SPLIT TYPE
ROOM AIR CONDITIONER

DUCT type
INVERTER

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	AR*G30LHTBP	AO*G30LBTA
	AR*G36LHTBP	AO*G36LBTA
	AR*G45LHTBP	AO*G45LBTA
	AR*G54LHTBP	AO*G54LBTA
	RDG30LHTBP	ROG30LBTA
	RDG36LHTBP	ROG36LBTA
	RDG45LHTBP	ROG45LBTA
	RDG54LHTBP	ROG54LBTA

Refrigerant
R410A

FUJITSU GENERAL LIMITED

CONTENTS

1. DESCRIPTION OF EACH CONTROL OPERATION

2. TROUBLE SHOOTING

Refrigerant
R410A

DUCT type
INVERTER

1 . DESCRIPTION OF EACH CONTROL OPERATION

1-1. COOLING OPERATION

1-1-1 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 6.0°C higher than a set temperature, the compressor operation frequency will attain to maximum performance.

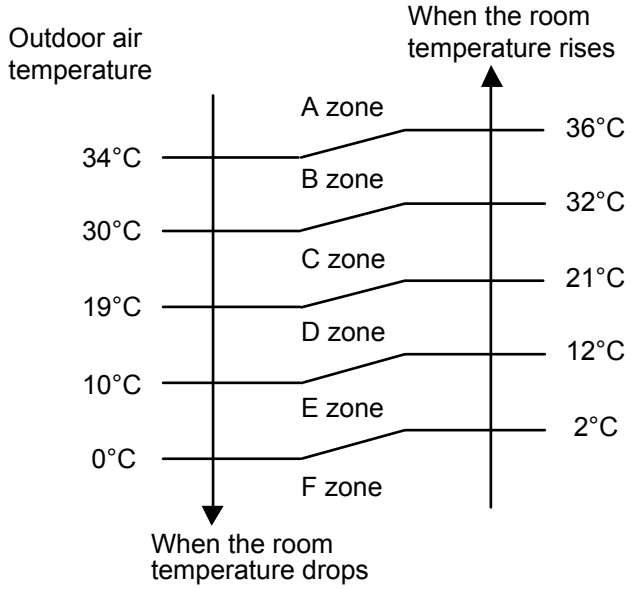
* If the room temperature is 1.0°C lower than a set temperature, the compressor will be stopped.

* When the room temperature is between +6.0°C to -1.0℃ 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 Fig.1 based on the fan speed mode and the outdoor temperature.

(Table 1 : Compressor Frequency Range)

MODEL	minimum frequency	maximum frequency
30,36LBTA	16rps	90rps
45LBTA	16rps	100rps
54LBTA	16rps	110rps

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



Fan speed mode		Hi	Me	Lo	Qu
30,36LBTA	A zone	72rps	59rps	50rps	39rps
	B zone	72rps	59rps	50rps	39rps
	C zone	65rps	50rps	44rps	39rps
	D-F zone	50rps	44rps	39rps	35rps
45LBTA	A zone	93rps	75rps	68rps	44rps
	B zone	93rps	75rps	68rps	44rps
	C zone	78rps	68rps	56rps	44rps
	D-F zone	73rps	56rps	47rps	29rps
54LBTA	A zone	100rps	78rps	73rps	44rps
	B zone	100rps	78rps	73rps	44rps
	C zone	85rps	73rps	62rps	44rps
	D-F zone	76rps	62rps	50rps	29rps

1-2. HEATING OPERATION

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

* If the room temperature is lower 6.0°C than a set temperature, the compressor operation frequency will attain to maximum performance.

* If the room temperature is higher 1.0°C than a set temperature, the compressor will be stopped.

* When the room temperature is between +1.0°C to -6.0°C of the setting temperature, the compressor frequency is controlled within the range shown in Table2.

(Table 2 : Compressor Frequency Range)

	minimum frequency	maximum frequency
30,36LBTA	16rps	90rps
45,54LBTA	16rps	110rps

1-3. DRY OPERATION

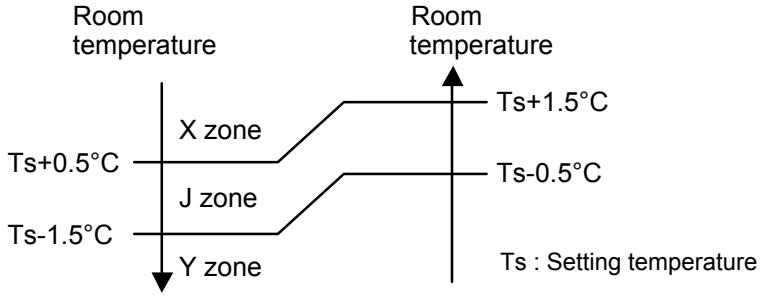
1-3-1 INDOOR UNIT CONTROL

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.

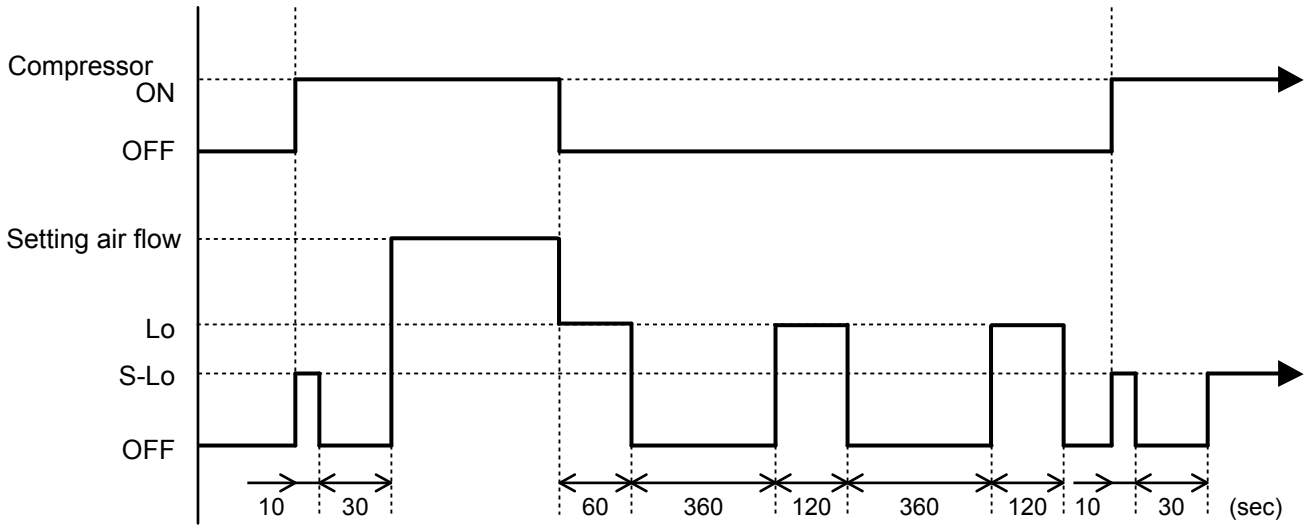
(Table 3 : Compressor frequency)

	Operating frequency	
	30,36LHTBP	45,54LHTBP
X zone	39rps	44rps
J zone		
Y zone	0rps	0rps

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



(Fig.3 : Indoor Fan Control)



1-4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the Auto mode by remote controller, operation starts in the optimum mode from among the Heating, Cooling, and Monitoring mode. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 0.5°C(wireless and 2WIRE remote controller) Or 1.0°C(3WIRE remote controller) steps.

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

(Table 4 : Operation mode selection table)

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

TR : Room temperature
Ts : Setting temperature

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

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

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

(2). Selected by the outdoor temperature.

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

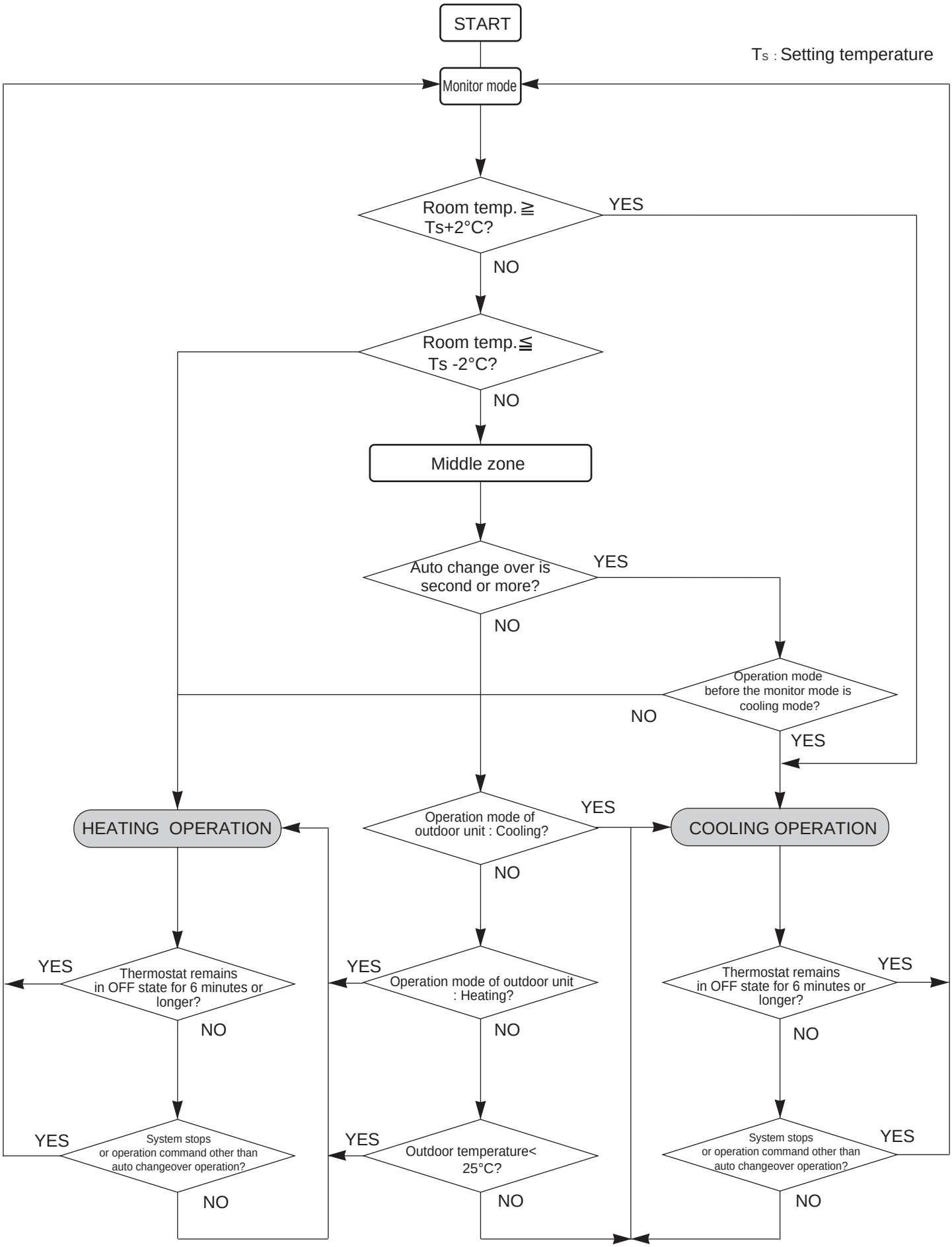
(Fig.4 : Outdoor temperature zone selection)

Temperature	Mode
25°C and over	Cooling
25°C under	Heating

② When the compressor was stopped for 6 consecutive minutes by the temperature control function after the Cooling or Heating mode was selected at ① above, operation is switched to Monitoring and the operation mode is selected again.

③ When the middle zone is selected on the predetermining of the operation mode, the operation mode before the changing to the monitor mode is selected.

■ AUTO CHANGEOVER operation flow chart



1-5. INDOOR FAN CONTROL

1. Fan speed

(Table 5 : Standard of Indoor Fan Speed)

*The following fan speed is a standard value.
(Static pressure: 45Pa = 30,36LHTBP, 60Pa = 45,54LHTBP)

Operation mode	Air flow mode	Speed (rpm)		
		30LHTBP	36LHTBP	45,54LHTBP
Heating	HIGH	1060	900	1130
	MED	880	800	930
	LOW	780	660	780
	Quiet	720	560	700
Cooling	HIGH	1060	980	1130
	MED	880	800	930
	LOW	780	660	780
	Quiet	720	560	700
	Soft Quiet	510	480	560
S-Lo		420	420	420
Dry		720	560	700

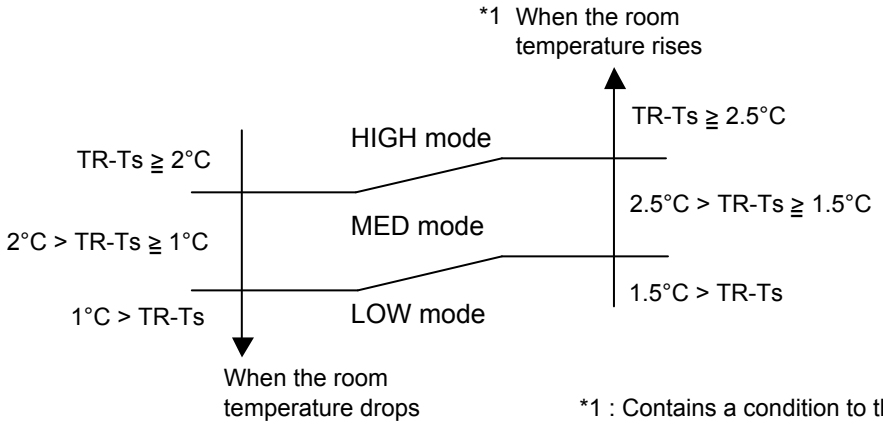
2. FAN OPERATION

The airflow can be switched in 4 steps such as AUTO, QUIET, LOW, MED, HIGH, while the indoor fan only runs.
When [AUTO] is selected, the indoor fan motor runs MED.

3. COOLING OPERATION

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



TR : Room temperature
Ts : Setting temperature

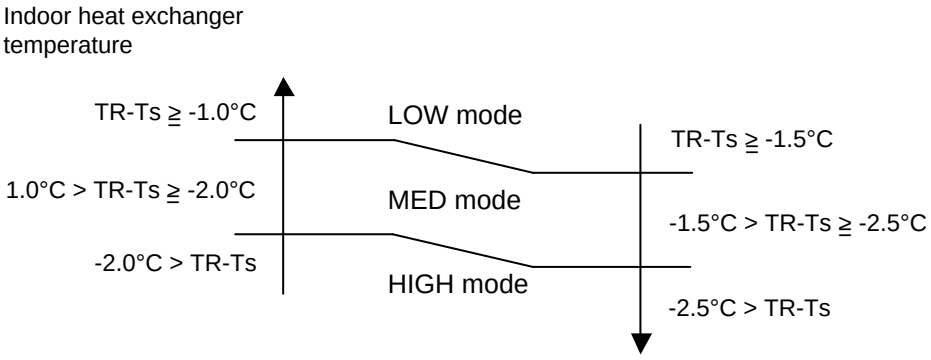
*1 : Contains a condition to the following
1 When the operation mode is set to AUTO mode at the start of operation.
2 When the setting temperature was changed.
3 When the operation mode was changed to COOLING mode.
4 When the airflow mode was changed to AUTO mode.

4. HEATING OPERATION

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

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

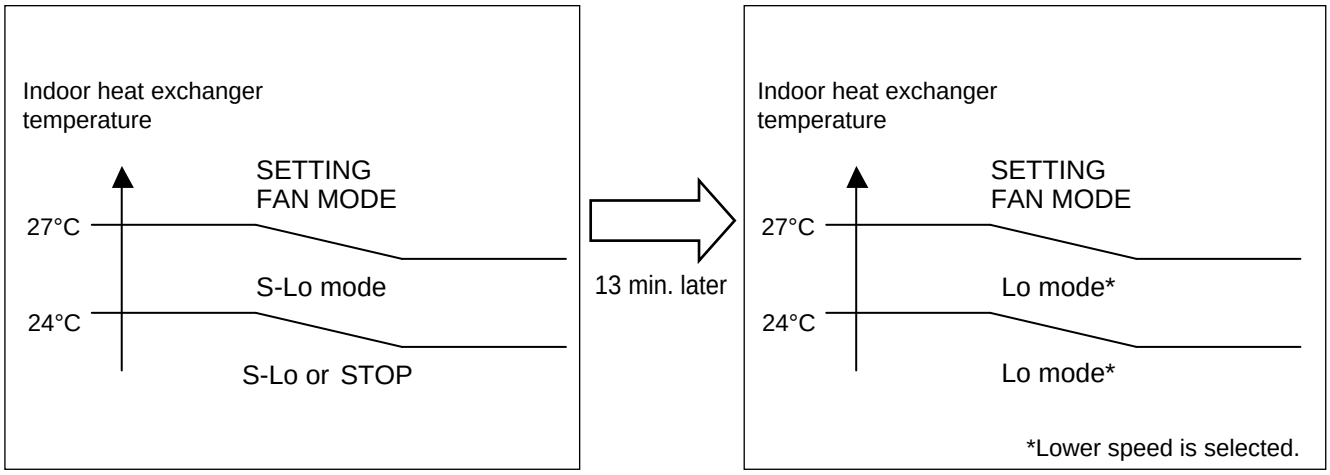
(Fig.6 : Airflow change - over (Heating : AUTO))



5. COOL AIR PREVENTION CONTROL (Heating mode)

The maximum value of the indoor fan speed is set as shown in Fig.7, based on the detected temperature by the indoor heat exchanger sensor on heating mode.
When the compressor does not operate, the indoor fan motor operates [S-Lo] or [Stop] mode.

(Fig.7 : Cool Air Prevention Control)



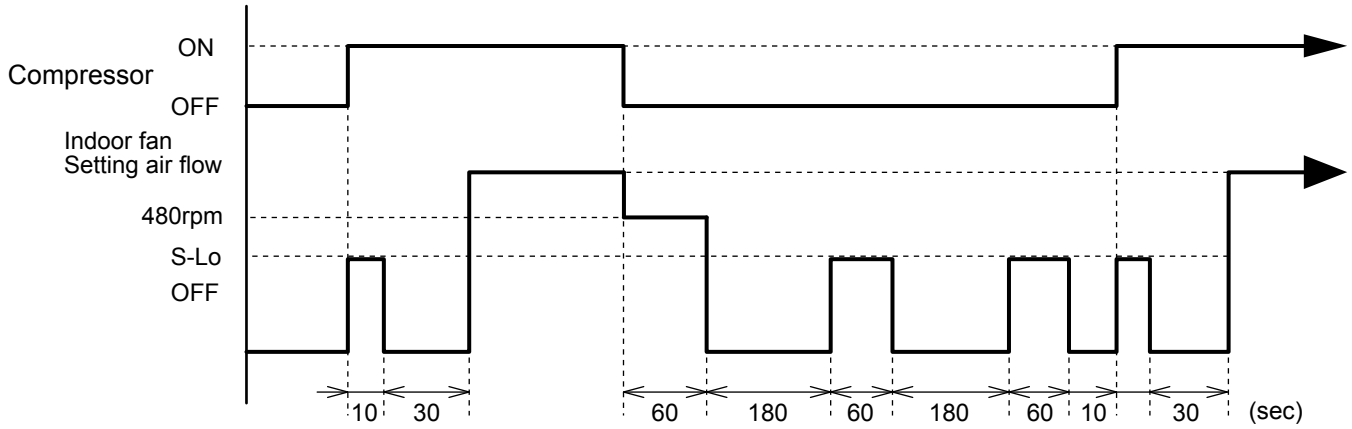
6. DRY OPERATION

Refer to the Fig.4.
During the dry mode operation, the fan speed setting can not be changed.

7. FAN CONTROL FOR ENERGY SAVING

When the air flow setting except AUTO mode, the indoor fan motor will run as shown in Fig.8.

(Fig 8 : Indoor Fan Control)



(◆. . .Factory setting)

	Setting Description	Function Number	Setting Value
	Disable	49	00
	Enable		01
◆	Remote controller		02

00 : When the outdoor unit is stopped, the indoor unit fan operates continuously following the setting on the remote controller.

01 : When the outdoor unit is stopped, the indoor unit fan operates intermittently at a very low speed.

02 : Enable or disable this function by remote controller setting.
Set to “00”or “01”when connecting a remote controller that cannot set the Fan control for energy saving function or connecting a network converter.

To confirm if the remote controller has this setting,
refer to the operating manual of each remote controller.

8. DEFROST OPERATION

When the defrost operation starts, the indoor fan runs according to cool air prevention control for 20 seconds.
And the fan is stopped if 20 seconds have passed.
When 60 seconds have passed after defrost operation is released,
the fan runs according to cool air prevention control.

1-6. OUTDOOR FAN CONTROL

1. Outdoor Fan Motor

Following table shows the fan speed of the outdoor unit.

(Table 6 : Fan speed of the outdoor unit) rpm

	Cooling	Heating
30LBTA	850/ 800/ 620/ 550/ 500/ 450/ 400/ 320/ 300/ 250/ 200	900/ 850/ 800/ 620/ 550/ 450
36LBTA	900/ 800/ 620/ 550/ 500/ 450/ 400/ 320/ 300/ 250/ 200	900/ 850/ 800/ 620/ 550/ 450
45,54LBTA	850(800)/ 780(750)/ 750(700)/ 540(520)/ 360(340)/ 290(270)/ 480(0)/ 400(0)/ 350(0)/ 280(0)	900(880)/ 850(830)/ 780(750)/ 720(700)/ 570(550)/ 500(480)/ 370(350)/ 300(280)/ 220(200)

Upper fan(Lower fan)

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

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

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

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

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

1-7. COMPRESSOR CONTROL

1. OPERATION FREQUENCY RANGE

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

(Table 7 : Compressor Operation Frequency Range)

	Coolin/Dry/Heating	
	Min	Max
30,36LBTA	16rps	90rps

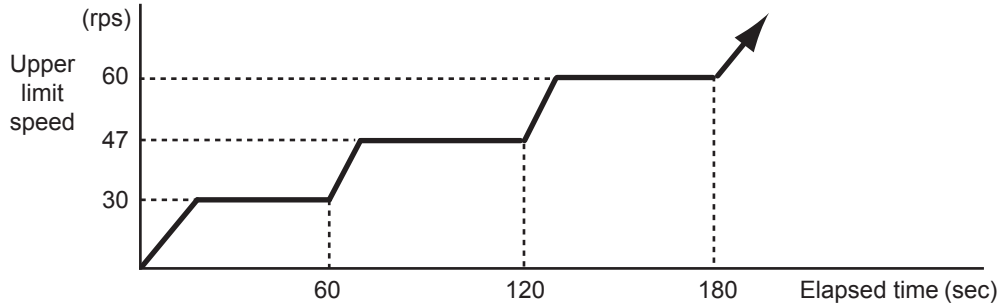
2. OPERATION FREQUENCY CONTROL AT START UP

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

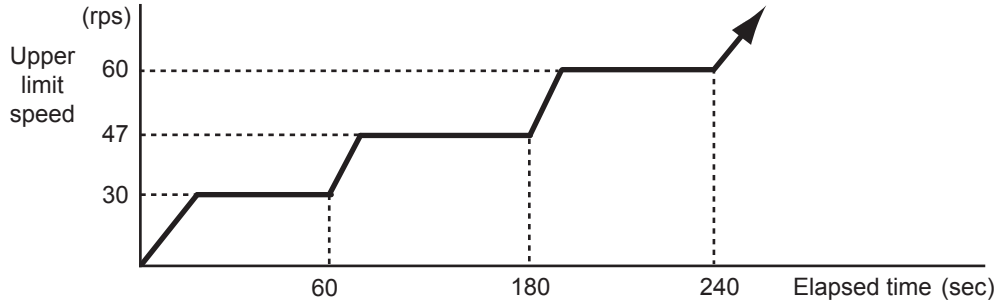
(Fig.9 : Compressor Control at Start-up)

30,36LBTA

< Normal start-up Coolling/ Dry >



<Immediate start-up after power-ON / Heating>



1. OPERATION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode shown in Table 8.

(Table 8 : Compressor Operation Frequency Range)

MODEL	Cooling		Heating	
	Min	Max	Min	Max
45LBTA	16rps	100rps	16rps	110rps
54LBTA	16rps	110rps	16rps	110rps

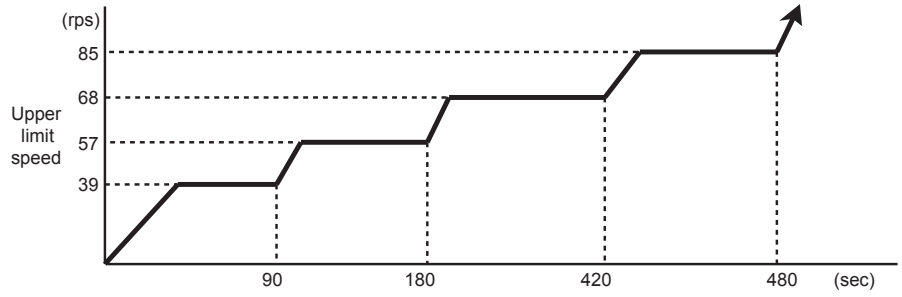
2. OPERATION FREQUENCY CONTROL AT START UP

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

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

45,54LBTA

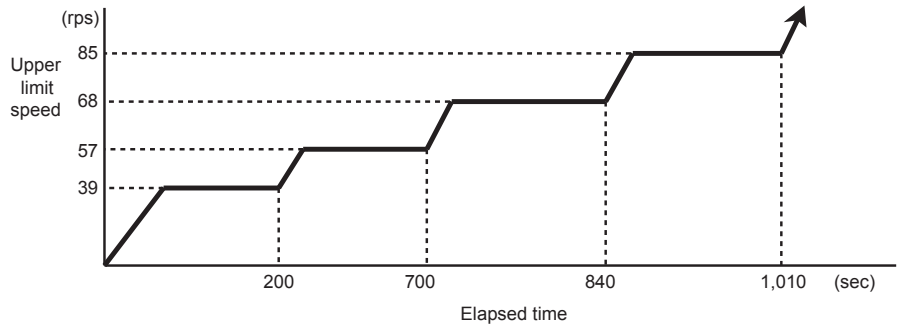
< Normal start-up >



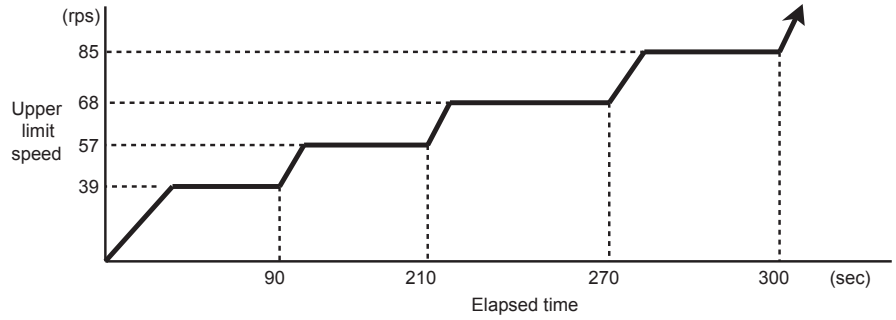
Ta : Outdoor temperature
Tc : Compressor temperature

Condition
Mode: Cooling
Mode: Heating Below 3 hours from comp stop Tc ≧ 15 °C

< Immediate / under specific conditions start-up>



Condition
Mode: Heating Below 3 hours from comp stop Ta < 10 °C Tc < 15 °C 3 hours longer from comp stop Ta < 10 °C



Condition
Mode: Heating Below 3 hours from comp stop Ta ≧ 10 °C Tc < 15 °C 3 hours longer from comp stop Ta ≧ 10 °C

1-8. TIMER OPERATION CONTROL

1-8-1 Wired Remote Controller

UTY-RNR*Z1(2 wire remote controller)

- ON / TIMER
- OFF / TIMER
- WEEKLY TIMER

*3 wire remote controller can be connected

If 3 wire remote controller is connected, set the DIP-SW on the controller PCB

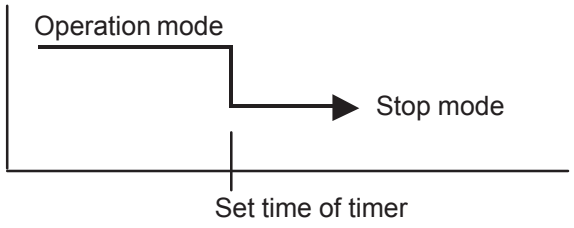
Refer to the installation manual for detailed.

If used in combination with wireless and wired remote controller, the following function is limited.

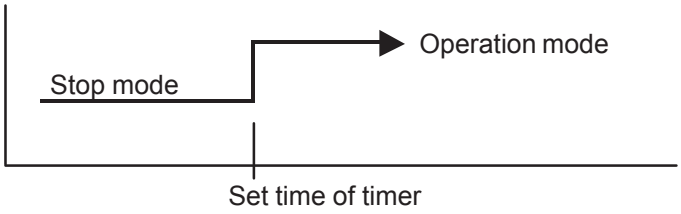
- Sleep timer
- Timer
- 10°C heat operation

1. ON / OFF TIMER

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



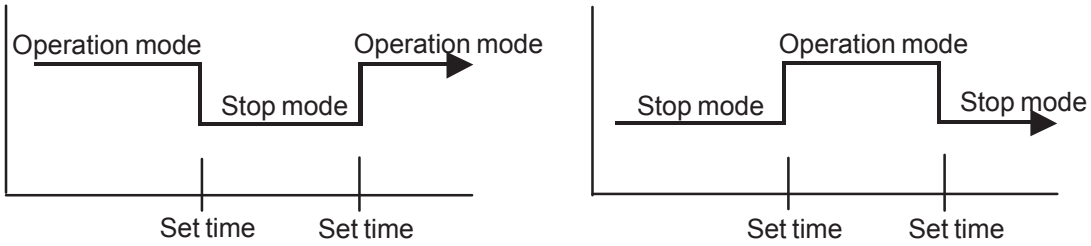
・ON timer : When the clock reaches the set time, the air conditioner will be turned on.



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.

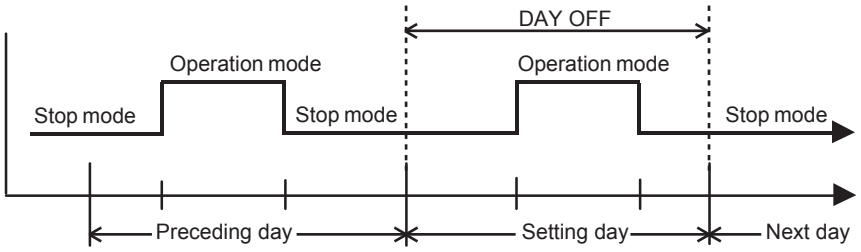


・The operating time can be set in 30 min increments only.
・The OFF time can be carried over to next day.
・The ON timer and the OFF timer functions cannot be set with using the weekly timer. Both ON and OFF time must be set.

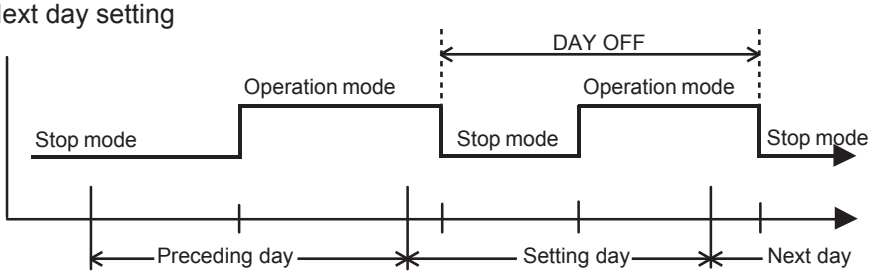
2-2. DAY OFF setting

- 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.

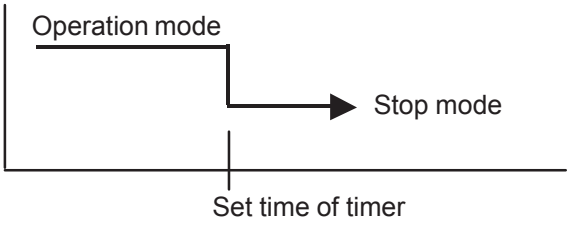
1-8-2 Wireless Remote Controller (OPTION)

AR- REJ1E

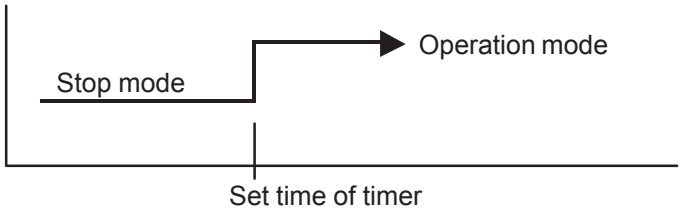
- ON / TIMER
- OFF / TIMER
- PROGRAM TIMER
- SLEEP TIMER

1. ON / OFF TIMER

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

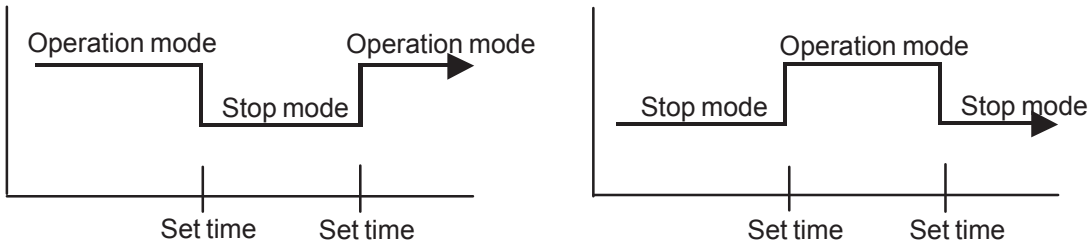


・ON timer : When the clock reaches the set time, the air conditioner will be turned on.



2. PROGRAM TIMER

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



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

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

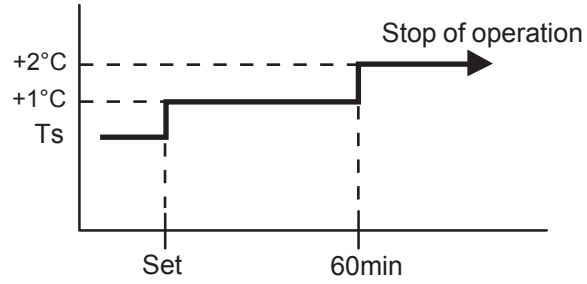
3. SLEEP TIMER

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

In the COOLING operation mode

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

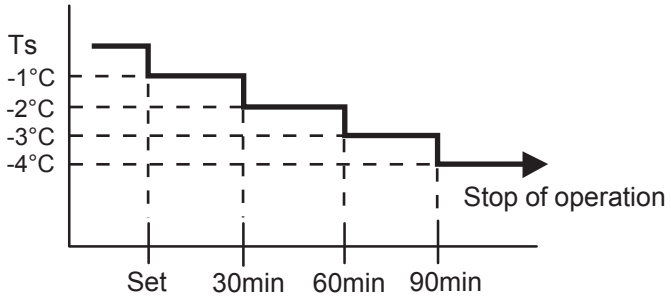
Set temperature rises
(Ts : Set temperature)



In the HEATING operation mode

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

Set temperature lowers
(Ts : Set temperature)



1-9. ELECTRONIC EXPANSION VALVE CONTROL

The most proper opening of the electronic expansion valve is calculated and controlled under the present operating condition based on the following values.
The compressor frequency, the temperatures detected by the discharge temperature sensor and the outdoor temperature sensor.

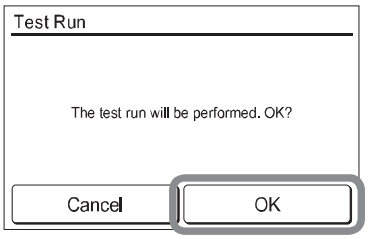
30,36LBTA	The pulse range of the electronic expansion valve control is 53 ~ 480 pulses (Cooling) and 40 ~ 480 pulses (Heating).
45,54LBTA	The pulse range of the electronic expansion valve control is 53 ~ 480 pulses (Cooling) and 53 ~ 480 pulses (Heating).

* 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).

1-10. TEST OPERATION CONTROL

▪ With Wired Remote Controller

Touch the [Test run] in the “Maintenance” screen.
The “Test Run” screen is displayed.
Touch [OK] to return to the Maintenance screen, and start the test run.
The test run will automatically end is approximately 60 min.
If you wish to cancel the test run before it is complete, return to the “Monitor Mode screen”, and touch the On/Off button.



*Installer password is required.
If the password has been charged from the default setting “0000”, contact to the installer.

▪ With Wireless Remote Controller

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

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

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

1-12. 4-WAY VALVE EXTENSION SELECT

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

1-13. AUTO RESTART

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

[Operation contents memorized when the power is interrupted]

- Operation mode
- Air flow direction (Swing setting)
- Individual air flow direction (Swing setting)
- Human sensor auto saving (setting/timer)
- Human sensor auto off (setting/timer)
- Energy saving setting
- Set temperature
- Set air flow
- Timer mode and timer time (Set by wireless remote controller)
- 10°C HEAT (Wireless remote controller is in use)
- Each central setting
- ECONOMY

1-14. PUMP DOWN For Model 30,36

PUMP DOWN (Refrigerant collecting operation)
Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor un

(1) Close the 3-way valve (Liquid).

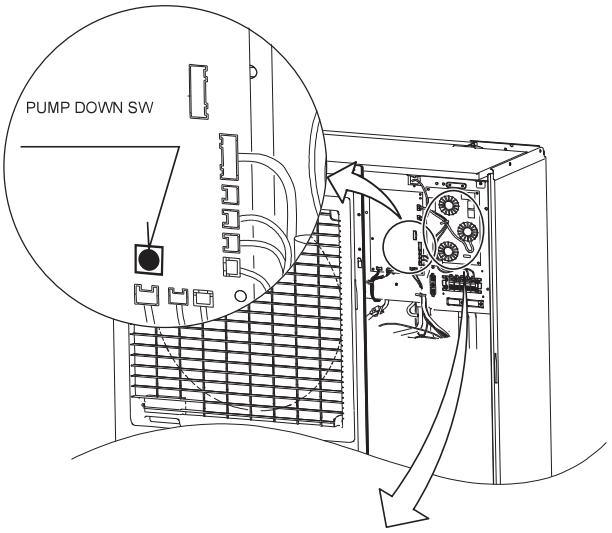
(2) Press the push-button switch on the circuit board once.
The LED on the circuit board starts lighting. This indicates the start of PUMP DOWN operation.

(3) PUMP DOWN operation continues for about 1 minute.
Then close the 3-way valve (Gas) immediately.
The compressor stops automatically.

(4) Turn the power off.

⚠ WARNING
This part (Choke coil) generates high voltages. Never touch this part.
Never touch electrical components such as the terminal blocks except the button on the display board. It may cause a serious accident such as electric shock.
During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation with 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

⚠ CAUTION
Perform the pump down operation before disconnecting any refrigerant pipe or electric cable.
Collect refrigerant from the service port or the 3-way valve if pump down cannot be performed.
In case of group control system installation, disconnect all remote controller cables before starting the pump down operation. (Group control system installation is described in “SPECIAL INSTALLATION METHODS” in the installation manual of the indoor unit.)
Please check the refrigerant circuit for any leaks before starting the pump down operation. Do not proceed with the pump down operation if there is no refrigerant left in the circuit due to bent or broken piping.



1-14. PUMP DOWN For Model 45,54

⚠ WARNING

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

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

⚠ CAUTION

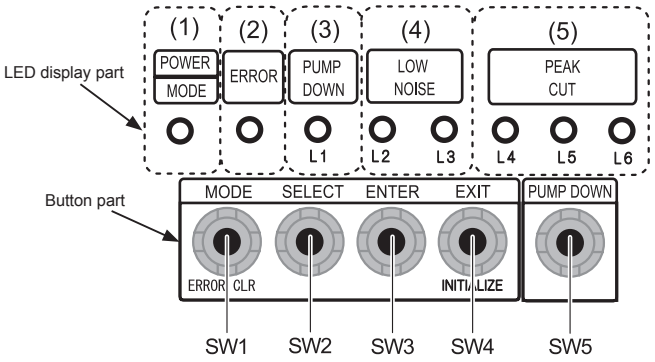
Perform the pump down operation before disconnecting any refrigerant pipe or electric cable.

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

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

Please check the refrigerant circuit for any leaks before starting the pump down operation.
Do not proceed with the pump down operation if there is no refrigerant left in the circuit due to bent or broken piping.

- Operate “PUMP DOWN” button on the display board in the manner described below.



14.1. Preparation for pump down

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

14.2. Pump down procedure

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

(2) Turn the power on.

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

Sign “○”: Lights off, “●”: Lights on

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

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

Sign “○”: Lights off, “●”: Lights on
LED display lights on as shown in the above figure, and the fans and the compressor start operating.

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

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

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

Sign “○”: Lights off, “●”: Lights on

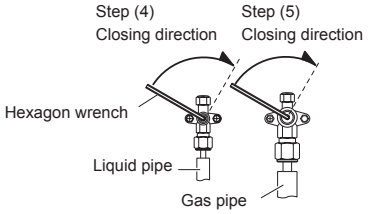
- If the valve on the liquid pipe side is not closed, the pump down cannot be performed.

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

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

Sign “○”: Lights off, “●”: Lights on

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



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

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

Sign “○”: Lights off, “●”: Lights on
Fans and compressor stop automatically.

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

(7) Turn the power off.

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

Sign “○”: Lights off
PUMP DOWN is completed.

(Note)

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

1-15. COMPRESSOR PREHEATING

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

1-16. 10°C HEAT OPERATION

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

(Table9)

Mode	Heating
Setting temperature	10°C
Fan mode	AUTO

1-17. ECONOMY OPERATION

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

(Table10)

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

1-18. DEFROST OPERATION CONTROL

1. CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts as shown in the following Table 11, 12, and 13.

(Table 11 : Condition of 1st defrost operation)

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

(Table 12 : Condition of 2nd defrost operation)

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

(Table 13 : Condition of Integrating defrost operation)

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

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

2. CONDITION OF THE DEFROST OPERATION COMPLETION

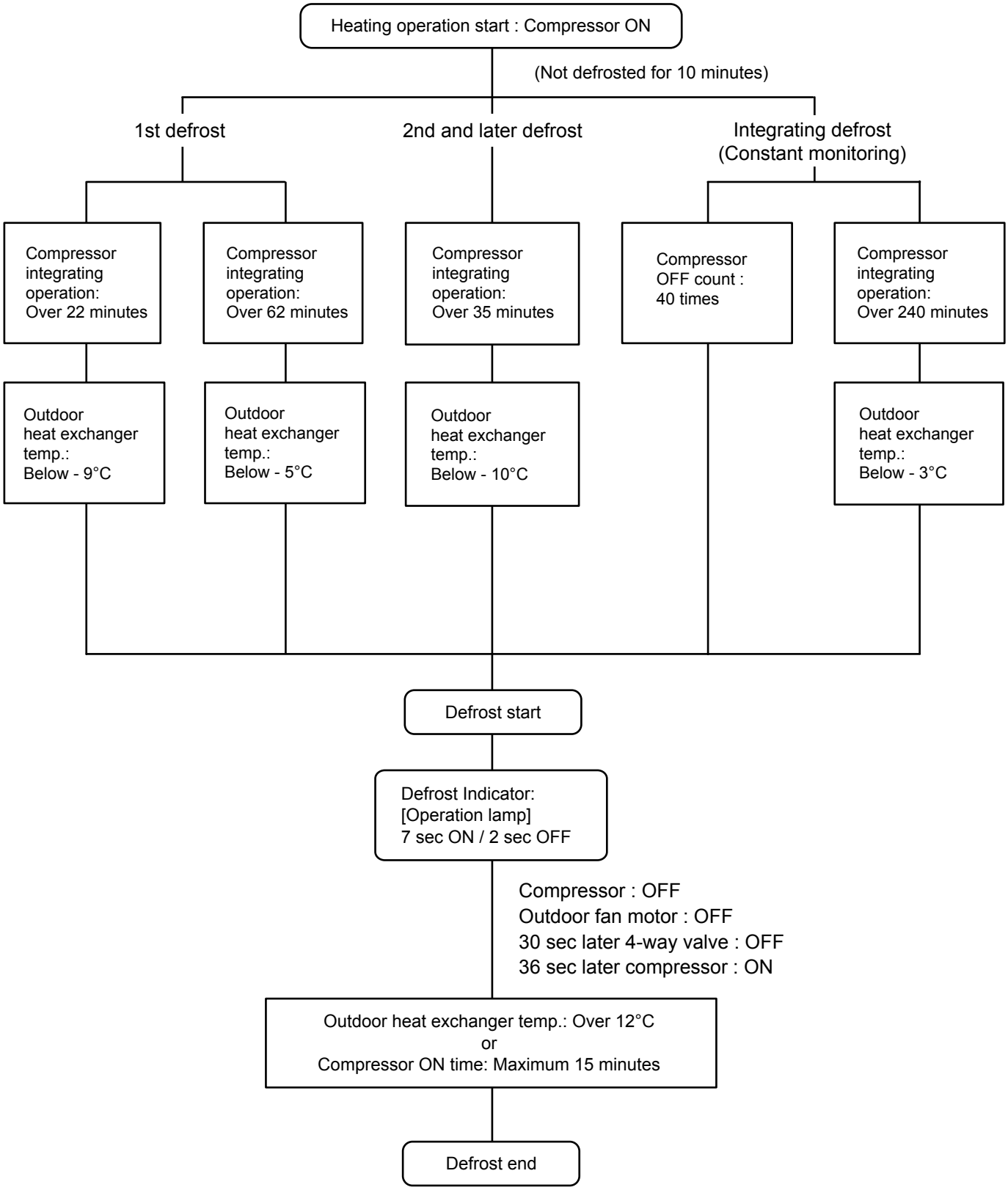
Defrost operation is released when the conditions becomes as shown in Table 14.

(Table 14 : Condition of defrost release)

Release Condition
Outdoor heat exchanger temp. is higher than 12°C or Compressor operation time has passed 15 minutes.

3. Defrost Flow Chart

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



1-19. OFF DEFROST OPEARTION CONTROL

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

1. OFF DEFROST OPERATION CONDITION

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

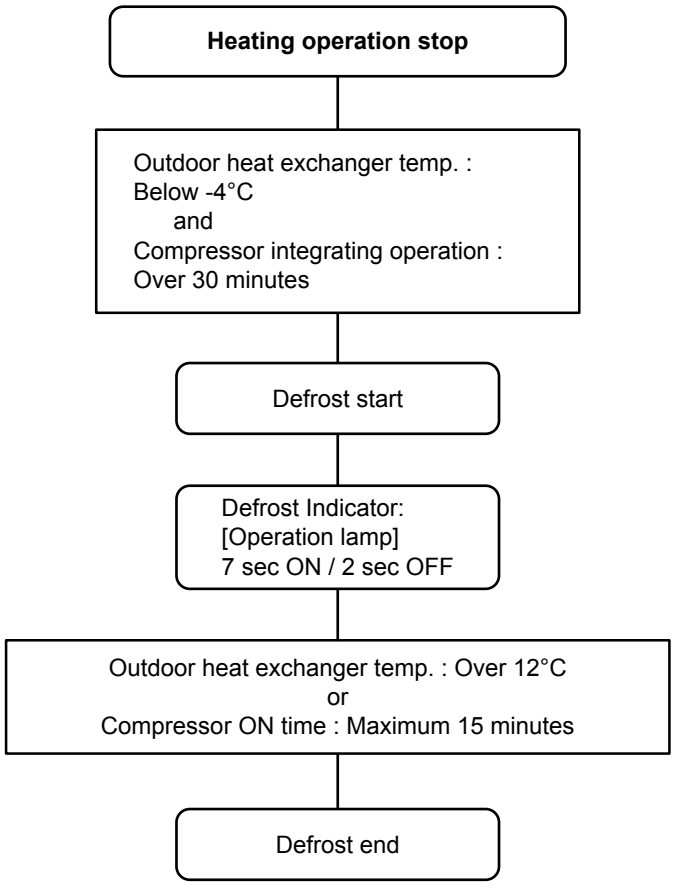
2. OFF DEFROST RELEASE CONDITION

OFF defrost operation is released when the conditions becomes as shown in Table 15.

(Table 15 : OFF Defrost Release Condition)

Release Condition
Outdoor heat exchanger temp. is higher than 12°C or Compressor operation time has passed 15 minutes.

OFF Defrost Flow Chart



1-20. VARIOUS PROTECTIONS

1. DISCHARGE GAS TEMPERATURE OVERRISE 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 10rps(30,36) 14rps(45,54), and it continues to decrease the frequency for 10/14rps 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 is stopped and the indoor unit LED starts blinking.

(Table16 : Discharge Temperature Over Rise Prevention Control / Release Temperature)

	Temperature Ⅰ	Temperature Ⅱ	Temperature Ⅲ
30,36LBTA 45,54LBTA	104°C	101°C	110°C

2. CURRENT RELEASE CONTROL

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

30LBTA

[Heating]

T0 (Control / Release)

17°C	10.0A / 9.5A
12°C	11.5A / 11.0A
5°C	14.5A / 14.0A
	14.5A / 14.0A

T0 : Outdoor Temperature

[Cooling]

T0 (Control / Release)

50°C	9.0A / 8.5A
46°C	10.0A / 9.5A
40°C	12.5A / 12.0A
	14.5A / 14.0A

T0 : Outdoor Temperature

36LBTA

[Heating]

T0 (Control / Release)

17°C	10.0A / 9.5A
12°C	11.5A / 11.0A
5°C	16.0A / 15.5A
	18.0A / 17.5A

T0 : Outdoor Temperature

[Cooling]

T0 (Control / Release)

50°C	9.0A / 8.5A
46°C	10.0A / 9.5A
40°C	13.0A / 12.5A
	16.5A / 16.0A

T0 : Outdoor Temperature

45,54LBTA

[Heating] (Table 17 : Current Release Operation Value / Release Value) (Control / Release)

	Outdoor unit fan speed (UP / LO)								
	900/880rpm	850/830rpm	780/750rpm	720/700rpm	570/550rpm	500/480rpm	370/350rpm	300/280rpm	220/200rpm
20°C ≦ Ta	14.5A/14.0A								
12°C ≦ Ta < 20°C	16.5A/16.0A								
Ta <12°C	19.5A/19.0A								

Ta : Outdoor Temperature

45,54LBTA

[Cooling]

(Control / Release)

<table>
<tr><th rowspan="2"></th><th colspan="10">Outdoor unit fan speed (UP / LO)</th></tr>
<tr><th>850/800rpm</th><th>780/750rpm</th><th>750/700rpm</th><th>540/520rpm</th><th>360/340rpm</th><th>290/270rpm</th><th>480/ 0rpm</th><th>400/ 0rpm</th><th>350/ 0rpm</th><th>280/ 0rpm</th></tr>
<tr><td>50°C ≦ Ta</td><td colspan="2" rowspan="2"></td><td colspan="2">6.5A/6.0A</td><td colspan="6" rowspan="2"></td></tr>
<tr><td>46°C ≦ Ta < 50°C</td><td>13.5A/13.0A</td><td rowspan="2">12.5A/12.0A</td><td colspan="2">9.0A/8.5A</td></tr>
<tr><td>40°C ≦ Ta < 46°C</td><td>16.5A/16.0A</td><td colspan="2">10.0A/9.5A</td><td colspan="4" rowspan="2"></td><td rowspan="4">6.0A/5.5A</td><td rowspan="6">5.0A/4.5A</td></tr>
<tr><td>38°C ≦ Ta < 40°C</td><td>19.0A/18.5A</td><td rowspan="2">17.5A/17.0A</td><td rowspan="5">16.5A/16.0A</td><td>13.5A/13.0A</td><td rowspan="2">10.0A/9.5A</td><td rowspan="2">9.0A/8.5A</td></tr>
<tr><td>31°C ≦ Ta < 38°C</td><td rowspan="6">19.5A/19.0A</td><td rowspan="6">19.0A/18.5A</td><td>14.5A/14.0A</td></tr>
<tr><td>19°C ≦ Ta < 31°C</td><td>15.0A/14.5A</td><td rowspan="2">11.0A/10.5A</td><td>10.0A/9.5A</td></tr>
<tr><td>13°C ≦ Ta < 19°C</td><td rowspan="2">15.5A/15.0A</td><td rowspan="2">10.5A/10.0A</td></tr>
<tr><td>7°C ≦ Ta < 13°C</td><td>13.5A/13.0A</td></tr>
<tr><td>0°C ≦ Ta < 7°C</td><td colspan="2" rowspan="3">16.0A/15.5A</td><td>12.5A/12.0A</td></tr>
<tr><td>-5°C ≦ Ta < -0°C</td><td colspan="2">14.5A/14.0A</td><td>12.5A/11.5A</td><td></td></tr>
<tr><td>-10°C ≦ Ta < -5°C</td><td colspan="2">15.5A/15.0A</td><td></td><td>11.5A/11.0A</td></tr>
<tr><td>-15°C ≦ Ta < -10°C</td><td colspan="4" rowspan="2"></td><td colspan="2">12.5A/12.0A</td><td rowspan="2">8.0A/7.5A</td></tr>
<tr><td>Ta < -15°C</td><td colspan="2">13.0A/12.5A</td></tr>
</table>

Ta : 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 18 : Anti-freezing Protection Operation / Release Temperature)

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

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

4. COOLING PRESSURE OVER RISE PROTECTION

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

30,36LBTA

Outdoor heat exchange temperature

Compressor is OFF (3 minutes stop)
After 60sec. temp detection starts

67°C ——————————

Release of protection

45,54LBTA

Outdoor heat exchange temperature

Compressor is OFF

68°C ——————————

The compressor frequency is decreased 7rps every 120seconds.

63°C ——————————

Release of protection

5. LOW PRESSURE PROTECTION CONTROL (For Cooling mode) *Model 45,54LBTA

5-1. Low Pressure Protection 1

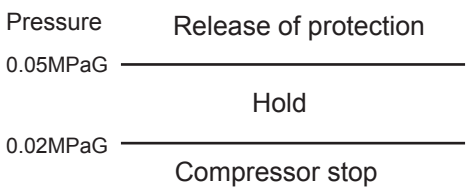
<After the compressor start-up and 1 minute has passed>

(a).The detected value of pressure sensor is 0.02MPaG or less, continues for 5 minutes, the compressor is stopped.

(b). When 7 minutes has passed and low pressure sensor detects value is more than 0.05MPaG after the protection stop by (a), the compressor restarts.

(c).When the protection (a) operates 5 times within 2 hours after the restart by (b),
the error is displayed and the compressor stops. **[Permanent stop]**

(Fig 12 : Low pressure protection 1)



5-2. Low Pressure Protection 2

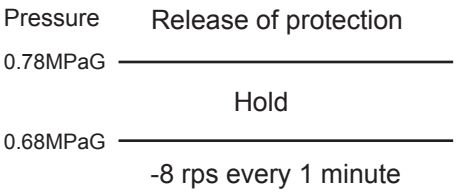
<After the compressor start-up and 10 minutes has passed>

(a).When the low pressure value becomes 0.68MPaG or less continues for 1 minute, the compressor speed -8 rps.

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

(c). When the low pressure value becomes more than 0.78MPaG, this protection is released.

(Fig 13 : Anti freezing protection)



6. INDOOR UNIT FAN MOTOR OVER TEMPERATURE PROTECTION

- When satisfy the following conditions, the protection works.
  - a) After the 90 seconds from the fan operation, detect less than 300 rpm for 10 seconds.
  - b) IPM trip protection works.
  - c) Current overload protection works.

  When detecting the above condtion, recheck the condition after 6 minutes.
  When count the twice, the protection works
- Protection contents
  Reduce the static pressure 20 Pa
  When it does not dissolve even the minimum static pressure condition, work the following operation
  - a) Fan motor error displayed
  - b) Fan stop 40 secounds
  - c) Fan stop 50 secounds

7. COMPRESSOR STOP CONTOROL

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

(Table 19 : Operation temperature of compressor stop control)

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

1-21. LOW NOISE OPERATION

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

(Table 20 : Detail of Low Noise Operation)

Low Noise mode		Outdoor fan speed (Upper / Lower) [rpm]	Compressor speed [rps]	
			Model 45	Model 54
LEVEL 1	Cooling	540/520	68	75
	Heating	570/550	75	85
LEVEL 2	Cooling	540/520	54	58
	Heating	570/550	62	68

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

Capacity priority mode

(1) Operation condition

- The function setting is set the “1” for the capacity priority mode.

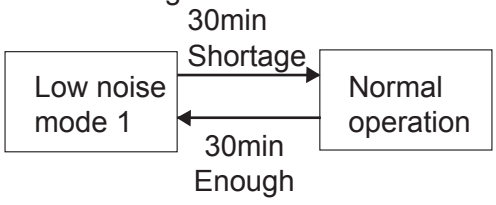
(2) Check the capacity condition

Shortage	Required compressor speed > Limited compressor speed of low noise mode
Enough	Required compressor speed ≦ Limited compressor speed of low noise mode

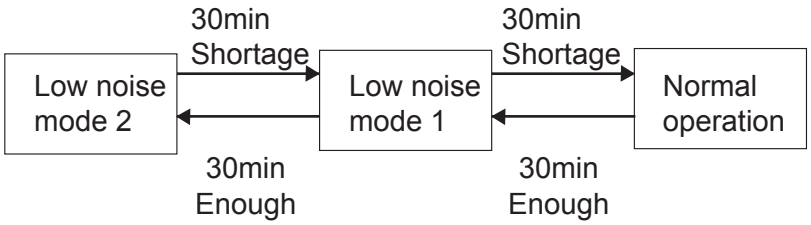
(3) Operation

- When detect the shortage capacity or enough capacity condition continuous 30 minute, the mode is upped or downed for 1 step.

Automatic switching 1
Level 1 setting



Automatic switching 2
Level 2 setting



1-22. PEAK CUT OPERATION

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

(Table 22 : Outline of Peak Cut Operation)

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

*Percentage is rated electrical power ratio.

1-23. AUTOMATIC AIRFLOW ADJUSTMENT FUNCTION

The unit automatically sets the static pressure.

- This setting can be used by the function setting 26.

The static pressure is calculated by the input current and voltage of the motor and the return air temperature.
*For the setting method, refer to the technical manual.

NOTE

Be sure to conduct this setting before any other operation. If the motor is warm or the heat exchanger is wet, false and detection may lead to incorrect adjustments.
Check if the electrical wirings and duct installations are complete.
If there is a damper installed in the system, make sure the damper is open.
Check if the air filter(optional) is attached.
If there are several inlet, outlet ports, make sure the airflow rates of each port match the designed airflow rate by adjusting the throttles.

Automatic airflow adjustment is possible by the following procedures.

1) Change Function 26 to "Automatic airflow adjustment (32)".

2) Run the air conditioner on Fan mode (High).
* For instructions on how to operate the air conditioner, refer to the operation manual of the remote controller.
Automatic During airflow ajustment, the mode will be fixed at Fan mode(High).
When this function is active, do not operate the Outdoor unit.
When the setting is performing, Test mode display: 3-Wire RC/ Maintenance dispaly: 2-Wire RC will be shown on the remote controller panelle.

3) The air conditioner will run for about 1 to 8 min. then stop automatically.
* Do not change the throttles of the inlet and outlet ports during operation.
When used in a Group control system, the setting will take about 10 min.
When the Error code 15.4 (Automatic Air flow Adjustment Error) appears, the setting is not completed.
Refer to the Trouble shooting Error code15

4) Turn the air conditioner off and on again.

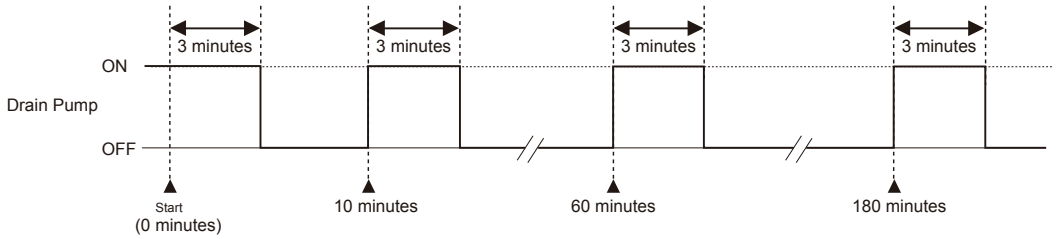
5) Check the setting value of Function 26 and take note of the setting value.
* If the setting value has not changed, repeat the procedure from step 2.

1-24. DRAIN PUMP OPERATION

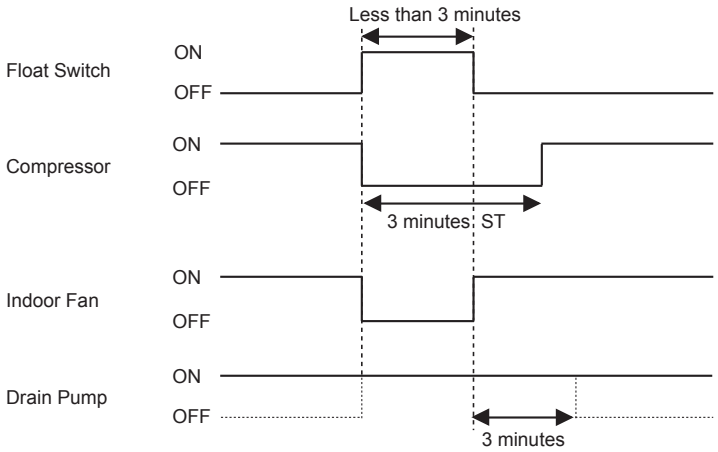
· During Cooling / Dry mode

1. When the compressor starts, the drain pump starts simultaneously.
2. The drain pump operates continuously for 3 minutes after the compressor is turned off as show in Fig15.
3. When the compressor stops by the "Anti- freezing protection", the drain pump is turned off in 1 hour after the compressor stops.
4. When the water level in the drain pan rises up and then the float switch functions:
   ① The compressor, indoor and outdoor fan motor operation are stopped.
   ② Drain pump operates continuously for 3 minutes after the float switch is turned off. (Almost condensing water may be drained)
   ③ The indoor unit fan motor operates after the float switch is turned off.
5. When the float switch turns ON continuously for 3 minutes, "FAILURE INDICATION" operates. (It is necessary to turn off power for release it.)
6. When the float switch turns OFF less than 3 minutes, the unit starts Cooling operation.

(Fig 15 : Detail of Drain Pump Operation)

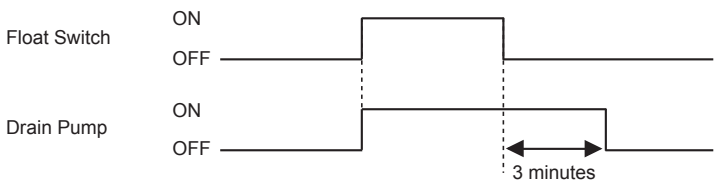


<Float Switch turns OFF less than 3 minutes>



· During Heating / Fan mode / Stop operation

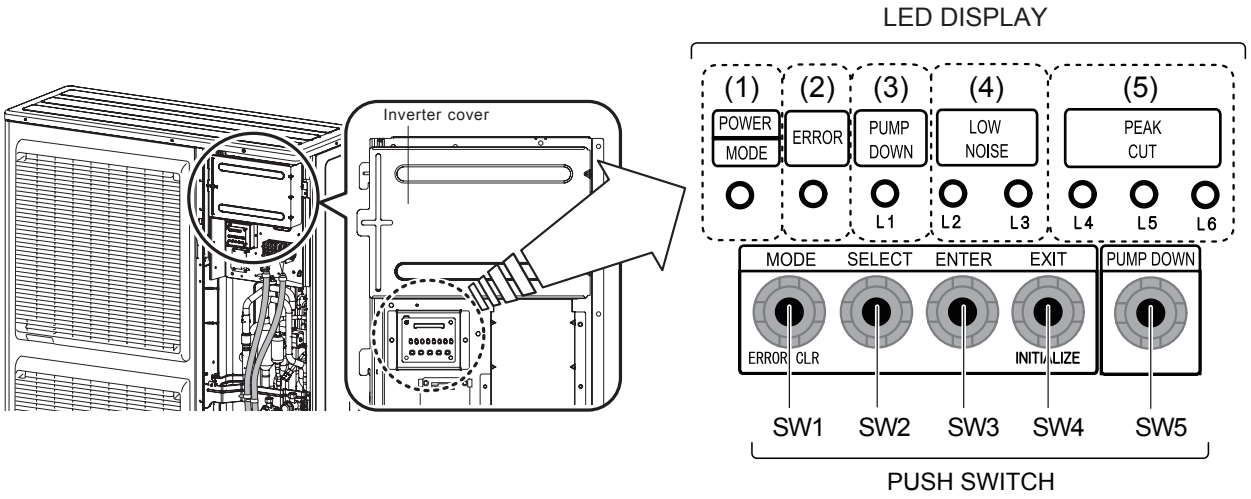
1.When the water level in the drain pan rises up and then the float switch functions:
   ① Drain pump operates continuously for 3 minutes after the float switch is turned off. (Almost condensing water may be drained)
2. When the float switch turns ON continuously for 3 minutes, "FAILURE INDICATION" operates. Thereafter, even if the float switch turns OFF, the "FAILURE INDICATION" is not released. (It is necessary to turn off power for release it.)



1-25. DESCRIPTION OF DISPLAY UNIT For Model 45,54

1-25-1 Layout of Display Unit

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



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

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

1-25-2 Display mode

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

(Table :23 Procedure for Present Value) ○ : Light OFF ● : Light ON ◑ : Blinking ◆1 : 1 Time Blinking

Procedure	Operation	Power / Mode	Error	L1	L2	L3	L4	L5	L6
1	During status display, press the MODE SWITCH 1 time. (Status display : Outdoor unit is stopping and no error)	◆1	○	○	○	○	○	○	○
2	When the POWER / MODE LED blinking 1 time, press the ENTER SWITCH.	◆1	○	○	○	◑	○	○	○
3	Press the SELECT SWITCH and adjust to DISPLAY ITEM (from L1 to L3) that you want to confirm. (Refer to Table : 23)	◆1	○	○	◑	○	○	○	○
4	Press the ENTER SWITCH. (Data is displayed by lighting LED. Refer to Table : 24)	◆1	○	○	●	○	DATA		
5	Selecting display items can be done by pressing the SELECT SWITCH. (Return to Procedure 3)	◆1	○	○	◑	○	○	○	○
	When the EXIT SWITCH is pressed, this mode ends and returns to the status display.	●	○	○	○	○	○	○	○

(Table :24 Display pattern) ○ : Light OFF ● : Light ON ◑ : Blinking ◆n : n Time Blinking

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

(Table 25 : Detail of LED Display Data)

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

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

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

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

1-25-3 Error history mode

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

(Table : 26 Procedure for History Mode) ○ : Light OFF ● : Light ON ◑ : Blinking ◆2 : 2 Times Blinking ◆**n** : **n** Times Blinking

Procedure	Operation	Power Mode	Error	L1	L2	L3	L4	L5	L6
1	During status display, press the MODE SWITCH 2 times. (Status display : Outdoor unit is stopping and no error)	◆2	○	○	○	○	○	○	○
2	When the POWER / MODE LED blinking 2 times, press the ENTER SWITCH.	◆2	○	○	○	◑	○	○	○
3	Press the SELECT SWITCH and adjust to DISPLAY ITEM (from L1 to L3) that you want to confirm. (Refer to Table : 27)	◆2	○	○	◑	○	○	○	○
4	Press the ENTER SWITCH, Error code is displayed by lighting LED. (Refer to TROUBLESHOOTING)	◆2	●	◆n	◆n	DATA			
5	Selecting display items can be done by pressingthe SELECT SWITCH. (Return to Procedure 3)	◆2	○	○	◑	○	○	○	○
	When the EXIT SWITCH is pressed, this mode ends and returns to the status display.	●	○	○	○	○	○	○	○

(Table :27 Display pattern) ○ : Light OFF ● : Light ON ◑ : Blinking ◆n : n Time Blinking

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

Refrigerant
R410A

DUCT type
INVERTER

2 . TROUBLE SHOOTING

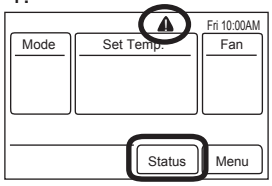
2 ERROR DISPLAY

2-1 WIRED REMOTE CONTROLLER DISPLAY

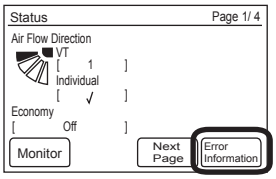
1. Check the error

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

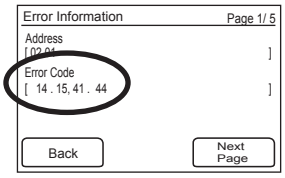
1.



2.



3.



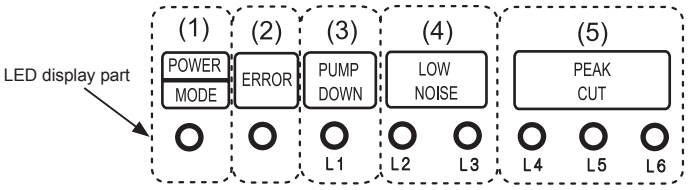
For the details of the indoor unit or outdoor unit error , refer to the error codes in each installation manual

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

Error Contents	Error Code	Trouble shooting
Active filter voltage error	64	19
IPM Error	65	20
Discharge Thermistor Error	71	21
Compressor Thermistor Error	72	22
Heat Ex. Liquid Outlet Thermistor Error	73	23
Outdoor Thermistor Error	74	24
Heat Sink Thermistor Error	77	25
Current sensor Error	84	26
Pressure sensor Error	86	27
Over Current Error	94	28
Compressor Control Error	95	29
Outdoor Unit Fan Motor 1 Error	97	30
Outdoor Unit Fan Motor 2 Error	98	31
4-way Valve Error	99	32
Discharge Temp. Error	A1	33
Compressor Temp. Error	A3	34
Low Pressure Error	A5	35

2-1-2 OUTDOOR UNIT DISPLAY For Model 45,54

You can determine the operating status by the lighting up and blinking of the LED lamp.



Display when an error occurs.

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

Sign "○": Lights off, "●": Lights on

(1) Check that the "ERROR" LED blinks, then press the "ENTER" button once.

(2) For details, refer to the following table.

Check that the "ERROR" LED blinks, then press the [Enter] button once.

For details, refer to the following table. ● : Light OFF ● : Light ON ◆2 : 2Times Blinking ◆1 ~ ◆15 : 1~ 15 Times Blinking

Error Contents	LED DISPLAY								Trouble shooting
	POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT			
	MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)	
Serial Communication Error	◆2	●	◆1	◆1	○	○	●	●	1,2
Indoor Unit Error	◆2	●	◆5	◆15	○	○	○	●	1-16
Inverter Error	◆2	●	◆6	◆3	○	○	○	●	18
IPM Error	◆2	●	◆6	◆5	○	○	●	●	20
Discharge Thermistor Error	◆2	●	◆7	◆1	○	○	○	●	21
Compressor Thermistor Error	◆2	●	◆7	◆2	○	○	○	●	22
Heat Ex. Liquid Outlet Thermistor Error	◆2	●	◆7	◆3	○	○	●	●	23
Outdoor Thermistor Error	◆2	●	◆7	◆4	○	○	○	●	24
Heat Sink Thermistor Error	◆2	●	◆7	◆7	○	○	○	●	25
Current sensor Error	◆2	●	◆8	◆4	○	○	○	●	26
Pressure sensor Error	◆2	●	◆8	◆6	○	●	○	○	27
Over Current Error	◆2	●	◆9	◆4	○	○	○	●	28
Compressor Control Error	◆2	●	◆9	◆5	○	○	○	●	29
Outdoor Unit Fan Motor 1 Error	◆2	●	◆9	◆7	○	○	●	●	30
Outdoor Unit Fan Motor 2 Error	◆2	●	◆9	◆8	○	○	●	●	31
4-way Valve Error	◆2	●	◆9	◆9	○	○	○	●	32
Discharge Temp. Error	◆2	●	◆10	◆1	○	○	○	●	33
Compressor Temp. Error	◆2	●	◆10	◆3	○	○	○	●	34
Low Pressure Error	◆2	●	◆10	◆5	○	○	○	●	35

2-2 TROUBLE SHOOTING WITH ERROR CODE

Trouble shooting 1
OUTDOOR UNIT Error Method:
Serial Communication Error
(Serial Reverse Transfer Error)

Indicate or Display:

Error code : 11

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Outdoor unit Main PCB
Outdoor unit Fan motor

Detective details:

When the indoor unit cannot receive the serial signal from Outdoor unit more than 2minutes after power ON, or the indoor unit cannot receive the serial signal more than 15seconds during normal operation.

Forecast of Cause:

1. Connection failure 2. External cause 3. Main PCB failure 4. Active filter module failure
5. Transistor PCB (IPM) failure 6. Filter PCB failure 7. Outdoor unit Fan motor failure

Check Point 1-1 : Reset the power and operate

- Does error indication reappear?

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

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

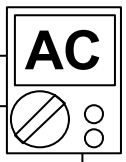
YES

Check Point 2 : Check connection

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

OK

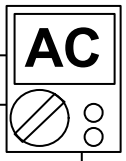
Check Point 3 : Check the voltage of power supply



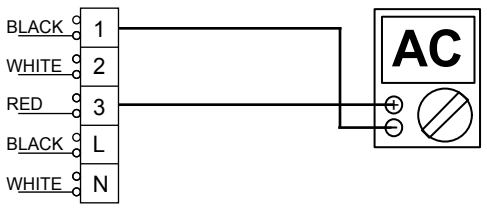
- Check the voltage of power supply
  >> Check if AC198V(AC220V-10%) - 264V(AC240V+10%) appears at outdoor unit terminal L - N.

OK

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



- Check serial signal (Reverse transfer signal)
  >> Check if indicated value swings between AC90V and AC270V at outdoor unit terminal 1 - 3.
  >> If it is abnormal, Check the parts as follows.
  - Outdoor unit fan motor (PARTS INFORMATION 5)
  - Active filter module (PARTS INFORMATION 6)
  - Transistor PCB (IPM) (PARTS INFORMATION 7)
  - Filter PCB (Check the wire of CN110)
  >> If Outdoor fan motor is abnormal, replace Outdoor unit fan motor and Main PCB.
  >> If Active filter module or IPM is abnormal, replace it.
  >> If the parts are normal, replace Main PCB.



Trouble shooting 2
INDOOR UNIT Error Method:
Serial Communication Error
(Serial Forward Transfer Error)

Indicate or Display:

Error code : 11

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆1	◆1	○	○	●	●
◆2	●	◆1	◆1	○	●	○	○

Detective Actuators:

Indoor unit Controller PCB

Detective details:

When the outdoor unit cannot properly receive the serial signal from indoor unit for 10 seconds or more.

Forecast of Cause:

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

Check Point 1-1 : Reset the power and operate

- Does error indication reappear?

NO

YES

Check Point 2 : Check connection

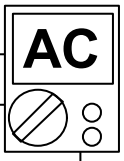
- Check any loose or removed connection line of between indoor unit and outdoor unit.
  >> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.
- Check connection condition in control unit. (If there is loose connector, open cable or mis-wiring)

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

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

OK

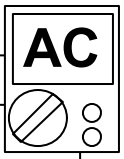
Check Point 3 : Check the voltage of power supply



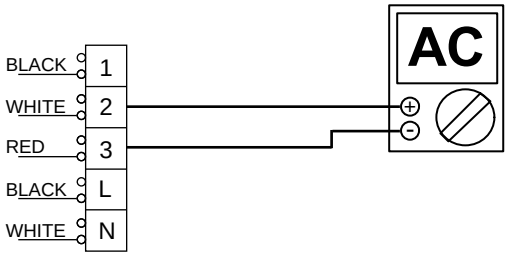
- Check the voltage of power supply
  >> Check if AC198V(AC220V-10%) - 268V(AC240V+10%) appears at outdoor unit terminal L - N.

OK

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



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



Trouble shooting 3
INDOOR UNIT Error Method:

Wired Remote Controller
Communication Error

Indicate or Display:

Error code : 12

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit Controller PCB
Wired Remote Controller

Detective details:

When the indoor unit cannot properly receive the signal from Wired Remote Controller for 1 minute or more.

Forecast of Cause:

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

Check Point 1 : Check the connection of terminal

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

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

OK

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

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

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

Check Point 2 : Wire installation Wrong RCgroup setting

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

Check Point 2-1 : Check Indoor unit controller PCB

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

Trouble shooting 4
INDOOR UNIT Error Method:

Automatic Air flow Adjustment Error

Indicate or Display:

Error code : 15

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit controller PCB

Detective details:

- On automatic airflow adjustment operation, when the fan speed other than 0rpm is detected at the 0rpm operation.
- On automatic airflow adjustment operation, when the fan speed is not reach the target speed, after 2 minutes from the fan started.
- On automatic airflow adjustment operation operation, when the 750W of input power is detected.

Forecast of Cause:

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

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check ambient temp. around motor

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

OK

Check Point 3 : Check Indoor unit fan motor

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

OK

Check Point 4 : Replace Controller PCB

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

Trouble shooting 5
INDOOR UNIT Error Method:

External communication error

Indicate or Display:

Error code : 18

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

External communication error

Detective details:

After receiving a signal from the external I/O PCB,
the same a signal has not been received for 15sec

Forecast of Cause :

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

Check Point 1 : Check the connection

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

OK

Check Point 2: Replace external I/O PCB

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

OK

Check Point 3: Replace Controller PCB

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

Trouble shooting 6
INDOOR UNIT Error Method:

Combination error

Indicate or Display:

Error code : 23

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit

Detective details:

1. When the outdoor unit type is multi.

Forecast of Cause:

1. The selection of indoor units is incorrect

Check Point 1 : Check the type of indoor unit

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

OK

Check Point 2 : Replace Main PCB

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

Trouble shooting 7
INDOOR UNIT Error Method:

Indoor unit address setting error

Indicate or Display:

Error code : 26

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Wired remote controller (2-Wire)
Indoor unit Controller PCB circuit

Detective details:

When the address number set by auto setting and manual setting are mixed in one RC group.
When the duplicated address number exists in one RC group.

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

Check Point 1 :Wire installation

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

Check Point 2 : Wrong RCgroup setting

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

Check Point 3 : Check Indoor unit controller PCB

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

Trouble shooting 8 **INDOOR UNIT Error Method:** **Connection unit number error (Indoor unit in Wired remote controller system)**	**Indicate or Display:** Error code : 29 Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

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

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

Check Point 1 : Wire installation

- ☐ Wrong number of connecting indoor unit

↓

Check Point 2 : Check Indoor unit controller PCB

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

Trouble shooting 9
INDOOR UNIT Error Method:

Indoor unit PCB model information error

Indicate or Display:

Error code : 32

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit Controller PCB

Detective details:

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

Forecast of Cause:

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

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO

YES

Check Point 2 :
Check Indoor unit electric components

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

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

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

Check Point 3 : Replace Controller PCB

▶ **Change Controller PCB.**

Note : EEPROM

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

Trouble shooting 10
INDOOR UNIT Error Method:

Indoor unit motor electricity consumption detection error

Indicate or Display:

Error code : 33

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit motor electricity consumption detection error

Detective details:

When the voltage value or the current value of the motor go beyond the limits.

Forecast of Cause:

1. Fan motor failure 2. Main PCB failure

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check ambient temp. around motor

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

OK

Check Point 3 : Check Indoor unit fan motor

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

OK

Check Point 4 : Replace Power Supply PCB

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

Trouble shooting 11 **INDOOR UNIT Error Method:** Indoor unit power supply error for fan motor	**Indicate or Display:** Error code : 39 Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

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

Forecast of Cause :

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

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

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

OK

Check Point 2 : Check connection of Connector

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

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

OK

Check Point 3 : Replace Power supply PCB

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

Trouble shooting 12 **INDOOR UNIT Error Method:** Indoor unit Communication circuit (wired remote controller) error	**Indicate or Display:** Error code : 3A Outdoor unit : Model 45.54

POWER / MODE	ERROR	PUMP DOWN (L1)	LOW NOISE (L2)	LOW NOISE (L3)	PEAK CUT (L4)	PEAK CUT (L5)	PEAK CUT (L6)
◆2	●	◆5	◆15	○	○	○	●

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

Forecast of Cause : 1.Communication PCB defective
2. Indoor unit controller PCB defective

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

OK

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

OK

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

Trouble shooting 13
INDOOR UNIT Error Method:

Indoor Room Thermistor Error

Indicate or Display:

Error code : 41

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor Unit Controller PCB Circuit
Indoor Temperature Thermistor

Detective details:

Indoor unit thermistor is open or short is detected always.

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

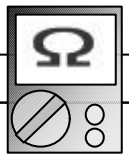
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics(Rough value)

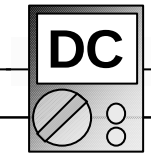
Temperature (°C)	0	5	10	15	20	25	30	35
Resistance value (kΩ)	33.6	25.9	20.2	15.8	12.5	10.0	8.0	6.5

Temperature (°C)	40	45	50
Resistance value (kΩ)	5.3	4.35	3.59

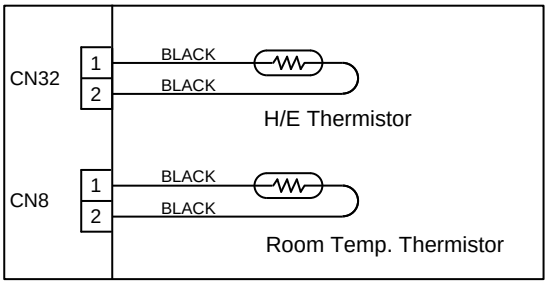
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

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



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



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

Trouble shooting 14
INDOOR UNIT Error Method:

Indoor Heat Ex. Thermistor Error

Indicate or Display:

Error code : 42

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor Unit Controller PCB
Heat Exchanger (MID) Thermistor

Detective details:

Indoor unit thermistor is open or short is detected always.

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

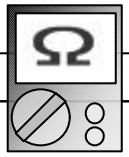
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics(Rough value)

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

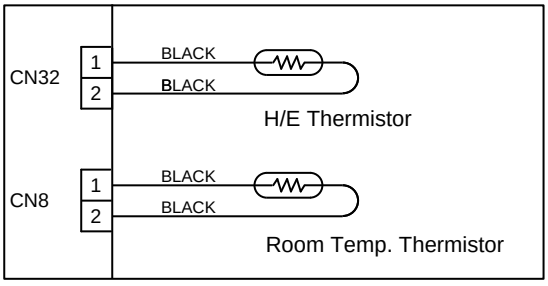
Temperature (°C)	40	45	50
Resistance value (kΩ)	25.6	20.8	17.1

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

OK

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

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



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

Trouble shooting 15
INDOOR UNIT Error Method:

Indoor Unit Fan Motor1 Error

Indicate or Display:

Error code : 51

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor unit Power Supply PCB
Indoor unit fan motor

Detective details:

When the fan motor speed is less than 1/3 of the target fan speed for 56 seconds.

When detect the 0 rpm for 56 seconds after fan motor started.

Forecast of Cause:

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

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check ambient temp. around motor

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

OK

Check Point 3 : Check Indoor unit fan motor

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

OK

Check Point 4 : Replace Power Supply PCB

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

Trouble shooting 15
INDOOR UNIT Error Method:
Drain pump Error

Indicate or Display:

Error code : 53

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆5	◆15	○	○	○	●

Detective Actuators:

Indoor Unit Controller PCB Circuit
Float Switch

Detective details:

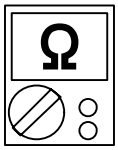
When Float switch is ON for more than 3 minutes.

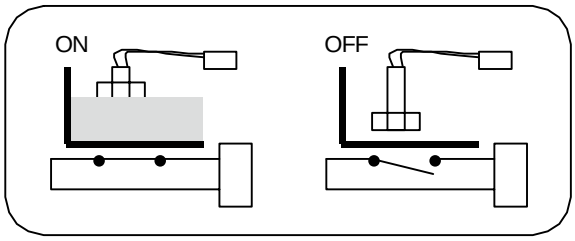
Forecast of Cause : 1. Float switch failure 2. Shorted connector/wire 3. Controller PCB failure
4. Drain pump failure 5. Hose clogging

Check Point 1 : Check Float Switch

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

>>If Float switch is abnormal, replace it.





OK

Check Point 2 : Check Connector and Wire

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

>>Replace Float switch if the wire is abnormal

OK

Check Point 3 : Check Drain Hose

- ☐ Check Drain Hose .

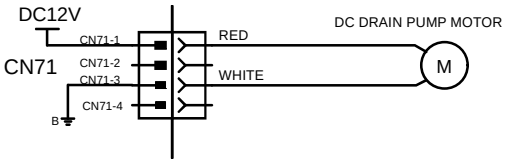
>>If there is Hose clogging. Please clear the clog.

OK

Check Point 4 : Check Controller PCB and Drain Pump

- ☐ Check Drain Pump.

If drain pump is not run on the working condition, check the voltage of the CN71 on the controller PCB.



Measurement result
12V : Replace the Drain Pump
Other than 12V : Replace the controller PCB

Trouble shooting 17 **OUTDOOR UNIT Error Method:** **Outdoor unit main PCB model information error**	**Indicate or Display:** Error code : 62 Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆6	◆2	○	○	○	●

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

Forecast of Cause:

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

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO

YES

Check Point 2 : Replace Main PCB

▶ **Change Main PCB.**

Check Point 1-2 : Check external cause

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

Trouble shooting 18
OUTDOOR UNIT Error Method:
Inverter Error

Indicate or Display:

Error code : 63

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆6	◆3	○	○	○	●

Detective Actuators:

Transistor PCB

Detective details:

- Error information received from Transistor PCB

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

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

Error displayed again?

NO

Check Point 1-2 : External cause

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

YES

Check Point 2 : Check the wiring (Power supply to Filter PCB to Inverter PCB)

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

OK

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

- ☐ Replace Filter PCB and Inverter PCB.

Trouble shooting 19 **OUTDOOR UNIT Error Method:** **Active filter voltage error**	**Indicate or Display:** Error code : 64 **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Active filter module Transistor PCB	① When inverter input DC voltage is higher than 430V or lower than 110V. ② When a momentary power cut off occurred on low voltage

Forecast of Cause :

1. External cause 2. Connector connection failure 3. Main PCB failure 4. Active filter module failure
5. Transistor PCB failure

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

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

OK

Check Point 2 : Check connection of Connector

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

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

OK

Check Point 3 : Check Active filter module

- Check Active filter module.

>>If Active filter module is abnormal, replace it.

OK

Check Point 4 : Check Transistor PCB

- Check Transistor PCB

>>If Transistor PCB is abnormal, replace it.

OK

Check Point 5 : Replace Main PCB

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

Trouble shooting 20
OUTDOOR UNIT Error Method:

IPM Error

Indicate or Display:

Error code : 65

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆6	◆5	○	○	●	●

Detective Actuators:

Outdoor unit Main PCB
Compressor
Transistor PCB

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
6. Transistor 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 29,30)

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

OK

Check Point 4 : Check Compressor

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

OK

Check Point 5 : Check Transistor PCB

- Check Transistor PCB

>>If Transistor PCB is abnormal, replace it.

OK

Check Point 6 : Replace Main PCB

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

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

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆7	◆1	○	○	○	●

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

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

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

Check Point 2 : Check the thermistor

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

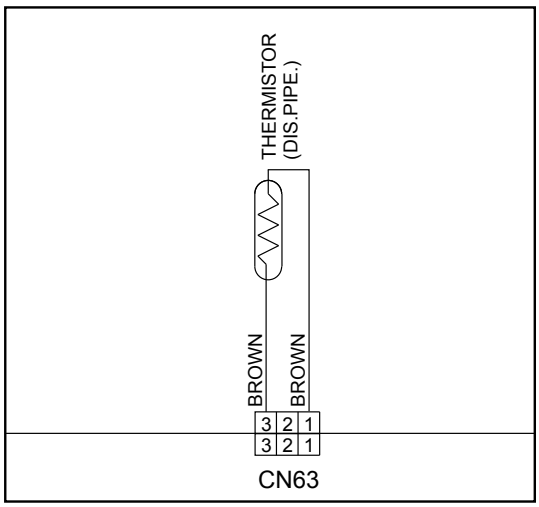
OK

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

DC

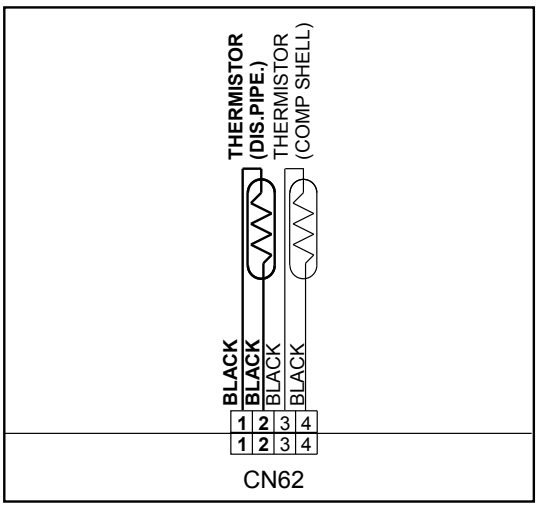
- ☐ Main PCB 30/36(CN63:1-2) 45/54(CN62:1-2) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.

[30/ 36]



Discharge temperature thermistor (CN63:1-3)

[45/ 54]



Discharge temperature thermistor (CN62:1-2)

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

Trouble shooting 22 **OUTDOOR UNIT Error Method:** **Compressor Thermistor Error**	**Indicate or Display:** Error code : 72 Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆7	◆2	○	○	○	●

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

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

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

Check Point 2 : Check the thermistor

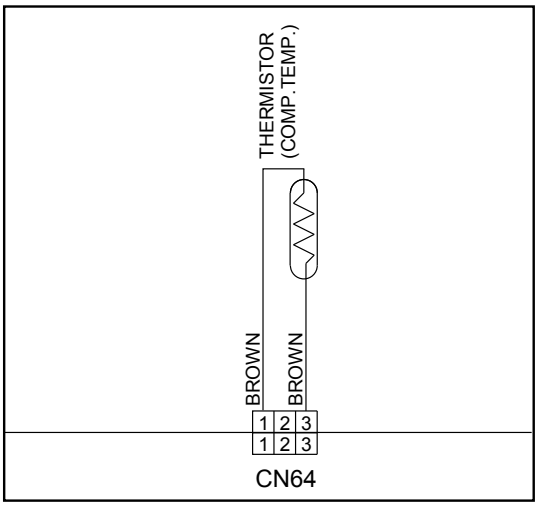
- ☐ Thermistor characteristics check (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

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

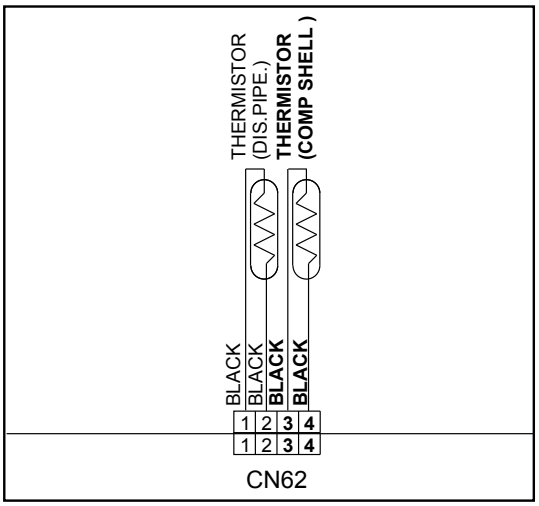
- ☐ Main PCB 30/36(CN64:1-3) 45/54(CN62:3-4) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.

[30/ 36]



Compressor temperature thermistor(CN64:1-3)

[45/ 54]



Compressor temperature thermistor(CN62:3-4)

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

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

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆7	◆3	○	○	●	○
◆2	●	◆7	◆3	○	○	●	●

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

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

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

Check Point 2 : Check the thermistor

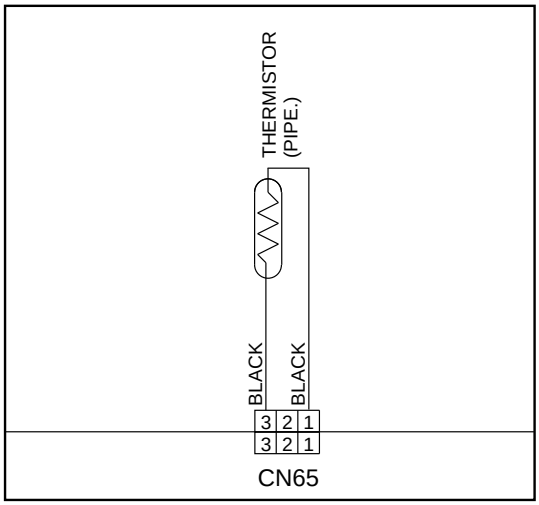
- ☐ Thermistor characteristics check (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

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

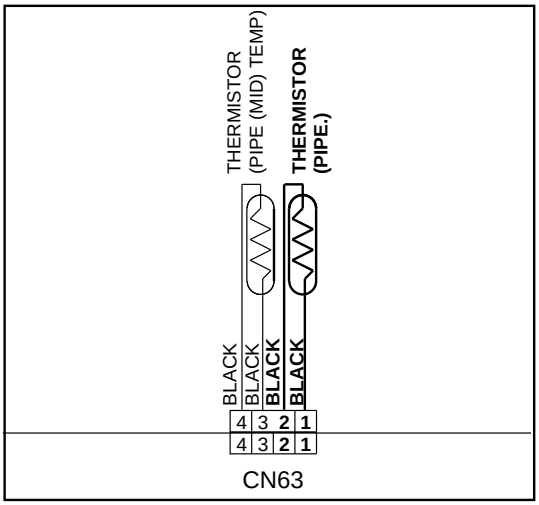
- ☐ Main PCB 30/36(CN65:1-3) 45/54(CN63:1-2) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.

[30/ 36]



Compressor temperature thermistor(CN65:1-3)

[45/54]



Compressor temperature thermistor(CN63:1-2)

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

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

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆7	◆4	○	○	○	●

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

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

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

Check Point 2: Check the thermistor

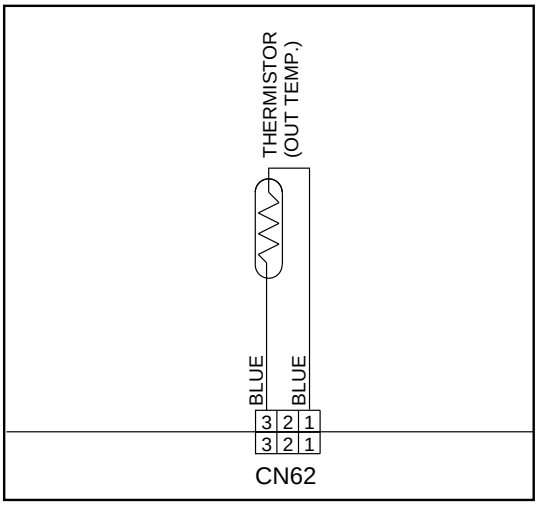
- ☐ Thermistor characteristics check (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 8".

OK

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

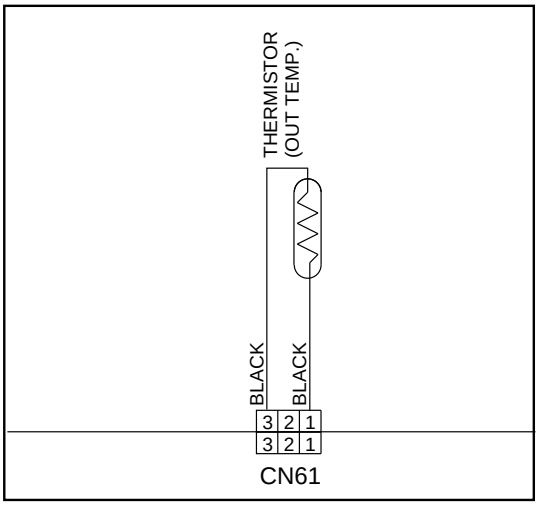
- ☐ Main PCB 30/36(CN62:1-3) 45/56(CN61:1-3) voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.

[30/36]



Compressor temperature thermistor(CN62:1-3)

[45/ 54]



Compressor temperature thermistor(CN61:1-3)

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

Trouble shooting 25
OUTDOOR UNIT Error Method:

Heat Sink Thermistor Error

Indicate or Display:

Error code : 77

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆7	◆7	○	○	○	●

Detective Actuators:

Outdoor unit Main PCB

Detective details:

- Heat sink temperature thermistor (Built-in IPM) open/short detected

Forecast of Cause : 1. Main PCB failure

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

Attention!!

This unit does not have a heat sink themistor

In this case, replace Main PCB

Trouble shooting 26
OUTDOOR UNIT Error Method:

Current Sensor Error

Indicate or Display:

Error code : 84

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆8	◆4	○	○	○	●

Detective Actuators:

Outdoor unit Main PCB

Detective details:

When Input Current Sensor has detected 0A, while Inverter Compressor is operating at higher than 56rps, after 1minute upon starting the Compressor. (Except during the defrost operation)

Forecast of Cause :

1. Defective connection of electric components
2. External cause
3. Filter PCB failure
4. Main PCB failure

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO → Check Point 1-2 :
Check external cause at Indoor and Outdoor (Voltage drop or Noise)

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

YES ↓

Check Point 2 :
Check connections of Outdoor Unit Electrical Components

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

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

OK ↓

Check Point 3 : Replace Filter PCB

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

OK ↓

Check Point 4 : Replace Main PCB

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

Trouble shooting 27 **OUTDOOR UNIT Error Method:** **Pressure Sencer Error**	**Indicate or Display:** Error code : 86

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆8	◆6	○	●	○	○

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

Forecast of Cause :
1. High pressure switch connector disconnection, open
2. High pressure switch characteristics failure3. Main PCB failure

Check Point 1 : Check the high pressure switch connection state

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

OK

Check Point 2 : Check the high pressure switch characteristics

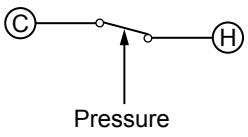
- ☐ Switch characteristics check
  * For the characteristics of high pressure switch, refer to below.

OK

Check Point 3 : Replace Main PCB

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

・Type of contact



・Characteristics of pressure switch (30/36:CN90,45/54:CN101)

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

Trouble shooting 28
OUTDOOR UNIT Error Method:

Over Current Error

Indicate or Display:

Error code : 94

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆9	◆4	○	○	○	●

Detective Actuators:

Outdoor unit Main PCB
Compressor
Transistor PCB

Detective details:

- "**Protection stop** by overcurrent generation after inverter compressor start processing completed" generated consecutively 10 times.
  * The number of generations is reset if the start-up of the compressor succeeds.

Forecast of Cause :

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

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

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

OK

Check Point 2: Check Transistor PCB (IPM)

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

>> If IPM is abnormal, replace Transistor PCB.

OK

Check Point 3: Replace Main PCB

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

OK

Check Point 4: Replace Compressor

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

Trouble shooting 29
OUTDOOR UNIT Error Method:

Compressor Control Error

Indicate or Display:

Error code : 95

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆9	◆5	○	○	○	●

Detective Actuators:

Outdoor unit Main PCB
Compressor
Transistor PCB

Detective details:

① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90°, the compressor stops.
② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again.
③ If ① and ②repeats 5 times, the compressor stops permanently.

Forecast of Cause :

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

Check Point 1 : Check Noise from Compressor

・Turn on Power and check operation noise.

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

OK

Check Point 2 : Check connection of around the Compressor components

For Compressor Terminal, Main PCB

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

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

OK

Check Point 3: Check Transistor PCB (IPM)

・Check IPM. **(PARTS INFORMATION 7)**

>> If IPM is abnormal, replace Transistor PCB.

OK

Check Point 4: Replace Main PCB

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

OK

Check Point 5: Replace Compressor

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

Trouble shooting 30
OUTDOOR UNIT Error Method:

Outdoor Unit Fan Motor 1 Error

Indicate or Display:

Error code : 97

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆9	◆7	○	○	●	●

Detective Actuators:

Outdoor unit Main PCB
Outdoor unit fan motor

Detective details:

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

Forecast of Cause:

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

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check ambient temp. around motor

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

OK

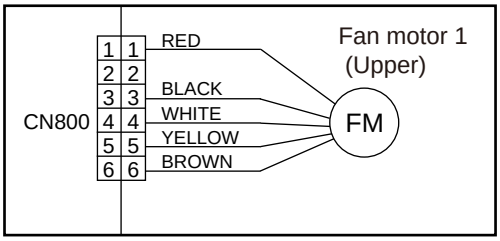
Check Point 3 : Check Outdoor unit fan motor

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

OK

Check Point 4 : Check Output Voltage of Main PCB

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



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

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

Trouble shooting 31
OUTDOOR UNIT Error Method:
Outdoor Unit Fan Motor 2 Error
For Model 45/54

Indicate or Display:

Error code : 98

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆9	◆8	○	○	●	●

Detective Actuators:

Outdoor unit Main PCB
Outdoor unit fan motor

Detective details:

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

Forecast of Cause:

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

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check ambient temp. around motor

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

OK

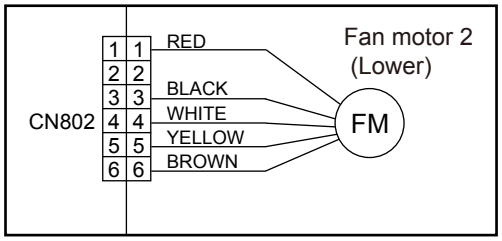
Check Point 3 : Check Outdoor unit fan motor

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

OK

Check Point 4 : Check Output Voltage of Main PCB

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



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

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

Trouble shooting 32
OUTDOOR UNIT Error Method:
4-Way Valve Error

Indicate or Display:

Error code : 99

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆9	◆9	○	○	○	●

Detective Actuators:

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

Detective details:

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

- Cooling or Dry operation
  [Indoor heat exchanger temp.] - [Room temp.] > 20°C
- Heating operation
  [indoor heat exchanger temp.] - [Room temp.] < -14°C

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

Forecast of Cause :

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

Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Check thermistor of Indoor unit

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

>> Check characteristics of thermistor, (Refer to Trouble shooting 12,13), If defective, replace the thermistor.

OK

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

[Solenoid coil]

- Remove 30/36:CN500,45/54:CN6 from PCB and check the resistance value of coil.
  Resistance value is about 1.7kΩ

>> If it is Open or abnormal resistance value, replace Solenoid Coil.

[4-way valve]

- Check each piping temperature,
  and the location of the valve by the temperature difference.

>> If the value location is not proper, replace 4-way valve.

OK

Check Point 4 : Replace Main PCB

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

Trouble shooting 33
OUTDOOR UNIT Error Method:
Discharge Temp. Error

Indicate or Display:

Error code : A1

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆10	◆1	○	○	○	●

Detective Actuators:

Discharge temperature thermistor

Detective details:

- "Protection stop by "discharge temperature ≧115°C during compressor operation"" generated 2 times within 24 hours.

Forecast of Cause :

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

<Cooling operation>

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

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

OK

Check Point 2 : Check the EEV, strainer

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

OK

Check Point 3 : Check the outdoor unit fan,heat exchanger

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

OK

Check Point 4 : Check the discharge thermistor

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

OK

Check Point 5 : Check the refrigerant amount

- ☐ Leak check

<Heating operation>

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

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

OK

Check Point 2 : Check the EEV, strainer

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

OK

Trouble shooting 34 **OUTDOOR UNIT Error Method:** **Compressor Temp. Error**	**Indicate or Display:** Error code : A3

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆10	◆3	○	○	○	●

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

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

<Cooling operation>

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

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

OK

Check Point 2 : Check the EEV, strainer

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

OK

Check Point 3 : Outdoor unit fan, heat exchanger check

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

OK

Check Point 4 : Check the compressor temperature thermistor

- ☐ Compressor temperature thermistor characteristics check (Check by disconnecting thermistor from PCB)
  * For the characteristics of the thermistor, refer to the "Service Parts Information 8.

OK

Check Point 5 : Check the refrigerant amount

- ☐ Leak check

<Heating operation>

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

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

OK

Check Point 2 : Check the EEV, strainer

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

OK

Trouble shooting 35
OUTDOOR UNIT Error Method:

Low Pressure Error

Indicate or Display:

Error code : A5

Outdoor unit : Model 45.54

POWER	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
MODE		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
◆2	●	◆10	◆5	○	○	○	●

Detective Actuators:

Pressure sensor

Detective details:

- "Protection stop by suction pressure≦ 0.02MPaG continued for 5 minutes" repeats 5 times within 2 hours.

Forecast of Cause :

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

<Cooling operation>

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

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

OK

strainer clogging

- ☐ Indoor unit EEV operation check
- ☐ Strainer not clogged?

OK

Check Point 5 : Check the solenoid valve (SV1)

- ☐ Solenoid valve operation check

OK

Check Point 6 : Check the suction pressure sensor

- ☐ Pressure sensor characteristics check
  * For the characteristics of the suction pressure sensor (PARTS INFORMATION 9)

OK

Check Point 7 : Check the refrigerant amount

- ☐ Leak check

<Heating operation>

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

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

OK

Check Point 2 : Check the outdoor unit ambient temperature

- ☐ Outdoor ambient temperature lower than operating range?

OK

Check Point 3 : Check the outdoor unit fan operation, heat exchanger

- ☐ No foreign object in air passage?
- ☐ Heat exchange fins clogged
- ☐ Fan rotates?
- ☐ Outdoor unit fan motor check

OK

Check Point 4 : Check the outdoor unit EEV, strainer clogging

- ☐ Outdoor unit EEV operation check
- ☐ Strainer not clogged?
  Refer to "Service Parts Information 3"

Attention!!

30/36 units do not have the pressure sensor.

In this case, replace the Main PCB.

2-3 TROUBLE SHOOTING WITH NO ERROR CODE

Trouble shooting 36

Indoor Unit - No Power

Forecast of Cause:

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

Check Point 1 : Check Installation Condition

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

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

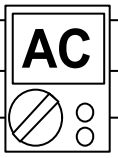
OK

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

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

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

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

NO

YES

- Check Fuse in Filter PCB.

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

- Check Varistor in Filter PCB.

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

OK

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

Trouble shooting 37

Outdoor Unit - No Power

Forecast of Cause:

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

Check Point 1 : Check Installation Condition

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

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

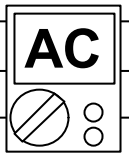
OK

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

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

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

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

NO

YES

- Check Fuse in Main PCB.

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

YES

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

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

OK

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

Trouble shooting 38

No Operation (Power is ON)

Forecast of Cause:

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

Check Point 1 : Check indoor and outdoor installation condition

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

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

OK

Turn off Power and check/ correct followings.

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

OK

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

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

OK

Check Point 3 : Check Wired Remote Controller and Controller PCB

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

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

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

Trouble shooting 39

No Cooling / No Heating

Forecast of Cause:

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

Check Point 1 : Check Indoor Unit

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

OK

Check Point 2 : Check Outdoor Unit Operation

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

OK

Check Point 3 : Check Site Condition

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

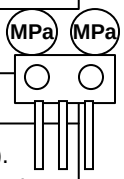
OK

Check Point 4 :
Check Indoor/ Outdoor Installation Condition

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

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

OK



Check Point 5 : Check Refrigeration Cycle

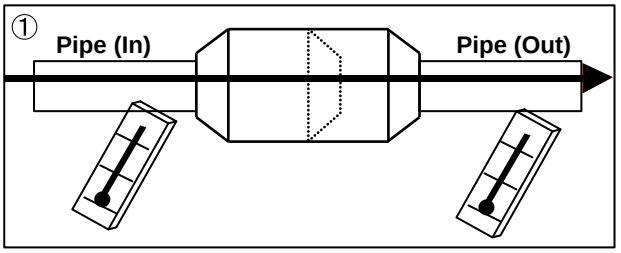
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

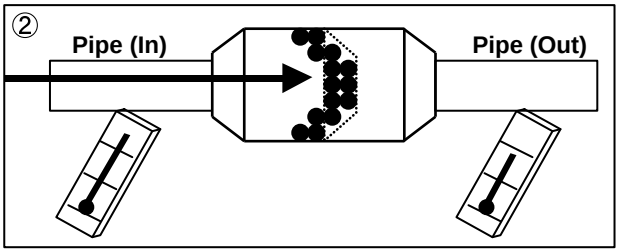
>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.

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

Attention

Strainer normally does not have temperature difference between inlet and outlet as shown in① , but if there is a difference like shown in② , there is a possibility of inside clogged. In this case, replace Strainer.





Trouble shooting 40

Abnormal Noise

Forecast of Cause :

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

Diagnosis method when Abnormal Noise is occurred

- Abnormal noise is coming from Indoor Unit. (Check and correct followings)
  - Is Main Unit installed in stable condition?
  - Is the installation of Air suction grille and front panel normal?

OK

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

- Abnormal noise is coming from Outdoor Unit. (Check and correct followings)
  - Is Main Unit installed in stable condition?
  - Is Fan Guard installed normally?

OK

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

OK

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

OK

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

Trouble shooting 41

Water Leaking

Forecast of Cause:

1. Erroneous installation 2. Drain hose failure

Diagnosis method when water leak occurs

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

OK

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

OK

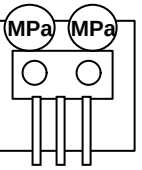
- Is Fan rotating?

Diagnosis method when water is spitting out.

- Is the filter clogged?

OK

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



2-4 SERVICE PARTS INFORMATION

SERVICE PARTS INFORMATION 1

Compressor

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

Does not start up

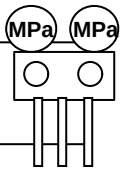
- Is there open or loose connection cable?
- Check Main PCB, connection of Compressor, and winding resistance. (Refer to the next page).

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

Replace Compressor

Stops soon after starting up

- Is there open or loose connection cable?
- Is Gas Pipe Valve open? (Low Pressure is too low)
- Check if Refrigerant is leaking. (Recharge Refrigerant)



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

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

Replace Compressor

Abnormal noise

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

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

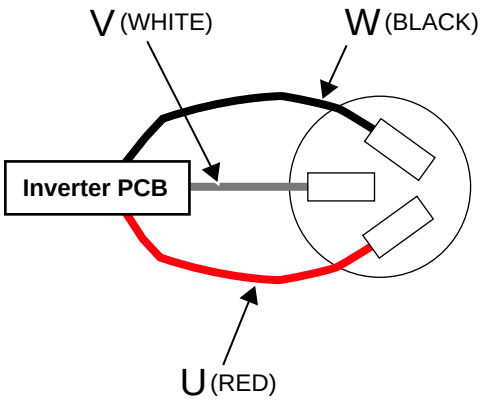
Replace Compressor

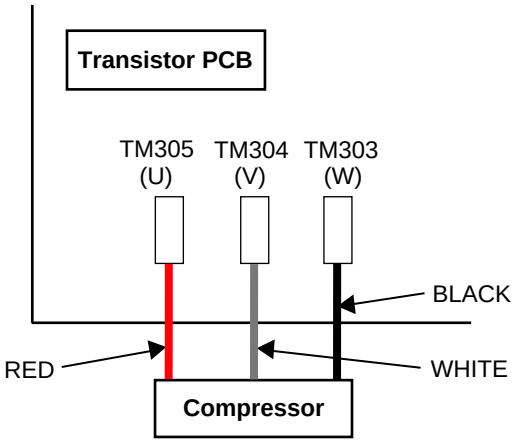
SERVICE PARTS INFORMATION 2

Inverter Compressor

Check Point 1 : Check Connection

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

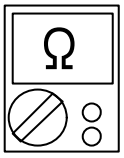


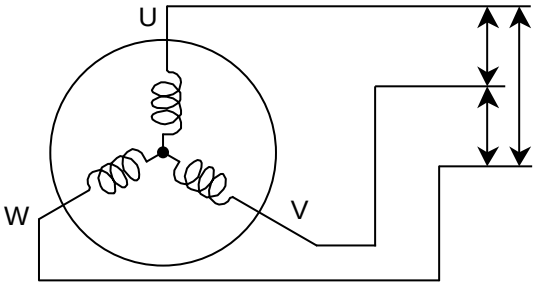


Check Point 2 : Check Winding Resistance

・Check winding resistance of each terminal

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





Resistance Value :
0.64Ω at 20°C (30/36)
0.43Ω at 20°C (45/54)

Check Point 3 : Replace Main PCB

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

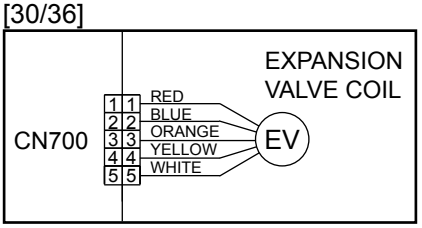
SERVICE PARTS INFORMATION 3

Outdoor unit Electronic Expansion Valve
(EEV)

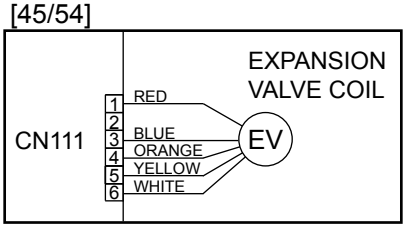
Check Point 1 : Check Connections

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

[30/36]



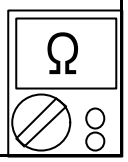
[45/54]



Check Point 2 : Check Coil of EEV

・Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	**46**Ω ± **4**Ω at 68°F(20°C)
Yellow - Red	
Orange - Red	
Blue - Red	



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

Check Point 3 : Check Noise at start up

・Turn on Power and check operation noise.

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

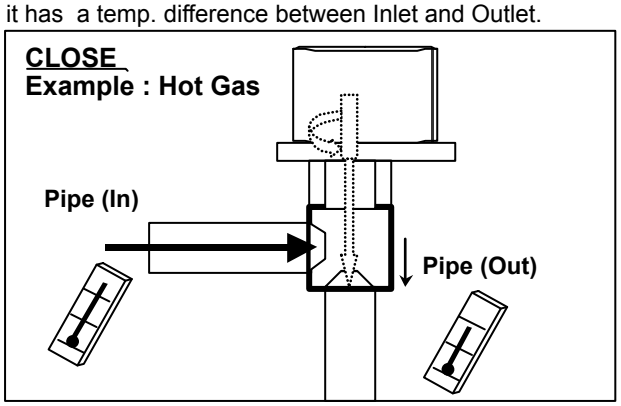
Check Point 4 : Check Voltage from Main PCB.

・Remove Connector and check Voltage (DC12V)

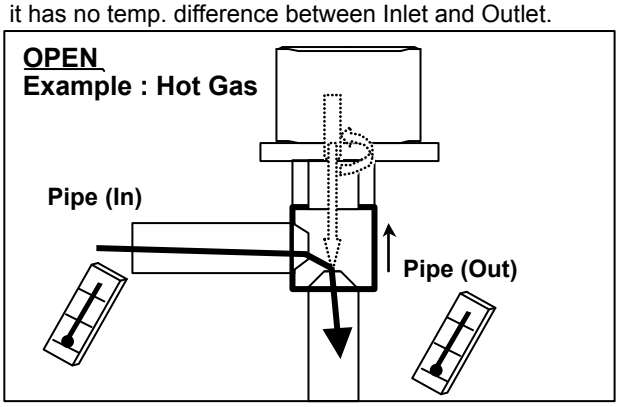
▶ **If it does not appear, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

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

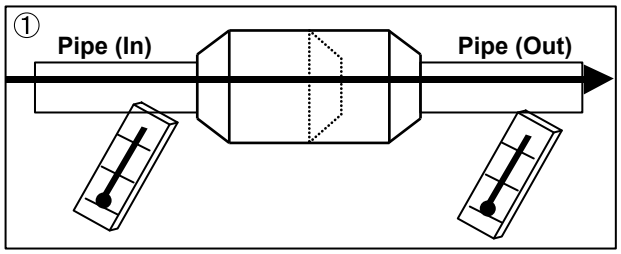


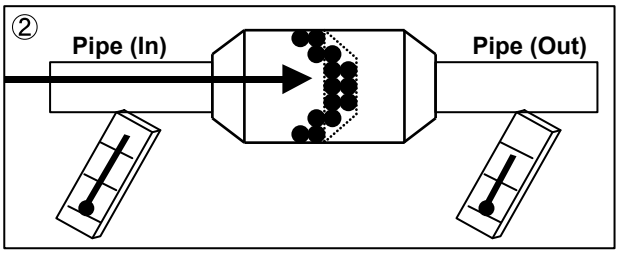
If it is open,
it has no temp. difference between Inlet and Outlet.



Check Point 6 : Check Strainer

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





SERVICE PARTS INFORMATION 4

Indoor unit fan motor

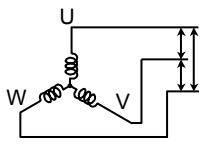
Check Point 1 : Check rotation of Fan

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

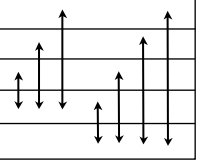
Check Point 2 : Check resistance of Indoor Fan Motor

Check resistance when the main power supply is OFF.

1. Winding coil resistance check (U,V,W)

Pin number (wire color)	Terminal function (symbol)	Resistance: 3.50Ω
1 (Red)	Motor Winding U	
2		
3 (White)	Motor Winding V	
4		
5 (Black)	Motor Winding W	

2. Location circuit resistance check

Pin number (wire color)	Terminal function (symbol)	Resistance: More than 2 M Ω
1 (Yellow)	Hu	
2 (Blue)	Hw	
3 (Orange)	Hv	
4 (Pink)	Vcc	
5 (Gray)	GND	

>> If they are other resistance valule, replace the fan motor

SERVICE PARTS INFORMATION 5

Outdoor unit fan motor

Check Point 1 : Check rotation of Fan

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

Check Point 2 : Check resistance of Outdoor Fan Motor 1 or 2

・Refer to below. Circuit-test "Vm" and "GND" terminal
Check resistance when the main power supply is OFF.
(Vm: DC voltage, GND: Earth terminal)
>>If they are short-circuited (below 300 kΩ), replace Outdoor fan motor and Main PCB.

[30/36]

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

[45/54]

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

SERVICE PARTS INFORMATION 6

Active filter module

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

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

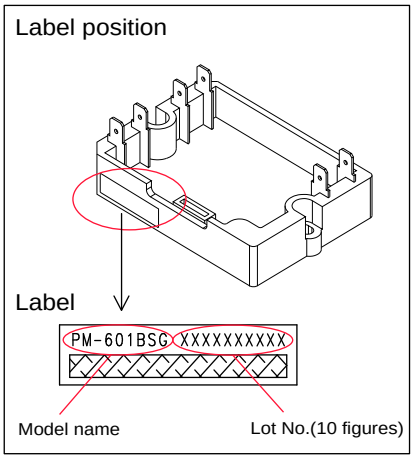
Check the open or short-circuit

Table.1 Each type standard value

	Terminal		Resistance value	
			Type A	Type B
	multimeter (+)	multimeter (-)	SACT32010 [HITACHI] LACT33020 [HITACHI] PM-601 [FGEL] **LOT No. - 1302931395**	PM-604 [FGEL] PM-703 [FGEL] PM-601 [FGEL] **LOT No. 1302931396 -**
	+ (+IN)*	- (-IN)*	**360kΩ ± 20%**	**360kΩ ± 20%**
	- (-IN)*	N1 (N)*	**0 Ω**	**0 Ω**
※	P	+ (+IN)*	**720kΩ ± 20%**	**900kΩ ± 20%**
	L1	L2	**1.01MΩ / 0.76MΩ** **(Ref. value 1) (Ref. value 2)**	**1.01MΩ / 0.76MΩ** **(Ref. value 1) (Ref. value 2)**
	P	N1 (N)*	**360kΩ ± 20%**	**540kΩ ± 20%**
	L1 , L2	Control Box	**∞Ω**	**∞Ω**
※	L2	N1 (N)*	**1.65MΩ / 1.14MΩ** **(Ref. value 1) (Ref. value 2)**	**1.65MΩ / 1.14MΩ** **(Ref. value 1) (Ref. value 2)**

* ( ) is FGEL terminal name.

LOT No. of PM-601 [FGEL] type



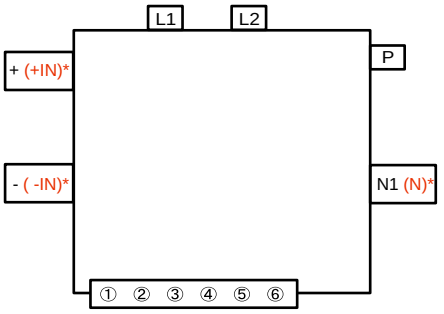


Table.2 Standard value is changed by the tool specification
(Type A and B are the same value)

	Terminal		Resistance value
	multimeter (+)	multimeter (-)	
※	L2	P	**1.32MΩ / 0.66MΩ** **(Ref. value 1) (Ref. value 2)**
※	P	L2	**1.01MΩ / 0.76MΩ** **(Ref. value 1) (Ref. value 2)**

※ By kind of multimeter , the value may change significantly.

Ref. value 1
Specifications for Multimeter
Manufacturer : FLUKE
Model name : FLUKE11
Power source : DC9V.

Ref. value 2
Specifications for Multimeter
Manufacturer : SANWA
Model name : PM3
Power source : DC3V.

▶ If it is abnormal,replace ACTIVE FILTER MODULE

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

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

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

SERVICE PARTS INFORMATION 7

IPM

(**Mounted on Transistor PCB)**

Check Point 1

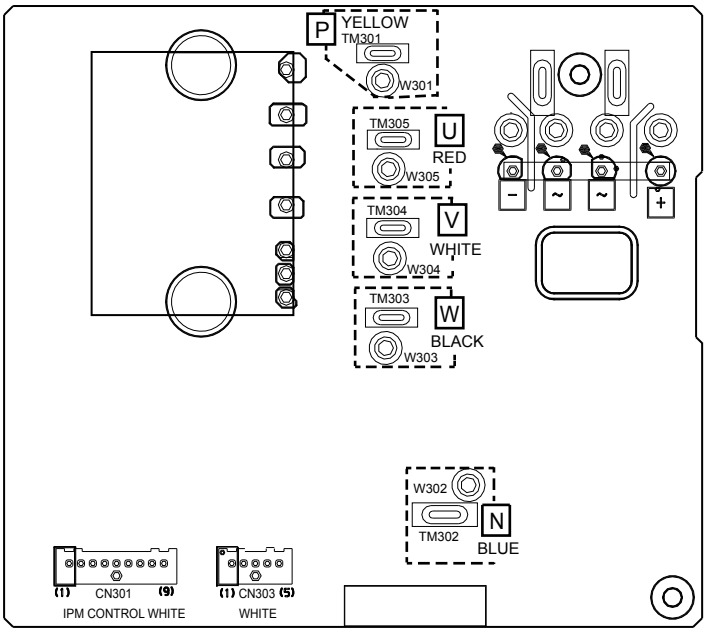
① Disconnect the connection wires between the Transistor PCB - Capacitor PCB and Transistor PCB - Inverter Compressor.

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

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

③ Judge the result of ② as follows:

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



Check Point 2

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

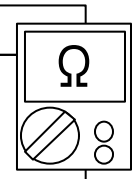
⑤ Judge the result of ④ as follows:

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

SERVICE PARTS INFORMATION 8

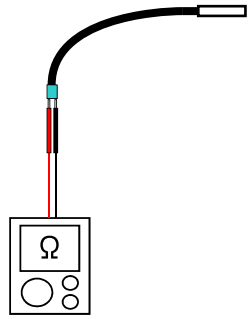
Thermistor

Check Point : Check Thermistor resistance value



☐ Remove connector and check Thermistor resistance value.

Temperature [°C]	Resistance Value [kΩ]			
	Thermistor A	Thermistor B	Thermistor C	Thermistor D
- 20	---	---	105.4	---
- 10	---	27.8	58.2	27.4
- 5	---	21.0	44.0	20.7
0	168.6	16.1	33.6	15.8
5	129.8	12.4	25.9	12.2
10	100.9	9.6	20.2	9.5
15	79.1	7.6	15.8	7.5
20	62.6	6.0	12.5	5.9
25	49.8	4.8	10.0	4.7
30	40.0	3.8	8.0	3.8
40	26.3	2.5	5.3	2.5
50	17.8	1.7	3.6	1.7
60	12.3	1.2	---	1.2
70	8.7	---	---	0.8
80	6.3	---	---	0.6
90	4.6	---	---	0.4
100	3.4	---	---	0.3
110	2.6	---	---	---
120	2.0	---	---	---
Applicable Thermistors	Discharge temp. TH Compressor temp. TH	Heat exchanger. TH	Outdoor temp. TH	Heat sink temp. TH

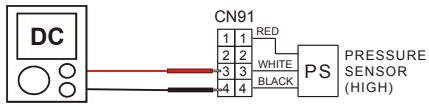


SERVICE PARTS INFORMATION 9

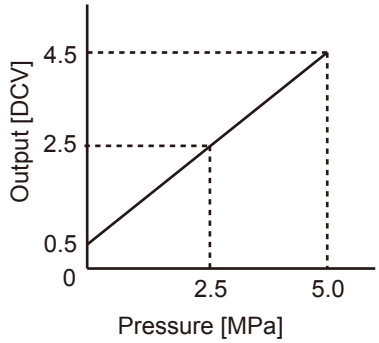
Pressure Sensor

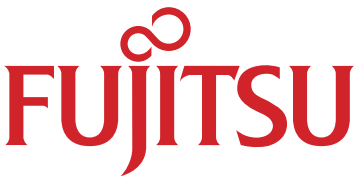
Check Point : Check Voltage from Main PCB

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



- Characteristics of pressure sensor





FUJITSU GENERAL LIMITED

3-3-17,Suenaga,Takatsu-ku,Kawasaki 213-8502,Japan

Aug. 2015 Printed in Japan