SPLIT TYPE
ROOM AIR CONDITIONER

WALL MOUNTED type
INVERTER

# SERVICE INSTRUCTION

| Models | Indoor unit | Outdoor unit |
|---|---|---|
| | ASTA09LFC | AOTR09LFC |
| | ASTA12LFC | AOTR12LFC |

*Refrigerant*
**R410A**

FUJITSU GENERAL LIMITED

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Refrigerant
R410A

# *WALL MOUNTED type*
# *INVERTER*

## 1 . DESCRIPTION OF EACH CONTROL OPERATION

# 1. COOLING OPERATION

## 1-1 COOLING CAPACITY CONTROL

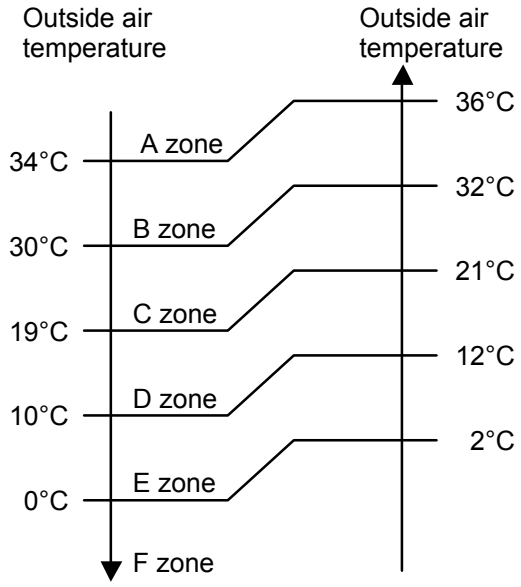
A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

* If the room temperature is 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 Figure1 based on the fan speed mode and the outdoor temperature.

( Table1 : Compressor Frequency Range )

| | minimum frequency | maximum frequency Ⅱ | maximum frequency Ⅰ |
|---|---|---|---|
| ASTA09LFC | 15Hz | 63Hz | 70Hz |
| ASTA12LFC | 15Hz | 63Hz | 76Hz |

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




| | | Hi | Me | Lo | Quiet |
|---|---|---|---|---|---|
| 09LFC | A zone | 70Hz | 45Hz | 37Hz | 26Hz |
| | B zone | 70Hz | 45Hz | 37Hz | 26Hz |
| | C zone | 70Hz | 45Hz | 37Hz | 26Hz |
| | D zone | 43Hz | 35Hz | 26Hz | 20Hz |
| | E zone | 43Hz | 35Hz | 26Hz | 20Hz |
| | F zone | 43Hz | 35Hz | 26Hz | 20Hz |
| 12LFC | A zone | 76Hz | 45Hz | 37Hz | 29Hz |
| | B zone | 76Hz | 45Hz | 37Hz | 29Hz |
| | C zone | 76Hz | 45Hz | 37Hz | 26Hz |
| | D zone | 43Hz | 35Hz | 26Hz | 20Hz |
| | E zone | 43Hz | 35Hz | 26Hz | 20Hz |
| | F zone | 43Hz | 35Hz | 26Hz | 20Hz |

When the compressor operates for 30 minutes continuously at over the maximum frequency Ⅱ, the maximum frequency is changed from Maximum Frequency Ⅰ to Maximum Frequency Ⅱ.

# 2. HEATING OPERATION

## 2-1 HEATING CAPACITY CONTROL

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

* If the room temperature is lower by 3°C than a set temperature, the compressor operation frequency will attain to maximum performance.

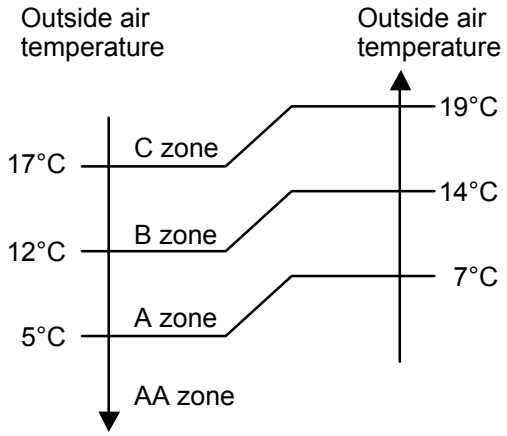
* If the room temperature is higher 2.5°C than a set temperatire, the compressor will be stopped.

* 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. However, the maximum frequency is limited in the range shown in Figure2 based on the fan speed mode and the outdoor temperature.

( Table2 : Compressor Frequency Range )

| | minimum frequency | maximum frequency |
|---|---|---|
| ASTA09LFC | 15Hz | 119Hz |
| ASTA12LFC | 15Hz | 119Hz |

( Fig.2 : Limit of Maximum Frequency based on Outdoor Temperature )




| | | Hi | Me+ | Me | Lo | Quiet |
|---|---|---|---|---|---|---|
| 09LFC | AA zone | 119Hz | 119Hz | 70Hz | 57Hz | 35Hz |
| | A zone | 119Hz | 119Hz | 70Hz | 57Hz | 40Hz |
| | B zone | 119Hz | 119Hz | 70Hz | 57Hz | 51Hz |
| | C zone | 119Hz | 119Hz | 70Hz | 57Hz | 51Hz |
| 12LFC | AA zone | 119Hz | 119Hz | 70Hz | 57Hz | 35Hz |
| | A zone | 119Hz | 119Hz | 70Hz | 57Hz | 40Hz |
| | B zone | 119Hz | 119Hz | 70Hz | 57Hz | 51Hz |
| | C zone | 119Hz | 119Hz | 70Hz | 57Hz | 51Hz |

* The room temperature is controlled 2°C higher than the setting temperature for 60 minutes after starting the operation.
After 60 minutes, it is controlled based on the normal setting temperature.

# 3. DRY OPERATION

## 3-1 INDOOR UNIT CONTROL

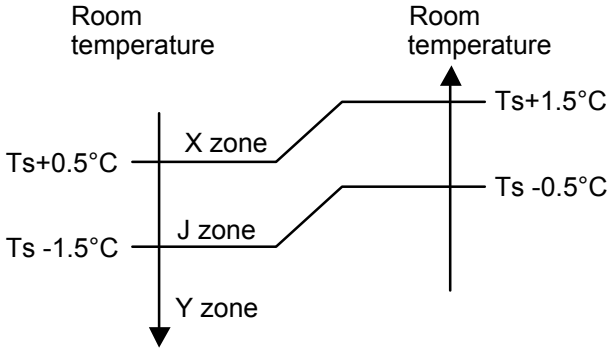
The compressor rotation frequency shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit body has detected as shown in the Table3.
However, after the compressor is driven, the indoor unit shall run at operation frequency of 51Hz, for a minute.

( Table3 : Compressor frequency )

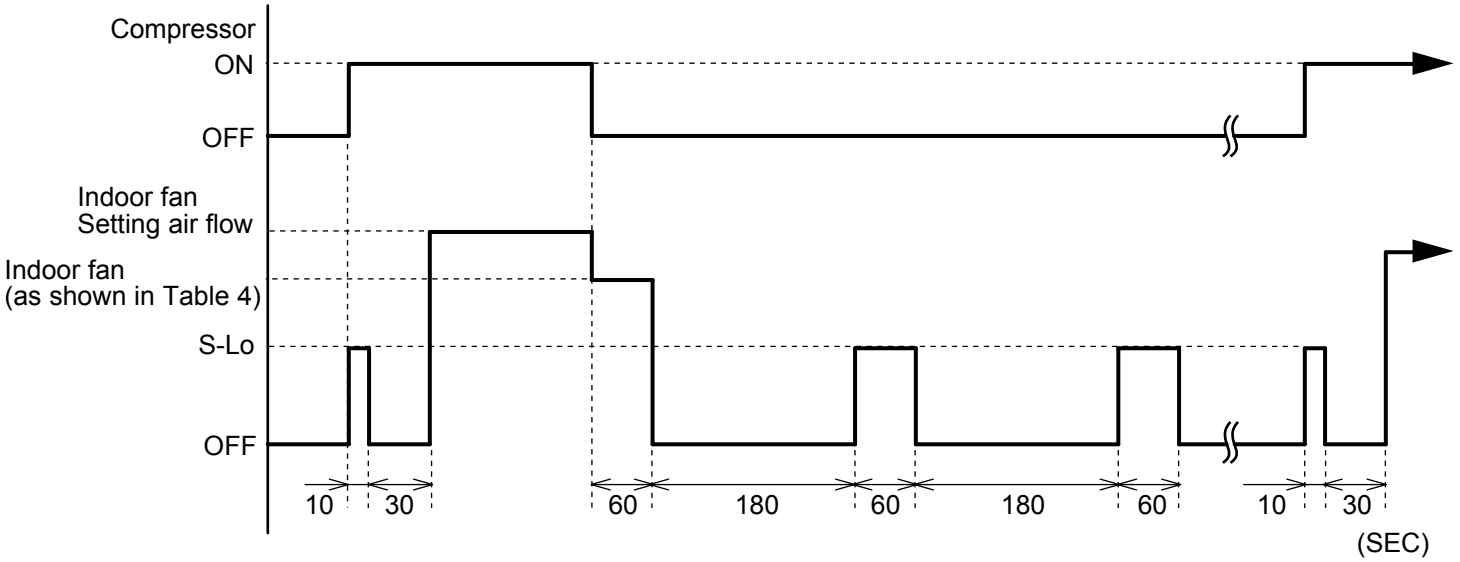
| | | Operating frequency |
|---|---|---|
| 09LFC | X zone | 26Hz |
| | J zone | 18Hz |
| | Y zone | 0Hz |

| | | Operating frequency |
|---|---|---|
| 12LFC | X zone | 26Hz |
| | J zone | 18Hz |
| | Y zone | 0Hz |

( Fig.3 : Compressor Control based on Room Temperature )




( Fig.4 : Indoor Fan Control )




( Table4 : Indoor fan speed )

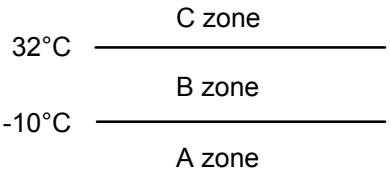
| | X zone | J zone | Y zone |
|---|---|---|---|
| ASTA09LFC | 660rpm | 640rpm | 0⇔480rpm |
| ASTA12LFC | 660rpm | 640rpm | 0⇔480rpm |

# 4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the AUTO mode by remote control, operation starts in the optimum mode from among the HEATING, COOLING, DRY and MONITORING modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 1°C steps.

① When operation starts, only the indoor and outdoor fans are operated for 1 minute. After 1 minute, the room temperature and outside air temperature are sensed and the operation mode is selected in accordance with the table below.

( Fig.5 : Outside air temperature zone selection )




( Table5 Operation mode selection table)

| Outside air temperature (TO) / Room temperature (TB) | A zone | B zone | C zone |
|---|---|---|---|
| TB > TS+2°C | Monitoring | Cooling (automatic dry) | Cooling (automatic dry) |
| TS+2°C ≧ TB ≧ TS -2°C | Monitoring | Monitoring | Monitoring |
| TB < TS -2°C | Heating | Heating | Monitoring |

② When COOING was selected at ① , the air conditioner operates as follow:
- The same operation as COOLING OPERATION of item 1 above is performed.
- When the room temperature has remained at (set temperature -1°C) for 8 minutes, operation is automatically switched to DRY and the same operation as DRY OPERATION of item 3 above is performed.
- If the room temperature reaches (set temperature +2°C) during DRY operation, operation returns to COOLING operation.

③ When HEATING was selected at ① , the same operation as HEATING OPERATION of item 2 above is performed.

④ When the compressor was stopped for 6 consecutive minutes by the temperature control function after the COOLING or HEATING operation mode was selected at ① above, operation is switched to MONITORING and the operation mode is selected again.

# 5. INDOOR FAN CONTROL

## 1. Fan speed

( Table6 : Indoor Fan Speed )

▪ ASTA09 / 12LFC

| Operation mode | Air flow mode | Speed (rpm) |
|---|---|---|
| Heating | Hi | 1320 |
| | Me+ | 1250 |
| | Me | 1130 |
| | Lo | 890 |
| | Quiet | 660 |
| | Cool air prevention | 600 |
| | S-Lo | 480 |
| Cooling | Hi | 1320 |
| | Me | 1130 |
| | Lo | 890 |
| | Quiet | 660 |
| Dry | | X zone: 660<br>J zone: 640 |

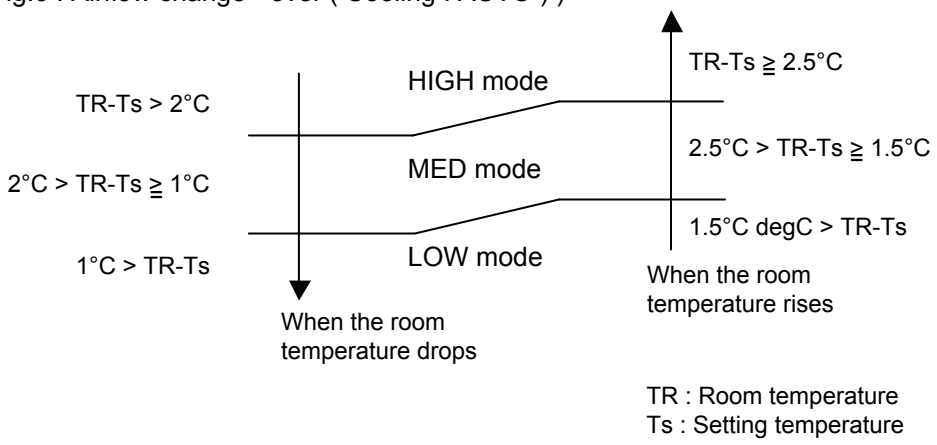
## 2. FAN OPERATION

The airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH, while the indoor fan only runs.
When Fan mode is set at (Auto), it operates on (MED) Fan Speed.

## 3. COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure6.
On the other hand, if switched in [HIGH]～[QUIET], the indoor motor will run at a constant airflow of [COOL] operation modes QUIET, LOW, MED, HIGH,as shown in Table6.

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



## 4. DRY OPERATION

Refer to the Table6.

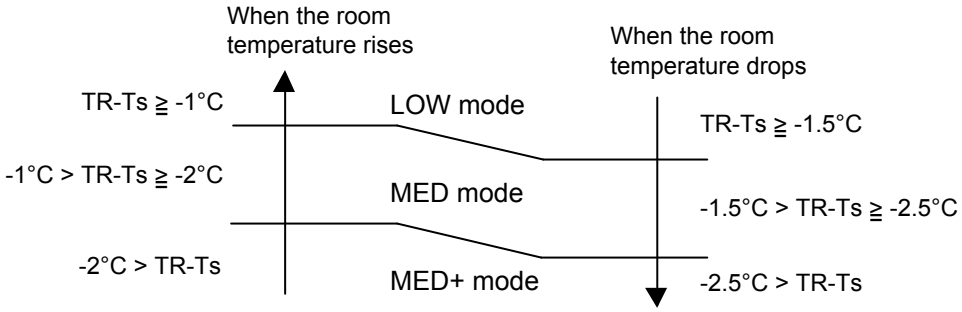
During the dry mode operation, the fan speed setting can not be changed.

## 5. HEATING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure7.

On the other hand, if switched in [HIGH] ～ [QUIET], the indoor motor will run at a constant airflow of [HEAT] operation modes QUIET, LOW, MED, HIGH, as shown in Table6.

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



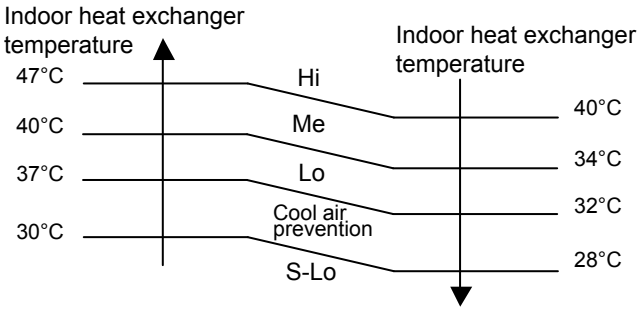

TR : Room temperature
Ts : Setting temperature

## 6. COOL AIR PREVENTION CONTROL (Heating mode)

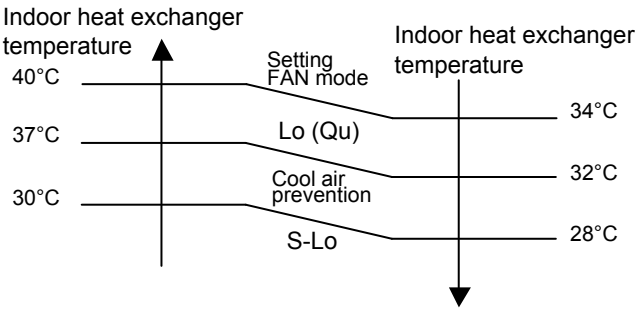
The maximum value of the indoor fan speed is set as shown in Figure8, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

(Fig.8 : Cool Air Prevention Control)

< [Hi] setting >




< The other of [Hi] setting >



# 6. OUTDOOR FAN CONTROL

### 1. Outdoor Fan Motor

Following table shows the type of the outdoor fan motor. The control method is different between AC motor and DC motor.

( Table7 : Type of Motor )

| | AC Motor | DC Motor |
|---|---|---|
| ASTA09 / 12LFC | | ◯ |

### 2. Fan Speed

( Table8 : Outdoor fan speed ) (rpm)

| | Zone ※ | Cooling | Dry |
|---|---|---|---|
| ASTA09LFC | A - C | 1050/ 810/ 720/ 530 | 530 |
| | D | 530/ 300 | |
| | E | 300/ 250 | |
| | F | 250/ 200 | |
| ASTA12LFC | A - C | 1050/ 870/ 720/ 530 | 530 |
| | D | 530/ 300 | |
| | E | 300/ 250 | |
| | F | 250/ 200 | |

※ Refer to Fig.1

(rpm)

| | Zone ※ | Heating |
|---|---|---|
| ASTA09LFC | AA / A | 1000/ 800/ 780/ 590/ 480 |
| | B / C | 1000/ 800/ 780/ 590/ 480 |
| ASTA12LFC | AA / A | 1100/ 870/ 780/ 590/ 480 |
| | B / C | 1100/ 870/ 780/ 590 /480 |

※ Refer to Fig.2

* When A-D ZONE, it runs at 500rpm for 20 seconds after starting up the outdoor fan. When E or F ZONE, it runs at 200rpm for 60 seconds after starting up the outdoor fan.
* The outdoor fan speed mentioned above depends on the compressor frequency. (When the compressor frequency increases, the outdoor fan speed also changes to the higher speed. When the compressor frequency decreases, the outdoor fan speed also changes to the lower speed.)
* Outdoor temperature falls, and if it becomes E and F zone(Refer to Fig.1), rotations of fan speed will fall.
* After the defrost control is operated on the heating mode, the fan speed keeps at the higher speed as table9 without relating to the compressor frequency.

( Table9 : Outdoor fan speed after the defrost )

| | |
|---|---|
| ASTA09LFC | 1000rpm |
| ASTA12LFC | 1100rpm |

# 7. LOUVER CONTROL

## 1. VERTICAL LOUVER CONTROL

(Function Range)

Each time the button is pressed, the air direction range will change as follow:

Ⅰ : ① ⇄ ② ⇄ ③ ⇄ ④ ⇄ ⑤ ⇄ ⑥ ⇄ ⑦

Ⅱ : ① ⇄ ② ⇄ ③

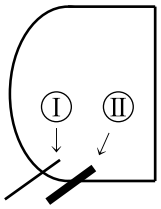
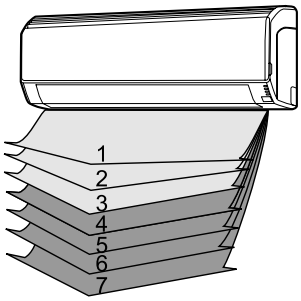
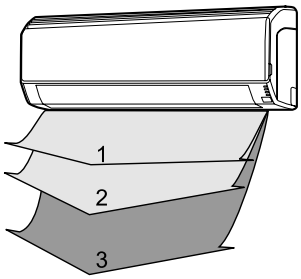



Fig.9 : Air Direction Range Ⅰ




Air Direction Range Ⅱ




(Table9 : Operation Range)

| | Ⅰ | Ⅱ |
|---|---|---|
| Cooling / Dry mode | ①－②－③ | ①－② |
| Heating mode | ④－⑤－⑥－⑦ | ②－③ |
| Fan mode | ①－②－③－④－⑤－⑥－⑦ | ①－②－③ |

Use the air direction adjustments within the ranges shown above.

- The vertical airflow direction is set automatically as shown, in accordance with the type of operation selected.
  Cooling / Dry mode : Horizontal flow ①
  Heating mode : Downward flow ⑥
- When the temperature of the air being blown out is low at the start of heating operation or during defrosting, the airflow direction temporarily becomes ⑥ to prevent cold air being blown onto the body.
- During use of the Cooling and Dry modes, do not set the Air Flow Direction Louver in the Heating range (④～⑦) for long period of time, since water vapor many condense near the outlet louvers and drop of water may drip from the air conditioner. During the Cooling and Dry modes, if the Air Flow Direction Louvers are left in the heating range for more than 30minutes, they will automatically return to position ③.
- During Monitor operation in AUTO CHANGEOVER mode, the airflow direction automatically becomes ①, and it cannot be adjusted.

## 2. SWING OPERATION

When the swing signal is received from the remote controller, the vertical louver starts to swing.

(Table10 : Swinging Range)

| | Ⅰ | Ⅱ |
|---|---|---|
| Cooling / Dry / Fan mode ( ①～④ ) | ① ⇔ ⑤ | ② |
| Heating / Fan mode ( ⑤～⑦ ) | ③ ⇔ ⑦ | ③ |

- When the indoor fan is either at S-lo or Stop mode, the swinging operation is interrrupted and the louver stops at the memorized position.

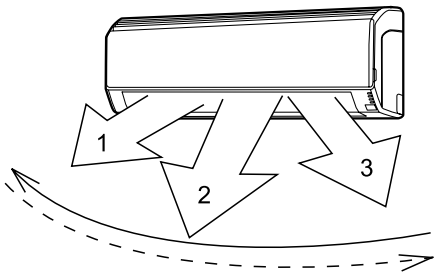
## 3. HORIZONTAL LOUVER CONTROL

(Function Range)

Each time the button is pressed, the air direction range will change as follow:

Cooling / Dry / Heating Fan mode : ① ⇄ ② ⇄ ③

Fig.10 : Air Direction Range




Use the air direction adjustments within the ranges shown above.

## 4. SWING OPERATION

When the swing signal is received from the remote controller, the horizontal louver starts to swing.

(Swinging Range)

Cooling / Dry / Heating Fan mode : ① ⇔ ③

- When the indoor fan is either at S-lo or Stop mode, the swinging operation is interrrupted and the louver stops at the memorized position.

# 8. COMPRESSOR CONTROL

## 1. OPEARTION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in the table11.

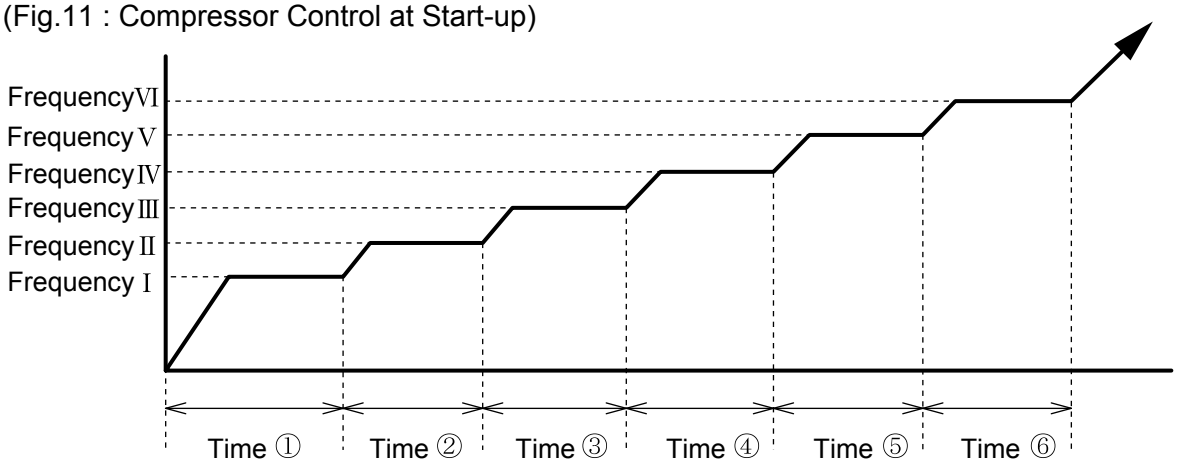
(Table11 : Compressor Operation Frequency Range)

| | Cooling | | Heating | | Dry | |
|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max |
| ASTA09LFC | 15Hz | 70Hz | 15Hz | 119Hz | 18Hz | 26Hz |
| ASTA12LFC | 15Hz | 76Hz | 15Hz | 119Hz | 18Hz | 26Hz |

## 2. OPEARTION FREQUENCY CONTROL AT START UP

The compressor frequency soon after the start-up is controlled as shown in the Figure11.

(Fig.11 : Compressor Control at Start-up)




**(Frequency)**

| | Frequency Ⅰ | Frequency Ⅱ | Frequency Ⅲ | Frequency Ⅳ | Frequency Ⅴ | Frequency Ⅵ |
|---|---|---|---|---|---|---|
| ASTA09LFC | 40Hz | 57Hz | 72Hz | 80Hz | 101Hz | 110Hz |
| ASTA12LFC | 40Hz | 57Hz | 72Hz | 80Hz | 101Hz | 110Hz |

**(Time)**

| | Time ① | Time ② | Time ③ | Time ④ | Time ⑤ | Time ⑥ |
|---|---|---|---|---|---|---|
| ASTA09LFC | 60sec | 50sec | 30sec | 60sec | 150sec | 60sec |
| ASTA12LFC | 60sec | 50sec | 30sec | 60sec | 150sec | 60sec |

# 9. TIMER OPEARTION CONTROL

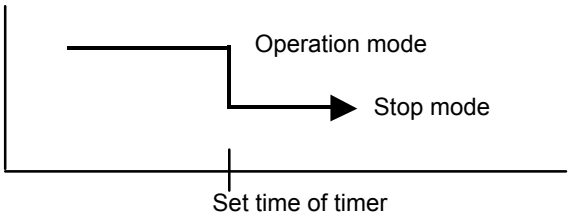
The table12 shows the available timer setting based on the product model.

(Table12 : Timer Setting)

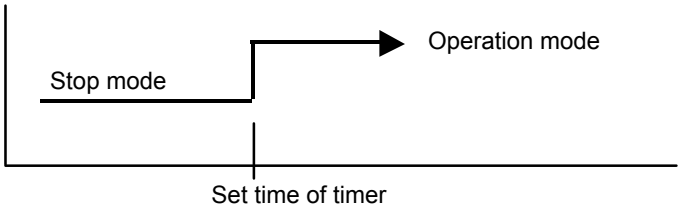
| | ON TIMER / OFF TIMER | PROGRAM TIMER | SLEEP TIMER |
|---|---|---|---|
| ASTA09 / 12LFC | ○ | ○ | ○ |

## 1. OPEARTION FREQUENCY RANGE

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

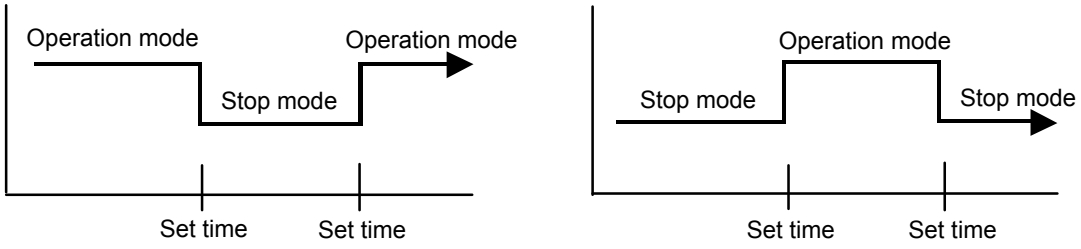



・ON timer : When the clock reaches the set time, the air conditioner will be turned on.




## 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.

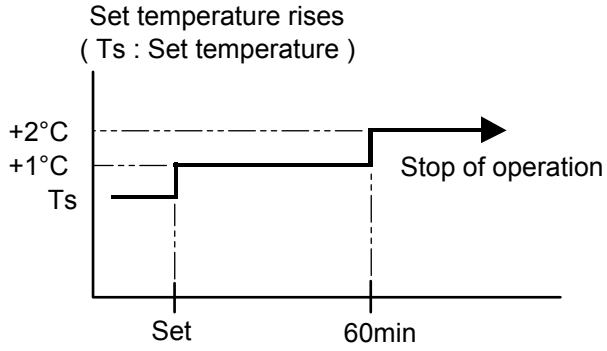
・SLEEP timer operation cannot be combined with ON timer operation.

## 3. SLEEP TIMER

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

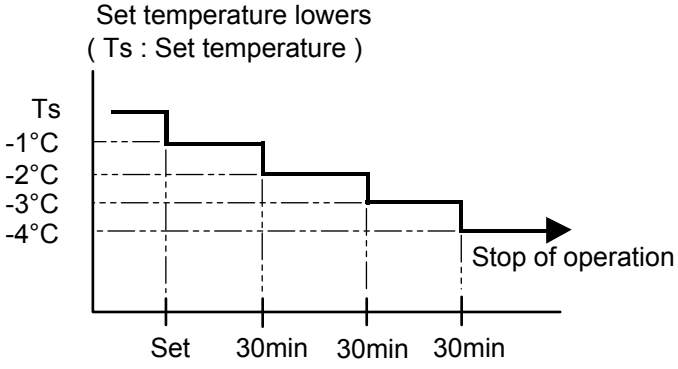
### In the cooling operation mode

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




### In the heating operation mode

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



## 10. 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 Table13.
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.

Table13 : The pulse range of the electronic expansion valve control

| Operation mode | Pulse range |
|---|---|
| Cooling / Dry mode | between 60 to 480 pulses. |
| Heating mode | between 45 to 480 pulses. |

* The expansion valve is set at 480 pulses after 110 seconds of stopping compressor.
* At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

## 11. TEST OPERATION CONTROL

Under the condition where the air conditioner runs, press the test run button of the remote control, and the test operation control mode will appear. During test running, the operation lamp and timer lamp of the air conditioner body twinkle 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.

## 12. PREVENT TO RESTART FOR 3 MINUTES ( 3 MINUTES ST )

The compressor won't enter operation status for 2 minutes and 20 seconds after the compressor is stopped, even if any operation is given.

## 13. FOUR-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 four-way valve is switched in 2 minutes and 20 seconds later after the compressor stopped.

## 14. 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 started with the memorized operation contents.
When the power is interrupted and recovered during timer operation, since the timer operation time is shifted by the time the power was interrupted, an alarm is given by blinking (7 sec ON/2 sec OFF) the indoor unit body timer lamp.

[Operation contents memorized when the power is interrupted]

- Operation mode
- Set temperature
- Set air flow
- Timer mode and timer time
- Set air flow Direction
- Swing

## 15. MANUAL AUTO OPERATION (Indoor unit body operation)

If MANUAL AUTO Button is set, the operation is controlled as shown in Table14.
If the remote control is lost or battery power dissipated, this function will work without the remote control.

(Table14)

| | Manual auto operation | Forced cooling operation |
|---|---|---|
| OPERATION MODE | Auto changeover | Cooling |
| FAN CONT. MODE | Auto | Hi |
| TIMER MODE | Continuous (No timer setting available) | - |
| SETTING TEMP. | 24°C | Room Temp is not controlled |
| SETTING LOUVER | Standard | Horizontal |
| SWING | OFF | OFF |

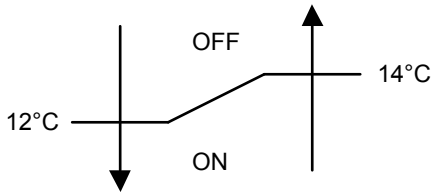
## 16. FORCED COOLING OPERATION

Forced cooling operation is started when pressing MANUAL AUTO button for 10 seconds or more.
During the forced cooling operation, it operates regardless of room temperature sensor.
Operation LED and timer LED blink during the forced cooling operation. They blink for 1 second ON and 1 second OFF on both operation LED and timer LED (same as test operation).
Forced cooling operation is released after 60 minutes of starting operation.
The FORCED COOLING OPERATION will start as shown in Table14.

## 17. COMPRESSOR PREHEATING

When the outdoor temperature is lower than 12°C and the heating operation 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 14°C or greater, preheating is ended.

Fig.12 : Outdoor temperature




## 18. COIL DRY OPERATION CONTROL

The coil-dry operation functions by pressing COIL DRY button on the remote controller.
The coil-dry operation is consisted of Fan operation 50 minutes, Heating operation 3 minutes, and Fan operates for 30 minutes at last before ending the air conditioner operation.

(Table15 : COIL-DRY Operating Functions)

| | Indoor Fan Speed | Compressor Frequency | Louver Position | Open Panel | Main Unit Indication |
|---|---|---|---|---|---|
| ASTA09LFC | 780rpm | 29Hz | ① | Open | COIL-DRY : ON<br>Other indication : OFF |
| ASTA12LFC | 780rpm | 29Hz | ① | Open | |

# 19. DEFROST OPERATION CONTROL

## 1. CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table16.

(Table16 : Condition of starting Defrost Operation)

| | Compressor operating time | | |
|---|---|---|---|
| | Less than 25 minutes | 25 minutes to 4 hours | After 4 hours |
| ASTA09 / 12LFC | Does not operate | - 6°C | - 3°C |

## 2. CONDITION OF THE DEFROST OPERATION COMPLETION

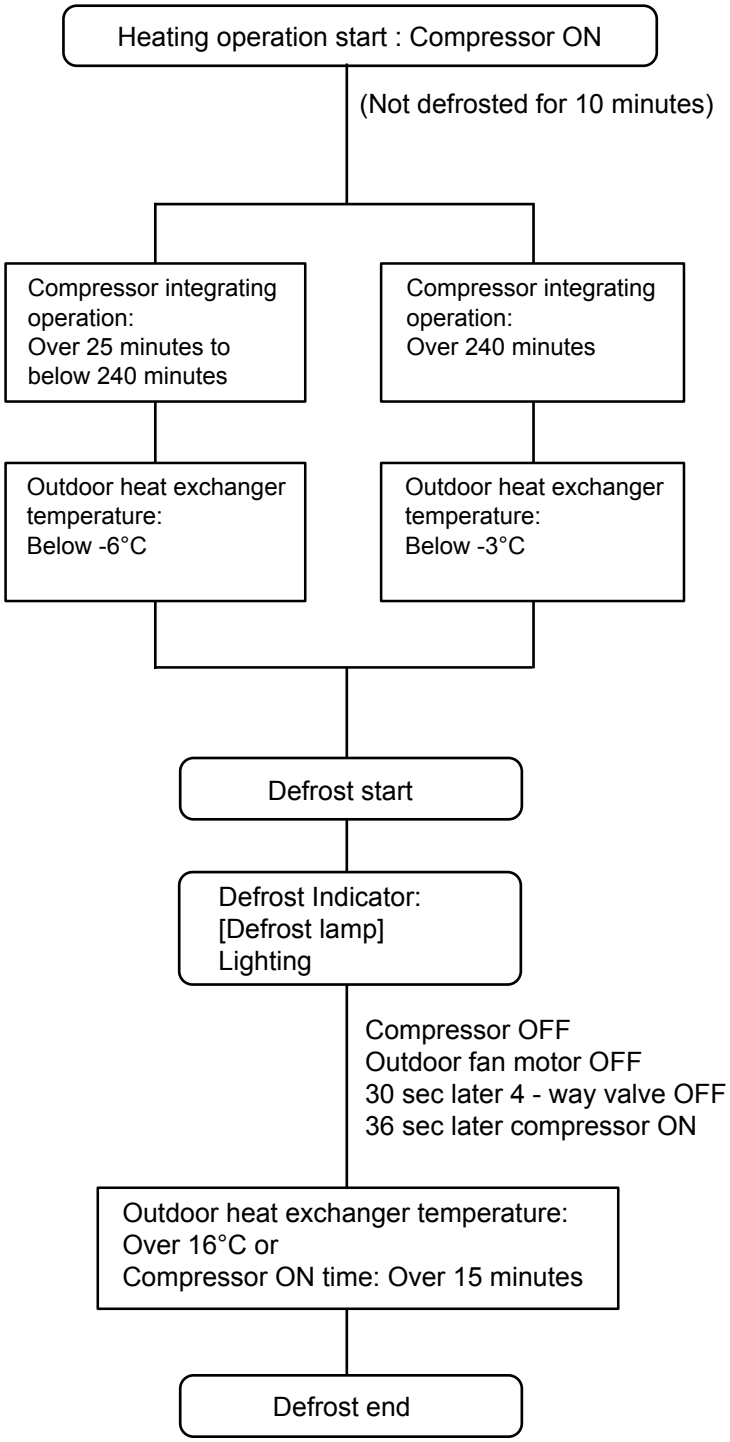
Defrost operation is released when the conditions become as shown in Table17.

(Table17 : Defrost Release Condition)

| | Release Condition |
|---|---|
| ASTA09 / 12LFC | Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes. |

**Defrost Flow Chart**

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



# 20. 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 defrost lamp lighting, the outdoor unit will allow the heat exchanger to defrost, and then stop.

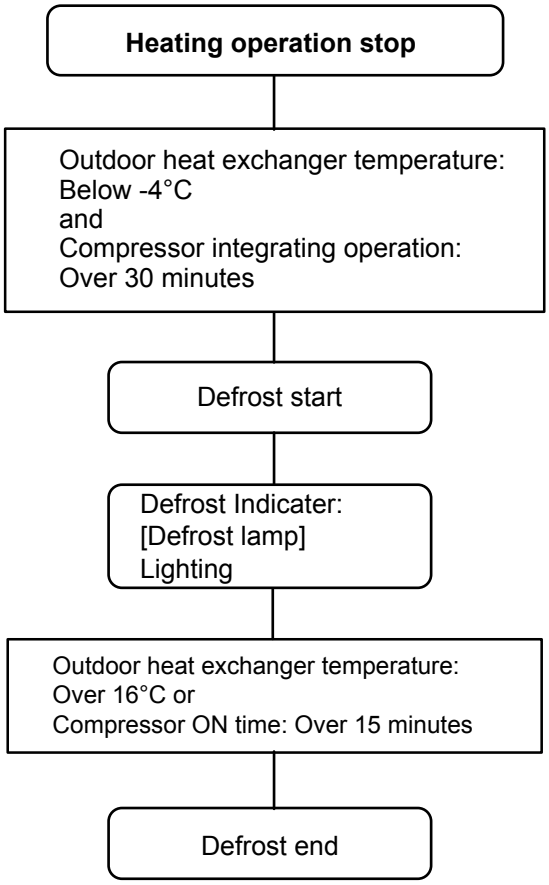
### 1. OFF DEFROST OPERATION CONDITION

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

### 2. OFF DEFROST END CONDITION

| | Release Condition |
|---|---|
| ASTA09 / 12LFC | Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes. |

**OFF Defrost Flow Chart**




# 21. 10°C HEAT OPERATION

The 10°C HEAT operation functions by pressing 10°C HEAT button on the remote controller.

The 10°C HEAT operation is almost the same operation as below settings.

( Table18 )

| | |
|---|---|
| mode | HEAT |
| setting temperature | 10°C |
| fan mode | AUTO |

# 22. 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 20 Hz, and it continues to decrease the frequency for 20 Hz every 120 seconds until the temperature becomes lower than Temperature Ⅰ.

When the discharge temperature becomes lower than Temperature Ⅱ,the control of 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.

(Table19 : Discharge Temperature Over Rise Prevension Control / Release Temperature)

| | Temperature Ⅰ | Temperature Ⅱ | Temperature Ⅲ |
|---|---|---|---|
| ASTA09 / 12LFC | 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 velue 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.

(Table20 : Current Release Operation Value / Release Value)

**[ Heating ]**

| ASTA09LFC | |
|---|---|
| OT (Control / Release) | |
| 17°C | 6.5A/ 6.0A |
| 12°C | 8.0A/ 7.5A |
| 5°C | 8.0A/ 7.5A |
| | 8.0A/ 7.5A |

OT : Outdoor Temperature

| ASTA12LFC | |
|---|---|
| OT (Control / Release) | |
| 17°C | 6.5A/ 6.0A |
| 12°C | 8.0A/ 7.5A |
| 5°C | 8.5A/ 8.0A |
| | 9.5A/ 9.0A |

OT : Outdoor Temperature

**[ Cooling ]**

| ASTA09LFC | |
|---|---|
| OT (Control / Release) | |
| 46°C | 3.5A/ 3.0A |
| 42°C | 4.0A/ 3.5A |
| | 5.5A/ 5.0A |

OT : Outdoor Temperature

| ASTA12LFC | |
|---|---|
| OT (Control / Release) | |
| 46°C | 4.0A/ 3.5A |
| 42°C | 5.0A/ 4.5A |
| | 6.0A/ 5.5A |

OT : 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.

(Table21 : Anti-freezing Protection Operation / Release Temperature)

| Outdoor temperature | Temperature Ⅰ | Temperature Ⅱ |
|---|---|---|
| Over than 10°C *1<br>or 12°C *2 | 4°C | 7°C |
| Less than 10°C *1<br>or 12°C *2 | | 13°C |

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

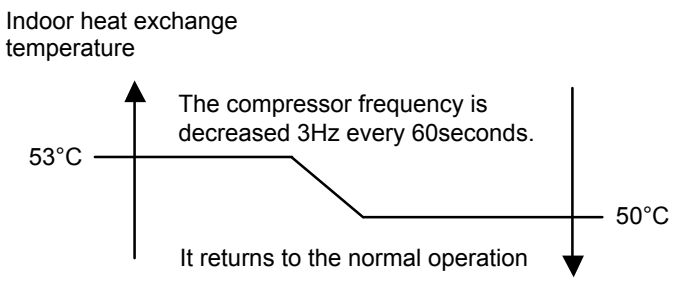
### 4. COOLING PRESSURE OVERRISE PROTECTION

When the outdoor unit heat exchange sensor temperature rises to 67°C or greater, the compressor is stopped and trouble display is performed.

### 5. HIGH TEMPERATURE RELEASE CONTROL ( HEATING MODE )

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

[ Control System ]



Refrigerant
R410A

# *WALL MOUNTED type*
# *INVERTER*

## 2 . TROUBLE SHOOTING

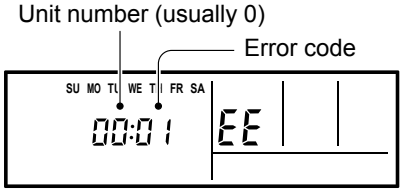
# 2. TROUBLESHOOTING

## 2-1 ERROR DISPLAY

### 2-1-1 WIRED REMOTE CONTROLLER DISPLAY (OPTION)

1. SELF - DIAGNOSIS

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




ex. Self-diagnosis check

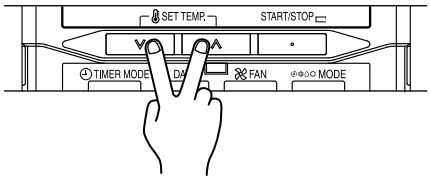
| Error code | Error contents | Trouble shooting |
|---|---|---|
| 00 | Communication error (indoor unit ← remote control) | 1 |
| 01 | Communication error (Serial reverse transfer error) | 2 |
| 02 | Room temperature sensor error | 3 |
| 04 | Indoor heat exchanger temperature sensor error | 4 |
| 06 | Outdoor heat exchanger temperature sensor(outlet) error | 5 |
| 08 | Outdoor temperature sensor error | 6 |
| 0C | Outdoor discharge pipe temperature sensor error | 7 |
| 0F | Discharge temperature error | 8 |
| 11 | Indoor EEPROM abnormal (Model No.) | 9 |
| 12 | Indoor fan motor abnormal | 10 |
| 13 | Outdoor communication signal error (Forward transfer signal error) | 11 |
| 17 | IPM error | 12 |
| 18 | CT error | 13 |
| 19 | Active filter module (AFM) error | 14 |
| 1A | Compressor rotor location cannot detect (permanent stop) | 15 |
| 1b | Outdoor unit fan motor error | 16 |
| 20 | Indoor manual auto switch error | 17 |
| 24 | Excessive high pressure protection on cooling | 18 |
| 25 | PFC circuit error | 19 |
| 2c | 4-way valve error | 20 |

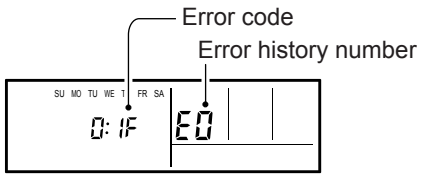
## 2. ERROR CODE HISTORY DISPLAY

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

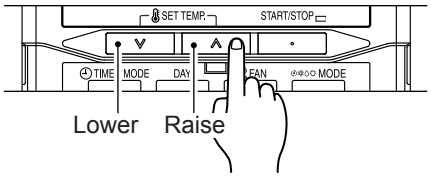
1. Stop the air conditioner operation.

2. Press the SET TEMPERATURE buttons ⋁, ⋀, [ON/OFF] 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.

## 2-1-2 OUTDOOR UNIT DISPLAY

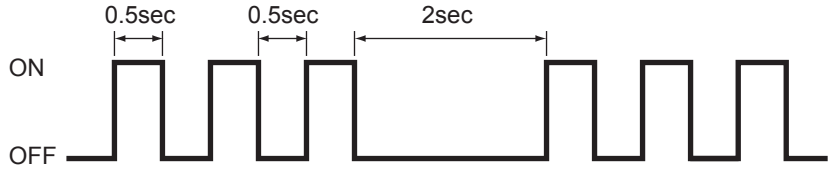
1. ERROR DISPLAY

1-1. For ASTA09 / 12LFC (AOTR09 / 12LFC)

| Error contents | LED Flashing Pattern | Trouble shooting |
|---|---|---|
| Discharge temperature error | Continuously lighting | 8 |
| IPM error | 0.5sec ON / 0.5sec OFF | 12 |
| CT error | 2sec ON / 2sec OFF | 13 |
| Compressor rotor location cannot detect | 0.1sec ON / 2sec OFF | 15 |
| Outdoor unit sensor error<br>(Discharge or Outdoor or Heat EX(In)(Out)) | 0.1sec ON / 0.1sec OFF | 5,6,7 |
| Outdoor unit fan motor error | 5sec ON / 5sec OFF | 16 |

1-2-1. ERROR DISPLAY METHOD

Outdoor LED Blink (1 to 16 times) 0.5sec ON / 0.5sec OFF blinking




1-2-2. NORMAL OPERATION DISPLAY

| Operation | LED Blinking Pattern |
|---|---|
| Normal operation | OFF |
| Protected operation | 5sec ON / 1sec OFF |
| Pump down operation | 1sec ON / 1sec OFF |

## 2-1-3 INDOOR UNIT DISPLAY

1. ERROR DISPLAY

| Error contents | Operation LED | Timer LED | Trouble shooting |
|---|---|---|---|
| Communication error in start-up (Serial reverse transfer error) | OFF | 2 times flash | 2 |
| Communication error in operation (Serial reverse transfer error) | OFF | 3 times flash | 2 |
| Communication error in start-up (Serial forward transfer error) | OFF | 4 times flash | 11 |
| Communication error in operation (Serial forward transfer error) | OFF | 5 times flash | 11 |
| Communication error (indoor unit ← remote control) | OFF | 8 times flash | 1 |
| Room temperature sensor error | 2 times flash | 2 times flash | 3 |
| Indoor heat exchanger temperature sensor error | 2 times flash | 3 times flash | 4 |
| Outdoor discharge pipe temperature sensor error | 3 times flash | 2 times flash | 7 |
| Outdoor heat exchanger temperature sensor(outlet) error | 3 times flash | 3 times flash | 5 |
| Outdoor temperature sensor error | 3 times flash | 4 times flash | 6 |
| Indoor manual auto switch error | 4 times flash | 2 times flash | 17 |
| Power supply frequency detection error | 4 times flash | 4 times flash | 21 |
| IPM error | 5 times flash | 2 times flash | 12 |
| CT error | 5 times flash | 3 times flash | 13 |
| Compressor rotor location cannot detect (permanent stop) | 5 times flash | 5 times flash | 15 |
| Outdoor unit fan motor error | 5 times flash | 6 times flash | 16 |
| Indoor fan motor lock error | 6 times flash | 2 times flash | 10 |
| Indoor fan motor rev abnormal | 6 times flash | 3 times flash | 10 |
| Discharge temperature error | 7 times flash | 2 times flash | 8 |
| Excessive high pressure protection on cooling | 7 times flash | 3 times flash | 18 |
| 4-way valve error | 7 times flash | 4 times flash | 20 |
| Active filter module (AFM) error | 8 times flash | 2 times flash | 14 |
| PFC circuit error | 8 times flash | 4 times flash | 19 |
| Indoor EEPROM abnormal (Model No.) | LED concurrently blinking | | 9 |

## 2-2 TROUBLE SHOOTING WITH ERROR CODE

| **Trouble shooting 1**<br>**INDOOR UNIT Error Method:**<br>**Communication Error**<br>**(Indoor unit ← Remote control)** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : OFF, Timer LED : 8 times**<br>**ERROR CODE : [E : 00]** |
|---|---|
| **Detective Actuators:**<br>Indoor unit controller PCB circuit<br>Wired Remote Control | **Detective details:**<br>When the indoor unit cannot receive the signal from Wired Remote more than 10seconds after power ON, or the indoor unit cannot receive the signal more than 1minute during normal operation. |

Forecast of Cause:

1. Terminal connection abnormal 2. Wired Remote Control failure 3. Controller PCB failure

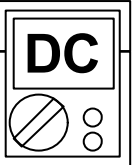
Check Point 1 : Check the connection of terminal

After turning off the power, check & correct the followings.

- Check the connection of terminal between remote control and Indoor unit, and check if there is a disconnection of the cable.

**OK**

Check Point 2 : Check Remote Control and Controller PCB




- Check Voltage at CN6 (terminal 1-3) of Controller PCB. (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

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

| **Trouble shooting 2**<br>**OUTDOOR UNIT Error Method:**<br>**Communication Error**<br>**(Serial Reverse Transfer Error)** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : OFF, Timer LED : 2 or 3 times**<br>**ERROR CODE : [E : 01]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit | **Detective details:**<br>When the indoor unit cannot receive the serial signal from Outdoor unit more than 10seconds,<br>then permanent stop after 20seconds. |

Forecast of Cause:

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

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

**NO**

**YES**

Check Point 2 : Check Connection

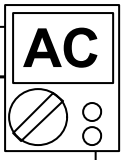
- Check any loose or removed connection line of Indoor unit and Outdoor unit.
  **>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**

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

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

**OK**

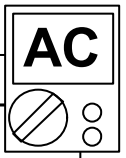
Check Point 3 : Check the voltage of power supply



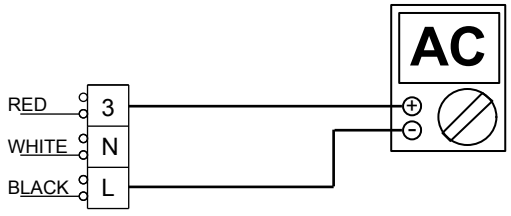

- Check the voltage of power supply
  **>> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.**

**OK**

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




- Check Serial Signal (Reverse Transfer Signal)
  **>> Check if Indicated value swings between AC70V and AC130V at Outdoor Unit Terminal L - 3.**
  **>> If it is abnormal, replace Main PCB.**



| Trouble shooting 3<br>**INDOOR UNIT Error Method:**<br>**Room Temperature Sensor Error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 2 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 02]** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit<br>Room Temperature Thermistor | **Detective details:**<br>When Room Temperature Thermistor open or short-circuit is detected at power ON. |

Forecast of Cause :

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

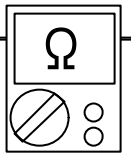
Check Point 1 : Check connection of Connector

- 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 : Remove connector and check Thermistor resistance value




Thermistor Characteristics (Approx. value)

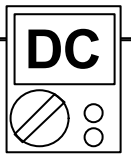
| Temperature | 0°C | 5°C | 10°C | 15°C | 20°C | 25°C | 30°C | 35°C |
|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 33.6 | 25.9 | 20.2 | 15.8 | 12.5 | 10.0 | 8.04 | 6.51 |

| Temperature | 40°C | 45°C | 50°C |
|---|---|---|---|
| Resistance Value (kΩ) | 5.30 | 4.35 | 3.59 |

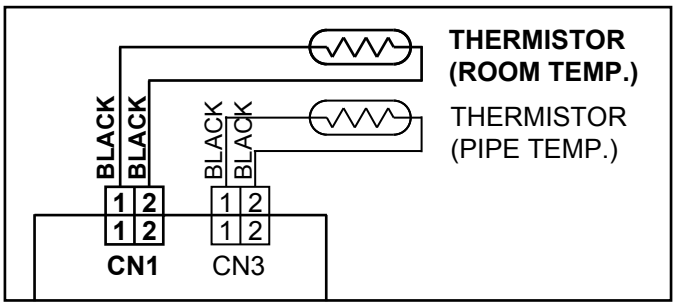
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

**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)




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

| **Trouble shooting 4**<br>**INDOOR UNIT Error Method:**<br>**Indoor Heat Exchanger Temperature Sensor Error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 2 times, Timer LED : 3 times**<br>**ERROR CODE : [E : 04]** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit<br>Heat Exchanger Temperature Thermistor | **Detective details:**<br>When Heat Exchanger Temperature Thermistor open or short-circuit is detected at power ON. |

Forecast of Cause :

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

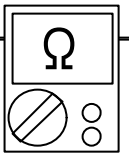
Check Point 1 : Check connection of Connector

- 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 : Remove connector and check Thermistor resistance value




Thermistor Characteristics (Approx. value)

| Temperature | 0°C | 5°C | 10°C | 15°C | 20°C | 25°C | 30°C | 35°C |
|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 176 | 134 | 103 | 80.3 | 62.9 | 49.7 | 39.6 | 31.7 |

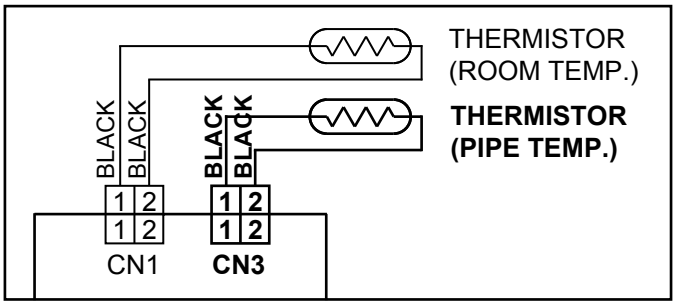
| Temperature | 40°C | 45°C | 50°C |
|---|---|---|---|
| Resistance Value (kΩ) | 25.6 | 20.8 | 17.1 |

▶ **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)




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

| Trouble shooting 5<br>**OUTDOOR UNIT Error Method:**<br>**Outdoor Heat Exchanger Temperature Sensor (Outlet) Error** | **Indicate or Display:**<br>**Outdoor Unit : LED 0.1sec ON/ 0.1sec OFF**<br>**Indoor Unit : Operation LED : 3 times, Timer LED : 3 times**<br>**ERROR CODE : [E : 06]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit<br>Heat Exchanger Temperature Thermistor | **Detective details:**<br>When Heat Exchanger Temperature Thermistor (Outlet) open or short-circuit is detected at power ON or while running the compressor. |

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. 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 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)

| Temperature | -10°C | -5°C | 0°C | 5°C | 10°C | 15°C | 20°C | 25°C | 30°C |
|---|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 27.8 | 21.0 | 16.1 | 12.4 | 9.63 | 7.56 | 5.98 | 4.77 | 3.84 |

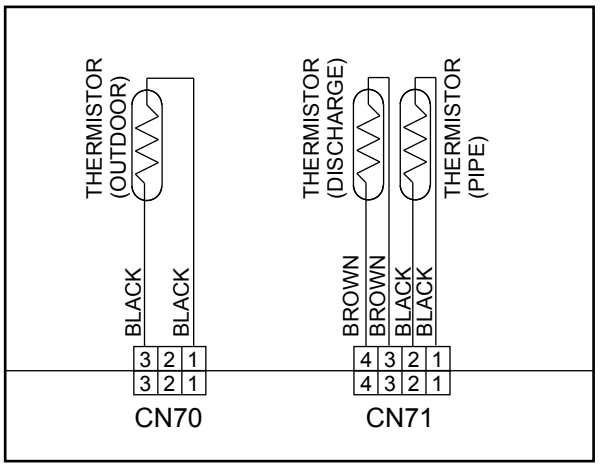
| Temperature | 35°C | 40°C | 45°C | 50°C | 60°C | 70°C | 80°C | 90°C | 100°C |
|---|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 3.11 | 2.53 | 2.08 | 1.71 | 1.19 | 0.840 | 0.606 | 0.446 | 0.333 |

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

**OK**

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

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




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

| Trouble shooting 6<br>**OUTDOOR UNIT Error Method:**<br>**Outdoor Temperature Sensor Error** | **Indicate or Display:**<br>**Outdoor Unit : LED 0.1sec ON/ 0.1sec OFF**<br>**Indoor Unit : Operation LED : 3 times, Timer LED : 4 times**<br>**ERROR CODE : [E : 0A]** |
|---|---|

| **Detective Actuators:** | **Detective details:** |
|---|---|
| Outdoor Unit Main PCB Circuit<br>Outdoor Temperature Thermistor | When Outdoor Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor. |

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. 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 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)

| Temperature | -20°C | -10°C | -5°C | 0°C | 5°C | 10°C | 15°C | 20°C |
|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 115 | 62.3 | 46.6 | 35.2 | 26.9 | 20.7 | 16.1 | 12.6 |

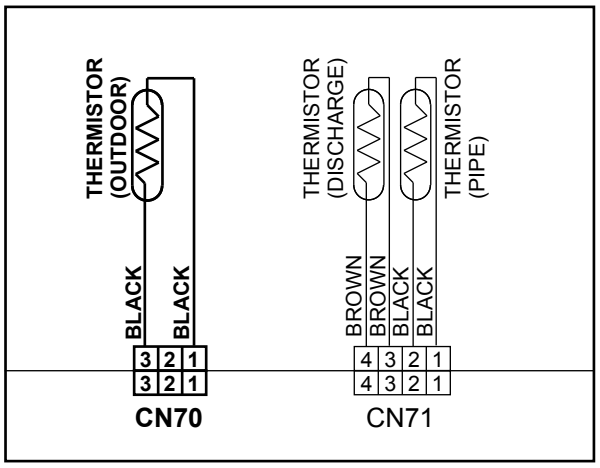
| Temperature | 30°C | 40°C | 50°C | 60°C | 70°C |
|---|---|---|---|---|---|
| Resistance Value (kΩ) | 7.97 | 5.18 | 3.45 | 2.36 | 1.65 |

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

**OK**

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

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




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

| Trouble shooting 7<br>**OUTDOOR UNIT Error Method:**<br>**Outdoor Discharge Pipe Temperature Sensor Error** | **Indicate or Display:**<br>**Outdoor Unit : LED 0.1sec ON/ 0.1sec OFF**<br>**Indoor Unit : Operation LED : 3 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 0C]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit<br>Discharge Pipe Temperature Thermistor | **Detective details:**<br>When Discharge Pipe Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor. |

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. 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 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)

| Temperature | 0°C | 5°C | 10°C | 15°C | 20°C | 30°C | 40°C | 50°C | 60°C |
|---|---|---|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 169 | 130 | 101 | 79.1 | 62.6 | 40.0 | 26.3 | 17.8 | 12.3 |

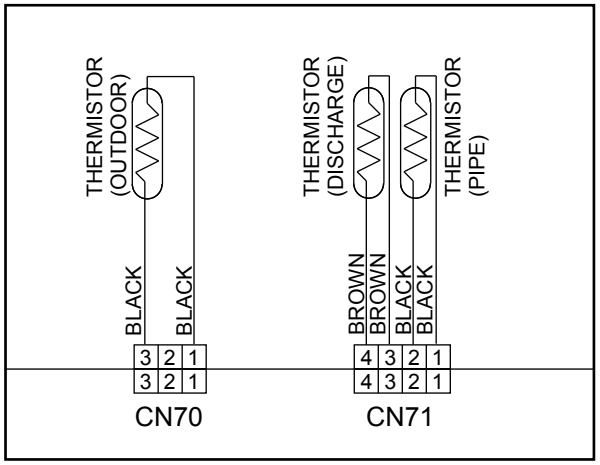
| Temperature | 70°C | 80°C | 90°C | 100°C | 120°C | 140°C |
|---|---|---|---|---|---|---|
| Resistance Value (kΩ) | 8.70 | 6.27 | 4.60 | 3.43 | 2.00 | 1.22 |

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

**OK**

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

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




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

| Trouble shooting 8<br>**OUTDOOR UNIT Error Method:**<br>**Discharge temperature error** | **Indicate or Display:**<br>**Outdoor Unit : LED continuously lighting**<br>**Indoor Unit : Operation LED : 7 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 0F]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit<br>Discharge Pipe Temperature Thermistor | **Detective details:**<br>① When the discharge temperature becomes higher than 110°C, the compressor stops.<br>② After the compressor restarts, if the same operation is repeated, the compressor stops permanently. |

Forecast of Cause :

1. Valve is close 2. EEV failure 3. Gas Leak, less 4. Discharge Thermistor failure
5. Outdoor Fan Operation failure 6. Outdoor Heat Exchanger clogged

< Cooling mode >

**Check Point 1 : Check if Gas Valve is open**

- If it is not open, open it and check the operation.

**OK**

**Check Point 2 : Check EEV and Strainer**

- Are EEV and Strainer open? (Refer to PARTS INFORMATION 3)

**>>If EEV or Strainer is defective, replace it.**

**OK**

**Check Point 3 : Check if gas leak or less gas**

- Measure Gas pressure, if there is a leak, correct it.

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

**OK**

**Check Point 4 : Check Discharge Thermistor**

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

**>> Check characteristics of thermistor (Refer to Trouble shooting 7), If defective, replace the thermistor**

**OK**

**Check Point 5 : 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? (Check by hand and if it is locked, replace the motor)
- Check Outdoor Fan Motor.

**>>If the Fan Motor is defective, replace it.**

< Heating mode >

**Check Point 1 : Check if Llquid Valve is open**

- If it is not open, open it and check the operation.

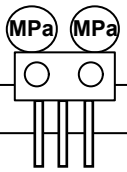
**OK**

**Check Point 2 : Check EEV and Strainer**

- Are EEV and Strainer open? (Refer to PARTS INFORMATION 3)

**>>If EEV or Strainer is defective, replace it.**

**OK**



| **Trouble shooting 9**<br>**INDOOR UNIT Error Method:**<br>**Indoor EEPROM abnormal (Model No.)** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : LED concurrently blinking**<br>**ERROR CODE : [E : 11]** |
|---|---|

| **Detective Actuators:** | **Detective details:** |
|---|---|
| Indoor Unit Controller PCB circuit | When the model information being read from EEPROM has an apparent error. |

Forecast of Cause:

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

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

**NO** → Check Point 1-2 :
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 Indoor Unit electric components

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

→ Check Point 3 : Replace Controller PCB

▶ **Change Controller PCB.**

**Note : EEPROM**

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

| Trouble shooting 10<br>**INDOOR UNIT Error Method:**<br>**Indoor Fan Motor abnormal** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 6 times, Timer LED : 2 or 3 times**<br>**ERROR CODE : [E : 12]** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit<br>Indoor Fan Motor | **Detective details:**<br>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. Control PCB failure

Check Point 1 : Check rotation of Fan

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

**OK**

Check Point 2 : Check ambient temp. around motor

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

**OK**

Check Point 3 : Replace Controller PCB

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

| Trouble shooting 11<br>**INDOOR UNIT Error Method:**<br>**Outdoor Communication Signal Error (Forward Transfer Signal Error)** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : OFF, Timer LED : 4 or 5 times**<br>**ERROR CODE : [E : 13]** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit | **Detective details:**<br>When the outdoor unit cannot receive the serial signal from Indoor unit more than 10seconds. |

Forecast of Cause:

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

Check Point 1-1 : Reset the power

- Does Error indication reappear?

**NO**

**YES**

Check Point 2 : Check Connection

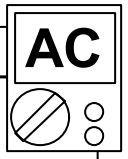
- Check any loose or removed connection line of Indoor unit and Outdoor unit.
  **>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**
- Check connection between Indoor Unit Controller PCB and Filter PCB.
  (If there is loose connector or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

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

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

**OK**

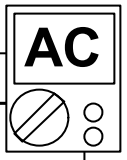
Check Point 3 : Check the voltage of power supply



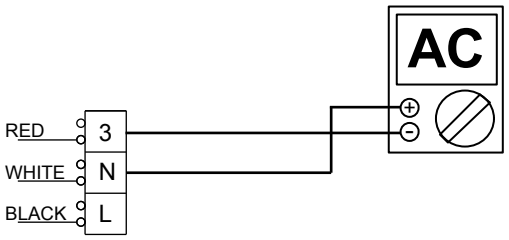

- Check the voltage of power supply
  **>> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.**

**OK**

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




- Check Serial Signal (Forward Transfer Signal)
  **>> Check if Indicated value swings between AC70V and AC130V at Outdoor Unit Terminal N - 3.**
  **>> If it is abnormal, Controller PCB is failure. >> Replace Controller PCB**



| Trouble shooting 12<br>**OUTDOOR UNIT Error Method:**<br>**IPM error (Permanent Stop)** | **Indicate or Display:**<br>**Outdoor Unit : LED 0.5sec ON/ 0.5sec OFF**<br>**Indoor Unit : Operation LED : 5 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 17]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit<br>Compressor | **Detective details:**<br>① When more than normal operating current to IPM in Main PCB flows, the compressor stops.<br>② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again.<br>③ If ① and ② repeats 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 16)

**>> 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 13<br>**OUTDOOR UNIT Error Method:**<br>CT error | **Indicate or Display:**<br>**Outdoor Unit : LED 2sec ON/ 2sec OFF**<br>**Indoor Unit : Operation LED : 5 times, Timer LED : 3 times**<br>**ERROR CODE : [E : 18]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit | **Detective details:**<br>When Input Current Sensor has detected 0A, while Inverter Compressor is operating at higher than 56Hz,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 14<br>**OUTDOOR UNIT Error Method:**<br>**Active Filter Module (AFM) error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 8 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 19]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit | **Detective details:**<br>When inverter input DC voltage is higher than 467V or lower than 237V.<br>When a momentary power cut off occurred on low voltage. |

Forecast of Cause :

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

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

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

**OK**

**Check Point 2 : Check connection of Connector**

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

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

**OK**

**Check Point 3 : Replace Main PCB**

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

| Trouble shooting 15<br>**OUTDOOR UNIT Error Method:**<br>**Compressor rotor location cannot detect (Permanent Stop)** | **Indicate or Display:**<br>**Outdoor Unit : LED 0.1sec ON/ 2sec OFF**<br>**Indoor Unit : Operation LED : 5 times, Timer LED : 5 times**<br>**ERROR CODE : [E : 1A]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit<br>Compressor | **Detective details:**<br>① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90°C, the compressor stops.<br>② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again.<br>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

Check Point 1 : Check Noise from Compressor

- Turn on Power and check operation noise.

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

**OK**

Check Point 2 : Check connection of around the Compressor components

For Compressor Terminal, Main PCB

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

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

**OK**

Check Point 3: Replace Main PCB

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

| Trouble shooting 16<br>**OUTDOOR UNIT Error Method:**<br>**Outdoor Unit Fan Motor Error** | **Indicate or Display:**<br>**Outdoor Unit : LED 5sec ON/ 5sec OFF**<br>**Indoor Unit : Operation LED : 5 times, Timer LED : 6 times**<br>**ERROR CODE : [E : 1b]** |
|---|---|

| **Detective Actuators:** | **Detective details:** |
|---|---|
| Outdoor Unit Main PCB Circuit<br>Outdoor Fan Motor | ① When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops.<br>② After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops.<br>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

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.**

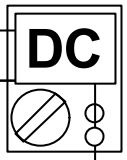
**OK**

Check Point 2 : Check ambient temp. around motor

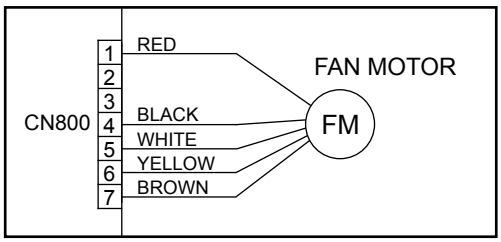
・Check excessively high temperature around the motor.
(If there is any surrounding equipment that causes heat)
**>>Upon the temperature coming down, restart operation.**

**OK**

Check Point 3 : Check 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 | 150 - 390V |
| White - Black | 15 ±1.5V |

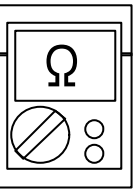
▶ **If the voltage is not correct, replace Main PCB.**

| **Trouble shooting 17**<br>**INDOOR UNIT Error Method:**<br>**Indoor manual auto switch error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 4 times, Timer LED : 2 times**<br>**ERROR CODE : [E : 20]** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit<br>Forced auto switch | **Detective details:**<br>When the Forced auto switch becomes ON for 30 consecutive seconds. |

Forecast of Cause :

1. Forced auto switch failure 2.Controller PCB failure

Check Point 1 : Check the Forced auto switch




- Check if Forced auto switch is kept pressed.
- Check ON/OFF switching operation by using a meter.

**>>If Forced auto switch is detective, replace it.**

**OK**

Check Point 2 : Replace Controller PCB

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

| Trouble shooting 18<br>**OUTDOOR UNIT Error Method:**<br>**Excessive high pressure protection on cooling** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 7 times, Timer LED : 3 times**<br>**ERROR CODE : [E : 24]** |
|---|---|

| **Detective Actuators:** | **Detective details:** |
|---|---|
| Outdoor Unit Main PCB Circuit<br>Outdoor Fan Motor<br>Heat Exchanger Temp. Thermistor<br>Outdoor unit Electronic Expansion Valve | Excessive high pressure protection on cooling mode has been activated. |

Forecast of Cause :

1. Defective connection of electric components 2. Outdoor Fan Operation failure
3. Outdoor Heat Exchanger clogged 4. Thermistor failure 5. EEV failure 6. 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 16)

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

**OK**

**Check Point 4 : Check Thermistor**

- Check Thermistor. (Refer to Trouble shooting 5)

**>> If the Thermistor is failure, replace it.**

**OK**

**Check Point 5 : Check Electronic Expansion Valve**

- Check EEV. **(PARTS INFORMATION 3)**

**OK**

**Check Point 6 : Replace Main PCB**

▶ **If Check Point 1～5 do not improve the symptom, change Main PCB.**

| Trouble shooting 19<br>**OUTDOOR UNIT Error Method:**<br>**PFC circuit error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 8 times, Timer LED : 4 times**<br>**ERROR CODE : [E : 25]** |
|---|---|
| **Detective Actuators:**<br>Outdoor Unit Main PCB Circuit | **Detective details:**<br>When inverter output DC voltage is higher than 415V for over 3 seconds, the compressor stops.<br>If the same operation is repeated 5 times, the compressor stops permanently. |

Forecast of Cause :

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

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

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

**OK**

**Check Point 2 : Check connection of Connector**

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

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

**OK**

**Check Point 3 : Replace Main PCB**

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

| Trouble shooting 20<br>**INDOOR UNIT Error Method:**<br>**4-way valve error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 7 times, Timer LED : 4 times**<br>**ERROR CODE : [E : 2c]** |
|---|---|

| **Detective Actuators:** | **Detective details:** |
|---|---|
| Indoor Unit Controller PCB Circuit<br>Heat Exchanger Temperature Thermistor<br>Room Temperature Thermistor<br>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.<br>▪ Cooling or Dry operation<br>[Indoor heat exchanger temp.] - [Room temp.] > 10degC<br>▪ Heating operation<br>[indoor heat exchanger temp.] - [room temp.] < -10degC<br>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. Controller 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 each thermistor

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

**>> Check characteristics of thermistor (Refer to Trouble shooting 3, 4, 5, 6, 7), If defective, replace the thermistor**

**OK**

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

[ Solenoid coil ]

- Remove CN30 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 Controller PCB

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

| Trouble shooting 21<br>**INDOOR UNIT Error Method:**<br>**Power supply frequency detection error** | **Indicate or Display:**<br>**Outdoor Unit : No indication**<br>**Indoor Unit : Operation LED : 4 times, Timer LED : 4 times**<br>**ERROR CODE : No indication** |
|---|---|
| **Detective Actuators:**<br>Indoor Unit Controller PCB Circuit | **Detective details:**<br>The power supply frequency cannot be recognized after 4sec of power ON. |

Forecast of Cause :

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

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

**NO**

**YES**

Check Point 2 : Check Connection

- Check any loose or removed connection line of Indoor unit and Outdoor unit.

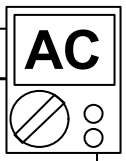
**>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**

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

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

**OK**

Check Point 3 : Check the voltage of power supply




- Check the voltage of power supply

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

**OK**

Check Point 4 : Replace Controller PCB

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

## 2-3 TROUBLE SHOOTING WITH NO ERROR CODE

**Trouble shooting 22**

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.**

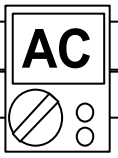
**OK**

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 Main PCB.

**>> If Fuse is open, check loose terminal or removed connector (CN1) , and replace Fuse.**

- Check Varistor in Main 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 23**

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.**

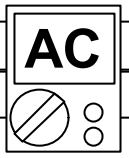
**OK**

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 loose terminal or removed connector (CN1) , and replace Fuse.**

- Check Varistor in Main 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 24**

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

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

**OK**

Turn off Power and check/ correct followings.

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

**OK**

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

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

**OK**

Check Point 3 : Check Electrical Components at Indoor and Outdoor


- Check Voltage at CN6 of Controller PCB.
  (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**

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

**Trouble shooting 25**

No Cooling / No Heating

Forecast of Cause:

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

**Check Point 1 : Check Indoor Unit**

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

**OK**

**Check Point 2 : Check Outdoor Unit Operation**

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

**OK**

**Check Point 3 : Check Site Condition**

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

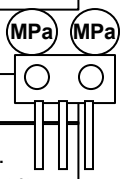
**OK**

**Check Point 4 : Check Indoor/ Outdoor Installation Condition**

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

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

**OK**




**Check Point 5 : Check Refrigeration Cycle**

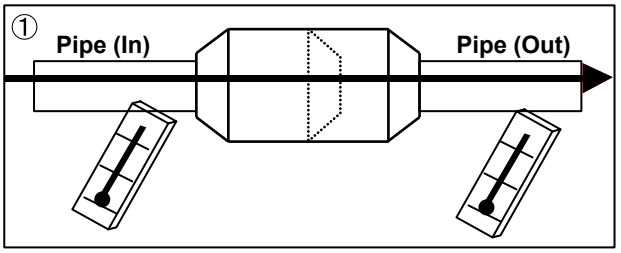
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

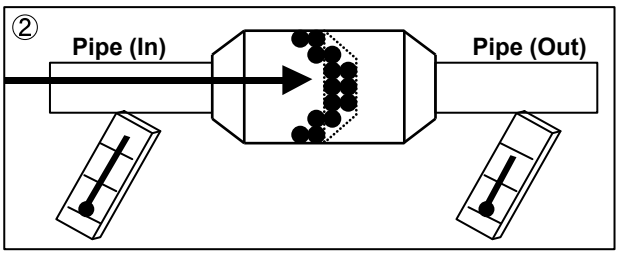
**>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.**

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

**Attention**

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



**Trouble shooting 26**

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 27**

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**

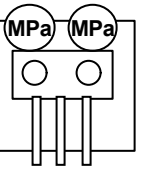
- Is Fan rotating?

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**

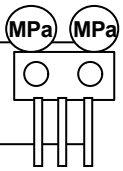
- Is there open or loose connection cable?
- Check Main PCB, connection of Compressor, and winding resistance. (Refer to the next page).

**>> 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)**

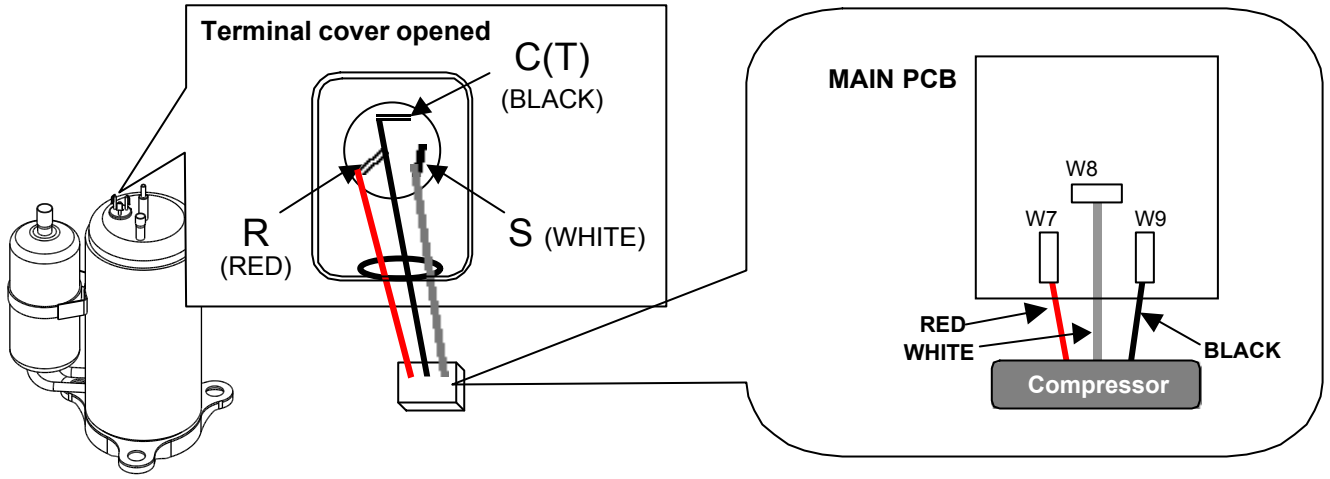
Replace Compressor

**SERVICE PARTS INFORMATION 2**

Inverter Compressor

## Check Point 1 : Check Connection

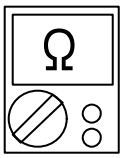
- Check terminal connection of Compressor (loose or incorrect wiring)
- Check connection of Main PCB (Loose or incorrect wiring)

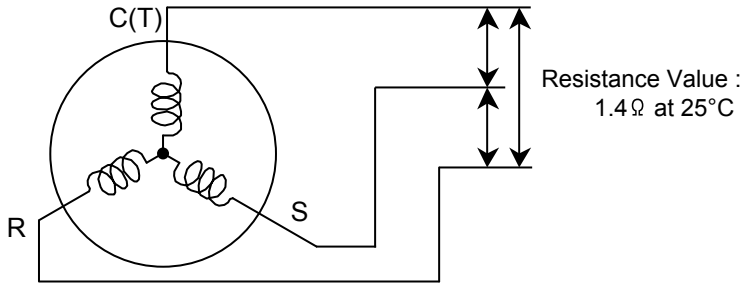



## Check Point 2 : Check Winding Resistance

- Check winding resistance of each terminal

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




## Check Point 3 : Replace Main PCB

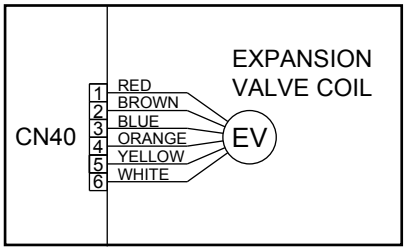
▶ **If the symptom does not change with above Check 1, 2, replace Main PCB.**

**SERVICE PARTS INFORMATION 3**

Outdoor unit Electronic Expansion Valve
( EEV )

## Check Point 1 : Check Connections

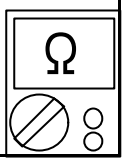
・Check connection of connector (CN40)
( Loose connector or open cable )




## 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 20°C |
| Yellow - Brown | |
| Orange - Red | |
| Blue - Brown | |




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

## Check Point 3 : Check Voltage from Main PCB.

・Remove Connector and check Voltage (DC12V)

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

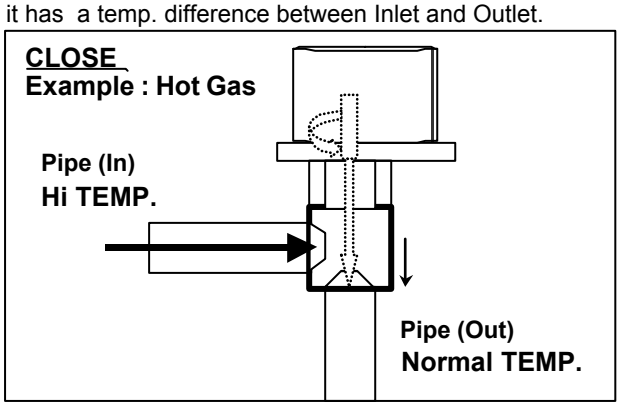

## Check Point 4 : Check Noise at start up

・Turn on Power and check operation noise.

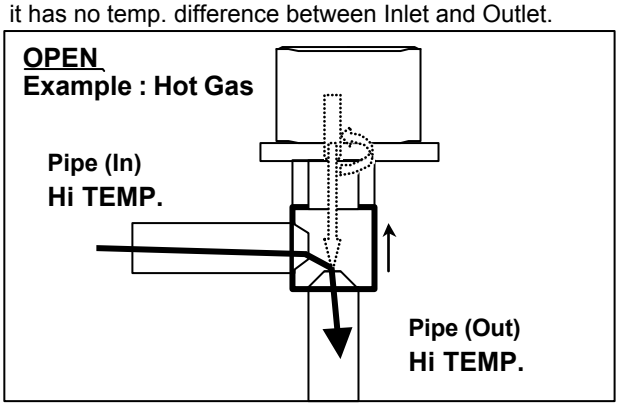
▶ **If an abnormal noise does not show, replace Main PCB.**

## Check Point 5 : Check Opening and Closing Operation of Valve

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

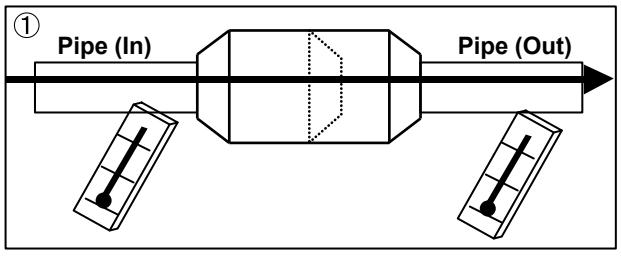


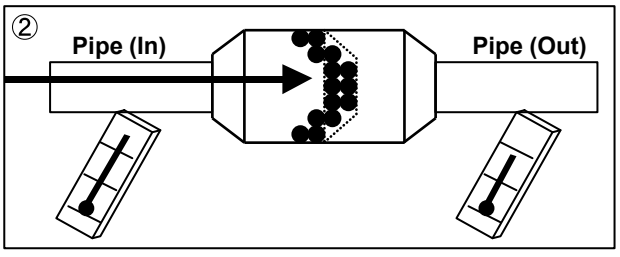

If it is open,
it has no temp. difference between Inlet and Outlet.




## 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.



Refrigerant
R410A

# *WALL MOUNTED type*
# *INVERTER*

## 3 . APPENDING DATA

1. Function setting

2. Outdoor unit Pressure Value and Total Electric Current Curve

3. Thermistor Resistance Values

# 3-1. FUNCTION SETTING

## 3-1-1 INDOOR UNIT

- Follow the instructions in the Local Setup Procedure, which is supplied with the remote control, in accordance with the installed condition.
  After the power is turned on, perform the Function Setting on the remote control.
- The settings may be selected between the following two: Function Number or Setting Value.
- Settings will not be changed if invalid numbers or setting values are selected.

### 1-1. Setting the Room Temperature Correction for Cooling

Depending on the installed environment, the room temperature sensor may require a correction.
The settings may be selected as shown in the table below.

(◆. . . Factory setting)

| | Setting Description | Function Number | Setting Value |
|---|---|---|---|
| ◆ | Standard | 30 | 00 |
| | Lower control | | 01 |

### 1-2. Setting the Room Temperature Correction for Heating

Depending on the installed environment, the room temperature sensor may require a correction.
The settings may be changed as shown in the table below.

(◆. . . Factory setting)

| | Setting Description | Function Number | Setting Value |
|---|---|---|---|
| ◆ | Standard | 31 | 00 |
| | Lower control | | 01 |
| | Slightly warmer control | | 02 |
| | Warmer control | | 03 |

### 1-3. Setting the Auto Restart

The following settings are also possible, depending on the operating conditions.

(◆. . . Factory setting)

| | Setting Description | Function Number | Setting Value |
|---|---|---|---|
| ◆ | Yes | 40 | 00 |
| | No | | 01 |

### 1-4. Setting the Remoto control Signal Code

The following settings are also possible, depending on the operating conditions.

(◆. . . Factory setting)

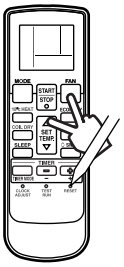
| | Setting Description | Function Number | Setting Value |
|---|---|---|---|
| ◆ | Code A | 44 | 00 |
| | Code B | | 01 |
| | Code C | | 02 |
| | Code D | | 03 |

## 3-1-2 Procedures to change the Function Setting for wireless RC

- This procedure changes to the function settings used to control the indoor unit according to the installation conditions. Incorrect settings can cause the indoor unit malfunction.
- After the power is turned on, perform the "FUNCTION SETTING" according to the installation conditions using the remote controller.
- Settings will not be changed if invalid numbers or setting values are selected.

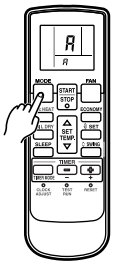
### Entering the Function Setting Mode

- While pressing the FAN button and SET TEMP.(▲) simultaneously, press the RESET button to enter the function setting mode.



### Selecting the Function Number and Setting Value

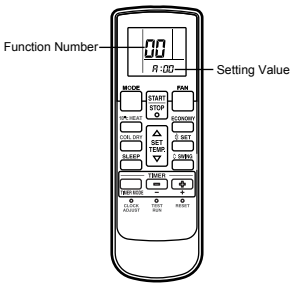
(1) Press the MODE button, and proceed to Fanction Number and Setting Value.
(There is no necessity for setting remote control signal code. Because signal code is setting by Fanction Number and Setting Value.)



(2) Press the SET TEMP. (▲) (▼) buttons to select the Function Number.
(Press the MODE button to switch between the left and right digits.)

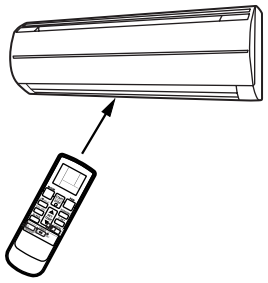
(3) Press the FAN button to proceed to Setting Value.
(Press the FAN button again to return to the Function Number selection.)

(4) Press the SET TEMP. (▲) (▼) buttons to select the Setting Value.
(Press the MODE button to switch between the left and right digits.)



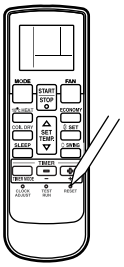

(5) Press the TIMER MODE button. It makes a signal to indoor unit.
(Indoor unit recognize the setting.)

(6) Press the START/STOP button. It makes a signal to indoor unit.
(Indoor unit run the setting.)



(7) Press the RESET button to cancel the function setting mode.

(8) After completing the FUNCTION SETTING, be sure to turn of the power and turn it on again.



| ⚠ CAUTION |
| --- |
| **After turning off the power, wait 10 seconds or more before turning on it again.**<br>**The FUNCTION SETTING doesn't become effective if it doesn't do so.** |

## Custom code setting for remote controller

(1) Press the MODE button for more then 5 seconds.

(2) Press the SET TEMP. (▲) (▼) buttons to change the signal code between A→b→C→d.
Match the code on the display to the air conditioner signal code. (initially set to A)

(3) Press the MODE button. (Return to normal display)

| ⚠ CAUTION |
| --- |
| If you change the setting of Fanction Number and Setting Value after setting custom code in remote controller, please set custom code in remote controller again.<br>The remote control unit resets to signal code A when the batteries in the remote control unit are replaced. If you use a signal code other than signal code A, reset the signal code after replacing the batteries.<br>If you do not know the air conditioner signal code setting, try each of the signal codes ( A→b→C→d ) until you find the code which operates the air conditioner. |

# 3-2. Outdoor unit Pressure Value and Total Electric Current Curve

## 3-2-1 Cooling operation

**Model Name : ASTA09 / 12LFC**

[Condition]

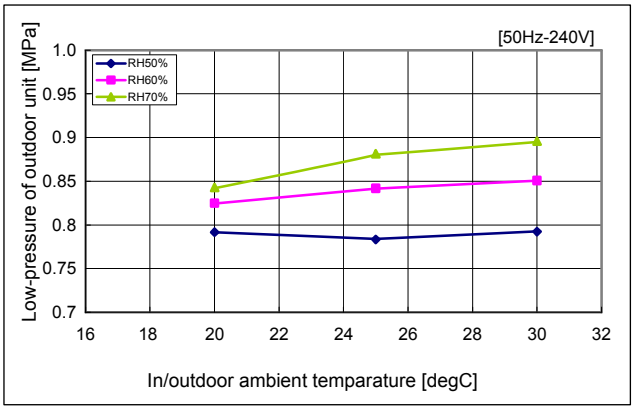
| | |
|---|---|
| Ambient temperature | Indoor / Outdoor - Same temperature |
| Refrigerant amount | Standard amount |
| Piping length | 7.5m<br>(Height difference 1m) |
| Power voltage | 50Hz - 240V |
| Operation condition | TEST mode (Cooling), Hi Fan, Horizontal direction, Front air flow |
| Measuring method | Measure the low pressure with the pressure meter at the service valve.<br>Measure the outdoor unit overall current with the current clamp meter at Power Cable. |

[Constant Frequency Operation Method (Test mode)]

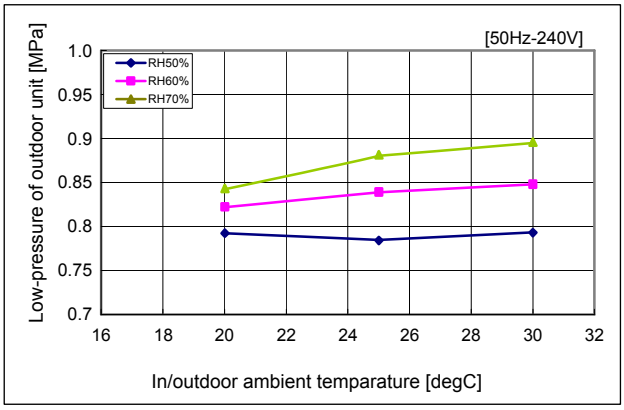
1. Operate on Colling mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

**(1) Indoor/Outdoor Temperature - Outdoor Low Pressure Curve**

ASTA09LFC

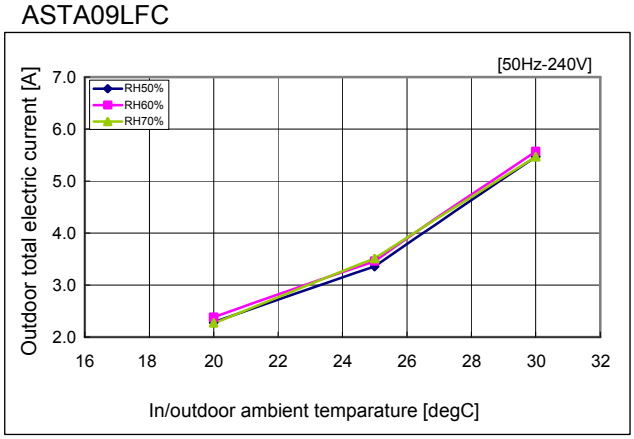



ASTA12LFC

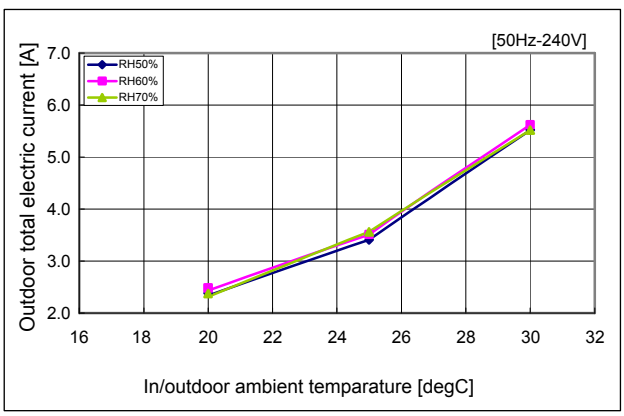



**(2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve**

ASTA09LFC




ASTA12LFC



## 3-2-2 Heating operation

**Model Name : ASTA09 / 12LFC**

[Condition]

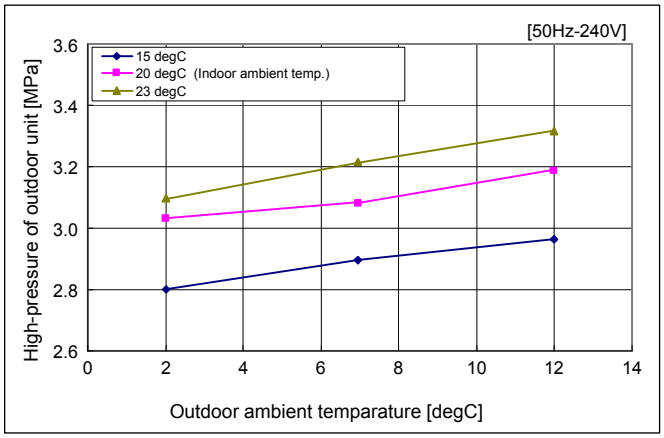
| | |
|---|---|
| Ambient temperatur | Indoor 15, 20, 23degC, Outdoor 2, 7, 12degC |
| Refrigerant amount | Standard amount |
| Piping length | 7.5m<br>(Height difference 1m) |
| Power voltage | 50Hz - 240V |
| Operation condition | TEST mode (Heating), Hi Fan, Lower direction, Front air flow |
| Measuring method | Measure the high pressure with the pressure meter at the service valve.<br>Measure the outdoor unit overall current with the current clamp meter at Power Cable. |

[Constant Frequency Operation Method (Test mode)]

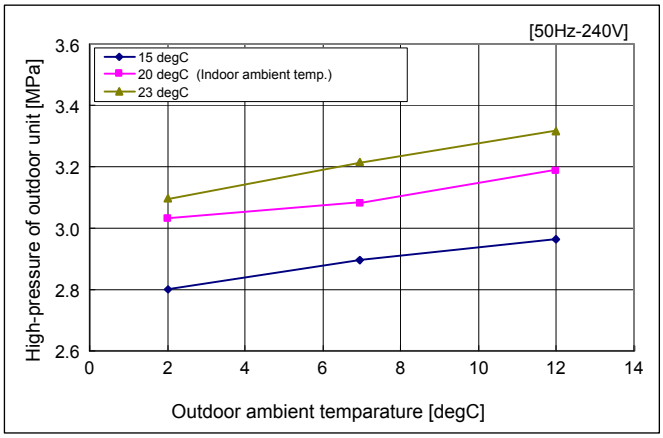
1. Operate on Heating mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

### (1) Indoor/Outdoor Temperature - Outdoor High Pressure Curve

ASTA09LFC

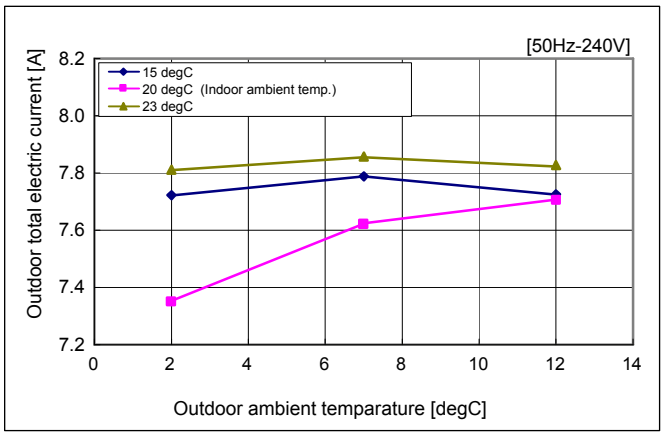



ASTA12LFC

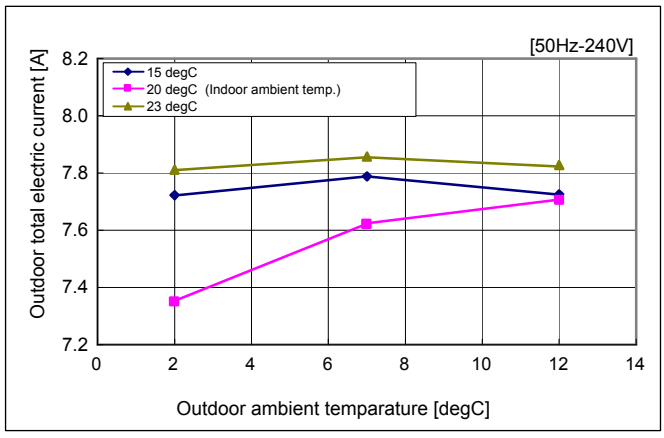



### (2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve

ASTA09LFC




ASTA12LFC



# 3-3. Thermistor Resistance Values

## 3-3-1 INDOOR UNIT

| Room temperature thermistor | | |
|---|---|---|
| Temp (℃) | Resistance(kΩ) | Voltage(V) |
| 0.00 | 33.62 | 1.15 |
| 5.00 | 25.93 | 1.39 |
| 10.00 | 20.18 | 1.66 |
| 15.00 | 15.84 | 1.94 |
| 20.00 | 12.54 | 2.22 |
| 25.00 | 10.00 | 2.50 |
| 30.00 | 8.04 | 2.77 |
| 35.00 | 6.51 | 3.03 |
| 40.00 | 5.30 | 3.27 |
| 45.00 | 4.35 | 3.48 |
| 50.00 | 3.59 | 3.68 |
| 55.00 | 2.98 | 3.85 |
| 60.00 | 2.47 | 4.00 |
| 65.00 | 2.09 | 4.14 |
| 70.00 | 1.76 | 4.25 |
| 75.00 | 1.49 | 4.35 |
| 80.00 | 1.27 | 4.44 |
| 85.00 | 1.09 | 4.51 |
| 90.00 | 0.93 | 4.57 |
| 95.00 | 0.81 | 4.63 |
| 100.00 | 0.70 | 4.67 |

| Indoor heat exchanger thermistor | | |
|---|---|---|
| Temp (℃) | Resistance(kΩ) | Voltage(V) |
| 0.00 | 176.03 | 1.10 |
| 5.00 | 134.23 | 1.36 |
| 10.00 | 103.34 | 1.63 |
| 15.00 | 80.28 | 1.92 |
| 20.00 | 62.91 | 2.21 |
| 25.00 | 49.70 | 2.51 |
| 30.00 | 39.57 | 2.79 |
| 35.00 | 31.74 | 3.06 |
| 40.00 | 25.64 | 3.30 |
| 45.00 | 20.85 | 3.53 |
| 50.00 | 17.06 | 3.73 |
| 55.00 | 14.10 | 3.90 |
| 60.00 | 11.64 | 4.55 |
| 65.00 | 9.69 | 4.19 |
| 70.00 | 8.12 | 4.30 |
| 75.00 | 6.83 | 4.40 |
| 80.00 | 5.78 | 4.48 |
| 85.00 | 4.91 | 4.55 |
| 90.00 | 4.19 | 4.61 |
| 95.00 | 3.59 | 4.66 |
| 100.00 | 3.09 | 4.71 |

## 7-3-2 OUTDOOR UNIT

| Discharge thermistor | | |
|---|---|---|
| Temp (℃) | Resistance(kΩ) | Voltage(V) |
| 0.00 | 168.6 | 0.36 |
| 5.00 | 130.7 | 0.45 |
| 10.00 | 102.2 | 0.56 |
| 15.00 | 80.51 | 0.70 |
| 20.00 | 63.89 | 0.85 |
| 25.00 | 51.05 | 1.01 |
| 30.00 | 41.07 | 1.20 |
| 35.00 | 33.26 | 1.41 |
| 40.00 | 27.09 | 1.62 |
| 45.00 | 22.20 | 1.85 |
| 50.00 | 18.29 | 2.08 |
| 55.00 | 15.15 | 2.31 |
| 60.00 | 12.62 | 2.54 |
| 65.00 | 10.56 | 2.76 |
| 70.00 | 8.878 | 2.97 |
| 75.00 | 7.498 | 3.17 |
| 80.00 | 6.361 | 3.36 |
| 85.00 | 5.419 | 3.53 |
| 90.00 | 4.635 | 3.69 |
| 95.00 | 3.980 | 3.83 |
| 100.00 | 3.430 | 3.96 |
| 105.00 | 2.967 | 4.07 |
| 110.00 | 2.575 | 4.17 |
| 115.00 | 2.243 | 4.26 |
| 120.00 | 1.960 | 4.34 |

| Outdoor heat exchanger thermistor | | |
|---|---|---|
| Temp (℃) | Resistance(kΩ) | Voltage(V) |
| -20.00 | 48.13 | 0.45 |
| -15.00 | 36.07 | 0.58 |
| -10.00 | 27.29 | 0.74 |
| -5.00 | 20.84 | 0.93 |
| 0.00 | 16.05 | 1.14 |
| 5.00 | 12.45 | 1.38 |
| 10.00 | 9.736 | 1.64 |
| 15.00 | 7.672 | 1.91 |
| 20.00 | 6.090 | 2.19 |
| 25.00 | 4.869 | 2.47 |
| 30.00 | 3.918 | 2.74 |
| 35.00 | 3.173 | 3.00 |
| 40.00 | 2.586 | 3.24 |
| 45.00 | 2.120 | 3.46 |
| 50.00 | 1.747 | 3.66 |
| 55.00 | 1.448 | 3.83 |
| 60.00 | 1.206 | 3.99 |
| 65.00 | 1.009 | 4.12 |
| 70.00 | 0.849 | 4.24 |
| 75.00 | 0.717 | 4.34 |
| 80.00 | 0.608 | 4.43 |
| 85.00 | 0.518 | 4.51 |
| 90.00 | 0.444 | 4.57 |
| 95.00 | 0.381 | 4.63 |
| 100.00 | 0.328 | 4.68 |

| Outdoor temperature thermistor | | |
|---|---|---|
| Temp (℃) | Resistance(kΩ) | Voltage(V) |
| -20.00 | 101.7 | 1.37 |
| -15.00 | 76.31 | 1.67 |
| -10.00 | 57.73 | 1.99 |
| -5.00 | 44.01 | 2.33 |
| 0.00 | 33.80 | 2.66 |
| 5.00 | 26.14 | 2.97 |
| 10.00 | 20.35 | 3.27 |
| 15.00 | 15.96 | 3.53 |
| 20.00 | 12.59 | 3.76 |
| 25.00 | 10.00 | 3.96 |
| 30.00 | 7.990 | 4.14 |
| 35.00 | 6.423 | 4.28 |
| 40.00 | 5.192 | 4.40 |
| 45.00 | 4.222 | 4.50 |
| 50.00 | 3.451 | 4.59 |
| 55.00 | 2.836 | 4.66 |
| 60.00 | 2.343 | 4.71 |
| 65.00 | 1.945 | 4.76 |
| 70.00 | 1.623 | 4.80 |
| 75.00 | 1.361 | 4.83 |
| 80.00 | 1.146 | 4.85 |
| 85.00 | 0.970 | 4.88 |
| 90.00 | 0.824 | 4.89 |
| 95.00 | 0.703 | 4.91 |
| 100.00 | 0.602 | 4.92 |

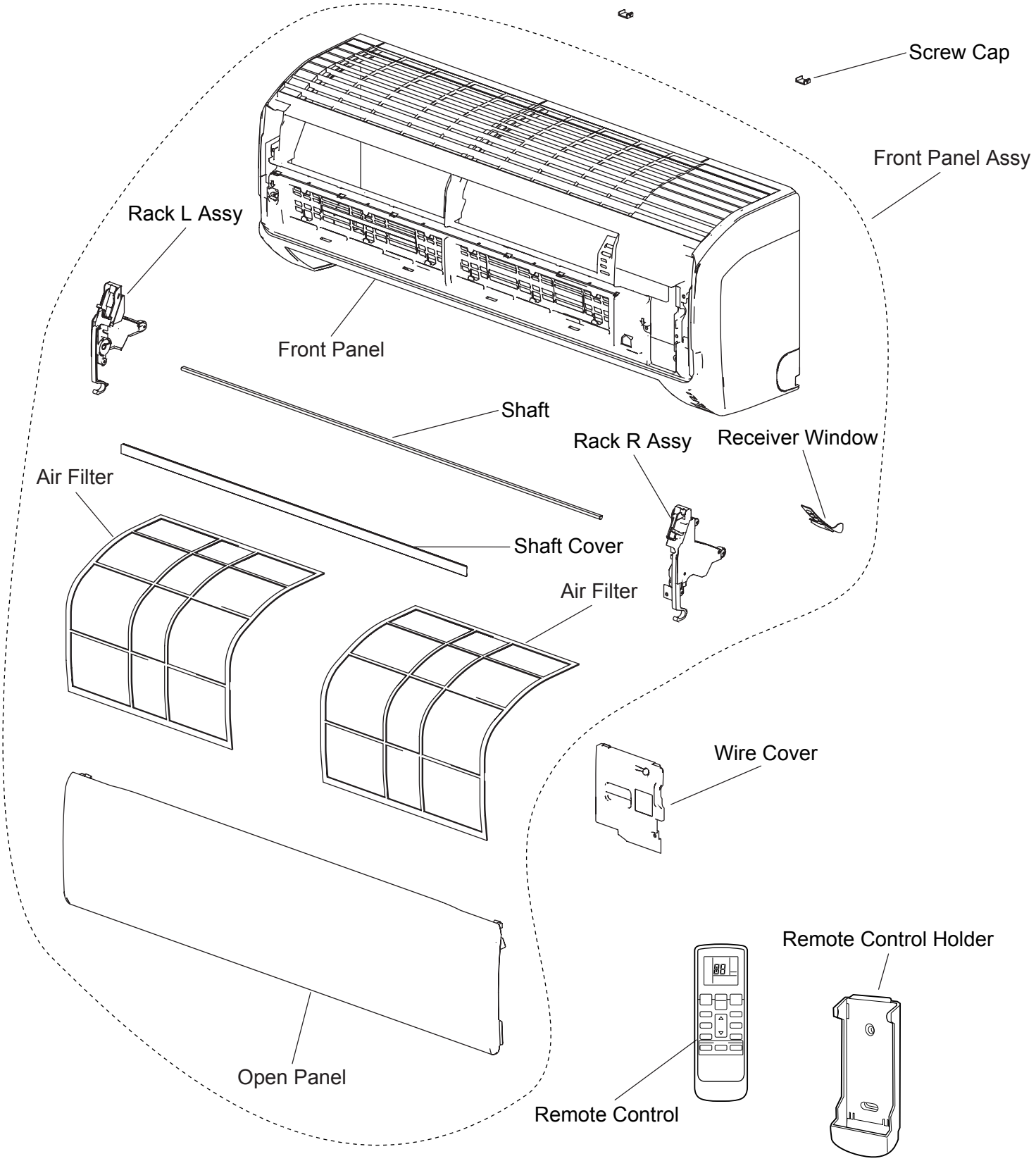
Refrigerant
R410A

# *WALL MOUNTED type*
# *INVERTER*

## 4 . REPLACEMENT PARTS

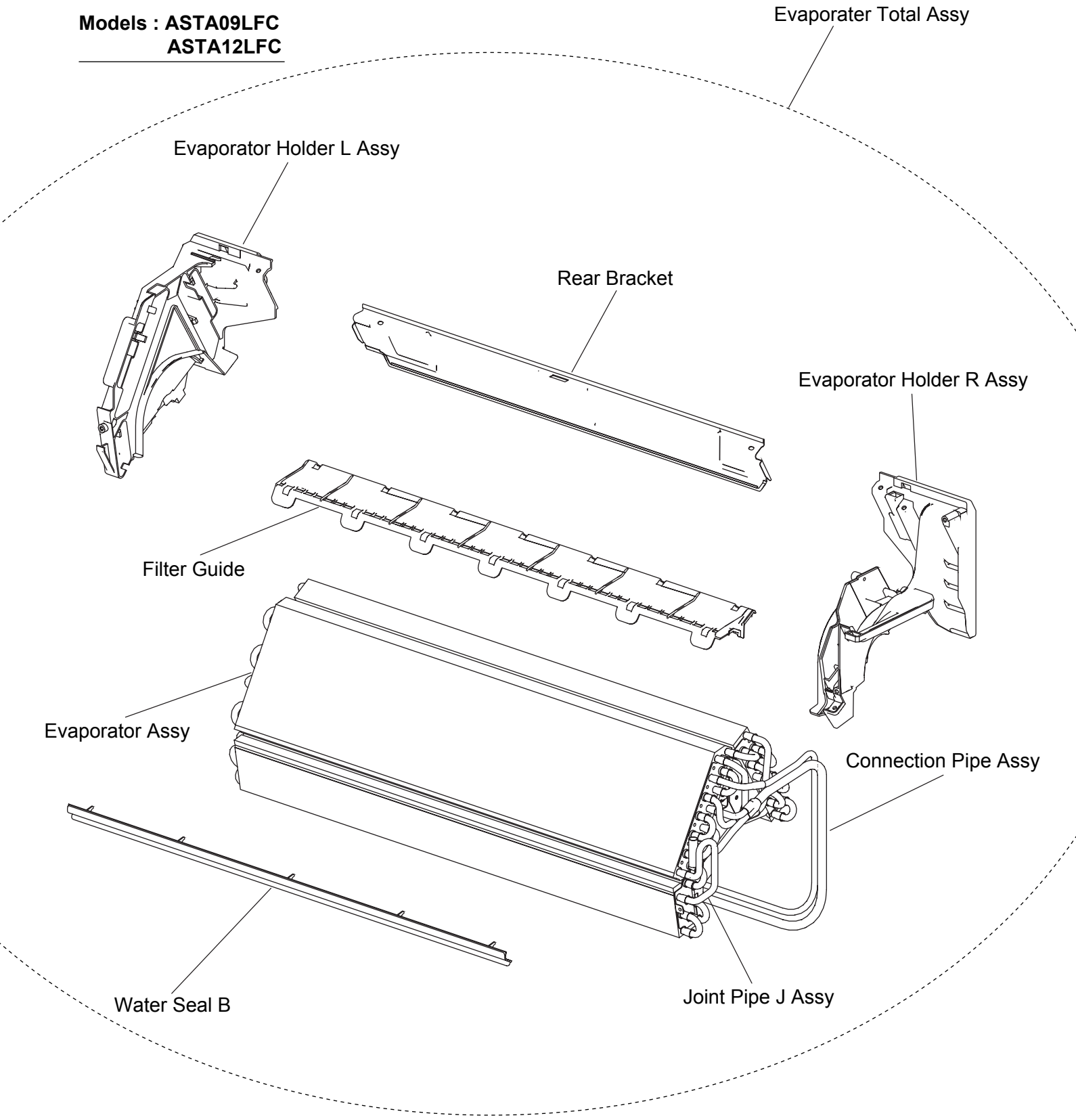
# REPLACEMENT PARTS

**Models : ASTA09LFC**
**ASTA12LFC**



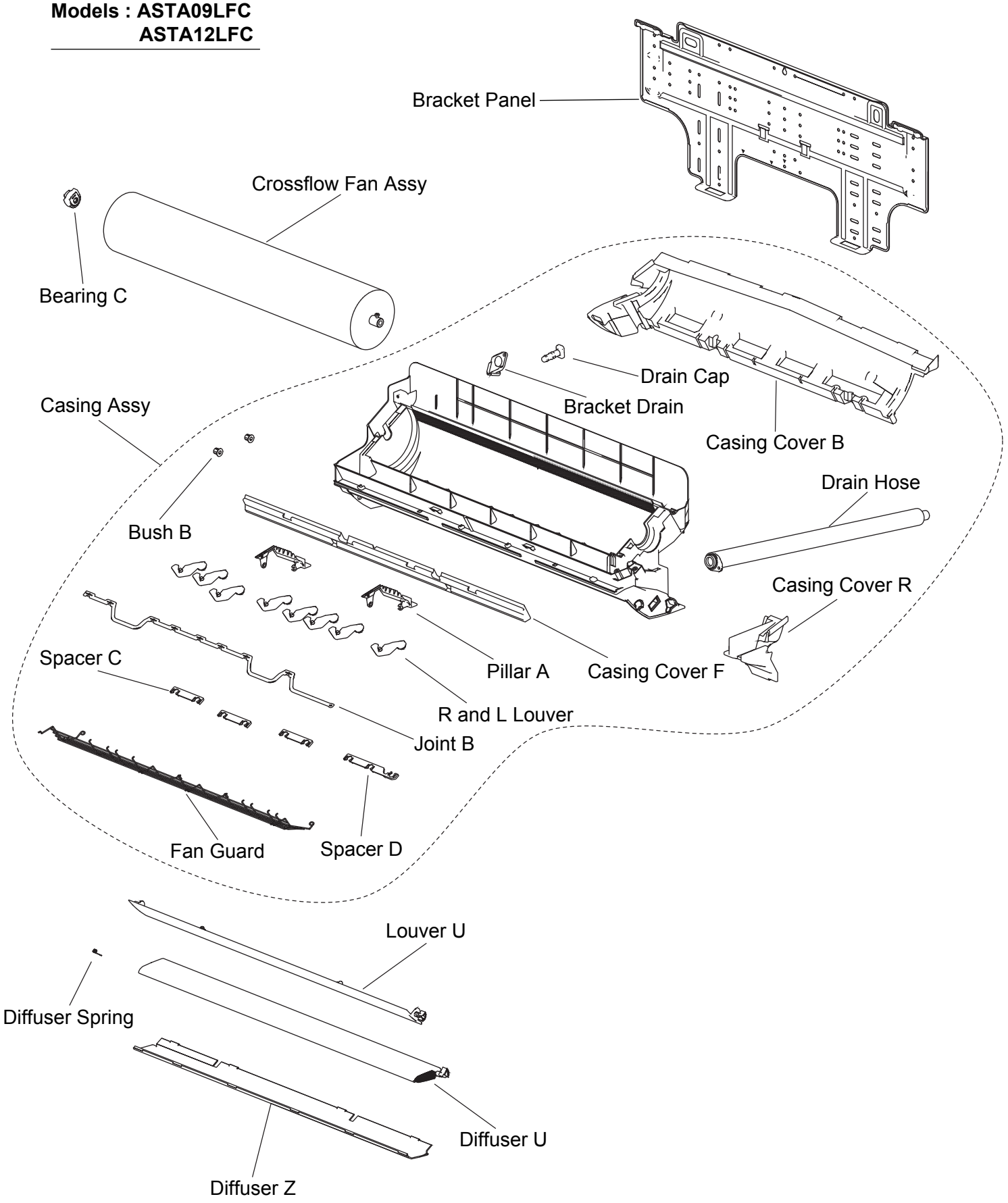
# REPLACEMENT PARTS

**Models : ASTA09LFC**
**ASTA12LFC**



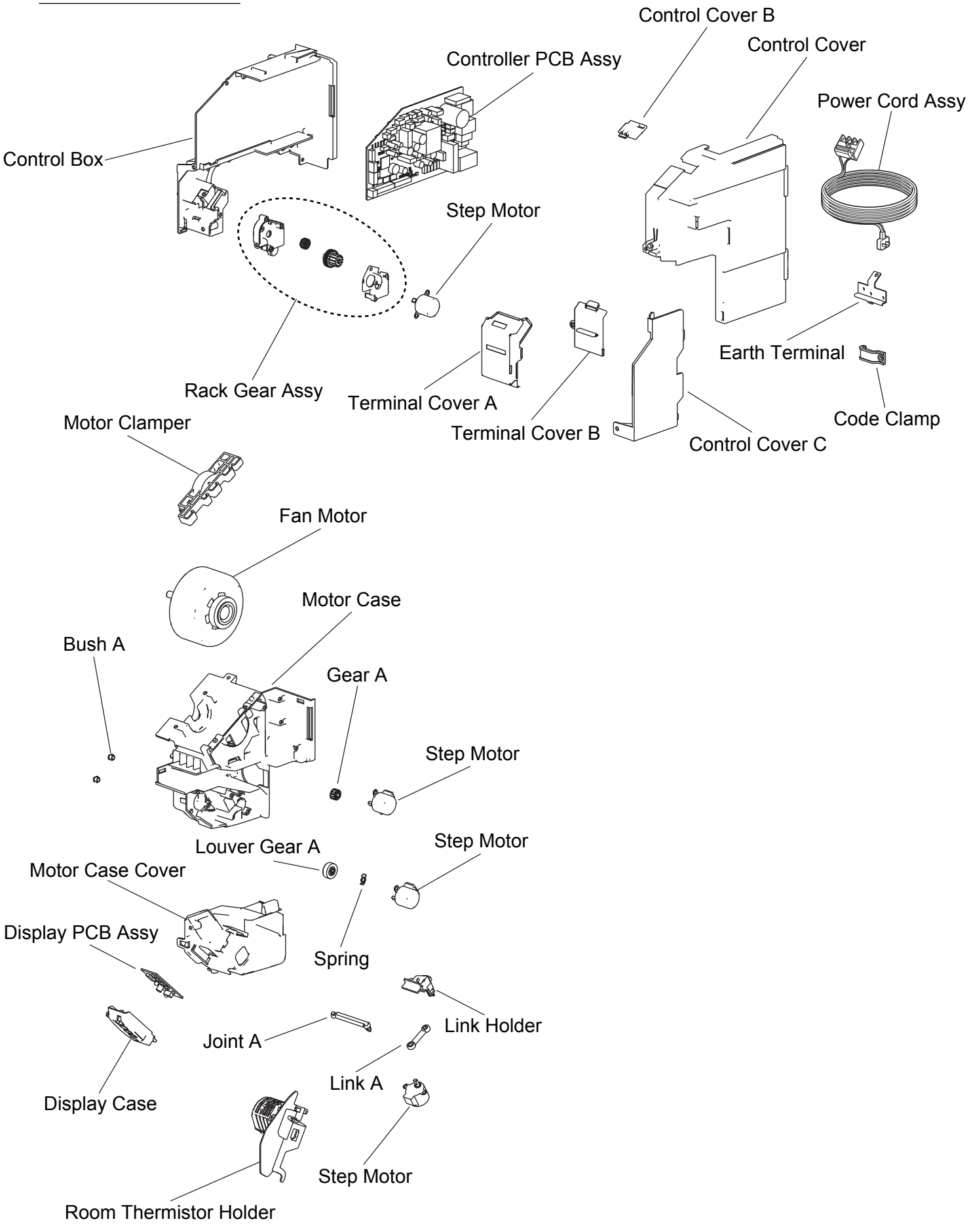
# REPLACEMENT PARTS

**Models : ASTA09LFC**
**ASTA12LFC**



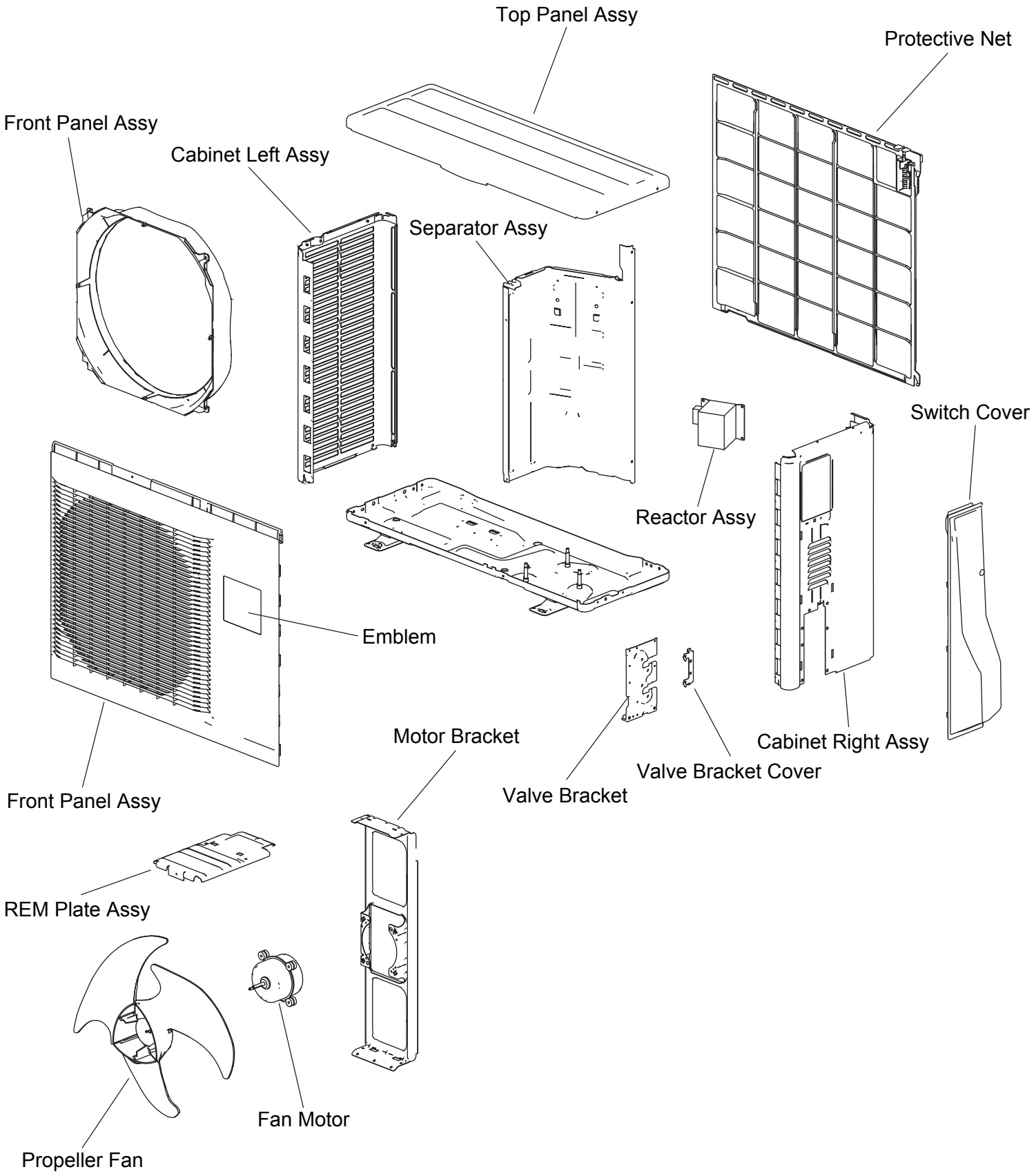
# REPLACEMENT PARTS

**Models : ASTA09LFC**
**ASTA12LFC**



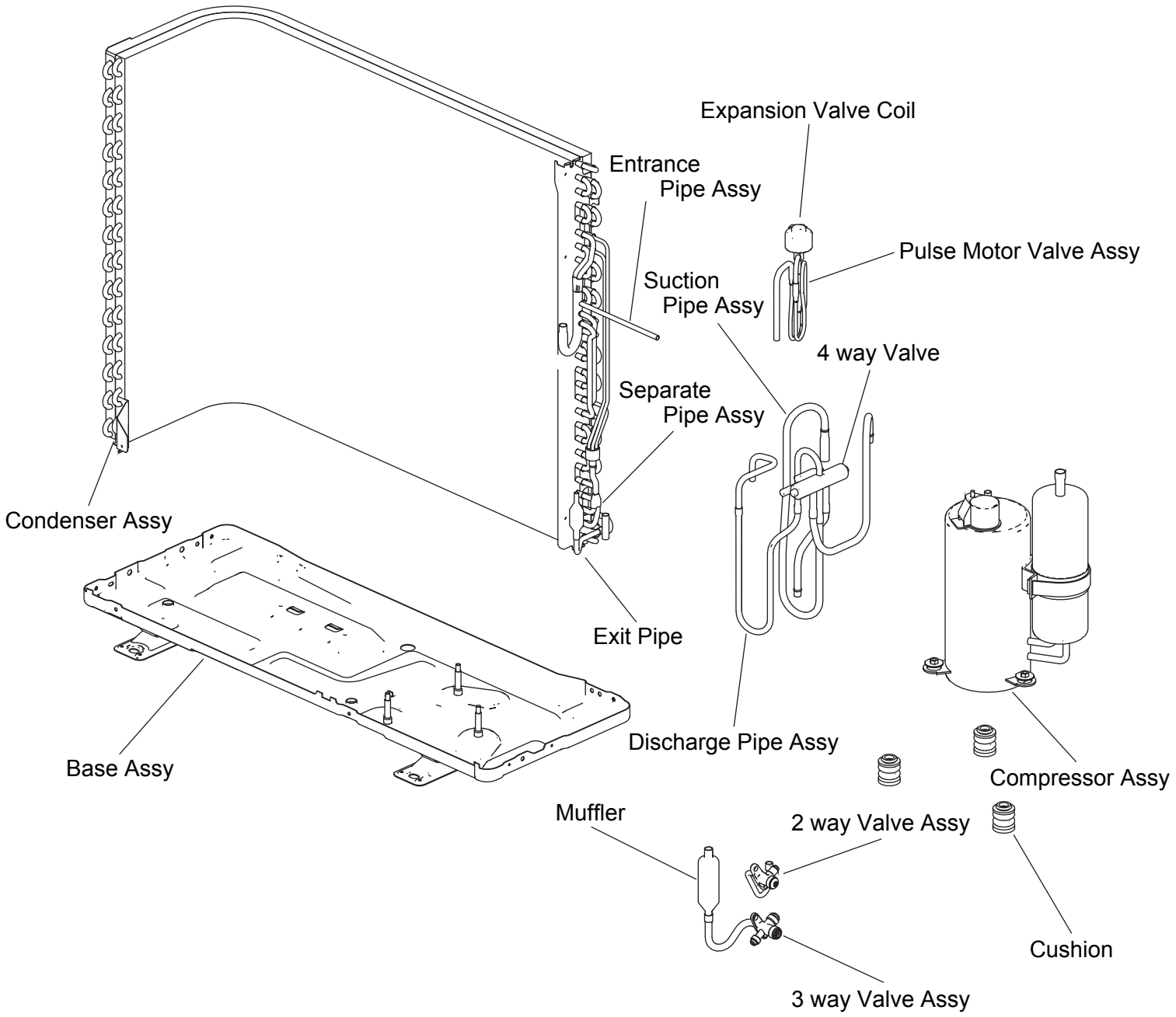
# REPLACEMENT PARTS

**Models : AOTR09LFC**
**AOTR12LFC**



# REPLACEMENT PARTS

**Models : AOTR09LFC**
**AOTR12LFC**



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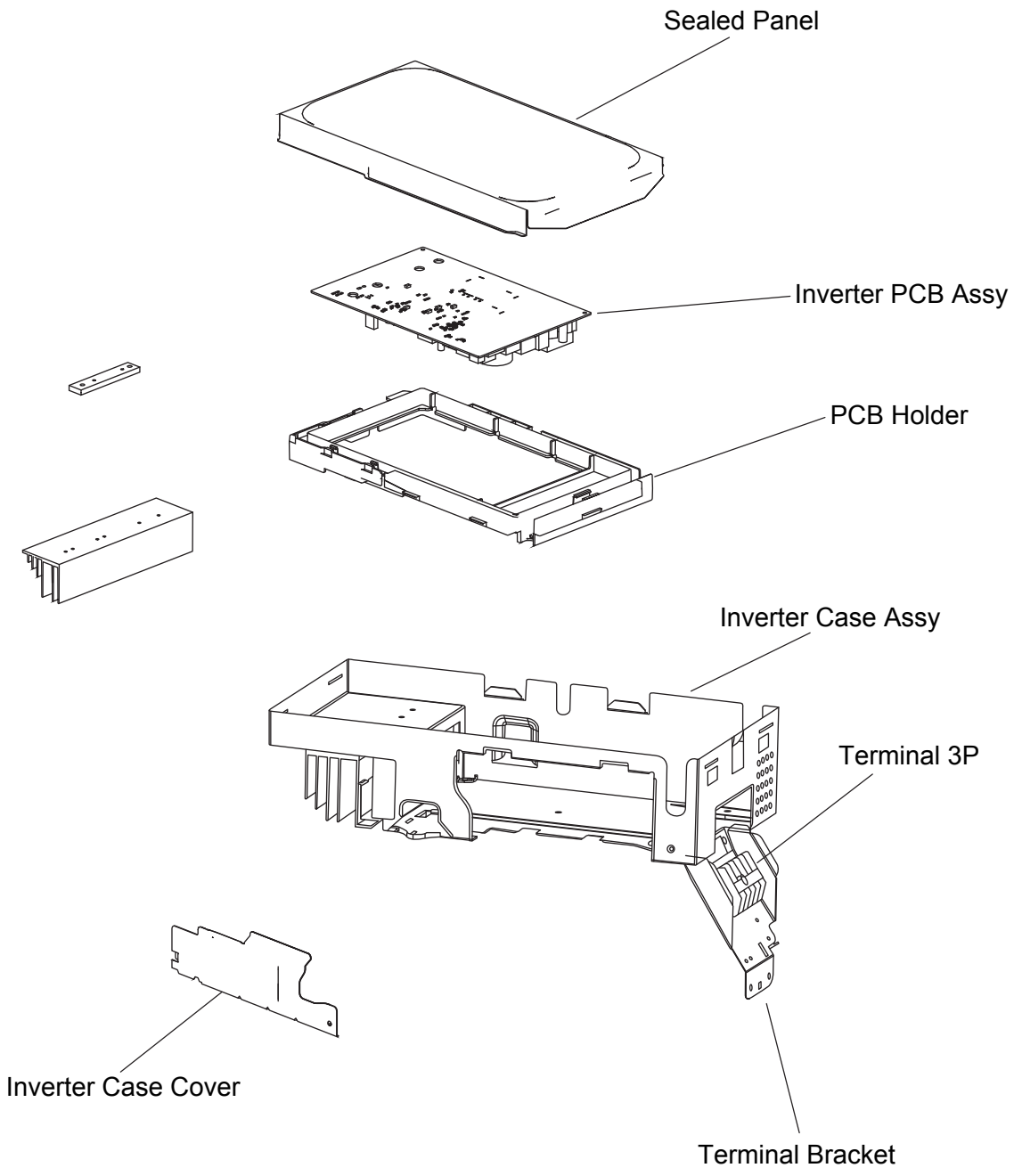
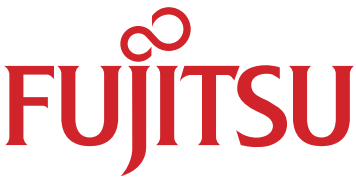
**Models : AOTR09LFC**
**AOTR12LFC**





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