

MANUEL D'INSTRUCTION

**LUTECH
ÉNERGIE**

(514) 267-4237

CLIMATISATION

RÉFRIGÉRATION

VENTILATION

CHAUFFAGE

PISCINE

WWW.LUTECHENERGIE.COM

**SPLIT TYPE
ROOM AIR CONDITIONER
WALL MOUNTED^{type}
INVERTER**

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	ASU9RL	AOU9RL
	ASU12RL	AOU12RL

Refrigerant
R410A

CONTENTS

1. SPECIFICATION

ASU9/12RL, AOU9/12RL.....	01-01
---------------------------	-------

2. DIMENSIONS

ASU9/12RL, AOU9/12RL.....	02-01
---------------------------	-------

3. REFRIGERANT SYSTEM DIAGRAM

ASU9/12RL, AOU9/12RL.....	03-01
---------------------------	-------

4. CIRCUIT DIAGRAM

ASU9/12RL, AOU9/12RL.....	04-01
---------------------------	-------

5. DESCRIPTION OF EACH CONTROL OPERATION

1. COOLING OPERATION.....	05-01
2. HEATING OPERATION.....	05-02
3. DRY OPERATION.....	05-03
4. AUTO CHANGEOVER OPERATION.....	05-04
5. INDOOR FAN CONTROL.....	05-05
6. OUTDOOR FAN CONTROL.....	05-07
7. LOUVER CONTROL.....	05-08
8. COMPRESSOR CONTROL.....	05-09
9. TIMER OPERATION CONTROL.....	05-10
10. ELECTRONIC EXPANSION VALVE CONTROL.....	05-12
11. TEST OPERATION CONTROL.....	05-12
12. PREVENT TO RESTART FOR 3 MINUTES (3 MINUTES ST).....	05-12
13. FOUR-WAY VALVE EXTENSION SELECT.....	05-12
14. AUTO RESTART.....	05-12
15. MANUAL AUTO OPERATION (Indoor unit body operation).....	05-13
16. FORCED COOLING OPERATION.....	05-13
17. COMPRESSOR PREHEATING.....	05-13
18. COIL DRY OPEARTION CONTROL.....	05-13
19. DEFROST OPERATION CONTROL.....	05-14
20. OFF DEFROST OPERATION CONTROL.....	05-16
21. MINIMUM HEAT OPERATION.....	05-16
22. VARIOUS PROTECTIONS.....	05-17

6. TROUBLE SHOOTING

6-1 ERROR DISPLAY.....	06-01
6-1-1 WIRED REMOTE CONTROLLER DISPLAY (OPTION).....	06-01
6-1-2 OUTDOOR UNIT DISPLAY.....	06-03
6-1-3 INDOOR UNIT DISPLAY.....	06-04
6-2 TROUBLE SHOOTING WITH ERROR CODE.....	06-05
6-3 TROUBLE SHOOTING WITH NO ERROR CODE.....	06-24
6-4 SERVICE PARTS INFORMATION.....	06-29

7. APPENDING DATA

1. Function setting.....	07-01
2. Outdoor unit Pressure Value and Total Electric Current Curve.....	07-04
3. Thermistor Resistance Values.....	07-06
4. Capacity/ Input Data.....	07-07

8. REPLACEMENT PARTS

WALL MOUNTED type INVERTER

1 . SPECIFICATIONS

SPECIFICATIONS

ELECTRICAL DATA

TYPE		Cool & heat inverter	
INDOOR UNIT		ASU9RL	ASU12RL
OUTDOOR UNIT		AOU9RL	AOU12RL
COOLING CAPACITY		8,500 BTU/h 2.50 kW	11,500 BTU/h 3.40 kW
HEATING CAPACITY		10,000 BTU/h 2.93 kW	14,000 BTU/h 4.11 kW
POWER SOURCE		230 V	230 V
FREQUENCY		60 Hz	60 Hz
RUNNING CURRENT	Cooling	3.3 A	4.4 A
	Heating	3.7 A	5.3 A
INPUT WATTS	Cooling	0.690 kW	0.950 kW
	Heating	0.770 kW	1.160 kW
E.E.R.	Cooling	12.32 BTU/Wh 3.62 kW/kW	12.10 BTU/Wh 3.58 kW/kW
	Heating	12.99 BTU/Wh 3.81 kW/kW	12.06 BTU/Wh 3.54 kW/kW
MOISTURE REMOVAL		1.3 L/h	1.8 L/h
AIR CIRCULATION HIGH	Cooling	750 m ³ /h	750 m ³ /h
	Heating	750 m ³ /h	750 m ³ /h
MAXIMUM CURRENT	Cooling	6.0 A	6.5 A
	Heating	7.5 A	9.0 A

FAN MOTOR

INDOOR UNIT		ASU9RL	ASU12RL
OUTDOOR UNIT		AOU9RL	AOU12RL
POWER SOURCE		230 V	
INDOOR UNIT	High speed	Cool 1,440 r.p.m. Heat 1,440 r.p.m.	
	Middle speed	Cool 1,200 r.p.m. Heat 1,200 r.p.m.	
	Low speed	Cool 920 r.p.m. Heat 980 r.p.m.	
	Quiet	Cool 680 r.p.m. Heat 700 r.p.m.	
OUTDOOR UNIT		C 730-150 r.p.m. H 650/ 470 r.p.m.	C 860- 200 r.p.m. H 760/ 680/ 470 r.p.m.

NOISE LEVEL

INDOOR UNIT		ASU9RL	ASU12RL
OUTDOOR UNIT		AOU9RL	AOU12RL
INDOOR UNIT	High speed	Cool 43 dB / Heat 43 dB	
	Middle speed	Cool 38 dB / Heat 38 dB	
	Low speed	Cool 33 dB / Heat 33 dB	
	Quiet	Cool 22 dB / Heat 22 dB	
OUTDOOR UNIT		C 46 dB / H 46 dB	C 49 dB / H 49 dB

DIMENSIONS

TYPE	Cool & heat inverter	
INDOOR UNIT	ASU9RL	ASU12RL
OUTDOOR UNIT	AOU9RL	AOU12RL
INDOOR UNIT H x W x D	10-1/4(260) x 31-3/32(790) x 7-25/32(198) Inch(mm)	
OUTDOOR UNIT H x W x D	21-1/4(540) x 25-31/32(660) x 11-13/32(290) Inch(mm)	

WEIGHT

INDOOR UNIT	Gross / Net	9.5 kg / 7.5 kg	
OUTDOOR UNIT	Gross / Net	28 kg / 25 kg	34 kg / 31 kg

COMPRESSOR AND REFRIGERANT

COMPRESSOR TYPE	Hermetic type, 4 pole, 3 phase, DC inverter motor, Rotary		
DISCRIMINATION	5SS072XAA	DA89X1C-20FZ2	
WEIGHT (with oil)	5.9 kg	9.2 kg	
STANDARD REFRIGERANT	650 g	800 g	
REFRIGERANT TYPE	R410A	R410A	
FULL CHARGE	Pipe Length 15 m	650 g	800 g
	20 m	750 g	900 g
ADDITIONAL REFRIGERANT	20 g/m		
MAXIMUM PIPING HEIGHT	15m		

WALL MOUNTED type INVERTER

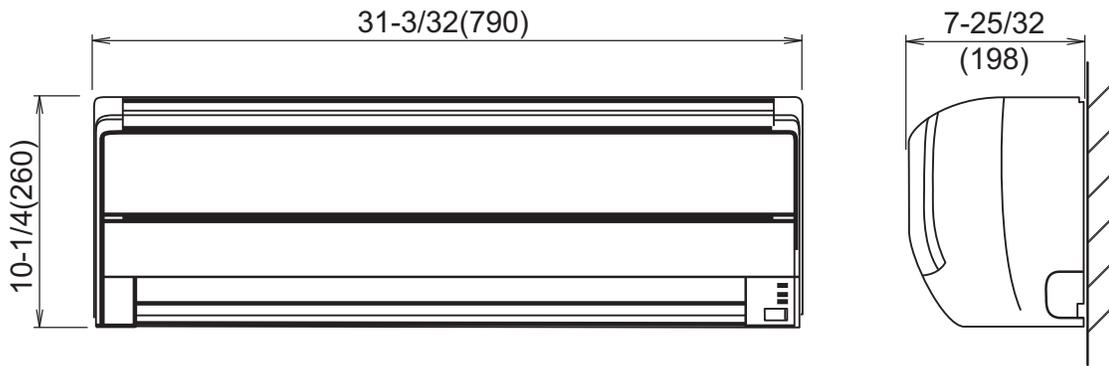
2 . DIMENSIONS

DIMENSIONS

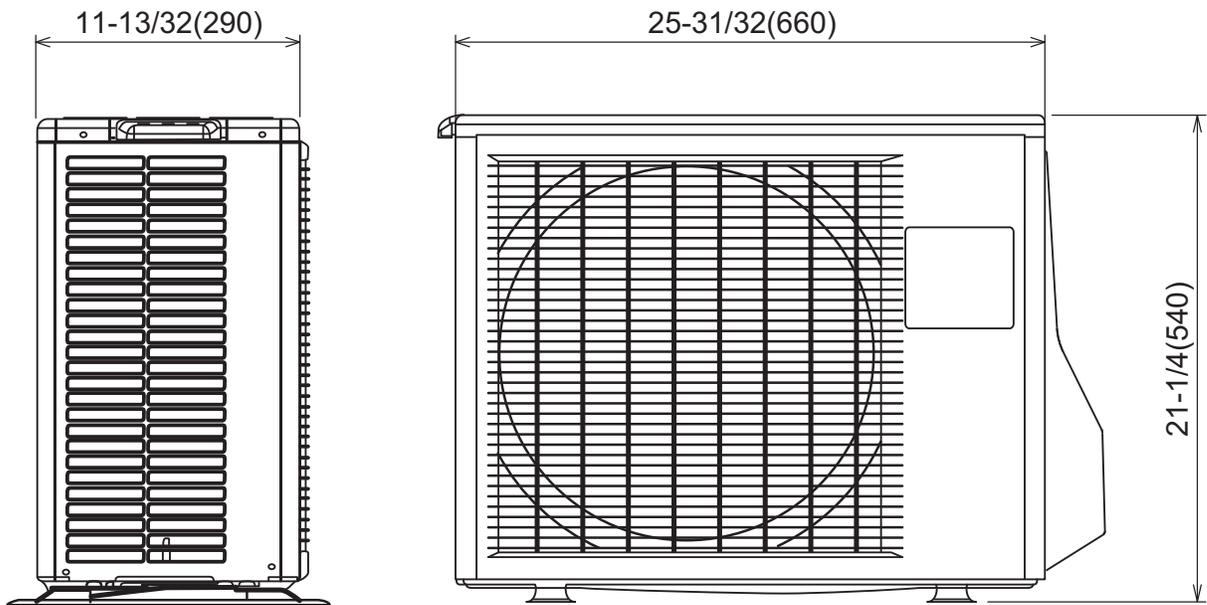
Models : ASU9RL / AOU9RL
ASU12RL / AOU12RL

Unit : Inch(mm)

INDOOR UNIT



OUTDOOR UNIT

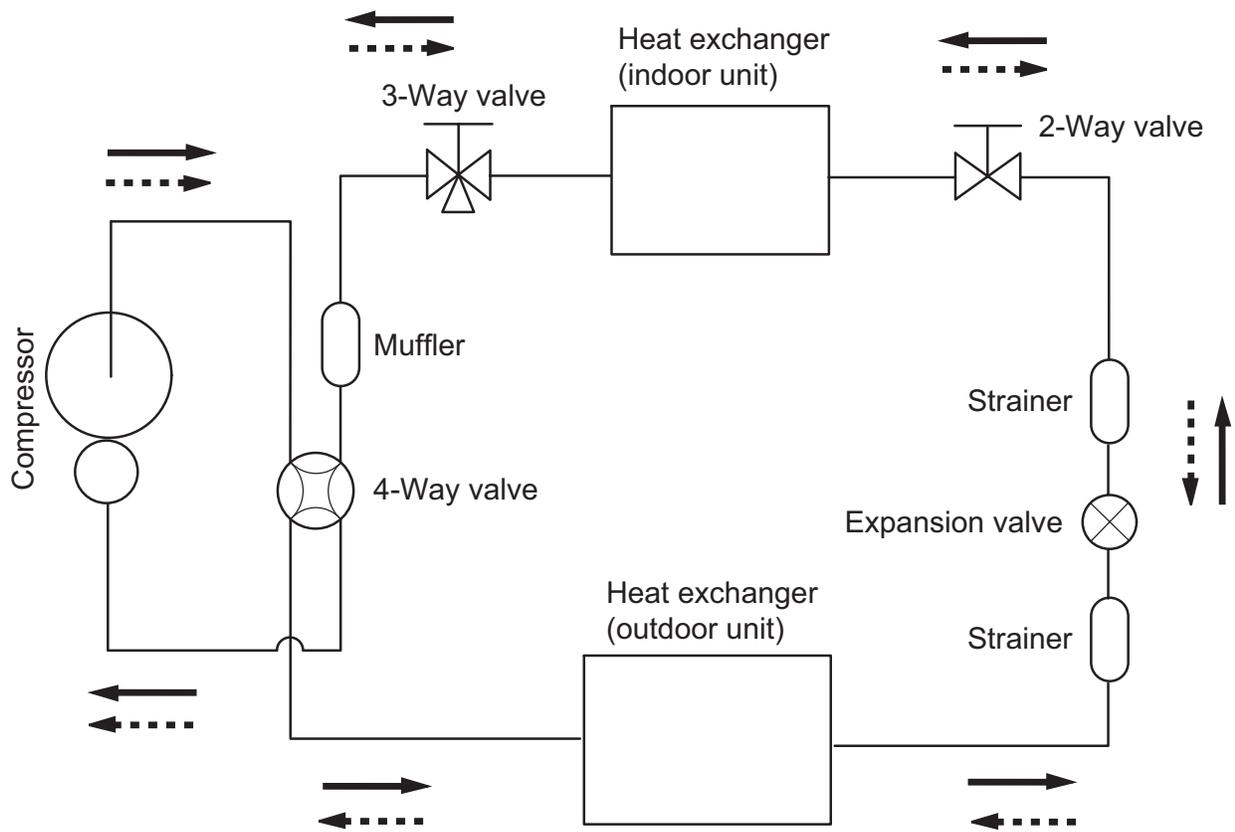


WALL MOUNTED type INVERTER

3 . REFRIGERANT SYSTEM DIAGRAM

REFRIGERANT SYSTEM DIAGRAM

Models : ASU9RL / AOU9RL
 ASU12RL / AOU12RL



Refrigerant direction

- > Cooling
-> Heating

Refrigerant pipe diameter

Liquid : 1/4" (6.35 mm)

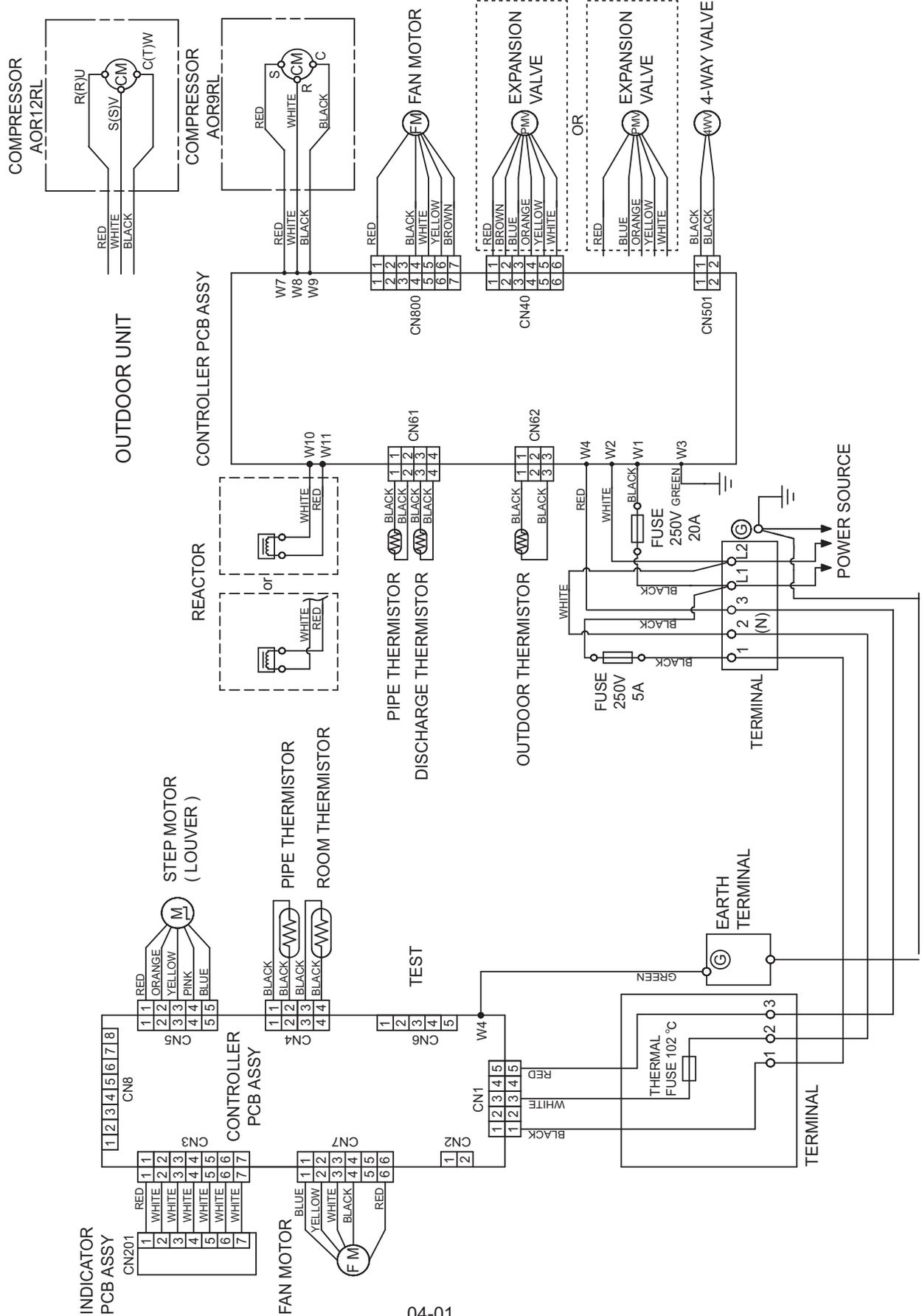
Gas : 3/8" (9.52 mm)

WALL MOUNTED type INVERTER

4 . CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

Models : ASU9RL / AOU9RL
ASU12RL / AOU12RL



WALL MOUNTED type INVERTER

5 . DESCRIPTION OF EACH CONTROL OPERATION

1. COOLING OPERATION

1-1 COOLING CAPACITY CONTROL

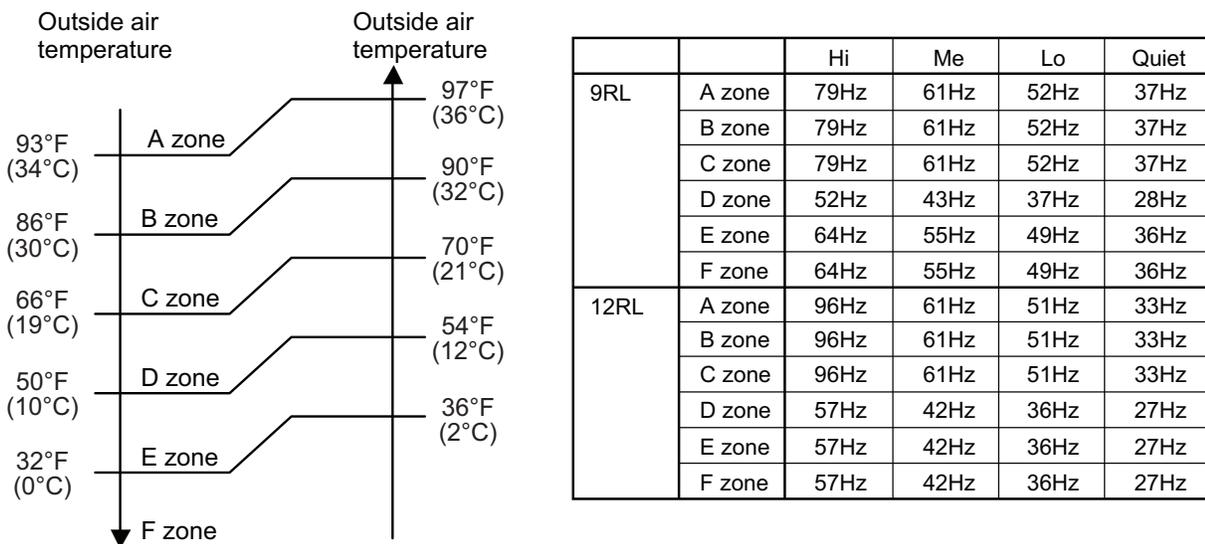
A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

- * If the room temperature is 4°F(2°C) higher than a set temperature, the compressor operation frequency will attain to maximum performance.
- * If the room temperature is 5°F(2.5°C) lower than a set temperature, the compressor will be stopped.
- * When the room temperature is between +4°F(+2°C) to -5°F(-2.5°C) of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

(Table 1 : Compressor Frequency Range)

	minimum frequency	maximum frequency II	maximum frequency I
ASU9RL	22Hz	76Hz	79Hz
ASU12RL	18Hz	80Hz	96Hz

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



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

2. HEATING OPERATION

2-1 HEATING CAPACITY CONTROL

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

* If the room temperature is lower by 6°F(3°C) than a set temperature, the compressor operation frequency will attain to maximum performance.

* If the room temperature is higher 5°F(2.5°C) than a set temperature, the compressor will be stopped.

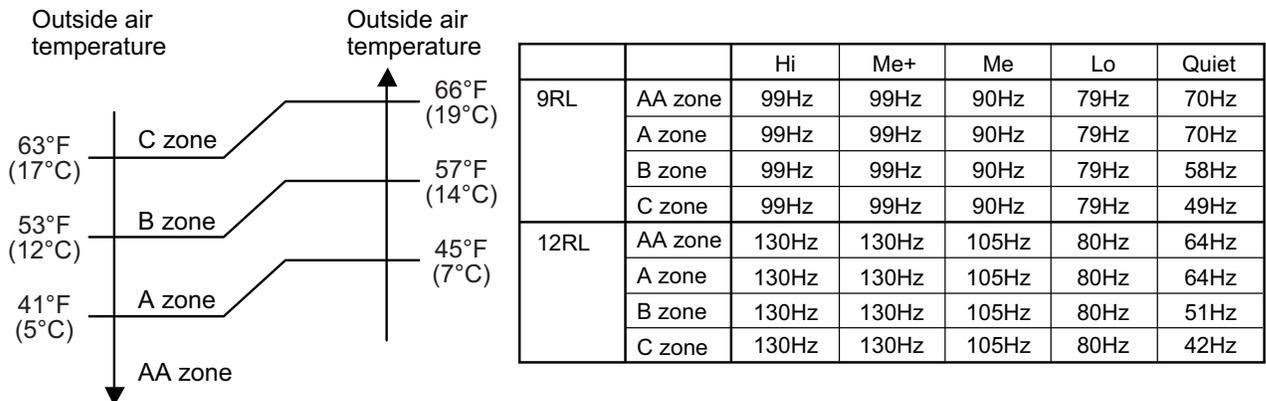
* When the room temperature is between +5°F(+2.5°C) to -6°F(-3°C) of the setting temperature, the compressor frequency is controlled within the range shown in Table2.

However, the maximum frequency is limited in the range shown in Figure 2 based on the fan speed mode and the outdoor temperature.

(Table 2 : Compressor Frequency Range)

	minimum frequency	maximum frequency
ASU9RL	22Hz	99Hz
ASU12RL	18Hz	130Hz

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



* The room temperature is controlled 4°F(2°C) higher than the setting temperature for 60 minutes after starting the operation.

After 60 minutes, it is controlled based on the normal setting temperature.

3. DRY OPERATION

3-1 INDOOR UNIT CONTROL

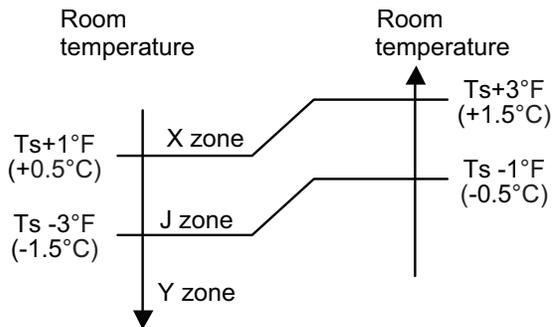
The compressor rotation frequency shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit body has detected as shown in the Table 3.

However, after the compressor is driven, the indoor unit shall run at operation frequency of 64Hz (for ASU9RL) or 61Hz (for ASU12RL), for a minute.

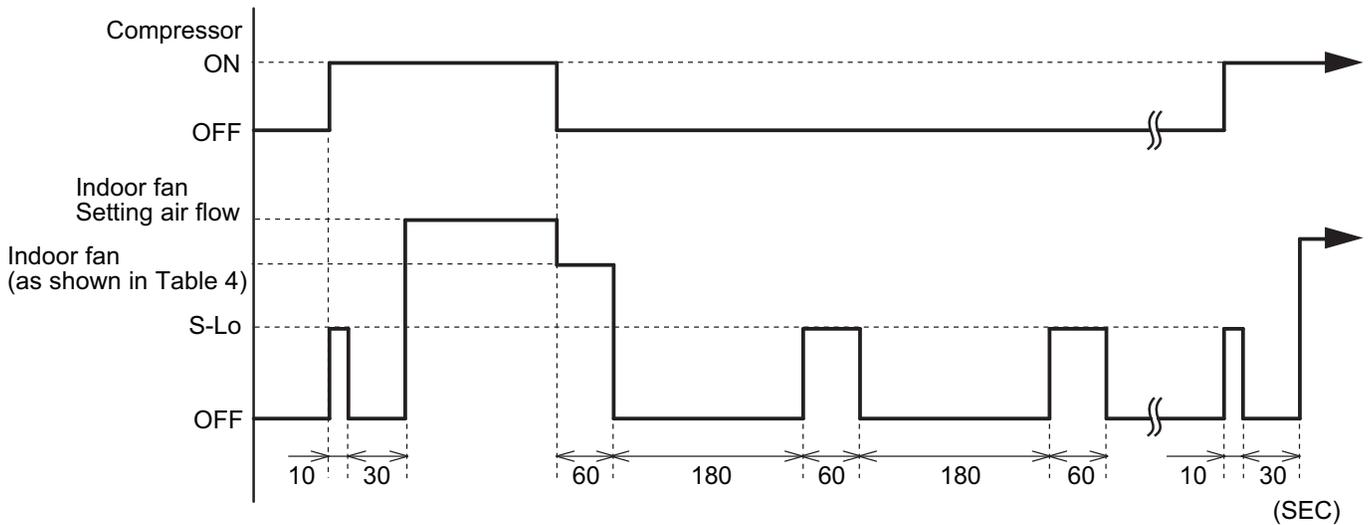
(Table 3 : Compressor frequency)

		Operating frequency			Operating frequency
9RL	X zone	37Hz	12RL	X zone	33Hz
	J zone	28Hz		J zone	25Hz
	Y zone	0Hz		Y zone	0Hz

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



(Fig.4 : Indoor Fan Control)



(Table 4 : Indoor fan speed)

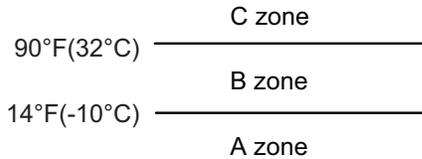
	X zone	J, Y zone
ASU9RL	680rpm	650rpm
ASU12RL	680rpm	650rpm

4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the AUTO mode by remote control, operation starts in the optimum mode from among the HEATING, COOLING, DRY and MONITORING modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 64°F(18°C) and 86°F(30°C) in 2°F(1°C) steps.

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

(Fig.5 : Outside air temperature zone selection)



(Table.5 Operation mode selection table)

Room temperature (TB) \ Outside air temperature (TO)	A zone	B zone	C zone
$TB > TS + 4^{\circ}\text{F}(+2^{\circ}\text{C})$	Monitoring	Cooling (automatic dry)	Cooling (automatic dry)
$TS + 4^{\circ}\text{F}(+2^{\circ}\text{C}) \geq TB \geq TS - 4^{\circ}\text{F}(-2^{\circ}\text{C})$	Monitoring	Monitoring	Monitoring
$TB < TS - 4^{\circ}\text{F}(-2^{\circ}\text{C})$	Heating	Heating	Monitoring

- ② When COOLING was selected at ①, the air conditioner operates as follow:
- The same operation as COOLING OPERATION of item 1 above is performed.
 - When the room temperature has remained at (set temperature -2°F(-1°C)) for 8 minutes, operation is automatically switched to DRY and the same operation as DRY OPERATION of item 3 above is performed.
 - If the room temperature reaches (set temperature +4°F(+2°C) during DRY operation, operation returns to COOLING operation.
- ③ When HEATING was selected at ①, the same operation as HEATING OPERATION of item 2 above is performed.
- ④ When the compressor was stopped for 6 consecutive minutes by the temperature control function after the COOLING or HEATING operation mode was selected at ① above, operation is switched to MONITORING and the operation mode is selected again.

5. INDOOR FAN CONTROL

1. Fan speed

(Table 6 : Indoor Fan Speed)

• ASU9 / 12RL

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1440
	Me+	1370
	Me	1200
	Lo	980
	Quiet	700
	Cool air prevention	600
Cooling	S-Lo	480
	Hi	1440
	Me	1200
	Lo	920
Dry	Quiet	680
		X zone: 680 J zone: 650

2. FAN OPERATION

The airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH, while the indoor fan only runs.

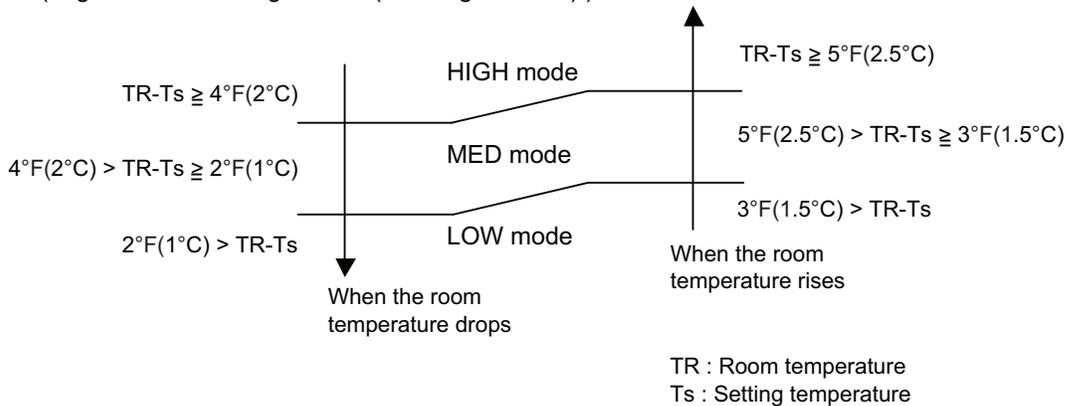
When Fan mode is set at (Auto), it operates on (MED) Fan Speed.

3. COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 6.

On the other hand, if switched in [HIGH]~[QUIET], the indoor motor will run at a constant airflow of [COOL] operation modes QUIET, LOW, MED, HIGH, as shown in Table 6.

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



4. DRY OPERATION

Refer to the Table 6.

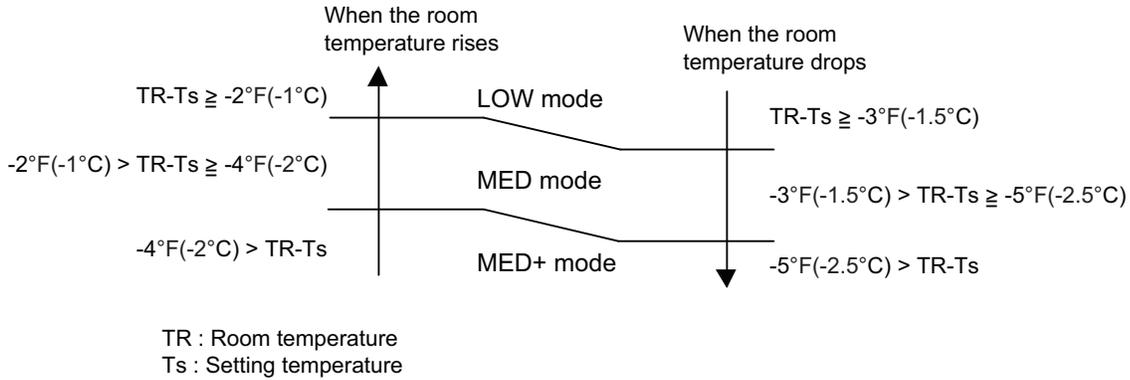
During the dry mode operation, the fan speed setting can not be changed.

5. HEATING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 7.

On the other hand, if switched in [HIGH] ~ [QUIET], the indoor motor will run at a constant airflow of [HEAT] operation modes QUIET, LOW, MED, HIGH, as shown in Table 6.

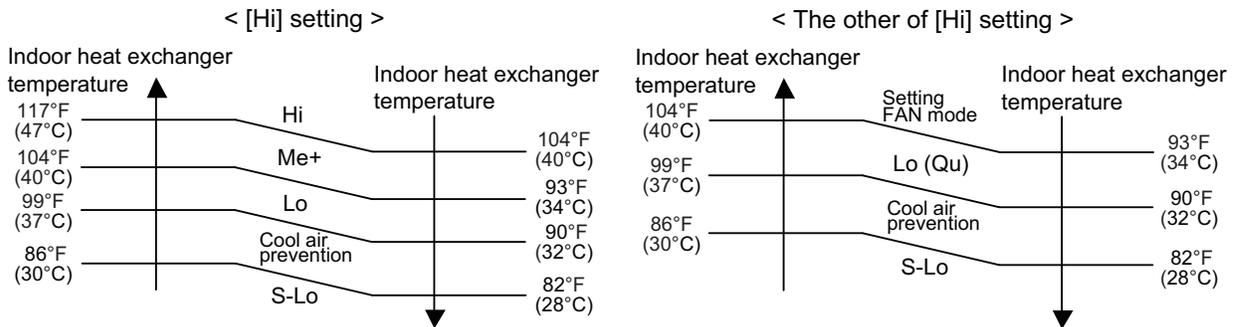
(Fig.7 : Airflow change - over (Heating : AUTO))



6. COOL AIR PREVENTION CONTROL (Heating mode)

The maximum value of the indoor fan speed is set as shown in Figure 8, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

(Fig.8 : Cool Air Prevention Control)



6. OUTDOOR FAN CONTROL

1. Outdoor Fan Motor

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

(Table 7 : Type of Motor)

	AC Motor	DC Motor
ASU9 / 12RL		○

2. Fan Speed

(Table 8 : Outdoor fan speed)

(rpm)

	ZONE※	Cooling	Dry	Heating
ASU9RL	A - C	730/ 650/ 470	730/ 470	900/ 650/ 470
	D	730/ 470/ 230		
	E	230	230	
	F	150	150	
ASU12RL	A - C	1330/ 860/ 760/ 470	760/ 470	900/ 760/ 680/ 470
	D	860/ 470/ 330		
	E	330	330	
	F	230/ 200	230/ 200	

※ Refer to Fig1.

- * When A-D ZONE, it runs at 500rpm for 20 seconds after starting up the outdoor fan.
When E or F ZONE, it runs at 200rpm for 60 seconds after starting up the outdoor fan.
- * The outdoor fan speed mentioned above depends on the compressor frequency.
(When the compressor frequency increases, the outdoor fan speed also changes to the higher speed. When the compressor frequency decreases, the outdoor fan speed also changes to the lower speed.)
- * Outdoor temperature falls, and if it becomes E and F zone(Refer to Fig1), rotations of fan speed will fall.
- * After the defrost control is operated on the heating mode, the fan speed keeps at the higher speed as table 9 without relating to the compressor frequency.

(Table 9 : Outdoor fan speed after the defrost)

	Min
ASU9 / 12RL	900rpm

7. LOUVER CONTROL

1. VERTICAL LOUVER CONTROL

(Function Range)

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

① ⇄ ② ⇄ ③ ⇄ ④ ⇄ ⑤ ⇄ ⑥

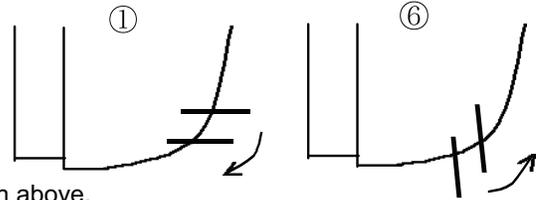
(Fig 9: Air Direction Range)

(Operation Range)

Cooling / Dry mode : ①-②-③

Heating mode : ④-⑤-⑥

Fan mode : ①-②-③-④-⑤-⑥



Use the air direction adjustments within the ranges shown above.

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

2. SWING OPERATION

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

(Swinging Range)

Cooling mode / Dry mode / Fan mode(①~③) : ① ⇄ ③

Heating mode / Fan mode(④~⑥) : ③ ⇄ ⑥

- 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.

8. COMPRESSOR CONTROL

1. OPEARTION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in the table 10.

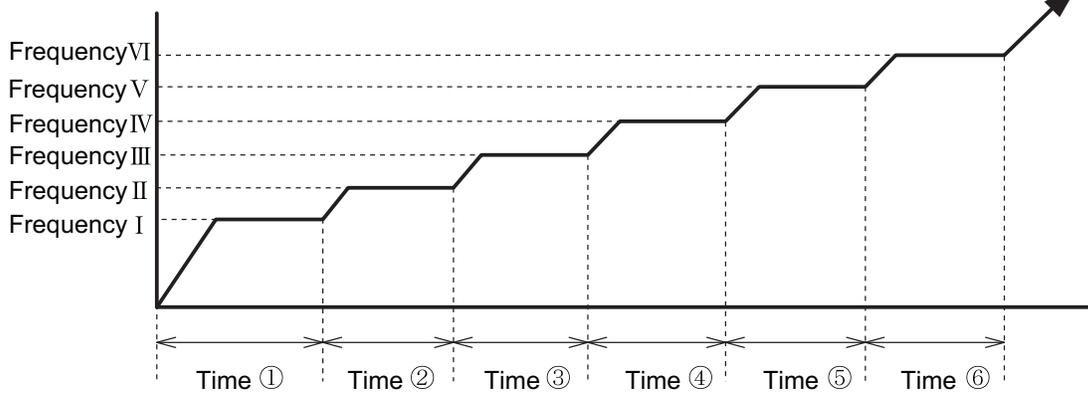
(Table 10 : Compressor Operation Frequency Range)

	Cooling		Heating		Dry	
	Min	Max	Min	Max	Min	Max
ASU9RL	22Hz	79Hz	22Hz	99Hz	28Hz	37Hz
ASU12RL	18Hz	96Hz	18Hz	130Hz	25Hz	33Hz

2. OPEARTION FREQUENCY CONTROL AT START UP

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

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



(Frequency)

	Frequency I	Frequency II	Frequency III	Frequency IV	Frequency V	Frequency VI
ASU9RL	70Hz	82Hz	92Hz	96Hz	96Hz	-
ASU12RL	56Hz	74Hz	87Hz	97Hz	108Hz	119Hz

(Time)

	Time ①	Time ②	Time ③	Time ④	Time ⑤	Time ⑥
ASU9RL	80sec	60sec	60sec	180sec	60sec	-
ASU12RL	60sec	40sec	40sec	60sec	150sec	60sec

9. TIMER OPERATION CONTROL

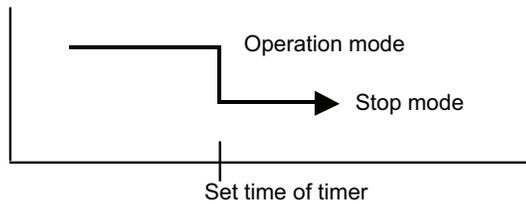
The table 11 shows the available timer setting based on the product model.

(Table 11 : Timer Setting)

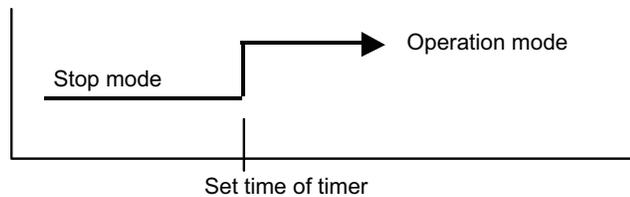
	ON TIMER / OFF TIMER	PROGRAM TIMER	SLEEP TIMER
ASU9 / 12RL	○	○	○

1. OPERATION FREQUENCY RANGE

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

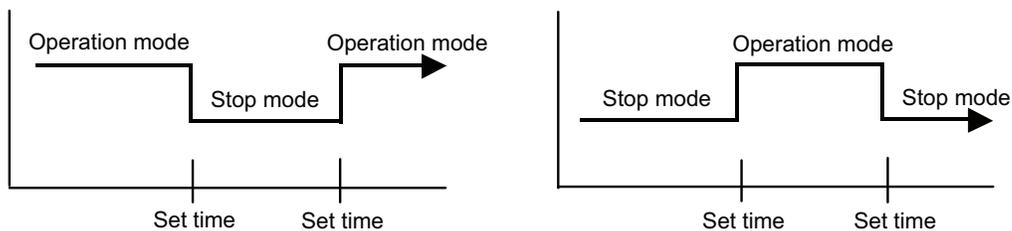


- ON timer : When the clock reaches the set time, the air conditioner will be turned on.



2. PROGRAM TIMER

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



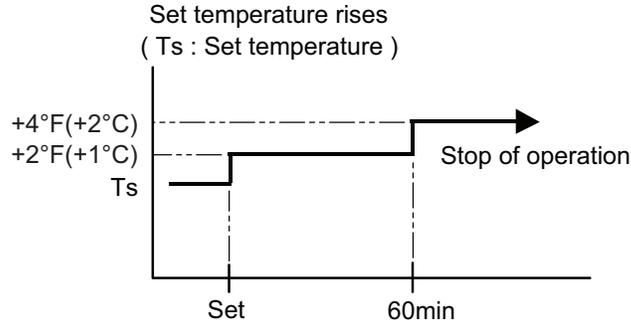
- Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current timer setting.
The order of operations is indicated by the arrow in the remote control unit's display.
- SLEEP timer operation cannot be combined with ON timer operation.

3. SLEEP TIMER

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

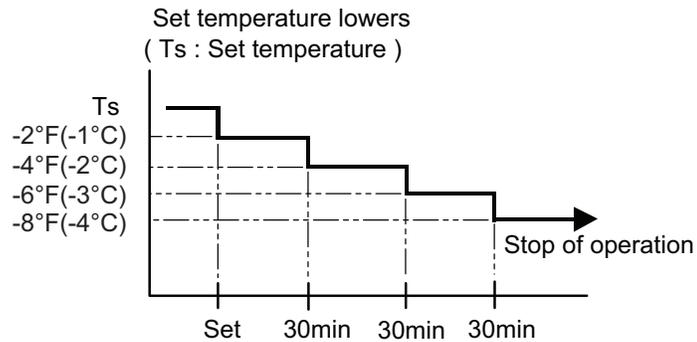
In the cooling operation mode

When the sleep timer is set, the setting temperature is increased $2^{\circ}\text{F}(1^{\circ}\text{C})$. It increases the setting temperature another $2^{\circ}\text{F}(1^{\circ}\text{C})$ after 1 hour. After that, the setting temperature is not changed and the operation is stopped at the time of timer setting.



In the heating operation mode

When the sleep timer is set, the setting temperature is decreased $2^{\circ}\text{F}(1^{\circ}\text{C})$. It decreases the setting temperature another $2^{\circ}\text{F}(1^{\circ}\text{C})$ every 30 minutes. Upon lowering $8^{\circ}\text{F}(4^{\circ}\text{C})$, the setting temperature is not changed and the operation stops at the time of timer setting.



10. ELECTRONIC EXPANSION VALVE CONTROL

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

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

- * The pulse range of the electronic expansion valve control is between 60 to 480 pulses.
- * The expansion valve is set at 480 pulses after 110 seconds of stopping compressor.
- * At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

11. TEST OPERATION CONTROL

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

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

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

13. FOUR-WAY VALVE EXTENSION SELECT

At the time when the air conditioner is switched from the cooling mode to heating mode, the compressor is stopped, and the four-way valve is switched in 2 minutes and 20 seconds later after the compressor stopped.

14. AUTO RESTART

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

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

[Operation contents memorized when the power is interrupted]

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

15. MANUAL AUTO OPERATION (Indoor unit body operation)

If MANUAL AUTO Button is set, the operation is controlled as shown in Table 12.

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

(Table 12)

	Manual auto operation	Forced cooling operation
OPERATION MODE	Auto changeover	Cooling
FAN CONT. MODE	Auto	Hi
TIMER MODE	Continuous (No timer setting available)	-
SETTING TEMP.	75°F(24°C)	Room Temp is not controlled
SETTING LOUVER	Standard	Horizontal
SWING	OFF	OFF

16. FORCED COOLING OPERATION

Forced cooling operation is started when pressing MANUAL AUTO button for 10 seconds or more.

During the forced cooling operation, it operates regardless of room temperature sensor.

Operation LED and timer LED blink during the forced cooling operation. They blink for 1 second ON and 1 second OFF on both operation LED and timer LED (same as test operation).

Forced cooling operation is released after 60 minutes of starting operation.

The FORCED COOLING OPERATION will start as shown in Table12.

17. COMPRESSOR PREHEATING

When the outdoor heat exchanger temperature is lower than 54°F(12°C) and the heating operation has been stopped for 30 minutes, power is applied to the compressor and the compressor is heated. (By heating the compressor, warm air is quickly discharged when operation is started.)

When operation was started, and when the outdoor temperature rises to 57°F(14°C) or greater, preheating is ended.

18. COIL DRY OPERATION CONTROL

The coil-dry operation functions by pressing COIL DRY button on the remote controller.

The coil-dry operation is consisted of Fan operation 50 minutes, Heating operation 3 minutes, and Fan operates for 30 minutes at last before ending the air conditioner operation.

(Table 13 : COIL-DRY Operating Functions)

	Indoor Fan Speed	Compressor Frequency	Louver Position	Main Unit Indication
ASU9RL	780rpm	43Hz	①	COIL-DRY : ON
ASU12RL	780rpm	39Hz	①	Other indication : OFF

19. DEFROST OPERATION CONTROL

1. CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table 14.

(Table 14 : Condition of starting Defrost Operation)

	Compressor operating time		
	Less than 25 minutes	25 minutes to 4 hours	After 4 hours
ASU9 / 12RL	Does not operate	21°F(- 6°C)	27°F(- 3°C)

2. CONDITION OF THE DEFROST OPERATION COMPLETION

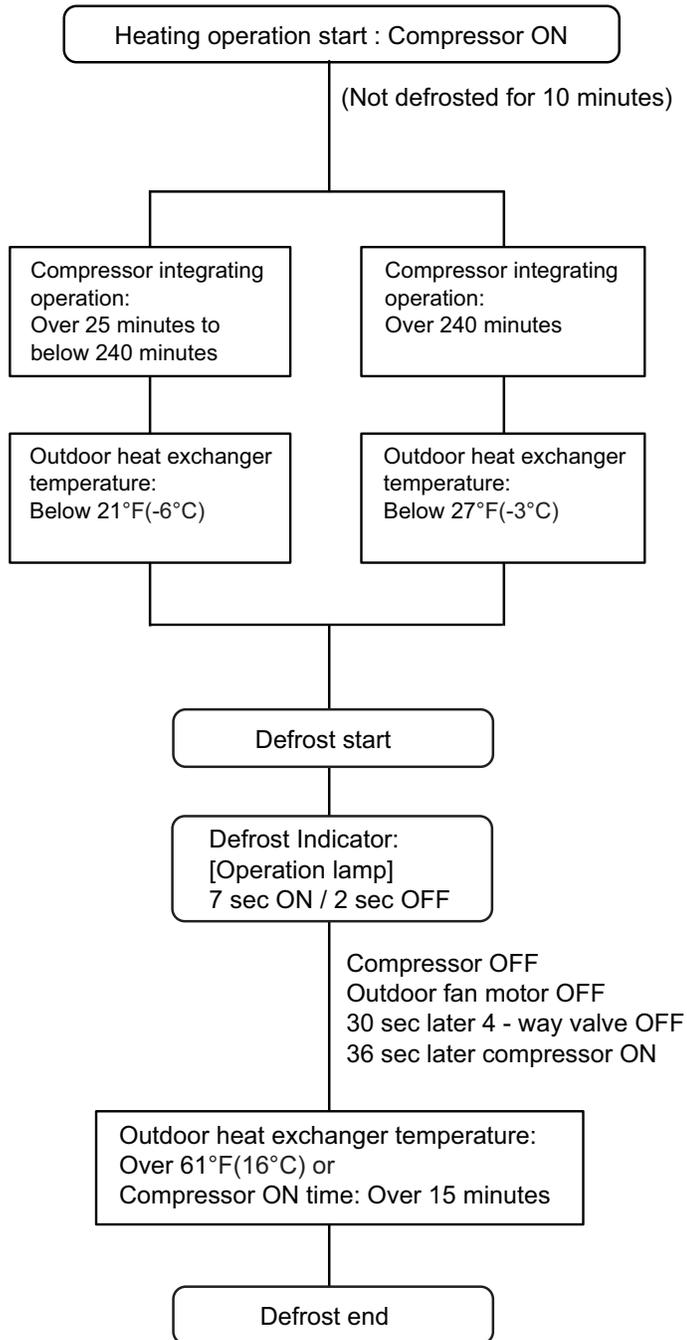
Defrost operation is released when the conditions become as shown in Table 15.

(Table 15 : Defrost Release Condition)

	Release Condition
ASU9 / 12RL	Outdoor heat exchanger temperature sensor value is higher than 61°F(16°C) or Compressor operation time has passed 15 minutes.

Defrost Flow Chart

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



20. OFF DEFROST OPEARTION CONTROL

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

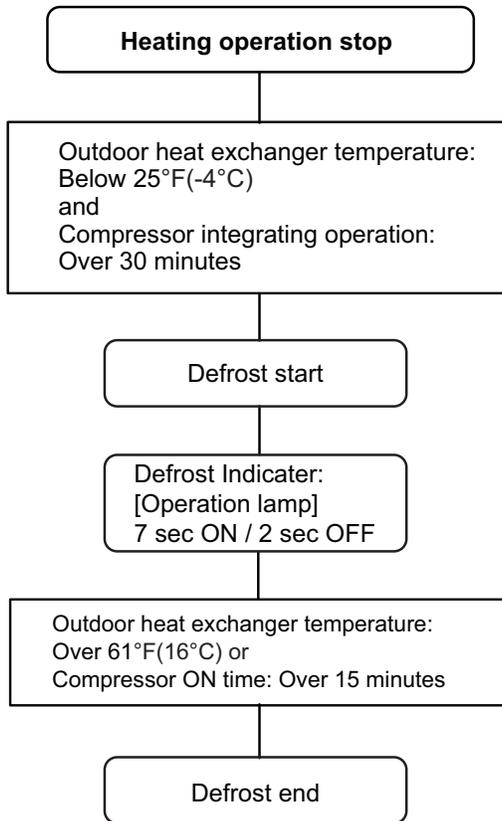
1. OFF DEFROST OPERATION CONDITION

In heating operation, the outdoor heat exchanger temperature is less than 25°F(-4°C), and compressor operation integrating time lasts for more than 30 minutes.

2. OFF DEFROST END CONDITION

	Release Condition
ASU9 / 12RL	Outdoor heat exchanger temperature sensor value is higher than 61°F(16°C) or Compressor operation time has passed 15 minutes.

OFF Defrost Flow Chart



21. MINIMUM HEAT OPERATION

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

(Table 16)

mode	HEAT
setting temperature	50°F(10°C)
fan mode	AUTO

22. VARIOUS PROTECTIONS

1. DISCHARGE GAS TEMPERATURE OVERRISE PREVENION CONTROL

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

When the discharge temperature becomes higher than Temperature I, the compressor frequency is decreased 20 Hz, and it continues to decrease the frequency for 20 Hz every 120 seconds until the temperature becomes lower than Temperature I.

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

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

(Table 17 : Discharge Temperature Over Rise Prevension Control / Release Temperature)

	Temperature I	Temperature II	Temperature III
ASU9 / 12RL	219°F(104°C)	214°F(101°C)	230°F(110°C)

2. CURRENT RELEASE CONTROL

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

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

(Table 18 : Current Release Operation Value / Release Value)

[Heating]

ASU9RL	
OT (Control / Release)	
63°F (17°C)	5.5A/ 5.0A
54°F (12°C)	6.0A/ 5.5A
41°F (5°C)	7.0A/ 6.5A
	7.0A/ 6.5A

OT : Outdoor Temperature

ASU12RL	
OT (Control / Release)	
63°F (17°C)	5.5A/ 5.0A
54°F (12°C)	7.0A/ 6.5A
41°F (5°C)	7.5A/ 7.0A
	8.5A/ 8.0A

OT : Outdoor Temperature

[Cooling]

ASU9RL	
OT (Control / Release)	
115°F (46°C)	3.5A/ 3.0A
108°F (42°C)	4.0A/ 3.5A
	5.5A/ 5.0A

OT : Outdoor Temperature

ASU12RL	
OT (Control / Release)	
115°F (46°C)	4.0A/ 3.5A
108°F (42°C)	5.0A/ 4.5A
	6.0A/ 5.5A

OT : Outdoor Temperature

3. ANTIFREEZING CONTROL (Cooling and Dry mode)

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

(Table 19 : Anti-freezing Protection Operation / Release Temperature)

Outdoor temperature	Temperature I	Temperature II
Over than 50°F(10°C) *1 or 54°F(12°C) *2	39°F(4°C)	45°F(7°C)
Less than 50°F(10°C) *1 or 54°F(12°C) *2		55°F(13°C)

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

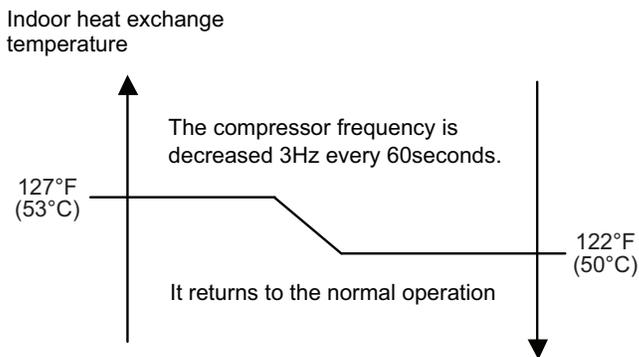
4. COOLING PRESSURE OVERRISE PROTECTION

When the outdoor unit heat exchange sensor temperature rises to 153°F(67°C) or greater, the compressor is stopped and trouble display is performed.

5. HIGH TEMPERATURE RELEASE CONTROL (HEATING MODE)

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

[Control System]



WALL MOUNTED type INVERTER

6 . TROUBLE SHOOTING

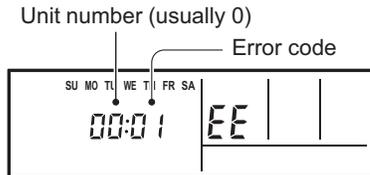
6. TROUBLESHOOTING

6-1 ERROR DISPLAY

6-1-1 WIRED REMOTE CONTROLLER DISPLAY (OPTION)

1. SELF - DIAGNOSIS

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



ex. Self-diagnosis check

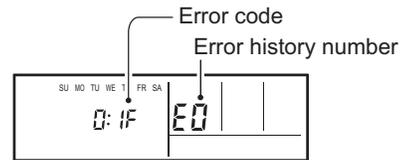
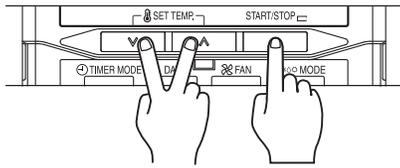
Error code	Error contents	Trouble shooting
00	Communication error (indoor unit ← remote control)	1
01	Communication error (Serial reverse transfer error)	2
02	Room temperature sensor error	3
04	Indoor heat exchanger temperature sensor error	4
06	Outdoor heat exchanger temperature sensor(outlet) error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

2. ERROR CODE HISTORY DISPLAY

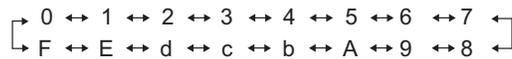
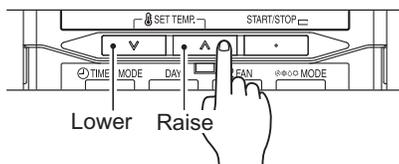
Up to 16 memorized error codes may be displayed for the indoor unit connected to the remote controller.

1. Stop the air conditioner operation.

2. Press the SET TEMPERATURE buttons [▼], [▲], [ON/OFF] simultaneously for 3 seconds or more to start the self-diagnosis.



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



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

6-1-2 OUTDOOR UNIT DISPLAY

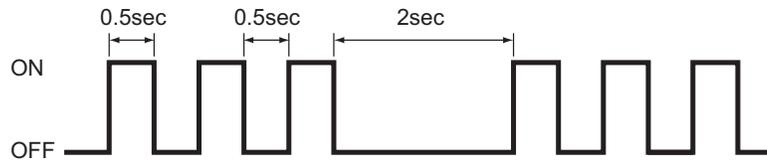
1. ERROR DISPLAY

1-1. For ASU9 / 12RL (AOU9 / 12RL)

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

1-2-1. ERROR DISPLAY METHOD

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



1-2-2. NORMAL OPERATION DISPLAY

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

6-1-3 INDOOR UNIT DISPLAY

1. ERROR DISPLAY

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

6-2 TROUBLE SHOOTING WITH ERROR CODE

<p>Trouble shooting 1 INDOOR UNIT Error Method: Communication Error (Indoor unit ← Remote control)</p>	<p>Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : OFF, Timer LED : 8 times ERROR CODE : [E : 00]</p>
---	--

<p>Detective Actuators: Indoor unit controller PCB circuit Wired Remote Control</p>	<p>Detective details: 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>Forecast of Cause: 1. Terminal connection abnormal 2. Wired Remote Control failure 3. Controller PCB failure</p>

<p>Check Point 1 : Check the connection of terminal</p> <p><u>After turning off the power, check & correct the followings.</u></p> <ul style="list-style-type: none"> · Check the connection of terminal between remote control and Indoor unit, and check if there is a disconnection of the cable.
--

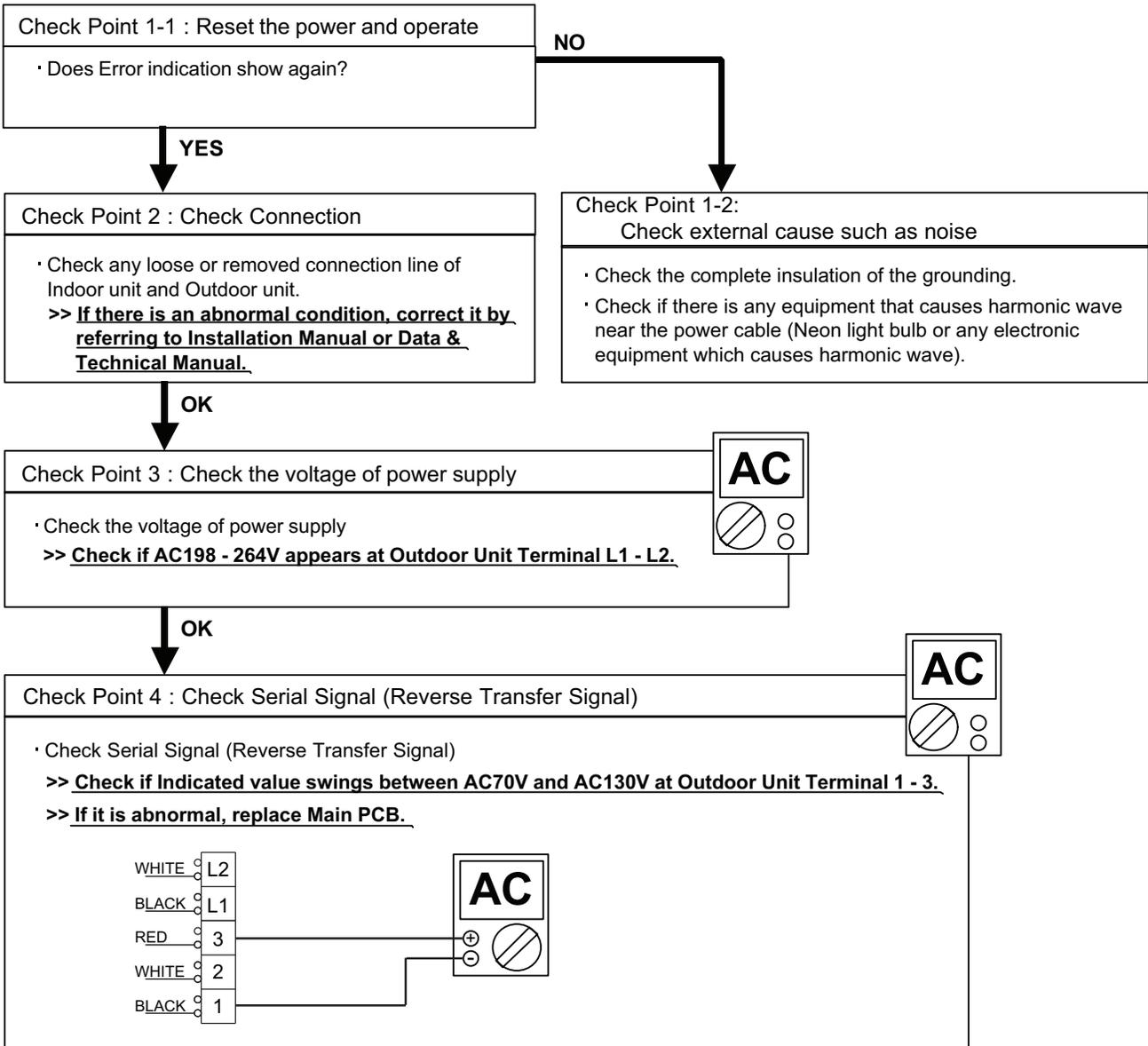


<p>Check Point 2 : Check Remote Control and Controller PCB</p> <ul style="list-style-type: none"> · Check Voltage at CN6 (terminal 1-3) of Controller PCB. (Power supply to Remote Control) <p>>> If it is DC12V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control >> If it is DC 0V, Controller PCB is failure. (Check Remote Control once again) >> Replace Controller PCB</p> <p>▶ <u>Upon correcting the removed connector or mis-wiring, reset the power.</u></p>	
--	--

Trouble shooting 2 OUTDOOR UNIT Error Method: Communication Error (Serial Reverse Transfer Error)	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : OFF, Timer LED : 2 or 3 times ERROR CODE : [E : 01]
--	--

Detective Actuators: Outdoor Unit Main PCB Circuit	Detective details: When the indoor unit cannot receive the serial signal from Outdoor unit more than 10seconds, then permanent stop after 20seconds.
--	--

Forecast of Cause:
 1. Connection failure 2. External cause 3. Main PCB failure



Trouble shooting 3 INDOOR UNIT Error Method: Room Temperature Sensor Error	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : 2 times, Timer LED : 2 times ERROR CODE : [E : 02]
---	---

Detective Actuators: Indoor Unit Controller PCB Circuit Room Temperature Thermistor	Detective details: 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

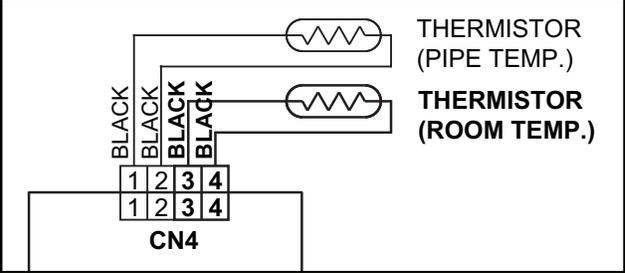
► **If Thermistor is either open or shorted, replace it and reset the power.**



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)



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

Trouble shooting 4 INDOOR UNIT Error Method: Indoor Heat Exchanger Temperature Sensor Error	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : 2 times, Timer LED : 3 times ERROR CODE : [E : 04]
--	---

Detective Actuators: Indoor Unit Controller PCB Circuit Heat Exchanger Temperature Thermistor	Detective details: 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

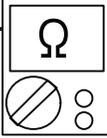
Check Point 1 : Check connection of Connector

- 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.

Trouble shooting 5 OUTDOOR UNIT Error Method: Outdoor Heat Exchanger Temperature Sensor (Outlet) Error	Indicate or Display: Outdoor Unit : LED 0.1sec ON/ 0.1sec OFF Indoor Unit : Operation LED : 3 times, Timer LED : 3 times ERROR CODE : [E : 06]
---	---

Detective Actuators: Outdoor Unit Main PCB Circuit Heat Exchanger Temperature Thermistor	Detective details: When Heat Exchanger Temperature Thermistor (Outlet) open or short-circuit is detected at power ON or while running the compressor.
---	---

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

Check Point 1 : Check connection of Connector

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

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



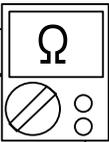
Check Point 2 : Remove connector and check Thermistor resistance value

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)	27.8	21.0	16.1	12.4	9.63	7.56	5.98	4.77	3.84

Temperature	95°F (35°C)	104°F (40°C)	113°F (45°C)	122°F (50°C)	140°F (60°C)	158°F (70°C)	176°F (80°C)	194°F (90°C)	212°F (100°C)
Resistance Value (kΩ)	3.11	2.53	2.08	1.71	1.19	0.840	0.606	0.446	0.333

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



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

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

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



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

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

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

Check Point 1 : Check connection of Connector

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

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



Check Point 2 : Remove connector and check Thermistor resistance value

Ω

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 (k Ω)	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 (k Ω)	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)

DC

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

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

Trouble shooting 7 OUTDOOR UNIT Error Method: Outdoor Discharge Pipe Temperature Sensor Error	Indicate or Display: Outdoor Unit : LED 0.1sec ON/ 0.1sec OFF Indoor Unit : Operation LED : 3 times, Timer LED : 2 times ERROR CODE : [E : 0C]
--	---

Detective Actuators: Outdoor Unit Main PCB Circuit Discharge Pipe Temperature Thermistor	Detective details: When Discharge Pipe Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.
---	--

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

Check Point 1 : Check connection of Connector

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

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



Check Point 2 : Remove connector and check Thermistor resistance value

Ω

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 (k Ω)	169	130	101	79.1	62.6	40.0	26.3	17.8	12.3

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)
Resistance Value (k Ω)	8.70	6.27	4.60	3.43	2.00	1.22

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



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

DC

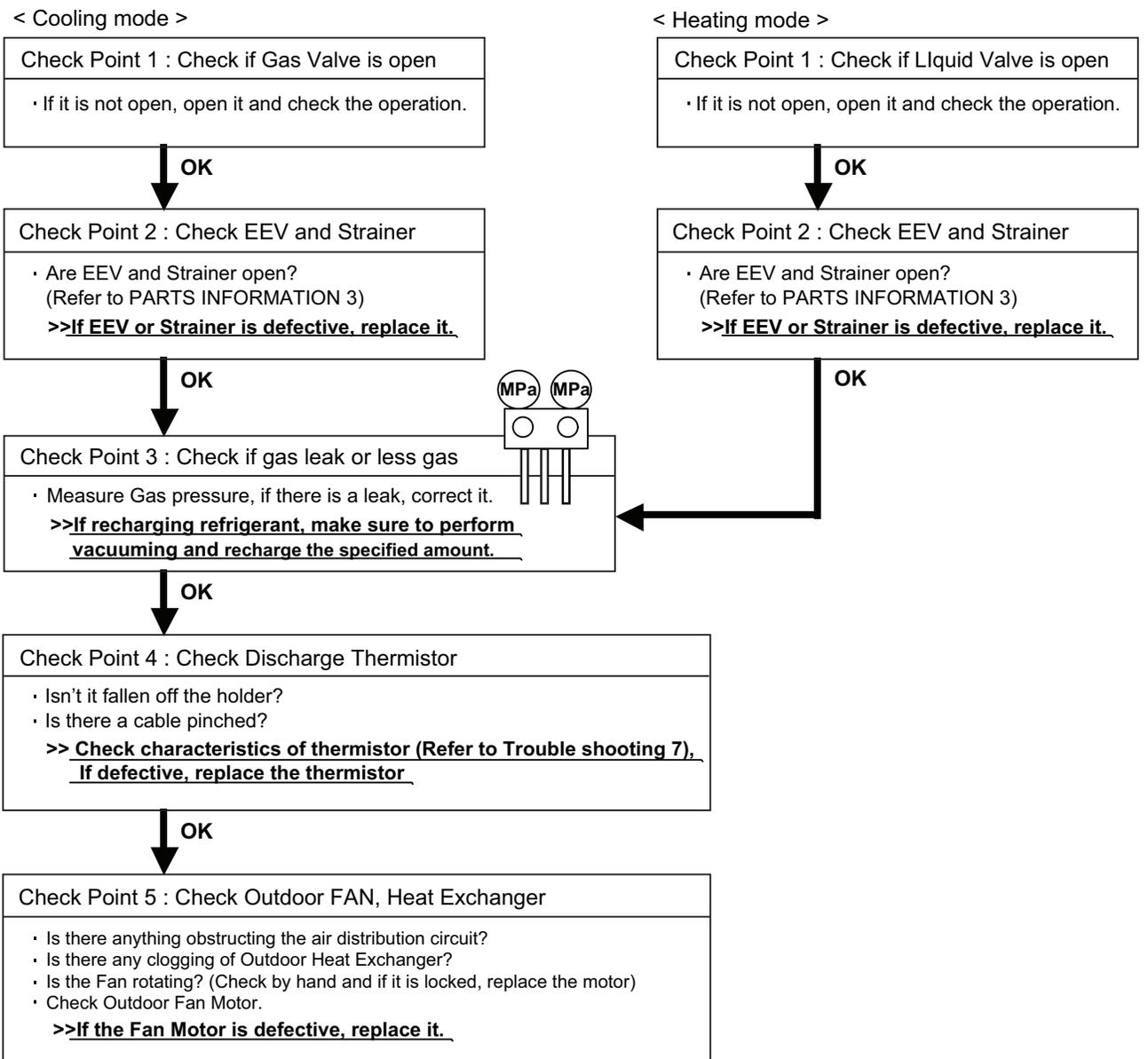
Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)

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

Trouble shooting 8 OUTDOOR UNIT Error Method: Discharge temperature error	Indicate or Display: Outdoor Unit : LED continuously lighting Indoor Unit : Operation LED : 7 times, Timer LED : 2 times ERROR CODE : [E : 0F]
---	--

Detective Actuators: Outdoor Unit Main PCB Circuit Discharge Pipe Temperature Thermistor	Detective details: ① When the discharge temperature becomes higher than 230°F(110°C), the compressor stops. ② After the compressor restarts, if the same operation is repeated, the compressor stops permanently.
---	--

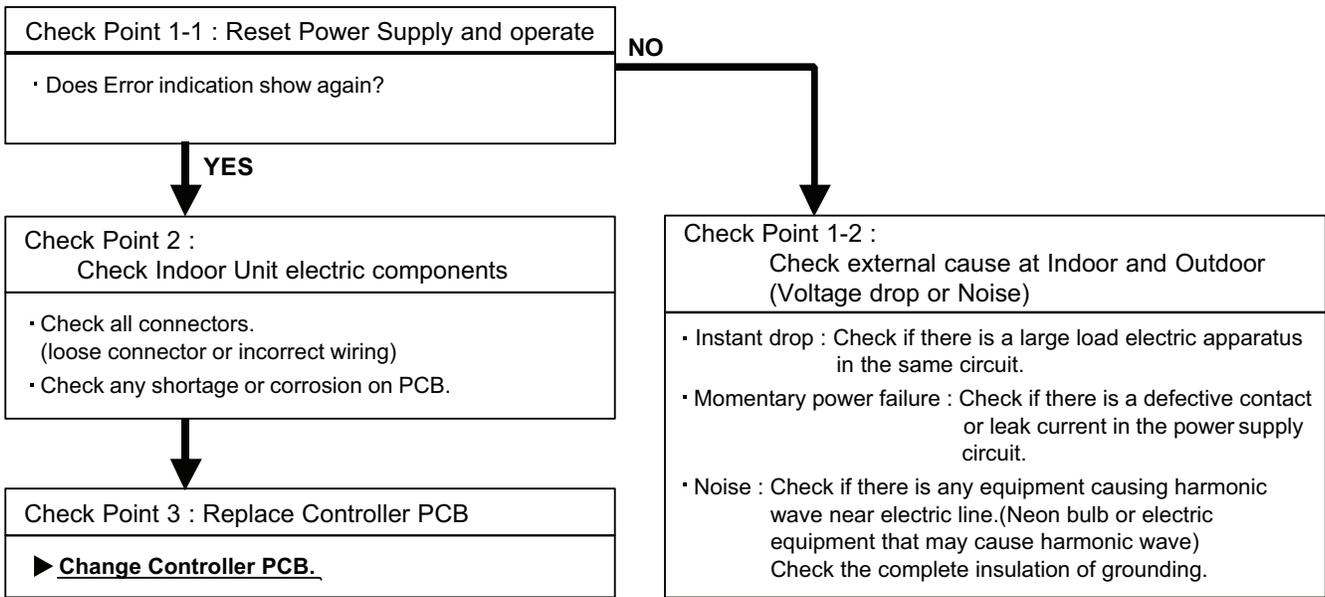
Forecast of Cause : 1. Valve is close 2. EEV failure 3. Gas Leak, less 4. Discharge Thermistor failure 5. Outdoor Fan Operation failure 6. Outdoor Heat Exchanger clogged
--



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

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

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



Note : EEPROM

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

Trouble shooting 10 INDOOR UNIT Error Method: Indoor Fan Motor abnormal	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : 6 times, Timer LED : 2 or 3 times ERROR CODE : [E : 12]
--	--

Detective Actuators: Indoor Unit Controller PCB Circuit Indoor Fan Motor	Detective details: When the condition that actual frequency of Indoor Fan is below 1/3 of target frequency is continued more than 56 seconds.
---	---

Forecast of Cause: 1. Fan rotation failure 2. Fan motor winding open 3. Motor protection by surrounding temperature rise 4. Control PCB failure
--

Check Point 1 : Check rotation of Fan

- Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)

>>**If Fan or Bearing is abnormal, replace it.**



Check Point 2 : Check ambient temp. around motor

- Check excessively high temperature around the motor.
(If there is any surrounding equipment that causes heat)

>>**Upon the temperature coming down, restart operation.**



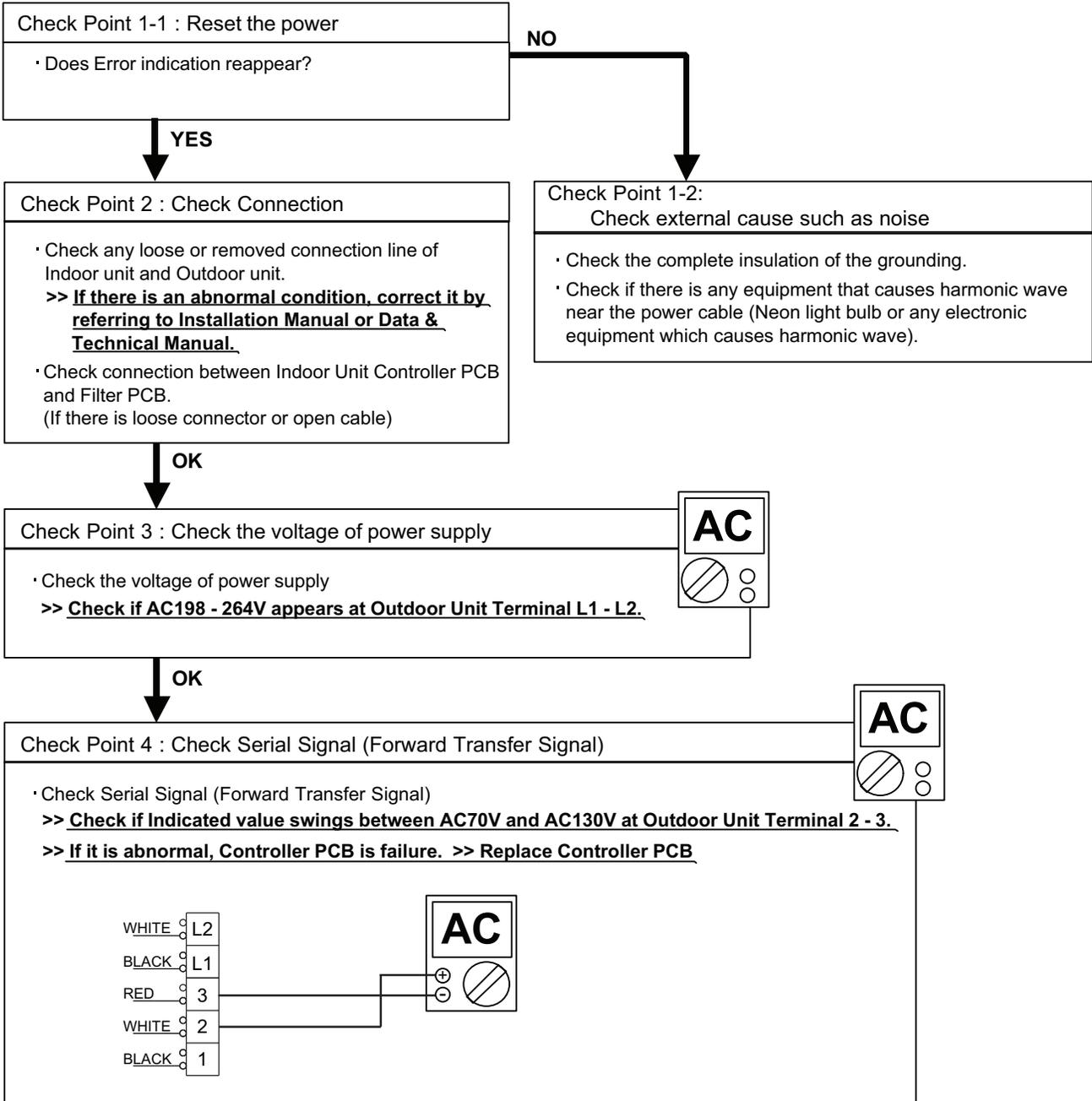
Check Point 3 : Replace Controller PCB

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

Trouble shooting 11 INDOOR UNIT Error Method: Outdoor Communication Signal Error (Forward Transfer Signal Error)	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : OFF, Timer LED : 4 or 5 times ERROR CODE : [E : 13]
---	--

Detective Actuators: Indoor Unit Controller PCB Circuit	Detective details: When the outdoor unit cannot receive the serial signal from Indoor unit more than 10seconds.
---	---

Forecast of Cause:
 1. Connection failure 2. External cause 3. Controller PCB failure



Trouble shooting 12 OUTDOOR UNIT Error Method: IPM error (Permanent Stop)	Indicate or Display: Outdoor Unit : LED 0.5sec ON/ 0.5sec OFF Indoor Unit : Operation LED : 5 times, Timer LED : 2 times ERROR CODE : [E : 17]
--	---

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

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

Check Point 1 : Check connections of Outdoor Unit Electrical Components

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

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



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 Point 3 : Check Outdoor Fan

- Check Outdoor Fan Motor. (Refer to Trouble shooting 16)

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



Check Point 4 : Check Compressor

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



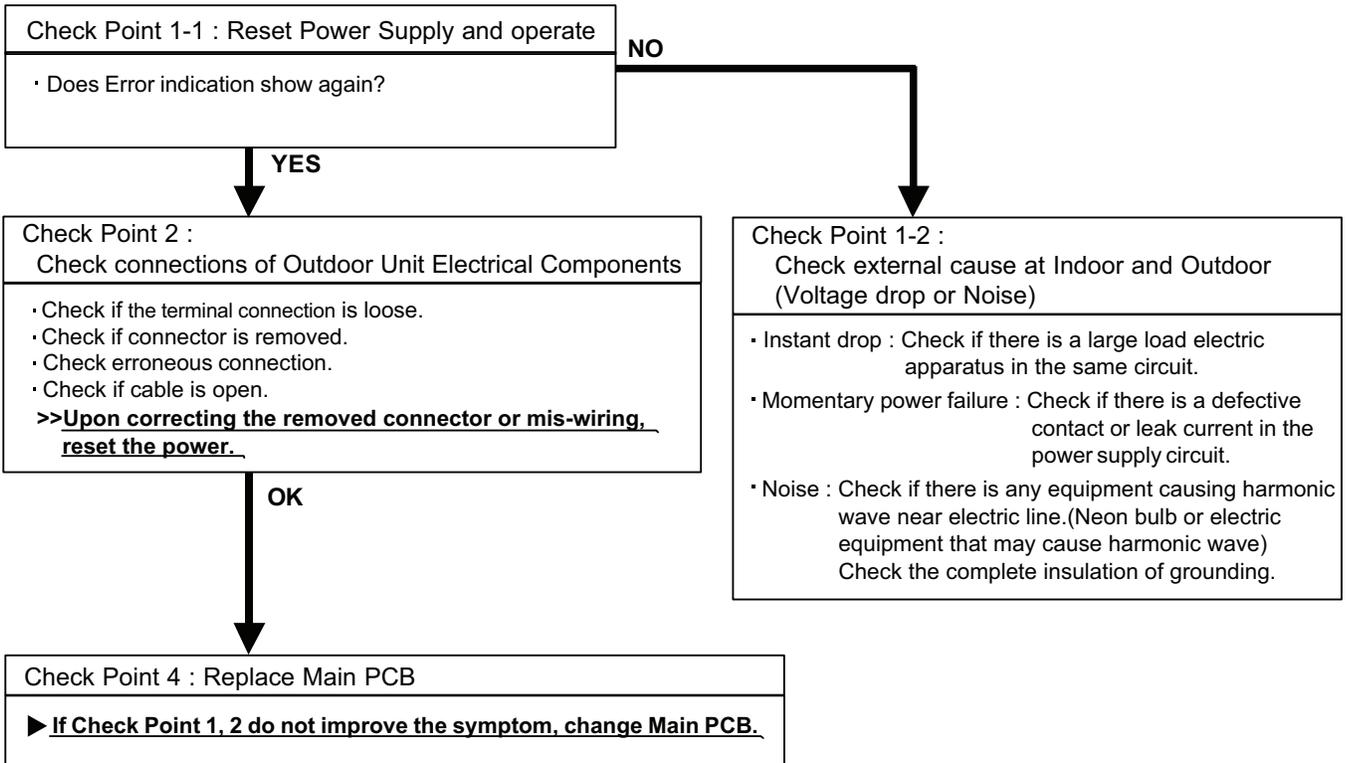
Check Point 5 : Replace Main PCB

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

Trouble shooting 13 OUTDOOR UNIT Error Method: CT error	Indicate or Display: Outdoor Unit : LED 2sec ON/ 2sec OFF Indoor Unit : Operation LED : 5 times, Timer LED : 3 times ERROR CODE : [E : 18]
--	---

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

Forecast of Cause : 1. Defective connection of electric components 2. External cause 3. Main PCB failure
--



Trouble shooting 14 <u>OUTDOOR UNIT Error Method:</u> Active Filter Module (AFM) error	<u>Indicate or Display:</u> Outdoor Unit : No indication Indoor Unit : Operation LED : 8 times, Timer LED : 2 times ERROR CODE : [E : 19]
---	--

<u>Detective Actuators:</u> Outdoor Unit Main PCB Circuit	<u>Detective details:</u> When inverter input DC voltage is higher than 467V or lower than 237V. When a momentary power cut off occurred on low voltage.
---	---

<u>Forecast of Cause :</u> 1. External cause 2. Connector connection failure 3. Main PCB failure
--

Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)
<ul style="list-style-type: none"> • 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.



Check Point 2 : Check connection of Connector
<ul style="list-style-type: none"> • Check if connector is removed. • Check erroneous connection. • Check if cable is open. <p>>>Upon correcting the removed connector or mis-wiring, reset the power.</p>



Check Point 3 : Replace Main PCB
<p>► <u>If Check Point 1, 2 do not improve the symptom, change Main PCB.</u></p>

Trouble shooting 15 <u>OUTDOOR UNIT Error Method:</u> Compressor rotor location cannot detect (Permanent Stop)	<u>Indicate or Display:</u> Outdoor Unit : LED 0.1sec ON/ 2sec OFF Indoor Unit : Operation LED : 5 times, Timer LED : 5 times ERROR CODE : [E : 1A]
---	--

<u>Detective Actuators:</u> Outdoor Unit Main PCB Circuit Compressor	<u>Detective details:</u> ① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 194°F(90°C), 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.
---	---

<u>Forecast of Cause :</u> 1. Defective connection of electric components 2. Main PCB failure 3. Compressor failure

Check Point 1 : Check Noise from Compressor
· Turn on Power and check operation noise. ▶ <u>If an abnormal noise show, replace Compressor.</u>



Check Point 2 : Check connection of around the Compressor components
For Compressor Terminal, Main PCB · Check if connector is removed. · Check erroneous connection. · Check if cable is open. (Refer to PARTS INFORMATION 2) >><u>Upon correcting the removed connector or mis-wiring, reset the power.</u>



Check Point 3: Replace Main PCB
▶ <u>If Check Point 1,2 do not improve the symptom, change Main PCB.</u>

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

<u>Detective Actuators:</u> Outdoor Unit Main PCB Circuit Outdoor Fan Motor	<u>Detective details:</u> ① When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops. ② After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops. ③ If ① and ② repeats 5 times in a row, compressor and fan motor stops permanently.
--	--

Forecast of Cause:
 1. Fan rotation failure 2. Motor protection by surrounding temperature rise 3. Main PCB failure

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 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 3 : Check Output Voltage of Main PCB

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

1	RED
2	
3	BLACK
4	WHITE
5	YELLOW
6	BROWN
7	

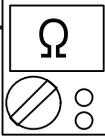
Read wire	DC voltage
Red - Black	150 - 390V
White - Black	15 ±1.5V

► If the voltage is not correct, replace Main PCB.

Trouble shooting 17 INDOOR UNIT Error Method: Indoor manual auto switch error	Indicate or Display: Outdoor Unit : No indication Indoor Unit : Operation LED : 4 times, Timer LED : 2 times ERROR CODE : [E : 20]
---	--

Detective Actuators: Indoor Unit Controller PCB Circuit Forced auto switch	Detective details: When the Forced auto switch becomes ON for 30 consecutive seconds.
---	---

Forecast of Cause :
 1. Forced auto switch failure 2. Controller PCB failure

Check Point 1 : Check the Forced auto switch · Check if Forced auto switch is kept pressed. · Check ON/OFF switching operation by using a meter. >>If Forced auto switch is detective, replace it.	
--	--



Check Point 2 : Replace Controller PCB ▶ If Check Point 1 do not improve the symptom, change Controller PCB.
--

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

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

Forecast of Cause : 1. Defective connection of electric components 2. Outdoor Fan Operation failure 3. Outdoor Heat Exchanger clogged 4. Thermistor failure 5. EEV failure 6. Main PCB failure

Check Point 1 : Check connections of Outdoor Unit Electrical Components · Check if the terminal connection is loose. · Check if connector is removed. · Check erroneous connection. · Check if cable is open. >> Upon correcting the removed connector or mis-wiring, reset the power.

↓
OK

Check Point 2 : Check Outdoor Fan, Heat Exchanger · Is there anything obstructing the air distribution circuit? · Is there any clogging of Outdoor Heat Exchanger? · Is the Fan rotating by hand when operation is off ? >> If the Fan Motor is locked, replace it.

↓
OK

Check Point 3 : Check Outdoor Fan · Check Outdoor Fan Motor. (Refer to Trouble shooting 16) >> If the Fan Motor is failure, replace it.

↓
OK

Check Point 4 : Check Thermistor · Check Thermistor. (Refer to Trouble shooting 5) >> If the Thermistor is failure, replace it.

↓
OK

Check Point 5 : Check Electronic Expansion Valve · Check EEV. (PARTS INFORMATION 3)

↓
OK

Check Point 6 : Replace Main PCB ▶ If Check Point 1 ~ 5 do not improve the symptom, change Main PCB.

Trouble shooting 19 <u>OUTDOOR UNIT Error Method:</u> PFC circuit error	<u>Indicate or Display:</u> Outdoor Unit : No indication Indoor Unit : Operation LED : 8 times, Timer LED : 4 times ERROR CODE : [E : 25]
--	--

<u>Detective Actuators:</u> Outdoor Unit Main PCB Circuit	<u>Detective details:</u> When inverter output DC voltage is higher than 415V for over 3 seconds, the compressor stops. If the same operation is repeated 5 times, the compressor stops permanently.
---	---

<u>Forecast of Cause :</u> 1. External cause 2. Connector connection failure 3. Main PCB failure
--

Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise) <ul style="list-style-type: none"> • 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.
--



Check Point 2 : Check connection of Connector <ul style="list-style-type: none"> • Check if connector is removed. • Check erroneous connection. • Check if cable is open. >><u>Upon correcting the removed connector or mis-wiring, reset the power.</u>
--



Check Point 3 : Replace Main PCB ▶ <u>If Check Point 1, 2 do not improve the symptom, change Main PCB.</u>

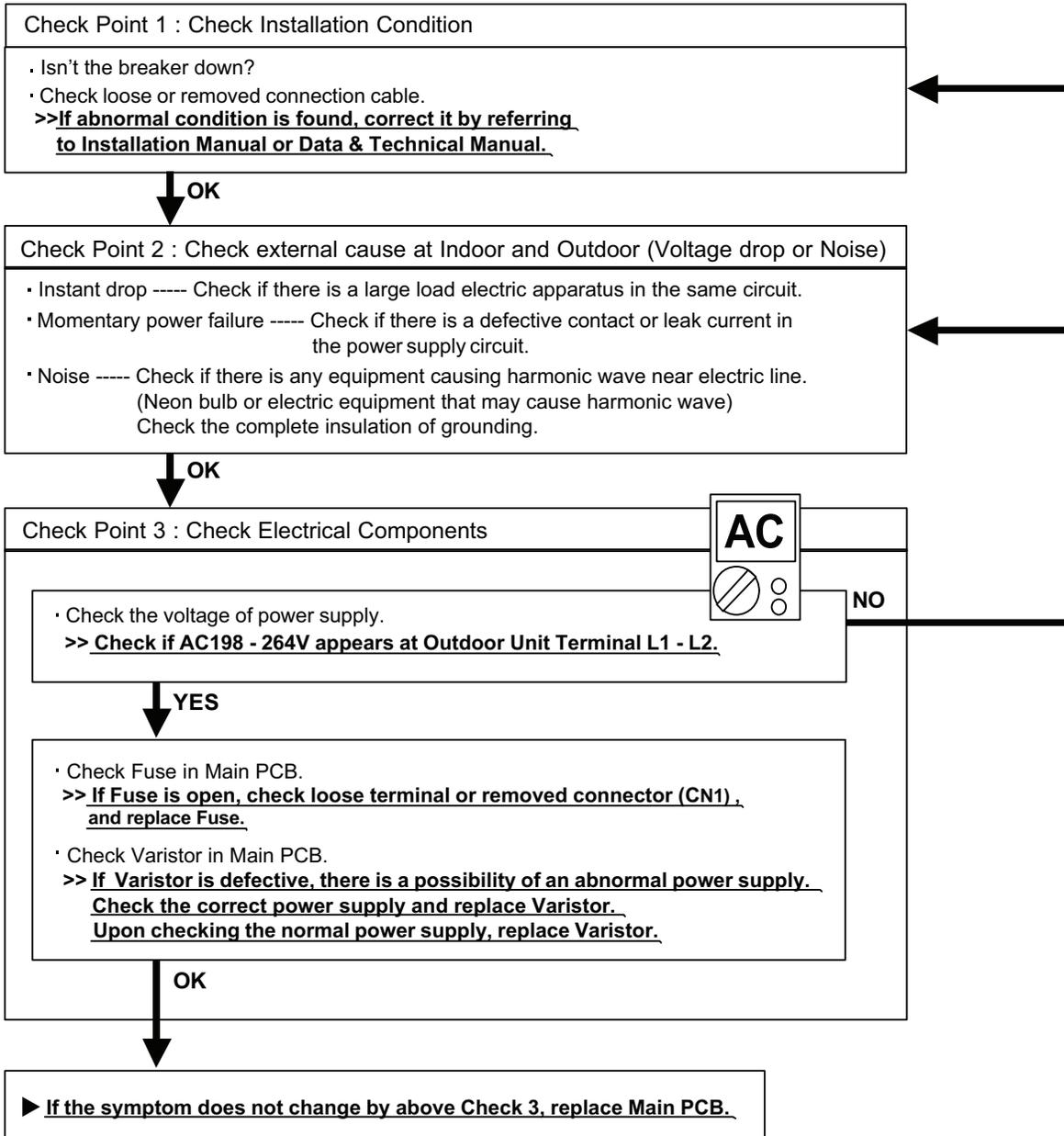
6-3 TROUBLE SHOOTING WITH NO ERROR CODE

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 AC198 - 264V appears at Outdoor Unit Terminal L1 - L2.**

YES

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

OK

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



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 CN6 of Controller PCB.
(Power supply to Remote Control)

>> If it is DC12V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control

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

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



Trouble shooting 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
- 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 ?



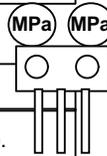
Check Point 4 : Check Indoor/ Outdoor Installation Condition

- 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.**



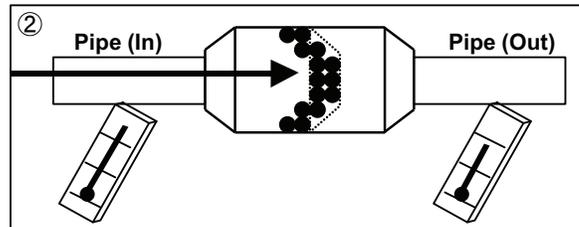
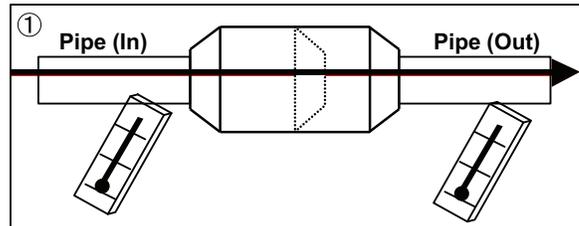
Check Point 5 : Check Refrigeration Cycle

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



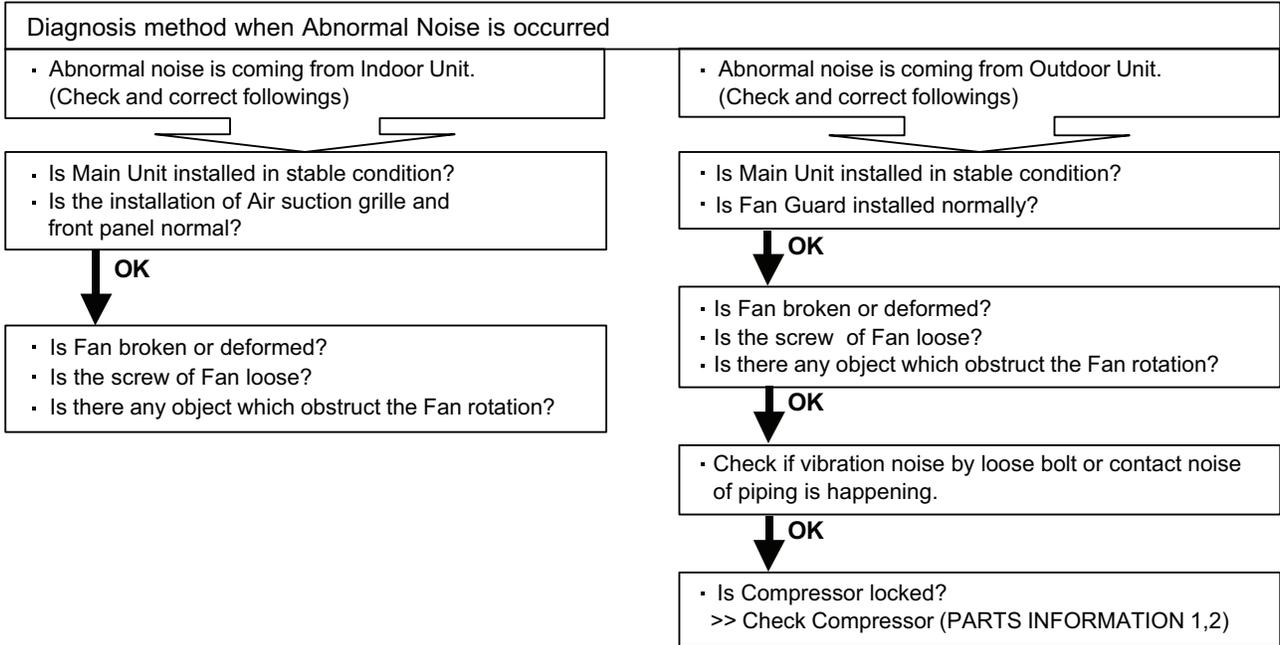
Attention

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



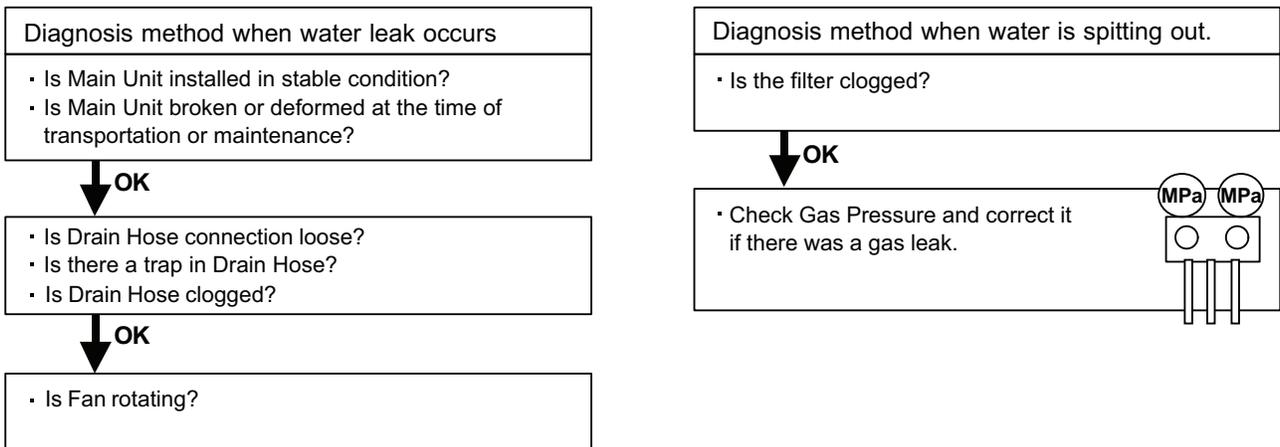
Trouble shooting 24
Abnormal Noise

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

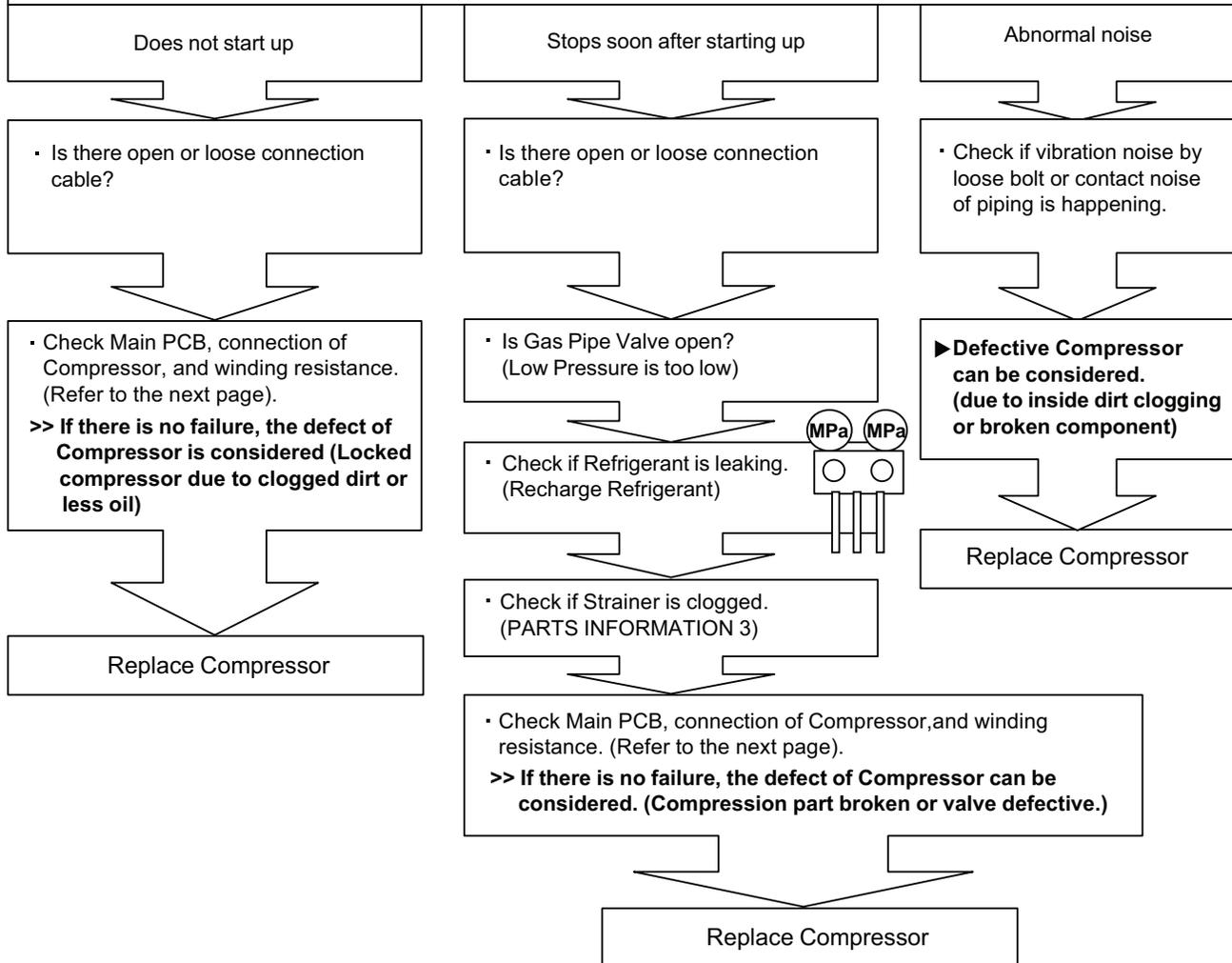


6-4 SERVICE PARTS INFORMATION

SERVICE PARTS INFORMATION 1

Compressor

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



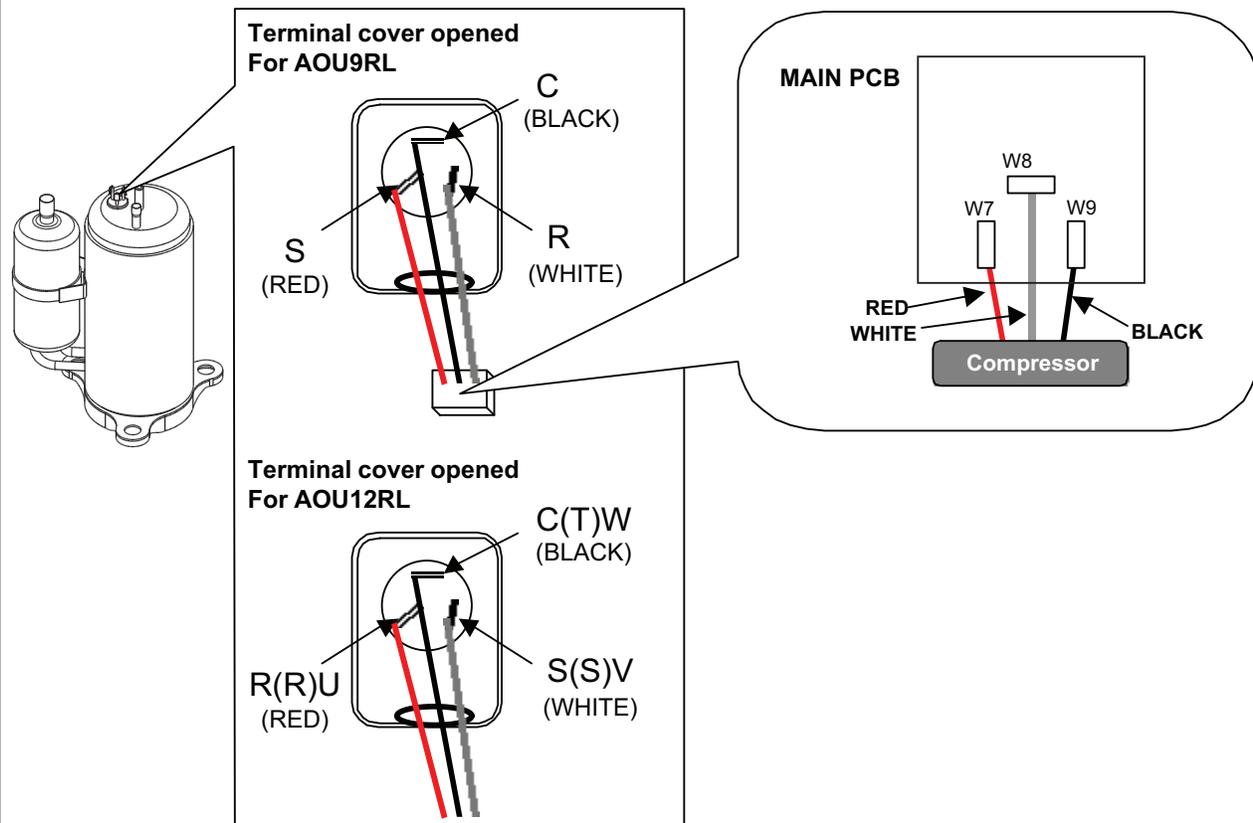
SERVICE PARTS INFORMATION 2

Inverter Compressor

Check Point 1 : Check Connection

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

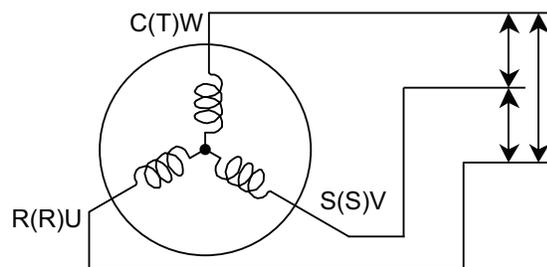
- Check connection of Main PCB (Loose or incorrect wiring)



Check Point 2 : Check Winding Resistance

- Check winding resistance of each terminal

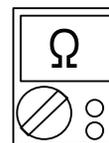
► **If the resistance value is 0Ω or infinite, replace Compressor.**



Resistance Value :

AOU9RL : 2.7 Ω at 68°F(20°C)

AOU12RL : 0.71 Ω at 68°F(20°C)



Check Point 3 : Replace Main PCB

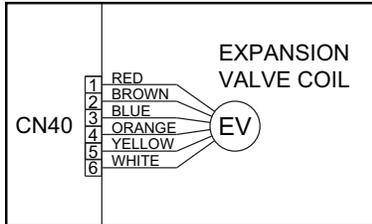
► **If the symptom does not change with above Check 1, 2, replace Main PCB.**

SERVICE PARTS INFORMATION 3

Outdoor unit Electronic Expansion Valve (EEV)

Check Point 1 : Check Connections

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



Check Point 2 : Check Coil of EEV

- Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	$46 \Omega \pm 4 \Omega$ at 68°(20°C)
Yellow - Brown	
Orange - Red	
Blue - Brown	



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

Check Point 3 : Check Voltage from Main PCB.

- Remove Connector and check Voltage (DC12V)

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



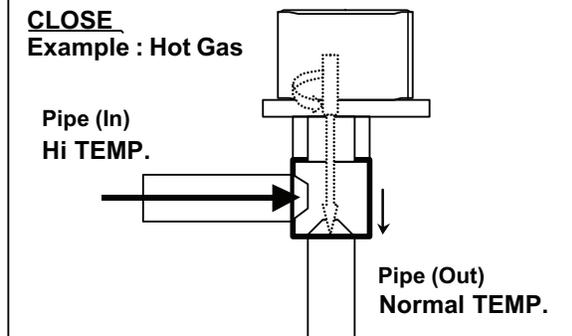
Check Point 4 : Check Noise at start up

- Turn on Power and check operation noise.

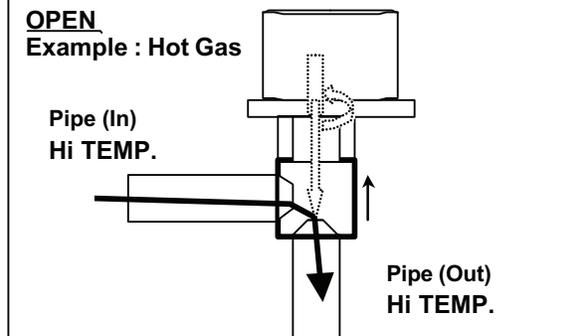
► **If an abnormal noise does not show, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

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

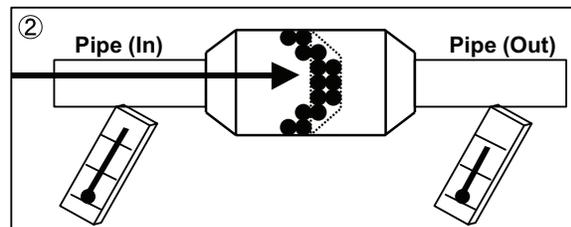
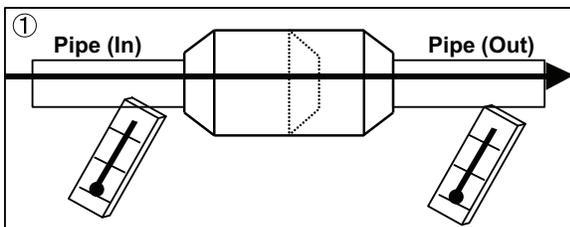


If it is open, it has no temp. difference between Inlet and Outlet.



Check Point 6 : Check Strainer

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



WALL MOUNTED type INVERTER

7 . APPENDING DATA

1. Function setting
2. Outdoor unit Pressure Value and Total Electric Current Curve
3. Thermistor Resistance Values
4. Capacity

7-1. FUNCTION SETTING

7-1-1 INDOOR UNIT

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

1-1. Setting the Room Temperature Correction for Cooling

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

(◆ . . . Factory setting)

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

1-2. Setting the Room Temperature Correction for Heating

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

(◆ . . . Factory setting)

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

1-3. Setting the Auto Restart

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

(◆ . . . Factory setting)

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

1-4. Setting the Remoto control Signal Code

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

(◆ . . . Factory setting)

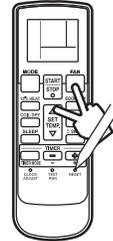
Setting Description	Function Number	Setting Value
◆ Code A	44	00
Code B		01
Code C		02
Code D		03

7-1-2 Procedures to change the Function Setting for wireless RC

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

Entering the Function Setting Mode

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

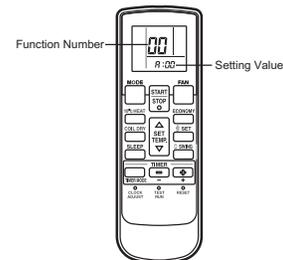


Selecting the Function Number and Setting Value

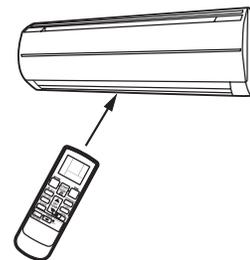
- (1) Press the MODE button, and proceed to Function Number and Setting Value.
(There is no necessity for setting remote control signal code. Because signal code is setting by Function Number and Setting Value.)



- (2) Press the SET TEMP. (▲) (▼) buttons to select the Function Number.
(Press the MODE button to switch between the left and right digits.)
- (3) Press the FAN button to proceed to Setting Value.
(Press the FAN button again to return to the Function Number selection.)
- (4) Press the SET TEMP. (▲) (▼) buttons to select the Setting Value.
(Press the MODE button to switch between the left and right digits.)



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



- (7) Press the RESET button to cancel the function setting mode.
- (8) After completing the FUNCTION SETTING, be sure to turn of the power and turn it on again.



CAUTION

After turning off the power, wait 10 seconds or more before turning on it again.
The FUNCTION SETTING doesn't become effective if it doesn't do so.

Custom code setting for remote controller

- (1) Press the MODE button for more than 5 seconds.
- (2) Press the SET TEMP. (▲) (▼) buttons to change the signal code between $A \rightarrow b \rightarrow c \rightarrow d$.
Match the code on the display to the air conditioner signal code. (initially set to A)
- (3) Press the MODE button. (Return to normal display)

CAUTION

If you change the setting of Function Number and Setting Value after setting custom code in remote controller, please set custom code in remote controller again.

The remote control unit resets to signal code A when the batteries in the remote control unit are replaced. If you use a signal code other than signal code A, reset the signal code after replacing the batteries.

If you do not know the air conditioner signal code setting, try each of the signal codes ($A \rightarrow b \rightarrow c \rightarrow d$) until you find the code which operates the air conditioner.

7-2. Outdoor unit Pressure Value and Total Electric Current Curve

7-2-1 Cooling operation

Model Name : ASU9 / 12RL

[Condition]

Ambient Indoor / Outdoor - Same temperature temperature

Refrigerant Standard amount amount

Piping 8.2 yard (7.5m) length (Height difference 1.09yard(1m))

Power 60Hz - 230V voltage

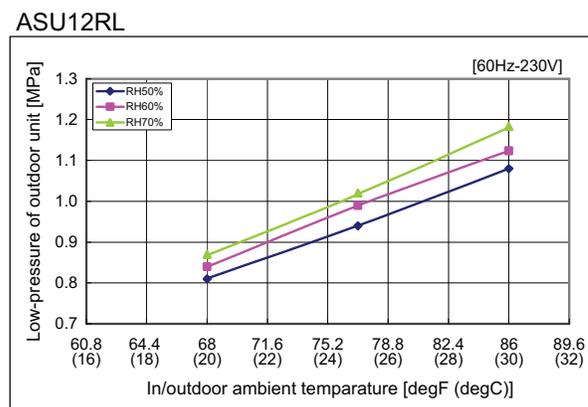
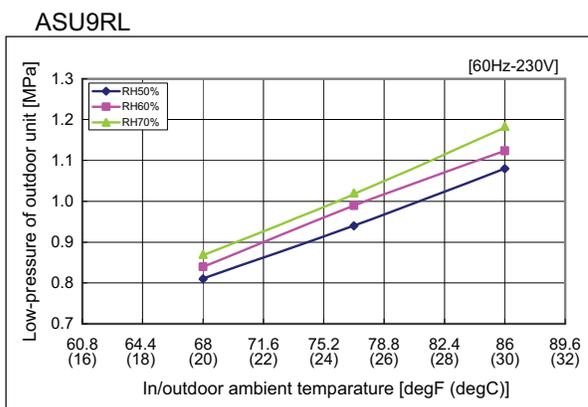
Operation TEST mode (Cooling), Hi Fan, Horizontal direction, Front air flow condition

Measuring Measure the low pressure with the pressure meter at the service valve. method Measure the outdoor unit overall current with the current clamp meter at Power Cable.

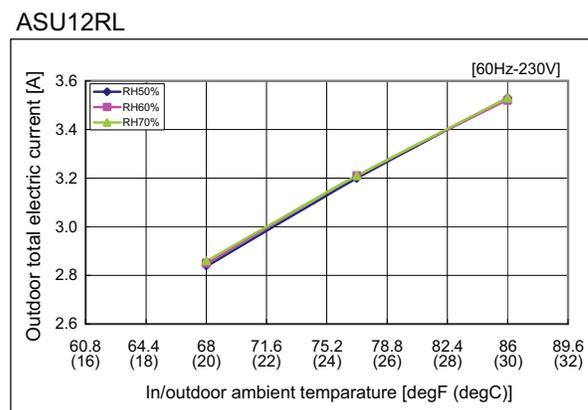
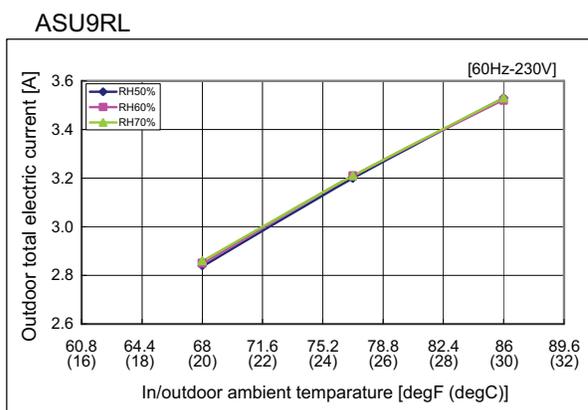
[Constant Frequency Operation Method (Test mode)]

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

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



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



7-2-2 Heating operation

Model Name : ASU9 / 12RL

[Condition]

Ambient temperature Indoor 59, 68, 73.4degF, Outdoor 35.6, 44.6, 53.6 degF
(Indoor 15, 20, 23degC, Outdoor 2, 7, 12degC)

Refrigerant Standard amount
amount

Piping length 8.2 yard (7.5m)
(Height difference 1.09yard(1m))

Power voltage 60Hz - 230V

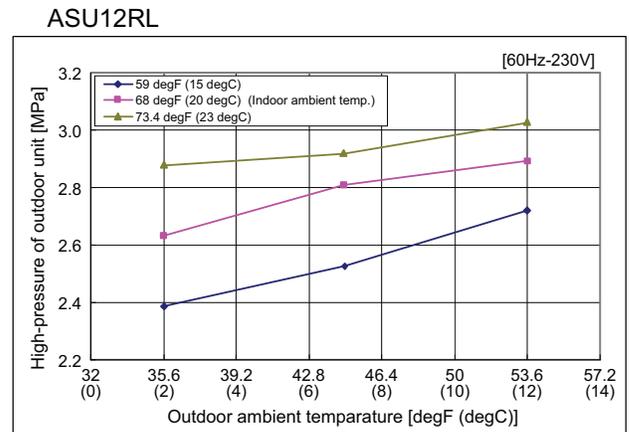
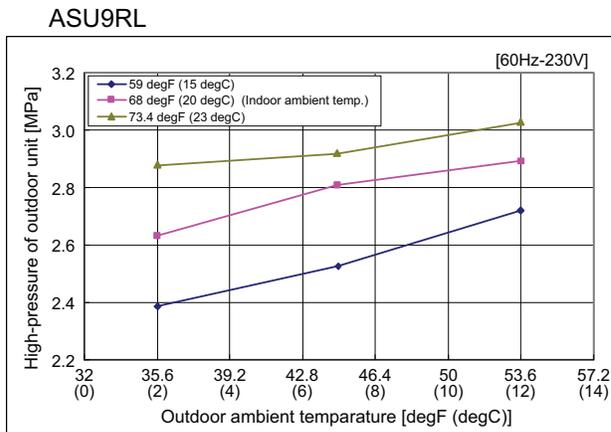
Operation condition TEST mode (Heating), Hi Fan, Lower direction, Front air flow

Measuring method Measure the high pressure with the pressure meter at the service valve.
Measure the outdoor unit overall current with the current clamp meter at Power Cable.

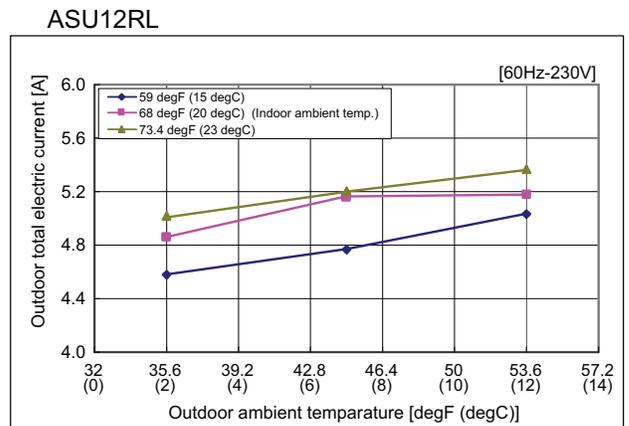
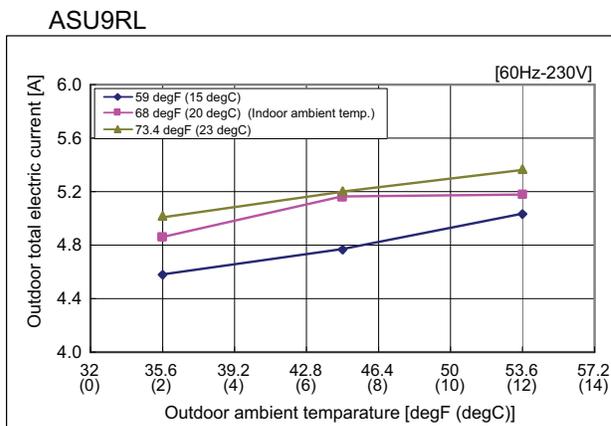
[Constant Frequency Operation Method (Test mode)]

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

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



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



7-3. Thermistor Resistance Values

7-3-1 INDOOR UNIT

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

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

7-3-2 OUTDOOR UNIT

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

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

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

■ MODEL : ASU9RL

● COOLING

AFR	441
-----	-----

		Indoor temperature																	
		64			70			75			80			85			90		
		54			60			63			67			71			73		
Outdoor temperature	°FDB	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	67	7.98	5.46	1.65	8.89	5.49	0.49	9.20	5.97	0.49	10.11	6.47	0.50	10.71	6.44	0.51	11.32	6.86	0.51
	77	7.58	5.18	1.86	8.45	5.21	0.55	8.73	5.67	0.56	9.60	6.14	0.56	10.17	6.12	0.57	10.75	6.52	0.58
	87	7.17	4.90	2.06	7.98	4.93	0.61	8.26	5.36	0.62	9.07	5.81	0.63	9.62	5.78	0.63	10.16	6.16	0.64
	95	6.74	4.61	2.27	7.51	4.63	0.68	7.76	5.04	0.68	8.50	5.50	0.69	9.04	5.44	0.70	9.55	5.79	0.70
	104	6.00	4.11	2.27	6.69	4.13	0.68	6.92	4.49	0.68	7.60	4.86	0.69	8.06	4.85	0.70	8.51	5.16	0.70
	115	5.57	3.81	2.26	6.20	3.83	0.67	6.42	4.16	0.68	7.05	4.51	0.69	7.47	4.49	0.69	7.90	4.79	0.70

AFR : Air flow rate (CFM)

TC : Total capacity (kBTU)

SHC : Sensible Heat capacity (kBTU)

PI : Power Input (kW)

● HEATING

AFR	441
-----	-----

		Indoor temperature											
		°FDB		60		65		70		75		78	
		°FDB	°FWB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	5	3	5.35	0.62	5.22	0.64	5.09	0.65	4.97	0.66	4.84	0.67	
	14	12	6.09	0.64	5.94	0.66	5.80	0.67	5.65	0.68	5.51	0.70	
	23	19	6.98	0.66	6.82	0.68	6.65	0.69	6.48	0.70	6.32	0.72	
	32	28	8.27	0.69	8.07	0.70	7.88	0.72	7.68	0.73	7.48	0.75	
	41	37	9.65	0.72	9.42	0.74	9.19	0.75	8.96	0.77	8.73	0.78	
	47	43	10.50	0.74	10.25	0.75	10.00	0.77	9.75	0.79	9.50	0.80	
	50	47	11.04	0.75	10.78	0.76	10.52	0.78	10.25	0.80	9.99	0.81	
	59	50	11.44	0.74	11.17	0.76	10.90	0.77	10.62	0.79	10.35	0.80	

AFR : Air flow rate (CFM)

TC : Total capacity (kBTU)

PI : Power Input (kW)

■ MODEL : ASU12RL

● COOLING

AFR	441
-----	-----

		Indoor temperature																	
		64			70			75			80			85			90		
		54			60			63			67			71			73		
Outdoor temperature	°FDB	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	67	10.80	7.51	0.65	12.02	7.55	0.66	12.43	8.21	0.66	13.66	8.89	0.67	14.48	8.86	0.68	15.30	9.44	0.69
	77	10.28	7.15	0.74	11.45	7.19	0.75	11.84	7.81	0.75	13.01	8.47	0.77	13.79	8.43	0.77	14.57	8.98	0.78
	87	9.72	6.76	0.83	10.82	6.80	0.84	11.19	7.39	0.84	12.30	8.01	0.86	13.04	7.97	0.86	13.78	8.49	0.87
	95	9.11	6.34	0.92	10.15	6.37	0.93	10.49	6.93	0.94	11.50	7.50	0.95	12.22	7.48	0.96	12.92	7.96	0.97
	104	7.70	5.36	0.85	8.58	5.39	0.87	8.87	5.86	0.87	9.75	6.35	0.88	10.34	6.32	0.89	10.92	6.73	0.90
	115	7.09	4.93	0.85	7.90	4.96	0.87	8.17	5.39	0.87	8.98	5.84	0.88	9.52	5.82	0.89	10.05	6.20	0.90

AFR : Air flow rate (CFM)

TC : Total capacity (kBTU)

SHC : Sensible Heat capacity (kBTU)

PI : Power Input (kW)

● HEATING

AFR	441
-----	-----

		Indoor temperature											
		°FDB		60		65		70		75		78	
		°FDB	°FWB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	5	3	9.33	1.27	9.11	1.30	8.88	1.33	8.66	1.35	8.44	1.38	
	14	12	10.31	1.27	10.06	1.30	9.82	1.32	9.57	1.35	9.33	1.37	
	23	19	11.46	1.27	11.19	1.30	10.92	1.32	10.65	1.35	10.37	1.38	
	32	28	12.85	1.27	12.55	1.30	12.24	1.33	11.94	1.35	11.63	1.38	
	41	37	13.87	1.12	13.54	1.14	13.21	1.17	12.88	1.19	12.55	1.21	
	47	43	14.70	1.11	14.35	1.14	14.00	1.16	13.65	1.18	13.30	1.21	
	50	47	15.24	1.11	14.88	1.14	14.52	1.16	14.15	1.18	13.79	1.21	
	59	50	15.22	1.04	14.85	1.06	14.49	1.09	14.13	1.11	13.77	1.13	

AFR : Air flow rate (CFM)

TC : Total capacity (kBTU)

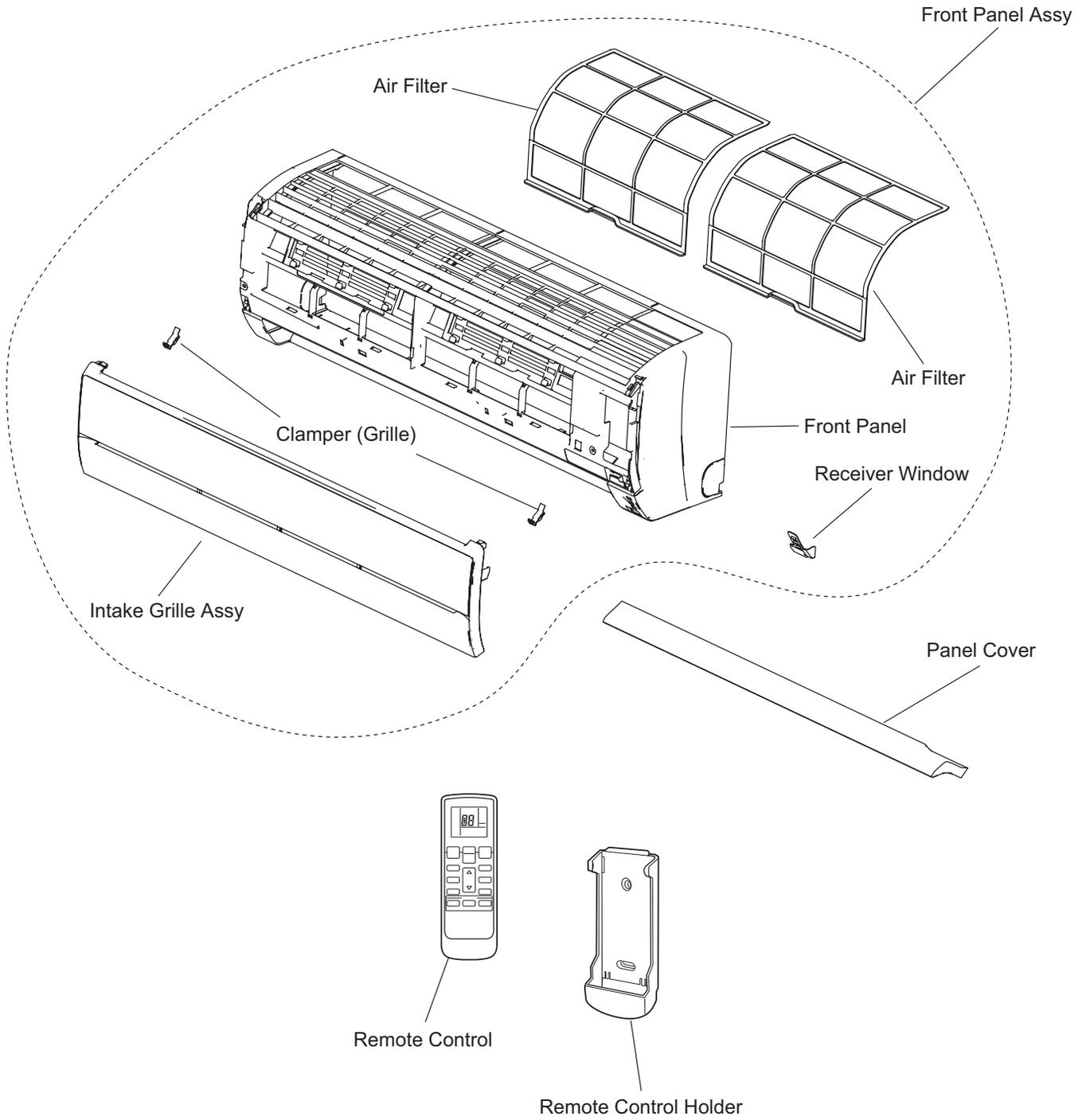
PI : Power Input (kW)

WALL MOUNTED type INVERTER

8 . REPLACEMENT PARTS

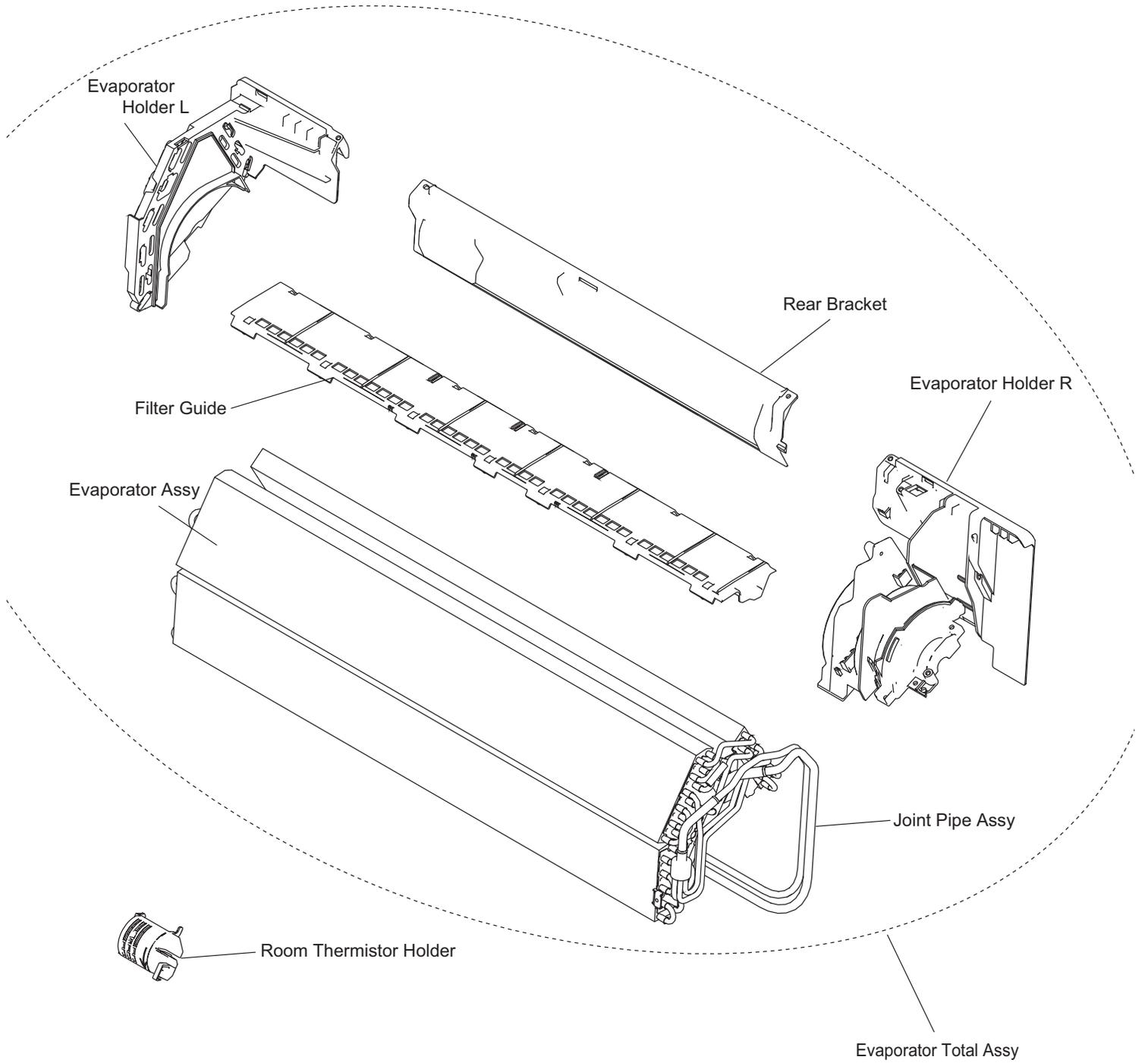
REPLACEMENT PARTS

Models : ASU9RL
ASU12RL



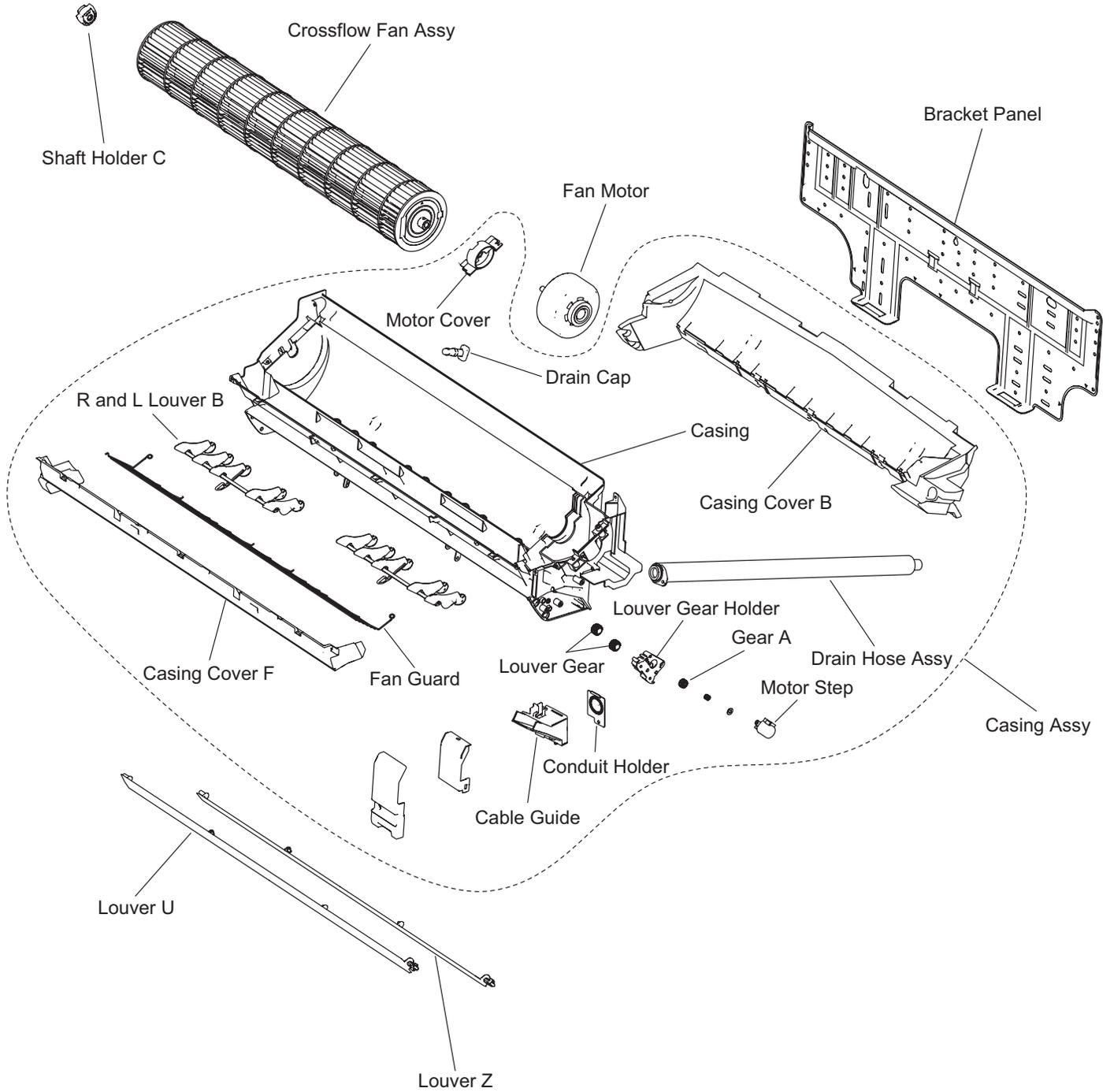
REPLACEMENT PARTS

Models : ASU9RL
ASU12RL



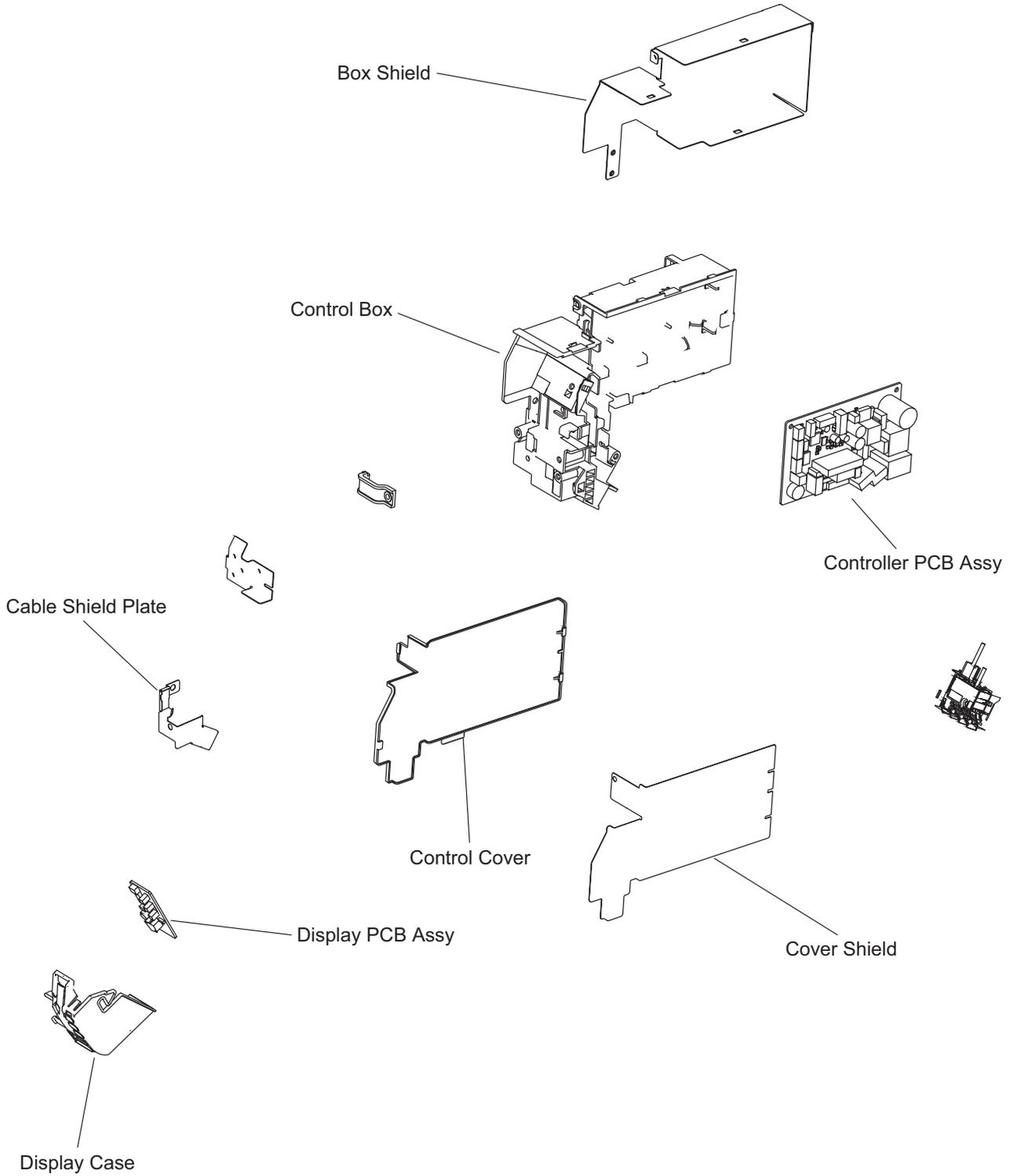
REPLACEMENT PARTS

Models : ASU9RL
ASU12RL



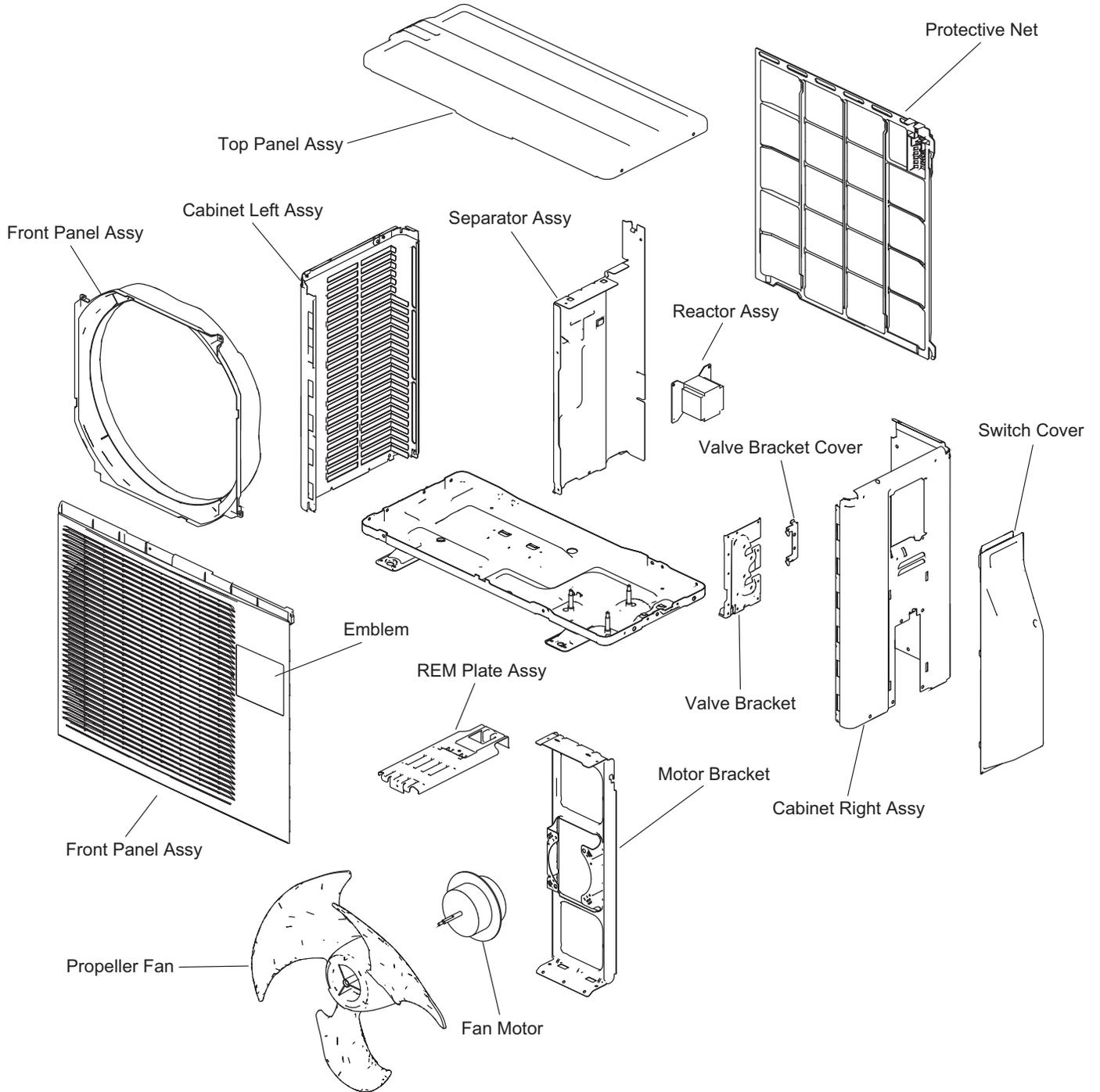
REPLACEMENT PARTS

Models : ASU9RL
ASU12RL



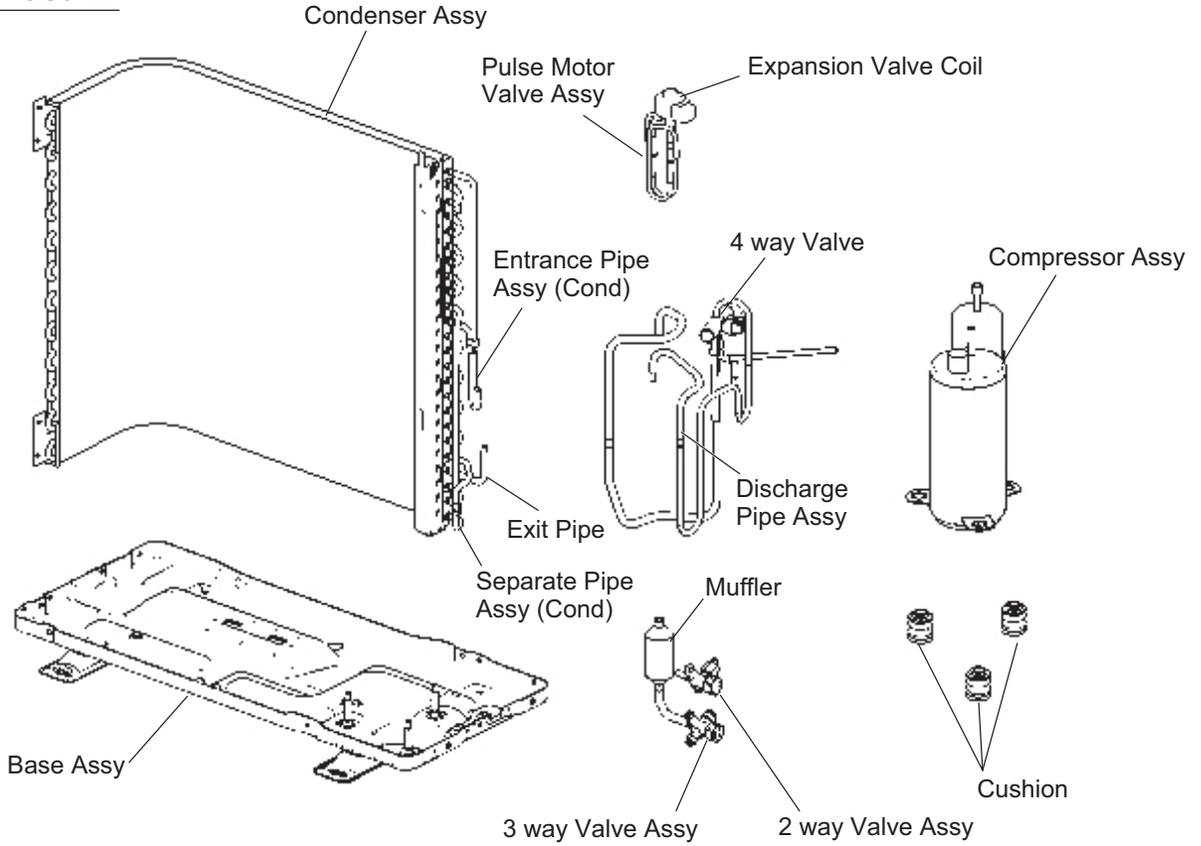
REPLACEMENT PARTS

Models : AOU9RL
AOU12RL

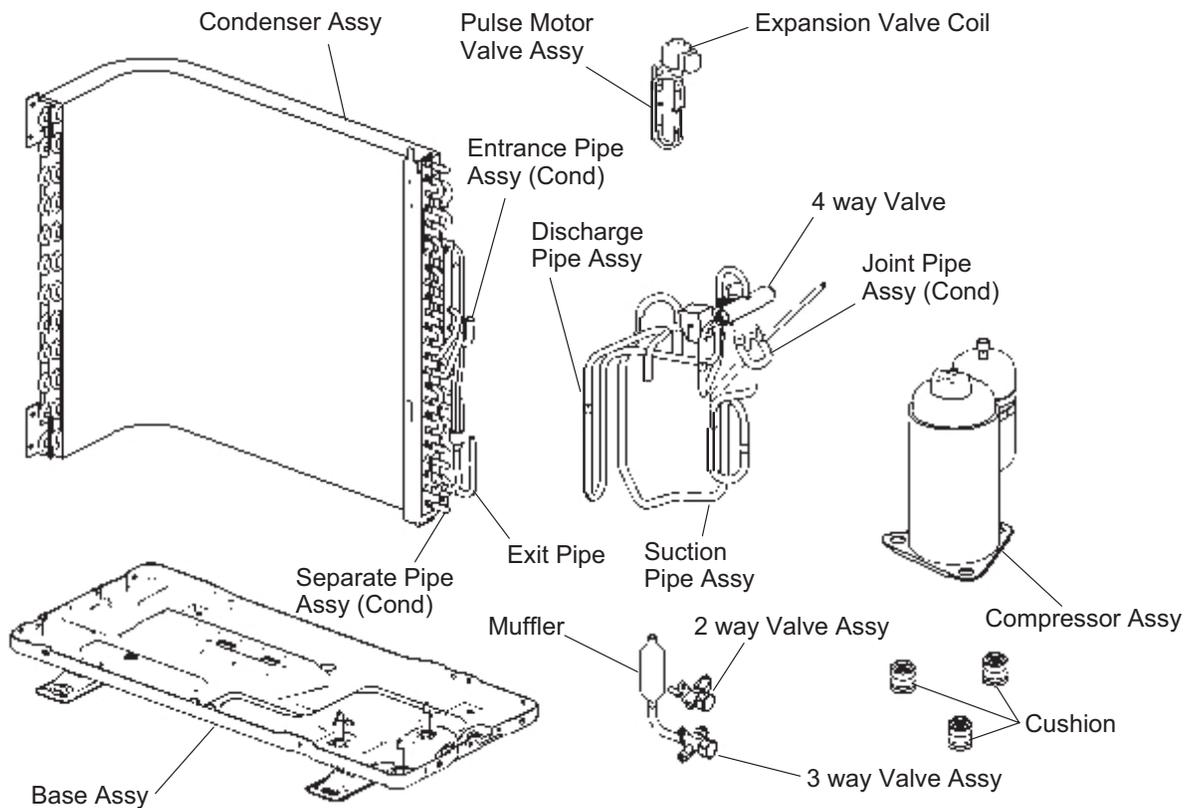


REPLACEMENT PARTS

Models : AOU9RL

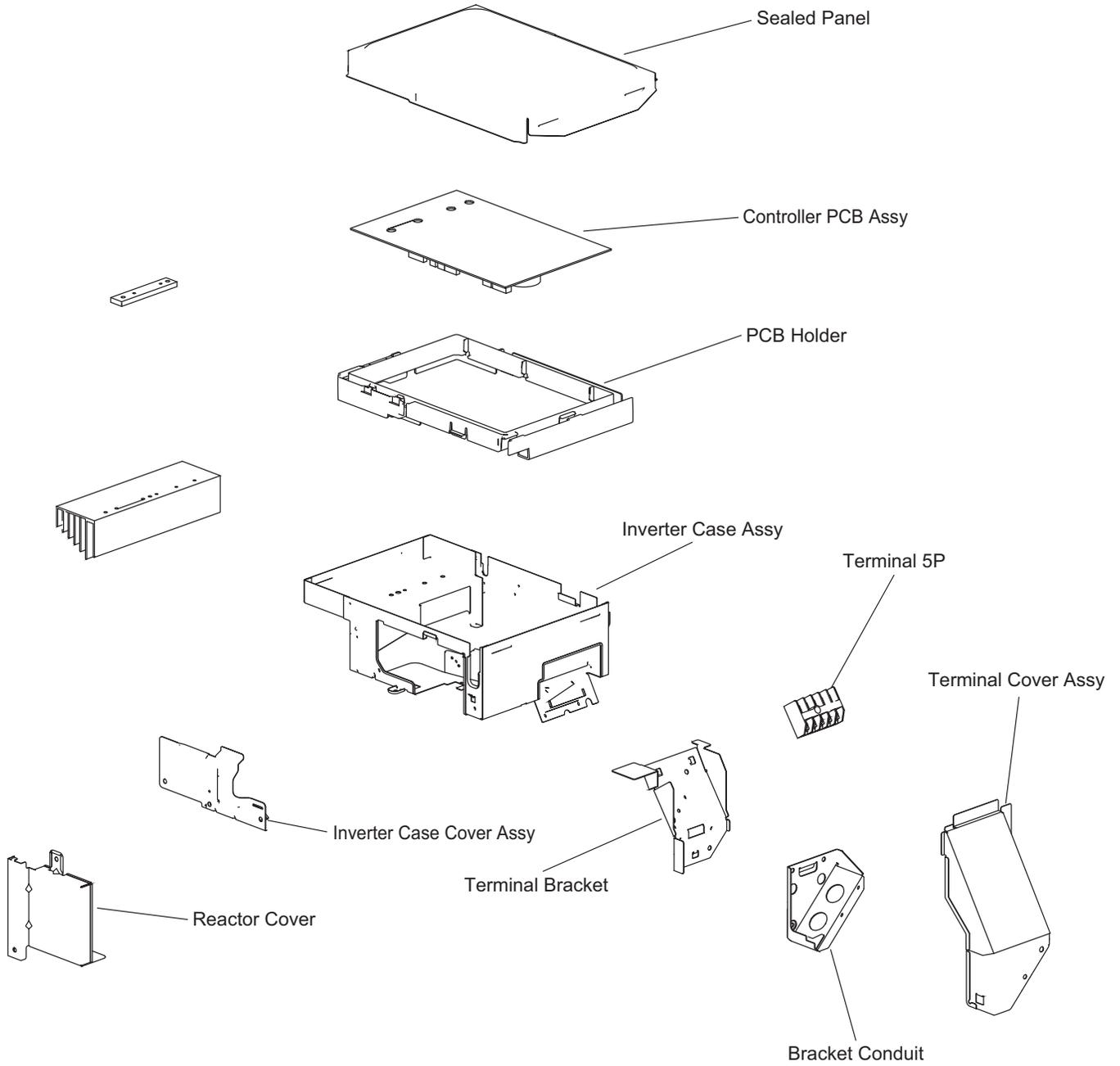


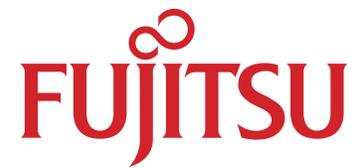
Models : AOU12RL



REPLACEMENT PARTS

Models : AOU9RL
AOU12RL





FUJITSU GENERAL LIMITED

1116, Suenaga, Takatsu-ku, Kawasaki 213-8502, Japan