Manual No.'22・PAC-SM-426

MITSUBISHI HEAVY INDUSTRIES

SERVICE MANUAL

INVERTER PACKAGED AIR-CONDITIONERS
(Split system, air to air heat pump type)

HYPER INVERTER
FLOOR STANDING TYPE

Single type	Twin type
FDF71VNXWVH	FDF140VNXWPVH
100VNXWVH	140VSXWPVH
100VSXWVH	
125VNXWVH	
125VSXWVH	
140VNXWVH	
140VSXWVH	

MICRO INVERTER
FLOOR STANDING TYPE

Single type	Twin type
FDF100VNAWVH	FDF140VNAWPVH
100VSAWVH	140VSAWPVH
125VNAWVH	200VSAWPVH
125VSAWVH	250VSAWPVH
140VNAWVH	280VSAWPVH
140VSAWVH	

STANDARD INVERTER
FLOOR STANDING TYPE

Single type
FDF71VNPWVH
90VNPWVH
100VNPWVH

MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.

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1. HYPER INVERTER PACKAGED AIR-CONDITIONERS

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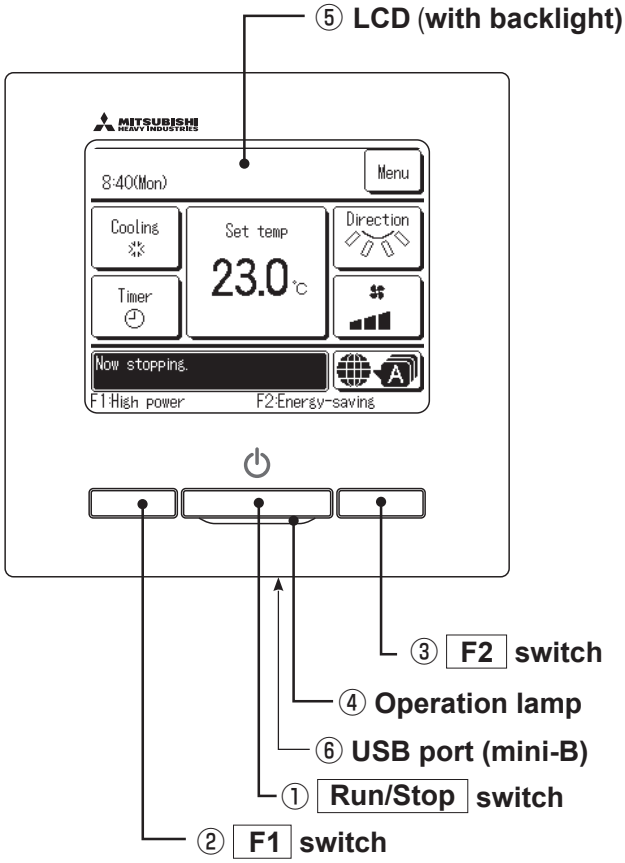
1.1 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

1.1.1 Remote control

(1) Wired remote control

Installed wired remote control (Equivalent to RC-EX3A)
RC-EX3A(Option)

※Hereafter, the two remote controls on the left will both be referred to as RC-EX3A.



Touch panel system, which is operated by tapping the LCD screen with a finger, is employed for any operations other than the ①Run/Stop, ②F1 and ③F2 switches.

① Run/Stop switch

One push on the button starts operation and another push stops operation.

② F1 switch③ F2 switch

This switch starts operation that is set in F1/F2 function change.

④ Operation lamp

This lamp lights in green (yellow-green) during operation. It changes to red (orange) if any error occurs.
Operation lamp luminance can be changed.

⑤ LCD (with backlight)

A tap on the LCD lights the backlight.
The backlight turns off automatically if there is no operation for certain period of time. Lighting period of the backlight lighting can be changed.
If the backlight is ON setting, when the screen is tapped while the backlight is turned off, the backlight only is turned on. (Operations with switches ①,② and ③ are excluded.)

⑥ USB port

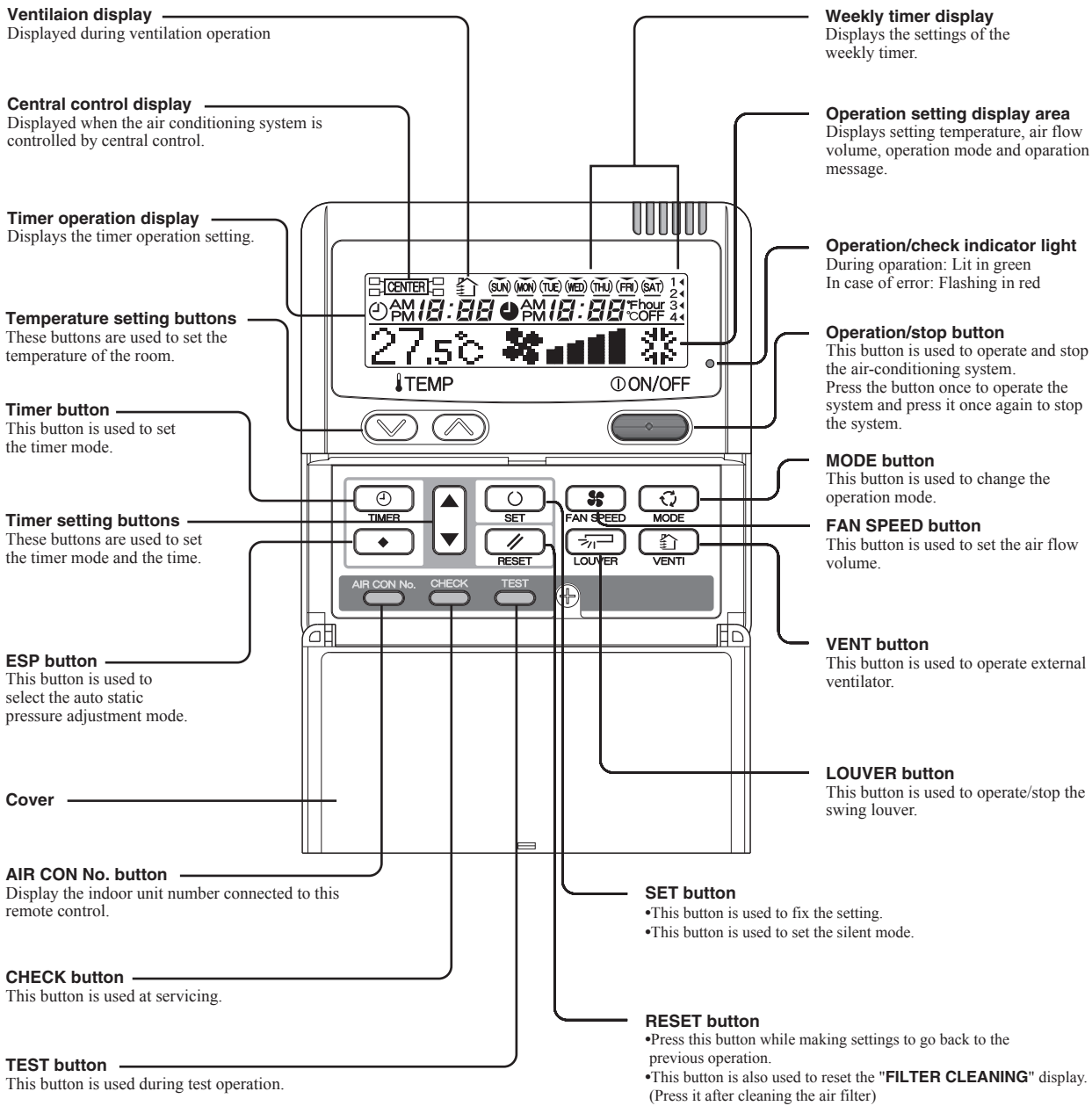
USB connector (mini-B) allows connecting to a personal computer.
For operating methods, refer to the instruction manual attached to the software for personal computer (remote control utility software).

Note When connecting to a personal computer, do not connect simultaneously with other USB devices.
Please be sure to connect to the computer directly,without going through a hub, etc.

Model RC-E5

The figure below shows the remote control with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation.
Characters displayed with dots in the liquid crystal display area are abbreviated.

The figure below shows the remote control with the cover opened.

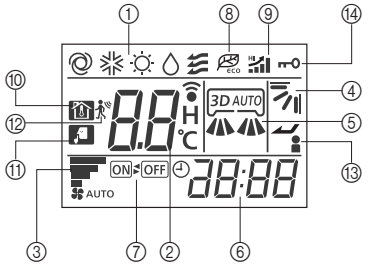


∗ All displays are described in the liguid crystal display for explanation.

(2) Wireless remote control

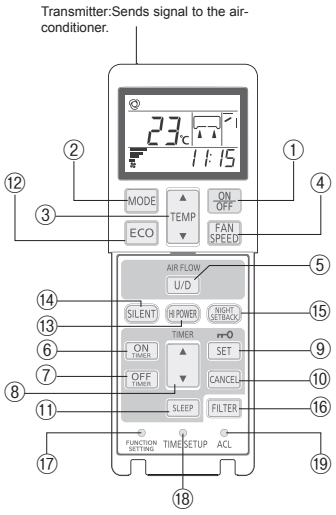
RCN-E2

Indication section



①	OPERATION MODE display	Indicates selected operation mode.
②	SET TEMP display	Indicates set temperature.
	SLEEP TIMER time display	Indicates the amount of time remaining on the sleep timer.
	Indoor function setting number display	Indicates the setting number of the indoor function setting.
③	FAN SPEED display	Indicates the selected air flow volume.
④	UP/DOWN AIR FLOW display	Indicates the up/down louver position.
⑤	LEFT/RIGHT AIR FLOW display	Indicates the left/right louver position.
⑥	Clock display	Indicates the current time. If the timer is set, the ON TIMER and OFF TIMER setting times are indicated.
⑦	ON/OFF TIMER display	Displayed when the timer is set.
⑧	ECO mode display	Displayed when the energy-saving operation is active.
⑨	HI POWER display	Displayed when the high power operation is active.
⑩	NIGHT SETBACK display	Displayed when the home leave mode is active.
⑪	SILENT display	Displayed when the silent mode control is active.
⑫	Motion sensor display	Displayed when the infrared sensor control(motion sensor control) is enabled.
⑬	Anti draft setting display	Displayed when anti draft setting is enabled.
⑭	Child lock display	Displayed when child lock is enabled.

Operation section



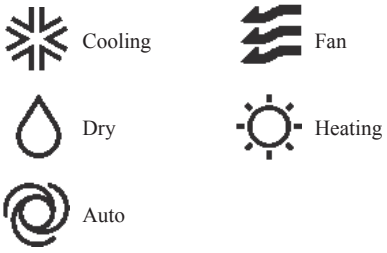
①	ON/OFF button	When this is pressed once, the air-conditioner starts to operate and when this is pressed once again, it stops operating.
②	MODE button	Every time this button is pressed, displays switch as below (AUTO) → (COOL) → (HEAT) (FAN) ← (DRY) ←
③	TEMP button	Change the set temperature by pressing ▲ or ▼ button.
④	FAN SPEED button	The fan speed is switched in the following order: 1-speed → 2-speed → 3-speed → 4-speed → AUTO → 1-speed.
⑤	U/D button	Used to determine the up/down louver position.
⑥	ON TIMER button	Used to set the ON TIMER.
⑦	OFF TIMER button	Used to set the OFF TIMER.
⑧	SELECT button	Used to switch the time when setting the timer or adjusting the time. Used to switch the settings of the indoor function.
⑨	SET button	Used to determine the setting when setting the timer or adjusting the time. Used to determine the settings of the indoor function. When press and hold SET button ,Child Lock is enabled.
⑩	CANCEL button	Used to cancel the timer setting.
⑪	SLEEP button	Used to set the sleep timer.
⑫	ECO button	Pressing this button starts the energy-saving operation. Pressing this button again cancels it.
⑬	HI POWER button	Pressing this button starts the high power operation. Pressing this button again cancels it.
⑭	SILENT button	Pressing this button starts the silent mode control. Pressing this button again cancels it.
⑮	NIGHT SETBACK button	Pressing this button starts the home leave mode. Pressing this button again cancels it.
⑯	FILTER button	Pressing this button resets FILTER SIGN.
⑰	FUNCTION SETTING switch	Used to set the indoor function.
⑱	TIME SETUP switch	Used to set the current time.
⑲	ACL switch	Used to reset the microcomputer.

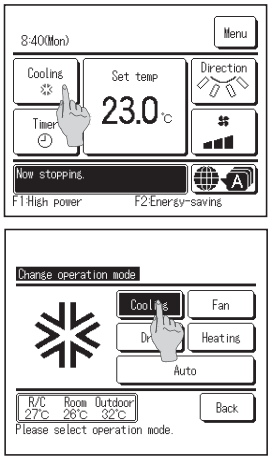
1.1.2 Operation control function by the wired remote control

● Model RC-EX3A

(1) Switching sequence of the operation mode switches of remote control

(a) Tap the change operation mode button on the TOP screen.
(b) When the change operation mode screen is displayed, tap the button of desired mode.
(c) When the operation mode is selected, the display returns to the TOP screen.
Icons displayed have the following meanings.



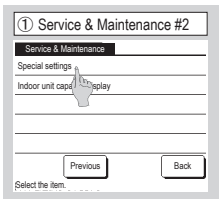


Notes (1) Operation modes which cannot be selected depending on combinations of indoor unit and outdoor unit are not displayed.
(2) When the Auto is selected, the cooling and heating switching operation is performed automatically according to indoor and outdoor temperatures.

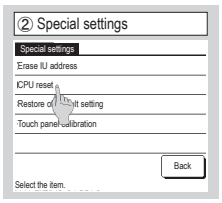
(2) CPU reset

Reset CPU from the remote control as follows.

TOP screen [Menu] ⇒ [Service setting] ⇒ [Service & Maintenance] ⇒ [Service password]



The selected screen is displayed.



The selected screen is displayed.

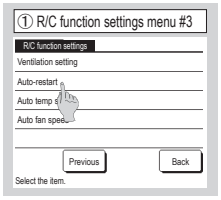
CPU reset

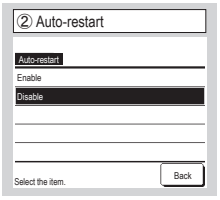
Microcomputers of indoor unit and outdoor unit connected are reset (State of restoration after power failure).

(3) Power failure compensation function (Electric power source failure)

Enable the Auto-restart function from the remote control as follows.

TOP screen [Menu] ⇒ [Service setting] ⇒ [R/C function settings] ⇒ [Service password]





If the unit stops during operation,

Enable

It returns to the state before the power failure as soon as the power source is restored (After the end of the primary control at the power on).

Disable

It stops after the restoration of power source.

●Since the status of remote control is retained in memory always, it restarts operations according to the contents of memory as soon as the power source is restored. Although the timer mode is cancelled, the weekly timer, peak cut timer and silent mode timer operate according to the following contents:

・When the clock setting is valid : These timer settings are also valid.
・When the clock setting is invalid : These timer settings become “Invalid” since the clock setting is invalid.
These timer settings have to be changed to “Valid” after the timer setting.

●Content memorized with the power failure compensation are as follows.

Note(1) Items (f) and (g) are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

(a) At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized.

(b) Operation mode

(c) Air flow volume mode

(d) Room temperature setting

(e) Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

(f) "Remote control function items" which have been set with the administrator or installation function settings ("Indoor function items" are saved in the memory of indoor unit.)

(g) Weekly timer, peak-cut timer or silent mode timer settings

(h) Remote control function setting

(4) Alert displays

If the following (a) to (c) appear, check and repair as follows.

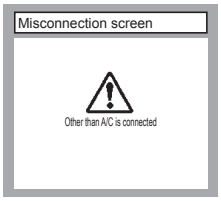
(a) Communication check between indoor unit and remote control

●This appears if communications cannot be established between the remote control and the indoor unit.
Check whether the system is correctly connected (indoor unit, outdoor unit, remote control) and whether the power source for the outdoor unit is connected.

(b) Clock setting check

●This appears when the timer settings are done without clock setting.
Set the clock setting before the timer settings.

(c) Misconnection



●This appears when something other than the air-conditioner has been connected to the remote control.
Check the location to which the remote control is connected.

● Model RC-E5

(1) Switching sequence of the operation mode switches of remote control

(2) CPU reset

This functions when "CHECK" and "ESP" buttons on the remote control are pressed simultaneously. Operation is same as that of the power source reset.

(3) Power failure compensation function (Electric power source failure)

- This becomes effective if "Power failure compensation effective" is selected with the setting of remote control function.
- Since it memorizes always the condition of remote control, it starts operation according to the contents of memory no sooner than normal state is recovered after the power failure. Although the auto swing stop position and the timer mode are cancelled, the weekly timer setting is restored with the holiday setting for all weekdays.
  After recovering from the power failure, it readjusts the clock and resets the holiday setting for each weekday so that the setting of weekly timer becomes effective.
- Content memorized with the power failure compensation are as follows.

Note (1) Items (f), (g) and (h) are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

(a) At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized. (Although the timer mode is cancelled at the recovery from power failure, the setting of weekly timer is changed to the holiday setting for all weekdays.)

(b) Operation mode

(c) Air flow volume mode

(d) Room temperature setting

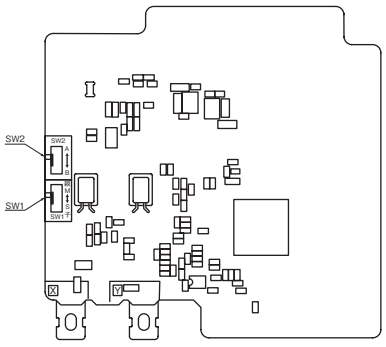
(e) Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

(f) "Remote control function items" which have been set with the remote control function setting ("Indoor function items" are saved in the memory of indoor unit.)

(g) Upper limit value and lower limit value which have been set with the temperature setting control

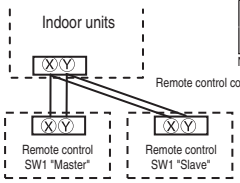
(h) Sleep timer and weekly timer settings (Other timer settings are not memorized.)

[Parts layout on remote control PCB]



Master/ slave setting when more than one remote controls are used

A maximum of two remote controls can be connected to one indoor unit (or one group of indoor units.)



Switch	Setting	Contents
SW1	M	Master remote control
	S	Slave remote control

Note (1) Don't change SW2 because it is not used normally.

Caution

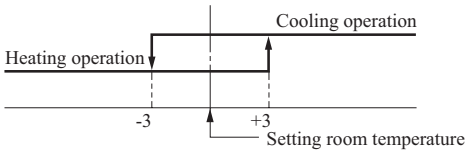
When using multiple remote controls, the following dispiays or settings cannot be done with the slave remote control. It is available only with the master remote control.

①Louver position setting (set upper or lower limit of swinging range)
②Setting indoor unit functions
③Setting temperature range
④Operation data display
⑤Error data display
⑥Silent mode setting
⑦Test operation of drain pump
⑧Remote control sensor setting

1.1.3 Operation control function by the indoor control

(1) Auto operation

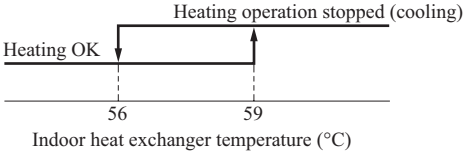
(a) If "Auto" mode is selected by the remote control, the heating and the cooling are automatically switched according to the difference between outdoor air temperature and setting temperature and the difference between setting temperature and return air temperature. (When the switching of cooling mode ↔ heating mode takes place within 3 minutes, the compressor does not operate for 3 minutes by the control of 3-minute timer.) This will facilitate the cooling/heating switching operation in intermediate seasons and the adaptation to unmanned operation at stores, etc (ATM corner of bank).



Notes (1) Temperature range of switching cooling/heating mode can be changed by RC-EX3A from ±1.0 − ±4.0.

(2) Room temperature control during auto cooling/auto heating is performed according to the setting room temperature. (DIFF: ±1 deg)

(3) If the indoor heat exchanger temperature rises to 59°C or higher during heating operation, it is switched automatically to cooling operation. In addition, for 1 hour after this switching, the heating operation is not performed, regardless of the temperature shown at right.



(b) The following automatic controls are performed other than (a) above.

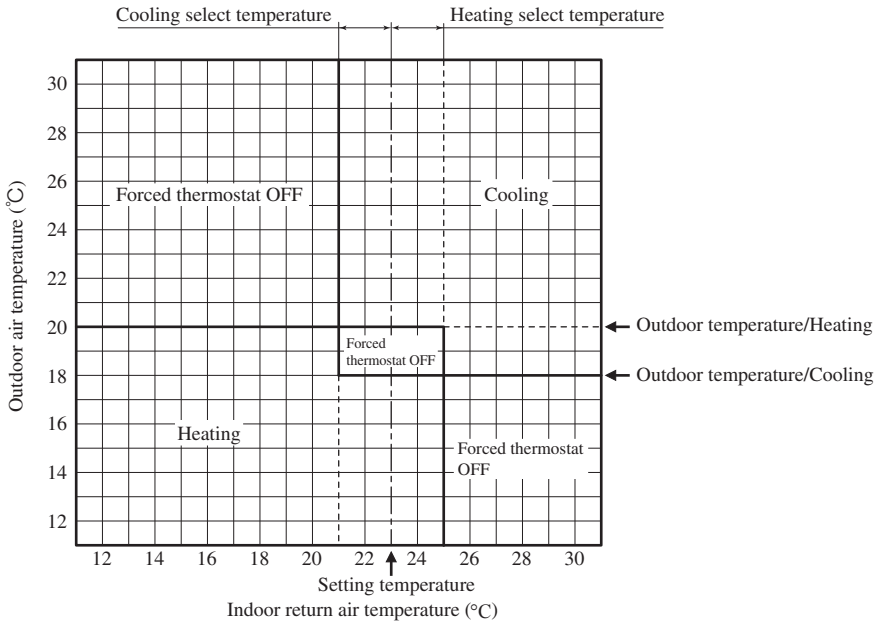
(i) Cooling or heating operation mode is judged according to the conditions of the "Judgment based on Setting temperature + Cooling select temperature and Indoor return air temperature" and the "Judgment based on Outdoor temperature".

1) In "Setting temperature - Cooling select temperature < Indoor return air temperature" and "Outdoor temperature/Cooling < Outdoor return air temperature" ⇒ Operation mode: Cooling

2) "Setting temperature + Heating select temperature > Indoor return air temperature" and "Outdoor temperature/ Heating > Outdoor air temperature" ⇒ Operation mode: Heating

3) The outdoor air temperature of the above judgment conditions is sampled at every 10 minutes.

4) In the range where the above cooling and heating zones are overlapped ⇒ Forced thermostat OFF



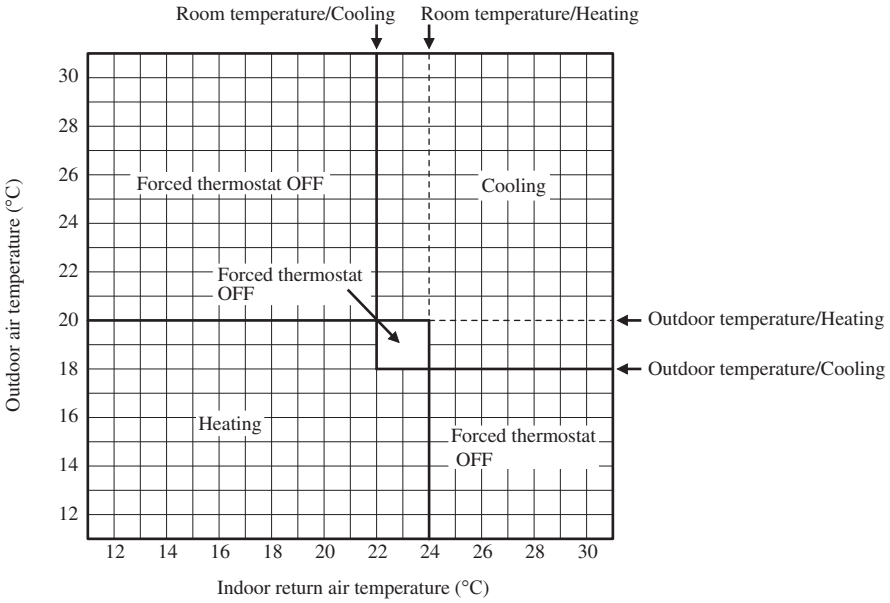
(ii) Regardless of the setting temperature, the cooling or heating operation mode is judged according to the "Judgment based on Room temperature/Cooling or Heating and Outdoor temperature/Cooling or Heating".

1) In case of "Room temperature/Cooling < Indoor return air temperature" and "Outdoor temperature/Cooling < Outdoor air temperature" ⇒ Operation mode: Cooling

2) In case of "Room temperature/Heating > Indoor return air temperature" and "Outdoor temperature /Heating > Outdoor air temperature" ⇒ Operation mode: Heating

3) The outdoor air temperature of the above judgment conditions is sampled at every 10 minutes.

4) In the range where the above cooling and heating zones are overlapped ⇒ Forced thermostat OFF



(2) Operations of functional items during cooling/heating

Operation / Functional item	Cooling		Fan	Heating			Dehumidifying
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Hot start (Defrost)	
Compressor	○	×	×	○	×	○	○/×
4-way valve	×	×	×	○	○	○(×)	×
Outdoor unit fan	○	×	×	○	×	○(×)	○/×
Indoor unit fan	○	○	○	○/×	○/×	○/×	○/×
Drain pump (3)	○	×(2)	×(2)	○/×(2)			Thermostat ON: ○ Thermostat OFF: ×(2)

Notes (1) ○: Operation ×: Stop ○/×: Turned ON/OFF by the control other than the room temperature control.
(2) ON during the drain pump motor delay control.
(3) Drain pump ON setting may be selected with the indoor unit function setting of the wired remote control.

(3) Dehumidifying (DRY) operation

Return air temperature sensor [Thi-A (by the remote control when the remote control temperature sensor is enabled)] controls the indoor temperature environment simultaneously.

(i) Operation is started in the cooling mode. When the difference between the return air temperature and the setting temperature is 2°C or less, the indoor fan speed is brought down by one. That speed is retained for 3 minutes after changing the indoor fan speed.

(ii) If the return air temperature exceeds the setting temperature by 3°C during dehumidifying operation, the indoor fan speed is raised by one. That speed is retained for 3 minutes after changing the indoor fan speed.

(iii) If the thermostat OFF is established during the above control, the indoor fan speed at the thermostat ON is retained so far as the thermostat is turned OFF.

(4) Timer operation

(a) RC-EX3A

(i) Sleep timer

Set the time from the start to stop of operation. The time can be selected in the range from 30 to 240 minutes (in the unit of 10-minute).

Note Enable the "Sleep timer" setting from the remote control. If the setting is enabled, the timer operates at every time.

(ii) Set OFF timer by hour

Set the time to stop the unit after operation, in the range from 1 to 12 hours (in the unit of hour).

(iii) Set ON timer by hour

Set the time to start the unit after the stop of operation, in the range from 1 to 12 hours (in the unit of hour). It is allowed also to set simultaneously the indoor temperature, operation mode, air flow rate and warm-up enabled/disabled.

(iv) Set ON timer by clock

Set the time to start operation. The time can be set in the unit of 5-minute. This setting can be switched only once or daily. It is allowed also to set simultaneously the indoor temperature, operation mode, air flow rate and warm-up enabled/disabled.

Note It is necessary to set the clock to use this timer.

(v) Set OFF timer by clock

Set the time to stop operation. The time can be set in the unit of 5-minute. This setting can be switched only once or daily.

Note It is necessary to set the clock to use this timer.

(vi) Weekly timer

Set the ON or OFF timer for a week. Up to 8 patterns can be set for a day. The day-off setting is provided for holidays and non-business days.

Note It is necessary to set the clock to use the weekly timer.

(vii) **Combination of patterns which can be set for the timer operations**

	Sleep timer	Set OFF timer by hour	Set ON timer by hour	Set OFF timer by clock	Set ON timer by clock	Weekly timer
Sleep timer		×	×	○	○	○
Set OFF timer by hour	×		×	×	×	×
Set ON timer by hour	×	×		×	×	×
Set OFF timer by clock	○	×	×		○	×
Set ON timer by clock	○	×	×	○		×
Weekly timer	○	×	×	×	×	

Note (1) ○: Allowed ×: Not

(b) RC-E5

(i) Sleep timer

Set the duration of time from the present to the time to turn off the air-conditioner.

It can be selected from 10 steps in the range from "OFF 1 hour later" to "OFF 10 hours later". After the Sleep timer setting, the remaining time is displayed with progress of time in the unit of hour.

(ii) OFF timer

Time to turn OFF the air-conditioner can be set in the unit of 10 minutes.

(iii) ON timer

Time to turn ON the air-conditioner can be set in the unit of 10 minutes. Indoor temperature can be set simultaneously.

(iv) Weekly timer

Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.

(v) **Combination of patterns which can be set for the timer operations**

Item \ Item	Sleep timer	OFF timer	ON timer	Weekly timer
Sleep timer		×	○	×
OFF timer	×		○	×
ON timer	○	○		×
Weekly timer	×	×	×	

Notes (1) ○: Allowed ×: Not

(2) Since the ON timer, Sleep timer and OFF timer are set in parallel, when the times to turn ON and OFF the air-conditioner are duplicated, the setting of the OFF timer has priority.

(5) Hot start (Cold draft prevention at heating)

(a) Operating conditions

When either one of following conditions is satisfied, the hot start control is performed.

(i) From stop to heating operation

(ii) From cooling to heating operation

(iii) Form heating thermostat OFF to ON

(iv) After completing the defrost operation (only on units with thermostat ON)

(b) Contents of operation

(i) Indoor fan motor control at hot start

1) Within 7 minutes after starting heating operation, the fan mode is determined depending on the condition of thermostat (fan control with heating thermostat OFF).

a) Thermostat OFF

i) Operates according to the fan control setting at heating thermostat OFF.

ii) Even if it changes from thermostat OFF to ON, the fan continues to operate with the fan control at thermostat OFF till the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher.

iii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set air flow volume.

b) Thermostat ON

i) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 25°C or lower, the fan is turned OFF and does not operate.

ii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 25°C or higher, the fan operates with the fan control at heating thermostat OFF.

iii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set air flow volume.

c) If the fan control at heating thermostat OFF is set at the "Set air flow volume" (from the remote control), the fan operates with the set air flow volume regardless of the thermostat ON/OFF.

2) Once the fan motor is changed from OFF to ON during the thermostat ON, the indoor fan motor is not turned OFF even if the heat exchanger temperature sensor detects lower than 25°C.

Note When the defrost control signal is received, it complies with the fan control during defrost operation.

3) Once the hot start is completed, it will not restart even if the temperature on the heat exchanger temperature sensor drops.

(ii) During the hot start, the louver is kept at the horizontal position.

(iii) When the fan motor is turned OFF for 7 minutes continuously after defrost operation, the fan motor is turned ON regardless of the temperatures detected with the indoor heat exchanger temperature sensors (Thi-R1, R2).

(c) Ending condition

(i) If one of following conditions is satisfied during the hot start control, this control is terminated, and the fan is operated with the set air flow volume.

1) Heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher.

2) It has elapsed 7 minutes after starting the hot start control.

(6) Hot keep

Hot keep control is performed at the start of the defrost operation.

(a) Contents of operation

(i) When the indoor heat exchanger temperature (detected with Thi-R1 or R2) drops to less than 35°C, the speed of indoor fan follows fan setting at the time of thermostat OFF.

(ii) During the hot keep, the louver is kept at the horizontal position.

(7) Auto swing control

Note Even if [Auto Swing] is selected, the louver position with anti draft function is fixed to position 1.

(a) RC-EX3A

(i) Louver control

1) To operate the swing louver when the air-conditioner is operating, press the "Direction" button on the TOP screen of remote control. The wind direction select screen will be displayed.

2) To swing the louver, touch the "Auto swing" button. The lover will move up and down. To fix the swing louver at a position, touch one of [1] - [4] buttons. The swing lover will stop at the selected position.

3) Louver operation at the power on with a unit having the louver 4-position control function
The louver swings one time automatically (without operating the remote control) at the power on.
This allows the microcomputer recognizing and inputting the louver motor (LM) position.

(ii) Automatic louver level setting during heating

At the hot start and the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (in order to prevent blowing of cool wind). The louver position display LCD continues to show the display which has been shown before entering this control.

(iii) Louver free stop control

If you touch the "Menu" → "Service setting" → "R/C settings" → "Service password" buttons one after another on the TOP screen of remote control, the "Flap control" screen is displayed. If the free stop is selected on this screen, the louver motor stops upon receipt of the stop signal from the remote control. If the auto swing signal is received from the remote control, the auto swing will start from the position before the stop.

(b) RC-E5

(i) Louver control

1) Press the "LOUVER" button to operate the swing louver when the air-conditioner is operating.
"SWING" is displayed for 3 seconds and then the swing louver moves up and down continuously.

2) To fix the swing louver at a position, press one time the "LOUVER" button while the swing louver is moving so that four stop positions are displayed one after another per second.
When a desired stop position is displayed, press the "LOUVER" button again. The display stops, changes to show the "STOP 1" for 5 seconds and then the swing louver stops.

3) Louver operation at the power on with a unit having the louver 4-position control function
The louver swings one time automatically (without operating the remote control) at the power on.
This allows inputting the louver motor (LM) position, which is necessary for the microcomputer to recognize the louver position.

Note If you press the "LOUVER" button, the swing motion is displayed on the louver position LCD for 10 seconds. The display changes to the "SWING" display 3 seconds later.

(ii) Automatic louver level setting during heating

At the hot start with the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (In order to prevent the cold start). The louver position display LCD continues to show the display which has been shown before entering this control.

(iii) Louver-free stop control

When the louver-free stop has been selected with the indoor function of wired remote control "POSITION", the louver motor stops when it receives the stop signal from the remote control. If the auto swing signal is received from the remote control, the auto swing will start from the position where it was before the stop.

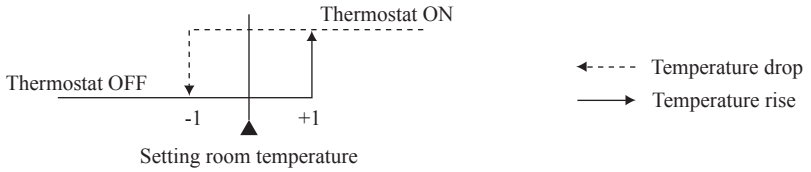
Note When the indoor function of wired remote control "POSITION" has been switched, switch also the remote control function "POSITION" in the same way.

(8) Thermostat operation

(a) Cooling

(i) Thermostat is operated with the room temperature control.

(ii) Thermostat is turned ON or OFF relative to the setting room temperature as shown below.

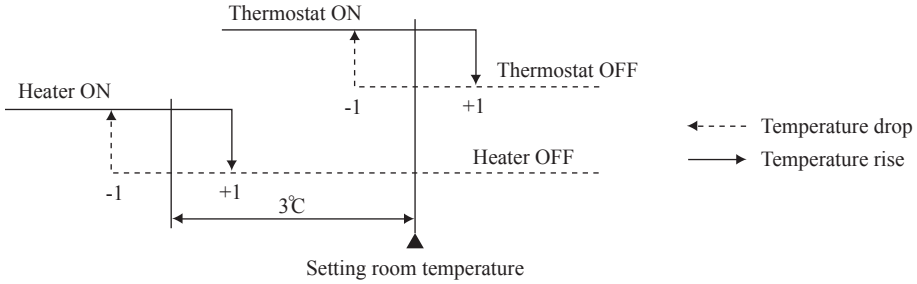


(iii) Thermostat is turned ON when the room temperature is in the range of -1 < Setting room temperature < +1 at the start of cooling operation (including from heating to cooling).

(b) Heating

(i) Thermostat is operated with the room temperature control.

(ii) Thermostat is turned ON or OFF relative to the setting room temperature as shown below.



(iii) Thermostat is turned ON when the room temperature is in the range of -1 < Setting room temperature < +1 at the start of heating operation (including from cooling to heating).

(c) Fan control during heating thermostat OFF

(i) Following fan controls during the heating thermostat OFF can be selected with the indoor function setting of the wired remote control.

① Low fan speed (Factory default) ② Set fan speed ③ Intermittence ④ Fan OFF

(ii) When the "Low fan speed (Factory default)" is selected, the following speed is used for the indoor fans.

・For DC motor : ULo

(iii) When the "Set fan speed" is selected, it is operated with the set fan speed also in the thermostat OFF condition.

(iv) If the "Intermittence" is selected, following controls are performed:

1) If the thermostat is turned OFF during the heating operation, the indoor unit moves to the hot control and turns OFF the indoor fan if the heat exchanger temperature sensors (both Thi-R1 and R2) detect 25°C or lower.
2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at ULo for 2 minutes. In the meantime the louver is controlled at level.
3) After operating at ULo for 2 minutes, the indoor fan moves to the state of 1) above.
4) If the thermostat is turned ON, it moves to the hot start control.
5) When the heating thermostat is turned OFF, the remote control displays the temperature detected at the fan stop and revises the temperature later when the indoor fan changes from ULo to stop.
   The remote control uses the operation data display function to display temperatures and updates values of temperature even when the indoor fan is turned OFF.
6) When the defrost operation starts while the heating thermostat is turned OFF or the thermostat is turned OFF during defrost operation, the indoor fan is turned OFF. (Hot keep or hot start control takes priority.) However, the suction temperature is updated at every 7-minute.
7) When the heating thermostat is turned ON or the operation is changed to another mode (including stop), this control is stopped immediately, and the operating condition is restored.

(v) When the "Fan OFF" is selected, the fan on the indoor unit of which the thermostat has been turned OFF, is turned OFF. The same occurs also when the remote control sensor is effective.

(d) Fan control during cooling thermostat OFF

(i) Following fan controls during the cooling thermostat OFF can be selected with the indoor function setting of the wired remote control.

① Low fan speed ② Set fan speed (Factory default) ③ Intermittence ④ Fan OFF

(ii) When the "Low fan speed" is selected, the following speed is used for the indoor fans.

・For DC motor : ULo

(iii) When the "Set fan speed" is selected, it is operated with the set fan speed also in the thermostat OFF condition.

(iv) If the "Intermittence" is selected, following controls are performed:

1) If the thermostat is turned OFF during the cooling operation, the indoor fan motor stops.

2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at ULo for 2 minutes. In the meantime the louver is controlled at level.

3) After operating at ULo for 2 minutes, the indoor fan moves to the state of 1) above.

4) If the thermostat is turned ON, the fan starts operation at set fan speed.

5) When the cooling thermostat is turned OFF, the remote control displays the temperature detected at the fan stop and revises the temperature later when the indoor fan changes from ULo to stop.

By using operation data display function at wireless remote control, the tempenature as displayad and the value is updated including the fan stops.

6) When the cooling thermostat is turned ON or the operation is changed to another mode (including stop), this control is stopped immediately, and the operating condition is restored.

(v) When the "Fan OFF" is selected, the fan on the indoor unit of which the thermostat has been turned OFF, is turned OFF. The same occurs also when the remote control sensor is effective.

(9) Filter sign

As the operation time (Total ON time of ON/OFF switch) accumulates to 180 hours (1), "FILTER CLEANING" is displayed on the remote control. (This is displayed when the unit is in trouble and under the central control, regardless of ON/OFF.)

Notes (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote control "Filter sign". (It is set at setting 1 at the shipping from factory.)

Filter sign setting	Function
Setting **1**	Setting time: 180 hrs (Factory default)
Setting **2**	Setting time: 600 hrs
Setting **3**	Setting time: 1,000 hrs
Setting **4**	Setting time: 1,000 hrs (Unit stop) (2)

(2) After the setting time has elapsed, the "FILTER CLEANING" is displayed and, after operating for 24 hours further (counted also during the stop), the unit stops.

(10) Compressor inching prevention control

(a) 3-minute timer

When the compressor has been stopped by the thermostat, remote control operation switch or anomalous condition, its restart will be inhibited for 3 minutes. However, the 3-minute timer is invalidated at the power on the electric power source for the unit.

(b) 3-minute forced operation timer

(i) Compressor will not stop for 3 minutes after the compressor ON. However, it stops immediately when the unit is stopped by means of the ON/OFF switch or when the thermostat is turned OFF by the change of operation mode.

(ii) If the thermostat is turned OFF during the forced operation control of heating compressor, the louver position (with the auto swing) is returned to the level position.

Note The compressor stops when it has entered the protective control.

(11) Operation check mode

(a) If the power is turned on by the DIP switch (SW7-1) on the indoor unit control PCB when electric power source is supplied, it enters the mode of operation check. It is ineffective (prohibited) to change the switch after turning power on.

(b) When the communication with the remote control has been established within 60 seconds after turning power on by the DIP switch (SW7-1) ON, it enters the operation check mode.

(c) Operation check mode

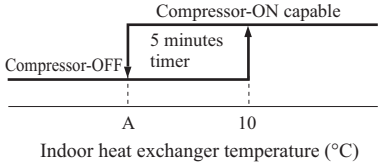
There is no communication with the outdoor unit but it allows performing operation in respective modes by operating the remote control.

(12) Cooling, dehumidifying frost protection

(a) To prevent frosting during cooling mode or dehumidifying mode operation, the compressor-OFF if the indoor heat exchanger temperature (detected with Thi-R) drops to 1.0 °C or lower at 4 minutes after the compressor-ON. If the indoor unit heat exchanger temperature is 1.0 °C or lower after 5 minutes, the indoor unit is controlled compressor-OFF. If it becomes 10°C or higher, the control terminates.

• Frost prevention temperature setting can be selected with the indoor unit function setting of the wired remote control.

Item \ Symbol	A
Temperature - Low (Factory default)	1.0
Temperature - High	2.5



(b) Selection of indoor fan speed

If it enters the frost prevention control during cooling operation (including dehumidifying), the indoor fan speed is switched.

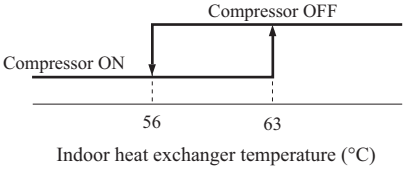
(i) When the indoor return air temperature (Thi-A) is 18°C or higher and the indoor heat exchanger temperature (detected with Thi-R) detects the compressor frequency drop start temperature A°C+1°C, indoor fan speed is increased by 20min^{-1}.

(ii) If the phenomenon of (i) above is detected again after the acceleration of indoor fan, indoor fan speed is increased further by 20min^{-1}.

Note Indoor fan speed can be increased by up to P-Hi.

(13) Heating overload protection

(a) If the indoor heat exchanger temperature (detected with Thi-R) at 63°C or higher is detected for 2 seconds continuously, the compressor stops. When the compressor is restarted after a 3-minute delay, if a temperature at 63°C or higher is detected for 2 seconds continuously within 60 minutes after initial detection and if this is detected 5 times consecutively, the compressor stops with the anomalous stop (E8). Anomalous stop occurs also when the indoor heat exchanger temperature at 63°C or higher is detected for 6 minutes continuously.



(b) Indoor fan speed selection

If, after second detection of heating overload protection up to fourth, the indoor fan is set at below Hi when the compressor is turned ON, the indoor fan speed is increased by 1.

(14) Anomalous fan motor

(a) After starting the fan motor, if the fan motor speed is 200 min^{-1} or less is detected for 30 seconds continuously and 4 times within 60 minutes, then fan motor stops with the anomalous stop (E16).

(b) If the fan motor fails to reach at -50 min^{-1} less than the required speed, it stops with the anomalous stop (E20).

(15) Plural unit control – Control of 16 units group by one remote control

(a) Function

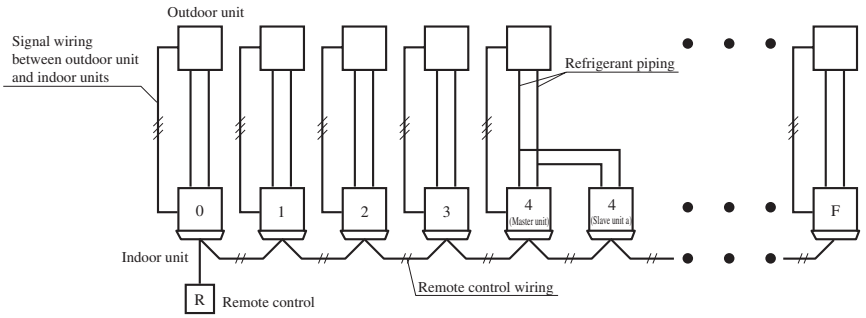
One remote control can control a group of multiple number of unit (Max. 16 indoor units). "Operation mode" which is set by the remote control can operate or stop all units in the group one after another in the order of unit. No.(1). Thermostat and protective function of each unit function independently.

Notes (1) Unit No. is set by SW2 on the indoor unit control PCB. Unit No. setting by SW2 is necessary for the indoor unit only. In cases of the twin, triple and double twin specification, it is necessary set for the master and the slave units. This can be selected by SW5. (All are set for the master unit at the shipping from factory.)

SW2: For setting of 0 – 9, A – F
SW5: For setting of master and slave units
(See table shown at right.)

SW5 setting

Unit \ Switch	SW5-1	SW5-2
Master unit	OFF	OFF
Slave unit a	OFF	ON



(2) Unit No. may be set at random unless duplicated, it should be better to set orderly like 0, 1, 2…, F to avoid mistake.

(b) Display to the remote control

(i) Central or each remote control basis, heating preparation
The smallest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.

(ii) Inspection display, filter sign
Any of unit that starts initially is displayed.

(c) Confirmation of connected units

(i) In case of RC-EX3A remote control

If you touch the buttons in the order of "Menu" → "Service setting" → "Service & Maintenance" → "Service password" → "IU address" on the TOP screen of remote control, the indoor units which are connected are displayed.

(ii) In case of RC-E5 remote control

Pressing "AIR CON No." button on the remote control displays the indoor unit address. If "▲" "▼" button is pressed at the next, it is displayed orderly starting from the unit of smallest No..

(d) In case of anomaly

If any anomaly occurs on a unit in a group (a protective function operates), that unit stops with the anomalous stop but any other normal units continue to run as they are.

(e) Signal wiring procedure

Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, connect the remote control wiring to each indoor unit via terminal block for the remote control.

Connect the remote control wiring separately from the power source cable or wires of other electric devices (AC220V or higher).

(16) Fan speed setting control

When sufficient air flow rate cannot be obtained from the indoor unit which is installed at a room with high ceiling, the air flow rate can be increased by changing the fan speed. To change the fan speed, use the indoor unit function "Fan speed setting" on the wired remote control.

Fan speed		Indoor unit air flow rate setting				(Wired remote control)
Fan speed setting	Standard	P-Hi1 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	(RC-EX3A)
		UH - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	(RC-E5)
	Setting1	P-Hi1 - P-Hi1 - Hi - Me	P-Hi1 - Hi - Me	P-Hi1 - Me	P-Hi1 - Hi	(RC-EX3A)
	HIGH SPEED1, 2	UH - UH - Hi - Me	UH - Hi - Me	UH - Me	UH - Hi	(RC-E5)

Notes (1) Factory default is Standard.
(2) At the hot-start and heating thermostat OFF, or other, the indoor fan is operated at the low speed of each setting.
(3) This function is not able to be set with wireless remote control or simple remote control (RCH-E3).

(17) Abnormal temperature sensor (return air/indoor heat exchanger) broken wire/short-circuit detection

(a) Broken wire detection

When the return air temperature sensor detects -50°C or lower or the heat exchanger temperature sensor detect -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes after the initial detection for 6 minutes continuously, stops again (the return air temperature sensor: E7, the heat exchanger temperature sensor: E6).

(b) Short-circuit detection

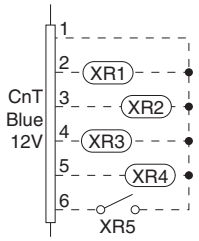
If the heat exchanger temperature sensor detects short-circuit for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON during cooling operation, the compressor stops (E6).

(18) External input/output control (CnT or CnTA)

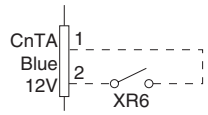
External input/output connectors are provided on the indoor unit control PCB, and each input/output is possible to be changed by RC-EX3A.

Be sure to connect the wired remote control to the indoor unit. Remote operation with CnT/CnTA only is not possible.

・CnT



・CnTA



Input/Output	Connector	Factory default setting	RC-EX3A function name
Output	CnT-2 (XR1)	Operation output	External output 1
	CnT-3 (XR2)	Heating output	External output 2
	CnT-4 (XR3)	Compressor ON output	External output 3
	CnT-5 (XR4)	Inspection(Error) output	External output 4
"Input	CnT-6 (XR5)	Remote operation input	External input 1
(Volt-free contact)"	CnTA (XR6)	Remote operation input	External input 2

■ Priority order for combinations of CnT and CnTA input.

		CnTA					
		① Operation stop level	② Operation stop pulse	③ Operation permission/prohibition	④ Operation permission/prohibition pulse	⑤ Cooling/heating selection level	⑥ Cooling/heating selection pulse
CnT	① Operation stop level	CnT ①	CnT ①	CnT ① +CnTA ②	CnT ①	CnT ① /CnTA ⑤	CnT ① /CnTA ⑥
	② Operation stop pulse	CnT ②	CnT ②	CnT ② +CnTA ③	CnT ②	CnT ② /CnTA ⑤	CnT ② /CnTA ⑥
	③ Operation permission/prohibition level	CnT ③ >CnTA ①	CnT ③ >CnTA ②	CnT ③ +CnTA ③	CnT ③	CnT ③ /CnTA ⑤	CnT ③ /CnTA ⑥
	④ Operation permission/prohibition pulse	CnT ④	CnT ④	CnT ④ +CnTA ③※	CnT ④	CnT ④ /CnTA ⑤	CnT ④ /CnTA ⑥
	⑤ Cooling/heating selection level	CnT ⑤ /CnTA ①	CnT ⑤ /CnTA ②	CnT ⑤ /CnTA ③	CnT ⑤ /CnTA ④	CnT ⑤	CnT ⑤
	⑥ Cooling/heating selection pulse	CnT ⑥ /CnTA ①	CnT ⑥ /CnTA ②	CnT ⑥ /CnTA ③	CnT ⑥ /CnTA ④	CnT ⑥	CnT ⑥

Note Following operation commands are accepted when the operation prohibition is set with CnTA as indicated with *.

Individual operation command from remote control, test run command from outdoor unit and operation command from option device, CnT input.

Reference: Explanation on the codes and the combinations of codes in the table above

1. In case of CnT “Number”, the CnT “Number” is adopted and CnTA is invalidated.
2. In case of CnTA “Number”, the CnTA “Number” is adopted and CnT is invalidated.
3. In case of CnT “Number”/CnTA “Number”, the CnT “Number” and the CnTA “Number” become independent functions each other.
4. In case of CnT “Number” + CnTA “Number”, the CnT “Number” and the CnTA “Number” become competing functions each other.
5. In case of CnT “Number” > CnTA “Number”, the function of CnT “Number” supersedes that of CnTA “Number”.
6. In case of CnT “Number” < CnTA “Number”, the function of CnTA “Number” supersedes that of CnT “Number”.

(The “Number” above means ① - ⑥ in the table.)

(a) Output for external control (remote display)

Indoor unit outputs the following signal for operation status monitoring.

	Output name	Condition
1	Operation output	During operation
2	Heating output	During heating operation
3	Compressor ON output	During compressor operation
4	Inspection(Error) output	When anomalous condition occurs.
5	Cooling output	During cooling operation
6	Fan operation output 1	When indoor unit's fan is operating
7	Fan operation output 2	When indoor unit's fan is operating, and fan speed is higher than Hi speed.
8	Fan operation output 3	When indoor unit's fan is operating, and fan speed is Lower than Me speed.
9	Defrost/oil return output	When indoor unit receive defrost/oil return signal from the outdoor unit.
10	Ventilation output	When "Venti.ON" is selected from remote control
11	Free cooling output	When the ambient temperature is between 10 - 18°C in cooling and fan operation
12	Indoor unit overload alrm output	Refer to "IU overload alarm"
13	Heater output	Refer to "(8) Thermostat operation (b) Heating"

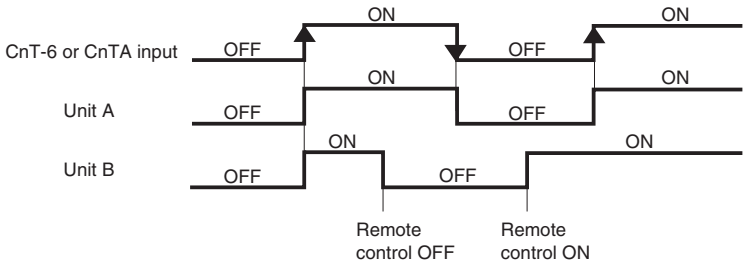
(b) Input for external control

The external input for the indoor unit can be selected from the following input.

	Input name	Content
1	Run/Stop	Refer to [(18) (c) Remote operation input]
2	Premission/Prohibition	Refer to [(19) Operation permission/prohibition]
3	Cooling/Heating	Refer to [(21) Selection of cooling/heating external input function]
4	Emergency stop	Indoor/outdoor units stop the operation, and [E63] is displayed.
5	Setting temperature shift	Set temperature is shifted by +2/-2°C in cooling/heating.
6	Forced thermo-OFF	Unit goes thermo off.
7	Temporary stop	Refer to [(20) Temporary stop input]
8	Silent mode	Outdoor unit silent mode is activated.

(i) In case of "Level input" setting (Factory default)

Input signal to CnT-6 or CnTA is OFF→ON …… unit ON
Input signal to CnT-6 or CnTA is ON→OFF …… unit OFF
Operation is not inverted.

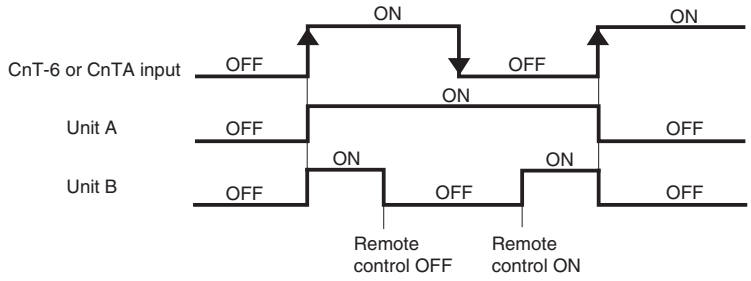


Note The latest operation has priority

It is available to operate/stop by remote control or central control.

(ii) In case of "Pulse input" setting (Local setting)

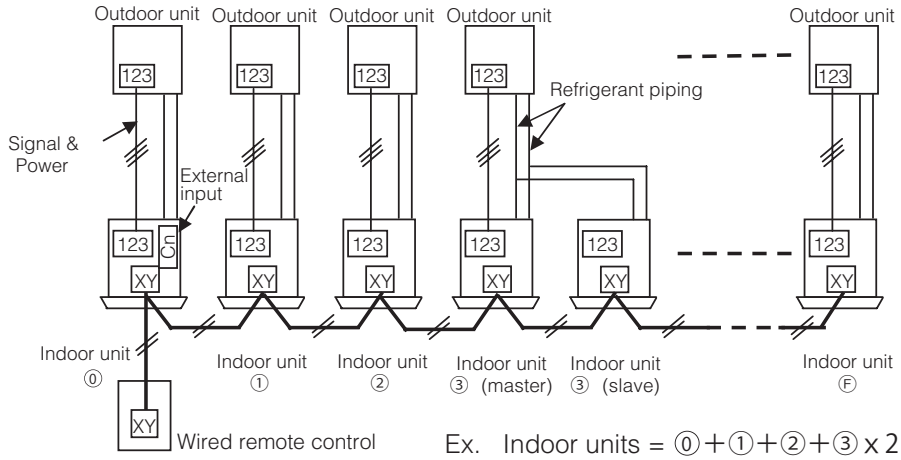
It is effective only when the input signal to CnT-6 or CnTA is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



(c) Remote operation input

(i) In case of multiple units (Max. 16 indoor units group) are connected to one wired remote control

When the R/C function setting of wired remote control for "External control set" is changed from "Individual (Factory default)" to " For all units", all units connected in one wired remote control system can be controlled by external operation input.



Ex. Indoor units = ⓪+①+②+③ x 2+……Ⓕ ≦16 units

	Individual operation (Factory default)		All units operation (Local setting)	
CnT-6 or CnTA	ON	OFF	ON	OFF
	Only the unit directly connected to the remote control can be operated.	Only the unit directly connected to the remote control can be stopped opeartion.	All units in one remote control system can be operated.	All units in one remote control system can be stopped operation.
	Unit ① only	Unit ① only	Units ① – Ⓕ	Units ① – Ⓕ

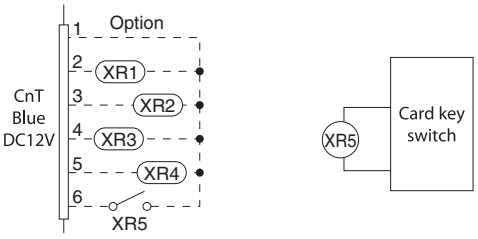
When more than one indoor unit (Max. 16 indoor units) are connected in one wired remote control system:
(1) With the factory default, external input to CnT-6 or CnTA is effective for only the unit ①.
(2) When setting "For all unit" (Local setting), all units in one remote control system can be controlled by external input to CnT-6 or CnTA on the indoor unit ①.
(3) External input to CnT-6 or CnTA on the other indoor unit than the unit ① is not effective.

(19) Operation permission/prohibition

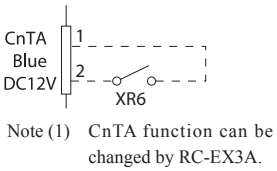
(In case of adopting card key switches or commercially available timers)

When the indoor function setting of wired remote control for "Operation permission/prohibition" is changed from "Invalid (Factory default)" to " Valid", following control becomes effective.

・CnT



・CnTA



Note (1) CnTA function can be changed by RC-EX3A.

	Normal operation (Factory default)		Operation permission/prohibition mode "Valid" (Local setting)	
CnT-6 or CnTA	ON	OFF	ON	OFF
	Operation	Stop	Operation permission*1	Operation prohibition (Unit stops)

*1 **Only the "LEVEL INPUT" is acceptable for external input**, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote control, operation status will be changed as follows.

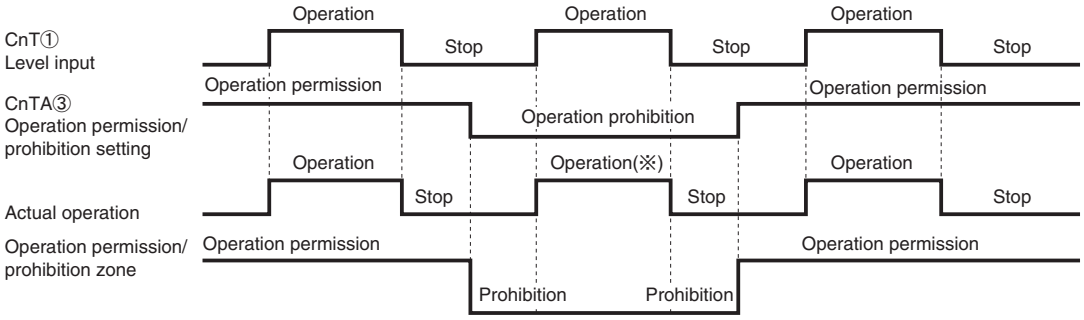
In case of "Level input" setting	In case of "Pulse input" setting
Unit operation from the wired remote control becomes available※1	Unit starts operation ※2

※1) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Level input (Factory default)";
① When card key switch is ON (CnT-6 or CnTA ON: Operation permission), start/stop operation of the unit from the wired remote control becomes available.
② When card key switch is OFF (CnT-6 or CnTA OFF: Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote control becomes unavailable.

※2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";
① When card key switch is ON (Operation permission), the unit starts operation in conjunction with ON signal, and also start/stop operation of the unit from the wired remote control becomes available.
② When card key switch is OFF (Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote control becomes unavailable.

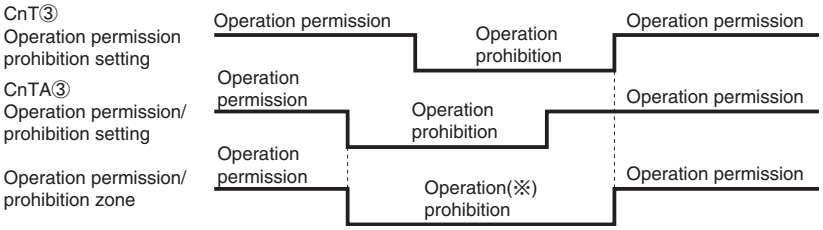
3) This function is invalid only at "Center mode" setting done by central control.

(a) In case of CnT ① Operation stop level > CnTA ③ Operation permission/prohibition level



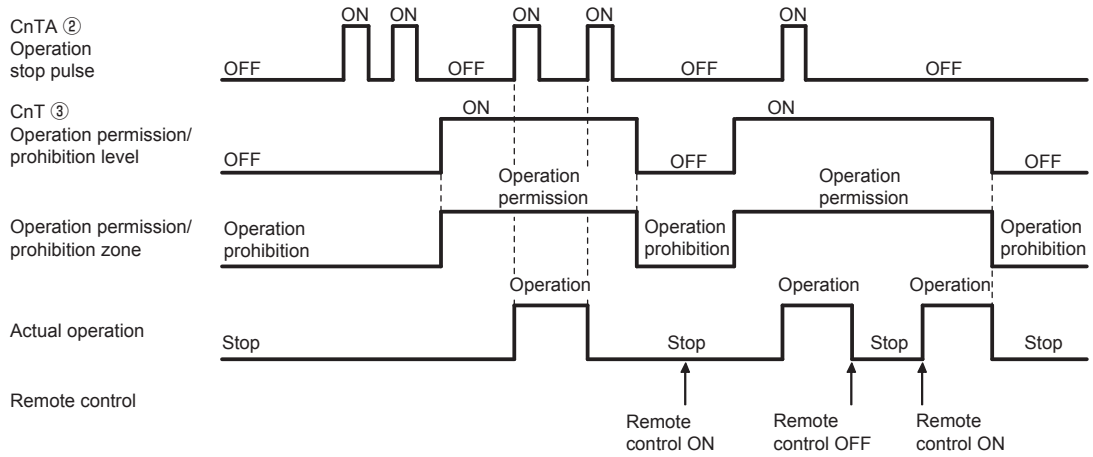
(※) CnT level input supersedes CnTA operation prohibition.

(b) In case of CnT ③ Operation permission/prohibition level + CnTA ③ Operation permission/prohibition level



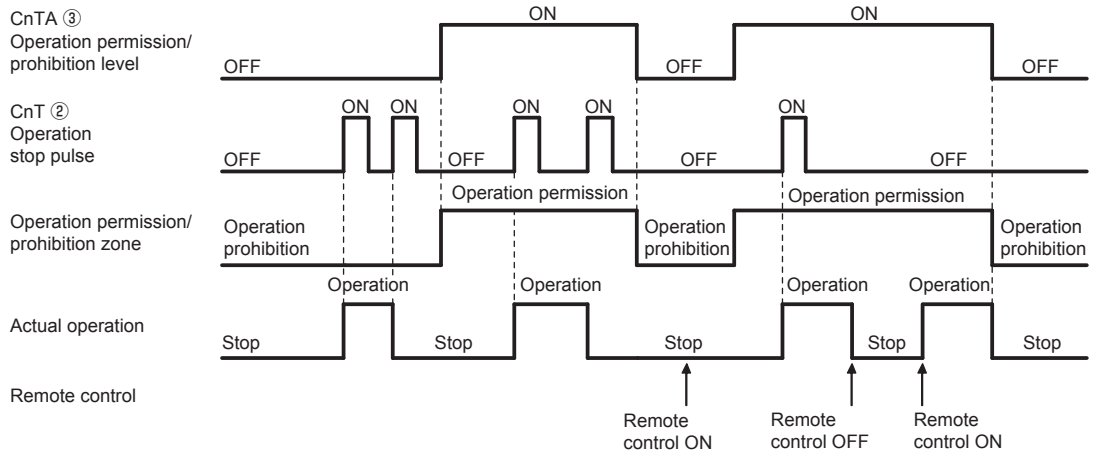
(※) Operation prohibition zone is determined by the OR judgment between CnT operation prohibition zone and CnTA operation prohibition zone.

(c) In case of CnT ③ Operation permission/prohibition level > CnTA ② Operation stop pulse



Note (1) If it is prohibited by CnT, all "Operation" and "Stop" commands are not accepted.

(d) In case of CnT ② Operation stop pulse + CnTA ③ Operation permission/prohibition level

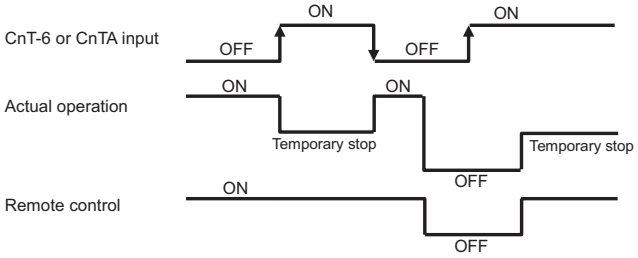


(20) Temporary stop input

In case of temporary stop, operation lamp of remote control lights, but indoor/outdoor unit stop the operation.

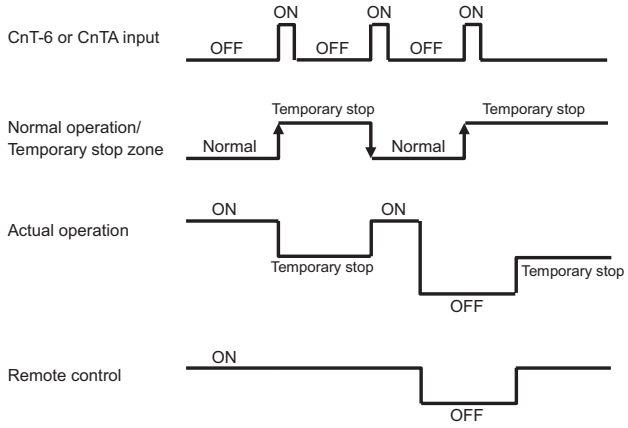
(a) In case of "level input" setting (Factory default)

Input signal to CnT-6 or CnTA is OFF → ON : Temporary stop
Input signal to CnT-6 or CnTA is OFF → ON : Normal operation



(b) In case of "pulse input" setting (Local setting)

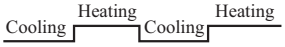
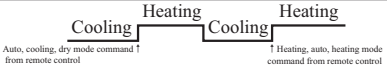
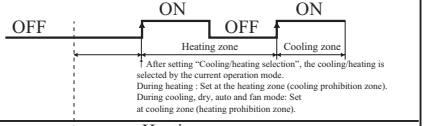
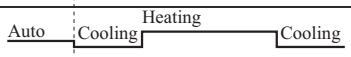
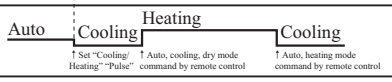
It is effective only when the input signal is changed OFF→ON, and "temporary stop/normal operation" is inverted.



(21) Selection of cooling/heating external input function

(a) When "External input 1 setting: Cooling/heating" is set by the indoor unit function from remote control, the cooling or heating is selected with CnT-6 or CnTA.
(b) When the external input 1 method selection: Level input is set by the indoor unit function:
・CnT-6 or CnTA: OPEN → Cooling operation mode
・CnT-6 or CnTA: CLOSE → Heating operation mode
(c) When the external input 1 method selection: Pulse input is set by the indoor unit function:
If the external input is changed OPEN → CLOSE, operation modes are inverted (Cooling → Heating or Heating → Cooling).
(d) If the cooling/heating selection signal is given by the external input, the operation mode is transmitted to the remote control.

■ Selection of cooling/heating external input function

External input selection	External input method	Operation	
External input selection Cooling/heating selection	⑤ Level	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	
	⑥ Pulse	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	

Note Regarding the priority order for combinations of CnT and CnTA, refer to page 19.

(22) Fan control at heating startup

(a) Starting conditions

At the start of heating operation and after the end of hot start control, if the difference of setting temperature and return air temperature is 5°C or higher, this control is performed.

(b) Contents of control

(i) Sampling is made at each minute and, when the indoor heat exchanger temperature (detected with Thi-R) is 37°C or higher, present number of revolutions of indoor fan speed is increased by $10min^{-1}$.

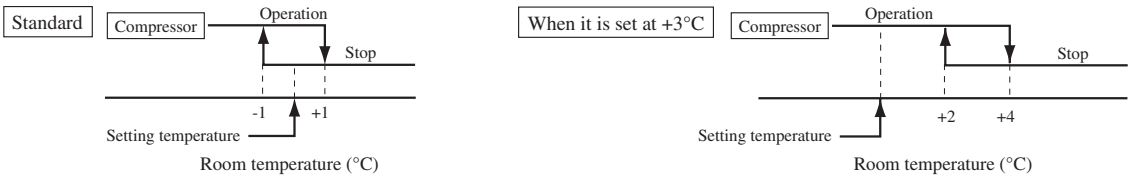
(ii) If the indoor heat exchanger temperature drops below 37°C at next sampling, present number of revolutions of indoor fan speed is reduced by $10min^{-1}$.

(c) Ending conditions

Indoor fan speed is reduced to the setting air flow rate when the compressor OFF is established and at 30 minutes after the start of heating operation.

(23) Room temperature detection temperature compensation during heating

With the standard specification, the compressor is turned ON/OFF with the thermostat setting temperature. When the thermostat is likely to turn OFF earlier because the unit is installed at the ceiling where warm air tends to accumulate, the setting can be changed with the wired remote control indoor unit function "SP OFFSET". The compressor and the heater are turned ON/OFF at one of the setting temperature +3, +2 or +1°C in order to improve the feeling of heating. The setting temperature, however, has the upper limit of 30°C.



(24) Return air temperature compensation

This is the function to compensate the deviation between the detection temperature by the return air temperature sensor and the measured temperature after installing the unit.

(a) It is adjustable in the unit of 0.5°C with the wired remote control indoor unit function "RETURN AIR TEMP".

• +1.0°C, +1.5°C, +2.0°C • -1.0°C, -1.5°C, -2.0°C

(b) Compensated temperature is transmitted to the remote control and the compressor to control them.

Note (1) The detection temperature compensation is effective on the indoor unit temperature sensor only.

(25) High power operation (RC-EX3A only)

It operates at with the set temperature fixed at 16°C for cooling, 30°C for heating and maximum indoor fan speed for 15 minutes maximum.

(26) Energy-saving operation (RC-EX3A only)

It operates with the setting temperature fixed at 28°C for cooling, 22°C for heating or 25°C for auto. When fan control in cooling/heating thermo-OFF setting is "Set fan speed", fan speed during thermo-OFF is changed to "Low". (Maximum capacity is restricted at 80%.)

(27) Warm-up control (RC-EX3A only)

Operation will be started 5 to 60 minutes before use according to the forecast made by the microcomputer which calculates when the operation should be started in order to warm up the indoor temperature near the setting temperature at the setting time of operation start.

(28) Home leave mode (RC-EX3A only)

When the unit is not used for a long period of time, the room temperature is maintained at a moderate level, avoiding extremely hot or cool temperature.

(a) Cooling or heating is operated according to the outdoor temperature (factory setting 35°C for cooling, 0°C for heating) and the setting temperature. (factory setting 33°C for cooling, 10°C for heating)

(b) Setting temperature and indoor fan speed can be set by RC-EX3A.

(29) Auto temperature setting (RC-EX3A only)

Setting temperature is adjusted automatically at the adequate temperature the center setting temperature is 24°C by correcting the outdoor air temperature.

(30) Fan circulator operation (RC-EX3A only)

When the fan is used for circulation, the unit is operated as follows depending on the setting with the remote control.

(a) If the invalid is selected with the remote control, the fan is operated continuously during the fan operation. (normal fan mode)

(b) If the valid is selected with the remote control, the fan is operated or stopped when on the difference of the remote control temperature sensor and the return air temperature sensor becomes bigger than 3°C.

(31) The operation judgment is executed every 5 minutes (RC-EX3A only)

Setting temperature Ts is changed according to outdoor temperature.

This control is valid with cooling and heating mode. (Not auto mode)

(a) Operate 5 minutes forcedly.

(b) Setting temperature is adjusted every 10 minutes.

(i) Cooling mode.
Ts = outdoor temperature − offset value

(ii) Heating mode.
Ts = outdoor temperature − offset value

(c) If the return air temperature lower than 18°C in cooling or return air temperature becomes higher than 25°C in heating, unit goes thermostat OFF.

(32) Auto fan speed control (RC-EX3A only)

In order to reach the room temperature to the set temperature as quickly as possible, the air flow rate is increased when the set temperature of thermostat differs largely from the return air temperature. According to temperature difference between set temperature and return air temperature, indoor fan speed are controlled automalically.

・Auto 1: Changes the indoor fan speed within the range of Hi ↔ Me ↔ Lo.

・Auto 2: Changes the indoor fan speed within the range of P-Hi ↔ Hi ↔ Me ↔ Lo.

(33) Indoor unit overload alarm (RC-EX3A only)

If the following condition is satisfied at 30 minutes after starting operation, RC-EX3A shows maintenance code "M07" and the signal is transmitted to the external output (CnT-2-5).

・Cooling, Dry, Auto(Cooling) : Indoor air temperature = Set room temperature by remote control + Alarm temperature difference

・Heating, Auto(Heating) : Indoor air temperature = Set room temperature by remote control - Alarm temperature difference

Alarm temperature difference is selectable between 5 to 10°C.

If the following condition is satisfied or unit is stopped, the signal is disappeared.

・Cooling, Dry, Auto(Cooling) : Indoor air temperature = Set room temperature + Alarm temperature difference -2°C

・Heating, Auto(Heating) : Indoor air temperature = Set room temperature - Alarm temperature difference +2°C

(34) Peak-cut timer (RC-EX3A only)

Power consumption can be reduced by restricting the maximum capacity.

Set the [Start time], the [End time] and the capacity limit % (Peak-cut %).

・4-operation patterns per day can be set at maximum.

・The setting time can be changed by 5-minute interval.

・The selectable range of capacity limit % (Peak-cut %) is from 0% to 40-80% (20% interval).

・Holiday setting is available.

(35) Motion sensor control (Option, RC-EX3A and RCN-E2 only)

The sensor determines the presence of people and the amount of activity, and the following controls are done by the motion sensor.

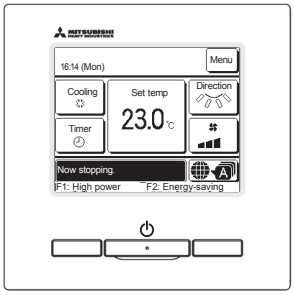
Following settings are necessary to activate motion sensor control.

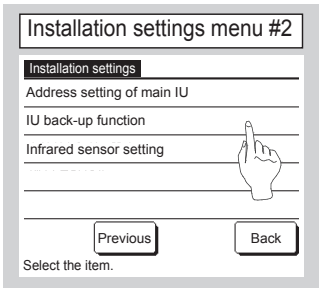
(a) Infrared (motion) sensor setting: Installation setting of remote control
The indoor unit which is set to "Enable" become valid.

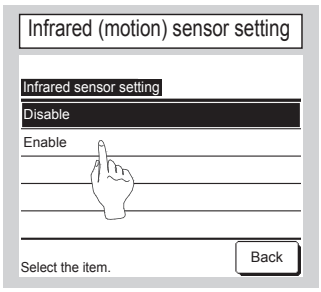
(b) Infrared (motion) sensor control: Energy-saving setting of remote control
The function which is set to "Enable" become valid.

Installed wired remote control

TOP screen **Menu** ⇨ **Service setting** ⇨ **Installation settings** ⇨ **Service password**

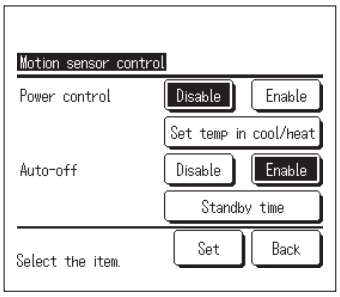






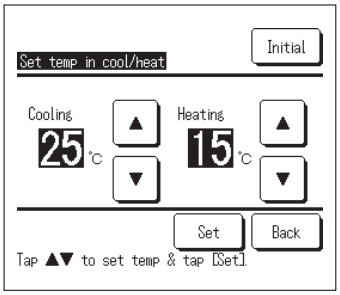
TOP screen **Menu** ⇨ **Energy-saving setting** ⇨ **Infrared sensor control** or **Motion sensor control**

The Motion sensor control screen and contents of the current settings are displayed.



Select Enable/Disable for Power control. When you select Enable, the set temperature is gradually adjusted to ±3.0 based on the amount of activities.

Tap Set temp in cool/heat .

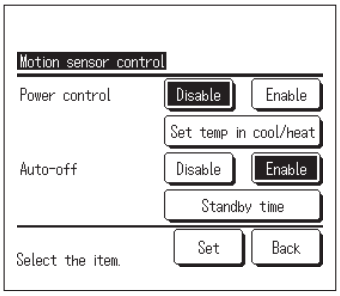


Use the ▲ ▼ button to set the temperature, and tap the Set button. Temporarily determine the set temperature. The allowable range is as follows:

Cooling: 25 to 35°C (in unit of 1°C, Initial setting 33°C)

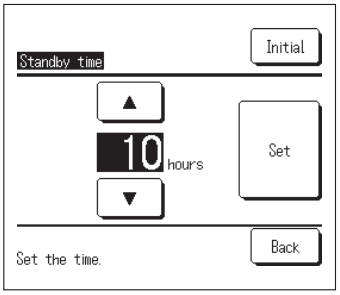
Heating: 10 to 20°C (in unit of 1°C, Initial setting 15°C)

If the amount of activities continues to be small, Set temp is changed to the set temperature and the power of the air conditioner is suppressed. "Power control ON" is displayed when power is being controlled. Also, Set temp displays the adjusted temperature.



Select Enable/Disable for Auto-off. If you select Enable, the unit judges that there is no one around based on the amount of activities. After one hour, the unit will be in the "Operation wait" state.

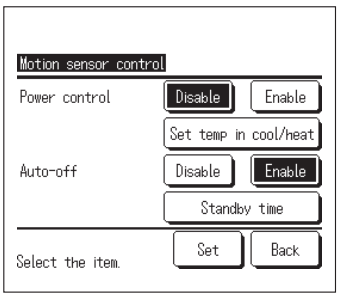
Tap Standby time .



Use the ▲ ▼ button to set the time, and tap the Set button. You can set the time from one to 50 hours in one-hour increments. Temporarily determine the time from when the unit enters the "Operation wait" state to when "Complete stop" is executed based on the fact that the unit continuously judges that there is no one around.

Operation wait: The air conditioner stops, however, it resumes operation when a person returns. "In auto-off mode" is displayed during "Operation wait".

Complete stop: The air conditioner stops and does not resume operation even when a person returns. When "Complete stop" is executed, "In auto-off mode" disappears, and the operation lamp turns off. To resume operation, press the Run/Stop switch.



Set each item, then tap the Set button.

Motion sensor control is selected.

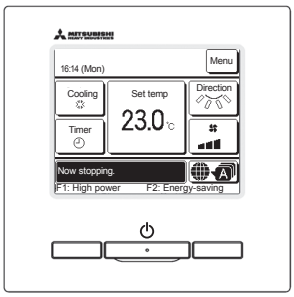
* If you do not tap the Set button on this screen, Motion sensor control is not executed.

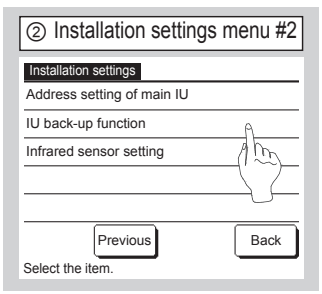
Note

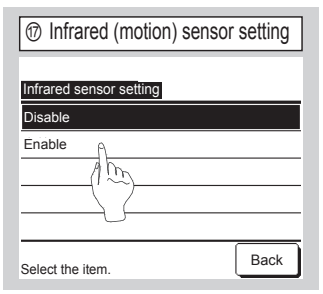
If Motion sensor control is not executed even after you make these settings, select the TOP screen Menu ⇒ Service setting ⇒ Installation settings ⇒ Motion sensor control, and check that Motion sensor control is set to Enable. If it is set to Disable, change to Enable. (For details, refer to the Installation Manual.)

RC-EX3A

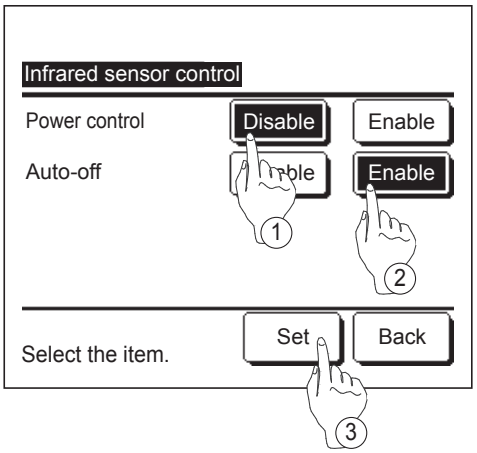
TOP screen **Menu** ⇨ **Service setting** ⇨ **Installation settings** ⇨ **Service password**







TOP screen **Menu** ⇨ **Energy-saving setting** ⇨ **Infrared sensor control** or **Motion sensor control**



The Infrared sensor control screen and contents of the current settings are displayed.

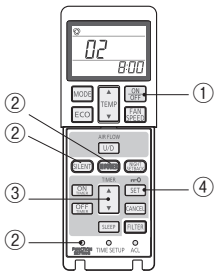
① Enable/disable power control.

② Enable/disable auto-off.

③ After you set each item, tap the **Set** button. The display returns to the Energy-saving setting menu screen.

RCN-E2

1. Set indoor functions
① Press the ON/OFF button to stop the unit.
② Press the desired one of the buttons shown item **2.** while holding down the FUNCTION SETTING switch.
③ Use the selection buttons, ▲ and ▼, to change the setting.
④ Press the SET button.
The buzzer on the remote control signal receiver beeps twice, and the LED lamp flashes four times at two-second intervals.



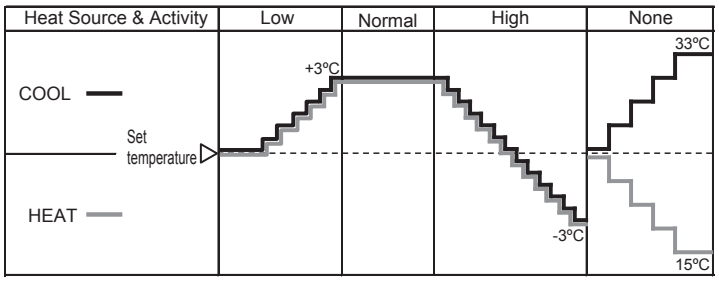
2. Setting details

Button	Number indicator	Function setting
SILENT	00	Infrared sensor setting (Motion sensor setting) : Disable
	01	Infrared sensor setting (Motion sensor setting) : Enable
HI POWER	00	Infrared sensor control (Motion sensor control) : Disable
	01	Infrared sensor control (Motion sensor control) : Power control only
	02	Infrared sensor control (Motion sensor control) : Auto OFF only
	03	Infrared sensor control (Motion sensor control) : Power control and Auto OFF

(i) Power saving / comfort control

The set temperature is adjusted according to the presence of people and their amount of activity detected by the infrared (motion) sensor.

MODE:AUTO/COOL/HEAT mode operation



Low	**When the extent of human activity is low**
High	**When the extent of human activity is high**
None	**When there is no one in the room**

- When the "None" continues for 1 hour, the FAN SPEED is set Lo.

Notes (1) When the following operations are set, power saving control will be canceled.
① Energy-saving, Home leave mode, Warm-up control, Cooling operation check.
② When the operation mode is changed DRY or FAN.
(2) Not operable while the air-conditioner is OFF.

(ii) Auto-off control

When no activity is detected for 1 hour, unit will go stand-by mode.※ Unit will re-start operation automatically with the original set temperature by activity detection during the stand-by mode. When stand-by mode continues for 12 hours, unit stops.

※Compressor keeps stopped regardless of the set temperature.

(36) Refrigerant leak detection control

A refrigerant sensor at the bottom of the indoor unit constantly detects refrigerant leakage while the unit is energized.

(a) Starting condition

(i) When the refrigerant sensor detects a refrigerant leak (An "alarm" output is issued from refrigerant sensor connector CN1-2.)

(b) Control contents

(i) The remote control will display "E23 Refrigerant is leaking. Ventilate room." and the registered contact details are displayed.
(ii) The buzzer on the connected remote control will sound for 5 seconds.
(iii) After an abnormal shutdown of the indoor unit, the fan operation is performed to prevent leaked refrigerant from remaining in the unit.
(iv) If "Refrigerant leakage" is selected as the CnT output according to the input unit function setting, it is also output from the CnT.
(v) Once an error occurs, even if repairs are carried out to the leakage point of the refrigerant, the error will occur repeatedly unless the refrigerant sensor is replaced or the error is reset.
For information on how to treat the refrigerant sensor, see page 132.

(37) Refrigerant sensor control

Monitor refrigerant sensor failure.

(a) Refrigerant sensor failure

(i) Starting condition
① When the refrigerant sensor fails (A "fault" signal is output from refrigerant sensor connector CN1-3.)

(ii) Control contents
① The remote control will display "Refrigerant sensor is faulty." and the registered contact details are displayed.
② The buzzer on the connected remote control will sound for 5 seconds.

(b) Refrigerant sensor replacement (9 years elapsed)

(i) Starting condition
① Continuous energization time of the refrigerant sensor exceed 9 years. (The "Replace" signal is output from refrigerant sensor connector CN1-3.)

(ii) Control contents
① For 1 minute after the air-conditioner is started or stopped, the remote control will display the message "Refrigerant sensor replace time has passed." and the resisterd contact details are displayed.
② Touching the message display switches the screen and selecting "Yes" will cause the message and contact details to disappear from all remote controls connected to that remote control for 720 hours.

(c) Refrigerant sensor disconnected

(i) Starting condition
① The control board cannot detect either input from the refrigerant sensor for 5 minutes continuously.

(ii) Control contents
① The remote control will display "Refrigerant sensor is disconnected." and the registered contact details are displayed.

1.1.4 Operation control function by the outdoor control

(1) Determination of compressor speed

Required compressor speed

(a) Cooling/dehumidifying operation

Unit: rps

Model		FDC71	FDC100	FDC125	FDC140
Max. required compressor speed	Usual operation	105	75	95	95
	Silent mode, outdoor air temperature ≦ 15°C	48	40	50	58
	Silent mode II (When SW3-4 ON (FDC71) / When SW4-1 ON (FDC100-140))	60	36	36	36
Min. required compressor speed		11	11	11	11

(b) Heating operation

Unit: rps

Model		FDC71	FDC100	FDC125	FDC140
Max. required compressor speed	Usual operation	120	100	120	120
	Silent mode	60	39	50	59
	Silent mode II (When SW3-4 ON (FDC71) / When SW4-1 ON (FDC100-140))	60	36	36	36
Min. required compressor speed		12	11	11	11

(c) If the indoor fan speed becomes “Me” or “Lo”, max. required compressor speed goes down accordingly depending on indoor unit model.

(d) Max. required compressor speed under high outdoor air temperature in cooling mode

Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC71	FDC100	FDC125	FDC140
Max. required compressor speed	Outdoor air temperature is 37°C or higher	80	75	95	95
	Outdoor air temperature is 40°C or higher	63	75	75	75
	Outdoor air temperature is 46°C or higher	50	70	70	70

(e) Max. required compressor speed under high outdoor air temperature in heating mode

Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC71	FDC100	FDC125	FDC140
Max. required compressor speed	Outdoor air temperature is 18°C or higher	76	80	80	85
	Outdoor air temperature is 10°C or higher	100	75	95 (92)	95 (92)

Note Value in ( ) are for the 3 phase models.

(f) Selection of max. required compressor speed by heat exchanger temperature

(i) Maximum required compressor speed is selected according to the outdoor heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor heat exchanger temperature (Thi-R) during heating mode.

(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), whichever the highest applies.
When there are 2 outdoor heat exchanger temperatures (Tho-R), whichever the higher applies.

Unit: rps

Model			FDC71	FDC100	FDC125	FDC140
Max. required compressor speed	Cooling/ dehumidifying	Outdoor heat exchanger temperature is 61〔55〕°C or higher	60	70	95 (92)	95 (92)
	Heating	Indoor heat exchanger temperature is 47°C or higher	110	–	–	–
		Indoor heat exchanger temperature is 54〔55〕°C or higher	100	100	100	100
		Indoor heat exchanger temperature is 60°C or higher	90	–	–	–

Notes (1) Value in 〔 〕is for the model FDC100-140.
(2) Value in ( ) are for the 3 phase models.

(g) When any of the controls from (a) to (f) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required compressor speed.

(h) During heating, it is operated with the maximum required compressor speed until the indoor heat exchanger temperature becomes 40°C or higher.

(2) Compressor start control

(a) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

(b) However, at initial start after turning the power source breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote control) in order to prevent the oil loss in the compressor.

If the cooling/dehumidifying/heating operation is selected from the remote control when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote control.

(3) Compressor soft start control

(a) Compressor protection start I

[Control condition]

Normally, the operation compressor speed is raised in this start pattern.

[Control contents]

(i) Starts with the target compressor speed at **A** rps.
However, when the outdoor air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (Thi-A) is 25°C or higher and the outdoor air temperature (Tho-A) is10°C or higher during heating, it starts at **C** rps.

(ii) At 30 seconds after the start of compressor, its target compressor speed changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation compressor speed fixed at **B** rps.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC71	Cooling/Dehumidifying	45	45	30
	Heating	45	45	30
FDC100-140	Cooling/Dehumidifying	35	35	25
	Heating	35	35	25

(b) Compressor protection start III

[Control condition]

Number of compressor start is only 1 counted after the power source breaker ON.

[Control contents]

Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

(i) Low operation compressor speed control during cooling/dehumidifying

[Control condition]

Upon establishing the conditions of compressor protection start III, the low operation compressor speed control is performed during cooling/dehumidifying.

[Control contents]

1) Starts with the target compressor speed at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.
2) At 30 seconds after the compressor start, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC71	Cooling/Dehumidifying	45	45	30
FDC100-140	Cooling/Dehumidifying	35	35	25

(ii) Low operation compressor speed control during heating

[Control condition]

When the conditions of compressor protection start III are established and the following condition is satisfied, the low number of revolutions operation control is performed during heating.

1) At 30 minutes or more after turning the power source breaker on.

[Control contents]

1) Starts the compressor with its target compressor speed at A rps. However, when the indoor return air temperature (Thi-A) is 25°C or higher and the outdoor air temperature (Tho-A) is10°C or higher, it starts at **C** rps.
2) At 30 seconds after the start of compressor, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC71	Heating	45	45	30
FDC100-140	Heating	35	35	25

(4) Outdoor fan control

(a) Outdoor fan tap and fan motor speed

Unit: min^{-1}

Model	Mode	Fan motor tap						
FDC71		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	400	600	710	810	850	950
	Heating	200	400	600	710	810	850	950
FDC100-140		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	370	560	640	745	870	910
	Heating	200	370	560	650	830	870	910

(b) Fan tap control during cooling/defumidifying operation

Fan taps are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note It is detected by Tho-R1 or R2, whichever the higher.

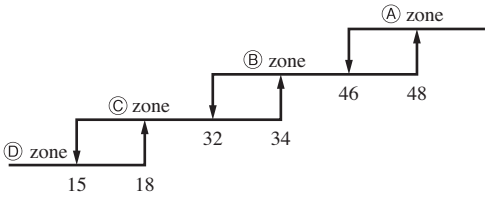
	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5 (6)	Tap 5 (6)	Tap 5 (6)	Tap 4
ⓑ zone	Tap 5 (6)	Tap 5 (6)	Tap 4 (6)	Tap 3
ⓒ zone	Tap 4	Tap 4	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

Note Value in ( ) are for the model FDC71.

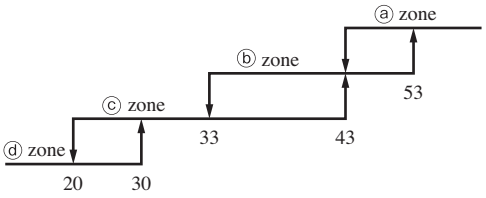
• Silent mode only

	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5	Tap 5	Tap 5	Tap 4
ⓑ zone	Tap 5	Tap 4 (5)	Tap 3	Tap 3
ⓒ zone	Tap 4	Tap 3	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

Note Value in ( ) is for the model FDC71.



Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

(c) Fan tap control during heating operation

Fan taps are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note It is detected by Tho-R1 or R2, whichever the lower.

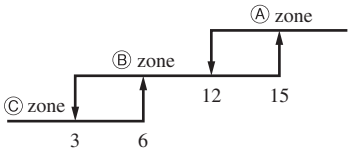
	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3 (1)	Tap 3 (1)	Tap 4 (2)
ⓐ' zone	Tap 3 (2)	Tap 3 (2)	Tap 4 (3)
ⓑ zone	Tap 3	Tap 4 (3)	Tap 5 (4)
ⓒ zone	Tap 4 (3)	Tap 5 (4)	Tap 6 (5)
ⓓ zone	Tap 5 (4)	Tap 6 (5)	Tap 7 (6)

Note Value in ( ) are for the model FDC71.

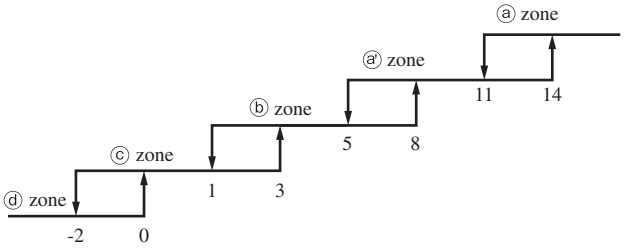
• Silent mode only

	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3 (1)	Tap 3 (1)	Tap 3 (2)
ⓐ' zone	Tap 3 (2)	Tap 3 (2)	Tap 3
ⓑ zone	Tap 3	Tap 3	Tap 5 (3)
ⓒ zone	Tap 4 (3)	Tap 5 (3)	Tap 6 (5)
ⓓ zone	Tap 4	Tap 5	Tap 6

Note Value in ( ) are for the model FDC71.



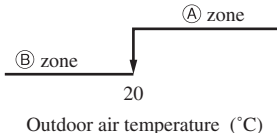
Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

(d) Outdoor fan control at cooling low outdoor air temperature

(i) If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, outdoor fan is controlled with ±5 – ±20min-1 to keep high pressure level which is controlled by outdoor heat exchanger temperature (Tho-R1, R2).
Note It is detected by Tho-R1 or R2, whichever the higher.



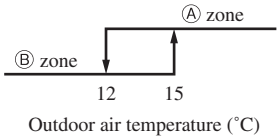
(ii) The outdoor heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 30 seconds.

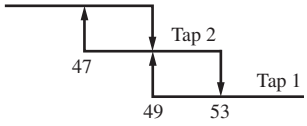
(iii) Range of the outdoor fan speed under this control is as follows.
a) Lower limit: 130min^{-1}
b) Upper limit: 390min^{-1}

(iv) As any of the following conditions is established, this control terminates.
a) When the outdoor air temperature is in the zone Ⓐ and the outdoor heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously
b) When the outdoor heat exchanger temperature at 40°C or higher is established for 40 seconds or more continuously
c) When the outdoor heat exchanger temperature at 50°C or higher is established

(e) Outdoor fan control at heating high outdoor air temperature (FDC71 only)

(i) When all the following conditions are established after the start of compressor, the following control is implemented.
If the outdoor air temperature (Tho-A) is in the zone Ⓐ in the heating mode, it has elapsed 20 seconds from the start of outdoor fan and the outdoor fan is at the tap 3 speed, the outdoor fan speed is controlled according to the indoor heat exchanger temperature (Thi-R1, R2).
Note It is detected with Thi-R1 or R2, whichever the higher.





Indoor heat exchanger temperature (Thi-R1, R2)
(Thi-R1 or R2, whichever the higher)

(ii) The indoor heat exchanger temperature is detected always.

(f) Outdoor fan control by the power transistor radiator fin temperature (FDC100-140 only)

When all the following conditions are established later than 3 minutes after the start of compressor, the following control is implemented

(i) Cooling/dehumidifying

1) Outdoor air temperature (Tho-A) ≧ 33°C
2) Actual compressor speed ≧ **A** rps
3) Power transistor radiator fin temperature ≧ **C** °C

(ii) Heating

1) Outdoor air temperature (Tho-A) ≧ 16°C
2) Actual compressor speed ≧ **B** rps
3) Power transistor radiator fin temperature ≧ **C** °C

(iii) Control contents

1) Raises the outdoor fan tap by 1 tap.
2) When the sampling is for 60 seconds and the value of power transistor radiator fin temperature (Tho-P) is as follows
   a) When the power transistor radiator fin temperature (Tho-P) ≧ **C** °C, the outdoor fan tap is raised by 1 step further.
   b) When **C** °C > power transistor radiator fin temperature (Tho-P) > **D** °C, present outdoor fan tap is maintained.
   c) When the power transistor radiator fin temperature (Tho-P) ≦ **D** °C, the outdoor fan tap is dropped by 1 step.

(iv) Ending conditions

When the operation under the condition of item 2), c) above and with the outdoor fan tap, which is determined by the items (b) and (c) is detected 2 times consecutively

• Compressor speed and power transistor radiator fin temperature

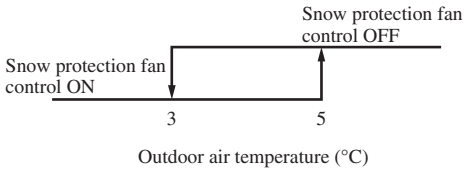
Item / Model	A	B	C	D
FDC100-140	65	65	72	68

(g) Caution at the outdoor fan start control (3 phase model only)

When the outdoor fan is running at 400min^{-1} or more before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan this is normal.

(h) Snow protection fan control (FDC100-140 only)

If the DIP switch (SW3-2) on the outdoor control PCB is turned ON, the outdoor fan is operated for 30 seconds at 4th speed once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.



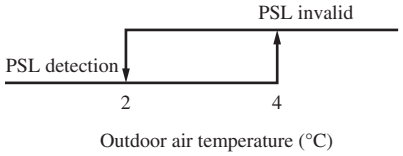
(5) Defrost operation

(a) Starting conditions

If all of the following defrost conditions A or conditions B are satisfied, the defrost operation starts.

(i) Defrost conditions A

1) Accumulative compressor operation time after the end of defrost operation has elapsed 37 minutes, and the accumulative compressor operation time after the start of heating operation (remote control ON) has elapsed 30 minutes.
2) After 5 minutes from the compressor ON
3) After 5 minutes from the start of outdoor fan
4) After satisfying all above conditions, if temperatures of the outdoor heat exchanger temperature sensor (Tho-R1, R2) and the outdoor air temperature sensor (Tho-A) become lower than the defrost operation start temperature as shown by the right figure for 15 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (PSL) stay for 3 minutes within the range below the defrost operation start temperature as shown by the right figure.However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.



(ii) Defrost conditions B

1) When previous defrost ending condition is the time out of defrost operation and it is in the heating operation after the accumulative compressor operation time after the end of defrost operation has become 30 minutes
2) After 5 minutes from the start of compressor
3) After 5 minutes from the start of outdoor fan

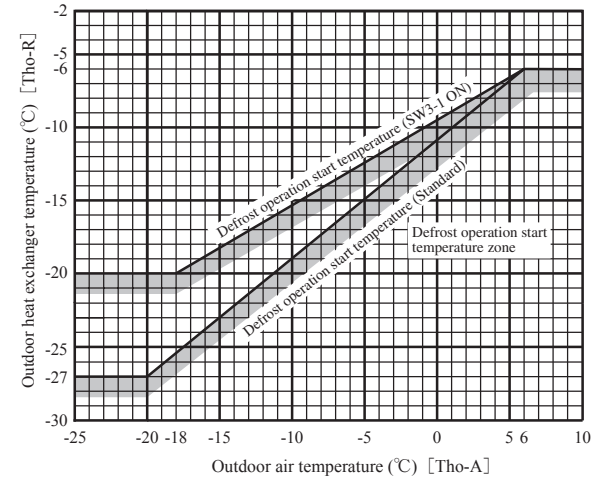
(b) Ending conditions

When any of the following conditions is satisfied, the heating operation starts.

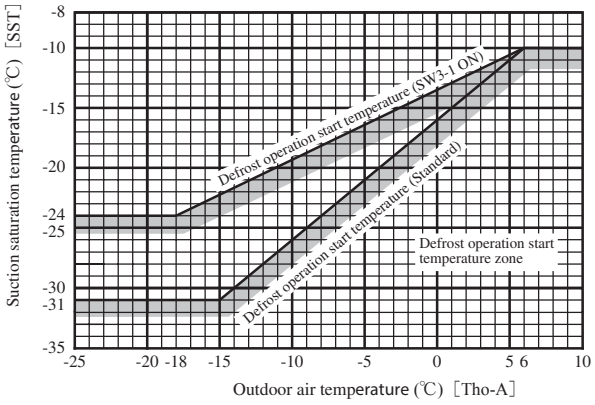
(i) When it has elapsed 13 minutes and 20 seconds after the start of defrost operation (After 10 minutes and 20 seconds for model FDC71)

(ii) When the outdoor heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 60 (10: FDC71) seconds continuously

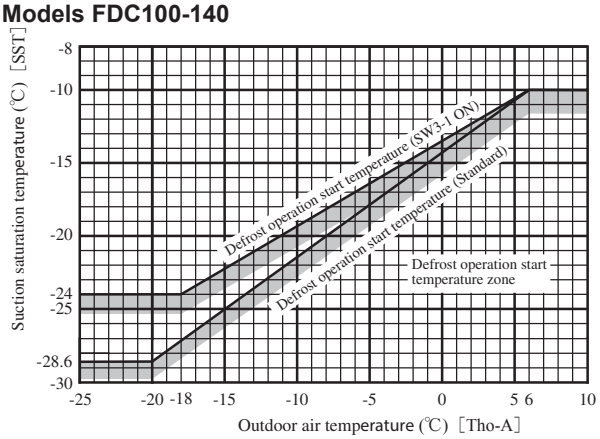
Models FDC71-140



Model FDC71



Models FDC100-140



(c) Switching of defrost control with SW3-1

(i) If SW3-1 on the outdoor control PCB is turned to ON, it becomes easier to enter the defrost operation. Use this when installing a unit at snowing regions.

(ii) Control contents

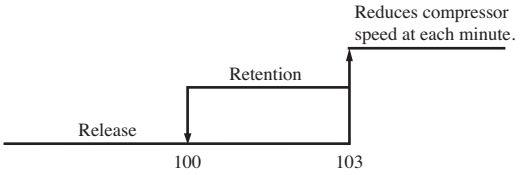
1) It allows entering the defrost operation under the defrost condition A when the accumulative heating operation time becomes 30 minutes. It is 37 minutes at SW3-1 OFF (Factory default).
2) It allows entering the defrost operation under the defrost condition B when the accumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).
3) It allows the defrost operation with the outdoor heat exchanger temperature (Tho-R) and suction pressure saturation temperature (SST) being higher than normal.

(6) Protective control/anomalous stop control by compressor's number of revolutions

(a) Compressor discharge pipe temperature protection

(i) Protective control

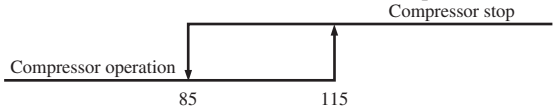
As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed is controlled to suppress the rise of discharge pipe temperature.



Discharge pipe temperature (°C)

(ii) Anomalous stop control

1) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.
2) When it is detected 2 times within 60 minutes or after continuous 30 minutes, including the stop of compressor, E36 is displayed on the remote control and it enters the anomalous stop mode.



Discharge pipe temperature (°C)

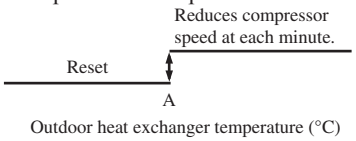
(iii) Reset of anomalous stop mode

As it drops to the reset value of 85°C or lower for 45 minutes continuously, it becomes possible to restart from the remote control.

(b) Cooling high pressure protection

(i) Protective control

1) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor speed is controlled to suppress the rise of high pressure.
2) Control value A is updated to an optimum value automatically according to the operating conditions.

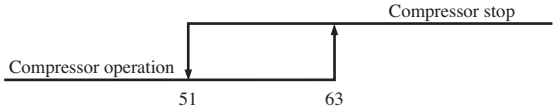


Outdoor heat exchanger temperature (°C)

Control value A
59−53°C

(ii) Anomalous stop control

1) As the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
2) If it is detected 5 times within 60 minutes or 63°C or higher continues for 30 minutes, including the stop of compressor, E35 is displayed on the remote control and it enters the anomalous stop mode.



Outdoor heat exchanger temperature (°C)

(iii) Reset of anomalous stop mode

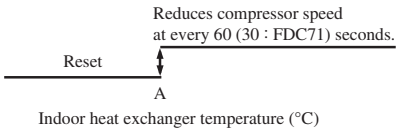
As it reaches the reset value of 51°C or lower, it becomes possible to restart from the remote control.

(c) Heating high pressure protection

(i) Protective control

1) As the indoor heat exchanger temperature (Thi-R) exceeds the setting value, the compressor speed is controlled to suppress the rise of high pressure.

2) Control value A is updated to an optimum value automatically according to the operating conditions.



Model	Existing piping adaptation switch: SW5-1 (SW8-1: model FDC71)	
	OFF (Shipping)	ON
	Control value A (°C)	
FDC71-140	54–48	51–45

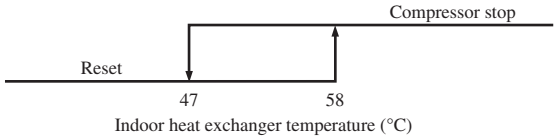
Note Adaptation to existing piping is at ON.

(ii) Anomalous stop control

Operation control function by the indoor unit control - See the heating overload protection, page 17.

(iii) Adaptation to existing piping, stop control

If the existing piping adaptation switch, SW5-1 (model FDC71: SW8-1), is turned ON, the compressor stops to protect existing piping when the indoor heat exchanger temperature (Thi-R) exceeds the setting value.



(d) Anomaly detection control by the high pressure switch (63H1)

(i) If the pressure rises and operates the high pressure switch (opens at 4.15MPa/closes at 3.15MPa), the compressor stops.

(ii) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.

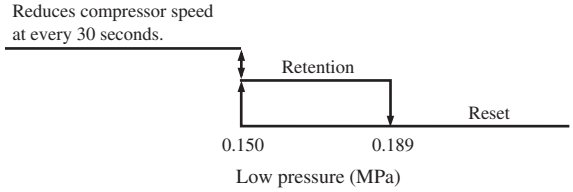
1) When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1

2) When 63H1 has been in the open state for 30 minutes continuously, including the stop of compressor

(e) Low pressure control

(i) Protective control

If the value detected by the low pressure sensor (PSL) exceeds the setting value, the compressor speed is controlled to restrain the drop of pressure.



(ii) Anomalous stop control

1) When a value detected by the low pressure sensor (PSL) satisfies any of the following conditions, the compressor stops to run for its protection.

a) When the low pressure drops to 0.079MPa or lower for 15 seconds continuously

b) At 10 minutes after the start of compressor, the suction superheat becomes 30°C or higher for 60 seconds continuously and the low pressure becomes 0.15MPa or lower

2) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.

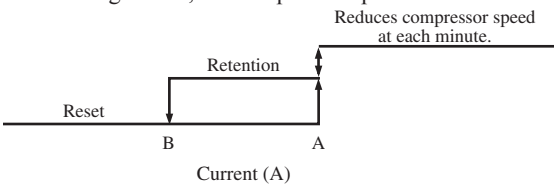
a) When the low pressure drops 5 times within 60 minutes and the compressor stops under any of the above conditions

b) When a value detected with the low pressure sensor becomes 0.079MPa or lower for 5 minutes continuously, including the stop of compressor

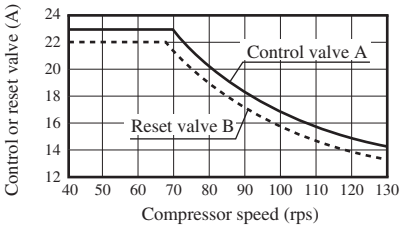
3) However, when the control condition 1). a) is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

(f) Over-current protection current safe controls I, II

Detecting the outdoor inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed is controlled to protect the inverter.



(Fig. C) The control value "A" and the reset value vary depending on the compressor speed.

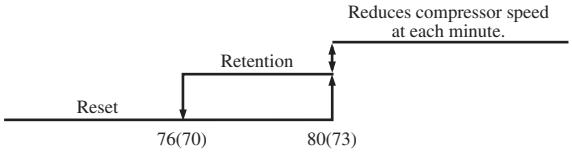


Model		Cooling		Heating	
		Control value A	Reset value B	Control value A	Reset value B
Primary current side	FDC71	18.0	17.0	18.0	17.0
	FDC100	11.0 (23.0)	10.0 (22.0)	11.0 (23.0)	10.0 (22.0)
	FDC125, 140	11.0 (23.0)	10.0 (22.0)	11.0 (25.0)	10.0 (24.0)
Secandary current side	FDC71	※ 1	※ 2	10.0	9.0
	FDC100	11.5 (Fig.C)	10.5 (Fig.C-1)	11.5 (Fig.C)	10.5 (Fig.C-1)
	FDC125, 140	11.5 (Fig.C)	10.5 (Fig.C-1)	11.5 (Fig.C)	10.5 (Fig.C-1)

Notes (1) Value in ( ) are for the single phase model
(2) ※ 1 It is controlled with 7 - 8A according to outdoor air temperature.
(3) ※ 2 6 - 7A according to outdoor air temperature

(g) Power transistor temperature protection (FDC100-140 only)

(i) Protective control
If the power transistor temperature (detected with TIP) exceeds the setting value, the compressor speed is controlled to suppress the rise of power transistor temperature.



Note Value in ( ) are for the single phase model.

(h) Anomalous power transistor current

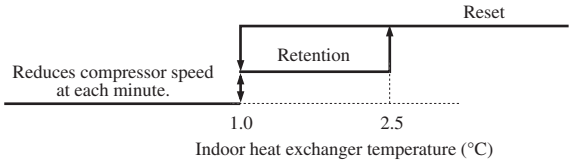
(i) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
(ii) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote control and it enters the anomalous stop mode.

(i) Anomalous inverter PCB (FDC100-140 only)

If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote control and it enters the anomalous stop mode.

(j) Anti-frost control by the compressor speed control

(i) If the indoor heat exchanger temperature (detected with Thi-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed is controlled to initiate the anti-frost control of indoor heat exchanger.
(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), the lowest temperature is detected.



(iii) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit control and the cooling, dehumidifying frost prevention of page 17.

(k) Dewing prevention control (FDC100-140 only)

[Control condition]

During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed is reduced to prevent dewing and water splash.

(i) Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

(ii) Suction superheat is 10°C or higher.

(iii) Compressor speed is **A** rps or higher.

[Control contents]

(i) When the suction superheat is 10°C or higher, the compressor speed is reduced at each 1 minute.

(ii) Compressor speed does not rise till the cooling expansion valve becomes 460 pulses.

Model	**A** rps
FDC100-140	60

(iii) This control takes **A** rps as its lower limit so that compressor speed is not controlled when it is less than **A** rps.

(l) Refrigerant quantity shortage protection

Under the compressor protection start III control during cooling and dehumidifying operations, the following control is performed by detecting the indoor heat exchanger temperature (Thi-R) and the indoor return air temperature (Thi-A).

[Control condition]

When the state that the indoor heat exchanger temperature (Thi-R) does not become lower than the indoor return air temperature (Thi-A) by 4°C or more continues for 1 minute

[Control contents]

It judges that the flowing of refrigerant in to the indoor unit is insufficient so that the compressor is stopped and E57 is displayed on the remote control.

(m) Broken wire detection on temperature sensor and low pressure sensor

(i) Outdoor heat exchanger sensor, outdoor air temperature sensor and low pressure sensor

If the following is detected for 5 seconds continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Outdoor heat exchanger sensor: -50°C or lower
- Outdoor air temperature sensor: -45°C or lower
- Low pressure sensor: 0V or lower or 4.0V or more

(ii) Discharge pipe temperature sensor, suction pipe temperature sensor

If the following is detected for 5 seconds continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Discharge pipe temperature sensor: -10°C or lower
- Suction pipe temperature sensor: -50°C or lower

(n) Fan motor error

(i) If the fan speed of 100min^{-1} or under is detected for 30 seconds continuously under the outdoor fan control (with the operation command of fan tap at ① speed or higher), the compressor stops.

(ii) When the fan motor speed drops to 100min-1 or under 5 times within 60 minutes and the compressor stops, it enters the anomalous stop mode with E48 displayed on the remote control.

(o) Anomalous stop by the compressor start stop

(i) When it fails to shift to the compressor DC motor rotor position defection operation at 5 seconds after establishing the compressor starting condition, the compressor stops temporarily and restarts 3-minute later.

(ii) If it fails to shift to the position detection operation again at second time, it judges the anomalous compressor start and stops the compressor by the anomalous stop (E59).

(7) Silent mode

(a) As "Silent mode start" signal is received from the remote control, it operates by dropping the outdoor fan speed and the compressor speed.

(b) For details, refer to items (1) and (4) above.

(8) Test run

(a) It is possible to operate from the outdoor unit using the DIP switch on the outdoor unit control PCB.

SW3-3 (SW5-3:FDC71)	ON	SW3-4 (SW5-4:FDC71)	OFF	Cooling test run
			ON	Heating test run
	OFF	Normal and end of test run		

Make sure to turn SW3-3(SW5-3:FDC71) to OFF after the end of operation.

(b) Test run control

(i) Operation is performed at the maximum compressor speed, which is determined for each model.

(ii) Each protective control and error detection control are effective.

(iii) If SW3-4 (SW5-4:FDC71) is switched during test run, the compressor is stopped for once by the stop control and the cooling/heating operation is switched.

(iv) Setting and display of remote control during test run

Item / Mode	Contents of remote control setting/display
Cooling test run	Setting temperature of cooling is 5°C.
Heating test run	Setting temperature of heating (preparation) is 30°C.

(9) Pump-down control

Turning ON the pump-down switch SW1 for 2 seconds during the operation stop or anomalous stop (excluding the thermostat OFF) and SW7-1(SW8-3:FDC71) is OFF, the pump-down operation is performed. (This is invalid when the indoor unit is operating. This is effective even when the indoor unit is stopped by the anomalous stop or the power source is turned OFF.)

(a) Control procedure

(i) Close the service valve at the liquid side. (It is kept open at the gas side.)

(ii) Compressor is started with the target speed at 35(45:FDC71) rps in the cooling mode.

(iii) Red and green lamps (LED) flash continuously on the outdoor unit control PCB.

(iv) Each of protection and error detection controls, excluding the low pressure control, anti-frost control and dewing prevention control, is effective.

(v) Outdoor fan is controlled as usual.

(vi) Electronic expansion valve is fully opened.

(b) Ending conditions

Stop control is initiated depending on any of the following conditions.

(i) Low pressure of 0.087MPa or lower is detected for 5 seconds continuously.

1) Red LED: Light, Green LED: Flashing, Remote control: Displays stop
2) It is possible to restart when the low pressure is more than 0.087MPa.
3) Electronic expansion valve (cooling/heating) is kept fully open.

(ii) Stop by the error detection control

1) Red LED: Keeps flashing, Green LED: Flashing
2) Restart is prohibited. To return to normal operation, reset the power source.
3) Electronic expansion valve (cooling/heating) is kept fully open.

(iii) When the accumulative operation time of compressor under the pump-down control becomes 5 minutes

1) Red LED: Stays OFF, Green LED: Flashing, Remote control: Stop
2) It is possible to pump-down again.
3) Electronic expansion valve (cooling/heating) is kept fully open.

Note After the stop of compressor, close the service valve at the gas side.

Caution: Since pressing the pump-down switch cancels communications with the indoor unit, the indoor unit and the remote control display "Transmission error – E5". This is normal.

(10) Base heater ON/OFF output control (Option, FDC100-140VN(S)X-W only)

(a) Base heater ON conditions

When all of following conditions are satisfied, the base heater is turned ON.

· Outdoor air temperature (detected with Tho-A) is 1ºC or lower.

· In the heating mode

· When the compressor is turned ON

· JSW1-4 is OFF.

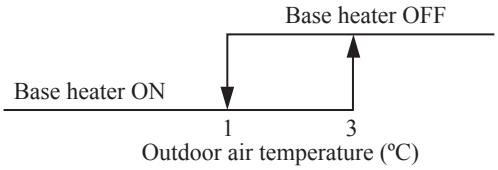
(b) Base heater OFF conditions

When either one of following conditions is satisfied, the base heater is turned OFF.

· Outdoor air temperature (detected with Tho-A) is 3ºC or higher.

· When the compressor stop has been detected for 30 minutes continuously

· In the cooling or dehumidifying mode



(11) Manual defrost (Need to activate SW4-4) *For maintenance only

When unit is operated with SW4-4 ON, defrost operation will be activated in every 12 minutes.

Caution! This function is used for maintenance only.
Long term operation with this function will damage the compressor.

(12) Limit the number of compressor start (Need to activate SW7-2)

Maximum number of compressor start is to be limited up to 6 times per hour.

1.2 MAINTENANCE DATA

1.2.1 Diagnosing of microcomputer circuit

(1) Selfdiagnosis function

(a) Check indicator table

Whether a failure exists or not on the indoor unit and outdoor unit can be know by the contents of remote control error code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

(i) Indoor unit

Remote control		Indoor unit control PCB		Outdoor unit control PCB		Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)	Red LED	Green LED (1)				
No-indication	Stays OFF	Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	—	• **Normal operation**	—	—
		Stays OFF	Stays OFF	2-time flash	Stays OFF	Indoor unit power source	• Power OFF, broken wire/blown fuse, broken transformer wire	Repair	106
		* 3-time flash	Keeps flashing	Stays OFF	Keeps flashing	Remote control wires	• Poor connection, breakage of remote control wire * For wire breaking at power ON, the LED is OFF.	Repair	107•108
						Remote control	• Defective remote control PCB	Replacement of remote control	
WAIT or INSPECT I/U		Stays OFF	Keeps flashing	2-time flash	Keeps flashing	Indoor-outdoor units connection wire	• Poor connection, breakage of indoor-outdoor units connection wire	Repair	109-118
						Remote control	• Improper setting of master and slave by remote control		
E 1	Keeps flashing	Stays OFF	* Keeps flashing	Stays OFF	Keeps flashing	Remote control wires (Noise)	• **Poor connection of remote control signal wire (White)** * For wire breaking at power ON, the LED is OFF • **Intrusion of noise in remote control wire**	Repair	120
						Remote control indoor unit control PCB	*• Defective remote control or indoor unit control PCB (defective communication circuit)?	Replacement of remote control or PCB	
E 5		2-time flash	Keeps flashing	2-time flash	Keeps flashing	Indoor-outdoor units connection wire	• **Poor connection of wire between indoor-outdoor units during operation (disconnection, loose connection)** • **Anomalous communication between indoor-outdoor units by noise, etc.**	Repair	121
		2-time flash	Keeps flashing	Stays OFF	Keeps flashing	(Noise)	• **CPU-runaway on outdoor unit control PCB**	Power reset or Repair	
						Outdoor unit control PCB	*• Occurrence of defective outdoor unit control PCB on the way of power source (defective communication circuit)?	Replacement of PCB	
		2-time flash	Keeps flashing	Stays OFF	Keeps flashing	Outdoor unit control PCB	• **Defective outdoor unit control PCB on the way of power source**	Replacement	
						Fuse	• **Blown fuse**		
E 6		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor heat exchanger temperature sensor	• **Defective indoor heat exchanger temperature sensor** (defective element, broken wire, short-circuit) • Poor contact of temperature sensor connector	Replacement, repair of temperature sensor	122
						Indoor unit control PCB	*• **Defective indoor unit control PCB (Defective temperature sensor input circuit)?**	Replacement of PCB	
E 7		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor return air temperature sensor	• **Defective indoor return air temperature sensor** (defective element, broken wire, short-circuit) • Poor contact of temperature sensor connector	Replacement, repair of temperature sensor	123
						Indoor unit control PCB	*• **Defective indoor unit control PCB (Defective temperature sensor input circuit)?**	Replacement of PCB	
E 8		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Installation or operating condition	• **Heating over-load** (Anomalously high indoor heat exchanger temperature)	Repair	124
						Indoor heat exchanger temperature sensor	• **Defective indoor heat exchanger temperature sensor (short-circuit)**	Replacement of temperature sensor	
						Indoor unit control PCB	*• **Defective indoor unit control PCB** (Defective temperature sensor input circuit)?	Replacement of PCB	
E 10		Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	Number of connected indoor units	• **When multi-unit control by remote control is performed, the number of units is over**	Repair	125
E 11		Stays OFF	Keeps flshing	Stays OFF	Keeps flshing	Address setting error	• Address setting error of indoor units	Repair	126
E 14		3-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor unit No. setting	•No master is assigned to slaves.	Repair	127
						Remote control wires	•Anomalous remote control wire connection, broken wire between master and slave units		
E 16		1(2)-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor fan motor	• **Defective indoor fan motor**	Replacement, repair	128
						Indoor unit power PCB	• **Defective indoor unit power PCB**	Replacement	
E 18		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Address setting error	• Address setting error of master and slave indoor units	Repair	129
E 19		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor unit control PCB	• **Indoor unit operation check error**	Repair	130
E 20		1(2)-time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor fan motor	• Indoor motor rotation speed anomaly	Replacement, repair	131
						Indoor unit power PCB	• Defective indoor unit power PCB	Replacement	
E 23		1-time flash	Keeps flashing	Stays OFF	Keeps flashing	Refrigerant leak	• Refrigerant leak of indoor unit	Replacement, repair	132
							• Detective refrigerant sensor	Reset this error stop or replacement	
E 28		Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	Remote control temperature sensor	• Broken wire of remote control temperature sensor	Repair	133

Notes (1) **Normal indicator lamp (Indoor, outdoor units: Green) extinguishes (or lights continuously) only when CPU is anomalous. It keeps flashing in any trouble other than anomalous CPU.**

(2) * mark in the description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(ii) Outdoor unit

1) FDC71-140VNX-W, 100-140VSX-W
FDC100-140VNA-W, 100-140VSA-W

Remote control		Indoor unit control PCB		Outdoor unit control PCB		Outdoor inventer PCB	Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)	Red LED	Green LED (1)	Yellow LED				
E35		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Installation or operating condition	• Higher outdoor heat exchanger temperature	Repair	134
							Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor	Replacement of temperature sensor	
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E36		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Installation or operating condition	• Higher discharge temperature	Repair	136
							Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor	Replacement, repair of temperature sensor	
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E37		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	138
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E38		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor air temperature sensor	• Defective outdoor air temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	139
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E39		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	140
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E40		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Installation or operating condition	• Rising high pressure (Operation of 63H1) • Service valve closing operation	Repair	141
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective 63H input circuit)?	Replacement of PCB	
E41		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	6-time flash	Inverter PCB or radiator fin	• Power transistor overheat	Replacement of PCB or Repair	143
E42		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	1-time flash	Outdoor unit control PCB compressor	• Current cut (Anomalous compressor over-current)	Replacement of PCB	145•146
							Installation or operating condition	• Service valve closing operation	Repair	
E45		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Outdoor unit control PCB	• Anomalous outdoor unit control PCB communication	Replacement of PCB	151
							Inverter PCB	• Anomalous inverter PCB communication		
E47		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	7-time flash	Inverter PCB active filter	• Defective inverter PCB (Model FDC 71 only) Defective active filter of control.	Replacement	153
							Outdoor unit control PCB active filter	• Defective outdoor unit control PCB (Models FDC100-140VNA-W only) Defective active filter of control.	Replacement of PCB	154
E48		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor fan motor	• Anomalous outdoor fan motor	Replacement, repair	156•157
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective motor input circuit)?	Replacement of PCB	
E49		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Installation or operating condition	• Low pressure error • Service valve closing operation	Repair	159•160
							Low pressure sensor	• Anomalous low pressure, broken wire of low pressure sensor or poor connector connection	Replacement, repair of sensor	
							Outdoor unit control PCB	*• Defective outdoor unit control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E51		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	6-time flash	Inverter PCB	• Anomalous inverter PCB	Replacement of PCB	161
E53		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Suction pipe temperature sensor	• Defective suction pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	164
							Outdoor unit control PCB	*• Defective outdoor unit PCB (Defective sensor input circuit)?	Replacement of control PCB	
E54		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Low pressure sensor	• Defective low pressure sensor	Replacement of sensor	165
							Outdoor unit control PCB	• Defective outdoor unit control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E57		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Operation status	• Shortage in refrigerant quantity	Repair	167
							Installation status	• Service valve closing operation	Service valve opening check	
E58		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	–	Compressor PCB	• Anomalous compressor by loss of synchronism (FDC100-140VNA/VSA-W only)	Replacement	169
E59		Stays OFF	Keeps flashing	5 time flash	Keeps flashing	Stays OFF	Compressor inverter PCB	• Anomalous compressor startup	Replacement	171-174

Note (1) * mark in the description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

2) FDC200, 250, 280VSA-W

Remote control		Indoor control PCB		Outdoor control PCB		Outdoor inventer PCB	Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)	Red LED	Green LED (1)	Yellow LED				
E35		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Installation or operating condition	• Higher outdoor heat exchanger temperature	Repair	134
							Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor	Replacement of temperature sensor	
							Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E36		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Installation or operating condition	• Higher discharge temperature	Repair	137
							Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor	Replacement, repair of temperature sensor	
							Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E37		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	138
							Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E38		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor air temperature sensor	• Defective outdoor air temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	139
							Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E39		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	140
							Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E40		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Installation or operating condition	• Rising high pressure (Operation of 63H1) • Service valve closing operation	Repair	141
							Outdoor control PCB	*• Defective outdoor control PCB (Defective 63H input circuit)?	Replacement of PCB	
E41		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	8-time flash	Inverter PCB or radiator fin	• Power transistor overheat	Replacement of PCB or Repair	144
E42		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	9-time flash	Outdoor control PCB compressor	• Current cut (Anomalous compressor over-current)	Replacement of PCB	147・148
							Installation or operating condition	• Service valve closing operation	Repair	
E44		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Outdoor control PCB	• Liquid flooding error	Replacement of PCB	149・150
E45		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor control PCB	• Anomalous outdoor control PCB communication	Service valve opening check	152
							Inverter PCB	• Anomalous inverter PCB communication	Replacement of PCB	
E48		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Outdoor fan motor	• Anomalous outdoor fan motor	Replacement, repair	156
							Outdoor control PCB	*• Defective outdoor control PCB (Defective motor input circuit)?	Replacement of PCB	
E49		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Installation or operating condition	• Low pressure error • Service valve closing operation	Repair	159・160
							Low pressure sensor	• Anomalous low pressure, broken wire of low pressure sensor or poor connector connection	Replacement, repair of sensor	
							Outdoor control PCB	*• Defective outdoor control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E51		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	8-time flash	Inverter PCB	• Anomalous inverter PCB	Replacement of PCB	162
E53		Stays OFF	Keeps flashing	1-time flash	Keeps flashing	Keeps flashing	Suction pipe temperature sensor	• Defective suction pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	164
							Outdoor control PCB	*• Defective outdoor PCB (Defective sensor input circuit)?	Replacement of control PCB	
E54		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Low pressure sensor	• Defective low pressure sensor	Replacement of sensor	165
							Outdoor control PCB	• Defective outdoor control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E55		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Compressor under dome temperature sensor	• Defective compressor under dome temperature sensor (Model FDC250 only)	Replacement of temperature sensor	166
							Outdoor control PCB	• Defective outdoor control PCB (Defective sensor input circuit)? (Model FDC250 only)	Replacement of control PCB	
E57		Stays OFF	Keeps flashing	1-time flash	Keeps flashing		Operation status	• Shortage in refrigerant quantity	Repair	167
							Installation status	• Service valve closing operation	Service valve opening check	
E59		Stays OFF	Keeps flashing	5-time flash	Keeps flashing	4-time flash	Compressor inverter PCB	• Anomalous compressor startup	Replacement	175・176

Note * mark in the description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

3) FDC71, 90, 100VNP-W

Remote control		Indoor unit control PCB		Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED				
E35	Keeps flashing	Stays OFF	Keeps flashing	Installation, operation status	• Higher outdoor heat exchanger temperature	Repair	135
				Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor	Replacement, repair of temperature sensor	
				Outdoor unit PCB	*• Defective outdoor unit PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E36		Stays OFF	Keeps flashing	Installation, operation status	• Higher discharge temperature	Repair	136
				Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor	Replacement, repair of temperature sensor	
				Outdoor unit PCB	*• Defective outdoor unit PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E37		Stays OFF	Keeps flashing	Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	138
				Outdoor unit PCB	*• Defective outdoor unit PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E38		Stays OFF	Keeps flashing	Outdoor air temperature sensor	• Defective outdoor air temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	139
				Outdoor unit PCB	*• Defective outdoor unit PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E39		Stays OFF	Keeps flashing	Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	140
				Outdoor unit PCB	*• Defective outdoor unit PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E40		Stays OFF	Keeps flashing	Installation, operation status	• Service valve (gas side) closing operation	Replacement	142
E42		Stays OFF	Keeps flashing	Outdoor unit PCB, compressor	• Current cut (Anomalous compressor over-current)	Replacement of PCB	145・146
				Installation, operation status	• Service valve closing operation	Repair	
E47		Stays OFF	Keeps flashing	Outdoor unit PCB	• Over voltage • Defective active filter	Repair PCB replacement	155
E48		Stays OFF	Keeps flashing	Fan motor	• Defective fan motor	Replacement	158
				Outdoor unit PCB	• Defective outdoor unit PCB		
E51		Stays OFF	Keeps flashing	Power transistor error (Outdoor unit PCB)	• Power transistor error	Replacement of PCB	163
E57		Stays OFF	Keeps flashing	Operation status	• Shortage in refrigerant quantity	Repair	168
				Installation status	• Service valve closing operation	Service valve opening check	
E58		Stays OFF	Keeps flashing	• Overload operation • Overcharge • Compressor locking	• Current safe stop	Replacement	170
E59		Stays OFF	Keeps flashing	Compressor, outdoor unit PCB	• Anomalous compressor startup • Voltage drop	Replacement	177
E60		Stays OFF	Keeps flashing	Compressor	• Anomalous compressor rotor lock	Replacement	178

Note * mark in the description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(iii) Option control in-use

		Indoor unit control PCB		Outdoor unit control PCB		Description of trouble	Repair method
Error code	Red LED	Red LED	Green LED	Red LED	Green LED		
E75	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	• Communication error (Defective communication circuit on the main unit of SC-SL2NA-E or SC-SL4-AE/BE) ete.	Replacement

(iv) Display sequence of error codes or inspection indicator lamps

■ **Occurrence of one kind of error**

Displays are shown respectively according to errors.

■ **Occurrence of plural kinds of error**

Section	Category of display
Error code on remote control	• Displays the error of higher priority (When plural errors are persisting)
Red LED on indoor unit control PCB	E1>E5>·····>E10>E35>·····>E60
Red LED on outdoor unit control PCB (1)	• Displays the present errors. (When a new error has occurred after the former error was reset.)

■ **Error detecting timing**

Section	Error description	Error code	Error detecting timing
Indoor	Communication error at initial operation	"WAIT"	No communication between indoor and outdoor units is established at initial operation.
	Remote control communication circuit error	E1	Communication between indoor unit and remote control is interrupted for more than 2 minutes continuously after initial communication was established.
	Communication error during operation	E5	Communication between indoor and outdoor units is interrupted for more than 2 minutes continuously after initial communication was established.
	Excessive number of connected indoor units by controlling with one remote control	E10	Whenever excessively connected indoor units is detected after power ON.
	Return air temperature sensor anomaly	E7	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature.
	Indoor heat exchanger temperature sensor anomaly	E6	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature. Or 70°C or higher is detected for 5 seconds continuously
	Refrigerant leak	E23	Whenever refrigerant sensor is activated after 3 minutes had past since power ON.
Outdoor	Outdoor air temperature sensor anomaly	E38	-45(-55)°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -45(-55)°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON.
	Outdoor heat exchanger temperature sensor anomaly	E37	-50(-55)°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -50(-55)°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON.
	Discharge pipe temperature sensor anomaly	E39	-10(-25)°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.
	Suction pipe temperature sensor anomaly	E53	-50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.
	Low pressure sensor anomaly	E54	0V or lower or 4.0V or higher is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous pressure.
	Compressor under dome temperature sensor anomaly	E55	-50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.

Notes (1) This LED isn't installed on models FDC71-100VNP-W.
(2) Value in ( ) are for the models FDC71-100VNP-W.

■ **Information of maintenance**

Remote control display	Maintenance content	Content
M07	Indoor unit overload alarm	Indoor unit overload alarm setting(Alarm setting temperature (Talm) can be set at 5 – 10°C.) Cooling:(Return temperature)-(Setting temperature)>Talm. Release below Talm-2°C. Heating:(Setting temperature)-(Return temperature)>Talm. Release below Talm-2°C.

■ **Error log and reset**

Error indicator	Memorized error log	Reset
Remote control display	• Higher priority error is memorized.	• Stop the unit by pressing the ON/OFF switch of remote control. • If the unit has recovered from anomaly, it can be operated.
Red LED on indoor unit control PCB	• Not memorized.	
Red LED on outdoor unit control PCB	• Memorizes a mode of higher priority.	

■ **Resetting the error log**

1) RC-EX3A

• Resetting the memorized error log in the remote control

You touch the buttons in the order of "Menu" → "Service setting" → "Service & Maintenance" → "Service password" → "Error display" → "Error history" on the TOP screen of remote control.And if you touch "Delete" → "Yes" button,all error log and anomaly data memorized in the remote control are deleted.

• Resetting the memorized error log in the indoor unit

You touch the buttons in the order of "Menu" → "Service setting" → "Service & Maintenance" → "Service password" → "Error display" → "Error anomaly data" on the TOP screen of remote control.

The remote control transmits error log erase command to the indoor unit when "Yes" button is pressed on the erase anomaly data screen.

Receiving the command, the indoor unit erase the log and answer the status of no error.

2) RC-E5

• Resetting the memorized error log in the remote control

Holding down "CHECK" button, press "TIMER" button to reset the error log memorized in the remote control.

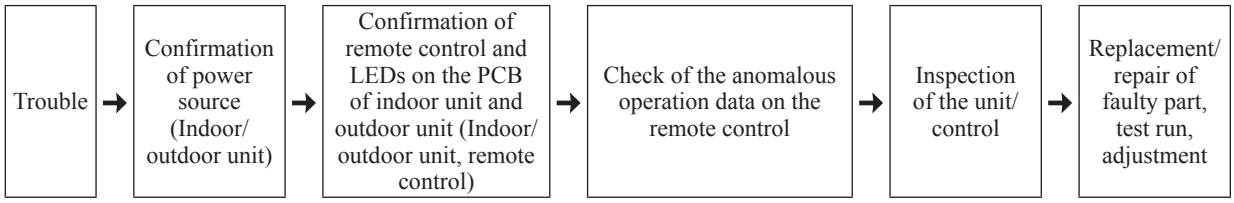
• Resetting the memorized error log in the indoor unit

The remote control transmits error log erase command to the indoor unit when "VENTI" button is pressed while holding down "CHECK" button.

Receiving the command, the indoor unit erase the log and answer the status of no error.

(2) Troubleshooting procedure

When any trouble has occurred, inspect as follows. Details of respective inspection method will be described on later pages.



(3) Troubleshooting at the indoor unit

With the troubleshooting, find out any defective part by checking the voltage (AC, DC), resistance, etc. at respective connectors at around the indoor unit PCB, according to the inspection display or operation status of unit (the compressor does not run, fan does not run, the 4-way valve does not switch, etc.), and replace or repair in the unit of following part.

(a) Replacement part related to indoor unit PCB's

Control PCB, power source PCB, temperature sensor (return air, indoor heat exchanger), remote control switch, limit switch, transformer and fuse

Note With regard to parts of high voltage circuits and refrigeration cycle, judge it according to ordinary inspection methods.

(b) Instruction of how to replace indoor unit control PCB

SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the replacement in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, WARNING and CAUTION.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.

⚠ WARNING	Wrong installation would cause serious consequences such as injuries or death.
⚠ CAUTION	Wrong installation might cause serious consequences depending on circumstances.

- After completing the replacement, do commissioning to confirm there are no anomaly.

⚠ WARNING

- Replacement should be performed by the specialist.
  If you replace the PCB by yourself, it may lead to serious trouble such as electric shock or fire.
- Replace the PCB correctly according to these instructions.
  Improper replacement may cause electric shock or fire.
- Shut off the power before electrical wiring work.
  Replacement during the applying the current would cause the electric shock, unit failure or improper running.
  It would cause the damage of connected equipment such as fan motor,etc.
- Fasten the wiring to the terminal securely, and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connections or hold could result in abnormal heat generation or fire.
- Check the connection of wiring to PCB correctly before turning on the power, after replacement.
  Defectiveness of replacement may cause electric shock or fire.

⚠ CAUTION

- In connecting connector onto the PCB, connect not to deform the PCB. It may cause breakage or malfunction.
- Insert connecter securely, and hook stopper. It may cause fire or improper running.
- Bundle the cables together so as not to be pinched or be tensioned. It may cause malfunction or electric shock for disconnection or deformation.

● Model FDF series

PSC012D182

a) Control PCB

Replace and set up the PCB according to this instruction.

i) Set to an appropriate address and function using switch on PCB.
Select the same setting with the removed PCB.

item	switch	Content of control			
Address	SW2	Plural indoor units control by 1 remote control			
Master /Slave setting		Master	Slave1	Slave2	Slave3
	SW5-1	—	—	○	○
	SW5-2	—	○	—	○
Test run	SW7-1	—	Normal		
		○	Operation check		

○ : ON — : OFF

ii) Set to an appropriate capacity using the model selector switch(SW6).
Select the same capacity with the PCB removed from the unit.

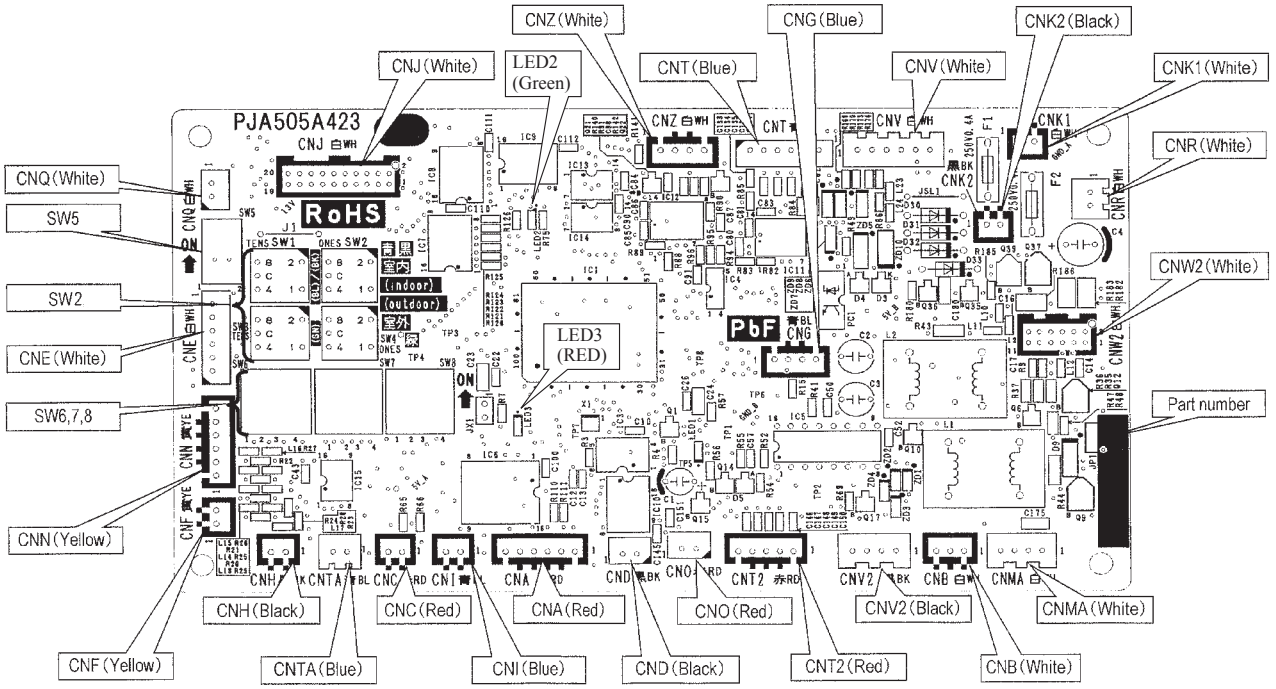
SW6	-1	-2	-3	-4
71V	○	—	—	○
100V	○	○	—	○
125V	—	—	○	○
140V	○	—	○	○

Example setting for 71V

iii) Replace the PCB
1) Replace the PCB only after all the wirings connected to the connector are removed.
2) Fix the board such that it will not pinch any of the wires.
3) Switch setting must be same setting as that of the removed PCB.
4) Reconnect the wirings to the PCB. Wiring connector color should match the color of connector of the PCB.

iv) Control PCB

Parts mounting are different by the kind of PCB.



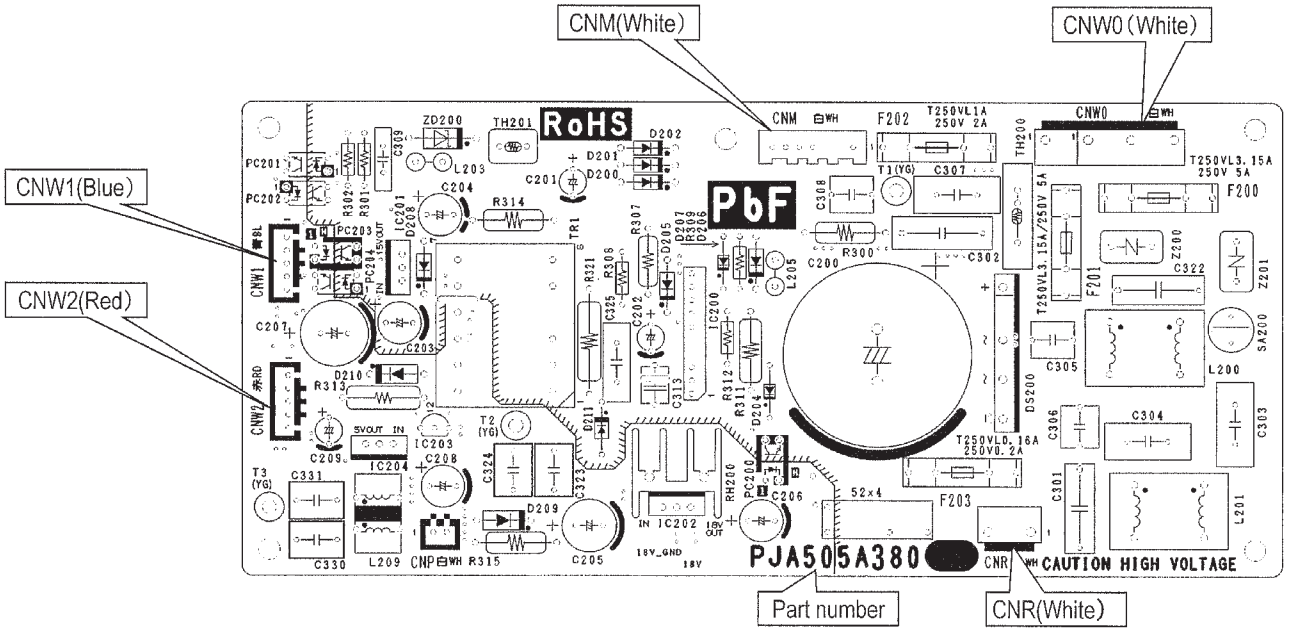
PSC012D181

b) Power PCB

This PCB is a general PCB. Replace the PCB according to this instruction.

i) Replace the PCB

1) Replace the PCB only after all the wirings connected to the connector are removed.
2) Fix the board such that it will not pinch any of the wires.
3) Reconnect the wiring to the PCB. Wiring connector color should match the color of connector of the PCB.



●DIP switch setting list

Switch	Description		Default setting		Remark
SW2	Address No. setting at plural indoor units control by 1 R/C		0		0-F
SW5-1	Master/Slave setting	Master*/Slave	OFF		See table 2.
SW5-2			OFF		
SW6-1	Model selection		As per model		See table 1.
SW6-2					
SW6-3					
SW6-4					
SW7-1	Test run	Normal*/Test run	OFF	Normal	
SW7-2	Reserved		OFF		Keep OFF
SW7-3	Reserved		OFF		Keep OFF
SW7-4	Reserved		OFF		Keep OFF
JSL1	Superlink terminal spare	Normal*/switch to spare	With		

* Default setting

Table 1: Indoor unit model selection with SW6-1-SW6-4

Switch	71VH	100VH	125VH	140VH
SW6-1	ON	ON	OFF	ON
SW6-2	OFF	ON	OFF	OFF
SW6-3	OFF	OFF	ON	ON
SW6-4	ON	ON	ON	ON

Table 2: Indoor unit Master/Slave setting with SW5-1,SW5-2

Switch	SW5-1	SW5-2
Master	OFF	OFF
Slave1	OFF	ON
Slave2	ON	OFF
Slave3	ON	ON

c) Refrigerant sensor

This indoor unit uses refrigerant sensor.
They may react with gases (*1) other than the refrigerant.

If gas in dense concentration is present near the indoor unit when the power is supplied, the refrigerant sensor detects it and stops the unit with the error (E23).

To restore operation from the error stop, it is necessary to reset the error stop or replace the refrigerant sensor.
Before resetting the error stop or replacing the refrigerant sensor, make sure that the refrigerant does not leak and there is no gas (*1) that could be detected by the refrigerant sensor.

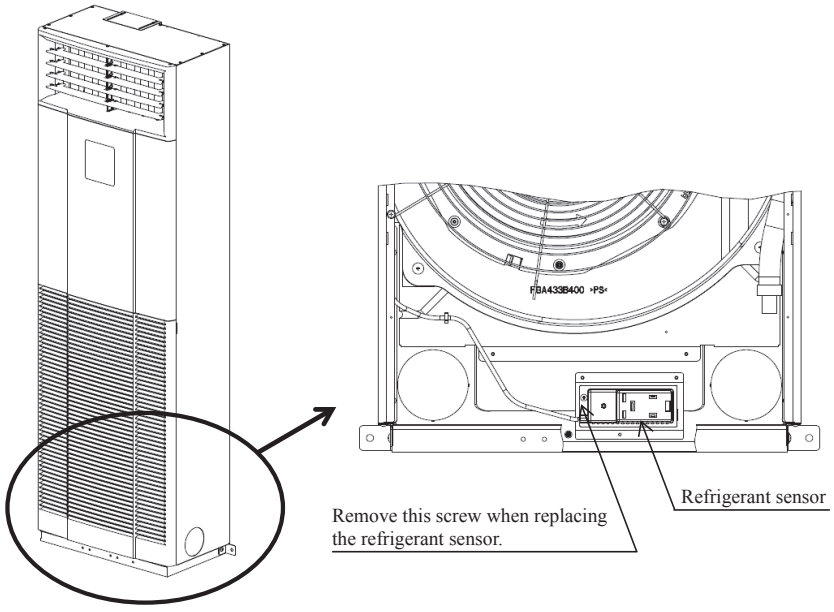
<Method to reset error stop (E23)>
① Confirm that the power supply to the air-conditioner is turned ON.
② Change SW8-4 on the control PCB from OFF to ON.
③ After waiting 30 seconds, change the setting of SW8-4 from ON to OFF. (Return to original setting.)
④ Turn OFF the power supply to the air-conditioner.
⑤ Confirming that LED on the control PCB is turned OFF, turn ON the power supply to the air-conditioner.
* Error stop (E23) of the refrigerant sensor can be reset twice only. After that, the refrigerant sensor must be replaced.

*1 <Example of gasses other than the refrigerant, which could be detected by the refrigerant sensor>

- Combustible gas that could leak from drain pipes or evaporate from wall paper adhesive.
- Gas evaporating from paint or combustible gas such as hair spray or insecticides.
- Alcohols for sterilizing or other
- Sealing agents including siloxane

● Refrigerant sensor replacement procedure

The refrigerant sensor is located at the bottom of the indoor unit, remove the grille and then remove the one screw shown in the diagram below and replace the refrigerant sensor fixed to the case.



(4) Troubleshooting at the outdoor unit

When troubleshooting the outdoor unit, firstly assess the overview of malfunction and try to presume the cause and the faulty part by checking the error code dispalyed on the remote control and flashing pattern of indicator lamps (Red LED and Green LED), and then proceed further inspection and remedy it.

Self-diagnosis system by microcomputor on indoor unit and outdoor unit PCB can assist to find the cause of malfunction smoothly by making a diagnosis of not only the anomaly of microcomputer, but also the anomaly in power source system, installation space, overload resulting from improper charging amount of refrigerant and etc.

Unless the power is reset, the error log is saved in memory and the inspection indicator lamps on outdoor unit PCB keep flashing after automatical recovering from malfunction.

After automatical recovering from malfunction, if any another error mode which has a higher priority than the previous error saved in memory occurs, it is overwritten in memory and is displayed.

[Reset of power source]

Be sure to avoid electrical shock, when replacing or checking the outdoor unit control PCB, because some voltage is still retained in the electrolytic capacitor on the PCB even after shutting down the power source to the outdoor unit.

Be sure to start repairing work, after confirming that the red LED or green LED on the PCB has been extiguished for more than 10 seconds after more than 3 minutes had been passed since power shut down, and reconfirming that voltage has been discharged sufficiently by measuring the voltage (DC) between both terminals of electrolytic capacitor (C58) (Measurment of voltage may be disturbed by the moisture-proof coating. In such case, remove the coating and measure it by taking care of avoiding electrical shock.)

(a) Module of part to be replaced for outdoor unit control

Outdoor unit control PCB, Inverter PCB, Temperature sensor (of outdoor heat exchanger, discharge pipe, outdoor air, IPM, suction pipe and under dome), Fuses (for power source and control PCB), Noise filter, Capacitor and Reactor.

(b) Replacement procedure of outdoor unit control PCB

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them.
  WARNING and CAUTION are described as follows:

⚠ WARNING	Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
⚠ CAUTION	Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

⚠ WARNING

- Securely replace the PCB according to this procedure.
  If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

⚠ CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

PCA012D049A A

(i) Model FDC71VNX-W

1) Replace the PCB **after elapsing 3 minutes from power OFF.** **(Be sure to measure voltage (DC)** between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently(10V or less)**.(Refer to Fig.2))
2) Disconnect the connectors from the control PCB.
3) Match the switches setting (SW4) with the former PCB.
4) Connect the connectors to the control PCB.(Confirm the **connectors are not half inserted**.)

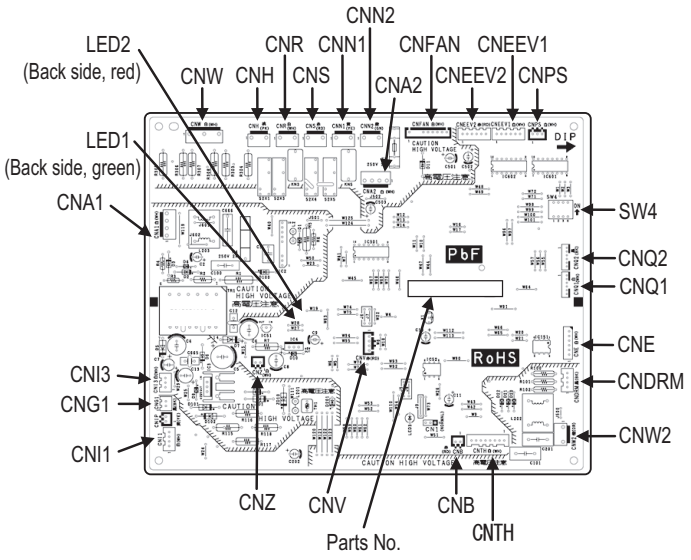


Fig.1 Parts arrangement view

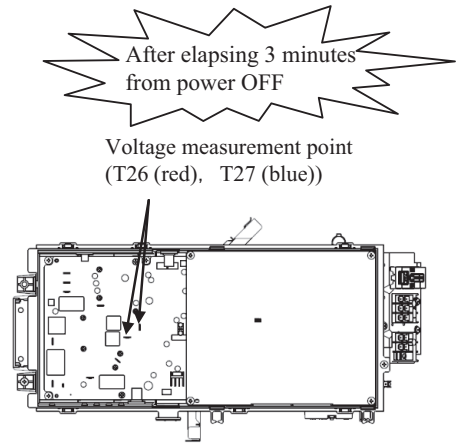
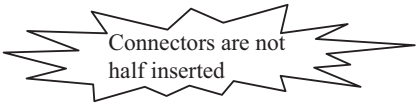


Fig.2 Position of terminal

*Presence and shape of electric component may vary according to model.



PCA012D043 C

(ii) Models FDC100VNX-W, 125VNX-W, 140VNX-W
FDC100VSX-W, 125VSX-W, 140VSX-W

1) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in control back, and **check that the voltage is discharged sufficiently**.)
2) Disconnect the connectors from the control PCB.
3) Disconnect the white wiring passing through CT1 on the PCB before replacing the PCB.
4) Match the setting switches (SW3-5, JSW) with the former PCB.
5) Tighten up a screw after passing white wiring through CT1 of the changed.
6) Connect the connectors with the control PCB referring to the parts arrangement of Fig.1.
(Confirm the **connectors are not half inserted**.)

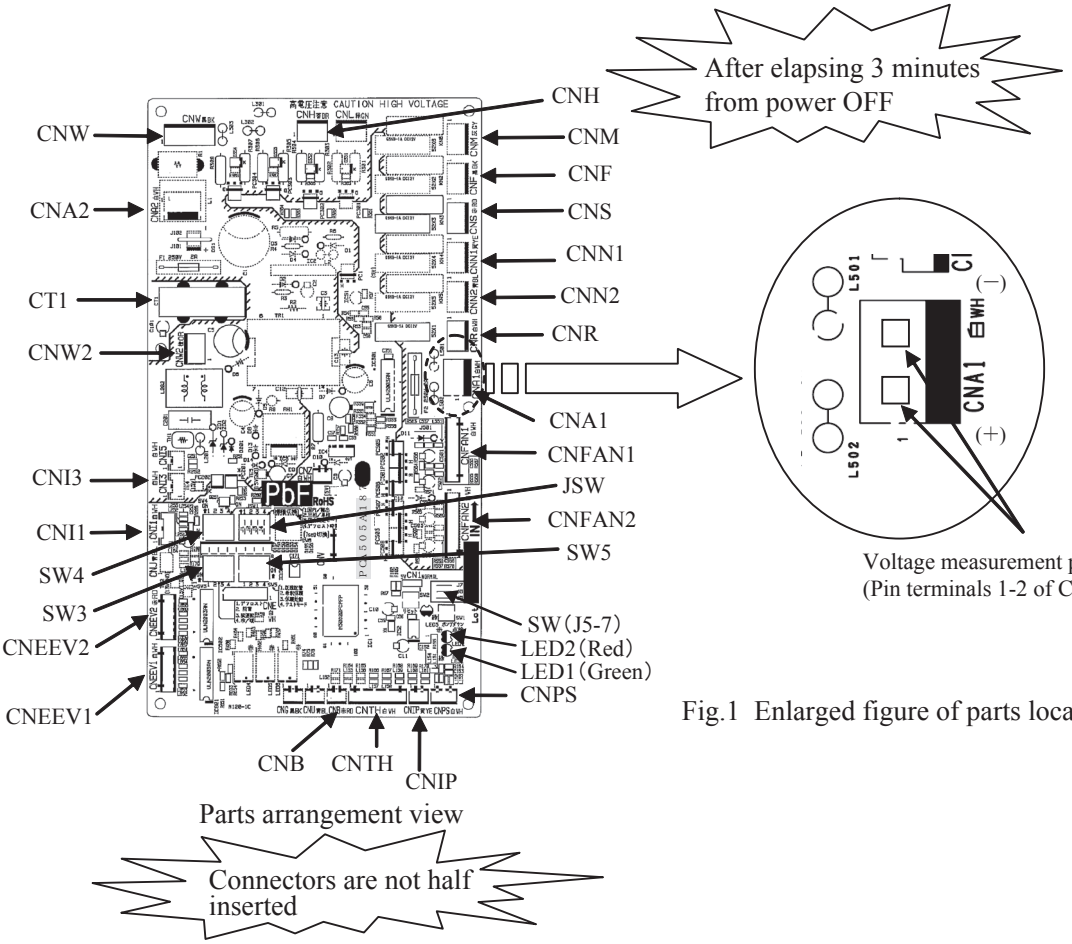


Fig.1 Enlarged figure of parts location

(iii) Models FDC100VNA-W, 125VNA-W, 140VNA-W

PCA012D083 A

1) Disassembly

a) After the breaker is shut down, remove the service panel, top panel and rear panel. (Refer to Fig.1).

b) Don't touch the main PCB until three minutes have passed after the breaker is shut doun.
(After having shut down the breaker, some capacitor is held by high voltage. It is very dangerous to touch the main PCB in this condition.)
In the situation that hamesses are connected to main PCB, **be sure to measure voltage (DC)** on main PCB, and **check that the voltage is discharged sufficientlv (DC voltage 30 V or less).** (Refer to Fig.2)

c) Disconnect the connectors, faston terminals and round terminals from the main PCB as shown in Fig.2.
And then remove the fixing screws (3 places) as shown in Fig.3.
After removing the main PCB, wipe off the heat conduction sheet neatly from the copper plate.

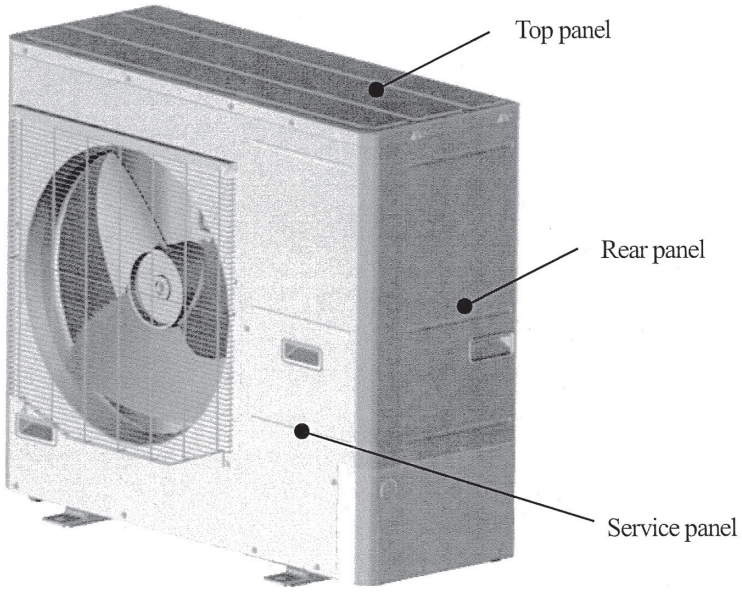


Fig.1 Outdoor unit overall view

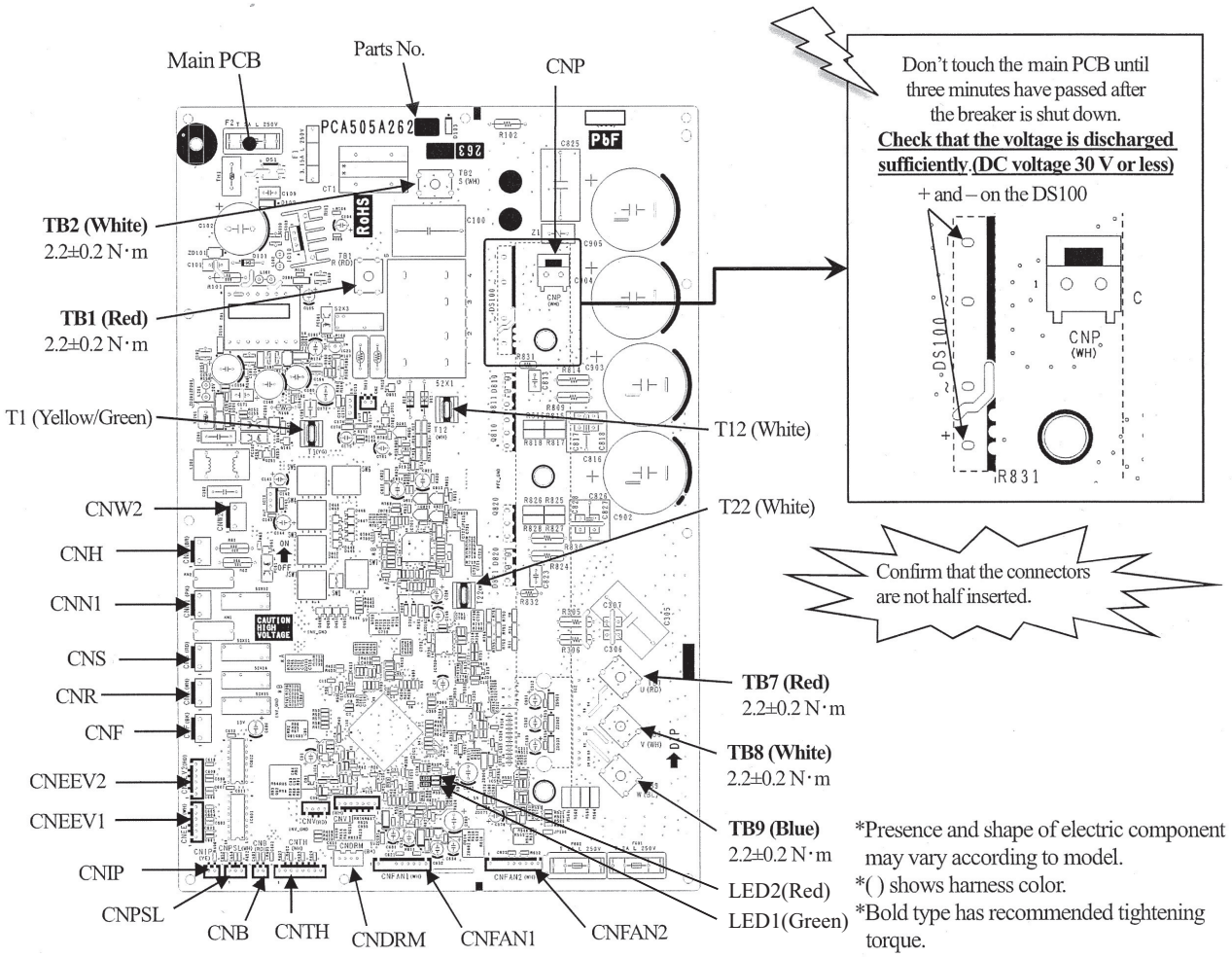


Fig.2 Parts arrangement view of main PCB and voltage measurement points

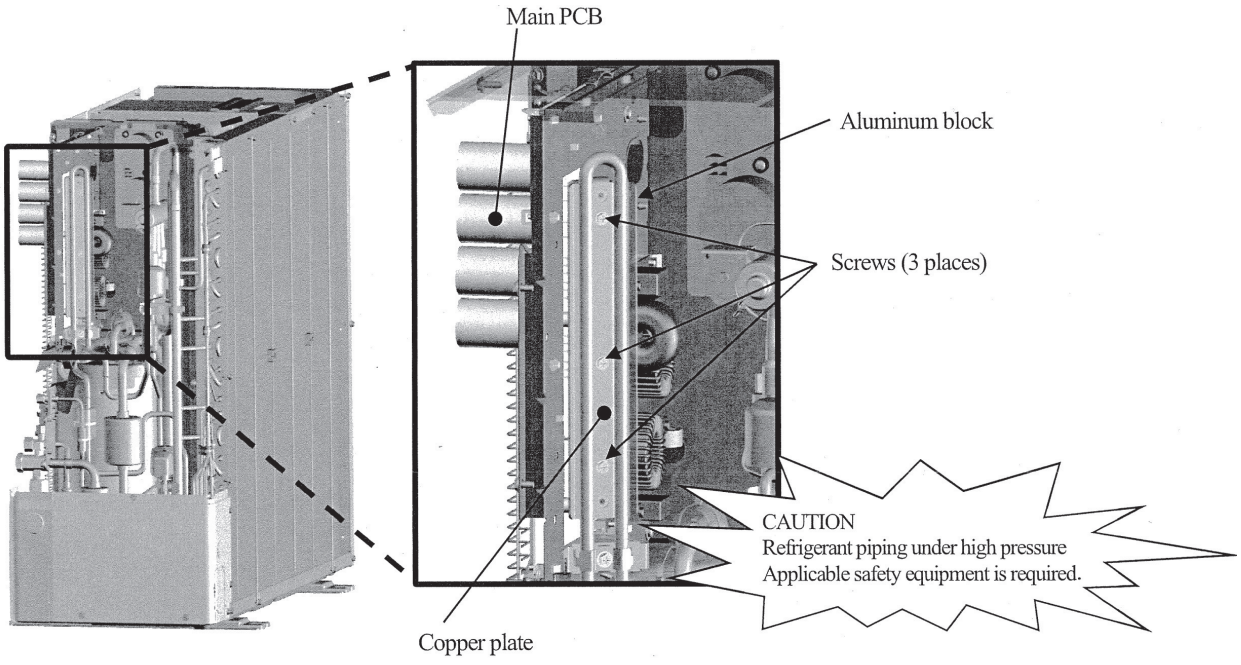


Fig.3 Outdoor unit side view

2) Exchange

a) Match the setting of new main PCB switches (JSW1, SW3-7) with former main PCB. (Refer to Fig.4)

b) Tum over the separator of new heat conduction sheet and paste the heat conduction sheet on the aluminum block. (Refer to Fig.5)

c) Install the attached hamess clip on the new main PCB as shown in Fig.6.

3) Installation

a) Install the new main PCB on the control and tighten the screw as shown in Fig.7.

b) Reconnect the connectors, faston terminals and round terminals to the main PCB as before. (Refer to Fig.2) (Confirm that the **connectors are not half inserted**.)

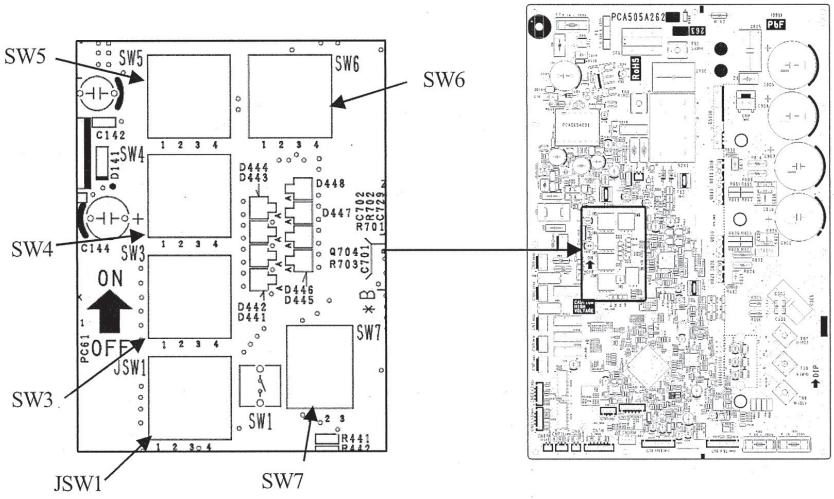


Fig.4 Switch position of main PCB

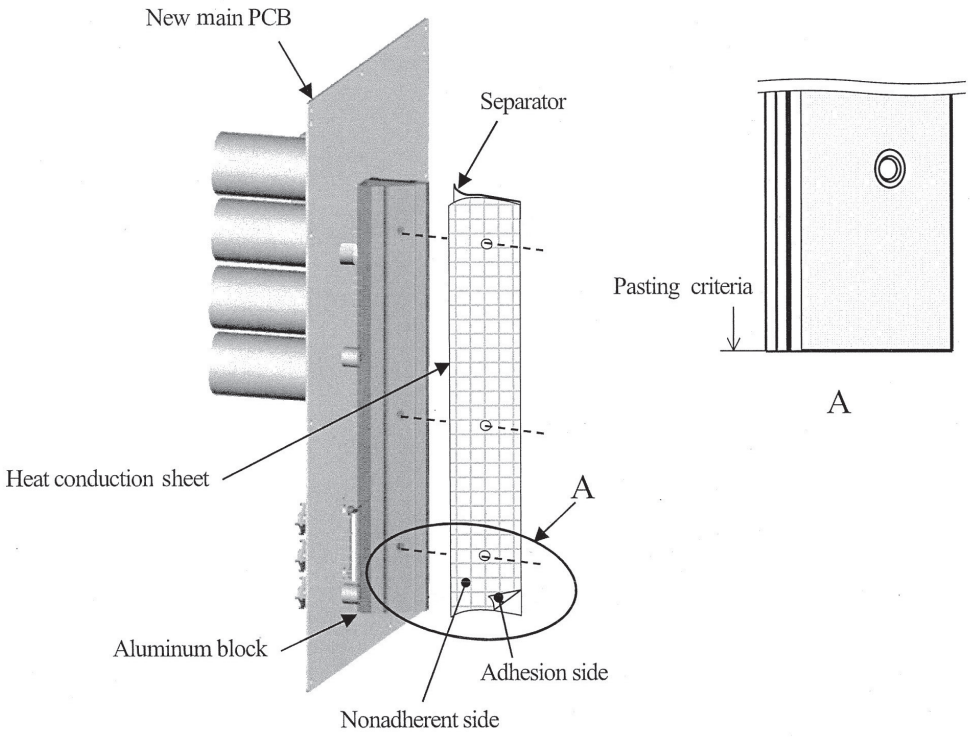


Fig.5 Detail of paste for the heat conduction sheet

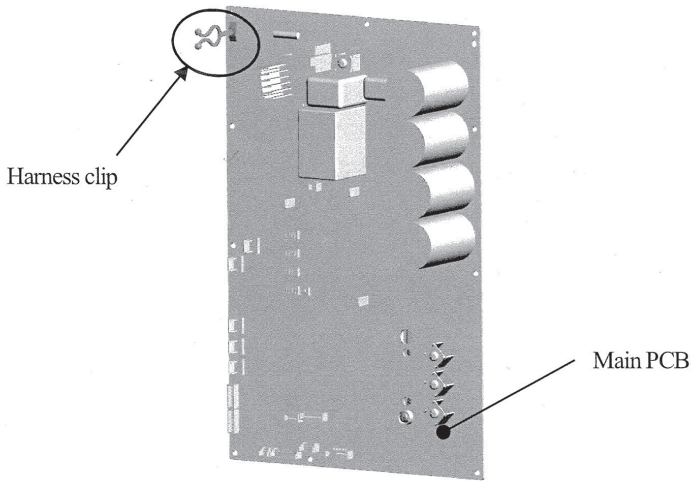


Fig.6 Install of the harness clip

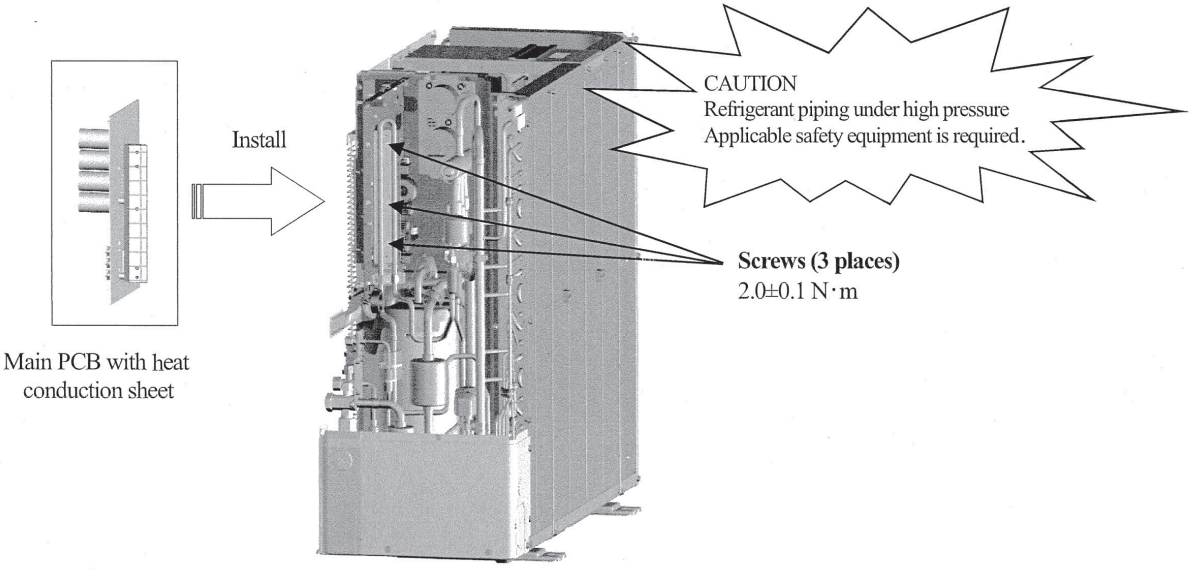
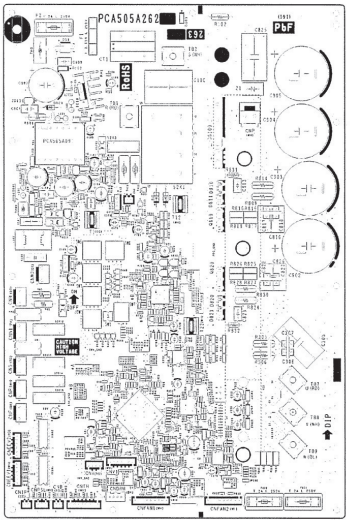


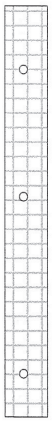
Fig.7 Install of the main PCB

●Accessories

Check the following accessories are packed in. (Except this manual)



Main PCB ×1



Heat conduction sheet
×1

Harness clip
×1

(iv) Models FDC100VSA-W, 125VSA-W, 140VSA-W

PCA012D084 A

1) Disassembly

a) After the breaker is shut down, remove the service panel, top panel and rear panel. (Refer to Fig.1).

b) Don't touch the main PCB until three minutes have passed after the breaker is shut doun.
(After having shut down the breaker, some capacitor is held by high voltage. It is very dangerous to touch the main PCB in this condition.)
In the situation that hamesses are connected to main PCB, **be sure to measure voltage (DC)** on main PCB, and **check that the voltage is discharged sufficientlv (DC voltage 30 V or less).** (Refer to Fig.2)

c) Disconnect the connectors, faston terminals and round terminals from the main PCB as shown in Fig.2.
And then remove the fixing screws (3 places) as shown in Fig.3.
After removing the main PCB, wipe off the heat conduction sheet neatly from the copper plate.

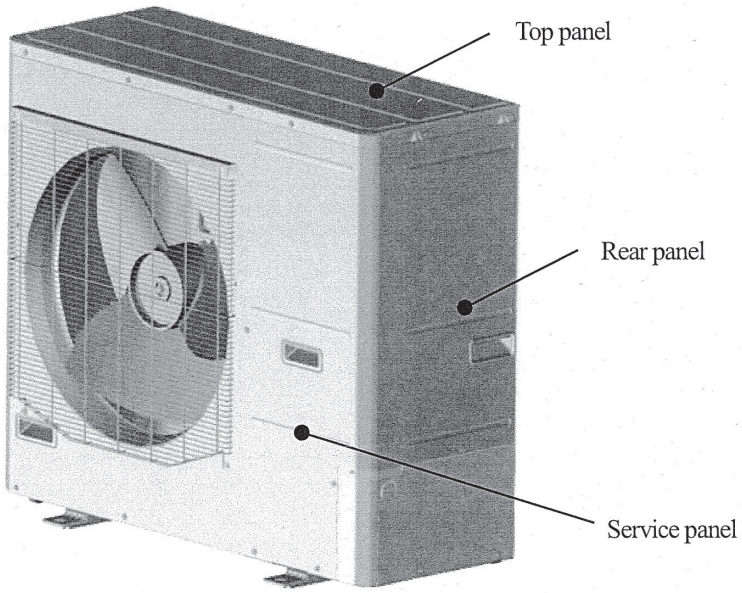


Fig.1 Outdoor unit overall view

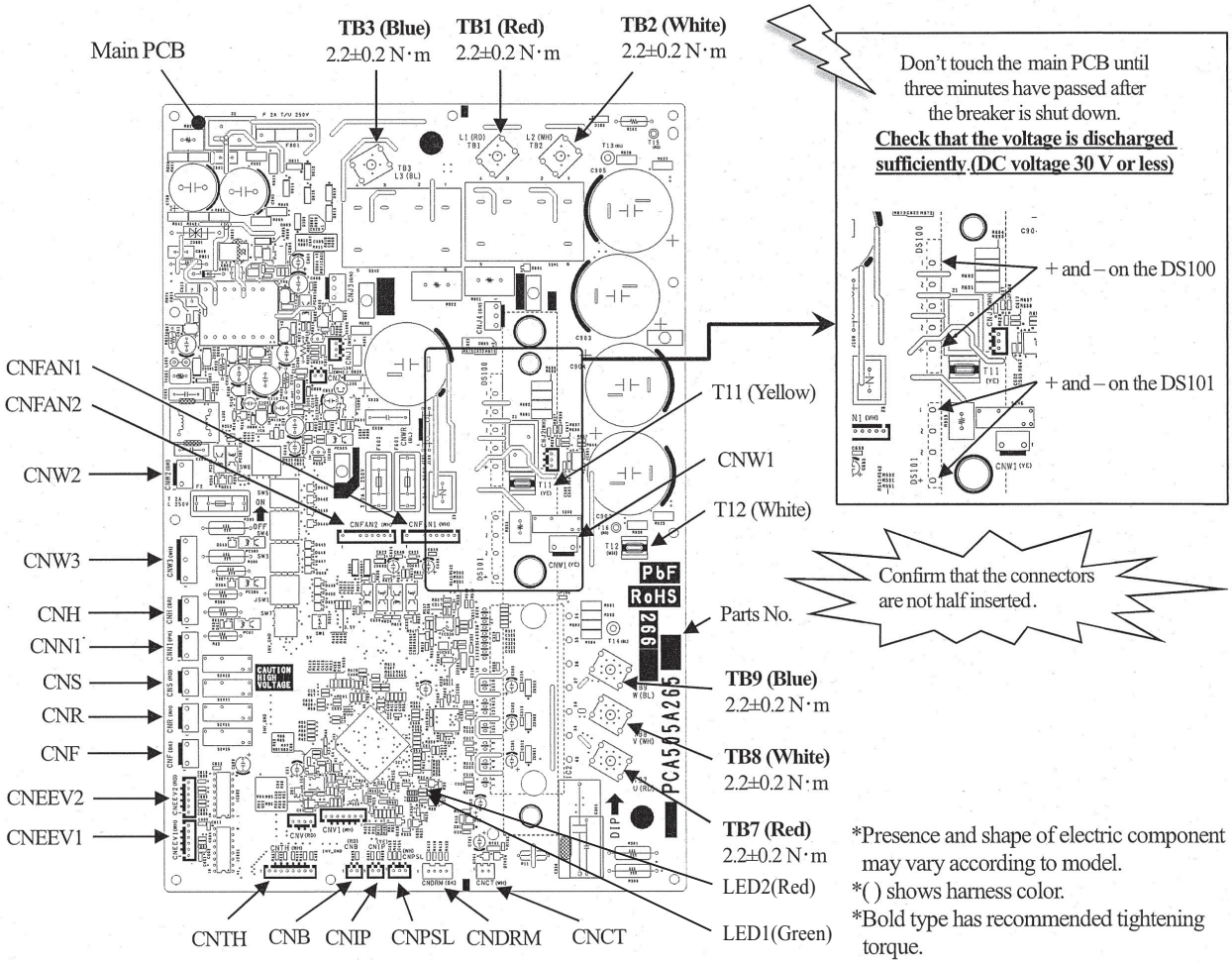


Fig.2 Parts arrangement view of main PCB and voltage measurement points

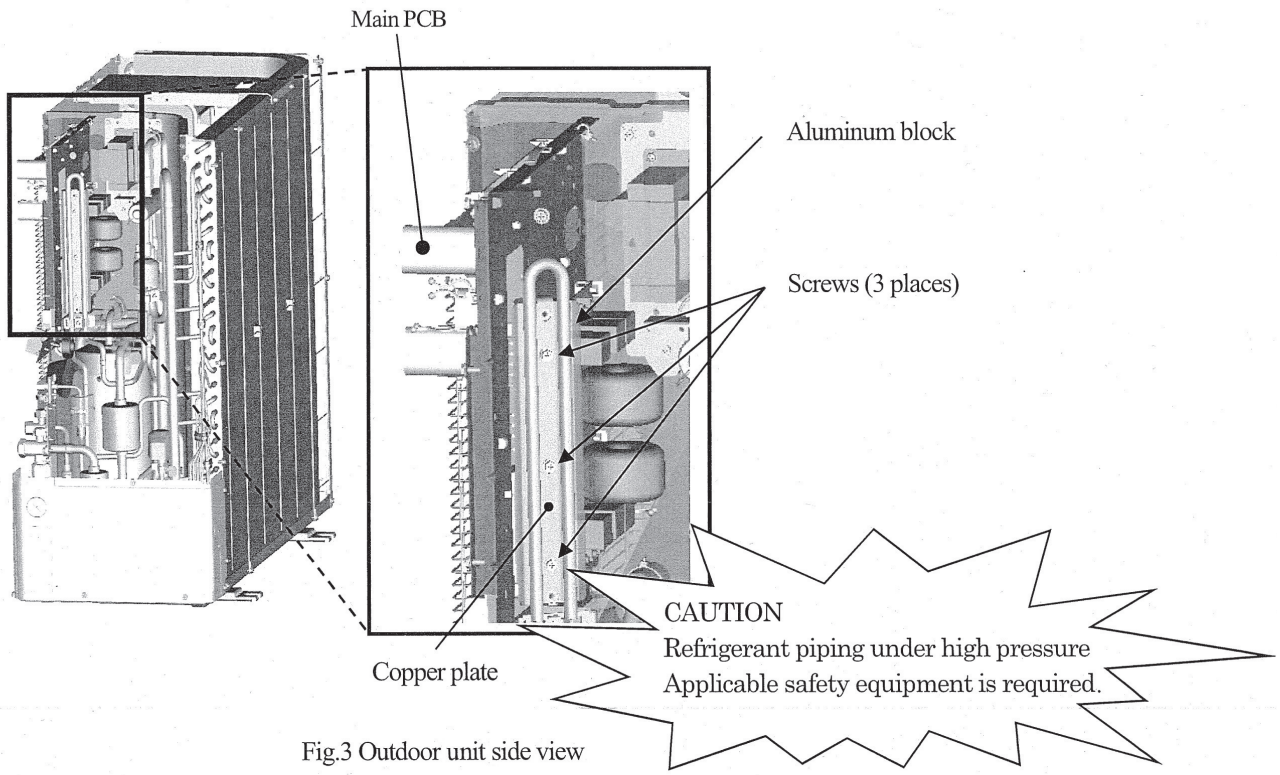


Fig.3 Outdoor unit side view

2) Exchange

a) Match the setting of new main PCB switches (JSW1, SW3-7) with former main PCB. (Refer to Fig.4)

b) Tum over the separator of new heat conduction sheet and paste the heat conduction sheet on the aluminum block. (Refer to Fig.5.)

3) Installation

a) Install the new main PCB on the control and tighten the screw as shown in Fig.6.

b) After the new Main PCB is installed on the control, reconnect the connectors, faston terminals, and round terminals to the main PCB as before. (Refer to Fig.2.)
(Confirm that the **connectors are not half inserted**.)

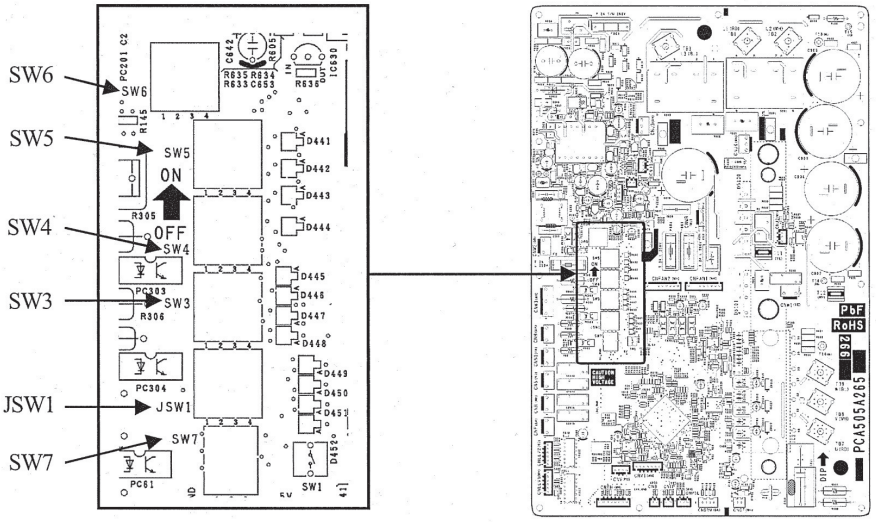


Fig.4 Switch position of main PCB

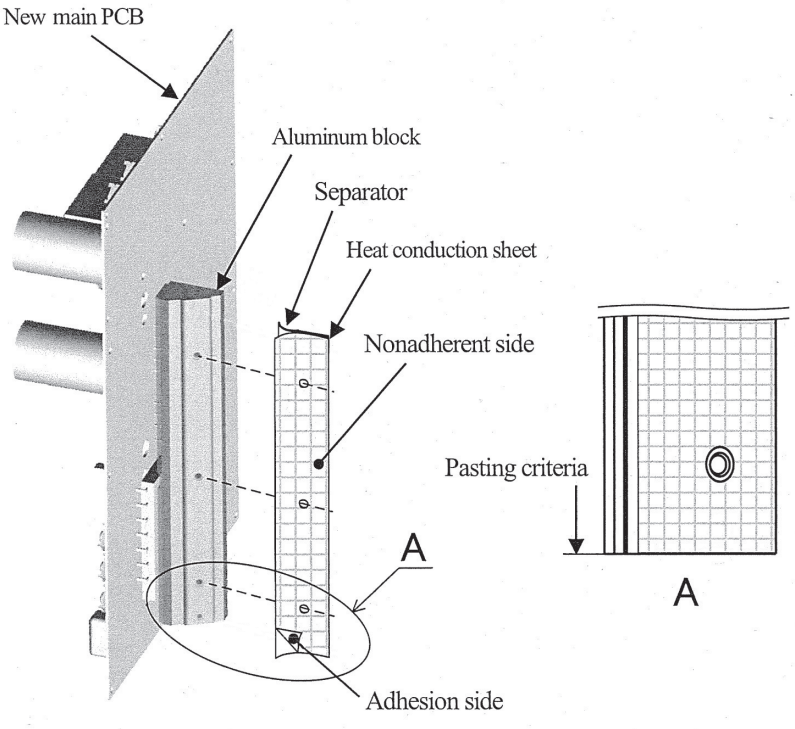


Fig.5 Detail of paste for the heat conduction sheet

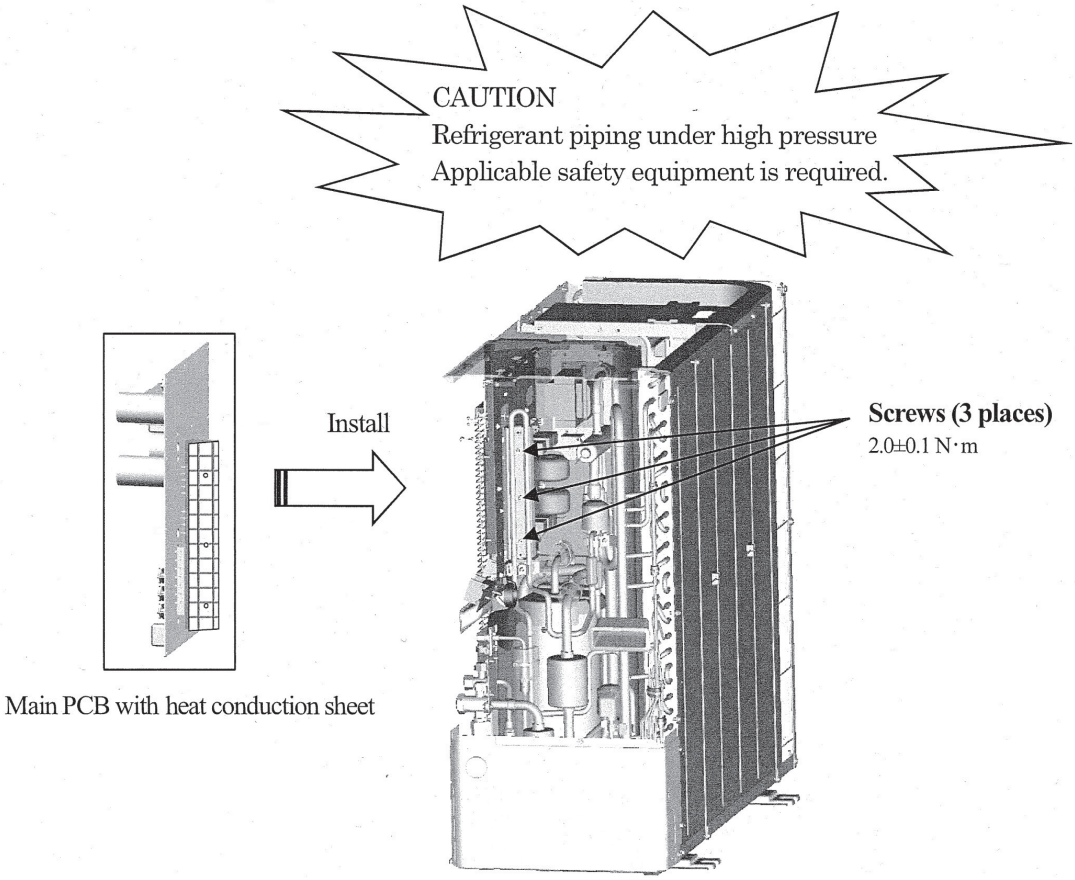
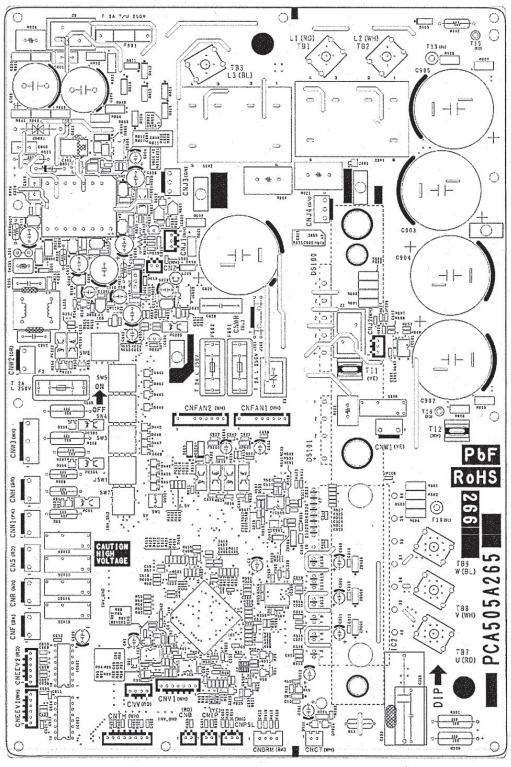


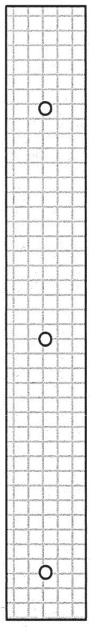
Fig.6 Installation of the main PCB

●Accessories

Check following accessories are packed in. (Except this manual)



Main PCB ×1



Heat conduction sheet ×1

(v) Models FDC200, 250, 280VSA-W

PCA012D110

Exchange the control PCB according to the following procedure.

1. Exchange the PCB **after elapsing 3 minutes from power OFF**.
2. Measurement was done on both ends of connector (CNA1) during measurement, **the voltage (DC) might charged the electrolytic capacitor, be sure that the voltage is discharged sufficiently (10V of less)**. (Refer to Fig.2.)
3. Disconnect the connectors from the control PCB. (Refer to Fig.1.)
4. Disconnect the white or blue wiring passing through CT1 on the PCB before exchanging the PCB.
5. Match the setting switches (SW3-5, 7, JSW1) with the former PCB.
6. Tighten up a screw after passing white of blue wiring through CT1 of the changed.
7. Please connect the connectors with the same place. (Confirm the **connectors are not half inserted**.)

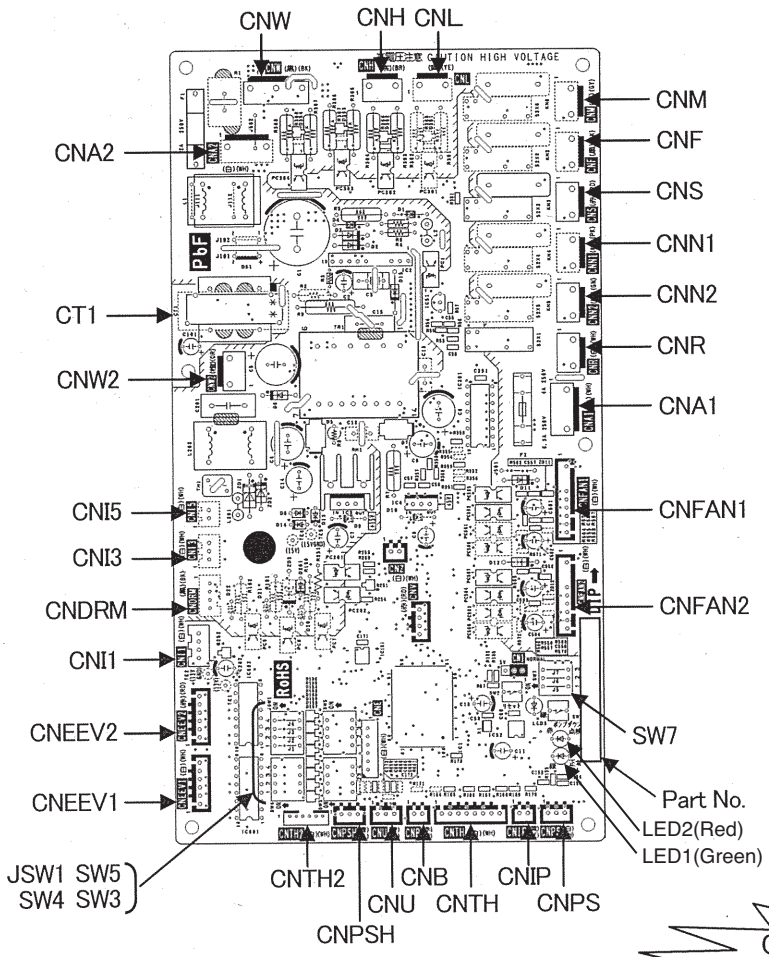
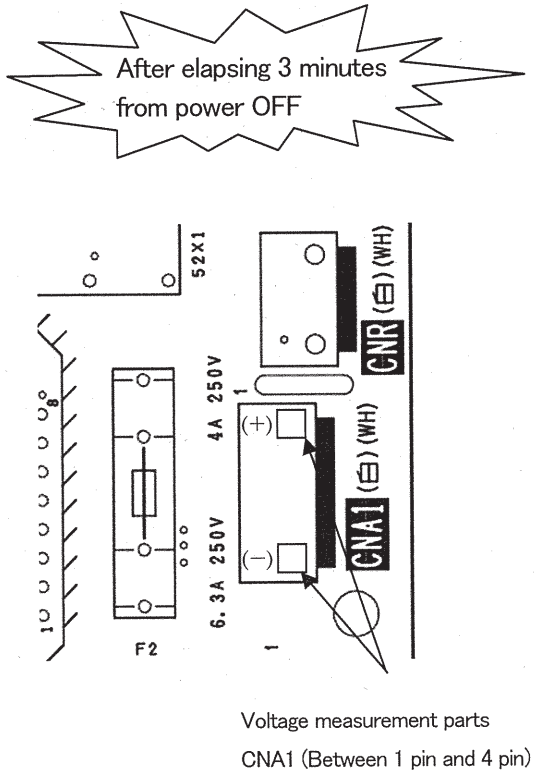
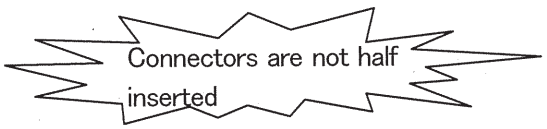


Fig. 1 Parts arrangement view



Voltage measurement parts
CNA1 (Between 1 pin and 4 pin)

Fig. 2 Enlarged view of parts arrangement



(vi) Model FDC71VNP-W

1)Shut down a power source.
2)Remove a top panel.(Fig.1 ①)
3)Detach a service panel.(Fig.1 ②)
4)Detach a top panel of control box.(Fig.1 ③)

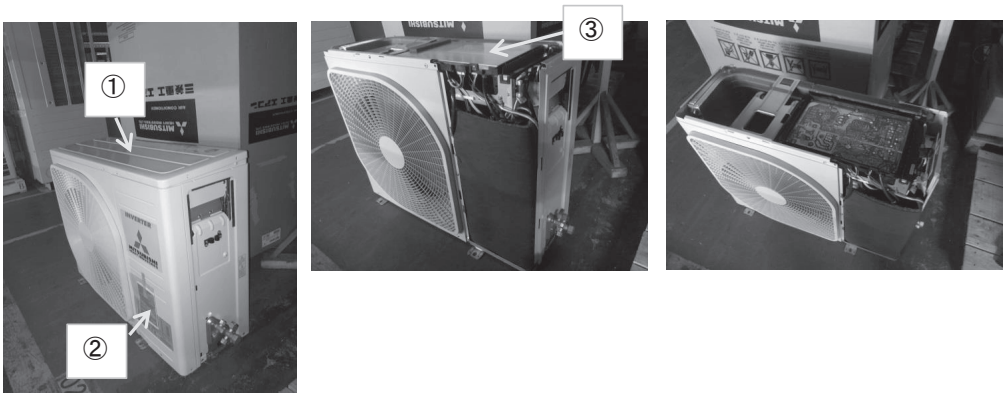


Fig.1 Outdoor unit

5)Make sure that 3 minutes are elasped after shutting down a power source.
6)Check a voltage with the temrinal of C58 by multimeter. (Fig.2)

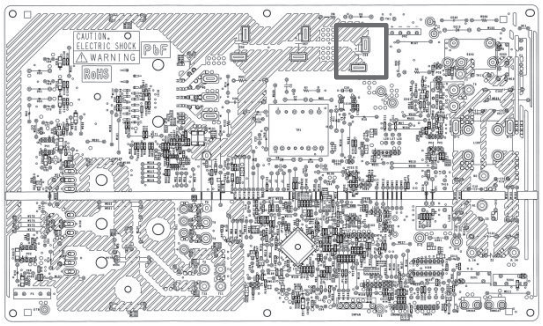


Fig.2 Terminal of C58 on PCB

7)Detach a cover of terminal block.(Fig.3 ④)
8)Detach a cover of reactor.(Fig.3 ⑤)
9)Remove a screw fixing a control PCB.(Fig.3 ⑥)

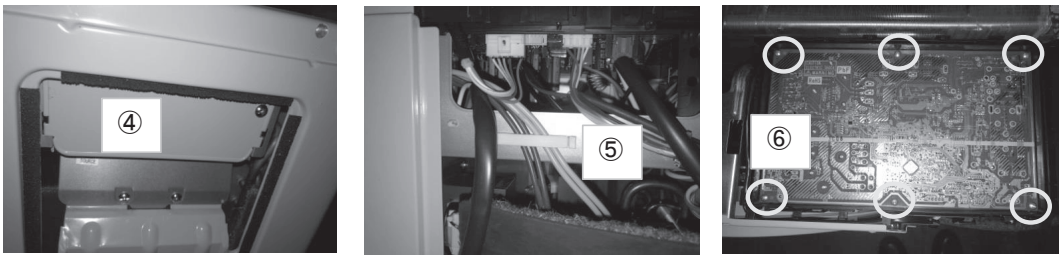


Fig 3. Cover of terminal block, reactor and screw of PCB

9)Disconect the cable of terminal block and fuse.(Fig.4 ⑦、⑧)
10)Disconnect the cables of reactor.(Fig.4 ⑨)

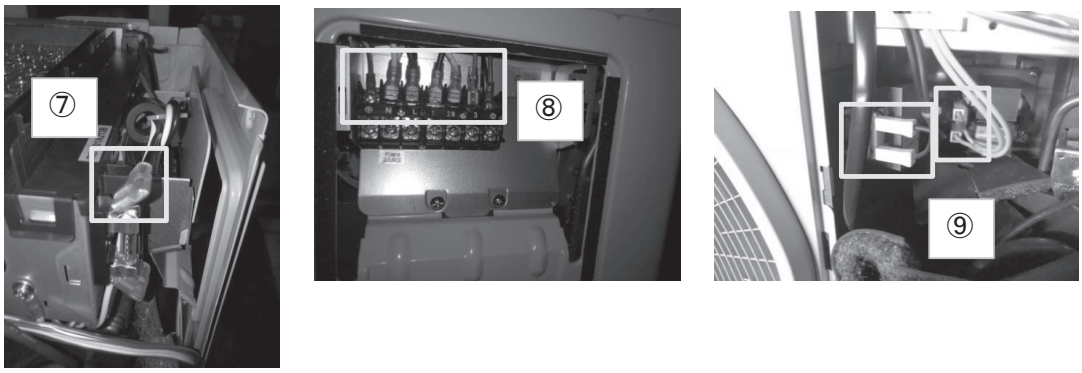


Fig.4 Cable of fuse, terminal block and reactor

11)Disconnect 2 earth calbes on right side of control box.(Fig.5 ⑩、⑪)

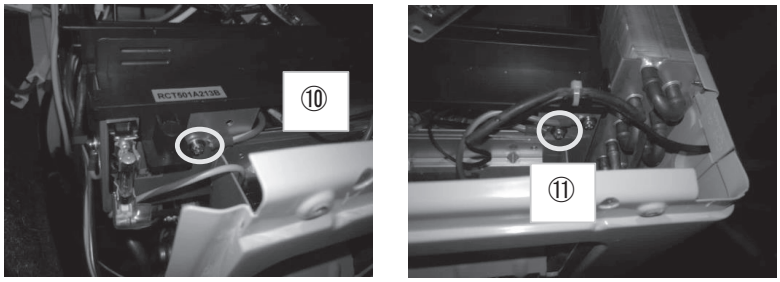


Fig.5 Earth cable of control box

12)Disconnect CnTH(Black) on control PCB. (Fig.6 ⑫)
13)Disconnect a power cable of compressor(U,V,W) from control PCB.(Fig.6 ⑬)

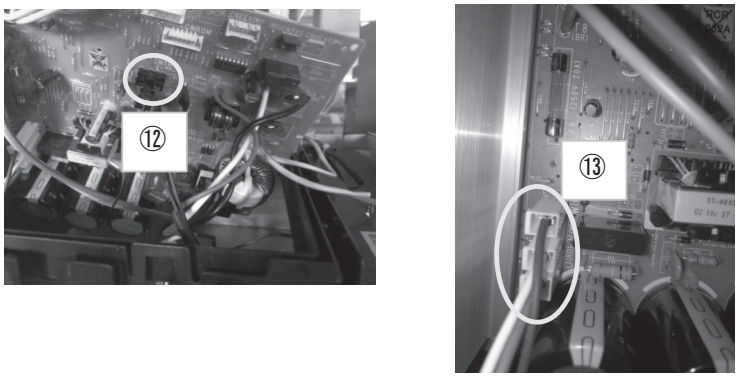


Fig.6 CnTH and power cable of compressor(U,V,W)

14)Take a control PCB out. (Fig.7)
Note: When you take a control box out, please pull it up straight.
Otherwise, it can be damaged.

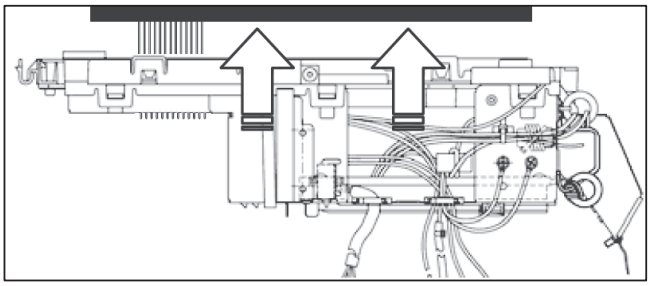


Fig.7 How to remove control PCB

15)Make sure setting of jumper on new PCB is the same with old PCB's setting. (Fig.8)

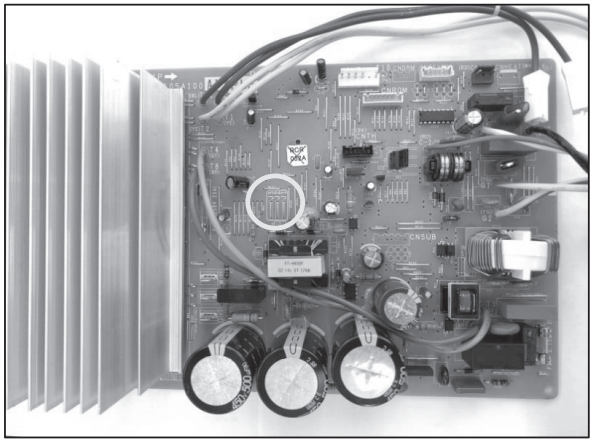


Fig.8 Setting of jumper on PCB

16)Connect the cables and connectors with the control PCB. (Confirm the **connectors are not half inserted**.)

(vii) Models FDC90, 100VNP-W

1)Shut down a power source.
2)Remove a top panel.(Fig.1 ①)
3)Detach a service panel.(Fig.1 ②)
4)Detach a top panel of control box.

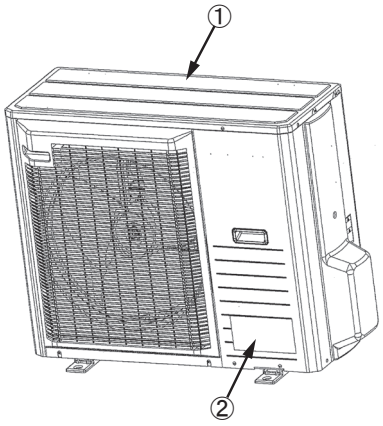


Fig.1 Outdoor unit

5)Make sure that 3 minutes are elasped after shutting down a power source.
6)Check a voltage with the temrinal of C58 by multimeter. (Fig.2)

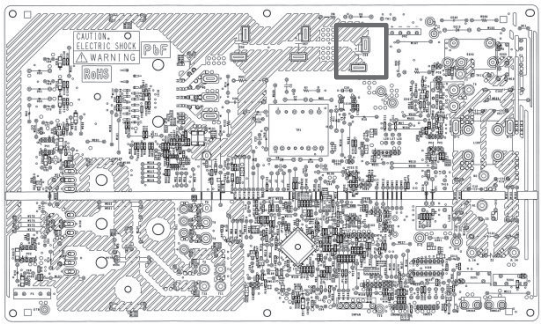


Fig.2 Terminal of C58 on PCB

7)Detach a cover of terminal block.(Fig.3 ④)
8)Detach a cover of reactor.(Fig.3 ⑤)
9)Remove a screw fixing a control PCB.(Fig.3 ⑥)

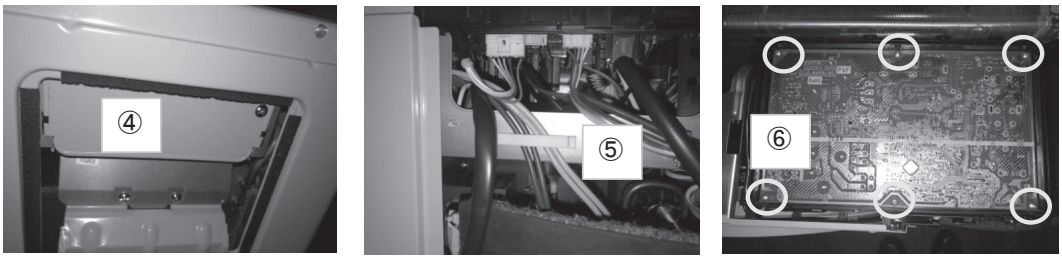


Fig 3. Cover of terminal block, reactor and screw of PCB

9)Disconect the cable of terminal block and fuse.(Fig.4 ⑦、⑧)
10)Disconnect the cables of reactor.(Fig.4 ⑨)

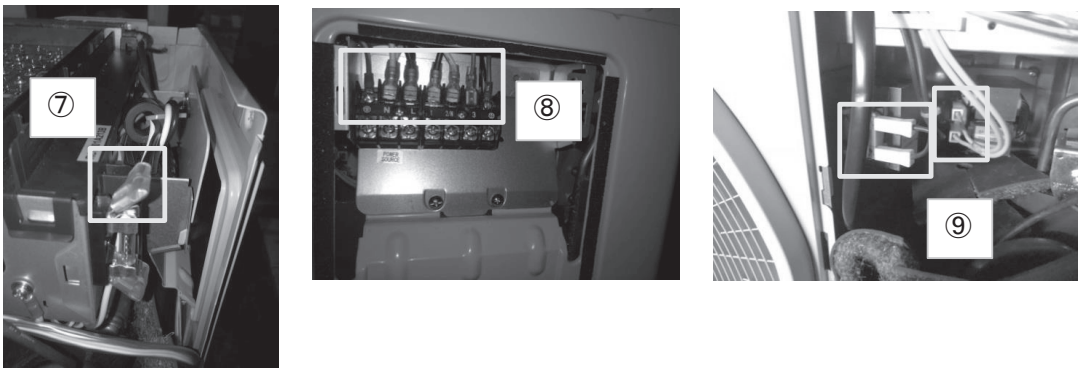


Fig.4 Cable of fuse, terminal block and reactor

11)Disconnect 2 earth calbes on right side of control box.(Fig.5 ⑩、⑪)

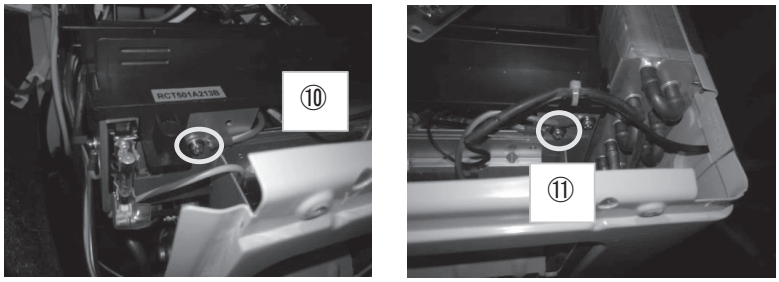


Fig.5 Earth cable of control box

12)Disconnect CnTH(Black) on control PCB. (Fig.6 ⑫)
13)Disconnect a power cable of compressor(U,V,W) from control PCB.(Fig.6 ⑬)

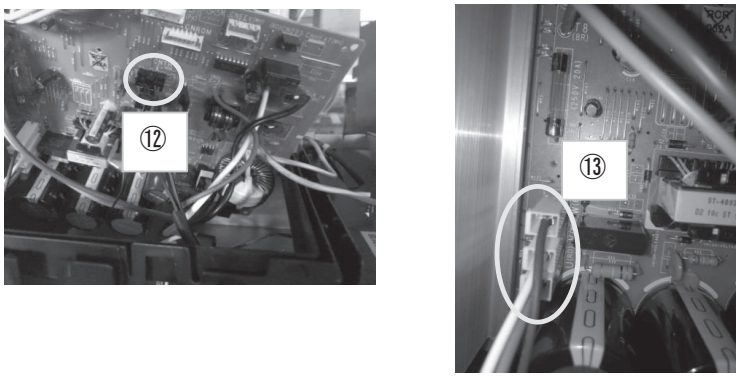


Fig.6 CnTH and power cable of compressor(U,V,W)

14)Take a control PCB out. (Fig.7)
Note: When you take a control box out, please pull it up straight.
Otherwise, it can be damaged.

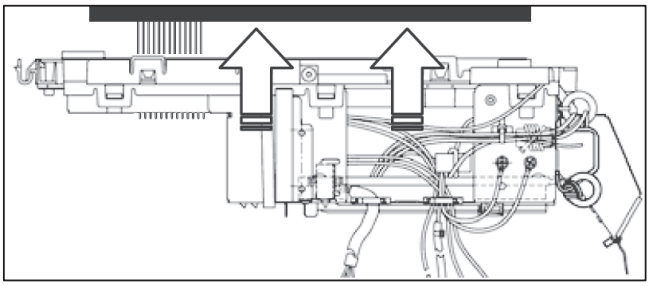


Fig.7 How to remove control PCB

15)Make sure setting of jumper on new PCB is the same with old PCB's setting. (Fig.8)

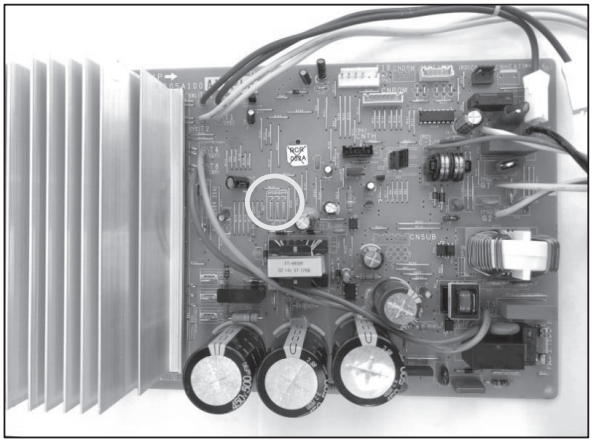


Fig.8 Setting of jumper on PCB

16)Connect the cables and connectors with the control PCB. (Confirm the **connectors are not half inserted**.)

(c) Outdoor inverter PCB replacement procedure

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

⚠ WARNING Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.

⚠ CAUTION Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

⚠ WARNING

- Securely replace the PCB according to this procedure. If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

⚠ CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

Replace the inverter PCB according to the following procedure.

(i) Model FDC71VNX-W

PCA012D067B

1) Replace the PCB **after elapsing 3 minutes from power OFF**.
(High voltage is retained on the capacitor after turning the power off. It is very dangerous to touch the PCB in this condition.)
In the situation that harnesses are connected to inverter PCB **be sure to measure voltage (DC)** between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently**. (Refer to Fig.2.)
2) Disconnect the connectors and faston terminals from the inverter PCB as shown in Fig. 1.
3) Match the setting of switches (JSW10, 11) of new PCB with former PCB.
4) Remove the harness bands (3 places) from the control unit, then remove the fixing screws (4places) from the radiator. (Refer to Fig.3.)
5) Remove the inverter PCB with radiator from the control unit, and exchange the inverter PCB with radiator. Be careful not to pinch the wiring at the time of exchanging.
6) Fix the radiator to the control unit by screws. After exchanging the inverter PCB, reconnect the connectors, faston terminals and the harnesses as before. (Confirm that the **connectors are not half inserted**.)
7) Attach the harness bands (3 places), then reconnect the harnesses as before.
8) Install the harness clip on the inverter PCB as shown in Fig.4, and fix the harness.

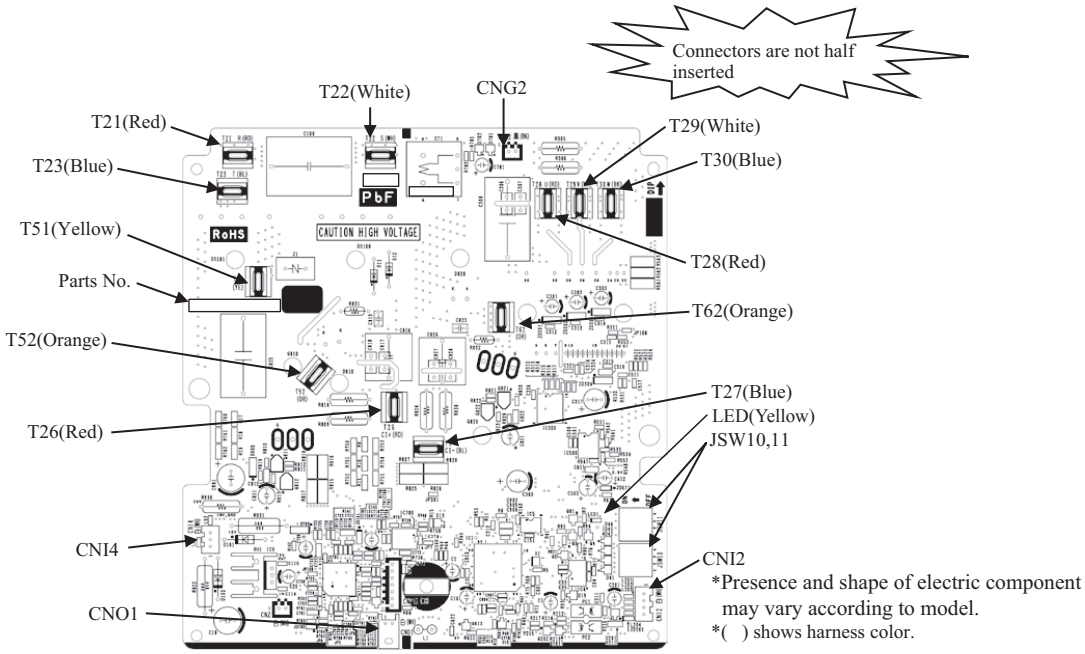


Fig.1 Parts arrangement view of inverter PCB

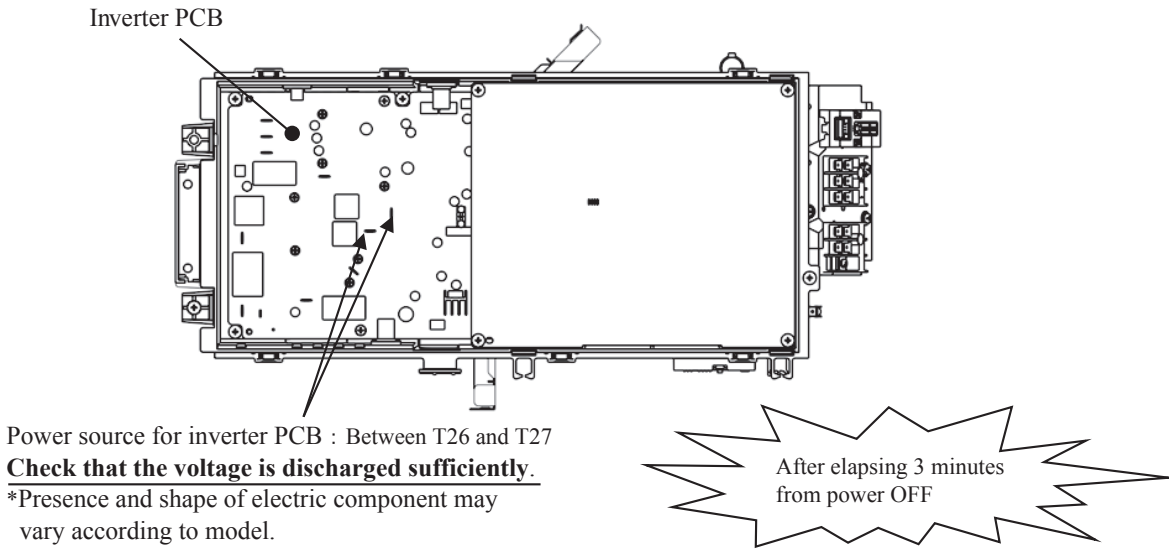


Fig.2 Voltage measurement points

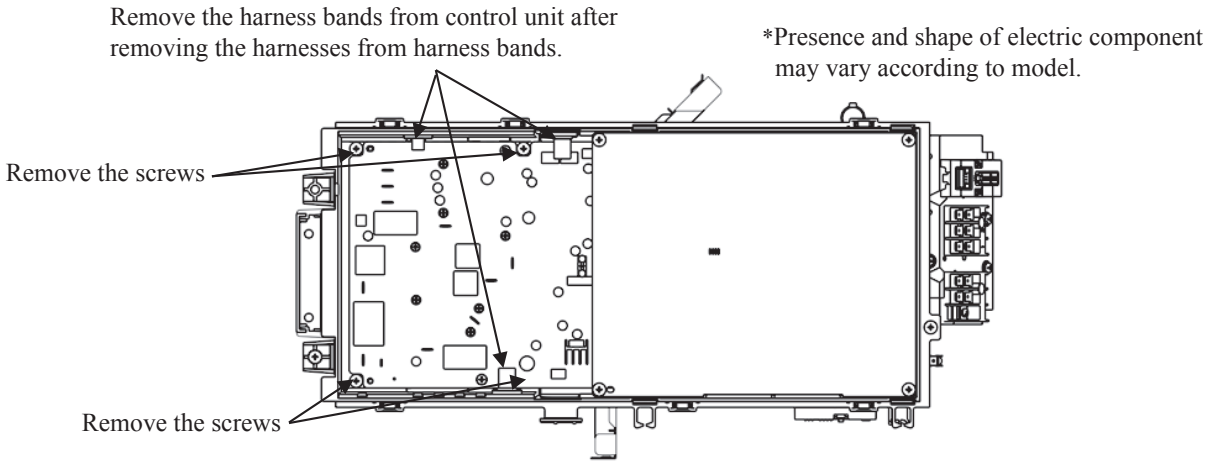


Fig.3 Target places where harness bands and screws are removed

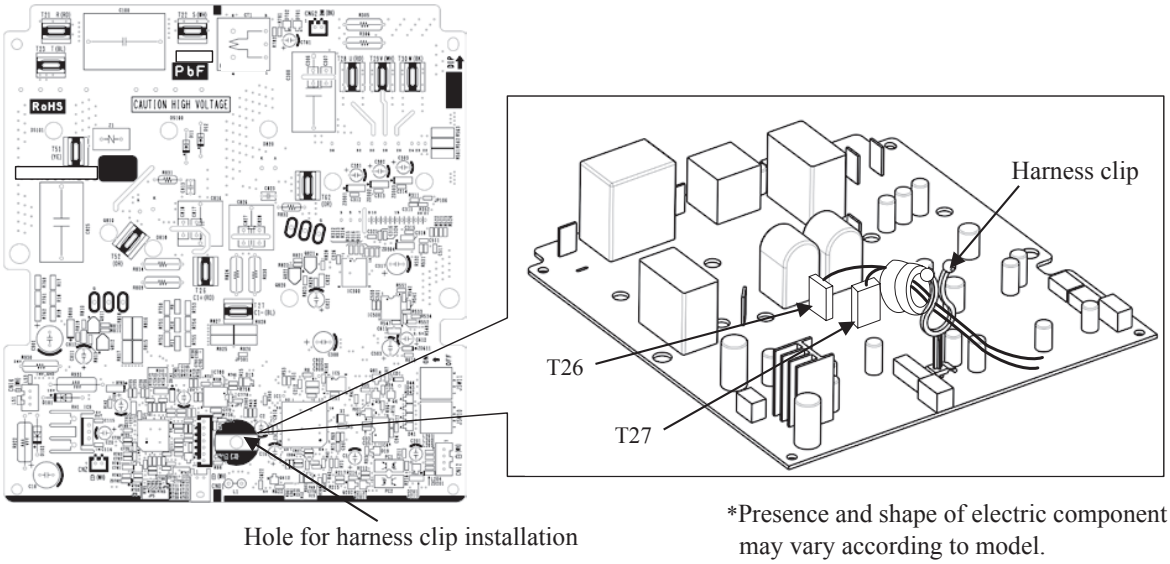
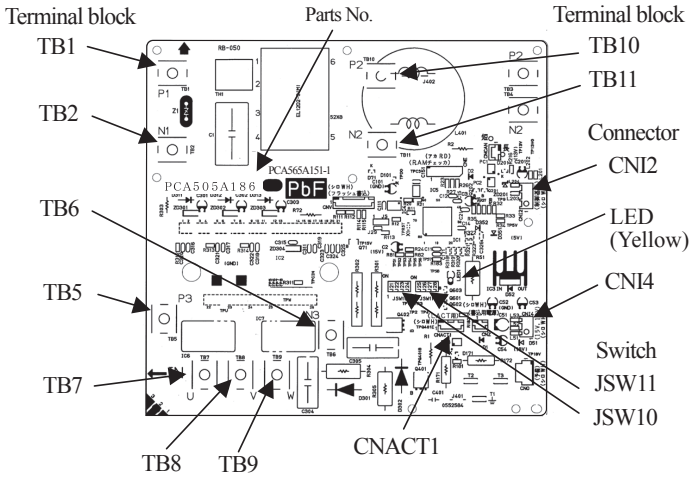


Fig.4 Fix the harness on the harness clip

(ii) Models FDC100VNX-W, 125VNX-W, 140VNX-W

PCA012D025D R

1) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in control back, and **check that the voltage is discharged sufficiently**.(Refer to Fig.1.))
2) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the control's radiation heat fins.
3) Match the setting switches (JSW10,11) of new PCB with the former PCB.
4) Before installing the power transistor on the new PCB, apply uniformly a bundled of silicon grease first on the surface of power transistor.Make sure it is applied to prevent damage on power transistor.
5) Tighten the screw of power transistor on inverter PCB and connect the terminal block.Confirm the connection and don't use soldering in the connection.Tighten properly the power transistor with a screw and make sure there is no slack.Power transistor can be damage if not properly tighten.(Recommended power transistor tightening torque:0.98 – 1.47N·m)



Parts arrangement view

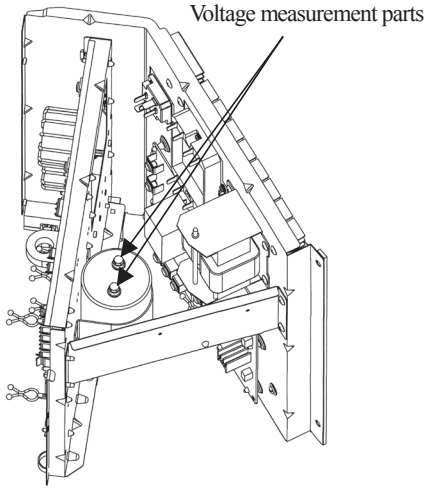


Fig.1 Position of capacitor

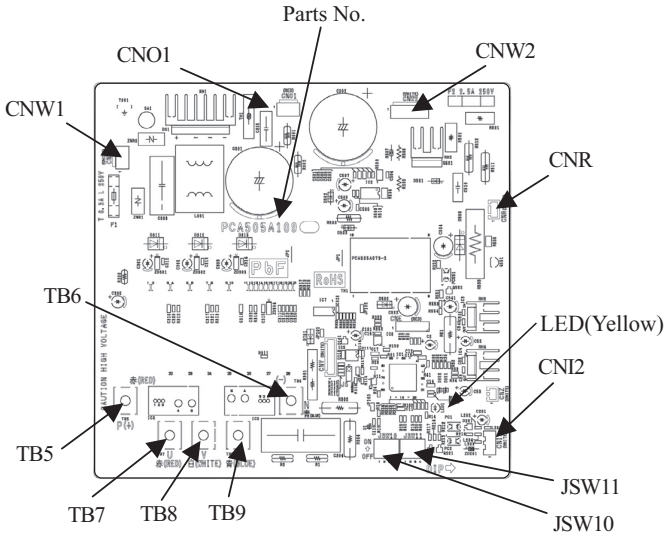
Table. 1 Switch setting
Models FDC100VNX-W, 125VNX-W, 140VNX-W

JSW10	-1	OFF	JSW11	-1	OFF
	-2	ON		-2	OFF
	-3	OFF		-3	OFF
	-4	OFF		-4	ON

PCA012D025F R

(iii) Models FDC100VSX-W, 125VSX-W, 140VSX-W

1) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in control back, and **check that the voltage is discharged sufficiently**.(Refer to Fig.1.))
2) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the control's radiation heat fins.
3) Match the setting switches (JSW10,11) of new PCB with the former PCB.
4) Before installing the power transistor on the new PCB, apply uniformly a bundled of silicon grease first on the surface of power transistor.Make sure it is applied to prevent damage on power transistor.
5) Tighten the screw of power transistor on inverter PCB and connect the terminal block.Confirm the connection and don't use soldering in the connection.Tighten properly the power transistor with a screw and make sure there is no slack.Power transistor can be damage if not properly tighten.(Recommended power transistor tightening torque:0.98 – 1.47N·m)



Parts arrangement view

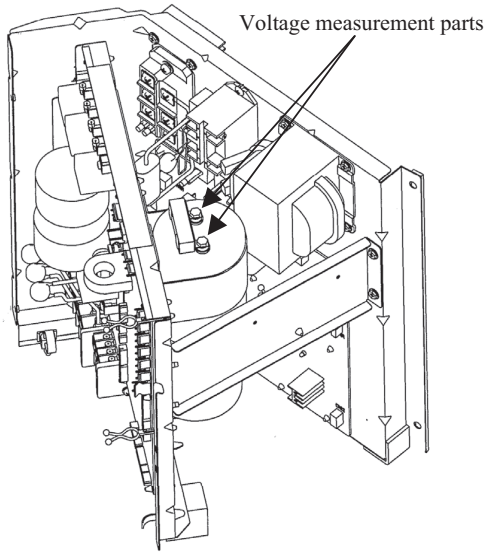


Fig.1 Position of capacitor

Table. 1 Switch setting

Models FDC100VSX-W, 125VSX-W, 140VSX-W

JSW10	-1	OFF	JSW11	-1	ON
	-2	ON		-2	ON
	-3	OFF		-3	ON
	-4	OFF		-4	OFF

PCB012D057A D

(iv) Models FDC200, 250, 280VSA-W

Replace the inverter PCB (Fig.1) according to the following procedure.

1) Replace the PCB **after elapsing 3 minutes from power OFF**.
2) In the situation that harnesses are connected to control PCB, **be sure to measure voltage (DC) of two places ((A), (B))** and check that **the voltage is discharged sufficiently**. (Refer to Fig.2.)
3) Remove the harnesses from bands, clips and connectors on the control PCB. Then, remove the appointed screws (4 places) of a control. (Refer toFig.3.)
4) Open main layer and **measure voltage (DC) of aplace (C)** and check that **the voltage is discharged sufficiently**. (Refer to Fig.4)
5) Disconnect connectors from the inverter PCB (Refer to Fig.1), remove a snubber capacitor (Refer to Fig.4.) and harnesses ("P", "N" ,"U", "V" and "W"), and exchange the inverter PCB then. In the situation of being opening main layer, do not press the control from above. It will cause the product deformation or injury.
6) Match the setting of switches (JSW10, 11) of new PCB with former PCB.
7) After exchanging the inverter PCB, install the snubber capacitor to power transistor (Refer to Fig.5.), and reconnect the connectors and the harnesses as before. (Confirm the **connectors are not half inserted**.)
   Be careful not to pinch the wiring at the time of closing main layer. The wiring is damaged, and it will cause a short circuit or fire.

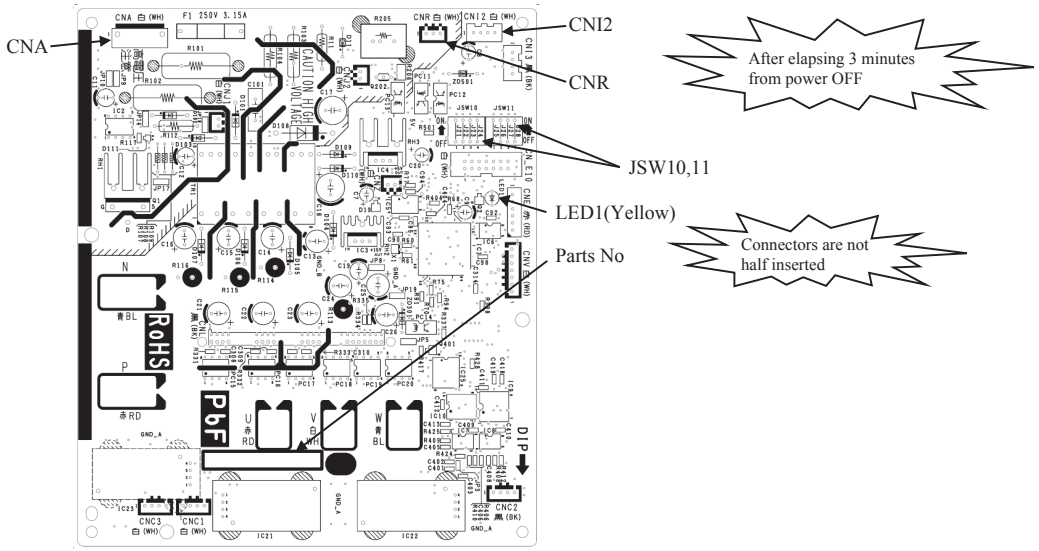


Fig.1 Parts arrangement view of inverter PCB

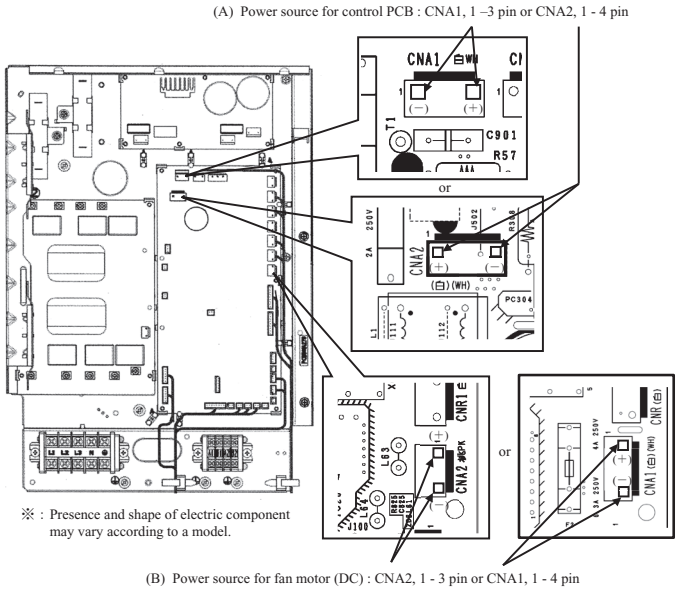


Fig.2 Voltage measurement points

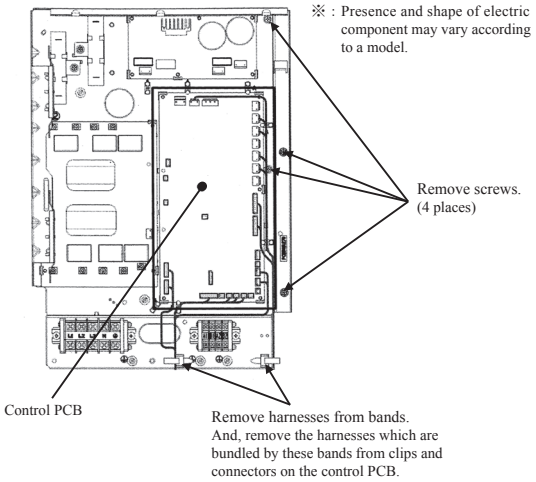


Fig.3 Target places which are removed harnesses and screws

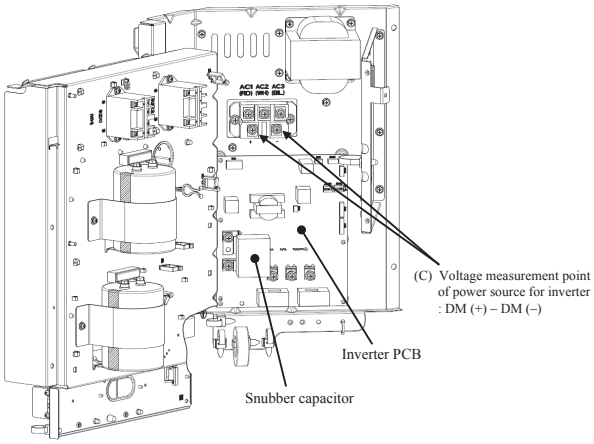
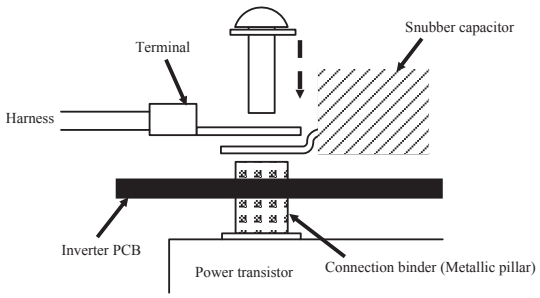


Fig.4 Installation place of inverter PCB



Procedure on tightening harness (Snubber capacitor) and power transistor with screw.
A metallic connection binder is set in each hole of the inverter PCB of "P", "N", "U", "V", and "W" beforehand.
Then tighten the harness (Snubber capacitor) and the power transistor with the screw together.
(Set the harness wires to be fixed to "U" and "W" with screws in respective holes after passing them through IC21 and 22.)
(Connect the snubber capacitor with "P" and "N".)

Fig.5 Installation method to power transistor

●DIP switch setting list (Outdoor unit)

Model FDC71VNX-W

(1) Control PCB

Switch	Description		Default setting		Remark
SW3-1	Defrost condition	Normal*/Cold region	OFF	Normal	
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	
SW3-3	Model selection	Cooling only/Heat pump*	OFF	Heat pump	Keep OFF
SW3-4	Defrost prohibition time	ON: 37min*/OFF: 45min	ON	37min.	
SW4-1	Model selection	Domestic/Overseas*	ON	Overseas	Keep ON
SW4-2	Model selection	3 phase/Single phase*	ON	Single phase	Keep ON
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Reserved		OFF		Keep OFF
SW5-1	Model selection		OFF		Keep OFF
SW5-2	Model selection		OFF		Keep OFF
SW5-3	Test run Switch	Normal*/Test run	OFF	Normal	
SW5-4	Test run mode	Cooling*/Heating	OFF	Cooling	
SW7-1	Reserved		OFF		Keep OFF
SW7-2	Reserved		OFF		Keep OFF
SW7-3	Reserved		OFF		Keep OFF
SW8-1	Reserved		OFF		Keep OFF
SW8-2	Reserved		OFF		Keep OFF
SW8-3	Reserved		OFF		Keep OFF
SW9	Pump down operation	Normal*/Pump down	OFF	Normal	

* Default setting

(2) Inverter PCB

Switch	FDC71VNX-W
	Single phase models
JSW10-1	OFF
JSW10-2	OFF
JSW10-3	OFF
JSW10-4	OFF ∗
JSW11-1	ON
JSW11-2	OFF
JSW11-3	ON
JSW11-4	OFF

∗ When checking inverter PCB of FDC71 model with inverter checker, turn JSW10-4 ON.
(Regarding the checking method of inverter PCB with inverter checker, refer to page 70 for details)

Models FDC100, 125, 140VNX-W, 100, 125, 140VSX-W

(1) Control PCB

Switch	Description		Default setting		Remark
SW1	Pump down operation	Normal*/Pump down	OFF	Normal	
JSW 1-1	Model selection		As per model		See table1.
JSW 1-2					
JSW 1-3					
JSW 1-4	Reserved		OFF		Keep OFF
SW 3-1	Defrost condition	Normal*/Cold region	OFF	Normal	
SW 3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	
SW 3-3	Test run switch	Normal*/Test run	OFF	Normal	
SW 3-4	Test run mode	Normal*/Heating	OFF	Cooling	
SW 4-1	Silent mode setting	Normal*/Silent	OFF	Normal	See page 30.
SW4-2	Model setting	3 phase/ Single phase	As per model		See table 1.
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Manual defrost	Normal*/Control activated	OFF	Normal	See page 41.
SW5-1	Control for existing pipnig	Normal*/Control activated	OFF	Normal	See Note 1.
SW5-2	High head-difference control	Normal*/Control activated	OFF	Normal	When the outdoor unit is installed 30m or higher than indoor unit.
SW5-3	Reserved		OFF		Keep OFF
SW5-4	Reserved		OFF		Keep OFF
SW7-1	SW1 function selection		OFF		See table 1.
SW7-2	Limit the number of compressor start	Normal*/Control activated	OFF	Normal	See page 41.
SW7-3	Reserved		OFF		Keep OFF

Table 1: Outdoor unit model setting with JSW1-1-JSW1-3 and SW4-2

	100VNX-W	100VSX-W	125VNX-W	125VSX-W	140VNX-W	140VSX-W
JSW 1-1	OFF	OFF	ON	ON	OFF	OFF
JSW 1-2	OFF	OFF	OFF	OFF	ON	ON
JSW 1-3	OFF	OFF	OFF	OFF	OFF	OFF
SW 4-2	ON	OFF	ON	OFF	ON	OFF

Table 2 : SW1 fuction selection

SW7-1	SW1 function allocation	Remark
OFF	Pump down operation	Refer to page 40.
ON	Reset cumulative time of compressor operation	Reset of cumulative operation time in such case the compressor is replaced.

(2) Inverter PCB

Switch	FDC100, 125, 140VNX-W	FDC100, 125, 140VSX-W
	Single phase models	3 phase models
JSW10-1	OFF	OFF
JSW10-2	ON	ON
JSW10-3	OFF	OFF
JSW10-4	OFF *	OFF *
JSW11-1	OFF	ON
JSW11-2	OFF	ON
JSW11-3	OFF	ON
JSW11-4	ON	OFF

* When checking inverter PCB of FDC100－140 models with inverter checker, turn JSW10-4 ON.
(Regarding the checking method of inverter PCB with inverter checker, refer to pages 72, 73 for details)

Moedls FDC100, 125, 140VNA-W, 100, 125, 140VSA-W

Switch	Description		Default setting		Remark
SW1	(See table 1)		OFF		
JSW1-1 JSW1-2 JSW1-3	Model selection		As per model		See table 2.
JSW1-4	Reserved		OFF		Keep OFF
SW3-1	Defrost condition	Normal*/Cold region	OFF	Normal	Refer to page 36.
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	Refer to page 34.
SW3-3	Test run SW	Normal*/Test run	OFF	Normal	Refer to page 40.
SW3-4	Test run mode	Cooling*/Heating	OFF	Cooling	Refer to page 40.
SW4-1	Reserved		OFF		Keep OFF
SW4-2	Cancel measuring of refrigerant leak	Normal*/Cancel	OFF	Normal	Detection function of error in E57 refrigeration system protection (OFF: Detection / ON: Cancel to detect)
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Reserved		OFF		Keep OFF
SW5-1	Utilization of existing piping control	Normal*/Existing piping control	OFF	Normal	See Note 1.
SW5-2	Hight difference of IU and OU control	Normal*/High head control	OFF	Normal	When the outdoor unit is positioned higher than 30m (OFF : Normal / ON : high head)
SW5-3	Reserved		OFF		Keep OFF
SW5-4	Reserved		OFF		Keep OFF
SW6-1	Reserved		OFF		Keep OFF
SW6-2	Reserved		OFF		Keep OFF
SW6-3	Reserved		OFF		Keep OFF
SW6-4	Inverter checker mode	Normal*/Check INV	OFF	Normal	Refer to page 85.
SW7-1	SW1 function selection		OFF		See table1.
SW7-2	Frost protection by frequent external ON/OFF	Normal*/connected external device	OFF	Normal	In case external device switches ON/OFF frequently, switch to ON to start defrost operation even though short operation time.
SW7-3	Silent mode selection	Normal*/Silent mode	OFF	Normal	Refer to page 40.

* Default setting

Table 1: SW1 fuction selection

0: OFF 1:ON

SW7-1	SW1 function	Remark
0	Pump down operation	Refer to page 40.
1	Reset cumulative time of compressor operation	Reset of operation time after replacing a compressor

Table 2: Outdoor unit model selection with JSW1-1-JSW1-3

0: OFF 1:ON

	100VNA	100VSA	125VNA	125VSA	140VNA	140VSA
JSW1-1	0	0	1	1	0	0
JSW1-2	0	0	0	0	1	1
JSW1-3	0	0	0	0	0	0

Note 1: Utilization of existing pipe

1 In case of reusing annealed pipe ϕ 19.05× t1.0, be sure to turn the DIP switch on the outdoor PCB ON as shown in the table because of its insufficient strength. If its material is 1/2H or its thickness is 1.2mm or more it is no necessary.

2 If bendng radius of existing pipe is less than R70mm, be sure to turn the DIP switch on the outdoor PCB shown in the table due to its insufficient strength.

Moedls FDC200, 250, 280VSA-W

(1) Control PCB

Switch	Description		Default setting	Remark
SW1	(See table 1.)		OFF	
JSW1-1 JSW1-2 JSW1-3	Model selection		As per model	See table 2.
JSW1-4	No function		OFF	
SW3-1	Defrost condition	Normal*/Cold region	OFF	Refer to page 195.
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Refer to page 195.
SW3-3	Test run SW	Normal*/Test run	OFF	Refer to page 199.
SW3-4	Test run mode	Cooling*/Heating	OFF	Refer to page 199.
SW4-1	SW1 function selection		OFF	See table1.
SW4-2	Reserve		OFF	
SW4-3	Reserve		OFF	
SW4-4	Forced defrost	Normal*/Valid	OFF	
SW5-1	Existing pipe system setting	Normal*/Valid	OFF	
SW5-3	Reserve		OFF	
SW5-4	Reserve		OFF	
SW7-1	Anti-frost control	Normal*/Valid	ON	
SW7-2	Reserve		ON	
SW7-3	Silent mode selection	Capacity priority/Silent priority*	ON	Refer to page 199.

* Default setting

Table 1: SW1 fuction selection

0: OFF 1:ON

SW4-1	SW1 function	Remark
0	Pump down operation	Refer to page 200.
1	Reset cumulative time of compressor operation	Reset of operation time after replacing a compressor

Table 2: Outdoor unit model selection with JSW1-1-JSW1-4

Switch	FDC200	FDC250	FDC280
JSW1-1	ON	OFF	ON
JSW1-2	ON	OFF	OFF
JSW1-3	ON	ON	ON

(2) Inverter PCB

Switch	FDC200	FDC250	FDC280
JSW10-1	OFF	OFF	OFF
JSW10-2	ON	ON	ON
JSW10-3	OFF	OFF	OFF
JSW10-4	OFF *	OFF *	OFF *
JSW11-1	OFF	OFF	OFF
JSW11-2	OFF	OFF	OFF
JSW11-3	ON	ON	ON
JSW11-4	OFF	OFF	OFF

* When checking inverter PCB of FDC200, 250, 280 models with inverter checker, turn JSW10-4 ON.
(Regarding the checking method of inverter PCB with inverter checker, refer to page 85 for details)

(5) Check of anomalous operation data with the remote control

(a) In case of RC-EX3A remote control

[Operating procedure]

① On the TOP screen, touch the buttons in the order of "Menu" → "Service setting" → "Service & Maintenance" → "Service password" → "Set" → "Error display" → "Error history".

② When only one indoor unit is connected to the remote control, followings will be displayed.

1. When there is any anomaly: "Loading. Wait a while" is displayed, followed by the operation data at the occurrence of anomaly

Contents of display

・Error code

・Number and data item

2. When there is no anomaly: "No anomaly" is displayed, and this mode is terminated.

③ When two or more indoor units are connected to the remote control, followings will be displayed.

1. When there is any anomaly: If the unit having anomaly is selected on the "Select IU" screen, "Loading. Wait a while" is displayed, followed by the operation data at the occurrence of anomaly.

Contents of display

・Indoor unit No.

・Error code

・Number and data item

2. When there is no anomaly: "No anomaly" is displayed, ant this mode is terminated.

Note (1) When the number of connected units cannot be shown in a page, select "Next".

④ If you press [RUN/STOP] button, the display returns to the TOP screen.

◎ **If you touch "Back" button on the way of setting, the display returns to the last precious screen.**

Note When two remote controls are used to control indoor units, the check of anomaly operation data can be made on the master remote control only. (It cannot be operated from the slave remote control.)

■ Anomaly operation data (Corresponding data may not be provided depending on models. Such items will not be displayed.)

Number	Data Item
01	Operation Mode
02	Set Temperature
03	Return Air Temperature
04	Remote Control Temperature Sensor
05	Indoor Heat Exchanger Temperature Sensor / U Bend
06	Indoor Heat Exchanger Temperature Sensor /Capillary
07	Indoor Heat Exchanger Temperature Sensor /Gas Header
08	Indoor Unit Fan Speed
09	Frequency Requirements
10	Response Frequency
11	Pulse of Indoor Unit Expansion Value
12	Total Running Hours of The Indoor Unit
13	Supply Air Temperature
21	Outdoor Air Temperature
22	Outdoor Heat Exchanger Temperature Sensor
23	Outdoor Heat Exchanger Temperature Sensor
24	Compressor Frequency
25	High Pressure
26	Low Pressure
27	Discharge Pipe Temperature
28	Comp Bottom Temperature
29	Current
30	Target Super Heat
31	Super Heat
32	Discharge Pipe Super Heat
33	Protection State No. of The Compressor
34	Outdoor Unit Fan Speed
35	63H1 On/Off
36	Defrost Control On/Off
37	Total Running Hours of The Compressor
38	Pulse of The Outdoor Unit Expansion Valve EEVC
39	Pulse of The Outdoor Unit Expansion Valve EEVH

●Number 33 Details of compressor protection status No.
Model FDC71VNX-W

No.	Contents of display	Reference page
"0"	Normal	
"1"	Discharge pipe temperature protection control	P.36, (6).(a).(i)
"2"	Discharge pipe temperature anomaly	P.36, (6).(a).(ii)
"3"	Current safe control of inverter primary current	P.38, (6).(f)
"4"	High pressure protection control	P.36, (6).(b).(i), P.37, (6).(c).(i)
"5"	High pressure anomaly	P.36, (6).(b).(ii), P.37, (6).(c).(ii)
"6"	Low pressure protection control	P.37, (6).(e).(i)
"7"	Low pressure anomaly	P.37, (6).(e).(ii)
"8"	Anti-frost prevention control	P.38, (6).(j)
"9"	Current cut	P.38, (6).(f)
"11"	Power transistor anomaly (Overheat)	P.38, (6).(h)
"13"	Spare	
"15"	Current safe control of inverter secondary current	P.38, (6).(f)
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	P.39, (6).(o)
"18"	Active filter anomaly	

Notes(1) Operation data display on the remote control.
・Data is dispalyed until canceling the protection control.
・In case of multiple protections controlled, only the younger No. is displayed
(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

Models FDC100, 125, 140VNX-W, 100, 125, 140VSX-W

No.	Contents of display	Reference page
"0"	Normal	
"1"	Discharge pipe temperature protection control	P.36, (6).(a).(i)
"2"	Discharge pipe temperature anomaly	P.36, (6).(a).(ii)
"3"	Current safe control of inverter primary current	P.38, (6).(f)
"4"	High pressure protection control	P.36, (6).(b).(i), P.37, (6).(c).(i)
"5"	High pressure anomaly	P.36, (6).(b).(ii), P.37, (6).(c).(ii)
"6"	Low pressure protection control	P.37, (6).(e).(i)
"7"	Low pressure anomaly	P.37, (6).(e).(ii)
"8"	Anti-frost prevention control	P.38, (6).(j)
"9"	Current cut	P.38, (6).(f)
"10"	Power transistor protection control	P.38, (6).(g)
"11"	Power transistor anomaly (Overheat)	P.38, (6).(h)
"13"	Spare	
"14"	Dewing prevention control	P.39, (6).(k)
"15"	Current safe control of inverter secondary current	P.38, (6).(f)
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	P.39, (6).(o)
"18"	Active filter anomaly	

Notes(1) Operation data display on the remote control.
- Data is dispalyed until canceling the protection control.
- In case of multiple protections controlled, only the younger No. is displayed

(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

Models FDC100, 125, 140VNA-W, 100, 125, 140VSA-W

No.	Contents of display	Reference page
"0"	Normal	
"1"	Discharge pipe temperature protection control	P.196, (6).(a).(i)
"2"	Discharge pipe temperature anomaly	P.196, (6).(a).(ii)
"3"	Current safe control of inverter primary current	P.198, (6).(f)
"4"	High pressure protection control	P.196, (6).(b).(i), P.197, (6).(c).(i)
"5"	High pressure anomaly	P.197, (6).(b).(ii), P.197, (6).(c).(ii)
"6"	Low pressure protection control	P.197, (6).(e).(i)
"7"	Low pressure anomaly	P.197, (6).(e).(ii)
"8"	Anti-frost prevention control	P.198, (6).(i)
"9"	Current cut	P.198, (6).(f)
"11"	Power transistor anomaly (Overheat)	P.198, (6).(g)
"13"	Spare	
"14"	Dewing prevention control	P.198, (6).(j)
"15"	Current safe control of inverter secondary current	P.198, (6).(f)
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	P.199, (6).(m)
"18"	Active filter anomaly	

Notes(1) Operation data display on the remote control.
- Data is dispalyed until canceling the protection control.
- In case of multiple protections controlled, only the younger No. is displayed.

(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

Models FDC200, 250, 280VSA-W

No.	Contents of display	Reference page
"0"	Normal	
"1"	Discharge pipe temperature protection control	P.207, (6).(a).(i)
"2"	Discharge pipe temperature anomaly	P.207, (6).(a).(ii)
"3"	Current safe control of inverter primary current	P.210, (6).(g)
"4"	High pressure protection control	P.208, (6).(b).(i), P.209, (6).(c).(i)
"5"	High pressure anomaly	P.208, (6).(b).(iv), P.209, (6).(c).(ii)
"6"	Low pressure protection control	P.209, (6).(e).(i)
"7"	Low pressure anomaly	P.209, (6).(e).(ii)
"8"	Anti-frost prevention control	P.210, (6).(k)
"9"	Current cut	P.210, (6).(g)
"10"	Power transistor protection control	P.210, (6).(h)
"11"	Power transistor anomaly (Overheat)	P.210, (6).(i)
"12"	Compression ratio control	P.209, (6).(f)
"13"	Spare	
"14"	Dewing prevention control	P.211, (6).(1)
"15"	Current safe control of inverter secondary current	P.210, (6).(g)
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	P.211, (6).(o)
"18"	Active filter anomaly	

Notes(1) Operation data display on the remote control.
- Data is dispalyed until canceling the protection control.
- In case of multiple protections controlled, only the younger No. is displayed

(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

Models FDC71, 90, 100VNP-W

No.	Contents of display	Reference page
"0"	Normal	
"1"	Discharge pipe temperature protection control	P231, (11). (b). (i)
"2"	Discharge pipe temperature anomaly	P232, (11). (b). (ii)
"3"	Current safe control of inverter primary current	P232, (12)
"4"	High pressure protection control	P229, (6). (c), P230, (8), (b)
"5"	High pressure anomaly	P231, (11)
"8"	Anti-frost prevention control	
"9"	Current cut	P232, (13)
"11"	Power transistor anomaly (Overheat)	
"12"	Compression ratio control	
"13"	Spare	
"14"	Dewing prevention control	
"15"	Current safe control of inverter secondary current	
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	
"18"	Active filter anomaly	

Notes(1) Operation data display on the remote control.
- Data is dispalyed until canceling the protection control.
- In case of multiple protections controlled, only the younger No. is displayed.

(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

(b) In case of RC-E5 remote control

Operation data can be checked with remote control unit operation.

① Press the [CHECK] button.
The display change " OPER DATA ▼"

② Press the (SET) button while " OPER DATA ▼ " is displayed.

③ When only one indoor unit is connected to remote control, " DATA LOADING " is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step ⑦.

④ When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
[Example]:
" SELECT I/U " (blinking 1 seconds) → " I/U000 ▲ " blinking.

⑤ Select the indoor unit number you would like to have data displayed with the [▲] [▼] button.

⑥ Determine the indoor unit number with the (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
" I/U000 " (The address of selected indoor unit is blinking for 2 seconds.)
↓
" DATA LOADING " (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.

Number	Data Item	
01	※	(Operation Mode)
02	SET TEMP___℃	(Set Temperature)
03	RETURN AIR___℃	(Return Air Temperature)
04	SENSOR___℃	(Remote Control Temperature Sensor)
05	THI-R1___℃	(Indoor Heat Exchanger Temperature Sensor / U Bend)
06	THI-R2___℃	(Indoor Heat Exchanger Temperature Sensor /Capillary)
07	THI-R3___℃	(Indoor Heat Exchanger Temperature Sensor /Gas Header)
08	I/U FANSPEED___	(Indoor Unit Fan Speed)
09	DEMAND___Hz	(Frequency Requirements)
10	ANSWER___Hz	(Response Frequency)
11	I/U EEV____P	(Pulse of Indoor Unit Expansion Value)
12	TOTAL I/U RUN___H	(Total Running Hours of The Indoor Unit)
21	OUTDOOR___℃	(Outdoor Air Temperature)
22	THO-R1___℃	(Outdoor Heat Exchanger Temperature Sensor)
23	THO-R2___℃	(Outdoor Heat Exchanger Temperature Sensor)
24	COMP___Hz	(Compressor Frequency)
25	HP___MPa	(High Pressure)
26	LP____MPa	(Low Pressure)
27	Td___℃	(Discharge Pipe Temperature)
28	COMP BOTTOM___℃	(Compressor Bottom Temperature)
29	CT___AMP	(Current)
30	TARGET SH___℃	(Target Super Heat)
31	SH___℃	(Super Heat)
32	TDSH___℃	(Discharge Pipe Super Heat)
33	PROTECTION No.__	(Protection State No. of The Compressor)
34	O/U FANSPEED___	(Outdoor Unit Fan Speed)
35	63H1	(63H1 On/Off)
36	DEFROST	(Defrost Control On/Off)
37	TOTAL COMP RUN___H	(Total Running Hours of The Compressor)
38	O/U EEV1____P	(Pulse of The Outdoor Unit Expansion Valve EEVC)
39	O/U EEV2____P	(Pulse of The Outdoor Unit Expansion Valve EEVH)

⑦ Upon operation of the [▲] [▼] button, the current operation data is displayed in order from data number 01.
The items displayed are in the above table.
*Depending on models, the items that do not have corresponding data are not displayed.

⑧ To display the data of a different indoor unit, press the [AIR CON No.] button, which allows you to go back to the indoor unit selection screen.

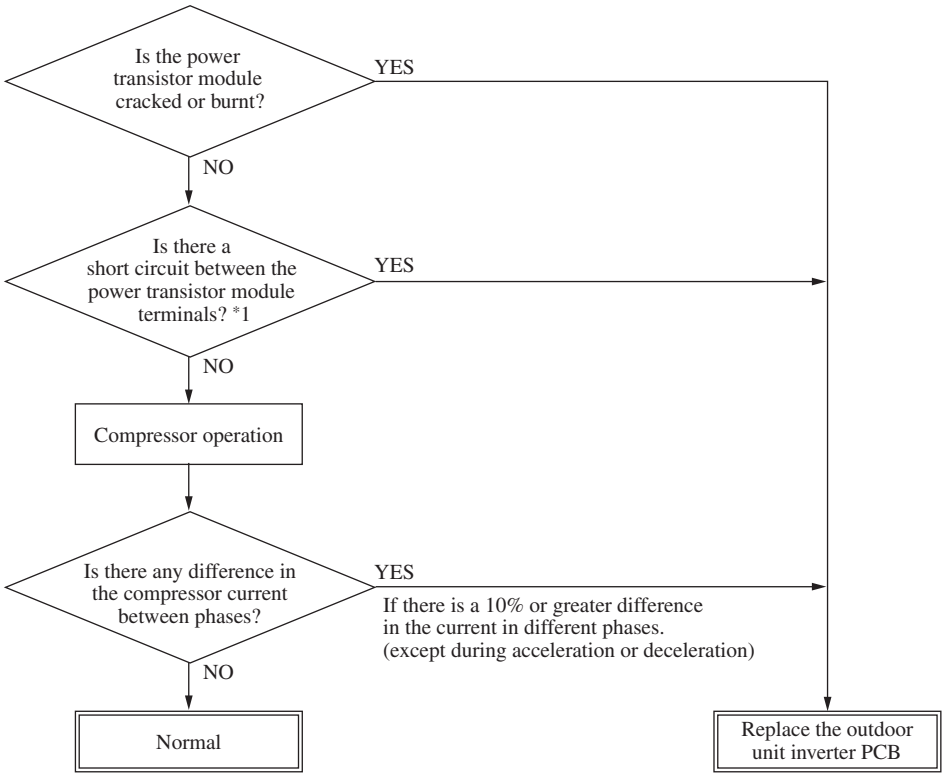
⑨ Pressing the [①ON/OFF] button will stop displaying data.
Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

⊙If two (2) remote controls are connected to one (1) inside unit, only the master control is available for trial operation and confirmation of operation data. (The slave remote control is not available.)

●Number 33 details of compressor protection status

Refer to pages 80 and 81.

(6) Power transistor module (Including the driver PCB) inspection procedure



***1 Power transistor module terminal short-circuit check procedure**

Disconnect the compressor wiring, then conduct a short circuit check.

P-U, P-V, P-W

N-U, N-V, N-W

Check between the P-N terminals.

Bring the tester probes in contact with the following places on each te rminal.

P: Power transistor P terminal,

N: Power transistor N terminal,

U: End of red harness to compressor

V: End of white harness to compressor

W: End of black or blue harness to compressor

Check for a power transistor short-circuit.

- When you do not have a diagnostic checker for judging if the inverter is defective, measure between the terminals of the power transistor parts, judge whether the power transistor is defective or not.
- Disconnect the compressor, then measure with the control incorporated.

Model FDC71VNX-W

Tester		Normal value (Ω)
Terminal (+)	Terminal (-)	Model FDC71
P	N	0 - (Numerical value rises.)
N	P	
P	U	Several M (Numerical value rises.)
P	V	
P	W	
N	U	Approx. 650 k
N	V	
N	W	
U	P	Approx. 670 k
V	P	Approx. 4.4 M
W	P	Approx. 4.4 M
U	N	Approx. 650 k
V	N	Approx. 4.8 M
W	N	Approx. 4.9 M

If the measured values range from 0 - several kW, there is a possibility that the elements are damaged, so replace the power transistor parts.

Models FDC100-140VNX-W, 100-140VSX-W

Tester		Normal value (Ω)	
Terminal (+)	Terminal (-)	FDC100-140VNX-W	FDC100-140VSX-W
P	N	Approx. 230 k	Approx. 50 k
N	P	Approx. 570 k	Approx. 525 k
P	U	Approx. 420 k	Approx. 260 k
P	V		
P	W		
N	U	Approx. 250 k	Approx. 215 k
N	V		
N	W		
U	P		Approx. 235 k
V	P		
W	P		
U	N	Approx. 480 k	Approx. 280 k
V	N		
W	N		

If the measured values range from 0 - several kW, there is a possibility that the elements are damaged, so replace the power transistor parts.

Models FDC200, 250, 280VSA-W

Tester		Normal value (Ω)
Terminal (+)	Terminal (-)	Models FDC200, 250, 280
P	N	Scores of M
N	P	Approx. 8.9M
P	U	Scores of M
P	V	
P	W	
N	U	Approx. 4.6M
N	V	
N	W	
U	P	Approx. 4.8M
V	P	
W	P	
U	N	Scores of M
V	N	
W	N	

If the measured values range from 0 - several kW, there is a possibility that the elements are damaged, so replace the power transistor parts.

Models FDC71, 90, 100VNP-W

Tester		Normal values (Ω)	Diode mode (V)
Terminal (+)	Terminal (-)		
P	N	A few of MΩ (Not short)	—
N	P		
P	U		
P	V		
P	W		
N	U		Approx. 0.4V
N	V		
N	W		
U	P		
V	P		
W	P		
U	N		—
V	N		
W	N		

If the measured values range from 0 - several kΩ, there is a possibility that the elements are damaged, so replace the power transistor parts.

(7) Inverter checker for diagnosis of inverter output

Models FDC71, 100, 125, 140VNX-W,100, 125, 140VSX-W
FDC100, 125, 140VNA-W,100, 125, 140VSA-W,200, 250, 280VSA-W, FDC71, 90, 100VNP-W

●Checking method

(a) Models FDC71-280

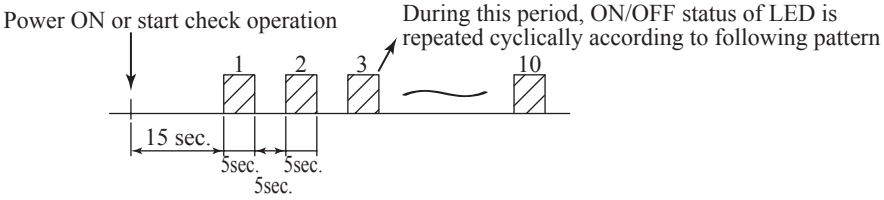
(i) Setup procedure of checker.

1) Power OFF (Turn off the breaker).
2) Remove the terminal cover of compressor and disconnect the wires (U, V, W) from compressor.
3) Connect the wires U (Red) , V (White) and W (Black) of checker to the terminal of disconnected wires (U, V, W) from compressor respectively.

(ii) Operation for judgment.

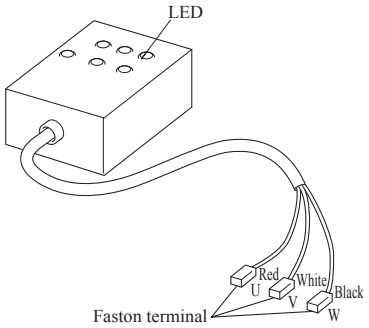
1) Power ON after JSW10-4 (SW6-4 : FDC100-140VN(S)A-W) on outdoor inverter PCB was turned ON.
2) After 15 seconds since power has turned ON, LED start ON/OFF for 5 seconds cyclically and it repeats 10 times.
3) Check ON/OFF status of 6 LED's on the checker.
4) Judge the PCB by ON/OFF status of 6 LED's on the checker.

ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Inverter PCB	Normal	Anomalous

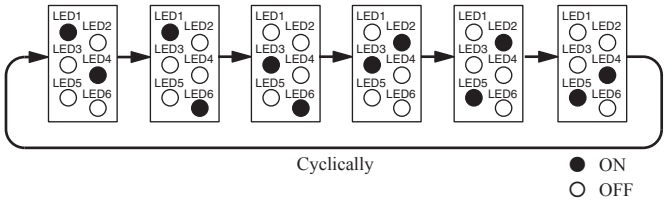


5) Be sure to turn off JSW10-4 (SW6-4 : FDC100-140VN(S)A-W) on outdoor inverter PCB, after finishing the check operation.

〈**Inverter checker**〉



LED ON/OFF pattern



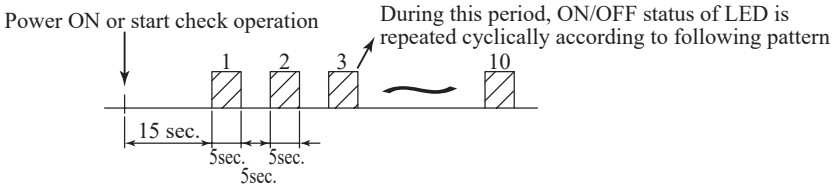
Connect to the terminal of the wires which are disconnected from compressor.

(b) Models FDC71-100VNP-W

(i) Setup procedure of checker.
1) Power OFF (Turn off the breaker).
2) Remove the terminal cover of compressor and disconnect the wires (U, V, W) from compressor.
3) Connect the wires U (Red) , V (White) and W (Black) of checker to the terminal of disconnected wires (U, V, W) from compressor respectively.
4) Connect the short connector to CNROM on the main PCB.

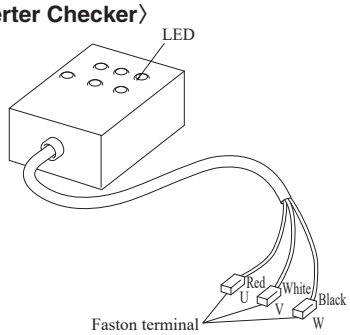
(ii) Operation for judgment.
1) Power ON.
2) After 15 seconds since power has turned ON. LED start ON/OFF for 5 seconds cyclically and it repeats 10 times.
3) Check ON/OFF status of 6 LED's on the checker.
4) Judge the PCB by ON/OFF status of 6 LED's on the checker.

ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Control PCB	Normal	Anomalous



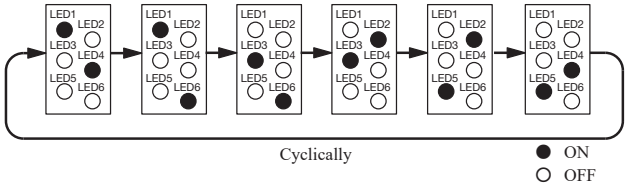
5) Be sure to disconnect the connector from CNROM, after finishing the check operation.

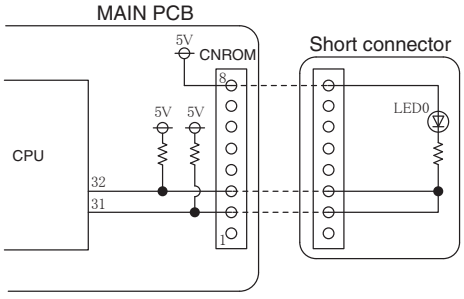
〈Inverter Checker〉



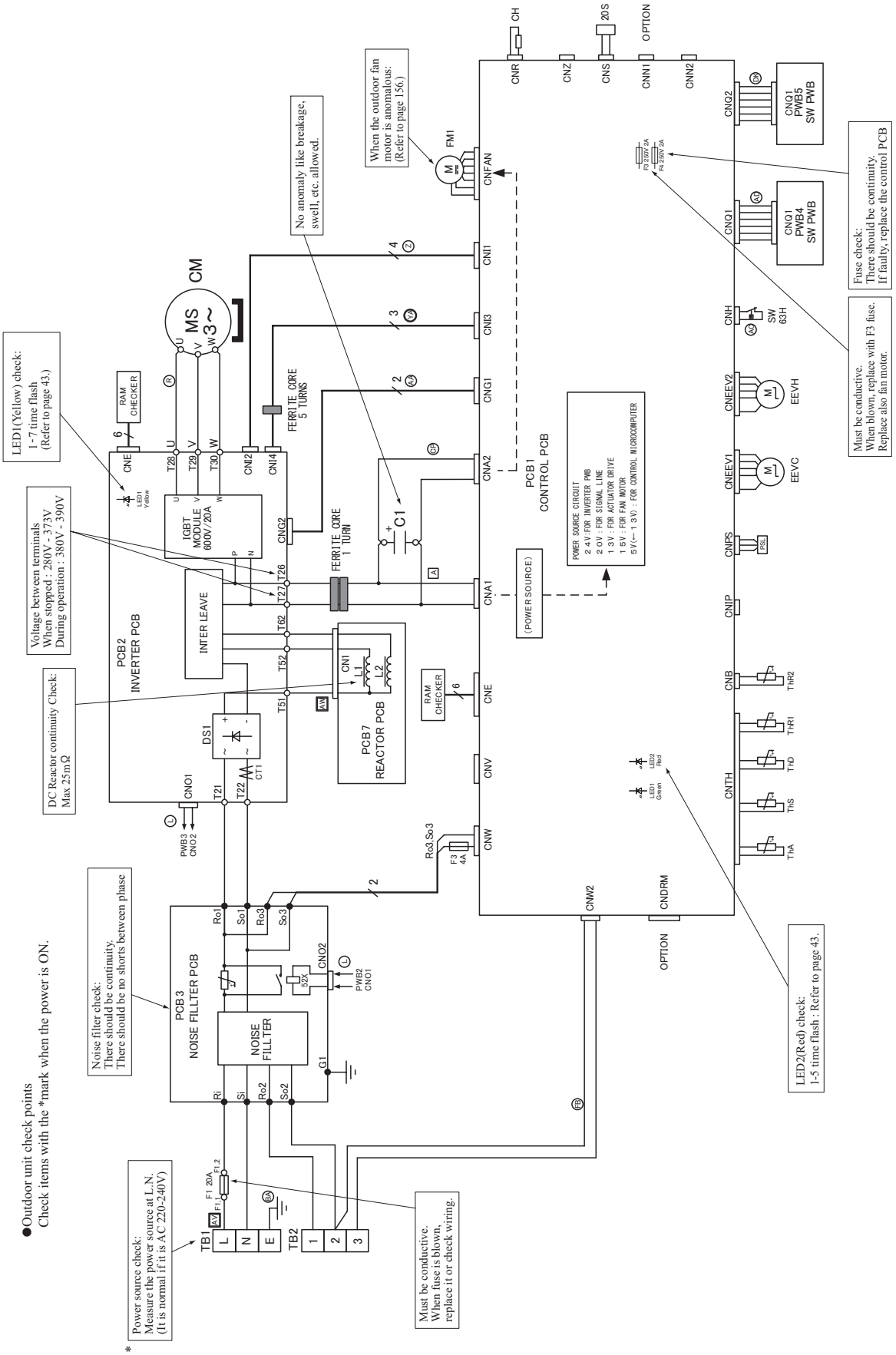
Connect to the terminal of the wires which are disconnected from compressor.

LED ON/OFF pattern

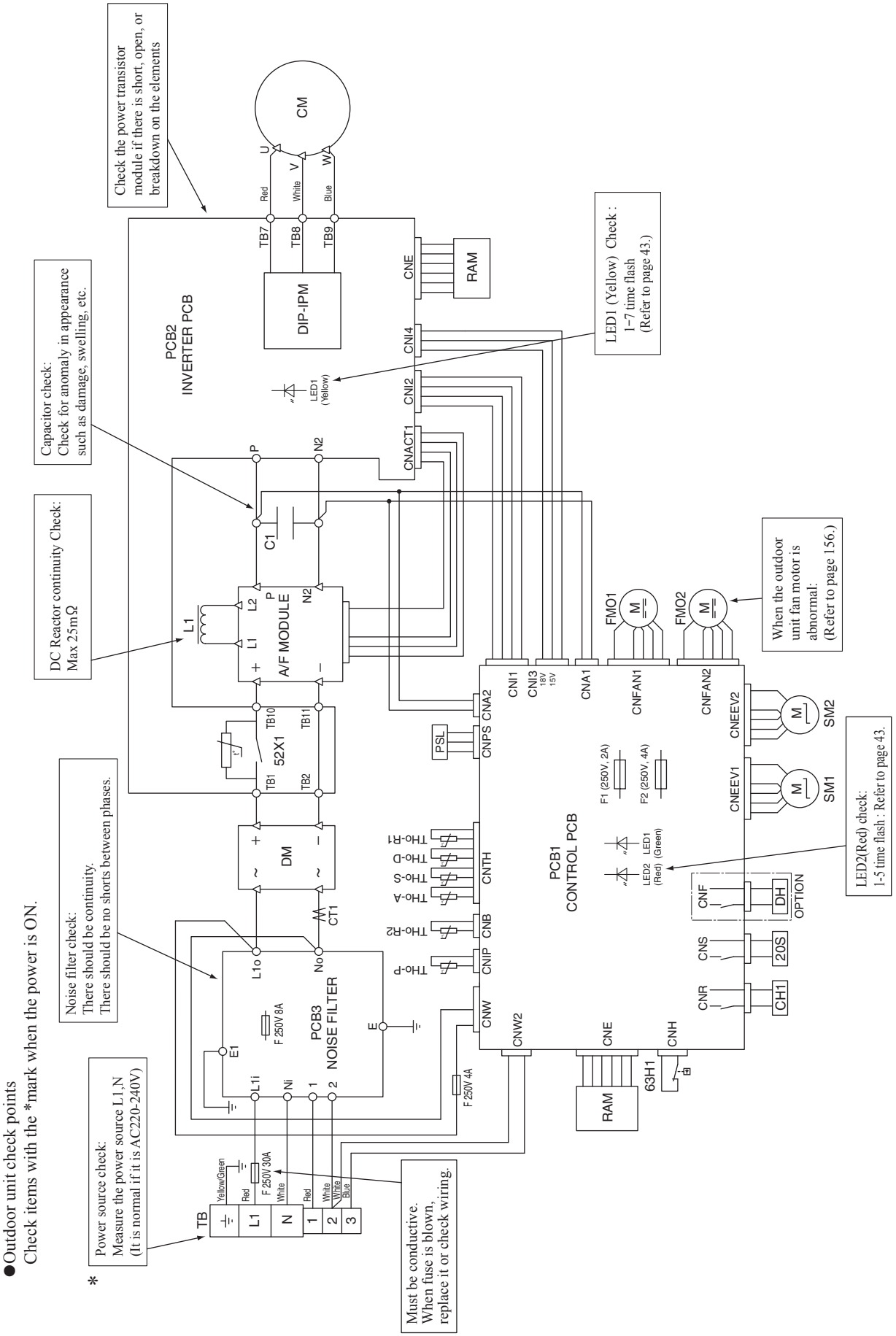




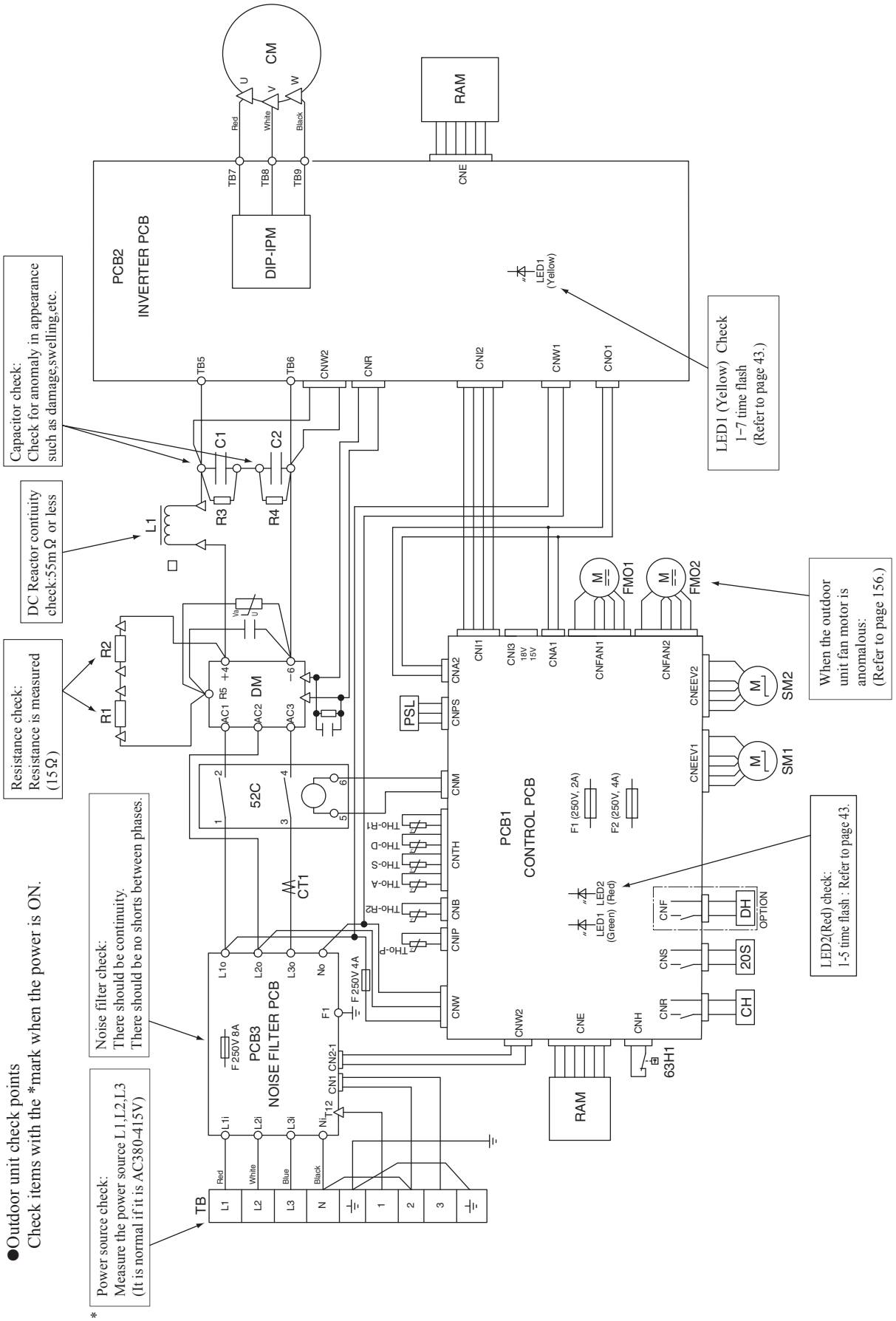
(8) Outdoor unit control failure diagnosis circuit diagram
Model FDC71VNX-W



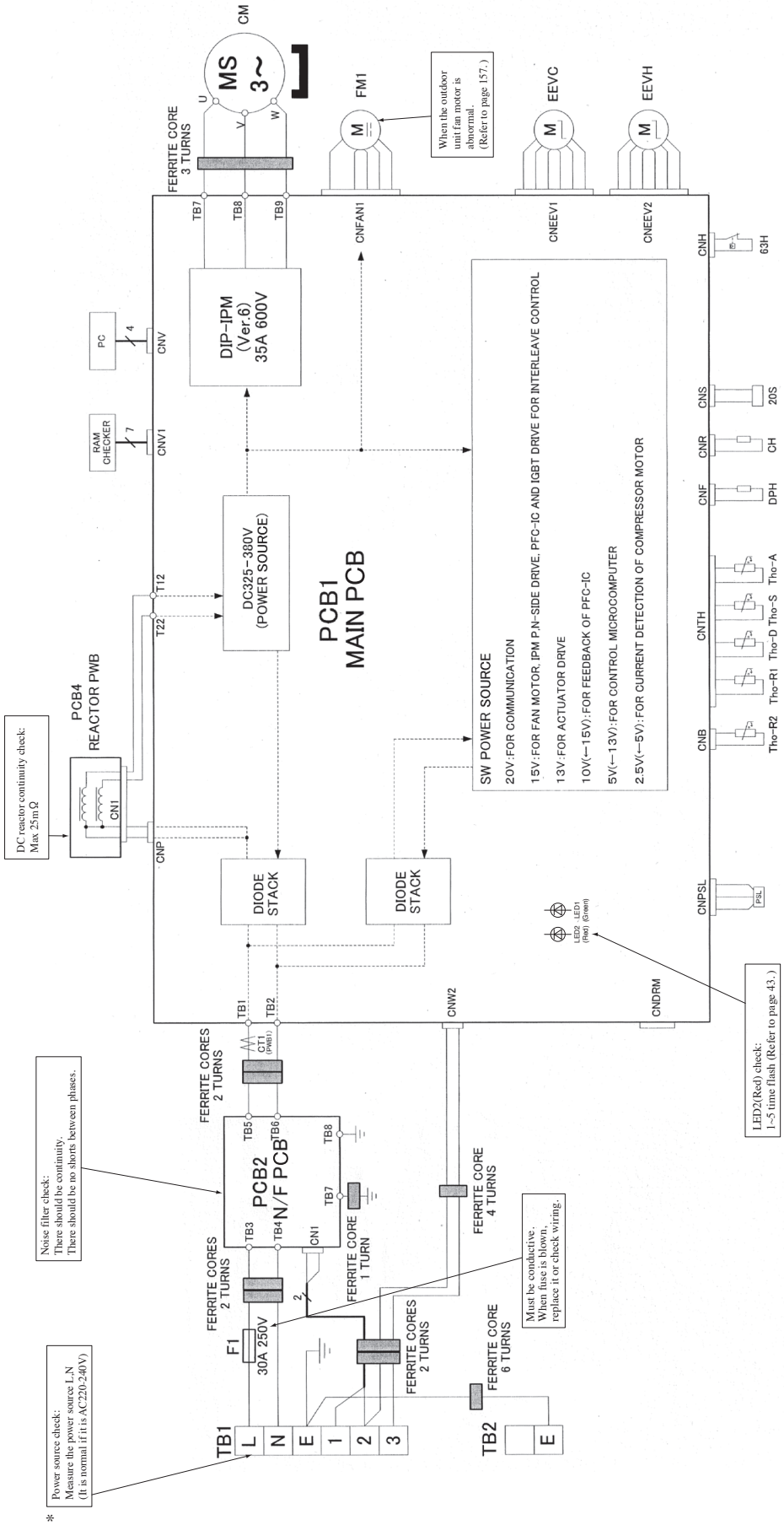
Models FDC100VNX-W, 125VNX-W, 140VNX-W



Models FDC100VSX-W, 125VSX-W, 140VSX-W



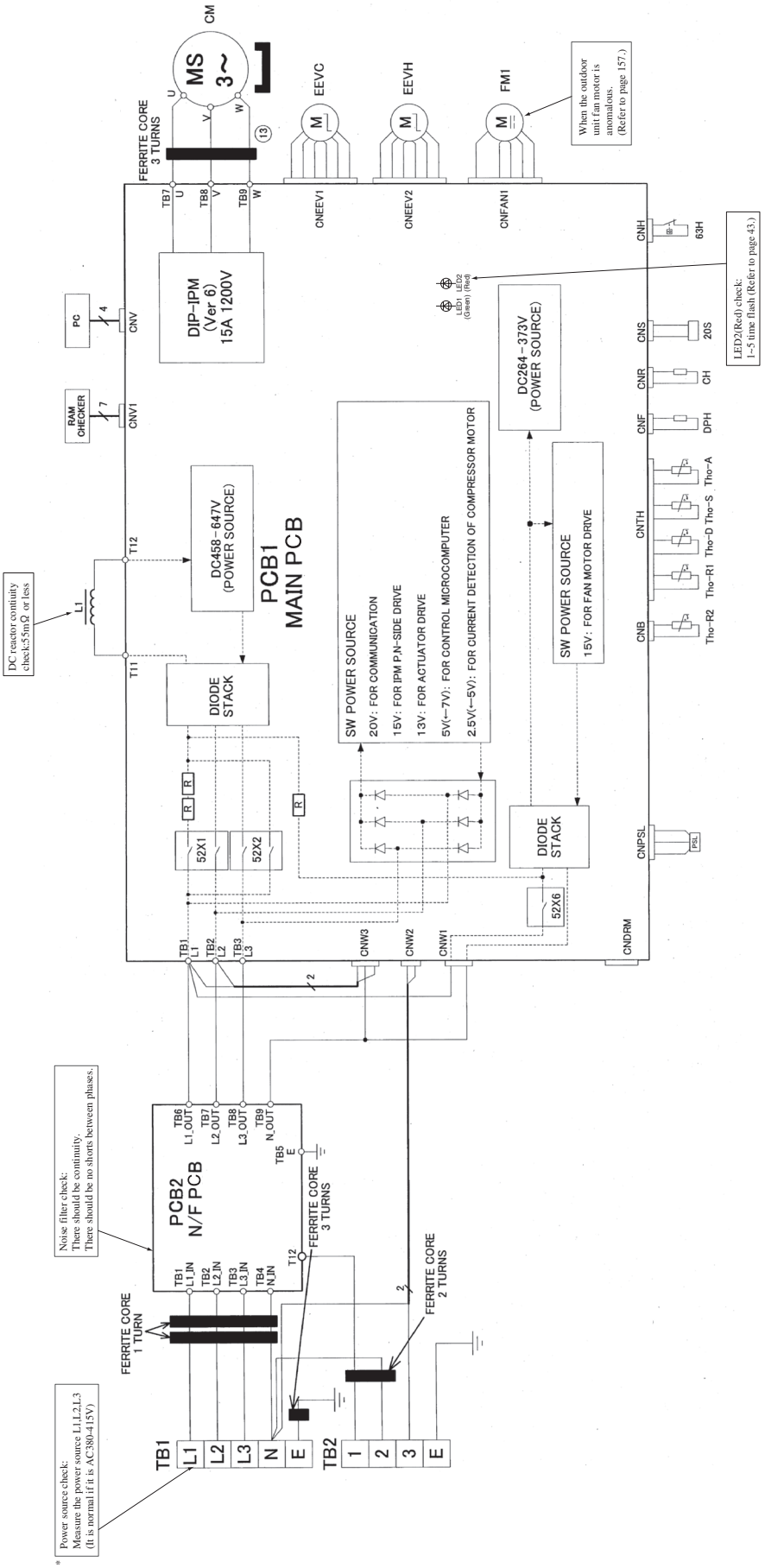
Models FDC100, 125, 140VNA-W



●Outdoor unit check points

Check items with the *mark when the power is ON.

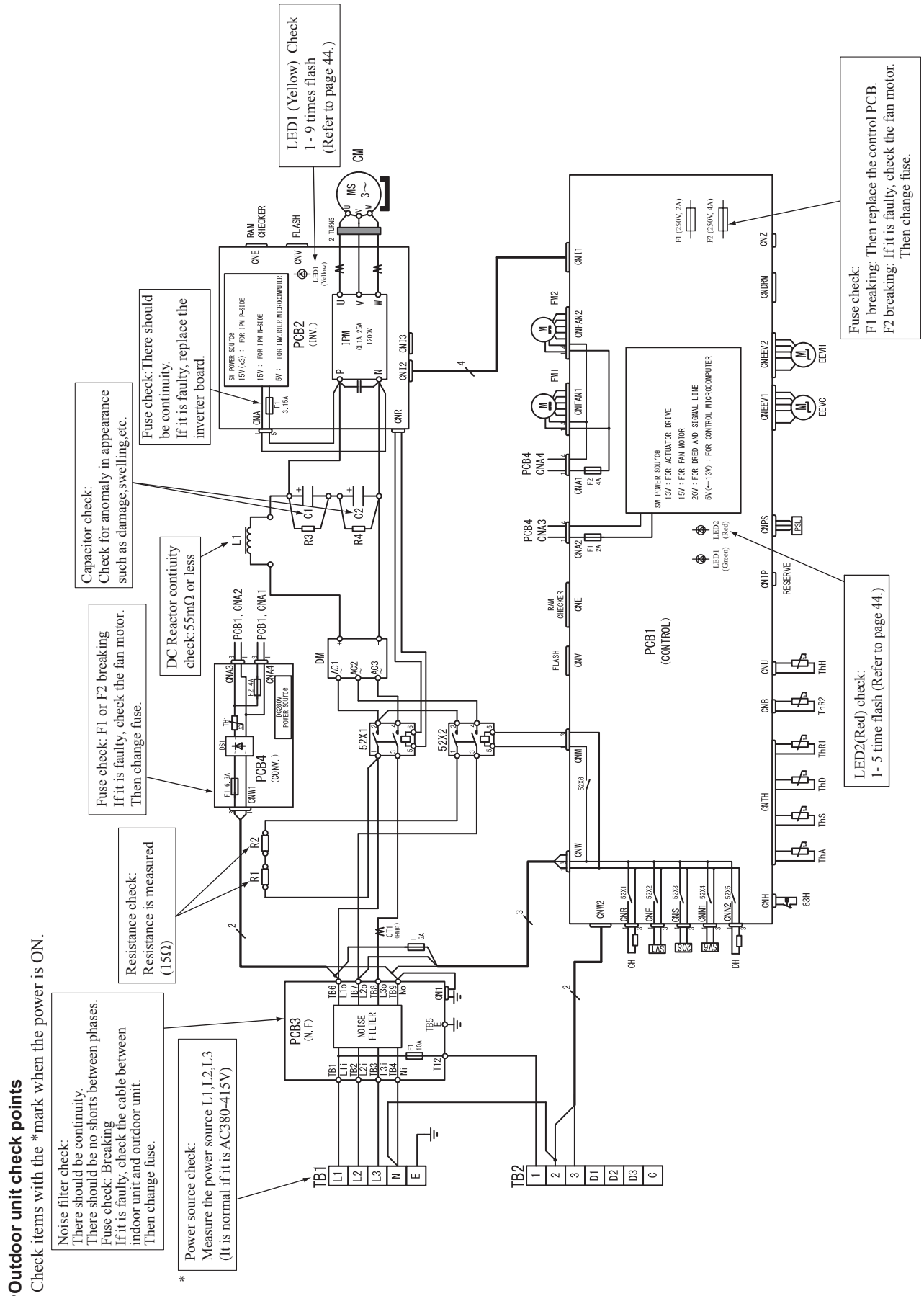
Models FDC100, 125, 140VSA-W



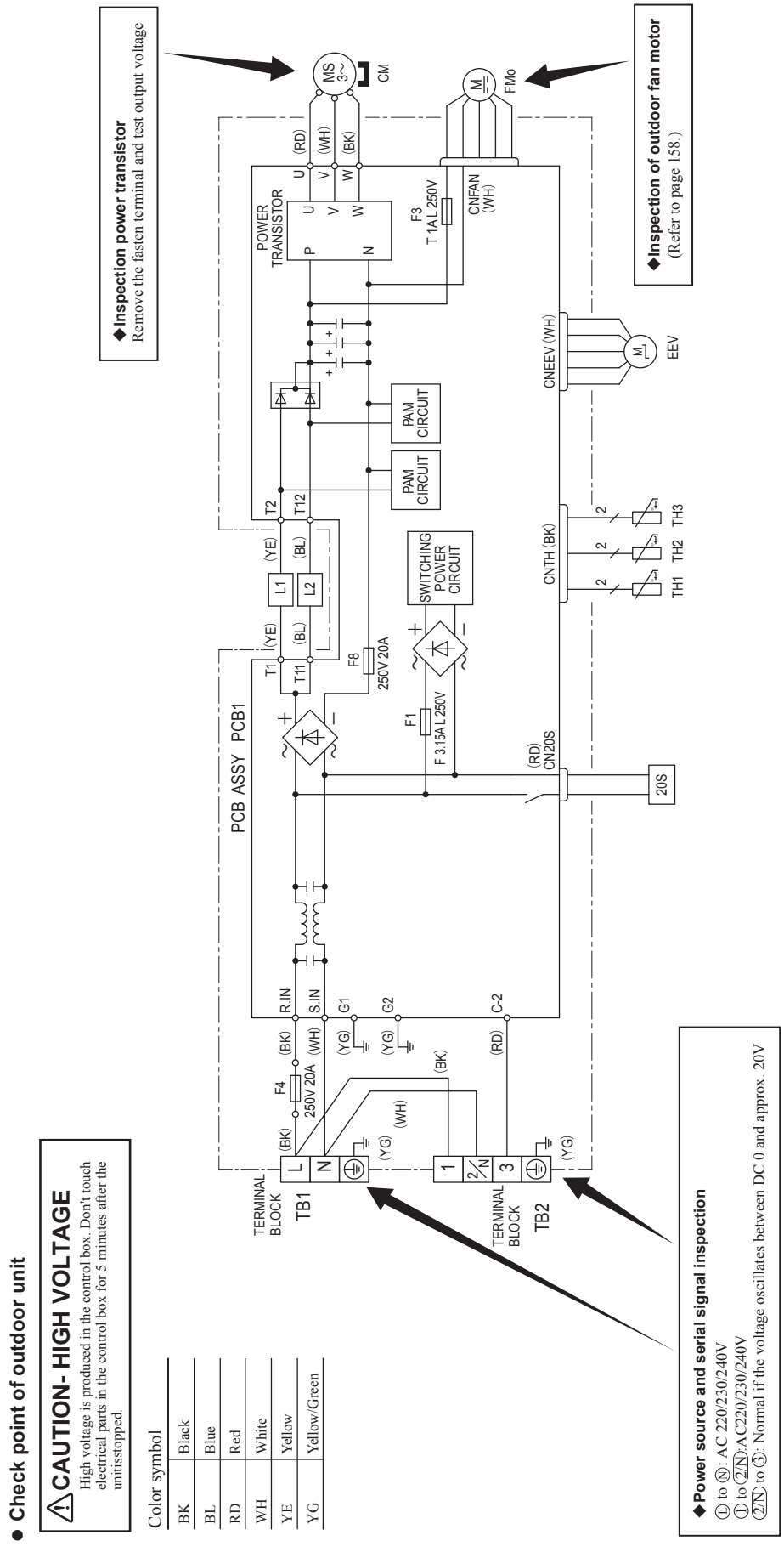
●Outdoor unit check points

Check items with the *mark when the power is ON.

Models FDC200, 250, 280VSA-W



Models FDC71, 90, 100VNP-W



● **Check point of outdoor unit**

⚠CAUTION- HIGH VOLTAGE

High voltage is produced in the control box. Don't touch electrical parts in the control box for 5 minutes after the unitisstopped.

Color symbol

BK	Black
BL	Blue
RD	Red
WH	White
YE	Yellow
YG	Yellow/Green

1.2.2 Troubleshooting flow

(1) List of troubles

Models FDC71, 100, 125, 140VNX-W, 100, 125, 140VSX-W

FDC100, 125, 140VNA-W, 100, 125, 140VSA-W

Remote control display	Description of trouble	Reference page
None	Operates but does not cool.	97
None	Operates but does not heat.	98
None	Earth leakage breaker activated	101
None	Excessive noise/vibration (1/3)	102
None	Excessive noise/vibration (2/3)	103
None	Excessive noise/vibration (3/3)	104
None	Louver motor failure	105
None	Power source system error (Power source to indoor unit control PCB)	106
None	Power source system error (Power source to remote control)	107
INSPECT I/U	INSPECT I/U (When 1 or 2 remote controls are connected)	109
INSPECT I/U	INSPECT I/U (Connection of 3 units or more remote controls)	110
WAIT	Communication error at initial operation	111-113
None	No display	119
E1	Remote control communication circuit error	120
E5	Communication error during operation	121
E6	Indoor heat exchanger temperature sensor anomaly	122
E7	Return air temperature sensor anomaly	123
E8	Heating overload operation	124
E10	Excessive number of connected indoor units (more than 17 units) by controlling with one remote control	125
E11	Address setting error of indoor units	126
E14	Communication error between master and slave indoor units	127
E16	Indoor fan motor anomaly	128
E18	Address setting error of master and slave indoor units	129
E19	Operation mode setting error	130
E20	Indoor fan motor rotation speed anomaly	131
E23	Refrigerant leak detection	132
E28	Remote control temperature sensor anomaly	133
E35	Cooling overload operation	134
E36	Discharge pipe temperature error	136
E37	Outdoor heat exchanger temperature sensor anomaly	138
E38	Outdoor air temperature sensor anomaly	139
E39	Discharge pipe temperature sensor anomaly	140
E40	High pressure error (63H1 activated)	141
E41	Power transistor overheat (Models FDC71-140VNX-W, 100-140VSX-W only)	143
E42	Current cut	145 · 146
E45	Communication error between inverter PCB and outdoor unit control PCB (Models FDC71-140VNX-W, 100-140VSX-W only)	151
E47	Inverter PCB A/F module anomaly (Model FDC71VNX-W only)	153
E47	Control PCB A/F module anomaly (Models FDC100-140VNA-W only)	154
E48	Outdoor fan motor anomaly (Models FDC71-140VNX-W, 100-140VSX-W only)	156
E48	Outdoor fan motor anomaly (Models FDC100-140VN (S) A-W only)	157
E49	Low pressure error or low pressure sensor anomaly	159 · 160
E51	Inverter and fan motor anomaly	161
E53	Suction pipe temperature sensor anomaly	164
E54	Low pressure sensor anomaly	165
E57	Insufficient refrigerant amount or detection of service valve closure	167
E58	Anomalous compressor by loss of synchronism (Models FDC100-140VN (S) A-W only)	169
E59	Compressor startup failure (Models FDC71-140VNX-W, 100-140VSX-W only)	171 · 172
E59	Compressor startup failure (Models FDC100-140VN (S) A-W only)	173 · 174
The refrigerant sensor is faulty.	Refrigerant sensor failure	179
The refrigerant sensor is disconnected.	Refrigerant sensor disconnection	180

Models FDC200, 250, 280VSA-W

Remote control display	Description of trouble	Reference page
None	Operates but does not cool.	97
None	Operates but does not heat.	99 · 100
None	Earth leakage breaker activated	101
None	Excessive noise/vibration (1/3)	102
None	Excessive noise/vibration (2/3)	103
None	Excessive noise/vibration (3/3)	104
None	Louver motor failure	105
None	Power source system error (Power source to indoor unit control PCB)	106
None	Power source system error (Power source to remote control)	107
INSPECT I/U	INSPECT I/U (When 1 or 2 remote controls are connected)	109
INSPECT I/U	INSPECT I/U (Connection of 3 units or more remote controls)	110
WAIT	Communication error at initial operation	114 · 115
None	No display	119
E1	Remote control communication circuit error	120
E5	Communication error during operation	121
E6	Indoor heat exchanger temperature sensor anomaly	122
E7	Return air temperature sensor anomaly	123
E8	Heating overload operation	124
E10	Excessive number of connected indoor units (more than 17 units) by controlling with one remote control	125
E11	Address setting error of indoor units	126
E14	Communication error between master and slave indoor units	127
E16	Indoor fan motor anomaly	128
E18	Address setting error of master and slave indoor units	129
E19	Operation mode setting error	130
E20	Indoor fan motor rotation speed anomaly	131
E23	Refrigerant leak detection	132
E28	Remote control temperature sensor anomaly	133
E35	Cooling overload operation	134
E36	Discharge pipe temperature error	137
E37	Outdoor heat exchanger temperature sensor anomaly	138
E38	Outdoor air temperature sensor anomaly	139
E39	Discharge pipe temperature sensor anomaly	140
E40	High pressure error (63H1 activated)	141
E41	Power transistor overheat	144
E42	Current cut	147 · 148
E44	Liquid back error	149 · 150
E45	Communication error between inverter PCB and outdoor unit control PCB	152
E48	Outdoor fan motor anomaly	156
E49	Low pressure error or low pressure sensor anomaly	159 · 160
E51	Inverter or power transistor anomaly	162
E53	Suction pipe temperature sensor anomaly	164
E54	Low pressure sensor anomaly	165
E55	Compressor under-dome temperature sensor anomaly	166
E57	Insufficient refrigerant amount or detection of service valve closure	167
E59	Compressor startup failure	175 · 176
The refrigerant sensor is faulty.	Refrigerant sensor failure	179
The refrigerant sensor is disconnected.	Refrigerant sensor disconnection	180

Models FDC71, 90, 100VNP-W

Remote control display	Description of trouble	Reference page
None	Operates but does not cool.	97
None	Operates but does not heat.	98
None	Earth leakage breaker activated	101
None	Excessive noise/vibration (1/3)	102
None	Excessive noise/vibration (2/3)	103
None	Excessive noise/vibration (3/3)	104
None	Louver motor failure	105
None	Power source system error (Power source to indoor unit control PCB)	106
None	Power source system error (Power source to remote control)	108
INSPECT I/U	INSPECT I/U (When 1 or 2 remote controls are connected)	109
INSPECT I/U	INSPECT I/U (Connection of 3 units or more remote controls)	110
WAIT	Communication error at initial operation	116-118
E1	Remote control communication circuit error	120
E5	Communication error during operation	121
E6	Indoor heat exchanger temperature sensor anomaly	122
E7	Return air temperature sensor anomaly	123
E8	Heating overload operation	124
E10	Excessive number of connected indoor units (more than 17 units) by controlling with one remote control	125
E11	Address setting error of indoor units	126
E16	Indoor fan motor anomaly	128
E19	Operation mode setting error	130
E20	Indoor fan motor rotation speed anomaly	131
E23	Refrigerant leak detection	132
E28	Remote control temperature sensor anomaly	133
E35	Cooling overload operation	135
E36	Discharge pipe temperature error	136
E37	Outdoor heat exchanger temperature sensor anomaly	138
E38	Outdoor air temperature sensor anomaly	139
E39	Discharge pipe temperature sensor anomaly	140
E40	Service valve (gas side) closing operation	142
E42	Current cut	145 · 146
E47	Active filter voltage error	155
E48	Outdoor fan motor anomaly	158
E51	Power transistor anomaly	163
E57	Insufficient refrigerant amount or detection of service valve closure	168
E58	Current safe stop	170
E59	Compressor startup failure	177
E60	Compressor rotor lock error	178
The refrigerant sensor is faulty.	Refrigerant sensor failure	179
The refrigerant sensor is disconnected.	Refrigerant sensor disconnection	180

(2) Troubleshooting

Error code	LED	Green	Red	Content
Remote control: None	Indoor	Keeps flashing	Stays OFF	Operates but does not cool.
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

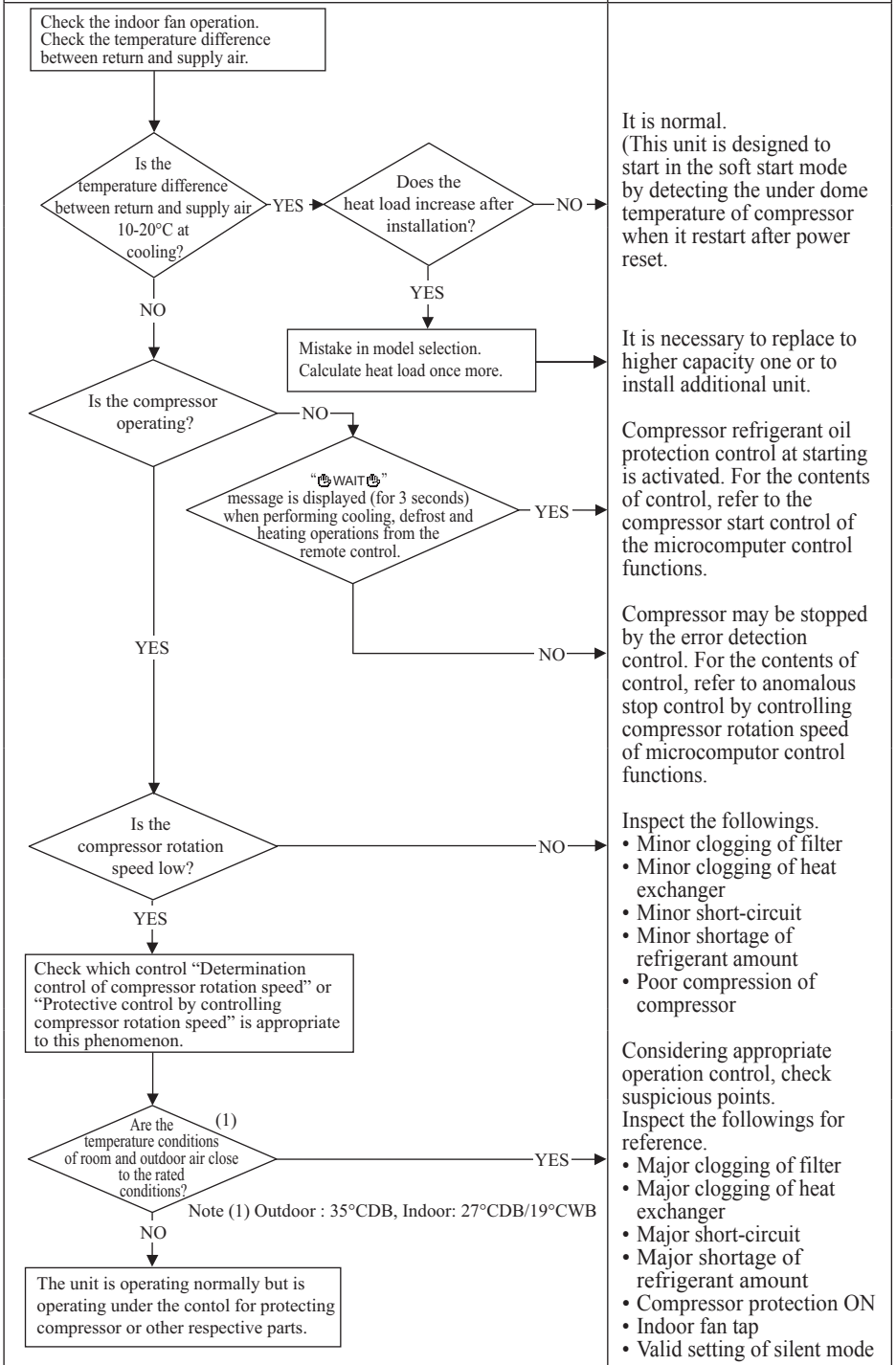
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Poor compression of compressor
- Faulty expansion valve operation

5. Troubleshooting



Note:

Error code

Remote control: None

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	Stays OFF

Content: Operates but does not heat. (Except for models FDC200-280VSA-W)

1.Applicable model

Except for models FDC200-280VSA-W

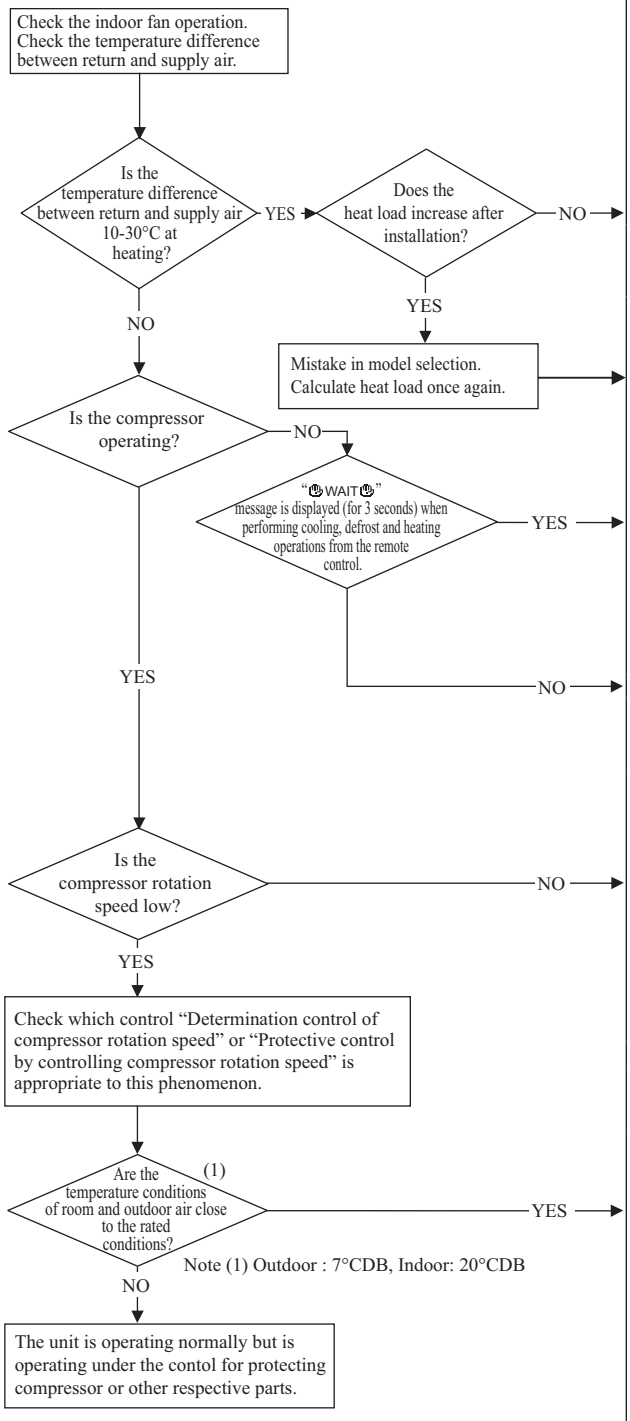
2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty expansion valve operation

5.Troubleshooting



Diagnosis	Countermeasure
Check the indoor fan operation. Check the temperature difference between return and supply air.	
Is the temperature difference between return and supply air 10-30°C at heating? YES → Does the heat load increase after installation? NO	It is normal. (This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset.
Does the heat load increase after installation? YES	It is necessary to replace to higher capacity one or to install additional unit.
Is the compressor operating? NO → "WAIT" message is displayed (for 3 seconds) when performing cooling, defrost and heating operations from the remote control. YES	Compressor refrigerant oil protection control at starting is activated. For the contents of control, refer to the compressor start control of the microcomputer control functions.
Is the compressor operating? YES / "WAIT" message is displayed (for 3 seconds) when performing cooling, defrost and heating operations from the remote control. NO	Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions.
Is the compressor rotation speed low? NO	Inspect the followings. • Minor clogging of filter • Minor clogging of heat exchanger • Minor short-circuit • Minor shortage of refrigerant amount • Poor compression of compressor
Is the compressor rotation speed low? YES → Check which control "Determination control of compressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon.	
Are the temperature conditions of room and outdoor air close to the rated conditions? (1) YES Note (1) Outdoor : 7°CDB, Indoor: 20°CDB	Considering appropriate operation control, check suspicious points. Inspect the followings for reference. • Major clogging of filter • Major clogging of heat exchanger • Major short-circuit • Major shortage of refrigerant amount • Compressor protection ON • Indoor fan tap • Valid setting of silent mode
Are the temperature conditions of room and outdoor air close to the rated conditions? NO → The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.	

Note:

Error code

Remote control: None

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	Stays OFF

Content

Operates but does not heat. (1/2) (Models FDC200-280VSA-W only)

1.Applicable model

Models FDC200-280VSA-W

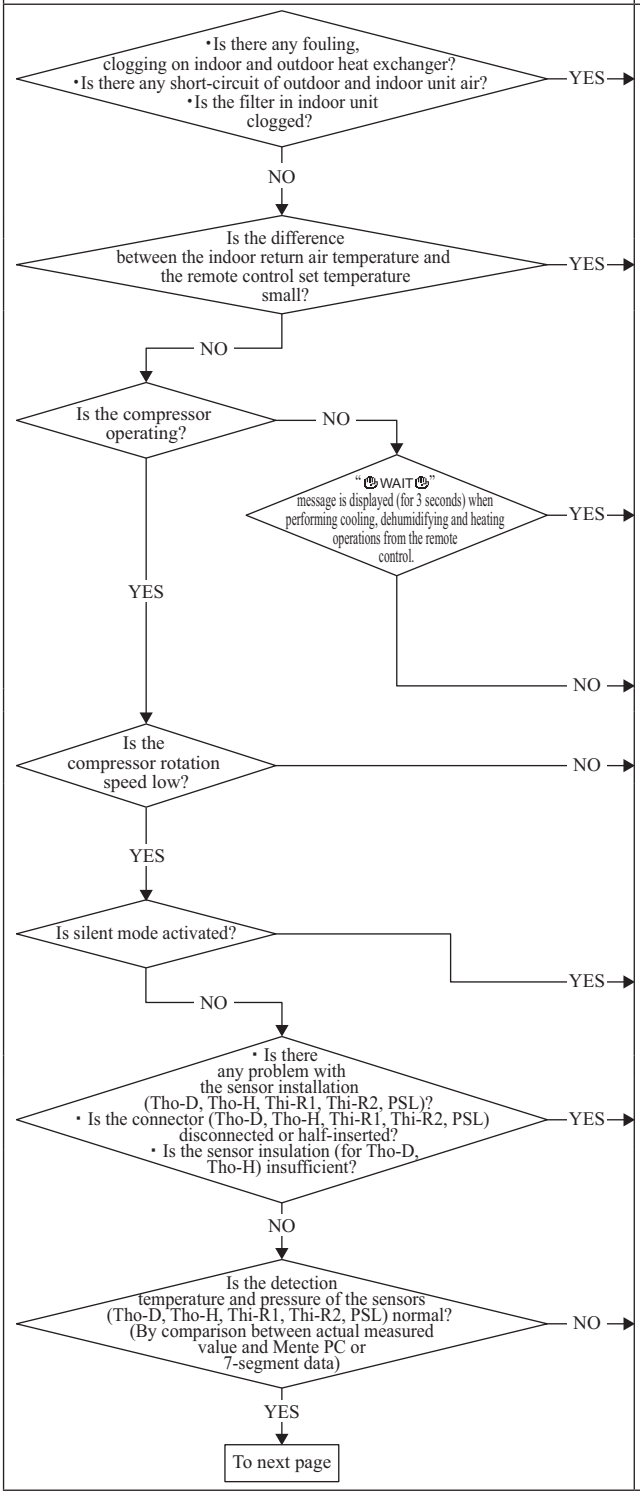
2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty body of EEVH, EEVC
- Faulty coil of EEVH, EEVC
- Faulty body of SV1
- Faulty coil of SV1
- Faulty temperature sensor (Tho-D, Tho-H, Thi-R1, Thi-R2)
- Faulty pressure sensor PSL
- Insufficient amount of refrigerant

5.Troubleshooting



Note:

Error code

Remote control: None

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	Stays OFF

Content

Operates but does not heat. (2/2) (Models FDC200-280VSA-W only)

1.Applicable model

Models FDC200-280VSA-W

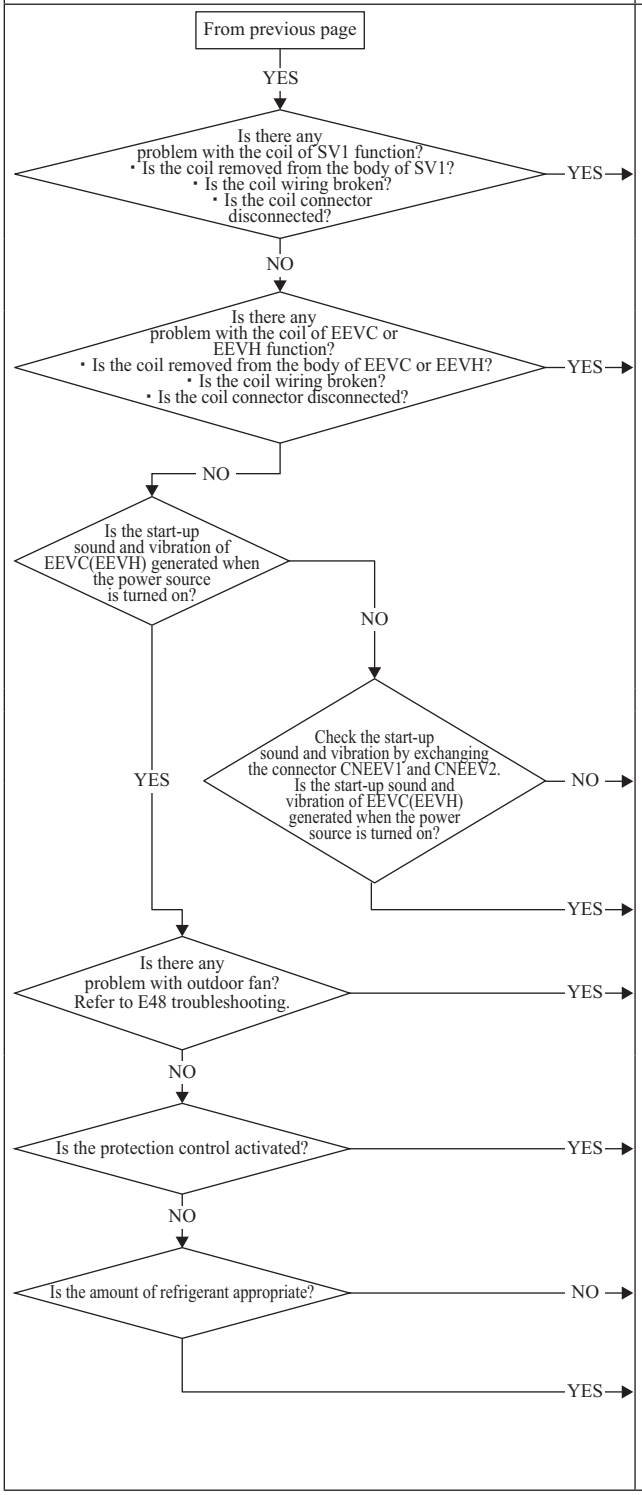
2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty body of EEVH, EEVC
- Faulty coil of EEVH, EEVC
- Faulty body of SV1
- Faulty coil of SV1
- Faulty temperature sensor (Tho-D, Tho-H, Thi-R1, Thi-R2)
- Faulty pressure sensor PSL
- Insufficient amount of refrigerant

5.Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	Stays OFF	Stays OFF	Earth leakage breaker activated
	Outdoor	Stays OFF	Stays OFF	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

• Defective compressor
• Noise

5.Troubleshooting

Diagnosis	Countermeasure
Are OK the insulation resistance and resistance between terminals (1) of compressor? NO →	Replace compressor.*
(1)See pages 145 and 147.	
YES	
Is insulation of respective harnesses OK? Is any harness bitten between pannel and casing or etc? NO →	Secure insulation resistance.
YES	
Check the outdoor unit grounding wire/earth leakage breaker.	

Check of the outdoor unit grounding wire/earth leakage breaker

① Run an independent grounding wire from the grounding screw of outdoor unit to the grounding terminal on the distribution panel. (Do not connect to another grounding wire.)
② In order to prevent malfunction of the earth leakage breaker itself, confirm that it is conformed to higher harmonic regulation.

* Insulation resistance of compressor
• Immediately after installation or when the unit has been left for long time without power source, the insulation resistance may drop to a few MΩ because of refrigerant migrated in the compressor.
When the earth breaker is activated at lower insulation resistance, check the following points.
① 6 hours after power ON, check if the insulation resistance recovers to normal. (Except for FDC71, 90, 100VNP-W)
When power ON, crankcase heater heat up compressor and evaporate the refrigerant migrated in the compressor.
② Check if the earth leakage breaker is conformed to higher harmonic regulation or not.
Since the unit is equipped with inverter, it is necessary to use components conformed to higher harmonic regulation in order to prevent malfunction of earth leakage breaker.

Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	–	–	Excessive noise/vibration (1/3)
	Outdoor	–	–	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

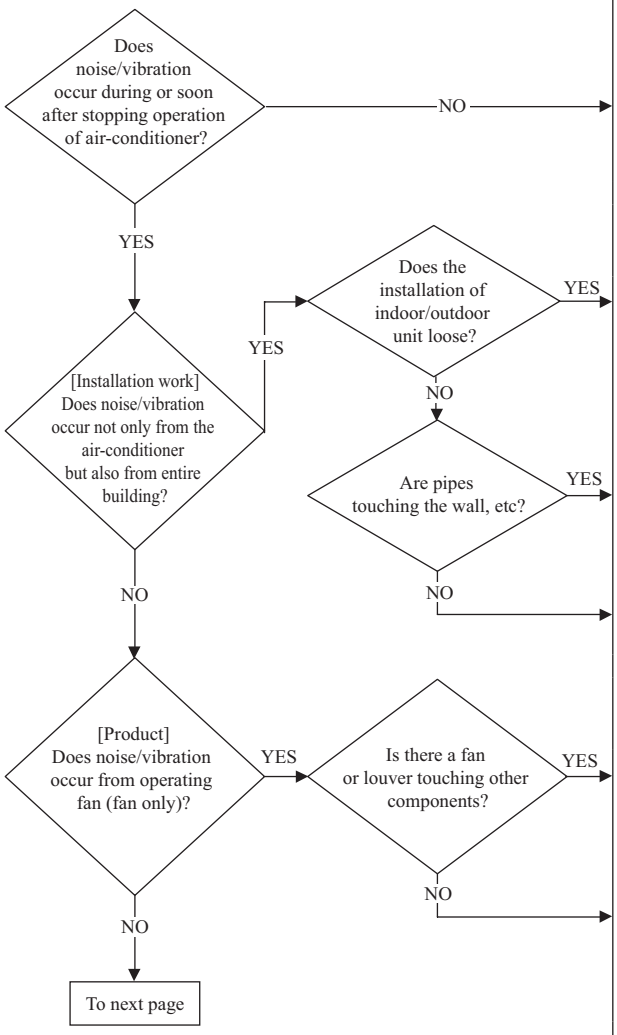
4.Presumable cause

① Improper installation work
- Improper anti-vibration work at installation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

5.Troubleshooting



Diagnosis	Countermeasure
	If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source. Check the installed condition carefully, and correct the position or insert rubber cushions or others into the gap, if necessary. Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means. Strength of ceiling wall, floor, etc. may be insufficient. Review the installing position or reinforce it. Check for leaning of installed unit or anomalous mounting of fan, louver or motor and specify the contacting point and correct it. When the heat exchanger or filter is clogged, clean them. In case that the unit is installed at the site where background noise is very low, small noise from indoor unit can be heard, but it is normal. Before installation, check for background noise. If backgound nois is very low, convince client prior to installation.

Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	–	–	Excessive noise/vibration (2/3)
	Outdoor	–	–	

1. Applicable model

All models

2. Error detection method

3. Condition of error displayed

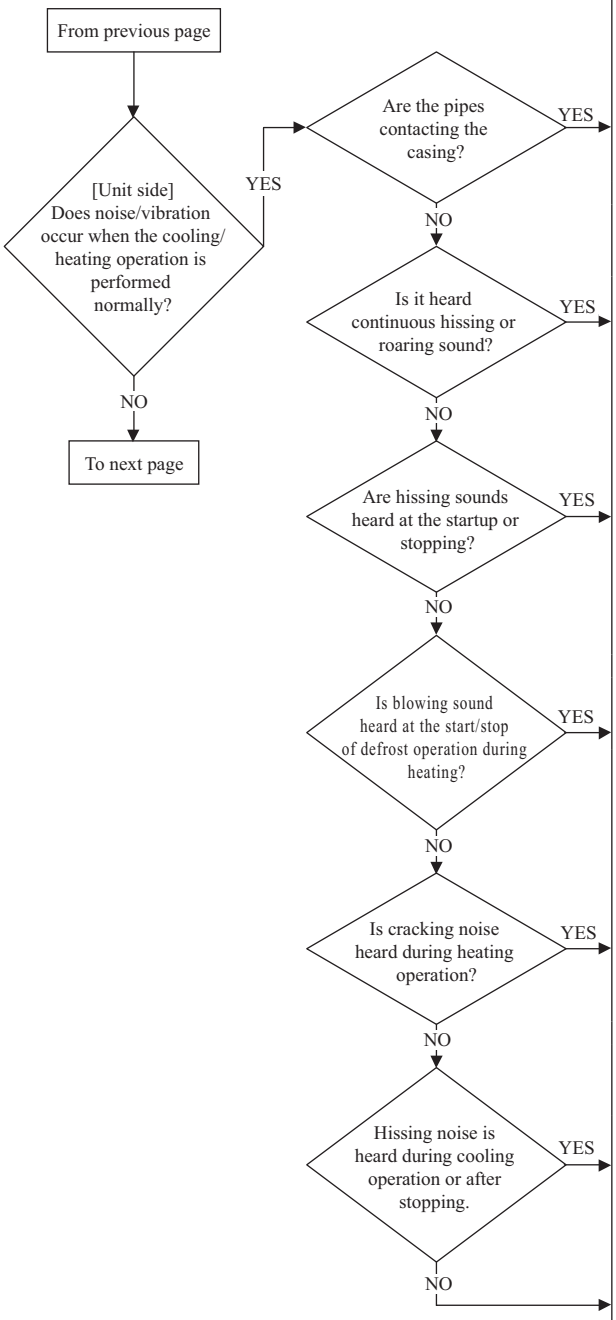
4. Presumable cause

① Improper installation work
- Improper anti-vibration work at installation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

5. Troubleshooting



Diagnosis	Countermeasure
	Rearrange the piping to avoid contact with the casing.
	It is noise/vibration that is generated when the refrigerant gas or liquid flow through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrost operation in the heating mode. It is normal.
	The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.
	When the defrost operation starts or stops during heating, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may accompany also the hissing sounds as mentioned above. They are normal.
	After the start or stop of heating operation or during defrost operation, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.
	It is the sound produced by the drain pump that discharges drain from the indoor unit. The pump continues to run for 5 minutes after stopping the cooling operation. This is normal.
	Apply the damper sealant at places considered to be the sources such as the pressure reducing mechanism (expansion valve), capillary, etc.

Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	–	–	Excessive noise/vibration (3/3)
	Outdoor	–	–	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

① Improper installation work
- Improper anti-vibration work at installation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

5.Troubleshooting

Diagnosis	Countermeasure
From previous page 〔Adjustment during commissioning〕 Does noise/vibration occur when the cooling/heating operation is in anomalous condition? YES	If insufficient cooling/heating problem happens due to anomalous operating conditions at cooling/heating, followings are suspicious. • Overcharge of refrigerant • Insufficient charge of refrigerant • Intrusion of air, nitrogen, etc. In such occasion, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant. * Since there could be many causes of noise/vibration, the above do not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check point. • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor air temperatures, pressure) • Time it occurred • Operation data retained by the remote control such as compressor rotation speed, heat exchanger temperature, EEV opening degree, etc. • Tone (If available, record the noise) • Any other anomalies

Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	Keeps flashing	Stays OFF	Louver motor failure
	Outdoor	Keeps flashing	Stays OFF	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

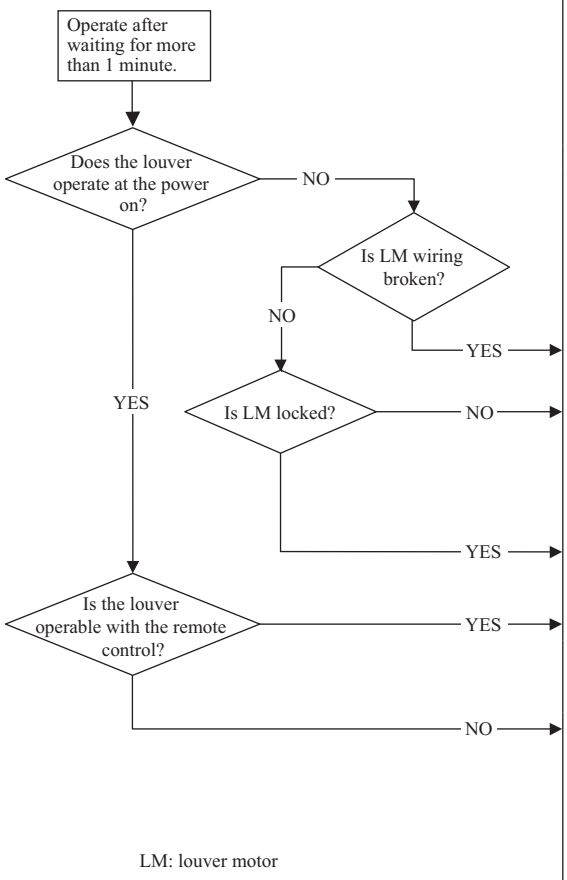
4.Presumable cause

- Defective LM
- LM wire breakage
- Faulty indoor unit control PCB

5.Troubleshooting

Diagnosis	Countermeasure

▲ Check at the indoor unit side.



LM: louver motor

Note:

Error code

Remote control: None

LED	Green	Red
Indoor	Stays OFF	Stays OFF
Outdoor	Keeps flashing	2-time flash

Content

Power source system error (Power source to indoor unit control PCB)

1.Applicable model

All models

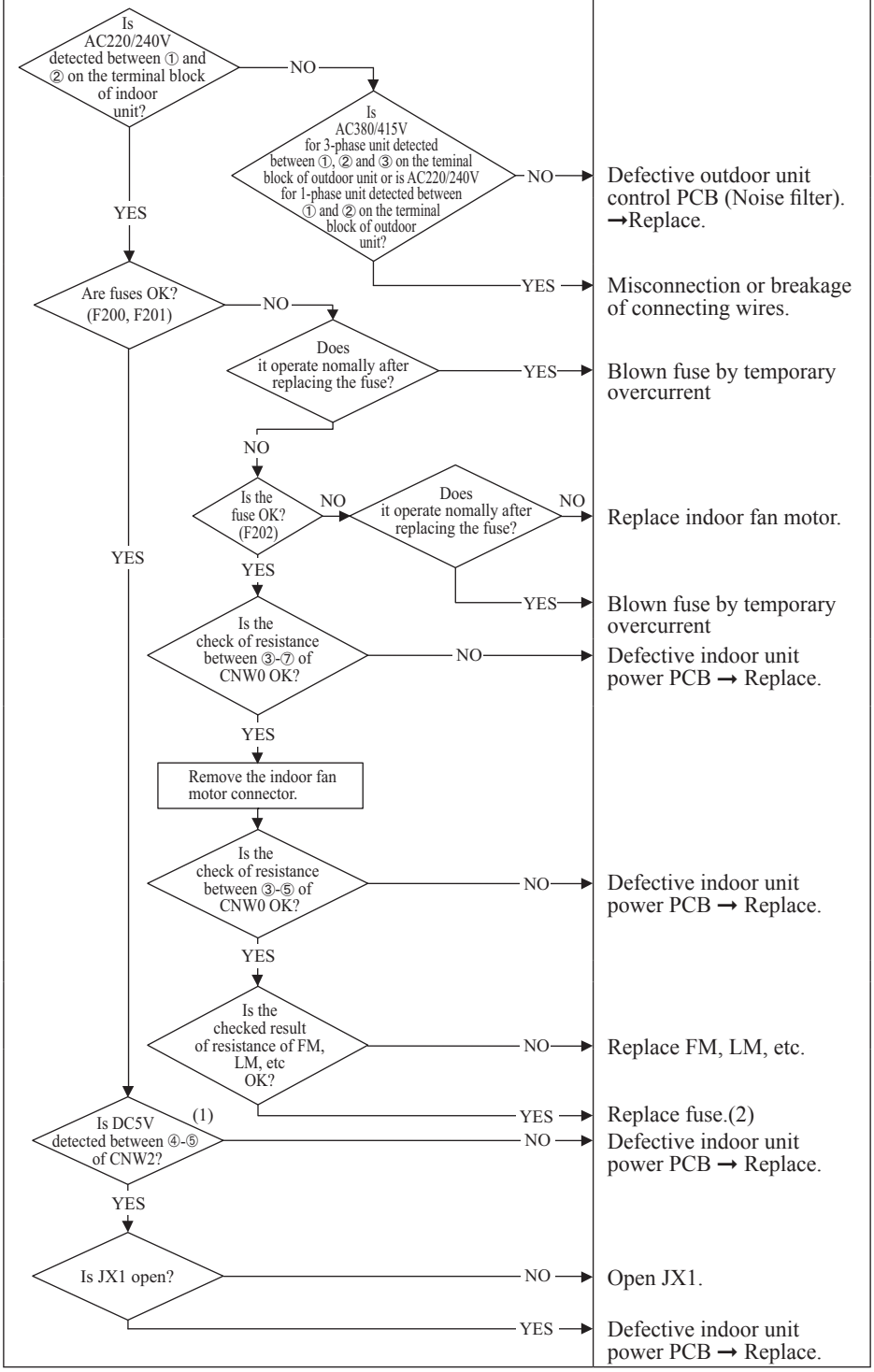
2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Misconnection or breakage of connecting wires
- Blown fuse
- Faulty indoor unit control PCB
- Broken harness
- Faulty outdoor unit control PCB (Noise filter)
- Faulty indoor fan motor, louver motor
- Faulty indoor unit power PCB

5.Troubleshooting



Notes : (1) ⑤ for GND

(2) Power source reset after replacing the fuse. If the fuse is blown, replace indoor unit power PCB.

Error code

Remote control: None

LED	Green	Red
Indoor	Keeps flashing	3-time flash
Outdoor	Keeps flashing	Stays OFF

Content: Power source system error (Power source to remote control) (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

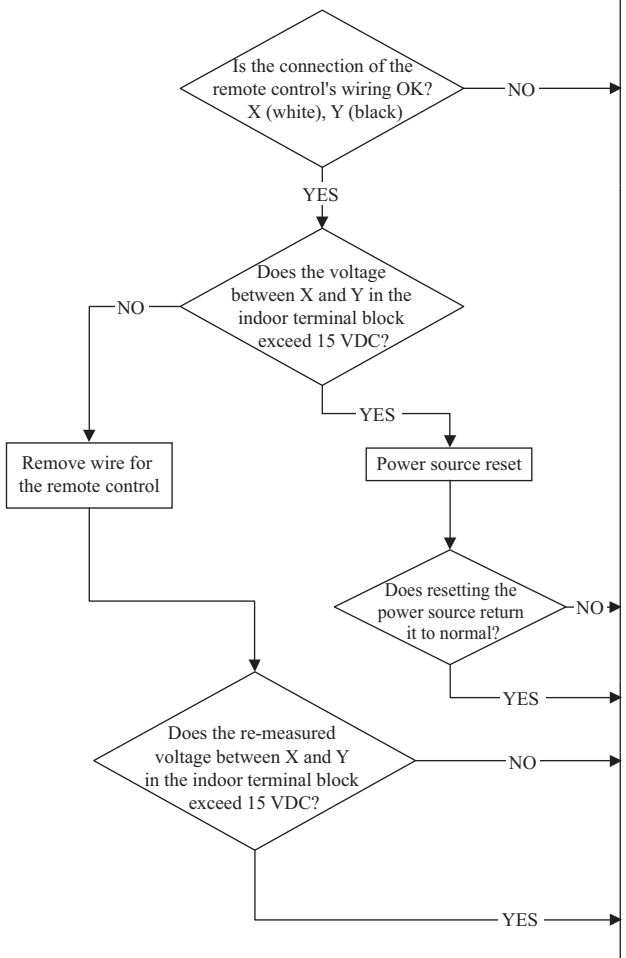
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Remote control wire breakage/short-circuit
- Defective remote control
- Malfunction by noise
- Broken harness
- Faulty indoor unit control PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	Keeps flashing	3-time flash	Power source system error (Power source to remote control) (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Remote control wire breakage/short-circuit
- Defective remote control
- Malfunction by noise
- Faulty indoor unit power PCB
- Broken harness
- Faulty indoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is there any loose connection of remote control wires? YES	Correct it.
NO → Is remote control wire broken or short-circuited? YES	Replace wires.
NO → Disconnect remote control wires. → Is DC15V or higher detected between X-Y of indoor unit terminal block? YES	Replace remote control.
NO → Is DC180V between①-②of CNW2? NO	Defective indoor unit power PCB→Replace.
YES	Defective indoor unit control PCB→Replace.

Note:

Error code	LED	Green	Red	Content
Remote control: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (When 1 or 2 remote controls are connected)
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

All models

2. Error detection method

Communication between indoor unit and remote control is disabled for more than 30 minutes after the power on.

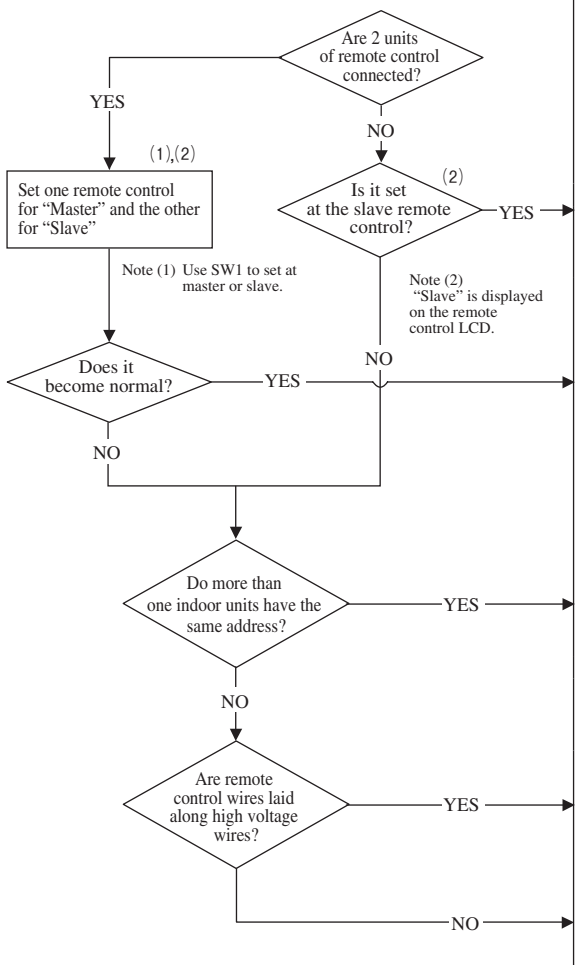
3. Condition of error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote control communication circuit
- Faulty indoor unit control PCB

5. Troubleshooting



Note: If any error is detected 30 minutes after displaying "WAIT" on the remote control, the display changes to "INSPECT I/U".

Error code	LED	Green	Red	Content
Remote control: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (Connection of 3 units or more remote controls)
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

All models

2. Error detection method

Indoor unit cannot communicate for more than 30 minutes after the power on with remote control.

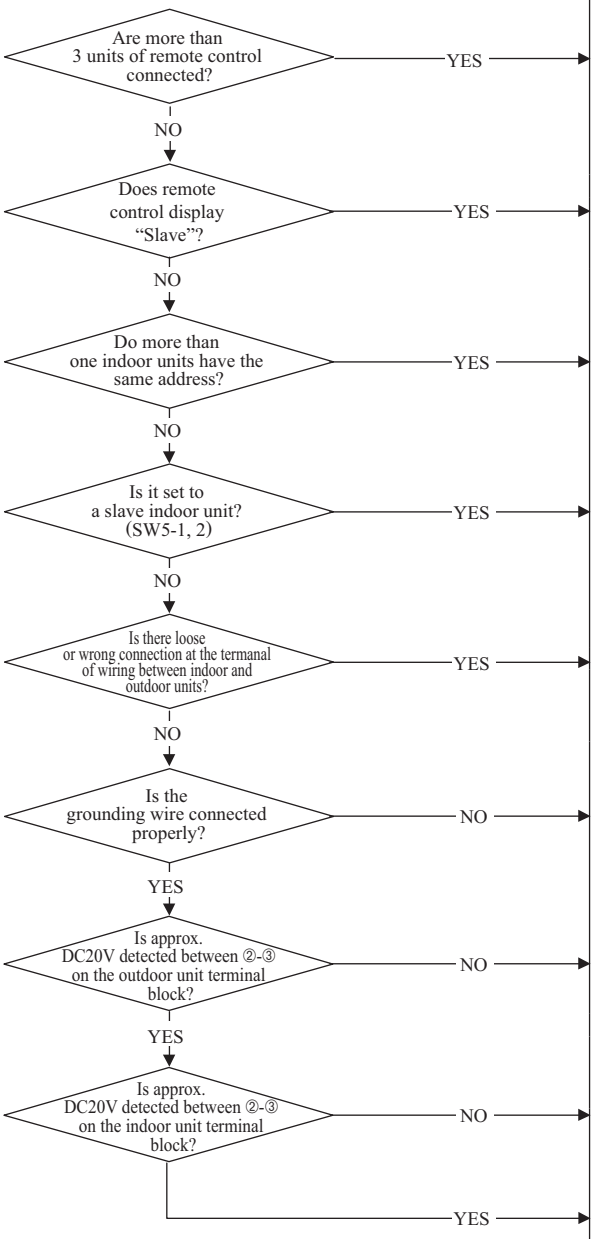
3. Condition of error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote control communication circuit
- Faulty indoor unit control PCB
- Faulty outdoor unit control PCB

5. Troubleshooting



Note: If any error is detected 30 minutes after displaying "WAIT" on the remote control, the display changes to "INSPECT I/U".

Error code

Remote control: WAIT

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2-time flash

Content

Communication error at initial operation (1/3)

1. Applicable model

Models FDC71-140VNX-W,
100-140VSX-W,
100-140VN(S)A-W

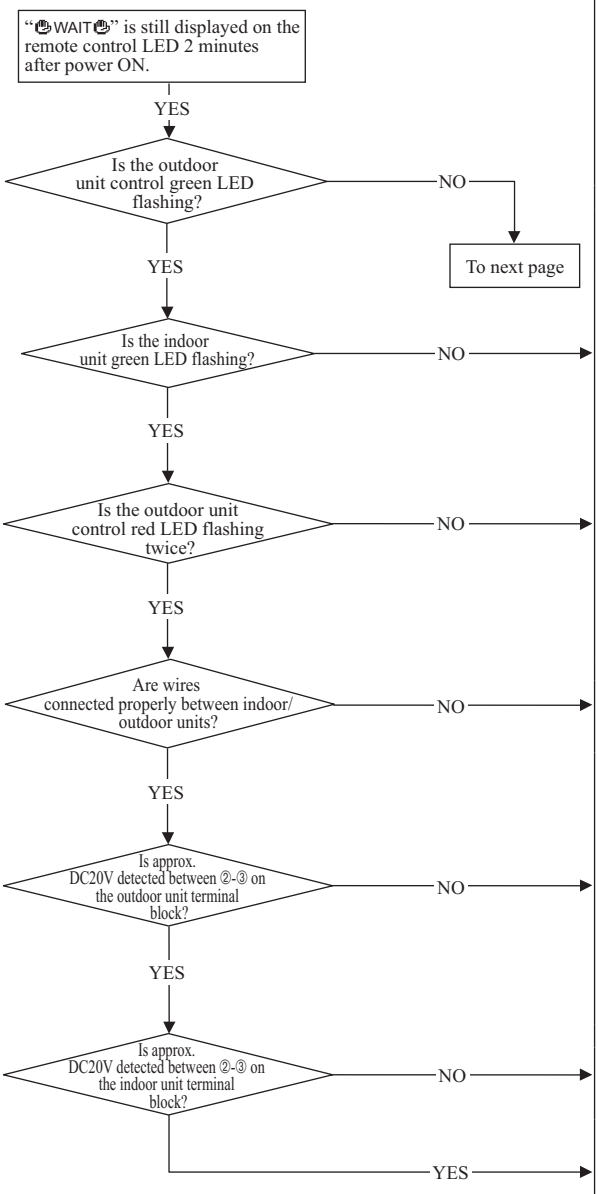
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Faulty indoor unit control PCB
- Defective remote control
- Broken remote control wire
- Faulty outdoor unit control PCB
- Broken connection wires

5. Troubleshooting



Note:

Error code

Remote control: WAIT

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2-time flash

Content

Communication error at initial operation (2/3)

1. Applicable model

Models FDC71-140VNX-W,
100-140VSX-W,
100-140VN(S)A-W

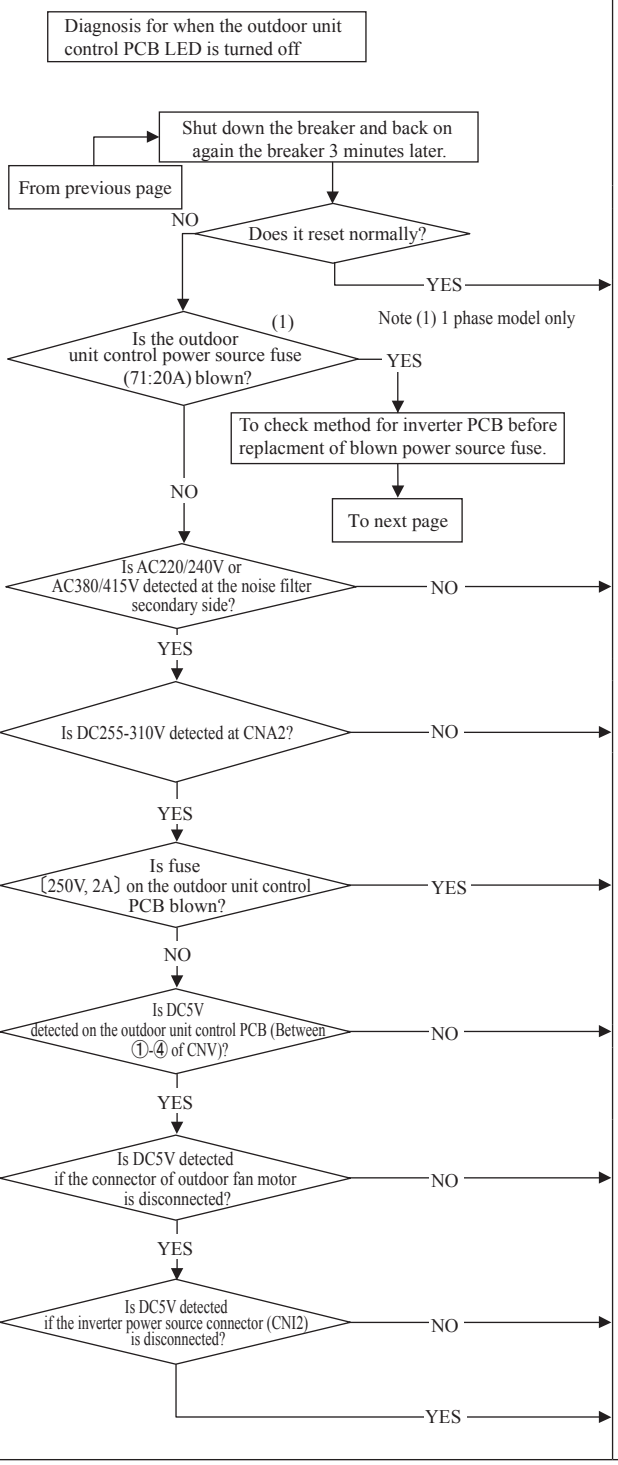
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Faulty noise filter
- Faulty indoor unit control PCB
- Faulty outdoor unit control PCB
- Faulty inverter PCB
- Faulty fan motor

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (3/3)
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

Models FDC71-140VNX-W,
100-140VSX-W,
100-140VN(S)A-W

2. Error detection method

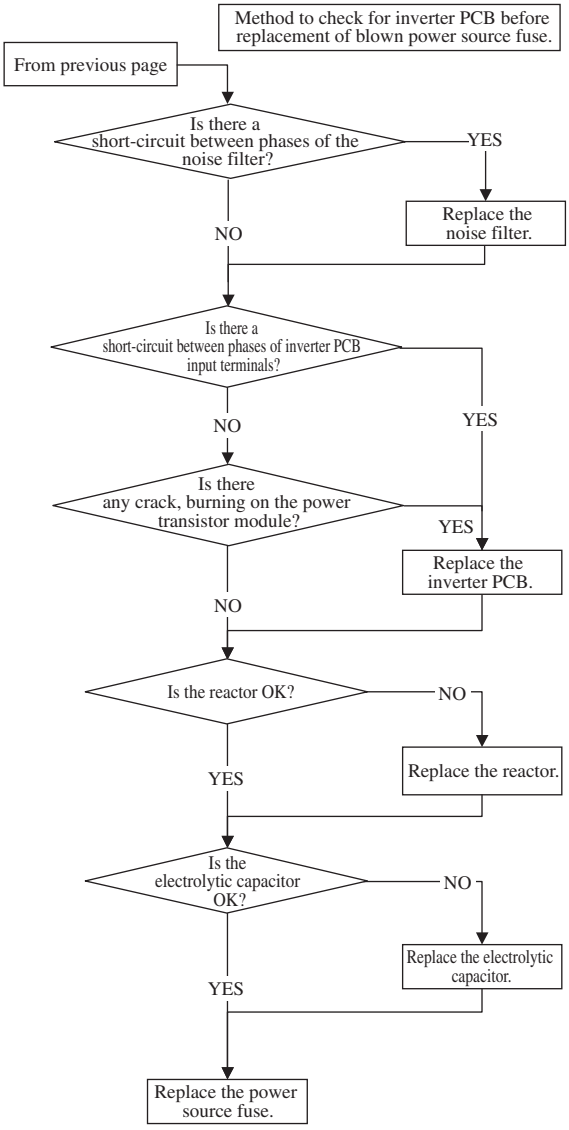
3. Condition of error displayed

4. Presumable cause

- Blown fuse
- Faulty noise filter
- Faulty inverter PCB
- Faulty reactor
- Faulty electrolytic capacitor

5. Troubleshooting

Diagnosis



Countermeasure

Note:

Error code

Remote control: WAIT

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2-time flash

Content

Communication error at initial operation (1/2) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

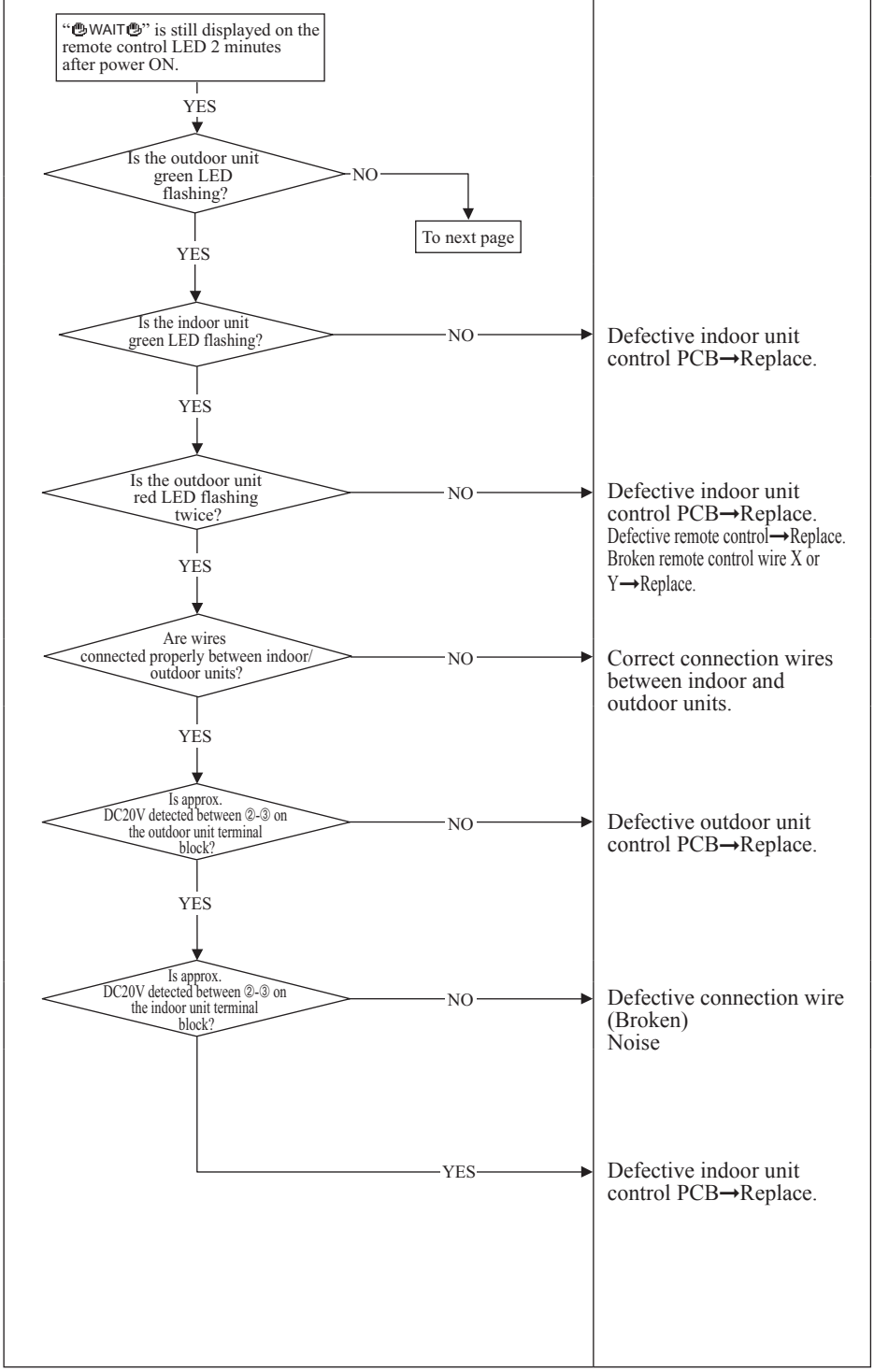
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Faulty indoor unit control PCB
- Defective remote control
- Broken remote control wire
- Faulty outdoor unit control PCB
- Broken connection wires

5. Troubleshooting



Note:

Error code

Remote control: WAIT

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2-time flash

Content: Communication error at initial operation (2/2) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

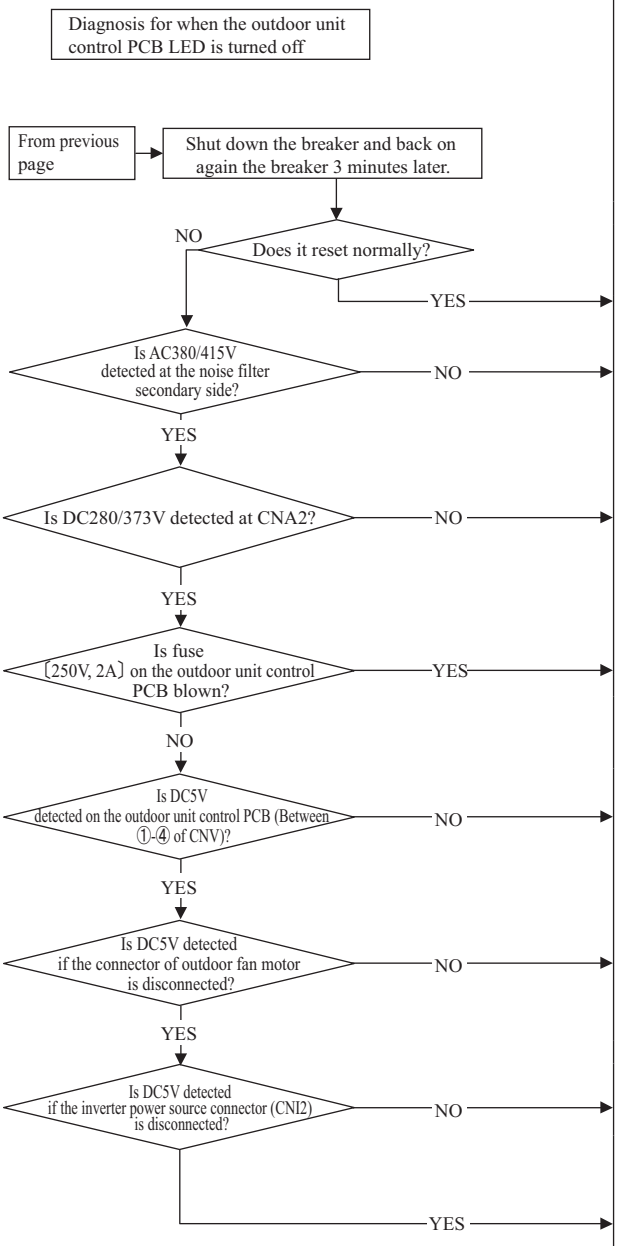
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Faulty noise filter
- Faulty indoor unit control PCB
- Faulty outdoor unit control PCB
- Faulty inverter PCB
- Faulty fan motor

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: ✋WAIT✋	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (1/3) (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

When the remote control LCD displays "✋WAIT✋" 2 minutes after the power on.

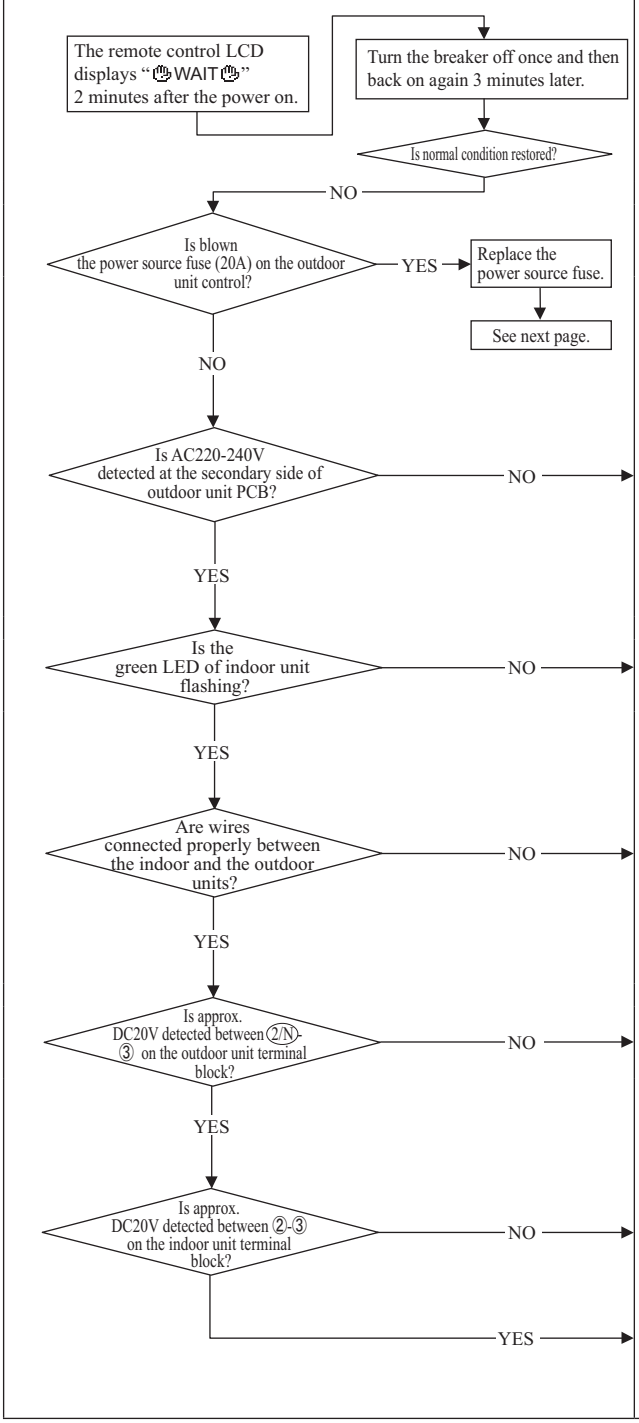
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Faulty outdoor unit PCB
- Connection between PCB's
- Faulty indoor unit control PCB
- Defective remote control
- Broken remote control wire

5. Troubleshooting



Note: If any anomaly is detected during communication, the error code E5 is displayed. Inspection procedure is same as above. (Excluding matters related to connection) When the power source is reset after the occurrence of E5, the LED will display "✋WAIT✋" if the anomaly continues. If the breaker ON/OFF is repeated in a short period of time (within 1 minute), "✋WAIT✋" may be displayed. In such occasion, turn the breaker off and wait for 3 minutes.

Error code	LED	Green	Red	Content
Remote control: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (2/3) (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

When the fuse is blown, the method to inspect outdoor unit PCB before replacing the power source fuse

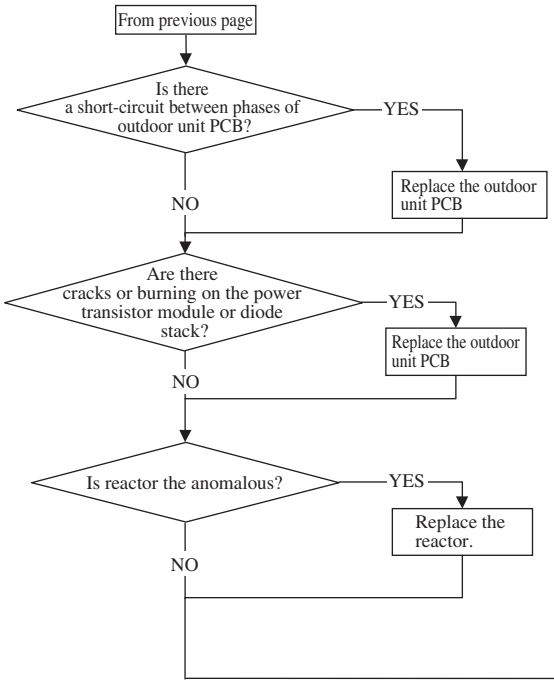
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Faulty outdoor unit PCB
- Faulty reactor

5. Troubleshooting

Diagnosis	Countermeasure
	Replace fuse.

Note:

Error code	LED	Green	Red	Content
Remote control: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (3/3) (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

When the remote control display is extinguished after the power on

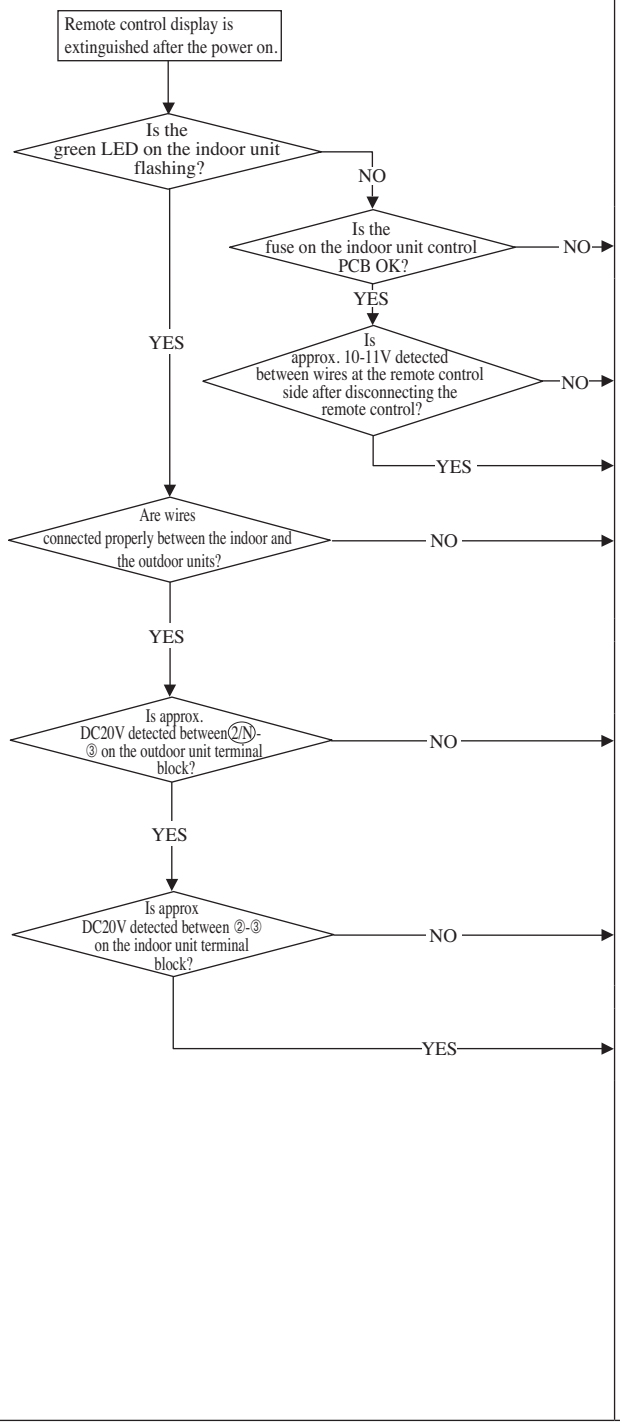
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Connection between PCB's
- Blown fuse
- Faulty indoor unit control PCB
- Defective remote control
- Wire breakage on remote control
- Faulty outdoor unit PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: None	Indoor	Stays OFF	Stays OFF	No display (Except for models FDC71-100VNP-W)
	Outdoor	Stays OFF	Stays OFF	

1.Applicable model

Except for models FDC71-100VNP-W

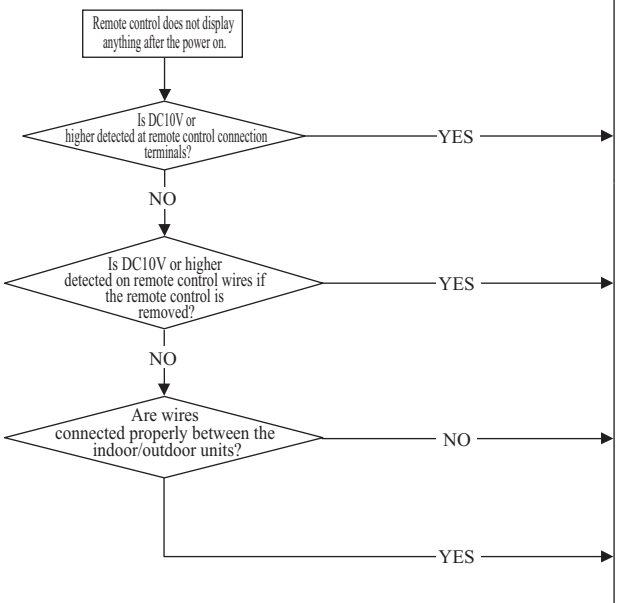
2.Error detection method

3.Condition of error displayed

4.Presumable cause

- Faulty indoor unit control PCB
- Defective remote control
- Broken remote control wire

5.Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E1	Indoor	Keeps flashing	Stays OFF	Remote control communication circuit error
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

When normal communication between the remote control and the indoor unit is interrupted for more than 2 minutes (Detectable only with the remote control)

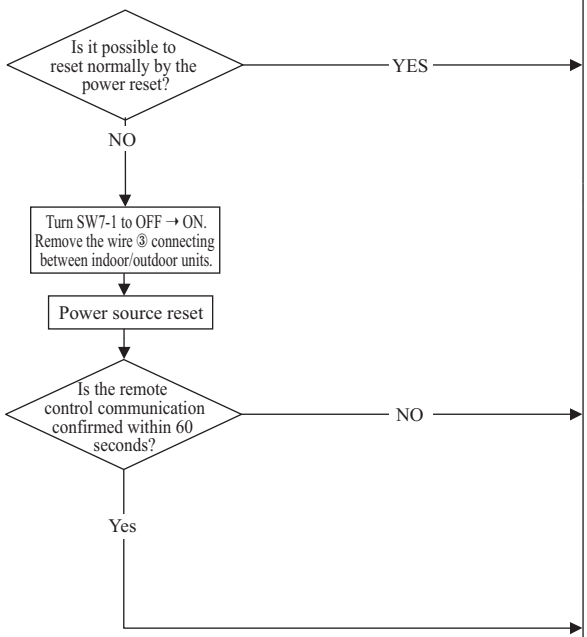
3. Condition of error displayed

Same as above

4. Presumable cause

- Defective communication circuit between remote control-indoor unit
- Noise
- Defective remote control
- Faulty indoor unit control PCB

5. Troubleshooting



Note: If the indoor unit cannot communicate normally with the remote control for 180 seconds, the indoor unit PCB starts to reset automatically.

Error code	LED	Green	Red	Content
Remote control: E5	Indoor	Keeps flashing	2-time flash	Communication error during operation
	Outdoor	Keeps flashing	See below	

1. Applicable model

All models

2. Error detection method

When normal communication between indoor and outdoor unit is interrupted for more than 2 minutes

3. Condition of error displayed

Same as above is detected during operation.

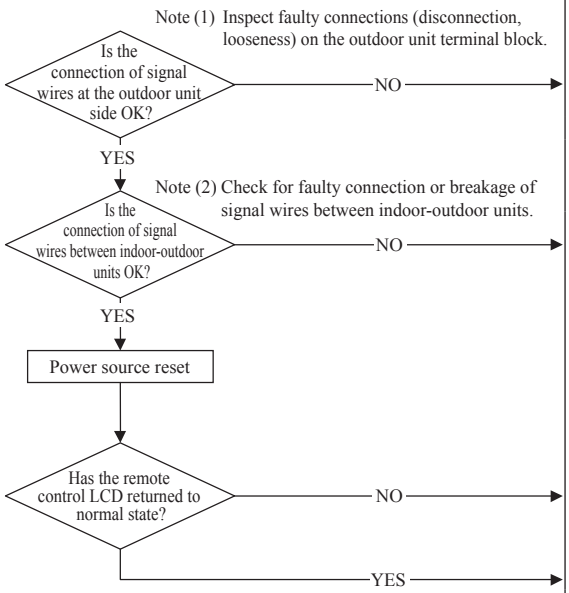
4. Presumable cause

- Unit No. setting error
- Broken remote control wire
- Faulty remote control wire connection
- Faulty outdoor unit control PCB

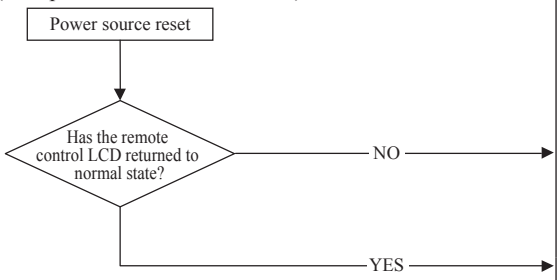
5. Troubleshooting

Diagnosis

●In case that the outdoor unit red LED flashes 2-time



●In case that the outdoor unit red LED stays OFF (Except for FDC71-100VNP-W)



Note: Pressing the pump-down switch cancels communications between indoor and outdoor unit so that "communication error-E5" is displayed on indoor unit and remote control, but it is normal. (Except for FDC71-100VNP-W)

Error code

Remote control: E6

LED	Green	Red
Indoor	Keeps flashing	1-time flash
Outdoor	Keeps flashing	Stays OFF

Content

Indoor heat exchanger temperature sensor anomaly

1.Applicable model

All models

2.Error detection method

Anomalously low temperature or high temperature (resistance) is detected on the indoor heat exchanger temperature sensor (Thi-R1, R2 or R3).

3.Condition of error displayed

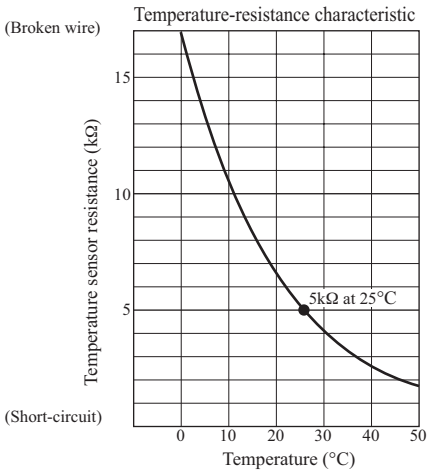
- When the temperature sensor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
- Or if short-circuit is detected for 5 seconds continuously

4.Presumable cause

- Defective indoor heat exchanger temperature sensor connector
- Indoor heat exchanger temperature sensor anomaly
- Faulty indoor unit control PCB

5.Troubleshooting

Diagnosis	Countermeasure
Is the connection of indoor heat exchanger temperature sensor connector OK? → NO	Correct it.→Insert connector securely.
YES → Are characteristics of indoor heat exchanger temperature sensor OK? → NO	Defective indoor heat exchanger temperature sensor→Replace.
YES	Defective indoor unit control PCB→Replace. (Defective indoor heat exchanger temperature sensor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote control: E7	Indoor	Keeps flashing	1-time flash	Return air temperature sensor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected by return air temperature sensor (Thi-A)

3. Condition of error displayed

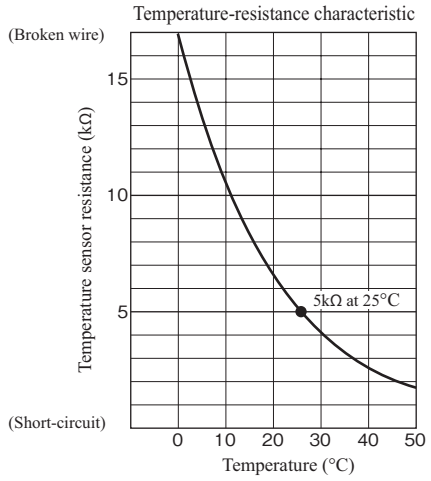
- When the temperature sensor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
- Or if short-circuit is detected for 5 seconds continuously

4. Presumable cause

- Defective return air temperature sensor connector
- Defective return air temperature sensor
- Faulty indoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of return air temperature sensor connector OK? → NO	Correct it.→Connect connector.
YES → Are the characteristics of return air temperature sensor OK? → NO	Defective return air temperature sensor→ Replace.
YES	Defective indoor unit control PCB→Replace. (Defective return air temperature sensor input circuit)



Note:

Error code

Remote control: E8

LED	Green	Red
Indoor	Keeps flashing	1-time flash
Outdoor	Keeps flashing	Stays OFF

Content

Heating overload operation

1. Applicable model

All models

2. Error detection method

Indoor heat exchanger temperature sensor (Thi-R1, R2, R3)

3. Condition of error displayed

When it is detected 5 times within 60 minutes from initial detection or when the overload condition is detected for 6 minutes continuously

4. Presumable cause

- Clogged air filter
- Defective indoor heat exchanger temperature sensor connector
- Defective indoor heat exchanger temperature sensor
- Anomalous refrigerant system

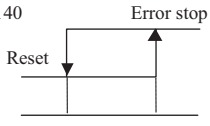
5. Troubleshooting

Diagnosis	Countermeasure
Is the air filter clogged? NO	
Is the air filter clogged? YES	Wash.
Is the indoor heat exchanger temperature sensor connection OK? NO	Defective indoor heat exchanger temperature sensor connector→Correct it.
Are the characteristics of indoor heat exchanger temperature sensor OK? (2) NO	Defective indoor heat exchanger temperature sensor→Replace.
Check the error data with the remote control.	
Is the unit operating in the state of heating overload? NO	Check refrigerant system.
Is the unit operating in the state of heating overload? YES	Adjust.

Note (1) Judge if it is in the state of overload or not as follows.
- Is there any short-circuit of air?
- Isn't there any fouling or clogging on the indoor heat exchanger?
- Is the outdoor fan control normal?
- Isn't the room and outdoor air temperature too high?

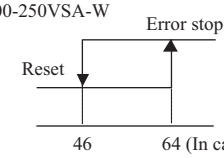
Note (2) For characteristics of indoor heat exchanger temperature sensor, see the error display E6.

•Models FDC71-140



Indoor heat exchanger temperature (°C)

•Models FDC200-250VSA-W



64 (In case SW5-1 : OFF)

57 (In case SW5-1 : ON)

Indoor heat exchanger temperature (°C)

Note: During heating operation; After starting compressor, compressor rotation speed is decreased by detecting indoor heat exchanger temperature (Thi-R) in order to control high pressure.

Error code

Remote control: E10

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	Stays OFF

Content: Excessive number of connected indoor units (more than 17 units) by controlling with one remote control

1. Applicable model

All models

2. Error detection method

When it detects more than 17 of indoor units connected to one remote contorl

3. Condition of error displayed

Same as above

4. Presumable cause

- Excessive number of indoor units connected
- Defective remote control

5. Troubleshooting

Diagnosis	Countermeasure
Are more than 17 indoor units connected to one remote control? → NO	Defective remote control →Replace.
YES	Reduce to 16 or less units.

Note:

Error code	LED	Green	Red	Content
Remote control: E11	Indoor	Keeps flashing	Stays OFF	Address setting error of indoor units
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

IU address has been set using the "Master IU address set" function of remote control.

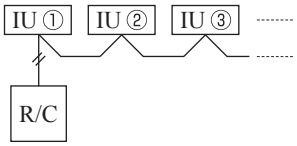
3. Condition of error displayed

Same as above

4. Presumable cause

Mistake of address setting method
(Address setting from remote control can't be done)

5. Troubleshooting

Diagnosis	Countermeasure
E11 occurs ↓ Is "Master IU address set" function of remote control used? YES →	Change of address setting method Set the address by DIP switch SW2 and SW5-1, 2 (Master / Slave setting) on indoor unit control PCB.
In case the wiring is below and "Mastar IU address set" is used, E11 is appeared.  	

Note:

Error code	LED	Green	Red	Content
Remote control: E14	Indoor	Keeps flashing	3-time flash	Communication error between master and slave indoor units
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

Models FDC140VN(S)X-W,
140VN(S)A-W,
200-280VSA-W

2. Error detection method

When communication error between master and slave indoor units occurs

3. Condition of error displayed

Same as above

4. Presumable cause

- Unit address setting error
- Broken remote control wire
- Defective remote control wire connection
- Defective indoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is it OK the unit address setting for master and slave indoor units? → NO	Correct unit address setting.
Is the remote control wiring between indoor units defective? → YES	Correct wiring.
Is it restored by resetting the power source? → NO	Defective indoor unit control PCB→Replace.
→ YES	• Malfunction by noise • Check surrounding environment.

Note (1) Set DIP switches SW5-1 and SW5-2 as shown in the following table.
(Factory default setting – "Master")

		Indoor unit	
		Master	Slave-a
DIP switch	SW5-1	OFF	OFF
	SW5-2	OFF	ON

Note:

Error code	LED	Green	Red	Content
Remote control: E16	Indoor	Keeps flashing	1-time flash	Indoor fan motor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of indoor fan motor

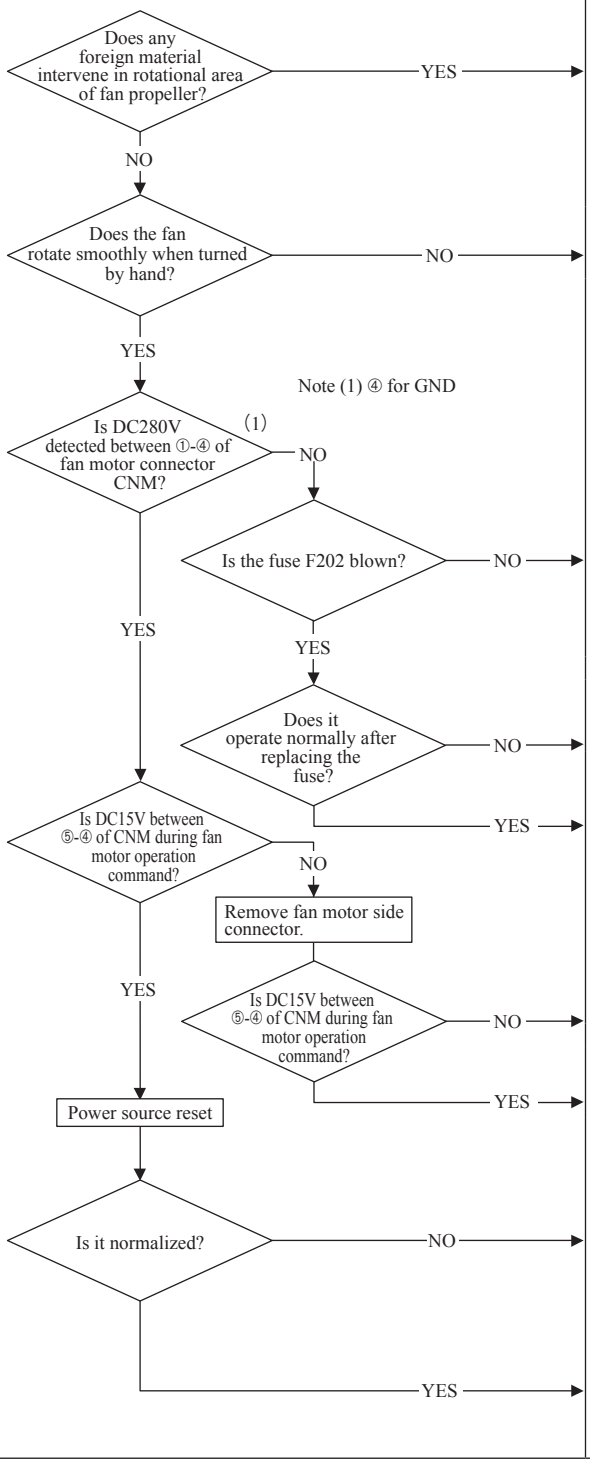
3. Condition of error displayed

- When actual rotation speed of indoor fan motor drops to lower than 200min^{-1} for 30 seconds continuously, the compressor and the indoor fan motor stop.
- After 2-seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective indoor unit control PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on indoor unit PCB
- Blown fuse
- External noise, surge
- Defective indoor unit power PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E18	Indoor	Keeps flashing	1-time flash	Address setting error of master and slave indoor units
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

Models FDC140VN(S)X-W,
140VN(S)A-W,
200-280VSA-W

2. Error detection method

IU address has been set using the "Master IU address set" function of remote control.

3. Condition of error displayed

Same as above

4. Presumable cause

Same as above

5. Troubleshooting

Diagnosis	Countermeasure
E18 occurs ↓ Is "Master IU address set" function of remote control used? YES →	• In cases of RC-EX3A Menu → Service setting → IU settings → Select IU • In cases of RC-E5 Return address No. to "IU …" using [▲] or [▼] button.

Note:

Error code	LED	Green	Red	Content
Remote control: E19	Indoor	Keeps flashing	1-time flash	Operation mode setting error
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

After indoor operation check, when the communication between indoor and outdoor unit is established and SW7-1 is still kept ON.

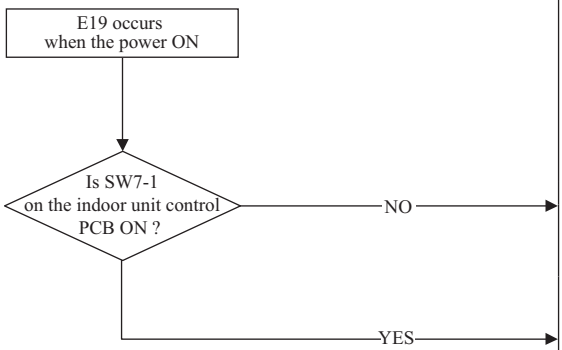
3. Condition of error displayed

Same as above

4. Presumable cause

- Mistake in SW7-1 setting (Due to forgetting to turn OFF SW7-1 after indoor operation check)
- Defective indoor unit control PCB (Defective SW7)

5. Troubleshooting



Diagnosis	Countermeasure
Is SW7-1 on the indoor unit control PCB ON ? NO	Defective indoor unit control PCB (Defective SW7)→Replace.
Is SW7-1 on the indoor unit control PCB ON ? YES	Turn SW7-1 on the indoor unit control PCB OFF and reset the power.

Note:

Error code	LED	Green	Red	Content
Remote control: E20	Indoor	Keeps flashing	1-time flash	Indoor fan motor rotation speed anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of indoor fan motor

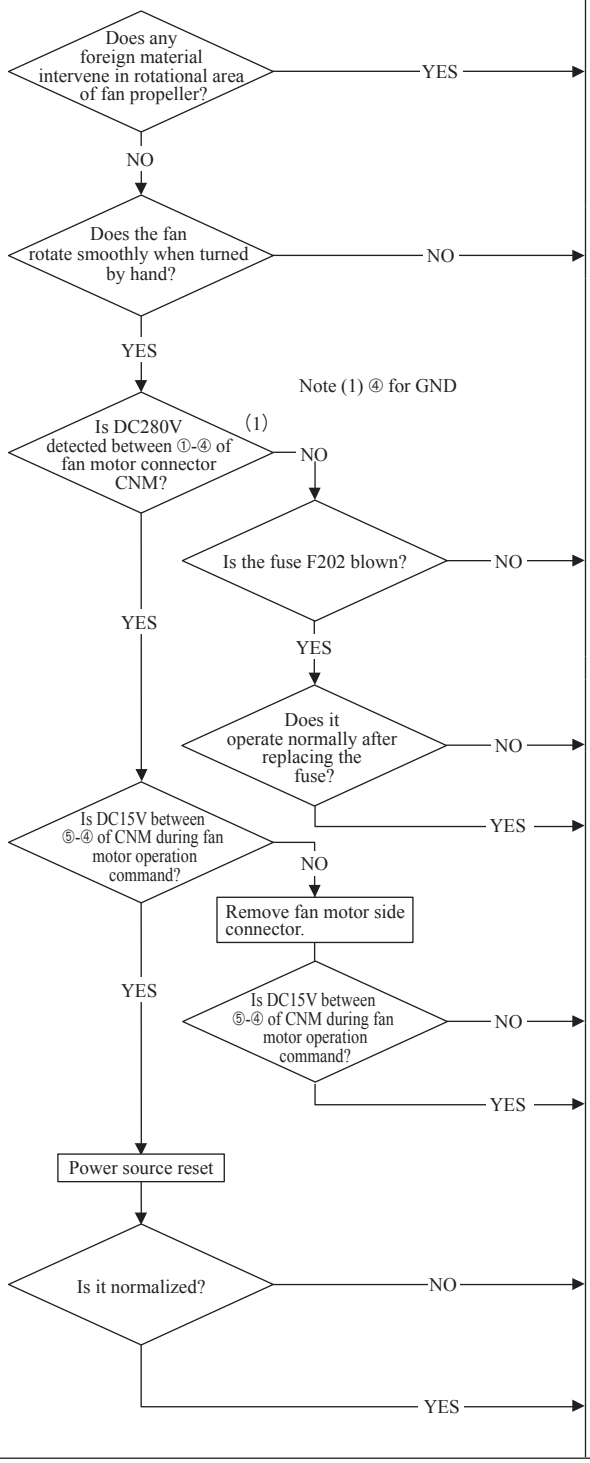
3. Condition of error displayed

When the actual fan rotation speed does not reach to the speed of [required speed -50 min^{-1} after 2 minutes have been elapsed since the fan motor rotation speed command was output, the unit stops by detecting indoor fan motor anomaly.

4. Presumable cause

- Defective indoor unit control PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on indoor unit PCB
- Blown fuse
- External noise, surge
- Defective indoor unit power PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E23	Indoor	Keeps flashing	1-time flash	Refrigerant leak detection
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

When analarm signal is received from the refrigerant sensor

3. Condition of error displayed

- When a refrigerant sensor detects refrigerant
- When a refrigerant sensor detects a gas other than a refrigerant
- When the refrigerant sensor degrades and falsely detects
- When a sensor that has detected a refrigerant once is reused

4. Presumable cause

- Refrigerant leakage from the heat exchanger
- Refrigerant leakage from pipe connections
- Use of gases such as pesticides near indoor units
- Refrigerant sensor deterioration
- Use a refrigerant sensor that has already been detected
- Poor wiring (False detection of faulty output)

5. Troubleshooting

Diagnosis	Countermeasure
Is the refrigerant actually leaking? → YES	Repair the refrigerant leakage point. →Replace refrigerant sensor.
NO → Are gases other than refrigerant falsely detected? → YES	Remove gas near refrigerant sensor. →Reset the error stop (※) or replace refrigerant sensor.
NO → Are you using a refrigerant sensor that has already been detected? → YES	Replace refrigerant sensor.
NO	The refrigerant sensor may be deteriorating or defective, or the wiring may be detective. →Replace refrigerant sensor.

※Error stop (E23) of the refrigerant sensor can be reset twice only. After that, the refrigerant sensor must be replaced.

Note For resetting and replacement instructions, see page 51.
Since the refrigerant sensor once it has been detected cannot be reused, replace the refrigerant sensor after repairing the refrigerant leakage point.
If the refrigerant sensor is replaced before repair, the refrigerant sensor will detect the refrigerant and will need to be replaced again.

Note:If "E23" is displayed on the remote control, perform the following ① and ② before starting the repair.
① If the refrigerant is actually leaking, extinguish the fire such as combustion appliances and ventilate the room.
② Do not block power source breaker before starting the repair.
The indoor unit stops abnormally, but blowing air is performed to prevent the retention of leaking refrigerant.

Error code	LED	Green	Red	Content
Remote control: E28	Indoor	Keeps flashing	Stays OFF	Remote control temperature sensor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of remote control temperature sensor (Thc)

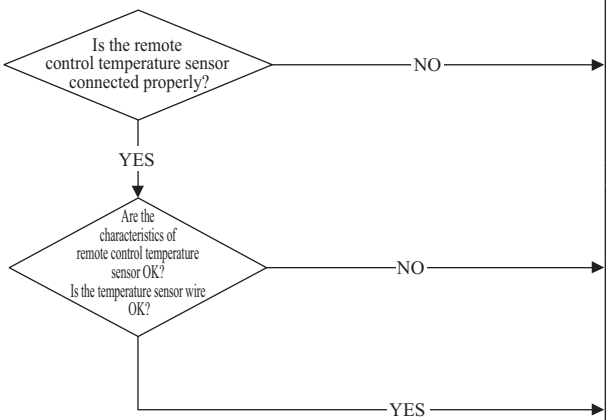
3. Condition of error displayed

When the temperature sensor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Faulty connection of remote control temperature sensor
- Defective remote control temperature sensor
- Defective remote control PCB

5. Troubleshooting



Temperature-resistance characteristics of remote control temperature sensor (Thc)

Temperature (°C)	Resistance value (kΩ)	Temperature (°C)	Resistance value (kΩ)
0	65	30	16
1	62	32	15
2	59	34	14
4	53	36	13
6	48	38	12
8	44	40	11
10	40	42	9.9
12	36	44	9.2
14	33	46	8.5
16	30	48	7.8
18	27	50	7.3
20	25	52	6.7
22	23	54	6.3
24	21	56	5.8
26	19	58	5.4
28	18	60	5.0

Note: After 10 seconds has passed since remote control temperature sensor was switched from valid to invalid, E28 will not be displayed even if the sensor harness is disconnected. At same time the temperature sensor, which is effective, is switched from remote control temperature sensor to indoor return air temperature sensor. Even though the remote control temperature sensor is set to be effective, the return air temperature displayed on remote control for checking still shows the value detected by indoor return air temperature sensor, not by remote control temperature sensor.

Error code

Remote control: E35

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1-time flash
Outdoor inverter PCB	Yellow LED	
	Keeps flashing	

Content

Cooling overload operation (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

For the error detection method, refer to cooling high pressure protective control in the protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

3. Condition of error displayed

When outdoor heat exchanger temperature anomaly is detected 5 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

4. Presumable cause

- Defective outdoor heat exchanger temperature sensor
- Defective outdoor unit control PCB
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Excessive refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of outdoor heat exchanger temperature sensor, refer to E37.	
Are the characteristics of outdoor heat exchanger temperature sensor normal? — NO	Replace outdoor heat exchanger temperature sensor.
YES	
Is the unit operating in the state of cooling overload? — YES	Check unit side. • Isn't the air circulation of outdoor unit short-circuited? • Are installation spaces adequate? • Isn't there any fouling or clogging on heat exchanger?
NO	
Is the high pressure control normal? — NO	Control operation check *
YES	
Is the temperature (measured actually) at detection of error correct? — NO	Defective outdoor unit control PCB → Replace.
YES	Excessive refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.

* For the contents of control, refer to cooling high pressure protective control in the protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

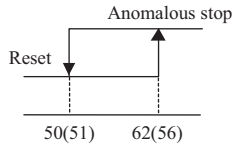
Note:

Error code	LED	Green	Red	Content
Remote control: E35	Indoor	Keeps flashing	Stays OFF	Cooling overload operation (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method



Outdoor heat exchanger temperature (°C)

Note (1) Values in ( ) are applicable when outdoor air temperature (TH2) is lower than 32 °C

3. Condition of Error displayed

When anomalous outdoor heat exchanger temperature occurs 5 times within 60 minutes or 62(56)°C or higher continues for 10 minutes, including the compressor stop

4. Presumable cause

- Defective outdoor heat exchanger temperature sensor
- Defective outdoor unit control PCB
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Excessive refrigerant quantity

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of outdoor heat exchanger temperature sensor, refer to E37. Are the characteristics of outdoor heat exchanger temperature sensor normal? NO	Replace outdoor heat exchanger temperature sensor.
YES Is the unit operating in the state of cooling overload? YES	Check unit side. • Isn't the air circulation of outdoor unit short-circuited? • Are installation spaces adequate? • Isn't there any fouling or clogging on heat exchanger?
NO Is the high pressure control normal? NO	Control operation check*
YES Is the temperature (measured actually) at direction of error correct? NO	Defective outdoor unit control PCB→Replace.
YES	Excessive refrigerant amount: Recharge refrigerant by weighing proper amount on a scale.

* For the contents of control, refer to cooling high pressure protective control in the protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

Note:

Error code	LED	Green	Red
Remote control: E36	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Discharge pipe temperature error (Except for models FDC200-280VSA-W)

1. Applicable model

Except for models FDC200-280VSA-W

2. Error detection method

For the error detection method, refer to compressor overheat in protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

3. Condition of error displayed

When discharge pipe temperature anomaly is detected 2 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop

4. Presumable cause

- Defective outdoor unit control PCB
- Defective discharge pipe temperature sensor
- Clogged filter
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of discharge pipe temperature sensor, refer to E39. Are the characteristics of discharge pipe temperature sensor normal? NO →	Replace discharge pipe temperature sensor.
YES Is the discharge pipe temperature error persisted during cooling / heating operation? YES →	Insufficient refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.
NO Is the discharge pipe temperature control normal? NO →	Control operation check *
YES Is the temperature (measured actually) at detection of error correct? NO →	Defective outdoor unit control PCB→Replace.
YES →	Check unit side: • Isn't filter clogged? • Are indoor, outdoor unit installation spaces adequate ? • Isn't there any short-circuit of air? • Isn't there any fouling, clogging on indoor heat exchanger?

* For the contents of control, refer to compressor overheat in protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

Note:

Error code	LED	Green	Red
Remote control: E36	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Discharge pipe temperature error (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

For the error detection method, refer to compressor overheat protective control in the protective control by controlling compressor rotation speed of microcomputer control function for corresponding models.

3. Condition of error displayed

When discharge pipe temperature anomaly is detected 2 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

4. Presumable cause

- Defective outdoor unit control PCB
- Defective discharge pipe temperature sensor
- Clogged filter
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Faulty solenoid valve SV1 (at heating mode)
- Clogging of capillary tube of SV1 circuit (at heating mode)
- Faulty coil of SV1
- Faulty control PCB
- Faulty body of SV1
- Clogging of the strainer on the upstream of SV1(at heating mode)
- Insufficient amount of refrigerant

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of discharge pipe temperature sensor, refer to E39. Are the characteristics of discharge pipe temperature sensor normal? — NO	Replace discharge pipe temperature sensor.
YES Is the discharge pipe temperature error persisted during cooling /heating operation? — YES	Insufficient refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.
NO Is the discharge pipe temperature control normal? — NO	Control operation check *
YES Is the temperature (measured actually) at detection of error correct? — NO	Defective outdoor unit control PCB→Replace.
YES	Check unit side: • Isn't filter clogged? • Are indoor, outdoor unit installation spaces adequate? • Isn't there any short-circuit of air? • Isn't there any fouling, clogging on indoor heat exchanger? • In addition to the above, check the clogging and malfunction of the SV1 circuit by the flow chart * 1.
* For the contents of control, refer to compressor discharge pipe temperature protection in page 36.	
* 1 Check the following when SV1 is on. (Check On/OFF status of SV1 with Mente PC)	
Is there any problem with the coil of SV1 function? •Is the coil removed from the body of SV1? •Is the coil wiring broken? •Is the coil connector disconnected? — YES	Fix abnormal condition.
NO Is 220-240 VAC applied to the CNF terminal of the control PCB ? — NO	Change control PCB.
YES Is the temperature between capillary tube and compressor of the SV1 circuit below 40 °C when the compressor is running? — NO	Change the body of SV1, the capillary tube and/or the strainer in the SV1 circuit.
YES Is there a temperature difference between upstream and downstream of the strainer in the SV1 circuit? — YES	Change the strainer in the SV1 circuit.
NO Is the amount of refrigerant appropriate? — NO	Adjust to the appropriate amount of refrigerant.
YES	Due to suspected partial clogging of SV1 circuit, change the body of SV1, the capillary tube and/or the strainer in the SV1 circuit. or Check the other actuator.

Note:

Error code	LED	Green	Red
Remote control: E37	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content: **Outdoor heat exchanger temperature sensor anomaly**

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the outdoor heat exchanger temperature sensor

3. Condition of error displayed

- When the temperature sensor detects -50(-55)°C or lower for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -50(-55)°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON

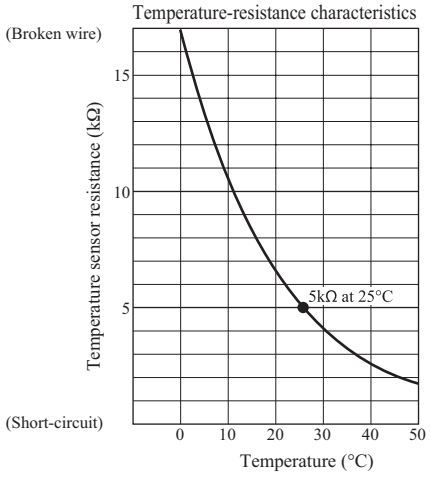
Note Values in ( ) are for the models FDC71-100VNP-W.

4. Presumable cause

- Defective outdoor unit control PCB
- Broken sensor harness or temperature sensing section
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor heat exchanger temperature sensor connector connected properly? → NO	Correct connector.
YES	
For the characteristics of outdoor heat exchanger temperature sensor, see the following graph.	
Are the characteristics of outdoor heat exchanger temperature sensor OK? → NO	Defective outdoor heat exchanger temperature sensor→Replace.
YES	Defective outdoor unit control PCB→Replace. (Defective outdoor heat exchanger temperature sensor input circuit)



Note:

Error code	LED	Green	Red
Remote control: E38	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Outdoor air temperature sensor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on outdoor air temperature sensor

3. Condition of error displayed

- When the temperature sensor detects -45(-55)°C or lower for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -45(-55)°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON

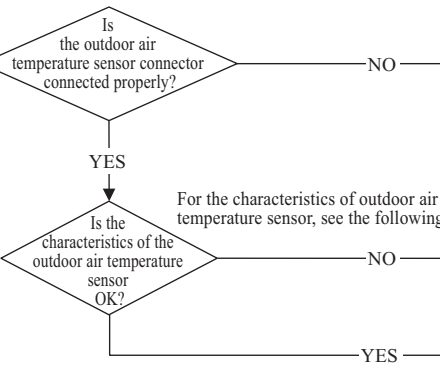
Note Values in ( ) are for the models FDC71-100VNP-W.

4. Presumable cause

- Defective outdoor unit control PCB
- Broken sensor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

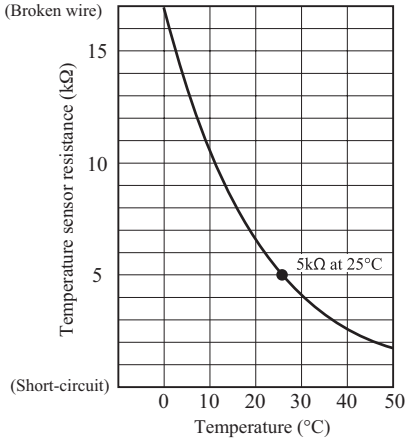
5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor air temperature sensor connector connected properly? → NO	Correct connector.
YES → Is the characteristics of the outdoor air temperature sensor OK? (For the characteristics of outdoor air temperature sensor, see the following graph.) → NO	Defective outdoor air temperature sensor→Replace.
YES	Defective outdoor unit control PCB→Replace. (Defective outdoor air temperature sensor input circuit)



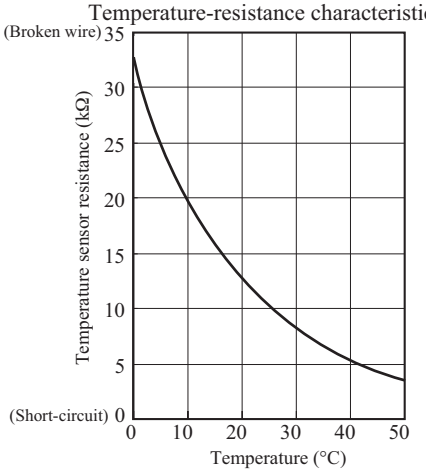
• Models FDC71-100VNP-W

Temperature-resistance characteristics



• Models FDC71 - 280

Temperature-resistance characteristics



Note:

Error code	LED	Green	Red
Remote control: E39	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Discharge pipe temperature sensor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the discharge pipe temperature sensor

3. Condition of error displayed

When the temperature sensor detects -10(-25)°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.

Note Value in ( ) is for the models FDC71-100VNP-W.

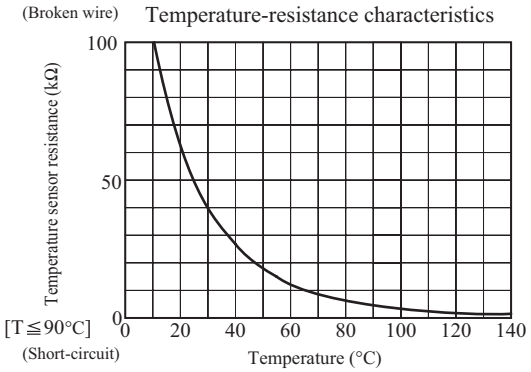
4. Presumable cause

- Defective outdoor unit control PCB
- Broken sensor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

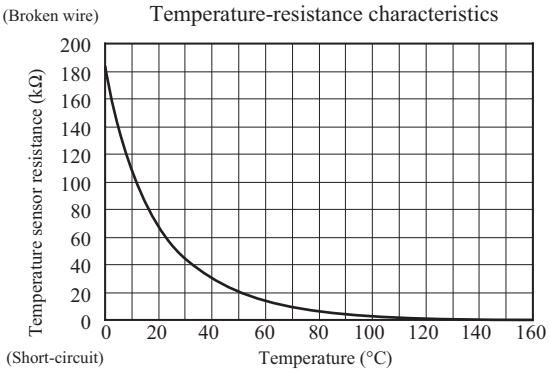
5. Troubleshooting

Diagnosis	Countermeasure
Is the discharge pipe temperature sensor connector connected properly? → NO	Correct connector.
YES → Are the characteristics of discharge pipe temperature sensor OK? (For the characteristics of discharge pipe temperature sensor, see the following graph.) → NO	Defective discharge pipe temperature sensor→ Replace.
YES	Defective outdoor unit control PCB→Replace. (Defective discharge pipe temperature sensor input circuit)

• Models FDC71-100VNP-W



• Models FDC71-280



Note:

Error code
Remote control: E40

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1-time flash
Outdoor inverter PCB	Yellow LED	
	Keeps flashing	

Content

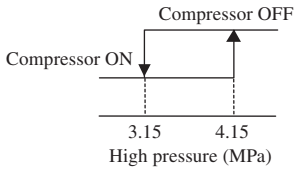
High pressure error (63H1 activated) (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

When the high pressure switch 63H1 is activated



3. Condition of error displayed

If 63H1 turns OFF (opened), the compressor stops. After 3-minute delay, the compressor restarts. If this anomaly occurs 5 times within 60 minutes or continues for 60 minutes continuously.

4. Presumable cause

- Short-circuit of air flow, disturbance of air flow and clogging filter at outdoor heat exchanger/Breakdown of fan motor
- Defective outdoor unit control PCB
- Defective 63H1 connector
- Defective electronic expansion valve connector
- Closed service valve
- Mixing of non-condensing gas (nitrogen, etc.)
- Faulty sensor(Tho-R1, Tho-R2, Thi-R1, Thi-R2, Tho-H, PSL)

5. Troubleshooting

Diagnosis	Countermeasure
If the power source breaker is turned OFF and ON too quickly, E40 may be displayed. (This is normal.)	
Is the service valve fully opened? — NO	Open the service valve.
YES	
Has 63H1 activated? — NO	
On operation of 63H1 — YES	
1. During cooling ・ Is the outdoor fan motor running? ・ Isn't any short-circuit of air on the outdoor unit? ・ Is Tho-R1, Tho-R2, Tho-H, PSL normal? ・ Is the sensor(Tho-R1, Tho-R2, Tho-H) detached from the sensor holder? ・ Is the sensor(Tho-H) covered with insulation? ・ Are sufficient return air/supply air space secured? 2. During heating ・ Isn't the indoor heat exchanger temperature sensor disconnected from the sensor casing? ・ Isn't the filter clogged? ・ Is Thi-R1, Thi-R2, Tho-H, PSL normal? ・ Is the sensor(Tho-R1, Tho-R2, Tho-H) detached from the sensor holder? ・ Is the sensor(Tho-H) covered with insulation? * Under the condition of overcharging refirgerant, 63H1 may activate due to delay of starting the preventive control by compressor speed control, because detected heat exhanger temperature, which conducts compressor speed control, becomes lower than normal condition due to excess subcooling degree.	
Is 63H1 connector connected properly? — NO	Correct 63H1 connector.
YES	
Is the electronic expansion valve connector connection OK? — NO	Correct electronic expansion valve connector.
If any anomaly exists on the electronic expansion valve connector connection, the power source must be reset.	
YES	Defective outdoor unit control PCB→Replace. (Defective 63H1 input circuit)

Note: In the protective control range for compressor startup (initial startup after power ON), even if 63H1 is activated only once (63H1 turns OFF), immediately the error is displayed.

Error code	LED	Green	Red	Content
Remote control: E40	Indoor	Keeps flashing	Stays OFF	Service valve (gas side) closing operation (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

If the inverter output current value exceeds the setting value within 80 seconds after the compressor ON in the heating mode, the compressor stops.

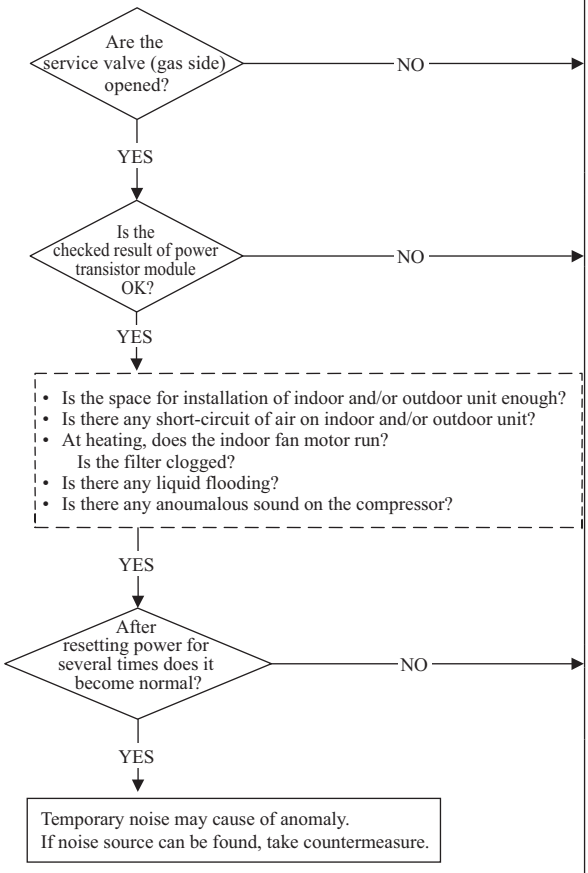
3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping. (In heating mode)
- After 3-minute delay, the compressor restarts, but if this anomaly occurs 2 times within 20 minutes after the intial detection.

4. Presumable cause

- Service valve (gas side) closing
- Defective outdoor unit PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E41	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		6-time flash	

Content

Power transistor overheat (Models FDC71-140VNX-W, 100-140VSX-W only)

1. Applicable model

Models FDC71-140VNX-W, 100-140VSX-W

2. Error detection method

When less than DC14V of the output voltage is detected between ② and ③ on CNI3, E41 is displayed
(See "Note" mentioned below.)

3. Condition of error displayed

Seme as above.

4. Presumable cause

- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Outdoor unit control PCB anomaly
- Noise filter PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
• **Single phase models (FDC71-140VNX-W)**	
(1) (2) Is DC15V detected between ② and ③ on CNI3? — YES	Replace inverter PCB . If not solved, replace noise filter PCB as well.
NO — Note(1) Under anomalous conditions, the voltage becomes less than DC14V.	
(1) Is DC15V detected after disconnecting outdoor fan motor? — YES	Replace outdoor fan motor.
NO	Replace outdoor unit control PCB . If not solved, replace inverter PCB as well.
Note(2) How to check the voltage between ② and ③ of CNI3? ⇒See E51	
• **3 phase models (FDC100-140VSX-W)** E41⇒Replace inverter PCB.	

Note: The "Single phase models" of inverter PAC have no function to output the signal for the power transistor overheat. However since the power source for the power transistor and the outdoor fan motor is in the same line, when the anomaly of the outdoor fan motor occurs, E41 is displayed.

Error code	Indoor display	RUN light	TIMER light	Content
Remote control: E41		–	–	Power transistor overheat (Models FDC200-280VSA-W only)
	Outdoor unit control PCB	Green LED	Red LED	
		Keeps flashing	1-time flash	
	Outdoor unit inverter PCB	Yellow LED		
		Keeps flashing		

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

When anomalously high temperature is detected by power transistor

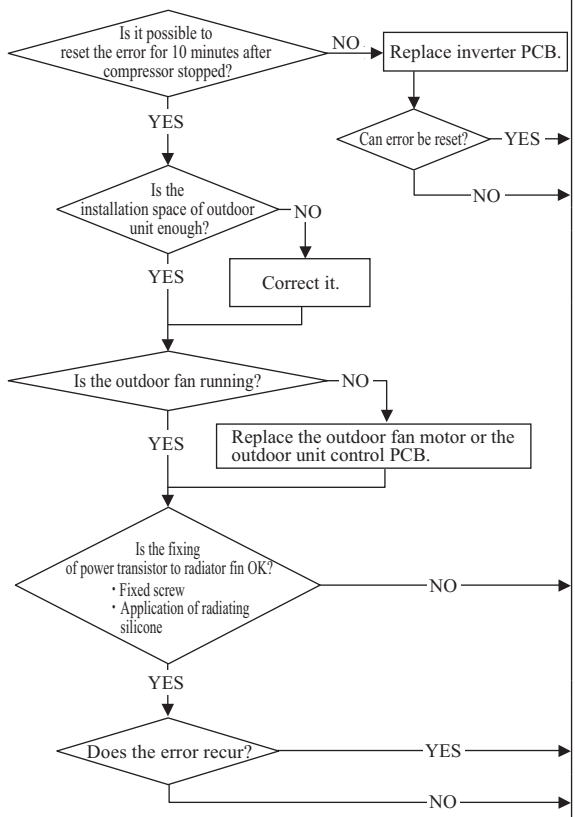
3. Condition of error displayed

Anomalously high temperature of power transistor is detected 5 times within 60 minutes.

4. Presumable cause

- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Improperly fixing of power transistor to radiator fin
- Inadequate installation space of outdoor unit
- Outdoor unit control PCB anomaly
- Power transistor module anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E42	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		1-time flash	

Content

Current cut (1/2) (Except for models FDC200-280VSA-W)

1. Applicable model

Except for models FDC200-280VSA-W

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minutes after the intial detection. (Except for FDC71-100VNP-W)

4. Presumable cause

- The service valves closed
- Faulty power source
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting

Diagnosis	Countermeasure
Is the power source voltage OK? — NO	Check power source.
YES → Are the service valves opened? — NO	Open the service valves.
YES → Is the high pressure during operation OK? — NO	Check refrigerant amount and refrigerant circuit. *In case of transitional increase of high pressure and/or test run, several times restarting may recover it, because liquid refrigerant (migrated) in the compressor is discharged from the compressor.
YES → Is the checked result of insulation resistance and resistance between terminals (1) of compressor motor OK? — NO	Replace compressor.
YES → To next page.	

(1) 0.722Ω or more at 20°C (Model FDC71VNX-W)
1.044Ω or more at 20°C (Models FDC100-140VNX-W)
1.044Ω or more at 20°C (Models FDC100-140VSX-W)
0.448Ω or more at 20°C (Models FDC100-140VNA-W)
1.044Ω or more at 20°C (Models FDC100-140VSA-W)
1.452Ω or more at 20°C (Model FDC71VNP-W)
0.724Ω or more at 20°C (Models FDC90, 100VNP-W)

Note:

Error code	LED	Green	Red
Remote control: E42	Indoor	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		1-time flash	

Content

Current cut (2/2) (Except for models FDC200-280VSA-W)

1. Applicable model

Except for models FDC200-280VSA-W

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minutes after the intial detection.(Except for FDC71-100VNP-W)

4. Presumable cause

- Defective inverter (or outdoor unit) PCB
- Faulty power source
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting

Diagnosis	Countermeasure
From previous page	
Is the checked result of power transistor module OK? — NO	Defective inverter (or outdoor unit) PCB→Replace.
YES	
• Is the space for installation of indoor and/or outdoor unit enough? • Is there any short-circuit of air on indoor and/or outdoor unit? • At cooling, does the outdoor fan motor run? Are the service valves fully opened? Is the filter clogged? • At heating, does the indoor fan motor run? Are the service valves fully opened? Is the filter clogged? • Is there any liquid flooding? Is the superheat within normal range? Is the low pressure sensor and suction pipe temperature sensor normal? • Is there any anoumalous sound on the compressor?	
YES	
After resetting power for several times does it become normal? — NO	Defective inverter (or outdoor unit) PCB→Replace.
YES	
Temporary noise may cause of anomaly. If noise source can be found, take countermeasure.	

Note:

Error code	LED	Green	Red
Remote control: E42	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		9-time flash	

Content

Current cut (1/2) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minutes after the intial detection.

4. Presumable cause

- The service valves closed
- Faulty power source
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module
- Faulty body of SV1
- Faulty outdoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the power source voltage OK? NO	Check power source.
YES → Are the service valves opened? NO	Open the service valves.
YES → Is the high pressure during operation OK? NO	Check refrigerant amount and refrigerant circuit. *In case of transitional increase of high pressure and/or test run, several times restarting may recover it, because liquid refrigerant (migrated) in the compressor is discharged from the compressor.
YES → Is the checked result of insulation resistance and resistance between terminals (1) of compressor motor OK? NO (1) 0.309Ω or more at 20°C (Model FDC200-280VSA-W)	Replace compressor.
YES → To next page	

Note:

Error code	LED	Green	Red
Remote control: E42	Indoor	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		9-time flash	

Content

Current cut (2/2) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

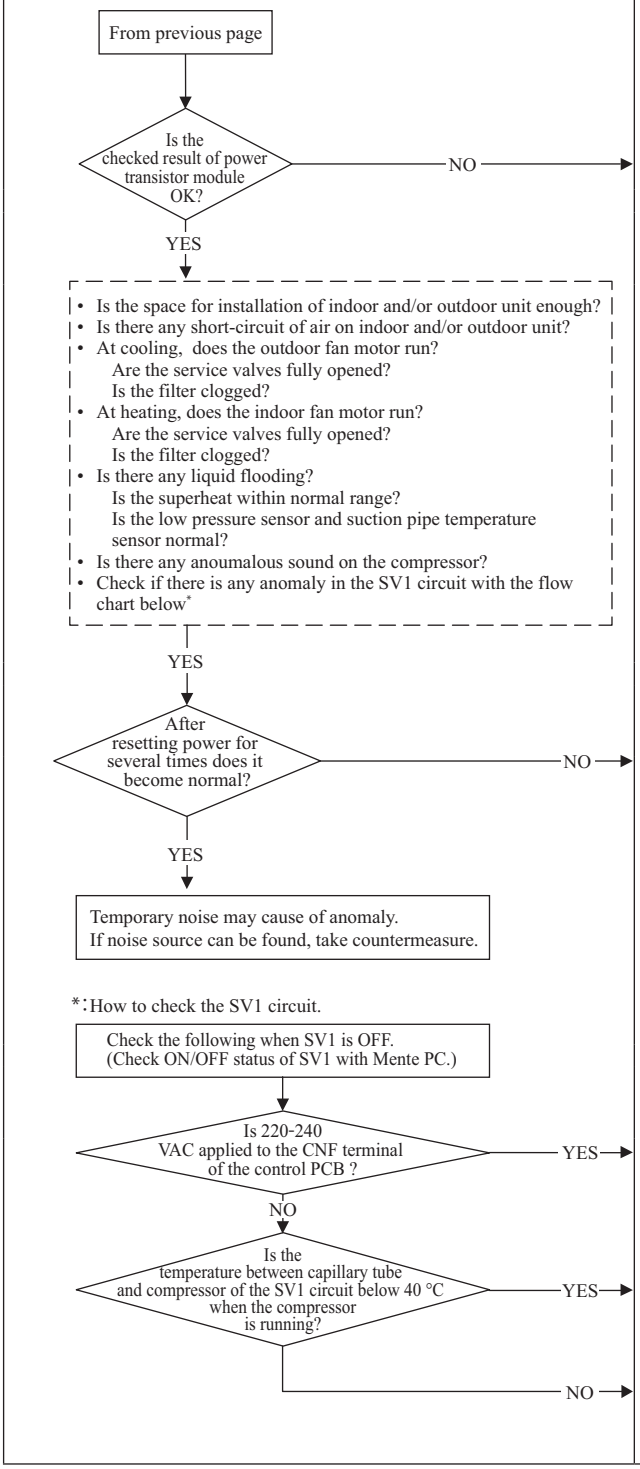
3. Condition of error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minutes after the intial detection.

4. Presumable cause

- Defective outdoor unit control PCB
- Defective inverter PCB
- Faulty power source
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E44	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Liquid back error (Cooling mode) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

Detected by under-dome superheat.

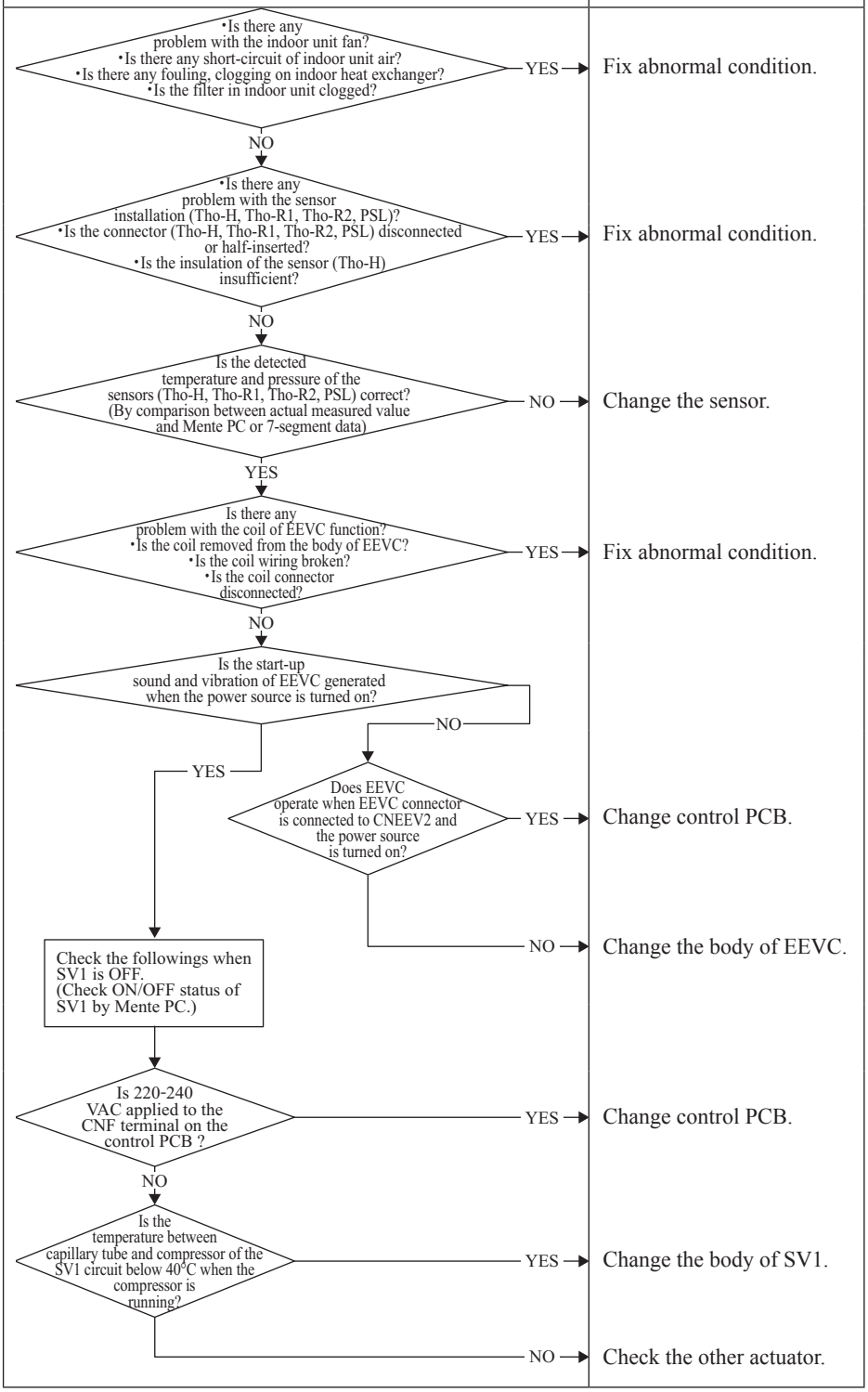
3. Condition of error displayed

When abnormal liquid back is detected 3 times within 90 minutes, the compressor stops.

4. Presumable cause

- Faulty indoor unit fan
- Faulty body of SV1
- Faulty outdoor unit control PCB
- Short-circuit of air on indoor units
- Fouling, clogging of heat exchanger
- Clogged filter
- Abnormal condition of Tho-H, Tho-R1, Tho-R2, PSL
- Faulty coil of EEVC
- Faulty body of EEVC

5. Troubleshooting



Note:

Error code

Remote control: E44

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1-time flash
Outdoor inverter PCB	Yellow LED	
	Keeps flashing	

Content

Liquid back error (Heating mode) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

Detected by under-dome superheat.

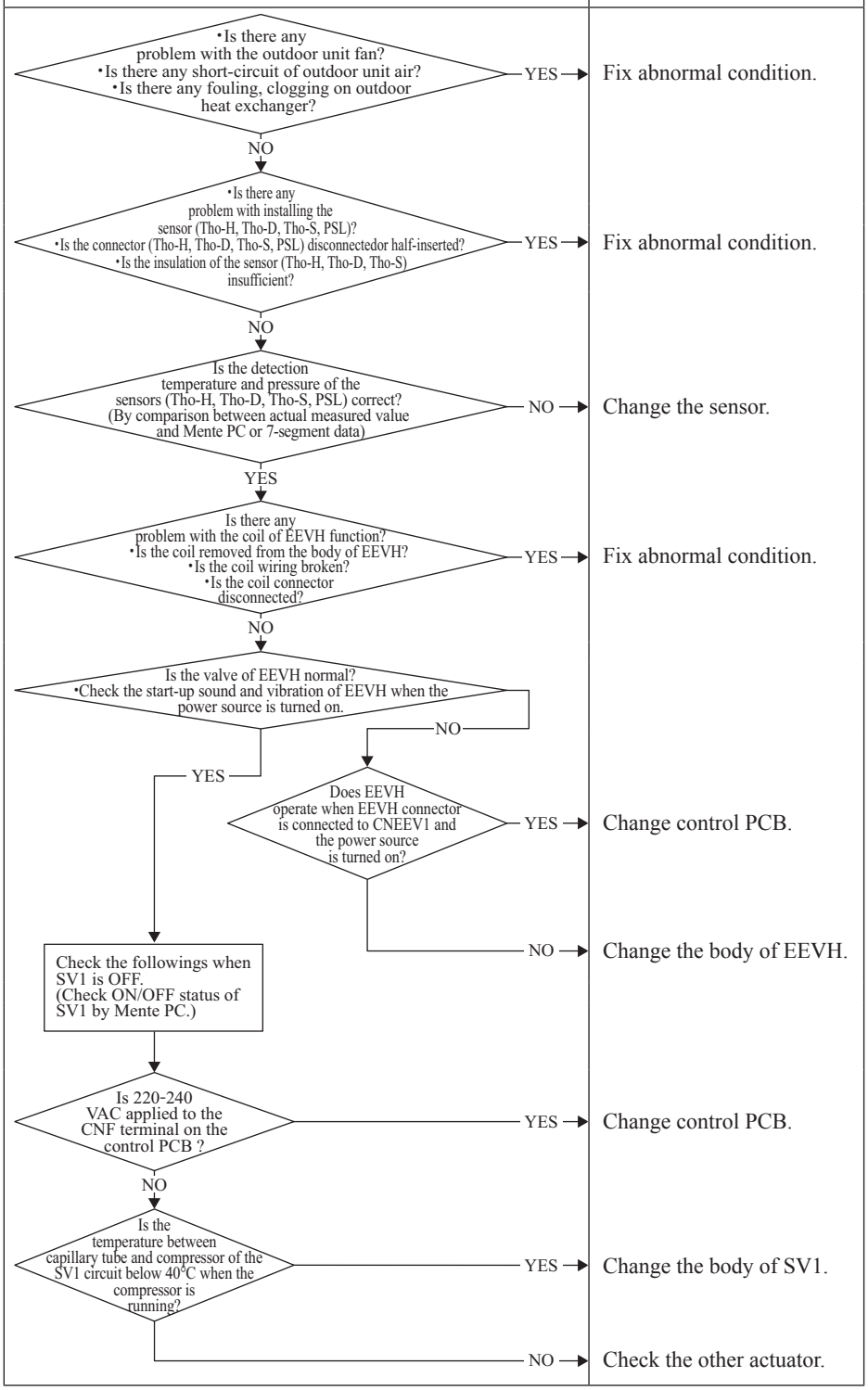
3. Condition of error displayed

When abnormal liquid back is detected 3 times within 90 minutes, the compressor stops.

4. Presumable cause

- Faulty outdoor unit fan
- Faulty body of SV1
- Faulty outdoor unit control PCB
- Short-circuit of air on outdoor units
- Fouling, clogging of heat exchanger
- Clogged filter
- Abnormal condition of Tho-H, Tho-D, Tho-S, PSL
- Faulty coil of EEVH
- Faulty body of EEVH

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E45	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content: Communication error between inverter PCB and outdoor unit control PCB (Models FDC71-140VNX-W, 100-140VSX-W only)

1. Applicable model

Models FDC71-140VNX-W, 100-140VSX-W

2. Error detection method

When the communication between inverter PCB and outdoor unit control PCB is not established

3. Condition of error displayed

Same as above

4. Presumable cause

- Inverter PCB anomaly
- Anomalous connection of connector between the outdoor unit control PCB and inverter PCB
- Outdoor unit control PCB anomaly
- Outdoor fan motor anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of connectors between the inverter PCB and the outdoor unit control PCB OK? — NO	Correct the connection.
YES → Are both switches of JSW10,11 on the inverter PCB set correctly? — NO	Set JSW10, 11 correctly. →See page 76 or 77.
YES → Is LED on the inverter PCB flashing? — NO (For 3-phase models)	No power is supplied to inverter PCB. Check the power source voltage and correct it. If not solved, find the cause by checking following points. • Fan motor anomaly
NO (For single-phase models) → Note(1) How to check voltage at CN13 →See E51	
YES → Is DC15V detected between ② and ③ on CNI3? (1) (2) — YES	
NO → Note(2) Under anomalous conditions, the voltage becomes less than DC14V → Is DC15V detected after disconnecting outdoor fan motor? — YES	Replace outdoor fan motor.
NO	Replace outdoor unit control PCB. If not solved, replace inverter PCB as well.
YES → Is the communication wire between the inverter PCB and the outdoor unit control PCB connected properly? — NO	Connect the communication wire securely.
YES → Replace the outdoor unit control PCB. → Does it become normal? — NO	Replace inverter PCB.
YES	OK

Note:

Error code

Remote control: E45

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1-time flash
Outdoor inverter PCB	Yellow LED	
	Keeps flashing	

Content

Communication error between inverter PCB and outdoor unit control PCB (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

When the communication between inverter PCB and outdoor unit control PCB is not established

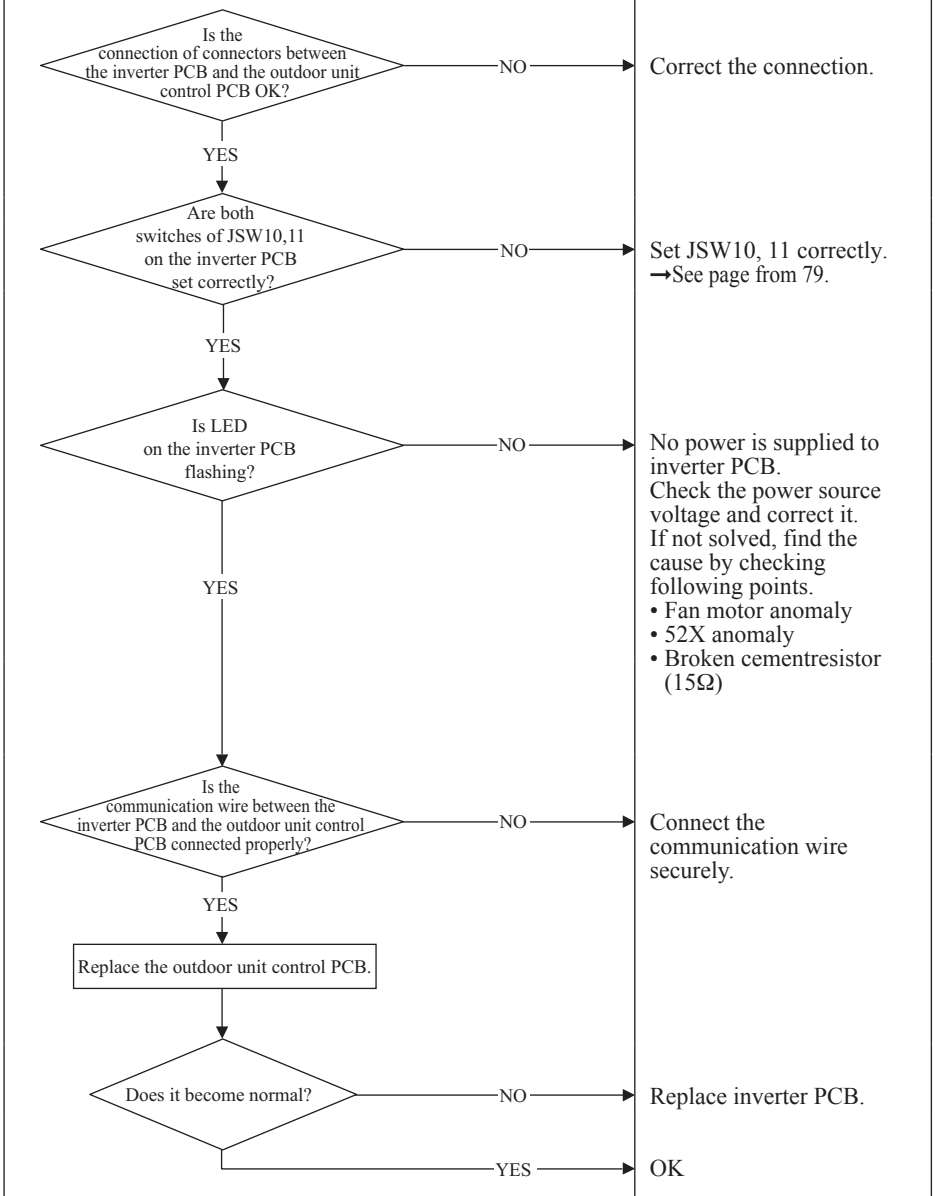
3. Condition of error displayed

Same as above

4. Presumable cause

- Inverter PCB anomaly
- Anomalous connection of connector between the outdoor unit control PCB and inverter PCB
- Outdoor unit control PCB anomaly
- Outdoor fan motor anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E47	Indoor	Keeps flashing	Stays off
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		7-time flashing	

Content

Inverter PCB A/F module anomaly (Model FDC71VNX-W only)

1. Applicable model

Model FDC71VNX-W

2. Error detection method

In order to prevent from overcurrent of A/F, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of error displayed

- If the output current of A/F exceeds the specifications, it makes the compressor stopping.

4. Presumable cause

- Defective inverter PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the power source voltage OK? → NO	Check power source.
YES → Is the checked results of insulation resistance and resistance between terminals (1) of compressor motor OK? → NO (1) 0.722Ω or more at 20°C (Model FDC71VNX-W)	Replace compressor.
YES	Defective outdoor inverter PCB→Replace.

Note:

Error code	LED	Green	Red	Content
Remote control: E47	Indoor unit control PCB	Keeps flashing	Stays OFF	Control PCB A/F module anomaly (Models FDC100-140VNA-W only)
	Outdoor unit control PCB	Keeps flashing	1-time flash	

1. Applicable model

Models FDC100-140VNA-W

2. Error detection method

In order to avoid an unexpected trouble, if the protective circuit defect unexpected voltage, current and movement of the power element, it makes the compressor stopping.

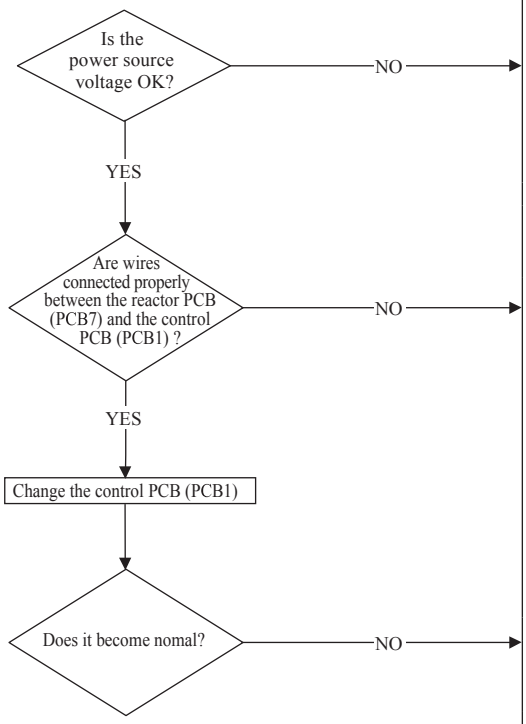
3. Condition of error displayed

- If the A/F anomaly occurs, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts if this anomaly occurs 4 times within 30 minutes or continues for 15 minutes continuously.

4. Presumable cause

- Defective main PCB
- Defective reactor PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E47	Indoor	Keeps flashing	Stays OFF	Active filter voltage error (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

Error is displayed if the converter voltage exceeds target voltage (3 times within 20 minutes). Remote control may be set after 3-minute delay.
Error is displayed if the converter voltage is lower than 210V (1-time within 5 seconds after power ON)

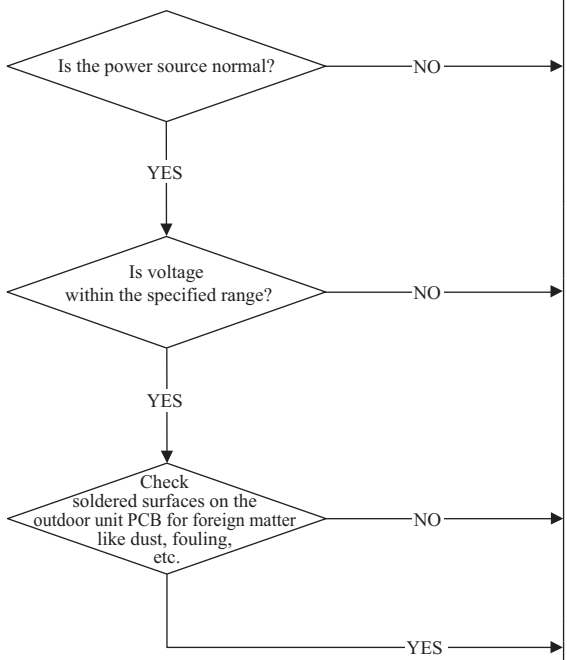
3. Condition of Error displayed

Same as above

4. Presumable cause

- Defective outdoor unit PCB
- Dust on outdoor unit PCB
- Anomalous power source

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E48	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Outdoor fan motor anomaly

1. Applicable model

Models FDC71-140VNX-W,
100-140VSX-W,
200-280VSA-W

2. Error detection method

Detected by rotation speed of outdoor fan motor

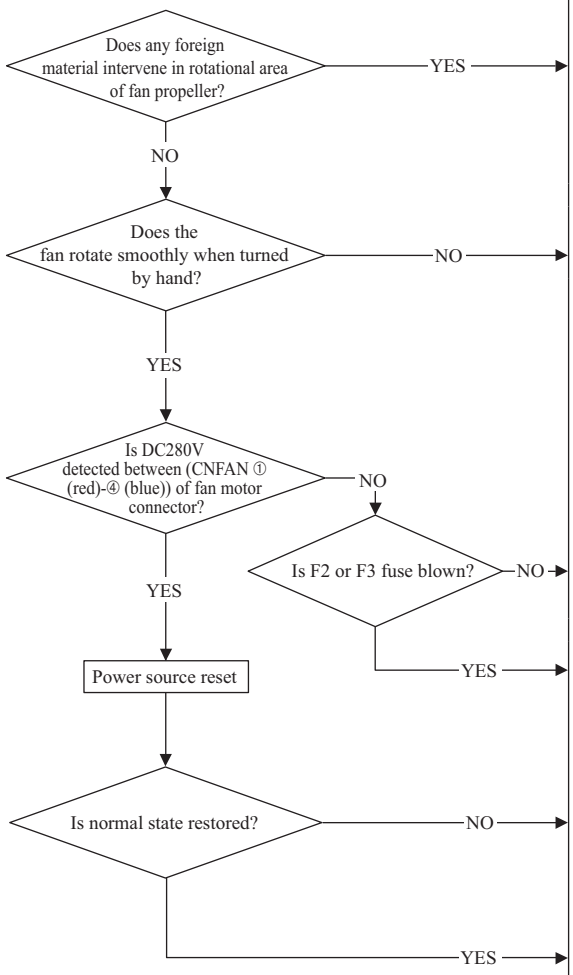
3. Condition of error displayed

When actual rotation speed of outdoor fan motor (FMo1, 2) drops to 100min^{-1} or lower for 30 seconds continuously, the compressor and the outdoor fan motor stop. After 3-minute delay, it starts again automatically, but if this anomaly occurs 5 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective outdoor unit control PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor unit control PCB
- Blow fuse
- External noise, surge

5. Troubleshooting



Note: When E48 error occurs, in almost cases F2 fuse (4A) [Model 71 : F3 fuse (2A)] on the outdoor unit control PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor unit control PCB (or fuse) is replaced,, another trouble (*1) could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)
*1 The error which does not seem to relate E48 may occur like as "WAIT", Stay OFF of LED on outdoor unit control PCB, inverter communication error (E45) and etc.

Error code	LED	Green	Red	Content
Remote control: E48	Indoor unit control PCB	Keeps flashing	Stays OFF	Outdoor fan motor anomaly (Models FDC100-140VN(S)A-W only)
	Outdoor unit control PCB	Keeps flashing	1-time flash	

1. Applicable model

Models FDC100-140 VN(S)A-W

2. Error detection method

Detected by rotation speed of outdoor fan motor

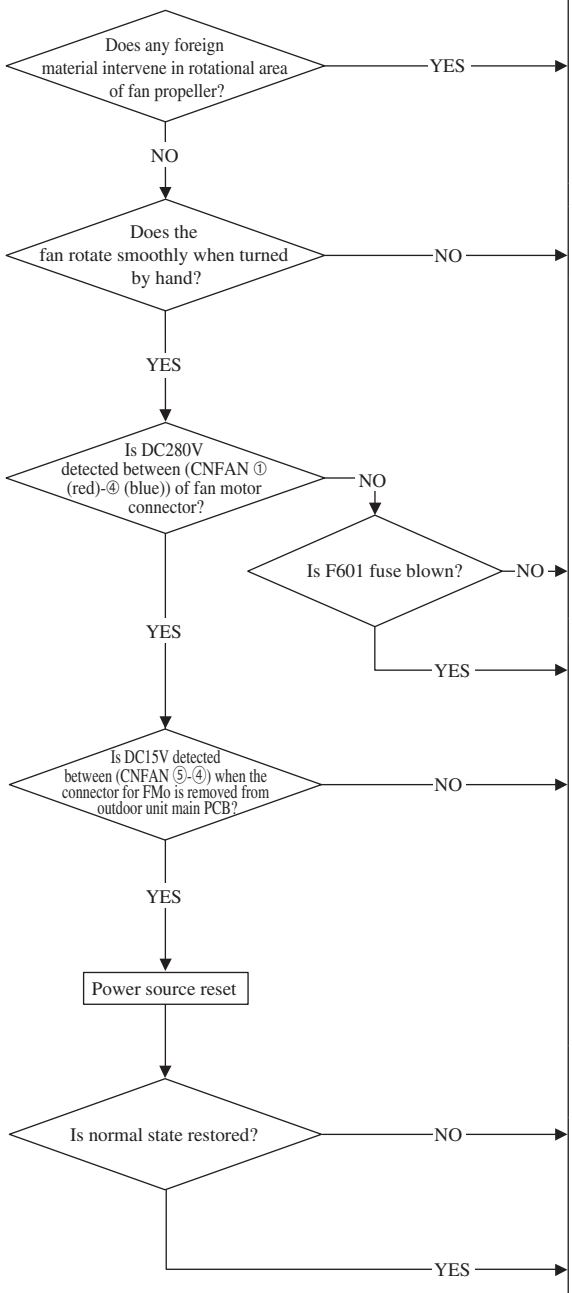
3. Condition of error displayed

When actual rotation speed of outdoor fan motor (FMo1) drops to 100min^{-1} or lower for 30 seconds continuously, the compressor and the outdoor fan motor stop. After 3-minute delay, it starts again automatically, but if this anomaly occurs 5 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective outdoor unit main PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor unit main PCB
- Blow fuse
- External noise, surge

5. Troubleshooting



Note: When E48 error occurs, in almost cases F601 fuse (2A) on the outdoor unit main PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor unit main PCB (or fuse) is replaced, another trouble (*1) could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)
*1 The error which does not seem to relate E48 may occur like as "WAIT", Stay OFF of LED on outdoor unit main PCB, inverter communication error (E45) and etc.

Error code	LED	Green	Red	Content
Remote control: E48	Indoor	Keeps flashing	Stays OFF	Outdoor fan motor anomaly (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

Detected by rotation speed of outdoor fan motor

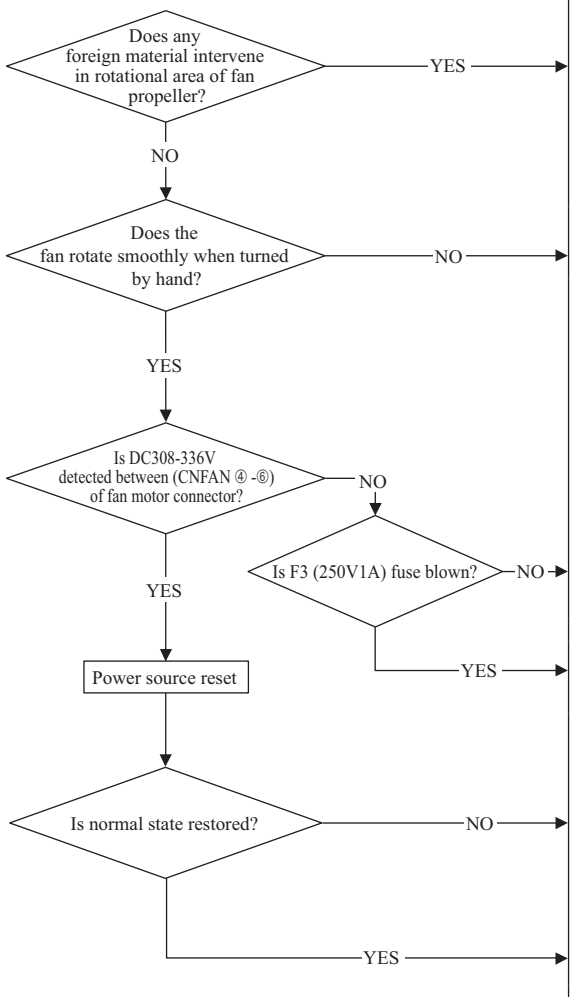
3. Condition of Error displayed

When actual rotation speed of outdoor fan motor drops to 75min^{-1} or lower for 30 seconds continuously, the compressor and the outdoor fan motor stop. After 3-minute delay, it starts again automatically, but if this anomaly occurs 3 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective outdoor unit PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor unit PCB
- Blown F3 fuse

5. Troubleshooting



Note: When E48 error occurs, in almost cases F3 fuse (1A) on the outdoor unit PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor unit PCB (or fuse) is replaced,, another trouble could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)

Error code	LED	Green	Red
Remote control: E49	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Low pressure error or low pressure sensor anomaly (1/2) (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

Detected by low pressure drop and suction superheat

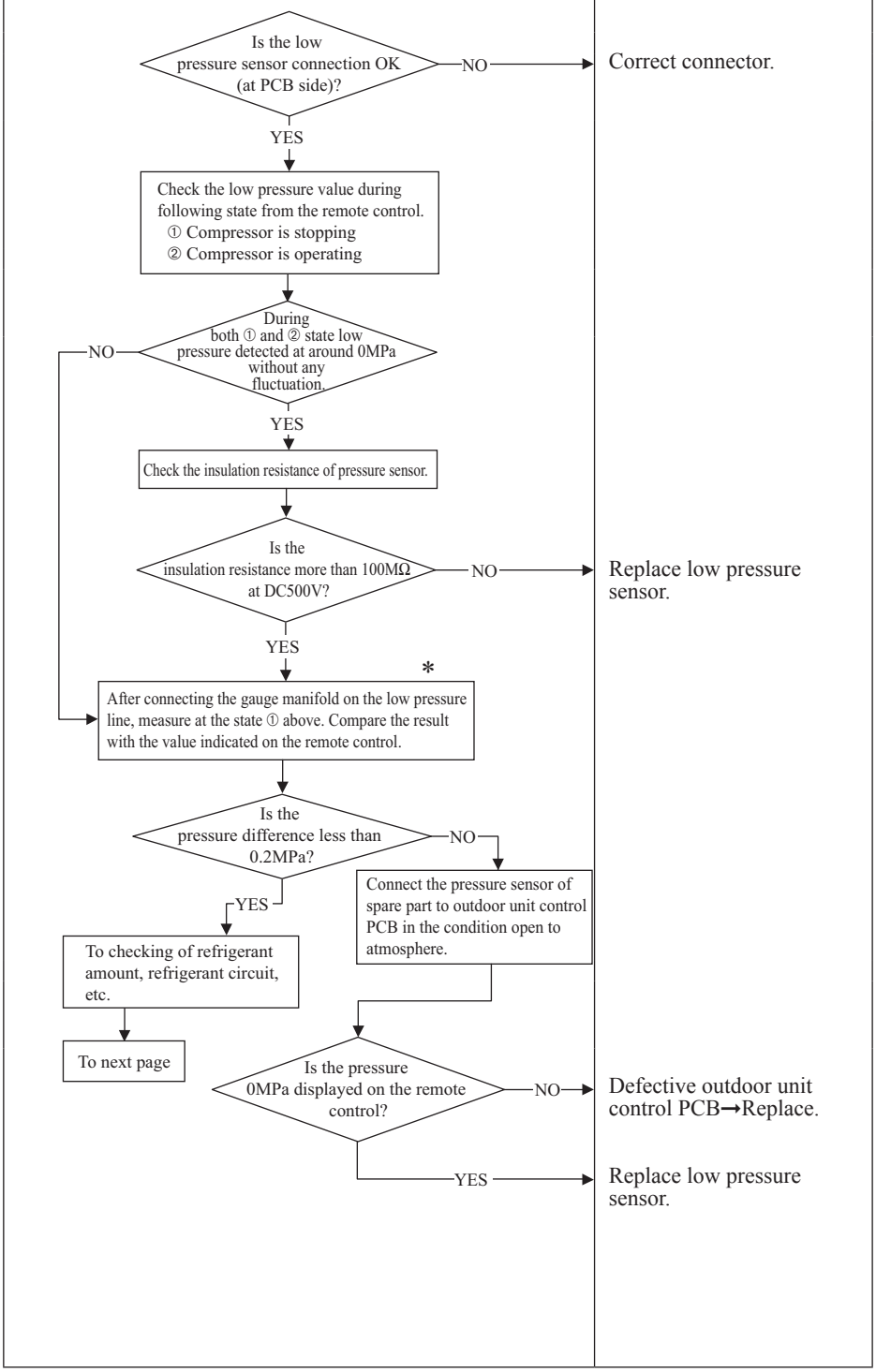
3. Condition of error displayed

① When the low pressure sensor detects 0.079MPa or lower for 15 seconds continuously, compressor stops and it restarts automatically after 3-minute delay, but if this anomaly occurs 5 times within 60 minutes.
② 10 minutes after the compressor starts, if the low pressure sensor detects 0.15MPa or lower for 60 seconds continuously and compressor suction superheat is detected 30degC or higher for 60 seconds continuously, but if this anomaly occurs 5 times within 60 minutes.
③ If low pressure sensor detects 0.079MPa or lower for 5 minutes continuously (Including the compressor stop status)

4. Presumable cause

- Defective outdoor unit control PCB
- Defective low pressure sensor connector
- Defective low pressure sensor
- Defective suction pipe temperature sensor connector
- Defective suction pipe temperature sensor

5. Troubleshooting



Note: * Connect the gauge manifold to the service valve check joint during cooling, or connect it to the check joint at internal piping of outdoor unit during heating.

Error code

Remote control: E49

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1-time flash
Outdoor inverter PCB	Yellow LED	
	Keeps flashing	

Content

Low pressure error or low pressure sensor anomaly (2/2) (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

Detected by low pressure drop and suction superheat

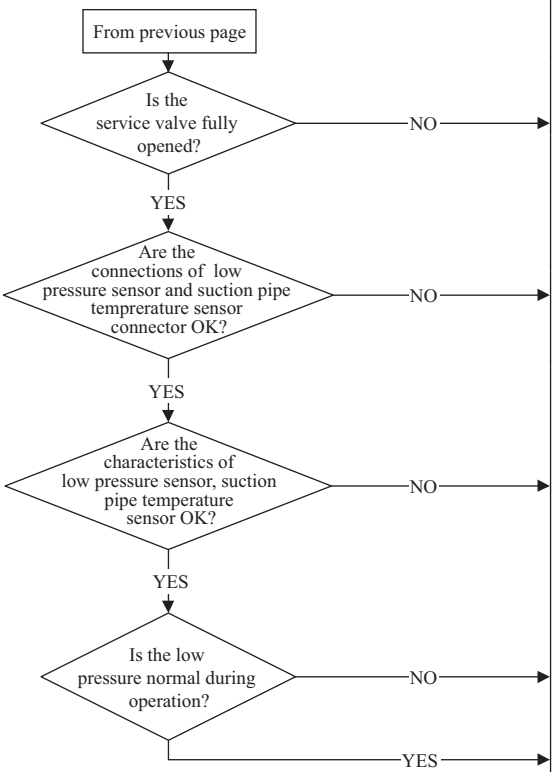
3. Condition of error displayed

① When the low pressure sensor detects 0.079MPa or lower for 15 seconds continuously, compressor stops and it restarts automatically after 3-minute delay, but if this anomaly occurs 5 times within 60 minutes.
② 10 minutes after the compressor starts, if the low pressure sensor detects 0.15MPa or lower for 60 seconds continuously and compressor suction superheat is detected 30degC or higher for 60 seconds continuously, but if this anomaly occurs 5 times within 60 minutes.
③ If low pressure sensor detects 0.079MPa or lower for 5 minutes continuously (Including the compressor stop status)

4. Presumable cause

- Defective outdoor unit control PCB
- Defective low pressure sensor connector
- Defective low pressure sensor
- Defective suction pipe temperature sensor connector
- Defective suction pipe temperature sensor

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E51	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		6-time flash	

Content

Inverter and fan motor anomaly

1. Applicable model

Models FDC71-140VNX-W,
100-140VSX-W,
100-140VN(S)A-W

2. Error detection method

When power transistor anomaly is detected for 15 minutes continuously

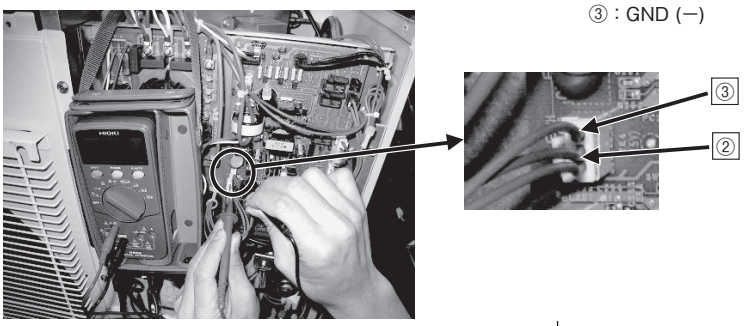
3. Condition of error displayed

Same as above

4. Presumable cause

- Outdoor fan motor anomaly
- Inverter PCB anomaly
- Outdoor unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
• Models FDC71-140VNX-W (1)(2) Is DC15V detected between ② and ③ on CNI3? — YES → Replace inverter PCB. If not solved, replace noise filter PCB as well. Note(1) Under anomalous conditions, the voltage becomes less than DC14V. NO ↓ (1) Is DC15V detected after disconnecting outdoor fan motor? — YES → Replace outdoor fan motor. NO → Replace outdoor unit control PCB. If not solved, replace inverter PCB as well.	
• Models FDC100-140VSX-W Replace immediately the inverter PCB and the power transistor.	
Note(2) How to check the voltage between ② and ③ of CNI3 ② : DC15V (+) ③ : GND (−) 	
• Models FDC100-140VNA-W, 100-140VSA-W Replace immediately the main PCB.	

Note:

Error code	LED	Green	Red
Remote control:E51	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		8-time flash	

Content

Inverter or power transistor anomaly

(Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

When power transistor anomaly is detected for 15 minutes continuously

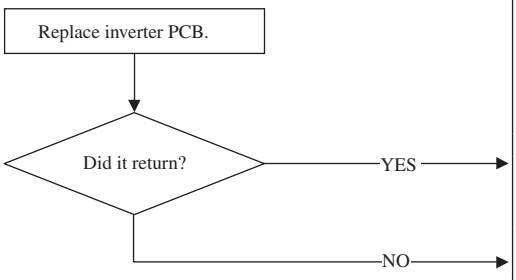
3. Condition of error displayed

Same as above

4. Presumable cause

- Inverter PCB anomaly
- Power transistor anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E51	Indoor	Keeps flashing	Stays OFF	Power transistor anomaly (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

Power transistor primary current

3. Condition of Error displayed

If the power transistor primary current exceeds the setting value for 3 seconds, the compressor stops.

4. Presumable cause

- Faulty outdoor unit PCB
- Dust on outdoor unit PCB

5. Troubleshooting

Diagnosis	Countermeasure
Check soldered surfaces on the outdoor unit PCB for foreign matter like dust, fouling,etc.	
NO	Remove foreign matter like dust, fouling, etc.
YES	Defective outdoor unit PCB→Replace.

Note:

Error code	LED	Green	Red
Remote control: E53	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Suction pipe temperature sensor anomaly (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

When the suction pipe temperature sensor detects anomalously low temperature

3. Condition of error displayed

If the temperature sensor detects -50°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minute delay, but if this anomaly ocuurs 3 times within 40 minutes.

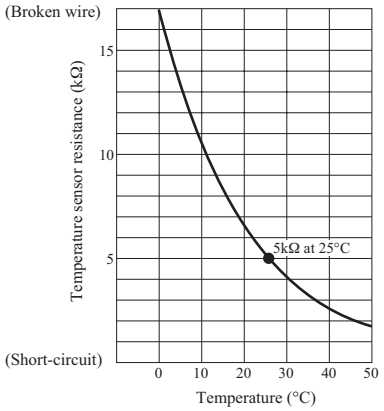
4. Presumable cause

- Defective suction pipe temperature sensor connection
- Defective suction pipe temperature sensor
- Defective outdoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of suction pipe temperature sensor connector OK? — NO	Correct connection of suction pipe temperature sensor connector.
YES → For the characteristics of suction pipe temperature sensor, see the following graph.	
Are the characteristics of suction pipe temperature sensor OK? — NO	Defective suction pipe temperature sensor→ Replace.
YES	Defective outdoor unit control PCB→Replace. (Defective suction pipe temperature sensor input circuit)

Temperature-resistance characteristics



Note:

Error code	LED	Green	Red
Remote control: E54	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Low pressure sensor anomaly (Except for models FDC71-100VNP-W)

1.Applicable model

Except for models
FDC71-100VNP-W

2.Error detection method

When anomalous voltage (pressure) is detected

3.Condition of error displayed

If the pressure sensor detects DC0V or lower and DC4.0V or higher for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minute delay, but if this anomaly occurs 3 times within 40 minutes.

4.Presumable cause

- Defective low pressure sensor connection
- Defective low pressure sensor
- Defective outdoor unit control PCB
- Improper amount of refrigerant
- Anomalous refrigeration circuit

5.Troubleshooting

Diagnosis	Countermeasure
Are the connection of low pressure sensor connectors (at sensor side and PCB side) OK? — NO	Correct low pressure sensor connector connection.
YES → Are the pressure (actual measurement) matched with the value indicated on the remote control? — YES	Is refrigerant amount charged properly? Is there any anomaly on the refrigeration circuit?
NO → Replace the low pressure sensor. → Is normal condition restored? — NO	Defective outdoor unit control PCB➞Replace. (Defective low pressure sensor input circuit)
YES	OK

Note:

Error code	LED	Green	Red
Remote control: E55	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keep flashing	

Content: Compressor under-dome temperature sensor anomaly (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

When anoumalous low temperature (resistance) is detected by the compressor under-dome temperature sensor

3. Condition of error displayed

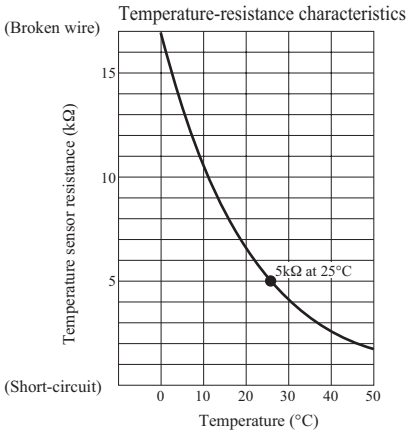
If the temperature sensor detcts -50°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minute delay, if this anomaly ocuurs 3 times within 40 minutes.

4. Presumable cause

- Defective under-dome temperature sensor connection
- Defective under-dome temperature sensor
- Defective outdoor unit control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of under-dome temperature sensor connector OK? — NO	Correct connection of under-dome temperature sensor connector.
YES → For the characteristics of under-dome temperature sensor, see the following graph. Are the characteristics of under-dome temperature sensor OK? — NO	Defective under-dome temperature sensor →Replace.
YES	Replace outdoor unit control PCB. (Defective under-dome temperature sensor input circuit)



Note:

Error code	LED	Green	Red
Remote control: E57	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1-time flash
	Outdoor inverter PCB	Yellow LED	
		Keeps flashing	

Content

Insufficient refrigerant amount or detection of service valve closure (Except for models FDC71-100VNP-W)

1. Applicable model

Except for models FDC71-100VNP-W

2. Error detection method

- Judge insufficient refrigerant amount by detecting the temperature differnce between indoor heat exchanger (Thi-R) and indoor return air (Thi-A).
- It detects at initial startup in cooling or dehumidifying mode after power ON. (In case of model FDC71 it cannot detect)

3. Condition of error displayed

Anomalous stop at initial detection

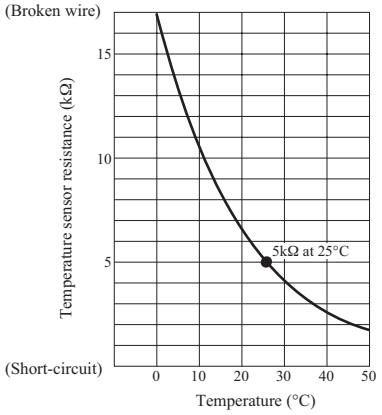
4. Presumable cause

- Defective indoor heat exchanger temperature sensor
- Defective indoor return air temperature sensor
- Defective indoor unit control PCB
- Insufficient refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure
Is the service valve fully opened? NO	Open fully.
YES → Are the connections of indoor heat exchanger and/or return air temperature sensor connectors OK? NO	Correct indoor heat exchanger, return air temperature sensor connector connections.
YES → For the characteristics of indoor heat exchanger,return air temperature sensor, see the following graph. Are the characteristics of indoor heat exchanger and/or return air temperature sensor OK? NO	Defective indoor heat exchanger, return air temperature sensor →Replace.
YES → Is the low pressure during operation normal? NO	Charge refrigerant.
YES	Defective indoor unit control PCB→Replace. (Defective indoor heat exchanger, return air temperature sensor input circuits)

Indoor heat exchanger, return air temperature sensor
Temperature-resistance characteristics



Note: Insufficient refrigerant amount preventive control makes compressor stopped, if it judges insufficient refrigerant amount by detecting the temperature difference between indoor heat exchanger (Thi-R) and return air temperature (Thi-A) for 5 (1: FDC71) minutes after compressor ON in cooling or dehumidifying mode and for 9 minutes after compressor ON in heating mode. [in cooling mode: (Thi-A)-(Thi-R)<4degC, in heating mode: (Thi-R)-(Thi-A)<4degC]

Error code	LED	Green	Red	Content
Remote control: E57	Indoor	Keeps flashing	Stays OFF	Insufficient refrigerant amount or detection of service valve closure (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

- Judge insufficient refrigerant amount by detecting the temperature differnce between indoor heat exchanger (Thi-R) and indoor return air (Thi-A).

3. Condition of error displayed

When the insufficient refrigerant amount is detected 3 times within 60 minutes.

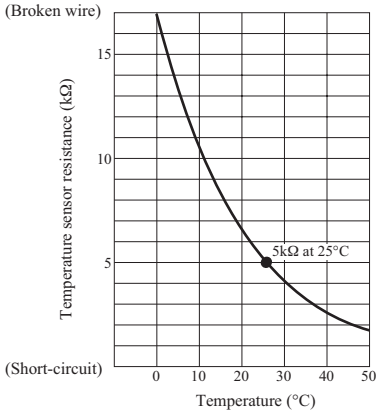
4. Presumable cause

- Defective indoor heat exchanger temperature sensor
- Defective indoor return air temperature sensor
- Defective indoor unit control PCB
- Insufficient refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure
Is the service valve fully opened? NO	Open fully.
YES → Are the connections of indoor heat exchanger and/or return air temperature sensor connectors OK? NO	Correct indoor heat exchanger, return air temperature sensor connector connections.
YES → For the characteristics of indoor heat exchanger,return air temperature sensor, see the following graph. Are the characteristics of indoor heat exchanger and/or return air temperature sensor OK? NO	Defective indoor heat exchanger, return air temperature sensor →Replace.
YES → Is the low pressure during operation normal? NO	Charge refrigerant.
YES	Defective indoor unit control PCB→Replace. (Defective indoor heat exchanger, return air temperature sensor input circuits)

Indoor heat exchanger, return air temperature sensor
Temperature-resistance characteristics



Note: When the compressor speed is faster than 40 rps or 60 rps ※1 after several minutes ※2 from compressor start, the low refrigerant protection control judges, by satisfying the under condition for 5 minutes, that it is in the state of gas leakage, and stops the compressor.
Cooling: Indoor return air temperature (Thi-A) – Indoor heat exchanger temperature (Thi-R) < 4 deg C
Heating: Indoor heat exchanger temperature (Thi-R) – Indoor return air temperature (Thi-A) < 4 deg C
※1 : In case of heating at low air temperature.
※2 : Cooling is 5 minutes, heating is 9 minutes.

Error code	LED	Green	Red	Content
Remote control: E58	Indoor	Keeps flashing	Stays OFF	Anomalous compressor by loss of synchronism (Models FDC100-140VN(S)A-W only)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Models FDC100-140VN(S)A-W

2. Error detection method

E58

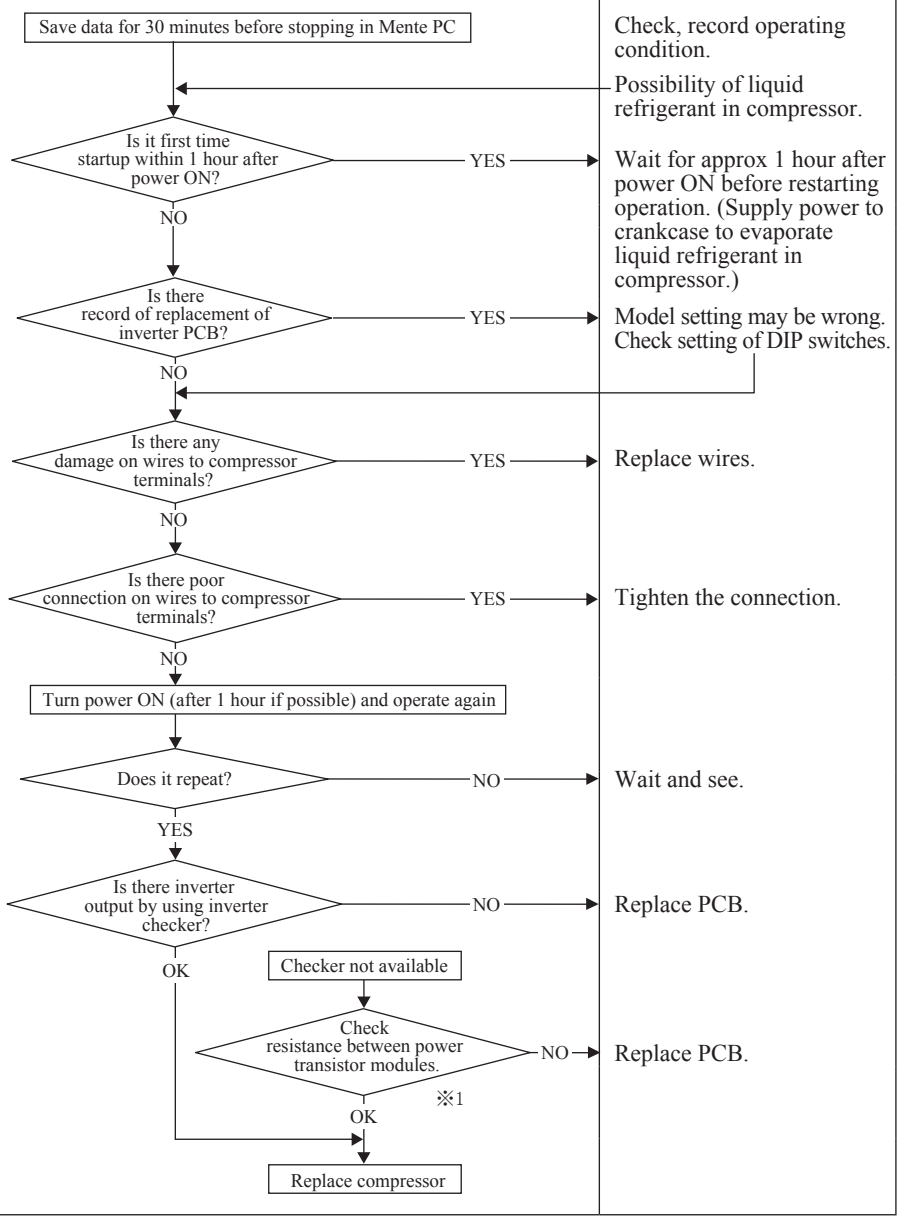
3. Condition of error displayed

This anomaly is established 4 times within 15 minutes.

4. Presumable cause

- Insufficient time elapsed after the power supplied before compressor startup. (Startup the compressor without crankcase heater ON)
- Compressor anomaly
- PCB anomaly

5. Troubleshooting



Note: 1. ※1 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N (Disconnect wires from compressor beforehand.)

2. Measurement position to check power transistor (Refer to page 83.)

Model name	P	N	U	V	W	Note
FDC100-140VNA-W	IC2 24 or 25 pin	IC2 18, 19 or 20 pin	U(RD) TB7	V(WH) TB8	W(BL) TB9	IC2:Power transistor
FDC100-140VSA-W	T12	IC2 34, 35 or 36 pin	U(RD) TB7	V(WH) TB8	W(BL) TB9	IC2:Power transistor

3. If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E58	Indoor	Keeps flashing	Stays OFF	Current safe stop (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

When the current safe control has operated at the compressor speed of 30 rps or under

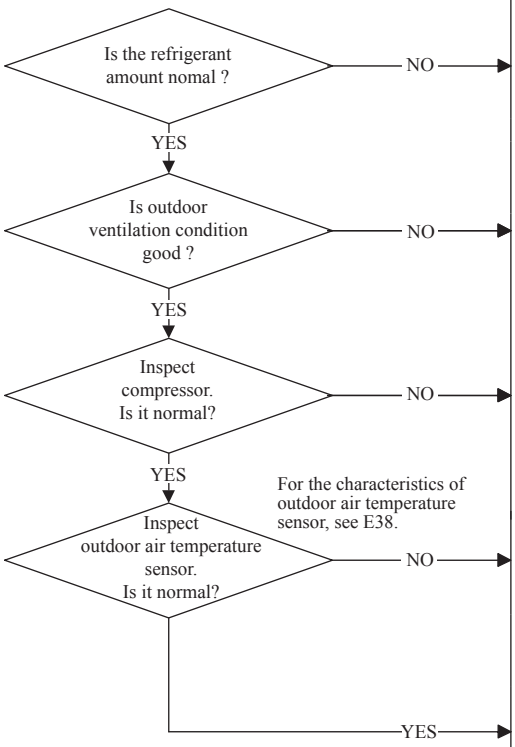
3. Condition of Error displayed

Same as above

4. Presumable cause

- Excessive refrigerant amount
- Indoor, outdoor unit installation spaces
- Faulty compressor
- Defective outdor air temperature sensor
- Defective outdoor unit PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote control: E59	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	5-time flash
	Outdoor inverter PCB	Yellow LED	
		Stays OFF	

Content

Compressor startup failure (1/2) (Models FDC71-140VNX-W, 100-140VSX-W only)

1. Applicable model

Models FDC71-140VNX-W, 100-140VSX-W

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor

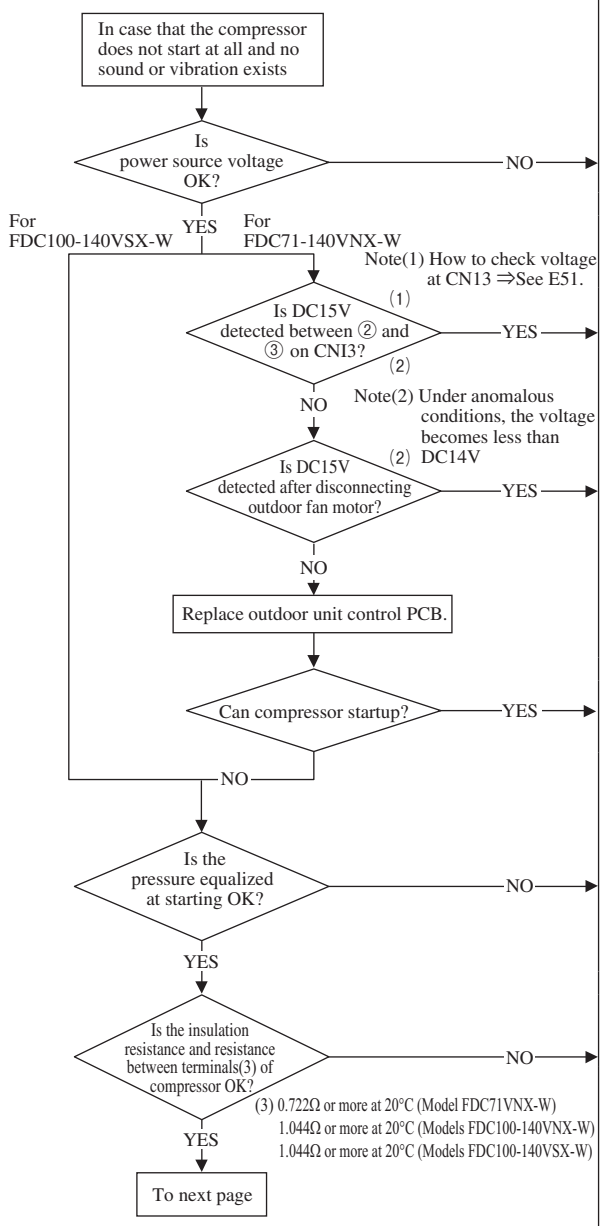
3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns ×2 times) continuously

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor unit control PCB anomaly
- Inverter PCB anomaly
- Anomalous power source voltage
- Insufficient or excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power source or soon after installation, insulation resistance may decrease to several MΩ or lower due to the liquid refrigerant migrated in the refrigerant oil in compressor. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whether the insulation resistance can recover or not, after 6 hours has passed since power ON.
  (By energize the crankcase heater, liquid refrigerant migrated in the refrigerant oil in compressor can be evaporated.)
  ② Check whether the electric leakage breaker conforms to high-harmonic specifications.
  (As inverter PAC units has inverter, in order to prevent from improper operation, be sure to use the breaker of high-harmonic type.)

Error code

Remote control: E59

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	5-time flash
Outdoor inverter PCB	Yellow LED	
	Stays OFF	

Content

Compressor startup failure (2/2)
(Models FDC71-140VNX-W, 100-140VSX-W only)

1. Applicable model

Models FDC71-140VNX-W, 100-140VSX-W

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor

3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns ×2 times) continuously

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor unit control PCB anomaly
- Inverter PCB anomaly
- Anomalous power source voltage
- Insufficient or excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting

Diagnosis	Countermeasure
From previous page	
Is the power transistor module OK? (Inverter PCB anomaly) NO	Replace inverter PCB.
YES	
After power OFF, turn JSW10-4 of inverter PCB ON and connect the inverter checker. Then power ON again.	
Is the inverter output OK? (Check by inverter checker.) NO	Replace inverter PCB.
Note Several times restarting may recover it, because liquid refrigerant migrated in the compressor could be discharged from the compressor.	
YES	
Try to restart several times.	
Does it start? NO	Replace compressor.

Note:

Error code	LED	Green	Red	Content
Remote control: E59	Indoor unit control PCB	Keeps flashing	Stays OFF	Compressor startup failure (1/2) (Models FDC100-140VN(S)A-W only)
	Outdoor unit control PCB	Keeps flashing	5-time flash	

1. Applicable model

Models FDC100-140VN(S)A-W

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor

3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns ×2 times) continuously

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor unit main PCB anomaly
- Anomalous power source voltage
- Insufficient or excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting

Diagnosis	Countermeasure
In case that the compressor does not start at all and no sound or vibration exists	
Is power source voltage OK? — NO	Check the power source voltage and correct it.
YES (For FDC100-140VSA-W / For FDC100-140VNA-W)	
Is DC15V detected after disconnecting outdoor fan motor? — YES	Replace outdoor fan motor.
NO → Replace outdoor unit main PCB.	
Can compressor startup? — YES	OK
NO	
Is the pressure equalized at starting OK? — NO	Check refrigerant amount and refrigerant circuit.
YES	
Is the insulation resistance and resistance between terminals(1) of compressor OK? — NO	Replace compressor.
(1) 0.448Ω or more at 20°C (Models FDC100-140VNA-W) 1.044Ω or more at 20°C (Models FDC100-140VSA-W)	
YES → To next page	

Note: Insulation resistance
- The unit is left for long period without power source or soon after installation, insulation resistance may decrease to several MΩ or lower due to the liquid refrigerant migrated in the refrigerant oil in compressor. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whether the insulation resistance can recover or not, after 6 hours has passed since power ON.
  (By energize the crankcase heater, liquid refrigerant migrated in the refrigerant oil in compressor can be evaporated.)
  ② Check whether the electric leakage breaker conforms to high-harmonic specifications
  (As inverter PAC units has inverter, in order to prevent from improper operation, be sure to use the breaker of high-harmonic type.)

Error code	LED	Green	Red	Content
Remote control: E59	Indoor unit control PCB	Keeps flashing	Stays OFF	Compressor startup failure (2/2) (Models FDC100-140VN(S)A-W only)
	Outdoor unit control PCB	Keeps flashing	5-time flash	

1. Applicable model

Models FDC100-140
VN(S)A-W

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor

3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns x2 times) continuously.

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor unit main PCB anomaly
- Anomalous power source voltage
- Insufficient or excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting

Diagnosis	Countermeasure
From previous page	
Is the power transistor module OK? (Outdoor unit main PCB anomaly) NO	Replace outdoor unit main PCB.
YES	
After power OFF, turn JSW6-4 of outdoor unit main PCB ON and connect the outdoor unit main checker. Then power ON again.	
Is the inverter output OK? (Check by inverter checker.) NO	Replace outdoor unit main PCB.
Note Several times restarting may recover it, because liquid refrigerant migrated in the compressor could be discharged from the compressor.	
YES	
Try to restart several times.	
Does it start? NO	Replace compressor.

Note:

Error code	LED	Green	Red
Remote control:E59	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	5-time flash
	Outdoor inverter PCB	Yellow LED	
		4-time flash	

Content

Compressor startup failure (1/2) (Models FDC200-280VSA-W only)

1. Applicable model

Models FDC200-280VSA-W

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor

3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns ×2 times) continuously

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor unit control PCB anomaly
- Inverter PCB anomaly
- Anomalous power source voltage
- Insufficient or excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting

Diagnosis	Countermeasure
In case that the compressor does not start at all and no sound or vibration exists	
Is power source voltage OK? — NO	Check the power source voltage and correct it.
YES	
Is the pressure equalized at starting OK? — NO	Check refrigerant amount and refrigerant circuit.
YES	
Is the insulation resistance and resistance between terminals(1) of compressor OK? — NO (1) 0.309Ω or more at 20°C (Model FDC200-280VSA-W)	Replace compressor.
YES	
To next page	

Note: Insulation resistance
- The unit is left for long period without power source or soon after installation, insulation resistance may decrease to several MΩ or lower due to the liquid refrigerant migrated in the refrigerant oil in compressor. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whether the insulation resistance can recover or not, after 6 hours has passed since power ON.
  (By energize the crankcase heater, liquid refrigerant migrated in the refrigerant oil in compressor can be evaporated.)
  ② Check whether the electric leakage breaker conforms to high-harmonic specifications.
  (As INV PAC units has inverter, in order to prevent from improper operation, be sure to use the breaker of high-harmonic type.)

Error code

Remote control: E59

LED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	5-time flash
Outdoor inverter PCB	Yellow LED	
	4-time flash	

Content

Compressor startup failure (2/2) (Models FDC200-280VSA-W only)

1. Applicable model

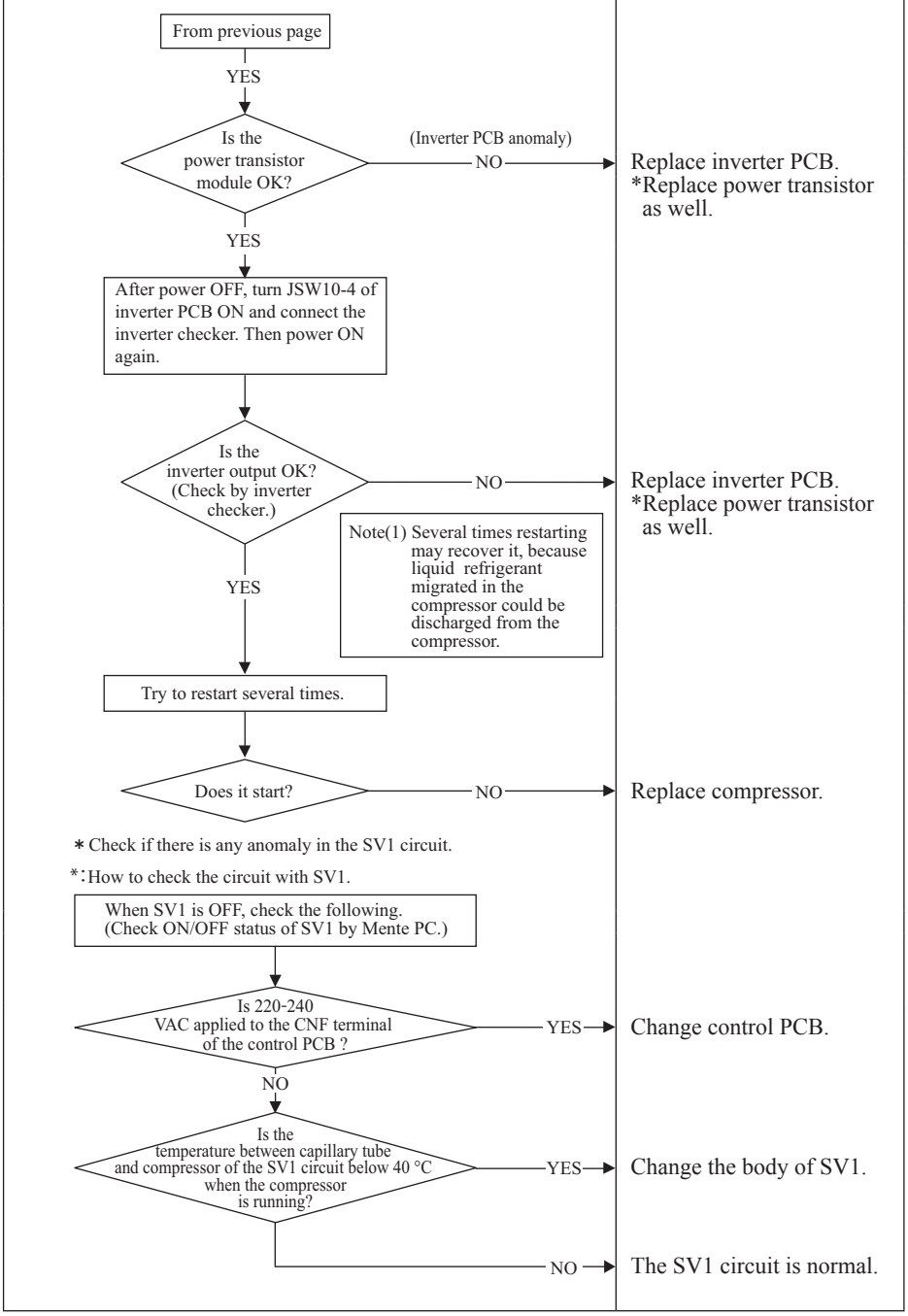
Models FDC200-280VSA-W

2. Error detection method

3. Condition of error displayed

4. Presumable cause

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E59	Indoor	Keeps flashing	Stays OFF	Compressor startup failure (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

- If it fails to change over to the rotor detection operation of compressor motor

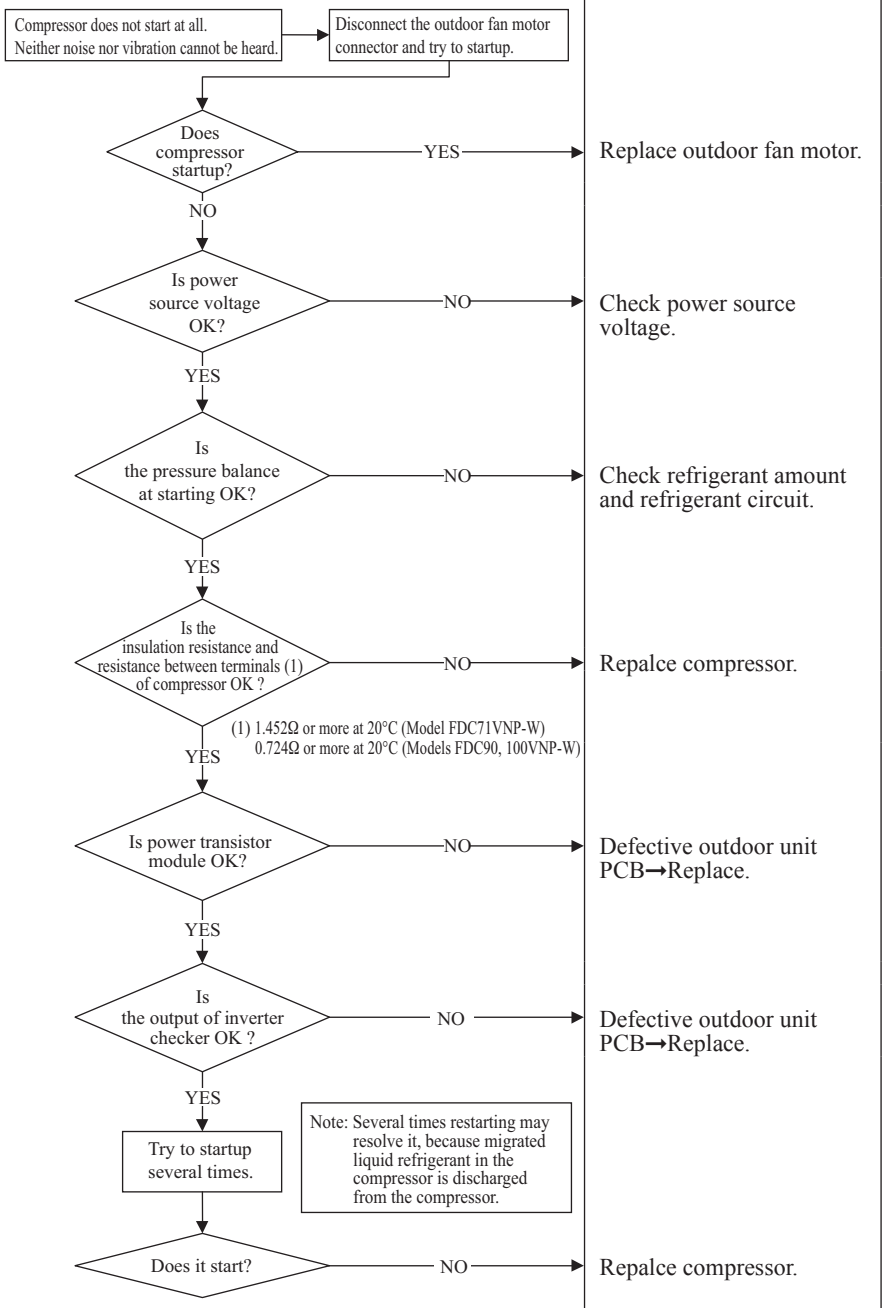
3. Condition of Error displayed

If compressor fails to startup for 42 times

4. Presumable cause

- Faulty outdoor fan motor
- Faulty outdoor unit PCB
- Anomalous power source voltage
- Improper refrigerant amount and refrigerant circuit
- Faulty compressor (Motor bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power source or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.

① Check whehter the insulation resistance can recover or not, after 6 hours has passed since power ON.
(By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated.)
② Check whether the electric leakage breaker conforms to high-harmonic specifications.
(As units has inverter, in order to prevent from improper operation, be sure to use high-harmonic one.)

Error code	LED	Green	Red	Content
Remote control: E60	Indoor	Keeps flashing	Stays OFF	Compressor rotor lock error (Models FDC71-100VNP-W only)

1. Applicable model

Models FDC71-100VNP-W

2. Error detection method

Compressor rotor position

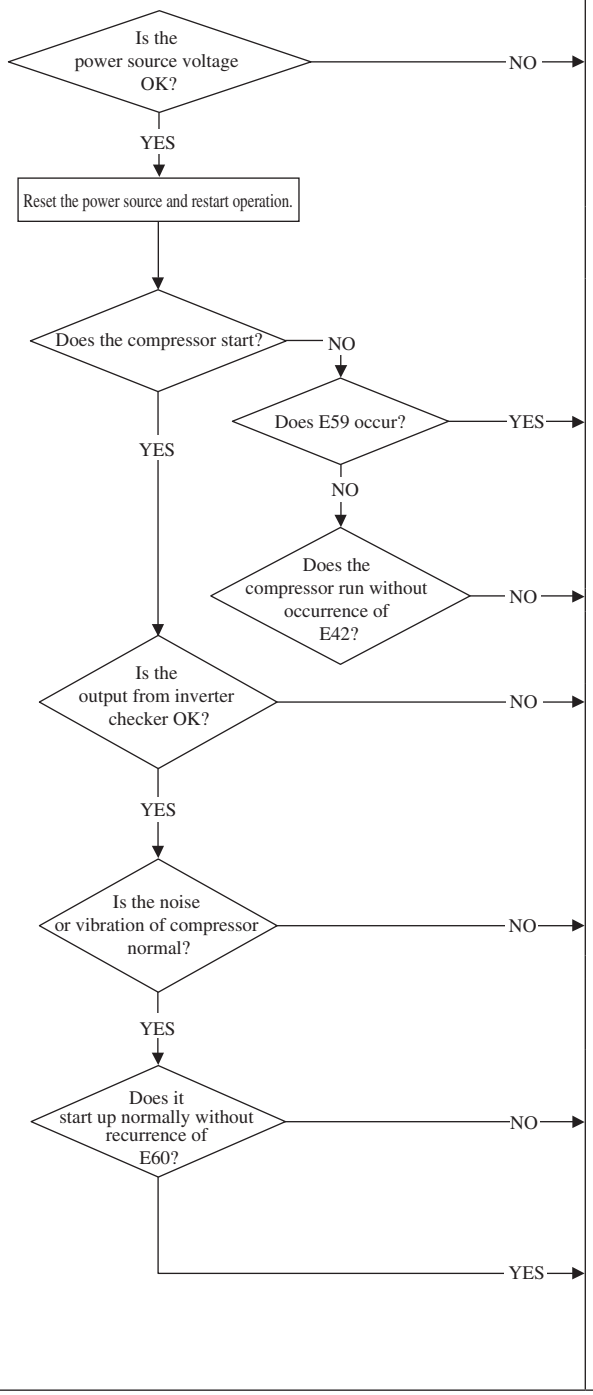
3. Condition of Error displayed

If it fails again to detect the rotor position after shifting to the compressor rotor position detection operation, the compressor stops.

4. Presumable cause

- Defective outdoor fan motor
- Defective outdoor unit PCB
- Anomalous power source voltage
- Improper refrigerant amount and refrigerant circuit
- Defective compressor (motor, bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power source or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.

① Check whehter the insulation resistance can recover or not, after 6 hours has passed since power ON.
(By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated.)
② Check whether the electric leakage breaker conforms to high-harmonic specifications.
(As units has inverter, in order to prevent from improper operation, be sure to use high-harmonic one.)

Error code	LED	Green	Red	Content
Remote control: The refrigerant sensor is faulty.	Indoor	Stays OFF	Keeps flashing	Refrigerant sensor failure
	Outdoor	—	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detects fault signal from refrigerant sensor

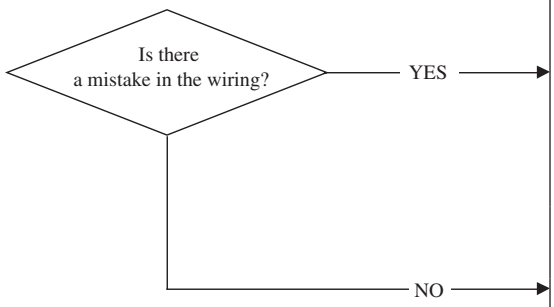
3. Condition of error displayed

If the refrigerant sensor fails

4. Presumable cause

- Defective refrigerant sensor
- Poor wiring (False detection of alarm output)

5. Troubleshooting



Diagnosis	Countermeasure
Is there a mistake in the wiring? YES	Wiring modification→ Replace refrigerant sensor.
Is there a mistake in the wiring? NO	Defective refrigerant sensor→Replace refrigerant sensor.

Note:

Error code	LED	Green	Red	Content
Remote control: The refrigerant sensor is disconnected.	Indoor	Stays OFF	Stays OFF	Refrigerant sensor disconnection
	Outdoor	—	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection by output from refrigerant sensor

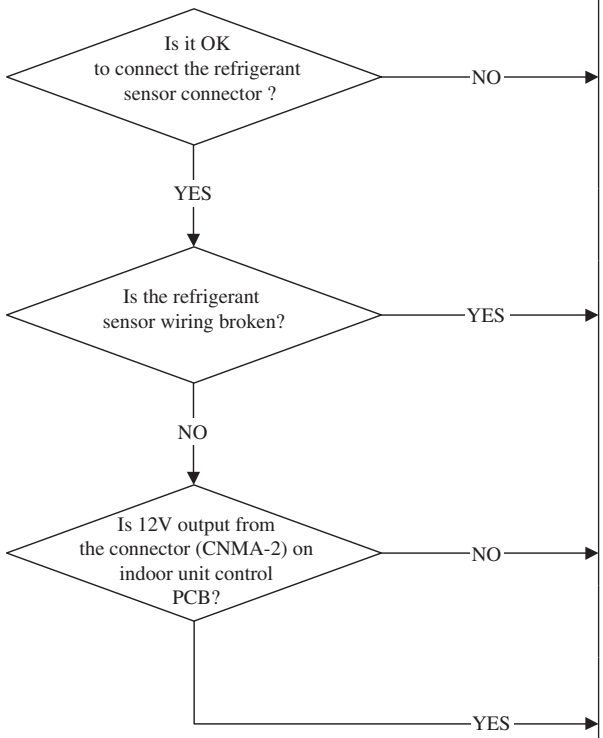
3. Condition of error displayed

If either the output from the refrigerant sensor to CNMA-4 or CNZ-1 cannot be detected for 5 seconds

4. Presumable cause

- Defective refrigerant sensor connector
- Defective refrigerant sensor
- Defective refrigerant sensor wiring
- Defective indoor unit control PCB

5. Troubleshooting



Note:

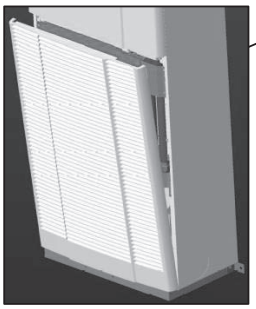
1.3 DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

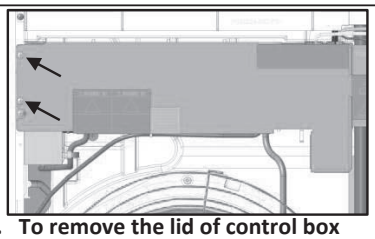
- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

(1) Indoor units
· FDF series

PGA012D410A A

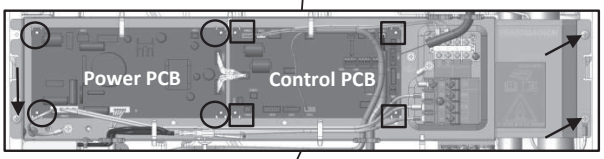


1. To remove the air inlet grille (1) Pull the air inlet grille forward and remove it.



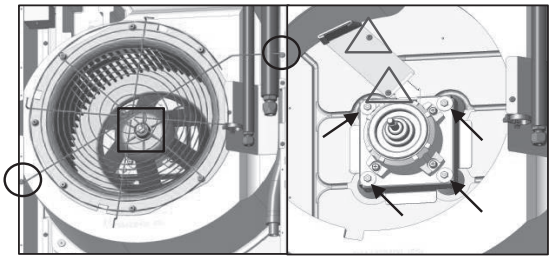
2. To remove the lid of control box
(1) Remove the air inlet grille(See No.1.)
(2) Remove 2 the lid fixing screw and remove it.

3. To remove the control box
(1) Remove the lid of control box.(See No.2.)
(2) Pull off all the inserted connectors.
(3) Remove 3 control box fixing screws and remove it. (← mark)

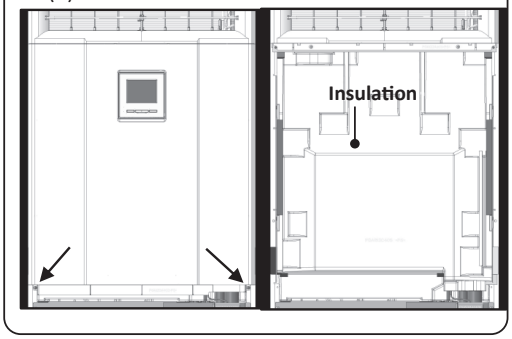


4. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.2.)
(2) Pull off all the inserted connectors.
- **Power PCB**
(3) Take off 4 power PCB fixing locking supports and remove it.(○ mark)
- **Control PCB**
(4) Take off 4 control PCB fixing locking supports and remove it.(□ mark)

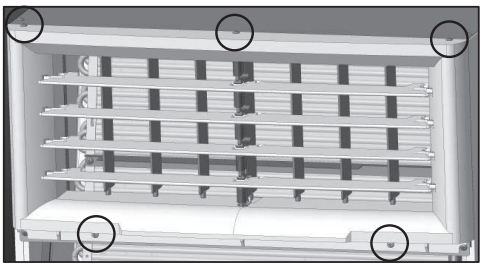
5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.2.)
(2) Disconnect the motor connector(CNM) on PCB in control box.
(3) Remove 2 fan guard fixing screws and remove it.(○ mark)
(4) Remove the impeller fixing nut and remove it.(□ mark)
(5) Remove 2 plate fixing screws and remove it.(△ mark)
(6) Remove 4 motor fixing nuts and remove it.(← mark)

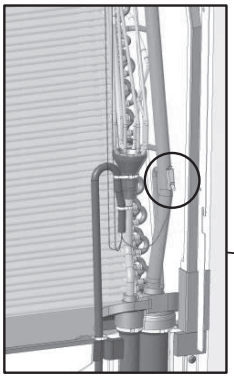


6. To remove the center panel assembly
(1) Remove the air inlet grille.(See No.1.)
(2) Remove 2 center panel fixing screws and remove it.(← mark)
(3) Pull the insulation out.

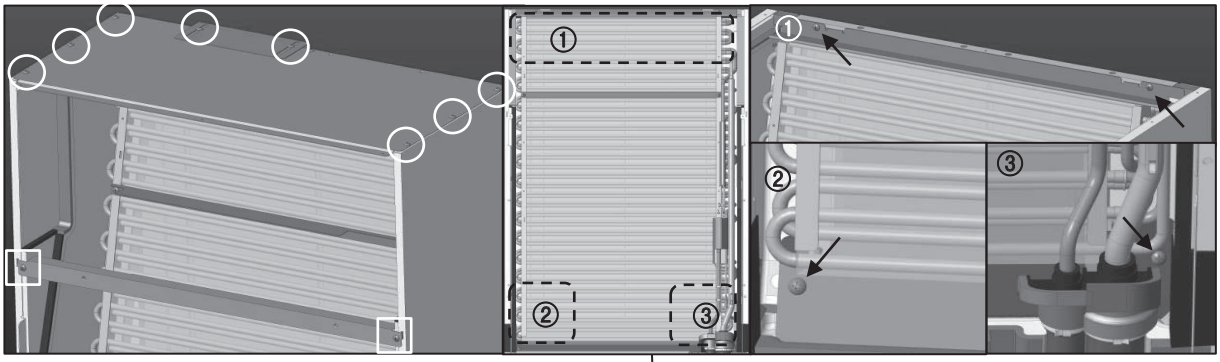


7. To remove the air outlet grille
(1) Remove the lid of control box.(See No.2.)
(2) Disconnect the louver motor connector(CNR).
(3) Remove the center panel assembly.(See No.6.)
(4) Remove 5 air outlet grille fixing screws and remove it.



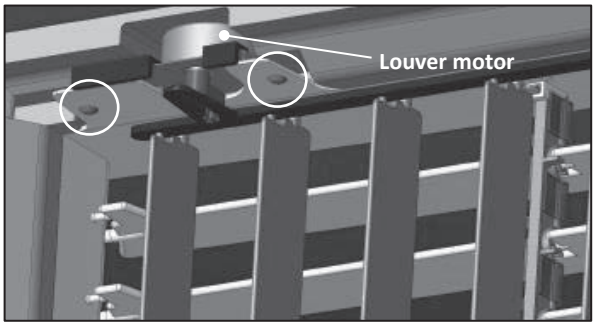


8. To remove the temperature sensors (example"Thi-R3")
(1) Remove the lid of control box.(See No.2.)
(2) Disconnect the Tho-R3 connector(CNN) on PCB in control box.
(3) Remove the center panel assembly.(See No.6.)
(4) Pull out the temperature sensor "Thi-R3" from the sensor holder.



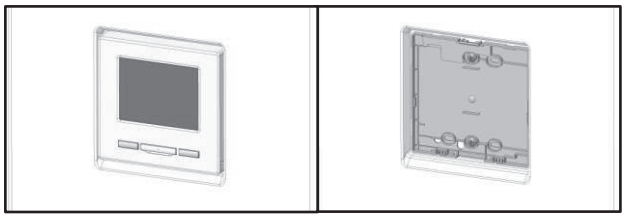
9. To remove the heat exchanger assembly

(1) Remove the center panel assembly.(See No.6.)
(2) Remove 8 top panel fixing screws and remove it.(○ mark)
(3) Remove 2 support fixing screws and remove it.(□ mark)
(4) Remove 4 heat exchanger assy fixing screws and remove it.(← mark)



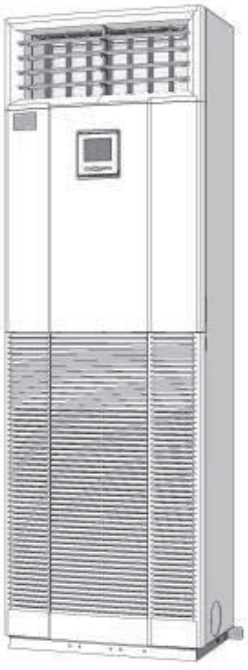
10. To remove the louver motor

(1) Remove the air outlet grille.(See No.7.)
(2) Remove 2 louver motor fixing screws and remove it.(○ mark)



11. To remove the remote control

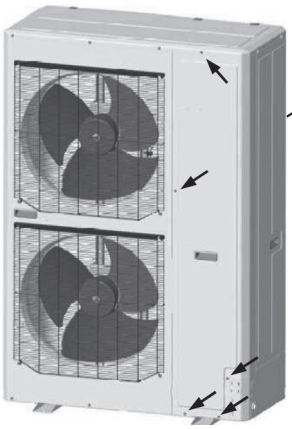
(1) Take off the remote control case hooks and remove it.



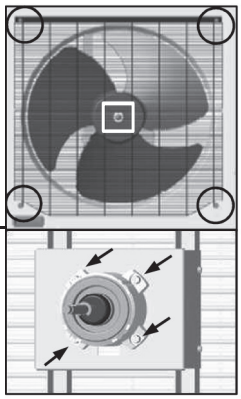
General view

(2) Outdoor units

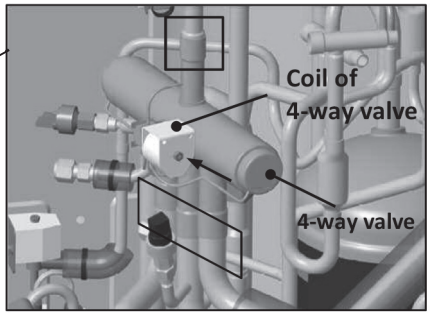
PCA012D087

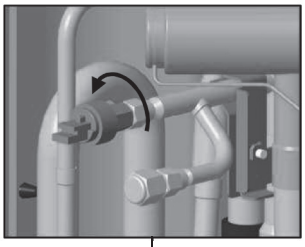


1. To remove the service panel
(1) Remove 5 service panel fixing screws and remove it.



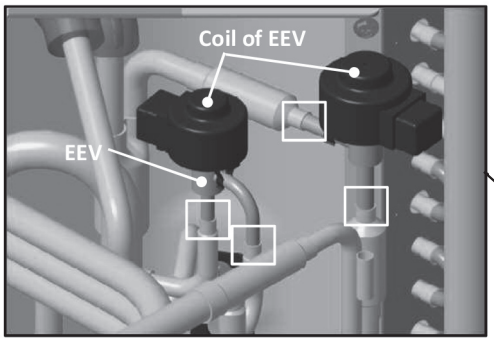
2. To remove the fan motor (FM)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the motor connector(FMxx) on PCB in control box.
(3) Remove 4 fan guard fixing screws and remove it.(○ mark)
(4) Remove the propeller fan fixing nut and remove it.(□ mark)
(5) Remove 4 fan motor fixing nuts and remove it.(← mark)



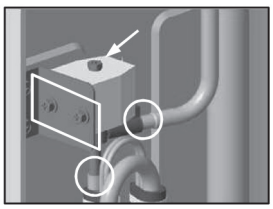


3. To remove the 4-way valve (20S)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the coil of 4-way valve connector (CNS,CNNx) on PCB in control box.
(3) Remove the coil of 4-way valve fixing screws (← mark) and remove it.
(4) Remove welded part of 4-way valve by welding. (□ mark)

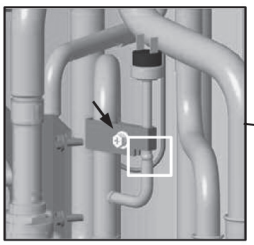
4. To remove the high pressure sensor (PSH)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the PSH connector(CNLx) on PCB in control box.
(3) Turn PSH to the left and remove it.
(Double spanners are needed.)



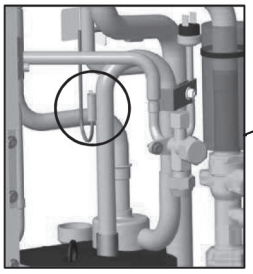
5. To remove the electronic expansion valve (EEV)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the EEV connector(CNEEVx) on PCB in control box.
(3) Remove the coil of EEV by pull out on the top.
(4) Remove welded part of EEV by welding. (□ mark)



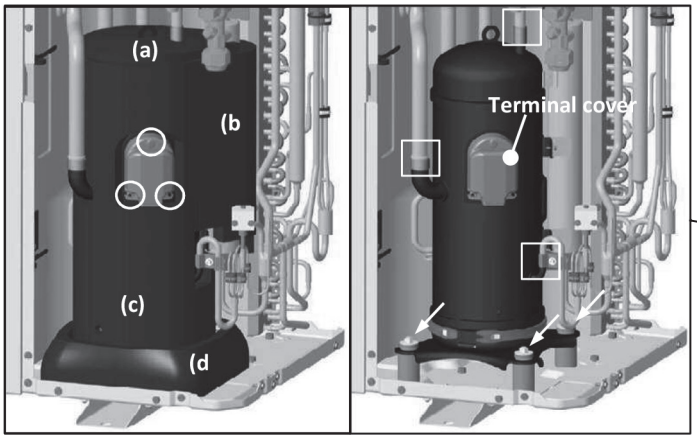
7. To remove bypass valve (SV)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the SV connector(CNNxx) on PCB in control box.
(3) Remove the coil of SV fixing screws. (← mark)
(4) Remove 2 coil of SV fixing screws and remove it.(□ mark)
(5) Remove welded part of SV by welding. (○ mark)



6. To remove the high pressure switch (63H)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the 63H connector(CNH or CNQx) on PCB in control box.
(3) Remove the metal fitting fixing screws and remove it. (← mark)
(4) Remove welded part of high pressure switch by welding. (□ mark)

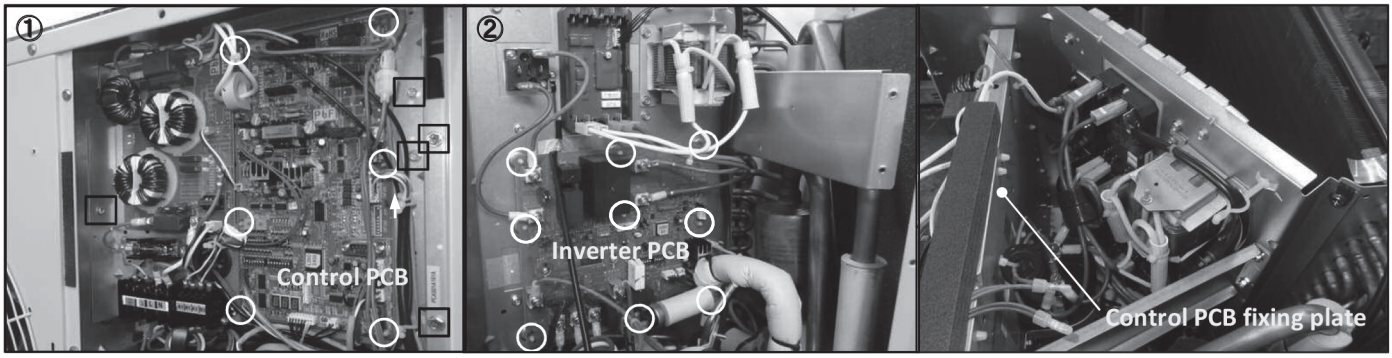


8. To remove the temperature sensors (example"Tho-D1")
(1) Remove the service panel.(See No.1.)
(2) Disconnect the Tho-D1 connector(CNTH) on PCB in control box.
(4) Pull out the temperature sensor "Tho-D1 , THxx" from the sensor holder.



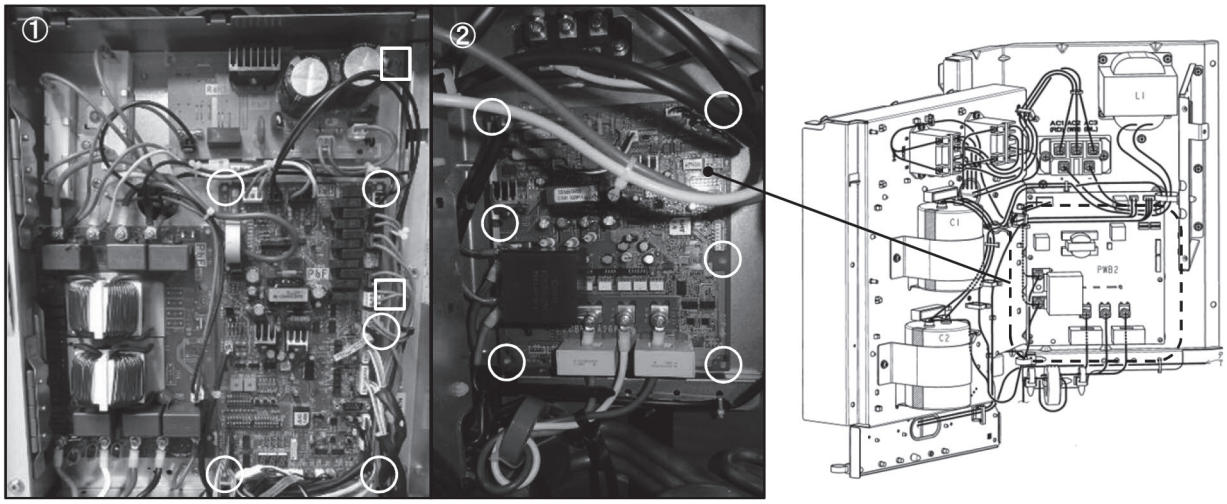
9. To remove the compressor (CM)

(1) Remove the service panel.(See No.1.)
(2) Remove the insulation which covers compressors. (Strings (a)−(d) should be loosen.)
(3) Remove 3 terminal cover fixing bolts(○ mark) and remove it and disconnect the power wiring.
(4) Remove welded part of compressor by welding. (☐ mark)
(5) Remove 3 compressor fixing nuts(← mark) using spanner or adjustable wrench.



10. To remove the printed circuit board (PCB)

(1) Remove the service panel and top panel. (2) Pull off all the inserted connectors of control PCB.(Pic.①)
(3) Take off 6 control PCB fixing locking support and remove it.(○ mark, Pic.①)
(4) Remove 5 plate fixing screws and open it.(☐ mark, Pic.①)
(5) Pull off all the inserted connectors of inverter PCB.(Pic.②)
(6) Take off 9 inverter PCB fixing locking support and remove it.(○ mark, Pic.②)



11. To remove the printed circuit board (PCB)

≪Hinge control type≫

(1) Remove the service panel. (2) Pull off all the inserted connectors of control PCB.(Pic.①)
(3) Take off 5 control PCB fixing locking supports and remove it.(○ mark, Pic.①)
(4) Remove 2 plate fixing screws and open it.(☐ mark, Pic.①)
(5) Pull off all the inserted connectors of inverter PCB.(Pic.②)
(6) Take off 6 inverter PCB fixing locking supports and remove it.(○ mark, Pic.②)

1.4 ELECTRICAL WIRING

(1) Indoor units

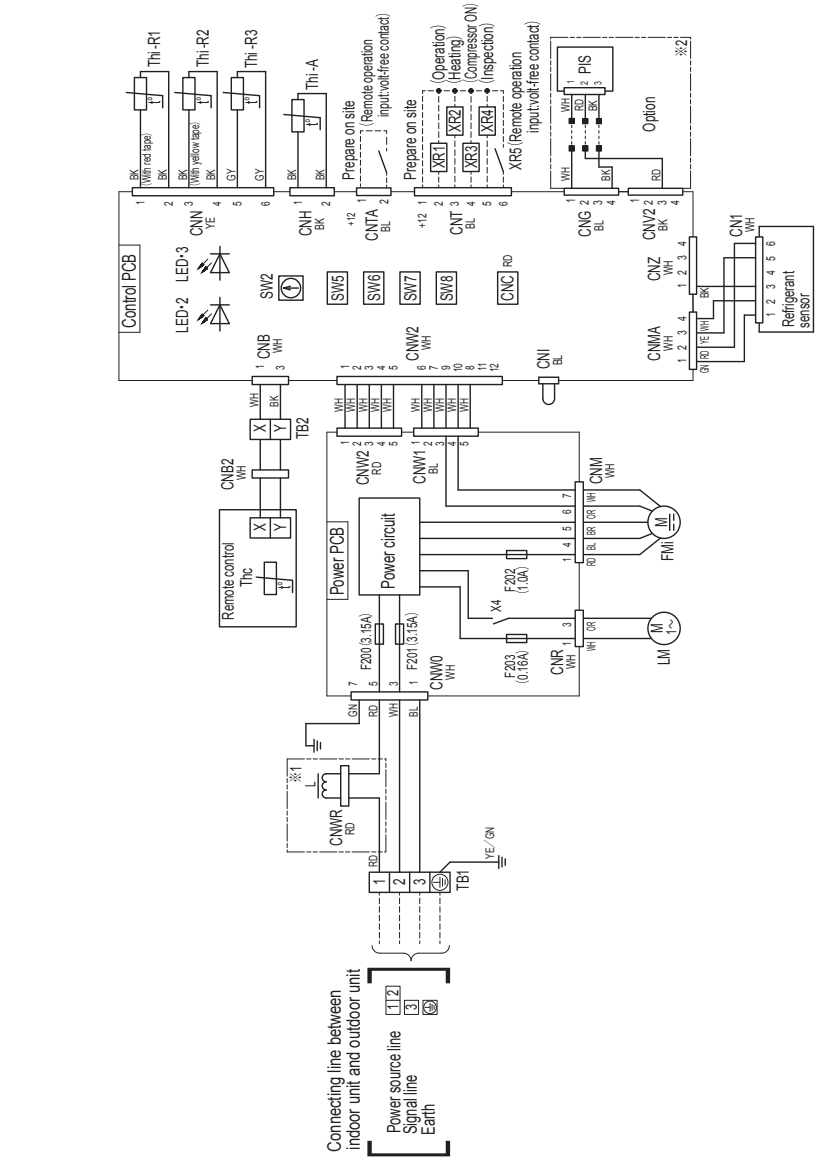
Models FDF71VH, 100VH, 125VH, 140VH

Meaning of marks

Item	Description
CNB−Z	Connector
F200−203	Fuse
FMi	Fan motor
L	Reactor
LED-2	Indication lamp (Green-Normal operation)
LED-3	Indication lamp (Red-Inspection)
PIS	Motion sensor
LM	Louver motor
SW2	Remote control communication address
SW5	Plural units Master／Slave setting
SW6	Model capacity setting
SW7-1	Operation check
SW8-4	Reset the alarm of refrigerant sensor
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Temperature sensor (Remote control)
Thi-A	Temperature sensor (Return air)
Thi-R1,2,3	Temperature sensor (Heat exchanger)
X4	Relay for LM
■mark	Closed-end connector

Color marks

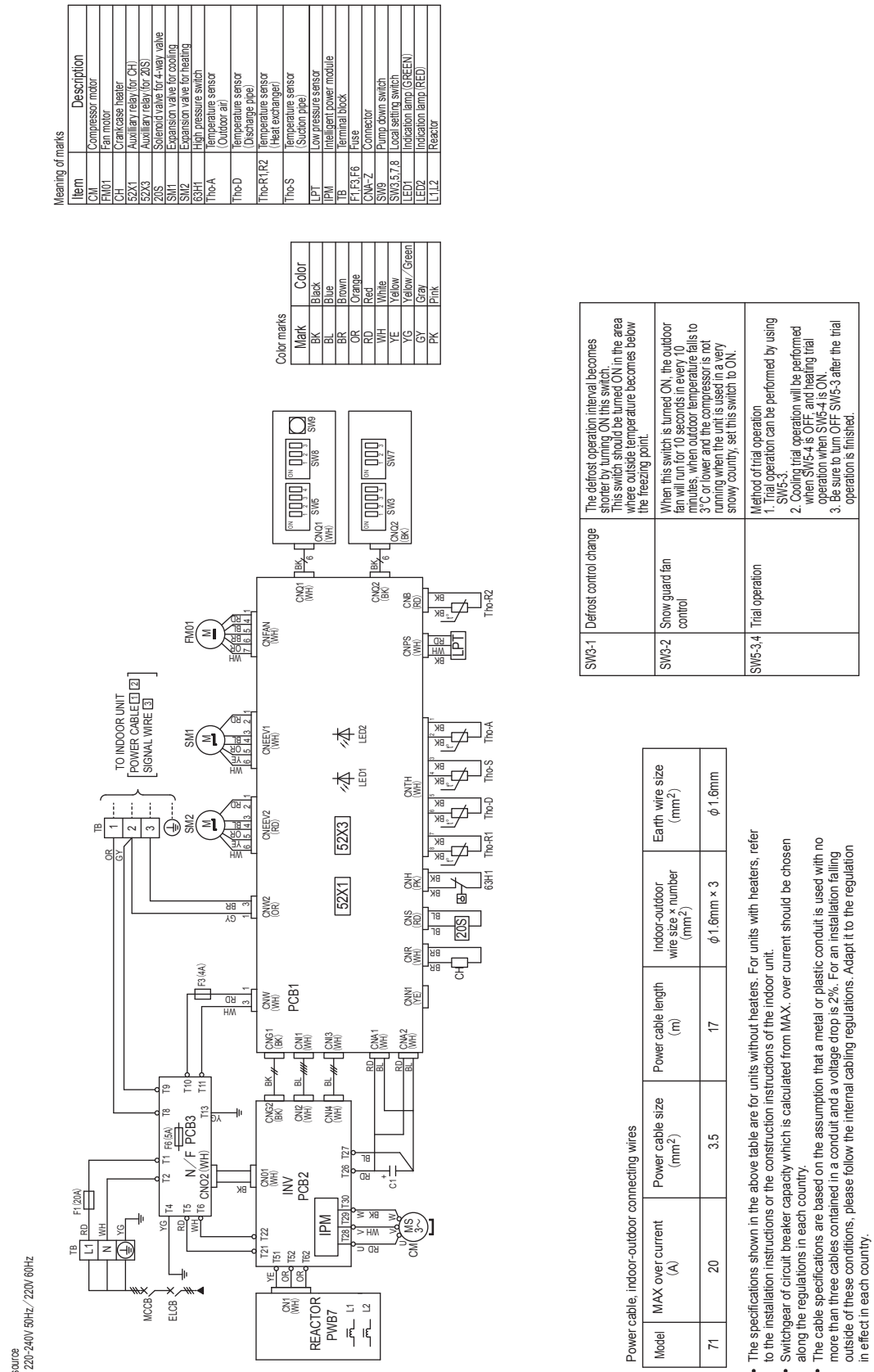
Mark	Color	Mark	Color
BK	Black	OR	Orange
BL	Blue	RD	Red
BR	Brown	WH	White
GN	Green	YE	Yellow
GY	Gray	YE/GN	Yellow/Green



Notes 1. ----- indicates wiring on site.
2. See the wiring diagram of outdoor unit about the line between indoor unit and outdoor unit.
3. Use twin core cord (0.3mm^2 × 2) at remote control line.
See spec sheet of remote control in case that the total length is more than 100m.
4. Do not put remote control line alongside power source line.
5. Section 1 (※1) is provided on the models 100-140 only.
6. Section 2 (※2) shows electric circuit of motion sensor (Option).
7. The alarm of refrigerant sensor can reset until 2 times.

PGA000Z843

(2) Outdoor units
Model FDC71VNX-W



SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW5-3,4	Trial operation	Method of trial operation 1. Trial operation can be performed by using SW5-3. 2. Cooling trial operation will be performed when SW5-4 is OFF, and heating trial operation when SW5-4 is ON. 3. Be sure to turn OFF SW5-3 after the trial operation is finished.

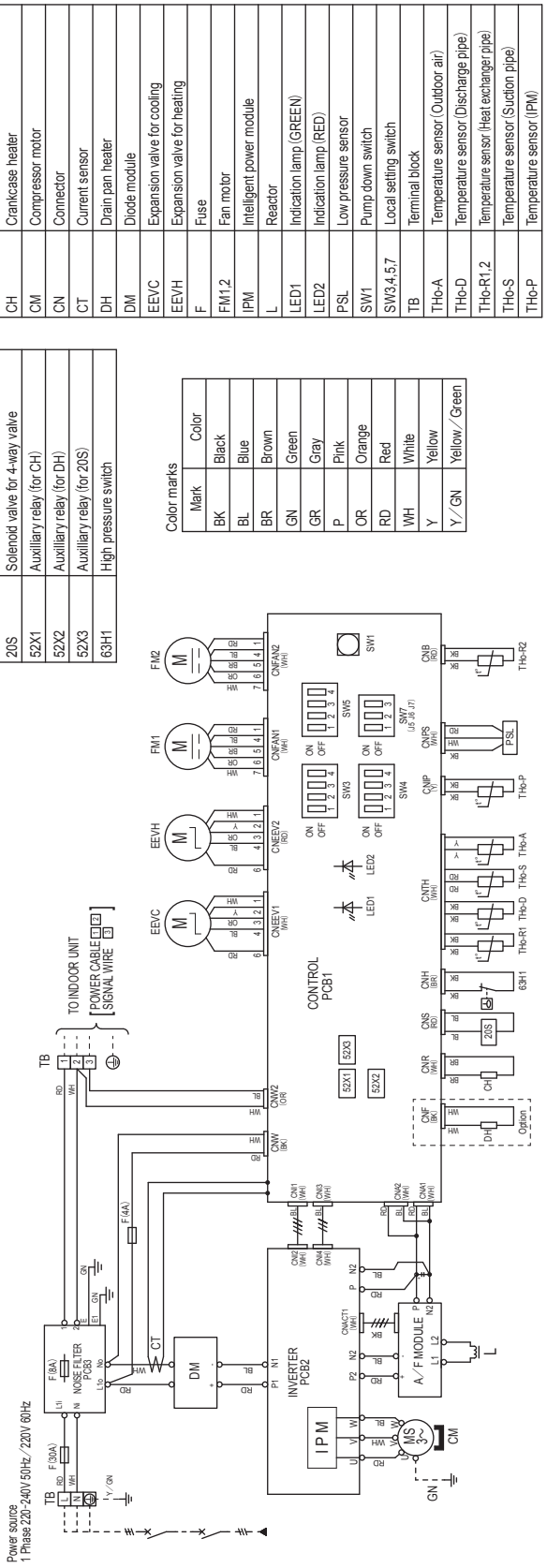
Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	Indoor-outdoor wire size × number (mm^2)	Earth wire size (mm^2)
71	20	3.5	17	ϕ1.6mm × 3	ϕ1.6mm

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.
- Refer to installation manual or technical manual about usage of local setting switch.
- Don't operate SW3-3,SW5-1,SW5-2,SW7,SW8

PCA001Z880

Models FDC100VNX-W, 125VNX-W, 140VNX-W



Meaning of marks

Item	Description
20S	Solenoid valve for 4-way valve
52X1	Auxiliary relay (for CH)
52X2	Auxiliary relay (for DH)
52X3	Auxiliary relay (for 20S)
63H1	High pressure switch

Color marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GN	Green
GR	Gray
P	Pink
OR	Orange
RD	Red
WH	White
Y	Yellow
Y／GN	Yellow／Green

Meaning of marks

Item	Description
CH	Crankcase heater
CM	Compressor motor
CN	Connector
CT	Current sensor
DH	Drain pan heater
DM	Diode module
EEVC	Expansion valve for cooling
EEVH	Expansion valve for heating
F	Fuse
FM1,2	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
PSL	Low pressure sensor
SW1	Pump down switch
SW3,4,5,7	Local setting switch
TB	Terminal block
THo-A	Temperature sensor (Outdoor air)
THo-D	Temperature sensor (Discharge pipe)
THo-R1,2	Temperature sensor (Heat exchanger pipe)
THo-S	Temperature sensor (Suction pipe)
THo-P	Temperature sensor (IPM)

Local setting switch SW3,4,5 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.
SW4-1	Lower noise silent mode	Upper limit of compressor speed and fan speed becomes lower in silent mode.
SW5-2	High height difference operation control	Set this switch to ON when outdoor unit is installed at a position higher than indoor unit by 30m or more.

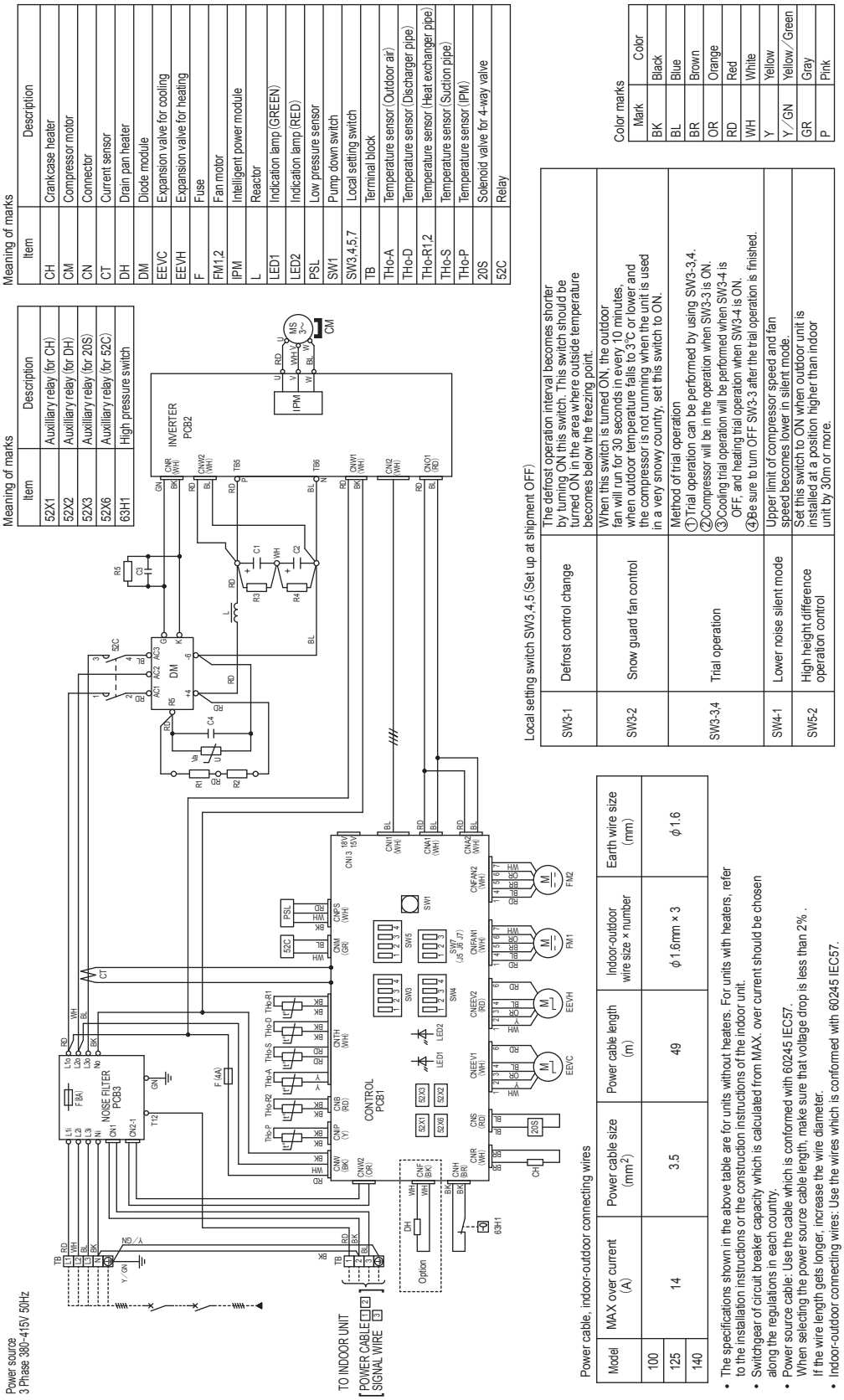
Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	Indoor-outdoor wire size × number	Earth wire size (mm)
100	25	5.5	21	φ1.6mm × 3	φ1.6
125	27		20		
140					

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- Power source cable: Use the cable which is conformed with 60245 IEC57.
  When selecting the power source cable length, make sure that voltage drop is less than 2% .
  If the wire length gets longer, increase the wire diameter.
- Indoor-outdoor connecting wires: Use the wires which is conformed with 60245 IEC57.

PCA001Z886 A

Models FDC100VSX-W, 125VSX-W, 140VSX-W



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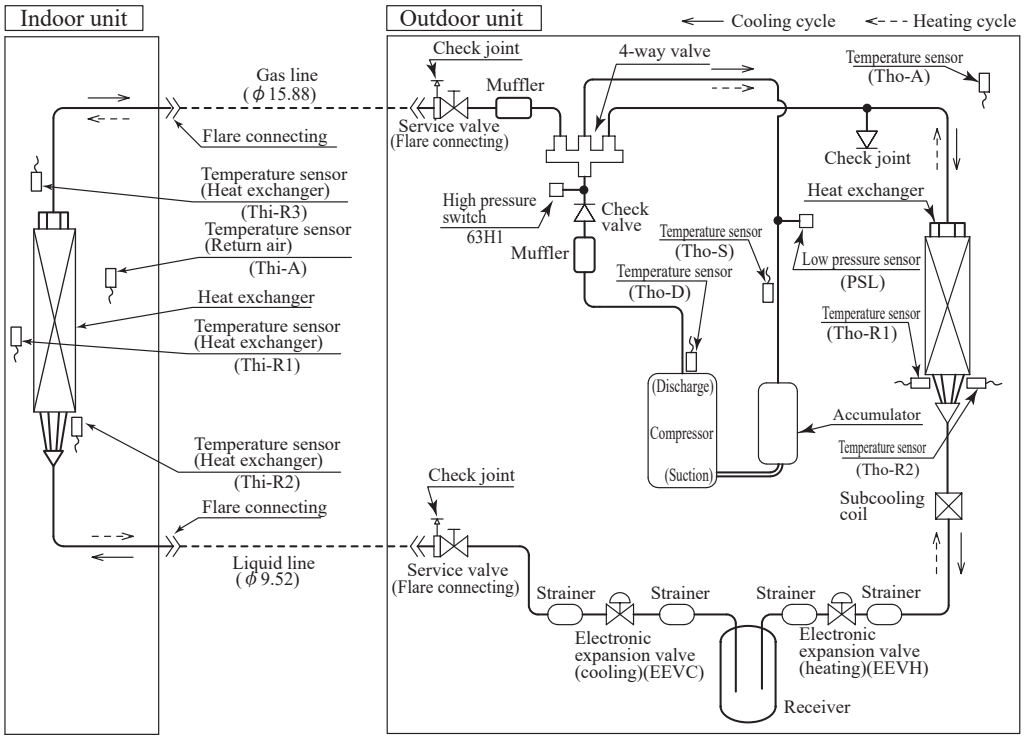
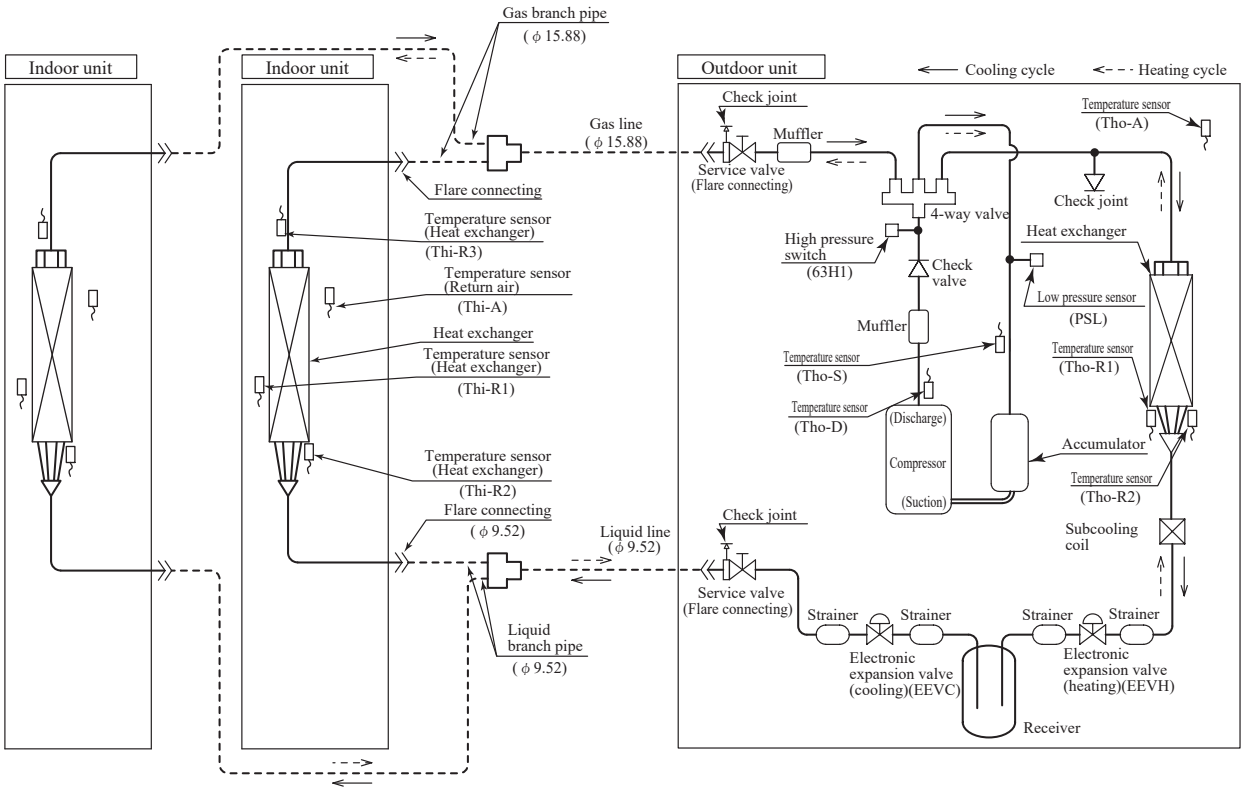
1.5 PIPING SYSTEM

(1) Single type
Models 71, 100, 125, 140



(2) Twin type
Model 140



Preset point of the protective devices

Parts name	Mark	Equipped unit	100, 125, 140 model
Temperature sensor (for protection overloading in heating)	**Thi-R**	Indoor unit	Active 63℃ Inactive 56℃
Temperature sensor (for frost prevention)	**Thi-R**	Indoor unit	Active 1.0℃ Inactive 10℃
Temperature sensor (for protection high pressure in cooling)	**Tho-R**	Outdoor unit	Active 63℃ Inactive 51℃
Temperature sensor (for detecting discharge pipe temperature)	**Tho-D**	Outdoor unit	Active 115℃ Inactive 85℃
High pressure switch (for protection)	**63H1**	Outdoor unit	Active 4.15MPa Inactive 3.15MPa
Low pressure sensor (for protection)	**PSL**	Outdoor unit	Active 0.079MPa Inactive 0.227MPa

2. MICRO INVERTER PACKAGED AIR-CONDITIONERS

CONTENTS

2.1 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(I) Models FDC100-140VNA-W, 100-140VSA-W

(1) Determination of compressor speed

Required compressor speed

(a) Cooling/dehumidifying operation

Unit: rps

Model			FDC100	FDC125	FDC140
Max. required compressor speed	Usual operation		90	105	105
	Silent mode, outdoor temperature ≦ 15°C	SW7-3 OFF	60	80	85
		SW7-3 ON	47	50	53
Min. required compressor speed			14	14	14

(b) Heating operation

Unit: rps

Model			FDC100	FDC125	FDC140
Max. required compressor speed	Usual operation		90	105	110
	Silent mode	SW7-3 OFF	60	80	85
		SW7-3 ON	47	50	53
Min. required compressor speed			15	15	15

(c) If the indoor unit fan speed becomes “Me” or “Lo”, max. required compressor speed goes down accordingly depending on indoor unit model.

(d) Max. required compressor speed under high outdoor air temperature in cooling mode
Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC100	FDC125	FDC140
Max. required compressor speed	Outdoor air temperature is 40°C or higher	75	90	96
	Outdoor air temperature is 46°C or higher	75	75	75

(e) Max. required compressor speed under high outdoor air temperature in heating mode
Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC100	FDC125	FDC140
Max. required compressor speed	Outdoor air temperature is 18°C or higher	60	80	85
	Outdoor air temperature is 10°C or higher	90	105	110

(f) Selection of max. required compressor speed by heat exchanger temperature

(i) Maximum required compressor speed is selected according to the outdoor heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor heat exchanger temperature (Thi-R) during heating mode.

(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), whichever the highest applies.
When there are 2 outdoor heat exchanger temperatures (Tho-R), whichever the higher applies.

Unit: rps

Model			FDC100	FDC125	FDC140
Max. required compressor speed	Cooling/ dehumidifying	Outdoor unit heat exchanger temperature is 55°C or higher	90	100	100
	Heating	Indoor unit heat exchanger temperature is 55°C or higher	90	100	100

(g) When any of the controls from (a) to (f) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required compressor speed.

(h) During heating, it is operated with the maximum required compressor speed until the indoor heat exchanger temperature becomes 40°C or higher.

(2) Compressor start control

(a) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

(b) However, at initial start after turning the power source breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote control) in order to prevent the oil loss in the compressor.
If the cooling/dehumidifying/heating operation is selected from the remote control when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote control.

(3) Compressor soft start control

(a) Compressor protection start I

[Control condition]
Normally, the operation compressor speed is raised in this start pattern.

[Control contents]

a) Starts with the target compressor speed at **A** rps.
However, when the outdoor air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (Thi-A) is 25°C or higher and the outdoor air temperature (Tho-A) is 10°C or higher during heating, it starts at **C** rps.

b) At 30 seconds after the start of compressor, its target compressor speed changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation compressor speed fixed at **B** rps.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC100-140	Cooling/Dehumidifying	55	55	30
	Heating	55	55	30

(b) Compressor protection start III

[Control condition]
Number of compressor start is only 1 counted after the power source breaker ON.

[Control contents]
Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

(i) Low operation compressor speed control during cooling/dehumidifying

[Control condition]
Upon establishing the conditions of compressor protection start III, the low operation compressor speed control is performed during cooling/dehumidifying.

[Control contents]

① Starts with the target compressor speed at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.

② At 30 seconds after the compressor start, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC100-140	Cooling/Dehumidifying	55	55	30

(ii) Low operation compressor speed control during heating

[Control condition]
When the conditions of compressor protection start III are established and the following condition is satisfied, the low number of revolutions operation control is performed during heating.

① At 30 minutes or more after turning the power source breaker on

[Control contents]

① Starts the compressor with its target compressor speed at **A** rps. However, when the indoor return air temperature (Thi-A) is 25°C or higher and the outdoor air temperature (Tho-A) is 10°C or higher, it starts at **C** rps.

② At 30 seconds after the start of compressor, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC100-140	Heating	55	55	30

(4) Outdoor fan control

(a) Outdoor fan tap and fan motor speed

Unit: min^{-1}

Model	Mode	Fan motor tap						
		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
FDC100-140	Cooling/Dehumidifying	200	350	600(1)	740	820	870	950
	Heating	200	350	600(1)	740	820	870	950

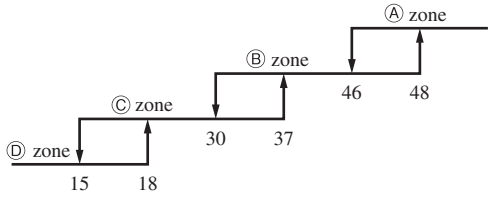
Note (1) If the "silent mode start" signal is received from the remote control and SW7-3 is ON, the speed changes from 600 to 500.

(b) Fan tap control during cooling/defumidifying operation

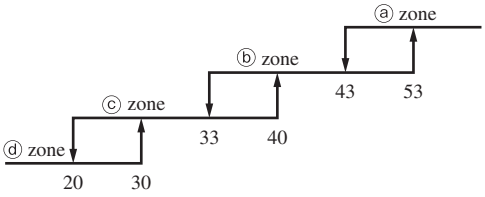
Fan taps are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note It is detected by Tho-R1 or R2, whichever the higher.

	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5	Tap 5	Tap 5	Tap 4
ⓑ zone	Tap 5	Tap 5	Tap 4(1)	Tap 3
ⓒ zone	Tap 4	Tap 4(1)	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

Note (1) If the "silent mode start" signal is received from the remote control, the speed changes from Tap 4 to Tap 3.



Outdoor air temperature (˚C)



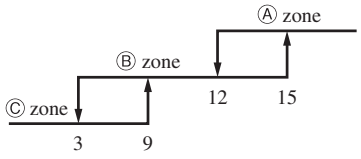
Outdoor heat exchanger temperature (˚C)

(c) Fan tap control during heating operation

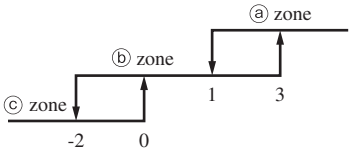
Fan taps are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note It is detected by Tho-R1 or R2, whichever the lower.

	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3	Tap 3	Tap 4
ⓑ zone	Tap 3	Tap 4(1)	Tap 5
ⓒ zone	Tap 4	Tap 5	Tap 6

Note (1) If the "silent mode start" signal is received from the remote control, the speed changes from Tap 4 to Tap 3.



Outdoor air temperature (˚C)

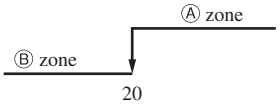


Outdoor heat exchanger temperature (˚C)

(d) Outdoor fan control at cooling low outdoor air temperature

(i) If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, outdoor fan is controlled with ±5 – ±30min^{-1} to keep high pressure level which is controlled by outdoor heat exchanger temperature (Tho-R1, R2).

Note It is detected by Tho-R1 or R2, whichever the higher.



Outdoor air temperature (˚C)

(ii) The outdoor heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 20 seconds.

(iii) Range of the outdoor fan speed under this control is as follows.

a) Lower limit: 130min^{-1}

b) Upper limit: 350min^{-1}

(iv) As any of the following conditions is established, this control terminates.

a) When the outdoor air temperature is in the zone Ⓐ and the outdoor heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.

b) When the outdoor heat exchanger temperature at 40°C or higher is established for 40 seconds or more continuously.

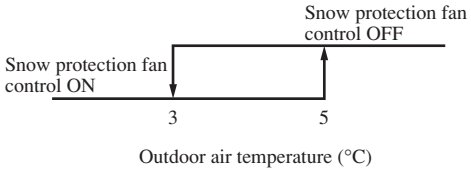
c) When the outdoor heat exchanger temperature at 50°C or higher is established.

(e) Caution at the outdoor fan start control (3 phase models only)

When the outdoor fan is running at 400min^{-1} before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan. This is normal.

(f) Snow protection fan control

If the DIP switch (SW3-2) on the outdoor unit control PCB is turned ON, the outdoor fan is operated for 30 seconds at 4th speed once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.



(5) Defrost operation

(a) Starting conditions

If either of the following defrost conditions A or conditions B or conditions C are satisfied, the defrost operation starts.

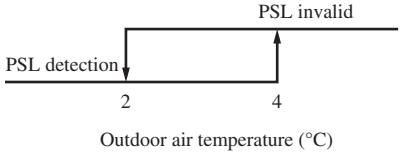
(i) Defrost conditions A

1) Accumulative compressor operation time after the end of defrost operation has elapsed 37 minutes, and the accumulative compressor operation time after the start of heating operation (remote control ON) has elapsed 30 minutes.

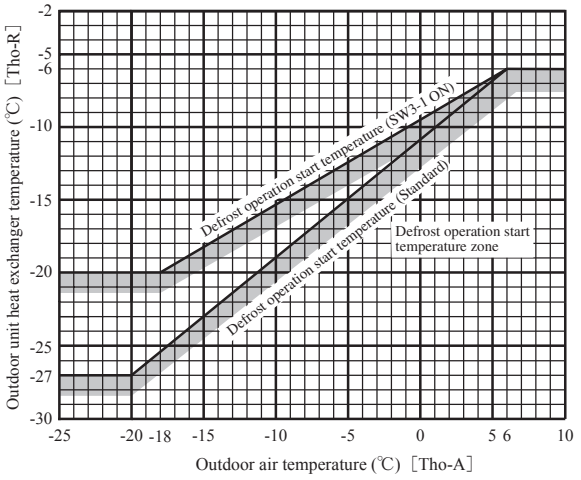
2) After 5 minutes from the compressor ON

3) After 5 minutes from the start of outdoor fan

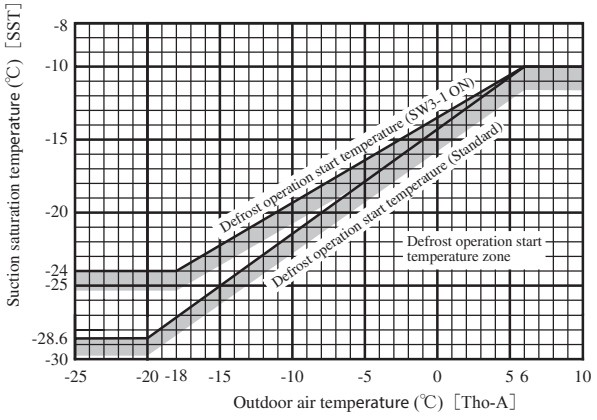
4) After satisfying all above conditions, if temperatures of the outdoor heat exchanger temperature sensor (Tho-R1, R2) and the outdoor air temperature sensor (Tho-A) become lower than the defrost operation start temperature as shown by the right figure for 15 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (PSL) stay for 3 minutes within the range below the defrost operation start temperature as shown by the right figure.However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.



Models FDC100-140



Models FDC100-140



(ii) Defrost conditions B

1) When previous defrost ending condition is the time out of defrost operation and it is in the heating operation after the accumulative compressor operation time after the end of defrost operation has become 30 minutes
2) After 5 minutes from the start of compressor
3) After 5 minutes from the start of outdoor fan

(iii) Defrost condition C

After 12 minutes from the start of compressor with SW4-4 ON

(b) Ending conditions

When any of the following conditions is satisfied, the heating operation starts.

(i) When it has elapsed 13 minutes and 20 seconds after the start of defrost operation

(ii) When the outdoor heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 10 seconds continuously

(c) Switching of defrost operation with SW3-1

(i) If SW3-1 on the outdoor unit control PCB is turned to ON, it becomes easier to enter the defrost operation. Use this when installing a unit at snowing regions.

(ii) Control contents

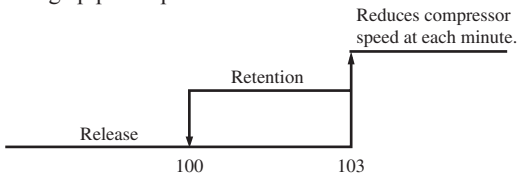
a) It allows entering the defrost operation under the defrost condition A when the accumulative heating operation time becomes 30 minutes. It is 37 minutes at SW3-1 OFF (Factory default).
b) It allows entering the defrost operation under the defrost condition B when the accumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).
c) It allows the defrost operation with the outdoor heat exchanger temperature (Tho-R).

(6) Protective control/anomalous stop control by compressor's number of revolutions

(a) Compressor discharge pipe temperature protection

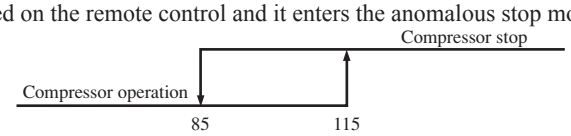
(i) Protective control

As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed is controlled to suppress the rise of discharge pipe temperature.



(ii) Anomalous stop control

a) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.
b) When it is detected 2 times within 60 minutes or after continuous 30 minutes, including the stop of compressor, E36 is displayed on the remote control and it enters the anomalous stop mode.



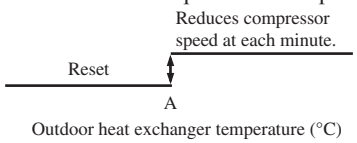
(iii) Reset of anomalous stop mode

As it drops to the reset value of 85°C or lower for 45 minutes continuously, it becomes possible to restart from the remote control.

(b) Cooling high pressure protection

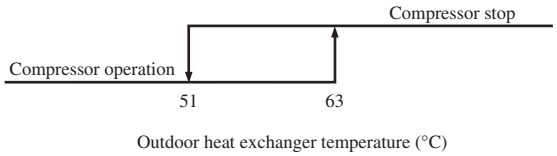
(i) Protective control

a) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor speed is controlled to suppress the rise of high pressure.
b) Control value A is updated to an optimum value automatically according to the operating conditions.



Control value A
59–53°C

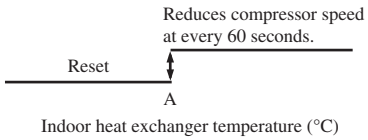
(ii) Anomalous stop control
a) As the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
b) If it is detected 5 times within 60 minutes or 63°C or higher continues for 30 minutes, including the stop of compressor, E35 is displayed on the remote control and it enters the anomalous stop mode.



(iii) Reset of anomalous stop mode
As it reaches the reset value of 51°C or lower for 3 minutes continuously, it becomes possible to restart from the remote control.

(c) Heating high pressure protection

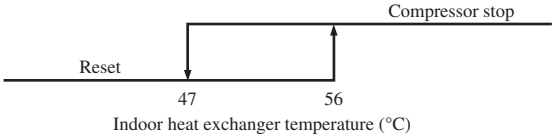
(i) Protective control
a) As the indoor heat exchanger temperature (Thi-R) exceeds the setting value, the compressor speed is controlled to suppress the rise of high pressure.
b) Control value A is updated to an optimum value automatically according to the operating conditions.



Model	Existing piping adaptation switch: SW5-1	
	OFF (Shipping)	ON
	Control value A (°C)	
FDC100-140	54–48	51–45

Note Adaptation to existing piping is at ON.

(ii) Anomalous stop control
Operation control function by the indoor unit control - See the heating overload protection, page 17.
(iii) Adaptation to existing piping, stop control
If the existing piping adaptation switch, SW5-1, is turned ON, the compressor stops to protect existing piping when the indoor heat exchanger temperature (Thi-R) exceeds the setting value.

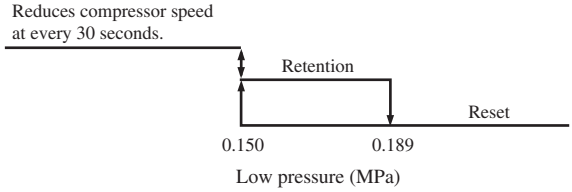


(d) Anomaly detection control by the high pressure switch (63H1)

(i) If the pressure rises and operates the high pressure switch (opens at 4.15MPa/closes at 3.15MPa), the compressor stops.
(ii) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.
a) When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1
b) When 63H1 has been in the open state for 30 minutes continuously, including the stop of compressor

(e) Low pressure control

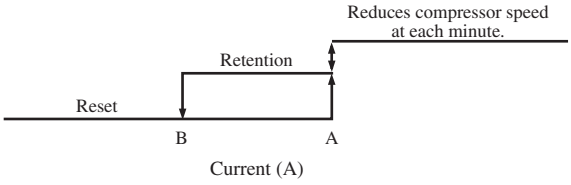
(i) Protective control
If the value detected by the low pressure sensor (PSL) exceeds the setting value, the compressor speed is controlled to restrain the drop of pressure.



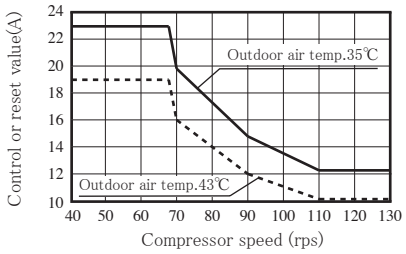
(ii) Anomalous stop control
1) When a value detected by the low pressure sensor (PSL) satisfies any of the following conditions, the compressor stops to run for its protection.
a) When the low pressure drops to 0.079MPa or lower for 15 seconds continuously
b) At 10 minutes after the start of compressor, the suction superheat becomes 30°C or more for 60 seconds continuously and the low pressure becomes 0.15MPa or lower
2) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.
a) When the low pressure drops 5 times within 60 minutes and the compressor stops under any of the above conditions
b) When a value detected with the low pressure sensor becomes 0.079MPa or lower for 5 minutes continuously, including the stop of compressor
3) However, when the control condition 1). a) is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

(f) Over-current protection current safe controls I, II

Detecting the outdoor inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed is controlled to protect the inverter.



(Fig. C) The control value "A" and the reset value vary depending on the compressor speed.



Model		Cooling		Heating	
		Control value A	Reset value B	Control value A	Reset value B
Primary current side	FDC100	13.5 (23.0)	12.5 (22.0)	13.5 (23.0)	12.5 (22.0)
	FDC125, FDC140	13.5 (23.0)	12.5 (22.0)	13.5 (23.0)	12.5 (22.0)
Secandary current side	FDC100	12.0 (Fig.C)	11.0 (A-1)	12.0 (23)	11.0 (22)
	FDC125, FDC140	12.0 (Fig.C)	11.0 (A-1)	12.0 (23)	11.0 (22)

Note Value in ( ) are for the single phase models.

(g) Anomalous power transistor current

1) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
2) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote control and it enters the anomalous stop mode.

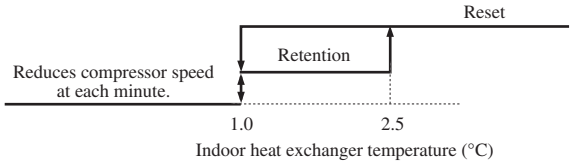
(h) Anomalous inverter PCB

If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote control and it enters the anomalous stop mode.

(i) Anti-frost control by the compressor speed control

(i) If the indoor heat exchanger temperature (detected with Thi-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed is controlled to initiate the anti-frost control of indoor heat exchanger.

(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), the lowest temperature is detected.



(iii) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit control and the cooling, dehumidifying frost prevention of page 17.

(j) Dewing prevention control

[Control condition]

During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed is reduced to prevent dewing and water splash.

① Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

② Suction superheat is 10°C or higher.

③Compressor speed is 60 rps or higher.

[Control contents]

① When the suction superheat is 10°C or higher, the compressor speed is reduced at each 1 minute.

② Compressor speed does not rise till the cooling expansion valve becomes 460 pulses.

③ This control takes 60 rps as its lower limit so that compressor speed is not controlled when it is less than 60 rps.

(k) Broken wire detection on temperature sensor and lowpressure sensor

(i) Outdoor heat exchanger temperature sensor, outdoor air temperature sensor and low pressure sensor

If the following is detected for 5 seconds continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Outdoor heat exchanger temperature sensor: -50°C or lower
- Outdoor air temperature sensor: -45°C or lower
- Low pressure sensor:0V or lower, 4.0V or more (Short-circuit)

(ii) Discharge pipe temperature sensor and suction pipe temperature sensor

If the following is detected for 5 seconds continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Discharge pipe temperature sensor: -10°C or lower
- Suction pipe temperature sensor: -50°C or lower

(l) Fan motor error

(i) If the fan speed of 100 min^{-1} or under is detected for 30 seconds continuously under the outdoor fan control (with the operation command of fan tap at ① speed or higher), the compressor stops.

(ii) When the fan motor speed drops to 100 min-1 or under 5 times within 60 minutes and the compressor stops, it enters the anomalous stop mode with E48 displayed on the remote control.

(m) Anomalous stop by the compressor start stop

(i) When it fails to shift to the compressor DC motor rotor position defection operation at 5 seconds after establishing the compressor starting condition, the compressor stops temporarily and restarts 3-minute later.

(ii) If it fails to shift to the position detection operation again at second time, it judges the anomalous compressor start and stops the compressor by the anomalous stop (E59).

(7) Silent mode

(a) As "Silent mode start" signal is received from the remote control, it operates by dropping the outdoor fan speed and the compressor speed.

(b) For details, refer to items (1) and (4) above.

(8) Test run

(a) It is possible to operate from the outdoor unit using the DIP switch on the outdoor unit control PCB.

SW3-3	ON	SW3-4	OFF	Cooling test run
			ON	Heating test run
	OFF	Normal and end of test run		

Make sure to turn SW3-3 to OFF after the end of operation.

(b) Test run control

1) Operation is performed at the fuzzy compressor speed, which is determined for each model.
2) Each protective control and error detection control are effective.
3) If SW3-4 is switched during test run, the compressor is stopped for once by the stop control and the cooling/heating operation is switched.
4) Setting and display of remote control during test run

Item / Mode	Contents of remote control setting/display
Cooling test run	Setting temperature of cooling is 5°C.
Heating test run	Setting temperature of heating (preparation) is 30°C.

(9) Pump-down control

When SW7-1 is OFF, turning ON the pump-down switch SW1 for 2 seconds during the operation stop or anomalous stop (excluding the thermostat OFF), the pump-down operation is performed. (This is invalid when the indoor unit is operating. This is effective even when the indoor unit is stopped by the anomalous stop or the power source is turned OFF.)

(a) Control contents

1) Close the service valve at the liquid side. (It is kept open at the gas side.)
2) Compressor is started with the target speed at 55 rps in the cooling mode.
3) Red and green lamps (LED) flash continuously on the outdoor unit control PCB.
4) Each of protection and error detection controls, excluding the low pressure control, anti-frost control and dewing prevention control, is effective.
5) Outdoor fan is controlled as usual.
6) Electronic expansion valve is fully opened.

(b) Ending conditions

Stop control is initiated depending on any of the following conditions.

(i) Suction pipe temperature of -38.7°C or lower is detected for 5 seconds continuously.
  a) Red LED: Light, Green LED: Flashing, Remote control: Displays stop
  b) It is possible to restart when the suction pipe temperature of -38.7°C or higher.
  c) Electronic expansion valve (cooling/heating) is kept fully open.

(ii) Stop by the error detection control
  a) Red LED: Flashing, Green LED: Flashing
  b) Restart is prohibited. To return to normal operation, reset the power source.
  c) Electronic expansion valve (cooling/heating) is kept fully open.

(iii) When the accumulative operation time of compressor under the pump-down control becomes 5 minutes
  a) Red LED: OFF, Green LED: Flashing, Remote control: Stop
  b) It is possible to pump-down again.
  c) Electronic expansion valve (cooling/heating) is kept fully open.

Note After the stop of compressor, close the service valve at the gas side.

Caution: Since pressing the pump-down switch cancels communications with the indoor unit, the indoor unit and the remote control display “Transmission error – E5”. This is normal.

(Ⅱ) Models FDC200, 250, 280VSA-W

(1) Determination of compressor speed

Required compressor speed

(a) Cooling/dehumidifying operation. Unit: rps

Model		FDC200	FDC250	FDC280
Max. required compressor speed	Usual operation	120	120	120
	Outdoor air temperature ≦ 15°C or indoor return air temperature ≦ 20°C	68	100	100
	Silent mode	50 (68)	70 (100)	80 (100)
Min. required compressor speed		20	20	20

Note Value in ( ) are for the SW7-3 OFF.

(b) Heating operation. Unit: rps

Model		FDC200	FDC250	FDC280
Max. required compressor speed	Usual operation	120	120	120
	Silent mode	76 (94)	70 (100)	80 (100)
Min. required compressor speed		24	20	20

Note Value in ( ) are for the SW7-3 OFF.

(c) If the indoor fan speed becomes “Me” or “Lo”, max. required compressor speed goes down accordingly depending on indoor unit model.

(d) Max. required compressor speed under high outdoor air temperature in cooling mode
Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC200	FDC250	FDC280
Max. required compressor speed	Outdoor air temperature is 35°C or higher	106	106	114
	Outdoor air temperature is 42°C or higher	90	90	98

(e) Max. required compressor speed under high outdoor air temperature in heating mode
Maximum required compressor speed is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		FDC200	FDC250	FDC280
Max. required compressor speed	Outdoor air temperature is 10°C or higher	120	120	120
	Outdoor air temperature is 18°C or higher	120	120	120

(f) Selection of max. required compressor speed by heat exchanger temperature

(i) Maximum required compressor speed is selected according to the outdoor heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor heat exchanger temperature (Thi-R) during heating mode.

(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), whichever the highest applies.
When there are 2 outdoor heat exchanger temperature (Tho-R), whichever the higher applies.

Unit: rps

Model			FDC200	FDC250	FDC280
Max. required compressor speed	Cooling/ dehumidifying	Outdoor heat exchanger temperature is 55°C or higher	120	120	120
	Heating	Indoor heat exchanger temperature is 55°C or higher	120	120	120

(g) When any of the controls from (a) to (f) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required compressor speed.

(h) During heating, it is operated so that the required compressor speed adds 5 rps every 1 minute until the indoor heat exchanger temperature becomes 40°C or higher.

(2) Compressor start control

(a) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

(b) However, at initial start of heating mode after turning on the power source breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote control) in order to prevent the oil loss in the compressor.

If the heating operation is selected from the remote control when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote control.

(3) Compressor soft start control

(a) Compressor protection start I

[Control condition]

Normally, the operation compressor speed is raised in this start pattern.

[Control contents]

(i) Starts with the target compressor speed at **A** rps.
However, when the outdoor air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (Thi-A) is 25°C or higher during heating, it starts at **C** rps.

(ii) At 30 seconds after the start of compressor, its target compressor speed changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation compressor speed fixed at **B** rps.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC200-280	Cooling/Dehumidifying	55	55	30
	Heating	55	55	30

(b) Compressor protection start III

[Control condition]

Number of compressor start is only 1 counted after the power source breaker ON.

[Control contents]

Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

(i) Low operation compressor speed control during cooling/dehumidifying

[Control condition]

Upon establishing the conditions of compressor protection start III, the low operation compressor speed control is performed during cooling/dehumidifying.

[Control contents]

1) Starts with the target compressor speed at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.
2) At 30 seconds after the compressor start, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC200-280	Cooling/Dehumidifying	55	30	30

(ii) Low operation compressor speed control during heating

[Control condition]

When the conditions of compressor protection start III are established and one of following conditions a), b) is satisfied, the low operation compressor speed control is performed during heating.

a) At 30 minutes or more after turning the power source breaker on
b) When compressor under-dome sensor temperature (Tho-H) is 4°C or higher and the difference between compressor under-dome sensor temperature and outdoor air sensor temperature (Tho-H-Tho-A) is 4°C or higher

[Control contents]

a) Starts the compressor with its target compressor speed at **A** rps. However, when the indoor return air temperature (Thi-A) is 25°C or higher, it starts at **C** rps.
b) At 30 seconds after the start of compressor, the target compressor speed is changed to **B** rps and the operation compressor speed is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
FDC200-280	Heating	55	30	30

(4) Outdoor fan control

(a) Outdoor fan speed and fan motor revolution

Unit: min^{-1}

Model	Mode	Fan motor revolution						
FDC200, 250		Speed ①	Speed ②	Speed ③	Speed ④	Speed ⑤	Speed ⑥	Speed ⑦
	Cooling/Dehumidifying	200	370	600	750	850	900	950
	Heating	200	370	600	820	850	910	950
FDC280		Speed ①	Speed ②	Speed ③	Speed ④	Speed ⑤	Speed ⑥	Speed ⑦
	Cooling/Dehumidifying	200	370	560	650	750	850	900
	Heating	200	370	560	830	850	910	950

(b) Fan speed control during cooling/defumidifying operation

Fan speeds are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).

Note It is detected by Tho-R1 or R2, whichever the higher.

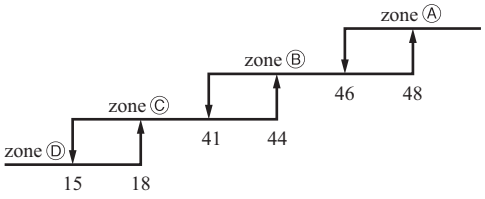
【FDC200, 250】

	zone Ⓐ	zone Ⓑ	zone Ⓒ	zone Ⓓ
zone ⓐ	Speed ⑥	Speed ⑥	Speed ⑥	Speed ④
zone ⓑ	Speed ⑤	Speed ⑤	Speed ※1	Speed ③
zone ⓒ	Speed ④	Speed ④	Speed ④	Speed ②
zone ⓓ	Speed ③	Speed ③	Speed ③	Speed ①

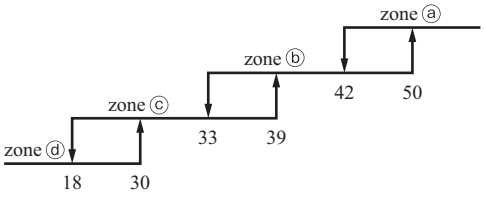
• Silent mode only

	zone Ⓐ	zone Ⓑ	zone Ⓒ	zone Ⓓ
zone ⓐ	Speed ⑤	Speed ⑤	Speed ④(⑤)	Speed ④
zone ⓑ	Speed ④	Speed ④	Speed ③(④)	Speed ③
zone ⓒ	Speed ④	Speed ③	Speed ③	Speed ②
zone ⓓ	Speed ③	Speed ③	Speed ②	Speed ①

Note Value in ( ) are for the model FDC200 only.

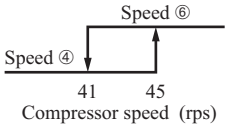


Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

※1 When using FDC250 : Fan speed ⑥
When using FDC200 : As shown below



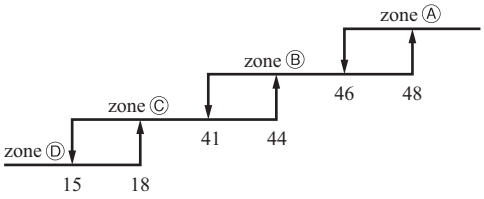
Compressor speed (rps)

【FDC280】

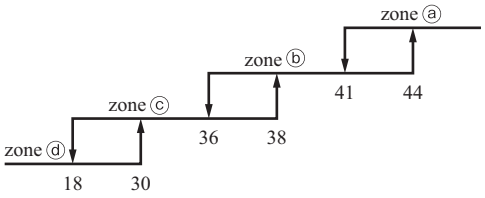
	zone Ⓐ	zone Ⓑ	zone Ⓒ	zone Ⓓ
zone ⓐ	Speed ⑦	Speed ⑦	Speed ⑦	Speed ⑤
zone ⓑ	Speed ⑥	Speed ⑥	Speed ⑤	Speed ③
zone ⓒ	Speed ⑥	Speed ⑥	Speed ④	Speed ②
zone ⓓ	Speed ③	Speed ③	Speed ③	Speed ①

• Silent mode only

	zone Ⓐ	zone Ⓑ	zone Ⓒ	zone Ⓓ
zone ⓐ	Speed ⑥	Speed ③	Speed ③	Speed ③
zone ⓑ	Speed ③	Speed ③	Speed ③	Speed ③
zone ⓒ	Speed ③	Speed ③	Speed ③	Speed ②
zone ⓓ	Speed ③	Speed ③	Speed ③	Speed ①



Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

(c) Fan speed control during heating operation

Fan speeds are selected depending on the outdoor heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).

Note It is detected by Tho-R1 or R2, whichever the lower.

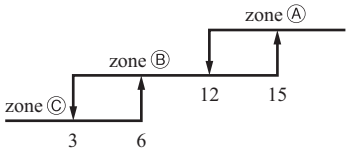
【FDC200, 250】

	zone Ⓐ	zone Ⓑ	zone Ⓒ
zone ⓐ	Speed ③	Speed ③	Speed ④
zone ⓑ	Speed ③	Speed ④	Speed ⑤
zone ⓒ	Speed ④	Speed ⑦	Speed ※2

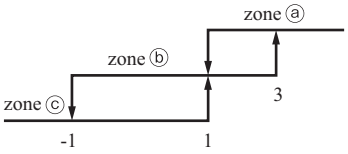
• Silent mode only

	zone Ⓐ	zone Ⓑ	zone Ⓒ
zone ⓐ	Speed ③	Speed ③	Speed ③
zone ⓑ	Speed ③	Speed ③	Speed ④
zone ⓒ	Speed ③(④)	Speed ⑤	Speed ⑥

Notes Value in ( ) is for the model FDC200 only.

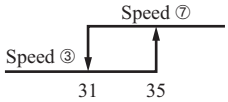


Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

※2 When using FDC250 : Speed ⑦
When using FDC200 : As shown below



Compressor speed (rps)

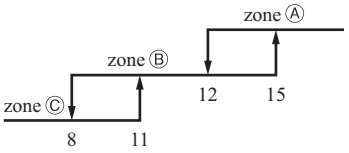
【FDC280】

	zone Ⓐ	zone Ⓑ	zone Ⓒ
zone ⓐ	Speed ③	Speed ③	Speed ④(③)
zone ⓑ	Speed ③	Speed ④	Speed ⑦(④)
zone ⓒ	Speed ④	Speed ⑥(⑤)	Speed ⑦(⑥)

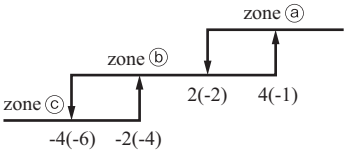
Note Value in ( ) are for the pattern Ⅱ.

• Silent mode only

	zone Ⓐ	zone Ⓑ	zone Ⓒ
zone ⓐ	Speed ③	Speed ③	Speed ③
zone ⓑ	Speed ③	Speed ③	Speed ③
zone ⓒ	Speed ③	Speed ③	Speed ③

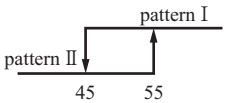


Outdoor air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

Note Value in ( ) are for the pattern Ⅱ.

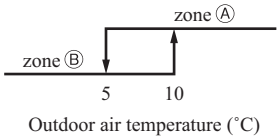


Compressor speed (rps)

(d) Outdoor fan control at cooling low outdoor air temperature

(i) When all the following conditions are established after the start of compressor, the following control is implemented. If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, it has elapsed 20 seconds from the start of outdoor fan and the outdoor fan is at the speed ①, the outdoor fan speed is controlled according to the outdoor heat exchanger temperature (Tho-R1, R2).

Note It is detected by Tho-R1 or R2, whichever the higher.



(ii) The outdoor heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 30 seconds.

(iii) Range of the outdoor fan speed under this control is as follows.

1) Lower limit: 130min^{-1}

※1:The fan stops if the outdoor air temperature is less than -5°C and 130min^{-1} is continuously operated for 30 seconds and outdoor heat exchanger temperature (either Tho-R1 or Tho-R2, whichever is higher) is 28°C or lower. If the outdoor air temperature is 0°C or higher or the heat exchanger temperature is 33°C or higher, the fan will resume operation at 130min^{-1}.

2) Upper limit: 500min^{-1}

(iv) As any of the following conditions is established, this control terminates.

1) When the outdoor air temperature is in the zone Ⓐ and the outdoor heat exchanger temperature at 29°C or higher is established for 40 seconds or more continuously

2) When the outdoor fan speed is 500min^{-1} and the outdoor heat exchanger temperature at 29°C or higher is established for 40 seconds or more continuously

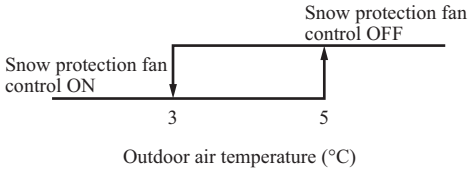
3) When the outdoor heat exchanger temperature at 44°C or higher is established for 40 seconds or more continuously

(e) Caution at the outdoor fan start control

When the outdoor fan is running at 400min^{-1} or more before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan. This is normal.

(f) Snow protection fan control

If the DIP switch (SW3-2) on the outdoor unit control PCB is turned ON, the outdoor fan is operated for 30 seconds at speed ④ once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.



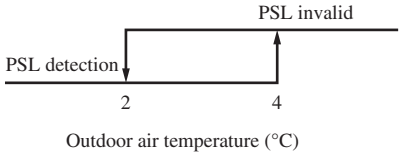
(5) Defrost operation

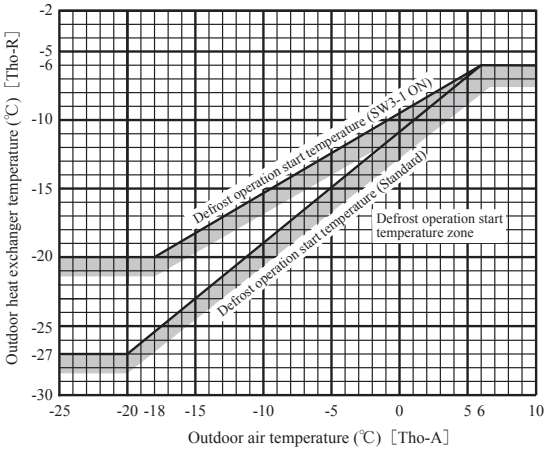
(a) Starting conditions

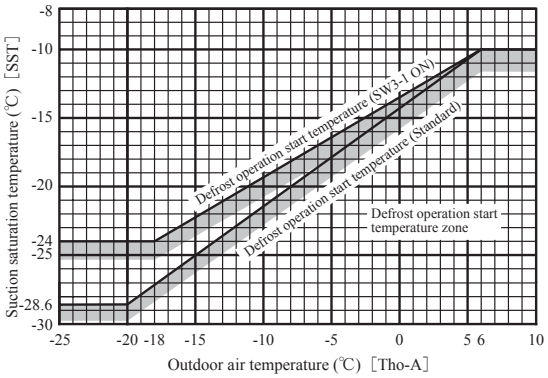
If all of the following defrost conditions A or conditions B or conditions C are satisfied, the defrost operation starts.

(i) Defrost conditions A

1) Accumulative compressor operation time after the end of defrost operation has elapsed 37 minutes, and the accumulative compressor operation time after the start of heating operation (remote control ON) has elapsed 30 minutes.
2) After 5 minutes from the compressor ON
3) After 5 minutes from the start of outdoor fan
4) After satisfying all above conditions, if temperatures of the outdoor heat exchanger temperature sensor (Tho-R1, R2) and the outdoor air temperature sensor (Tho-A) become lower than the defrost operation start temperature as shown by the right figure for 55 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (PSL) stay for 3 minutes within the range below the defrost operation start temperature as shown by the right figure. However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.







(ii) Defrost conditions B

1) When previous defrost ending condition is the time out of defrost operation and it is in the heating operation after the accumulative compressor operation time after the end of defrost operation has become 30 minutes
2) After 5 minutes from the start of compressor
3) After 5 minutes from the start of outdoor fan

(iii) Defrost condition C

After 12 minutes from the start of compressor with SW4-4 ON

(b) Ending conditions

When any of the following conditions is satisfied, the heating operation starts.

(i) When it has elapsed 10 minutes and 20 seconds after the start of defrost operation

(ii) When the outdoor heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 10 seconds continuously

(c) Switching of defrost control with SW3-1

(i) If SW3-1 on the outdoor unit control PCB is turned to ON, it becomes easier to enter the defrost operation. Use this when installing a unit at snowing regions.

(ii) Control contents

1) It allows entering the defrost operation under the defrost condition A when the accumulative heating operation time becomes 30 minutes. It is 37 minutes at SW3-1 OFF (Factory default).
2) It allows entering the defrost operation under the defrost condition B when the accumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).
3) It allows the defrost operation with the outdoor heat exchanger temperature (Tho-R) and suction pressure saturation temperature (SST) being higher than normal.

(6) Protective control/anomalous stop control by compressor's number of revolutions

(a) Compressor discharge pipe temperature protection

(i) Discharge pipe temperature control (Solenoid valve SV1 control(At heating mode))

The solenoid valve SV1 opens to suppress the rise of discharge pipe temperature.

1) SV1 open condition

In case the following conditions and other certain conditions are satisfied.

- Discharge pipe temperature (detected with Tho-D) is 100°C or higher.
- Low pressure is 0.7MPa or lower.

2) SV1 close condition

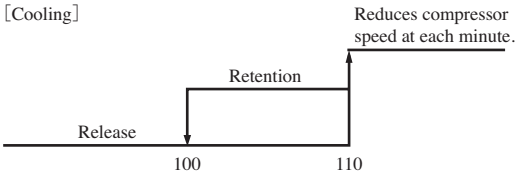
In case any of the following conditions are satisfied.

- Discharge pipe temperature (detected with Tho-D) is less than 50°C.
- Low pressure is more than 0.8MPa.

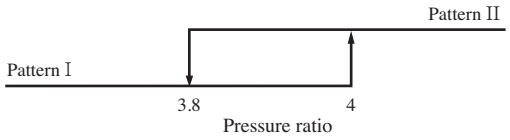
(ii) Protective control

As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed is controlled to suppress the rise of discharge pipe temperature.

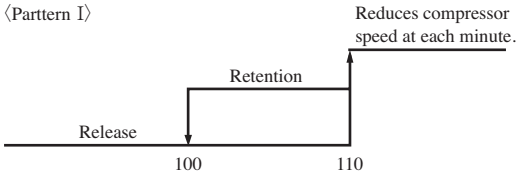
［Cooling］



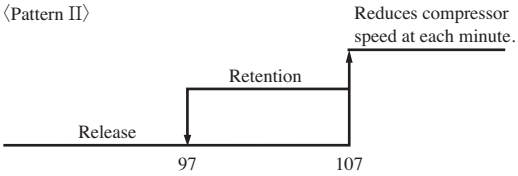
［Heating］



〈Parttern I〉

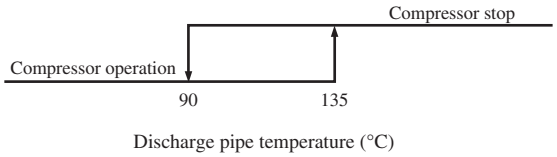


〈Pattern II〉



(iii) Anomalous stop control

1) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.
2) When it is detected 2 times within 60 minutes or after continuous 30 minutes, including the stop of compressor, E36 is displayed on the remote control and it enters the anomalous stop mode.



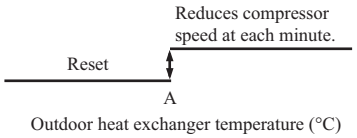
(iv) Reset of anomalous stop mode

As it drops to the reset value of 90°C or lower for 45 minutes continuously, it becomes possible to restart from the remote control.

(b) Cooling high pressure protection

(i) Protective control 1 (Compressor speed control)

1) Outdoor heat exchanger temperature (Tho-R) exceeds the control value A.
Value A is changed from 59°C to 53°C by number of 63H1 operations.
2) When the outdoor air temperature (Tho-A) is 40°C or higher
3) If outdoor heat exchanger temperature (Tho-R) is less than the control value A continuously for 6minutes, protective control finishes.



Control value A
59–53°C

(ii) High pressure control 1 (Electric expantion valve EEVC control 1)
The electric expantion valve EEVC opens to suppress the rise of high pressure.

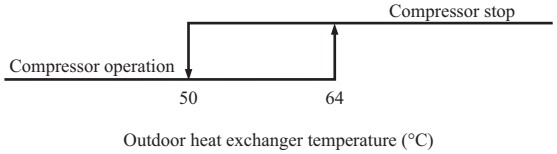
1) Operation condition
In case the following conditions are all satisfied
• Outdoor heat exchanger temperature | Tho-R1 - Tho-R2 | is 8°C or higher (In case outdoor air temperature is more than 42°C), 10°C or higher (In case outdoor air temperature is 42°C or lower).
• Outdoor heat exchanger temperature (either Tho-R1 or Tho-R2, whichever is higher) is 54°C or higher.
• Under-dome temperature - suction saturation temperature (SST) is 30°C or higher.
2) Ending condition
In case any of the following conditions are satisfied
• Outdoor heat exchanger temperature | Tho-R1 - Tho-R2 | is 4°C or lower (In case outdoor air temperature is more than 42°C), 6°C or lower (In case outdoor air temperature is 42°C or lower).
• Outdoor heat exchanger temperature (either Tho-R1 or Tho-R2, whichever is higher) is 50°C or lower.
• Under-dome temperature - suction saturation temperature (SST) is 8°C or lower (In case outdoor air temperature is more than 42°C), 10°C or lower (In case outdoor air temperature is 42°C or lower).

(iii) High pressure control 2 (Electric expantion valve EEVC control 2)
The electric expantion valve EEVC opens 30 pulse every 60 seconds to suppress the rise of high pressure.

1) Operation condition
In case the following conditions are all satisfied
• Outdoor heat exchanger temperature (either Tho-R1 or Tho-R2, whichever is higher) is 58°C or higher.
• Under-dome temperature - suction saturation temperature (SST) is 15°C or higher.
• Outdoor air temperature is 46°C or higher.
2) Ending condition
In case any of the following conditions are satisfied
• Outdoor heat exchanger temperature (either Tho-R1 or Tho-R2, whichever is higher) is 50°C or lower.
• Under-dome temperature - suction saturation temperature (SST) is 8°C or lower.
• Outdoor air temperature is 43°C or lower.

(iv) Anomalous stop control

1) As the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
2) If it is detected 5 times within 60 minutes or 64°C or higher continues for 30 minutes, including the stop of compressor, E35 is displayed on the remote control and it enters the anomalous stop mode.



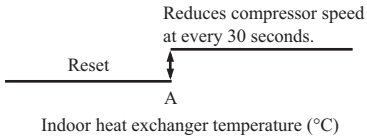
(v) Reset of anomalous stop mode
As it reaches the reset value of 50°C or lower, it becomes possible to restart from the remote control.

(c) Heating high pressure protection

(i) Protective control

1) As the indoor heat exchanger temperature (Thi-R) exceeds the setting value, the compressor speed is controlled to suppress the rise of high pressure.

2) Control value A is changed from 57°C to 51°C by number of 63H1 operations.



Model	Control value A (°C)
FDC200-280	57–51

3) If indoor heat exchanger temperature(Thi-R) is less than the control value A continuously for 6minutes, protective control finishes.

(ii) Anomalous stop control

Operation control function by the indoor unit control - See the heating overload protection, page 17.

(d) Anomaly detection control by the high pressure switch (63H1)

(i) If the pressure rises and operates the high pressure switch (opens at 4.15MPa/closes at 3.15MPa), the compressor stops.

(ii) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.

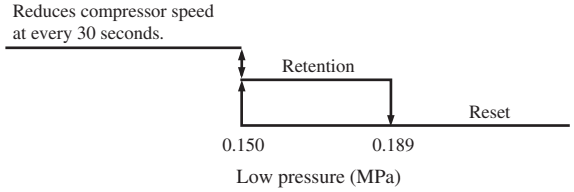
1) When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1

2) When 63H1 has been in the open state for 30 minutes continuously, including the stop of compressor

(e) Low pressure control

(i) Protective control

1) If the value detected by the low pressure sensor (PSL) exceeds the setting value, the compressor speed is controlled to restrain the drop of pressure.



2) If low pressure sensor (PSL) is 0.189MPa or higher, protective control finishes.

(ii) Anomalous stop control

1) When a value detected by the low pressure sensor (PSL) satisfies any of the following conditions, the compressor stops for its protection.

a) When the low pressure drops to 0.079MPa or lower for 15 seconds continuously

b) At 10 minutes after the start of compressor, the suction superheat becomes 30°C or more for 60 seconds continuously and the low pressure becomes 0.15MPa or lower.

2) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.

a) When the low pressure drops 5 times within 60 minutes and the compressor stops under any of the above conditions

b) When a value detected with the low pressure sensor becomes 0.079MPa or lower for 5 minutes continuously, including the stop of compressor

3) However, when the control condition 1). a) is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

4) If low pressure sensor (PSL) is 0.227MPa or higher and 3 minutes took after the compressor stops, it becomes possible to restart from the remote control.

(f) Compressor pressure ratio protection control

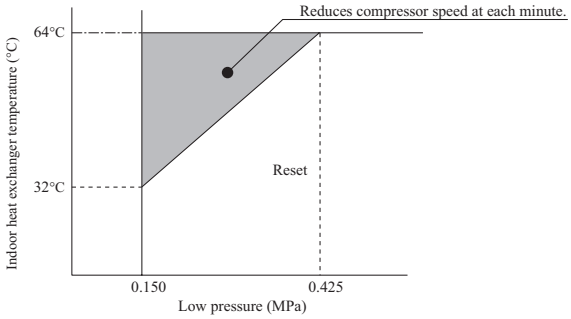
(i) During heating operation, if the indoor heat exchanger temperature (Thi-R) and low pressure sensor (PSL) exceed the setting values at 10 minutes after the start of compressor, the compressor speed is controlled to protect the compressor.

(ii) This control is not performed during the outdoor fan ON and for 10 minutes from the start of outdoor fan.

(iii) This control is not performed during defrost operation and at 10 minutes after the reset of defrost operation.

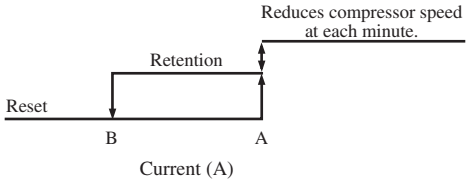
(iv) When there are 3 indoor heat exchanger temperatures (Thi-R), the highest temperature is detected.

(v) If the indoor heat exchanger temperature (Thi-R) and low pressure sensor (PSL) is without "Reduces compressor speed at each minute" range in the following figure continuously for 6minutes, protective control finishes.



(g) Over-current protection current safe controls I, II

Detecting the outdoor inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed is controlled to protect the inverter.



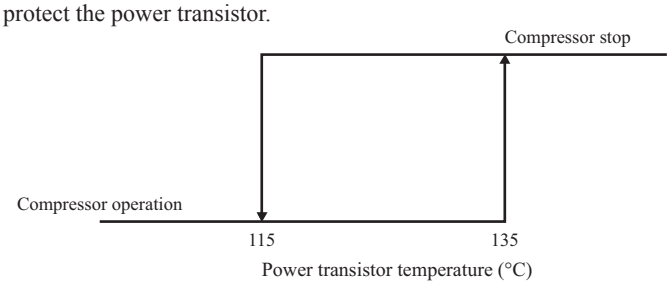
unit : A

Model		Cooling		Heating	
		Control value A	Reset value B	Control value A	Reset value B
Primary current side	FDC200	16.0	15.0	16.0	15.0
	FDC250, 280	17-17.5	16-16.5	17-17.5	16-16.5
Secandary current side	FDC200	15.5	14.5	15.5	14.5
	FDC250, 280	17-18.5	16-17.5	17-18.5	16-17.5

(h) Power transistor temperature protection

(i) Anomalous stop control

If the power transistor temperature exceeds the setting value, the protective switch in the power transistor trips and stops the compressor to protect the power transistor.



(ii) Anomalous inverter PCB

1) If the power transistor detects anomaly 5 times within 60 minutes with compressor stop, E41 is displayed on the remote control and it enters the anomalous stop mode.
2) If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote control and it enters the anomalous stop mode.
3) 3 minutes after the compressor stops, it becomes possible to restart from the remote control.

(i) Anomalous power transistor current

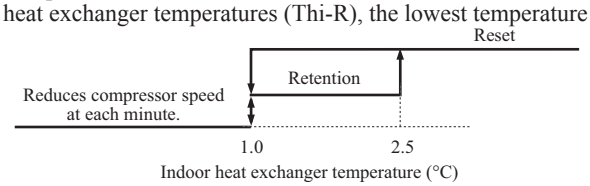
(i) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
(ii) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote control and it enters the anomalous stop mode.
(iii) 3 minutes after the compressor stops, it becomes possible to restart.

(j) Anomalous inverter communication

(i) When the answerback signal from the inverter cannot be received continuously for 15 seconds, the compressor stops.
(ii) If the power transistor defects anomalies 4 times within 15 minutes, including the stop of compressor, E45 is displayed on the remote control and it enters the anomalous stop mode.
3 minutes after the compressor stops, it becomes possible to restart from the remote control.

(k) Anti-frost control by the compressor speed control

(i) If the indoor heat exchanger temperature (detected with Thi-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed is controlled to initiate the anti-frost control of indoor heat exchanger.
(ii) When there are 3 indoor heat exchanger temperatures (Thi-R), the lowest temperature is detected.



(iii) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit control and the cooling, dehumidifying frost prevention of page 17.

(l) Dewing prevention control

[Control condition]

During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed is reduced to prevent dewing and water splash.

(i) Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

(ii) Suction superheat is more than 10°C.

(iii) Compressor speed is 60 rps or higher.

[Control contents]

(i) The compressor speed is reduced at each 1 minute until EEVC aperture is 460 pulses or lower.

(ii) This control takes 60 rps as its lower limit of compressor speed.

(iii) If cooling electronic expansion valve aperture (EEVC) is less than 460 pulses continuously for 6minutes, protective control finishes.

(m) Broken wire detection on temperature sensor and low pressure sensor

(i) Outdoor heat exchanger temperature sensor, outdoor air temperature sensor and low pressure sensor

If the following is detected for 5 seconds continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON or 20 seconds after power on, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation, it is not detected.

- Outdoor heat exchanger temperature sensor: -50°C or lower
- Outdoor air temperature sensor: -45°C or lower
- Low pressure sensor: 0V or lower or 4.0V or more

(ii) Discharge pipe temperature sensor, suction pipe temperature sensor, compressor under-dome temperature sensor

If the following is detected for 5 seconds continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation, it is not detected.

- Discharge pipe temperature sensor: -10°C or lower
- Suction pipe temperature sensor: -50°C or lower
- Compressor under-dome temperature sensor : -50°C or lower

(n) Fan motor error

(i) If compressor moves and the fan of revolution 100min^{-1} or less is detected for 30 seconds continuously , the compressor stops.

(ii) If the above (i) is detected 5 times within 60 minutes from first detection of the above (i), it enters the anomalous stop mode with E48 displayed on the remote control.

(o) Anomalous stop by the compressor start stop

(i) When a compressor startup failure is received from the inverter PCB, the compressor stops temporarily and restarts 3-minute later.

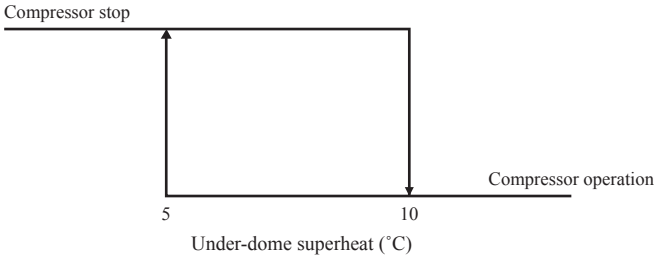
(ii) If the above (i) is detected 5 times, the compressor stops and E59 is displayed on the remote control.

(iii) 3 minutes after the compressor stops, it becomes possible to restart from the remote control.

(p) Anomaly liquid flooding

(i) Anomalous stop control

1) If the under-dome superheat exceeds the setting value continuously for 15 minutes (first anomalous stop) or 30 minutes (after the second anomalous stop), the compressor stops.



2) When it occurs 3 times within 90 minutes, E44 is displayed on the remote control and it enters the anomalous stop mode.

(ii) Reset of anomalous stop mode

3 minutes after the compressor stops, it becomes possible to restart from the remote control.

(7) Silent mode

(a) As "Silent mode start" signal is received from the remote control, it operates by dropping the outdoor fan speed and the compressor speed.

(b) For details, refer to items (1) and (4) above.

(8) Test run

(a) It is possible to operate from the outdoor unit using the DIP switch on the outdoor unit control PCB.

SW3-3	ON	SW3-4	OFF	Cooling test run
			ON	Heating test run
	OFF	Normal and end of test run		

Make sure to turn SW3-3 to OFF after the end of operation.

(b) Test run control

(i) Operation is performed at required compressor speed, which is determined for each model.

(ii) Each protective control and error detection control are effective.

(iii) If SW3-4 is switched during test run, the compressor is stopped once by the stop control and the cooling/heating operation is switched.

(iv) Setting and display of remote control during test run

Item / Mode	Contents of remote control setting/display
Cooling test run	Setting temperature of cooling is 5°C.
Heating test run	Setting temperature of heating (preparation) is 30°C.

(9) Pump-down control

Turning ON the pump-down switch SW1 for 2 seconds during the operation stop or anomalous stop (excluding the thermostat OFF) or SW4-1 is off, the pump-down operation is performed. (This is invalid when the indoor unit is operating. This is effective even when the indoor unit is stopped by the anomalous stop or the power source is turned OFF.)

(a) Control contents

(i) Close the service valve at the liquid side. (It is kept open at the gas side.)

(ii) Compressor is started with the target speed at 55 rps in the cooling mode.

(iii) Red and green lamps (LED) keeps flashing on the outdoor unit control PCB.

(iv) Each of protection and error detection controls, excluding the low pressure control, anti-frost control and dewing prevention control, is effective.

(v) Outdoor fan is controlled as usual.

(vi) Electronic expansion valve is fully opened.

(b) Ending conditions

Stop control is initiated depending on any of the following conditions.

(i) Low pressure of 0.087MPa or lower is detected for 5 seconds continuously.
1) Red LED: Light, Green LED: Keeps flashing, Remote control: Displays stop
2) It is possible to restart when the low pressure is more than 0.087MPa.
3) Electronic expansion valve (cooling/heating) is kept fully open.

(ii) Stop by the error detection control
1) Red LED: Keeps flashing, Green LED: Keeps flashing
2) Restart is prohibited. To return to normal operation, reset the power source.
3) Electronic expansion valve (cooling/heating) is kept fully open.

(iii) When the accumulative operation time of compressor under the pump-down control becomes 5 minutes
1) Red LED: Stays OFF, Green LED: Keeps flashing, Remote control: Stop
2) It is possible to pump-down again.
3) Electronic expansion valve (cooling/heating) is kept fully open.

Note After the stop of compressor, close the service valve at the gas side.

Caution: Since pressing the pump-down switch cancels communications with the indoor unit, the indoor unit and the remote control display "Transmission error – E5". This is normal.

(10) Base heater ON/OFF output control (Option)

(i) Base heater ON conditions

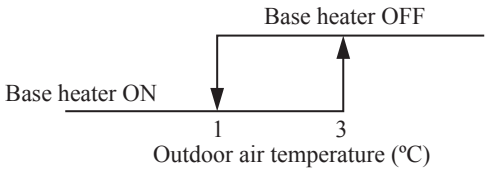
When all of following conditions are satisfied, the base heater is turned ON.

- Outdoor air temperature (detected with Tho-A) is 1ºC or lower.
- In the heating mode
- When the compressor is turned ON

(ii) Base heater OFF conditions

When either one of following conditions is satisfied, the base heater is turned OFF.

- Outdoor air temperature (detected with Tho-A) is 3ºC or higher.
- When the compressor stop has been detected for 30 minutes continuously
- In the cooling or dehumidifying mode



2.2 MAINTENANCE DATA

See page 42 of 1.2 chapter.

2.3 DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

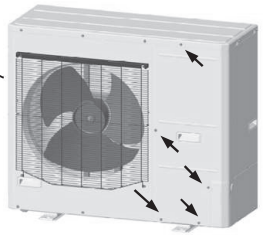
(1) Indoor units ..... See page 181.

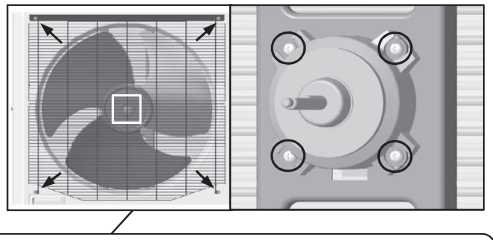
(2) Outdoor unit

(a) Models FDC125, 140VN(S)A-W

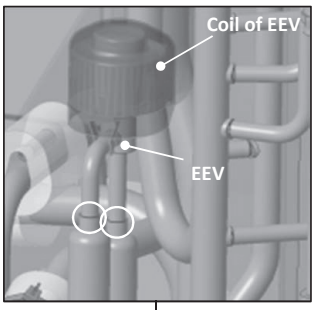
PCA012D089A B

1. To remove the service panel
(1) Remove 5 service panel fixing screws and remove it.

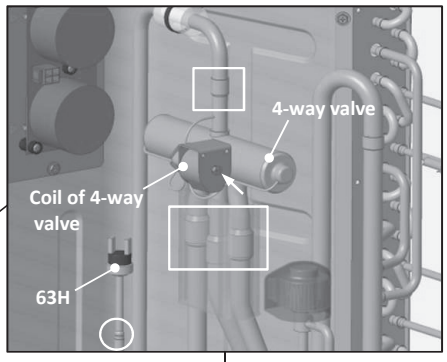




2. To remove the fan motor (FM)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the motor connector(FMxx or CNFxx) on PCB in control box.
(3) Remove 4 fan guard fixing screws and remove it.(← mark)
(4) Remove the propeller fan fixing nut and remove it.(□ mark)
(5) Remove 4 fan motor fixing nuts and remove it.(○ mark)

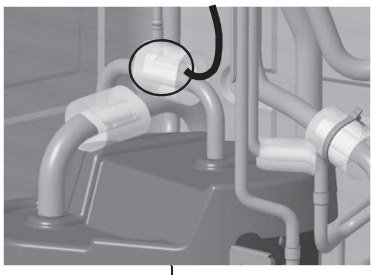


3. To remove the electronic expantion valve (EEV)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the EEV connector(CNEEVx) on PCB in control box.
(3) Remove the coil of EEV by pull out on the top.
(4) Remove welded part of EEV by welding. (○ mark)

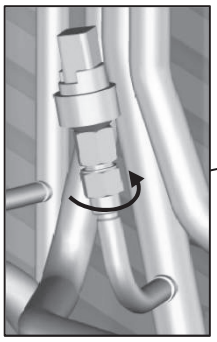


4. To remove the high pressure switch (63H)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the 63H connector(CNH) on PCB in control box.
(3) Remove welded part of high pressure switch by welding.(○ mark)

5. To remove the 4-way valve (20S)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the coil of 4-way valve connector (CNS) on PCB in control box.
(3) Remove the coil of 4-way valve fixing screw and remove it.(← mark)
(4) Remove welded part of 4-way valve by welding. (□ mark)

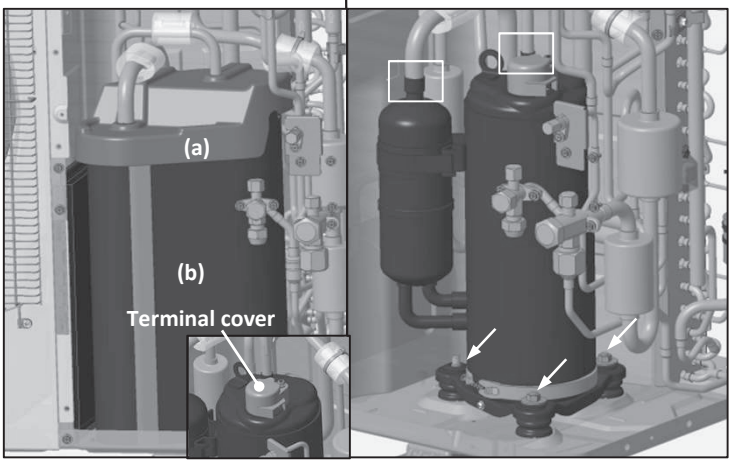


6. To remove the temperature sensors (example"Tho-D1")
(1) Remove the service panel.(See No.1.)
(2) Disconnect the Tho-D1 connector(CNTH) on PCB in control box.
(3) Pull out the temperature sensor "Tho-D1" from the sensor holder.

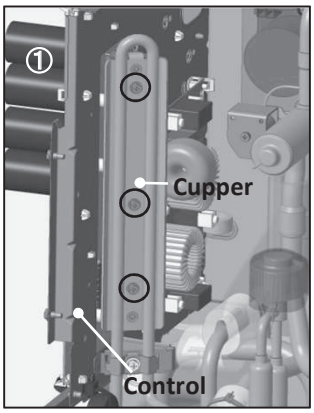


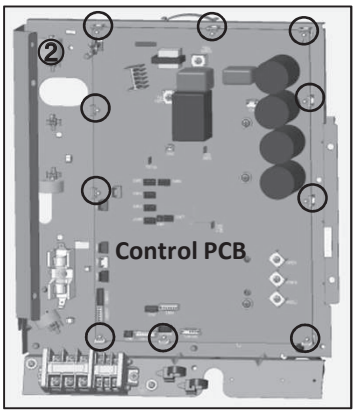
7. To remove the low pressure sensor (PSL)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the PSL connector(CNPSL) on PCB in control box.
(3) Turn PSL unticlockwise and remove it.
(Double spanners are needed.)
* Be sure to collect a refrigerant before remove the low pressure sensor.

8. To remove the compressor (CM)
(1) Remove the service panel.(See No.1.)
(2) Remove the insulation which covers compressor. (Strings (a)—(b) should be loosen.)
(3) Remove the terminal cover fixing bolt and remove it, and disconnect the power wiring.
(4) Remove welded part of compressor by welding. (□ mark)
(5) Remove 3 compressor fixing nuts(← mark) using spaner or adjustable wrench.

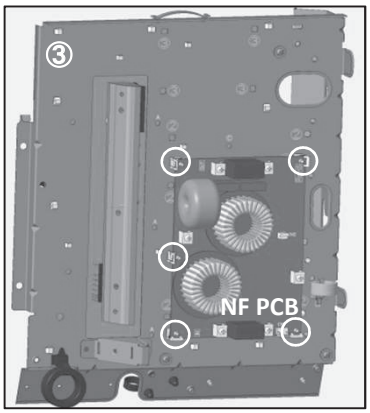


9. To remove the printed circuit board (PCB)
(1) Remove the service panel and rear panel, top panel.
(2) Remove 3 cupper plate fixing screws.(○ mark, Pic.①)
(3) Pull off all the inserted connectors of control PCB.(Pic.②)
(4) Take off 10 control PCB fixing locking supports and remove it.(○ mark, Pic.②)
(5) Pull off all the inserted connectors of NF PCB.(Pic.③)
(6) Take off 5 NF PCB fixing locking supports and remove it.(○ mark, Pic.③)





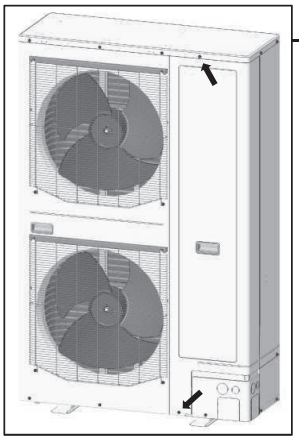
Front of control



Rear of control

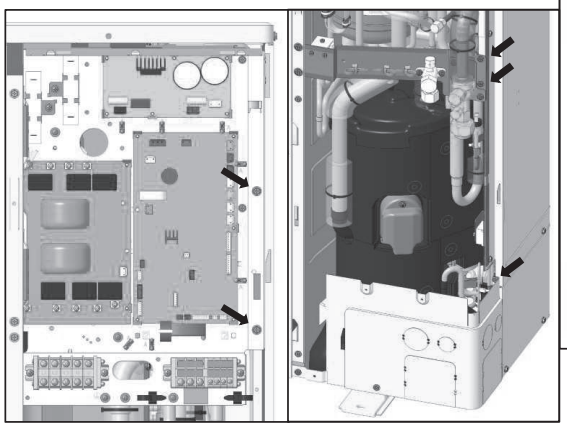
(b) Models FDC200, 250, 280VSA-W

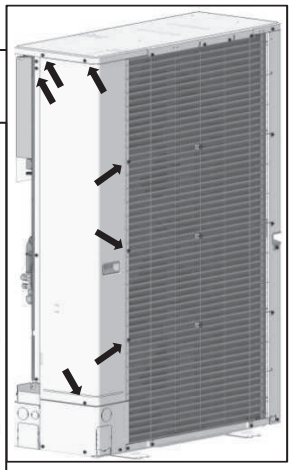
PCA012D109



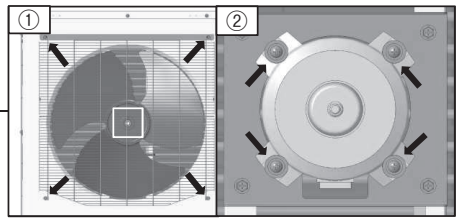
1. To remove the service panel
(1) Remove 2 service panel fixing screws and remove service panel.

2. To remove the rear panel
(1) Remove the service panel.(See No.1.)
(2) Remove 12 rear panel fixing screws and remove rear panel.

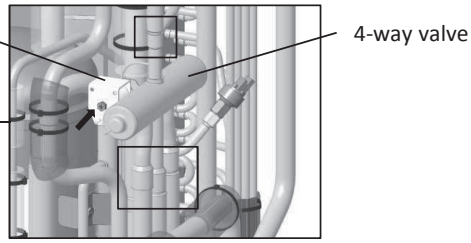




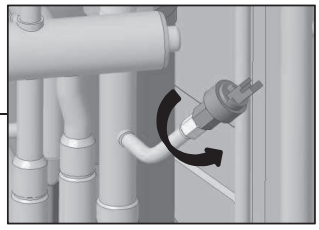
3. To remove the fan motor (FM)
(1) Remove the service panel.(See No.1.)
(2) Disconnect the motor connector(CNFANx) on PCB in control box.
(3) Remove 4 fan guard fixing screws and remove fan guard.(← mark, Pic.①)
(4) Remove the propeller fan fixing nut and remove propeller fan .
(□ mark, Pic.①)
(5) Remove the fan motor wiring fixing bands.
(6) Remove 4 fan motor fixing screws and remove fan motor.(← mark, Pic.②)



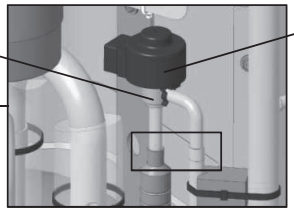
4. To remove the 4-way valve (20S)
(1) Remove the service panel and rear panel.(See No.1,2.)
(2) Disconnect the coil of 4-way valve connector(CNS) on PCB in control box.
(3) Remove the coil of 4-way valve wiring fixing bands.
(4) Remove the coil of 4-way valve fixing screw (← mark) and remove coil of 4-way valve.
(5) Remove welded part of 4-way valve by welding. (□ mark)



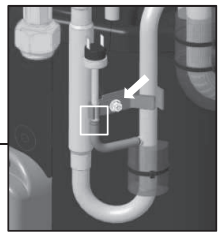
5. To remove the low pressure sensor (PSL)
(1) Remove the service panel and rear panel.(See No.1,2.)
(2) Disconnect the PSL connector(CNPS) on PCB in control box.
(3) Remove the PSL wiring fixing bands.
(4) Turn PSL to the left and remove PSL.
(Double spanners are needed.)

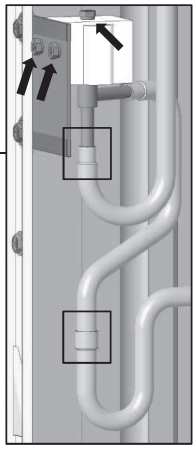


6. To remove the electronic expansion valves (example"EEVC")
(1) Remove the service panel and rear panel.(See No.1,2.)
(2) Disconnect the EEVC connector(CNEEV1) on PCB in control box.
(3) Remove the EEVC coil wiring fixing bands.
(3) Remove the EEVC coil by pull out on the top.
(4) Remove welded part of EEV by welding. (□ mark)

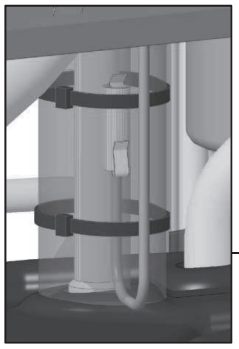


7. To remove the high pressure switch (63H)
(1) Remove the service panel and rear panel.(See No.1,2.)
(2) Disconnect the 63H connector(CNH) on PCB in control box.
(3) Remove the high pressure switch wiring fixing bands.
(4) Remove the metal fitting fixing screws and remove metal fitting.(← mark)
(5) Remove welded part of high pressure switch by welding. (□ mark)



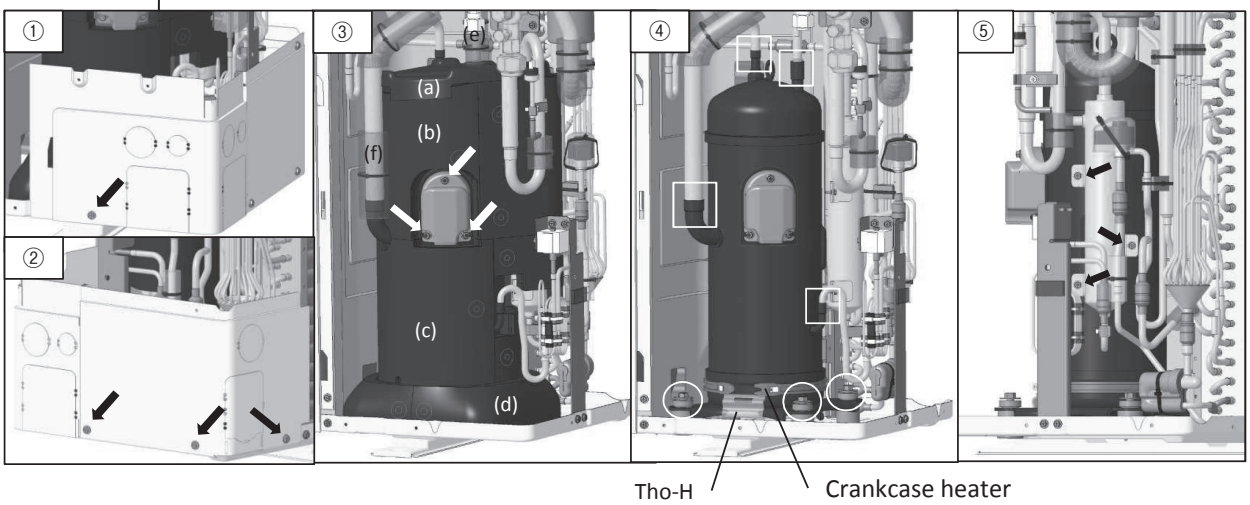


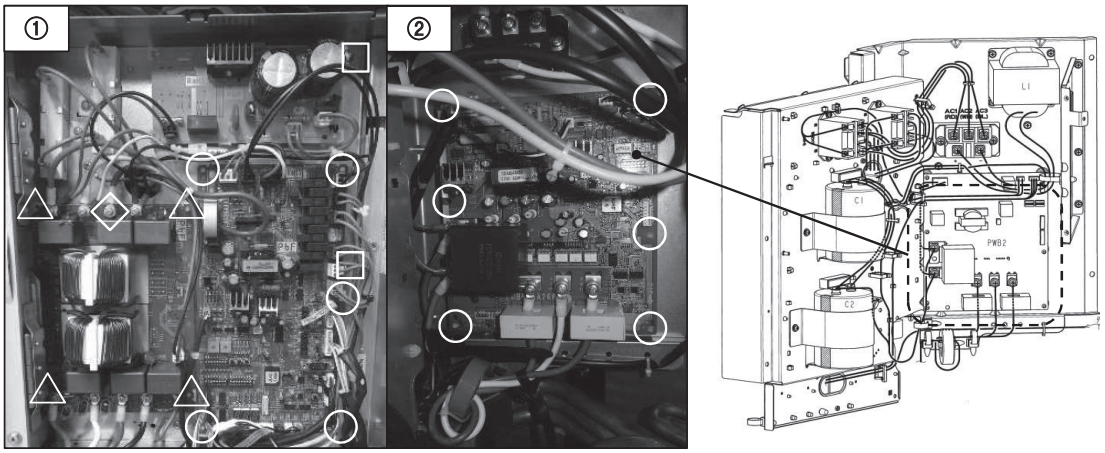
8. To remove bypass valves (example"SV1")
(1) Remove the service panel.(See No.1.)
(2) Disconnect the SV1 connector(CNF) on PCB in control box.
(3) Remove the coil of SV1 wiring fixing bands.
(4) Remove 3 coil of SV1 fixing screws and remove coil .(← mark)
(5) Remove welded part of SV1 by welding.(□ mark)



9. To remove the temperature sensors (example"Tho-D")
(1) Remove the service panel.(See No.1.)
(2) Remove the insulation which covers Tho-D.
(3) Disconnect the Tho-D connector(CNTH) on PCB in control box.
(4) Remove the Tho-D wiring fixing bands.
(5) Pull out the temperature sensor"Tho-D" from the sensor holder.

10. To remove the compressor (CM)
(1) Remove the service panel and rear panel.(See No.1,2.)
(2) Remove front cover fixing screw and remove front cover.(← mark, Pic.①)
(3) Remove 3 side cover fixing screws and remove side cover.(← mark, Pic.②)
(4) Remove the insulation ((a)—(d), Pic.③) which covers compressor. (Strings (b)—(d), Pic.③ should be loosen.)
(5) Remove 3 terminal cover fixing bolts(← mark, Pic.③) and remove terminal cover and disconnect the power wirings.
(6) Remove the crankcase heater.
(7) Pull out the temperature sensor"Tho-H" from the sensor holder.
(8) Remove the insulation ((e),(f), Pic.③) which covers welded part.
(9) Remove welded part of compressor by welding.(□ mark, Pic.④)
(10) Remove 3 oil separator fixing screws and remove oil separator.(← mark, Pic.⑤)
(11) Remove 3 compressor fixing nuts(○ mark, Pic.④) using spanner or adjustable wrench.





11. To remove the printed circuit board (PCB)

≪Control PCB≫

(1) Remove the service panel.(See No.1.)
(2) Pull off all the inserted connectors of control PCB.(Pic.①)
(3) Remove wiring fixing screw of noise filter PCB.(◇ mark, Pic.①)
(4) Take off 5 control PCB fixing locking supports and remove control PCB.(○ mark, Pic.①)

≪Inverter PCB≫

(1) Remove the service panel.(See No.1.)
(2) Remove 2 plate fixing screws and open plate.(□ mark, Pic.①)
(3) Pull off all the inserted connectors of inverter PCB.(Pic.②)
(4) Remove all wiring fixing screws of inverter PCB.(Pic.②)
(5) Take off 6 inverter PCB fixing locking supports and remove inverter PCB.(○ mark, Pic.②)

≪Noise filter PCB≫

(1) Remove the service panel.(See No.1.)
(2) Pull off all the inserted connectors of noise filter PCB.(Pic.①)
(3) Remove all wiring fixing screws of noise filter PCB.(Pic.①)
(4) Take off 4 noise filter PCB fixing locking supports and remove noise filter PCB.(△ mark, Pic.①)

2.4 ELECTRICAL WIRING

(1) Indoor units ..... See page 185.

(2) Outdoor units

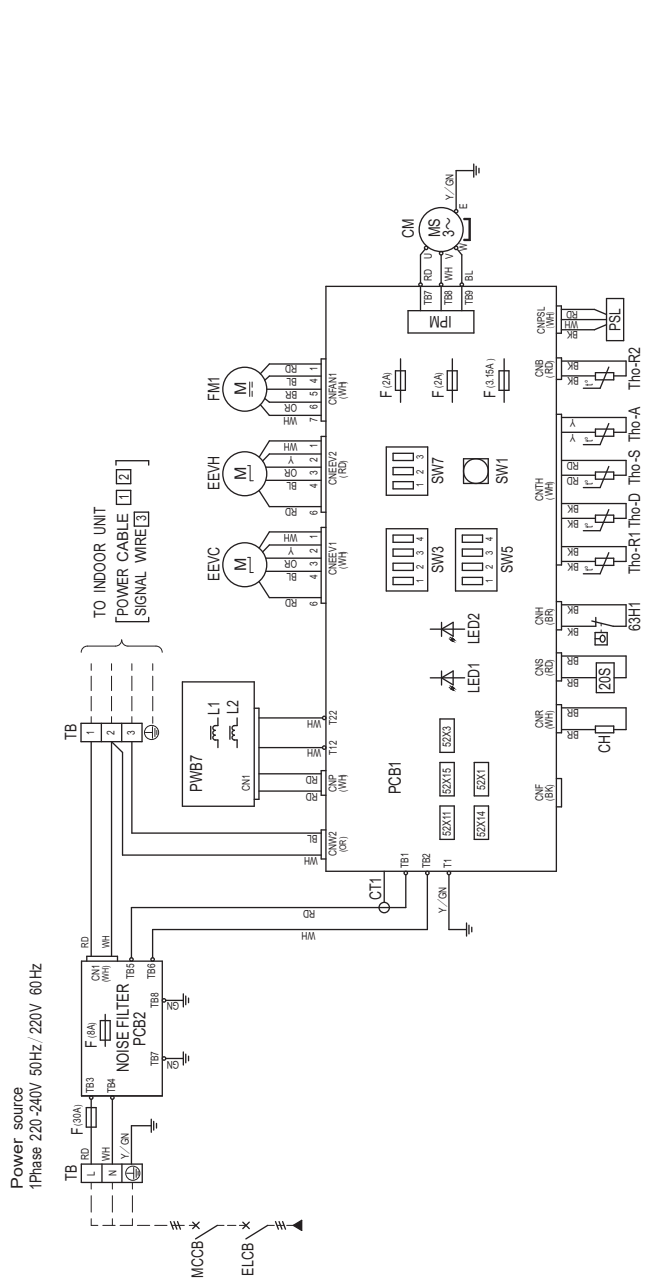
Model FDC100VNA-W, 125VNA-W, 140VNA-W

Meaning of marks

Item	Description
CH	Crankcase heater
CM	Compressor motor
CN	Connector
CT1	Current sensor
EEVC	Expansion valve for cooling
EEVH	Expansion valve for heating
F	Fuse
FM1	Fan motor
IPM	Intelligent power module
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
L1,2	Reactor
PSL	Low pressure sensor
SW1	Switch
SW3,5,7	Local setting switch
TB	Terminal block
THo-A	Temperature sensor (Outdoor air)
THo-D	Temperature sesor (Discharge pipe)
THo-R1,R2	Temperature sensor (Heat exchanger)
THo-S	Temperature sensor (Suction pipe)
20S	Solenoid valve for 4-way valve
52X1	Auxiliary relay
52X3	Auxiliary relay
52X11	Auxiliary relay (for 20S)
52X14	Auxiliary relay (for CH)
52X15	Auxiliary relay
63H1	High pressure switch

Color marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GN	Green
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	24	5.5	22	ϕ1.6mm x 3	ϕ1.6
125					
140					

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

Local setting switch SW3,5,7 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON ④Be sure to turn OFF SW3-3 after the trial operation is finished.
SW5-2	High height difference operation control	Set this switch to ON when outdoor unit is installed at a position higher than indoor unit by 30m or more.
SW7-2	Defrost control change	Set this switch to ON when managing unit operation by remote control connected external equipment.
SW7-3	Lower noise silent mode	Upper limit of compressor speed and fan speed becomes lower in silent mode.

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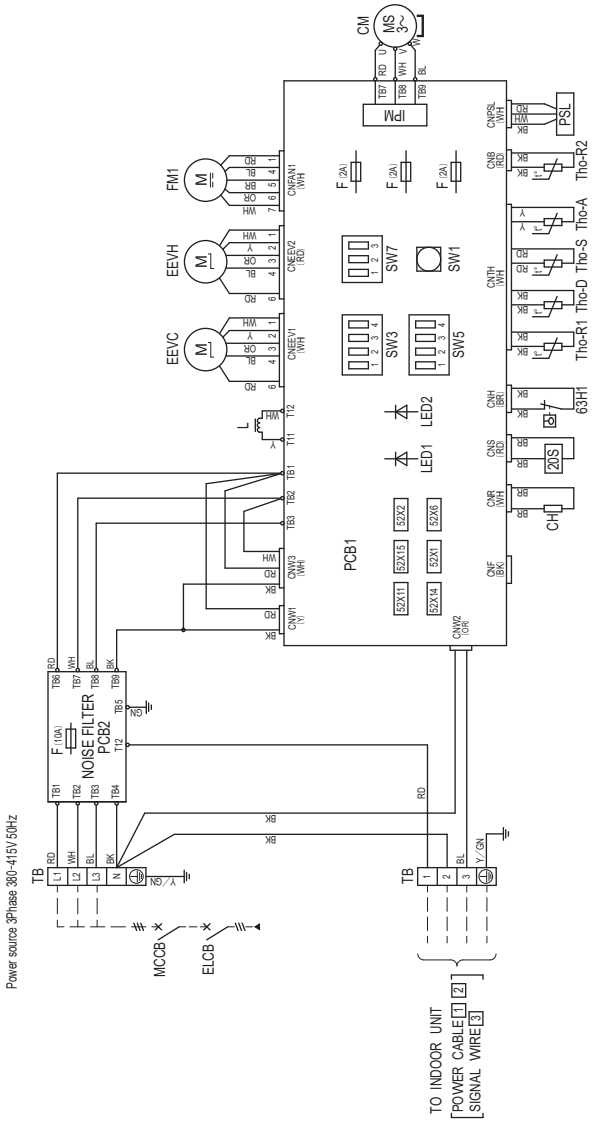
Models FDC100VSA-W, 125VSA-W, 140VSA-W

Meaning of marks

Item	Description
CH	Crankcase heater
CM	Compressor motor
CN	Connector
EEVC	Expansion valve for cooling
EEVH	Expansion valve for heating
F	Fuse
FM1	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
PSL	Low pressure sensor
SW1	Switch
SW3,5,7	Local setting switch
TB	Terminal block
THo-A	Temperature sensor (Outdoor air)
THo-D	Temperature sensor (Discharge pipe)
THo-R1,R2	Temperature sensor (Heat exchanger)
THo-S	Temperature sensor (Suction pipe)
20S	Solenoid valve for 4-way valve
52X1	Auxiliary relay
52X2	Auxiliary relay
52X6	Auxiliary relay (for FM1)
52X11	Auxiliary relay (for 20S)
52X14	Auxiliary relay (for CH)
52X15	Auxiliary relay
63H1	High pressure switch

Color marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GN	Green
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



Local setting switch SW3,5,7 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON ④Be sure to turn OFF SW3-3 after the trial operation is finished.
SW5-2	High height difference operation control	Set this switch to ON when outdoor unit is installed at a position higher than indoor unit by 30m or more.
SW7-2	Defrost control change	Set this switch to ON when managing unit operation by remote control connected external equipment.
SW7-3	Lower noise silent mode	Upper limit of compressor speed and fan speed becomes lower in silent mode.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	15	3.5	46	ϕ1.6mm x 3	ϕ1.6
125					
140					

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

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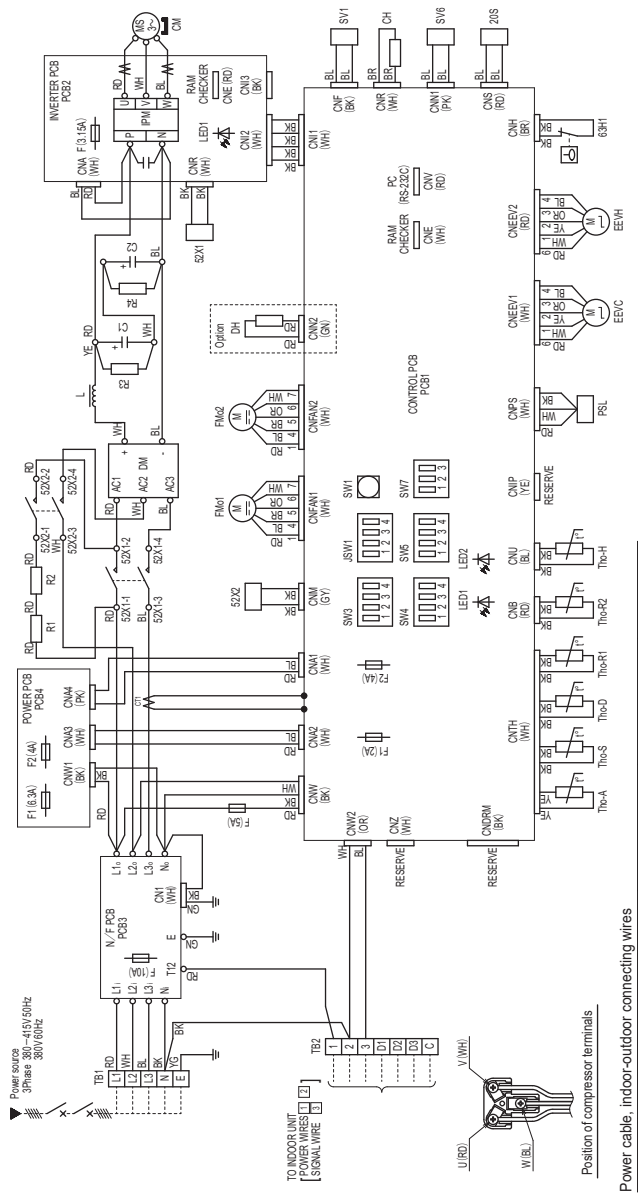
Models FDC200VSA-W, 250VSA-W, 280VSA-W



Meaning of marks

Item	Description
CH	Crankcase heater
CM	Compressor motor
CNA-Z	Connector
CT	Current sensor
DH	Drain pan heater
DM	Diode module
F	Fuse
FMo 1, 2	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
PSL	Low pressure sensor
EEVC	Expansion valve for cooling
EEVH	Expansion valve for heating
SW1	Pump down switch
SW3-5, 7	Local setting switch
TB	Terminal block
Tho-A	Temperature sensor (Outdoor air)
Tho-D	Temperature sensor (Discharge pipe)
Tho-R1, R2	Temperature sensor (Heat exchanger)
Tho-H	Temperature sensor (Compressor under-dome)
Tho-S	Temperature sensor (Suction pipe)
20S	Solenoid coil for 4-way valve
SV1, 6	Solenoid coil for 2-way valve
52X1, 2	Relay
63H1	High pressure switch

Color marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GN	Green
OR	Orange
RD	Red
WH	White
YE	Yellow
YG	Yellow / Green
GY	Gray
PK	Pink

Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	Indoor-outdoor wire size × number	Earth wire size
200V	19	5.5	72	φ 1.6mm × 3	φ 1.6mm
250V	20		69		
280V					

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

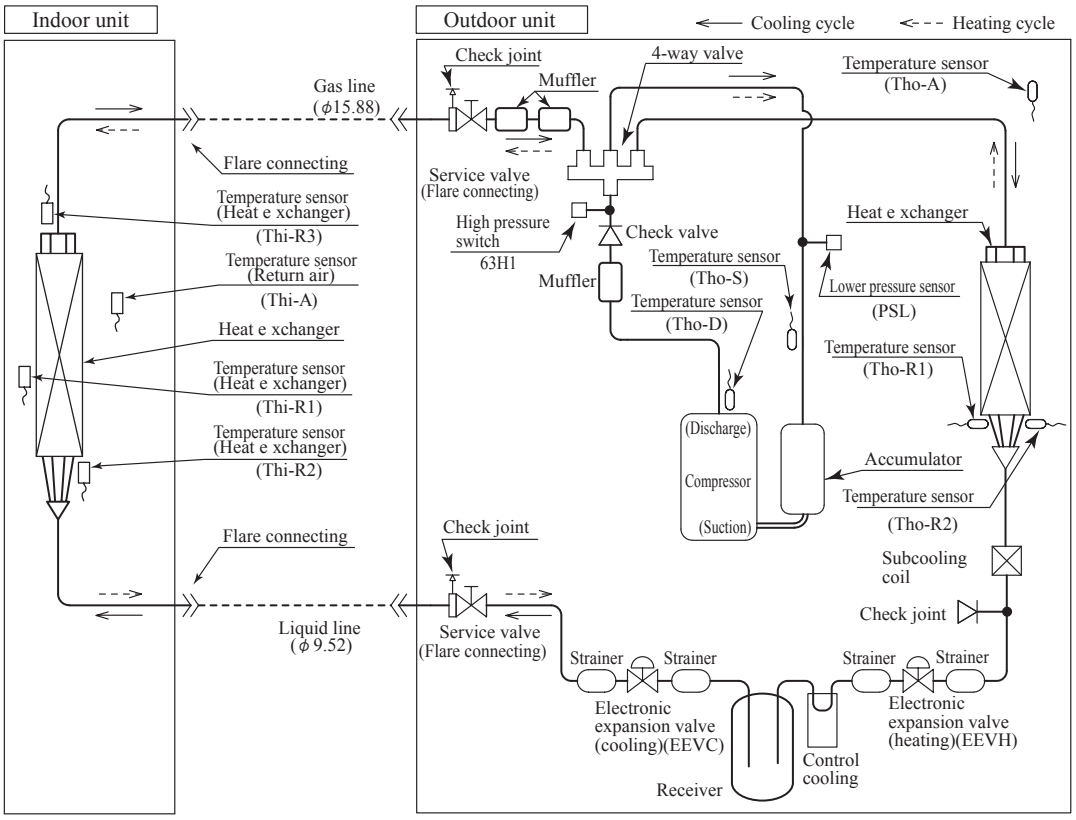
PCB004Z471 A

2.5 PIPING SYSTEM

(1) Models FDC100-140VNA-W, 100-140VSA-W

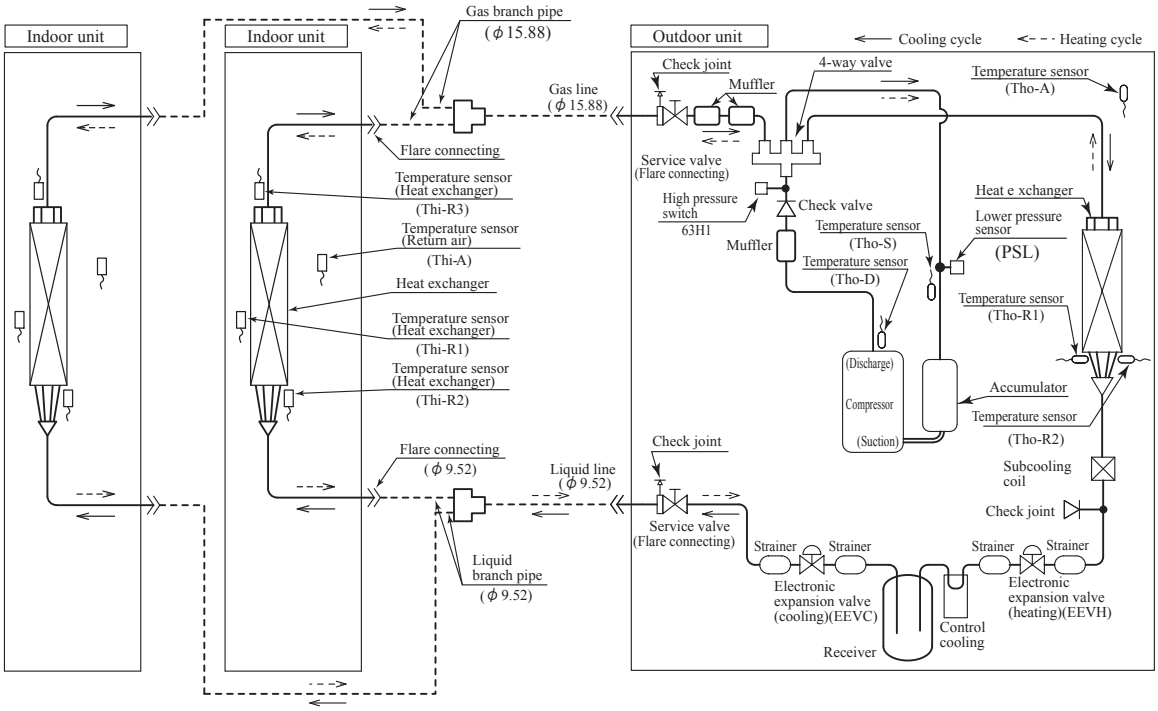
(a) Single type

Models 100, 125, 140



(b) Twin type

Model 140

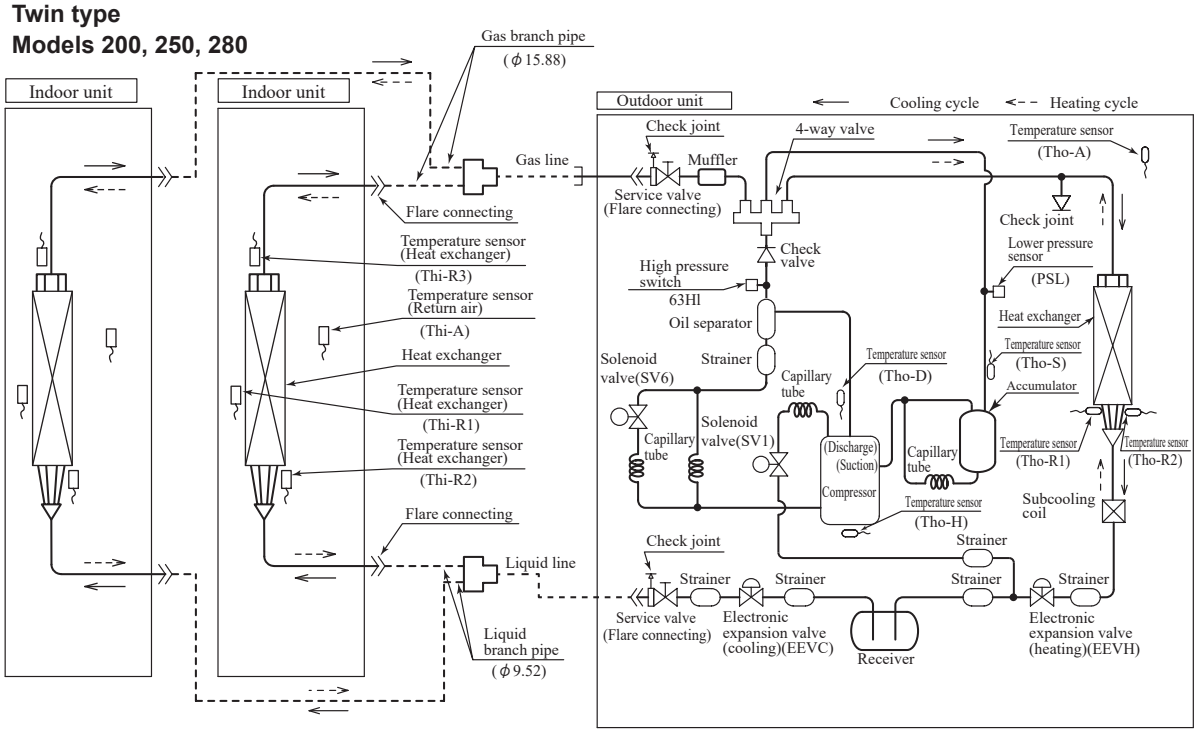


Preset point of the protective devices

Parts name	Mark	Equipped unit	100, 125, 140 model
Temperature sensor (for protection over-loading in heating)	**Thi-R**	Indoor unit	Active 63˚C Inactive 56˚C
Temperature sensor (for frost prevention)	**Thi-R**		Active 1.0˚C Inactive 10˚C
Temperature sensor (for protection high pressure in cooling)	**Tho-R**	Outdoor unit	Active 65˚C Inactive 51˚C
Temperature sensor (for detecting dis-charge pipe temperature)	**Tho-D**	Outdoor unit	Active 115˚C Inactive 85˚C
High pressure switch (for protection)	**63H1**	Outdoor unit	Active 4.15MPa Inactive 3.15MPa
Low pressure sensor (for protection)	**PSL**	Outdoor unit	Active 0.079MPa Inactive 0.227MPa

(2) Models FDC200-280VSA-W

Twin type
Models 200, 250, 280



●**Refrigerant line (one way) pipe size**

Model	Gas line	Liquid line
200	In case of ϕ22.22 : 35m	In case of ϕ9.52 : 40m (200)
250	In case of ϕ25.4 or ϕ28.58 : 70m (200, 250)	In case of ϕ12.7 : 70m (200, 250)
280	60m (280)	60m (280)

Preset point of the protective devices

Parts name	Mark	Equipped unit	200, 250, 280 model
Temperature sensor (for protection over-loading in heating)	**Thi-R**	Indoor unit	Active 63˚C Inactive 56˚C
Temperature sensor (for frost prevention)	**Thi-R**	Indoor unit	Active 1.0˚C Inactive 10˚C
Temperature sensor (for protection high pressure in cooling)	**Tho-R**	Outdoor unit	Active 64˚C Inactive 50˚C
Temperature sensor (for detecting discharge pipe temperature)	**Tho-D**	Outdoor unit	Active 135˚C Inactive 90˚C
High pressure switch (for protection)	**63H1**	Outdoor unit	Active 4.15MPa Inactive 3.15MPa
Low pressure sensor (for protection)	**PSL**	Outdoor unit	Active 0.079MPa Inactive 0.227MPa

3. STANDARD INVERTER PACKAGED AIR-CONDITIONERS

CONTENTS

3.1 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

3.1.4 Operation control function by the outdoor control

(1) Compressor speed

Unit: rps

Mode / Item	Cooling			Heating		
	FDC71	FDC90	FDC100	FDC71	FDC90	FDC100
Upper limit	120 (80)	120 (68)	120 (74)	120 (90)	120 (70)	120 (70)
Lower limit	12			12		

Note Value in ( ) are for the silent mode.

(2) Compressor protection start

(a) Compressor protection start I

(i) Operating condition

When the compressor is turned ON from the state of OFF

(ii) Detail of operation

During the protection start I control, the upper limit of compressor speed is restricted to the speeds as shown in the following table.

Unit: rps

			Time after establishment of operating conditions (Including acceleration time)				
			Less than 3 min	Less than 5 min	Less than 7 min	Less than 9 min	9 min or more
FDC71	Cooling		120	120	120	120	End of control
	Heating(1)	TH2≧10°C	120	120	120	120	
		TH2<10°C	48	56	56	96	
FDC90,100	Cooling		120	120	120	120	
	Heating(1)	TH2≧10°C	55	55	75	95	
		TH2<10°C	55	55	75	95	

Note (1) Judgment by the outdoor air temperature sensor (TH2) is made only at the start of control during heating operation.

(b) Compressor protection start II

(i) Operating condition

When the outdoor air temperature sensor (TH2) has detected 10°C or lower after starting the compressor during heating operation

(ii) Detail of operation

During the protection start II control, the upper limit of compressor speed is restricted to the speeds as shown in the following table.

Unit: rps

		Time after compressor ON (Including acceleration time)				
		Less than 1 min	Less than 5 min	Less than 7 min	Less than 9 min	9 min or more
FDC71		40	40	120	120	End of control
FDC90,100	TH2≧-5°C	40	45	120	120	
	TH2<-5°C	55	55	120	120	

(3) Outdoor fan control

(a) Outdoor fan speed and fan motor speed

Unit: min^{-1}

Fan speed	1st speed	2nd speed	3rd speed	4th speed	5th speed	6th speed	7th speed	8th speed
FDC71	150	225	485	520	570	685	800	850
FDC90,100	150	300	500	650	740	835	890	950

(b) Outdoor fan control at start (Cooling operation only)

When the outdoor air temperature (TH2) is lower than 22°C at the start of compressor, the outdoor fan is operated at a fixed speed.

(i) When the outdoor air temperature is 11°C or higher, the compressor runs at 2nd speed for 30 seconds after the compressor ON.

(ii) When the outdoor air temperature is lower than 11°C, the compressor runs at 1st speed for 30 seconds after the compressor ON.

(c) Relationship between compressor speed and outdoor fan speed

Outdoor fan speed is controlled according to the operation mode (Heating/cooling) and the compressor speed.

Unit: rps

Fan speed		1st speed	2nd speed	3rd speed	4th speed	5th speed	6th speed	7th speed	8th speed
FDC71	Cooling	–	–	–	0-22	22-30	30-58	58-80	80-
	Heating	–	–	–	0-30	30-38	38-78	78-85	85-
FDC90,100	Cooling	–	–	0-30	30-46	46-64	64-70	70-75	75-
	Heating	–	–	0-30	30-46	46-70	70-90	90-	–

(d) Outdoor fan control at low outdoor air temperature

(i) Cooling

1) Operating conditions

When the outdoor air temperature (TH2) is 22ºC or lower for 30 seconds continuously while the compressor speed is other than 0 rps

2) Detail of operation

After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
15˚C < Outdoor air temperature	15th speed
10˚C < Outdoor air temperature ≦ 15˚C	12th speed
Outdoor air temperature ≦ 10˚C	10th speed

a) Outdoor heat exchanger temperature ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 9th speed)

b) 21ºC < Outdoor heat exchanger temperature ≦ 38ºC
After the outdoor fan speed maintains for 20 seconds; if the outdoor heat exchanger temperature is 21ºC-38ºC, maintain outdoor fan speed again.

c) Outdoor heat exchanger tempeature > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 15th speed)

3) Reset conditions

When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher and fan speed is 15th speed or more.

b) The compressor speed is 0 rps.

4) Outdoor fan speed and fan motor speed

Unit: min^{-1}

Fan speed	9th speed	10th speed	11th speed	12th speed	13th speed	14th speed	15th speed
FDC71	150	200	240	260	290	390	485
FDC90,100	200	225	250	275	300	400	500

(ii) Heating

1) Operating condition

When the outdoor air temperature (TH2) is 4ºC or lower for 30 seconds continuously while the compressor speed is other than 0 rps

2) Detail of operation

The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions

When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC or higher.

b) The compressor speed is 0 rps.

(e) Outdoor fan control at overload

(i) Cooling

1) Operating condition

When the outdoor air temperature (TH2) is 41ºC or higher for 30 seconds continuously while the compressor command speed is other than 0 rps

2) Detail of operation

The outdoor fan is stepped up by 3 speed. (Upper limit 8th speed)

3) Reset conditions

When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 40ºC or lower.

b) The compressor speed is 0 rps.

(ii) Heating

1) Operating conditions

When the outdoor air temperature (TH2) is 13ºC or higher for 30 seconds continuously while the compressor speed is other than 0 rps

2) Detail of operation

After the outdoor fan operates at -3 speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

a) Outdoor heat exchanger temperature ≦ 10ºC

After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 10ºC, gradually increase the outdoor fan speed by 1 speed.

b) 10ºC < Outdoor heat exchanger temperature ≦ 13ºC

After the outdoor fan speed maintains for 20 seconds; if the outdoor heat exchanger temperature is 10ºC-13ºC, maintain outdoor fan speed again.

c) Outdoor heat exchanger tempeature > 13ºC

After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 13ºC, gradually reduce outdoor fan speed by 1 speed. (Lower limit 2nd speed)

3) Reset conditions

When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 11ºC or lower.

b) The compressor speed is 0 rps.

(f) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 min^{-1} or lower for more than 30 seconds, the compressor and fan motor are stopped.

(4) Defrost operation

(a) Starting conditions (Defrost operation can be started only when all of the following conditions are satisfied.)

(i) After start of heating operation

When it elapsed 35 minutes (Accumulated compressor operation time)

(ii) After end of defrost operation

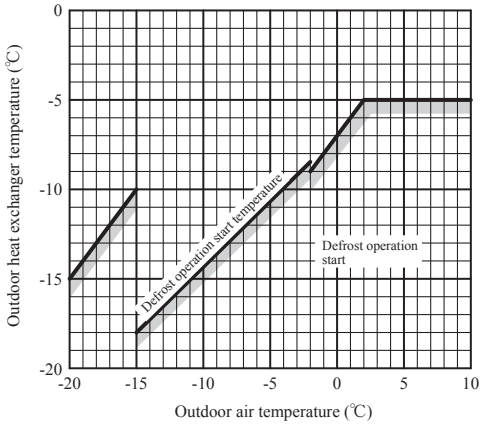
When it elapsed 35 minutes (Accumulated compressor operation time)

(iii) Outdoor heat exchanger sensor (TH1) temperature

When the temperature has been below −5ºC for 3 minutes continuously

(iv) The difference between the outdoor air temperature and the outdoor heat exchanger temperature (TH2-TH1)

- The outdoor air temperature ≧ −2ºC : 7ºC or higher
- −15ºC < The outdoor air temperature < −2ºC : 4/15 × The outdoor air temperature + 7ºC or higher
- The outdoor air temperature ≦ −15ºC : −5ºC or higher



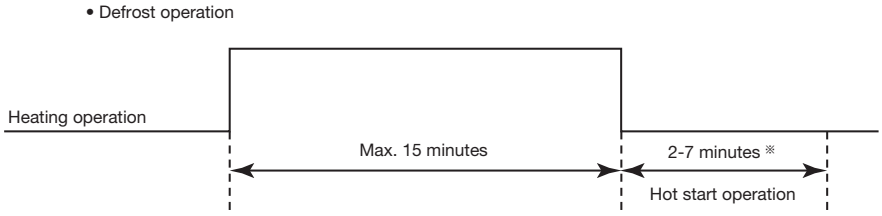
(v) During continuous compressor operation

In addition, when the speed command from the indoor control of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of (i), (ii) above and the outdoor air temperature is 3ºC or less and the temperature for outdoor heat exchanger sensor (TH1) is −5ºC or less: 62 rps or more, −4ºC or less: less than 62 rps are satisfied, defrost operation is started.

(b) Ending conditions (Operation returns to the heating cycle when either one of the following is satisfied.)

(i) Outdoor heat exchanger sensor (TH1) temperature: 10ºC or higher

(ii) Continued operation time of defrost operation → For more than 15 minutes



※Depends on an operation condition, the time can be longer than 7 minutes.

(5) Cooling overload protective control

(a) Operating conditions

When the outdoor air temperature (TH2) is 41°C or higher for 30 seconds continuously while the compressor speed is other than 0 rps

(b) Detail of operation

(i) Taking the upper limit of compressor speed range at 85(60)rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

(ii) The lower limit of compressor speed is set to 30(40[30:FDC71])rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30(40[30:FDC71])rps. However, when the thermostat OFF, the speed is reduced to 0 prs.

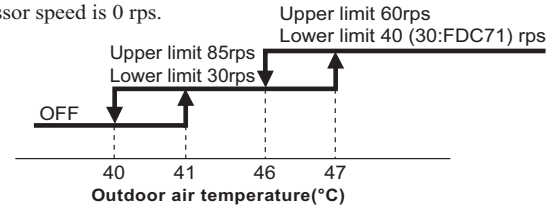
Note Values in ( ) are for outdoor air temperature at 47ºC.

(c) Reset conditions

When either of the following condition is satisfied.

(i) The outdoor air temperature (TH2) is lower than 40ºC.

(ii) The compressor speed is 0 rps.



(6) Cooling high pressure control

(a) Purpose

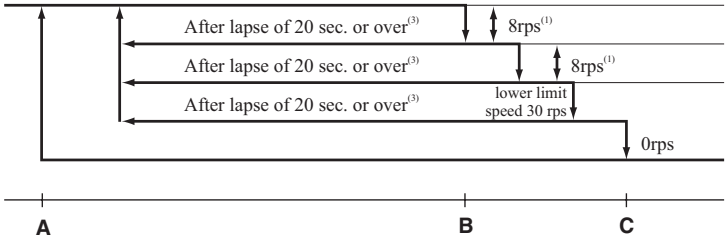
Prevents anomalous high pressure operation during cooling

(b) Detector

Outdoor heat exchanger sensor (TH1)

(c) Detail of operation:

(Example) Fuzzy



Outdoor air temperature(TH2)	Time after compressor ON	A	B	C
TH2 ≧ 32ºC	Less than 10 min	50 (45)	58 (50)	60 (62)
	Less than 15 min	50 (46)	58 (51)	
	Less than 20 min	50 (47)	58 (52)	
	Less than 25 min	50 (48)	58 (53)	
	25 min or more	50	58 (54)	
TH2 < 32ºC	—	51	53	56

Note Values in ( ) are for the model FDC71.

Notes (1) When the outdoor heat exchanger temperature is in the range of B-CºC, the compressor speed is reduced by 8 rps at each 20 seconds.
(2) When the temperature is C ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of A-BºC, if the compressor speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal cooling operation.

(7) Cooling low outdoor air temperature protective control

(a) Operating conditions

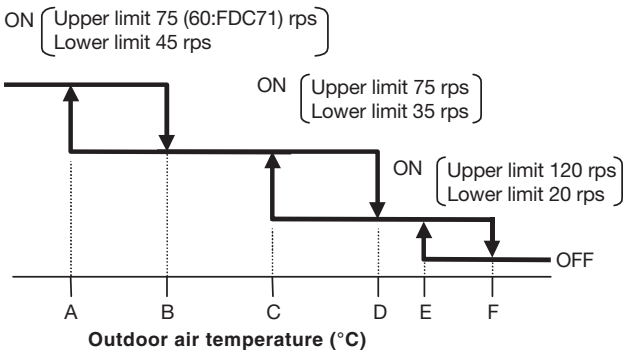
When the outdoor air temperature (TH2) is CºC or lower for 20 seconds continuously while the compressor speed is other than 0 rps

(b) Detail of operation

(i) The lower limit of the compressor speed is set to 45 (35) <20> rps and even if the speed becomes lower than 45 (35) <20> rps, the speed is kept to 45 (35) <20> rps. However, when the thermostat OFF, the speed is reduced to 0 rps.

(ii) The upper limit of the compressor speed is set to 75 <120> rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 75 <120> rps.

Notes (1) Values in ( ) are for outdoor air temperature is C or D.
(2) Values in < > are for outdoor air temperature is E or F.



● Values of A, B, C, D, E, F

Model FDC71VNP-W

	Outdoor air temperature (˚C)					
	A	B	C	D	E	F
First time	9	11	22	25	26	28
After the second time	16	19	25	28	26	28

Models FDC90, 100VNP-W

	Outdoor air temperature (˚C)					
	A	B	C	D	E	F
First time	9	11	22	25	26	28

(c) Reset conditions

When either of the following condition is satisfied

(i) The outdoor air temperature (TH2) is F ºC or higher.

(ii) The compressor speed is 0 rps.

(8) Heating high pressure control

(a) Operating conditions

When the indoor heat exchanger temperature (Thi-R) has risen to a specified temperature while the compressor is turned on

(b) Detail of operation

Compressor speed is controlled according to the zones of indoor heat exchanger temperature as shown by the following table.

	Thi-R < P1	P1 ≦ Thi-R < P2	P2 ≦ Thi-R < P3	P3 ≦ Thi-R
Protection control speed (NP)	Normal	Retention	NP−4rps	NP−8rps
Sampling time (s)	Normal	10	10	10

Model FDC71VNP-W Unit: °C

NP \ Thi-R	P1	P2	P3
10 ≦ NP < 50	45	52	54.5
50 ≦ NP < 115	45	52	57
115 ≦ NP < 120	45 - 43	52 - 50	57 - 55
120 ≦ NP	43	50	55

Models FDC90, 100VNP-W Unit: °C

NP \ Thi-R	P1	P2	P3
10 ≦ NP < 90	45	52	57
90 ≦ NP < 120	45 - 43	52 - 45	57 - 48
120 ≦ NP	43	45	48

(9) Heating overload protective control

(a) Operating conditions

When the outdoor air temperature (TH2) is 13°C or higher continues for 30 seconds while the compressor speed is other than 0 rps

(b) Detail of operation

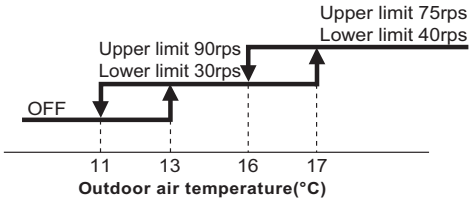
(i) Taking the upper limit of compressor speed range at 90(75)rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

(ii) The lower limit of compressor speed is set to 30(40)rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30(40)rps. However, when the thermostat OFF, the speed is reduced to 0 prs.

Note Values in ( ) are for outdoor air temperature at 17°C.

(c) Reset conditions

The outdoor air temperature (TH2) is lower than 11°C.



(10) Heating low outdoor air temperature protective control

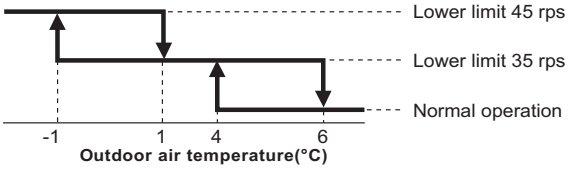
(a) Operating conditions

When the outdoor air temperature (TH2) is 4°C or lower for 30 seconds continuously while the compressor speed is other than 0 rps

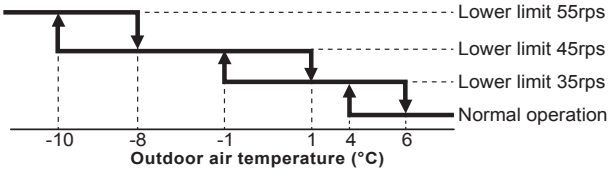
(b) Detail of operation

The lower limit compressor speed is changed as shown in the figure below.

Model FDC71VNP-W



Models FDC90, 100VNP-W



(c) Reset conditions

When either of the following condition is satisfied

(i) The outdoor air temperature (TH2) is higher than 6°C.

(ii) The compressor speed is 0 rps.

(iii) Compressor protection start II is activate.

(11) Compressor overheat protection

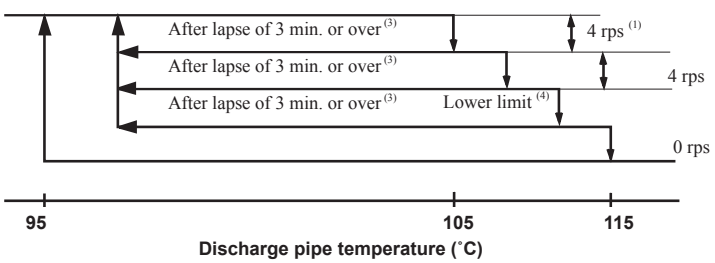
(a) Purpose

It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

(b) Detail of operation

(i) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.

(Example) Fuzzy



Notes (1) When the discharge pipe temperature is in the range of 105-115°C, the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 95-105°C even when the compressor speed is maintained for 3 minutes when the temperature is in the range of 95-105°C, the speed is raised by 1 rps and kept at that speed for 3 minutes. This process is repeated until the command speed is reached.

(4) Lower limit speed

	Cooling	Heating
Lower limit speed	25 rps	32 rps

(ii) If the temperature of 115ºC is detected by the sensor on the discharge pipe, then the compressor will stop immediately. When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(12) Current safe

(a) Purpose

Current is controlled not to exceed the upper limit of the setting operation current.

(b) Detail of operation

(i) Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor speed is reduced.

(ii) If the mechanism is actuated when the compressor speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(13) Current cut

(a) Purpose

Inverter is protected from overcurrent.

(b) Detail of operation

Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(14) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air-conditioning.
The compressor is stopped if any one of the following in item (a), (b) is satisfied. Once the unit is stopped by this function, it is not restarted.

(a) When the input current is measured at 1 A or less for 3 continuous minutes or more

(b) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on

(15) Serial signal transmission error protection

(a) Purpose

Prevents malfunction resulting from error on the indoor ↔ outdoor signals

(b) Detail of operation

(i) If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minutes and 35 seconds, the compressor is stopped.

(ii) After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(16) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(17) Refrigeration cycle system protection

(a) Operating conditions

(i) When 5 (Heating: 9) minutes have elapsed after the compressor ON or the completion of the defrost control

(ii) Other than the defrost control

(iii) When, after satisfying the conditions of (i) and (ii) above, the compressor speed, indoor air temperature (Thi-A) and indoor heat exchanger temperature (Thi-R) have satisfied the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Thi-A)	Indoor air temperature (Thi-A)/ Indoor heat exchanger temperature (Thi-R)
Cooling	40≦N	10≦Thi-A≦40	Thi-A−4<Thi-R
Heating	40≦N : Outdoor air temperature ≧0°C 60≦N : Outdoor air temperature < 0°C	0≦Thi-A≦40	Thi-R<Thi-A+4

(b) Detail of operation

(i) When the conditions of (a) above are satisfied, the compressor stops.

(ii) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

(c) Reset condition

When the compressor has been turned OFF

(18) Silent mode

As “Silent mode start” signal is received from the remote control, it operates by dropping the outdoor fan speed.

Item / Model	Outdoor fan tap (Upper limit)
FDC71VNP-W	Cooling: 7th speed, Heating: 7th speed
FDC90, 100VNP-W	Cooling: 7th speed, Heating: 5th speed

(19) Broken wire detection on temperature sensor

(a) Outdoor heat exchanger temperature sersor, outdoor air temperature sensor

If the following is detected for 5 seconds continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON or within 20 seconds after power ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Outdoor unit heat exchanger temperature sensor: -55°C or lower
- Outdoor air temperature sensor: -55°C or lower

(b) Discharge pipe temperature sensor

If the following is detected for 5 seconds continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note During defrost operation and for 3 minutes after the end of defrost operation, it is not detected.

- Discharge pipe temperature sensor: -25°C or lower

3.2 MAINTENANCE DATA

See page 42 of 1.2 chapter.

3.3 ELECTRICAL WIRING

(1) **Indoor units** ..... **See page 185.**

(2) **Outdoor units**

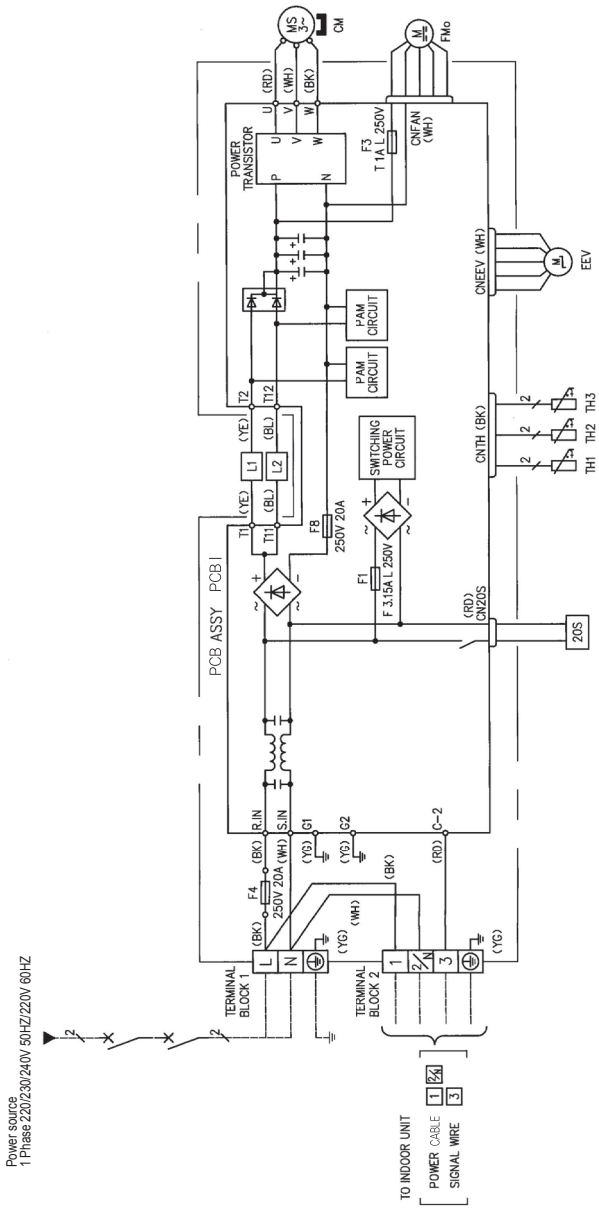
Model FDC71VNP-W

Meaning of marks

Item	Description
CM	Compressor motor
CN20S CNTH CNEEV CNFAN	Connector
EEV	Electric expansion valve (coil)
FMo	Fan motor
L1,2	Reactor
TH1	Heat exchanger temperature sensor (outdoor unit)
TH2	Outdoor air temperature sensor
TH3	Discharge pipe temperature sensor
20S	Solenoid coil for 4-way valve

Color marks

Mark	Color
BK	BLACK
BR	BROWN
OR	ORANGE
RD	RED
WH	WHITE
YE	YELLOW
YG	YELLOW/GREEN



Power cable, indoor-outdoor connecting wires

Model	MAX running current (A)	Power cable size (mm^2)	Power cable length (m)	Indoor-outdoor wire size x number	Earth wire size (mm^2)
71	15.8	2.0	13	$1.5mm^2$ x 4	1.5

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

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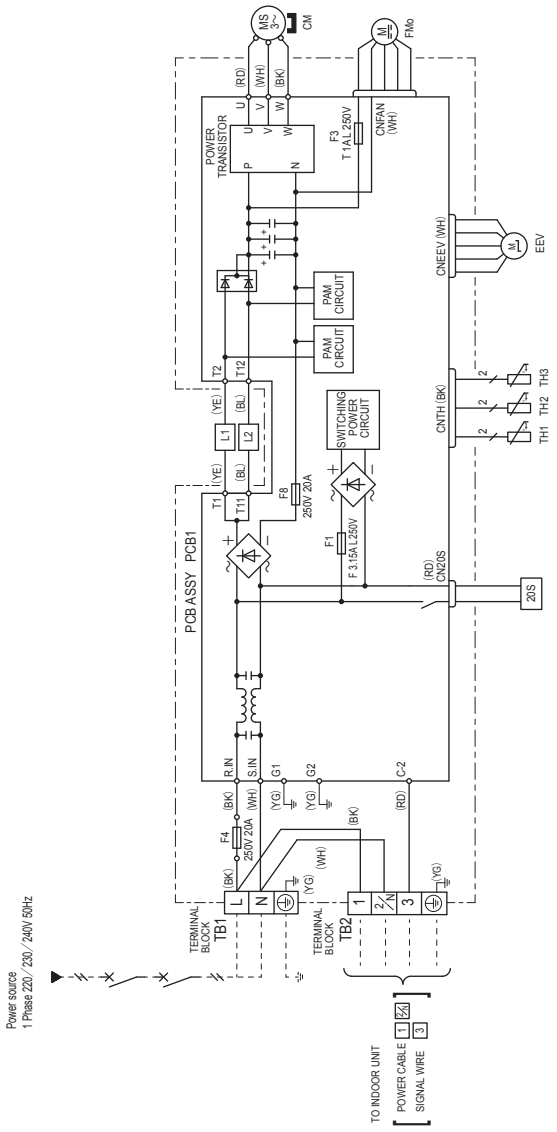
Models FDC90VNP-W, 100VNP-W

Meaning of marks

Item	Description
CM	Compressor motor
CN20S CNTH CNEEV CNFAN	Connector
EEV	Electric expansion valve (coil)
FMo	Fan motor
L1,2	Reactor
TB1,2	Terminal block
TH1	Heat exchanger temperature sensor (outdoor unit)
TH2	Outdoor air temperature sensor
TH3	Discharge pipe temperature sensor
20S	Solenoid coil for 4-way valve

Color marks

Mark	Color
BK	Black
BL	Blue
RD	Red
WH	White
YE	Yellow
YG	Yellow Green



Power cable, indoor-outdoor connecting wires

Model	MAX running current (A)	Power cable size (mm^2)	Power cable length (m)	Indoor–outdoor wire size × number	Earth wire size (mm^2)
90, 100	19	2.5	14	1.5mm² × 4	1.5

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

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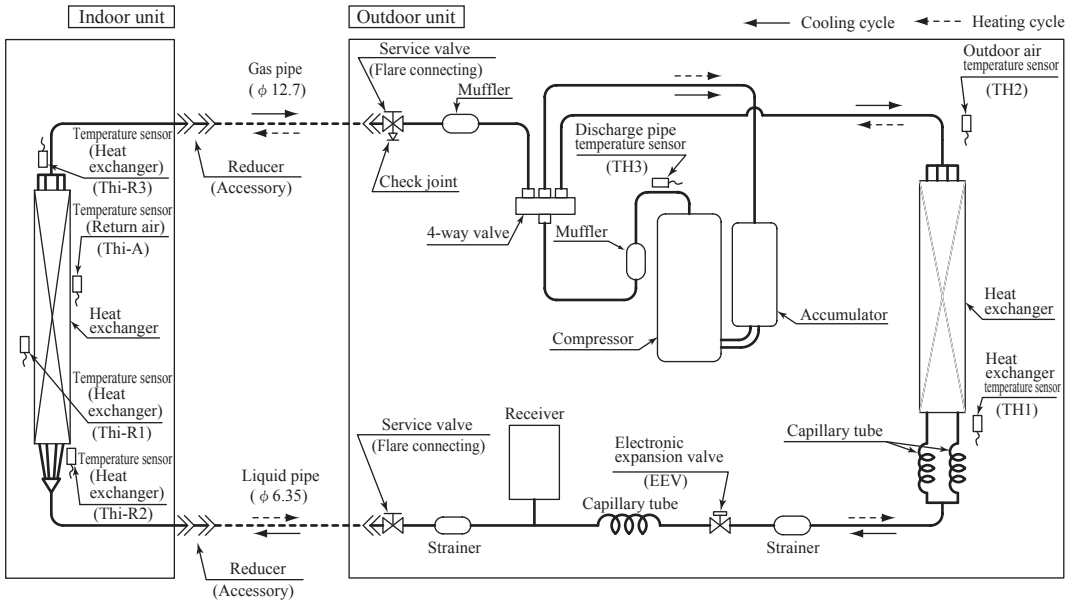
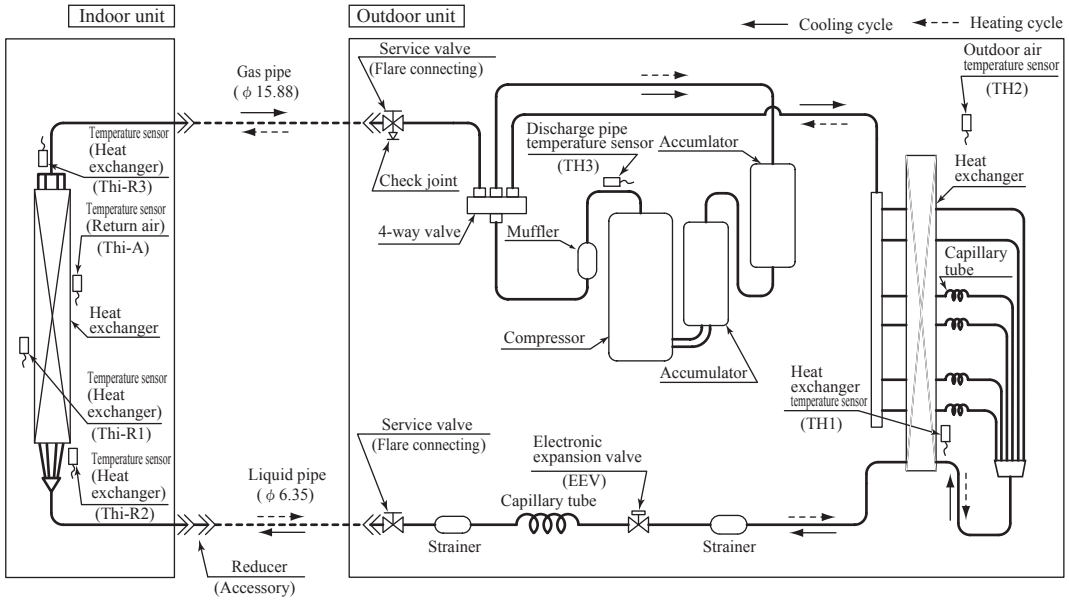
3.4 PIPING SYSTEM

Model 71



Models 90,100



Preset point of the protective devices

Parts name	Mark	Equipped unit	71 model	90,100 model
Temperature sensor (for protection overloading in heating)	Thi-R1 or Thi-R2	Indoor unit	Active 63℃, Inactive 56℃	
Temperature sensor (for frost prevention)			Active 1.0℃, Inactive 10℃	
Temperature sensor (for protection high pressure in cooling)	TH1	Outdoor unit	Active 62℃ Inactive 45-50℃	Active 60℃ Inactive 50℃
Temperature sensor (for detecting discharge pipe temperature)	TH3		Active 115℃, Inactive 95℃	

INVERTER PACKAGED AIR-CONDITIONERS

MITSUBISHI HEAVY INDUSTRIES

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