Manual No.'14･KX-SM-221

MHI

SERVICE MANUAL

VRF INVERTER MULTI-SYSTEM AIR-CONDITIONERS

KXZ Outdoor units

KXZP series

- **Single use**
  FDC224KXZPE1, 280KXZPE1

・Note:
(1)Regarding the indoor unit series, refer to the No.'14･KX-DB-206.

MITSUBISHI HEAVY INDUSTRIES, LTD.

CONTENTS

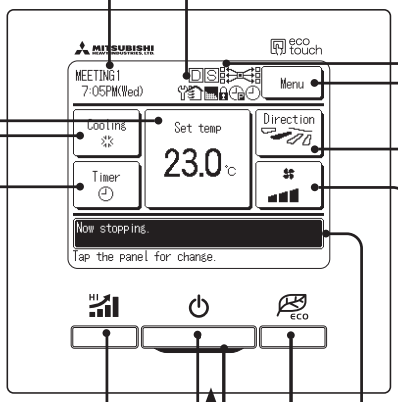
1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

1.1 Remote control (option parts)

(1) Wired remote control

Model RC-EX1A

All icons are shown for the sake of explanation.



⑦ **Clock, R/C name display**
Displays the current time and the name of R/C

⑪ **Change set temp button**
Displays the temperature which is set currently.Tap this button to change the set temperature.

⑩ **Change operation mode button**
Displays the operation mode which is selected currently. Tap this button to change the operation mode.

⑭ **Timer button**
Displays simplified contents of the timer which is set currently.
(When two or more timers are set, contents of the timer which will be operated immediately after is displayed.)
Tap this button to set the timer.

② **switch (High Power switch)**
Pushing this button starts the high power operation.

① ⏻ **switch (Run/Stop switch)**
One push on the button starts operation and another push stops operation.

⑥ **USB port (mini-B)**
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 (eco-touch remote control RC-EX1, utility software).

⑤ **LCD display (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.)

⑧ **Icon display**
Each icon is displayed when one of following settings is going on.(It is referring to the following figure for details.)

⑨ **Menu button**
When setting or changing other than the following ⑩-⑭, tapthemenubutton.When menu items are displayed, select one and set.

⑫ **Flap direction button**
Displays the flap direction which is selected currently.
Tap this button to change the flap direction.

⑬ **Fan speed change button**
Displays the fan speed which is selected currently.
Tap this button to change the fan speed.

⑮ **Message display**
Status of air-conditioner operation and messages of the R/C operations etc.are displayed.

③ **switch (Energy Saving switch)**
Pushing this button starts the energy-saving operation.

④ **Operation lamp**
This lamp lights in green (yellow-green) during operation. It changes to red if any error occurs.

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

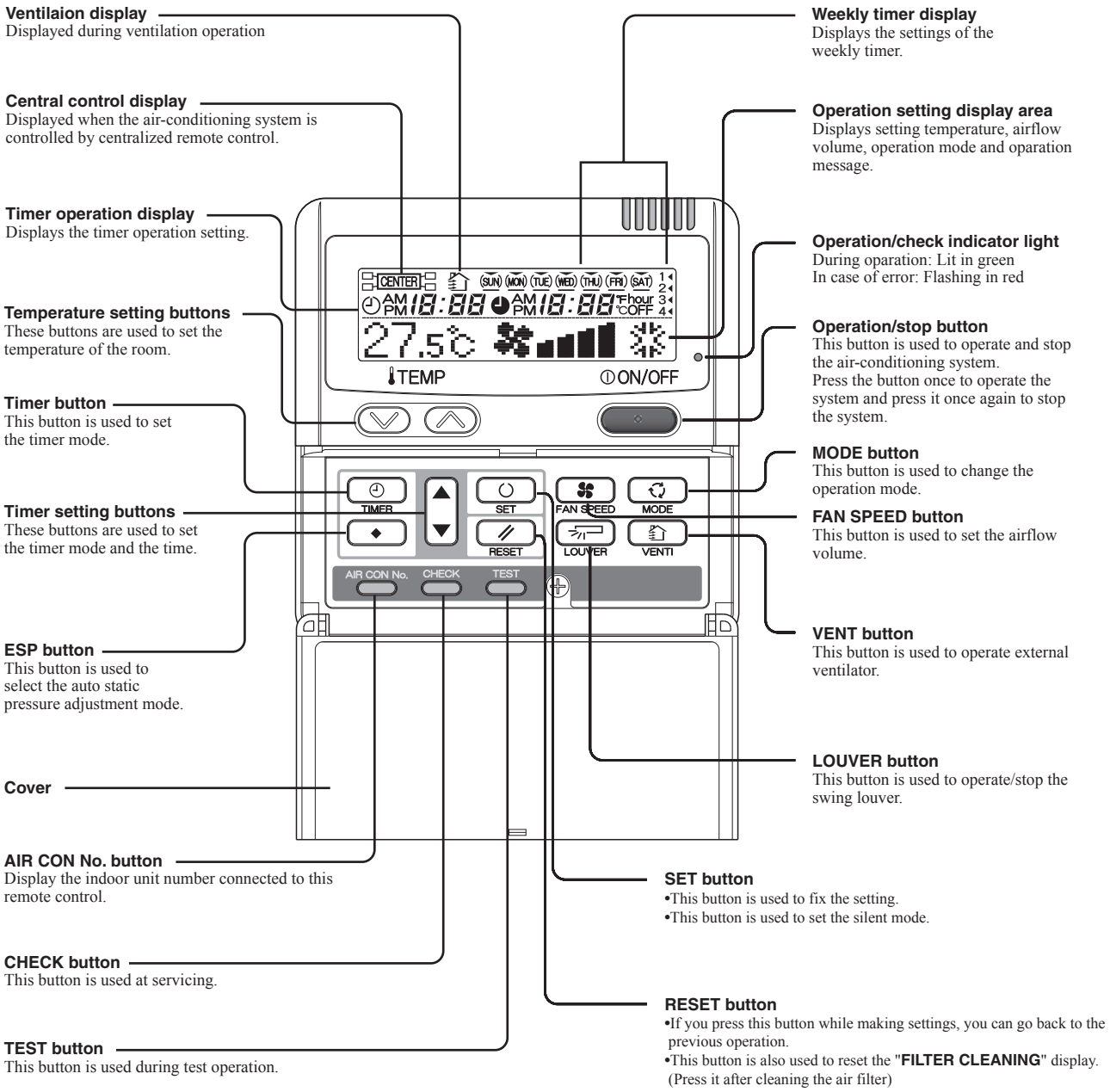
⑧ Icon display
Each icon is displayed when one of following settings is going on.

When the demand control is effective.	When setting is made from the sub R/C.	When the central control (option) is running.
When the periodical inspection is necessary.	During the ventilation operation	When "filter sign" is up.
When the Permission/ Prohibition setting is made.	When the weekly timer is set.	When the peak-cut timer is set

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.

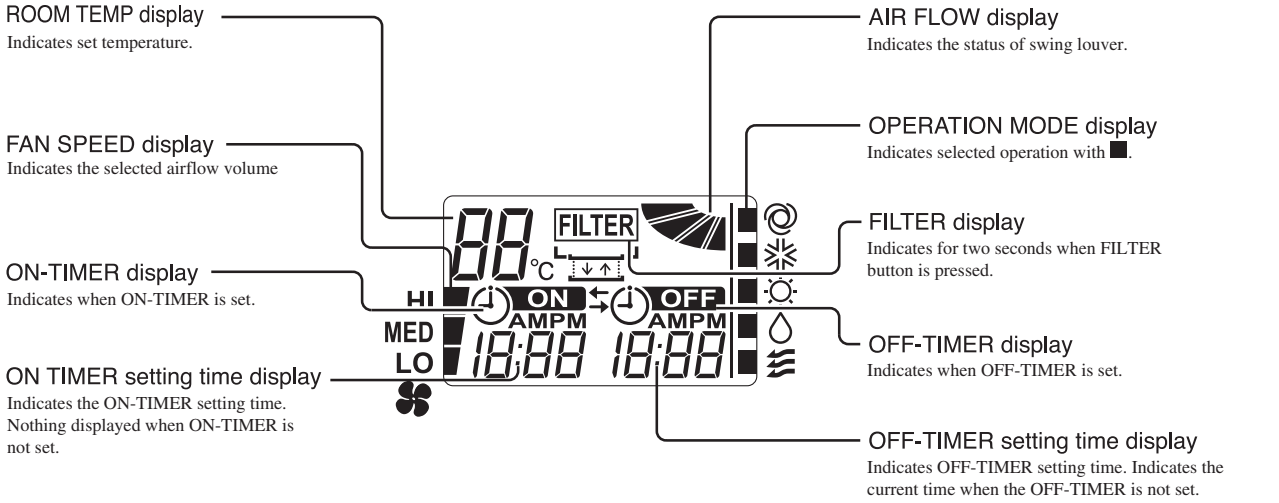
The figure below shows the remote control with the cover opened.



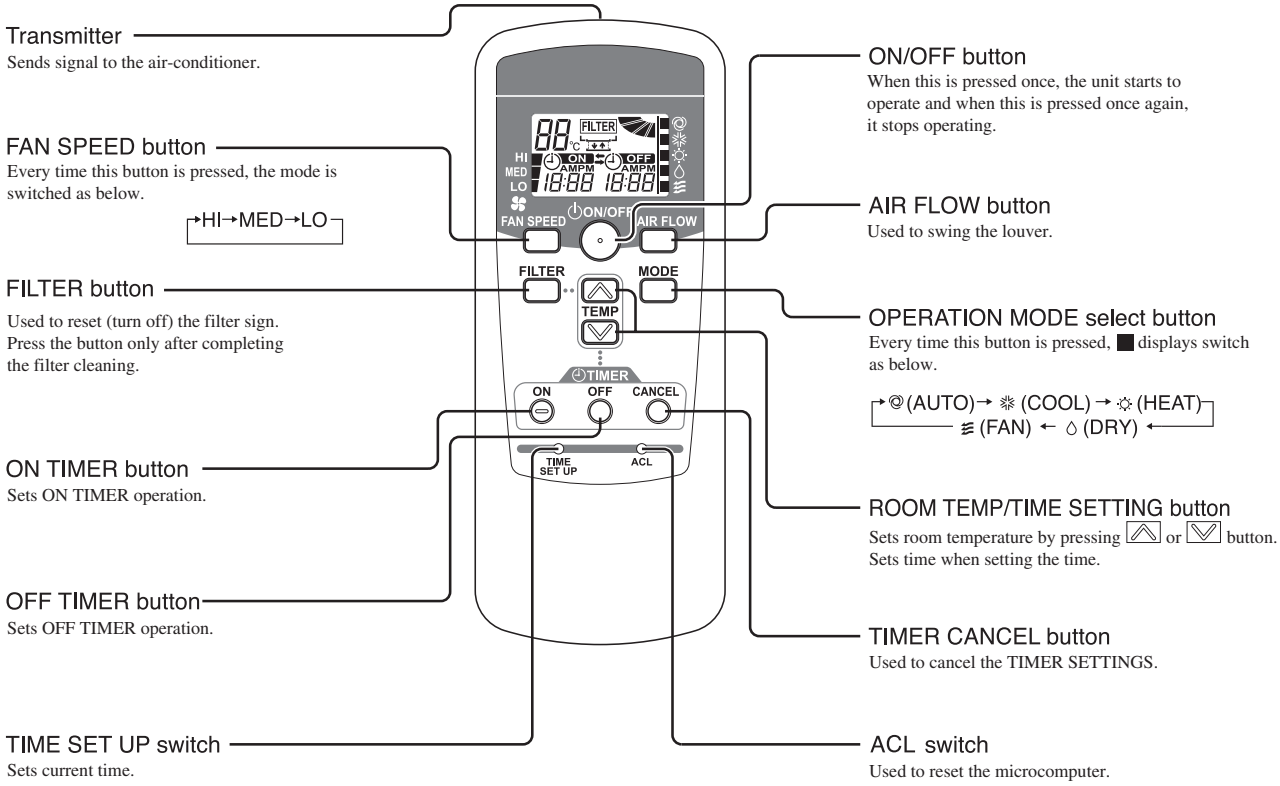
∗ All displays are described in the liquid crystal display for explanation.

(2) Wireless remote control

Indication section



Operation section



* All displays are described in the liquid crystal display for explanation

1.2 Operation control function by the wired remote control

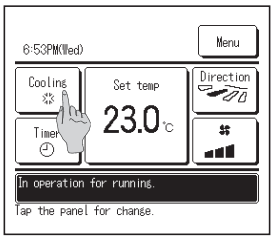
Model RC-EX1A

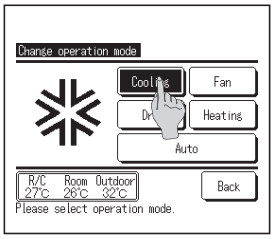
(1) Switching sequence of the operation mode switches of remote control

(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.



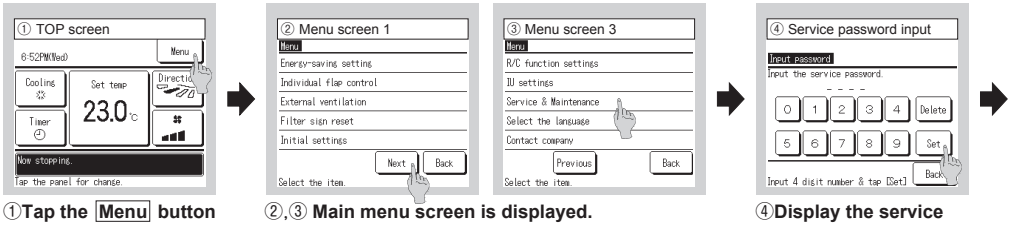


Notes(1) Operation modes which cannot be selected depending on combinations of IU and OU are not displayed.

(2) When the Auto is selected, the cooling and heating switching operation is performed automatically according to indoor and outdoor temperatures.

(2) CPU reset

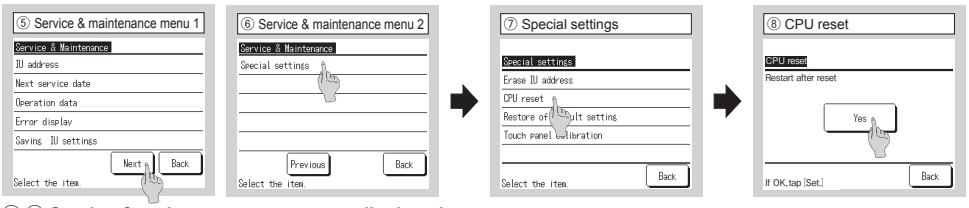
Reset CPU from the remote control as follows.



①Tap the Menu button on the TOP screen.

②,③ Main menu screen is displayed.
Tap the "Service & Maintenance" on the menu screen.

④Display the service password input screen.
Enter the service password (4-digit number).



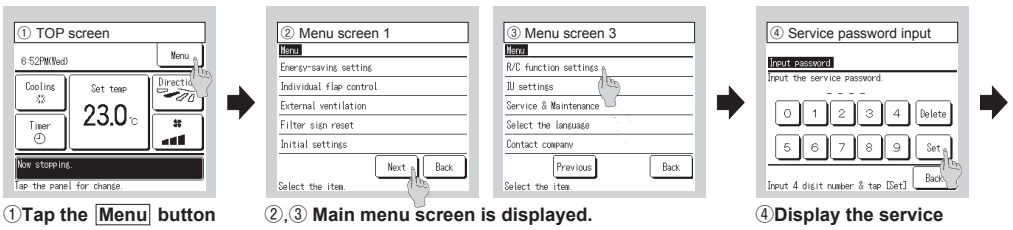
⑤,⑥ Service & maintenance menus are displayed.

⑦ Special settings
CPU reset : Microcomputers of IU and OU connected are reset (State of restoration after power failure).

⑧ CPU reset
All microcomputers on the R/C operated, other R/Cs, IUs and OUs are reset (State of restoration after power failure).
Tap [Yes] to reset CPU

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

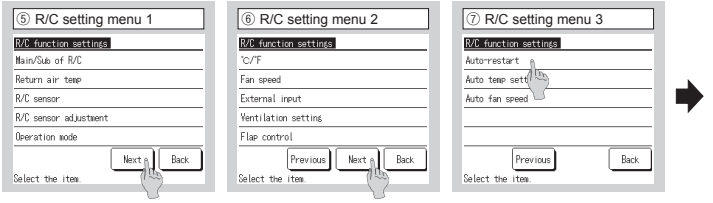
Enable the Auto-restart function from the remote control as follows.



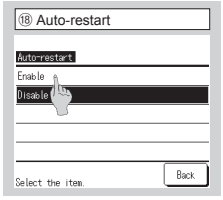
①Tap the Menu button on the TOP screen.

②,③ Main menu screen is displayed.
Tap the "Service & Maintenance" on the menu screen.

④Display the service password input screen.
Enter the service password (4-digit number).



⑤,⑥,⑦ Display the R/C setting menu screens.



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

Disable : It stops after the restoration of power source, regardless the state of operation before the power failure.

⑱ Auto-restart
Set the state of operation to be started when the power source is restored after a power failure.

- 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) Airflow 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.)

(4) Operation and setting from remote control

A: Refer to the instruction manual for RC-EX series.
B: Refer to the installation manual for RC-EX series.
C: Loading a utility software vie Internet
○: Nearly same function setting and operations are possible.
△: Similar function setting and operations are possible.

	Setting & display item	Description	RC-EX series	RC-E4 RC-E5
1. Remote Control network				
1	Control plural indoor units by a single remote control	A remote control can control plural indoor units up to 16 (in one group of remote control network). An address is set to each indoor unit.	○	○
2	Master/slave setting of remote controls	A maximum of two remote controls (include option wireless) can be connected to one indoor unit. Set one to "Master" and the other to "Slave".	B	○
2. TOP screen, Switch manipulation			A	
1	Menu	"Control", "Settings", or "Details" can be selected. (3.-19.)	A	
2	Operation mode	"Cooling", "Heating", "Fan" or "Dry" can be set.	A	○
3	Set temp.	"Set temperature" can be set by 0.5℃ interval.	A	○
4	Air flow direction	"Air flow direction". [Individual flap control setting] can be set.	A	○
5	Fan speed	"Fan speed" can be set.	A	○
6	Timer setting	"Timer operation" can be set.	A	○
7	ON/OFF	"On/Off operation of the system" can be done.	A	○
8	High power SW	"High power operation" or "Normal operation" can be selected.	A	
9	Energy-saving SW	"Energy-saving operation" or "Normal operation" can be selected.	A	
3. Energy-saving setting			A	
1	Auto OFF timer [Administrator password]	For preventing the timer from keeping ON, set hours to stop operation automatically with this timer. ・The selectable range of setting time is from 30 to 240 minutes (10minutes interval) ・When setting is "Valid", this timer will activate whenever the ON timer is set.	A	△
2	Peak-cut timer [Administrator password]	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-minutes interval. ・The selectable range of capacity limit % (Peak-cut %) is from 0% to 40-80% (20% interval). ・Holiday setting is available.	A	
3	Automatic temp. set back [Administrator password]	After the elapse of the set time period, the current set temp. will be set back to the [Set back temp.] ・The setting can be done in cooling and heating mode respectively. ・The selectable range of the set time is from 20 min. to 120 min. (10 min. interval). ・Set the [Set back temp.] by 1℃ interval.	A	△
4. Individual flap control setting			A	
	Individual flap control setting	The moving range (the positions of upper limit and lower limit) of the flap for individual air outlet port can be set.	A	○
5. Ventilation				
1	External ventilation (In combination with ventilator)	On/Off operation of the external ventilator can be done. ・The settings of [Interlock] with AC (air-conditioner), [Single operation] of ventilator or operation [invalid] of ventilation can be done through [Ventilation settings] in the [Remote control] menu.	A	○
6.Filter sign reset			A	○
1	Filter sign reset	The filter sign can be reset.	B	
2	Setting next cleaning date	The next cleaning date can be set.	A	
7.Initial settings				
1	Clock setting	The current date and time can be set or revised.	A	△
2	Date and time display	[Display] or [Hide] the date and/or time can be set, and the [12H] or [24H] display can be set.	A	
3	Summer time	When select [Valid], the +1hour adjustment of current time can be set.When select [Invalid], the [Summer time] adjustment can be reset.	A	
4	Contrast	The contrast of LCD can be adjusted higher or lower.	A	
5	Backlight	Switching on/off a light can be set and the period of the lighting time can be set within the range of 5sec-90sec (5sec interval).	A	
6	Control sound	It can set with or without [Control sound (beep sound)] at touching panel.	A	
8.Timer settings			A	
1	Set On timer by hour	The period of time to start operation after stopping can be set. ・The period of set time can be set within the range of 1hour-12hours (1hr interval). ・The operation mode, set temperature and fan speed at starting operation can be set.	A	△
2	Set Off timer by hour	The period of time to stop operation after starting can be set. ・The period of set time can be set within the range of 1hour-12hours (1hr interval).	A	△
3	Set On timer by clock	The clock time to start operation can be set. ・The set clock time can be set by 5 minutes interval. ・[Once (one time only)] or [Everyday] operation can be switched. ・The operation mode, set temperature and fan speed at starting operation can be set.	A	△
4	Set Off timer by clock	The clock time to stop operation can be set. ・The set clock time can be set by 5 minutes interval. ・[Once (one time only)] or [Everyday] operation can be switched.	A	△
5	Confirmation of timer settings	Status of timer settings can be seen.	A	
9.Weekly timer				
1	Weekly timer [Administrator password]	On timer and Off timer on weekly basis can be set.	A	△
		・8-operation patterns per day can be set at a maximum.		
		・The setting clock time can be set by 5 minutes interval.		
		・Holiday setting is available.		△
		・The operation mode, set temperature and fan speed at starting operation can be set.		△
10.Home leave mode				
1	Home leave mode [Administrator password]	When leaving home for a long period like a vacation leave, the unit can be operated to maintain the room temperature not to be hotter in summer or not to be colder in winter. ・The judgment to switch the operation mode (Cooling⇔Heating) is done by the both factors of the set temp. and outdoor air temperature. ・The set temperature and fan speed can be set.	A	

	Setting & display item	Description	RC-EX series	RC-E4 RC-E5
11. Administrator settings		[Administrator password]	A	
1	Enable/Disable setting	・Enable/Disable setting of operation can be set. [On/Off] [Change set temp.] [Change operation mode] [Change air flow direction] [Individual flap control setting][Fan speed] [High power operation] [Energy-saving operation] [Timer settings] [Weekly timer setting] ・Request for administrator password can be set. [Individual flap control setting][Weekly timer][Energy-saving setting][Home leave mode][Administrator settings]	A	△
2	Silent mode timer	The period of time to operate the outdoor unit by prioritizing the quietness can be set. ・The [Start time] and the [End time] for operating outdoor unit in silent mode can be set. ・The period of the operation time can be set once a day by 5 minutes interval.	A	△
3	Setting temp. range	The upper/lower limit of indoor temperature setting range can be set. ・The limitation of indoor temperature setting range can be set for each operation mode in cooling and heating.	A	△
4	Temp. increment setting	The temperature increment setting can be changed by 0.5℃ or 1.0℃.	A	
5	RC display setting	Register [Room name] [Name of I/U] Display [indoor temp.] or not. Display [inspection code] or not. Display [Heating stand-by] [Defrost operation] [Auto cooling/heating] or not	A	 ○ △ ○
6	Change administrator password	The administrator password can be changed. (Default setting is "0000") The administrator password can be reset.	A B	
12.Installer settings		[Service password]	B	
1	Installation date	The [Installation date] can be registered. ・When registering the [Installation date], the [Next service date] is displayed automatically. (For changing the [Next service date]. please refer the item of [Service & Maintenance].)	B	
2	Service contact	The [Service contact] can be registered and can be displayed on the RC. ・The [Contact company] can be registered within 10 characters. ・The [Contact phone] can be registered within 13 digits.	B	
3	Test run	On/Off operation of the test run can be done.		
	Cooling test run	The [Cooling test run] can be done at 5℃ of set temperature for 30 minutes.	B	○
	Drain pump test run	Only the drain pump can be operated.		○
	Compressor rps fixed operation	The [Test run] operation can be done with fixed compressor rps set by installer.		○
4	Static pressure adjustment	In case of combination with only the ducted indoor unit which has a function of static pressure adjustment, the static pressure is adjustable.	B	
5	Change auto-address	The set address of each indoor unit decided by auto-address setting method can be changed to any other address. (For multiple KX units only)	B	△
6	Address setting of Main IU	Main indoor unit address can be set. ・Only the Main indoor unit can change operation mode and the Sub indoor units dominated by the Main indoor unit shall follow. ・The Main indoor unit can domain 10 indoor units at a maximum.	B	△
13.RC function settings		[Service password]	B	
1	Main/Sub RC setting	The setting of [Main/Sub RC] can be changed.	B	○
2	RC sensor	The [Valid/Invalid] setting of [RC sensor] can be done. Respective setting in cooling and heating is available.	B	○
3	RC sensor adjustment	The offset value of [RC sensor] sensing temperature can be set respectively in heating and cooling. ・The setting range of offset value is ±3℃ both in cooling and heating.	B	△
4	Operation mode	The [Valid/Invalid] setting of [Auto][Cooling][Heating] and [Dry] can be done respectively.	B	○
5	Fan speed	The setting of [Fan speed] can be done from following patterns.・1-speed, 2-speeds (Hi-Me), 2-speeds (Hi-Lo), 3-speeds, 4-speeds.	B	○
6	External input	The applicable range ([Individual] or [All units]) of CnT input to the multiple indoor units connected in one control system. ・[Individual] : Only the unit received CnT input signal.・[All units] : All the units connected to one control system received CnT input signal.	B	○
7	Ventilation setting	The setting of [Invalid] operation of ventilator, [Interlock] with AC or [Independent] of ventilator can be selected. ・When setting [Interlock], the operation of external ventilator is interlocked with the operation of AC ・When setting [Independent], only the operation of external ventilator is available.	B	○
8	Flap control	The [Flap control] method can be switched to[Stop at fixed position] or [Stop at any position]・[Stop at fixed position] : Stop the flap at a certain position among the designated 4 positions.・[Stop at any position] : Stop the flap at any arbitrary position just after the stopping command from RC was sent.	B	○
9	Auto-restart	The operation control method after recovery of power blackout happened during operation can be set.	B	○
10	Auto temp. setting	[Valid] or [Invalid] of [Auto temp. setting] can be selected.	B	
11	Auto fan speed setting	[Valid] or [Invalid] of [Auto fan speed setting] can be selected.	B	
14. I/U settings		[Service password]	B	
1	High ceiling	The fan tap of indoor fan can be changed. ・[Standard] [High ceiling 1] [High ceiling 2] can be selected.	B	○
2	Filter sign	The setting of filter sign display timer can be done from following patterns.	B	○
3	External input 1	The content of control by external input can be changed.・The selectable contents of control are [On/Off] [Permission/Prohibition] [Cooling/heating] [Emergency stop]	B	○
4	External input 1 signal	The type of external input signal ([Level input]/[Pulse input]) can be changed.	B	○
5	External input 2	・The selectable contents of control are [On/Off] [Permission/Prohibition] [Cooling/heating] [Emergency stop]	B	
6	External input 2 signal	The type of external input signal ([Level input]/[Pulse input]) can be changed.	B	
7	Heating thermo-off temp. adjust.	The judgment temperature of heating thermo-off can be adjusted within the range from 0 to +3℃ (1℃ interval)	B	△
8	Return air sensor adjust.	The sensing temperature of return air temperature sensor built in the indoor unit can be adjusted within the range of ±2℃.	B	△
9	Fan control in heating thermo OFF	The fan control method at heating thermo-off can be changed.・The selectable fan control methods are [Low] [Set fan speed] [Intermittent] [Stop].	B	○
10	Anti-frost temp.	The judgment temperature of anti-frost control for the indoor unit in cooling can be changed to [Temp. High] or [Temp. Low].	B	○
11	Anti-frost control	When the anti-frost control of indoor unit in cooling is activated, the fan speed can be changed.	B	○
12	Drain pump operation	In any operation mode in addition to cooling and dry mode, the setting of drain pump operation can be done.	B	○
13	Residual fan operation in cooling	The time period of residual fan operation after stopping in cooling mode can be set.	B	○
14	Residual fan operation in heating	The time period of residual fan operation after stopping or thermo-off in heating mode can be set.	B	○
15	Intermittent fan operation in heating	The fan operation rule following the residual fan operation after stopping or thermo-off in heating mode can be set.	B	○
16	Fan circulator operation	In case that the fan is operated as the circulator, the fan control rule can be set.	B	
17	Control pressure adjust. (For OA processing unit only)	When only the OA processing units are operated, control pressure value can be changed.	B	○
18	Auto operation mode	The [Auto rule selection] for switching the operation mode automatically can be selected from 3 patterns.	B	
19	Thermo. rule setting	When selecting [Outdoor air temp. control], the judgment temperature can be offset by outdoor temperature.	B	
20	Auto fan speed control	Under the [Auto fan speed control] mode, the switching range of fan speed can be selected from following 2 patterns [Auto 1] [Auto 2]. ・[Auto 1] : Hi ⇔Me⇔Lo・[Auto 2] : P-hi⇔Hi⇔Me⇔Lo	B	
15.Service & Maintenance		[Service password]	B	
1	IU address No.	Max. 16 indoor units can be connected to one remote control, and all address No. of the connected indoor units can be displayed. ・The indoor unit conforming to the address No. can be identified by selecting the address No. and tapping [Check] to operate the indoor fan.	B	○
2	Next service date	The [Next service date] can be registered.・The [Next service date] and [Service contact] is displayed on the [Periodical check] message screen.	AB	
3	Operation data	Total 39 items of [Operation data] for indoor unit and outdoor unit can be displayed.	B	○
4	Error history	[Date and time of error occurred] [I/U address] [Error code] for Max. 16 latest cases of error history can be displayed.	B	△
	Display anomaly data	The operation data just before the latest error stop can be displayed.	B	
	Reset periodical check	The timer for the periodical check can be reset.	B	○
5	Saving I/U settings	The I/U settings memorized in the indoor PCB connected to the remote control can be saved in the memory of the remote control.	B	
6	Special settings	[Erase I/U address] [CPU reset] [Initializing] [Touch panel calibration]	B	△
16.Inspection			A	△
	Confirmation of Inspection	The address No, of anomalous indoor/outdoor unit and error code are displayed.		
17.PC connection			C	
	USB connection	Weekly timer setting and etc., can be set from PC.		

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) Airflow volume mode

(d) Room temperature setting

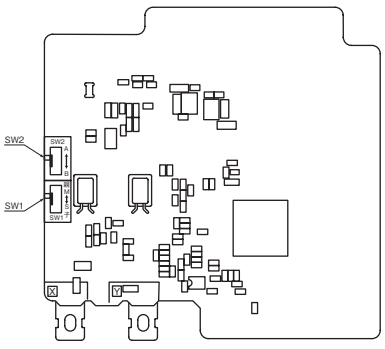
(e) Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

(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.

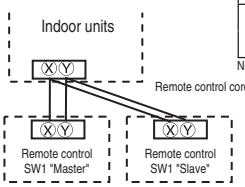
(h) Sleep timer and weekly timer settings (Other timer settings are not memorized.)

[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

1.3 Operation control function by the indoor control

(1) 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)

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

(2) Dehumidifying operation

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

(a) 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 unit fan tap is brought down by one tap. That tap is retained for 3 minutes after changing the indoor unit fan tap.

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

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

(3) Timer operation

(a) RC-EX1A

(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 (1) 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 activated only once or at every time. It is allowed also to set simultaneously the indoor temperature, operation mode, air flow rate and warm-up enabled/disabled.
Note (1) 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 activated only once or at every time.
Note (1) 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 (1) 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 time	Set OFF timer by hour	Set ON timer by hour	Set OFF timer by clock	Set ON timer by clock	Weekly timer
Sleep time		×	×	○	○	○
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. 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) Timer operations which can be set in combination

Item / Item	Timer	OFF timer	ON timer	Weekly timer
Timer		×	○	×
OFF timer	×		○	×
ON timer	○	○		×
Weekly timer	×	×	×	

Note (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.

(4) Remote control display during the operation stop

When the operation is stopped (the power source is turned ON), it displays preferentially the "Room temperature", "Center/Remote", "Filter sign", "Inspection" and "Timer operation".

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

(a) Operating conditions

When either one of following conditions either of (i) to (iv), the hot start control is performed.

(i) From stop to heating operation

(ii) From cooling to heating operation

(iii) From heating thermostat OFF to ON

(iv) After completing the defrost control (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 thermistor (ThI-R1 or R2, whichever higher) detects 35°C or higher.

iii) When the heat exchanger thermistor (ThI-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set airflow volume.

b) Thermostat ON

i) When the heat exchanger thermistor (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 thermistor (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 thermistor (ThI-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set airflow volume.

c) If the fan control at heating thermostat OFF is set at the "Set airflow volume" (from the remote control), the fan operates with the set airflow 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 thermistor detects lower than 25°C.

Note (1) When the defrost control signal is received, it complies with the fan control during defrosting.

3) Once the hot start is completed, it will not restart even if the temperature on the heat exchanger thermistor 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 defrosting, the fan motor is turned ON regardless of the temperatures detected with the indoor heat exchanger thermistors (ThI-R1, R2).

(c) Ending condition

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

1) Heat exchanger thermistor (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 control.

(a) Control

(i) When the indoor heat exchanger temperature (detected with ThI-R1 or R2) drops to 35°C or lower, the speed of indoor fan is changed to the lower tap at each setting.

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

(b) Ending condition

When the indoor fan is at the lower tap at each setting, it returns to the set airflow volume as the indoor heat exchanger temperature rises to 45°C or higher.

(7) Auto swing control (FDT, FDTC, FDTW, FDTS, FDE only)

(a) RC-EX1A

(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" → "Next" → "R/C settings" 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 (1) If you press the "LOUVER" button, the swing motion is displayed on the louver position LCD for 10 second. 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.

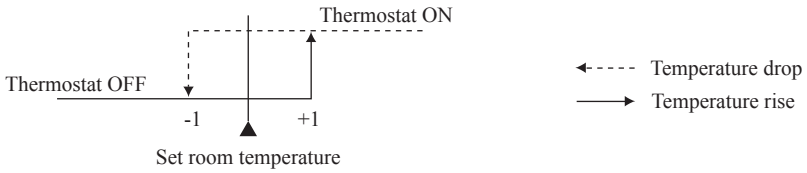
Note (1) When the indoor function of wired remote control "POSITION" has been switched, switch also the remote control function "POSITION" in the same way.

(8) Thermostat operation

(a) Cooling

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

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

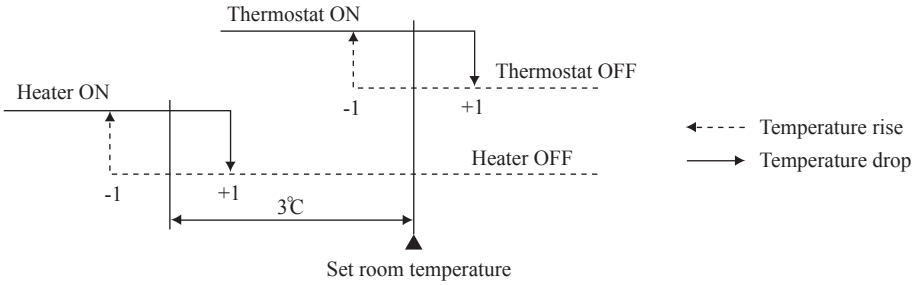


(iii) Thermostat is turned ON when the room temperature is in the range of -1 < Set temperature < +1 at the start of cooling operation (including from heating to cooling).

(b) Heating

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

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



(iii) Thermostat is turned ON when the room temperature is in the range of -1 < Set point < +1 at the start of cooling 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 taps are used for the indoor fans.
- For AC motor : Lo tap
- For DC motor : ULo tap

(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 fan motor stops.
2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at Lo or ULo for 2 minutes. In the meantime the louver is controlled at level.
3) After operating at Lo or 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 Lo or 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 defrosting starts while the heating thermostat is turned OFF or the thermostat is turned OFF during defrosting, 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 taps are used for the indoor fans.
- For AC motor : Lo tap
- For DC motor : ULo tap

(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 unit fan motor stops.
2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at Lo or ULo for 2 minutes.
3) After operating at Lo or 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 Lo or 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 centralized control, regardless of ON/OFF)

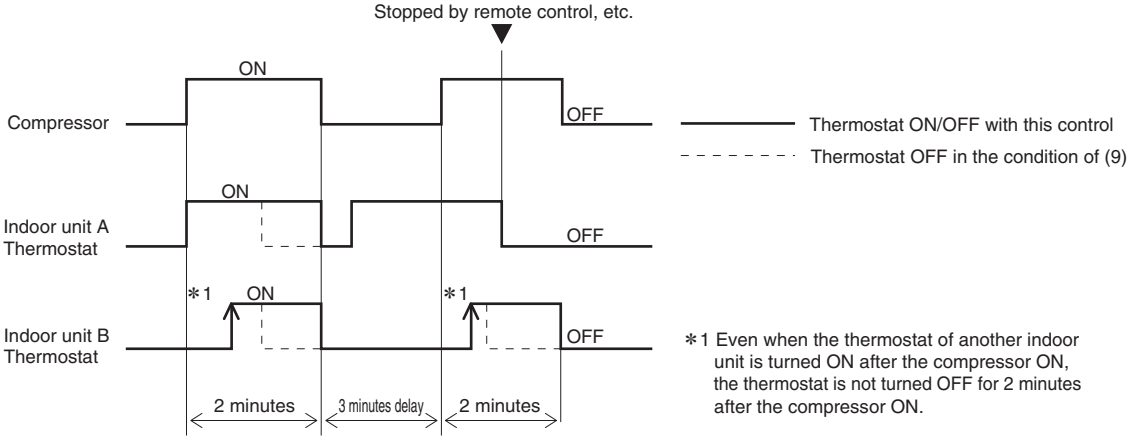
Note (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote control "FILTER SIGN SET". (It is set at TYPE 1 at the shipping from factory.)

Filter sign setting	Function
TYPE 1	Setting time: 180 hrs (Factory default)
TYPE 2	Setting time: 600 hrs
TYPE 3	Setting time: 1,000 hrs
TYPE 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) Once the indoor unit thermostat has been turned ON, the thermostat is not turned OFF for 2 minutes (*1) after the compressor ON even if the thermostat is turned OFF at the state of (9).



(b) When the oil return control has started while the thermostat is turned ON, the thermostat is not turned OFF even if the thermostat OFF condition is met during the oil return control.

(11) Drain pump control

(a) This control is operated when the inverter frequency is other than 0 rps during the cooling operation and automatic cooling and dehumidifying operations.

(b) Drain pump ON condition continues for 5 minutes even when it enters the OFF range according to (i) above after turning the drain pump ON, and then stops. The 5-minute delay continues also in the event of anomalous stop.

(c) The drain pump is operated with the 5-minute delay operation when the compressor is changed from ON to OFF.

(d) Even in conditions other than the above (such as heating, fan, stop, cooling thermostat OFF), the drain pump control is performed by the drain detection.

(e) Following settings can be made using the indoor function setting of the wired remote control.

(i) ❄💧〔Standard (in cooling & dry)〕: Drain pump is run during cooling and dry.

(ii) ❄💧AND☀〔Operate in standard & heating〕: Drain pump is run during cooling, dry and heating.

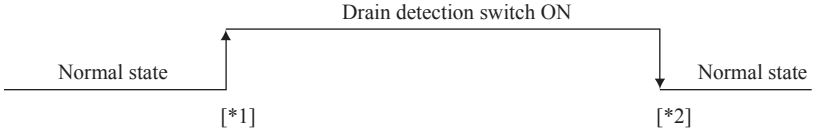
(iii) ❄💧AND☀AND〓〔Operate in heating & fan〕: Drain pump is run during cooling, dry, heating and fan.

(iv) ❄💧AND〓〔Operate in standard & fan〕: Drain pump is run during cooling, dry and fan.

Note (1) Values in 〔 〕are for the RC-EX1A model.

(12) Drain motor (DM) control

(a) Drain detection switch is turned ON or OFF with the float switch (FS) and the timer.



[∗1] Drain detection switch is turned "ON" when the float switch "Open" is detected for 3 seconds continuously in the drain detectable space.

[∗2] Drain detection switch is turned "OFF" when the float switch "Close" is detected for 10 seconds continuously.

(i) It detects always from 30 seconds after turning the power ON.

1) There is no detection of anomalous draining for 10 seconds after turning the drain pump OFF.

2) Turning the drain detection switch "ON" causes to turn ON the drain pump forcibly.

3) Turning the drain detection switch "OFF" releases the forced drain pump ON condition.

(b) Indoor unit performs the control A or B depending on each operating condition.

	Indoor unit operation mode				
	Stop (1)	Cooling	Dry	Fan (2)	Heating
Compressor ON		Control A			
Compressor OFF	Control B				

Note (1) Including the stop from the cooling, dehumidifying, fan and heating, and the anomalous stop
(2) Including the "Fan" operation according to the mismatch of operation modes

(i) Control A

1) If the float switch detects any anomalous draining condition, the unit stops with the anomalous stop (displays E9) and the drain pump starts. After detecting the anomalous condition, the drain motor continues to be ON.

2) It keeps operating while the float switch is detecting the anomalous condition.

(ii) Control B

If the float switch detects any anomalous drain condition, the drain motor is turned ON for 5 minutes, and at 10 seconds after the drain motor OFF it checks the float switch. If it is normal, the unit is stopped under the normal mode or, if there is any anomalous condition, E9 is displayed and the drain motor is turned ON. (The ON condition is maintained during the drain detection.)

(13) Operation check/drain pump test run operation mode

(a) If the power is turned on by the dip switch (SW7-1) on the indoor PCB when electric power source is supplied, it enters the mode of operation check/drain pump test run. 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. Unless the remote control communication is established, it enters the drain pump test run mode.

Note (1) To select the drain pump test run mode, disconnect the remote control connector (CNB) on the indoor PCB to shut down the remote control communication.

(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.

(d) Drain pump test run mode

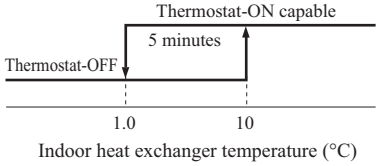
As the drain pump test run is established, the drain pump only operates and during the operation protective functions by the microcomputer of indoor unit become ineffective.

(14) Cooling, dehumidifying frost protection

To prevent frosting during cooling mode or dehumidifying mode operation, the of thermostat-OFF if the indoor heat exchanger temperature (detected with ThI-R) drops to 1.0 °C or lower at 4 minutes after the thermostat-ON. If the indoor unit heat exchanger temperature is 1.0 °C or lower after 5 minutes, the indoor unit is controlled thermostat-OFF. If it becomes 10°C or higher, the control terminates. When the indoor heat exchanger temperature has become as show, the indoor unit send outdoor unit the "Anti-frost" signal.

• 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



(15) Anomalous fan motor

(a) After starting the fan motor, if the fan motor speed is 200min^{-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(FDU: -500) min^{-1} less than the required speed, it stops with the anomalous stop (E20).

(16) High ceiling 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 tap. To change the fan tap, use the indoor unit function "FAN SPEED SET" on the wired remote control.

Fan tap		Indoor unit airflow setting				Series
		- - - -	- - - -	- -	- -	
FAN SPEED SET	STANDARD	PHi1 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Except FDT
		PHi2 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Only FDT
	HIGH SPEED1	PHi1 - PHi1 - Hi - Me	PHi1 - Hi - Me	PHi1 - Me	PHi1 - Hi	Except FDT, FDTW, FDTS
		PHi2 - PHi1 - Hi - Me	PHi1 - Hi - Me	PHi1 - Me	PHi1 - Hi	Only FDT, FDTW, FDTS
	HIGH SPEED2	PHi2 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - M	Only FDT, FDTW, FDTS

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

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

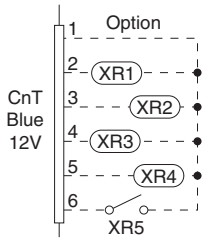
(a) Broken wire detection
When the return air temperature thermistor detects -20°C or lower or the heat exchanger temperature thermistor detect -40°C or lower for 5 seconds continuously, the compressor stops. After a 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes after the initial detection for 6 minutes continuously, stops again (the return air temperature thermistor: E7, the heat exchanger temperature thermistor: E6).

(b) Short-circuit detection
If the heat exchanger temperature thermistor detects 70°C or higher for 5 seconds continuously at 2 minutes and 20 seconds after the compressor ON during cooling operation, the compressor stops (E6).

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

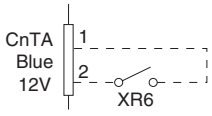
Be sure to connect the wired remote control to the indoor unit. Without wired remote control remote operation by CnT is not possible to perform.

・CnT



①Operation output (CnT-2: XR1)
②Heating output (CnT-3: XR2)
③Thermostat ON output (CnT-4: XR3)
④Error output (CnT-5: XR4)
⑤Remote operation input (CnT-6: Volt-free contact)

・CnTA



Note (1) CnTA function can be changed by RC-EX1A.

■ 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	⑦ Emergency stop
CnT	① Operation stop level	CnT ①	CnT ①	CnT ① +CnTA ②	CnT ①	CnT ① /CnTA ⑤	CnT ① /CnTA ⑥	CnT ① <CnTA ⑦
	② Operation stop pulse	CnT ②	CnT ②	CnT ② +CnTA ③	CnT ②	CnT ② /CnTA ⑤	CnT ② /CnTA ⑥	CnT ② <CnTA ⑦
	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	CnT ③ <CnTA ⑦
	④ Operation permission/prohibition pulse	CnT ④	CnT ④	CnT ④ +CnTA ③※	CnT ④	CnT ④ /CnTA ⑤	CnT ④ /CnTA ⑥	CnT ④ <CnTA ⑦
	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	CnT ⑤ /CnTA ⑦
	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	CnT ⑥ /CnTA ⑦
	⑦ Emergency stop	CnT ⑦ >CnTA ①	CnT ⑦ >CnTA ②	CnT ⑦ >CnTA ③	CnT ⑦ >CnTA ④	CnT ⑦ /CnTA ⑤	CnT ⑦ /CnTA ⑥	CnT ⑦ +CnTA ⑦

Note (1) 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 - ⑦ in the table.)

(a) Output for external control (remote display)

Following output connectors (CnT) are provided on the indoor control PCB for monitoring operation status.

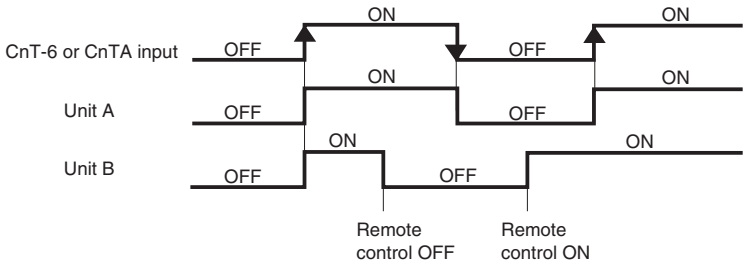
① **Operation output:** Outputs DC12V signal for driving relay during operation
② **Heating output:** Outputs DC12V signal for driving relay during heating operation
③ **Thermostat ON output:** Outputs DC12V signal for driving relay when compressor is operating.
④ **Error output:** Outputs DC12V signal for driving relay when anomalous condition occurs.

(b) Remote operation input

Remote operation input connector (CnT-6 or CnTA) is provided on the indoor control PCB.
However remote operation by CnT-6 or CnTA is not effective, when "Center mode" is selected by central control.
In case of plural unit (twin, triple, double twin), remote operation input to CnT-6 or CnTA on the slave indoor unit is invalid.
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.

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

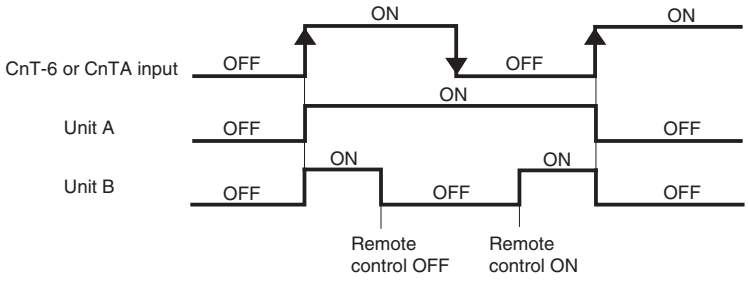
Input signal to CnT-6 or CnTA is OFF→ON …… unit ON
Input signal to CnT-6 or CnTA is ON→OFF …… unit OFF
Operation is not inverted.



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)

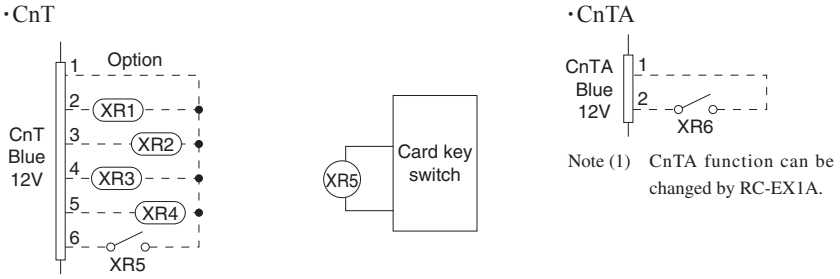
It is effective only when the input signal to CnT-6 or CnTA is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



(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.



	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 not available.

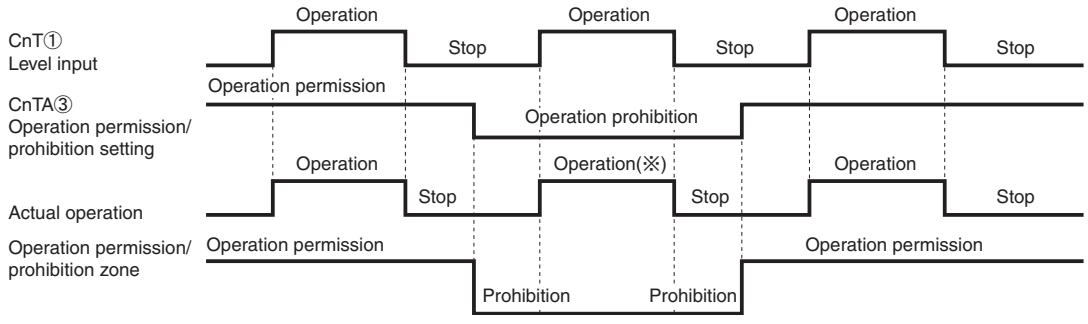
*(2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";

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 not available.

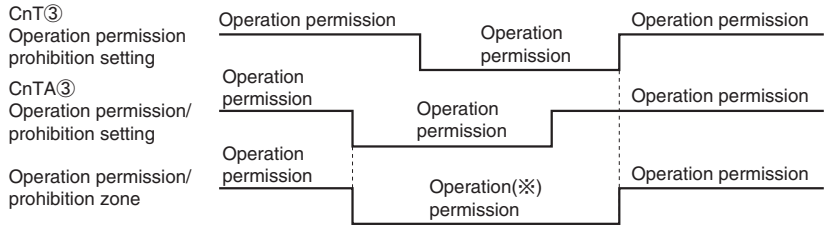
(3) This function is invalid only at "Center mode" setting done by central control.

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



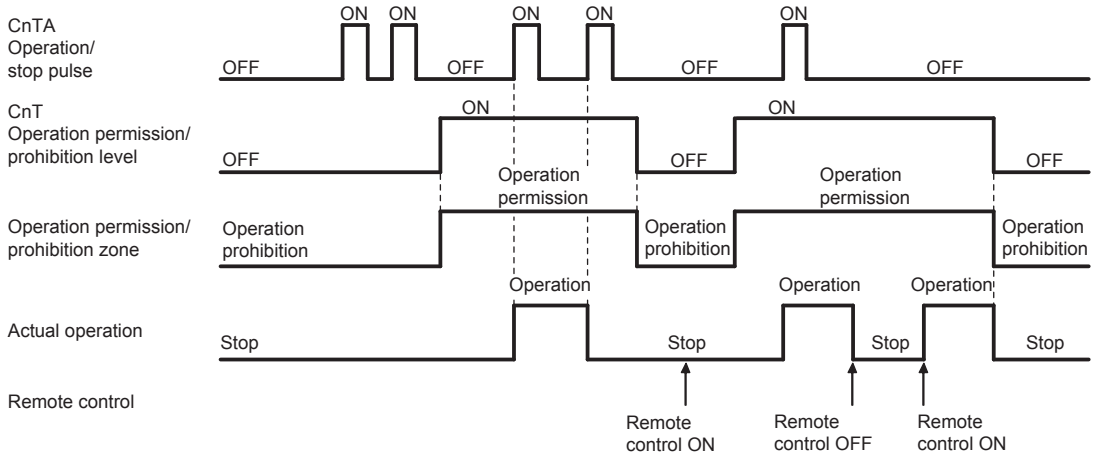
(※) CnT level input supersedes CnTA operation prohibition.

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



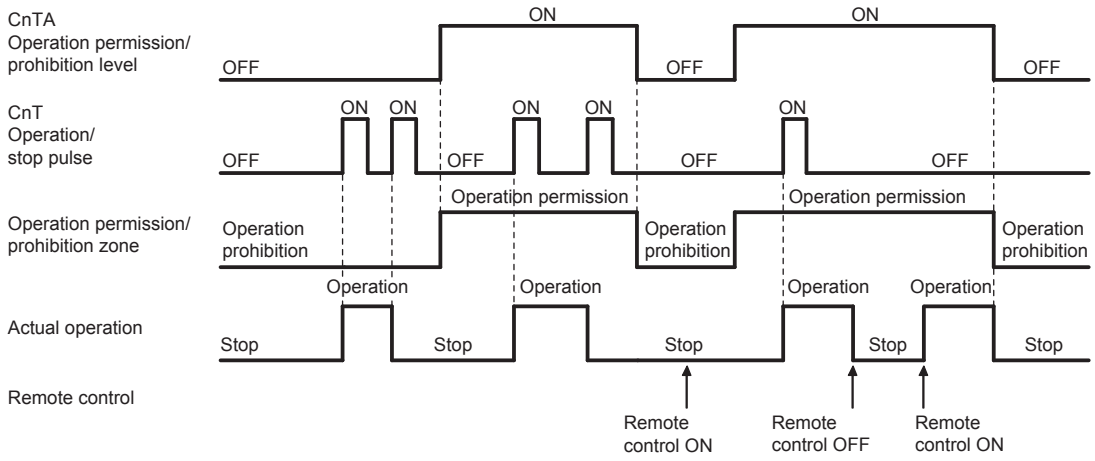
(※) Operation prohibition zone is determined by the OR judgment between CnT Operation prohibition zone and CnTA Operation prohibition zone.

(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) Selection of cooling/heating external input function

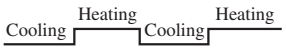
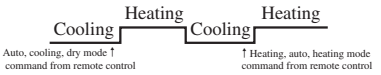
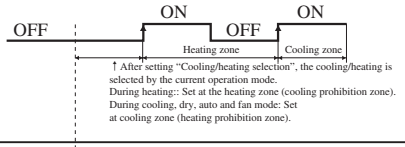
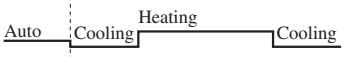
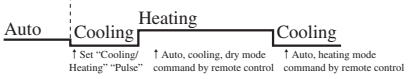
(a) When "External input 1 setting: Cooling/heating" is set for the indoor unit function from remote control, the cooling or heating is selected with CnT-6 or CnTA.

(b) When the External input 1 method selection: Level input is set for 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 for 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.

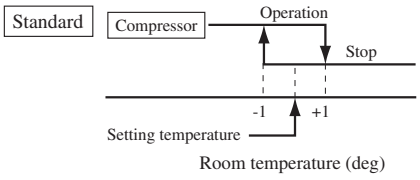
■ Selection of cooling/heating external input function

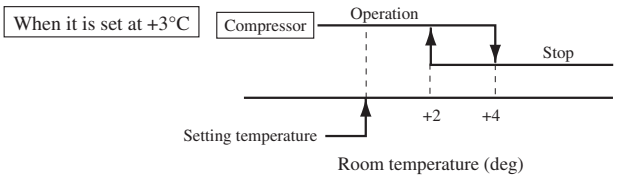
External input selection	External input method	Operation	
External input selection Cooling/heating selection	⑤ Level	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	
	⑥ Pulse	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	

Notes (1) Regarding the priority order for combinations of CnT and CnTA, refer to Page 16.

(21) 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.





(22) Return air temperature compensation

This is the function to compensate the deviation between the detection temperature by the return air temperature thermistor 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 thermistor only.

(23) High power operation (RC-EX1A only)

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

(24) Energy-saving operation (RC-EX1A only)

It operates with the setting temperature fixed at 28°C for cooling, 22°C for heating or 25°C for auto. (Maximum capacity is restricted at 80%.)

(25) Warm-up control (RC-EX1A 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.

(26) Home leave mode (RC-EX1A only)

When the unit is not used for a long period of time, the room temperature is maintained at a moderate leval, 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 set temperature (factory setting 33°C for cooling, 10°C for heating)

(b) Set temperature and indoor fan speed can be set by RC-EX1A.

(27) Auto temp. setting (RC-EX1A only)

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

(28) Fan circulator operation (RC-EX1A 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. (mormal 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 indoor unit return air temperature sensor becomes bigger than 3°C.

(29) The operation judgment is executed every 5 minutes (RC-EX1A 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 or return air temperature becomes lower than 25°C, unit goes thermo OFF.

(30) Auto fan speed control (RC-EX1A only)

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

- Auto 1: Changes the indoor unit fan tap within the range of Hi ↔ Me ↔ Lo.
- Auto 2: Changes the indoor unit fan tap within the range of PHi ↔ Hi ↔ Me ↔ Lo.

(31) IU overload alarm (RC-EX1A only)

If the following condition is satisfied at 30 minutes after starting operation, RC-EX1A shows maintenance code "M07" and the signal is transmitted to the external output (CnT-5).

(a) Receipt of the signal by the external output is indicated by lighting an LED or other prepared on site.

- 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.

(b) 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

(32) Peak-cut time (RC-EX1A 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-minutes interval.
- The selectable range of capacity limit % (Peak-cut %) is from 0% to 40-80% (20% interval).
- Holiday setting is available.

1.4 Operation control function by the outdoor control

(A) Normal control

(1) Operation of major functional components under each operation mode

Operation mode / Fonctional compornents	Cooling/Dehumidifying		Fan	Heating		
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Defrost
Indoor unit fan	Remote control command	Depend on remote control setting	Remote control command	Remote control command	Depend on remote control setting	○→×
Indoor unit electronic expansion valve	Superheating control response	Fully closed	Fully closed	Outlet temperature control response	Slight opening control	Model-specific aperture opening angle
Compressor [CM]	○	×	×	○	×	○
Magnetic contactor CM1 [52X1, 52X2]	○	○	○/×	○	○	○
Outdoor unit fan mortor [FMo-1]	○	○/×	○/×	○/×	○/×	○→×
Outdoor unit fan mortor [FMo-2]	○/×	○/×	○/×	○/×	○/×	○→×
4 way valve (20S)	×	×	×	○	○	○→×
Electronic expansion valve for heating [EEVH]	Fully open	○/×	※1	Opening Angle Control	※2	Fully closed / Fully open
Electronic expansion valve for sub-cooling coil [EEVSC]	Opening Angle Control	Fully closed	Fully closed	※2	Fully closed	Fully closed
Solenoid valve [SV1] (liquid injection return)	○/×	×	×	○/×	×	○/×
Solenoid valve [SV6] (oil return)	○/×	○/×	×	○/×	○/×	○/×
Crankcase heater [CH]	○/×	○/×	○/×	○/×	○/×	○/×

Note (1) It means ○ : ON, × : OFF, ○/× : ON or OFF, ○→× : ON→OFF

(2) This shows the state of output when all indoor units are under the same mode.

(3) ※1 : When stopped from cooling, it is fully open

When stopped from heating, it is fully closed unless another degree of opening is specified by the electronic expansion valve (EEV) control at the stop.

※2 : When stopped from heating, it is fully closed unless another degree of opening is specified by the electronic expansion valve (EEV) control at the stop.

(2) Compressor operation range

(a) Maximum compressor frequency

(Unit: rps)

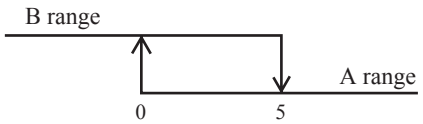
Model	Cooling	Heating	
		A range	B range
224	92	96	116
280	120	120	124

Outdoor air temperature (℃)

(b) Minimum compressor frequency

(Unit: rps)

Model	Cooling	Heating	
		A range	B range
224	20	20	40
280	20	20	40



Outdoor air temperature (℃)

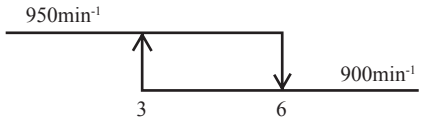
(3) Outdoor fan control

(a) Outdoor fan speed and fan motor rotation speed

The 7th outdoor fan speed in the following table is specified as the rated speed. Under the normal control, the speeds up to 9th level are used.

Outdoor fan tap	Cooling		Heating	
	FMo1 [min^{-1}]	FMo2 [min^{-1}]	FMo1 [min^{-1}]	FMo2 [min^{-1}]
0th speed	0	0	0	0
1th speed	200	0	200	0
2th speed	200	200	200	200
3th speed	300	300	300	300
4th speed	390	390	390	390
5th speed	530	530	530	530
6th speed	600	600	600	600
7th speed	730	730	730	730
8th speed	825	825	825	825
9th speed	900	900	900/950	900/950

Note (1) Heating 9th speed changes it depending to outdoor air temperature Tho-A as follows.



(b) Fan control during cooling

During cooling and dehumidifying, fan speed is controlled in accordance with the high pressure (sensed by PSH) and the outdoor air temperature (sensed by Tho-A).

(i) Initial fan speeds are as follows.

Initial ourdoor fan speed at cooling

Model	Outdoor air temp. ≤ 10ºC	10ºC < Outdoor air temp. < 15ºC	15ºC ≤ Outdoor air temp.
All models	2th speed	4th speed	6th speed

(ii) Speed changes depending on high pressure value.

(iii) Under low outdoor air temperature condition, the stepless fan control between 130-300min^{-1} is performed.

(c) Outdoor fan heating control

The fan speed control is performed based on the low pressure (detected with PSL) during heating operation.

(i) Initial fan speed is 6th speed.

(ii) Speed changes depending on low pressure value.

(4) Defrost control

(a) Temperature condition of defrosting

(i) Start conditions (Standard specification or cold region specification can be selected by switching the jumper wire J15.)

Defrost operation will start, when outdoor unit whose compressor is operating under heating mode has satisfied all the following conditions.

1) When 33 minutes of cumulative compressor operation time has passed since heating operation started.
2) When 33 minutes of cumulative compressor operation time has passed since the previous defrosting ended.
3) When 8 minutes has passed since the compressor turned ON from OFF status.
4) When 8 minutes has passed since one outdoor fan turned ON from OFF status.
5) After all above conditions have been met, when any of the following conditions is satisfied.
   ① When the outdoor heat exchanger temperature (sensed by Tho-R) and the outdoor air temperature (sensed by Tho-A) dropped below the defrosting start temperature in Fig. 1 for 3 minutes continuously
   ② When the suction pressure saturated temperature calculated by the low pressure (sensed by PSL) and the outdoor air temperature (sensed by Tho-A) dropped below the defrosting start temperature in Fig. 2 for 3 minutes continuously

Fig. 1

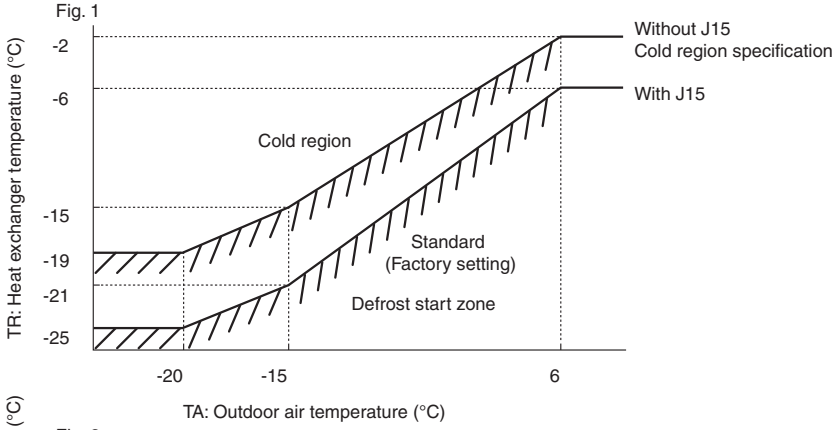
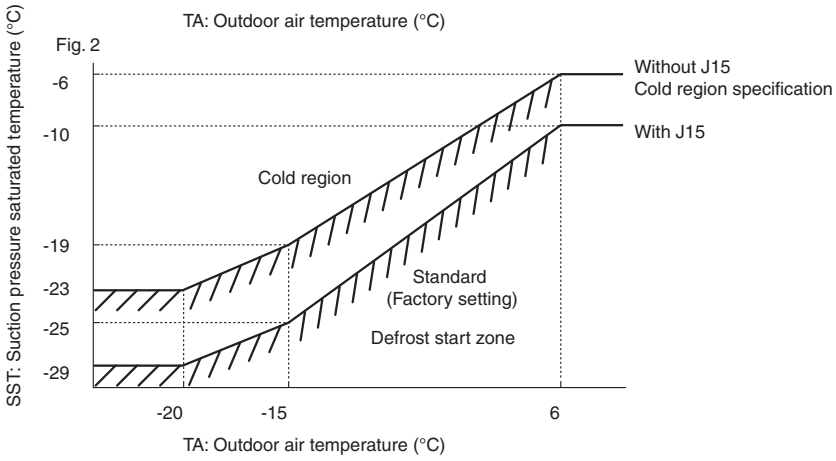


Fig. 2



(ii) End conditions

- Standard (J14 is shorted)
  1) When the temperature detected with both outdoor heat exchanger temperature thermistors (Tho-R1 and Tho-R2) is higher than 9ºC
  2) Or when 12 minutes have elapsed since defrosting started.
- Cold region setting (J14 is open)
  1) When (Tho-R1 and Tho-R2) ≧ 9ºC is satisfied, after 2 minutes and 30 seconds have elapsed since defrosting started, and when either of following conditions is satisfied, the defrosting end operation starts.
     a) 2 minutes and 30 seconds have elapsed since the temperature of either Tho-R1 or Tho-R2 was 14ºC or higher
     b) The temperature of either Tho-R1 or Tho-R2 is 30ºC or higher.
     c) 14 minutes have elapsed since defrosting started.
  2) When (Tho-R1and Tho-R2) < 9ºC is satisfied, after 2 minutes and 30 seconds have elapsed since defrosting started, and when either of following conditions is satisfied, the defrosting end operation starts.
     1) 5 minutes have elapsed since the temperature of either Tho-R1 or Tho-R2 was 14ºC or higher.
     b) The temperature of either Tho-R1 or Tho-R2 is 30ºC or higher.
     c) 14 minutes have elapsed since defrosting started.

(5) Protective control

(a) High pressure protective control/error

If the high pressure exceeds 3.7 MPa, the compressor speed is reduced gradually.
It reduces to 20 rps at the lowest.
If the high pressure still rises to 4.15 MPa, the compressor stops.

(b) Low pressure protective control/error

If the low pressure drops below 0.18 MPa, the compressor speed is reduced gradually.
It reduces to 20 rps at the lowest.
If the low pressure still drops below 0.134 MPa, the compressor stops.

(c) Discharge pipe temperature control/error

If discharge pipe temperatures (detected with Tho-Dl, -D2) exceed 120ºC, the compressor speed is reduced gradually. (To 20 rps at the lowest) If the temperatures still continue to rise beyond 130ºC, the compressor stops.

(d) Compressor compression ratio protective control

If the compressor compression ratio exceeds the setting value, the compressor speed is reduced gradually.
It reduces to 20 rps at the lowest.

(e) Current safe control

(i) The current safe control monitors current values at T-phase of inverter. If the value exceeds the setting value, the compressor speed is reduced.
If the value is higher than the setting value even if the speed is reduced, the speed is reduced further.

(ii) This control is reset if the current value at T-phase of inverter becomes lower than the setting value – 1 A for 3 minutes continuously or lower than the setting value for 6 minutes continuously.

(f) Current cut control

(i) Current sensor built in the power transistor monitors current values output from the inverter. If the value exceeds the setting value, the current cut control stops the compressor. The compressor starts automatically 3 minutes after the stop.

(ii) If the above control activates 4 times within 15 minutes, and the operation is stopped with the error stop.
State of the error continues for 3 minutes after the error stop. The error can be reset by operating the inspection reset from the remote control.

(g) Under-dome temperature protective control

If the under-dome temperature exceeds the setting value, the compressor speed is reduced gradually.
It reduces to 20 rps at the lowest.

(6) Test run

(a) Start conditions

(i) Turn ON the test run switch (SW5-1). The switch is invalid if it is turned ON before the power ON.

(ii) Pump down switch (SW5-3) must be turned OFF.

(b) Contents of control

(i) Turning ON the dip switch (SW5-2) conducts cooling operation and turning OFF (SW5-2) conducts heating operation.

1) Cooling operation
Compressor operation frequency control is conducted by the cooling low pressure control.

2) Heating operation
Compressor operation frequency control is operated by the heating high pressure control.

(ii) Test run start signal under corresponding operation mode is transmitted to all indoor units connected.

(c) End conditions

(i) When the test run switch (SW5-1) is turned OFF, it stops.

(ii) When it has stopped anomalously by the error control during test run, the error is displayed in the same way as the case of normal operation and the state of anomalous stop is kept ON even if the test run switch (SW5-1) is turned OFF.

(B) Optional controls

- **Functions of outdoor PCB connector CNS1 and CNZ1**

① CNS1 connector : By changing the allocation of external input functions [P07-"X"] on the 7-segment, following functions can be selected.

Function No. "X"	CNS1 short circuited	CNS1 open
"0" : Extemal operation input	Operation permission	Operation prohibition
"1" : Demand input	Invalid	Valid
"2" : Forced cooling/heating input	Heating	Cooling
"3" : Silent mode input 1	Valid	Invalid
"4" : Spare		
"5" : Outdoor fan snow guard control input	Valid	Invalid
"6" : Test run extemal input 1	Test run start	Normail operation
"7" : Test run extemal input 2	Cooling test run	Heating test run
"8" : Silent mode input 2	Valid	Invalid
"9" : Spare		
"10" : AF periodic inspection display	Valid	Invalid
"11" : AF error display	Valid	Invalid
"12" : Building multi energy save control	Valid	Invalid

② CNZ1 connector : By changing the allocation of external input functions [P06-"X"] on the 7-segment, following functions can be selecte.

"0" : Operation output
"1" : Error output
"2" : Compressor ON output
"3" : Fan ON output
"4" : Oil return operation or defrost operation output
"5" : High pressure control output to water spraying device, etc.
"6 ~ 9" : Spare

(1) External input and demand input

(a) Operation permission and prohibition modes

(Note) With 7-segment display [P07]-[0]

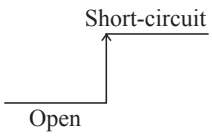
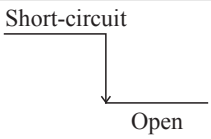
(i) Operation permission or operation prohibition mode is switched with the connector (CnS1) and the jumper wire (J13) on the outdoor PCB.

J13: Switching of CnS1 input method

J13 short-circuited: CNS1 is for the level input.

J13 open: CnS1 is for the pulse input.

(ii) Operation permission/prohibition control by the external input CnS1 of outdoor unit

Input: CnS1	Switching with J13	CnS1: Switching of operation permission/ prohibition modes
	Short-circuit (Level input)	Operation prohibition mode → Operation permission mode
	Open (Pulse input)	Switching of operation permission/ operation prohibition modes (Reversal)
	Short-circuit (Level input)	Operation permission mode → Operation prohibition mode
	Open (Pulse input)	—— (NOP)

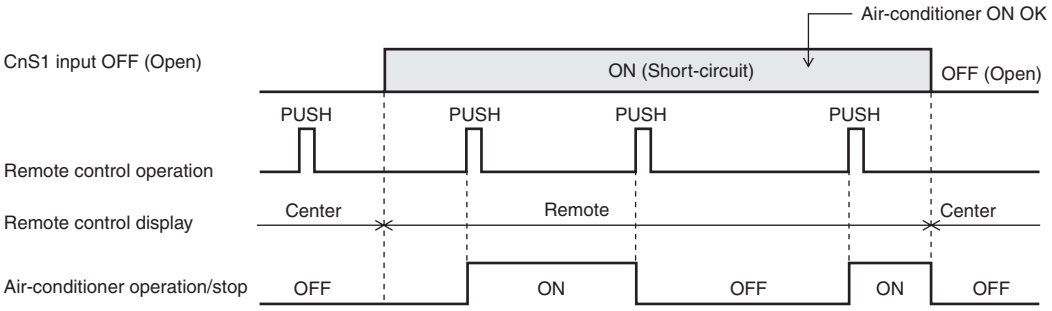
Note (1) Factory setting – J13: Short-circuit, CnS1: Short-circuit (Short-circuit pin connected)

(iii) The operation condition is desplayed on the LCD of remote control and is transfered to optional centralised control.

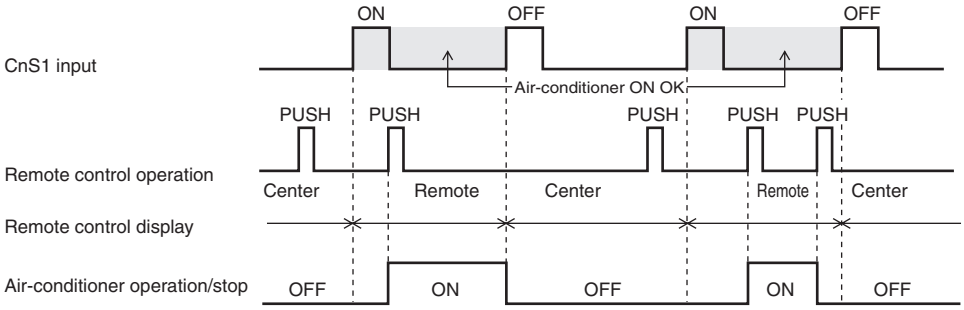
(iv) When the control comand from remote control is not accepted (Under the condition of the system all stop status by external input), “Center” is dispalyed. See Item (v) mentioned below.

(v) CnS1 performs the following operations depending on the short-circuit or open of the jumper wire (J13). In case of pulse input, the pulse width is 500ms or larger.

① J13 – Short-circuit



② J13 - Open



(vi) After changing mode from operation prohibition mode to permission mode, the indoor units operation status can be select by 7-segment [P17] setting.

7-segment [P17] =0 → Keeping STOP

7-segment [P17] =1 → Automatically RUN

(b) Demand control

(Note) With 7-segment [P07] = [1]

(i) Demand control and normal operation are switched with the connector (CnS1) and the jumper wire (J13) on the outdoor PCB.

J13: Switching of CnS1 input method

J13 short-circuit: CnS1 is for the level input

J13 open: CnS1 is for the pulse input

(ii) Operation/ stop control by the demand input CnS1 of outdoor unit

Input: CnS1	Switching with J13	CnS1: Switching of demand control/ normal operation
Short-circuit / Open	Short-circuit (Level input)	Demand control → Normal operation
	Open (Pulse input)	Switching of normal operation/ demand control (Reversal)
Short-circuit / Open	Short-circuit (Level input)	Normal operation → Demand control
	Open (Pulse input)	NOP

Note (1) Factory setting – J13: Short-circuit, CnS1: Short-circuit (Short-circuit pin connected)

(iii) The operation condition is desplayed on the LCD of remote control and is transferred to option centralised control.

(iv) Demand control

Demand ratio can be switched with the dip switches (SW4-7, 4-8) on the outdoor PCB.

SW4-7, SW4-8 demand switching: 0 – Open, 1 – Short-circuit (Factory default is open)

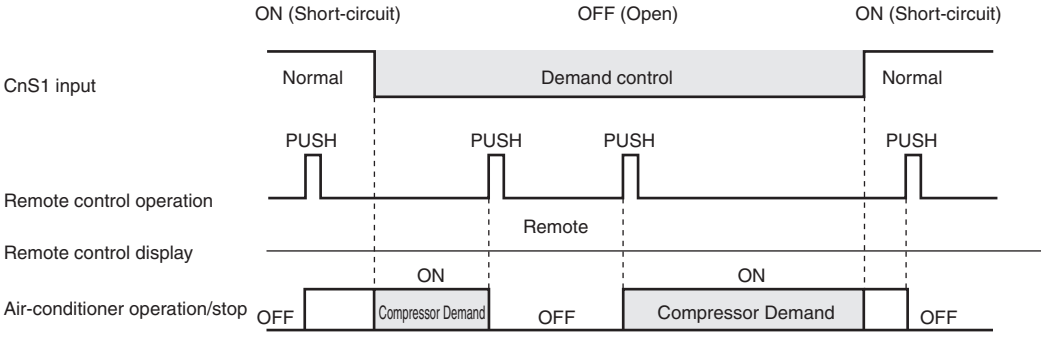
SW4-7	SW4-8	Compressor Out put(%)
0	0	80
1	0	60
0	1	40
1	1	0

(v) The controls of 4-way valve safeguard, compressor protective start operation, defrost operation, oil equalized operation, oil return operation, pump-down operation for replacement, Start/Stop pump-down operation and check operation have priority over this control.

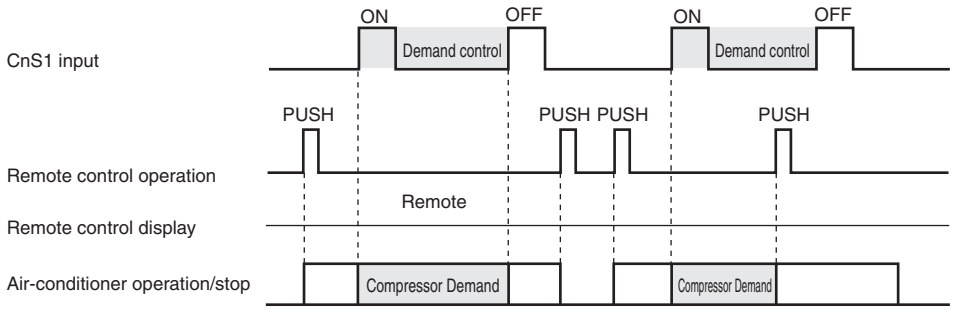
(vi) CnS1 performs the following operations depending on the short circuited or open of the jumper wire (J13).

In the case of pulse input, the pulse width is 500ms or larger.

① J13 – Short-circuit



② J13 - Open



(c) Demand control from indoor unit

(i) Starting condition

① When a demand ratio (“80%”, “60%”, “40%” or “0%”) has been transmitted from an indoor unit of “Peak-cut timer” function.

② Normal demand of Item (b) is not activated.

③ This control is performed on the RC-EX1A remote control.

(ii) Contents of control

① Compressor’s upper limit speed is restricted according to the demand restriction rate.

② The demand ratio controlled by the restriction rate which is transmitted from an indoor unit.

③ If the demand control rate signals are received from two or more indoor units, the control takes the lowest rate.

④ When the demand rate is other than 0%, the controls of 4-way valve safeguard, defrost operation, oil return operation, oil equalized operation, pump-down operation for replacement, Start/Stop pump-down operation and check operation have a priority over this control.

(iii) Ending condition

When the starting conditions have been lost.

(2) Silent mode control

(a) Start conditions

When all of the following conditions is established.

(i) At the start of silent mode initiated by the indoor unit or when the silent mode input is made effective (short-circuited) at the external input terminal (CnS1) on the outdoor unit. (With 7-segment display [P07] - [3] or [8])

(ii) When the outdoor unit operation mode is cooling or heating.

(iii) When the outdoor air temperature satisfies the following conditions.

1) Setting of the external input terminal "CnS1" on the outdoor unit PCB

a) The control becomes capacity priority when the external input setting is "Silent mode input 1" and CnS1 is shorted.

b) The control becomes sound level priority when the external input setting is "Silent mode input 2" and CnS1 is shorted.

2) Receive the signal of "Silent mode" from indoor unit

(iv) It is excluded when the following invalid conditions are established
(For prevention of anomalous pressure rise at start)

- For 30 seconds after compressor has been turned ON
- During the 4-way valve switching safeguard
- During the defrost control
- During the oil return control
- During the pump-down control for replacement
- During the Start/Stop pump-down control

(Note) Any controls affected by the restriction of compressor and outdoor fan capcity during the silent mode are excluded.

(b) Control contents

Upper limit of compressor speed and upper limit of outdoor fan speed are restricted according to the established start condition and outdoor temperature and silent mode setting.

(i) External input setting "Capacity priority"

1) Silent setting 0, 1, 4, 5: Effective in zone A and B

2) Silent setting 2, 3, 6, 7: Effective in zone B

(ii) External input setting "Sound level priority"
Regardless of outdoor air temperature condition, it move based on a list shown below.

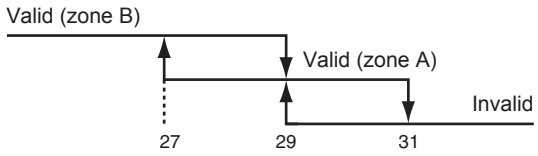
(iii) Receive the signal from indoor unit

1) Silent setting 0, 1: Effective in zone A and B

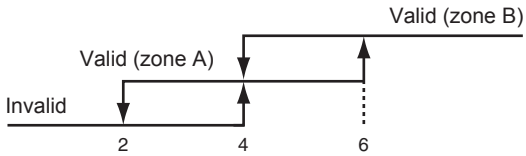
2) Silent setting 2, 3: Effective in zone B

3) Silent setting 4 ~ 7: Regardless of outdoor air temperature condition, it move based on a list shown below.

<Outdoor operation mode - Cooling>



<Outdoor operation mode - Heating>



Item / Setting	Upper limit of compressor speed (rps)		Upper limit of outdoor fan speed (min^{-1})	
	224	280	224	280
Silent setting 0,4 (Factory default)	67	67	825	825
Silent setting 1,5	66	66	730	730
Silent setting 2,6	57	57	600	600
Silent setting 3,7	50	50	390	390

(c) End condition

- When the starting conditions are not established.

(3) Outdoor fan snow protection control

(a) This control is enabled/disabled by entering data into 7-segment display.

(b) Setting method of outdoor fan control

[Starting conditions]

When following conditions are established for 10 minutes continuously.

(i) Snow protection control setting is valid ([P02]-1) and outdoor air temperature < 3°C or external input of outdoor fan snow protection control ON. ([P07]-5 and CnS1 is shorted)

① Set the Code No. to "P02".

② "0" or "1" is displayed at the data display area.
"0": Outdoor fan control disabled (Factory setting)
"1": Outdoor fan control enabled

③ Press SW7 (Data write/delete) for 3 seconds continuously.

④ "0" or "1" blinks every 0.5 second at the data display area.

⑤ Press SW8 (one digit) to toggle the display back and forth between "0" and "1" (blinking).

⑥ If SW7 is pressed for 3 seconds or longer continuously while "0 " and "1" is blinking, the blinking stops. With this operation, the enabled/disabled setting of outdoor fan control is stored in memory of EEPROM, and henceforth the outdoor fan is controlled according to the contents of memory.

⑦ Contents of the outdoor fan control are retained even if the power is turned off and backed on again.

(c) Contents of outdoor fan snow protection control

(i) If the outdoor air temperature drops 3°C or lower when the unit is all stop or error stop, the outdoor fan runs at the rating speed (7th speed) once every 10 minutes.

(ii) The outdoor fan runs for 30 seconds.*
*Operation time outdoor fan is changeable from 10 to 600 seconds by [P03]

(iii) During this snow protection control, the compressor's magnetic contactor (52X2) is ON.

(d) End conditions of outdoor fan snow protection control

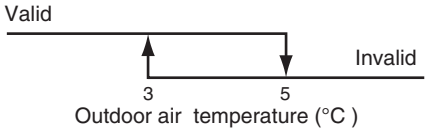
When folowing conditions are established.

(i) Snow protection control setting is invalid ([P02]-0) or outdoor air temperature > 5°C and external input of outdoor fan snow protection control OFF ([P07]-[5] and CnSl is opend).

(ii) Compressor ON

(iii) During all stop by anomaly

<Outdoor air temperature condition at snow protection control>



(4) External output

This function is used in order to operate the external option devices in conjunction with relay outputs of the respective operation information from outdoor unit.

[External output function]

External output function of CnZ1 can be switched by changing of [P06] on 7-segment display as mentioned below.

0: Operation output

- When the outdoor unit operation mode is "Operation", the external output relay is turned ON.

(Note) The "Operation" includes not only compressor ON mode but also Fan mode and thermostat OFF mode under the condition of remote control ON. But the anomalous stop is excluded.

1: Error output

- It is turned ON at anomalous stop, and turned OFF when "CHECK" and "RESET" buttons on remote control are pressed simutaneously after recovering from the anomaly. Even if "CHECK" and "RESET" buttons are pressed before recovering from the anomaly, it is not turned OFF, but when recovering from the anomaly later, it is automatically turned OFF.

2: Compressor ON output

- It is turned ON when the compressor is ON.

3: Fan ON output

- It is turned ON when the outdoor fan speed command > 0.

4: Oil return operation output / defrost operation output

- This is turned ON during the oil return operation (cooling and heating) or defrost operation on heating.

5: High pressure control output to water spraying device, etc.

- Signal is output in order to operate a sprinkler system for cooling down the outdoor heat exchanger.

  It is turned ON, when high pressure > 3.3MPa in cooling mode

  If once starting operation of sprinkler system, it shall be kept operation for 30sec at least.

(5) Outdoor operation mode

On the standard models of 2 pipe system, the outdoor operation mode of Stop/Cooling/Heating is selected based on the information of indoor units, and then respective controls are performed.

<Contents of control>

(a) Determination of outdoor operation mode

Operation mode of outdoor unit is determined based on respective signals of Operation/Stop and Cooling/Heating.

(b) Type of outdoor operation mode

(i) Outdoor operation mode - Stop

(ii) Outdoor operation mode - Cooling

(iii) Outdoor operation mode - Heating

(c) Priority in operation mode selection.

(i) First priority is given to the forced cooling/heating operation.

(ii) Second priority is given as follows

Priority in the operation mode selection can be changed using the 7-segment setting [P01].

P01 setting	Mode
0 (Factory default)	First unit's operation mode
1	Last unit's operation mode
2	Priority of master unit's setting operation mode
3	Priority of required major operation mode

・First unit's operation mode: Operation mode of the indoor unit which is operated first time after stop of the outdoor unit operation mode.

・Last unit's operation mode: Operation mode of the indoor unit which is operated at the last time.

・Priority of master unit's setting operation mode: Operation mode of indoor unit of which the address No. is smallest (Master indoor unit). When the master indoor unit is turned off, it become valid the first push priority on other indoor units' remote controls.

・Priority of required major operation mode: Operation mode of which the total capacity of operating indoor units is larger. There is no renewed judgment for 10 minutes after a change on the operation mode.

The judgment, however, is renewed in following cases.

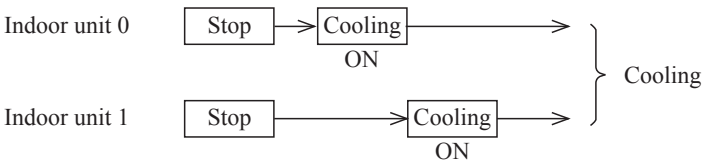
- At the stop
- When the P01 setting is changed.

(iii) In the event that agreement of operation mode is lost between indoor units and outdoor units by selecting the first or second priority after determining the operation mode, it is changed forcibly to the "Fan" mode. The operation mode LCD flickers to warn the "Mode unmatch".

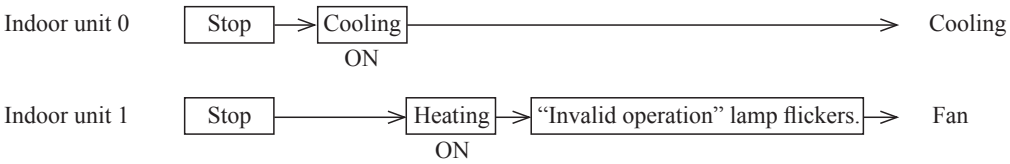
(iv) Example of operation mode selection

<First unit's operation mode>

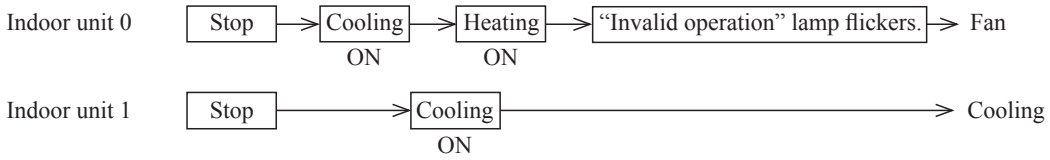
① If both of indoor units 0 and 1 have the same operation mode, it operates with the mode.



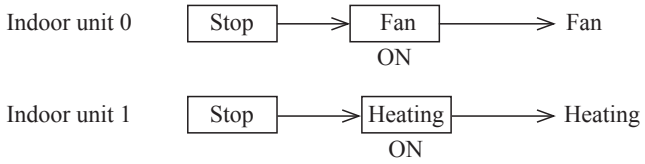
② Cooling does not match on indoor units 0 and 1 (Priority is given to previous operation.)



③ When it is changed from same mode to unmatch.

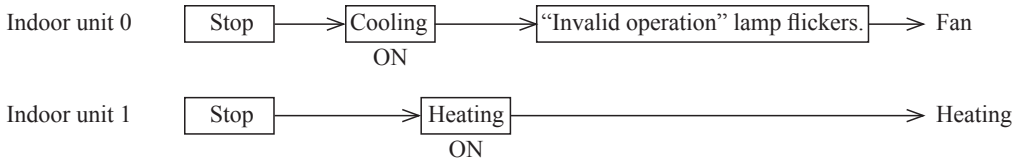


④ Operation mode is prepared for change in the fan mode.

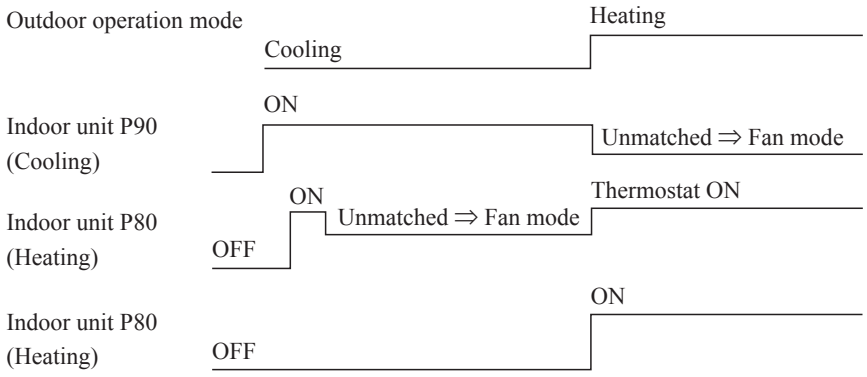


<Last unit's operation mode>

① If the indoor unit 1 of which operation mode is different has joined in when the indoor units 0 is operating.



<Priority of required major operation mode>



(v) Reset of unmatched condition (Cooling/heating unmatched)

When unmatch occurs among indoor units, it can be reset by either one of followings.

① If the operation mode of outdoor unit is matched with that of indoor unit.

② If the operation mode is changed to "Fan" or "Stop" on the indoor units on which Cooling/heating is unmatched.

(6) Forced cooling/heating operation

(a) With this control, SW3-7 on the outdoor PCB is turned ON and setting function [P07]-[2] with 7-segment display so as to forcibly determined whether the indoor unit is operated for cooling or heating.

(b) If any operation mode other than the forcible mode is commanded from indoor unit, the mode unmatch message is displayed on the remote control or others and operation enters in the FAN mode.

SW3-7	CnS1	Operation
ON	Open	Cooling only
	Close	Heating only
OFF	Normal operation	

(c) With the forced mode from indoor unit, if a different operation mode is commanded, following operations take place based on the forced cooling/heating operation set with the 7-segment [P18].

P18=0: The operation mode unmatch is displayed on the remote control, etc., and it is changed to the fan operation.

P18=1: It is operated with the forced cooling/heating operation mode.
Setting temperature for cooling...28℃
Setting temperature for heating...20℃

(7) Emergency stop control

When one of indoor units receives the emergency stop signal through CnT terminal on the indoor control PCB from the device like as refrigerant leakage detector and that information is transmitted to the outdoor unit, the outdoor unit stops operation and emergency stop error message transmitted to all indoor units running.

It is able to make the emergency stop function effective by remote control indoor function setting.

(a) When the outdoor unit receives the “Emergency stop” command from the indoor unit, it makes all stop by error.

(b) And the “Emergency stop” command is transmitted to all indoor units and error code “E63” is displayed.

(c) When the outdoor unit receives the “Emergency stop reset” command from the indoor unit, the “Emergency stop reset” command is transmitted to all indoor units.

(8) Pump down operation control for removal of the unit

When an outdoor unit is discarded or removed, the pump down control is performed at the outdoor unit side in order to recover the refrigerant quickly to the outdoor unit.

(a) Start conditions

This is implemented with the liquid service valve closed.

(i) Outdoor unit operation mode – Stop

(ii) Turn ON the test run cooling switch SW5-2 (cooling).

(iii) Turn ON the pump down switch SW5-3 (pump down).

(iv) Turn ON the test run switch SW5-1 when the above (i)-(iii) statuses are satisfied.

Note (1) Input before the power ON is invalid.

(b) Control contents

(i) Compressor starts under compressor start protection control and runs at target speed of pump down operation. However, when the operation start conditions have been established during the 3-minute delay control of compressor, the compressor starts after completing the 3-minute delay control.

Item / Model	Target compressor speed at pump down operation
FDC224KXZPE1	50rps
FDC280KXZPE1	62rps

(ii) As the start conditions are established, both red LED and green LED on the outdoor PCB flash continuously. 7-segment display shows “PdS” (Channel 0) at the code display area.

(iii) During the pump down operation control, the protective controls (excluing low pressure protective control, anomalous low pressure control and pressure ratio protection control) and the error detection control are effective.

(iv) The sub-cooling coil expansion valve (EEVSC) closes fully during the pump down control.

(c) End conditions

If any of the following conditions is satisfied, this control ends.

(i) If a low pressure (LP) ≤ 0.01MPa is detected for 5 seconds continuously, it ends normally and initiates the followings.

① Red LED: keeps lighting

② Green LED: keeps flashing

③ 7-segment display: PdE

④ Remote control: Stop

(ii) Anomalous all stop by the error detection control

(iii) If the cumulative compressor operation time under the pump down control totals 15 minutes (ending by time count up), it stops and initiates the following.

① Red LED: stays OFF

② Green LED: keeps flashing

③ 7-segment display: No display

④ Remote control: Stop

(iv) When any of setting switches (SW5-1, SW5-2 and SW5-3) has been turned OFF during pump down.

(Note) Even if only the pump down switch SW5-3 is turned OFF, it does not recognized as the cooling test run mode , but stops.

(9) VTCC : Variable Temperature and capacity control (VRF inverter multi-system energy save control)

On the multi-system, target pressures are set uniformly so that indoor units operate with a constant capacity and repeat the ON/OFF control with which thermostats are turned OFF when temperatures become near the setting temperature.

Owing to the tuning of target high/low pressure near the setting temperature, it becomes possible to perform the high efficiency operation near the setting temperature.

For this reason, duration of time for highly efficient operation is increased by providing the compressor upper limit speed according to the thermostat ON capacity.

・Thermostat ON capacity … Total capacity of indoor units which are operating with the thermostat ON.

(a) Correction of target high/low pressure

(i) Starting condition (either of ① or ②)

① When the external input function assignment [P07] : Multi-system energy save control = Valid

② When 7-segment [P69] (Multi-system energy save control I) = ON, if the external input function assignment [P07] is not assigned this control.

(ii) Contents of control

① During the outdoor unit operation mode at cooling

・Indoor load more than 50% → Corrected to the target cooling low pressure lower.

・Indoor load less than 50% → Corrected to the target cooling low pressure higher.

② During the outdoor unit operation mode at heating

・Indoor load more than 50% → Corrected to the target heating high pressure higher.

・Indoor load less than 50% → Corrected to the target heating high pressure lower.

$$\text{(Note) Indoor load condition (\%)} = \frac{\text{(Total capacity of indoor units of which load is high)}}{\text{Total capacity of indoor units with the thermostat ON}}$$

(iii) Ending condition

① When the starting conditions are lost.

(b) Compressor upper limit speed restriction for each operation capacity

(i) Starting condition (either of ① or ②)

① When the external input assignment [P07] : Multi-system energy save operation = Valid and 7-segment [P16] (Multi-system energy save control II) = 1 or 2 or 3

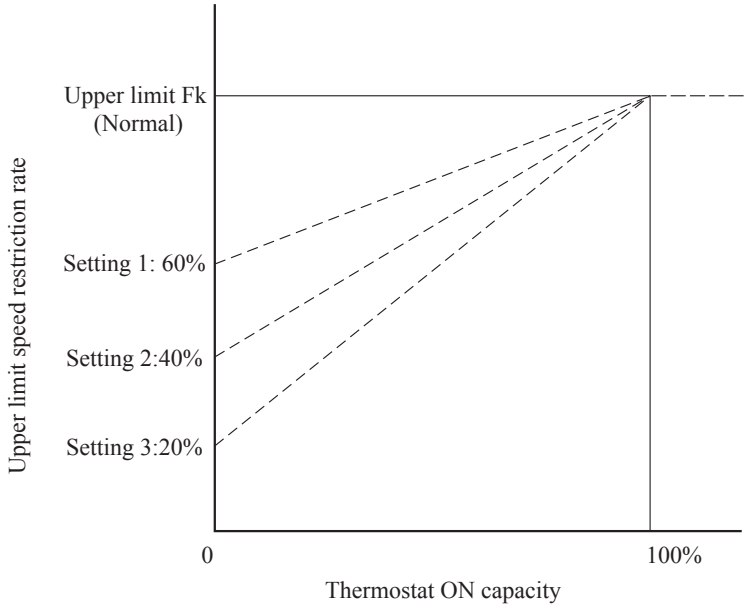
Factory default: 0 (OFF)/1 (Setting 1), 2 (Setting 2), 3 (Setting 3)

② 7-segment [P16] = 1 or 2 or 3, if the external input function assignment [P07] is not assigned this control.

(ii) Contents of control

① Compressor upper limit speed is the value obtained by multiplying with the upper limit speed restriction rate according to the thermostat ON capacity.

② The upper limit restriction rate is divided to the following 3 steps according to each setting of [P16] as follows.



③ Following controls supersede this control.

- 4-way valve safeguard
- Defrost operation
- Oil return operation
- Oil equalized operation
- Pump-down operation for replacement
- Start/Stop pump-down operation

(iii) Ending condition

① When the starting conditions are lost.

(C) Data output

(1) 7-segment display and operation data retention

(a) 7-segment display

Operation information is displayed for checking various operation data during test run and for helping malfunction diagnosis at servicing. Input data to microcomputer, contents of outdoor unit control, registration information of indoor units and etc. are mainly displayed on the 7-segment LED.

(i) Operation information display

1) Each item is displayed at the 7-segment LED with 3-digit on outdoor control PCB.
2) The code No. of each item is selected by pressing SW9 for the order of 10 and SW8 for the order of 1.
3) Code No. at factory setting is “C00”.
4) The code No. “C96” is for resetting.
   The contents of retained operation data (the data for a period of 30 minutes prior to error stop) can be erased by setting the code No. at “C96”.
   < The way to reset >
   The resetting method is to select the code “C96” first. (If any error data is retained, “dEL” is displayed on the data display area.)
   And then when press SW7 for 3 seconds, the retained error data can be erased. However the data of the code No. “C44” (compressor cumulative operation time) are not erased.
   When the data is erased, “---” is displayed on the data display area of 7-segment LED. And this is displayed as well when no error data is retained.
5) If SW8 (order of 1) is pressed, it displays in the order of 0 ⇒ 1 ⇒ 2 …… 9 ⇒ 0.
6) If SW9 (order of 10) is pressed, it jumps to the leading code of each order of 10.
   (Example) If SW9 is pressed at the code No. “C07” displayed, it jumps to the code No. “C10”. If SW9 is pressed at the code No. “C90” displayed, it jumps to the code No. “P00”.
7) The data of code No. “C44” can be erased independently.
   < The way to reset >
   The compressor cumulative operation time corresponding to the code No. selected can be erased (reset). (For resetting of the compressor cumulative operation time after replacement of compressor.)
   The resetting method is to select the code “C44” first. (The compressor cumulative operation time corresponding to the code No. is displayed on the data display area of 7-segment LED.)
   And then when press SW7 for 3 seconds, the retained data can be erased. However the data of the retained operation data (the data for 30 minutes before error stop) are not erased.
8) It will skip items of spare in display unit.

(ii) Error code displayed at error occurrence can be reset with the dip switch SW3-1 ON.

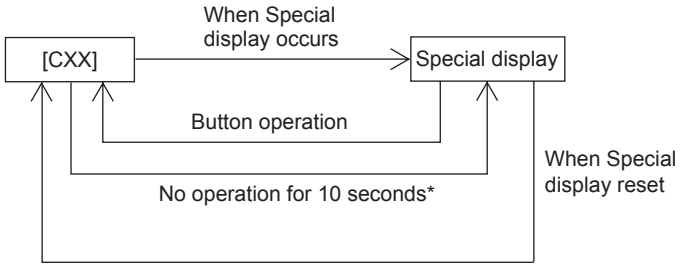
(iii) Discharge pressure saturated temperature and suction pressure saturated temperature are displayed after rounding to unit, if it is -10.0°C or lower. (Because the 7-segment display range is 3-digit.)

(iv) Priority of display

1) [EXX] > [CHJ] > [CHU] > [PdS] > [PdE] > [oPE-X] > [CXX], [PXX]

   [EXX]: Error code — [CHJ], [CHU]: Check mode
   [PdE], [PdS]: Pump down operation — [oPE]: Outdoor unit setting

2) If the state of 1) is reset, it is automatically switched to [CXX]. (Automatic data display mode)
3) When pressing SW8 or SW9 under the state of 1), it switched to [CXX].
   However the button input is not done for 10 seconds after switching to [CXX], the display is changed to the special display according to the priority of the state 1).



* If the special display is reset in the meanwhile, it remains [CXX].

< Individual definition of display contents >

[C49] Sub-cooling degree at cooling mode

= High pressure saturated temperature (°C) detected with high pressure sensor (PHS)

- Sub-cooling coil temperature (°C) detected with sub-cooling temperature thermistor (Tho-SC)

During heating mode this data might be unreliable as sub-cooling degree, but the result is displayed as it is.

[C50] Suction superheat degree

= Suction pipe temperature (°C) detected with suction pipe temperature thermistor (Tho-S)

- Low pressure saturated temperature (°C) detected with low pressure sensor (PLS)

[C51] Superheat degree of sub-cooling coil

= Sub-cooling coil temperature (°C) detected with sub-cooling coil temperature thermistor (Tho-H)

- Low pressure saturated temperature (°C) detected with low pressure sensor (PLS)

[C52] Superheat degree of under-dome

= Under-dome temperature (°C) detected with under-dome temperature thermistor (Tho-C)

- Low pressure saturated temperature (°C) detected with low pressure sensor (PLS)

< Operation information >

Code No.	Contents of display	Data display range	Minimum unit	Remarks
Unusual code	[Exx]			
Warning code	[oPx][oPE-X]			
Special code	[PdS][PdE] [CH][CHF][CO][HE][PCL][dLP]			
< Information for sensor or actuator value >				
C00	CM1 operating frequency	0~130	1Hz	
C02	Tho-A Atmosphere air temp.	L,-20~70	1°C	
C03	Tho-R1 Heat exchanger temp. 1	L,-40~75	1°C	
C07	Tho-D1 Discharge pipe temp. (CM1)	L,-20~140	1°C	
C10	Tho-C1 Under-dome temp. (CM1)	L,-30~90	1°C	
C14	Tho-SC Sub-cooling coil temp. 1	L,-40~75	1°C	
C15	Tho-H Sub-cooling coil temp. 2	L,-40~75	1°C	
C16	Tho-S Suction pipe temp.	L,-40~75	1°C	
C18	CT1 Current (CM1)	0~50	1A	
C20	Opening angle of EEVH1 expansion valve for heating	0~500	1Pulse	
C22	Opening angle of EEVSC expansion valve for sub-cooling coil	0~500	1Pulse	
C23	FM01 Number of rotations	0~999	$10min^{-1}$	
C24	FM02 Number of rotations	0~999	$10min^{-1}$	
C25	PSH High pressure sensor	0~4.15	0.01MPa	
C26	PSL Low pressure sensor	0~1.70	0.01MPa	
C27	Inverter secondary current 1	0~50	1A	
C30	63H1	0,1	–	Order of 100 : 63H1 Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)
C31	CNS1	0,1	–	Order of 100 : CNS1 Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)
C33	52X2 CH1	0,1	–	Order of 100 : 52X2 Order of 10 : Spare Order of 1 : CH1 (0: Close, 1: Open)
C34	20S	0,1	–	Order of 100 : Spare Order of 10 : 20S Order of 1 : Spare (0: Close, 1: Open)
C36	SV1	0,1	–	Order of 100 : SV1 Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)
C37	SV6 SV7	0,1	–	Order of 100 : Spare Order of 10 : SV6 Order of 1 : SV7 (0: Close, 1: Open)
C39	CNZ1	0,1	–	Order of 100 : CNZ1 Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)

Code No.	Contents of display	Data display range	Minimum unit	Remarks
< Information for outdoor unit >				
C40	Number of connected indoor unit	0~80	1	
C41	Capacity ratio of connected indoor unit	0~999	1%	
C42	Number of operation indoor unit	0~50	1	
C43	Required Fk total	0~999	1Hz	
C44	Compressor cumulative operating time (CM1)	0~655	100h	
C46	Discharge pressure saturation temperature	-50~70	0.1°C	Minimum unit 1°C at -10°C or lower
C47	Suction pressure saturation temperature	-50~30	0.1°C	Minimum unit 1°C at -10°C or lower
C48	Tho-SC1 saturated pressure	-0.68~4.15	0.01MPa	
C49	Cooling operation sub-cooling	0~50	0.1deg	See page 39
C50	Super heat	0~50	0.1deg	See page 39
C51	Super heat of sub-cooling coil	0~50	0.1deg	See page 39
C52	Tho-C1 Super heat	0~50	0.1deg	See page 39
C54	Target cooling low pressure	0.00~2.00	0.01MPa	
C55	Target heating high pressure	1.60~4.15	0.01MPa	
C56	Target Fk	0~999	1Hz	
C57	Inverter 1 operating frequency command	0~130	1Hz	
C59	FMo1 operating revolution command	0~999	$10min^{-1}$	
C60	FMo2 operating revolution command	0~999	$10min^{-1}$	
C61	Demand ratio	0~100, Lo	1%	
< Control status >				
C65	(Spare) Outdoor unit operating mode pattern	0~127	1	
C66	Control status	0~127	1	See table on page 44
C67	Protection control status	0~127	1	See table on page 44
C68	Compressor stop causes	0~127	1	See table on page 45
C69	Time elapsed after compressor stop cause	0~255	1h	
C70	Protection control causes 1	0~127	1	Displays No. of the protection control of which effect is the strongest among those occurred from the start of operation after the power on
C71	Protection control causes 2	0~127	1	Displays No. of the protection control of which effect is stronger secondly among those occurred from the start of operation after the power on
C72	Protection control causes 3	0~127	1	Displays No. of the protection control of which effect is stronger thirdly among those occurred from the start of operation after the power on

Code No.	Contents of display	Data display range	Minimum unit	Remarks
C73	Compressor error causes 1	0~127	1	Displays No. of the error detection of which effect is the strongest among those occurred from the start of operation after the power on
C74	Compressor error causes 2	0~127	1	Displays No. of the error detection of which effect is stronger secondly among those occurred from the start of operation after the power on
C75	Compressor error causes 3	0~127	1	Displays No. of the error detection of which effect is stronger thirdly among those occurred from the start of operation after the power on
< Information for unusual counter >				
C80	Counter · Current cut (CM1)	0~255	1	EEPROM memory. Resettable.
C82	Counter · Power transistor overheat (CM1)	0~255	1	EEPROM memory. Resettable.
C84	Counter · Compressor startup failure (CM1)	0~255	1	EEPROM memory. Resettable.
C86	Counter · Anomalous compressor by loss of synchronism (CM1)	0~255	1	EEPROM memory. Resettable.
C88	Counter · Communication error between inverter PCB and outdoor unit control (CM1)	0~255	1	EEPROM memory. Resettable.
C90	Counter · Anomalous FMo1	0~255	1	EEPROM memory. Resettable.
C91	Counter · Anomalous FMo2	0~255	1	EEPROM memory. Resettable.
C92	Counter · Indoor-outdoor communications error	0~255	—	EEPROM memory. Resettable.
C93	Counter · Outdoor unit CPU reset	0~255	—	EEPROM memory. Resettable.
< The other >				
C96	Data reset	—	—	
C97	Program sub-version	0~991	—	
C98	Program POL version	0.00~9.99	0.01	
C99	(Spare) Auto send display	—	—	

< 7-segment software input >

< User setting >				
P01	Switching to operation priority	0: (Factory default) 0, 1, 2, 3	1	0: First push priority 1: Last push priority 2: Director mode 3: Operation mode capacity priority
P02	Outdoor fan snow protection control	0: (Factory default) 0, 1	—	0: Invalid 1: Valid
P03	Outdoor fan snow protection control ON time setting	30: (Factory default) 10,30~600(sec)	30	Changes to 10, 30, 60, 90 ... 600.
P05	Silent mode setting	0: (Factory default) 0 ~ 9	1	
P06	CNZ1 function assignment	0: (Factory default) 0 ~ 9	1	See page 27

Code No.	Contents of display	Data display range	Minimum unit	Remarks
P07	CNS1 function assignment	0: (Factory default) 0 ~ 20	1	0: External operation input 1: Demand input 2: Cooling/heating forced operation input 3: Silent mode input 1 4: — 5: Outdoor fan snow protection control input 6: Test run external input 1 (SW5-1 equivalent) 7: Test run external input 2 (SW5-2 equivalent) 8: Silent mode input 2 10: AF periodic inspection display 11: AF error display 12: Building multi energy save control 9, 13~20:Spare
P11	Switching to heating air outlet temperature save priority	0: (Factory default) 0, 1	—	0: Heating air outlet temperature save control invalid (Factory default) 1: Heating air outlet temperature save control valid
P12	Capacity ratio of thermostat ON admission for heating air outlet temperature save	110: (Factory default) 100,090,080	—	Changes to 110,100,090,080, 110 .....
P13	Number of thermostat ON indemnification for heating air outlet temperature save	0: (Factory default) 0~9	1	
P16	Multi-system energy save control II	0: (Factory default) 0, 1, 2, 3	1	
P17	After changing mode from operation prohibition mode	0: (Factory default) 0, 1	1	
P18	Mode unmatched indoor unit setting in forced mode	0: (Factory default) 0, 1	1	
< New Superlink setting >				
P30	Superlink communication status	0, 1	—	0: Current Superlink 1: New Superlink
P31	Start automatic address setting	0: (Factory default) 0, 1	—	0: Automatic address setting standby 1: Automatic address setting start
P32	Input starting indoor address	0: (Factory default) 1~127	1	Specify the starting indoor address connected in one refrigerant system for automatic address setting.
P33	Input the number of connected indoor units	24: (Factory default) 1~24(*)	1	Specify the number of indoor units connected in one refrigerant system for automatic address setting. (*) Maximum connectable number of indoor units for each outdoor unit
P34	Polarity definition	0: (Factory default) 0, 1	—	0: Network polarity not defined 1: Network polarity defined
P69	Multi-system energy save control I	0: (Factory default) 0, 1	1	
AUX	Auto address setting on			
AUE	Indoor unit address No. assignment normal ending			
A01	Indoor unit address No. assignment error 1			
A02	Indoor unit address No. assignment error 2			
A03	Indoor unit address No. assignment error 3			
A04	Superlink setting error			

[C66] Control status

<Definition of signal>

Shows the status of control in operation currently.
If two or more controls among the following protection controls are established simultaneously, No. of the control of which number is larger is displayed.

Protection control status		Number
Ordinary control	Remote control all stop	0
	Ordinary cooling control	1
	Ordinary heating control	2
Operating control	Pump down control at start/stop	10
	Indoor heat exchanger refrigerant purge control	11
	Outdoor heat exchanger refrigerant purge control	12
	Oil return control	13
	Defrost control	14
	Oil equalization rotation control	15
	Oil equalization control	16
Special control	Test run control	20
	Pump down control for replacement	21
	Demand control	22
	Silent mode control	23
	Capacity measurement mode control	24
	Outdoor air intake unit control	25
	Low outdoor temperature control	26
	Cooling unusual low pressure return control	27
	Compressor dilution protection control	28

[C67] Protection control status

<Definition of signal>

Shows the status of protection control in operation currently.
If two or more controls among the following protection controls are established simultaneously, No. of the control of which number is larger is displayed.

Protection control status		Number
Ordinary control	No operation of protective control	0
Protection control	During high pressure (HP)	1
	Spare	2
	During low pressure (LP)	3
	During discharge pipe temperature (Td)	4
	During compressor ratio protective	5
	During under-dome temperature (Tc)	6
	During current safe (CS)	7
	During power transistor temperature (PT)	8

[C68] Compressor stop causes

<Definition of signal>

Shows the latest compressor stop cause counted from right now.
(Excluding the ordinary stop, etc.)
Output of the No. is retained till next compressor stop cause occurs.

Compressor stop causes		Number
	No history	0
Sensor wire breakage	Tho-A	1
	Tho-R1	2
	Tho-D1	6
	Tho-SC	8
	Tho-H	9
	Tho-S	10
	Tho-C1	11
	High pressure sensor	15
	Low pressure sensor	16
System anomaly detection	High pressure anomaly	20
	Low pressure anomaly	21
	Discharge temperature error (Tho-D1)	22
	Liquid flooding anomaly (CM1)	24
External device anomaly detection	Fan motor anomaly (FMo1)	30
	Fan motor anomaly (FMo2)	31
	Current cut (CM1)	32
	Power transistor overheat (CM1)	34
	Compressor startup failure (CM1)	36
	Communication error between inverter PCB and outdoor control (CM1)	38
	Anomalous compressor by loss of synchronism (CM1)	40
	Communication error between the master unit and slave units	42
Compressor stop by special control	Operation mode change	50
	Differential pressure startup prevention control	51
	Protect for heating overload	52
	Spare	53

(b) Saving of Operation Data

For the purpose to investigate the cause of trouble in the field, the operation data are always saved in the memory, and if the trouble occurs, the data writing is stopped and the operation data prior to the trouble occurrence are recorded. These data can be retrieved to personal computer through RS232C connector on the outdoor control PCB and utilized for investigating the cause.

(i) Operation data for a period of 30 minutes prior to the present operation are saved and updated sequentially.

(ii) If an anomalous stop occurs, the data are not updated any more.

(iii) Data are written in at 1-minute interval and following data will be transmitted to PC upon demand.

Data	Data Range	Example
Software version	Ascii 15 byte	KD3C218######## (#: NULL)
PID (program ID)	Ascii 2 byte	5D
Outdoor unit capacity	Ascii 3 byte	As shown in table at right
Power source frequency	Ascii 2 byte	60
Outdoor address	Ascii 2 byte	00 ~ 3F
Indoor address × 16 units	Ascii 2 byte × 16 units	40 ~ 7F
Indoor capacity × 16 units	Ascii 3 byte × 16 units	022 ~ 280

Outdoor unit capacity data	Outdoor unit capacity data	Remarks
Single type	Example: 24HP - [S24]	S: Display with Horse Power of single type or single use of combination type

(iv) Error retention and monitoring data

< Indoor unit indicate data >

Code No.	Write-in contents	Record data				
		Data write-in range	Write-in unit	Number of bytes	Contents	
00	Indoor unit 1 Thi-A	-10~52	1°C	1	Air inlet temp.	
01	Indoor unit 1 Thi-R1	-19~71	1°C	1	Heat exchanger temp. 1	
02	Indoor unit 1 Thi-R2	-19~71	1°C	1	Heat exchanger temp. 2	
03	Indoor unit 1 Thi-R3	-19~71	1°C	1	Heat exchanger temp. 3	
04	Indoor unit 1 EEV	0~470	1pulse	2		
05	Indoor unit 1 setting temperature	0~127	0.5°C	1	05H command	
06	Indoor unit 1 Operation mode/Air capacity	0~500	–	2	0	Not used (Data not received)
					100	Dehumidifying stop 0-speed
					110	Dehumidifying operation 0-speed
					111	Dehumidifying operation 1-speed
					112	Dehumidifying operation 2-speed
					113	Dehumidifying operation 3-speed
					114	Dehumidifying operation 4-speed
					115	Dehumidifying operation 5-speed
					116	Dehumidifying operation 6-speed
					200	Cooling stop 0-speed
					210	Cooling operation 0-speed
					211	Cooling operation 1-speed
					212	Cooling operation 2-speed
					213	Cooling operation 3-speed
					214	Cooling operation 4-speed
					215	Cooling operation 5-speed
					216	Cooling operation 6-speed
					300	Fan stop 0-speed
					310	Fan operation 0-speed
					311	Fan operation 1-speed
					312	Fan operation 2-speed
					313	Fan operation 3-speed
					314	Fan operation 4-speed
					315	Fan operation 5-speed
					316	Fan operation 6-speed
					400	Heating stop 0-speed
					410	Heating operation 0-speed

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
					411 Heating operation 1-speed 412 Heating operation 2-speed 413 Heating operation 3-speed 414 Heating operation 4-speed 415 Heating operation 5-speed 416 Heating operation 6-speed
07	Indoor unit 1 Demand frequency	0~255	1Hz	1	
08	Indoor unit 1 Answer frequency	0~255	1Hz	1	
09	Indoor unit 1 Indoor local	—	—	1	Bit0 Anti-frost Bit1 Aperture command ON
10	Indoor unit 1 Thi spare	-10~52	1°C	1	Air outlet temp.
11	Indoor unit 1 Model	0~85	—	1	0 FDT 1 FDK 2 other 3 FDE 4 FDTC 5 Outdoor air intake unit 6 Spacious area 7 Outdoor air treatment
12	Indoor unit 1 PID	—	—	1	
Data contents for indoor 2 to 16 are same as above.					

< Outdoor unit indicate data >

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
00	Anomalous code	00~99	—	1	00: No anomalous, outdoor unit all anomalous
01	Address of unit where trouble occurred	00~FF	—	1	00~3F: Outdoor unit side, 40~6F: Indoor unit side
< Sensor mesurement value >					
02	Tho-A Outdoor air temp.	-20~70	0.01°C	2	
03	Tho-R1 Heat exchanger temp. 1	-40~75	0.01°C	2	
04	Spare	—	—	2	
05	Spare	—	—	2	
06	Spare	—	—	2	
07	Tho-D1 Discharge pipe temp. (CM1)	-20~140	0.01°C	2	
08	Spare	—	—	2	
09	Tho-C1 Under-dome temp. (CM1)	-30~90	0.01°C	2	
10	Spare	—	—	2	
11	Spare	—	—	2	
12	Spare	—	—	2	
13	Tho-S Suction pipe temp.	-40~75	0.01°C	2	
14	Tho-SC Sub-cooling coil temp. 1	-40~75	0.01°C	2	

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
15	Tho-H Sub-cooling coil temp. 2	-40~75	0.01°C	2	
16	Injection suction pipe temp. 1 (spare)	-40~75	0.01°C	2	
17	Tho-J Receiver liquid surface detection temp. 1 (spare)	-40~75	0.01°C	2	
18	CT1 Current	0~50	0.01A	2	
19	Spare	—	—	2	
20	Inverter secondary current 1	0~50	0.01A	2	
21	Spare	—	—	2	
22	High pressure sensor	0.00~4.15	0.001MPa	2	
23	Low pressure sensor	0.00~1.70	0.001MPa	2	
24	Spare	—	—	2	
< Information for outdoor unit >					
25	Indoor unit connection number	0~127	1unit	1	
26	Indoor unit connection capacity	0~65535	—	2	
27	Indoor unit thermostat ON number	0~255	1unit	1	
28	Indoor unit cooling thermostat ON capacity	0~65535	—	2	
29	Indoor unit heating thermostat ON capacity	0~65535	—	2	
30	Operation mode	0~2	—	1	0 Stop 1 Cooling 2 Heating
31	Outdoor unit operation pattern	0~255	1	1	Real range is 1~17
32	CM1 frequency	0~255	1Hz	1	
33	Spare	—	—	1	
34	FMo1 Number of rotations	0~2550	$10min^{-1}$	1	
35	FMo2 Number of rotations	0~2550	$10min^{-1}$	1	
36	Required Hz total	0~65535	1Hz	2	
37	Discharge pressure saturation temp.	-50~70	0.01°C	2	
38	Suction pressure saturation temp.	-50~30	0.01°C	2	
39	Pressure ratio	1.0~10.0	0.1	1	
40	Cooling operation sub-cooling	0~25.5	0.1deg	1	
41	Super heat of suction pipe	0~25.5	0.1deg	1	
42	Super heat of sub-cooling coil	0~25.5	0.1deg	1	

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
43	Under-dome super heat CM1	0~25.5	0.1deg	1			
44	Spare	—	—	1			
45	Target FK	0~65535	1Hz	2			
46	Inverter CM1 operation frequency	0~255	1Hz	1			
47	Spare	—	—	1			
48	FMo1 rotation command	0~2550	$10min^{-1}$	1			
49	FMo1 rotation command	0~2550	$10min^{-1}$	1			
50	EEVH1 opening angle	0~65535	1pulse	2			
51	Spare	—	—	2			
52	EEVSC opening angle	0~65535	1pulse	2			
53	Spare	—	—	2			
54	Target cooling low pressure of compressor	0.00~2.00	0.01MPa	1			
55	Target heating high pressure of compressor	0.00~4.15	0.01MPa	2			
56	Target differential temperature of heating CSST	0~127	1ºC	1	Real range is 5~30 deg		
57	Learning primary opening angle of outdoor unit EEVH	0~255	1pulse	1			
58	Target super heat of outdoor unit EEVSC	0~25.5	0.1ºC	1			
59	Count of refrigerant oil reduction (CM1)	0~2550	10cc	1	Real range is 0~1100 cc		
60	Spare	—	—	1			
61	Countdown of refrigerant oil return	0~255	3minutes	1	Real range is 0~600 minutes		
< Output of PCB hardware >							
62	Output of relay	—	—	1	Bit0	52X2	0: OFF, 1: ON
					Bit1	Spare(52C2)	0: OFF, 1: ON
					Bit2	CH1	0: OFF, 1: ON
					Bit3	Spare(CH2)	0: OFF, 1: ON
					Bit4	20S	0: OFF, 1: ON
					Bit5	Spare(20SH)	0: OFF, 1: ON
					Bit6	Spare(FMC1,2)	0: OFF, 1: ON
					Bit7	Spare(FMC3)	0: OFF, 1: ON
63	Output of relay	—	—	1	Bit0	SV1	0: OFF, 1: ON
					Bit1	Spare(SV2)	0: OFF, 1: ON
					Bit2	Spare(SV4)	0: OFF, 1: ON
					Bit3	SV6	0: OFF, 1: ON
					Bit4	Spare(SV7)	0: OFF, 1: ON
					Bit5	Spare(SV8)	0: OFF, 1: ON
					Bit6	Spare(SV10)	0: OFF, 1: ON
					Bit7	Spare(SV11)	0: OFF, 1: ON
64	Output of relay	—	—	1	Bit0	Spare(SV12)	0: OFF, 1: ON
					Bit1	Spare(SV13)	0: OFF, 1: ON
					Bit2	Spare(SV3)	0: OFF, 1: ON
					Bit3	Spare	0: OFF, 1: ON
					Bit4	Spare	0: OFF, 1: ON
					Bit5	CNZ1	0: OFF, 1: ON
					Bit6	Spare (CnH)	0: OFF, 1: ON
					Bit7	Spare (CnY)	0: OFF, 1: ON

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
< Compressor >							
65	Compressor 1 cumulative operating time (estimate)	0~65535	1h	2			
66	Spare	—	—	2			
67	Compressor 1 start times	0~65535	20times	2			
68	Spare	—	—	2			
69	CM1 3-minute delay timer	0~180	1second	1			
70	Spare	—	—	1			
71	CH compressor protection timer (count down)	0~360	2minutes	1			
72	Control status CH compressor protective start	0~15	—	1	15	Protective start end	
					0~14	During protective start	
< Control status >							
73	Control status Oil equalization	0~127	—	1	0	None	
					1	Oil equalized rotation	
					10	Oil equalized operation 1	
					20	Oil equalized operation 2	
					30	Oil equalized operation 3	
					41	Oil equalized operation 4-1	
					42	Oil equalized operation 4-2	
					51	Oil equalized operation 5-1	
					52	Oil equalized operation 5-2	
					61	Oil equalized operation 6-1	
					62	Oil equalized operation 6-2	
					71	Oil equalized operation 7-1	
					72	Oil equalized operation 7-2	
					81	Oil equalized operation 8-1	
					82	Oil equalized operation 8-2	
74	Control status Oil return	0~2	—	1	0	None	
					1	Oil return (cooling)	
					2	Oil return (gas cycle)	
75	Control status Defrost types + defrost status	0~127	—	1	0	None	
					11	Thermal condition defrost status 1	
					12	Thermal condition defrost status 2	
					13	Thermal condition defrost status 3	
					14	Thermal condition defrost status 4	
					21	Strength type thermal condition defrost status 1	
					22	Strength type thermal condition defrost status 2	
					23	Strength type thermal condition defrost status 3	
					24	Strength type thermal condition defrost status 4	
					31	Time condition defrost status 1	
					32	Time condition defrost status 2	
					33	Time condition defrost status 3	
					34	Time condition defrost status 4	
76	Control status Low pressure error (cooling) return status	0~4	—	1	0	Normal operation	
					1	Compressor OFF	
					2	For 70 seconds after compressor ON	
					3	After 70 to 180 seconds after compressor ON	
					4	After 180 to 195 seconds after compressor ON	
77	Control status 1	—	—	1	Bit0	Superlink communication state	0: SL Ⅰ (old SL) 1: SL Ⅱ (new SL)
					Bit1	In trial operation control	0: Normal 1: Practice
					Bit2	In demand control	0: Normal 1: Practice
					Bit3	In silent mode	0: Normal 1: Practice
					Bit4	Spare	0: Normal 1: Practice
					Bit5	In outdoor air intake unit control	0: Normal 1: Practice
					Bit6	Spare	0: Normal 1: Practice
					Bit7	In pump-down control at Start/Stop	0: Normal 1: Practice
78	Control status 2	—	—	1	Bit0	In low outdoor temperature control	0: Normal 1: Practice
					Bit1	In pump-down control for replacement	0: Normal 1: Practice
					Bit2	Compressor dilution protection	0: Normal 1: Practice

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
					Bit3	Outdoor heat exchanger refrigerant purge	0: Normal 1: Practice
					Bit4	Indoor heat exchanger refrigerant purge	0: Normal 1: Practice
					Bit5	Evaporative air handling setting valid	0: Normal 1: Practice
					Bit6	Spare	0: Normal 1: Practice
					Bit7	Spare	0: Normal 1: Practice
79	Control status 3	—	—	1	Bit0	Auto backup operation	0: Normal 1: Practice
					Bit1	Spare	0: Count 1: Count up
					Bit2	Spare	0: Count 1: Count up
					Bit3	Spare	0: Count 1: Count up
					Bit4	Spare	0: Count 1: Count up
					Bit5	Spare	0: Count 1: Count up
					Bit6	Spare	0: Count 1: Count up
					Bit7	Spare	0: Count 1: Count up
< Protection control status >							
85	Protection control status 1	—	—	1	Bit0	HP protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit1	HP protection 2 Gas bypass control	0: Normal 1: Practice
					Bit2	HP protection 3 Heating stop indoor unit slight opening control	0: Normal 1: Practice
					Bit3	LP protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit4	LP protection 2 Compressor rising rate control	0: Normal 1: Practice
					Bit5	LP protection 3 Outdoor side EEV control	0: Normal 1: Practice
					Bit6	LP protection 4 Oil separator SV control	0: Normal 1: Practice
					Bit7	Td protection 1 Compressor capacity control	0: Normal 1: Practice
86	Protection control status 2	—	—	1	Bit0	Td protection 2-1 EEVSC-Td cooling control	0: Normal 1: Practice
					Bit1	Td protection 2-2 EEVH-Td cooling control	0: Normal 1: Practice
					Bit2	Td protection 4 Heating stop indoor unit slight opening control	0: Normal 1: Practice
					Bit3	Td protection 5 Outdoor side EEV control	0: Normal 1: Practice
					Bit4	CS protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit5	Tc protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit6	Tc protection 2 Gas bypass control	0: Normal 1: Practice
					Bit7	Tc protection 3 CM dilution protection control	0: Normal 1: Practice
87	Protection control status 3	—	—	1	Bit0	Compression ratio protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit1	Compression ratio protection 2 Outdoor side EEV control	0: Normal 1: Practice
					Bit2	PT protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit3	PT protection 2 Inverter cooling fan control	0: Normal 1: Practice
					Bit4	Dilution rate protection	0: Normal 1: Practice
					Bit5	Spare	0: Normal 1: Practice
					Bit6	Spare	0: Normal 1: Practice
					Bit7	Spare	0: Normal 1: Practice

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
88	Protection control causes 1	0~127	—	1	
89	Protection control causes 2	0~127	—	1	
90	Protection control causes 3	0~127	—	1	
91	Compressor stop causes	0~127	—	1	
92	Compressor stop causes lapse of time	0~255	1h	1	
< Anomaly counter >					
93	Control status High pressure anomaly (63H1) counter	0~5	—	1	
94	Control status Low pressure anomaly (running) counter	0~5	—	1	
95	Control status Low pressure anomaly (starting) counter	0~5	—	1	
96	Control status Low pressure anomaly (stopped) counter	0~5	—	1	
97	Control status Discharge temperature error (Tho-D1) counter	0~5	—	1	
98	Spare	—	—	1	
99	Control status Cut off sensor counter	0~3	—	1	
100	Control status Liquid flooding anomaly counter	0~3	—	1	
101	Counter・Current cut (CM1)	0~255	—	1	EEPROM memory. Resettable.
102	Spare	—	—	1	EEPROM memory. Resettable.
103	Counter・Power transistor overheat (CM1)	0~255	—	1	EEPROM memory. Resettable.
104	Spare	—	—	1	EEPROM memory. Resettable.
105	Counter・Compressor startup failure (CM1)	0~255	—	1	EEPROM memory. Resettable.
106	Spare	—	—	1	EEPROM memory. Resettable.
107	Counter・Anomalous compressor by loss of synchronism (CM1)	0~255	—	1	EEPROM memory. Resettable.
108	Spare	—	—	1	EEPROM memory. Resettable.
109	Counter・Communication error between inverter PCB and outdoor control (CM1)	0~255	—	1	EEPROM memory. Resettable.
110	Spare	—	—	1	EEPROM memory. Resettable.
111	Counter・FMo1 abnormal stop	0~255	—	1	EEPROM memory. Resettable.
112	Counter・FMo2 abnormal stop	0~255	—	1	EEPROM memory. Resettable.
113	Counter・Indoor-outdoor communications error	0~255	—	1	EEPROM memory. Resettable.
114	Counter・CPU reset	0~255	—	1	EEPROM memory. Resettable.
115	Compressor error causes 1	0~127	—	1	

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
116	Compressor error causes 2	0~127	—	1			
117	Compressor error causes 3	0~127	—	1			
118	INV 1 information	—	—	1	Version (Initial value FFh)		
119		—	—	1	DIP SW (Initial value FFh)		
120	Spare	—	—	1	Version (Initial value FFh)		
121	Spare	—	—	1	DIP SW (Initial value FFh)		
< Information for indoor unit >							
122	Indoor unit control status 1	—	—	1	Bit0	Indoor unit EEV full open detection control	0: Normal 1: Practice
					Bit1	Indoor unit avoidance of un-heating control	0: Normal 1: Practice
					Bit2	Indoor unit heating stop slight opening control	0: Normal 1: Practice
					Bit3	Indoor unit cooling startup control 1 (normal)	0: Normal 1: Practice
					Bit4	Indoor unit cooling startup control 2 (prevent liquid back)	0: Normal 1: Practice
					Bit5	Indoor unit heating startup control	0: Normal 1: Practice
					Bit6	Indoor unit outlet temp. of heating control assist	0: Normal 1: Practice
					Bit7	Indoor unit refrigerant withdrawing control	0: Normal 1: Practice
123	Indoor unit control status 2	—	—	1	Bit0	Outdoor air intake unit HP protection	0: Normal 1: Practice
					Bit1	Spare	
					Bit2	Indoor unit refrigerant purge control	0: Normal 1: Practice
					Bit3	Spare	
					Bit4	Spare	
					Bit5	Spare	
					Bit6	Spare	
					Bit7	Spare	
< Input of PCB hardware >							
124	External input	—	—	1	Bit0	63H1	0: OFF 1: ON
					Bit1	Spare	0: OFF 1: ON
					Bit2	CNS1	0: OFF 1: ON
					Bit3	Spare	0: OFF 1: ON
					Bit4	Spare	0: OFF 1: ON
					Bit5	Spare	0: OFF 1: ON
					Bit6	Spare	0: OFF 1: ON
					Bit7	Spare	0: OFF 1: ON
125	DIP SW [SW3]	—	—	1	Bit0	SW3-1	0: OFF 1: ON
					Bit1	SW3-2	0: OFF 1: ON
					Bit2	SW3-3	0: OFF 1: ON
					Bit3	SW3-4	0: OFF 1: ON
					Bit4	SW3-5	0: OFF 1: ON
					Bit5	SW3-6	0: OFF 1: ON
					Bit6	SW3-7	0: OFF 1: ON
					Bit7	SW3-8	0: OFF 1: ON
126	DIP SW [SW4]	—	—	1	Bit0	SW4-1	0: OFF 1: ON
					Bit1	SW4-2	0: OFF 1: ON
					Bit2	SW4-3	0: OFF 1: ON
					Bit3	SW4-4	0: OFF 1: ON
					Bit4	SW4-5	0: OFF 1: ON
					Bit5	SW4-6	0: OFF 1: ON
					Bit6	SW4-7	0: OFF 1: ON
					Bit7	SW4-8	0: OFF 1: ON
127	DIP SW [SW5]	—	—	1	Bit0	SW5-1	0: OFF 1: ON
					Bit1	SW5-2	0: OFF 1: ON
					Bit2	SW5-3	0: OFF 1: ON
					Bit3	SW5-4	0: OFF 1: ON
					Bit4	SW5-5	0: OFF 1: ON
					Bit5	SW5-6	0: OFF 1: ON
					Bit6	SW5-7	0: OFF 1: ON
					Bit7	SW5-8	0: OFF 1: ON

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
128	DIP SW [SW6]	—	—	1	Bit0	SW6-1	0: OFF 1: ON
					Bit1	SW6-2	0: OFF 1: ON
					Bit2	SW6-3	0: OFF 1: ON
					Bit3	SW6-4	0: OFF 1: ON
					Bit4	SW6-5	0: OFF 1: ON
					Bit5	SW6-6	0: OFF 1: ON
					Bit6	SW6-7	0: OFF 1: ON
					Bit7	SW6-8	0: OFF 1: ON
129	Jumper SW	—	—	1	Bit0	J11	0: OFF 1: ON
					Bit1	J12	0: OFF 1: ON
					Bit2	J13	0: OFF 1: ON
					Bit3	J14	0: OFF 1: ON
					Bit4	J15	0: OFF 1: ON
					Bit5	J16	0: OFF 1: ON
					Bit6	Spare	0: OFF 1: ON
					Bit7	Spare	0: OFF 1: ON
< List of setting value >							
130	Software SW	—	—	1	Bit0	Spare	
					Bit1	Spare	
					Bit2	Spare	
					Bit3	Outdoor fan snow protection control	
					Bit4	Spare	
					Bit5	Switching to heating wind temperature security priority	
					Bit6	Spare	
					Bit7	Spare	
131	Priority operation SW	0,1	—	1	0	First push priority	
					1	Last push priority	
132	Heating setting 1 (Target exit temperature)	40~50	1°C	1			
133	Heating setting 2 (Target of high pressure)	3.15~2.75	0.05MPa	1			
134	Heating setting 3 (Judgment temperature)	30~38	1°C	1			
135	CNS1 function assignment	0~9	—	1			
136	Spare	—	—	1			
137	Spare	—	—	1			
138	Spare	—	—	1			
139	External output function assignment	0~9	—	1			
140	Spare	—	—	1			
< The others >							
141	Override	0~	—	1			

(2) Outdoor PCB setting

(a) Control PCB

Code	Input		Remarks
SW1	Outdoor address No. (Order of 10)		
SW2	Outdoor address No. (Order of 1)		
SW3-1	Inspection LED reset	Normal★/Reset	
SW3-2	Existing pipe control SW	None★/Existing	
SW3-3	Spare		Keep OFF
SW3-4			
SW3-5			
SW3-6			
SW3-7	Forced cooling/heating	Normal★/Forced cooling-heating	
SW3-8	Spare		Keep OFF
SW4-1	Model selection		See following table
SW4-2			
SW4-3			
SW4-4			
SW4-5	Spare		Keep OFF
SW4-6			
SW4-7	Demand control		See following table
SW4-8			
SW5-1	Test run SW	Normal★/Test run	
SW5-2	Test run mode	Heating★/Cooling	
SW5-3	Pump down SW	Normal★/Pump down	
SW5-4	Spare		Keep OFF
SW5-5	SL selector	New SL (Auto)★/Old SL	
SW5-6	Spare		Keep OFF
SW5-7			
SW5-8			
SW7	Data erase/write		
SW8	7-segment display code No. increasing (order of 1)		
SW9	7-segment display code No. increasing (order of 10)		
J10	SL spare terminal selection	Normal★/Spare	
J13	External input	Level★/Pulse	
J14	Defrost reset temperature	Normal★/Intensive	
J15	Defrost start temperature	Normal★/Cold region	

Note (1) Jumper wires J10 ~ J15 indicate short-circuit/open.
(2) Dip switch SW's indicate OFF/ON
(3) ★ indicates the factory setting (OFF).

■Model selection with SW4-1 - SW4-4

0: OFF 1: ON

Model	224	280
SW4-1	0	0
SW4-2	0	1
SW4-3	0	0
SW4-4	0	0

■Demand control with SW4-7, SW4-8

0: OFF 1: ON

Demand ratio	Compressor capacity [%]			
	80	60	40	20
SW4-7	0 ★	1	0	1
SW4-8	0 ★	0	1	1

Note(1) ★ indicates the factory setting.

(b) Inverter PCB

0: OFF 1: ON

Code	Setting
JSW10-1	0
JSW10-2	1
JSW10-3	0
JSW10-4	0
JSW11-1	0
JSW11-2	0
JSW11-3	1
JSW11-4	0

Note (1) 224 and 280 are the same setting.

(3) Indoor PCB setting

Code	Input		Default setting		Remarks
SW1	Indoor unit address No.(Order of 10)		0		0-9
SW2	Indoor unit address No.(Order of 1)		0		0-9
SW3	Outdoor unit address No.(Order of 10)		4		0-9
SW4	Outdoor unit address No.(Order of 1)		9		0-9
SW5-1	Superlink selection	Automatic*/Previous SL	OFF	Automatic	
SW5-2	Indoor unit address No.(Order of 100)		OFF	0	OFF : 0, ON : 1
SW6-1 SW6-2 SW6-3 SW6-4 SW8-1	Model selection		As per model		See table 1
SW7-1	Test run, Drain motor	Normal*/Test run	OFF	Normal	
SW7-2	Reserved		OFF		keep OFF
SW7-3	Spare		OFF		keep OFF
SW7-4	Reserved		OFF		keep OFF
JSL1	Superlink terminal spare	Normal*/switch to spare	With	Normal	

* Default setting

■Model selection with SW6-1 - SW6-4 and SW8-1

0 : OFF 1 : ON

	P15	P22	P28	P36	P45	P56	P71	P90	P112	P140	P160	P224	P280
SW6-1	0	0	1	0	0	0	0	0	1	0	1	0	1
SW6-2	0	0	0	1	0	1	0	1	1	0	0	1	1
SW6-3	0	0	0	0	1	1	0	0	0	1	1	1	1
SW6-4	0	0	0	0	0	0	1	1	1	1	1	1	1
SW8-1	1	0	0	0	0	0	0	0	0	0	0	0	0

2. SYSTEM TROUBLESHOOTING PROCEDURE

2.1 Basics of troubleshooting

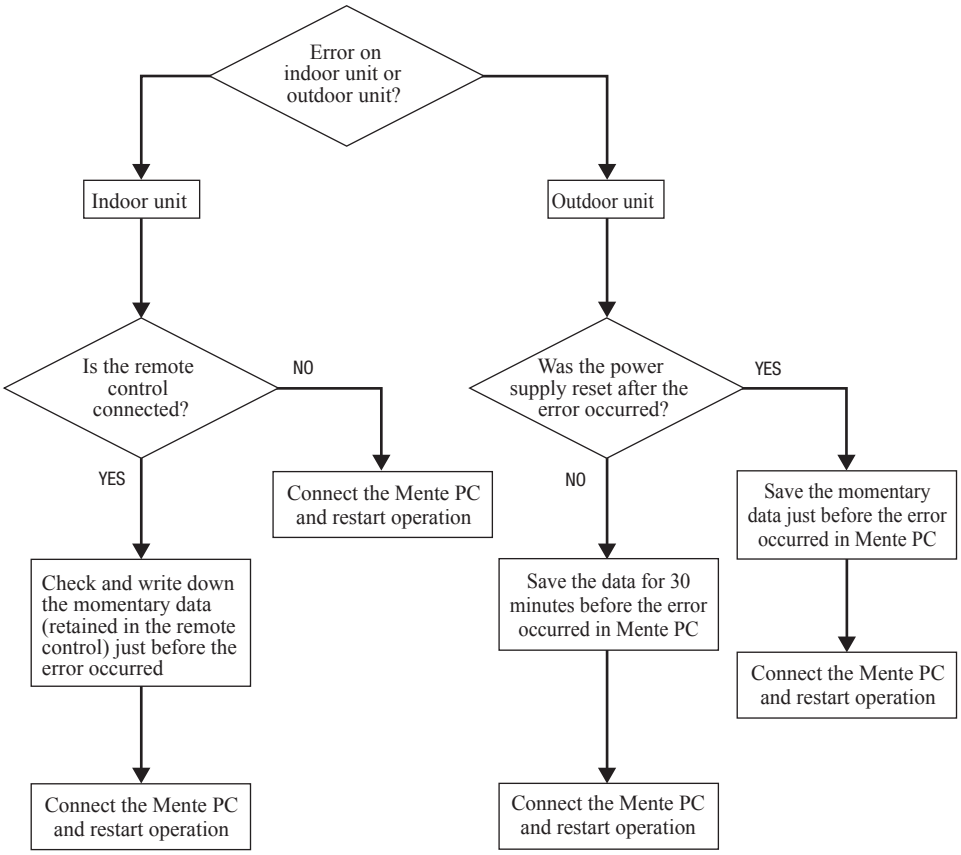
Basic troubleshooting is to check/analyze/save data by connecting the Mente PC.

Whenever arriving at the site, always connect the Mente PC before starting work.

Method of error data analysis (Basic procedure)

- Identify whether particular error occurred during operation or stopping.
- Is it caused by the installation conditions of outdoor/indoor unit? (Refrigerant quantity, pipe length, short-circuit, clogged filter, etc.)
- Isn't there any beginner's mistake at the installation? (Wrong address, mistake in piping or wiring, etc.)
- Is the failure related to any hardware (parts)? (SV main body, coil, capillary, check valve, sensor, etc.)
- Is it a major component?

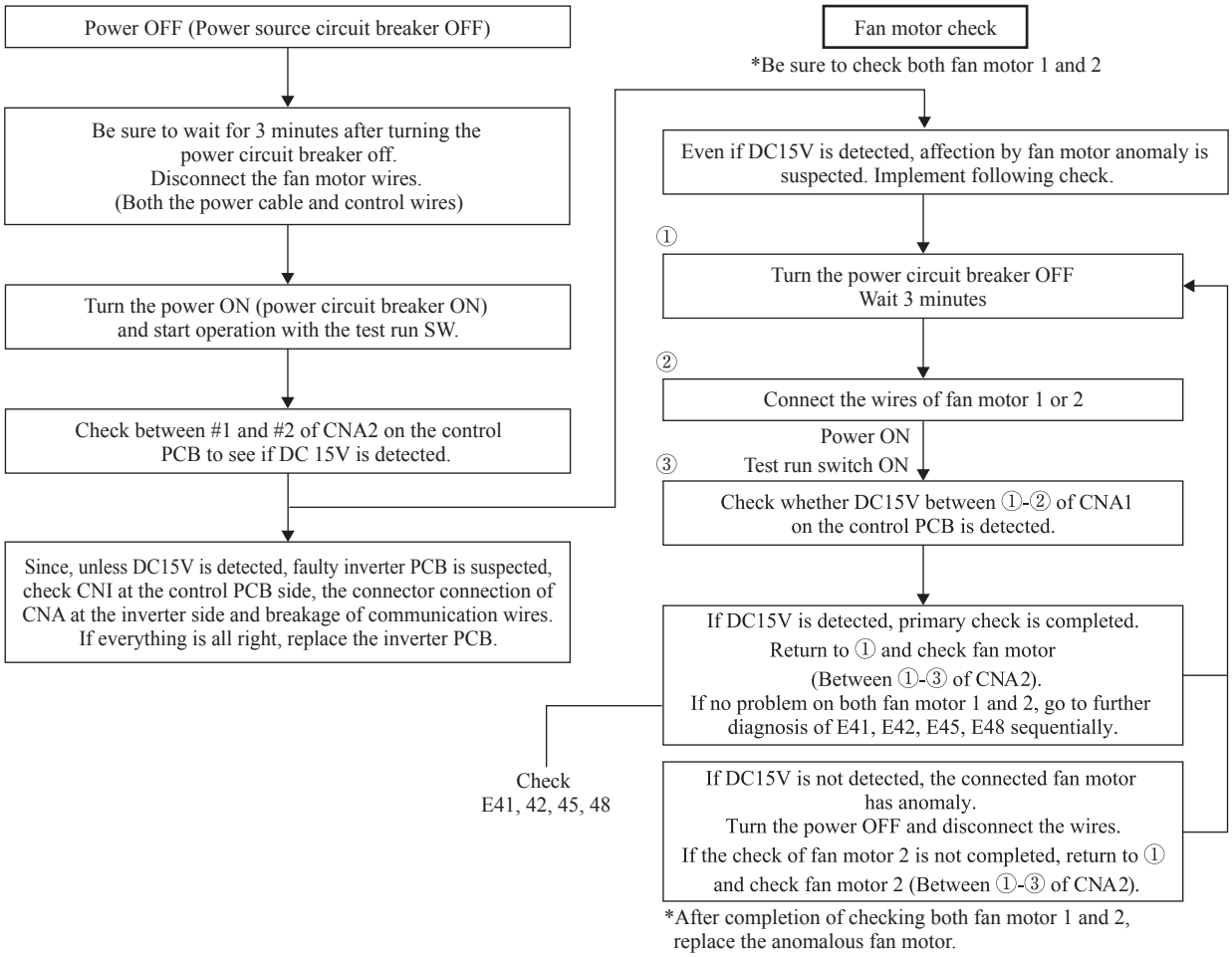
  Compressor, inverter PCB and outdoor DC fan motor
- Is it a failure of electrical component



2.2 Explanation of troubleshooting

(a) Checking 15V on the control PCB (Step to check if the inverter PCB fails or not)

Use this to diagnose E41, E42, E45 and E48.



(b) Inspection of short-circuit on the power transistor module terminals

Disconnect the wiring of compressor and check for short-circuit with a tester.

Inspect between terminals of: P-U, P-V, P-W, N-U, N-V, N-W and P-N

It will be easier to contact the tester at the following place at each terminal.

P: P terminal of power transistor

N: N terminal of power transistor

U: End of red harness to compressor

V: End of white harness to compressor

W: End of blue harness to compressor

Terminal (+)	Terminal (–)	Normal values(Ω)
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	

Note (1) When a measured value is 0 – a few kΩ, the element may be broken. Replace the power transistor part.

(c) Inverter checker for diagnosis of inverter output

●Checking method

(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 the checker to the terminal of disconnected wires (U, V, W) from compressor respectively.

(ii) Operation for judgment

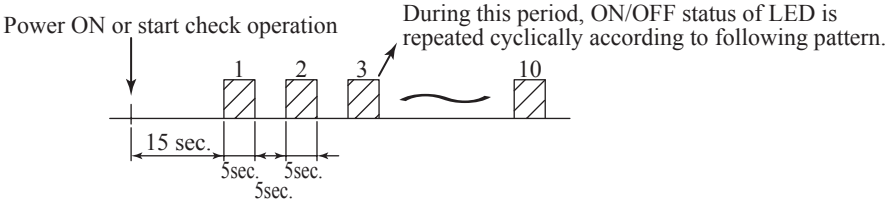
1) Power ON after JSW10-4 on outdoor inverter PCB was turned ON.

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.

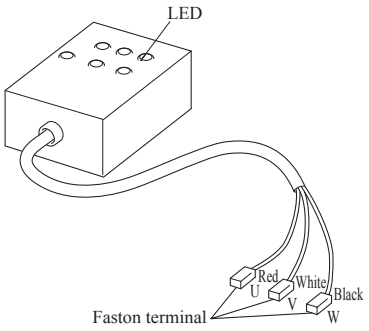
4) Judge the PCB by ON/OFF status of 6 LED's on the checker.

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



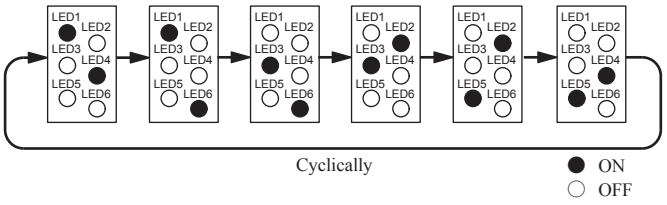
5) Be sure to turn off JSW10-4 on outdoor inverter PCB, after finishing the check operation.

〈**Inverter checker**〉



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

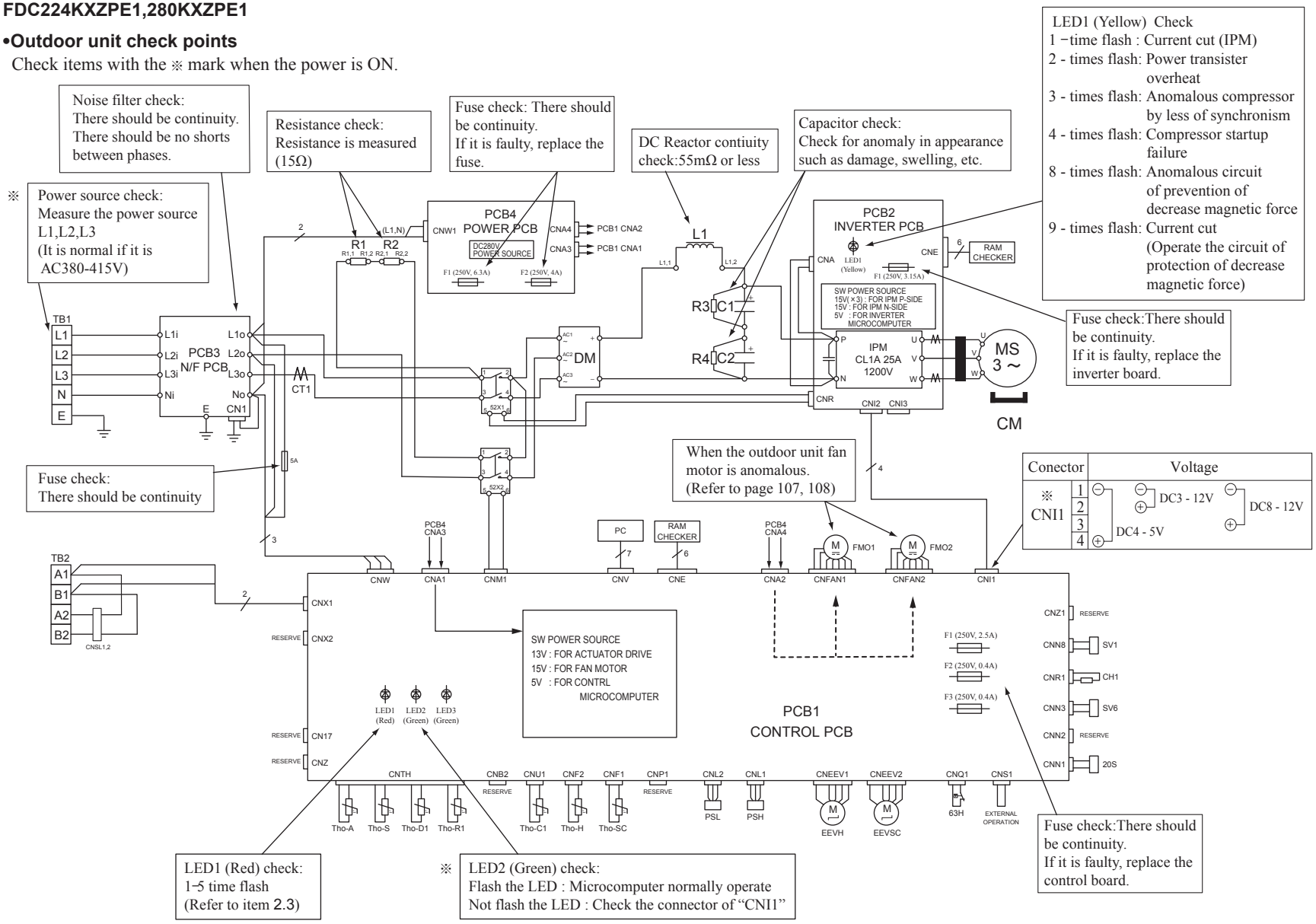
LED ON/OFF pattern



FDC224KXZPE1,280KXZPE1

•Outdoor unit check points

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



2.3 Contents of troubleshooting

(a) List of inspection displays

Indoor and outdoor units

Remote control error code	7-segment display	Name of inspection	Classification	Page
E1	–	Remote control communication error	Communication error	78
E2	–	Duplicated indoor unit address	Address setting error	79
E3	–	Outdoor unit signal line error	Address pairing setting error	80
E5	–	Communication error during operation	Communication error	81
E6	–	Indoor heat exchanger temperature thermistor anomaly (ThI-R)	Thermistor wire breakage	82
E7	–	Indoor return air temperature thermistor anomaly (ThI-A)	Thermistor wire breakage	83
E9	–	Drain trouble	System error	84
E10	–	Excessive number of indoor units (more than 17 units) by controlling one remote control	Communication error	85
E11	–	Address setting error between master and slave indoor units	Address setting error	86
E12	–	Address setting error by mixed setting method	Address setting error	87
E16	–	Indoor DC fan motor anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDK, FDUT71, FDFW series)	DC fan motor error	88
E18	–	Address setting error of master and slave indoor units	Address setting error	89
E19	–	Indoor unit operation check drain motor check mode anomaly	Setting error	90
E20	–	Indoor DC fan motor speed anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDK, FDUT71, FDFW series)	DC fan motor error	91
E21	–	Detective panel switch operation (FDT)	Panel switch error	92
E28	–	Remote control temperature thermistor anomaly (Thc)	Thermistor wire breakage	93
E31	E31	Duplicated outdoor unit address No.	Address setting error	94
E32	E32	Open L3 Phase on power supply at primary side	Site setting error	95
E36	E36	Discharge pipe temperature error (Tho-D)	System error	96
E37	E37	Outdoor heat exchanger temperature thermistor (Tho-R) and subcooling coil temperature thermistor (Tho-SC, -H) anomaly	Thermistor wire breakage	97
E38	E38	Outdoor air temperature thermistor anomaly (Tho-A)	Thermistor wire breakage	98
E39	E39	Discharge pipe temperature thermistor anomaly (Tho-D)	Thermistor wire breakage	99
E40	E40	High pressure anomaly (63H1 activated)	System error	100
E41(E51)	E41(E51)-1,2	Power transistor overheat	System error	101
E42	E42	Current cut (CM1)	System error	102
E43	E43	Excessive number of indoor units connected, excessive total capacity of connection	Site setting error	103
E44	E44	Liquid flooding anomaly (CM1)	System error	104
E45	E45	Communication error between inverter PCB and outdoor control PCB	Communication error	105
E46	E46	Mixed address setting methods coexistent in same network	Address setting error	106
E48	E48	Outdoor DC fan motor anomaly	DC fan motor error	107, 108
E49	E49	Low pressure anomaly	System error	109
E53/E55	E53/E55	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C1)	Thermistor wire breakage	110
E54	E54	High pressure sensor anomaly (PSH) Low pressure sensor anomaly (PSL)	Thermistor wire breakage	111
E58	E58	Anomalous compressor by loss of synchronism	System error	112
E59	E59	Compressor startup failure (CM1)	System error	113
E63	E63	Emergency stop	Site setting error	114

(b) Troubleshooting

Error code	LED	Green	Red	Content
Remote control: None 7-segment display: –	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
- Expansion valve operation anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Check the indoor fan operation. Check the temperature difference between return and suction air of indoor unit.	
Is the temperature difference between return and suction air 10-20°C at cooling? 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 compressor under-dome temperature when it restart after power reset.)
Does the heat load increase after installation? YES → Mistake in model selection. Calculate heat load once more.	It is necessary to replace to higher capacity unit or to install additional unit.
Is the compressor operating? NO → "WAIT" message is displayed [for 3 seconds] when performing cooling, dehumidifying or heating operation from remote control? YES →	Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.
"WAIT" message is displayed [for 3 seconds] when performing cooling, dehumidifying or heating operation from 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 microcomputer control function.
Is the compressor rotation speed low? NO →	Check the followings. • Minor clogging of filter • Minor fouling of heat exchanger • Minor short-circuit of airflow • Slightly insufficient or excessive refrigerant amount • Poor compression of compressor
Check following operation control function. · Control for determine compressor rotation speed · Protective control by controlling compressor rotation speed Which control is appropriate to this phenomenon.	Check suspicious points considering appropriate operation control.
Is the operating conditions of indoor/outdoor unit under rated condition? YES → Note (1) Outdoor: 35ºC Indoor : 27ºCDB/19ºCWB	Check the followings for reference. • Severe clogging of filter • Severe clogging of heat exchanger • Severe short-circuit of airflow • Severely insufficient or excessive refrigerant amount • Under protective control of compressor • Indoor unit fan tap setting • Valid setting of silent mode
The unit is operating normally, but is operating under the protective control of compressor or other respective components.	

Note:

Error code	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor	Keeps flashing	Stays OFF	Operates but does not heat
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

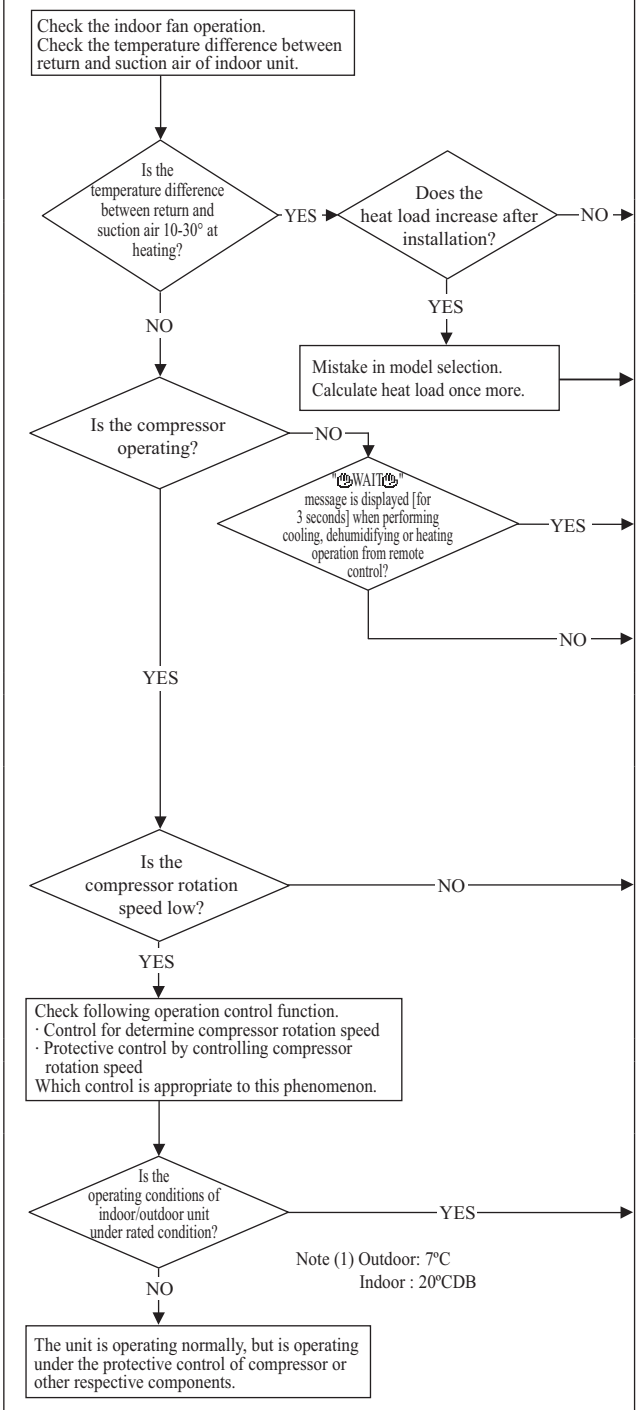
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- 4-way valve anomaly
- Poor compression of compressor
- Expansion valve anomaly operation

5. Troubleshooting



Diagnosis	Countermeasure
	It is normal. (This unit is designed to start in the soft start mode by detecting the compressor under-dome temperature when it restart after power reset.)
	It is necessary to replace to higher capacity unit or to install additional unit.
	Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.
	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 microcomputer control function.
	Check the followings. • Minor clogging of filter • Minor fouling of heat exchanger • Minor short-circuit of airflow • Slightly insufficient or excessive refrigerant amount • Poor compression of compressor
	Check suspicious points considering appropriate operation control.
	Check the followings for reference. • Severe clogging of filter • Severe clogging of heat exchanger • Severe short-circuit of airflow • Severely insufficient or excessive refrigerant amount • Under protective control of compressor • Indoor unit fan tap setting • Valid setting of silent mode

Note:

Error code

Remote control: None
7-segment display: –

LED	Green	Red
Indoor	Stays OFF	Stays OFF
Outdoor	Stays OFF	Stays OFF

Content

Earth leakage breaker activated

1.Applicable model

All models

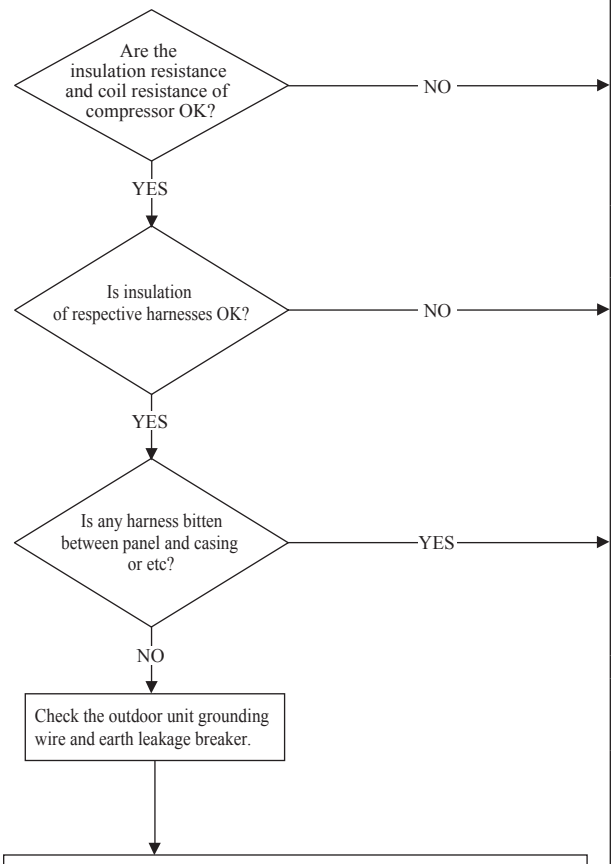
2.Error detection method

3. Condition of error displayed

4.Presumable cause

• Compressor anomaly
• Noise

5.Troubleshooting



Check of the outdoor unit grounding wire and 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 the conformity of high harmonic regulation.

* Insulation resistance of compressor
• Immediately after installation or when the unit has been left for long period without power supply, the insulation resistance may drop to a few MΩ because of refrigerant migrated in the compressor.
When the earth leakage 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.
When power ON, crankcase heater heat up compressor and evaporates the refrigerant migrated in the compressor.
② Check if the earth leakage breaker is conformed to higher harmonic regulation or not.
Since the unit has inverter, it is necessary to use components conformed to high harmonic regulation in order to prevent malfunction of earth leakage breaker.

Note:

Error code	LED	Green	Red	Content
Remote control:None 7-segment display: –	Indoor	–	–	Excessive noise/vibration (1/3)
	Outdoor	–	–	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

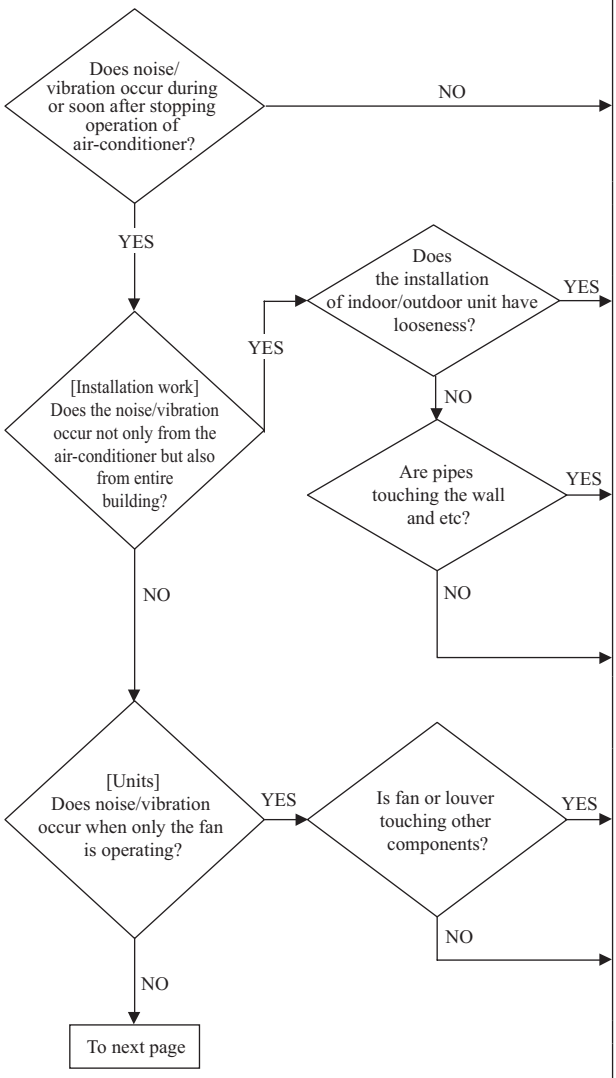
4.Presumable cause

① Improper installation work
- Improper vibration-proof work at installation
- Insufficient strength of mounting surface

② Anomaly of product
- Before/after shipment from factory

③ Improper adjustment during commissioning
- Excessive/insufficient refrigerant.

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 installed position or insert rubber cushions into the gap or take other measure in order to eliminate looseness. Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall tightly 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 installation place or apply reinforcement to increase the strength. Check for leaning of installed unit or incorrect mounting of fan, louver or motor, and then 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, even the low level noise from indoor unit like as refrigerant flow noise can be heard, but it is normal. Before installation, check for background noise. If background noise is very low, convince client prior to installation.

Note:

Error code	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor	–	–	Excessive noise/vibration (2/3)
	Outdoor	–	–	

1. Applicable model

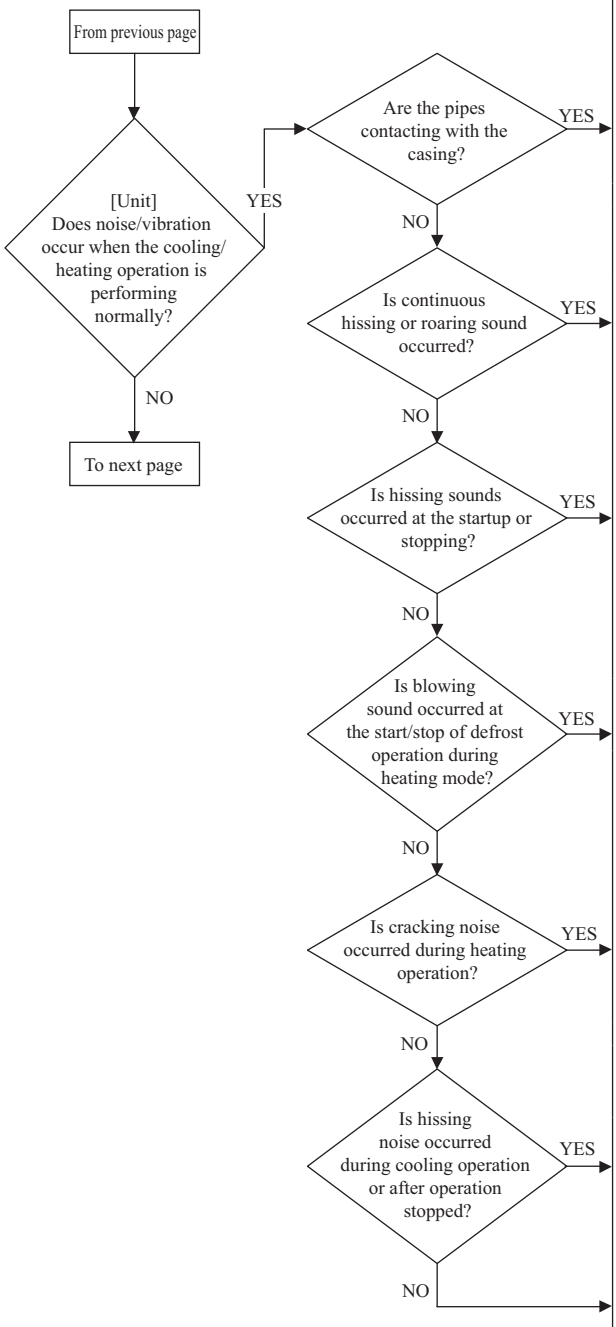
All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause

5. Troubleshooting



Diagnosis	Countermeasure
Are the pipes contacting with the casing? YES	Rearrange the piping to avoid contact with the casing.
Is continuous hissing or roaring sound occurred? YES	Noise/vibration is generated when the refrigerant gas or liquid flows through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrosting in the heating mode. It is normal.
Is hissing sounds occurred at the startup or stopping? YES	The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.
Is blowing sound occurred at the start/stop of defrost operation during heating mode? YES	When the defrosting starts or stops during heating mode, 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 also accompany the hissing sound as mentioned above. This is normal.
Is cracking noise occurred during heating operation? YES	After the start or stop of heating operation or during defrosting, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.
Is hissing noise occurred during cooling operation or after operation stopped? YES	It is the sound produced by the drain pump that discharges drain from indoor unit. The pump continues to run for 5 minutes after stopping the cooling operation. This is normal.
NO	Apply the damper sealant at the place considered to be the sources such as the pressure reducing mechanism. (Expansion valve, capillary tube, etc.)

Note:

Error code	LED	Green	Red	Content
Remote control:None 7-segment display: –	Indoor	–	–	Excessive noise/vibration (3/3)
	Outdoor	–	–	

1.Applicable model

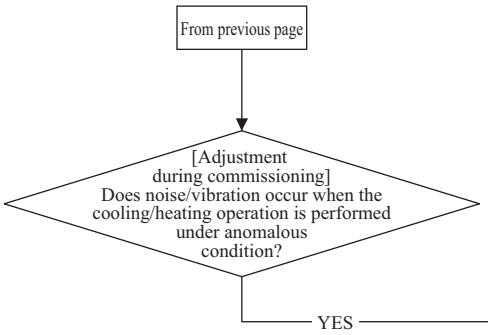
All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

5.Troubleshooting

Diagnosis	Countermeasure
	If insufficient cooling/ heating problem happens due to anomalous operating conditions at cooling /heating, followings are suspicious. • Excessive charged amount of refrigerant • Insufficient charge amount of refrigerant • Intrusion of air, nitrogen, etc. In such case, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant. * Since there could be many causes of noise/ vibration, the above may not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check points and ask our consultation. • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor temperatures and pressures) • Time it occurred • Operation data retained by remote control or Mente PC such as compressor rotation speed, heat exchanger temperature, EEV opening degree and etc. • Tone (If available, record the noise) • Any other anomalies.

Note:

Error code	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor	Keeps flashing	Stays OFF	Louver motor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

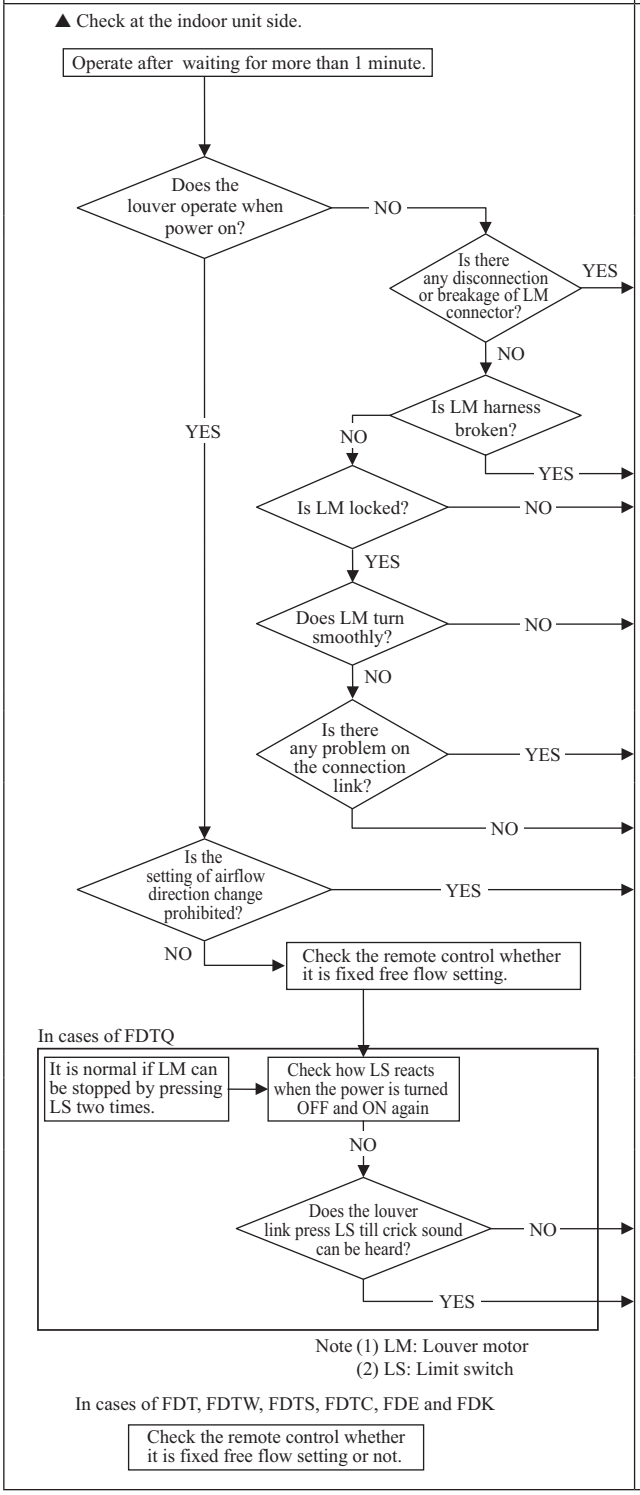
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Louver motor anomaly
- Disconnection/breakage of LM harness
- Limit switch anomaly

5. Troubleshooting



Note:

Error code

Remote control: None
7-segment display:

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

Content: Power source system anomaly (Power source to indoor unit PCB)

1. Applicable model

All models

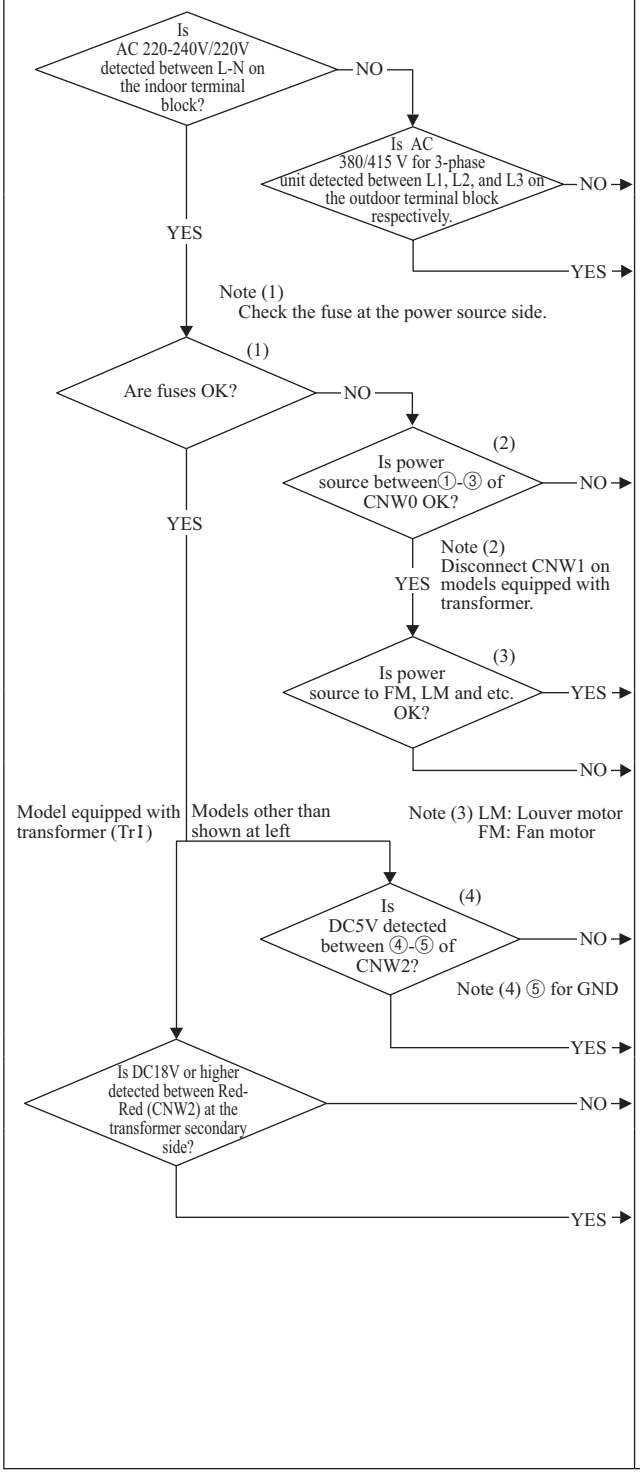
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Wrong connection or breakage of connecting wires
- Blown fuse
- Transformer anomaly
- Indoor power PCB anomaly
- Broken harness
- Indoor control PCB anomaly

5. Troubleshooting



Note:

Error code

Remote control: None
7-segment display: –

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

Content

Power source system error (Power source to remote control)

1. Applicable model

All models

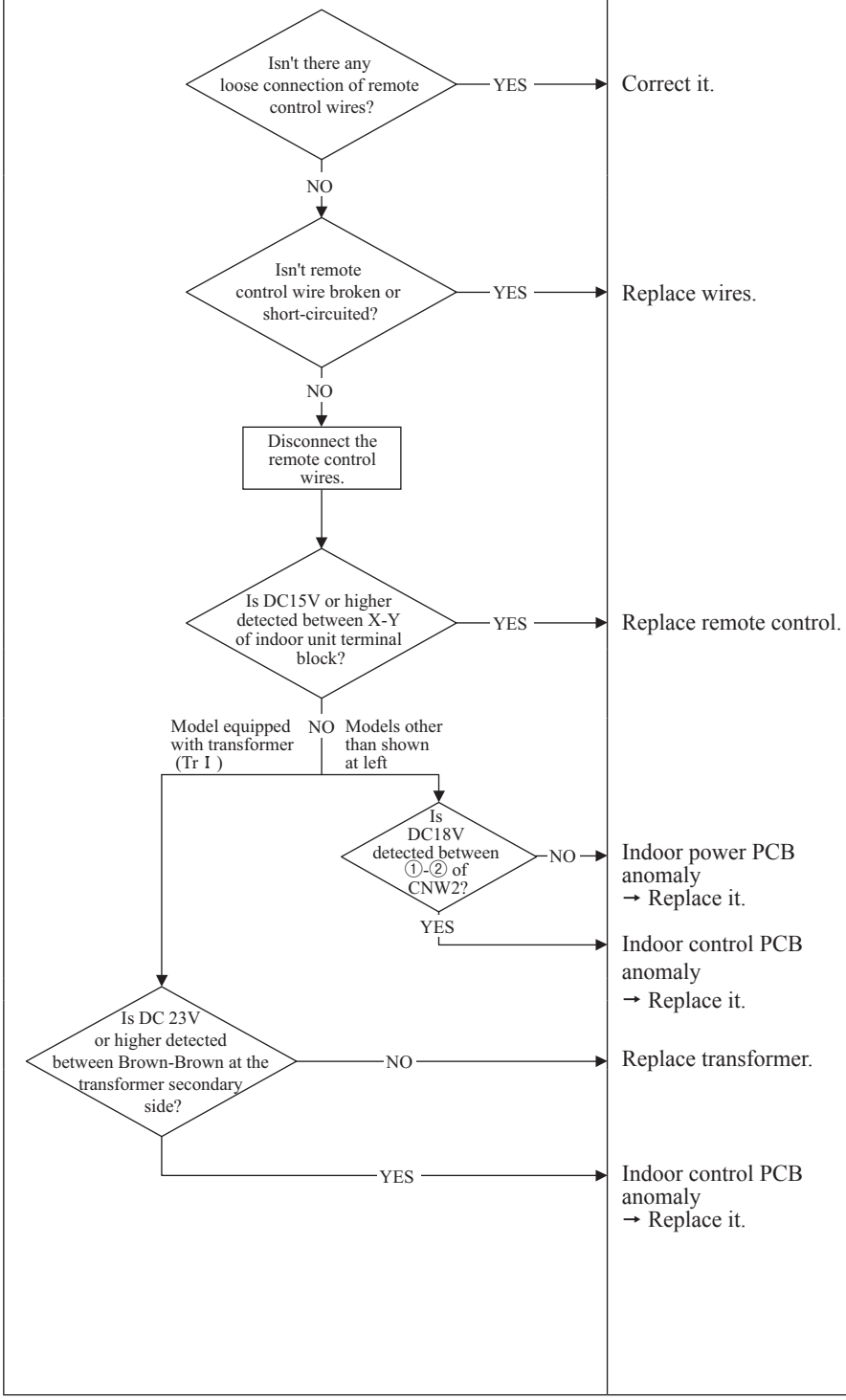
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Remote control wire breakage/short-circuit
- Remote control anomaly
- Malfunction by noise
- Indoor power PCB anomaly
- Broken harness
- Indoor control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display:	Indoor	Keeps flashing	Stays OFF	WAIT (1)
	Outdoor	Keeps flashing	Keeps flashing	

1. Applicable model

All models

(In case that WAIT is kept on displaying on the remote control for more than 2 minutes after power ON.)

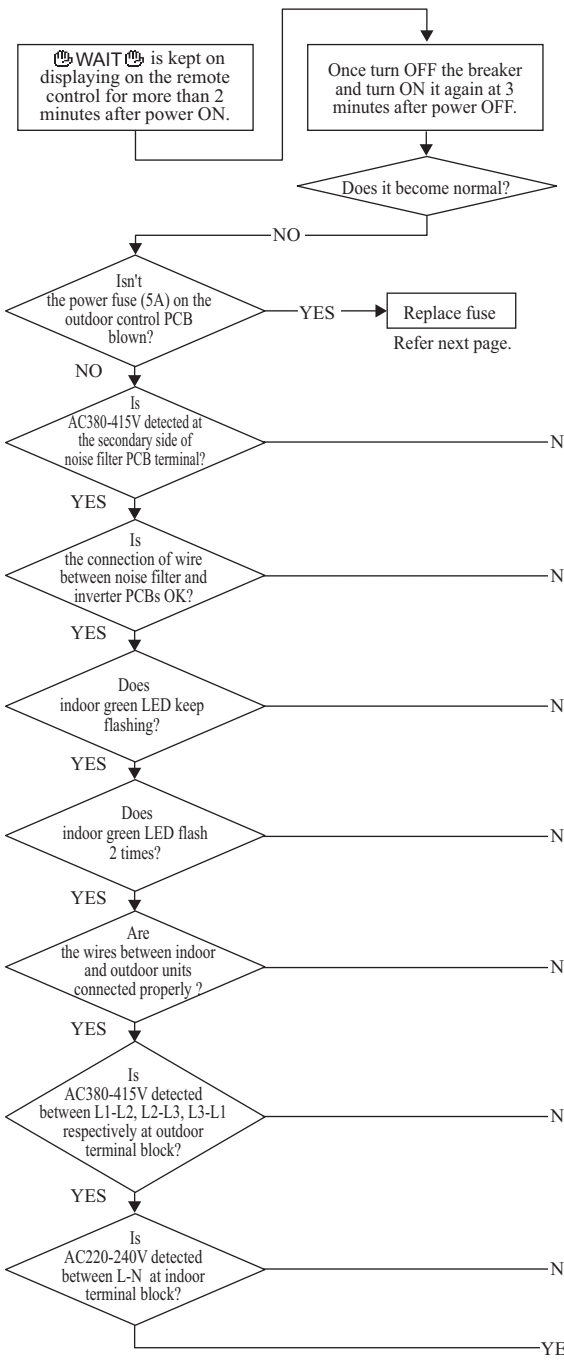
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting



Note: (1) When anomaly occurs during establishing communication between indoor and outdoor unit, error code E5 is displayed (outdoor red LED flash 2-times).
In case of E5, the way of troubleshooting is same as above mentioned (except for checking of connecting wire).
When reset the power after E5 occurs, if this anomaly recurs, WAIT is displayed on remote control. If power ON/OFF is repeated in a short period (within 1 minute), WAIT may be displayed. In such case, please wait for 3 minute after the power breaker OFF.
(2) 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: WAIT 7-segment display: –	Indoor	Keeps flashing	Stays OFF	WAIT (2)
	Outdoor	Keeps flashing	Keeps flashing	

1. Applicable model

All models

(In case of fuse blown, how to check the unit before replacement of fuse.)

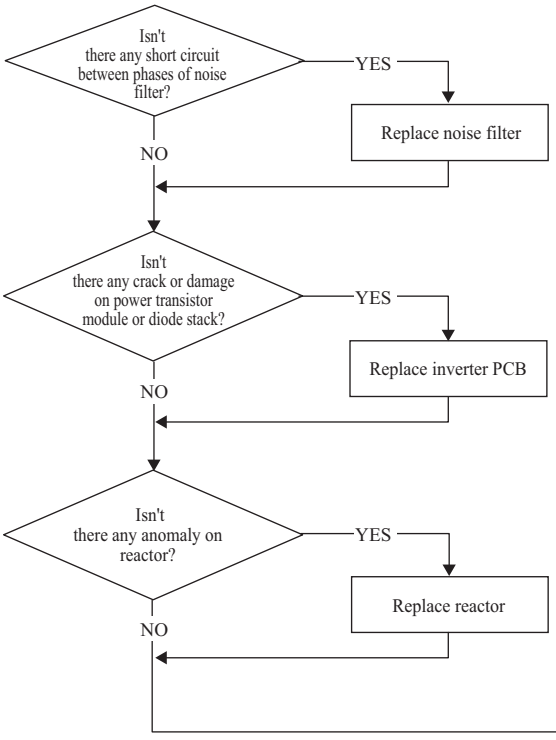
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
	Replace fuse.

Note:

Error code

Remote control: WAIT
7-segment display:

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

Content

WAIT (3)

1. Applicable model

All models

(No display on the remote control after power ON.)

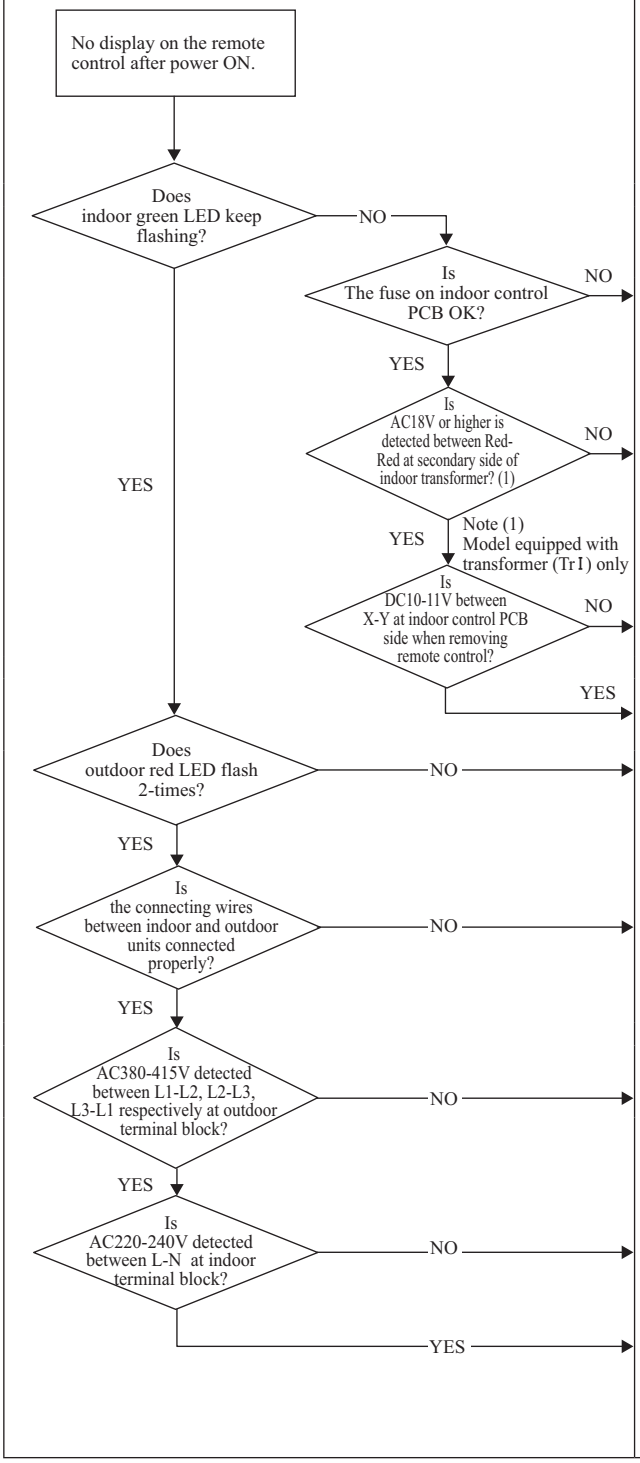
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting



Note:

Error code

Remote control: WAIT
7-segment display: –

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

Content

WAIT (4)

1. Applicable model

All models

(In case that WAIT is kept on displaying on the remote control for more than 2 minutes after power ON.)

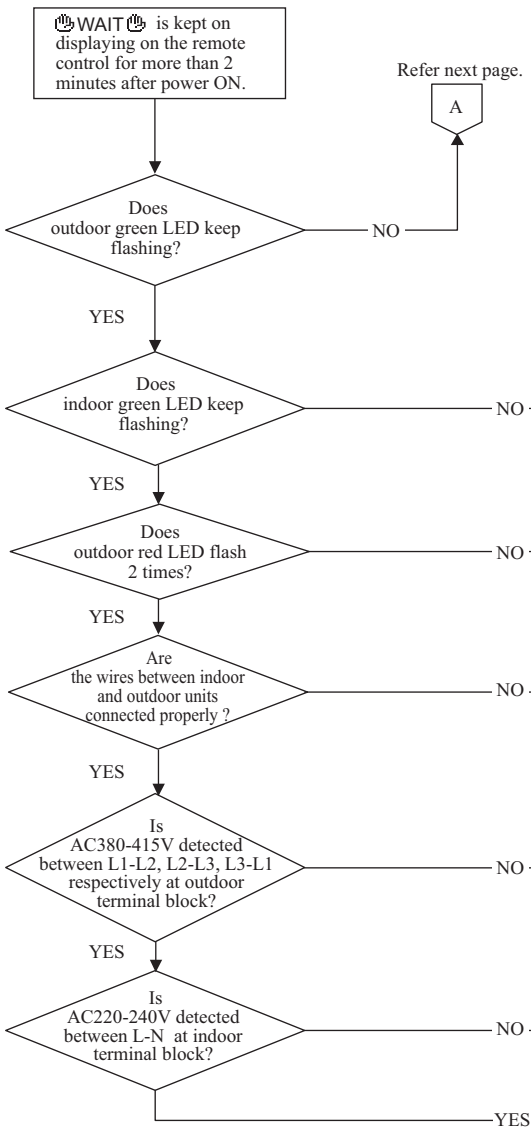
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting



Note:

Error code

Remote control: WAIT
7-segment display:

LED	Green	Red
Indoor	Stays OFF	Stays OFF
Outdoor	Stays OFF	Stays OFF

Content

WAIT (5)

1. Applicable model

All models

(In case that LED on outdoor control PCB stays OFF.)

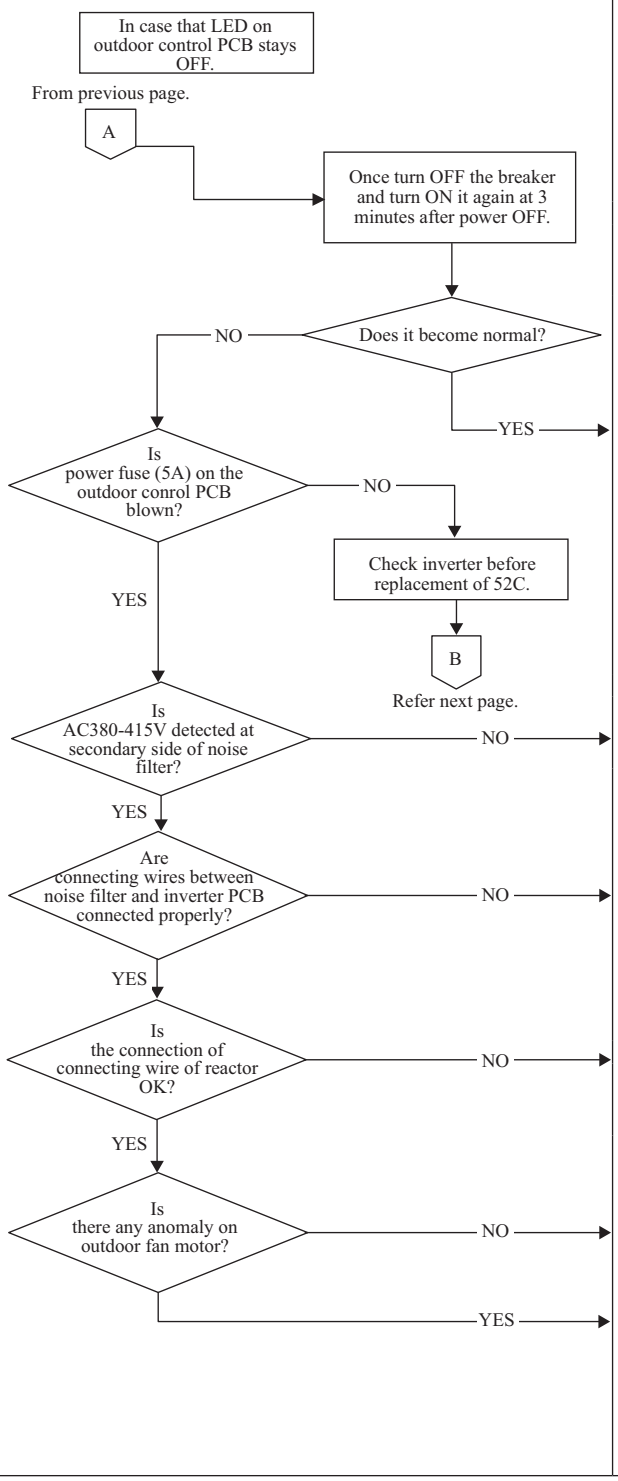
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display: –	Indoor	Stays OFF	Stays OFF	WAIT (6)
	Outdoor	Stays OFF	Stays OFF	

1. Applicable model

All models

(In case of fuse blown, how to check the unit before replacement of fuse.)

2. Error detection method

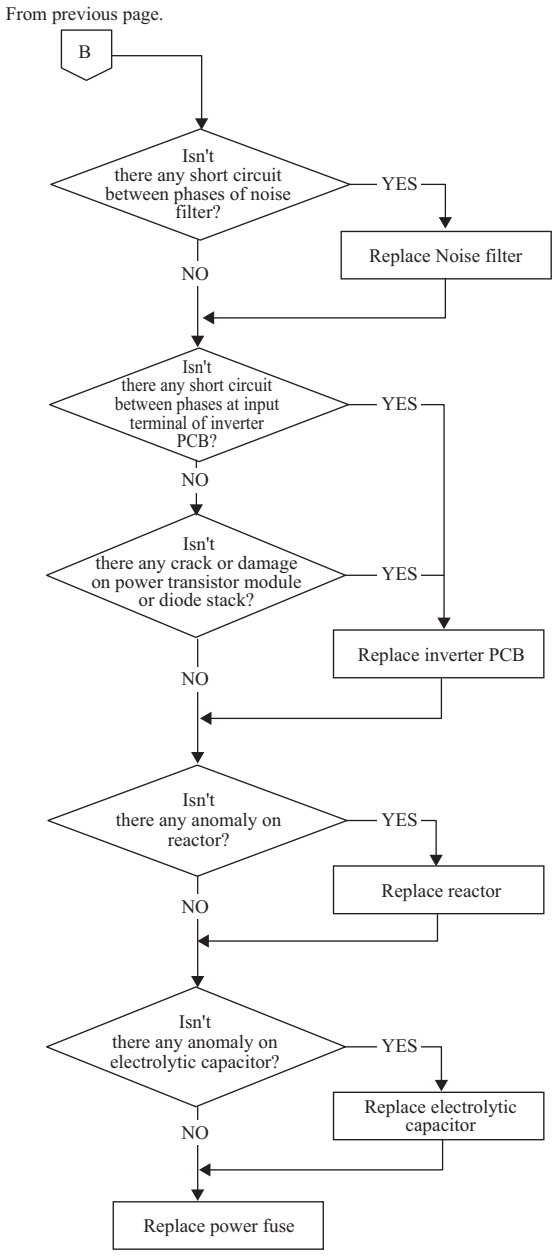
3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure



Note:

Error code

Remote control: [No display]
7-segment display:

LED	Green	Red
Indoor	Stays OFF	Stays OFF
Outdoor	Stays OFF	Stays OFF

Content

[No display]

1. Applicable model

All models

(No display on the remote control after power ON.)

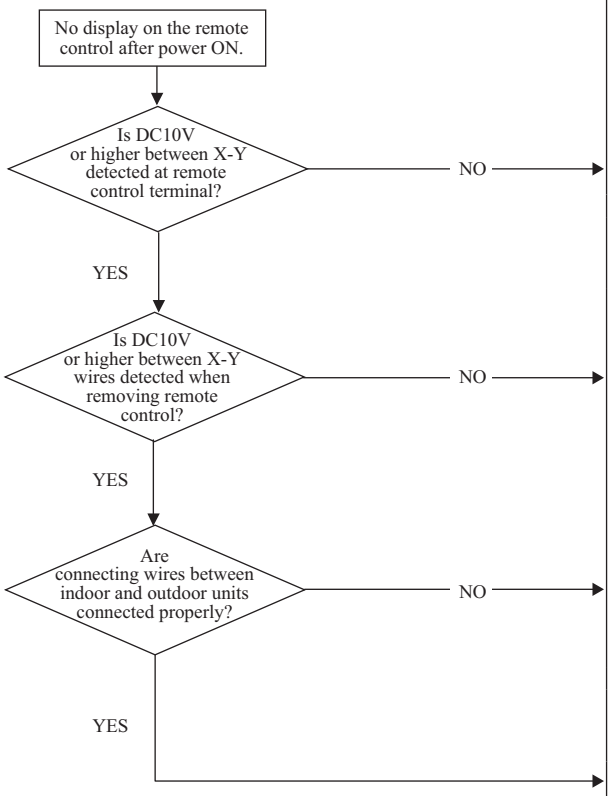
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Anomalous connection of wire between PCBs
- Indoor control PCB anomaly
- Remote control anomaly
- Breakage of connecting wires of remote control
- Outdoor control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E1 7-segment display: –	Indoor	Keeps flashing	Stays OFF	Remote control communication error
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

When normal communication between remote control and indoor unit is interrupted for more than 2 minutes. (Detectable only with the remote control.)

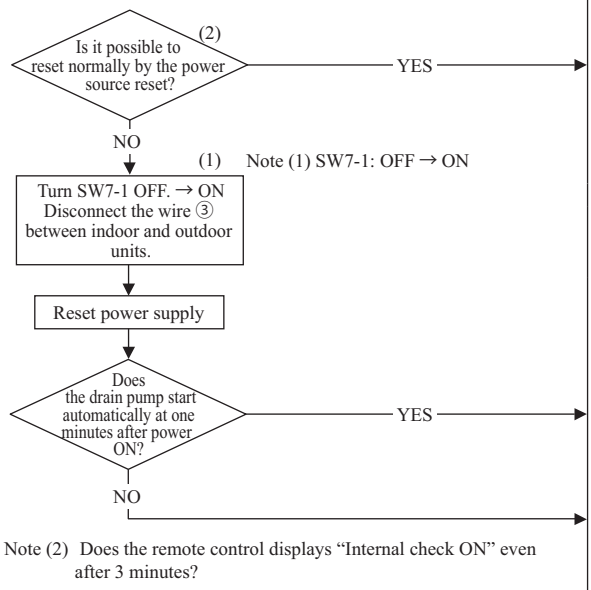
3. Condition of error displayed

Same as above

4. Presumable cause

- Anomalous communication circuit between remote control and indoor unit.
- Noise

5. Troubleshooting

Diagnosis	Countermeasure
	Malfunction by temporary noise. Check peripheral environment. Indoor control PCB anomaly → Replace it. Remote control anomaly → Replace it.

Note (2) Does the remote control displays “Internal check ON” even after 3 minutes?

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: E2 7-segment display: –	Indoor	Keeps flashing	Keeps flashing	Duplicated indoor unit address
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

More than 129 indoor units are connected in the same Superlink system.
Duplicated indoor unit address

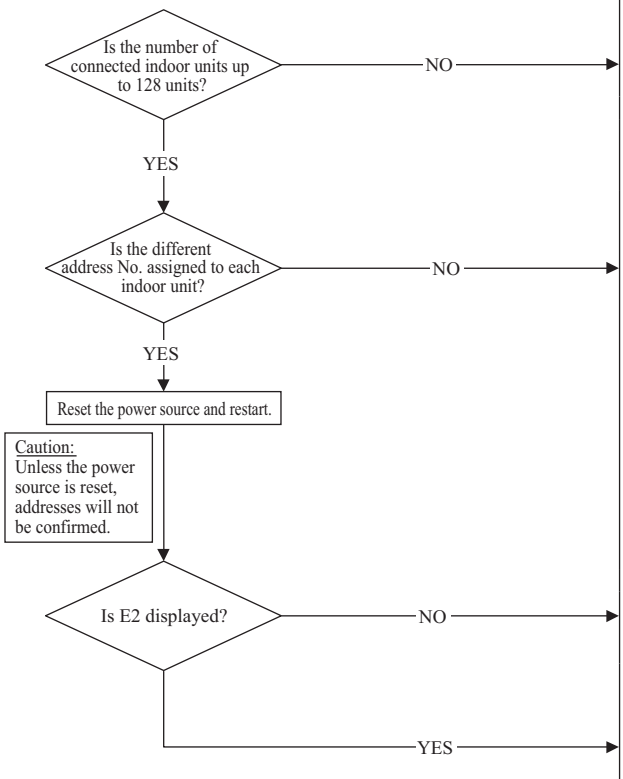
3. Condition of error displayed

Same as above

4. Presumable cause

- Number of connected indoor units exceeds the limitation.
- Duplicated indoor unit address
- Indoor control PCB anomaly

5. Troubleshooting



Note:

Error code

Remote control: E3/5
7-segment display: –

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

Content

Outdoor unit signal line error

1. Applicable model

All models

2. Error detection method

No outdoor unit exists in the same Superlink system.

3. Condition of error displayed

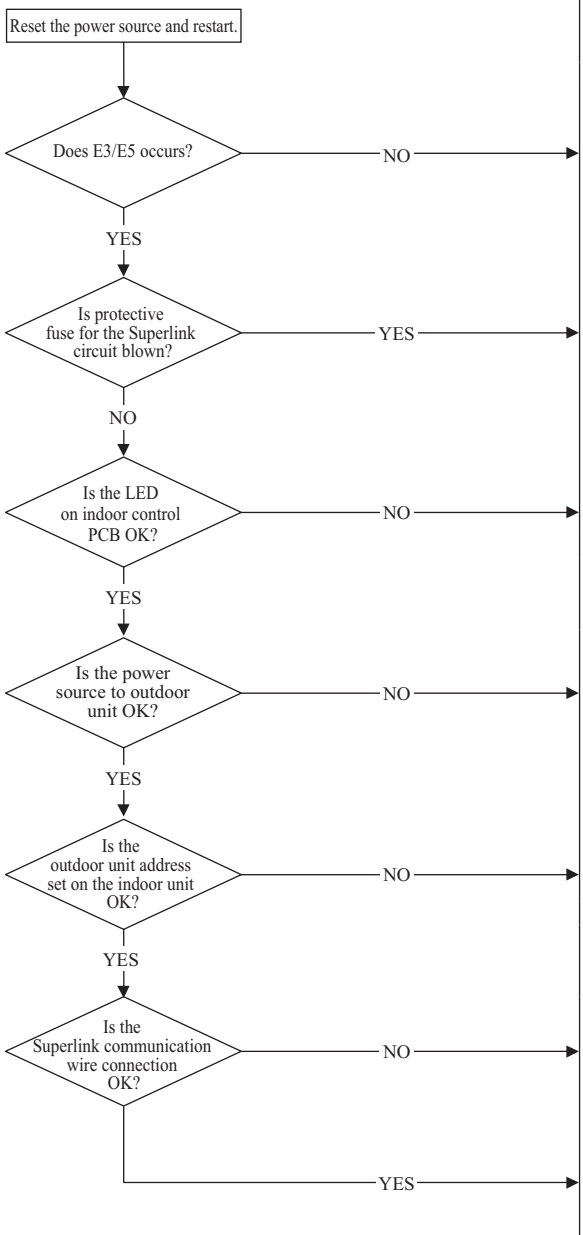
Same as above

4. Presumable cause

- Power is not supplied to the outdoor unit
- Unmatch of pairing between indoor and outdoor units
- Indoor control PCB anomaly
- Outdoor control PCB anomaly
- Missing local wiring

5. Troubleshooting

E3 is a communication error that occurs when communication between indoor and outdoor units is not established at all. Once the communication between indoor and outdoor units is established, it changes to E5.
In both cases, check signal line wired locally.



Note:

Error code	LED	Green	Red	Content
Remote control: E5 7-segment display: –	Indoor	Keeps flashing	*See below	Communication error during operation
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

All models

2. Error detection method

When the communication between indoor and outdoor units is interrupted for more than 2 minutes.

3. Condition of error displayed

When this anomaly is detected during operation.

4. Presumable cause

- Unit address No. setting error
- Remote control wires broken
- Poor connection/disconnection of remote control wires
- Indoor control PCB anomaly

5. Troubleshooting

Diagnosis

* In case that indoor red LED flashes 2 times

Note (1) Check the connection (disconnection, looseness) of signal wires at outdoor terminal block.

Is the connection of signal wires at the outdoor unit side OK?

NO → Repair signal wires.

YES

Note (2) Check the connection (disconnection, looseness, breakage) of signal wires between indoor and outdoor units.

Is the connection of signal wires between indoor and outdoor units OK?

NO → Repair signal wires.

YES

Reset the power source and restart.

Does the remote control LCD becomes normal?

NO → Go to the diagnosis of ✋WAIT✋ (1)

YES → Unit is normal. (Malfunction by temporary noise, etc.)

* In case that indoor red LED stays OFF

Reset the power source and restart.

Does the remote control LCD becomes normal?

NO → Outdoor control PCB anomaly (Network communication circuit anomaly) → Replace it.

YES → Unit is normal. (Malfunction by temporary noise, etc.)

Countermeasure

Repair signal wires.

Repair signal wires.

Go to the diagnosis of ✋WAIT✋ (1)

Unit is normal. (Malfunction by temporary noise, etc.)

Outdoor control PCB anomaly (Network communication circuit anomaly) → Replace it.

Unit is normal. (Malfunction by temporary noise, etc.)

Note: When the pump down switch is turned on, communication between indoor and outdoor units is cancelled so that "Communication error E5" will be displayed on the remote control and indoor control PCB, but this is normal.

Error code	LED	Green	Red	Content
Remote control: E6 7-segment display: –	Indoor	Keeps flashing	1-time flash	Indoor heat exchanger temperature thermistor anomaly (ThI-R)
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of ThI-R1, R2, R3.

3. Condition of error displayed

- If -50ºC or lower is detected for 5 seconds continuously, compressor stops. After 3-minutes delay, the compressor is restarted automatically, but if this anomaly occurs again within 60 minutes after the initial detection.
- Or if 70ºC or higher is detected for 5 seconds continuously.

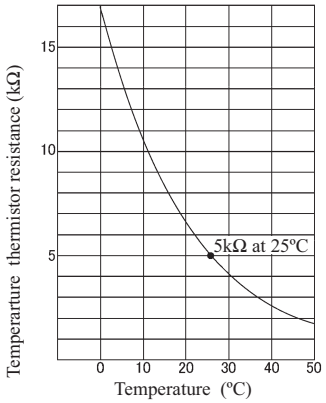
4. Presumable cause

- Anomalous connection of indoor heat exchanger temperature thermistor
- Indoor heat exchanger temperature thermistor anomaly
- Indoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Is the connector of thermistor connected properly ? — NO	Insert the connector securely.
YES	
Regarding the characteristics of the thermistor, see the following chart.	
Are the characteristics of thermistor OK? *1 — NO	Replace thermistor. (ThI-R)
YES	Replace indoor control. PCB
*1 Check several times to prove any poor connection	

Temperature-resistance characteristics of indoor heat exchanger temperature thermistor (ThI-R1, R2, R3)



Note:

Error code	LED	Green	Red	Content
Remote control: E7 7-segment display: –	Indoor	Keeps flashing	1-time flash	Indoor return air temperature thermistor anomaly (ThI-A)
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of ThI-A.

3. Condition of error displayed

- If -50°C or lower is detected for 5 seconds continuously, compressor stops. After 3-minutes delay the compressor is restarted automatically, but if this anomaly occurs again within 60 minutes after the initial detection.
- Or if 48°C or higher is detected for 5 seconds continuously.

4. Presumable cause

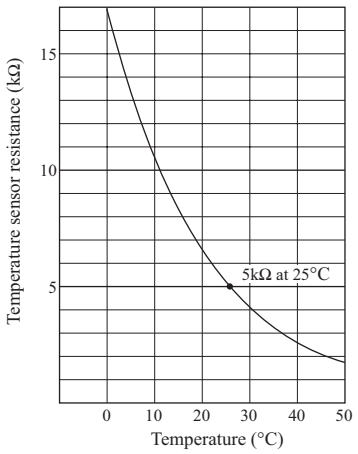
- Anomalous connection of indoor return air temperature thermistor
- Indoor return air temperature thermistor anomaly
- Indoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Is the connector of thermistor connected properly ? — NO	Insert the connector securely.
YES → Regarding the characteristics of the thermistor, see the following chart.	
Are the characteristics of thermistor OK? *1 — NO	Replace thermistor (ThI-A).
YES	Replace indoor control PCB.

*1 Check several times to prove any poor connection

Temperature-resistance characteristics of indoor return air temperature thermistor (ThI-A)



Note:

Error code	LED	Green	Red	Content
Remote control: E9 7-segment display: –	Indoor	Keeps flashing	1-time flash	Drain trouble
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

FDT, FDTC, FDTW, FDTQ, FDTS, FDR, FDU, FDUM, and FDUT series

2. Error detection method

Float switch is activated.

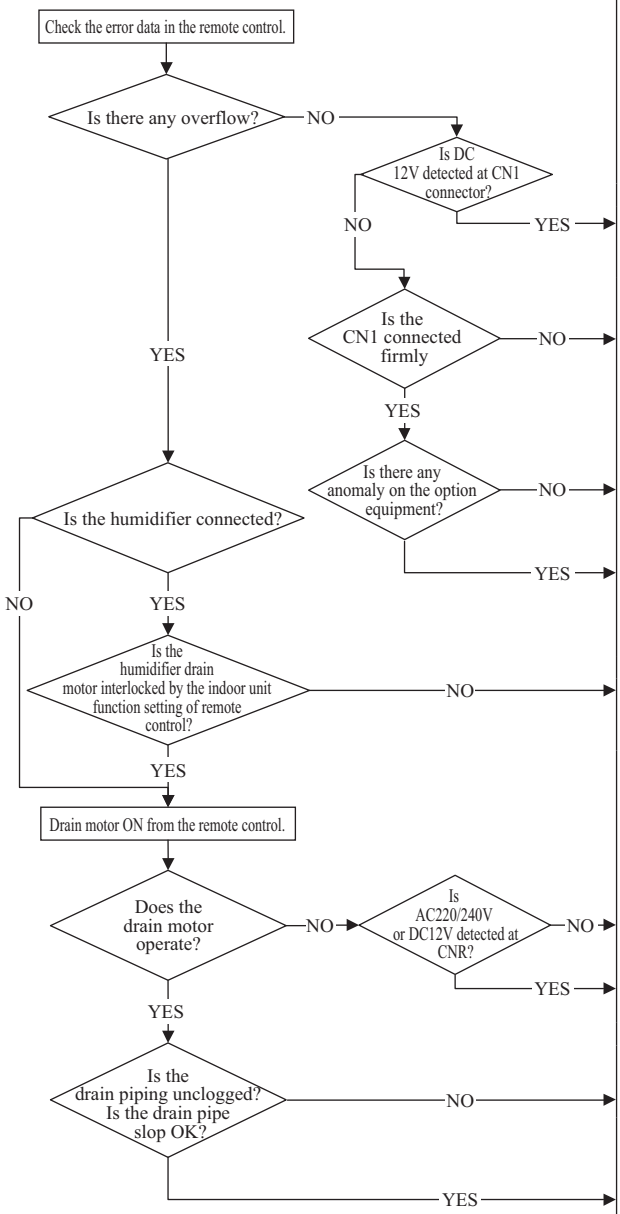
3. Condition of error displayed

If the float switch OPEN is detected for 3 seconds continuously or if float switch connector is disconnected or wire broken.

4. Presumable cause

- Indoor control PCB anomaly
- Mistake in setting of float switch
- Mistake in setting of humidifier drain motor interlock
- Mistake in setting of option equipment
- Mistake in drain piping
- Drain motor anomaly
- Disconnection/breakage of drain motor wires

5. Troubleshooting



Note: When this anomaly occurs at power ON, disconnection of connector or breakage of wire of float switch is suspected. Check and correct it (or replace it, if necessary).

Error code	LED	Green	Red	Content
Remote control: E10 7-segment display: –	Indoor	Keeps flashing	Stays OFF	Excessive number of indoor units (more than 17 units) by controlling one remote control
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

When it detects more than 17 of indoor units connected to one remote control.

3. Condition of error displayed

Same as above

4. Presumable cause

- Excessive number of indoor units connected.
- Remote control anomaly.

5. Troubleshooting

Diagnosis	Countermeasure
Aren't more than 17 indoor units connected to one remote control? → NO	Remote control anomaly → Replace it.
Aren't more than 17 indoor units connected to one remote control? → YES	Reduce to 16 or less units.

Note:

Error code

Remote control: E11
7-segment display: –

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

Content

Address setting error between master and slave indoor units

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

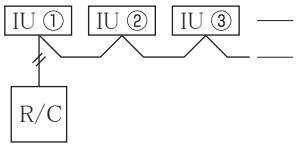
4. Presumable cause

Same as above

5. Troubleshooting

Diagnosis	Countermeasure
E11 occurs → Is "Master IU address set" function of remote control used? → YES	・In cases of RC-E5 Return address No. to "IU ⋯" using [▲] or [▲] button. ・In cases of RC-EX1A Menu → **Next** → IU settings → Select IU

In case the wiring is below and "Master IU address set" is used, E11 is appeared.



Note:

Error code	LED	Green	Red	Content
Remote control: E12 7-segment display:	Indoor	Keeps flashing	Keeps flashing	Address setting error by mixed setting method
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Automatic address setting and manual address setting are mixed when setting address of indoor units.

3. Condition of error displayed

Same as above

4. Presumable cause

Mistake in address setting for indoor unit.

5. Troubleshooting

Diagnosis	Countermeasure
Isn't the automatic setting and manual setting mixed in the address setting method for indoor units? — YES	Review address setting.
NO	Replace indoor control PCB.

Address setting method list (Figures in [ ] are for Previous Superlink models)

		Models for new Superlink protocol			Models for Previous Superlink protocol		
		Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
		Indoor unit No. SW	Outdoor unit No. SW	Outdoor unit No. SW	Indoor unit No. SW	Outdoor unit No. SW	Outdoor unit No. SW
Manual address setting	(New SL)	000-127	00-31	00-31	00-47	00-47	00-47
	(Previous SL)	[00-47]	[00-47]	[00-47]			
Automatic address setting for single refrigerant system	(New SL)	000	49	49	49	49	49
	(Previous SL)						
Automatic address setting for multiple refrigerant systems	(New SL)	000	49	00-31	Not available		
	(Previous SL)	Not available					

Note:

Error code	LED	Green	Red	Content
Remote control: E16 7-segment display: -	Indoor	Keeps flashing	1(2)-time flash	Indoor DC fan motor anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM FDUT71, FDK, FDFW, FDU-F series)
	Outdoor	Keeps flashing	Stays OFF	

Note (1) Value in ( ) is for the FM2 only.

1. Applicable model

FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDUT71, FDK, FDFW, FDU-F series only

2. Error detection method

Detected by rotation speed of indoor fan motor

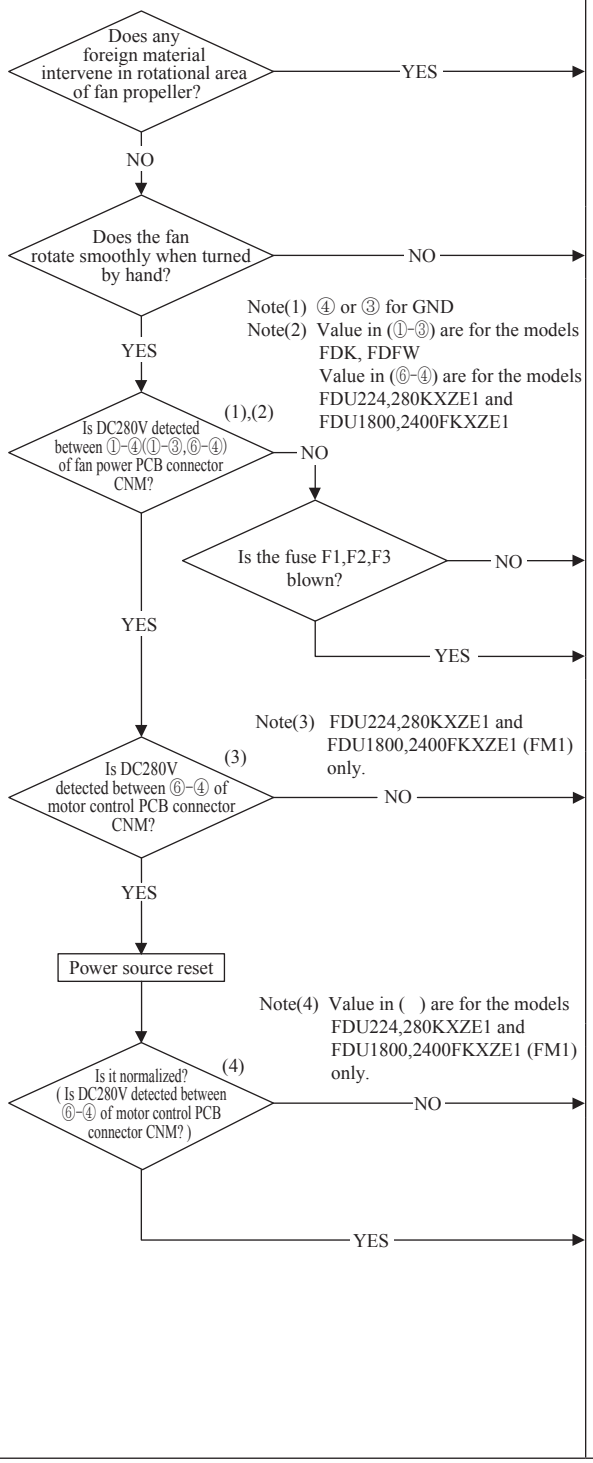
3. Condition of Error displayed

- 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 power (control) PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on control PCB
- Blown fuse
- External noise, surge

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E18 7-segment display: –	Indoor	Keeps flashing	1-ime flash	Address setting error of master and slave indoor units
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

(1) When the address setting for the master indoor unit is not existing in the same Superlink system.
(2) When the address setting for the slave indoor unit is set for the master indoor unit redundantly.

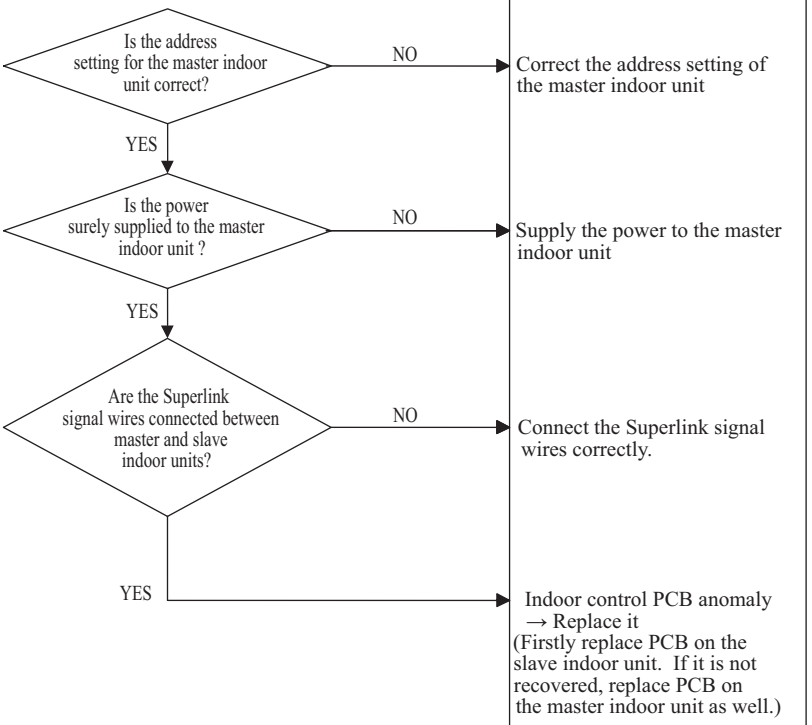
3. Condition of Error displayed

Same as above

4. Presumable cause

- Address setting error of the master indoor unit
- No power source to the master indoor unit
- No connection of Superlink signal wires between master and slave indoor unit.

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E19 7-segment display: –	Indoor	Keeps flashing	1-time flash	Indoor unit operation check, drain motor check mode anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

E19 occurs

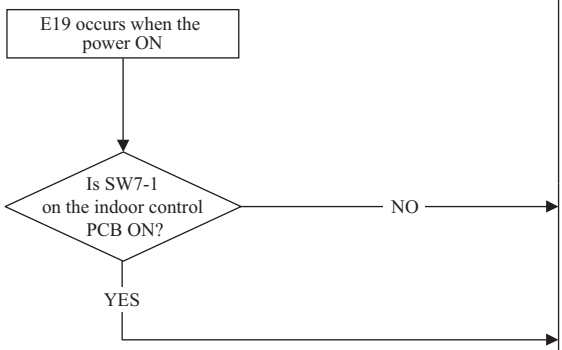
3. Condition of error displayed

Same as above

4. Presumable cause

Mistake in SW7-1 setting
Due to forgetting to turn OFF SW7-1 after indoor operation check)

5. Troubleshooting



Diagnosis	Countermeasure
Is SW7-1 on the indoor control PCB ON? NO	Indoor control PCB anomaly (Anomalous SW7) → Replace.
Is SW7-1 on the indoor control PCB ON? YES	Turn SW7-1 on the indoor control PCB OFF and reset the power.

Note: Indoor operation check/drain pump check mode
If the power is ON after SW7-1ON, indoor operation check/drain pump check mode can be established.
1) When the communication between remote control and indoor PCB is established 15 seconds after power ON, it goes to indoor operation check.
2) When the communication between remote control and indoor PCB is not established, it goes to drain pump check. (CnB connector should be open before power ON.)

Error code	LED	Green	Red	Content
Remote control: E20 7-segment display: -	Indoor	Keeps flashing	1(2)-time flash	Indoor DC fan motor rotation speed anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM FDUT71, FDK, FDFW, FDU-F series)
	Outdoor	Keeps flashing	Stays OFF	

Note (1) Value in ( ) is for the FM2 only.

1.Applicable model

FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDUT71, FDK, FDFW, FDU-F series only

2.Error detection method

Detected by rotation speed of indoor fan motor

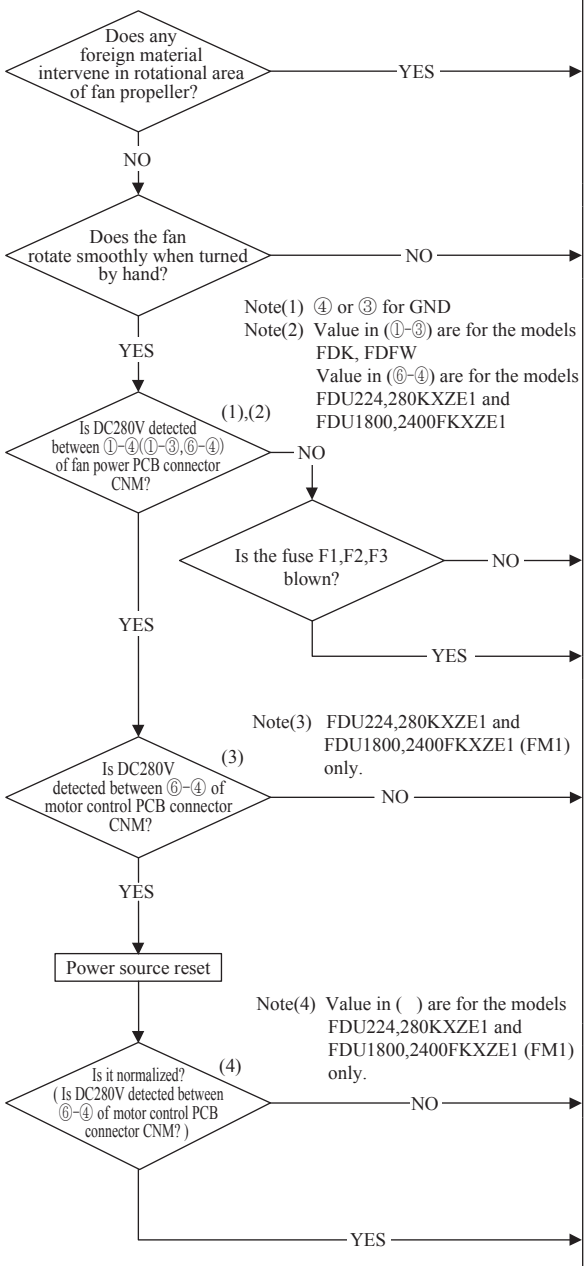
3.Condition of Error displayed

- When the actual fan rotation speed does not reach to the speed of [required speed -50 (FDU: -500) 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 power (control) PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on control PCB
- Blown fuse
- External noise, surge

5.Troubleshooting



Note:

Error code

Remote control: E21
7-segment display: –

LED	Green	Red
Indoor	Keeps flashing	1-time flash
Outdoor	Keeps flashing	Stays OFF

Content

Defective panel switch operation (FDT)

1. Applicable model

FDT series only

2. Error detection method

Panel switch (PS) has detected Open for more than 1 second.

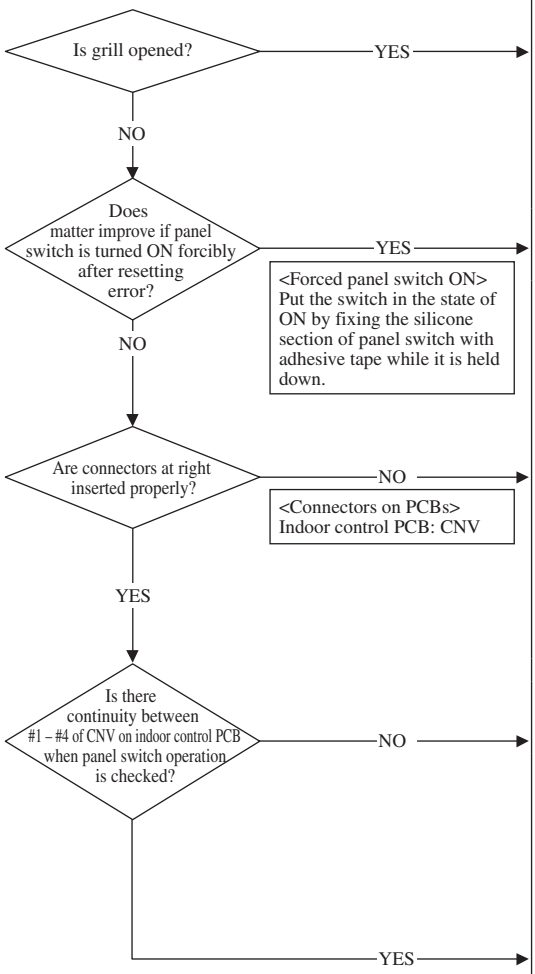
3. Condition of Error displayed

Same as above

4. Presumable cause

- Defective panel switch
- Disconnection of wiring
- Defective indoor control PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E28 7-segment display: –	Indoor	Keeps flashing	Stays OFF	Remote control temperature thermistor anomaly (Thc)
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of Thc.

3. Condition of error displayed

- If -50ºC or lower is detected for 5 seconds continuously, compressor stops. After 3-minutes delay, the compressor is restarted automatically, but if this anomaly occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Anomalous connection of remote control temperature thermistor
- Remote control temperature thermistor anomaly
- Remote control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Is the connector of thermistor connected properly ? — NO	Insert the connector securely.
YES → Regarding the characteristics of the thermistor, see the following table.	
Are the characteristics of thermistor OK? Is the thermistor wire OK *1 — NO	Replace thermistor (Thc).
YES	Replace indoor control PCB.

*1 Check several times to prove any poor connection.

Temperature-resistance characteristics of remote control temperature thermistor (Thc).

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
0	65	14	33	30	16	46	8.5
1	62	16	30	32	15	48	7.8
2	59	18	27	34	14	50	7.3
4	53	20	25	36	13	52	6.7
6	48	22	23	38	12	54	6.3
8	44	24	21	40	11	56	5.8
10	40	26	19	42	9.9	58	5.4
12	36	28	18	44	9.2	60	5.0

Note: After 10 seconds has elapsed since remote control temperature thermistor was switched from invalid to valid, E28 will not be displayed even if the thermistor harness is disconnected or broken. However, in such case, the indoor return air temperature thermistor (Thi-A) will be valid instantly instead of the remote control temperature thermistor (Thc).
Please note that even though the remote control temperature thermistor (Thc) is valid, the displayed return air temperature on the remote control LCD shows the value detected by the indoor return air temperature thermistor (Thi-A), not by the remote control temperature thermistor (Thc).

Error code	LED	Green	Red	Content
Remote control: E31 7-segment display: E31	Indoor	Keeps flashing	Stays OFF	Duplicated outdoor unit address No.
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When the microcomputer of outdoor control PCB recognizes the duplicated address No. by scanning all addresses of outdoor units in the same Superlink system.

3. Condition of error displayed

When duplicated outdoor unit address No. exists in the same Superlink system.

4. Presumable cause

- Mistake in the address setting of outdoor units
- More than 129 indoor units connected
  [Maximum number can be set by address switch is 128 units]
- No setting of Master/Slave setting switch for combination use

5. Troubleshooting

Diagnosis	Countermeasure
	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation. Check the current address Nos. of outdoor units.
Save data for 30 minutes before stopping in Mente PC.	
Reset the power source and restart operation.	
Caution: Unless the power is reset after changing address, the set address will not be confirmed.	
Does E31 recur? — NO	Test run *No action is taken because it is judged that the power reset is not done after changing address.
YES	
Check outdoor address Nos. in the same Superlink system.	
Does the same address No. exist? — YES	Correct address.
NO	Replace outdoor control PCB. * * Before replacement, please confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)

Note: After taken above measure, reset the power and confirm no error is displayed occurs.
Unless the power is reset after changing address, the set address will not be confirmed.
In case of combination use, set the same address to both master and slave units. Distinction of master or slave unit is done by setting SW4-7 and 4-8. (Refer the instruction manual and technical manual for details)

Error code	LED	Green	Red	Content
Remote control: E32 7-segment display: E32	Indoor	Keeps flashing	Stays OFF	Open L3 Phase on power source at primary side
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

By Checking the power source voltage at primary side of the outdoor control PCB.
(Check only L3 phase)

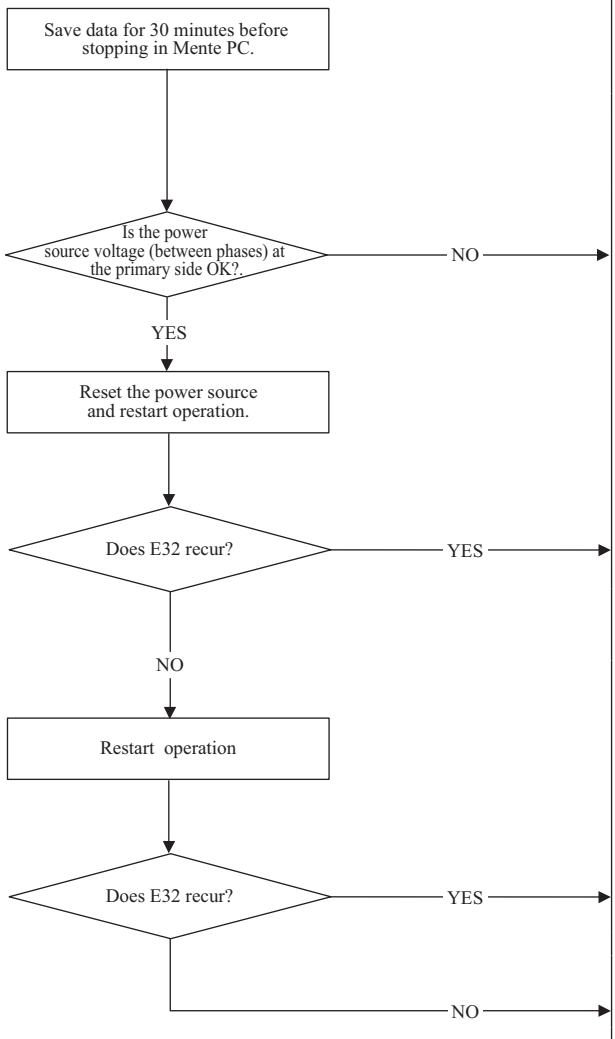
3. Condition of error displayed

When the power source voltage between L1-N or L2-N becomes 0V and/or the current of L3 decrease to 0A.

4. Presumable cause

- Anomalous power source at primary side
- Outdoor control PCB anomaly.

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E36 7-segment display: E36	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature error (Tho-D)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When anomalously high temperature is detected by the discharge pipe temperature thermistor (Tho-D).

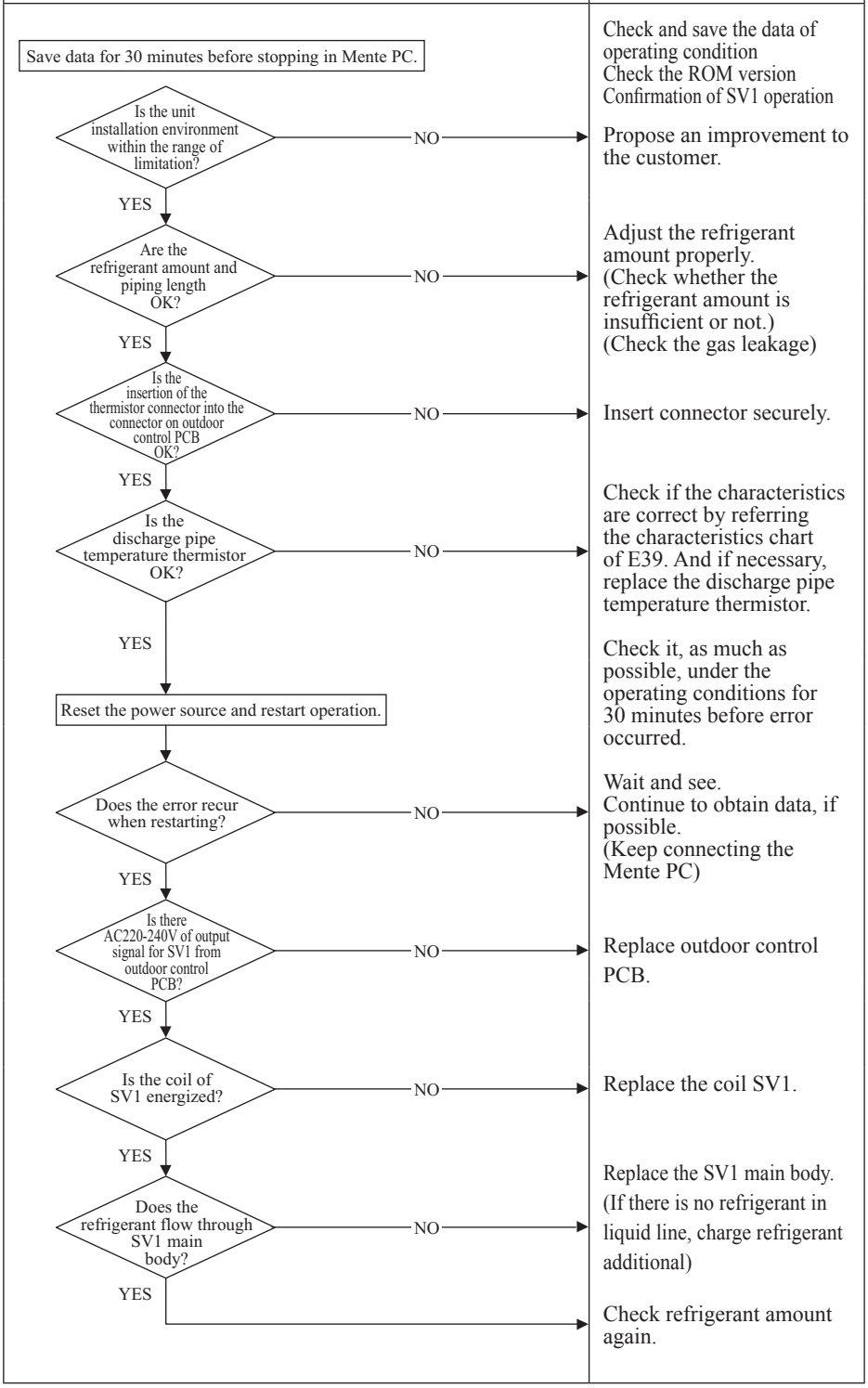
3. Condition of error displayed

When 130°C or higher is detected by the discharge temperature thermistor, the compressor stops. After 3 minutes delay, the compressor starts again. automatically, but if this anomaly occurs 2 times within 60 minutes after the initial detection, or 130°C or higher is detected continuously for 60 minutes.

4. Presumable cause

- Discharge pipe temperature anomaly
- SV1 (liquid refrigerant by-pass valve) anomaly
  - Breakage of coil
  - Faulty main body.
- Outdoor control PCB anomaly
- Insufficient amount of refrigerant
- Insufficient airflow volume
- Short-circuit of airflow

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E37 7-segment display: E37	Indoor	Keeps flashing	Stays OFF	Outdoor heat exchanger temperature thermistor (Tho-R) and subcooling coil temperature thermistor (Tho-SC,-H) anomaly
	Outdoor	Keeps flashing	*1	

*1 1-time flash : Tho-R, 5-time flash : Tho-SC, 6-time flash : Tho-H

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-R or Tho-SC or Tho-H.

3. Condition of error displayed

- If -50°C or lower is detected for 5 seconds continuously within 2-minutes to 2-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection.
- If -50°C or lower is detected for 5 seconds continuously within 20 seconds after power ON.

4. Presumable cause

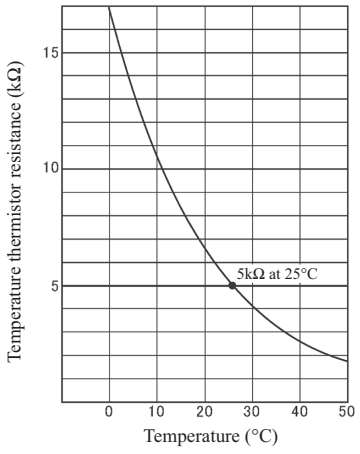
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector).
- Outdoor control PCB anomaly.

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.
Is the connector of thermistor connected properly? — NO	Insert the connector securely.
YES → Are the characteristics of thermistor OK?*2 — NO	Replace thermistor. (Tho-SC, Tho-H, Tho-R)
YES	Replace outdoor control PCB.

*2
Check several times to prove any poor connection

Outdoor heat exchanger temperature thermistor (Tho-R)
Subcooling coil thermistor (Tho-SC, Tho-H)
Temperature-resistance characteristics



Note:

Error code

Remote control: E38
7-segment display: E38

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	1-time flash

Content

Outdoor air temperature thermistor anomaly (Tho-A)

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-A

3. Condition of error displayed

- If -30°C or lower is detected for 5 seconds continuously within 2-minutes to 2-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection.
- If -30°C or lower is detected for 5 seconds continuously within 20 seconds after power ON.

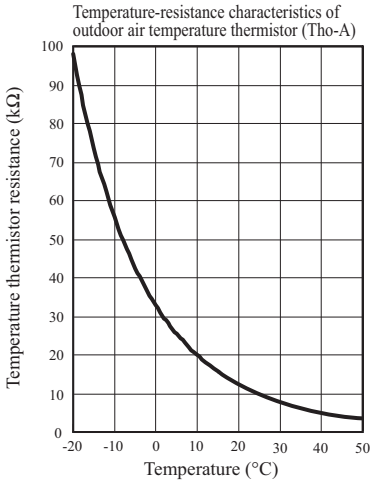
4. Presumable cause

- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector).
- Outdoor control PCB anomaly.

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.
Is the connector of thermistor connected properly? — NO	Insert the connector securely.
YES → Are the characteristics of thermistor OK?*1 — NO	Replace thermistor (Tho-A).
YES	Replace outdoor control PCB.

*1
Check several times to prove any poor connection



Note:

Error code	LED	Green	Red	Content
Remote control: E39 7-segment display: E39	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature thermistor anomaly (Tho-D)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-D.

3. Condition of error displayed

- If 3°C or lower is detected for 5 seconds continuously within 10-minutes to 10-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection.

4. Presumable cause

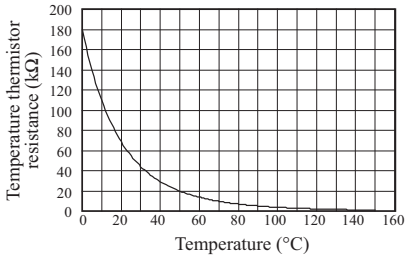
- Broken thermistor harness or the internal wire of sensing section. (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Outdoor control PCB anomaly.

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.
Is the connector of thermistor connected properly? → NO	Insert the connector securely.
YES → Are the characteristics of thermistor OK? *3 → NO	Replace thermistor (Tho-D).
YES	Replace outdoor control PCB.

*3
Check several times to prove any poor connection

Temperature-resistance characteristics of discharge pipe temperature thermistor (Tho-D)



Note:

Error code	LED	Green	Red	Content
Remote control: E40 7-segment display: E40	Indoor	Keeps flashing	Stays OFF	High pressure anomaly (63H1 activated)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When high pressure switch 63H1 is activated.

3. Condition of error displayed

- If high pressure exceeds 4.15MPa
- If 63H1 is activated 5 times within 60 minutes
- If 63H1 is activated for 60 minutes continuously

4. Presumable cause

- Short-circuit of airflow at condenser side of heat exchanger/Disturbance of airflow/Clogging filter/Fan motor anomaly
- Disconnection of high pressure switch connector
- Breakage of high pressure switch harness
- Closed service valves
- High pressure sensor anomaly
- High pressure switch anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating condition. Check the sensed value of high pressure sensor when the 63H1 is activated. Check whether the high pressure switch is activated at the sensed value of high pressure sensor.
Was 63H1 activated at 4.15MPa or higher? NO → Does the sensed value of the high pressure sensor show 4.15MPa? (Normal?) NO →	High pressure sensor anomaly is suspicious. Check high pressure sensor itself according to the troubleshooting procedure of E54, after restarting operation. (If the high pressure sensor [PSH] fails, replace it)
YES → Are the 63H1 OK? Are the connector and/or harness OK? NO →	If the connector is disconnected or the harness is broken, correct it. Also check whether the high pressure switch is properly mounted or not. Check the open N phase on power source
YES → Are the service valves fully open? NO →	Open operation valve.
YES → Connect a pressure gauge and restart operation.	Check it, as much as possible, under the operating conditions for 30 minutes before error occurred.
Is it stop at 4.15MPa of gauge pressure ? NO →	Replace outdoor control PCB.
YES → Is there any clogging in the refrigerant circuit ? YES →	Remove clogs.
NO →	Check items (condenser side): • Filter clogging • Airflow volume (Fan motor) • Short-circuit of airflow

Note: If the error does not recur, connect the Mente PC and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E41(E51) 7-segment display: E41(E51)-1, 2*1	Indoor	Keeps flashing	Stays OFF	Power transistor overheat
	Outdoor	Keeps flashing	∗2	

*1 E41-1 (E51-1) : CM1, E41-2 (E51-2) : CM2 *2 E41-1 (E51-1) : 1-time flash, E41-2 (E51-2) : 2-time flash

1.Applicable model

Outdoor unit

2.Error detection method

E41 is displayed on 7-segment LED.

3. Condition of error displayed

Anomalously high temperature of power transistor is detected 5 times within 60 minutes (E41). Or it is detected for 15 minutes continuously (E51).

4.Presumable cause

- Power transistor anomaly
- Power transistor temperature thermistor anomaly
- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Anomalous cooling fan motor for inverter

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check, record operating condition. Check power transistor temperature. Check operations of outdoor fan, inverter cooling fan.
Have outdoor fans been running? — NO	Repair according to the troubleshooting E48.
YES → Reset the power source, and restart.	
Does it repeat after restarting operation? — NO	Wait and see. (Continue, if possible, and record data.)
YES	
Is 15V detected on inverter PCB? (∗1) — NO	Measure after confirming that 52X1 is turned ON. Replace inverter PCB.
YES → After power OFF	
Is power transformer attached properly? Check tightness of screw, heat radiation silicon. — NO	Coat power transistor with silicon sufficiently, and fix on radiator fin securely.
YES	Replace power transistor.

Note: *1 Measuring position: Between + and – of C19
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E42 7-segment display: E42	Indoor	Keeps flashing	Stays OFF	Current cut (CM1)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When anomalously high output current of inverter is detected by the current sensor mounted in the power transistor.

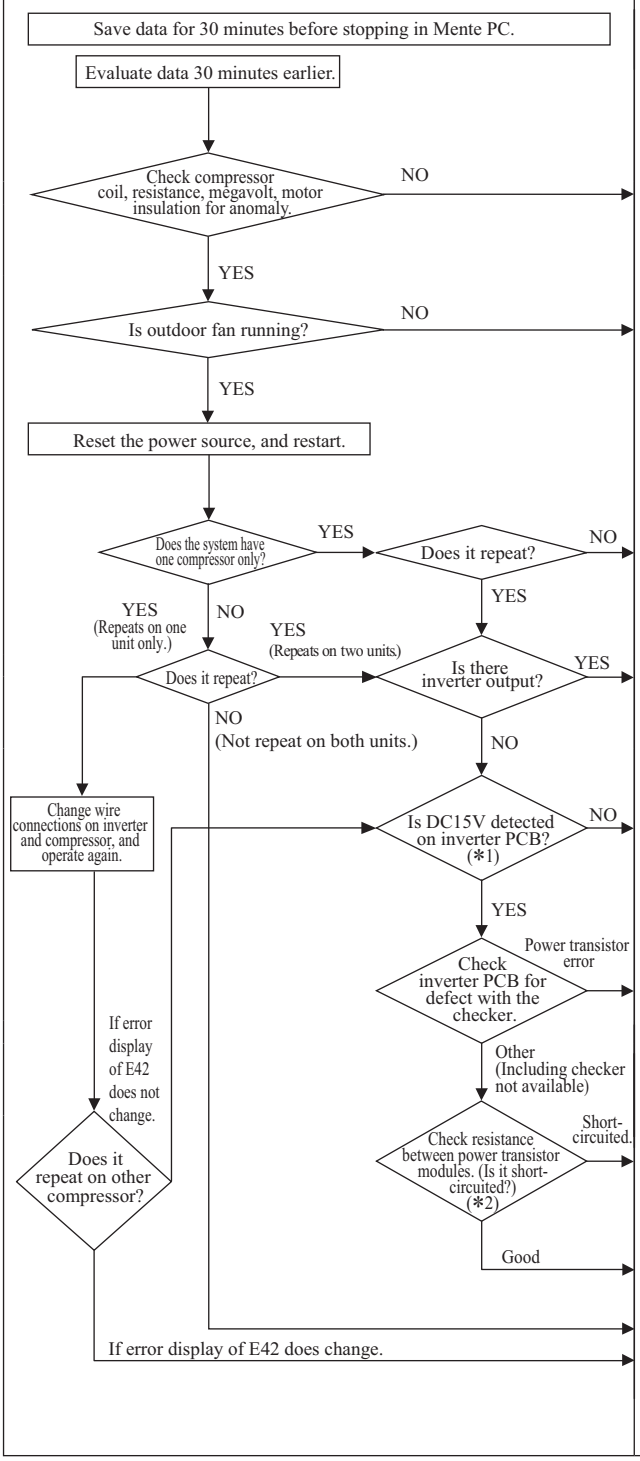
3. Condition of error displayed

When 88A or higher output current of inverter is detected 4 times within 15 minutes.

4. Presumable cause

- Compressor anomaly
- Leakage of refrigerant
- Power transistor module anomaly
- Anomalous power source for inverter PCB
- Outdoor fan motor anomaly

5. Troubleshooting



Note: *1 Measurement position: Between + and - of C19
*2 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (Disconnect compressor wires before measurement.).
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E43 7-segment display: E43	Indoor	Keeps flashing	Stays OFF	Excessive number of indoor units connected, excessive total capacity of connection
	Outdoor	Keeps flashing	*1	

*1 1-time flash: Excessive number of indoor units connected, 2-time flash:Excessive capacity of connection

1.Applicable model

Outdoor unit

2.Error detection method

When the number of connected indoor units exceeds the limitation.
When the total capacity of connected indoor units exceeds the limitation.

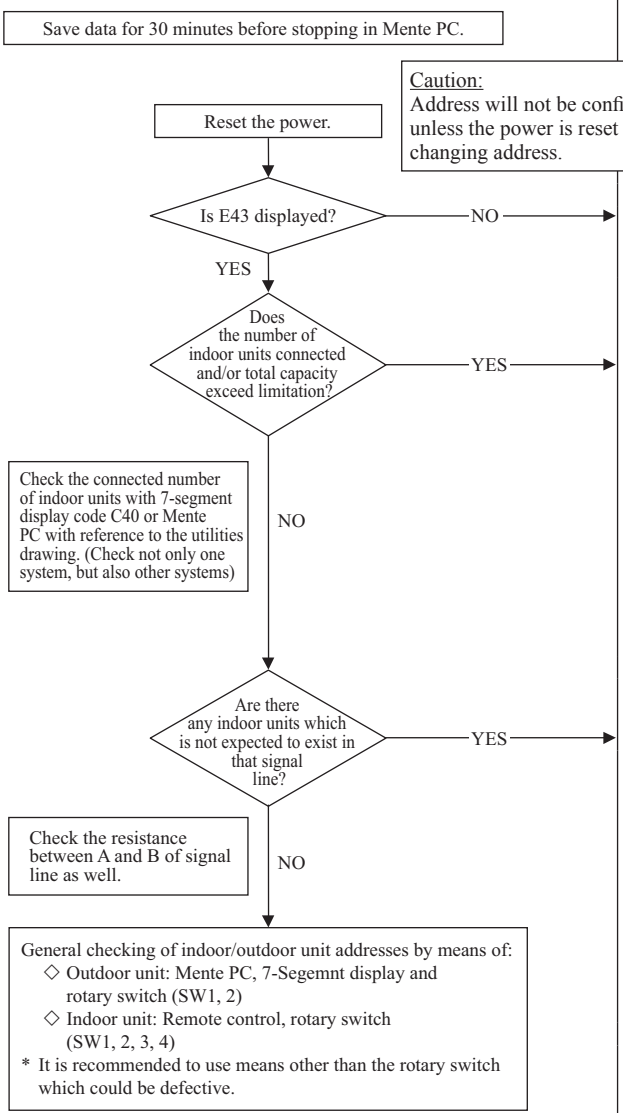
3. Condition of error displayed

- Excessive number of connected indoor units
- Excessive total capacity of connected indoor units
- The total capacity of connected indoor units exceeds the limitation

4.Presumable cause

- Mistake in setting of indoor/ outdoor unit addresses
- Mistake in signal wire connection

5.Troubleshooting



Note: After completing the above procedure, reset the power and confirm that the error display does not recur. Unless the power is reset for both indoor unit and outdoor unit, the set addresses will not be confirmed.

Error code	LED	Green	Red	Content
Remote control: E44 7-segment display: E44	Indoor	Keeps flashing	Stays OFF	Liquid flooding anomaly (CM1)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor units

2. Error detection method

When 5ºC or lower of the under-dome temperature superheat is detected for 15 minutes continuously or for 30 minutes continuously.

3. Condition of error displayed

When above anomaly is detected 3 times within 90 minutes.

4. Presumable cause

- Unmatching of refrigerant piping and/or signal wiring
- Overcharging of refrigerant
- Anomalous control of superheat
- Anomalous circuit of liquid refrigerant by-pass
- Anomalous refrigerant circuit of subcooling coil
- Under-dome temperature (Tho-D) anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating condition. Check the ROM version. Confirmation of SV1 operation.
Are there any wrong connection of refrigerant piping and/or signal wiring ? · Check the numbers of connected indoor units recognized by outdoor unit in comparison with those numbers in utility drawing. — YES	Correct the connection of refrigerant piping and/or signal wiring properly.
NO → Are there any excessive refrigerant charged at site? · Check the calculation result of additional refrigerant charging amount and the record of additional refrigerant charged amount. — YES	Adjust refrigerant amount properly.
NO → Are there any leakage of refrigerant through valve sheet of SV1? · Check the temperature difference between before and after SV1. — YES	Replace SV1. Replace the coil of SV1.
NO → Are there any fault in subcooling coil circuit ? · Check whether the EEVSC is kept open (at cooling mode) · Check whether the thermistor of Tho-H is inserted in the thermistor holder properly. · Check whether the characteristics of Tho-H and PSL is OK. — YES	• Replace EEVSC. • Check the coil of EEVSC → Replace the coil of EEVSC • Replace Tho-H. • Replace PSL.
NO → Is the superheat control of indoor unit OK at cooling mode? · Check whether the indoor EEV is kept open or not. · Check whether ThI-R1, R2, R3 are installed at proper position or the characteristics of them are OK. · Check whether the air filter is clogged. · Check whether the indoor fan rotates. — NO	• Replace indoor EEV. • Check the coil of EEV → Replace the coil of EEV. • Check the installed position of ThI-R1, R2, R3 → Replace ThI-R, if necessary. • Check the air filter. • Check the connection of indoor fan motor connector. Replace indoor fan motor * By checking ThI-R1, R2, R3 from indoor unit operation data of Mente PC, specify the indoor unit which tends to be liquid flooding (ThI-R3≒ThI-R2 shows the probability of liquid flooding)
YES → Is the superheat control of outdoor unit OK at heating mode? · Check whether EEVH is kept open or not. · Check whether Tho-R are installed at proper position or the characteristics of them is OK. · Check whether the characteristics of PSL are OK. · Check whether the fin of outdoor heat exchanger is clogged with snow, ice or dust. · Check whether the outdoor fan rotates. — NO	• Replace EEVH. • Check the coil of EEVH → Replace the coil of EEVH. • Check the installed position of Tho-R → Replace Tho-R, if necessary. • Clean the fin of outdoor heat exchanger. • Check the connection of outdoor fan motor connector Replace outdoor fan motor.
YES → Is the characteristics of Tho-C OK ? — NO	• Replace Tho-C.
YES	Correct the data with Mente PC and ask our consultation.

Note: If the error does not recur, connect the Mente PC and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E45 7-segment display: E45	Indoor	Keeps flashing	Stays OFF	Communication error between inverter PCB and outdoor control PCB
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

E45 is displayed on 7-segment LED.

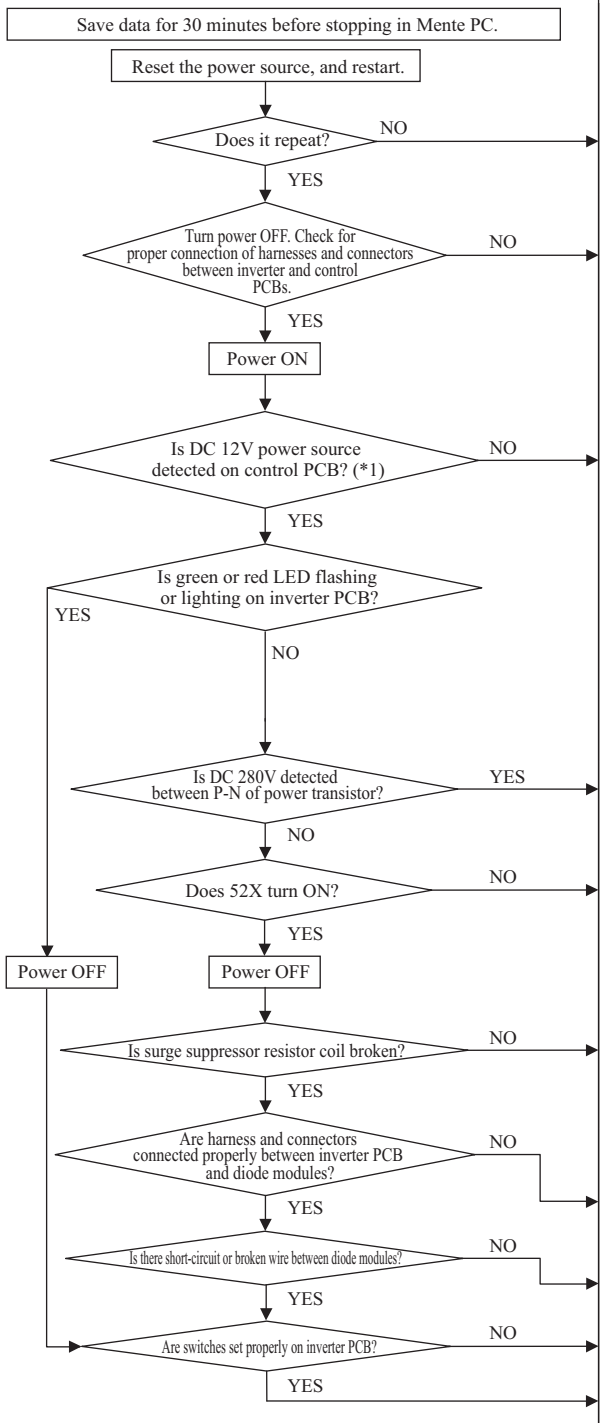
3. Condition of error displayed

When the communication between inverter PCB and outdoor control PCB is not established.

4. Presumable cause

- Signal wire anomaly
- Outdoor control PCB anomaly
- Inverter PCB anomaly
- Rush current prevention resistor anomaly
- Defective 52X
- Defective diode module

5. Troubleshooting



Note: *1 Measurement position: Between + and - of C21
*2 Measurement position: Between pins ① - ③ of CNM1, CNM2 (CNM2 for systems having 2 units of compressor only)
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E46 7-segment display: E46	Indoor	Keeps flashing	Stays OFF	Mixed address setting methods coexistent in same network
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

Outdoor unit

2. Error detection method

If the signal line of a outdoor unit system applied automatic address setting is connected to other outdoor unit system.
(Detected at indoor unit side)

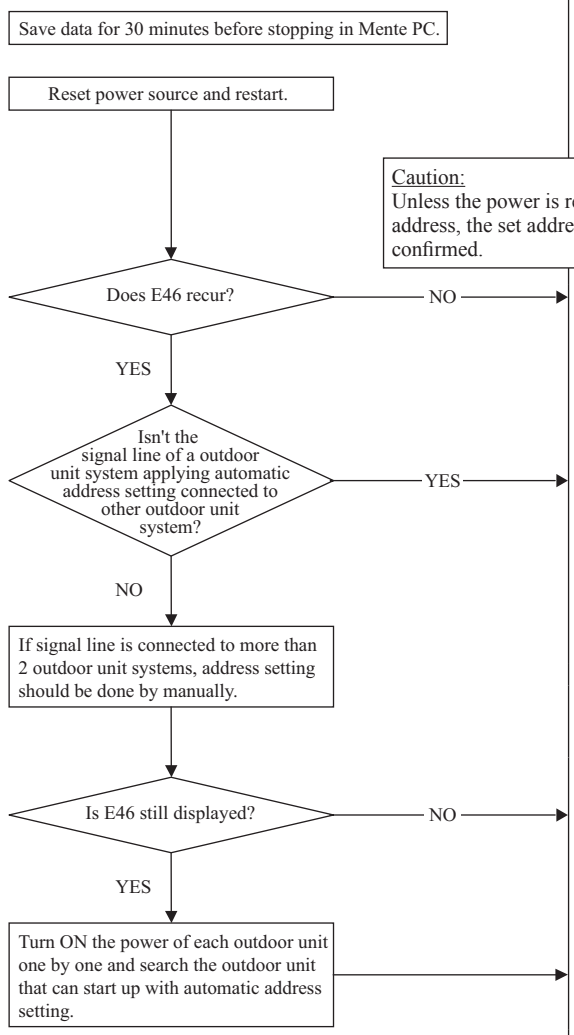
3. Condition of error displayed

Same as above.

4. Presumable cause

- Mistake in the address setting
- Mistake in the connection of signal wire

5. Troubleshooting



<Reference>
Error display at mixed address setting

	Auto	Manual
Auto address setting	E31	E46
Manual address setting	E46	Normal

Note: After completing the above procedure, reset the power and confirm that the error display does not recur. Unless the power is reset for both indoor unit and outdoor unit, the set addresses will not be confirmed.

Error code	LED	Green	Red	Content
Remote control: E48 7-segment display: E48	Indoor	Keeps flashing	Stays OFF	Outdoor DC fan motor anomaly(1/2)
	Outdoor	Keeps flashing	*1	

*1 1-time flash : FMo1, 2-time flash : FMo2

1. Applicable model

Outdoor unit

2. Error detection method

- If 400 min^{-1} or lower of the fan rotation command and the state of overcurent are detected for 10 times continuously.
(CNFAN terminal:
Between 5-2 pins ⋯
Hi output ⇒ Overcurrent
Lo output ⇒ Normal)
- If 100 min^{-1} of the actual fan rotation speed is detected for 30 seconds.

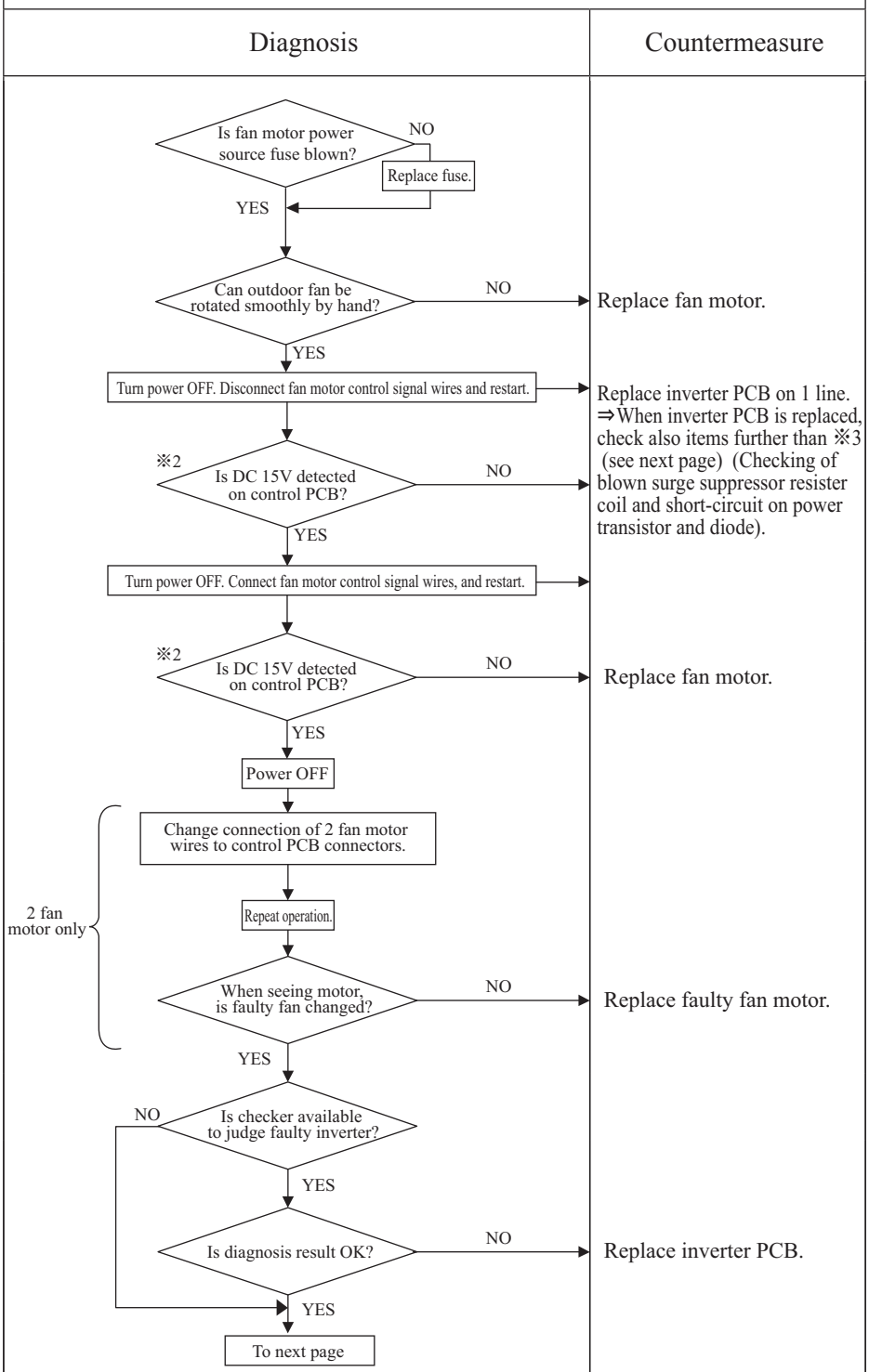
3. Condition of error displayed

Speed of 400 min^{-1} or less is commanded, and state of overcurrent is communicated.

4. Presumable cause

- Broken or disconnected wire
- Faulty fan motor
- Defective inverter PCB
- Defective control PCB
- Defective power transistor
- Defective diode module
- Defective surge suppressor resistor

5. Troubleshooting



Note: ※2 Measurement position: Between pins 2-3 of IC3 on control PCB
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E48 7-segment display: E48	Indoor	Keeps flashing	Stays OFF	Outdoor DC fan motor anomaly(2/2)
	Outdoor	Keeps flashing	*1	

*1 1-time flash : FMo1, 2-time flash : FMo2

1. Applicable model

Outdoor unit

2. Error detection method

- If 400 min^{-1} or lower of the fan rotation command and the state of overcurent are detected for 10 times continuously.

(CNFAN terminal:
Between 5-2 pins ⋯
Hi output ⇒ Overcurrent
Lo output ⇒ Normal)

- If 100 min^{-1} of the actual fan rotation speed is detected for 30 seconds.

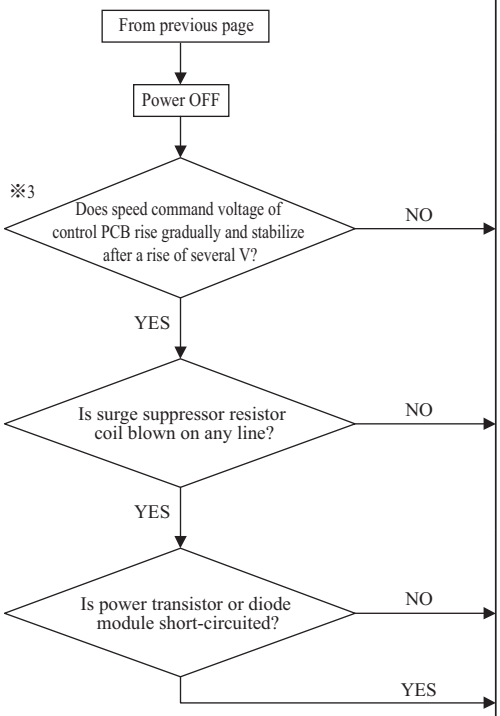
3. Condition of error displayed

Speed of 400 min^{-1} or less is commanded, and state of overcurrent is communicated.

4. Presumable cause

- Broken or disconnected wire
- Faulty fan motor
- Defective inverter PCB
- Defective control PCB
- Defective power transistor
- Defective diode module
- Defective surge suppressor resistor

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E49 7-segment display: E49	Indoor	Keeps flashing	Stays OFF	Low pressure anomaly
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low pressure.

3. Condition of error displayed

- At start up after power on:
  When the low pressure sensor detects lower than 0.003MPa for 60 seconds continuously.
  And if this anomaly occurs 2 times.
- During operation:
  When the low pressure sensor detects 0.134MPa or lower for 30 seconds continuously.
  And if this anomaly occurs 5 times within 60 minutes.

4. Presumable cause

- Low pressure sensor (PSL) anomaly
- Service valves closed
- EEV anomaly (EEV closed)
- Insufficient refrigerant amount
- Clogging at EEV or strainer

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions Check error status. Is the refrigerant amount OK? Check additional refrigerant amount charged at site according to the piping length instructed on the label pasted on the panel of the unit.
Reset power source and restart.	
Does the error occur immediately after the startup? YES	Check whether the service valves are open.
NO: Does the low pressure fluctuate after the startup? NO: Is the connection of sensor connector OK? NO	Correct the connection of low pressure sensor connector.
YES: Are the sensor characteristics OK?* NO	Replace low pressure sensor.
* The sensor characteristics is shown in page 111. YES	Replace outdoor control PCB.
Is the opening degree of EEV for evaporator side fluctuating? NO: Is the connection of thermistor connector for heat exchanger OK? NO	Correct the connection of temperature thermistor connector of heat exchanger.
YES: Is the checked result of harness and insulation of EEV coil OK? YES: Are the thermistor characteristics OK? NO	Replace temperature thermistor of heat exchanger at evaporator side.
YES	Replace control PCB at evaporator side.
NO	Replace EEV coil.
Does the EEV operate normally by judging from Mente PC data, etc? NO: Isn't EEV or strainer clogged? YES	Replace EEV main body or strainer.
YES / NO	Check for short circuit of airflow of heat exchanger at evaporator side and for fan motor anomaly.

Note: Check whether the indoor unit is connected to other outdoor Superlink network.
If the error does not recur, connect the Mente PC and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E53/E55*1 7-segment display: E53/E55	Indoor	Keeps flashing	Stays OFF	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C)
	Outdoor	Keeps flashing	1-time flash	

*1 E53 : Tho-S, E55 : Tho-C

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-S or Tho-C

3. Condition of error displayed

- If -50°C or lower is detected for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after compressor ON, compressor stops. When the compressor is restarted automatically after 3-minutes delay, if this anomaly occurs 3 times within 40 minutes.

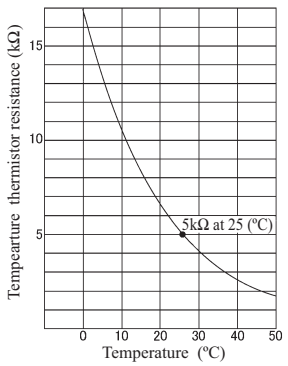
4. Presumable cause

- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Outdoor control PCB anomaly

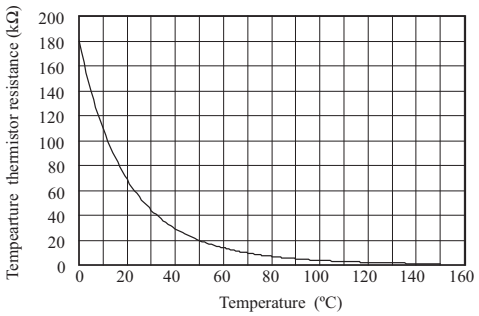
5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.
Is the connector of thermistor connected properly ? — NO	Insert the connector securely.
YES Regarding the characteristics of the thermistor, see the following chart.	
Are the characteristics of thermistor OK? ※1 — NO	Replace thermistor. (Tho-S or Tho-C)
YES	Replace outdoor control PCB.
※1 Check several times to prove any poor connection.	

Temperature-resistance characteristics of suction pipe temperature thermistor (Tho-S)



Temperature-resistance characteristics of under-dome temperature thermistor (Tho-C)



Note:

Error code	LED	Green	Red	Content
Remote control: E54 7-segment display: E54	Indoor	Keeps flashing	Stays OFF	High pressure sensor anomaly (PSH) Low pressure sensor anomaly (PSL)
	Outdoor	Keeps flashing	*1	

*1 1-time flash : PSL, 2-time flash : PSH

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalous pressure (voltage) of PSH or PSL.

[Operation range
High pressure : 0-4.15MPa
Low pressure : 0-1.7MPa]

3. Condition of error displayed

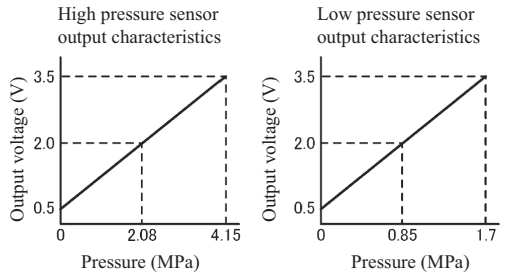
If anomalous sensor output voltage (0V or lower or 3.49V or higher) is detected for 5 seconds within 2 minutes to 2 minutes 20 seconds after the compressor ON.

4. Presumable cause

- Broken sensor harness
- Disconnection of sensor harness connection (connector)
- Sensor (PSH, PSL) anomaly
- Outdoor control PCB anomaly
- Anomalous installation conditions
- Insufficient airflow volume
- Excessive or insufficient refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value.
Check the data for 30 minutes before stopping.	
Is anomalous pressure detected? YES	
NO: Is the connector of the sensor inserted properly to the connector on the outdoor control PCB? NO	Insert the connector securely and restart operation.
YES: Reset the power and restart operation.	
Does E54 recur? NO	Temporary malfunction by noise. Correct if the source of noise is specified.
YES: Does the pressure converted from the sensor output voltage match the actual pressure measure by pressure gauge? NO	Replace sensor (PSH, PSL)
YES	Replace outdoor control PCB.



Sensor output Black (GND) – White; Output voltage (Black – Red; DC5V)

Note:

Error code	LED	Green	Red	Content
Remote control: E58 7-segment display: E58	Indoor	Keeps flashing	Stays OFF	Anomalous compressor by loss of synchronism
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

E58 is displayed on 7-segment LED.

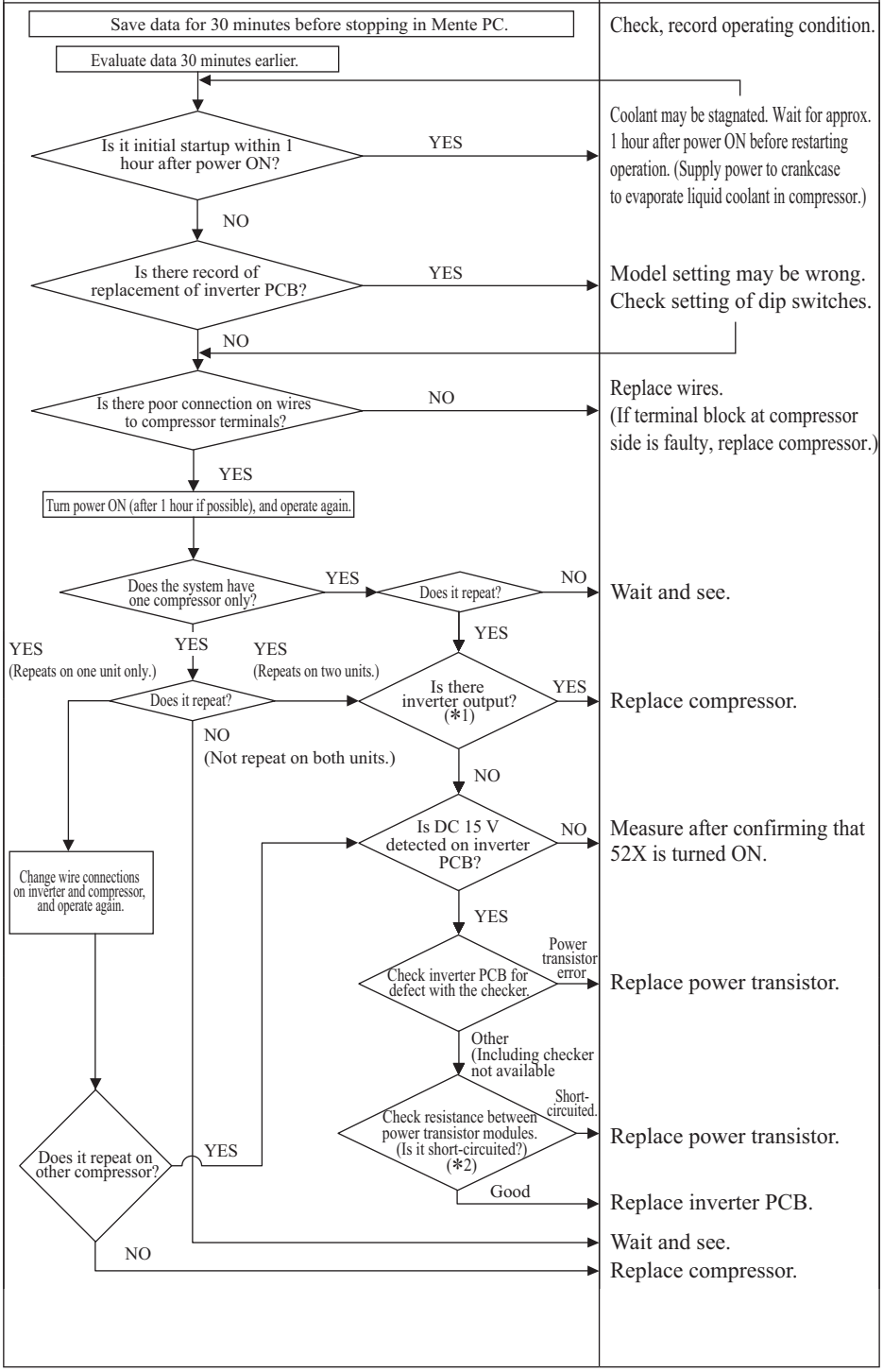
3. Condition of error displayed

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 wihtout crankcase heater ON)
- Compressor anomaly
- Inverter PCB anomaly
- Power transitor anomaly

5. Troubleshooting



Note: *1 Measurement position: Between + and - of C19
*2 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (Disconnect wires from compressor beforehand.)
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E59 7-segment display: E59	Indoor	Keeps flashing	Stays OFF	Compressor startup failure (CM1)
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor. (If the compressor speed cannot increase 11rps or higher)

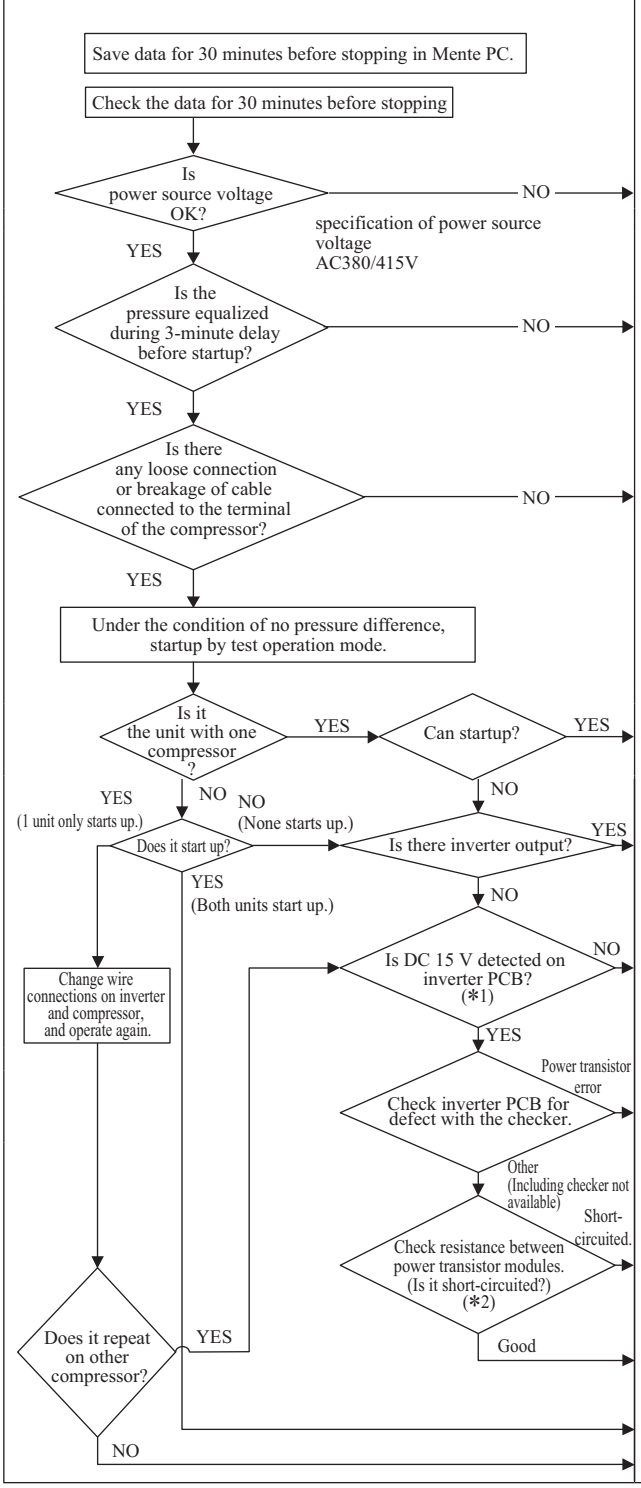
3. Condition of error displayed

If the compressor fails to startup for 20 times (10 patterns x 2 times) continuously.

4. Presumable cause

- Anomalous voltage of power source
- Anomalous components for refrigerant circuit
- Inverter PCB anomaly
- Loose connection of connector or cable
- Compressor anomaly (Motor or bearing)

5. Troubleshooting



Note: *1 Measurement position: Between + and - of C19
*2 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (Disconnect wires from compressor beforehand.)
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code	LED	Green	Red	Content
Remote control: E63 7-segment display: E63	Indoor	Keeps flashing	Stays OFF	Emergency stop
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Indoor unit

2. Error detection method

When ON signal is inputted to the CnT terminal of indoor unit control PCB.

3. Condition of error displayed

Same as above

4. Presumable cause

Factors for emergency stop

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation.
Is the remote control setting of Emergency Stop "Valid"? — NO	Replace remote control PCB.
YES → Is ON signal inputted to the CnT terminal of indoor unit control PCB? — NO	Replace indoor unit control PCB.
YES	Check the cause of emergency stop. (It is better to have the data for 30 minutes before stopping, when instructing the installer)

Note: Indoor unit detected emergency stop signal gives command "all stop"

2.4 Outdoor unit control PCB replacement procedure

PCB012D046B

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

⚠ CAUTION

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

Exchange the control PCB according to the following procedure.

1. Exchange the PCB **after elapsing 3 minutes from power OFF.**
2. (**Be sure to measure voltage (DC)** on Pin terminals 1-3 of CNA1 and **check that the voltage is discharged sufficiently.** (Refer to Fig.2))
3. Disconnect the connectors from the controlPCB.
4. Disconnect the blue wiring passing through CT1 on the PCB before exchanging the PCB.
5. Match the setting switches (SW1-5) and jumper wires (J11-16) with the former PCB.
6. Tighten up a screw after passing blue wiring through CT1 of the changed.
7. Connect the connectors to the control PCB. (Confirm the **connectors are not half inserted.**)

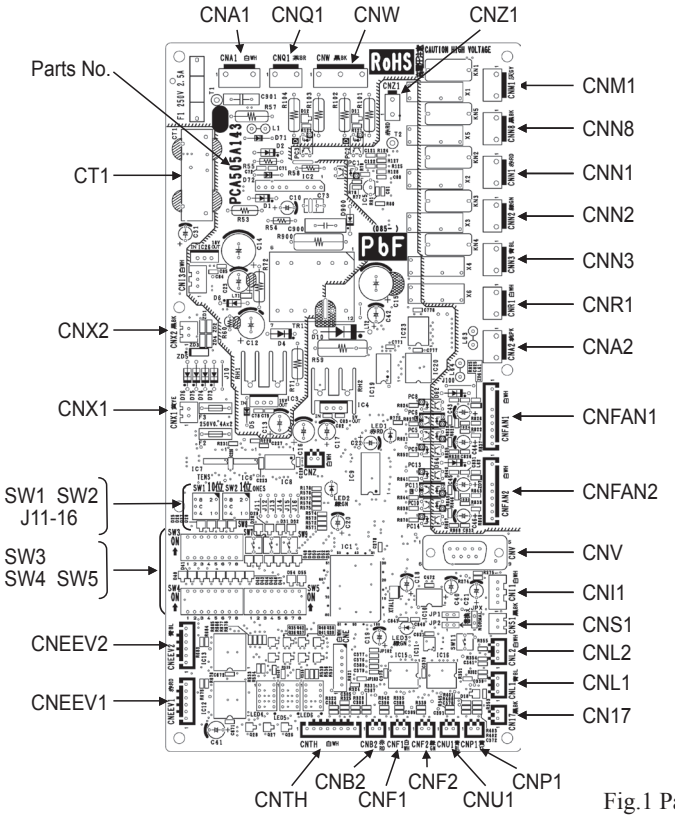


Fig.1 Part arrangement view

Connectors are not half inserted

After elapsing 3 minutes from power OFF

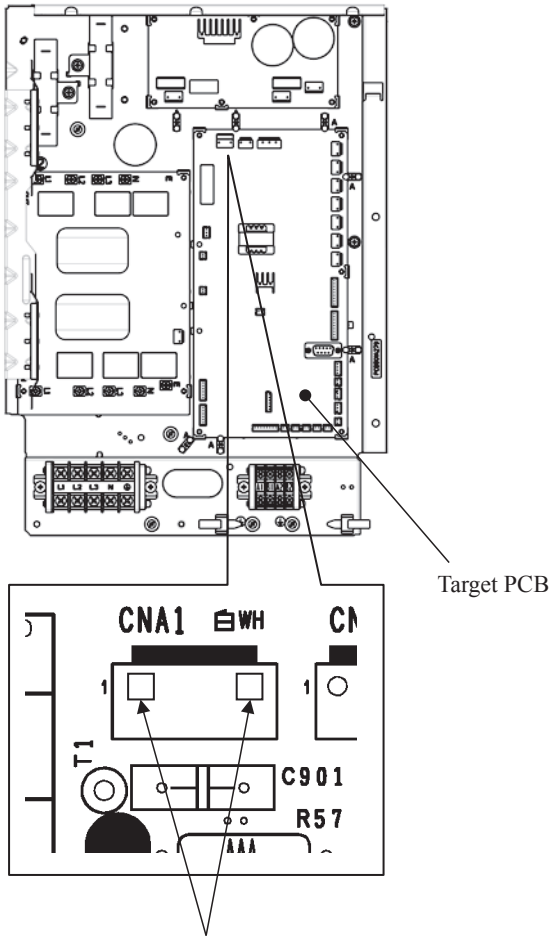


Fig.2 Voltage measurement point

2.5 Outdoor unit inverter PCB replacement procedure

PCB012D057A

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

⚠ CAUTION

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

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

1. Exchange 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 appointedscrews (4 places) of a controller. (Refer to Fig.3)
4. Open main layer and **measure voltage (DC) of a place (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 controller 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.

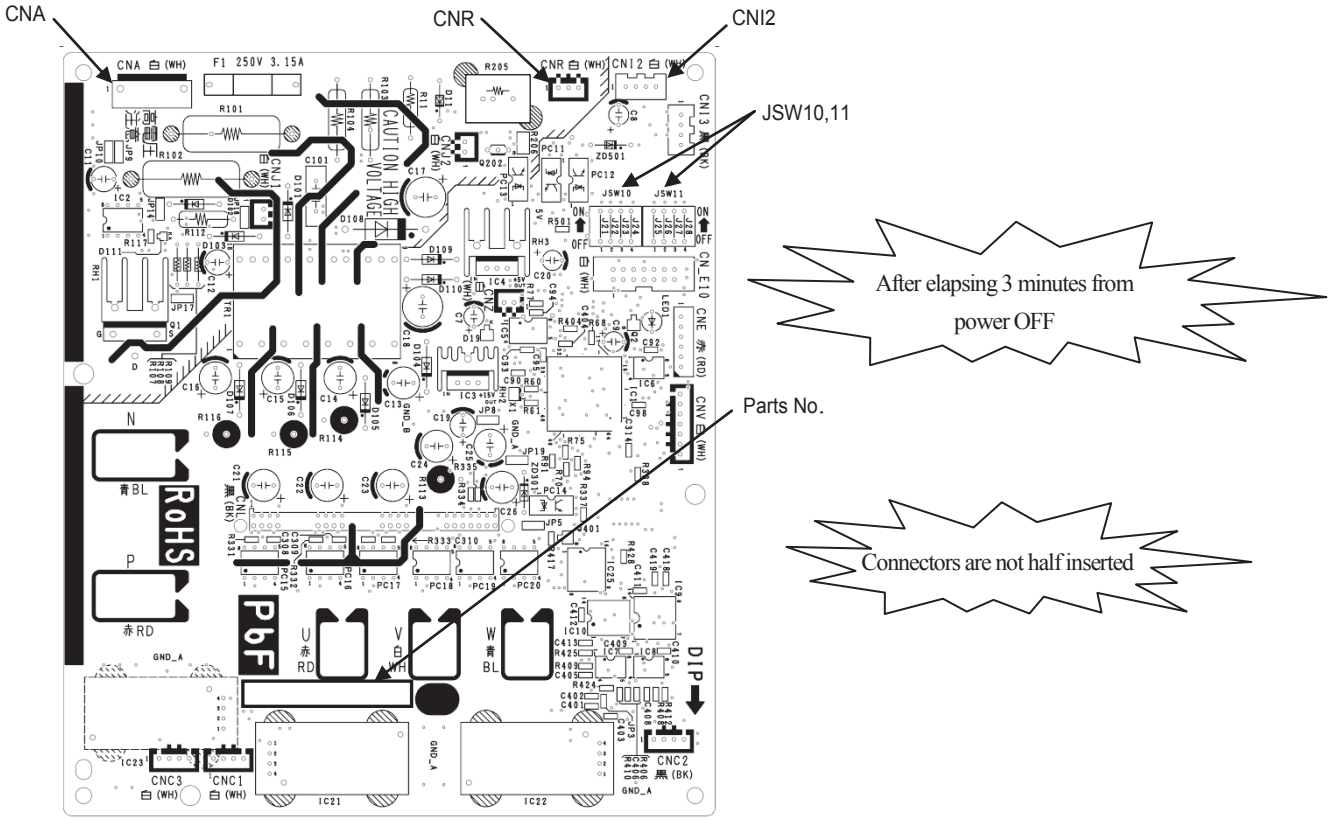
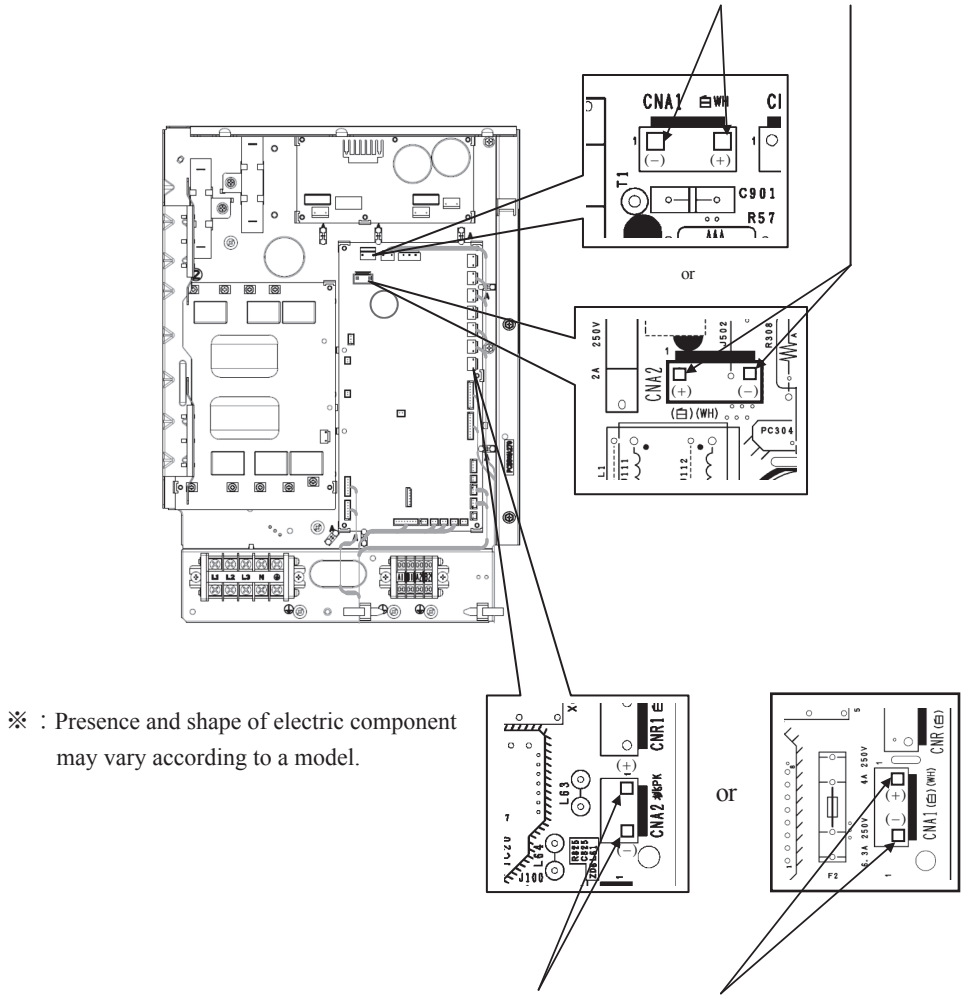


Fig.1 Parts arrangement view of inverter PCB

(A) Power source for control PCB : CNA1, 1 - 3pin or CNA2, 1 - 4pin



(B) Power source for fan motor (DC) : CNA2, 1- 3pin or CNA1, 1 - 4pin

Fig.2 Voltage measurement points

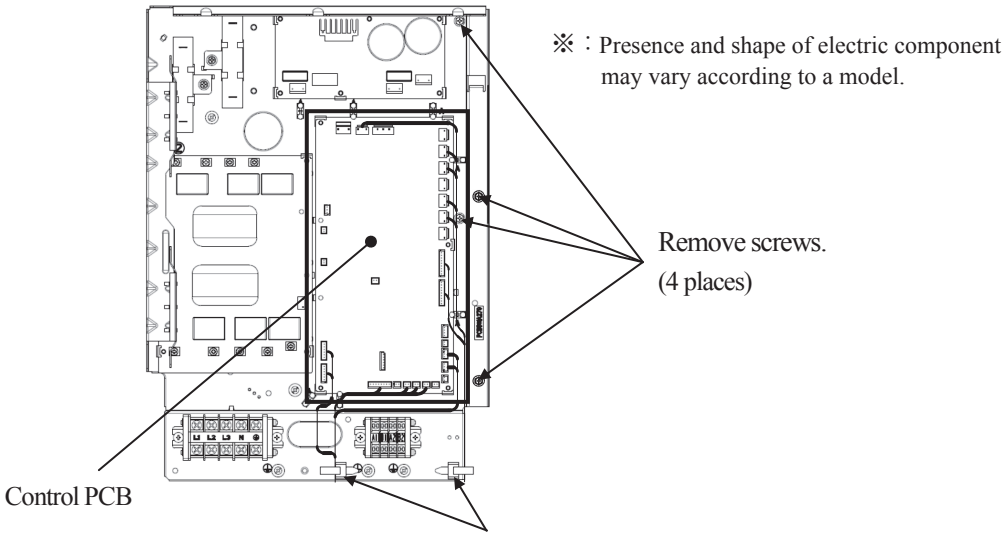


Fig. 3 Target places which are removed harnesses and screws

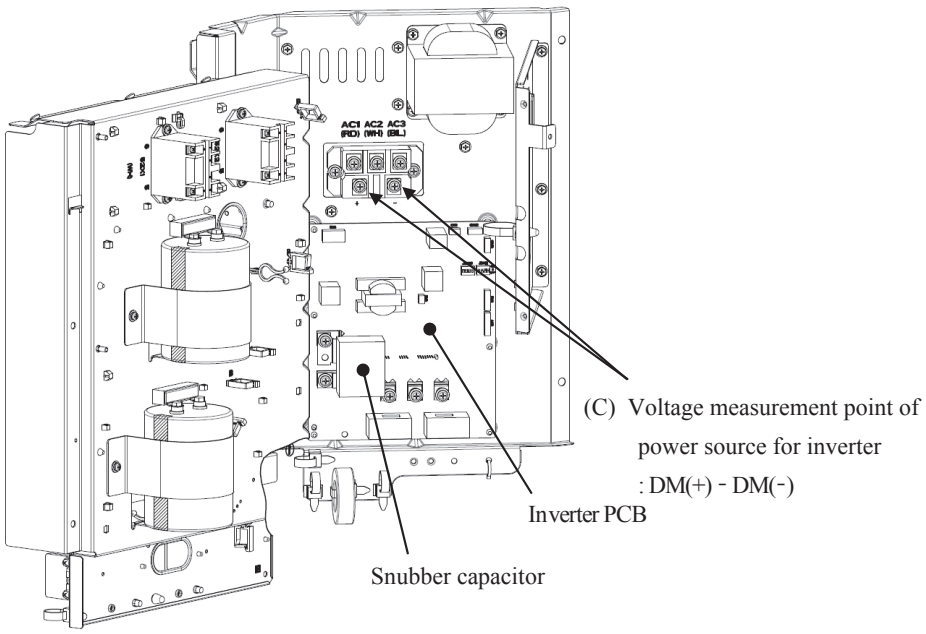
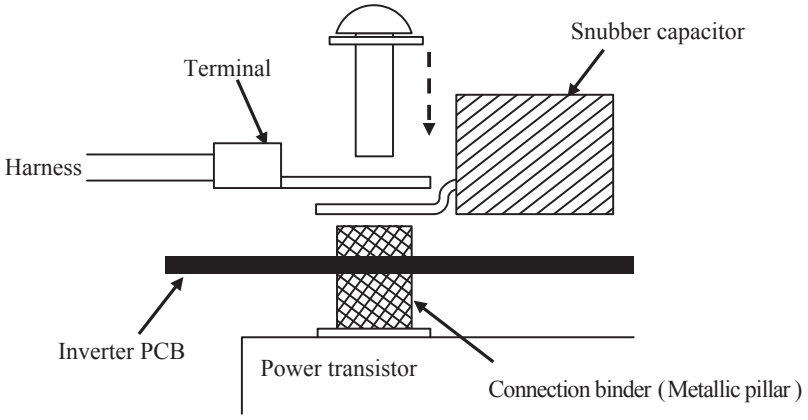


Fig. 4 Installationplace of inverter PCB



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

2.6 Outdoor unit converter PCB replacement procedure

PCB012D056A

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

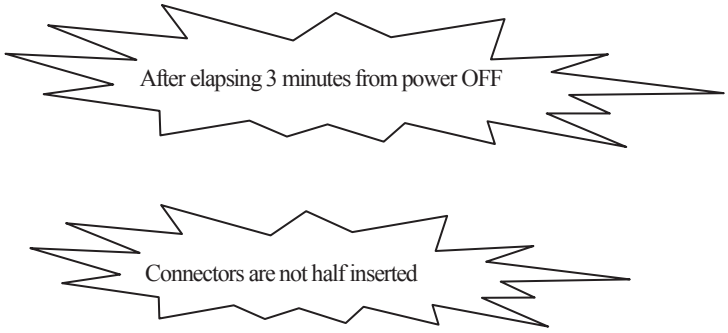
- Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the PCB. The PCB exchange under current-carrying will cause an electric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

⚠ CAUTION

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

Exchange the converter PCB according to the following procedure.

1. Exchange the PCB **afte r elapsing 3 minutes from power OFF**.
2. (**Be sure to measure voltage (DC)** on Pin terminals 1 -3 of CNA 3 and **check that the voltage is discharged sufficiently** .(Refer to Fig.2))
3. Disconnect the connectors from the converter PCB before exchanging the PCB.
4. Connect the connectors with the converter PCB.(Confirm the **connectors are not half inserted** .)



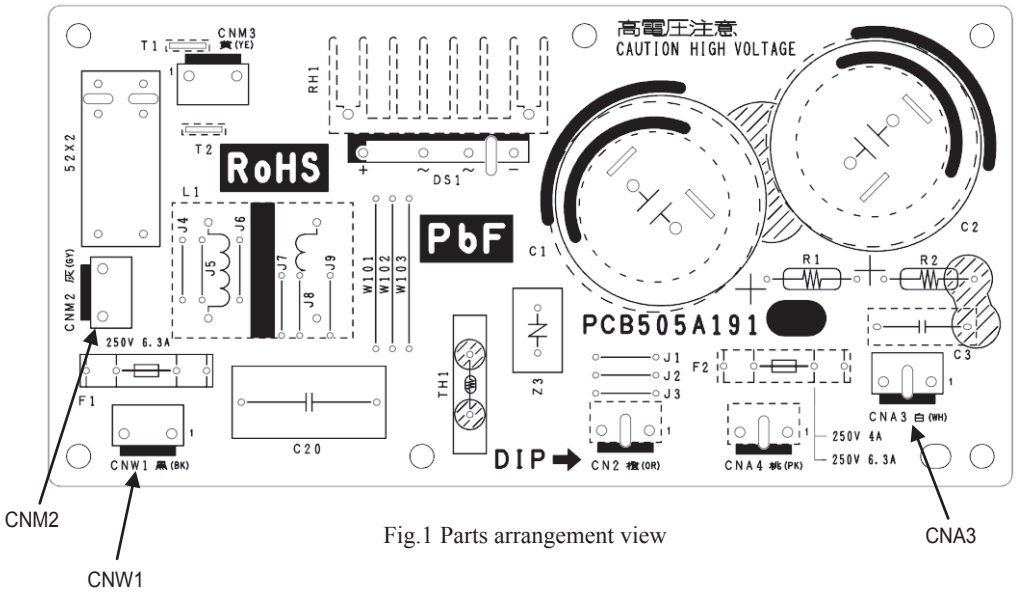


Fig.1 Parts arrangement view

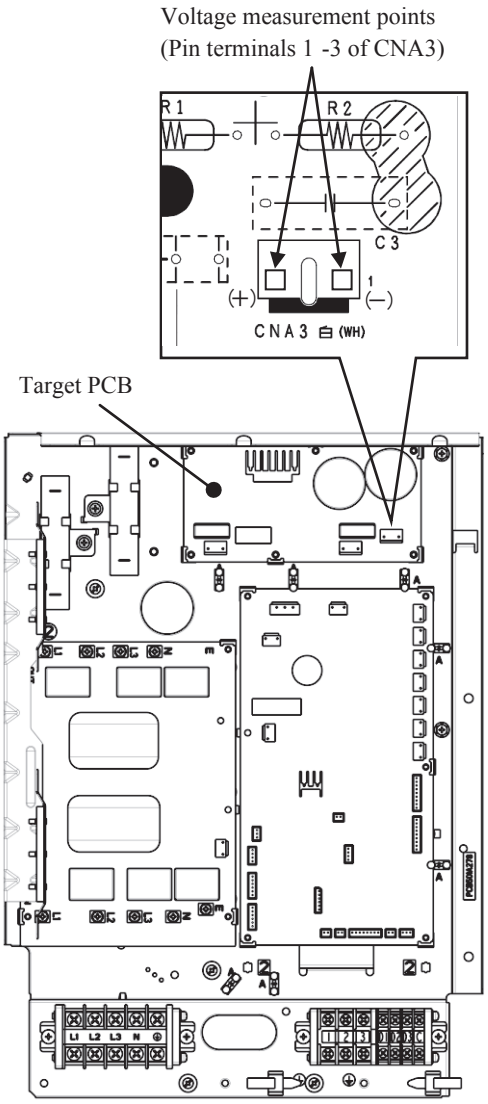


Fig.2 Voltage measurement points

2.7 Outdoor unit transistor module replacement procedure

PCB012D043C

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 exchange the transistor module according to this procedure.
  If the transistor module is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the transistor module. The transistor module exchange under current-carrying will cause an electric shock.
- After finishing the transistor module exchange, check that wiring is correctly connected with the transistor module before power distribution. If the transistor module is incorrectly exchanged, it will cause an electric shock or fire.

⚠ CAUTION

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

Exchange the transistor module according to the following procedure.

1. Exchange the transistor module **after elapsing 3 minutes from power OFF.**
   (Be sure to measure voltage (DC) on both capacitor terminals (P, N of transistor module or connector terminals of fan motor power etc.) , **and check that the voltage is discharged sufficiently.**)
2. Disassemble the control box.
3. Disconnect with the wire (U, V, W, P, N) to the transistor module. (Refer to Fig.1 Parts arrangement view)
4. Pull up the inverter PCB from transistor module. Remove transistor module after removing the screw for transistor module.
5. Attach the transistor module. Coat the transistor module where its reverse-side all over with accessories silicone grease uniformly.
6. Set the inverter PCB with make sure of connect connector.
7. Connect with the wire (U, V, W, P, N) to the transistor module.
8. Assemble the control box as before.

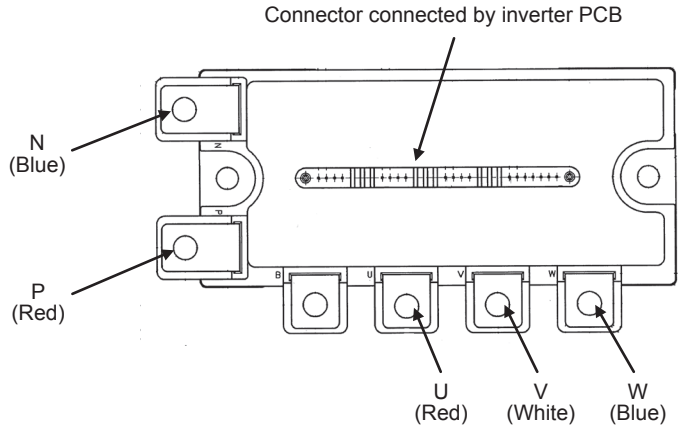


Fig.1 Parts arrangement view

2.8 Outdoor unit diode module replacement procedure

PCB012D009C

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 exchange the diode module according to this procedure.
  If the diode module is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the diode module. The diode module exchange under current-carrying will cause an electric shock.
- After finishing the diode module exchange, check that wiring is correctly connected with the diode module before power distribution. If the diode module is incorrectly exchanged, it will cause an electric shock or fire.

⚠ CAUTION

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

It is recommended to exchange the diode module according to the following procedure.

1. Start the replacing work **ten minutes after turninng off the power.** (Be sure to measure the voltage (DC) between **the electrolytic capacitor terminals (connector terminals of fan motor power etc.) to check that the electrolytic capacitor have been discharged completely.)**
2. Disassemble the control box.
3. Disconnect with the wire (AC1, AC2, AC3, +, -) to the diode module. (See Fig. 1)
4. Remove the diode module after removing the screw for diode module.
5. Attach the diode module after applying uniformly silicone grease to the back surface of the diode module.
   (Recommended diode module tightening torque: 2.4 ~ 2.8N・m)
6. Connect the wire to the diode module (AC1, AC2, AC3, +, -). (See Fig.1)
   (Recommended diode module tightening torque: 2.4 ~ 2.8N・m)
8. Assemble the control box as before.

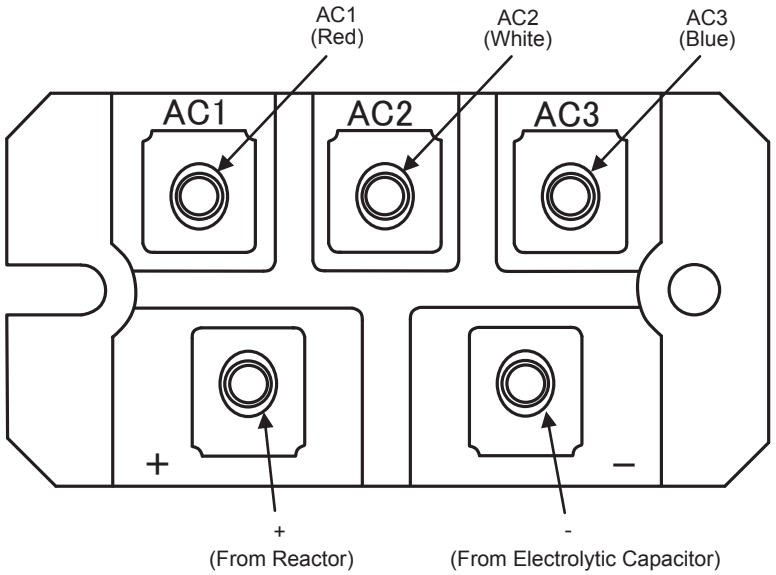


Fig.1 Parts arrangement view

■ Function of connection

(1) Control PCB input

Mark	Connector	Function
Tho-A	CNTH	Outdoor air thermistor
Tho-R1	CNTH	Heat exchanger thermistor 1 (Capillary)
Tho-D	CNTH	Discharge pipe thermistor (CM1)
Tho-S	CNTH	Suction pipe thermistor
	CNB2	Spare
Tho-SC	CNF1	Subcooling coil thermistor 1
Tho-H	CNF2	Subcooling coil thermistor 2
Tho-C1	CNU1	Under-dome thermistor 1(CM1)
	CNP1	Spare
	CN17	Option demand PCB signal input
CT1		Current sensor (CM1)
PSH	CNL1	High pressure sensor
PSL	CNL2	Low pressure sensor
63H1	CHQ1	High pressure switch (CM1)
	CNS1	External operation input
Power source	CNW	380/415V Open phase detection
Power source	CNA1	DC280V (for SW)
Power source	CNA2	DC280V (for FMo)
Power source	CNZ	DC9V

(2) Control PCB output

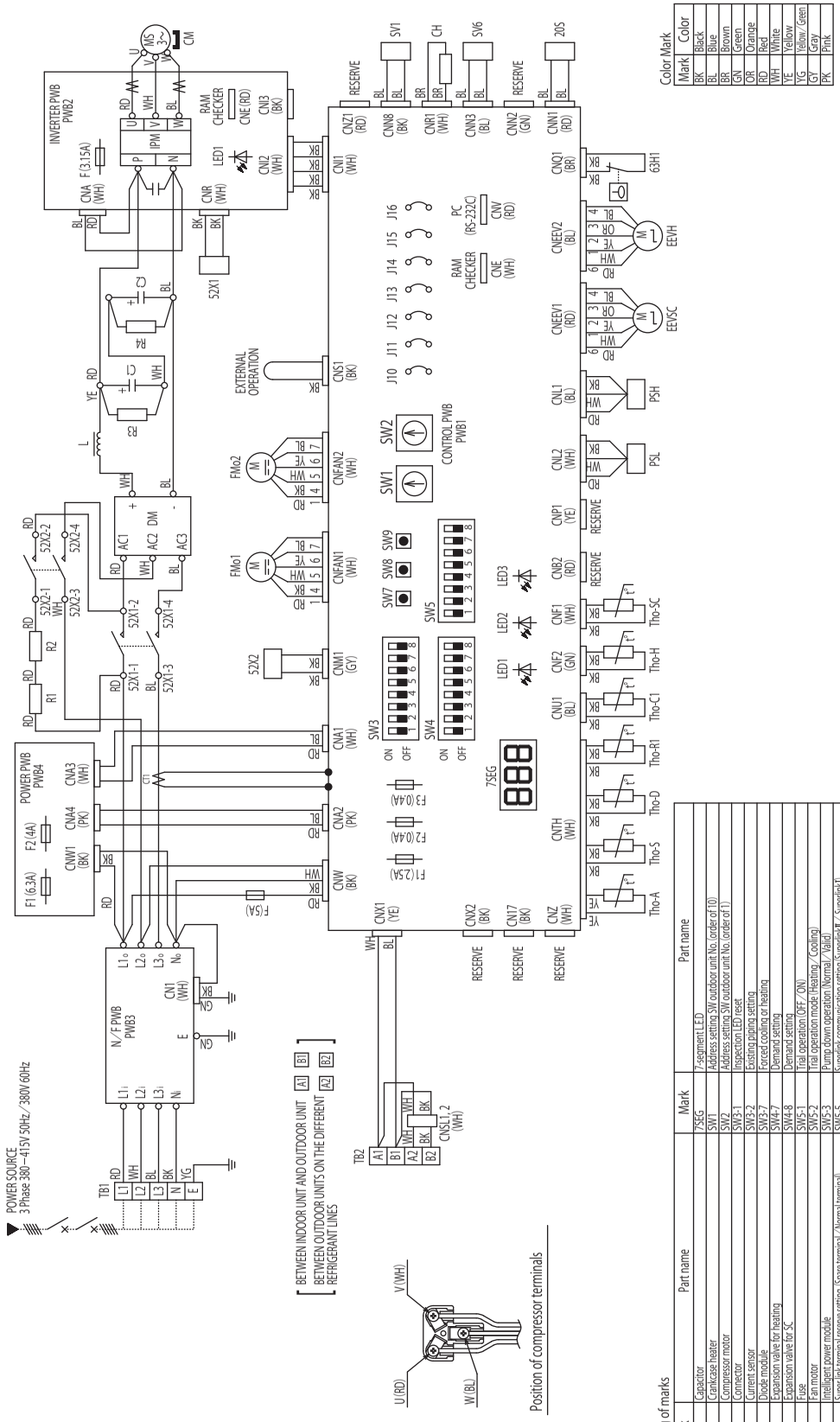
Mark	Connector	Function
52X2	CNM1	Solenoid for CM1
20S	CNN1	4-way valve
	CNN2	Spare
SV6	CNN3	Solenoid valve (oil return CM1)
SV1	CNN8	Solenoid valve (CM1:liquid bypass)
CH1	CNR1	Crankcase heater (CM1)
	CNZ1	External output
	CNE	RAM Checker output
RS-232C	CNV	For servicing (for rewriting soft ware)
LED1		Inspection (Red)
LED2		Inspection (Green)
LED3		For service (Green)
7 SEG 1		7-segment LED1 (function / data)
EEVH	CNEEV1	EEVH for heating
EEVSC	CNEEV2	EEVSC for Subcooling coil

(3) Control PCB input/output

Mark	Connector	Function
FMo1	CNFAN1-1	Motor power source (Vm)
	-2	Spare
	-3	Spare
	-4	GND
	-5	Control power source (Vcc)
	-6	Speed control input voltage (Vsp)
	-7	Revolution pulse output (PG)
	-8	Spare
	-9	Spare
FMo2	CNFAN2-1	Motor power source (Vm)
	-2	Spare
	-3	Spare
	-4	GND
	-5	Control power source (Vcc)
	-6	Speed control input voltage (Vsp)
	-7	Revolution pulse output (PG)
	-8	Spare
	-9	Spare
	CNI1	Inverter protocol
	CNX1	Superlink protocol
	CNX2	Spare for Superlink protocol

3. ELECTRICAL WIRING

Models FDC224KXZPE1, 280KXZPE1



Meaning of marks

Mark	Part name	Mark	Part name
C1, 2	Capacitor	7SEG	7-segment LED
CH	Crankcase heater	SW1	Address setting SW outdoor unit No. (order of 10)
CM	Compressor motor	SW2	Address setting SW outdoor unit No. (order of 1)
CNA~Z	Connector	SW3-1	Inspection LED reset
CT1	Current sensor	SW3-2	Existing piping setting
DM	Diode module	SW3-7	Forced cooling or heating
EEVH	Expansion valve for heating	SW4-7	Demand setting
EEVSC	Expansion valve for SC	SW4-8	Demand setting
F	Fuse	SW5-1	Trial operation (OFF / ON)
FMo 1,2	Fan motor	SW5-2	Trial operation mode (Heating / Cooling)
IPM	Intelligent power module	SW5-3	Pump down operation (Normal / Valid)
J10	Super link terminal reserve setting (Spare terminal / Normal terminal)	SW5-5	Superlink communication setting (Superlink II / Superlink1)
J13	External inputting signal type setting (Pulse / Level)	SW7 (button)	Data clear, reset
J14	Defrost recover temperature (Cold district. / Normal)	SW8 (button)	7-segment indicate (order of 1)
J15	Defrost start temperature (Cold district. / Normal)	SW9 (button)	7-segment indicate (order of 10)
L	Reactor	TB1, 2	Terminal block
LED1	Inspection (Red)	Tho-A	External air thermistor
LED1 (INV)	Normal (Yellow) / Flashing	Tho-C1	Under-dome thermistor
LED2	Normal (Green)	Tho-D	Discharge pipe thermistor
LED3	Service (Green for service)	Tho-R1	Heat exchanger thermistor
PSH	High pressure sensor	Tho-S	Suction pipe thermistor
PSL	Low pressure sensor	Tho-SC	Sub-cooling coil Thermistor 1 (Liquid)
R1, R2	Rush current suppression resistor	Tho-H	Sub-cooling coil Thermistor 2 (Gas)
R3, R4	Discharge resistor	SV1	Solenoid valve (Liquid return)
20S	Solenoid coil for 4 way valve	SV6	Solenoid valve (Oil return)
52X1, 2	Relay		Setting of J10~J16: Connect. / Disconnect
63H1	High pressure switch		Setting of SW3~5: OFF / ON

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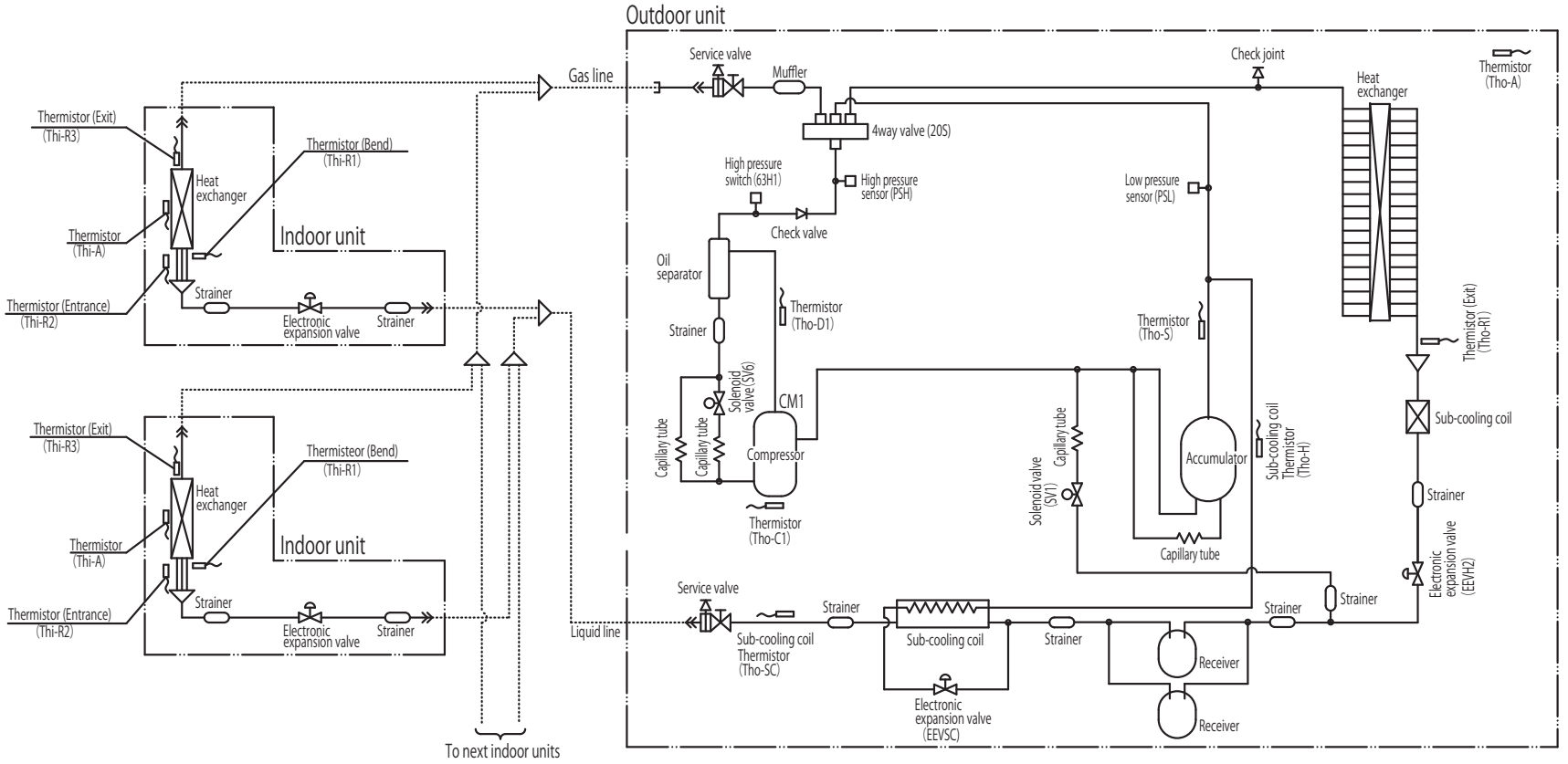


Notes (1) Preset point of protective device
63H1 : Open 4.15MPa, Close 3.15MPa
(For protection)

(2) Function of thermistor
PSH : For compressor control
3.70 ON (MPa)
PSL : ON 0.18MPa, OFF 0.20MPa
(For compressor control)
ON 0.134MPa, OFF 0.18MPa
(For protection)

Thi-R1, R2 : Heating operation : Indoor fan control.
Cooling operation : Frost prevention control.
Super heat control.
Thi-R3 : For super heat control of cooling operation.
Tho-D1 : For control of discharge pipe temperature.
Tho-C1 : For control of temperature under the dome.
Tho-S : For control of suction pipe temperature, super heat control.
Tho-R1: For control of defrosting.
Tho-A : For control of defrosting.
Tho-SC : Electronic expansion valve (EEVSC) control of cooling operation.
Tho-H : For super heat control of sub-cooling coil.

5. APPLICATION DATA

5.1 Installation of outdoor unit

KXZ SERIES INSTALLATION MANUAL

Designed for R410A refrigerant

PCB012D053D

Outdoor unit capacity
FDC224, 280

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to the respective installation manuals supplied with the units.
◎When install the unit, be sure to check whether the selection of installation place, power source specifications, usage limitation (piping length, height differences between indoor and outdoor units, power source voltage and etc.) and installation spaces.

SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNINGS and ⚠CAUTIONS. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNINGS and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTIONS. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of"Marks"used here are as shown on the right.

Never do it under any circumstance.	**Always do it according to the instruction.**

- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user
- For outdoor unit, EN61000-3-2 is not applicable as consent by the utility company or notification to the utility company is given before usage.

⚠WARNING

- Installation must be carried out by the qualified installer.
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury , as a result of a system malfunction.
- Install the system in full accordance with the instruction manual.
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- Use the original accessories and the specified components for installation.
  If parts other than those prescribed by us are used, It may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- Ventilate the working area well in the event of refrigerant leakage during installation.
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- After completed installation, check that no refrigerant leaks from the system.
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit.
- Install the unit in a location with good support.
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.
  Power source with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire.
- Be sure to shut off the power before starting electrical work.
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.
  Loose connections or cable mountings can cause anomalous heat production or fire.
- Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.
  Incorrect installation may result in overheating and fire.
- In connecting the power cable, make sure that no anomalies such as dust deposits, socket clogging or wobble are found and insert the plug securely.
  Accumulation of dust, clogging on the socket, or looseness of plugging can cause electric shocks and fire.
- Be sure not to reuse existing refrigerant pipes
  Conventional refrigerant oil or chlorine contained in the conventional refrigerant which is remaining in the existing refrigerant pipes can cause deterioration of refrigerant oil of new unit. And 1.6 times higher pressure of R410A refrigerant than conventional one can cause burst of existing pipe, personal injury or serious accident.
- Do not perform brazing work in the airtight room
  It can cause lack of oxygen.
- Use the prescribed pipes, flare nuts and tools for R410A.
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant.
- Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulphide gas can occur.
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. It can also cause the corrosion of the indoor unit and resultant unit failure or refrigerant leak.
- Only use prescribed option parts. The installation must be carried out by the qualified installer.
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- Do not perform any change of protective device itself or its setup condition
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- Be sure to switch off the power source in the event of installation, inspection or servicing.
  If the power source is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- Consult the dealer or an expert regarding removal of the unit.
  Incorrect installation can cause water leaks, electric shocks or fire.
- Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit.

- Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- Do not run the unit with removed panels or protections
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- Be sure to fix up the service panels.
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

⚠CAUTION

- Use the circuit breaker for all pole with correct capacity.
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- Take care when carrying the unit by hand.
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- Dispose of any packing materials correctly.
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- Perform installation work properly according to this installation manual.
  Improper installation can cause abnormal vibrations or increased noise generation.

- Carry out the electrical work for ground lead with care.
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting.
  Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.

- Earth leakage breaker must be installed
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- Do not install the unit near the location where leakage of combustible gases can occur.
  If leaked gases accumulate around the unit, it can cause fire.
- Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- Secure a space for installation, inspection and maintenance specified in the manual.
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- Do not install the outdoor unit in a location where insects and small animals can inhabit.
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- Do not use the base frame for outdoor unit which is corroded or damaged due to long periods of operation.
  Using an old and damage base frame can cause the unit falling down and cause personal injury.
- Do not install the unit in the locations listed below
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (If installed, be sure to provide base frame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations with calcium chloride (e.g. snow melting agent).
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- Do not install the outdoor unit in the locations listed below.
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.
  It can cause the damage of the items.
- Do not touch any buttons with wet hands
  It can cause electric shocks
- Do not shut off the power source immediately after stopping the operation.
  Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.
- Do not control the system with main power switch.
  It can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.
- Do not touch any refrigerant pipes with your hands when the system is in operation.
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- Do not operate the outdoor unit with any article placed on it.
  You may incur property damage or personal injure from a fall of the article.
- Do not step onto the outdoor unit.
  You may incur injury from a drop or fall.
- Do not clean up the unit with water
  It can cause electric shocks

Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant.
- A unit designed for R410A has adopted a different size outdoor unit service valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

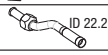
	Dedicated R410A tools
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. BEFORE BEGINNING INSTALLATION (Check that the models, power source specifications, piping, wiring are correct.)

Caution

- Be sure to read this manual before installation to follow the proper installation methods.
- When installing the indoor unit, read the installation manual of indoor unit.
- Optional distribution parts are required for the piping (Branch pipe set, header set). For details, refer to the catalog, etc.
- Make sure to install the earth leakage breaker. (Select a product compatible with high frequency.)
- There is risk of damaging the compressor if the unit is operated while the discharge pipe thermistor, suction pipe thermistor, pressure sensor, etc. are removed. Never attempt to operation in such condition.
- With this air-conditioning system, room temperature may rise, depending on installation conditions, while indoor units are stopped, because small quantity of refrigerant flows into the stopped indoor units if heating operation is conducted on the system.

Accessory

Name	Quantity	Location of use	
Edging 	1	Use it for protection of a knock-out hole.	It is attached to the bracket with an adhesive tape in the proximity of the service valve.
Accessory pipe (280 only) 	1	Use this when connecting gas pipe.	Attached on the base below the operation valve.
Instruction manual	1	When the installation work is completed, give instructions to the customer and ask him/her to keep it.	Placed in front of the compressor

Combination pattern

- Combination pattern of outdoor units, number of indoor units connected and capacity of connection are as show in the table.
- It can be used in combination with the following indoor unit.

Indoor unit	Remote control	Connection OK/NO
FD○△△KXE6	RC-E3(2 cores), RC-E4(2 cores),RC-E5 (2 cores), RC-EX1A (2 cores)	OK
FD○A△△KXE4R, KXE4BR, KXE5R	RC-E1R(3 cores)	NO
FD○A△△KXE4, KXE4(A), KXE4A	RC-E1(3 cores)	NO

Outdoor unit		Indoor unit	
Capacity	Combination pattern	Number of units connected (unit)	Range of total capacity of connected indoor units
224	Single	1～8	112～268
280	Single	1～8	140～336

[Items sold separately]

Refrigerant pipe distribution parts, which are not contained in the package, will be required for installation.
As for refrigerant pipe distribution parts, we offer branching pipe sets (Model type: DIS) and header sets (Model type: HEAD) as parts used on the indoor side of piping.
Select according to the application. In selecting distribution parts, refer to "4. REFRIGERANT PIPING."
If you are not sure which parts to select, consult with your dealer.
Use refrigerant branching pipe sets and header sets designed exclusively for R410A without fail.

2. INSTALLATION LOCATION (Obtain approval from the customer when selecting the installation area.)

2-1. Selecting the installation location

- ○ Where air is not trapped.
- ○ Where the installation fittings can be firmly installed.
- ○ Where wind does not hinder the air intake and outlet.
- ○ Out of the heat range of other heat sources.
- ○ Where strong winds will not blow against the air outlet.
- ○ A place where stringent regulation of electric noises is not applicable.
- ○ Where it is safe for the drain water to be discharged.
- ○ Where noise and hot air will not bother neighboring residents.
- ○ Where snow will not accumulate.
- ○ A place where no TV set or radio receiver is placed within 5m. (If electrical interference is caused, seek a place less likely to cause the problem)
- ○ Do not install the unit in places which exposed to sea breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent), exposed to ammonia substance (e.g. organic fertilizer).

Note

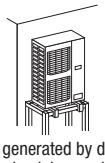
a) If there is a danger of a short-circuit, then install a wind direction variable adapter.
b) When installing multiple units, provide sufficient intake space so that a short-circuit does not occur.
c) Do not install the equipment in areas where there is a danger for potential explosive atmosphere.
* Please ask your distributor about optional parts such as wind vane adapters, snow guard hoods, etc.

CAUTION

Keep sufficient clearance around the unit without fail. Otherwise, a risk of compressor and/or electric component failure may arise.

(1) If the unit is installed in the area where the snow will accumulate, following measures are required. The bottom plate of unit and intake, outlet may be blocked by snow.

1.Install the unit on the base so that the bottom is higher than snow cover surface.



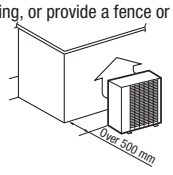
2.Provide a snow hood to the outdoor unit on site. Regarding outline of a snow hood, refer to our technical manual.

3.Install the unit under eaves or provide the roof on site.

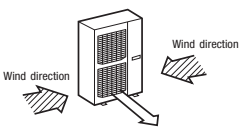
Since drain water generated by defrost control may freeze, following measures are required.
- Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- Recommend setting Defrost start temperature and Outdoor fan snow protection control. [Refer to 7-2. change of control]

(2) If the unit can be affected by strong wind, following measures are required. Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

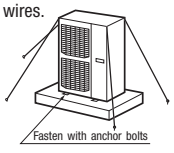
1.Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.



2.Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.

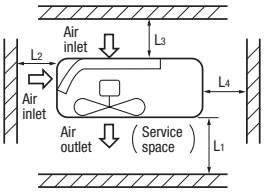


3.The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.



2-2. Installation space (Ex. servicing space)

a) Secure sufficient clearance (room for maintenance work, passage, draft and piping). (If your installation site does not fulfill the installation condition requirements set out on this drawing, please consult with your distributor or the manufacturer)
b) When installing units side by side, it is necessary to secure the service space of minimum 250 mm between them. The units can be operated, however, if they are separated by more than 5 mm each other. Where this minimum space is not available, it may be adapted by moving one of the units, for example, during the service work.
c) Don't install at a place where it will be surrounded with walls in four directions.
Even when it is not surrounded with walls in four directions and it is met the installation conditions as shown by this figure, if there is risk of short-circuit, install the flex flow adaptor to prevent the short-circuit.
d) There must be a 1-meter or larger space in the above.
e) A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.



(Unit : mm)

Size \ Sample	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	250 (5)*1	250 (5)*1	250 (5)*1

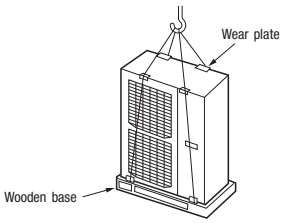
*1 Under the setting condition as specified in ( ) , it is necessary to secured 250 mm for the dimension L4 when replacing the compressor.
Establish this for example by moving the unit during the work.

2-3. Available external static pressure

When attaching a duct to inlet or outlet of outdoor unit, it can be use by follwing static pressure.
Max: 35Pa

3. Unit delivery and installation

⚠ **Caution** Attach the ropes on the unit and carry it in avoiding displacement of gravity center. Improper slinging may cause the unit to lose balance and fall.



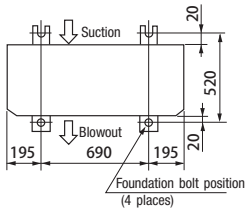
3-1. Delivery

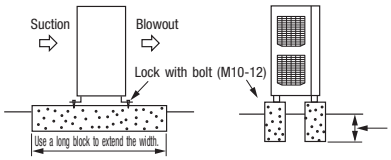
- Deliver the unit in the packing to the specified installation place.
- To hoist the unit, attach a pair of textile ropes with cushion materials attached to protect it.

Request
Put cushion materials between the unit and the ropes to avoid damages.

3-2. Cautions for installation

- When installing the unit, make sure to lock its legs with the following bolts.





- The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- Refer to the above illustrations for information regarding concrete foundations.
- Install the unit in a level area. (With a gradient of 5 mm or less.)
Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

3-3. To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site. So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

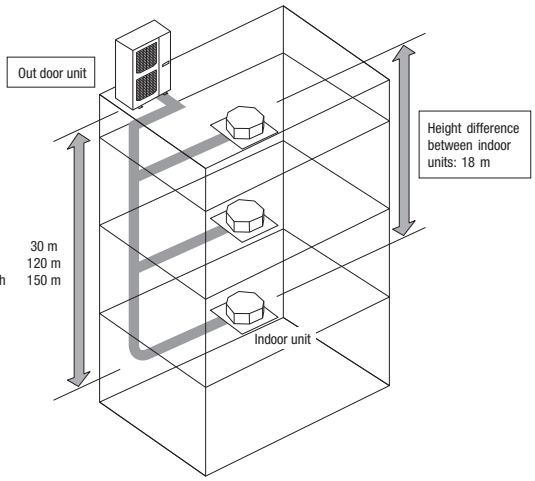
4. REFRIGERANT PIPING

4-1. Restrictim on use of pipes (Select from the following matrix according to indoor unit specifications and installation site conditions)

(1) Limitation on use of pipes

- When arranging pipes, observe the limitation on use concerning the maximum piping length, total piping length, allowable pipe length from initial branching and allowable difference of height (difference between heads).
- Avoid any trap ( ) or bump ( ) in piping as they can cause fluid stagnation.
- Maximum length (To the furthest indoor unit) ... 120 m or less as actual pipe length.
It is required to change the pipe diameter when the actual length exceeds 90 m.
Determine the size of main pipe, referring to the table of main pipe selection table of (3) (a).
- Total piping length ..... 150 m or less
- Length of main pipe ..... 90 m or less
- Allowable pipe length from initial branching ..... 40 m or less
Difference in pipe lengths between indoor units, however, is 40 m or less.
- Allowable difference in height (Difference of heads)
(a) When an indoor unit is positioned at a higher place ..... 30 m or less
(b) When an outdoor unit is positioned at a lower place ..... 30 m or less
(c) Difference of heights between indoor units in a system ..... 18 m or less
(d) Difference of heights between initial branching and indoor unit ... 18 m or less

CAUTION
Make sure to install within the range of limitation. Otherwise, resulting malfunction of compressor may not be warranted. Observe always the limitation of use during installation.



(2) Selection of pipe material

- Use pipes with the inside clean and free from any harmful sulfur, oxides, dirt, chips & oil, or moisture (contamination).
- Use following refrigerant pipes.
Material ... Phosphate deoxidation treated seamless pipe (C1220T-O, 1/2H, JIS H3300)
C1220T-1/2H for O.D. ø19.05 or more, or C1220T-O for ø15.88 or less
- Wall thickness and size - Select according to the guide for pipe size selection
(This product uses R410A. Since, in case of pipes in the size of ø19.05 or more, materials of -O lacks sufficient capacity to withstand pressure, make sure to use pipes of 1/2H material and thickness larger than the minimum thickness.)
- When a pipe is branched, make sure to use our branching set or header set.
- When setting branching pipes, take care of the mounting direction and consult carefully with the instruction manual.

(3) Pipe size selection

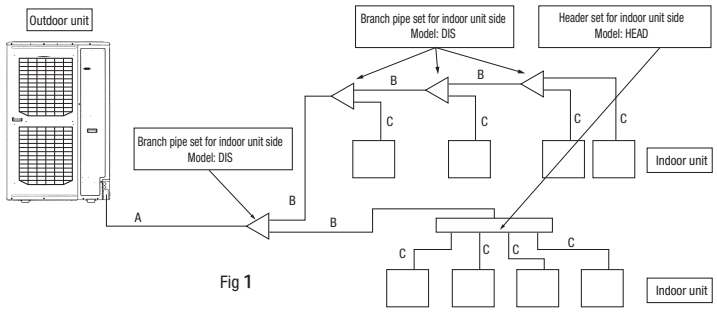


Fig 1

(a) Main pipe (Between branch at outdoor unit side - initial branch at indoor unit side): Section A in Fig. 1

When the maximum length (to the furthest indoor unit from outdoor unit) is 90 m or more (actual length), change the size of main pipe as shown by the following table.

Outdoor unit	Main pipe size (Ordinary)		Pipe size for actual length longer than 90 m	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
224	ø19.05×t1.0	ø9.52×t0.8	ø22.22×t1.0	ø9.52×t0.80
280	ø22.22×t1.0		ø28.58, ø25.4×t1.0	

For ø19.05 or larger, use C1220T-1/2H material.

(b) Between initial branch at indoor unit side- indoor unit side: Section B in Fig. 1

Select from following table based on the total capacity of indoor units connected at the downstream side. However, it should never exceed the size of main pipe (Section A in Fig. 1).

Total capacity of indoor units	Gas pipe	Liquid pipe
Less than 70	ø12.7 ×t1.0	ø 9.52×t0.8
70 - 180	ø15.88×t1.0	
180 or more	ø19.05×t1.0 *1	

For ø19.05 or larger, use C1220T-1/2H material.

*1: When connecting indoor units of 280 at the downstream and the main gas pipe is of ø22.22 or larger, use the pipe of ø22.22x t1

(c) Between branching at indoor unit side - indoor unit side: Section C in Fig. 1

According to the table of pipe size for indoor unit. However, it should never exceed the size of main pipe (Section A in Fig. 1).

Capacity		Gas pipe	Liquid pipe
Indoor unit	15, 22, 28	ø 9.52×t0.8	ø6.35×t0.8
	36, 45, 56	ø 12.7×t0.8	
	71, 90, 112, 140, 160	ø15.88×t1.0	ø9.52×t0.8
	224	ø19.05×t1.0	
	280	ø22.22×t1.0	

For ø19.05 or larger, use C1220T-1/2H material.

(4) Selection of the branch set for indoor unit side

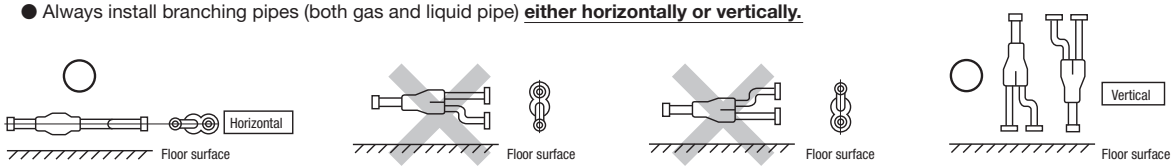
(a) Selection of the branch pipe set

Total capacity downstream	Branch pipe set
Less than 180	DIS-22-1G
180 or more	DIS-180-1G

- As an appropriate branching pipe size varies with the connected capacity (total capacity connected downstream), determine a size from the table at right.

Request

- In connecting an indoor unit with the indoor unit side branching pipe set, please use a pipe conforming to the pipe size specified for indoor unit connection.
- Always install branching pipes (both gas and liquid pipe) **either horizontally or vertically.**



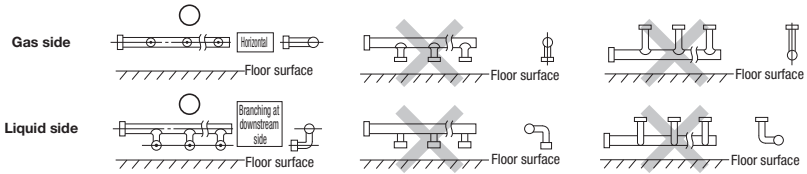
(b) Selection of the header set

Total capacity downstream	Header set model	Number of branches
Less than 180	HEAD4-22-1G	Max. 4 branches
180 or more	HEAD6-180-1G	Max. 6 branches

- Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).
- For the size of a plugged pipe, refer to the documentation for a header set (optional part).

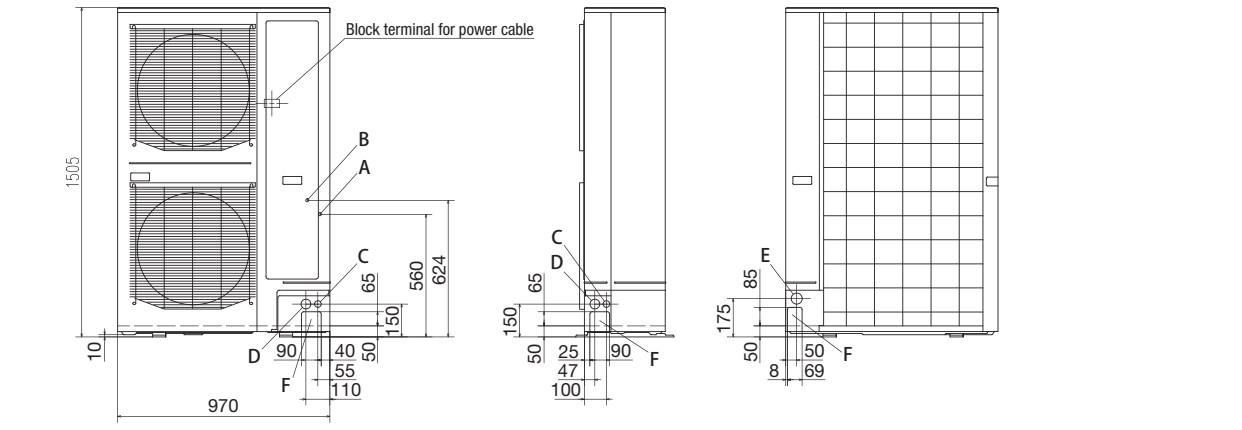
Request

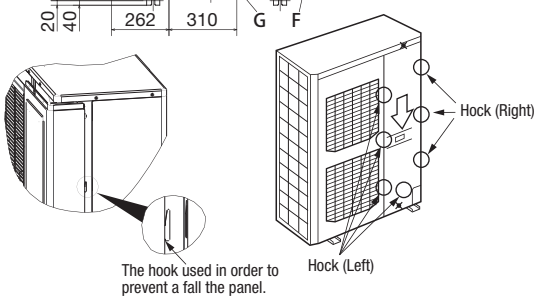
- In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.
- **In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**
- Indoor units 224 and 280 can not be connected to the header.

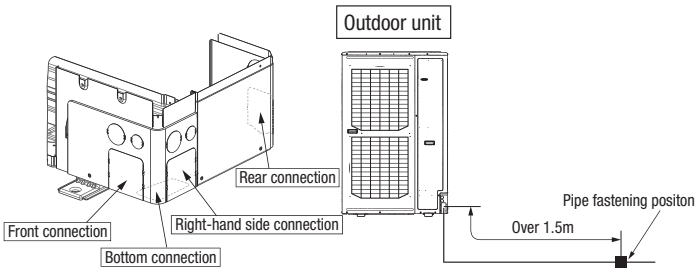


4-2. Piping work

(1) Pipe connecting position and pipe outgoing direction







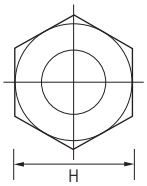
- First remove the two screws (✕ mark) of the service panel and push it down into the direction of the arrow mark and then remove it by pulling it toward you.
- There are hook right side panel which used in order to prevent a fall the panel.
  Lift it a few after pushing it down and then remore it by pulling it towoard you.
- The pipe can be laid in any of the following directions: side right, front, rear and downward.
- Remove a knock-out plate provided on the pipe penetration to open a minimum necessary area and attach an edging material supplied as an accessory by cutting it to an appropriate length before laying a pipe.
- In laying pipes on the installation site, cut off the casing's half blank that covers a hole for pipe penetration with nippers.
- If there is a risk of small animals entering from the pipe penetration part, close the part with some sealing material (to be arranged on site).
- In the case of an installation using a collective drain system, use a port other than the bottom one to take out cables and pipes. If the bottom port is used, seal it thoroughly so that drain water may not spill out.
- Use an elbow (to be arranged on site) to connect control valves to the piping.
- In anchoring piping on the installation site, give 1.5m or a longer distance between an outdoor unit and an anchoring point where the piping is secured as illustrated below. (A failure to observe this instruction may result in a pipe fracture depending on a method of isolating vibrations employed.)
- The pipe should be anchored every 1.5m or less to isolate the vibration.

(2) Field piping work

Important

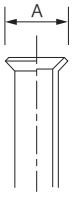
CAUTION
If you tighten it without using double spanners, you may deform the service valve, which can cause an inflow of nitrogen gas into the outdoor unit.

- Take care so that installed pipes may not touch components within a unit.
- **During the pipe installation at site, keep the service valves shut all the time**.
- Give **sufficient protections** (compressed and brazed or by an adhesive tape) **to pipe ends so that any water or foreign matters may not enter the pipes**.
- In bending a pipe, bend it **to the largest possible radius (at least four times the pipe diameter)**. Do not bend a pipe repeatedly to correct its form.
- An outdoor unit's pipe and refrigerant piping are to be flare connected. Flare a pipe after engaging a flare nut onto it. A flare size for R410A is different from that for conventional R407C. Although we recommend the use of flaring tools developed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- Be sure to use the accessory pipe for connection to the gas operation valve. For details, refer to the installation manual of the accessory pipe.
- Tighten a flare joint securely **with two spanners**. Observe flare nut tightening torque specified in the table below.



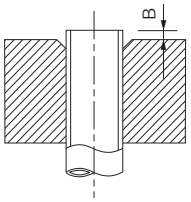
Flare nut parallel side measurement: H (mm)

Copper pipe outer diameter	H
ϕ6.35	17
ϕ9.52	22
ϕ12.7	26
ϕ15.88	29



Flared pipe end: A (mm)

Copper pipe outer diameter	A 0 −0.4
ϕ6.35	9.1
ϕ9.52	13.2
ϕ12.7	16.6
ϕ15.88	19.7

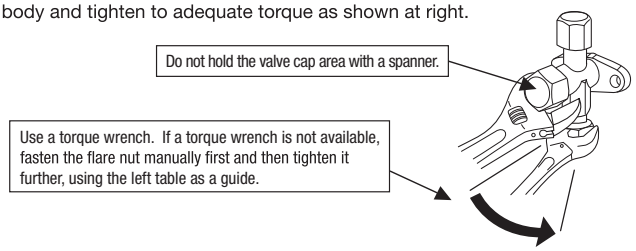


Copper pipe protrusion for flaring: B (mm)

Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ϕ6.35	0〜0.5	0.7〜1.3
ϕ9.52		
ϕ12.7		
ϕ15.88		

For operation valves both at the liquid and gas sides, fix the valve body and tighten to adequate torque as shown at right.

Operation valve size (mm)	Tightening torque (N•m)	Tightening angle (°)	Recommended length of tool handle (mm)
Ø6.35 (1/4")	14～18	45～60	150
Ø9.52 (3/8")	34～42	30～45	200
Ø12.7 (1/2")	49～61	30～45	250
Ø15.88 (5/8")	68～82	15～20	300
Ø19.05 (3/4")	100～120	15～20	450

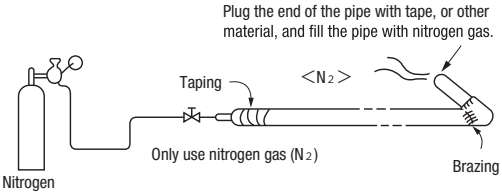


- Do not apply any oil on a flare joint.
- **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.
- Brazing of the service valve and the pipes should be performed while cooling the valve body with a wet towel.
- Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).

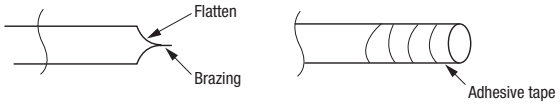
Operation procedure

① **During the pipe installation at site, keep the service valves shut all the time.**

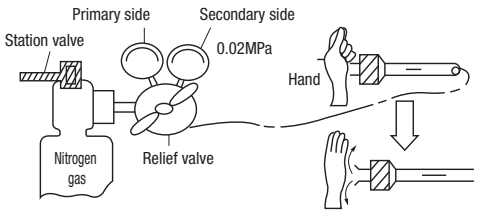
② **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.



③ Give **sufficient protections** (compressed and brazed or with an adhesive tape) **so that water or foreign matters may not enter the piping.**



④ Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).



4-3. Air tightness test and vacuuming

(1) Air tightness test

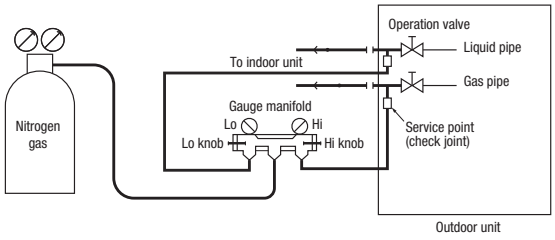
① Although an outdoor unit itself has been tested for air tightness at the factory, check the connected pipes and indoor units for air tightness from the check joint of the service valve on the outdoor unit side. While conducting a test, **keep the service valve shut all the time.**

② Since refrigerant piping is pressurized to the design pressure of a unit with nitrogen gas for testing air tightness, connect instruments according the drawing below. Under no circumstances should chlorine-based refrigerant, oxygen or any other combustible gas be used to pressurize a system.
Keep the service valve shut all the time. Do not open it under any circumstances.
Be sure to pressurize all of the liquid, gas pipes.

③ In pressurizing the piping, do not apply the specified level of pressure all at once, but gradually raise pressure.
a) **Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes or more** to see if the pressure drops.
b) **Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes** to see if the pressure drops.
c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
d) **If no pressure drop is observed with an installation pressurized to** the specified level **and left for about one day, it is acceptable.** When the ambient temperature changes 1℃, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.
e) If a pressure drop is observed in checking a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

④Always pull air from the pipes after the airtightness test.

CAUTION
Applying excessive pressure can cause an inflow of nitrogen gas into an outdoor unit.

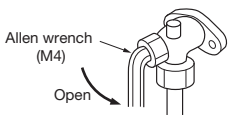


Standard torque at sections on operation valve

Operation valve size (mm)	Shaft tightening torque (N•m)	Cap tightening torque (N•m)	Check joint blind nut tightening torque (N • m)
Ø9.52 (3/8")	6～8	20～30	10～12
Ø12.7 (1/2")	14～16	25～35	10～12
Ø19.05 (3/4")	3	30～35	12～14

Securely tighten the cap and the blind nut after the adjustment.
Avoid applying any excessive force when operating the shaft or when tightening the cap or blind nut. Otherwise, it could cause malfunction or leakage from the shaft, cap or blind nut.

▶Allen wrench type

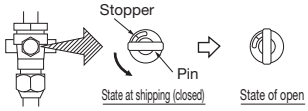


Fluid/gas operation valve

- Open the valve stem till it hits the stopper. No need to apply force more than that.
- After the adjustment, replace the blind nut as it was.

▶Pin type

Remove the cap and adjust as shown below



- After the adjustment, replace the cap as it was.

(2) Vacuuming

Pull the air **from the check joints of the operation valves on both liquid and gas sides.**

<Work flow>

When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise.
Check the system for a leaky point and then draw air to create a vacuum again.

Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)

Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.

Airtightness test completed
↓
Vacuuming begins
↓
Vacuuming completed
↓
Vacuum gauge check
↓
Fill refrigerant

Pay attention to the following points in addition to the above for the R410A and compatible machines.

○To prevent a different oil from entering, assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
○Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.

4-4. Additional charge of refrigerant

Charge additional refrigerant **in the liquid state.**
Be sure to measure the quantity **with a scale in adding refrigerant.**
If you cannot charge all refrigerant with the outdoor unit lying idle, charge it with the unit running in the test run mode. (For the test run method, refer to Section 8)
If operated for a long time with insufficient refrigerant the compressor will be damaged. (In particular, when adding rerigerant during operation, complete the job within 30min.)
This unit contains **8.9 kg of refrigerant**.
Calculate necessary quantity of additional charge with the following formula, and record the quantity of additionally charged refrigerant on the refrigerant quantity list provided on the front of service panel.

●Charge the additional refrigerant depending on the size and length of liquid pipe. Determine the quantity of additional charge by rounding the second place after decimal point, which means in the unit of 0.1 kg.

Additional charge quantity for piping P (kg) = (L1×0.054)+ (L2×0.022)
Charge quantity for the refrigerant piping

Refrigerant pipe size	ø9.52	ø6.35	Remark
Additional charge quantity(kg/m)	0.054	0.022	

L1: Total length of ø9.52 pipes (m), L2: Total length of ø6.35 pipes (m)

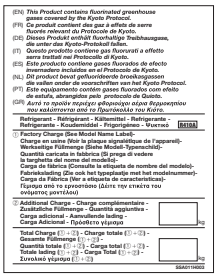
●According the amount of P, the total additional charge quantity can be calculated.
<If P ≦1.6kg>
Total additional charge quantity = P (kg)
<If P ＞ 1.6kg>
Total additional charge quantity = P (kg) + 1.0 (kg)
Important
When the total additional charge quantity is over 9.1kg, separate the refrigerant line.

Pay attention to the following points in addition to the above for the R410A and compatible machines.

○To prevent a different oil from entering, assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
○Refrigerant types are indicated by color at the top of the cylinder 5. (Pink for R410A). Always confirm this.
○Do not use a charge cylinder under any circumstances. There is a danger that the composition of the refrigerant will change when R410A is transferred to a cylinder.
○When charging refrigerant, use liquid refrigerant from a cylinder. If refrigerant is charged in a gas form, the composition may change considerably.

●Request

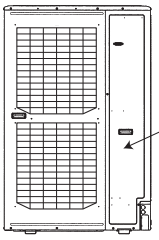
Record the refrigerant quantity calculated based on the piping length in the refrigerant quantity label provided on the front of service panel.



Refrigerant quantity label

CAUTION

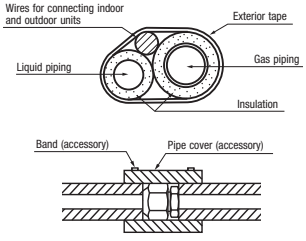
Be sure to record the refrigerant volume, because the information is necessary to perform the installation's maintenance service.



Attached on the front service panel.

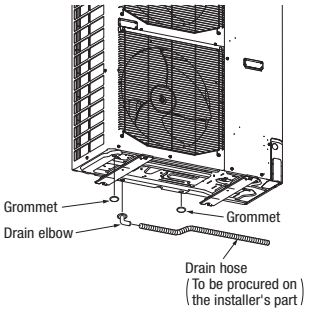
4-5. Heating and condensation prevention

①Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
②Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.
a) The gas pipe can cause dew condensation during a cooling operation, which will become drain water causing a possible water-leak accident, or reach as high a temperature as 60℃ to 110℃ during a heating operation, posing a risk of burns, when touched accidentally. So, do not fail to dress it with a heat insulation material.
b) Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
c) Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.
d) **Both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**
When the ambient dew point temperature becomes 28℃ or higher, or the relative humidity becomes 80% or higher, add further 10 to 20 mm thickness heat insulation material.

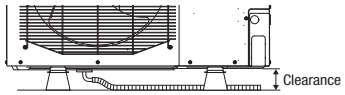


5. DRAIN PIPING WORK

- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.
- Water may drip where there is a larger amount of drain water. Seal around the drain elbow and drain grommets with putty or adequate caulking material.
- Condensed water may flow out from vicinity of operation valve or connected pipes.
- Where you are likely to have several days of sub-zero temperatures in a row, do not use a drain elbow and drain grommets. (There is a risk of drain water freezing inside and blocking the drain.)
- Do not use drain elbow and grommet made of plastic for drain piping when base heater for outdoor unit is used. Plastic grommet and elbow will be damaged and burnt in worst case.
- Prepare another drain tray made of metallic material for collecting drain when base heater is used.



- When condensed water needs to be led to a drain, etc., install the unit on a flat base or concrete blocks. (prepared on site)
  Then, secure space for the drain elbow and the drain hose.



6. Electric wiring

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.
Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.
⚠ **Install an earth leakage breaker without fail**. The installation of an earth leakage breaker is compulsory in order to prevent electric shocks or fire accidents.
(Since this unit employs inverter control, **use an impulse withstanding type** to prevent an earth leakage breaker's false actuation.)

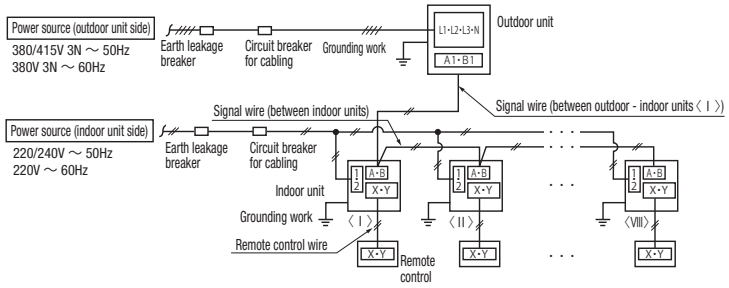
Note

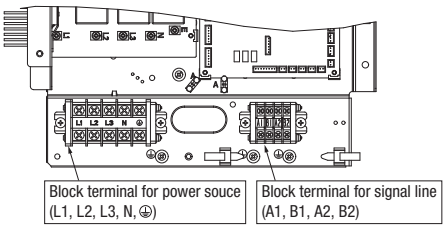
a) Use only copper wires.
Do not use any supply cord lighter than one specified in parentheses for each type below.
- braided cord (code designation 60245 IEC 51), if allowed in the relevant part 2;
- ordinary tough rubber sheathed cord (code designation 60245 IEC 53);
- flat twin tinsel cord (code designation 60227 IEC 41)
- ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53).

Do not use anything lighter than polychloroprene sheathed flexible cord (cord designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.

b) **Use separate power sources for the indoor and outdoor units** .
c) A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
d) **The power sources for indoor units in the same system should turn on and off simultaneously** .
e) Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire.
If improperly grounded, an electric shock or malfunction may result.
Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.
f) **The installation of an impulse withstanding type earth leakage breaker is necessary**. A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire. Do not turn on the power until the electrical work is completed. Be sure to turn off the power when servicing.
g) Do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an abnormal overheat accident)
h) For power source cables, use conduits.
i) **Do not lay electronic control cables (remote control and signaling wires) and other high current cables together outside the unit** Laying them together can result in malfunctioning or a failure of the unit due to electric noises.
j) Power cables and signaling wires must always be connected to the power cable terminal block and secured by cable fastening clamps provided in the unit.
k) Fasten cables so that they may not touch the piping, etc.
l) **When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection** and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)
m) Make sure to use circuit breakers (earth leakage breaker and circuit breaker) of proper capacity. Use of breakers of larger capacity could result in trouble on components or fire accident. The circuit breaker should isolate all poles under over current.
n) Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations. The isolator should be locked in OFF state in accordance with EN60204-1.
o) After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

6-1. Wiring system drawing





CAUTION

If the earth leakage breaker is exclusively for ground fault protection, then you will need to install a circuit breaker for wiring work.

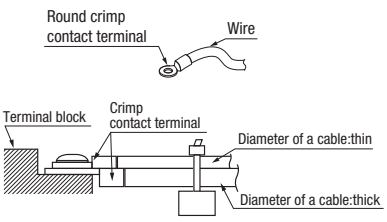
6-2. Power source connection

(1) Method of leading out cables

- As shown on the drawing in Section 4-2, cables can be laid through the front, right, rear or bottom casing.
- In wiring on the installation site, cut off a half-blank covering a penetration of the casing with nippers.
- In the case of an installation using a collective drain system, use a port other than the bottom one to take out cables and pipes. If the bottom port is used, seal it thoroughly so that drain water may not spill out.

(2) Notabilia in connecting power cables

- Connect the ground wire before you connect the power cable. When you connect a grounding wire to a terminal block, use a grounding wire longer than the power cable so that it may not be subject to tension.
- Do not turn on power until installation work is completed. Turn off power to the unit before you service the unit.
- Ensure that the unit is properly grounded.
- Always connect power cables to the power terminal block, and then fix the power cable using a band on the bracket of operation valve.
- To connect a cable to the power terminal block, use a round crimp contact terminal.
  If two cables are to be connected to one terminal, arrange cables in such a manner that you put their crimp contact terminals together back to back. Further, put the thinner cable above the thicker one in arranging cables for such connection.
- Use specified wires in wiring, and fasten them securely in such a manner that the terminal blocks are not subject to external force.
- In fastening a screw of a terminal block, use a correct-size driver.
  Fastening a screw of a terminal block with excessive force can break the screw.
- When electrical installation work is completed, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection.



(3) Outdoor unit power source specification: 380/415V 3N~ 50Hz 380V 3N~ 60Hz

Model	Power source	Cable size for power source (mm²)	Wire length (m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Earth wire	
				Rated current	Switch capacity		Size (mm²)	Screw type
224KXZPE1	Three-phase 380/415V 50Hz 380V 60Hz	5.5	51	30	30	30A, 30mA less than 0.1 sec	2	M5
280KXZPE1			49					

(4) Indoor unit power source specification: 220/240V~50Hz, 220V~60Hz & signal line (Outdoor unit is another power source)

Combined total capacity of indoor units	Cable size for power source(mm²)	Wire length(m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Signal line (mm²)	
			Rated current	Switch capacity		outdoor-indoor	indoor-indoor
less than 7A	2	21	20	30	20A, 30mA less than 0.1 sec	2 core × 0.75 ※	
less than 11A	3.5						
less than 12A	5.5	33	20		30A, 30mA less than 0.1 sec		
less than 16A	5.5	24	30				

※ Use a shielded cable.

Note:
a) The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEAC8001). (Please adapt it to the regulations in effect in each country)
b) Wire length in the table left is the value for when the indoor unit is connect to the power cable in series also the wire size and minimum length when the power drop is less than 2% are shown. If the current exceeds the value in the table above, change the wire size according to the indoor wiring regulations. (Please adapt it to the regulations in effect in each country)
c) For details, refer to the installation manual supplied with the indoor unit.
d) Wires connected to indoor units are allowed up to 5.5 mm². For 8 mm² or more, use a dedicated pull box and branch to indoor units with 5.5 mm² or less.

6-3. How to connect signal cables

The communication protocol can be choosen from following two types. One of them is the conventional Superlink (hereinafter previous SL) and the other is the new Superlink Ⅱ (hereinafter new SL) . These two communication protocols have the following advantages and restrictions, so choose a desirable one meeting your installation conditions such as connected indoor units and centralized control. When signal cables are connected into a network involving outdoor units, indoor units or centralized control equipment that do not support new SL, select communications in the previous SL mode, even if the refrigerant system is separated from theirs.

Communication protocol	Conventional communication protocol (previous SL)	New communication protocol (new SL)
Outdoor unit setting (SW5-5)	ON	OFF (Factory default)
No. of connectable indoor units	Max. 48	Max. 128
No. of connectable outdoor units in a network	Max. 48	Max. 32
Signal cable (total length)	Up to 1000m	Up to 1,500 m for 0.75 mm² shielding wire (MVVS) Up to 1,000 m for 1.25 mm² shielding wire (MVVS)
Signal cable (furthest length)	Up to 1000m	Up to 1000m
Connectable units to a network	Units not supporting new SL (FD○A△△KXE4·5 series) Units supporting new SL (FD○△△KXE6 series, FD○△△KXZ series) Can be used together.	Units supporting new SL (FD○△△KXE6 series, FD○△△KXZ series)

Note: For FDT224 and 280 models, calculate the number of units taking 1 indoor unit as 2 units for the sake of communication.

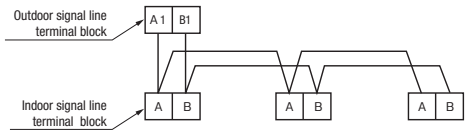
● **Signal cables are for DC 5 V. Never connect wires for 220/240 V or 380/415 V.** Protective fuse on the PCB will trip.

① Confirm that signal cables are prevented from applying 220/240 V or 380/415 V
② Before turning the power on, check the resistance on the signal cable terminal block. If it is less than 100Ω, power source cables may be connected to the signal cable terminal block.
When units of FD○△△KXE6 Series, FD○△△KXZ series are connected:
Standard resistance value=5,100/Number of connected units.
When units of FD○A△△KXE4 and 5 Series only are connected:
Standard resistance value=9,200/Number of connected units.
When units of FD○△△KXE6 Series, FD○△△KXZ series and units of FD○A△△KXE4 and 5 Series are connected in a mixture:
Standard resistance value=46,000/[(Number of connected FD○A△△KXE4 and 5 Series units x 5) + (Number of connected FD○△△KXE6 and KXZ Series units x 9)]
The number of connected units includes those of indoor units, outdoor units and SL devices..
If the resistance value is less than 100Ω, disconnect the signal cables temporarily to divide to more than one network, to reduce the number of indoor units on the same network, and check each network.

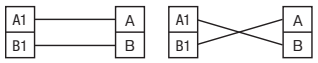
Indoor and outdoor units signal cables

- Connect the signal line between indoor unit and outdoor unit to A1 and B1.
- Connect the signal line between outdoor units to A2 and B2.
- Use a shielded cable for a signal line and connect a shielding earth at all the indoor units and outdoor units.

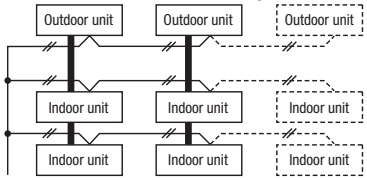
(1) When one outdoor unit is used.



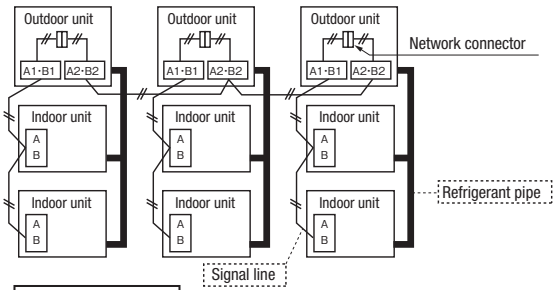
○Indoor and outdoor signal lines do not have a polarity.
Any of the connections in the following illustration can be made.



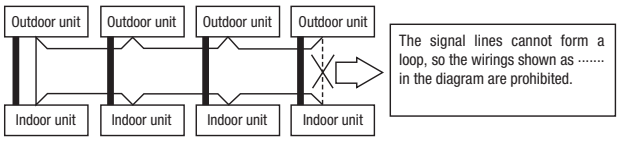
(3) The signal lines can also be connected using the method shown below.



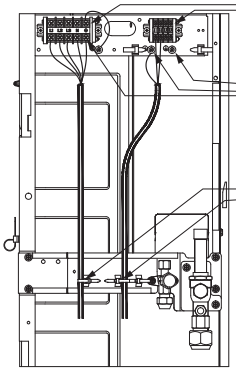
(2) When plural outdoor units are used



Important ○Loop wiring prohibited.



Power cable and signal cable connection



Power souce, signal line and ground terminal block

Grounding terminal

- Do not connect to the grounding wire from another unit, but install a dedicated wire up to the grounding wire from the distribution board.

Wiring clamp

Wiring diagram

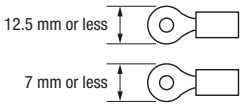
- It is attached on the back side of the service panel.

Outgoing cable direction

- As like the refrigerant pipe, it can be let out in any of the following direction: right, front, rear and downward.

Request

- When connecting to the power source terminal block, use the crimp terminals for M5 as shown at right.
- When connecting to the signal terminal block, use the crimp terminals for M3.5 as shown at right.



Remote control wiring specifications

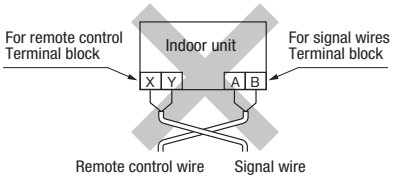
(1) **A standard remote control wire is 0.3mm² x 2 cores (FD○△△KXE6 indoor unit), 0.3mm² x 3 cores (FD○A△△KXE4·5 indoor unit).** It can be extended **up to 600m. For a remote control wire exceeding 100m,** upgrade wire size **as specified in the table below**.

Length (m)	Wire size
	FD○△△KXE6 indoor unit
100 to 200	0.5mm² × 2 cores
To 300	0.75mm² × 2 cores
To 400	1.25mm² × 2 cores
To 600	2 mm² × 2 cores

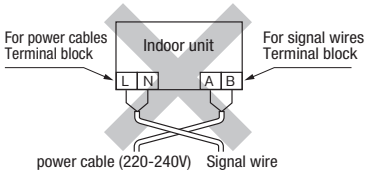
(2) When the remote control wire runs parallel to another power source wire or when it is subject to outside noise, such as from a high-frequency device, use shielded wire. (Be sure to ground only one end of the shielded wire.)

CAUTION In addition to a possible wiring error between indoor and outdoor units, there are other possibilities of erroneous wiring as illustrated below.

① Wrong wiring between signaling wires and remote control wires.



② Connecting power cables to the signaling wire terminal block.



It will result in a blown signal line fuse (CNK).

7. CONTROL SETTINGS

7-1. Unit address setting

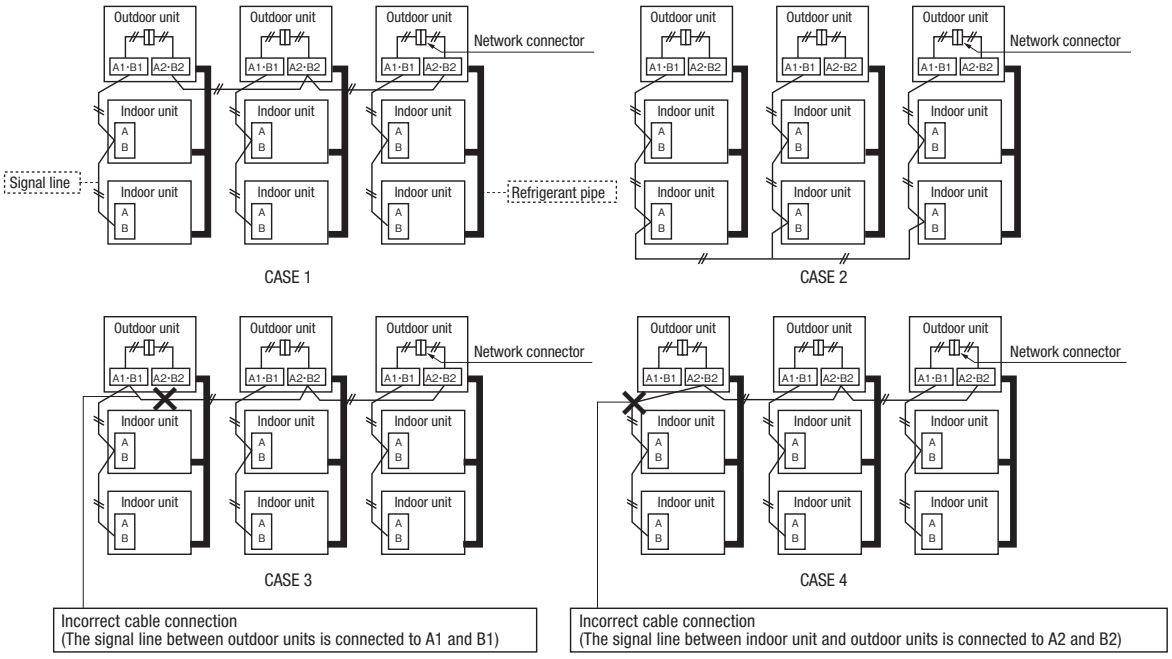
This control system controls the controls of more than one air-conditioner's outdoor unit, indoor unit and remote control unit through communication control, using the microcomputers built in the respective controls. Address setting needs to be done for both outdoor and indoor units. Turn on power in the order of the outdoor units and then the indoor units.
Give a one-minute or longer interval for them.
The communication protocol can be chosen from following two types. One of them is the conventional communication protocol (previous SL) and the other is the new communication protocol (new SL). These two communication protocols have their own features and restrictions as shown by Table 6-3. Select them according the indoor units and the centralized control to be connected.
When signal cables are connected into a network involving outdoor units, indoor units or centralized control equipment that do not support new SL, select communications in the previous SL mode, even if the refrigerant system is separated from theirs.
When communication is established after setting addresses, check the communication protocol with the 7 segment display panel of the outdoor unit.

●Address setting methods

The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one.
Use the automatic address setting function after reading this manual carefully.

Communication protocol		new SL		previous SL	
Address setting method		Automatic	Manual	Automatic	Manual
When plural refrigerant systems are linked with signal lines (e.g., to implement centralized control)	Case 1 When signal lines linking plural refrigerant systems are provided between outdoor units. (When the network connector is disconnected, refrigerant systems are separated each other)	OK※1	OK	×	OK
	Case 2 When signal lines linking plural refrigerant systems are provided between indoor units.	×※2	OK	×	OK
When only one refrigerant system is involved (signal lines do not link plural refrigerant systems)		OK	OK	OK	OK

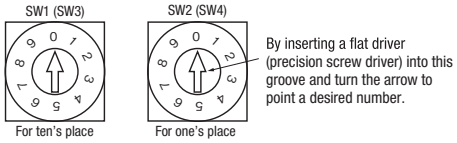
※1 Do not connect the signal line between outdoor units to A1 and B1. This may interrupt proper address setting. (Case 3)
Do not connect the signal line between indoor unit and outdoor unit to A2 and B2. This may interrupt proper address setting. (Case 4)
※2 In Case 2, automatic address setting is not available. Set addresses manually.



●Address No. setting

Set SW1 ~ 4 and SW5-2 provided on the PCB and SW1 & 2 provided on the outdoor unit PCB as shown in the drawings below.

Indoor PCB	SW1, 2 (blue)	For setting indoor No. (The ten's and one's)
	SW3, 4 (green)	For setting outdoor No. (The ten's and one's)
	SW5-2	Indoor No. switch (The hundred's Place) [OFF : 0, ON : 1]
Outdoor PCB	SW1, 2 (green)	For setting outdoor No. (The ten's and one's)



●Summary of address setting methods (figures in [ ] should be used with previous SL)

	Units supporting new SL			Units NOT supporting new SL		
	Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
	Indoor No. switch	Outdoor No. switch	Outdoor No. switch	Indoor No. switch	Outdoor No. switch	Outdoor No. switch
Manual address setting (previous SL/new SL)	000～127[47]	00～31[47]	00～31[47]	00～47	00～47	00～47
Automatic address setting for single refrigerant system installation (previous SL/new SL)	000	49	49	49	49	49
Automatic address setting for multiple refrigerant systems installation (with new SL only)	000	49	00～31	×	×	×

Do not set numbers other than those shown in the table, or an error may be generated.

Note: When units supporting new SL are added to a network using previous SL such as one involving FD◯A△△KXE4 series units, choose previous SL for the communication protocol and set addresses manually. Since the models FDT224 and 280 have 2 PCBs per unit, set different indoor unit No. and SW on each PCB.

- An outdoor unit No., which is used to identify which outdoor unit and indoor units are connected in a refrigerant system, is set on outdoor unit PCB and indoor unit PCB. Give the same outdoor unit No. to all outdoor unit and indoor units connected in same refrigerant system.
- An indoor unit No. is used to identify individual indoor units. Assign a unique number that is not assigned to any other indoor units on the network.

Unless stated otherwise, the following procedures apply, when new SL is chosen for the communication protocol.

When previous SL is chosen, use figures shown in [ ] in carrying out these procedures.

Manual address setting Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.

① Outdoor unit address setting

Set as follows before you turn on power. Upon turning on power, the outdoor unit address is registered.

Set **the Outdoor Unit No. switch to a number 00 - 31 [in the case of previous SL: 00 - 47]**.

Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

② Indoor unit address setting

Set as follows before you turn on power. Upon turning on power, the indoor unit address is registered.

Set **the Indoor Unit No. switch to a number 000 - 127 [in the case of previous SL: 00 - 47]**.

Set **the Outdoor Unit No. switch** to the outdoor unit No. of the associated outdoor unit within the range of **00 - 31 [in the case of previous SL: 00 - 47].**

Set a unique number by avoiding the numbers assigned to other indoor units on the network.

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

* When there are some units not supporting new SL connected in the network, set SW5-5 to ON to choose the previous SL communication mode. In the case of previous SL, the maximum number of indoor units connectable in a network is 48.

Automatic address setting Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.

With new SL, you can set indoor unit addresses automatically even for an installation involving multiple refrigerant systems connected with same network, in addition to the conventional automatic address setting of a single refrigerant system installation.

However, an installation must satisfy some additional requirements such as for wiring methods, so read this manual carefully before you carry out automatic address setting.

(1) In the case of a single refrigerant system installation (Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.)

① Outdoor unit address setting
Set as follows before you turn on power.
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 [in the case of previous SL: 49] (factory setting)**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them. Unlike the procedure set out in (2) below, you need not change settings from the 7 segment display panel.

④ Make sure that the number of indoor units indicated on the 7 segment display panel agrees with the number of the indoor units that are actually connected to the refrigerant system.

(2) In the case of a multiple refrigerant systems installation (Applicable to new SL only. In the case of previous SL, set addresses by manual setting.)

(This option is available when the interconnection wiring among refrigerant systems is on the outdoor side and new SL is chosen as the communication protocol.)

Address setting procedure (perform these steps for each outdoor unit)

[STEP1] (Items set before turning on power)

① Outdoor unit address setting
Set as follows before you turn on power.
Set the **Outdoor Unit No. switch** to a number **00 - 31**. Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 (factory setting)**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**

③ Isolate the present refrigerant system from the network.
Disengage the **network connectors (white 2P)** of the outdoor units. (Turning on power without isolating each refrigerant system will result in erroneous address setting.)

[STEP2] (Power on and automatic address setting)

④ Turn on power to the outdoor unit
Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

⑤ Select and enter "1" in P31 on the 7 segment display panel of each outdoor unit to input "Automatic address start."

⑥ Input a starting address and the number of connected indoor units.
Input a starting address in P32 on the 7 segment display panel of each outdoor unit.

⑦ When a starting address is entered, the display indication will switch back to the "Number of Connected Indoor Units Input" screen.
Input the number of connected indoor units from the 7 segment display panel of each outdoor unit. Input the number of connected indoor units for each outdoor unit. (You can input it from P33 on the 7 segment display panel.)When the number of connected indoor units is entered, the 7 segment display panel indication will switch to "AUX" and start blinking.

[STEP3] (Automatic address setting completion check)

⑧ Indoor unit address determination

When the indoor unit addresses are all set, the 7 segment display panel indication will switch to "AUE" and start blinking.
If an error is detected in this process, the display will show "A○○."
Check the 7 segment display panel of each outdoor unit.
Depending on the number of connected indoor units, it may take **about 10 minutes** before the indoor unit addresses are all set.

[STEP4] (Network definition setting)

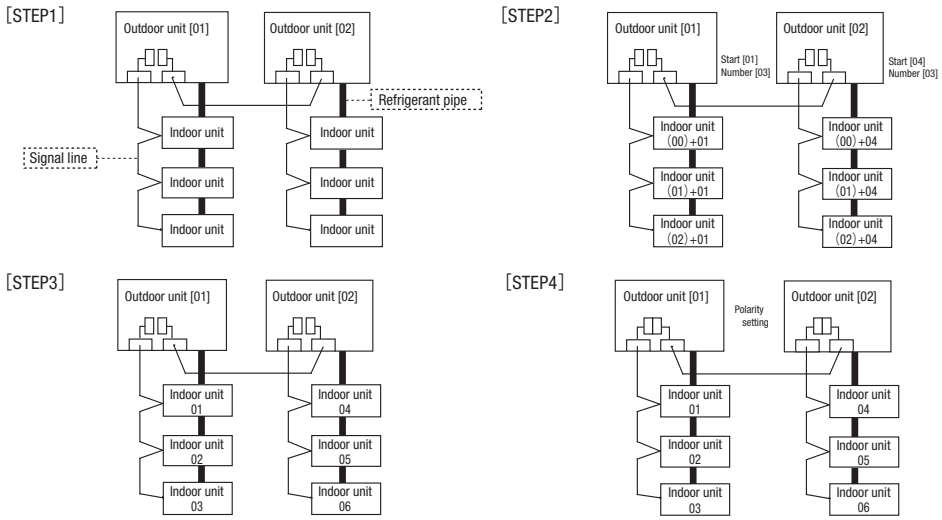
⑨ Network connection
When you have confirmed an "AUE" indication on the display of each outdoor unit, **engage the network connectors** again.

⑩ Network polarity setting

After you have made sure that the network connectors are engaged, select and enter "1" in P34 on the 7 segment display panel of **any outdoor unit (on only 1 unit)** to specify network polarity.

⑪ Network setting completion check
When the network is defined, "End" will appear on the 7 segment display panel. An "End" indication will go off, when some operation is made from the 7 segment display panel or 3 minutes after.

	STEP1	STEP2	STEP3	STEP4
Indoor unit power source	②OFF	④ON	—	—
Outdoor unit power source	①OFF	④ON	—	—
Indoor unit (indoor/outdoor No.SW)	②indoor000/outdoor 49 (factory setting)	—	—	—
Outdoor unit (outdoor No.SW)	①01,02(Ex)	—	—	—
Network connectors	③Disconnect(each outdoor unit)	—	—	⑨Connect(each outdoor unit)
Start automatic address setting		⑤ Select "Automatic Address Start" on each outdoor unit.		
Set starting address		⑥outdoor 01:「01」(Ex) outdoor 02:「04」(Ex)	—	—
Set the number of indoor unit		⑦outdoor 01:「03」(Ex) outdoor 02:「03」(Ex)	—	—
Polarity setting		—	—	⑩ Set in P34 on the 7 segment display panel of any outdoor unit.
7 segment display		⑦ [AUX] (blinking)	⑧ "AUE"(blinking), or "A○○" in error events.	⑪ 「End」



- Within a refrigerant system, indoor units are assigned addresses in the order they are recognized by the outdoor unit. Therefore, they are not necessarily assigned addresses in order from the nearest to the outdoor unit first as depicted in drawings above.
- Make sure that power has been turned on to all indoor units.
- When addresses are set, you can have the registered indoor unit address No.'s and the outdoor unit address No. displayed on the remote control unit by pressing its Inspection switch.
- Automatic address setting can be used for an installation in which plural indoor units are controlled from one remote control unit.
- Once they are registered, addresses are stored in microcomputers, even if power is turned off.
- If you want to change an address after automatic address setting, you can change it from the remote control unit with its "Address Change" function or by means of manual setting. Set a unique address by avoiding the address assigned to other indoor unit on the network when the address is changed.
- Do not turn on power to centralized control equipment until automatic address setting is completed.
- When addresses are set, be sure to perform a test run and ensure that you can operate all indoor and outdoor units normally. Also check the addresses assigned to the indoor units.

Address change (available only with new SL)

"Address Change" is used, **when you want to change an indoor unit address assigned with the "Automatic Address Setting" function from a remote control unit**. Accordingly, the conditions that permit an address change from a remote control unit are as follows.

	Indoor unit address setting		Outdoor unit address setting
	Indoor No.SW	Outdoor No.SW	Outdoor No.SW
Automatic address setting for single refrigerant system installation	000	49	49
Automatic address setting for multiple refrigerant systems installation	000	49	00～31

If "CHANGE ADD. ▼" is selected with some addresses falling outside these conditions, the following indication will appear for 3 seconds on the remote control "INVALID OPER" .

Operating procedure

(1) When single indoor unit is connected to the remote control.

	Item	Operation	Display
1	Address change mode	① Press the AIR CON No. switch for 3 seconds or longer.	[CHANGE ADD.▼]
		② Each time when you press the ▲▼ switch, the display indication will be switched.	[CHANGE ADD.▼] ⇔[MASTER I/U▲]
		③ Press the Set switch when the display shows "CHANGE ADD. ▼" and then start the address change mode, changing the display indication to the "Indoor Unit No. Setting" screen from the currently assigned address.	[I/U 001 O/U 01] (1sec) →[▲▼ SET I/U ADD.] (1sec) →[I/U 001 ▲▼] (Blink)
2	To set a new indoor unit No.	④ Set a new indoor unit No. with the ▲▼ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ▲▼] ⇔[I/U 002 ▲▼] ⇔ ・・・ ⇔[I/U 127▼]
		⑤ After selecting an address, press the Set switch, and then the indoor unit address No. is defined.	[I/U 002] (2sec)
3	To set a new outdoor unit No.	⑥ After showing the defined indoor address No. for 2 seconds, the display will change to the "Outdoor Address No. Setting" screen. The currently assigned address is shown as a default value.	[I/U 002] (2sec Lighting) →[▲▼SET O/U ADD.] (1sec) →[O/U 01 ▲▼] (Blink)
		⑦Set a new outdoor unit No. with the ▲▼ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ▲▼] ⇔[O/U 02 ▲▼] ⇔ ・・・ ⇔[O/U 31▼]
		⑧ After selecting an address, press the Set switch, and then the outdoor unit No. and the indoor unit No. are defined.	[I/U 002 O/U 02] (2sec Lighting) →[SET COMPLETE] (2sec Lighting) →Returns to normal condition.

(2) When plural indoor units are connected to the remote control.
When plural indoor units are connected, you can change their addresses without altering their cable connection.

	Item	Operation	Display
1	Address change mode	① Press the AIR CON Unit No. switch for 3 seconds or longer.	[CHANGE ADD▼]
		② Each time when you press the ▲▼ switch, the display indication will be switched.	[CHANGE ADD▼] ⇔[MASTER I/U▲]
		③ Press the Set switch when the display shows "CHANGE ADD. ▼" The lowest indoor unit No. among the indoor units connected to the remote control unit will be shown.	[▲▼SELECT I/U] (1sec) →[I/U 001 O/U 01▲] (Blink)

	Item	Operation	Display
2	Selecting an indoor unit to be changed address	④ Pressing the ▲▼ switch will change the display indication cyclically to show the unit No.'s of the indoor units connected to the remote control and the unit No.'s of the outdoor units connected with them.	[I/U 001 O/U 01▲] ⇔[I/U 002 O/U 01 ▲▼] ⇔[I/U 003 O/U 01 ▲▼] ⇔ ・・・ ⇔[I/U 016 O/U 01▼]
		⑤ Then the address No. of the indoor unit to be changed is determined and the screen switches to the display " ▲▼ SET I/U ADD."	[▲▼ SET I/U ADD.] (1sec) →[I/U 001 ▲▼](Blink)
3	Setting a new indoor unit No.	⑥ Set a new indoor unit No. with the ▲▼ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ▲▼] ⇔[I/U 002 ▲▼] ⇔ ・・・ ⇔[I/U 127▼]
		⑦ After selecting an address, press the Set switch. Then the address No.of the indoor unit is determined.	[I/U 002] (2sec)
4	Setting a new outdoor unit No.	⑧ The display will indicate the determined indoor address No. for 2 seconds and then switch to the " ▲▼ SET O/U ADD." screen. A default value shown on the display is the current address.	[I/U 002] (2sec lighting) ⇔[▲▼ SET O/U ADD.](1sec) ⇔[O/U 01 ▲▼] (Blink)
		⑨ Set a new outdoor unit No. with the ▲▼ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ▲▼] ⇔[O/U 02 ▲▼] ⇔ ・・・ ⇔[O/U 31▼]
		⑩ After selecting an address, press the Set switch. Then the address of the indoor unit and outdoor unit are determined.	[I/U 002 O/U 02](2sec lighting) →[▲▼ SELECT](1sec lighting) →[I/U SELECTION▼](lighting)
		⑪ If you want to continue to change addresses, return to step ④.	[Press the ▲▼ switch](1sec) →[SET COMPLETE] (2～10sec lighting)
5	Ending the session	⑫ If you want to end the session (and reflect new address settings) In Step ⑩, press the ▼ switch to select "END ▲." If you have finished changing addresses, press the Set switch while "END ▲" is shown. While new settings are being transmitted, "SET COMPLETE" will be indicated. Then the remote control display will change to the normal state.	[END▲] →[SET COMPLETE] (2～10sec lighting) →Normal state
		⑬ If you want to end the session (without reflecting new address settings) Before you complete the present address setting session, press the "ON/OFF" switch. Then the display is change to exit from this mode and switch the display to the normal state. All address settings changed in the session will be aborted and not reflected.	[ON/OFF] →Forced termination

The ▲▼ switch will continuously change the display indication to the next one in every 0.25 seconds when it is pressed for 0.75 seconds or longer.
If the Reset switch is pressed during an operation, the display indication returns to the one that was shown before the last Set switch operation.
Even if an indoor unit No. is changed in this mode, the registered indoor unit No. before address change mode is displayed when [I/U SELECTION▼] is shown.
When "SET COMPLETE" is shown, indoor unit No.'s are registered.

NOTICE Turn on power to centralized control equipment after the addresses are determined.
Turning on power in wrong order may result in a failure to recognize addresses.

● 7-segment display indication in automatic address setting

Items that are to be set by the customer

Code	Contents of a display		
P30	Communication protocol	0: Previos SL mode 1: New SL mode	(The communication protocol is displayed ; display only)
P31	Automatic address start		
P32	Input starting address	Specify a starting indoor unit address in automatic address setting.	
P33	Input number of connected indoor units	Specify the number of indoor units connected in the refrigerant system in automatic address setting.	
P34	Polarity difinition	0: Network polarity not defined. 1: Network polarity defined.	

7-segment display indication in automatic address setting.

Code	Contents of a display
AUX	During automatic address setting. X: The number of indoor units recognized by the outdoor unit.
AUE	Indoor unit address setting is completed normally.
End	Polarity is defined. (Automatic address) Completed normally.

Address setting failure indication

Code	Contents of a display	Please check
A00	Unable to find any indoor unit that can be actually communicated with.	Are signal lines connected properly without any loose connections? Is power for indoor units all turned on?
A01	The number of the indoor units that can be actually communicated with is less than the number specified in P33 on the 7-segment display panel.	Are signal lines connected properly without any loose connections? Input the number of connected indoor units again.
A02	The number of the indoor units that can be actually communicated with is more than the number specified in P33 on the 7-segment display panel.	Are signal lines connected properly without any loose connections? Are the network connectors disengaged properly? Input the number of connected indoor units again.
A03	Starting address (P32) + Number of connected indoor units (P33) > 128	Input the starting address again. Input the number of connected indoor units again.
A04	While some units are operating in the previous SL mode on the network, the automatic address setting on multiple refrigerant systems is attempted.	Perform manual address setting. Separate old SL setting unit from the network Arrange all units to operate in the new SL.

Error indication

Code	Contents of a display	Cause
E2	Duplicating indoor unit address.	・Incorrect manual address setting
E3	Incorrect pairing of indoor-outdoor units.	・An outdoor unit number that does not exist in the network is specified ・No master unit exists in combination outdoor unit.
E11	Address setting for plural remote controls.	・Indoor unit address is set from plural remote controls.
E12	Incorrect adderess setting of indoor units.	・Automatic address setting and manual address setting are mixed.
E31	Duplicating outdoor unit address.	・Plural outdoor units are exist as same address in same network.
E46	Incorrect setting.	・Automatic address setting and manual address setting are mixed.

7-2. Selection switching

Contents of control for outdoor unit can be changed with dipswitches on PCB and P○○ on 7-segment indicator.
When changing P○○ on 7-segment indicator, it can be set by holding down SW8 (7-segment indicator UP: Ones digit), SW9 (7-segment indicator UP: Tens digit) and SW7 (Data write/Enter).

Control selecting method		Content of control
SW setting on PCB	P○○ on 7-segment	
SW3-7 to ON=1 *1	Set allocation of external input function to "2" *1	Forced cooling /heating mode (It can be fixed at cooling with external input terminals open, or at heating with them short-circuited.)
SW5-1 to ON + SW5-2 to ON	—	Cooling test run
SW5-1 to ON + SW5-2 to OFF	—	Heating test run
Close the liquid operation valve on outdoor unit and set as follows: (1) SW5-2 on PCB to ON (2) SW5-3 on PCB to ON (3) SW5-1 on PCB to ON	—	Pump down operation
SW4-7:OFF, SW4-8:OFF*1 80% (Factory default) SW4-7:ON , SW4-8:OFF*1 60% SW4-7:OFF, SW4-8:ON*1 40% SW4-7:ON , SW4-8:ON*1 00%	Set allocation of external input function to "1" *1	Demand control mode by inputting signal to external input terminal. (J13 short-circuited: Level input, J13 open: Pulse input)
SW5-5	—	Communication method selection ON: Previous SL communication, OFF: New SL communication
J13: Closed (Factory default), J13: Open	—	External input switching (CnS1 only) Closed: Level input, Open: Pulse input
J14: Closed (Factory default), J14: Open		Defrost recover temperature Closed: normal, Open: cold weather district
J15: Closed (Factory default), J15: Open	—	Defrost start temperature Closed: normal, Open: cold weather district
—	P01	Operation priority selection 0: First push priority (at shipping) 2: Priority by master unit's setting operation mode 1: Last push priority 3: Priority of required major operation mode
—	P02	Outdoor unit fan snow protection control 0: Control disabled (at shipping) 1: Control enabled
—	P03	Outdoor unit fan snow protection control ON time setting - 30 sec (at shipping) 10, 30-600 sec
—	P05	Silent mode setting 0 (at shipping) - 3: Capacity priority 4-7: Sound priority
—	P06	Allocation of external output (CnZ1)
—	P07	Allocation of external input (CnS1)

*1 Control is switched when both the allocation of external input function (P07) and SW are changed.
(Example: To use CnS1 for the input of forced cooling mode, set P07 at 2 and SW3-7 at ON.)

By changing the allocation of external input functions (P07) on the 7-segment, functions of external input terminals CnS1 can be selected. Inputting signals to external input terminals enable the following functions.

Setting value for allocation of external input function	With external input terminals closed	With external input terminals open
"0" : External operation input	Permitted	Prohibited
"1" : Demand input	Invalid	Valid
"2" : Cooling/heating forced input	Heating	Cooling
"3" : Silent mode 1 *1	Valid	Invalid
"5" : Outdoor fan snow guard control input	Valid	Invalid
"6" : Test run external input 1 (equivalent to SW5-1)	Test run start	Normal
"7" : Test run external input 2 (equivalent to SW5-2)	Cooling	Heating
"8" : Silent mode 2 *2	Valid	Invalid
"10" : AF periodic inspection display	Valid	Invalid
"11" : AF error display	Valid	Invalid
"12" : Building multi energy save control	Valid	Invalid

*1 Valid/invalid is changed depending on outdoor temperature.
*2 It is always Valid, regardless of outdoor temperature.

The external output function of CnZ1 can be changed by changing the setting in P06 on the 7 segment display panel.

"0" : Operation output
"1" : Error output
"2" : Compressor ON output
"3" : Fan ON output
"4 – 9" : Spare

7-3. External input and output terminals specifications

Name	Purpose (Factory default)	Specification	Operating side connector
External input CnS1	External operation input (closed at shipping)	Non-voltage contactor (DC12V)	J.S.T (NICHIATSU) B02B-XAKS-1-T (LF) (SN)
External output CnZ1	Spare output (External output)	DC12V output	MOLEX 5566-02A-RE

7-4. Silent mode setting

● Operating sound of outdoor unit can be reduced in the silent mode. Remember, however, larger the effect of silencing, the drop of operating capacity becomes larger.
● The silent mode can be set with the following methods of (1) or (2).
<Setting method of silent mode>
(1) Setting from the external input terminal (CnS1) on the outdoor unit
STEP1: If the external input function (P07) is allocated to "3": silent mode 1 or "8": silent mode 2, and the external input terminal (CnS1) is shorted, it is set to the silent mode.
* Priority in operations varies depending on silent mode 1 or silent mode 2. Select either one depending on purposes.
Silent mode 1: Capacity priority.
Silent mode 2: Sound priority.
STEP2: Allocate the external input function (P05) to "0～3" for silent mode 1 (Capacity priority) or "4～7" for silent mode 2 (Sound priority). Larger the figure, the silencing effect is larger. (Default setting is 0.)
(2) Setting by input from the remote control of indoor unit
If the signal of silent mode is transmitted from one of indoor units in the connection, it is set in the silent mode.
It is operated in the silent mode, depending on the allocation to "0～7" for the external input function (P05). Larger the figure, the silencing effect is larger. (Default setting is 0.)
If (P05) is set at 0～3: Capacity priority.
If (P05) is set at 4～7: Sound priority.
Note) If the settings (1) and (2) above are established simultaneously, the priority is given to operations from the remote control in (2).
If the settings of the silent mode and the demand control are established simultaneously, they are operated according to their lowest demands.

7-5. Demand control setting

● The demand control setting allows cutting the power peak, by suppressing the operating capacity of outdoor unit.
Demand ratio is the rate of the maximum capacity relative to the rated capacity.

● When the load is low, the effect of demand control setting may be small and the power consumption may not be reduced so much.
Under the overload condition, it reduces also the rated maximum capacity so that it may reduce the capacity larger than the demand ratio.

● The demand control can be set with the following methods of (1) or (2).

<Setting method of demand control>

(1) Setting from the external input terminal
To set the demand ratio, allocate the external input function (P07) to "1": Demand input, and change the setting of SW4-7 and SW4-8 on the PCB as follows while the external input terminal (CnS1) is open.

SW4-7	SW4-8	Demand ratio (%)
OFF	OFF	80
ON	OFF	60
OFF	ON	40
ON	ON	0

(2) Setting from the remote control
If the signal of peak cut ratio, by means of the peak cut timer, is received from the remote control of indoor unit, it is operated with the set demand ratio.
If peak cut signals are received from two or more indoor units, it is operated with the lowest demand ratio.

Note) If two or more settings of (1) and (2) above are established simultaneously, the priority is given to the demand of lowest ratio.
If the settings of the silent mode and the demand control are established simultaneously, they are operated according to their lowest demands.

8. TEST OPERATION AND TRANSFER

8-1. Before starting operation

(1) **Make sure that a measurement between the power source terminal block and ground, when measured with a 500V megger, is greater than 1 MΩ.**
When the unit is left for a long time with power OFF or just after the installation, there is possibility that the refrigerant is accumulated in the compressor and the insulation resistance between the contact terminals for power source and grounding decreases to 1MΩ or around.
When the insulation resistance is 1MΩ or more, the insulation resistance will rise with crank case heater power ON for 6 hours or more because the refrigerant in the compressor is evaporated.

(2) Check the resistance of the signal wire terminal block before power is turned on. If a resistance measurement is 100Ω or less, it suggests a possibility that power cables are connected to the signal wire terminal block. (Please refer to 6-3. Standard resistance value.)

(3) **Be sure to turn on the crank case heater 6 hours before operation.**
After turning on the crank case heater, there is possibility that the compressor doesn't start operation unless the compressor temperature rises or the time mentioned above is passed. (for protection of compressor)
If the 7 segment display shows the "dL○" and "○○○"(the rest of time 360～001) alternately every 4 seconds, perform the test operation after the compressor temperature rises by the turning on the crank case heater.

(4) **Make sure that the bottom of the compressor casing is warm**. (higher than outdoor temperature +5°C)

(5) Be sure to fully open the operation valves (liquid and gas) for the outdoor unit.
Operating the outdoor unit with the valves closed may damage the compressor.

(6) **Check that the power to all indoor units has been turned on. If not, water leakage may occur.**

> **CAUTION**
> Make sure that the operation valves (gas and liquid) are full open before a test run. Conducing a test run with any of them in a closed position can result in a compressor failure.

8-2. Test run

(1) Test run from an outdoor unit.
Whether CnS1 is set to ON or OFF, you can start a test run by using the SW5-1 and SW5-2 switches provided on the outdoor unit PCB.
Select the test run mode first.
Set SW5-2 to ON for a cooling test run or OFF for a heating test run. (It is set to OFF at the factory for shipment)
Turning SW5-1 from OFF to ON next will cause all connected indoor units to start.
When a test run is completed, set SW5-1 to OFF.
Note: During a test run, an indoor unit cannot be operated from the remote control unit (to change settings). ("Under centralized control" is indicated)

(2) Method of starting a test run for a cooling operation from an indoor unit: operate a remote control unit according to the following steps.
(a) Start of a cooling test run
○Operate the unit by pressing the [ON/OFF] button.
○Select the "COOLING" mode with the [MODE] button.
○Press the [TEST] button for 3 seconds or longer.
The screen display will be switched from "Select with ITEM ▲▼ "→"Determine with [SET] "→"Cooling test run▼."
○When the [SET] button is pressed while "Cooling test run▼ " is displayed, a cooling test run will start. The screen display will be switched to "COOLING TEST RUN."
(b) Termination of a cooling test run
○When the [ON/OFF] button or the "TEMP [▽] [△] " button is pressed, a cooling test run will be terminated.

Notes : for engineers undertaking piping or electrical installation work

When a test run is completed, make sure again that the electrical component box cover and the unit panel have been attached before you turn the unit over to the customer.

8-3. Transfer

● Use the instruction manual that came with the outdoor unit to explain the operation method to the customer.
Ask the customer to keep this installation manual together with the operation manual of his indoor units.

● Instruct the customer that the power should not be turned off even if the unit is not to be used for a long time. This will enable operation of the air-conditioner any time.
(Since the compressor bottom is warmed by the crank case heater, seasonal compressor trouble can be prevented.)

9. CAUTIONS FOR SERVICING (for R410A and compatible machines)

(1) To avoid mixing of different types of oil, use separate tools for each type of refrigerant.
(2) To avoid moisture from being absorbed by the refrigerant oil, the time for when the refrigerant circuit is open should be kept as short as possible. (Within 10 min. is ideal.)
(3) For other piping work, airtightness testing , vacuuming, and refrigerant charging, refer to section 4, REFRIGERANT PIPING.
(4) Diagnostic Inspection Procedures
For the meanings of failure diagnosis messages, refer to the technical manual.
(5) 7-segment LED indication
Data are indicated when so chosen with the indication selector switch. For the details of indication, refer to the technical manual.
(6) Internal wiring
After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

5.2 Method for connecting the accessory pipe

PSC012D028C

- Be sure to use the accessory pipe to connect the operation valve on the gas side with the field pipe.
- Be sure to ues the straight pipe (Procured at the field) shown in the table 1 applicable to the model of outdoor unit.
- When tightening the flare, connect the pipe securely by pressing the flared face of pipe against the operation valve.
- When brazing between the pipe in place and the attached pipe, confirm that no excessive force is applied to the flare joint. Otherwise gas could leak from the flare joint.
- Connect the attached pipe according to the following steps ①～⑤.

① Referring to Table 2 and Table 3, prepare the straight pipe and the elbow in the field, which are used in the construction examples Ⓐ～Ⓓ applicable to the connecting direction.

② Firstly, use the accessory pipe to assemble the connecting pipe assembly outside the outdoor unit. (As showm in the figure of connecting examples Ⓐ～Ⓓ.)

③ After assembling the connecting pipe, connect it to the operation valve on the gas side inside the outdoor unit. Tighten the flare nut with appropriate torque.

Proper torque	
φ19.05	100～120N･m

④ After connection of the connecting pipe assembly to the operation valve on the gas side, braze the connecting pipe assembly and the field pipe.

⑤ When connecting pipe contacts wiring, attach heat insulating material to the pipe in order to prevent from contacting of the pipe and wiring. (If the wiring is rubber with the pipe and the cover of wiring is teared, there is a risk of a short circuit or an electtric shock.)

About brazing

- Be sure to braze while supplying nitrogen gas.
  If no nitrogen gas is supplied, a large amount of impurity (oxidized film) will be generated, which may clog the capillary tube and the expansion valve, resulting in fatal malfunction.

Table 1 Pipe specification

		Refrigerant line (one way) length (m)	
Single type	250V	≦35(m)	φ22.22 x T1.0
		≦70(m)	φ25.4 x T1.0 or φ28.58 x T1.0
Multi type	224KXZPE1	≦90(m)	φ19.05 x T1.0
		≦120(m)	φ22.22 x T1.0
	280KXZPE1	≦90(m)	φ22.22 x T1.0
		≦120(m)	φ25.4 x T1.0 or φ28.58 x T1.0

- Be sure to use pipes of 1／2H material, and wall thickness above 1mm. (Pressure resistance of O-type pipe is not enough)

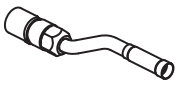
Table 2 Parts used for the connecting pipe assembly

No.	Name	Quantity	Remark
1	Accessory pipe A	1	Accessory
2	Straight pipe①	1	Procured at the field
3	Straight pipe②	1 or 0	Procured at the field (Not required for downward direction)
4	Elbow	1 or 0	Procured at the field (Not required for downward direction)

Table 3 Length and specification of straight pipe (Procured in the field)

	ⒶDownward	ⒷForward	ⒸRightward	ⒹBackward
Straight pipe①	400mm or more	192.5～202.5mm	192.5～202.5mm	210mm
Straight pipe②	-	105mm or more	155mm or more	370mm or more

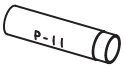
A



Accessory pipe A x 1 pc (Except 224KXZPE1)

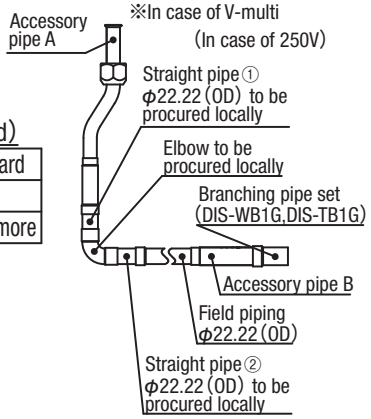
Heat insulating material is attached to the accessory pipe with band. When installing the heat insulating material, cut the band and retrieve it.

B



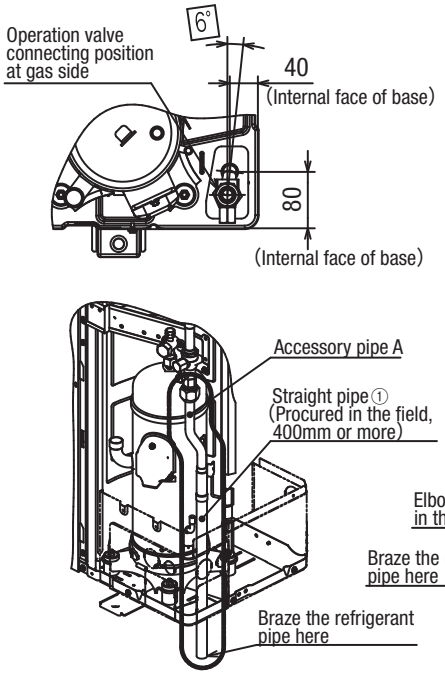
Accessory pipe B x 1 pc (Only use for 250V)

- Branching pipe set can be used by using the accessory pipe B. When φ22.22(OD) size of the indoor unit gas pipe is used, the accessory pipe B is unnecessary.

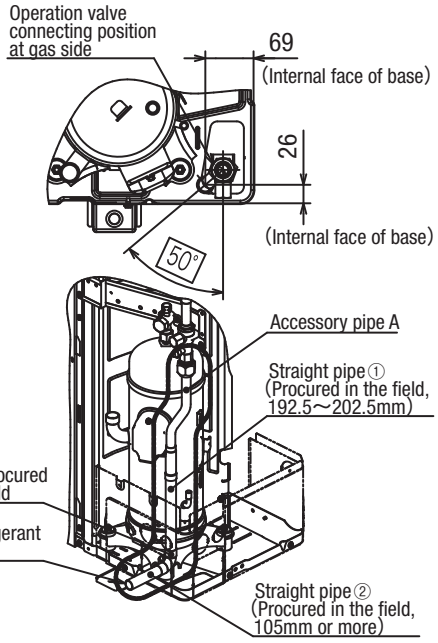


【Connection example Ⓐ～Ⓓ applicable to the connecting direction.】

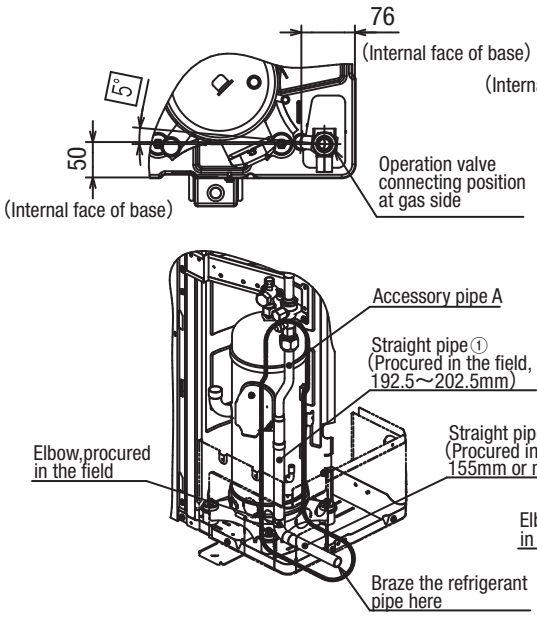
● The piping angle shown below is an example in case of 15mm of heat insulating material.
Adjust an angle, according to the thickness of heat insulating material.
Pass the connecting pipe in a hole after angle adjustment.



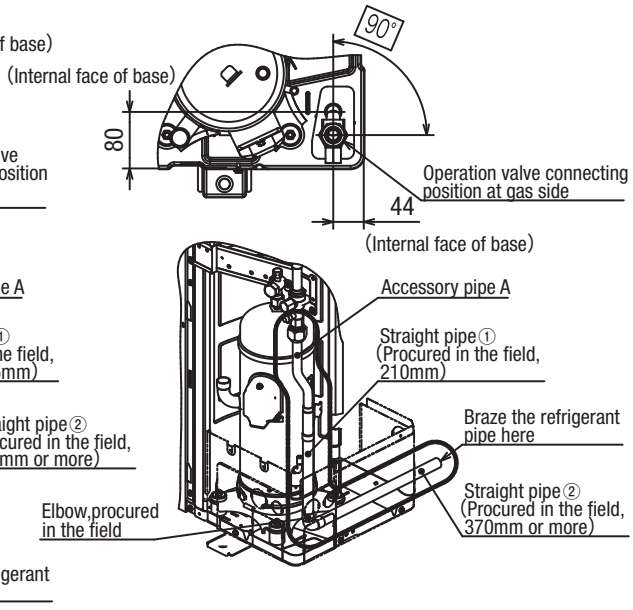
Connection example of refrigerant pipe-Ⓐ
(Downward connection)



Connection example of refrigerant pipe-Ⓑ
(Forward connection)



Connection example of refrigerant pipe-Ⓒ
(Rightward connection)



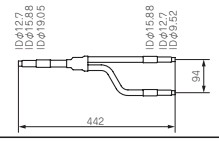
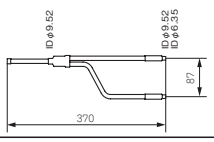
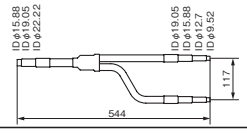
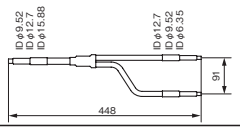
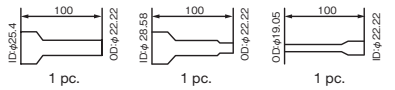
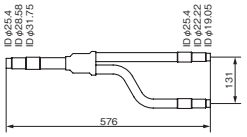
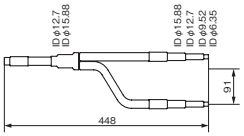
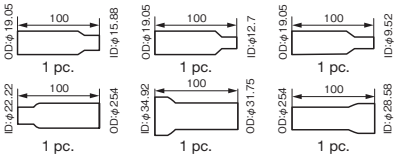
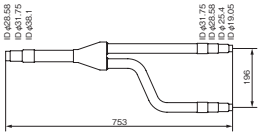
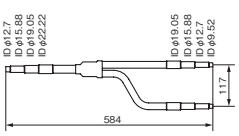
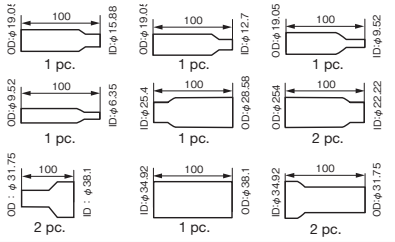
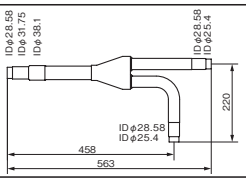
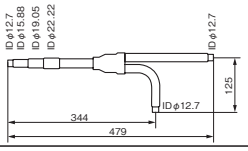
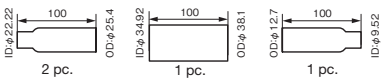
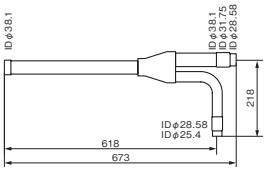
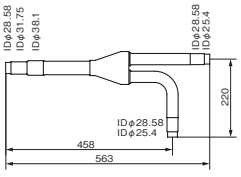
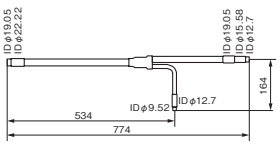
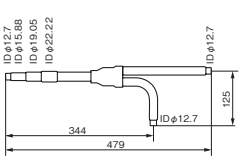
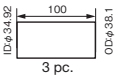
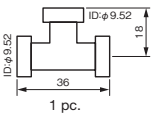
Connection example of refrigerant pipe-Ⓓ
(Backward connection)

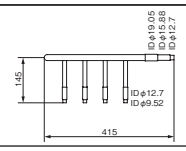
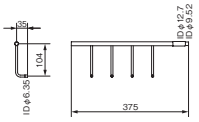
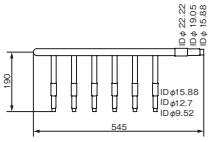
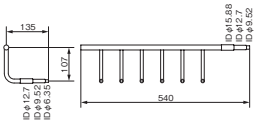
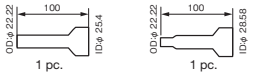
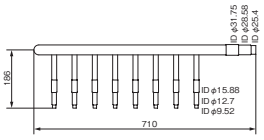
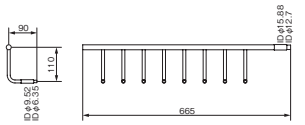
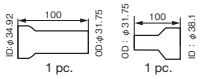
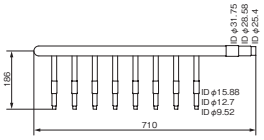
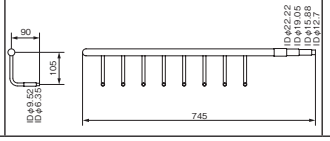
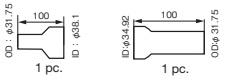
5.3 Instructions for installing the branch pipe set

PSB012D855D

◎ This manual describes the specifications of branching pipe set and header set installation. For outdoor unit installation and indoor unit installation, please refer to the respective installation manuals supplied with your outdoor unit and indoor unit.
◎ Before you set about installation work, please read this manual carefully so that you can carry out installation work according to the instructions contained herein.
● Please read the safety instructions contained in the installation manual supplied with your outdoor unit carefully and carry out installation work unerringly.
● When installation work is completed, conduct a test run to check the installation for any anomaly. Please also give the customer necessary instructions as to the operation and maintenance of the unit pursuant to the instruction manual (supplied with the indoor unit).
● Please ask the customer to keep the installation manual on the customer's part together with the instruction manual.

PARTS LIST

Branching pipe set type		Gas side	Liquid side	Different diameter pipe joint
Branching pipe set	DIS-22-1G			None
	DIS-180-1G			
	DIS-371-1G			
	DIS-540-3			
Outdoor unit's branching pipe set	DOS-2A-3			
	DOS-3A-3	Branch pipe 1  Branch pipe 2 	Branch pipe 1  Branch pipe 2 	 

Branching pipe set type	Gas side	Liquid side	Different diameter pipe joint
HEAD4-22-1G			None
HEAD6-180-1G			
HEAD8-371-2			
HEAD8-540-3			

INSTALLATION PROCEDUCE

1. Please select an appropriate branching pipe set model and a pipe size by consulting with the installation manual of the indoor unit or other relevant technical documents.

Attention

① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and a branching pipe.

② Use a pipe conforming to a pipe size specified for outdoor unit connection for the section between an outdoor branching pipe and an outdoor unit.

2. Cut a branching pipe set or a different diameter joint with a pipe cutter to make it fit for a selected pipe size before application.

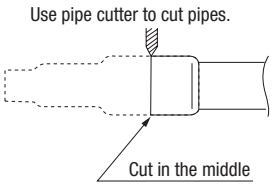
Attention

① In cutting pipes, always use a pipe cutter. Remove burrs from a cut end when you cut a pipe. In doing so, keep a cut end downward so that no chips or burrs may enter the pipe.

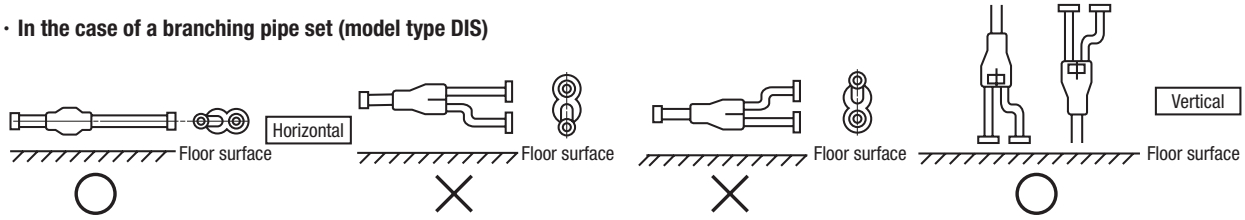
② Take utmost care so that no foreign matter such as dust or water may enter piping during installation work.

- Please cover all the open ends of piping until installation work is completed. Particularly, any openings in the section of piping laid outdoors should be sealed stringently.
- As long as possible, avoid open ends left facing upward. Make them face either horizontally or downward.

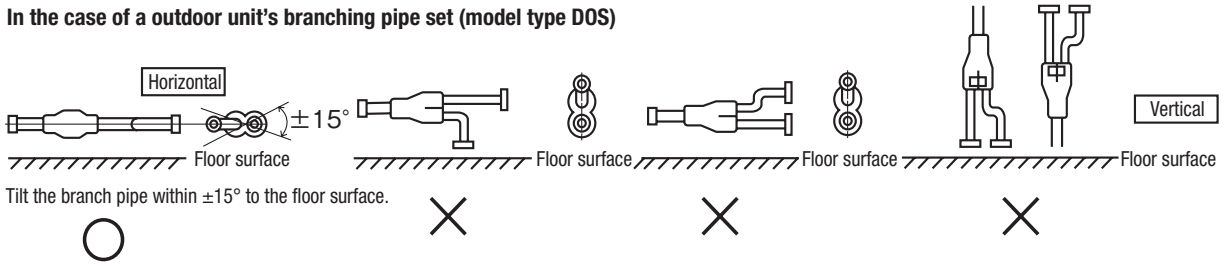
③ A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.



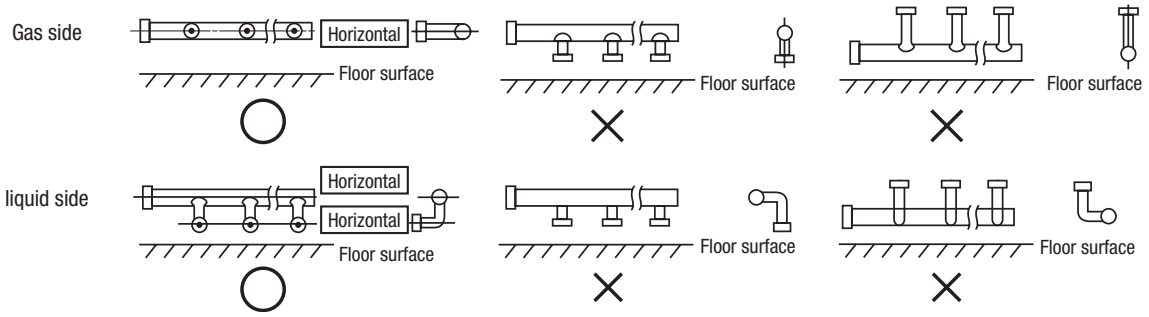
- **In the case of a branching pipe set (model type DIS)**



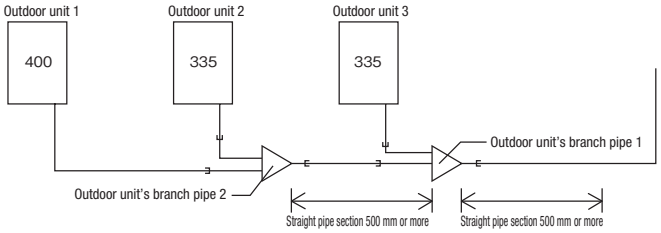
- **In the case of a outdoor unit's branching pipe set (model type DOS)**



・**In the case of a header set (model type HEAD)**



④ When using the outdoor unit's branch pipe set, make sure to secure a straight section of 500 mm or more for both the gas and liquid pipes before branching them.



⑤ Always apply nitrogen gas when soldering joints. If nitrogen gas is not applied, a large amount of film oxide will be formed which could lead to a critical failure in the unit. Use caution to prevent moisture or any foreign matters from entering the pipe when connecting pipe ends.

For the method of air tightness testing and pulling air, please refer to the installation manual of the outdoor unit.

⑥ Do not leave piping with any open ends uncovered to prevent water or foreign matters from entering inside.

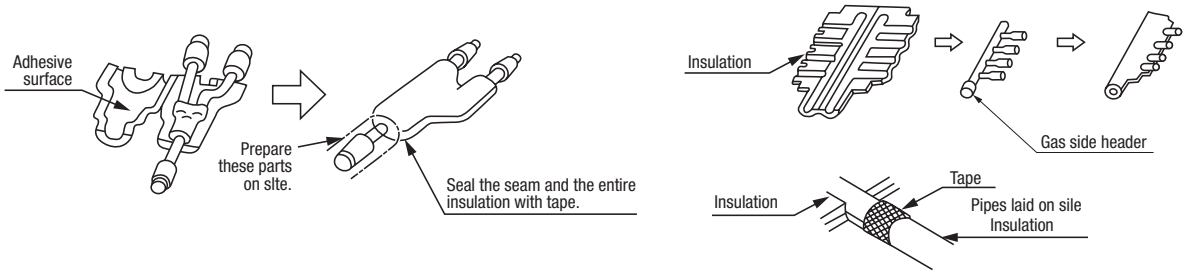
3. Please dress it with an attached insulation sheet for heat insulation. (Please dress both liquid and gas sides)

Attention

① A1pply an attached insulation sheet along a pipe, tape the joining line with a joint tape (to be procured on the installer's part) for complete sealing, and wrap the pipe and insulation sheet entirely with a tape.

② Dress both liquid and gas pipes with attached insulation sheets for heat insulation.

③ Ensure that the liquid pipe is given the heat insulation as good as that of the gas pipe. The absence of heat insulation can cause dripping water from dew condensing on the pipe or performance degradation.



4. How to select a branching pipe

(1) Method to select a branch pipe set (Type DIS)

● An appropriate branching pipe size varies depending on the capacity of connected indoor units (combined total capacity connected downstream), so please choose from the table below.

● In the case of a 140/160 (5/6HP) outdoor unit, however, select DIS-22-1G. (Even if the capacity of connected indoor units reaches 180 or higher, select DIS-22-1G.)

Total capacity downstream	Branching pipe set model type
less than 180	DIS-22-1G
180 or higher – less than 371	DIS-180-1G
371 or higher – less than 540	DIS-371-1G
540 or more	DIS-540-3

Attention

① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and an indoor unit side branching pipe.

② A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.

(2) How to select a header set

● Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).

● For the size of a plugged pipe, please refer to the documentation for a header set (optional part).

● In the case of a 140/160 (5/6HP) outdoor unit, however, select HEAD4-22-1G. (Even if the capacity of connected indoor units reaches 180 or higher, select HEAD4-22-1G.)

Total capacity downstream	Header set model type	Number of branches
less than 180	HEAD4-22-1G	Up to 4 branches
180 or higher – less than 371	HEAD6-180-1G	Up to 6 branches
371 or higher – less than 540	HEAD8-371-2	Up to 8 branches
540 or more	HEAD8-540-3	Up to 8 branches

Attention

① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between a header and an indoor unit.

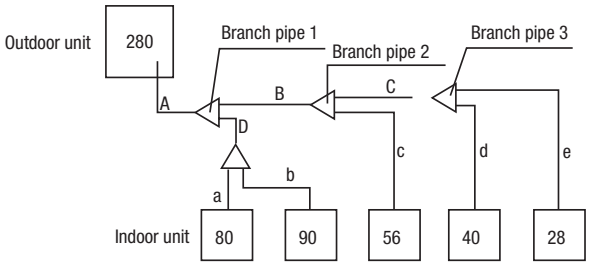
② Always position a header (both gas and liquid headers) in such a way that it branches horizontally.

③ No 224 or 280 indoor unit is connectable to a header.

5. Example of piping

Example 1: Branching type configuration

Connected capacity: 294

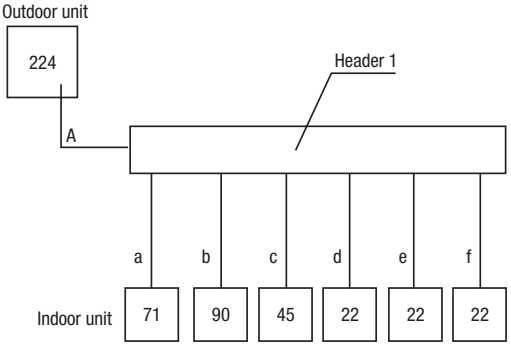


Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (80+90+56+40+28) =294	DIS-180-1G
Branch pipe 2	Combined total capacity of indoor units connected downstream (56+40+28) =124	DIS-22-1G
Branch pipe 3	Combined total capacity of indoor units connected downstreamm (40+28) =68	DIS-22-1G

Example 2: Header type configuration

Connected capacity:272

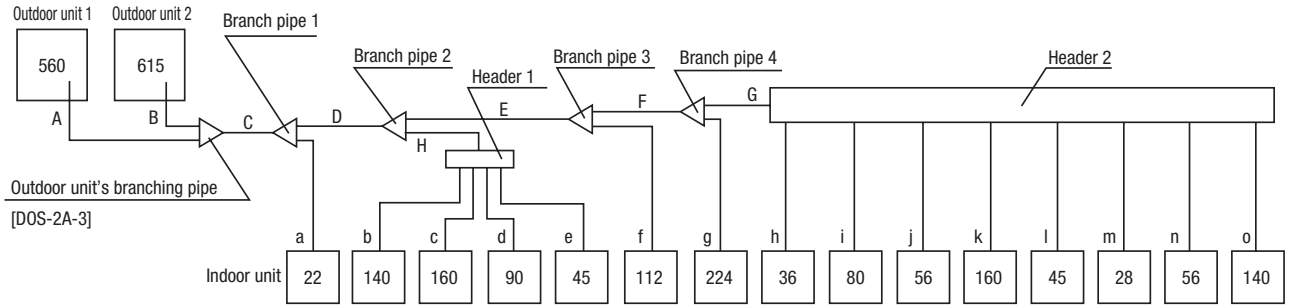


Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (71+90+45+22+22+22) =272	HEAD6-180-1G

Example 3: Branching + Header mixed type configuration

Connected capacity: 1394



Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (22+140+160+90+45+112+224+36+80+56+160+45+28+56+140) =1394	DIS-540-3
Branch pipe 2	Combined total capacity of indoor units connected downstream (140+160+90+45+112+224+36+80+56+160+45+28+56+140) =1372	DIS-540-3
Branch pipe 3	Combined total capacity of indoor units connected downstream (112+224+36+80+56+160+45+28+56+140) =937	DIS-540-3
Branch pipe 4	Combined total capacity of indoor units connected downstream (224+36+80+56+160+45+28+56+140) =825	DIS-540-3

Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (140+160+90+45) =435	HEAD8-371-2
Header 2	Combined total capacity of indoor units connected downstream (36+80+56+160+45+28+56+140) =601	HEAD8-540-3

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