

**SPLIT TYPE  
ROOM AIR CONDITIONER  
Universal Floor / Ceiling  
& Large Ceiling type**

**INVERTER**

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# **SERVICE INSTRUCTION**

<b>Models</b>	<b>Indoor unit</b>	<b>Outdoor unit</b>
	ABU18RULX	AOU18RLX
	ABU24RULX	AOU24RLX
	ABU36RSLX	AOU36RLX

*Refrigerant*  
**R410A**

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# *Universal Floor / Ceiling & Large Ceiling 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 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 3.6 degF(2 degC) higher than a set temperature, the compressor operation frequency will attain to maximum performance.

\* If the room temperature is 3.6 degF(2 degC) lower than a set temperature, the compressor will be stopped.

\* When the room temperature is between +3.6 degF(+2 degC) to -3.6 degF(-2 degC) of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

( Table 1 : Compressor Frequency Range )

	minimum frequency	maximum frequency
ABU18RULX	20Hz	63Hz
ABU24RULX	20Hz	80Hz
ABU36RSLX	20Hz	90Hz

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

Outdoor air temperature		Fan speed mode				
		Hi	Me	Lo		
87.8°F (31°C)	A zone	ABU18RULX	A zone	63Hz	45Hz	45Hz
	B zone		B zone	45Hz	35Hz	35Hz
			C zone	35Hz	35Hz	35Hz
			D zone	35Hz	30Hz	30Hz
66.2°F (19°C)	C zone	ABU24RULX	A zone	80Hz	55Hz	55Hz
			B zone	55Hz	45Hz	45Hz
			C zone	45Hz	45Hz	45Hz
			D zone	45Hz	35Hz	35Hz
51.8°F (11°C)	D zone	ABU36RSLX	A zone	90Hz	75Hz	75Hz
			B zone	75Hz	70Hz	70Hz
			C zone	70Hz	63Hz	63Hz
			D zone	63Hz	55Hz	55Hz

## 2. HEATING OPERATION

### 2-1 HEATING CAPACITY CONTROL

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

- \* If the room temperature is lower 5.4 degF(3 degC) than a set temperature, the compressor operation frequency will attain to maximum performance.
- \* If the room temperature is higher 3.6 degF(2 degC) than a set temperature, the compressor will be stopped.
- \* When the room temperature is between +3.6 degF(+2 degC) to -5.4 degF(-3 degC) 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 Figure 2 based on the outdoor temperature.

( Table 2 : Compressor Frequency Range )

	minimum frequency	maximum frequency
ABU18RULX	20Hz	87Hz
ABU24RULX	20Hz	87Hz
ABU36RSLX	20Hz	95Hz

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

Outdoor air temperature		Limit of Maximum Frequency
68°F (20°C)	E zone	
		ABU18RULX A zone 87Hz
		B zone 85Hz
		C zone 70Hz
		D zone 70Hz
60.8°F (16°C)	D zone	
		E zone 60Hz
	C zone	ABU24RULX A zone 87Hz
		B zone 85Hz
		C zone 70Hz
53.6°F (12°C)	B zone	
		D zone 70Hz
		E zone 60Hz
	A zone	ABU36RSLX A zone 95Hz
		B zone 95Hz
41°F (5°C)		C zone 90Hz
		D zone 80Hz
		E zone 80Hz

### 3. DRY OPERATION

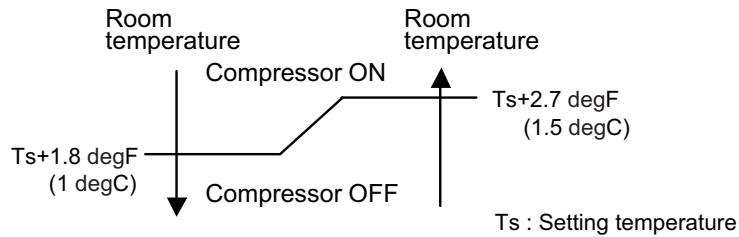
#### 3-1 INDOOR UNIT CONTROL

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

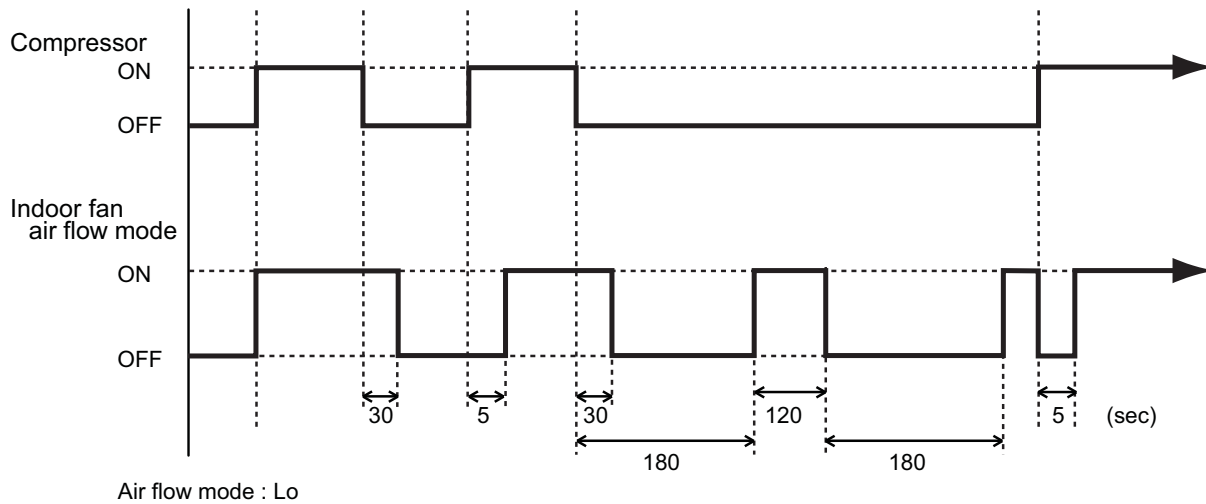
( Table 3 : Compressor frequency )

	Operating frequency
ABU18RULX	25Hz
ABU24RULX	30Hz
ABU36RSLX	45Hz

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



( Fig.4 : Indoor Fan Control )



## 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 and MONITORING modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 64°F(18°C) and 88°F(30°C) in 2 degF(1 degC) steps.

- ① When operation starts, only the indoor fan is operated for 1 minute. (Air flow mode: S-Lo)  
After 1 minute, depends on the room temperature and outdoor unit's operation mode, the operation mode is selected in accordance with the table below.

( Table 4 : Operation mode selection table )

Room temperature :TR	Operation mode
$TR \geq Ts + 3.6 \text{ degF}$ (2 degC)	Cooling
$Ts + 3.6 \text{ degF} > TR > Ts - 3.6 \text{ degF}$ (2 degC) (2 degC)	Monitoring
$Ts + 3.6 \text{ degF} \geq TR$ (2 degC)	Heating

Ts : Setting temperature

- ② When COOLING was selected at ①, the same operation as COOLING OPERATION is performed.
- ③ When HEATING was selected at ①, the same operation as HEATING OPERATION 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

( Table 5 : Indoor Fan Speed )

· ABU18RULX

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1060
	Me	890
	Lo	770
	S-Lo	250
Cooling	Hi	1060
	Me	890
	Lo	770
	S-Lo	250

· ABU24RULX

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1100
	Me	1000
	Lo	900
	S-Lo	250
Cooling	Hi	1180
	Me	1000
	Lo	900
	S-Lo	250

· ABU36RSLX

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1100
	Me	900
	Lo	700
	S-Lo	200
Cooling	Hi	1100
	Me	1000
	Lo	850
	S-Lo	200

## 2. FAN OPERATION

The airflow can be switched in 4 steps such as AUTO, LOW, MED, HIGH, while the indoor fan only runs.

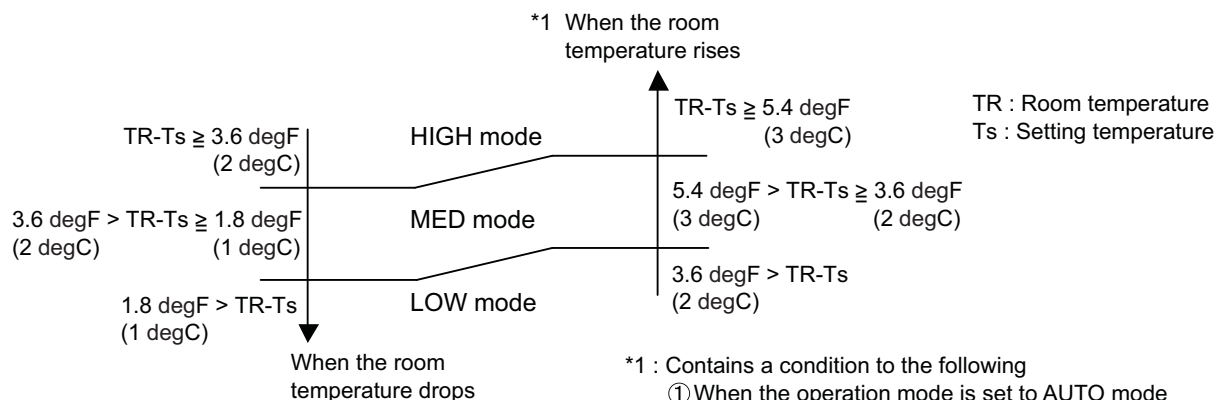
When [AUTO] is selected, the indoor fan motor runs LO and OFF at 1 minute intervals.

## 3. COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 5.

On the other hand, if switched in [HIGH]~ [LOW], the indoor motor will run at a constant airflow of [COOL] operation modes LOW, MED, HIGH, as shown in Table 5.

( Fig.5 : Airflow change - over ( Cooling : AUTO ) )



\*1 : Contains a condition to the following

- ① When the operation mode is set to AUTO mode at the start of operation.
- ② When the setting temperature was changed.
- ③ When the operation mode was changed to COOLING mode.
- ④ When the airflow mode was changed to AUTO mode.



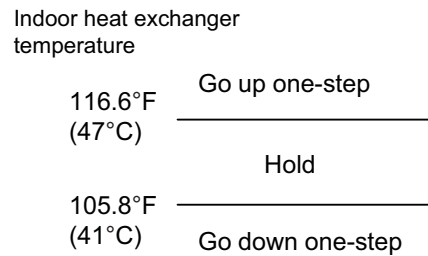
#### 4. HEATING OPERATION

When the airflow is set to [AUTO], the indoor fan motor operates [MED] mode.

Then the indoor fan motor will run according to a room temperature, as shown in Figure 6.

On the other hand, if switched in [HIGH] ~ [LOW], the indoor motor will run at a constant airflow of [COOL] operation modes LOW, MED, HIGH, as shown in Table 5.

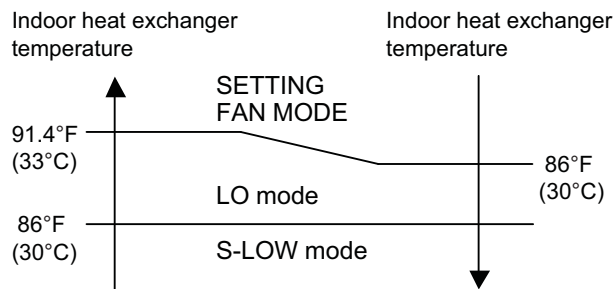
( Fig.6 : Airflow change - over ( Heating : AUTO ) )



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

The maximum value of the indoor fan speed is set as shown in Figure 7, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

( Fig.7 : Cool Air Prevention Control )



#### 6. DRY OPERATION

Refer to the Figure 4.

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

## 6. OUTDOOR FAN CONTROL

### 1. Outdoor Fan Motor

Following table shows the fan speed of the outdoor unit.

( Table 6 : Fan speed of the outdoor unit )

	Cooling	Heating
ABU18RULX	780/ 400/ 250/ 220/ 200 rpm	780/ 400/ 250/ 220/ 200 rpm
ABU24RULX	900/ 850/ 780/ 400/ 250/ 220/ 200 rpm	900/ 780/ 400/ 250/ 220/ 200 rpm
ABU36RSLX		

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

\* For ABU18RULX

It runs at 250rpm for 20 seconds after starting up the outdoor fan.  
When the outdoor heat exchanger temperature is lower than 35.6°F (2°C),  
the fan speed switches to 780rpm on heating mode.

\* For ABU24RULX / ABU36RSLX

It runs at 250rpm for 20 seconds after starting up the outdoor fan.  
When the outdoor heat exchanger temperature is lower than 35.6°F (2°C),  
the fan speed switches to 900rpm on heating mode.

# 7. LOUVER CONTROL

## 1. VERTICAL LOUVER CONTROL

(Function Range)

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

■ For ABU18/ 24RULX

① → ② → ③ → ④ → ⑤ → ⑥ → ⑦

■ For ABU36RSLX

① → ② → ③ → ④

(Operation Range)

■ For ABU18/ 24RULX

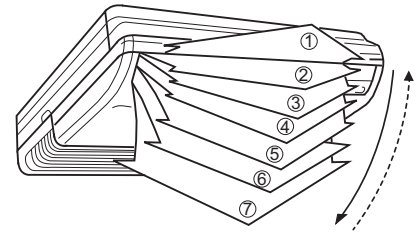
Cooling / Dry mode : }  
 Heating mode : } ① - ② - ③ - ④ - ⑤ - ⑥ - ⑦  
 Fan mode : }

■ For ABU36RSLX

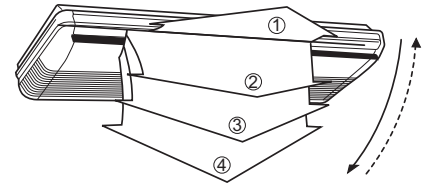
Cooling / Dry mode : }  
 Heating mode : } ① - ② - ③ - ④  
 Fan mode : }

(Fig.8 : Air Direction Range)

■ ABU18/ 24RULX  
 (UNIVERSAL FLOOR/ CEILING TYPE)



■ ABU36RSLX  
 (LARGE CEILING TYPE)



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 / Fan mode : Horizontal flow ①  
 Heating mode : Downward flow ⑦ (For ABU18/ 24RULX)  
 ④ (For ABU36RSLX)

• At the start of operation if the setting louver position is ① or ②, the setting position is set to ① or ② after the louver moves from totally-enclosed position to ③. (Positioning Control)

• The indoor fan motor starts after the louver reaches to the setting position.

### 1-2. SWING OPERATION

When the swing signal is received from the remote controller, the vertical louver starts to swing. The range of swing depends on the set airflow direction.

(Swinging Range)

Airflow direction set	Range of swing	
	ABU18/ 24RULX	ABU36RSLX
①	① to ③	① to ③
②	① to ④	② to ④
③	② to ⑤	② to ④
④	③ to ⑥	① to ④
⑤	④ to ⑦	—
⑥	⑤ to ⑦	—
⑦	① to ⑦	—

• When the indoor fan is either at S-Lo or Stop mode, the swinging operation is interrupted and the louver stops at the memorized position.  
 ( Stop mode means Operation stop.)

## 2. HORIZONTAL LOUVER CONTROL

(Function Range)

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

① → ② → ③ → ④ → ⑤

(Operation Range)

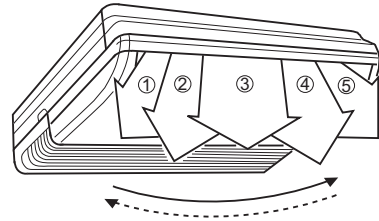
Cooling / Dry mode : }  
 Heating mode : } ① - ② - ③ - ④ - ⑤  
 Fan mode : }

Use the air direction adjustments within the ranges shown above.

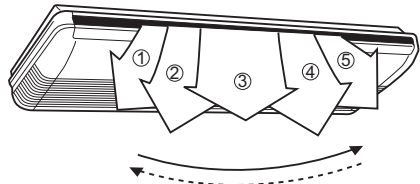
- The horizontal airflow direction is set automatically on ③ after initialization.

(Fig.9 : Air Direction Range)

■ ABU18/ 24RULX  
 (UNIVERSAL FLOOR/ CEILING TYPE)



■ ABU36RSLX  
 (LARGE CEILING TYPE)



### 2-1. SWING OPERATION

When the swing signal is received from the remote controller, the horizontal louver starts to swing. The range of swing depends on the set airflow direction.

(Swinging Range)

Airflow direction set	Range of swing
①	① to ⑤
②	① to ③
③	② to ④
④	③ to ⑤
⑤	① to ⑤

- When the indoor fan is either at S-Lo or Stop mode, the swinging operation is interrupted and the louver stops at the memorized position.  
 ( Stop mode means Operation stop.)

## 8. COMPRESSOR CONTROL

### 1. OPERATION FREQUENCY RANGE

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

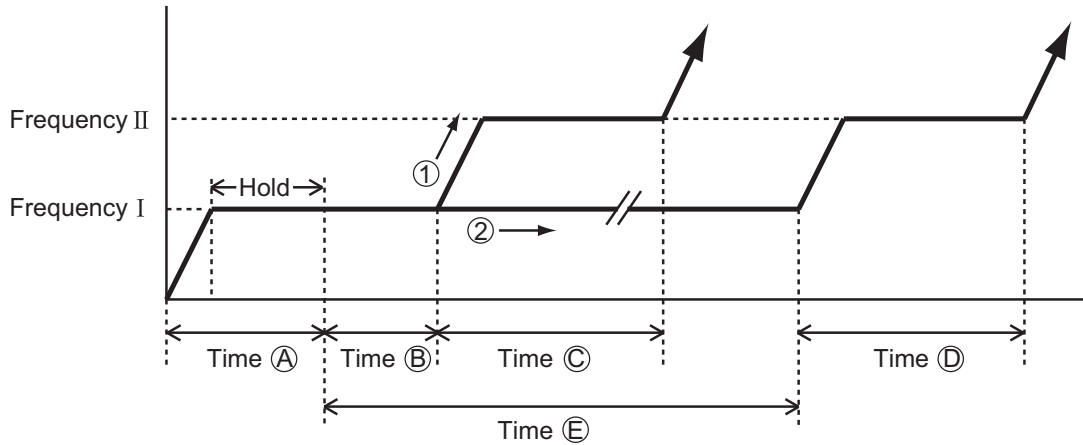
(Table 7 : Compressor Operation Frequency Range)

	Cooling		Heating		Dry
	Min	Max	Min	Max	
ABU18RULX	20Hz	63Hz	20Hz	87Hz	25Hz
ABU24RULX	20Hz	80Hz	20Hz	87Hz	30Hz
ABU36RSLX	20Hz	90Hz	20Hz	95Hz	45Hz

### 2. OPERATION FREQUENCY CONTROL AT START UP

The compressor frequency soon after the start-up is controlled as shown in Figure 10.

(Fig.10 : Compressor Control at Start-up)



- ① Discharge pipe temp.  $\geq 50^{\circ}\text{F}$  ( $10^{\circ}\text{C}$ ) (Cooling)  
86°F (30°C) (Heating)
- ② Discharge pipe temp.  $< 50^{\circ}\text{F}$  ( $10^{\circ}\text{C}$ ) (Cooling)  
86°F (30°C) (Heating)

(Frequency)

	Frequency I	Frequency II
ABU18RULX	40Hz	56Hz
ABU24RULX		
ABU36RSLX		

(Time)

	Time A	Time B	Time C	Time D	Time E
ABU18RULX	180sec	60sec	120sec	120sec	720sec
ABU24RULX					
ABU36RSLX					

## 9. TIMER OPERATION CONTROL

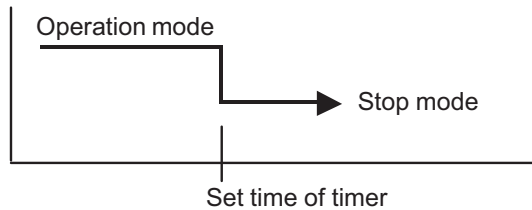
### 9-1 Wireless Remote Controller (accessory parts)

#### AR- JW5

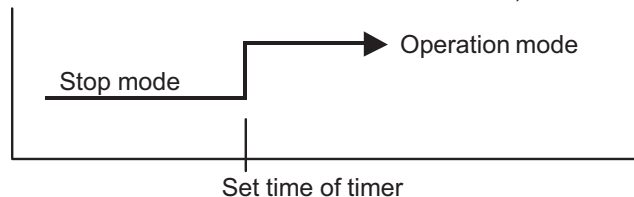
- ON / TIMER
- OFF / TIMER
- PROGRAM TIMER
- SLEEP TIMER

#### 1. ON / OFF TIMER

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

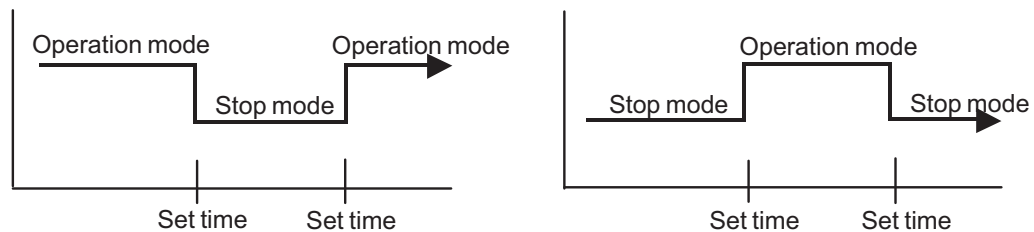


- ON timer : When the clock reaches the set time, the air conditioner will be turned on.



#### 2. PROGRAM TIMER

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



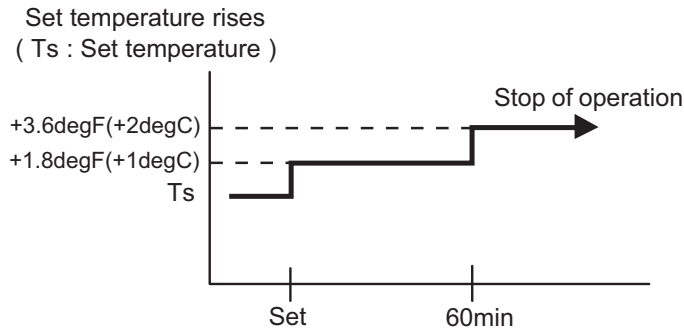
- Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current timer setting.  
The order of operations is indicated by the arrow in the remote control unit's display.
- SLEEP timer operation cannot be combined with ON timer operation.

### 3. SLEEP TIMER

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

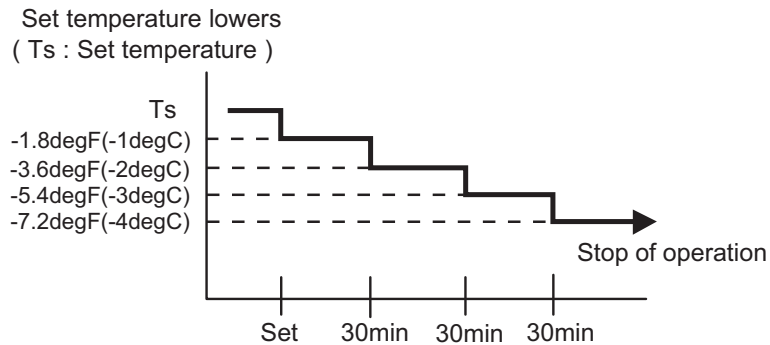
#### In the cooling operation mode

When the sleep timer is set, the setting temperature is increased 1.8 degF (1 degC). It increases the setting temperature another 1.8 degF (1 degC) after 1 hour. After that, the setting temperature is not changed and the operation is stopped at the time of timer setting.



#### In the heating operation mode

When the sleep timer is set, the setting temperature is decreased 1.8 degF (1 degC). It decreases the setting temperature another 1.8 degF (1 degC) every 30 minutes. Upon lowering 7.2 degF (4 degC), the setting temperature is not changed and the operation stops at the time of timer setting.



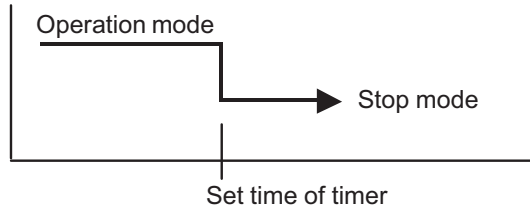
## 9-2 Wired Remote Controller (optional parts)

### UTB- UUB

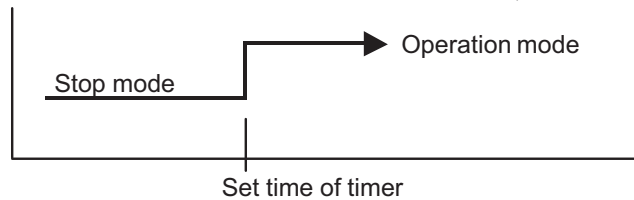
- ON / TIMER
- OFF / TIMER
- WEEKLY TIMER
- TEMPERATURE SET BACK TIMER

#### 1. ON / OFF TIMER

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



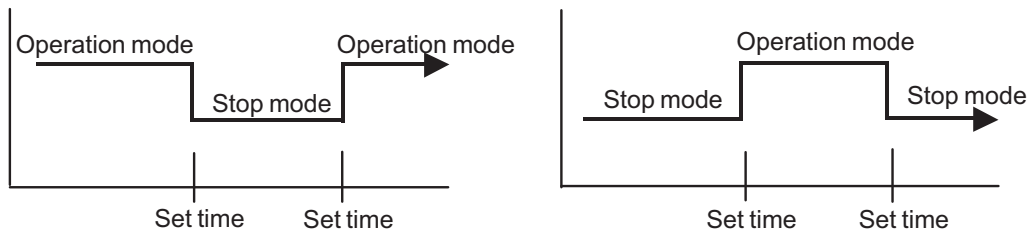
- ON timer : When the clock reaches the set time, the air conditioner will be turned on.



#### 2. WEEKLY TIMER

##### 2-1. WEEKLY TIMER

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



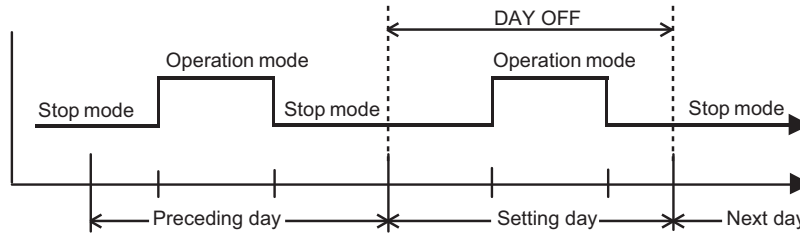
- The operating time can be set in 30 min increments only.
- The OFF time can be carried over to next day.
- The ON timer and the OFF timer functions cannot be set with using the weekly timer. Both ON and OFF time must be set.



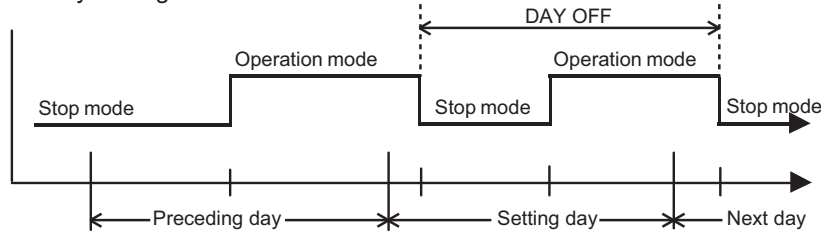
## 2-2. DAY OFF setting

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

### • Normal



### • Next day setting



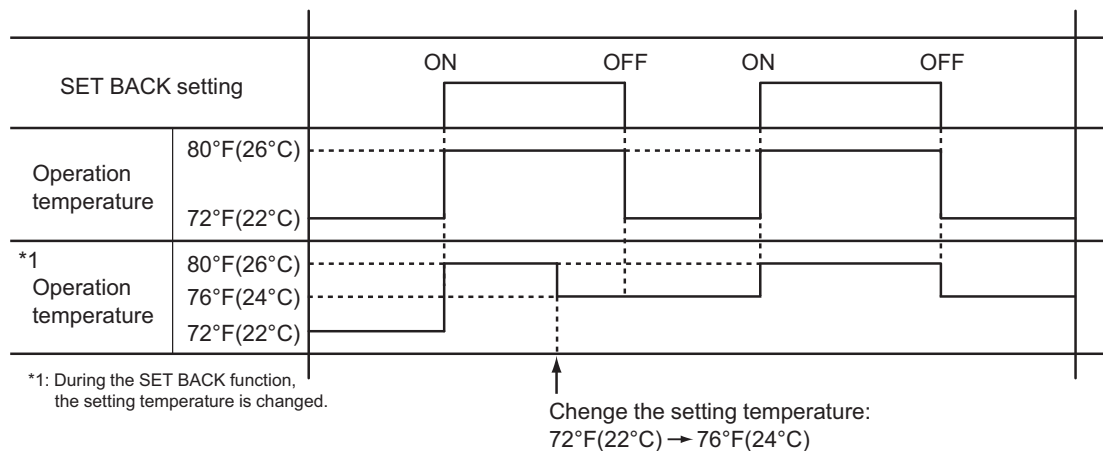
- The DAY OFF setting can only be set one time. The DAY OFF setting is cancelled automatically after the set day has passed.

## 3. TEMPERATURE SET BACK TIMER

- The SET BACK timer only changes the set temperature for 7 days, it cannot be used to start or stop air conditioner operation.
- The SET BACK timer can be set to operate up to two times per day but only one temperature setting can be used.
- During the COOL/DRY mode, the air conditioner will operate at a minimum of 64°F(18°C) even if the SET BACK temperature is set to 62°F(17°C) or lower.

Case of SET BACK timer on the Cooling operation.

( Setting temperature :72°F(22°C), SET BACK temperature :80°F(26°C))



## 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 following values.

The compressor frequency, the temperatures detected by the discharge temperature sensor and the outdoor temperature sensor.

- \* The pulse range of the electronic expansion valve control is between 50 to 480 pulses.
- \* At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (1000 pulses are input to the closing direction).

## 11. TEST OPERATION CONTROL

### ▪ With Wireless Remote Controller

Under the condition where the air conditioner runs, short two metal contacts under the battery compartment lid, 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.

### ▪ With Wired Remote Controller

Under the condition where the air conditioner stops, press the MASTER CONTROL button and the FAN CONTROL button simultaneously for 5 seconds or more, and the test operation control mode will appear.

During test running, " a l " will display on the remote controller display.

Set the test operation mode, and the compressor will continue to run regardless of whatever the room temperature sensor detects.

The test operation mode is released if 60 minutes have passed after setting up the test operation.

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

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

## 13. 4-WAY VALVE EXTENSION SELECT

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

## 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 resumed with the memorized operation contents.

When the power is interrupted and recovered during timer operation, timer operation is canceled, but only setting time is memorized.

[Operation contents memorized when the power is interrupted]

- Operation mode
- Set temperature
- Set air flow
- Timer mode and timer time
- Air flow Direction
- Swing
- Thermistor detected position

## 15. PUMP DOWN ( Refrigerant collecting operation )

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

### When the product is stopped:

1. Press the PUMP DOWN switch (SW2) on the outdoor unit.  
(The LED on the outdoor unit circuit board flickers every 1second.)
2. The pump down operation (cooling operation) begins right away.  
After operation starts, close the 3-way valve (liquid).
3. After 2-3minutes, operation stops. Close the 3-way valve (gas) within 1minute after operations stops.
4. The LED will go out 3minutes after it stops. Disconnect the power supply after confirming that the LED has gone out.

### When the product is operating:

1. Press the PUMP DOWN switch (SW2) on the outdoor unit. The LED on the outdoor unit circuit board flickers every 1second, and operation stops.  
At this point, recovery has not been completed, so do not close the 2 and 3-way valves.
2. The pump down operation (cooling operation) begins after 3minutes.  
Close the 3-way valve (liquid) after operation starts.
3. After 2-3minutes, operation stops. Close the 3-way valve (gas) within 1minute after operations stops.
4. The LED will go out 3minutes after it stops. Disconnect the power supply after confirming that the LED has gone out.

## 16. COMPRESSOR PREHEATING

When the outdoor heat exchanger temperature is lower than Operation temperature (Refer to Table 8) and the heating operation has been stopped for 3 hours, 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 Release temperature or greater, preheating is over.

(Table 8 : Preheating Operation / Release Temperature)

	Before 24 hour		After 24 hour	
	Operation temperature	Release temperature	Operation temperature	Release temperature
ABU18RULX	37.4°F (3°C)	44.6°F (7°C)	32°F (0°C)	39.2°F (4°C)
ABU24RULX				
ABU36RSLX				

## 17. 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 Table 9.

(Table 9 : Condition of starting Defrost Operation)

	Compressor integrating operation :Less than 45min.	Compressor integrating operation :45min and over	
		Less than 6 min. *1 or 10min. *2	After 6 min. *1 or 10min. *2
ABU18RULX	Does not operate		17.6°F(-8°C) *3 14°F (-10°C) *4
ABU24RULX			
ABU36RSLX			

\*1. It means contiguous operation time.

\*2. Compressor stop time: Below 20min. → Select 6min.  
Above 20min. → Select 10min.

\*3. Outdoor temp.  $\geq$  30.2°F (-1°C)

\*4. Outdoor temp. < 30.2°F (-1°C)

### 2. CONDITION OF THE DEFROST OPERATION COMPLETION

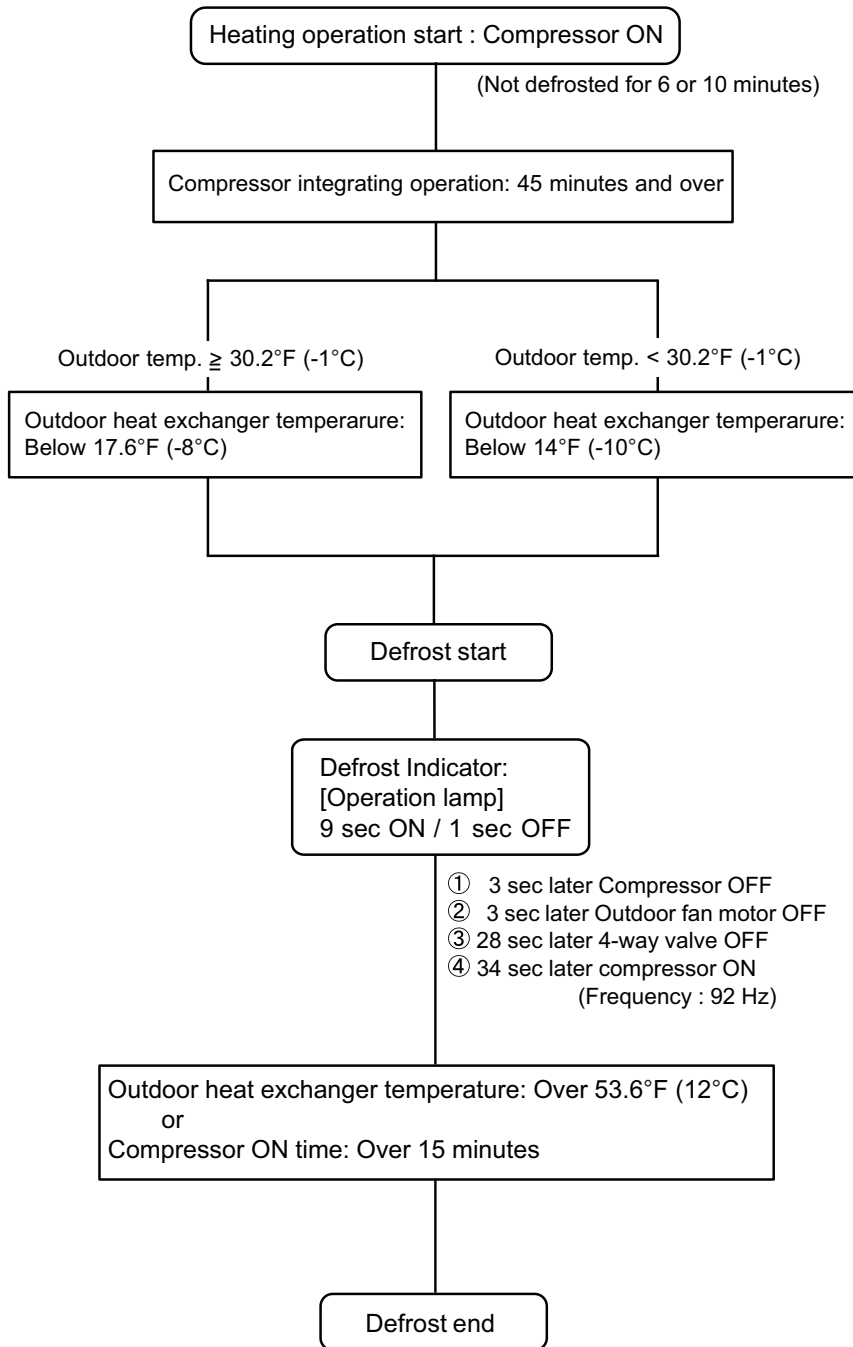
Defrost operation is released when the conditions become as shown in Table 10.

(Table 10 : Defrost Release Condition)

	Release Condition
ABU18RULX	Outdoor heat exchanger temperature sensor value is higher than 53.6°F(12°C) or Compressor operation time has passed 15 minutes.
ABU24RULX	
ABU36RSLX	

### 3. Defrost Flow Chart

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



## 18. MANUAL AUTO OPERATION (Using the Wireless Remote Controller)

If MANUAL AUTO Button is set, the operation is controlled as shown in Table 11.

If the remote control is lost or battery power dissipated, this function will work without the remote control.

(Table 11 : Manual auto operation )

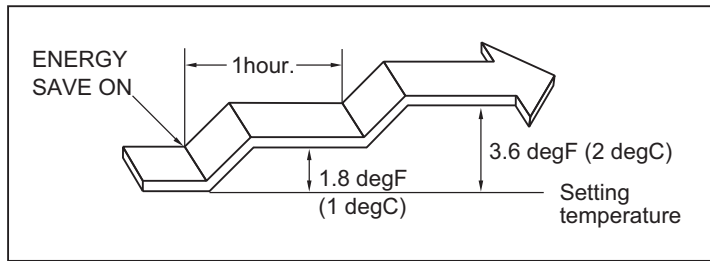
OPERATION MODE	Auto changeover
FAN CONT. MODE	Auto
TIMER MODE	Continuous (No timer setting available)
SETTING TEMP.	73.4°F (23°C)
SETTING LOUVER	Standard
SWING	OFF

## 19. ENERGY SAVE FUNCTION (Using the Wired Remote Controller)

### 1. During Cooling / Dry operation:

The thermostat temperature setting increases by 1.8 degF (1 degC) as soon as the ENERGY SAVE button is pressed, and then increases by 1.8 degF (1 degC) after 1 hour later.

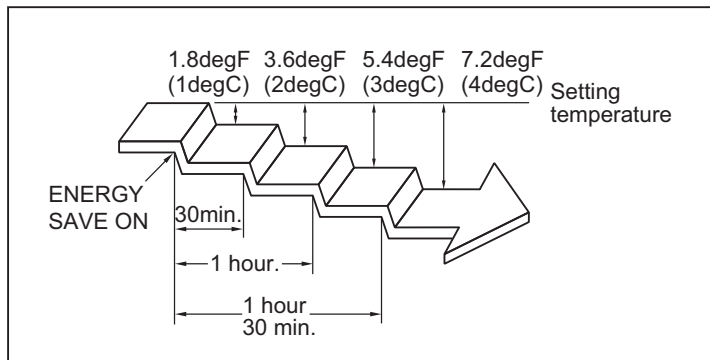
Afterwards, energy consumption is saved by continuing to cool or dry at a thermostat temperature of 3.6 degF (2 degC) higher than setting temperature.



### 2. During Heating operation:

The thermostat temperature setting decreases by 1.8 degF (1 degC) as soon as the ENERGY SAVE button is pressed, and then decreases by another 1.8 degF (1 degC) every 30 minutes.

Afterwards, energy consumption is saved by continuing to heat at a thermostat temperature of 7.2 degF (4 degC) lower than setting temperature.



## 20. VARIOUS PROTECTIONS

### 1. DISCHARGE GAS TEMPERATURE OVER RISE PREVENTION 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 10 Hz, and it continues to decrease the frequency for 10 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 compressor frequency is released.

When the discharge temperature becomes higher than Temperature III ,the compressor stops.

When the discharge temperature becomes lower than Temperature IV ,the compressor operates.

(Table 12 : Discharge Temperature Over Rise Prevention Control / Release Temperature)

	Temperature I	Temperature II	Temperature III	Temperature IV
ABU18RULX	221°F (105°C)	212°F (100°C)	239°F (115°C)	176°F (80°C)
ABU24RULX				
ABU36RSLX				

### 2. CURRENT RELEASE CONTROL

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

The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 13 : Current Release Operation Value / Release Value)

#### [ Heating ]

ABU18RULX	Outdoor unit fan speed			
	780 rpm	400 rpm	250 rpm	220, 200 rpm
T0 ≥ 68°F (20°C)	10.0A / 9.5A	10.0A / 9.5A	8.0A / 7.5A	6.0A / 5.5A
T0 < 68°F (20°C)	12.0A / 11.5A			

T0: Outdoor temperature

ABU24RULX	Outdoor unit fan speed			
	900, 780 rpm	400 rpm	250 rpm	220, 200 rpm
T0 ≥ 68°F (20°C)	10.0A / 9.5A	10.0A / 9.5A	8.0A / 7.5A	6.0A / 5.5A
T0 < 68°F (20°C)	12.0A / 11.5A			

T0: Outdoor temperature

ABU36RSLX	Outdoor unit fan speed				
	900 rpm	780 rpm	400 rpm	250 rpm	220 ,200 rpm
T0 ≥ 53.6°F (12°C)	15.0A / 14.5A	15.0A / 14.5A	13.0A / 12.5A	10.0A / 9.5A	8.0A / 7.5A
53.6°F > T0 ≥ 41°F (12°C) (5°C)	18.0A / 17.5A				
T0 < 41°F (5°C)		18.0A / 17.5A	18.0A / 17.5A	18.0A / 17.5A	18.0A / 17.5A

T0: Outdoor temperature

**[ Cooling ]**

ABU18RULX	Outdoor unit fan speed			
	780 rpm	400 rpm	250 rpm	220, 200 rpm
$T_0 \geq 113^\circ\text{F}$ (45°C)	8.0A / 7.5A	8.0A / 7.5A	5.0A / 4.5A	4.0A / 3.5A
$113^\circ\text{F} > T_0 \geq 77^\circ\text{F}$ (45°C) (25°C)	10.0A / 9.5A			
$77^\circ\text{F} > T_0 \geq 66.2^\circ\text{F}$ (25°C) (19°C)	12.0A / 11.5A	12.0A / 11.5A	7.0A / 6.5A	
$66.2^\circ\text{F} > T_0 \geq 55.4^\circ\text{F}$ (19°C) (13°C)			8.0A / 7.5A	
$55.4^\circ\text{F} > T_0 \geq 44.6^\circ\text{F}$ (13°C) (7°C)			8.5A / 8.0A	5.0A / 4.5A
$44.6^\circ\text{F} > T_0 \geq 32^\circ\text{F}$ (7°C) (0°C)			9.0A / 8.5A	6.5A / 6.0A
$T_0 < 32^\circ\text{F}$ (0°C)				7.5A / 7.0A

T0: Outdoor temperature

ABU24RULX	Outdoor unit fan speed				
	900 ,850 rpm	780 rpm	400 rpm	250 rpm	220, 200 rpm
$T_0 \geq 113^\circ\text{F}$ (45°C)	8.0A / 7.5A	8.0A / 7.5A	8.0A / 7.5A	5.0A / 4.5A	4.0A / 3.5A
$113^\circ\text{F} > T_0 \geq 100.4^\circ\text{F}$ (45°C) (38°C)	10.0A / 9.5A	10.0A / 9.5A			
$100.4^\circ\text{F} > T_0 \geq 77^\circ\text{F}$ (38°C) (25°C)	12.0A / 11.5A	12.0A / 11.5A	12.0A / 11.5A	7.0A / 6.5A	
$77^\circ\text{F} > T_0 \geq 66.2^\circ\text{F}$ (25°C) (19°C)				8.0A / 7.5A	
$66.2^\circ\text{F} > T_0 \geq 55.4^\circ\text{F}$ (19°C) (13°C)				8.5A / 8.0A	5.0A / 4.5A
$55.4^\circ\text{F} > T_0 \geq 44.6^\circ\text{F}$ (13°C) (7°C)				9.0A / 8.5A	6.5A / 6.0A
$44.6^\circ\text{F} > T_0 \geq 32^\circ\text{F}$ (7°C) (0°C)					7.5A / 7.0A
$T_0 < 32^\circ\text{F}$ (0°C)					

T0: Outdoor temperature

ABU36RSLX	Outdoor unit fan speed				
	900 ,850 rpm	780 rpm	400 rpm	250 rpm	220, 200 rpm
$T_0 \geq 113^\circ\text{F}$ (45°C)	10.0A / 9.5A	10.0A / 9.5A	10.0A / 9.5A	7.0A / 6.5A	5.5A / 5.0A
$113^\circ\text{F} > T_0 \geq 100.4^\circ\text{F}$ (45°C) (38°C)	14.0A / 13.5A	14.0A / 13.5A			
$100.4^\circ\text{F} > T_0 \geq 66.2^\circ\text{F}$ (38°C) (19°C)	18.0A / 17.5A				
$66.2^\circ\text{F} > T_0 \geq 55.4^\circ\text{F}$ (19°C) (13°C)		15.0A / 14.5A	15.0A / 14.5A	12.0A / 11.5A	7.0A / 6.5A
$55.4^\circ\text{F} > T_0 \geq 44.6^\circ\text{F}$ (13°C) (7°C)					
$44.6^\circ\text{F} > T_0 \geq 32^\circ\text{F}$ (7°C) (0°C)					
$T_0 < 32^\circ\text{F}$ (0°C)					9.5A / 9.0A

T0: Outdoor temperature

### 3. ANTI-FREEZING CONTROL (Cooling mode)

The compressor frequency decreases on cooling mode when the indoor heat exchanger temperature sensor detects the temperature lower than 37.4°F (3°C).

Then, the anti-freezing control is released when it becomes higher than 42.8°F (6°C).

(Fig 11 : Anti-freezing Protection Operation / Release Temperature)

Indoor heat exchange temperature	Operation
37.4°F (3°C)	The compressor frequency is decreased 10Hz every 120seconds. Hold
42.8°F (6°C)	Compressor OFF : Hold Compressor ON : Release of protection
53.6°F (12°C)	Release of protection

- When the compressor frequency becomes lower than minimum frequency, the compressor operates at minimum frequency.  
If the indoor heat exchanger temperature sensor detects the temperature lower than 37.4°F (3°C) after 2minutes upon operating the compressor at minimum frequency, the compressor stops.

### 4. COOLING PRESSURE OVER RISE PROTECTION

When the outdoor unit heat exchange sensor temperature rises to 158.9°F (70.5°C) or greater, the compressor is stopped and error display is indicated.

### 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.

(Fig 12 : Heating Overload Protection Control)

Indoor heat exchange temperature	Operation
145.4°F (63°C)	Compressor is OFF
129.2°F (54°C)	The compressor frequency is decreased 10Hz every 60seconds. Hold
122°F (50°C)	Compressor OFF : Release of protection Compressor ON : The compressor frequency is increased 10Hz every 60seconds.



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INVERTER***

**2 . TROUBLE SHOOTING**

## 2. TROUBLESHOOTING

### 2-1 ERROR DISPLAY

#### 2-1-1 INDOOR UNIT DISPLAY

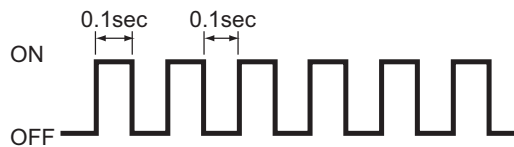
##### 1. ERROR DISPLAY

Please refer the blinking pattern as follows.

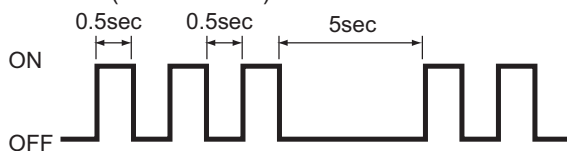
Error Contents	Operation LED (RED)	Timer LED (GREEN)	Vertical Swing LED (ORANGE)	Trouble shooting
Indoor EEPROM abnormal (Model No.)	Continuous blink	Continuous blink	OFF	8
Room temperature sensor open	2 times blink	Continuous blink	OFF	3
Room temperature sensor short-circuited	2 times blink	Continuous blink	Continuous blink	
Indoor heat exchanger temperature sensor open	3 times blink	Continuous blink	OFF	4
Indoor heat exchanger temperature sensor short-circuited	3 times blink	Continuous blink	Continuous blink	
Communication error (Serial reverse transfer error)	5 times blink	Continuous blink	OFF	2
Indoor fan motor abnormal	6 times blink	Continuous blink	OFF	9
Outdoor communication signal error (Forward transfer signal error)	5 times blink	Continuous blink	Continuous blink	10
Outdoor heat exchanger temperature sensor error	Continuous blink	3 times blink	OFF	5
Outdoor temperature sensor error	Continuous blink	4 times blink	OFF	6
Outdoor discharge pipe temperature sensor error	Continuous blink	5 times blink	OFF	7
Compressor temperature sensor error	Continuous blink	8 times blink	OFF	11
Pressure switch error	Continuous blink	9 times blink	OFF	12
IPM error	Continuous blink	10 times blink	OFF	13
CT error	Continuous blink	11 times blink	OFF	14
Active filter module (AFM) error	Continuous blink	12 times blink	OFF	15
Compressor rotor location cannot detect (permanent stop)	Continuous blink	13 times blink	OFF	16
Outdoor unit fan motor error	Continuous blink	14 times blink	OFF	17

##### 2. ERROR DISPLAY METHOD

- LED Continuous Blink : 0.1sec ON / 0.1sec OFF blinking



- LED Blink (2 to 14 times) : 0.5sec ON / 0.5sec OFF blinking



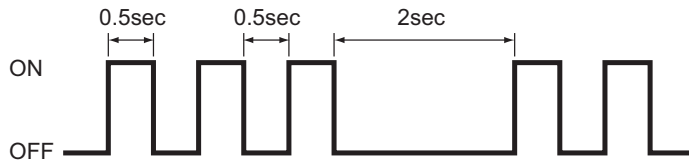
## 2-1-2 OUTDOOR UNIT DISPLAY

### 1. ERROR DISPLAY

Error contents	LED Flashing Pattern	Display priority	Trouble shooting
Outdoor communication signal error (Forward transfer signal error)	1 time blink	1	10
Outdoor discharge pipe temperature sensor error	2 times blink	2	7
Outdoor heat exchanger temperature sensor error	3 times blink	3	5
Outdoor temperature sensor error	4 times blink	4	6
Compressor temperature sensor error	7 times blink	5	11
Heat sink temperature sensor error	8 times blink	6	18
Pressure switch abnormal	9 times blink	7	12
IPM error	12 times blink	8	13
Compressor rotor location cannot detect	13 times blink	9	16
Compressor Start-up error	14 times blink	10	19
Outdoor unit fan motor error	15 times blink	11	17

### 2. ERROR DISPLAY METHOD

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



### 3. NORMAL OPERATION DISPLAY

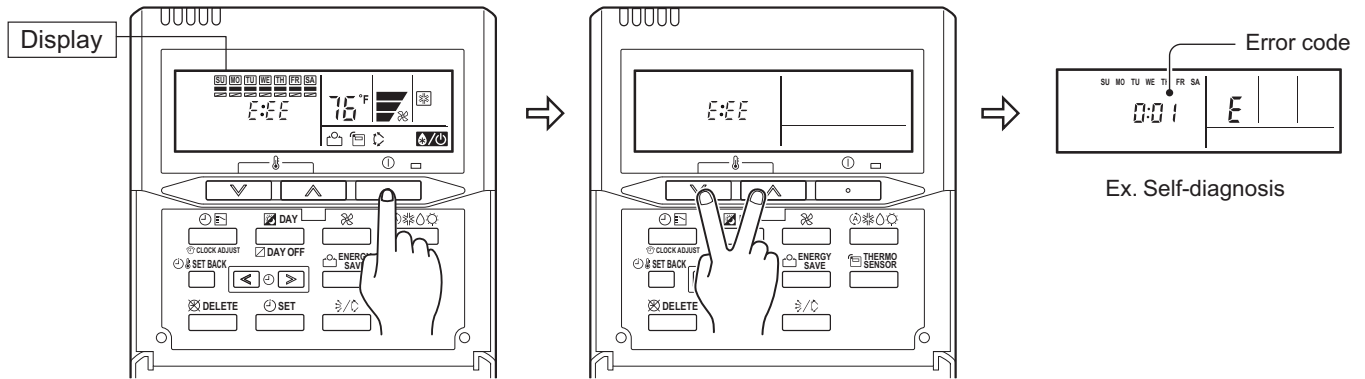
Operation	LED Blinking Pattern
Normal operation	Continuously lighting
Protected operation	5sec ON / 1sec OFF
Pump down operation	1sec ON / 1sec OFF

## 2-1-3 WIRED REMOTE CONTROLLER DISPLAY (optional parts)

### 1. SELF - DIAGNOSIS

When the error indication "E:EE" is displayed, inspection of the air conditioning system is necessary. Please consult authorized service personnel.

Run [Self-Diagnosis] if [E:EE] flashes on the clock display of the remote controller.



1. Stop the air conditioner operation.
2. Press the SET TEMPERATURE buttons and simultaneously for 5 seconds or more to start the self-diagnosis.
3. Press the SET TEMPERATURE buttons and simultaneously for 5 seconds or more or there is no key input for 20 seconds to stop the self-diagnosis.

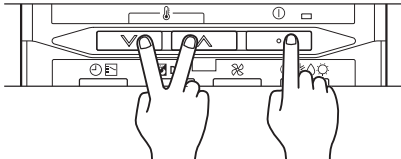

Error code	Error contents	Trouble shooting
E:00	Communication error (indoor unit ← remote control)	1
E:01	Communication error (Serial reverse transfer error)	2
E:02	Room temperature sensor open	3
E:03	Room temperature sensor short-circuited	
E:04	Indoor heat exchanger temperature sensor open	4
E:05	Indoor heat exchanger temperature sensor short-circuited	
E:06	Outdoor heat exchanger temperature sensor error	5
E:0A	Outdoor temperature sensor error	6
E:0C	Outdoor discharge pipe temperature sensor error	7
E:11	Indoor EEPROM abnormal (Model No.)	8
E:12	Indoor fan motor abnormal	9
E:13	Outdoor communication signal error (Forward transfer signal error)	10
E:15	Compressor temperature sensor error	11
E:16	Pressure switch error	12
E:17	IPM error	13
E:18	CT error	14
E:19	Active filter module (AFM) error	15
E:1A	Compressor rotor location cannot detect (permanent stop)	16
E:1b	Outdoor unit fan motor error	17

## 2. ERROR CODE HISTORY DISPLAY

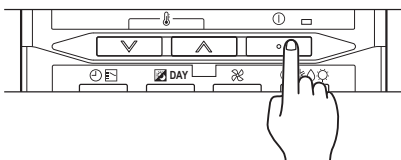
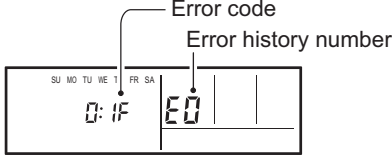
Up to 16 memorized error codes may be displayed for the indoor unit connected to the remote controller.

1. Stop the air conditioner operation.

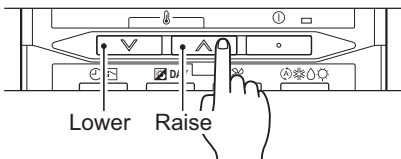
2. Press the SET TEMPERATURE buttons  $\nabla$ ,  $\blacktriangle$  and the START/STOP button  $\text{\textcircled{1}}$  simultaneously for 5 seconds or more to start the self-diagnosis.

3. Press the START/STOP button.

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



$\leftarrow 0 \leftrightarrow 1 \leftrightarrow 2 \leftrightarrow 3 \leftrightarrow 4 \leftrightarrow 5 \leftrightarrow 6 \leftrightarrow 7 \leftrightarrow$   
 $\leftarrow F \leftrightarrow E \leftrightarrow d \leftrightarrow c \leftrightarrow b \leftrightarrow A \leftrightarrow 9 \leftrightarrow 8 \leftrightarrow$

5. Press the SET TEMPERATURE buttons  $\nabla$ ,  $\blacktriangle$  and START/STOP button  $\text{\textcircled{1}}$  simultaneously for 5 seconds or more or there is no key input for 20 seconds to stop the display.

## 2-2 TROUBLE SHOOTING WITH ERROR CODE

<p><b>Trouble shooting 1</b>  <b>INDOOR UNIT Error Method:</b>  <b>Communication Error</b>  <b>(Indoor unit ← Remote control)</b></p>	<p><b>Indicate or Display:</b>  <b>Indoor Unit : No LED</b>  <b>Outdoor Unit : No indication</b>  <b>ERROR CODE : E : 00</b></p>
---	--

<p><b>Detective Actuators:</b>          Indoor unit controller PCB circuit          Wired Remote Control</p>	<p><b>Detective details:</b>          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.</p>
--	--

<p><b>Forecast of Cause:</b>          1. Terminal connection abnormal   2. Wired Remote Control failure   3. Controller PCB failure</p>
---

Check Point 1 : Check the connection of terminal

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

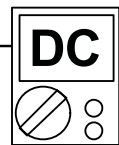
- Check the connection of terminal between remote control and Indoor unit, and check if there is a disconnection of the cable.



Check Point 2 : Check Remote Control and Controller PCB

- Check Voltage at CN17 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

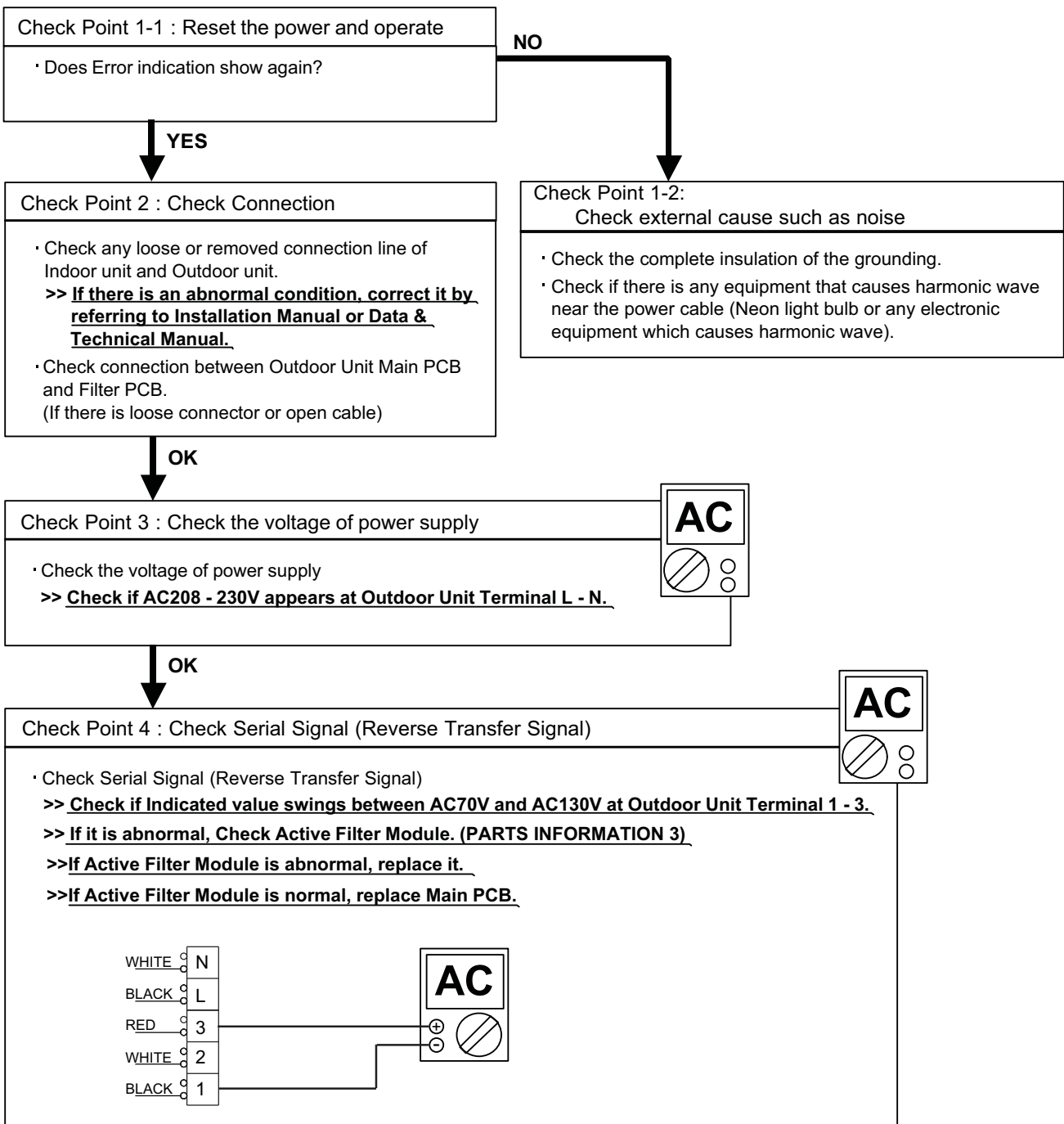
▶ Upon correcting the removed connector or mis-wiring, reset the power.



<b>Trouble shooting 2</b> <b>OUTDOOR UNIT Error Method:</b> <b>Communication Error</b> <b>(Serial Reverse Transfer Error)</b>	<b>Indicate or Display:</b> Indoor Unit : Operation LED: <u>5 times blink</u> , Timer LED: <u>Blink</u> , Vertical swing LED: <u>OFF</u> Outdoor Unit : No indication <b>ERROR CODE : E : 01</b>
--	--

<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit	<b>Detective details:</b> When the indoor unit cannot receive the serial signal from Outdoor unit more than 10seconds.
--	---

**Forecast of Cause:**  
1. Connection failure 2. External cause 3. Main PCB failure 4. Active Filter Module failure



<b>Trouble shooting 3</b> <b>INDOOR UNIT Error Method:</b> <b>Room Temperature Sensor Error</b>	<b>Indicate or Display:</b> <b>Indoor Unit</b> : Operation LED: <u>2 times blink</u> , Timer LED: <u>Blink</u> , Vertical swing LED: <u>OFF / Blink</u>
	<b>Outdoor Unit</b> : No indication <b>ERROR CODE</b> : <u>E : 02 / 03</u>

<b>Detective Actuators:</b> Indoor Unit Controller PCB Circuit Room Temperature Thermistor	<b>Detective details:</b> 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

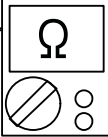
Check Point 1 : Check connection of Connector

- 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.**



Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics (Approx. value)


Temperature	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)	95°F (35°C)
Resistance Value (kΩ)	33.6	25.9	20.2	15.8	12.5	10.0	8.04	6.51

Temperature	104°F (40°C)	113°F (45°C)	122°F (50°C)
Resistance Value (kΩ)	5.30	4.35	3.59


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




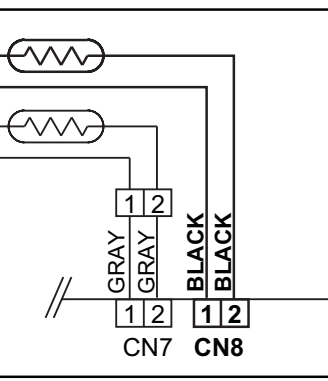
Check Point 3 : Check voltage of Controller PCB (DC5.0V)



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

**THERMISTOR (ROOM TEMP.)** 

**THERMISTOR (PIPE TEMP.)** 



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



<b>Trouble shooting 4</b> <b>INDOOR UNIT Error Method:</b> Indoor Heat Exchanger Temperature Sensor Error	<b>Indicate or Display:</b> Indoor Unit : Operation LED: <u>3 times blink</u> , Timer LED: <u>Blink</u> , Vertical swing LED: <u>OFF / Blink</u> Outdoor Unit : No indication ERROR CODE : <u>E : 04 / 05</u>
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<b>Detective Actuators:</b> Indoor Unit Controller PCB Circuit Heat Exchanger Temperature Thermistor	<b>Detective details:</b> 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

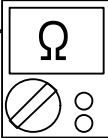
Check Point 1 : Check connection of Connector

- 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.**



Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics (Approx. value)


Temperature	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)	95°F (35°C)
Resistance Value (kΩ)	176	134	103	80.3	62.9	49.7	39.6	31.7

Temperature	104°F (40°C)	113°F (45°C)	122°F (50°C)
Resistance Value (kΩ)	25.6	20.8	17.1

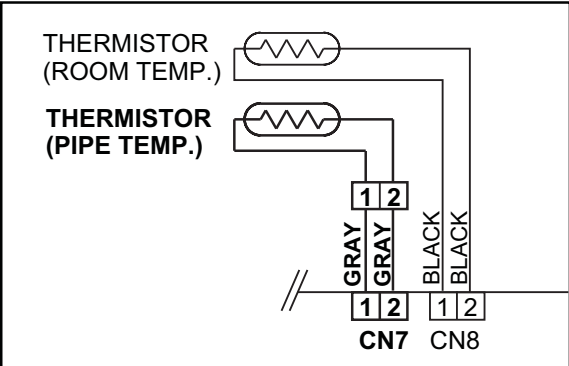
**► If Thermistor is either open or shorted, replace it and reset the power.**



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.**

<b>Trouble shooting 5</b> <b>OUTDOOR UNIT Error Method:</b> <b>Outdoor Heat Exchanger Temperature Sensor Error</b>	<b>Indicate or Display:</b> <b>Indoor Unit</b> : Operation LED: <u>Blink</u> , Timer LED: <u>3 times blink</u> , Vertical swing LED: <u>OFF</u> <b>Outdoor Unit</b> : LED <u>3 times blink</u> <b>ERROR CODE</b> : <u>E : 06</u>
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<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Heat Exchanger Temperature Thermistor	<b>Detective details:</b> When Heat Exchanger 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.

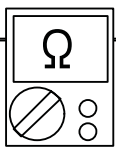
**>>Upon correcting the removed connector or mis-wiring, reset the power.**



Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)									
Temperature	14°F (-10°C)	23°F (-5°C)	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)
Resistance Value (kΩ)	27.5	20.9	16.1	12.4	9.73	7.67	6.10	4.89	3.95

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

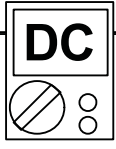


Check Point 3 : Check voltage of Main PCB (DC5.0V)

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

THERMISTOR (DISCHARGE)	THERMISTOR (PIPE)	THERMISTOR (OUTDOOR)	THERMISTOR (COMPRESSOR)	THERMISTOR (HEAT SINK)
BROWN	BLACK	BLUE	BROWN	BLACK
1 2	1 2	1 2	1 2	1 2
CN21	CN22	CN23	CN26	CN25

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



<b>Trouble shooting 6</b> <b><u>OUTDOOR UNIT Error Method:</u></b>  <b>Outdoor Temperature Sensor Error</b>	<b><u>Indicate or Display:</u></b> <b>Indoor Unit</b> : Operation LED: <b>Blink</b> , Timer LED: <b>4 times blink</b> , Vertical swing LED: <b>OFF</b> <b>Outdoor Unit</b> : LED <b>4 times blink</b> <b>ERROR CODE : E : 0A</b>
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<b><u>Detective Actuators:</u></b>  Outdoor Unit Main PCB Circuit Outdoor Temperature Thermistor	<b><u>Detective details:</u></b>  When Outdoor Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.
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**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.**



Check Point 2 : Remove connector and check Thermistor resistance value




Thermistor Characteristics (Approx. value)

Temperature	- 4°F (-20°C)	14°F (-10°C)	23°F (-5°C)	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)
Resistance Value (kΩ)	115	62.3	46.6	35.2	26.9	20.7	16.1	12.6
Temperature	86°F (30°C)	104°F (40°C)	122°F (50°C)	140°F (60°C)	158°F (70°C)			
Resistance Value (kΩ)	7.97	5.18	3.45	2.36	1.65			

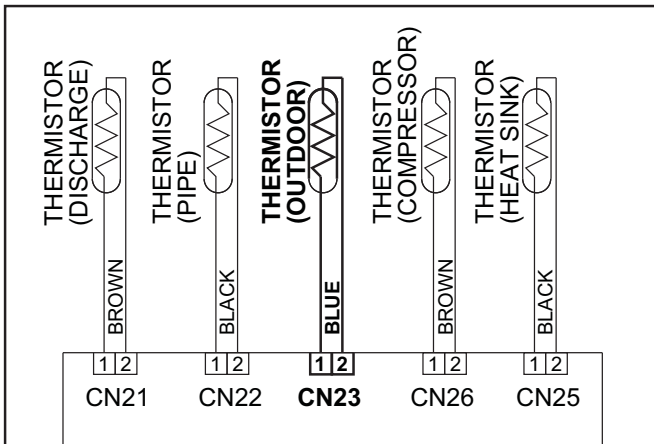
► **If Thermistor is either open or shorted, replace it and reset the power.**



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.**

<b>Trouble shooting 7</b> <b>OUTDOOR UNIT Error Method:</b> <b>Outdoor Discharge Pipe Temperature Sensor Error</b>	<b>Indicate or Display:</b> <b>Indoor Unit</b> : Operation LED: <u>Blink</u> , Timer LED: <u>5 times blink</u> , Vertical swing LED: <u>OFF</u> <b>Outdoor Unit</b> : LED <u>2 times blink</u> <b>ERROR CODE : E : 0C</b>
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<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Discharge Pipe Temperature Thermistor	<b>Detective details:</b> When Discharge Pipe Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.
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**Forecast of Cause :**  
1. Connector connection failure 2. Thermistor failure 3. Main PCB failure

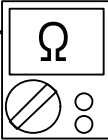
**Check Point 1 : Check connection of Connector**

- 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.**



**Check Point 2 : Remove connector and check Thermistor resistance value**



Thermistor Characteristics (Approx. value)


Temperature	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	86°F (30°C)	104°F (40°C)	122°F (50°C)	140°F (60°C)
Resistance Value (kΩ)	176	135	105	81.8	64.5	41.1	26.9	18.1	12.5

Temperature	158°F (70°C)	176°F (80°C)	194°F (90°C)	212°F (100°C)	248°F (120°C)	284°F (140°C)	320°F (160°C)	356°F (180°C)
Resistance Value (kΩ)	8.78	6.31	4.61	3.43	1.98	1.21	0.77	0.51

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



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



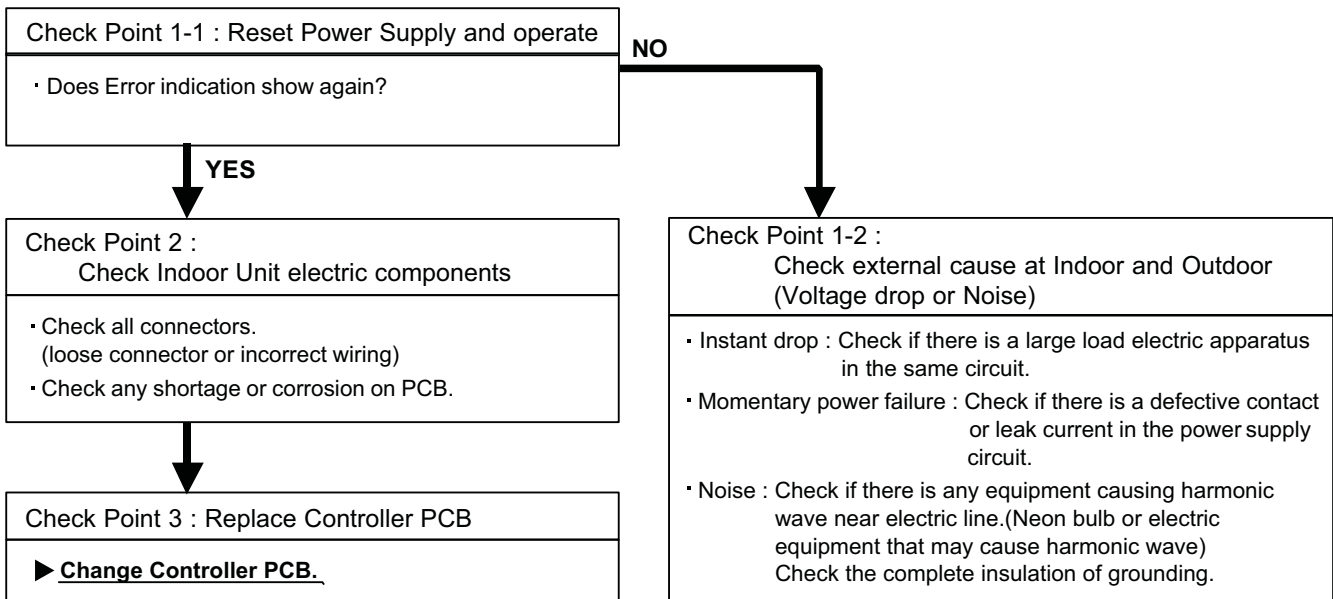
Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)

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

<b>Trouble shooting 8</b> <b>INDOOR UNIT Error Method:</b> <b>Indoor EEPROM abnormal</b> <b>(Model No.)</b>	<b>Indicate or Display:</b> <b>Indoor Unit : Operation LED: <u>Blink</u>, Timer LED: <u>Blink</u>,</b> <b>Vertical swing LED: <u>OFF</u></b> <b>Outdoor Unit : No indication</b> <b>ERROR CODE : <u>E : 11</u></b>
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<b><u>Detective Actuators:</u></b>  Indoor Unit Controller PCB circuit	<b><u>Detective details:</u></b>  When the model information being read from EEPROM has an apparent error.
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**Forecast of Cause:**  
 1. External cause    2. Defective connection of electric components    3. Controller PCB failure



**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.

<b>Trouble shooting 9</b> <b>INDOOR UNIT Error Method:</b> <b>Indoor Fan Motor abnormal</b>	<b>Indicate or Display:</b> <b>Indoor Unit : Operation LED: <u>6 times blink</u>, Timer LED: <u>Blink</u>,  Vertical swing LED: <u>OFF</u></b> <b>Outdoor Unit : No indication</b> <b>ERROR CODE : <u>E : 12</u></b>
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<b>Detective Actuators:</b> Indoor Unit Controller PCB Circuit Indoor Fan Motor	<b>Detective details:</b> When the condition that actual frequency of Indoor Fan is below 1/3 of target frequency is continued more than 56 seconds.
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<b>Forecast of Cause:</b> 1. Fan rotation failure   2. Fan motor winding open   3. Motor protection by surrounding temperature rise 4. Capacitor failure   5. Control PCB failure
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Check Point 1 : Check rotation of Fan

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



Check Point 2 : Check Motor winding

· Check Indoor Fan motor. (PARTS INFORMATION 5)  
**>>If Fan motor is abnormal, replace it.**



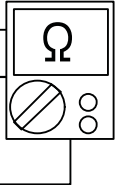
Check Point 3 : Check ambient temp. around motor

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



Check Point 4 : Check Motor Capacitor

· Check continuity of motor capacitor  
**>>If it is shorted, replace the capacitor.**

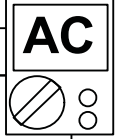


Check Point 5 : Check Output Voltage of Control PCB

· Check indoor unit circuit diagram and the output voltage (between 2 (White) and 3 (Red)) of CN5.

- ABU18RULX : Input AC voltage (Cooling, Airflow[HIGH])  
Input AC voltage (Heatling, Airflow[HIGH])
- ABU24RULX : Input AC voltage (Cooling, Airflow[HIGH])  
Input AC voltage (Heatling, Airflow[HIGH])
- ABU36RSLX : 74% of Input AC voltage (Cooling, Airflow[HIGH])  
(Approx. value)  
74% of Input AC voltage (Heatling, Airflow[HIGH])  
(Approx. value)

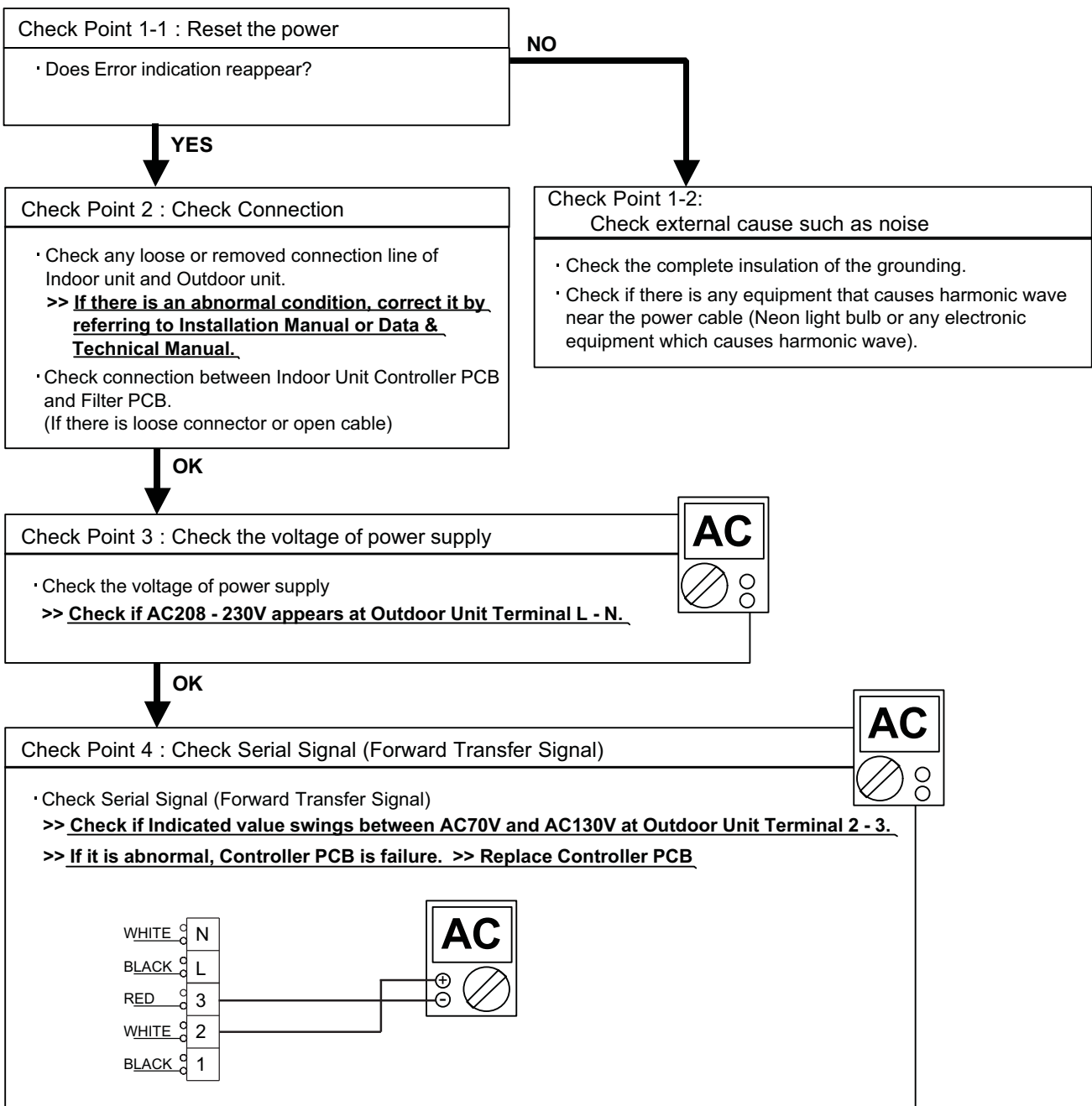
► **If the voltage is not correct, replace Controller PCB.**



<b>Trouble shooting 10</b> <b>INDOOR UNIT Error Method:</b> <b>Outdoor Communication Signal Error</b> <b>(Forward Transfer Signal Error)</b>	<b>Indicate or Display:</b> Indoor Unit : Operation LED: <u>5 times blink</u> , Timer LED: <u>Blink</u> , Vertical swing LED: <u>Blink</u> Outdoor Unit : LED <u>1 time blink</u> <b>ERROR CODE : E : 13</b>
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<b>Detective Actuators:</b> Indoor Unit Controller PCB Circuit	<b>Detective details:</b> When the outdoor unit cannot receive the serial signal from Indoor unit more than 10seconds.
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Forecast of Cause:  
1. Connection failure 2. External cause 3. Controller PCB failure



<b>Trouble shooting 11</b> <b>OUTDOOR UNIT Error Method:</b> <b>Compressor Temperature Sensor Error</b>	<b>Indicate or Display:</b> <b>Indoor Unit : Operation LED: Blink, Timer LED: 8 times blink, Vertical swing LED: OFF</b> <b>Outdoor Unit : LED 7 times blink</b> <b>ERROR CODE : E : 15</b>
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<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Compressor Temperature Thermistor	<b>Detective details:</b> When Compressor Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.
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**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.**



**Check Point 2 : Remove connector and check Thermistor resistance value**

Thermistor Characteristics (Rough value)									
Temperature	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	86°F (30°C)	104°F (40°C)	122°F (50°C)	140°F (60°C)
Resistance Value (kΩ)	176	135	105	81.8	64.5	41.1	26.9	18.1	12.5

Temperature	158°F (70°C)	176°F (80°C)	194°F (90°C)	212°F (100°C)	248°F (120°C)	284°F (140°C)	320°F (160°C)	356°F (180°C)
Resistance Value (kΩ)	8.78	6.31	4.61	3.43	1.98	1.21	0.77	0.51

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



**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.**



<b>Trouble shooting 12</b> <b><u>OUTDOOR UNIT Error Method:</u></b> <b>Pressure Switch Error</b>	<b><u>Indicate or Display:</u></b> Indoor Unit : Operation LED: <u>Blink</u> , Timer LED: <u>9 times blink</u> , Vertical swing LED: <u>OFF</u> Outdoor Unit : LED <u>9 times blink</u> <b>ERROR CODE : E : 16</b>
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<b><u>Detective Actuators:</u></b> Outdoor Unit Main PCB Circuit Pressure Switch	<b><u>Detective details:</u></b> When pressure switch open is detected in 10 seconds after the power is turned on.
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**Forecast of Cause :**  
1. Connector connection failure 2. Pressure Switch failure 3. Main PCB failure

Check Point 1 : Reset Power Supply and operate  
· Does abnormal LED indication show again?



Check Point 2 : Check voltage of Main PCB (DC5.0V)

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

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



Check Point 3 : Check Pressure Switch

· Check if connector is loose or cable is open.  
>> **If no abnormal connection is found, replace Pressure Switch.**

► **After replacing Pressure Switch, check operating condition and pressure in operation.**

<b>Trouble shooting 13</b> <b><u>OUTDOOR UNIT Error Method:</u></b> <b>IPM error (Permanent Stop)</b>	<b><u>Indicate or Display:</u></b> <b>Indoor Unit : Operation LED: <u>Blink</u>, Timer LED: <u>10 times blink</u>,  Vertical swing LED: <u>OFF</u></b> <b>Outdoor Unit : LED <u>12 times blink</u></b> <b>ERROR CODE : <u>E : 17</u></b>
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<b><u>Detective Actuators:</u></b> Outdoor Unit Main PCB Circuit Compressor	<b><u>Detective details:</u></b> ① When more than normal operating current to IPM in Main PCB flows, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.
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<b><u>Forecast of Cause :</u></b> 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.**



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.**

- Check Outdoor Fan Motor. (Refer to Trouble shooting 17)

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



Check Point 3 : Check Compressor

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



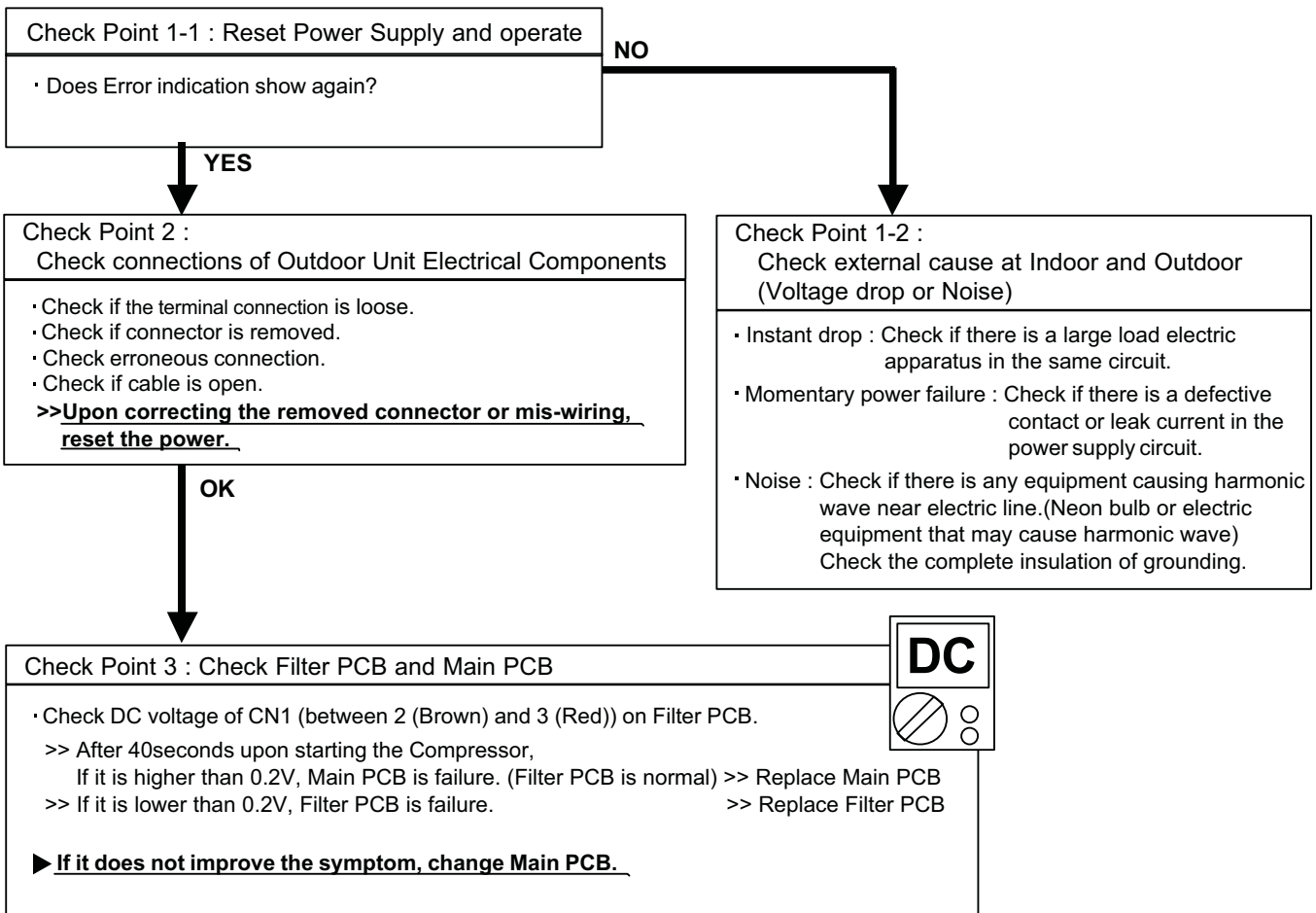
Check Point 4 : Replace Main PCB

**▶ If Check Point 1, 2, 3 do not improve the symptom, change Main PCB.**

<b>Trouble shooting 14</b> <b>OUTDOOR UNIT Error Method:</b> <b>CT error</b>	<b>Indicate or Display:</b> <b>Indoor Unit : Operation LED: <u>Blink</u>, Timer LED: <u>11 times blink</u>,  Vertical swing LED: <u>OFF</u></b> <b>Outdoor Unit : No indication</b> <b>ERROR CODE : <u>E : 18</u></b>
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<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Outdoor Unit Filter PCB Circuit (Input current sensor unit)	<b>Detective details:</b> When Input Current Sensor has detected lower than 0.5A while Inverter Compressor is operating at higher than 56Hz, after 1minute upon starting the Compressor. (Except during the defrost operation)
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**Forecast of Cause :**  
1. Defective connection of electric components 2. External cause 3. Filter PCB failure 4. Main PCB failure



<b>Trouble shooting 15</b> <b><u>OUTDOOR UNIT Error Method:</u></b> <b>Active Filter Module (AFM) error</b>	<b><u>Indicate or Display:</u></b> <b>Indoor Unit : Operation LED: <u>Blink</u>, Timer LED: <u>12 times blink</u>,  Vertical swing LED: <u>OFF</u></b> <b>Outdoor Unit : No indication</b> <b>ERROR CODE : <u>E : 19</u></b>
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<b><u>Detective Actuators:</u></b> Outdoor Unit Main PCB Circuit Active Filter Module	<b><u>Detective details:</u></b> When inverter input DC voltage is higher than 467V or lower than 237V. When a momentary power cut off occurred on low voltage.
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<b><u>Forecast of Cause :</u></b> 1. External cause   2. Connector connection failure   3. Active Filter Module failure   4 . Main PCB failure
---

<b>Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)</b> <ul style="list-style-type: none"> <li>· Instant drop : Check if there is a large load electric apparatus in the same circuit.</li> <li>· Momentary power failure : Check if there is a defective contact or leak current in the power supply circuit.</li> <li>· 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.</li> </ul>
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<b>Check Point 2 : Check connection of Connector</b> <ul style="list-style-type: none"> <li>· Check if connector is removed.</li> <li>· Check erroneous connection.</li> <li>· Check if cable is open.</li> </ul> <b>&gt;&gt;<u>Upon correcting the removed connector or mis-wiring, reset the power.</u></b>
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<b>Check Point 3 : Check Active Filter Module</b> <ul style="list-style-type: none"> <li>· Check Active Filter Module. <b>(PARTS INFORMATION 3)</b></li> </ul> <b>&gt;&gt;<u>If Active Filter Module is abnormal, replace it.</u></b>
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<b>Check Point 4 : Replace Main PCB</b> <b>▶ <u>If Check Point 1, 2 do not improve the symptom, change Main PCB.</u></b>
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<p><b>Trouble shooting 16</b>  <b><u>OUTDOOR UNIT Error Method:</u></b>  <b>Compressor rotor location cannot detect (Permanent Stop)</b></p>	<p><b><u>Indicate or Display:</u></b>  <b>Indoor Unit : Operation LED: <u>Blink</u>, Timer LED: <u>13 times blink</u>,  Vertical swing LED: <u>OFF</u></b>  <b>Outdoor Unit : LED <u>13 times blink</u></b>  <b>ERROR CODE : <u>E : 1A</u></b></p>
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<p><b><u>Detective Actuators:</u></b>  Outdoor Unit Main PCB Circuit</p>	<p><b><u>Detective details:</u></b></p> <ol style="list-style-type: none"> <li>① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90 degrees, the compressor stops.</li> <li>② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again.</li> <li>③ If ① and ② repeats 5 times, the compressor stops permanently.</li> </ol>
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<p><b><u>Forecast of Cause :</u></b>  1. Defective connection of electric components    2. Main PCB failure</p>
---

<p>Check Point 1 : Check connection of around the Compressor components</p>
<p>For Compressor Terminal, Main PCB</p> <ul style="list-style-type: none"> <li>• Check if connector is removed.</li> <li>• Check erroneous connection.</li> <li>• Check if cable is open.</li> </ul> <p>(Refer to PARTS INFORMATION 2)</p> <p><b>&gt;&gt;<u>Upon correcting the removed connector or mis-wiring, reset the power.</u></b></p>



<p>Check Point 2 : Replace Main PCB</p>
<p><b>▶ <u>If Check Point 1 do not improve the symptom, change Main PCB.</u></b></p>

<b>Trouble shooting 17</b> <b>OUTDOOR UNIT Error Method:</b> <b>Outdoor Unit Fan Motor Error</b>	<b>Indicate or Display:</b> <b>Indoor Unit</b> : Operation LED: <u>Blink</u> , Timer LED: <u>14 times blink</u> , Vertical swing LED: <u>OFF</u> <b>Outdoor Unit</b> : LED <u>15 times blink</u> <b>ERROR CODE : E : 1b</b>
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<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Outdoor Fan Motor	<b>Detective details:</b> ① When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops. ② After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops. ③ If ① and ② repeats 5 times in a row, compressor and fan motor stops permanently.
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<b>Forecast of Cause:</b> 1. Fan rotation failure 2. Motor protection by surrounding temperature rise 3. Main PCB failure
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<b>Check Point 1 : Check rotation of Fan</b>
· Rotate the fan by hand when operation is off. (Check if fan is caught, dropped off or locked motor) <b>&gt;&gt;If Fan or Bearing is abnormal, replace it.</b>



<b>Check Point 2 : Check ambient temp. around motor</b>
· Check excessively high temperature around the motor. (If there is any surrounding equipment that causes heat) <b>&gt;&gt;Upon the temperature coming down, restart operation.</b>



<b>Check Point 3 : Check Output Voltage of Main PCB</b> · Check outdoor unit circuit diagram and the voltage. (Measure at Main PCB side connector)	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>DC</b>  </div>																			
<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;"> <table style="border-collapse: collapse;"> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">1</td><td style="padding: 2px 5px;">RED</td><td rowspan="5" style="text-align: center; vertical-align: middle;"> </td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">2</td><td style="padding: 2px 5px;">BLACK</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">3</td><td style="padding: 2px 5px;">WHITE</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">4</td><td style="padding: 2px 5px;">YELLOW</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">5</td><td style="padding: 2px 5px;">BLUE</td></tr> <tr><td style="border-right: 1px solid black; padding: 2px 5px;">6</td><td style="padding: 2px 5px;"></td></tr> </table> </div> <div style="border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Read wire</th> <th>DC voltage</th> </tr> </thead> <tbody> <tr> <td>Red - Black</td> <td style="text-align: center;">150 ~ 380V</td> </tr> <tr> <td>White - Black</td> <td style="text-align: center;">15 ± 1.5V</td> </tr> </tbody> </table> </div> </div>	1	RED		2	BLACK	3	WHITE	4	YELLOW	5	BLUE	6		Read wire	DC voltage	Red - Black	150 ~ 380V	White - Black	15 ± 1.5V	
1	RED																			
2	BLACK																			
3	WHITE																			
4	YELLOW																			
5	BLUE																			
6																				
Read wire	DC voltage																			
Red - Black	150 ~ 380V																			
White - Black	15 ± 1.5V																			
<b>▶ If the voltage is not correct, replace Main PCB.</b>																				

<b>Trouble shooting 18</b> <b>OUTDOOR UNIT Error Method:</b> <b>Heat Sink Temperature Sensor Error</b>	<b>Indicate or Display:</b> Indoor Unit : No LED Outdoor Unit : LED <b>8 Times Blink</b> <b>ERROR CODE : No indication</b>
--	---

<b>Detective Actuators:</b> Outdoor Unit Main PCB Circuit Heat Sink Temperature Thermistor	<b>Detective details:</b> When Heat Sink 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.**



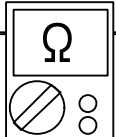
Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)								
Temperature	32°F (0°C)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	86°F (30°C)	104°F (40°C)	122°F (50°C)
Resistance Value (kΩ)	16.1	12.4	9.73	7.67	6.10	3.95	2.62	1.79

Temperature	140°F (60°C)	158°F (70°C)	176°F (80°C)	194°F (90°C)	212°F (100°C)	230°F (110°C)	248°F (120°C)
Resistance Value (kΩ)	1.25	0.89	0.65	0.48	0.36	0.27	0.21

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



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)

THERMISTOR (DISCHARGE) BROWN 1 2 CN21	THERMISTOR (PIPE) BLACK 1 2 CN22	THERMISTOR (OUTDOOR) BLUE 1 2 CN23	THERMISTOR (COMPRESSOR) BROWN 1 2 CN26	THERMISTOR (HEAT SINK) BLACK 1 2 CN25
--	---	---	---	--

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



<b>Trouble shooting 19</b> <b><u>OUTDOOR UNIT Error Method:</u></b> <b>Compressor Start-up error</b> <b>(Permanent Stop)</b>	<b><u>Indicate or Display:</u></b> <b>Indoor Unit : No LED</b> <b>Outdoor Unit : LED <u>14 Times Blink</u></b> <b>ERROR CODE : No indication</b>
---	---

<b><u>Detective Actuators:</u></b>  Outdoor Unit Main PCB Circuit	<b><u>Detective details:</u></b>  ① On start-up the compressor, when detected rotor position is out of phase with actual rotor position more than 90 degrees, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.
---	--

<b><u>Forecast of Cause :</u></b>  1. Defective connection of electric components    2. Main PCB failure
--

Check Point 1 : Check connection of around the Compressor components
For Compressor Terminal, Main PCB <ul style="list-style-type: none"> <li>• Check if connector is removed.</li> <li>• Check erroneous connection.</li> <li>• Check if cable is open.</li> </ul> (Refer to PARTS INFORMATION 2) <b>&gt;&gt;<u>Upon correcting the removed connector or mis-wiring, reset the power.</u></b>



Check Point 2 : Replace Main PCB
<b>▶ <u>If Check Point 1 do not improve the symptom, replace Main PCB.</u></b>



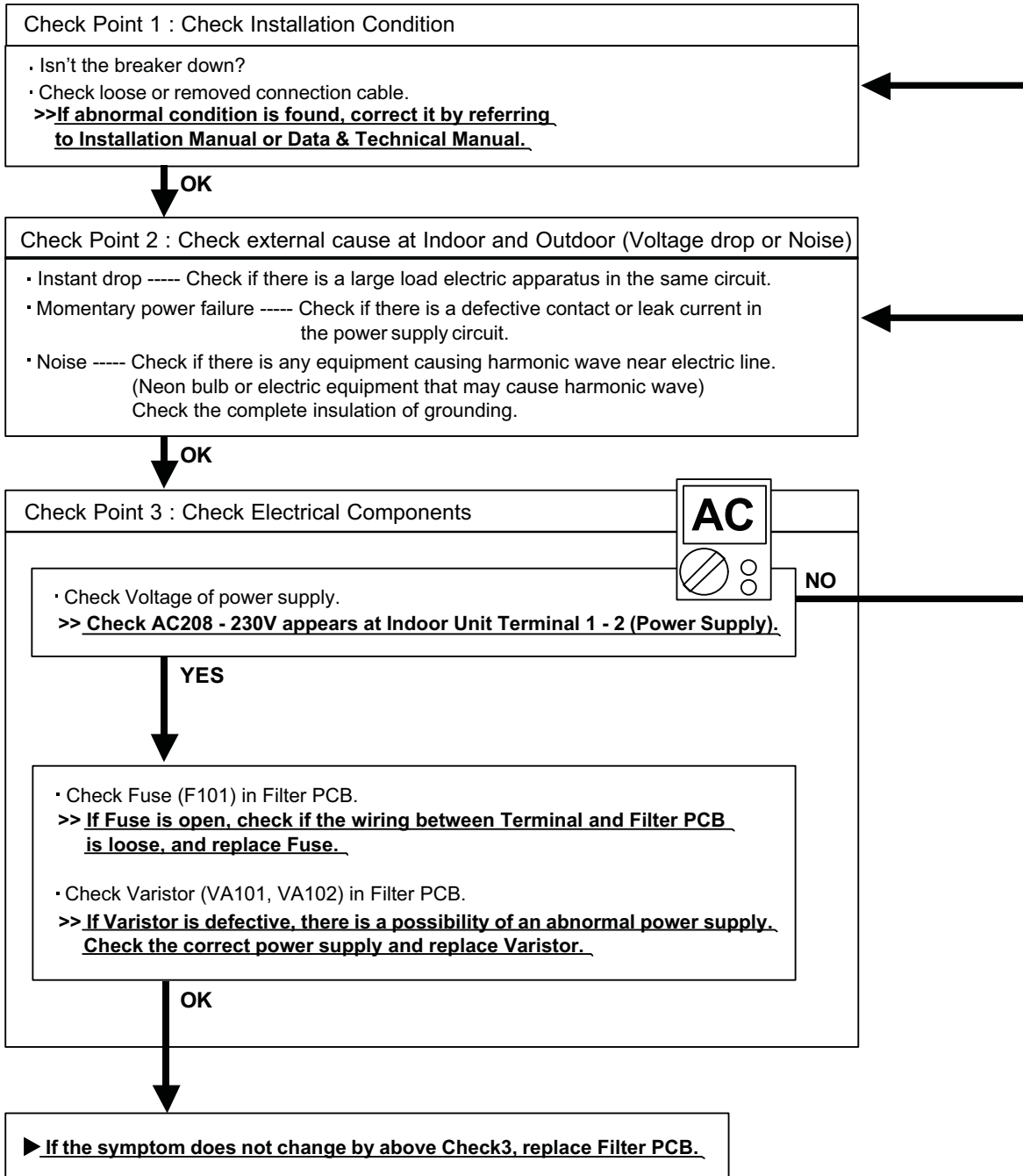
## 2-3 TROUBLE SHOOTING WITH NO ERROR CODE

### Trouble shooting 20

Indoor Unit - No Power

#### Forecast of Cause:

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



## Trouble shooting 21

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 AC208 - 230V appears at Outdoor Unit Terminal L - N.**

YES

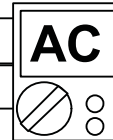
- Check Fuse (F2, F4) in Main PCB.
- >> If Fuse is open, check loose terminal or removed connector (CN1), and replace Fuse.**
- Check Varistor in Main PCB (VA103).
- >> If Varistor is defective, there is a possibility of an abnormal power supply. Check the correct power supply and replace Varistor. Upon checking the normal power supply, replace Varistor.**

YES

- Check Active Filter Module. (PARTS INFORMATION 3)
- >>If Active Filter Module is abnormal, replace it.**

OK

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



NO

## Trouble shooting 22

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 CN17 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 23

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.



#### Check Point 2 : Check Outdoor Unit Operation

- Check if Outdoor Unit is operating  
(If not, refer to Trouble shooting 22)
- Check any objects that obstruct the air flow route.
- Check clogged Heat Exchanger.
- Is the Valve open?



#### Check Point 3 : Check Site Condition

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



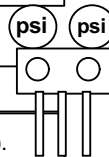
#### Check Point 4 : Check Indoor/ Outdoor Installation Condition

- 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.**



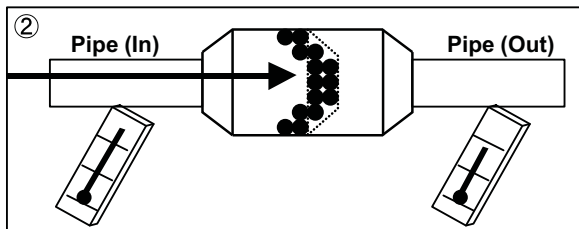
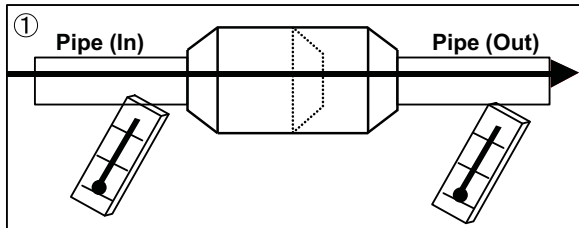
#### Check Point 5 : Check Refrigeration Cycle

- 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 4)
- Check Compressor (PARTS INFORMATION 1,2)



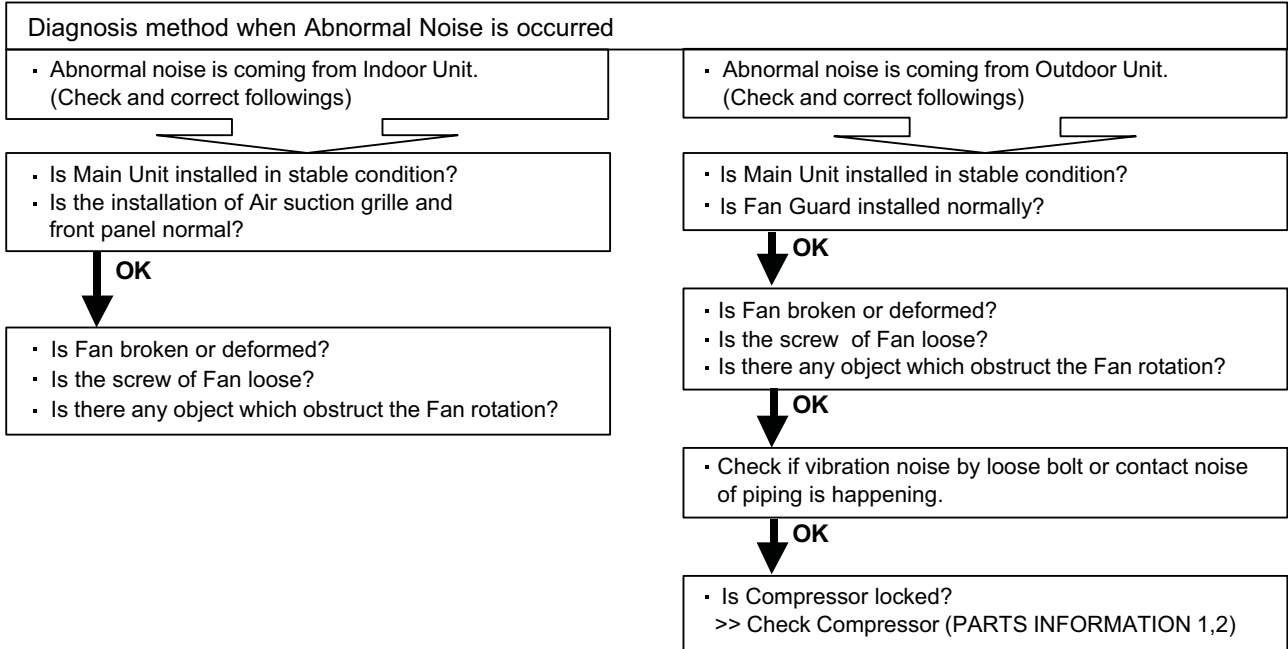
### Attention

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.



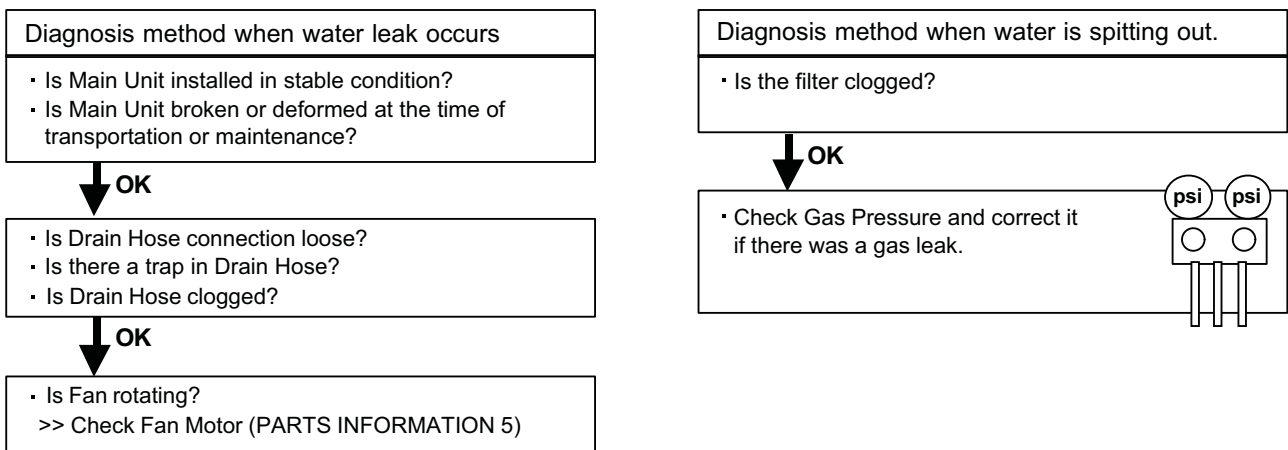
**Trouble shooting 24**  
Abnormal Noise

Forecast of Cause :  
1. Abnormal installation (Indoor/ Outdoor) 2. Fan failure(Indoor/ Outdoor)  
3. Compressor failure (Outdoor)



**Trouble shooting 25**  
Water Leaking

Forecast of Cause:  
1. Erroneous installation 2. Drain hose failure

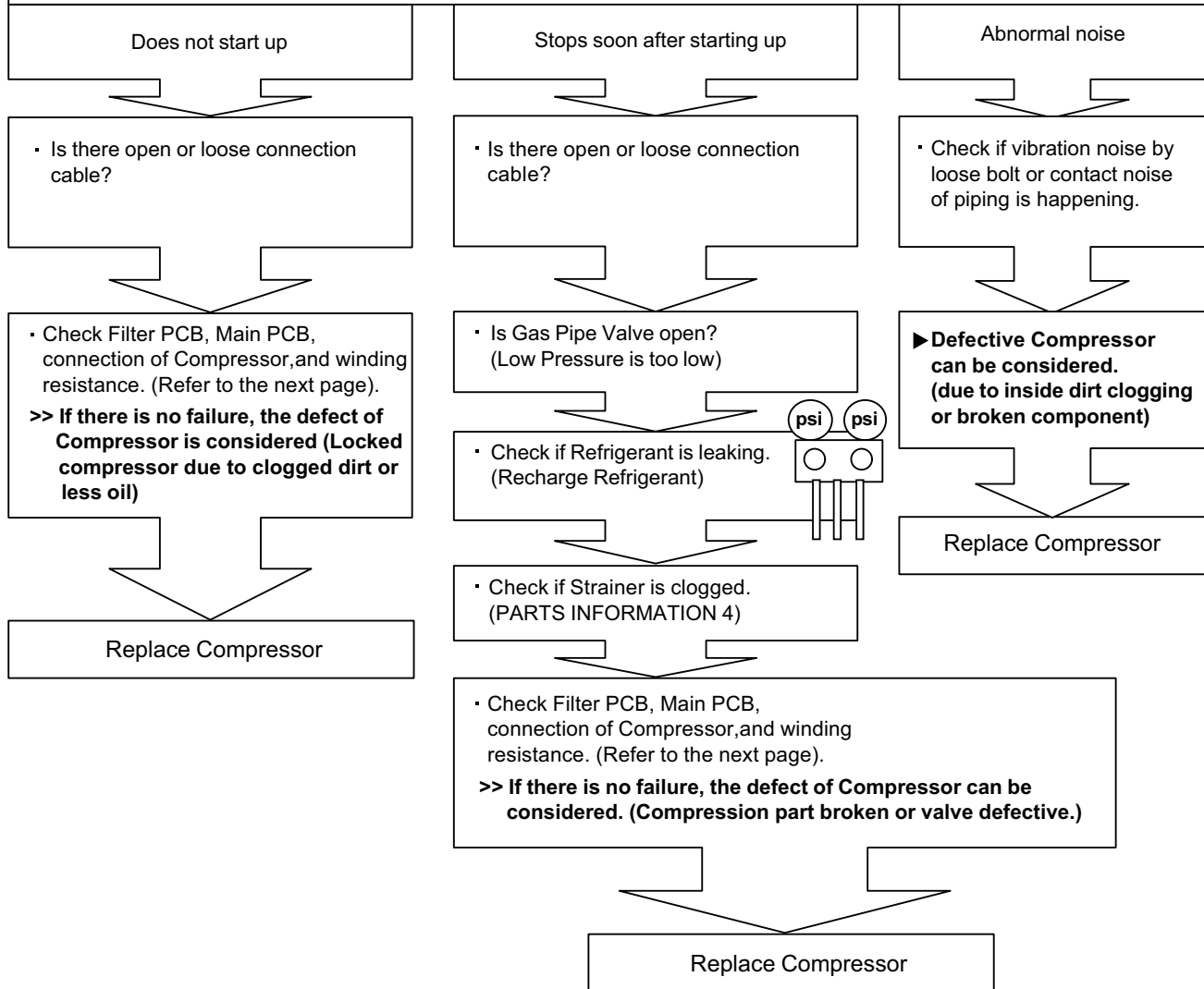


## 2-4 SERVICE PARTS INFORMATION

### SERVICE PARTS INFORMATION 1

#### Compressor

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

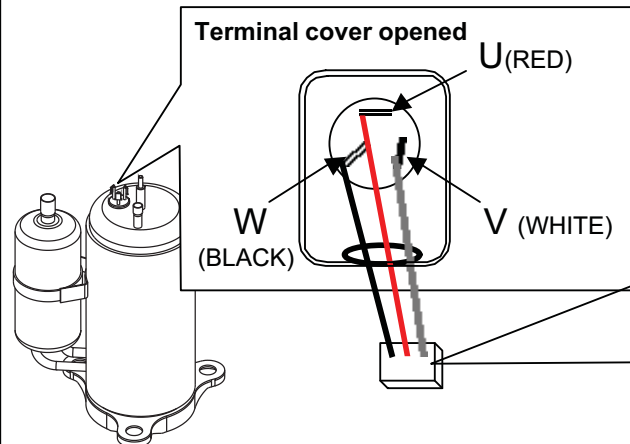


## SERVICE PARTS INFORMATION 2

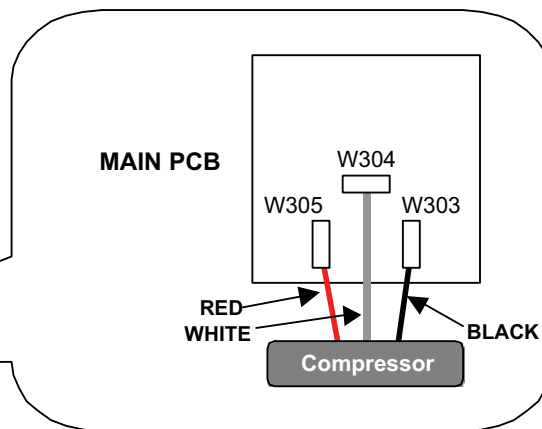
### Inverter Compressor

#### Check Point 1 : Check Connection

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



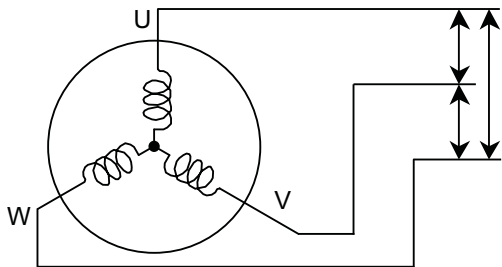
- Check connection of Main PCB (Loose or incorrect wiring)



#### Check Point 2 : Check Winding Resistance

- Check winding resistance of each terminal

► **If the resistance value is  $0\Omega$  or infinite, replace Compressor.**



Resistance Value :  $0.88\Omega$   
at  $68^{\circ}\text{F}(20^{\circ}\text{C})$



#### Check Point 3 : Replace Main PCB

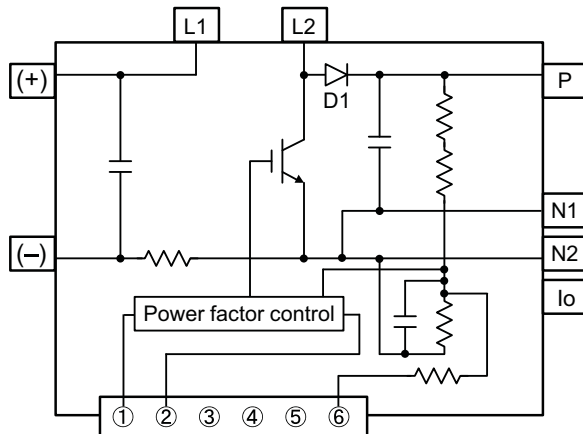
► **If the symptom does not change with above Check 1, 2, replace Main PCB.**

### SERVICE PARTS INFORMATION 3

#### Active Filter Module

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

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



Check the open or short-circuit

Terminal		Resistance value
Tester(+)	Tester(-)	
(+)	(-)	<b>360k</b> Ω
(-)	N1	<b>0</b> Ω
P	(+)	<b>720k</b> Ω
L1	L2	<b>5.4M</b> Ω (approx.)
P	N1	<b>360k</b> Ω
L1,L2	Control Box	<b>∞</b> Ω
L2	N2	<b>5.8M</b> Ω (approx.)

Check the diode

Terminal		Resistance value
Tester(+)	Tester(-)	
L2	P	<b>5.3M</b> Ω (approx.)
P	L2	<b>5.4M</b> Ω (approx.)

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

#### Check Point 2 : Check the Output DC voltage (between P and N1)

- Check the Output DC voltage (between P and N1) of compressor stopping and operating.
  - >> If the output voltage of compressor operating is less than the output voltage of compressor stopping, Active Filter Module is defective. >> **Replace Active Filter Module**

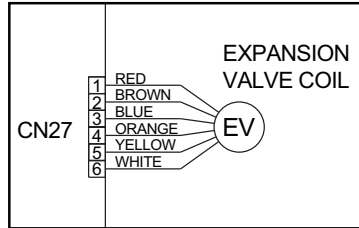


## SERVICE PARTS INFORMATION 4

Outdoor unit Electronic Expansion Valve  
( EEV )

### Check Point 1 : Check Connections

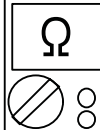
- Check connection of connector (CN27)  
( Loose connector or open cable )



### Check Point 2 : Check Coil of EEV

- Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	$46 \Omega \pm 4 \Omega$ at 68°F(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.

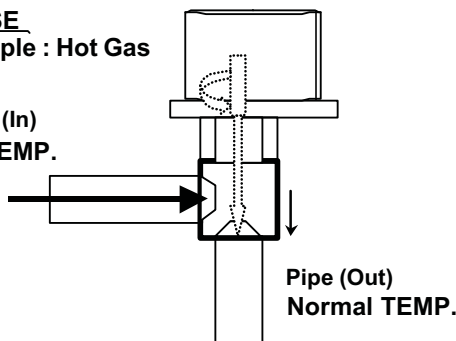
► **If an abnormal noise does not show, replace Main PCB.**

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

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

**CLOSE**  
Example : Hot Gas

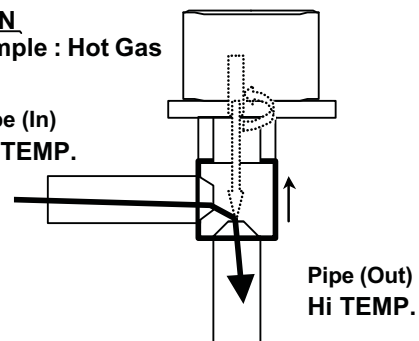
Pipe (In)  
Hi TEMP.



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

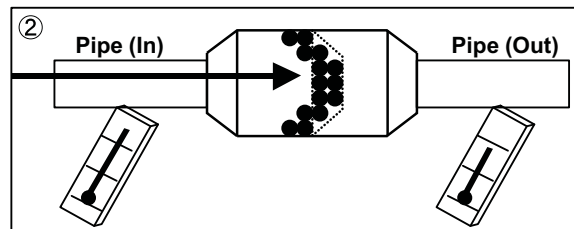
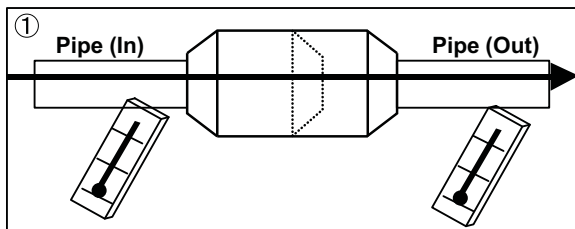
**OPEN**  
Example : Hot Gas

Pipe (In)  
Hi TEMP.



### Check Point 6 : Check Strainer

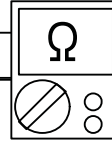
Strainer normally does not have temperature difference between inlet and outlet as shown in ①, but if there is a difference as shown in ②, there is a possibility of inside clogged. In this case, replace Strainer.



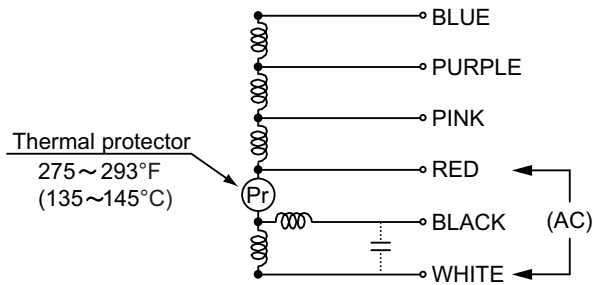
## SERVICE PARTS INFORMATION 5

### Indoor Unit Fan Motor

Check Point : ABU18/ 24RULX



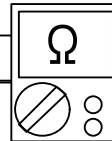
- Check each winding resistance of the motor
- ▶ **If Resistance value is abnormal, replace motor.**



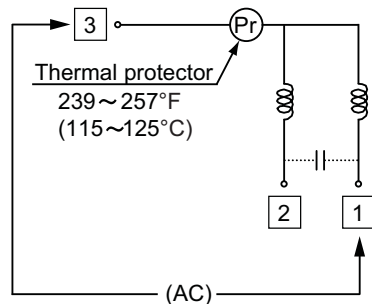
Read Wire	Resistance value
White - Red	<b>131 <math>\Omega</math> <math>\pm</math> 8%</b>
Red - Black	<b>107 <math>\Omega</math> <math>\pm</math> 8%</b>
Red - Pink	<b>46.4 <math>\Omega</math> <math>\pm</math> 8%</b>
Pink - Purple	<b>46.4 <math>\Omega</math> <math>\pm</math> 8%</b>
Purple- Blue	<b>237 <math>\Omega</math> <math>\pm</math> 8%</b>

at 68°F(20°C)

Check Point : ABU36RSLX



- Check each winding resistance of the motor
- ▶ **If Resistance value is abnormal, replace motor.**



The connector inserting numbers	Resistance value
<b>1 - 3</b>	<b>22.8 <math>\Omega</math> <math>\pm</math> 10%</b>
<b>2 - 3</b>	<b>31.9 <math>\Omega</math> <math>\pm</math> 10%</b>

at 68°F(20°C)

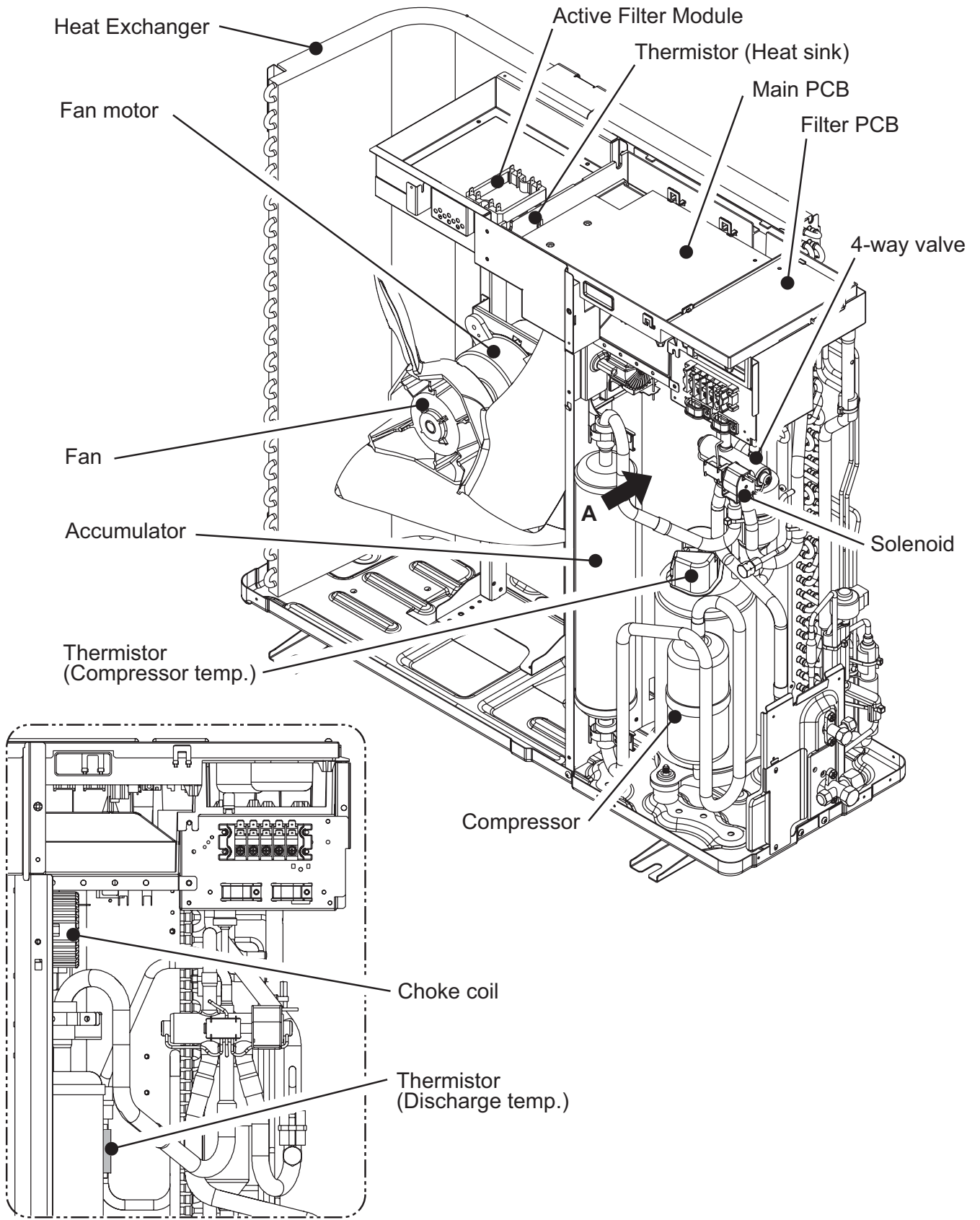
*Universal Floor / Ceiling &  
Large Ceiling type  
INVERTER*

**3 . REPLACEMENT PARTS**

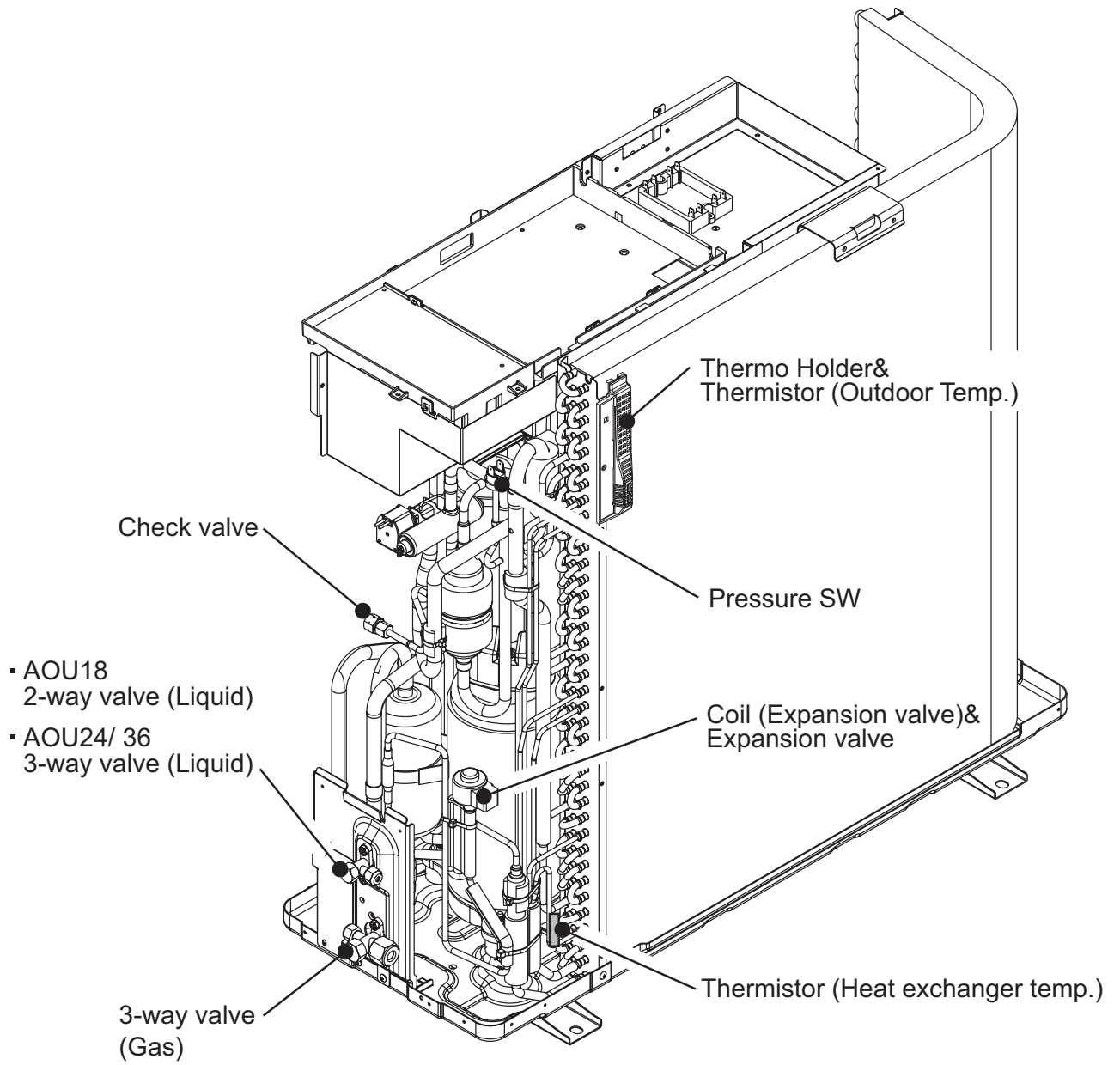
# 1. REPLACEMENT PARTS (FOR OUTDOOR UNIT)

## 1-1 For AOU18/ 24/ 36RLX

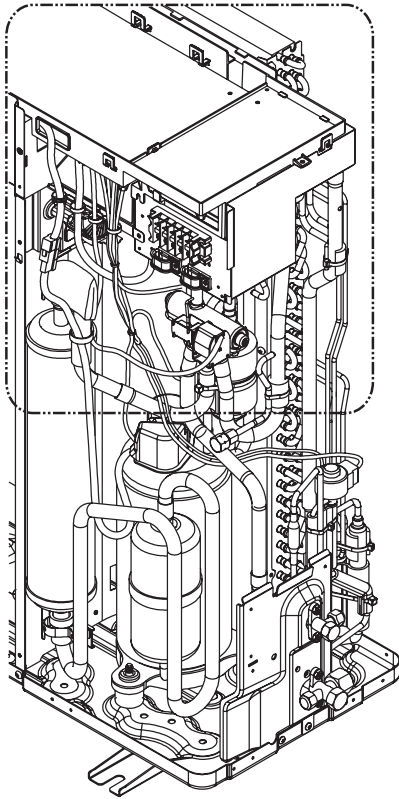
### 1-1-1 PARTS LAYOUT DRAWING



VIEW - A



# 1-1-2 WIRING (For AOU18/ 24/ 36RLX)



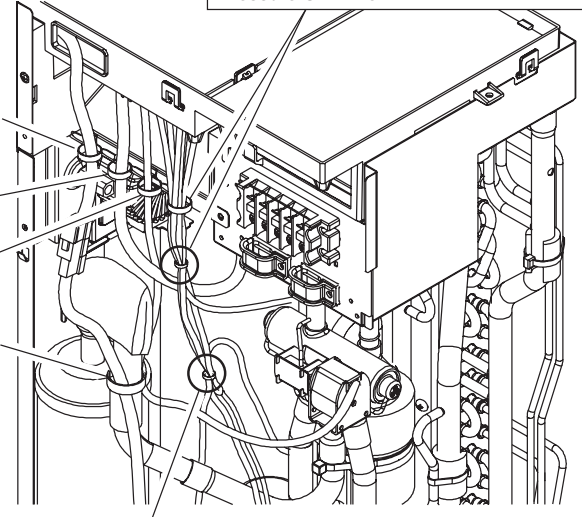
CLAMP & BIND  
 Thermistor (Discharge temp.) wire  
 Thermistor (Outdoor temp.) wire  
 Thermistor (Compressor temp.) wire  
 Thermistor (Heat exchanger temp.) wire  
 Coil (Expansion valve) wire  
 Pressure SW wire

CLAMP  
 (Compressor wire)

CLAMP  
 (Fan motor wire)

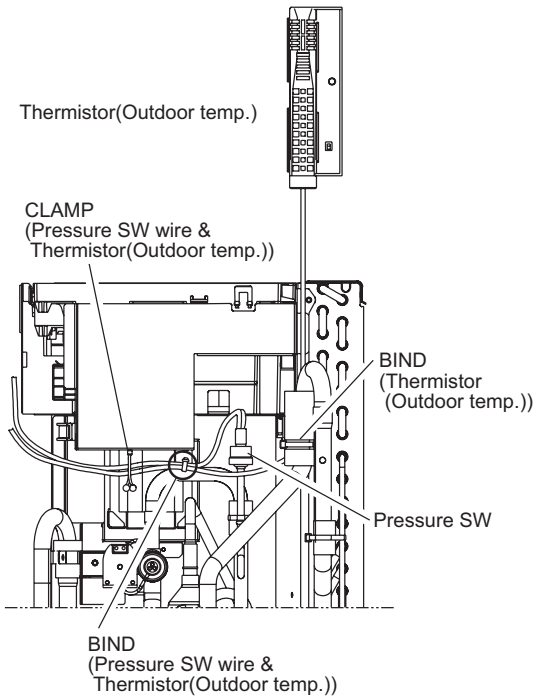
CLAMP  
 (Solenoid wire)

BIND  
 (Compressor wire  
 & Solenoid wire)

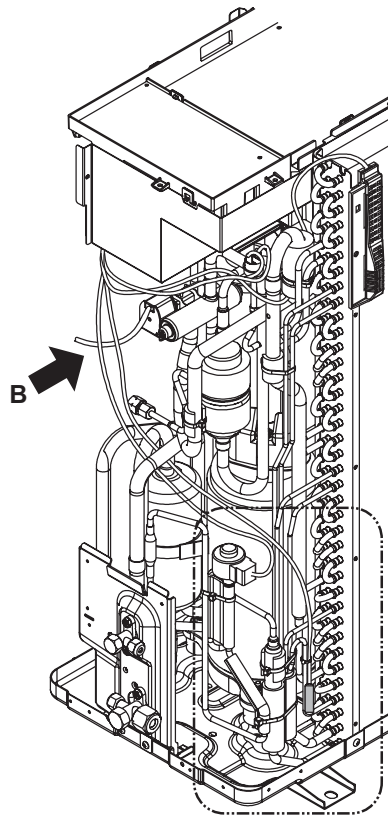


BIND  
 (Thermistor (Discharge temp.))  
 (Thermistor (Compressor temp.))  
 (Thermistor (Heat exchanger temp.))  
 (Coil (Expansion valve))

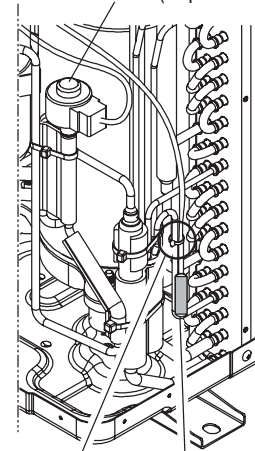
**ENLARGED DETAIL**



**VIEW - B**



Coil (Expansion valve)



Thermistor  
 (Heat exchanger temp.)

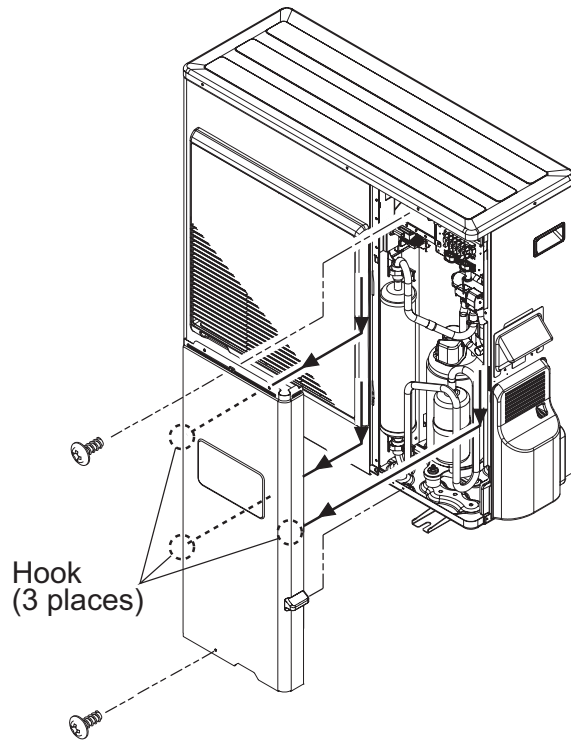
BIND  
 (Thermistor  
 (Heat exchanger temp.))

**ENLARGED DETAIL**

## 1-1-3 DISASSEMBLY PROCESS (For AOU18/ 24/ 36RLX)

### 1. SERVICE PANEL removal

- Remove the 2 mounting screws.
- Remove the SERVICE PANEL by sliding downward.

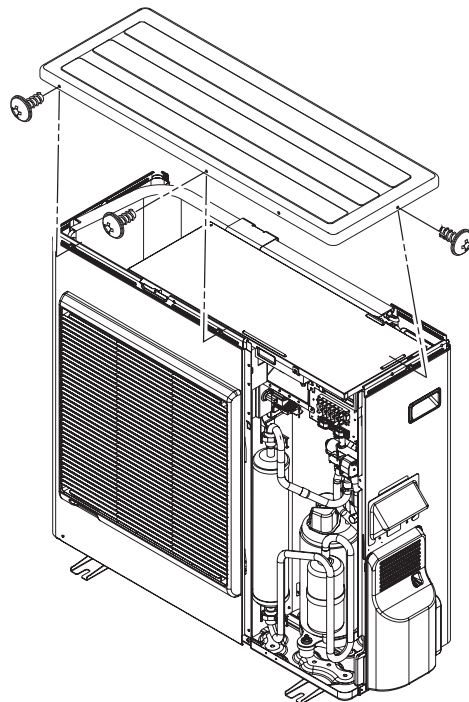


#### Replaceable Component

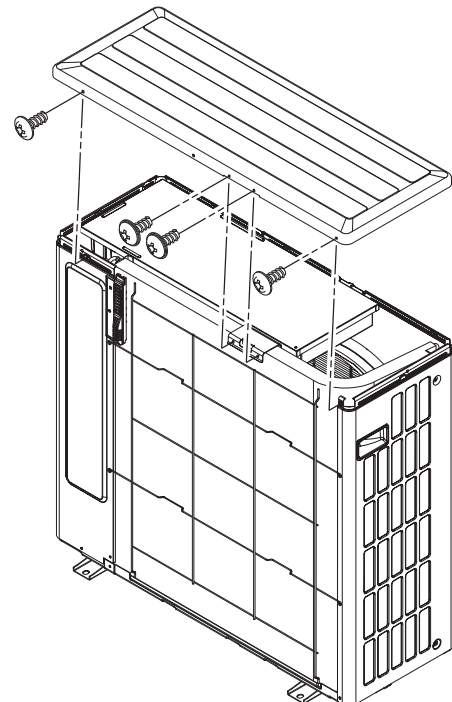
Compressor  
Accumulator  
4-way valve  
Solenoid  
Thermistor (Compressor temp.)  
Thermistor (Discharge temp.)  
Thermistor (Outdoor temp.)  
Thermistor (Heat exchanger temp.)  
Pressure SW  
Coil (Expansion valve)

### 2. TOP PANEL removal

- Remove the 7 mounting screws.
- Remove the TOP PANEL upward.



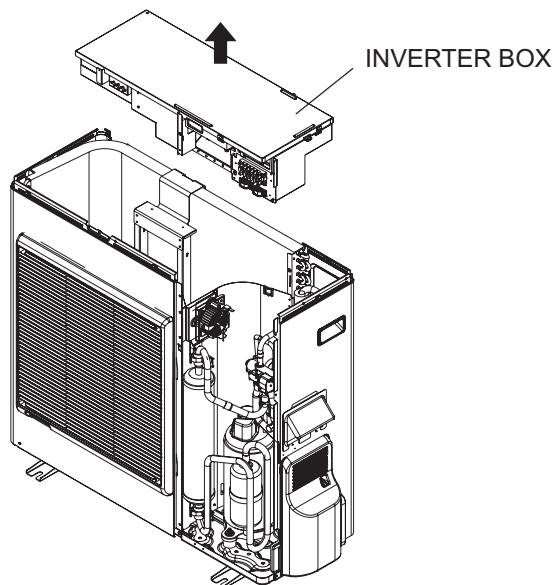
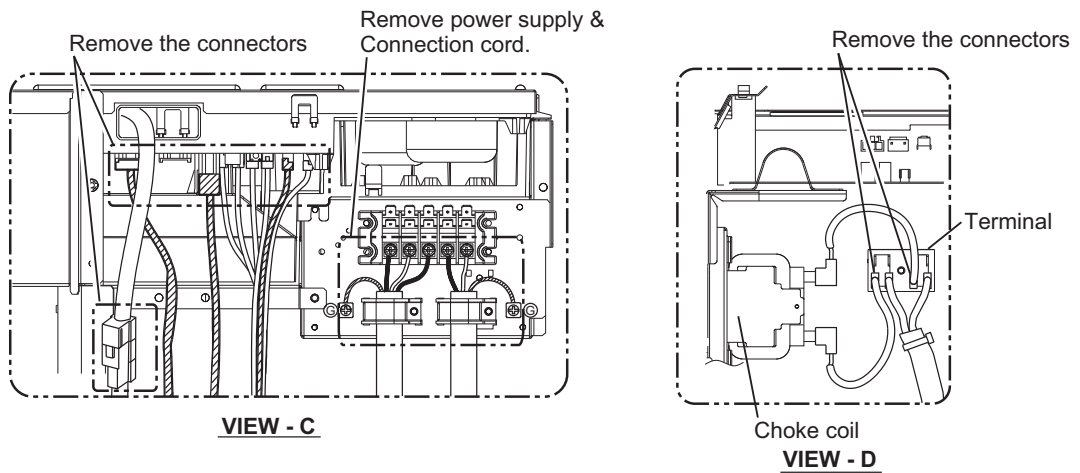
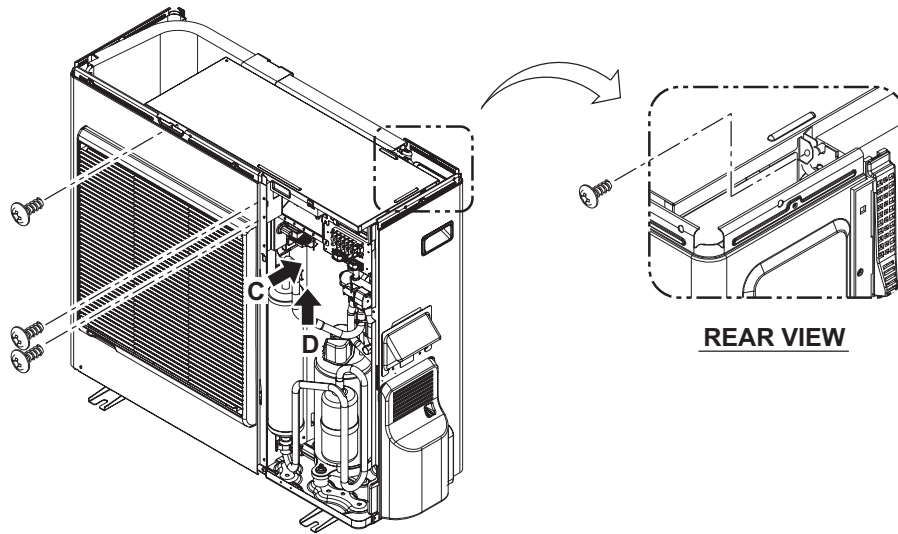
FRONT VIEW



REAR VIEW

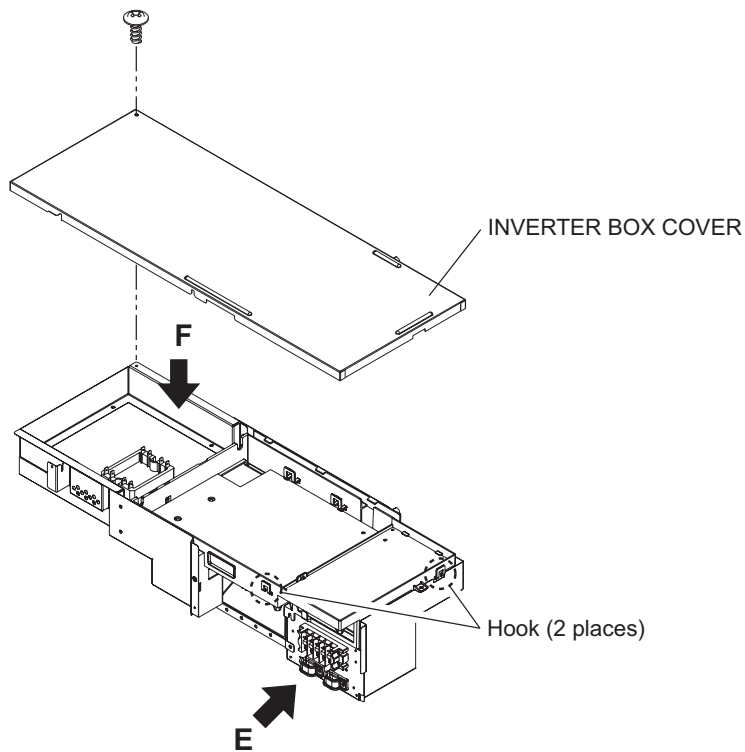
### 3. INVERTER BOX removal

- Remove the 4 mounting screws.
- Remove the connectors and cords. (Refer to VIEW -C,-D)
- Remove the INVERTER BOX upward.

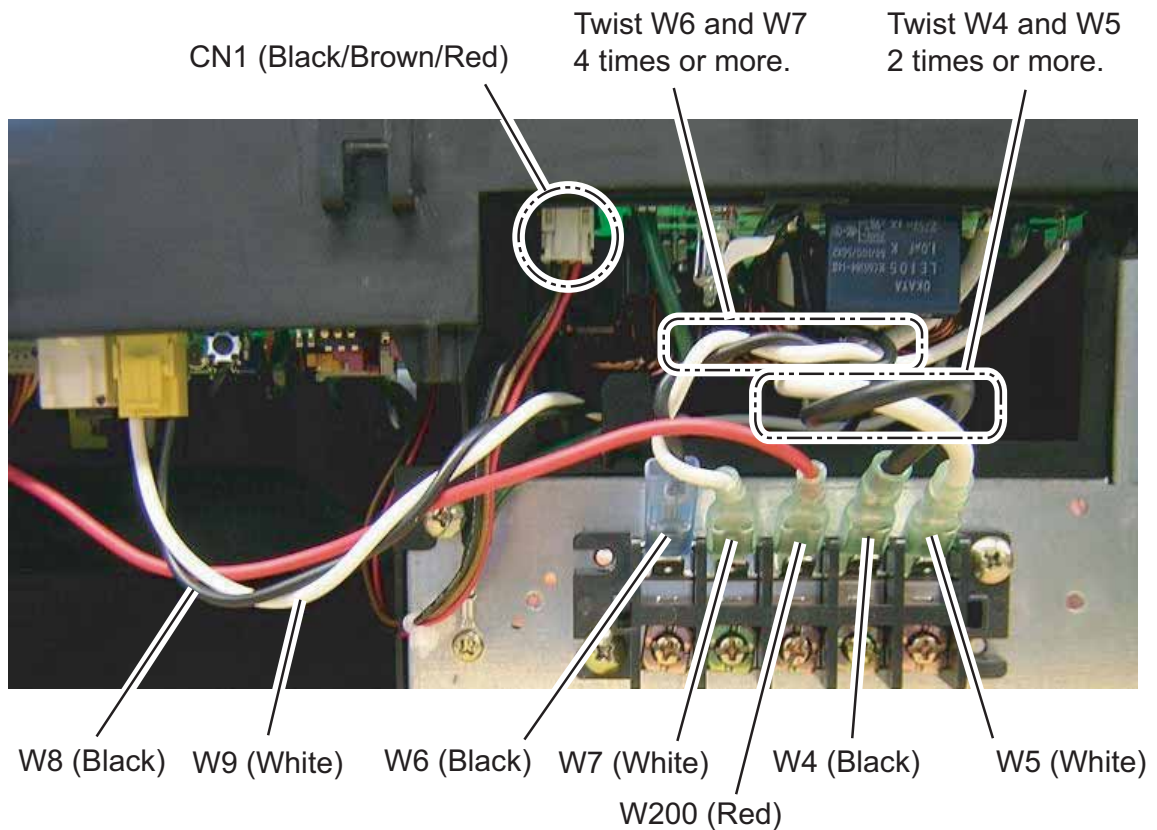




- Remove the 1 mounting screw.
- Remove the INVERTER BOX COVER upward.

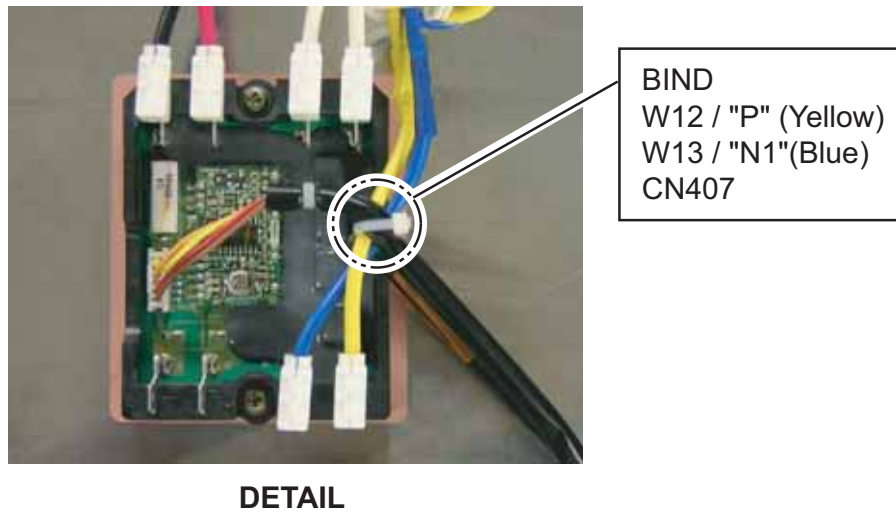
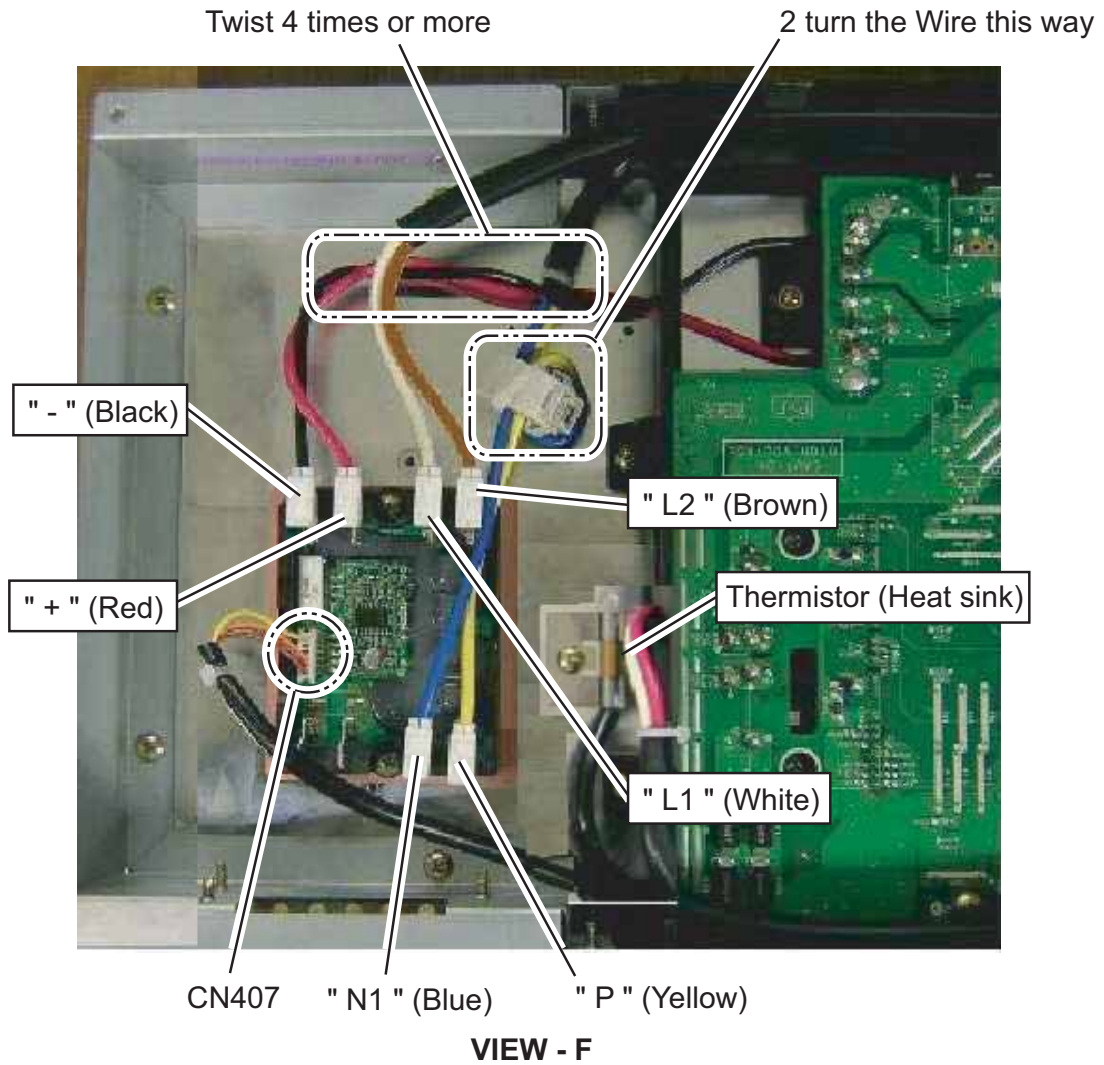


- Remove the connector and cords.

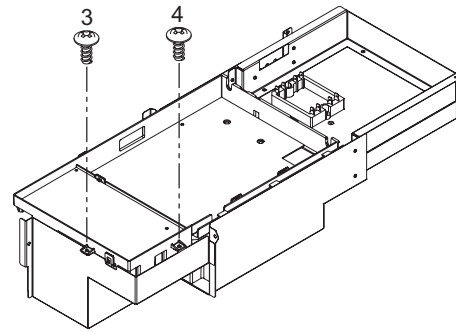
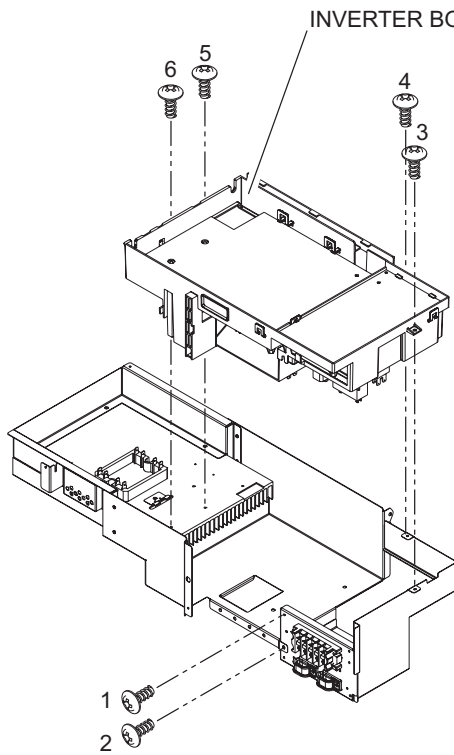


**VIEW - E**

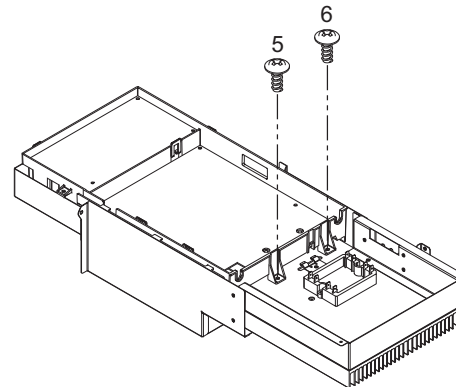
- Remove the connector and cords.



- Remove the 6 mounting screws.
- Remove the INVERTER BOX A upward.



**REAR VIEW**



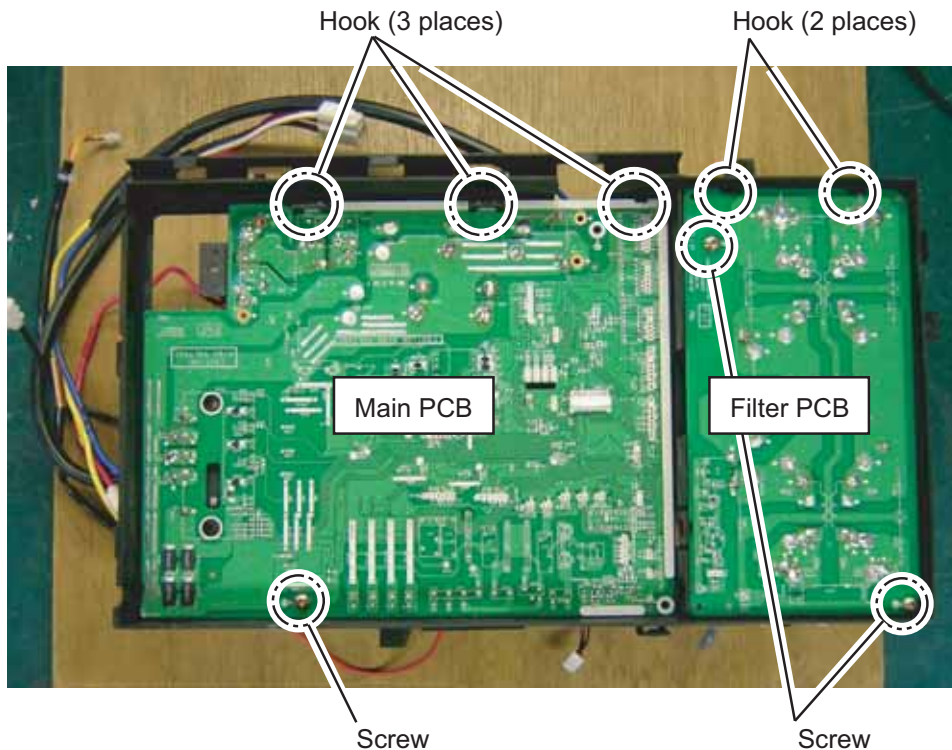
**LEFT SIDE VIEW**

**Main PCB**

- Remove the 1 mounting screw.
- Remove the Main PCB upward.

**Filter PCB**

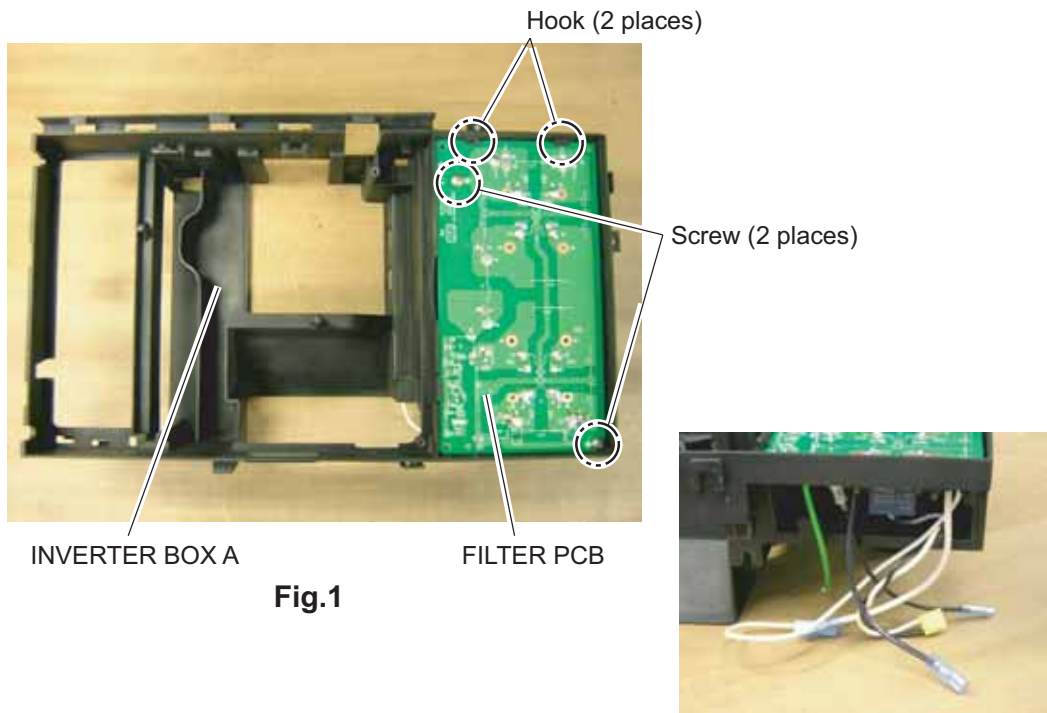
- Remove the 2 mounting screws.
- Remove the Filter PCB upward.



# 1-1-4 ASSEMBLY PROCESS of INVERTER UNIT (For AOU18/ 24/ 36RLX)

## 1. FILTER PCB

- As shown in Fig.1, assemble FILTER PCB to INVERTER BOX A.
- As shown in Fig.2, pull out the wires of FILTER PCB.



INVERTER BOX A

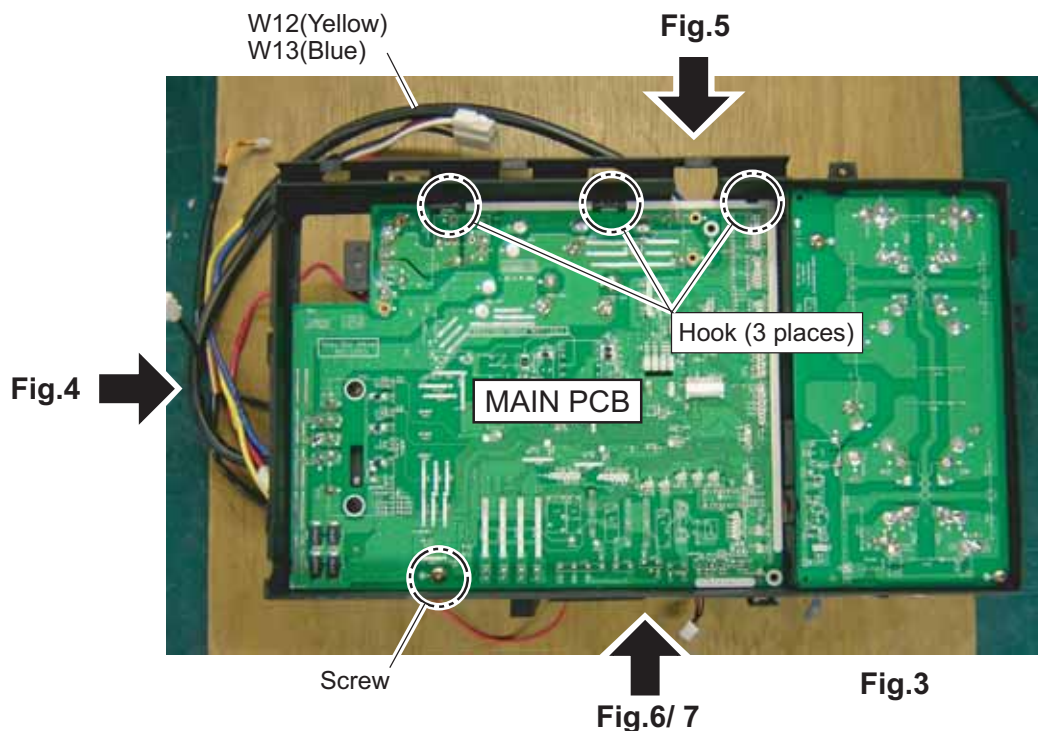
FILTER PCB

Fig.1

Fig.2

## 2. MAIN PCB

- As shown in Fig.3, temporarily fix MAIN PCB to INVERTER BOX A.
- After it is temporary fix of MAIN PCB, As shown in the Fig 4 - 7, pull out the wires of MAIN PCB.



W12(Yellow)  
W13(Blue)

Fig.5

Hook (3 places)

MAIN PCB

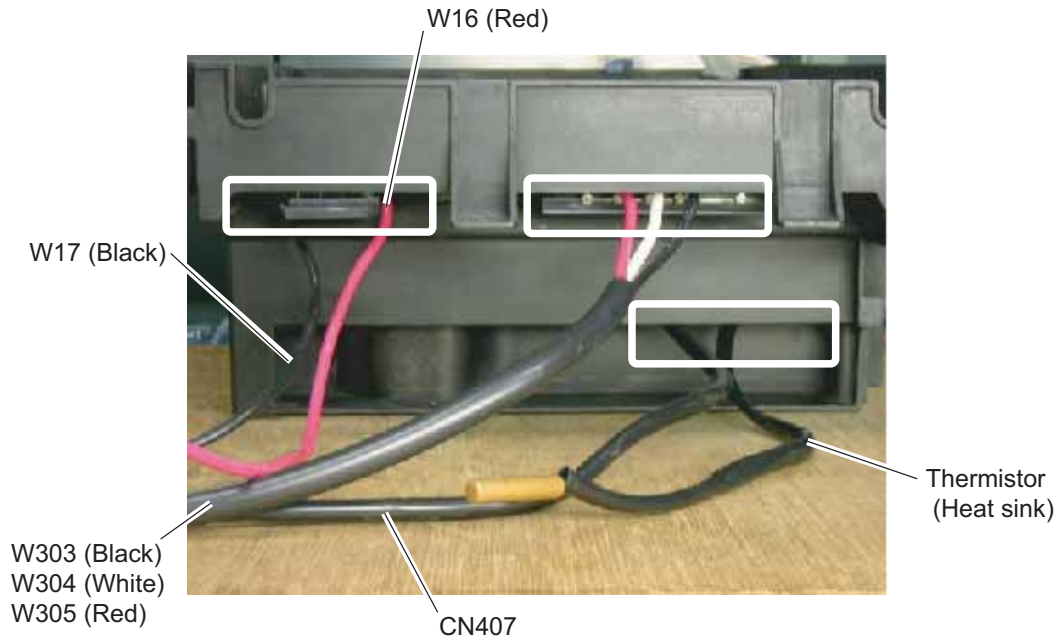
Fig.4

Screw

Fig.6/ 7

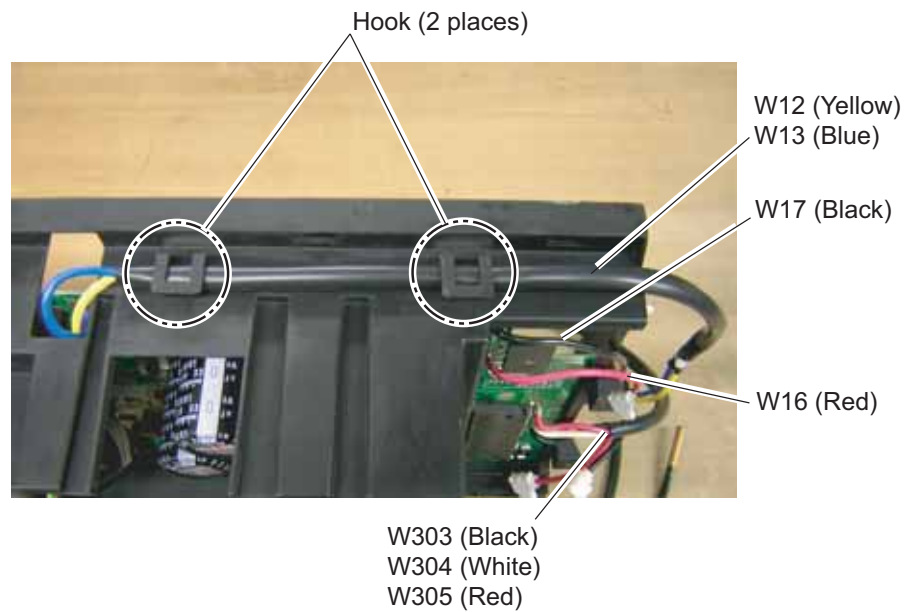
Fig.3

▪ As shown in Fig.4, pull out the wires.



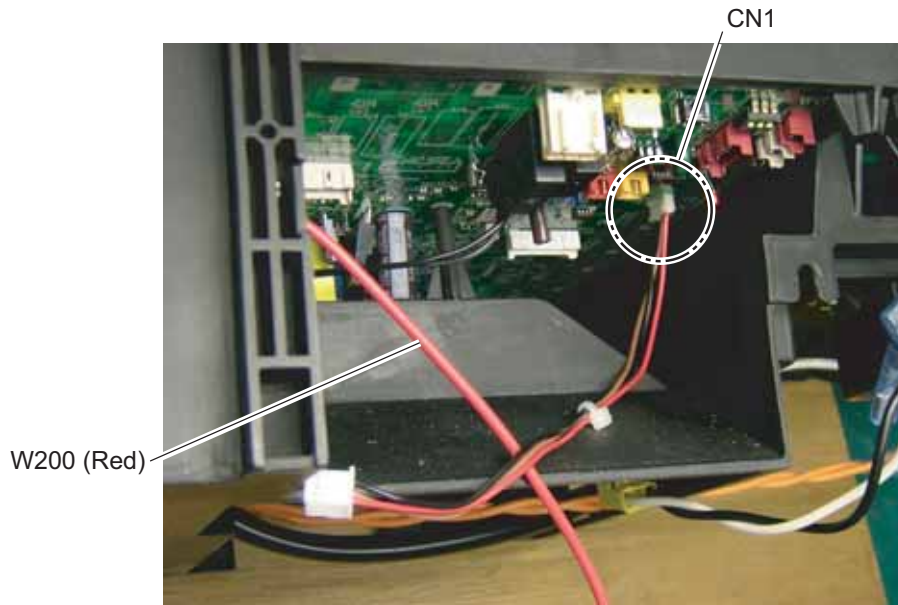
**Fig. 4**

▪ As shown in Fig.5, pull out the wires and fix them.



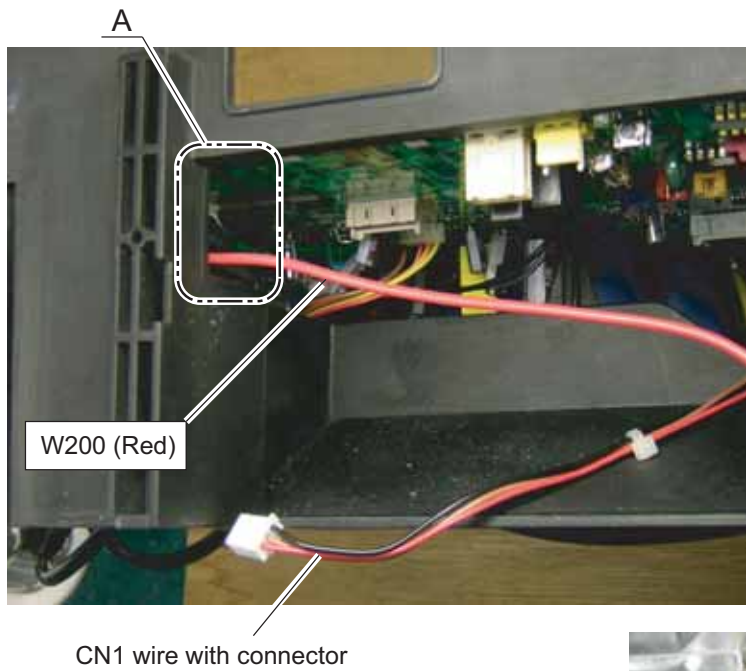
**Fig. 5**

▪ As shown in Fig.6, pull out the wires.

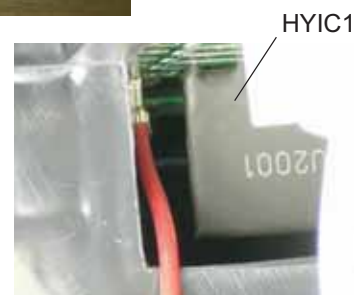


**Fig. 6**

▪ As shown in Fig.7, pull out the wires.



**Fig. 7**



Don't come in contact with HYIC1.

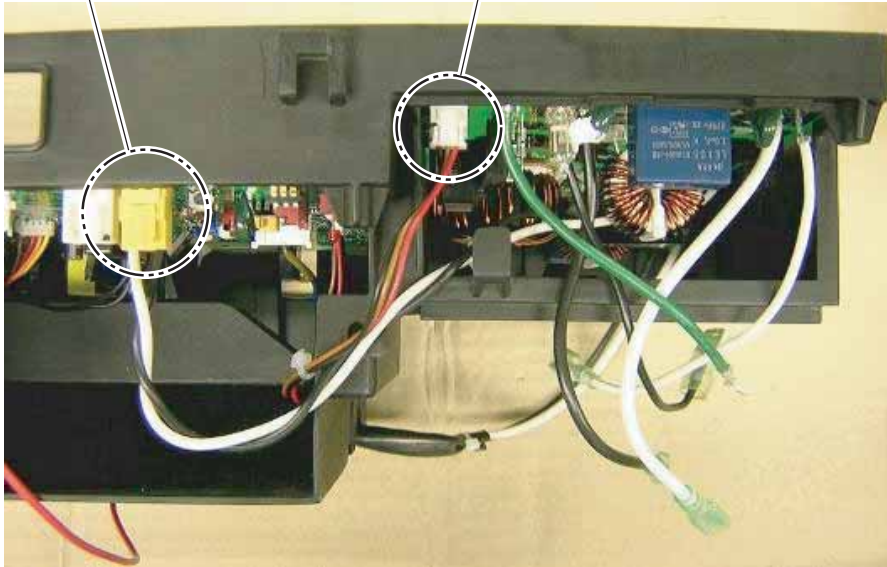
**DETAIL - A**

▪ For AOU18/ 24RLX

▪ As shown in Fig.8, connect wires.

CN34 (Yellow)

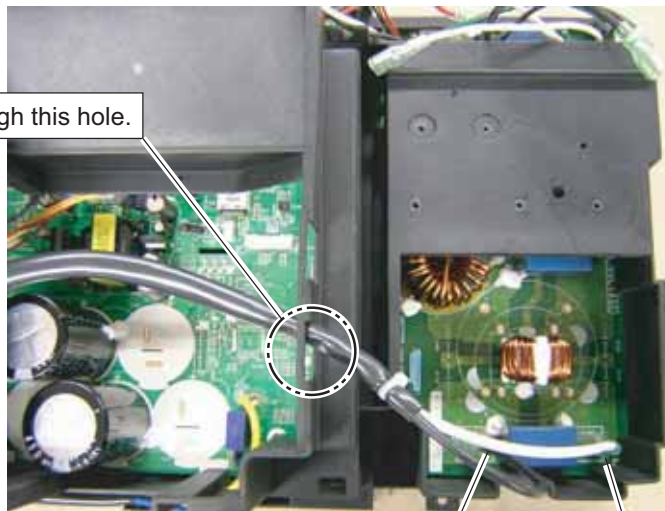
CN1 (White)



**Fig. 8**

▪ As shown in Fig.9, connect wires.

Through this hole.



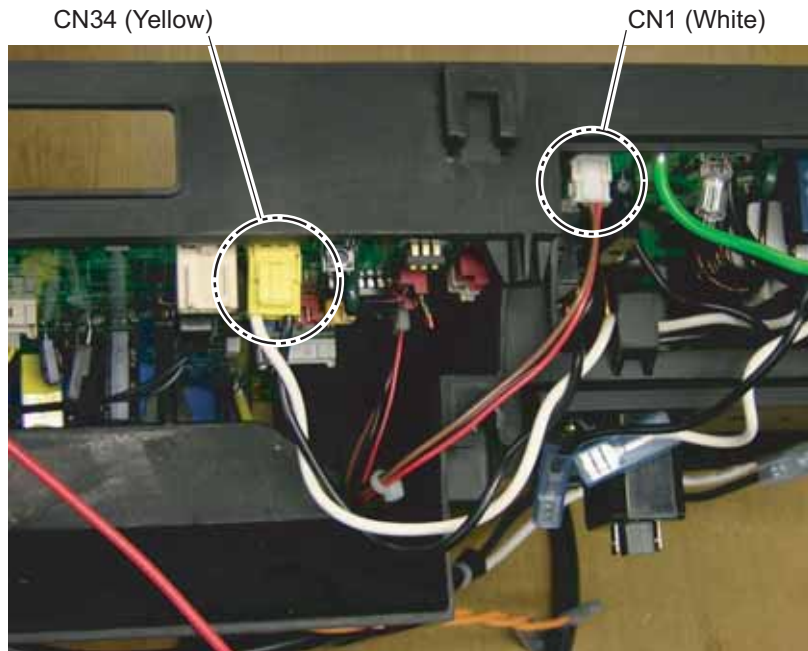
TM101 (Black line)

TM102 (White line)

**Fig. 9**

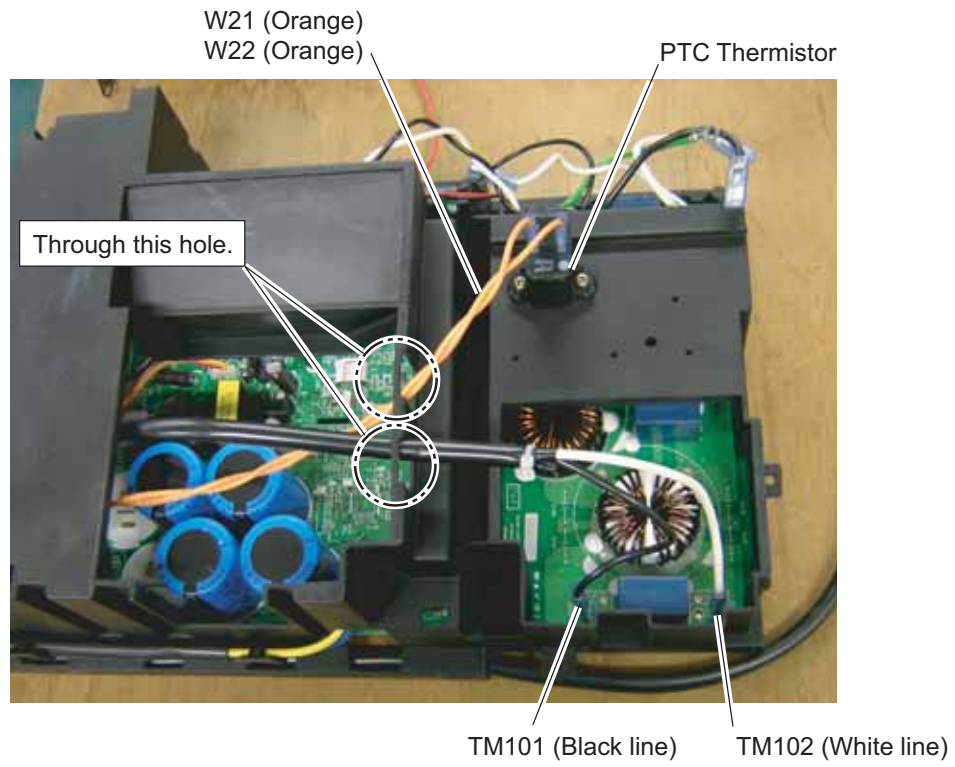
▪ For AOU36RLX

▪ As shown in Fig.8, connect wires.



**Fig. 8**

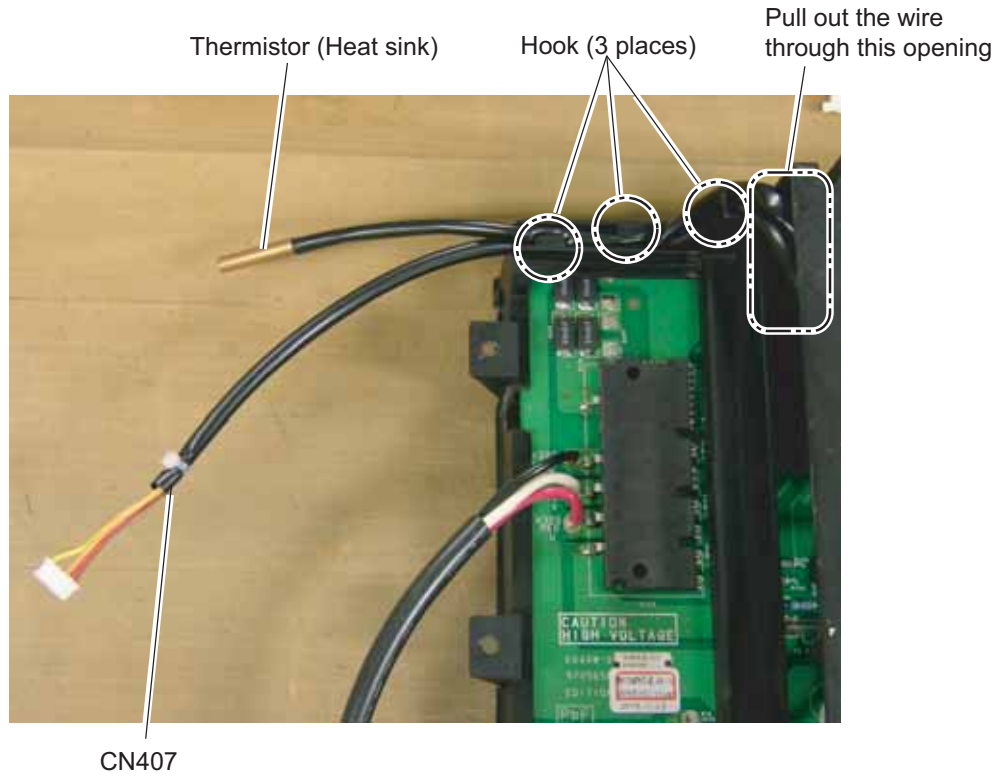
▪ As shown in Fig.9, connect wires.



**Fig. 9**

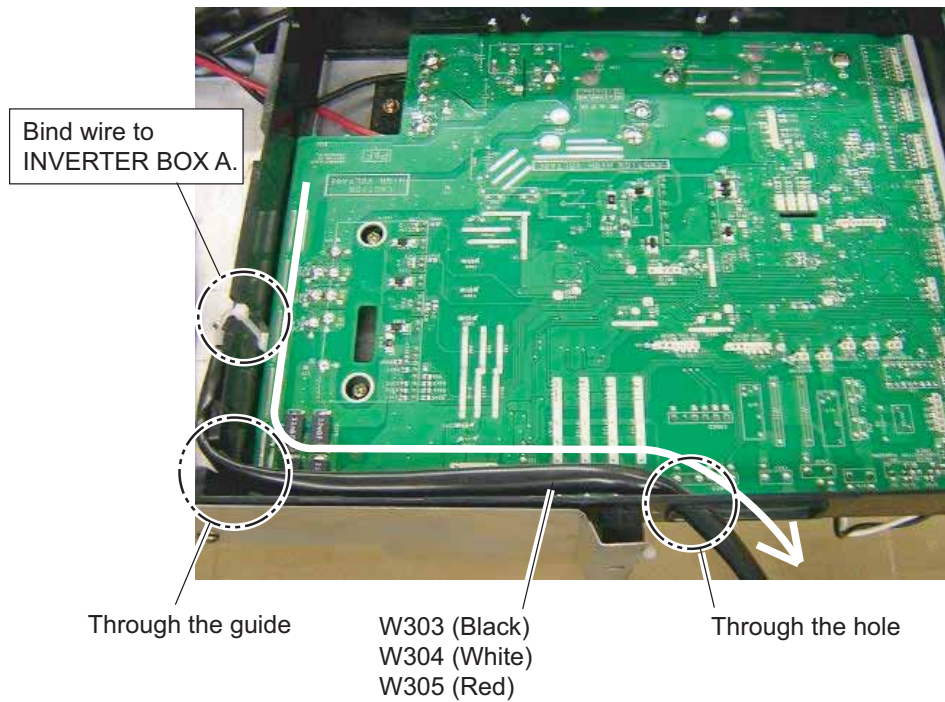


▪ As shown in Fig.10, fix the wire to INVERTER BOX A.



**Fig. 10**

▪ As shown in the figures, set wire with connector and bind it to INVERTER BOX A.



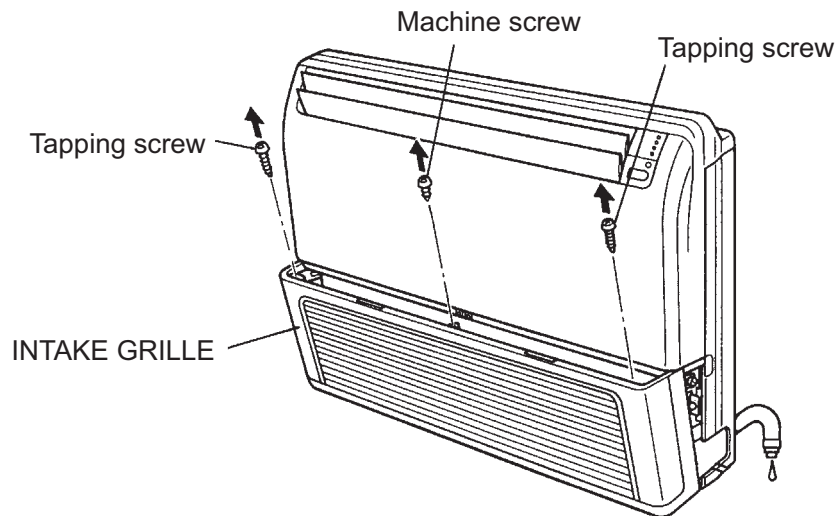
**Fig. 11**

## 2. REPLACEMENT PARTS (For INDOOR UNIT)

### 2-1 PARTS LAYOUT DRAWING ( For ABU18/ 24RULX )

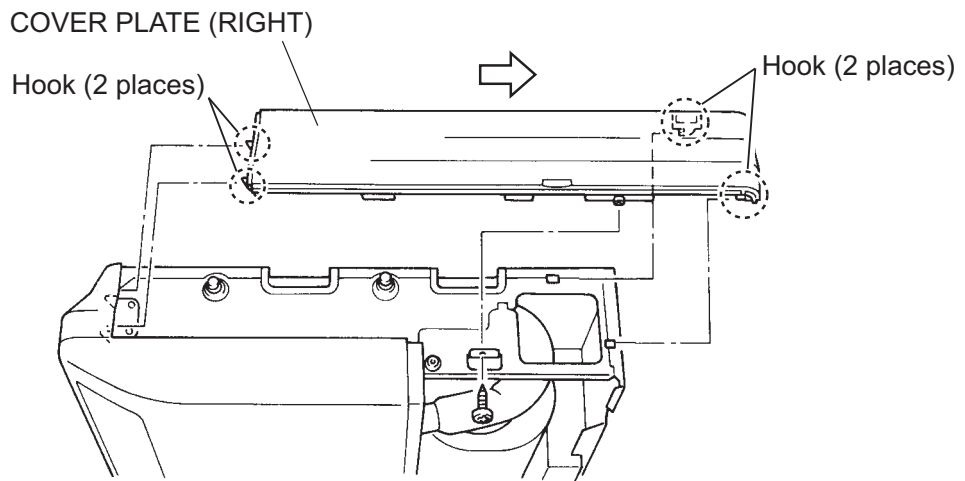
#### 1. INTAKE GRILLE removal

- Open the INTAKE GRILLE and remove the 3 mounting screws.
- Remove the INTAKE GRILLE



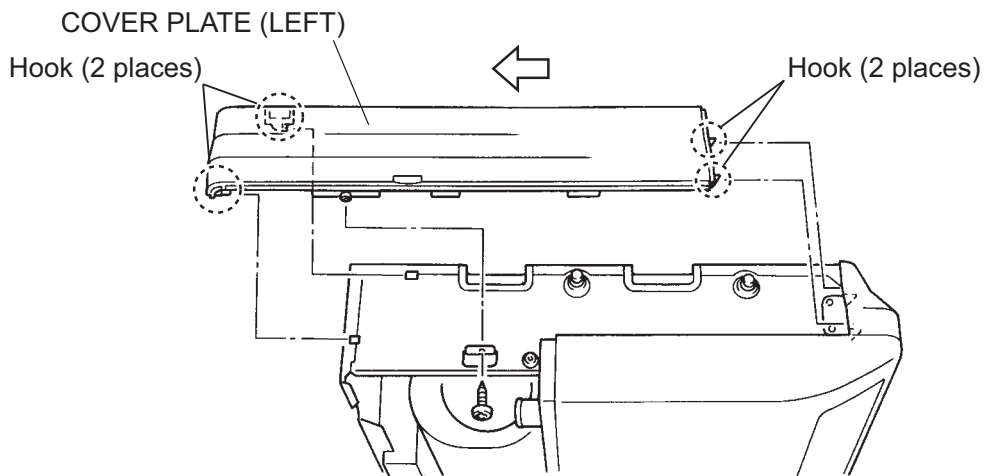
## 2. COVER PLATE (RIGHT) removal

- Remove the 1 mounting screw.
- Remove the COVER PLATE (RIGHT).



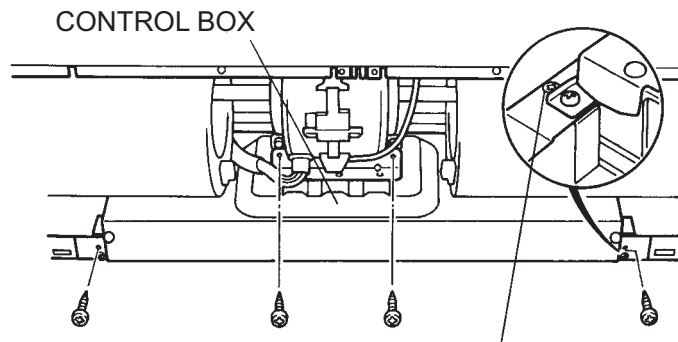
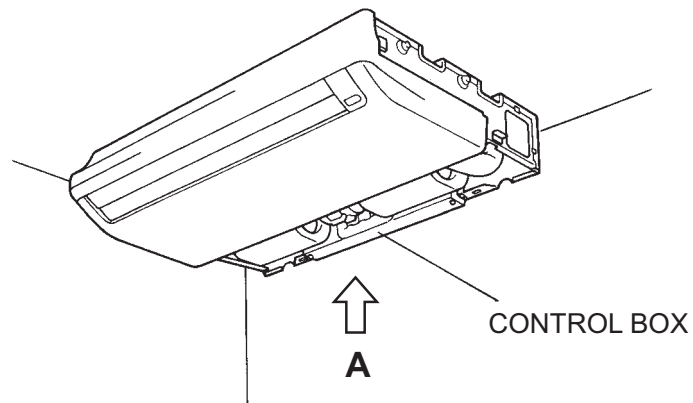
## 3. COVER PLATE (LEFT) removal

- Remove the 1 mounting screw.
- Remove the COVER PLATE (LEFT).



#### 4. CONTROL BOX removal

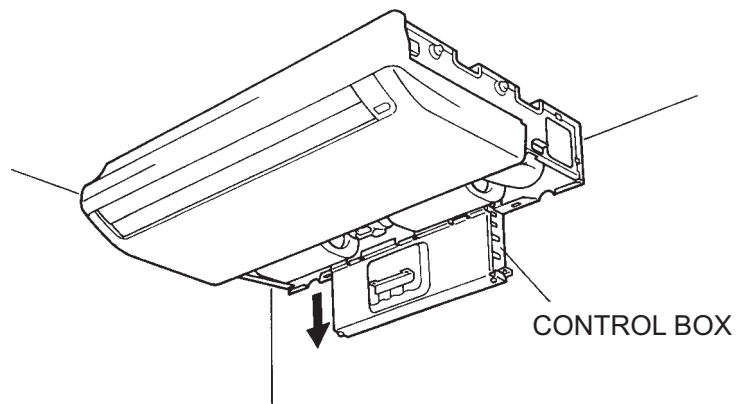
- Remove the 4 mounting screw.



Do not remove the screws.  
If the stays are removed,  
the CONTROL BOX will fall.

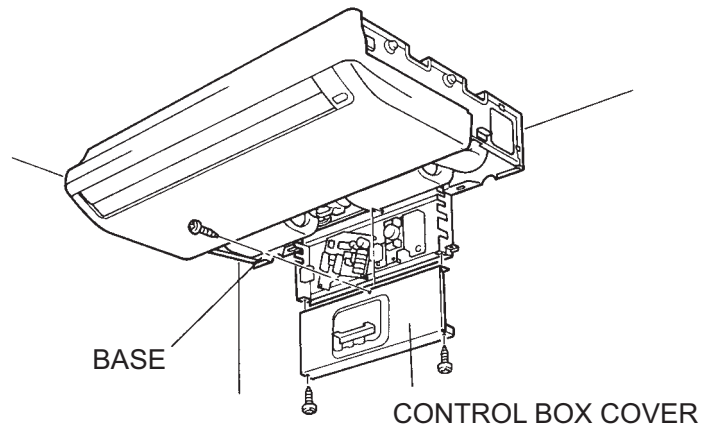
VIEW - A

- 
- Pull out the CONTROL BOX.



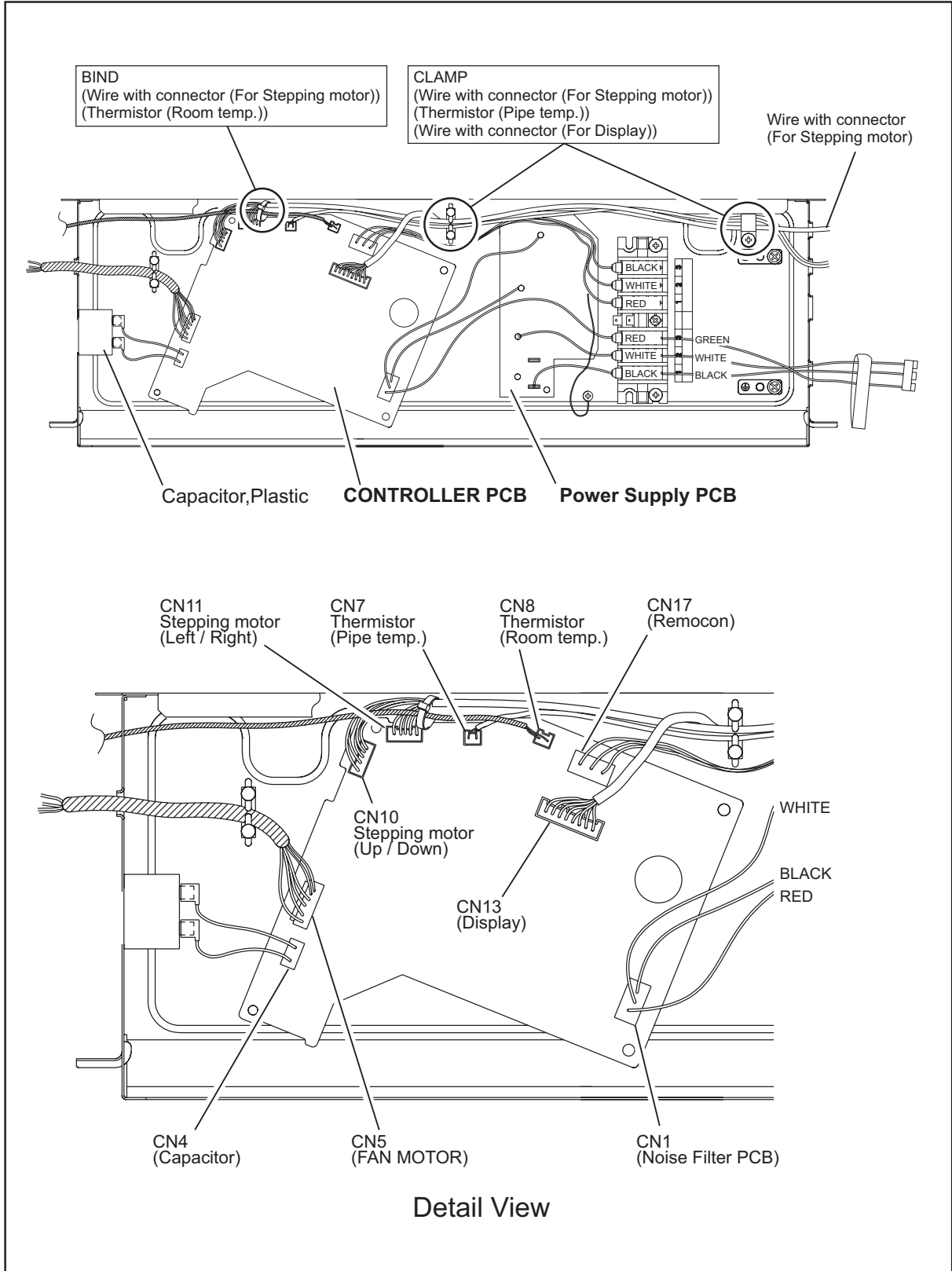
## 5. CONTROL BOX COVER removal

- Remove the 3 mounting screw.
- Remove the CONTROL BOX COVER.

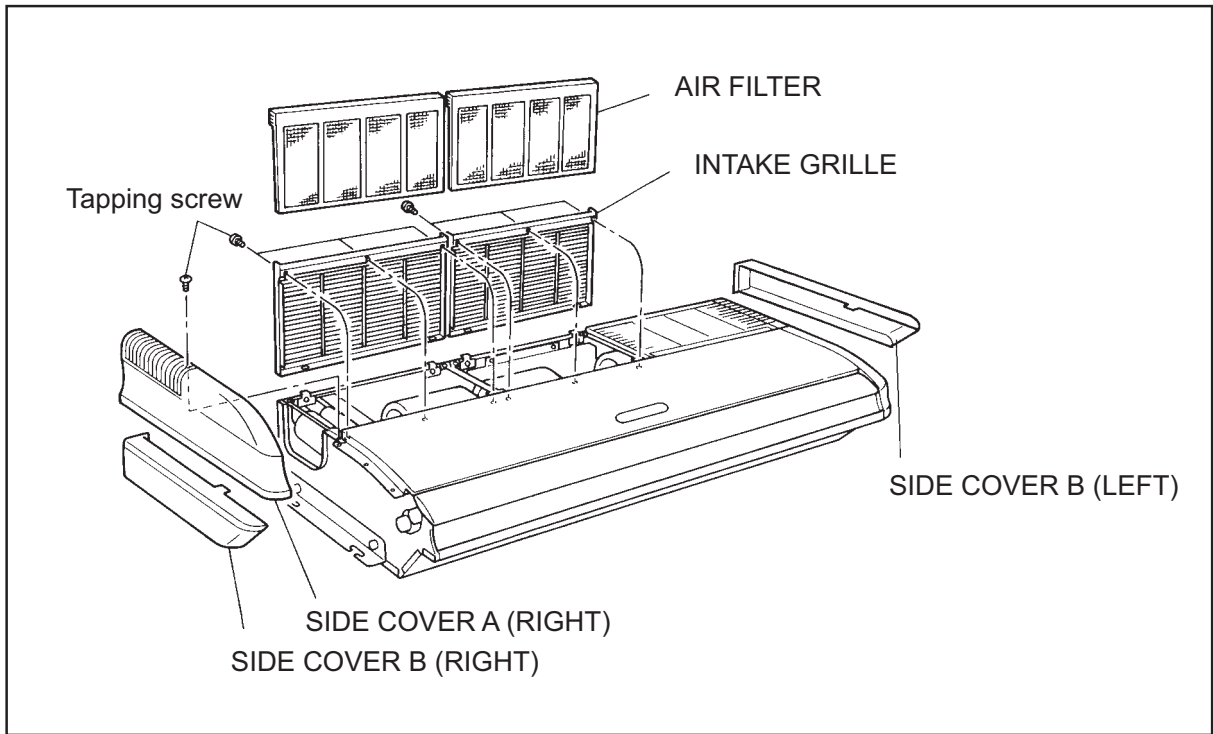


**CAUTION**  
Be careful not to pinch the lead wires  
between the CONTROL BOX and BASE.

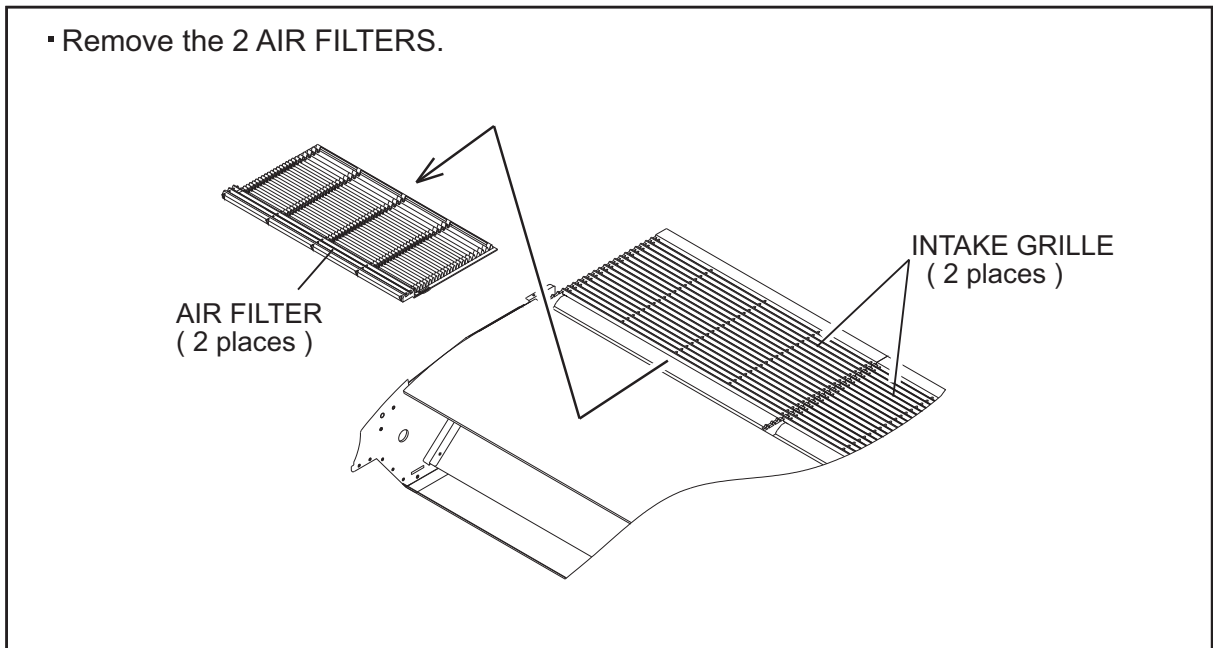
## 6. Wiring and Parts layout



## 2-2 PARTS LAYOUT DRAWING ( For ABU36RSLX )

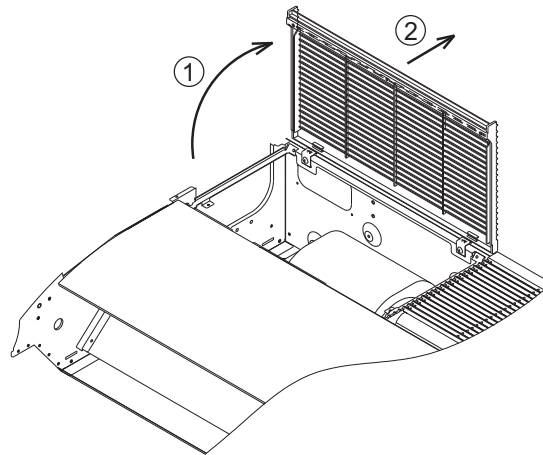
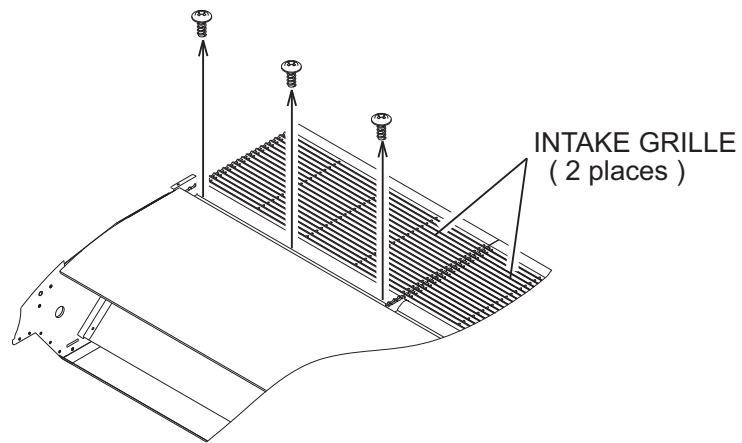


### 1. AIR FILTER removal



## 2. INTAKE GRILLE removal

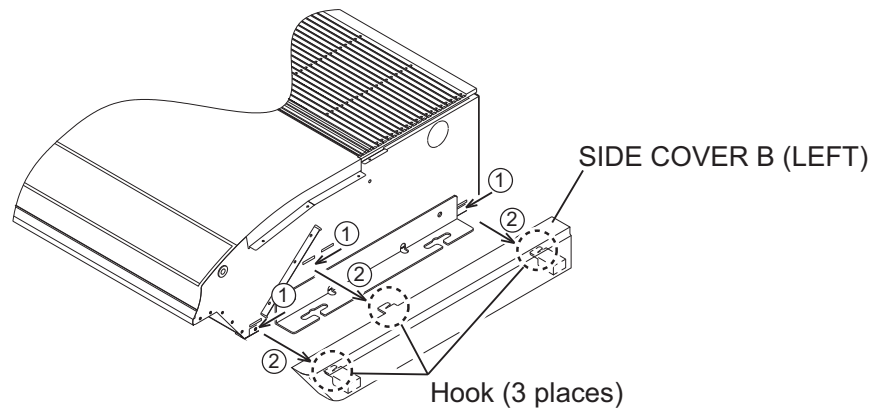
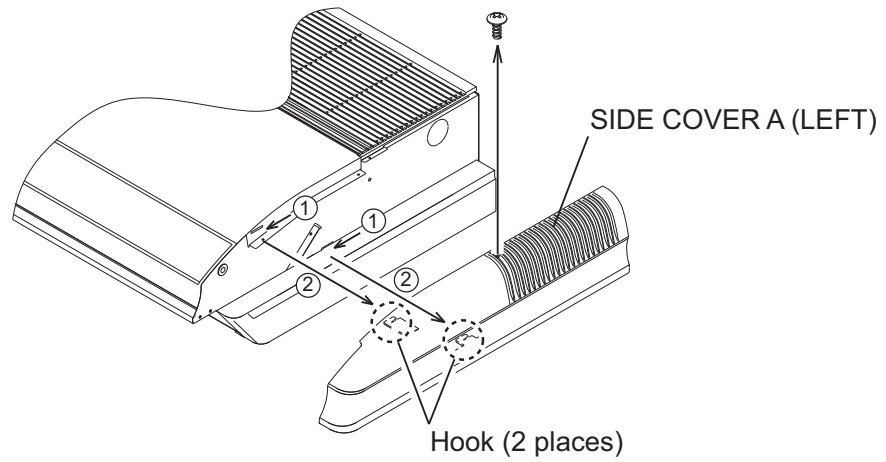
- Remove the 6 mounting screws.
- Remove the 2 INTAKE GRILLES.





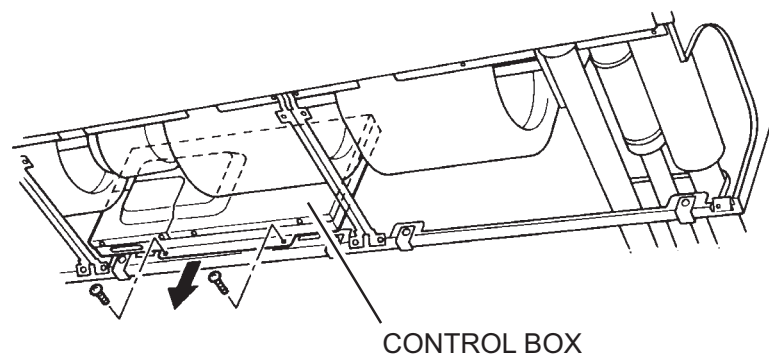
### 3. SIDE COVER removal

- Remove the 2 mounting screws.(Left side and Right side)
- Remove the SIDE COVER A and B.

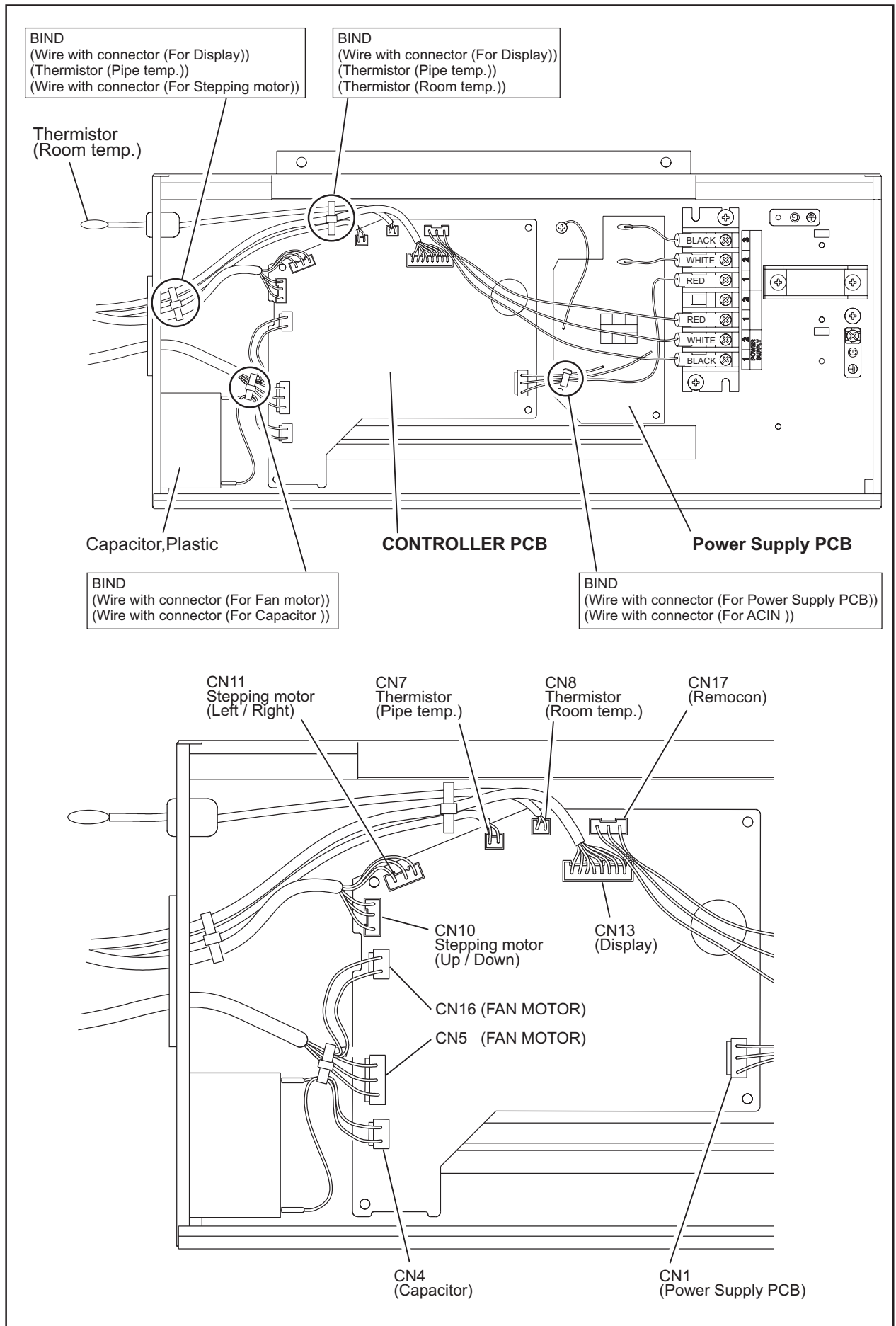


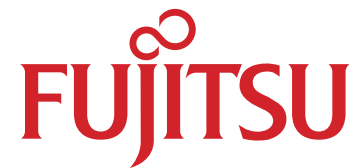
### 4. CONTROL BOX removal

- Remove the 2 mounting screws.
- Pull the CONTROL BOX downward.



## 6. Wiring and Parts layout





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