SPLIT TYPE
ROOM AIR CONDITIONER

DUCT type
INVERTER

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	ARXG30KHTAP	AO*G30KBTB
	ARXG36KHTAP	AO*G36KBTB
	ARXG45KHTAP	AO*G45KBTB
	ARXG54KHTAP	AO*G54KBTB
	RDG30KHTAP	ROG30KBTB
	RDG36KHTAP	ROG36KBTB
	RDG45KHTAP	ROG45KBTB
	RDG54KHTAP	ROG54KBTB

Refrigerant R32

FUJITSU GENERAL LIMITED

1. CONTROL AND FUNCTIONS

CONTENTS

1. CONTROL AND FUNCTIONS

1. Compressor frequency control 01-1

1-1. Cooling operation 01-1
1-2. Heating operation 01-3
1-3. Dry operation 01-4
1-4. Compressor frequency at normal start-up 01-5
1-5. Compressor frequency limitation by outdoor temperature 01-7

2. Auto changeover operation 01-9

3. Fan control 01-11

3-1. Indoor fan control 01-11
3-2. Outdoor fan control 01-14

4. Timer operation control 01-16

4-1. Wireless remote control 01-16
4-2. Wired remote control 01-18

5. Defrost operation control 01-21

5-1. Defrost operation in heating operation stopped 01-22

6. Various control 01-23

6-1. Auto restart 01-23
6-2. 10 °C HEAT operation 01-23
6-3. ECONOMY operation 01-23
6-4. Compressor preheating 01-24
6-5. External electrical heater control 01-24
6-6. Electronic expansion valve control 01-24
6-7. Drain pump control 01-25
6-8. 4-way valve control 01-28
6-9. Peak cut operation 01-28
6-10. Outdoor unit low noise operation 01-29

7. Various protections 01-30

7-1. Discharge gas temperature over-rise prevention control 01-30
7-2. Anti-freezing control (cooling and dry mode) 01-30
7-3. Current release control 01-31
7-4. Indoor unit fan motor over temperature protection 01-31
7-5. Compressor temperature protection 01-32
7-6. High pressure protection 01-32
7-7. Low outdoor temperature protection 01-32
7-8. High temperature and high pressure release control 01-33

CONTROL AND FUNCTIONS

1. Compressor frequency control

1-1. Cooling operation

A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

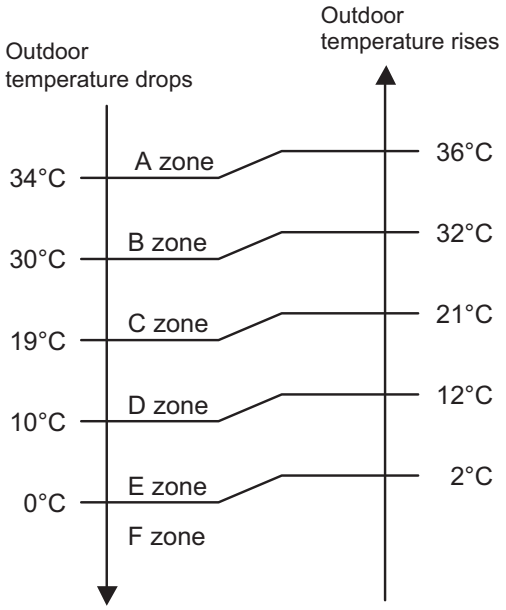
- If the room temperature is 6.0 °C higher than a set temperature, the compressor operation frequency will attain to maximum performance.
- If the room temperature is 1.0 °C lower than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +6.0°C to -1.0°C of the setting temperature, the compressor frequency is controlled within the range shown in the table below. However, the maximum frequency is limited in the range shown in the figure below based on the indoor fan mode and the outdoor temperature.

- **Compressor frequency range**

Model name	Minimum frequency	Maximum frequency
ARXG30KHTAP	15 rps	98 rps
ARXG36KHTAP	15 rps	98 rps
ARXG45KHTAP	17 rps	95 rps
ARXG54KHTAP	17 rps	95 rps

CONTROL AND FUNCTIONS

- **Limit of maximum speed based on outdoor temperature**



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
ARXG30KHTAP	A zone	98	64	49	32
	B zone	98	64	49	32
	C zone	77	49	40	32
	D zone	54	40	34	26
	E zone	54	40	34	26
	F zone	54	40	34	26
ARXG36KHTAP	A zone	98	79	64	44
	B zone	98	79	64	44
	C zone	85	64	54	44
	D zone	64	54	44	36
	E zone	64	54	44	36
	F zone	64	54	44	36
ARXG45KHTAP	A zone	95	66	51	33
	B zone	95	66	51	33
	C zone	80	51	41	33
	D zone	56	41	35	27
	E zone	56	41	35	27
	F zone	56	41	35	27
ARXG54KHTAP	A zone	95	66	51	33
	B zone	95	66	51	33
	C zone	80	51	41	33
	D zone	56	41	35	27
	E zone	56	41	35	27
	F zone	56	41	35	27

CONTROL AND FUNCTIONS

1-2. Heating operation

A sensor (room temperature thermistor) built in indoor unit body will usually perceive difference or variation between setting temperature and present room temperature, and controls operation frequency of compressor.

- If the room temperature is 6.0 °C lower than a set temperature, the compressor operation frequency will attain to maximum performance.
- If the room temperature is 1.0 °C higher than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +1.0°C to -6.0°C of the setting temperature, the compressor frequency is controlled within the range shown below.

- **Compressor frequency range**

Unit: rps

Model name	Minimum frequency	Maximum frequency
AOHG30KBTB	15	120
AOHG36KBTB	15	120
AOHG45KBTB	17	120
AOHG54KBTB	17	120

CONTROL AND FUNCTIONS

1-3. Dry operation

The compressor rotation frequency shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit has detected as shown in the table below.

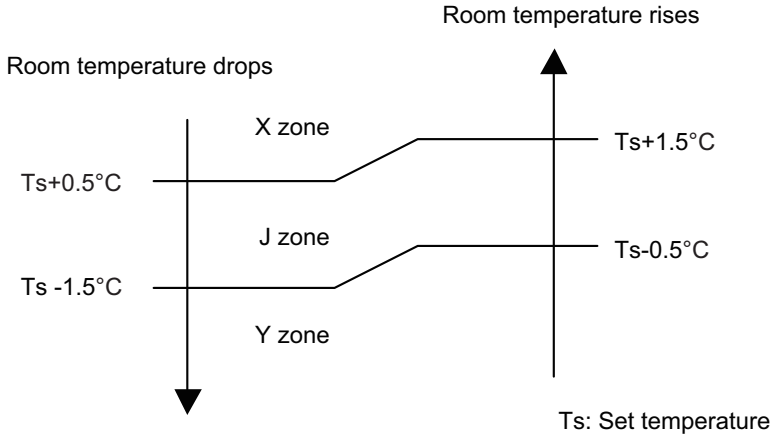
Zone is defined by set temperature and room temperature.

- **Compressor frequency range**

Unit: rps

Model name	Outdoor temperature zone	Operating frequency
ARXG30KHTAP	X zone	44
	J zone	44
	Y zone	0
ARXG36KHTAP	X zone	44
	J zone	44
	Y zone	0
ARXG45KHTAP	X zone	33
	J zone	33
	Y zone	0
ARXG54KHTAP	X zone	33
	J zone	33
	Y zone	0

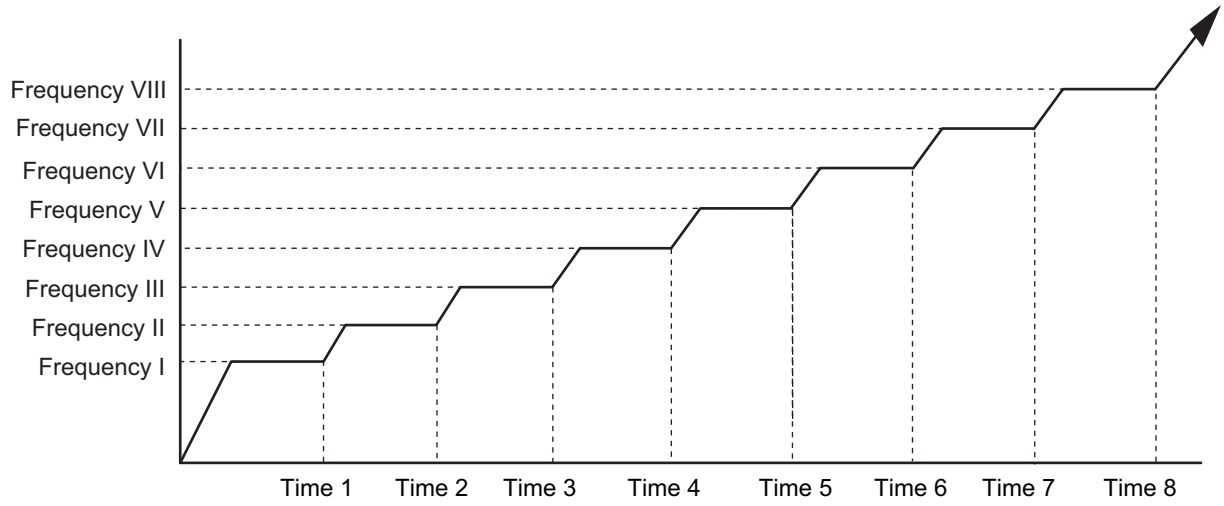
- **Compressor control based on room temperature**



1-4. Compressor frequency at normal start-up

■ Models: AOHG30KBTB and AOHG36KBTB

Compressor frequency soon after starting is controlled as below.



- Normal operation

Frequency (rps)	I	II	III	IV	V	VI	VII	VIII
	25	42	53	61	65	75	85	92
Time (sec)	1	2	3	4	5	6	7	8
	90	150	270	330	390	450	570	630

- Special operation

Frequency (rps)	I	II	III	IV	V	VI	VII	VIII
	25	42	53	61	65	75	85	92
Time (sec)	1	2	3	4	5	6	7	8
	225	305	605	665	725	785	855	1,000

NOTES:

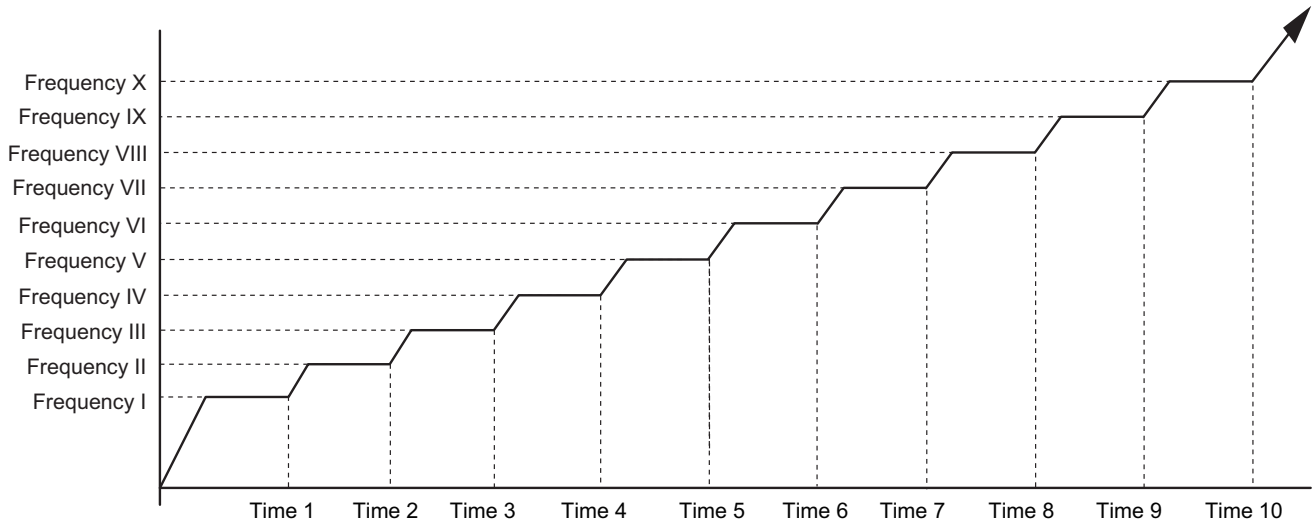
- Normal operation:
  - Cooling and dry mode
    - Below 3 hours from the compressor stop and the compressor thermistor ≥ 15 °C
    - After defrost operation
  - Other than when the compressor starts for the first time since the breaker turns on

- Special operation:
  - Other than the normal operation condition
  - When the compressor starts for the first time since the breaker turns on

CONTROL AND FUNCTIONS

■ Models: AOHG45KBTB and AOHG54KBTB

Compressor frequency soon after starting is controlled as below.



- Normal operation

Frequency (rps)	I	II	III	IV	V	VI	VII	VIII	IX	X
	41	46	51	57	60	72	81	91	100	110
Time (sec)	1	2	3	4	5	6	7	8	9	10
	60	120	180	240	360	420	480	540	600	660

- Special operation

Frequency (rps)	I	II	III	IV	V	VI	VII	VIII	IX	X
	41	46	51	57	60	72	81	91	100	110
Time (sec)	1	2	3	4	5	6	7	8	9	10
	120	185	245	305	605	665	725	785	845	1,000

NOTES:

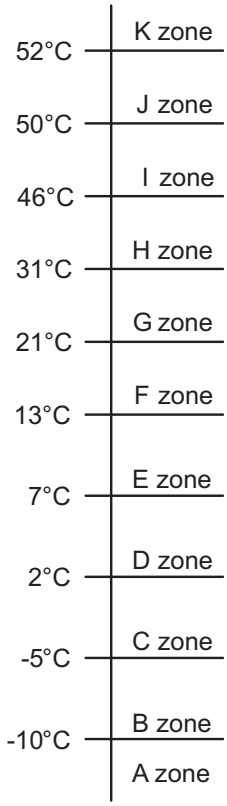
- Normal operation:
  - Cooling and dry mode
    - Below 3 hours from the compressor stop and the compressor thermistor ≥ 15 °C
    - After defrost operation
  - Other than when the compressor starts for the first time since the breaker turns on

- Special operation:
  - Other than the normal operation condition
  - When the compressor starts for the first time since the breaker turns on

1-5. Compressor frequency limitation by outdoor temperature

The minimum compressor frequency is limited by outdoor temperature as below.

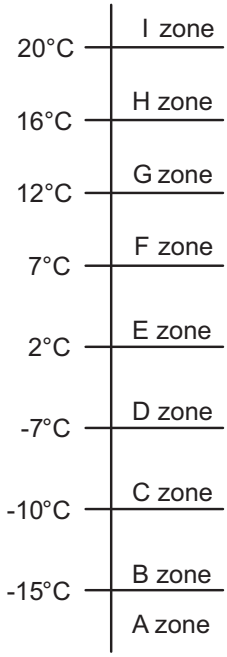
- **Cooling/Dry mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOHG30KBTB AOHG36KBTB	A zone	55 rps
	B zone	52 rps
	C zone	47 rps
	D zone	39 rps
	E zone	33 rps
	F zone	25 rps
	G zone	18 rps
	H zone	20 rps
	I zone	20 rps
	J zone	21 rps
	K zone	24 rps
AOHG45KBTB AOHG54KBTB	A zone	50 rps
	B zone	47 rps
	C zone	40 rps
	D zone	30 rps
	E zone	22 rps
	F zone	20 rps
	G zone	16 rps
	H zone	16 rps
	I zone	17 rps
	J zone	23 rps
	K zone	28 rps

CONTROL AND FUNCTIONS

- **Heating mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOHG30KBTB AOHG36KBTB	A zone	58 rps
	B zone	52 rps
	C zone	43 rps
	D zone	38 rps
	E zone	28 rps
	F zone	23 rps
	G zone	20 rps
	H zone	17 rps
	I zone	17 rps
AOHG45KBTB AOHG54KBTB	A zone	46 rps
	B zone	42 rps
	C zone	35 rps
	D zone	32 rps
	E zone	23 rps
	F zone	20 rps
	G zone	17 rps
	H zone	13 rps
	I zone	16 rps

CONTROL AND FUNCTIONS

2. Auto changeover operation

When the air conditioner is set to AUTO mode by remote controller, operation starts in the optimum mode from among heating, cooling, dry and monitoring modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 1.0°C steps.

- When operation starts, indoor fan and outdoor fan are operated for around 1 minute.
  Room temperature and outdoor temperature are sensed, and the operation mode is selected in accordance with the table below.

Room temperature	Operation mode
Tr > Ts + 2°C	Cooling
Ts + 2°C ≥ Tr ≥ Ts - 2°C	Middle zone
Tr < Ts - 2°C	Heating

Tr: Room temperature

Ts: Setting temperature

NOTE: When the operation mode is middle zone, indoor unit operation mode is selected as below.

- Same operation mode is selected as outdoor unit.
  If outdoor unit is operating in cooling and heating mode, indoor unit will be operated by the same operation mode.
- Selected by outdoor temperature.
  If outdoor unit is operating in other than cooling and heating mode, indoor unit will be operated according to the outdoor temperature as below.

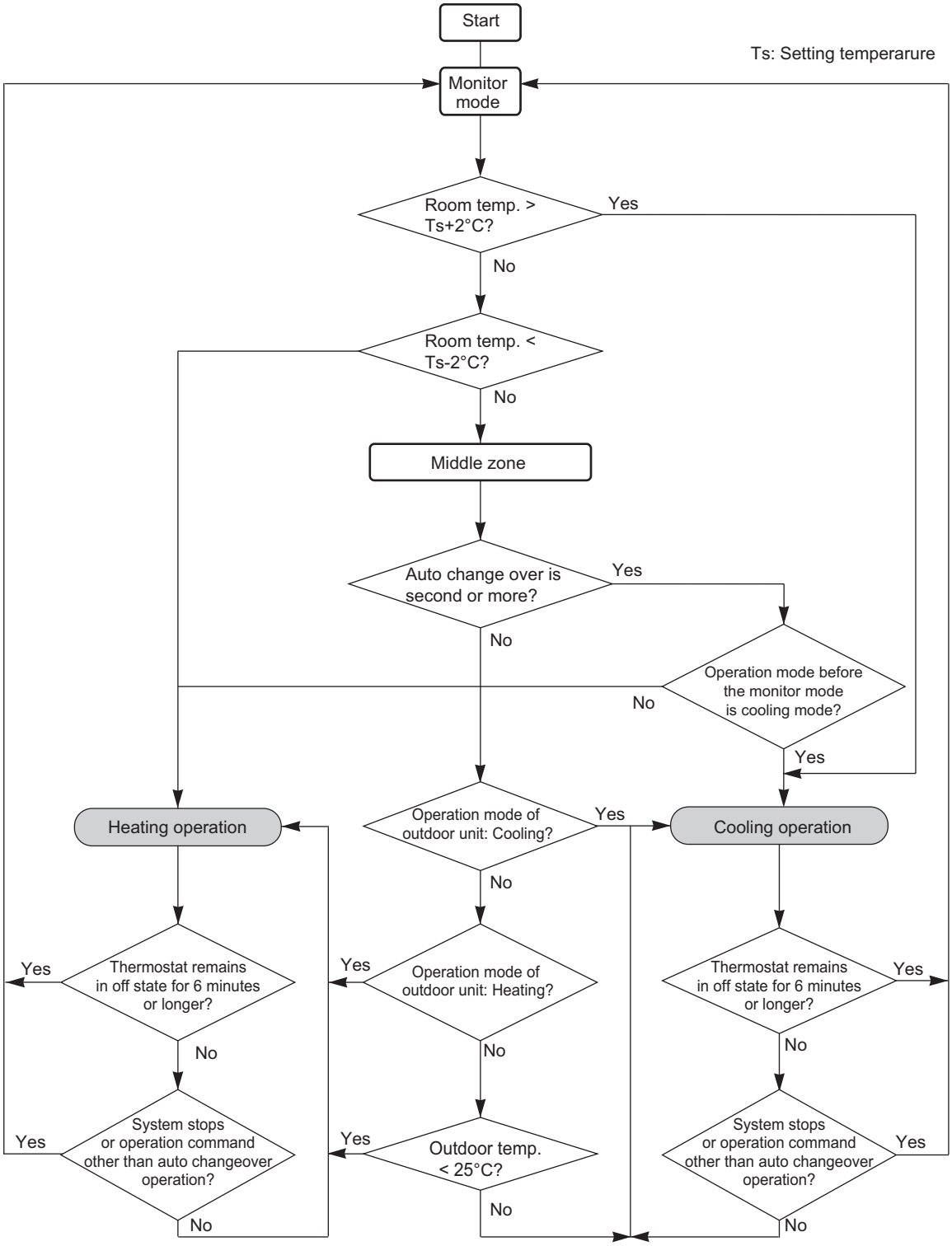
Outdoor temp.	Operation mode
25°C or more	Cooling
Less than 25°C	Heating

- When the compressor was stopped for 6 consecutive minutes by temperature control function after the cooling or heating mode was selected as above, operation is switched to monitoring mode and the operation mode selection is done again.

- When the middle zone is selected on the predetermining of the operation mode, the operation mode before the changing to the monitoring mode is selected.

CONTROL AND FUNCTIONS

Operation flow chart



3. Fan control

Tr: Room temperature
Ts: Setting temperature

3-1. Indoor fan control

■ Fan speed

Indoor fan speed is defined as below.

Operation mode	Fan mode	Speed (rpm)			
		ARXG30KHTAP	ARXG36KHTAP	ARXG45KHTAP	ARXG54KHTAP
Heating	HIGH	1,060	900	1,130	1,130
	MED	880	800	930	930
	LOW	780	660	780	780
	QUIET	720	560	700	700
	S-LOW	420	420	420	420
Cooling/Fan	HIGH	1,060	980	1,130	1,130
	MED	880	800	930	930
	LOW	780	660	780	780
	QUIET	720	560	700	700
	Soft quiet	510*1	480*1	560*1	560*1
	S-LOW	420*2	420*2	420*2	420*2
Dry		X zone: 720 J zone: 720	X zone: 560 J zone: 560	X zone: 700 J zone: 700	X zone: 700 J zone: 700

*1: Fan mode only
*2: Cooling mode only

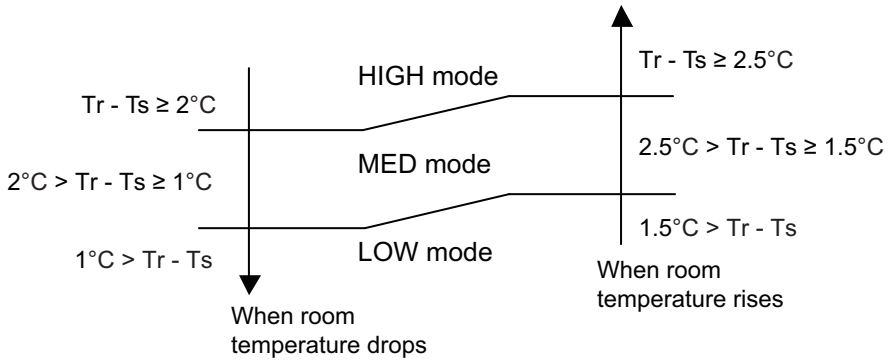
■ Fan operation

Airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH while indoor unit fan only runs.
When fan mode is set at AUTO, it operates on MED fan speed.

■ Cooling operation

Switch the airflow AUTO, and indoor fan motor will run according to room temperature, as below.
On the other hand, if switched in HIGH—QUIET, indoor motor will run at a constant airflow of COOL operation modes QUIET, LOW, MED, HIGH as shown in “Fan speed” above.

Airflow change over (Cooling: Auto)



■ Dry operation

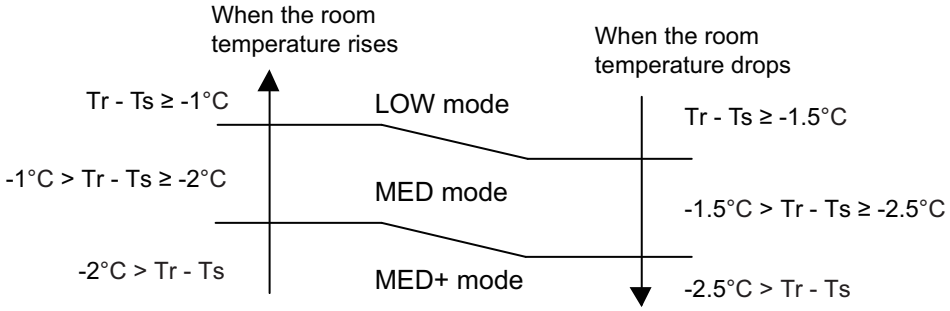
During dry operation, fan speed setting can not be changed as shown in “Fan speed” above.

CONTROL AND FUNCTIONS

■ Heating operation

Switch the airflow AUTO, and the indoor fan motor will run according to a room temperature, as below.
On the other hand, if switched in HIGH—QUIET, the indoor motor will run at a constant airflow of HEAT operation modes QUIET, LOW, MED, HIGH as shown in “Fan speed” above.

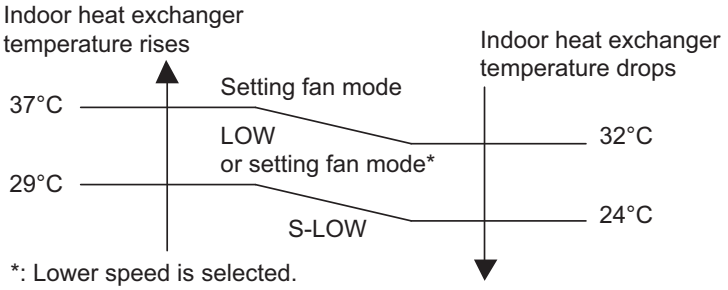
Airflow change over (Heating: Auto)



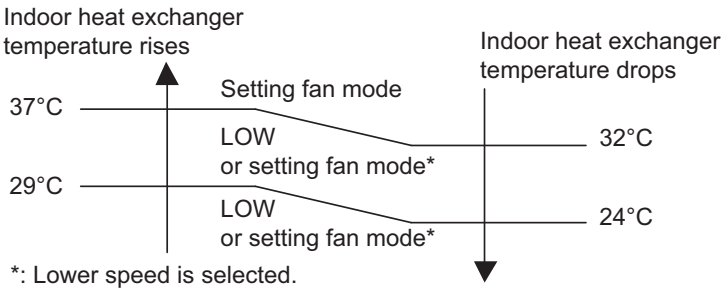
■ Cool air prevention control (heating mode)

The maximum value of the indoor fan speed is set as shown below, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

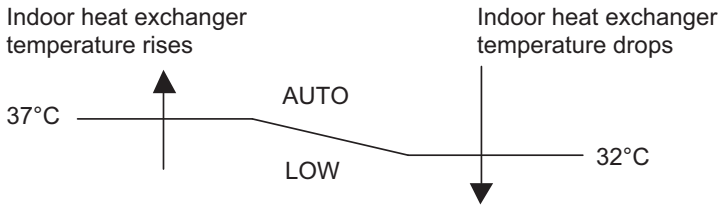
- **Normal operation**



13 minutes later:

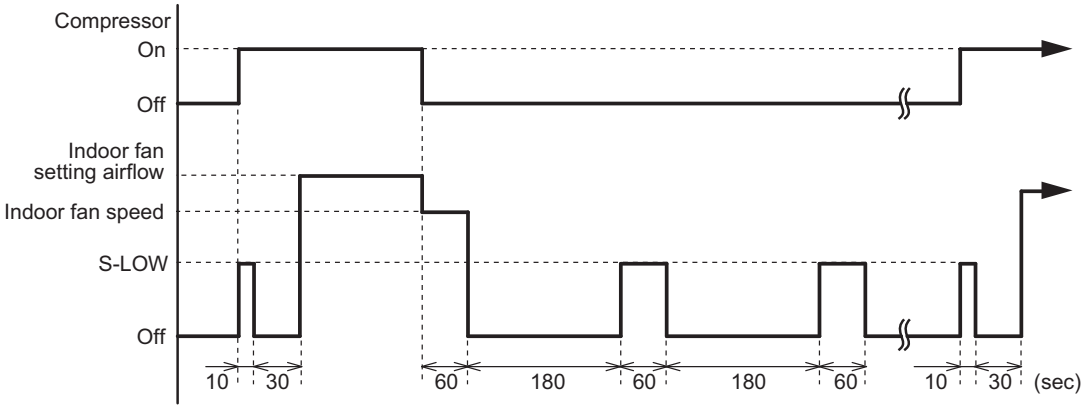


- **10 °C HEAT operation**



■ Moisture return prevention control (cooling and dry mode)

Switch the airflow AUTO at cooling mode, and the indoor fan motor will run as shown below.



CONTROL AND FUNCTIONS

3-2. Outdoor fan control

■ Outdoor fan motor

This outdoor unit has a DC fan motor. (Control method is different between AC and DC motors.)

■ Fan speed

● Models: AOHG30KBTB and AOHG36KBTB

Fan speed is defined by outdoor temperature and compressor frequency.

Unit: rpm

Fan step	Cooling or dry	Heating
13	830	—
12	830	—
11	740	—
10	700	830
9	650	740
8	570	690
7	570	620
6	570	590
5	570	480
4	540	410
3	480	340
2	400	270
1	270	200
S-HIGH	—	830

- When the compressor frequency increases, the outdoor fan speed also changes to the higher speed.
- When the compressor frequency decreases, the outdoor fan speed also changes to the lower speed.

NOTE: After defrost control on the heating mode, the fan speed is kept higher regardless of the compressor frequency.
Fan speed after defrost control: 830 rpm

CONTROL AND FUNCTIONS

● Models: AOHG45KBTB and AOHG54KBTB

Fan speed is defined by outdoor temperature and compressor frequency.

Unit: rpm

Fan step	Cooling or dry	Heating
13	990	—
12	920	—
11	860	—
10	800	990
9	740	900
8	650	820
7	600	740
6	530	650
5	490	540
4	400	460
3	330	380
2	270	290
1	200	200
S-HIGH	—	990

- When the compressor frequency increases, the outdoor fan speed also changes to the higher speed.
- When the compressor frequency decreases, the outdoor fan speed also changes to the lower speed.

NOTE: After defrost control on the heating mode, the fan speed is kept higher regardless of the compressor frequency.
Fan speed after defrost control: 990 rpm

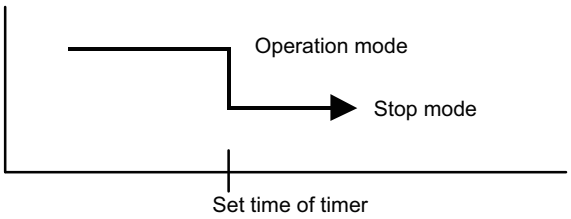
4. Timer operation control

4-1. Wireless remote control

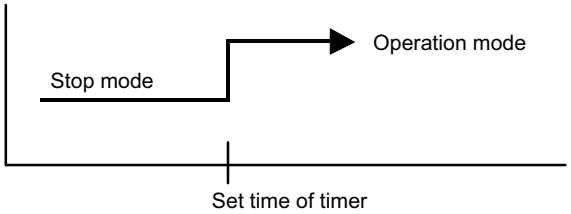
On/Off timer	Program timer	Sleep timer	Weekly timer
○	○	○	—

■ On/Off timer

- Off timer: When the clock reaches the set timer, the air conditioner will be turned off.

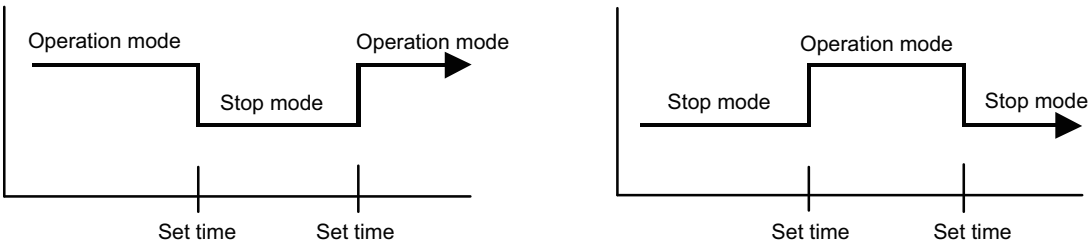


- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



■ Program timer

- The program timer allows the off timer and the on timer to be used in combination one time.



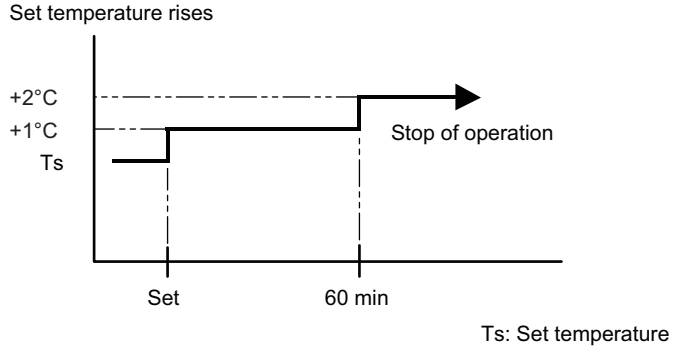
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

CONTROL AND FUNCTIONS

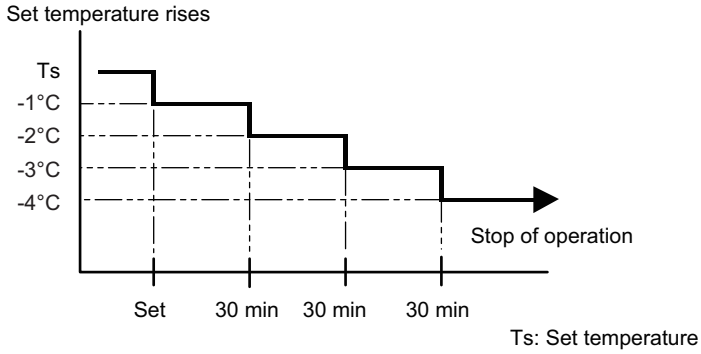
■ Sleep timer

If the sleep timer is set, the room temperature is monitored and the operation is stopped automatically. If the operation mode or the set temperature is change after the sleep timer is set, the operation is continued according to the changed setting of the sleep timer from that time on.

- In the cooling operation mode
  When the sleep timer is set, the setting temperature is increased 1°C. It increases the setting temperature another 1°C after 1 hour. After that, the setting temperature is not changed and the operation is stopped at the setting time.



- In the heating operation mode
  When the sleep timer is set, the setting temperature is decreased 1°C. It decreases the setting temperature another 1°C every 30 minutes. Upon lowering 4°C, the setting temperature is not changed and the operation is stopped at the setting time.

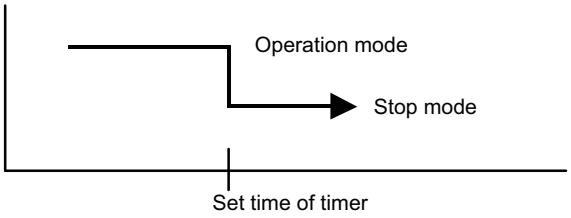


4-2. Wired remote control

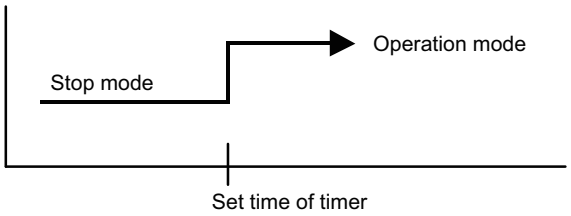
On/Off timer	Program timer	Sleep timer	Weekly timer	Temperature set back timer
○	○	○	○	○

■ On/Off timer

- Off timer: When the clock reaches the set timer, the air conditioner will be turned off.

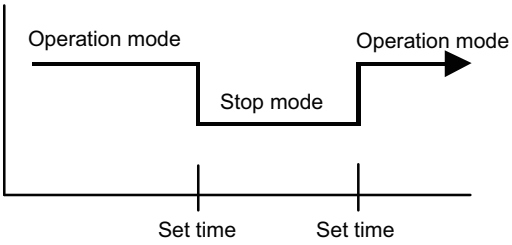


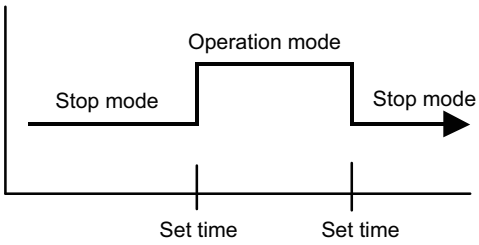
- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



■ Program timer

- The program timer allows the off timer and the on timer to be used in combination one time.





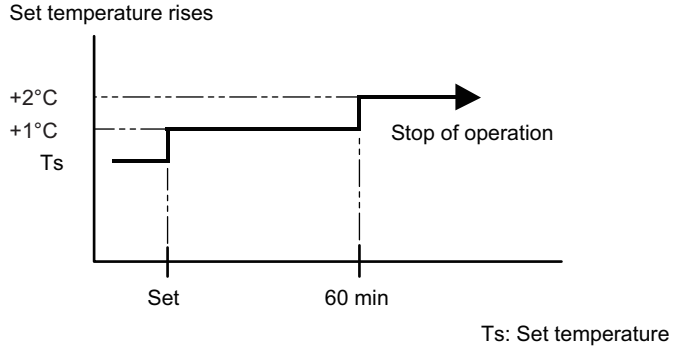
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

CONTROL AND FUNCTIONS

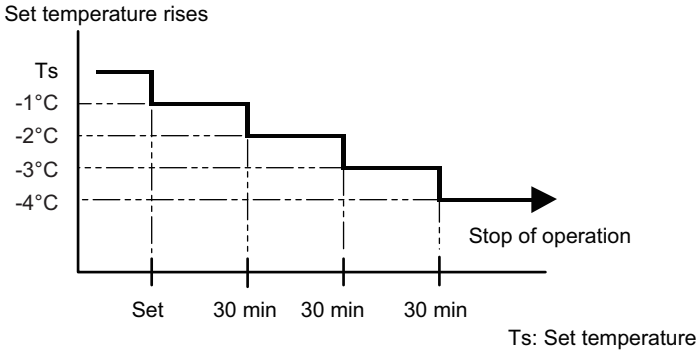
■ Sleep timer

If the sleep timer is set, the room temperature is monitored and the operation is stopped automatically. If the operation mode or the set temperature is change after the sleep timer is set, the operation is continued according to the changed setting of the sleep timer from that time on.

- In the cooling operation mode
  When the sleep timer is set, the setting temperature is increased 1°C. It increases the setting temperature another 1°C after 1 hour. After that, the setting temperature is not changed and the operation is stopped at the setting time.



- In the heating operation mode
  When the sleep timer is set, the setting temperature is decreased 1°C. It decreases the setting temperature another 1°C every 30 minutes. Upon lowering 4°C, the setting temperature is not changed and the operation is stopped at the setting time.



■ Weekly timer

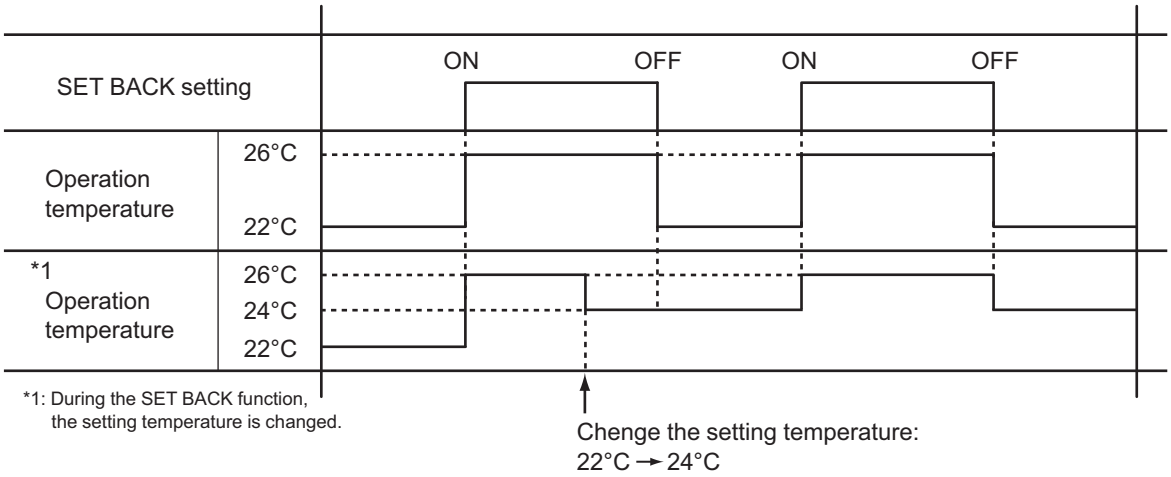
On and off timer can be combined, and up to 4 reservations per day and 28 reservations per week. Before setting the program, set the week and time of the air conditioner at first. If the week and time are not set, the weekly timer will not operate correctly at the setting time.

CONTROL AND FUNCTIONS

■ Temperature set back timer

- The SET BACK timer only changes the set temperature for 7 days, it cannot be used to start or stop air conditioner operation.
- The SET BACK timer can be set to operate up to two times per day but only one temperature setting can be used.
- During COOLING/DRY mode, the air conditioner will operate at a minimum of 18°C even if the SET BACK temperature is set to 17°C or lower.

Case of SET BACK timer on the Cooling operation. (Setting temperature :22°C, SET BACK temperature :26°C)



CONTROL AND FUNCTIONS

5. Defrost operation control

Tn: Outdoor unit heat exchanger temperature
Ta: Outdoor temperature
Tn10: Temperature at 10 minutes after compressor start
Tnb: Temperature before 5 minutes

• Triggering condition

The defrost operation starts when outdoor unit heat exchanger temperature sensor detects the temperature lower than the values shown below.

– **1st time defrosting after starting operation**

Compressor integrating operation time	Less than 17 min.	17 to 57 min.	More than 57 min.
Condition	Does not operate	Tn ≤ -9°C and Tn-Ta ≥ 5 deg	Tn ≤ -5°C

– **2nd time and after**

Compressor integrating operation time	Less than 35 min.	More than 35 min.
Condition	Does not operate	Tn-Tn10 < -5 deg (Tn ≤ -10°C) Tn-Tnb < -2 deg (Tn ≤ -10°C) Tn ≤ -25°C (Ta ≥ -20°C) Tn ≤ -7°C or Tn ≤ -25°C (Ta < -20°C)

– **Integrating defrost (Constant monitoring)**

Compressor integrating operation time	More than 240 min. (For long continuous operation)	More than 215 min. (For long continuous operation	Less than 10 min.* (For intermittent operation)
Condition	Tn ≤ -3°C	Tn ≤ -5°C	Count of the compressor off: 40 times

*: If the compressor continuous operation time is less than 10 minutes, the number of the compressor off is counted. If any defrost operated, the compressor off count is cleared.

• Release condition

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	12°C or more
Compressor operation time	15 minutes

CONTROL AND FUNCTIONS

5-1. Defrost operation in heating operation stopped

If the outdoor unit is frosted when stopping the heating operation, it stops after performing the automatic defrosting operation.

In this time, if the indoor unit operation lamp flashes slowly (6 sec on/2 sec off), the outdoor unit allow the heat exchanger to defrost, and then stop.

• Triggering condition

When all of the following conditions are satisfied in heating operation

– Compressor operation integrating time: 30 minutes or more
– Compressor continuous operation time: 10 minutes or more
– Outdoor unit heat exchanger temperature: -4°C or less

• Release condition

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	12°C or more
Compressor operation time	15 minutes

CONTROL AND FUNCTIONS

6. Various control

6-1. Auto restart

When the power was interrupted by a power failure etc. during operation, the operation contents at that time are memorized and when the power is recovered, operation is automatically started with the memorized operation contents.

Operation contents memorized when the power is interrupted
Operation mode
Setting temperature
Fan mode setting
Timer mode and set time (set by wireless remote controller)
Airflow direction setting
Swing
ECONOMY operation
10 °C HEAT operation
Outdoor low noise operation

6-2. 10 °C HEAT operation

10 °C HEAT operation performs as below setting when pressing 10 °C HEAT button.

Operation mode	Heating
Setting temperature	10°C
Fan mode	AUTO
LED display	Economy
Defrost operation	Operate as normal

6-3. ECONOMY operation

The ECONOMY operation starts by pressing ECONOMY button on the remote controller.
The ECONOMY operation is almost the same operation as below settings.

Mode	Cooling/Dry	Heating
Target temperature	Setting temperature +1°C	Setting temperature -1°C

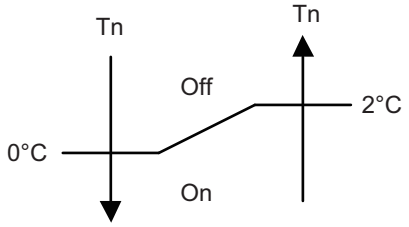
CONTROL AND FUNCTIONS

6-4. Compressor preheating

By preheating the compressor, warm airflow is quickly discharged when the operation is started.

- **Triggering condition 1**
  - Outdoor temperature ≤ 20°C
    When outdoor temperature reaches 26°C, compressor preheating stops.
  - 30 minutes after compressor stopped

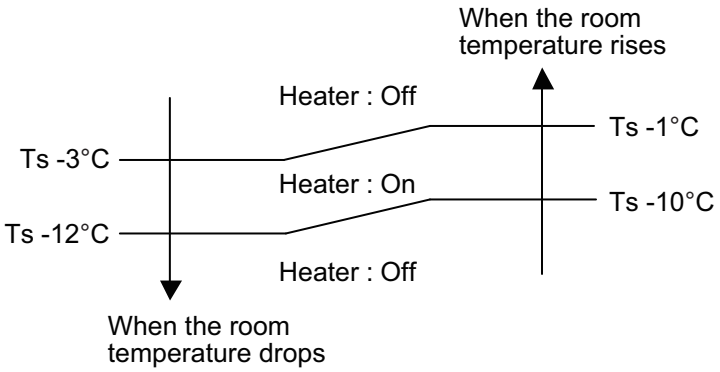
- **Triggering condition 2**



Tn: Outdoor unit heat exchanger temp.

6-5. External electrical heater control

The external electrical heater is operated as below.



Ts: Setting temperature

NOTES:

- When the compressor stop, external electric heater is off.
- It operates only in heating mode and when the indoor fan operates. (However, S-LOW is excluded.)

6-6. Electronic expansion valve control

The most proper opening of the electronic expansion valve is calculated and controlled under the present operating condition based on the table below.

Operation mode	Pulse range
Cooling/dry mode	Between 47 and 480 pulses
Heating mode	Between 39 and 480 pulses

NOTE: At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

6-7. Drain pump control

■ Drain control for cooling operation

● During the compressor in operation

- **Triggering condition**
  The thermostat is turned on during cooling or dry mode.

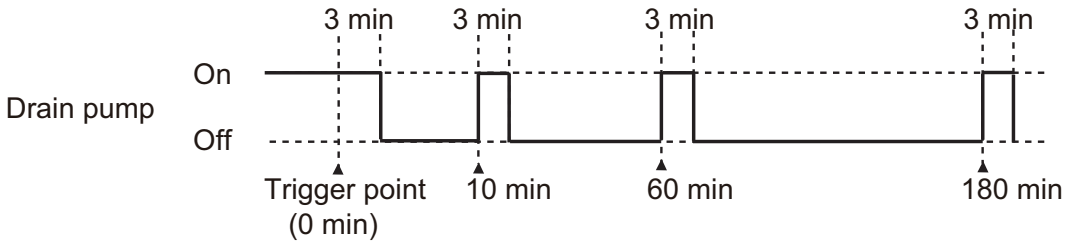
- **Operation details**
  The drain pump is turned on.

- **Release condition**
  – The thermostat is turned off.
  Refer to "When the compressor is not in operation" for the operation after release.
  – The compressor is stopped.
  Refer to "When the compressor is not in operation" for the operation after release.
  – The operation is switched to heating mode.
  Refer to "When the compressor is not in operation" for the operation after release.
  – The float switch is turned on.
  Refer to "Overflow control" for the operation after release.
  – The compressor is stopped by Anti-freezing control.
  Refer to "The compressor is stopped by Anti-freezing control" for the operation after release.

● When the compressor is not in operation

- **Triggering condition**
  – The thermostat is turned off.
  – The compressor is stopped.
  – The operation is switched to heating mode.
  – The float switch is turned off.

- **Operation details**
  – Count 180 minutes.
  – Start drain pump intermittent operaion.



- **Release condition**
  – 3 minutes drain pump operation is finished after 180 minutes count.
  – The operation is switched to cooling or dry mode.
  Refer to "During the compressor in operation" for the operation after release.
  – The float switch is turned on.
  Refer to "Overflow control" for the operation after release.

- **Operation after release**
  The drain pump is turned off and the air conditioner operate according the settings.

CONTROL AND FUNCTIONS

● Overflow control

- **Triggering condition**
  The float switch is turned on.

- **Operation details**
  - The drain pump is turned on.
  - When the operation mode is cooling or dry, operate the followings.
    - The compressor is stopped.
    - Then indoor fan control is turned off.

- **Release condition**
  - The float switch is turned off.
    - In the case that on the cooling or dry mode the thermostat is on, refer to "During the compressor in operation" for the operation after release.
    - In other case, refer to "When the compressor is not in operation" for the operation after release.
  - 3 minutes passed

- **Operation after release**
  The compressor stopps permanently.

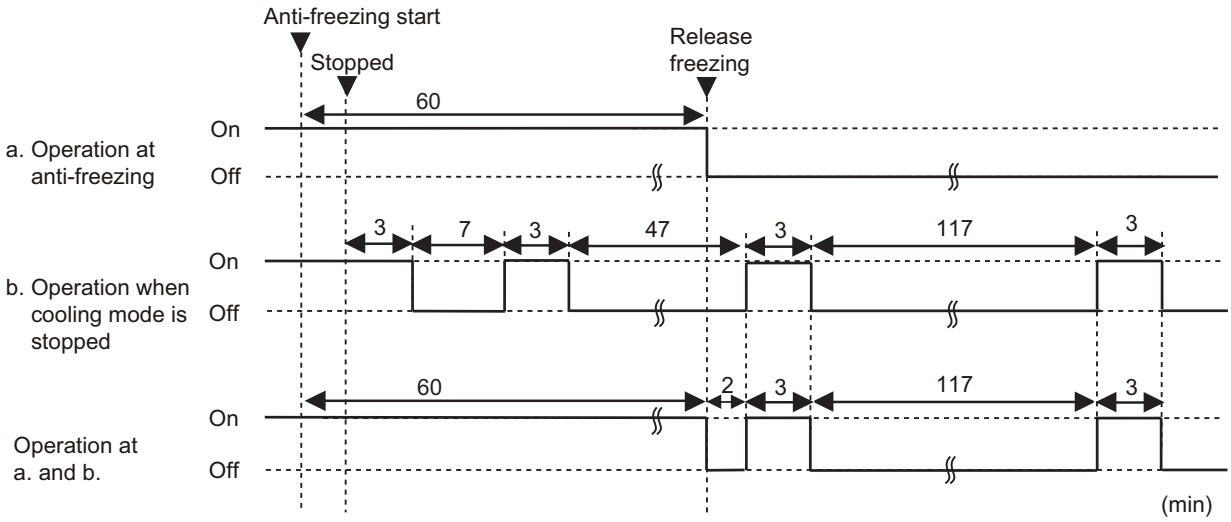
● The compressor is stopped by Anti-freezing control

- **Triggering condition**
  During the compressor in operation, the compressor is stopped by Anti-freezing control.

- **Operation details**
  The drain pump is kept on in 60 minutes after Anti-freezing control released.

- **Release condition**
  60 minutes passed

- **Operation after release**
  According to the settings, operate the followings.

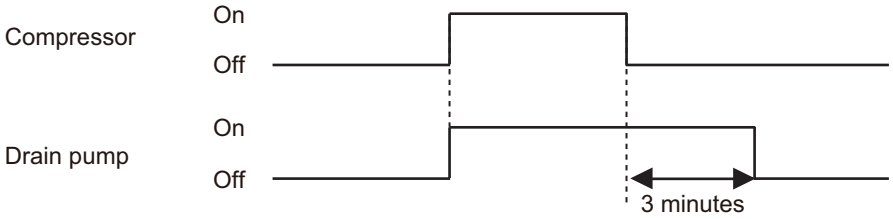


CONTROL AND FUNCTIONS

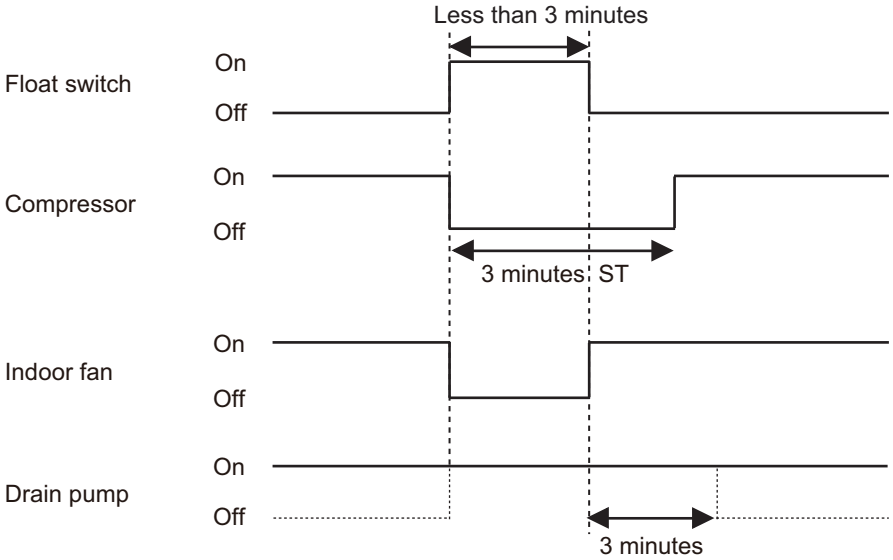
■ Drain control for dehumidification operation

● During cooling or dry mode

- When the compressor starts, the drain pump starts simultaneously.
- The drain pump operates continuously for 3 minutes after the compressor is turned off.



- When the compressor stops by the "Anti-freezing control (cooling and dry mode)" on page 01-30, the drain pump is turned off in 1 hour after the compressor stops.
- When the float switch is on, the compressor, indoor and outdoor fan motor operation are stopped.
- Drain pump operates continuously for 3 minutes after the float switch is turned off and then drain pump is turned off.
- When the float switch turns on continuously for 3 minutes, "failure indication" operates. (It is necessary to turn off power for release it.)
- When the float switch turns off less than 3 minutes, the unit starts cooling operation. Indoor fan motor starts after the float switch is turned off and the compressor starts after 3 minutes st.

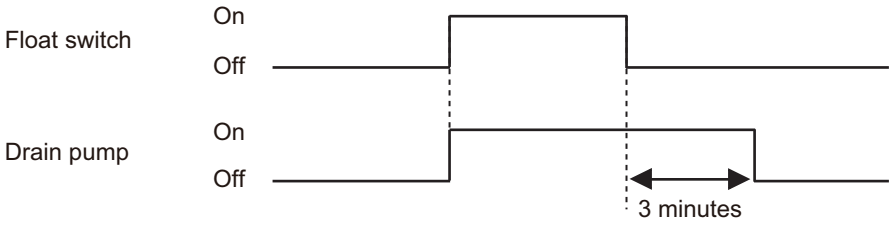


CONTROL AND FUNCTIONS

● During heating mode or fan mode and when operation is stopped

- **Triggering condition**
  Drain pump is turned on at the same time that the float switch is turned on.

- **Operation details**
  When the float switch turns on continuously for 3 minutes, "failure indication" operates. Thereafter, even if the float switch turns off, the "failure indication" is not released. (It is necessary to turn off power for release it.)



- **Release condition**
  Drain pump operates continuously for 3 minutes after the float switch is turned off and then drain pump is turned off.

6-8. 4-way valve control

- If heating mode is selected at the compressor start, 4-way valve is energized for heating.
- When the air conditioner is switched between cooling and heating mode, compressor is stopped, and the 4-way valve is switched when the 3 minutes passes and the compressor is started.

6-9. Peak cut operation

The current value is limited to reduce the power consumption by external input.

Peak cut level	Level 1	Level 2	Level 3	Level 4
Peak cut for rated capacity	Forced thermostat off	50%	75%	100%

NOTES:

- During defrost operation, peak cut operation becomes invalid.
- Even during the peak cut operation, the operations of current overload, economy, and low noise are effective and the outdoor unit operates by lowest current of them.

CONTROL AND FUNCTIONS

6-10. Outdoor unit low noise operation

The compressor frequency and outdoor unit fan speed are limited to reduce the operation noise by external input.

Low noise mode	Low noise mode		Outdoor fan speed	Compressor frequency
			rpm	rps
AOHG30KBTB AOHG36KBTB	Level 1	Cooling/Dry	830	44
		Heating	700	44
	Level 2	Cooling/Dry	830	36
		Heating	700	36
AOHG45KBTB AOHG54KBTB	Level 1	Cooling/Dry	740	60
		Heating	600	60
	Level 2	Cooling/Dry	740	40
		Heating	600	40

NOTES:

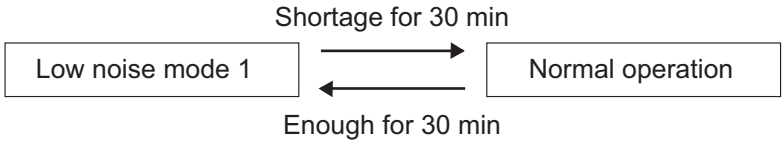
- During the defrost operation, the compressor operates by the speed for defrost operation.
- Even during the low noise operation, the operations of current overload, economy, and peak cut are effective and the outdoor unit operates by lowest current of them.

Capacity priority mode

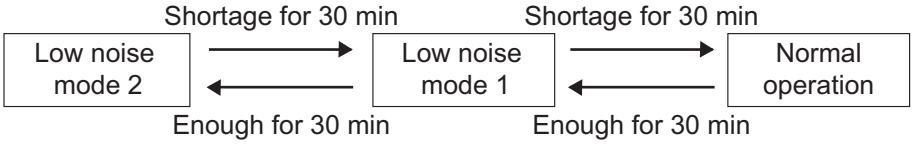
- Operation condition
  The function setting is set to 1.

- Capacity check condition
  - Shortage: Compressor frequency > limited compressor frequency for low noise mode
  - Enough: Compressor frequency ≤ limited compressor frequency for low noise mode

- Operation
  When detecting the shortage capacity or enough capacity condition continuous 30 minutes, the mode is changed as follows:
  - Automatic switching 1 (Level 1 setting)



  - Automatic switching 2 (Level 2 setting)



7. Various protections

7-1. Discharge gas temperature over-rise prevention control

The discharge gas temperature sensor (discharge thermistor: outdoor unit side) detects the discharge gas temperature.

- When the discharge temperature becomes higher than the trigger condition, the compressor frequency is decreased as the table below, and it continues to decrease until the discharge temperature becomes lower than the trigger condition.
- When the discharge temperature becomes lower than the release condition, control of compressor frequency is released.
- When the discharge temperature becomes higher than the compressor protection temperature, the compressor is stopped and the indoor unit LED starts blinking.

Trigger condition	104°C
Compressor frequency	-14 rps/120 seconds
Release condition	101°C
Compressor protection temperature	110°C

7-2. Anti-freezing control (cooling and dry mode)

The compressor frequency is decrease in cooling and dry mode when the indoor unit heat exchanger temperature sensor detects the temperature lower than the trigger condition.

When the indoor unit heat exchanger temperature reaches release condition, the anti-freezing control is stopped.

Trigger condition		4°C
Release condition	Outdoor temp. ≥ 10°C*1 Outdoor temp. ≥ 12°C*2	7°C
	Outdoor temp. < 10°C*1 Outdoor temp. < 12°C*2	13°C

*1: During the outdoor temperature dropping

*2: During the outdoor temperature rising

CONTROL AND FUNCTIONS

7-3. Current release control

The compressor frequency is controlled so that the outdoor unit input current does not exceeds current limit value set according to the outdoor temperature.

The compressor frequency returns according to the operation mode, when the current becomes lower than the release value.

■ Models: AOHG30KBTB and AOHG36KBTB

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	52°C ≤ Ta	8.0 A	7.5 A
	50°C ≤ Ta < 52°C	12.0 A	11.5 A
	42°C ≤ Ta < 50°C	14.0 A	13.5 A
	2°C ≤ Ta < 42°C	18.0 A	17.5 A
	Ta < 2°C	20.0 A	19.5 A
Heating	2°C ≤ Ta	18.0 A	17.5 A
	Ta < 2°C	20.0 A	19.5 A

■ Models: AOHG45KBTB and AOHG54KBTB

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	52°C ≤ Ta	10.0 A	9.5 A
	50°C ≤ Ta < 52°C	13.0 A	12.5 A
	46°C ≤ Ta < 50°C	15.0 A	14.5 A
	42°C ≤ Ta < 46°C	18.0 A	17.5 A
	2°C ≤ Ta < 42°C	20.0 A	19.5 A
	Ta < 2°C	24.0 A	23.5 A
Heating	2°C ≤ Ta	20.0 A	19.5 A
	Ta < 2°C	24.0 A	23.5 A

7-4. Indoor unit fan motor over temperature protection

When satisfy the following conditions, the protection works.

- After the 90 seconds from the fan operation, detect less than 300 rpm for 10 seconds.
- IPM trip protection works.
- Current overload protection works.

When detecting the above condtion, recheck the condition after 6 minutes. When count the twice, the protection works.

- **Protection contents**
  Reduce the static pressure 20 Pa. When it does not dissolve even the minimum static pressure condition, work the following operation.
  – Fan motor error displayed when less than 300 rpm for 10 seconds is detected after the 90 seconds from the fan operation.
  – Fan stop 40 seconds when IPM trip protection works.
  – Fan stop 50 seconds when corrent overload protection works.

CONTROL AND FUNCTIONS

7-5. Compressor temperature protection

When the compressor temperature sensor detects higher than the trigger condition below, the compressor is stopped. When the compressor temperature sensor detects the release condition, the protection is released.

Trigger condition	108°C
Release condition	80°C (3 minutes after compressor stop)

7-6. High pressure protection

Trigger condition	Pressure switch: Off (Open: Higher than 4.2 MPa) Compressor stop
Release condition	Pressure switch: On (Close: Lower than 3.2 MPa) (3 minutes after compressor stop) Compressor restart

7-7. Low outdoor temperature protection

When the outdoor temperature sensor detects lower than the trigger condition below, the compressor is stopped.

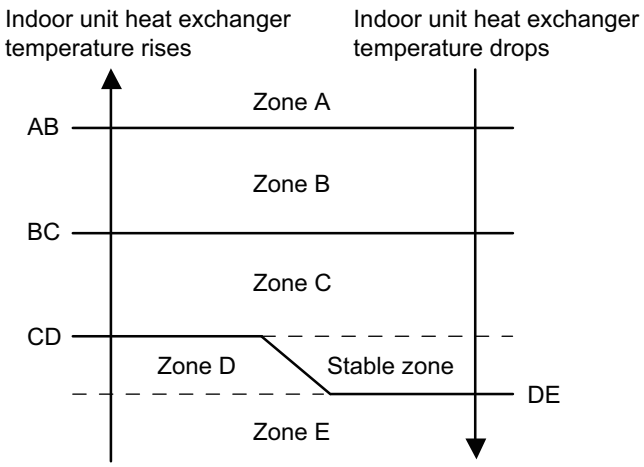
Operation mode	Cooling/Dry
Trigger condition	-20°C
Release condition	-15°C

7-8. High temperature and high pressure release control

The compressor is controlled as follows.

■ Models: AOHG30KBTB, AOHG36KBTB, AOHG45KBTB, and AOHG54KBTB

- **Heating mode**



AB: 63°C
BC: 55°C
CD: 53°C
DE: 50°C

Zone	Operation	
Zone A	Compressor is stopped.	
Zone B	The compressor frequency is decreased.	-15 rps/60 sec.
Zone C		-2 rps/60 sec.
Zone D	The protection is released and the operation is returned to normal mode.	
Zone E		

Refrigerant R32

DUCT type INVERTER

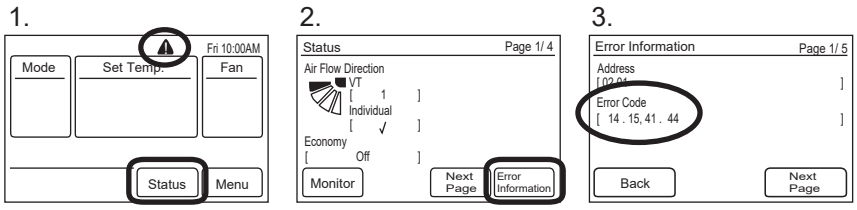
2 . TROUBLE SHOOTING

2 ERROR DISPLAY

2-1 WIRED REMOTE CONTROLLER DISPLAY (OPTION)

1. Check the error

   1. If an error occurs, an error icon appears on the “Monitor mode screen”.
      Touch the [Status] on the “Monitor mode screen”.The “Status” screen is displayed.
   2. Touch the [Error Information] on the “Status”screen. The “Error Information”screen is displayed.
      (If there are no errors, the [Error Information] will not be displayed.)
   3. 2-digit numbers correspond to the error code in the table below. Touch the [Next page]
      (or [Previous page]) to switch to other connected indoor units.



For the details of the indoor unit or outdoor unit error , refer to the error codes in each installation manual

Error Contents	Error Code	Trouble shooting
Serial Communication Error	11	1,2
Wired Remote Controller Communication Error	12	3
Automatic Air flow Adjustment Error	15	4
External communication Error	18	5
Combination Error	23	6
Indoor unit address setting Error	26	7
Connection unit number Error (Indoor unit Wired remote controller Error)	29	8
Indoor unit PCB model information Error	32	9
Indoor unit motor electricity consumption detection Error	33	10
Indoor unit power supply Error for fan motor	39	11
Indoor unit Communication circuit (wired remote controller) Error	3A	12
Indoor Room Thermistor Error	41	13
Indoor Heat Ex. Thermistor Error	42	14
Indoor Unit Fan Motor Error	51	15
Drain pump Error	53	16
Outdoor unit main PCB model information error	62	17
Inverter Error	63	18

Error Contents	Error Code	Trouble shooting
PFC circuit Error	64	19
Trip terminal L Error	65	20
Discharge Thermistor Error	71	21
Compressor Thermistor Error	72	22
Heat Ex. Outlet / Middle Thermistor Error	73	23
Outdoor Thermistor Error	74	24
Heat Sink Thermistor Error	77	25
Current sensor Error	84	26
Pressure sensor Error	86	27
Trip detection	94	28
Compressor rotor position detection Error	95	29
Outdoor Unit Fan Motor Error	97	30
4-way Valve Error	99	31
Discharge Temp. Error	A1	32
Compressor Temp. Error	A3	33
Low pressure Error	A5	34
Heat sink Temp. Error	AC	35

2-2 TROUBLE SHOOTING WITH ERROR CODE

Trouble shooting 1 **OUTDOOR UNIT Error Method:** **Serial communication error (Serial Reverse Transfer Error)**	**Indicate or Display:** Error code : 11 **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Outdoor unit fan motor	When the indoor unit cannot receive the serial signal from Outdoor unit more than 2minutes after power ON, or the indoor unit cannot receive the serial signal more than 15seconds during normal operation.

Forecast of Cause:

1. Connection failure 2. External cause 3. Main PCB failure 4. Outdoor unit fan motor failure

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

NO → **Check Point 1-2: Check external cause such as noise**

- Check the complete insulation of the grounding.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).

YES ↓

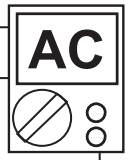
Check Point 2 : Check Connection

- Check any loose or removed connection line of Indoor unit and Outdoor unit.
  >> **If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**

OK ↓

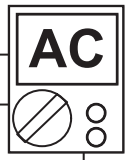
Check Point 3 : Check the voltage of power supply

- Check the voltage of power supply
  >> **Check if AC198V (AC220V -10%) - 264V (AC240V +10%) appears at Outdoor Unit Terminal L - N.**

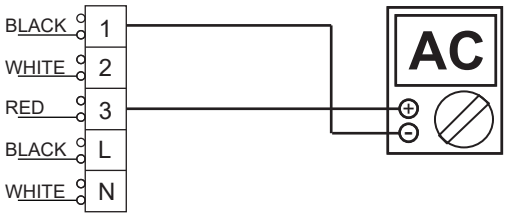


OK ↓

Check Point 4 : Check Serial Signal (Reverse Transfer Signal)



- Check Serial Signal (Reverse Transfer Signal)
  >> **Check if Indicated value swings between AC90V and AC270V at Outdoor Unit Terminal 1 - 3.**
  >> **If it is abnormal, Check Outdoor unit fan motor (PARTS INFORMATION 5)**
  >> **If Outdoor fan motor is abnormal, replace Outdoor unit fan motor and Main PCB.**
  >> **If Outdoor fan motor is normal, replace Main PCB.**



Trouble shooting 2 **INDOOR UNIT Error Method:** **Serial communication error (Serial Forward Transfer Error)**	**Indicate or Display:** Error code : 11 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆1	◆1	○	○/●	●/○	●/○

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB	When the outdoor unit cannot properly receive the serial signal from indoor unit for 10 seconds or more.

Forecast of Cause:

1. Connection failure 2. External cause 3. Controller PCB failure

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

NO → **Check Point 1-2: Check external cause such as noise**

- Check if the ground connection is proper.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).

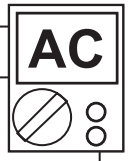
YES ↓

Check Point 2 : Check Connection

- Check any loose or removed connection line of Indoor unit and Outdoor unit.
  >> **If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**
- Check connection condition in control unit. (If there is loose connector, open cable or mis-wiring)

OK ↓

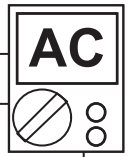
Check Point 3 : Check the voltage of power supply



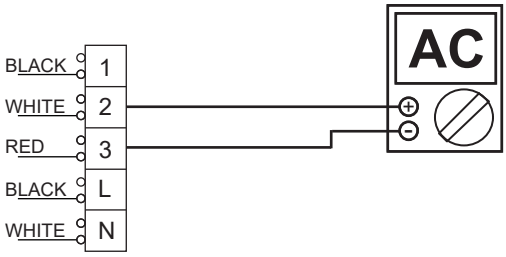
- Check the voltage of power supply
  >> **Check if AC198V (AC220V -10%) - 264V (AC240V +10%) appears at Outdoor Unit Terminal L - N.**

OK ↓

Check Point 4 : Check Serial Signal (Forward Transfer Signal)



- Check Serial Signal (Forward Transfer Signal)
  >> **Check if indicated value swings berween AC30v and AC130V at outdoor unit terminal 2 - 3.**
  >> **If it is abnormal, replace Controller PCB.**



Trouble shooting 3 **INDOOR UNIT Error Method:** **Wired Remote Controller Communication Error**	**Indicate or Display:** Error code : 12 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB Wired Remote Controller	When the outdoor unit cannot properly receive the serial signal from indoor unit for 10 seconds or more.

Forecast of Cause:

1. Connection failure 2. Wired Remote Controller failure 3. Controller PCB failure

Check Point 1 : Check the connection of terminal

After turning off the power.

Check & correct the followings.

- Check the connection of terminal berween Wired Remote Controller and indoor unit, and check if there is a disconnection of the cable.

OK

Check Point 1-2 : Check Wired Remote Controller and Controller PCB

- Check Voltage at CN14 of Controller PCB. (Terminal 1-3, Terminal 1-2) (Power supply for the Remote Control)

>> If it is DC13V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control
>> If it is DC 0V, Controller PCB is failure. (Check Remote Control once again) >> Replace Controller PCB

Check Point 2 : Wire installation Wrong RCgroup setting

- ☐ Wrong wire connection in RCgroup (Please refer to the installation manual)
- ☐ The number of connecting indoor unit and Remote controller in one RCgroup were less than 32 units.

Check Point 2-1 : Check Indoor unit controller PCB

- ☐ Check if controller PCB damage.
- ☐ Change controller PCB and check the Error after setting remote controller address.

Trouble shooting 4 **INDOOR UNIT Error Method:** **Automatic Air flow Adjustment Error**	**Indicate or Display:** Error code : 15 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit controller PCB	● On automatic airflow adjustment operation, when the fan speed other than 0rpm is detected at the 0rpm operation. ● On automatic airflow adjustment operation, when the fan speed is not reach the target speed, after 2 minutes from the fan started. ● On automatic airflow adjustment operation operation, when the 750W of input power is detected.

Forecast of Cause:

1. Fan rotation failure 2. Fan motor winding open 3. Indoor unit controller PCB

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

OK

Check Point 2 : Check ambient temp. around motor

・Check excessively high temperature around the motor.
(If there is any surrounding equipment that causes heat)
>>Upon the temperature coming down, restart operation.

OK

Check Point 3 : Check Indoor unit fan motor

・Checl Indoor unit fan motor. (PARTS INFORMATION 4)
>>if Indoor unit fan motor is abnormal, replace Indoor unit fan motor.

OK

Check Point 4 : Replace Controller PCB

▶ **If Check Point 1- 3 do not improve the symptom, replace Controller PCB.**

Trouble shooting 5 **INDOOR UNIT Error Method:** **External communication error**	**Indicate or Display:** Error code : 18 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
External communication error	After receiving a signal from the external I/O PCB, the same a signal has not been received for 15sec

Forecast of Cause :

1. Connection failure 2.External I/O PCB failure 3.Controller PCB failure

Check Point 1 : Check the connection

- Check any loose or removed connection of between the controller PCB to the external I/OPCB
  >>If there is an abnormal condition, correct it by refer to installation manual or the technical manual.
- Check the condition condtion on the external I/O PCB and the controller PCB
  (If there is loose connector, open cable or mis-wiring)

OK

Check Point 2: Replace external I/O PCB

▶ **If Check Point 1 do not improve the symptom, change External I/O PCB.**

OK

Check Point 3: Replace Controller PCB

▶ **If Check Point 2 do not improve the symptom, change Controller PCB.**

Trouble shooting 6 **INDOOR UNIT Error Method:** **Combination error**	**Indicate or Display:** Error code : 23 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Indoor unit	1. The outdoor unit receives the serial signal of applied refrigerant information from Indoor unit. When the refrigerant is R410a. 2. When the outdoor unit type is multi.

Forecast of Cause:

1. The selection of indoor units is incorrect

Check Point 1 : Check the type of indoor unit

- Check the type of the connected indoor unit.
  >> If abnormal condition is found, correct it.

OK

Check Point 2 : Replace Main PCB

▶ **If Check Point 1 do not improve the symptom, replace Main PCB of Outdoor unit.**

Trouble shooting 7 **INDOOR UNIT Error Method:** Indoor unit address setting error	**Indicate or Display:** Error code : 26 **Outdoor unit :** Mode: ◆2 / Error: ● / L1: ◆5 / L2: ◆15 / L3: ○ / L4: ○ / L5: ○ / L6: ● ○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Wired remote controller (2-Wire) Indoor unit Controller PCB circuit	When the address number set by auto setting and manual setting are mixed in one RC group. When the duplicated address number exists in one RC group.

Forecast of Cause :

1. Wrong wiring of RCgroup 2. Wrong remote address setting 3. Indoor unit controller PCB failure
4. Remote controller failure

Check Point 1 : Wire installation

- ☐ Wrong wire connection in RCgroup (Please refer to the installation manual)

↓ **OK**

Check Point 2 : Wrong RCgroup setting

- ☐ The given address number by auto setting (00) and the manual set number (Except 00) were not existing in one RCG.
- ☐ The remote controller address setting by U.I. were not existing same address.
- ☐ The duplicated address number is not existing in one RCgroup

↓ **OK**

Check Point 3 : Check Indoor unit controller PCB

- ☐ Check if controller PCB damage
- ☐ Change controller PCB and check the Error after setting remote controller address

Trouble shooting 8 **INDOOR UNIT Error Method:** **Connection unit number error (Indoor unit in Wired remote controller system)**	**Indicate or Display:** Error code : 29 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Wired remote controller (2-Wire) Indoor unit Controller PCB circuit	When the number of connecting indoor units are out of specified rule.

Forecast of Cause :

1. Wrong wiring / Number of I.U, RC in RCgroup 2. Indoor unit controller PCB defective

Check Point 1 : Wire installation

- ☐ Wrong number of connecting indoor unit

OK

Check Point 2 : Check Indoor unit controller PCB

- ☐ Check if controller PCB damage
- ☐ Check if controller PCB and check the Error after setting remote controller address

Trouble shooting 9
INDOOR UNIT Error Method:

Indoor unit PCB model information error

Indicate or Display:

Error code : 32

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:

Indoor unit Controller PCB

Detective details:

When power is on and there is some below case.
1. When model information of EEPROM is incorrect.
2. When the access to EEPROM failed.

Forecast of Cause:

1. External cause 2. Defective connection of electric components 3. Controller PCB failure

Check Point 1-1 : Reset Power Supply and operate

・Does Error indication show again?

NO → Check Point 1-2 :

YES ↓

Check Point 2 :
Check Indoor unit electric components

・Check all connectors.
(loose connector or incorrect wiring)
・Check any shortage or corrosion on PCB.

↓

Check Point 3 : Replace Controller PCB

▶ **Change Controller PCB.**

Check Point 1-2 :
Check external cause such as noise

・Check if the ground connection is proper.
・Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).

Note : EEPROM

EEPROM(Electronically Erasable and Programmable Read Only Memory) is a non-volatile memory which keeps memorized information even if power is turned off.
It can change the contents electronically.
To change the contents, it uses higher voltage than normal, and it can not change a partial contents. (Rewriting shall be done upon erasing the all contents.)
There is a limit in a number of rewriting.

Trouble shooting 10 **INDOOR UNIT Error Method:** **Indoor unit motor electricity consumption detection error**	**Indicate or Display:** Error code : 33 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit fan motor Indoor unit Controller PCB circuit	When the voltage value or the current value of the motor go beyond the limits.

Forecast of Cause:

1. Fan motor failure 2. Controller PCB failure

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace It.

OK

Check Point 2 : Check ambient temp. around motor

・Check excessively high temperature around the motor.
(if there is any surrounding equipment that causes heat)
>>Upon the temperature coming down, restart operation.

OK

Check Point 3 : Check Indoor unit fan motor

・Check Indoor unit fan motor. (PARTS INFORMATION 4)
>>if Indoor unit fan motor is abnormal, replace Indoor unit fan motor.

OK

Check Point 4 : Replace Controller PCB

▶ **If Check Point 1- 3 do not improve the symptom, replace Controller PCB.**

Trouble shooting 11 **INDOOR UNIT Error Method:** **Indoor unit power supply error for fan motor**	**Indicate or Display:** Error code : 39 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Power Supply PCB	When a momentary power cut off. When do not start fan motor.

Forecast of Cause :

1. External cause 2. Connection of connector failure 3. Power Supply PCB failure

Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop : Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure : Check if there is a defective contact or leak current in the power supply circuit.
- Noise : Check if there is any equipment causing harmonic wave near electric line.
  (Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

OK

Check Point 2 : Check connection of Connector

- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open.

>>Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 3 : Replace Power supply PCB

▶ **If Check Point 1, 2 do not improve the symptom, replace Power supply PCB.**

Trouble shooting 12 **INDOOR UNIT Error Method:** **Indoor unit Communication circuit (wired remote controller) error**	**Indicate or Display:** Error code : 3A **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB circuit	Detect the communication error of microcomputer and communication PCB.

Forecast of Cause :

1.Communication PCB defective 2. Indoor unit controller PCB defective

Check Point 1 : Check the connection of terminal
After turning off the power supply, check & correct the followings □ Indoor unit - Check the connection the communication PCB and the controller PCB

OK

Check Point 2 : Replace the communication PCB
If the Check point 1 is ok, replace the communication PCB

OK

Check Point 3 : Replace the controller PCB
If condition is doesn't change, replace the controller PCB

Trouble shooting 13 **INDOOR UNIT Error Method:** **Indoor Room Thermistor Error**	**Indicate or Display:** Error code : 41 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB Circuit Indoor Temperature Thermistor	Indoor unit thermistor is open or short is detected always.

Forecast of Cause :

1. Connector failure connection 2. Thermistor failure 3. Controller PCB failure

Check Point 1 : Check connection of Connector

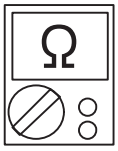
- ☐ Check if connector is loose or removed
- ☐ Check erroneous connection
- ☐ Check if thermistor cable is open

>>Reset Power when reinstalling due to removed connector or incorrect wiring.

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics(Rough value)



Temperature (°C)	-10	-5	0	5	10	15	20	25
Resistance value (kΩ)	58.2	44.0	33.6	25.9	20.2	15.8	12.5	10.0

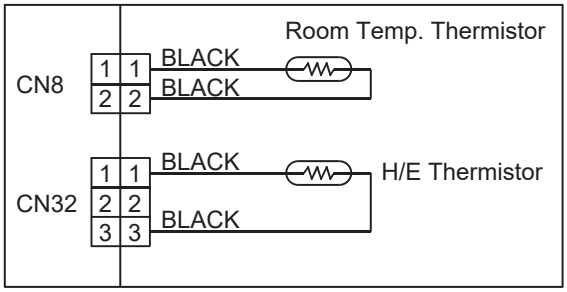
Temperature (°C)	30	35	40	45
Resistance value (kΩ)	8.0	6.5	5.3	4.3

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check Voltage of Controller PCB (DC 5.0V)

Make sure circuit diagram of each indoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Controller PCB and execute the check operation again.**

Trouble shooting 14 **INDOOR UNIT Error Method:** **Indoor Heat Ex. Thermistor Error**	**Indicate or Display:** Error code : 42 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB Circuit Heat Exchanger (MID) Thermistor	Indoor unit thermistor is open or short is detected always.

Forecast of Cause :

1. Connector failure connection 2. Thermistor failure 3. Controller PCB failure

Check Point 1 : Check connection of Connector

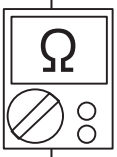
- ☐ Check if connector is loose or removed
- ☐ Check erroneous connection
- ☐ Check if thermistor cable is open

>>Reset Power when reinstalling due to removed connector or incorrect wiring.

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics(Rough value)



Temperature (°C)	-30	-25	-20	-15	-10	-5	0	5	10	15
Resistance value (kΩ)	1131.9	804.5	579.6	422.9	312.3	233.2	176.0	134.2	103.3	80.3

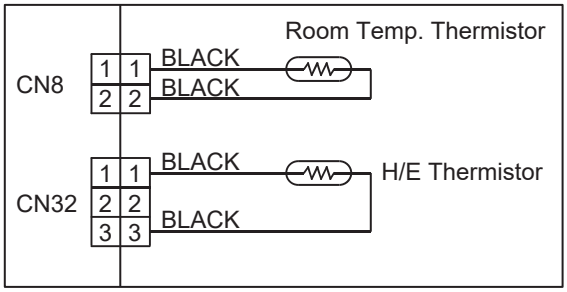
Temperature (°C)	20	25	30	35	40	45	50	55	60	65
Resistance value (kΩ)	62.9	49.7	39.6	31.7	25.6	20.8	17.1	14.1	11.6	9.7

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check Voltage of Controller PCB (DC 5.0V)

Make sure circuit diagram of each indoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Controller PCB and execute the check operation again.**

Trouble shooting 15 **INDOOR UNIT Error Method:** **Indoor Unit Fan Motor Error**	**Indicate or Display:** Error code : 51 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Power Supply PCB Indoor unit fan motor	When the fan motor speed is less than 1/3 of the target fan speed for 56 seconds. When detect the 0 rpm for 56 seconds after fan motor started.

Forecast of Cause:

1. Fan rotation failure 2. Fan motor winding open 3. Motor protection by surrounding temperature rise
4. Power Supply PCB failure 5. Indoor unit fan motor failure

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace It.

OK

Check Point 2 : Check ambient temp. around motor

・Check excessively high temperature around the motor.
(if there is any surrounding equipment that causes heat)
>>Upon the temperature coming down, restart operation.

OK

Check Point 3 : Check Indoor unit fan motor

・Check Indoor unit fan motor. (PARTS INFORMATION 4)
>>if Indoor unit fan motor is abnormal, replace Indoor unit fan motor.

OK

Check Point 4 : Replace Power Supply PCB

▶ **If Check Point 1- 3 do not improve the symptom, replace Power Supply PCB.**

Trouble shooting 16 **INDOOR UNIT Error Method:** **Drain Pump Error**	**Indicate or Display:** Error code : 53 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆5	◆15	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB Circuit Float switch	When Float switch is ON for more than 3 minutes.

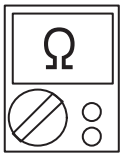
Forecast of Cause :

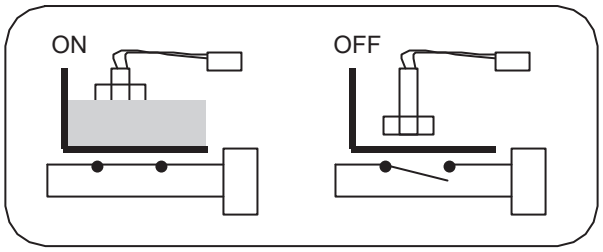
1. Float switch failure 2. Shorted connector/wire 3. Controller PCB failure
4. Drain pump failure 5. Hose clogging

Check Point 1 : Check Float switch

- Check operation of float switch. (any blocking by dust, etc.)
- Remove Float switch and check ON/OFF switching operation by using a meter.

>>If Float switch is abnormal, replace it.





OK

Check Point 2 : Check Connector and Wire

- Check loose contact of CN9 /shorted wire (pinched wire).

>>Replace Float switch if the wire is abnormal

OK

Check Point 3 : Check Drain hose

- Check Drain hose .

>>If there is Hose clogging. Please clear the clog.

OK

Check Point 4 : Replace Controller PCB

▶ **If Check Point 1- 3 do not improve the symptom, replace Controller PCB.**

Trouble shooting 17 **OUTDOOR UNIT Error Method:** **Outdoor unit main PCB model information error**	**Indicate or Display:** Error code : 62 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆2	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB	Access to EEPROM failed due to some cause after outdoor unit started.

Forecast of Cause:

1. External cause (Noise, temporary open, voltage drop)
2. Main PCB failure

Check Point 1-1 : Reset Power Supply and operate

・Does Error indication show again?

NO → **Check Point 1-2 : Check external cause**

- Check if temporary voltage drop was not generated.
- Check if momentary open was not generated.
- Check if ground is connection correctly or there are no related cables near the power line.

YES → **Check Point 2 : Replace Main PCB**

▶ **Change Main PCB.**

Trouble shooting 18 **OUTDOOR UNIT Error Method:** **Inverter error**	**Indicate or Display:** Error code : 63 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆3	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB	・Error information received from Outdoor unit Inverter PCB

Forecast of Cause :

1. External cause.
2. Power supply to Inverter PCB wiring disconnection, open
3. Outdoor unit Inverter PCB failure
3. Outdoor unit Main PCB failure

Check Point 1-1 : Turn the power on again?

・Error displayed again?

NO → **Check Point 1-2: External cause**

・Check if temporary voltage drop was not generated.
・Check if temporary open was not generated.
・Check if ground is connected correctly or there are no related cables near the power line.

YES ↓

Check Point 2 : Check the wiring

・Connector and wiring connection state check
・Cable open check

OK ↓

Check Point 3 : Replace Inverter PCB

・Replace Outdoor unit Inverter PCB.

OK ↓

Check Point 4 : Replace Main PCB

▶ **If Check Point 1~3 do not improve the symptom, change Main PCB.**

Trouble shooting 19 **OUTDOOR UNIT Error Method:** **PFC circuit error**	**Indicate or Display:** Error code : 64 **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB	When inverter output DC voltage is higher than 420V for over 3 seconds, the compressor stops. If the same operation is repeated 5 times, the compressor stops permanently.

Forecast of Cause :

1. External cause 2. Connector connection failure 3. Main PCB failure

Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop : Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure : Check if there is a defective contact or leak current in the power supply circuit.
- Noise : Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave) Check the complete insulation of grounding.

OK

Check Point 2 : Check connection of Connector

- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open.

>>Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 3 : Replace Main PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Main PCB.**

Trouble shooting 20 **OUTDOOR UNIT Error Method:** **Trip terminal L error**	**Indicate or Display:** Error code : 65 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆5	○	○	●	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB	When the signal from FO terminal of IPM is "L"(=0V) while the compressor stops.

Forecast of Cause:

1. Outdoor unit Main PCB failure

Check Point 1 : Replace Main PCB
▶ **Replace Outdoor unit Main PCB.**

Trouble shooting 21 **OUTDOOR UNIT Error Method:** **Discharge Thermistor Error**	**Indicate or Display:** Error code : 71 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆7	◆1	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Discharge temperature thermistor	・Discharge temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

↓ **OK**

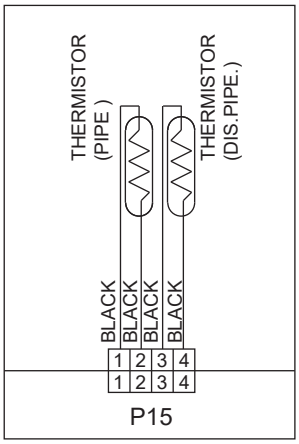
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

↓ **OK**

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P15:3-4 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Trouble shooting 22 **OUTDOOR UNIT Error Method:** **Compressor Temp. Thermistor Error**	**Indicate or Display:** Error code : 72 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆7	◆2	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	・Compressor temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

↓ **OK**

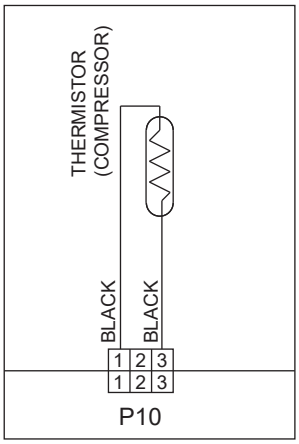
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

↓ **OK**

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P10:1-3 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



▶ **If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Trouble shooting 23 **OUTDOOR UNIT Error Method:** **Heat Ex. Outlet / Middle Temp. Thermistor Error**	**Indicate or Display:** Error code : 73

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆7	◆3	○	○	●	○

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Heat exchanger Outlet / Middle temperature thermistor	・Heat exchanger outlet temperature thermistor short or open detected ・Heat exchanger middle temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

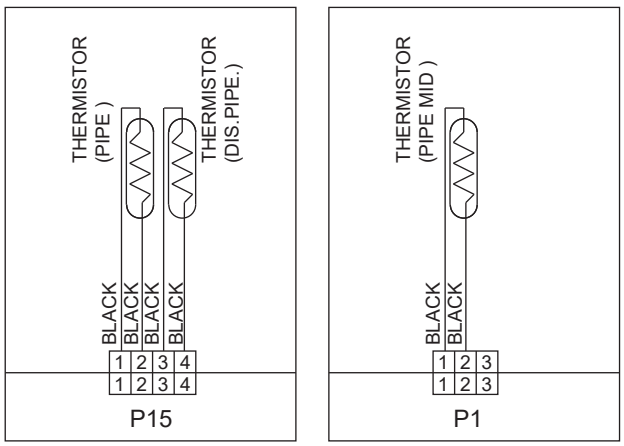
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P15:1-2 voltage value =5V
  Main PCB P1 :1-2 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Trouble shooting 24 **OUTDOOR UNIT Error Method:** **Outdoor Thermistor Error**	**Indicate or Display:** Error code : 74 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆7	◆4	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor temperature thermistor	・Outdoor temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

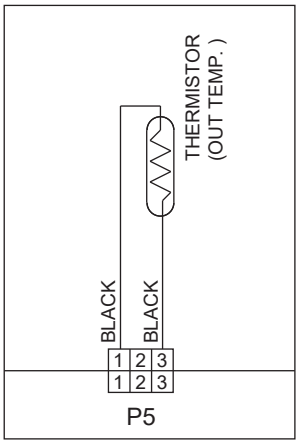
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P5:1-3 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Trouble shooting 25 **OUTDOOR UNIT Error Method:** **Heat Sink Thermistor Error**	**Indicate or Display:** Error code : 77 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆7	◆7	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Heat sink temperature thermistor	・Heat sink temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Inverter PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

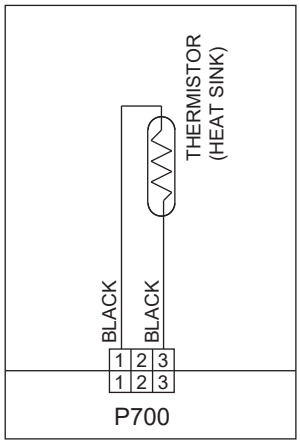
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

Check Point 3 : Check voltage of Inverter PCB (DC5.0V)

- ☐ Main PCB P700:1-3 voltage value =5V
  Remove the thermistor from Inverter PCB, check the voltage.



►**If the voltage does not appear, replace Inverter PCB, and execute the check operation again.**

Trouble shooting 26 **OUTDOOR UNIT Error Method:** **Current sensor error**	**Indicate or Display:** Error code : 84 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆8	◆4	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB	When Input Current Sensor has detected 1A or less, while Inverter Compressor is operating at higher than 50rps, after 1minute upon starting the Compressor. (Except during the defrost operation)

Forecast of Cause :

1. Defective connection of electric components 2. External cause 3. Inverter PCB failure

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO → Check Point 1-2

YES ↓

Check Point 2 :
Check connections of Outdoor Unit Electrical Components

- Check if the terminal connection is loose.
- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open.

>>Upon correcting the removed connector or mis-wiring, reset the power.

OK ↓

Check Point 3 : Replace Inverter PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Inverter PCB.**

Check Point 1-2 :
Check external cause at Indoor and Outdoor
(Voltage drop or Noise)

- Instant drop : Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure : Check if there is a defective contact or leak current in the power supply circuit.
- Noise : Check if there is any equipment causing harmonic wave near electric line.(Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

Trouble shooting 27-1 **OUTDOOR UNIT Error Method:** **Pressure sensor error**	**Indicate or Display:** Error code : 86 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆8	◆6	○	●	○	○

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
High pressure switch	When the power was turned on, "high pressure switch : open" was detected.

Forecast of Cause :

1. High pressure switch connector disconnection, open
2. High pressure switch characteristics failure
3. Inverter PCB failure

Check Point 1 : Check the high pressure switch connection state

- Connector and wiring connection state check
- Cable open check

OK

Check Point 2 : Check the high pressure switch characteristics

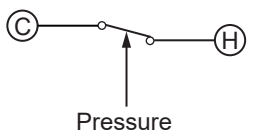
- Switch characteristics check
  * For the characteristics of high pressure switch, refer to below.

OK

Check Point 3 : Replace Inverter PCB

- **Change Inverter PCB, and execute the check operation again.**

- Type of contact



- Characteristics of pressure switch (P770)

	Pressure switch
Contact : Short ⇒ Open	4.2±0.1MPa
Contact : Open ⇒ Short	3.2±0.15MPa

[For 36/ 45/ 54 type]

Trouble shooting 27-2 **OUTDOOR UNIT Error Method:** **Pressure sensor error**	**Indicate or Display:** Error code : 86 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆8	◆6	○	●	●	○

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Pressure sensor	30 seconds or more after power-on, when pressure sensor detection value detects the condition below continuously for 30 seconds or more. ・Ps ≦ 0 or Ps ≧ 5 [MPa]

Forecast of Cause :

1. Connector connection failure 2. Pressure sensor failure 3. Main PCB failure

Check Point 1 : Check connection of the Pressure sensor

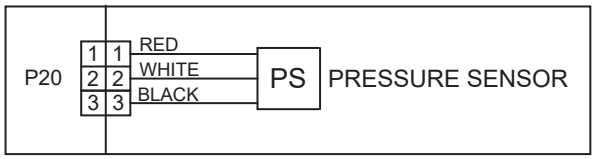
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

>> Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 2 : Check output voltage of Main PCB

- Check voltage of Main PCB.
  (Measure at Main PCB side connector)
  >>1 pin(Red) - 3 pin(Black) DC5V ±5%

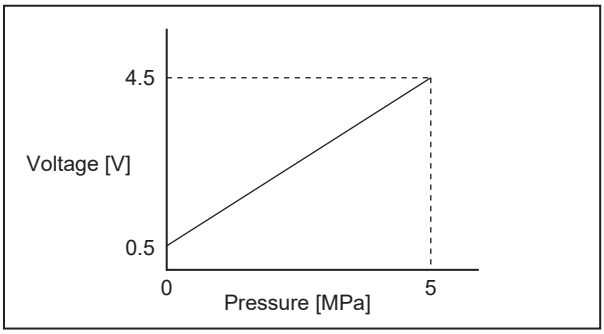


▶ **If the voltage is not correct, replace Main PCB.**

OK

Check Point 3 : Check output voltage of Pressure Sensor

- Check voltage of Main PCB.
  (Measure at Main PCB side connector)
  >>2 pin(White) - 3 pIn(Black) Voltage is refer to the following graph.



▶ **If the voltage is not correct, replace Presure Sensor.**

Trouble shooting 28 **OUTDOOR UNIT Error Method:** **Trip detection**	**Indicate or Display:** Error code : 94 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆9	◆4	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB Outdoor unit Main PCB Compressor	・"**Protection stop** by overcurrent generation after inverter compressor start processing completed" generated consecutively 10 times. *The number of generations is reset if the start-up of the compressor succeeds.

Forecast of Cause :
1. Outdoor unit fan operation defective, foreign matter on hear exchanger, excessive rise of ambient temperature
2. Main PCB
3. Inverter compressor failure (lock, winding short)
4. Inverter PCB

Check Point 1 : Check the outdoor unit fan operation, heat exchanger, ambient temperature

・No obstructions in air passages?
・Heat exchange fins clogged
・Outdoor unit fan motor check
・Ambient temperature not raised by the effect of other heat sources?
・Discharged air not sucked in?

↓ **OK**

Check Point 2 : Replace Inverter PCB

▶ **If Check Point 1 do not improve the symptom, change Inverter PCB.**

↓ **OK**

Check Point 3 : Replace Main PCB

▶ **If Check Point 1,2 do not improve the symptom, change Main PCB.**

↓ **OK**

Check Point 4 : Replace Compressor

▶ **If Check Point 3 do not improve the symptom, change Compressor.**

Trouble shooting 29 **OUTDOOR UNIT Error Method:** **Compressor rotor position detection error**	**Indicate or Display:** Error code : 95 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆9	◆5	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB Outdoor unit Main PCB Compressor	"Protection stop by "overcurrent generation at inverter compressor starting" restart" generated consecutively 10 times x 3 sets (total 30 times)

Forecast of Cause :

1. Defective connection of electric components 2. Inverter PCB failure 3. Main PCB failure
4. Compressor failure

Check Point 1 : Check Noise from Compressor

・Turn on Power and check operation noise.

▶ **If an abnormal noise show, replace Compressor.**

OK

Check Point 2 : Check connection of around the Compressor components

For Compressor Terminal, Main PCB

・Check if connector is removed.
・Check erroneous connection.
・Check if cable is open. (Refer to PARTS INFORMATION 2)

>>Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 3 : Replace Inverter PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Inverter PCB.**

OK

Check Point 4 : Replace Main PCB

▶ **If Check Point 3 do not improve the symptom, change Main PCB.**

OK

Check Point 5 : Replace Compressor

▶ **If Check Point 4 do not improve the symptom, change Compressor.**

Trouble shooting 30 **OUTDOOR UNIT Error Method:** **Outdoor Unit Fan Motor Error**	**Indicate or Display:** Error code : 97 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆9	◆7	○	○	●	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:

Outdoor unit Inverter PCB
Outdoor unit Main PCB
Outdoor unit fan motor

Detective details:

① When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops.
② After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops.
③ If ① and ②repeats 5 times in a row, compressor and fan motor stops permanently.

Forecast of Cause:

1. Fan rotation failure 2. Motor protection by surrounding temperature rise 3. Inverter PCB failure
4. Main PCB failure 5. Outdoor unit fan motor failure

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

OK

Check Point 2 : Check ambient temp. around motor

・Check excessively high temperature around the motor.
(If there is any surrounding equipment that causes heat)
>>Upon the temperature coming down, restart operation.

OK

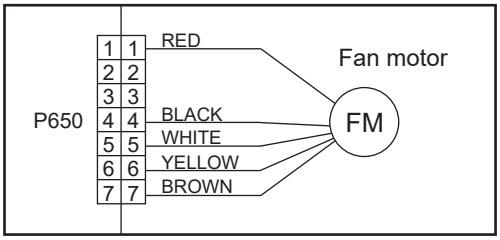
Check Point 3 : Check Outdoor unit fan motor

・Check Outdoor unit fan motor. **(PARTS INFORMATION 5)**
>>If Outdoor Fan Motor is abnormal, replace Outdoor fan motor and Main PCB.

OK

Check Point 4 : Check Output Voltage of Inverter PCB

・Check outdoor unit circuit diagram and the voltage. (Measure at Inverter PCB side connector)



Read wire	DC voltage
Red - Black	280V (AC220V-10%) ~ 373V (AC240+10%)
White - Black	15±1.5V

▶ **If the voltage is not correct, replace Inverter PCB.**

OK

Check Point 5 : Replace Main PCB

▶ **If Check Point 1~4 do not improve the symptom, change Main PCB.**

Trouble shooting 31 **OUTDOOR UNIT Error Method:** **4-Way Valve Error**	**Indicate or Display:** Error code : 99 **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆9	◆9	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:

Indoor Unit Controller PCB Circuit
Heat Exchanger Temperature Thermistor
Room Temperature Thermistor
4-way valve

Detective details:

When the indoor heat exchanger temperature is compared with the room temperature, and either following condition is detected continuously two times, the compressor stops.

- Cooling or Dry operation
  [Indoor heat exchanger temp.] - [Room temp.] > 10°C
- Heating operation
  [indoor heat exchanger temp.] - [Room temp.] < -10°C

If the same operation is repeated 5 times,
the compressor stops permanently.

Forecast of Cause :

1. Connector connection failure 2. Thermistor failure 3. Coil failure 4. 4-way valve failure
5. Main PCB failure

Check Point 1 : Check connection of Connector

- Check if connector is removed.
- Check erroneous connection.
- Check if thermistor cable is open.

>> Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 2 : Check thermistor of Indoor unit

- Isn't it fallen off the holder?
- Is there a cable pinched?

>> Check characteristics of thermistor, (Refer to Trouble shooting 13,14),
If defective, replace the thermistor.

OK

Check Point 3 : Check the solenoid coil and 4-way valve

[Solenoid coil]

- Remove P60 from PCB and check the resistance value of coil.
  Resistance value is about 1.97 kΩ
  >> If it is Open or abnormal resistance value, replace Solenoid Coil.

[4-way valve]

- Check each piping temperature,
  and the location of the valve by the temperature difference.
  >> If the value location is not proper, replace 4-way valve.

OK

Check Point 4 : Replace Main PCB

▶ **If Check Point 1- 3 do not improve the symptom, replace Main PCB.**

Trouble shooting 32 **OUTDOOR UNIT Error Method:** **Discharge Temp. Error**	**Indicate or Display:** Error code : A1 **Outdoor unit :**

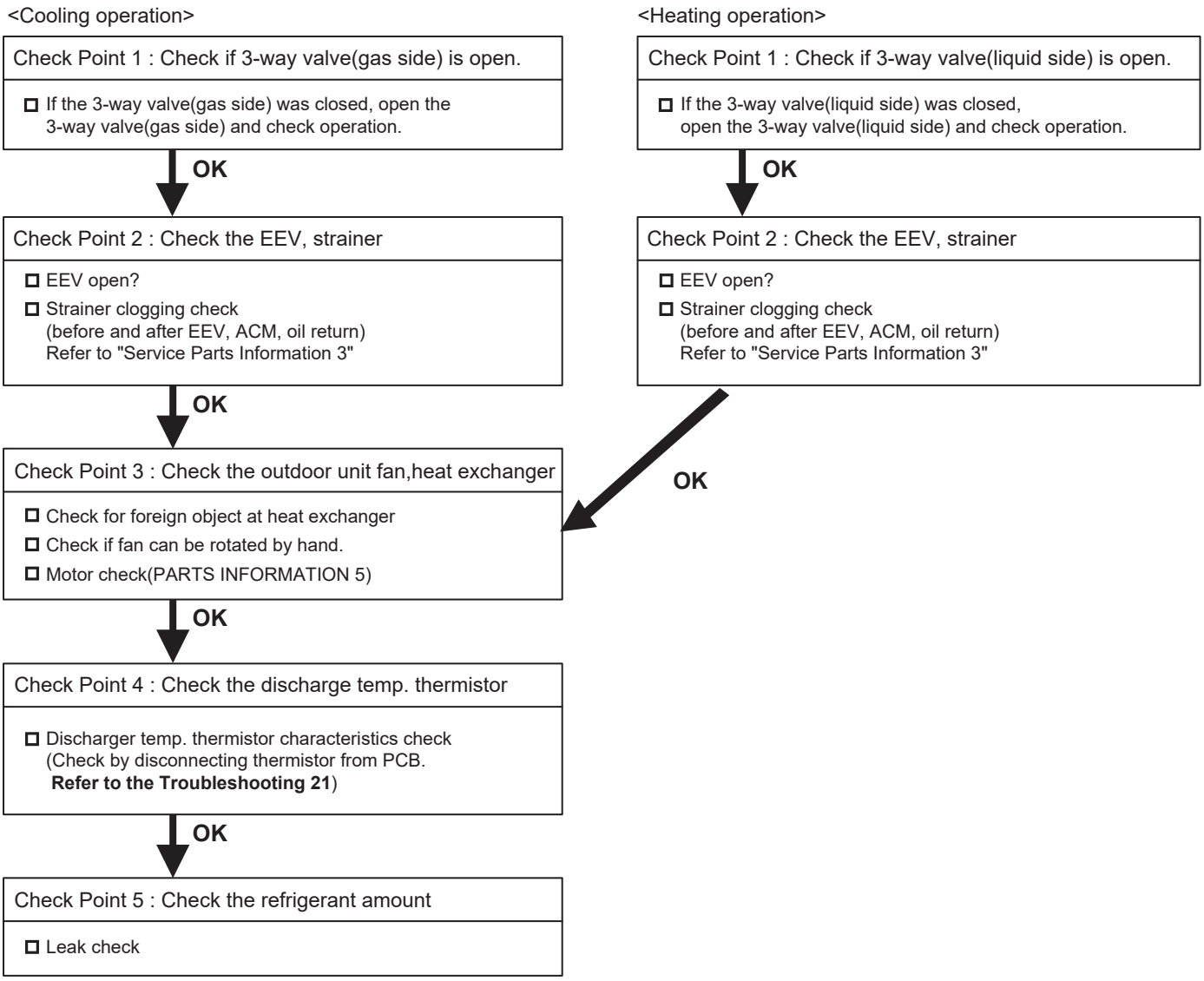
Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆1	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Discharge temperature thermistor	▪ "Protection stop by "discharge temperature ≧ 110°C during compressor operation"" generated 2 times within 24 hours.

Forecast of Cause :

1. 3-way valve not opened
2. EEV defective, strainer clogged
3. Outdoor unit operation failure, foreign matter on heat exchanger
4. Discharge temperature thermistor failure
5. Insufficient refrigerant



Trouble shooting 33 **OUTDOOR UNIT Error Method:** **Compressor Temp. Error**	**Indicate or Display:** Error code : A3 **Outdoor unit :**

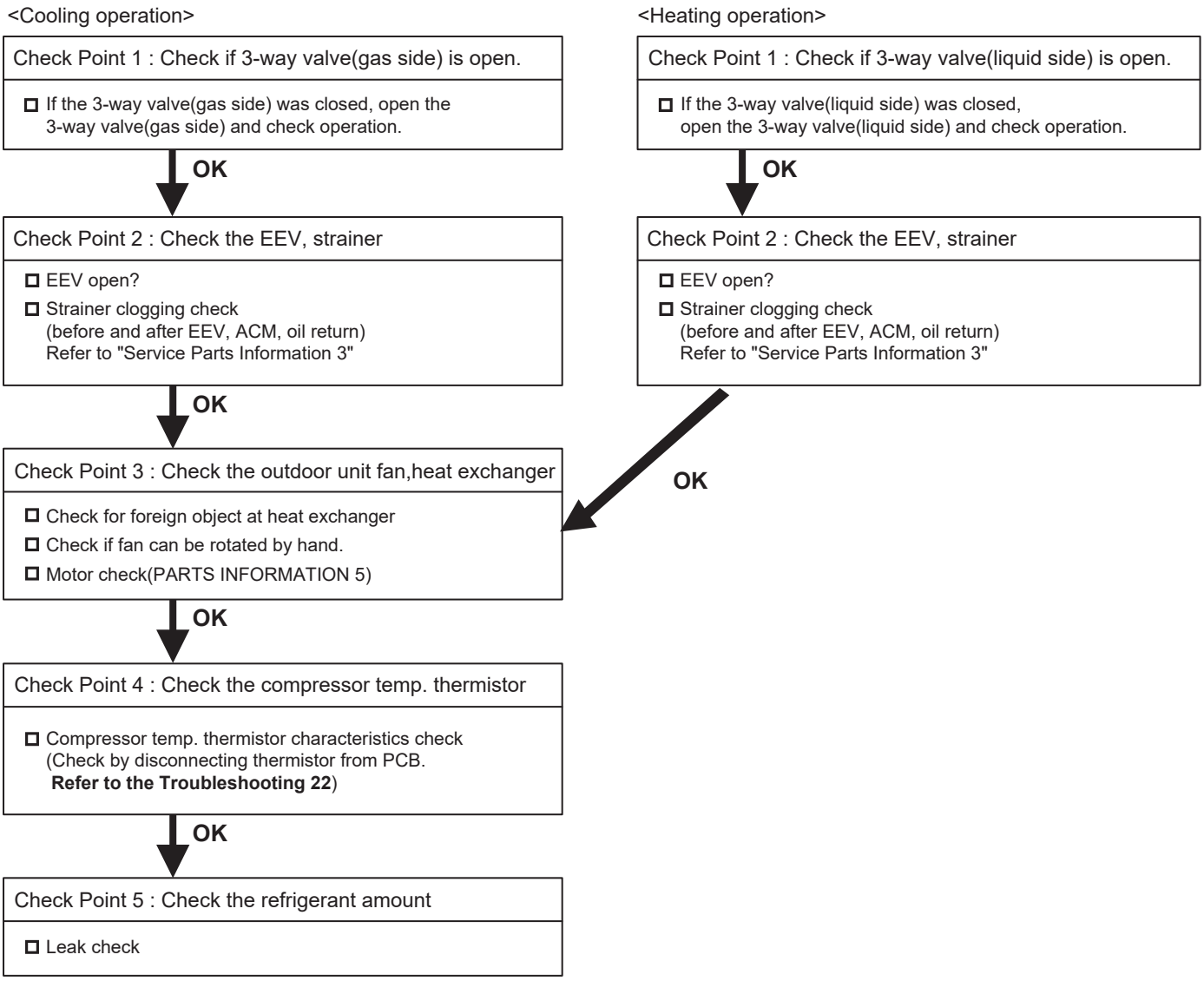
Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆3	○	○	○	●

○: Light OFF ●: Light ON ◆n: n times blinking

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	▪ "Protection stop by "compressor temperature ≧ 108°C during compressor operation"" generated 2 times within 24 hours.

Forecast of Cause :

1. 3-way valve not opened
2. EEV defective, strainer clogged
3. Outdoor unit operation failure, foreign matter on heat exchanger
4. Compressor temperature thermistor failure
5. Insufficient refrigerant



Trouble shooting 34 **OUTDOOR UNIT Error Method:** **Low pressure Error**	**Indicate or Display:** Error code : A5 **Outdoor unit :**

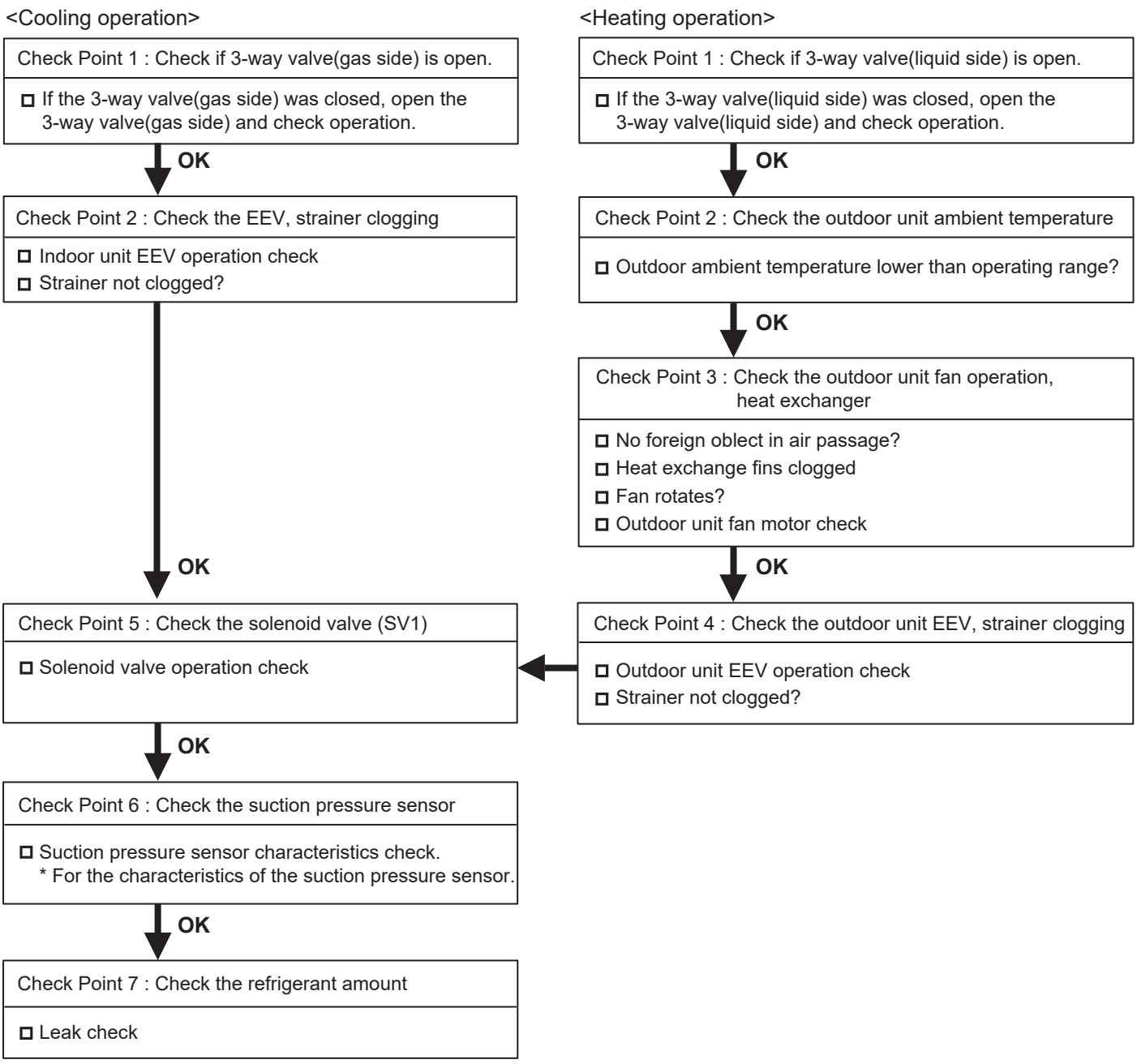
Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆5	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Pressure sensor	▪ "Protection stop by suction pressure ≦ 0.02MPa continued for 5 minutes" repeats 5 times within 2 hours.

Forecast of Cause :

1. 3-way valve not opened
2. Outdoor unit ambient temperature too low
3. Outdoor unit fan operation defective, foreign matter at heat exchanger
4. EEV defective, strainer clogged
5. Solenoid valve defective
6. Low pressure sensor characteristics defective
7. Insufficient refrigerant



Trouble shooting 35 **OUTDOOR UNIT Error Method:** **Heat sink Temp. Error**	**Indicate or Display:** Error code : AC **Outdoor unit :**

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆12	○	○	●	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB Heat sink temperature thermistor	▪ "Protection stop by "heat sink temp. ≧ 80°C"" generated 2 times within 24 hours.

Forecast of Cause :

1. Foreign matter on heat sink, heat sink dirty
2. Foreign matter on heat exchanger, excessive ambient temperature rise
3. Heat sink temp. thermistor defective

Check Point 1 : Check the heat sink state

- ☐ Heat sink foreign matter, soiling check

↓ **OK**

Check Point 2 :
Check the foreign matter and ambient temperature of heat exchanger

- ☐ Heat exchange foreign matter check
- ☐ Ambient temperature not raised by effect of other heat sources?
- ☐ Discharged air not sucked in?

↓ **OK**

Check Point 3 : Check the heat sink temp. thermistor

- ☐ Heat sink temp. thermistor characteristics check
  (Check by disconnecting thermistor from PCB.
  Refer to the Troubleshooting 25)

↓ **OK**

Check Point 4 : Replace Inverter PCB

- ☐ Replace Inverter PCB

2-3 TROUBLESHOOTING WITH NO ERROR CODE

Trouble shooting 36

Indoor Unit - No Power

Forecast of Cause:

1. Power Supply failure 2. External cause
3. Electrical Components defective

Check Point 1 : Check Installation Condition

- Isn't the breaker down?
- Check loose or removed connection cable.

>>If abnormal condition is found, correct it by referring to Installation Manual or Data & Technical Manual.

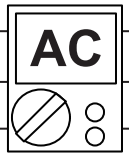
OK

Check Point 2 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop ----- Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure ----- Check if there is a defective contact or leak current in the power supply circuit.
- Noise ----- Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave) Check the complete insulation of grounding.

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

>> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.

NO

YES

- Check Fuse of between of Terminal and Power supply PCB (Indoor unit).

>> If Fuse is open, check if the wiring between Terminal and Power supply PCB (Indoor unit) is loose, and replace Fuse.

- Check Varistor in Power supply PCB (Indoor unit).

>> If Varistor is defective, there is a possibility of an abnormal power supply. Check the correct power supply and replace Varistor. Upon checking the normal power supply, replace Varistor.

OK

▶ **If the symptom does not change by above Check 3, replace Power supply PCB (Indoor unit).**

Trouble shooting 37

Outdoor unit - No Power

Forecast of Cause:

1.Power Supply failure 2. External cause
3.Electrical Components defective

Check Point 1 : Check Installation Condition

- Isn't the breaker down?
- Check loose or removed connection cable.

>>If abnormal condition is found, correct it by referring to Installation Manual or Data & Technical Manual.

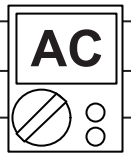
OK

Check Point 2 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop ----- Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure ----- Check if there is a defective contact or leak current in the power supply circuit.
- Noise ----- Check if there is any equipment causing harmonic wave near electric line.
  (Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

>> Check if AC198 - 264V appears at Outdoor unit Terminal L - N.

NO

YES

- Check Fuse in Main PCB.

>> If Fuse is open, check if the wiring between Terminal and Main PCB is loose, and replace Fuse.

OK

▶ **If the symptom does not change by above Check 3, replace Main PCB.**

Trouble shooting 38

No Operation (Power is ON)

Forecast of Cause:

1. Setting/ Connection failure 2. External cause
3. Electrical Component defective

Check Point 1 : Check indoor and outdoor installation condition

- Indoor Unit - Check incorrect wiring between Indoor Unit - Remote Control.
  Or, check if there is an open cable connection.
- Are these Indoor Unit, Outdoor Unit, and Remote Control suitable model numbers to connect?

>> If there is some abnormal condition, correct it by referring to Installation manual and Data & Technical Manual.

OK

Turn off Power and check/ correct followings.

- Is there loose or removed communication line of Indoor Unit and Outdoor Unit?

OK

Check Point 2 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop ----- Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure ----- Check if there is a defective contact or leak current in the power supply circuit.
- Noise ----- Check if there is any equipment causing harmonic wave near electric line.
  (Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

OK

Check Point 3 : Check Wired Remote Controller and Controller PCB

- Check Voltage at CN14 of Controller PCB. (terminal 1-3)
  (Power supply to Remote Control)

>> If it is DC13V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control
>> If it is DC 0V, Controller PCB is failure. (Check Remote Control once again) >> Replace Controller PCB

>> If the symptom does not change by above Check 1, 2, 3, replace Main PCB of Outdoor unit.

Trouble shooting 39

No Cooling / No Heating

Forecast of Cause:

1. Indoor Unit error 2. Outdoor Unit error
3. Effect by Surrounding environment
4. Connection Pipe / Connection Wire failure 5. Refrigeration cycle failure

Check Point 1 : Check Indoor Unit

- Does Indoor unit FAN run on HIGH FAN?
- Is Air Filter dirty?
- Is Heat Exchanger clogged?
- Check if Energy save function is operated.

OK

Check Point 2 : Check Outdoor Unit Operation

- Check if Outdoor Unit is operating
- Check any objects that obstruct the air flow route.
- Check clogged Heat Exchanger.
- Is the Valve open?

OK

Check Point 3 : Check Site Condition

- Is capacity of Indoor unit fitted to Room size?
- Any windows open? Or direct sunlight ?

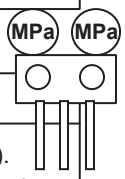
OK

Check Point 4 : Check Indoor/ Outdoor Installation Condition

- Check connection pipe (specified pipe length & Pipe diameter?)
- Check any loose or removed communication line.

>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.

OK



Check Point 5 : Check Refrigeration cycle

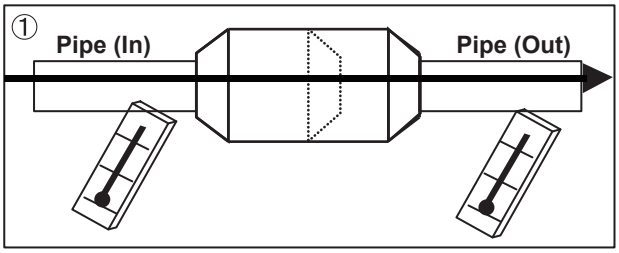
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

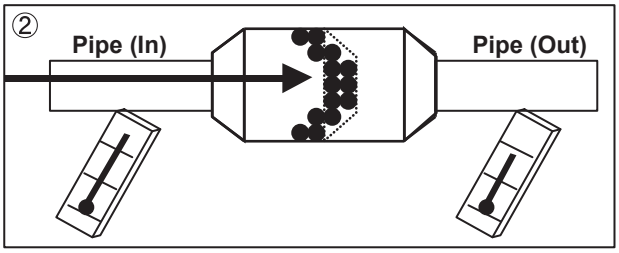
>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.

- Check EEV (PARTS INFORMATION 3)
- Check Compressor (PARTS INFORMATION 1,2)

Attention

Strainer normally does not have temperature difference between inlet and outlet as shown in ①, but if there is a difference like shown in ②, there is a possibility of inside clogged. In this case, replace Strainer.





Trouble shooting 40

Abnormal Noise

Forecast of Cause :

1. Abnormal installation (Indoor/ Outdoor)
2. Fan failure (Indoor/ Outdoor)
3. Compressor failure (Outdoor)

Diagnosis method when Abnormal Noise is occurred

- Abnormal noise is coming from Indoor Unit. (Check and correct followings)

- Is Main unit installed in stable condition?
- Is the installation of air suction grille and front panel normal?

OK

- Is Fan broken or deformed?
- Is the screw of Fan loose?
- Is there any object which obstruct the Fan rotation?

- Abnormal noise is coming from Outdoor Unit. (Check and correct followings)

- Is Main Unit installed in stable condition?
- Is Fan Guard installed normally?

OK

- Is Fan broken or deformed?
- Is the screw of Fan loose?
- Is there any object which obstruct the Fan rotation?

OK

- Check if vibration noise by loose bolt or contact noise of piping is happening.

OK

- Is Compressor locked?
  >> Check Compressor (PARTS INFORMATION 1,2)

Trouble shooting 41

Water Leaking

Forecast of Cause:

1. Erroneous installation 2. Drain hose failure

Diagnosis method when water leak occurs

- Is Main Unit installed in stable condition?
- Is Main Unit broken or deformed at the time of transportation or maintenance?

OK

- Is Drain Hose connection loose?
- Is there a trap in Drain Hose?
- Is Drain Hose clogged?

OK

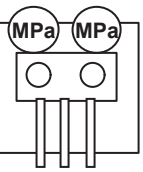
- Is Fan rotating?

Diagnosis method when water is spitting out.

- Is the filter clogged?

OK

- Check Gas Pressure and correct it if there was a gas leak.



2-4 SERVICE PARTS INFORMATION

SERVICE PARTS INFORMATION 1

Compressor

Diagnosis method of Compressor (If Outdoor Unit LED displays Error, refer to Trouble shooting)

Does not start up

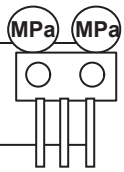
- Is there open or loose connection cable?
- Check Main PCB, connection of Compressor, and winding resistance. (Refer to the next page).

>> If there is no failure, the defect of Compressor is considered (Locked compressor due to clogged dirt or less oil)

Replace Compressor

Stops soon after starting up

- Is there open or loose connection cable?
- Is Gas pipe valve open? (Low pressure is too low)
- Check if Refrigerant is leaking. (Recharge Refrigerant)



- Check if capillary tube, strainer is clogged. (PARTS INFORMATION 3)
- Check Main PCB, connection of Compressor,and winding resistance. (Refer to the next page).

>> If there is no failure, the defect of Compressor can be considered. (Compression part broken or valve defective.)

Replace Compressor

Abnormal noise

- Check if vibration noise by loose bolt or contact noise of piping is happening.

▶Defective Compressor can be considered. (due to inside dirt clogging or broken component)

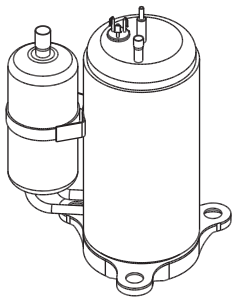
Replace Compressor

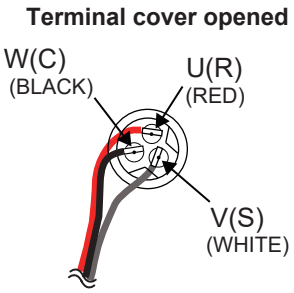
SERVICE PARTS INFORMATION 2

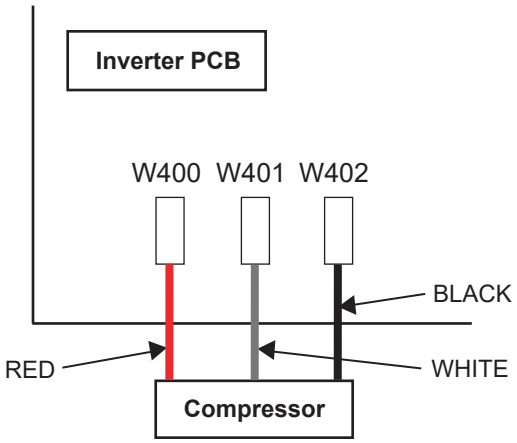
Inverter Compressor

Check Point 1 : Check Connection

・Check terminal connection of Compressor
(loose or incorrect wiring)

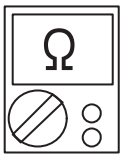


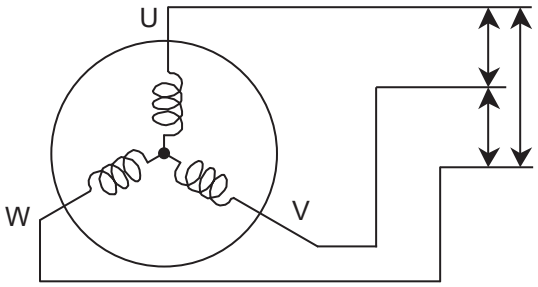




Check Point 2 : Check Winding Resistance

・Check winding resistance of each terminal
▶**If the resistance value is 0Ω or infinite, replace Compressor.**





Resistance Value :
1.125Ω at 25°C (30/ 36 type)
0.766Ω at 20°C (45/ 54 type)

Check Point 3 : Replace Invereter PCB

▶**If the symptom does not change with above Check 1, 2, replace Inverter PCB.**

Check Point 4 : Replace Main PCB

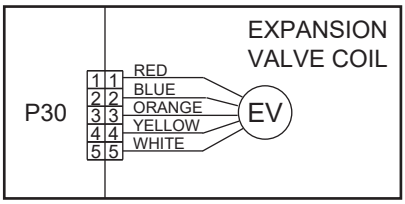
▶**If the symptom does not change with above Check 1~3, replace Main PCB.**

SERVICE PARTS INFORMATION 3

Outdoor unit Electronic Expansion Valve
(EEV)

Check Point 1 : Check Connections

・Check connection of connector
(Loose connector or open cable)



Check Point 2 : Check Coil of EEV

・Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	**46**Ω ± **3**Ω at 20°C
Yellow - Red	
Orange - Red	
Blue - Red	

▶ **If Resistance value is abnormal, replace EEV.**

Check Point 3 : Check Noise at start up

▪ Turn on Power and check operation noise.

▶ **If an abnormal noise does not show, replace Main PCB.**

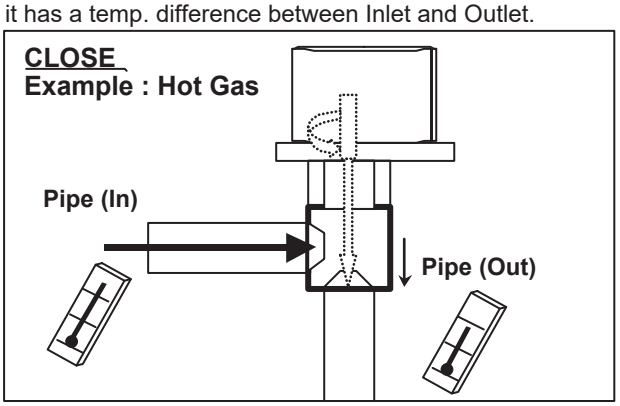
Check Point 4 : Check Voltage from Main PCB.

▪ Remove Connector and check Voltage (DC12V)

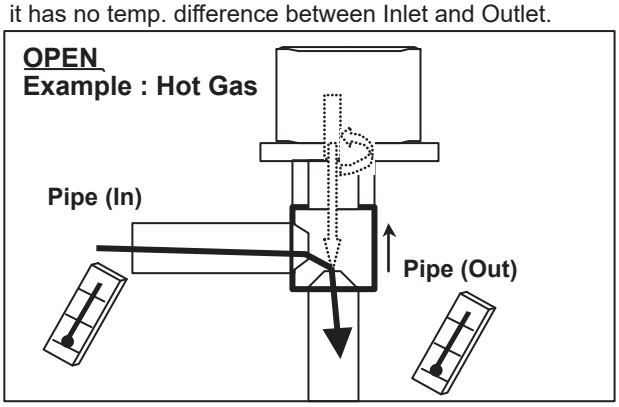
▶ **If it does not appear, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

When Valve is closed,
it has a temp. difference between Inlet and Outlet.

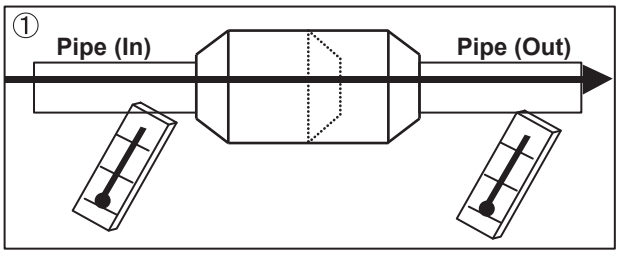


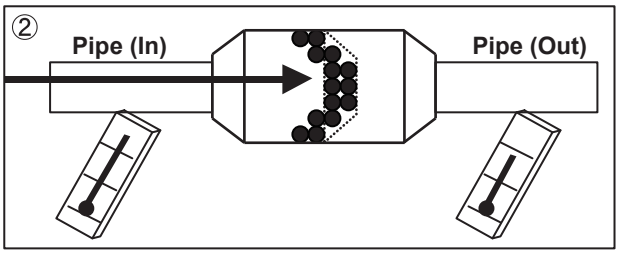
If it is open,
it has no temp. difference between Inlet and Outlet.



Check Point 6 : Check Strainer

Strainer normally does not have temperature difference between inlet and outlet as shown in ①,
but if there is a difference as shown in ② , there is a possibility of inside clogged. In this case, replace Strainer.





SERVICE PARTS INFORMATION 4

Indoor unit fan motor

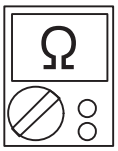
Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

Check Point 2 : Check resistance of Indoor unit Fan Motor

・Refer to below. Circuit-test "Vm" and "GND" terminal.
(Vm: DC voltage, GND: Earth terminal)
>>If they are short-circuited (below 300 kΩ), replace Indoor unit fan motor and Controller PCB.

Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage(Vm)
2	No function
3	No function
4 (Black)	(GND)
5 (White)	Control voltage (Vcc)
6 (Yellow)	Speed command (Vsp)
7 (Brown)	Feed back (FG)



SERVICE PARTS INFORMATION 5

Outdoor unit fan motor

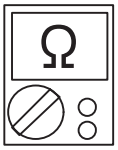
Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

Check Point 2 : Check resistance of Outdoor Fan Motor

・Refer to below. Circuit-test "Vm" and "GND" terminal.
(Vm: DC voltage, GND: Earth terminal)
>>If they are short-circuited (below 300 kΩ), replace Outdoor fan motor and Main PCB.

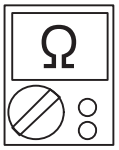
Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage (Vm)
2	No function
3	No function
4 (Black)	Earth terminal (GND)
5 (White)	Control voltage (Vcc)
6 (Yellow)	Speed command (Vsp)
7 (Brown)	Feed back (FG)



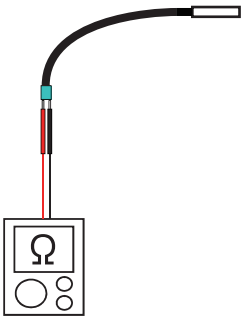
SERVICE PARTS INFORMATION 8

Thermistor

Check Point : Check Thermistor resistance value



☐ Remove connector and check Thermistor resistance value.



Temperature [°C]	Resistance Value [kΩ]			
	Thermistor A	Thermistor B	Thermistor C	Thermistor D
-30	1013.1	95.6	224.3	94.3
-20	531.6	50.3	115.2	49.6
-10	292.9	27.8	62.3	27.4
0	168.6	16.1	35.2	15.8
10	100.9	9.6	20.7	9.5
20	62.5	6.0	12.6	5.9
30	40.0	3.8	8.0	3.8
40	26.3	2.5	5.2	2.5
50	17.8	1.7	3.5	1.7
60	12.3	1.2	2.4	1.2
70	8.7	0.8	---	0.8
80	6.3	0.6	---	0.6
90	4.6	---	---	0.4
100	3.4	---	---	0.3
110	2.6	---	---	0.2
120	2.0	---	---	0.2
130	---	---	---	0.1
140	---	---	---	0.1
150	---	---	---	0.1
Applicable Thermistors	Discharge temp. TH Compressor temp. TH	Heat exchanger. TH	Outdoor temp. TH	Heatsink temp. TH

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