18 | 43146418 | Valve, 4-Way |
| 20 | 43107215 | Holder, Sensor (TE) |
| 21 | 43169600 | Holder |
| 22 | 43148114 | Accumulator |

| Location No. | Part No. | Description |
|--------------|----------|-------------------------|
| 23 | 43145082 | Dryer |
| 24 | 43155080 | Capacitor, Plastic Film |
| 25 | 43140318 | Compressor, PH330X3-4MS |
| 26 | 43146454 | Packed Valve (1/4") |
| 27 | 43146406 | Packed Valve (1/2") |
| 28 | 43147321 | Check Joint |
| 29 | 43146433 | Expansion Valve |
| 30 | 43046156 | Checked Valve |
| 31 | 43146283 | Checked Valve |
| 33 | 43A58003 | Transformer, Power |
| 34 | 43046151 | Valve, 2-way |
| 35 | 43046198 | Coil, 2-Way Valve |
| 36 | 43A50001 | Sensor, Cond. Out (TL) |
| 37 | 43150196 | Sensor, Heat Exch. (TE) |
| 38 | 43193043 | Spring |
| 39 | 43157167 | Heater, Crankcase |
| 40 | 44246236 | Capillary Tube |
| 41 | 43055379 | Capillary, Electrolytic |
| 43 | 43146459 | Capillary Tube |
| 44 | 43107215 | Holder, Sensor (TL) |

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