



SERVICE MANUAL

INVERTER FLOOR STANDING TYPE RESIDENTIAL AIR-CONDITIONERS (Split system, air to air heat pump type)

SRF25ZS-W / SRC25ZS-W2

SRF35ZS-W / SRC35ZS-W2

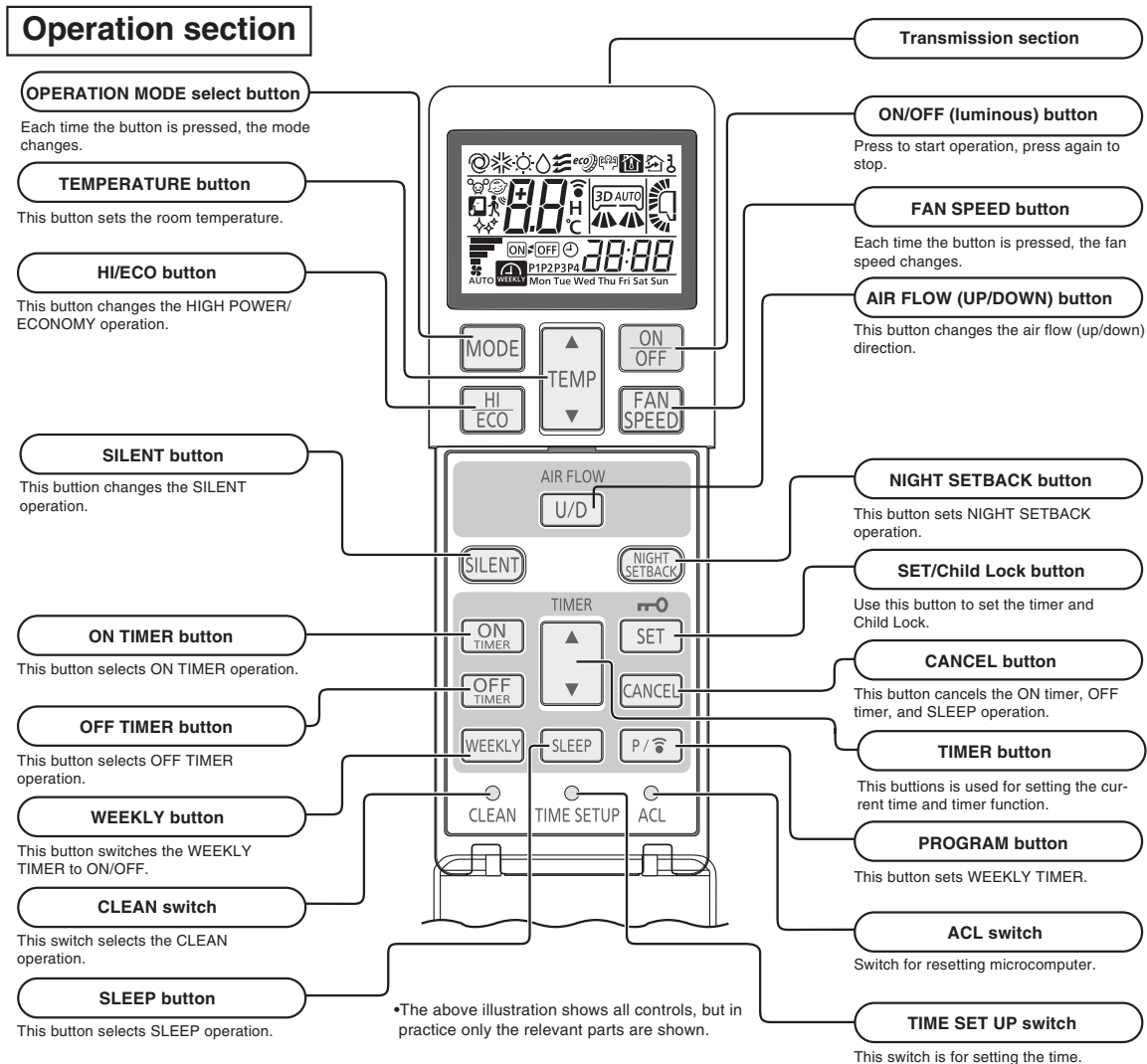
SRF50ZSX-W / SRC50ZSX-W2

CONTENTS

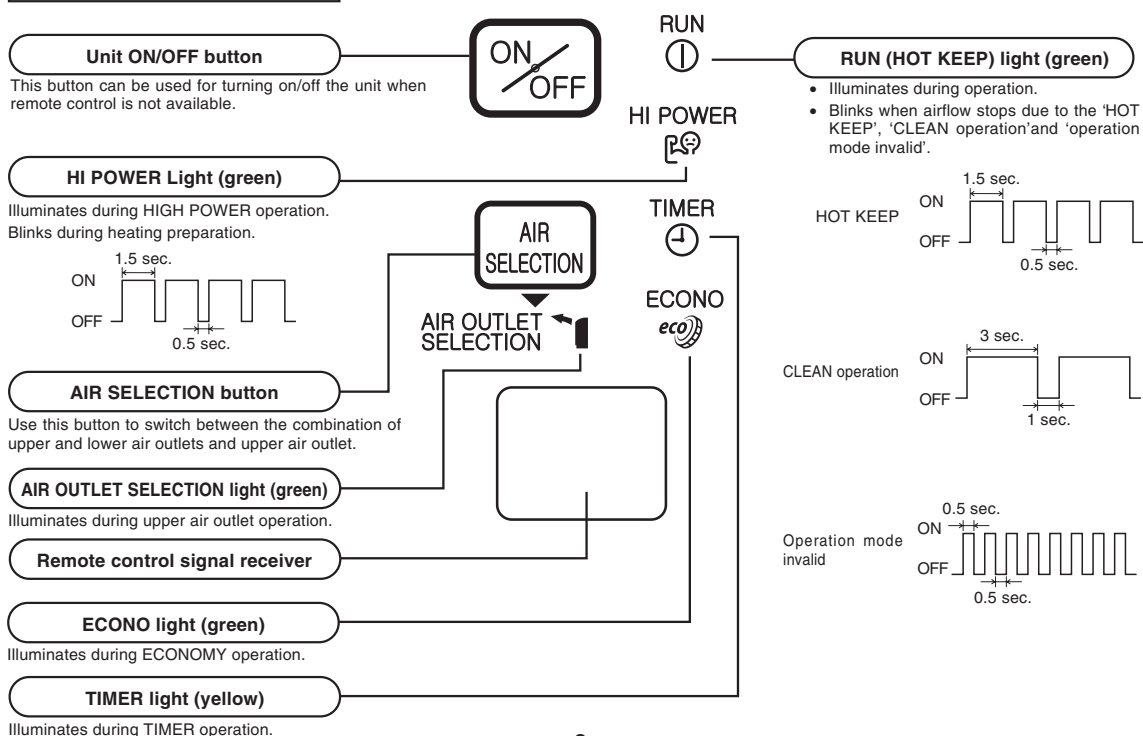
1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER	2
(1) Operation control function by wireless remote control	2
(2) Unit ON/OFF button	3
(3) Auto restart function	3
(4) Installing two air-conditioners in the same room	3
(5) Selection of the annual cooling function	4
(6) High power operation	4
(7) Economy operation	4
(8) Flap control	5
(9) Air outlet selection	5
(10) Timer operation	6
(11) Silent mode	6
(12) Night setback	6
(13) Outline of heating operation	6
(14) Outline of cooling operation	8
(15) Outline of dehumidifying (DRY) operation	9
(16) Outline of automatic operation	9
(17) Protective control function	10
2. MAINTENANCE DATA	18
(1) Cautions	18
(2) Items to check before troubleshooting	18
(3) Troubleshooting procedure (If the air-conditioner does not run at all)	18
(4) Troubleshooting procedure (If the air-conditioner runs)	19
(5) Self-diagnosis table	20
(6) Service mode (Trouble mode access function)	21
(7) Inspection procedures corresponding to detail of trouble	29
(8) Phenomenon observed after short-circuit, wire breakage on sensor	33
(9) Checking the indoor electrical equipment	34
(10) How to make sure of wireless remote control	35
(11) Inspection procedure for blown fuse on the indoor and outdoor unit PCB	35
(12) Outdoor unit inspection points	36
3. ELECTRICAL WIRING	39
4. PIPING SYSTEM	42

1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(1) Operation control function by wireless remote control



Unit display section



(2) Unit ON/OFF button

When the wireless remote control batteries become weak, or if the wireless remote control is lost or malfunctioning, this button may be used to turn the unit on and off.

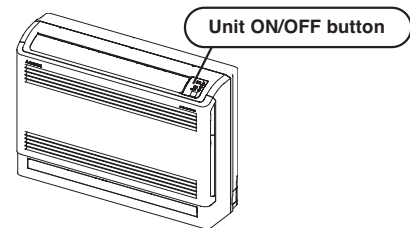
(a) Operation

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(b) Details of operation

The unit will go into the automatic mode in which it automatically determines, from indoor temperature (as detected by sensor), whether to go into COOL, DRY or HEAT modes.

Function	Indoor temperature setting	Fan speed	Flap/Louver	Timer switch
Operation mode				
COOL	About 24°C	Auto	Auto	Continuous
DRY	About 25°C			
HEAT	About 26°C			



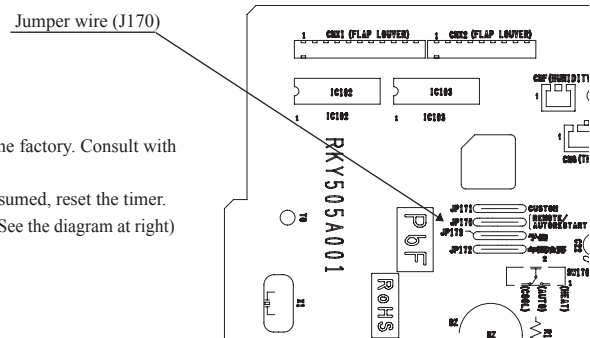
(3) Auto restart function

(a) Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

(b) The following settings will be cancelled:

- (i) Timer settings
- (ii) HIGH POWER operation

- Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
 (2) When power failure occurs, the timer setting is cancelled. Once power is resumed, reset the timer.
 (3) If the jumper wire (J170) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)

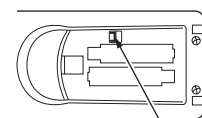


(4) Installing two air-conditioners in the same room

When two air-conditioners are installed in the room, use setting when the two air-conditioners are not operated with one wireless remote control. Set the wireless remote control and indoor unit.

(a) Setting the wireless remote control

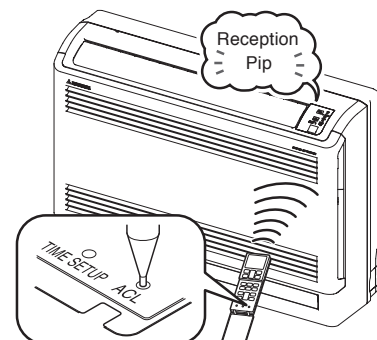
- (i) Pull out the cover and take out batteries.
- (ii) Disconnect the switching line next to the battery with wire cutters.
- (iii) Insert batteries, Close the cover.



Disconnect

(b) Setting an indoor unit

- (i) Turn off the power source, and turn it on after 1 minute.
- (ii) Point the wireless remote control that was set according to the procedure described on the left side at the indoor unit and send a signal by pressing the ACL switch on the wireless remote control.
 Since the signal is sent in about 6 seconds after the ACL switch is pressed, point the wireless remote control at the indoor unit for some time.
- (iii) Check that the reception buzzer sound "Pip" is emitted from the indoor unit.
 At completion of the setting, the indoor unit emits a buzzer sound "Pip".
 (If no reception tone is emitted, start the setting from the beginning again.)



(5) Selection of the annual cooling function

(a) The annual cooling control is valid from factory default setting. It is possible to disable by cutting jumper wire (J172), or changing the setting of DIP switch (SW2-4) on the interface kit (option) PCB if it is connected.

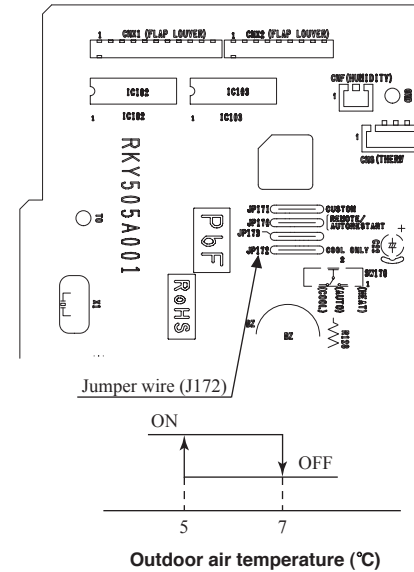
Jumper wire (J172)	Interface kit (SC-BIKN2-E) SW2-4	Function
Shorted	ON	Enabled
Shorted	OFF	Disabled
Open	ON	Disabled
Open	OFF	Disabled

Note: (1) Default states of the jumper wire (J172) and the interface kit at the shipping from factory – On the PCB, the DIP switch (SW2-4) is set to enable the annual cooling function.

(2) To cancel the annual cooling setting, consult your dealer.

(b) Content of control

- (i) If the outdoor air temperature sensor (TH3) detects below 5°C, the indoor unit speed is switched to 8th step.
- (ii) If the outdoor air temperature sensor (TH3) detects higher than 7°C, the indoor unit speed is changed to the normal control speed.



(6) High power operation

Pressing the HI POWER/ECONO button intensifies the operating power and initiates powerful cooling and heating operation for 15 minutes continuously. The wireless remote control displays and the FAN SPEED display disappears.

- (a) During the HIGH POWER operation, the room temperature is not controlled. When it causes an excessive cooling and heating, press the HI POWER/ECONO button again to cancel the HIGH POWER operation.
- (b) HIGH POWER operation is not available during the DRY and the program timer operations.
- (c) When HIGH POWER operation is set after ON TIMER operation, HIGH POWER operation will start from the set time.
- (d) When the following operation are set, HIGH POWER operation will be canceled.
 - ① When the HI POWER/ECONO button is pressed again.
 - ② When the operation mode is changed.
 - ③ When it has been 15 minutes since HIGH POWER operation has started.
 - ④ When the SILENT button is pressed.
 - ⑤ When the NIGHT SETBACK button is pressed.
- (e) Not operable while the air-conditioner is OFF.
- (f) After HIGH POWER operation, the sound of refrigerant flowing may be heard.

(7) Economy operation

Pressing the HI POWER/ECONO button initiate a soft operation with the power suppressed in order to avoid an excessive cooling or heating. The unit operate 1.5°C higher than the setting temperature during cooling or 2.5°C lower than that during heating. The wireless remote control displays ECONO mark and the FAN SPEED display disappears.

- (a) It will go into ECONOMY operation at the next time the air-conditioner runs in the following cases.
 - ① When the air-conditioner is stopped by ON/OFF button during ECONOMY operation
 - ② When the air-conditioner is stopped in SLEEP or OFF TIMER operation during ECONOMY operation
 - ③ When the operation is retrieved from CLEAN operation
- (b) When the following operation are set, ECONOMY operation will be canceled.
 - ① When the HI POWER/ECONO button is pressed again
 - ② When the operation mode is changed DRY to FAN
 - ③ When the NIGHT SETBACK button is pressed
- (c) Not operable while the air-conditioner is OFF.
- (d) The setting temperature is adjusted according to the following table.

Item	Mode	Cooling	Heating
	Temperature adjustment	①	+0.5
②		+1.0	- 2.0
③		+1.5	- 2.5

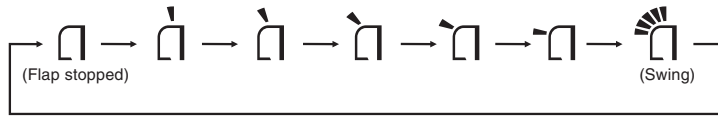
- ① at the start of operation
- ② one hour after the start of operation
- ③ two hours after the start of operation

(8) Flap control






Control the flap by AIR FLOW  (UP/DOWN) button on the wireless remote control.

(a) Flap

Each time when you press the AIR FLOW  (UP/DOWN) button the mode changes as follows.



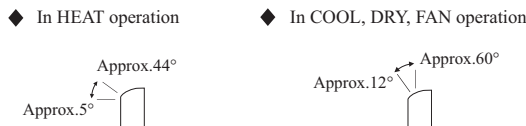
• Angle of Flap from horizontal

Remote control display					
COOL , DRY, FAN	Approx. 60°	Approx. 50°	Approx. 38°	Approx. 21.5°	Approx. 12°
HEAT	Approx. 44°	Approx. 32°	Approx. 21.5°	Approx. 12°	Approx. 5°

(b) Swing

(i) Swing flap

Flap moves in upward and downward directions continuously.



(c) Memory flap (Flap stopped)

When you press the AIR FLOW button once while the flap is operating, it stops swinging at the position. Since this angle is memorized in the microcomputer, the flap will automatically be set at this angle when the next operation is started.

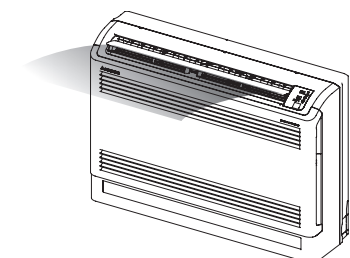
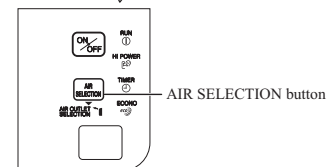
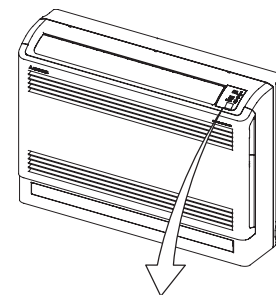
(d) When not operating

The flap returns to the position of air flow directly below, when operation has stopped.

(9) Air outlet selection

(a) AIR SELECTION button can switch between the combination of upper and lower air outlets and upper air outlet. Not operable while the air-conditioner is OFF.

- (i) Each time the AIR SELECTION button is pressed. The combination of the upper and lower air outlets and the upper air outlet can be switched.
- (ii) When the upper air outlet is selected, AIR OUTLET SELECTION light on the unit display area will light green.



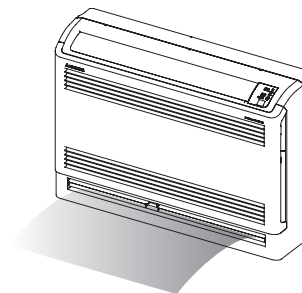
(b) Auto air outlet selection

(i) COOL, DRY operation

- 1) In case both lower and upper outlets operation is selected in Cooling or Dry operation, both outlets will be kept for sixty minutes after the start or until indoor temperature is below the setting point. And then the air outlet will change to the upper outlet. That state will be maintained until switch is turned off.
- 2) In case both outlets operation with auto fan speed mode is selected, the upper outlet will be kept for ten minutes after the start or until indoor temperature is close to reaching the setting point. And then the air outlet will change to both outlets in order to spread comfort air to every corner.

(ii) HEAT operation

- 1) In case both lower and upper outlets operation with auto fan speed mode is selected, the lower outlet will be kept for twenty minutes after the start or until room temperature is close to reaching the setting point . And then the air outlet will change to both outlets. That state will be maintained until the switch is turned off.
- 2) Automatic adjustment of lower air outlet direction prevents stirring up of warm air and keeps optimum comfort at floor level.



(10) Timer operation

(a) Comfortable timer setting (ON timer)

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the room temperature at the setting time (temperature of room temperature sensor) and the setting temperature.

(b) Sleep timer operation

Pressing the SLEEP button causes the temperature to be controlled with respect to the set temperature.

(c) OFF timer operation

The Off timer can be set at a specific time (in 10-minute units) within a 24-hour period.

(d) Weekly timer operation

Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.

(11) Silent mode

As “Silent mode start” signal is received from the wireless remote control, it operates by dropping the outdoor fan tap and the compressor command speed.

	SRF25ZS-W		SRF35ZS-W		SRF50ZSX-W	
	Cooling	Heating	Cooling	Heating	Cooling	Heating
Outdoor fan tap (Upper limit)	4th speed	4th speed	5th speed	4th speed	5th speed	5th speed
Compressor command speed (Upper limit)	37 rps	49 rps	46 rps	56 rps	43 rps	48 rps

(12) Night setback

As “Night setback” signal is received from the wireless remote control, the heating operation starts with the setting temperature at 10°C.

(13) Outline of heating operation

(a) Operation of major functional components in heating mode

	Heating		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON(HOT KEEP)	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF
4-way valve	ON	ON	OFF (3 minutes ON)

(b) Details of control at each operation mode (pattern)**(i) Fuzzy operation**

Deviation between the room temperature setting correction temperature and the return air temperature is calculated in accordance with the fuzzy rule, and used for control of the air capacity and the compressor speed.

Fan speed \ Model	SRF25ZS-W	SRF35ZS-W	SRF50ZSX-W
Auto	20-102rps	20-115rps	12-110rps
HI	20-102rps	20-115rps	12-110rps
MED	20-76rps	20-98rps	12-80rps
LO	20-66rps	20-92rps	12-70rps
ULO	20-58rps	20-80rps	12-60rps

When the defrost operation, protection device, etc. is actuated, operation is performed in the corresponding mode.

(ii) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor blower is controlled based on the temperature of the indoor heat exchanger (Th2) to prevent blowing of cool wind.

However, if the fan speed setting is Hi and room temperature is 19°C or higher, this control is not executed.

(c) Defrost operation

(i) Starting conditions (Defrost operation can be started only when all of the following conditions are satisfied.)

1) After start of heating operation

When it elapsed 35 minutes (Accumulated compressor operation time)

2) After end of defrost operation

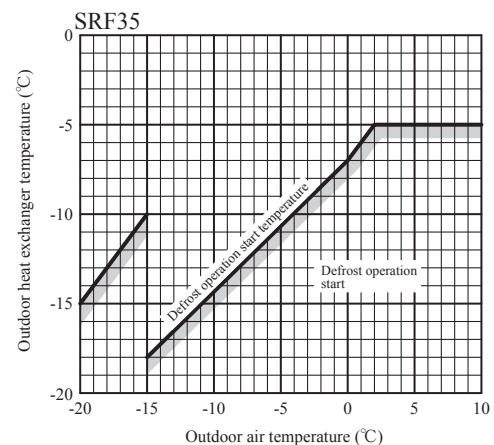
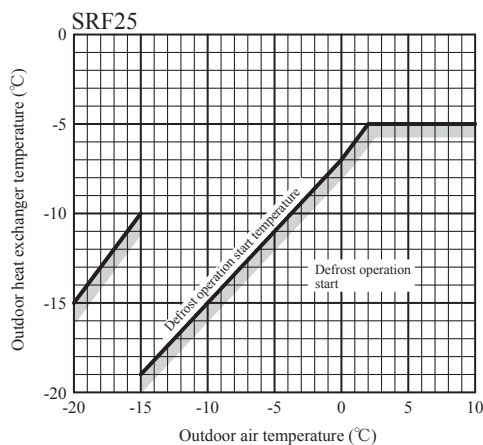
When it elapsed 35 minutes (Accumulated compressor operation time)

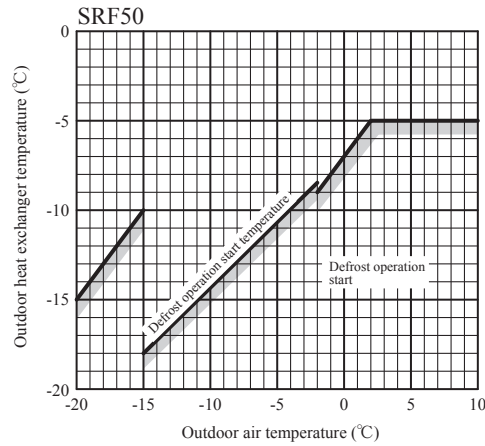
3) Outdoor heat exchanger temperature sensor (TH1)

When the temperature has been below -5°C for 3 minutes continuously

4) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature (TH2-TH1)

- The outdoor air temperature $\geq 0^\circ\text{C}$ (SRF50 : $\geq -2^\circ\text{C}$) : 7°C or higher
- $-15^\circ\text{C} \leq$ The outdoor air temperature $< 0^\circ\text{C}$ (SRF50 : $\geq -2^\circ\text{C}$) : $3/15 \times$ The outdoor air temperature + 7°C or higher (SRF25)
 $4/15 \times$ The outdoor air temperature + 7°C or higher (SRF35, 50)
- The outdoor air temperature $< -15^\circ\text{C}$: -5°C or higher





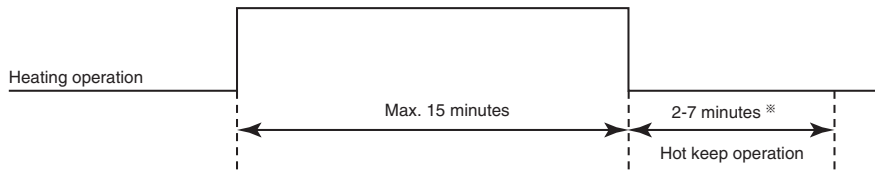
5) During continuous compressor operation

In addition, when the speed command from the indoor control of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of 1), 2) and 3) above and the outdoor air temperature is 3°C or less are satisfied (note that when the temperature for outdoor heat exchanger temperature sensor (TH1) is -5°C or less: 62 rps or more, -4°C or less: less than 62 rps), defrost operation is started.

(ii) Ending conditions (Operation returns to the heating cycle when either one of the following is satisfied.)

- 1) Outdoor heat exchanger temperature sensor (TH1) : 13°C (SRF50 : 10°C) or higher
- 2) Continued time of defrost operation → For more than 15 minutes

● Defrost operation



※Depends on an operation condition, the time can be longer than 7 minutes.

(14) Outline of cooling operation

(a) Operation of major functional components in cooling mode

	Cooling		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF (few minutes ON)
4-way valve	OFF	OFF	OFF

(b) Detail of control in each mode (Pattern)

(i) Fuzzy operation

During the fuzzy operation, the air flow and the compressor speed are controlled by calculating the difference between the room temperature setting correction temperature and the return air temperature.

Model	SRF25ZS-W	SRF35ZS-W	SRF50ZSX-W
Fan speed			
Auto	15-72rps	15-104rps	12-86rps
HI	15-72rps	15-104rps	12-86rps
MED	15-48rps	15-71rps	12-58rps
LO	15-40rps	15-58rps	12-48rps
ULO	15-34rps	15-46rps	12-38rps

(15) Outline of dehumidifying (DRY) operation

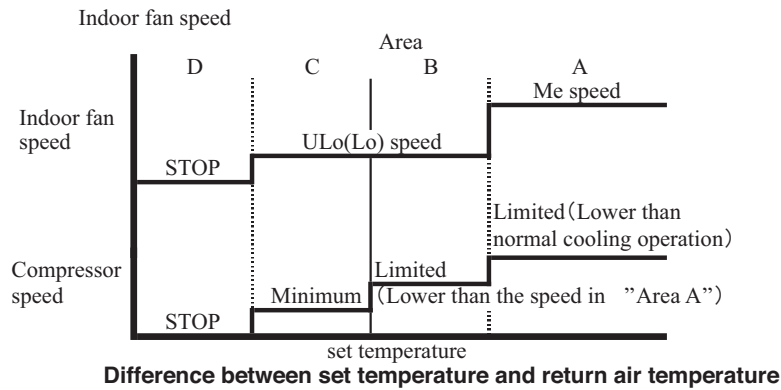
(a) Purpose of DRY mode

The purpose is "Dehumidification", and not to control the humidity to the target condition.

Indoor/outdoor unit control the operation condition to reduce the humidity, and also prevent over cooling.

(b) Outline of control

(i) Indoor fan speed and compressor are controlled by the area which is selected by the temperature difference.



(ii) The indoor unit check the current area by every 5 minutes, and operate by the next checking.

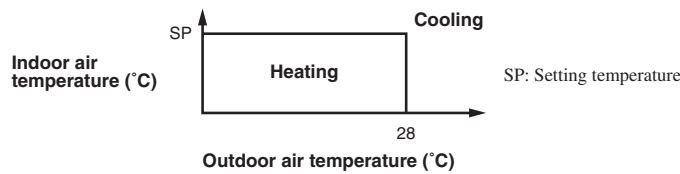
(c) Other

When the outside temperature and room temperature is low for cooling operation, indoor unit can not operate in cooling, and dehumidify. In this case, the units operate in heating to rise the room temperature, and after that start DRY operation.

(16) Outline of automatic operation

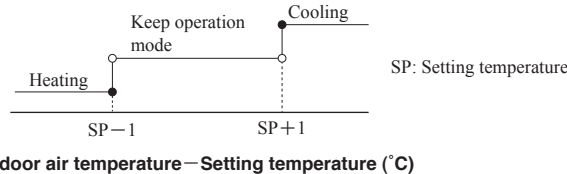
(a) Determination of operation mode

Operation mode is determined by indoor air temperature and outdoor air temperature as following.



(b) Operation mode is changes when keep cooling and heating thermostat off 20 minutes and be satisfied following conditions.

If the setting temperature is changed with the remote control, the operation mode is judged immediately.



※It can not be changed to heating mode if outdoor air temperature is 28°C or higher.

(c) 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 dehumidifying operation, the unit is operated in the previous operation mode.

- (d) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote control and the setting temperature.

		Signals of wireless remote control (Display)												Unit : °C
		18	19	20	21	22	23	24	25	26	27	28	29	30
Setting temperature	Cooling	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

- (e) When the unit is operated automatically with the wired remote control, the cooling operation is controlled according to the display temperatures while the setting temperature is compensated by +2°C during heating.

(17) Protective control function

(a) Dew prevention control [Cooling]:Prevents dewing on the indoor unit.

(i) Operating conditions

When the following conditions have been satisfied for more than 30 minutes after starting operation

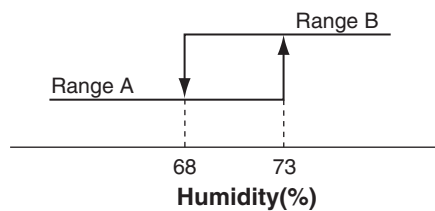
- 1) Compressor's command speed is 32 (SRF50 : 28) rps or higher.
- 2) Detected value of humidity is 68% or higher.

(ii) Contents of operation

- 1) Air capacity control

		Model	SRF25, 35	SRF50
LO, ULO	Upper limit of compressor's command speed		RangeA: 60rps, RangeB: 40 (SRF35 : 45) rps	RangeA: 50rps, RangeB: 30rps
	Indoor fan		5th speed	
AUTO,HI,MED	Upper limit of compressor's command speed		RangeA: 60rps, RangeB: 40 (SRF35 : 45) rps	RangeA: 50rps, RangeB: 30rps
	Indoor fan		Adaptable to compressor's command speed (Lower limit 5th speed)	

Note (1) Ranges A and B are as shown below.



- 2) When this control has continued for more than 30 minutes continuously, the following wind direction control is performed.

- Upper flap : Approx 38°
- Lower flap and Damper : Close

(iii) Reset conditions

When any of followings is satisfied

- 1) Compressor's command speed is less than 32 (SRF50 : 28) rps.
- 2) Detected value of humidity is less than 63%.

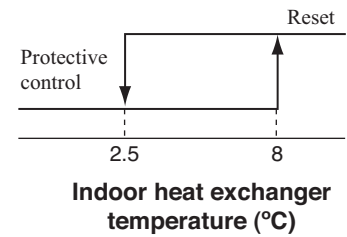
(b) Frost prevention control (During cooling or dehumidifying)

(i) Operating conditions

- 1) Indoor heat exchanger temperature (Th2) is lower than 2.5°C.
- 2) 8 minutes after reaching the compressor command speed except 0 rps.

(ii) Detail of anti-frost operation

Item \ Operation mode	Protective control	Reset
Compressor operation	Forced outage	Operation instruction
Indoor fan	Depends on operation mode	Depends on operation mode



(iii) Reset condition

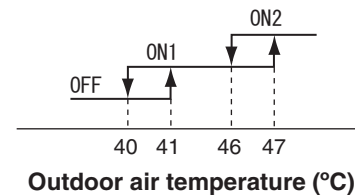
The indoor heat exchanger temperature (Th2) is 8°C or higher.

(c) Cooling overload protective control

(i) Operating conditions

When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41°C or more, or 47°C or more with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	SRF25, 35, 50	
Outdoor air temperature	41°C or more	47°C or more
Lower limit speed	30 rps	45 rps (SRF50 : 40 rps)



(ii) Detail of operation

- 1) The outdoor fan is stepped up by 3 speed step. (Upper limit 8th speed.)
- 2) The lower limit of compressor command speed is set to 30 or 45 rps (SRF50 : 40 rps) and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 45 rps (SRF50 : 40 rps). However, when the thermo OFF, the speed is reduced to 0 rps.

(iii) Reset conditions

When either of the following condition is satisfied

- 1) The outdoor air temperature is lower than 40°C.
- 2) The compressor command speed is 0 rps.

(d) Cooling high pressure control

(i) Purpose

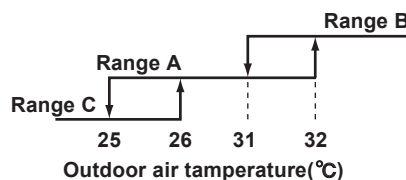
Prevents anomalous high pressure operation during cooling

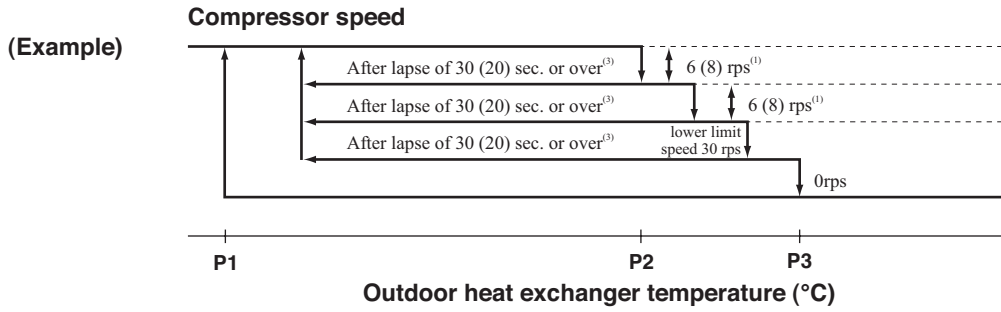
(ii) Detector

Outdoor heat exchanger temperature (TH1)

(iii) Detail of operation

		TH1(°C)		
		P1	P2	P3
25	Range B	53	58	63
	Range A	47	50	53
35	Range B	53	58	63
	Range A	48	53	55
50	Range B	53	58	63
	Range A	51	53	56
	Range C	47	49	51





- Notes
- (1) When the outdoor heat exchanger temperature is in the range of P2-P3 °C, the speed is reduced by 6 (8) rps at each 30 (20) seconds.
 - (2) When the temperature is P3 °C or higher, the compressor is stopped.
 - (3) When the outdoor heat exchanger temperature is in the range of P1-P2 °C, if the compressor command speed is been maintained and the operation has continued for more than 30 (20) seconds at the same speed, it returns to the normal cooling operation.
 - (4) Value in () are for the model SRF50.

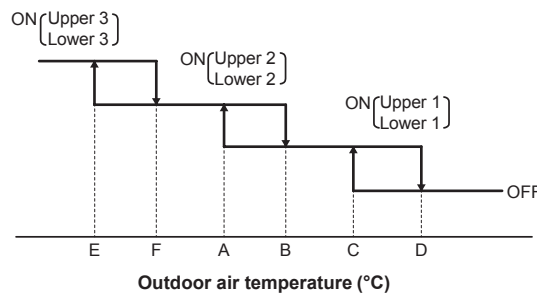
(e) Cooling low outdoor temperature protective control

(i) Operating conditions

When the outdoor air temperature (TH2) is 22°C or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

(ii) Detail of operation

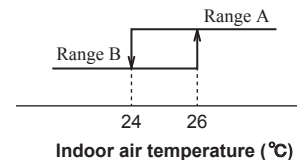
- 1) It controls the upper and lower limit values for the compressor speed according to the following table.
- 2) It checks the outdoor air temperature (TH2) once every hour to judge the operation range.



● Values of A, B, C, D, E, F

		Outdoor air temperature (°C)					
		E	F	A	B	C	D
SRF25,35	First time	-8	-5	0	3	22	25
	After the second times	-2	1	5	8	25	28
SRF50	First time	-	-	9	11	22	25
	After the second times	-	-	9	11	22	25

	Compressor speed: Upper/lower limit (rps)						
	Lower 1		Upper 1	Lower 2	Upper 2	Lower 3	Upper 3
	Range B	Range A					
SRF25, 35	30	Release	60	44	50	50	50
SRF50	35	Release	75	45	60	-	-



(iii) Reset conditions

When either of the following condition is satisfied

- 1) The outdoor air temperature (TH2) is D °C or higher.
- 2) The compressor command speed is 0 rps.

(f) Heating high pressure control

(i) Starting condition

When the indoor heat exchanger temperature (Th2) has risen to a specified temperature while the compressor is turned on.

(ii) Compressor speed is controlled according to the zones of indoor heat exchanger temperature as shown by the following table.

	Th2<P1	P1 ≤ Th2<P2	P2 ≤ Th2<P3	P3 ≤ Th2
Protection control speed (NP)	Normal	Retention	NP-4rps	NP-8rps
Sampling time (s)	Normal	20 (10)	20 (10)	20 (10)

Note Value in () are for the model SRF50.

SRF25, 35 Unit:°C

NP \ Th2	P1	P2	P3
NP<50	47	52	54
50 ≤ NP<92	47.5	55	57
92 ≤ NP<115	47.5-39	55-40	57-42
115 ≤ NP	39	40	42

SRF50 Unit:°C

NP \ Th2	P1	P2	P3
NP<50	45	52	54.5
50 ≤ NP<115	45	52	57
115 ≤ NP<120	45-43	52-50	57-55
120 ≤ NP	43	50	55

(g) Heating overload protective control

(i) Indoor unit side

1) Operating conditions

When the outdoor air temperature (TH2) is 17°C or higher continues for 30 seconds while the compressor command speed other than 0 rps

2) Detail of operation

The indoor fan is stepped up by 1 speed step. (Upper limit 9th speed)

3) Reset conditions

The outdoor air temperature (TH2) is lower than 16°C.

(ii) Outdoor unit side

• Models SRF25, 35

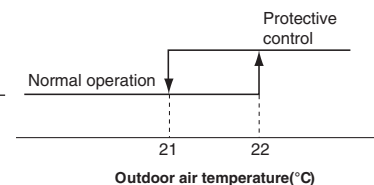
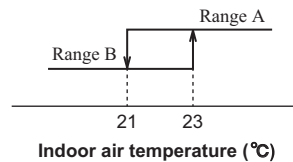
1) Operating conditions

When the outdoor air temperature (TH2) is 22°C or higher continues for 30 seconds while the compressor command speed other than 0 rps

2) Detail of operation

Upper and lower limits of compressor speed and the outdoor unit fan speed are restricted.

Compressor command speed (rps)		Outdoor fan speed
Lower limit	Upper limit	
Range A	Range B	60
40	Release	



3) Reset condition

When the outdoor air temperature drops below 21°C

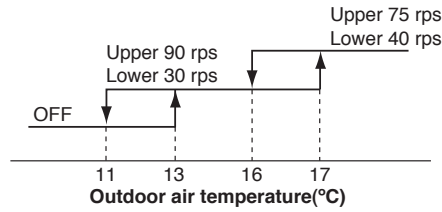
• Model SRF50

1) Operating condition

When the outdoor air temperature (TH2) is 13°C or higher continues for 30 seconds while the compressor speed is other than 0 rps

2) Detail of operation

- a) Taking the upper limit of compressor speed range at 90(75) rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.
- b) The lower limit of compressor speed is set to 30(40) rps and even if the calculated result lower than that after fuzzy calculation, the speed is kept to 30(40) rps. However, when the thermostat OFF, the speed is reduced to 0 rps.
- c) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps.
- d) The outdoor fan speed is stepped down by 3 speed step.(Low limit 2nd speed)



3) Reset condition

The outdoor air temperature (TH2) is lower than 11°C

(h) Heating low outdoor temperature protective control

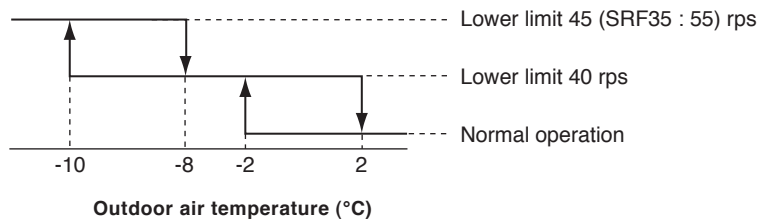
• **Models SRF25, 35**

(i) Operating conditions

When the outdoor air temperature (TH2) is -2°C or lower continues for 30 seconds while the compressor command speed is other than 0 rps

(ii) Detail of operation

The lower limit compressor command speed is changed as shown in the figure below.



(iii) Reset conditions

When either of the following condition is satisfied

- a) The outdoor air temperature (TH2) becomes 2°C.
- b) The compressor command speed is 0 rps.

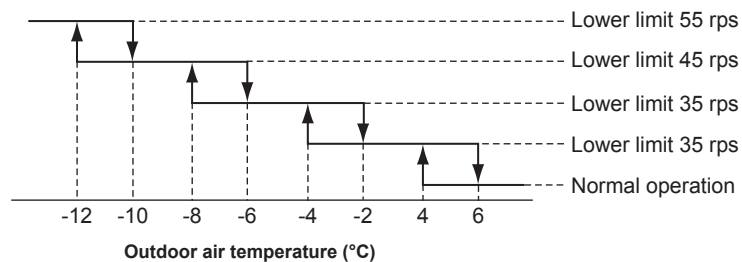
• **Model SRF50**

(i) Operating conditions

When the outdoor air temperature (TH2) is 4°C or lower continues for 30 seconds while the compressor speed is other than 0 rps

(ii) Detail of operation

The lower limit compressor speed is change as shown in the figure below.



(iii) Reset conditions

When either of the following condition is satisfied

- a) The outdoor air temperature (TH2) becomes 6°C.
- b) The compressor speed is 0 rps.

(i) Compressor overheat protection

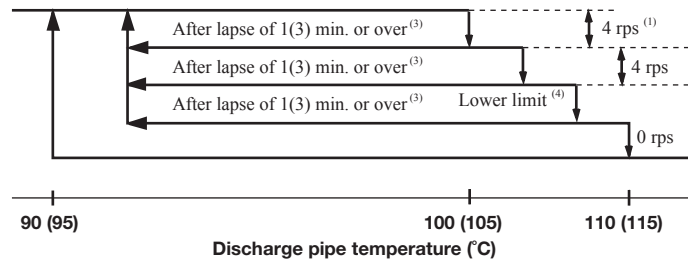
(i) Purpose

It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

(ii) Detail of operation

1) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.

(Example) Fuzzy



- Notes (1) When the discharge pipe temperature is in the range of 100-110°C (105-115°C), the speed is reduced by 4 rps.
 (2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.
 (3) If the discharge pipe temperature is in the range of 90-100°C (95-105°C) even when the compressor command speed is maintained for 1(3) minutes when the temperature is in the range of 90-100°C (95-105°C), the speed is raised by 1 rps and kept at that speed for 1(3) minutes. This process is repeated until the command speed is reached.
 (4) Lower limit speed

Model	Item	Cooling	Heating
		SRF25, 35	15 rps
	SRF50	25 rps	32 rps

(5) Value in () are for the model SRF50

- 2) If the temperature of 110°C (115°C) is detected by the sensor on the discharge pipe, then the compressor will stop immediately.
 When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(j) Current safe

(i) Purpose

Current is controlled not to exceed the upper limit of the setting operation current.

(ii) Detail of operation

Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced. If the mechanism is actuated when the compressor command speed is less than 30 (SRF35:36) rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Current cut

(i) Purpose

Inverter is protected from overcurrent.

(ii) Detail of operation

Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(l) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air-conditioning.

The compressor is stopped if any one of the following in item (i), (ii) is satisfied. Once the unit is stopped by this function, it is not restarted.

- (i) When the input current is measured at 1 A or less for 3 continuous minutes or more
- (ii) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(m) Indoor fan motor protection

When the air-conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 300 min⁻¹ or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

(n) Serial signal transmission error protection

(i) Purpose

Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

(ii) Detail of operation

If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minutes and 35 seconds, the compressor is stopped. After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(o) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(p) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 min⁻¹ or under for more than 30 seconds, the compressor and fan motor are stopped.

(q) Outdoor fan control at low outdoor air temperature

(i) Cooling

1) Operating conditions

When the outdoor air temperature (TH2) is 22°C or lower continues for 30 seconds while the compressor command speed is other than 0 rps

2) Detail of operation

After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10°C	2nd speed
Outdoor temperature ≤ 10°C	1st speed

a) Outdoor heat exchanger temperature ≤ 21°C

After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21°C, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21°C < Outdoor heat exchanger temperature ≤ 38°C

After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21°C-38°C, maintain outdoor fan speed.

c) Outdoor heat exchanger temperature > 38°C

After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38°C, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions

When either of the following conditions is satisfied

- a) The outdoor air temperature (TH2) is 25°C or higher.
- b) The compressor command speed is 0 rps.

(ii) Heating**1) Operating conditions**

When the outdoor air temperature (TH2) is 0°C (SRF50: 4°C) or lower continues for 30 seconds while the compressor command speed is other than 0 rps

2) Detail of operation

The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions

When either of the following conditions is satisfied

- a) The outdoor air temperature (TH2) is 2°C (SRF50: 6°C) or higher.
- b) The compressor command speed is 0 rps.

(r) Refrigeration cycle system protection**(i) Starting conditions**

- 1) When 5 [model SRF50 : 8 (heating only)] minutes have elapsed after the compressor ON or the completion of the defrost control
- 2) Other than the defrost control.
- 3) When, after meeting the conditions of 1) and 2) above, the compressor speed, room temperature (Th1) and indoor heat exchanger temperature (Th2) have satisfied the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Room temperature (Th1)	Room temperature (Th1)/ Indoor heat exchanger temperature (Th2)	
Cooling	50(40)≤N	10≤Th1≤40	Th1-4<Th2	
Heating ^{a)}	SRF25, 35	50≤N	Th2<Th1+6	
	SRF50	40≤N (TH2≥ 0°C)		0≤Th1≤40
		60≤N (TH2< 0°C)		

Notes (1) Value in () are for the model SRF50.
 (2) Except that the fan speed is Hi in heating operation.

(ii) Contents of control

- 1) When the conditions of (i) above are satisfied, the compressor stops.
- 2) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

(iii) Reset condition

When the compressor has been turned OFF

2. MAINTENANCE DATA

(1) Cautions

- (a) If you are disassembling and checking an air-conditioner, be sure to turn off the power before beginning. When working on indoor units, let the unit sit for about 1 minute after turning off the power before you begin work. When working on an outdoor unit, there may be an electrical charge applied to the main circuit (electrolytic condenser), so begin work only after discharging this electrical charge (to DC10V or lower).
- (b) When taking out printed circuit boards, be sure to do so without exerting force on the circuit boards or package components.
- (c) When disconnecting and connecting connectors, take hold of the connector housing and do not pull on the lead wires.

(2) Items to check before troubleshooting

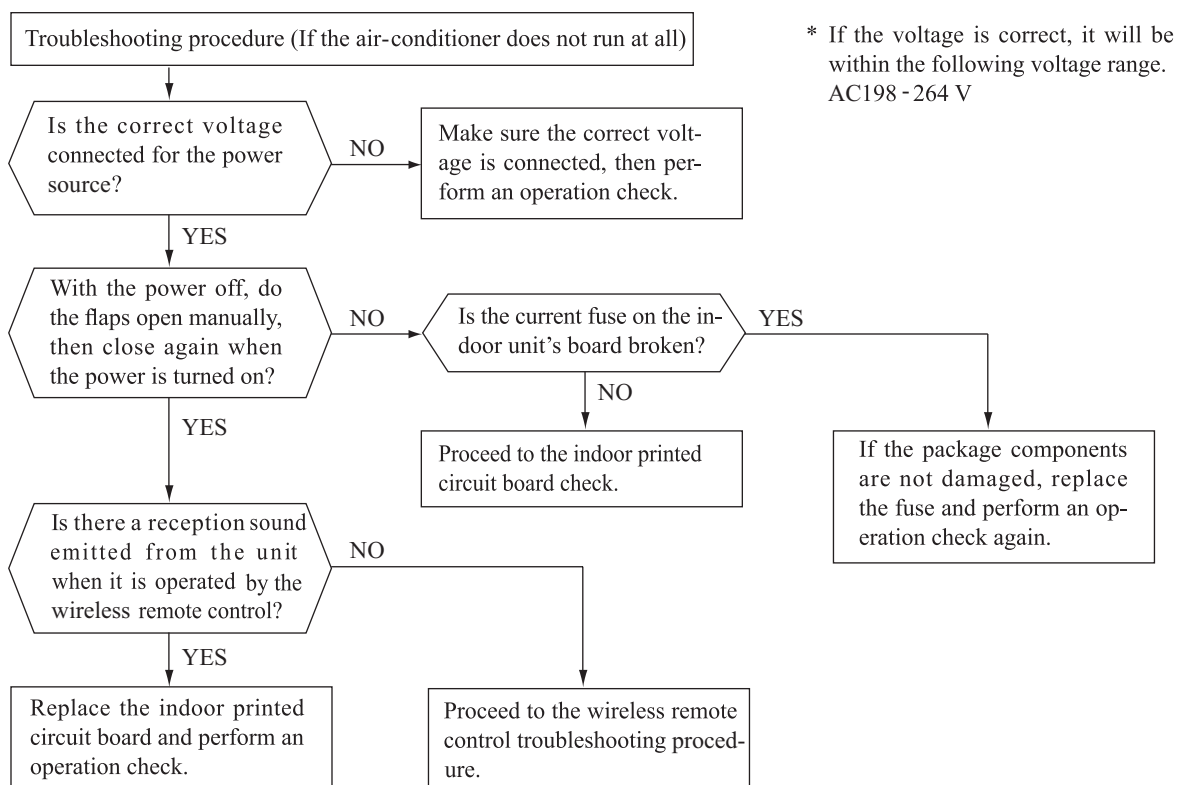
- (a) Have you thoroughly investigated the details of the trouble which the customer is complaining about?
- (b) Is the air-conditioner running? Is it displaying any self-diagnosis information?
- (c) Is a power source with the correct voltage connected?
- (d) Are the control lines connecting the indoor and outdoor units wired correctly and connected securely?
- (e) Is the outdoor unit's service valve open?

(3) Troubleshooting procedure (If the air-conditioner does not run at all)

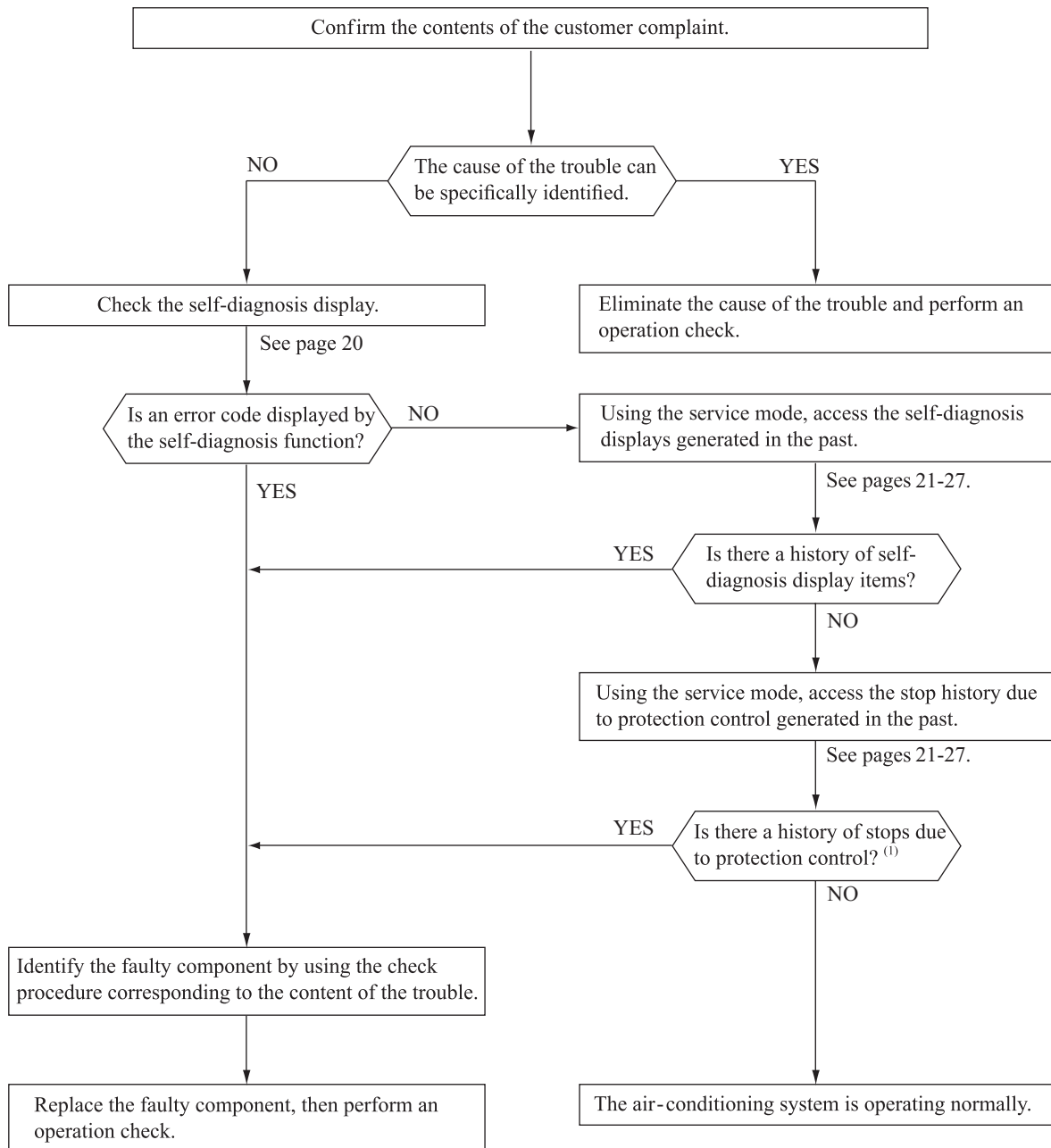
If the air-conditioner does not run at all, diagnose the trouble using the following troubleshooting procedure. If the air-conditioner is running but breaks down, proceed to troubleshooting step (4).

Important When all the following conditions are satisfied, we say that the air-conditioner will not run at all.

- (a) The RUN light does not light up.
- (b) The flaps do not open.
- (c) The indoor unit fan motors do not run.
- (d) The self-diagnosis display does not function.



(4) Troubleshooting procedure (If the air-conditioner runs)



Note (1) Even in cases where only intermittent stop data are generated, the air-conditioning system is normal. However, if the same protective operation recurs repeatedly (3 or more times), it will lead to customer complaints. Judge the conditions in comparison with the contents of the complaints.

(5) Self-diagnosis table

When this air-conditioner performs an emergency stop, the reason why the emergency stop occurred is displayed by the flashing of display lights. If the air-conditioner is operated using the remote control 3 minutes or more after the emergency stop, the trouble display stops and the air-conditioner resumes operation. ⁽¹⁾

Indoor unit display panel		Wired ⁽²⁾ remote control display	Description of trouble	Cause	Display (flashing) condition
RUN light	TIMER light				
1-time flash	ON	—	Heat exchanger temperature sensor 1 error	• Broken heat exchanger temperature sensor 1 wire, poor connector connection • Indoor unit PCB is faulty	When a heat exchanger temperature sensor 1 wire disconnection is detected while operation is stopped. (If a temperature of -28°C or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
2-time flash	ON	—	Room temperature sensor error	• Broken room temperature sensor wire, poor connector connection • Indoor unit PCB is faulty	When a room temperature sensor wire disconnection is detected while operation is stopped. (If a temperature of -45°C or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
3-time flash	ON	—	Heat exchanger temperature sensor 2 error	• Broken heat exchanger temperature sensor 2 wire, poor connector connection • Indoor unit PCB is faulty	When a heat exchanger temperature sensor 2 wire disconnection is detected while operation is stopped. (If a temperature of -28°C or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
6-time flash	ON	E 16	Indoor fan motor error	• Defective fan motor, poor connector connection	When conditions for turning the indoor fan motor on exist during air- conditioner operation, an indoor fan motor speed of 300 min ⁻¹ or lower is measured for 30 seconds or longer. (The air-conditioner stops.)
Keeps flashing	1-time flash	E 38	Outdoor air temperature sensor error	• Broken outdoor air temperature sensor wire, poor connector connection • Outdoor unit PCB is faulty	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -55°C or higher is detected for within 20 seconds after power ON. (The compressor is stopped.)
Keeps flashing	2-time flash	E 37	Outdoor heat exchanger temperature sensor error	• Broken heat exchanger temperature sensor wire, poor connector connection • Outdoor unit PCB is faulty	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -55°C or higher is detected for within 20 seconds after power ON. (The compressor is stopped.)
Keeps flashing	4-time flash	E 39	Discharge pipe temperature sensor error	• Broken discharge pipe temperature sensor wire, poor connector connection • Outdoor unit PCB is faulty	-25°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. (The compressor is stopped.)
ON	1-time flash	E 42	Current cut	• Compressor locking, open phase on compressor output, short circuit on power transistor, service valve is closed	The compressor output current exceeds the set value during compressor start. (The air-conditioner stops.)
ON	2-time flash	E 59	Trouble of outdoor unit	• Broken compressor wire • Compressor blockage	When there is an emergency stop caused by trouble in the outdoor unit, or the input current value is found to be lower than the set value. (The air-conditioner stops.)
ON	3-time flash	E 58	Current safe stop	• Overload operation • Overcharge • Compressor locking	When the compressor command speed is lower than the set value and the current safe has operated. (the compressor stops)
ON	4-time flash	E 51	Power transistor error	• Broken power transistor	When the power transistor is judged breakdown while compressor starts. (The compressor is stopped.)
ON	5-time flash	E 36	Over heat of compressor	• Gas shortage, defective discharge pipe temperature sensor, service valve is closed	When the value of the discharge pipe temperature sensor exceeds the set value. (The air-conditioner stops.)
ON	6-time flash	E 5	Error of signal transmission	• Defective power source, Broken signal wire, defective indoor/outdoor unit PCB	When there is no signal between the indoor unit PCB and outdoor unit PCB for 10 seconds or longer (when the power is turned on), or when there is no signal for 7 minute 35 seconds or longer (during operation)(the compressor is stopped).
ON	7-time flash	E 48	Outdoor fan motor error	• Defective fan motor, poor connector connection	When the outdoor fan motor speed continues for 30 seconds or longer at 75 min ⁻¹ or lower. (3 times) (The air-conditioner stops.)
ON	Keeps flashing	E 35	Cooling high pressure protection	• Overload operation, overcharge • Broken outdoor heat exchange temperature sensor wire • Service valve is closed	When the value of the outdoor heat exchanger temperature sensor exceeds the set value.
2-time flash	2-time flash	E 60	Rotor lock	• Defective compressor • Open phase on compressor • Defective outdoor unit PCB	If the compressor motor's magnetic pole positions cannot be correctly detected when the compressor starts. (The air-conditioner stops.)
5-time flash	ON	E 47	Active filter voltage error	• Defective active filter	When the wrong voltage connected for the power source. When the outdoor unit PCB is faulty
7-time flash	ON	E 57	Refrigeration cycle system protective control	• Service valve is closed. • Refrigerant is insufficient	When refrigeration cycle system protective control operates.
—	—	E 1	Error of wired remote control wiring	• Broken wired remote control wire, defective indoor unit PCB	The wired remote control wire Y is open. The wired remote control wires X and Y are reversely connected. Noise is penetrating the wired remote control lines. The wired remote control or indoor unit PCB is faulty. (The communications circuit is faulty.)

Notes (1)The air-conditioner cannot be restarted using the remote control for 3 minutes after operation stops.

(2)The wired remote control is option parts.

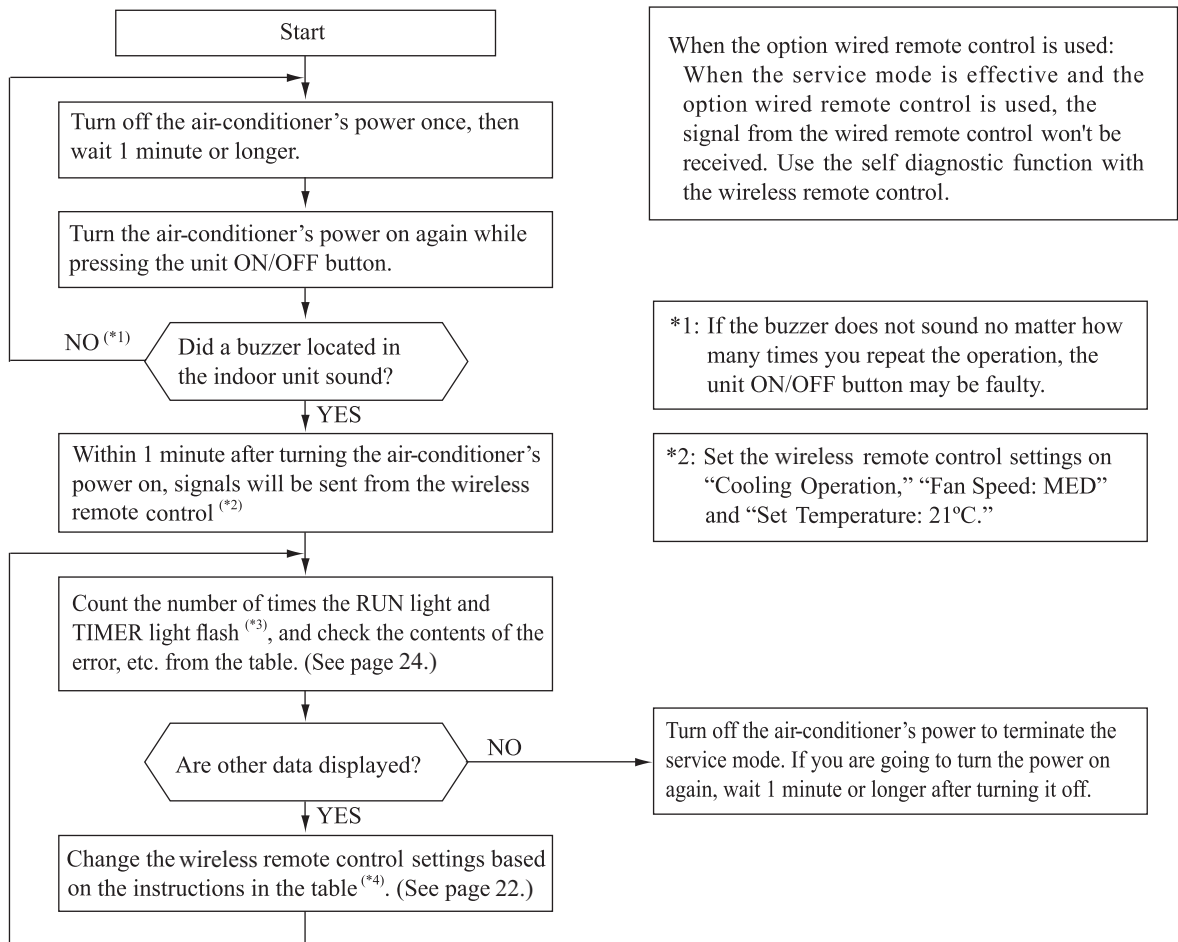
(6) Service mode (Trouble mode access function)

This air-conditioner is capable of recording error displays and protective stops (service data) which have occurred in the past. If self-diagnosis displays cannot be confirmed, it is possible to get a grasp of the conditions at the time trouble occurred by checking these service data.

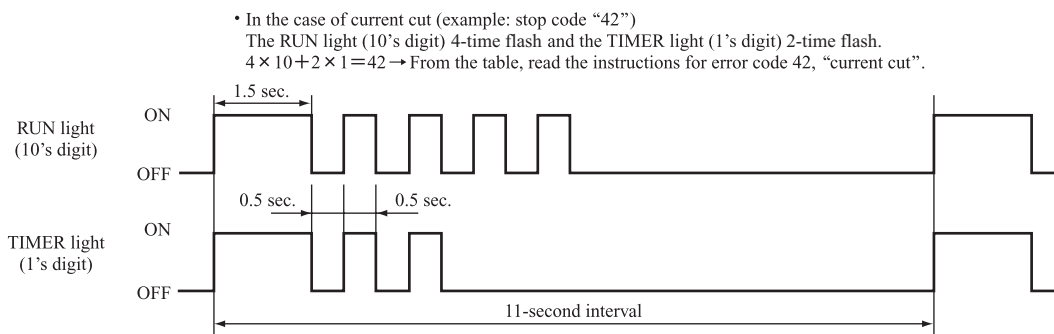
(a) Explanation of terms

Term	Explanation
Service mode	The service mode is the mode where service data are displayed by flashing of the display lights when the operations in item (b) below are performed with the indoor control.
Service data	These are the contents of error displays and protective stops which occurred in the past in the air-conditioner system. Error display contents and protective stop data from past anomalous operations of the air-conditioner system are saved in the indoor unit control's non-volatile memory (memory which is not erased when the power goes off). There are two types of data, self-diagnosis data and stop data, described below.
Self-diagnosis data	These are the data which display the reason why a stop occurred when an error display(self-diagnosis display) occurred in an indoor unit. Data are recorded for up to 5 previous occurrences. Data which are older than the 5th previous occurrence are erased. In addition, data on the temperature of each sensor (room temperature, indoor heat exchanger, outdoor heat exchanger, outdoor air temperature, discharge pipe), remote control information (operation switching, fan speed switching) are recorded when trouble occurs, so more detailed information can be checked.
Stop data	These are the data which display the reason by a stop occurred when the air-conditioning system performed protective stops, etc. in the past. Even if stop data alone are generated, the system restarts automatically. (After executing the stop mode while the display is normal, the system restarts automatically.) Data for up to 10 previous occasions are stored. Data older than the 10th previous occasion are erased. (Important) In cases where transient stop data only are generated, the air-conditioner system may still be normal. However, if the same protective stop occurs frequently (3 or more times), it could lead to customer complaints.

(b) Service mode display procedure



*3: To count the number of flashes in the service mode, count the number of flashes after the light lights up for 1.5 second initially (start signal). (The time that the light lights up for 1.5 second (start signal) is not counted in the number of flashes.)



*4: When in the service mode, when the wireless remote control settings (operation mode, fan speed mode, temperature setting) are set as shown in the following table and sent to the air-conditioner unit, the unit switches to display of service data.

(i) Self-diagnosis data

What are self-diagnosis Data?

These are control data (reasons for stops, temperature at each sensor, wireless remote control information) from the time when there were error displays (abnormal stops) in the indoor unit in the past. Data from up to 5 previous occasions are stored in memory. Data older than the 5th previous occasion are erased. The temperature setting indicates how many occasions previous to the present setting the error display data are and the operation mode and fan speed mode data show the type of data.

Wireless remote control setting		Contents of output data
Operation mode	Fan speed mode	
Cooling	MED	Displays the reason for stopping display in the past (error code).
	HI	Displays the room temperature sensor temperature at the time the error code was displayed in the past.
	AUTO	Displays the indoor heat exchanger sensor temperature at the time the error code was displayed in the past.
Heating	LO	Displays the wireless remote control information at the time the error code was displayed in the past.
	MED	Displays the outdoor air temperature sensor temperature at the time the error code was displayed in the past.
	HI	Displays the outdoor heat exchanger sensor temperature at the time the error code was displayed in the past.
	AUTO	Displays the discharge pipe sensor temperature at the time the error code was displayed in the past.

Wireless remote control setting	Indicates the number of occasions previous to the present the error display data are from.
Temperature setting	
21°C	1 time previous (previous time)
22°C	2 times previous
23°C	3 times previous
24°C	4 times previous
25°C	5 times previous

Only for indoor heat exchanger sensor 2

Wireless remote control setting	Indicates the number of occasions previous to the present the error display data are from.
Temperature setting	
26°C	1 time previous (previous time)
27°C	2 times previous
28°C	3 times previous
29°C	4 times previous
30°C	5 times previous

(Example)

Wireless remote control setting			Displayed data
Operation mode	Fan speed mode	Temperature setting	
Cooling	MED	21°C	Displays the reason for the stop (error code) the previous time an error was displayed.
		22°C	Displays the reason for the stop (error code) 2 times previous when an error was displayed.
		23°C	Displays the reason for the stop (error code) 3 times previous when an error was displayed.
		24°C	Displays the reason for the stop (error code) 4 times previous when an error was displayed.
		25°C	Displays the reason for the stop (error code) 5 times previous when an error was displayed.

(ii) Stop data

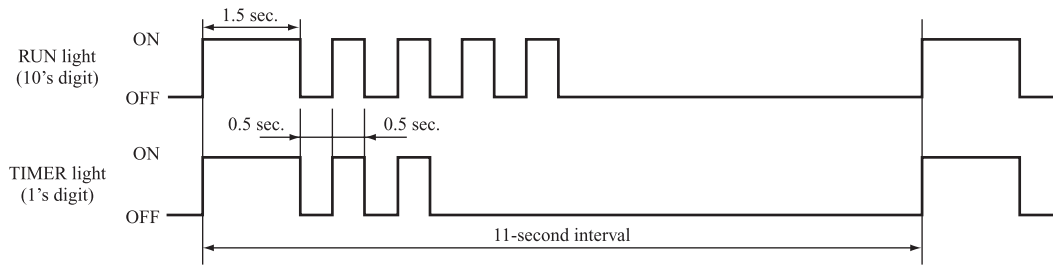
Wireless remote control setting			Displayed data
Operation mode	Fan speed mode	Temperature setting	
Cooling	LO	21°C	Displays the reason for the stop (stop code) the previous time when the air-conditioner was stopped by protective stop control.
		22°C	Displays the reason for the stop (stop code) 2 times previous when the air-conditioner was stopped by protective stop control.
		23°C	Displays the reason for the stop (stop code) 3 times previous when the air-conditioner was stopped by protective stop control.
		24°C	Displays the reason for the stop (stop code) 4 times previous when the air-conditioner was stopped by protective stop control.
		25°C	Displays the reason for the stop (stop code) 5 times previous when the air-conditioner was stopped by protective stop control.
		26°C	Displays the reason for the stop (stop code) 6 times previous when the air-conditioner was stopped by protective stop control.
		27°C	Displays the reason for the stop (stop code) 7 times previous when the air-conditioner was stopped by protective stop control.
		28°C	Displays the reason for the stop (stop code) 8 times previous when the air-conditioner was stopped by protective stop control.
		29°C	Displays the reason for the stop (stop code) 9 times previous when the air-conditioner was stopped by protective stop control.
		30°C	Displays the reason for the stop (stop code) 10 times previous when the air-conditioner was stopped by protective stop control.

(c) Error code, stop code table (Assignment of error codes and stop codes is done in common for all models.)

Number of flashes when in service mode		Stop code or Error code	Error content	Cause	Occurrence conditions	Error display	Auto recovery
RUN light (10's digit)	TIMER light (1's digit)						
OFF	OFF	0	Normal	—	—	—	—
	1-time flash	01	Error of wired remote control wiring	Broken wired remote control wire, defective indoor unit PCB	The wired remote control wire Y is open. The wired remote control wires X and Y are reversely connected. Noise is penetrating the wired remote control lines. The wired remote control or indoor unit PCB is faulty.	—	○
	5-time flash	05	Can not receive signals for 35 seconds (if communications have recovered)	Power source is faulty. Power source cables and signal lines are improperly wired. Indoor or outdoor unit PCB are faulty.	When 35 seconds passes without communications signals from either the outdoor unit or the indoor unit being detected correctly.	○	—
3-time flash	5-time flash	35	Cooling high pressure control	Cooling overload operation. Outdoor fan speed drops. Outdoor heat exchanger temperature sensor is short-circuit.	When the outdoor heat exchanger temperature sensor's value exceeds the set value.	○ (5 times)	○
	6-time flash	36	Compressor overheat 110°C (SRC50:115°C)	Refrigerant is insufficient. Discharge pipe temperature sensor is faulty Service valve is closed.	When the discharge pipe temperature sensor's value exceeds the set value.	○ (2 times)	○
	7-time flash	37	Outdoor heat exchanger temperature sensor is abnormal	Outdoor heat exchanger temperature sensor wire is disconnected. Connector connections are poor. Outdoor unit PCB is faulty.	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -55°C higher is detected for 5 seconds continuously within 20 seconds after power ON.	○ (3 times)	○
	8-time flash	38	Outdoor air temperature sensor is abnormal	Outdoor air temperature sensor wire is disconnected. Connector connections are poor. Outdoor unit PCB is faulty.	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -55°C higher is detected for 5 seconds continuously within 20 seconds after power ON.	○ (3 times)	○
	9-time flash	39	Discharge pipe temperature sensor is abnormal (anomalous stop)	Discharge pipe temperature sensor wire is disconnected. Connector connections are poor. Outdoor unit PCB is faulty.	-25°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.	○ (3 times)	○
4-time flash	2-time flash	42	Current cut	Compressor lock. Compressor wiring short-circuit. Compressor output is open phase. Outdoor unit PCB is faulty. Service valve is closed. Electronic expansion valve is faulty. Compressor is faulty.	Compressor start fails 42 times in succession and the reason for the final failure is current cut.	○ (2 times)	○
	7-time flash	47	Active filter voltage error	Defective active filter.	When the wrong voltage connected for the power source. When the outdoor unit PCB is faulty.	○	—
	8-time flash	48	Outdoor fan motor is abnormal	Outdoor fan motor is faulty. Connector connections are poor. Outdoor unit PCB is faulty.	When a fan speed of 75 min ⁻¹ or lower continues for 30 seconds or longer.	○ (3 times)	○
5-time flash	1-time flash	51	Short-circuit in the power transistor (high side) Current cut circuit breakdown	Outdoor unit PCB is faulty. Power transistor is damaged.	When it is judged that the power transistor was damaged at the time the compressor started.	○	—
	7-time flash	57	Refrigeration cycle system protective control	Service valve is closed. Refrigerant is insufficient.	When refrigeration cycle system protective control operates.	○ (3 times)	○
	8-time flash	58	Current safe	Refrigerant is overcharge. Compressor lock. Overload operation.	When there is a current safe stop during operation.	—	○
	9-time flash	59	Compressor wiring is unconnection Voltage drop	Compressor wiring is disconnected. Power transistor is damaged. Power source construction is defective. Outdoor unit PCB is faulty. Compressor is faulty.	When the current is 1A or less at the time the compressor started. When the power source voltage drops during operation.	○	○
6-time flash	OFF	60	Rotor lock	Compressor is faulty. Compressor output is open phase. Electronic expansion valve is faulty. Overload operation. Outdoor unit PCB is faulty.	After the compressor starts, when the compressor stops due to rotor lock.	○ (2 times)	○
	1-time flash	61	Connection lines between the indoor and outdoor units are faulty	Connection lines are faulty. Indoor or outdoor unit PCB are faulty.	When 10 seconds passes after the power is turned on without communications signals from the indoor or outdoor unit being detected correctly.	○	—
	2-time flash	62	Serial transmission error	Indoor or outdoor unit PCB are faulty. Noise is causing faulty operation.	When 7 minutes 35 seconds passes without communications signals from either the outdoor unit or the indoor unit being detected correctly.	○	—
8-time flash	OFF	80	Indoor fan motor is abnormal	Indoor fan motor is faulty. Connector connections are poor. Indoor unit PCB is faulty.	When the indoor fan motor is detected to be running at 300 min ⁻¹ or lower speed with the fan motor in the ON condition while the air-conditioner is running.	○	—
	2-time flash	82	Indoor heat exchanger temperature sensor is abnormal (anomalous stop)	Indoor heat exchanger temperature sensor wire is disconnected. Connector connections are poor.	When a temperature of -28°C or lower is sensed continuously for 40 minutes during heating operation. (the compressor stops).	○	—
	4-time flash	84	Anti-condensation control	High humidity condition. Humidity sensor is faulty.	Anti-condensation prevention control is operating.	—	○
	5-time flash	85	Anti-frost control	Indoor fan speed drops. Indoor heat exchanger temperature sensor is broken wire.	When the anti-frost control operates and the compressor stops during cooling operation.	—	○
	6-time flash	86	Heating high pressure control	Heating overload operation. Indoor fan speed drops. Indoor heat exchanger temperature sensor is short-circuit.	When high pressure control operates during heating operation and the compressor stops.	—	○

Notes (1) The number of flashes when in the service mode do not include the 1.5 second period when the lights light up at first (start signal). (See the example shown below.)

- In the case of current cut (example: stop code “42”)
 - The RUN light (10’s digit) 4-time flash and the TIMER light (1’s digit) 2-time flash.
 - $4 \times 10 + 2 \times 1 = 42 \rightarrow$ From the table, read the instructions for error code 42, “current cut”.



- (2) Error display: — Is not displayed. (automatic recovery only)
 ○ Displayed.
 If there is a () displayed, the error display shows the number of times that an auto recovery occurred for the same reason has reached the number of times in ().
 If no () is displayed, the error display shows that the trouble has occurred once.
- (3) Auto Recovery: — Does not occur
 ○ Auto recovery occurs.

(d) Operation mode, Fan speed mode information tables

(i) Operation mode

Display pattern when in service mode	Operation mode when there is an abnormal stop
RUN light (10's digit)	
—	AUTO
1-time flash	DRY
2-time flash	COOL
3-time flash	FAN
4-time flash	HEAT

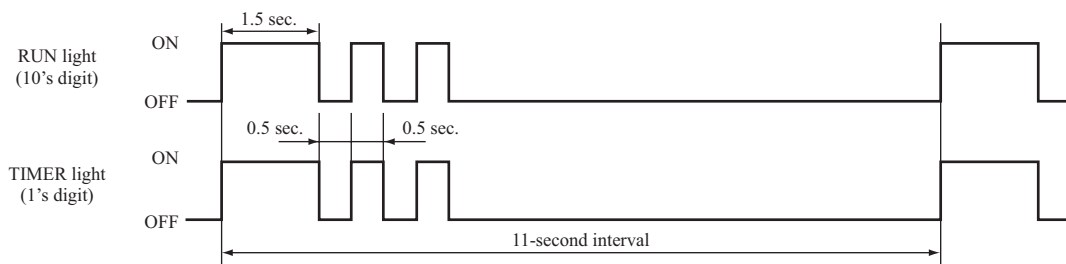
(ii) Fan speed mode

Display pattern when in service mode	Fan speed mode when there is an abnormal stop
TIMER light (1's digit)	
—	AUTO
2-time flash	HI
3-time flash	MED
4-time flash	LO
5-time flash	ULO
6-time flash	HI POWER
7-time flash	ECONO

* If no data are recorded (error code is normal), the information display in the operation mode and fan speed mode becomes as follows.

Mode	Display when error code is normal.
Operation mode	AUTO
Fan speed mode	AUTO

(Example): Operation mode: COOL, Fan speed mode: HI



(e) Temperature information

(i) Room temperature sensor, indoor heat exchanger temperature sensor, outdoor air temperature sensor, outdoor heat exchanger temperature sensor

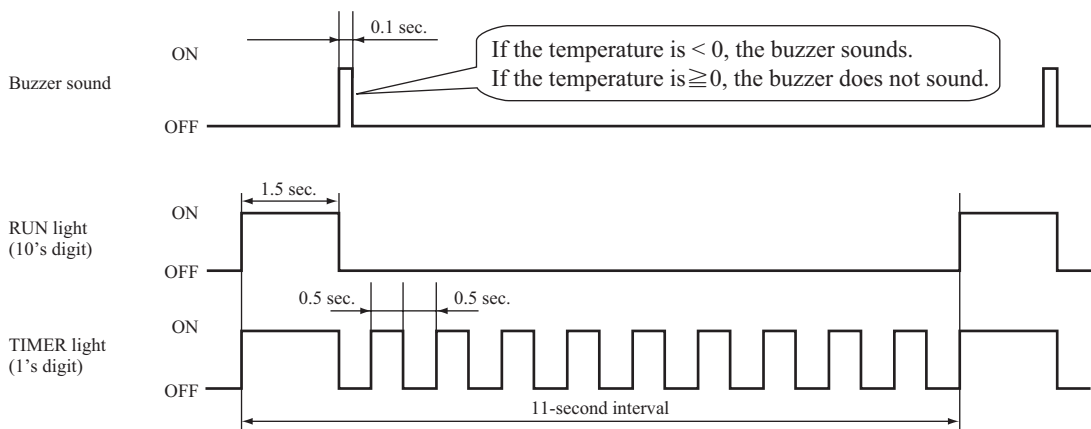
Unit: °C

Buzzer sound	TIMER light (1's digit)		RUN light (10's digit)								
	0	1	2	3	4	5	6	7	8	9	
Yes (sounds for 0.1 second)	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 (does 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 no data are recorded (error code is normal), the display for each temperature information becomes as shown below.

Sensor name	Sensor value displayed when the error code is normal
Room temperature sensor	-64°C
Indoor heat exchanger temperature sensor	-64°C
Outdoor air temperature sensor	-64°C
Outdoor heat exchanger temperature sensor	-64°C

(Example) Outdoor heat exchanger temperature data: “-9°C”



(ii) Discharge pipe temperature sensor

Unit: °C

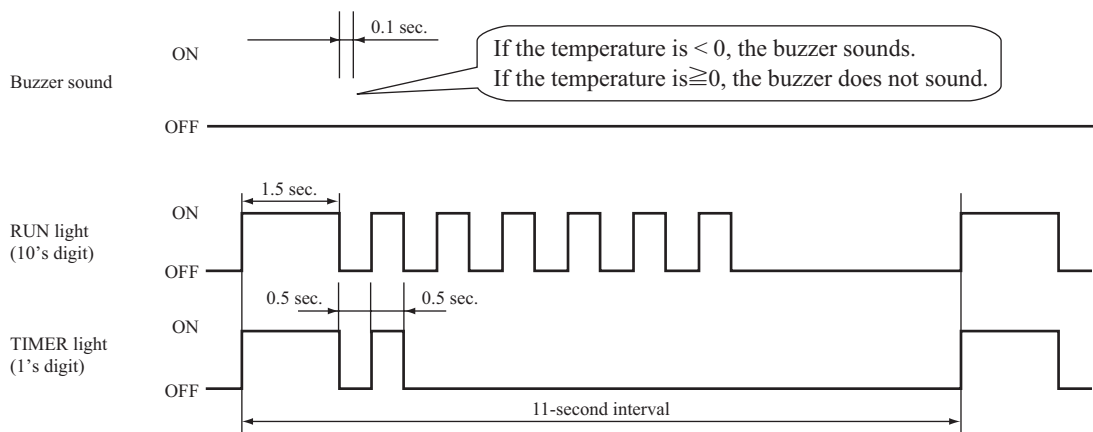
Buzzer sound	TIMER light (1's digit)	RUN light (10's digit)											
			0	1	2	3	4	5	6	7	8	9	
Yes (sounds for 0.1 second)	3	-60	-62	-64									
	2	-40	-42	-44	-46	-48	-50	-52	-54	-56	-58		
	1	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38		
	0	/	-2	-4	-6	-8	-10	-12	-14	-16	-18		
No (does not sound)	0	0	2	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 no data are recorded (error code is normal), the display for each temperature information becomes as shown below.

Sensor name	Sensor value displayed when the error code is normal
Discharge pipe temperature sensor	-64°C

(Example) Discharge pipe temperature data: “122°C”

* In the case of discharge pipe data, multiply the reading value by 2. (Below, 61 x 2 = “122°C”)



Service data record form

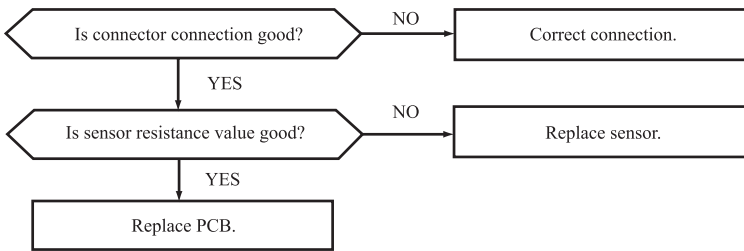
Customer		Model					
Date of investigation							
Machine name							
Content of complaint							
Wireless remote control settings			Content of displayed data	Display results			Display content
Temperature setting	Operation mode	Fan speed mode		Buzzer (Yes/No.)	RUN light (Times)	TIMER light (Times)	
21	Cooling	MED	Error code on previous occasion	/			
		HI	Room temperature sensor on previous occasion				
		AUTO	Indoor heat exchanger temperature sensor 1 on previous occasion				
	Heating	LO	Wireless remote control information on previous occasion	/			
		MED	Outdoor air temperature sensor on previous occasion				
		HI	Outdoor heat exchanger temperature sensor on previous occasion				
	AUTO	Discharge pipe temperature sensor on previous occasion					
26	Cooling	AUTO	Indoor heat exchanger temperature sensor 2 on previous occasion				
22	Cooling	MED	Error code on second previous occasion	/			
		HI	Room temperature sensor on second previous occasion				
		AUTO	Indoor heat exchanger temperature sensor 1 on second previous occasion				
	Heating	LO	Wireless remote control information on second previous occasion	/			
		MED	Outdoor air temperature sensor on second previous occasion				
		HI	Outdoor heat exchanger temperature sensor on second previous occasion				
	AUTO	Discharge pipe temperature sensor on second previous occasion					
27	Cooling	AUTO	Indoor heat exchanger temperature sensor 2 on second occasion				
23	Cooling	MED	Error code on third previous occasion	/			
		HI	Room temperature sensor on third previous occasion				
		AUTO	Indoor heat exchanger temperature sensor 1 on third previous occasion				
	Heating	LO	Wireless remote control information on third previous occasion	/			
		MED	Outdoor air temperature sensor on third previous occasion				
		HI	Outdoor heat exchanger temperature sensor on third previous occasion				
	AUTO	Discharge pipe temperature sensor on third previous occasion					
28	Cooling	AUTO	Indoor heat exchanger temperature sensor 2 on third occasion				
24	Cooling	MED	Error code on fourth previous occasion	/			
		HI	Room temperature sensor on fourth previous occasion				
		AUTO	Indoor heat exchanger temperature sensor 1 on fourth previous occasion				
	Heating	LO	Wireless remote control information on fourth previous occasion	/			
		MED	Outdoor air temperature sensor on fourth previous occasion				
		HI	Outdoor heat exchanger temperature sensor on fourth previous occasion				
	AUTO	Discharge pipe temperature sensor on fourth previous occasion					
29	Cooling	AUTO	Indoor heat exchanger temperature sensor 2 on fourth occasion				
25	Cooling	MED	Error code on fifth previous occasion	/			
		HI	Room temperature sensor on fifth previous occasion				
		AUTO	Indoor heat exchanger temperature sensor 1 on fifth previous occasion				
	Heating	LO	Wireless remote control information on fifth previous occasion	/			
		MED	Outdoor air temperature sensor on fifth previous occasion				
		HI	Outdoor heat exchanger temperature sensor on fifth previous occasion				
	AUTO	Discharge pipe temperature sensor on fifth previous occasion					
30	Cooling	AUTO	Indoor heat exchanger temperature sensor 2 on fifth occasion				
21	Cooling	LO	Stop code on previous occasion				
22			Stop code on second previous occasion				
23			Stop code on third previous occasion				
24			Stop code on fourth previous occasion				
25			Stop code on fifth previous occasion				
26			Stop code on sixth previous occasion				
27			Stop code on seventh previous occasion				
28			Stop code on eighth previous occasion				
29			Stop code on ninth previous occasion				
30			Stop code on tenth previous occasion				
Judgment							Examiner
Remarks							

Note (1) In the case of indoor heat exchanger temperature sensor 2, match from 26 to 30 the temperature setting of wireless remote control. (Refer to page 22)

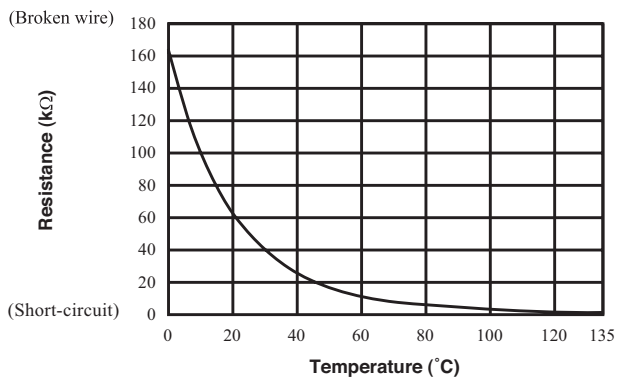
(7) Inspection procedures corresponding to detail of trouble

Sensor error

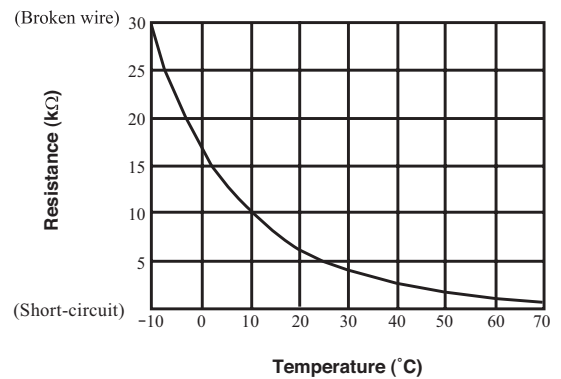
[Broken sensor wire, connector poor connection]



◆ Discharge pipe temperature sensor characteristics

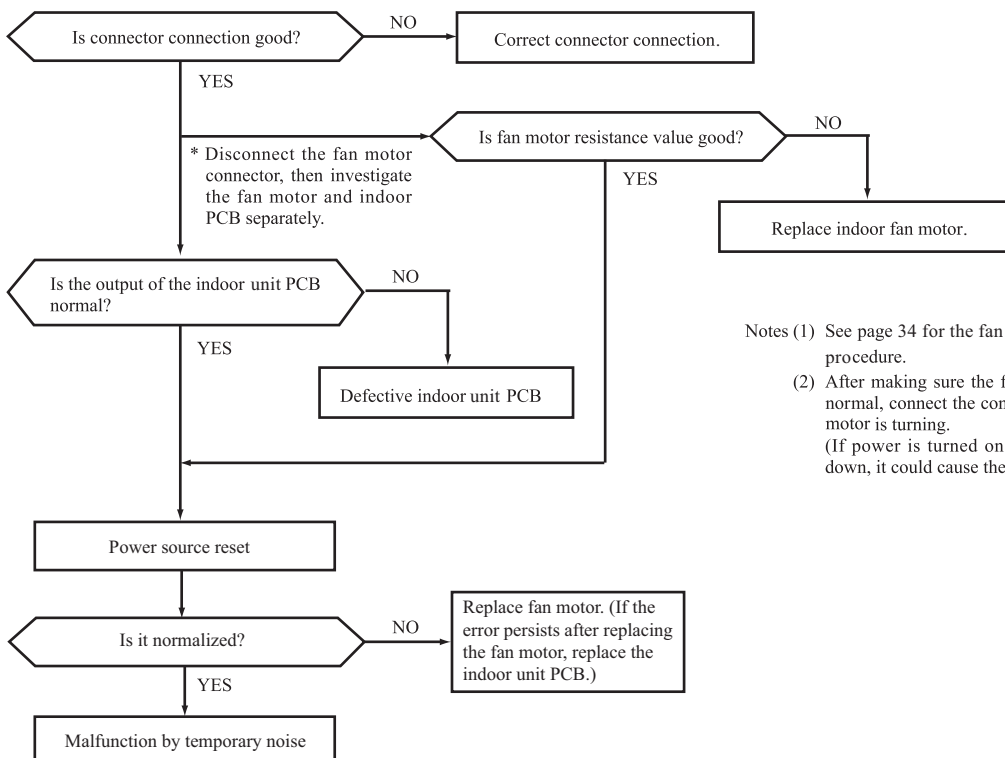


◆ Temperature sensor characteristics (Room temperature, indoor heat exchanger temperature, outdoor heat exchanger temperature, outdoor air temperature)



Indoor fan motor error

[Defective fan motor, connector poor connection, defective indoor unit PCB]

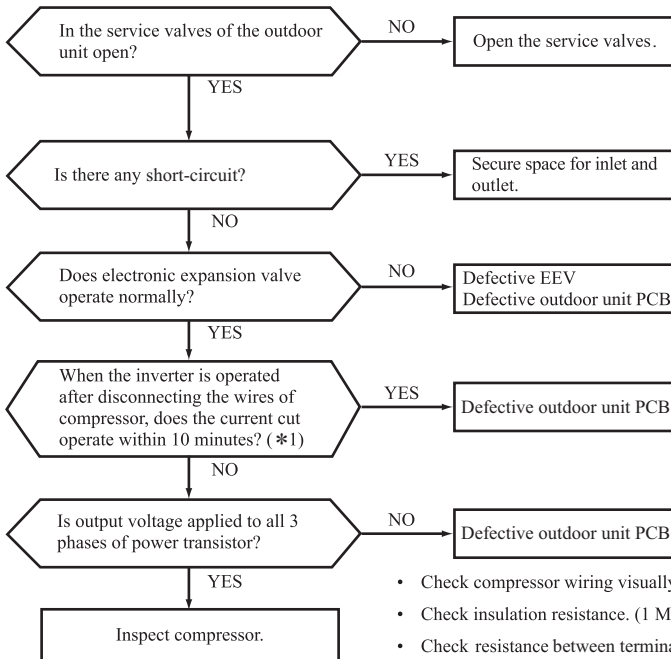


Notes (1) See page 34 for the fan motor and indoor unit PCB check procedure.

(2) After making sure the fan motor and indoor unit PCB are normal, connect the connectors and confirm that the fan motor is turning. (If power is turned on while one or the other is broken down, it could cause the other to break down also.)

Current cut

[Compressor lock, Compressor wiring short-circuit, Compressor output is open phase, Outdoor unit PCB is faulty, Service valve is closed, EEV is faulty, Compressor faulty.]



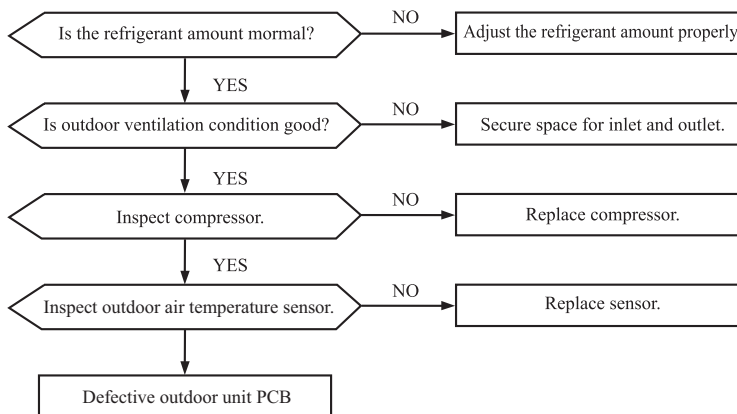
For inspection of electronic expansion valve, see page 38.

*1 If it is normal, it is the rotor lock problem.

- Check compressor wiring visually.
 - Check insulation resistance. (1 MΩ or over)
 - Check resistance between terminals.
- } If check results are normal, compressor is locked.
- SRC25 : 4.428Ω (U-V, V-W, U-W) or more at 20°C
 SRC35 : 1.703Ω (U-V, V-W, U-W) or more at 20°C
 SRC50 : 1.452Ω (U-V, V-W, U-W) or more at 20°C

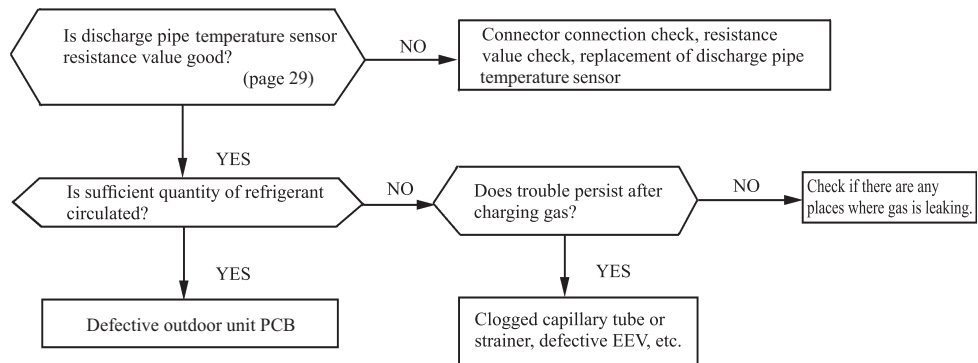
Current safe stop

[Overload operation, compressor lock, overcharge]



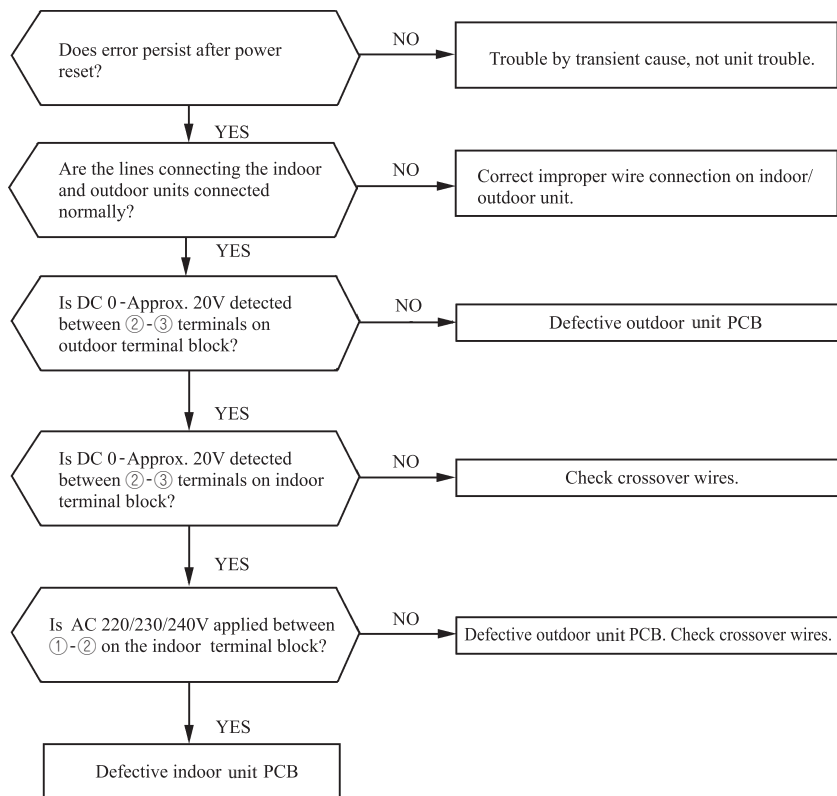
Over heat of compressor

[Gas shortage, defective discharge pipe temperature sensor]



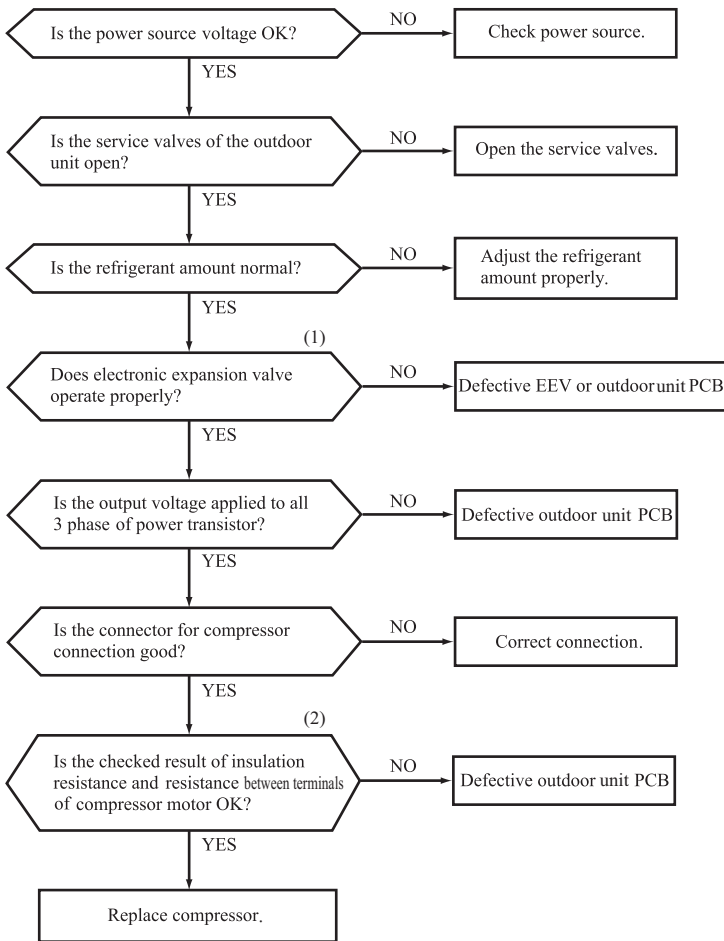
Error of signal transmission

[Wiring error including power cable, defective indoor/ outdoor unit PCB]



Trouble of outdoor unit

[Insufficient refrigerant amount, Faulty power transistor, Broken compressor wire]
 [Service valve close, Defective EEV, Defective outdoor unit PCB]



Proper power source voltages are as follows.
 (At the power source outlet)
 AC220V : AC 198-242V
 AC230V : AC 207-253V
 AC240V : AC 216-264V

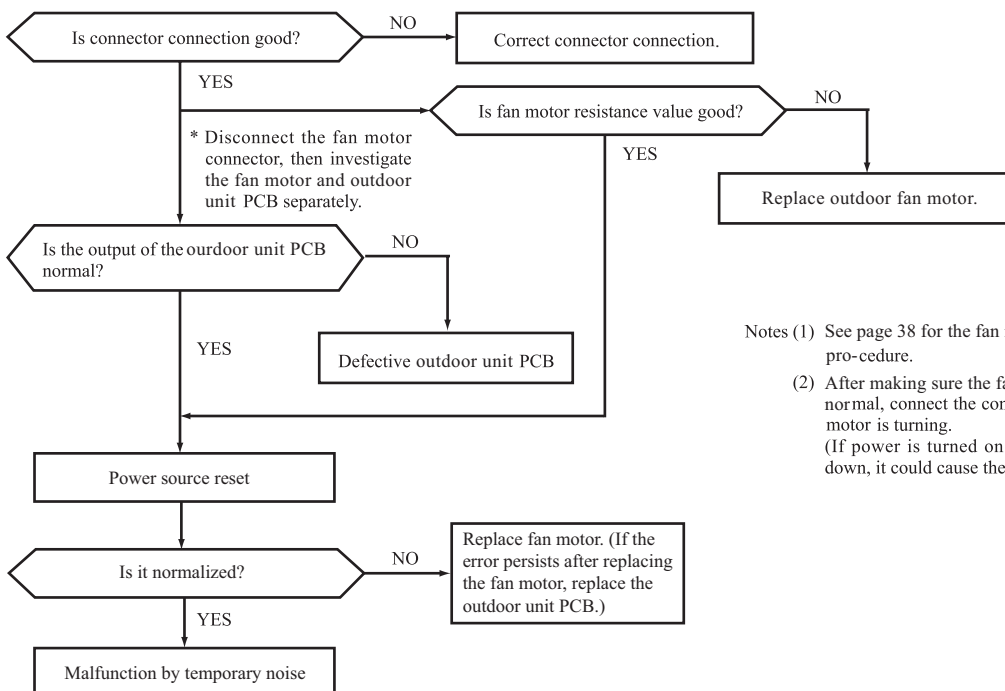
- ◆ Judgment of refrigerant quantity
- (1) Phenomenon of insufficient refrigerant
 - (a) Loss of capacity
 - (b) Poor defrost operation
(Frost is not removed completely.)
 - (c) Longer time of hot keep
(5 minutes or more)
(Normal time: Approx. 1 – 1 minute and 30 seconds)

Notes (1) For inspection of electronic expansion valve, see page 38.

(2) Check resistance between terminals, see page 30.

Outdoor fan motor error

[Defective fan motor, connector poor connection, defective outdoor unit PCB]

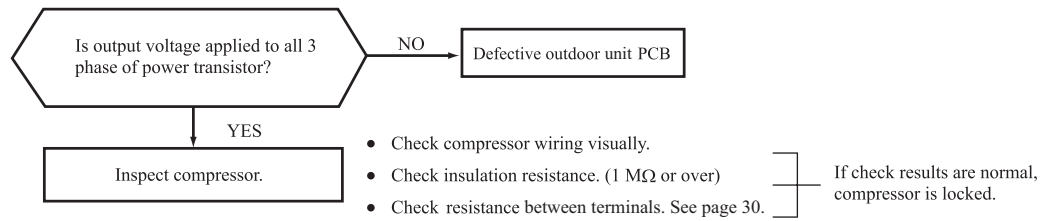


Notes (1) See page 38 for the fan motor and outdoor unit PCB check procedure.

(2) After making sure the fan motor and outdoor unit PCB are normal, connect the connectors and confirm that the fan motor is turning.
 (If power is turned on while one or the other is broken down, it could cause the other to break down also.)

Rotor lock

[Defective compressor, defective outdoor unit PCB]



(8) Phenomenon observed after short-circuit, wire breakage on sensor

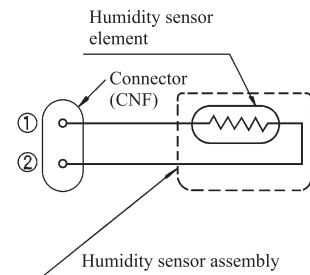
(a) Indoor unit

Sensor	Operation mode	Phenomenon	
		Short-circuit	Disconnected wire
Room temperature sensor	Cooling	Release of continuous compressor operation command	Continuous compressor operation command is not released.
	Heating	Continuous compressor operation command is not released.	Release of continuous compressor operation command
Heat exchanger temperature sensor	Cooling	Freezing cycle system protection trips and stops the compressor.	Continuous compressor operation command is not released. (Anti-frosting)
	Heating	High pressure control mode (Compressor stop command)	Hot keep (Indoor fan stop)
Humidity sensor	Cooling	Refer to the table below.	Refer to the table below.
	Heating	Normal system operation is possible.	

■ Humidity sensor operation

Failure mode		Control input circuit resding	Air-conditioning system operation
Disconnected wire	① Disconnected wire	Humidity reading is 0%	Anti-condensation control is not done.
	② Disconnected wire		
	①② Disconnected wire		
Short-circuit	① and ② are short circuited	Humidity reading is 100%	Anti-condensation control keep doing.

Remark: Do not perform a continuity check of the humidity sensor with a tester. If DC current is applied, it could damage the sensor.

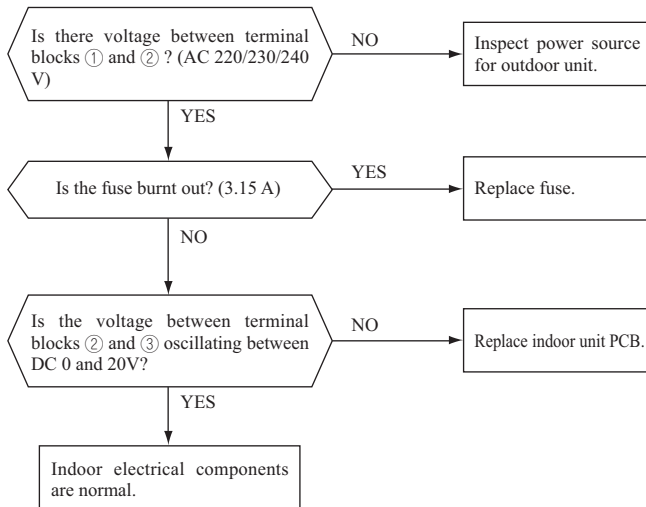


(b) Outdoor unit

Sensor	Operation mode	Phenomenon	
		Short-circuit	Disconnected wire
Heat exchanger temperature sensor	Cooling	Compressor stop.	Compressor stop
	Heating	Defrost operation is not performed.	Defrost operation is performed for 10 minutes at approx. 35 minutes
Outdoor air temperature sensor	Cooling	The compressor cannot pick up its speed owing to the current safe so that the designed capacity is not achieved.	Compressor stop
	Heating	The compressor cannot pick up its speed owing to the heating overload protection so that the designed capacity is not achieved.	Defrost operation is performed for 10 minutes at approx. 35 minutes
Discharge pipe temperature sensor	All modes	Compressor overload protection is disabled. (Can be operated.)	Compressor stop

(9) Checking the indoor electrical equipment

(a) Indoor unit PCB check procedure



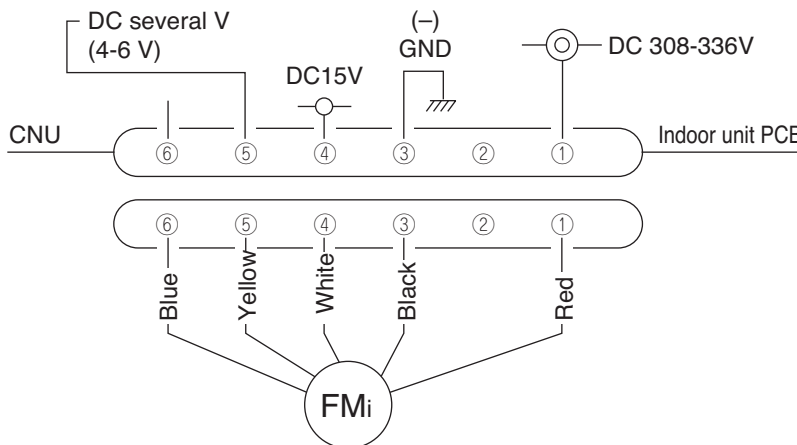
(b) Indoor fan motor check procedure

This is a diagnostic procedure for determining if the indoor unit's fan motor or the indoor unit PCB is broken down.

1) Indoor unit PCB output check

- a) Turn off the power.
- b) Remove the front panel, then disconnect the fan motor lead wire connector.
- c) Turn on the power. If the unit operates when the ON/OFF button is pressed, if trouble is detected after the voltages in the following figure are output for approximately 30 seconds, it means that the indoor unit PCB is normal and the fan motor is broken down.

If the voltages in the following figure are not output at connector pins No. ①, ④ and ⑤, the indoor unit PCB has failed and the fan motor is normal.



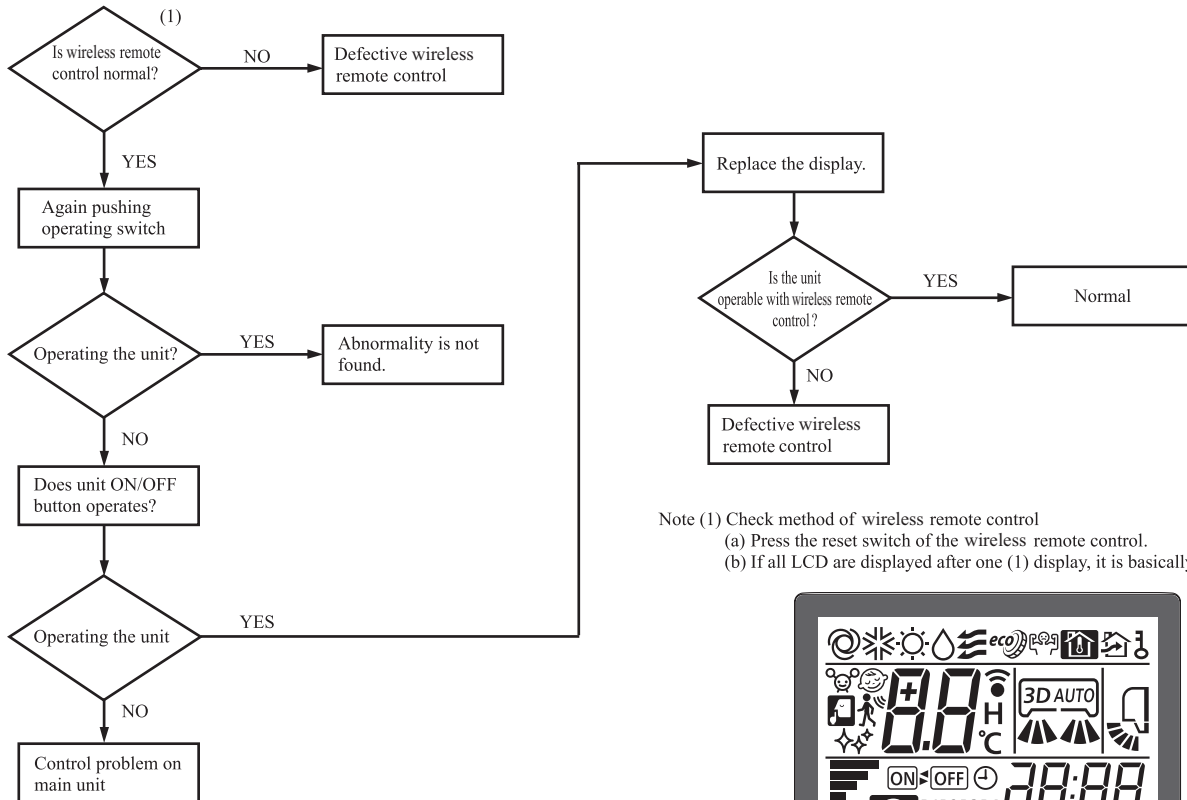
Measuring point	Voltage range when normal
① - ③	DC 308-336V
④ - ③	DC 15V
⑤ - ③	DC several V (4-6V)

2) Fan motor resistance check

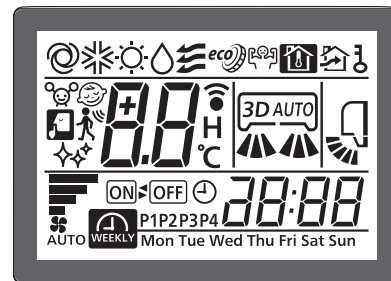
Measuring point	Resistance when normal
① - ③ (Red - Black)	20 MΩ or higher
④ - ③ (White - Black)	20 kΩ or higher

- Notes (1) Remove the fan motor and measure it without power connected to it.
 (2) If the measured value is below the value when the motor is normal, it means that the fan motor is faulty.

(10) How to make sure of wireless remote control

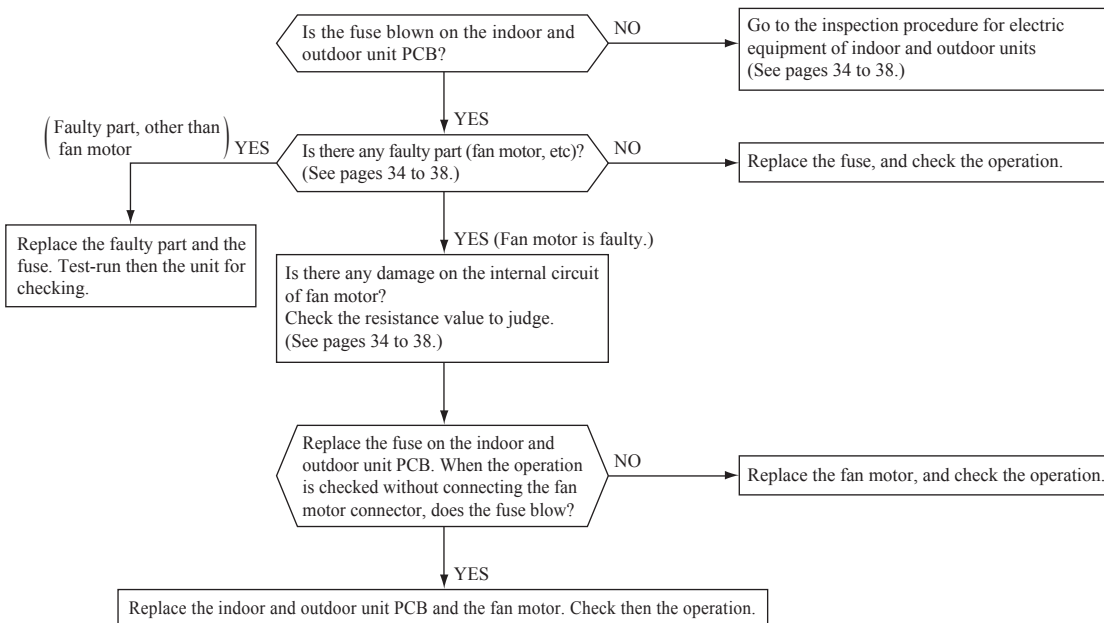


Note (1) Check method of wireless remote control
 (a) Press the reset switch of the wireless remote control.
 (b) If all LCD are displayed after one (1) display, it is basically normal.



◆ Simplified check method of wireless remote control
 It is normal if the signal transmission section of the wireless remote control emits a whitish light at each transmission on the monitor of digital camera.

(11) Inspection procedure for blown fuse on the indoor and outdoor unit PCB



(12) Outdoor unit inspection points
Models SRC25ZS-W2, 35ZS-W2

◆ Check point of outdoor unit

⚠ WARNING – HIGH VOLTAGE

High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

◆ Power source and serial signal inspection

- ① to ② : AC 220/230/240V
- ① to ②/N : AC 220/230/240V
- ②/N to ③ : Normal if the voltage oscillates between DC 0 and approx. 20V

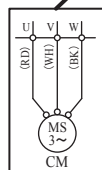
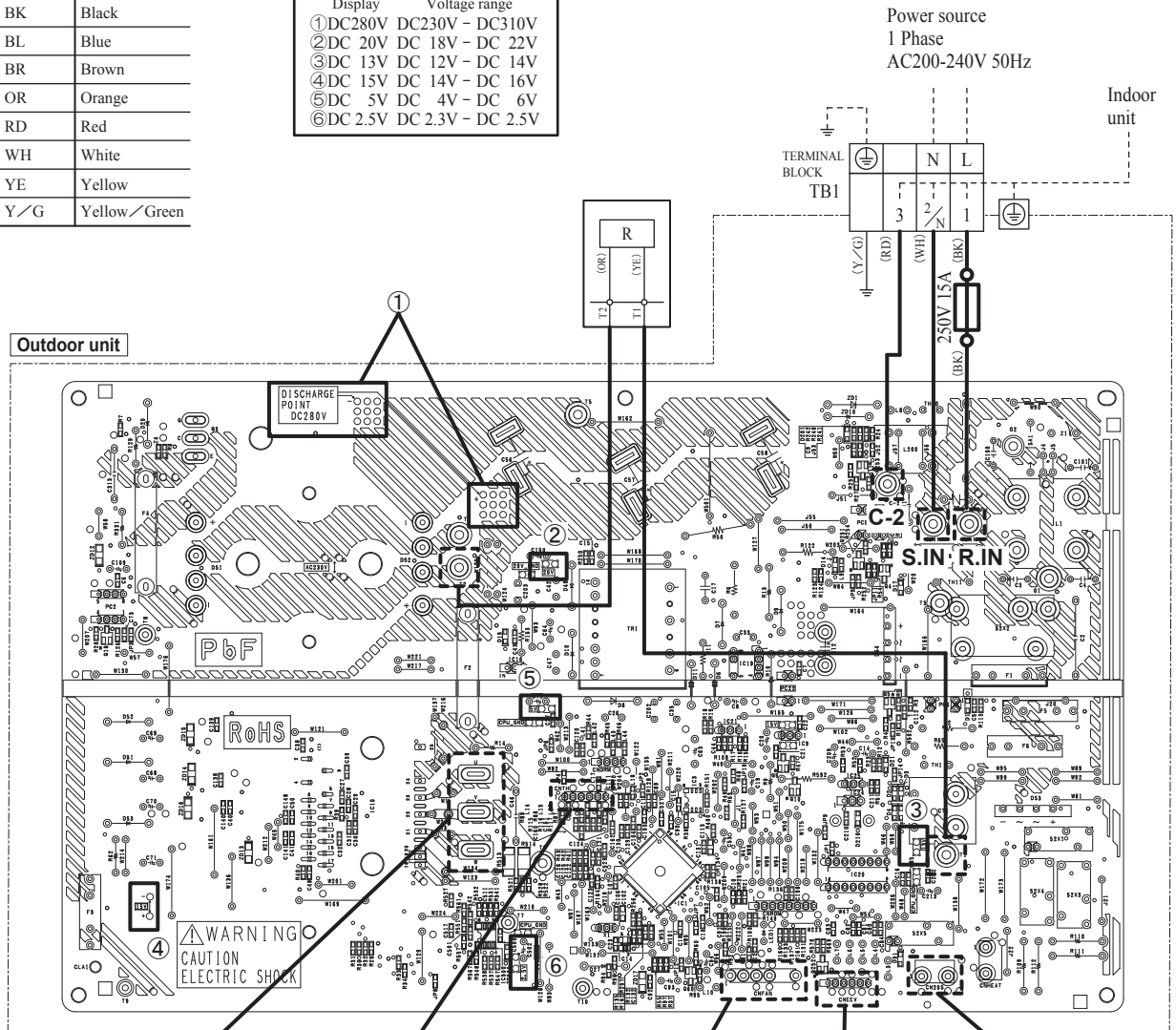
Color symbol

Mark	Color
BK	Black
BL	Blue
BR	Brown
OR	Orange
RD	Red
WH	White
YE	Yellow
Y/G	Yellow/Green

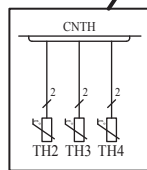
◆ Voltage check in PCB

The normal range is as follows.

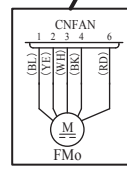
- | Display | Voltage range |
|-----------|-------------------|
| ① DC280V | DC230V - DC310V |
| ② DC 20V | DC 18V - DC 22V |
| ③ DC 13V | DC 12V - DC 14V |
| ④ DC 15V | DC 14V - DC 16V |
| ⑤ DC 5V | DC 4V - DC 6V |
| ⑥ DC 2.5V | DC 2.3V - DC 2.5V |



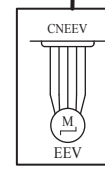
◆ Inspection power transistor
 Remove the faston terminal and test output voltage



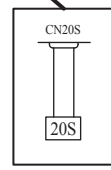
◆ Inspection of resistance value of sensor
 Remove the connector and check the resistance value. See the section of sensor characteristics on page 29.



◆ Inspection of outdoor fan motor
 See page 38.



◆ Inspection of electronic expansion valve
 See page 38.



Model SRC50ZSX-W2

◆ Check point of outdoor unit

⚠ CAUTION – HIGH VOLTAGE
 High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unit is stopped.

Color symbol

Mark	Color
BK	Black
BL	Blue
RD	Red
WH	White
YE	Yellow
Y/G	Yellow/Green

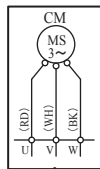
◆ Voltage check in PCB

The normal range is as follows.

Display	Voltage range
① DC280V	DC230V – DC310V
② DC 20V	DC 18V – DC 22V
③ DC 13V	DC 12V – DC 14V
④ DC 15V	DC 14V – DC 16V
⑤ DC 5V	DC 4V – DC 6V
⑥ DC 2.5V	DC 2.3V – DC 2.5V

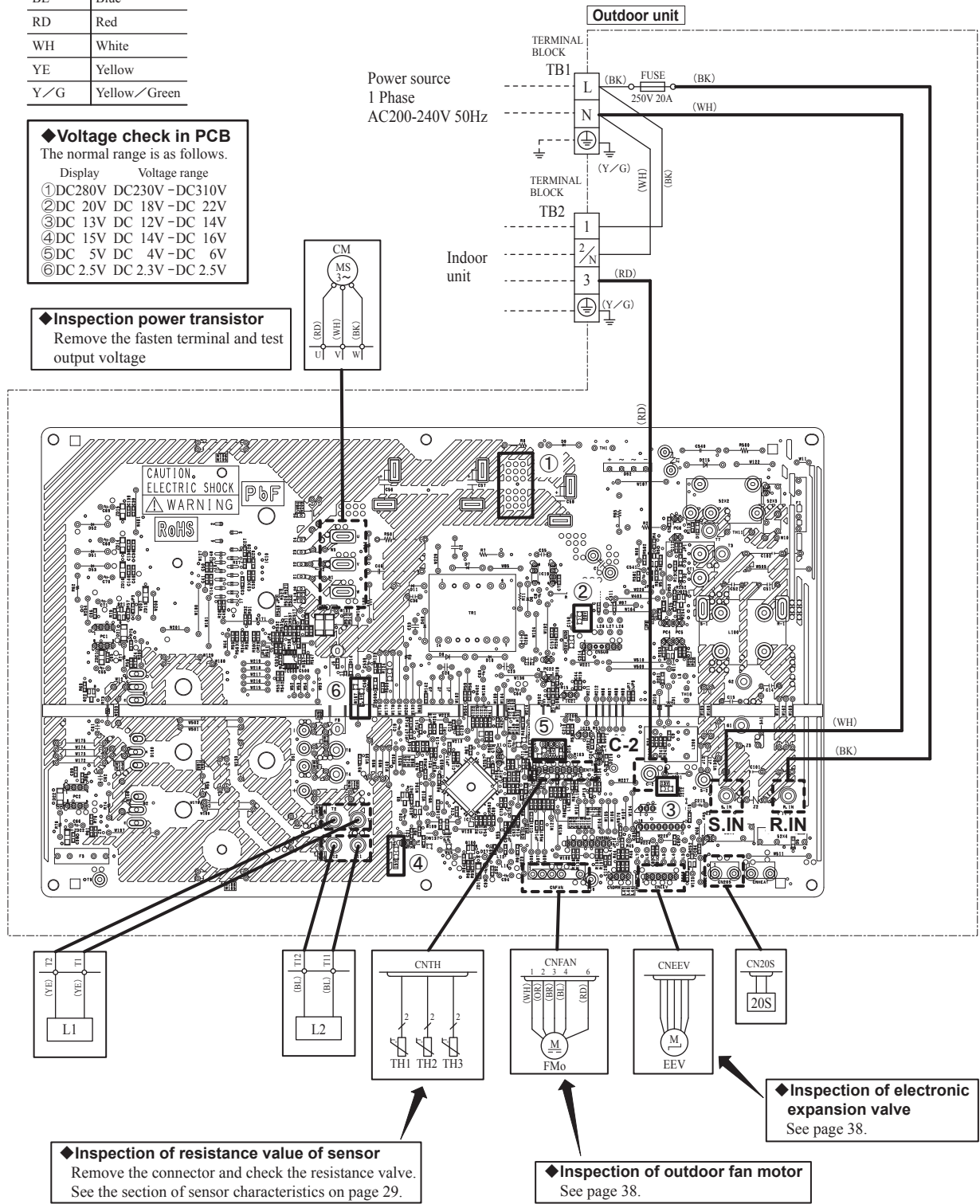
◆ Inspection power transistor

Remove the fasten terminal and test output voltage



◆ Power source and serial signal inspection

- ① to ④ : AC220/230/240V
- ① to ②/N : AC220/230/240V
- ②/N to ③ : Normal if the voltage oscillates between DC0 and approx. 20V



◆ Inspection of resistance value of sensor
 Remove the connector and check the resistance value. See the section of sensor characteristics on page 29.

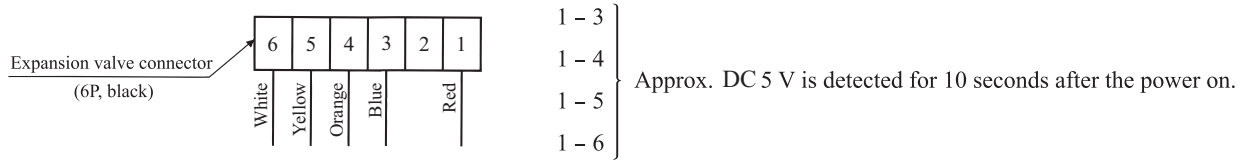
◆ Inspection of outdoor fan motor
 See page 38.

◆ Inspection of electronic expansion valve
 See page 38.

(a) Inspection of electronic expansion valve

Electronic expansion valve operates for approx. 10 seconds after the power on, in order to determine its aperture. Check the operating sound and voltage during the period of time. (Voltage cannot be checked during operation in which only the aperture change occurs.)

- (i) If it is heard the sound of operating electronic expansion valve, it is almost normal.
- (ii) If the operating sound is not heard, check the output voltage.



- (iii) If voltage is detected, the outdoor unit PCB is normal.
- (iv) If the expansion valve does not operate (no operating sound) while voltage is detected, the expansion valve is defective.

• Inspection of electronic expansion valve as a separate unit

Measure the resistance between terminals with an analog tester.

Measuring point	Resistance when normal
1-6	46 ± 4Ω (at 20°C)
1-5	
1-4	
1-3	

(b) Outdoor fan motor check procedure

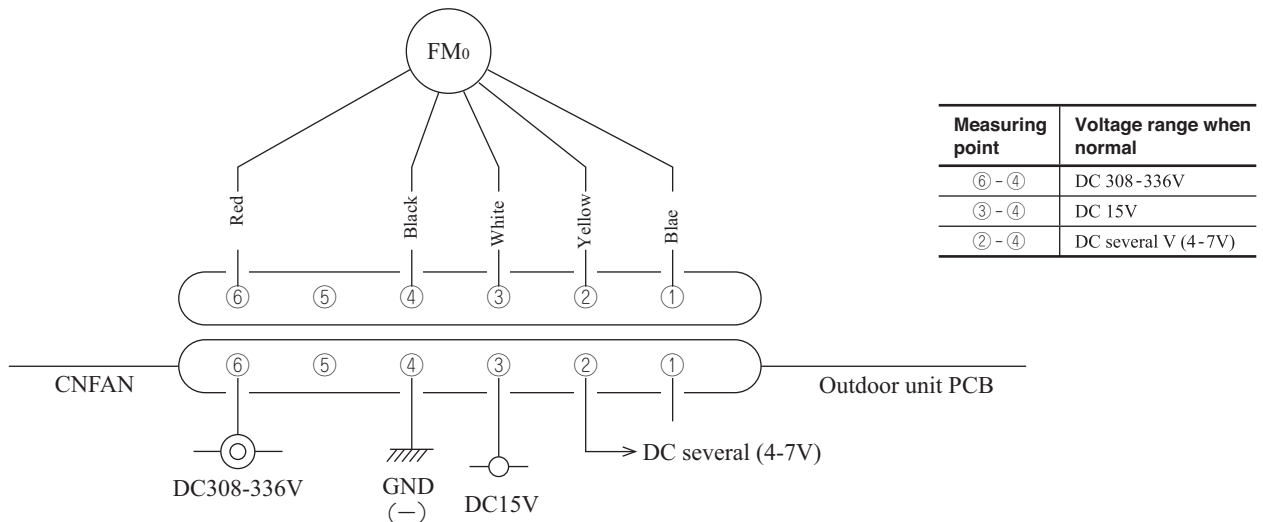
- When the outdoor unit fan motor error is detected, diagnose which of the outdoor unit fan motor or outdoor unit PCB is defective.
- Diagnose this only after confirming that the indoor unit is normal.

(i) Outdoor unit PCB output check

- 1) Turn off the power.
- 2) Disconnect the outdoor fan motor connector CNFAN.
- 3) When the indoor unit is operated by inserting the power source plug and pressing (ON) the backup switch for more than 5 seconds, if the voltage of pin No. ② in the following figure is output for 30 seconds at 20 seconds after turning “ON” the backup switch, the outdoor unit PCB is normal but the fan motor is defective.

If the voltage is not detected, the outdoor unit PCB is defective but the fan motor is normal.

Note (1) The voltage is output 3 times repeatedly. If it is not detected, the indoor unit displays the error message.



(ii) Fan motor resistance check

Measuring point	Resistance when normal
⑥ - ④ (Red - Black)	20 MΩ or higher
③ - ④ (White - Black)	20 kΩ or higher

- Notes (1) Remove the fan motor and measure it without power connected to it.
- (2) If the measured value is below the value when the motor is normal, it means that the fan motor is faulty.

3. ELECTRICAL WIRING

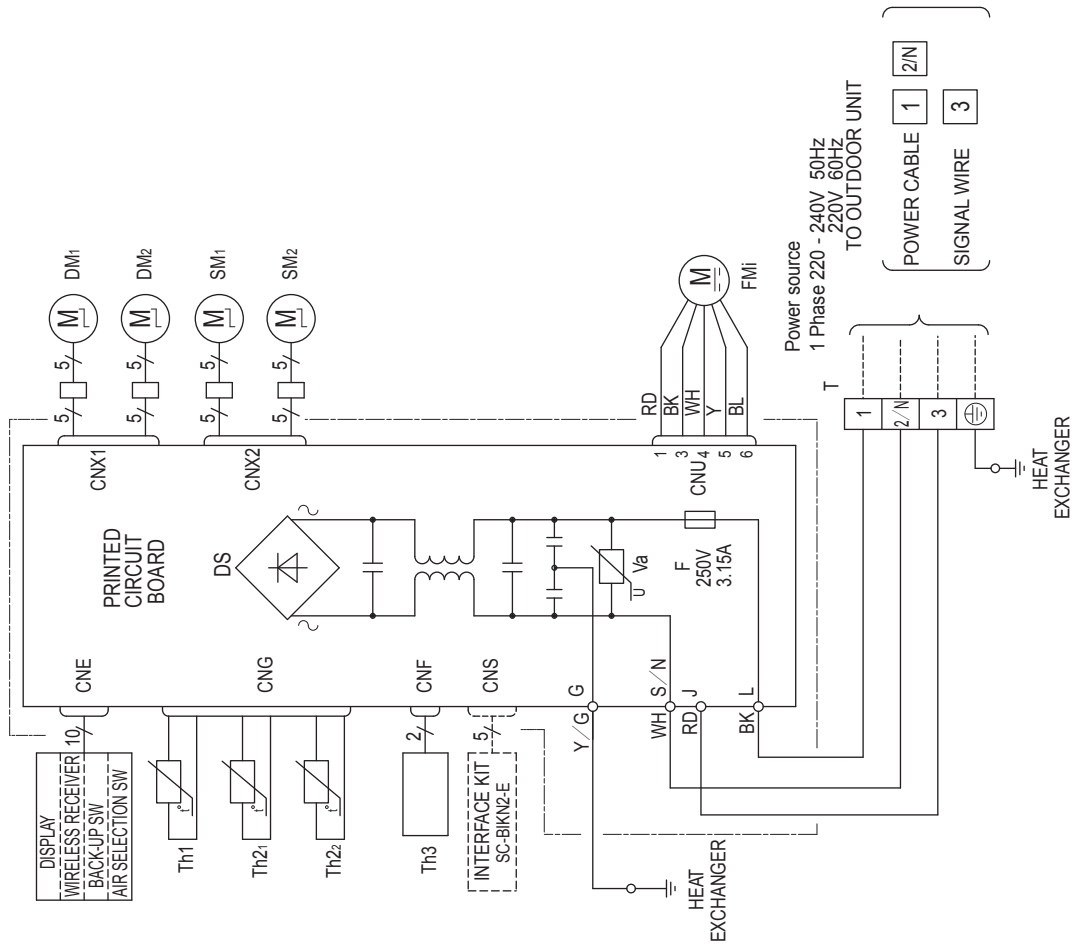
(1) Indoor units

Models SRF25ZS-W, 35ZS-W, 50ZSX-W

Meaning of marks

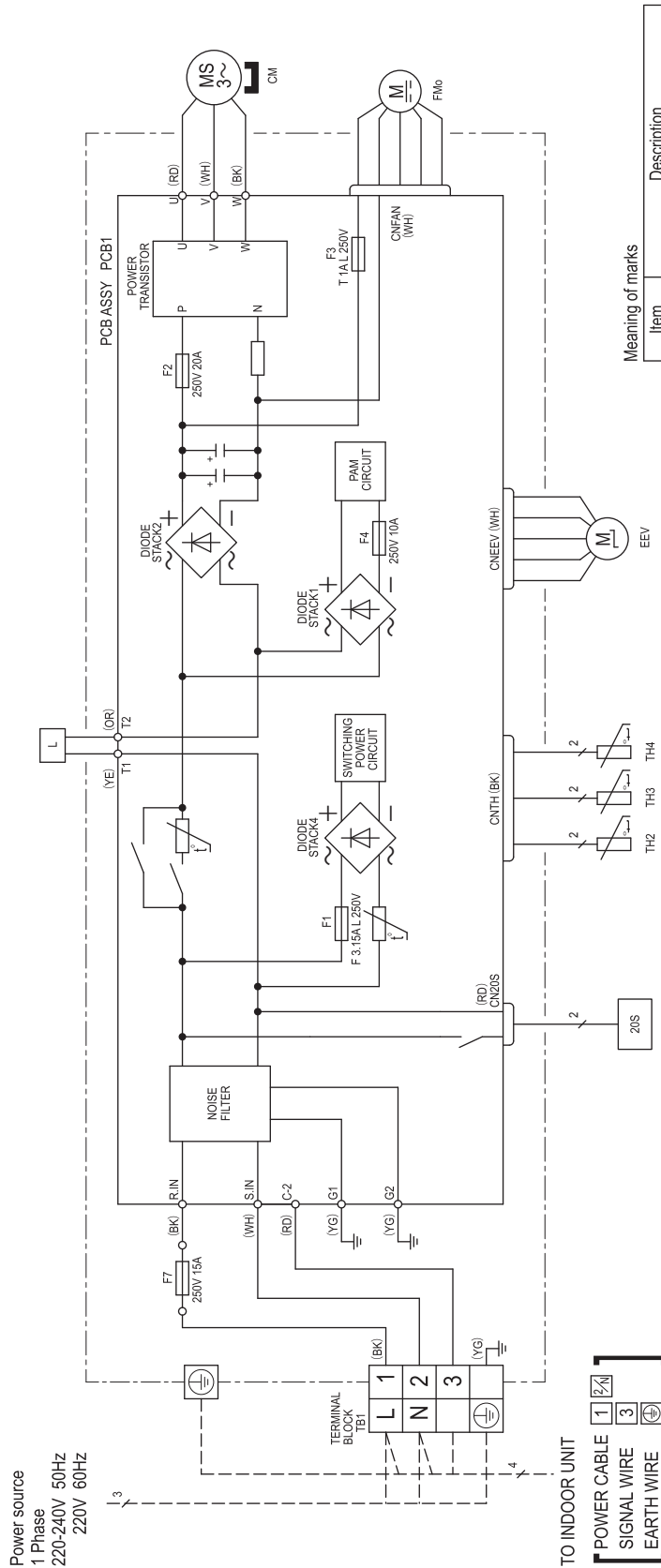
Item	Description
CNE-CNX2	Connector
FMi	Fan motor
SM1,2	Flap motor
DM1	Damper motor
DM2	Damper arm motor
Th1	Room temperature sensor
Th2,1,2	Heat exchanger temperature sensor
Th3	Humidity sensor
DS	Diode stack
F	Fuse
T	Terminal block
Va	Varistor

Color marks	Color
BK	Black
BL	Blue
RD	Red
WH	White
Y	Yellow
Y/G	Yellow / Green



(2) Outdoor units

Models SRC25ZS-W2, 35ZS-W2



Meaning of marks

Item	Description
20S	4-way valve (coil)
CN20S	Connector
CNEEV	Compressor motor
CNFAN	Electric expansion valve (coil)
CNTH	Fan motor
CM	Reactor
EEV	Heat exchanger temperature sensor
FMo	Outdoor air temperature sensor
L	Discharge pipe temperature sensor
TH2	
TH3	
TH4	

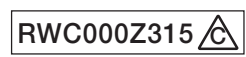
Color marks

Mark	Color
BK	Black
RD	Red
WH	White
OR	Orange
YE	Yellow
YG	Yellow / Green

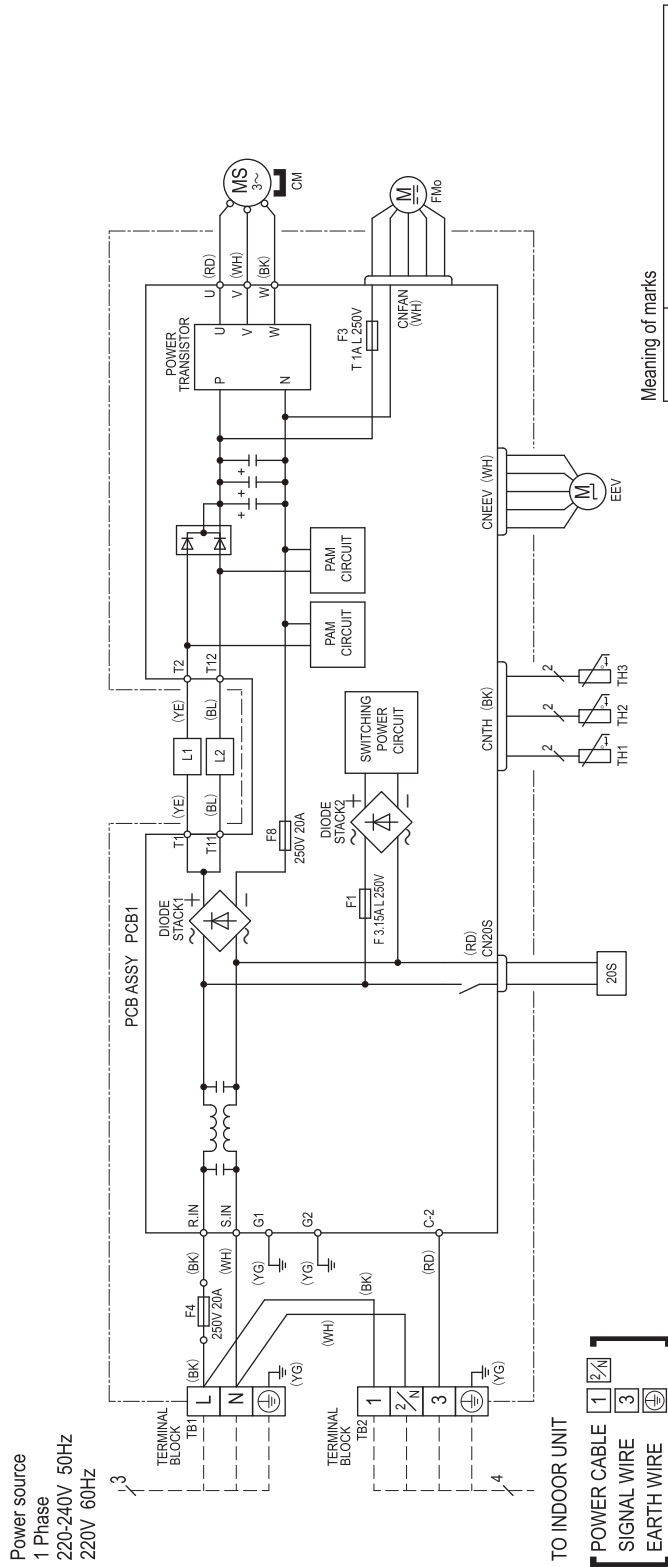
Power cable, indoor-outdoor connecting wires

Model name	MAX running current (A)	Power cable wire size x number*	Power cable length (m)	Connecting cable wire size x number*
SRC25ZS-W2 SRC35ZS-W2	9	2.0mm ² x 3	22	1.5mm ² x 4

- * The wire numbers include earth wire (Yellow / Green).
- Switchgear or circuit breaker capacity should be chosen according to national or regional electricity regulations.
- The power cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the national or regional electricity regulations.



Model SRC50ZSX-W2



Meaning of marks

Item	Description
20S	Solenoid coil for 4-way valve
CN20S	Connector
CNEEV	Compressor motor
CNFAN	Electric expansion valve (coil)
CNTH	Fan motor
CM	Reactor
EEV	Heat exchanger temperature sensor
FMo	Outdoor air temperature sensor
L1,2	Discharge pipe temperature sensor
TH1	
TH2	
TH3	

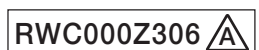
Color marks

Mark	Color
BK	Black
BL	Blue
RD	Red
WH	White
YE	Yellow
YG	Yellow / Green

Power cable, indoor-outdoor connecting wires

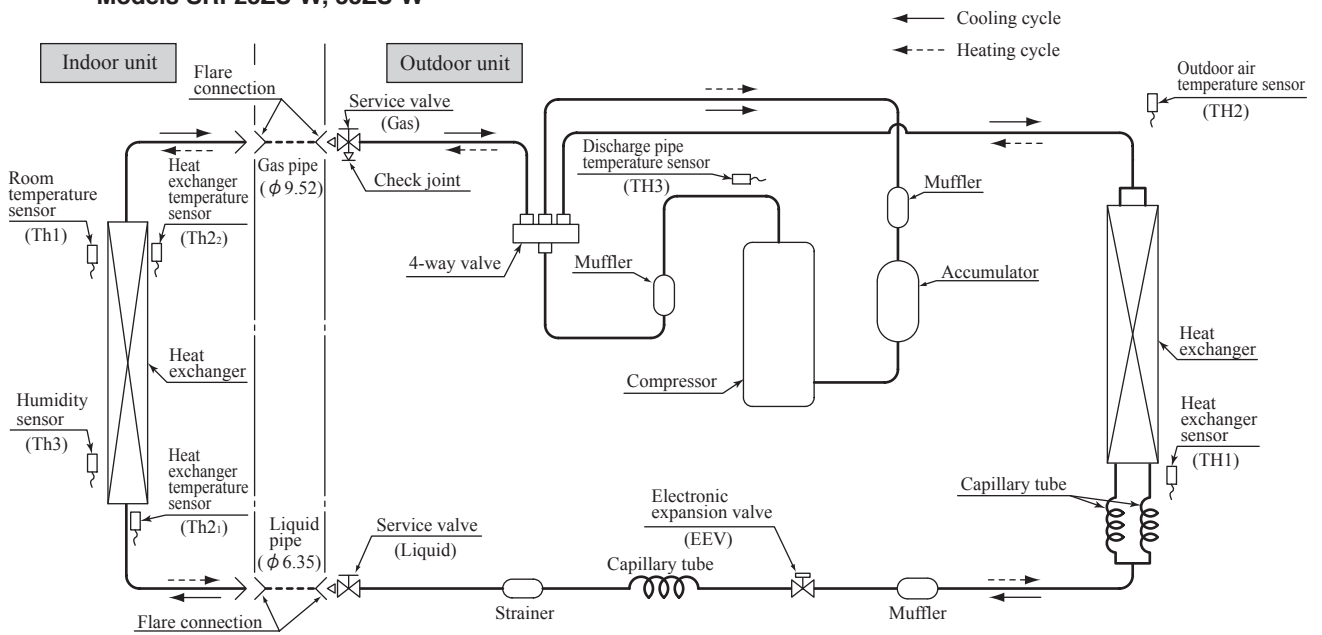
Model name	MAX running current (A)	Power cable wire size x number*	Power cable length (m)	Connecting cable wire size x number*
SRC50ZSX-W2	15	2.0mm ² x 3	13	1.5mm ² x 4

* The wire numbers include Earth wire (Yellow / Green).
 ◦ Switchgear or Circuit breaker capacity should be chosen according to national or regional electricity regulations.
 ◦ The power cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the national or regional electricity regulations.

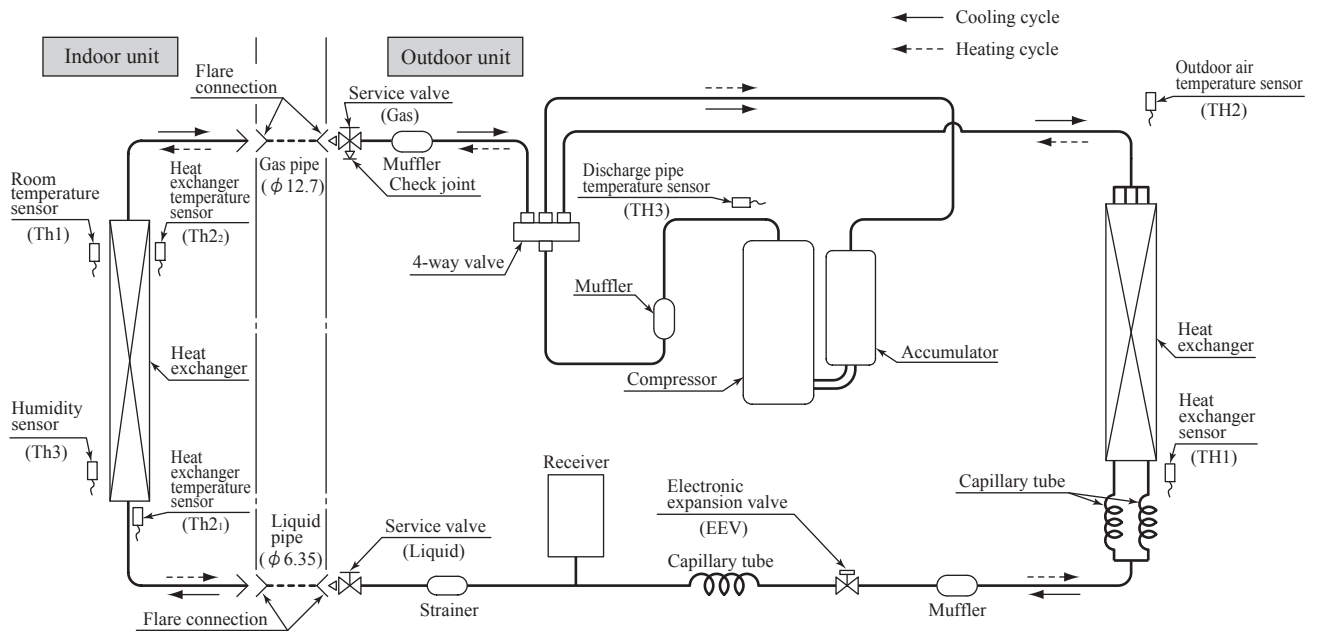


4. PIPING SYSTEM

Models SRF25ZS-W, 35ZS-W



Model SRF50ZSX-W



INVERTER FLOOR STANDING TYPE RESIDENTIAL AIR-CONDITIONERS



MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.
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Because of our policy of continuous improvement, we reserve the right to make changes in all specifications without notice.

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