



Mitsubishi Heavy Industries Air Conditioners

Technical Manual

Manual Number: 2011 No. W1-01

Variable Frequency Wall Mounted Type

Room Air Conditioners

(Split system, heat pump type)

SRK25QA-S/SRC25QA-S

SRK35QA-S/SRC35QA-S

(R410A Refrigerant Used)



mitsubishi heavy industries, ltd.

Table of Contents

1. GENERAL INFORMATION.....	1
1.1 Features.....	1
1.2 Model identification.....	1
2 MODEL SELECTION.....	2
2.1 Model function.....	2
2.2 Range of usage.....	4
2.3 Outline drawing.....	4
2.4 Cooling cycle system diagram.....	5
2.5 Performance curve.....	6
3 ELECTRICAL WIRING DIAGRAM.....	7
4 NAME OF EACH PART AND ITS FUNCTION.....	9
4.1 NAME OF EACH PART.....	9
4.2 Emergency “ON/OFF” button (back-up switch)	12
4.3 Automatic restart.....	12
4.4 Flap control.....	12
4.5 Comfort timer setting.....	14
4.6 Outline of heating operation.....	15
4.7 Outline of cooling operation	17
4.8 Outline of drying operation	18
4.9 Outline of automatic operation	20
4.10 Economical operation.....	20
4.11 Air blowing operation.....	20
4.12 CLEAN operation control.....	21
4.13 EEV control.....	21
5 INSTALLATION.....	22
5.1 Selection of installation location.....	24
5.2 Installation of indoor unit.....	25
5.3 Installation of outdoor unit.....	28

5.4 Pipe connection.....	28
5.5 Precautions for wireless remote controller operation.....	30
5.6 Standard running data.....	31
6 MAINTENANCE.....	32
6.1 Electrical parts failure diagnosis method.....	32
6.2 Servicing.....	56
7 SERVICING MANUAL.....	57
8 MOUNT ASSEMBLY.....	72
8.1 Indoor unit.....	72
8.2 Outdoor unit.....	80

1 GENERAL INFORMATION

1.1 Features

(1) Inverter

- Heating/cooling

The rotate speed of the compressor is changed steplessly in relation to varying load, and is linked with the fans of indoor and outdoor units controlled by the changes of frequency, thus controls the power.

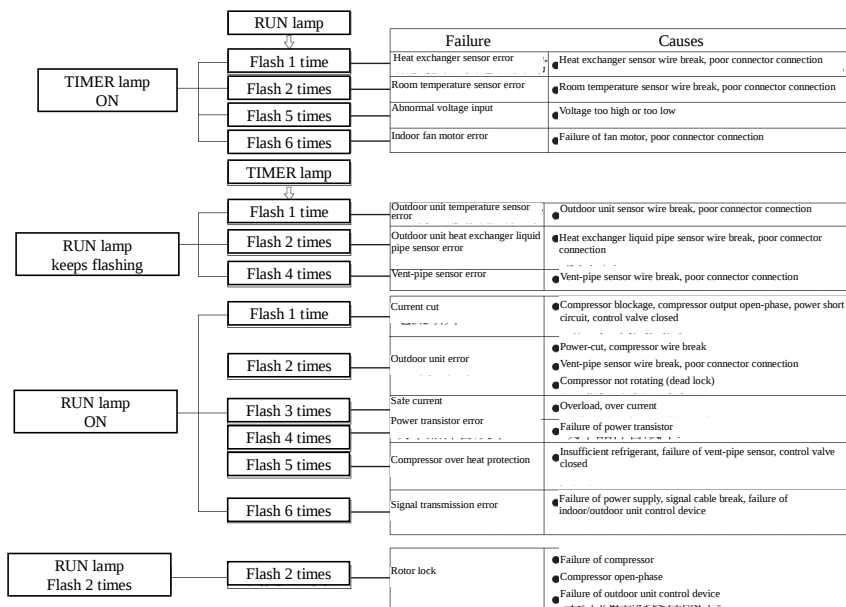
- Allowing quick heating/cooling operation during start-up period.

The room temperature is kept constant through fine-tuned control after the machine is stabilized.

(2) Fuzzy control: According to the fuzzy control technology, the room temperature and humidity, etc. are obtained through dynamic analysis to accurately regulate the rotate speeds of the compressor and the fan to realize precise temperature control.

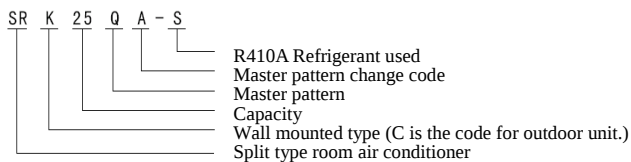
(3) Life: Actual service life: over 20,000 hours; Working life: over 100,000 hours; On/off of relay: over 100,000 times; Continuous on of LED: over 50,000 hours; On/off of emergency switch: over 10,000 times.

(4) Self diagnosis function: We will continuously provide the best services for our customers through devices judging abnormal operation, as follows:



The air conditioner indicates the error of the indoor and outdoor sensors (thermistors) only when it is in the stop mode. Error indication is removed after restart.

1.2 Model identification



2 MODEL SELECTION

2.1 Model function

2.1.1 Model: SRK25QA-S (Indoor unit)

SRC25QA-S (Outdoor unit)

Item	Unit	Indoor unit SRK25QA-S	Outdoor unit SRC25QA-S
Net weight	kg	9	31
Machine dimension	mm	790×222×268	780×290×540
Package dimension	Length× Width ×Height	830×340×280	920×380×590
Color		White	Ash-colored
Fan		Through-flow type, AS resin + glass fiber	Axial flow type, AS resin + glass fiber
Air flow	m ³ /h	550	1830
Noise in cool room	dB(A)	Hi/Me/Lo: 37/30/23(completely mute, SPL)	45(completely mute, SPL)
Noise in warm room	dB(A)	Hi/Me/Lo: 37/32/28(completely mute, SPL)	48(completely mute, SPL)
Fan motor	Nominal value	16W, 4-step capacitor type asynchronous motor, insulation grade E	25W, AC motor, insulation grade B
Power of motor	W (reference value)	40	50
Power of electric control	W (reference value)	2	7.5
Power supply and power cord		Single-phase, 220V, 50Hz and 3-core, 1.0mm ² , 250V, 10A, 2m, w/o plug	
Heat exchanger		Spiral, hydrophilic, 3-folded, 16-section, 2-row, 452-fin, 1-2 circuit	Spiral, hydrophilic, 20-section, 1-row, 621-fin, 2-1 circuit
Compressor	Nominal value	THACOM RM - B5077MDE2, 527W, DC frequency conversion compressor, insulation grade E	
Refrigerating machine oil	ml	300, DIAMOND FREEZE MA68	
Refrigerant controller		Electronic expansion valve (Φ1.65mm) + hush pipe	
Refrigerant	g	R-410A, 850g, addition/reduction not needed within the use range of 15m	
Operating pressure limit	Mpa	Max.: 4.1, Min.: 1.47	
Air filter		Mould-proof air filter	
Accessories and quantity		Indoor unit 1, mounting plate 1, tapping screw 5, battery 2, use and installation manual 1, remote controller 1, outdoor unit 1, Drain elbow 1, Water shutoff plug 1	
Operation control devices		Wireless remote controller, electronic thermostat controlling room temperature, microcomputer controlling defrosting	
Safety devices		Serial signal protection, fan error protection, compressor over heat protection, high voltage protection, over current protection, etc.	

* The nominal values of “Noise in cool room” and “Noise in warm room” in the above table are tested in a dead room.

Item	Unit	Rating cooling	Rating heating
Capacity	W	2500	3200
Power	W	700	870
Energy efficiency ratio		3.57	3.68
Energy efficiency grade		Grade A (European norm)	

Note (1) The data are measured at the following conditions. The pipe length is 5m.

Operation	Item	Indoor air temperature		Outdoor air temperature		Standards
		DB	WB	DB	WB	
Cooling		27°C	19°C	35°C	24°C	
Heating		20°C	—	7°C	6°C	
Low temperature Heating		20°C	—	2°C	1°C	

(2) The operation data are applied to the 220V districts respectively.

(3) The refrigerant quantity to be charged includes the refrigerant in 15m connecting piping. (Purging is not required even for the short piping.)

2.1.2 Model: SRK35QA-S (Indoor unit)
SRC35QA-S (Outdoor unit)

Item	Unit	Indoor unit SRK35QA-S	Outdoor unit SRC35QA-S
Net weight	kg	9.5	35
Machine dimension	mm	790×222×268	780×290×540
Package dimension	Length× Width×Height	830×340×280	920×380×590
Color		White	Ash-colored
Fan		Through-flow type, AS resin + glass fiber	Axial flow type, AS resin + glass fiber (embedded damping spindle sleeve)
Air flow	m ³ /h	520	1940
Noise in cool room	dB(A)	Hi/Me/Lo: 40/33/25	47
Noise in warm room	dB(A)	Hi/Me/Lo: 39/35/27	48
Fan motor	Nominal value	16W, 4-step capacitor type asynchronous motor, insulation grade E	24W, DC motor, insulation grade E
Power of motor	W (reference value)	40	20
Power of electric control	W (reference value)	2	7.5
Power supply and power cord		Single-phase, 220V, 50Hz and 3-core, 1.0mm ² , 250V, 10A, 2m, w/o plug	
Heat exchanger		Spiral, hydrophilic, 3-folded, 16-section, 2-row, 452-fin, 1-4 circuit Child heat exchanger: Spiral, hydrophilic, 1-row, 4-section, 408-fin	Spiral, hydrophilic, 20-section, 2-row, 1221-fin, 2-1 circuit Pf1.4
Compressor	Nominal value	THACOM RM - B5077MDE2, 527W, DC frequency conversion compressor, insulation grade E	
Refrigerating machine oil	ml	300, DIAMOND FREEZE MA68	
Refrigerant controller		Electronic expansion valve (Φ1.5mm) + hush pipe	
Refrigerant	g	R-410A, 900g, addition/reduction not needed within the use range of 15m	
Operating pressure limit	MPa	Max.: 4.15, Min.: 1.47	
Air filter		Mould-proof air filter	
Accessories and quantity		Indoor unit 1, mounting plate 1, tapping screw 5, battery 2, use and installation manual 1, remote controller 1, outdoor unit 1, Drain elbow 1, Water shutoff plug 1	
Operation control devices		Wireless remote controller, electronic thermostat controlling room temperature, microcomputer controlling defrosting	
Safety devices		Serial signal protection, fan error protection, compressor over heat protection, high voltage protection, over current protection, etc.	

* The nominal values of “Noise in cool room” and “Noise in warm room” in the above table are tested in a dead room.

Item	Unit	Rating cooling	Rating heating
Capacity	W	3500	4000
Power	W	1020	1100
Energy efficiency ratio		3.43	3.64
Energy efficiency grade	Grade A (European norm)		

Note (1) The data are measured at the following conditions. The pipe length is 5m.

Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	
Heating	20°C	—	7°C	6°C	
Low temperature Heating	20°C	—	2°C	1°C	

(2) The operation data are applied to the 220V districts respectively.

(3) The refrigerant quantity to be charged includes the refrigerant in 15m connecting piping.

(Purging is not required even for the short piping.)

2.2 Range of usage

Please use the air conditioners within the following range of usage, otherwise the protector will be triggered.

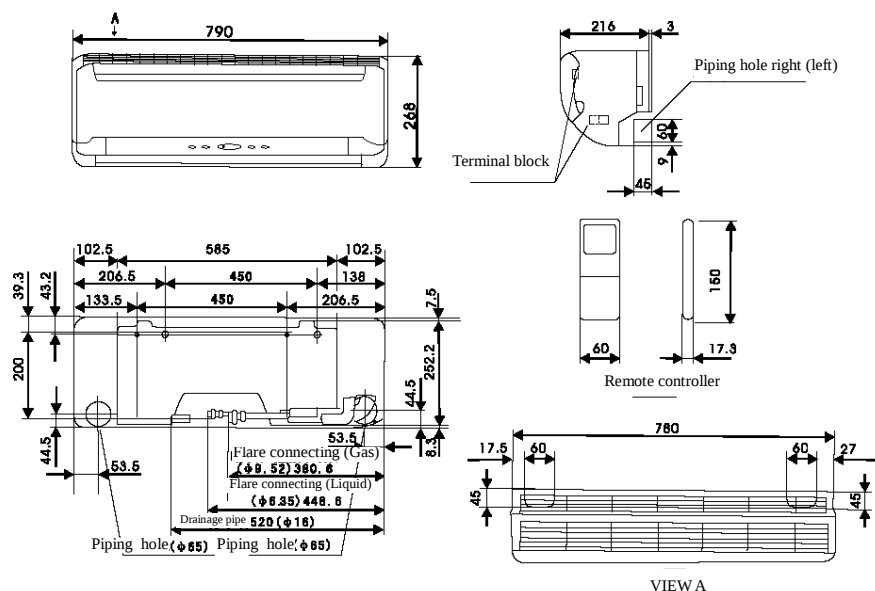
	Cooling Operation	Heating Operation
Outdoor temperature	About 18°C~43°C	About -15~24°C
Room temperature	About 18°C~32°C	About below 30°C
Indoor humidity	About below 80%	

	25~35 Models
Max. piping one-way length	Within 15 m
Vertical height difference	Within 5 m
Additional R410A Refrigerant	Not required
Voltage	Rating $\pm 10\%$
Starting voltage	At least 85% of rating
Switching frequency	Max. 10 times per hour
Time interval between stop and start	Min. 3 min

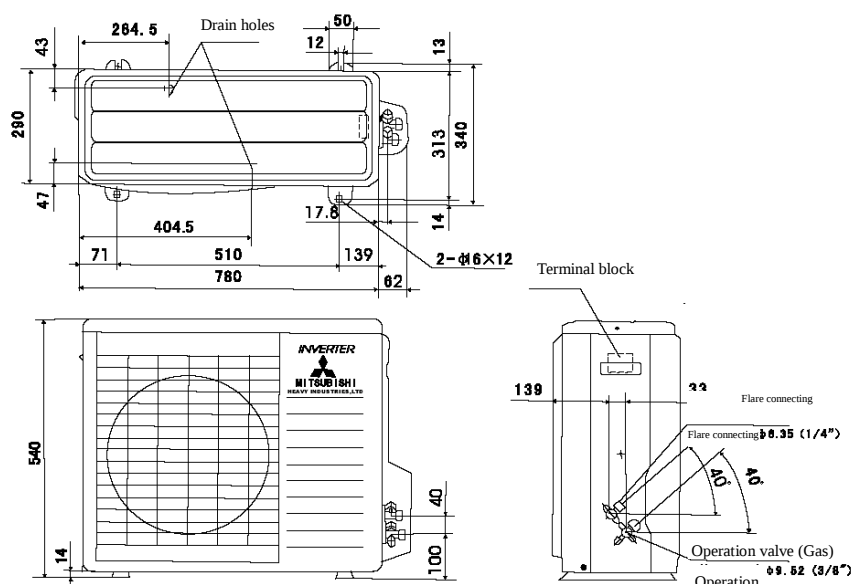
2.3 Outline drawing

(1) Indoor unit: SRK25QA-S/ SRK35QA-S

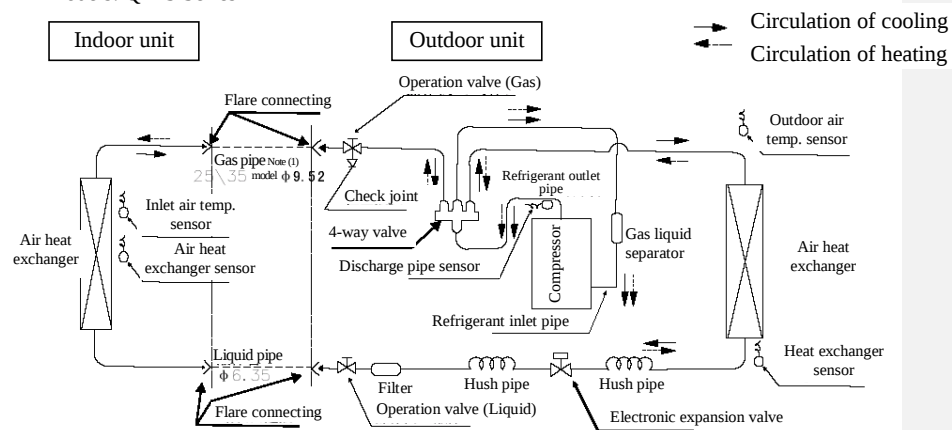
Unit: mm



Unit: mm



Models: QA-S Series



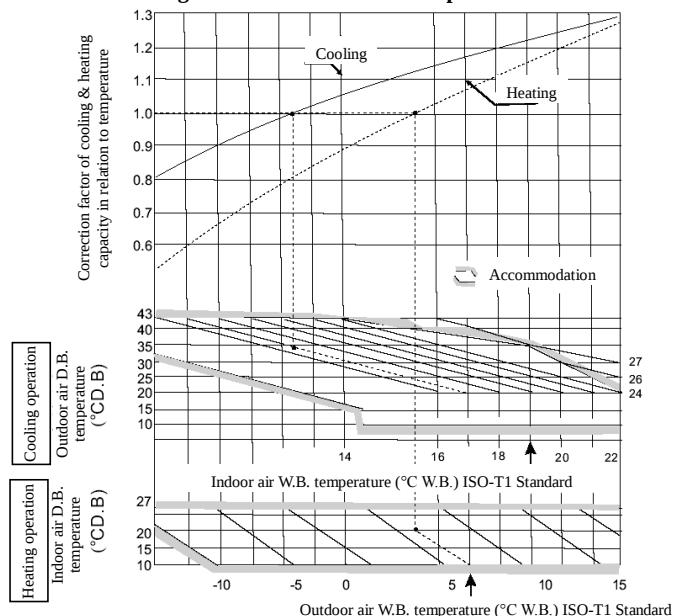
Note (1).....line is piping for site construction.

2.5 Performance curve

The cooling and heating capacities are measured in the following conditions. The actual capacity can be obtained with the following formula.

$$\text{Actual capacity} = \text{Rating capacity} \times \text{Correction factor}$$

(1) Capacity correction according to indoor and outdoor temperatures:



(2) Capacity correction according to one way length of refrigerant piping:

It is necessary to correct the cooling and heating capacity according to the one way length of refrigerant piping.

Piping length (m)	7	10	15
Cooling	1.0	0.99	0.975
Heating	1.0	1.0	1.0

(3) Capacity correction according to frosting on outdoor heat exchanger during heating:

In additions to the foregoing corrections (1) and (2), the heating capacity also needs to be corrected according to the frosting on the outdoor heat exchanger.

Air inlet temperature of outdoor unit	-10	-9	-7	-5	-3	-1	1	3	5
Frosting correction factor	0.95	0.94	0.93	0.91	0.88	0.86	0.87	0.92	1.00

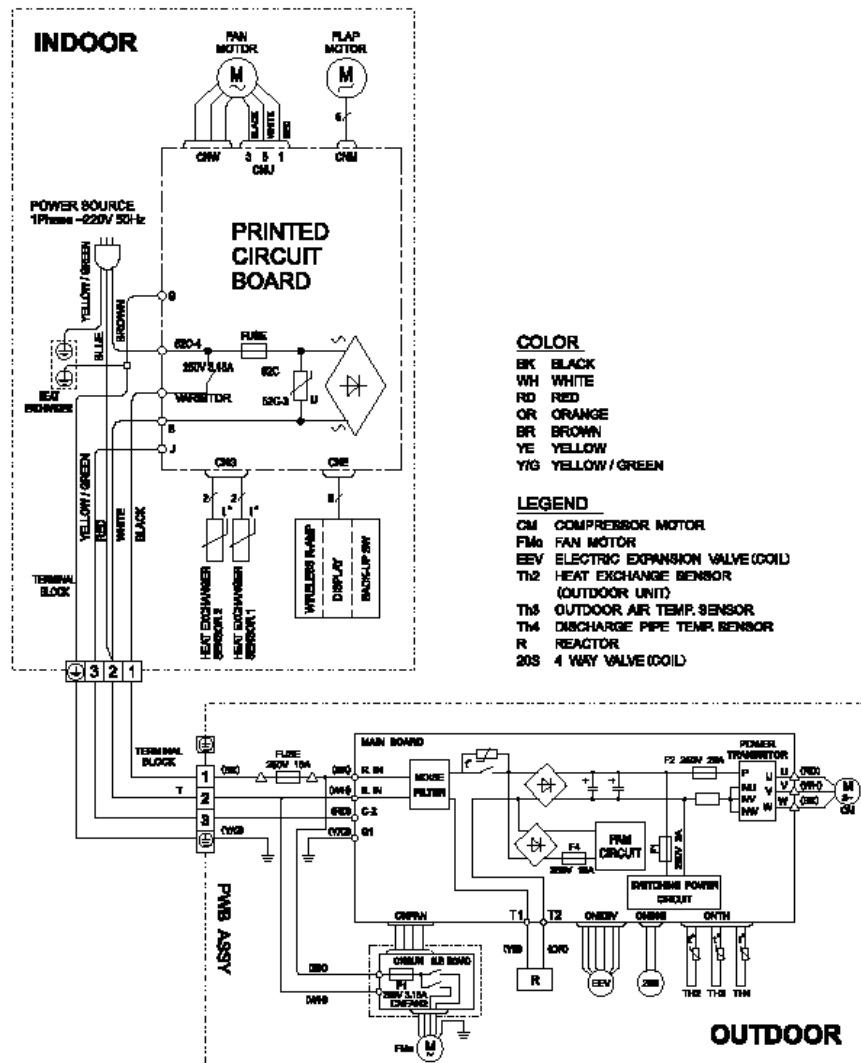
(4) Example of cooling and heating capacity calculation:

The actual cooling capacity of model SRK25QA-S with the one way piping length of 25m at the indoor wet-bulb temperature of 19°C and outdoor dry-bulb temperature of 35°C in summer or indoor dry-bulb temperature of 20°C, outdoor dry-bulb temperature of 1°C and indoor wet-bulb temperature of -1°C in winter is

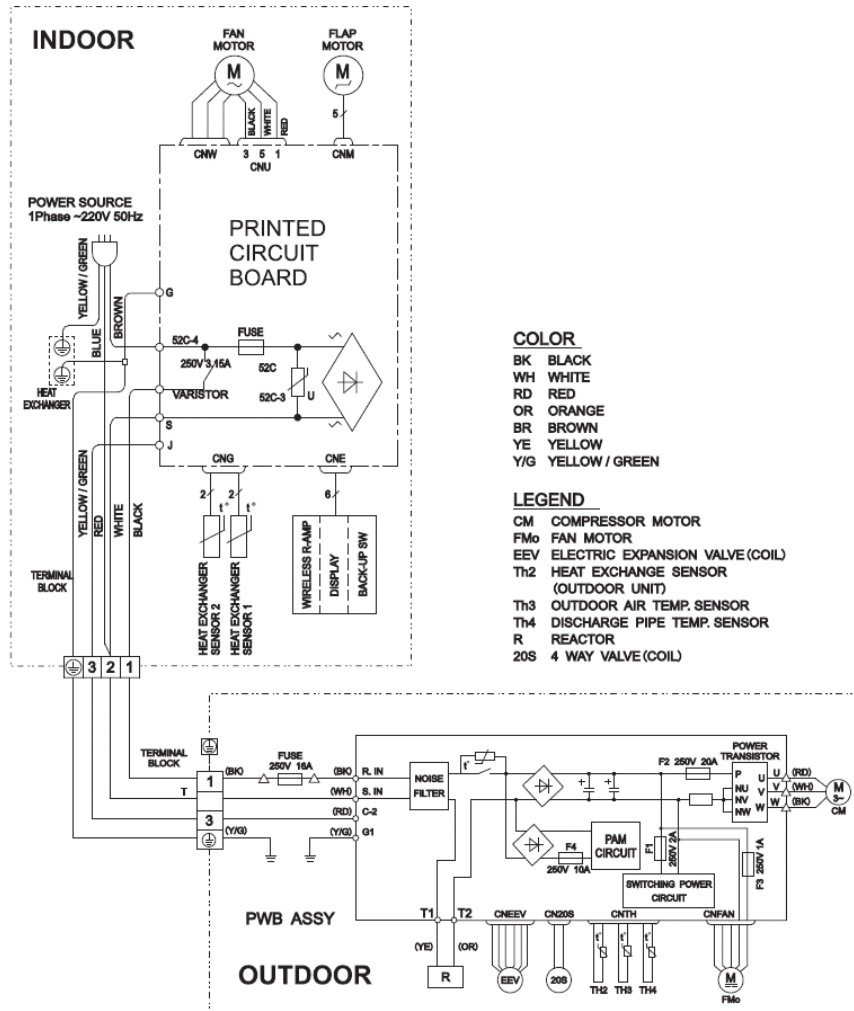
$$\begin{aligned}
 &\text{Actual cooling capacity} = 2500 \times \text{Temp. correction factor} (1.0) \times \text{Piping length correction factor} (0.95) \approx 2375\text{W} \\
 &\text{Actual heating capacity} = 3200 \times \text{Temp. correction factor} (0.81) \times \text{Piping length correction factor} (0.95) \times \text{Frosting correction factor} (0.86) \approx 2118\text{W}
 \end{aligned}$$

3 ELECTRICAL WIRING DIAGRAM

3.1 Circuit diagram: 25QA-S

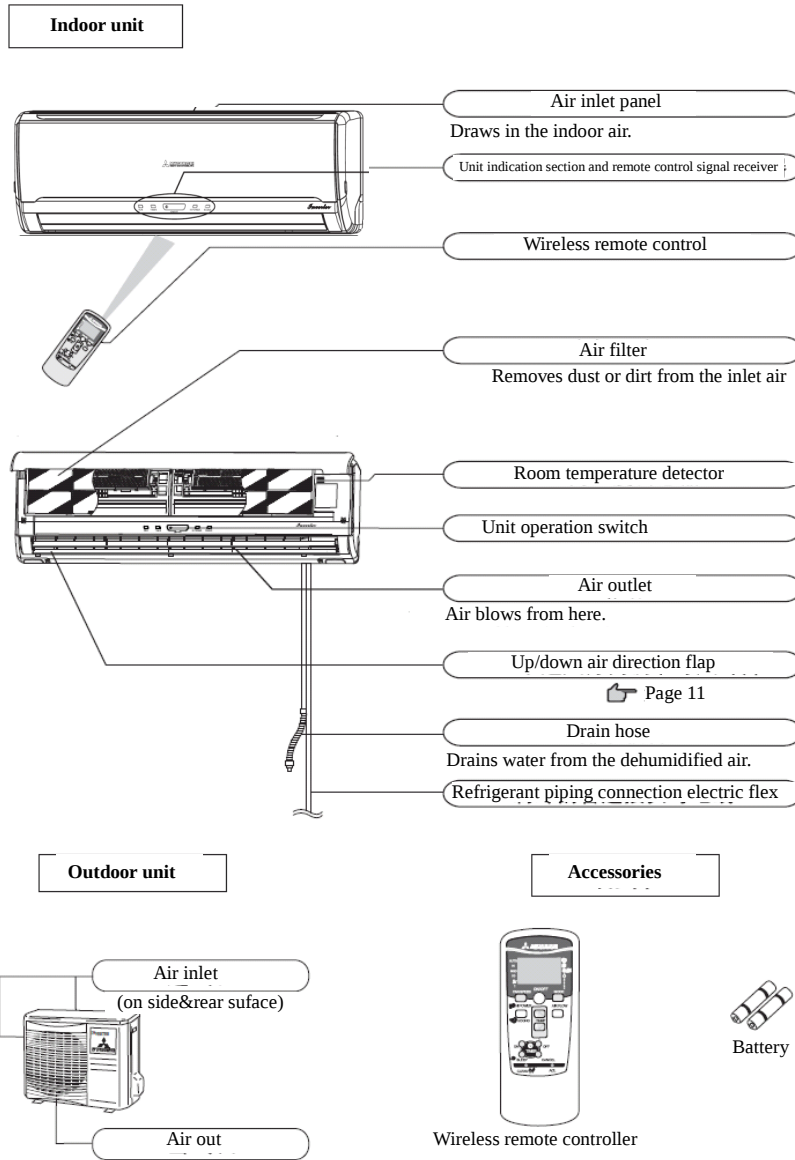


3.2 Circuit diagram: 35QA-S

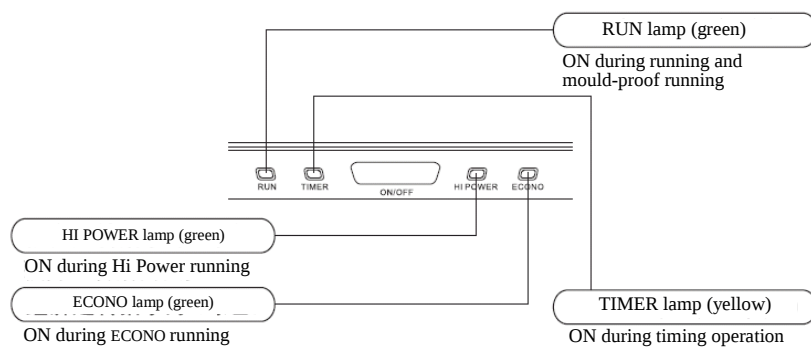


4 NAME OF EACH PART AND ITS FUNCTION

4.1 Name of each part



Indication section of air conditioner



Opening the air inlet grille

Put your hands on the indentations on both sides, raise the grille towards yourself, and stop at the opening position of about 60°.



Closing the air inlet grille

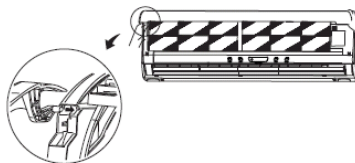
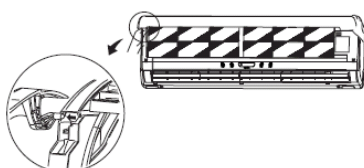
Gently push both sides and then gently push the central portion.



Removing and mounting the air inlet grille

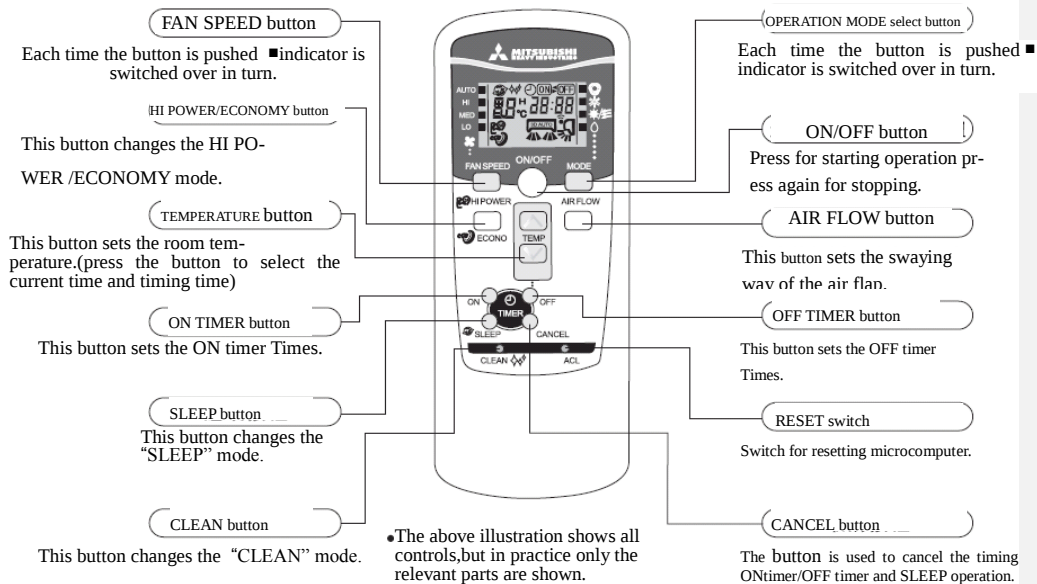
To remove the air inlet grille to clean the inside, open it at the position of about 65° and pull it towards yourself to remove the grille.

To mount the air inlet grille, insert the mounting arm in the pin roll on the main frame and close the grille.

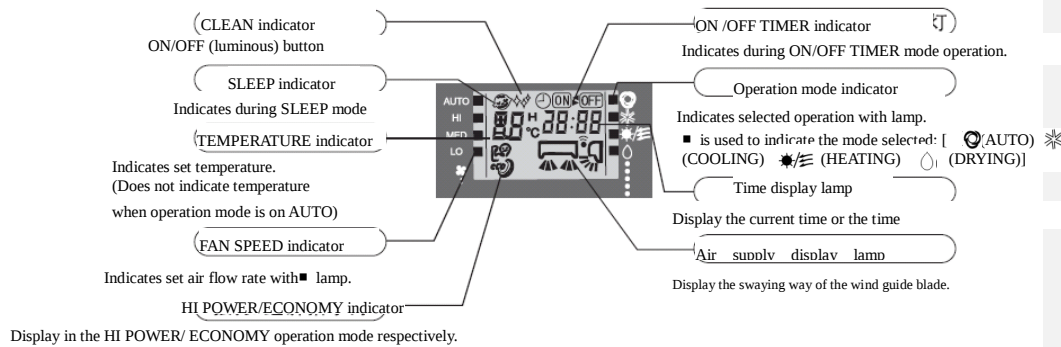


Operation and indication section for remote control

Operation section



Indication section



4.2 Emergency “ON/OFF” button (back-up switch)

When the battery of the remote controller runs out or the remote controller is lost or malfunctioning, this switch can be used to turn the unit on and off.

(1) Operation method

Press the switch once to place the unit in the AUTO mode. Push it once more to turn the unit off.

(2) Detail of operation

The system operates in the COOL, DRY or HEAT mode according to the room temperature (temperature at the temperature detection point).

Note: To repair or move the machine, push and hold the switch for more than 5 seconds to set to the cooling mode automatically.

Function Operating mode	Set temperature	Fan speed	Flap	Timer conversion
COOL	About 24°C	Automatic	Automatic	Continuous
DRY	About 24°C			
HEAT	About 26°C			



Emergency “ON/OFF” button on the equipment

4.3 Automatic restart due to power cut:

- (1) This function can rapidly record the operation state immediately before the air conditioner is switched off due to power failure, and will resume operation automatically after the power supply is restored.
- (2) This function is set to Active by default.
- (3) Operation state memorized immediately before power cut includes:
 - Indoor operation switching (cool room · warm room · drying · automatic · air flow, stop)
 - Air flow
 - Power Save
 - Set temperature
 - Air direction
- (4) After automatic restart due to power cut, the following settings will be canceled:
Timing operation, HI POWER operation, CLEAN operation
- (5) Priority of start:
Compressor 3 min. delayed start control > Automatic restart due to power cut

4.4 Flap control

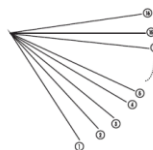
(1) Swing of vertical flap (SM1)

The vertical flap continuously swings upward and downward.

Set the angle and pulse count (0° for horizontal)

		①	②	③	④	⑤	⑥	⑦	⑧
SM1	Angle	75°	70°	65°	60°	55°	50°	45°	40°
	Pulse count	0	57	114	171	228	284	341	398

		⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
SM1	Angle	32°	30°	25°	20°	15°	10°	5°	-24°
	Pulse count	489	512	569	626	683	739	796	1274



Note: Max control range: 1274 pulse.

(2) Non-operating period

When the machine stops, the vertical flap fully closes.

(3) Flap memorizing function (where the vertical or horizontal flap stops)

When you press the AIR FLOW (Up/Down or Left/Right) button, the flap will operate at the angle set. As this angle is memorized in the microcomputer, the flap will automatically operate at the same angle next time the machine is started.

- Recommended angle of flap



(4) Flap control

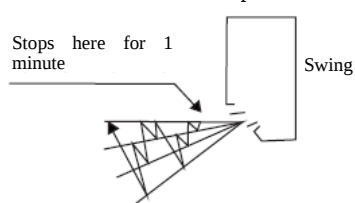
The flap is controlled with the FLAP button on the remote controller.

(a) Automatic direction

The flap is automatically set to the best air flow angle in an operating mode.

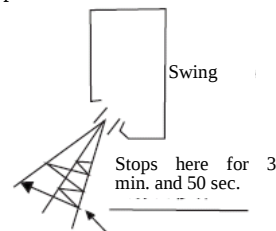
1) Start time of operation

► COOL and DRY operation ◀



The flap moves repeatedly as shown in the above figure.

► HEAT operation ◀



The flap moves repeatedly as shown in the above figure.

- In the HEAT mode, when the climator (thermostat) functions or the DRY operation is in progress, it becomes horizontal automatically.

2) Non-operating period

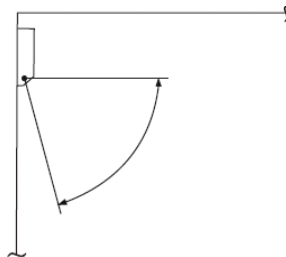
When the machine stops, the flap fully closes.

(b) Flap memorizing function

As this angle is memorized in the microcomputer, the flap will automatically operate at the angle next time the machine is started.

(c) Swing

As shown in the figure below, the flap swings upward/downward and to the left/right continuously.



4.5 Comfort timer setting

If, in the COOL or HEAT mode or Automatic COOL or HEAT mode, the timer is set to ON, the Comfort Timer functions.

The initial value is 15 minutes. The start time for next operation is determined according to the relationship between the room temperature (sensor) at the time of setting and the set temperature (max. 60 minutes).

Operating mode	Correction value at the start of operation (minute)		
COOL	$3 < \text{room temperature} - \text{set temperature}$	$1 < \text{room temperature} - \text{set temperature} \leq 3$	$\text{room temperature} - \text{set temperature} \leq 1$
	+5	No change	-5
HEAT	$3 < \text{room temperature} - \text{set temperature}$	$2 < \text{room temperature} - \text{set temperature} \leq 3$	$\text{room temperature} - \text{set temperature} \leq 2$
	+5	No change	-5

Notes: (1) The room temp. sensor (Th1) commences operation 5 minutes before the timer is ON, regardless of the temperature.

(2) In the DRY or Automatic DRY mode, the function does not work.

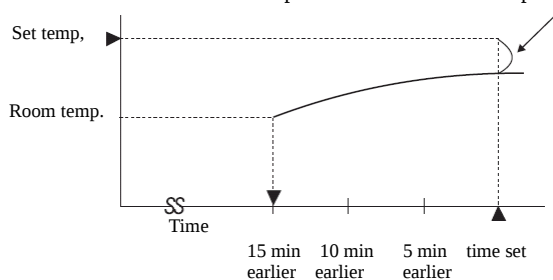
However, in the Automatic DRY mode, the operation described in (1) commences.

(3) During the comfort reservation operation, the RUN lamp and TIMER lamp light up.

After expiration of the timer, the TIMER lamp goes off.

(Example) HEAT

Detect the temperature difference to compensate the start time of next operation.



- If the difference between the set temperature and room temperature is 4°C, according to the above table, the correction value is +5 minutes, therefore, the start time of next operation is:

$$\underline{15 \text{ minutes earlier}} + \underline{5 \text{ minutes}} = 20 \text{ minutes earlier}$$

4.6 Outline of heating operation

(1) Operation of functional components

Functional component \ Item	Instruction frequency 0	Instruction frequency other than 0	Changed to a value other than 0 due to abnormal stop
Indoor fan motor	ON	ON	OFF
Swinging flap	ON or OFF	ON or OFF	Stop position control
Indication	Light up	Light up	Light up or flash
52C relay	ON	ON	OFF in Stop mode
Outdoor fan motor	Depending on Stop mode	ON	Depending on Stop mode
4-way valve	Depending on Stop mode	ON (Indoor continuous instructions-1)	Depending on Stop mode
EEV		Depending on EEV control	

(2) Air flow switching

(a) The inverter instruction frequency changes within the range of selected air flow.

Model		SRK25QA-S	SRK35QA-S
Air flow switching	AUTO	Frequency	30-110 rps
		Air flow	30-112 rps
HI	Frequency	30-110 rps	30-112 rps
	Air flow	Corresponding to frequency	
ME	Frequency	30-72 rps	30-78 rps
	Air flow	8th speed	
LO	Frequency	30-42 rps	30-50 rps
	Air flow	3rd speed	

(b) When the defrosting or protection device is actuated, operation is performed in the corresponding mode.

(c) Outdoor fan operates in accordance with the instruction frequency.

(3) Details of control in each operating mode

(a) Fuzzy operation

Deviation between the room temperature setting compensation value and the suction air temperature is calculated in accordance with the fuzzy rule, and used for control of the air flow and the inverter frequency.

(b) Heating constant temperature operation (HEAT operation)

• Operating conditions

If the frequency obtained with the fuzzy calculation drops below -24 rps during the heating fuzzy operation, the operation changes to the heating constant temperature operation.

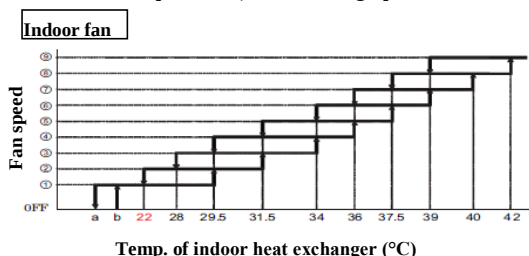
• Detail of operation

Model	SRK25QA-S, SRK35QA-S
Item	
Inverter instruction frequency	0 rps [Comp. stopped]
Indoor fan	Heat-retaining (normal operating mode)→1st speed (OFF)
Outdoor fan	According to the stop mode
Flap	According to the HEAT and DRY flap control

(c) Heat-retaining operation

During the heating operation, the indoor fan is controlled based on the temperature of the outdoor heat exchanger (measured by indoor heat exchanger sensor) to prevent cool wind from blowing.

• Normal operation (Usual heating operation, HI POWER operation)

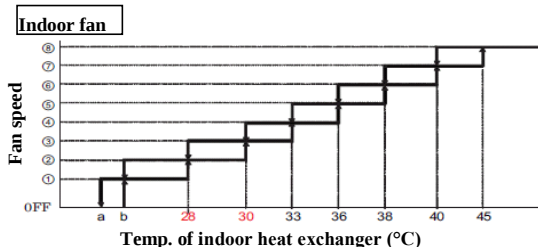


Note: (1) For the values of A and B, see the above table.

• Values of A, B

	A	B
At 0 rps instruction	22	25
Other than 0 rps instruction	10	15

- Heat-retaining M mode (automatic, economical operation (15 minutes))



Note: (1) For the values of A and B, see the above table.

• Values of A, B

	A	B
At 0 rps instruction	22	25
Other than 0 rps instruction	10	15

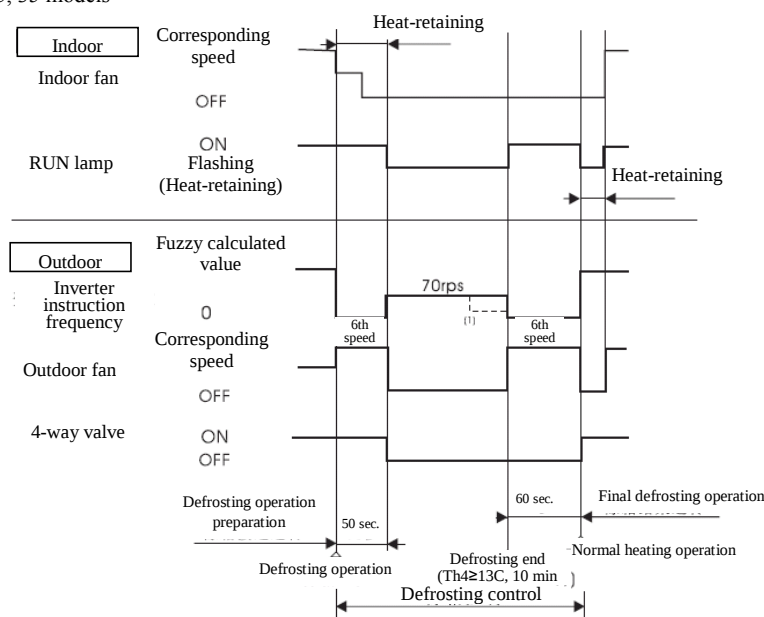
(d) Defrosting operation

1) Starting conditions (The defrosting operation is started only when all of the following conditions are met.)

- 35 minutes after start of heating operation (accumulated operation time).
 - 35 minutes after end of defrosting operation (accumulated compressor operation time).
 - The temperature measured by the outdoor heat exchanger liquid pipe sensor (Th4) has been below -5°C for 3 minutes continuously.
 - Temperature measured by outdoor air temp. sensor (Th5) - Temperature measured by outdoor heat exchanger liquid pipe sensor (Th4) $> 5^{\circ}\text{C}$.
 - During compressor operation. (However, the defrosting can't operate within 10 minutes after the compressor commences operation.)
- In addition, if the count exceeds 10 times when the inverter frequency of the indoor controller is 0 rps during heating operation, only ①, ② and ③ should be satisfied. (However, the temperature measured by Th4 is below -5°C when the frequency is above 62 rps and below -4°C when the frequency is below 62 rps.)

2) Operation of functional components during defrosting operation

- 25, 35 models



Note: When the temperature measured by the outdoor heat exchanger sensor (Th4) becomes 2°C or higher, the inverter instruction frequency changes from 70 rps to 50 rps.

3) Ending conditions (Operation returns to the heating operation when either of the following is met.)

- Temperature measured by outdoor heat exchanger sensor (Th4): 13°C or higher
- Continued operation time of defrosting: More than 10 min.

(e) HI POWER Heating operation (HI POWER button on remote controller: ON)

High rotate speed operation for 15 minutes.

• Detail of operation

Item	Model	SRK25QA-S	SRK35QA-S
Inverter instruction frequency		110	112
Indoor fan		Heat-retaining mode (max. 9th speed)	
Outdoor fan		Corresponding to instruction frequency	

Notes: (1) Room temperature can't be adjusted during the HI POWER operation.

(2) Priority is given to actuation of protective device even during the HI POWER operation.

4.7 Outline of cooling operation

(1) Operation of functional components

Item	Instruction frequency 0	Instruction frequency other than 0	Becomes 0 due to abnormal stop
Indoor fan motor	ON	ON	OFF
Swinging flap	ON or OFF	ON or OFF	Stop position control
Indication	Light up	Light up	Light up or flash
52C relay	ON	ON	OFF in Stop mode
Outdoor fan motor	Depending on Stop mode	ON	Depending on Stop mode
4-way valve		OFF (Indoor continuous instructions-0)	
EEV	Depending on Stop mode	Depending on EEV control	Depending on Stop mode

(2) Air flow switching

(a) The inverter instruction frequency changes within the range of selected air flow.

Air flow switching	Model	SRK25QA-S	SRK35QA-S
AUTO	Frequency	20~92 rps	20~106 rps
	Air flow	Corresponding to frequency	
HI	Frequency	20~92 rps	20~106 rps
	Air flow	6th speed	
ME	Frequency	20~55 rps	20~66 rps
	Air flow	4th speed	
LO	Frequency	20~34 rps	20~38 rps
	Air flow	2nd speed	

(b) When the protection device is actuated, operation is performed in the corresponding mode.

(c) Outdoor fan operates in accordance with the instruction frequency.

(3) Details of control in each operating mode

(a) Fuzzy operation

Deviation between the room temperature setting compensation value and the suction air temperature is calculated in accordance with the fuzzy rule, and used for control of the air flow and the inverter frequency.

(b) Cooling constant temperature operation

• Operating conditions

If the frequency obtained with the fuzzy calculation drops below -24 rps during the cooling fuzzy operation, the operation changes to the cooling constant temperature operation.

• Detail of operation

Item	Model	SRK25QA-S, SRK35QA-S
Inverter instruction frequency		0 rps [Comp. stopped]
Indoor fan		According to the Indoor Fan Operating Mode Table (corresponding to fan speed)
Outdoor fan		Stop

(c) HI POWER Cooling operation (HI POWER button on remote controller: ON)

Unrelated to set temperature. Continuous operation for 15 minutes.

• Detail of operation

Item	Model	SRK25QA-S	SRK35QA-S
Inverter instruction frequency		92	106
Indoor fan		7th speed	
Outdoor fan		Corresponding to instruction frequency	

Notes: (1) Room temperature can't be adjusted during the HI POWER operation.

(2) Priority is given to actuation of protective device even during the HI POWER operation.

4.8 Outline of drying operation

(1) After the fan commences operation (1st speed for indoor fan, 3rd speed for outdoor fan) within 20 seconds after the start of operation, the room temperature TION, the outdoor air temp. sensor TO and set temperature SP are checked to determine whether to use cooling & drying or heating & drying.

• $TION > SP-3$ or $TO \geq 19^{\circ}\text{C}$: cooling & drying

• $TION \leq SP-3$ or $TO < 19^{\circ}\text{C}$: heating & drying

Cooling & drying or heating & drying is selected again one hour after selection.

(2) Outline of control

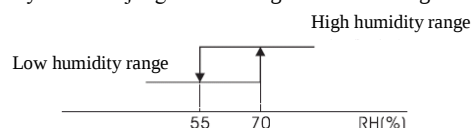
(a) Cooling & drying

• Room temperature TION, set temperature SP and value of humidity sensor are checked every 5 minutes after the cooling & drying is selected to determine the operation range of drying.

• Operation ranges are shown in the table below:

	Humidity range	$TION < SP-1$	$SP-1 \leq TION < SP$	$SP \leq TION < SP+2$	$SP+2 \leq TION$
Normal operation	Low humidity	Range I	Range C	Range B	Range A
	High humidity	Range I	Range F	Range E	Range D
Economical type		Range I	Range C	Range C	Range E

• The range of humidity sensor is judged according to the following:



• The operations of the components in the operation range of cooling & drying are as follows:

Operation range	A	B	C	D	E	F	I
Functional component							
Instruction frequency HZ	34	26	20	40	26	20	0
Rotate speed of indoor fan	4th speed	2nd speed	2nd speed	4th speed	2nd speed	2nd speed	1st speed ↔ OFF
Rotate speed of outdoor fan	Corresponding to instruction frequency						OFF
4-way valve	OFF (indoor continuous instructions - 0)						OFF F (indoor continuous instructions - 0)

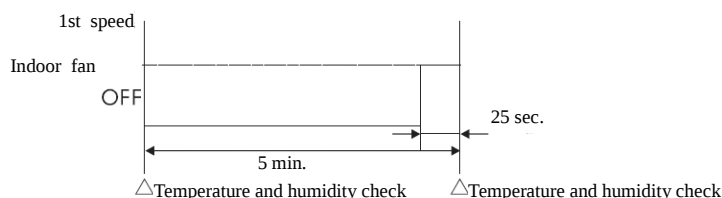
• When the set temperature change signal is received, the original range will be continued till finished; in the next 5 minutes, the room temperature TION, set temperature SP and value of humidity sensor are checked to determine the new operation range.

• When a range other than Range I is switched to Range I, the control is as follows:

(A) According to the Stop mode (B);

(B) Prevent Range I in jiggle operation from changing to Range C operation.

- Operation of Range I:



(b) Heating & drying

After heating & drying is determined, heating operation begins 3 minutes (3 min. timer) after the stop of the compressor. When the room temperature TION is higher than the set temperature SP by more than 2°C, the room temperature TION and set temperature SP are checked every 5 minutes to determine the operation range of heating & drying.

- Operation ranges are shown in the table below:

	$TION < SP - 1$	$SP - 1 \leq TION < SP$	$SP \leq TION$
Usual operation	Range O	Range L	Range M
Economical type	Range O	Range L	Range M

- The operations of the components in the operation range of cooling & drying are as follows:

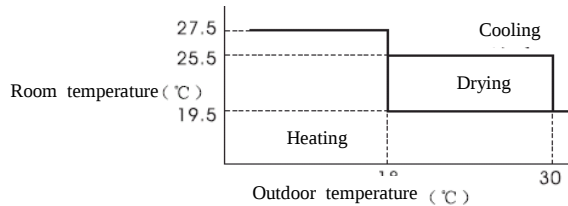
Operation range Functional component	Heating operation	M	L	O
Instruction frequency HZ	40	26	20	0
Indoor fan	5th speed	2nd speed	2nd speed	1st speed ↔ OFF
Outdoor fan	Corresponding to instruction frequency			OFF
4-way valve	OFF (indoor continuous instructions - 1)	OFF F (indoor continuous instructions - 0)		

- During the heating operation, the protection functions of defrosting operation and high pressure control are effective. (This is also the case for usual heating operation.)
- If, during the operation of this control range, the set temperature TP change signal is received and the heating operation of heating & drying is changed immediately, TION judgment will be conducted. For other operations, it operates in the range before temperature confirmation every 5 minutes and in the new range after judgment.
- When a range other than Range O is switched to Range O, the control is as follows:
 - (A) According to the Stop mode;
 - (B) Prevent Range O in jiggle operation from changing to Range L operation.
- Range O operation is the same as Range I operation of cooling & drying.
- No heat-retaining is conducted during heating operation.

4.9 Outline of automatic operation

(1) Determination of operating mode

After the indoor and outdoor fans operate at the 2nd speed and 3rd speed respectively for 20 seconds, the system checks the room temperature and outdoor air temperature to determine the operating mode and the room temperature setting compensation value, and then enters the automatic operation.



- (2) The unit checks the temperature every hour after the start of operation and, if the result of check is not the same as the previous operating mode, it will change the operating mode.
- (3) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or drying operation, the unit will operate in the original operating mode.
- (4) Set temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote controller and the set temperature.

		Signals of wireless remote controller (indication)												
		-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
Set temp.	Cooling	18	19	20	21	22	23	24	25	26	27	28	29	30
	Drying	18	19	20	21	22	23	24	25	26	27	28	29	30
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

4.10 Economical operation (ECONO button on remote controller: ON)

- (1) When the ECONO button is pressed, the power is controlled for gentle operation in the status which is not too cold or too hot. In this case, the temperature in the Cooling mode is higher than the set temperature by 1.5°C (increasing 0.5°C per hour), and the temperature in the Heating mode is lower than the set temperature by 2.5°C (decreasing 0.5°C per hour).

Model	SRK25QA-S		SRK35QA-S	
Item				
Operating mode	Cooling	Heating	Cooling	Heating
Inverter instruction frequency	20~46 rps	20~60 rps	20~62 rps	20~76 rps
Rotate speed of indoor fan	2nd, 4th speed	3rd, 5th speed	2nd, 4th speed	3rd, 5th speed
Rotate speed of outdoor fan	3rd speed			

4.11 Air blowing operation

- (1) When the fresh air signal from the remote controller is received, the fresh air operation begins.
- (2) The so-called “fresh air operation” refers to the air blowing operation in the whole machine with filter.

	Air flow switching					
	Automatic	Hi	Me	Lo	Economical	
Instruction frequency HZ	0					
Rotate speed of indoor fan	6th speed	5th speed	4th speed	3rd speed	2nd speed	
Rotate speed of outdoor fan	-					
4-way valve	Same as cooling					

- (3) In this control, the continuous transmission error protection function can be neglected.
- (4) In the fresh air operation, all timing functions are effective.

4.12 CLEAN operation control

About CLEAN operation:

In the cooling and drying mode, when the unit is turned off, the fan of the indoor unit will continue to run for 120 minutes to discharge the water from the unit for the purpose of mould-proof.

CLEAN setting

Example: Setting of CLEAN operation when the unit is turned off after cooling operation.

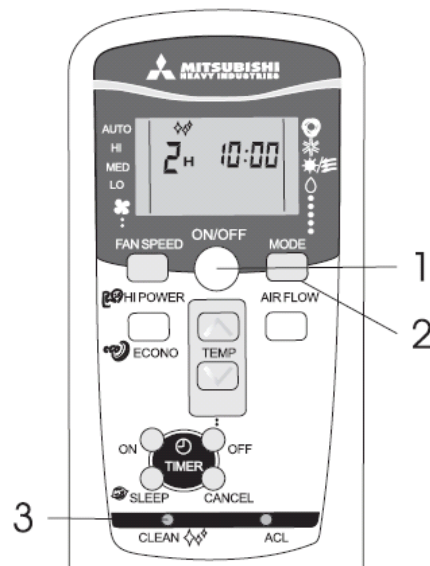
1: When the air conditioner is in the stop mode, press the ON/OFF button.

2: Press the MODE button to set the cooling mode.

3: Press the CLEAN button and CLEAN indication on the display will light up.

Cancellation of CLEAN operation

Press the CLEAN button and CLEAN indication on the display will disappear.



4.13 Electronic expansion valve (EEV) control function

(1) General control range: 0~470 pulse.

(2) The open loop control and area control are combined for EEV control.

5 Installation

Precautions for installation

- Use this system only for household and residence.
- This appliance must be installed according to the national wiring regulation.
- A 2-level switch must be used for the fixed wiring of the power supply and its disconnection clearance must be at least 3mm.
- If the outdoor unit may tip over or move and drop from the original installation location, use trip bolts or string to secure it in place.
- The liquid pipe and gas pipe in the piping should be insulated with thermal insulation.

SAFETY PRECAUTIONS

- Please read this "SAFETY PRECAUTIONS" carefully before the installation work in order to ensure correct installation.
- The precautions described below are divided into **⚠ WARNING** and **⚠ CAUTION**. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the **⚠ WARNING**, however the matters listed in **⚠ CAUTION** may sometimes lead to serious accidents. These are very important precautions for safety. Be sure to observe all of them without fail.
- For qualified installing personnel, take precautions in respect to themselves by using suitable protective clothing, gloves, etc., and then perform the installation works.
- Please pay attention not to fall down the tools, etc. when installing the unit at the high position.
- If unusual noise can be heard during operation, consult the local dealer.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Symbols which appear frequently in the text have the following meaning:

	Strictly prohibited		Observe instructions		Provide proper earthing
---	---------------------	---	----------------------	---	-------------------------

- Keep the installation manual together with owner's manual at a place where any user can read. Moreover if necessary, ask to hand them to a new user.

⚠ WARNING

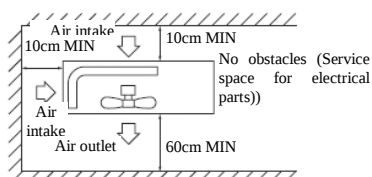
ⓘ • Installation must be carried out by the qualified installer and only the specified optional components should be used. If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction. • Install the system in full accordance with the instruction manual. Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire. • Be sure to use only for household and residence. If this appliance is installed in inferior environment such as machine shop etc., it can cause malfunction. • Use the original accessories and the specified components for installation. If parts other than those prescribed by us are used, it may cause drop of machine, water leaks, electric shocks, fire, refrigerant leakage, insufficient performance, poor control, and personal injury. • Install the unit in a location with good support and ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds. Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury. • Ventilate the working area well in the event of refrigerant leakage during installation. If the refrigerant comes into contact with naked flames, poisonous gas is produced. • When the equipment is to be installed in a small room, take preventive measures to avoid refrigerant leakage exceeding the density limit. Consult with the installation professionals about the preventive measures. If the density is greater than the limit of refrigerant, it may cause serious accidents such as refrigerant leakage, shortage of oxygen, etc. • Confirm there is no refrigerant leakage after the installation. If the refrigerant leaked comes into contact with the fire of an air blowing type heater, oven, etc., poisonous gas is produced. • Use the prescribed pipes, flare nuts and tools for R410A. Using conventional parts (for R22) can cause the unit failure and serious accidents due to burst of the refrigerant circuit. • Tighten the flare nut by torque wrench with specified method. If the flare nut were tightened with excess torque, this may cause burst and refrigerant leakage after a long period.	• Do not open the operation valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation. If the compressor is operated when operation valves are open before the connection of refrigerant piping work is completed, it can cause frostbite or injury due to rapid refrigerant leakage, and burst or personal injury due to anomalously high pressure in the refrigerant circuit into which air is sucked. • The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit. Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire. • Be sure to shut off the power before starting electrical work. Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment. • Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work. Unconformable cables can cause electric leak, anomalous heat production or fire. • This appliance must be connected to main power supply by means of a circuit breaker or switch (fuse:16A) with a contact separation of at least 3mm. • If the appliance has a plug, the plug must comply with IEC 60884-1. • Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal block. Loose connections or cable mountings can cause anomalous heat production or fire. • Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the case and service panel correctly. Incorrect installation may result in overheating and fire. • Be sure to mount the service panel. Incorrect mounting can cause electric shocks or fire due to intrusion of dust or water. • Be sure to switch off the power supply before installation, inspection or servicing. If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
--	---

⚠ WARNING	
❗	• To recover refrigerant, stop the compressor before closing the valve and disconnecting the refrigerant piping. If the refrigerant piping is disconnected before the compressor stops and when the service valve is opened, it can cause frostbite or injury due to rapid refrigerant leakage, and burst or personal injury due to anomalously high pressure in the refrigerant circuit into which air is sucked
⊘	• Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulphide gas can occur. Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. • Never connect the power cord to the central socket. Never use extended wires or share a socket with other electrical appliances. This may cause fire or electric shocks due to defective contact, poor insulation and over-current etc. • Do not discharge R410A to the atmosphere. R410A is a fluoride greenhouse gas and can cause global warming if it is discharged to the atmosphere. • Ensure that no air enters in the refrigerant circuit when the unit is installed and removed. If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury. • Do not bundle or wind the power cord. Or, do not deform the power plug by treading it. This may cause electric shocks, heating or fire. • Do not run the unit with removed panels or protections. Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks. • Do not perform any change of protective device itself or its setup condition. The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
⚡	• Carry out the electrical work for ground lead with care. Do not connect the ground lead to the gas line, liquid line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the ground lead to the gas line as gas leakage can cause explosion or fire.
⚠ CAUTION	
❗	• Use the circuit breaker with correct breaking capacity at all electrodes. If a wrong breaker is used, it can cause the unit malfunction and fire. • Earth leakage breaker must be installed. If the earth leakage breaker is not installed, it can cause fire or electric shocks. • Secure a space for installation, inspection and maintenance specified in the manual. Insufficient space can result in accident such as personal injury due to falling from the installation place. • After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured. • Take care when carrying the unit by hand. If the unit weighs more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins. • Dispose of any packing materials correctly. Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tearing it up. • Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them. Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables. • When the air conditioner is operating (cooling & drying operation) and the ventilator installed in the room is also running, there is the possibility that drain water may backflow as the room enters the negative pressure state. Therefore, set up the opening port to let air enter the room to provide appropriate ventilation (for example, open the door a little). In addition, just as above, set up the opening port if the room enters the negative pressure state due to the aerator for the high rise apartment etc. • Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.
⊘	• Do not install the unit in the locations listed below. • Locations where carbon fiber, metal powder or any powder is floating. • Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur. • Vehicles and ships. • Locations where cosmetic or special sprays are often used. • Locations with direct exposure to oil mist and steam such as kitchen and machine plant. • Locations where any machines which generate high frequency harmonics. • Locations with salty atmospheres such as coastlines. • Locations with heavy snow. • Locations where the unit is exposed to chimney smoke. • Locations at high altitude (more than 1000m high). • Locations with ammoniac atmospheres. • Locations where heat radiation from other heat source can affect the unit. • Locations without good air circulation. • Locations with any obstacles which can prevent inlet and outlet air of the unit. • Locations where short circuit of air can occur (in case of multiple units installation). • Locations where strong air blows against the vent of outdoor unit. It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.

⚠ CAUTION	
⊘ Do not install the outdoor unit in the locations listed below. - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood. - Locations where outlet air of the outdoor unit blows directly to animals or plants. The outlet air may cause adverse impact on plants, etc. - Locations where vibration and operation sound generated by the outdoor unit can affect seriously (on the wall or at the place near bed room). - Locations where vibration can be amplified and transmitted due to insufficient strength of structure. - Locations where an equipment affected by high harmonics is placed (TV set or radio receiver is placed within 5m). - Locations where drainage cannot run off safely. It can affect surrounding environment and cause a complaint. Do not install the unit where corrosive gas (such as sulfuric acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled. Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire. Do not use the base frame for outdoor unit which is corroded or damaged due to long periods of operation. Using an old and damaged base frame can cause the unit falling down and cause personal injury. Do not touch the suction or aluminum fin on the outdoor unit. This may cause injury.	Do not install the outdoor unit in a location where insects and small animals can inhabit. Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean. Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics. Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming. Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used. Connecting the circuit with copper wire or other metal thread can cause unit failure and fire. Do not touch any buttons with wet hands. It can cause electric shocks. Do not touch any refrigerant pipes with your hands when the system is in operation. During operation the refrigerant pipes become extremely hot or extremely cold depending on the operating condition, and it can cause burn injury or frost injury. Do not put anything on the outdoor unit and operating unit. This may cause damage of the object or injury due to the fall of the object.

5.1 Selection of installation location

- The appliance must be installed at a location with the air intake and vents being 10cm away from walls.
(In case the fence is 1.2m or above in height, or is overhead, the sufficient space between the unit and walls shall be secured.)
- When the unit is installed, the space of the following dimension shall be secured.

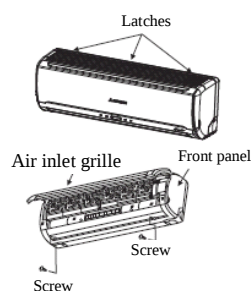


⚠ Caution

If the wall is 1.2m or above in height or there is a ceiling, the sizes should be greater than those indicated above.

How to remove and install the front panel

- | | |
|---|---|
| <p>○ Removal</p> <ol style="list-style-type: none"> Remove the air inlet grille. Remove the 2 screws securing the front panel. Remove the 3 latches on the upper part of the front panel and remove the front panel from the unit. | <p>○ Installation</p> <ol style="list-style-type: none"> Remove the air filter. Cover the unit with the front panel. Tighten the 2 screws to secure the front panel. Mount the air filter. Mount the air inlet grille. |
|---|---|



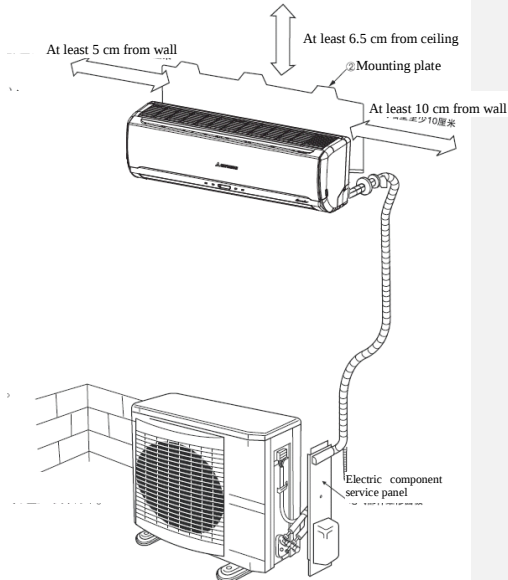
Selection of installation location

Indoor unit

- Where there are no obstructions and where cool air and warm air can blow in the room.
- Where the indoor unit or wall does not vibrate and where is strong.
- Where there is adequate space for servicing. (The space mentioned below is safe.)
- Where wire and pipe mounting is convenient.
- Where direct sunlight and strong light do not hit the unit.
- Where water from the unit can drain easily.
- Where there is at least 1 meter distance from the TV set or radio. (Otherwise, it may interfere with TV reception or produce noise.)

Outdoor unit

- Where rain, snow and sunlight do not directly hit the unit, and where there is enough air circulation.
- Where blasts of cold or hot air and noise do not bother the neighbors.
- Where there are installation and servicing conditions.
- A location where vibrations are not enhanced and where is strong.
- ✕ Please avoid the following locations.
 - A location near the room, etc. to prevent the operating noise from causing trouble.
 - Where there are possibilities of flammable gas leaks.
 - Where there is constant exposure to harsh winds.

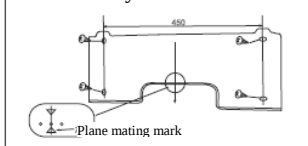


5.2 Installation of indoor unit

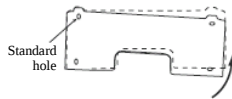
Mounting of mounting plate

Fixing the mounting plate

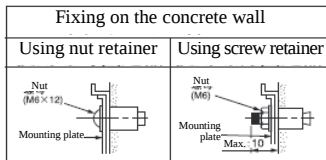
Firstly find the position of support or columella in the wall. Check that the mounting location is level and then fix the unit more securely.



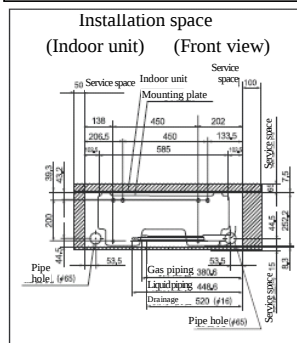
- In the loose state, use four screws to adjust the mounting plate horizontally.



- Turn the mounting plate with the standard hole as the center to make it level.



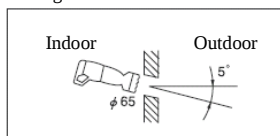
Setting the relationship between plate and indoor unit



Installation of indoor unit

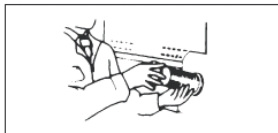
Drilling holes and securing sleeve (optional)

Drilling a hole with $\Phi 65$ whole core drill



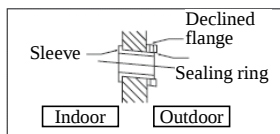
- Use the whole core drill to drill a hole.

Mounting the sleeve.

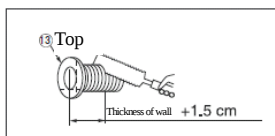


- Insert the sleeve.

Sketch of state after mounting

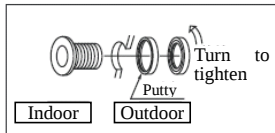


Adjusting the length of the sleeve



- If the rear pipe is pulled out, cut the lower part and right side of the axle collar

Sleeve Declined plate Sealing ring



Caution

Drill a hole at an angle of 5°

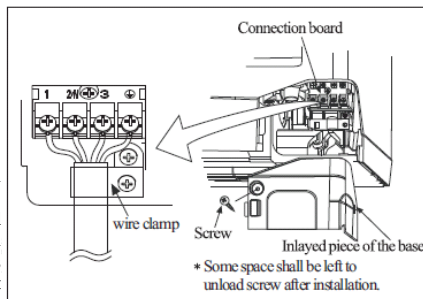
Preparation for installation of indoor unit

Preparation for mounting of electric wire

- ① Open the air inlet grille.
- ② Remove the cover.
- ③ Remove the wire clamp.
- ④ Connect the electric wire to the connection board securely.
 - 1) Connect the electric wire to the connection board securely. If the electric wire is not fixed completely, the contacting will be poor, thus causes risk, as the connection board may heat which causes fire.
 - 2) Please note that the number of terminals of the indoor and outdoor connections should not be confused.
 - 3) Use the wire clamp to connect the electric wire.
- ⑤ Connect the electric wire through the wire clamp.
- ⑥ Secure the cover.
- ⑦ Close the air inlet grille.

Caution

In case of failure of wiring connection, the indoor unit will stop running, the RUN lamp will light up, and the TIMER lamp will flash.

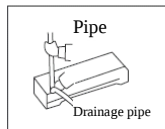


Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables required field cables.
H05RNR4G1.5 (Example) or 245 ICE57
H Harmonized cable type
05 300/500 volts
R Natural-and/or synth, rubber wire insulation
N polychlorene rubber conductors insulation
R stranded core
4or5 Number of conductors
G One conductor the cable is the earth conductor (yellow/green)
1.5 Section of copper wire (mm²)

Mounting pipe support

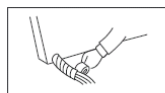
The pipe can be connected to the rear, left, left rear, bottom left, right or bottom right.

1. Removing the



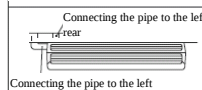
- Hold the root segment of the pipe, pull out the pipe, and shape the extended section.

Indoor unit

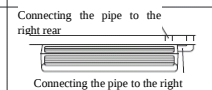


Mounting plate

Connecting the pipe to the left

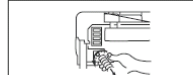


Connecting the pipe to the right



Insulation tape winding

2. Removing the drain cover



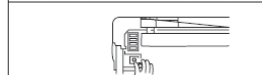
Securing the indoor unit



- Turn the drainage pipe to remove it.

- Remove it by hand or with pliers..

4. Connecting the drainage pipe



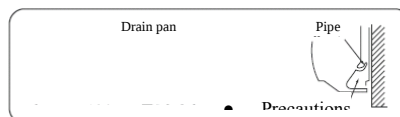
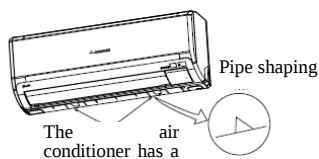
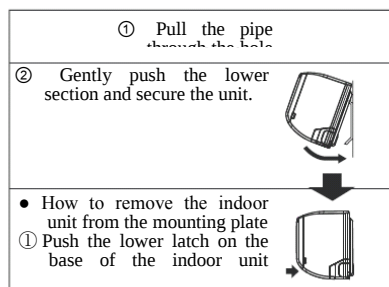
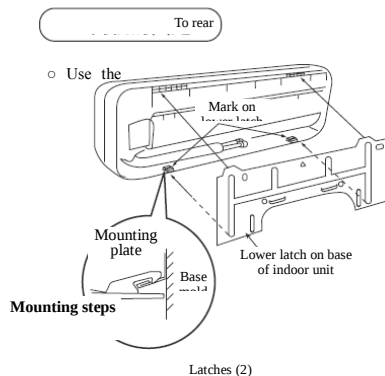
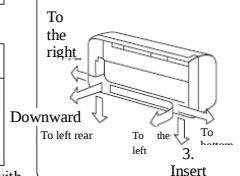
Wall

- Securely insert the drainage



- Wind the section extending to outdoor with exterior insulation tape.
- Be sure to wind the wiring and the piping together with exterior insulation tape.
- To apply the exterior insulation tape, be sure to begin from the lower part of the piping to avoid

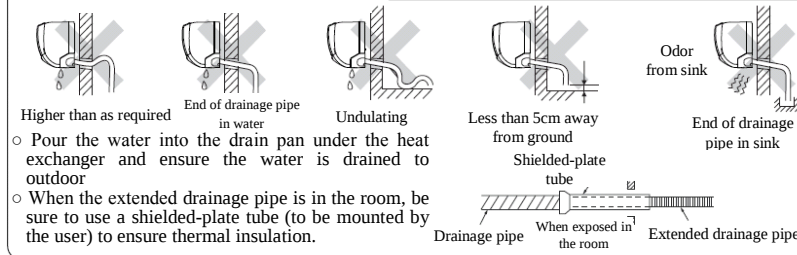
[Steps for drainage pipe displacement]



Drainage pipe

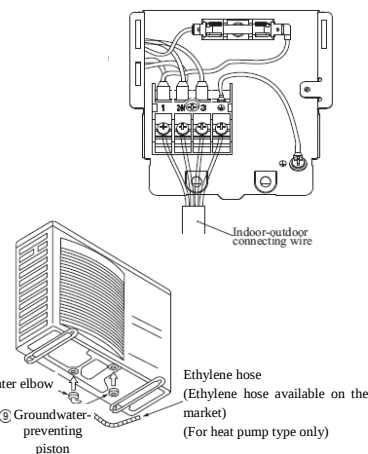
- Mount the drainage pipe at a downward angle.
- Avoid the following drainage pipe connections.

Caution After all mounting steps, check whether the drain is proper. Otherwise, water leakage may occur.



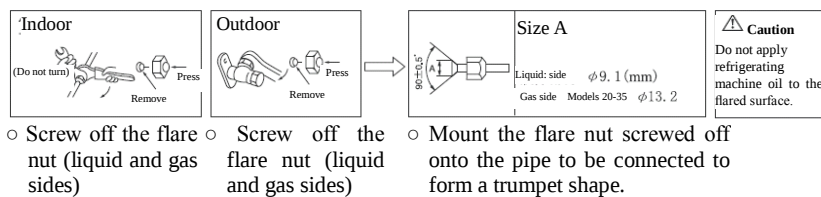
5. 3 Installation of outdoor unit

- Make sure that the unit is stable in installation.
Fix the unit to stable base.
- When installing the unit at higher place or where it could be toppled by strong winds, secure the unit firmly with foundation bolts, wire, etc.
- Perform wiring, making wire terminal numbers conform to terminal numbers of indoor unit terminal block.
- Connect using ground screw located near $\oplus$ mark.
- Never install the water elbow when the temperature is below 0°C for several days in a row.

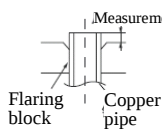


5. 4 Pipe connection

Preparation Before pipe connection, cover the pipes with tape, etc. to prevent dust, sand, etc. from entering.



● Flaring



Model	Copper pipe diameter	Measurement B (mm)		
		Clutch type flare tool for R410A	Conventional (R22) flare tool	
			Clutch type	Wing nut type
SRK25/35QA-S	φ 6.35	0.0~0.5	1.0~1.5	1.5~2.0
SRK25/35QA-S	φ 9.52	0.0~0.5	1.0~1.5	1.5~2.0

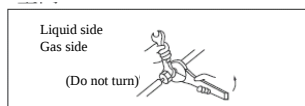
Use a flare tool designed for R410A or a conventional flare tool. Please note that measurement B (protrusion from the flaring block) will vary depending on the type of flare tool in use. If a conventional flare tool is used, please use a copper pipe gauge or a similar instrument to check protrusion so that you can keep measurement B to a correct value.

⚠ Caution

Do not apply excess torque to the flared nuts. Otherwise, the flared nuts may crack depending on the conditions and refrigerant leak may occur.

Connection

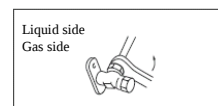
Indoor



- Connect the pipes on both liquid and gas sides.
- Tighten the nuts to the following torque.

Liquid side (φ 6.35) : 14. 0~18. 0N·m (1. 4~1. 8kgf·m)
Gas side (φ 9. 52) : 34. 0~42. 0N·m (3. 4~4. 2kgf·m)

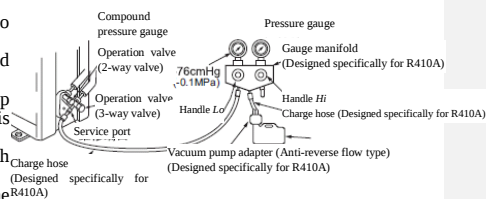
Outdoor



- Connect the pipes on both liquid and gas sides.
- All torques are the same as on the indoor liquid side.

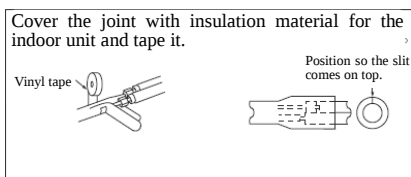
Air purging

- ① Secure all flare nuts on both indoor and outdoor sides to prevent leaks from the pipes.
- ② Connect the operation valves, charge hose, manifold valve and vacuum pump as shown in the right figure.
- ③ Fully open Handle Lo for the manifold valve, and pump a vacuum for over 15 minutes. Ensure that the meter is indicating -76cmHg (-0.1MPa).
- ④ After vacuuming, fully open the operation valve (both liquid and gas sides) with a hexagon wrench.
- ⑤ Ensure that there are no gas leaks from the joints in the indoor and outdoor units.

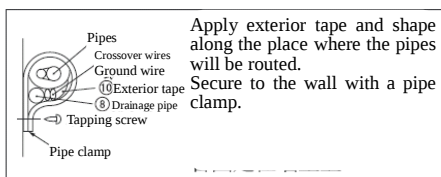


- Since the system uses service ports differing in diameter from those found on the conventional models, a charge hose (for R22) presently in use is not applicable. Please use one designed specifically for R410A.
- Please use an anti-reverse flow type vacuum pump adapter so as to prevent vacuum pump oil from running back into the system. Oil running back into an air-conditioning system may cause the refrigerant cycle to break down.

Heat insulation for joints



Finish and fixing



Earthing Work

- Earth work shall be carried out without fail in order to prevent electric shock and noise generation.
- The connection of the earth cable to the following substances causes dangerous failures, therefore it shall never be done. (City water pipe, Town gas pipe, TV antenna, lightning conductor, telephone line, etc.)

Moving or removing the appliance

- In order to meet the requirement of environmental protection, pump down (recovering refrigerant) is required.
- The effect of pump down is to return the refrigerant from the indoor unit to the outdoor unit when the pipes are removed from the main frame. (Pump down method)
- ① Connect the charge hose to the service port.
- ② Liquid side: Close the liquid valve with a hexagon wrench.
Gas side: Fully open the gas valve
Cooling operation (If the room temperature is too low, run the HI POWER cooling.)
- ③ When the pressure gauge indicates 0.01Mpa, stop cooling and close the gas valve.

Safe disposal of product after the useful life

- The safe, comfortable useful life of the product is 10 years.
- Some products may be used even after the normal useful life is expired.
- For the destruction or disposal of the product and waste after the useful life has expired, the impact on safety and environment must be considered.

Installation test check points

Check the following points after completion of the installation, and before turning on the power. Conduct a test run and ensure that the unit operates properly.
At the same time, explain to the customer how to use the unit and how to take care of the unit following the installation manual.

After installation

- ☐ The power supply voltage is correct as the rating.
- ☐ No gas leaks from the joints of the operation valve.
- ☐ Power cables and crossover wires are securely fixed to the terminal block.
- ☐ Operation valve is fully open.
- ☐ The pipe joints for indoor and outdoor pipes have been insulated.

When the air conditioner is restarted or when changing the operation, the unit will not start operating for approximately 3minutes. This is to protect the unit and it is not a malfunction.

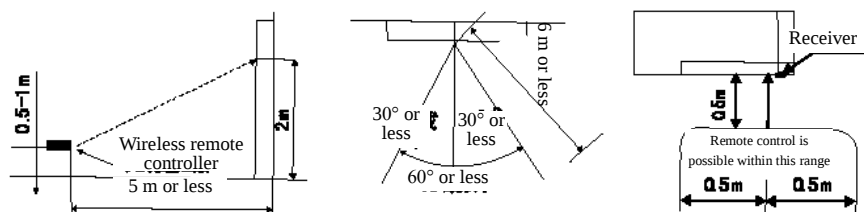
Test run

- ☐ Air conditioning and heating are normal.
- ☐ No abnormal noise.
- ☐ Water drains smoothly.
- ☐ Protective functions are not working.
- ☐ The remote control is normal.
- ☐ Operation of the unit has been explained to the customer.

(Three-minute restart preventive timer)

5.5 Precautions for wireless remote controller operation:

(1) Effective distance of wireless remote controller:



(2) Precautions:

- ① The remote controller should be correctly facing the receiver of the air conditioner for manipulation.
- ② The typical coverage is indicated in the left illustration. It may be increased or decreased depending on the installation.
- ③ The coverage may be decreased or even nil, if the receiver is exposed to strong light, such as direct sunlight, illumination, etc., or covered by dust or used behind a curtain, etc.

5.6 Standard running data:

		SRK25QA-S	SRK35QA-S
High pressure (MPa)	Cooling	-	-
	Heating	2.2-2.9	2.0-3.2
Low pressure (MPa)	Cooling	1.0-1.2	0.9-1.2
	Heating	-	-
Temp. difference between inlet and outlet air of indoor unit (°C)	Cooling	9-11	8-14
	Heating	9-16	10-21
Operating current (A)	Cooling	1.4-3.5	1.3-5.3
	Heating	1.7-4.6	1.6-6.5

Notes: ① The above data complies with the standard:

and is measured at the following ambient temperature:

indoor side: cooling.....27°CDB, 19°CWB; heating.....20°CDB

outdoor side: cooling.....35°CDB, 24°CWB; heating.....7°CDB, 6°CWB

- ② The length of the pipe between the indoor and outdoor units is 5 meters in the test. The length of the pipe supplied with the appliance may vary.

6. MAINTENANCE

6.1 Electrical parts failure diagnosis method

(1) Precautions:

- ① Be sure to switch off the power before disassembling and checking the air conditioner.

Maintenance of the indoor unit should commence 1 minute after the power is switched off.

With respect to maintenance of the outdoor unit, the major circuit (electrolytic capacitor), which may be charged, should be fully discharged before the maintenance.

- ② When removing the circuit board, do not vigorously press the circuit board or the bonded parts.
- ③ When unplugging the plug connector, do not drag the electric wire and be sure to hold the plug frame.

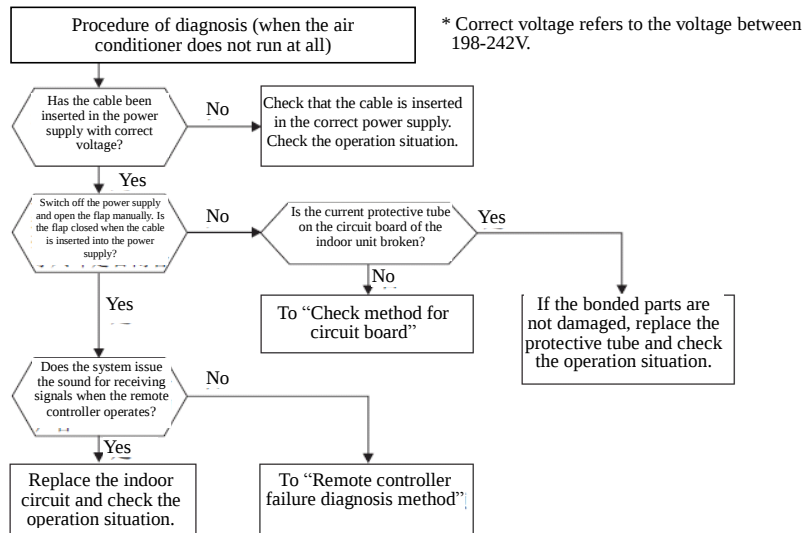
(2) Matters to be confirmed before diagnosis:

- ① Have you asked the user about the details of the failure?
- ② Does the air conditioner run? Does the self-diagnosis have any indication?
- ③ Is the voltage of the power socket correct?
- ④ Is the connection between the indoor and outdoor units wrong?
- ⑤ Is the outdoor refrigerant disconnecting valve opened?

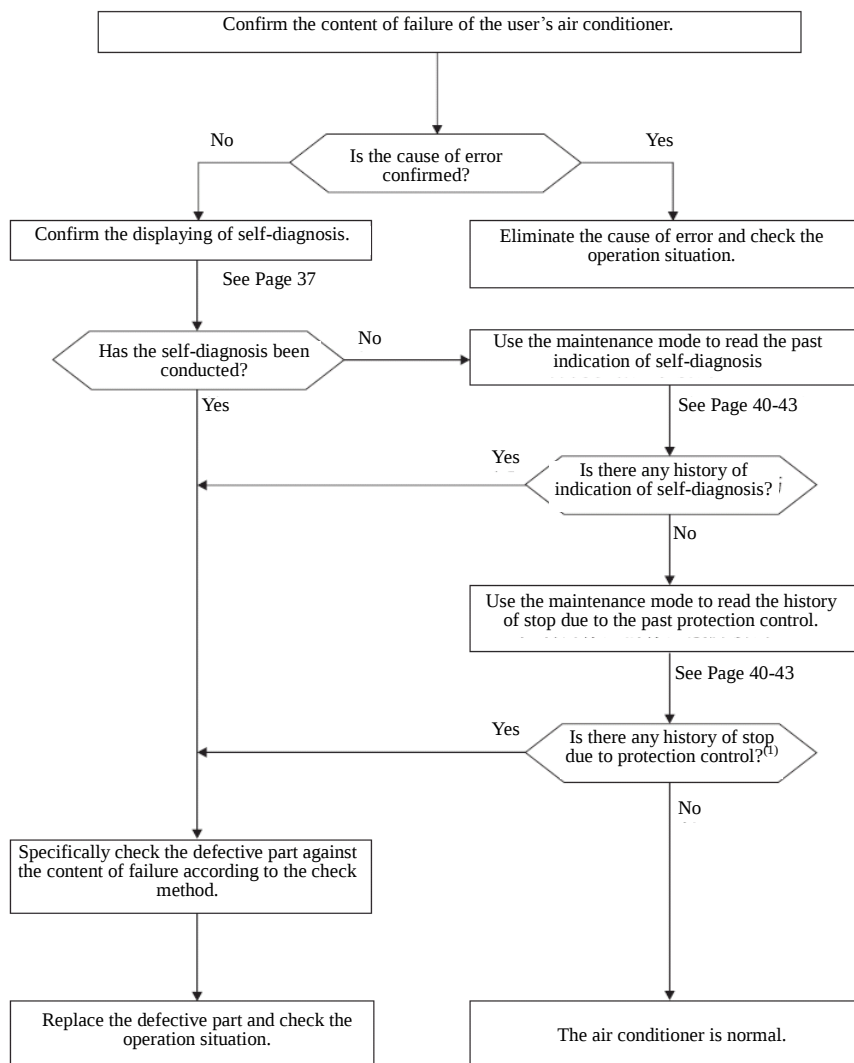
- (3) Procedure of diagnosis (when the air conditioner can't run at all). When the air conditioner runs but malfunctions, follow the procedure described in (4).

Important The air conditioner does not run at all when all of the following are met.

- ① The RUN lamp does not light up;
- ② The flap does not open;
- ③ The motor of the indoor fan does not rotate;
- ④ The self-diagnosis does not have indication.



(4) Procedure of failure diagnosis (when the air conditioner can run)



Note: (1) When only stop data is indicated, the air conditioner is normal. However, when the same protection is triggered repeatedly (more than 3 times), which becomes the user's complaint, it should be judged according to the content of failure.

(5) Indication of self-diagnosis

When the air conditioner stops abnormally, the cause is indicated with lamps. Three minutes after abnormal stop, use the remote controller to start the appliance. The error indication will disappear and the appliance will commence operation⁽²⁾.

Indoor indication		Content of failure	Main cause	Indication (flash, light up) conditions
RUN lamp	TIMER lamp			
Light up	Flash 6 times	Error of communication between indoor and outdoor units	Connection wire break, poor contacting, defective indoor and outdoor circuit boards, defective power supply	Indoor circuit board ←→ outdoor circuit board: signal over 10 sec. (with power), even over 1 min. and 50 sec. (operating), no signal (compressor stops)
Flash 1 time	Light up	Error of indoor heat exchanger sensor	Wire break of indoor heat exchanger sensor, poor plug contacting	The operation stops and the wire break of the heat exchanger sensor is detected (wire break is determined when it is detected within 15 sec. at a temperature of below-20°C) (No indication during operation)
Flash 2 times	Light up	Room temperature sensor error	Room temperature sensor wire break, poor joint contacting	The operation stops and the wire break of the heat exchanger sensor is detected (wire break is determined when it is detected within 15 sec. at a temperature of below-20°C) (No indication during operation)
Flash 5 times	Light up	Voltage error	Voltage is abnormal.	
Flash 6 times	Light up	Indoor fan motor error	Defective fan motor, poor plug contacting, defective indoor circuit board	When the air conditioner is operating and the indoor fan motor is ON, the rotational frequency of the indoor fan motor is 300 rpm for over 30sec. (The air conditioner stops.)
Light up	Flash 3 times	Over current (safe current)	Operating with overload, over current	
Light up	Flash 4 times	Power transistor failure	Failure of power transistor	
Light up	Flash 5 times	Compressor over heat	Insufficient refrigerant Defective vent-pipe sensor Disconnecting valve closed	When the value of vent-pipe sensor exceeds the setting (The air conditioner stops.)
Continuous flashing	Flash 2 times	Outdoor heat exchanger liquid pipe sensor error	Wire break of outdoor heat exchanger liquid pipe sensor Poor joint connection	The operation stops and the wire break of the outdoor heat exchanger sensor is detected (wire break is determined when it is detected within 15 sec. at a temperature of below-50°C) (No indication during operation)
Continuous flashing	Flash 1 time	Outdoor air temp. sensor error	Wire break of external temperature sensor, poor joint contacting	The operation stops and the wire break of the outdoor heat exchanger sensor is detected (wire break is determined when it is detected within 15 sec. at a temperature of below-40°C) (No indication during operation)
Continuous flashing	Flash 4 times	Vent-pipe sensor error	Wire break of vent-pipe sensor, poor joint contacting	After the rotational frequency of over 0 rps of outdoor unit lasts for 9 minutes; the temperature measured by the vent-pipe sensor of compressor is <7°C for more than 15 sec. (The air conditioner stops.)
Light up	Flash 1 time	Power cut	Lock of compressor, output missing phase of compressor, short circuit of wiring of compressor Defective outdoor circuit board Defective EEV Disconnecting valve closed	When the compressor is started and the output current of the inverter (current of compressor motor) exceeds the setting (The air conditioner stops.)
Light up	Flash 2 times	Outdoor unit error	Damage of mains transformer, wiring break of compressor, wire break of vent-pipe sensor, poor joint contacting, disconnecting valve closed, insufficient refrigerant, defective EEV	The outdoor unit stops due to abnormal cause or the input current is lower than the setting for 3 min. (The air conditioner stops.)
Flash 2 times	Flash 2 times	Rotor lock	Defective compressor, output missing phase of compressor, wiring break of compressor, defective circuit board of outdoor unit	The position of magnetic pole of the compressor motor can't be correctly detected when the compressor is started. (The air conditioner stops.)

Note: (1) It can't be started with the remote controller 3 minutes after abnormal stop. The abnormal stop disappears when the power of the air conditioner is switched off.

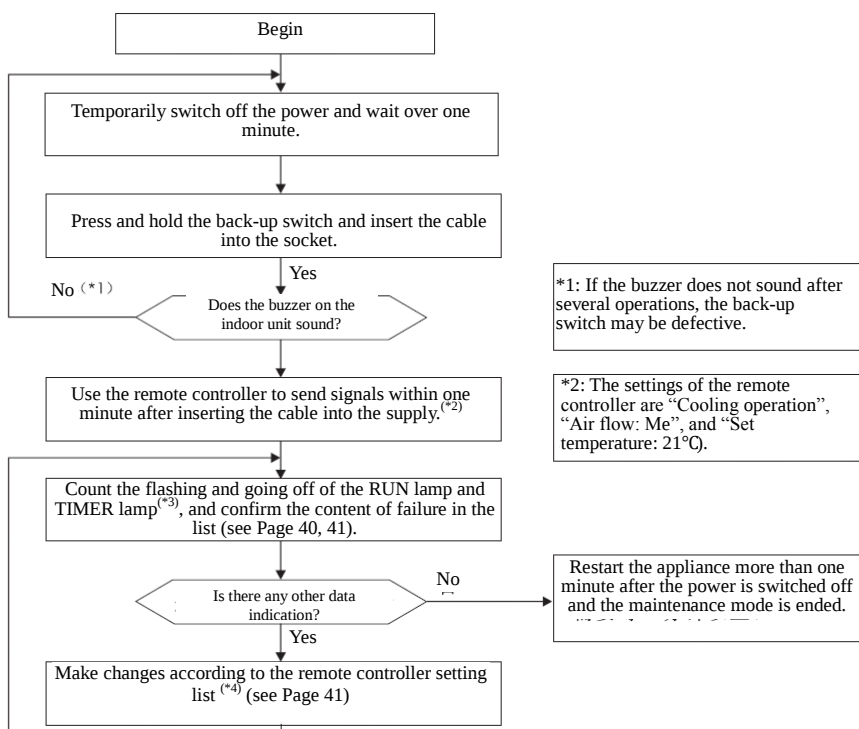
(6) Service mode (failure mode reading function)

The air conditioner records the past error indication and protection stops (service data). If the indication of self-diagnosis can't be confirmed, it can be confirmed through service data to grasp the condition when the error occurs.

(a) Terms

Term	Description
Service mode	Service mode refers to indicating service data with the lamp on the display board through the operation of the indoor controller described in (b).
Service data	Refers to the content of past error indication and protection stops of the air conditioner. The controller of the indoor unit uses nonvolatile memory (the data stored will not disappear even after the power is cut) to memorize the past error indication and protection stops of the air conditioner. Service data is composed of self-diagnosis data and stop data.
Self-diagnosis data	Refers to the indication data of causes of past stops of the indoor unit (self-diagnosis indication). Data of last 5 times can be memorized, and the older data is deleted automatically. It also includes the temperatures measured by the various sensors (room temperature, indoor heat exchanger, outdoor liquid pipe, and outdoor temperature discharge pipe sensors) and information of the remote controller (operation switching and air flow changes). More detailed data can be confirmed.
Stop data	Data of causes of past stops due to protection control, etc. in the air conditioner. If only stop data is indicated, the system will be restored automatically. (The indication will be restored automatically after the appliance enters the stop mode normally). Data of last 10 times can be memorized and the older data is deleted automatically. (Important) If only stop data is indicated, the air conditioner is normal. However, when the same protection repeats (more than 3 times), it will become the cause of user's complaint.

(b) Indication sequence of service modes

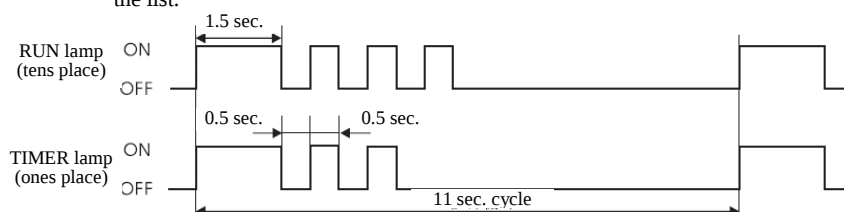


*3: Counting of flashing in service mode: 1.5 sec. light-up (beginning signal) and number of continuous flashes (Number of continuous flashes excluding the 1.5 sec. light-up (beginning signal)).

- Safe current (heating safety I) (for example, the stop code is “32”)

RUN lamp (tens place) flashes 3 times and TIMER lamp (ones place) flashes 2 times:

 $3 \times 10 + 2 \times 1 = 32$. The code 32 “Safe current (heating safety I)” can be read from the list.



*4: In the service mode, set the remote controller (operation switching, air flow setting, temperature setting) according to the table below. When sending signals to the main frame of the air conditioner, the service data indication will change.

① Self-diagnosis data

What is self-diagnosis data?

Refers to the indication data of causes of past stops of the indoor unit (self-diagnosis indication). Data of last 5 times can be memorized and the older data is deleted automatically. It also includes the temperatures measured by the various sensors (room temperature, indoor heat exchanger, outdoor liquid pipe, and outdoor temperature discharge pipe sensors) and information of the remote controller (operation switching and air flow changes). More detailed data can be confirmed.

As shown in the table below, for different operating modes, temperature settings and air flow settings of the remote controller, different contents are indicated.

Settings of remote controller		Content of output data
Operation switching	Air flow switching	
Cooling	Me	Indicates the causes of past stops (error code) indicated in the past
	Hi	Indicates the temperature measured by the room temperature sensor when the error code was indicated
	Auto	Indicates the temperature measured by the indoor heat exchanger sensor when the error code was indicated
Heating	Lo	Indicates the information on the remote controller when the error code was indicated
	Me	Indicates the temperature measured by the outdoor air temp. sensor when the error code was indicated
	Hi	Indicates the temperature measured by the outdoor heat exchanger sensor when the error code was indicated
	Auto	Indicates the temperature measured by the discharge pipe sensor when the error code was indicated

Setting of remote controller	Indicates the time number of indication data of previous errors
Temperature setting	
21°C	Last time
22°C	Second to last time
23°C	Third to last time
24°C	Fourth to last time
25°C	Fifth to last time

(Example)

Settings of remote controller			Indication data
Operation switching	Air flow switching	Temperature setting	
Cooling	Me	21°C	Indicates the cause of stop indicated last time (error code)
		22°C	Indicates the cause of stop indicated second to last time (error code)
		23°C	Indicates the cause of stop indicated third to last time (error code)
		24°C	Indicates the cause of stop indicated fourth to last time (error code)
		25°C	Indicates the cause of stop indicated fifth to last time (error code)

② Stop data

Settings of remote controller			Indication data
Operation switching	Air flow switching	Temperature setting	
Cooling	Lo	21°C	Indicates the cause of the last stop due to protection control, etc. (stop code)
		22°C	Indicates the cause of second to last stop due to protection control, etc. (stop code)
		23°C	Indicates the cause of third to last stop due to protection control, etc. (stop code)
		24°C	Indicates the cause of fourth to last stop due to protection control, etc. (stop code)
		25°C	Indicates the cause of fifth to last stop due to protection control, etc. (stop code)
		26°C	Indicates the cause of sixth to last stop due to protection control, etc. (stop code)
		27°C	Indicates the cause of seventh to last stop due to protection control, etc. (stop code)
		28°C	Indicates the cause of eighth last stop due to protection control, etc. (stop code)
		29°C	Indicates the cause of ninth to last stop due to protection control, etc. (stop code)
		30°C	Indicates the cause of tenth to last stop due to protection control, etc. (stop code)

(c) List of error codes and stop codes (for all models)

No. of flashes in service mode		Stop code or error code	Category	Content of failure		Cause	Conditions	Error indication	Automatic restoration
RUN lamp (tens place)	TIMER lamp (ones place)			Class					
Off	Off	0	Normal	-		-	-	-	-
Flash 1 time	Flash 1 time	11	Power cut	Start of compressor program	Compressor lock Short circuit of compressor wiring Output missing phase of compressor Defective circuit board of outdoor unit	The cause of final failure is power cut after the compressor fails to start after 42 continuous attempts.	O (twice)	O	
	Flash 2 times	12		Below 20 rps	Disconnecting valve closed Output missing phase of compressor Defective EEV				
	Flash 3 times	13		Over 20 rps	Disconnecting valve closed Output missing phase of compressor Defective compressor Defective EEV				
	Flash 4 times	14		Over voltage (DC350V)	Defective outdoor circuit board Error of power supply				
	Flash 5 times	15		Short circuit of power transistor (high voltage side)	Defective circuit board of outdoor unit Damage of mains transformer				
	Flash 6 times	16		Power cut, loop failure	Defective circuit board of outdoor unit Damage of mains transformer	Failure of power transistor is determined when the compressor starts.	O	-	-
Flash 2 times	Flash 1 time	21	Failure of outdoor unit	Abnormal result of PWM algorithm	Wiring break of compressor Damage of mains transformer	The result of PWM algorithm (0%) lasts for over 3 min.	O	-	-
	Flash 2 times	22		Input below 2A (PWM above 90%)	Wiring break of compressor Defective outdoor circuit board	The result of PWM algorithm is 90% and the input current is below the setting for 3 min. continuously.	O	-	-
	Flash 3 times	23		3 abnormal stops within 20 min.	Disconnecting valve closed Output missing phase of compressor Defective EEV Insufficient refrigerant	Automatic restoration and abnormal stop repeat 3 times within 20 min. after the outdoor unit is powered on.	O	-	-
	Flash 8 times	28		Different voltage	Defective power supply engineering	Wrong voltage input	O	-	-
	Flash 9 times	29		Low voltage	Defective power supply engineering Defective outdoor circuit board	Supply voltage reduces during operation.	-	-	O
	Flash 7 times	27	Error of outdoor fan motor	Error of outdoor fan motor (for DC motor only)	Defective outdoor fan motor Poor plug contacting Defective outdoor circuit board	75 rpm lasts for over 30 sec.	O (thrice)	O	O
Flash 3 times	Flash 1 time	31	Safe current	Cooling safe current I	Excessive refrigerant Compressor lock	Safe current stops in the safe current I mode during cooling operation.	-	O	
				Heating safe current I	Excessive refrigerant Compressor lock	Safe current stops in the safe current I mode during heating operation.	-	O	
	Flash 2 times	32		Cooling safe current II	Excessive refrigerant Compressor lock	Safe current stops in the safe current II mode during cooling operation.	-	O	
				Heating safe current II	Excessive refrigerant Compressor lock	Safe current stops in the safe current II mode during heating operation.	-	O	
	Flash 3 times	33		Cooling safe current III	Excessive refrigerant Compressor lock	Safe current stops in the safe current III mode during cooling operation.	-	O	
				Heating safe current III	Excessive refrigerant Compressor lock	Safe current stops in the safe current III mode during heating operation.	-	O	
	Flash 4 times	34		Cooling safe current IV	Excessive refrigerant Compressor lock	Safe current stops in the safe current IV mode during cooling operation.	-	O	
	Flash 5 times	35		Heating safe current IV	Excessive refrigerant Compressor lock	Safe current stops in the safe current IV mode during heating operation.	-	O	

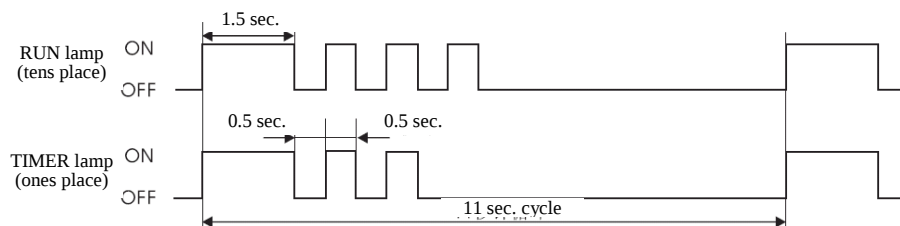
	Flash 6 times	36		Heating safe current III	Excessive refrigerant	Safe current stops in the safe current III mode during heating operation.	-	O
					Compressor lock			
	Flash 7 times	37		Heating safe current III +3A	Excessive refrigerant	Safe current stops in the safe current III+3A mode during heating operation.	-	O
					Compressor lock			

No. of flashes in service mode		Stop code or error code		Content of failure	Cause	Conditions	Error indication	Automatic restoration
RUN lamp (tens place)	TIMER lamp (ones place)		Category	Class				
Flash 4 times	Flash 1 time	41	Safe current	Cooling overload 1 (outdoor temp. 36~40°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 1 mode during cooling operation.	-	O
	Flash 2 times	42		Heating overload 1 (outdoor temp. 5~12°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 1 mode during heating operation.	-	O
	Flash 3 times	43		Cooling overload 2 (outdoor temp. 40~45°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 2 mode during cooling operation.	-	O
	Flash 4 times	44		Heating overload 2 (outdoor temp. 12~17°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 2 mode during heating operation.	-	O
	Flash 5 times	45		Cooling overload 3 (outdoor temp. 45~°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 3 mode during cooling operation.	-	O
	Flash 6 times	46		Heating overload 3 (outdoor temp. 17~°C)	Excessive refrigerant Compressor lock Operation with overload	Stops in the overload 3 mode during heating operation.	-	O
Flash 5 times	Off	50	Compressor over heat	125°C	Insufficient refrigerant Defective vent-pipe sensor Disconnecting valve closed	The value of vent-pipe sensor exceeds the setting.	O (twice)	O
Flash 6 times	Off	60	Error of indoor and outdoor communication	Can't receive signals for 1 min. and 55 sec. continuously (reply in communication)	Defective power supply Power wire, signal cable and signal cabling error Defective indoor and outdoor circuit boards	The outdoor unit can't correctly detect signals from the indoor unit for 1 min. and 55 sec. continuously.	-	O
	Flash 1 time	61		Poor indoor and outdoor connection	Poor indoor and outdoor connection Defective indoor and outdoor circuit boards	After the power is switched on, the indoor unit can't correctly detect signals from the outdoor unit for 10 sec. continuously.	O	-
	Flash 2 times	62		Serial signal transmission error	Defective indoor and outdoor circuit boards Wrong operation of electromagnetic noise	The indoor unit can't correctly detect signals from the outdoor unit for 1 min. and 55 sec. continuously.	O (thrice)	O
Flash 7 times	Flash 1 time	71	Rotor lock	Below 16 rps	Defective compressor Output missing phase of compressor Defective EEV Operation with overload Defective outdoor circuit board	The compressor, after starting, stops after the rotor is locked when the rotational frequency is below 16 rps.	-	O
	Flash 2 times	72		Above 16 rps	Defective compressor Output missing phase of compressor Defective EEV Operation with overload Defective outdoor circuit board	Stops after the rotor is locked when the rotational frequency is above 16 rps	-	O
	Flash 3 times	73		Poor phase position switching (U phase)	Defective compressor Compressor wiring break Short circuit of compressor wiring Defective outdoor circuit board	The cause of final failure is rotor locked after the compressor fails to start after 42 continuous attempts.	O (twice)	O
	Flash 4 times	74		Poor phase position switching (V phase)	Defective compressor Compressor wiring break Short circuit of compressor wiring Defective outdoor circuit board	The cause of final failure is rotor locked after the compressor fails to start after 42 continuous attempts.	O (twice)	O
	Flash 5 times	75		Poor phase position switching (W phase or not determined)	Defective compressor Compressor wiring break Short circuit of compressor wiring Defective outdoor circuit board	The cause of final failure is rotor locked after the compressor fails to start after 42 continuous attempts.	O (twice)	O
	Flash 6 times	76		Start of compressor program (within 4 sec. after phase position switching)	Defective compressor Compressor wiring break Short circuit of compressor wiring Defective outdoor circuit board	The cause of final failure is rotor locked after the compressor fails to start after 42 continuous attempts.	O (twice)	O
Flash 8 times	Off	80	Protection control operation	Error of fan motor of indoor unit	Defective fan motor Poor socket connection Defective indoor circuit board	When the air conditioner is operating and the indoor fan motor is ON, the rotational frequency of the indoor fan motor is below 300 rps for over 30sec.	O	-
	Flash 1 time	81		Vent-pipe sensor error (abnormal stop)	Wire break of vent-pipe sensor Poor socket contacting	After the outdoor rotational frequency is 0 rps for 9 minutes continuously, the discharge pipe sensor data sends wire break signals for over 15 sec. (below 7°C)	O (4 times)	O
	Flash 2 times	82		Indoor heat exchanger sensor error (abnormal stop)	Wire break of indoor heat exchanger sensor Poor socket contacting	The temperature is below -20°C for 40 min. continuously during heating operation. (The compressor stops.)	O	-
	Flash 3 times	83		Heat exchanger liquid pipe sensor error (abnormal stop)	Wire break of heat exchanger liquid pipe sensor Poor socket contacting	The temperature is below -50°C for 40 min. continuously during heating operation. (The compressor stops.)	O	-
	Flash 4 times	84		Condensation prevention control	High indoor humidity Defective humidity sensor	The condensation prevention control operates.	-	O
	Flash 5 times	85		Defrost control	Reduced indoor air flow Wire break of indoor heat exchanger sensor	During cooling operation, the condensation prevention control operates and the compressor stops.	-	O
	Flash 6 times	86		High pressure control	Overload in heating Reduced indoor air flow Short circuit of indoor heat exchanger sensor	During heating operation, the high pressure control operates and the compressor stops.	-	O
	Flash 7 times	87		Compressor over heat protection control	Insufficient refrigerant Defective vent-pipe sensor Disconnecting valve closed	The over heat protection control of the compressor operates and the compressor stops.	-	O

	Flash 8 times	88		Cooling cycle system protection control	Disconnecting valve closed Insufficient refrigerant	The cooling cycle system protection control operates.	-	0
--	---------------	----	--	---	--	---	---	---

Notes: (1) The number of flashes in service mode excludes the 1.5 sec. light-up (beginning signal).
(See the following example.)

- Safe current (heating safety I) (for example, the stop code is “32”)
RUN lamp (tens place) flashes 3 times and TIMER lamp (ones place) flashes 2 times:
 $3 \times 10 + 2 \times 1 = 32$. The code 32 “Safe current (heating safety I)” can be read from the list.



(2) Abnormal stop indication: - No indication (automatic restoration only)

O With indication

Indication with () means the number of automatic restorations for the same cause, with error indication.

Indication without () means one error indication occurs.

(3) Automatic restoration: - No indication

O With indication

(d) Remote controller information list

1) Operation switching

Indication in service mode	Operation switching status at the time of abnormal stop
RUN lamp (Operation switching)	
0	AUTO
1	DRYING
2	COOLING
4	HEATING

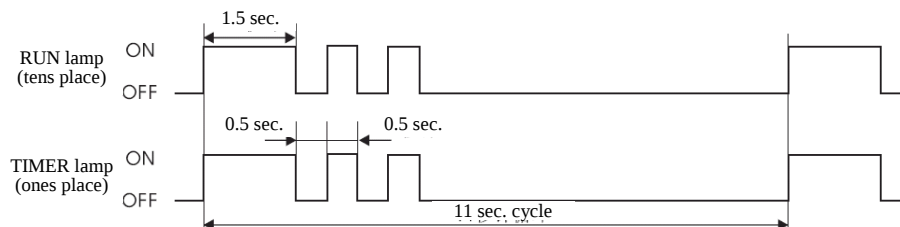
2) Air flow switching

Indication in service mode	Air flow switching status at the time of abnormal stop
TIMER lamp (Air flow switching)	
0	AUTO
2	HI
3	ME
4	LO
6	HI POWER
7	ECONO

* If there is no data recorded (the error code is normal), the information on the remote controller is as showed in the table below:

Settings of remote controller	Indication when the error code is normal
Operation switching	AUTO
Air flow switching	AUTO

(Example): Operation switching: Cooling, Air flow switching: HI



(e) List of temperatures measured by room temperature sensor, indoor heat exchanger sensor, outdoor air temp. sensor, and outdoor heat exchanger liquid pipe sensor

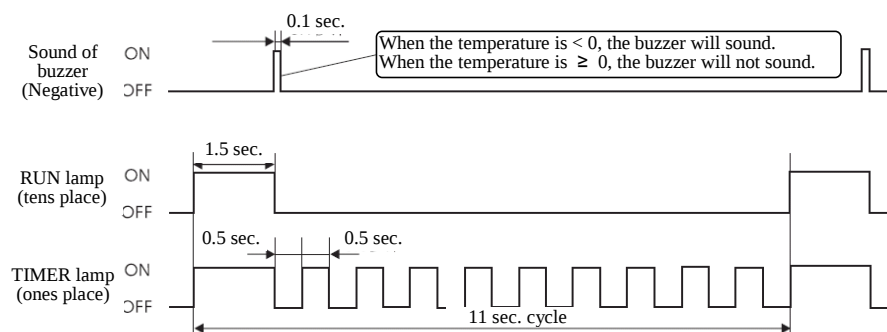
Unit: °C

Does the buzzer sound? (Sound means negative)		TIMER lamp (ones place)									
RUN lamp (tens place)		0	1	2	3	4	5	6	7	8	9
Yes (Sounds for 0.1 sec.)	6	-60	-61	-62	-63	-64					
	5	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59
	4	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49
	3	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39
	2	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29
	1	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19
	0		-1	-2	-3	-4	-5	-6	-7	-8	-9
No (Not sound)	0	0	1	2	3	4	5	6	7	8	9
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49
	5	50	51	52	53	54	55	56	57	58	59
	6	60	61	62	63	64	65	66	67	68	69
	7	70	71	72	73	74	75	76	77	78	79
	8	80	81	82	83	84	85	86	87	88	89
	9	90	91	92	93	94	95	96	97	98	99

* If there is no data recorded (the error code is normal), the information of each sensor is as showed in the table below:

Name of sensor	Value displayed by the sensor when the error code is normal
Temperature measured by room temperature sensor	-19°C
Temperature measured by indoor heat exchanger sensor	-64°C
Temperature measured by outdoor air temp. sensor	-64°C
Temperature measured by outdoor heat exchanger liquid pipe sensor	-64°C

(Example): Temperature measured by room temperature sensor, indoor heat exchanger sensor, outdoor air temp. sensor and outdoor heat exchanger liquid pipe sensor: “-9°C”



(f) List of temperatures of compressor vent-pipe

Unit: °C

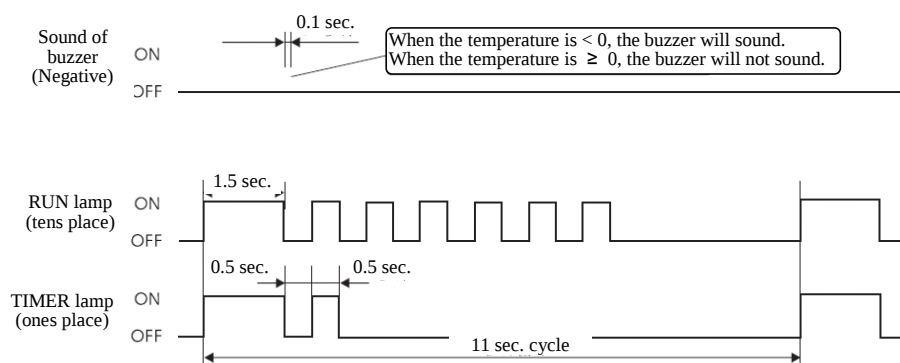
Does the buzzer sound? (Sound means negative)	RUN lamp (tens place)	TIMER lamp (ones place)	0	1	2	3	4	5	6	7	8	9
			0	1	2	3	4	5	6	7	8	9
Yes (Sounds for 0.1 sec.)	3		-60	-62	-64							
	2		-40	-42	-44	-46	-48	-50	-52	-54	-56	-58
	1		-20	-22	-24	-26	-28	-30	-32	-34	-36	-38
	0			-2	-4	-6	-8	-10	-12	-14	-16	-18
No (Not sound)	0		0	2	4	6	8	10	12	14	16	18
	1		20	22	24	26	28	30	32	34	36	38
	2		40	42	44	46	48	50	52	54	56	58
	3		60	62	64	66	68	70	72	74	76	78
	4		80	82	84	86	88	90	92	94	96	98
	5		100	102	104	106	108	110	112	114	116	118
	6		120	122	124	126	128	130	132	134	136	138
	7		140	142	144	146	148	150				

* If there is no data recorded (the error code is normal), the information of each sensor is as showed in the table below:

Name of sensor	Value displayed by the sensor when the error code is normal
Temperature measured by vent-pipe sensor	-64°C

(Example): Temperature of compressor vent-pipe: “122°C”

* The temperature data of compressor vent-pipe should be two times the reading. (The following, $61 \times 2 = “122°C”$)

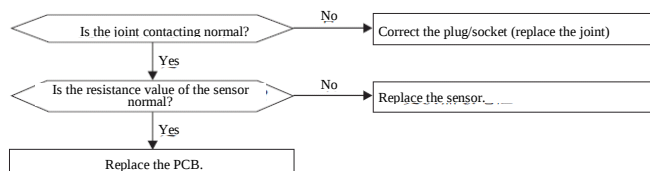


Check data recording sheet

Customer					Model			
Date								
Equipment name								
Complaint								
Settings of remote controller			Content of indication data		Indication result		Content of indication	
Temp. setting	Operation switching	Air flow switching		Buzzer (yes/no)	RUN lamp (no. of times)	TIMER lamp (no. of times)		
21	Cooling	Me	Code of last error					
		Hi	Temp. measured by room temp. sensor of last error					
		Auto	Temp. measured by indoor heat exchanger sensor of last error					
	Heating	Lo	Info of remote controller of last error					
		Me	Temp. measured by outdoor air temp. sensor of last error					
		Hi	Temp. measured by outdoor heat exchanger liquid pipe sensor of last error					
	Auto	Temp. measured by discharge pipe sensor of last error						
22	Cooling	Me	Code of second to last error					
		Hi	Temp. measured by room temp. sensor of second to last error					
		Auto	Temp. measured by indoor heat exchanger sensor of second to last error					
	Heating	Lo	Info of remote controller of second to last error					
		Me	Temp. measured by outdoor air temp. sensor of second to last error					
		Hi	Temp. measured by outdoor heat exchanger liquid pipe sensor of second to last error					
	Auto	Temp. measured by discharge pipe sensor of second to last error						
23	Cooling	Me	Code of third to last error					
		Hi	Temp. measured by room temp. sensor of third to last error					
		Auto	Temp. measured by indoor heat exchanger sensor of third to last error					
	Heating	Lo	Info of remote controller of third to last error					
		Me	Temp. measured by outdoor air temp. sensor of third to last error					
		Hi	Temp. measured by outdoor heat exchanger liquid pipe sensor of third to last error					
	Auto	Temp. measured by discharge pipe sensor of third to last error						
24	Cooling	Me	Code of fourth to last error					
		Hi	Temp. measured by room temp. sensor of fourth to last error					
		Auto	Temp. measured by indoor heat exchanger sensor of fourth to last error					
	Heating	Lo	Info of remote controller of fourth to last error					
		Me	Temp. measured by outdoor air temp. sensor of fourth to last error					
		Hi	Temp. measured by outdoor heat exchanger liquid pipe sensor of fourth to last error					
	Auto	Temp. measured by discharge pipe sensor of fourth to last error						
25	Cooling	Me	Code of fifth to last error					
		Hi	Temp. measured by room temp. sensor of fifth to last error					
		Auto	Temp. measured by indoor heat exchanger sensor of fifth to last error					
	Heating	Lo	Info of remote controller of fifth to last error					
		Me	Temp. measured by outdoor air temp. sensor of fifth to last error					
		Hi	Temp. measured by outdoor heat exchanger liquid pipe sensor of fifth to last error					
	Auto	Temp. measured by discharge pipe sensor of fifth to last error						
21	Cooling	Lo	Code of last stop					
22			Code of second to last stop					
23			Code of third to last stop					
24			Code of fourth to last stop					
25			Code of fifth to last stop					
26			Code of sixth to last stop					
27			Code of seventh to last stop					
28			Code of eighth to last stop					
29			Code of ninth to last stop					
30			Code of tenth to last stop					
Judgment							Checker	
Remark								

(7) Check method according to the content of failure

Error of sensor (Wire break of sensor and poor joint contacting)



• List of temperatures and resistance properties of sensors

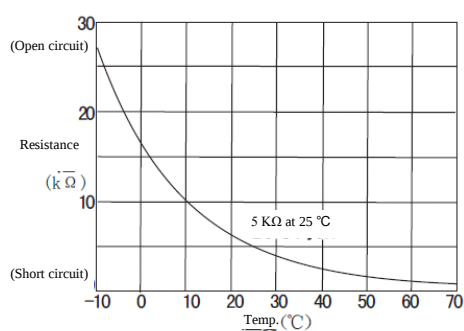
<Temperature of vent-pipe of outdoor compressor>

Temp. (°C)	Resistance(KΩ)	Temp. (°C)	Resistance(KΩ)
0	164	70	8.7
5	127	75	7.3
10	99	80	6.2
15	78	85	5.3
20	62	90	4.5
25	50	95	3.9
30	40	100	3.3
35	32	105	2.9
40	26	110	2.5
45	21	115	2.2
50	17	120	1.9
55	14	125	1.6
60	12	130	1.4
65	10	135	1.3

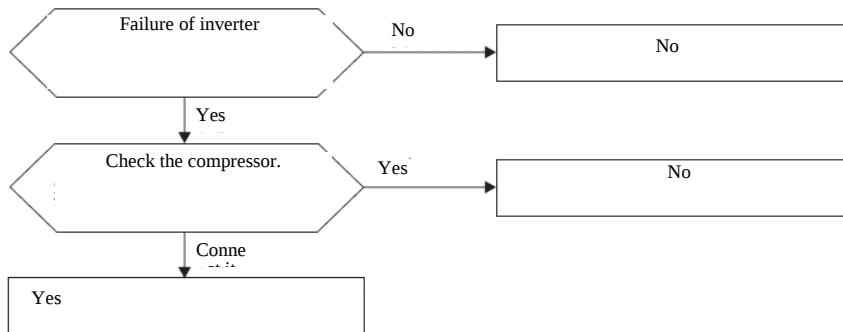
• Curve and table of temperatures and resistance properties of sensor

<Room temperature sensor, heat exchanger (indoor and outdoor) sensors, and outdoor air temp. sensor >

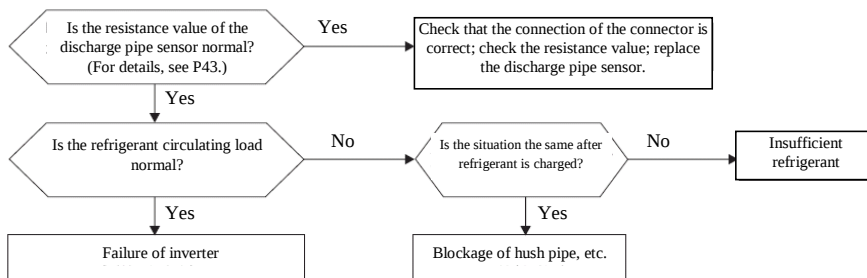
Temp. (°C)	Resistance(KΩ)	Temp. (°C)	Resistance(KΩ)
-15	37	40	2.6
-10	28	45	2.1
-5	21.4	50	1.7
0	16.5	55	1.4
5	12.8	60	1.2
10	10	65	1
15	7.8	70	0.8
20	6.2	75	0.7
25	5	80	0.6
30	4		



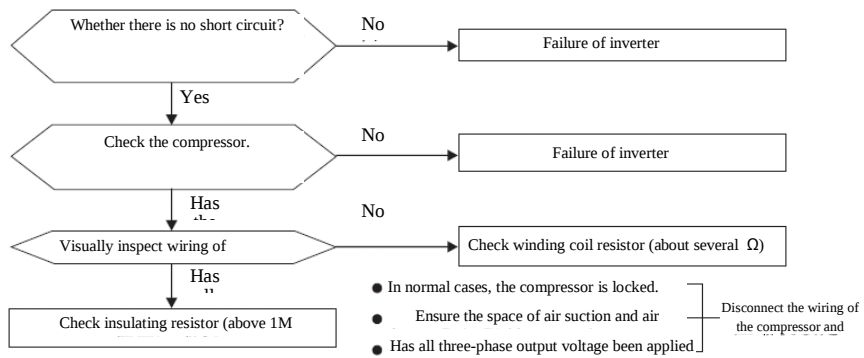
Error of outdoor unit (Damage of power transistor, wiring break of compressor)



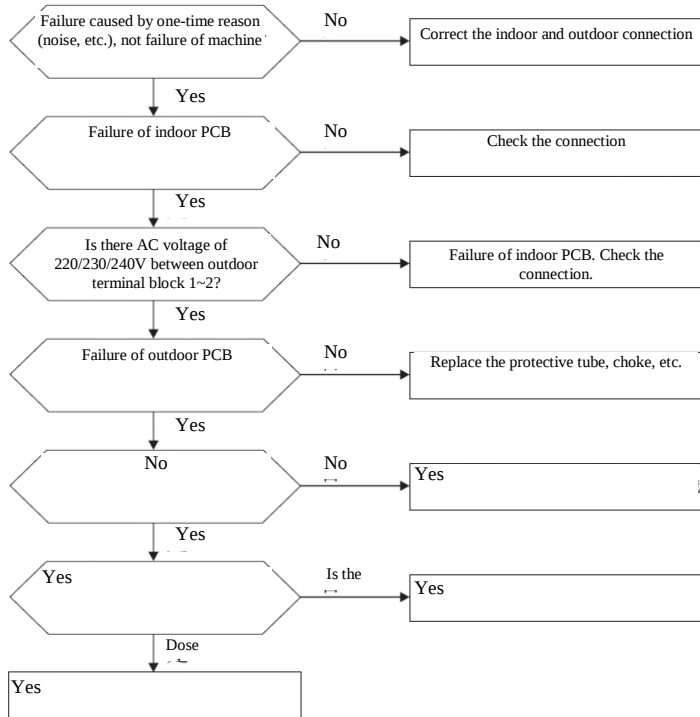
Compressor over heat (Insufficient refrigerant, failure of discharge pipe sensor)



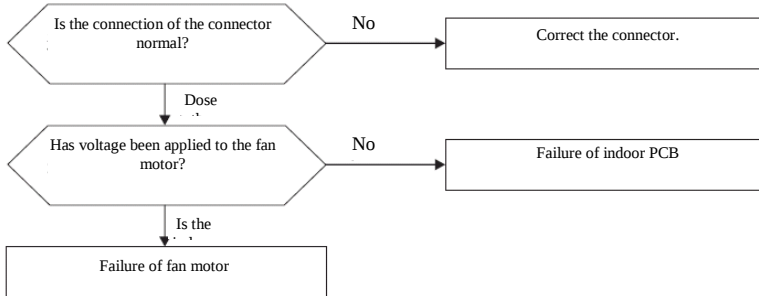
Power cut (Open-phase of output terminal of compressor, compressor lock)



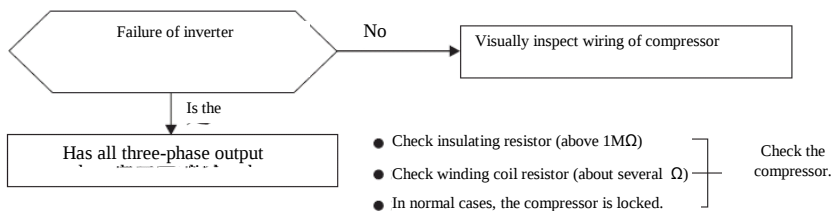
Serial signal transmission error (Wrong power supply and signal cable connection, failure of indoor and outdoor PCB, error of power supply system)



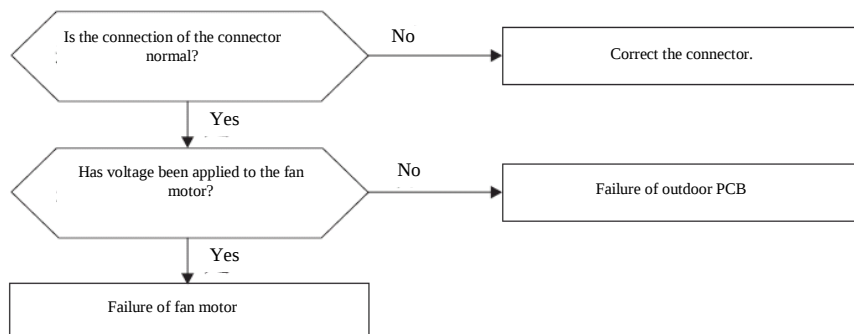
Indoor fan motor error (Failure of fan motor, failure of indoor PCB)



Compressor lock (Failure of compressor, failure of outdoor PCB)



Outdoor fan motor error (Failure of fan motor, failure of outdoor PCB)



(8) Actions in case of short circuit and wire break of sensor

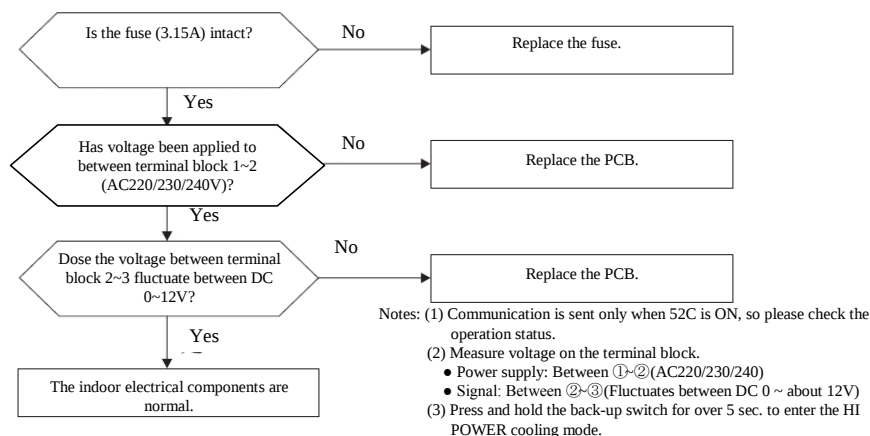
(a) Indoor unit

Sensor	Operation type	Actions	
		Short circuit	Wire break
Room temp. sensor	Cooling	Become the compressor continuous operation instruction	No compressor operation instruction obtained
	Heating	No compressor operation instruction obtained	Become the compressor continuous operation instruction
Heat exchanger sensor	Cooling	Usual operation of system is possible.	No compressor operation instruction obtained (frost prevention)
	Heating	High pressure control mode (inverter stop instruction)	Heat-retaining (stop of indoor fan)
Humidity sensor ⁽¹⁾	Cooling	① in the table below	② in the table below
	Heating	Usual operation of system is possible.	

(b) Outdoor unit

Sensor	Operation type	Actions	
		Short circuit	Wire break
Heat exchanger liquid pipe sensor	Cooling	Usual operation of system is possible.	Usual operation of system is possible.
	Heating	The defrosting does not function.	10 min. defrosting about once an hour
Outdoor air temp. sensor	Cooling	Usual operation of system is possible.	Usual operation of system is possible.
	Heating	The defrosting does not function.	10 min. defrosting about once an hour
Compressor vent-pipe sensor	All modes	Compressor over heat protection is impossible. (The unit can run.)	The compressor stops. (The inverter does not output.)

(9) Check method for indoor electrical components

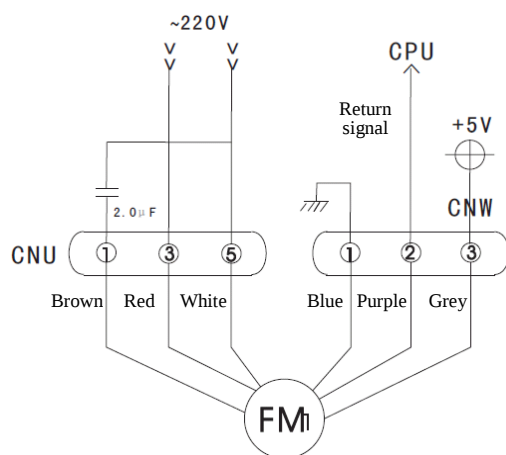


(10) Check method for indoor fan motor (AC motor)

Method for checking whether the fan motor or the circuit board malfunctions when the indoor fan motor is abnormal

1) Output check of indoor PCB

- Unplug the wire from the power socket.
- Remove the panel and the cable socket for the fan motor.
- Plug the cable into the power supply and press the ON/OFF button; the machine runs and the voltage shown in the figure below outputs for about 30 sec.; if the error is detected, it indicates that the circuit board is basically normal and the fan motor malfunctions. If there is no voltage as shown in the figure below between ③ and ⑤ of contact pins CNU of the socket, it indicates that the indoor circuit board malfunctions and the fan motor is basically normal.

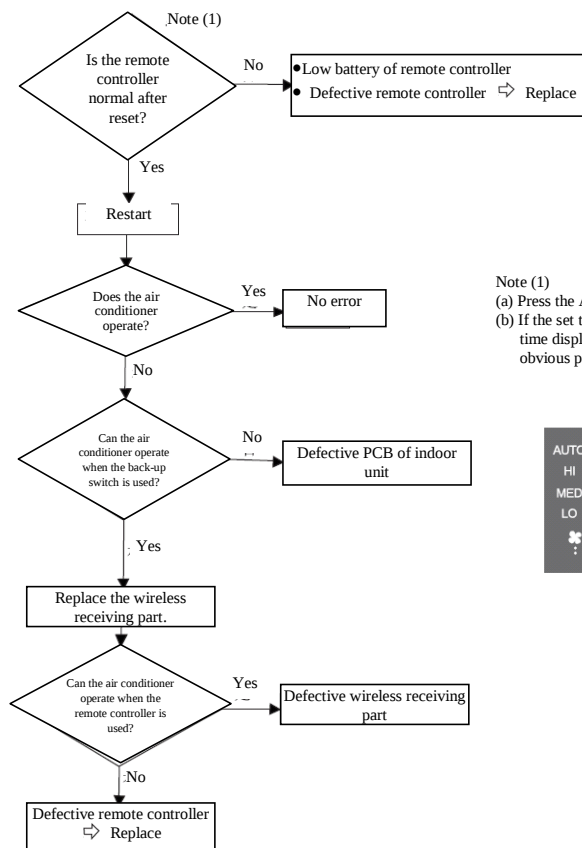


2) Check of resistance value of AC fan motor

Measurement point	Resistance value in normal cases
③-⑤ (red and white)	Above 25MΩ
①-③ (brown and red)	Above 30MΩ

- Notes: (1) Remove the fan motor and measure without power.
 (2) The fan motor is abnormal if the measurement is below the normal value.

(11) Remote controller failure diagnosis procedure



Note (1)

- (a) Press the ACL switch on the remote controller.
 (b) If the set temperature displayed is 0°C and the current time displayed is 12:00, it indicates there are no obvious problems.



ATTENTIONS OF DETECTING ELECTRONIC CONTROL

BECAUSE OF SMEARING MOISTUREPROOF GLUE BEHIND THE PRINTING CIRCUIT BOARD, SO YOU NEED TO SCRAPE OFF THE GLUE WHERE YOU WANT TO DETECT VOLTAGE IN THIS CASE.

SOME TESTPOINTS OF VOLTAGE AS FOLLOW

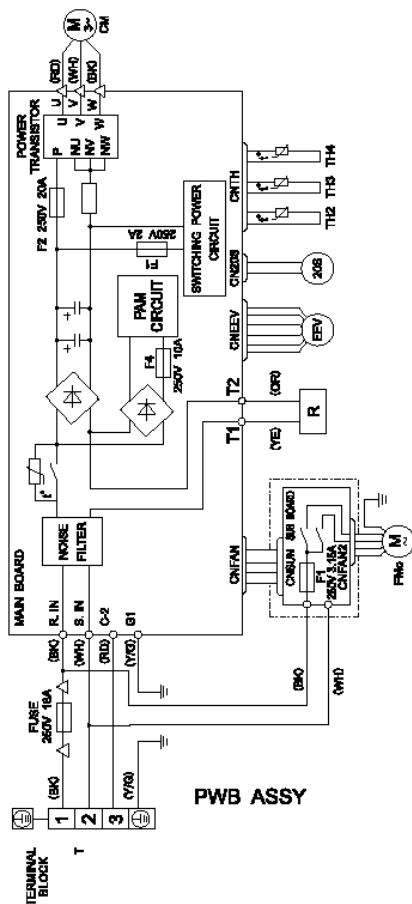
- IF FINDING TESTPOINTS, YOU CAN REFER TO PRINTING TO PRINTING TYPEFACE ON THE BOARD.
- (1) POWER SUPPLY (AC230V)
 - (2) AC INPUT OF RECTIFYING TUBE.
 - (3) DC OUTPUT OF RECTIFYING TUBE.
 - (4) THE OUTPUT OF FREQUENCY CONVERSION
 - (5) DETECTING THE VOLTAGE OF COMPRESSOR ON U, V, W END
 - (6) THE VOLTAGES OF CONTROL CIRCUIT
 - (7) THE MARK OF DC20V, DC15V, DC13V, DC5V.

△ HIGH VOLTAGE-ATTENTION

THERE IS HIGH VOLTAGE IN THE ELECTRONIC CONTROL BOARD. IF REPLACING ELECTRONIC CIRCUIT, YOU NEED TO CUT OFF THE POWER SUPPLY AFTER 5 MINUTE DISCHARGE.

CM	COMPRESSOR MOTOR
PMO	OUTDOOR FAN MOTOR
EEV	VALVE BODY (EXP) (WINDING)
Th2	HEAT EXCHANGE SENSOR
Th3	OUTDOOR TEMPERATURE SENSOR
Th4	DISCHARGE PIPE TEMPERATURE SENSOR
L	REACTOR
2OS	VALVE S (4WAY) (WINDING)

MARK	COLOUR
BK	BLACK
WH	WHITE
RD	RED
GR	GREEN
YG	YELLOW



- (12) Check method for outdoor unit
- 1) Circuit diagram of 25QA-S outdoor unit

2) Circuit diagram of 35QA-S outdoor unit

ATTENTIONS OF DETECTING ELECTRONIC CONTROL

BECAUSE OF SMEARING MOISTUREPROOF GLUE BEHIND THE PRINTING CIRCUIT BOARD, SO YOU NEED TO SCRAPE OFF THE GLUE WHERE YOU WANT TO DETECT VOLTAGE IN THIS CASE.

SOME TESTPOINTS OF VOLTAGE AS FOLLO

IF FINDING TESTPOINTS, YOU CAN REFER TO PRINTING TO PRINTING TYPEFACE ON THE BOARD.

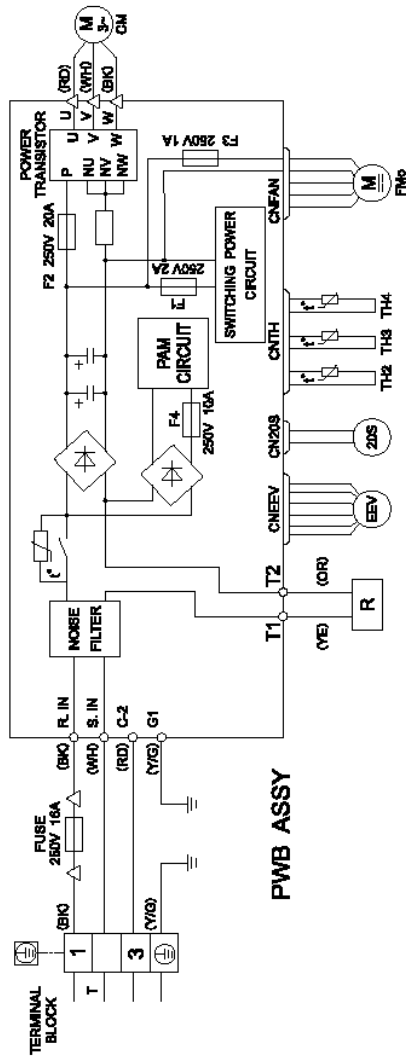
- (1) POWER SUPPLY (AC230V)
- AC INPUT OF RECTIFYING TUBE.
- (2) POWER SUPPLY (DC280V)
- DC OUTPUT OF RECTIFYING TUBE.
- (3) THE OUTPUT OF FREQUENCY CONVERSION
- DETECTING THE VOLTAGE OF COMPRESSOR ON U, V, W END
- (4) THE VOLTAGES OF CONTROL CIRCUIT

THE MARK OF DC20V, DC15V, DC13V, DC5V,

△ HIGH VOLTAGE-ATTENTION

THERE IS HIGH VOLTAGE IN THE ELECTRONIC CONTROL BOARD, IF REPLACING ELECTRONIC CIRCUIT, YOU NEED TO CUT OFF THE POWER SUPPLY AFTER 5 MINUTE DISCHARGE.

CM	COMPRESSOR MOTOR	MARK	COLOUR
FM6	OUTDOOR FAN MOTOR	BK	BLACK
EEV	VALVE, BODY (EXP) (WINDING)	WH	WHITE
TH-2	HEAT EXCHANGE SENSOR	RD	RED
TH-3	OUTDOOR TEMPERATURE SENSOR	GR	GREEN
TH-4	DISCHARGE PIPE TEMPERATURE SENSOR	YG	YELLOW
L	REACTOR		
20S	VALVE, S (4WAY) (WINDING)		



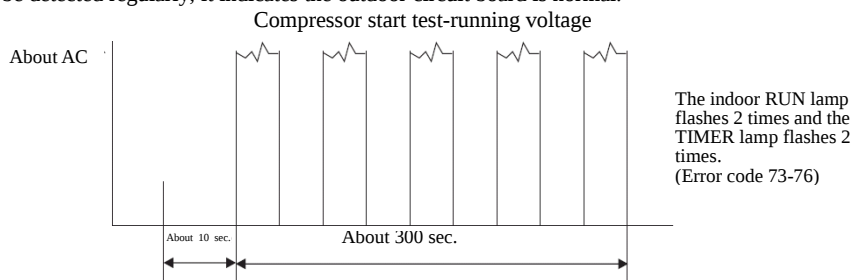
(13) Check method for outdoor circuit board (inverter)

Make confirmation after checking that the indoor circuit board is normal.

(I) Use a multimeter to conduct inspection.

- a) Unplug the plug.
- b) Remove the output cables U, V and W (to the compressor) of the power transistor.
(Note: The inspection of inverter can be conducted only after the capacitor is discharged and after making sure the residual voltage is below 10V.)
- c) Insert the plug and press and hold the back-up switch for over 5 sec. till the appliance commences operation.
- d) Measure the voltages between U and V, V and W, and W and U of the power transistor with the analogue instrument within the range of AC1000V.

If the voltages between U and V, V and W, and W and U as shown in the following figure can be detected regularly, it indicates the outdoor circuit board is normal.



Press and hold the switch on the main frame for over 5 sec. [ON]

The indoor RUN lamp flashes 2 times and the TIMER lamp flashes 2 times. (Error code 73-76)

Note (1) After the one-time output one minute after this power transistor outputs voltage, the error of the indoor unit is indicated.

(II) Judgment through defective inverter detector (MRE part number: SA01927)

1) Detector setting procedure

- a. Switch off the power supply (turn off the switch).
- b. Remove the output (power transistor) U, V and W of the inverter (control) circuit board from the connection of the compressor.
- c. Connect the wires of the detector (U=Red, V=White, W=Black) to the terminal wires of the power transistor.

2) Judging the operation method

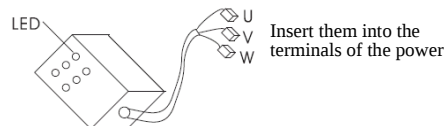
- a. Insert the plug and press and hold the back-up switch for over 5 sec. till the appliance commences operation.
- b. Confirm the flashing and ON status of the 6 LEDs. The flashing and ON status, which repeats for 300 sec., is shown below:
Flash (about 3 sec.) ↔ On (about 5 sec.) The flashing stops for one minute and then repeats for 300 sec.

c. Judge according to the flashing and ON status of the LEDs.

Flashing and ON status of LEDs	6 LEDs flash at the same time.	6 LEDs go off or several LEDs flash or light up.
Inverter	Normal	Defective

- d. Let it operate for a while and the error will be indicated (the indoor RUN lamp flashes 2 times and the TIMER lamp flashes 2 times). The output of the inverter stops.

Note: The terminals of the power transistor that control the circuit board are mounted on the back of the control casing. Remove the control circuit board before connection.

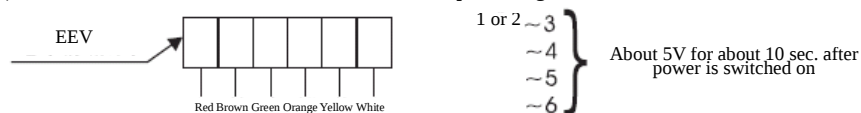


(14) Check method for EEV

After the power is switched on, check the opening of the EEV and the sound and voltage within 10 sec. of operation.

[In operation, only the opening is changed and the voltage can't be measured.]

- 1) If sound of the EEV is heard, it indicates the EEV is basically good.
- 2) If no sound of the EEV is heard, measure the output voltage.



- 3) If there is voltage, it indicates the circuit board is normal.
- 4) If there is voltage and the EEV can't operate (or has no sound), it indicates the EEV is defective.
- 5) Check method for EEV coil: Measure the resistance value between the terminals with a multimeter.

Measurement point		Resistance value in normal cases
6-wire EEV	5-wire EEV	46±4Ω (at 20°C)
①-④ (red and orange)	①-③ (red and green)	
①-⑥ (red and white)	①-④ (red and orange)	
②-③ (brown and green)	①-⑤ (red and yellow)	
②-⑤ (brown and yellow)	①-⑥ (red and white)	

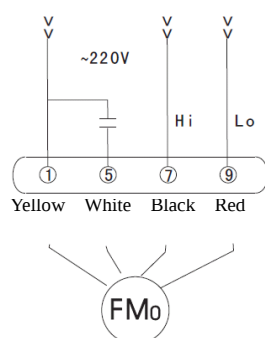
(15) Check method for outdoor fan motor

1) 25QA-S uses AC motor.

Turn on the appliance as usual and measure whether there is 220V voltage input between the terminals ① and ⑦ and the terminals ① and ⑨ of the motor for the outdoor unit (220V

voltage input between the terminals ① and ⑦ when the air flow is high; between the

terminals ① and ⑨ when the air flow is low). If the motor can operate normally, it indicates the motor is normal; if there is voltage input, but the appliance can't operate normally, it indicates the motor is abnormal.



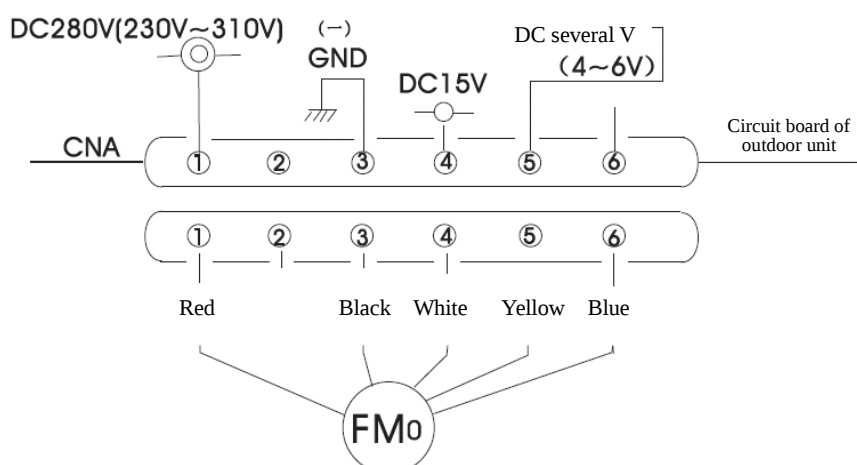
2) 35QA-S uses DC motor.

- Failure diagnosis method for outdoor circuit board or motor when the fan motor can't operate
- Check it after confirming the indoor unit is normal.

(1) Output check of outdoor circuit board

- 1) Unplug the plug.
- 2) Remove the plug CAN for the outdoor fan motor.
- 3) Insert the plug and press and hold the back-up switch for over 5 sec. (ON) till the indoor unit commences operation. If, 20 sec. after the back-up switch is turned ON, the contact pin No. ② of the plug as shown in the following figure outputs voltage for about 30 sec., it indicates the circuit board is basically normal and the fan motor malfunctions. If there is no voltage output, it indicates the circuit board malfunctions and the fan motor is basically normal.

Note (1) After the one-time output another 30 seconds after the contact pin ② of the plug outputs voltage for 3 minutes, the error of the indoor unit is detected.



(ii) Checking resistance of DC fan motor

Measure the resistance between the terminals with a multimeter.

Measurement point	Resistance value in normal cases
①-③ (red and black)	Above 25MΩ
④-③ (white and black)	Above 30MΩ

- Notes: (1) Remove the fan motor and measure without power.
 (2) The fan motor is abnormal if the measurement is below the normal value.

6.2 Servicing

(1) Evacuation

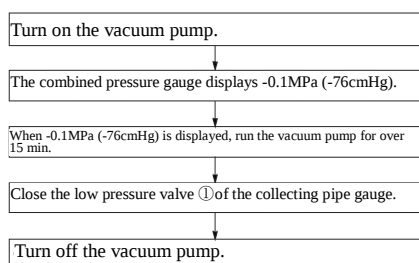
Evacuation refers to the process of purging non-condensable gas, air, water, etc. from the refrigerant equipment with a vacuum pump.

The R410A refrigerant is highly water insoluble, therefore even a little water left in the refrigerant equipment will be frozen, which causes the so-called water blockage.

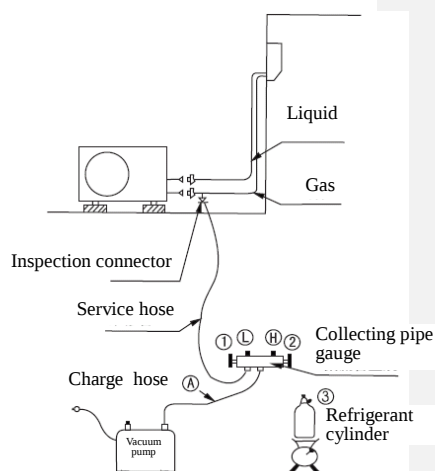
The refrigeration oil of the compressor is esterification oil or synoil which has strong hygroscopicity, so deposit may be formed easily when foreign matters enter, which causes many inexplicable faults.

● Evacuation procedure

- Check whether there is internal pressure in the machine. If there is any, use the inspection connector to eliminate it.
- Connect the service hose of the collecting pipe gauge to the gas and liquid pipes.
- Connect the vacuum pump to the charge hose ④. Conduct evacuation repeatedly in the following order.



- Notes: (1) Never use the pressure of the refrigerant to purge the air.
 (2) Never use the compressor for evacuation.
 (3) Never operate the compressor in the vacuum mode.



(2) Refrigerant charging

In case of leakage of R410A, be sure to discharge it all, evacuate the machine till the acceptance value is reached, and charge new refrigerant according to the specified weight. Never add refrigerant.

- Discharge all refrigerant from the machine and evacuate the machine.
 Note: It is unreasonable to add refrigerant without evacuation, as this will cause insufficient or excessive charging.
- Retain the collecting pipe gauge, and connect the refrigerant cylinder to the machine.
- Record the weight of the refrigerant cylinder on the scale. This is necessary to ensure the amount of refrigerant to be charged.
- Purge the air in the charge hose ④.
 Loosen the connection between the charge hose ④ and the collecting pipe gauge; open the valve ③ for several seconds; and tighten the connection immediately after the gas blown from the loose part is observed.
- After the air is released from the charge hose ④, open the valves ① and ③ and the refrigerant gas will immediately flow from the cylinder into the machine. Ensure the refrigerant cylinder is kept vertical to allow the gas to flow into the machine.
- The refrigerant will not move several procedures after it is charged into the system. In such case, start the compressor to start the cooling cycle, till the machine is fully charged with gas of the specified weight.
- After the amount of refrigerant is determined, close the valve ③.
- Remove the charge hose from the machine. Cover the valve mouth of the refrigerant pipe with the blanking cover and tighten it.
- Use the gas leak detector to check for any leakage along the piping.
- Start the air conditioner, and ensure that its operation, the high/low pressure and temperature difference between inlet air and outlet air, etc. are normal.

7 Service Manual for Air Conditioners with Refrigerant Piping Mounted/Using R410A Refrigerant

(The following is selected from the document published by The Japanese Refrigeration and Air Conditioning Industry Association)

7.1 Overview

7.1.1 R410A Refrigerant

(1) Using R410A in air conditioners

In 1974, scientists found that the ozone in the upper stratosphere (about 20-40 km away from the ground) may be damaged by ozone depleting substances such as CFC (chlorofluorocarbon) and HCFC (hydrochlorofluorocarbon), etc. From then on, many countries have taken various measures to protect the ozone layer.

As a kind of HCFC, the conventional refrigerant (R22) used in air- conditioners will damage the ozone layer. Therefore, in accordance with the international protocols (i.e. Protocols of Montreal (Ozone Depleting Substances)) and the relevant laws and regulations of the various countries, other refrigerants that will not damage the ozone layer must be used to substitute R22.

Refrigerants composed of hydrogen (H), fluorine (F) and carbon (C) are called HFC which will not damage the ozone layer. R410A is a kind of HFC, with a pressure higher than R22 by about 1.6 times and a performance about the same as R22 at the same temperature of refrigerant.

(2) Chemical properties of R410A

a) Chemical stability

Like R22, R410A is a harmfullness, inflammable refrigerant with stable chemical properties. However, just like R22, with a specific gravity of vapor heavier than that of air, if R410A is leaked to a closed room, it will be distributed at a low level and cause oxygen starvation. If R410A is directly exposed to fire, it may produce poisonous gas, so be sure to dispose of it in a place with good ventilation.

b) Compositional variation (property of false azeotropic point)

R410A is a kind of false azeotropic mixture refrigerant composed of R32 and R125. The "false azeotropic" condition refers to the dew point curve and the boiling point curve-gas-liquid balanced curve (constant pressure) are located at each other's peak respectively. Multi-component refrigerant with this chemical property will not change in ingredients basically even when its state is changed, such as becoming vapor (or condensation). Therefore, even in case of gas refrigerant leakage at a position during pipe mounting, the ingredients of the circulating refrigerant will keep unchanged basically. Therefore, R410A can basically be disposed of as a single component refrigerant similar to R22. However, with respect to the charging of R410A, in consideration of the little changes in ingredients during the conversion from gaseous to liquid state when it is put into the cylinder, it should be charged in liquid state.

c) Property of pressure

As shown in Table 2, the vapor pressure of R410A is higher than that of R22 by 1.6 times at the same temperature, so be sure to use the tools and materials designed specifically for R410A that can bear high pressure for installation and servicing.

Table 1 Comparison of thermo-physical property between R410A and R22

	R410A R22/R125 (50/50)	R22 (100)
Ingredient (wt%)	72.6	86.5
Molecular weight	-51.4	-40.8
Boiling point (°C)	1.56	0.94
Vapor pressure (25°C, MPa)	64.0	44.4
Density of saturated vapor (25°C, kg/m ³)	Inflammable	Inflammable
Inflammability	0	0.055
Ozone depletion potential (ODP)	1730	1700
Global warming potential (GWP)		

Source: Thermo-physical Properties List, NIST REFPROP V5.10, etc. prepared by JRAIA.

Table 2 Comparison of pressure of saturated vapor between R410A and R22
Unit: MPa

Refrigerant Temp. (°C)	R410A	R22
-20	0.30	0.14
0	0.70	0.40
20	1.35	0.81
40	2.32	1.43
60	3.73	2.33
65	4.15	2.60

Source: Thermo-physical Properties List, NIST REFPROP V5.10, etc. prepared by JRAIA.

(3) Lubricants for R410A

Mineral oil, AB (Alkybenzene), etc. are widely used as the lubricants for R22. R410A is not easily dissolved in conventional lubricants such as mineral oil, etc. and such lubricants likely stay in refrigerant cycle, so ester, ether and other synoil in which R410A is highly dissoluble are generally used. However, such synoil has high hygroscopicity, so they must be handled more carefully than conventional lubricants. In addition, if such synoil is mixed with mineral oil, AB (Alkybenzene), etc., this may cause deterioration, thus blocks the hush pipe or causes failure of compressor. Therefore, never mix these synoil.

7.1.2 Safety of installation/ servicing

The pressure of R410A is higher than that of R22 by about 1.6 times, so unreasonable installation/ servicing may cause severe consequences. Therefore, be sure to use tools and materials designed specifically for R410A, conduct installation/ servicing carefully, and pay attention to the following precautions.

- 1) Never use refrigerants other than R410A in air conditioners designed to use R410A.
- 2) In case of refrigerant gas leakage during installation/ servicing, be sure to provide sufficient ventilation.
If the refrigerant gas is exposed to fire, poisonous gas may be produced.
- 3) Prevent air or vapor from entering the refrigerant cycle when installing or removing air conditioners. Otherwise, the pressure in the refrigerant cycle may become exceptionally high, which will cause fracture of equipment or personal injury.
- 4) After the installation is completed, check that there is no refrigerant gas leakage.
If the refrigerant gas is leaked to the room and comes into contact with the fire in the fan driven heater, small heating stove, etc., it may produce poisonous gas.
- 5) If an air conditioner charged with large amount of refrigerant (such as a multi-functional air conditioner) is installed in a small room, be sure to take more care and ensure that the concentration will not exceed the limit even in case of refrigerant leakage.
In case the refrigerant is leaked and its concentration exceeds the limit, oxygen starvation may be caused.
- 6) Be sure to conduct installation or removal according to the Installation Manual.
Incorrect installation may cause failure of refrigerant, water leakage, electric shocks, fire, etc.
- 7) Unauthorized operation of air conditioners may be very dangerous. In case of failure of the machine, please call the qualified air conditioner technician or electrician.
Incorrect servicing may cause water leakage, electric shocks, fire, etc.

7.2 Mounting refrigerant pipes

7.2.1 Piping materials and joints used

Refrigerant pipes are mounted mainly with copper pipes and joints. Be sure to select and mount copper pipes and joints suitable for refrigerant. In addition, be sure to use clean copper pipes and joints and try to keep their inner walls clean.

(1) Copper pipes

Be sure to use seamless copper pipes made of copper or copper alloy. Copper pipes with residual oil less than 40mg/10m are ideal. Do not use fractured, distorted or discolored copper pipes (especially in respect of inner walls). Otherwise, the filth may block the EEV or hush pipe.

As the pressure of air conditioners using R410A is higher than that of air conditioners using R22, be sure to select appropriate materials.

The thickness of copper pipes for R410A is shown in Table 3. Never use copper pipes with a thickness less than 0.8mm.

Table 3 Thickness of annealed copper pipes

Rating diameter	Outside diameter (mm)	Thickness (mm)	
		R410A	[Reference] R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.70	0.80	0.80
5/8	15.88	1.00	1.00

(2) Joints

Copper pipes use flared joints or sleeve joints. Be sure to clean them before use.

a) Flared joints

Flared joints are used to connect copper pipes that can't be used for piping as their outside diameter exceeds 20mm. In such case, sleeve joints may also be used.

The sizes of ends of flared pipes, ends of flared joints and flare nuts are shown in Tables 5~8 (see pages 112 and 113). In addition, double-ended loose joints, single end loose joints, pipe tee joints and corner joints are generally used. (See Figure 1.)

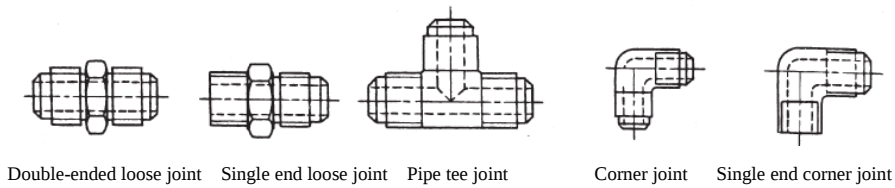


Figure 1 Flared joints

b) Sleeve joints

Sleeve joints need welding for connection and are mainly used for pipes with a diameter exceeding 20mm. The thicknesses of sleeve joints are shown in Table 4. Sleeve joints, corner joints and pipe tee joints are generally used. (See Figure 2.)

Table 4 Min. thickness of sleeve joints

Rating diameter	Reference outside diameter of sleeve joints (mm)	Min. joint thickness (mm)
1/4	6.35	0.50
3/8	9.52	0.60
1/2	12.70	0.70
5/8	15.88	0.80

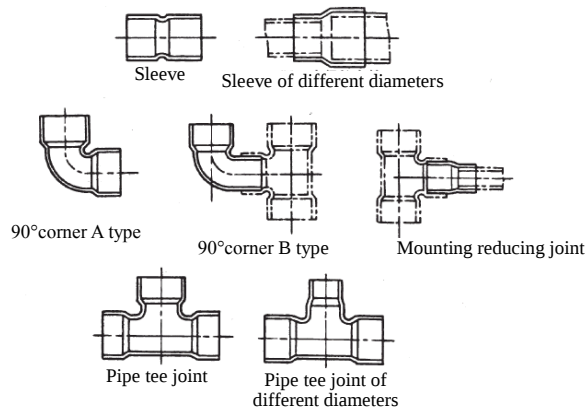


Figure 2 Sleeve joints

7.2.2 Handling of piping materials

When mounting refrigerant pipes, be careful to prevent water or dust from entering the pipes, do not use oil other than the lubricant used in the air conditioner and avoid refrigerant leakage. Use dehydrated lubricant for piping. Be sure to use airtight cover or similar cover gasket to seal the container for storage.

(1) Flaring procedure and precautions

a) Cutting pipes

Use a pipe cutter to cut the pipes slowly to avoid distortion.

b) Removing burrs and nicks

Burrs or nicks on the flared position may cause refrigerant leakage. Remove all burrs and clean the cutting surface carefully before mounting.

c) Inserting flare nuts

d) Flaring

Ensure to clean the clamps and copper pipes.

Use the clamping bars to conduct flaring correctly.

Use the flare tools for R410A or conventional flare tools.

The size of flaring varies depending on the kinds of flare tool.

Please note that the size must be adjusted to “Size A” with the size adjustment scaled rule when using conventional flare tools.

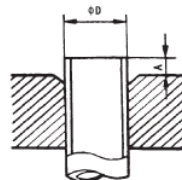


Figure 3 Flare tool

Table 5 R410A flaring sizes

Rating diameter	Outside diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R410A Clutch type	Conventional flare tools	
				Clutch type	Wing nut type
1/4	6.35	0.8	0~0.5	1.0~1.5	1.5~2.0
3/8	9.52	0.8	0~0.5	1.0~1.5	1.5~2.0
1/2	12.70	0.8	0~0.5	1.0~1.5	2.0~2.5
5/8	15.88	1.0	0~0.5	1.0~1.5	2.0~2.5

Table 6 R22 flaring sizes

Rating diameter	Outside diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R410A Clutch type	Conventional flare tools	
				Clutch type	Wing nut type
1/4	6.35	0.8	0~0.5	0.5~1.0	1.0~1.5
3/8	9.52	0.8	0~0.5	0.5~1.0	1.0~1.5
1/2	12.70	0.8	0~0.5	0.5~1.0	1.5~2.0
5/8	15.88	1.0	0~0.5	0.5~1.0	1.5~2.0

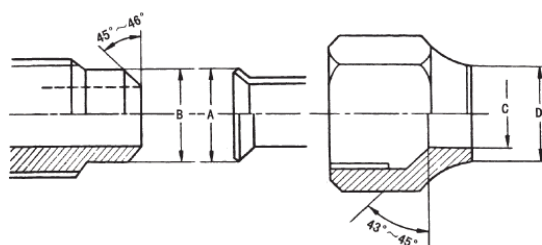


Figure 4 Relationship between flare nut and flaring sealing surface

Table 7 Sizes of R410A flaring and flare nut

[Unit: mm]

Rating diameter	Outside diameter	Width of flare nut	Size				Thickness
			A	B	C	D	
1/4	6.35	0.8	9.1	9.2	6.5	13	17
3/8	9.52	0.8	13.2	13.5	9.7	20	22
1/2	12.70	0.8	16.6	16.0	12.9	23	26
5/8	15.88	1.0	19.7	19.0	16.0	25	29

Table 8 Sizes of R22 flaring and flare nut

[Unit: mm]

Rating diameter	Outside diameter	Thickness	Size				Width of flare nut
			A	B	C	D	
1/4	6.35	0.8	9.0	9.2	6.5	13	17
3/8	9.52	0.8	13.0	13.5	9.7	20	22
1/2	12.70	0.8	16.2	16.0	12.9	20	24
5/8	15.88	1.0	19.4	19.0	16.0	23	27

(2) Flaring procedure and precautions

- Ensure there is not any defect or dust, etc. on the flaring and connection.
- Correctly connect the flared surface and the joint axis.
- Use a torque wrench to tighten the flaring to the specified torque. The tightening torque for R410A is the same as that for R22. Insufficient torque may cause gas leakage. Excessive torque may cause the flare nut damaged and can't be removed. Please select the tightening torque of the value specified by the manufacturer. Table 9 shows the reference values.

Note: Apply the oil specified by the manufacturer on the flared surface. If other types of oil are used, it may cause deterioration of the lubricant and failure of the compressor.

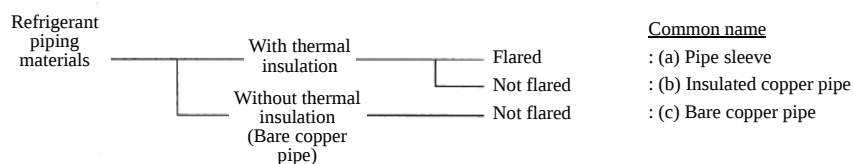
Table 9 Tightening torque for flaring for R410A [reference values]

Rating diameter	Outside diameter (mm)	Tightening torque N · m (kgf · cm)	Tightening torque of torque wrench available on the market N · m (kgf · cm)
1/4	6.35	14~18 (140~180)	16 (160), 18 (180)
3/8	9.52	33~42 (330~420)	42 (420)
1/2	12.70	50~62 (500~620)	55 (550)
5/8	15.88	63~77 (630~770)	65 (650)

7.2.3 Storage of piping materials

(1) Types and storage of piping materials

The refrigerant piping materials for air conditioners are generally divided into the following types.



The pressure of R410A is higher than that of R22 by about 1.6 times, so be sure to use copper pipes of the thickness as shown in Table 3 (see Page 56) and try to keep them clean. Be careful in handling/storing copper pipes to avoid bending, distorting or damaging them. Be careful to prevent dust, water, etc. from entering the pipes.

Seal the pipe opening with caps, etc. Ensure the sealing is intact during storage. To store coated or bare copper pipes, use clamps, tape, etc. to fully seal the opening.

(2) Characteristics

a) Pipe sleeve

Copper pipes as R410A pipe sleeves must have a thickness as shown in Table 3 (see Page 59) and Tables 5 and 6 (see Page 61), and sizes of flaring and flare nuts different from those of R22. Therefore, be sure to select pipe sleeves suitable for R410A.

b) Insulated copper pipes

Before using insulated copper pipes, ensure their thickness is suitable for R410A.

c) Bare copper pipes

Be sure to use bare copper pipes of a thickness as shown in Table 3 (see Page 59) and try to keep them clean. The surface of bare copper pipes is exposed, so be especially careful to handle them and mark them to prevent misuse.

(3) Precautions before mounting

Pay attention to the following during pipe connection.

a) Before connecting to the appliance, use caps, etc. to seal all pipe opening.

b) Be especially careful in pipe mounting in rainy days.

If water enters the pipe, the lubricant may deteriorate, which causes failure of the appliance.

c) Connect the pipes as quickly as possible.

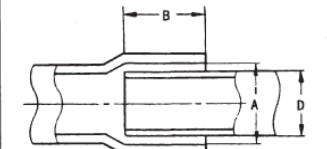
If the pipes are kept open for a long time, please fully charge them with nitrogen or use a vacuum pump for drying.

7.2.4 Welding

(1) Processing connection

Due to fusion cast between the surfaces of joints, which produces very high adhesive strength, be sure to leave adequate space for welding and keep adequate gap between the surfaces of joints. The minimum depth of penetration of joint of copper pipe, the outside diameter of inner pipe and the gap between the outer pipe and the inner pipe are shown in Table 10. If copper brazing filler is used, the pipe connection is the most secure when the gap is kept between about 0.05~0.1mm.

Table 10 Minimum depth of penetration and gap between copper pipe and joint

	Inside diameter of outer pipe D (mm)	Minimum depth of penetration B (mm)	Gap (A-D) x 1/2 (mm)
	5~8	6	0.05~0.35
	8~12	7	0.05~0.35
	12~16	8	0.05~0.45

* When inserting the pipe, either process the end of the pipe or connect the pipe with a sleeve joint through welding.

(2) Brazing filler

a) Alloy brazing filler

Alloy mainly composed of silver and copper is used to bond iron, copper or copper alloy. In spite of its outstanding solderability, it's expensive.

b) Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to bond copper or copper alloy.

c) Low melting temperature solder

Alloy of tin and lead. Conventional solder. Due to its weak adhesive strength, it can't be used for refrigerant pipe welding.

* Notes:

1) BCuP reacts with sulfur easily and produces a complex aqueous solution, which may cause gas leakage. Therefore, use other types of brazing filler for SPA, etc. and apply paint on pipe surface.

2) If welding is needed during servicing, please use the same type of brazing filler.

(3) Welding flux

a) Reasons for using welding flux

- To remove the oxide film and impurity from metal surface to help the flow of brazing filler.
- To prevent oxidization on metal surface in welding.
- To reduce the surface tension of brazing filler to make it better adhere to the treated metal.

b) Features of welding flux required

- The active temperature and welding temperature of the welding flux are the same.
- Due to the wide range of effective temperature, the welding flux is hard to carbonize.
- Slag is easily removed after welding.
- The corrosion of treated metal and brazing filler is slight.
- Good spreading property, harmless to human body.

As described above, the working of welding flux is complex, therefore an appropriate type of welding flux must be selected according to the type and shape of treated metal, type of brazing filler and welding mode, etc.

c) Types of welding flux

- Corrosion resistant welding flux

This type of welding flux is generally composed of borax and boric acid.

Suitable for welding temperature of above 800°C.

- Active welding flux

Most welding fluxes used for silver brazing are active welding fluxes

The borax-boric acid compound is added with potassium fluoride, potassium chloride, sodium fluoride, etc., so it has enhanced oxide film removing ability.

* Precautions:

- ① Remove the welding flux after welding.
- ② If the chlorine contained in the welding flux is left in the pipe, it may cause deterioration of lubricant. Therefore, do not use welding flux containing chlorine.
- ③ When adding water to the welding flux, do not use water containing chlorine (such as distilled water or ion exchange water).

(4) Welding

Welding requires complicated technique and experience, so it must be operated by professionals.

In order to prevent the formation of oxide film in the pipe, conduct welding when the nitrogen (N₂) is flowing.

<Welding method to prevent oxidation>

- a) Connect a reducing valve to the nitrogen cylinder.
- b) Charge nitrogen into the piping with a copper pipe and install a flowmeter on the nitrogen cylinder.
- c) Seal the gap between the piping and the inserted pipe to prevent return of nitrogen.
- d) When the nitrogen is flowing, be sure to keep the end of the piping open.
- e) Adjust the flow velocity of nitrogen. Use the reducing valve to keep it below 0.05m³/h or 0.02MPa (0.2kgf/cm²).
- f) After the above steps, keep the nitrogen flowing till the piping cools to a certain extent (that is, to the finger temperature).
- g) Remove all welding flux after welding.

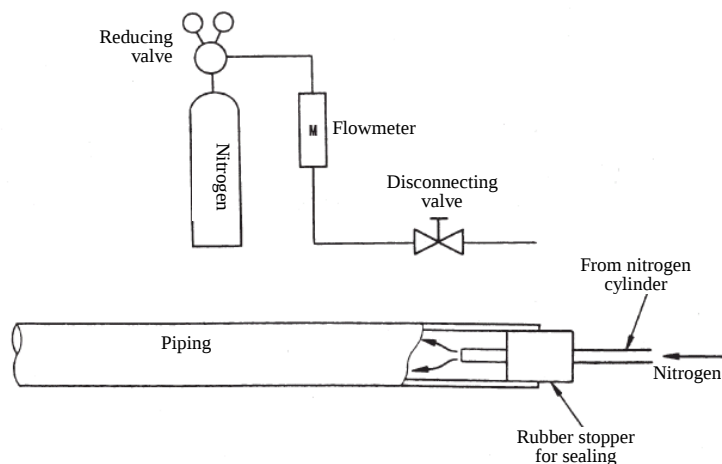


Figure 5 Preventing oxidation in welding

* Precautions for welding

① General precautions

- 1) The weld strength should meet the requirement.
- 2) Keep air tightness under the pressure condition after the operation.
- 3) During welding, avoid damaging the components due to high temperature.
- 4) Do not allow the oxide or welding flux to block the refrigerant piping.
- 5) Prevent the welding portion from hindering the flow in the refrigerant circuit.
- 6) Avoid corrosion of the welding portion.

② Over heat prevention

Due to over heat, the inner and outer surfaces of the treated metal may be oxidized. Particularly, if the inside of the refrigerant circuit is oxidized due to over heat, the oxide film produced will severely damage the circuit. Therefore, keep the appropriate welding temperature and try to reduce the heating area during welding.

③ Over heat protection

In order to prevent damaging or downgrading the components near the welding position due to over heat, please take appropriate protection measures, such as using (1) a metal plate, (2) wet cloth, or (3) heat absorbent.

④ Movement during welding

Avoid any vibration during welding to prevent breaking or damaging the welded splice.

⑤ Oxidation prevention

In order to improve the efficiency of welding, several types of antioxidant available on the market may be used. However, the ingredients of such antioxidant may differ in thousands ways, and some may erode the piping materials or have negative impact on HFC refrigerants, lubricants, etc. Therefore, be especially careful in the use of antioxidants.

7.3 Installation, Removal and Servicing

7.3.1 Tools for R410A

For air conditioners using R410A, in order to prevent charging other types of refrigerant accidentally, the diameter of the service opening of the control valve (3-way valve) for the outdoor unit is changed. In addition, in order to improve the compressive strength, the sizes of flaring and flare nut (for copper pipes, the rating diameters are 1/2 and 5/8) are also changed. Therefore, prepare the tools designed specifically for R410A as shown in (1) on Page 117 and the general tools as shown in (2) on Page 118 for installation/ servicing.

(1) Tools for R410A

a) Manifold pressure gauge

- As R410A has the property of high pressure, conventional tools can't be used.

Table 11 Difference between conventional high/low pressure gauge and pressure gauge for R410A

	Conventional pressure gauge	Pressure gauge designed specifically for R410A
High pressure gauge (Red)	-0.1~3.5MPa -76 cmHg~35 kgf/cm ²	-0.1~5.3MPa -76 cmHg~53 kgf/cm ²
Compound pressure gauge (Blue)	-0.1~1.7MPa -76 cmHg~17 kgf/cm ²	-0.1~3.8MPa -76 cmHg~38 kgf/cm ²

- In order to prevent charging other types of refrigerant accidentally, the shapes of the various ports of the branch manifold are changed.

Table 12 Difference between conventional branch manifold and branch manifold for R410A

	Conventional branch manifold	Branch manifold for R410A
Port size	7/16 UNF 20 screw threads per inch	1/2 UNF 20 screw threads per inch

b) Charge hose

- Due to the property of high pressure of R410A, the pressure impedance of the charge hose must be improved and the material is changed to HFC impedance type material. Furthermore, in order to comply with the sizes of the various ports of the branch manifold, the sizes of hose caps are also changed. In addition, in order to prevent gas pressure reaction, the charge hose with a valve mounted beside the hose cap may be used.

Table 13 Difference between conventional charge hose and charge hose for R410A

		Conventional charge hose	Charge hose for R410A
Pressure impedance	Normal pressure	3.4 MPa (34 kgf/cm ²)	5.1 MPa (51 kgf/cm ²)
	Breakdown pressure	17.2 MPa (172 kgf/cm ²)	27.4 MPa (274 kgf/cm ²)
Engineering material		NBR rubber	HNBR rubber With nylon coating inside
Size of hose cap		7/16 UNF 20 screw threads per inch	1/2 UNF 20 screw threads per inch

c) Electronic loadcell scale for charging refrigerant

- As a kind of HFC, due to the properties of high pressure and high vapor rate, R410A can't keep the liquid state and foam state of pneumatolytic refrigerant in the cylinder when the charging cylinder is used to charge R410A, and the value is difficult to read. Therefore, it is recommended to use an electronic loadcell scale for charging refrigerant.
- The electronic loadcell scale can measure the weight of the refrigerant cylinder though the 4 supporting points, therefore it has higher strength. The connection of the charge hose has two ports, one for R22 (7/16 UNF, 20 screw threads per inch) and one for R410A (1/2 UNF, 20 screw threads per inch), so it can be used to charge general refrigerants.
- There are two types of electronic loadcell scale for charging refrigerant, one for 10kg cylinders and one for 20kg cylinders.

Electronic loadcell scale for 10kg cylinders precision $\pm 2g$

Electronic loadcell scale for 20kg cylinders precision $\pm 5g$

- Refrigerant can be charged manually by opening/closing the valve.

d) Torque wrench (for rating diameters of 1/2 and 5/8)

- In order to enhance the pressure impedance, the size of flare nut is changed. Therefore the side-to-center distance of the torque wrench for R410A vary.

Table 14 Difference between conventional wrench and wrench for R410A

	Conventional torque wrench	Torque wrench for R410A
For 1/2 (side-to-center distance x torque)	24mm x 55N · m (550 kgf · cm)	26mm x 55N · m (550 kgf · cm)
For 5/8 (side-to-center distance x torque)	27mm x 65N · m (650 kgf · cm)	29mm x 65N · m (650 kgf · cm)

- e) Flare tool (clutch type)
- The flare tool for R410A has a big clamping bar receiving hole, so as to set the copper pipe portion protruding from the clamping bar during flaring to 0~0.5mm and have stronger elasticity for the increased torque of EEV. This type of flare tool can also be used for R22 copper pipes.
- f) Adjusting the scaled rule for the protruding portion (used when a conventional flare tool (including clutch type) is used for flaring)
- A scaled rule with the thickness of 1.0mm helps setting the protruding portion of the copper pipe in the clamp to 1.0~1.5mm.
- g) Vacuum pump adapter
- In order to prevent the vacuum pump oil from returning into the charge hose, be sure to use an adapter. The connection of the charge hose has two ports, one for conventional refrigerants (7/16 UNF, 20 screw threads per inch) and one for R410A. If the vacuum pump oil (mineral oil) is mixed with R410A, deposit may be produced, which will damage the appliance.
- h) Refrigerant cylinder
- According to the U.S.A regulations, refrigerant cylinders designed specifically for R410A are marked with the refrigerant name and have pink coating.
- i) Charging port and package for refrigerant cylinder
- According to the cap size of the charge hose, a charging port (1/2 UNF, 20 screw threads per inch) and corresponding package are required.
- j) Gas leakage detector
- Use a highly sensitive gas leakage detector designed specifically for HFC refrigerants. For R410A, the detection sensitivity is about 23g/ year.
- (2) Frequently used tools
- | | |
|---|-------------------------------------|
| a) Vacuum pump | g) Hollow drill (Φ65 or 70) |
| b) Torque wrench | h) Hexagon wrench |
| For 1/4, side-to-center distance 17 mm x (16 N · m) | (side-to-center distance 4 or 5 mm) |
| (160 kgf · cm) | i) Wrench or monkey wrench |
| For 1/4, side-to-center distance 17 mm x (18 N · m) | j) Tapeline |
| (180 kgf · cm) | k) Thermometer |
| For 3/8, side-to-center distance 22 mm x (42 N · m) | l) Clamping ammeter |
| (420 kgf · cm) | m) Insulation resistance meter |
| c) Pipe cutter | (megameter) |
| d) Driller | n) Circuit tester |
| e) Screw driver (+,-) | o) Pipe bender |
| f) Steel saw | |
- (3) Applicability of tools for R410A to models using R22

Table 15 Applicability of tools for R410A to models using R22

	Tools for R410A	Applicability to models using R22
a)	Manifold pressure gauge	X
b)	Charge hose	X
c)	Electronic loadcell scale for charging refrigerant	O
d)	Torque wrench (rating diameter 1/2, 5/8)	X
e)	Flare tool (clutch type)	O
f)	Scaled rule for adjusting protruding portion*	O
g)	Vacuum pump adapter	O
h)	Refrigerant cylinder	X
i)	Charging port and package for refrigerant cylinder	X
j)	Gas leakage detector	X

* Used when the conventional flare tool (clutch type) is used.

Note: If you have any questions, please consult your dealer.

7.3.2 New installation (when new refrigerant piping is used)

(1) Use the vacuum pump to suction air and detect any gas leakage (see Figure 6)

a) Connect the charge hose to the outdoor unit. ①

b) Connect the charge hose to the vacuum pump adapter. ②

Here, fully close the control valves. ③④

c) Push Handle *Lo* to the full open position ⑤ and turn on the power switch of the vacuum pump.

In this step, evacuate the appliance (for about 10~15 minutes). For the time of evacuation, see the manual provided by the equipment manufacturer.

d) When the pointer of the compound pressure gauge indicates -0.1MPa (-76cmHg) ⑥, push Handle *Lo* to the full close position ⑤ and turn off the power switch of the vacuum pump. Keep the status for 1~2 minutes and ensure the pointer of the compound pressure gauge has not turned back.

e) Fully open the control valves. ③④

f) Disconnect the charge hoses. ①②

g) Tighten the cover on the service opening. ⑦

h) Secure the covers on the control valves and check for any gas leakage around the covers. ③④⑦

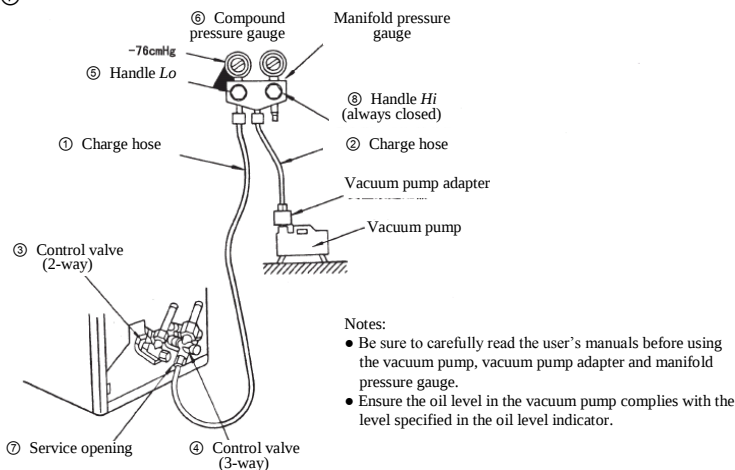


Figure 6 Evacuation structure of vacuum pump

(2) The refrigerant pipe required for additional refrigerant charging should be longer than the standard pipe length. (After step e in (1) above, execute the following steps. See Figure 7.)

a) Put the refrigerant cylinder on the electronic loadcell scale and connect the charge hoses of the cylinder to the connection ports of the electronic loadcell scale.

* Note:

Be sure to make setting so as to charge liquid. When a cylinder with syphon tube is used, you can charge liquid without turning the cylinder.

b) Connect the charge hose of the manifold pressure gauge to the connection port of the electronic loadcell scale. ③②

c) Open the valve of the refrigerant cylinder, and slightly open the charging valve and then close it. ①②

d) After zero position (0) adjustment, open the charging valve and open Valve *Lo* of the manifold pressure gauge to charge the liquid refrigerant. ②⑤
(Please read the user's manual before using the electronic loadcell scale.)

e) If the specified amount of refrigerant can't be charged, charge more little by little through the cooling operation. (For the amount of each additional charging, see the operation manual prepared by the equipment manufacturer.) If the amount of the first charge is inadequate, charge for the second time with the same method as for the first charge after one minute.

* Note:

Never charge large amount of liquid refrigerant at a time in the cooling mode, as the liquid refrigerant is charged from the gas side.

- f) After charging the liquid refrigerant into the air conditioner by closing the charging valve, fully close Valve Lo of the manifold pressure gauge to stop. ②⑤
- g) Quickly move the charge hose away from the service opening.⑥
If the movement is slow, the circulating refrigerant may be leaked.
- h) Secure the covers of the service opening and control valve, and check for any gas leakage around the covers. ⑥⑦

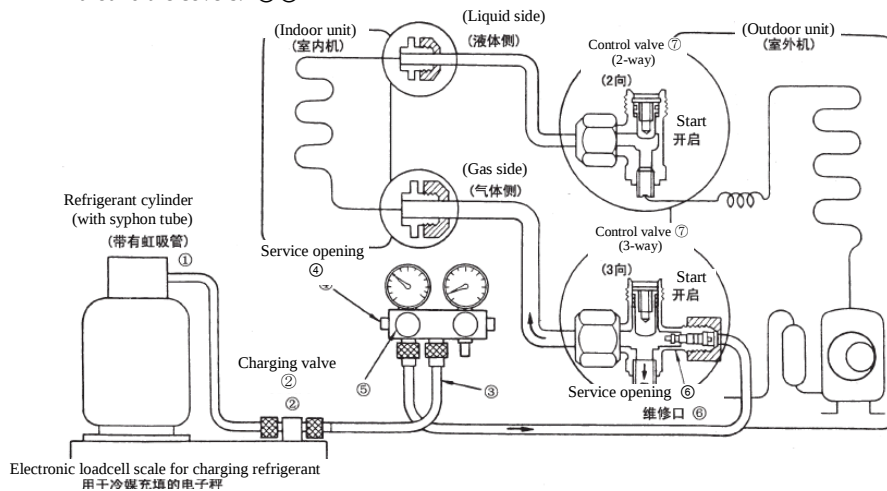


Figure 7 Structure for additional refrigerant charging

7.3.3 Removal (when new refrigerant piping is used)

(1) Removing the equipment

a) To recover refrigerant from the outdoor unit through evacuation

- Use the manifold pressure gauge for R410A in evacuation.
- Recover refrigerant from the outdoor unit when the equipment is operating in the HI POWER cooling mode.
(For the steps and precautions for recovery, see the user's manual prepared by the equipment manufacturer.)

* Precaution:

Use the refrigerant recovery device for outdoor unit in which evacuation is impossible.

b) To remove indoor unit/ outdoor unit

- Remove the pipes and wires between the indoor and outdoor units.
- Tighten the control valve and service opening of the outdoor unit to the specified torque.
- Tighten the flare nut with cap at the connection between the indoor and outdoor units to the specified torque.
- Remove the indoor unit/outdoor unit.

* Precaution:

Be careful not to break the piping for the indoor unit when it is stored in the original place.

(2) Installing the equipment

a) According to the steps described in “7.3.2 New installation”.

7.3.4 Replacing equipment (never use the existing refrigerant piping)

To replace an air conditioner using conventional refrigerant (R22) with one using the alternative refrigerant (R410A) or replace an air conditioner using the alternative refrigerant (R410A) with another using the alternative refrigerant (R410A), please use completely new refrigerant piping (1), otherwise the difference of pressure properties of refrigerants or the difference of lubricants may cause failure. (Not all air conditioners using R410A use the same type of lubricant.)

7.3.5 Refitting equipment

Do not charge the air conditioner which used the conventional refrigerant (R22) with the alternative refrigerant (R410A). Otherwise, the equipment may malfunction or such severe consequences as interruption of refrigerant cycle, etc.

7.3.6 Recharging refrigerant in servicing

If it is necessary to charge refrigerant, charge the specified amount of refrigerant by following these steps.

(For details, see the operation manual prepared by the equipment manufacturer.)

- 1) Connect the charge hose to the service opening of the outdoor unit.
- 2) Connect the charge hose to the vacuum pump adapter. Here, push the control valve to the full open position.
- 3) Push Handle *Lo* to the full open position (ON) and turn on the power switch of the vacuum pump. (For the time of evacuation, see the manual of the equipment manufacturer.)
- 4) When the pointer of the compound pressure gauge indicates -0.1MPa (-76cmHg), push Handle *Lo* to the full close position and turn off the power switch of the vacuum pump. Keep the status for 1~2 minutes and ensure the pointer of the compound pressure gauge has not turned back.
- 5) According to the steps described in 7.3.2(2) (Pages 119-120), use the electronic loadcell scale to charge liquid refrigerant.

7.4 Refrigerant recovery

7.4.1 Recovery procedure

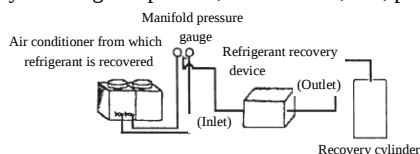
The following is the general procedure for recovering refrigerant. The recovery procedure varies depending on the type of refrigerant recovery device. The connection and disposal methods for different types of refrigerant recovery device may be different. Therefore, see the user's manual, etc. of the various equipment to learn the detailed operation information.

- (1) Check before the recovery procedure
 - a) Check the refrigerant recovery device
 - ① Gas leakage (Servicing is required when there is any failure.)
 - ② Oil extractor (for discharging residual oil)
 - ③ Weighing function, excessive charging prevention function (floating switch), moisture indicator, dryer and other ancillary functions of the recovery device (to be adjusted or replaced when necessary).
 - ④ Circuit
 - b) Check the accessories to the refrigerant recovery device.
- (2) Preparation for the recovery procedure
 - a) Installing the refrigerant recovery device

The device should be installed in the place meeting the following requirements as far as possible.

 - ① Ambient temperature above 0°C and below 40°C.
 - ② Flat, dry floor.
 - ③ A position as near the air conditioner as possible.
 - b) Preparing a recovery cylinder

Use a compliant recovery cylinder suitable for recovering refrigerant.
 - c) Connecting to the power supply
 - d) Preparing the air conditioner for refrigerant recovery
 - ① If the air conditioner from which refrigerant is to be recovered can operate, evacuate the appliance to store the refrigerant in the outdoor unit (condenser side).
 - Evacuate the air conditioner after confirming the specifications of the air conditioner from which refrigerant is to be recovered.
 - ② If there are any blocking components, such as EEV, etc., please fully open such components.



- (3) Connecting the refrigerant recovery device
 - a) Connect the air conditioner from which refrigerant is to be recovered to the refrigerant recovery device.
 - ① With service opening (recovery port):

Use the manifold pressure gauge to connect the charge hose to the service opening (recovery port).
 - ② Without service opening (recovery port):

Use the needle valve to connect in a way similar to ①.
 - b) Connect the refrigerant recovery device to the recovery cylinder.

- (4) Recovery procedure
- According to the instructions on refrigerant recovery device (see the operation manual supplied), operate the device to recover refrigerant.
 - Pay attention to the following during the operation.
 - Confirm that the refrigerant recovery device runs according to the requirements and the operation status is always monitored, so as to take correct actions in case of emergency.
 - During the operation, stay at the working site to ensure safety.
 - If you have to leave the working site due to irresistible reasons, confirm the recovery cylinder is not over charged before stopping the operation.
 - If, during the operation, the overcharge protection of the refrigerant recovery device is triggered and the device stops automatically, please replace with an empty recovery cylinder.
 - If the reading of the pressure gauge increases not long after the recovery is completed and the refrigerant recovery device stops automatically, please restart the device. If the device stops again, end the recovery.
- (5) Procedure after the recovery is completed
- Close the valves of the air conditioner from which refrigerant has been recovered, the refrigerant recovery device, and the recovery cylinder.
 - Disconnect the recovery cylinder for charging refrigerant and store it according to the regulations.

7.4.2 Accessories/tools

A number of accessories/tools are used to recover R410A.

The following are standard accessories.

(1) Recovery cylinder

- Use the recovery cylinder specified by the equipment manufacturer.
- Be sure to use a removable cylinder compliant with the laws and regulations.
- Do not use a general cylinder as recovery cylinder.
 - Note 1: The cylinder used when R410A is bought is borrowed.
 - Note 2: The cylinder used when R410A is bought, which has a check valve, can't be used as recovery cylinder.
- Types (divided by function)

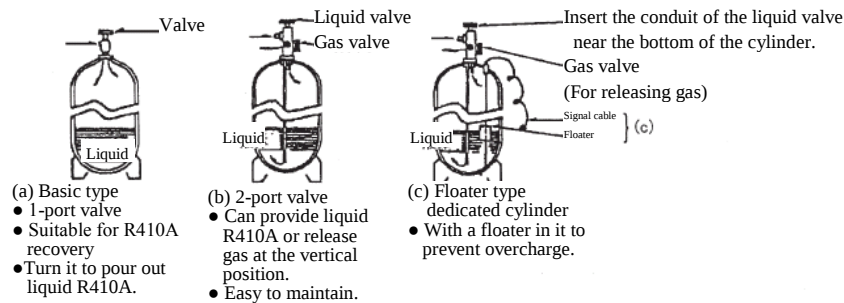


Figure 8 Types of cylinder

- Note
- Laws prohibit recovery of R410A into discarded cylinders or one-way cylinders.

(2) Dryer

- A desiccant container used to remove water from R410A
- The dryer should be used as supplies.
- Before the installation, keep the dryer sealed.
- Used to protect the R410A recovery device.

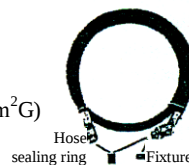
(3) Connection hose

- Charging port and charging port sealing ring
 - It is generally sold separately from the refrigerant cylinder.
 - The use of a two-port cylinder, which may have special diameter, should be confirmed by the manufacturer.
- Sealing rings are supplies.



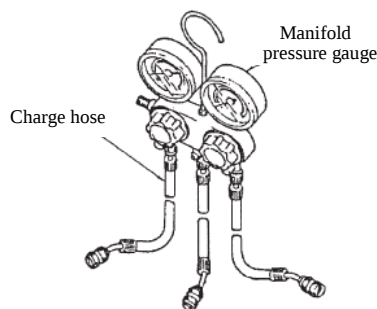
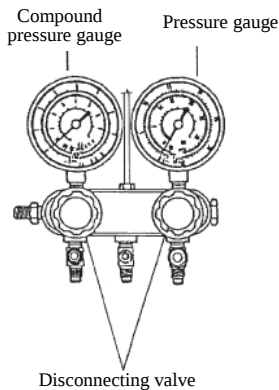
b) Charge hose (pressure resistant fluorocarbon hose) and sealing ring

- Thickness 1/48, multiple lengths available
- Hose with the pressure resistance property higher than 5.2MPa (52kg/cm²G)
- In general, only one end has fixture.



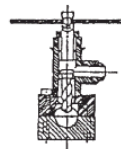
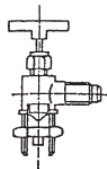
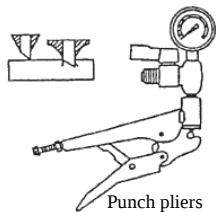
(4) Manifold pressure gauge

- The most important servicing tool for coolers and air conditioners
- It is widely used to check gas pressure when R410A is being charged/recovered.



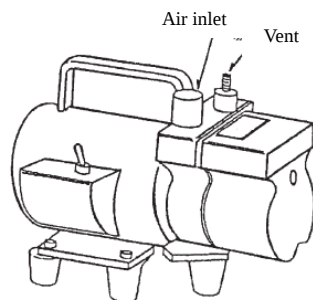
(5) Conduit needle valve

- To recover R410A from the equipment without gas charging or recovery port, use the tool to drill a hole in the copper pipe. There are a number of types available on the market which have different names.
- The edge of needle may be damaged easily, so such valve should be treated as semi-supplies.
- When the vacuum level rises, air will be absorbed into the hole easily. Therefore, please operate carefully.



(6) Vacuum pump

For evacuating the recovery device and the recovery cylinder.

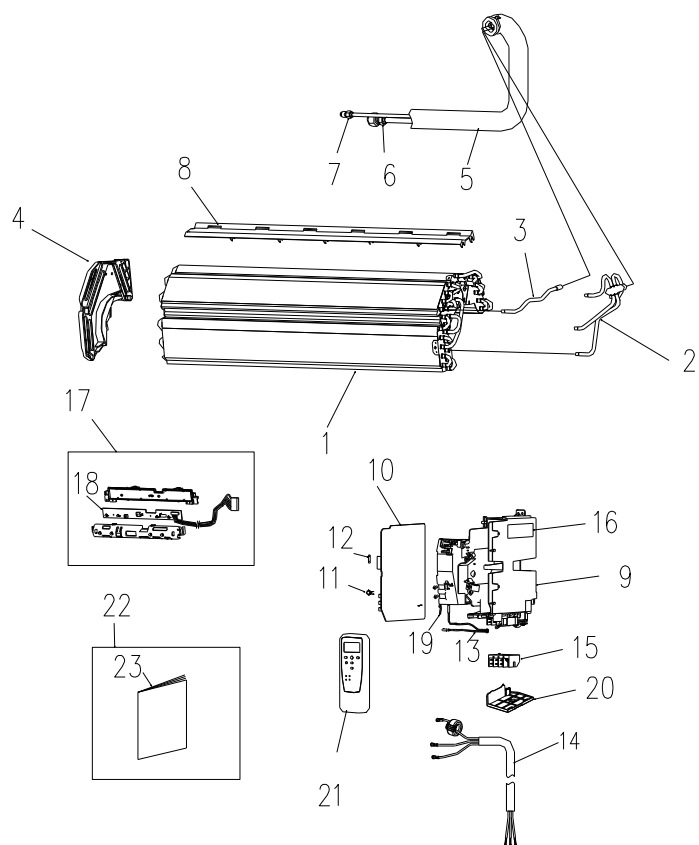


8 MOUNT ASSEMBLY**8 DISASSEMBLY EXPLANATORY DRAWING****8.1 Indoor unit****8.1.1 SRK25QA-S**

RAC-SRK25QA-S-HEAT& EXCH&CONTROL			
NO.	Part No	Parts	RE.Q
1-8	RYD301A055A	HEAT EXCH ASSY(AIR)	1
2	RYD315D013	HEADER ASSY	1
3	RYD321A061	PIPE	1
4	RYD129A053	BRACKET ASSY(L)	1
5-7	RYD321A049C	PIPE ASSY	1
6	RYG323F002	UNION,SOLDER	1
7	RYG323F002A	UNION,SOLDER	1
8	RYD129A038	PLATE,BAFFLE	1
9	RYD142A037	BOX,CONTROL	1
10-16	RYD501A068J	CONTROL ASSY	1
10-12	RYD505A055B	PWB ASSY	1
11	RYG555B002A	VASTOR	1
12	RYS564A001	FUSE(CURRENT)	1
13	RYD551A009A	SENSOR ASSY	1
14	RYD566A094	CORD,POWER	1
15	RYG561B001A	BLOCK,TERMINAL	1
16	RYD011G018A	LABEL,WIRING	1

17	RYD503A011A	DISPLAY ASSY	1
18	RYD505A029A	PWB ASSY(DISPLAY)	1
19	RYF941F001	SPRING,LEAF	1
20	RYD142A041	COVER	1
21	RYD502A016	CONTROL ASSY,REMOTE	1
22	RYD008A043D	PARTS,STANDARD	1
23	RYD012A192	MANUAL,INSTRUCTION&INST	1
24	RYD011H050D	ENERGY LABEL	1

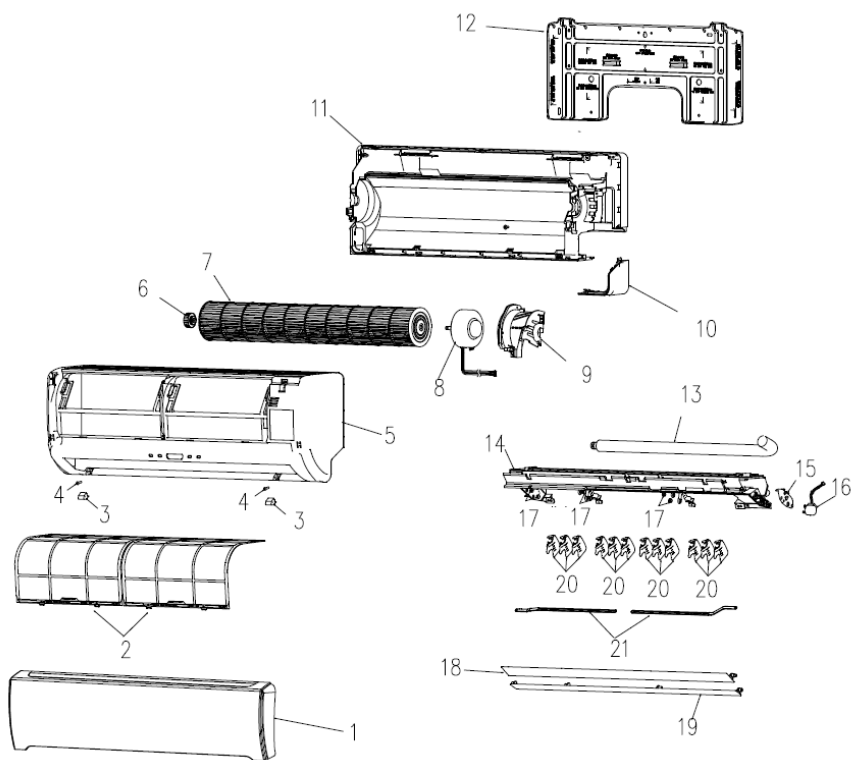
HEAT EXCH & CONTROL



RAC-SRK25QA-S-PANEL&FAN ASSY			
NO.	Part No	Parts	RE.Q
1-5	RYD102A024AH	PANEL ASSY,FRONT	1
1	RYD435A050C	GRILLE,AIR INLET(A)	1
2	RYD437A015	NET	2
3	RYD129A046A	CAP	2
4	W010D04X008	TAP-SCREW,CRS-TRS 2	6
5	RYD122A017R	PANEL,FRONT	1
6	RYG923C001	BEARING,PLANE	1
7	RYD431G001	IMPELLER	1
8	RYD511A015	MOTOR,AC	1
9	RYD129A039	COVER(MOTOR)	1
10	RYD132A005	LID	1
11	RYD111A010	BASE ASSY	1
12	RYD032A006A	PLATE,INSTALLATION	1
13-21	RYD435A023H	GRILLE ASSY,AIR OUT	1
13	RYD423A005	HOSE,DRAIN	1
14	RYD435A023H	GRILLE ASSY,AIR OUT	1
15	RYD129A043	BRACKET,MOTOR(A)	1
16	RYD512T002H	MOTOR,STEPPING	1
17	RYD935C001	COLLAR	6

18	RYD436A018J	FLAP(A)	1
19	RYD436A019J	FLAP(B)	1
20-21	RYD436A021	LOUVER ASSY	1
20	RYD436A020	LOUVER	12
21	RYD129A048	PLATE,CONNECTING	2

PANEL & FAN ASSY

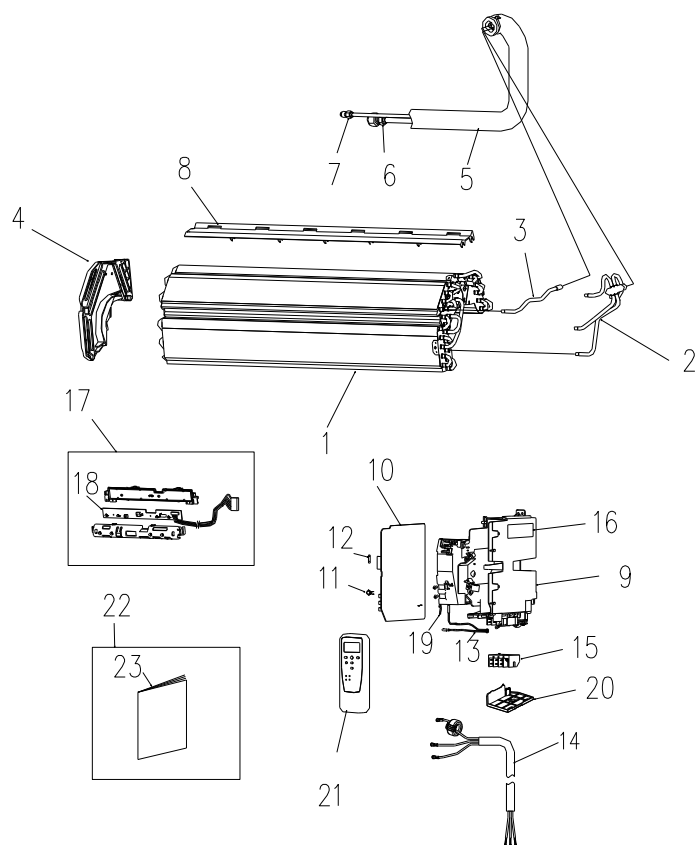


8.1.2 SRK35QA-S

RAC-SRK35QA-S-HEAT& EXCH&CONTROL			
NO.	Part No	Parts	RE.Q
1-8	RYD301A036F	HEAT EXCH ASSY(AIR)	1
2	RYD315D015	HEADER ASSY	1
3	RYD321A065	PIPE	1
4	RYD129A053	BRACKET ASSY(L)	1
5-7	RYD321A049C	PIPE ASSY	1
6	RYG323F002	UNION,SOLDER	1
7	RYG323F002A	UNION,SOLDER	1
8	RYD129A038	PLATE,BAFFLE	1
9	RYD142A037	BOX,CONTROL	1
10-16	RYD501A068K	CONTROL ASSY	1
10-12	RYD505A055C	PWB ASSY	1
11	RYG555B002A	VASTOR	1
12	RYS564A001	FUSE(CURRENT)	1
13	RYD551A009A	SENSOR ASSY	1

14	RYD566A094	CORD,POWER	1
15	RYG561B001A	BLOCK,TERMINAL	1
16	RYD011G018A	LABEL,WIRING	1
17	RYD503A011A	DISPLAY ASSY	1
18	RYD505A029A	PWB ASSY(DISPLAY)	1
19	RYF941F001	SPRING,LEAF	1
20	RYD142A041	COVER	1
21	RYD502A016	CONTROL ASSY,REMOTE	1
22	RYD008A043D	PARTS,STANDARD	1
23	RYD012A192	MANUAL,INSTRUCTION&INST	1
24	RYD011H050F	ENERGY LABEL	1

HEAT EXCH & CONTROL

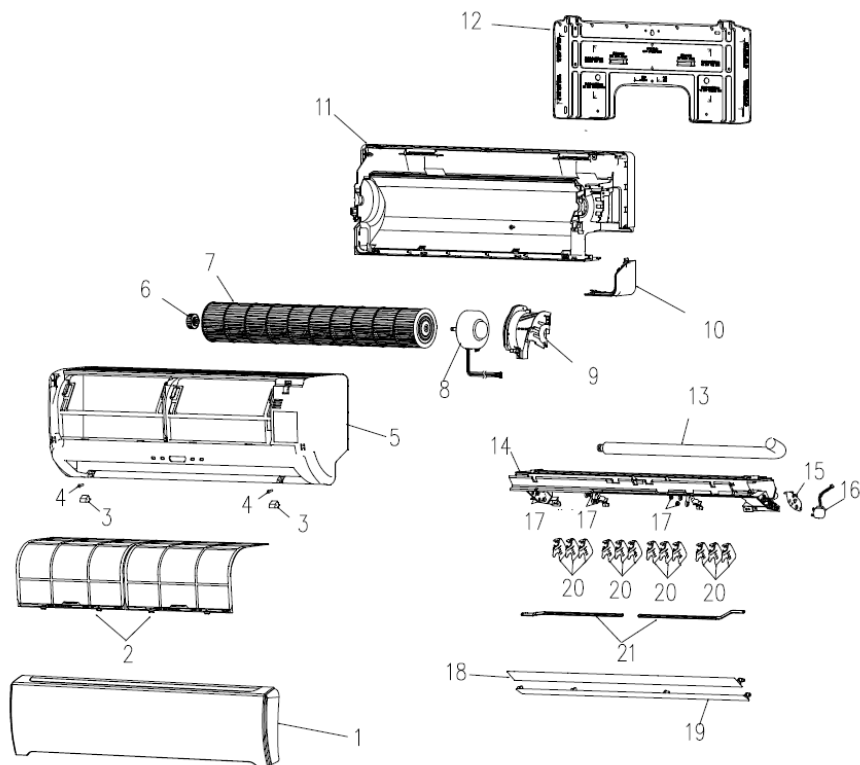


RAC-SRK35QA-S-PANEL&FAN ASSY

NO.	Part No	Parts	RE.Q
1-5	RYD102A024AH	PANEL ASSY,FRONT	1
1	RYD435A050C	GRILLE,AIR INLET(A)	1
2	RYD437A015	NET	2
3	RYD129A046A	CAP	2
4	W010D04X008	TAP-SCREW,CRS-TRS 2	6
5	RYD122A017R	PANEL,FRONT	1
6	RYG923C001	BEARING,PLANE	1
7	RYD431G001	IMPELLER	1
8	RYD511A015	MOTOR,AC	1
9	RYD129A039	COVER(MOTOR)	1
10	RYD132A005	LID	1
11	RYD111A010	BASE ASSY	1
12	RYD032A006A	PLATE,INSTALLATION	1
13-21	RYD435A023H	GRILLE ASSY,AIR OUT	1
13	RYD423A005	HOSE,DRAIN	1
14	RYD435A023H	GRILLE ASSY,AIR OUT	1
15	RYD129A043	BRACKET,MOTOR(A)	1
16	RYD512T002H	MOTOR,STEPPING	1
17	RYD935C001	COLLAR	6
18	RYD436A018J	FLAP(A)	1
19	RYD436A019J	FLAP(B)	1

20-21	RYD436A021	LOUVER ASSY	1
20	RYD436A020	LOUVER	12
21	RYD129A048	PLATE,CONNECTING	2

PANEL & FAN ASSY



8.2 Outdoor unit

8.2.1 SRC25QA-S

SRC25QA-S-HEAT EXCH&CONTROL

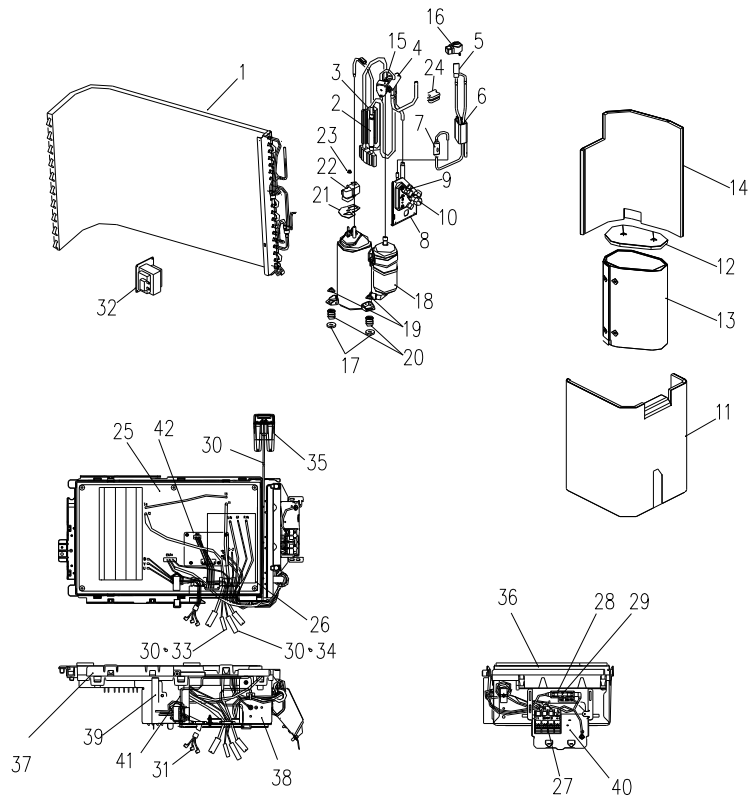
NO.	Parts No	Parts Name	RE.Q
1	RYF301A042	HEAT EXCH ASSY(AIR)	1
2-10	RYF304A156F	PIPING ASSY(4WAY)	1
2	RYF325A005	PIPE,SHELL	1
3	RYC325A001	PIPE,SHELL	1
4	RYF382C010	VALVE,S(4WAY)	1
5-7	RYF304A109B	PIPING ASSY(EXPAN)	1
5	SSA387F062	VALVE,BODY(EXP)	1
6	RYF315B048	CAPILLARY	1
7	RYG357A003	STRAINER	1
8	RYF116A008	BRACKET,VALVE	1
9	RYF381A070	VALVE,SERVICE(1/4")	1
10	RYF381A069	VALVE,SERVICE(3/8")	1
11	RYF154D009B	INSULATION,COMP	1
12	RYF154D013	INSULATION,COMP	1
13	RYF154D037	INSULATION,COMP	1
14	RYF154D011A	INSULATION,COMP	1
15	RYF382F013	COIL,SOLENOID	1
16	SSA382F220	COIL,SOLENOID	1

17-23	RYF200A057	FINAL ASSY,COMP	1
17	RYF932C019	RUBBER WASHER	3
18	AHT201A864DS	COMPRESSOR ASSY	1
19	SSA914C013A	NUT,FLANGE	3
20	RYF941C014	CUSHION,RUBBER	3
21	RYF932C018	GASKET,COVER	1
22	RSA947K005	COVER,TERMINAL	1
23	RYF914C008	NUT,FLANGE	1
24	SSA941C294	CUSHION,RUBBER	1
25-42	RYF501A040D	CONTROL ASSY	1
25	RYF505A008B	PWB ASSY	1
26	RYF011G020C	LABEL,WIRING	1
27	RYG561B001A	BLOCK,TERMINAL	1
28	RYG564A002	HOLDER,FUSE	1
29	RYG564A003	FUSE(CURRENT)	1
30	RYG551A009	SENSOR ASSY	1
31	RYF504A021C	WIRING ASSY	1
32	RYF554B001	REACTOR	1
33	RYF941F001	SPRING,LEAF	1
34	RYG941F001	SPRING,LEAF	1
35	RYF129A003	HOLDER,SENSOR	1
36	RYF142A014C	LID ASSY,CONTROL	1

37	RYF142A017	BOX ASSY,CONTROL	1
38	RYF142A010	BOX,CONTROL(A)	1
39	RYF116A015	BRACKET	1
40	RYF116A014	BRACKET(TB)	1
41	RYF142A011	LID	1
42	RYF505A010	PWB ASSY(SUB)	1
(43)	RYF011F037D	LABEL,MODEL NAME	1
(44)	RYF011H029D	ENERGY LABEL	1
(45)	RYC008A002	PARTS,STANDARD	1
(46)	RYA008A015G	PARTS-SET	1

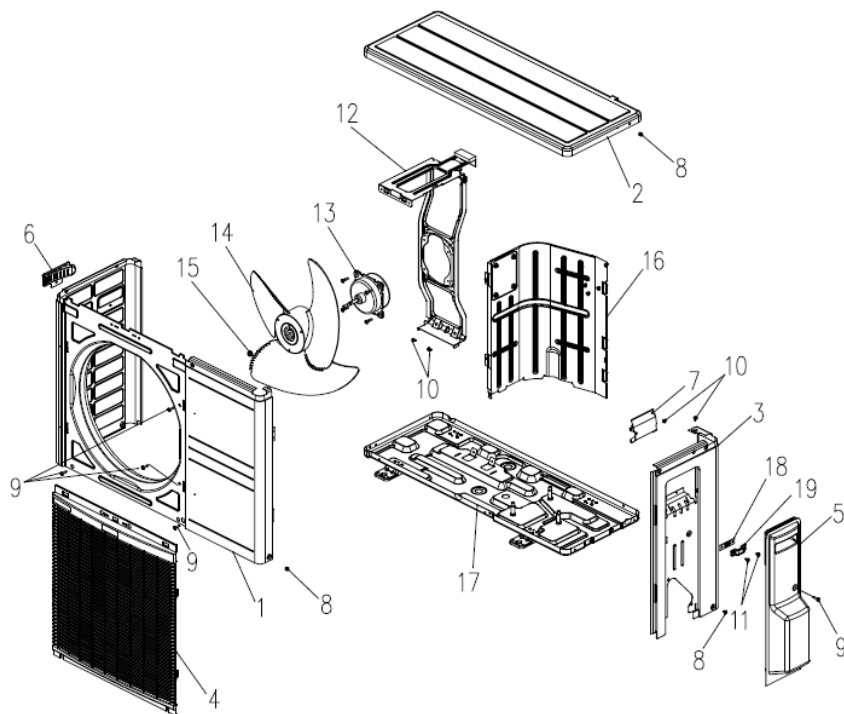
Примечание [微软用户1]: 删除此行

HEAT EXCH & CONTROL



SRC25QA-S-PANEL&FAN ASSY			
NO.	Parts No	Parts Name	RE.Q
1	RYF122A002	PANEL ASSY,FRONT	1
2	RYF124A001A	PANEL,TOP	1
3	RYF123A002	PANEL,SIDE(R)	1
4	RYF435A003A	GRILL ASSY,AIR OUT	1
5	RYF132A002	PANEL ASSY,SERVICE	1
6	RYF944B001	HANDLE	1
7	RYF142A013	COVER(TB)	1
8	RYF913A002	SCREW,TAP	12
9	RYF913A002A	SCREW,TAP	5
10	W010D04X008	TAP-SCREW,CRS-TRS 1	6
11	W010D04X012	TAP-SCREW,CRS-TRS 1	2
12-15	RYF401A011K	FAN EQUIP ASSY	1
12	RYF116A006	BRACKET ASSY , MOTOR	1
13	RYF511A049	MOTOR,AC	1
14	RYF431B502	PROPELLER	1
15	SSA914B007CC	NUT,TH	1
16	RYF141A005	PLATE ,BAFFLE	1
17	RYF111A003F	BASE ASSY	1
18	RYF129A006	PLATE	1
19	RYF937A002A	CLAMP,WIRE	1

PANEL & FAN ASSY



8.2.2 SRC35QA-S

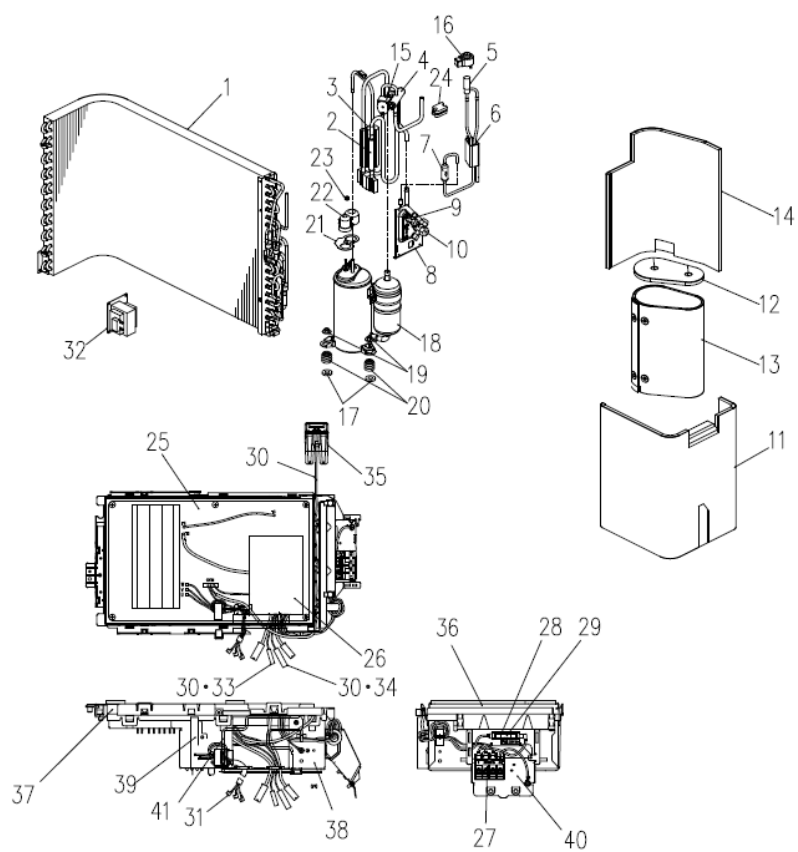
SRC35QA-S-HEAT EXCH&CONTROL			
NO.	Parts No	Parts Name	RE.Q
1	RYF301A044A	HEAT EXCH ASSY(AIR)	1
2-10	RYF304A169A	PIPING ASSY(4WAY)	1
2	RYF325A005	PIPE,SHELL	1
3	RYC325A001	PIPE,SHELL	1
4	RYF382C010	VALVE,S(4WAY)	1
5-7	RYF304A170	PIPING ASSY(EXPAN)	1
5	SSA387F051	VALVE,BODY(EXP)	1
6	RYF315B048	CAPILLARY	1
7	RYG357A003	STRAINER	1
8	RYF116A008	BRACKET,VALVE	1
9	RYF381A070	VALVE,SERVICE(1/4")	1
10	RYF381A069	VALVE,SERVICE(3/8")	1
11	RYF154D009B	INSULATION,COMP	1
12	RYF154D013	INSULATION,COMP	1
13	RYF154D037	INSULATION,COMP	1
14	RYF154D011A	INSULATION,COMP	1
15	RYF382F013	COIL,SOLENOID	1
16	SSA382F210AY	COIL,SOLENOID	1
17-23	RYF200A057	FINAL ASSY,COMP	1

17	RYF932C019	RUBBER WASHER	3
18	AHT201A864DS	COMPRESSOR ASSY	1
19	SSA914C013A	NUT,FLANGE	3
20	RYF941C014	CUSHION,RUBBER	3
21	RYF932C018	GASKET,COVER	1
22	RSA947K005	COVER,TERMINAL	1
23	RYF914C008	NUT,FLANGE	1
24	SSA941C294	CUSHION,RUBBER	1
25-41	RYF501A040F	CONTROL ASSY	1
25	RYF505A008C	PWB ASSY	1
26	RYF011G020D	LABEL,WIRING	1
27	RYG561B001A	BLOCK,TERMINAL	1
28	RYG564A002	HOLDER,FUSE	1
29	RYG564A003	FUSE(CURRENT)	1
30	RYG551A009	SENSOR ASSY	1
31	RYF504A021C	WIRING ASSY	1
32	RYF554B001	REACTOR	1
33	RYF941F001	SPRING,LEAF	1
34	RYG941F001	SPRING,LEAF	1
35	RYF129A003	HOLDER,SENSOR	1
36	RYF142A014C	LID ASSY,CONTROL	1
37	RYF142A017	BOX ASSY,CONTROL	1

38	RYF142A010	BOX,CONTROL(A)	1
39	RYF116A015	BRACKET	1
40	RYF116A014	BRACKET(TB)	1
41	RYF142A011	LID	1
(42)	RYF011F037F	LABEL,MODEL NAME	1
(43)	RYF011H029F	ENERGY LABEL	1
(44)	RYC008A002	PARTS,STANDARD	1
(45)	RYA008A015G	PARTS SET	1

Примечание [微软用户2]: 删除此行

HEAT EXCH & CONTROL

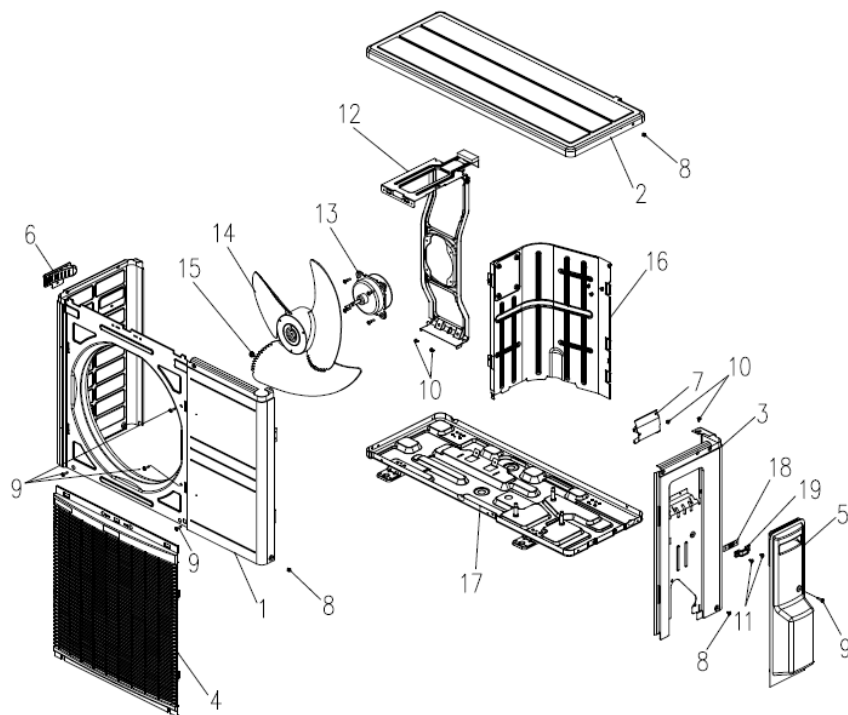


SRC35QA-S-PANEL&FAN ASSY

NO.	Parts No	Parts Name	RE.Q
1	RYF122A002	PANEL ASSY,FRONT	1
2	RYF124A001A	PANEL,TOP	1
3	RYF123A002	PANEL,SIDE(R)	1
4	RYF435A003A	GRILL ASSY,AIR OUT	1
5	RYF132A002	PANEL ASSY,SERVICE	1
6	RYF944B001	HANDLE	1
7	RYF142A013	COVER(TB)	1
8	RYF913A002	SCREW,TAP	12
9	RYF913A002A	SCREW,TAP	5
10	W010D04X008	TAP-SCREW,CRS-TRS 1	6
11	W010D04X012	TAP-SCREW,CRS-TRS 1	2
12-15	RYF401A011F	FAN EQUIP ASSY	1
12	RYF116A006	BRACKET ASSY , MOTOR	1
13	SSA512T094A	MOTOR,DC	1
14	RYF431B502	PROPELLER	1
15	SSA914B007AC	NUT,TH	1
16	RYF141A005	PLATE ,BAFFLE	1
17	RYF111A003F	BASE ASSY	1
18	RYF129A006	PLATE	1

19	RYF937A002A	CLAMP,WIRE	1
----	-------------	------------	---

PANEL & FAN ASSY



VARIABLE FREQUENCY WALL MOUNTED TYPE ROOM AIR CONDITIONERS



MITSUBISHI HEAVY INDUSTRIES EUROPE, LTD.

AIR-CONDITIONING DIVISION

4th Floor, International Buildings, 71 Kingsway London WC2B 6ST, U.K.

Phone: +44 (0) 20 7421 6208

Fax: +44 (0) 20 7421 6209