Manual No. '14• KX-SM-200
updated March 30, 2018

MITSUBISHI HEAVY INDUSTRIES

SERVICE MANUAL

VRF INVERTER MULTI-SYSTEM AIR-CONDITIONERS

KXZW Heat source units

Water cooled series

- **Single use (Used also for combination)**
  FDC224KXZWE1, 280KXZWE1, 335KXZWE1
- **Combination use**
  FDC450KXZWE1, 500KXZWE1, 560KXZWE1, 615KXZWE1, 670KXZWE1, 730KXZWE1, 775KXZWE1, 850KXZWE1, 900KXZWE1, 950KXZWE1, 1000KXZWE1

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

MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.

CONTENTS

1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER 1
1.1 Remote control (option parts) 1
1.2 Operation control function by the wired remote control 4
1.3 Operation control function by the indoor control 9
1.4 Operation control function by the outdoor control 22
2. SYSTEM TROUBLESHOOTING PROCEDURE 56
2.1 Basics of troubleshooting 56
2.2 Explanation of troubleshooting 57
2.3 Contents of troubleshooting 58
2.4 Heat source unit control PCB replacement procedure 113
2.5 Heat source unit inverter PCB replacement procedure 115
2.6 Heat source unit transistor module replacement procedure 117
2.7 Heat source unit diode module replacement procedure 118
3. ELECTRICAL WIRING 120
4. PIPING SYSTEM 121
5. APPLICATION DATA 122
5.1 Installation of heat source unit 122
5.2 Instructions for installing the branch pipe set 146
6. OUTDOOR UNIT DISASSEMBLY PROCEDURE 151
7. INDOOR UNIT DISASSEMBLY PROCEDURE 153

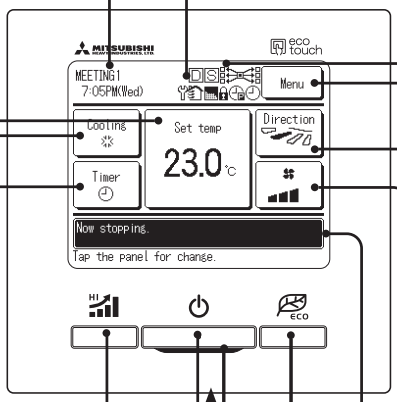
1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

1.1 Remote control (option parts)

(1) Wired remote control

(a) 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.

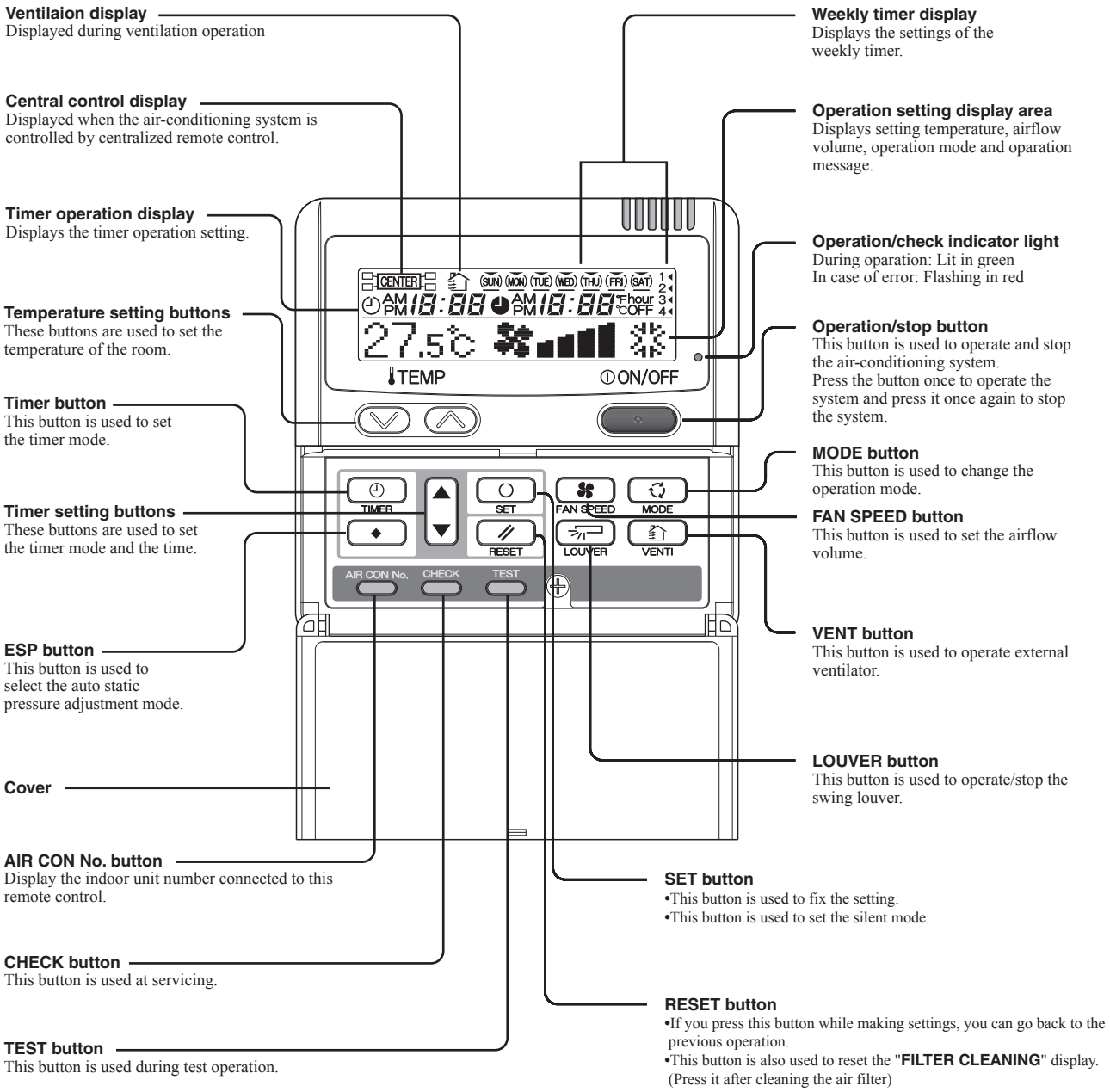
⑧ Icon display
Each icon is displayed when one of following settings is going on.

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

(b) 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.

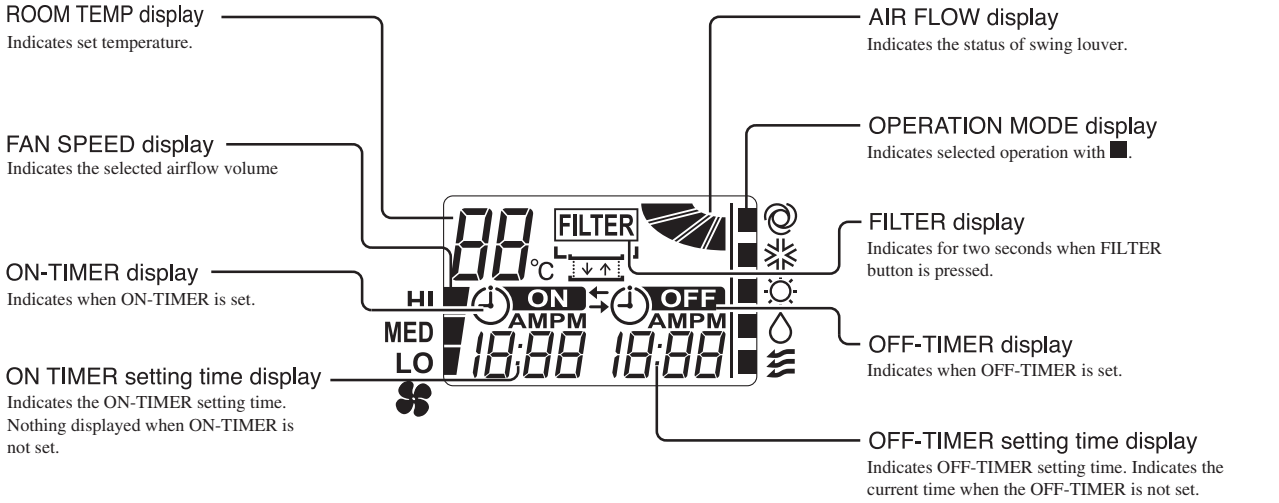
The figure below shows the remote control with the cover opened.



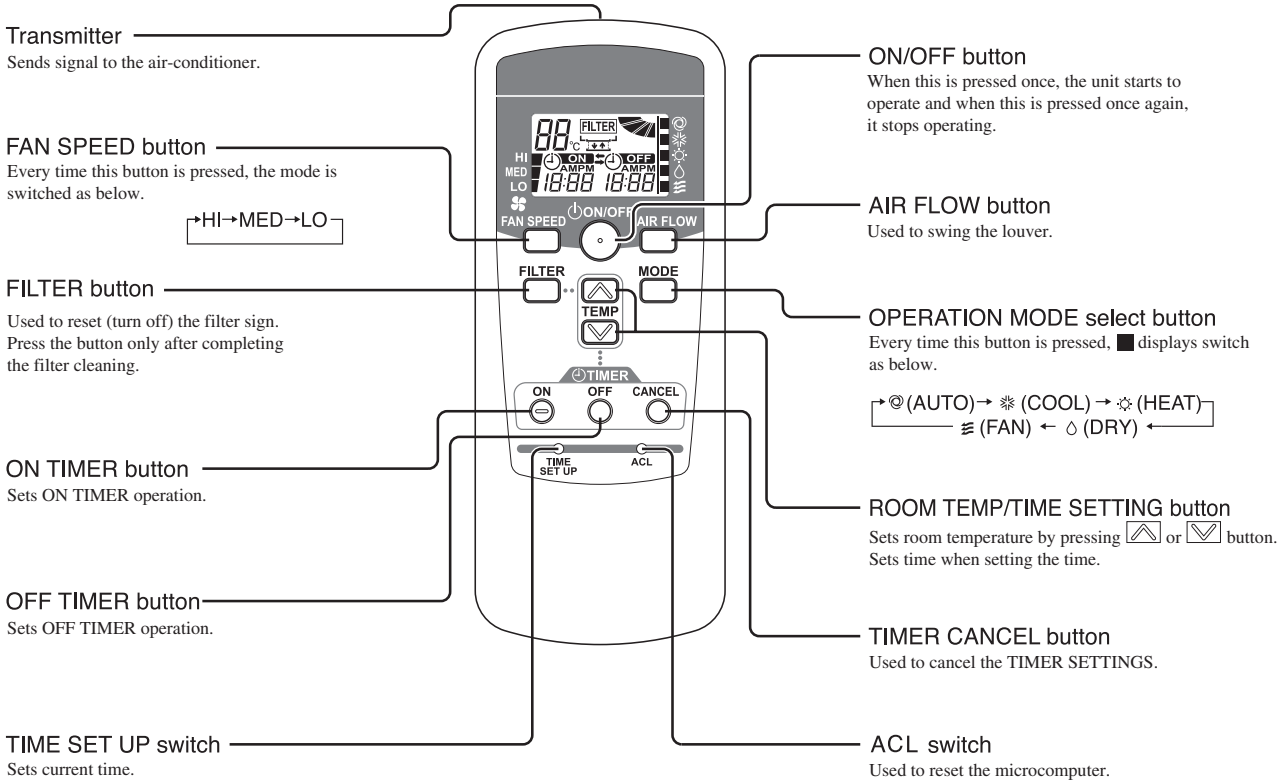
∗ All displays are described in the liquid crystal display for explanation.

(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

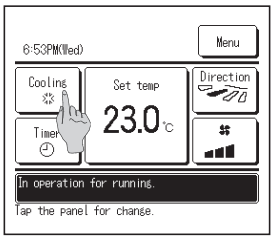
(1) Switching sequence of the operation mode switches of remote control

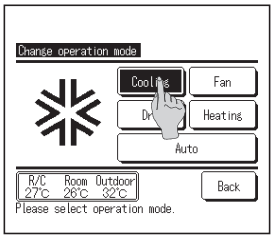
(a) Tap the change operation mode button on the TOP screen.

(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.



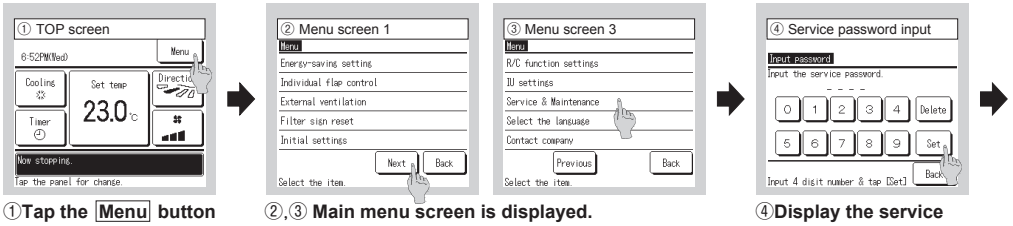


Notes(1) Operation modes which cannot be selected depending on combinations of IU and OU are not displayed.

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

(2) CPU reset

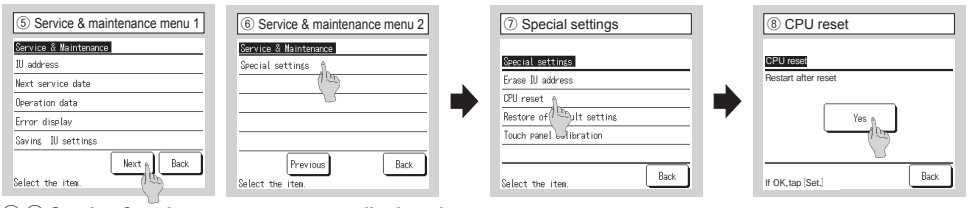
Reset CPU from the remote control as follows.



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).



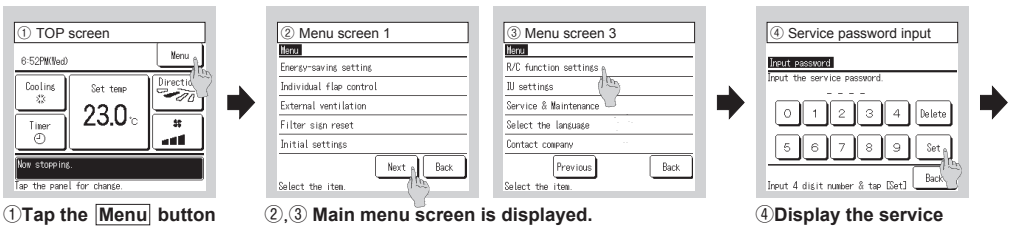
⑤,⑥ Service & maintenance menus are displayed.

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)

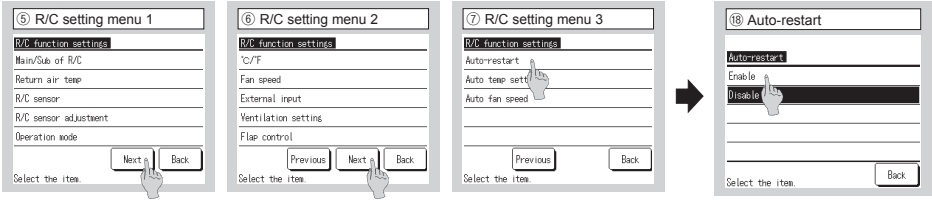
Enable the Auto-restart function from the remote control as follows.



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 temp 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

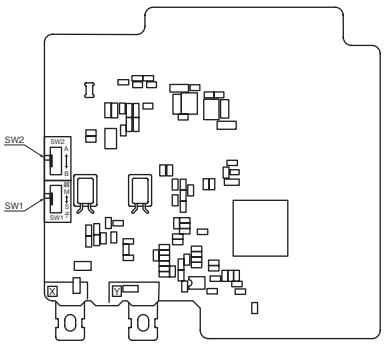
(e) Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

(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.

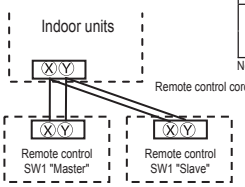
(h) Sleep timer and weekly timer settings (Other timer settings are not memorized.)

[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	×	×	×	○	○	○(×)	×
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 supply 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.

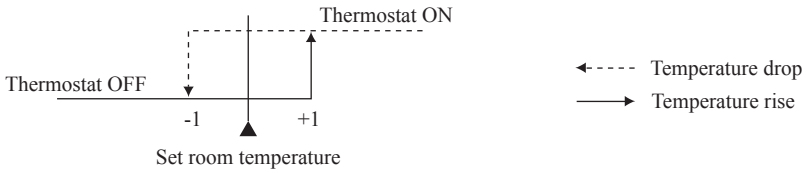
Note (1) When the indoor function of wired remote control "POSITION" has been switched, switch also the remote control function "POSITION" in the same way.

(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.

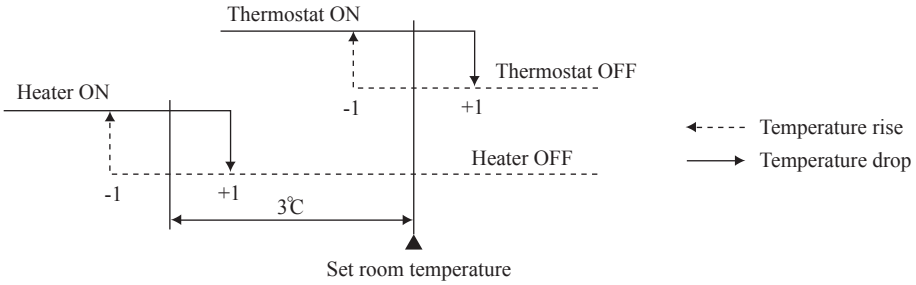


(iii) Thermostat is turned ON when the room temperature is in the range of -1 < Set temperature < +1 at the start of cooling operation (including from heating to cooling).

(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)

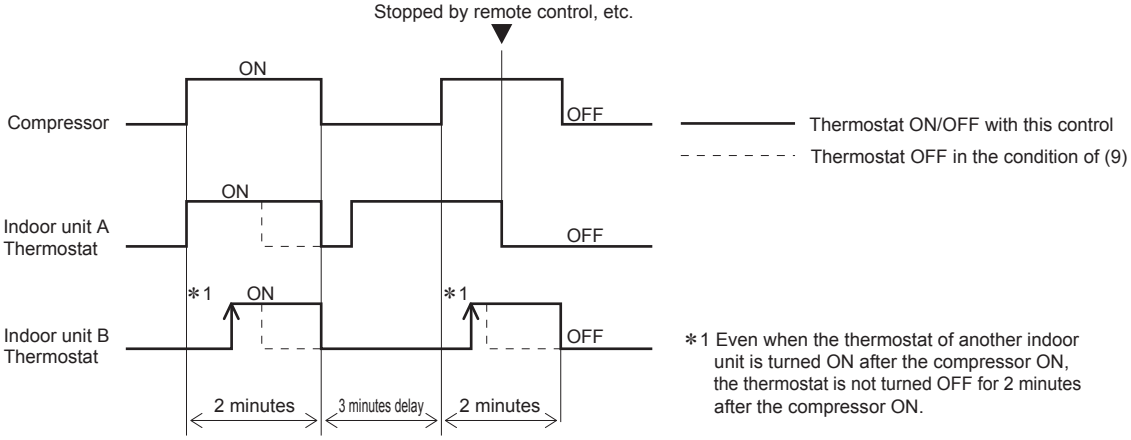
Note (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote control "FILTER SIGN SET". (It is set at TYPE 1 at the shipping from factory.)

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.

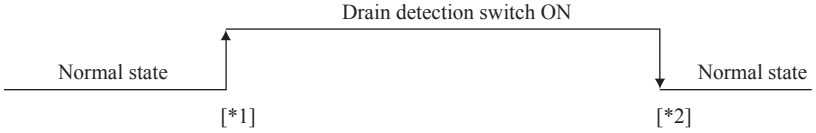
(iii) ❄ AND ☼ AND ≡ 〔Operate in heating & fan〕: Drain pump is run during cooling, dry, heating and fan.

(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 heat source unit but it allows performing operation in respective modes by operating the remote control.

(d) Drain pump test run mode

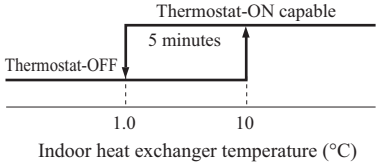
As the drain pump test run is established, the drain pump only operates and during the operation protective functions by the microcomputer of indoor unit become ineffective.

(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 heat source 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

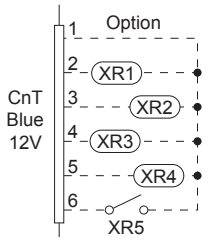
(a) Broken wire detection
When the return air temperature thermistor detects -20°C or lower or the heat exchanger temperature thermistor detect -40°C or lower for 5 seconds continuously, the compressor stops. After a 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes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

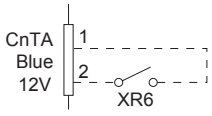
Be sure to connect the wired remote control to the indoor unit. Without wired remote control remote operation by CnT is not possible to perform.

・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 heat source 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.

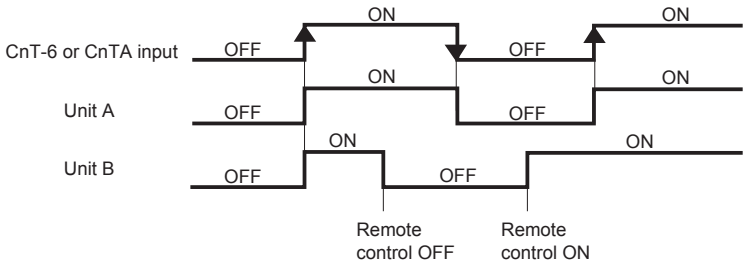
① **Operation output:** Outputs DC12V signal for driving relay during operation
② **Heating output:** Outputs DC12V signal for driving relay during heating operation
③ **Thermostat ON output:** Outputs DC12V signal for driving relay when compressor is operating.
④ **Error output:** Outputs DC12V signal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

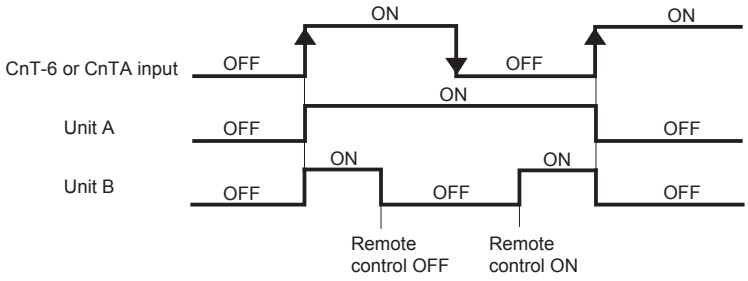
Input signal to CnT-6 or CnTA is OFF→ON …… unit ON
Input signal to CnT-6 or CnTA is ON→OFF …… unit OFF
Operation is not inverted.



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)

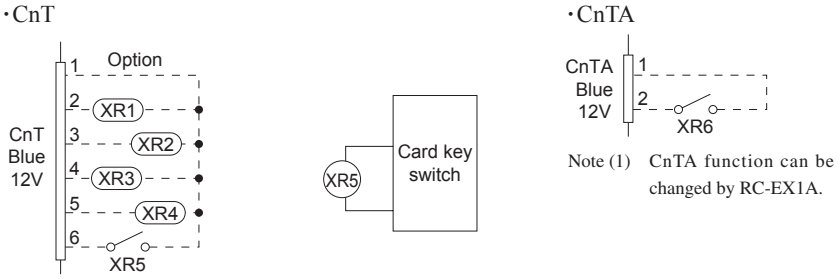
It is effective only when the input signal to CnT-6 or CnTA is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



(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.

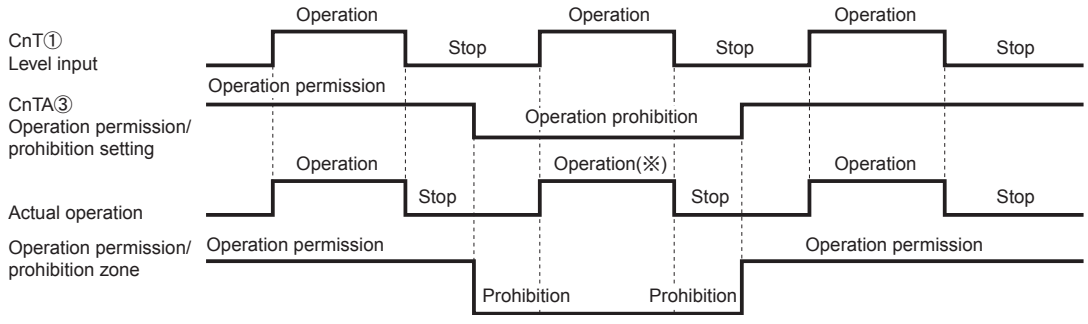
*(2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";

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.

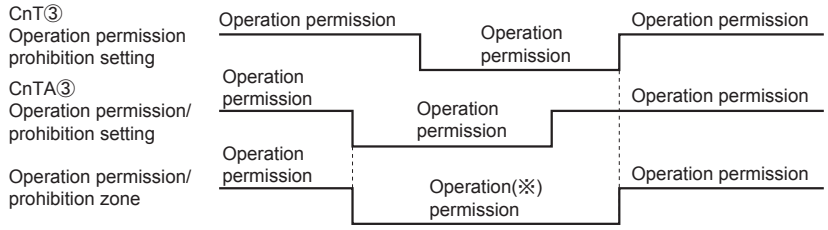
(3) This function is invalid only at "Center mode" setting done by central control.

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



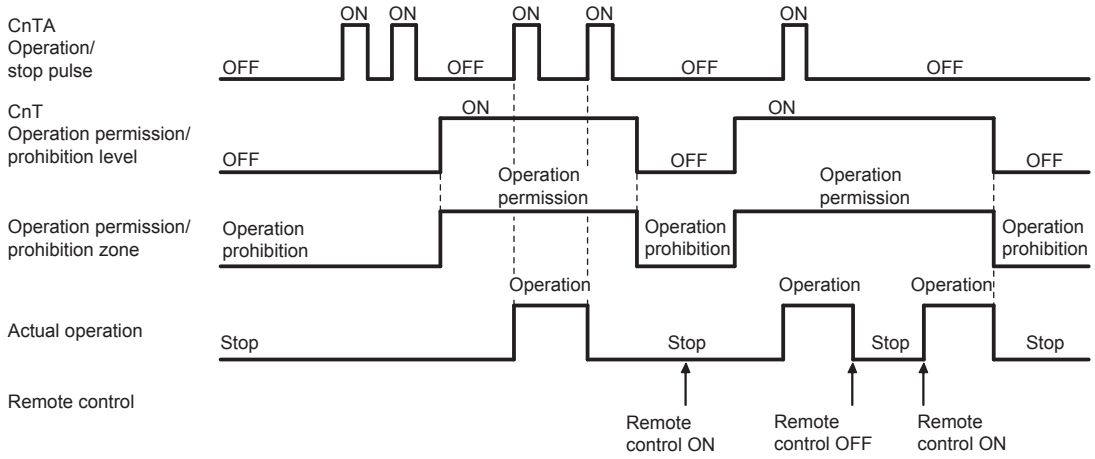
(※) CnT level input supersedes CnTA operation prohibition.

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



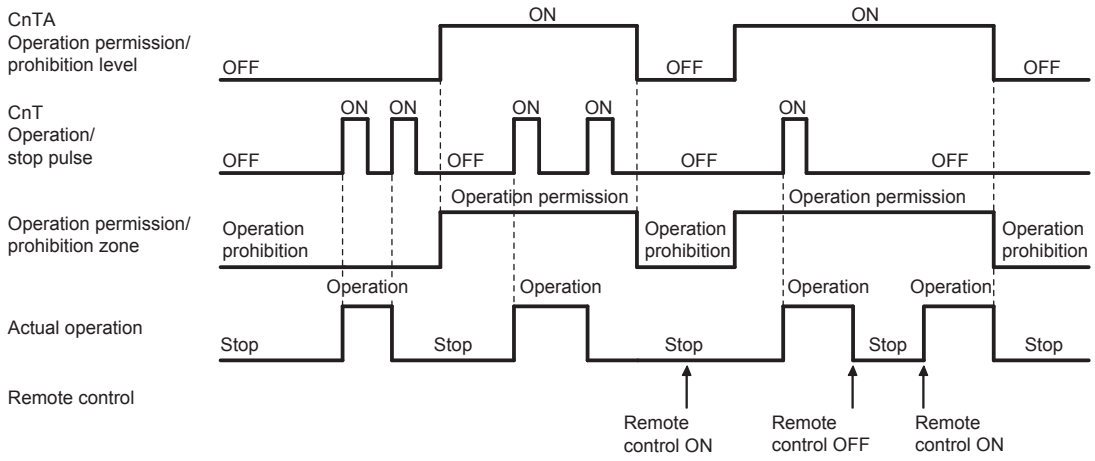
(※) Operation prohibition zone is determined by the OR judgment between CnT Operation prohibition zone and CnTA Operation prohibition zone.

(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

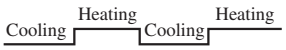
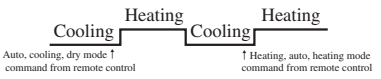
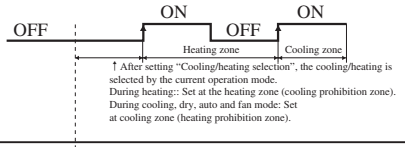
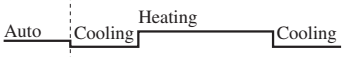
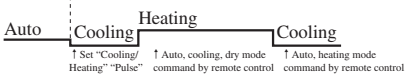
(a) When "External input 1 setting: Cooling/heating" is set for the indoor unit function from remote control, the cooling or heating is selected with CnT-6 or CnTA.

(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.

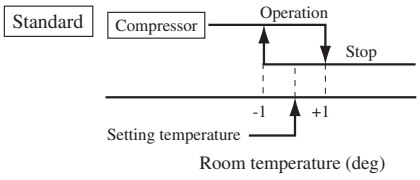
■ Selection of cooling/heating external input function

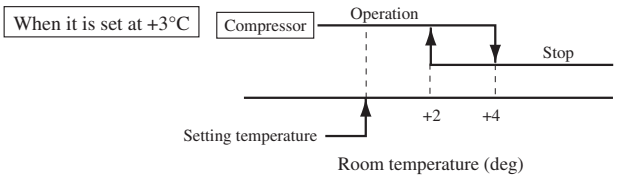
External input selection	External input method	Operation	
External input selection Cooling/heating selection	⑤ Level	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	
	⑥ Pulse	External terminal input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	

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 heat source unit control

(A) Normal control

(1) Basic controls in each operation pattern and roles of functional components

		Operation pattern	
		C6	**E6**
Water heat exchanger condition		Condenser	Evaporator
Compressor control		Low pressure control	High pressure control
4 way valve	**20SM**	ON	OFF
	20SH	OFF	ON
Electronic expansion valve for water heat exchanger	**EEVW**	Fully open	SH control
Electronic expansion valve for sub-cooling	**EEVSC**	SH control / Td control	
Pressure valve for receiver	**EEVG**	High pressure control	Fully closed
Decompression valve for receiver	**SVR**	OFF(/ON)	OFF(/ON)
Solenoid valve for hot-gas bypass	**SVB**	ON/OFF	
Solenoid valve for oil return	**SVO**	ON/OFF	

Notes : Operations may differ from the above during the protective control, or other.

(2) Heat source operation mode

On the standard models of 2 pipe system, the heat source unit 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 heat source unit operation mode

Operation mode of heat source unit is determined based on respective signals of Operation/Stop and Cooling/Heating. The compressor, however, starts only upon confirmation of the start of water pump.

(b) Type of heat source unit operation mode

1) Heat source unit operation mode - Stop
2) Heat source unit operation mode - Cooling (C6)
3) Heat source unit operation mode - Heating (E6)

(c) Priority in operation mode selection.

1) First priority is given to the forced cooling/heating operation.
2) 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

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

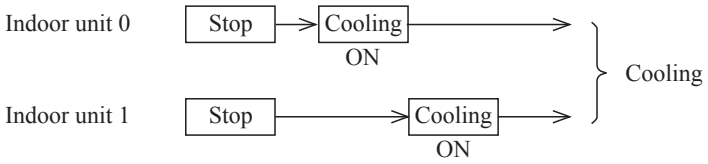
・Last unit's operation mode: Operation mode of the indoor unit which is operated at the last time

3) In the event that agreement of operation mode is lost between indoor units and heat source 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”

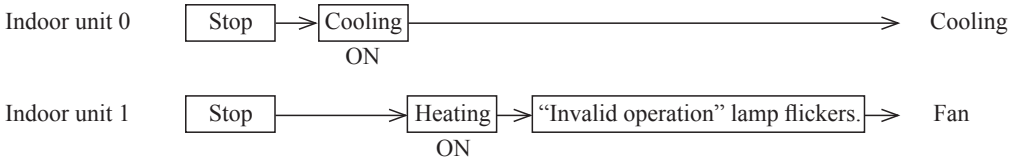
4) Example of operation mode selection

<First unit’s operation mode>

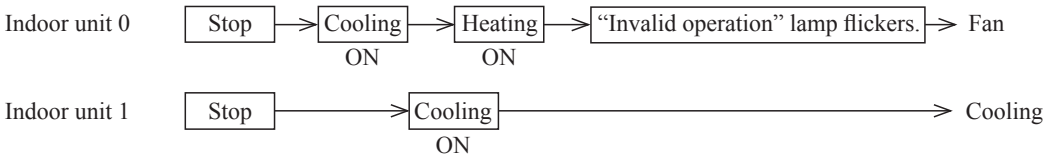
① If both of indoor units 0 and 1 have the same operation mode, it operates with the mode.



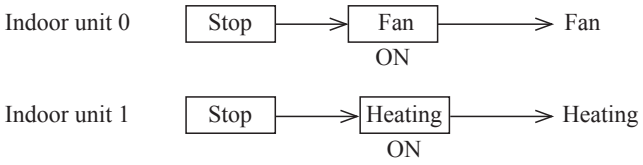
② Cooling does not match on indoor units 0 and 1 (Priority is given to previous operation.)



③ When it is changed from same mode to unmatch.

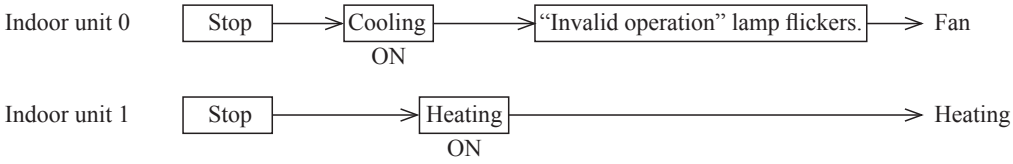


④ Operation mode is prepared for change in the fan mode.



<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.



5) 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 heat source 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.

(d) Forced cooling /heating operation (Master unit)

(Note) Following explanation is based on using CnG1 terminal and setting function [P09]-[2] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display.

CnS1: [P07]-[2] CnS2: [P08]-[2] CnG2: [P10]-[2]

1) When SW3-7 on the heat source unit control PCB is turned ON after setting function [P09]-[2] with 7-segment display, if CnG1 is shorted, forced heating operation is performed, but if CnG1 is open, forced cooling operation is performed.

2) If the different mode from the forced operation mode is commanded from indoor unit, the "mode unmatch" message is displayed on the LCD of remote control and the operation is entered in FAN mode.

SW3-7	ON	CnG1	Open	Operation in cooling only
			Shorted	Operation in heating only
	OFF	Normal operation		

(3) 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 heat source unit, the heat source 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 heat source 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 heat source unit receives the “Emergency stop reset” command from the indoor unit, the “Emergency stop reset” command is transmitted to all indoor units.

(4) Compressor control (Master unit/slave unit)

(a) Starting compressor

(i) Compressor starting order

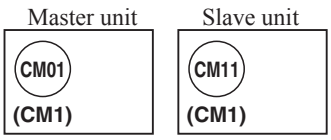
After turning the power on, firstly compressor starts. And corresponding to the condition of under-dome temperature and to the required capacity of indoor units thermostat ON, the next compressor will start sequentially, and finally maximum 3 compressors (in case of 3 heat source units combination use) will start simultaneously.

1) Single use (Model 224, 280, 335)

Range of the compressor operation speed relative to load is as follows.

System load range (Number of operating heat source units)	0	1
Local load range (Number of compressors operating in heat source units)	0	1
CM1	0rps	20–120rps

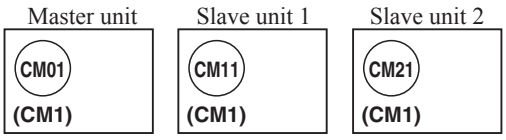
2) 2 heat source unit combination use (Model 450, 500, 560, 615, 670)



Range of the compressor operation frequency relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	1
Local load range		0	1	1
Master unit	CM01	0rps	20–112rps	41–120rps
Slave unit	CM11	0rps	0rps	41–120rps

3) 3 heat source units combination use (Model 730, 775, 850, 900, 950, 1000)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20–112rps	41–112rps	41–120rps
Slave unit 1	CM11	0rps	0rps	41–112rps	41–120rps
Slave unit 2	CM21	0rps	0rps	0rps	41–120rps

(ii) Rotation of compressor start/stop order

1) Heat source unit start order

- Start order for each heat source unit is set depending on the number of heat source units.
- Set the start order as shown in the following table, starting from the first in the heat source unit start order.
- When the power is turned on, the master unit is given the position of the first in the heat source unit start order.
- Pattern at the combination of 3 heat source units

Pattern / Start order	A-1	A-2	A-3	B-1	B-2	B-3
First	Master	Slave1	Slave2	Slave2	Slave1	Master
Second	Slave1	Slave2	Master	Slave1	Master	Slave2
Third	Slave2	Master	Slave1	Master	Slave2	Slave1

2) Rotation

- If the first in the heat source unit start order is changed, the rotation takes place.
- Change the first in the heat source unit start order at each time when one of or all heat source units stop.
- Pattern change at the combination of 3 heat source units

<Switching condition>

①When the ending conditions are established in the cooling oil return control.

②When the “Oil return condition cumulative timer = 10 hours” is set in the defrosting control.

<Switching method>

- Switch such that the first in the heat source unit start order for the Pattern A ⇔ Pattern B will become the same.

(5) Defrosting

The time conditions for defrosting only is implemented for the heating oil return operation.

〔**Time conditions for defrosting**〕

(a) Starting condition

When all of following conditions ①～⑦ are established

① Heat source unit operation mode: Heating

② When the accumulated system operation time has exceeded 33 minutes or more after starting the heating operation

③ When the accumulated system operation time has exceeded 33 minutes or more after ending the last defrosting

④ It has elapsed 1 minute and 45 seconds after the heating compressor ON.

⑤ Following cases are excluded:

・Operating in the capacity measurement mode

・ Accumulated compressor ON time is less than 40 minutes at the power ON

⑥ When the oil return start conditions are established (increased amount of oil loss or elapse of setting time), or when the "Forced oil return control input" is changed from the "Invalid (open)" to the "Valid (shorted)" by the allocation of external input functions.

⑦ Time conditions for defrosting cancel setting for the software input is invalid.

(b) Contents of control

Status 1: From the defrost start condition to the end of 4-way valve switching and the completion of preparation for compressor rpm UP.

Status 2: After the end of Status 1 to the establishment of defrost end condition.

Status 3: From the end of Status 2 to the compressor rpm DOWN.

Operation of functional component

		before	Status 1	Status 2	Status 3	After
Compressor		Heating operation	Compressor rpm on all units < Min. rpm	Compressor rpm on all units = Max. rpm	Stop	Reset
4 way valve	20SH	ON	(115 seconds after) OFF	Maintain	Maintain	ON
	20SM	OFF	(115 seconds after) ON	Maintain	Maintain	OFF
EEVW		Normal control	(115 seconds after) Full open	Maintain	Fully shut	Normal control
EEVSC		Normal control	Fully shut	Maintain	Maintain	Normal control
EEVG		Normal control	Fully shut	High pressure control	Fully shut	Normal control
SVO		OFF	ON	Maintain	Maintain	OFF
SVR		ON	OFF	Maintain	Maintain	ON
EEV for indoor unit		Normal control	Aperture command is sent depending on condition.	Maintain	Maintain	Normal control

(c) Ending condition

When one of the following conditions is established.

① At the end of the defrost status 3.

② When the heat source unit operation mode has changed to any other than the heating.

③ Stop of all compressors after detecting an anomalous condition.

④ During pump down control after defrosting stopped.

⑤ When the pump down for replacement control began.

(6) 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-D 1) exceed 120ºC, the compressor speed is reduced gradually. (To20 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, and 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, 52C1 is turned off, 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) Power transistor temperature (PT) protective control

If temperatures on the power transistor exceed the setting value, the compressor speed is reduced gradually.
It reduces to 20 rps at the lowest.

(h) 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.

(i) Protection for combination of heat source units (Master unit)

The capacity of connectable heat source units is checked when the communication check is performed after turning the power ON.
If the checked result is other than the allowable combinations mentioned in the following table ① it is prohibited to start operation due to heat source unit combination error.

(i) When this error occurs, the error code mentioned in the following table ② is displayed on the 7-segment display.

Table① combination list

Capacity	Combination patterns
450	Combination (224+224)
500	Combination (224+280)
560	Combination (280+280)
615	Combination (280+335)
670	Combination (335+335)

Capacity	Combination patterns
730	Combination (224+224+280)
775	Combination (224+280+280)
850	Combination (280+280+280)
900	Combination (280+280+335)
950	Combination (280+335+335)
1000	Combination (335+335+335)

Table② Contents displayed on 7-segment display at the combination error

Code display area	Data display area	Contents of invalid operation
oPE	3	Invalid combination of heat source units

(ii) When the following series is the combinations of different models

- Cooling/heating selection series unit
- Simultaneous heating/cooling series unit

(B) Option controls

• External input terminal

① 4 External input terminals (CnS1, CnS2, CnG1 and CnG2) are provided. (See Fig-1)

② Each external input terminal can be changed its function by allotting the external input function No. of P07-P10 selected with 7-segment respectively. (External input functions of the code P07-P10 are shown in Fig-2)

External input terminal			External input function allotment of 7-segment		
Terminal	Specification	Factory setting	Code	Function No.	Factory setting
CnS1	No voltage contact (DC12V)	Shorted	P07	"0"-"9"	"0"
CnS2	No voltage contact (DC12V)	Shorted	P08	"0"-"9"	"1"
CnG1	No voltage contact (DC12V)	Open	P09	"0"-"9"	"2"
CnG2	No voltage contact (DC12V)	Open	P10	"0"-"9"	"3"

Fig-1

③ The following function is effective, when the external input function of PXX-"X" is allotted and the signal is input to the external terminal of CnXX.

(Example) If CnS1 terminal is used for demand control (pulse input), allot the "1" of P07 and open J13, and if CnS2 terminal is used for demand control (level input), allot the "1" of P08 and short J13.

By changing the allocation of external input function (P07-10) on the 7-segment, functions of external input terminal may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for external input function assignment	External input terminal shorted	External input terminal open
“0” : External operation input	Permitted	Prohibited
“1” : Demand input *1	Invalid	Valid
“2” : Cooling / heating forced operation input	Heating	Cooling
“6” : Test run external input 1 (SW5-1 equivalent)	Test run start	Normal
“7” : Test run external input 2 (SW5-2 equivalent)	Cooling	Heating
“9” : 2-step demand input *1	Invalid	Valid
“12”: Building multi energy save control	Valid	Invalid

*1 According to the demand setting table.

Fig-2

*1 Demand setting table

Demand control	Function assignment 1	Function assignment 9
None (Normal)	Shorted	Shorted
1-step	Open	Shorted
2-step	Open	Open

④ J13: Switching of CnS1,S2 input method (CnS1, S2 only)

J13 shorted: Level input by CnS1, S2

J13 open : Pulse input by CnS1, S2

*1 "Setting" means;

Master : Set only the master unit. (No necessary to set the slave unit)

Master/Slave: Set both master/slave unit same.

(1) External input and demand input (Master unit/Slave unit)

(a) Operation permission or prohibition mode

(Note) Following explanation is based on using CnS1 terminal and setting function [P07]-[0] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display.

CnS2: [P08]-[0] CnG1: [P09]-[0] CnG2: [P10]-[0]

1) Operation permission or prohibition mode is switched with the connector (CnS1) and the Jumper wire (J13) on the heat source unit control PCB after setting function [P07]-[0] (Factory setting) with 7-segment display

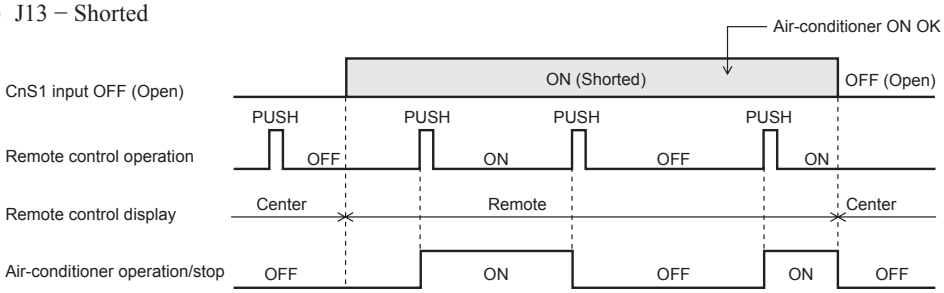
2) Operation permission/prohibition control by the external input CnS1 to heat source unit.

Input: CnS1	Switching CnS1 input method:J13	CnS1: Switching operation permission/prohibition mode
Shorted → Open	Shorted (Level input)	Operation prohibition mode → Operation permission mode
	Open (Pulse input)	Switching operation permission/ Operation prohibition mode (Reversal)
Shorted → Open	Shorted (Level input)	Operation permission mode → Operation prohibition mode
	Open (Pulse input)	(NOP)

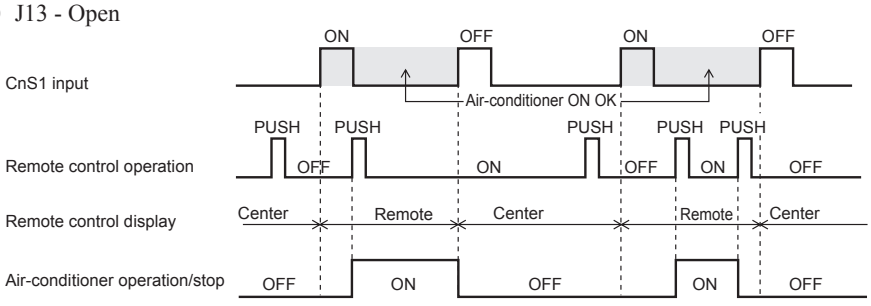
Note (1) Factory setting J13: Shorted, CnS1: Shorted (Short pin is connected)

3) The operation condition is displayed on the LCD of remote control and it is transferred to option centralized control.
4) When the operation command from remote control is not accepted by this control, "Center" is displayed on the LCD of remote control.
5) CnS1 performs the following operation according to switching the jumper wire (J13) shorted or open. In case of pulse input, the pulse width is 500ms or larger.

① J13 − Shorted



② J13 - Open



(b) Demand control

(Note) Following explanation is based on using CnS2 terminal and setting function [P08]-[1] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display

CnS1: [P07]-[1] CnG1: [P09]-[1] CnG2: [P10]-[1]

1) Demand control or normal control is switched with the connector (CnS2) and the jumper wire (J13) on the heat source unit control PCB after setting function [P08]-[1] (Factory setting) with 7-segment display.

J13: Switching of CnS2 input method

J13 shorted: Level input by CnS2

J13 open : Pulse input by CnS2

2) Demand control/Normal operation by the external input CnS2 to heat source unit.

Input: CnS2	Switching CnS2 input method:J13	CnS2: Switching operation permission/prohibition mode
Shorted → Open	Shorted (Level input)	Demand control ⟶ Normal operation
	Open (Pulse input)	Switching Demand control/ Normal operation (Reversal)
Shorted → Open	Shorted (Level input)	Normal control ⟶ Demand operation
	Open (Pulse input)	(NOP)

Note (1) Factory setting J13: Shorted, CnS2: Shorted (Short pin is connected)

3) The operation condition is displayed on the LCD of remote control and it is transferred to option centralized control.

4) Demand control

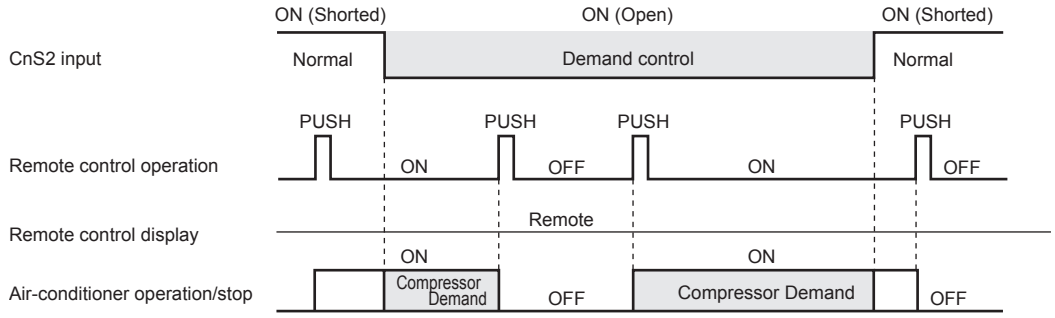
Demand ratio can be changed with the dip switches (SW4-5, SW4-6) on the heat source unit control PCB.
SW4-5, SW4-6 demand switch: 0 - open, 1 - shorted

Dip switch	Compressor output (%)			
	80	60	40	0
SW4-5	**0**	**1**	**0**	**1**
SW4-6	**0**	**0**	**1**	**1**

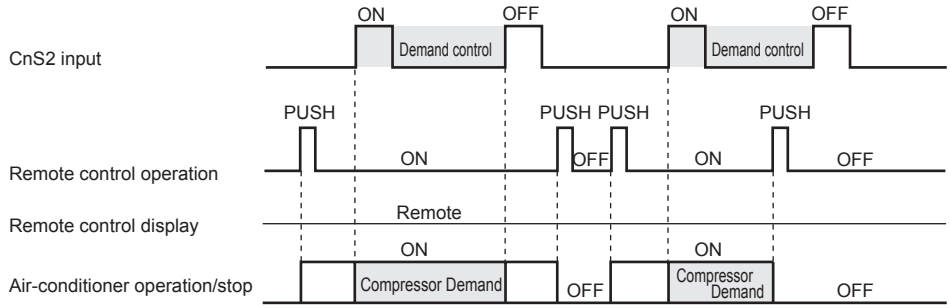
5) This control has priority over the controls of 4-way valve safeguard, compressor protective start operation, defrost operation, oil equalized operation, oil return operation, pump-down operation for replacement, Start/Stop pump-down operation and check operation.

6) CnS2 performs the following operation according to switching the jumper wire (J13) shorted or open.
In case of pulse input, the pulse width is 500ms or larger.

① J13 − Shorted



② J13 - Open



(c) 2-step demand control

1) Starting condition

When the “2-step demand input” via the external input terminal of heat source unit (master unit) has become valid.

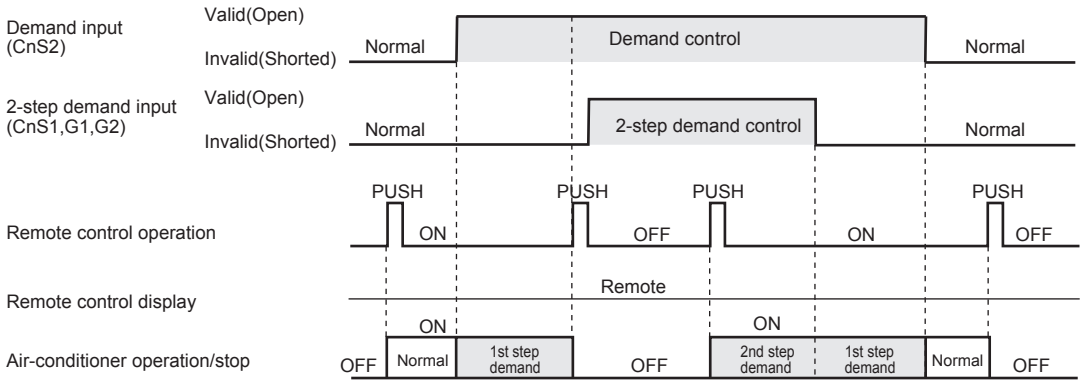
2) Contents of control

The demand control is performed at the demand rate which has been set with [SW4-5, SW4-6] and [P04] according to the demand input or the 2-step demand input.

Demand control	Following is assigned to one of P07 - P10.		Demand rate setting
	Demand input (Function assignment: 1)	2-step demand input (Function assignment: 9)	
None (Normal)	Shorted	Shorted	Invalid
1st step demand	Open	Shorted	SW4-5, SW4-6
2nd step demand	Open	Open	P04

2-step demand ratio can be changed with the 7-segment "P04" on the heat source unit control PCB.

P04 setting	Compressor output (%)
080(Factory default)	80
060	60
040	40
000	0



3) Ending condition

When the starting conditions have been lost.

(2) Auto backup operation

(a) Classication of auto backup operations

When the auto backup operation is enabled, anomaly stops are classifiedas follows and countermeasures are provided for respective categories.

System stop: All stop including master/slave units of compressor

Unit stop: Stop in the unit of heat source unit of compressor

(b) Control contents of auto backup operation

(i) Condition of auto backup operation is established when the dip switch SW3-2 on the PCB of master unit is turned ON (selected).

(ii) However, the switching of SW3-2 is effective only at the power on. (It does not become effective unless the power source is reset.)

(iii) Anomaly contents in the following table are invalid and are not detected when the auto backup is effective.

Anomaly detection invalid code	SW3-2ON	Anomaly detection invalid code	SW3-2ON
E32: Open T phase on power source at primary side	○	E45: Communication error between inverter PCB and outdoor control PCB	○
E36: Discharge pipe temperature error	○		
E37: Heat source unit heat exchanger and sub-cooling coil temperature thernistor anomaly	○	E51: Power transister overheat (Continuousness)	○
E38: Outdoor air temperature thermistor anomaly	○	E53: Suction pipe temperature thermistor anomaly	○
E39: Discharge pipe temperature thermistor anomaly	○	E55: Under-dome temperature thermistor anomaly	○
E40: High pressure anomaly	○	E56: Power transitor temperature thermistor anomaly	○
E41: Power transister overheat	○	E58: Anomalous compressor by loss synchronism	○
E42: Current cut	○	E59: Compressor startup failure	○
E44: Liquid flooding anomaly	○	E60: Rotor position detection failure	○

(iv) If any anomaly occurs when the auto backup is effective, the operation output (CnH), Anomaly output (CnY), 7-segment display and LED show as follows.

1) At the system stop

Operation output on the master unit is turned OFF, the Anomaly output is turned ON, 7-segment display and LED show the anomaly, and the remote control displays E??. (To reset the anomaly, it is necessary to reset the inspection from the remote control.)

2) At the unit stop

On the anomaly occurred unit only, the operation output is turned OFF, the Anomaly output is turned ON, 7-segment display and LED show the anomaly and normal units continue their operation ON(or stop).

To reset the state of anomaly on the unit the anomaly occurred, it depends on the condition to reset the state of each anomaly.

Remote control error display	Anomaly contents	Anomalous stop of master heat source unit		Anomalous stop of slave heat source unit	
		System stop	Unit stop	System stop	Unit stop
E31	Duplicated heat source unit address No.	○			
E32	Open L3 Phase on power source at primary side		○		○
E36	Discharge pipe temperature error		○		○
E37	Heat source unit heat exchanger and subcooling coil temperature thermistor anomaly		○		○
E38	Outdoor air temperature thermistor anomaly		○		○
E39	Discharge pipe temperature thermistor anomaly		○		○
E40	High pressure anomaly		○		○
E41	Power transistor overheat		○		○
E42	Current cut		○		○
E43	Excessive number of indoor unit connected, excessive to tal capacity of connection	○		–	–
E44	Liquid flooding anomaly		○		○
E45	Communication error between inverter PCB and heat source unit control PCB		○		○
E46	Mixed address setting methods coexistent in same network	※1	※1	※1	※1
E49	Low pressure error	○		○	
E51	Power transister overheat (continuousness)		○		○
E53	Suction pipe temperature thermistor anomaly		○		○
E54	High pressure sensor/Low pressure sensor anomaly	○		○	
E55	Under-dome temperature thermistor anomaly		○		○
E56	Power transitor temperture thermistor anomaly		○		○
E58	Anomalous compressor by loss synchronism		○		○
E59	Compressor startup failure		○		○
E60	Rotor position detection failure		○		○
E61	Communications error between the master unit and slave units	○		–	–
E63	Emergency stop	○		–	–
E64	No water pump start input Anomalous stop by the anti-freeze protection	○	–	○	–

※1 : It cannot operate because all indoor units become in anomalous condition.

(c) Prohibiting conditions of auto backup operation

(i) When the conditions of oil return control are not established

(ii) When the backup operation time has exceeded the limit value

(iii) When the 4-way valve is switched on any indoor unit

(d) Control after the conditions to prohibit the auto backup operation have been established

All compressor stop, and the error display [E-XX] is shown on the 7-segment display and the remote control.
In this state, the inspection reset of remote control is effective. → [E-XX] is displayed continuously on the remote control.

Backup operation function is only for emergency purpose when one of compressors or one of units is damaged.
If backup operation is performed continuously for long period, it may cause the damage of good compressors.
Accordingly be sure to repair the damaged unit or to replace the damaged compressor and to cancel the backup operation within 48 hours after starting backup operation.

(3) Test run

(a) This control can be performed from the master unit, not from the slave unit.

If this control is done from the slave unit, the following display is shown on the 7-segement display.

The display returns to normal display if the test run control switch is reset.

Code indicator	Data indicator	Contents of invalid operation
OPE	10	Slave setting is invalid.

(b) Test run from master heat source units with dip switches SW5-1 and SW5-2.

SW5-1	ON	**SW5-2**	OFF	Test run for heating
			ON	Test run for cooling
	OFF	Normally operation and after test operation		

Take note that this operation has priority over other option devices such as central control and etc.

This operation status is transmitted to the option devices.

(Note) Test run operation by external input is also available with following method. (Refer next page for detail)

• Select the external input terminal (CnS1) and set 7-segment [P11]-[6] for the function of SW5-1, and select the external input terminal (CnS2) and set 7-segment [P12]-[7] for the function of SW5-2.

CnS1	Shorted	CnS2	Open	Test run for heating
			Shorted	Test run for cooling
	Open	Normal operation and after test operation		

• Other combination of external input terminals (CnS1, CnS2, CnG1, CnG2) and of setting function with 7-segment ([P11], [P12], [P13], [P14] and -[6], -[7]) are avilable to use.

(c) Starting conditions of test run operation

(i) Dip switch SW5-1 is turned ON. However the input before the power ON is invalid.

(ii) The dip switches SW3 and SW5, other than SW5-1and SW5-2, should be turned OFF.
However, regarding the dip switch SW3-2 for automatic backup operation, it is invalid during test run operation regardless whether SW3-2 is turned ON (valid) or OFF (invalid).→In order to check trouble during test run operation.

(d) Control during test run (If indoor units are normal)

(i) Heating operation is performed with SW5-2 OFF, while cooling operation is performed with SW5-2 ON.

(ii) Indoor EEV control at the end of test run is depended on the specifications of the indoor unit.

(iii) Cooling operation: Compressor frequency control is depended on the cooling low pressure control.

(iv) Heating operation: Compressor frequency control is depended on the heating high pressure control.

(e) Ending conditions of test run operation

Test run operation is terminated if one of following conditions is satisfied.

(i) Test run operation ends when the dip switch SW5-1 is turned OFF.

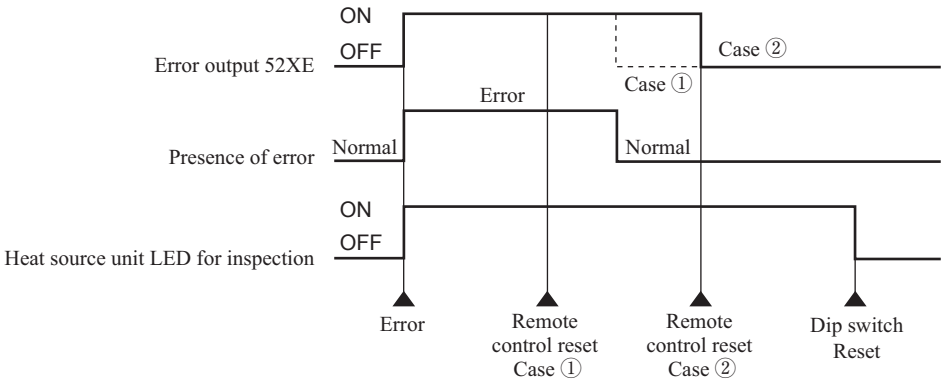
(ii) When the operation is stopped by the error control during test run, the error is displayed same as the normal operation and the state of error stop is retained even if SW5-1 is turned OFF.

(4) Operation and error signal output (Master unit/Slave unit)

This is the function to retrieve and display the operation and error information on the heat source unit as a batch.. Although indoor units also have the function to retrieve the operation and error information, this function is designed to retrieve the whole information of each refrigeration system connected to the heat source unit.

(a) The terminals for the operation and error outputs at the heat source unit side are provided on the heat source unit control PCB.

(b) Diagram of output relay operations



(c) The error output relay (52XE) is turned ON when the error stop occurs, and is turned OFF when the error reset is done from remote control by pressing "Check" and "Reset" button simultaneously after recovery from the error (Remote control reset case ②).

Before recovery from the error, if the error reset is done from remote control, 52XE is not turned OFF, but it will be turned OFF automatically after the error is recovered subsequently (Remote control reset case ①).

(d) If at least one of connected indoor units is operating, the operation output relay (52XR) is turned ON. (Operation means the state that remote control is turned ON, in which the fan operation and the thermostat OFF is included, but the error stop is excluded.)

(e) Output relay (52XR, 52XE) of DC12V should be prepared in the field. The maximum load of relay is LY2F (Omron).

(f) The output connectors (CnH, CnY) to be connected to the relays for operation output (52XR) and for error output (52XE) is mounted on the heat source unit control PCB.

(g) If CPU goes out of control, this function becomes disable.

(h) When the automatic backup operation is effective, there is no error display for any error on the compressor stopping by detecting its anomaly.

(5) External output

This function is used in order to operate the external option devices in conjunction with relay output of the respective operational information from heat source unit.

However, since these models do not have dedicated output, it makes switchable by using the existing 52XR relay in order to comply with various usages.

This control is done for master unit and slave unit independently.

[External output function]

External output function of CnH can be switched by changing of [P06] of 7-segment display from "0" to "5" as mentioned below.

0: Operation output [Factory default]

1: Error output

·It is turned on at anomalous stop, and turned OFF when "CHECK" and "RESET" buttons on remote control are pressed simultaneously 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: Oil return operation output

·It is turned ON at oil return operation in cooling or at oil return operation in heating, or at defrost operation in heating.

4: When HP is relatively high

·Signal is output in order to operate a sprinkler system for cooling down the heat source unit 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.

(6) Pump down control for replacement (Master unit/slave unit)

This control is for recovering refrigerant to heat source unit quickly in case of replacement or relocation of the heat source unit.

(a) This control is performed from the master unit side. It cannot be controlled from the slave unit side. If this control is attempted from the slave unit side, the following codes are displayed on the 7-segment LED of the slave unit.

Code display area	Data display area	Contents of invalid operation
oPE	10	Setting from the slave unit is invalid

Note (1) The display returns to normal if the pump-down control switch is reset.

(b) Pump down operation can be performed with the operation of 3 dip switches SW5-1(Test run switch), SW5-2 (Test run operation mode) and SW5-3 (Pump down switch)

(c) Pump down procedure

1) Shut the liquid side service valve on the heat source units
2) Turn SW5-2 (test run operation mode) ON (cooling)
3) Turn SW5-3 (pump down switch) ON
4) Turn SW5-1 (test run switch) ON

(d) End condition

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

(i) When the low pressure (LP) is preset value or less, this control ends normally, and indicates 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. Auto backup operation, however, depends on the dip switch setting.

(iii) If the cumulative compressor operation time under pump down control is 15minutes (End control because time is up), this control ends and indicates followings
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 switch (SW5-1, SW5-2, SW5-3) is turned OFF during pump down control.
(Note) Even if only SW5-3 is turned OFF, it is not recognized as the cooling test run mode and it stops.

(7) 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] - [P10]: 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] - [P10] is not assigned this control.

(ii) Contents of control

① During the heat source 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 heat source 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.

(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 heat source 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 6-digit on heat source unit control PCB
2) Left 3 digits are for code display and right 3 digits are for data display
3) The code No. of each item is selected by pressing SW9 for the order of 10 and SW8 for the order of 1.
4) If the code No. is set at "C99", the data of the code No. from "C00" to "C29" is displayed cyclically.
   Code No. at factory setting is "C99"
5) If the code No. is set at other than "C99", the data of selected code No. are kept on displaying.
6) 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 are 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 EEPROM are not erased.
   When the data are erased, "---" is displayed on the data display area of 7-segment LED. And this is displayed as well when no error data are retained.
7) If SW8 (order of 1) is pressed, it displays in the order of 0 ⇒ 1 ⇒ 2 …… 9 ⇒ 0.
8) 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".
9) The data of code No. "C44" and "C45" 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" or "C45" 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.
10) 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.

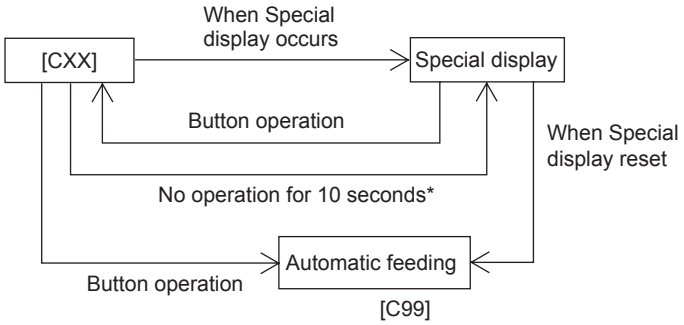
(iii) Discharge pressure saturated temperature and suction pressure saturated temperature are displayed after rounding to unit, if it is -10.0°C or lower. (Because the 7-segment display range is 3-digit)

(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]: Heat source 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	
C04	Tho-R2 Heat exchanger temp. 2	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	
C12	Tho-P1 Power transistor temp. (CM1)	L,-20~140	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 EEVW1 expansion valve for water heat exchanger 1	0~500	1Pulse	
C21	Opening angle of EEVW2 expansion valve for water heat exchanger 2	0~500	1Pulse	
C22	Opening angle of EEVSC expansion valve for sub-cooling coil	0~500	1Pulse	
C23	Opening angle of EEVG expansion valve for high pressure control	0~500	1Pulse	
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	
C29	PSLQ Liquid pipe pressure sensor	0~4.15	0.01MPa	
C30	63H1-1	0,1	–	Order of 100 : 63H1-1 Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)
C31	CNS1 CNS2 CNG1	0,1	–	Order of 100 : CNS1 Order of 10 : CNS2 Order of 1 : CNG1 (0: Close, 1: Open)
C32	CNG2 SVA	0,1	–	Order of 100 : CNG2 Order of 10 : SVA Order of 1 : Spare (0: Close, 1: Open)
C33	CH1	0,1	–	Order of 100 : Spare Order of 10 : Spare Order of 1 : CH1 (0: Close, 1: Open)

Code No.	Contents of display	Data display range	Minimum unit	Remarks
C34	20SM 20SH	0,1	–	Order of 100 : Spare Order of 10 : 20SM Order of 1 : 20SH (0: Close, 1: Open)
C35	FMC	0,1	–	Order of 100 : FMC Order of 10 : Spare Order of 1 : Spare (0: Close, 1: Open)
C36	SVB SVR	0,1	–	Order of 100 : SVB Order of 10 : SVR Order of 1 : Spare (0: Close, 1: Open)
C37	SV4 SVO	0,1	–	Order of 100 : SV4 Order of 10 : SVO Order of 1 : Spare (0: Close, 1: Open)
C38	SV13	0,1	–	Order of 100 : Spare Order of 10 : Spare Order of 1 : SV13 (0: Close, 1: Open)
C39	CNZ1 CNH CNY	0,1	–	Order of 100 : CNZ1 Order of 10 : CNH Order of 1 : CNY (0: Close, 1: Open)
< Information for heat source 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
C56	Target Fk	0~999	1Hz	
C57	Inverter 1 operating frequency command	0~130	1Hz	
< Control status >				
C65	Heat source unit operating mode pattern	0~127	1	
C66	Control status	0~127	1	See table on page 43
C67	Protection control status	0~127	1	See table on page 44
C68	Compressor stop causes	0~127	1	See table on page 44
C69	Time elapsed after compressor stop cause	0~255	1h	

Code No.	Contents of display	Data display range	Minimum unit	Remarks
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
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 heat source unit control (CM1)	0~255	1	EEPROM memory. Resettable.
C92	Counter · Indoor-heat source unit communications error	0~255	—	EEPROM memory. Resettable.
C93	Counter · Heat source 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	Auto send display	—	—	

< 7-segment software input >

< User setting >				
P01	Switching to operation priority	—	—	
P04	Many steps demand setting (2 step demand or energy save control)	OFF: (Usually) 000,040,060,080	—	
P06	CNZ1 function assignment	0: (Factory default) 0 ~ 9	1	
P07	CNS1 function assignment	0: (Factory default) 0 ~ 20	1	0: External operation input 1: Demand input 2: Cooling/heating forced operation input 4: Oil return control forced operation input 6: Test run external input 1 (SW5-1 equivalent) 7: Test run external input 2 (SW5-2 equivalent) 8: Silent mode input 2 9: 2-step demand input 10: AF periodic inspection display 11: AF error display 12: Building multi energy save control 13~20:Spare
P08	CNS2 function assignment	1: (Factory default) 0 ~ 20	1	
P09	CNG1 function assignment	2: (Factory default) 0 ~ 20	1	
P10	CNG2 function assignment	3: (Factory default) 0 ~ 20	1	

Code No.	Contents of display	Data display range	Minimum unit	Remarks
< 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 heat source unit
P34	Polarity definition	0: (Factory default) 0, 1	—	0: Network polarity not defined 1: Network polarity defined

[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
	Heat source unit 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
	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
	During low pressure (LP)	3
	During discharge pipe temperature (Td)	4
	During specific pressure (SCR)	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-R2	3
	Tho-D1	6
	Tho-SC	8
	Tho-H	9
	Tho-S	10
	Tho-C1	11
	Tho-P1	13
	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	Current cut (CM1)	32
	Power transistor overheat (CM1)	34
	Compressor startup failure (CM1)	36
	Communication error between inverter PCB and heat source unit 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
Water heat source related	Water heat exchanger freeze protection	60
	Water pump not started	61

(b) Saving of operation data

For the purpose to investigate the cause of trouble in the field, the operation data are always saved in thememory, 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 heat source unit control PCB and utilized for probing 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
Heat source unit capacity	Ascii 3 byte	As shown in table at right
Power source frequency	Ascii 2 byte	60
Heat source unit 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

Heat source unit capacity data	Heat source unit capacity data	Remarks
Single type	Example: 24HP - [S24]	S: Display with Horse Power of single type or single use of combination type
Master unit of combination type	Example: 46HP - [S46]	S: Display with Horse Power of master unit of combination type
Slave unit of combination type	Example: 20HP - [C22]	C: Display with Horse Power of slave unit 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	
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.					

< Heat source 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, heat source unit all anomalous
01	Address of unit where trouble occurred	00~FF	—	1	00~3F: Heat source 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	Cooling liquid side
04	Tho-R2 Heat exchanger temp. 2	-40~75	0.01°C	2	Cooling gas side
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	Tho-P1 Power transistor temp. (Heat dissipation fin)	-20~140	0.01°C	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	Liquid pipe pressure sensor	0.00~4.15	0.001MPa	2	
< Information for heat source 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	Heat source unit operation pattern	0~255	1	1	Real range is 1~17
32	CM1 frequency	0~255	1Hz	1	
33	Spare	—	—	1	
34	Spare	—	—	1	
35	Spare	—	—	1	
36	Required Hz total	0~65535	1Hz	2	
37	Discharge pressure saturation temp.	-50~70	0.01°C	2	
38	Intake 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	Super heat of water heat exchanger exit	0~25.5	0.1deg	1			
45	Target FK	0~65535	1Hz	2			
46	Inverter CM1 operation frequency	0~255	1Hz	1			
47	Spare	—	—	1			
48	Spare	—	—	1			
49	Spare	—	—	1			
50	EEVW1 opening angle	0~65535	1pulse	2			
51	EEVG opening angle	0~65535	1pulse	2			
52	EEVSC opening angle	0~65535	1pulse	2			
53	EEVW2 opening angle	0~65535	1pulse	2			
57	Learning primary opening angle of heat source unit EEVH	0~255	1pulse	1			
58	Target super heat of heat source 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	Target super heat of water heat exchanger	0~25.5	0.1ºC	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	52C1	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	20SM	0: OFF, 1: ON
					Bit5	20SH	0: OFF, 1: ON
					Bit6	FMC1,2	0: OFF, 1: ON
					Bit7	Spare(FMC3)	0: OFF, 1: ON
63	Output of relay	—	—	1	Bit0	SVB	0: OFF, 1: ON
					Bit1	Spare(SV2)	0: OFF, 1: ON
					Bit2	SVR	0: OFF, 1: ON
					Bit3	SVO	0: OFF, 1: ON
					Bit4	Spare(SV7)	0: OFF, 1: ON
					Bit5	SVA	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	CnH	0: OFF, 1: ON
					Bit7	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	0~360	2minutes	1			
72	Control status CH compressor protective start	0~15	—	1	15 0~14	Protective start end During protective start	
< Control status >							
73	Control status Oil equalization	0~127	—	1	0 1 10 20 30 41 42 51 52 61 62 71 72 81 82	None Oil equalized rotation Oil equalized operation 1 Oil equalized operation 2 Oil equalized operation 3 Oil equalized operation 4-1 Oil equalized operation 4-2 Oil equalized operation 5-1 Oil equalized operation 5-2 Oil equalized operation 6-1 Oil equalized operation 6-2 Oil equalized operation 7-1 Oil equalized operation 7-2 Oil equalized operation 8-1 Oil equalized operation 8-2	
74	Control status Oil return	0~2	—	1	0 1 2	None Oil return (cooling) Oil return (gas cycle)	
75	Control status Defrost kinds + defrost status	0~127	—	1	0 31 32 33 34	None Time condition defrost status 1 Time condition defrost status 2 Time condition defrost status 3 Time condition defrost status 4	
76	Control status Low pressure error (cooling) return status	0~4	—	1	0 1 2 3 4	Normal operation Compressor OFF For 70 seconds after compressor ON After 70 to 180 seconds after compressor ON After 180 to 195 seconds after compressor ON	
77	Control status 1	—	—	1	Bit0 Bit1 Bit2 Bit3 Bit4 Bit5 Bit6 Bit7	Superlink communication state In trial operation control In demand control Spare Spare In outdoor air intake unit control Spare In pump-down control at Start/Stop	0: SL Ⅰ (old SL) 1: SL Ⅱ (new SL) 0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice
78	Control status 2	—	—	1	Bit0 Bit1 Bit2	Spare In pump-down control for replacement Compressor dilution protection	0: Normal 1: Practice 0: Normal 1: Practice 0: Normal 1: Practice

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
					Bit3	Heat source unit 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	In pressure equalization control at heat source unit	0: Normal 1: Practice
					Bit7	Compressor control with branching controller	0: Normal 1: Practice
79	Control status 3	—	—	1	Bit0	Auto backup operation	0: Normal 1: Practice
					Bit1	Mster unit compressor 1 Oil equalization comulative Fk UP	0: Count 1: Count up
					Bit2	Spare	0: Count 1: Count up
					Bit3	Slave unit compressor 1 Oil equalization comulative Fk UP	0: Count 1: Count up
					Bit4	Spare	0: Count 1: Count up
					Bit5	Slave unit compressor 2 Oil equalization comulative Fk UP	0: Count 1: Count up
					Bit6	Spare	0: Count 1: Count up
					Bit7	Oil equalization rotation comulative Fk UP	0: Count 1: Count up
80	Spare	—	—	1			
81	Backup cumulative time	0~127	1hour	1			
82	Check operation status	0~7	—	1	0	Normal	
					1	Insufficient check operation start condition	
					2	Check operation warm-up	
					3	Check operation ON	
					4	Check operation stop	
					5	Operation valve is closed	
					6	Indoor unit abnormal	
					7	Normal ending of check operation	
83	Spare	—	—	1			
84	Spare	—	—	1			
< 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	Spare	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	Spare	0: Normal 1: Practice
					Bit2	Td protection 4 Heating stop indoor unit slight opening control	0: Normal 1: Practice
					Bit3	Td protection 5 Heat source unit 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	Spare	0: Normal 1: Practice

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
					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
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 heat source unit control (CM1)	0~255	—	1	EEPROM memory. Resettable.		
110	Spare	—	—	1	EEPROM memory. Resettable.		
111	Spare	—	—	1	EEPROM memory. Resettable.		

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
112	Spare	—	—	1	EEPROM memory. Resettable.		
113	Counter・Indoor-heat source unit 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			
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	0: Normal 1: Practice
					Bit2	Indoor unit refrigerant purge control	0: Normal 1: Practice
					Bit3	Spare	0: Normal 1: Practice
					Bit4	Spare	0: Normal 1: Practice
					Bit5	Spare	0: Normal 1: Practice
					Bit6	Spare	0: Normal 1: Practice
					Bit7	Spare	0: Normal 1: Practice
< Input of PCB hardware >							
124	External input	—	—	1	Bit0	63H1	0: OFF 1: ON
					Bit1	52P-a	0: OFF 1: ON
					Bit2	CNS1	0: OFF 1: ON
					Bit3	CNS2	0: OFF 1: ON
					Bit4	CNG1	0: OFF 1: ON
					Bit5	CNG2	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

Code No.	Write-in contents	Record data					
		Data write-in range	Write-in unit	Number of bytes	Contents		
					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
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	Switching to measure of siren	
					Bit1	Switching to measure of discharge pulsation	
					Bit2	Cancel abnormal liquid back	
					Bit3	Outdoor fan snow protection control	
					Bit4	Condition of cooling cycle oil return operation	
					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	CNS2 function assignment	0~9	—	1			
137	CNG1 function assignment	0~9	—	1			
138	CNG2 function assignment	0~9	—	1			
139	External output function assignment function assignment	0~9	—	1			
140	State in check operation (User's operation, limited to 255 – 1→0 only)	0~255	—	1			
< The others >							
141	Override	0~	—	1			

(2) Heat source unit PCB setting

Code	Input		Remarks
SW1	Heat source unit address No. (Order of 10)		
SW2	Heat source unit address No. (Order of 1)		
SW3-1	Inspection LED reset	Normal★/Reset	
SW3-2	Auto backup operation	None★/With	
SW3-5	Check operation start	Normal★/Check	
SW3-7	Forced cooling/heating	Normal★/Forced cooling-heating	
SW4-1	Model selection		
SW4-2			
SW4-3			
SW4-4			
SW4-5	Demand control		See following table
SW4-6			
SW4-7	Master/slave unit setting address		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	Connecting capacity protection	With★/None	
SW5-5	SL selector	New SL (Auto)★/Old SL	
SW5-6	Capacity measurement mode		
SW5-7			
SW5-8			
SW6-1	Hz fixed mode selection	Normal★/Hz fixed	
SW6-2	Model selection	Cooling-heating selection★/Free	
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	
J11	Power source voltage selection		
J12			
J13	External input	Level★/Pulse	

Note (1) Jumper wires J13 indicate short-circuit/open.
(2) Dip switch SW's indicate OFF/ON
(3) ★ indicates the factory setting (OFF).

■Demand control with SW4-5, SW4-6 0: OFF 1: ON

	Compressor capacity [%]			
Demand ratio	80	60	40	20
SW4-5	0	1	0	1
SW4-6	0	0	1	1

■Master/slave setting with SW4-7, SW4-8 0: OFF 1: ON

Heat source unit	Master unit	Slave unit 1	Slave unit 2
SW4-7	0 ★	1	0
SW4-8	0 ★	0	1

(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	Heat source unit address No.(Order of 10)		4		0-9
SW4	Heat source 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		
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

2. SYSTEM TROUBLESHOOTING PROCEDURE

2.1 Basics of troubleshooting

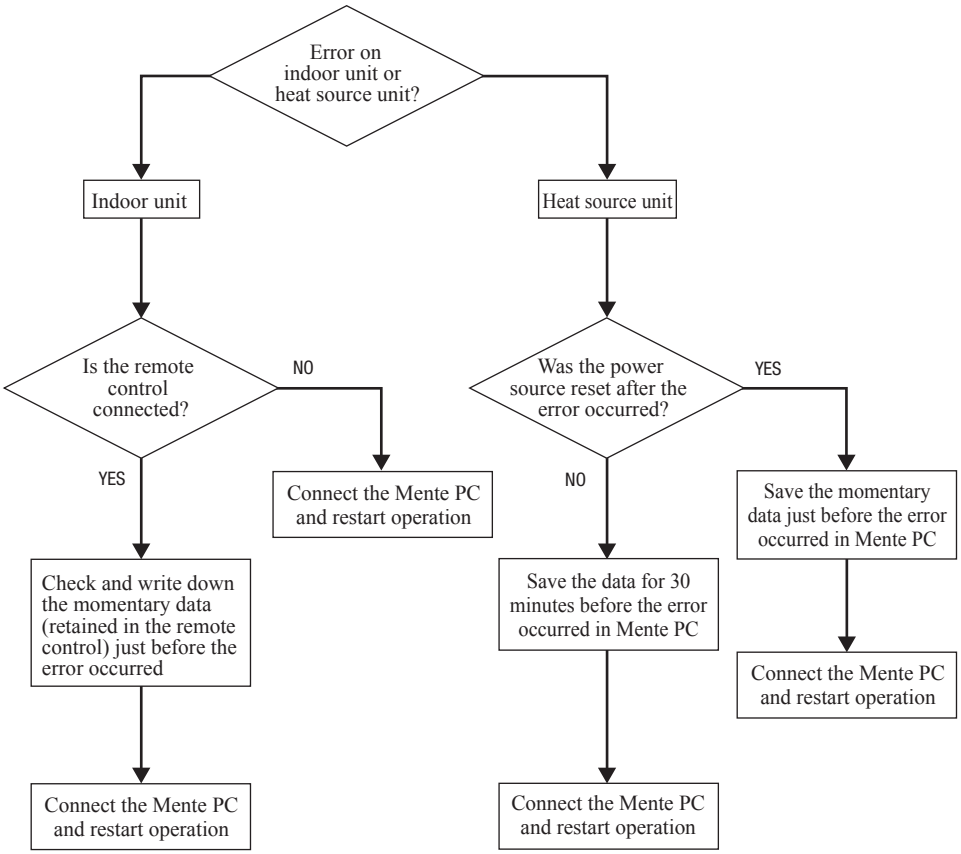
Basic troubleshooting is to check/analyze/save data by connecting the Mente PC.

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 heat source/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?

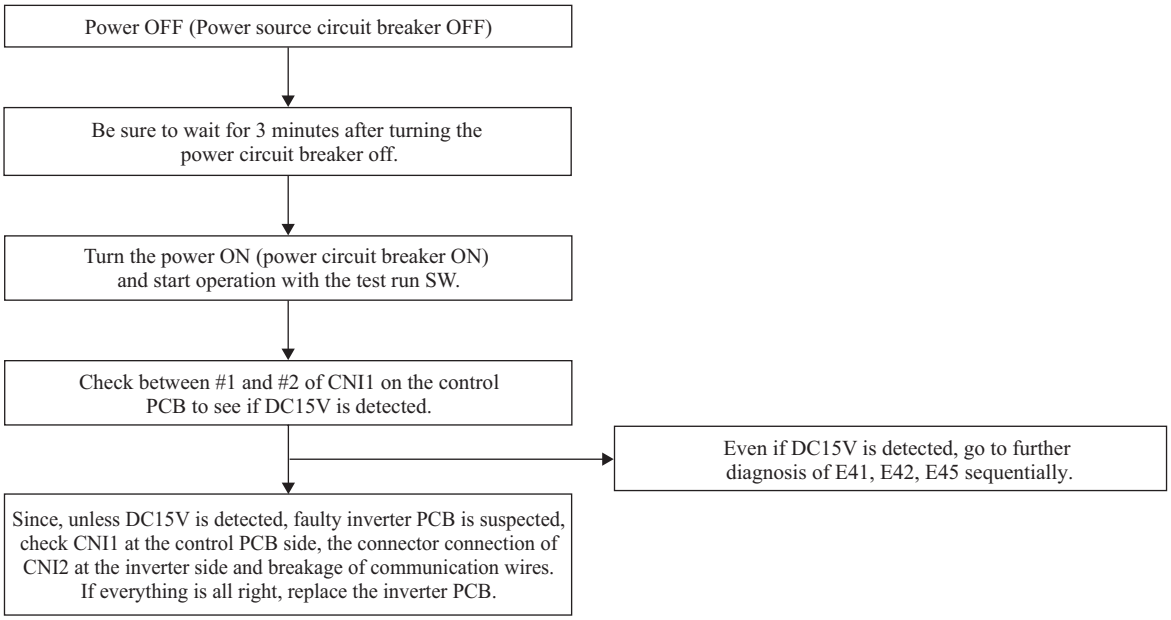
  Compressor, inverter PCB
- Is it a failure of electrical component



2.2 Explanation of troubleshooting

(a) Checking DC15V on the control PCB (Step to check if the inverter PCB fails or not)

Use this to diagnose E41, E42 and E45.



(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 value (Ω)	
P	N	About 1M About 300-400	Several 10 M
N	P		Several M
P	U	0	Several 10 M
P	V		
P	W		
N	U	About 1.2M	Several 100k
N	V		
N	W		
U	P	About 1.3M	Several 100k
V	P		
W	P		
U	N	0	Several 10 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.

2.3 Contents of troubleshooting

(a) List of inspection displays

1) Indoor and heat source unit

Remote control error code	7-segment display	Name of inspection	Classification	Page
E1	–	Remote control communication error	Communication error	75
E2	–	Duplicated indoor unit address	Address setting error	76
E3	–	Heat source unit signal line error	Address pairing setting error	77
E5	–	Communication error during operation	Communication error	78
E6	–	Indoor heat exchanger temperature thermistor anomaly (ThI-R)	Thermistor wire breakage	79
E7	–	Indoor return air temperature thermistor anomaly (ThI-A)	Thermistor wire breakage	80
E9	–	Drain trouble	System error	81
E10	–	Excessive number of indoor units (more than 17 units) by controlling one remote control	Communication error	82
E11	–	Address setting error between master and slave indoor units	Address setting error	83
E12	–	Address setting error by mixed setting method	Address setting error	84
E16	–	Indoor DC fan motor anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDUT71, FDK, FDFW, FDU-F series)	DC fan motor error	85
E18	–	Address setting error of master and slave indoor units	Address setting error	86
E19	–	Indoor unit operation check drain motor check mode anomaly	Setting error	87
E20	–	Indoor DC fan motor speed anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDUT71, FDK, FDFW, FDU-F series)	DC fan motor error	88
E21	–	Detective panel switch operation (FDT)	Panel switch error	89
E28	–	Remote control temperature thermistor anomaly (Thc)	Thermistor wire breakage	90
E30	E30	Unmatch connection of indoor and heat source unit	System error	91
E31	E31	Duplicated heat source unit address No.	Address setting error	92
E32	E32	Open L3 Phase on power source at primary side	Site setting error	93
E36	E36-1	Discharge pipe temperature error (Tho-D1)	System error	94
E37	E37-1,-2 E37-5,-6	Heat source unit heat exchanger temperature thermistor (Tho-R1,-R2) and sub-cooling coil temperature thermistor (Tho-SC,-H) anomaly	Thermistor wire breakage	95
E38	E38	Atmosphere air temperature thermistor anomaly (Tho-A)	Thermistor wire breakage	96
E39	E39-1	Discharge pipe temperature thermistor anomaly (Tho-D1)	Thermistor wire breakage	97
E40	E40	High pressure anomaly (63H1 activated)	System error	98
E41 (E51)	E41-1 (E51-1)	Power transistor overheat	System error	99
E42	E42-1	Current cut (CM1)	System error	100
E43	E43-1,-2	Excessive number of indoor units connected, excessive total capacity of connection	Site setting error	101
E44	E44-1	Liquid flooding anomaly (CM1)	System error	102
E45	E45-1	Communication error between inverter PCB and heat source unit control PCB	Communication error	103
E46	E46	Mixed address setting methods coexistent in same network	Address setting error	104
E49	E49	Low pressure anomaly	System error	105
E53/E55	E53/E55-1	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C1)	Thermistor wire breakage	106
E54	E54-1 E54-2	Low pressure sensor anomaly (PSL) High pressure sensor anomaly (PSH)	Thermistor wire breakage	107
E56	E56-1	Power transistor temperature thermistor anomaly (Tho-P1)	Thermistor wire breakage	108
E58	E58-1	Anomalous compressor by loss of synchronism	System error	109
E59	E59-1	Compressor startup failure (CM1)	System error	110
E61	E61-1, 2	Communication error between the master unit and slave units	System error	111
E63	E63	Emergency stop	Site setting error	112

(b) Troubleshooting

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

1. Applicable model

All models

2. Error detection method

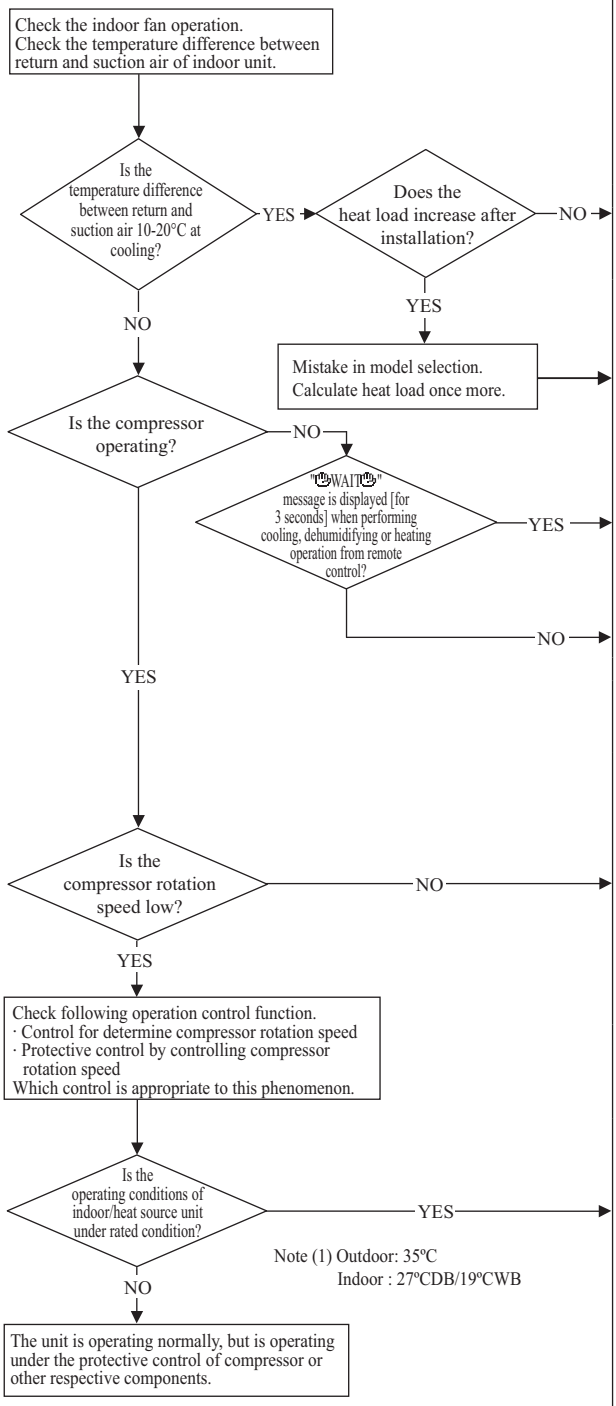
3. Condition of error displayed

4. Presumable cause

- Poor compression of compressor
- Expansion valve operation anomaly

5. Troubleshooting

Diagnosis



Countermeasure

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	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	Operates but does not heat
	Heat source unit	Keeps flashing	Stays OFF	

1. Applicable model

All models

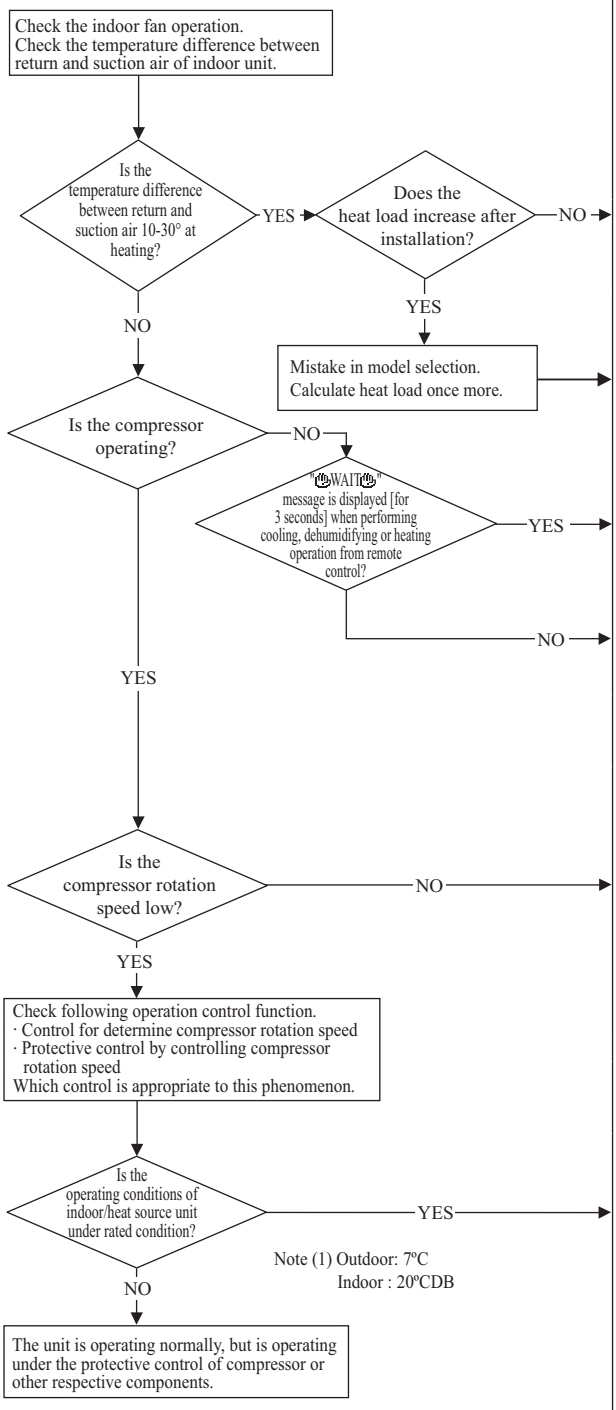
2. Error detection method

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	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor unit	Stays OFF	Stays OFF	Earth leakage breaker activated
	Heat source unit	Stays OFF	Stays OFF	

1. Applicable model

All models

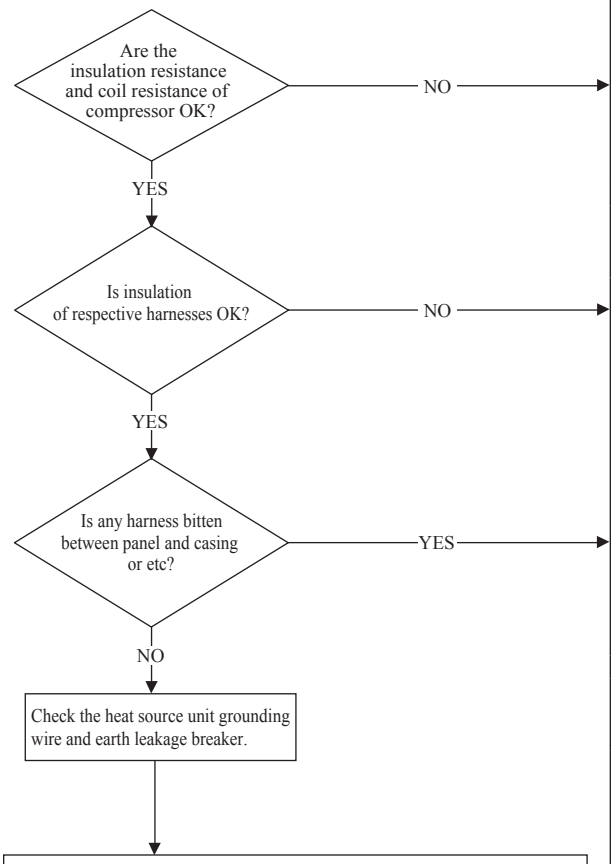
2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Compressor anomaly
- Noise

5. Troubleshooting



Check of the heat source unit grounding wire and earth leakage breaker

① Run an independent grounding wire from the grounding screw of heat source 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 source, 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 unit	–	–	Excessive noise/vibration (1/3)
	Heat source unit	–	–	

1. Applicable model

All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause

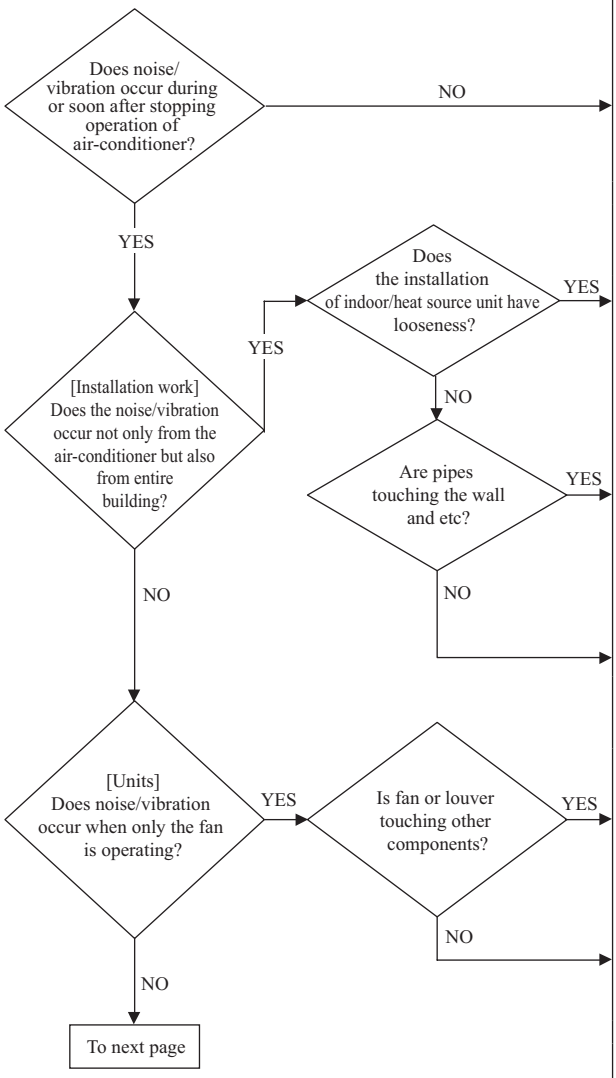
① Improper installation work
- Improper vibration-proof work at installation
- Insufficient strength of mounting surface

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 unit	–	–	Excessive noise/vibration (2/3)
	Heat source unit	–	–	

1. Applicable model

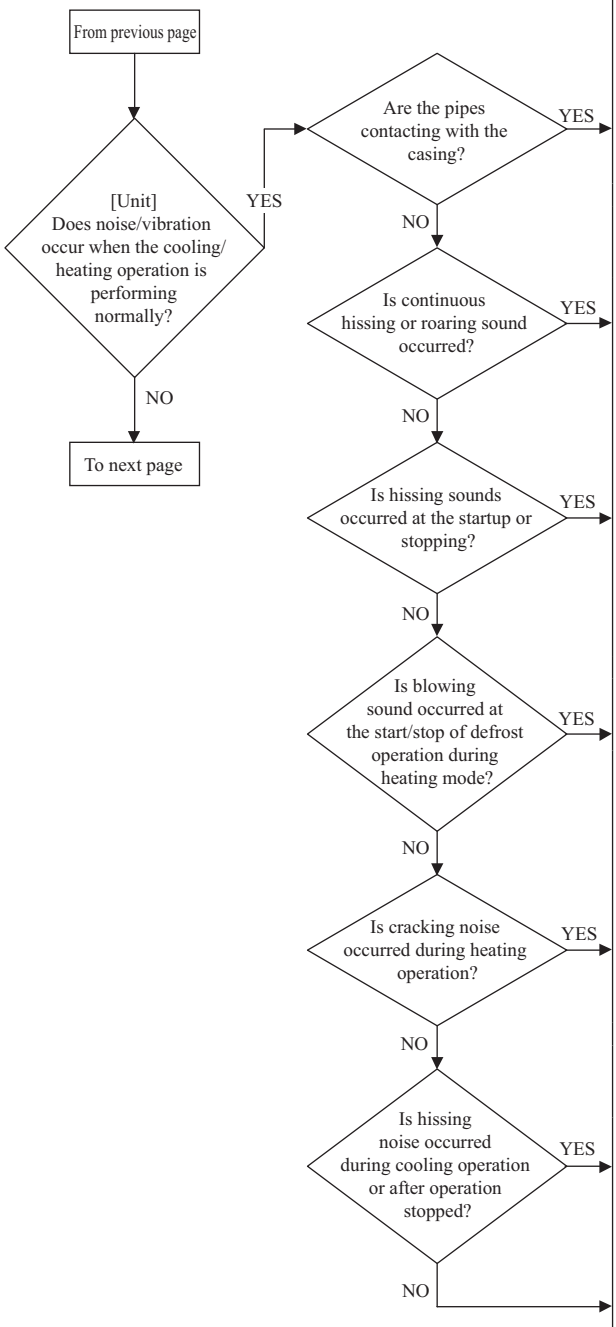
All models

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 unit	–	–	Excessive noise/vibration (3/3)
	Heat source unit	–	–	

1. Applicable model

All models

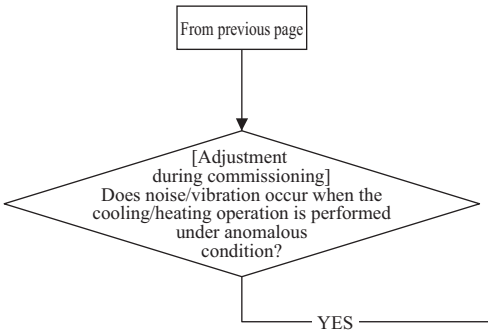
2. Error detection method

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/heat source unit
- Cooling/heating/fan mode
- Startup/stop/during operation
- Operating condition (Indoor/heat source unit 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 unit	Keeps flashing	Stays OFF	Louver motor anomaly
	Heat source unit	Keeps flashing	Stays OFF	

1. Applicable model

All models

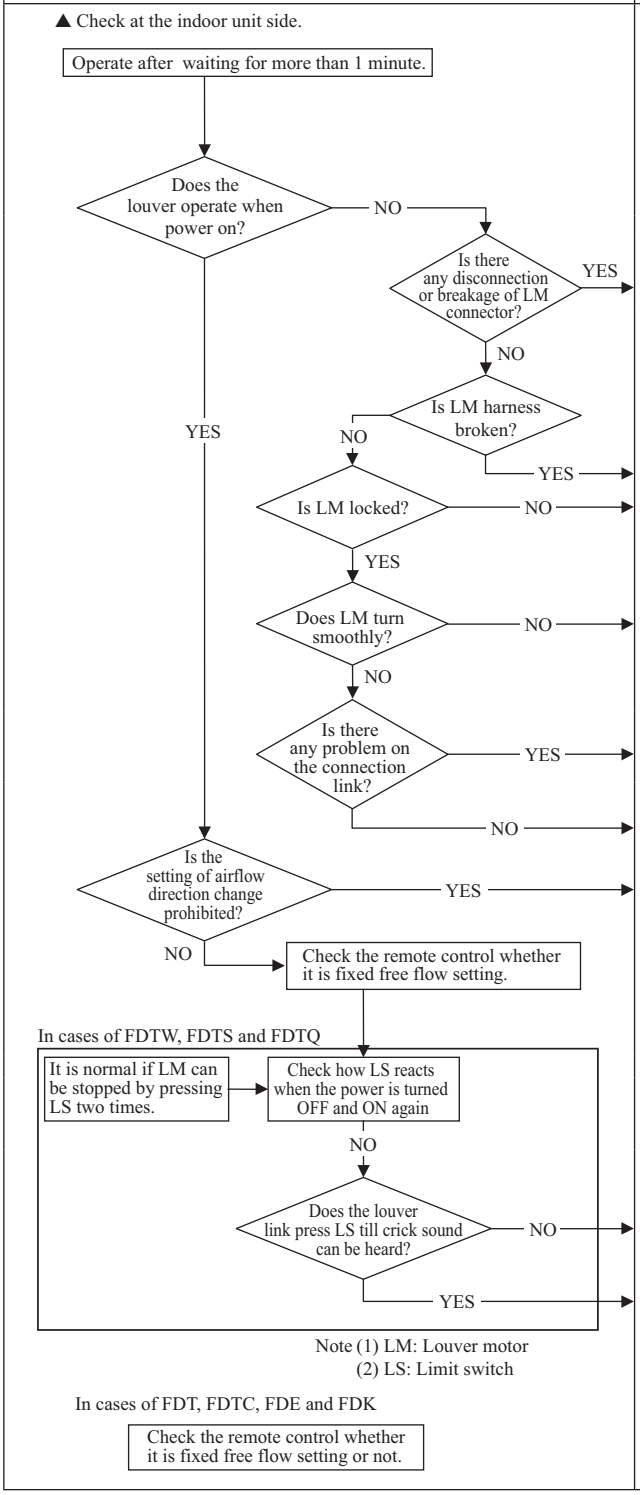
2. Error detection method

3. Condition of error displayed

4. Presumable cause

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

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor unit	Stays OFF	Stays OFF	Power source system anomaly (Power source to indoor unit PCB)
	Heat source unit	Stays OFF	2-time flash	

1. Applicable model

All models

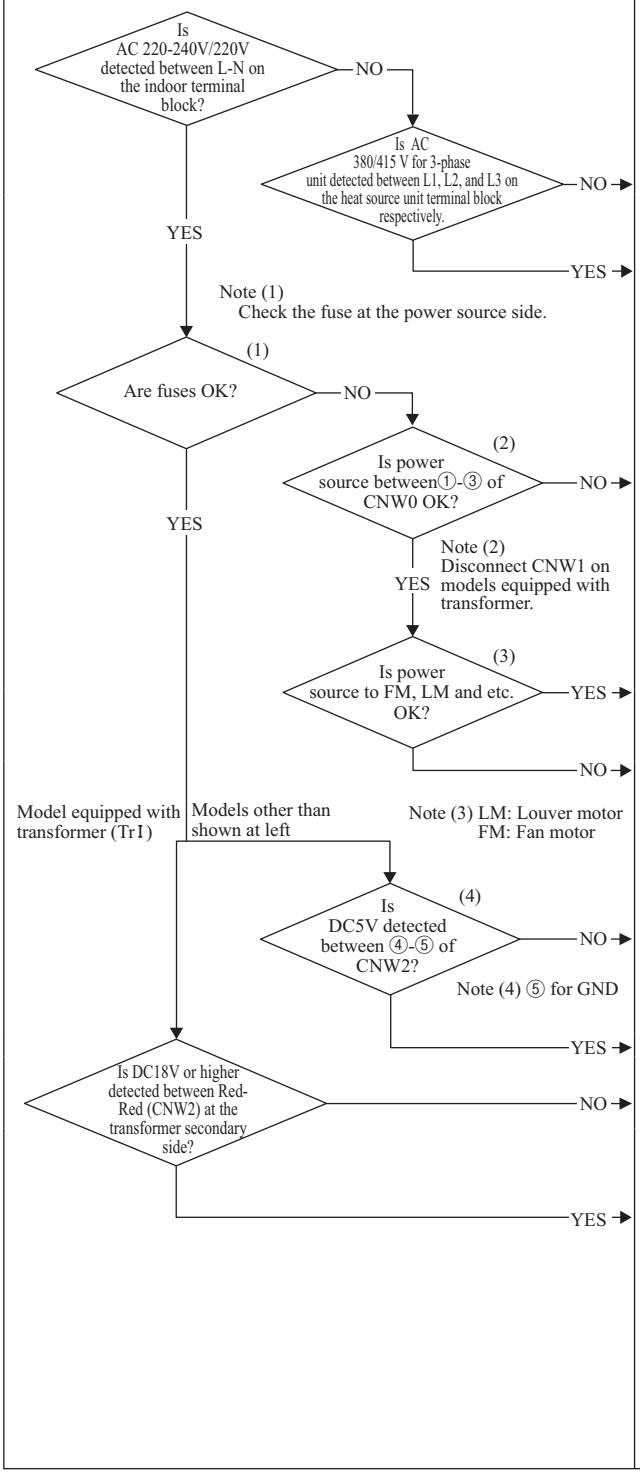
2. Error detection method

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	LED	Green	Red	Content
Remote control: None 7-segment display: –	Indoor unit	Stays OFF	Keeps lighting	Power source system error (Power source to remote control)
	Heat source unit	Stays OFF	Keeps lighting	

1. Applicable model

All models

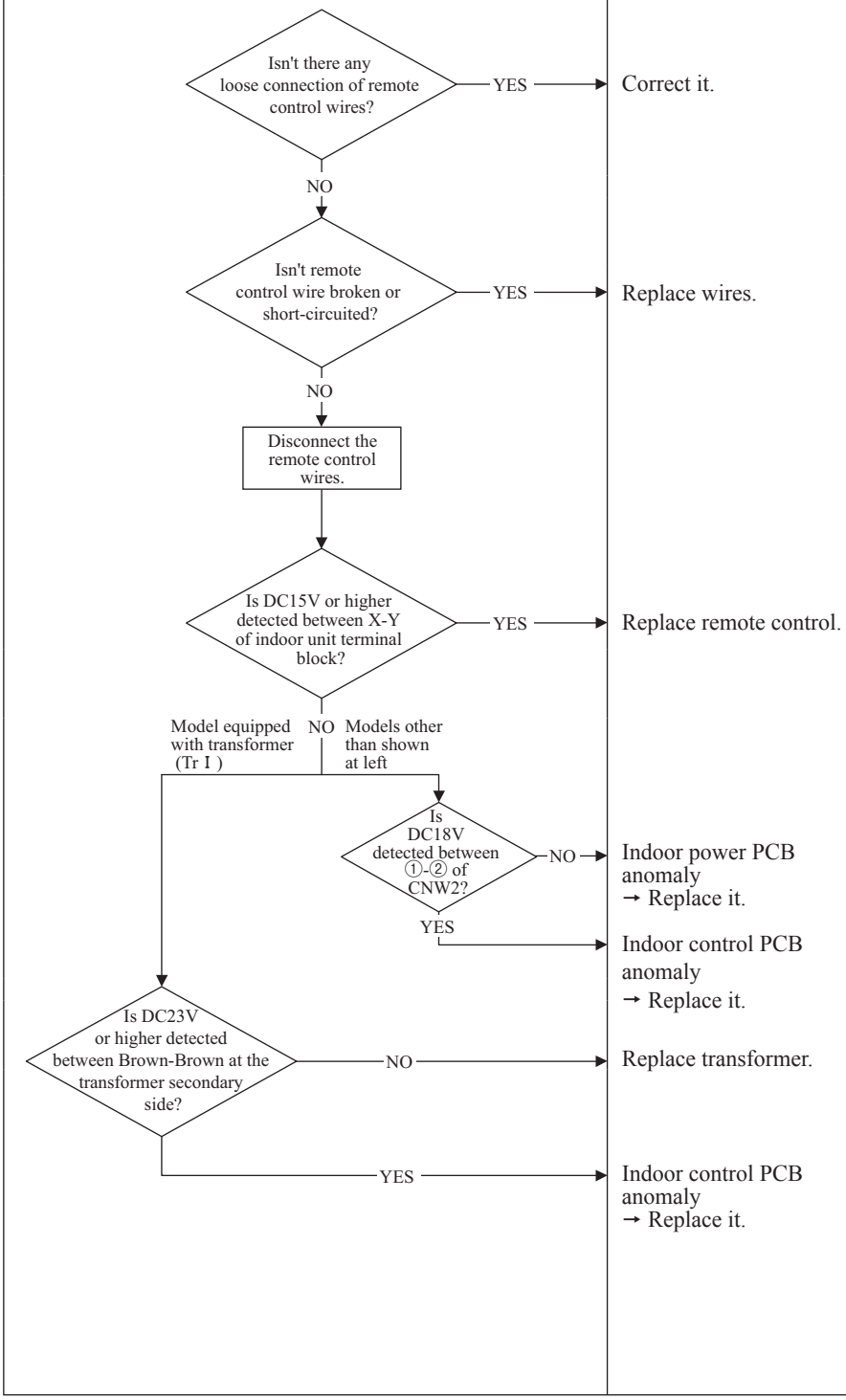
2. Error detection method

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 unit	Keeps flashing	Stays OFF	WAIT (1)
	Heat source unit	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.)

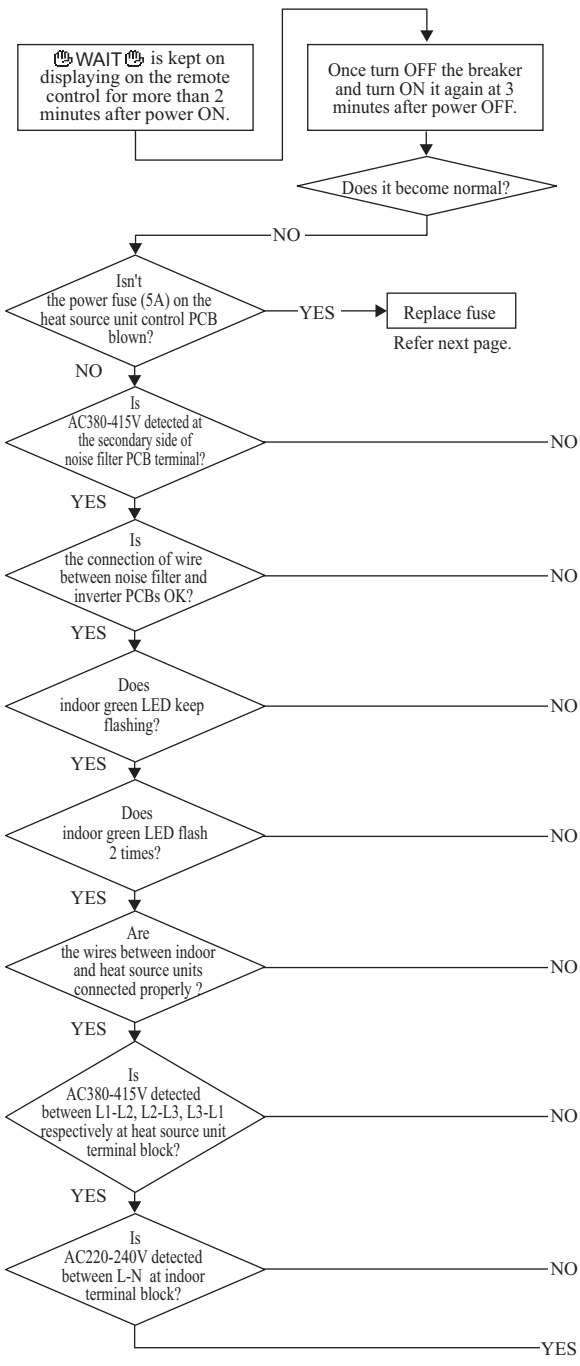
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting



Note: (1) When anomaly occurs during establishing communication between indoor and heat source unit, error code E5 is displayed (heat source unit 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 unit	Keeps flashing	Stays OFF	WAIT (2)
	Heat source unit	Keeps flashing	Keeps flashing	

1. Applicable model

All models

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

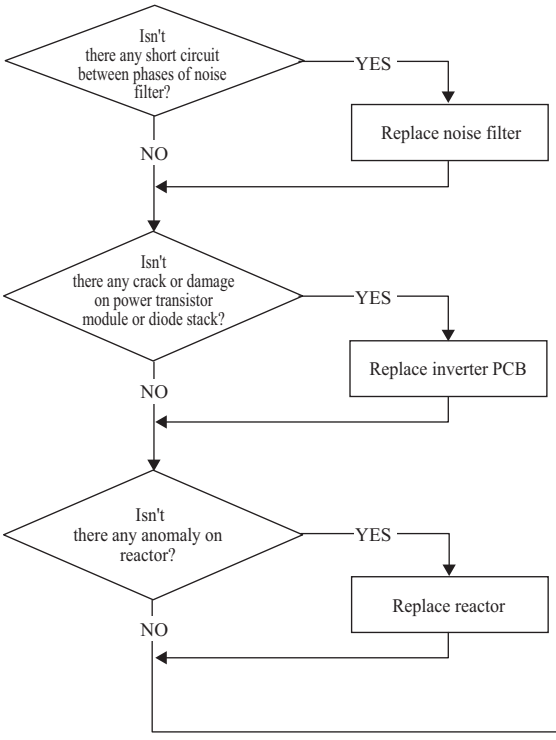
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
	Replace fuse.

Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	WAIT (3)
	Heat source unit	Keeps flashing	Keeps flashing	

1. Applicable model

All models

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

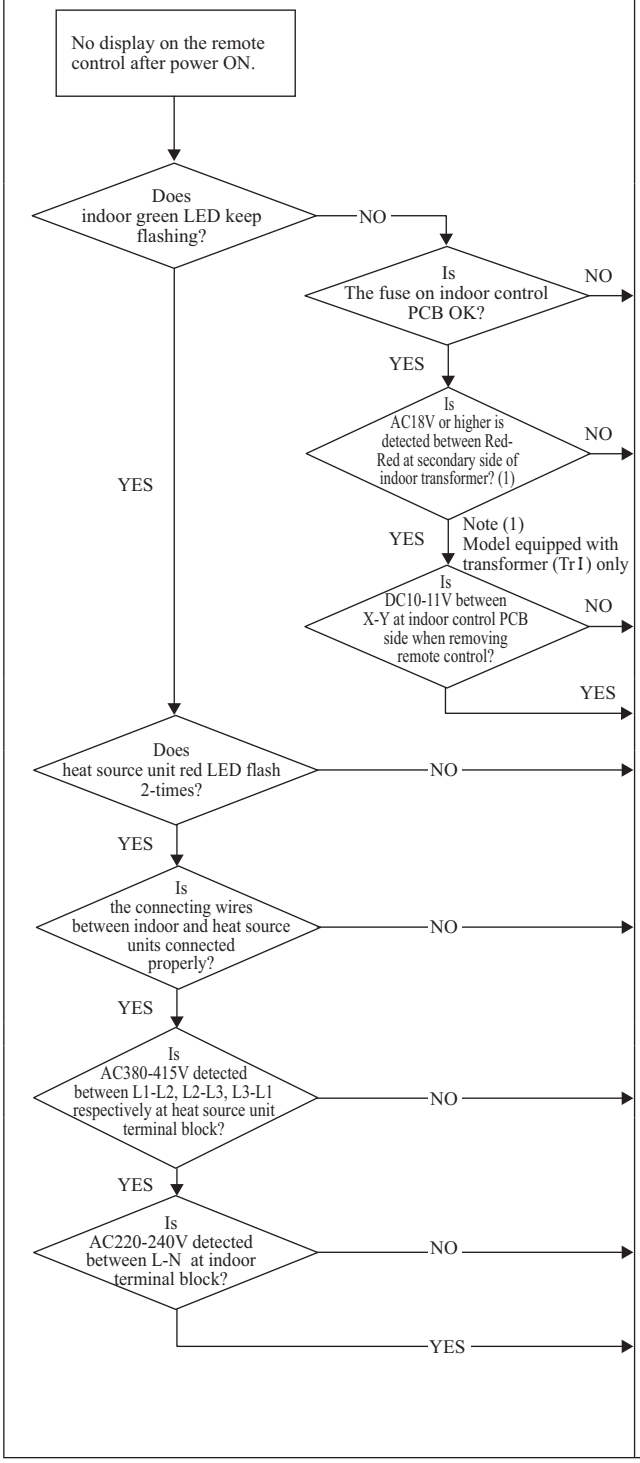
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	WAIT (4)
	Heat source unit	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.)

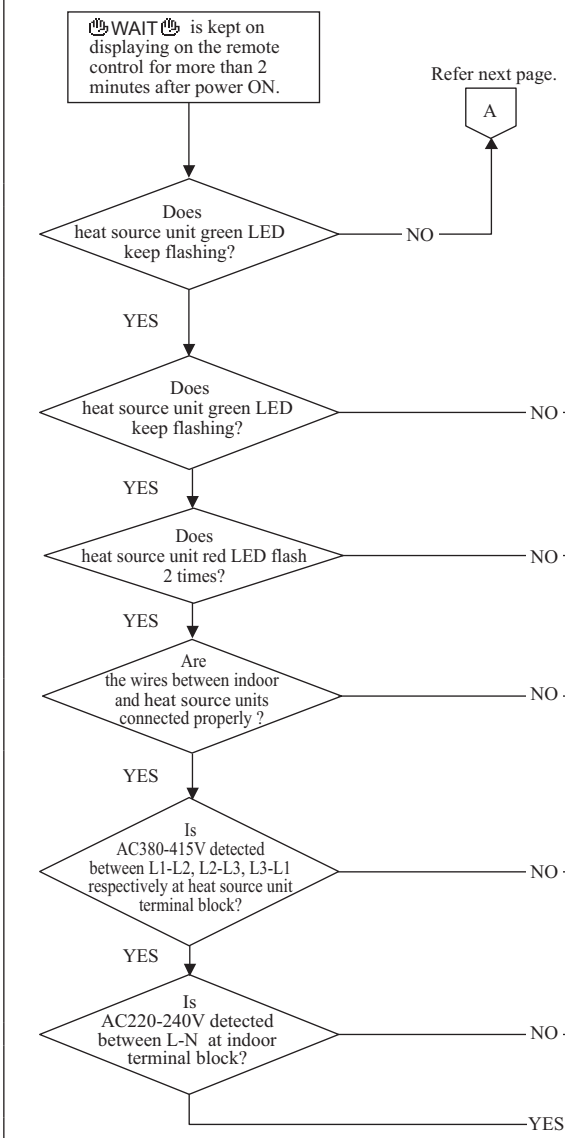
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display: –	Indoor unit	Stays OFF	Stays OFF	WAIT (5)
	Heat source unit	Stays OFF	Stays OFF	

1. Applicable model

All models

(In case that LED on heat source unit control PCB stays OFF.)

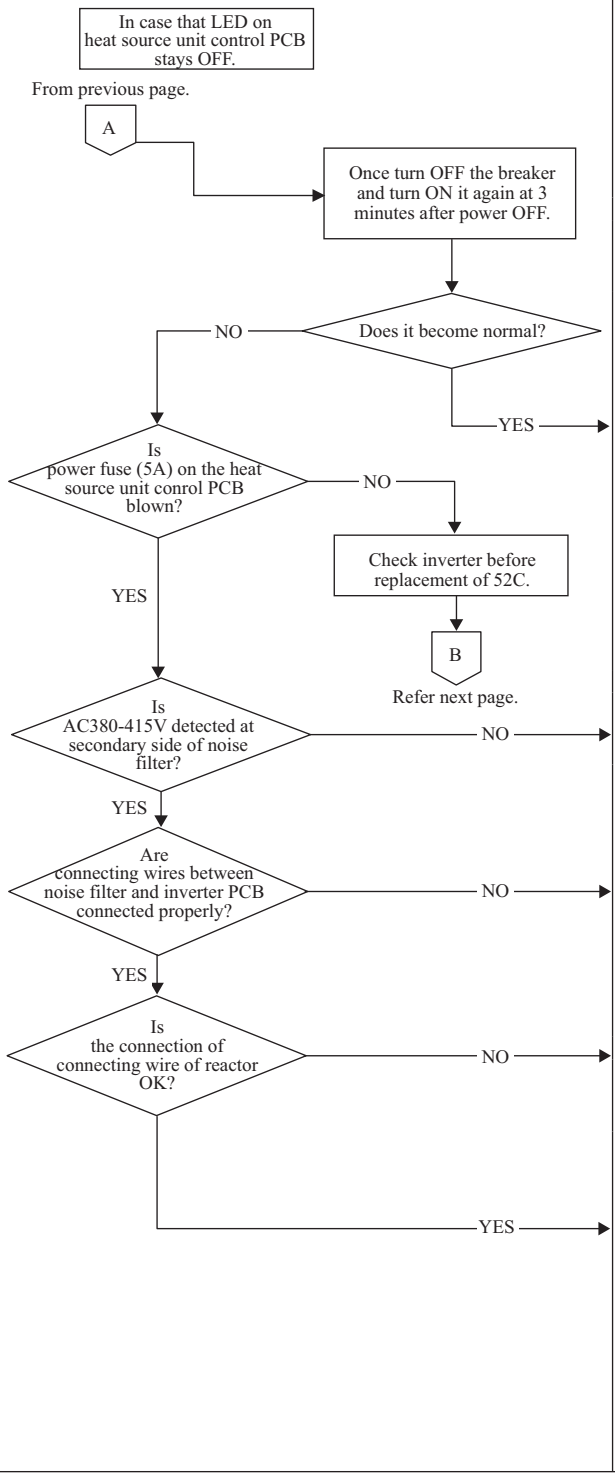
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting



Note:

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

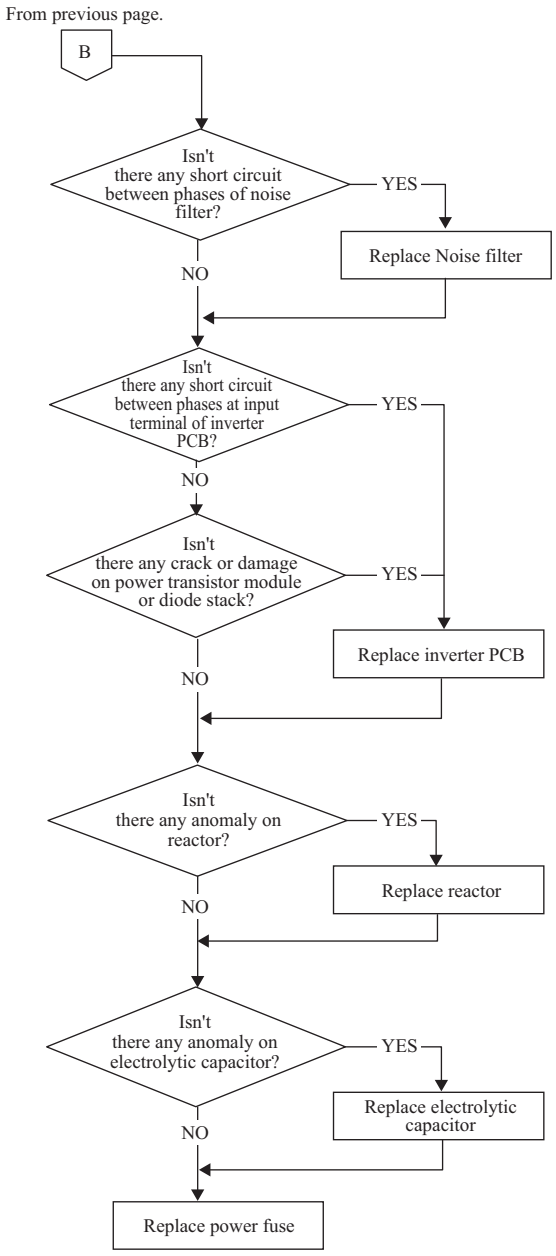
3. Condition of error displayed

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
- Heat source unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure



Note:

Error code	LED	Green	Red	Content
Remote control: [No display] 7-segment display: –	Indoor unit	Stays OFF	Stays OFF	[No display]
	Heat source unit	Stays OFF	Stays OFF	

1. Applicable model

All models

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

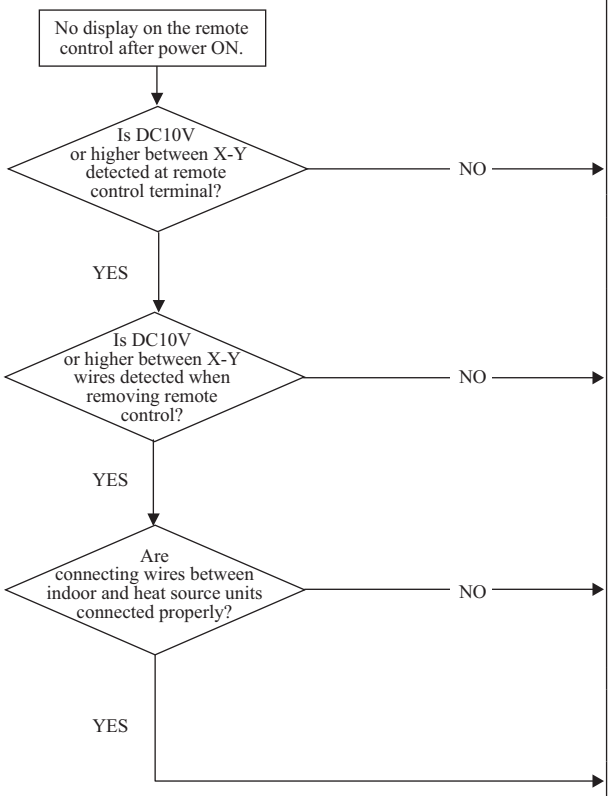
2. Error detection method

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
- Heat source unit control PCB anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E1 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	Remote control communication error
	Heat source unit	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.)

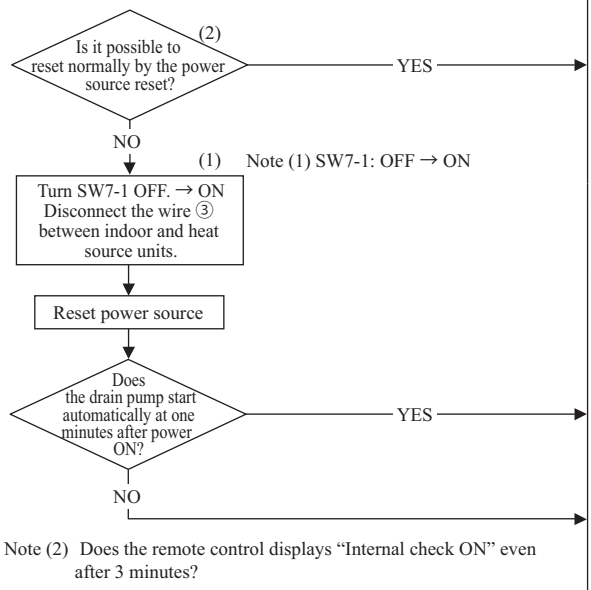
3. Condition of error displayed

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 unit	Keeps flashing	Keeps flashing	Duplicated indoor unit address
	Heat source unit	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

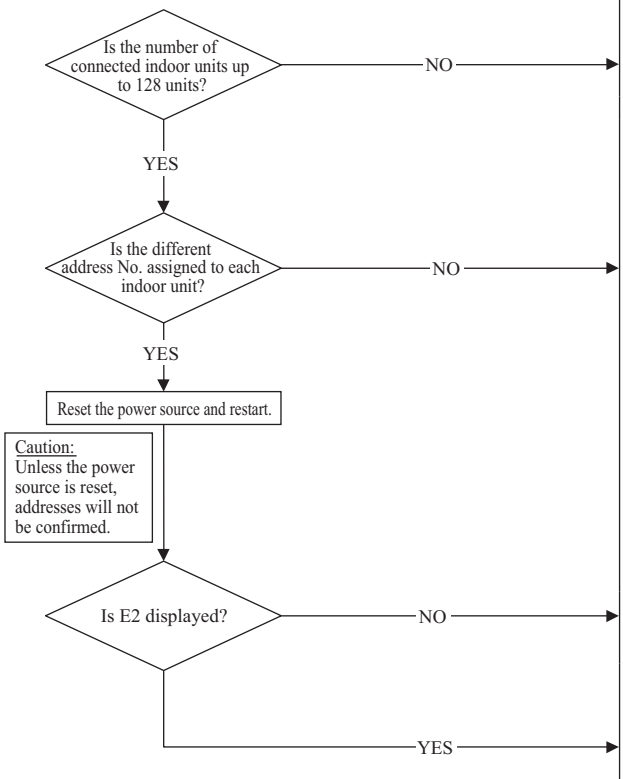
3. Condition of error displayed

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 unit	Keeps flashing	2-time flash
Heat source unit	Keeps flashing	Stays OFF

Content

Heat source unit signal line error

1. Applicable model

All models

2. Error detection method

No heat source unit exists in the same Superlink system.

3. Condition of error displayed

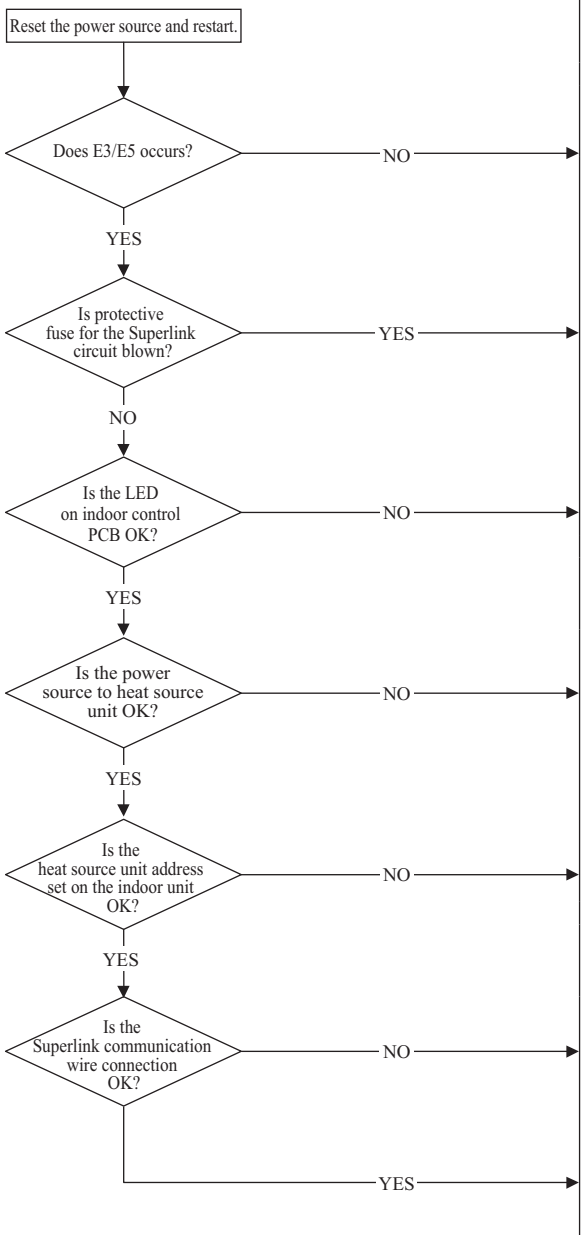
Same as above

4. Presumable cause

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

5. Troubleshooting

E3 is a communication error that occurs when communication between indoor and heat source units is not established at all. Once the communication between indoor and heat source 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 unit	Keeps flashing	*See below	Communication error during operation
	Heat source unit	Keeps flashing	2-time flash	

1. Applicable model

All models

2. Error detection method

When the communication between indoor and heat source 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	Countermeasure
* In case that indoor red LED flashes 2 times Note (1) Check the connection (disconnection, looseness) of signal wires at heat source unit terminal block. Is the connection of signal wires at the heat source unit side OK? NO → Repair signal wires. YES Note (2) Check the connection (disconnection, looseness, breakage) of signal wires between indoor and heat source units. Is the connection of signal wires between indoor and heat source 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 → Heat source unit control PCB anomaly (Network communication circuit anomaly) → Replace it. YES → Unit is normal. (Malfunction by temporary noise, etc.)	

Note: When the pump down switch is turned on, communication between indoor and heat source 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 unit	Keeps flashing	1-time flash	Indoor heat exchanger temperature thermistor anomaly (ThI-R)
	Heat source unit	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.

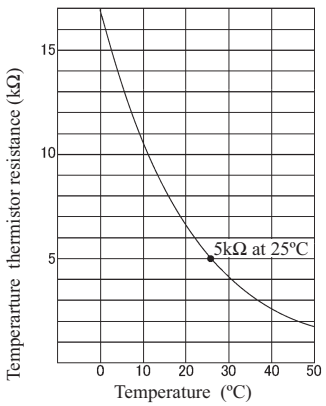
4. Presumable cause

- 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 unit	Keeps flashing	1-time flash	Indoor return air temperature thermistor anomaly (ThI-A)
	Heat source unit	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

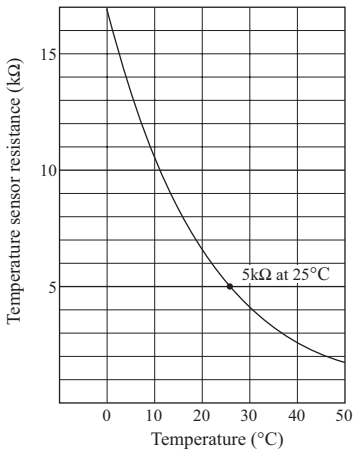
5. Troubleshooting

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

Regarding the characteristics of the thermistor, see the following chart.

*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 unit	Keeps flashing	1-time flash	Drain trouble
	Heat source unit	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.

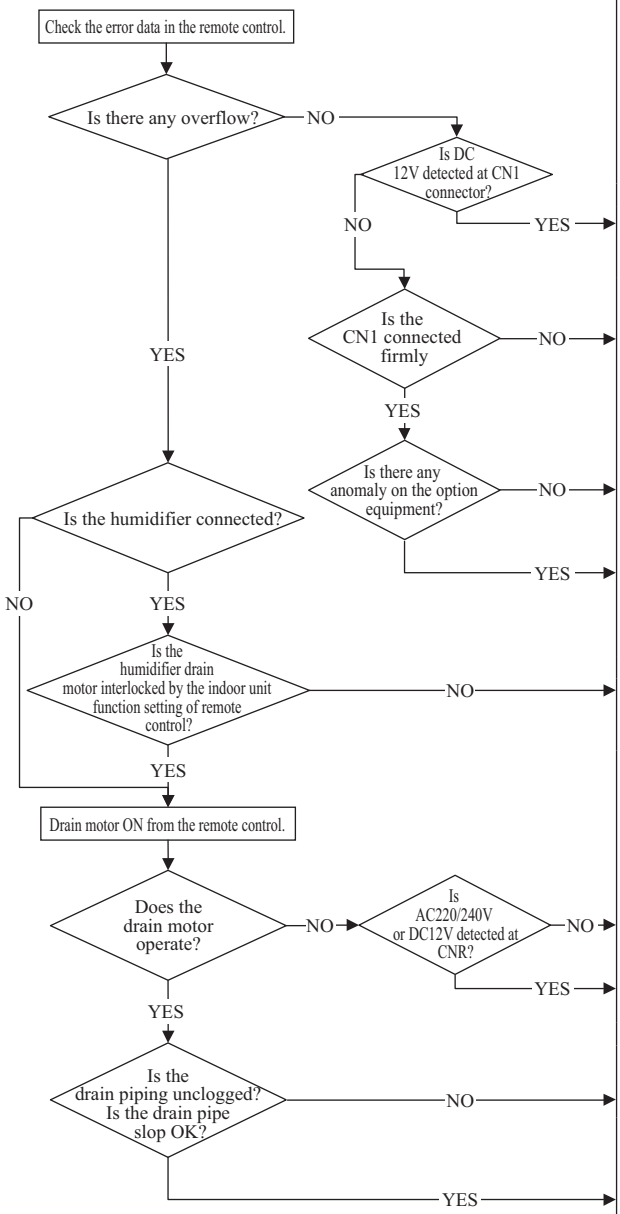
3. Condition of error displayed

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 unit	Keeps flashing	Stays OFF	Excessive number of indoor units (more than 17 units) by controlling one remote control
	Heat source unit	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.
YES	Reduce to 16 or less units.

Note:

Error code	LED	Green	Red	Content
Remote control: E11 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	Address setting error between master and slave indoor units
	Heat source unit	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

IU address has been set using the “Master IU address set” function of remote control.

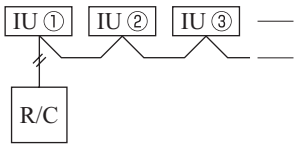
3. Condition of error displayed

Same as above

4. Presumable cause

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 bel ow and “Master IU address set” is used, E11 is appeared.  	

Error code	LED	Green	Red	Content
Remote control: E12 7-segment display: –	Indoor unit	Keeps flashing	Keeps flashing	Address setting error by mixed setting method
	Heat source unit	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		Heat source unit address setting	Indoor unit address setting		Heat source unit address setting
		Indoor unit No. SW	Heat source unit No. SW	Heat source unit No. SW	Indoor unit No. SW	Heat source unit No. SW	Heat source 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

Remote control: E16
7-segment display:

LED	Green	Red
Indoor	Keeps flashing	1(2)-time flash
Outdoor	Keeps flashing	Stays OFF

Content

Indoor DC fan motor anomaly

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

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

Diagnosis	Countermeasure
Does any foreign material intervene in rotational area of fan propeller? — YES	Remove foreign material.
NO → Does the fan rotate smoothly when turned by hand? — NO	Replace the fan motor.
YES → Is DC280V detected between ①-④(①-③,⑥-④) of fan power PCB connector CNM? (1),(2) — NO	Note(1) ④ or ③ for GND Note(2) Value in (①-③) are for the models FDK, FDFW Value in (⑥-④) are for the models FDU224,280KXZE1 and FDU1800,2400FKXZE1
NO → Is the fuse F1,F2,F3 blown? — NO	Check power voltage.
YES — YES	Replace faulty fan motor and power PCB.
YES → Is DC280V detected between ⑥-④ of motor control PCB connector CNM? (3) — NO	Note(3) FDU224,280KXZE1 and FDU1800,2400FKXZE1 (FM1) only. Replace harness assy between motor PCB and power PCB.
YES → Power source reset → Is it normalized? (Is DC280V detected between ⑥-④ of motor control PCB connector CNM?) (4) — NO	Note(4) Value in ( ) are for the models FDU224,280KXZE1 and FDU1800,2400FKXZE1 (FM1) only. Replace fan motor. [If the error persists after replacing the fan motor, replace the indoor control PCB. (FDU224,280KXZE1 and FDU1800,2400FKXZE1 (FM1) : Motor contrl PCB)]
YES	Malfunction by temporary noise.

Note:

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

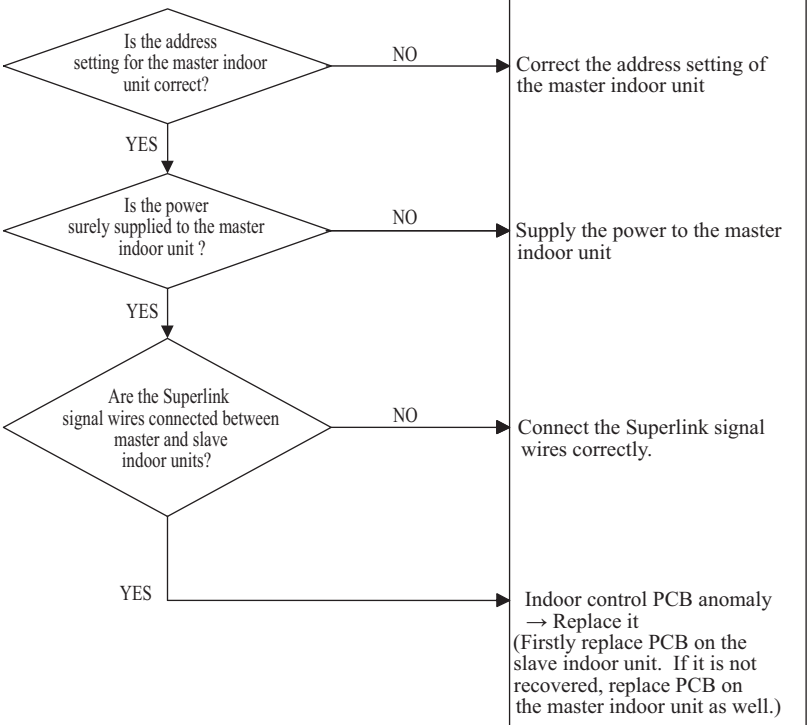
3. Condition of Error displayed

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 unit	Keeps flashing	1-time flash	Indoor unit operation check, drain motor check mode anomaly
	Heat source unit	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

E19 occurs

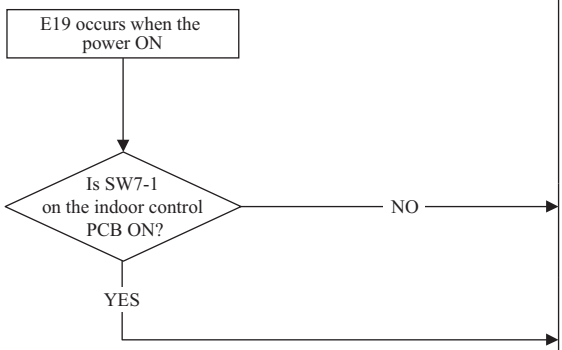
3. Condition of error displayed

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

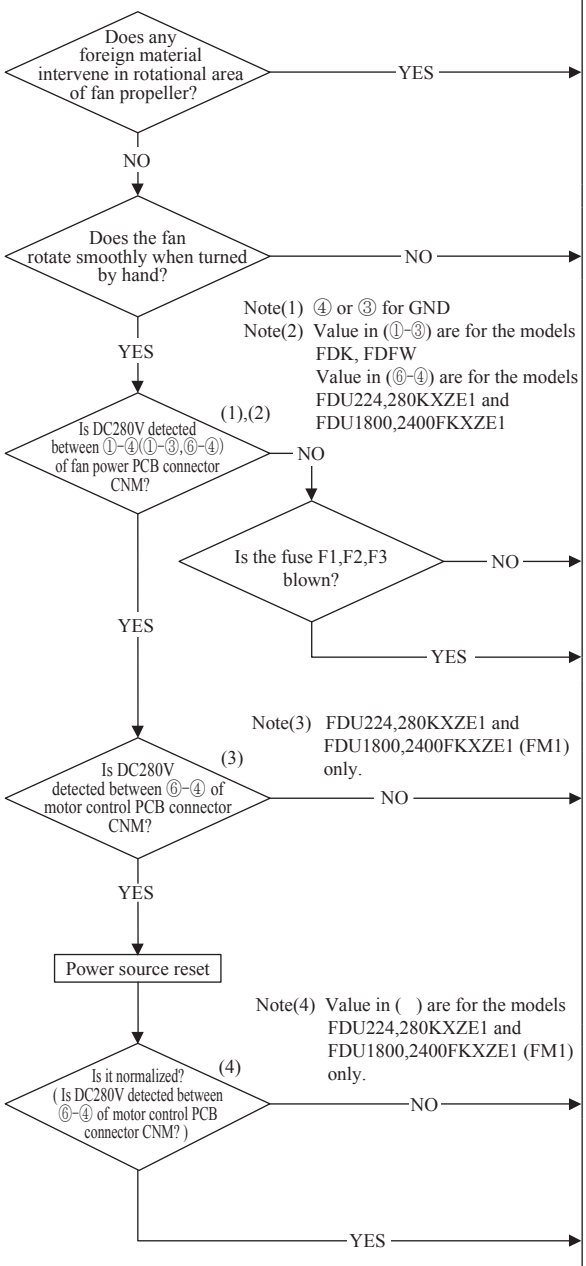
3. Condition of Error displayed

- 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	LED	Green	Red	Content
Remote control: E21 7-segment display: –	Indoor unit	Keeps flashing	1-time flash	Defective panel switch operation (FDT)
	Heat source unit	Keeps flashing	Stays OFF	

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

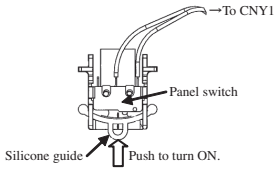
Same as above

4. Presumable cause

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

5. Troubleshooting

Diagnosis	Countermeasure
Is grill opened? — YES	Reset the error and close the grill.
NO → Does matter improve if panel switch is turned ON forcibly after resetting error? — YES	Insufficient push on the panel switch at the internal face of grill →Attach 3 mm thick rubber sheet at the section where the panel switch touches the inside of grill. Close then the grill.
<Forced panel switch ON> Put the switch in the state of ON by fixing the silicone section of panel switch with adhesive tape while it is held down.	
NO → Are connectors at right inserted properly? — NO	Disconnected, poorly connected connectors →Reinsert properly.
<Connectors on PCBs> Indoor control PCB: CNV	
YES → Is there continuity between #1 – #4 of CNV on indoor control PCB when panel switch operation is checked? — NO	・Defective panel switch or incorrect panel switch wiring → Replace panel switch. ・Broken wire between panel PCB (CNV) → Correct or replace wire.
YES	Defective indoor control PCB → Replace indoor control PCB.



Note:

Error code	LED	Green	Red	Content
Remote control: E28 7-segment display: –	Indoor unit	Keeps flashing	Stays OFF	Remote control temperature thermistor anomaly (Thc)
	Heat source unit	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: E30 7-segment display: E30	Indoor unit	Keeps flashing	Stays Off	Unmatch connection of indoor and heat source unit
	Heat source unit	Keeps flashing	1 time flash	

1.Applicable model

Heat source unit

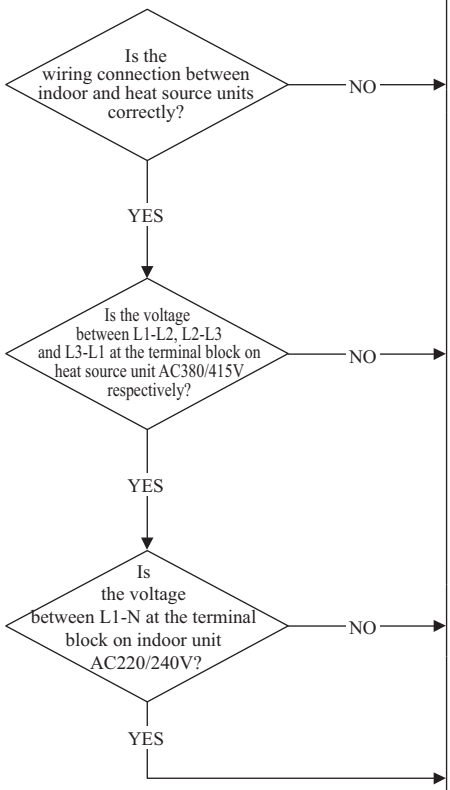
2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Indoor control PCB anomaly
- Heat source unit control PCB anomaly

5.Troubleshooting



Note:

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

1. Applicable model

Heat source unit

2. Error detection method

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

3. Condition of error displayed

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

4. Presumable cause

- Mistake in the address setting of heat source 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 heat source 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 heat source unit address Nos. in the same Superlink system.	
Does the same address No. exist? — YES	Correct address.
NO	Replace heat source unit 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 unit	Keeps flashing	Stays OFF	Open L3 Phase on power source at primary side
	Heat source unit	Keeps flashing	1-time flash	

1. Applicable model

Heat source unit

2. Error detection method

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

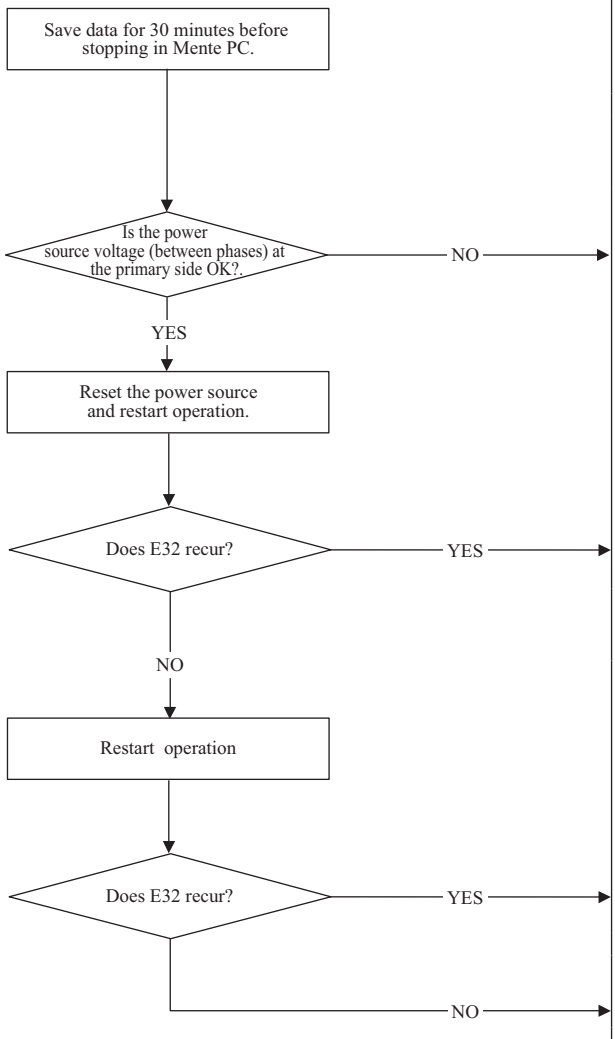
3. Condition of error displayed

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
- Heat source unit control PCB anomaly.

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E36 7-segment display: E36-1*1	Indoor unit	Keeps flashing	Stays OFF	Discharge pipe temperature error (Tho-D1)
	Heat source unit	Keeps flashing	*2	

*1 E36-1: Tho-D1 *2 E36-1: 1-time flash

1. Applicable model

Heat source unit

2. Error detection method

When anomalously high temperature is detected by the discharge pipe temperature thermistor (Tho-D1).

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
- EEVSC (liquid refrigerant by-pass valve) anomaly
  - Breakage of coil
  - Faulty main body.
- Heat source unit control PCB anomaly
- Insufficient amount of refrigerant

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 EEVSC operation
Is the unit installation environment within the range of limitation? — NO	Propose an improvement to the customer.
YES → Are the refrigerant amount and piping length OK? — NO	Adjust the refrigerant amount properly. (Check whether the refrigerant amount is insufficient or not.) (Check the gas leakage)
YES → Is the insertion of the thermistor connector into the connector on heat source unit control PCB OK? — NO	Insert connector securely.
YES → Is the discharge pipe temperature thermistor OK? — NO	Check if the characteristics are correct by referring the characteristics chart of E39. And if necessary, replace the discharge pipe temperature thermistor.
YES → Reset the power source and restart operation.	Check it, as much as possible, under the operating conditions for 30 minutes before error occurred.
Does the error recur when restarting? — NO	Wait and see. Continue to obtain data, if possible. (Keep connecting the Mente PC)
YES → Is there DC13V of output signal for EEVSC from heat source unit control PCB? — NO	Replace heat source unit control PCB.
YES → Is the coil of EEVSC energized? — NO	Replace the coil EEVSC.
YES → Does the refrigerant flow through EEVSC main body? — NO	Replace the EEVSC main body. (If there is no refrigerant in liquid line, charge refrigerant additional)
YES	Check refrigerant amount again.

Note:

Error code	LED	Green	Red	Content
Remote control: E37 7-segment display: E37-1, 2, 5, 6*1	Indoor unit	Keeps flashing	Stays OFF	Heat source unit heat exchanger temperature thermistor (Tho-R) and sub-cooling coil temperature thermistor (Tho-SC,-H) anomaly
	Heat source unit	Keeps flashing	*1	

*1 E37-1: 1-time flash (Tho-R1), E37-2: 2-time flash (Tho-R2), E37-5: 5-time flash (Tho-SC), E37-6: 6-time flash (Tho-H)

1. Applicable model

Heat source 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

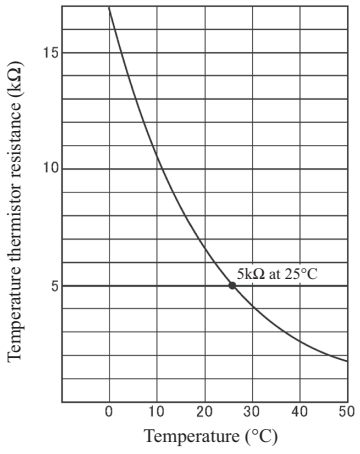
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector).
- Heat source unit control PCB anomaly.

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 heat source unit control PCB.

*2
Check several times to prove any poor connection

Heat source unit heat exchanger temperature thermistor (Tho-R1-R2)
Subcooling coil thermistor (Tho-SC, Tho-H)
Temperature-resistance characteristics



Note:

Error code	LED	Green	Red	Content
Remote control: E38 7-segment display: E38	Indoor unit	Keeps flashing	Stays OFF	Atmosphere air temperature thermistor anomaly (Tho-A)
	Heat source unit	Keeps flashing	1-time flash	

1. Applicable model

Heat source 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.

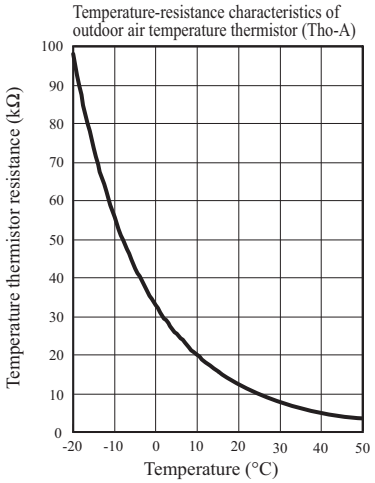
4. Presumable cause

- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector).
- Heat source unit 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 heat source unit control PCB.

*1
Check several times to prove any poor connection



Note:

Error code	LED	Green	Red	Content
Remote control: E39 7-segment display: E39-1*1	Indoor unit	Keeps flashing	Stays OFF	Discharge pipe temperature thermistor anomaly (Tho-D1)
	Heat source unit	Keeps flashing	∗2	

*1 E39-1: Tho-D1 *2 E39-1: 1-time flash

1. Applicable model

Heat source unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-D1.

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

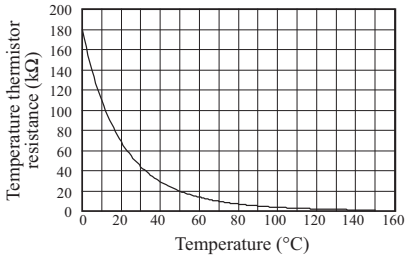
- Broken thermistor harness or the internal wire of sensing section. (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Heat source unit control PCB anomaly.

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-D1).
YES	Replace heat source unit control PCB.

*3
Check several times to prove any poor connection

Temperature-resistance characteristics of discharge pipe temperature thermistor (Tho-D1)



Note:

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

1. Applicable model

Heat source 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

- 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 supply
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 heat source unit control PCB.
YES → Is there any clogging in the refrigerant circuit ? YES →	Remove clogs.
NO →	Check items (condenser side)

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 unit	Keeps flashing	Stays OFF	Power transistor overheat
	Heat source unit	Keeps flashing	*2	

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

1. Applicable model

Heat source unit

2. Error detection method

E41 is displayed on 7-segment LED.

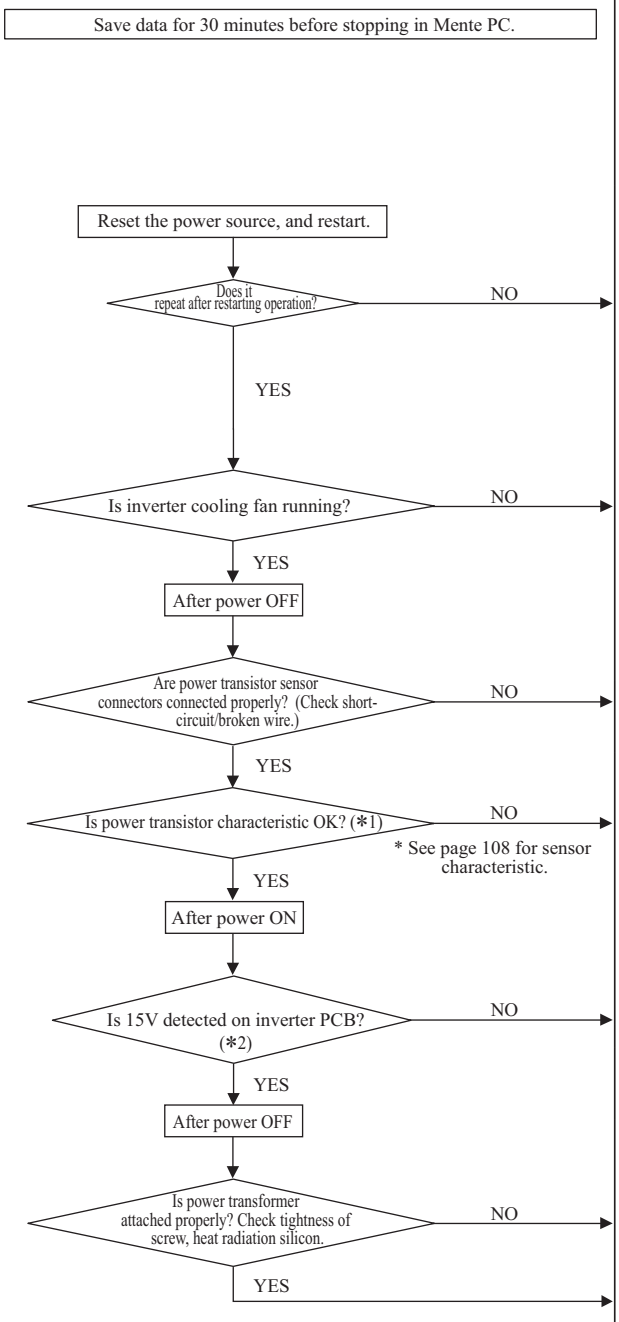
3. Condition of error displayed

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
- Anomalous cooling fan motor for inverter

5. Troubleshooting



Note: *1 Measurement position: Between ① – ③ pins of CNN8
*2 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: E42-1*1	Indoor unit	Keeps flashing	Stays OFF	Current cut (CM1)
	Heat source unit	Keeps flashing	*2	

*1 E42-1: CM1 *2 E42-1: 1-time flash

1. Applicable model

Heat source unit

2. Error detection method

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

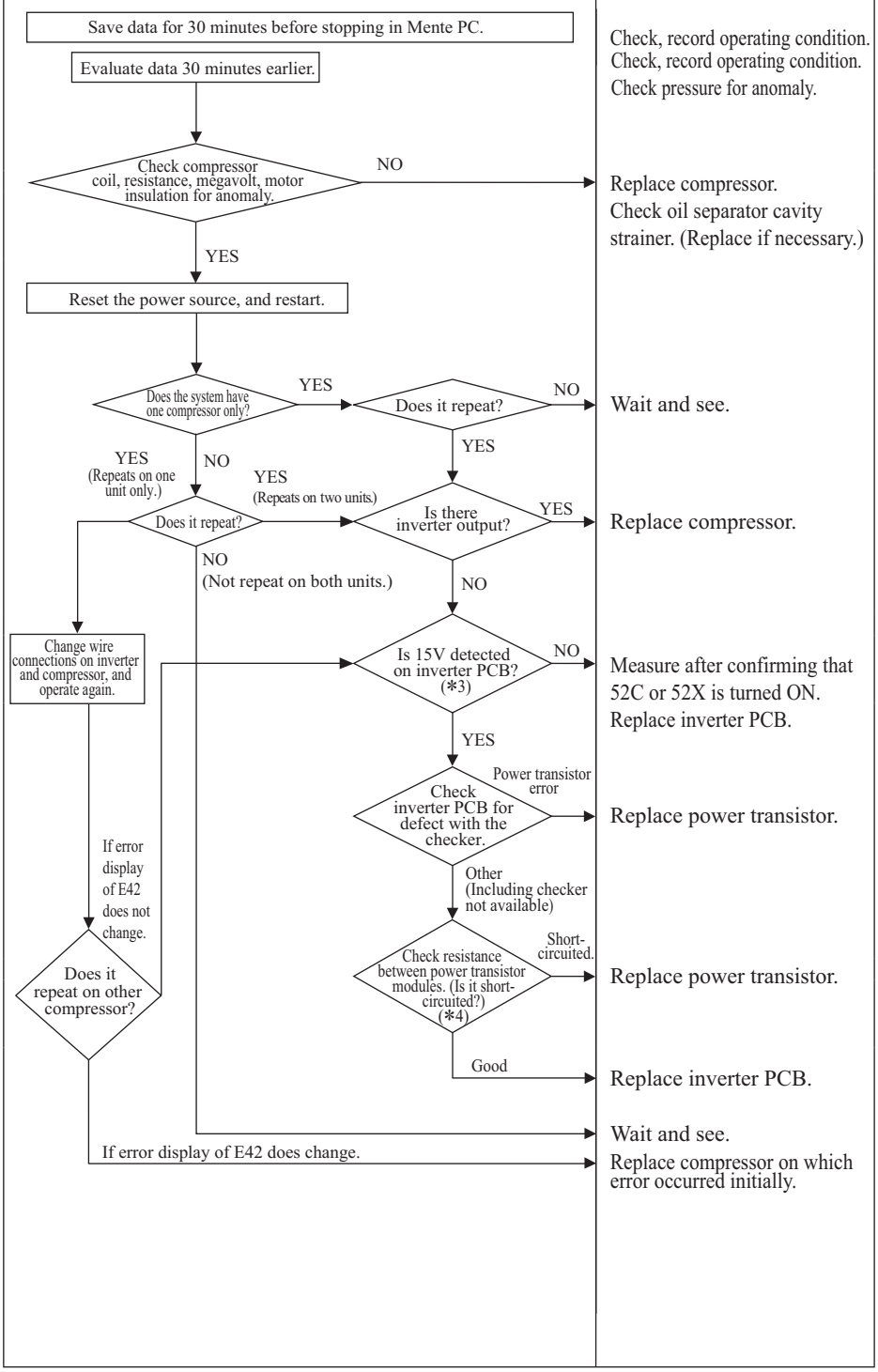
3. Condition of error displayed

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 supply for inverter PCB

5. Troubleshooting



Note: *3 Measurement position: Between + and - of C19
*4 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: E43-1, 2 *1	Indoor unit	Keeps flashing	Stays OFF	Excessive number of indoor units connected, excessive total capacity of connection
	Heat source unit	Keeps flashing	*1	

*1 E43-1/1-time flash: Excessive number of indoor units connected, E43-2/2-time flash:Excessive capacity of connection

1.Applicable model

Heat source 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.

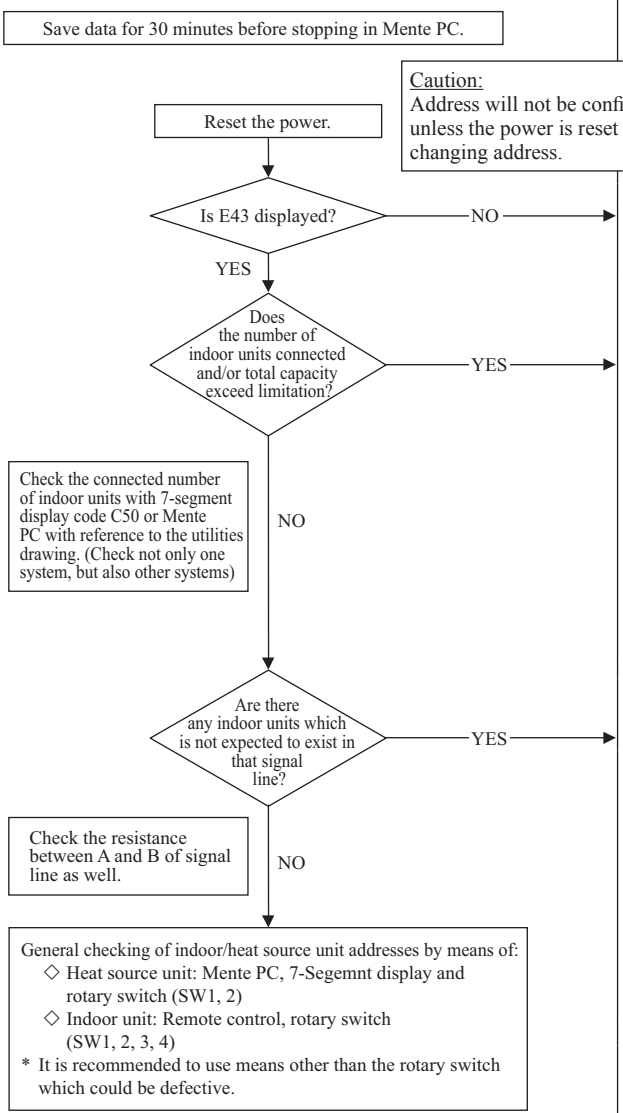
3. Condition of error displayed

- 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/ heat source 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 heat source unit, the set addresses will not be confirmed.

Error code	LED	Green	Red	Content
Remote control: E44 7-segment display: E44-1*1	Indoor unit	Keeps flashing	Stays OFF	Liquid flooding anomaly (CM1)
	Heat source unit	Keeps flashing	*2	

*1 E44-1: CM1 *2 E44-1: 1-time flash

1. Applicable model

Heat source 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.

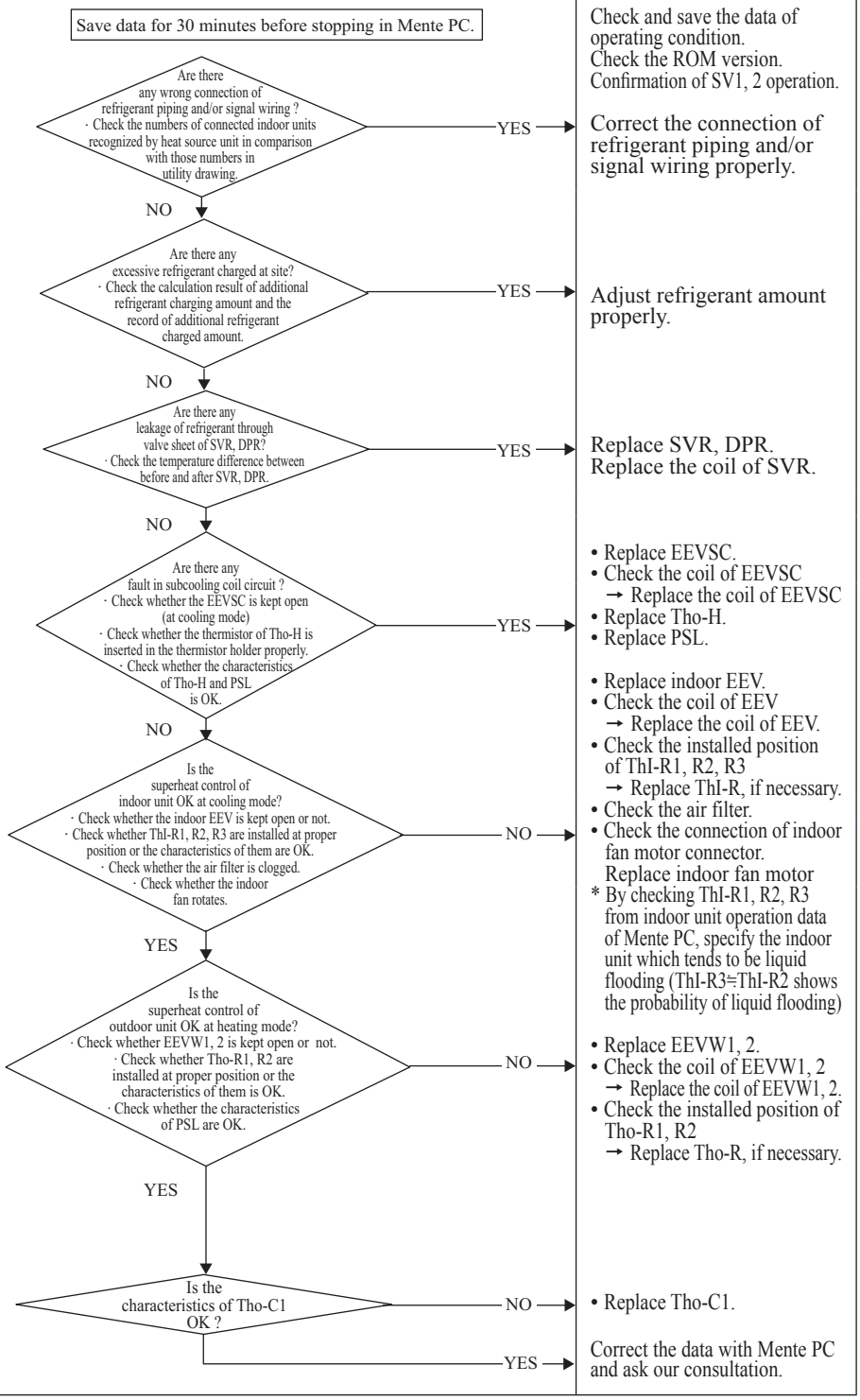
3. Condition of error displayed

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-C1) anomaly

5. Troubleshooting



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: E45-1*1	Indoor unit	Keeps flashing	Stays OFF	Communication error between inverter PCB and heat source unit control PCB
	Heat source unit	Keeps flashing	*2	

*1 E45-1: INV1 *2 E45-1: 1-time flash

1. Applicable model

Heat source unit

2. Error detection method

E45 is displayed on 7-segment LED.

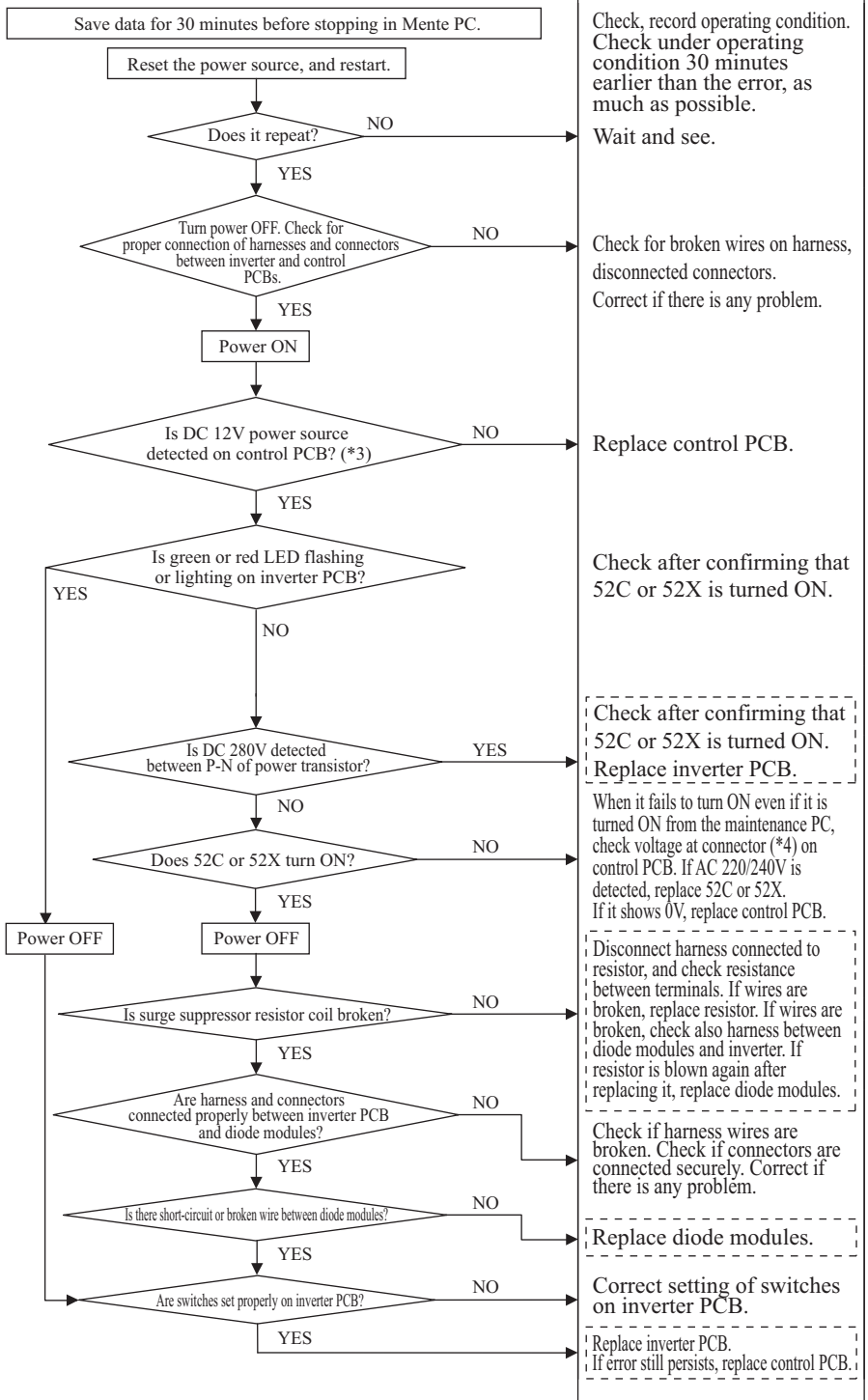
3. Condition of error displayed

When the communication between inverter PCB and heat source unit control PCB is not established.

4. Presumable cause

- Signal wire anomaly
- Heat source unit control PCB anomaly
- Inverter PCB anomaly
- Rush current prevention resistor anomaly
- Defective 52C or 52X
- Defective diode module

5. Troubleshooting



Note: *3 Measurement position: Between + and - of C21
*4 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 unit	Keeps flashing	Stays OFF	Mixed address setting methods coexistent in same network
	Heat source unit	Keeps flashing	Stays OFF	

1. Applicable model

Heat source unit

2. Error detection method

If the signal line of a heat source unit system applied automatic address setting is connected to other heat source 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

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions. Check the address setting method of faulty network whether it is automatic setting or manual setting.
Reset power source and restart.	
Caution: Unless the power is reset after changing address, the set address will not be confirmed.	
Does E46 recur? — NO	Test run. * No action is taken because it is judged that the power reset is not done after changing address.
YES	
Isn't the signal line of a heat source unit system applying automatic address setting connected to other heat source unit system? — YES	Correct signal line. *In case of automatic address setting, signal line cannot be connected to other heat source unit system.
NO	
If signal line is connected to more than 2 heat source unit systems, address setting should be done by manually.	
Is E46 still displayed? — NO	Test run.
YES	
Turn ON the power of each heat source unit one by one and search the heat source unit that can start up with automatic address setting.	Replace heat source unit control PCB*. (Rotary switch anomaly)
<Reference> Error display at mixed address setting	* 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)

	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 heat source unit, the set addresses will not be confirmed.

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

1. Applicable model

Heat source 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.
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 107. YES	Replace heat source unit 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 heat exchanger at evaporator side.

Note: Check whether the indoor unit is connected to other heat source unit 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/E55-1	Indoor unit	Keeps flashing	Stays OFF	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C1)
	Heat source unit	Keeps flashing	*2	

*1 E55-1 : Tho-C1 *2 E53 : E53·E55-1-time flash

1.Applicable model

Heat source unit

2.Error detection method

Detection of anomalously low temperature (resistance) of Tho-S or Tho-C1.

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.

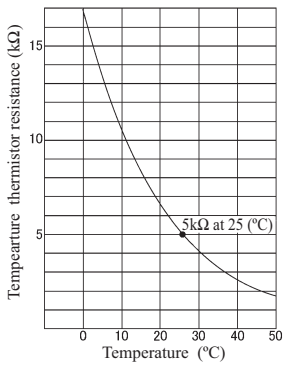
4.Presumable cause

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

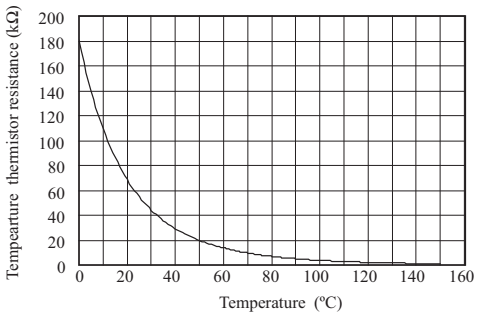
5.Troubleshooting

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-C1)
YES	Replace heat source unit 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-C1)



Note:

Error code	LED	Green	Red	Content
Remote control: E54 7-segment display: E54-1, 2 *1	Indoor unit	Keeps flashing	Stays OFF	High pressure sensor anomaly (PSH) Low pressure sensor anomaly (PSL)
	Heat source unit	Keeps flashing	*1	

*1 E54-1: 1-time flash (PSL), E54-2 : 2-time flash (PSH)

1. Applicable model

Heat source 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

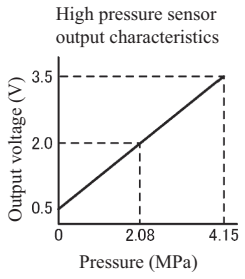
If anomalous sensor output DC voltage (0V or lower or 3.49V or higher) is detected for 5 seconds within 2 minutes to 2 minutes 20 seconds after the compressor ON.

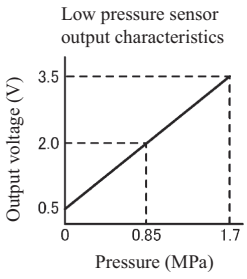
4. Presumable cause

- Broken sensor harness
- Disconnection of sensor harness connection (connector)
- Sensor (PSH, PSL) anomaly
- Outdoor control PCB anomaly
- Anomalous installation conditions
- 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 heat source unit 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 heat source unit control PCB.





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

Note:

Error code	LED	Green	Red	Content
Remote control: E56 7-segment display: E56-1*1	Indoor unit	Keeps flashing	Stays OFF	Power transistor temperature thermistor anomaly (Tho-P1)
	Heat source unit	Keeps flashing	*1	

*1 E56-1/1-time flash:Tho-P1 anomaly

1.Applicable model

Heat source unit

2.Error detection method

Detection of anomalously low temperature (resistance) of Tho-P1.

3. Condition of error displayed

When the outdoor air temperature is above 0ºC, if -10ºC or lower is detected for 20 seconds continuously within 10 minutes to 10 minutes 30 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

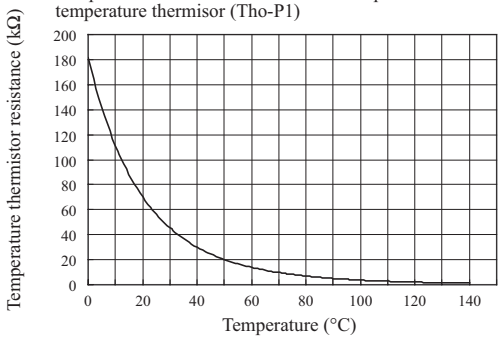
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Heat source unit control PCB anomaly

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 of Mente PC data with actual measured value.
Is the connector of thermistor connected properly OK ? — NO	Insert the connector securely.
YES	
(1) Are the characteristics of thermistor OK? ※1 — NO	Note (1) Regarding the characteristics of the thermistor, see the following. Replace power transistor temperature thermistor (Tho-P1).
YES	Replace heat source unit control PCB.

※1Check several times to prove any poor connection.

Temperature-resistance characteristics of power transistor temperature thermisor (Tho-P1)



Note:

Error code	LED	Green	Red	Content
Remote control: E58 7-segment display: E58-1*1	Indoor unit	Keeps flashing	Stays OFF	Anomalous compressor by loss of synchronism
	Heat source unit	Keeps flashing	*2	

*1 E58-1: CM1 *2 E58-1: 1-time flash

1. Applicable model

Heat source unit

2. Error detection method

E58 is displayed on 7-segment LED.

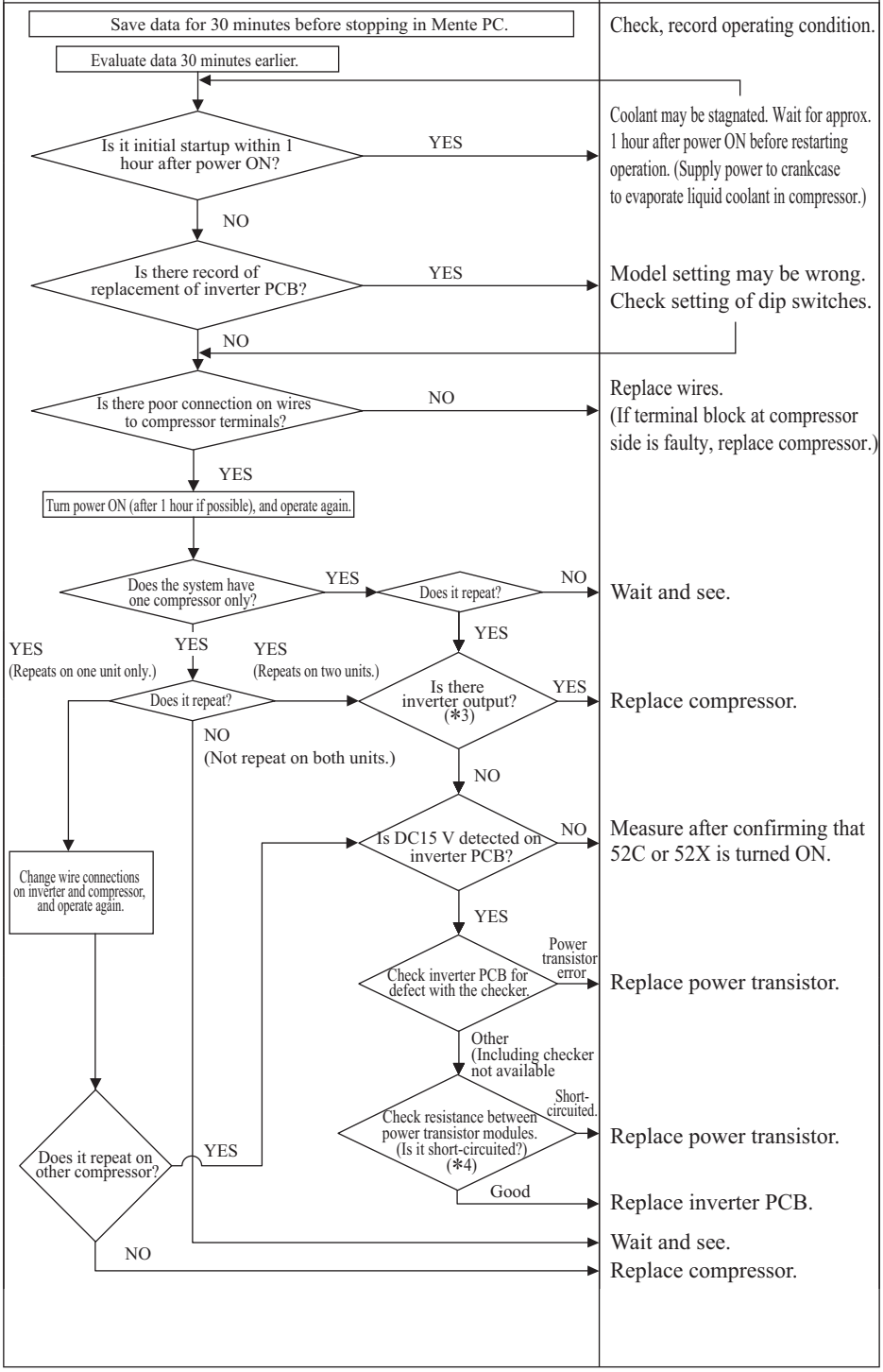
3. Condition of error displayed

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: *3 Measurement position: Between + and - of C19
*4 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: E59-1*1	Indoor unit	Keeps flashing	Stays OFF	Compressor startup failure (CM1)
	Heat source unit	Keeps flashing	*2	

*1 E59-1: CM1 *2 E59-1: 1-time flash

1. Applicable model

Heat source 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

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC.	Check and save the data of operating conditions.
Check the data for 30 minutes before stopping	
Is power source voltage OK? — NO	Check the power source voltage and correct it.
specification of power source voltage AC380/415V	
Is the pressure equalized during 3-minute delay before startup? — NO	Check the version No. of software. (Is it latest?) Check whether the solenoid valve SVO at the exit of oil separator is open during compressor stopping. (Is the pressure equalized?)
Is there any loose connection or breakage of cable connected to the terminal of the compressor? — NO	Replace the cable. (If there is a problem on the terminal of compressor, replace the compressor.)
Under the condition of no pressure difference, startup by test operation mode.	
Is it the unit with one compressor? — YES → Can startup? — YES	Wait and see
NO → Does it start up? — YES (1 unit only starts up.)	
NO (None starts up.) → Is there inverter output? — YES	Replace compressor.
YES (Both units start up.)	
NO → Is DC15 V detected on inverter PCB? (*3) — NO	Measure after confirming that 52C or 52X is turned ON. Replace inverter PCB.
YES → Check inverter PCB for defect with the checker. (Power transistor error)	Replace power transistor.
Other (Including checker not available) → Check resistance between power transistor modules. (Is it short-circuited?) (*4) (Short-circuited.)	Replace power transistor.
Good	Replace inverter PCB.
Change wire connections on inverter and compressor, and operate again. → Does it repeat on other compressor? — YES	Wait and see.
NO	Replace compressor.

Note: *3 Measurement position: Between + and - of C19
*4 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: E61 7-segment display: E61-1, 2 *1	Indoor unit	Keeps flashing	Stays OFF	Communications error between the master unit and slave units
	Heat source unit	Keeps flashing	*1	

*1 E61-1/1-time flash: Slave unit 1, E61-2/2-time flash: Slave unit 2

1. Applicable model

Heat source unit

2. Error detection method

E61 is displayed on 7-segment LED.

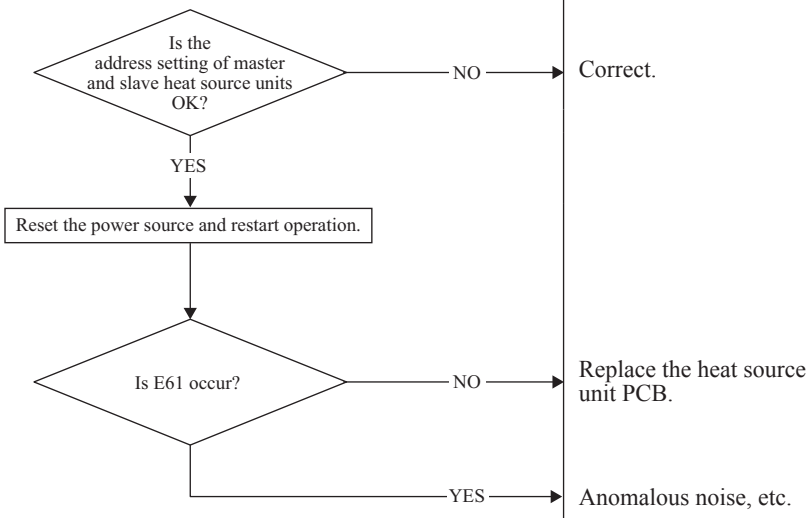
3. Condition of error displayed

When the communication between master unit and slave units is not established.

4. Presumable cause

- Signal wire anomaly
- Heat source unit control PCB anomaly
- Inverter PCB anomaly
- Rush current prevention resistor anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote control: E63 7-segment display: E63	Indoor unit	Keeps flashing	Stays OFF	Emergency stop
	Heat source unit	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 Heat source unit control PCB replacement procedure

PCB012D045B

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

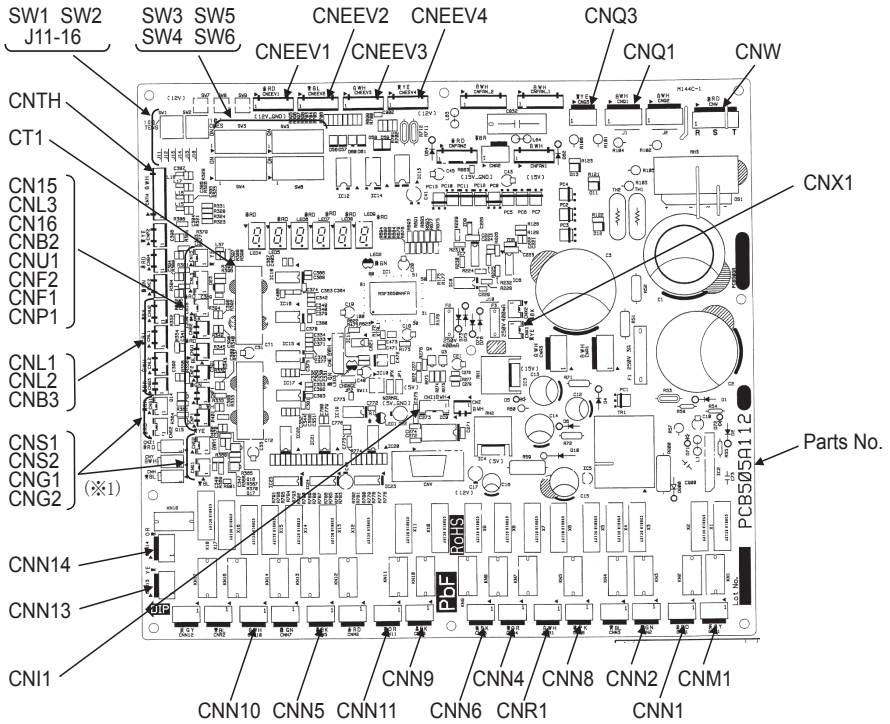
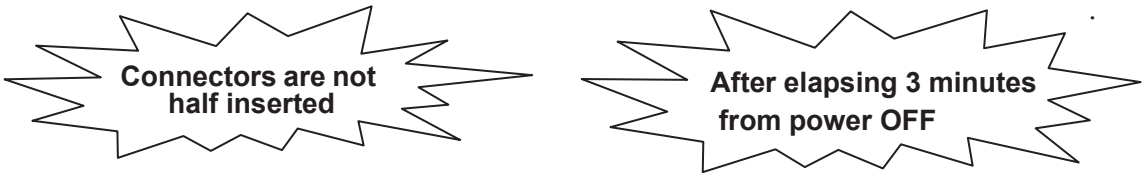


Fig.1 Part Arrangement View

※1： Reuse the parts used before the PCB exchange.

※2： Because spare PCB is commonized, by the model, extra connectors is implemented, compared with the former PCB. When connecting the connectors after exchanging the PCB, check the color and name of the connectors, please note the faulty connections.



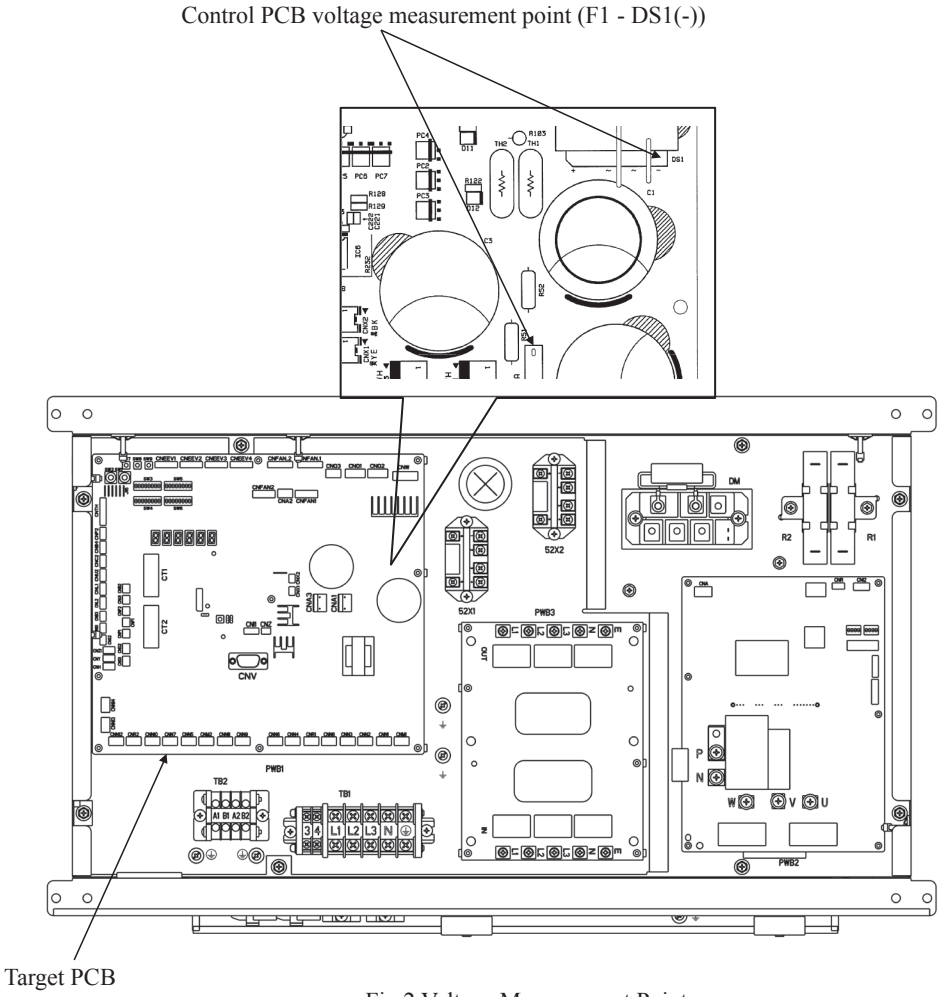


Fig.2 Voltage Measurement Point

2.5 Heat source unit inverter PCB replacement procedure

PCB012D018B

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 according to the following procedure.

1. Check parts numbers. (For each indication part, refer to Fig.1 Parts arrangement View.)
2. Exchange the PCB **after elapsing 3 minutes from power OFF.**
   (**Be sure to measure voltage (DC)** and **check that the voltage is discharged sufficiently.** (Refer to Fig.2))
3. Disconnect the connectors from the PCB.
4. Exchange the PCB.
5. Match the setting switches (JSW10,11) with the former PCB.
6. Connect the connectors, wiring, and snubber capacitor. (Confirm the **connectors are not half inserted.**)

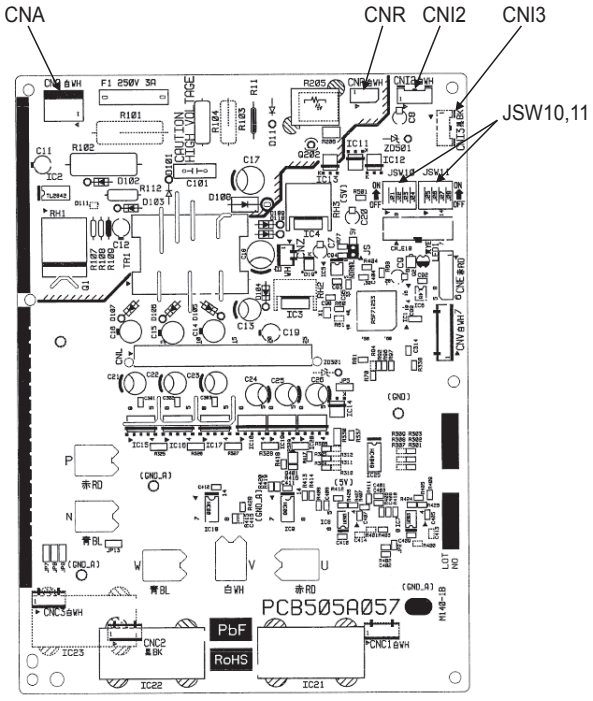


Fig.1 Part Arrangement View

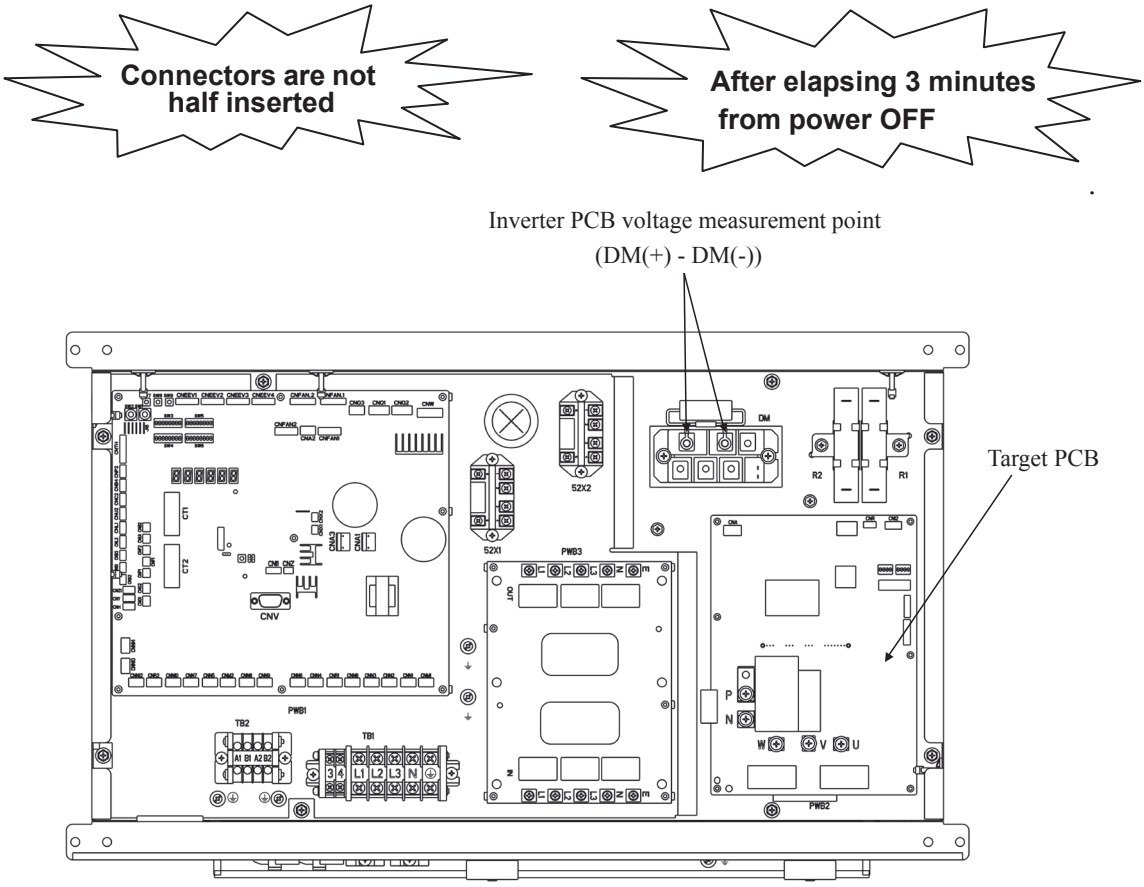
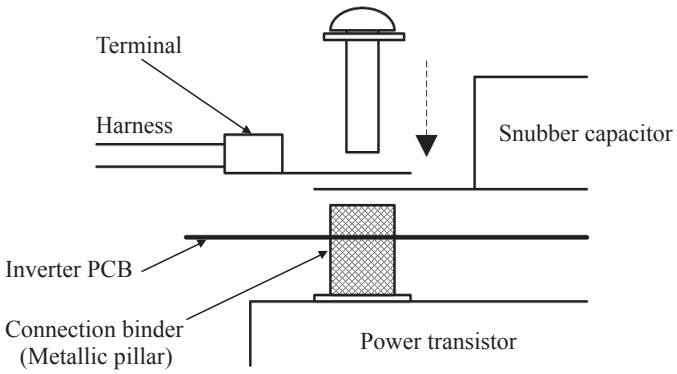


Fig.2 Voltage Measurement Point



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.
（Connect snubber capacitor with "P" and "N".）

Fig.3 Installation Method to Power transistor

2.6 Heat source unit transistor module replacement procedure

PCB012D008A

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.

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

1. Start the replacing work ten minutes after turning off the power. (Be sure to measure the voltage (DC) between the capacitor terminals (P,N of transistor module or connector terminals of fan motor power etc.) to check that the capacitor have been discharged completely.)
2. Disassemble the control box.
3. Disconnect with the wire (U,V,W,P,N) to the transistor module.
   (See Fig 1.Parts Arrangement View)
4. Pull up the inverter substrate 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 (MRE equipment SA03434 or SA01846)uniformly.
6. Set the inverter substrate 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.

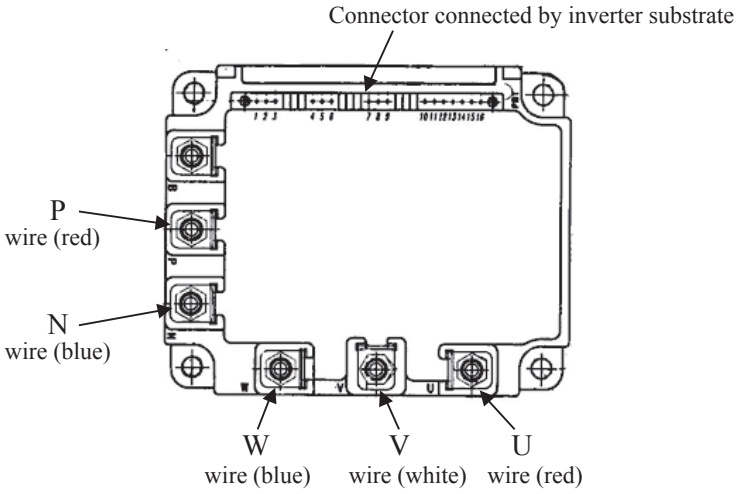


Fig.1 Part Arrangement View

2.7 Heat source unit diode module replacement procedure

PCB012D009A

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 turning 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 the wire (G,K,AC1,AC2,AC3,+4,R5,-6) to the diode module. (See Fig 1.Parts Arrangement View)
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 (G,K,AC1,AC2,AC3,+4,R5,-6). (See Fig 1.Parts Arrangement View) (Recommended diode module tightening torque : 2.4 ~ 2.8N·m)
7. Assemble the control box as before.

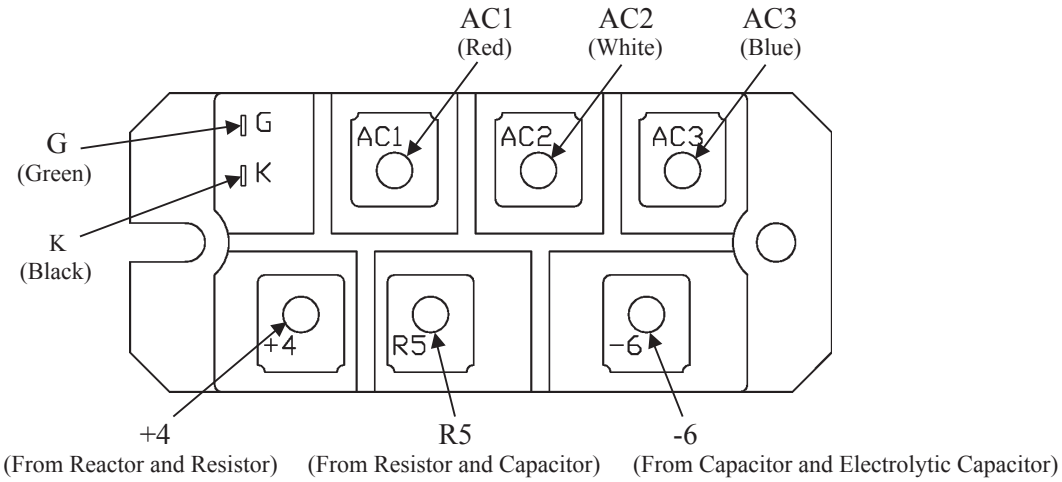


Fig.1 Part Arrangement View

■ **Function of Connection**

(1) Control PCB input

Mark	Connector	Function
Tho-A	CNTH	Outdoor air thermistor
Tho-R1	CNTH	Heat exchanger thermistor 1 (Liquid)
Tho-R2	CNB2	Heat exchanger thermistor 2 (Gas)
Tho-D1	CNTH	Discharge pipe thermistor 1(CM1)
Tho-C1	CNU1	Under-dome thermistor 1(CM1)
Tho-P1	CNP1	Power transistor thermistor 1(CM1)
Tho-S	CNTH	Suction pipe thermistor
Tho-SC	CNF1	Sub-cooling coil thermistor 1 (Liquid)
Tho-H	CNF2	Sub-cooling coil thermistor 2 (Gas)
CT1		Current sensor (CM1)
PSH	CNL1	High pressure sensor
PSL	CNL2	Low pressure sensor
PSLQ	CNL3	Liquid pipe pressure sensor
63H1-1	CNQ1	High pressure switch (CM1)
52P-a	CNQ3	Water pump interlock relay
	CNS1	External operation input
	CNS2	Demand input
	CNG1	Forced operation input cooling/heating
	CNG2	Silent mode input
Power source	CNW	Open phase detection 380-415V

(2) Control PCB output

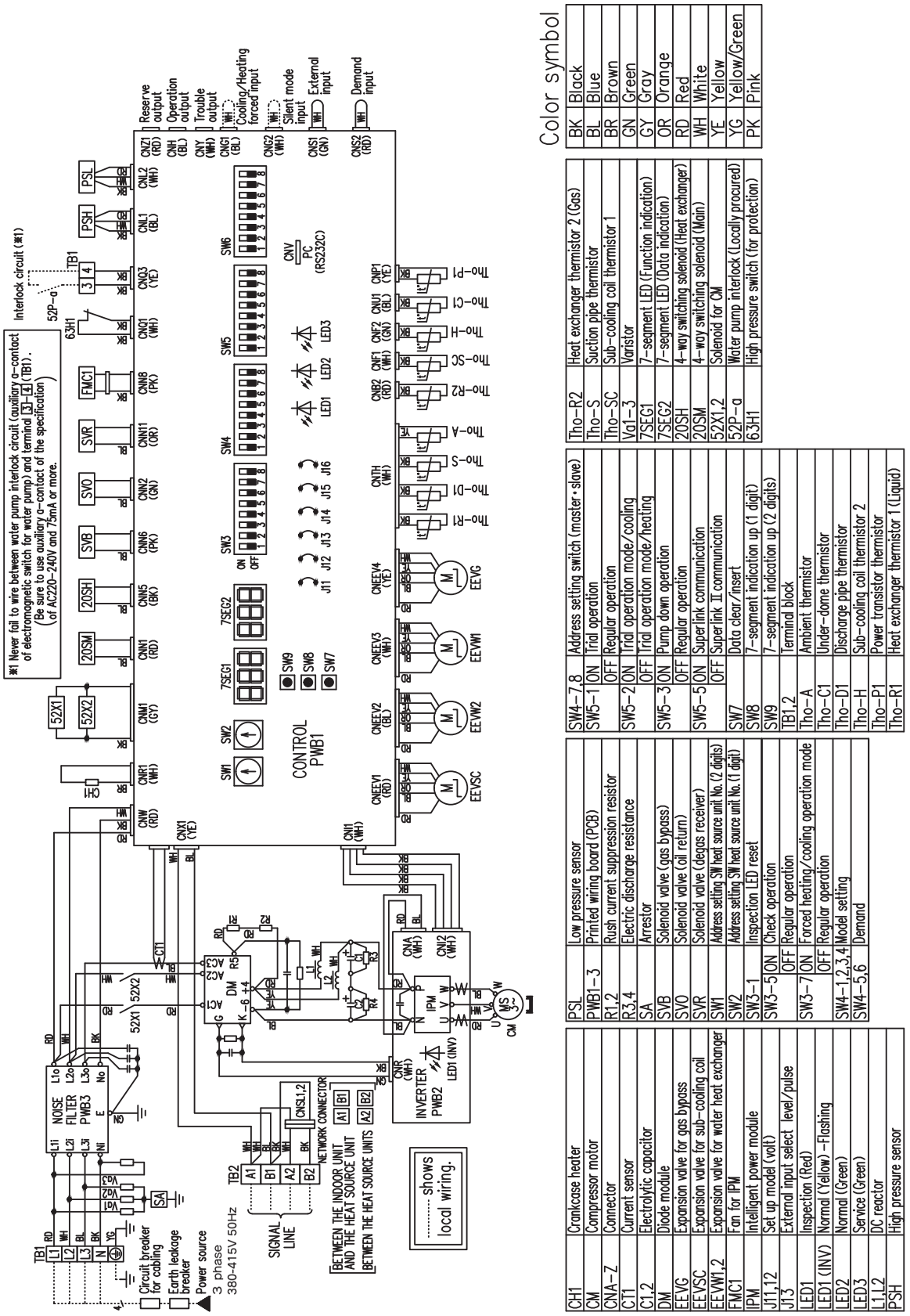
Mark	Connector	Function
52X1	CNM1	Solenoid for CM1
20SM	CNN1	4-way switching solenoid (Main)
20SH	CNN5	4-way switching solenoid (Heat exchange)
SVO	CNN2	Solenoid valve (oil return CM1)
SVB	CNN6	Solenoid valve (CM1:gas bypass)
SVR	CNN11	Solenoid valve (degas bypass)
SVA	CNN13	Solenoid valve (return to accumulator)
FMC	CNN8	Fan for IPM
CH1	CNR1	Crankcase heater (CM1)
52XR	CnH	Operation output
52XE	CnY	Error output
	CnE	RAM Checker output
	CnV	For servicing (for rewriting soft ware)
LED1		Inspection (Red)
LED2		Normal (Green)
LED3		For service (Green)
7 SEG 1		7-segment LED1 (function indication)
7 SEG 2		7-segment LED2 (data indication)
EEVSC	CNEEV1	EEVSC for Sub-cooling coil
EEVW2	CNEEV2	EEVW2 for water heat exchanger
EEVW1	CNEEV3	EEVW1 for water heat exchanger
EEVG	CNEEV4	EEVG for gas bypass
Power source	CNA1,3	Fan motor

(3) Control PCB input/output

Mark	Connector	Function
	CnI1	Inverter protocol
	CnX1	Superlink protocol
	CnX2	Spare for Superlink protocol

3. ELECTRICAL WIRING

Models FDC224KXZWE1, 280KXZWE1, 335KXZWE1



Color symbol

BK	Black
BL	Blue
BR	Brown
GN	Green
GY	Gray
OR	Orange
RD	Red
WH	White
YE	Yellow
YG	Yellow/Green
PK	Pink

CH1	Crankcase heater
CM	Compressor motor
CNA-Z	Connector
CT1	Current sensor
C1,2	Electrolytic capacitor
DM	Diode module
EEVG	Expansion valve for gas bypass
EEVSC	Expansion valve for sub-cooling coil
EEVW1,2	Expansion valve for water heat exchanger
FMC1	Fan for IPM
IPM	Intelligent power module
J11,12	Set up model (volt)
J13	External input select level/pulse
LED1	Inspection (Red)
LED1 (INV)	Normal (Yellow) -Flashing
LED2	Normal (Green)
LED3	Service (Green)
L1,L2	DC reactor
PSH	High pressure sensor

PSL	Low pressure sensor
PWB1-3	Printed wiring board (PCB)
R1,2	Rush current suppression resistor
R3,4	Electric discharge resistance
SA	Arrestor
SVB	Solenoid valve (gas bypass)
SVO	Solenoid valve (oil return)
SVR	Solenoid valve (degas receiver)
SW1	Address setting SW heat source unit No.(2 digits)
SW2	Address setting SW heat source unit No.(1 digit)
SW3-1	Inspection LED reset
SW3-5	ON Check operation
	OFF Regular operation
SW3-7	ON Forced heating/cooling operation mode
	OFF Regular operation
SW4-1,2,3,4	Model setting
SW4-5,6	Demand

SW4-7,8		Address setting switch (master・slave)
SW5-1	ON	Trial operation
	OFF	Regular operation
SW5-2	ON	Trial operation mode/cooling
	OFF	Trial operation mode/heating
SW5-3	ON	Pump down operation
	OFF	Regular operation
SW5-5	ON	Superlink communication
	OFF	Superlink II communication
SW7		Data clear/insert
SW8		7-segment indication up (1 digit)
SW9		7-segment indication up (2 digits)
TB1,2		Terminal block
Tho-A		Ambient thermistor
Tho-C1		Under-dome thermistor
Tho-D1		Discharge pipe thermistor
Tho-H		Sub-cooling coil thermistor 2
Tho-P1		Power transistor thermistor
Tho-R1		Heat exchanger thermistor 1 (Liquid)

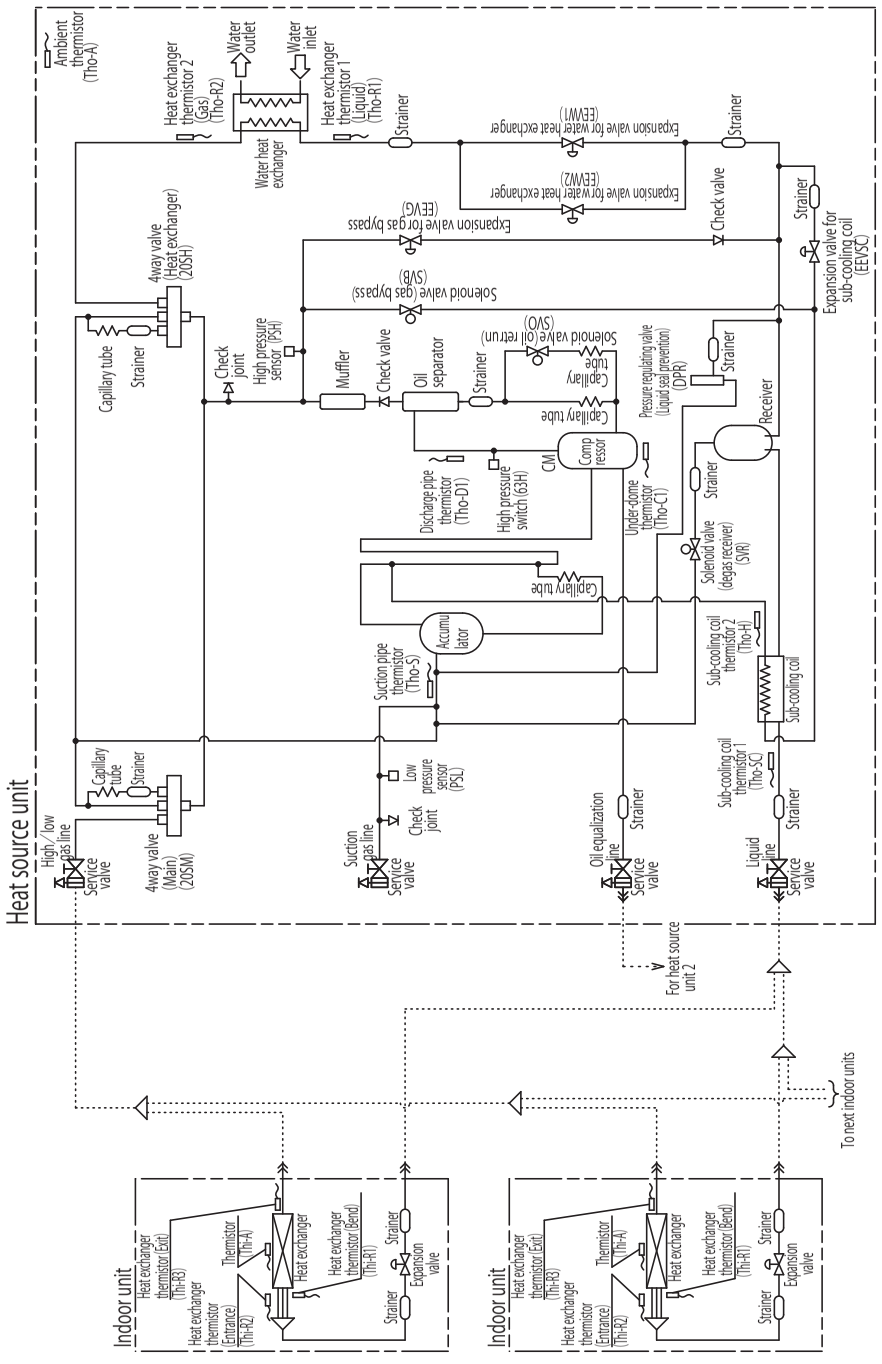
Tho-R2	Heat exchanger thermistor 2 (Gas)
Tho-S	Suction pipe thermistor
Tho-SC	Sub-cooling coil thermistor 1
Vd1-3	Varistor
7SEG1	7-segment LED (Function indication)
7SEG2	7-segment LED (Data indication)
20SH	4-way switching solenoid (Heat exchanger)
20SM	4-way switching solenoid (Main)
52X1,2	Solenoid for CM
52P-α	Water pump interlock (Locally procured)
63H1	High pressure switch (for protection)

PCB003Z842 A

4. PIPING SYSTEM

Models FDC224KXZWE1, 280KXZWE1, 335KXZWE1

[In case of heat pump system]



Notes (1) Preset point of protective device

63H : Open 4.15MPa, Close 3.15MPa
(For protection)

(2) Function of thermistor

PSH : ON 3.70MPa
(For compressor control)

PSL : Cooling
ON 0.18MPa, OFF 0.20MPa
(For compressor control)
ON 0.134MPa
(For protection)
Heating
ON 0.73MPa, OFF 0.76MPa
(For compressor control)
ON 0.70MPa
(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.
Tho-R1, R2 : Electronic expansion valve (EEVW1, 2) control.
Tho-SC : Electronic expansion valve (EEVSC) control.
Tho-H : For super heat control of sub-cooling coil.

PCB003Z843A

5. APPLICATION DATA

5.1 Installation of heat source unit

KXZW SERIES INSTALLATION MANUAL

Designed for R410A refrigerant

PSC012D032

Heat source unit capacity
FDC224–1000

◎This installation manual deals with heat source units and general installation specifications only. For indoor units, please refer to the respective installation manuals supplied with your units.
◎Please read this manual carefully before you set to installation work and carry it out according to the instructions contained in this manual.

Precautions for safety

- Read these “Precautions for safty” carefully before starting installation work and do it in the proper way.
- Safety instructions listed here are grouped into ⚠ Warnings and ⚠Cautions. If a non-compliant installation method is likely to result in a serious consequence such as death or major injury, the instruction is grouped into ⚠ Warnings to emphasize its importance. However, a failure to observe a safety instruction listed under ⚠Cautions can also result in a serious consequence depending on the circumstances. Please observe all these instructions, because they include important points concerning safety.
- The meanings of “Marks” used here are as shown on the right: **Never do it under any circumstances.** **Always do it according to the instruction.**
- When you have completed installation work, perform a test run and make sure that the installation is working properly. Then, explain the customer how to operate and how to take care of the air-conditioner according to the user’s manual. Please ask the customer to keep this installation manual together with the user’s manual.
- This unit complies with EN61000-3-3.
- For heat source 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, substanard performance, contrl 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 and water 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.
- For drain piping work, be sure to make descending slope of greater than 1/100, not to make traps and not to make air-purging.
  Check if the drainage is correctly done during test run and ensure the space for inspection and maintenance.
- Be sure to take measure for anti-freezing.
  Without taking measure for anti-freezing, it might cause breakage of water pipe, components or connecting joints in the system.
- Be sure to perform waterproofing work and indirect wastewater treatment work
  Improper treatment might cause serious damage, when water leak occurs.
- Be sure to perform waterproofing work and drain work in order to prevent from the secondary damage due to the leakage from water piping.
- Before servicing the water heat exchanger and water pipes, be sure to drain water by setting the water stop valve to “close”.
  There is a risk of electric shock, if water is splashed over electric parts.

- 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 and fire 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 heat source unit is installed on a high place, provide permanent ladders and handrails along the access route and fences and handrails around the heat source 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 heat source units 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 flame for outdoor unit which is corroded or damaged due to long periods of operation.
  Using an old and damage base flame 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 where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres (e.g. organic fertilizer)
  - 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 heat source unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- Do not install the heat source unit in the locations listed below.
  - Locations where discharged operating sound of the heat source unit can bother nearby quiet room and neighborhood.
  - Locations where outlet air of the heat source 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.

⚠ CAUTION

- 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 heat source 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 heat source unit.
  You may incur injury from a drop or fall.

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 cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit operation 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. Please 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

- Please read this manual without fail before you set to installation work and carry it out according to this manual.
- This unit is heat pump system only. It is not possible to be used as heat recovery system.
- A heat source water circulation system is required to operate this unit.
- For the installation of an indoor unit, please refer to the installation manual of an indoor unit.
- For piping work, option distribution parts (branching pipe set, header set) are necessary. Please refer to our catalog, etc.
- Never fail to install an earth leakage breaker. (Please use one tolerable to harmonic components)
- Operating the unit with the outlet pipe thermistor, the inlet pipe thermistor, the pressure sensor, etc. removed can result in a compressor burnout. Avoid operation under such conditions in any circumstances.
- 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	Usage location	
Wiring 	2	In operating the unit in the silent mode or the forced cooling/heating operation mode, insert it to the heat source unit board's CNG.	It is supplied with the unit. You can find it taped inside the control box.
Instruction manual	1	When the installation work is completed, give instructions to the customer and ask him/her to keep it.	Attached on the top panel.
Band	4	Use to bind the power source cable to clamps.	Included in this installation manual set
Accessory pipe 	1	Use for connection to high/low gas line.	
Gasket 	1	Use for flange connection of the accessory pipe.	Fixed to the drain pan in the unit with tapes.
Reducer pipe	P224:2 P280:4 P335:1	Use for connection to the heat source unit side branching pipe set on the unit which combines heat source units.	

COMBINATION PATTERNS

- The possible heat source unit combinations and the number and the total capacity of indoor units that can be connected in a system are shown in the table below.
- Please always use indoor units designed exclusively for R410A. For connectable indoor unit model names, please check with our catalog, etc.
- 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

Notabilia

The same heat source unit is used whether it is used alone or in combination with another unit.

- Please note that an installation involving a combination other than those listed below is not operable.

Heat source unit		Indoor unit	
Capacity	Combination patterns	Number of connectable units (units)	Range of the total capacity of indoor units connected in a system
224	Single	1—22	112—336
280	Single	1—28	140—420
335	Single	1—33	167—503
450	Combination (224+224)	1—44	224—672
500	Combination (224+280)	1—50	252—756
560	Combination (280+280)	1—56	280—840
615	Combination (280+335)	2—61	307—923
670	Combination (335+335)	2—67	335—1005
730	Combination (224+224+280)	2—72	364—1092
775	Combination (224+280+280)	2—78	392—1176
850	Combination (280+280+280)	2—80	420—1275
900	Combination (280+280+335)	2—80	447—1343
950	Combination (280+335+335)	2—80	475—1425
1000	Combination (335+335+335)	2—80	502—1508

【Option parts】

Refrigerant distribution piping components supplied as option parts will become necessary in installing the unit.
As refrigerant distribution piping components, branching pipe sets (model type: DOS) for the heat source unit side piping, branching pipe sets (model type: DIS) and header sets (model type: HEAD) for the indoor side piping are available.
Select according to the application. Please refer to Section 5-1 (4)(5).
If you are uncertain, please do not hesitate to consult with your distributor or the manufacturer.
Please use refrigerant branching sets and header sets designed exclusively for R410A without fail.

※ When connecting the indoor unit type FDK, FDFL or FDFU series, limit the connectable capacity not higher than130%.

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

2-1. Selecting the installation location

- ○ Where a vent hole or air vent, capable of dissipating heat generating from the unit sufficiently, is provided and where ambient temperatures are within a range of 0-40℃ and humidity does not exceed 80%RH around the unit.
- ○ Where the installation fittings can be firmly installed.
- ○ Out of the heat range of other heat sources.
- ○ A place where stringent regulation of electric noises is not applicable.
- ○ Do not install the unit in places which:
  exposed to see breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent)
  exposed to ammonia substance (e.g. organic fertilizer)
- ○ Where water can be drained reliably.
- ○ Where noise will not bother nearby quiet room and neighborhood.
- ○ 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)
- ○ Where wind does not hinder the intake and outlet opening.
- ○ Where strong winds will not blow against the outlet opening.

Please note

a) It must be installed indoors (machine room, etc.).
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.

CAUTION
It must be installed indoors (machine room, etc.).
This unit is not designed for outdoor specifications.

[Water quality standards]*5

Makeup water and cyclic water shall be the water within the range of water quality standards mentioned below.
If water quality is out of the range of standards, it may cause a trouble such as scale adhesion and corrosion.

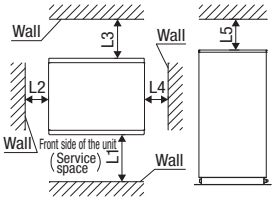
Item*1			Cooling water system*2		Hot water system*3		Tendency*4	
			Circulation system	Makeup water	Circulation system (20°C—60°C)	Makeup water	Corrosion	Scale
Standard items	pH (25°C)	—	6.5—8.2	6.0—8.0	7.0—8.0	7.0—8.0	○	○
	Electric conductivity (25°C)	mS/m	≦80	≦30	≦30	≦30	○	○
	Chloride ion	$mgCl^-/L$	≦200	≦50	≦50	≦50	○	
	Sulphate ion	$mgSO_4^{2-}/L$	≦200	≦50	≦50	≦50	○	
	Acid consumption (pH4.8)	$mgCaCO_3/L$	≦100	≦50	≦50	≦50		○
	Total hardness	$mgCaCO_3/L$	≦200	≦70	≦70	≦70		○
	Calcium hardness	$mgCaCO_3/L$	≦150	≦50	≦50	≦50		○
	Ionic silica	$mgSiO_2/L$	≦50	≦30	≦30	≦30		○
Reference items	Iron	mgFe/L	≦1.0	≦0.3	≦1.0	≦0.3	○	○
	Copper	mgCu/L	≦0.3	≦0.1	≦1.0	≦0.1	○	
	Sulphide ion	mgS^{2-}/L	Not detected	Not detected	Not detected	Not detected	○	
	Ammonium ion	$mgNH_4^+/L$	≦1.0	≦0.1	≦0.3	≦0.1	○	
	Residual chlorine	mgCl /L	≦0.3	≦0.3	≦0.25	≦0.3	○	
	Free carbon	$mgCO_2/L$	≦4.0	≦4.0	≦0.4	≦4.0	○	
	Stability index	—	6.0—7.0	—	—	—	○	○

*1 The fifteen items in the table represent typical causes of corrosion and scale.
*2 In a condenser water circuit that uses a closed cooling tower, the closed circuit circulating water and makeup water must satisfy its water quality standards for the hot water system and passing water and makeup water must satisfy those for the circulation type cooling water system.
*3 Corrosion has a tendency to occur when water temperature is high (40°C or higher), and if metals with no protective coating whatever are directly exposed to water. it would be a good idea to take effective measures against corrosion such as adding a corrosion inhibitor or deaeration treatment.
*4 The columns show a factor of corrosion or scale.
*5 The supply water must be clean tap water, industrial water or clean ground water.

2-2. Installation space (service space) example

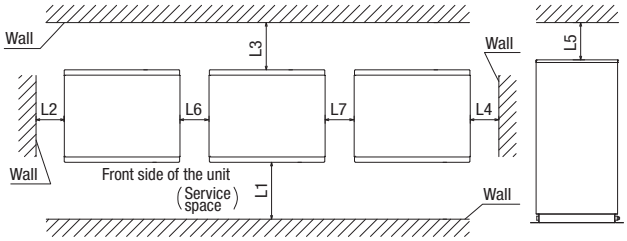
Please secure sufficient clearance (room for maintenance work, passage, draft and piping). (If your installation site does not fulfill the installation condition requirements set out on this drawing, please consult with your distributor or the manufacturer)

CAUTION
Please ventilate sufficiently this installation space.



Dimensions \ Installation example	1
L1	600 or more
L2	20 or more
L3	500 or more
L4	20 or more
L5	300 or more

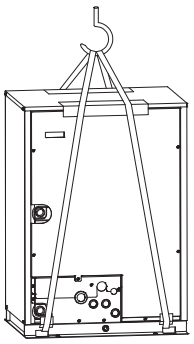
For your information:
the footprint of heat source unit is 780x624 for all models throughout the series (224–335).



Dimensions \ Installation example	1
L1	600 or more
L2	20 or more
L3	500 or more
L4	20 or more
L5	300 or more
L6	20 or more
L7	20 or more

3. Unit delivery and installation

⚠ CAUTION When a unit is hoisted with slings for haulage, please take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.



3-1. Delivery

- By defining a cartage path, carry in the entire package containing a unit to its installation point.
- In slinging a unit, use two canvas belts with plates, cloth pads or other protections applied to the unit to prevent damage.

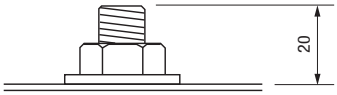
Please note

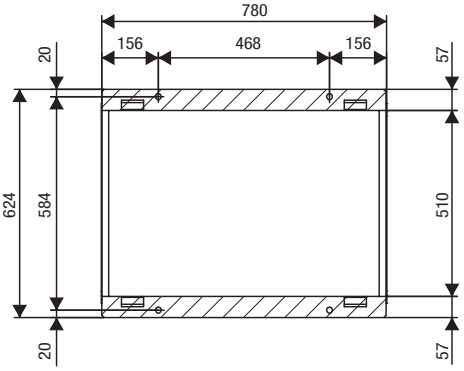
a) Please do not fail to put belts through the rectangular holes of a unit's base.
b) Apply cloth pads between a canvas belt and a unit to prevent damage.

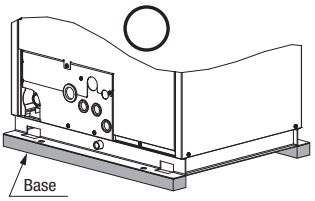
3-2. Notabilia for installation

(1) Anchor bolt positions

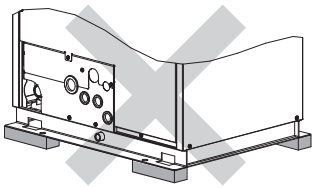
- Use four anchor bolts (M10) to fix heat source unit's base at all times. Ideally, an anchor bolt should protrude 20mm.







Normally, it is desirable that a foundation as specified in the drawing above is provided.



It cannot be installed on a foundation which is supported at four corners.

(2) Base

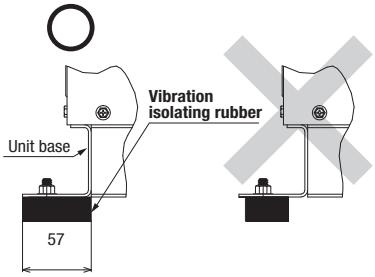
- Please install a unit after ascertaining that the bases have been made to sufficient strength and level to ensure the unit against vibration or noise generation.
- Please construct a base to the size of a shadowed area (the entire bottom area of heat source unit's base) shown on the above drawing or larger.
- Please orient a base in the traversal direction (direction of W780mm) of heat source unit as illustrated in the drawing above.

(3) Vibration isolating rubber

- A vibration isolating rubber must support heat source unit's base by its entire bottom area.

Please note

a) Install a vibration isolating rubber **in such a manner that the entire bottom area of a heat source unit's base will rest on it**.
b) Do not install a heat source unit in such a manner that a part of the bottom area of its base is off a vibration isolating rubber.



4. WATER PIPING WORK, DRAINAGE WORK

4-1. Caution for heat source water and water pipes

○ This heat source unit must be operated within the following limitation for use.

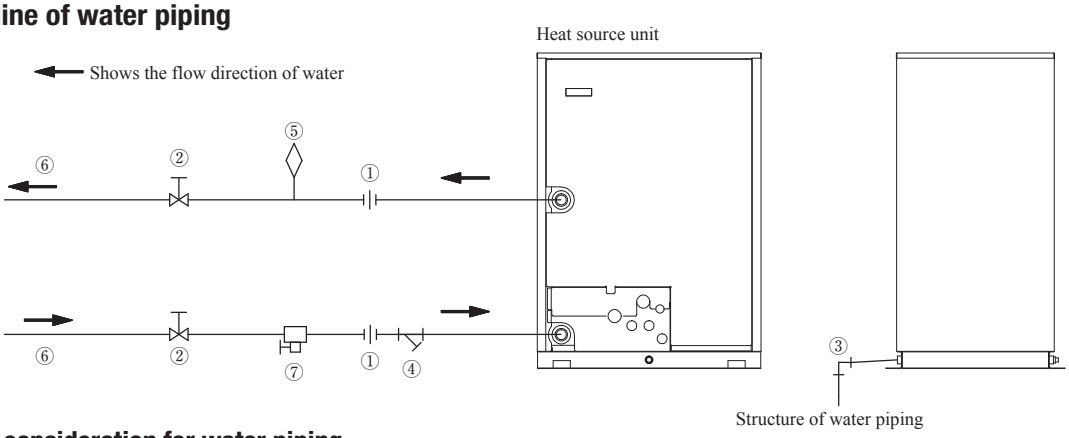
Item	Limitation for use
Inlet water temperature	10°C – 45°C
Water pressure	2 MPa or less
Water flow rate	50L/min – 150L/min
Water quality	See Section 2-1 Water quality standards
Heat source water circuit	Circulation type*

* Cooling tower and heating tower must be closed circuit type.
Open circuit type could cause clogging or corrosion on the water heat exchanger in the heat source unit.

Request:

A circuit to interlock with the circulating water pump must be provided to ensure that the heat source unit operates only when the pump is operating.
It is recommended to install a water suspension relay for protection in the event when the water quantity is depleted as a result of faulty operation of valves installed on water pipe lines, air sucked accidentally, or other. (See Section 6-4)

4-2. Outline of water piping



(1) Key consideration for water piping

Please consider following point when designing and installing. (Description of ①-⑦ in above figure)

① Union joint	Be sure to fit it in order to enable the unit replacement easily.
② Valve	Be sure to fit it for servicing such as cleaning heat exchanger and/or replacing unit and etc.
③ Drain piping	Be sure to make its descending slope as larger as possible and make the distance of its horizontal part as shorter as possible in order to prevent the drain water from freezing.
④ Strainer	Be sure to fit a strainer (50 mesh or more) at the inlet port of the unit to avoid intrusion of foreign matter into the unit.
⑤ Air purge valve	Be sure to equip it to the place where air may accumulate in order to purge air in the water pipe.
⑥ Water piping	Water piping work shall be done by considering to purge air in the water pipe easily. Insulation work shall be done sufficiently.
⑦ Drain valve	Be sure to equip it in order to drain off the water from the system at servicing. Select carefully a position where water can be drained completely from piping.

(2) Caution for corrosion

(a) Water quality
It is important to check in advance whether the feed water and hot water have good quality.
Be sure to use cyclic water and makeup water whose qualities are within the range of water quality standards mentioned in Section 2-1.

(b) Foreign matter in water
If solid matter such as sand and small stone and/or floating suspended solid such as corrosion product exist in water, the heat-transfer surface of heat exchanger is directly attacked by water flow, and corrosion may be created locally.
In order to avoid such corrosion by these foreign matters, be sure to fit a cleanable strainer (50 mesh or higher) at the water inlet port of the unit to remove foreign matters.

(3) Others

(a) Water pipe shall have no water leak and no air intrusion. Especially if air intrudes at suction side of pump, pump performance becomes decreasing and it may cause generation of noise
(b) Be sure to take into consideration for water pipe not to freeze at stopping operation in winter

4-3. Water pipe connection

- Check the connecting positions at water inlet/outlet on the outline drawing in Section 5-2(1).
- Water pipe joints in this heat source unit are made of stainless steel. When a pipe made of other kind of metal is connected to the joint, use an insulating material between them to prevent corrosion resulting from such combination of different metals.
- Size of water pipe should be same or larger than the size of water pipe at the product side (R1 1/4).
- To avoid from the weight of water pipes being exerted to joints of heat source unit, support the water pipes at places in the building, which are sufficiently strong.
- Be sure to tighten joints between water pipes and sockets to a tightening torque not larger than 265 N・m. Devices might be damaged if it is tightened with a torque larger than that.
- Install an air vent valve on water pipe where air is likely trapped so that air can be bled effective when filling water in the pipeline.
- Be sure to provide anti-freezing means where a risk of freezing is suspected.
- When all water pipes have been connected, run the circulating water pump to confirm that there is no water leakage.
- Run the circulating water pump to bleed air till water flows out from the air vent on water pipes connected at site.
- Run the circulating water pump to flash in water pipes. Clean strainers after the flashing.
- Since this product is designed for indoor specifications, perform the piping work with care to avoid water condensation on the control, etc.

4-4. Drain pipe

- Drain pipe joints are provided in front and rear of the heat source unit. When the joint at the rear is used, remove the plug from the rear joint and attach it to the front joint. Tighten the plug securely.
- Size of drain pipe must be same or larger than that of the drain pipe joint (Rp 1/2).
- Do not connect the drain pipe to the heat source water outlet.
- Incline the drain pipe downward (larger than 1/100), with care to avoid air traps.
- After connecting drain pipes, confirm that they are not clogged with dirt and water runs down smoothly.

4-5. Heat insulation

- Dress water pipes with heat insulation material to prevent dew condensation.

5. REFRIGERANT PIPING

5-1. Restrictions on the use of pipes

(1) Limitation on use of pipes

- **In installing pipes, always observe the restrictions on the use of pipes specified in this Section (1) including Maximum length, Total pipe length, Allowable pipe length from the first branching, and Allowable elevation difference (head difference).**
- Please avoid forming any trap ( ) or bump ( ) in piping as they can cause fluid stagnation.
- Maximum length (from a heat source unit to the farthest indoor unit) ····· 160 m or less as actual pipe length (185 m or less as equivalent pipe length)
  (When an actual pipe length exceeds 90m, however, it is necessary to change the pipe size. Please determine the main pipe size by consulting with the Main Selection Reference Table set out in this Section (3) (c).

- Total pipe length ····· 510 m or less
- Main pipe length ····· 130 m or less
- Allowable pipe length from the first branching ····· 90 m or less

(However, difference between the longest and shortest piping ····· 40 m or less)

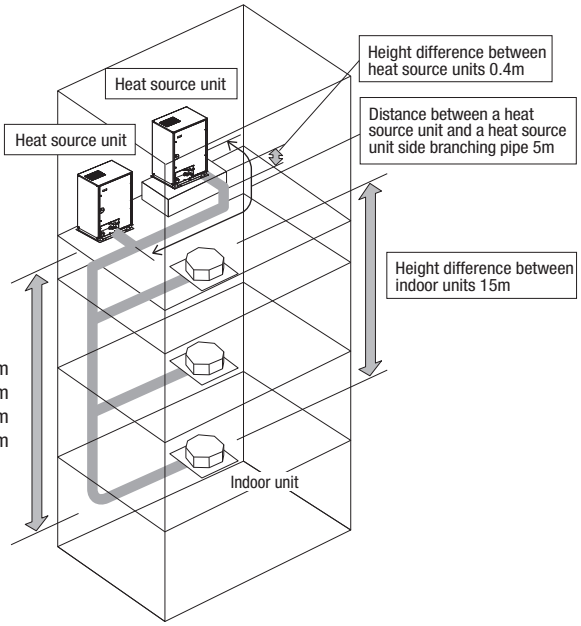
- Allowable elevation difference (head difference)

(a) When a heat source unit is installed above ····· 50 m or less
(b) When a heat source unit is installed below ····· 40 m or less
(c) Difference in the elevation of indoor units in a system ····· 15 m or less
(d) Elevation difference between the first branching point and the indoor unit ····· 15 m or less

- Restrictions on piping applicable to the section between a heat source unit and a heat source unit side branching pipe (combination unit)

(a) Difference in the elevation ····· 0.4 m or less
(b) Distance between a heat source unit and a heat source unit side branching pipe ·· 5 m or less
(c) Length of oil equalization piping ····· 10 m or less

CAUTION
An installation not conforming to these restrictions can induce a compressor failure, which shall be excluded from the scope of warranty. Always observe the restrictions on the use of pipes in developing a system.



Difference in the elevation	50m
Actual length	160m
Equivalent length	185m
Total length	510m

(2) Piping material selection

- Please use pipes clean on both the inside and outside and free from contaminants harmful to operation such as sulfur, oxides, dust, chips, oil, fat and water.
- Use the following material for refrigerant piping.
  Material: phosphorus deoxidized seamless copper pipe (C1120T-O, 1/2H, JIS H 3300)
  Use C1220T-1/2H for ϕ 19.05 or larger, or C1220T-O for ϕ 15.88 or smaller
- Do not use ϕ 28.58 x t1.0, ϕ 31.8 x t1.1, ϕ 34.92 x t1.2 and ϕ 38.1 x t1.35 as a bent pipe.
- Thickness and size: Please select proper pipes according to the pipe size selection guideline.
  (Since this unit uses R410A, always use 1/2H pipes of a specified minimum thickness or thicker for all pipes of ϕ 19.05 or larger, because the pressure resistance requirement is not satisfied with O-type pipes).
- For branching pipes, use a genuine branching pipe set or header set at all times. (optional parts)
- For the handling of operation valves, please refer to Section 5-5.
- In installing pipes, observe the restrictions on the use of pipes set out in this Section (1) (Maximum length, total pipe length, allowable pipe length from the first branching, allowable elevation difference (head difference)) without fail.
- Install a branching pipe set, paying attention to the direction of attachment, after you have perused through the installation manual supplied with it.

(3) Pipe size selection

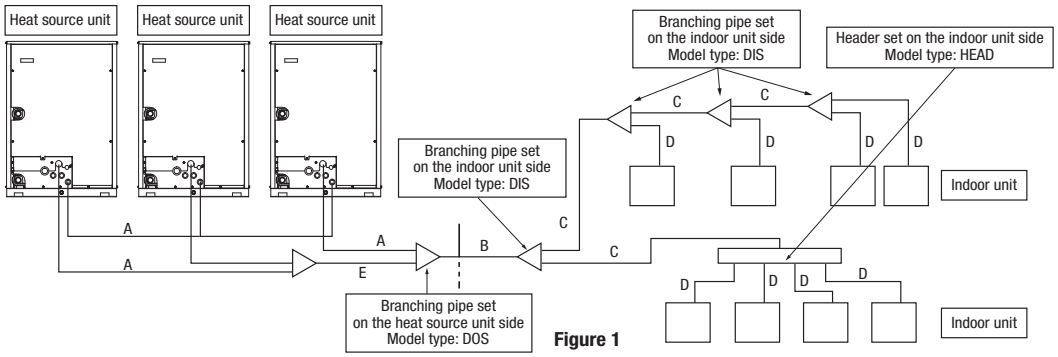


Figure 1

(a) Heat source unit – Heat source unit side branching pipe: Section A in Figure 1

Please use a pipe conforming to the pipe size specified for heat source unit connection.
Indoor unit connecting pipe size table

Capacity	Heat source unit outlet pipe specifications					
	Gas pipe	Connection method	Liquid pipe	Connection method	Oil equalization pipe	Connection method
224	ϕ 19.05 × t1.0	Flange	ϕ 9.52 × t0.8	Flare	ϕ 9.52 × t0.8*	Flare
280	ϕ 22.22 × t1.0					
335	ϕ 25.4 (ϕ 22.22) × t1.0		ϕ 12.7 × t0.8			

Pipe sizes applicable to European installations are shown in parentheses.
Please use C1220T-1/2H for ϕ 19.05 or larger pipes.
* Please connect the master and slave units with an oil equalization pipe, when they are used in a combined installation. (It is not required, when a unit is used as a standalone installation)
When three heat source units combination, please connect using the tee joint (attached to the branching pipe set (DOS-3A-3)).

(b) Selection of the connection pipe to branching pipes for three heat source units combination: Section E in Figure 1

Total capacity of heat source units connected to second branch pipe heat source unit side	Pipe size between branching pipes	
	Gas pipe	Liquid pipe
450, 500, 560, 615, 670	ϕ28.58× t1.0	ϕ12.7× t0.8

Please use C1220T-1/2H for ϕ19.05 or larger pipes.

(c) Main (Heat source unit side branching pipe – Indoor unit side first branching pipe): Section B in Figure 1

If the longest distance (measured between the heat source unit and the farthest indoor unit) is 90m or longer (actual length), please change the main pipe size according to the table below.

Heat source unit	Main pipe size (normal)		Pipe size for an actual length of 90m or longer	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
224	ϕ19.05 × t1.0	ϕ9.52 × t0.8	ϕ22.22 × t1.0	ϕ12.7× t0.8
280	ϕ22.22 × t1.0		ϕ25.4 × t1.0 (ϕ22.22× t1.0)	
335	ϕ25.4 (ϕ22.22) × t1.0	ϕ12.7 × t0.8		
450	ϕ28.58 × t1.0		ϕ31.75 × t1.1 (ϕ28.58 × t1.0)	ϕ15.88 × t1.0
500				
560				
615				
670				
730	ϕ31.75 × t1.1 (ϕ34.92 × t1.2)	ϕ15.88 × t1.0	ϕ38.1 × t1.35 (ϕ34.92 × t1.2)	ϕ19.05 × t1.0
775				
850				
900				
950				
1000	ϕ38.1 × t1.35 (ϕ34.92 × t1.2)			

Please use C1220T-1/2H for ϕ19.05 or larger pipes.
Pipe sizes applicable to European installations are shown in parentheses.

(d) Indoor unit side first branching pipe – Indoor unit side branching pipe: Section C in Figure 1

Please choose from the table below an appropriate pipe size as determined by the total capacity of indoor units connected downstream, provided, **however, that the pipe size for this section should not exceed the main size (Section B in Figure 1).**

Total capacity of indoor units	Gas pipe	Liquid pipe
Less than 70	ϕ12.7× t1.0	ϕ 9.52× t0.8
70 or more but less than 180	ϕ15.88× t1.0	
180 or more but less than 371	ϕ19.05× t1.0 *	ϕ12.7 × t0.8
371 or more but less than 540	ϕ25.4× t1.0 (ϕ28.58)	ϕ15.88× t1.0
540 or more but less than 700	ϕ28.58× t1.0	
700 or more but less than 1100	ϕ31.75× t1.1 (ϕ34.92× t1.2)	ϕ19.05× t1.0
1100 or more	ϕ38.1× t1.35 (ϕ34.92× t1.2)	

Please use C1220T-1/2H for ϕ19.05 or larger pipes.
Pipe sizes applicable to European installations are shown in parentheses.
* When connecting indoor units of 280 at the downstream and the main gas pipe is of ϕ22.22 or larger, use the pipe of ϕ22.22x t1.0.

(e) Indoor unit side branching pipe – Indoor unit: Section D in Figure 1

Indoor unit connection pipe size table

Capacity		Gas pipe	Liquid pipe
Indoor unit	15, 22, 28	ϕ 9.52× t0.8	ϕ 6.35× t0.8
	36, 45, 56	ϕ 12.7× t0.8	
	71, 90, 112, 140, 160	ϕ15.88× t1.0	ϕ 9.52× t0.8
	224	ϕ19.05× t1.0	
	280	ϕ22.22× t1.0	

Please use C1220T-1/2H for ϕ19.05 or larger pipes.

(4) Selection of a heat source unit side branching pipe set

This branching pipe set will always become necessary when units are used in combination.
(When a unit is used as a standalone installation, it is not required)

Heat source unit	Branching pipe set
For two units (for 450 – 670)	DOS-2A-3
For three units (for 730 – 1000)	DOS-3A-3

Please note

a) In connecting a heat source unit, please use a pipe conforming to the pipe size specified for heat source unit connection.
b) For pipes connected to the indoor unit (= main pipes), use the pipe size specified above.
c) Always install branching pipes (for both gas and liquid) in such a manner that they form either correct horizontial or vertical branch.

(5) Selection of an indoor unit side branching pipe set

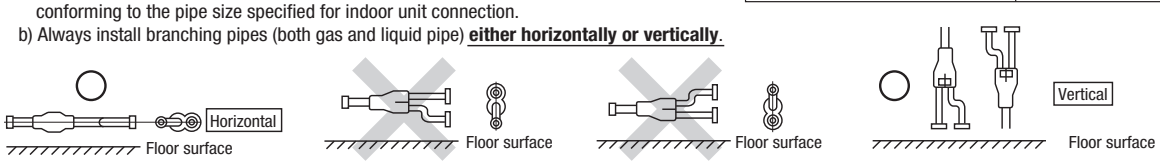
(a) Method of selecting a branching pipe set

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

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1G
180 or more but less than 371	DIS-180-1G
371 or more but less than 540	DIS-371-1G
540 or more	DIS-540-3

Please note a) 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.

b) Always install branching pipes (both gas and liquid pipe) **either horizontally or vertically**.



(b) Header Method

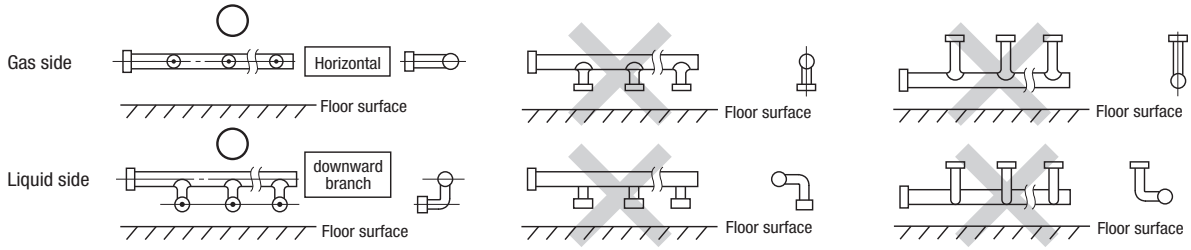
- Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).
- For the size of a plugged pipe, please refer to the documentation for a header set (option part).

Total capacity downstream	Header set model type	Number of branches
Less than 180	HEAD4-22-1G	4 branches at the most
180 or more but less than 371	HEAD6-180-1G	6 branches at the most
371 or more but less than 540	HEAD8-371-2	8 branches at the most
540 or more	HEAD8-540-3	8 branches at the most

Please note a) In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.

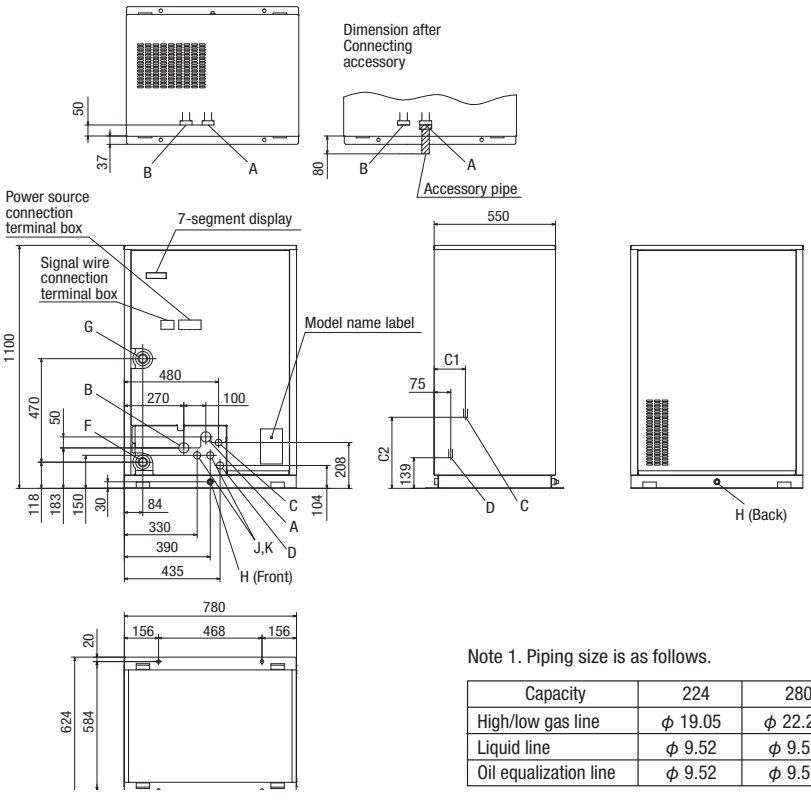
b) **In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**

c) Indoor units 224 and 280 can not be connected to the header.



5-2. Pipe connection position and pipe direction

(1) Pipe connecting position and pipe outgoing direction



(Unit: mm)

MARK	Content	
A	High/low gas line	Refer to note.
B	Suction gas line*1	Refer to note.
C	Liquid line	Refer to note.
D	Oil equalization line	Refer to note.
F	Water inlet	R1 1/4
G	Water outlet	R1 1/4
H	Drain outlet	Rp 1/2,2pcs.
J	Power source intake	ϕ 35
K	Signal wiring intake	ϕ 35
L	Anchor bolt hole	ϕ 28,4pcs.

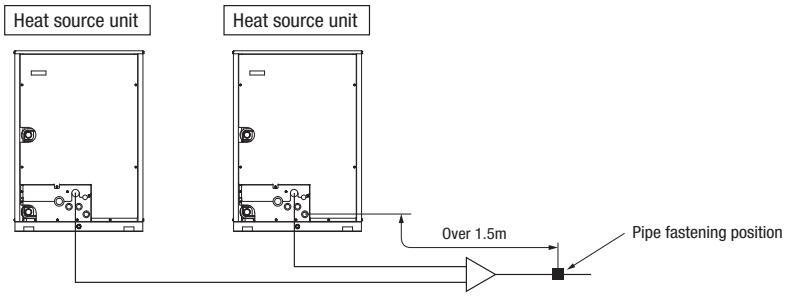
Dimension	Capacity	
	224,280	335
C1	142	139
C2	322	316

*1: In case of heat pump system, not to use Suction gas line.

Note 1. Piping size is as follows.

Capacity	224	280	335	Connection method
High/low gas line	ϕ 19.05	ϕ 22.22	ϕ 25.4	Flange
Liquid line	ϕ 9.52	ϕ 9.52	ϕ 12.7	Flare
Oil equalization line	ϕ 9.52	ϕ 9.52	ϕ 9.52	

- When there is a danger that a small animal enters from the pipe port, cover the port with appropriate blocking materials (to be arranged on the user's part).
- Use an elbow (locally procured) to connect control valves to the piping.
- In anchoring piping on the installation site, give 1.5m or a longer distance between heat source 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.

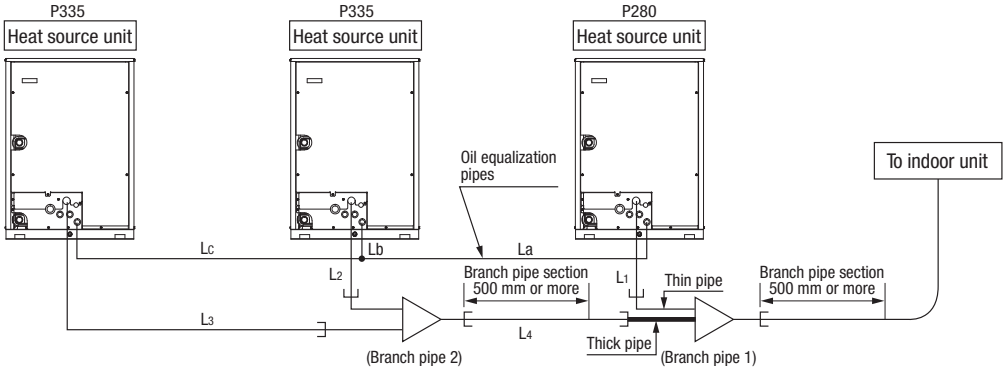


- Connect pipes between combined units, with care for the followings.

(a) On combination units, it must be secured a straight pipe section of 500 mm or more before a branch pipe (Type DOS) for both gas pipe and liquid pipe as shown below.

(b) On the pipe connection system for combination of three units, use a branch pipe of which the pipe diameter is different after the pipe branching, for the branch pipe (branch pipe 1) located the closest to the indoor unit. It is necessary also to connect a thin pipe to the heat source unit and to connect a thick pipe to next branch pipe.

(c) It must be no longer than 5m the length of pipe from the branching pipe 1 to the heat source unit. ($L_1 \leqq 5$ m, $L_2+L_4 \leqq 5$ m, $L_3+L_4 \leqq 5$ m)
It must be no longer than 10 m the length of oil equalization pipes between heat source units. ($La+Lb \leqq 10$ m, $Lb+Lc \leqq 10$ m, $La+Lc \leqq 10$ m)
In case of P950 three combination unit:

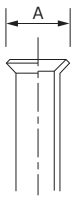


(2) Piping work

Important

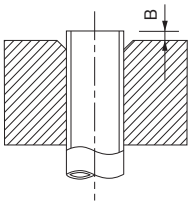
CAUTION
If you tighten it without using double spanners, you may deform the operation valve, which can cause an inflow of nitrogen gas into the heat source unit.

- Please take care so that installed pipes may not touch components within a unit.
- **In laying pipes on the installation site, keep the operation 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.
- Heat source unit's liquid pipe and liquid 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.
- Tighten a flare joint securely **with two spanners**. Observe flare nut tightening torque specified in the table below.



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

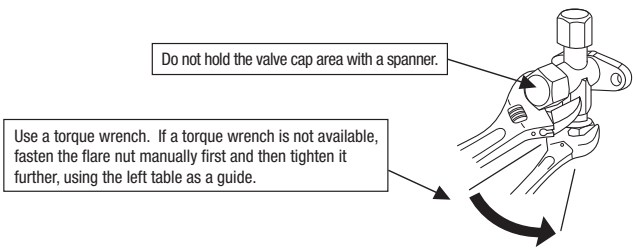


Copper pipe protrusion for flaring: B (mm)

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		

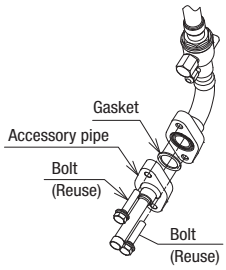
Tightening torque (N·m)

Operation valve size (mm)	Tightening torque (N·m)	Tightening angle (°)	Recommended length of tool handle (mm)
ϕ6.35 (1/4")	14—18	45—60	150
ϕ9.52 (3/8")	34—42	30—45	200
ϕ12.7 (1/2")	49—61	30—45	250
ϕ15.88 (5/8")	68—82	15—20	300
ϕ19.05 (3/4")	100—120	15—20	450



- Do not apply any oil on a flare joint.
- Use the accessory pipe to connect the refrigerant pipe to the gas valve of the heat source unit.
  The gasket must be used between their flanges.
  Tightening torque for bolts is 25-30 N·m. Gas might leak if they are tightened beyond the specified range.
  Try to tighten bolts homogeneously. Tighten alternately a pair of bolts located opposite to each other across the center of flange. After tightening all bolts in this way, tighten them again to the specified torque.

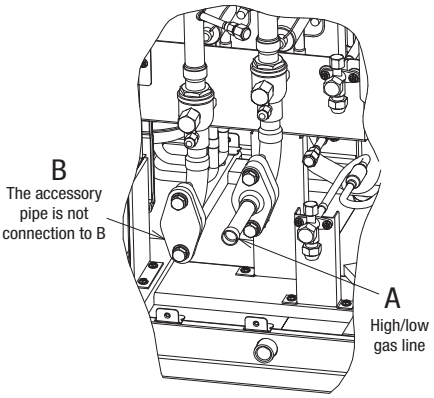
Capacity	224	280	335
High/low gas line (A)	ϕ 19.05	ϕ 22.22	ϕ 25.4



Use the accessory gasket when connecting the flange pipe.

Tightening torque 25-30 N·m

Tighten equally it more than 2 times for top and bottom alternation.
Afterwards, finally tighten it by specified torque once again.

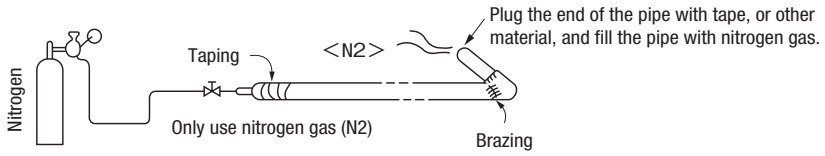


- Pipes are to be blazed to connect the accessory pipe with refrigerant piping or refrigerant piping with a branching pipe set.
- **Blazing must be performed under a nitrogen gas flow**. Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.
- Brazing of the operation 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

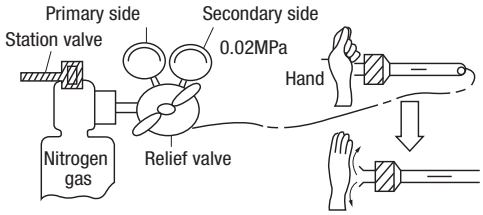
① **In laying pipes on the installation site, keep the operation valves shut all the time**.

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).



⑤ In brazing an operation valve and a pipe, **braze them with the valve main body cooled with a wet towel or the like**.

5-3. Air tightness test and air purge

(1) Air tightness test

① Although a heat source unit itself has been tested for air tightness at the factory, please check the connected pipes and indoor units for air tightness from the check joint of the operation valve on the heat source unit side. While conducting a test, **keep the operation 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, please 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 operation valve shut all the time. Do not open it under any circumstances.

Be sure to pressurize all of the liquid, gas and oil equalizing pipes.

CAUTION
Applying excessive pressure can cause an inflow of nitrogen gas into a heat source unit.

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 does not drop.

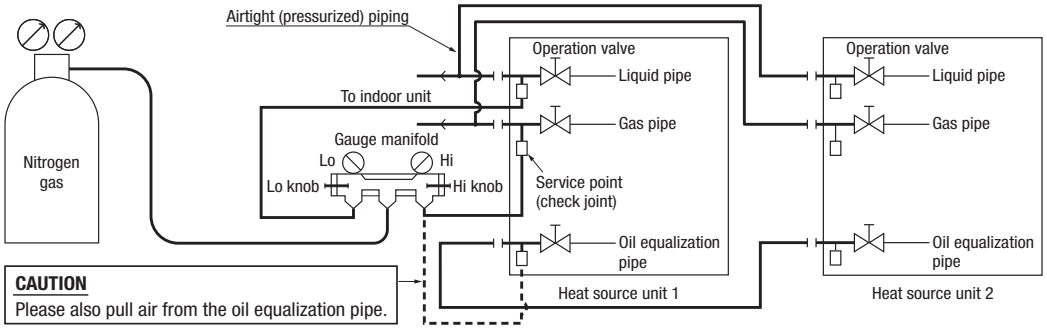
b) **Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes** to see if the pressure does not drop.

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°C, 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.



(2) Vacuuming

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

Please also **pull air from the oil equalization pipe**. (Please pull air separately from the rest of the piping by using the oil equalization valve check joint)

＜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.

Please 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 **after leaving the system for an hour or more**.

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

CAUTION
Insufficient vacuuming may result in poor performance falling short of the design capacity, pipe clogging due to residue moisture and/or a compressor failure.

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

○To prevent a different oil from entering, please 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.

5-4. Additional refrigerant charge

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 heat source unit lying idle, charge it with the unit running in the test run mode. (For the test run method, please refer to Section 8)

If operated for a long time with insufficient refrigerant the compressor will be damaged. (In particular, when adding refrigerant during operation, complete the job within 30min.)

This unit contains **<224-335: 9.9 kg, 450-670: 19.8 kg, 730-1000: 29.7 kg> of refrigerant**.

Determine the amount of refrigerant to be charged additionally using the following formula and put down the amount of refrigerant added on the refrigerant charge volume recording plate provided on the back the front panel.

●Adding additional refrigerant

Charge additional refrigerant according to the size and length of the liquid piping and unit capacity.

Determine additional charge volume by rounding to the nearest 0.1 kg.

Additional fill quantity (kg) = A＋B

A: Additional refrigerant quantity for piping (kg)

A = (L1×0.26) + (L2×0.18) + (L3×0.12) + (L4×0.059) + (L5×0.022)

L1 : φ19.05 total length (m)　L2 : φ15.88 total length (m)

L3 : φ12.7 total length (m)　L4 : φ9.52 total length (m)　L5 : φ6.35 total length (m)

Refrigerant liquid pipe size	φ19.05	φ15.88	φ12.7	φ9.52	φ6.35
Additional fill quantity (kg/m)	0.26	0.18	0.12	0.059	0.022

B: Additional refrigerant quantity for indoor units (kg)
If the total indoor units capacity is larger than the heat source unit capacity, then calculate the additional refrigerant quantity for indoor units.
D = (Total indoor units capacity) - (Heat source unit capacity)
B = D x 0.01
When D > 0, calculate B using the above equation;
When D ≦ 0, take it as B = 0.

<Example>
When you connect FDC335 to FDT140 x 3 units:
D = 140 x 3 - 335 = 85 (> 0)
B = 85 x 0.01 = 0.85 (kg)

Important

When the Additional refrigerant quantity (A+B) is over the following table, please separate the refrigerant line.

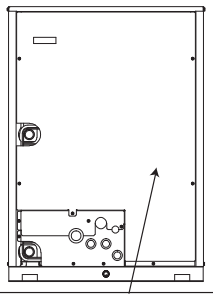
Capacity	A+B (kg)
224-335	25
450-670	50
730-1000	75

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

- To prevent a different oil from entering, please 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 (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.

Please note

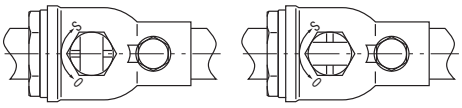
Put down on the refrigerant charge volume recording plate provided on the back of the front panel the amount of refrigerant calculated from the pipe length.



It is located in back of this front panel.

CAUTION

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



Opened position Closed position

5-5. Method of operating operation valves

Method of opening/closing a valve

○Remove the cap, turn the gas pipe side until it comes to the "Opened" position as indicated in the drawing on the right.

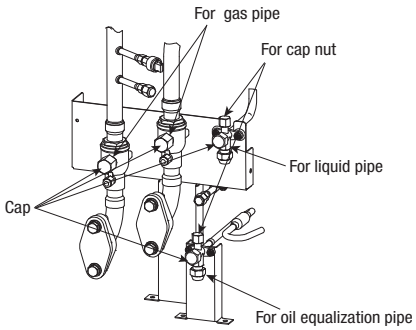
○For the liquid side pipe and oil equalization pipe side, turn with a hexagonal wrench until the shaft stops. If excessive force is applied, the valve main body can be damaged. Always use a dedicated special tool.

○Tighten the cap securely.

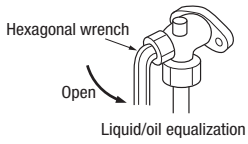
For tightening torque, refer to the table below.

		Tightening torque N・m		
		Shaft (valve main body)	Cap (lid)	Cap nut (check joint section)
For gas pipes		7 or less	30 or less	13
For liquid pipes	φ 9.52 (3/8")	6-8	20-30	10-12
	φ 12.7 (1/2")	14-16	25-35	10-12
For oil equalization pipe		6-8	20-30	10-12

For fastening torque of a flare nut, please refer to Section 5-2 (2).



▶ Hexagonal wrench type



Liquid/oil equalization valves

5-6. Heating and condensation prevention

①Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
Perform the heat insulation work after completing the airtight test when it will be detected if there is any leak.
When a pipe joint used on the way of piping which is buried, provide an inspection hole, or the like, for maintenance.
Inspection hole must be provided also when a pipe joint is located in the ceiling.
Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

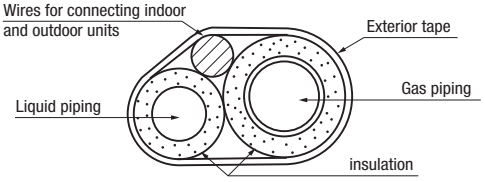
②Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

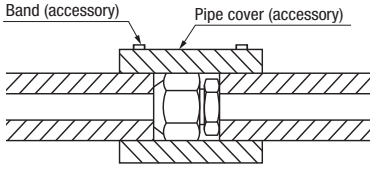
a) The gas pipe can cause during a cooling operation dew condensation, which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60℃ to 110℃, posing a risk of burns, when touched accidentally. So, do not fail to dress it with a 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) Although this air conditioning unit has been tested under the JIS condensation test conditions, pipes for both liquid and gas need to be heat insulated with material of 20 mm or more in thickness, in the ceiling, or other, where the 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 thick heat insulation material.





6. ELECTRICAL WIRING WORK

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.

⚠ **Please 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, please **use an impulse withstanding type** to prevent an earth leakage breaker's false actuation.)

Please 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).

Please 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 heat source 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) Please 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) Please **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, please 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.)

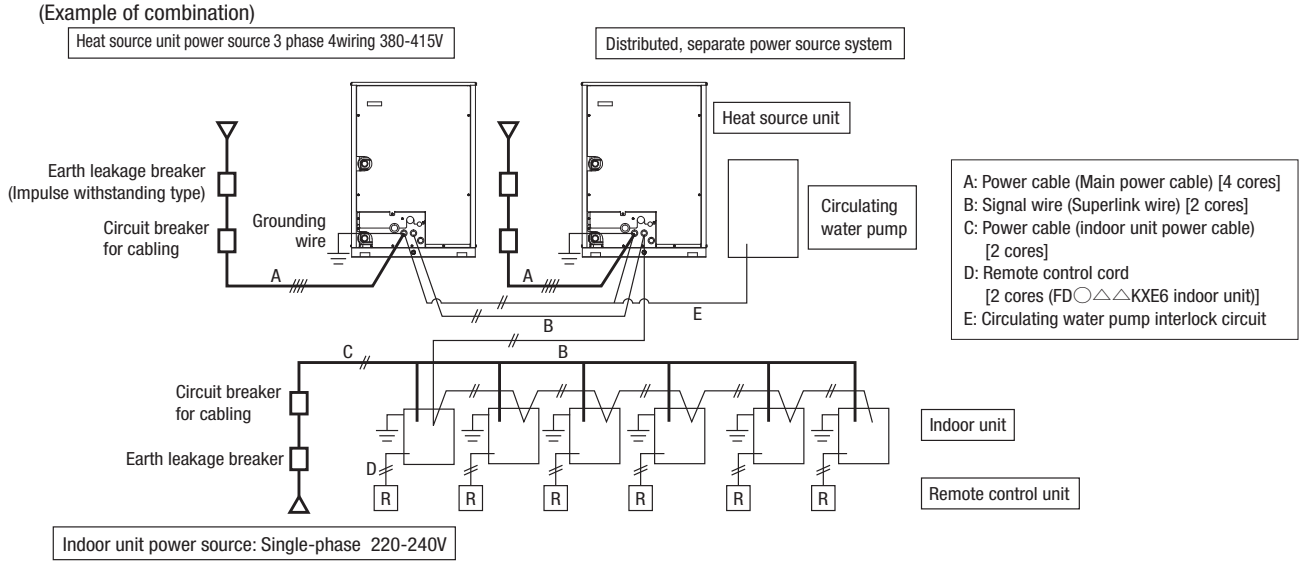
m) Make sure to use circuit breakers (earth leakage breaker and circuit breaker) of proper capacity. Use of breakers of larger capacity could result in trouble on components or fire accident. The circuit breaker should isolate all poles under over current.

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 diagrams

(Example of combination)



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. Method of connecting power cables

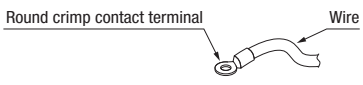
(1) Method of leading out cables

- As shown on the drawing in Section 5-2 (1), cables can be laid through the front casing.

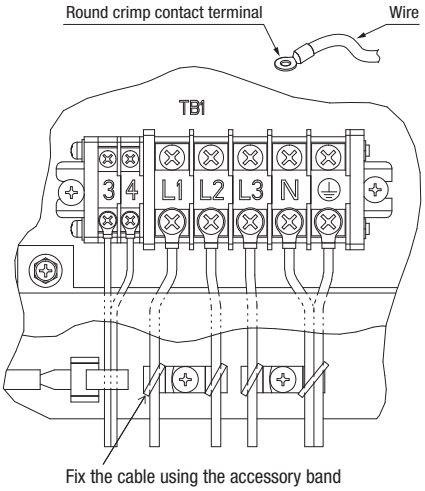
(2) Notabilia in connecting power cables

Power cables must always be connected to the power cable terminal block and clamped outside the electrical component box.
In connecting to the power cable terminal block, use round solderless terminals.

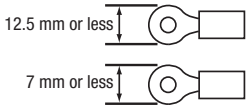
- Connect the ground wire before you connect the power cable. When you connect a grounding wire to a terminal block, use a grounding wire longer than the power cable so that it may not be subject to tension.
- Do not turn on power until installation work is completed. Turn off power to the unit before you service the unit.
- Ensure that the unit is properly grounded.



●Always connect power cables to the power terminal block and fix power cables to the cramp with using the accessory band as right figure.
●To connect a cable to the power terminal block, use round solderless terminals.
●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.
●For the tightening torque of terminals, refer to the following list.
●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.



Tightening torque (N·m)		
M3.5	Heat source unit signal line terminal block	0.9-1.2
	Water pump interlock curcuit terminal block 3,4	
M5	Power cable terminal block, Earth wire	2.00-2.35



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 and the circulating water pump interlock circuit terminal block 3,4, use the crimp terminals for M3.5 as shown at right.

(3) Heat source unit power source specifications

3 phase 380-415V

Capacity	Power source	Cable size for power source (mm^2)	Wire length (m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Earth wire	
				Rated current	Switch capacity		Size (mm^2)	Screw type
224	3 phase 4 wire 380-415V 50Hz	8	67	30	30	30A 30mA less than 0.1 sec	2	M5
280								
335								

Please 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) In the case of distributed, separate power source system, the listed data represent those of a heat source unit.
c) For details, please refer to the installation manual supplied with the indoor unit.

(4) Indoor unit power source specifications : Single phase 220-240V

Combined total capacity of indoor units	Cable size for power source (mm^2)	Wire length (m)	Moulded-case circuit breaker (For ground fault, overload and short circuit protection)	Signal wire size (mm^2)
Less than 7A	2	21	20A 100mA less than 0.1 sec	2cores x 0.75-2.0 *
Less than 11A	3.5	21	20A 100mA less than 0.1 sec	
Less than 12A	5.5	33	20A 100mA less than 0.1 sec	
Less than 16A	5.5	24	30A 100mA less than 0.1 sec	
Less than 19A	5.5	20	40A 100mA less than 0.1 sec	
Less than 22A	8	27	40A 100mA less than 0.1 sec	
Less than 28A	8	21	50A 100mA less than 0.1 sec	

* Please use a shielded cable.

Please 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 above 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, please refer to the installation manual supplied with the indoor unit.
d) Wires connected to indoor units are allowed up to 5.5 mm^2. For 8 mm^2 or more, use a dedicated pull box and branch to indoor units with 5.5 mm^2 or less.

6-3. Method of connecting signaling wires

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 please 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, please 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 for 0.75-2mm^2 shielding wire (MVVS)	Up to 1,500 m for 0.75 mm^2 shielding wire (MVVS) Up to 1,000 m for 1.25 mm^2 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) Can be used together.	Units supporting new SL (FD○△△KXE6 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 only 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 and units of FD○A△△KXE4 and 5 Series are connected in a mixture:

Standard resistance value=46000/[(Number of connected FD○A△△KXE4 and 5 Series units x 5) + (Number of connected FD○△△KXE6 Series units x 9)]

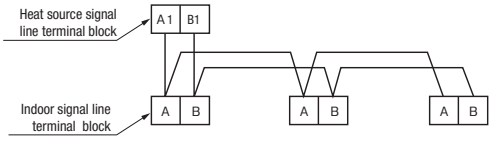
The number of connected units includes those of indoor units, outdoor units and SL devices.

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.

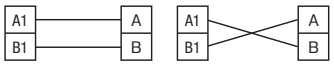
Indoor and heat source units signal cables

- Connect the signal cable between indoor and heat source units and the signal cable between heat source units belonging to the same refrigerant line to A1 and B1.
- Connect the signal line between heat source units on different refrigerant lines to A2 and B2.
- Please use a shielded cable for a signal line and connect a shielding earth at all the indoor units and heat source units.

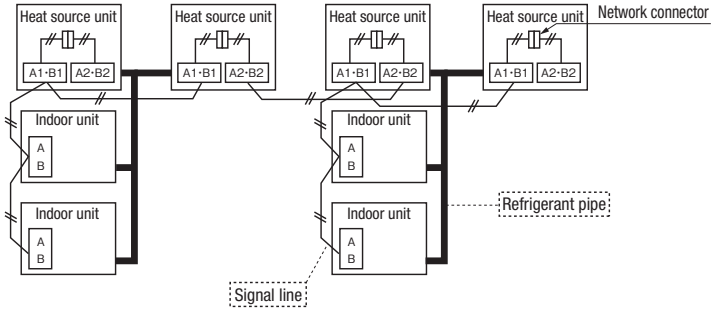
(1) When one heat source unit is used.



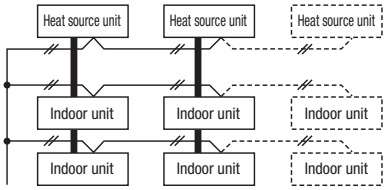
○Indoor and heat source signal lines do not have a polarity. Any of the connections in the following illustration can be made.



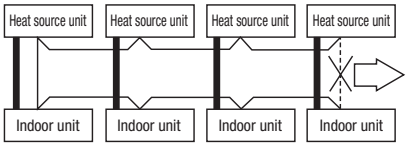
(2) When plural heat source units are used



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



Important ○Loop wiring prohibited.



The signal lines cannot form a loop, so the wirings shown as ····· in the diagram are prohibited.

Remote control wiring specifications

(1) **A standard remote control wire is 0.3mm² x 2 cores (FD○△△KXE6 indoor unit).**

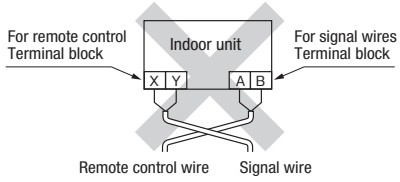
It can be extended **up to 600m. For a remote control wire exceeding 100m,** please upgrade wire size **as specified in the table below**.

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

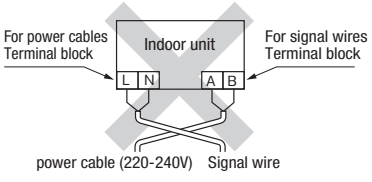
(2) When the remote control wire runs parallel to another power source wire or when it is subject to outside noise, such as from a high-frequency device, use shielded wire. (Be sure to ground only one end of the shielded wire.)

CAUTION In addition to a possible wiring error between indoor and heat source units, there are other possibilities of erroneous wiring as illustrated below.

① Wrong wiring between signaling wires and remote control wires.



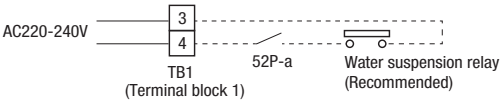
② Connecting power cables to the signaling wire terminal block.



It will result in a blown signal line fuse (CNK).

6-4. Procedure for interlock connection to the circulating water pump

To ensure that the heat source unit operates only when the circulating water pump is running, be sure to connect the pump interlock circuit (auxiliary a-contact of the electromagnetic switch for the circulating water pump) to terminal block 3,4 (TB1) of the heat source unit, as shown below.
The auxiliary a-contact must be AC 220 – 240 V, 75 mA or larger.
In case of a combination unit, connect the interlock circuits to all heat source units.
Heat source unit cannot be operated unless an interlock circuit is connected. If operation is stopped owing to this reason, the error code E64-4 will be displayed on the 7-segment indicator on the PCB of heat source unit.
It is recommended also to install a water suspension relay for protection in the event when the water quantity is depleted as a result of faulty operation of valves on the water pipes, air intrusion, or other.



Circulating water pump ON signal input

7. CONTROL SETTINGS

7-1. Unit address setting

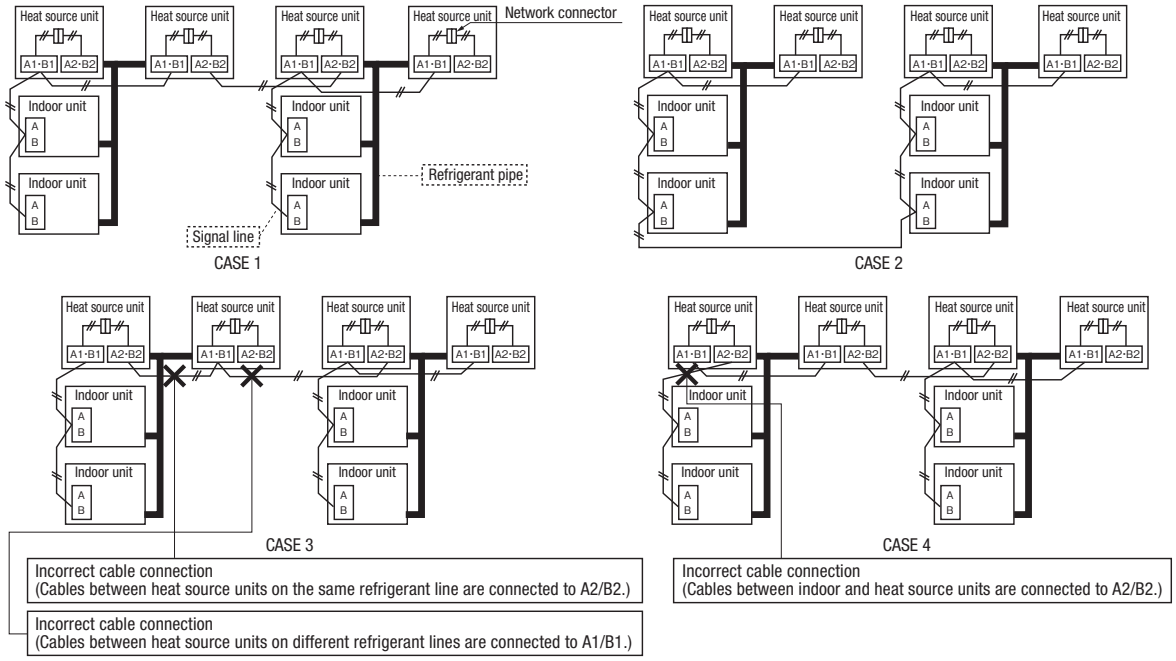
This control system controls the controllers of more than one air conditioner's heat source unit, indoor unit and remote control unit through communication control, using the microcomputers built in the respective controllers. Address setting needs to be done for both heat source and indoor units. Turn on power in the order of the heat source units and then the indoor units.
Use 1 minute as the rule of thumb for an interval between 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 heat source units, indoor units or centralized control equipment that do not support new SL, please 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 heat source unit.

●Address setting methods

The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one.
Please 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 heat source 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

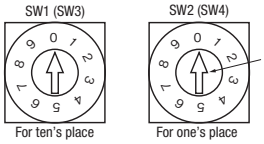
*1 Do not connect the signal line between heat source units on the different refrigerant lines to A1 and B1. Do not connect the signal line between heat source units on the same refrigerant line to A2 and B2. This may interrupt proper address setting. (Case 3)
Do not connect the signal line between indoor unit and heat source 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 through 4 and SW5-2 provided on the PCB and SW1 & 2 provided on the heat source 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 heat source No. (The ten's and one's)
	SW5-2	Indoor No. switch (The hundred's Place) [OFF : 0, ON : 1]
Heat source PCB	SW1, 2 (green)	For setting heat source No. (The ten's and one's)



By inserting a flat driver (precision screw driver) into this groove and turn the arrow to point a desired number.

●**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		Heat source unit address setting	Indoor unit address setting		Heat source unit address setting
	Indoor No. switch	Heat source No. switch	Heat source No. switch	Indoor No. switch	Heat source No. switch	Heat source 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△△KXE4-5 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.

- Heat source unit No., which is used to identify which heat source unit and indoor units are connected in a refrigerant system, is set on heat source unit PCB and indoor unit PCB. Give the same heat source unit No. to all heat source 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 Address setting of heat source unit

Before turning on the power, set as follows. The heat source unit address is registered when the power is turned on.

Set **the heat source No. switches** in a range of **00 – 31 [or 00 - 47 for old SL].**

Take care not to duplicate with other heat source unit No. on the network.

In the same way also on the master unit of combination, set the rotary switch for heat sorce No. **in a range of 00 - 31 [or 00 – 47 for old SL]**

For slave units of combination, set the rotary switches for heat source No. at **the same heat source No. as the master unit of combination.**

When 2 units are combined, set the dip switch SW4-7 of slave unit to ON. When 3 units are combined, set the dip switch SW4-7 of slave unit 1 to ON and the dip switch SW4-8 of slave unit 2 to ON. (Use same setting for heat source No. of master unit and slave unit.)

Refrigerant system	Heat source unit	SW1	SW2	SW4-7	Address on network
A	Master	2	2	OFF	22
	Slave	2	2	ON	23
B	Master	2	4	OFF	24
	Slave	2	4	ON	25
C	Master	3	1	OFF	31
	Slave	3	1	ON	00

Above list is an example. **The address on the network is master unit +1 for the slave unit.**

If the slave unit address is larger than 31 [or 47 for old SL], the address is assigned sequentially starting from 00.

When setting sequential addresses, take care not to duplicate the master unit address in the refrigerant system B with addresses of slave units in the refrigerant system A.

Refrigerant system	Heat source unit	SW1	SW2	SW4-7	SW4-8	Address on network
A	Master	2	2	OFF	OFF	22
	Slave 1	2	2	ON	OFF	23
	Slave 2	2	2	OFF	ON	24
B	Master	2	5	OFF	OFF	25
	Slave 1	2	5	ON	OFF	26
	Slave 2	2	5	OFF	ON	27
C	Master	3	1	OFF	OFF	31
	Slave 1	3	1	ON	OFF	00
	Slave 2	3	1	OFF	ON	01

Note:
Slave unit address is master unit +1. Address of second slave unit is master unit +2. When setting the address for master unit, take care to avoid duplication with other systems. Otherwise, it cannot operate. (Error: E-31)

② Address setting of indoor unit

Before turning on the power, set as follows. Indoor address is registered when the power is turned on.

Set **the indoor No. switch** in a range of **000 – 127 [or 00 – 47 for old SL].**

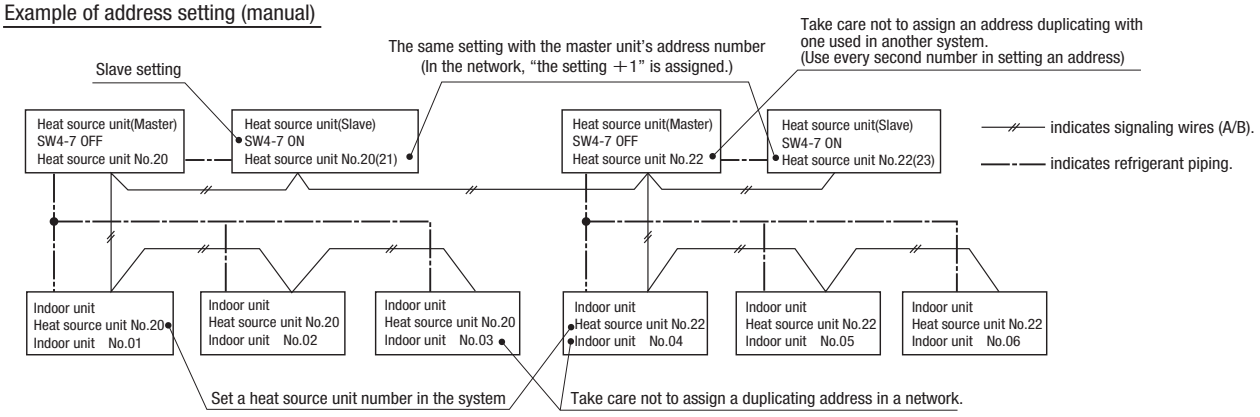
For **the heat source No. switches,** set corresponding heat source No. in a range of **00 – 31 [or 00 – 47 for old SL)].**

Set with care not to duplicate with other indoor No. on the network.

③ Turn on power in order from the heat source unit to indoor units. Give 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.

Example of address setting (manual)



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 please 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 Address setting of heat source unit

Before turning on the power, set as follows.

Confirm that **the heat source No. switch** is set **at 49 by the default.**

- **In the same way also on the master unit of combination,** confirm that the rotary switch for heat source No. is set **at 49 by the default.**
- **In the same way also on the slave unit of combination,** confirm that the rotary switch for heat source No. is set **at 49 by the default.**
  When 2 units are combined, set the dip switch SW4-7 of slave unit to ON. When 3 units are combined, set the dip switch 4-7 of slave unit 1 to ON and the dip switch SW4-8 of slave unit 2 to ON.

Heat source unit	SW1	SW2	SW4-7	Address on network
Master	4	9	OFF	49
Slave	4	9	ON	00

Heat source unit	SW1	SW2	SW4-7	SW4-8	Address on network
Master	4	9	OFF	OFF	49
Slave 1	4	9	ON	OFF	00
Slave 2	4	9	OFF	ON	01

CAUTION
If the slave unit is not specified, a compressor failure may result.

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 **Heat source Unit No. switch** is set to **49 (factory setting).**

③ Turn on power in order from the heat source unit to indoor units. Give 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 with some other method.)

(This option is available when the interconnection wiring among refrigerant systems is on the heat source unit side and new SL is chosen as the communication protocol.)

Address setting procedure (perform these steps for each heat source unit)

[STEP1] (Items set before turning on power)

① Address setting of heat source unit
Set as follows before you turn on power.
Set **the Heat source Unit No. switch** to a number **00 - 31**. Set a unique number by avoiding the numbers assigned to other heat source units on the network.
- Similarly for the master unit used in a combined installation, set **the Heat source Unit No. switch to a number 00-31.**
- **For slave units of combination,** set the rotary switches for heat source No. at **the same heat source No. as the master unit of combination.**
  When 2 units are combined, set the dip switch SW4-7 of slave unit to ON. When 3 units are combined, set the dip switch SW4-7 of slave unit 1 to ON and the dip switch SW4-8 of slave unit 2 to ON. (Use same setting for heat source No. of master unit and slave unit.)

② Address setting of indoor unit
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 **Heat source 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 heat source 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 heat source unit
Turn on power in order from the heat source unit to indoor units. Give one-minute or longer interval for them.

⑤ Select and enter "1" in P31 on the 7-segment display panel of each heat source unit (master unit in case of combination) 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 heat source unit (master unit in case of combination).

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 heat source unit (master unit in case of combination). Please input the number of connected indoor units (on the same refrigerant line in case of combination) for each heat source 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 flickering.

[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 flickering.
If an error is detected in this process, the display will show "A○○."
Check the 7-segment display panel of each heat source unit (master unit in case of combination).
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 heat source unit, **engage the network connectors** again.

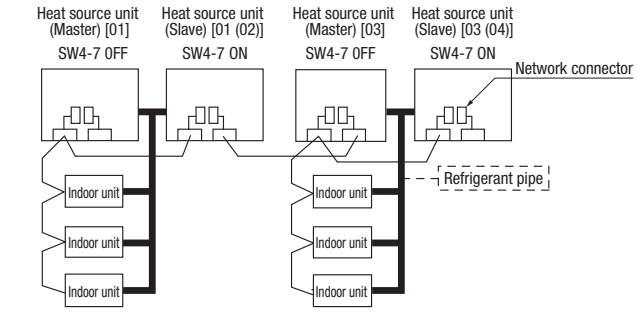
⑩ Network polarity setting

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 heat source unit (on only 1 unit : master unit in case of combination)** to specify network polarity.

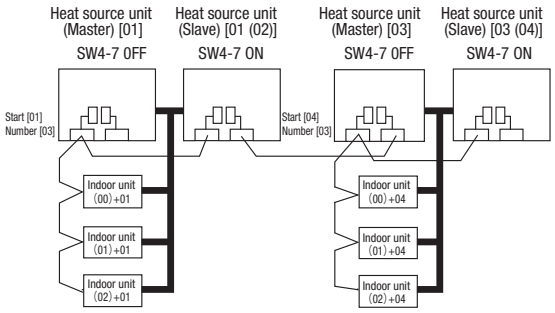
⑪ Network setting completion check
When the network is defined, "End" will appear on the 7-segment display panel. An "End" indication will go off, when some operation is made from the 7-segment display panel or 3 minutes after.

	STEP1	STEP2	STEP3	STEP4
Indoor unit power source	②OFF	④ON	—	—
Heat source unit power source	①OFF	④ON	—	—
Indoor unit (indoor/heat source No.SW)	②indoor000/heat source 49 (factory setting)	—	—	—
Heat source unit (heat source No.SW)	①01,03(Ex)	—	—	—
Network connectors	③Disconnect (each heat source unit)	—	—	⑨Connect(each heat source unit)
Start automatic address setting		⑤ Select "Automatic Address Start" on each heat source unit.	—	—
Set starting address		⑥heat source 01:「01」(Ex) heat source 03:「04」(Ex)	—	—
Set the number of indoor unit		⑦heat source 01:「03」(Ex) heat source 03:「03」(Ex)	—	—
Polarity setting		—	—	⑩ Set in P34 on the 7-segment display panel of any heat source unit.
7-segment display		⑦ 「AUX」(Blink)	⑧ "AUE"(blink), or "A○○" in error events.	⑪ 「End」

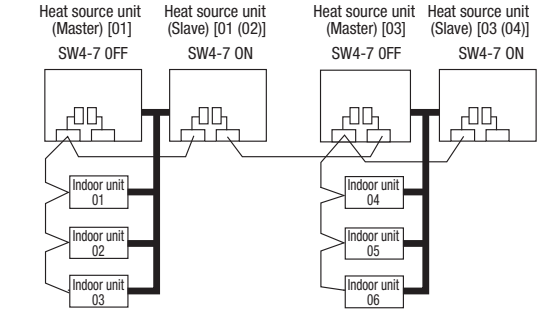
[STEP1]



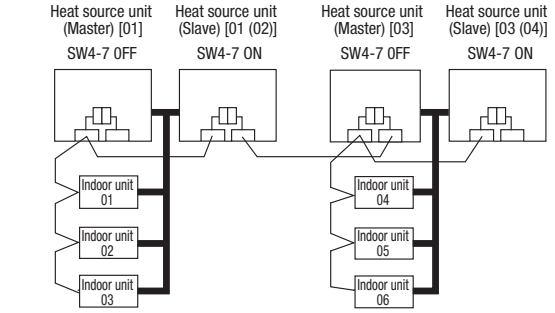
[STEP2]



[STEP3]



[STEP4]



- Within a refrigerant system, indoor units are assigned addresses in the order they are recognized by the heat source unit. Therefore, they are not necessarily assigned addresses in order from the nearest to the heat source 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. and the heat source unit address No. displayed on the remote control unit by pressing its CHECK button.
- Automatic address setting can be used for an installation in which prulal 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 heat source 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		Heat source unit address setting
	Indoor No.SW	Heat source No.SW	Heat source No.SW
Automatic address setting forsingle 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

When the eco touch remote control is connected, refer to the installation setting in the installation manual which is packed along with the remote control.

(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 heat source unit No.	⑥ After showing the defined indoor address No. for 2 seconds, the display will change to the "heat source 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 heat source 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 heat source 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)
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 heat source 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 heat source 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 heat source 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 heat source 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. is 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: Previous SL mode 1: New SL mode (The communication plotocol 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 heat source 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
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 coupled 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 previous SL setting unit from the network Arrange all units to operate in the new SL.

Error indication

Code	Contents of a display	Cause
E31	Duplicating heat source unit address.	Plural heat source units are exist as same address in same network.
E46	Incorrect setting.	Automatic address setting and manual address setting are mixed.

7-2. Control mode switching

Controls of heat source unit may be selected as follows using the dip switches on the PCB and P○○ on the 7-segment.
To change P○○ on the 7-segment, hold down SW8 (increasing a number shown on the 7-segment display panel: one's place), SW9 (increasing a number shown on the 7-segment display panel: tens place) and SW7 (Data write/Enter).

Control selecting method		Content of control
SW setting on PCB	P○○ on 7-segment	
SW3-7 to ON *1	Set external input function allocation to "2" *1	Forced cooling/heating operation mode (It can be fixed at cooling with external input terminals open, or at heating with them closed.)
SW5-1 to ON + SW5-2 to ON	—	Cooling test run
SW5-1 to ON + SW5-2 to OFF	—	Heating test run
Close the fluid operation valve on heat source 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
SW4-5:OFF, SW4-6:OFF*1 80% (at shipping) SW4-5:ON , SW4-6:OFF*1 60% SW4-5:OFF, SW4-6:ON*1 40% SW4-5:ON , SW4-6:ON*1 00%	Set allocation of external input function to "1" *1	Inputting signals to external input terminals selects the demand mode. (J13 shorted: Level input, J13 open: Pulse input)
SW5-5	—	Communication method selection ON: Previous SL communication, OFF: New SL communication
J13: Shorted (at shipping), J13: Open	—	External input switing (CnS1, CnS2 only) shorted : Level input, Open: Pulse input
—	P01	Operation priority select 0: First push preferred (at shipping) 1: Last push preferred
—	P04	2 stage demand mode *2 OFF: Disabled (at shipping) 000, 040, 060, 080 [%]
—	P05	Silent mode setting 0 (at shipping) – 3 : Larger values for large effect
—	P06	Allocation of external output (CnZ1)
—	P07	Allocation of external input (CnS1)
—	P08	Allocation of external input (CnS2)
—	P09	Allocation of external input (CnG1)
—	P10	Allocation of external input (CnG2)

*1 Control is switched when both the allocation of external input function (P07-10) and SW are changed.
(Example: To use CnS1 for the input of forced cooling/heating operation mode, set P07 at 2 and SW3-7 at ON. To use CnS2 for the input of forced cooling/heating operation mode, set P08 at 2 and SW3-7 at ON.)

*2 To enable the 2 stage demand mode, set J13 shorted and allocation of external input function to "1".

By changing the allocation of external input functions (P07-10) on the 7-segment, functions of external input terminals may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for allocation of external input function	With external input terminals shorted	With external input terminals open
"0" : External operation input	Allowing	Prohibition
"1" : Demand input	Invalid	Valid
"2" : Cooling/heating forced input	Heating	Cooling
"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
"9" : 2 stage demand input	Invalid	Valid

By changing the allocation of external output function (P06) on the 7-segment, functions of external output terminal (CnZ1) may be selected.

"0" : Operation output
"1" : Error output
"2" : Compressor ON output

7-3. External input and output terminals specifications

Name	Purpose (at shipping)	Specification	Operating side connector
External input CnS1	External operation input (Shorted at shipping)	Non-voltage contactor (DC12V)	J. S. T (NICHIATSU) B02B-XAMK-1 (LF) (SN)
External input CnS2	Demand input (Shorted at shipping)	Non-voltage contactor (DC12V)	J. S. T (NICHIATSU) B02B-XARK-1 (LF) (SN)
External input CnG1	Cooling / Heating forced input (Open at shipping)	Non-voltage contactor (DC12V)	J. S. T (NICHIATSU) B02B-XAEK-1 (LF) (SN)
External input CnG2	Silencing mode input (Open at shipping)	Non-voltage contactor (DC12V)	J. S. T (NICHIATSU) B02B-XASK-1 (LF) (SN)
External output CnZ1	Spare output (External output)	DC12V output	MOLEX 5566-02A-RE
External output CnH	Operation output	DC12V output	MOLEX 5286-02A-BU
External output CnY	Error output	DC12V output	MOLEX 5266-02A

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 less, 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) Please check the resistance of the signaling 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 signaling wire terminal block. (Please refer to Section 6-3. Standard resistance value.)

(3) **Be sure to turn on the crank case heater 6 hours before operation.**

(4) **Make sure that the bottom of the compressor casing is warm.** (higher than ambient temperature +5°C)

(5) Be sure to fully open the operation valves (liquid,gas and Equalizen oil piping (for a combined installation only)) 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.**

(7) Run the circulating water pump, and confirm that the water temperature and flow rate are within the limitation for use.

> **CAUTION**
> Please make sure that the operation valves (gas, liquid, oil equalization pipe (for a combined installation only)) 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. Check operation

It is recommended to practice the check operation in precedent to the test run.
[Even if the check operation is not practiced, the test run and normal operations can be performed.]
For further details regarding the check operation refer to the technical data.

Important

- Practice the check operation after completing the address setting for the indoor and heat source units and also after charging the refrigerant.
- To assure accurate checking, proper amount of refrigerant must be retained.
- Check operation cannot be done when the system is stopped by an error.
- Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the heat source unit capacity.
- Check operation cannot be done when the system communication method is previous SL.
- Don't perform the check operation simultaneously on more than one refrigerant line. Accurate checking cannot be obtained.
- Practice the check operation within the operation temperature ranges (Ambient temperature: 0 – 40°C, room temperature: 10 – 32°C). Check operation will not start out of these ranges.
- Outdoor air processing unit cannot be checked. (It is possible to check indoor units other than the outdoor air processing unit of the same refrigerant line.)
- It is impossible to check operation when connecting only one indoor unit.
- It is impossible to check operation when demand rate is setting 0%.
- If the compressor under dome superheat degree is lower than 15°C, check operation may not work with a protective control.
- Be sure to turn on the crank case heater 6 hours before check operation.

(1) **Check items**

Check operation allows proving the following points.

- Whether or not the operation valve is left open (Operation valve open/close check). (In case of combination, however, all operation valves need to be closed on master and slave units to obtain accurate judgment.)
- Whether or not the refrigerant pipes and signal cables are connected properly between indoor and heat source units. (Mismatch check)
- Whether or not the indoor expansion valve operates properly. (Expansion valve failure check)

(2) **Method of check operation**

(a) Starting the check operation

- Confirm that all of the following switches are turned OFF: SW3-7 (Forced cooling/heating operation mode), SW5-1 (Test run), SW5-2 (Test run cooling setting) and SW5-3 (Pump-down operation). (In case of combination, on both master and slave units)
- At the next, turn the SW3-5 (Check operation) OFF →ON (only on master unit in case of combination) so that the check operation will start.
- It takes 15 – 30 minutes normally (max. 80 min) from the start to the end of check operation.

(b) End the check operation and the result display

- When the check operation is over, the system stops automatically. The 7-segment indicator shows the result (only on master unit in case of combination).

<Normal ending>

- 7-segment indicator shows "CHO End".
- Return the SW3-5 to OFF. The 7-segment indicator returns to normal display.

<Abnormal ending>

- 7-segment indicator shows an error alarm.
- Referring to the section [Inspect here], repair the faulty section and return the SW3-5 to OFF.
- At the next, repeat the check operation from the Step (2) above.

Display on 7-segment indicator during check operation

Code indicator	Data indicator	Display contents
H1	Max. remaining time	Check operation preparation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
H2	Max. remaining time	Check operation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
CHO	End	Normal ending of check operation. (In case of combination, indicated on master unit only.)

Error display on 7-segment indicator after ending the check operation

Code indicator	Data indicator	Display contents	Check following points
CHL	– – –	Operation valve is closed. (Refrigerant circuit is shut off partially.)	・Isn't the operation valve of heat source unit left open? ・Is the low pressure sensor normal? (Detected pressure can be seen on the 7-segment indicator.) ・Is the connector of indoor unit expansion valve coil connected? ・Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? ・Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHU	Abnormal indoor unit No.	Mismatch between refrigerant pipes and signal cables. Refrigerant is not circulated to the indoor unit of which No. is displayed.	・Are the refrigerant pipes and signal cables connected properly between the indoor and heat source units? ・Is the connector of indoor unit expansion valve coil connected? ・Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? ・Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHJ	Abnormal indoor unit No.	Expansion valve on the indoor unit of which No. is displayed is not operating properly.	・Is the connector of indoor unit expansion valve coil connected? ・Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? ・Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHE	– – –	Abnormal ending of check operation.	・Isn't any error displayed (E??) on the indoor unit or heat source unit? ・Are signal cables connected without play? ・Hasn't the SW setting been changed during the check operation?

※ When any error is detected, errors other than those listed above may be displayed. In such occasion, refer to the separate technical data.

8-3. Test operation

(1) Test run from a heat source unit.

Whether external inputs are set to ON or OFF, you can start a test run by using the SW5-1 and SW5-2 switches provided on the heat source unit board.
Select the test run mode first.
Please 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, please 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 a heat source unit: please operate a remote control unit according to the following steps.

(a) Start of a cooling test run
○Operate the unit by pressing the START/STOP button.
○Select the "COOLING" mode with the MODE button.
○Press the TEST RUN 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 START/STOP button or the "TEMP SET ▽△" 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, please make sure again that the electrical component box cover and the main body panel have been attached before you turn the unit over to the customer.

8-4. TRANSFER

○Use the instruction manual that came with the heat source unit to explain the operation method to the customer.
Please 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)

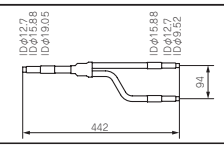
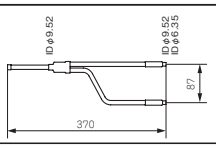
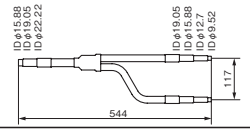
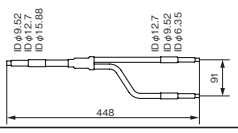
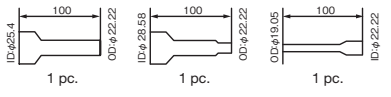
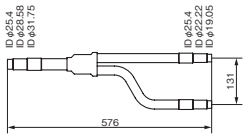
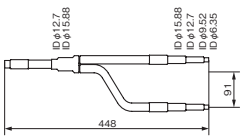
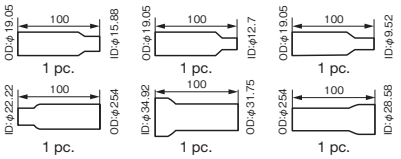
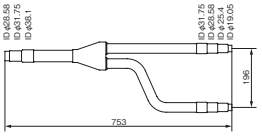
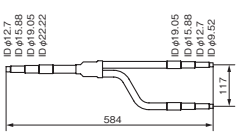
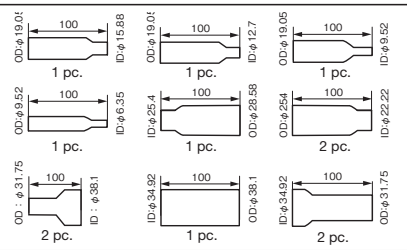
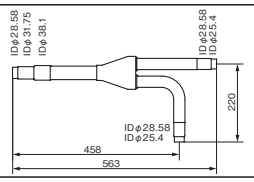
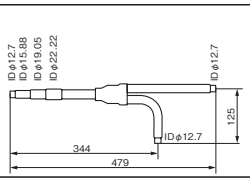
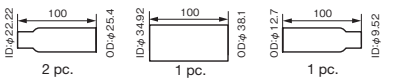
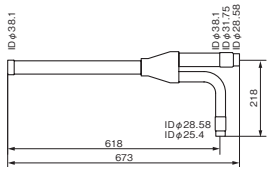
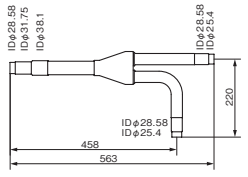
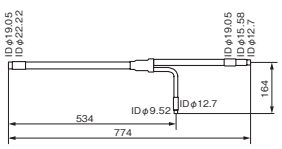
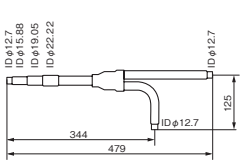
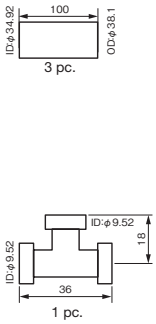
(1) To avoid mixing of different types of oil, use separate tools for each type of refrigerant.
(2) To avoid moisture from being absorbed by the refrigerant oil, the time for when the refrigerant circuit is open should be kept as short as possible. (Within 10 min. is ideal.)
(3) For other piping work, airtighteness testing , vacuuming, and refrigerant charging, refer to section 5, Refrigerant piping.
(4) Diagnostic Inspection Procedures
For the meanings of failure diagnosis messages, please refer to the nameplate provided on the unit (on the control lid)
(5) 7-segment LED indication
Data are indicated when so chosen with the indication selector switch. For the details of indication, please refer to the cable name plate attached on the unit. (On the control lid)
(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.
(7) When it becomes necessary to recover the refrigerant for maintenance or in the event of the pump-down operation for removal or relocation of the heat source unit, drain water completely from the water heat exchanger or continue to circulate heat source water.
There is a risk of puncture on the water heat exchanger, if water freezes.
(8) Confirm at periodic inspections that the temperature, flow rate and quality of heat source water are within the limitation for use.

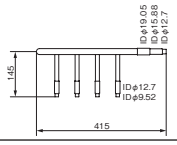
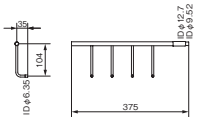
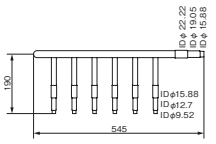
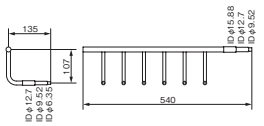
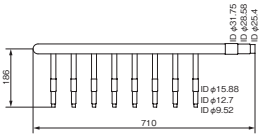
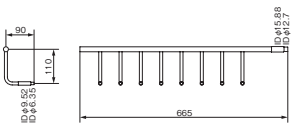
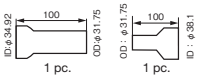
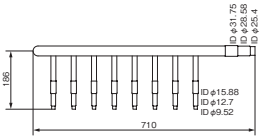
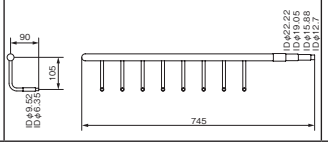
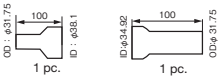
5.2 Instructions for installing the branch pipe set

PSB012D855D

◎ This manual describes the specifications of branching pipe set and header set installation. For heat source unit installation and indoor unit installation, please refer to the respective installation manuals supplied with your heat source 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 heat source 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 (Heat source) 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 PROCEDURE

(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 heat source unit connection for the section between heat source unit's branching pipe and heat source 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

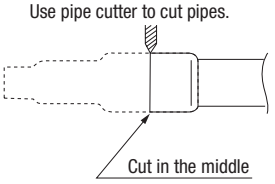
① In cutting pipes, always use a pipe cutter. Remove burrs from a cut end when you cut a pipe. In doing so, keep a cut end downward so that no chips or burrs may enter the pipe.

② Take utmost care so that no foreign matter such as dust or water may enter piping during installation work.

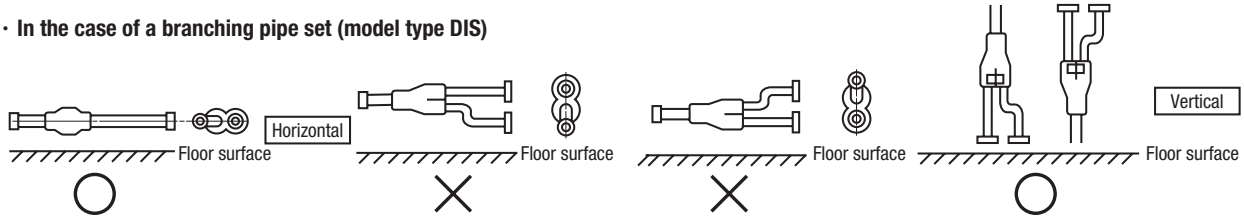
- Please cover all the open ends of piping until installation work is completed. Particularly, any openings in the section of piping laid outdoors should be sealed stringently.
- As long as possible, avoid open ends left facing upward. Make them face either horizontally or downward.

③ A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.

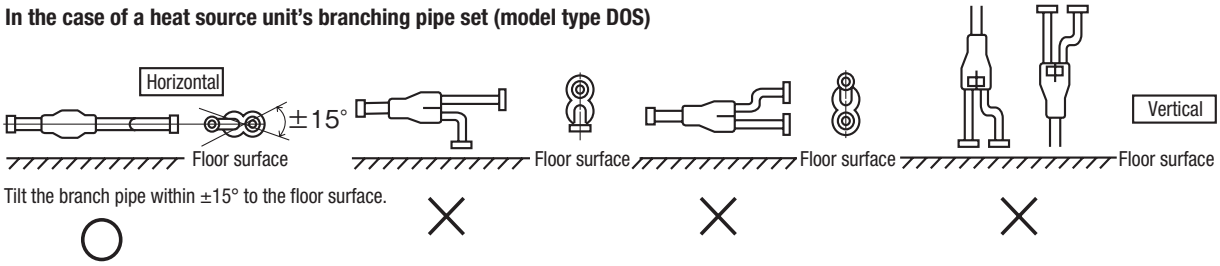
Use pipe cutter to cut pipes.



- **In the case of a branching pipe set (model type DIS)**

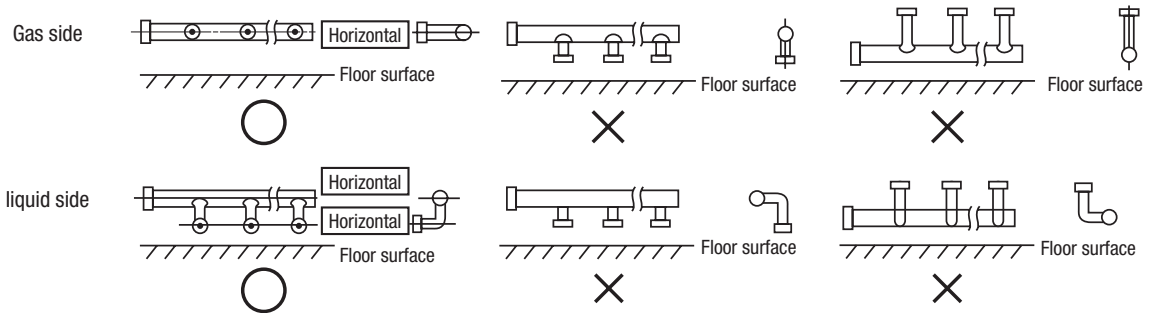


- **In the case of a heat source unit's branching pipe set (model type DOS)**

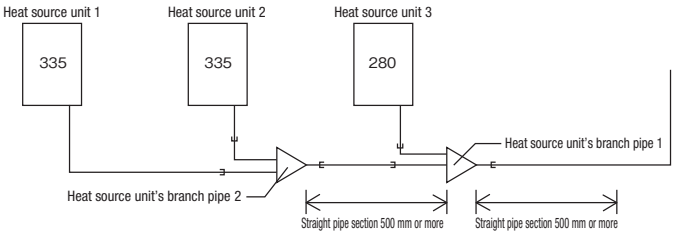


Tilt the branch pipe within ±15° to the floor surface.

・**In the case of a header set (model type HEAD)**



④ When using the heat source 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 heat source unit.

⑥ Do not leave piping with any open ends uncovered to prevent water or foreign matters from entering inside.

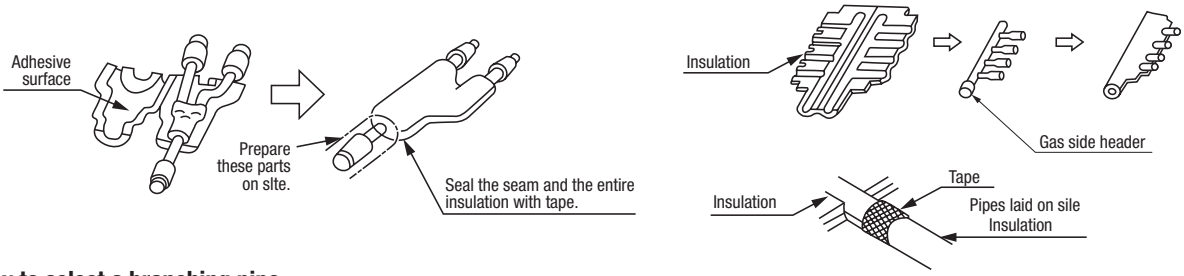
(3) Please dress it with an attached insulation sheet for heat insulation. (Please dress both liquid and gas sides)

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.

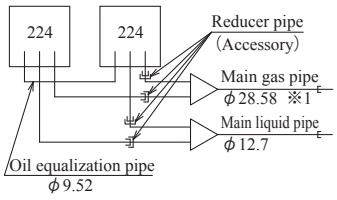
② Always position a header (both gas and liquid headers) in such a way that it branches horizontally.

③ No 224 or 280 indoor unit is connectable to a header.

(5) Example of piping

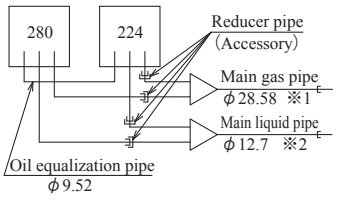
(a) Combination use

FDC450KXZWE1
Combination：FDC224KXZWE1＋FDC224KXZWE1
［Branching pipe set:DOS-2A-3］



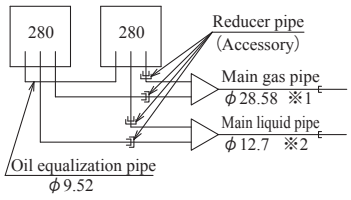
If the longest distance is 90m or longer (actual length)
※1 ϕ31.75 (ϕ28.58)

FDC500KXZWE1
Combination：FDC224KXZWE1＋FDC280KXZWE1
［Branching pipe set:DOS-2A-3］



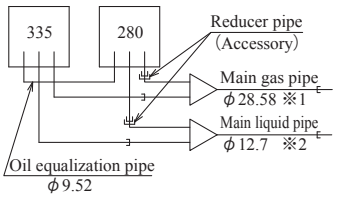
If the longest distance is 90m or longer (actual length)
※1 ϕ31.75 (ϕ28.58), ※2 ϕ15.88

FDC560KXZWE1
Combination：FDC280KXZWE1＋FDC280KXZWE1
［Branching pipe set:DOS-2A-3］



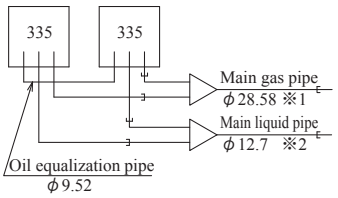
If the longest distance is 90m or longer (actual length)
※1 ϕ31.75 (ϕ28.58), ※2 ϕ15.88

FDC615KXZWE1
Combination：FDC280KXZWE1＋FDC335KXZWE1
［Branching pipe set:DOS-2A-3］



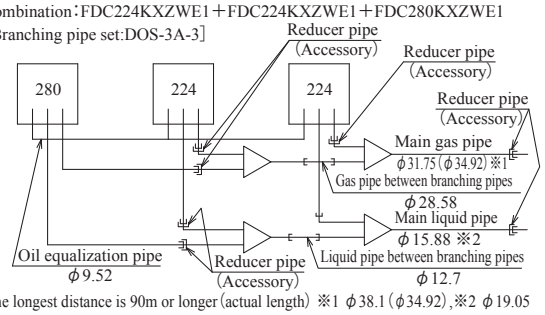
If the longest distance is 90m or longer (actual length)
※1 ϕ31.75 (ϕ28.58), ※2 ϕ15.88

FDC670KXZWE1
Combination：FDC335KXZWE1＋FDC335KXZWE1
［Branching pipe set:DOS-2A-3］



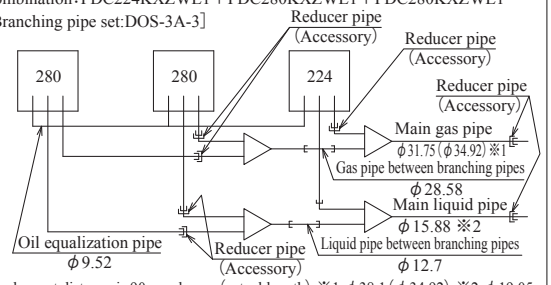
If the longest distance is 90m or longer (actual length)
※1 ϕ31.75 (ϕ28.58), ※2 ϕ15.88

FDC730KXZWE1
Combination：FDC224KXZWE1＋FDC224KXZWE1＋FDC280KXZWE1
［Branching pipe set:DOS-3A-3］



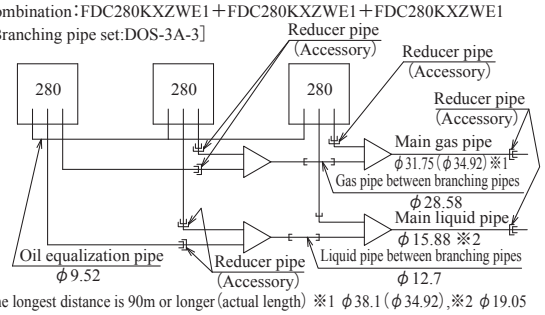
If the longest distance is 90m or longer (actual length) ※1 ϕ38.1 (ϕ34.92), ※2 ϕ19.05

FDC775KXZWE1
Combination：FDC224KXZWE1＋FDC280KXZWE1＋FDC280KXZWE1
［Branching pipe set:DOS-3A-3］



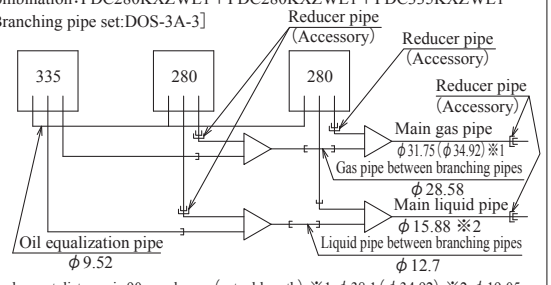
If the longest distance is 90m or longer (actual length) ※1 ϕ38.1 (ϕ34.92), ※2 ϕ19.05

FDC850KXZWE1
Combination：FDC280KXZWE1＋FDC280KXZWE1＋FDC280KXZWE1
［Branching pipe set:DOS-3A-3］



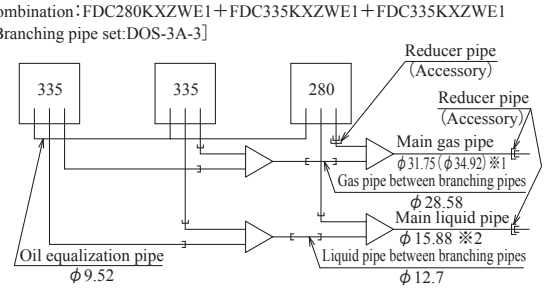
If the longest distance is 90m or longer (actual length) ※1 ϕ38.1 (ϕ34.92), ※2 ϕ19.05

FDC900KXZWE1
Combination：FDC280KXZWE1＋FDC280KXZWE1＋FDC335KXZWE1
［Branching pipe set:DOS-3A-3］



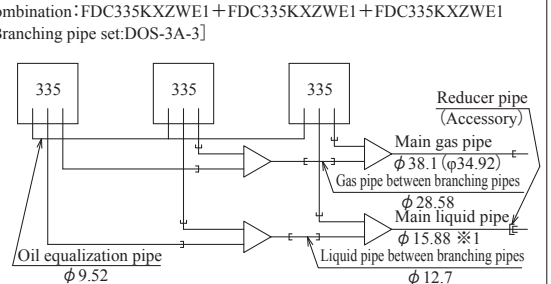
If the longest distance is 90m or longer (actual length) ※1 ϕ38.1 (ϕ34.92), ※2 ϕ19.05

FDC950KXZWE1
Combination：FDC280KXZWE1＋FDC335KXZWE1＋FDC335KXZWE1
［Branching pipe set:DOS-3A-3］



If the longest distance is 90m or longer (actual length) ※1 ϕ38.1 (ϕ34.92), ※2 ϕ19.05

FDC1000KXZWE1
Combination：FDC335KXZWE1＋FDC335KXZWE1＋FDC335KXZWE1
［Branching pipe set:DOS-3A-3］



If the longest distance is 90m or longer (actual length) ※1 ϕ19.05

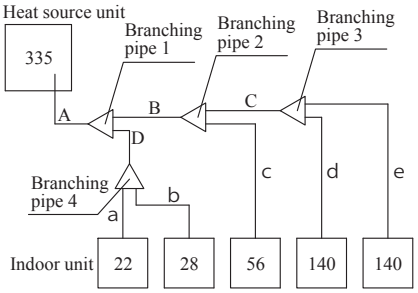
Refrigerant piping size applicable to European installations are shown in parentheses.

PCB003Z847

(b) Heat source unit connection

Example 1：Branch system

Connecting capacity：386



Selecting piping size

Item	Selection procedure	Piping size		Selection table of PCB003Z847
		Gas pipe	Liquid pipe	
A	If the longest distance is less than 90m (actual length)	φ25.4 (φ22.22)	φ12.7	Table 1 and table 3
	If the longest distance is 90m or longer (actual length)	φ25.4 (φ22.22)	φ12.7	
B	Downstream indoor unit capacity total (56+140+140) =336	φ19.05	φ12.7	Table 4
C	Downstream indoor unit capacity total (140+140) =280	φ19.05	φ12.7	Table 4
D	Downstream indoor unit capacity total (22+28) =50	φ12.7	φ9.52	Table 4
a	Indoor unit piping size (22)	φ9.52	φ6.35	Table 5
b	Indoor unit piping size (28)	φ9.52	φ6.35	Table 5
c	Indoor unit piping size (56)	φ12.7	φ6.35	Table 5
d	Indoor unit piping size (140)	φ15.88	φ9.52	Table 5
e	Indoor unit piping size (140)	φ15.88	φ9.52	Table 5

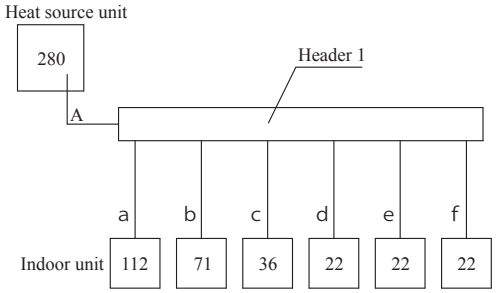
Selection of branching pipe set. (Than table 7 of PCB003Z847)

Item	Selection procedure	Branching pipe set
Branching pipe 1	Downstream indoor unit capacity total (22+28+56+140+140) =386	DIS-371-1G
Branching pipe 2	Downstream indoor unit capacity total (56+140+140) =336	DIS-180-1G
Branching pipe 3	Downstream indoor unit capacity total (140+140) =280	DIS-180-1G
Branching pipe 4	Downstream indoor unit capacity total (22+28) =50	DIS-22-1G

Refrigerant piping size applicable to European installations are shown in parentheses.

Example 2：Header system

Connecting capacity：285



Selecting piping size

Item	Selection procedure	Piping size		Selection table of PCB003Z847
		Gas pipe	Liquid pipe	
A	If the longest distance is less than 90m (actual length)	φ22.22	φ9.52	Table 1 and table 3
	If the longest distance is 90m or longer (actual length)	φ25.4 (φ22.22)	φ12.7	
a	Indoor unit piping size (112)	φ15.88	φ9.52	Table 5
b	Indoor unit piping size (71)	φ15.88	φ9.52	Table 5
c	Indoor unit piping size (36)	φ12.7	φ6.35	Table 5
d	Indoor unit piping size (22)	φ9.52	φ6.35	Table 5
e	Indoor unit piping size (22)	φ9.52	φ6.35	Table 5
f	Indoor unit piping size (22)	φ9.52	φ6.35	Table 5

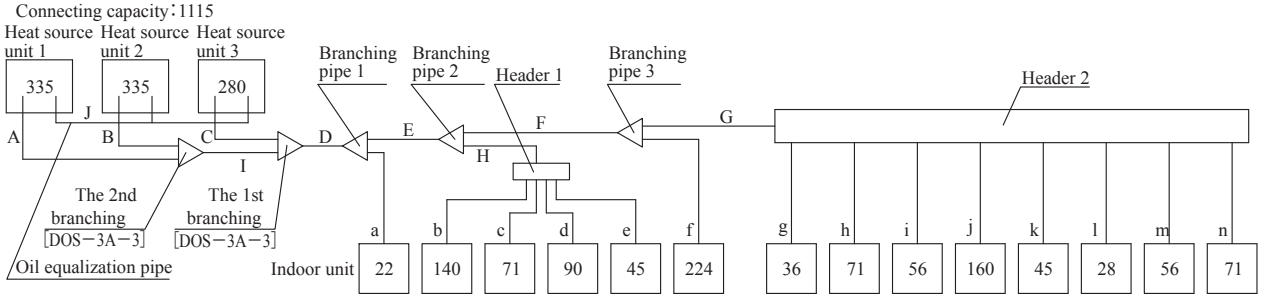
Refrigerant piping size applicable to European installations are shown in parentheses.

Selection header set. (Than table 8 of PCB003Z847)

Item	Selection procedure	Header set
Header 1	Downstream indoor unit capacity total (112+71+36+22+22+22) =285	HEAD6-180-1G

Example 3：Branch system + Header system

Connecting capacity：1115



Selecting piping size

Item	Selection procedure	Piping size		Selection table of PCB003Z847
		Gas pipe	Liquid pipe	
A	Heat source unit piping size (335)	φ25.4 (φ22.22)	φ12.7	Table 1
B	Heat source unit piping size (335)	φ25.4 (φ22.22)	φ12.7	Table 1
C	Heat source unit piping size (280)	φ22.22	φ9.52	Table 1
D	If the longest distance is less than 90m (actual length)	φ31.75 (φ34.92)	φ15.88	Table 3
	If the longest distance is 90m or longer (actual length)	φ38.1 (φ34.92)	φ19.05	
E	Downstream indoor unit capacity total (140+71+90+45+224 +36+71+56+160+45 +28+56+71) =1093	φ38.1 (φ34.92)	φ19.05	Table 4
F	Downstream indoor unit capacity total (224+36+71+56+160 +45+28+56+71) =747	φ31.75	φ15.88	Table 4
G	Downstream indoor unit capacity total (36+71+56+160+45 +28+56+71) =523	φ25.4 (φ28.58)	φ12.7	Table 4
H	Downstream indoor unit capacity total (140+71+90+45) =346	φ22.22	φ12.7	Table 4

Item	Selection procedure	Piping size		Selection table of PCB003Z847
		Gas pipe	Liquid pipe	
I	Heat source unit capacity total connect to the 2nd branching (335+335) =670	φ28.58	φ12.7	Table 2
a	Indoor unit piping size (22)	φ9.52	φ6.35	Table 5
b	Indoor unit piping size (140)	φ15.88	φ9.52	Table 5
c	Indoor unit piping size (71)	φ15.88	φ9.52	Table 5
d	Indoor unit piping size (90)	φ15.88	φ9.52	Table 5
e	Indoor unit piping size (45)	φ12.7	φ6.35	Table 5
f	Indoor unit piping size (224)	φ19.05	φ9.52	Table 5
g	Indoor unit piping size (36)	φ12.7	φ6.35	Table 5
h	Indoor unit piping size (71)	φ15.88	φ9.52	Table 5
i	Indoor unit piping size (56)	φ12.7	φ6.35	Table 5
j	Indoor unit piping size (160)	φ15.88	φ9.52	Table 5
k	Indoor unit piping size (45)	φ12.7	φ6.35	Table 5
l	Indoor unit piping size (28)	φ9.52	φ6.35	Table 5
m	Indoor unit piping size (56)	φ12.7	φ6.35	Table 5
n	Indoor unit piping size (71)	φ15.88	φ9.52	Table 5

Item	Selection procedure	Piping size	Selection table of PCB003Z847
J	Oil equalization pipe	φ9.52	Table 1

Selection of branching pipe set. (Than table 7 of PCB003Z847)

Item	Selection procedure	Branching pipe set
Branching pipe 1	Downstream indoor unit capacity total (22+140+71+90+45+224 +36+71+56+160+45 +28+56+71) =1115	DIS-540-3
Branching pipe 2	Downstream indoor unit capacity total (140+71+90+45+224 +36+71+56+160 +45+28+56+71) =1093	DIS-540-3
Branching pipe 3	Downstream indoor unit capacity total (224+36+71+56+160 +45+28+56+71) =747	DIS-540-3

Selection header set. (Than table 8 of PCB003Z847)

Item	Selection procedure	Header set
Header 1	Downstream indoor unit capacity total (140+71+90+45) =346	HEAD8-180-1G
Header 2	Downstream indoor unit capacity total (36+71+56+160+45+28 +56+71) =523	HEAD8-371-1G

Refrigerant piping size applicable to European installations are shown in parentheses.

PCB003Z848

6. OUTDOOR UNIT DISASSEMBLY PROCEDURE

DISASSEMBLY PROCEDURE

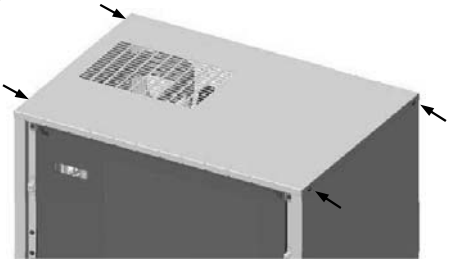
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (KXZW series)

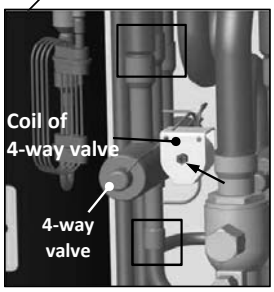
1. To remove the service panel
(1) Remove 6 service panel fixing screws and remove it.

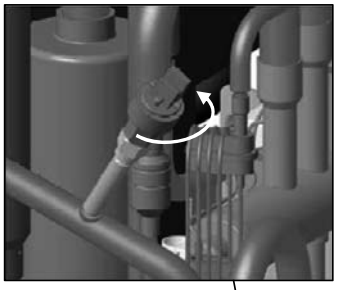
2. To remove the lid of control box
(1) Remove the service panel. (See No.1)
(2) Remove 4 lid fixing screws and remove it.

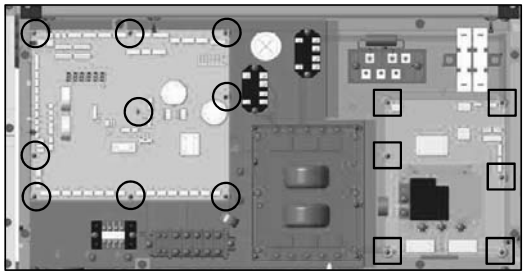


3. To remove the top panel
(1) Remove 4 top panel fixing screws and remove it.

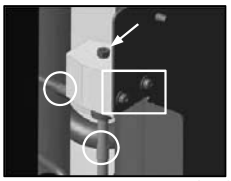
5. To remove the 4-way valve (20S)
(1) Remove the lid of control box.(See No.2)
(2) Disconnect the coil of 4-way valve connector (CNN1 or CNN5) on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Remove the coil of 4-way valve fixing screw (← mark) and remove it.
(5) Remove welded part of 4-way valve by welding. (☐ mark)







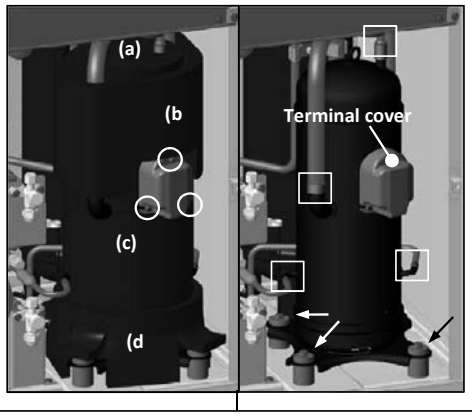
4. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.2)
Control PCB
(2) Pull off all the inserted connectors.
(3) Take off 9 control PCB fixing locking supports and remove it.(○ mark)
Inverter PCB
(4) Pull off all the inserted connectors.
(5) Take off 6 inverter PCB fixing locking supports and remove it.(☐mark)



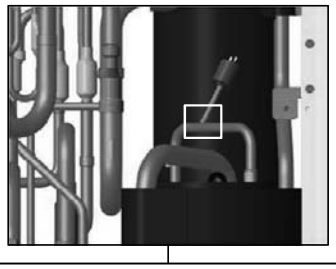
7. To remove bypass valve (SV)
(1) Remove the lid of control box.(See No.2)
(2) Disconnect the SV connector (CNN2 or 6 or 11)on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Remove the coil of SV fixing screw. (← mark)
(5) Remove 2 coil of SV fixing screws and remove it.(☐ mark)
(6) Remove welded part of SV by welding. (○ mark)

6. To remove the high pressure sensor (PSH)
(1) Remove the lid of control box.(See No.2)
(2) Disconnect the PSH connector(CNL1) on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Turn PSH to the left and remove it. (Double spanners are needed.)

PROCEDURE & PICTURES

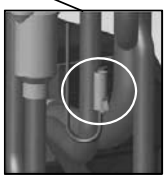


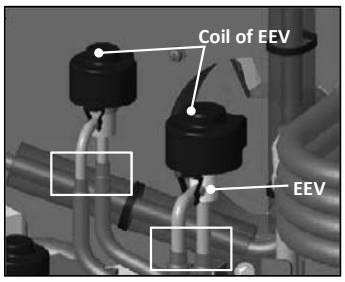
8. To remove the compressor (CM)
(1) Remove the service panel.(See No.1)
(2) Remove the insulation which covers compressor. (Strings (a)～(d) should be loosen.)
(3) Remove 3 terminal cover fixing bolts(○ mark) and remove it and disconnect the power wiring.
(4) Remove welded part of compressor by welding. (□ mark)
(5) Remove 3 compressor fixing nuts(← mark) using spanner or adjustable wrench.



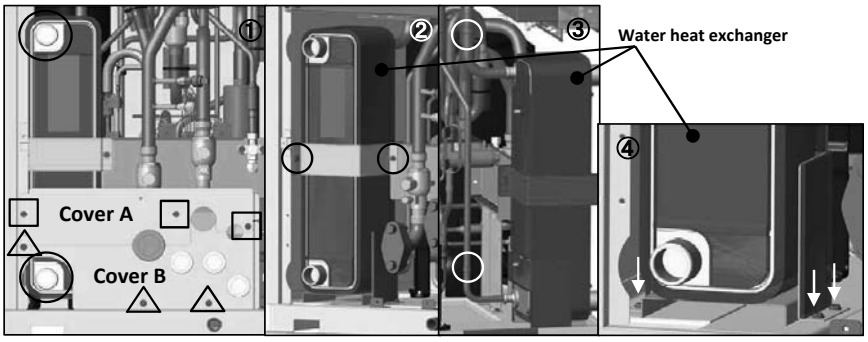
9. To remove the high pressoure switch (63H)
(1) Remove the lid of control box.(See No.2)
(2) Disconnect the 63H connector(CNQ1) on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Remove welded part of high pressure switch by welding.

10. To remove the thermistors (example"Tho-D1")
(1) Remove the lid of control box.(See No.2)
(2) Disconnect the Tho-D1 connector(CNTH) on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Pull out the thermistor"Tho-D1" from the sensor holder.





11. To remove the electronic expansion valve (EEV)
(1) Remove the lid of control box. (See No.2)
(2) Disconnect the EEV connector(CNEEVx) on PCB in control box.
(3) Remove the top panel.(See No.3)
(4) Remove the coil of EEV by pull out on the top.
(5) Remove welded part of EEV by welding.



12. To remove the water heat exchanger
(1) Remove the service panel.(See No.1)
(2) Remove 3 cover A fixing screws and remove it.(□ mark, Pic.①)
(3) Remove 3 cover B fixing screws and remove it.(△ mark, Pic.①)
(4) Loosen the connection screw of the water piping and remove it.(○ mark, Pic.①)
(5) Remove 2 plate fixing screws and remove it.(○ mark, Pic.②)
(6) Remove welded part of the water heat exchanger by welding.(○ mark, Pic.③)
(7) Remove 4 water heat exchanger fixing screws and remove it.(← mark, Pic.④)

6. INDOOR UNIT DISASSEMBLY PROCEDURE

DISASSEMBLY PROCEDURE

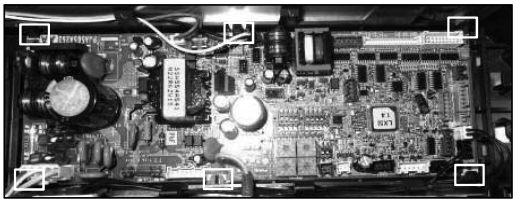
⚠WARNING Precautions for safety

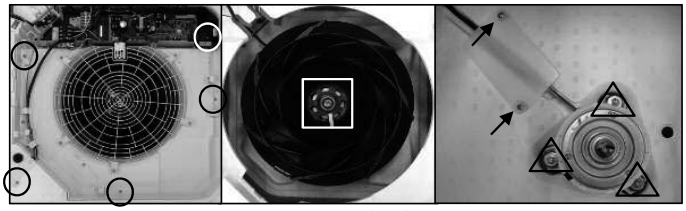
- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (FDT series)

1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

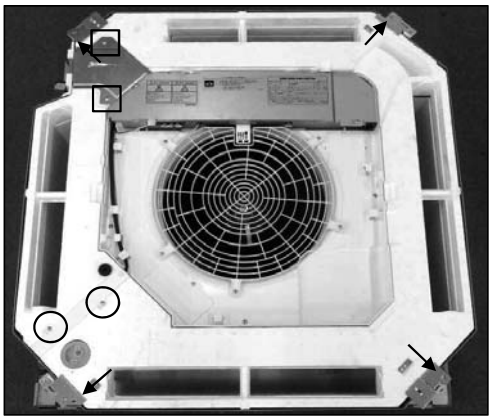
2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Take off 6 fixing hooks and remove it.

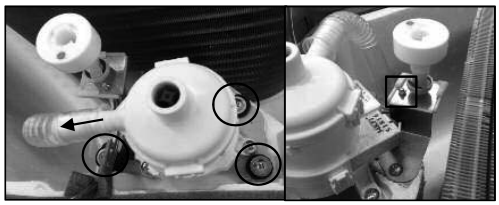




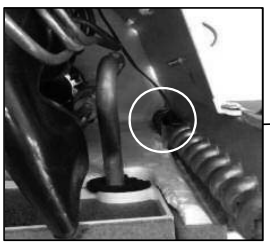
3. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the motor connector(CNMx) on PCB in control box.
(3) Remove 5 bellmouth fixing screws and remove it.(○ mark)
(4) Remove the impeller fixing nut and remove it.(□ mark)
(5) Remove 2 plate fixing screws and remove it.(← mark)
(6) Remove 3 motor fixing nuts and remove it.(△ mark)

4. To remove the drain pan
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Remove 2 plate fixing screws and remove it. (○ mark)
(4) Remove 2 lid fixing screws and remove it. (□ mark)
(5) Remove 4 drain pan fixing screws and remove it. (← mark)



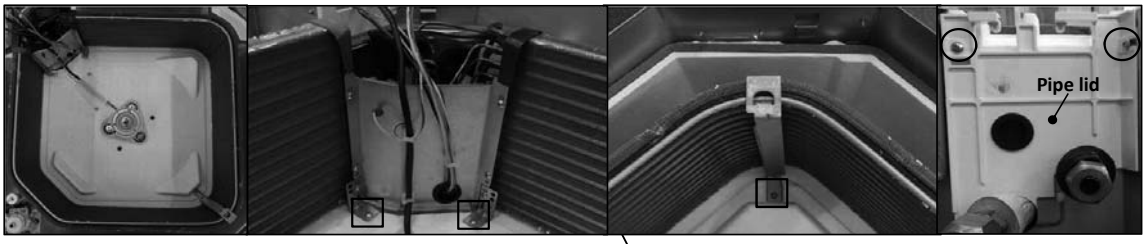


5. To remove drain pump (DM) and flot switch (FS)
(1) Remove the drain pan.(See No.4)
(2) Pull the hose to the arrow direction and remove it.
(3) Remove 3 drain pump fixing screws and remove it.(○ mark)
(4) Remove the flot switch fixing screw and remove it.(□ mark)



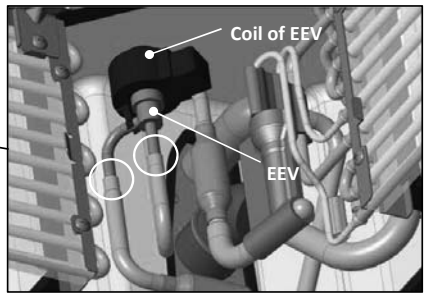
6. To remove the thermistors (example"Thi-R1")
(1) Remove the drain pan.(See No.4)
(2) Pull out the thermistor"Thi-R1" from the sensor holder.

PROCEDURE & PICTURES



7. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.4)
(2) Remove 2 pipe lid fixing screws and remove it.(○ mark)
(3) Remove 3 heat exchanger assembly fixing screws and remove it.(□ mark)

8. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.7)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



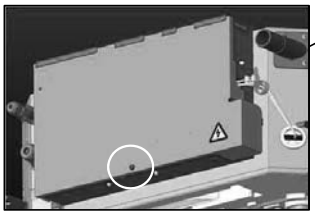
General view

DISASSEMBLY PROCEDURE

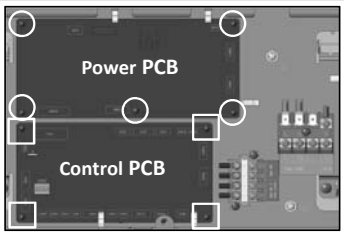
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (FDTC series)

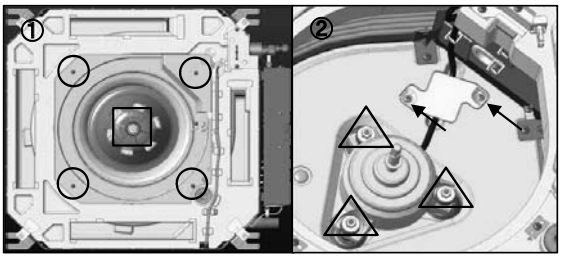


1. To remove the lid of control box
(1) Remove the lid fixing screw and remove it.

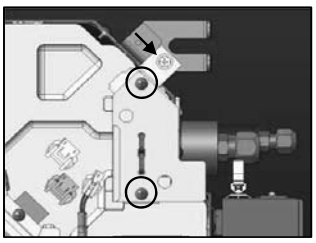


2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
▪ **Power PCB**
(3) Take off 5 power PCB fixing locking supports and remove it.(○ mark)
▪ **Control PCB**
(4) Take off 4 control PCB fixing locking supports and remove it.(□ mark)

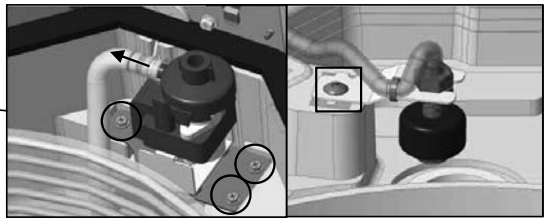
3. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the motor connector(CNMx) in the middle of wiring.
(3) Remove 4 bellmouth fixing screws and remove it.(○ mark)
(4) Remove the impeller fixing nut and remove it.(□ mark)
(5) Remove 2 plate fixing screws and remove it.(← mark)
(6) Remove 3 motor fixing nuts and remove it.(△ mark)

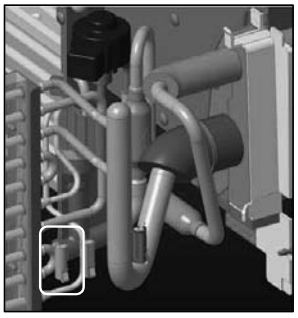


4. To remove the drain pan
(1) Remove 2 plate fixing screws and remove it. (○ mark)
(2) Remove 4 drain pan fixing screws and remove it. (← mark, Four corners)



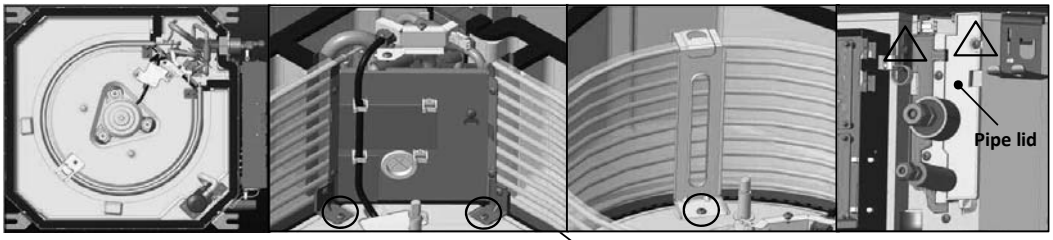
5. To remove drain pump (DM) and flot switch (FS)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the drain pump connector(CNRx) and flot switch connector(CNIx) in the middle of wiring.
(4) Remove the drain pan.(See No.4)
(5) Pull the hose to the arrow direction and remove it.
(6) Remove 3 drain pump fixing screws and remove it.(○ mark)
(7) Remove the flot switch fixing screw and remove it.(□ mark)





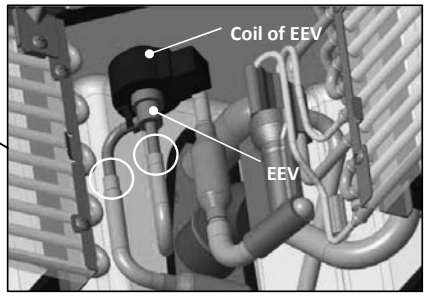
6. To remove the thermistors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNNx) in the middle of wiring.
(3) Remove the drain pan.(See No.3)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.

PROCEDURE & PICTURES



7. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.4)
(2) Remove 2 plate fixing screws and remove it.(△ mark)
(3) Remove 3 heat exchanger assembly fixing screws and remove it.(○ mark)

8. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.7)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



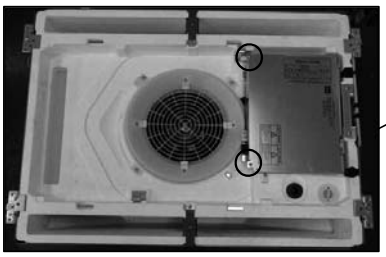
General view

DISASSEMBLY PROCEDURE

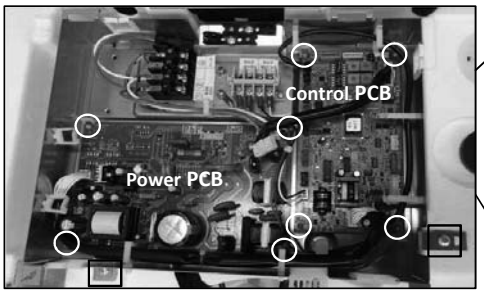
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (FDTW series)

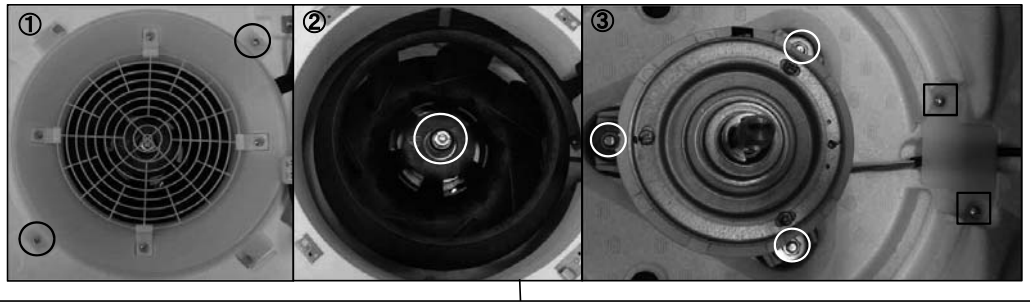


1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

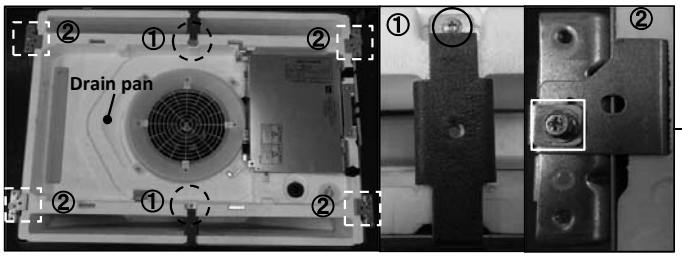


2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
▪ **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(○ mark)
▪ **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(○ mark)

3. To remove the control box
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Remove 2 control box fixing screws(□ mark) and remove it.

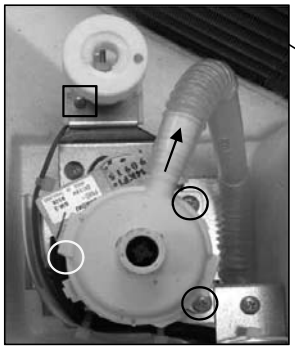


4. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the motor connector(CNMx) on PCB in control box.
(3) Remove 2 fan guard fixing screws and remove it.(Pic.①)
(4) Remove the impeller fixing nut and remove it.(Pic.②)
(5) Remove 2 plate fixing screws and remove it.(Pic.③, □ mark)
(6) Remove 3 motor fixing nuts and remove it.(Pic.③, ○ mark)

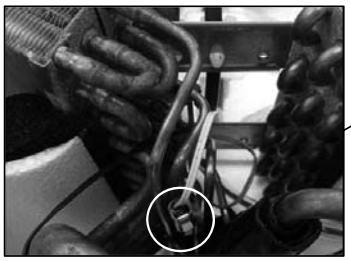


5. To remove the drain pan
(1) Remove the control box.(See No.3)
(2) Remove the plate fixing screw and remove it. (Pic.①, ○ mark)
(3) Remove the bracket fixing screw.(Pic.②,□ mark)
(4) Pull drain pan off.

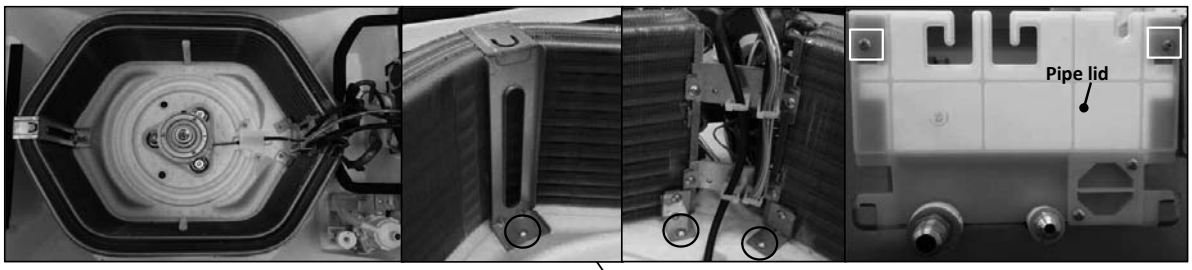
PROCEDURE & PICTURES



6. To remove the drain pump(DM) and flot switch(FS)
(1) Remove the drain pan.(See No.5)
(2) Pull a hose to the arrow direction and remove it.
(3) Remove 3 drain pump fixing screws and remove it.(○ mark)
(4) Remove the flot switch fixing screw and remove it.(□ mark)

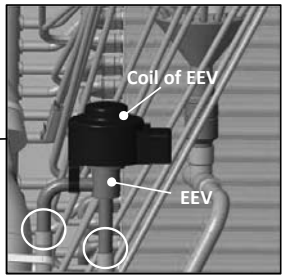


7. To remove the thermistors (example"Thi-R1")
(1) Remove the drain pan.(See No.5)
(2) Pull out the thermistor"Thi-R1" from the sensor holder.



8. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.5)
(2) Remove 2 pipe lid fixing screws and remove it.(□ mark)
(3) Remove 3 heat exchanger assembly fixing screws and remove it.(○ mark)

9. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.8)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



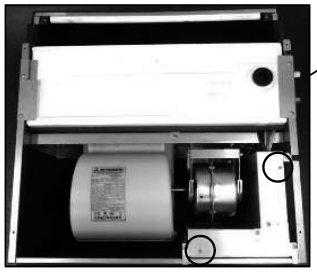
General view

DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

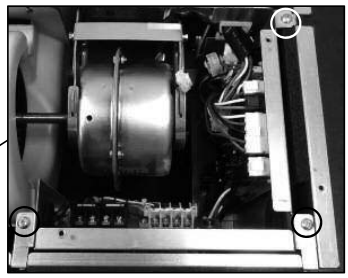
- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

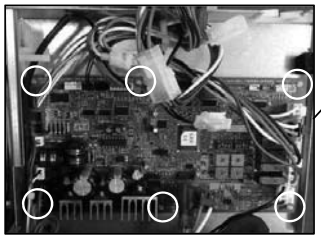
PROCEDURE & PICTURES (FDTQ series)



1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

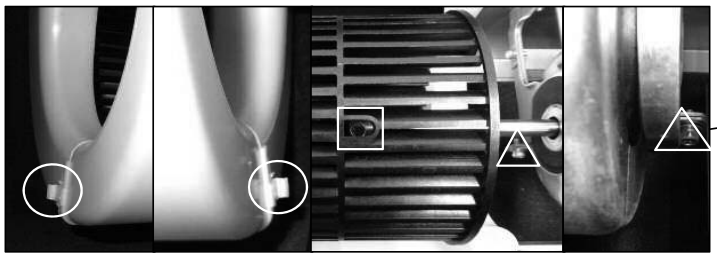
2. To remove the control box
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Remove 3 control box fixing screws and remve it.
(4) Pull out the contorl box.



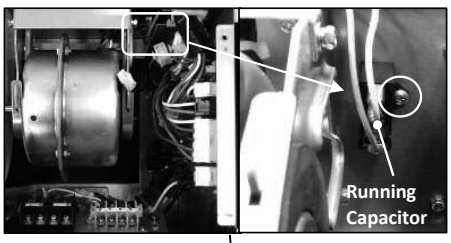


3. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Remove control box.(See No.2)
(3) Take off 6 PCB fixing locking supports and remove it.

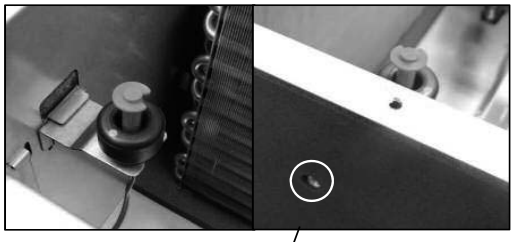
4. To remove the drain pan.
(1) Remove 2 plate fixing screws and remove it.(right anf left)
(2) Pull out the control box.



5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the flot switch connector(CNFx) in the middle of wiring.
(3) Take off 2 impeller casing hooks and remove it.(○ mark)
(4) Remove the impeller fixing bolt and remove it.(□ mark)
(5) Remove 2 motor fixing screws and remove it.(△ mark)

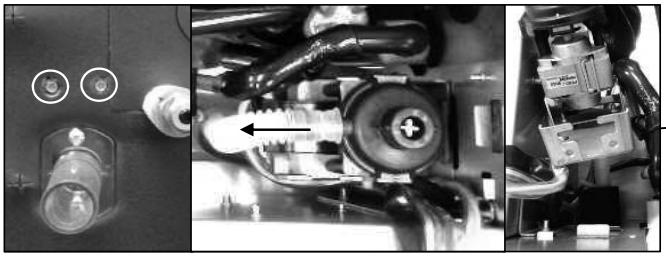


6. To remove the running capacitor of fan motor
(1) Remove the running capacitor fixing screw and remove it.

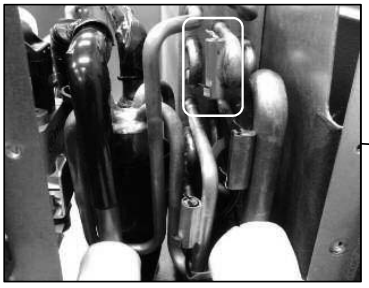


7. To remove the flot switch (FS)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the flot switch connector(CNIx) in the middle of wiring.
(3) Remove the drain pan.(See No.4)
(4) Remove the flot switch fixing screw and remove it.

PROCEDURE & PICTURES



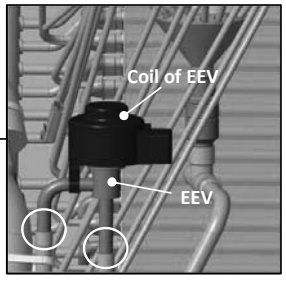
8. To remove drain pump (DM)
(1) Remove the lid of control box.(See No.1)
(2) Remove the drain pan.(See No.4)
(3) Disconnect the drain pump connector(CNRx) in the middle of wiring.
(4) Pull a hose to the arrow direction and remove it.
(5) Remove 2 drain pump assembly fixing screws and remove it.

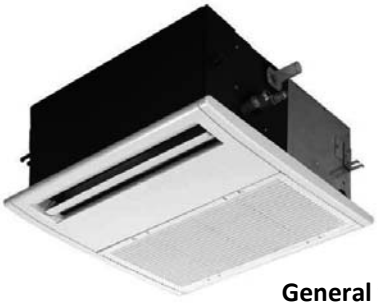


9. To remove the thermistors(example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
(3) Remove the drain pan.(See No.4)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.

10. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.3)
(2) Remove 3 pipe lid fixing screws and remove it.(○ mark)
(3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

11. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.10)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)





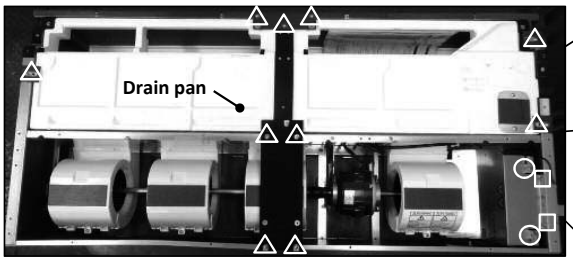
General view

DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

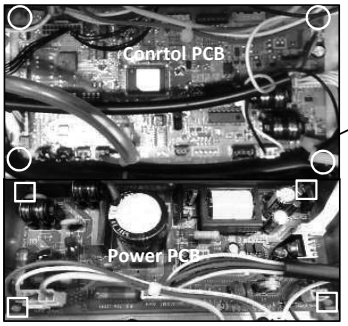
PROCEDURE & PICTURES (FDTS series)



1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.(○ mark)

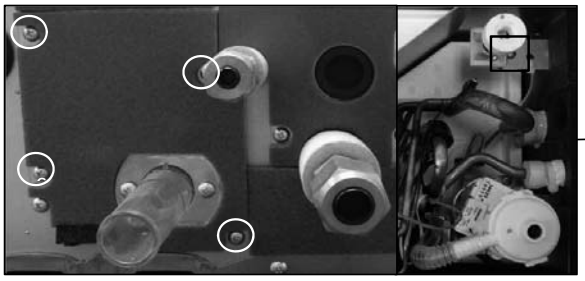
2. To remove the control box
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Remove 2 control box fixing screws and remove it.(□ mark)

3. To remove the drain pan
(1) Remove 10 drain pan fixing screws and remove it. (△ mark)



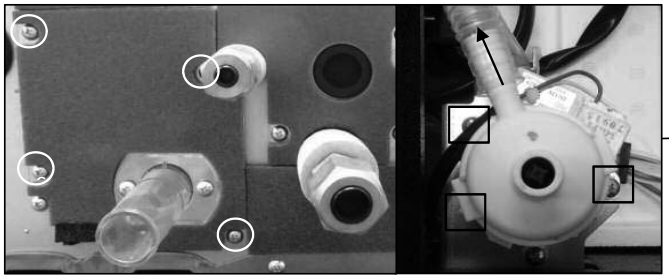
4. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(○ mark)
- **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(□ mark)

5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the motor connector(CNMx) on PCB in control box.
(3) Remove 2 motor fixings screw and remove it.(○ mark)
(4) Remove the fan casing fixing screw and remove it.(□ mark)
(5) Remove the impeller fixing bolt and remove it.(△ mark)

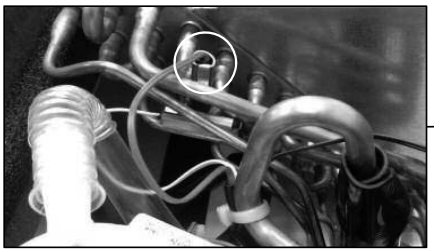


6. To remove the flot switch (FS)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the flot switch connector(CNI) on PCB in control box.
(3) Remove 4 drain pump assembly fixing screws and remove it.(○ mark)
(4) Remove the flot switch fixing screw and remove it.(□ mark)

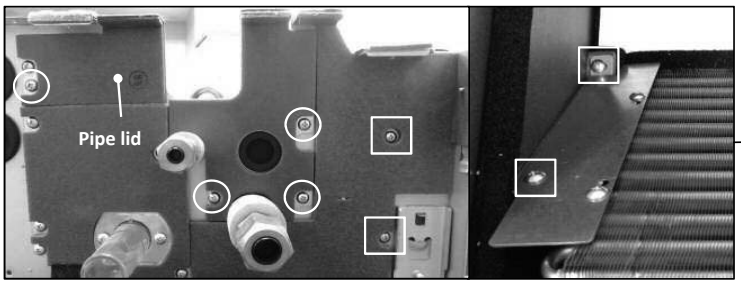
PROCEDURE & PICTURES



7. To remove drain pump (DM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the drain pump connector(CNR) on PCB in control box.
(3) Remove 4 drain pump assembly fixing screws and remove it.(○ mark)
(4) Pull a hose to the arrow direction and remove it.
(5) Remove 3 drain pump fixing screws and remove it.(□ mark)

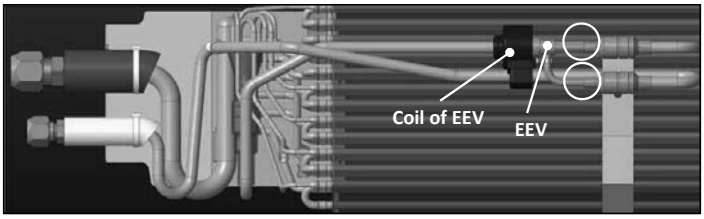


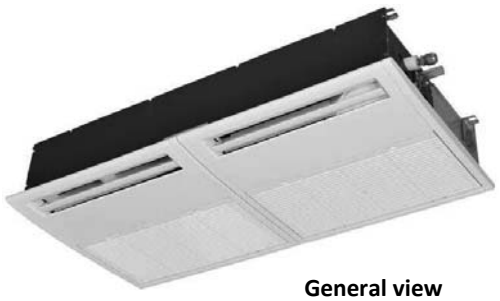
8. To remove the thermistors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
(3) Remove the drain pan.(See No.3)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.



9. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.3)
(2) Remove 4 pipe lid fixing screws and remove it.(○ mark)
(3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

10. To remove the electronic expansion Valve (EEV)
(1) Remove the heat exchanger assembly. (See No.7)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding. (○ mark)





General view

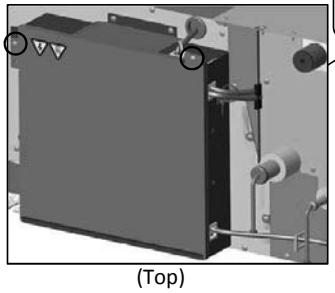
DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

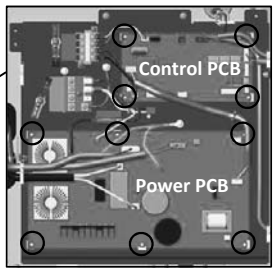
PROCEDURE & PICTURES (FDU･FDUM series)

(Bottom)

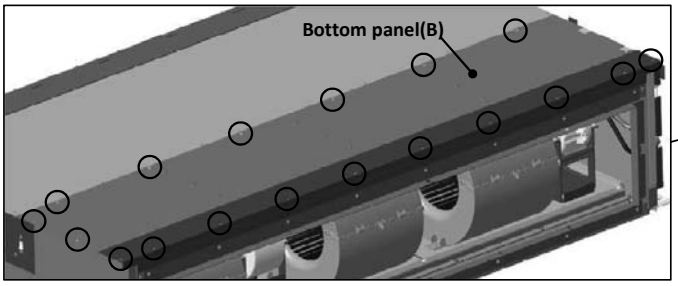


(Top)

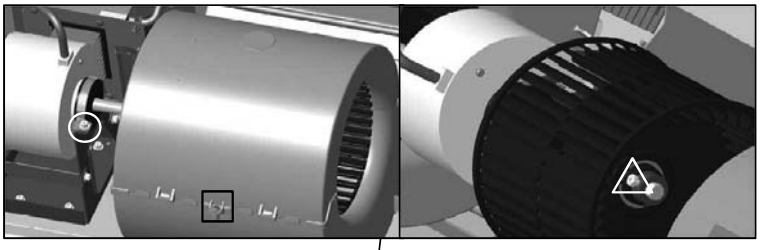
1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.



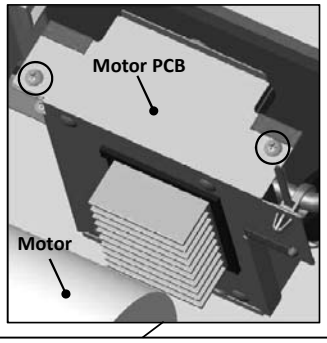
2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports(○ mark) and remove it.
- **Power PCB**
(4) Take off 6 power PCB fixing locking supports(○ mark) and remove it.



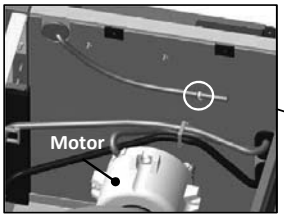
3. To remove the bottom panel(B)
(1) Remove 18 panel fixing screws and remove it.



4. To remove the impellers and motors(FM)
(1) Remove the lid of control box.(See No.1)
(2) Remove the bottom panel(B).(See No.3)
(3) Disconnect the motor connector(CNFMx or CNMx) on PCB in control box.
(4) Remove the motor fixing screw and remove it. (○ mark/right and left side)
(5) Remove the fan casing fixing screw and remove it.(□ mark)
(6) Remove the sirocco fan fixing bolt and remove it.(△ mark)

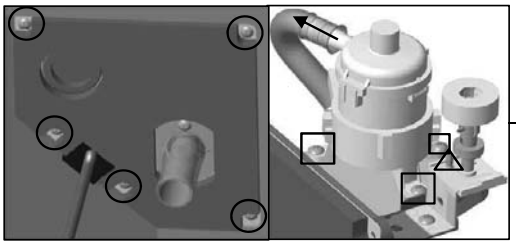


5. To remove the motor PCB
(1) Remove the lid of control box. (See No.1)
(2) Remove the bottom panel(B). (See No.3)
(3) Disconnect the motor PCB connector (CNFMx or CNMx)on PCB in control box.
(4) Remove 2 motor PCB fixing screws and remove it.

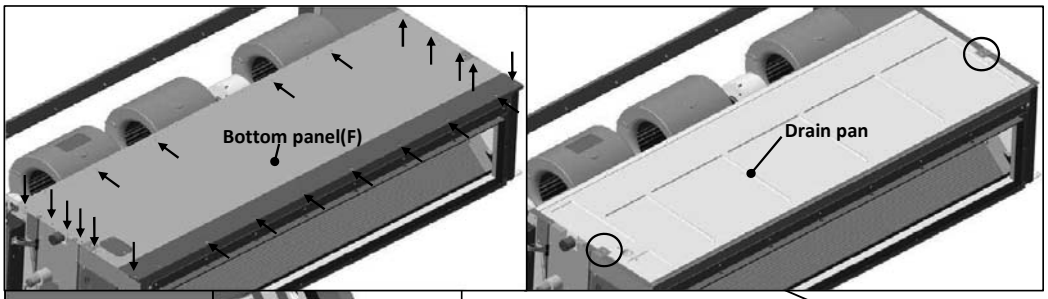


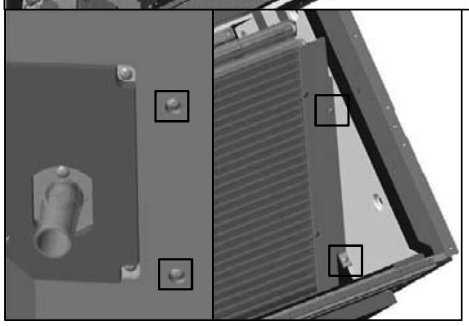
6. To remove the thermistors (example"Thi-A")
(1) Remove the lid of control box.(See No.1)
(2) Remove the bottom panel(B).(See No.3)
(3) Disconnect the Thi-A connector(CNH) on PCB in control box.
(4) Pull the thermistor fixing clip and remove it.(○ mark)

PROCEDURE & PICTURES

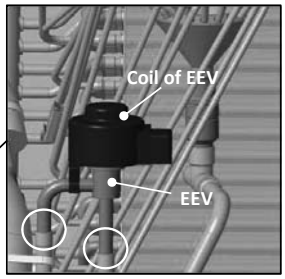


7. To remove the drain pump(DM) and flot switch(FS)
(1) Remove the lid of control box.(See No.1)
(2) Remove 5 drain pump assembly fixing screws and remove it. (○ mark)
(3) Disconnect the drain pump connector(CNR) on PCB in control box.
(4) Pull a hose to the arrow direction and remove it.
(5) Remove 3 drain pump fixing screws and remove it.(□ mark)
(6) Disconnect the flot switch connector(CNI) on PCB in control box.
(7) Remove the flot switch fixing screw and remove it.(△ mark)

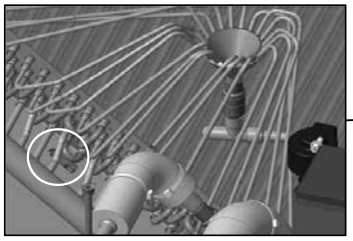




8. To remove the heat exchanger assembly
(1) Remove the bottom panel(B).(See No.3)
(2) Remove 22 bottom panel(F) fixing screws and remove it.(← mark)
(3) Remove 2 drain pan fixing screws and remove it.(○ mark)
(4) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)



9. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.8)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



10. To remove the thermistors (example"Thi-R3")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Thi-R3 connector(CNN) on PWB in control box.
(3) Remove the drain pan.(See No.8)
(4) Pull out the thermistor"Thi-R3" from the sensor holder.

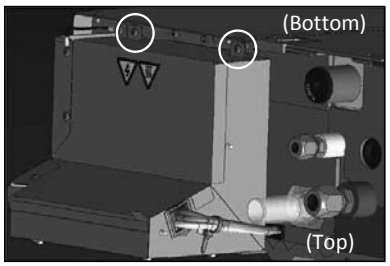
General view

DISASSEMBLY PROCEDURE

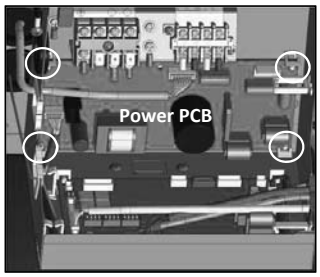
⚠WARNING Precautions for safety

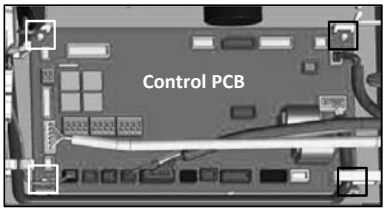
- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (FDUT series)



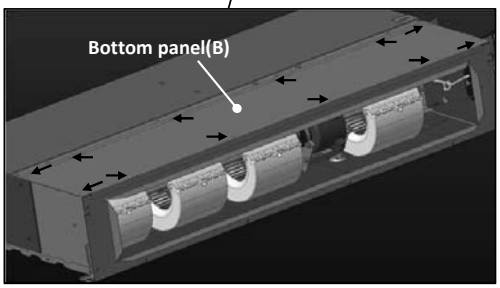
1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

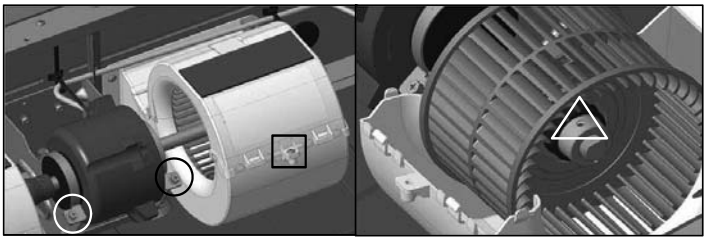




2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it. (☐ mark)
- **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it. (○ mark)

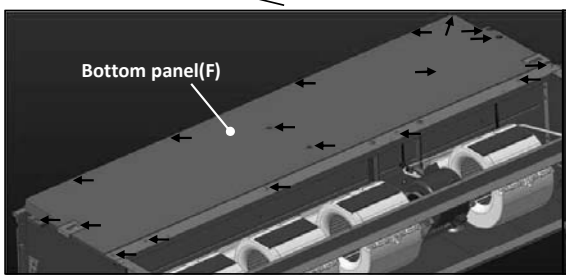
3. To remove the bottom panel(B)
(1) Remove 12 panel fixing screws and remove it.

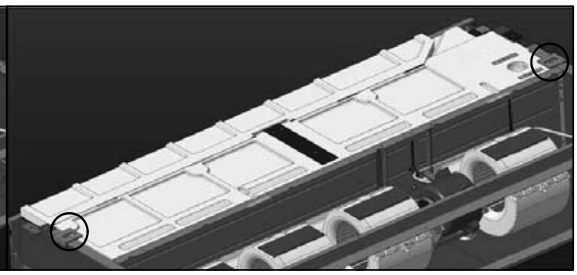




4. To remove the impellers and motors(FM)
(1) Remove the lid of control box.(See No.1)
(2) Remove the bottom panel(B).(See No.3)
(3) Disconnect the motor connector(CNM1) on PCB in control box.
(4) Remove 2 motor fixing screws and remove it.(○ mark)
(5) Remove the fan casing fixing screw and remove it.(☐ mark)
(6) Remove the sirocco fan fixing bolt and remove it.(△ mark)

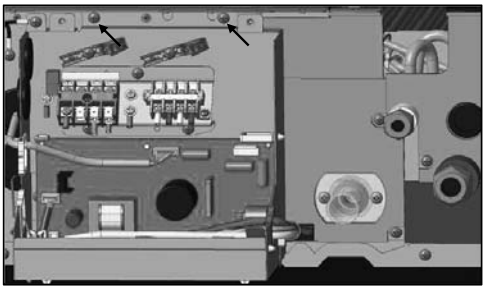
5. To remove the drain pan
(1) Remove the bottom panel(B).(See No.3)
(2) Remove 18 bottm panel(F) fixing screws and remove it.(← mark)
(3) Remove 2 drain pan fixing screws and remove it.(○ mark)

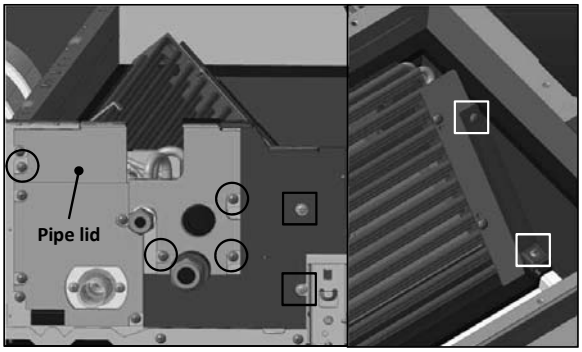




PROCEDURE & PICTURES

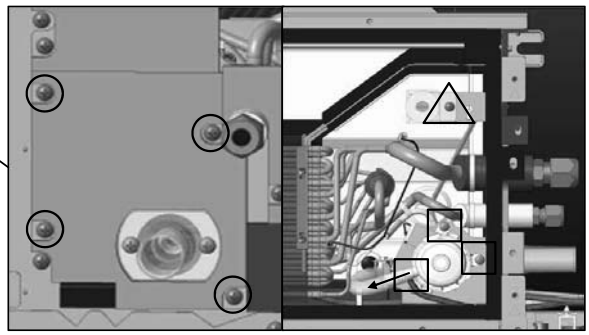
6. To remove the control box
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Remove 2 cotrol box fixing screws and remove it.



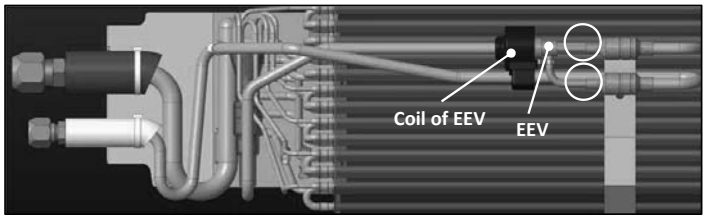


7. To remove the heat exchanger assembly
(1) Remove the bottom panel(B).(See No.3)
(2) Remove the drain pan.(See No.5)
(3) Remove the control box.(See No.6)
(4) Remove 4 pipe lid fixing screws and remove it.(○ mark)
(5) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

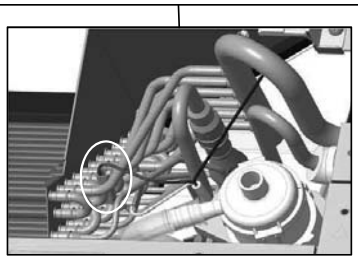
8. To remove the drain pump(DM) and flot switch(FS)
(1) Remove the control box.(See No.6)
(2) Disconnect the drain pump connector(CNR) on PCB in control box.
(3) Disconnect the flot switch connector(CNI) on PCB in control box.
(4) Remove 4 drain pump assembly fixing screws and remove it.(○ mark)
(5) Pull a hose to the arrow direction and remove it.
(6) Remove 3 drain pump fixing screws and remove it.(□ mark)
(7) Remove the flot switch fixing screw and remove it.(△ mark)

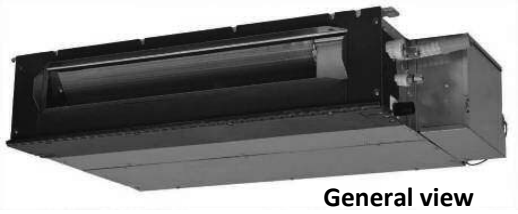


9. To remove the electronic expansion Valve (EEV)
(1) Remove the heat exchanger assembly. (See No.7)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding. (○ mark)



10. To remove the thermistors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Thi-R1 connector(CNN) on PWB in control box.
(3) Remove the drain pan.(See No.5)
(4) Pull out the thermistor"Thi-R3" from the sensor holder.





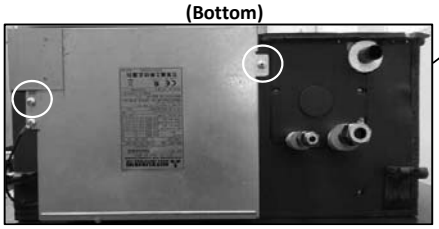
General view

DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

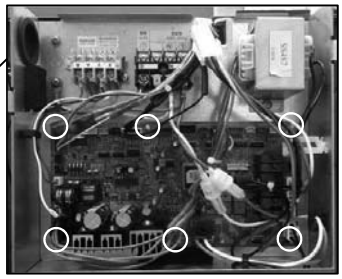
- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

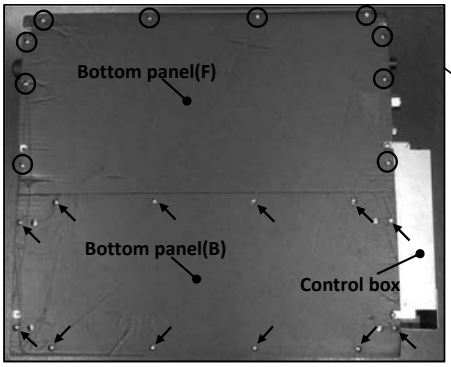
PROCEDURE & PICTURES (FDUH series)



1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

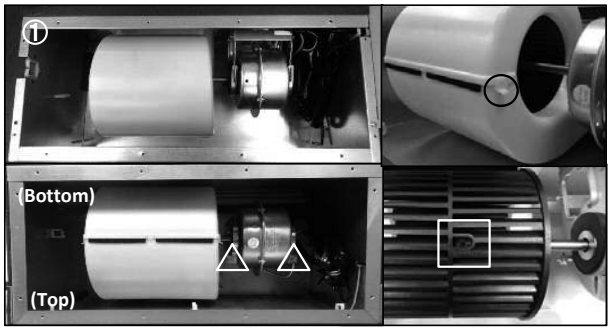
2. To remove the printed circuit board
(1) Remove the lid of control box. (See No.1)
(2) Pull off all the inserted connectors.
(3) Take off 6 control PCB fixing locking supports and remove it.



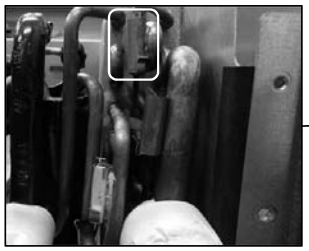


3. To remove the bottom panel(B) and bottom panel(F)
(1) Remove 12 bottom panel panel(B) fixing screws and remove it.(→ mark)
(2) Remove 10 bottom panel panel(F) fixing screws and remove it.(○ mark)

4. To remove the drain pan.
(1) Remove the bottom panel(B) and bottom panel(F).(See.No.3)
(2) Pull out the contorl box.

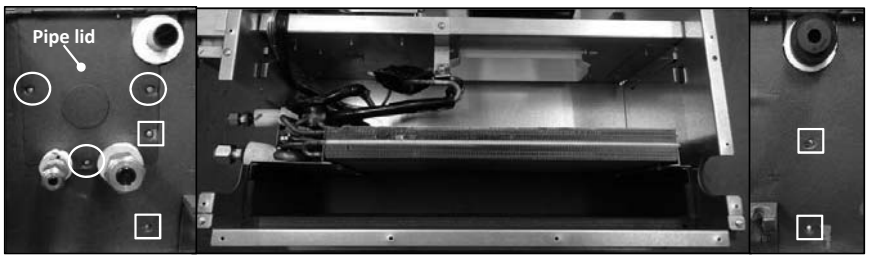


5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Remove the bottom panel(B).(See No.2)<Pic.①>
(3) Disconnect the motor connector(CNFx) in the middle of wiring.
(4) Take off the right and left hooks of the fan casing and remove it.(○ mark)
(5) Remove the impeller fixing bolt and remove it.(□ mark)
(6) Remove 2 motor fixing screws and remove it.(△ mark)



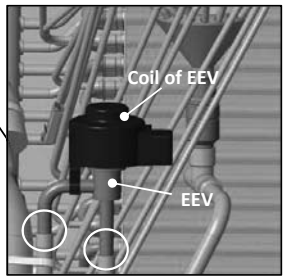
6. To remove the thermistors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
(3) Remove the drain pan.(See No.4)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.

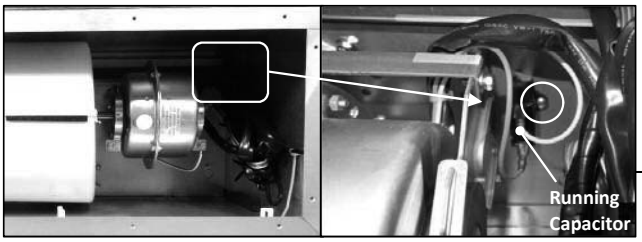
PROCEDURE & PICTURES



7. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.3)
(2) Remove 3 pipe lid fixing screws and remove it.(○ mark)
(3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

8. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.9)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)





8. To remove the running capacitor of fan motor
(1) Remove the running capacitor fixing screw and remove it.

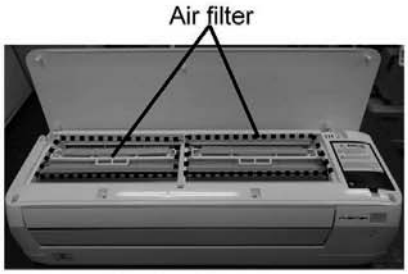
Genaral view

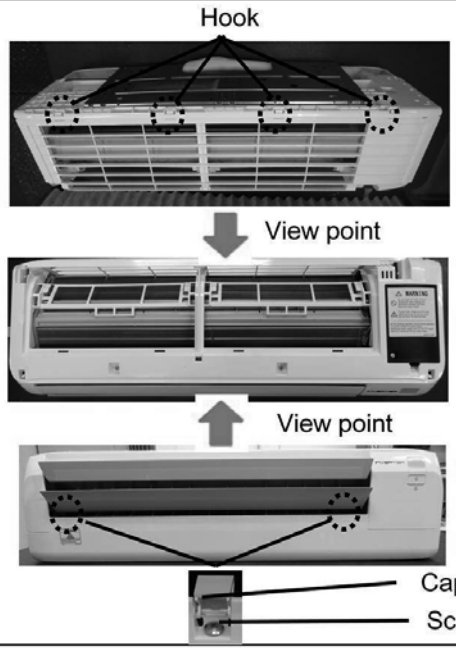
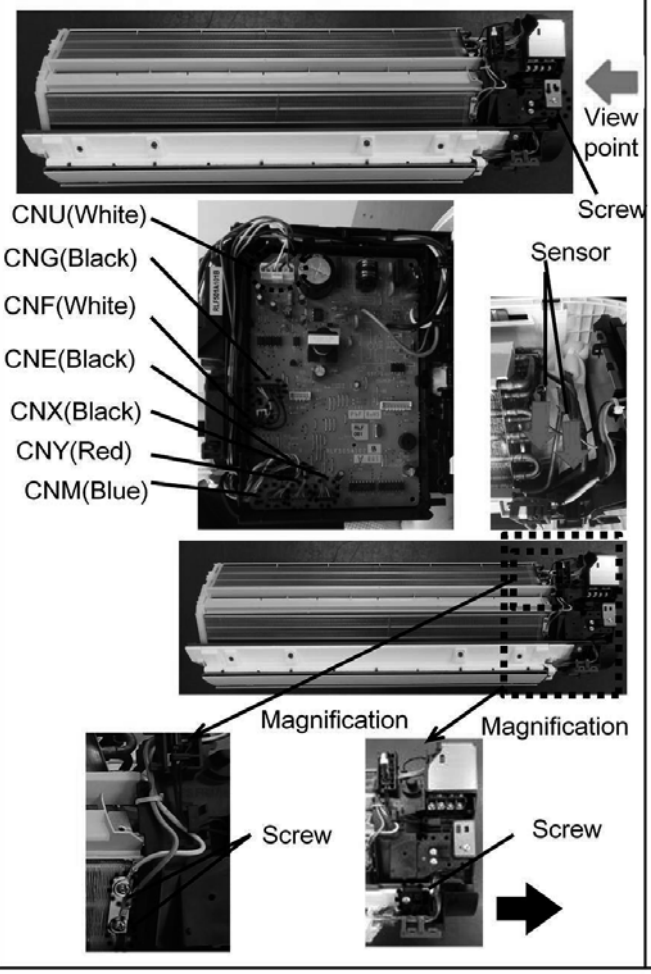
DISASSEMBLY PROCEDURE

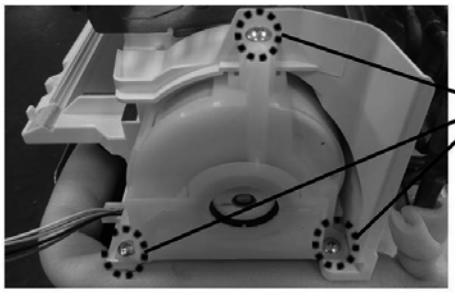
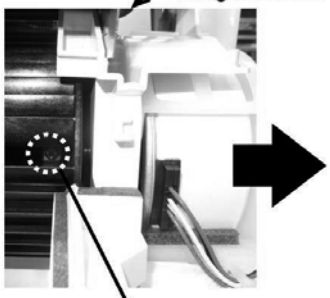
⚠WARNING **Precautions for safety**

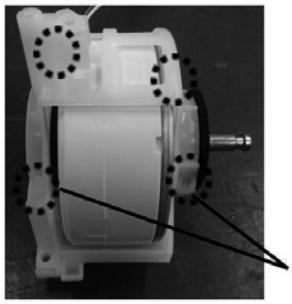
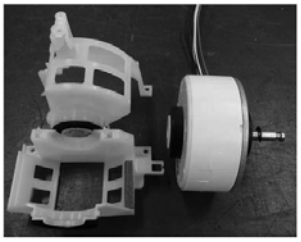
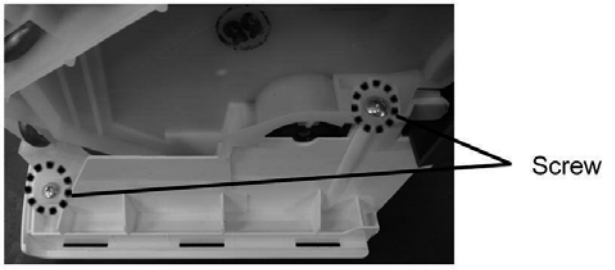
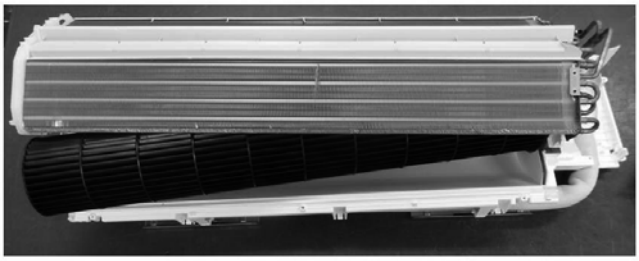
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (SRK-ZS,FDK series)

Item		Illustration	Operating procedure
①	Removing the front panel		[Removing the air inlet panel] 1.Hold lower edge of the air inlet panel, and then open it to about 80°.
②		 	[Removing the filter] 1.Remove the air filter ×2. 2.Remove the air-cleaning filter ×2 3.Holding both sides of the air inlet panel, pull the left and right sides forward at the same time to remove the panel.

Item		Illustration	Operating procedure
③	Removing the front panel		1.Open the caps, and then remove the screw ×2 (circled in the illustration below) 2. Draw the front panel above after removing 4 hooks Caution ・ Be sure to use a fine-tipped tool (such as a precision screwdriver) to open the cap. ・ Be careful not to damage the panel surface when opening the caps.
④	Removing the electrical controller and peripheral parts		[Removing the Controller] 1.Remove screw x1 so as to remove a metal lid. 2.Remove a metal lid then unplug the following connector x7 CNU(White) CNG(Black) CNF(White) CNE(Black) CNX(Black) CNY(Red) CNW(Blue) 3. Pull the each sensor out from the case into the indicated directions in red arrows. 4. Remove screw x3 then draw the controller toward right direction.

Item		Illustration	Operating procedure
⑤	Removing drain pan & outlet grill assembly	 Drain pan and outlet grill assembly  Bottom of unit Drain hose	[Removing the drain pan] 1.Draw the left of the drain pan and outlet grill assembly toward lower side so as to come off it from heat exchanger assembly. 2. Draw the drain pan and outlet grill assembly toward the right with drawing the drain hose.
⑥	Removing fan & motor	 Screw  Magnification  Screw	[Removing fan & motor] 1.Remove screw x3 2. Look into the area surrounded the black rectangle, adjust the screw position with rotating the cross flow fan, then remove a screw. 3.Draw the motor and its bracket toward the right.

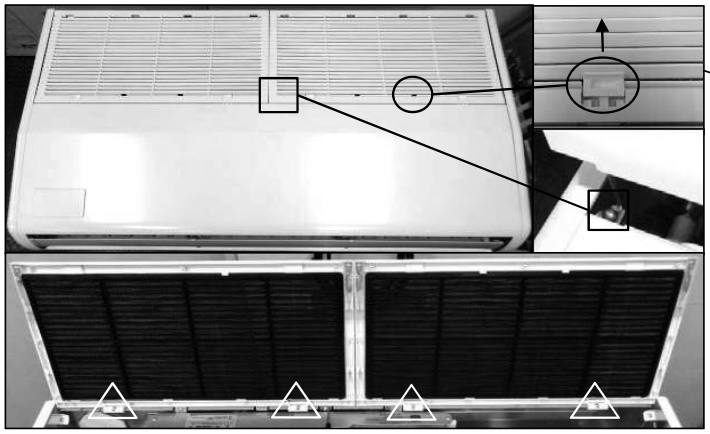
Item		Illustration	Operating procedure
⑦	Disassemble the motor	 	[Removing the motor case] 1.Release the hook ×4 (circled in the illustration), and then remove the motor case (U).
⑧	Removing the fan and heat exchanger	 	1.Remove the screw ×2 (circled in the illustration) on the left side of the heat exchanger. 2.While lifting up and supporting the left side of the heat exchanger, pull out the fan to the left, keeping it angled down.

DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

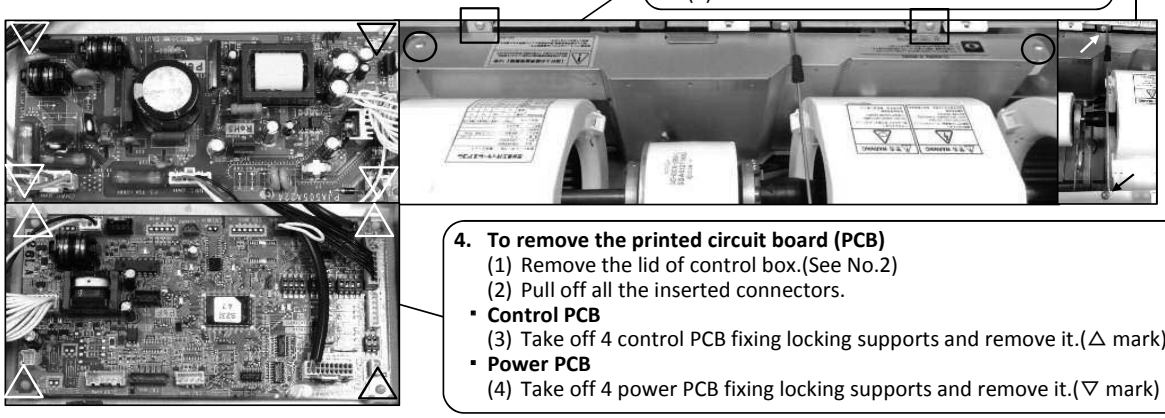
PROCEDURE & PICTURES (FDE series)



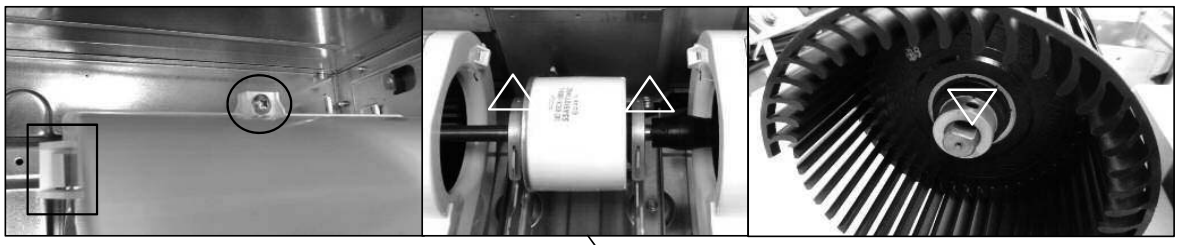
1. To remove air inlet grille.
(1) Slide the hook in the direction of the arrow.(○ mark)
(2) Remove 4 wire fixing screws.(□ mark)
(3) Remove 4 air inlet grille fixing screws. (△ mark)

2. To remove the lid of control box
(1) To remove air inlet grille.(See.No.1)
(2) Remove 2 wire fixing screws and remove it. (← mark)
(3) Remove 2 lid fixing screws and remove it. (○ mark)

3. To remove the control box
(1) Remove the lid of control box.(See No.2)
(2) Pull off all the inserted connectors.
(3) Remove 2 control box fixing screws and remve it.(□ mark)
(4) Pull out the control box.

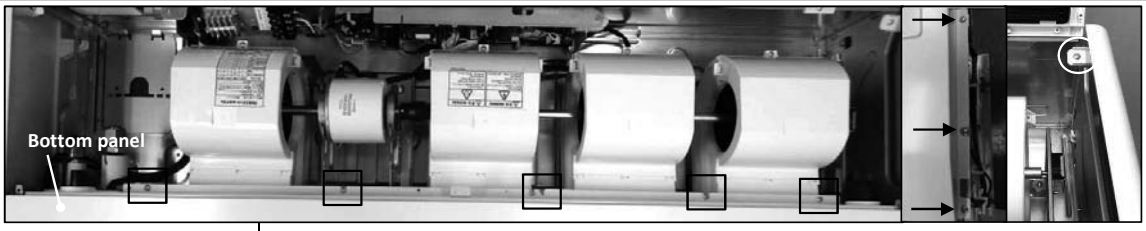


4. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.2)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(△ mark)
- **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(▽ mark)

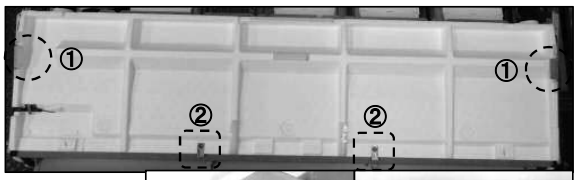


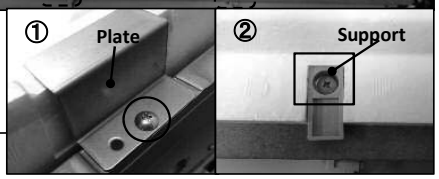
5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the motor connector(CNFx) in the middle way of wiring.
(3) Remove the fan casing fixing screw.(○ mark) Take off the fan casing fixing hook and remove it.(□ mark)
(4) Remove the impeller fixing screw and remove it.(▽ mark) (5) Remove 2 motor fixing screws and remove it.(△ mark)

PROCEDURE & PICTURES

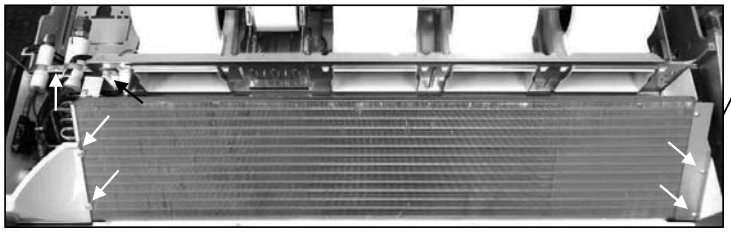


6. To remove side panel and bottom panel
(1) Remove air inlet grille.(See No.1)
(2) Remove the right and left side panel fixing screws and remove it.(○ mark)
(3) Remove 5 bottom panel fixing screws.(□ mark) Remove 6 bottom panel fixing screws and remove it. (← mark, left and right side)

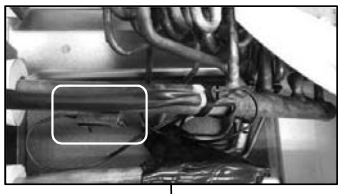


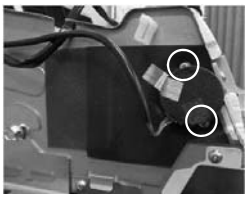


7. To remove drain pan
(1) Remove side panel and bottom panel.(See No.5)
(2) Remove 2 plate fixing screws and remove it.(○ mark, Pic.①)
(3) Remove 2 support fixing screws and remove it.(□ mark, Pic.②)
(4) Pull out the drain pan.



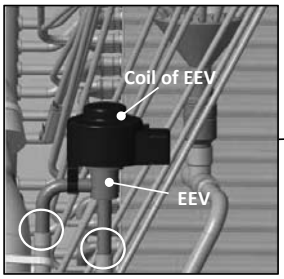
8. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.6)
(2) Remove 6 heat exchanger assy fixing screws and remove it.(← mark)





9. To remove the louver motor (LM)
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the louver motor connector (CNJ) on PCB in control box.
(3) Remove side panel.(See No.5)
(4) Remove 2 louver motor fixing screws and remove it.

10. To remove the thermistors (example"Thi-R3")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R3 connector(CNNx) on PCB in control box.
(3) Remove the drain pan.(See No.3)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.



11. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.9)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)

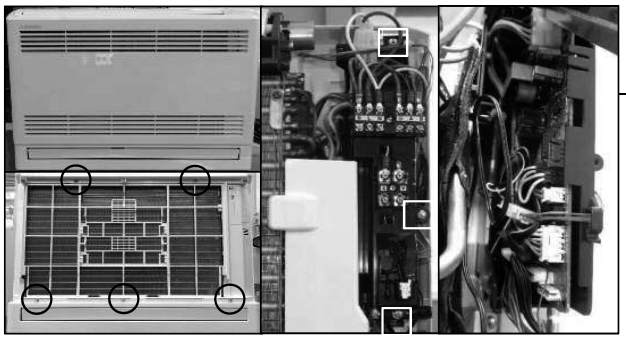
General view

DISASSEMBLY PROCEDURE

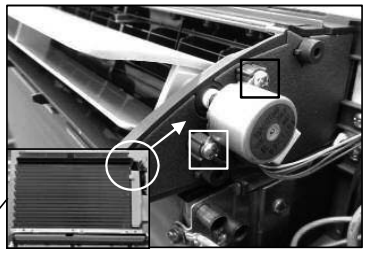
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

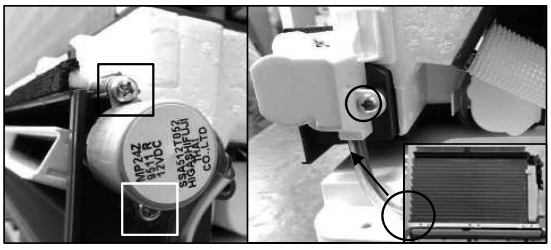
PROCEDURE & PICTURES (FDFW series)



1. To remove the control box
(1) Remove hooks of the front panel and remove it.
(2) Remove 5 filter assembly fixing screws and remove it.(○ mark)
(3) Remove 3 control box and lid fixing screws, and remove it.(□ mark)
(4) Pull the control box forward.

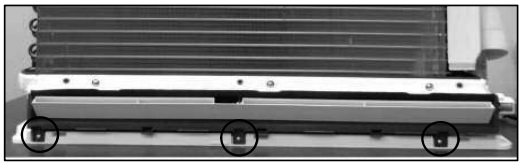


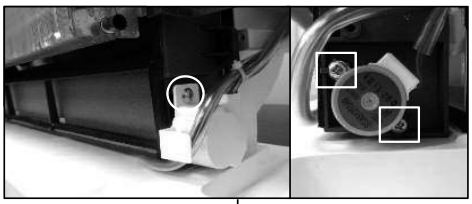
2. To remove the lower flap motor (LFM)
(1) Remove the control box.(See No.1)
(2) Disconnect the lower flap motor connector(CNJ3) in the way of wiring.
(3) Remove the cover fixing screw and remove it.(○ mark)
(4) Remove 2 lower flap motor screws and remove it. (□ mark)



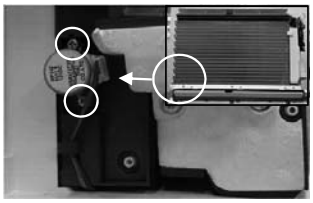
3. To remove the upper flap motor (UFM)
(1) Remove the control box.(See No.1)
(2) Disconnect the upper flap motor connector(CNJ4) in the way of wiring.
(3) Remove 2 upper flap motor fixing screws and remove it.(□ mark)

4. To remove drain pan
(1) Remove the lower flap motor.(See No.3)
(2) Remove 3 drain pan fixing screws and remove it.(○ mark)



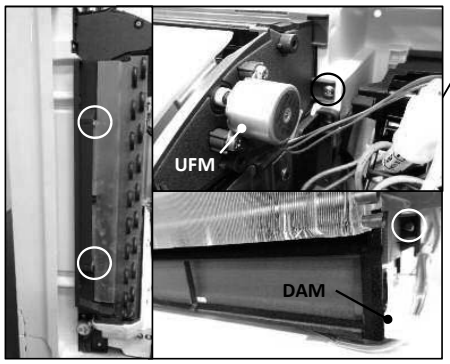


5. To remove the damper arm motor (DAM)
(1) Remove the control box.(See No.1)
(2) Disconnect the damper arm motor connector(CNJ2) in the way of wiring.
(3) Remove the cover fixing screw and remove it. (○ mark)
(4) Remove 2 damper arm motor fixing screws and remove it.(□ mark)

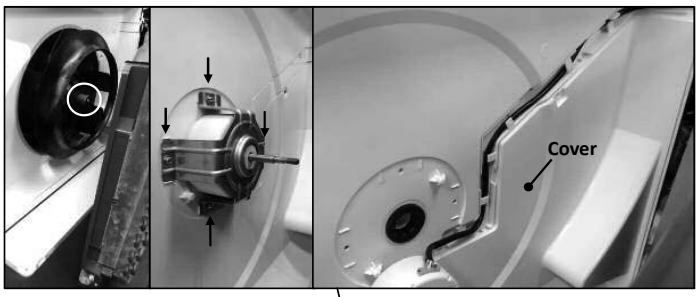


6. To remove the damper motor (DM)
(1) Remove the control box.(See No.1)
(2) Disconnect the damper motor connector(CNJ1) in the way of wiring.
(3) Remove 2 damper arm motor fixing screws and remove it.(○ mark)

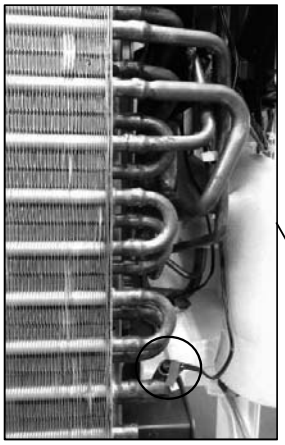
PROCEDURE & PICTURES



7. To remove the heat exchanger assembly
(1) Remove the drain pan.(See No.4)
(2) Remove 4 heat exchanger assy fixing screws and remove it.(○ mark)

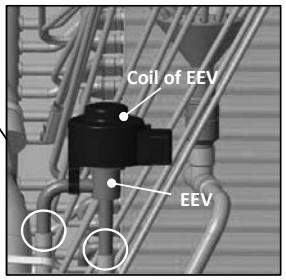


8. To remove the impeller and motor (FM)
(1) Remove control box.(See No.1)
(2) Disconnect the motor connector(CNM) on PCB in control box.
(3) Remove the heat exchanger assembly.(See No.7)
(4) Remove the impeller fixing nut and remove it.(○ mark)
(5) Remove 4 motor fixing bolts and remove it.(← mark)
(6) Take off the hooks of cover and remove it.



9. To remove the thermistors (example"Thi-R1")
(1) Remove control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNN) on PCB in control box.
(3) Pull out the thermistor"Thi-R1" from the sensor holder.

10. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.7)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



General view

DISASSEMBLY PROCEDURE

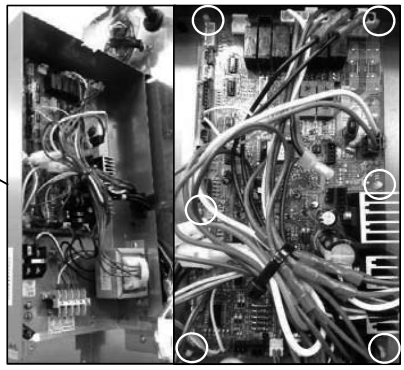
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

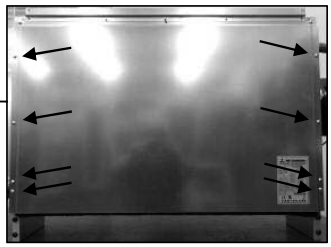
PROCEDURE & PICTURES (FDFU・FDFL series)

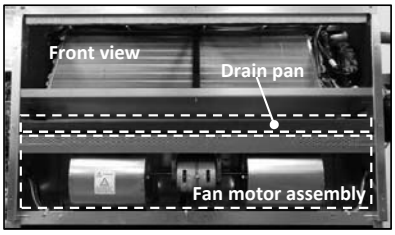
1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Take off 6 power PCB fixing locking supports and remove it.

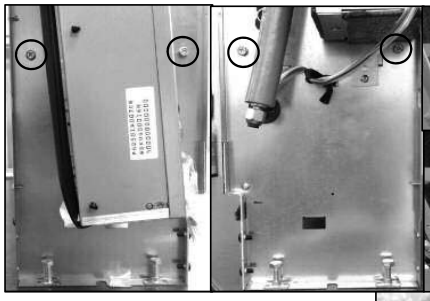


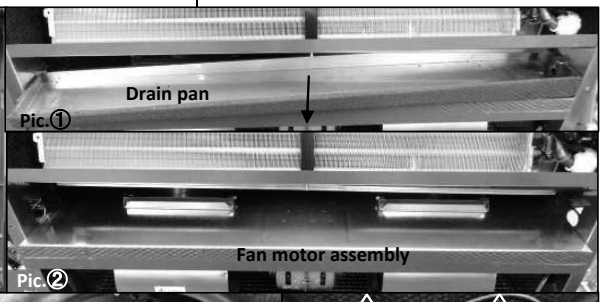
3. To remove the front panel (FDFU)
(1) Remove 8 front panel fixing screws and remove it.

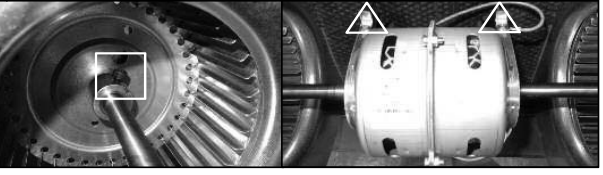


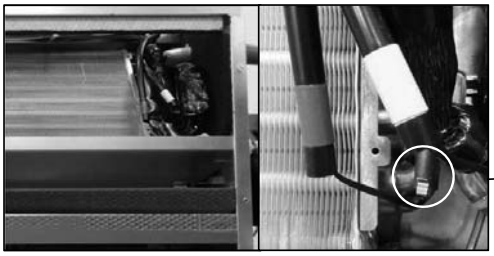


4. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1), remove the front panel.(See No.3)
(2) Disconnect the motor connector(CNF1) in the way of wiring.
(3) Pull drain pan in the direction of the arrow and remove.(Pic.①)
(4) Remove 4 fan base fixing screws and remove fan motor assembly.(○ mark)
(5) Remove the impeller fixing bolt and remove it.(□ mark)
(6) Remove 2 motor fixing screws and remove it.(△ mark)



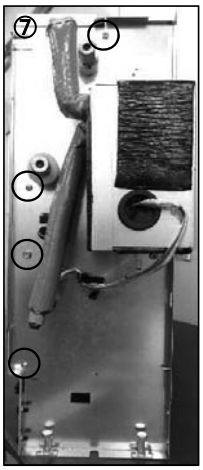


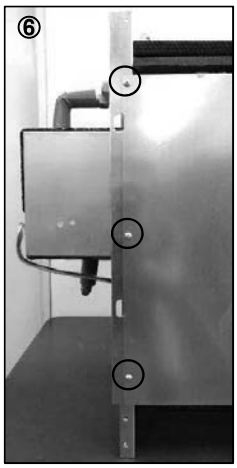


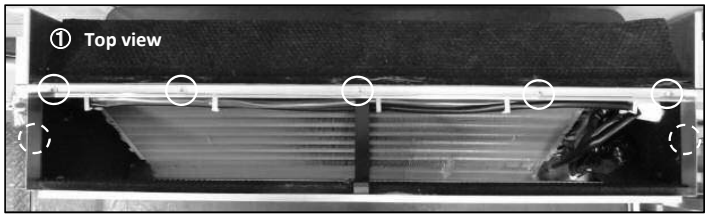


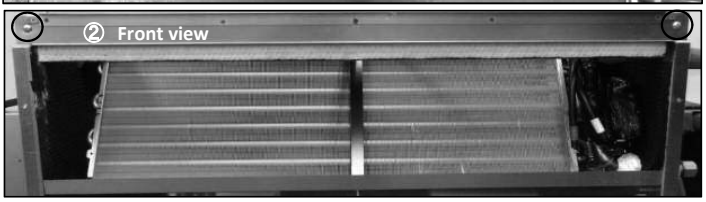
5. To remove the thermistors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1)
(2) Disconnect the Tho-R1 connector(CNNx) in the way of wiring.
(3) Remove the front panel.(See No.3)
(4) Pull out the thermistor"Thi-R1" from the sensor holder.

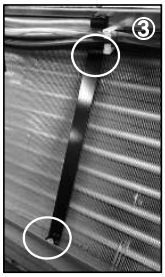
PROCEDURE & PICTURES

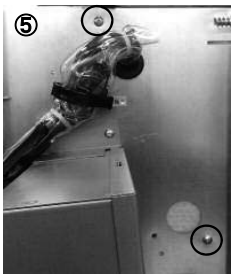


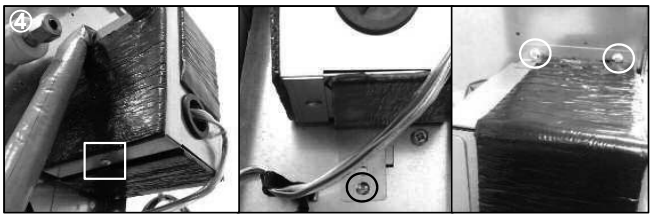






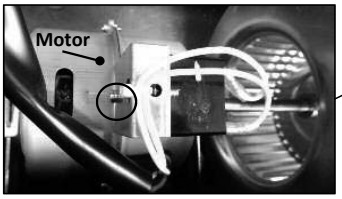






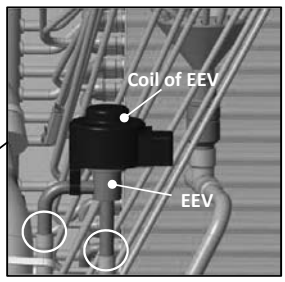
6. To remove the heat exchanger assembly

(1) Remove 9 top panel fixing screws and remove it .(Pic.① ②)
(2) Remove 2 support fixing screws and remove it .(Pic.③)
(3) Remove the lid of EEV box fixing screw and remove it.(☐ mark, Pic.④)
Remove 3 EEV box fixing screws and remove it.(○ mark, Pic.④)
(4) Remove 2 screws on the left side panel.(Pic.⑤)
(5) Remove 3 screws on the back side panel.(Pic.⑥)
(6) Remove 4 screws on the right side panel and pull the heat exchanger assembly to the right. (Pic.⑦)



7. To remove the running capacitor of fan motor

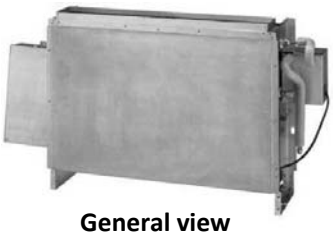
(1) Remove the fan motor assembly.
(See No.4)
(2) Remove faston terminal.
(3) Remove the running capacitor
fixing screw and remove it.



8. To remove the Electronic Expansion Valve (EEV)

(1) Remove the heat exchanger assembly.(See No.9)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)

General view
(FDFL)



General view
(FDFU)

DISASSEMBLY PROCEDURE

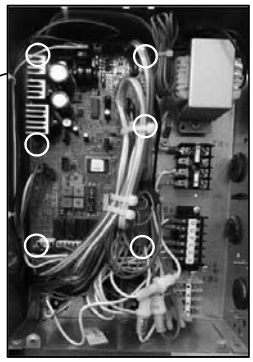
⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.**
- **When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.**
- **Be sure to collect refrigerant without spreading it in the air.**
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES (SAF-DX series)

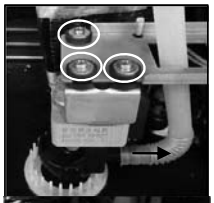
1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1)
(2) Pull off all the inserted connectors.
(3) Take off 6 PCB fixing locking supports(○ mark)

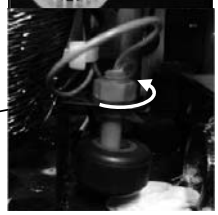


3. To remove the drain pan
(1) Remove 10 bottom panel fixing screws and remove it.
(2) Pull the drain pan and remove it.

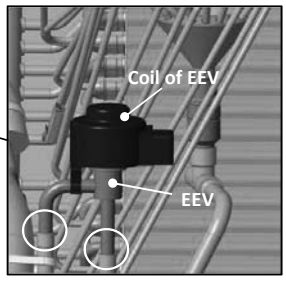
4. To remove the heat exchanger assembly
(1) Remove the bottom panel(See No.3)
(2) Remove 4 fixing screws on the attached plate of heat exchanger and remove it.



5. To remove the drain pump(DM) and flot switch(FS)
(1) Remove the lid of control box.(See No.1)
(2) Remove the drain pan.(See No.3)
(3) Disconnect the drain pump connector(CNRx) in the middle of wiring.
(4) Disconnect the flot switch connector(CNIx) in the middle of wiring.
(5) Pull a hose to the arrow direction and remove it.
(6) Remove 3 drain pump fixing screws and remove it.(○ mark)
(7) Turn flot switch to the left and remove it.



6. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.8)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



7. To remove the thermistors, (example"Thi-R3")
(1) Remove the drain pan.(See No.3)
(2) Pull out the thermistor"Thi-R3" from the sensor holder.

General view

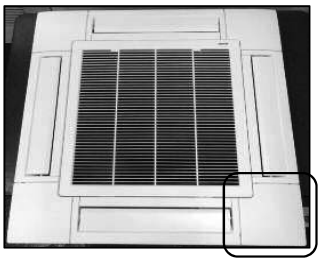
DISASSEMBLY PROCEDURE

⚠WARNING Precautions for safety

- **Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.**
- **When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.**
- **The electrical components are under high voltage by the operation of the booster capacitor.**
  Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- **These contents are an example. Please refer to a similar part of actual unit.**

PROCEDURE & PICTURES

FDT series

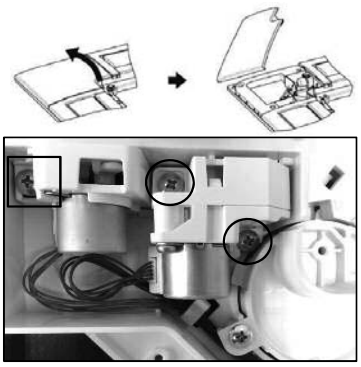


Corner lid

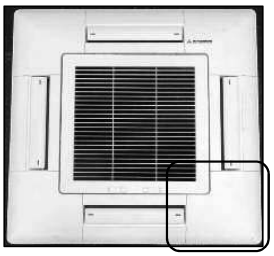
1. To remove the corner lid
(1) Remove the inlet grille.
(2) Pull the corner lid toward the direction indicated by the arrow and remove it.
(The four corner lids are the same way.)

2. To remove the louber motor (LM)
(1) Remove the corner lid.(See No.1)
(2) Remove the louber motor fixing screw and remove it.(☐ mark)

3. To remove anti draft motor (AM)
(1) Remove the corner lid.(See No.1)
(2) Remove 2 gear box fixing screws and remove it.(○ mark)



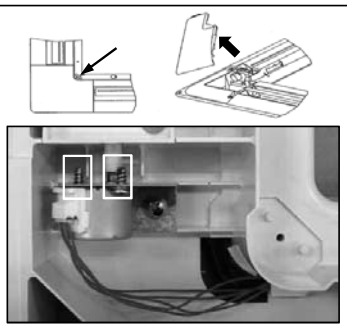
FDTC series



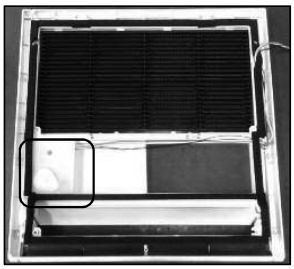
Corner lid

1. To remove the corner lid
(1) Remove the inlet grille.
(2) Remove the screw(← mark), pull the corner lid toword the direction indicated by the arrow mark.
(The four corner lids are the same way.)

2. To remove the louber motor (LM)
(1) Remove the corner lid.(See No.1)
(2) Remove 2 louber motor fixing screws and remove it.(☐ mark)

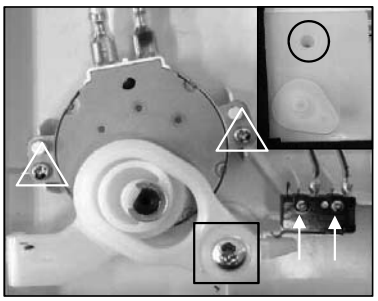


FDTS・FDTQ series

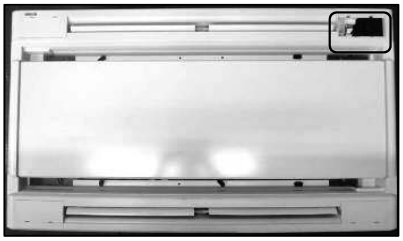


1. To remove the louber motor (LM)
(1) Remove the cover fixing screw and remove it.(○ mark)
(2) Remove the cam fixing screw and remove it.(☐ mark)
(3) Remove 2 louver motor fixing screws and remove it.(△ mark)

2. To remove the limit switch (LS)
(1) Remove the cover fixing screw and remove it.(○ mark)
(2) Remove 2 limit switch fixing screws and remove it.(← mark)

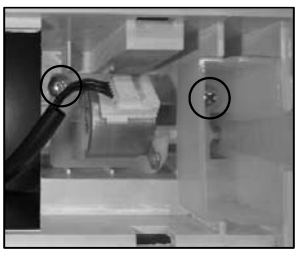


FDTW series



1. To remove the corner lid
(1) Take off the corner panel fixing hooks by a flathead screwdriver and remove it.

2. To remove the louber motor (LM)
(1) Remove the corner lid.(See No.1)
(2) Remove 2 louber motor fixing screws and remove it.(○ mark)



VRF INVERTER MULTI-SYSTEM AIR-CONDITIONERS

MITSUBISHI HEAVY INDUSTRIES

MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.
16-5 Konan 2-chome, Minato-ku, Tokyo, 108-8215, Japan
http://www.mhi-mth.co.jp/