SPLIT TYPE
ROOM AIR CONDITIONER

Cassette type
Duct type
Ceiling type

INVERTER

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	AU* G45LRLA	AO* G45LETL
	AR* G45LMLA	AO* G54LETL
	AR* G45LHTA	
	AB* G45LRTA	
	AU* G54LRLA	
	AR* G54LHTA	

Refrigerant
R410A

FUJITSU GENERAL LIMITED

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2. TROUBLE SHOOTING

Refrigerant
R410A

Cassette/ Duct/ Ceiling type
INVERTER

1 . DESCRIPTION OF EACH CONTROL OPERATION

1. DESCRIPTION OF EACH CONTROL OPERATION

1-1. COOLING OPERATION

A sensor (room temperature thermistor) built in the indoor unit 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 2°C higher than a set temperature, the compressor operation frequency will attain to maximum performance.

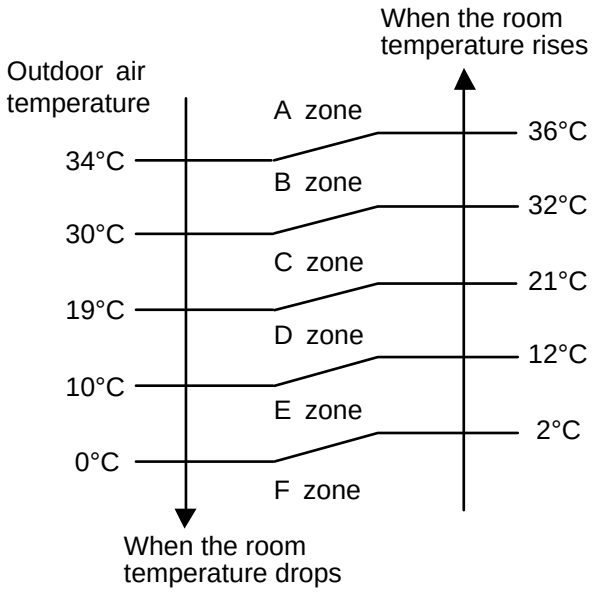
* If the room temperature is 2.5°C lower than a set temperature, the compressor will be stopped.

* When the room temperature is between +2°C to -2.5°C of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

(Table 1 : Compressor Frequency Range)

	minimum frequency	maximum frequency
AU* G45LRLA AR* G45LMLA AB* G45LRTA	16rps	93rps
AR* G45LHTA	16rps	85rps
AU* G54LRLA	16rps	100rps
AR* G54LHTA	16rps	90rps

(Fig. 1 : Limit of Maximum Frequency based on Outdoor Temperature)



Fan speed mode		Hi	Me	Lo	Qu
AU* G45LRLA AR* G45LMLA AB* G45LRTA	A zone	93rps	75rps	68rps	44rps
	B zone	93rps	75rps	68rps	44rps
	C zone	78rps	68rps	56rps	44rps
	D-F zone	73rps	56rps	47rps	29rps
AU* G54LRLA	A zone	100rps	78rps	73rps	44rps
	B zone	100rps	78rps	73rps	44rps
	C zone	85rps	73rps	62rps	44rps
	D-F zone	76rps	62rps	50rps	29rps
AR* G45LHTA	A zone	85rps	77rps	76rps	---
	B zone	85rps	77rps	76rps	---
	C zone	78rps	68rps	68rps	---
	D-F zone	68rps	62rps	56rps	---
AR* G54LHTA	A zone	90rps	85rps	81rps	---
	B zone	90rps	85rps	81rps	---
	C zone	85rps	76rps	73rps	---
	D-F zone	73rps	68rps	62rps	---

1-2. HEATING OPERATION

A sensor (room temperature thermistor) built in the indoor unit 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 lower 3°C than a set temperature, the compressor operation frequency will attain to maximum performance.

* If the room temperature is higher 2.5°C than a set temperature, the compressor will be stopped.

* When the room temperature is between +2.5°C to -3°C of the setting temperature, the compressor frequency is controlled within the range shown in Table2.

(Table 2 : Compressor Frequency Range)

	minimum frequency	maximum frequency
AU* G45LRLA AR* G45LMLA AB* G45LRTA AR* G45LHTA	16rps	110rps
AU* G54LRLA		
AR* G54LHTA		

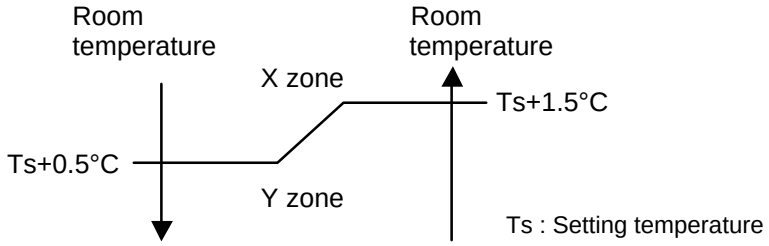
1-3. DRY OPERATION

The compressor rotation frequency shall change according to set temperature and room temperature variation which the room temperature sensor of the indoor unit has detected as shown in the Table 3.

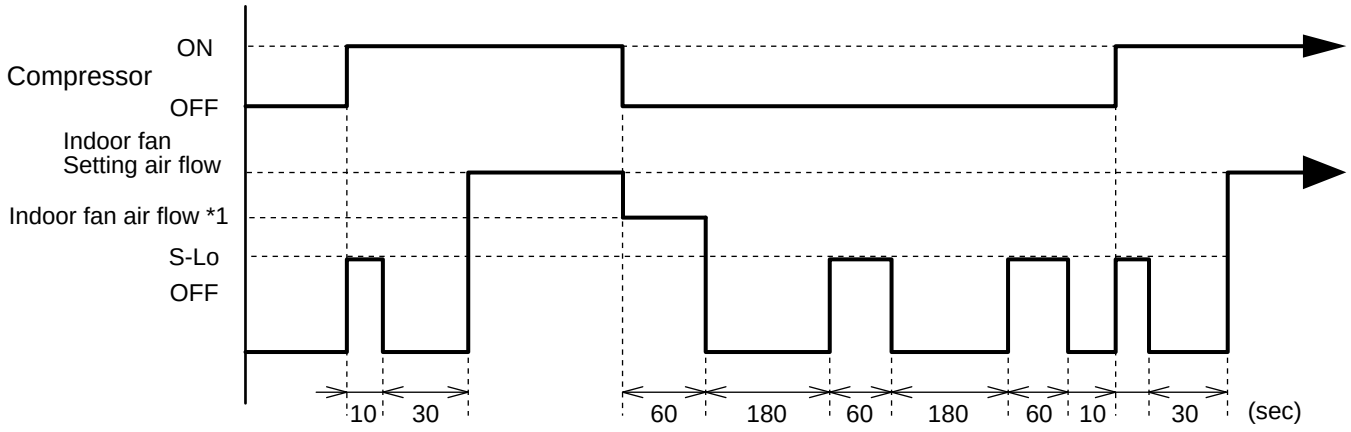
(Table 3 : Compressor frequency)

		Operating frequency
AU* G45LRLA AR* G45LMLA AB* G45LRTA AR* G45LHTA AU* G54LRLA AR* G54LHTA	X zone	44rps
	Y zone	0rps

(Fig.2 : Compressor Control based on Room Temperature)

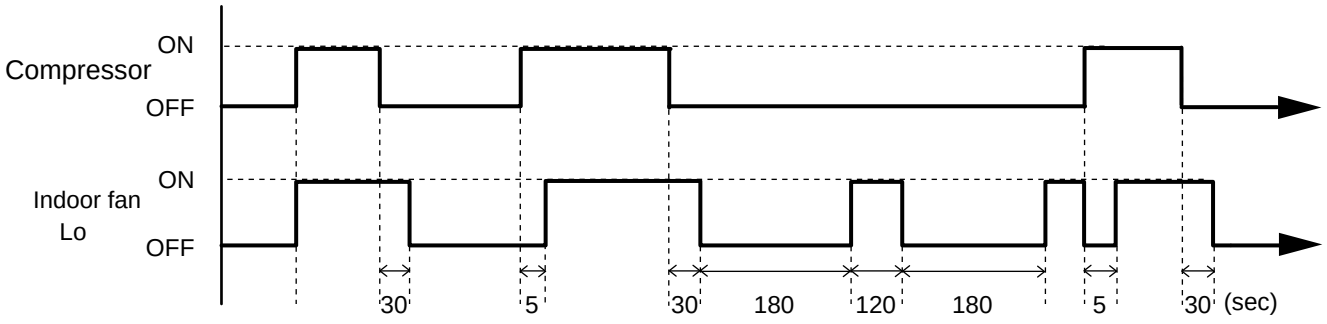


(Fig 3-1 : Indoor Fan Control for AU*G45/ 54LRTA, AR*G45LMLA, AB*G45LRTA)



*1 : AU*G45LRLA ---> 470rpm, AU*G54LRLA ---> 480rpm
AB*G45LRTA ---> 680rpm, AR*G45LMLA ---> 670rpm,

(Fig 3-2 : Indoor Fan Control for AR*G45/ 54LHTA)



1-4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the Auto mode by remote controller, operation starts in the optimum mode from among the Heating, Cooling, Dry and Monitoring mode. 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°C steps.

① When operation starts, indoor fan and outdoor fan are operated for around 3 minutes. Room temperature and outdoor temperature are sensed, and the operation mode is selected in accordance with the table below. **<Monitoring mode>**

(Table 4 : Operation mode selection table)

Room temperature (TR)	Operation mode
TR> Ts+2°C	Cooling (Autmatic dry)
Ts+2°C ≧TR ≧ Ts -2°C	*Middle zone
TR < Ts -2°C	Heating

TR : Room temperature
Ts : Setting temperature

*If it's Middle zone, operation mode of indoor unit is selected as below.

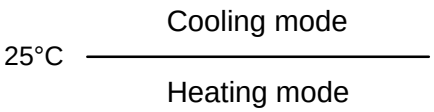
(1). Same operation mode is selected as outdoor unit.

If outdoor unit is operating in Cooling, Dry, and Heating mode, indoor unit will be operated by the same operation mode.

(2). Selected by the outdoor temperature.

If outdoor unit is operating in other than Cooling, Dry, and Heating mode, indoor unit will be operated according to the outdoor temperature as below.

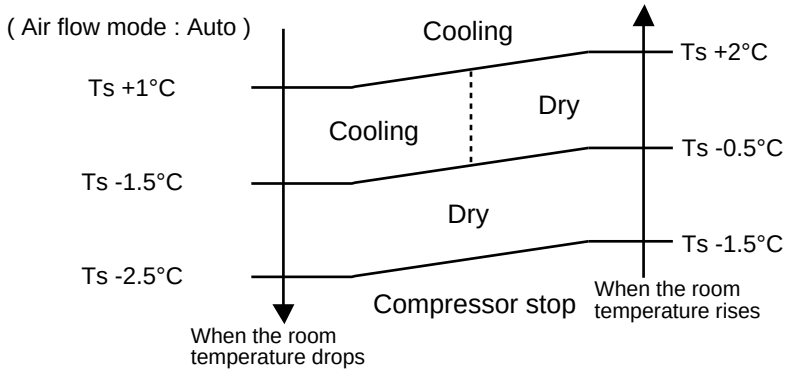
(Fig.4 : Outdoor temperature zone selection)



② When Cooling or Dry mode was selected at ① and air flow mode is Auto, the air conditioner operates as follow.

- The same operation as COOLING OPERATION AND DRY OPERATION of page 01-01 is performed.
- When the room temperature has remained at set temperature -1.5°C, operation is automatically switched to Dry mode.
- If the room temperature reaches set temperature +2°C during Dry mode, operation returns to Cooling.

(Fig.5 : Auto changeover : Cooling - Dry)

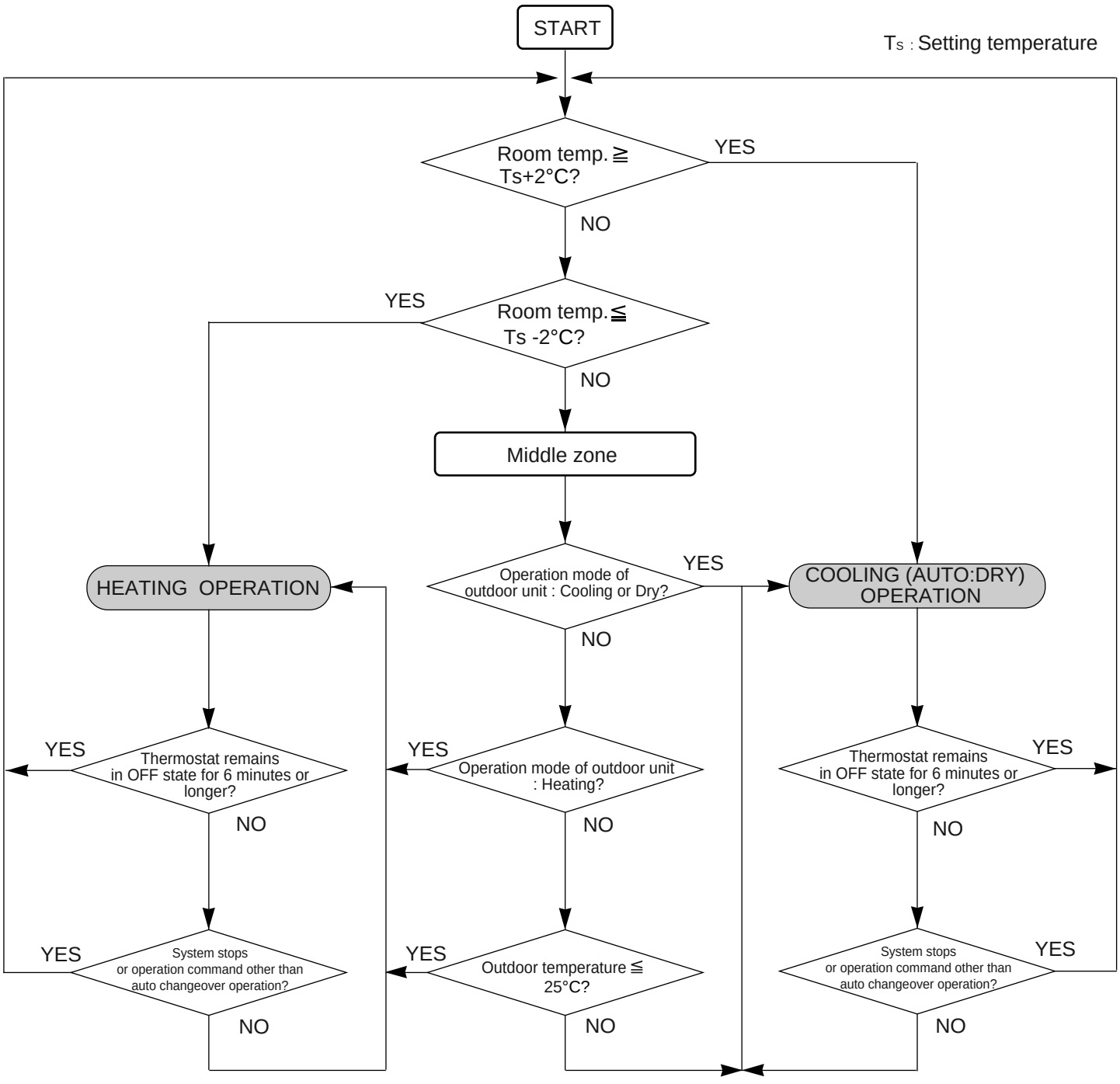


TR : Room temperature
Ts : Setting temperature

③ When Heating was selected at ①, the same operation as HEATING OPERATION of page 01-02 is performed.

④ When the compressor was stopped for 6 consecutive minutes by the temperature control function after the Cooling(Auto:Dry) or Heating mode was selected at ① above, operation is switched to Monitoring and the operation mode is selected again.

■ AUTO CHANGEOVER operation flow chart



1-5. INDOOR FAN CONTROL

1. Fan speed

(Table 5 : Indoor Fan Speed)

▪ AU* G45LRLA

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	690
	Me+	650
	Me	610
	Lo	550
	Quiet	470
	Cool air prevention	300
Cooling Fan	Hi	690
	Me	610
	Lo	550
	Quiet	470
	*Soft Quiet	300
Dry		470
S-Lo		270

▪ AU* G54LRLA

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	720
	Me+	680
	Me	630
	Lo	570
	Quiet	480
	Cool air prevention	300
Cooling Fan	Hi	720
	Me	630
	Lo	570
	Quiet	480
	*Soft Quiet	300
Dry		480
S-Lo		270

*Note, during Economy operation and operation mode is Fan, air flow is 1 step downs.
(Hi > Me, Me > Lo, Lo > Quiet, Quiet > Soft Quiet)

▪ AB* G45LRTA

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1200
	Me+	1100
	Me	1000
	Lo	830
	Quiet	680
	Cool air prevention	500
Cooling Fan	Hi	1200
	Me	1000
	Lo	830
	Quiet	680
	*Soft Quiet	500
Dry		680
S-Lo		250

▪ AR* G45LMLA

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1300
	Me+	---
	Me	1020
	Lo	840
	Quiet	670
	Cool air prevention	---
Cooling Fan	Hi	1310
	Me	1020
	Lo	840
	Quiet	670
	*Soft Quiet	420
Dry		670
S-Lo		420

*Note, during Economy operation and operation mode is Fan, air flow is 1 step downs.
(Hi > Me, Me > Lo, Lo > Quiet, Quiet > Soft Quiet)

▪ AR* G45/ 54LHTA
(Normal static pressure: 100Pa)

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling Fan	Hi	1300
	Me	1150
	Lo	1000

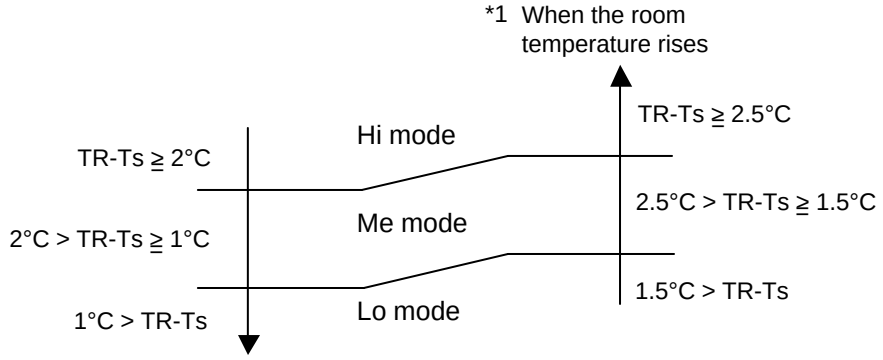
2. FAN OPERATION

The airflow can be switched in 5 steps such as Auto, Quiet, Lo, Me, Hi, while the indoor fan only runs.
The High Static Pressure Duct type is 4 steps such as Auto, Lo, Me, Hi.

3. COOLING OPERATION

Switch the airflow [Auto], and the indoor fan motor will run according to a room temperature, as shown in Fig.6.
On the other hand, if switched in [Hi] ~ [Lo], the indoor motor will run at a constant airflow of [Cool] operation modes Lo, Me, Hi, as shown in Table 5.

(Fig.6 : Airflow change - over (Cooling : Auto))



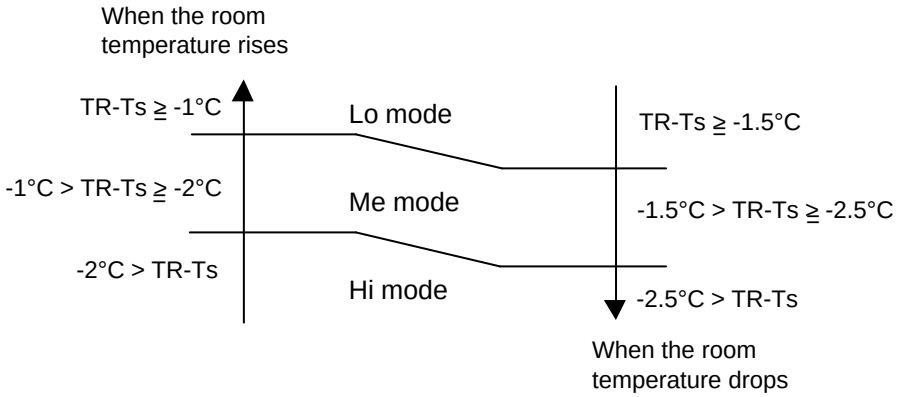
TR : Room temperature
Ts : Setting temperature

*1 : Contains a condition to the following
① When the operation mode is set to AUTO mode at the start of operation.
② When the setting temperature was changed.
③ When the operation mode was changed to Cooling mode.
④ When the airflow mode was changed to AUTO mode.

4. HEATING OPERATION

Switch the airflow [Auto], and the indoor fan motor will run according to a room temperature, as shown in Fig.7.
On the other hand, if switched in [Hi] ~ [Lo], the indoor motor will run at a constant airflow of [Heat] operation modes Lo, Me, Hi, as shown in Table 5.

(Fig.7 : Airflow change - over (Heating : Auto))

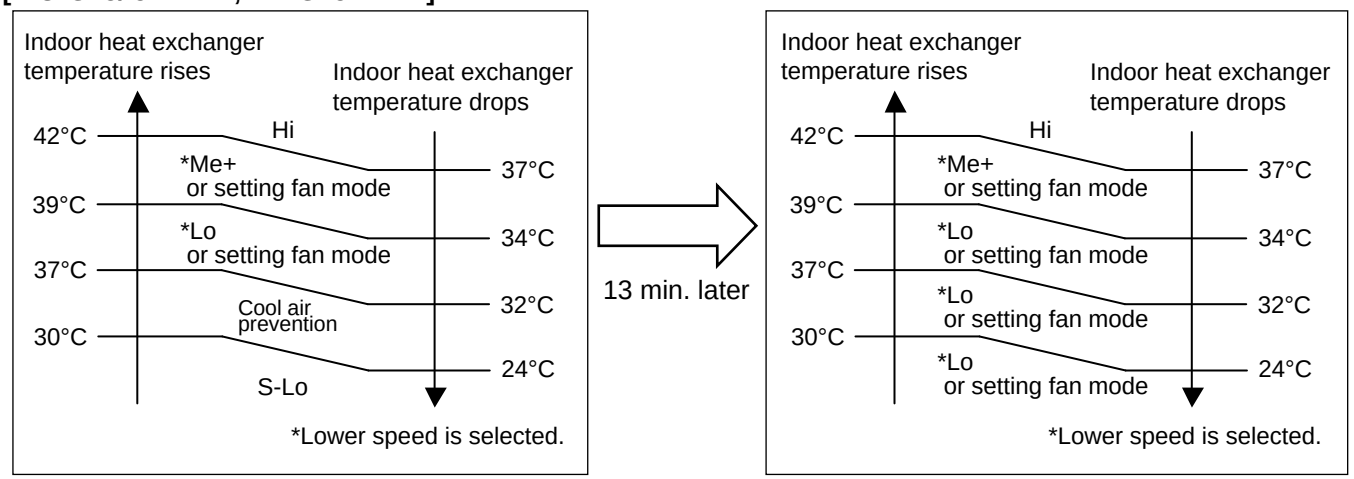


5. COOL AIR PREVENTION CONTROL (Heating mode)

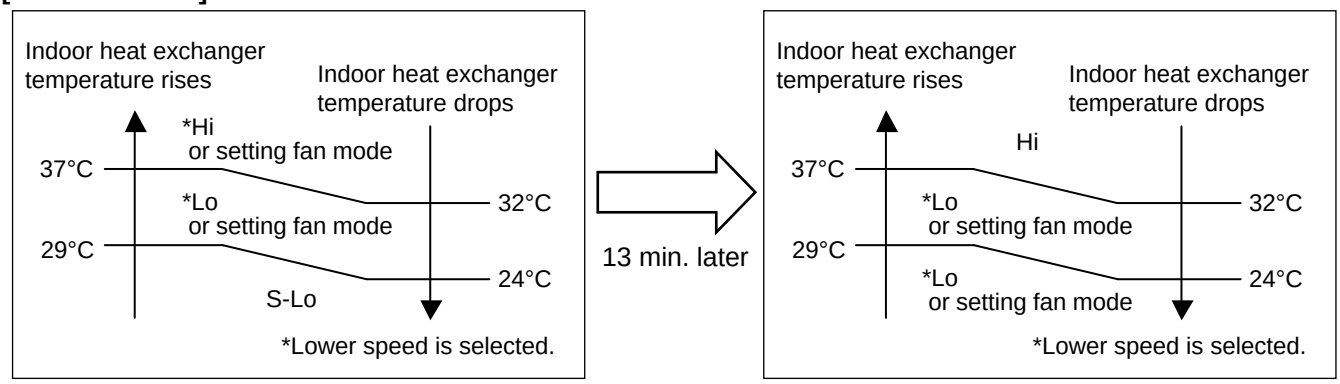
The maximum value of the indoor fan speed is set as shown in Fig.8, based on the detected temperature by the indoor heat exchanger sensor on heating mode.
When the compressor does not operate, the indoor fan motor operates [S-Lo] or [Stop] mode.

(Fig.8 : Cool Air Prevention Control)

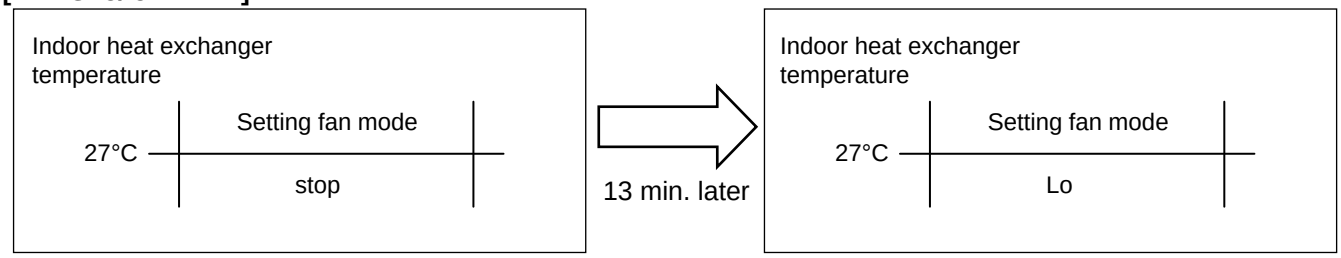
[AU*G45/ 54LRLA, AB*G45LRTA]



[AR*G45LMLA]



[AR*G45/ 54LHTA]



6. DRY OPERATION

Refer to the Fig. 3-1, 3-2.
During the dry mode operation, the fan speed setting can not be changed.

7. [For AU*G45/ 54LRTA, AR*G45LMLA, AB*G45LRTA] MOISTURE RETURN PREVENTION CONTROL (Cooling mode& Dry mode)

Switch the airflow [Auto] at cooling mode, and the indoor fan motor will run as shown in Fig.3-1.

8. [For AU*G45/ 54LRTA, AR*G45LMLA, AB*G45LRTA] INDOOR UNIT FAN (CONTROL FOR ENERGY SAVING (Cooling mode))

Switch the airflow at cooling mode, and the indoor fan motor will run as shown in Fig.3-1.
It depends on the Function setting "Indoor unit fan control for energy saving".

1-6. OUTDOOR FAN CONTROL

1. Outdoor Fan Motor

Following table shows the fan speed of the outdoor unit.

(Table 6 : Fan speed of the outdoor unit)

		Cooling / Dry	Heating
AO* G45LETL AO* G54LETL	Upper fan /Lower fan	850/800, 780/750, 750/700 540/520, 360/340, 290/270 480/ 0 , 400/ 0, 350/ 0 280/ 0	900/880, 850/830, 780/750 720/700, 570/550, 500/480 370/350, 300/280, 220/200

* The outdoor fan speed changes in the range mentioned above depending on the compressor frequency and outdoor temperature.
  (When the compressor frequency and outdoor temperature increase, the outdoor fan speed also changes to the higher speed.
  When the compressor frequency and outdoor temperature decrease, the outdoor fan speed also changes to the lower speed.)

* The compressor and the fan start-up at the same time, and the fan stops after the compressor stops and 60 seconds has passed.

* The fan doesn't operates fan 10 seconds after the fan stops.

* After operating the defrost control function on heating mode except economy operation, its speed becomes 900rpm(Upper) / 880rpm(Lower) regardless of the compressor speed. However, it returns to the normal speed control when the defrosting operation does not function for 240 minutes after releasing the defrost operation or when the outdoor temperature sensor detection value becomes higher than 5℃.

* It runs at 500rpm for 20 seconds after starting up the outdoor fan.
  However, the fan operates at 200rpm when the initial rotation speed is 300rpm or less.

1-7. COMPRESSOR CONTROL

1. OPERATION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in Table 7.

(Table 7 : Compressor Operation Frequency Range)

	Cooling					Heating		Dry
	Min	Max				Min	Max	
		45LRLA 45LMLA 45LRTA	45LHTA	54LRLA	54LHTA			
AO* G45LETL	16rps	93rps	85rps	----	----	16rps	110rps	44rps
AO* G54LETL	16rps	----	----	100rps	90rps	16rps	110rps	44rps

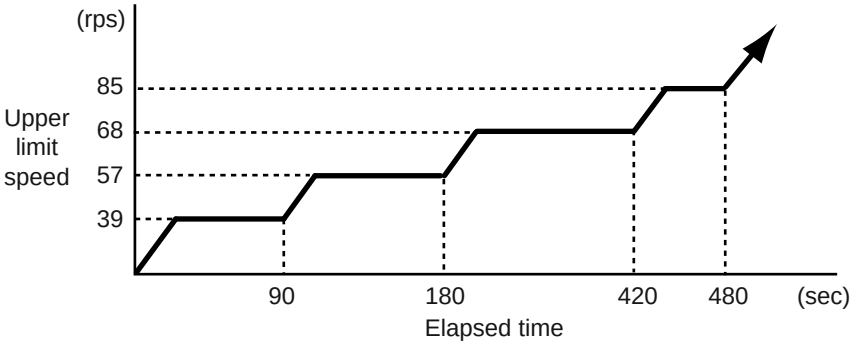
2. OPERATION FREQUENCY CONTROL AT START UP

The compressor frequency soon after the start-up is controlled as shown in Fig.9.

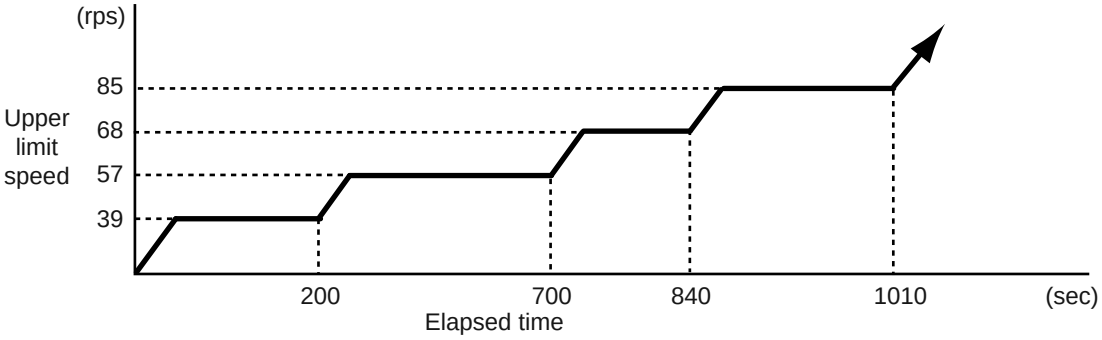
(Fig.9 : Compressor Control at Start-up)

< Normal start-up >

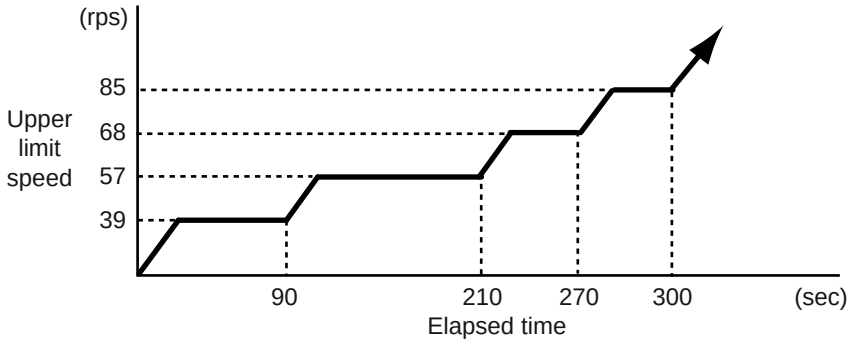
Immediate start-up after power-ON (cooling)



Immediate start-up after power-ON (Hearting Ta < 10℃)



Immediate start-up after power-ON (Hearting Ta ≧ 10℃)



Ta : Outdoor temperature

1-8. TIMER OPERATION CONTROL

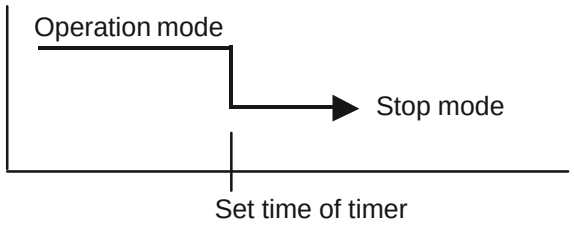
1-8-1 Wired Remote Controller (with AU, AR model)

AR-WAE1E

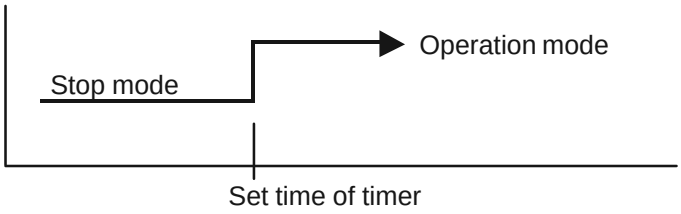
- ON / TIMER
- OFF / TIMER
- WEEKLY TIMER
- TEMPERATURE SET BACK TIMER

1. ON / OFF TIMER

・OFF timer : When the clock reaches the set time, the air conditioner will be turned off.



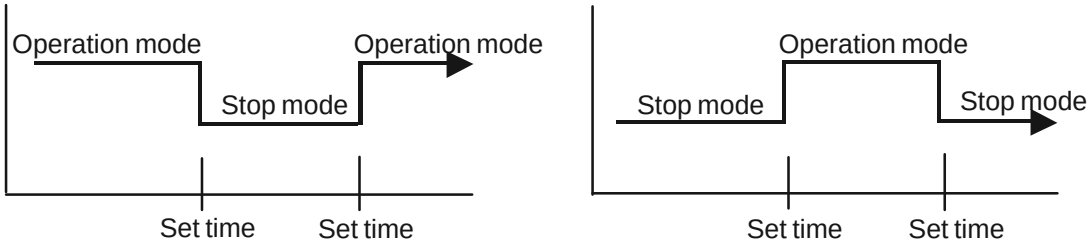
・ON timer : When the clock reaches the set time, the air conditioner will be turned on.



2. WEEKLY TIMER

2-1. WEEKLY TIMER

・Use this timer function to set operating time for each day of the week.
・The weekly timer allows up to two ON and OFF time to set up per day.

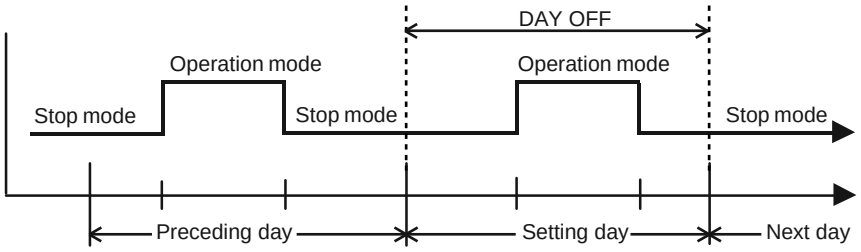


・The operating time can be set in 30 min increments only.
・The OFF time can be carried over to next day.
・The ON timer and the OFF timer functions cannot be set with using the weekly timer. Both ON and OFF time must be set.

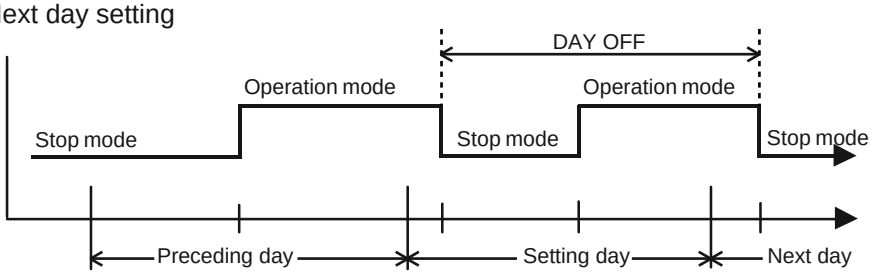
2-2. DAY OFF setting

- The DAY OFF setting is only available for days for which weekly settings already exist.
- If the operating time carries over to the next day (during a next day setting), the effective DAY OFF range will be set as shown below.

- Normal



- Next day setting

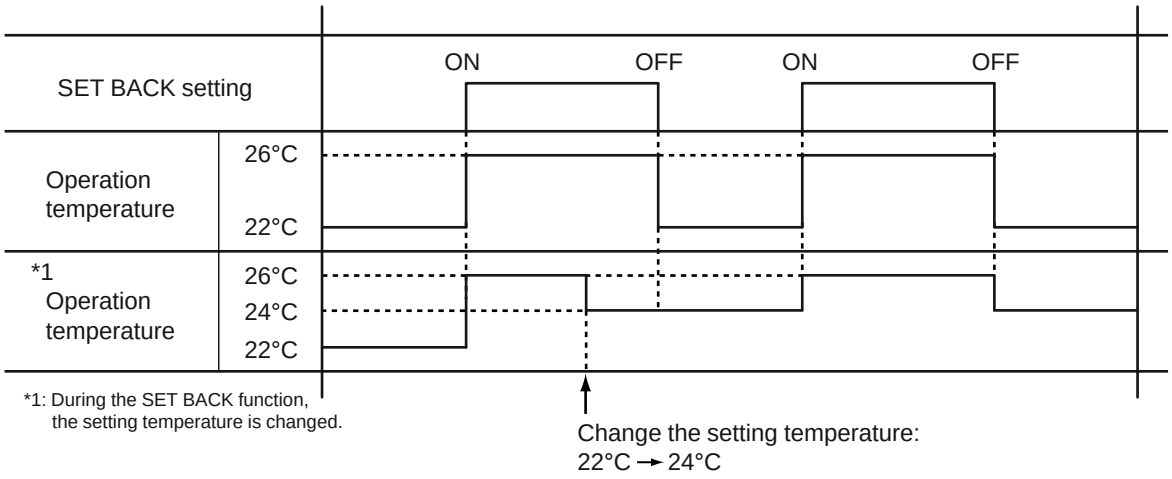


- The DAY OFF setting can only be set one time. The DAY OFF setting is cancelled automatically after the set day has passed.

3. 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 the COOL/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)



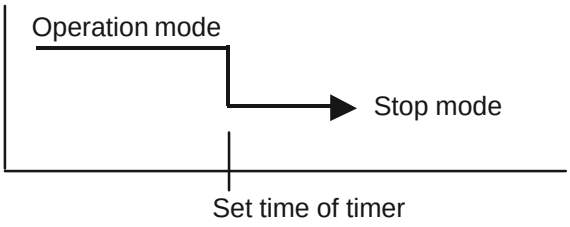
1-8-2 Wireless Remote Controller (with AB model)

AR- RAH2E

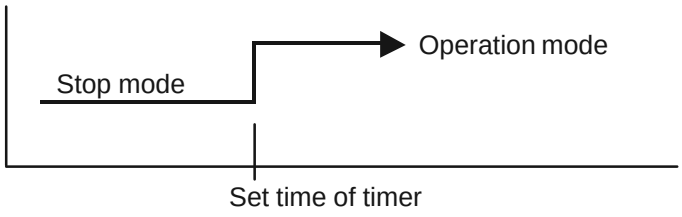
- ON / TIMER
- OFF / TIMER
- PROGRAM TIMER
- SLEEP TIMER

1. ON / OFF TIMER

・OFF timer : When the clock reaches the set time, the air conditioner will be turned off.

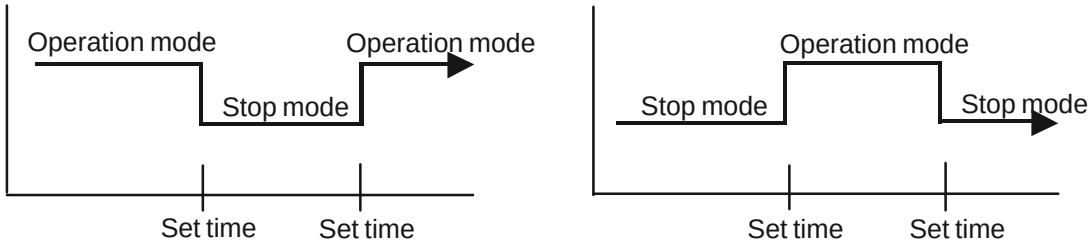


・ON timer : When the clock reaches the set time, the air conditioner will be turned on.



2. PROGRAM TIMER

・The program timer allows the OFF timer and ON timer to be used in combination one time.



・Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current timer setting.
The order of operations is indicated by the arrow in the remote control unit's display.

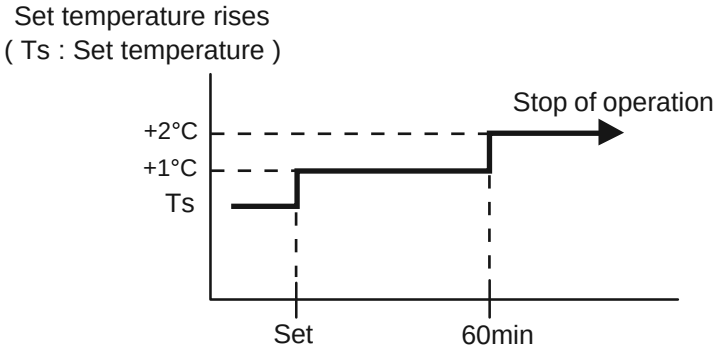
・SLEEP timer operation cannot be combined with ON timer operation.

3. 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.

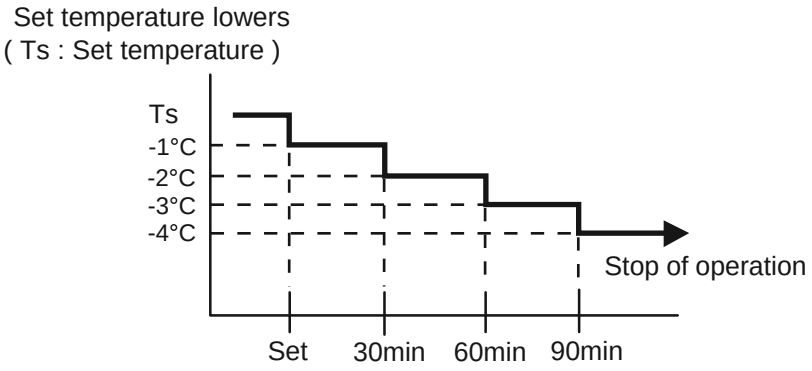
In the COOLING operation mode

When the sleep timer is set, the setting temperature is increased 1 degC.
It increases the setting temperature another 1 degC after 1 hour.
After that, the setting temperature is not changed and the operation is stopped at the time of timer setting.



In the HEATING operation mode

When the sleep timer is set, the setting temperature is decreased 1 degC.
It decreases the setting temperature another 1 degC every 30 minutes.
Upon lowering 4 degC, the setting temperature is not changed and the operation stops at the time of timer setting.



1-9. 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 following values.
The compressor frequency, the temperatures detected by the discharge temperature sensor, the indoor heat exchanger sensor, the outdoor heat exchanger sensor, and the outdoor temperature sensor.

(1) Pulse range of EEV

	Operation	Pulse range
AO* G45LETL AO* G54LETL	Cooling / Dry	53~480 pulse
	Heating	

(2) The EEV is set up at 480 pulses when the compressor is stopped.

(3) Initialization (Input of 528 pulses toward closing direction) is operated under the following condition.

* When the power is turned on.
* 4 hours has passed since the last initialization, and 3 minutes has passed after the compressor stop. (If 12 hours has passed since the last initialization, the compressor is compulsorily stopped.)

1-10. TEST OPERATION CONTROL

▪ With Wired Remote Controller

Under the condition where the air conditioner stops, press the MASTER CONTROL button and the FAN CONTROL button simultaneously for 2 seconds or more, and the test operation control mode will appear.
During test running, "01" will display on the remote controller display.
Set the test operation mode, and the compressor will continue to run regardless of whatever the room temperature sensor detects.
The test operation mode is released if 60 minutes have passed after setting up the test operation.

▪ With Wireless Remote Controller

Under the condition where the air conditioner runs, press the TEST RUN button, and the test operation control mode will appear.
During test running, the Operation LED and Timer LED of the air conditioner body blinks simultaneously.
Set the test operation mode, and the compressor will continue to run regardless of whether the room temperature sensor detects.
The test operation mode is released if 60 minutes have passed after setting up the test operation.

1-11. PREVENT TO RESTART FOR 3 MINUTES (3 MINUTES ST)

The compressor won't enter operation status for 3 minutes after the compressor is stopped, even if any operation is given.

1-12. 4-WAY VALVE EXTENSION SELECT

At the time when the air conditioner is switched from the cooling mode to heating mode, the compressor is stopped, and the 4-way valve is switched in 3 minutes later after the compressor stopped.

1-13. AUTO RESTART

When the power was interrupted by a power failure, etc. during operation, the operation contents at that time are memorized and when power is recovered, operation is automatically resumed with the memorized operation contents.
When the power is interrupted and recovered during timer operation, timer operation is canceled, but only setting time is memorized.

[Operation contents memorized when the power is interrupted]

- Operation mode
- Set temperature
- Set air flow
- Timer mode and timer time (Set by wireless remote controller)
- 10°C HEAT (Wireless remote controller is in use)
- ECONOMY

1-14. PUMP DOWN

⚠ WARNING

Never touch electrical components such as the terminal blocks except the button on the display board. It may cause a serious accident such as electric shock.

During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping.
Do not remove the connection pipe while the compressor is in operation with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

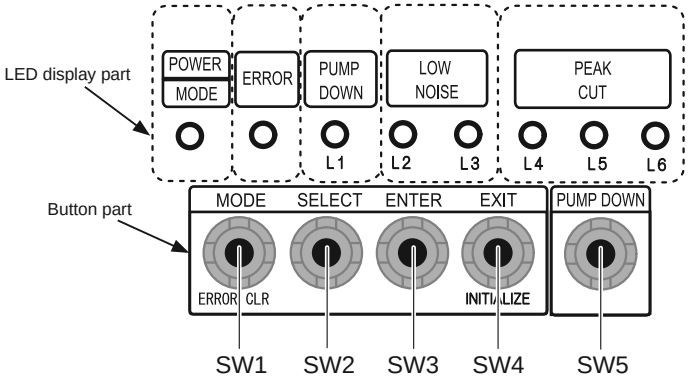
⚠ CAUTION

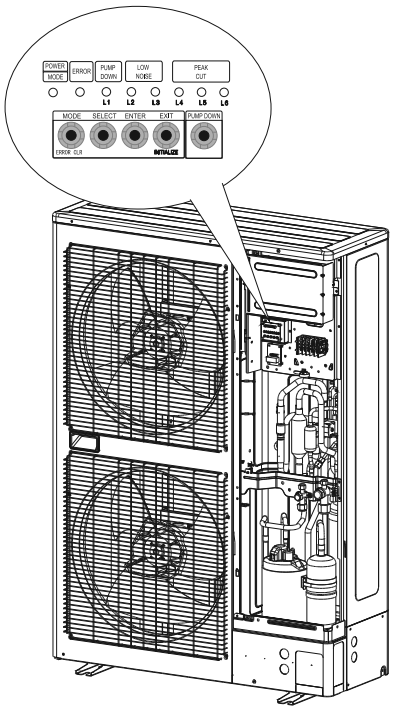
Perform the pump down operation before disconnecting any refrigerant pipe or electric cable.

Collect refrigerant from the service port or the 3-way valve if pump down cannot be performed.

In case of a group control system installation, do not turn the power off pump down is completed in all outdoor units.
(Group control system installation described in "SPECIAL INSTALLATION METHODS" in the installation manual of the indoor unit.)

- Operate [PUMP DOWN] button on the display board in the manner described below.





14.1. Preparation for pump down

- Confirm that the power is off, and then open the service panel

14.2. Pump down procedure

(1) Check the 3-way valves (both the liquid side and gas side) are opened.

(2) Turn the power on.

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	○	○	○	○	○	○	○

Sign "○": Lights off, "●": Lights on

(3) Press [PUMP DOWN] button for 3 seconds or more after 3 minutes after power on.

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	○	●	○	○	●	●	●

Sign "○": Lights off, "●": Lights on

LED display lights on as shown in the above figure, and the fans and the compressor start operating.

- If the [PUMP DOWN] button is pressed while the compressor is operating, the compressor will stop, then start again in about 3 minutes.

(4) LED display will change as shown below about 3 minutes after the compressor starts. Fully close the 3-way valve on the liquid pipe side at this stage.

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	○	●	○	○	○	●	●

Sign "○": Lights off, "●": Lights on

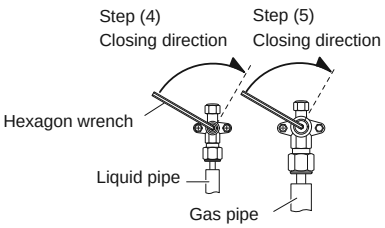
- If the valve on the liquid pipe side is not closed, the pump down cannot be performed.

(5) When LED display changes as shown in the below figure, close the 3-way valve on the gas pipe side tightly.

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	○	●	○	○	○	○	●

Sign "○": Lights off, "●": Lights on

- If the valve on the gas pipe side is not closed, refrigerant may flow into the piping after the compressor stops.



(6) LED display changes after 1 minute as shown in the figure below

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	○	●	○	○	○	○	○

Sign "○": Lights off, "●": Lights on

Fans and compressor stop automatically.

- If the pump down is successfully completed (the above LED display is shown), the outdoor unit remains stopped until the power is turned off.

(7) Turn the power off.

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
○	○	○	○	○	○	○	○

Sign "○": Lights off

PUMP DOWN is completed.

(Note)

- To stop pump down, press the [PUMP DOWN] button again.
- To start the pump down again after the compressor is automatically stopped due to an error, turn the power off and open the 3-way valves. Wait 3 minutes, turn the power on and start the pump down again.
- When starting the operation after completion of the pump down, turn the power off, and then open the 3-way valves. Wait 3 minutes, turn the power on and perform a test run in the "COOL" operation mode.
- If an error occurs, recover the refrigerant from service port.

1-15. COMPRESSOR PREHEATING

When the outdoor temperature is lower than 20°C and the all operation mode has been stopped for 30 minutes, power is applied to the compressor and the compressor is heated. (By heating the compressor, warm air is quickly discharged when operation is started.) When operation was started and when the outdoor temperature rises to 26°C or greater, preheating is ended.

1-16. 10°C HEAT OPERATION (For AB type)

10°C HEAT operation functions by pressing 10°C HEAT button on the remote controller. 10°C HEAT operation is almost the same operation as below settings.

(Table8)

Mode	Heating
Setting temperature	10°C
Fan mode	AUTO

1-17. ECONOMY OPERATION

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

(Table9)

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

1-18. DEFROST OPERATION CONTROL

1. CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts as shown in the following Table 10, 11, and 12.

(Table 10 : Condition of 1st defrost operation)

	Compressor integrating operation time		
1st defrost after starting operation	Less than 22 minutes	More than 22 minutes	More than 62 minutes
	Does not operate	Outdoor heat exchanger temperature Below -9°C	Outdoor heat exchanger temperature Below -5°C

(Table 11 : Condition of 2nd defrost operation)

	Compressor integrating operation time	
From 2nd and later defrost after starting operation	Less than 35 minutes	More than 35 minutes
	Does not operate	Outdoor heat exchanger temperature Below -10°C

(Table 12 : Condition of Integrating defrost operation)

	Compressor integrating operation time	
Integratingdefrost (Constant monitoring)	More than 240 minutes (For long continuous operation)	Less than 10 minutes * (For intermittent operation)
	Outdoor heat exchanger temperature Below -3°C	OFF count of the compressor 40 times

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

2. CONDITION OF THE DEFROST OPERATION COMPLETION

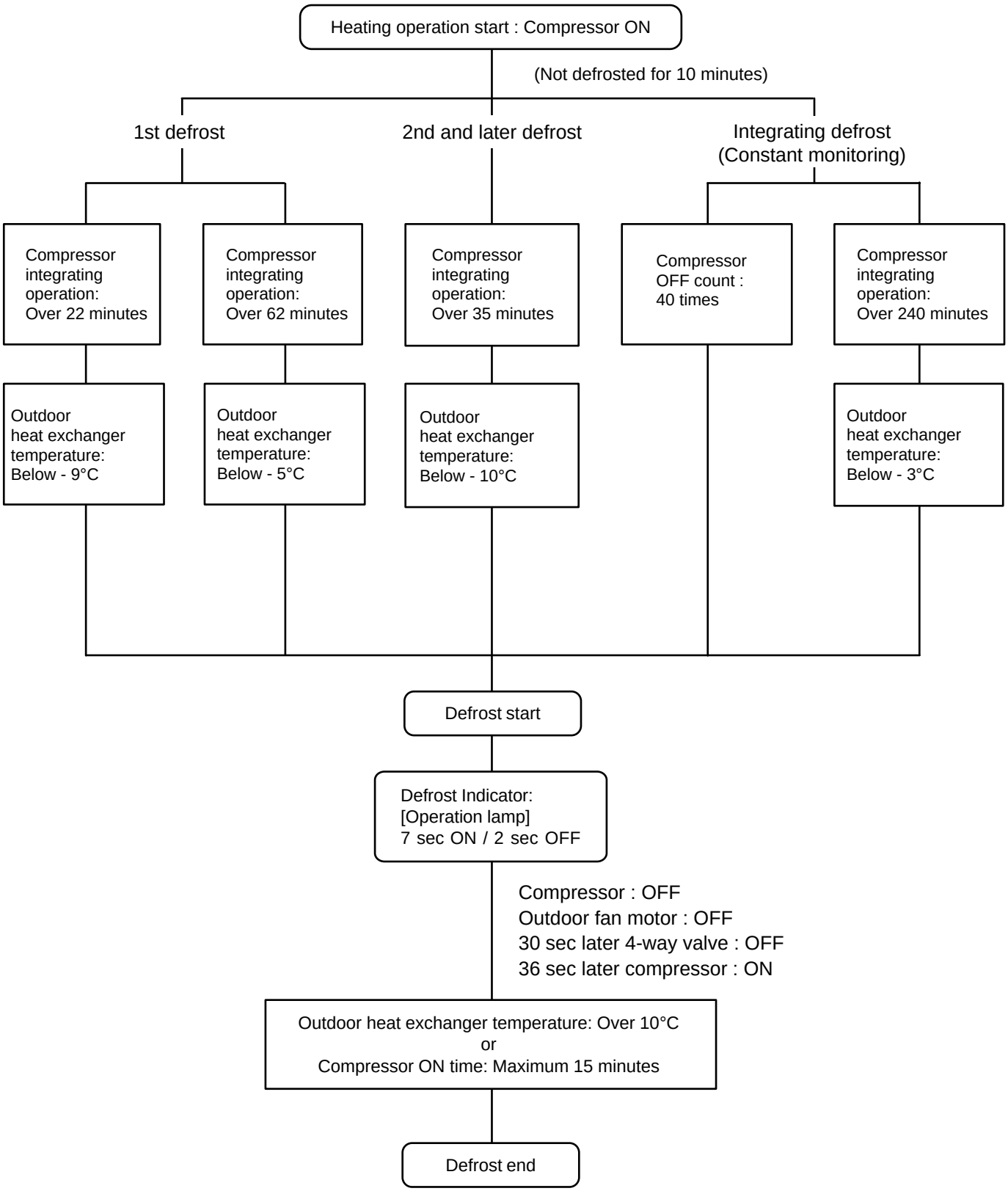
Defrost operation is released when the conditions becomes as shown in Table 13.

(Table 13 : Condition of defrost release)

Release Condition
Outdoor heat exchanger temperature is higher than 10°C or Compressor operation time has passed 15 minutes.

3. Defrost Flow Chart

The defrosting shall proceed by the integrating operation time, outdoor temperature and outdoor heat exchanger temperature as follows.



1-19. OFF DEFROST OPEARTION CONTROL

When operation stops in the [Heating operation] mode, if frost is adhered to the outdoor unit heat exchanger, the defrost operation will proceed automatically. In this time, if indoor unit operation lamp flashes slowly (7 sec ON / 2 sec OFF), the outdoor unit will allow the heat exchanger to defrost, and then stop.

1. OFF DEFROST OPERATION CONDITION

In heating operation, the outdoor heat exchanger temperature is less than -4°C,
and compressor operation integrating time lasts for more than 30 minutes,
and compressor operation contiguous time lasts for more than 10 minutes.

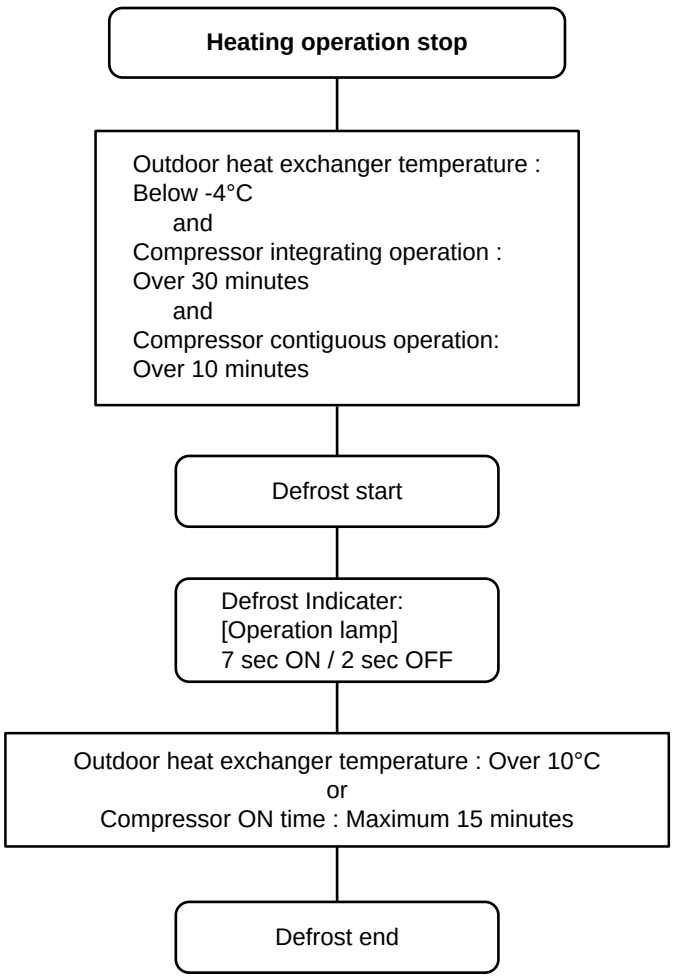
2. OFF DEFROST RELEASE CONDITION

OFF defrost operation is released when the conditions becomes as shown in Table 14.

(Table 14 : OFF Defrost Release Condition)

Release Condition
Outdoor heat exchanger temperature is higher than 10°C or Compressor operation time has passed 15 minutes.

OFF Defrost Flow Chart



1-20. VARIOUS PROTECTIONS

1. DISCHARGE GAS TEMPERATURE OVERRISE PREVENSION CONTROL

The discharge gas thermosensor (discharge thermistor : Outdoor side) will detect discharge gas temperature.

When the discharge temperature becomes higher than Temperature Ⅰ,the compressor frequency is decreased 14rps, and it continues to decrease the frequency for 14rps every 120 seconds until the temperature becomes lower than TemperatureⅡ.

When the discharge temperature becomes lower than Temperature Ⅱ, the control of the compressor frequency is released.

When the discharge temperature becomes higher than Temperature Ⅲ,the compressor is stopped and the indoor unit LED starts blinking.

(Table15 : Discharge Temperature Over Rise Prevension Control / Release Temperature)

Temperature Ⅰ	TemperatureⅡ	TemperatureⅢ
104°C	101°C	110°C

2. CURRENT RELEASE CONTROL

The compressor frequency is controlled so that the outdoor unit input current does not exceeds the current limit value that was set up with the outdoor temperature.
The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 16 : Current Release Operation Value / Release Value)

[Heating]

<table>
<tr><td rowspan="2"></td><td colspan="9">Outdoor unit fan speed (rpm)</td></tr>
<tr><td>900/880</td><td>850/830</td><td>780/750</td><td>720/700</td><td>570/550</td><td>500/480</td><td>370/350</td><td>300/280</td><td>220/200</td></tr>
<tr><td>T0 ≧ 20°C</td><td colspan="9">14.5/14.0</td></tr>
<tr><td>20°C > T0 ≧ 12°C</td><td colspan="9">16.5/16.0</td></tr>
<tr><td>T0 < 12°C</td><td colspan="6">19.5/19.0</td><td colspan="3"></td></tr>
</table>

T0: Outdoor temperature

[Cooling]

<table>
<tr><td rowspan="2"></td><td colspan="10">Outdoor unit fan speed (rpm)</td></tr>
<tr><td>850/800</td><td>780/750</td><td>750/700</td><td>540/520</td><td>360/340</td><td>290/270</td><td>480/ 0</td><td>400/ 0</td><td>350/ 0</td><td>280/ 0</td></tr>
<tr><td>T0 ≧ 50°C</td><td colspan="2">12.5/12.0</td><td colspan="2">6.5/ 6.0</td><td colspan="8" rowspan="2">5.0/ 4.5</td></tr>
<tr><td>50°C > T0 ≧ 46°C</td><td>13.5/13.0</td><td rowspan="2"></td><td colspan="2">9.0/ 8.5</td></tr>
<tr><td>46°C > T0 ≧ 40°C</td><td>16.5/16.0</td><td colspan="2">10.0/ 9.5</td><td colspan="2">9.0/ 8.5</td><td colspan="4" rowspan="5">6.0/ 5.5</td></tr>
<tr><td>40°C > T0 ≧ 38°C</td><td rowspan="8">19.5/19.0</td><td rowspan="2">17.5/17.0</td><td rowspan="8">16.5/16.0</td><td>13.5/13.0</td><td rowspan="2">10.0/ 9.5</td></tr>
<tr><td>38°C > T0 ≧ 31°C</td><td>14.5/14.0</td></tr>
<tr><td>31°C > T0 ≧ 19°C</td><td rowspan="7">19.0/18.5</td><td>15.0/14.5</td><td rowspan="3">11.0/10.5</td><td>10.0/ 9.5</td></tr>
<tr><td>19°C > T0 ≧ 13°C</td><td rowspan="2">15.5/15.0</td><td rowspan="2">10.5/10.0</td></tr>
<tr><td>13°C > T0 ≧ 7°C</td><td>13.5/13.0</td></tr>
<tr><td>7°C > T0 ≧ 0°C</td><td colspan="2" rowspan="3">16.0/15.5</td><td>12.5/12.0</td></tr>
<tr><td>0°C > T0 ≧ -5°C</td><td colspan="2">14.5/14.0</td><td>12.0/11.5</td><td>10.0/ 9.5</td></tr>
<tr><td>-5°C > T0 ≧ -10°C</td><td colspan="2">15.5/15.0</td><td rowspan="2">12.5/12.0</td><td>11.5/11.0</td></tr>
<tr><td>-10°C >T0 ≧ -15°C</td><td colspan="2"></td><td rowspan="2">8.0/ 7.5</td></tr>
<tr><td>T0 < -15°C</td><td colspan="4"></td><td colspan="2">13.0/12.5</td></tr>
</table>

T0: Outdoor temperature

3. ANTIFREEZING CONTROL (Cooling and Dry mode)

The compressor frequency is decrease on cooling & dry mode when the indoor heat exchanger temperature sensor detects the temperature lower than Temperature Ⅰ.
Then, the anti-freezing control is released when it becomes higher than Temperature Ⅱ.

(Table 17 : Anti-freezing Protection Operation / Release Temperature)

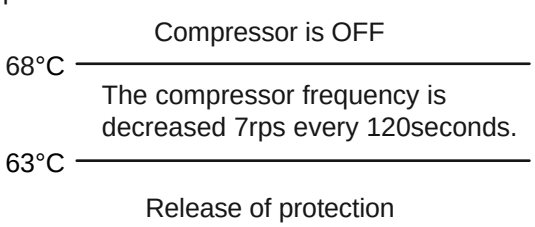
Outdoor temperature	Temperature Ⅰ	Temperature Ⅱ
Over than 10°C *1 or 12°C *2	4°C	7°C
Less than 10°C *1 or 12°C *2		13°C

*1. When the temperature rises.
*2. When the temperature drops.

4. COOLING PRESSURE OVER RISE PROTECTION

On cooling mode, the compressor frequency is controlled as following based on the detection value of the outdoor heat exchanger temperature sensor.

(Fig.10 : Cooling Pressure Over Rise Protection Control)



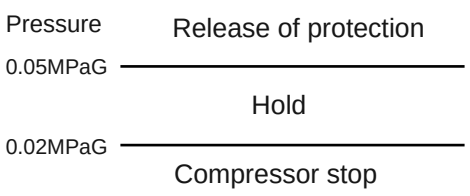
5. LOW PRESSURE PROTECTION CONTROL (For Cooling mode)

5-1. Low Pressure Protection 1

<After the compressor start-up and 1 minute has passed>

(a).The detected value of pressure sensor is 0.02MPaG or less, continues for 5 minutes, the compressor is stopped.
(b). When 7 minutes has passed and low pressure sensor detects value is more than 0.05MPaG after the protection stop by (a), the compressor restarts.
(c).When the protection (a) operates 5 times within 2 hours after the restart by (b),
the error is displayed and the compressor stops. **[Permanent stop]**

(Fig 11 : Low pressure protection 1)

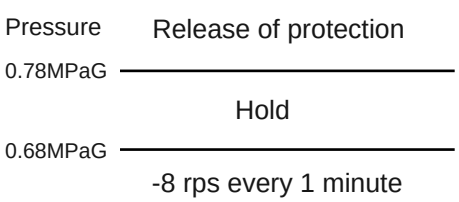


5-2. Low Pressure Protection 2

<After the compressor start-up and 10 minutes has passed>

(a).When the low pressure value becomes 0.68MPaG or less continues for 1 minute, the compressor speed -8 rps.
(b). When the low pressure value becomes 0.68MPaG or less after the protection (a), the compressor continues speed -8 rps every 1 minute until the detected value becomes more than 0.68MPaG.
(c). When the low pressure value becomes more than 0.78MPaG, this protection is released.

(Fig 12 : Anti freezing protection)

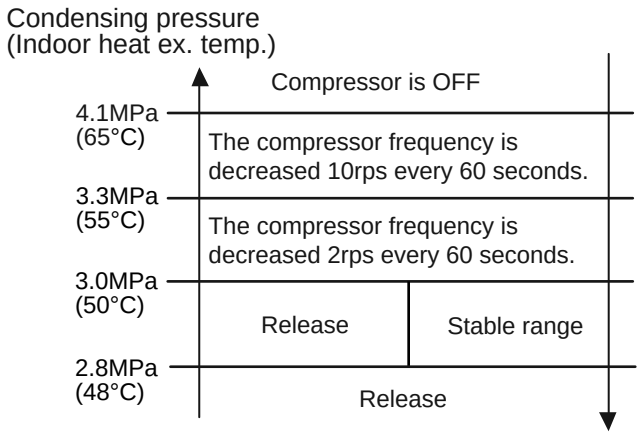


6. HEATING OVERLOAD PROTECTION

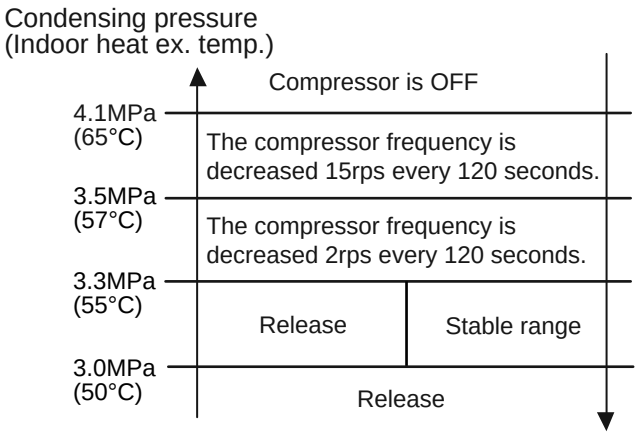
On heating mode, the compressor frequency is controlled as following based on the detection value of the pressure sensor.

(Fig.13 : Heating Overload Protection Control)

[AR*G45/54LHTA]



[Other models]



1-21. COMPRESSOR STOP CONTROL

When the detection value of outdoor temperature sensor is lower than temperature I in the table below, the compressor is stopped.

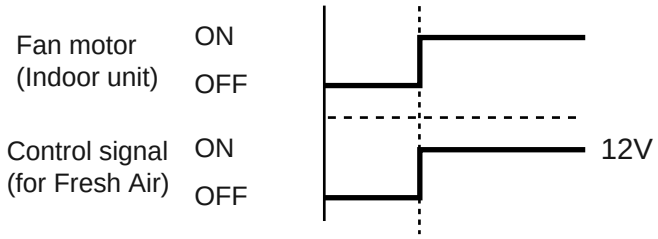
(Table 18 : Operation temperature of compressor stop control)

	Temperature I	
	Cooling	Heating
Operation temperature	- 20°C	———

1-22. FRESH AIR CONTROL

The fan motor for Fresh Air is operated in synchronization with the indoor fan operation as shown in Fig.14.

(Fig.14 : Fresh Air control)

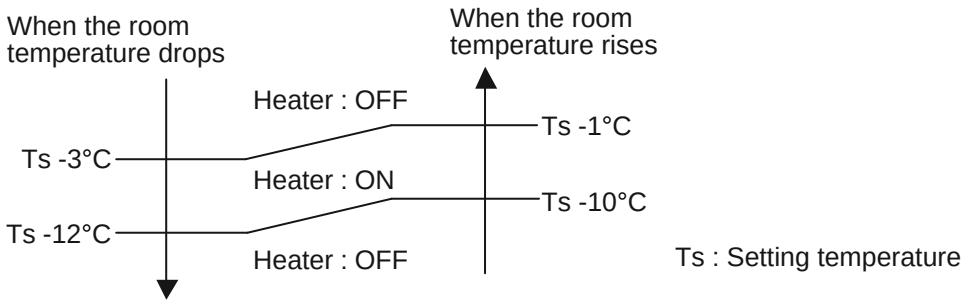


1-23. EXTERNAL ELECTRICAL HEATER CONTROL (For AR type)

The External Electrical Heater operates when it meets all the following conditions.

- Model type : Heat pump
- Operation mode : Heating mode
- Compressor : ON
- Indoor fan : ON

(Fig 15 : External Electrical Heater control)



1-24. LOW NOISE OPERATION

The compressor speed and the outdoor unit fan speed are limited to reduce the operation noise by External Input.
During the LOW NOISE OPERATION,
"CURRENT OVERLOAD OPERATION", "ECONOMY OPERATION" and "PEAK CUT OPERATION" are effective, and the outdoor unit operates by lowest current of them.
However, during the DEFROST OPERATION, the compressor operates by the speed for DEFROST OPERATION.

(Table 19 : Detail of Low Noise Operation)

Low Noise mode		Outdoor fan speed (Upper / Lower) [rpm]	Compressor speed [rps]	
			AO*G45L	AO*G54L
LEVEL 1	Cooling	540 / 520	68	75
	Heating	570 / 550	75	85
LEVEL 2	Cooling	540 / 520	54	58
	Heating	570 / 550	62	68
LEVEL 3	Cooling	540 / 520	48	48
	Heating	570 / 550	54	54

*The performance drops when operating in the LOW NOISE OPERATION.

1-25. PEAK CUT OPERATION

The Current Value is limited to reduce the power consumption by External Input.
During the PEAK CUT OPERATION,
"CURRENT OVERLOAD OPERATION", "ECONOMY OPERATION" and "LOW NOISE OPERATION" are effective, and the outdoor unit operates by lowest current of them.
However, this function becomes invalid during DEFROST OPERATION.

(Table 20 : Outline of Peak Cut Operation)

PEAK CUT LEVEL	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Peak Cut For Rated Capacity	Forced thermostat-OFF	50%	75%	100%

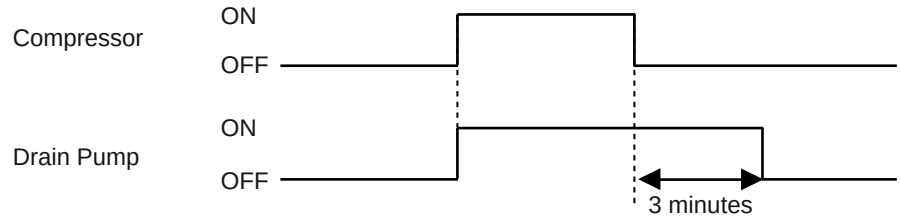
*Percentage is rated electrical power ratio.

1-26. DRAIN PUMP OPERATION (For AU/ AR type)

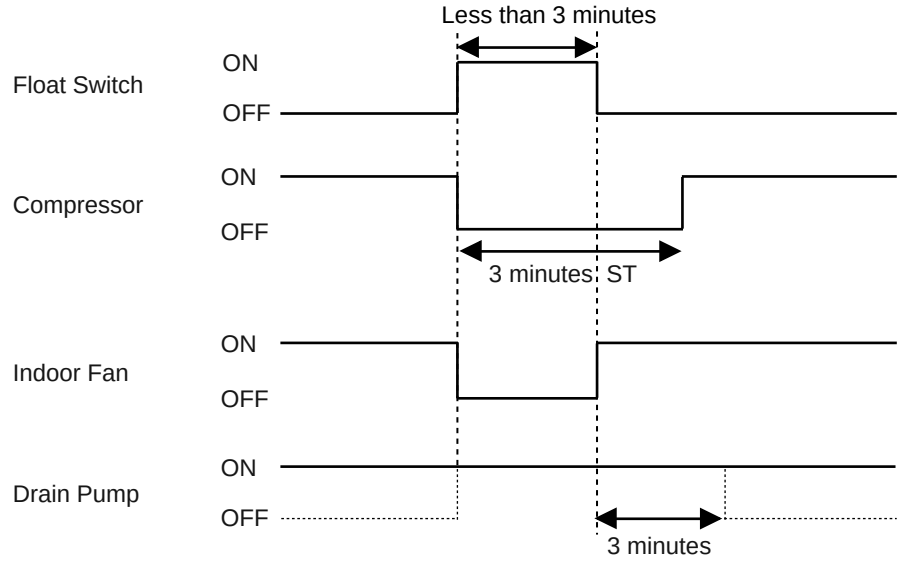
· During Cooling / Dry mode

1. When the compressor starts, the drain pump starts simultaneously.
2. The drain pump operates continuously for 3 minutes after the compressor is turned off.
3. When the compressor stops by the "Anti- freezing protection", the drain pump is turned off in 1 hour after the compressor stops.
4. When the water level in the drain pan rises up and then the float switch functions:
   ① The compressor, indoor and outdoor fan motor operation are stopped.
   ② Drain pump operates continuously for 3 minutes after the float switch is turned off. (Almost condensing water may be drained)
   ③ The indoor unit fan motor operates after the float switch is turned off.
5. When the float switch turns ON continuously for 3 minutes, "FAILURE INDICATION" operates. (It is necessary to turn off power for release it.)
6. When the float switch turns OFF less than 3 minutes, the unit starts Cooling operation.

(Fig 16 : Detail of Drain Pump Operation)



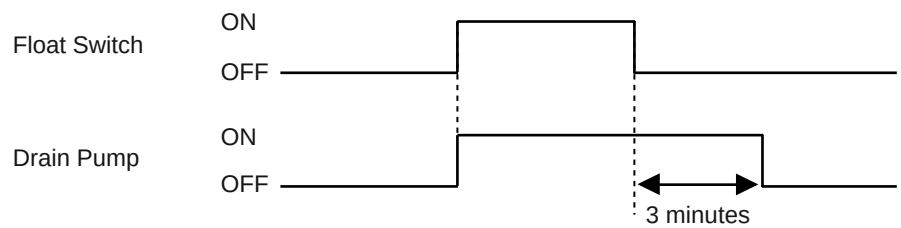
<Float Switch turns OFF less than 3 minutes>



· During Heating / Fan mode / Stop operation

1.When the water level in the drain pan rises up and then the float switch functions:
   ① Drain pump operates continuously for 3 minutes after the float switch is turned off. (Almost condensing water may be drained)

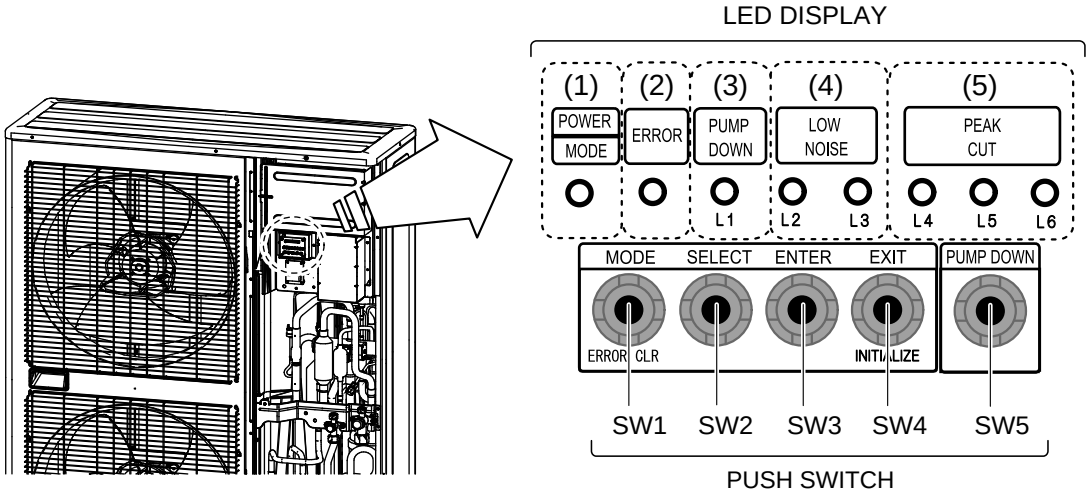
2. When the float switch turns ON continuously for 3 minutes, "FAILURE INDICATION" operates. Thereafter, even if the float switch turns OFF, the "FAILURE INDICATION" is not released. (It is necessary to turn off power for release it.)



1-27. DESCRIPTION OF DISPLAY UNIT

1-27-1 Layout of Display Unit

・Various settings can be adjusted by changing Push switches on the board of the outdoor unit.
(Excerpt from the "INSTALATION MANUAL")



Display lamp		Function or operation method
(1) POWER / MODE	Green	Lights on while power on. Local setting in outdoor unit or error code is displayed with blink.
(2) ERROR	Red	Blinks during abnormal air-conditioner operation.
(3) PUMP DOWN (L1)	Orange	Lights on during pump down operation.
(4) LOW NOISE MODE (L2, L3)	Orange	Lights on during “Low noise” mode when local setting is activated. (Lighting pattern of L2 and L3 indicates low noise level)
(5) PEAK CUT (L4, L5, L6)	Orange	Lights on during “Peak cut” mode when local setting is activated. (Lighting pattern of L4, L5 and L6 indicates peak cut level)

Switch		Function or operation method
MODE	SW1	To switch between “Local setting” and “Error code display”.
SELECT	SW2	To switch between the individual “Local settings” and the “Error code displays”.
ENTER	SW3	To fix the individual “Local settings ” and the “Error code displays”.
EXIT / INITIALIZE	SW4	To return to “Operation status display”.
PUMP DOWN	SW5	To start the pump down operation.

1-27-2 Display mode

• In this mode, the "Operation Condition" and "Error Code" can be displayed by Push Switch on outdoor unit PCB

(Table :21 Procedure for Present Value) ○ : Light OFF ● : Light ON ◑ : Blinking ◆1 : 1 Time Blinking

Procedure	Operation	Power / Mode	Error	L1	L2	L3	L4	L5	L6
1	During status display, press the MODE SWITCH 1 time. (Status display : Outdoor unit is stopping and no error)	◆1	○	○	○	○	○	○	○
2	When the POWER / MODE LED blinking 1 time, press the ENTER SWITCH.	◆1	○	○	○	◑	○	○	○
3	Press the SELECT SWITCH and adjust to DISPLAY ITEM (from L1 to L3) that you want to confirm. (Refer to Table : 22)	◆1	○	○	◑	○	○	○	○
4	Press the ENTER SWITCH. (Data is displayed by lighting LED. Refer to Table : 23)	◆1	○	○	●	○	DATA		
5	Selecting display items can be done by pressing the SELECT SWITCH. (Return to Procedure 3)	◆1	○	○	◑	○	○	○	○
	When the EXIT SWITCH is pressed, this mode ends and returns to the status display.	●	○	○	○	○	○	○	○

(Table :22 Display pattern) ○ : Light OFF ● : Light ON ◑ : Blinking ◆n : n Time Blinking

Power / Mode LED	**Display Item**	**LED**			
		ERROR	L1	L2	L3
Present Value Of Each Item ◆1	Compressor frequency	○	○	○	●
	Upper fan speed (Outdoor unit)	○	○	●	○
	Lower fan speed (Outdoor unit)	○	○	●	●
	EEV pulse	○	●	○	○
	Pressure sensor value (Low pressure range)	○	●	○	●
	Pressure sensor value (High pressure range)	○	●	●	○
	Outdoor air temperature sensor value	○	●	●	●
	Discharge temperature sensor value	●	○	○	○
	Heat-exchanger temperature sensor value (Middle)	●	○	○	●
	Current value	●	○	●	○
	Compressor accumulated time	●	○	●	●

(Table 23 : Detail of LED Display Data)　　○ : Light OFF　● : Light ON　◆1 : 1 Time Blinking

Item No,	Display Item		Power Mode	Error	L1	L2	L3	L4	L5	L6
1	Compressor Frequency (0 ~ 95rps)	0	◆1	○	○	○	●	○	○	○
		1 ~ 15	◆1	○	○	○	●	○	○	●
		16 ~ 30	◆1	○	○	○	●	○	●	○
		31 ~ 45	◆1	○	○	○	●	○	●	●
		46 ~ 60	◆1	○	○	○	●	●	○	○
		61 ~ 75	◆1	○	○	○	●	●	○	●
		76 ~ 90	◆1	○	○	○	●	●	●	○
		90 ~ 95	◆1	○	○	○	●	●	●	●
2	Outdoor Unit Upper Fan Speed (0 ~ 900rpm)	0	◆1	○	○	●	○	○	○	○
		1 ~ 150	◆1	○	○	●	○	○	○	●
		151 ~ 300	◆1	○	○	●	○	○	●	○
		301 ~ 450	◆1	○	○	●	○	○	●	●
		451 ~ 600	◆1	○	○	●	○	●	○	○
		601 ~ 750	◆1	○	○	●	○	●	○	●
		751 ~ 900	◆1	○	○	●	○	●	●	○
		901 ~	◆1	○	○	●	○	●	●	●
3	Outdoor Unit Lower Fan Speed (0 ~ 900rpm)	0	◆1	○	○	●	●	○	○	○
		1 ~ 150	◆1	○	○	●	●	○	○	●
		151 ~ 300	◆1	○	○	●	●	○	●	○
		301 ~ 450	◆1	○	○	●	●	○	●	●
		451 ~ 600	◆1	○	○	●	●	●	○	○
		601 ~ 750	◆1	○	○	●	●	●	○	●
		751 ~ 900	◆1	○	○	●	●	●	●	○
		901 ~	◆1	○	○	●	●	●	●	●
4	EEV Pulse (0 ~ 480pulse)	0	◆1	○	●	○	○	○	○	○
		1 ~ 80	◆1	○	●	○	○	○	○	●
		81 ~ 160	◆1	○	●	○	○	○	●	○
		161 ~ 240	◆1	○	●	○	○	○	●	●
		241 ~ 320	◆1	○	●	○	○	●	○	○
		321 ~ 400	◆1	○	●	○	○	●	○	●
		401 ~ 480	◆1	○	●	○	○	●	●	○
		481 ~	◆1	○	●	○	○	●	●	●
5	Pressure sensor value <Low pressure range> (0 ~ 2.1MPa)	~ 0.0	◆1	○	●	○	●	○	○	○
		0.01 ~ 0.3	◆1	○	●	○	●	○	○	●
		0.31 ~ 0.6	◆1	○	●	○	●	○	●	○
		0.61 ~ 0.9	◆1	○	●	○	●	○	●	●
		0.91 ~ 1.2	◆1	○	●	○	●	○	○	○
	Check the High Pressure Range if it is displayed [1.81 ~ 2.1]	1.21 ~ 1.5	◆1	○	●	○	●	●	○	●
		1.51 ~ 1.8	◆1	○	●	○	●	●	●	○
		1.81 ~ 2.1	◆1	○	●	○	●	●	●	●
6	Pressure sensor value <High pressure range> (2.1 ~ 4.2MPa)	~ 2.1	◆1	○	●	●	○	○	○	○
		2.11 ~ 2.4	◆1	○	●	●	○	○	○	●
		2.41 ~ 2.7	◆1	○	●	●	○	○	●	○
		2.71 ~ 3.0	◆1	○	●	●	○	○	●	●
		3.01 ~ 3.3	◆1	○	●	●	○	●	○	○
	Check the Low Pressure Range if it is displayed [~ 2.1]	3.31 ~ 3.6	◆1	○	●	●	○	●	○	●
		3.61 ~ 3.9	◆1	○	●	●	○	●	●	○
		3.91 ~ 4.2	◆1	○	●	●	○	●	●	●

○ : Light OFF ● : Light ON ◆1 : 1 Time Blinking

Item No,	Display Item		Power Mode	Error	L1	L2	L3	L4	L5	L6
7	Outdoor Air Temperature (-30 ~ 70°C)	~ -15	◆1	○	●	●	●	○	○	○
		-15 ~ -5	◆1	○	●	●	●	○	○	●
		-5 ~ 5	◆1	○	●	●	●	○	●	○
		5 ~ 15	◆1	○	●	●	●	○	●	●
		15 ~ 25	◆1	○	●	●	●	●	○	○
		25 ~ 35	◆1	○	●	●	●	●	○	●
		35 ~ 45	◆1	○	●	●	●	●	●	○
		45 ~	◆1	○	●	●	●	●	●	●
8	Discharge Temperature (-30 ~ 120°C)	~ 55	◆1	●	○	○	○	○	○	○
		55 ~ 65	◆1	●	○	○	○	○	○	●
		65 ~ 75	◆1	●	○	○	○	○	●	○
		75 ~ 85	◆1	●	○	○	○	○	●	●
		85 ~ 95	◆1	●	○	○	○	●	○	○
		95 ~ 105	◆1	●	○	○	○	●	○	●
		105 ~ 115	◆1	●	○	○	○	●	●	○
		115 ~	◆1	●	○	○	○	●	●	●
9	Heat-exchanger Temperature <Middle> (-30 ~ 80°C)	~ 53	◆1	●	○	○	●	○	○	○
		53 ~ 55	◆1	●	○	○	●	○	○	●
		55 ~ 57	◆1	●	○	○	●	○	●	○
		57 ~ 59	◆1	●	○	○	●	○	●	●
		59 ~ 61	◆1	●	○	○	●	●	○	○
		61 ~ 63	◆1	●	○	○	●	●	○	●
		63 ~ 65	◆1	●	○	○	●	●	●	○
		65 ~	◆1	●	○	○	●	●	●	●
10	Current (0 ~ 10A)	~ 0.0	◆1	●	○	●	○	○	○	○
		0.0 ~ 1.5	◆1	●	○	●	○	○	○	●
		1.5 ~ 3.0	◆1	●	○	●	○	○	●	○
		3.0 ~ 4.5	◆1	●	○	●	○	○	●	●
		4.5 ~ 6.0	◆1	●	○	●	○	●	○	○
		6.0 ~ 7.5	◆1	●	○	●	○	●	○	●
		7.5 ~ 9.0	◆1	●	○	●	○	●	●	○
		9.0 ~	◆1	●	○	●	○	●	●	●
11	Compressor Accumulated Time (H) <Round up by 1hour>	0	◆1	●	○	●	●	○	○	○
		0 ~ 10000	◆1	●	○	●	●	○	○	●
		10000 ~ 20000	◆1	●	○	●	●	○	●	○
		20000 ~ 30000	◆1	●	○	●	●	○	●	●
		30000 ~ 40000	◆1	●	○	●	●	●	○	○
		40000 ~ 50000	◆1	●	○	●	●	●	○	●
		50000 ~ 60000	◆1	●	○	●	●	●	●	○
		60000 ~	◆1	●	○	●	●	●	●	●

1-27-3 Error history mode

- In this mode, the history of abnormality that occurred in the past can be confirmed.

(Table : 24 Procedure for History Mode)

○ : Light OFF ● : Light ON ◑ : Blinking ◆2 : 2 Times Blinking ◆**n** : **n** Times Blinking

Procedure	Operation	Power / Mode	Error	L1	L2	L3	L4	L5	L6
1	During status display, press the MODE SWITCH 2 times. (Status display : Outdoor unit is stopping and no error)	◆2	○	○	○	○	○	○	○
2	When the POWER / MODE LED blinking 2 times, press the ENTER SWITCH.	◆2	○	○	○	◑	○	○	○
3	Press the SELECT SWITCH and adjust to DISPLAY ITEM (from L1 to L3) that you want to confirm. (Refer to Table : 25)	◆2	○	○	◑	○	○	○	○
4	Press the ENTER SWITCH, Error code is displayed by lighting LED. (Refer to Table : 26)	◆2	●	◆n	◆n	DATA			
5	Selecting display items can be done by pressingthe SELECT SWITCH. (Return to Procedure 3)	◆2	○	○	◑	○	○	○	○
	When the EXIT SWITCH is pressed, this mode ends and returns to the status display.	●	○	○	○	○	○	○	○

(Table :25 Display pattern) ○ : Light OFF ● : Light ON ◑ : Blinking ◆n : n Time Blinking

Power / Mode LED	**Display Item**	**LED**			
		ERROR	L1	L2	L3
Error Code ◆2	Newest error code	○	○	○	◑
	Error code before 1 time	○	○	◑	○
	Error code before 2 times	○	○	◑	◑

(Table : 26 Error Code) ○ : Light OFF ● : Light ON ◆2 : 2 Times Blinking ◆1 ~ ◆15 : 1~ 15 Times Blinking

Error Contents	Power / Mode	Error	L1	L2	L3	L4	L5	L6
Serial forward transfer error(after operation)	◆2	●	◆1	◆1	○	○	●	●
Serial forward transfer error(during operation)	◆2	●	◆1	◆1	○	●	○	○
Indoor Unit Error	◆2	●	◆5	◆15	○	○	○	●
Inverter Error	◆2	●	◆6	◆3	○	○	○	●
IPM Error	◆2	●	◆6	◆5	○	○	●	●
Discharge Thermistor Error	◆2	●	◆7	◆1	○	○	○	●
Compressor Thermistor Error	◆2	●	◆7	◆2	○	○	○	●
Heat Ex. Liquid Middle Thermistor Error	◆2	●	◆7	◆3	○	○	●	○
Heat Ex. Liquid Outlet Thermistor Error	◆2	●	◆7	◆3	○	○	●	●
Outdoor Thermistor Error	◆2	●	◆7	◆4	○	○	○	●
Heat Sink Thermistor Error	◆2	●	◆7	◆7	○	○	○	●
Current sensor Error	◆2	●	◆8	◆4	○	○	○	●
High Pressure Switch Error	◆2	●	◆8	◆6	○	●	○	○
Pressure sensor Error	◆2	●	◆8	◆6	○	●	●	○
Over Current Error	◆2	●	◆9	◆4	○	○	○	●
Compressor Control Error	◆2	●	◆9	◆5	○	○	○	●
Outdoor Unit Fan Motor 1 Error	◆2	●	◆9	◆7	○	○	●	●
Outdoor Unit Fan Motor 2 Error	◆2	●	◆9	◆8	○	○	●	●
4-way Valve Error	◆2	●	◆9	◆9	○	○	○	●
Discharge Temp. Error	◆2	●	◆10	◆1	○	○	○	●
Compressor Temp. Error	◆2	●	◆10	◆3	○	○	○	●
Low Pressure Error	◆2	●	◆10	◆5	○	○	○	●

1-27-4 ERROR CHECK MODE

• In this mode, abnormality that is occurring now can be confirmed.

(Table : 27 Procedure for Error Check Mode) ○ : Light OFF ● : Light ON ◆2 : 2 Times Blinking ◆**n** : **n** Times Blinking

Procedure	Operation	Power / Mode	Error	L1	L2	L3	L4	L5	L6
1	Check that the "ERROR" LED blinking (Hi-speed), and then short press the ENTER SWITCH 1 time.	●	Blinking Hi-speed	○	○	○	○	○	○
2	Error code is displayed by lighting LED. (Refer to Table : 26)	◆2	●	◆n	◆n	DATA			
3	When reset of the ERROR history, and then long press the MODE SWITCH.	◆2	◆2	◆2	◆2	◆2	◆2	◆2	◆2

※ After the error reset ,all LED is blinking and erased the all error history .
After this, ERROR LED is off and will normal display.

※ Confirm Chapter 2 " TROUBLE SHOOTING" in detail.

Refrigerant
R410A

Cassette/ Duct/ Ceiling type
INVERTER

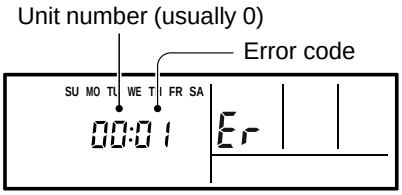
2 . TROUBLE SHOOTING

2-1 ERROR DISPLAY

2-1-1 INDOOR UNIT AND WIRED REMOTE CONTROLLER DISPLAY

1. SELF - DIAGNOSIS

When "Er" in Temperature Display is displayed, inspection of the air conditioning system is necessary. Please consult authoilzed service personnel.



ex. Self-diagnosis check

Error Contents	Error Code	Trouble shooting
Serial Communication Error	11	1,2
Wired Remote Controller Communication Error	12	3
Fan Motor Driving Circuit Error	39	4
Indoor Room Thermistor Error	41	5
Indoor Heat Ex. Thermistor Error	42	6
Indoor Unit Fan Motor1 Error	51	7
Drainage Error	53	8
Indoor Unit Fan Motor2 Error	59	9
Indoor Unit Error	5U	1- 9
Inverter Error	63	10
IPM Error	65	11
Discharge Thermistor Error	71	12
Compressor Thermistor Error	72	13
Heat Ex. Liquid Outlet Thermistor Error	73	14
Outdoor Thermistor Error	74	15
Heat Sink Thermistor Error	77	16

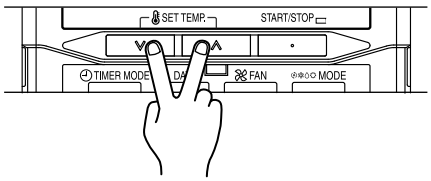
Error Contents	Error Code	Trouble shooting
Current sensor Error	84	17
Pressure sensor Error	86	18
Over Current Error	94	19
Compressor Control Error	95	20
Outdoor Unit Fan Motor 1 Error	97	21
Outdoor Unit Fan Motor 2 Error	98	22
4-way Valve Error	99	23
Discharge Temp. Error	A1	24
Compressor Temp. Error	A3	25
Low Pressure Error	A5	26

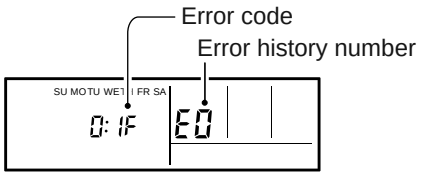
2. ERROR CODE HISTORY DISPLAY

Up to 16 memorized error codes may be displayed for the indoor unit connected to the remote controller.

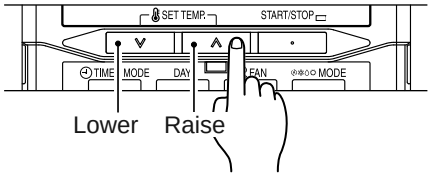
1. Stop the air conditioner operation.

2. Press the SET TEMPERATURE buttons ⩛, ⩓ simultaneously for 3 seconds or more to start the self-diagnosis.





3. Press the SET TEMPERATURE button to select the error history number.



0 ↔ 1 ↔ 2 ↔ 3 ↔ 4 ↔ 5 ↔ 6 ↔ 7
F ↔ E ↔ d ↔ c ↔ b ↔ A ↔ 9 ↔ 8

4. Press the SET TEMPERATURE buttons ⩛, ⩓ simultaneously for 3 seconds or more or there is no key input for 60 seconds to stop the display.

2-2 TROUBLE SHOOTING WITH ERROR CODE

Trouble shooting 1 **OUTDOOR UNIT Error Method:** **Serial Communication Error** **(Serial Reverse Transfer Error)**	**Indicate or Display:** **Refer to error code table.**
Detective Actuators: Outdoor unit Main PCB Outdoor unit Fan motor	**Detective details:** 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. Active filter module failure
5. Transistor PCB (IPM) failure 6. Filter PCB failure 7. Outdoor unit Fan motor failure

Check Point 1-1 : Reset the power and operate

- Does error indication reappear?

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).

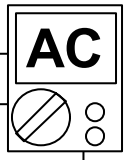
YES

Check Point 2 : Check connection

- Check any loose or removed connection line of between 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

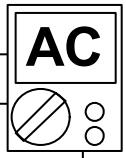
Check Point 3 : Check the voltage of power supply



- Check the voltage of power supply
  >> Check if AC198V(AC220V-10%) - 264V(AC240V+10%) appears at outdoor unit terminal L - N.

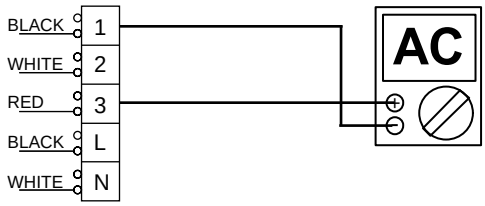
OK

Check Point 4 : Check serial signal (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 the parts as follows.
  - **Outdoor unit fan motor (PARTS INFORMATION 5)**
  - **Active filter module (PARTS INFORMATION 4)**
  - **Transistor PCB (IPM) (PARTS INFORMATION 7)**
  - **Filter PCB (Check the wire of CN110)**

  >> If Outdoor fan motor is abnormal, replace Outdoor unit fan motor and Main PCB.
  >> If Active filter module or IPM is abnormal, replace it.
  >> If the parts are normal, replace Main PCB.



Trouble shooting 2 **INDOOR UNIT Error Method:** **Serial Communication Error** **(Serial Forward Transfer Error)**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators: Indoor unit Controller PCB	**Detective details:** 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 reappear?

NO

YES

Check Point 2 : Check connection

- Check any loose or removed connection line of between 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)

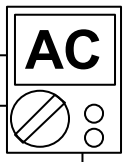
Check Point 1-2 : Check external cause such as noise

- 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).

OK

Check Point 3 : Check the voltage of power supply

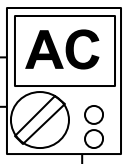
- Check the voltage of power supply
  >> Check if AC198V(AC220V-10%) - 268V(AC240V+10%) appears at outdoor unit terminal L - N.

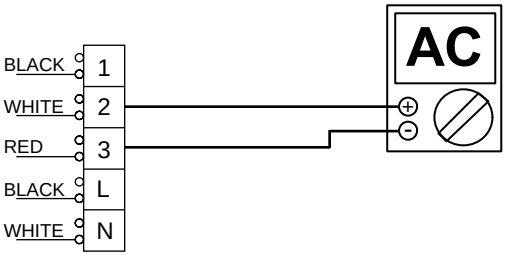


OK

Check Point 4 : Check serial signal (Forward transfer signal)

- Check serial signal (Forward transfer signal)
  >> Check if indicated value swings between 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:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Indoor unit Controller PCB Wired Remote Controller	When the indoor unit cannot properly receive the signal from Wired Remote Controller for 1 minute 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

Check & correct the followings.

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

OK

Check Point 2 : Check Wired Remote Controller and Controller PCB

- Check Voltage at CN14 (AU*G45/54LRLA, AR*G45LMLA, AB*G45LRTA), CN6 (AR*G45/54LHTA) of Controller PCB. (terminal 1-3) (Power supply to Remote Control)

>> If it is DC12V, 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

Trouble shooting 4 **INDOOR UNIT Error Method:** **Fan Motor Drive Circuit Error**	**Indicate or Display:** **Refer to error code table.**

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. Conenection 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 5 **INDOOR UNIT Error Method:** **Indoor Room Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

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

Forecast of Cause : 1. Connector failure connection 2. Thermistor failure 3. Controller PCB failuer

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	4.35

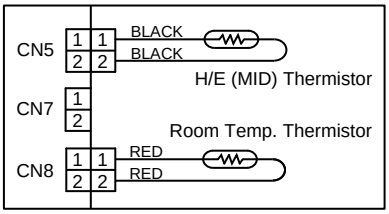
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

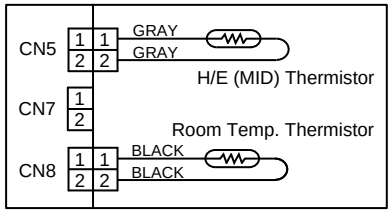
Check Point 3 : Check voltage of Controller PCB (DC5.0V)

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

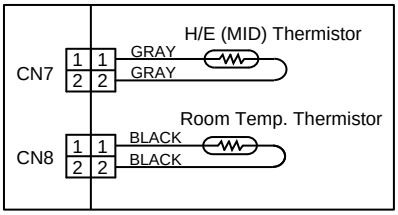
- AU*G45/ 54LRLA



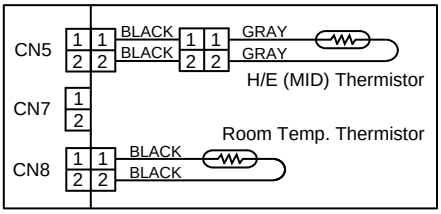
- AR*G45LMLA



- AR*G45/ 54LHTA



- AB*G45LRTA



▶ **If the voltage does not appear, replace Controller PCB.**

Trouble shooting 6 **INDOOR UNIT Error Method:** **Indoor Heat Ex. Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Indoor Unit Controller PCB 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 failuer

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	-20	-10	-5	0	5	10	15	20
Resistance value (kΩ)	1131.9	579.6	312.3	233.2	176.0	134.2	103.3	80.3	62.9

Temperature (°C)	25	30	35	40	45	50	55	60	63
Resistance value (kΩ)	49.7	39.6	31.7	25.6	20.8	17.1	14.1	11.6	10.4

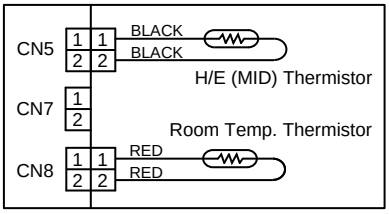
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

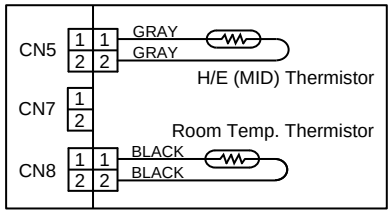
Check Point 3 : Check voltage of Controller PCB (DC5.0V)

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

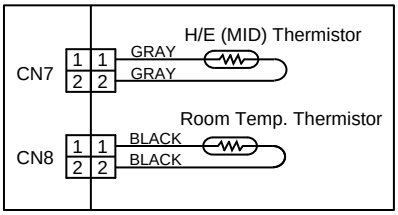
- AU*G45/ 54LRLA



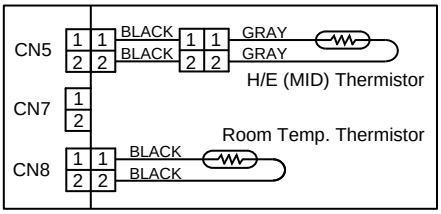
- AR*G45LMLA



- AR*G45/ 54LHTA



- AB*G45LRTA



▶ **If the voltage does not appear, replace Controller PCB.**

Trouble shooting 7 **INDOOR UNIT Error Method:** **Indoor Unit Fan Motor1 Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Indoor unit Power Supply PCB Indoor unit fan motor	When the condition that actual frequency of Indoor Fan is below 1/3 of target frequency is continued more than 56 seconds.

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.**

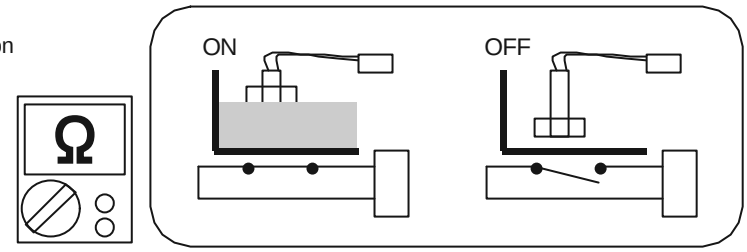
Trouble shooting 8 **INDOOR UNIT Error Method:** **Drainage Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators: Indoor Unit Controller PCB Circuit Float Switch	**Detective details:** 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 and 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 : Check Controller PCB

If Check Point 1 ~ 3 do not improve the symptom, change Controller PCB and execute the check operation again.

Attention!!
Wall mount / Small size wall mount type does not have a float switch.
In this case, replace Controller PCB and set up the original address.
Please refer to.

Trouble shooting 9 **INDOOR UNIT Error Method:** **Indoor Unit Fan Motor2 Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Indoor unit Power Supply PCB Indoor unit fan motor	When the condition that actual frequency of Indoor Fan is below 1/3 of target frequency is continued more than 56 seconds.

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 10 **OUTDOOR UNIT Error Method:** **Inverter Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Inverter PCB	▪Error information received from Inverter PCB

Forecast of Cause : 1. External cause. 2. Power supply to Filter PCB to Inverter PCB wiring disconnection, open 3. Filter PCB failure 4. Inverter 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 (Power supply to Filter PCB to Inverter PCB)

- ☐ Connector and wiring connection state check
- ☐ Cable open check

OK

Check Point 3 : Replace Filter PCB (INV) and Inverter PCB

- ☐ Replace Filter PCB and Inverter PCB.

Trouble shooting 11 **OUTDOOR UNIT Error Method:** **IPM Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators: Outdoor unit Main PCB Compressor	**Detective details:** ① When more than normal operating current to IPM in Main PCB flows, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ②repeats 5 times, the compressor stops permanently.

Forecast of Cause :

1. Defective connection of electric components
2. Outdoor Fan Operation failure
3. Outdoor Heat Exchanger clogged
4. Compressor failure
5. Main PCB failure

Check Point 1 : 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 2 : Check Outdoor Fan, Heat Exchanger

- Is there anything obstructing the air distribution circuit?
- Is there any clogging of Outdoor Heat Exchanger?
- Is the Fan rotating by hand when operation is off ?

>> If the Fan Motor is locked, replace it.

OK

Check Point 3 : Check Outdoor Fan

- Check Outdoor Fan Motor. (Refer to Trouble shooting 21,22)

>> If the Fan Motor is failure, replace it.

OK

Check Point 4 : Check Compressor

- Check Compressor. **(PARTS INFORMATION 2)**

OK

Check Point 5 : Replace Main PCB

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

Trouble shooting 12 **OUTDOOR UNIT Error Method:** **Discharge Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators: Discharge temperature thermistor	**Detective details:** ▪ Discharge temperature thermistor short detected ▪ Discharge thermistor 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

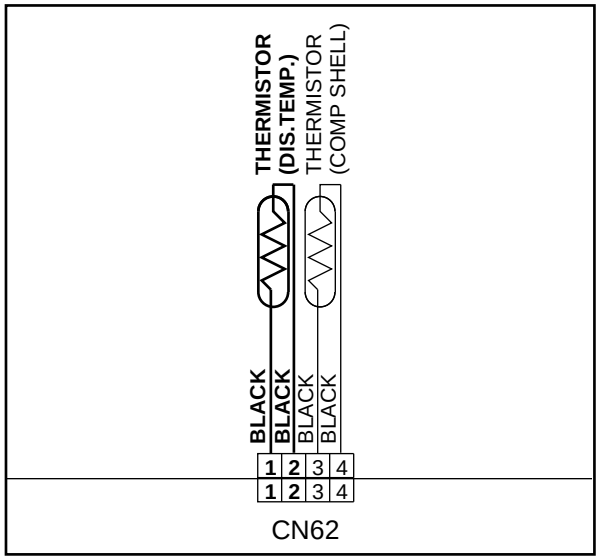
Check Point 2 : Check the thermistor

- ☐ 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 (CN62:1-2) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.



Discharge temperature thermistor (CN62:1-2)

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

Trouble shooting 13 **OUTDOOR UNIT Error Method:** **Compressor Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	▪ Compressor temperature thermistor short detected ▪ Compressor thermistor 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

↓

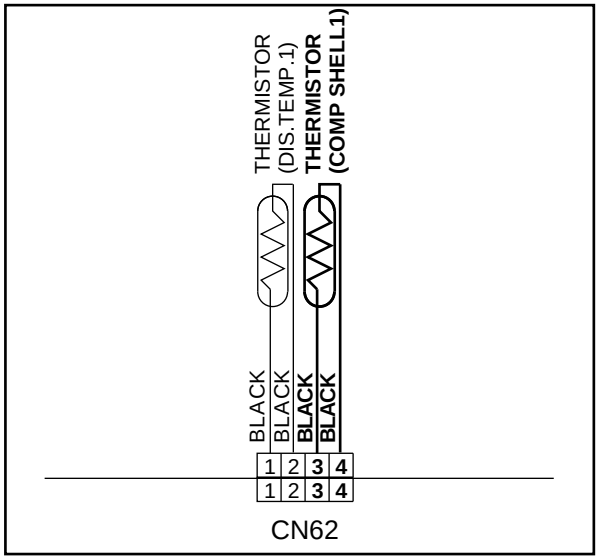
Check Point 2 : Check the thermistor

- ☐ 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 (CN62:3-4) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.



Compressor temperature thermistor (CN62:3-4)

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

Trouble shooting 14 **OUTDOOR UNIT Error Method:** **Heat Ex. Outlet Temp. Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Heat exchanger liquid temperature thermistor	▪ Heat exchanger outlet temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection defective, 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

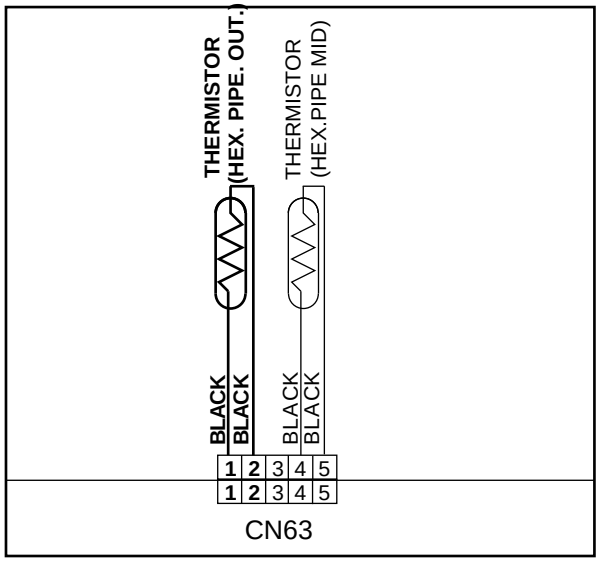
Check Point 2 : Check the thermistor

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 (CN63:1-2) voltage value = 5V
Remove the thermistor from Main PCB, check the voltage.



Heat exchanger outlet temperature thermistor (CN63:1-2)

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

Trouble shooting 15 **OUTDOOR UNIT Error Method:** **Outdoor Thermistor Error**	**Indicate or Display:** **Refer to error code table.**

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

Forecast of Cause :
1. Connector connection defective, 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

↓

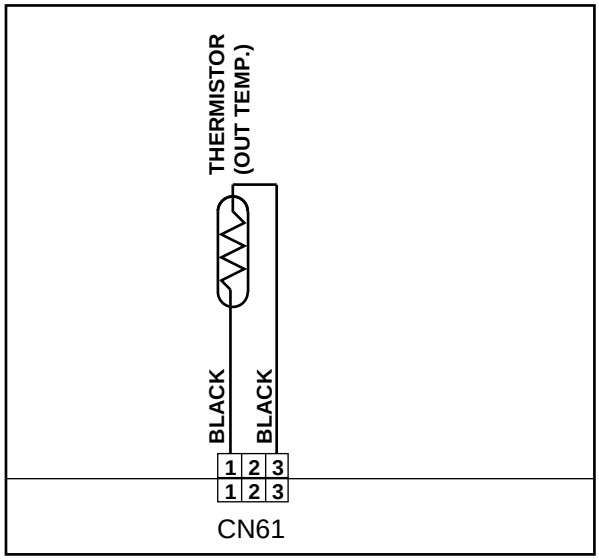
Check Point 2: Check the thermistor

- ☐ 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 (CN61:1-3) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.



Outdoor temperature thermistor (CN61:1-3)

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

Trouble shooting 16 **OUTDOOR UNIT Error Method:** Heat Sink Thermistor Error	**Indicate or Display:** Refer to error code table.

Detective Actuators:	**Detective details:**
Inverter PCB	・ Heat sink temperature thermistor (Built-in IPM) open/short detected

Forecast of Cause : 1. Inverter PCB failure

►**If this error is displayed, replace Inverter PCB**

Trouble shooting 17 **OUTDOOR UNIT Error Method:** **Current Sensor Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB	When Input Current Sensor has detected 0A, while Inverter Compressor is operating at higher than 56rps, after 1minute upon starting the Compressor. (Except during the defrost operation)

Forecast of Cause :

1. Defective connection of electric components 2. External cause 3. 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 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.

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 4 : Replace Main PCB

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

Trouble shooting 18 **OUTDOOR UNIT Error Method:** **Pressure Sensor Error**	**Indicate or Display:** **Refer to error code table.**

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. Main 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

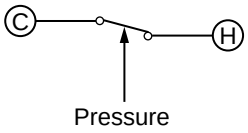
- ☐ Switch characteristics check
  * For the characteristics of high pressure switch, refer to below.

OK

Check Point 3 : Replace Main PCB

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

▪ Type of contact



▪ Characteristics of pressure switch (CN101)

	Pressure switch 1
Contact : Short ⇒ Open	4.2±0.1MPa
Contact : Open ⇒ Short	3.2±0.15MPa

Trouble shooting 19 **INDOOR UNIT Error Method:** **Over Current Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Compressor Transistor PCB	・"**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. Transistor PCB (IPM) failure

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: Check Transistor PCB (IPM)

・Check IPM. **(PARTS INFORMATION 7)**
>> If IPM is abnormal, replace Transistor PCB.

OK

Check Point 3: Replace Main PCB

▶ **If Check Point 1 or 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 20 **OUTDOOR UNIT Error Method:** **Compressor Control Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Compressor Transistor PCB	① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90°, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.

Forecast of Cause :

1. Defective connection of electric components 2. Main PCB failure 3. Compressor failure
4. Transistor PCB (IPM) 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: Check Transistor PCB (IPM)

- Check IPM. **(PARTS INFORMATION 7)**

>> If IPM is abnormal, replace Transistor PCB.

OK

Check Point 4: Replace Main PCB

▶ **If Check Point 1,2 or 1~3 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 21 **OUTDOOR UNIT Error Method:** **Outdoor Unit Fan Motor 1 Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Outdoor unit fan motor	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 ② repeats 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. Main PCB failure
4. 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.

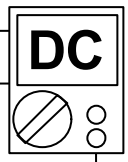
OK

Check Point 3 : Check Outdoor unit fan motor

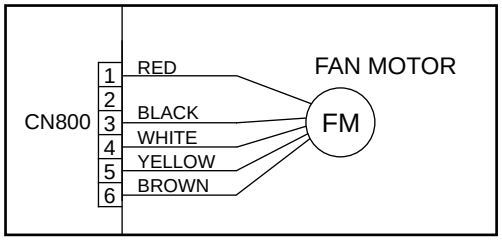
- Check Outdoor unit fan motor. **(PARTS INFORMATION 5)**
  >>If Outdoor Fan Motor is abnormal, replace Outdoor fan motor and Main PCB.

OK

Check Point 4 : Check Output Voltage of Main PCB



- Check outdoor unit circuit diagram and the voltage. (Measure at Main 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 Main PCB.**

Trouble shooting 22 **OUTDOOR UNIT Error Method:** **Outdoor Unit Fan Motor 2 Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Outdoor unit fan motor	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 ② repeats 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. Main PCB failure
4. 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

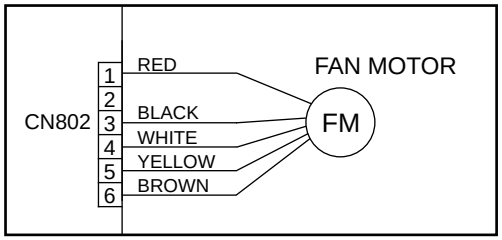
Check Point 3 : Check Outdoor unit fan motor

- 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 Main PCB

- Check outdoor unit circuit diagram and the voltage. (Measure at Main 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 Main PCB.**

Trouble shooting 23 **OUTDOOR UNIT Error Method:** **4-Way Valve Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Indoor Unit Controller PCB Circuit Heat Exchanger Temperature Thermistor Room Temperature Thermistor 4-way valve	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.] > 20degC ▪Heating operation [indoor heat exchanger temp.] - [Room temp.] < -14degC 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 5,6), If defective, replace the thermistor.

OK

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

[Solenoid coil]

- Remove CN6 from PCB and check the resistance value of coil.
  Resistance value is about 1.4kΩ

>> 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 24 **OUTDOOR UNIT Error Method:** **Discharge Temp. Error**	**Indicate or Display:** **Refer to error code table.**

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

<Cooling operation>

Check Point 1 : Check if 3-way valve(gas side) is open.
- ☐ If the 3-way valve(gas side) was closed, open the 3-way valve(gas side) and check operation.

OK

Check Point 2 : Check the EEV, strainer
- ☐ EEV open?
- ☐ Strainer clogging check (before and after EEV, ACM oil return)
  Refer to "Service Parts Information 3, 4"

OK

Check Point 3 : Check the outdoor unit fan,heat exchanger
- ☐ Check for foreign object at heat exchanger
- ☐ Check if fan can be rotated by hand.
- ☐ Motor check(PARTS INFORMATION 7)

OK

Check Point 4 : Check the discharge thermistor
- ☐ Discharger thermistor characteristics check
  (Check by disconnecting thermistor from PCB.)
  * For the characteristics of the thermistor, refer to the "Service Parts Information 8".

OK

Check Point 5 : Check the refrigerant amount
- ☐ Leak check

<Heating operation>

Check Point 1 : Check if 3-way valve(liquid side) is open.
- ☐ If the 3-way valve(liquid side) was closed, open the 3-way valve(liquid side) and check operation.

OK

Check Point 2 : Check the EEV, strainer
- ☐ EEV open?
- ☐ Strainer clogging check (before and after EEV, ACM oil return)
  Refer to "Service Parts Information 3, 4"

OK

Trouble shooting 25 **OUTDOOR UNIT Error Method:** **Compressor Temp. Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	▪ "Protection stop by "compressor tempreture" ≧ 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

<Cooling operation>

Check Point 1 : Check if 3-way valve(gas side) is open.

- ☐ If the 3-way valve(gas side) was closed, open the 3-way valve(gas side) and check operation.

OK

Check Point 2 : Check the EEV, strainer

- ☐ EEV open?
- ☐ Strainer clogging check (before and after EEV, ACM oil return)
  Refer to "Service Parts Information 3, 4".

OK

Check Point 3 : Outdoor unit fan, heat exchanger check

- ☐ Check for foreign object at heat exchanger
- ☐ Check if fan can be rotated by hand.
- ☐ Motor check(PARTS INFORMATION 7)

OK

Check Point 4 : Check the compressor temperature thermistor

- ☐ Compressor temperature thermistor characteristics check (Check by disconnecting thermistor from PCB)

  * For the characteristics of the thermistor, refer to the "Service Parts Information 8.

OK

Check Point 5 : Check the refrigerant amount

- ☐ Leak check

<Heating operation>

Check Point 1 : Check if 3-way valve(liquid side) is open.

- ☐ If the 3-way valve(liquid side) was closed, open the 3-way valve(liquid side) and check operation.

OK

Check Point 2 : Check the EEV, strainer

- ☐ EEV open?
- ☐ Strainer clogging check (before and after EEV, ACM oil return)
  Refer to "Service Parts Information 3,4 ".

OK

Trouble shooting 26 **OUTDOOR UNIT Error Method:** **Low Pressure Error**	**Indicate or Display:** **Refer to error code table.**

Detective Actuators:	**Detective details:**
Suction 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

<Cooling operation>

Check Point 1 : Check if 3-way valve(gas side) is open.
- ☐ If the 3-way valve(gas side) was closed, open the 3-way valve(gas side) and check operation.

OK

Check Point 2 : Check the EEV, strainer clogging
- ☐ Indoor unit EEV operation check
- ☐ Strainer not clogged?

OK

Check Point 5 : Check the solenoid valve (SV1)
- ☐ Solenoid valve operation check

OK

Check Point 6 : Check the suction pressure sensor
- ☐ Suction pressure sensor characteristics check
  * For the characteristics of the suction pressure sensor (PARTS INFORMATION 9)

OK

Check Point 7 : Check the refrigerant amount
- ☐ Leak check

<Heating operation>

Check Point 1 : Check if 3-way valve(liquid side) is open.
- ☐ If the 3-way valve(liquid side) was closed, open the 3-way valve(liquid side) and check operation.

OK

Check Point 2 : Check the outdoor unit ambient temperature
- ☐ Outdoor ambient temperature lower than operating range?

OK

Check Point 3 : Check the outdoor unit fan operation, heat exchanger
- ☐ No foreign oblect in air passage?
- ☐ Heat exchange fins clogged
- ☐ Fan rotates?
- ☐ Outdoor unit fan motor check

OK

Check Point 4 : Check the outdoor unit EEV, strainer clogging
- ☐ Outdoor unit EEV operation check
- ☐ Strainer not clogged?
  Refer to "Sevice Parts Information 3"

2-3 TROUBLE SHOOTING WITH NO ERROR CODE

Trouble shooting 27

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.

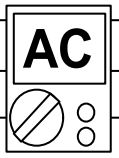
OK

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 in Filter PCB.

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

- Check Varistor in Filter PCB.

>> 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 Main PCB.**

Trouble shooting 28

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.

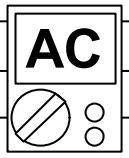
OK

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.

YES

- Check Active Filter Module and IPM. **(PARTS INFORMATION 6 and 7)**

>> If Active Filter Module or IPM is abnormal, replace it.

OK

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

Trouble shooting 29

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 2 : Check Wired Remote Controller and Controller PCB

- Check Voltage at CN14 (AU*G45/54LRLA, AR*G45LMLA, AB*G45LRTA), CN6 (AR*G45/54LHTA) of Controller PCB. (terminal 1-3) (Power supply to Remote Control)

>> If it is DC12V, 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

Trouble shooting 30

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 ?

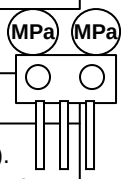
OK

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

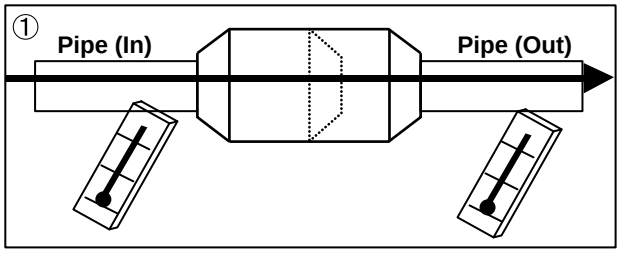
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

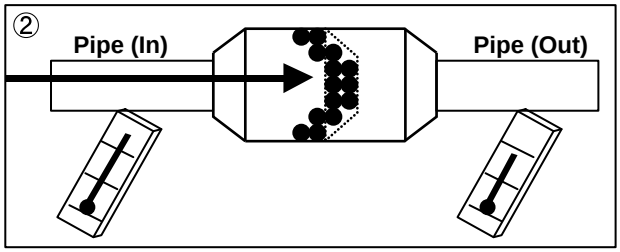
>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.

- 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 in① , but if there is a difference like shown in② , there is a possibility of inside clogged. In this case, replace Strainer.





Trouble shooting 31

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 32

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

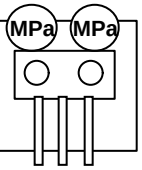
- Is Fan rotating?

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

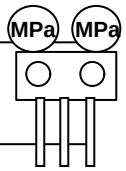
- Is there open or loose connection cable?
- Check Main PCB, connection of Compressor, and winding resistance. (Refer to the next page).

>> 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 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)

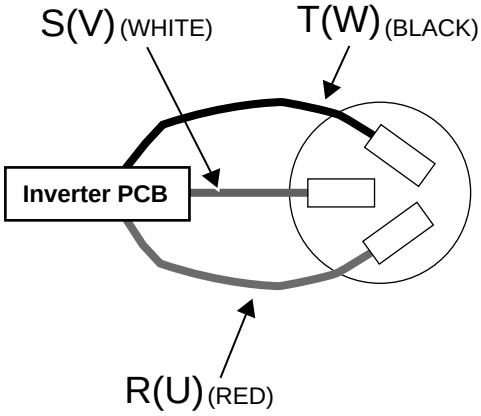
Replace Compressor

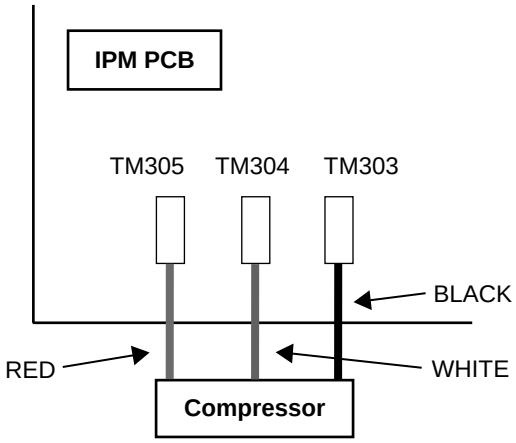
SERVICE PARTS INFORMATION 2

Inverter Compressor

Check Point 1 : Check Connection

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

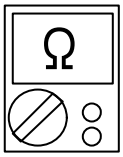


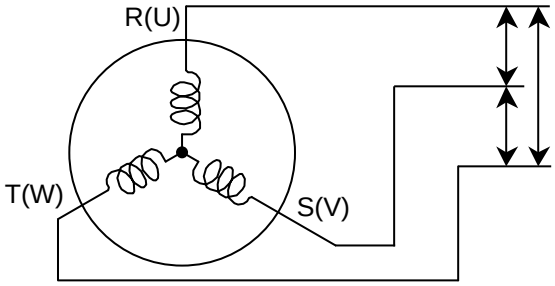


Check Point 2 : Check Winding Resistance

・Check winding resistance of each terminal

▶**If the resistance value is 0Ω or infinite, replace Compressor.**





Resistance Value :
0.432Ω ± 8% at 20°C

Check Point 3 : Replace Main PCB

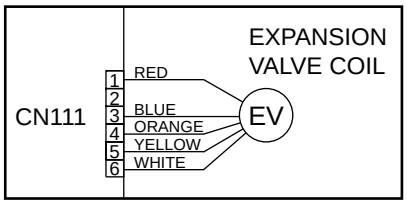
▶**If the symptom does not change with above Check 1, 2, replace Main PCB.**

SERVICE PARTS INFORMATION 3

Outdoor unit Electronic Expansion Valve
(EEV)

Check Point 1 : Check Connections

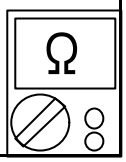
・Check connection of connector
(Loose connector or open cable)



Check Point 2 : Check Coil of EEV

・Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	**46**Ω ± **4**Ω at 68°F(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.**

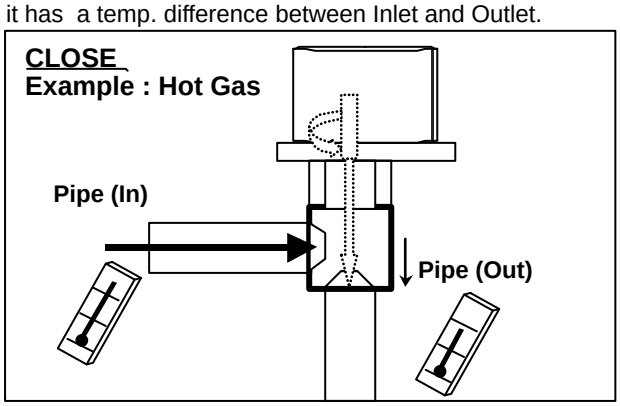
Check Point 4 : Check Voltage from Main PCB.

・Remove Connector and check Voltage (DC12V)

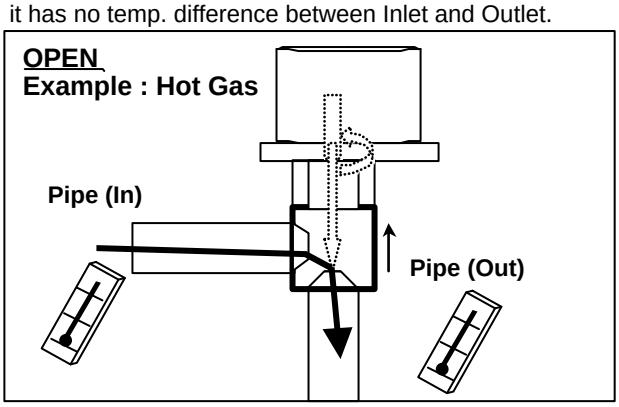
▶ **If it does not appear, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

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

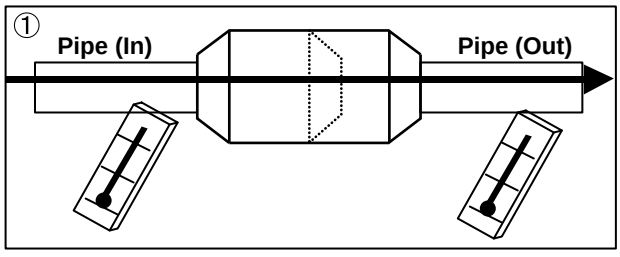


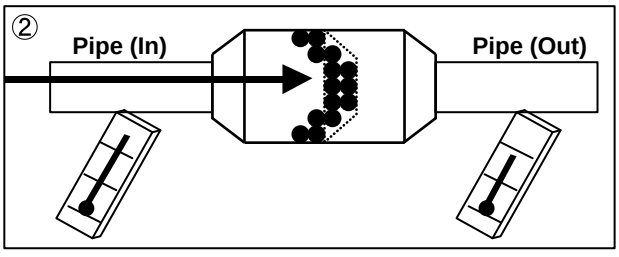
If it is open,
it has no temp. difference between Inlet and Outlet.



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.





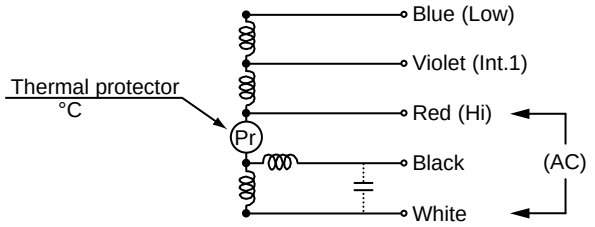
SERVICE PARTS INFORMATION 4

Indoor unit fan motor

For AR *G45/ 54LHTA

Check Point 1 : Check resistance of indoor fan motor

・Check each winding resistance of the motor
>>If Resistance value is abnormal, replace motor.



Lead wire color	Resistance value (20°C)
White - Red	7.73Ω ± 7%
Red - Black	7.08Ω ± 7%
Red - Violet	3.80Ω ± 7%
Violet - Blue	3.80Ω ± 7%

For other indoor unit

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 fan motor

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

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

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 1 or 2

・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.

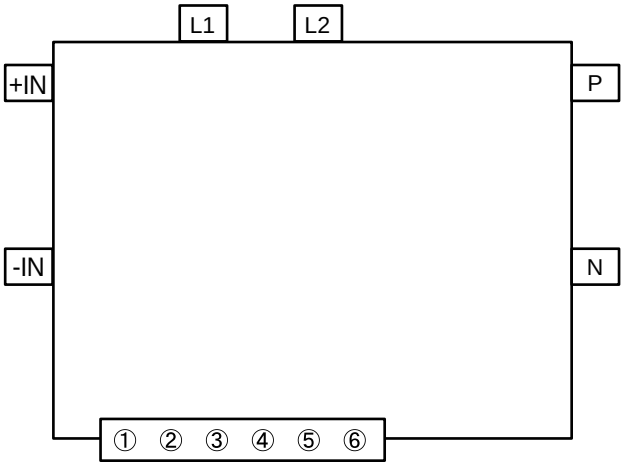
Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage (Vm)
2	No function
3 (Black)	Earth terminal (GND)
4 (White)	Control voltage (Vcc)
5 (Yellow)	Speed command (Vsp)
6 (Brown)	Feed back (FG)

SERVICE PARTS INFORMATION 6

Active filter module

Check Point 1 : Check Open or Short-circuit and Diode (D1)

・Remove connector, check the open or short-circuit and the diode in the module



Check the open or short-circuit

Terminal		Resistance value
Tester(+)	Tester(-)	
(+IN)	(–IN)	**360kΩ ±20%**
(–IN)	N	**0Ω**
P	(+IN)	**720kΩ ±20%**
L1	L2	**1.40MΩ / 2.28MΩ** (Ref. value 1) (Ref. value 2)
P	N	**360kΩ ±20%**
L1,L2	Control Box	**∞Ω**
L2	N	**1.69MΩ / 1.88MΩ** (Ref. value 1) (Ref. value 2)

Check the diode

Terminal		Resistance value
Tester(+)	Tester(-)	
L2	P	**1.32MΩ / 1.50MΩ** (Ref. value 1) (Ref. value 2)
P	L2	**1.40MΩ / 1.51MΩ** (Ref. value 1) (Ref. value 2)

Ref. value 1
Specifications for Multimeter
Manufacturer : HIOKI
Model name : 3804
Power source : DC9V.

Ref. value 2
Specifications for Multimeter
Manufacturer : YOKOGAWA
Model name : 7534
Power source : DC3V.

▶ **If it is abnormal,replace ACTIVE FILTER MODULE**

Check Point 2 : Check the Output DC voltage (between P and N)

・Check the Output DC voltage (between P and N) of compressor stopping and operating.

>> If the output voltage of compressor operating is less than the output voltage of compressor stopping, Active Filter Module is detective. >> **Replace Active Filter Module**

SERVICE PARTS INFORMATION 7

IPM

(**Mounted on Transistor PCB)**

Check Point 1

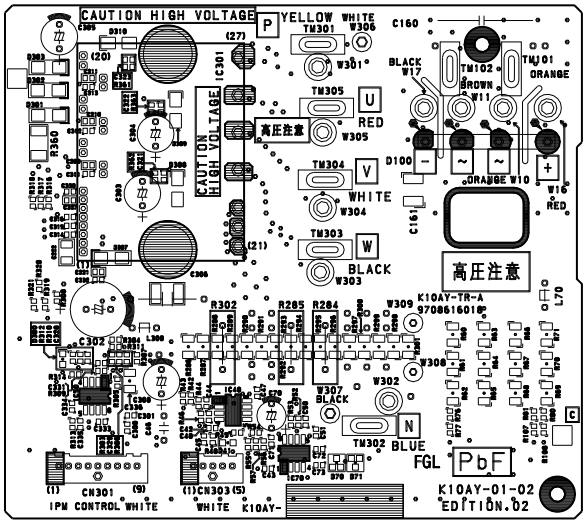
① Disconnect the connection wires between the Transistor PCB - Capacitor PCB and Transistor PCB - Inverter Compressor.

② Set the tester to the "Resistance" mode, and measure the resistance between the following terminals.

TM301 (P) - TM305(U) / TM304(V) / TM303(W)
TM302 (N) - TM305(U) / TM304(V) / TM303(W)

③ Judge the result of ② as follows:

Terminal		Resistance value
Tester(+)	Tester(-)	
P	U	Over 2kΩ (Including ∞Ω)
P	V	
P	W	
U	P	Over 20kΩ (Including ∞Ω)
V	P	
W	P	
N	U	
N	V	
N	W	
U	N	Over 2kΩ (Including ∞Ω)
V	N	
W	N	



Check Point 2

④ Set the tester to the "Diode" mode, and measure the voltage value between the following terminals.

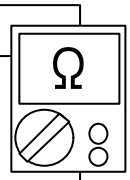
⑤ Judge the result of ④ as follows:

Terminal		Tester display
Tester(+)	Tester(-)	
P	U	∞
P	V	
P	W	
U	P	0.3V～0.7V
V	P	
W	P	
N	U	
N	V	
N	W	
U	N	∞
V	N	
W	N	

SERVICE PARTS INFORMATION 8

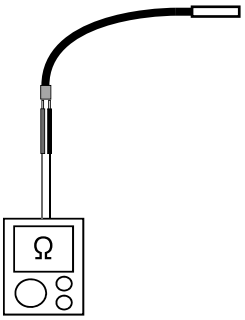
Thermistor

Check Point : Check Thermistor resistance value



☐ Remove connector and check Thermistor resistance value.

Temperature [°C]	Resistance Value [kΩ]		
	Thermistor A	Thermistor B	Thermistor C
- 30	1013.1	95.6	224.3
- 20	531.6	50.3	115.2
- 10	292.9	27.8	62.3
- 5	221.1	21.0	46.6
0	168.6	16.1	35.2
5	129.8	12.4	26.9
10	100.9	9.6	20.7
15	79.1	7.6	16.1
20	62.5	6.0	12.6
25	49.8	4.8	10.0
30	40.0	3.8	8.0
40	26.3	2.5	5.2
50	17.8	1.7	3.5
60	12.3	1.2	2.4
70	8.7	0.8	1.6
80	6.3	0.6	1.2
90	4.6	0.4	---
100	3.4	---	---
110	2.6	---	---
120	2.0	---	---
Applicable Thermistors	Discharge temp. TH Comprssor temp. TH	Heat exchanger. TH	Outdoor temp. TH



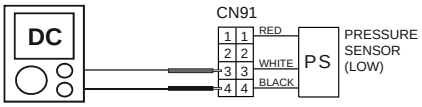
SERVICE PARTS INFORMATION 9

Suction Pressure Sensor

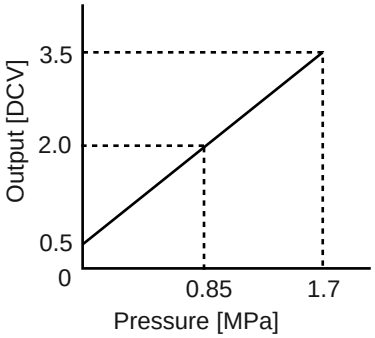
1. Suction Pressure Sensor

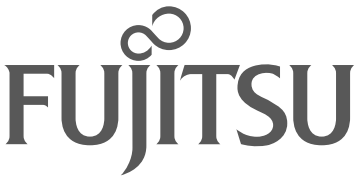
Check Point : Check Voltage from Main PCB

- With the connector connected to the PCB, measure the voltage between CN91:3-4 of the Main PCB.



- Characteristics of pressure sensor





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