MHI

SERVICE MANUAL

Manual No. '09·KX-SM-128
updated August 10, 2011

INVERTER DRIVEN MULTI-INDOOR UNIT CLIMATE CONTROL SYSTEM

Alternative refrigerant R410A use models

(OUTDOOR UNIT)

KX6 series **(Heat pump type)**

- **Single use (Used also for combination)**
  FDC335KXE6-K, 400KXE6, 450KXE6, 504KXE6, 560KXE6, 560KXE6-K, 615KXE6, 680KXE6
- **Combination use**
  FDC753KXE6, 800KXE6, 850KXE6, 900KXE6, 960KXE6, 1010KXE6, 1065KXE6, 1130KXE6, 1180KXE6, 1235KXE6, 1300KXE6, 1360KXE6

(INDOOR UNIT) –KX6 series–

FDT28KXE6A	FDTC22KXE6A	FDTW28KXE6	FDTS45KXE6	FDTQ22KXE6	FDU71KXE6
36KXE6A	28KXE6A	45KXE6	71KXE6	28KXE6	90KXE6
45KXE6A	36KXE6A	56KXE6		36KXE6	112KXE6
56KXE6A	45KXE6A	71KXE6			140KXE6
71KXE6A	56KXE6A	90KXE6			224KXE6
90KXE6A		112KXE6			280KXE6
112KXE6A		140KXE6			
140KXE6A					
160KXE6A					

FDUM22KXE6	FDQS22KXE6	FDK22KXE6	FDE36KXE6A	FDFL28KXE6	FDFU28KXE6
28KXE6	28KXE6	28KXE6	45KXE6A	45KXE6	45KXE6
36KXE6	36KXE6	36KXE6	56KXE6A	71KXE6	56KXE6
45KXE6	45KXE6	45KXE6	71KXE6A		71KXE6
56KXE6	56KXE6	56KXE6	112KXE6A		
71KXE6		71KXE6	140KXE6A		
90KXE6					
112KXE6					
140KXE6					
FDUH22KXE6					
28KXE6					
36KXE6					

• Note
Regarding the Duct Connected-High static Pressure-type Outdoor Air Processing Unit Series (FDU500～1800FKXE6), refer to the DATA BOOK No.'08 • KX-DB-122

MITSUBISHI HEAVY INDUSTRIES, LTD.

CONTENTS

1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

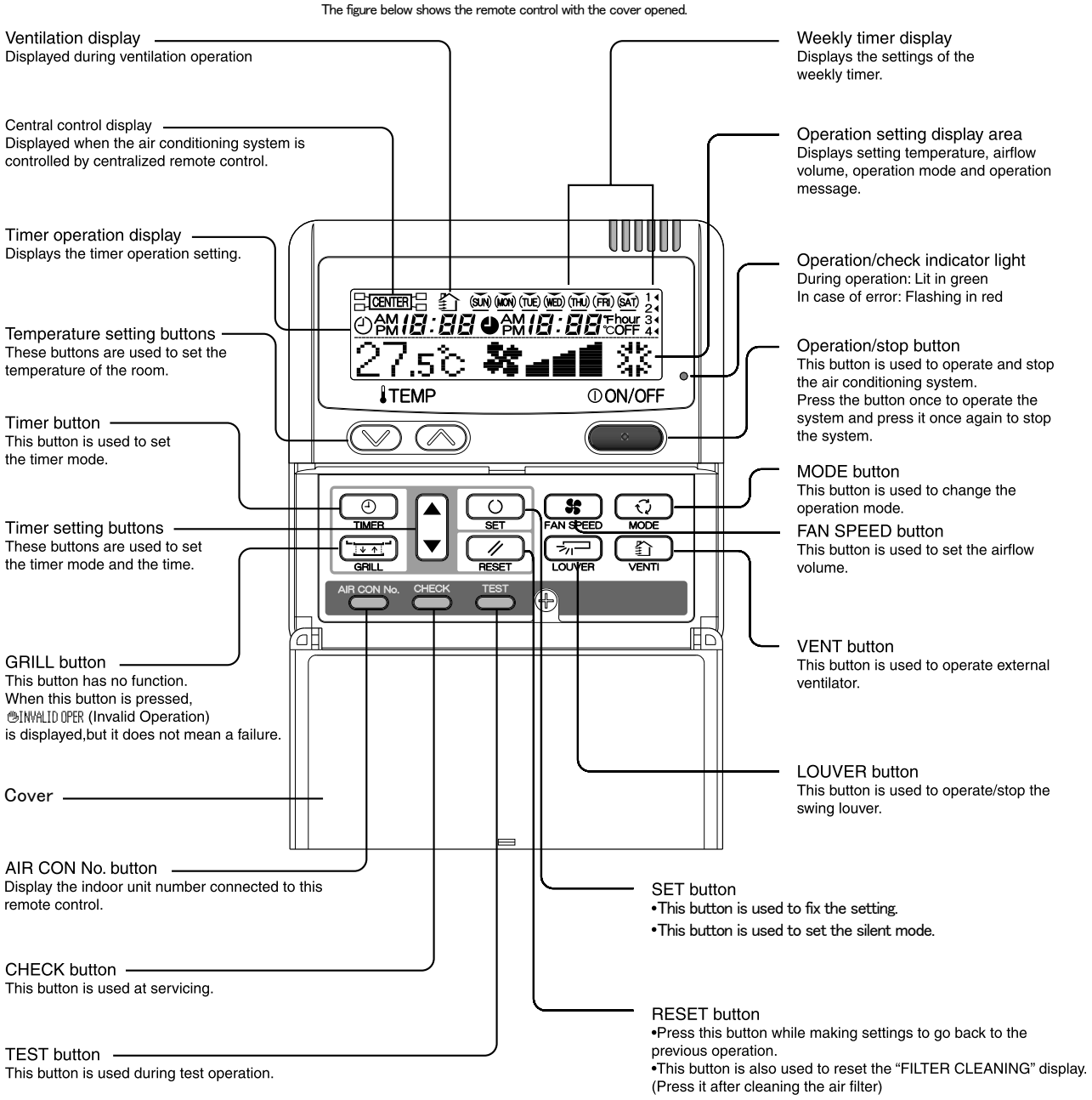
1.1 Wired remote controller (Option parts)

The figure below shows the remote controller 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.

Pull the cover downward to open it.

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



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

Installation of remote control

DO NOT install it on the following places in order to avoid malfunction.

(1) Places exposed to direct sunlight
(2) Places near heat devices
(3) High humidity places
(4) Hot surface or cold surface enough to generate condensation
(5) Places exposed to oil mist or steam directly
(6) Uneven surface

1.2 Operation control function by the indoor controller

(1) Operations of functional items during cooling/heating

Operation / Functional item	Cooling		Fan	Heating			Dehumidify
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Hot start (Defrost)	
Compressor	○	×	×	○	×	○	○/×
4-way valve	×	×	×	○	○	○(×)	×
Outdoor fan	○	×	×	○	×	○(×)	○/×
Indoor fan	○	○	○	○/×	○/×	○/×	○/×
Louver motor	○/×			○/×	○/×	○/×	○/×
Drain pump (4)	○	×(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 by the indoor unit function setting of the wired remote controller.

(2) Dehumidifying operation

(a) When the humidity sensor is not provided (Models other than FDT Series)
return air thermistor [Thı-A (by the remote controller when the remote control sensor is enabled)] controls the indoor temperature environment simultaneously.

1) Operation is started in the cooling mode. When the difference between the return air thermistor 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 fan tap.
2) If the suction air temperature exceeds the setting temperature 3°C or more during defrosting operation, the indoor fan tap is raised by one tap. That tap is retained for 3 minutes after changing the indoor fan tap.
3) If the thermostat OFF is established during the above control, the indoor fan tap at the thermostat ON is retained so far as the thermostat is turned OFF.
4) After stopping the cooling operation, the indoor unit continues to run at Lo for 15 seconds.

(b) When the humidity sensor is provided (FDT Series only) [Optional]

1) Operation starts in the cooling mode, and the target relative humidity is determined based on the setting temperature. If the humidity detected by the humidity sensor becomes lower than the target relative humidity, the indoor unit fan tap is retained.
2) Anything other than 1) above is same as the item (a) above.

(3) Timer operation

(a) 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 clock timer setting, the remaining time is displayed with progress of time in the unit of hour.

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

(c) ON timer
Time to turn ON the air-conditioner can be set. Indoor temperature can be set simultaneously.

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

(e) Timer operations which can be set in combination

	Timer	OFF timer	ON timer	Weekly timer
Timer		×	○	×
OFF timer	×		○	×
ON timer	○	○		×
Weekly timer	×	×	×	

Note (1) ○: Allowed ×: Not

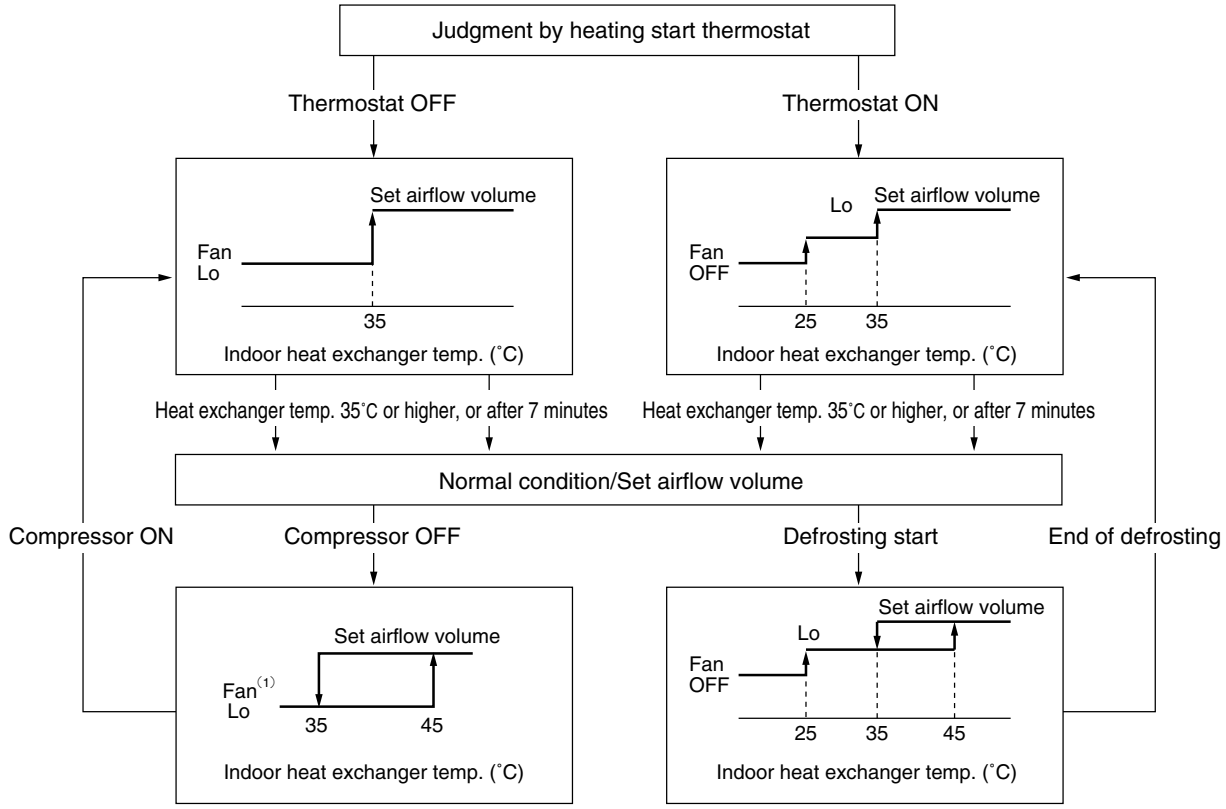
(4) Remote controller display during the operation stop

(a) "Centralized control ON" is displayed always on the LCD under the "Center/Remote" and "Center" modes during the operation stop (Power ON). This is not displayed under the "Remote" mode.

(b) If this display is not shown under the "Center/Remote" mode, check if the indoor unit power switch is turned on or not.

(5) Hot start (Prevention of cold draft during heating)

At the startup of heating operation, at resetting the thermostat, during defrosting operation and at returning to heating, the indoor fan is controlled by the indoor heat exchanger temperature (detected with Thı-R) to prevent the cold draft.



Note (1) Heating preparation is displayed during the hot start (when the compressor is operating and the indoor fan does not provide the set airflow volume).

(6) Hot keep

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

(a) Control

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

2) During the hot keep operation, the louver horizontal control signal is transmitted.

(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) Fan control during the heating thermostat OFF

When the heating thermostat is turned OFF, the setting of the fan control is selectable with using the indoor function of wired remote controller [Heating fan control].

(a) Low speed (Factory default)

If the indoor heat exchanger temperature drops 35°C or lower with the heating thermostat OFF, the indoor fan operate at the lower speed tap at each setting.

(b) Set airflow volume

Even if the indoor heat exchanger temperature drops 35°C or lower with the heating thermostat OFF, the indoor fan continues to run at the set airflow volume.

(c) Intermittent operation

If the indoor heat exchanger temperature drops 35°C or lower with the heating thermostat OFF, the indoor fan operates at the lower speed tap at each setting and, when the indoor heater exchanger temperature drops 25°C or lower, the indoor fan stops for 5 minutes. Then the fan runs at the slow speed tap for 2 minutes, and the judgment is made by the thermostat.

(d) Stop

If the indoor heat exchanger temperature drops 35°C or lower with the heating thermostat OFF, the indoor fan is turned OFF. The same applies also when the remote controller sensor is effective.

(8) Filter sign

As the operation time (when ON/OFF switch is at ON) accumulates to 180 hours (1), "Filter cleaning" is displayed on the remote controller. (This is also 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 controller "Filter sign setting". (It is set at 1 at the shipping from factory.)

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

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

(9) Auto swing control [Applicable model: FDT, FDTC, FDTW, FDTS, FDTQ (Excepted duct panel model) FDK and FDE]

(a) Louver control

(i) Press the [Louver] button to operate the swing louver when the air conditioner is operating.
"Auto wind direction" is displayed for 3 seconds and then the swing louver moves up and down continuously.

(ii) 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 "Louver stop" for 5 seconds and then the swing louver stops.

(iii) Louver operation at the power on
The louver swings one time automatically (without operating the remote controller) 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 "Auto wind direction" display 3 seconds later.

(b) Automatic louver level setting during heating
While hot start operation and heating thermostat OFF operation, the louver keeps the level position (In order to prevent the cold draft) whether the auto swing switch is operated or not (auto swing or louver stop), The louver position display LCD continues to show the display which has been shown before entering this control.

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

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

(10) Compressor inching prevention control

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

(b) 3-minutes forced operation timer

- Compressor will not stop for 3 minutes after the compressor ON. However, it stops immediately when the thermostat is turned OFF by the stop command by means of the ON/OFF switch or the change of operation mode.
- If the thermostat is turned OFF during the forced compressor operation in heating mode, the louver position (with the auto swing) is returned to the level position.

Note (1) The compressor stops when it has entered the protective control.

(11) Drain motor (DM) control [Applicable type: FDT, FDTC, FDTW, FDTS, FDTQ, FDUM, FDQS and FDU90～140]

(a) Drain motor (DM) start operation at the same time when compressor ON at cooling and dehumidifying mode and keeps operating for 5 minutes after operation stop, the anomalous stop, thermostat OFF and switching from cooling or dehumidifying operation to fan or heating operation.

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

Note (1) Including the stop from cooling, dehumidifying, fan and heating operation 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.
2) The drain motor 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 condition 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.)

(b) Drain motor (DM) interlock control
(i) Start conditions
Depending on the function setting of the remote controller, the drain motor is turned ON under either one of the following conditions.
1) During heating operation (Both the thermostat ON/OFF)
2) During heating operation (Both the thermostat ON/OFF) + Fan operation
3) Fan operation

(ii) Stop conditions
The drain motor is turned OFF 5 minutes after the stop of operations 1) to 3) above.

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

(a) If the power is turned on when the dip switch (SW7-1) on the indoor PCB is ON state, 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 controller 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 controller 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 controller communication.

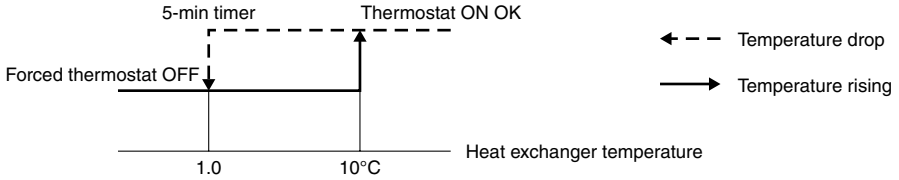
(c) Operation check mode
There is no communication with the outdoor unit but it allows performing operation in respective modes by operating the remote controller.

(d) Drain pump test run mode
When the drain pump test run is established, only the drain pump operates, and during operation the protective functions by the microcomputer of indoor unit become ineffective.

(13) Indoor heat exchanger anti-frost (anti-frost control)

Thermostat OFF control

1) Thermostat is turned OFF depending on the temperature detected with the heat exchanger sensor (Thı-R1, R2) during "Cooling" and "Dehumidifying" operations.



2) For 4 minutes after the thermostat ON, the forced thermostat OFF control for the anti-frost protection is not effective.
a) When temperatures detected by the heat exchanger sensors Thı-R1 and R2 are higher than the anti-frost protection temperature at 4 minutes after the thermostat ON, the detection starts from the state of thermostat ON.

3) If the temperature detected with the heat exchanger sensor Thı-R1 or R2 has stayed below the anti-frost protection temperature (-0.5°C) continuously for 5 minutes after 4 minutes of the thermostat ON operation, then the thermostat is turned OFF forcibly.
The thermostat will be turned ON if temperatures detected by Thı-Ra and R2 picked up in the thermostat ON range.

4) "Anti-frost" signal is sent to the outdoor unit.

(14) Anomalous fan motor (FDT and FDK only)

Fan motor will be stopped with displaying "E16", if it has detected the revolutions of 200 rpm or less continuously for 30 seconds at a rate of 4 times within 60 minutes, after starting the motor.

(15) High ceiling control [Applicable type: FDT, FDTC, FDTW, FDTS and FDE]

When the indoor unit is installed at a high ceiling, the airflow volume mode control can be changed with the indoor function of wired remote controller "High ceiling setting".

Setting	Standard (Shipping)	High Ceiling 1	High Ceiling 2
Remote controller setting	Hi Me Lo	Hi Me Lo	Hi Me Lo
Fan speed	Hi Me Lo	UHi1 Hi Me	UHi2 Hi Me

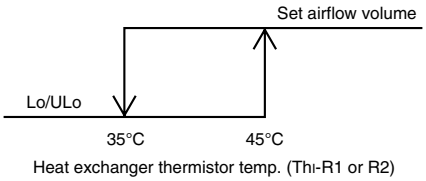
Note (1) It is set at Standard at the shipping from factory.
(2) At the hot start, heating thermostat OFF, or other, the indoor fan operate at the slow speed tap at each setting.

(16) Hot start

Indoor fan motor control is performed at the start of heating operation.

(a) When the temperature detected with the indoor heat exchanger thermistor (Thi-R1 or Thi-R2) drops 35°C or lower, it control the fan with AC motor: Lo and DC motor: ULo.

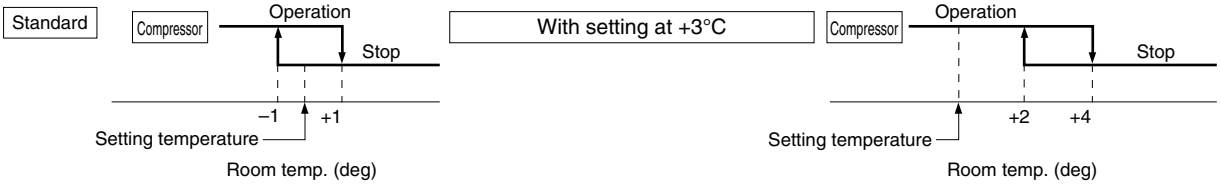
(b) When the heat exchanger thermistor detects 45°C or higher with the fan running at Lo/ULo, it returns to the set airflow volume.



(c) On the indoor unit of which the thermostat has been turned OFF during heating operation, the fan is turned OFF if the heat exchanger thermistor temperature (Thi-R1 or Thi-R2) drops 25°C or lower.

(17) Detection room temperature compensation during heating

With the standard specification, the compressor is turned ON/OFF based on the setting temperature of thermostat. However, when the thermostat OFF is likely to occur earlier because the unit is installed in a condition that warm air tends to accumulate near the ceiling, the setting can be changed by using the indoor function of wired remote controller "Heating room temperature compensation". Since the compressor is turned ON/OF at one of the setting temperature at +3, +2 or +1°C, the feeling of heating can be improved. However, the upper limit of setting temperature is 30°C.



(18) Return air temperature compensation

This is the function to compensate a difference between the detected temperature of the Return air thermistor and the measured temperature after installation of unit.

(a) It is adjustable in the unit of 0.5°C by using the indoor function of wired remote controller "Return air thermistor compensation".

- +1.0°C, +1.5°C and +2.0°C
- −1.0°C, −1.5°C and −2.0°C

(b) Since the compensated temperature is transmitted to the remote controller and the outdoor unit, it is controlled with the compensated temperature.

Note (1) Compensation of detection temperature is effective for the indoor unit sensor only.

(19) External control (Remote display)/Remote operation

Always connect the wired remote controller. Otherwise, you cannot perform the remote operation.

(a) Output for external control (remote display) (Optional remote RUN/STOP monitor kit can be utilized.)

Following output connectors (CNT) are provided on the indoor control PCB. Connect the remote RUN/STOP monitor kit and pick up respective dry contact signal.

- **Operation output**: Outputs DC12V relay drive signal during operation.

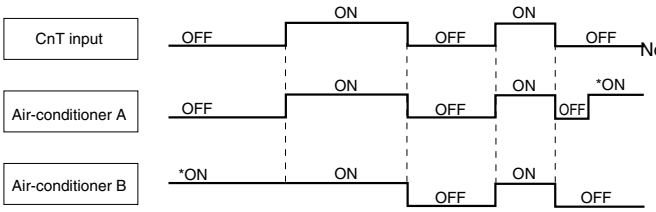
- **Heating output**: Outputs DC12V relay drive signal during heating operation.
- **Compressor ON output**: Outputs DC12V relay drive signal when the compressor is operating.
- **Error output**: When any anomalous condition occurs, it outputs DC12V relay drive signal.

(b) Remote operation input

Remote operation inputs (switch input, timer input) connectors (CnT) are provided on the indoor control PCB.
However, the remote operation by the CnT is not effective when "Center mode" is selected with the air-conditioner.

(i) At the shipping from factory [Indoor function of wired remote controller "External input selector" is set at the level input.]

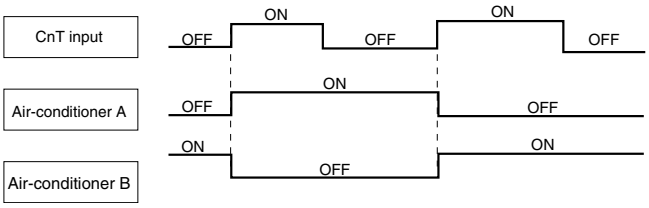
- Startup at the input signal to CnT OFF → ON [Edge input] … Air-conditioner ON
- Stop at the input signal to CnT ON → OFF [Edge input] … Air-conditioner OFF



Note (1) ON marked with * means ON by a remote controller switch or other.

(ii) When the setting is changed to the pulse input at site using the indoor unit function of wired remote controller "External input selector"

It becomes effective only when the input signal to CnT is changed OFF→ON and the air-conditioner operation [ON/OFF] is inverted.



(c) Processing of emergency stop signal

This emergency stop signal is used to stop all indoor unis connected to the same outdoor unit in emergency.

1) The emergency stop control becomes effective if the emergency stop control setting is changed to "Valid" from the wired controller.
2) If the emergency stop [E-63] signal is received from outdoor unit, it is transmitted to the remote controller and makes stop.

(d) Fresh air processing operation input

1) If indoor unit controller receive fresh air processing operation signal (*1) or fresh air processing stop signal from remote controller, it output ON signal or OFF signal from CnD connector respectively.
   *1. Operation switch ON at interlock setting and ventilation switch ON at non-interlock setting.
2) Output relay is DC12V option and maximum relay load is LY2F (OMRON).
3) In case of interlock setting, if either of indoor units connected to one remote controller is in the state of anomalous stop, the fresh air processing unit connected to that indoor unit cannot be operated. Other processing units connected to the indoor units operating normally can be operate.
   In case of non-interlock setting, processing unit can start ventilation even though the connected indoor unit is in anomalous stop.
4) In case of interlock setting if indoor unit stops, processing unit also stop.
5) In case of interlock setting if indoor unit stops with anomalous stop, processing unit also stop.
6) If indoor unit is started or stopped from center console, processing unit can start or stop in case of interlock setting, but it keep stopping in case of non-interlock setting.
7) Interlock or non-interlock can be set only on the remote controller.

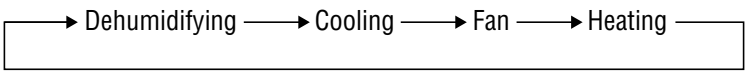
(20) Dip switch function

Model capacity selection with SW6 — 0 : OFF, 1 : ON

Model	P22	P28	P36	P45	P56	P71	P80	P90	P112	P140	P160	P224	P280
SW6-1	0	1	0	0	0	0	1	0	1	0	1	0	1
SW6-2	0	0	1	0	1	0	0	1	1	0	0	1	1
SW6-3	0	0	0	1	1	0	0	0	0	1	1	1	1
SW6-4	0	0	0	0	0	1	1	1	1	1	1	1	1

1.3 Operation control function by the remote controller

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



(2) [CPU reset]

When the “CHECK” and “GRILL” buttons on the remote controller are pressed at the same time, this function is activated. This function is same as power supply reset.

(3) [Power failure compensation function]

- This function becomes effective when “POWER FAILURE COMPENSATION SET” is valid by setting the remote controller functions.
- The remote controller's status is always stored in memory, and after recovery of power, operation is resumed according to the memory contents. However the auto swing stop position and timer mode are cancelled, but the weekly timer setting is restored with the holiday setting through all weekdays.
  By resetting the clock and cancelling the holiday setting for each weekday after recovery of power, weekly timer setting becomes effective.
- Contents stored in memory for power failure compenstion are as follows.

Note (1) Item ⑥⑦ and ⑧ are stored in memory regardless of whether the power failure compensation setting is valid or invalid, and silent mode setting is cancelled regardless of whether the power failure compensation setting is valid or invalid.

① Running or Stopping status just before power failure
If it had been operating under OFF timer mode or simple timer mode, memorzed status is as stopping (At the recovery of power, the timer mode is cancelled but weekly timer setting is changed to the holiday setting through all weekdays

② Operation mode

③ Fan speed mode

④ Room temperature setting

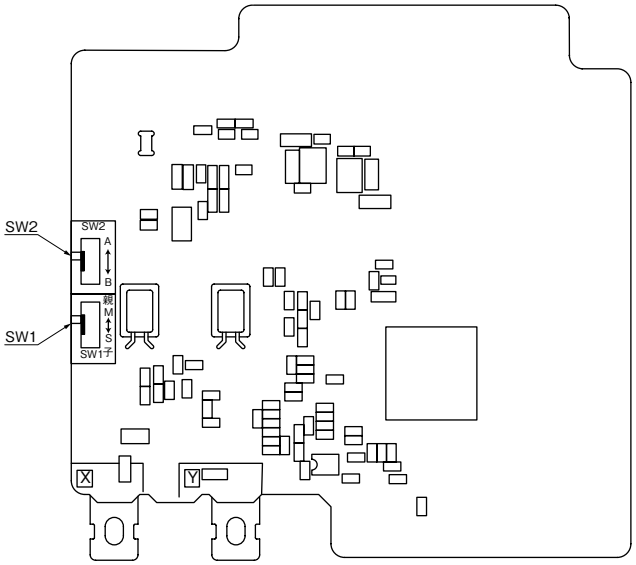
⑤ Louver auto swing/stop
However, the stop position (position 4) is cancelled and is becomes the level position (position 1).

⑥ “Remote control function items”, set with the remote controller function setting (“Indoor unit function items” are stored in the inoor unit's memory.)

⑦ Upper limit value and lower limit value set by temperature setting control.

⑧ Clock timer setting and weekly timer setting (Other timer settings are not sotred in memory).

[Parts layout on remote controller PCB]



■ **Control selector switch (SW1)**

Switch		Function
SW1	M	Master remote controller
	S	Slave remote controller

Note (1) SW2 is not normally used, so do not change the selection.

1.4 Operation control function by the outdoor controller

(A) Normal control

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

Functional Components \ Operation mode	Cooling		Fan	Heating			Dehumidify
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Defrost	
Indoor unit fan	Remote controller command	Remote controller command	Remote controller command	Remote controller command	Intermittent operation	○→×	○/×
Indoor unit electronic expansion valve	Overheating control response	Fully open	Fully closed	Outlet temperature control response	Slight opening control	Model-specific aperture opening angle	Overheating Control Response
Compressor [CM1]	○	×	×	○	×	○	○/×
Magnetic contactor CM1 [52X1]	○	○	×/○	○	○	○	○
Compressor [CM2]	○/×	×	×	○/×	×	○	○/×
Magnetic contactor CM2 [52X2]	○	○	×	○	○	○	○
Outdoor unit fan [FMo-1]	○/×	×	×/○	○/×	×	○→×	○/×
Outdoor unit fan [FMo-2]	○	×	×/○	○	×	○→×	○/×
Inverter cooling fan [FMC1, 2]	○/×	○/×	×	○/×	○/×	○/×	○/×
4 way valve [20S]	×	×	×	○	○	○→×	×
Electronic expansion valve for heating [EEVH1, 2]	Fully open ※3	※1	※2	Overheating control response ※4	※2	Fully closed / Fully open	Fully open ※3
Electronic expansion valve for sub-cooling [EEVSC]	Opening angle control	Fully closed	Fully closed	Fully closed	Fully closed	Fully closed	Opening angle control
Solenoid valve [SV1]	○/×	×	×	○/×	×	○/×	○/×
Solenoid valve [SV2]	○/×	×	×	○/×	×	○/×	○/×
Solenoid valve [SV6] [SV7]	○/×	×	×	○/×	×	○/×	○/×
Solenoid valve [SV13]	○/×	×	×	○/×	×	×	×
Crankcase heater [CH1,2]	○/×	○/×	○/×	○/×	○/×	○/×	○/×

Notes(1) ○ : ON, × : OFF, ○/×, ×/○: ON or OFF

(2) ※1: The EEVH1, 2 of master unit are fully opened and those of slave unit are fully closed.

(3) ※2: When the unit is stopped from cooling operation, the EEVH1, 2 of master unit are fully opened and those of slave unit are fully closed.
When the unit is stopped from heating operation, the EEVH1, 2 of both master and slave units are fully closed unless the opening degree is specified by the low pressure protective control.

(4) ※3: When the operation mode is changed from heating to cooling/dehumidifying, EEVH1, 2 are maintained at fully closed position and EEV of only one indoor unit keeps 60 pulse until 20S is turned OFF.

(5) ※4: When the operation mode is changed from cooling/dehumidifying to heating, EEVH1, 2 are maintained at fully opened position and EEVs of all indoor units keep 0 pulse until 20S is turned ON.

(6) This shows the state of output when all indoor units are in the same operation mode.

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

(a) Starting compressor

(i) Compressor starting order (2 compressors specification)

After turning the power on, firstly CM1 compressor starts. (In case of the combination use, it is CM01 of master unit) 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 4 compressors (in case of combination use) will start simultaneously.

1) Single use

The range of frequency for each compressor corresponding to the heat load is shown in below mentioned table. (The table shows the case that CM1 starts first. If CM2 starts first, the frequency of CM2 should be applied that of CM1 shown in heat load zone 1 instead.)

Following tabel is shown the case that the maximum compressor frequency is 120Hz.

Heat load zone	0	1	2
CM1	0Hz	20~112Hz (22~92Hz)	42 (34)~120Hz
CM2	0Hz	0Hz	42 (34)~120Hz

Note (1) Value in ( ) are for the models FDC615, 680KXE6

2) Combination use

The range of frequency for each compressor corresponding to the heat load is shown in below mentioned table. (The table shows the case that CM01 starts first. If CM11 starts first, the frequency of CM11 should be applied that of CM01 shown in heat load zone 1 instead.)

Heat load zone		0	1	2	3
Master unit	CM01	0Hz	20~112Hz (20~92Hz)	42~112Hz (34~92Hz)	42~120Hz (34~120Hz)
	CM02	0Hz	0Hz	0Hz	42~120Hz (34~120Hz)
Slave unit	CM11	0Hz	0Hz	42~112Hz (34~92Hz)	42~120Hz (34~120Hz)
	CM12	0Hz	0Hz	0Hz	42~120Hz (34~120Hz)

Note (1) Value in ( ) are for the models FDC1180~1360KXE6

(ii) Rotation of compressor start/stop order

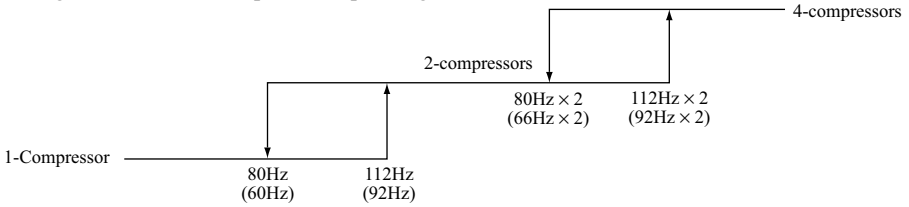
1) The compressors will be changed over by determinating the start/stop order in each heat load zone.
2) In case of single use, the starting order of CM1 and CM2 will be changed over on each occasion when the outdoor unit stops.
3) In case of combination use, the starting order of CM01(CM11) and CM02(CM12) will be changed over on each occation when the master unit or slave unit stops all independently.
4) In case of combination use, the starting order of master and slave units will be changed over on each occasion when the master unit or slave unit stops all independently.

Starting order of outdoor units Master→Slave→Master

Model	Starting Order of Outdoor Units	Starting Order of Compressors
FDC335~680	–	CM 1 → CM 2 → CM 1
FDC735~1360	Master → Slave → Master	CM 1 → CM 2 → CM 1

(Reference)

Change in number of compressors operating



Note (1) Value in ( ) are for the models FDC615, 680KXE6 and FDC1180~1360KXE6
(2) After recovery of power blackout, starting order of compressor is always CM01of master unit.

(3) Starting control of the compressor (Master unit/Slave unit)

According to the elapsed time after power ON and to the number of start-up, the starting control method of compressor is shown in following table. However during the defrost control, oil return control and oil equalization control, the starting control method of compressor is depended on that of the each control.

Conditions	Starting method
① The 1st startup after 45minutes or more has elapsed since power ON, or the subsequent startup after the compressor has been stopping for 45 minutes or longer with keeping the power ON.	After 4-way valve switching safeguard, "compressor protective start control A" will be perfomed according to the crankcase heater ON time. (See followings)
② The 1st startup after less than 45 minutes has elasped since power ON	After 4-way valve switching safeguard, "compressor protective start control B" will be perfomed according to the crankcase heater ON time. (See next page)
③ The startup other than ① and ② mentioned above.	After 4-way valve switching safeguard, "compressor protective start controls" will be perfomed.

(a) 4-way valve switching safeguard (Master unit/Slave unit)

At starting, the inverter compressor (CM1, CM2) is operated under following conditions regardless of the decision frequency.

(i) 0-20Hz operation

It is operated in the range of 0-20Hz. However during this operation, the compressor protective controls like current safe control, high pressure control, discharge pipe temperature control, low pressure control, power transistor temperature control, under-dome temperature control and compression ratio protective control are not performed.

(ii) 25-40(48)Hz opearation

The maximum frequency is determined by the temperature detected with the outdoor air temperature thermistor (Tho-A).

1) In case of 0°C or lower of Tho-A: It starts to increase the frequency up to 48Hz as maximum frequency and when the frequency reaches 48Hz, it stops.
2) In case of higher than 0°C of Tho-A: It starts to increase the frequency up to 40Hz as maximum frequency and. when the frequency reaches 40Hz, it stops. However during this operation, if the starting conditions of the compressor protective controls like current safe control, high pressure control, discharge pipe temperature control, low pressure control, power transistor temperature control, under-dome temperature control or compression ratio protective control is satisfied, this control ends and it is controlled according to such protective control satisfied with. And if the compressor frequency is determined and this protective control is cancelled, it returns to the normal operation.

(b) Compressor protective start control (Master unit/Slave unit)

The compressor frequency is controlled regardless of the target frequency.

1) Up to 1minutes 45 seconds after the compressor starts, it is operated at 20Hz.
2) When 1minutes 45 seconds has elapsed after the compressor starts, it is operated at the frequency by compressor potective start control.

(c) Compressor protective start control "A" according to the crankcase heater ON time (Master unit/Slave unit)

If it is the 1st startup after 45 minutes of the cumulative crankcase heater ON time has elapsed since power ON or if it is the subsequent startup after the compressor has stopped for 45 minutes or more since power ON, it starts operation according to this control.

1) After 4-way valve switching safeguard, inverter frequency is set at 20Hz. And during reducing frequency to 20Hz after 4-way valve switching safeguard, if the time for reaching to 20Hz is elasped 1 minutes after startup, it is set at the maximum frequency after 1 minute elasped (20Hz+5Hz).
2) During the period of 15 minutes after the inverter frequency reaches to 10Hz (the frequency to complete startup), the maximum inverter frequency will be increased from 20Hz by 5Hz per minute.
3) If the compressor stops within the period of 15 minutes after startup, and when the compressor starts again, the maximum inverter frequency is increased from 20Hz by 5Hz per minute during the cumlative period of 15 minutes under this control after the initial startup.

4) When the under-dome temperature (detected by Tho-C) exceeds 20°C and the under-dome superheat is 15degC, the compressor protective start control "A" is cancelled and the inverter frequency will be increased by 5Hz per 25 seconds.

(d) Compressor protective start control "B" according to the crankcase heater ON time (Master unit/Slave unit)

If it is the 1st startup after the cumulative crankcase heater ON time has elapsed less than 45 minutes since power ON

1) After 4-way valve switching safeguard, inverter frequency is set at 20Hz. And during reducing frequency to 20Hz after 4-way valve switching safeguard, if the time for reaching to 20Hz is elasped 1 minutes after startup, it is set at the maximum frequency after 1 minute elasped (20Hz).
2) During the period of 18 minutes after the inverter frequency reaches to 10Hz (the frequency to complete startup operation), the maximum inverter frequency will be increased from 20Hz by 5Hz per 2 minute.
3) From 18 minutes to 24 minutes after startup, the maximum inverter frequency will be increased by 5Hz per 1 minute, and this control will end when 24 minutes is elapsed after startup.
4) After this control ends once, if it is the 2nd startup or the period of 45 minutes after th power ON is elapsed, this control will be shifted to the compressor protective start control "A".
5) If the compressor stops within 24 minutes after startup, and when the compressor starts again, the compressor protective start control "B" is performed during the cumlative period of 24 minutes after the initial startup. However when the period of 45 minutes has elapsed since compressor stopped, the control is shifted to the compressor protective start control "A".
6) When the under-dome temperature (detected by Tho-C) exceeds 20°C and the under-dome superheat is 15degC, the compressor protective start control "B" is cancelled and the inverter frequency will be increased by 5Hz per 25 seconds.

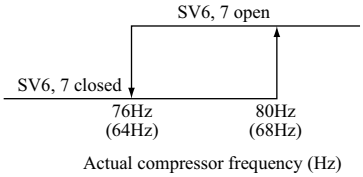
(4) Solenoid valve (SV6,7) control for oil return from oil separator (Maste unit/Slave unit)

(a) When the compressor starts, the following solenoid valve for corresponding compressor is opened respectively.

Compressor	Solenoid valve
CM1	SV6
CM2	SV7

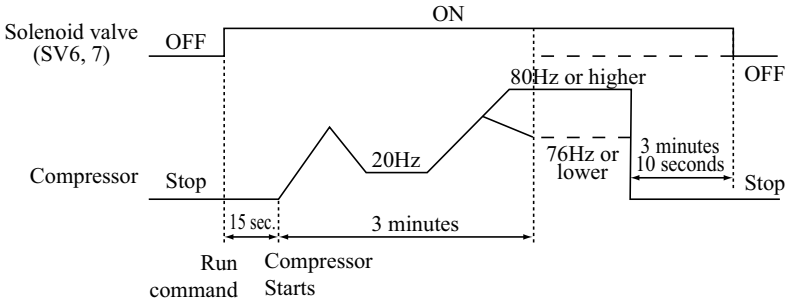
(b) SV6, SV7 is kept open for the period of 3 minutes after 4-way valve switching safeguard control and compressor protective control start.

(c) If the compressor frequency is 80Hz (68Hz) or higher, SV6,7 opens, and if the compressor frequency is 76Hz(64Hz) or lower, it closes.



Note (1) Value in ( ) are for the models FDC615, 680KXE6 and FDC1180~1360KXE6

(d) If the compressor stops after SV6, 7 opens, SV6, 7 remains open for 3 minutes and 10 seconds, then closes.



(5) Outdoor fan control (Master unit/slave unit)

(a) DC fan motor control

The outdoor fan is controlled from 0th speed to 4th speed, and set the standard speed according to the model and operation mode.

Under normal condition, 1st speed and 4th speed is standard, and under each condition the stepless fan control between 1st speed and 4th speed is performed.

(b) Outdoor fan speed and fan motor rotation speed

Unit: min^{-1}

Fan tap	FDC335, 400				FDC450				Remarks
	Cooling		Heating		Cooling		Heating		
	FMo1	FMo2	FMo1	FMo2	FMo1	FMo2	FMo1	FMo2	
0th speed	0	0	0	0	0	0	0	0	Stop
1st speed	0	160	0	160	0	160	0	160	1-unit operation min. speed
2nd speed	0	400	0	400	0	400	0	400	1-unit operation max. speed
3rd speed	160	160	160	160	160	160	160	160	2-unit operation min. speed
4th speed	960	960	960	960	1080	1080	1080	1080	2-unit operation max. speed

Unit: min^{-1}

Fan tap	FDC504～680				Remarks
	Cooling		Heating		
	FMo1	FMo2	FMo1	FMo2	
0th speed	0	0	0	0	Stop
1st speed	0	160	0	160	1-unit operation min. speed
2nd speed	0	400	0	400	1-unit operation max. speed
3rd speed	160	160	160	160	2-unit operation min. speed
4th speed	1140	1140	1140	1140	2-unit operation max. speed

(c) At the unit startup, outdoor fan is operated at 4th speed.

(d) DC fan motor startup control

① When the outdoor fan starts after stopping, the startup fan control is performed by checking the fan speed.

② If the rotating direction of the stopping fan, either FMo1 or FMo2, is reverse and its speed is 700min^{-1} or higher, the both fans cannot be started.

③ If the rotating direction of the stopping fans, both FMo1 and FMo2, are reverse but its speed is less than 700min^{-1} for 3 seconds continuously, the fan can be started.

④ During the period of 5 seconds after 52C1 is turned ON, the outdoor DC fan is prohibited to start.

(6) Compressor pre-start control (Master unit/slave unit)

(a) The following control is performed when the compressor ON conditions are established.

(i) Pre-start control when the operation mode is same as previous operation mode:

1) In case of "Cooling /Dehumidifying" mode, 4-way valve is turned OFF. In case of "Heating" mode, 4-way valve is turned ON.

However if the operation mode is same as previous operation mode and 4-way valve is retaing prescribed condition, the control status of 4-way valve is unchanged.

2) Solenoide valve SV6 and SV7 are turned ON.

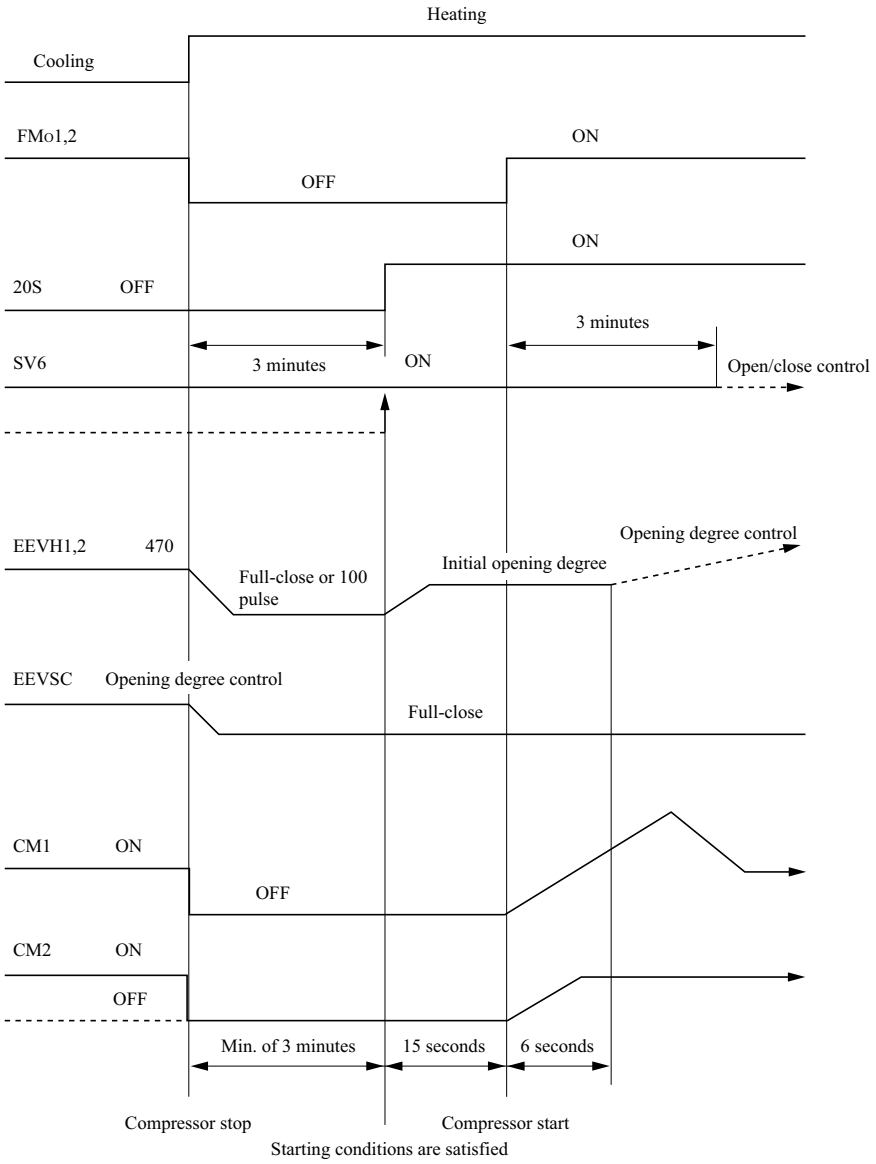
3) The opening degree of EEVH1, 2 for heating and EEVSC for subcooling coil are set to the initial opening degree mentioned in following table. The expansion valves EEVH1, 2 are operated first, and after those operations are completed, the expansion valve EEVSC will be operated.

(Unit: Pulse)

Item / Name	Operation mode	
	Cooling	Heating
EEVH1, 2	470	10
EEVSC	32	0

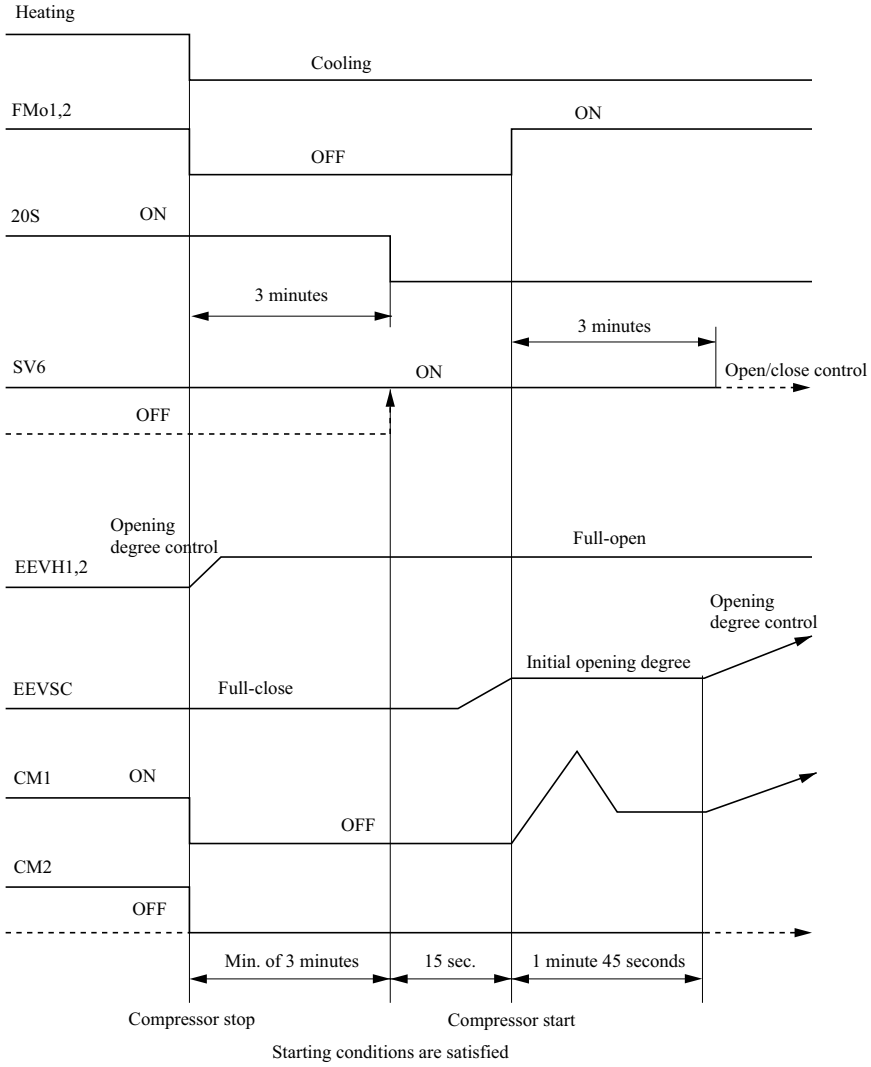
Note (1) Expansion valves of master unit and slave unit are operated respectively.

◆Cooling → Heating



4) Fan motors FMo1, FMo2 and compressor start 15 seconds after the compressor ON conditions are satisfied.

◆**Heating → Cooling**



(7) Crankcase heater control (Master unit/Slave unit)

(a) Crankcase heater ON (power on) and OFF (power off) are controlled with the under-dome temperature thermistor.

(b) Crankcase heater CH1 is turned ON, when the under-dome temperture (Tho-C1) ≦ (SST)+20°C

(c) Crankcase heater CH1 is turned OFF, when the under-dome temperture (Tho-C1) ≦ (SST)+25°C

(d) Crankcase heater CH2 is turned ON, when the under-dome temperture (Tho-C2) ≦ (SST)+20°C

(e) Crankcase heater CH2 is turned OFF, when the under-dome temperture (Tho-C2) ≦ (SST)+25°C

(Note) SST: Low pressure saturated temperature detected with low pressure sensor (LPS)

(f) Crankcase heater CH1 is turned OFF, when the under-dome temperature (Tho-C1) ≦ −40°C and CM1 is ON

(g) Crankcase heater CH2 is turned OFF, when the under-dome temperature (Tho-C2) ≦ −40°C and CM2 is ON

(Note) (f) and (g) are the protection for thermistor (Tho-C1, -C2) breakage

(8) Defrrosting (Master unit/Slave unit)

If the defrost starting conditions at the outdoor heat exchanger are established, defrost operation starts.

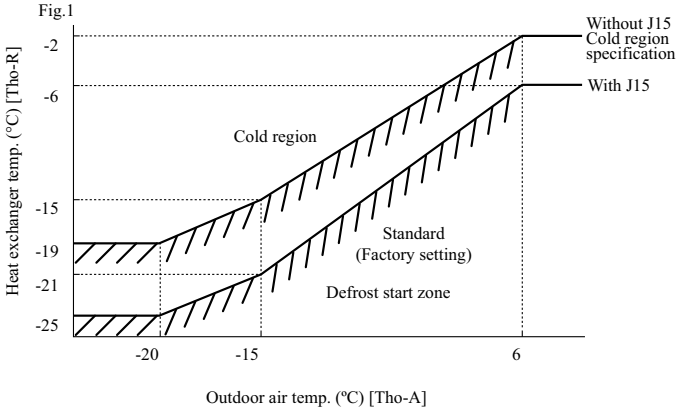
(a) Temperature conditions for defrosting

(i) Conditions for starting defrost

When all of following conditions are satisfied, defrost operation will be started.

1) When the cumulative operation time of the compressor becomes 33 minutes after completion of previous defrost operation, or it becomes 33 minutes after heating operation starts.
2) When 8 minutes have elapsed after one compressor is turned ON from the state of all compressors OFF.
3) When 8 minutes have elapsed after one outdoor fan is turned ON from the state of all outdoor fan OFF.

Fig.1



4) After all of the above conditions are satisfied, and when the temperatures detected with the outdoor heat exchanger temperature thermistor (Tho-R1,-R2) and outdoor air temperature thermistor (Tho-A) are below the defrost starting temperature mentioned in the above graph continuously for 3 minutes.

(ii) Conditions for finishing defrost

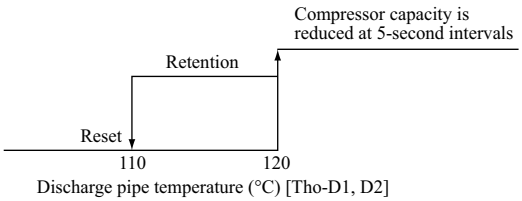
- Standard (J14 is shorted)
  1) When the temperature detected with both outdoor heat exchanger temperature thermistors (Tho-R1 and Tho-R2) is higher than 9ºC
  2) Or when 12 minutes have elapsed since defrosting started.
- Cold region setting (J14 is open)
  1) When (Tho-R1 and Tho-R2) ≧ 9ºC is satisfied,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

(9) Protective control

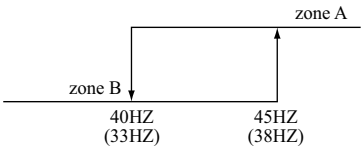
(a) Discharge pipe temperature control (Master unit/slave unit)

(i) If the discharge pipe temperature (detected with Tho-D1, D2) exceeds the set value, it makes the compressor capacity control performed and the solenoid valves SV1, 2 (for cooling down the compressor) open according to the compressor Hz in order to suppress the discharge pipe temperature rising.

1) Compressor capacity control

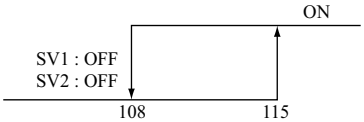


2) Solenoid valve (SV1, 2) control for cooling down compressor.

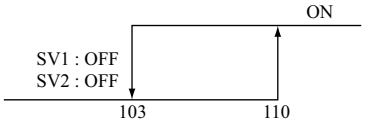


Note (1) Value in ( ) are for the models FDC615, 680KXE6 and FDC1180~1360KXE6

• zone A



• zone B



< ON conditions >

① In the zone A: SV1 is turned ON when Td1 ≧ 115°C. SV2 is turned ON when Td2 ≧ 115°C.

② In the zone B: SV1 is turned ON when Td1 ≧ 110°C. SV2 is turned ON when Td2 ≧ 110°C.

< OFF conditions>

① In the zone A: SV1 is turned OFF when Td1 ≦ 108°C. SV2 is turned OFF when Td2 ≧ 108°C.

② In the zone B: SV1 is turned OFF when Td1 ≦ 103°C. SV2 is turned OFF when Td2 ≦ 103°C.

(ii) Discharge pipe temperature control and Error display

1) When the discharger temperature exceeds 130°C or higher for 2 seconds continuously, it makes the compressor stopped. And when the discharge pipe temperature decreases to lower than 90°C, it makes the compressor restarted automatcally.

2) If this control [mentioned in (ii)-1)] is activates 5 times within 60 minutes, it makes the compressor anomalous stop and displays E36, In case of anomalous stop, it cannot be operated again until the discharge pipe temperature decreases to lower than 90°C for 60 minutes continuously.

(b) Current safe control

• Current safe control is done by both Master and Slave unit individually.

< Compressor capacity control >

1) Compressor frequency is controlled by detecting the inverter primary current (T-phase) and the inverter secondary current.

However under the following operating status ① and ② , it does not detect the inverter current.

① Actual compressor frequency N < 20Hz

② During the period that actual compressor frequency is decreasing or during the period of 1 second after the actual compressor frequency decreased.

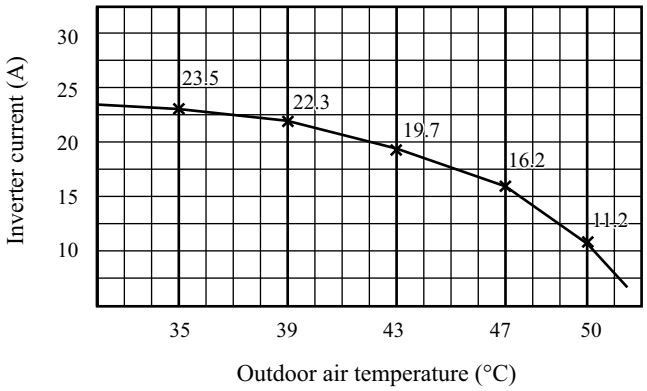
2) Initiation condition: When the detected current becomes following value.

① Within 2 minutes after starting operation of CM1 and CM2, the capacity control is done at the current safe value for starting mentioned in a) and b)

② During capacity measurement mode, the capacity control is done at the current safe value for measurement mode mentioned in a) and b)

a) The inverter primary current (Current safe 1): See following graph

(At starting and at measuring mode, the current safe value is the value (23.5A) at 35ºC of outdoor air temperature)



b) The inverter secondary current (Current safe 2): 24A

(At starting and at measuring mode, the current safe values are same.)

* Both current safe values mentioned in a) and b) can be corrected by the code P21 of 7-segment input.

Correction value $\alpha = 3$ to $+ 6$ (0.5 interval)

Factory setting $\alpha = 0$

3) Control contents

① The frequency of all compressors currently operating in the same refrigeration system will be decreased at every one second by 2-steps (Current safe 1: first step, Current safe 2: second step). The compressor that receives current safe control command first decreases the frequency and when its frequency is retaining at certain frequency, such retained frequency information is transmitted to master unit.

② Master unit will send the command to all other operating compressors in same refrigeration system to decrease frequency up to the same frequency as the first compressor reduced to according to the information of the first compressor.

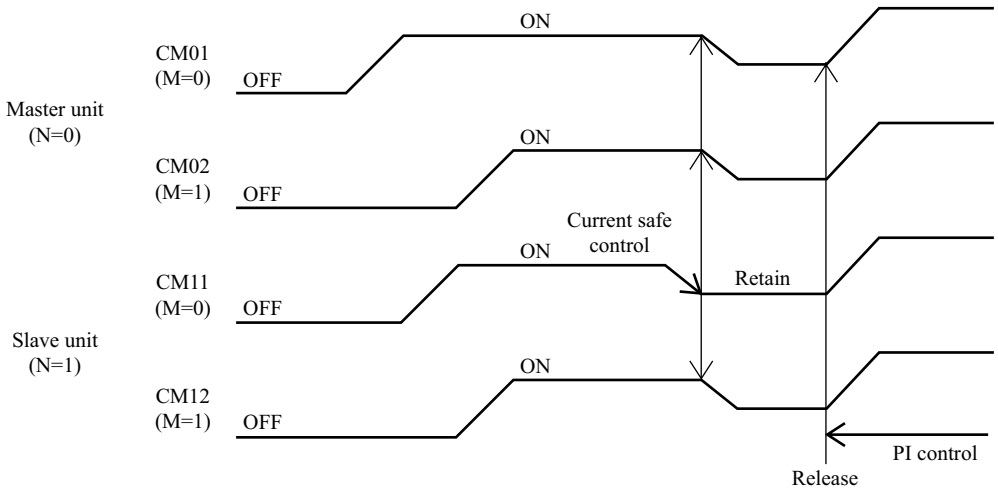
③ After the frequency is decreased, if the inverter current within the detection range is still above the current safe value, the procedure ① will be repeated.

④ After the frequency is decreased, if the inverter current within the detection range is lower than the current safe value, compressors will keep that frequency.

⑤ The minimum indicated frequency Ni by this control is 20Hz.

Example 1: In case of heat load zone 3 mentioned in Page 2, the operation of 20Hz×4 compressors is minimum (not 42Hz×4 mentioned in the table).

Example 2 : In case of heat load zone 2 mentioned in Page 2, the operation of 20Hz×2 compressors is minimum (not 42Hz×2 mentioned in the table).



⑥ When master unit retains the current safe control information in itself or receive the current safe control information from slave unit, master unit send signal of "Current safe protective control" to the indoor units during retaining those information.

4) At-end condition: If either following condition ① or ② is established, the protective control 3) will end and return to the PI control.

① The detected inverter current is -1A or lower of the current safe value for 3 minutes continuously.

② The detected inverter current is lower than the current safe value for 6 minutes continuously

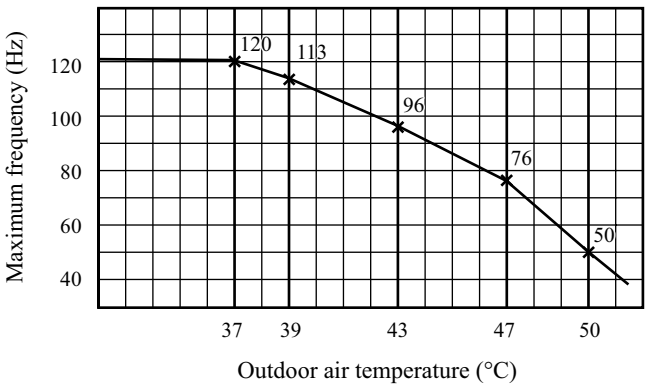
< Maximum compressor frequency control>

1) By controlling the maximum compressor frequency according to the rising outdoor air temperature, it makes the inverter secondary current decreasing and protects the controller from rising temperature.
Compressor frequency is also controlled by detecting inverter secondary frequency

2) Initiation condition: Outdoor air temperature ≧ 35ºC (For cooling operation)

3) Control contents

① Maximum compressor frequency is varied according to following chart.
Whichever the lower of maximum compressor frequency by this control or at normal operation has priority.



* Maximum compressor frequency can be corrected by the code P21 of 7-segment input.

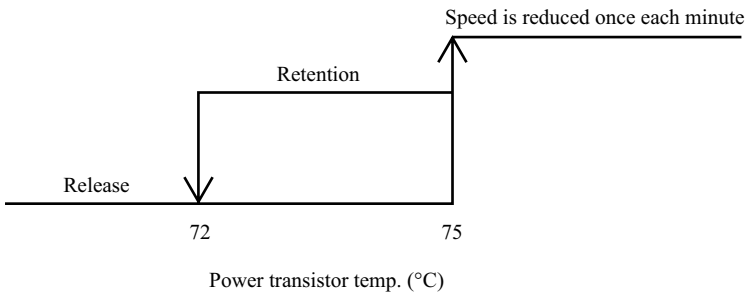
Correction value $\beta = 4 \times \alpha$

(α: Correction coefficient of current safe value)

4) At-end condition: Initiation conditions are not established.

(c) Power transistor temperature (PT) protective control (Master unit/Slave unit)

If the power transistor temperature exceeds 75°C, the compressor speed is controlled.



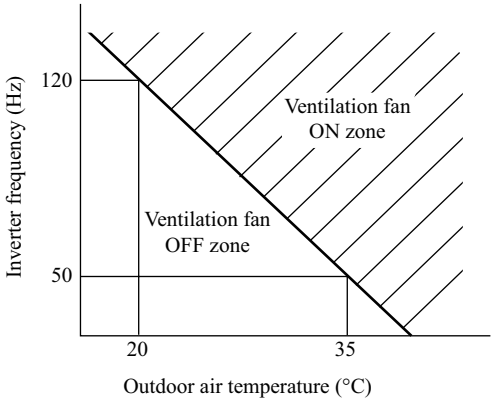
(d) Ventilation fan control for cooling inside control box (Master unit/Slave unit)

If the relationship between the outdoor air temperature (detected with Tho-A) and the inverter frequency (the frequency of CM1 or CM2, whichever the higher) is in the ventilation fan ON zone in the figure mentioned below and when the CM1 or CM2 is operating, the ventilation fan FMC3 is turned ON.

If once it enters in the zone of ON or OFF, FMC3 control is retained for 1 minute before resetting.

However at the start and stop of compressor, 1 minute retention control is invalid.

When all compressors of the unit are stopped, this control is terminated.



(e) Protection for the number of connected indoor units

(i) When the number of connected indoor units exceeds 80 units, all corresponding units are stopped with the error of excessive number of connected indoor units.

(ii) The number of connected indoor units is checked when the automatic address setting is completed, or when turning the power ON or starting operation of indoor units after completion of manual address setting.

(iii) When the error of exessive number of connected indoor units (E43) occurs, the error code (E43) is diplayed up to allowable maximum connected indoor units + 1unit on the LCD of remote controller, but in case of automatic address setting E43 is dispalyed on all of connected indoor units.

(iv) After 3 minutes or more has elapsed since power ON, the capacities of connected indoor units are summed, and if the summed result exceeds the usage limitation in comparison with the capacity of connected outdoor units, it displays error code (E43) and stops all units.

(f) Protection for combination of outdoor units (Master unit)

The capacity of connectable outdoor 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 outdoor unit combination error.

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

Combination list

Model	HP	Normal combination (HP)
P735	26 (12*1+ 14)	12 + 14
P800	28 (14 + 14)	14 + 14
P850	30 (14 + 16)	14 + 16
P900	32 (16 + 16)	16 + 16
P960	34 (16 + 18)	16 + 18
P1010	36 (18 + 18)	18 + 18
P1065	38 (18 + 20)	18 + 20
P1130	40 (20 + 20)	20 + 20
P1180	42 (20*2+ 22)	20 + 22
P1235	44 (22 + 22)	22 + 22
P1300	46 (22 + 24)	22 + 24
P1360	48 (24 + 24)	24 + 24

Note (1) *1 Use FDC335KXE6-K. *2 Use FDC560KXE6-K.

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 outdoor units

(10) 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
Unit stop: Stop in the unit of outdoor unit
Compressor stop: Stop in the 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 supply 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 L3 phase on power supply at primary side	○	E45: Communication error between inverter PCB and outdoor control PCB	○
E36: Discharge pipe temperature anomaly	○	E48: Outdoor DC fan motor anomaly	○
E37: Outdoor 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	○	E59: Compressor startup failure	○
E42: Current cut	○	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 controller displays E??. (To reset the anomaly, it is necessary to reset the inspection from the remote controller.)

2) At the unit stop
On the 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 (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.

3) At the compressor stop
Only the compressor concerned stops, previous states are maintained on the operation output, anomaly output, 7-segment display and LED. To reset the state of anomaly on the compressor, it depends on the condition to reset the state of each anomaly.

Remote controller error display	Anomaly contents	Anomalous stop of master outdoor unit			Anomalous stop of slave outdoor unit		
		System stop	Unit stop	Compressor stop	System stop	Unit stop	Compressor stop
E31	Duplicated outdoor unit address No.	○					
E32	Open L3 Phase on power supply at primary side		○			○	
E36	Discharge pipe temperature anomaliy			○			○
E37	Outdoor 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 thansistor overheat			○			○
E42	Current cut			○			○
E43	Excessive number of indoor unit connected, excessive to tal capacity of connection	○					
E45	Communication error between inverter PCB and outdoor control PCB		○			○	
E48	Outdoor DC fan motor anomaly		○			○	
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			○			○
E59	Compressor startup failure			○			○
E60	Rotor position detection failure			○			○
E61	Communications error between the master unit and slave units	○					
E63	Emergency stop	○					

(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

(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 controller.
In this state, the inspection reset of remote controller is effective. → [E-XX] is displayed continuously on the remote controller.

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.

*

Delete

(11) 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 outdoor 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 optional devices such as center console and etc.

This operation status is transmitted to the optional 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.

*

(B) Optional 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 P11-P14 selected with 7-segment respectively. (External input functions of the code P11-P14 are shown in fig-2)

External input terminal			External input function allotment of 7-segement		
Terminal	Specification	Factory setting	Code	Function No.	Factory setting
CnS1	No volatage contact (DC12V)	Shorted	P11	"0"-"9"	"0"
CnS2	No volatage contact (DC12V)	Shorted	P12	"0"-"9"	"1"
CnG1	No volatage contact (DC12V)	Open	P13	"0"-"9"	"2"
CnG2	No volatage contact (DC12V)	Open	P14	"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 P11 and open J13, and if CnS2 terminal is used for demand control (level input), allot the "1" of P12 and short J13.

(Note) More than one function cannot operate at same time.

Setting *1	Allotment of external input function (P11-P14)	External input terminal shorted	External input terminal open
Master unit	"0": External operation input	Operation permission	Operation prohibition
Master unit	"1": Demand input	Invalid	Valid
Master unit	"2": Forced cooling/heating input	Heating	Cooling
Master unit	"3": Silent mode input 1	Valid	Invalid
Master unit	"4": Spare	-	-
Master/Slave unit	"5": Outdoor fan snow protection control input	Valid	Invalid
Master unit	"6": Test run external input 1 (Equal to SW5-1)	Test run start	Normal operation
Master unit	"7": Test run external input 2 (Equal to SW5-2)	Cooling test run	Heating test run
Master unit	"8": Silent mode input 2	Valid	Invalid
Master unit	"9": Spare	-	-

Fig-2

*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 [P11]-[0] with 7-segment display.

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

CnS2: [P12]-[0] CnG1: [P13]-[0] CnG2: [P14]-[0]

1) Opearation permission or prohibition mode is switched with the connector (CnS1) and the Jumper wire (J13) on the outdoor control PCB after setting function [P11]-[0] (Factory setting) with 7-segment display

J13: Switching of CnS1 input method

J13 shorted: Level input by CnS1

J13 open : Pulse input by CnS1

2) Operation permission/prohibition control by the external input CnS1 to outdoor 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 prohibitiion mode (Reversal)
Shorted / Open	Shorted (Level input)	Operation permission mode ⟶ Operation prohibition mode
	Open (Pulse input)	— (NOP)

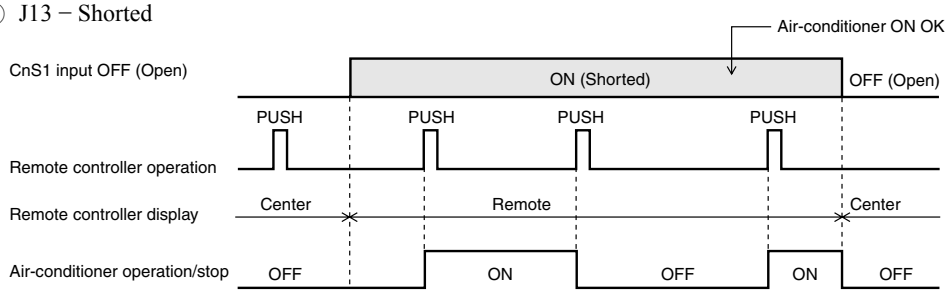
Note (1) Factory setting J13: Shorted, CnS1: Shorted (Short pin is connected)

3) The operation condition is displayed on the LCD of remote controller and it is transferred to optional centralized controller

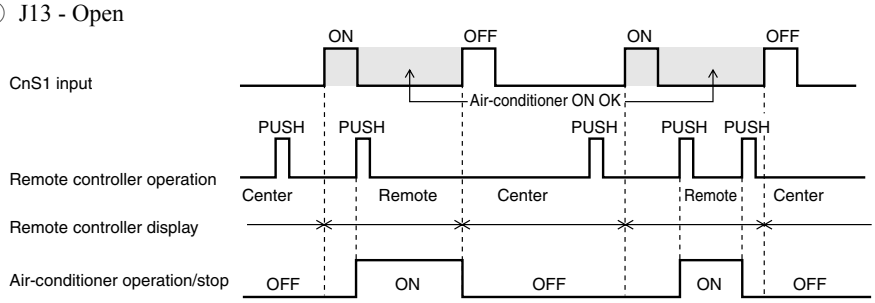
4) When the operation command from remote controller is not accepted by this control, "Center" is displayed on the LCD of remote controller. (See item 5 mentioned next page)

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 [P12]-[1] with 7-segment display.

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

CnS1: [P11]-[1] CnG1: [P13]-[1] CnG2: [P14]-[1]

1) Demand control or normal control is switched with the connector (CnS2) and the jumper wire (J13) on the outdoor control PCB after setting function [P12]-[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 outdoor 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 controller and it is transferred to optional centralized controller

4) Demand control

Demand ratio can be changed with the dip switches (SW4-5, SW4-6) on the outdoor control PCB.

SW4-5, SW4-6 demand switch: 0 - open, 1 - shorted

SW 4-5	SW 4-6	Upper limit operation Hz of compressor				Compressor output (%)
		400	450	504	560	
		14	16	18	20	
0	0	54Hz × 2	60Hz × 2	70Hz × 2	80Hz × 2	80
1	0	78Hz × 1	46Hz × 2	52Hz × 2	60Hz × 2	60
0	1	54Hz × 1	60Hz × 1	70Hz × 1	78Hz × 1	40
1	1	OFF	OFF	OFF	OFF	0

SW 4-5	SW 4-6	Upper limit operation Hz of compressor				Compressor output (%)
		615	680	735	800	
		22	24	26 (12+14)	28 (14+14)	
0	0	72Hz × 2	80Hz × 2	50Hz × 4	54Hz × 4	80
1	0	56Hz × 2	60Hz × 2	74Hz × 2	78Hz × 2	60
0	1	36Hz × 2	40Hz × 2	50Hz × 2	50Hz × 2	40
1	1	OFF	OFF	OFF	OFF	0

SW 4-5	SW 4-6	Upper limit operation Hz of compressor				Compressor output (%)
		850	900	960	1010	
		30 (14+16)	32 (16+16)	34 (16+18)	36 (18+18)	
0	0	58Hz × 4	60Hz × 4	66Hz × 4	70Hz × 4	80
1	0	42Hz × 4	46Hz × 4	50Hz × 4	52Hz × 4	60
0	1	58Hz × 2	62Hz × 2	66Hz × 2	70Hz × 2	40
1	1	OFF	OFF	OFF	OFF	0

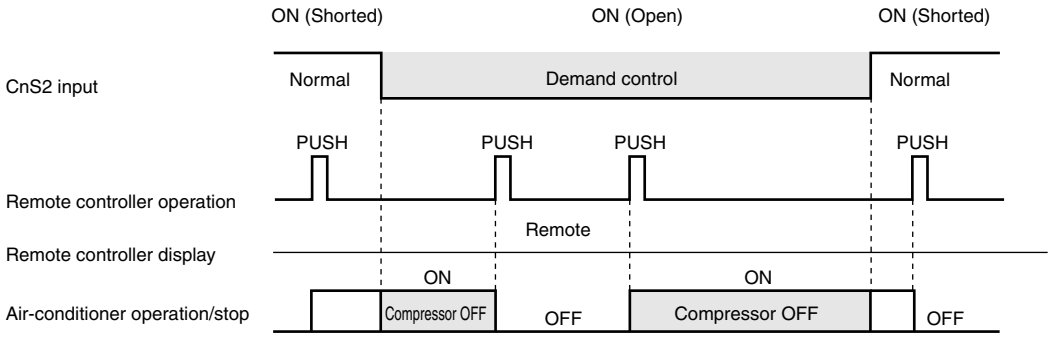
SW 4-5	SW 4-6	Upper limit operation Hz of compressor			Compressor output (%)
		1065	1130	1180	
		38 (18+20)	40 (20+20)	42 (20+22)	
0	0	74Hz × 4	80Hz × 4	84Hz × 4	80
1	0	56Hz × 4	60Hz × 4	64Hz × 4	60
0	1	76Hz × 2	78Hz × 2	42Hz × 4	40
1	1	OFF	OFF	OFF	0

SW 4-5	SW 4-6	Upper limit operation Hz of compressor			Compressor output (%)
		1235	1300	1360	
		44 (22+22)	46 (22+24)	48 (24+24)	
0	0	72Hz × 4	76Hz × 4	80Hz × 4	80
1	0	56Hz × 4	56Hz × 4	60Hz × 4	60
0	1	36Hz × 4	38Hz × 4	40Hz × 4	40
1	1	OFF	OFF	OFF	0

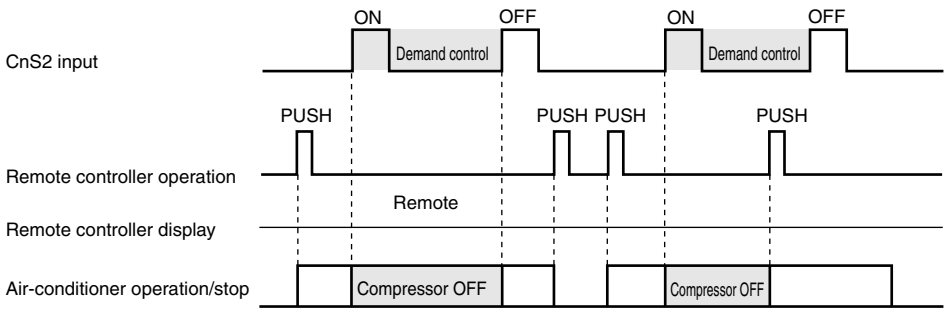
5) This control has priority over the controls of 4-way valve safeguard, compressor protective start operation, defrost operation, oil equalized operation and oil return operation.

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



(2) Silent mode control

(Note) Following explanation is based on using CnG2 terminal and setting functionwith 7-segment display [P14]-[3] or -[8]

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

CnS1: [P11]-[3] or -[8] CnS1: [P12]-[3] or -[8] CnG1: [P13]-[3] or -[8]

(a) Silent mode is commanded either from the indoor unit (remore controller setting) or from the master outdoor unit (CnG2).

(b) When the "Silent mode start" signals is received from one of indoor units, it enters the silent mode operation.,

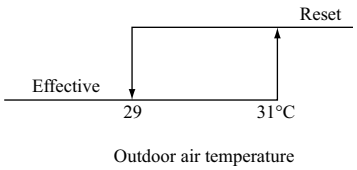
(c) When CnG2 of master unit is shorted after setting function [P14]-[3] (Factory setting) with 7-segment display, it enters the silent mode operation. (If the signal is input to the slave unit, it is invalid)

(d) When the "Silent mode start" signal from indoor unit and the "Silent mode" signal from outdoor unit are received, it enters the silent mode operation under "or"condition.

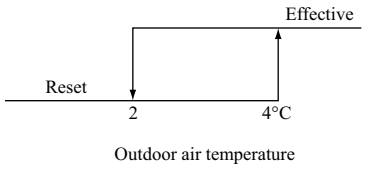
(e) When silent mode signals from all indoor units become "Silent mode end" and when silent mode signal input to CnG2 on outdoor unit becomes open, the silent mode operation is reset.

(f) The silent mode operation is effective within the following temperature range.

• Cooling



• Heating



(3) Outdoor fan snow protection control (Master unit/Slave unit)

(Note) Following explanation is based on setting function with 7-segment display [C75].

However the following terminals and 7-segment function settings are available to use.

CnS1: [P11]-[5] CnS2: [P12]-[5] CnG1: [P13]-[5] CnG2: [P14]-[5]

(a) The setting of this control should be done not only on the master unit but also on the slave unit, because the fans of master unit and the slave unit are controlled independently.

(b) The control is enabled /disabled by selecting [0] or [1] displayed at 7-segement LED of master/slave units.

(c) Operation method of outdoor fan snow protection control

(i) Set the code [C75] on 7-segment display

(ii) “0” or “1” is displayed at the data display area of 7-segment LED.

“0”: Outdoor fan snow protection control is disabled (Factory setting)

“1”: Outdoor fan snow protection control is enabled

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

(iv) “0” or “1” blinks every 0.5 second at the data display area of 7-segment LED.

(v) Press SW8 (one digit) to toggle the display between “0” and “1”.

(vi) If SW7 is pressed for 3 seconds continulouly while “0” and “1” are blinking, “0” or “1” at the data display area of 7-segment LED stops blinking.

With this operation, the enabled/disabled setting of outdoor fan snow protection control is saved in the memory of EEPROM, and henceforth the outdoor fan is controlled according to the contents of memory.

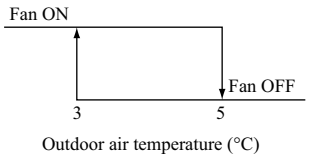
(vii) Contents of outdoor fan snow protection control are retained even if the power is turned off and backed on again.

(d) Contents of outdoor fan snow protection control

(i) At the status of all stop or emergency stop, if the outdoor air temperature drops 3°C or lower, all of outdoor fans are operated at the maximum speed (4th speed) once every 10 minutes.

(ii) The outdoor fan runs for 30 minutes

(iii) During this snow protection control, the magnetic contactor 52C1 of the compressor is ON



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

(Note) Following explanation is based on using CnG1 terminal and setting function [P13]-[2] with 7-segment display.

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

CnS1: [P11]-[2] CnS2: [P12]-[2] CnG2: [P14]-[2]

(a) When SW3-7 on the outdoor control PCB is turned ON after setting function [P13]-[2] with 7-segment display, if CnG1 is shorted, forced heating operation is performed, but if CnG1 is open, forced cooling operation is performed.

(b) 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 controller 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		

(5) 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 tarnsmitted to the outdoor unit, the outdoor unit stops opeartion and emergency stop error message transmitted to all indoor units running.

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

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

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

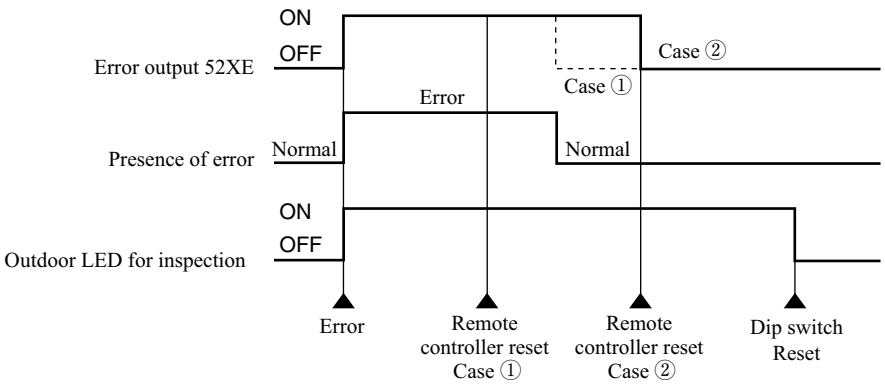
(c) When the outdoor unit receives the “Emergency stop reset” command from the indoor unit, the “Emergency stop reset” command is transmitted to all indoor units.

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

This is the function to retrieve and display the operation and error information on the outdoor 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 outdoor unit.

(a) The terminals for the operation and error outputs at the outdoor unit side are provided on the outdoor 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 controller by pressing "Check" and "Reset" button simultaneously after recovery from the error (Remote controller reset case ②).

Before recovery from the error, if the error reset is done from remote controller, 52XE is not turned OFF, but it will be turned OFF autmatically after the error is recovered subsequently (Remote controller 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 controller is turned ON, in which the fan opertion 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 outdoor controll 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.

(7) Pump down control (Master unit/slave unit)

This control is for recovering refrigerrant to outdoor unit quickly in case of replacement or relocation of the outdoor 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 outdoor 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) If the low pressure (LP) ≤ 0.01MPa is detected for 5 seconds continuously, this control ends normally, and indicates followings

① Red LED: Keeps lighting
② Green LED: Keeps flashing
③ 7-segment display: PdE
④ Remote controller: Stop

(ii) Anomalous all stop by the error detection control

(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 controller: 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.

(C) Data output

(1) 7-segment display and operation data retention

(a) 7-segment display

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

(i) Operation information display

1) Each item is displayed at the 7-segment LED with 6-digit on outdoor contol 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. is kept on displaying.
6) The code No. "C77" 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 "C77".
   The resetting method is to select the code "C77" first. (If any error data is retained, "dEL" is displayed on the data display area.)
   And then when press SW7 for 3 seconds, the retained error data can be erased. However the data of the code No. "C54" and "C55" (compressor cumulative operation time) are not erased.
   When the data is erased, "---" is displayed on the data display area of 7-segment LED. And this is displayed as well when no error data is retained.
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".
9) The data of code No. "C54" and "C55" can be erased independently
   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 "C54" or "C55" 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.

(ii) Individual definition of display contents

1) Code No. "C17": Subcooling degree at cooling mode
   [Subcooling degree at cooling mode] =
   [High pressure saturated temperature detected with high pressure sensor (PHS)]
   -[Subcooling coil temperature detected with subcooling temperature thermistor (Tho-SC)]
   The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.
   During heating mode this data might be unreliable as subcooling degree, but the result is displayed as it is.
2) Code No. "C18": Suction superheat degree
   [Suction superheat degree] =
   [Suction pipe temperature detected with suction pipe temperature thermisot (Tho-S)]
   -[Low pressure saturated temperature detected with low pressure sensor (PLS)]
   The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.
3) Code No. "C19": Superheat degree of subcooling coil
   [Superheat degree of subcooling coil] =
   [Subcooling coil temperature detected with subcooling coil temperature thermistor (Tho-H)]
   -[Low pressure saturated temperature detected with low pressure sensor (PLS)]
   The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.

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

(iv) 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)

(v) Priority of display

1) [EXX] > [CHX] > [PCLX] > [PoE] > [PoS] > [OPE] > [CXX]

Special display

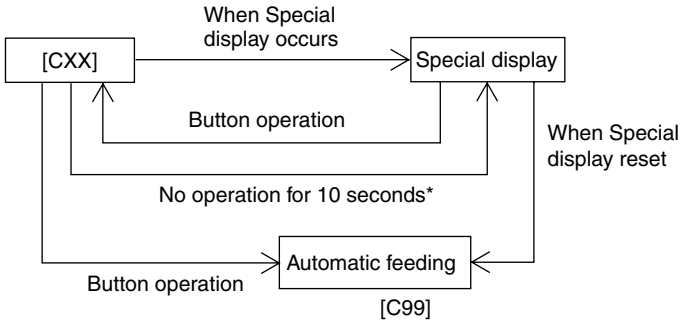
[EXX]: Error code [CHX]: Check mode

[PoE], [PoS]: Pump down opertion [OPE]: Outdoor unit setting

2) If the state of 1) is reset, it is automatically switched to [CXX] (Automatic data display mode)

3) When pressing SW8 or SW9 under the state of 1), it switched to [CXX]

However the button input is not done for 10 seconds after switching to [CXX], the display is changed to the special display according to the priority of the state 1)



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

(b) 7-Segment display

Code No.	Contents of display	Data display range	Minimum units	Remarks
Đ	Unusual code Pump down Check mode Outdoor unit setup, piping cleaning	–	–	E?? PoE, PoS CH?, PCL? OPE??
00	CM1 operating frequency	0~130	1Hz	
01	CM2 operating frequency	0~130	1Hz	
02	Tho-A Outdoor air temp.	L,-20~43	1°C	
03	Tho-R1 Heat exchanger temp. 1 (Exit. Front)	L,-25~73	1°C	
04	Tho-R2 Heat exchanger temp. 2 (Exit. Rear)	L,-25~73	1°C	
05	Tho-R3 Heat exchanger temp. 3 (Entrance. Front)	L,-25~73	1°C	
06	Tho-R4 Heat exchanger temp. 4 (Entrance. Rear)	L,-25~73	1°C	
07	Tho-D1 Discharge pipe temp. (CM1)	L,31~136	1°C	
08	Tho-D2 Discharge pipe temp. (CM2)	L,31~136	1°C	
10	Tho-C1 Under-dome temp. (CM1)	L,5~90	1°C	
11	Tho-C2 Under-dome temp. (CM2)	L,5~90	1°C	
12	Tho-P1 Power transistor temp. (CM1)	L,31~136	1°C	
13	Tho-P2 Power transistor temp. (CM2)	L,31~136	1°C	
14	Tho-SC Sub-cooling coil temp.1	L,18~73	1°C	
15	Tho-SC Sub-cooling coil temp.2	L,-25~73	1°C	
16	Tho-S Suction pipe temp.	L,-25~73	1°C	
17	Cooling operation super cooling	0~50	1°C	
18	Super heat	0~50	1°C	
19	Super heat of sub-cooling coil	0~20	1°C	SHS
20	CT1 Current (CM1)	0~70	1A	
21	CT2 Current (CM2)	0~70	1A	
22	EEVH1 Heating expansion valve opening angle	0~500	1 Pulse	
23	EEVH2 Heating expansion valve opening angle	0~500	1 Pulse	
24	Opening angle of EEVSC overcooling coil expansion valve	0~500	1 Pulse	
26	FM01 Number of rotations	0~1500	10 min^{-1}	

Code No.	Contents of display	Data display range	Minimum units	Remarks
27	FM02 Number of rotations	0~1500	10 min^{-1}	
28	PSH High pressure sensor	0~5.00	0.01MPa	
29	PSL Low pressure sensor	0~2.00	0.01MPa	
30	FMC1, 2 Cooling fan Crankcase heater	0,1	–	Order of 100 : FMC1, 2 Order of 10 : CH1 Order of 1 : CH2 (0: OFF, 1: ON)
31	63H1-1 63H1-2 (63H1-R)	0,1	–	Order of 100 : 63H1-1, 2 Order of 10 : 63H1-R (0: Close, 1: Open)
32	SV1 SV2 (20SL)	0,1	–	Order of 100 : SV1 Order of 10 : SV2 Order of 1 : 20SL (0: Close, 1: Open)
33	SV6 SV7 (SV13)	0,1	–	Order of 100 : SV6 Order of 10 : SV7 Order of 1 : SV13 (0: Close, 1: Open)
34	20S SV11 SV12	0,1	–	Order of 100 : 20S, Order of 10 : SV11 Order of 1 : SV12 (0: close, 1: open)
35	Compressor stop causes ①	0,1	–	Order of 100 : Defective outdoor temperature thermistor Order of 10 : Defective outdoor unit heat exchanger thermistor 1 Order of 1 : Defective outdoor unit heat exchanger thermistor 2 (0:Normal, 1: Abnormal)
36	Compressor stop causes ②	0,1	–	Order of 100 : Defective outdoor unit heat exchanger thermistor 3 Order of 10 : Defective outdoor unit heat exchanger thermistor 4 Order of 1 : Defective discharge pipe thermistor 1 (0:Normal, 1: Abnormal)
37	Compressor stop causes ③	0,1		Order of 100 : Defectived discharge pipe thermistor 2 Order of 10 : Defective Sub cooling coil thermistor 1 Order of 1 : Defective Sub cooling coil thermistor 2 (0:Normal, 1: Abnormal)
38	Compressor stop causes ④	0,1	–	Order of 100 : Defective suction pipe thermistor Order of 10 : Defective low pressure sensor Order of 1 : Defective high pressure sensor (0:Normal, 1: Abnormal)
39	Compressor stop causes ⑤	0,1	–	Order of 100 : Anomaly in inverter 1 Order of 10 : Anomaly in inverter 2 Order of 1 : Anomalous high pressure (0:Normal, 1: Abnormal)
40	Compressor stop causes ⑥	0,1	–	Order of 100 : Anomalous low pressure Order of 10 : Anomalous discharge pipe thermistor 1 Order of 1 : Anomalous discharge pipe thermistor 2 (0:Normal, 1: Abnormal)
41	Compressor stop causes ⑦	0,1	–	Order of 100 : Defect CM1 starting Order of 10 : Defect CM2 starting Order of 1 : Synchronous failure CM1 (0:Normal, 1: Abnormal)
42	Compressor stop causes ⑧	0,1	–	Order of 100 : Synchronous failure CM2 Order of 10 : CM1 Current cut Order of 1 : CM2 Current cut (0:Normal, 1: Abnormal)
43	Compressor stop causes ⑨	0,1	–	Order of 100 : Power transistor 1 overheating Order of 10 : Power transistor 2 overheating Order of 1 : Anomaly in DC fan1 (0:Normal, 1: Abnormal)
44	Compressor stop causes ⑩	0,1	–	Order of 100 : Anomaly in DC fan2 Order of 10 : Stop command from indoor Order of 1 : Operation mode charge (0:Normal, 1: Abnormal)
45	Compressor stop causes ⑪	0,1	–	Order of 100 : Liquid flooding protection Order of 10 : Demand control 0% Order of 1 : Starting error improvement (0:Normal, 1: Abnormal)
46	Control status	0,1	–	Order of 100 : During equal oil control Order of 10 : During oil return control Order of 1 : During defrost (0:Non-operation, 1: Operation)
47	Control status	0,1	–	Order of 100 : During Td control Order of 10 : During HP control Order of 1 : During CS control (0:Non-operation, 1: Operation)
48	Control status	0,1	–	Order of 100 : During LP control Order of 10 : During PT control Order of 1 : Under cooling low pressure control (0:Non-operation, 1: Operation)
49	Control status	0,1	–	Order of 100 : Cooling high pressure protection control Order of 10 : Heating high pressure protection control Order of 1 : Heating low pressure protection control (0:Non-operation, 1: Operation)
50	Number of connected indoor unit	0~50	1	
51	Number of operation indoor unit	0~50	1	
52	Required Hz total	0~999	1Hz	
53	Target Fk	0~999	1Hz	
54	Compressor cumulative operating time (CM1)	0~655	100h	

Code No.	Contents of display	Data display range	Minimum units	Remarks
55	Compressor cumulative operating time (CM2)	0~655	100h	
56	Discharge pressure saturation temperature	-50~70	0.1ºC	1ºC at -10 or lower
57	Air inlet pressure saturation temperature	-50~30	0.1ºC	1ºC at -10 or lower
58	Target cooling low pressure	0.00~2.00	0.01MPa	
59	Target heating high pressure	1.60~4.15	0.01MPa	
60	Counter · Compressor 2 starting failure	0, 1	—	
61	Counter · Synchronous failure compressor 2	0~3	—	
62	Power transistor 2 overheating	0~4	—	
63	Inverter 1 operating frequency command	0~130	1Hz	
64	Inverter 2 operating frequency command	0~130	1Hz	
65	Counter · Inverter 2 communications error	0~3	—	
66	Control status	0,1	—	Order of 100 : During silent mode Order of 10 : During test operation (0:Non-operation, 1: Operation) Order of 1 : Test operation on
67	Check operation status		—	
68	Control status	0,1	—	Order of 100 : Piping cleaning Order of 10 : Under-dome temperature control Order of 1 : Compession ratio protection control (0:Non-operation, 1: Operation)
70	Operation priority switching	0,1	—	0: Prior press priority (when shipped) 1: After press priority
71	High pressure control of cooling	2.2, 2.5	0.01MPa	2.2: Factory setting 2.5: Alternate setting
72	low pressure control of cooling	-0.05~+0.05	0.01MPa	0.00: Factory setting
73	Heating high pressure compensation	0.00~0.30	0.01MPa	0.00: Factory setting
74	Low pressure of heating	0.80, 0.90	—	0.8: Factory setting 0.9: Alternate setting
75	Snow protection fan control	0,1	—	0: Snow protection fan control deactivated 1: Snow protection fan control activated
77	Data reset	---, dEL	—	
78	Refrigerant quantity check status		—	
79	Counter/Liquid -back error	0~2	—	
80	Counter · Thermistor disconnection	0~2	—	
81	Counter · Inverter 1 communications error	0~3	—	
82	Counter · High pressure protection	0~4	—	
83	Counter · Compressor 1 starting failure	0,1	—	
84	Counter · Anomalous low pressure ① (Under stop)	0~4	—	

Code No.	Contents of display	Data display range	Minimum units	Remarks
85	Counter · Anomalous low pressure ② (Immediately after starting)	0,1	—	
86	Counter · Anomalous low pressure ③ (Under operation)	0~4	—	
87	Counter · Synchronous failure compressor 1	0~3	—	
88	Counter · Overheating of power transistor 1	0~4	—	
89	Counter · Anomalous temp. of discharge pipe 1	0,1	—	
90	Counter · Anomalous temp. of discharge pipe 2	0,1	—	
91	Counter · Current cut (CM1)	0~3	—	
92	Counter · Current cut (CM2)	0~3	—	
93	Counter · Indoor-outdoor communications error	0~255	—	
94	Counter · Outdoor inverter communications error 2	0~255	—	
95	Counter · CPU reset	0~255	—	
96	Counter · Anomalous FM01	0~255	—	
97	Counter · Anomalous FM02	0~255	—	
98	Program version	—	—	Example (2.11)
99	Auto send display	—	—	
P10	2-step demand setting			For optional functions (special substrate required)
P11	CNS1 function assignment	0~9	1	Factory setting: 0 (External operation input)
P12	CNS2 function assignment	0~9	1	Factory setting: 1 (Demand input)
P13	CNG1 function assignment	0~9	1	Factory setting: 2 (Forced cooling/heating input)
P14	CNG2 function assignment	0~9	1	Factory setting: 3 (Silent mode input)
P15	CNQ5 function assignment	0~9	1	Factory setting: 4 (2-step demand input)
P16	Outdoor unit fan snow protection control ON time	10.30~600	30 seconds	Factory setting: 30 seconds
<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 stating 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	0: (Factory default) 1~24(*)	1	Specify the number of indoor units connected in one refrigerant system for automatic address setting. (*) Maximum connectable number of indoor units for each outdoor unit
P34	Polarity difinition	0: (Factory default) 0, 1	—	0: Network polarity not defined 1: Network polarity defined

Code No.	Contents of display	Data display range	Minimum units	Remarks
AUX	Auto address setting on			
AUE	Indoor unit address No. assignment normal ending			
A01	Indoor unit address No. assignment error 1			
A02	Indoor unit address No. assignment error 2			
A03	Indoor unit address No. assignment error 3			
A04	Super Link setting error			

(c) Saving of Operation Data

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

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

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

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

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

Outdoor unit capacity data	Outdoor unit capacity data	Remarks
Single type	Example: 24HP - [S24]	S: Display with Horse Power of single type or single use of combination type
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 - [C20]	C: Display with Horse Power of slave unit of combination type

(iv) Error retention and monitoring data

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
00	Anomalous code	00~99	—	1	00: No anomalous, outdoor unit all anomalous ???
01	Address of unit where trouble occurred	00~FF	—	1	00~3F: Outdoor unit side, 40~6F: Indoor unit side
02	Operation mode	0~2	—	1	0 Stop 1 Cooling 2 Heating
03	High pressure sensor	0.00~5.00	A/D value	1	
04	Low pressure sensor	0.00~2.00	A/D value	1	
05	Heat exchanger temp. 1 (Exit, Front)	-35~75	A/D value	2	Cooling liquid side
06	Heat exchanger temp. 2 (Exit, Rear)	-35~75	A/D value	2	Cooling liquid side
07	Heat exchanger temp. 3 (Entrance, Front)	-35~75	A/D value	2	Cooling gas side
08	Heat exchanger temp. 4 (Entrance, Rear)	-35~75	A/D value	2	Cooling gas side
09	Tho-D1 Discharge pipe temp. (CM1)	20~140	A/D value	1	
10	Tho-D2 Discharge pipe temp. (CM2)	20~140	A/D value	1	
11	Tho-C1 Under-dome temp. (CM1)	-15~90	A/D value	1	
12	Tho-C2 Under-dome temp. (CM2)	-15~90	A/D value	1	
13	Tho-A Outdoor air temp.	-20~43	A/D value	1	
14	Tho-P1 Power transistor temp. (Heat dissipation fin)	20~140	A/D value	1	

*

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
15	Tho-P2 Power transistor temp. (Heat dissipation fin)	20~140	A/D value	1	
16	Tho-SC Sub cooling coil temp. 1	18~73	A/D value	1	Liquid pipe side
17	Tho-H Sub cooling coil temp. 2	-35~75	A/D value	2	Suction pipe side
18	Tho-S Suction pipe temp.	-35~75	A/D value	2	
19	Cooling operation super cooling	0~50	A/D value	1	
20	Super heat	0~50	A/D value	1	
21	Super heat of sub-cooling coil	0~50	A/D value	1	
22	CT1 Current	0~50	A/D value	1	
23	CT2 Current	0~50	A/D value	1	
24	Power source voltage	180~500	A/D value	1	
25	Pressure switch	—	—	1	Bit0 63H1 0: open, 1: close Bit1 63H1-R 0: open, 1:ON Bit2 63L 0: open, 1:ON
26	Solenoid valve	—	—	1	Bit0 20S 0:OFF, 1:ON Bit2 SV1 0:OFF, 1:ON Bit3 SV2 0:OFF, 1:ON Bit4 SV6 0:OFF, 1:ON Bit5 SV7 0:OFF, 1:ON Bit6 SV11 0: open, 1:ON Bit7 SV12 0: open, 1:ON
27	Crankcase heater etc.	—	—	1	Bit0 CH1 0:OFF, 1:ON Bit1 CH2 0:OFF, 1:ON Bit2 FM1,2 0:OFF, 1:ON Bit3 FMC3 0:OFF, 1:ON Bit4 Spare Bit5 Spare Bit6 SV13 0:OFF, 1:ON Bit7 Spare
28	FM01 Number of rotations	0~65535	10 min^{-1}	2	
29	FM02 Number of rotations	0~65535	10 min^{-1}	2	
30	EEVH1 opening angle	0~65535	1pulse	2	
31	EEVH2 opening angle	0~65535	1pulse	2	
32	EEVSC opening angle	0~65535	1pulse	2	
34	Indoor unit connection number	0~255	1 unit	1	
35	Indoor unit connection capacity	0~65535	—	2	
36	Indoor unit thermostat ON number	0~255	1 unit	1	
37	Indoor unit thermostat ON capacity	0~65535	—	2	
38	Required Hz total	0~65535	1Hz	2	
39	Target FK	0~65535	1Hz	2	
40	Inverter CM1 operation frequency	0~255	1Hz	1	

Code No.	Write-in contents	Record data				
		Data write-in range	Write-in unit	Number of bytes	Contents	
41	Inverter CM2 operation frequency	0~255	1Hz	1		
42	Answer Hz total	0~65535	1Hz	2		
43	Compressor 1 cumulative operating time (estimate)	0~65535	1 h	2		
44	Compressor 2 cumulative operating time (estimate)	0~65535	1 h	2		
45	Compressor 1 start times	0~65535	20 times	2		
46	Compressor 2 start times	0~65535	20 times	2		
47	Compressor stop causes	—	—	1	Bit0	Defective outdoor temperature thermistor
					Bit1	Defective outdoor unit heat exchanger 1 thermistor
					Bit2	Defective outdoor unit heat exchanger 2 thermistor
					Bit3	Defective outdoor unit heat exchanger 3 thermistor
					Bit4	Defective outdoor unit heat exchanger 4 thermistor
					Bit5	Defective discharge pipe thermistor 1
					Bit6	Defective discharge pipe thermistor 2
					Bit7	Defective sub-cooling coil thermistor 1
48	Compressor stop causes	—	—	1	Bit0	Defective sub-cooling coil thermistor 2
					Bit1	Defective suction pipe thermistor
					Bit2	Defective low pressure sensor
					Bit3	Defective high pressure sensor
					Bit4	Inverter 1 anomalous communication
					Bit5	Inverter 2 anomalous communication
					Bit6	Anomalous high pressure
					Bit7	Anomalous Low pressure
49	Compressor stop causes	—	—	1	Bit0	Td1 Anomalous discharge pipe temp.
					Bit1	Td2 Anomalous discharge pipe temp.
					Bit2	CM1 starting defect
					Bit3	CM2 starting defect
					Bit4	Synchronous failure of CM1
					Bit5	Synchronous failure of CM2
					Bit6	Current cut of CM1
					Bit7	Current cut of CM2
50	Compressor stop causes	—	—	1	Bit0	Power transistor 1 overheating
					Bit1	Power transistor 2 overheating
					Bit2	FM01 anomaly
					Bit3	FM02 anomaly
					Bit4	Compressor stop command from indoor unit
					Bit6	Dilution rate protection
					Bit7	Demand control 0%
51	Control status	0~180	1 second	1	CM1 3-minute delay timer	
52	Control status	0~180	1 second	1	CM2 3-minute delay timer	
53	Discharge pressure saturation temperature	-50~70	0.1ºC	2		
54	Intake pressure saturation temperature	-50~70	0.1ºC	2		
55	Control status equal oil 2	0,1	—	1	0	None
					1	Under control
56	Control status oil return	0~2	—	1	0	None
					1	Waiting for oil return
					2	Under oil return
57	Control status defrost conditions	0~3	—	1	0	None
					1	Temperature conditions
					2	Strengthening temperature conditions
					3	Time conditions

Code No.	Write-in contents	Record data				
		Data write-in range	Write-in unit	Number of bytes	Contents	
58	Control status defrost status	0~4	—	1	0	None
					1	Defrosting status 1
					2	Defrosting status 2
					3	Defrosting status 3
					4	Defrosting status 4
					5	Defrosting status 5
					6	Defrosting status 6
					7	Defrosting status 7
59	Control status Td	0~3	—	1	0	None
					1	Frequency down
					2, 3	Under Td control
60	Control status	0~1	—	1	Td1 error counter	
61	Control status	0, 1	—	1	Td2 error counter	
62	Control status HP	0~2	—	1	0	None
					1	Frequency down
					2, 3	Under high pressure control
63	Control status	0~1	—	1	HP error (63H1) counter	
64	Control status CS	0~3	—	1	0	None
					1	Frequency down
					2, 3	Under CS control
65	Control status LP	0~3	—	1	0	None
					1	Frequency down
					2, 3	Under low pressure control
66	Control status	0~3	—	1	LP error (when stopped) counter	
67	Control status	0~4	—	1	LP error (when started) counter	
68	Control status	0,1	—	1	LP error (when driving) counter	
69	Control status PT	0~3	—	1	0	None
					1	Frequency down
					2, 3	Under PT control
70	Check operation and Refrigerant quantity check	—	—	1		
71	Control status	0~360	3 minutes	1	CH compressor protection timer	
72	Control status CH compressor protective start	0~15	—	1	15	Protective start end
					0~14	During protective start
73	Switch etc.	—	—	1	Bit0	External operation (CnS1)
						0: Operation prohibition
						1: Operation permission
					Bit1	Demand (CnS2)
						0: None
						1: Under control
					Bit2	Forced cooling, heating (CnG1)
						0: None
						1: Under control
					Bit3	Silent mode (CnG2)
						0: None
						1: Under control
					Bit4	Back up operation
						0: None
						1: Back up operation
					Bit5	Hz cancel operation
						0: None
						1: Under control
74	Control status	0~3	—	1	Current cut anomaly counter (INV1)	
75	Control status	0~4	—	1	Power transistor overheating anomaly counter (INV1)	
76	Control status	0~3	—	1	Synchronous failure counter (INV1)	
77	Control status	0~1	—	1	Starting failure counter (INV1)	

Code No.	Write-in contents	Record data			
		Data write-in range	Write-in unit	Number of bytes	Contents
78	Control status	0~3	—	1	Communications anomaly counter (INV1)
79	Control status	0~3	—	1	Current cut anomaly counter (INV2)
80	Control status	0~4	—	1	Power transistor overheating anomaly counter (INV2)
81	Control status	0~3	—	1	Synchronous failure counter (INV2)
82	Control status	0~1	—	1	Starting failure counter (INV2)
83	Control status	0~3	—	1	Communications anomaly counter (INV2)
84	Control status	0~1	—	1	DC fan motor 1 error counter
85	Control status	0~1	—	1	DC fan motor 2 error counter
86	Control status	0~2	—	1	Thermistor disconnection counter
87	Control status	0~255	—	1	Communications error counter (INV)
88	INV1 information	—	—	1	Version (Initial value FFh)
		—	—	1	DIP SW (Initial value FFh)
		—	—	2	Spare
	INV2 information	—	—	1	Version (Initial value FFh)
		—	—	1	DIP SW (Initial value FFh)
		—	—	2	Spare
89	Registered indoor units 1~8 required Hz	0~255	1Hz	8	
90	Registered indoor units 1~8 answer Hz	0~255	1Hz	8	
91	Operation priority switching	0~1	—	1	0 Prior press priority 1 After press priority
92	High pressure control of cooling	2.20,2.50	0.01MPa	1	
93	Cooling low pressure compensation	-0.05~0.05	0.01MPa	1	
94	Low pressure control of heating	0.80,0.90	0,01MPa	1	
95	Snow protection fan control	0~1	—	1	0 With 1 None
96	CM1 frequency command	0~130	1Hz	1	
97	CM2 frequency command	0~130	1Hz	1	
98	Target cooling low pressure	0.00~2.00	0.01MPa	1	
99	Control status TC	0~2	—	1	0 None 1 Frequency down 2, 3 Under-dome temperature control
100	Target heating high pressure	1.60~4.15	0.01MPa	2	
101	Heating high pressure compensation	0.00~0.30	0.01MPa	1	
102	Control / status SCR	0~2	—	1	0 None 1 Frequency down 2, 3 Under compression ratio protection control
103	Equal oil loss amount CM1	0~65535	1cc	2	
104	Equal oil loss amount CM2	0~65535	1cc	2	

Code No.	Write-in contents	Record data				
		Data write-in range	Write-in unit	Number of bytes	Contents	
105	Return oil loss amount CM1	0~65535	1cc	2		
106	Return oil loss amount CM2	0~65535	1cc	2		
107	Oil return cumulative time	0~255	× 3 min.	1		
108	Equal oil cumulative Hz master CM1	0~65535	1Hz	2		
109	Equal oil cumulative Hz master CM2	0~65535	1Hz	2		
110	Equal oil cumulative Hz slave CM1	0~65535	1Hz	2		
111	Equal oil cumulative Hz slave CM2	0~65535	1Hz	2		
112	Equal oil rotation Hz	0~65535	1Hz	2		
113	Equal oil rotation status	—	—	1	Other than 0	Rotation on
114	Compressor of incomplete differential pressure start	—	—	1	Other than 0	With incomplete compressor
115	Under-dome overheat degree CM1	-32768~ -32767	0.01ºC	2		
116	Under-dome overheat degree CM2	-32768~ -32767	0.01ºC	2		
117	SHTc frequency restriction	—	—	1	Other than 0	Control on
118	Indoor unit EEV control	—	—	1	Bit5	LP error compensation
					Bit4	External regulator HP protection
					Bit3	No-heating compensation
					Bit2	HP/Td protection
					Bit1	Siren sound suppressing
					Bit0	Full closure detection
119	Compressor stop causes	—	—	1	Bit0	Broken Tho-P_2 wire
					Bit1	Broken Tho-P_1 wire
120	Anomalously stopped compressor	—	—	1	Other than 0	With stopped compressor
121	Backup display	—	—	1	Other than 0	Backup on
122	Backup cumulative time	0~65535	× 10 sec.	2		
123	Control status	0~2	—	1	Liquid backup error counter	

(2) Outdoor PCB setting

Code	Input		Remarks
SW1	Outdoor address No. (Order of 10)		
SW2	Outdoor address No. (Order of 1)		
SW3-1	Inspection LTD reset	Normal★/reset	
SW3-2	Auto backup operation	None★/With	
SW3-4	Refrigerant quantity check	Normal★/Check	
SW3-5	Check operation	Normal★/Check	
SW3-7	Forced heating/cooling	Normal/Forced heating-cooling	
SW5-1	Test run SW	Normal★/Test run	
SW5-2	Test run	Heating★/Cooling	
SW5-3	Pump down SW	Normal★/Pump down	
SW5-5	SL selector	New SL (Auto)★/Old SL	
SW5-6	Capacity measurement mode		
SW5-7	Capacity measurement mode		
SW5-8	Capacity measurement mode		
SW7	Data erase/write		
SW8	7-segment display code No. increasing (order of 1)		
SW9	7-segment display code No. increasing (order of 10)		
SW4-1	Model selection		See following table
SW4-2			
SW4-3			
SW4-4			
SW4-5	Demand ratio selection		See following table
SW4-6			
SW4-7	Master/slave unit setting address		See following table
SW4-8	Master/slave unit setting address		
J11	Power supply voltage selection		
J12	Power supply voltage selection		
J13	External input	Level★/Pulse	
J14	Defrost reset temperature	Normal★/Intensive	
J15	Defrost start temperature	Normal★/Cold region	
J16	Model selection		See following table

Note (1) Jumper wires J13, J15 indicate short-circuit/open.
(2) Dip switch SW's indicate OFF/ON
(3) ★indicates the factory setting (OFF).

■ Model selection with SW4-1 SW4-4 and J16

0: OFF 1: ON

Model (HP)	335-K (12)	400 (14)	450 (16)	504 (18)	560 (20)	560-K (20)	615 (22)	680 (24)
SW4-1	0	0	1	0	1	1	0	1
SW4-2	1	0	0	1	1	1	0	0
SW4-3	0	1	1	1	1	0	0	0
SW4-4	0	0	0	0	0	1	1	1
J16	0	0	0	0	0	0	0	0

■ Demand ratio selection with SW4-5, SW4-6

0: OFF 1: ON

SW4-5	SW4-6	Compressor capacity(%)
0 ★	0 ★	80
1	0	60
0	1	40
1	1	0

■ Master/slave setting with SW4-7, SW4-8

0: OFF 1: ON

Outdoor unit	SW4-7	SW4-8
Master unit	0 ★	0 ★
Slave unit 1	1	0
Slave unit 2	0	1
Slave unit 3	1	1

2 SYSTEM TROUBLESHOOTING PROCEDURE

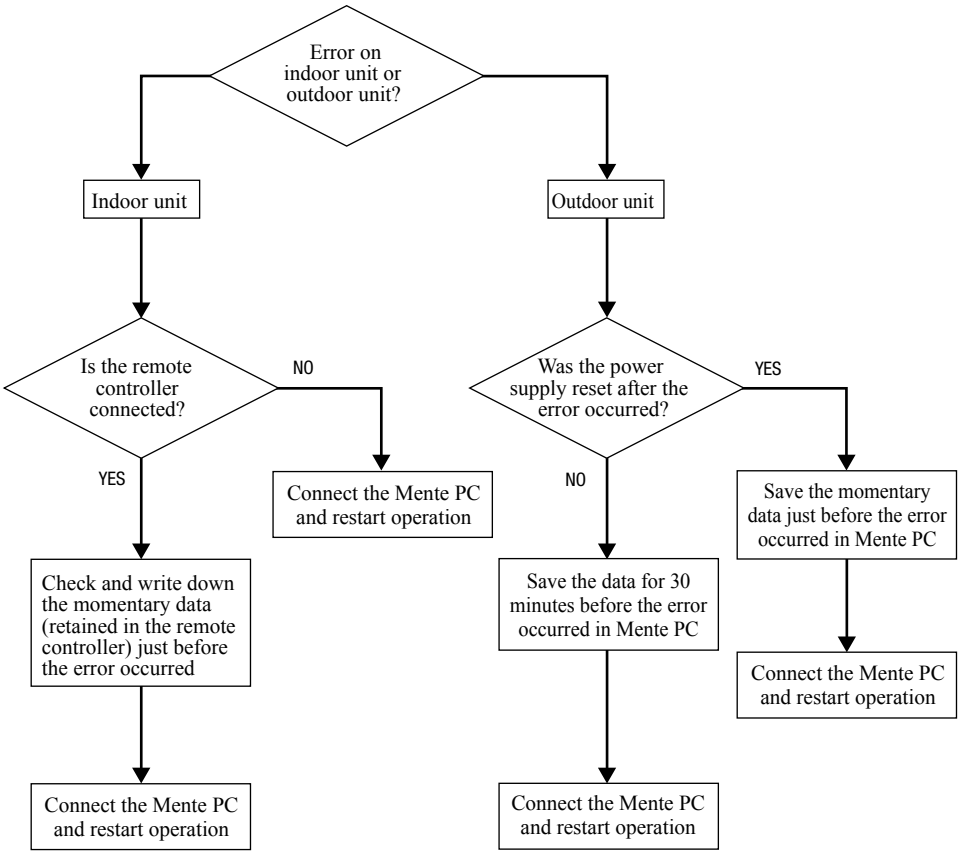
2.1 Basics of troubleshooting

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

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

Method of error data analysis (Basic procedure)

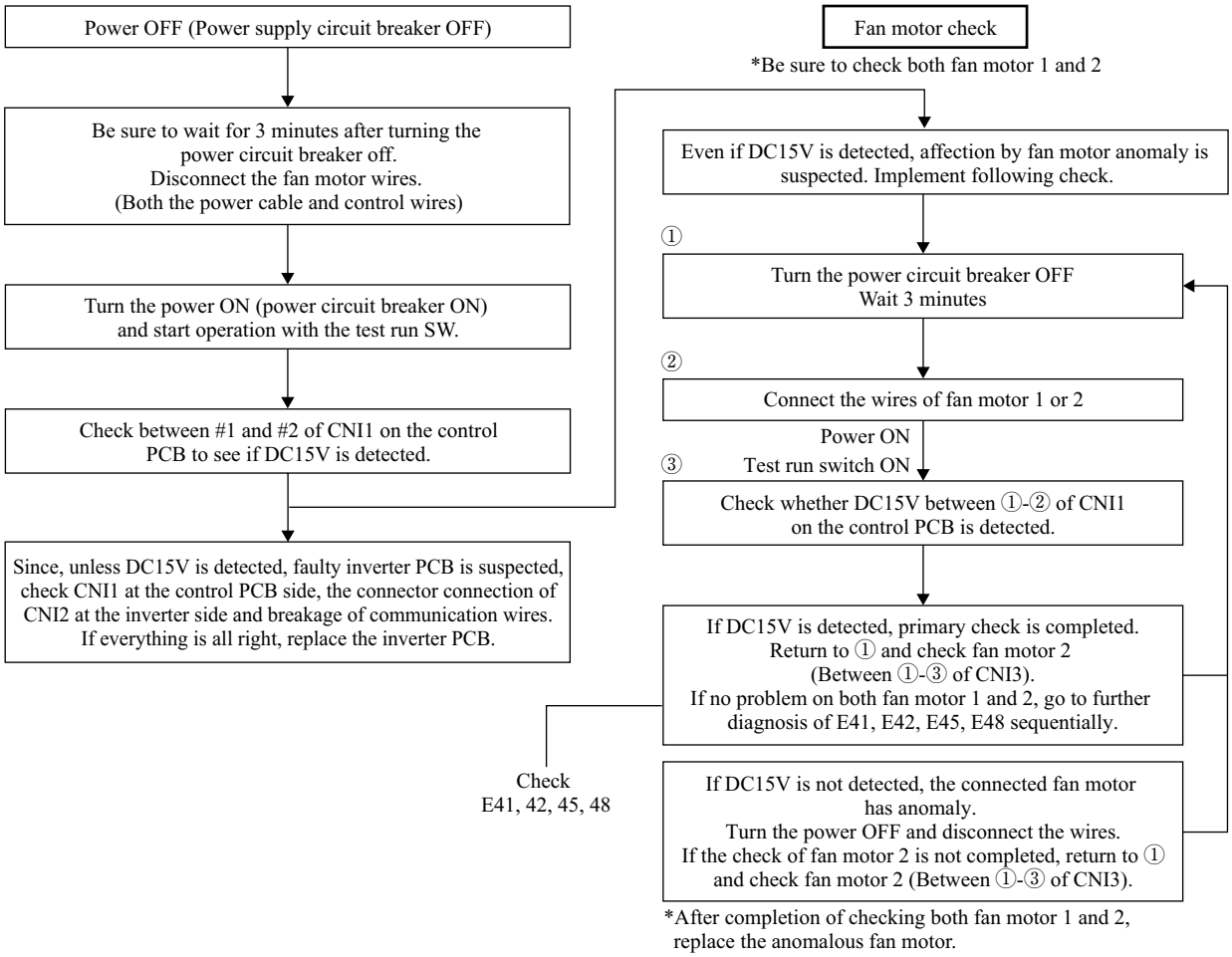
- Identify whether particular error occurred during operation or stopping.
- Is it caused by the installation conditions of outdoor/indoor unit? (Refrigerant quantity, pipe length, short-circuit, clogged filter, etc.)
- Isn't there any beginner's mistake at the installation? (Wrong address, mistake in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



2.2 Explanation of troubleshooting

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

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



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

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

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

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

P: P terminal of power transistor

N: N terminal of power transistor

U: End of red harness to compressor

V: End of white harness to compressor

W: End of blue harness to compressor

Terminal (+)	Terminal (--)	Normal value (Ω)	
P	N	about 1M	Several 10 M
N	P	about 300-400	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 outdoor units

Remote controller error code	7-segment display	Name of inspection	Classification	Page
E1	–	Remote controller communication error	Communication error	64
E2	–	Duplicated indoor unit address	Address setting error	65
E3	–	Outdoor unit signal line error	Address pairing setting error	66
E5	–	Communication error during operation	Communication error	67
E6	–	Indoor heat exchanger temperature thermistor anomaly (Thi-R)	Thermistor wire breakage	68
E7	–	Indoor return air temperature thermistor anomaly (Thi-A)	Thermistor wire breakage	69
E9	–	Drain trouble	System error	70
E10	–	Excessive number of indoor units (more than 17 units) by controlling one remote controller	Communication error	71
E12	–	Address setting error by mixed setting method	Address setting error	72
E16	–	Indoor fan motor anomaly (FDT series)	DC fan motor error	73
	–	Indoor fan motor anomaly (FDK series)	DC fan motor error	74
E19	–	Indoor unit operation check drain motor check mode anomaly	Setting error	75
E28	–	Remote controller temperature thermistor anomaly (ThC)	Thermistor wire breakage	76
E30	E30	Unmatch connection of indoor and outdoor unit	System error	77
E31	E31	Duplicated outdoor unit address No.	Address setting error	78
E32	E32	Open L3 Phase on power supply at primary side	Site setting error	79
E36	E36-1, 2	Discharge pipe temperature error (Tho-D1, D2)	System error	80
	E36-3	Liquid flooding anomaly	System error	81
E37	E37-1, 2 E37-4, 5 E37-5, 6	Outdoor heat exchanger temperature thermistor (Tho-R) and subcooling coil temperature thermistor (Tho-SC, -H) anomaly	Thermistor wire breakage	82
E38	E38	Outdoor air temperature thermistor anomaly (Tho-A)	Thermistor wire breakage	83
E39	E39-1, 2	Discharge pipe temperature thermistor anomaly (Tho-D1, D2)	Thermistor wire breakage	84
E40	E40	High pressure anomaly (63H1-1, 2 activated)	System error	85
E41 (E51)	E41 (E51)-1, 2	Power transister overheat	System error	86
E42	E42-1, 2	Current cut (CM1, 2)	System error	87
E43	E43-1 E43-2	Excessive number of indoor units connected, excessive total capacity of connection	Site setting error	88
E45	E45-1, 2	Communication error between inverter PCB and outdoor control (PCB)	Communication error	89
E46	E46	Mixed address setting methods coexistent in same network	Address setting error	90
E48	E48-1 E48-2	Outdoor DC fan motor anomaly	DC fan motor error	91
E49	E49	Low pressure anomaly	System error	92
E53/E55	E53/E55-1, 2	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C1, C2)	Thermistor wire breakage	93
E54	E54-1 E54-2	High pressure sensor (PSH)/Low pressure sensor (PSL) anomaly	Thermistor wire breakage	94
E56	E56-1, 2	Power transitor temperature thermistor anomaly (Tho-P1, Tho-P2)	Thermistor wire breakage	95
E58	E58	Anomalous compressor by loss of synchronism	System error	96
E59	E59-1, 2	Compressor startup failure (CM1, 2)	System error	97
E60	E60-1, 2	Rotor position detection failure (CM1, 2)	System error	98
E61	E61	Communication error between the master unit and slave units	System error	99
E63	E63	Emergency stop	Site setting error	100

(b) Troubleshooting

Error code	LED	Green	Red	Content
Remote controller: None 7-segment display:	Indoor	Keeps flashing	Stays Off	Operates but does not cool
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Poor compression of compressor
- Expansion valve operation anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Check the indoor fan operation Check the temperature difference between return and suction air of indoor unit	
Is the temperature differnce between return and suction air 10-20°C at cooling? — YES → Does the heat load increase after installtion? — NO →	It is normal (This unit is designed to start in the soft start mode by detecting the compressor under-dome temperature when it restart after power reset)
Does the heat load increase after installtion? — YES → Mistake in model selection. Calculate heat load once more.	It is necessary to replace to higher capacity unit or to install additional unit
Is the compressor operating? — NO → "WAIT" message is displayed [for 3 seconds] when performing cooling, defumidifying or heating operation from remote controller? — YES →	Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.
"WAIT" message is displayed [for 3 seconds] when performing cooling, defumidifying or heating operation from remote controller? — NO →	Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputer control function
Is the compressor operating? — YES → Is the compressor rotation speed low? — NO →	Check the followings • Minor clogging of filter • Minor fouling of heat exchanger • Minor short-circuit of airflow • Slightly insufficient or excessive refrigerant amount • Poor compression of compressor
Is the compressor rotation speed low? — YES → Check following operation control function. · Control for determing compressor rotation speed · Protective control by controlling compressor rotation speed Which control is appropriate to this phenomenon	Check suspicious points considering appropriate operation control
Is the operating conditions of indoor/outdoor unit under rated condition? — YES →	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
Is the operating conditions of indoor/outdoor unit under rated condition? — NO → The unit is operating normally, but is operating under the protective control of compressor or other respective components	

Note (1) Outdoor: 35ºC
Indoor : 27ºCDB/19ºCWB

Note:

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

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
Check the indoor fan operation Check the temperature difference between return and suction air of indoor unit	
Is the temperature differnce between return and suction air 10-30° at heating? — YES → Does the heat load increase after installtion? — NO →	It is normal (This unit is designed to start in the soft start mode by detecting the compressor under-dome temperature when it restart after power reset)
Does the heat load increase after installtion? — YES → Mistake in model selection. Calculate heat load once more.	It is necessary to replace to higher capacity unit or to install additional unit
Is the temperature differnce between return and suction air 10-30° at heating? — NO → Is the compressor operating?	
Is the compressor operating? — NO → "WAIT" message is displayed [for 3 seconds] when performing cooling, defumidifying or heating operation from remote controller? — YES →	Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.
"WAIT" message is displayed [for 3 seconds] when performing cooling, defumidifying or heating operation from remote controller? — NO →	Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputer control function
Is the compressor operating? — YES → Is the compressor rotation speed low?	
Is the compressor rotation speed low? — NO →	Check the followings • Minor clogging of filter • Minor fouling of heat exchanger • Minor short-circuit of airflow • Slightly insufficient or excessive refrigerant amount • Poor compression of compressor
Is the compressor rotation speed low? — YES → Check following operation control function. · Control for determing compressor rotation speed · Protective control by controlling compressor rotation speed Which control is appropriate to this phenomenon	Check suspicious points considering appropriate operation control
Is the operating conditions of indoor/outdoor unit under rated condition? — YES →	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
Is the operating conditions of indoor/outdoor unit under rated condition? — NO → The unit is operating normally, but is operating under the protective control of compressor or other respective components	

Note (1) Outdoor: 7ºC
Indoor : 20ºCDB

Note:

Error code	LED	Green	Red	Content
Remote controller: None 7-segment display:	Indoor	Stays Off	Stays Off	Earth leakage breaker activated
	Outdoor	Stays Off	Stays Off	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

- Compressor anomaly
- Noise

5.Troubleshooting

Diagnosis	Countermeasure
Are the insulation resistance and and coil resistance of compressor OK? — NO →	Replace compressor. *
YES ↓ Is insulation of respective harnesses OK? — NO →	Secure insulation resistance.
YES ↓ Is any hamess bitten between pannel and casing or etc? — YES →	Secure insulation resistance.
NO ↓ Check the outdoor unit grounding wire and earth leakage breaker	

Check of the outdoor unit grounding wire and earth leakage breaker

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

* Insulation resistance of compressor
- Immediately after installation or when the unit has been left for long period without power supply, the insulation resistance may drop to a few M 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 controller: None 7-segment display:	Indoor	–	–	Excessive noise/vibration (1/3)
	Outdoor	–	–	

1.Applicable model

All models

2.Error detection method

3. Condition of error displayed

4.Presumable cause

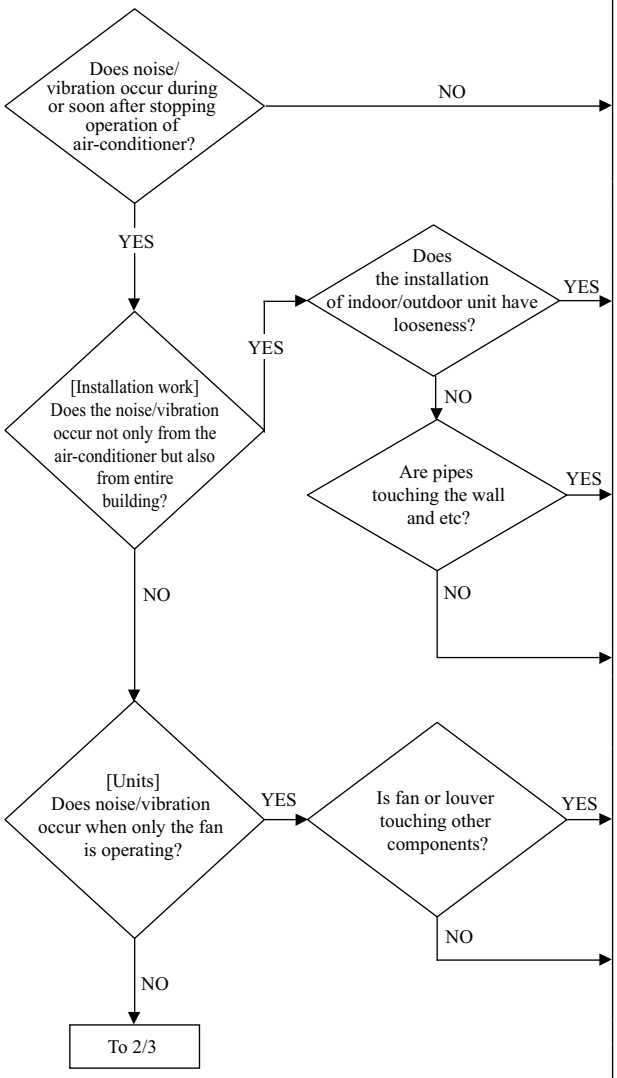
① Improper installation work
- Improper vibration-proof work at instllation
- Insufficient strength of mounting surface

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 th eheat 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 controller: None 7-segment display:	Indoor	–	–	Excessive noise/vibration (2/3)
	Outdoor	–	–	

1. Applicable model

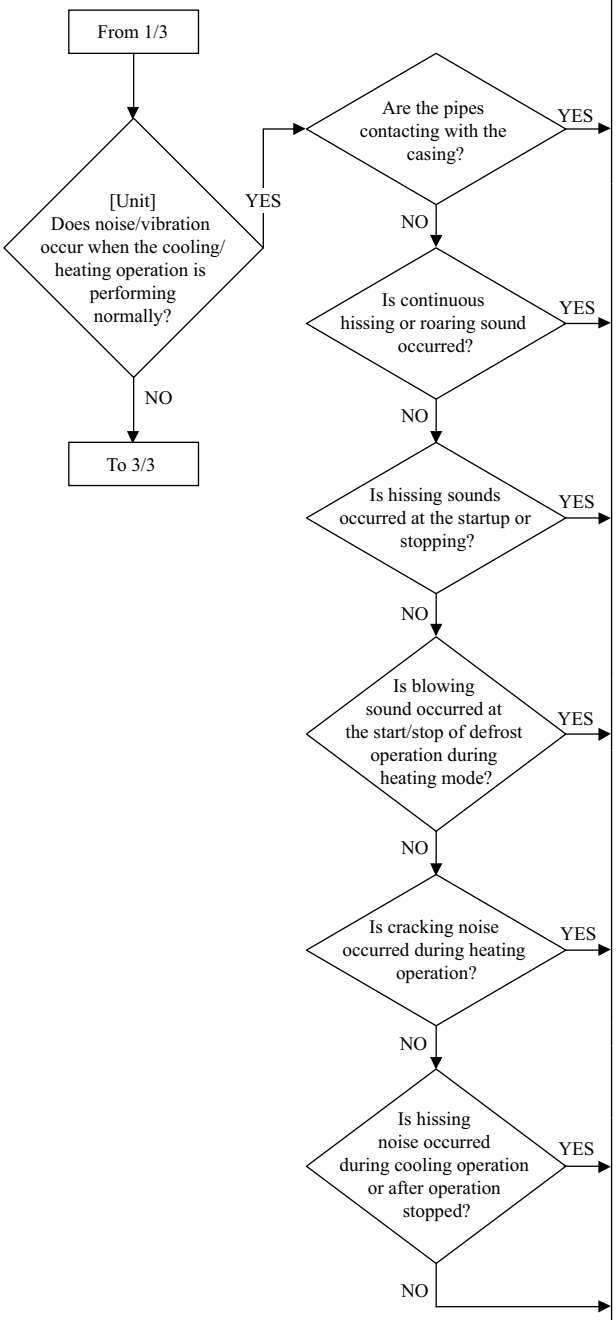
All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause

5. Troubleshooting

Diagnosis	Countermeasure
	

Rearrange the piping to avoid contact with the casing.

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.

The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.

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 wich produces a blowing sound. It may also accompany the hissing sound as mentioned above. This is normal.

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.

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.

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 controller: None 7-segment display:	Indoor	–	–	Excessive noise/vibration (3/3)
	Outdoor	–	–	

1. Applicable model

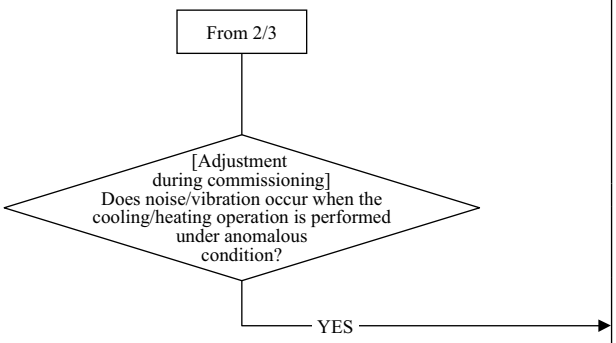
All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause

5. Troubleshooting

Diagnosis	Countermeasure
	If insufficient cooling/ heating problem happens due to anomalous operating conditions at cooling /heating, followings are suspicious. • Excessive charged amount of refrigerant • Insufficient charge amount of refrigerant • Intrusion of air, nitrogen, etc. In such case, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant. * Since there could be many causes of noise/ vibration, the above may not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check points and ask our consultation • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor temperatures and pressures) • Time it occurred • Operation data retained by remote controller 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 controller: None 7-segment display:	Indoor	Keeps flashing	Stays Off	Louver motor anomaly
	Outdoor	Keeps flashing	Stays Off	

1.Applicable model

All models

2.Error detection method

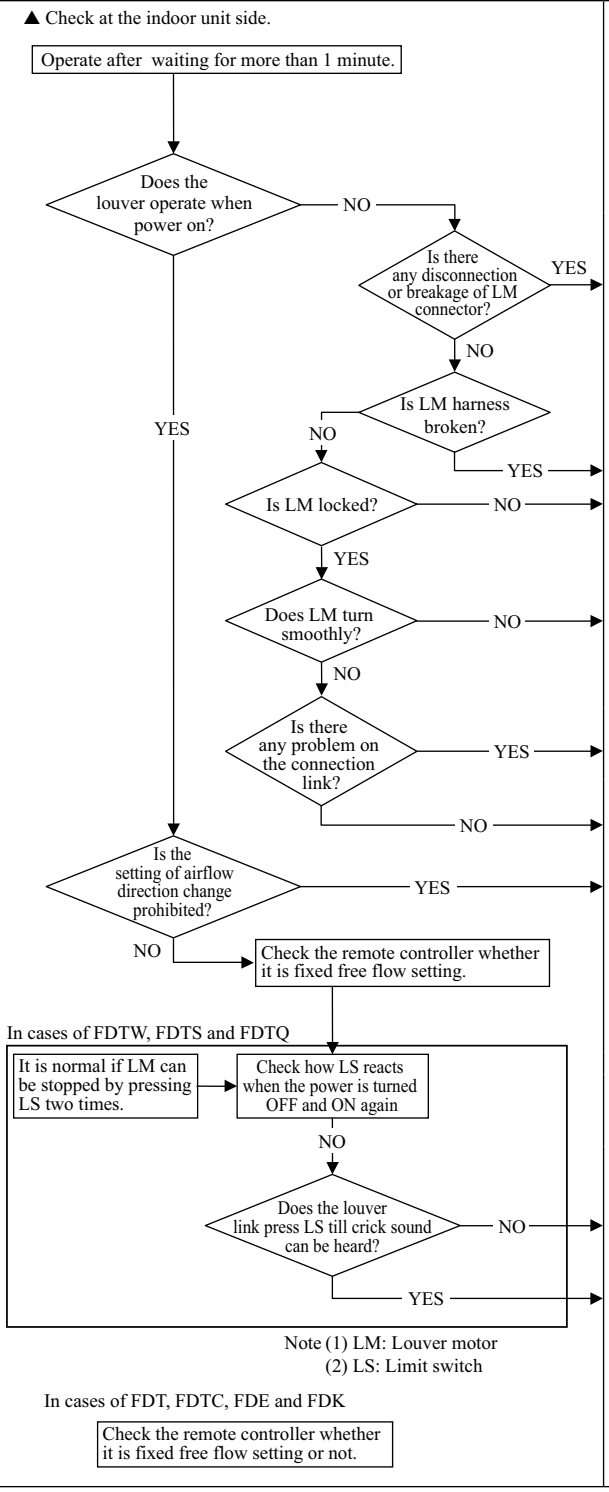
3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure



Note:

Error code	LED	Green	Red	Content
Remote controller: None 7-segment display:	Indoor	Stays Off	Stays Off	Power supply system anomaly (Power supply to indoor unit PCB)
	Outdoor	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

Diagnosis	Countermeasure
Is AC 220-240V/220V detected between L-N on the indoor terminal block?	
NO → Is AC 380/415 V for 3-phase unit detected between L1, L2, and L3 on the outdoor terminal block respectively.	
NO →	Outdoor Noise filter PCB anomaly → Replace it
YES →	Wrong wiring or broken wires between outdoor and indoor units
YES → Note (1) FDT and FDTC series: F200, F201 Other than FDT and FDTC: Fuse between wires	
(1) Are fuses OK? (2 pcs)	
NO → (2) Is power supply between①-③ of CNW0 OK?	
NO →	Indoor power PCB anomaly → Replace it
YES → Note (2) Remove transformer for other than FDT and FDTC series (CNW1)	
(3) Is power supply to FM, LM and etc. OK?	
YES →	Replace FM, LM and etc.
NO →	Replace fuse
Other than FDT and FDTC series	FDT and FDTC series
Note (3) LM: Louver motor FM: Fan motor	
(4) Is DC5V detected between ④-⑤ of CNW2?	
NO →	Indoor power PCB anomaly → Replace it
Note (4) ⑤ for GND	
YES →	Indoor control PCB anomaly → Replace it
Is DC18V or higher detected between Red-Red (CNW2) at the transformer secondary side?	
NO →	Replace transformer
YES →	Indoor control PCB anomaly → Replace it

Note:

Error code	LED	Green	Red	Content
Remote controller: None 7-segment display:	Indoor	Stays Off	Keeps lighting	Power supply system error (Power supply to remote controller)
	Outdoor	Stays Off	Keeps lighting	

1.Applicable model

All models

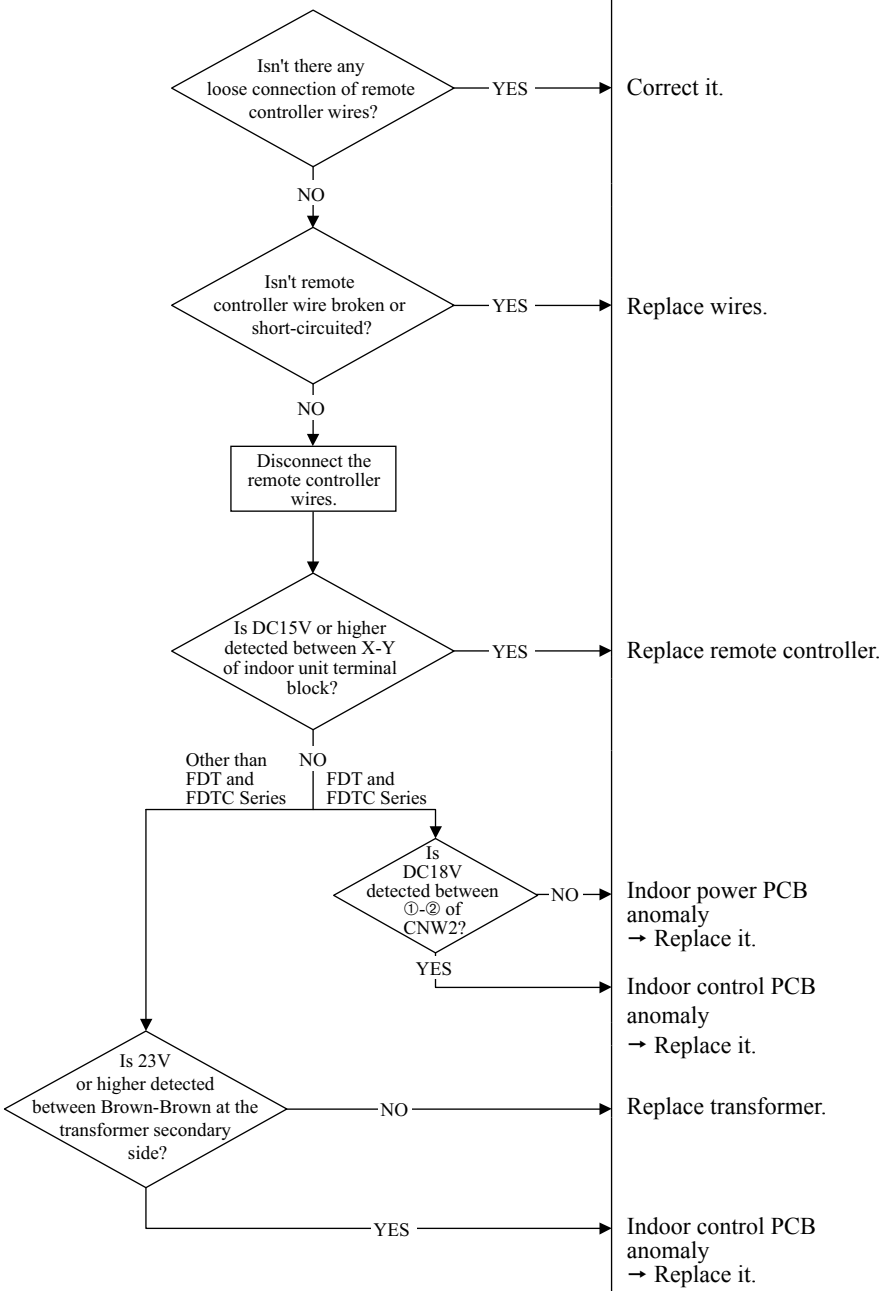
2.Error detection method

3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting



Note:

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

1. Applicable model

All models

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

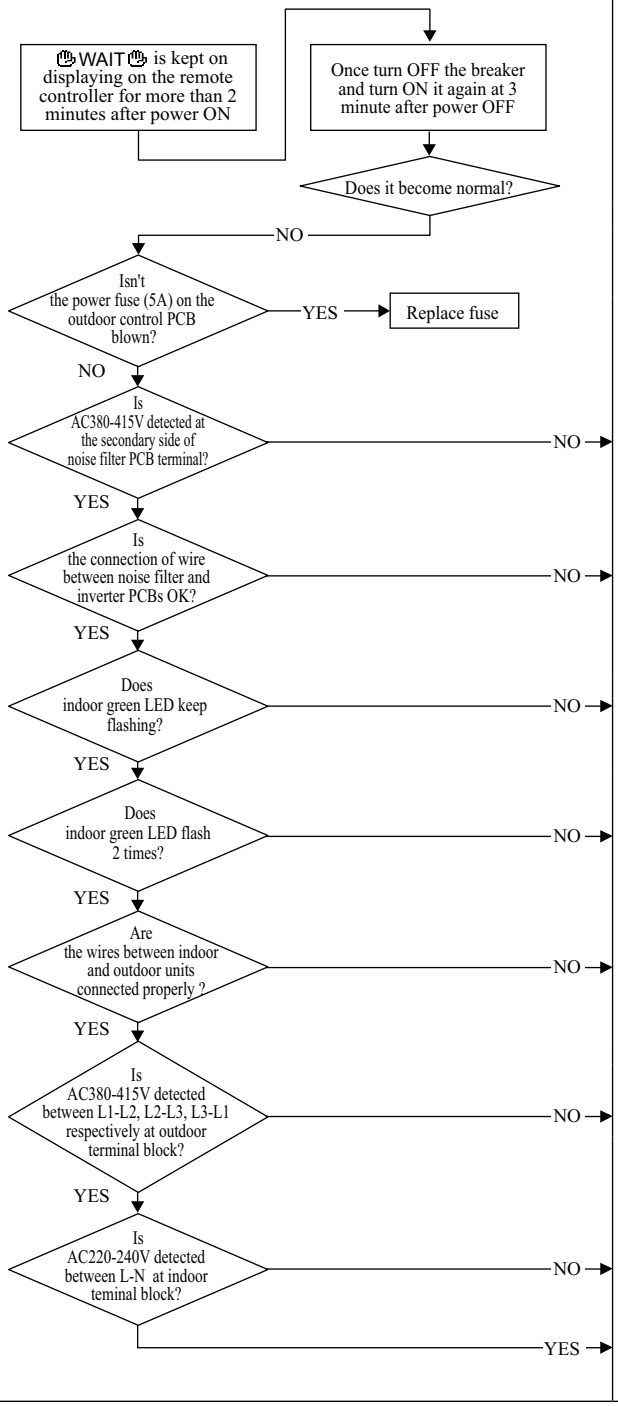
2. Error detection method

3. Condition of error displayed

4. Presumable cause

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

5. Troubleshooting



Note: (1) When anomaly occurs during establishing communication betweeen indoor and outdoor unit, error code E5 is displayed (outdoor red LED flash 2-times)
In case of E5, the way of troubleshooting is same as above mentioned (except for checking of connecting wire)
When reset the power after E5 occurs, if this anomaly recurs, WAIT is displayed on remote controller. 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 controller, the display changes to "INSPECT I/U"

Error code	LED	Green	Red	Content
Remote controller: WAIT 7-segment display:	Indoor	Keeps flashing	Stays Off	WAIT (2)
	Outdoor	Keeps flashing	Keeps flashing	

1.Applicable model

All models

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

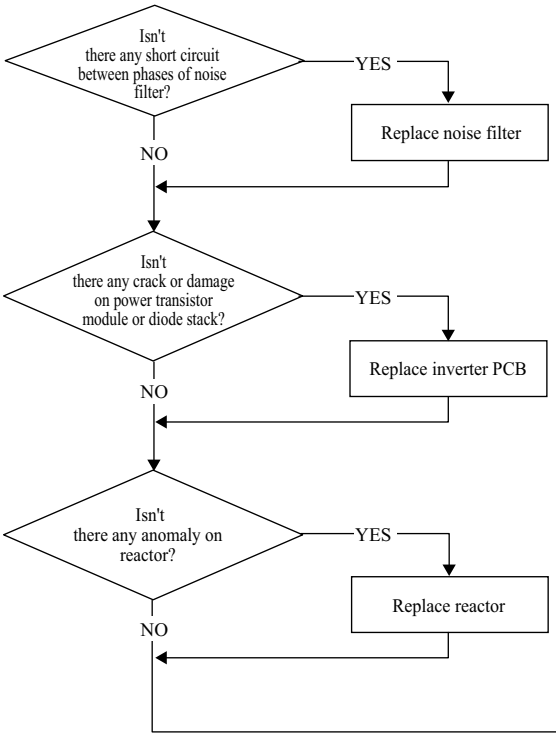
2.Error detection method

3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
	Replace fuse

Note:

Error code	LED	Green	Red	Content
Remote controller: WAIT 7-segment display:	Indoor	Keeps flashing	Stays Off	WAIT (3)
	Outdoor	Keeps flashing	Keeps flashing	

1.Applicable model

All models

(No display on the remote controller 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 controller anomaly
- Breakage of connecting wires of remote controller
- Outdoor control PCB anomaly

5.Troubleshooting

Diagnosis	Countermeasure
No display on the remote controller after power ON	
Does indoor green LED keep flashing? — NO	
Is The fuse on indoor control PCB OK? — NO	Fuse blown → Replace fuse
Is AC18V or higher is detected between Red-Red at secondary side of indoor transformer? (1) — NO	Transformer anomaly
Note (1) except FDT and FDTC	
Is DC10-11V between X-Y at indoor control PCB side when removing remote controller ? — NO	Remote controller wire short-circuited
YES	Remote controller anomaly
Does indoor green LED keep flashing? — YES	
Does outdoor red LED flash 2-times? — NO	Indoor control PCB anomaly Remote controller anomaly Brakage of connecting wires of remote controller
Is the connecting wires between indoor and outdoor units comnnected properly? — NO	Correct the connecting wires properly
Is AC380-415V detected between L1-L2, L2-L3, L3-L1 respectively at outdoor terminal block? — NO	Outdoor control PCB anomaly → Replace it
Is AC220-240V detected between L-N at indoor teminal block? — NO	Breakage of connecting wire Noise
YES	Indoor control PCB anomaly → Replace it

Note:

Error code	LED	Green	Red	Content
Remote controller: ✋WAIT✋ 7-segment display:	Indoor	Keeps flashing	Stays Off	✋WAIT✋ (4)
	Outdoor	Keeps flashing	Keeps flashing	

1.Applicable model

All models

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

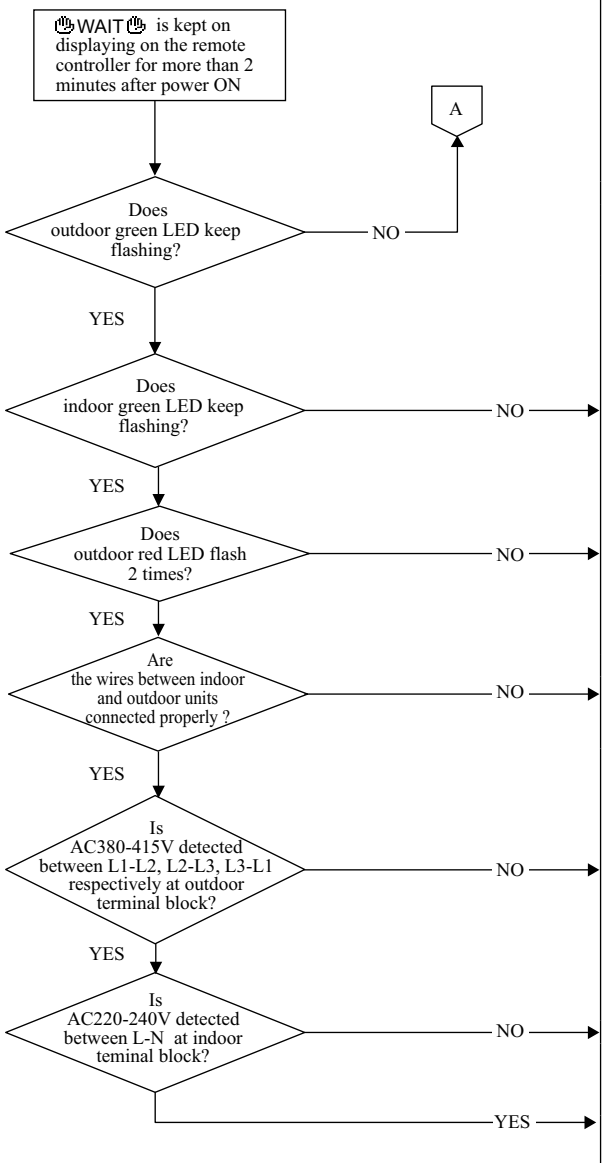
2.Error detection method

3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: WAIT 7-segment display:	Indoor	Stays Off	Stays Off	WAIT (5)
	Outdoor	Stays Off	Stays Off	

1.Applicable model

All models

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

2.Error detection method

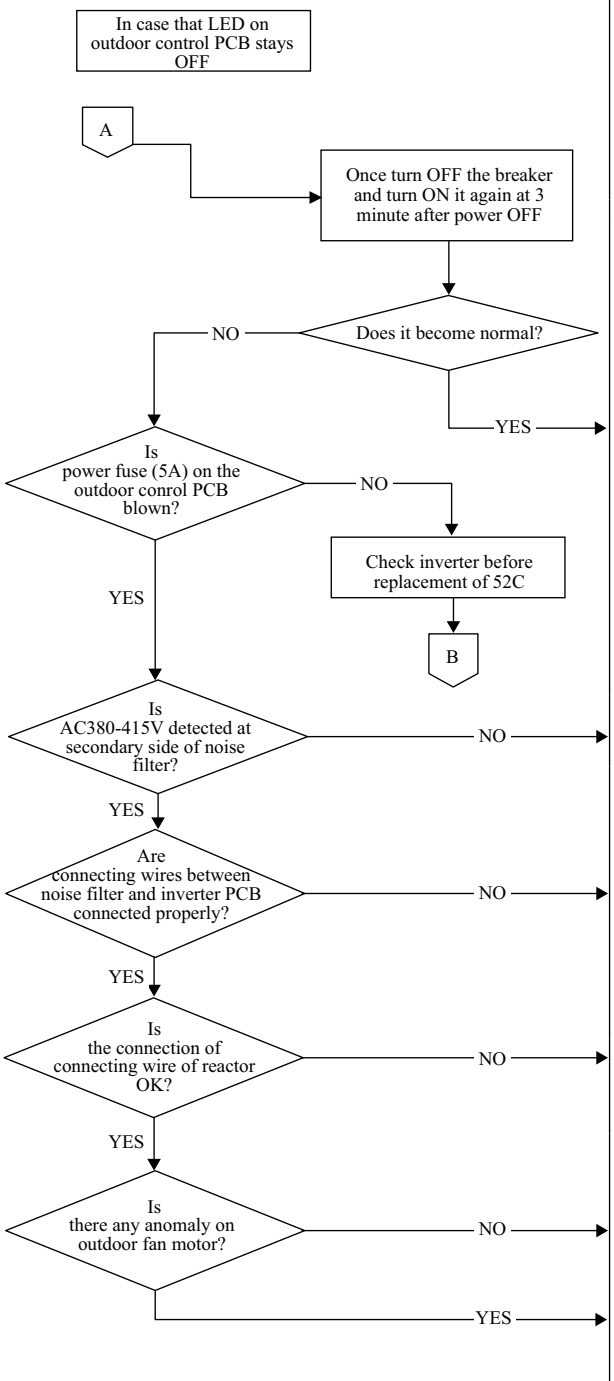
3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure



Note:

Error code	LED	Green	Red	Content
Remote controller: ✋WAIT✋ 7-segment display:	Indoor	Stays Off	Stays Off	✋WAIT✋ (6)
	Outdoor	Stays Off	Stays Off	

1.Applicable model

All models

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

2.Error detection method

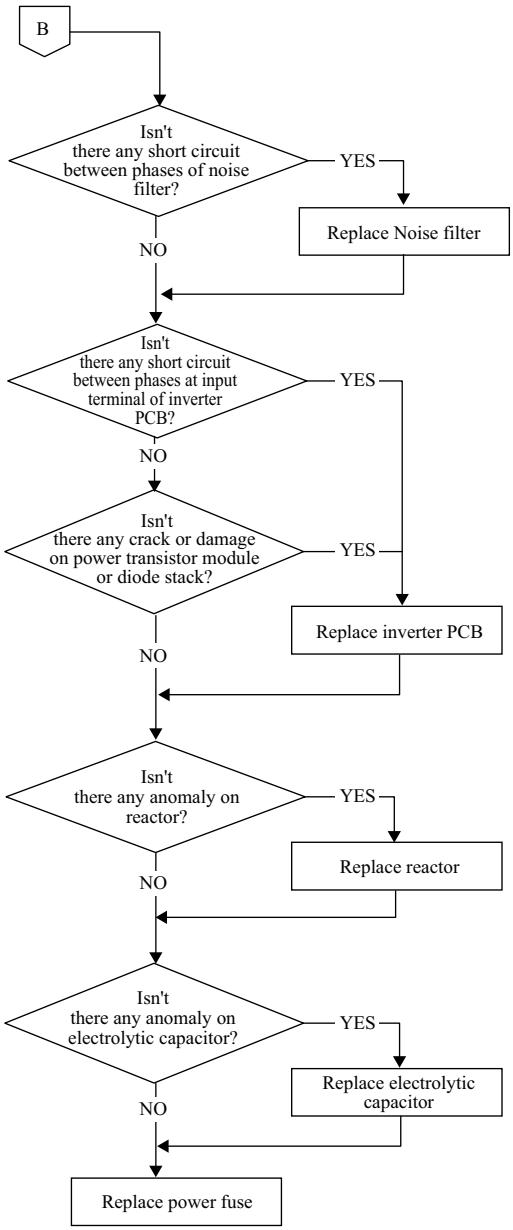
3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure



Note:

Error code	LED	Green	Red	Content
Remote controller: [No display] 7-segment display:	Indoor	Stays Off	Stays Off	[No display]
	Outdoor	Stays Off	Stays Off	

1.Applicable model

All models

(No display on the remote controller after power ON)

2.Error detection method

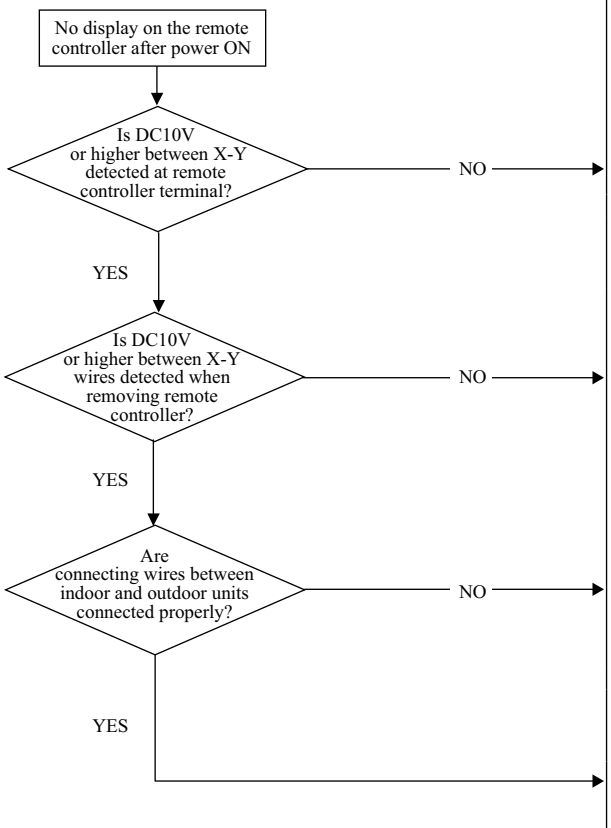
3. Condition of error displayed

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure



Note:

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

1. Applicable model

All models

2. Error detection method

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

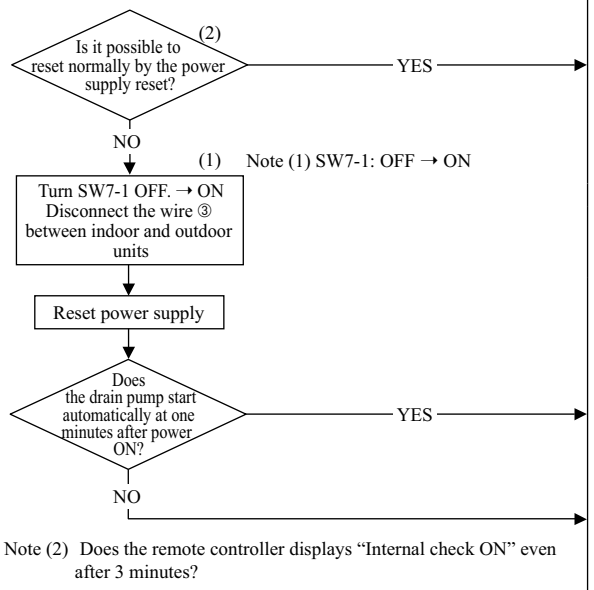
3. Condition of error displayed

Same as above

4. Presumable cause

- Anomalous communication circuit between remote controller and indoor unit
- Noise

5. Troubleshooting

Diagnosis	Countermeasure
	

Note: If the indoor unit cannot communicate normally with the remote controller for 180 seconds, the indoor unit PCB starts to reset automatically.

Error code	LED	Green	Red	Content
Remote controller: E2 7-segment display: -	Indoor	Keeps flashing	Keeps flashing	Duplicated indoor unit address
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

All models

2. Error detection method

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

3. Condition of error displayed

Same as above

4. Presumable cause

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

5. Troubleshooting

Diagnosis	Countermeasure
Is the number of connected indoor units up to 128 units? — NO →	Review number of connected units.
YES ↓ Is the different address No. assigned to each indoor unit? — NO →	Correct indoor unit address setting.
YES ↓ Reset the power supply and restart. (Caution: Unless the power supply is reset, addresses will not be confirmed.) ↓ Is E2 displayed? — NO →	Implement test run.
YES →	Replace indoor control PCB. * * Before replacement, confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)

Note:

Error code	LED	Green	Red	Content
Remote controller: E3/5 7-segment display: -	Indoor	Keeps flashing	2 times flash	Outdoor unit signal line error
	Outdoor	Keeps flashing	Stays Off	

1.Applicable model

All models

2.Error detection method

No outdoor unit exists in the same superlink system.

3. Condition of error displayed

Same as above

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
E3 is a communication error that occurs when communication between indoor and outdoor units is not established at all. Once the communication between indoor and outdoor units is established, it changes to E5. In both cases, check signal line wired locally	
Reset the power supply and restart.	
Does E3/E5 occurs? — NO →	Temporary malfunction by noise. Identify the source of noise and correct it.
YES	
Is protective fuse for the super link circuit blown? — YES →	Change to spare circuit.
NO	
Is the LED on indoor control PCB OK? — NO →	Indoor control PCB anomaly → Replace it
YES	
Is the power supply to outdoor unit OK? — NO →	Correct it.
YES	
Is the outdoor unit address set on the indoor unit OK? — NO →	Correct it.
YES	
Is the superlink communication wire connection OK? — NO →	Correct it.
YES →	Outdoor control PCB anomaly → Replace it

Note:

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

1. Applicable model

All models

2. Error detection method

When the communication between indoor and outdoor units is interupted 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 controller wires broken
- Poor connection/disconnection of remote controller 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 outdoor terminal block Is the connection of signal wires at the outdoor unit side OK? — NO →	Repair signal wires.
YES ↓ Note (2) Check the connection (disconnection, looseness, brakage) of signal wires between indoor and outdoor units Is the connection of signal wires between indoor and outdoor units OK? — NO →	Repair signal wires.
YES ↓ Reset the power supply and restart. ↓ Does the remote controller 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 supply and restart. ↓ Does the remote controller LCD becomes normal? — NO →	Outdoor control PCB anomaly (Network communicaion 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 outdoor units is cancelled so that "Communication error E5" will be displayed on the remote controller and indoor control PCB, but this is normal.

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

1. Applicable model

All models

2. Error detection method

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

3. Condition of error displayed

- If -50ºC or lower is detected for 5 seconds continuously, compressor stops. After 3-minute 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

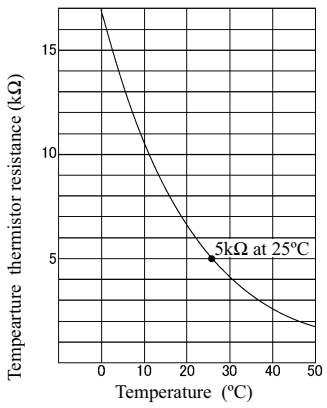
- Anomalous connecion of indoor heat exchanger temperature thermistor
- Indoor heat exchanger temperature thermistor anomaly
- Indoor control PCB anomaly

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 characreristics of indoor heat exchanger temperature thermistor (Thi-R1, R2, R3)



Note:

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

1. Applicable model

All models

2. Error detection method

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

3. Condition of error displayed

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

4. Presumable cause

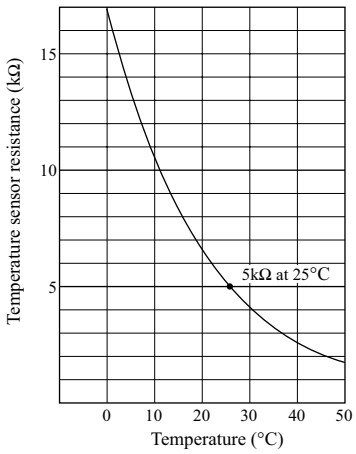
- Anomalous connection of indoor return air temperature thermistor
- Indoor return air temperature thermistor anomaly
- Indoor control PCB anomaly

5. Troubleshooting

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

*1 Check several times to prove any poor connection

Temperature-resistance characreristics of indoor return air temperature thermistor (Thi-A)



Note:

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

1.Applicable model

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

2.Error detection method

Float switch is activated

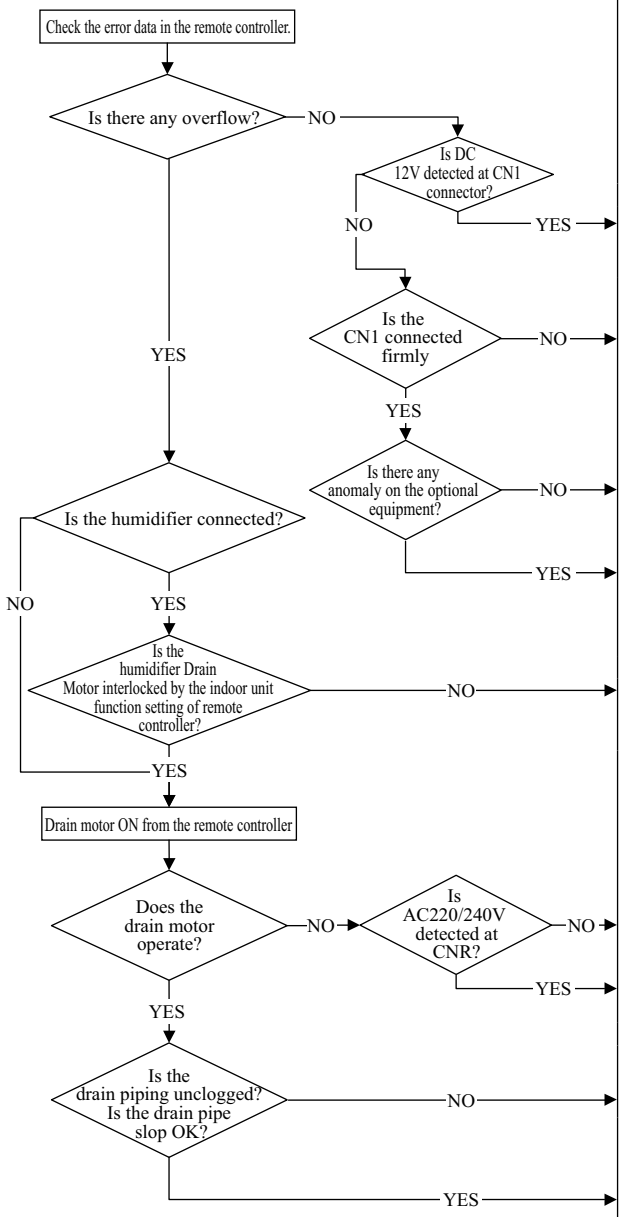
3. Condition of error displayed

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 optional 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 controller: E10 7-segment display: -	Indoor	Keeps flashing	Stays Off	Excessive number of indoor units (moe than 17 units) by controlling one remoto controller
	Outdoor	Keeps flashing	Stays Off	

1.Applicable model

All models

2. Error detection method

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

3. Condition of error displayed

Same as above

4. Presumable cause

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

5.Troubleshooting

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

Note:

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

1. Applicable model

All models

2. Error detection method

Automatic address setting and manual adress setting are mixed when setting adress 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.
Isn't the automatic setting and manual setting mixed in the address setting method for indoor units? — NO →	Replace indoor control PCB.

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

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

Note:

Error code	LED	Green	Red	Content
Remote controller: E16 7-segment display: -	Indoor	Keeps flashing	1 time flash	Indoor fan motor anomaly (FDT series)
	Outdoor	Keeps flashing	Stays Off	

1.Applicable model

FDT series only

2.Error detection method

Detected by revolution speed of indoor fan motor

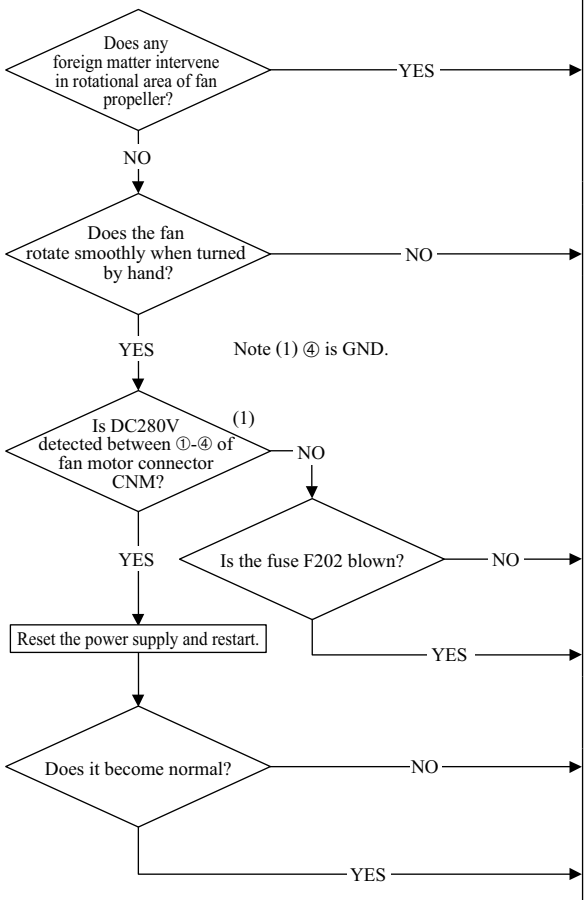
3. Condition of error displayed

When actual revolution 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 delay, fan motor starts again automatically, but if this anomaly occurs 4 times within 60 minutes after the initial detection.

4.Presumable cause

- Indoor fan motor anomaly
- Foreign matter at rotational area of fan propeller
- Fan motor anomaly
- Dust on control PCB
- Blown fuse
- External noise, surge

5.Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E16 7-segment display: -	Indoor	Keeps flashing	1 time flash	**Indoor fan motor anomaly** (FDK series)
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

FDK series only

2. Error detection method

Detected by revolution speed of indoor fan motor

3. Condition of error displayed

When actual revolution speed of indoor fan motor drops to lower than 200min^{-1} for 30 seconds continuously, the compressor and the indoor fan motor stop. After 3-seconds delay, fan motor starts again automatically, but if this anomaly occurs 4 times within 60 minutes after the initial detection.

4. Presumable cause

- Indoor fan motor anomaly
- Foreign matter at rotational area of fan impeller
- Fan motor anomaly
- Dust on control PCB
- Blown fuse
- External noise, surge

5. Troubleshooting

Diagnosis	Countermeasure
Does any foreign matter intervene in rotational area of fan impeller? — YES →	Remove foreign matter.
NO ↓ Does the fan rotate smoothly when turned by hand? — NO →	Replace fan motor.
YES ↓ Is DC280V detected between ①-③ of fan motor connector CNM? (1) Note (1) ③ for GND — NO →	Replace fan motor and power PCB
YES ↓ Reset the power supply and restart. ↓ Does it become normal? — NO →	Replace fan motor. (If this anomaly persists after replacing the fan motor, replace indoor control PCB.)
YES →	Malfunction by temporary noise

Note:

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

1.Applicable model

All models

2.Error detection method

E19 occurs

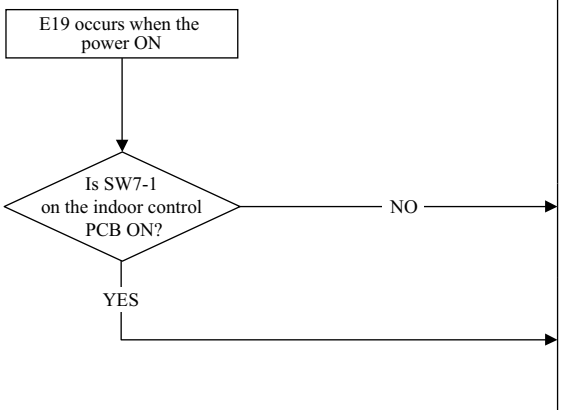
3. Condition of error displayed

Same as above

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
	

Note: Indoor operation ckeck/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 controller and indoor PCB is established 15 seconds after power ON, it goes to indoor operation check.
2) When the communication between remote controller 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 controller: E28 7-segment display: -	Indoor	Keeps flashing	Stays Off	Remote controller temperature thermistor anomaly (Thc)
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of Thc

3. Condition of error displayed

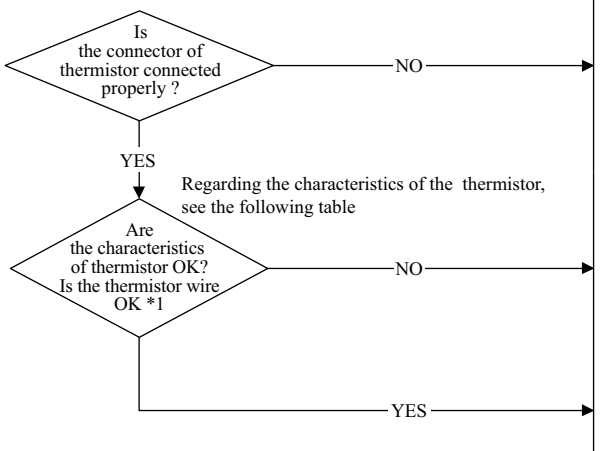
- If -50ºC or lower is detected for 5 seconds continuously, compressor stops. After 3-minutes delay, the compressor is restarted automatically, biut if this anomaly occurs again within 60 minutes after the initial detection.

4. Presumable cause

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

5. Troubleshooting

Diagnosis	Countermeasure



*1 Check several times to prove any poor connection

Temperature-resistance characreristics of remote controller 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 controller 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 controller temperature thermistor (Thc).
Please note that even though the remote controller temperature thermistor (Thc) is valid, the displayed return air temperature on the remote controller LCD shows the value detected by the indoor return air temperature thermistor (Thi-A), not by the remote controller temperature thermistor (Thc).

Error code	LED	Green	Red	Content
Remote controller: E30 7-segment display: E30	Indoor	Keeps flashing	Stays Off	Unmatch connection of indoor and outdoor unit
	Outdoor	Keeps flashing	1 time flash	

1.Applicable model

Outdoor unit

2. Error detection method

3. Condition of error displayed

4.Presumable cause

- Indoor control PCB anomaly
- Outdoor control PCB anomaly

5.Troubleshooting

Diagnosis	Countermeasure
Is the wiring connection between indoor and outdoor units correctly? — NO →	Correct the wiring
YES ↓	
Is the voltage between L1-L2, L2-L3 and L3-L1 at the terminal block on outdoor unit AC380/415V respectively? — NO →	Replace outdoor control PCB
YES ↓	
Is the voltage between L1-N at the terminal block on indoor unit AC220/240V? — NO →	Disconnection or breakage of wire between indoor and outdoor unit
YES →	Replace indoor unit PCB

Note:

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

1. Applicable model

Outdoor unit

2. Error detection method

When the microcomputer of outdoor control PCB recognizes the dupplicated address No. by scanning all adresses of outdoor units in the same superlink system.

3. Condition of error displayed

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

4. Presumable cause

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

5. Troubleshooting

Diagnosis	Countermeasure
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. Check the current address Nos. of outdoor units
Reset the power supply and restart operation.	
Caution: Unless the power is reset after changing address, the set address will not be confirmed.	
Does E31 recur? — NO →	Test run *No action is taken because it is judged that the power reset is not done after changing address
YES ↓	
Check outdoor address Nos. in the same superlink system	
Does the same address No. exist? — YES →	Correct address.
NO →	Replace outdoor control PCB. * * Before replacement, please confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)

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

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

1.Applicable model

Outdoor unit

2.Error detection method

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

3. Condition of error displayed

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

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. (It will be useful to persuade the customer why an improvement of power supply is required by showing these data)
Is the power supply voltage (between phases) at the primary side OK?. — NO →	Propose an improvement to the customer.
YES ↓ Reset the power supply and restart operation.	Check it, as much as possible, under the operating conditions for 30 minutes before error occurred.
Does E32 recur? — YES →	Replace outdoor control PCB.
NO →	Wait and see without taking any action.

Note:

Error code	LED	Green	Red	Content
Remote controller: E36 7-segment display: E36-1, 2 *1	Indoor	Keeps flashing	Stays Off	Discharge pipe temperature error (Tho-D1, D2)
	Outdoor	Keeps flashing	*2	

*1 E36-1: Tho-D1, E36-2: Tho-D2 *2 E36-1: 1 time flash, E36-2: 2 time flash

1.Applicable model

Outdoor unit

2.Error detection method

When anomalously high temperature is detected by the discharge pipe temperature thermistor (Tho-D1, D2)

3. Condition of error displayed

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

4.Presumable cause

- Discharge pipe temperature anomaly
- SV1, 2 (liquid refrigerant by-pass valve) anomaly
  - Beakage of coil
  - Faulty main body.
- Outdoor control PCB anomaly
- Insufficient amount of refrigerant
- Insufficient airflow volume
- Short-circuit of airflow

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition Check the ROM version Confirmation of SV1, 2 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 poperly (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 outdoor 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 supply 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 AC200V of output signal for SV1, 2 from outdoor control PCB? — NO	Replace outdoor control PCB
YES → Is the coil of SV1, 2 energized? — NO	Replace the coil SV1, 2
YES → Does the refrigerant flow through SV1, 2 main body? — NO	Replace the SV1, 2 main body (If there is no refrigerant in liquid line, charge refrigerant additionall)
YES	Check refrigerant amount again.

Note:

Error code	LED	Green	Red	Content
Remote controller: E36 7-segment display: E36-3	Indoor	Keeps flashing	Stays Off	Liquid flooding anomaly
	Outdoor	Keeps flashing	3 time flash	

1. Applicable model

Outdoor units

2. Error detection method

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

3. Condition of error displayed

When above anomaly is detected 3 times within 90 minutes.

4. Presumable cause

- Unmatching of refrigerant piping and/or signal wiring
- Overcharging of refrigerant
- Anomalous control of superheat
- Anomalous circuit of liquid refrigerant by-pass
- Anomalous refrigerant circuit of subcool coil
- Under-dome temperature (Tho-D1, 2) anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition Check the ROM version Comfirmation of SV1, 2 operation
Are there any wrong connection of refrigerant piping and/or signal wiring ? · Check the numbers of connected indoor units recognized by outdoor unit in comparison with those numbers in utility drawing YES →	Correct the connection of refrigerant piping and/or signal wiring properly
NO ↓ Are there any excessive refrigerant charged at site? · Check the calculation result of additional refrigerant charging amount and the record of additional refrigerant charged amount YES →	Adjust refrigerant amount properly
NO ↓ Are there any leakage of refrigerant through valve sheet of SV1, 2? · Check the temperature difference between before and after SV1, 2 YES →	Replace SV1, 2 Replace the coil of SV1, 2
NO ↓ Are there any fault in subcooling coil circuit ? · Check whether the EEVSC is kept open (at cooling mode) · Check whether the thermistor of Tho-H is inserted in the thermistor holder properly · Check whether the characteristics of Tho-H and PSL is OK YES →	• Replace EEVSC • Check the coil of EEVSC → Replace the coil of EEVSC • Replace Tho-H • Replace PSL
NO ↓ Is the superheat control of indoor unit OK at cooling mode? · Check whether the indoor EEV is kept open or not · Check whether Thi-R1, R2, R3 are installed at proper position or the characteristics of them are OK · Check whether the air filter is clogged · Check whether the indoor fan rotates NO →	• Replace indoor EEV • Check the coil of EEV → Replace the coil of EEV • Check the installed position of Thi-R1, R2, R3 → Replace Thi-R, if necessary • Check the air filter • Check the connection of indoor fan motor connector Replace indoor fan motor * By checking Thi-R1, R2, R3 from indoor unit operation data of Mente PC, specify the indoor unit which tends to be liquid flooding (Thi-R3≒Thi-R2 shows the probability of liquid flooding)
YES ↓ Is the superheat control of outdoor unit OK at heating mode? · Check whether EEVH1 is kept open or not · Check whether Tho-R1, R2, R3, R4 are installed at proper position or the characteristics of them is OK · Check whether the characteristics of PSL are OK · Check whether the fin of outdoor heat exchanger is clogged with snow, ice or dust · Check whether the outdoor fan rotates NO →	• Replace EEVH1, 2 • Check the coil of EEVH1, 2 → Replace the coil of EEVH1, 2 • Check the installed position of Tho-R1, R2, R3 → Replace Tho-R, if necessary • Clean the fin of outdoor heat exchanger • Check the connection of outdoor fan motor connector Replace outdoor fan motor
YES ↓ Is the characteristics of Tho-C1, 2 OK ? NO →	• Replace Tho-C1, 2
YES →	Correct the data with Mente PC and ask our consultation

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

Error code	LED	Green	Red	Content
Remote controller: E37 7-segment display: E37-1, 2, 3, 4, 5, 6*1	Indoor	Keeps flashing	Stays Off	Outdoor heat exchanger temperature termistor (Tho-R) and subcooling coil temperature thermistor (Tho-SC,-H) anomaly
	Outdoor	Keeps flashing	*1	

*1 E37-1: one time flash (Tho-R1), E37-2: 2 time flash (Tho-R2), E37-3: 3 time flash (Tho-R3), E37-4: 4 time flash (Tho-R4), E37-5: 5 time flash (Tho-SC), E37-6: 6 time flash (Tho-H)

1.Applicable model

Outdoor unit

2.Error detection method

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

3. Condition of error displayed

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

4.Presumable cause

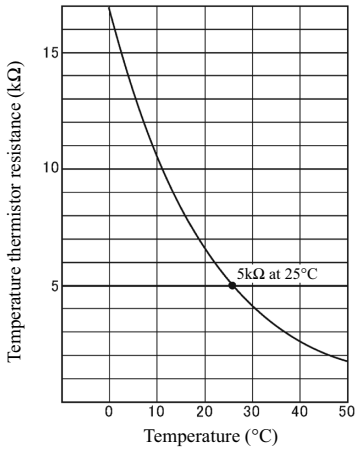
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Outdoor control PCB anomaly

5.Troubleshooting

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

*2
Check several times to prove any poor connection

Outdoor heat exchanger temperature thermistor (Tho-R1~R6)
Sub-cooling coil thermistor (Tho-SC, Tho-H)
Temperature-resistance characteristics



Note:

Error code	LED	Green	Red	Content
Remote controller: E38 7-segment display: E38	Indoor	Keeps flashing	Stays Off	Outdoor air temperature thermistor anomaly (Tho-A)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

Outdoor unit

2. Error detection method

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

3. Condition of error displayed

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

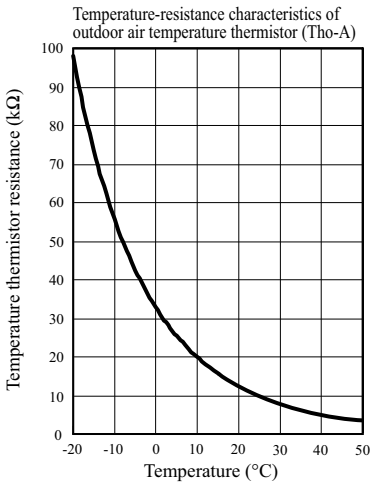
4. Presumable cause

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

5. Troubleshooting

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

*1
Check several times to prove any poor connection



Note:

Error code	LED	Green	Red	Content
Remote controller: E39 7-segment display: E39-1, 2	Indoor	Keeps flashing	Stays Off	Discharge pipe temperature thermistor anomaly (Tho-D1, D2)
	Outdoor	Keeps flashing	*2	

*1 E39-1: Tho-D1, E39-2: Tho-D2, *2 E39-1: 1 time flash, E39-2: 2 time flash

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-D1, D2

3. Condition of error displayed

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

4. Presumable cause

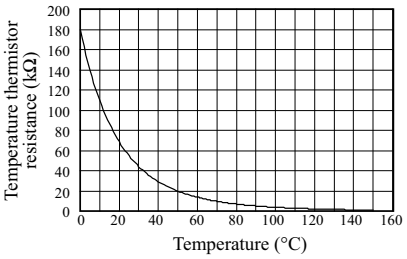
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Outdoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.
Is the connector of thermistor connected properly? — NO →	Insert the connector securely
YES ↓	
Are the characteristics of thermistor OK? *3 — NO →	Replace thermistor (Tho-D1 or D2).
YES →	Replace outdoor control PCB.

*3
Check several times to prove any poor connection

Temperature-resistance characteristics of discharge pipe temperature thermistor (Tho-D1, D2)



Note:

Error code	LED	Green	Red	Content
Remote controller: E40 7-segment display: E40	Indoor	Keeps flashing	Stays Off	High pressure anomaly (63H1-1, 2 activated)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

Outdoor unit

2. Error detection method

When high pressure switch 63H1-1 or 63H1-2 is activated

3. Condition of error displayed

- If high pressure exceeds 4.15MPa
- If 63H1-1, 2 is activated 5 times within 60 minutes
- If 63H1-1 is activated for 60 minutes continuously

4. Presumable cause

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

5. Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition Check the sensed value of high pressure sensor when the 63H1-1, 2 is activated Check whether the high pressure switch is activated at the sensed value of high pressure sensor.
Was 63H1 or 63H1-2 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 retarting operation. (If the high pressure sensor [PSH] fails, replace it)
Does the sensed value of the high pressure sensor show 4.15MPa? (Normal?) — YES → Are the 63H1-1, 2 OK? Are the connector and/or harnesse 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
Are the 63H1-1, 2 OK? Are the connector and/or harnesse OK? — YES → Are the service valves fully open?	
Are the service valves fully open? — NO →	Open operation valve.
Are the service valves fully open? — 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 pressre ? — NO →	Replace outdoor control PCB.
Is it stop at 4.15MPa of gauge pressre ? — YES → Is there any clogging in the refrigerant circuit ? — YES →	Remove clogs.
Is there any clogging in the refrigerant circuit ? — NO →	Check items (condenser side): • Filter clogging • Airflow volume (Fan motor) • Short-circuit of airflow

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

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

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

1.Applicable model

Outdoor unit

2.Error detection method

When anomalously high temperature is detected by power transistor temperature thermistor (Tho-P1)

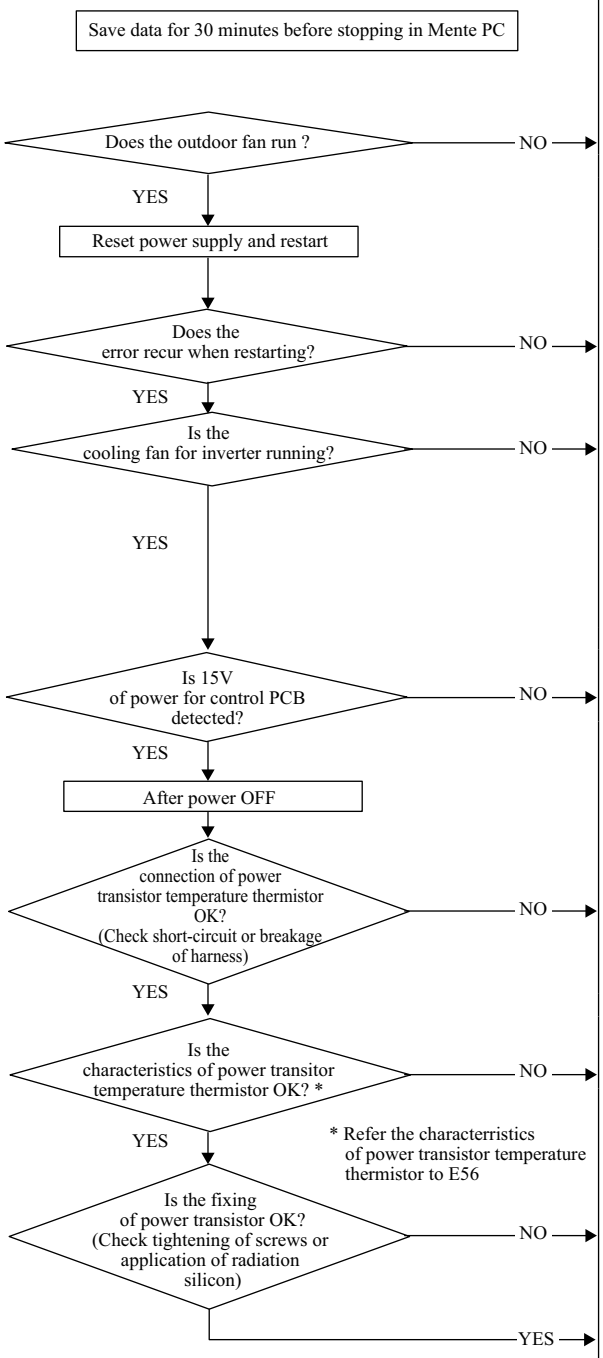
3. Condition of error displayed

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

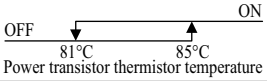
- Power transistor anomaly
- Power transistor temperature thermistor anomaly
- Improperly fixing of power transistor to radiator fin
- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Anomalous cooling fan motor for inverter
- Inadequate installation space of outdoor unit

5.Troubleshooting



Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating conditions Check the temperature of power transistor Check the operation of outdoor fan and cooling fan
Does the outdoor fan run ? — NO	Repair it according to the troubleshooting procedure of E48
YES → Reset power supply and restart	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 obain data, if possible (Keep connecting the Mente PC)
YES → Is the cooling fan for inverter running? — NO	If the cooling fan does not run in spite of the operation ON range, check the voltage at the connector of cooling fan. If the 220/240V is detected, repalce cooling fan motor. If 0V is detected, replace outdoor control PCB
YES → Is 15V of power for control PCB detected? — NO	After checking the loose connection of connetor or breakage of harness, replace inverter PCB
YES → After power OFF → Is the connection of power transistor temperature thermistor OK? (Check short-circuit or breakage of harness) — NO	Connect the connector of thermistor securely. Or replace power transistor temperature thermistor
YES → Is the characteristics of power transitor temperature thermistor OK? * — NO	Replace power transistor temperature thermistor
YES → Is the fixing of power transistor OK? (Check tightening of screws or application of radiation silicon) — NO	Fix power transistor on to the radiation fin with proper application of radiation silicon
YES	Replace power transistor

Note: The operating conditions of cooling fan for inverter is shown in the right figure.
If the error does not recur, connect the Mente PC and continue to collect data.



Error code	LED	Green	Red	Content
Remote controller: E42 7-segment display: E42-1, 2*	Indoor	Keeps flashing	Stays Off	Current cut (CM1, CM2)
	Outdoor	Keeps flashing	*2	

*1 E42-1: CM1, E42-2: CM2 *2 E42-1: 1 time flash, E42-2: 2 time flash

1.Applicable model

Outdoor unit

2.Error detection method

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

3. Condition of error displayed

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

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating conditions Check pressure anomaly Check the operation of outdoor fan
Is the coil resistance and insulation (megger check) of compressor motor OK? — NO	Replace compressor. Check the capillary tube and stariner of oil separator. If necessary, replace the capillary tube and strainer as well.
YES → Does the outdoor fan run ? — NO	Repair it according to the troubleshooting of E48
YES → Is 15V of power for control PCB detected? Is the outdoor fan motor OK? (Refer the checking method of 15V in page 46) — NO	Replace inverter PCB or outdoor fan motor
YES → Reset power supply and restart	Check it as much as possible under the operating conditions for 30 minutes before error occurred
Does E42 recur? — NO	Wait and see. Continue to obain data, if possible (Keep connecting the Mente PC)
YES → Is it the unit with 2 compressors? — YES → When interchanging the cables between inverter and compressor, is the compressor failed to startup switched? — NO	Replace compressor that is failed to startup
YES → Do you have inverter checker for judging whether inverter PCB is OK or not? — YES → Is the checked result by inverter checker OK? — NO	Replace power transistor module Replace inverter PCB
NO → After power OFF, Remove the 1-3 layers of control box → Is the checked result by measuring the resistance beween each terminal of power transistor module OK? (Are there any short-circuit?) — NO	Replace power transistor module. Refer Page 46. (Remove the power cable from compressor and check the resistance between P-U, P-V, P-W, N-U, N-V, N-W respectively.
YES	Replace inverter PCB

Note: In case that there is no the insulation resistance anomaly, the compressor anomaly could be considered.
If this anomaly occurs after replacement of power transistor module and/or inverter PCB, try to replace compressor as well.
If the error does not recur, connect the Mente PC and continue to collect data

Error code	LED	Green	Red	Content
Remote controller: E43 7-segment display: E43-1, 2 *1	Indoor	Keeps flashing	Stays Off	Excessive number of indoor units connected, excessive total capacity of connection
	Outdoor	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

Outdoor unit

2.Error detection method

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

3. Condition of error displayed

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

4.Presumable cause

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

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition.
Caution: Address will not be confirmed, unless the power is reset after changing addess.	
Reset the power.	
Is E43 dispalyed? — NO →	Test run. No action is taken because it is judged that the power reset was not done after changing address.
YES ↓	
Does the number of indoor units connected and/or total capacity exceed limitation? — YES →	Check indoor unit addresses and correct. In case that total capacity of connected indoor units exceeds the limitation, if tentative operation is required turn ON the dip switch SW5-4 on the outdoor control PCB. (However since this tentative solution could cause trouble, be sure to correct it as soon as possible)
Check the connected number of indoor units with 7-segment display code C50 or Mente PC with reference to the utilities drawing. (Check not only one system, but also other systems)	
NO ↓	
Are there any indoor units which is not expected to exsist in that signal line? — YES →	Signal wire may be connected to other outdoor unit system. Correct the signal wire.
Check the resistance between A and B of signal line as well.	
NO ↓	
General checking of indoor/outdoor unit addresses by means of: ◇ Outdoor unit: Mente PC, 7-Segemnt display and rorary switch (SW1, 2) ◇ Indoor unit: Remote controller, rotary switch (SW1, 2, 3, 4) * It is recommended to use means other than the rotary switch which could be defective.	Correct addresses. (Either one of addresses is wrong.) If the address corrected with rotary switch is still wrong, replace control PCB (Defective rotary switch) * 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 completing the above procedure, reset the power and confirm that the error display does not recur. Unless the power is reset for both indoor unit and outdoor unit, the set addresses will not be confirmed.

Error code	LED	Green	Red	Content
Remote controller: E45 7-segment display: E45-1, 2 *1	Indoor	Keeps flashing	Stays Off	Communication error between inverter PCB and outdoor control PCB
	Outdoor	Keeps flashing	*2	

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

1.Applicable model

Outdoor unit

2.Error detection method

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

3. Condition of error displayed

Same as above.

4.Presumable cause

- Signal wire anomaly
- Outdoor control PCB anomaly
- Inverter PCB (INV1, 2) anomaly
- Rush current prevention resistor anomaly

5.Troubleshooting (Inspect also the INV1 even if it is E45-2.)

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating conditions
Is 15V of power for control PCB detected? Is the outdoor fan motor OK? (Refer the checking method of 15V in page 46) — NO →	Replace inverter PCB or outdoor fan motor
YES ↓ Reset power supply and restart	Check it as much as possible under the operating conditions for 30 minutes before error occurred
Does E45 recur? — NO →	Wait and see. Continue to obain data, if possible (Keep connecting the Mente PC)
YES ↓ Turn off the power. Is the harness and/or connector between inverter PCB and outdoor control PCB OK ? — NO →	Check whether the harness is broken? Check whether the connector is loose? → If there is problem, correct it.
YES ↓ Is the rush current prevention resistor broken? — YES →	Disconnect the harness from the resistor and measure the resistance. If broken, replace the resistor. In such case check the harness between diode module and inverter PCB as well
NO ↓ Is the harness and/or connector between inverter PCB and diode module OK? — NO →	Check whether the harness is broken? Check whether the connector is loose? → If there is problem, correct it.
YES ↓ Is the setting of switches on the inverter PCB OK? * — NO →	Correct the setting of switches on the inverter PCB
YES →	Replace outdoor control PCB

* Switch setting of inverter PCB

· Models: 335-K, 400

SW1-1	OFF
SW1-2	OFF
SW1-3	OFF
SW1-4	OFF
JSW1-1	ON
JSW1-2	OFF
JSW1-3	*1
JSW1-4	OFF

*1…ON, if it is set at INV2.

· Models: 450~680

SW1-1	OFF
SW1-2	OFF
SW1-3	OFF
SW1-4	OFF
JSW2-1	OFF
JSW2-2	OFF
JSW2-3	*1
JSW2-4	OFF

*1…ON, if it is set at INV2.

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

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

1. Applicable model

Outdoor unit

2. Error detection method

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

3. Condition of error displayed

Same as above.

4. Presumable cause

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

5. Troubleshooting

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 supply 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 rest is not done after changing address
YES ↓	
Is't the signal line of a outdoor unit system applying automatic address setting connected to other outdoor unit system? — YES →	Correct signal line *In case of automatic address setting, signal line cannot be connected to other outdoor unit system
NO ↓	
If signal line is connected to more than 2 outdoor unit systems, address setting should be done by manually.	
Is E46 still displayed? — NO →	Test run
YES ↓	
Turn ON the power of each outdoor unit one by one and search the outdoor unit that can start up with automatic address setting →	Replace outdoor control PCB* (Rotary switch anomaly)

<Reference>
Error display at mixed address setting

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

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

Error code	LED	Green	Red	Content
Remote controller: E48 7-segment display: E48-1, 2 *1	Indoor	Keeps flashing	Stays Off	Outdoor DC fan motor anomaly
	Outdoor	Keeps flashing	*1	

*1 E48-1: 1 time flash (FMO1), E48-2 : 2 time flash (FMO2)

1. Applicable model

Outdoor unit

2. Error detection method

- If 400 min^{-1} or lower of the fan rotation command and the state of overcurent are detected for 10 times continueously.
- If 100 min^{-1} of the actual fan rotation speed is detected for 30 seconds (Fan motor is locked)

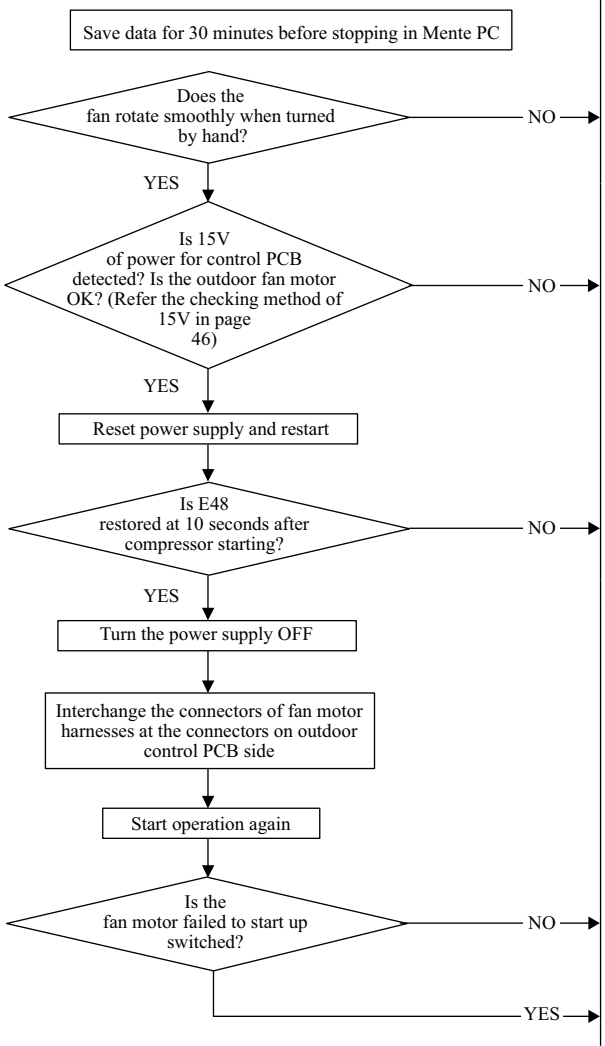
3. Condition of error displayed

Same as above.

4. Presumable cause

- Breakage of harness or loose conection of connector
- Outdoor fan motor anomaly
- Inverter PCB anomaly
- Outdoor control PCB anomaly

5. Troubleshooting (Inspect also the fan motor 2 even if it is E48-1. Inspect also the fan motor 1 even if it is E48-2.)



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

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

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low pressure

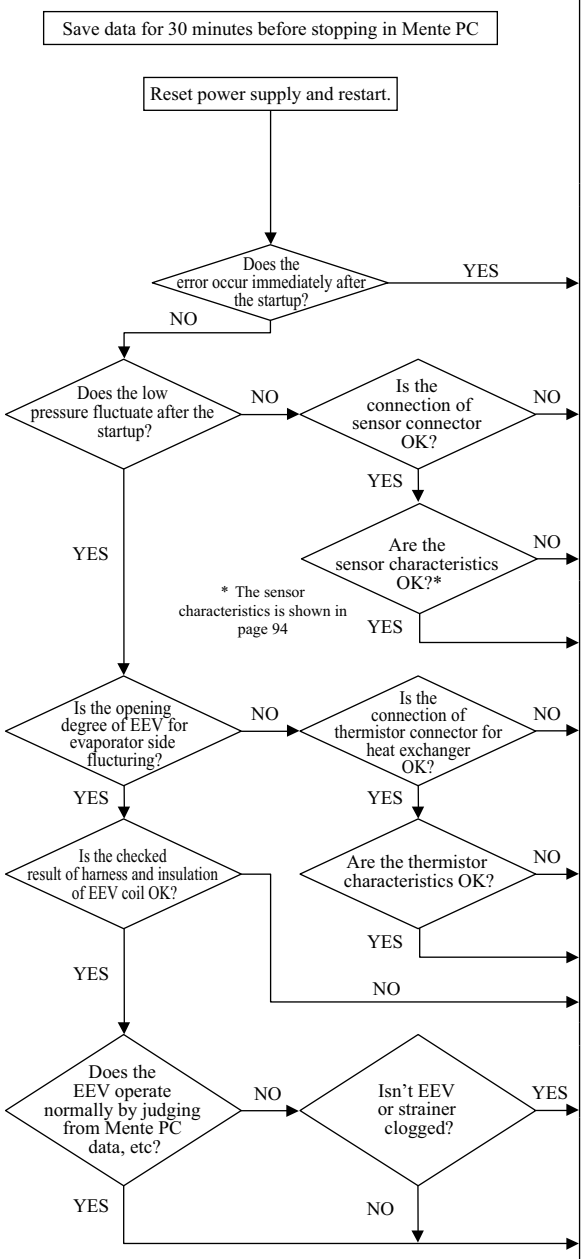
3. Condition of error displayed

- At start up after power on:
  When the low pressure sensor detects lower than 0.003MPa for 60 seconds continuously. And if this anomaly occurs 2 times.
- During operation:
  When the low pressure sensor detects 0.134MPa or lower for 30 seconds coninuously. 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
	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. Check whether the service valves are open. Correct the connection of low pressure sensor connector Replace low pressure sensor. Replace outdoor control PCB. Correct the connection of temperature thermistor connector of heat exchanger Replace temperature thermistor of heat exchanger at evaporator side. Replace control PCB at evaporator side. Replace EEV coil. Replace EEV main body or strainer. Check for short circuit of airflow of heat exchanger at evaporator side and for fan motor anomaly

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

Error code	LED	Green	Red	Content
Remote controller: E53/E55*1 7-segment display: E53/E55-1, 2	Indoor	Keeps flashing	Stays Off	Suction pipe temperature thermistor anomaly (Tho-S), Under-dome temperature thermistor anomaly (Tho-C1, C2)
	Outdoor	Keeps flashing	*2	

*1 E55-1 : Tho-C1, E55-2: Tho-C2 *2 E53 : E53·E55-1 time flash, E55-2: 2 time flash

1.Applicable model

Outdoor unit

2.Error detection method

Detection of anomalously low temperature (resistance) of Tho-S or Tho-C1, C2

3. Condition of error displayed

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

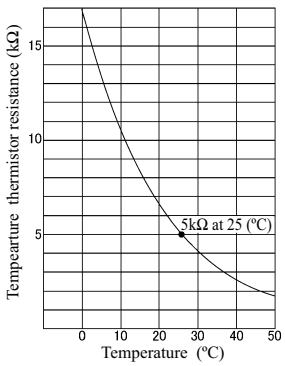
4.Presumable cause

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

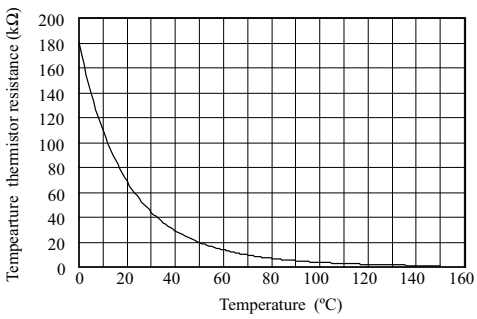
5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating conditions Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value
Is the connector of thermistor connected properly ? — NO →	Insert the connector securely
YES ↓ Regarding the characteristics of the thermistor, see the following chart Are the characteristics of thermistor OK? *2 — NO →	Replace thermistor (Tho-S or Tho-C1, C2)
YES →	Replace outdoor control PCB
*2 Check several times to prove any poor connection	

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



Temperature-resistance characreristics of under-dome temperature thermistor (Tho-C1, C2)



Note:

Error code	LED	Green	Red	Content
Remote controller: E54 7-segment display: E54-1, 2 *1	Indoor	Keeps flashing	Stays Off	High pressure sensor anomaly (PSH) Low pressure sensor anomaly (PSL)
	Outdoor	Keeps flashing	*1	

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

1.Applicable model

Outdoor unit

2.Error detection method

Detection of anomalous pressure (voltage) of PSH or PSL

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

3. Condition of error displayed

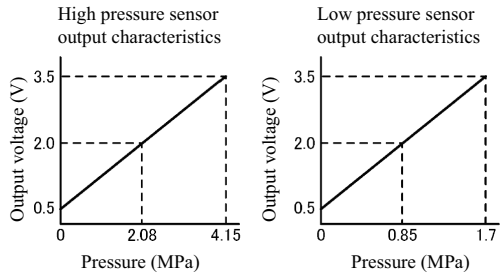
If anomalous sensor output voltage (0V or lower or 3.49V or higher) is detected for 5 seconds within 2 minutes to 2 minutes 20 seconds after the compressor ON

4.Presumable cause

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

5.Troubleshooting

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



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

Note:

Error code	LED	Green	Red	Content
Remote controller: E56 7-segment display: E56-1, 2 *1	Indoor	Keeps flashing	Stays Off	Power transitor temperature thermistor anomaly (Tho-P1, P2)
	Outdoor	Keeps flashing	*1	

*1 E56-1/1 time flash:Tho-P1 anomaly, E56-2/2 time flash: Tho-P2 anomaly

1.Applicable model

Outdoor unit

2.Error detection method

Detection of anomalously low temperature (resistance) of Tho-P1, P2

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

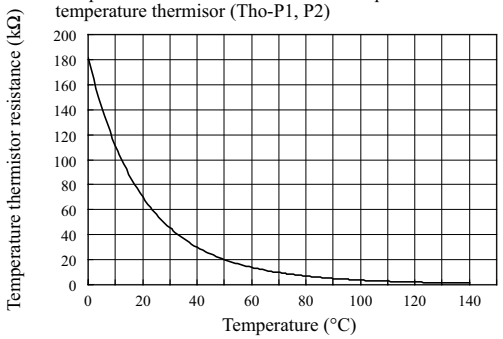
- Broken thermistor harness or the internal wire of sensing section (Check the molded section as well)
- Disconnection of thermistor harness connection (connector)
- Outdoor control PCB anomaly

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature of Mente PC data with actual measured value
Is the connector of thermistor connected properly OK ? — NO →	Insert the connector securely
YES ↓	
Are the characteristics of thermistor OK? *1 (1) — Regarding the characteristics of the thermistor, see the following. — NO →	Replace power transistor temperature thermistor (Tho-P1, P2).
YES →	Replace outdoor control PCB.

*1. Check several times to prove any poor connection

Temperature-resistance characreristics of power transistor temperature thermisor (Tho-P1, P2)



Note:

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

1.Applicable model

Outdoor unit

2.Error detection method

E58 is displayed on 7-segment LED

3. Condition of error displayed

This anomaly is established 4 times within 15 minutes.

4.Presumable cause

- Insufficient time elapsed after the power supplied, before compressor startup.
  (Startup the compressor wihtout crankcase heater ON)
- Compressor anomaly

5.Troubleshooting

Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC	Check and save the data of operating condition
Check the data for 30 minutes before stopping	
Is this the first startup within one hour after power is supplied? — YES	Refrigerant might be migrated in the refrigerant oil in the compressor. Wait for about one hour under the condition of power ON and start again. (Turn the on crankcase heater ON and evaporate the liquid refrigerant migrated in the compressor.
NO	
Is there any replacement record of inverter PCB ? — YES	The model setting could be wrong. Check the dip switch for model setting on the outdoor control PCB.
NO	
Compressor could be locked →Replace the compressor	

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

Error code	LED	Green	Red	Content
Remote controller: E59 7-segment display: E59-1, 2 *1	Indoor	Keeps flashing	Stays Off	Compressor startup failure (CM1,CM2)
	Outdoor	Keeps flashing	*2	

*1 E59-1: CM1, E59-2: CM2 *2 E59-1: 1 time flash, E59-2: 2 time flash

1.Applicable model

Outdoor unit

2.Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor (If the compressor speed cannot increase 11Hz 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 supply
- 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 supply voltage OK? — NO	Check the power supply voltage and correct it
specification of power supply voltage 380/415V	
YES → 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 SV6 at the exit of oil separator is open during compressor stopping. (Is the pressure equalized?)
YES → 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
YES → 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 → Can startup? — YES → (Only one compressor can startup) → Interchange the cables between inverter and compressor, and try to startup	
NO → Can startup? — NO → Is there any output from inverter? — YES	Replace compressor
NO	Replace inverter PCB or power transistor module. (Check 15V on the outdoor control PCB and check power transistor with inverter checker. If the power transistor is OK, replace inverter PCB)
NO (No compressor can)	Replace compressor
YES (Both of 2 compressors can)	Wait and see
Interchange the cables between inverter and compressor, and try to startup → Is the compressor failed to startup switched? — NO	Replace compressor
YES	Replace inverter PCB or power transistor module. (Check 15V on the outdoor control PCB and check power transistor by inverter checker. If the power transistor is OK, replace inverter PCB)

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

Error code	LED	Green	Red	Content
Remote controller: E60 7-segment display: E60-1, 2 *1	Indoor	Keeps flashing	Stays Off	Rotor position detection failure (CM1, CM2)
	Outdoor	Keeps flashing	*2	

*1 E60-1 : CM1, E60-2 : CM2 *2 E60-1 : 1 time flash E60-2 : 2 time flash

1.Applicable model

Outdoor unit

2.Error detection method

Detection of the compressor rotor position.

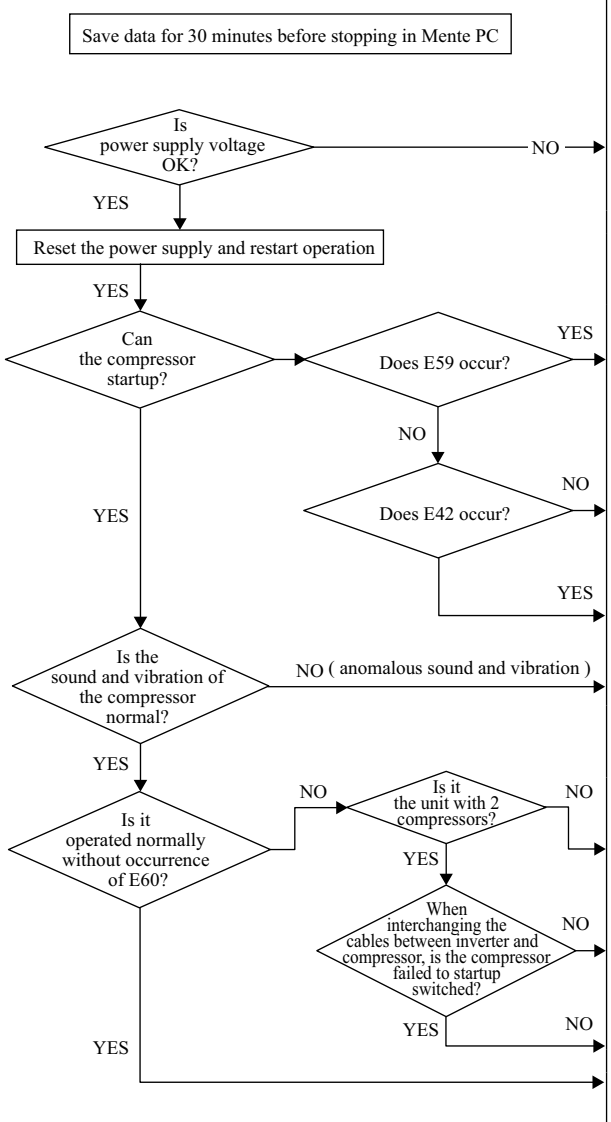
3. Condition of error displayed

If it fails to detect the rotor position of compressor, after changinging over to the operation of compressor rotor position detection, the compressor stops. When it is restart automatically after 3 minutes delay, this anomaly occurs 4 times within 15 minute after the initial detection

4.Presumable cause

- Compressor anomaly
- Inverter PCB anomaly
- Anomaly of power supply

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 controller: E61 7-segment display: E61	Indoor	Keeps flashing	Stays Off	Communications error between the master unit and slave units
	Outdoor	Keeps flashing	1 time flash	

1.Applicable model

Outdoor unit

2. Error detection method

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

3. Condition of error displayed

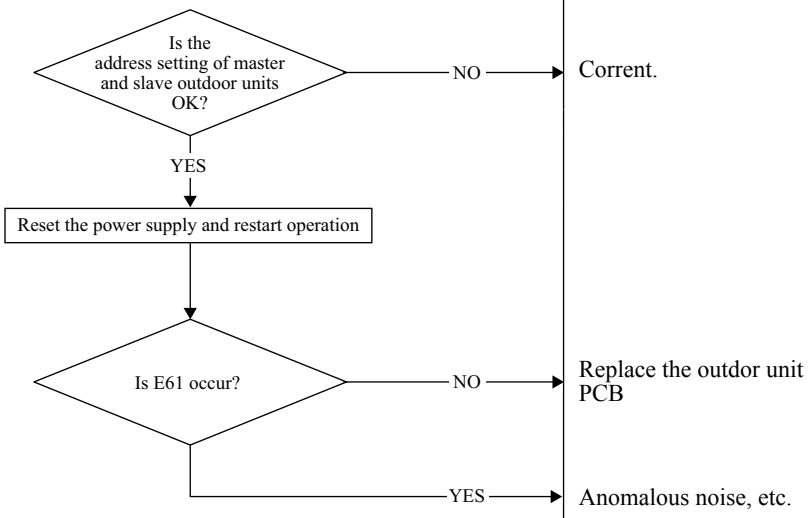
Same as above

4.Presumable cause

- Signal wire anomaly
- Outdoor control PCB anomaly
- Inverter PCB (INV1, 2) anomaly
- Rush current prevention resistor anomaly

5.Troubleshooting

Diagnosis	Countermeasure



Note:

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

1.Applicable model

Indoor unit

2.Error detection method

When ON signal is inputted to the CnT terminal of indoor 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 controller setting of Emergency Stop "Valid"? — NO →	Replace remote control PCB
YES ↓ Is ON signal inputted to the CnT terminal of indoor control PCB? — NO →	Replace indoor control PCB
YES →	Check the cause of emergency stop. (It is better to have the data for 30 minutes before stopping, when instructing the installer)

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

2.4 Outdoor unit control PCB replacement procedure

PCB012D017B ⚠C

Precautions for Safety

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

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

⚠ WARNING

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

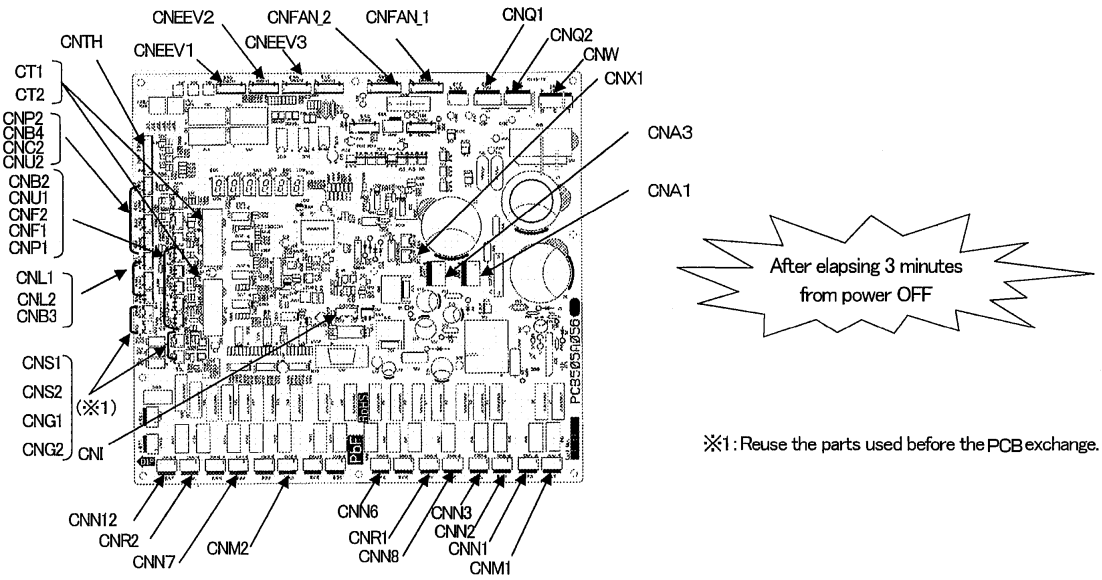
⚠ CAUTION

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

(Note) If cut the tie, the wiring cables should be bound with new tie again.

Exchange the control pwb according to the following procedure.

1. Exchange the pwb **after elapsing 3 minutes from power OFF.**
   (Be sure to measure voltage (DC) of two places (1. Power supply for pwb 2. Power supply for fan motor) and **check that the voltage is discharged sufficiently.** (Refer to Fig.1 next page))
2. Disconnect the connectors from the pwb.
3. Disconnect the blue wiring passing through CT1 and CT2 on the pwb before exchanging the pwb.
4. Match the setting switches (SW1-6) with the former pwb.
5. Tighten up a screw after passing blue wiring through CT1 and CT2 of the changed.
6. Connect the connectors to the pwb. (Contirm the **connectors are not half inserted.**)



Parts Arrangement View

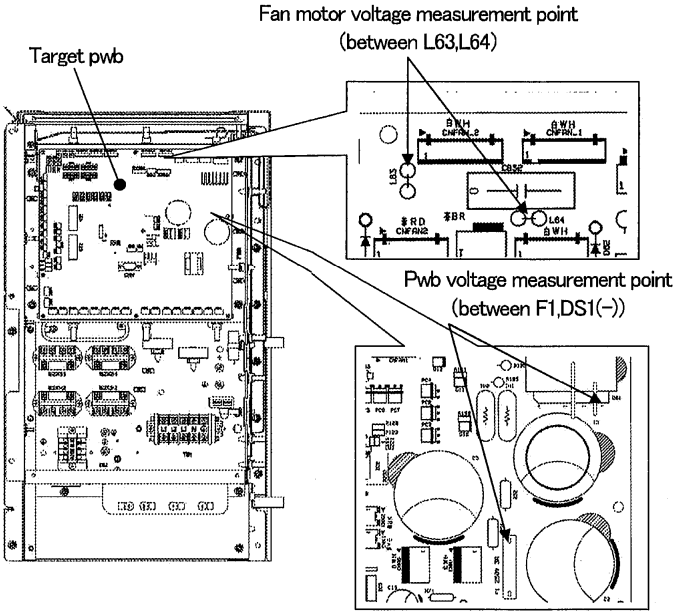


Fig.1 Voltage Measurement Points

2.5 Inverter PCB replacement procedure

pcb012d018ab

Exchange the inverter pwb according to the following procedure.

1. Exchange the pwb **after elapsing 3 minutes from power OFF.**
   (Be sure to measure voltage (DC) of two places (1. Power supply for pwb 2. Power supply for fan motor) and **check that the voltage is discharged sufficiently.** (Refer to Fig.3 next page))
2. Disconnect the connectors from the pwb.
3. Exchange the pwb.
4. Match the setting switches (JSW10, 11) with the former pwb. (Refer to Table.1)
5. Connect the connectors, wiring, and snubber capacitor. (Contirm the **connectors are not half inserted.**)
6. Cautions for maintenance of the control box
   This control box has its front part hinged so as to be able to open and close for maintenance of the inverter.
   Following cautions must be observed during the maintenance.
   Always follow the instructions described in the technical manual when implementing the maintenance.
   (1) Turn off the power supply before starting the maintenance.
   (2) After waiting for minimum 3 minutes after turning off the main power supply, measure the DC power supply voltage (between F1 and DS (-) of the control power supply) to confirm according to the technical manual that the electricity has been discharged sufficiently.
   Only then disconnect the power supply cable and the signal cable from the terminal board.
   (3) Remove a total 8 pieces of screw at the sections A, B and C in Figure 1.
   • Take care not to drop screws on the PCB, etc. when removing them.
   • Make sure to collect when dropped any.
   (4) Open the front part of the control box as shown in Figure 2.
   • Don't open the front part more than 90º.
   • Avoid exerting undue force on the open front part.
   • Provide a support under the open fuont part.
   (5) After opening the front part of the control box, you can access to the inverter. Start the maintenance according to the technical manual.
   • When a tie wrap band has been cut off, fix it firmly at the original position with a new tie wrap band.
   • When a connector has been disconnected from the PCB, insert firmly the connector again at the original position.
   • Some of electrical parts are designed specifically to INV1 or INV2.
   They are stamped or indicated with the lead mark to which of INV1 or INV2 they are used.
   Take care not to use wrong parts duing repair.
   If wrong parts are used, the equipment will not operate properly.
   (6) When the maintenance is over, close the front part of the control box as shown in Figure 3.
   • Take care not to nip the wiring with the front part.
   (7) Reinstall and tighten the 8 screws removed at the sections A, B and C.
   Don't overlook to tighten the screws at the sectiong B particularly.
   • Take care not to drop screws on the PCB, etc. when tightening them.
   • Make sure to collect when dropped any, and tighten them at proper positions.
   (8) Confirm visually that all screws have been tightened, and all cables have been connected properly.

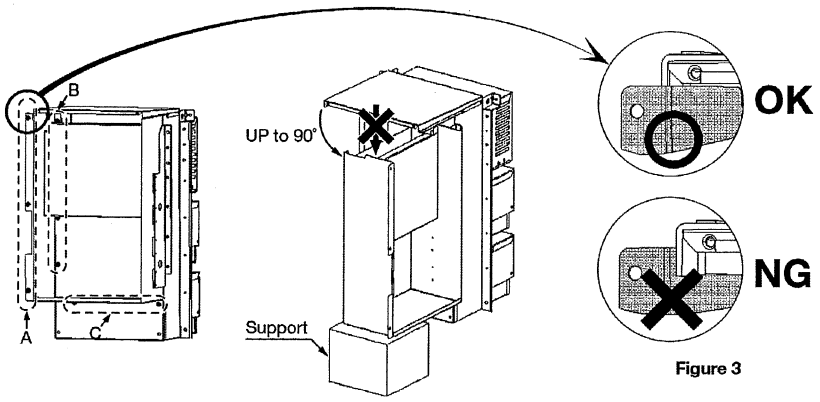
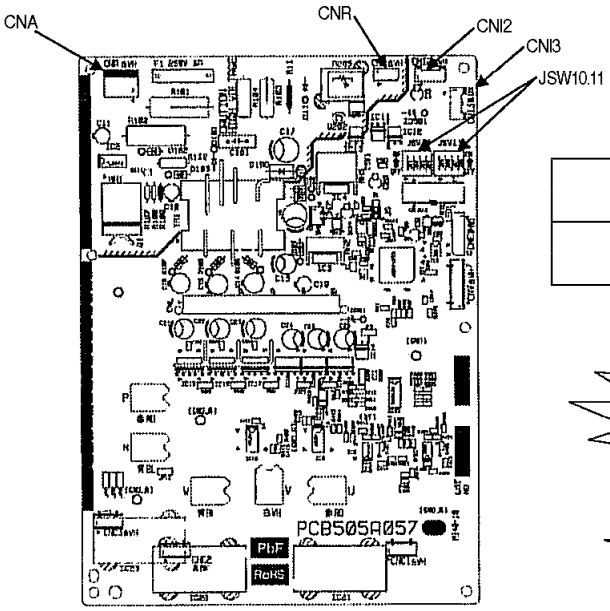


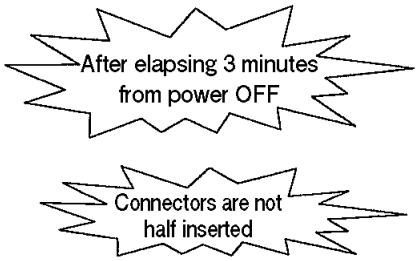
Figure 1 Figure 2 Figure 3



Parts Arrangement View

Table. 1 Switch Setting

Model		JSW10	JSW11			
			1	2	3	4
All models	INV1	↑	OFF	ON	OFF	OFF
	INV2	↑	OFF	ON	OFF	ON



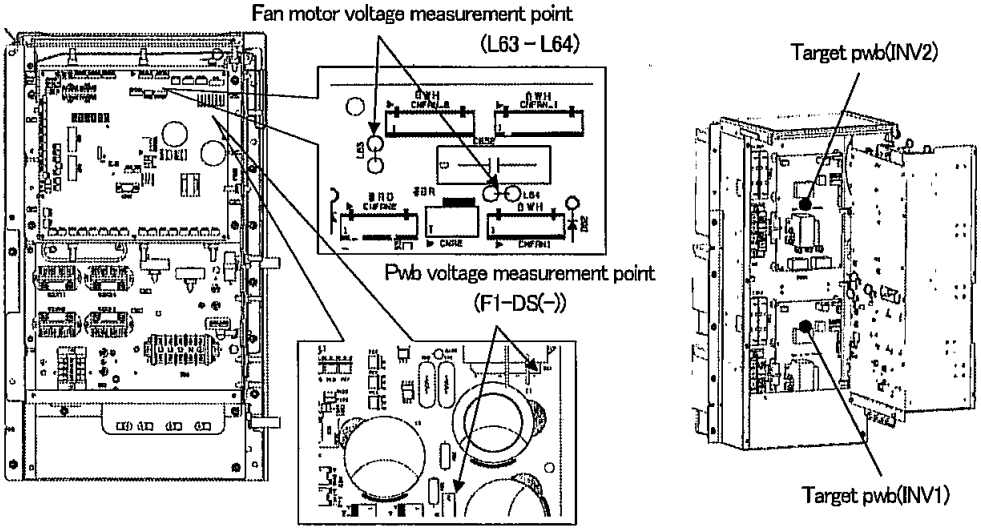
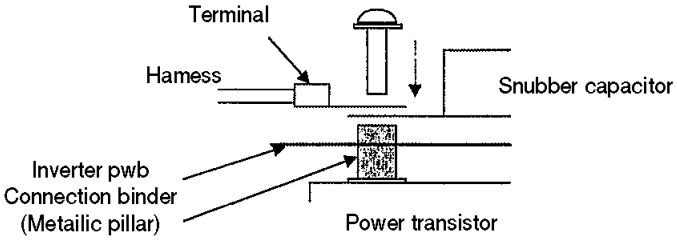


Fig.3 Voltage Measurement Points



・Procedure on tightening hamess (snubber capacitor) and power transistor with screw.
A metailic connection binder is set in each hole of the inverter pwb of "p", "N", "U", "V", and "w" beforehand. Then fighten the hamess (snubber capacitor) and the power transistor with the screw together. (Connect snubber capacitor with "p" and "N".)

Fig.3 Installation Method to Power transistor

■ Function of Dip switch for control (SW3, 4, 5)

• SW3 (Function setting)

Switch		Function
SW3-1	ON	Inspection LED reset
	OFF	Normal
SW3-2	ON	Auto
	OFF	Normal
SW3-4	ON	Refrigerant quantity check
	OFF	Normal
SW3-5	ON	Check operation
	OFF	Normal
SW3-7	ON	Forced cooling/heating
	OFF	Normal

■ Function of Jumper wire (J13, 15)
(With: Shorted / None: Opened)

Jumper		Function	
J13	With	External input	Level input
	None	External input	Pulse input
J15	With	Defrost time	Normal
	None	Defrost time	Cold weather region

• SW4 (Model selection)

Switch / Model	SW4			
	1	2	3	4
FDC335	OFF	ON	OFF	OFF
FDC400	OFF	OFF	ON	OFF
FDC450	ON	OFF	ON	OFF
FDC504	OFF	ON	ON	OFF
FDC560	ON	ON	ON	OFF
FDC615	OFF	OFF	OFF	ON
FDC680	ON	OFF	OFF	ON

• SW4 (Change demand ratio)

	ON/OFF		Function	
SW4-5	ON	SW4-6	OFF	Compressor capacity 60%
			ON	Compressor capacity 0%
	OFF		OFF	Compressor capacity 80%
			ON	Compressor capacity 40%

• SW4 (Master/Slave setting)

	ON/OFF	Function
SW4-7	OFF	Master
	ON	Slave

• SW5 (Function setting)

	ON/OFF	Function	
SW5-1	ON	Test run switch	test run
	OFF	Test run switch	Normal
SW5-2	ON	Test run operation mode	Cooling
	OFF	Test run operation mode	Heating
SW5-3	ON	Pump down switch	Pump down
	OFF	Pump down switch	Normal
SW5-5	ON	Super Link protocol : Previous SL	
	OFF	Super Link protocol : New SL	

• SW7,8,9 (Function setting)

Switch	Function	
SW7	Data erase/data write	
SW8	7-segment display No. UP	order of 1
SW9	7-segment display No. UP	order of 10

*

●DIP Switch setting list

(1) Outdoor unit

(a) Control PCB

Switches	Description		Default setting		Remarks
SW1	Outdoor address No. (Order of 10)		4		0-9
SW2	Outdoor address No. (Order of 1)		9		0-9
SW3-1	Inspection LED reset	Normal*/Reset	OFF	Normal	
SW3-2	Automatic backup operation	Normal*/Backup	OFF	Normal	
SW3-3	Reserved		OFF		Keep OFF
SW3-4	Refrigerant amount check	Normal*/Check	OFF	Normal	Keep OFF (KXR)
SW3-5	Check operation start	Normal*/Start	OFF	Normal	
SW3-6	Reserved		OFF		Keep OFF
SW3-7	Forced heating/cooling	Normal*/Forced	OFF	Normal	
SW3-8	Reserved		OFF		Keep OFF
SW4-1 SW4-2 SW4-3 SW4-4	Model selection		As per model		See table 1
SW4-5	Demand ratio selection		OFF		See table 2
SW4-6			OFF		
SW4-7	Master/Slave setting	Master*/Slave	OFF	Master	
SW4-8	Spare		OFF		Keep OFF
SW5-1	Test run SW	Normal*/Test run	OFF	Normal	
SW5-2	Test run mode	Heating*/Cooling	OFF	Heating	
SW5-3	Pump down operation	Normal*/Pump down	OFF	Normal	
SW5-4	Reserved		OFF		Keep OFF
SW5-5	Superlink selection	New SL*/Previous SL	OFF	New SL(Auto)	
SW5-6	Reserved		OFF		Keep OFF
SW5-7	Reserved		OFF		Keep OFF
SW5-8	Reserved		OFF		Keep OFF
SW6-1	Reserved		OFF		Keep OFF
SW6-2	Reserved		OFF		Keep OFF
SW6-3	Reserved		OFF		Keep OFF
SW6-4	Spare		OFF		Keep OFF
SW6-5	Spare		OFF		Keep OFF
SW6-6	Spare		OFF		Keep OFF
SW6-7	Spare		OFF		Keep OFF
SW6-8	Spare		OFF		Keep OFF
SW7	Data Erase/Write	Erase*/Write	OFF	Erase	
SW8	7-segment display code No. increase (Order of 1)		0		
SW9	7-segment display code No. increase (Order of 10)		0		
J10	Superlink terminal spare	Normal*/Switched	With	Normal	
J11 J12	Power voltage selection		As per voltage		See table 3
J13	External input	Level*/Pulse	With	Level	
J14	Defrost end temperature	Normal*/Intensive	With	Normal	
J15	Defrost start temperature	Normal*/Cold region	With	Normal	
J16	Outdoor unit type selection	KXR/KX	As per type		See table 1

* Default setting

Table 1: Model selection with SW4-1-SW4-4 and J16

0: OFF 1:ON

	335-K	400	450	504	560	560-K	615	680
SW4-1	0	0	1	0	1	1	0	1
SW4-2	1	0	0	1	1	1	0	0
SW4-3	0	1	1	1	1	0	0	0
SW4-4	0	0	0	0	0	1	1	1
J16	None	None	None	None	None	None	None	None

Table 2: Demand ratio selection with SW4-5, SW4-6

0: OFF 1:ON

SW4-5	SW4-6	Compressor capacity (%)
0	0	80
1	0	60
0	1	40
1	1	0

Table 3: Power voltage selection with J11, J12

0: None 1: With

Outdoor unit	J11	J12
380V 60Hz	0	1
380/415V 50Hz	0	0

(2) Indoor unit

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

* Default setting

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

0: OFF 1:ON

	P22	P28	P36	P45	P56	P71	P80	P90	P112	P140	P160	P224	P280
SW6-1	0	1	0	0	0	0	1	0	1	0	1	0	1
SW6-2	0	0	1	0	1	0	0	1	1	0	0	1	1
SW6-3	0	0	0	1	1	0	0	0	0	1	1	1	1
SW6-4	0	0	0	0	0	1	1	1	1	1	1	1	1

*

■ Function of Connection

(1) Control PCB input

Mark	Connecter	Function
Tho-A	CNTH	Outdoor air thermistor
Tho-R1	CNTH	Heat exchanger thermistor (exhaust)
Tho-R2	CNB2	Heat exchanger thermistor (exhaust)
Tho-R3	CNB3	Heat exchanger thermistor (inlet)
Tho-R4	CNB4	Heat exchanger thermistor (inlet)
Tho-D1	CNTH	Discharge pipe thermistor 1(CM1)
Tho-D2	CNC2	Discharge pipe thermistor 2(CM2)
Tho-C1	CNU1	Under-dome thermistor 1(CM1)
Tho-C2	CNU2	Under-dome thermistor 1(CM2)
Tho-P1	CNP1	Power transistor thermistor 1(CM1)
Tho-P2	CNP2	Power transistor thermistor 2(CM2)
Tho-S	CNTH	Suction pipe thermistor
Tho-SC	CNF1	Sub-cooling coil thermister 1
Tho-H	CNF2	Sub-cooling coil thermister 2
CT1		Current sensor (CM1)
CT2		Current sensor (CM2)
PSH	CNL1	High pressure sensor
PSL	CNL2	Low pressure sensor
63H1-1	CHQ1	High pressure switch (CM1)
63H1-2	CHQ2	High pressure switch (CM2)
	CNS1	External operation input
	CNS2	Demand input
	CNG1	Forced operation input cooling/heating
	CNG2	Silent mode input
Power source	CNW1	Open phase detection 380-415V
Power source	CNW2	For transformer (DC10,15.1V)
Power source	CNA2	Fan motor

(2) Ountrol PCB input

Mark	Connector	Function
52X1	CNM1	Solenoid value for CM1
52X2	CNM2	Solenoid value for CM2
20S	CNN1	4-way valve
SV6	CNN2	Solenoid valve (oil return CM1)
SV7	CNN3	Solenoid valve (oil return CM2)
SV1	CNN6	Solenoid valve (CM1:liquid bypass)
SV2	CNN7	Solenoid valve (CM2:liquid bypass)
FMC1,2	CNN8	Fan for IPM
SV13	CNN11	Solenoid valve (gas bypass)
CH1	CNR1	Crankcase heater (CM1)
CH2	CNR2	Crankcase heater (CM2)
52XR	CnH	Operation output
52XE	CnY	Error output
	CnZ1	EEV selection
	CnE	RAM Checker output
	CnV	For servicing (for rewriting soft ware)
LED1		Inspection (Red)
LED2		Inspection (Green)
LED3		For service (Green)
7 SEG G1		7 seg LED1 (function indication)
7 SEG G2		7 seg LED2 (data indication)
R,S	CNA1	

(3) Control PCB input/output

Mark	Connecter	Function
FM01	CNFAN1-1	DC 15 V output (Vcc)
	-2	Reverse turn detection output (REV)
	-3	Speed command output (Vsp)
	-4	RPM monitor input (FG)
	-5	Over-current error input (OverC)
	-6	Overheat error input (OverH)
FM02	CNFAN2-1	DC 15 V output (Vcc)
	-2	Reverse turn detection output (REV)
	-3	Speed command output (Vsp)
	-4	RPM monitor input (FG)
	-5	Over-current error input (OverC)
	-6	Overheat error input (OverH)
	Cnl11	Inverter protocol
	CnX1	Super Link protocol
	CnX2	Spare for Super Link protocol

(4) Expansion value PCB

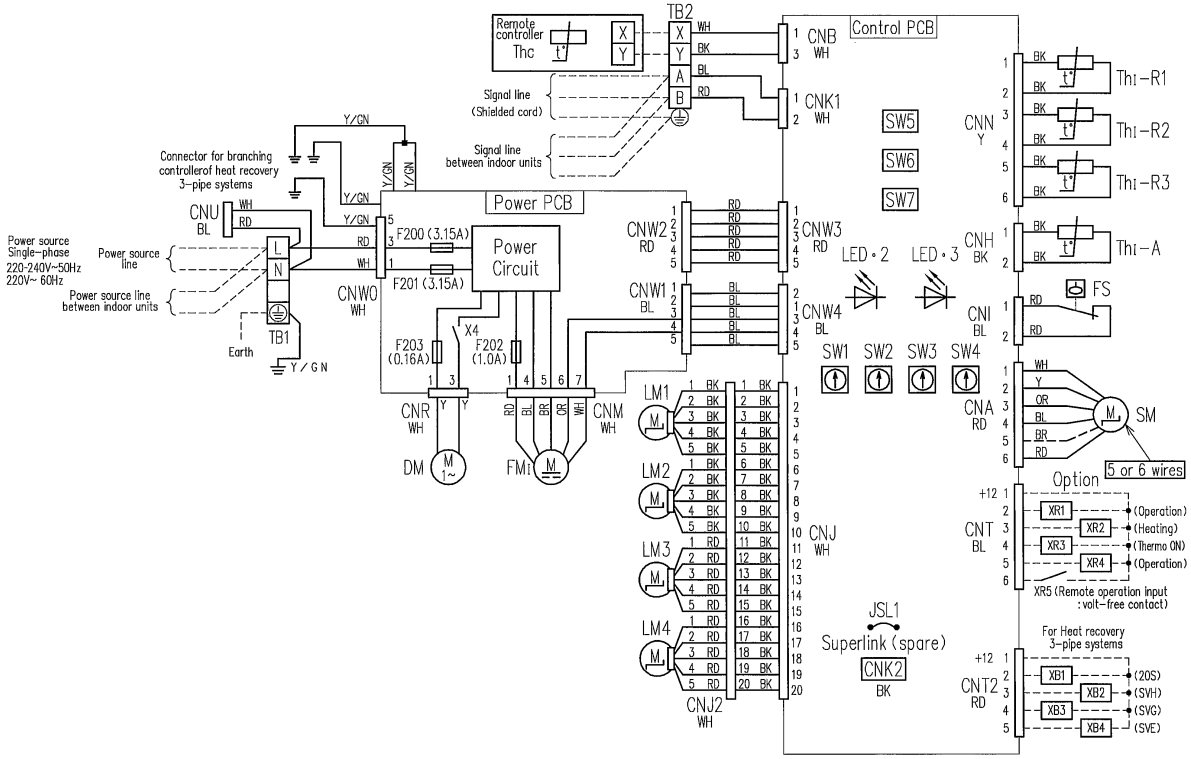
Mark	Connecter	Function
CT2	CNCT4	Compressor current (CM2)
EEVH1	CNEEV1	EEVH1 for heating (Front)
EEVH2	CNEEV2	EEVH2 for heating (Rear)
EEVSC	CNEEV3	EEV-SC for Subcooling coil

3. ELECTRICAL WIRING

3.1 Indoor unit

(a) Ceiling cassette-4 way type (FDT)

Models All : models



CNA~Z	Connector
DM	Drain motor
F200-203	Fuse
FMI	Fan motor
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM1~4	Louver motor
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address : tens place
SW2	Indoor unit address : ones place
SW3	Outdoor unit address : tens place
SW4	Outdoor unit address : ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address : hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Thi-A	Thermistor (Return air)
Thi-R1,2,3	Thermistor (Heat exchanger)
X4	Relay for DM
■mark	Closed-end connector

Notes
1. - - - indicates wiring on site.
2. Use twin core cord (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
OR	Orange	Y/GN	Yellow/Green

PJF000Z053 C

(b) Ceiling cassette-4 way Compact type (FDTC)

Models All : moddels

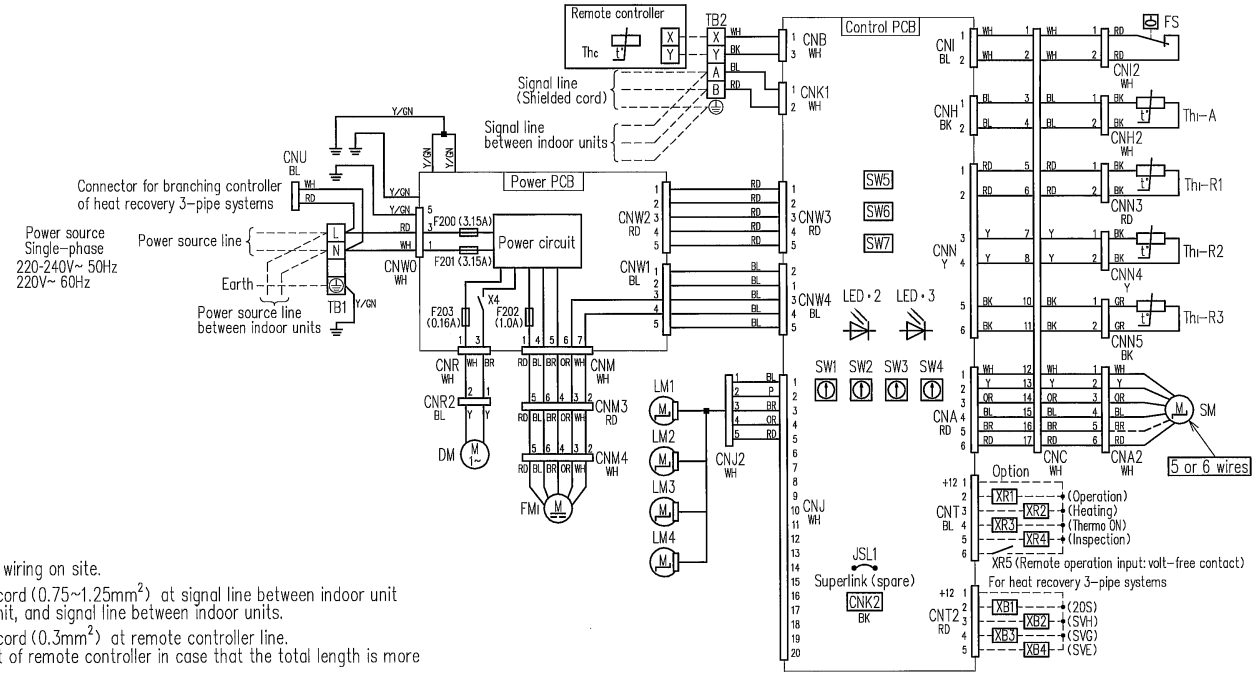
CNA~Z	Connector
DM	Drain motor
F200~203	Fuse
FM1	Fan motor
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
LM1~4	Louver motor

SM	Stepping motor (For electronic expansion valve)
SW1	Indoor unit address : tens place
SW2	Indoor unit address : ones place
SW3	Outdoor unit address : tens place
SW4	Outdoor unit address : ones place
SW5–1	Automatic adjustment/Fixed preivious version of Superlink protocol
SW5–2	Indoor unit address : hundreds place
SW6	Model capacity setting

SW7–1	Operation check,Drain motor test run
TB1	Terminal block (Power source) (□ mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1–A	Thermistor (Return air)
Th1–R1, 2, 3	Thermistor (Heat exchanger)
X4	Relay for DM
■ mark	Closed–end connector

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



Notes

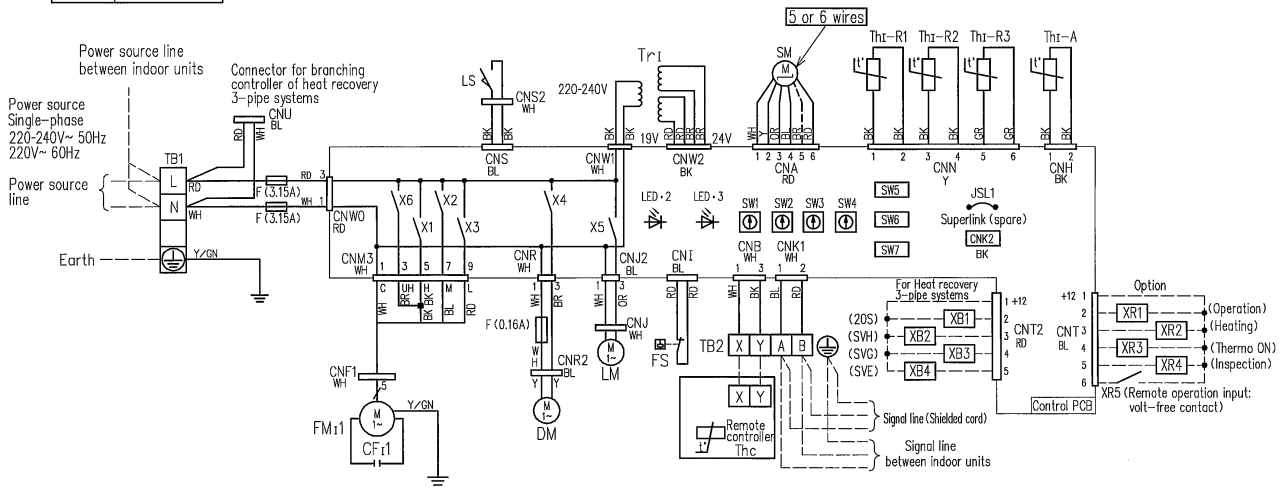
1. ----indicates wiring on site.
2. Use twin core cord (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJA003Z331 B

(c) Ceiling cassette-2 way type (FDTW)
Models FDTW28KXE6, 45KXE6, 56KXE6

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



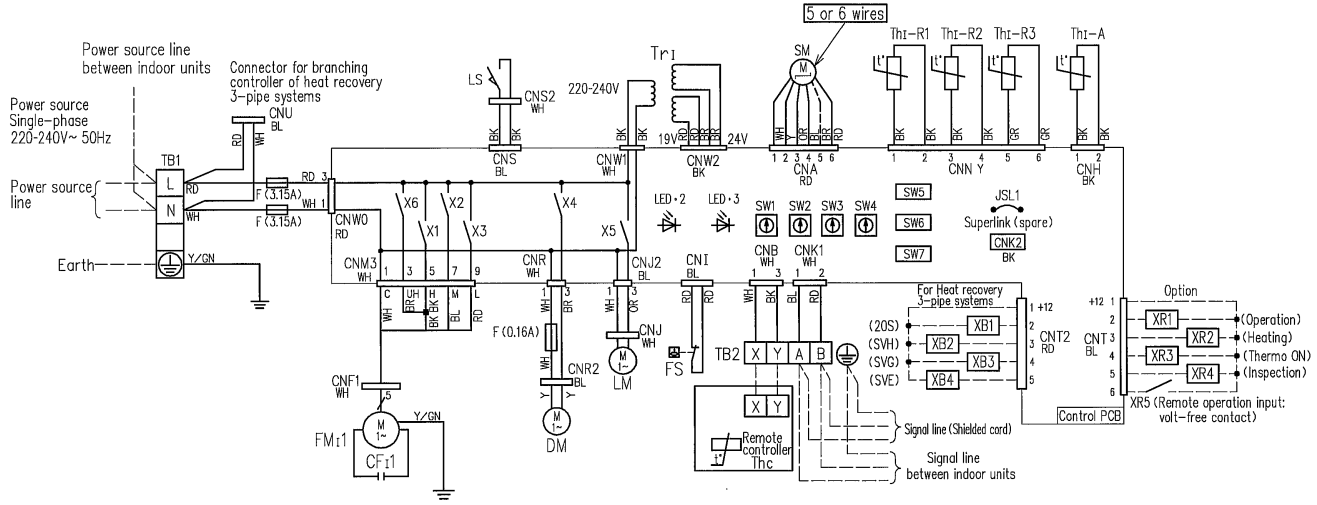
CF I 1	Capacitor for FMI
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM I 1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
LM	Louver motor
LS	Louver switch
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th I-A	Thermistor (Return air)
Th I-R1, 2, 3	Thermistor (Heat exchanger)
Tr I	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJB001Z560 B

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



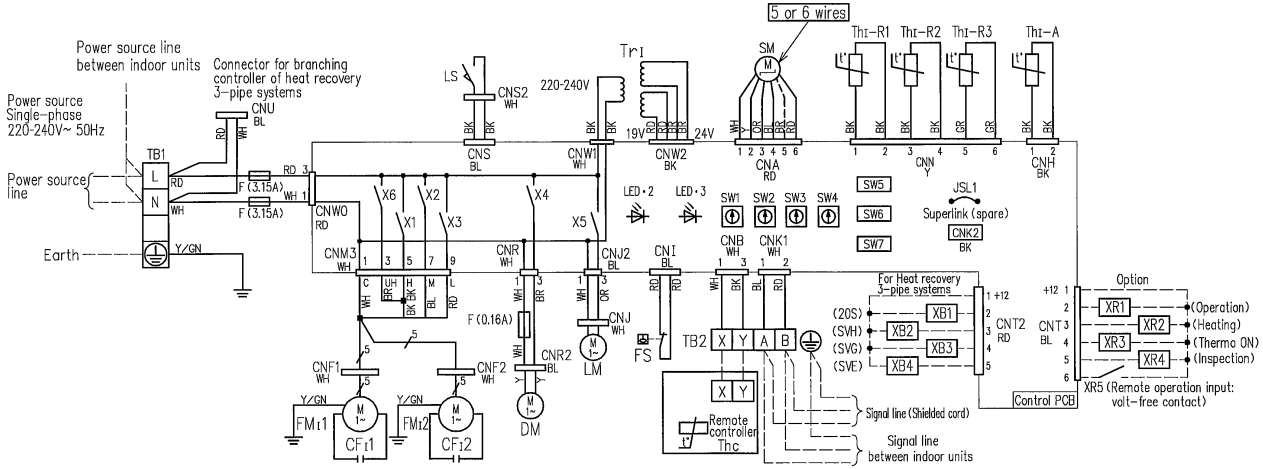
CF I 1	Capacitor for FM I
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM I 1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
LM	Louver motor
LS	Louver switch
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th I-A	Thermistor (Return air)
Th I-R1, 2, 3	Thermistor (Heat exchanger)
Tr I	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJB001Z561 B

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



CF I 1,2	Capacitor for FMI
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM I 1,2	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
LS	Louver switch
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM
■mark	Closed-end connector

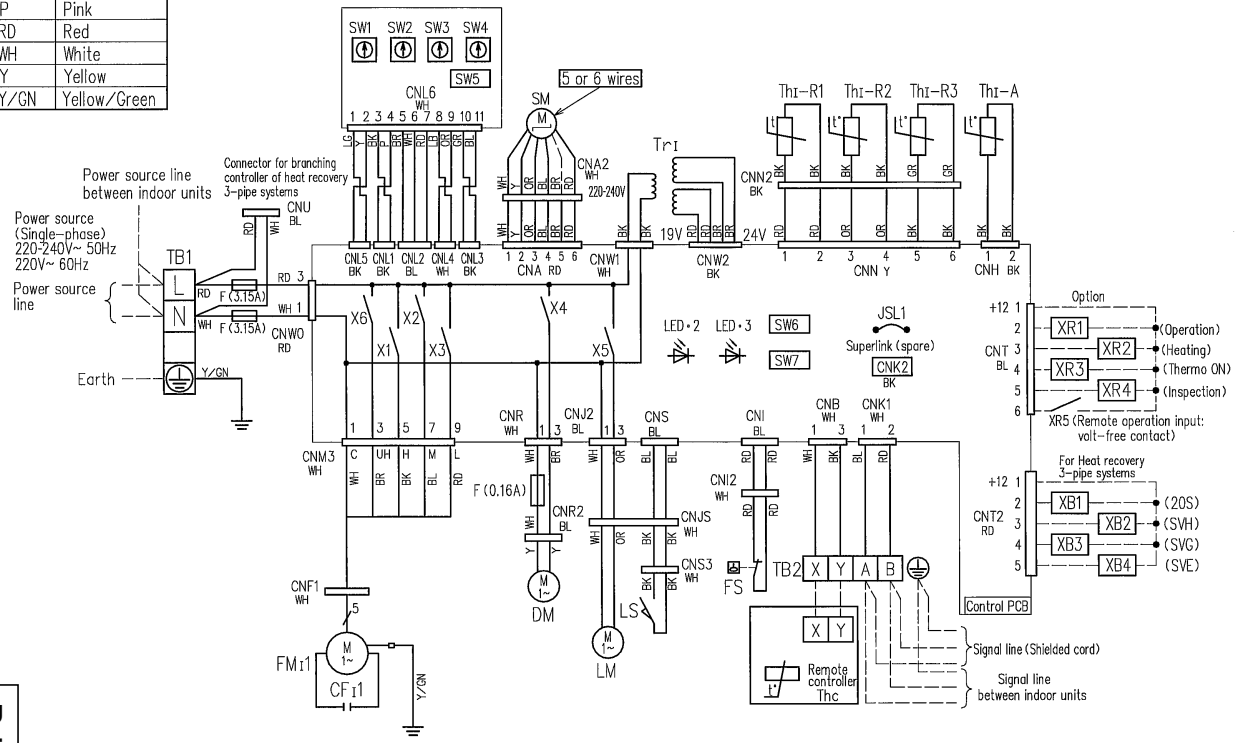
Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJB001Z562 B

(d) Ceiling cassette-1 way type (FDTS)
Model FDTS45KXE6

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
LB	Light Blue
LG	Light Green
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



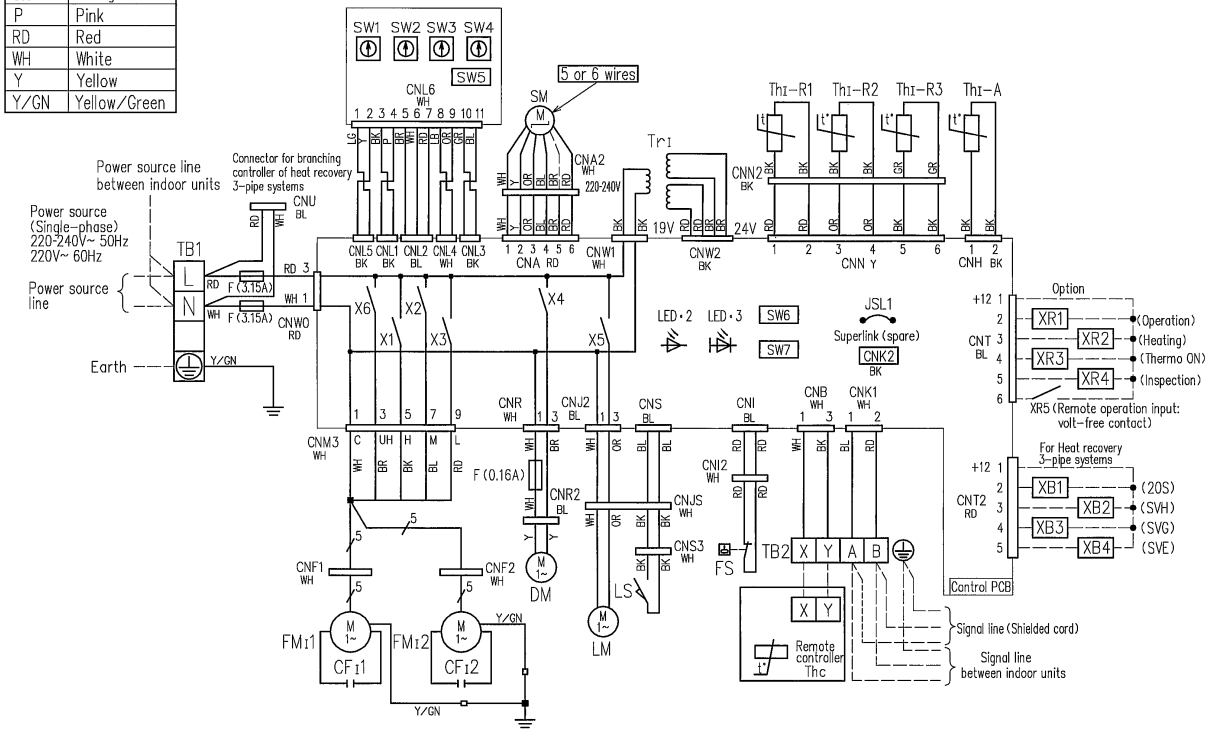
CF I1	Capacitor for FMI
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM I1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
LM	Louver motor
LS	Louver switch
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th I-A	Thermistor (Return air)
Th I-R1, 2, 3	Thermistor (Heat exchanger)
Tr I	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM
■mark	Closed–end connector

Notes 1. – – indicates wiring on site.
2. Use twin core cable (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJC001Z195 A

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
LB	Light Blue
LG	Light Green
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green

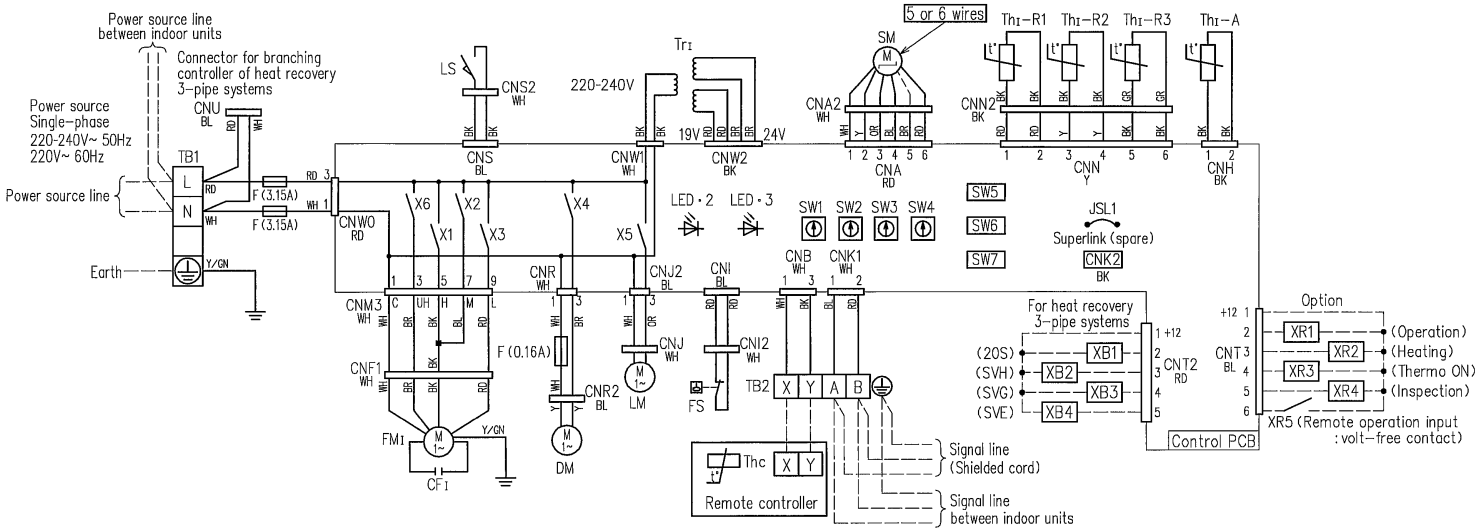


CF I 1,2	Capacitor for FMI
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM I 1,2	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
LS	Louver switch
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th I-A	Thermistor (Return air)
Th I-R1, 2, 3	Thermistor (Heat exchanger)
Tr I	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM
■mark	Closed-end connector

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJC001Z196 A

(e) Ceiling cassette-1 way compact type (FDTQ)
Models All models



Notes
1. —— indicates wiring on site.
2. Use twin core cord (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

CF1	Capacitor for FM1
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
LS	Louver switch

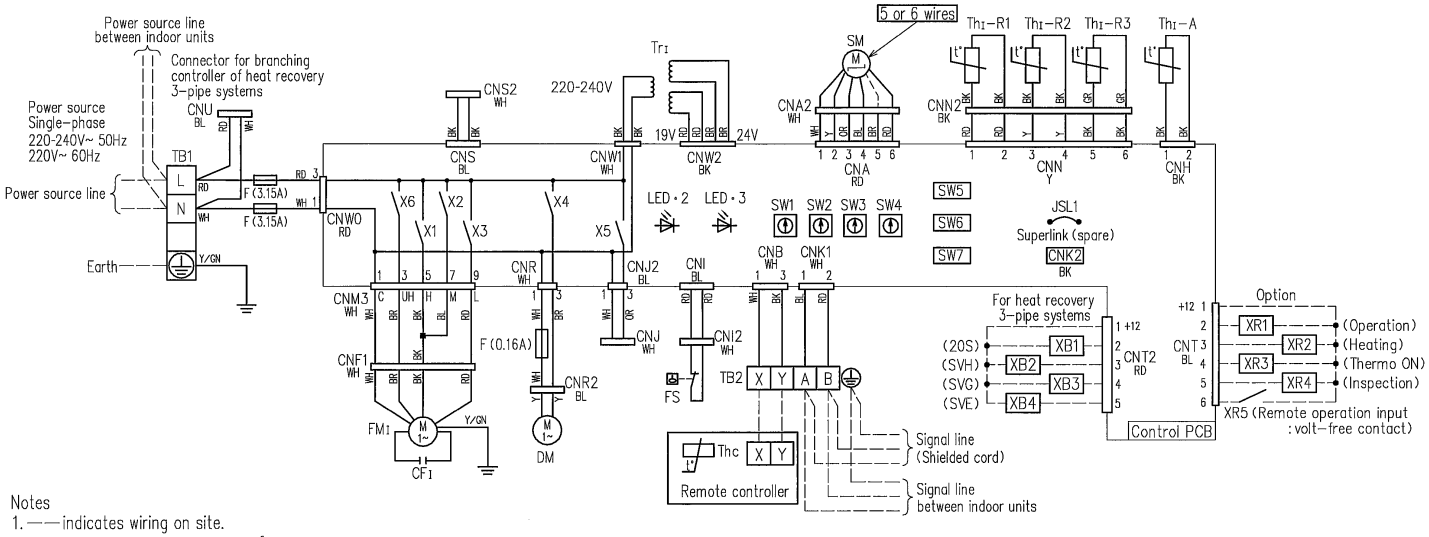
SM	Stepping motor (For electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed preivious version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run

TB1	Terminal block (Power source) (□ mark)
TB2	Terminal block (Signal line) (□ mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM
■mark	Closed-end connector

Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

PJC001Z190 A



Notes
1. —— indicates wiring on site.
2. Use twin core cord (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Changing the fan tap

The factory setting of the fan tap is "Standard".
Change the fan tap to "High Speed 1" by using the function setting of the wired remote controller.

CATEGORY	NUMBER	FUNCTION	SETTING
I/U FUNCTION	02	FAN SPEED SET	HIGH SPEED 1

Invalidating the louver button

The factory setting of the louver button is "Valid".
Change the louver button to "Invalid" by using the function setting of the wired remote controller.

CATEGORY	NUMBER	FUNCTION	SETTING
FUNCTION (REMOTE CONTROLLER FUNCTION)	07	LOUVER SW	INVALID

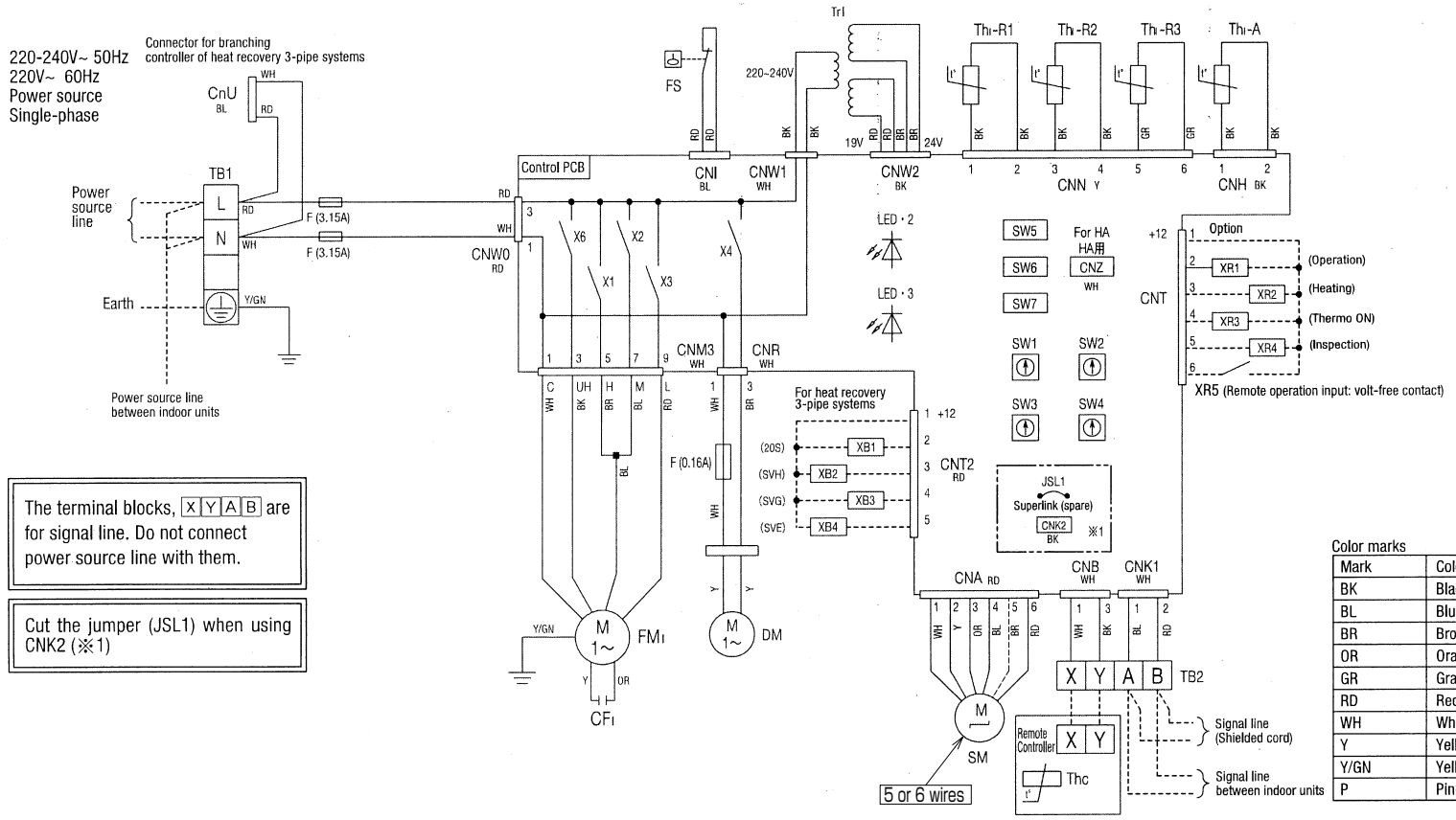
CF1	Capacitor for FM1
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)

SM	Stepping motor (For electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed preivious version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run

TB1	Terminal block (Power source) (□ mark)
TB2	Terminal block (Signal line) (□ mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
X5	Relay for LM
■mark	Closed–end connector

PJC001Z240 A

(f) Duct connected-High static pressure type (FDU)
Model FDU71KXE6



The terminal blocks, X Y A B are for signal line. Do not connect power source line with them.

Cut the jumper (JSL1) when using CNK2 (※1)

Color marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
OR	Orange
GR	Gray
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green
P	Pink

CFi	Capacitor for FMi
CNA~Z	Connector
DM	Drain motor
F	Fuse
FMi	Fan motor (with thermostat)
FS	Float switch
JSL1	Live superlink terminal setting (for spare)
LED・2	Indication lamp (Green – Normal operation)
LED・3	Indication lamp (Red – Inspection)
SM	Stepping motor (for electronic expansion valve)

SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□ mark)

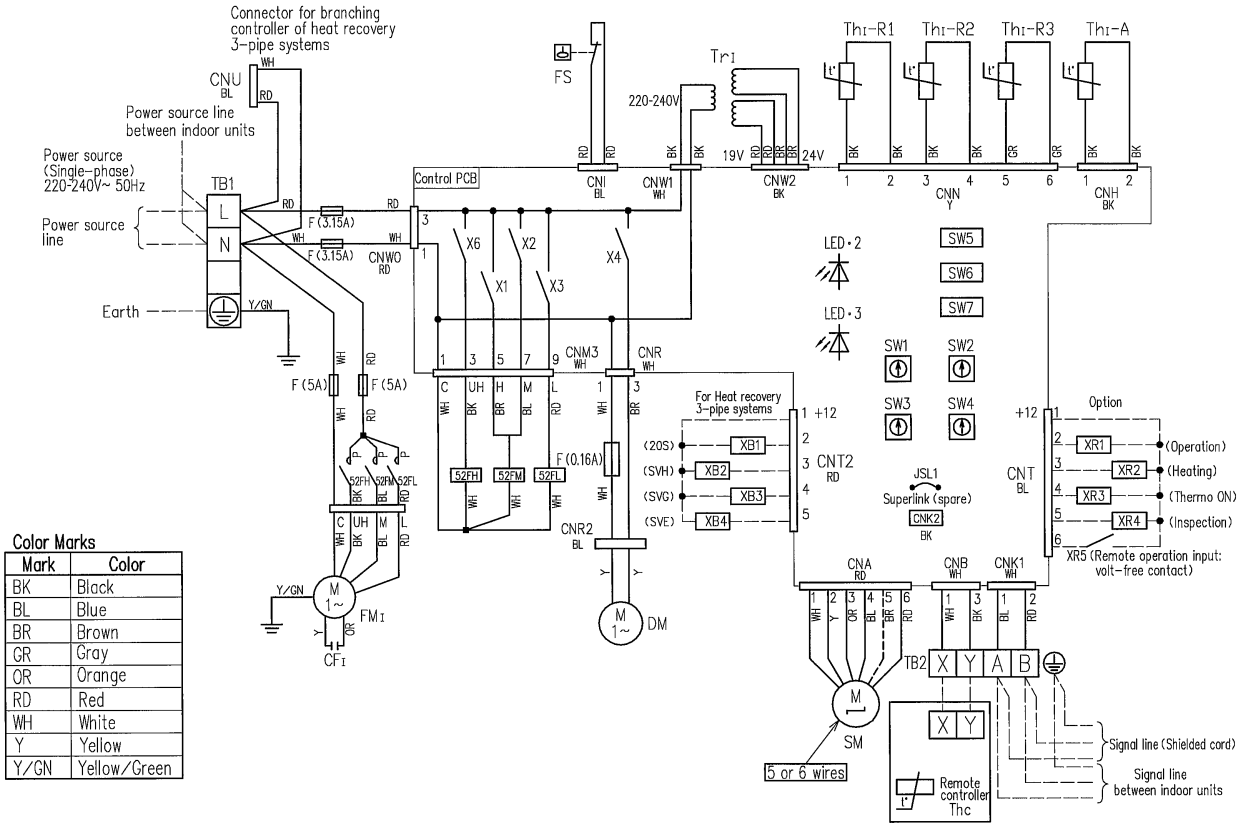
TB2	Terminal block (Signal line) (□ mark)
Thc	Thermistor (Remote controller)
Thi-A	Thermistor (Return air)
Thi-R1,2,3	Thermistor (Heat exchanger)
Tn	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
■mark	Closed-end connector

Notes 1. — —indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJD011G034 A

(f) Duct connected-High static pressure type (FDU)

Models 90KXE6, 112KXE6, 140KXE6



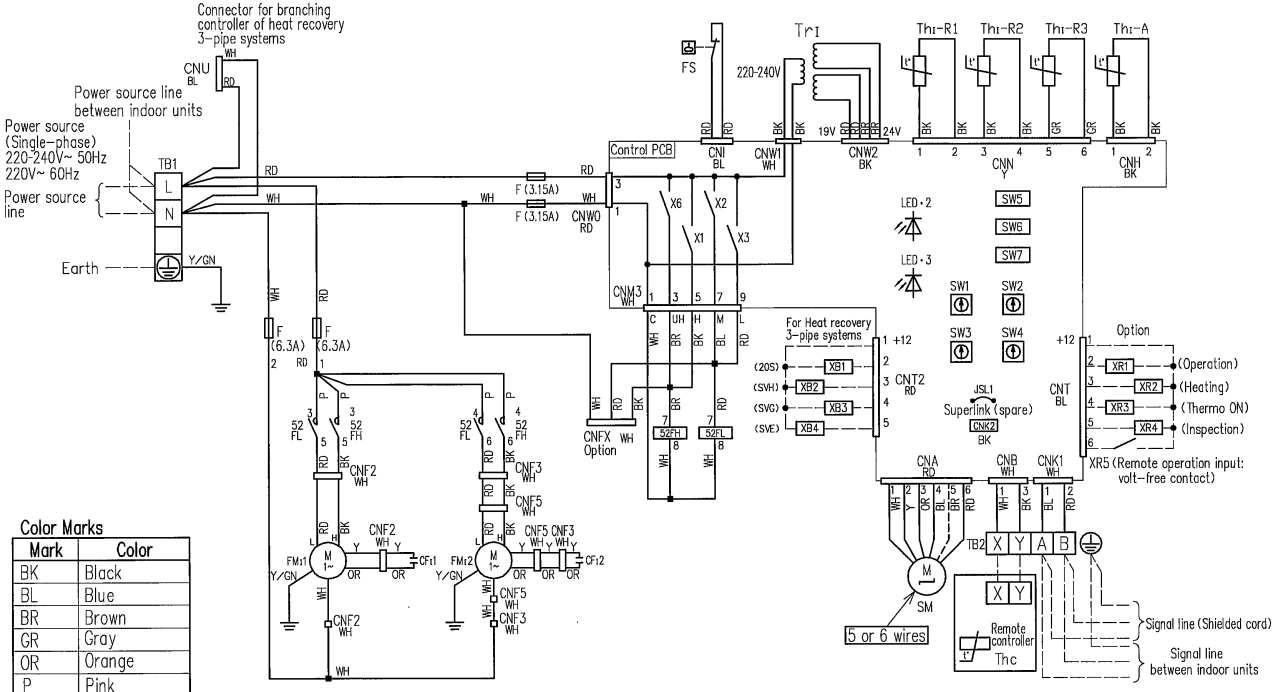
CF1	Capacitor for FM1
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
■mark	Closed–end connector
52FL,FM,FH	Electromagnetic contactor for FM1

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJD001Z229 B



CF I 1,2	Capacitor for FMI
CNA~Z	Connector
F	Fuse
FM I 1,2	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th I-A	Thermistor (Return air)
Th I-R1, 2, 3	Thermistor (Heat exchanger)
Tr I	Transformer
X1-3,6	Relay for FM
■mark	Closed-end connector
52FL,FH	Electromagnetic contactor for FMI

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

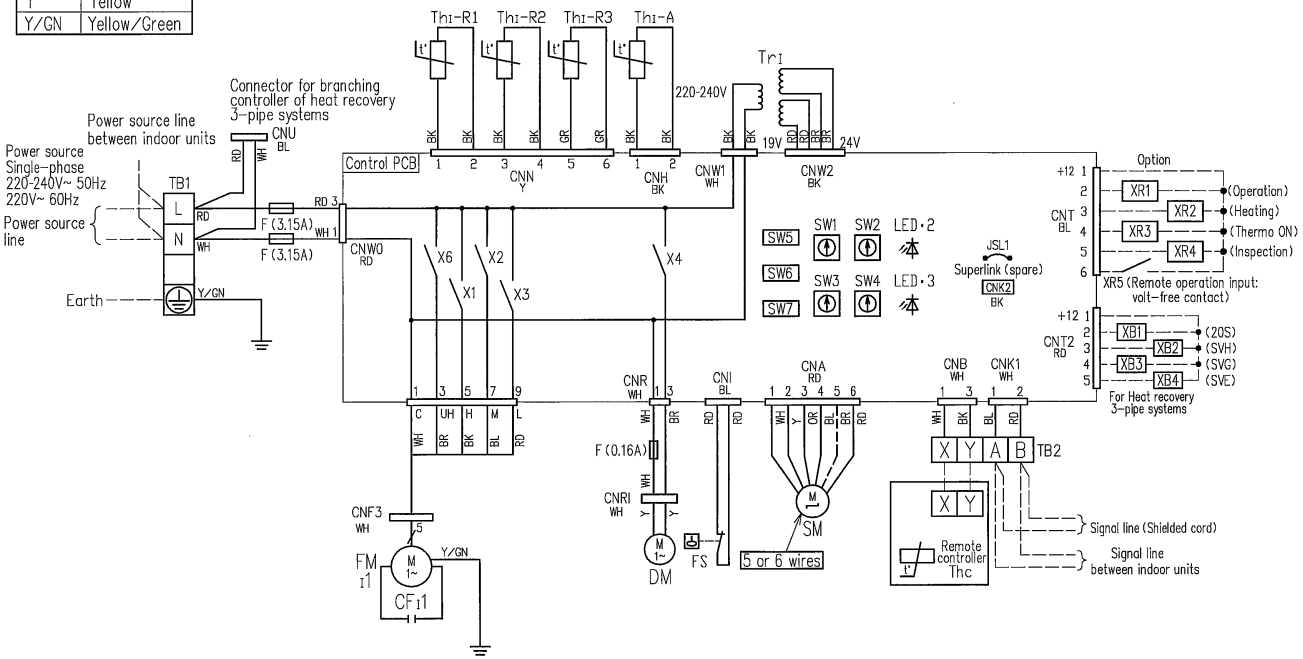
PJD001Z230 B

(g) Duct connected-Middle static pressure type (FDUM)

Models FDUM22KXE6, 28KXE6, 36KXE6, 45KXE6, 56KXE6, 71KXE6, 90KXE6

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



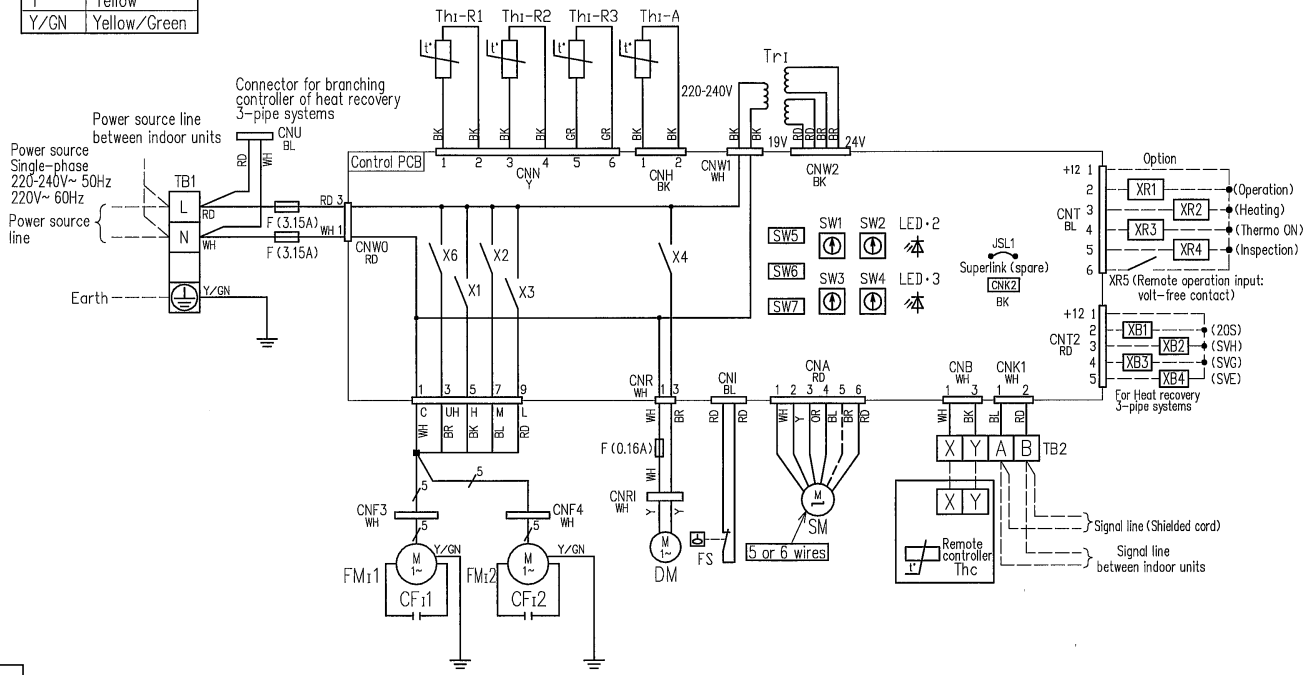
CFI1	Capacitor for FMI
CNA~Z	Connector
DM	Drain motor
F	Fuse
FMI1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
■mark	Closed–end connector

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJR002Z258 B

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



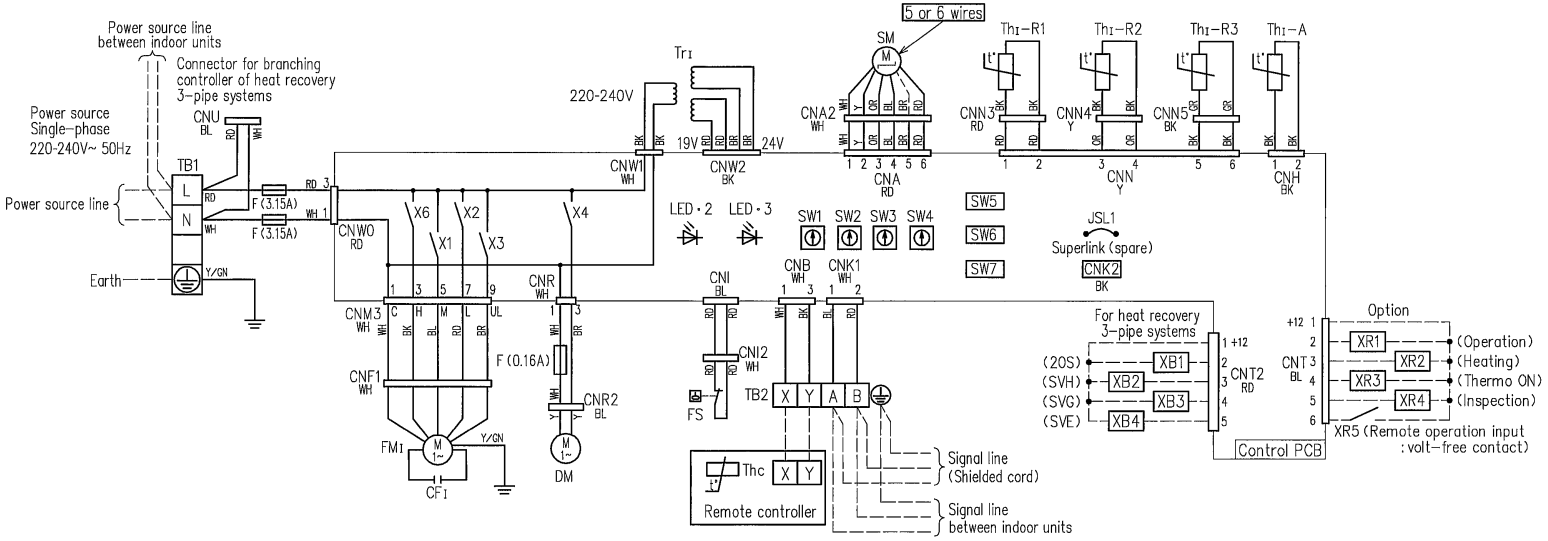
CF11,2	Capacitor for FM1
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM 11,2	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1–A	Thermistor (Return air)
Th1 –R1,2,3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
■mark	Closed–end connector

Notes 1. – – indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJR002Z259 B

(h) Duct connected (Ultra thin)-Low static pressure type (FDQS)

Models All models



Notes

1. —— indicates wiring on site.
2. Use twin core cord (0.75~1.25mm^2) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm^2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

CF1	Capacitor for FM1
CNA~Z	Connector
DM	Drain motor
F	Fuse
FM1	Fan motor (with thermostat)
FS	Float switch
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)

SM	Stepping motor (For electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed preivious version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting

SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□ mark)
TB2	Terminal block (Signal line) (□ mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM

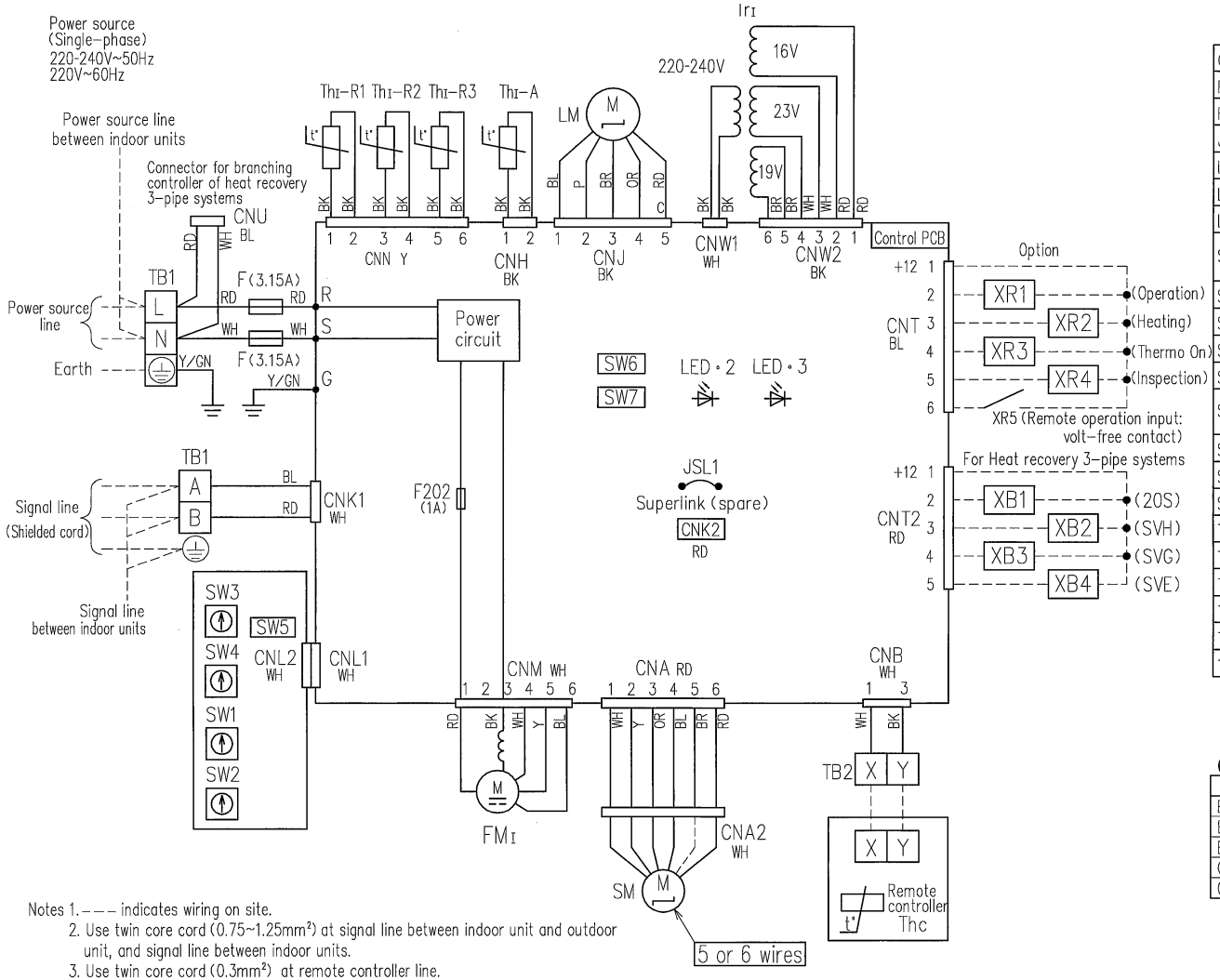
Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

PJC001Z200 C

(i) Wall mounted type (FDK)

Models FDK22KXE6, 28KXE6, 36KXE6, 45KXE6, 56KXE6



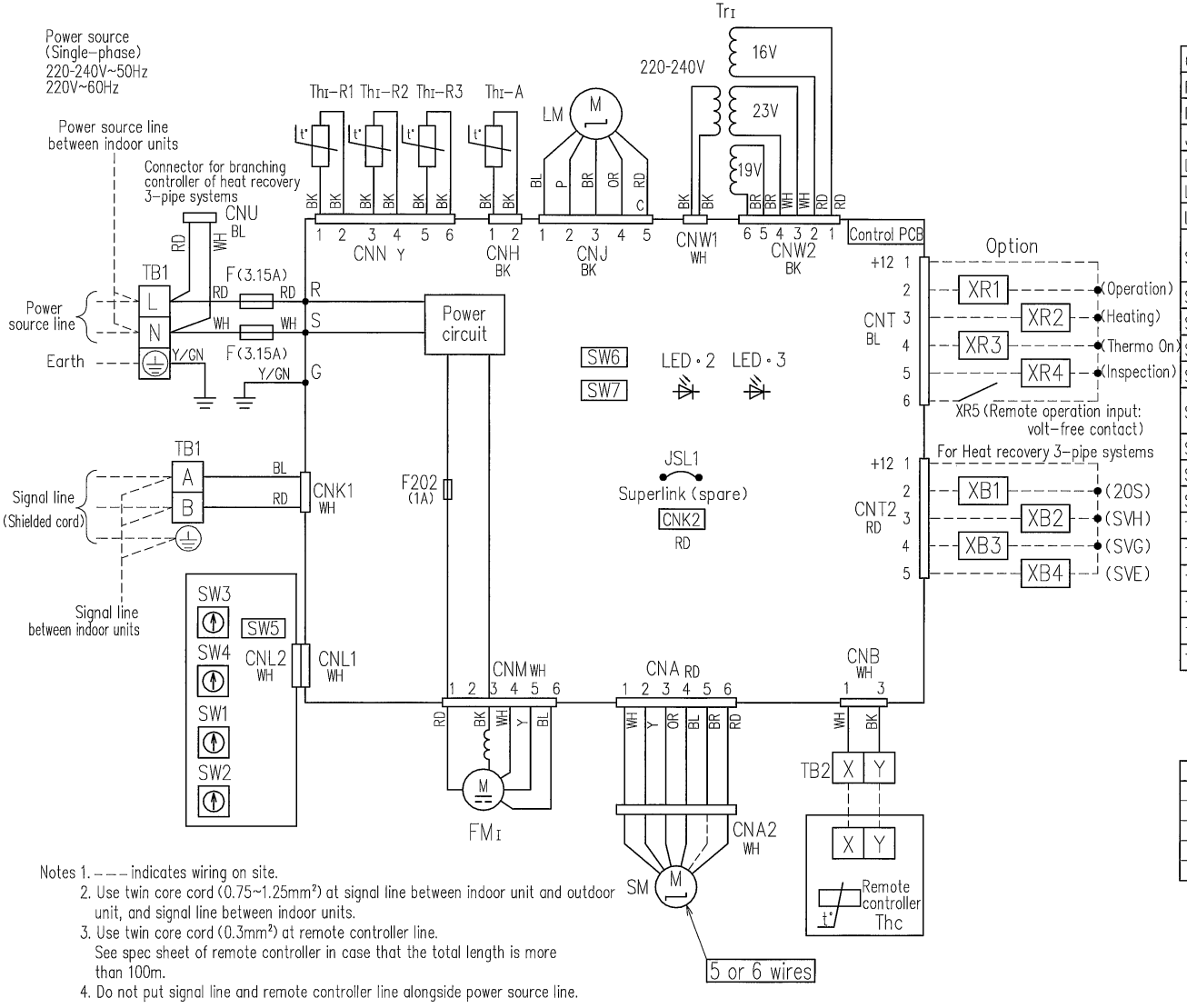
CNA~Z	Connector
F,F202	Fuse
FMr	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check/Drain motor test run
TB1	Terminal block (□mark)
TB2	Terminal block (Remote Controller) (□mark)
Thc	Thermistor (Remote controller)
Thr-A	Thermistor (Return air)
Thr-R1,2,3	Thermistor (Heat exchanger)
Trr	Transformer

Color Marks

Mark	Color	Mark	Color
BK	Black	P	Pink
BL	Blue	RD	Red
BR	Brown	WH	White
GN	Green	Y	Yellow
OR	Orange	Y/GN	Yellow/Green

Notes 1. - - - indicates wiring on site.
2. Use twin core cord (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PHA000Z983 B



Notes 1. – – – indicates wiring on site.
2. Use twin core cord (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cord (0.3mm²) at remote controller line.
See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

CNA~Z	Connector
F,F202	Fuse
FMi	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check/Drain motor test run
TB1	Terminal block (□mark)
TB2	Terminal block (Remote Controller) (□mark)
Thc	Thermistor (Remote controller)
Thi-A	Thermistor (Return air)
Thi-R1,2,3	Thermistor (Heat exchanger)
Tri	Transformer

Color Marks

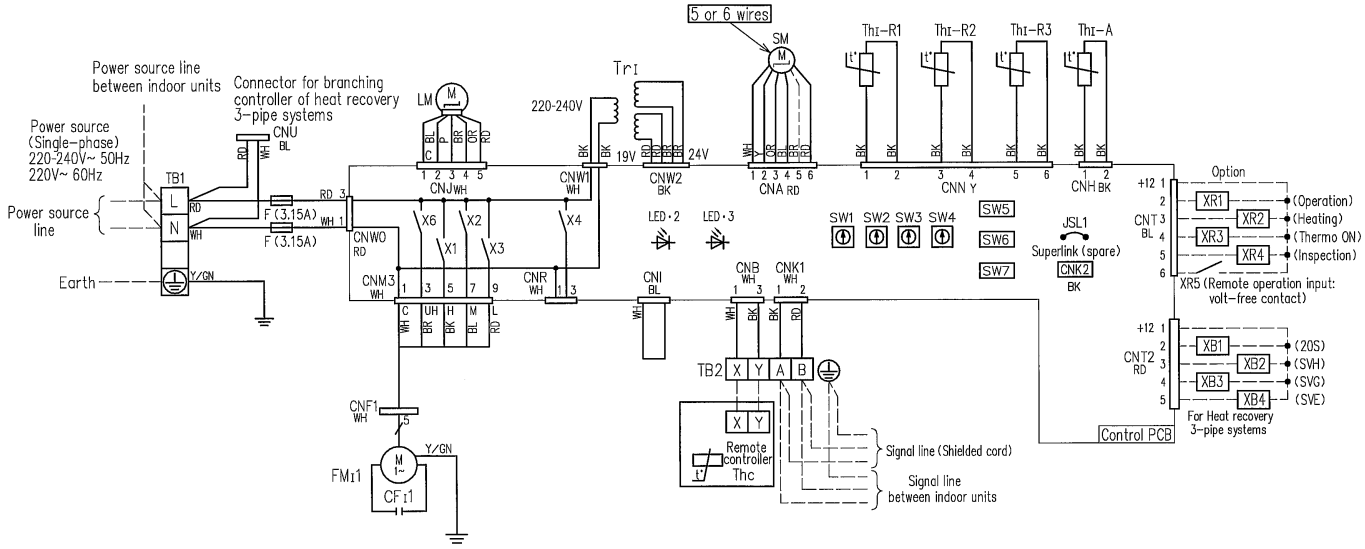
Mark	Color	Mark	Color
BK	Black	P	Pink
BL	Blue	RD	Red
BR	Brown	WH	White
GN	Green	Y	Yellow
OR	Orange	Y/GN	Yellow/Green

PHA000Z984 B

(j) Ceiling suspended type (FDE)
Models FDE36KXE6A, 45KXE6A, 56KXE6A

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



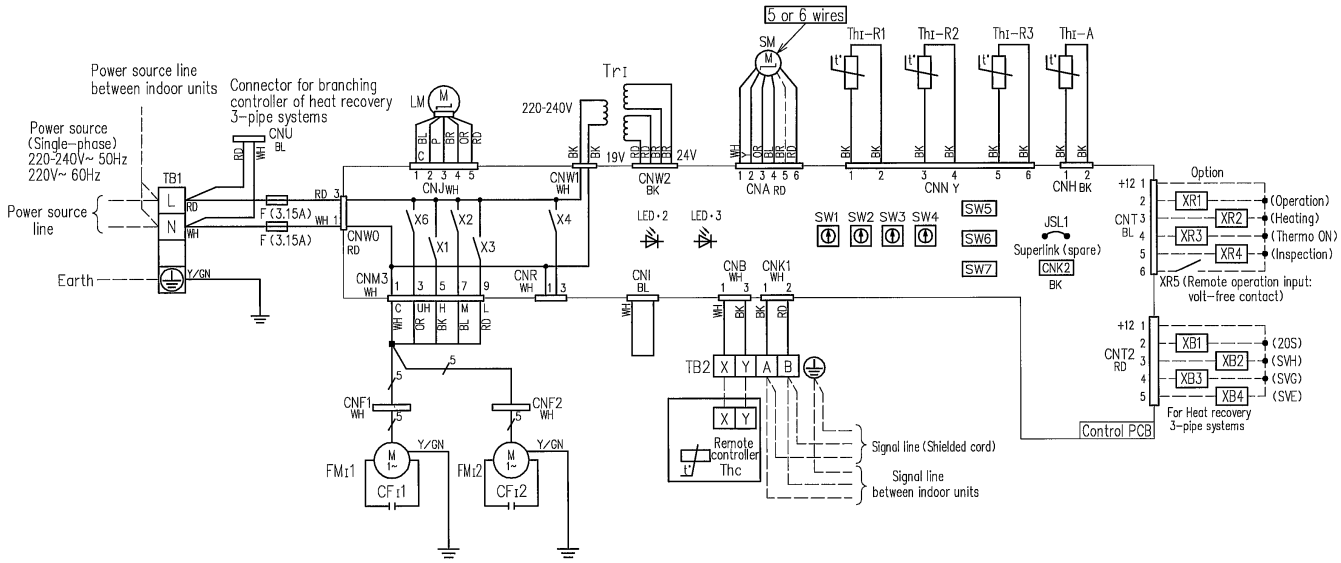
CF1 1,2	Capacitor for FM1
CNA~Z	Connector
F	Fuse
FM1 1,2	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
LM	Louver motor
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM

Notes 1. --- indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PFA003Z826 B

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
OR	Orange
P	Pink
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



CF1 1,2	Capacitor for FM1
CNA~Z	Connector
F	Fuse
FM1 1,2	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
LM	Louver motor
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
Th1-A	Thermistor (Return air)
Th1-R1, 2, 3	Thermistor (Heat exchanger)
Tr1	Transformer
X1~3,6	Relay for FM
X4	Relay for DM
■mark	Closed-end connector

Notes 1. ---- indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

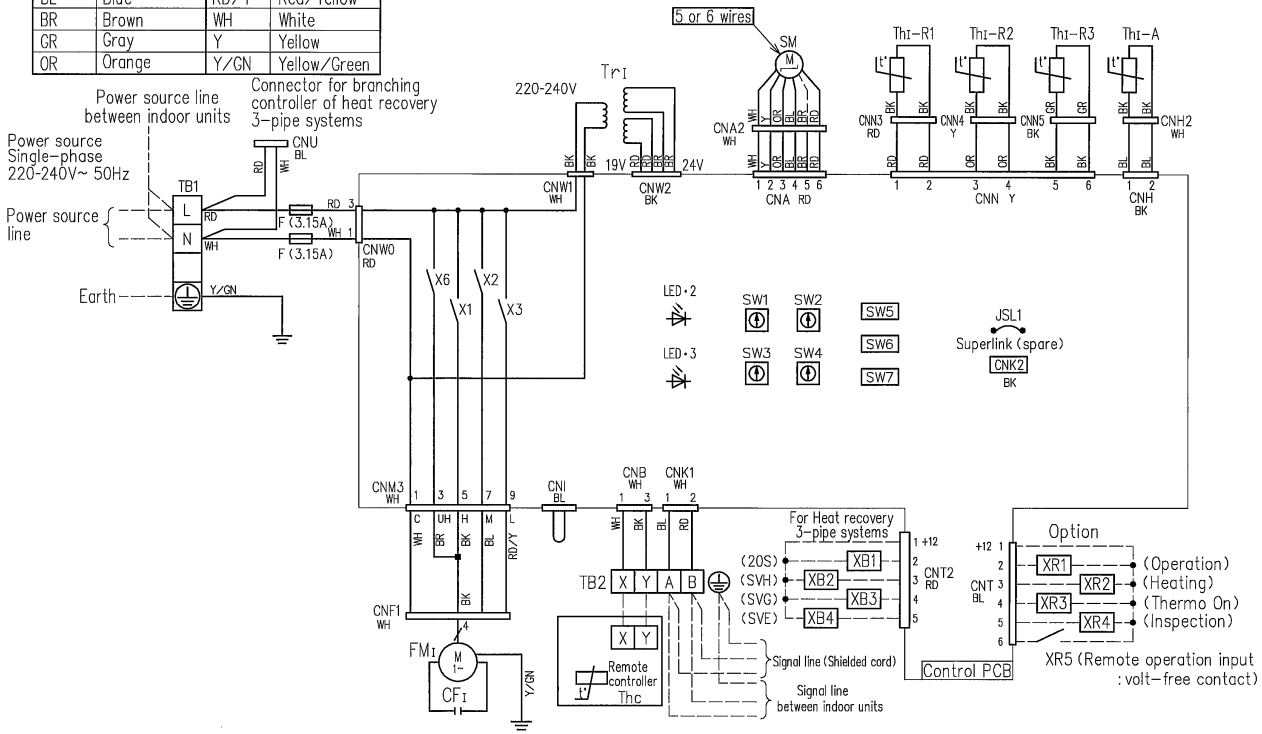
PFA003Z827 B

(k) Floor standing (with casing) type (FDFL)

Models All models

Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	RD/Y	Red/Yellow
BR	Brown	WH	White
GR	Gray	Y	Yellow
OR	Orange	Y/GN	Yellow/Green



CFI	Capacitor for FMI
CNA~Z	Connector
F	Fuse
FMI	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp(Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
ThI–A	Thermistor (Return air)
ThI–R1,2,3	Thermistor (Heat exchanger)
TrI	Transformer
X1~3,6	Relay for FM
■mark	Closed–end connector

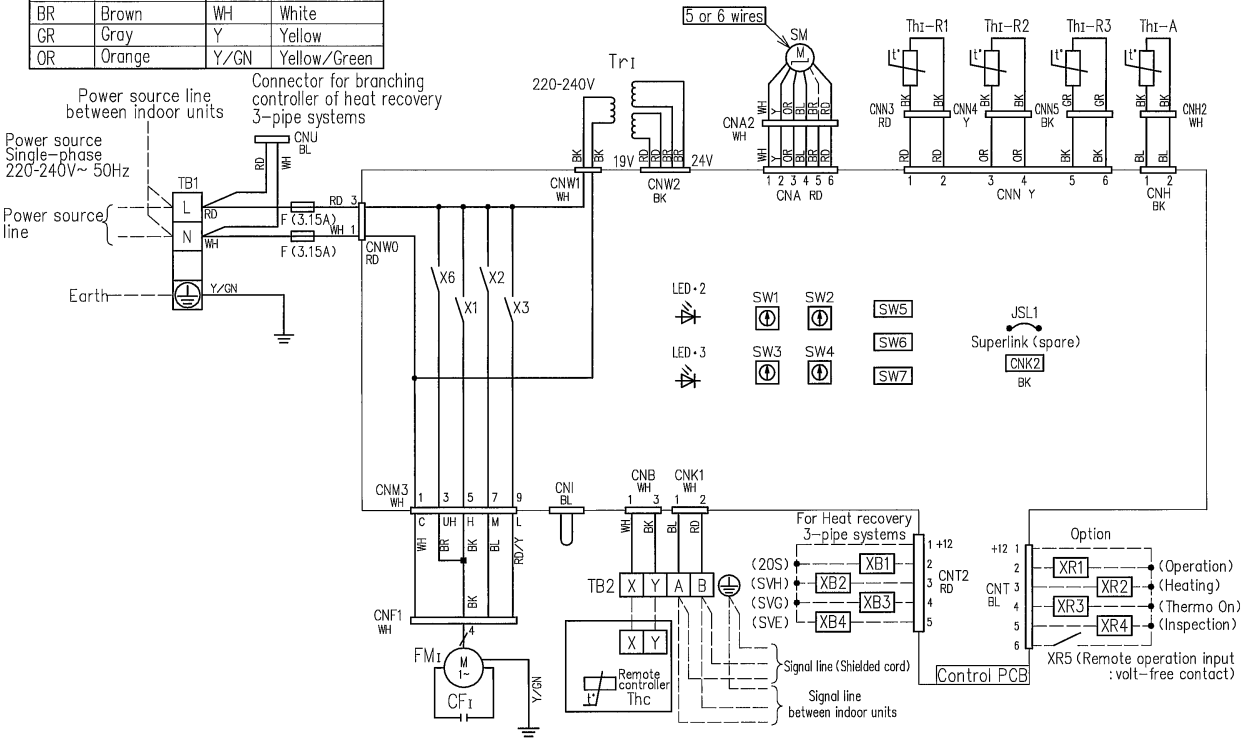
Notes 1.—— indicates wiring on site.
2.Use twin core cord (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3.Use twin core cord (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4.Do not put signal line and remote controller line alongside power source line.

PGD000Z053 B

(I) Floor standing (without casing) type (FDFU)
Models All models

Color Marks

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	RD/Y	Red/Yellow
BR	Brown	WH	White
GR	Gray	Y	Yellow
OR	Orange	Y/GN	Yellow/Green



CFI	Capacitor for FMI
CNA~Z	Connector
F	Fuse
FMI	Fan motor (with thermostat)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green–Normal operation)
LED・3	Indication lamp (Red–Inspection)
SM	Stepping motor (for electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: one place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5–1	Automatic adjustment/Fixed previous version of Superlink protocol
SW5–2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7–1	Operation check/Drain motor test run
TB1	Terminal block (Power source) (□mark)
TB2	Terminal block (Signal line) (□mark)
Thc	Thermistor (Remote controller)
ThI–A	Thermistor (Return air)
ThI–R1,2,3	Thermistor (Heat exchanger)
TrI	Transformer
X1~3,6	Relay for FM
■mark	Closed–end connector

Notes 1.—— indicates wiring on site
2.Use twin core cord (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3.Use twin core cord (0.3mm²) at remote controller line.
See spec sheet of remote controller in case that the total length is more than 100m.
4.Do not put signal line and remote controller line alongside power source line.

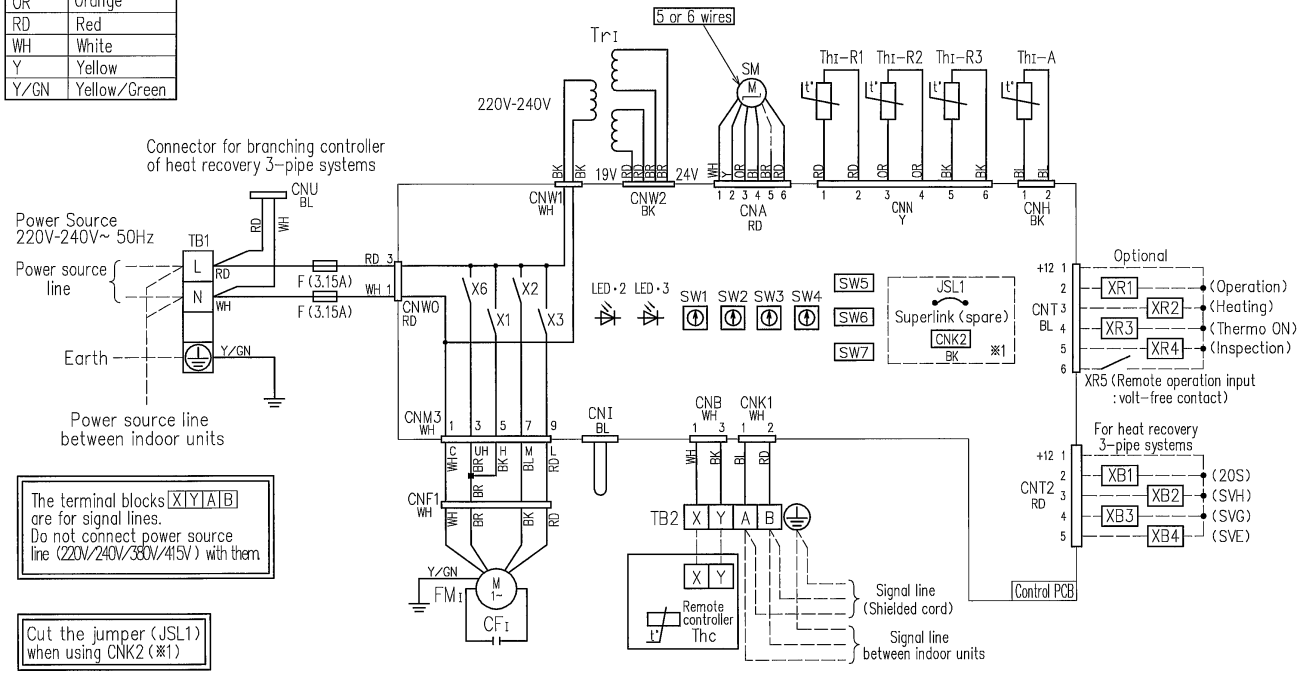
PGD000Z058 A

(m) Duct Connected-Compact and Flexible type (FDUH)

Models All models

Color Marks

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
Y/GN	Yellow/Green



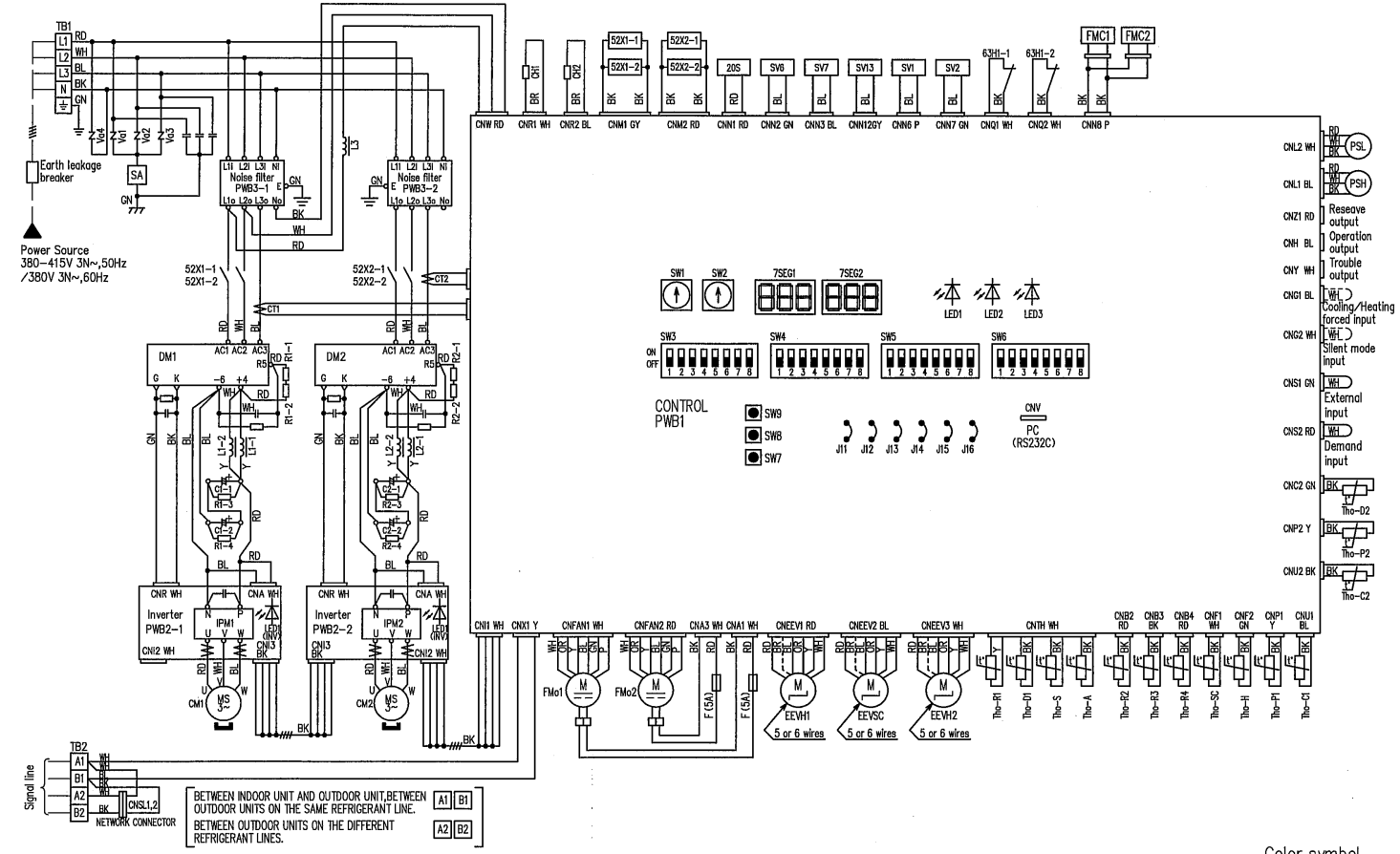
CFI	Capacitor for FMI
CNA~Z	Connector
F	Fuse
FMI	Fan motor (with thermister)
JSL1	Live Superlink terminal setting (for spare)
LED・2	Indication lamp (Green-Normal operation)
LED・3	Indication lamp (Red-Inspection)
SM	Stepping motor (For electronic expansion valve)
SW1	Indoor unit address: tens place
SW2	Indoor unit address: ones place
SW3	Outdoor unit address: tens place
SW4	Outdoor unit address: ones place
SW5-1	Automatic adjustment/Fixed preivious version of Superlink protocol
SW5-2	Indoor unit address: hundreds place
SW6	Model capacity setting
SW7-1	Operation check, Drain motor test run
TB1	Terminal block (Power source) (Ⓜmark)
TB2	Terminal block (Signal line) (Ⓜmark)
Thc	Thermistor (Remote controller)
ThI-A	Thermistor (Return air)
ThI-R1,2,3	Thermistor (Heat exchanger)
TrI	Transformer
X1~3,6	Relay for FM

Notes 1. — — indicates wiring on site.
2. Use twin core cable (0.75~1.25mm²) at signal line between indoor unit and outdoor unit, and signal line between indoor units.
3. Use twin core cable (0.3mm²) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put signal line and remote controller line alongside power source line.

PJC001Z255 A

3.2 Outdoor unit

Models FDC335KXE6-K, 400KXE6, 450KXE6, 504KXE6, 560KXE6, 560KXE6-K, 615KXE6, 680KXE6



CH1,2	Crankcase heater
CM1,2	Compressor motor
CNA~Z	Connector
CT1,CT2	Current sensor
C1~1,2,C2~1,2	Electrolytic capacitor
DM	Diode module
EEVH1,2	Expansion valve for heating
EEVSC	Expansion valve for SC
F	Fuse
FMC1,2	Fan for IPM
FMo1,2	Blower motor
IPM	Intelligent power module
J11,12	Set up model (volt)
J13	External input select level/pulse
J14	Defrost recover temp
J15	Defrost start temp
J16	Heat recovery unit
LED1	Inspection (Red)
LED1 (INV)	Normal (Yellow) -Flashing
LED2	Normal (Green)
LED3	Service (green for service)
L1~1,2,L2~1,2	D.C.reactor
L3	D.C.reactor

PSH		High pressure sensor
PSL		Low pressure sensor
PWB1~3		Printed wiring board (PCB)
R1,2		Rush current suppression resistor
SA		Arrestor
SV1		Solenoid valve (CM1: bypass)
SV2		Solenoid valve (CM2: bypass)
SV6		Solenoid valve (oil separator CM1)
SV7		Solenoid valve (oil separator CM2)
SV13		Solenoid valve (gas bypass)
SW1		Address setting SW outdoor unit No. (2 digits)
SW2		Address setting SW outdoor unit No. (1 digit)
SW3-1		inspection LED reset
SW3-2	ON	Auto backup operation
	OFF	Regular operation
SW3-3		Spare
SW3-4	ON	Refrigerant quantity check
	OFF	Regular operation
SW3-5	ON	Check operation
	OFF	Regular operation
SW3-6		Spare
SW3-7	ON	Forced cooling/heating
	OFF	Regular operation

SW3-8	ON	Test mode
	OFF	Regular operation
SW4-1~4		Model setting
SW4-5		Demand
SW4-6		Demand
SW4-7		Address setting switch (master・slave)
SW4-8		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
SW5-4		Spare
SW5-5	ON	Super Link communication
	OFF	Super Link Ⅱ communication
SW5-6~8		Spare
SW6-1~8		Spare
SW7		Data clear/insert
SW8		7seg indicate (unit's place)
SW9		7seg indicate (ten's place)
SW10		Reset
TB1,2		Terminal block

Tho-A	External air thermistor
Tho-C1,2	Under-dome thermistor
Tho-D1,2	Discharge pipe thermistor
Tho-H	Sub-cooling coil thermistor 2
Tho-P1,2	Power transistor thermistor
Tho-R1	Heat exchanger thermistor (exhaust)
Tho-R2	Heat exchanger thermistor (exhaust)
Tho-R3	Heat exchanger thermistor (inlet)
Tho-R4	Heat exchanger thermistor (inlet)
Tho-S	Suction pipe thermistor
Tho-SC	Sub-cooling coil thermistor 1
Va1~4	Varistor
20S	4way valve
52X1-1,2	Solenoid for CM1
52X2-1,2	Solenoid for CM2
63H1-1,2	High pressure switch (for protection)
7SEG1	7seg L.E.D. (function indication)
7SEG2	7seg L.E.D. (data indication)

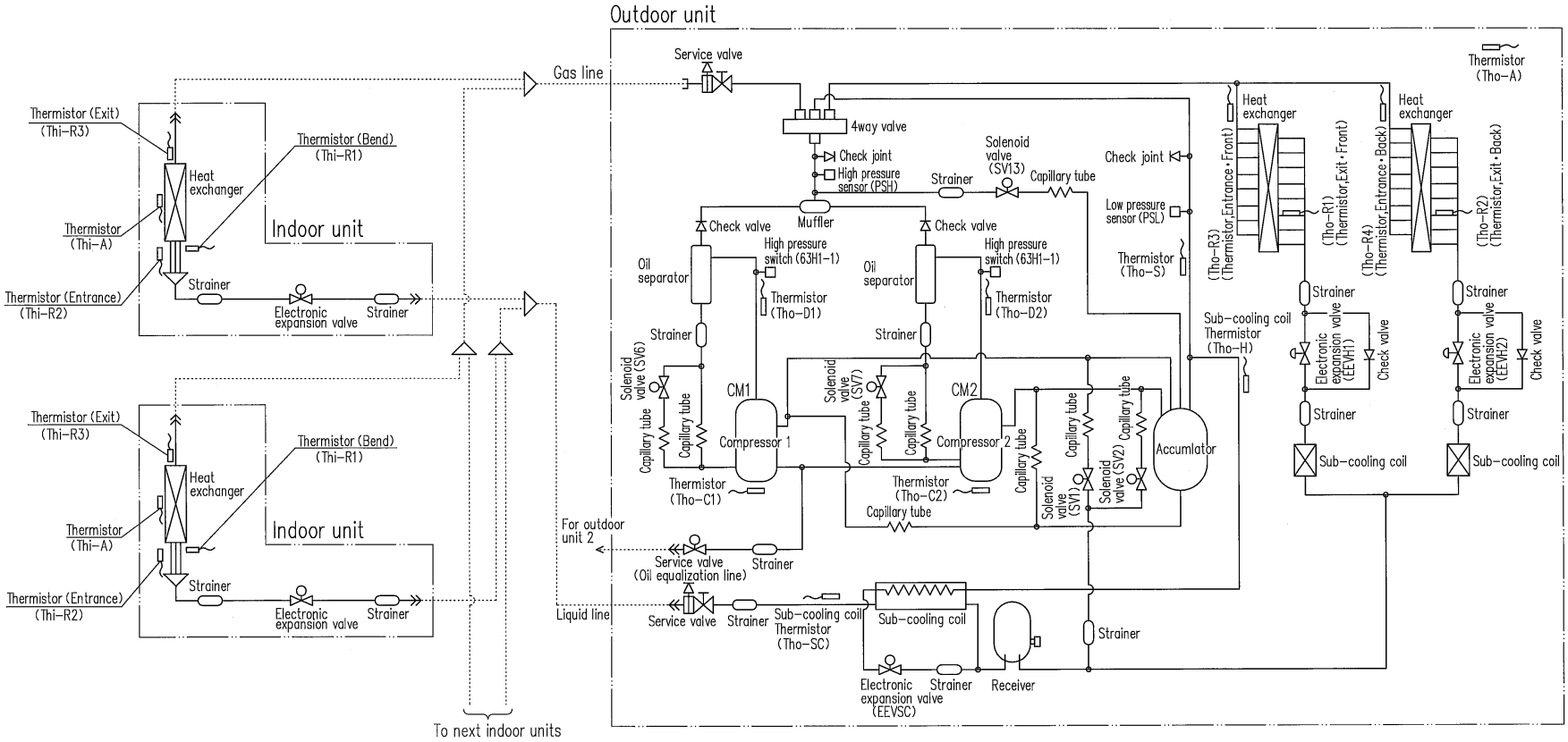
Color symbol

BK	Black
BL	Blue
BR	Brown
GN	Green
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
P	Pink

PCB003Z060

4. PIPING SYSTEM

Models FDC335KXE6-K, 400KXE6, 450KXE6, 504KXE6, 560KXE6, 560KXE6-K, 615KXE6, 680KXE6



Notes (1) Preset point of protective deviees

63H1-1 : Open 4.15MPa, Close 3.15MPa (For protection)

(2) Function of thermistor

PSH : For compressor control
Cooling: 3.70 ON (MPa)
Heating: 3.00 ON (MPa)

PSL : ON 0.18MPa, OFF 0.20MPa (For compressor control)
ON 0.134MPa, OFF 0.18MPa (For protection)

ThI-R1, R2 : Heating operation : Indoor fan control.
Cooling operation : Frost prevention control.
Super heat control.

ThI-R3 : For super heat control of cooling operation.

Tho-D : For control of discharge pipe temperature.

Tho-C : For control of temperarure under the dome.

Tho-S : For control of suction pipe temperature.

Tho-R1, R2 : For control of defrosting.

Tho-A : For control of defrosting.

Tho-R3, R4 : Electronic expansion valve (EEVH1, 2) control of heating operation

Tho-SC : Electronic expansion valve (EEVSC) control of cooling operation.

Tho-H : For super heat control of sub-cooling coil.

PCB003Z067

5 APPLICACTION DATA

5.1 Installation of indoor unit

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.
This unit must always be used with the panel.

SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

⚠ WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **Consider measurement not to exceed the limit of the density of refrigerant in the event of leakage especially when it is installed in a small room.**
  Consult the specialist about the measure. If the density of refrigerant exceeds the limit in the event of the leakage, serious accidents may occur due to lack of oxygen.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Make sure there is no dust or clogging on both the plug and the socket nor loose connection of the socket before plugging, and plug in securely to the end of the blade.**
  Accumulation of dust, clogging on the socket or plug, or loose installation of the socket could cause electric shock and fire. Replace the socket if it is loose.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Use the genuine optional parts. And installation should be performed by a specialist.**
  If you install the unit by yourself, it could cause water leakage, electric shock and fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Use the circuit breaker of correct capacity.**
  Using the incorrect capacity one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid or alkali.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not put the drain pipe directly into the ditch where toxic gas such as sulfide gas is generated.**
  Toxic gas would flow into the room and it would cause serious damage to user's health and safety.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

(a) Ceiling cassette-4way type (FDT)

PJA012D007 b

①Before installation

●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For unit hanging		For refrigerant pipe			For drain pipe			
Flat washer (M10)	Level gauge	Pipe cover(big)	Pipe cover (small)	Strap	Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
8	1	1	1	4	1	1	1	1
For unit hanging	For unit hanging and adjustment	For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting

②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

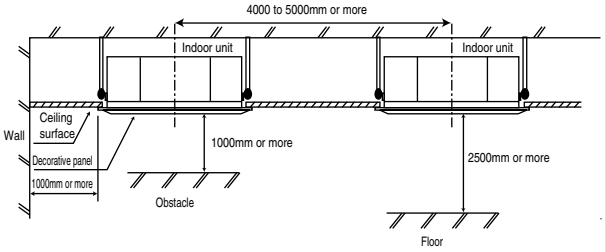
③If there are 2 units of wireless type, keep them away for more than 6m to avoid malfunction due to cross communication.

④When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service

●When it is not possible to keep enough space between indoor unit and wall or between indoor units, close the air supply port where it is not possible to keep space and confirm there is no short circuit of airflow.

●Install the indoor unit at a height of more than 2.5m above the floor.



Set blow-out pattern

●Select the most proper number of blow-out air supply port direction from 4 way, 3 way or 2 way according to the shape of the room and installation position. (1 way is not available.)

●If it is necessary to change the number of air supply port, prepare the covering materials. (sold as accessory)

●Instruct the user not to use low fan speed when 2way or 3way air supply is used.

●Do not use 2way air supply port under high temperature and humidity environment. (Otherwise it could cause condensation and leakage of water.)

●It is possible to set the airflow direction port by port independently. Refer to tne user's manual for details.

③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling

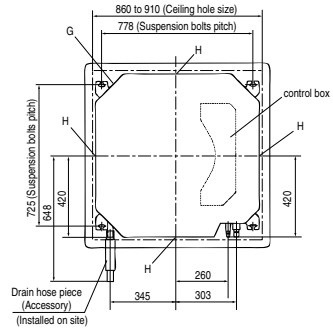
When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.

When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10 or M8) on site.

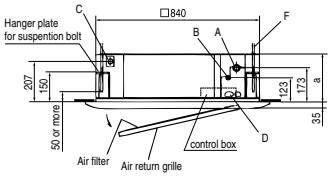
Ceiling opening, Suspension bolts pitch, Pipe position

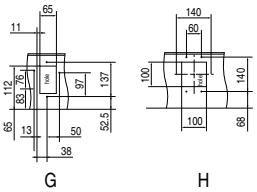


(mm)

Series	Type	a
Single Split (PAC) series	40 to 71 type	246
	100 to 140 type	298
VRF (KX) series	28 to 71 type	246
	90 to 160 type	298

Symbol	
A	Gas piping
B	Liquid piping
C	Drain piping
D	Hole for wiring
F	Suspension bolts
G	Outside air opening for ducting
H	Air outlet opening for ducting

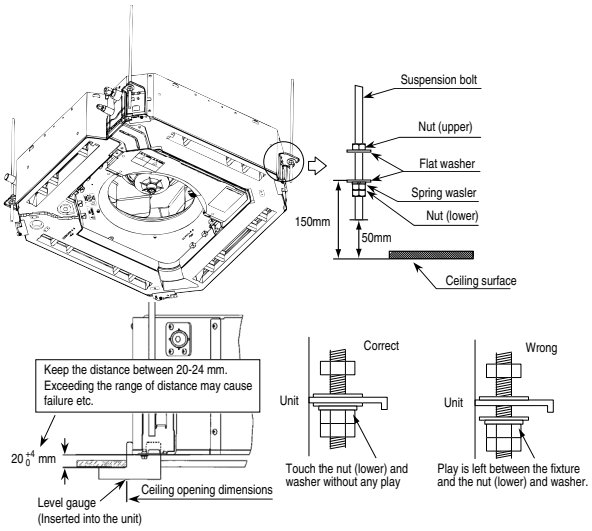




④Installation of indoor unit

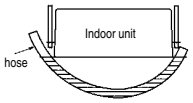
Work procedure

1. Prepare a ceiling hole with the size of from 860mm × 860mm to 910mm × 910mm referring to the template attached in the package.
2. Arrange the suspension bolt at the right position (725mm×778mm).
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 50mm above the ceiling plane. Temporarily put the four lower nuts 150mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.
5. Adjust the indoor unit position after hanging it by inserting the level gauge attached on the package into the air supply port and checking if the gap between the ceiling plane and the indoor unit is appropriate. In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.



④Installation of indoor unit (continued)

6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.



Caution

- Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.
- Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.
- Even after decorative panel attached, still the unit height can be adjusted finely. Refer to the installation manual for decorative panel for details.
- Make sure there is no gap between decoration panel and ceiling surface, and between decoration panel and the indoor unit. The gap may cause air leakage, dew condensation and water leakage.
- In case decorative panel is not installed at the same time, or ceiling material is installed after the unit installed, put the cardboard template for installation attached on the package (packing material of cardboard box) on the bottom of the unit in order to avoid dust coming into the indoor unit.

⑤Refrigerant pipe

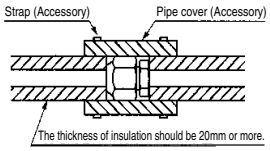
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  ・Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
φ 6.35	14 to 18
φ 9.52	34 to 42
φ 12.7	49 to 61
φ 15.88	68 to 82
φ 19.05	100 to 120



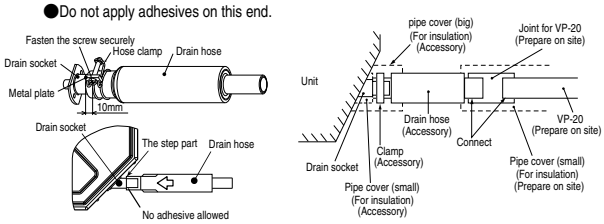
⑥Drain pipe

Caution

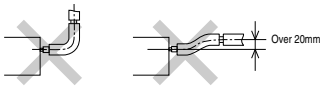
- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods， etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

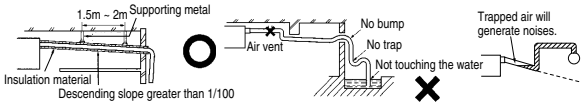
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   - Do not apply adhesives on this end.



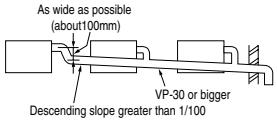
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Do not bend or make an excess offset on the drain hose as shown in the picture.
     Bend or excess offset will cause drain leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



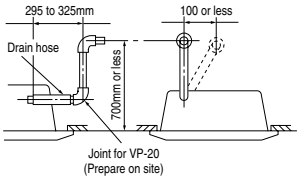
- When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 700mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.

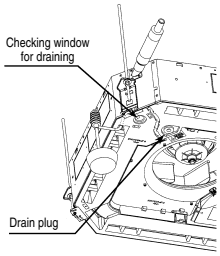


⑥Drain pipe (continued)

Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.



Drain pump operation

○In case electrical wiring work finished

Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

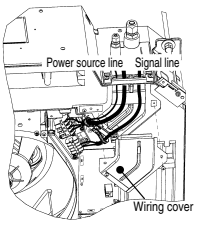
○In case electrical wiring work not finished

Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

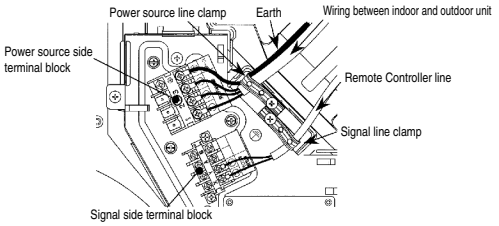
⑦Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

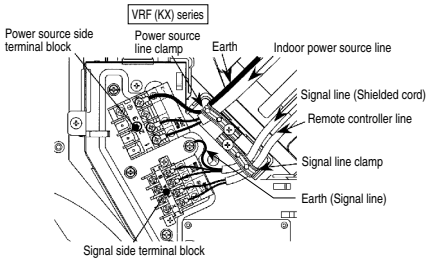
1. Remove a lid of the control box (3 screws) and the wiring cover (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



Single Split (PAC) series



VRF (KX) series



⑧Panel installation

- Attach the panel on the indoor unit after electrical wiring work.
- Refer to attached manual for panel installation for details.

(See next page)

⑨Check list after installation

- Check the following items after all installation work completed.

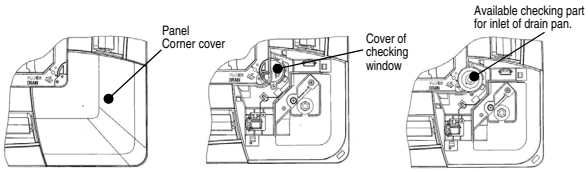
Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

⑩How to check the dirt of drain pan (Maintenance)

The method of checking the dirt of drain pan

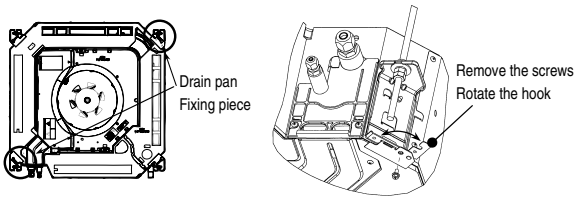
- It is possible to check the dirt for inlet of drain pan without detaching the panel.
  (Inspection is not possible when the high efficient filter and option spacer is installed.)

1. Open the air return grille and remove the panel corner cover on drain pan side.
2. Remove the cover of inspection window. (1screw)
3. Check the drain pan from the inspection window.
   If the drain pan is very dirty, remove the drain pan and clean it.
4. After checking of the dirty of drain pan, restore the cover of the inspection window securely. Improper restoration of the cover may cause dew condensation and water leakage.



Attention for removing drain pan

- The fixing components have been attached the with drain pan. Pay attention to these components during installation and removing. Take off the hanging hook after removing four screws. During the installation of drain pan, fix the drain pan firmly by using four screws after hanging it up with the fixing hook.



PANEL INSTALLATION MANUAL

PJF012D003

Read this manual together with the indoor unit's installation manual.

⚠ WARNING

- **Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal. Loose connection or hold will cause abnormal heat generation or fire.**
- **Make sure the power supply is turned off when electric wiring work. Otherwise, electric shock, malfunction and improper running may occur.**

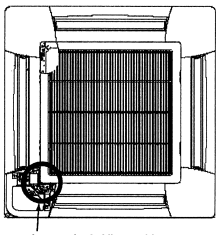
① Before installation

- Follow installation manual carefully, and install the panel properly.
- Check the following items.
  - ○ Accessories

Accessories

Bolt		4 pieces	For panel installation
Strap		4 pieces	For avoiding the corner panel from falling

Note: Accessories are laid in the position removing the corner panel.



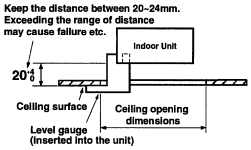
② Checking the indoor unit installation position

- Read this manual together with the air conditioner installation manual carefully.
- Check if the opening size for the indoor unit is correct with the level gauge supplied in the indoor unit.
- Check if the gap between the ceiling plane and the indoor unit is correct by inserting the level gauge into the air outlet port of the indoor unit. (See below drawing)
- Adjust the installation elevation if necessary.

Caution

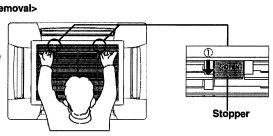
If there is a height difference beyond the design limit between the installation level of the indoor unit and the ceiling plane, the panel may be subject to excessive stress during installation, it may cause distortion and damage.

- The installation level of the indoor unit can be adjusted finely from the opening on the corner, even after panel is attached. (Refer to ⑥ Attaching the panel for details.)



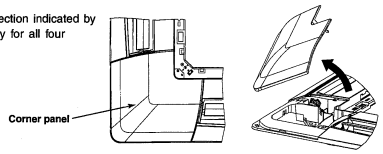
③ Removing the air return grille

1. Hold the stoppers on the air return grille (2 places) toward OPEN direction, open the air return grille.
2. Remove the hooks of the air return grille from the decorative panel while it is in the open position.



④ Removing a corner panel

- Pull the corner panel toward the direction indicated by the arrow and remove it. (Same way for all four corner panels)



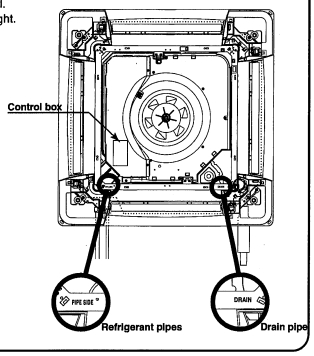
⑤ Orientation of the panel installation

Take note that there is an orientation to install the panel.

- Attach the panel with the orientation shown on the right.
- Align the "PIPE SIDE" mark (on the panel) with the refrigerant pipes on the indoor unit.
- Align the "DRAIN" mark (on the panel) with the drain pipe on the indoor unit.

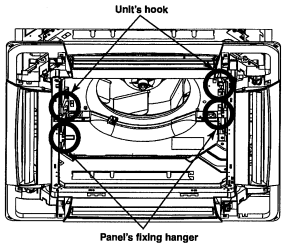
CAUTION

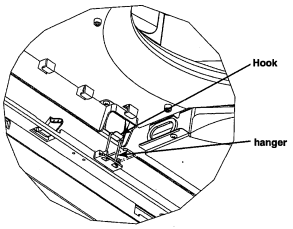
In case the orientation of the panel is not correct, it will lead to air leakage and also it is not possible to connect the louver motor wiring.



⑥ Attaching the panel

1. Temporary attaching
   - Lift up the hanger (2 places) on the panel for temporary support.
   - Hang the panel on the hook on the indoor unit.

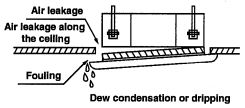


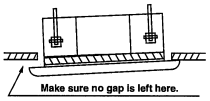


2. Fix the panel on the indoor unit
   - Fasten the panel on the indoor unit with the four bolts supplied with the panel.

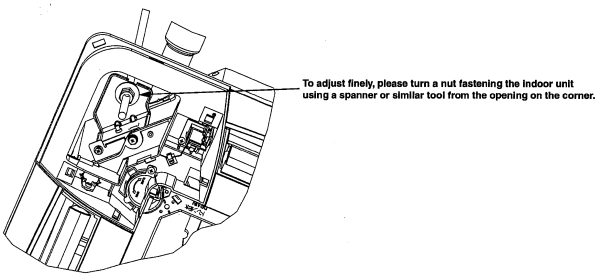
Caution

- Improperly tightened hanging bolts can cause the problems listed below, so make sure that you have tightened them securely.
- If there is a gap remaining between the ceiling and the decorative panel even after the hanging bolts are tightened, adjust the installation level of the indoor unit again.





- It is possible to adjust the installation height of the indoor unit with the panel attached as long as there is no influence on the drain pipe inclination and/or the indoor unit levelness.

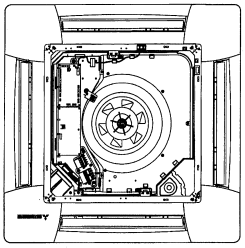


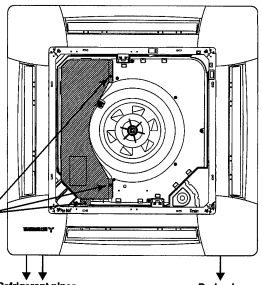
Caution

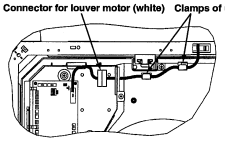
Make sure there is no stress given on the panel when adjusting the height of the indoor unit to avoid unexpected distortion. It may cause the distortion of panel or failing to close the air return grille.

⑦ Electrical wiring

1. After removing three screws of control box, detach the cover of control box (the hatched part).
2. Connect the connector for louver motor (white 20P).
   - Hold the wiring by using the clamps of the indoor unit.
   - Hold the connector inside the control box.

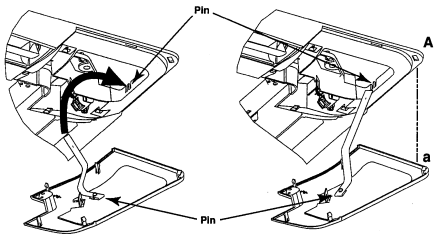






⑧ Attaching a corner panel

1. To avoid unexpected falling of the corner panel, put the strap onto the corner panel's pin with turning the strap up.
2. Then hang the strap of a corner panel onto the decorative panel's pin.
3. First insert the part "a" of a corner panel into the part "A" of the decorative panel, and then engage four hooks.



⑨ How to set the airflow direction

It is possible to change the movable range of the louver on the air outlet from the wired remote controller. Once the top and bottom position is set, the louver will swing within the range between the top and the bottom when swing operation is chosen. It is also possible to apply different setting to each louver.

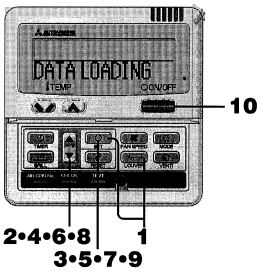
1 Stop the air conditioner and press SET button and LOUVER button simultaneously for three seconds or more.

The following is displayed if the number of the indoor units connected to the remote controller is enGo to step 4.

"DATA LOADING "
↓
"No.1 ▲"

The following is displayed if the number of the indoor units connected to the remote controller are more than one

"SELECT I/U "
↓
"I/U000 ▲"



2 Press ▲ or ▼ button.(selection of indoor unit)

Select the indoor unit of which the louver is set.

[EXAMPLE]
"I/U000 ▲"⇔"I/U001 ⇕"⇔"I/U002 ⇕"⇔
"I/U003 ⇕"

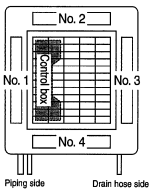
3 Press SET button. (determination of indoor unit)

Selected indoor unit is fixed.

[EXAMPLE]
"I/U001 " (displayed for two seconds)
↓
"DATA LOADING "
↓
"No.1 ▲"

NOTICE

- For FDT type, in case the louver No to be set is uncertain, set any louver temporarily. The louver will swing once when the setting is completed and it is possible to confirm the louver No and the position.
After that, choose the correct louver No and set the top and bottom position.



Louver No.

4 Press ▲ or ▼ button. (selection of louver No.)

Select the louver No. to be set according to the right figure.

[EXAMPLE]
"No.1 ▲"⇔"No.2 ⇕"⇔"No.3 ⇕"⇔
"No.4 ▼"

5 Press SET button. (Determination of louver No.)

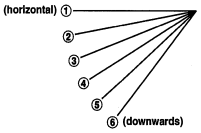
The louver No. to be set is confirmed and the display shows the upper limit of the movable range.

[EXAMPLE] If No.1 louver is selected,
"No.1 UPPER2 ⇕" ←current upper limit position

6 Press ▲ or ▼ button. (selection of upper limit position)

Select the upper limit of louver movable range.
"position 1" is the most horizontal, and "position 6" is the most downward.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

"No.1 UPPER1 ▼" (the most horizontal)
⇔ "No.1 UPPER2 ⇕"
⇔ "No.1 UPPER3 ⇕"
⇔ "No.1 UPPER4 ⇕"
⇔ "No.1 UPPER5 ⇕"
⇔ "No.1 UPPER6 ▲" (the most downwards)
⇔ "No.1 UPPER-- ▲" (return to the default setting)



the position of the louver

7 Press SET button (Fixing of the upper limit position)

The upper limit position is fixed and the setting position is displayed for two seconds. Then proceed to lower limit position selection display.

[EXAMPLE]
No.1 UPPER2 (displayed for two seconds)
↓
No.1 LOWER5 ⇕ (shows current setting)

8 Press ▲ or ▼ button (Selection of lower limit position)

Select the lower limit position of louver.
"position 1" is the most horizontal, and "position 6 "is the most downwards.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

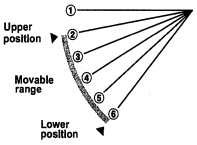
No.1 LOWER1 ▼ (the most horizontal)
No.1 LOWER2 ⇕
No.1 LOWER3 ⇕
No.1 LOWER4 ⇕
No.1 LOWER5 ⇕
No.1 LOWER6 ⇕ (the most downwards)
No.1 LOWER-- ▲ (return to the default setting)

9 Press SET button (Fixing of the lower limit position)

Upper limit position and lower limit position are fixed, and the set positions are displayed for two seconds, then setting is completed.

- After the setting is completed, the louver which was set moves from the original position to the lower limit position, and goes back to the original position again. (This operation is not performed if the indoor unit and/or indoor unit fan is in operation.)

[Example]
No.1 U2 L6 (displayed for two seconds)
SET COMPLETE
No.1 ▲



10 Press ①ON/OFF button.

Louver adjusting mode ends and returns to the original display.

Caution

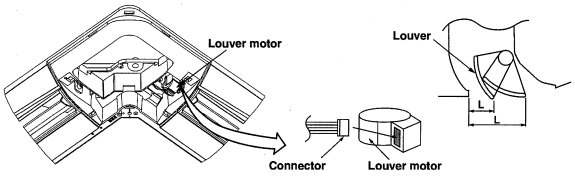
If the upper limit position number and the lower limit position number are set to the same position, the louver is fixed at that position auto swing does not funtion.

ATTENTION

If you press RESET button during settings, the display will return to previous display. If you press ①ON/OFF button during settings, the mode will be ended and return to original display, and the settings that have not been completed will become invalid.

When plural remote controllers are connected, louver setting operation cannot be set by slave remote controller.

If it is necessary to fix the louver position manually, follow the procedure mentioned below.
1. Shut off the main power switch.
2. Unplug the connector of the louver motor which you want to fix the position. Make sure to insulate unplugged connectors electrically with a vinyl tape.
3. Adjust the louver position slowly by hand so as to be within the applicable range mentioned below table.



<Range of louver setting>

Vertical airflow direction	Horizontal 0°	Downwards 45°
Dimension L (mm)	43	26

※It can be set between 26~43mm freely.

Caution

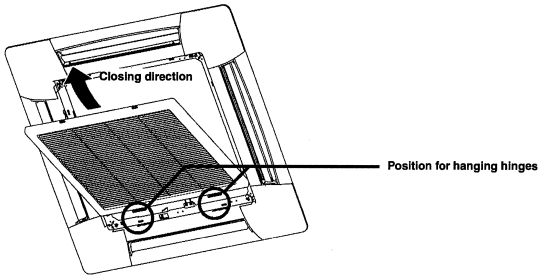
- Any automatic control or operation from the remote controller will be disabled on the louver whose position is fixed in the above way.
- Do not set a louver beyond the specified range. Failure to observe this instruction may result in dripping, dew condensation, the fouling of the ceiling and the malfunctioning of the unit.

⑩ Attaching the air return grille

There is no orientation on attaching the air return grille onto the panel.

To attach the air return grille, follow the procedure described in ③ Removing the air return grille in the reverse order.
1. Hang the hooks of the air return grille in the hole of the panel. (The hooks of the grille can be hanged in any four side of the panel.)
2. After the grille is hanged, close the grille while the stoppers on the grille (2 places) are kept pressed to "OPEN" direction. When the grille comes to the original position, release the stoppers to hold the grille. Make sure to hear the sound of "CLICK" in both stoppers.

<installation>



Caution

- Attaching the air return grille from the hinge side.
- Be careful in air return grille attaching, unstable attaching may cause grille falling.
- Repair or replace the distorted, broken stopper at once, or the grille falling may occur.

(b) Ceiling cassette-4way compact type (FDTC)

PJA012D756 a

① Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  ○ Unit type/Power supply specification ○ Pipes/Wires/Small parts ○ Accessory items

Accessory itme

For unit hanging		For refrigerant pipe			For draom pipe			
Flat washer (M10)	Level gauge (Insulation)	Pipe cover(big)	Pipe cover (small)	Strap	Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
8	4	1	1	4	1	1	1	1
For unit hanging	For adjustment in hoisting in the unit's main body	For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting

② Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

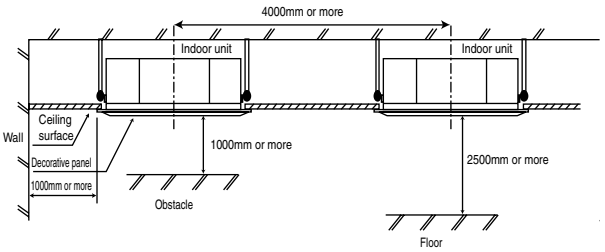
② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ If there are 2 units of wireless type, keep them away for more than 5m to avoid malfunction due to cross communication.

④ When plural indoor units are installed nearby, keep them away for more than 4m.

Space for installation and service

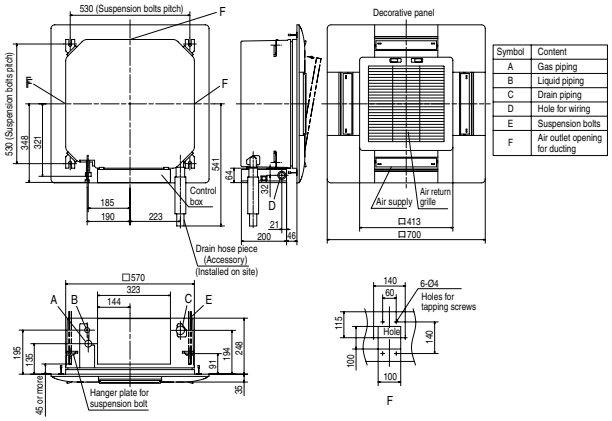
- When it is not possible to keep enough space between indoor unit and wall or between indoor units, close the air supply port where it is not possible to keep space and confirm there is no short circuit of airflow.
- Install the indoor unit at a height of more than 2.5m above the floor.



③ Preparation before installation

- If suspension bolt becomes longer, do reinforcement of earthquake resistant.
  ○ For grid ceiling
  When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
  ○ In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
  When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
- Prepare four (4) sets of suspension bolt, nut and spring washer (M10 or M8) on site.

Ceiling opening, Suspension bolts pitch, Pipe position

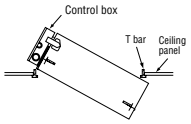


Symbol	Content
A	Gas piping
B	Liquid piping
C	Drain piping
D	Hole for wiring
E	Suspension bolts
F	Air outlet opening for ducting

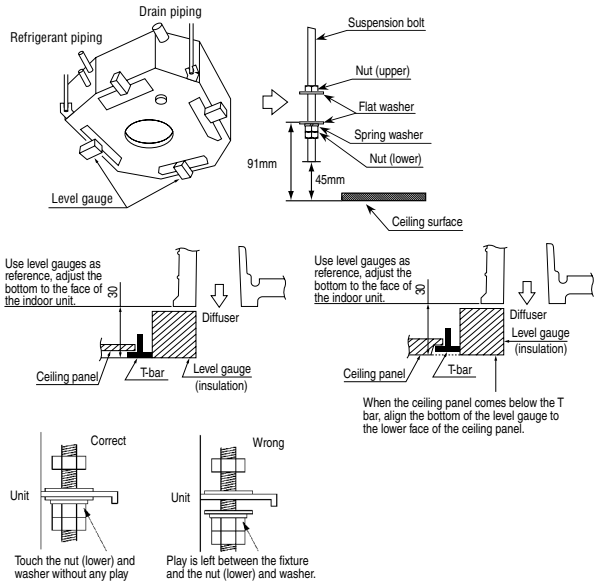
④ Installation of indoor unit

Work procedure

1. This units is designed for 2 x 2 grid ceiling.
   If necessary, please detach the T bar temporarily before you install it.
   If it is installed on a ceiling other than 2 x 2 grid ceiling, provide an inspection port on the control box side.
2. Arrange the suspension bolt at the right position (530mm×530mm).
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 45mm above the ceiling plane.
   Temporarily put the four lower nuts 91mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.

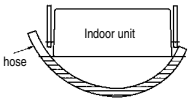


5. Adjust the indoor unit position after hanging it by inserting the level gauge attached on the package into the air supply port and checking if the gap between the ceiling plane and the indoor unit is appropriate. In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.



④ Installation of indoor unit (continued)

6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.



Caution

- Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.
- Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.
- Even after decorative panel attached, still the unit height can be adjusted finely. Refer to the installation manual for decorative panel for details.
- Make sure there is no gap between decoration panel and ceiling surface, and between decoration panel and the indoor unit. The gap may cause air leakage, dew condensation and water leakage.
- In case decorative panel is not installed at the same time, or ceiling material is installed after the unit installed, put the cardboard template for installation attached on the package (packing material of cardboard box) on the bottom of the unit in order to avoid dust coming into the indoor unit.

⑤ Refrigerant pipe

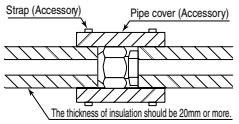
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  ・ Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  ・ Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※ Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※ Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120



⑥ Drain pipe

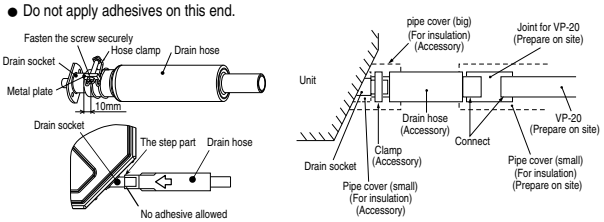
Caution

- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

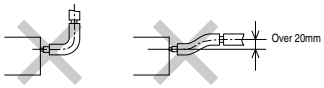
⑥ Drain pipe (continued)

Work procedure

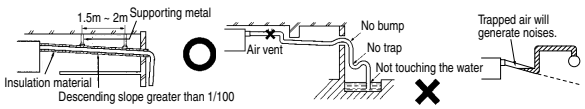
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   - Do not apply adhesives on this end.



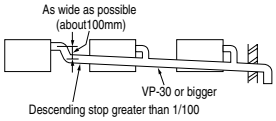
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes.
     Do not bend or make an excess offset on the drain hose as shown in the picture.
     Bend or excess offset will cause drain leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



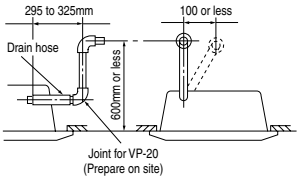
   - When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

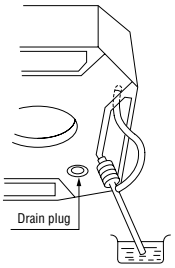
- The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.



⑥ Drain pipe (continued)

Drain pump operation

○ In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

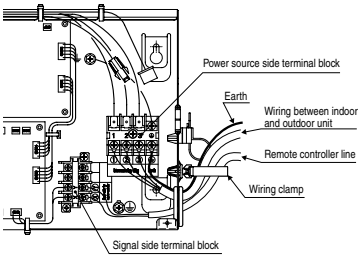
○ In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (220-240VAC on the terminal block [① and ②] or [Ⓛ and Ⓝ]) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test..

⑦ Wiring-out position and wiring connection

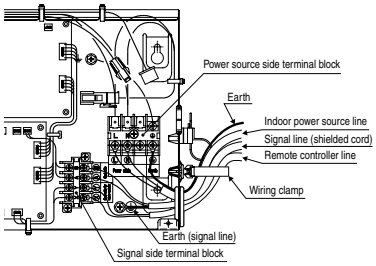
- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country. Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamp.
4. Install a lid of the control box back to original place.

Single split (PAC) series



VRF (KX) series



⑧ Panel installation

- After wiring work finished, install the panel on the indoor unit.
- Refer to attached panel installation manual for details. (see next page)

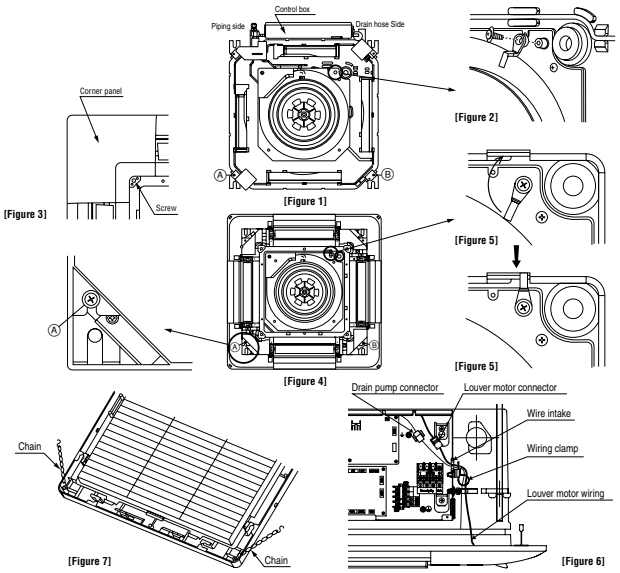
Accessory items

1	Hook		1 piece	For fixing temporarily
2	Chain		2 pieces	
3	Bolt		4 pieces	For installing the panel
4	Screw		1 piece	For attaching a hook
5	Screw		2 pieces	For attaching a chain

⑧ Panel installation (continued)

Work procedure

1. Make sure that the indoor unit is positioned at the correct height with the supplied level gauge. Remove the level gauge before you install the panel.
2. Screw the two bolts of the supplied four bolts by about 5mm. (● mark Ⓐ Ⓑ) [Figure 1]
3. Attach the supplied hook to the indoor unit with the screw (1 screw). [Figure 2]
4. Open the air return grille.
5. Remove the screw of a corner panel and remove a corner panel. (four places) [Figure 3]
6. Hang the panel on two bolts. (● mark Ⓐ Ⓑ) [Figure 4]
7. Rotate the hook and put it into the slot of the panel. And install the panel temporarily. [Figure 5]
8. Tighten the two bolts which were used to install the panel temporarily and the other two bolts.
9. Open a lid of the control box.
10. Fix the louver motor wiring and the drain pump wiring with clamp. And put louver motor wiring into the control box. [Figure 6]
11. Connect the connector of louver motor. [Figure 6]
12. Attach two chains to the air return grille with two screws. [Figure 7]
13. Install the corner panels back to original places. At that time attach the chains to the panel with screws together.
14. Close the air return grille.



⑨ Check list after installation

- Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

PANEL INSTALLATION MANUAL

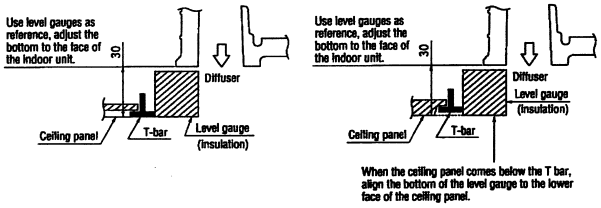
Please read this manual together with the air conditioning unit's installation manual.

PJA012D751 b

1 Checking the unit main body for level installation

- Please read this manual together with the air conditioning unit's installation manual.
- Check the installation level of the air conditioning unit main body relatively to the ceiling material.
- By attaching the level gauge supplied as an accessory of the air conditioning unit main body, determine the installation level of the main body.
- Remove the level gauge before you attach the panel.
- The installation level of the main body can be adjusted to some extent from the opening provided on a corner, even after the panel is attached.
- As long as it does not affect the level of the indoor unit body or the drain piping, you may adjust the installation height of the unit body slightly with the cover panel on.

***Caution:** If there is a height difference beyond the design limit existing between the installation level of the air conditioning unit main body and the ceiling material, the panel may be subject to excessive stress during installation work and broken.

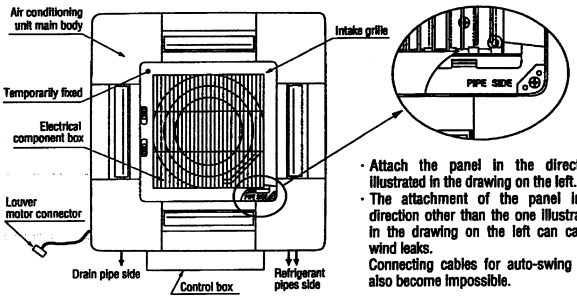


2 Removing the intake grille

① By sliding its hooks sideways, open the intake grille.
② Remove the intake grille's hinges from the cover panel while it is in the open position.

3 The direction of attachment of the main body, panel and intake grille

1. The main body and panel must be attached in a prescribed direction.
   - Bring the panel's intake opening area with the indication of "PIPE SIDE" over the main body's refrigerant pipes.
   - Check motor connectors for the direction of connection.
2. The intake grille can also be attached in a rotated position by 90 degrees.



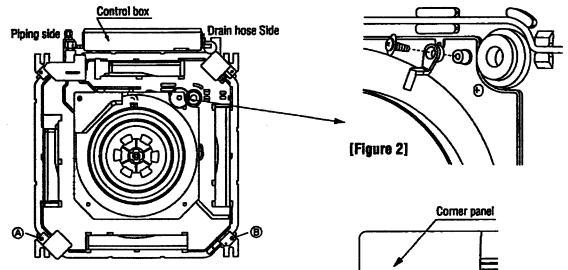
- Attach the panel in the direction illustrated in the drawing on the left.
- The attachment of the panel in a direction other than the one illustrated in the drawing on the left can cause wind leaks.
  Connecting cables for auto-swing will also become impossible.

4 Attaching the panel

<Accessory items>
(It is attached to the panel.)

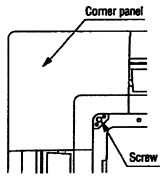
1	Hook		1 piece	For fixing temporarily
2	Chain		2 pieces	
3	Screw		4 pieces	For hoisting the panel
4	Screw		1 piece	For attaching a hook
5	Screw		2 pieces	For attaching a chain

1. Make sure that the unit main body is positioned at the correct height and the opening on the ceiling is made to the correct dimensions with the level gauge supplied with the main body. Remove the level gauge before you attach the panel.
2. Screw in two bolts out of the four supplied with the panel by about slightly less than 5mm. (● mark ⒶⒷ) [Figure 1]
3. Attach the hook supplied with the panel to the main body with the hook fixing screw (1 screw). [Figure 2]
4. Open the intake grille.
5. Please remove the screw of a corner panel and remove a corner panel. (four places) [Figure 3]
6. A panel is hooked on two bolts (● mark ⒶⒷ). [Figure 4]
7. Please rotate a hook, put in the slot on the panel, and carry out fixing the panel temporarily. [Figure 5]
8. Tighten the two bolts used for fixing the panel temporarily and the other two.
9. Please open the lid of a control box.
10. Like drain pump wiring, please band together by the clamp and put in louver motor wiring into a control box. [Figure 6]
11. Please connect a louver motor connector. [Figure 6]
12. Attach two chains to the intake grille with two screws. [Figure 7]
13. Replace the corner panels. Please also close a chain with a screw together then.
14. Close the intake grille.

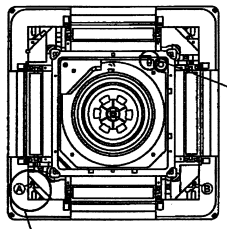


[Figure 1]

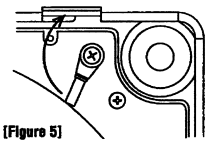
[Figure 2]



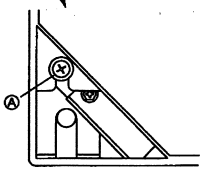
[Figure 3]

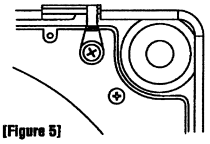


[Figure 4]

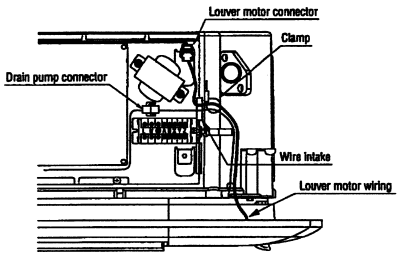


[Figure 5]

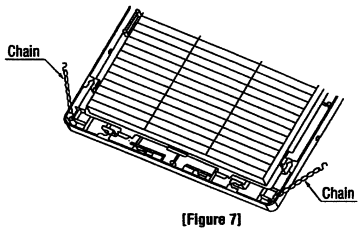




[Figure 5]



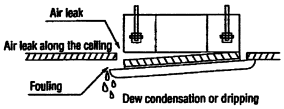
[Figure 6]



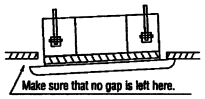
[Figure 7]

Caution:

- Improperly tightened hanging bolts can cause one or more of the problems listed below, so make sure that you have tightened them up securely.

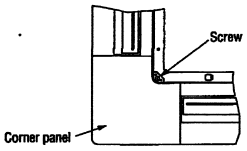


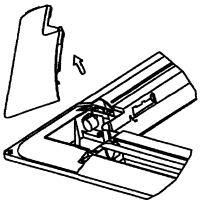
- If there is a gap remaining between the ceiling and the cover panel even after the hanging bolts are tightened up, adjust the installation level of the indoor unit main body again.



5 Removing a corner panel

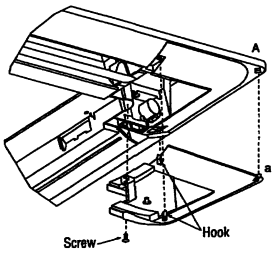
- Unscrew the screw from the corner area, pull the corner panel toward the direction indicated by the arrow mark.





6 Attaching a corner panel

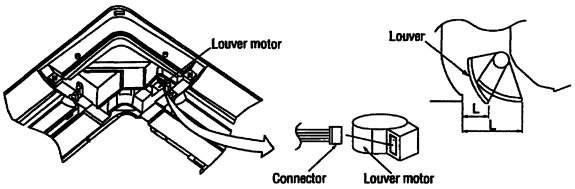
- First insert the part "a" of a corner panel into the part "A" of the cover panel, engage two hooks and tighten the screw.



7 Fixing vertical wind directions

●This cover panel allows the user to set the vertical direction of winds blown from each diffuser outlet independently to his preferred angle according to the setting of installation. Once a vertical wind direction is fixed, it will override and disable any remote control unit operations or automatic control attempting to change it.
Occasionally, a different wind direction may be indicated on the remote control unit's LCD display.

①Disconnect the main power switch (earth leakage breaker).
②Unplug the connector of the louver motor of the diffuser outlet you want to fix its wind direction. Please do not forget to insulate unplugged connectors electrically with a vinyl tape.
③By moving the wind direction-setting louver of the diffuser outlet you want to fix its wind direction slowly with your hand, set the wind direction within the range specified in the table below.



<Range of louver setting>

Yardstick for vertical wind direction setting	Horizontal 23°	Downward 50°
Measurement L (mm)	40	24

※You can set to any point between 24 mm and 40 mm.

***Caution:** Please do not set a louver beyond the specified range. A failure to observe this instruction may result in dripping, dew condensation, the fouling of the ceiling and the malfunctioning of the unit.

(C) Ceiling cassette-2way type (FDTW)

PJB012D227 a

①Before installation

●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For unit hanging		For refrigerant pipe		
Flat washer (M10)	Paper pattern	Pipe cover(big)	Pipe cover (small)	Strap
4	1	1	1	4
For unit hanging	For unit hanging and adjustment	For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing

For drain pipe				For wiring fixing		
Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp	Flat washer (M4)	Nut (M4)	Bolt (M4)
1	1	1	1	1	1	1
For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting			

②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.

This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.

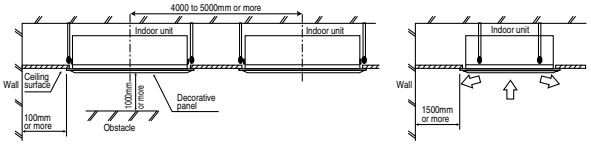
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
(A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service

●Install the indoor unit at a height of more than 2.5m above the floor.



③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling

When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.

When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

③Preparation before installation (continued)

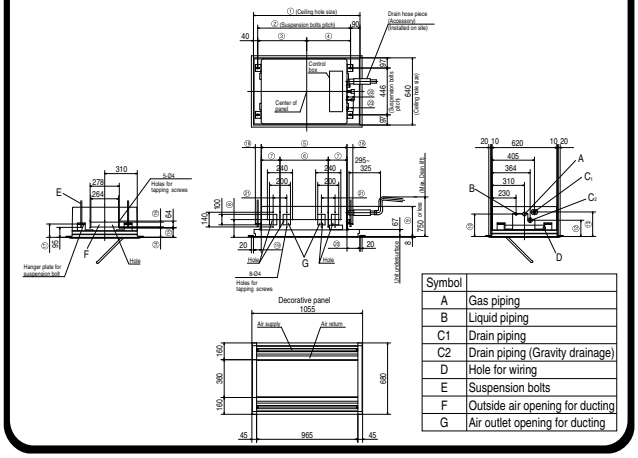
●If placing the unit with the top plate facing up (in the reversed orientation of packaging) is unavoidable, use care so that the area other than supporting member of the unit, will not be subjected to excessive loads. (A heavy load on the central part of this area could cause a damage to the filter).

Ceiling opening, Suspension bolts pitch, Pipe position

UNIT: mm

	Type		
	28 ~ 56	71, 90	112, 140
①	1015	1260	1730
②	885	1130	1600
③	468	590	825
④	417	540	775
⑤	817	1054	1524
⑥	460	460	240
⑦	178	382	672
⑧	161	240	255
⑨	287	342	357
⑩	214	226	241
⑪	405	410	410
⑫	155	155	170

	Type		
	28 ~ 56	71, 90	112, 140
⑬	234	284	299
⑭	98	95	110
⑮	91	88	103
⑯	47	50	50
⑰	127	127	137
⑱	56	66	66
⑲	74	78	78
⑳	124	128	128
㉑	130	-	-
㉒	70	82.5	80.5
㉓	60	65	70

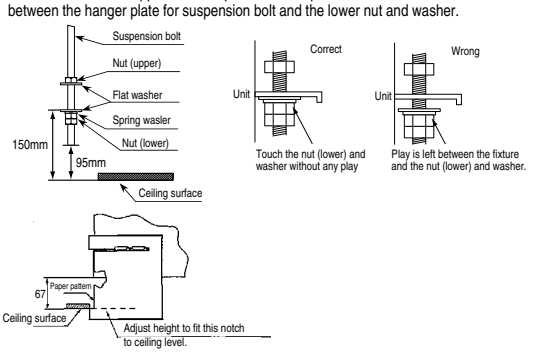


Symbol	
A	Gas piping
B	Liquid piping
C1	Drain piping
C2	Drain piping (Gravity drainage)
D	Hole for wiring
E	Suspension bolts
F	Outside air opening for ducting
G	Air outlet opening for ducting

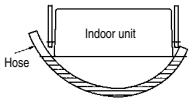
④Installation of indoor unit

Work procedure

1. Cut an installation opening in the ceiling to the measurements specified for ceiling opening.
2. Set the suspension bolts in place.
   ※ The suspension bolts pitch center do not match the panel center.
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 50mm above the ceiling plane. Temporarily put the four lower nuts 150mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.
5. Adjust the indoor unit position after hanging it by inserting the level gauge attached on the package into the air supply port and checking if the gap between the ceiling plane and the indoor unit is appropriate. In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.



6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.



Caution

●Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.

●Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.

●Even after decorative panel attached, still the unit height can be adjusted finely. Refer to the installation manual for decorative panel for details.

⑤Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

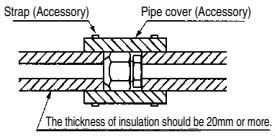
●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   ● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
φ 6.35	14 to 18
φ 9.52	34 to 42
φ 12.7	49 to 61
φ 15.88	68 to 82
φ 19.05	100 to 120



⑥Drain pipe

Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods，etc.

● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.

● Connect the pipe securely to avoid water leakage from the joint.

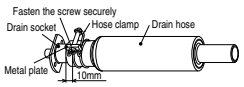
● Insulate the pipe properly to avoid condensation drop.

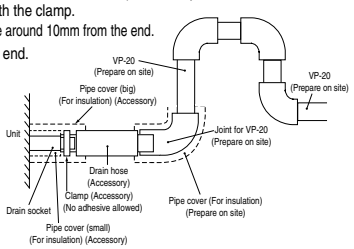
● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.

● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

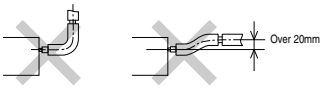
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp.
   Attach the hose clamp to the drain hose around 10mm from the end.
   ●Do not apply adhesives on this end.



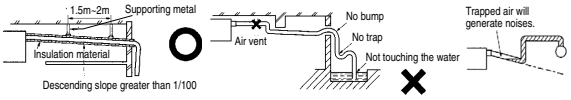


⑥Drain pipe (continued)

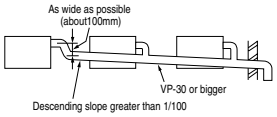
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   ● Make sure that the adhesive will not get into the supplied drain hose.
   It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   ● The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   ●Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   ●Do not set up air vent.



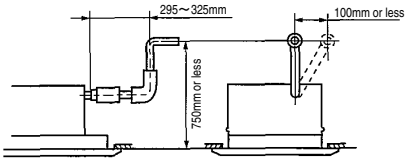
●When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   ●Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
   ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

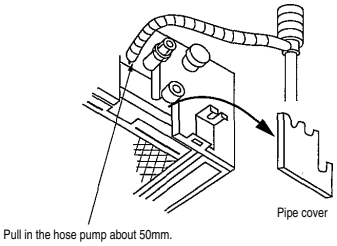
● The position for drain pipe outlet can be raised up to 750mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



Drain test

● After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
● Do drain test even if installation of heating season.
● For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.



⑥Drain pipe (continued)

Drain pump operation

○In case electrical wiring work finished

Drain pump can be operated by remote controller (wired).

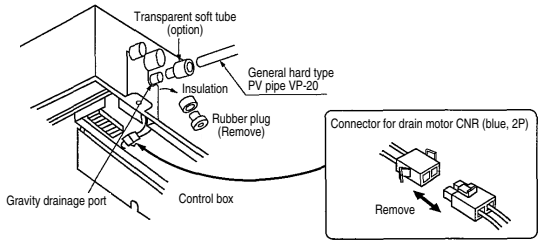
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

○In case electrical wiring work not finished

Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

In case of gravity drainage

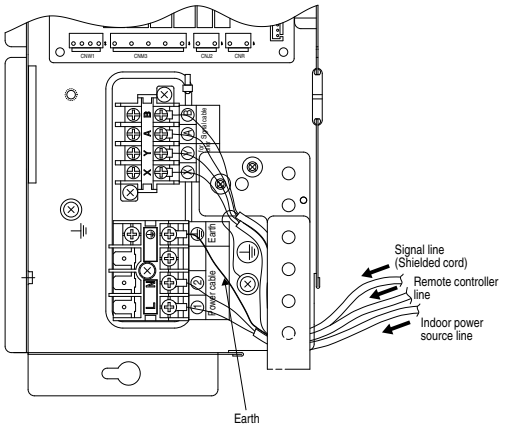
1. Remove the rubber plug and insulation from the gravity drainage port.
2. Connect the drain hose (VP-20) using the Gravity drainage connecting tube (option) and secure firmly with a clamp.
   (* If the drain tube is directly connected with the gravity drainage port, the drain pan could not be removed.)
3. Find CNR drain motor connector (blue, 2P) in the control box, and remove it.
   (* If the unit is used with this connector being connected, the drainage will go out through the standard drain connecting port, causing leaks.)



⑦Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to a terminal block securely.
3. Fix the wiring with supplied screw, nut and washer.
4. Install the removed parts back to original place.

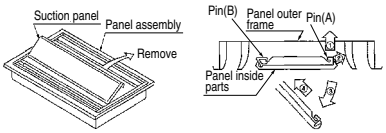


⑧Panel installation

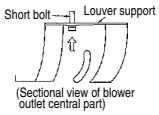
●Attach the panel on the indoor unit after electrical wiring work.

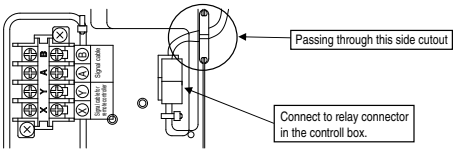
Work procedure

1. Using the paper pattern attached as an accessory, check to ensure the unit height and ceiling opening are finished true to the specified dimensions.
   Remove the suction panel from the panel assembly. (Ref. below diagram)



2. Among the bolts which are attached to the panel, 2 screw must be inserted 5mm at the diagonal positions.
3. Hang the panel on the 2 bolts and temporarily tighten them.
4. Tighten the temporarily tightened 2 bolts and the remaining 2 bolts.
5. Tighten the 2 short bolts (15mm) at the louver supporting section of blower outlet central part.
6. Connect the connecter of louver motor and limit switch through the side cutout of control box.





7. When the louver motor does not operate by the remote controller operation, check the connection of the connector, turn off the power for 10 seconds or longer, and reset.

⑨Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

(d) Ceiling cassette-1way type (FDTS)

① Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  - ○ Unit type/Power supply specification ○ Pipes/Wires/Small parts ○ Accessory items

Accessory item

For main unit suspension	For refrigerant			For panel	For drain pipe			
Paper pattern	Pipe cover (big)	Pipe cover (small)	Strap	Round machine screw (M5 x 35)	Pipe cover (big)	Pipe cover (small)	Drain hose	Hose clamp
2 pcs.	1 pcs.	1 pcs.	4 pcs.	7 pcs.	1 pcs.	1 pcs.	1 pcs.	1 pcs.
(One for left and one for right)	For heat insulation of gas pipe	For heat insulation of liquid pipe	For pipe cover fixing	Fixing of direct air flow panel	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting

② Selection of installation location for the indoor unit

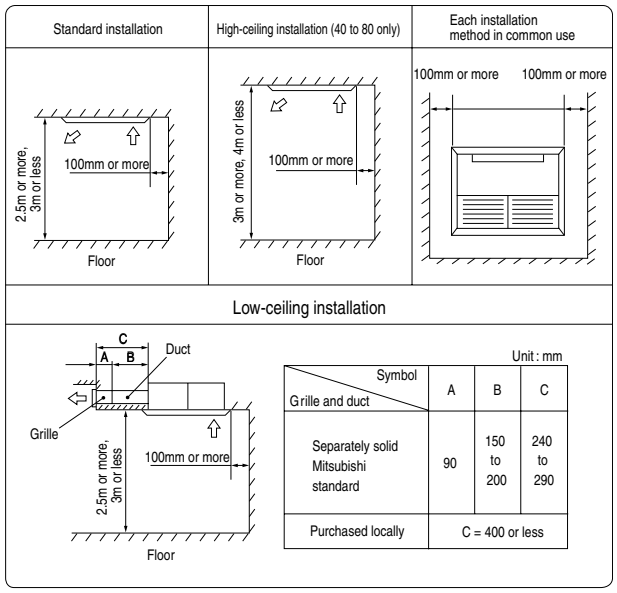
① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
- (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ If there are 2 units of wireless type, keep them away for more than 6m to avoid malfunction due to cross communication.

④ When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service



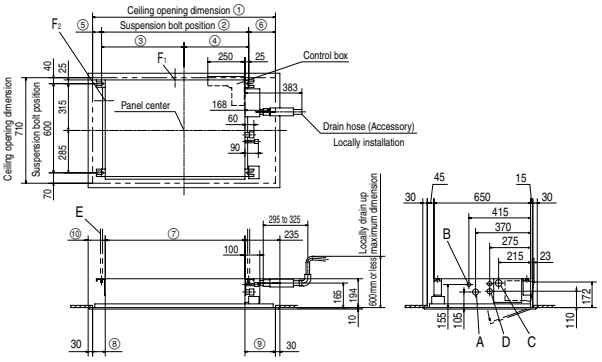
Unit : mm

Symbol / Grille and duct	A	B	C
Separately solid Mitsubishi standard	90	150 to 200	240 to 290
Purchased locally	C = 400 or less		

③ Preparation before installation

- If suspension bolt becomes longer, do reinforcement of earthquake resistant.
  - ○ For grid ceiling
    When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
  - ○ In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
    When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
- Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

③ Preparation before installation (continued)



Unit: mm

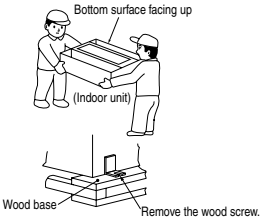
Multi	Type 45	Type 71
①	1230	1440
②	990	1250
③	555	675
④	435	575
⑤	60	45
⑥	180	145
⑦	940	1200
⑧	85	70
⑨	205	170
⑩	115	100

A	Refrigerant gas piping
B	Refrigerant liquid piping
C	Drain piping
D	Power supply inlet
E	Suspension bolt
$F_{1,2}$	Outlet air hole

④ Installation of indoor unit

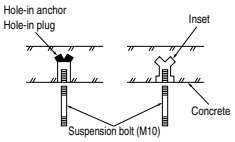
Delivery

- ○ Deliver the unit as close as possible to the installation location without unpacking it.
- ○ If unpacked and delivery can not be avoided, use a nylon sling or a rope with pads placed where the rope contacts the unit so it is not scratched.
- ○ To place the unit on the floor after unpacking, be sure that the unit bottom surface is facing up. (To avoid damage to the unit bottom surface as it is made of a styrene foam).
- ○ The unit and wood are fixed with two wood screws. When unpacking them, remove the two wood screws.



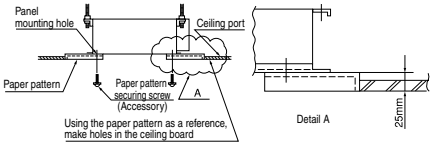
Securing suspension bolts

Tighten the bolts firmly according to the method shown in the drawing or other suitable methods.

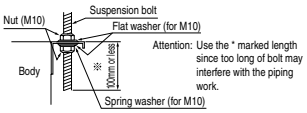


Installation

○ Ceiling hole drilling procefure



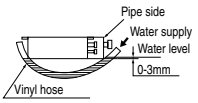
○ Unit mounting procedure



If the holes on the unit and the ceiling do not match, use a mounting bracket with oval hole to adjust the position.

<Horizontal adjustment>
Use a level or the following procedure to adjust horizontally.

○ Adjust so that the bottom surface of the unit and the water level is as shown in the below drawing.



Make the pipe side slightly lower.

⑤ Refrigerant pipe

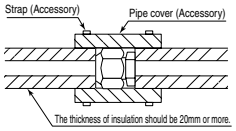
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into the pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※ Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※ Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
   ※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120



⑥ Drain pipe

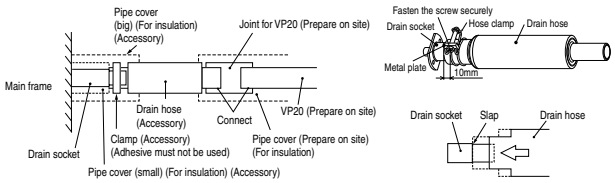
Caution

- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

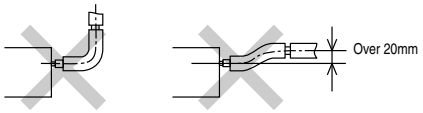
⑥ Drain pipe (continued)

Work procedure

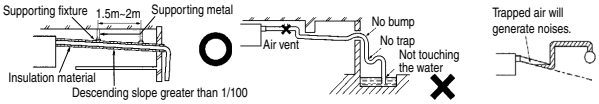
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   - Do not apply adhesives on this end.



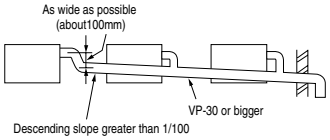
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※ As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



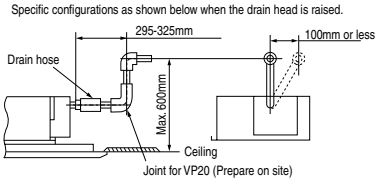
   - When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



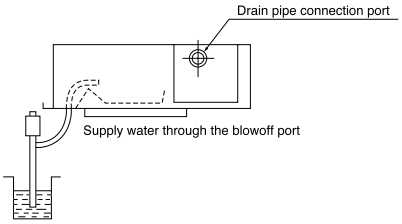
All piping work except above piping are performed in a similar normal drain piping.

⑥ Drain pipe (continued)

Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.



Drain pump operation

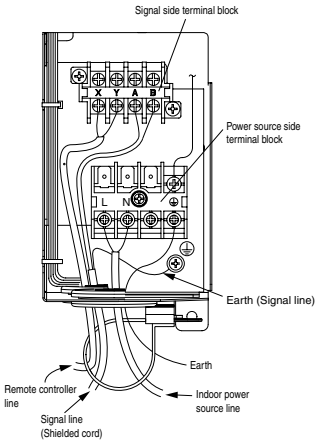
○ In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

○ In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

⑦ Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country. Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

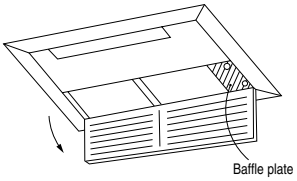
1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



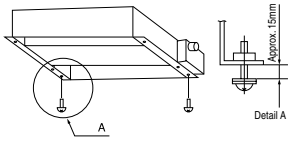
⑧ Panel installation

- Attach the panel on the indoor unit after electrical wiring work.
- Refer to attached manual for panel installation for details.

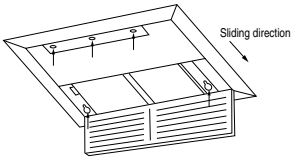
① Open the grille and remove the baffle plate. (Loosing the two screws.)



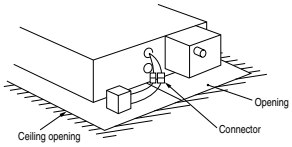
② Screw the two installation screws to the indoor unit.



③ Hook the panel the two screws (-②), and slide the panel approximately 10mm along the allow in following figure. Screw left five installation screw to the indoor unit.



④ Connect the connectors of louver motor and limit switch using "opening" space.



⑤ Return the baffle plate at its original position.

⑥ Close the grille.

Confirm the grille fixed with a hook securely.
* The grille may take the liberty to open if grille is not fixed securely.

⑨ Check list after installation

- Check the following items after all installation work completed.

Check if:	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

(e) Ceiling cassette-1way compact type (FDTQ)

PJC012D116 ⚠C

①Before installation

●Install correctly according to the installation manual.
●Confirm the following points:
○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For refrigerant pipe			For drain pipe			
Pipe cover(big)	Pipe cover (small)	Strap	Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
1	1	4	1	1	1	1
For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting

②Selection of installation location for the indoor unit

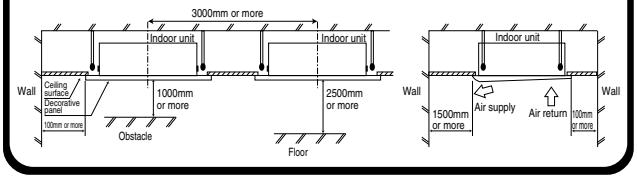
① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ When plural indoor units are installed nearby, keep them away for more than 3m.

Space for installation and service

●Install the indoor unit at a height of more than 2.5m above the floor.



③Preparation before installation

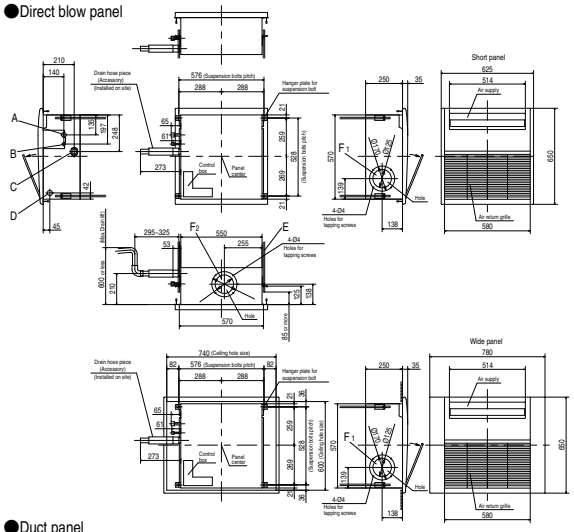
●If suspension bolt becomes longer, do reinforcement of earthquake resistant.
○For grid ceiling
When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Ceiling opening, Suspension bolts pitch, Pipe position

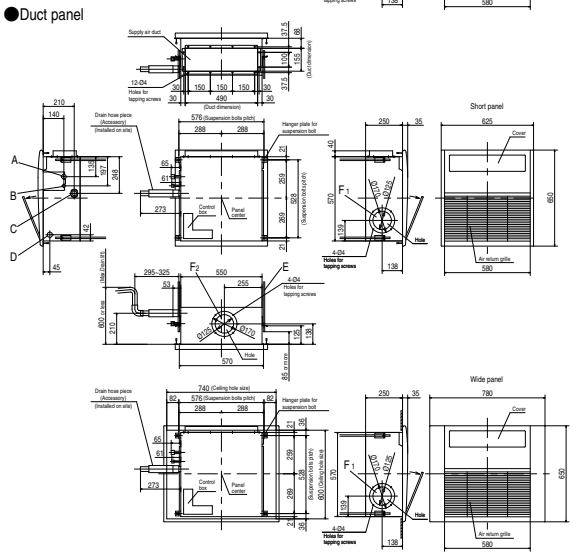
Symbol	Content
A	Gas piping
B	Liquid piping
C	Drain piping
D	Hole for wiring
E	Suspension bolts
F1,2	Outside air opening for ducting

③Preparation before installation (continued)

●Direct blow panel



●Duct panel



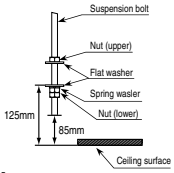
④Installation of indoor unit

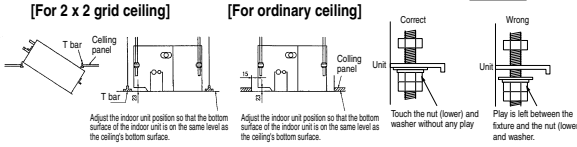
Work procedure

1. In case of installing on a ceiling other than 2 × 2 grid ceiling, prepare a ceiling hole with the size of 600mm × 740mm.
2. Arrange the suspension bolt at the right position (528mm × 576mm).
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 85mm above the ceiling plane. Temporarily put the four lower nuts 125mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.
5. Adjust the indoor unit position after hanging it so that the bottom surface of the indoor unit is on the same level as the ceiling (bottom surface of the T bar).
   The allowable gap between the bottom surface of the ceiling and that of the indoor unit is when the bottom surface of the indoor unit is no higher than 5mm.
   In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.

Caution

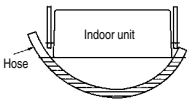
● Do not install the bottom surface of the inddor unit lower than the bottom surface of the ceiling.





④Installation of indoor unit (continued)

6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.



Caution

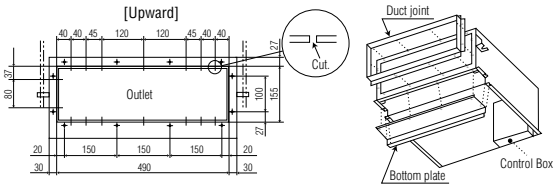
- ●Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel.
- ●Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.
- ●Make sure there is no gap between decoration panel and ceiling surface, and between decoration panel and the indoor unit. The gap may cause air leakage, dew condensation and water leakage.
- ●In case decorative panel is not installed at the same time, or ceiling material is installed after the unit installed, avoid dust coming into the indoor unit.

⑤The indoor unit change procedure for duct type

Prepare a duct panel.

(1) Drill hole for duct

① While referring to the dimensions, cut the insulation.
② Cut sheet metal for the hole, and drill hole.
③ Install the duct joint with screws attached to the panel.
④ Install the bottom plate with screws attached to the panel.



⑤ Set up as follows:

Changing the fan tap

Change the fan tap to the high speed by the remote controller.
[Method]
① Stop the operation of air conditioner. Press (SET) button and (MODE) button for 3 seconds at the same time.
② Select "I/U FUNCTION ▲ " (Indoor Unit Function) and press (SET) button.
③ Select "FAN SPEED SET " (Fan Speed Setting) of No."02" and press (SET) button.
④ Select "HIGH SPEED 1 " (High Fan Speed 1) and press (SET) button.
⑤ Press ON/OFF button to exit.
As for details, refer to the installation manual of remote controller.

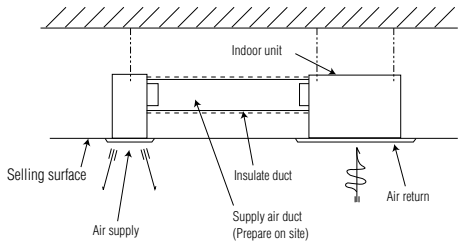
CATEGORY	NUMBER	FUNCTION	SETTING
I/U FUNCTION ▲	02	FAN SPEED SET	HIGH SPEED 1

Invalidating the louver switch

Invalidate the louver switch by the remote controller.
[Method]
① Stop the operation of air conditioner. Press (SET) button and (MODE) button for 3 seconds at the same time.
② Select " FUNCTION ▼" (Remote Controller Function) and press (SET) button.
③ Select " LOUVER S/W " (Louver Switch Setting) of No. "07" and press (SET) button.
④ Select " INVALID " (Louver Switch Invalid) and press (SET) button.
⑤ Press ON/OFF button to exit.
As for details, refer to the installation manual of remote controller.

CATEGORY	NUMBER	FUNCTION	SETTING
FUNCTION ▼	07	LOUVER S/W	INVALID

(2) Duct work



Request

- ●Calculate air flow and the static pressure to select the duct's length and shape.

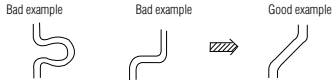
⑤The indoor unit change procedure for duct type (continued)

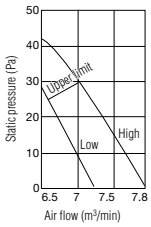
Caution

- ●Take care that the static pressure does not exceed 30 Pa.
  The indoor unit has condensation owing to the decrease of air flow, may cause wetting the ceiling and household goods.

Request

- ●The duct should be minimum bends. (Make the bend radius as large as possible.)
- ●Conduct the duct work before ceiling attachment.





(3) Connecting duct for outside air intake

① Outside air intake
- ●Use the intake, which is easier for work, either at the rear or the side.

② Duct connection
- ●Connect the 125 mm diameter duct, using the duct flange for 125mm diameter duct. (Clamp with band)
- ●Insulate the duct to prevent condensation.

⑥Refrigerant pipe

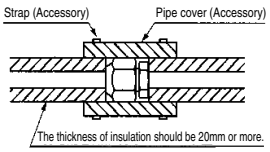
Caution

- ●Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - ・Do not use thin-walled pipes.
- ●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- ●Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- ●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- ●Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   ● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
φ 6.35	14 to 18
φ 9.52	34 to 42
φ 12.7	49 to 61
φ 15.88	68 to 82
φ 19.05	100 to 120



⑦Drain pipe

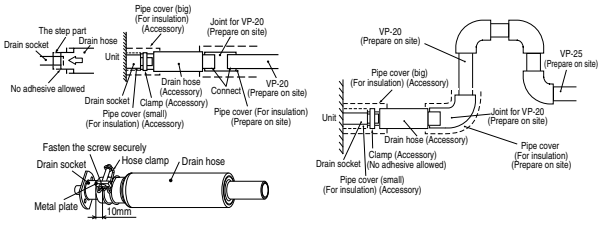
Caution

- ● Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- ● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- ● Connect the pipe securely to avoid water leakage from the joint.
- ● Insulate the pipe properly to avoid condensation drop.
- ● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- ● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

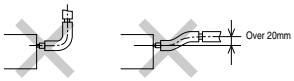
⑦Drain pipe (continued)

Work procedure

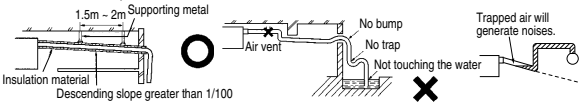
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   ●Do not apply adhesives on this end.



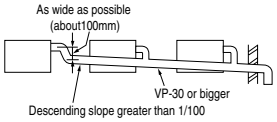
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   ●When drain pipe is set to rising in the nearest of the unit, use the VP-20 pipe.
   When drain pipe is set to after the horizontal pulling, use the VP-25 and above pipe.
   ●Make sure that the adhesive will not get into the supplied drain hose.
   It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   ●The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   ●Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   ●Do not set up air vent.



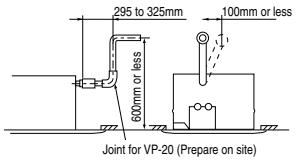
   ●When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   ●Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
   ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

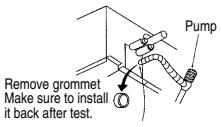
● The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



Drain test

● After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
● Do drain test even if installation of heating season.
● For new building cases, make sure to complete the test before hanging the ceiling.

1. Remove the drain grommet, and pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it.
4. Make sure to install the grommet back to original place.
5. Insulate the drain pipe properly finally.



Insert the edge of water pump hose in the drain pan.

⑦Drain pipe (continued)

Drain pump operation

○In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.
○In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (220-240VAC on the terminal block Ⓛ and Ⓝ) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

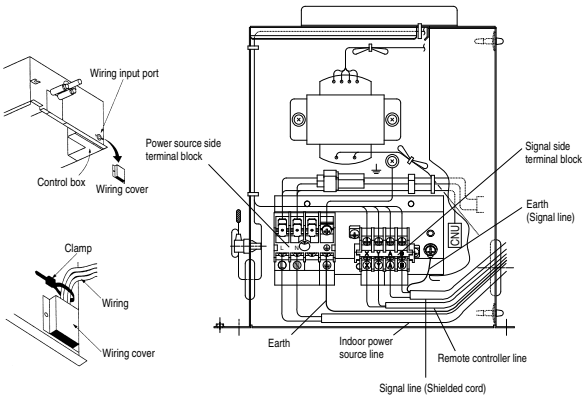
⑧Wiring-out position and wiring connection

● Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
Be sure to use an exclusive circuit.
● Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
● Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
● Be sure to do D type earth work.
● For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws) and the wiring cover (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Take out the wiring to upper direction of wiring cover, and fix the wiring with clamp.
4. Install the removed parts back to original place.

Caution

Make sure to install the wiring cover. Otherwise it may cause dew condensation into the control box.



⑨Panel installation

●Attach the panel on the indoor unit after electrical wiring work.
●Refer to attached manual for panel installation for details.

⑩Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

(f) Duct connected High static pressure type (FDU)

(1) Models 71～140

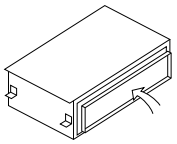
○This model is middle static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.

①Before installation

●Install correctly according to the installation manual.
●Confirm the following points:
○Unit type/Power supply specification
○Pipes/Wires/Small parts
○Accessory items

Accessory item

For refrigerant pipe		
Pipe cover(big)	Pipe cover (small)	Strap
1	1	4
For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing



Accessory parts are stored inside this suction side.

For drain pipe			
Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
1	1	1	1
For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting

②Selection of installation location for the indoor unit

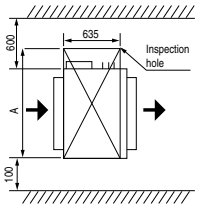
① Select the suitable areas to install the unit under approval of the user.
・Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
・Areas where there is enough space to install and service.
・Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
・Areas where there is no obstruction of airflow on both air return grille and air supply port.
・Areas where fire alarm will not be accidentally activated by the air conditioner.
・Areas where the supply air does not short-circuit.
・Areas where it is not influenced by draft air.
・Areas not exposed to direct sunlight.
・Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
・Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
・Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
・Areas where there is no influence by the heat which cookware generates.
・Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
・Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
(A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

Space for installation and service

●Make installation altitude over 2.5m.
(Indoor Unit)

Installation Space



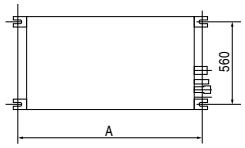
UNIT: mm

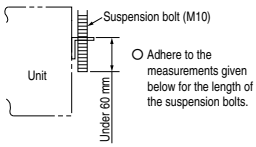
Multi type	71	90, 112, 140
Single type	71	100, 125, 140
A	1200	1720

③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.
○For grid ceiling
When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension Bolt Location



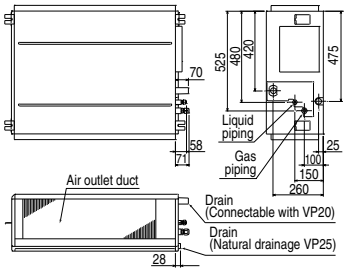


UNIT: mm

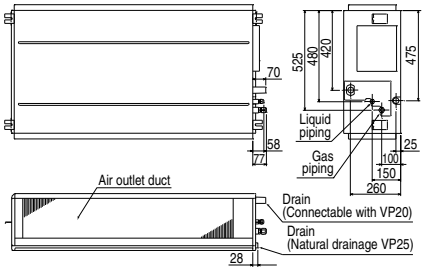
Multi type	71	90, 112, 140
Single type	71	100, 125, 140
A	986	1406

Pipe locations UNIT: mm

Multi type	71
Single type	71



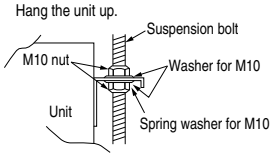
Multi type	90, 112, 140
Single type	100, 125, 140



④Installation of indoor unit

Installation

[Hanging]
Hang the unit up.

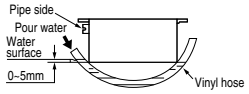


If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

Adjustment for horizontality

○Either use a level vial, or adjust the level according to the method below.

●Adjust so the bottom side of the unit will be leveled with the water surface as illustrated below.



Let the pipe side be slightly sloped.

○If the unit is not leveled, it may cause malfunctions or inoperation of the float switch.

⑤Duck Work

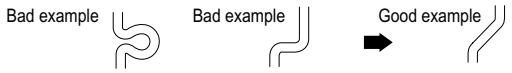
A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.

①●The air conditioner main unit does not have an air filter. Incorporate it into the easy-to-clean suction grille.

②Blowout duct

●The ducts should be at their minimum lengths.

●Keep the bends to a minimum. (The bending radius should be as large as possible.)



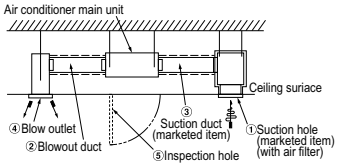
●Conduct the duct work before ceiling attachment.

③Suction duct

●Make sure to insulate the duct to prevent dewing on it.

④Location and form of blow outlet should be selected so that air from the outlet will be distributed all over the room, and equipped with a device to control air volume.

⑤Make sure provide an inspection hole on the ceiling. It is indispensable to service elecric equipment, motor, functional components and cleaning of heat exchanger.



Delete

Bad example of duct work

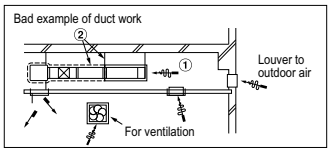
①If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

a)Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct. In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)

b)It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C DB, suction air temperature is 27°C WB) and it could result in such troubles as compressor overload, etc..

c)There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fall to reach the drain pan but leak outside (Example: drip on to the ceiling) with consequential water leakage in the room.

②If vibration damping is not conducted between the unit and the duct, and between the unit and the slab, vibration will be transmitted to the duct and vibration noise may occur. Also, vibration may be transmitted from the unit to the slab. Vibration damping must be performed.



⑥Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

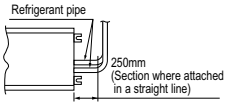
●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Piping work

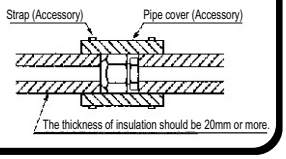


When conducting piping work, make sure to allow the pipes to be aligned in a straight line for at least 250 mm, as shown in the left illustration. (This is necessary for the drain pump to function)

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
(Gas may come out at this time, but it is not abnormal.)
● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2.Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
※Do a flare connection as follows:
● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
●Make sure to insulate both gas pipes and liquid pipes completely.
※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
φ6.35	14 to 18
φ9.52	34 to 42
φ12.7	49 to 61
φ15.88	68 to 82
φ19.05	100 to 120



⑦Drain pipe

Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods, etc.

● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.

● Connect the pipe securely to avoid water leakage from the joint.

● Insulate the pipe properly to avoid condensation drop.

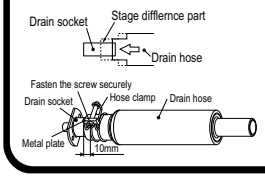
● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.

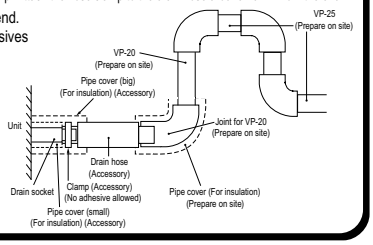
● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.

●Do not apply adhesives on this end.
●Do not use acetone-based adhesives to connect to the drain socket.

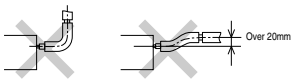




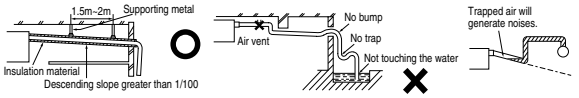
*

⑦Drain pipe (continued)

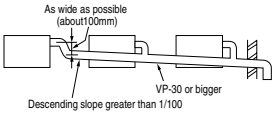
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - ●When installing drain pipe, use VP-20 for the pipe goes up the closest to the unit, and VP-25 or higher number product for farther pipes.
   - ●Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - ●The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - ●Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - ●Do not set up air vent.



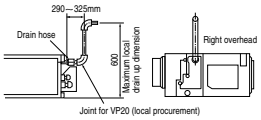
   - ●When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - ●Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- ● The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



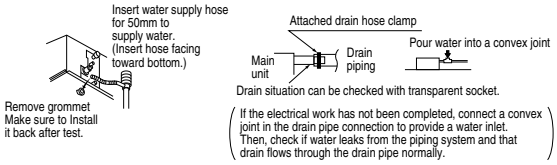
Otherwise, the construction point makes it same as drain pipe construction.

Drain test

1. Conduct a drain test after completion of the electrical work.
2. During the trail, make sure that drain flows properly through the piping and that no water leaks from connections.
3. In case of a new building, conduct the test before it is furnished with the ceiling.
4. Be sure to conduct this test even when the unit is installed in the heating season.

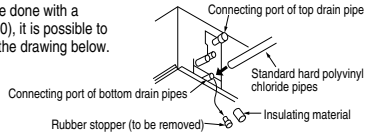
Procedures

1. Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.
2. Check the drain while cooling operation.



Outline of bottom drain piping work

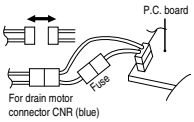
- ● If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.



Uncoupling the drain motor connector

- ● Uncouple the connector CNR for the drain motor as illustrated in the drawing on the right.

(Note: If the unit is run with the connector coupled, drain water will be discharged from the upper drain pipe joint, causing a water leak.)



⑦Drain pipe (continued)

Drain pump operation

○In case electrical wiring work finished

Drain pump can be operated by remote controller (wired).

For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

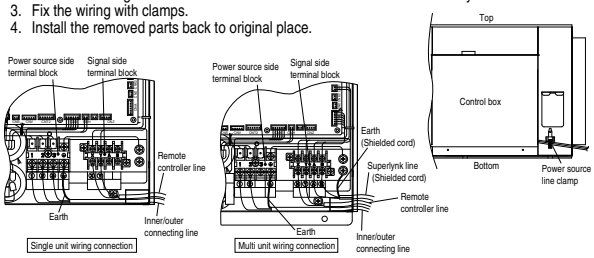
○In case electrical wiring work not finished

Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

⑧Wiring-out position and wiring connection

- ● Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- ● Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- ● Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- ● Be sure to do D type earth work.
- ● For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



⑨Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

⑩Tap selection on blower unit (when the high peformance filter is used)

The fan tap's factory setting is "Standard." If you want to change it to the high static-pressure setting, you can avail yourself of the following two methods. Use one of the two methods to set the fan tap.
Make sure to perform the functional setting with remote controller.
Select [Indoor function] in the functional setting mode, and change the function number [01] [High wall setting].
For operation method, refer to the user's manual of the remote controller.

Function number A	Functional content B	Setting content C	Default setting
01	High wall setting	Standard	○
		High wall 1	

UNIT: Pa

Static Pressure	Standard Tap	50
	High Tap	130

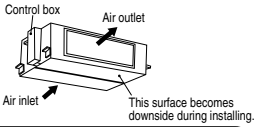
⚠ CAUTION

- ● Taps should not be used under static pressure outside the unit mentioned above. Dew condensation may occur with the unit and wet the ceiling or furniture.
- ● Do not use under static pressure outside the unit of 50Pa or less. Water drops may be blown from the diffuser outlet of the unit and wet the ceiling or furniture.

(2) Models 224, 280

PJD012D036 a

○This model is high static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.



①Before installation

●Install correctly according to the installation manual.

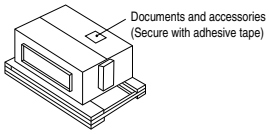
●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

Hose clamp
1
For drain hose mounting

Accessories storage position (during packing)



②Selection of installation location for the indoor unit

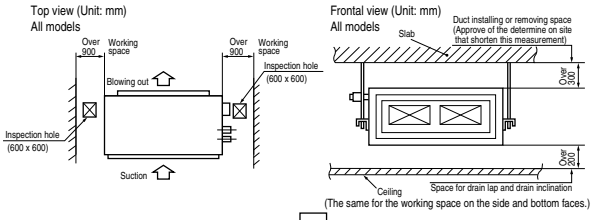
① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

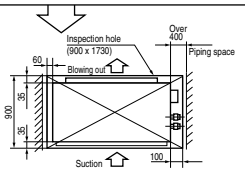
Space for installation and service

●Make installation altitude over 2.5m.



If the conditions shown in the left hand side cannot be met, the following method is also possible.

Top view (Unit: mm)
All models
The frontal view is as the left hand illustration.



Air Conditions and Airflow Limits

Single	Multi	Airflow m³/min			Temperature of the blow-in air of the indoor unit		Air temperature surrounding the indoor unit
		Rating	Lower limit	Upper limit	Cooler	Heater	
200	224	51	38	65	Upper limit 26°C WB When outdoor temperature is 35°C Lower limit 16°C WB When outdoor temperature is 15°C	Upper limit 27°C DB Outdoor temperature is below 20°C WB Lower limit 10°C DB Outdoor temperature is above 10°C WB	Dew point temperature below 28°C
250	280	68	51	87	Refer to the technical document published by our company for more details.		

③Preparation before installation

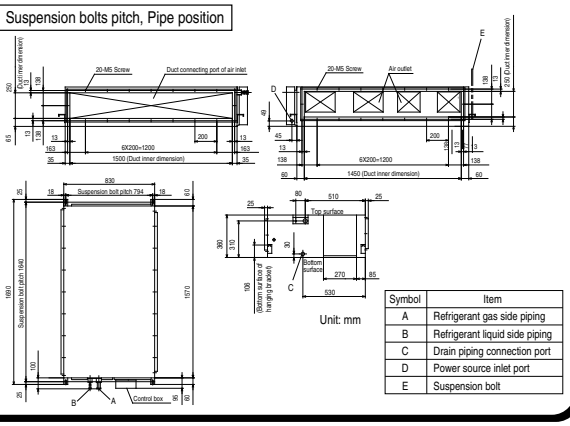
●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling
When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension bolts pitch, Pipe position



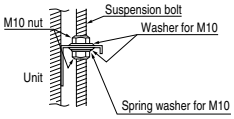
Symbol	Item
A	Refrigerant gas side piping
B	Refrigerant liquid side piping
C	Drain piping connection port
D	Power source inlet port
E	Suspension bolt

④Installation of indoor unit

Installation

[Hanging]

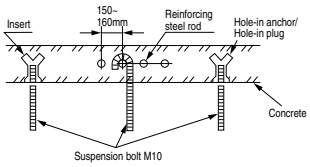
○Hang the unit up.



○If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

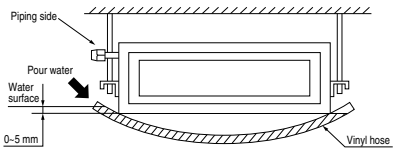
[Method for Fixing the Suspension Bolt]

○Secure the suspension bolt with one of the methods shown in the following illustration.



Horizontal Adjustment

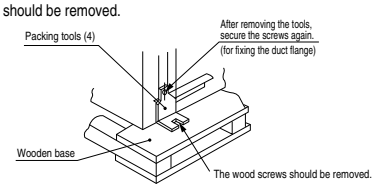
○Use a level vial or adjust the level as shown in the following illustration.



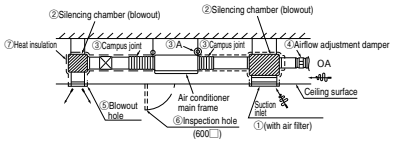
Set the pipe side slightly lower than the other side.

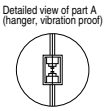
○If it is not horizontal, the float switch malfunctions or does not function.

(Packing Tools)
The packing tools (4) are not necessary.
Packing tools (4) should be removed.



⑤Duck work





①Air filters are not provided with the main frame of the air conditioner. Assemble on to the suction grill which can be cleaned easily.

②Fit the silencing chamber according to the noise level tolerance inside the installation room. If it is particularly necessary to keep the noise level low, further silencing devices is required (always install them in offices, and conference rooms).

③In order to keep the vibration from transferring to the ceiling and the slab, use a campus joint for the duct and a vibration proof rubber for the main frame.

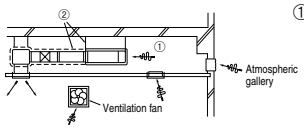
④Attach an airflow adjustment damper to the connection point of the OA duct so airflow adjustment may be possible after installation.

⑤For the blowing outlet, select a shape and location where air may circulate, and a structure where airflow may be controlled.

⑥An inspection hole must be made in the ceiling surface. This is necessary for the repair and maintenance of the electrical parts, motor and functional parts, as well as for cleaning the heat exchanger.

⑦Insulation must be performed for the duct to prevent water condensation on the duct. The thickness of the insulating material is 65 mm (JISA 9501).

A bad example of duct work



①If the suction duct is not used, and the attic is used as a suction duct, the attic will become extremely humid depending on the performance of the ventilation fan, the strength of wind blowing to the atmospheric gallery and the climate (e.g., rainy days).

a. Condensation occurs on the outer board of the unit and water may fall on the ceiling. Use the unit according to the air conditions in the above table and airflow limits. In concrete constructions, high humidity can occur in new constructions even when the attic is not used as a suction duct. In this case, insulate the entire unit with glass wool (25 mm) (use a metal net to hold the wool).

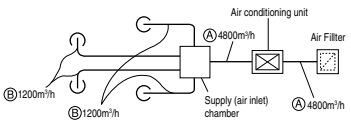
b. Operation of the unit may exceed its limits (for example, when the temperature of the suction air is 24 °C with the outdoor temperature of 35 °C DB). In such a cases, problems such as an overload of the compressor may occur.

c. The volume of the air blowing in may increase due to the performance of the ventilation fan and the wind strength blowing against the atmospheric gallery. The air usage limit may be exceeded, and the water from the heat exchanger will not be able to drain to the drain pan. Instead it will drain outside and cause a water leak (to the ceiling).

②If vibration damping is not conducted between the unit and the duct, and between the unit and the slab, vibration will be transmitted to the duct and vibration noise may occur. Also, vibration may be transmitted from the unit to the slab. Vibration damping must be performed.

Simple setting method for duct measurement

The following shows the method when duct is used at one side of 250mm as 1Pa/m by frictional resistance per the unit length of the duct, and in case of 250 type (single unit)/280 type (multi unit) , 60Hz rating airflow for a example.



	Airflow	Duct (mm x mm)
Ⓐ	4800m³/h (80m³/min)	250 x 950
Ⓑ	1200m³/h (20m³/min)	250 x 310

○Calculation of duct resistance
(Simplified calculate as following table)

Straight piping port	Calculate at 1Pa per 1m length to 1Pa/m
Bending port	Calculate at 3 to 4 m straight pipe per 1 piece of binding pipe
Air outlet port	Calculate at 25Pa
Chamber	Calculate at 50Pa per 1 piece
Air inlet grille (with filter)	Calculate at 40Pa per 1 piece

[Simplified duct dimension selection table] 1Pa/m

	Duct type / Item / Airflow	Quadrangle duct Dimensions
	m³/h (m³/min)	(mm×mm)
	100	250× 60
	200	250× 90
	300	250× 120
	400	250× 140
	450 (7.5)	250× 160
	500	250× 170
	600 (10)	250× 190
	800	250× 230
	1,000	250× 270
Ⓑ	1,200 (20)	250× 310
	1,400	250× 350
	1,600	250× 390
	1,800 (30)	250× 430
	2,000	250× 470
	2,400 (40)	250× 560
	3,000 (50)	250× 650
	3,500	250× 740
	4,000	250× 830
	4,500	250× 920
Ⓐ	4,800 (80)	250× 950
	5,000	250×1000
	5,500	250×1090
	6,000 (100)	250×1180

⑥Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

●The indoor unit pipes allow the maintenance panel to be removed. Therefore, regardless of the piping direction, there should be a straight section of 400 mm or more.

Work procedure

1. When brazing work, perform it while cool down around the brazing port with wet towels to prevent the overheating.
2. After check the gas leak test, install the heat insulation (prepare on site) to the brazing port of the indoor unit.
   ●Be sure to perform the heat insulation both of gas side piping with liquid side piping.
   ※If heat insulation does not install to the pipes, dew condensation may occurs and it may cause the water leakage.
   The thickness of the heat insulation should be more than 20mm.
3. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Single unit			Multi unit			
Type 200	Liquid piping	ϕ 9.52	Type 224	Liquid piping	ϕ 9.52	Flaring
	Gas piping	ϕ 25.4		Gas piping	ϕ 19.05	Flaring
Type 250	Liquid piping	ϕ 12.7	Type 280	Liquid piping	ϕ 9.52	Flaring
	Gas piping	ϕ 25.4		Gas piping	ϕ 22.22	Flaring

⑦Drain pipe

Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods・etc.

● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.

● Connect the pipe securely to avoid water leakage from the joint.

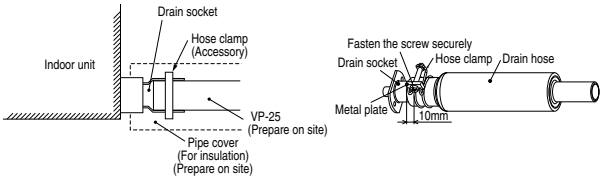
● Insulate the pipe properly to avoid condensation drop.

● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.

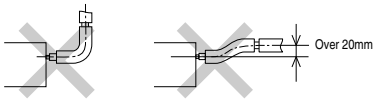
● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   ●Do not apply adhesives on this end.

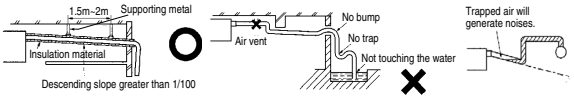


2. Prepare a joint for connecting VP-25 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-25 pipe (prepare on site).
   ※As for drain pipe, apply VP-25 made of rigid PVC which is on the market.
   ●Make sure that the adhesive will not get into the supplied drain hose.
   It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   ●The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.

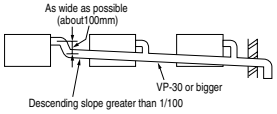


⑦Drain pipe (continued)

3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - ●Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - ●Do not set up air vent.



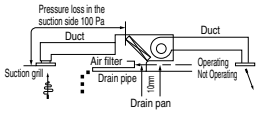
- ●When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - ●Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Caution

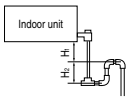
When the duct is connected and the blowing device is operated, the pressure inside the unit becomes negative to the atmospheric pressure.



Example: As shown in the above illustration, if the pressure loss of the suction grill, air filter, and the suction side of the duct is 100 Pa, the drain water level during operation is 10mm higher than when it is not operating.

Fixing Traps

The pressure loss varies depending on the clogging in the air filter. Therefore, make one trap (during the piping work) to prevent water from remaining in the drain pan. It is necessary to make a trap with a structure that allows cleaning. Use the T joint as demonstrated in the left illustration. Also, set the trap height as shown in the left illustration. Arrange the trap near to the unit.



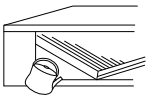
- ●Make one trap along the drain pipe as the left illustration.

H1 = 100 mm or the static pressure of the blowing device
H2 = 1/2 H1 or 50 ～ 100 mm

Drain test

Upon completion of drain piping, check by running water through it.

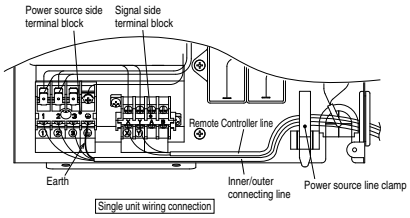
- ○Remove the side panel and gradually pour 1000 cc of water into the drain pan. Ensure that the water drains smoothly.
  Also, ensure that there are no water leaks from the connections and joints.



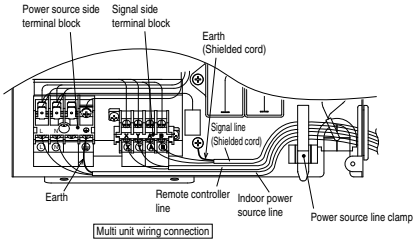
⑧Wiring-out position and wiring connection

- ● Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- ● Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- ● Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- ● Be sure to do D type earth work.
- ● For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws) and a hook which is located on top of it.
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



Single unit wiring connection



Multi unit wiring connection

⑨Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

(g) Duct connected Middle static pressure type (FDUM)

PJR012D317 ⚠a

○This model is middle static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.

①Before installation

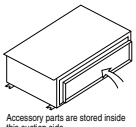
●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For refrigerant pipe			For drain pipe			
Pipe cover(big)	Pipe cover (small)	Strap	Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
1	1	4	1	1	1	1
For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting



Accessory parts are stored inside this suction side.

②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

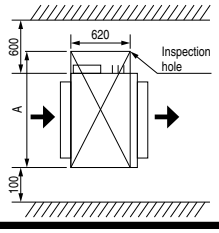
②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

Space for installation and service

●Make installation altitude over 2.5m.

(Indoor Unit)

Installation Space



UNIT: mm

Multi type	22~56	71, 90	112, 140
Single type	50	60, 71	100~140
A	1100	1300	1720

③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling

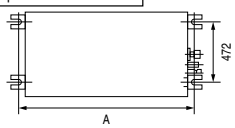
When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.

When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

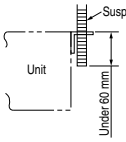
●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension Bolt Location



UNIT: mm

Multi type	22~56	71, 90	112, 140
Single type	50	60, 71	100~140
A	786	986	1406

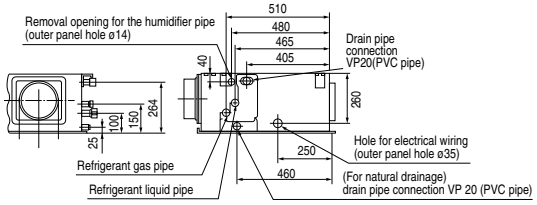


○ Adhere to the measurements given below for the length of the suspension bolts.

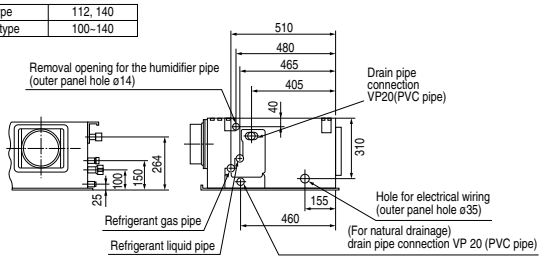
③Preparation before installation (continued)

Pipe locations UNIT: mm

Multi type	22~90
Single type	50~71



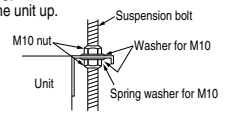
Multi type	112, 140
Single type	100~140



④Installation of indoor unit

Installation

[Hanging]
Hang the unit up.

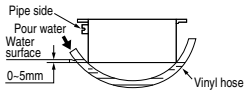


If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

Adjustment for horizontality

○Either use a level vial, or adjust the level according to the method below.

●Adjust so the bottom side of the unit will be leveled with the water surface as illustrated below.



Let the pipe side be slightly sloped.

○If the unit is not leveled, it may cause malfunctions or inoperation of the float switch.

⑤Duck Work

①A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.

●An air filter can be provided on the main body of the air conditioner (on the inlet port). Remove it when connecting the duct on the inlet port.

②Blowout duct

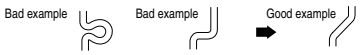
●Use according to the spot numbers shown in the table below with a 200 circular duct.

Multi type	22	36, 45, 56	71, 90	112, 140
Single type	-	20	25, 30	40~50
Spot numbers	1 spot	2 spots	3 or 2 spots	4 or 8 spots

●The difference of the duct lengths between each spot should be less than 2:1.

●The ducts should be at their minimum lengths.

●Keep the bends to a minimum. (The bending radius should be as large as possible.)



●Tie and secure the connection to the duct flange of the main unit/blowout hole with a band. Then, apply insulation materials to the secured part for dew condensation prevention.

●Use of the sound and heat insulated flexible duct is recommended for condensation prevention and soundproofing. (sold separately; 1m, 2m, 4m available)

●Conduct the duct work before ceiling attachment.

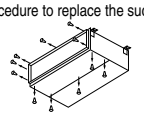
③Inlet port

●When shipped the inlet port lies on the back.

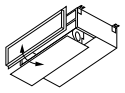
●When connecting the duct to the inlet port, remove the air filter if it is fitted to the inlet port.

⑤Duck Work (continued)

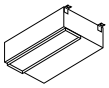
●When placing the inlet port to carry out suction from the bottom side, use the following procedure to replace the suction duct joint and the bottom plate.



●Remove the screws which fasten the bottom plate and the duct joint on the inlet port side of the unit.



●Replace the removed bottom plate and duct joint.



●Fit the duct join with a screw; fit the bottom plate.

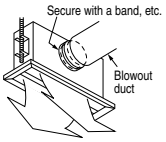
●Make sure to insulate the duct to prevent dewing on it.

④Install the specific blowout duct in a location where the air will circulate to the entire room.

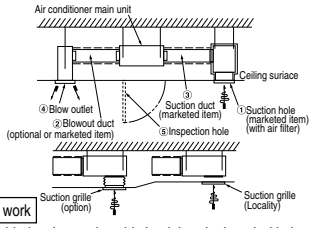
●The duct connection is specific to the 200 circular duct.

●Conduct the installation of the specific blowout hole and the connection of the duct before attaching them to the ceiling.

●Insulate the area where the duct is secured by a band for dew condensation prevention.



⑤Make sure provide an inspection hole on the ceiling. It is indispensable to service elecric equipment, motor, functional components and cleaning of heat exchanger.



Bad example of duct work

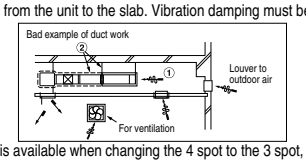
①If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

a)Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct. In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)

b)It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C DB, suction air temperature is 27°C WB) and it could result in such troubles as compressor overload, etc..

c)There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fall to reach the drain pan but leak outside (Example: drip on to the ceiling) with consequential water leakage in the room.

②If vibration damping is not conducted between the unit and the duct, and between the unit and the slab, vibration will be transmitted to the duct and vibration noise may occur. Also, vibration may be transmitted from the unit to the slab. Vibration damping must be performed.



Notice

A specific cover plate is available when changing the 4 spot to the 3 spot, or when changing the 3 spot to the 2 spot.

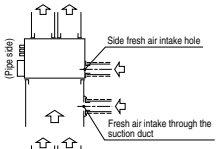
Note: Do not change from 2 spot to 1 spot.

Connecting the air intake/vent ducts

①Fresh Air Intake

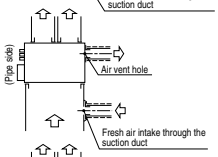
[for air intake duct only]

○Use the side fresh air intake hole, or supply through a part of the suction duct.



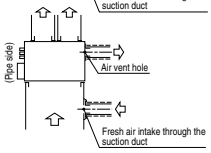
[for simultaneous air intake/vent]

○Intake air through the suction duct.
(the side cannot be used)



②Air Vent

○Use the side air vent hole.
(always use together with the air intake)



○Use the duct flange for the air intake/vent (sold separately; for 125 circular duct connection), and connect the 125 circular duct (tighten with band).

○Insulate the duct to protect it from dew condensation.

⑥Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

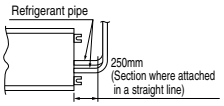
●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Piping work

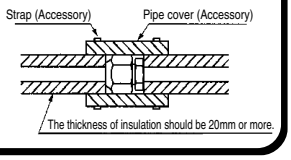


When conducting piping work, make sure to allow the pipes to be aligned in a straight line for at least 250 mm, as shown in the left illustration. (This is necessary for the drain pump to function)

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   ● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
φ 6.35	14 to 18
φ 9.52	34 to 42
φ 12.7	49 to 61
φ 15.88	68 to 82
φ 19.05	100 to 120



⑦Drain pipe

Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods， etc.

● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.

● Connect the pipe securely to avoid water leakage from the joint.

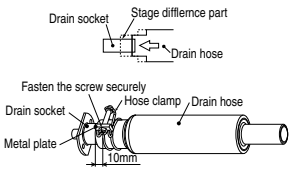
● Insulate the pipe properly to avoid condensation drop.

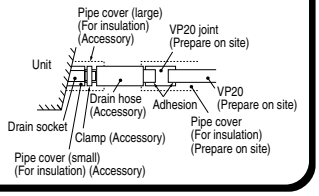
● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.

● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

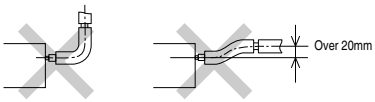
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   ●Do not apply adhesives on this end.
   ●Do not use acetone-based adhesives to connect to the drain socket.



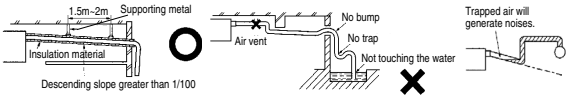


⑦Drain pipe (continued)

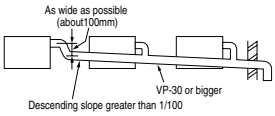
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   ●Make sure that the adhesive will not get into the supplied drain hose.
   It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   ●The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   ●Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   ●Do not set up air vent.



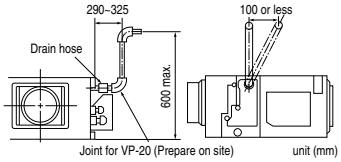
●When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   ●Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
   ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

● The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



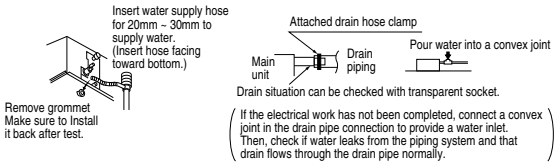
Otherwise, the construction point makes it same as drain pipe construction.

Drain test

1. Conduct a drain test after completion of the electrical work.
2. During the trail, make sure that drain flows properly through the piping and that no water leaks from connections.
3. In case of a new building, conduct the test before it is furnished with the ceiling.
4. Be sure to conduct this test even when the unit is installed in the heating season.

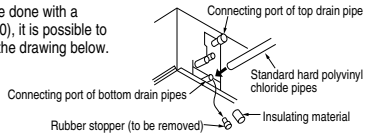
Procedures

1. Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.
2. Check the drain while cooling operation.



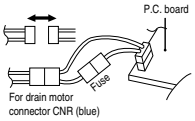
Outline of bottom drain piping work

● If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.



Uncoupling the drain motor connector

● Uncouple the connector CNR for the drain motor as illustrated in the drawing on the right.



(Note: If the unit is run with the connector coupled, drain water will be discharged from the upper drain pipe joint, causing a water leak.)

⑦Drain pipe (continued)

Drain pump operation

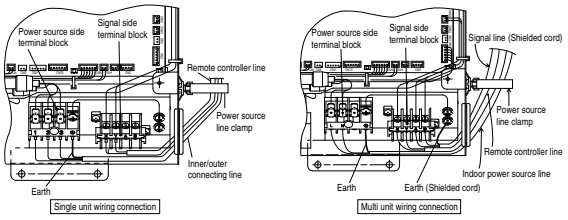
○In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

○In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

⑧Wiring-out position and wiring connection

● Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
Be sure to use an exclusive circuit.
● Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
● Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
● Be sure to do D type earth work.
● For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



⑨Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

⑩Tap selection on blower unit (when the high peformance filter is used)

The fan tap's factory setting is "Standard." If you want to change it to the high static-pressure setting, you can avail yourself of the following two methods. Use one of the two methods to set the fan tap.
Make sure to perform the functional setting with remote controller.
Select [Indoor function] in the functional setting mode, and change the function number [01] [High wall setting].
For operation method, refer to the user's manual of the remote controller.

Function number A	Functional content B	Setting content C	Default setting
01	High wall setting	Standard	○
		High wall 1	

Unit: Pa

Multi type		22~90	112	140
Single type		50~71	100	125, 140
Static Pressure	Standard Tap	50	60	60
	High Tap	85	90	85

⚠ CAUTION

● Taps should not be used under static pressure outside the unit mentioned above. Dew condensation may occur with the unit and wet the ceiling or furniture.
● Do not use under static pressure outside the unit of 50Pa or less. Water drops may be blown from the diffuser outlet of the unit and wet the ceiling or furniture.

(h) Duct connected (Ultra thin) Low static pressure type (FDQS)

PJC012D013 b

○This model is low static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.

①Before installation

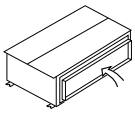
●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For refrigerant pipe			For drain pipe			
Pipe cover(big)	Pipe cover (small)	Strap	Pipe cover(big)	Pipe cover(small)	Drain hose	Hose clamp
1	1	4	1	1	1	1
For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For heat insulation of drain socket	For heat insulation of drain socket	For drain pipe connecting	For drain hose mounting



Accessory parts are stored inside this suction side.

②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.

This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.

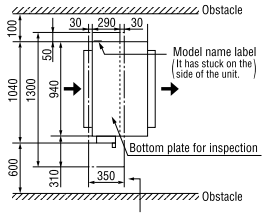
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
(A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

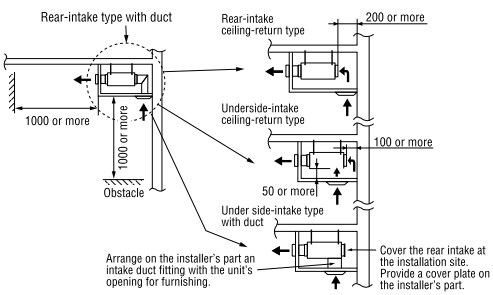
Space for installation and service

●Make installation altitude over 2.5m.

(Indoor Unit) Installation Space Unit : mm



An access measuring 350mm x 1300mm is required for servicing, so please provide a 350mm x 1300mm inspection opening right beneath it.
(For servicing the control, fan, fan motor and drain pump)



Notice Underside-intake type installation is not recommended for hotel and residential installations due to a high noise level.

③Preparation before installation

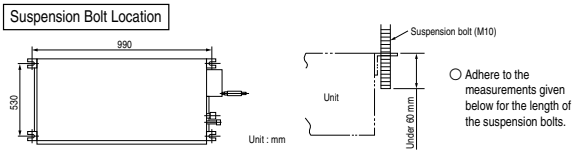
●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling
When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

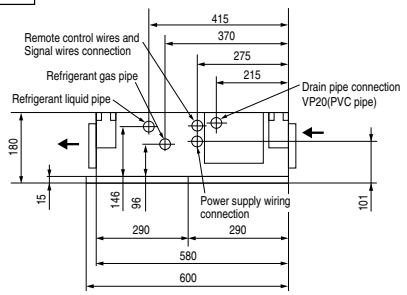
○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension Bolt Location



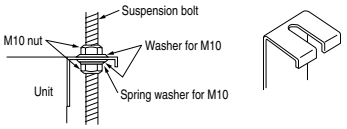
Pipe locations Unit: mm



④Installation of indoor unit

Installation

[Hanging]
Hang the unit up.

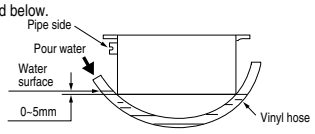


If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

Adjustment for horizontality

○Either use a level vial, or adjust the level according to the method below.

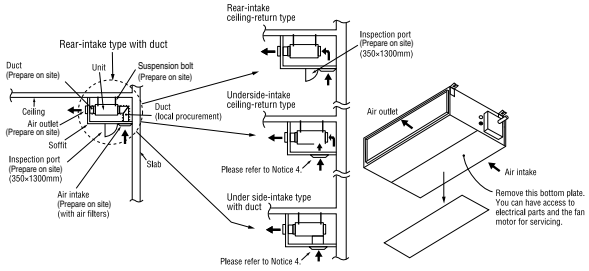
●Adjust so the bottom side of the unit will be leveled with the water surface as illustrated below.



Let the pipe side be slightly sloped.

○If the unit is not leveled, it may cause malfunctions or inoperation of the float switch.

⑤Duck Work



Notice

1. This unit is designed for installation in a soffit. It is not designed to inhale fresh air directly.
2. In the case of an underside-intake ceiling-return type installation, remove the bottom plate of the unit on the fan side to make it an underside intake type. The rear intake should be used together.

⑤Duck Work (continued)

3. The air conditioning unit main body is not equipped with air filters. Incorporate air filters in an air intake grille, which will facilitate the cleaning of air filters.
4. In the case of a rear-intake type with duct and a rear-intake ceiling-return type installation, be sure to provide a 350 mm x 1300 mm inspection opening right beneath the unit's fan side bottom plate to permit servicing of the unit as illustrated in installation geometries. In the case of an underside-intake type with duct and underside-intake ceiling-return type, provide an intake opening right beneath the unit's fan side bottom plate so that it will serve as an inspection opening as well. Also see to its dimensions so that the intake opening will be made to 350 mm x 1300 mm.
5. Take care to install a duct horizontally in connecting the unit with a diffuser.
6. When a canvas duct is used for either intake or outlet duct, install it with care so that it may not get flattened.
7. Select a desirable diffuser position and diffuser form to ensure the distribution of winds throughout the room and use a diffuser employing a structure that provides the capability to regulate winds.
8. Install the air conditioning unit main body via vibration-isolating rubbers to prevent vibrations from propagating directly from the air conditioning unit main body to the ceiling and slab.
9. Secure at least 0.15m² for the opening of an air intake.
10. Never fail to heat-insulate the ducts to prevent condensation on their surfaces.

⑥Refrigerant pipe

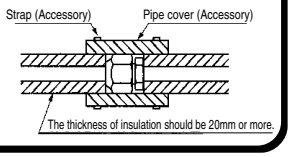
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 ~ 18
ϕ 9.52	34 ~ 42
ϕ 12.7	49 ~ 61



⑦Drain pipe

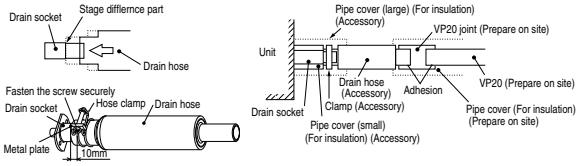
Caution

- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

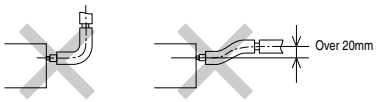
⑦Drain pipe (continued)

Work procedure

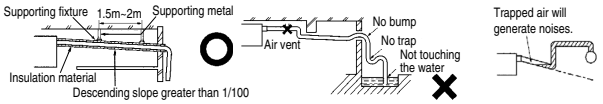
1. Insert the supplied drain hose (the end made of soft PVC) to the step of the drain socket on the indoor unit and fix it securely with the clamp. Attach the hose clamp to the drain hose around 10mm from the end.
   - Do not apply adhesives on this end.
   - Do not use acetone-based adhesives to connect the drain socket.



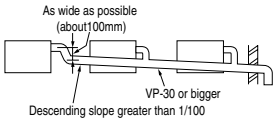
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at the unit or installation of drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



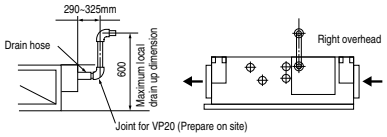
- When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.



4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.

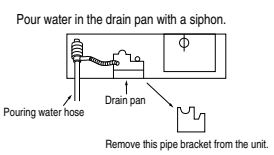


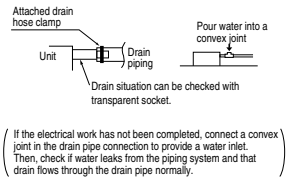
Drain test

1. Conduct a drainage test after completion of the electrical work.
2. During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.
3. In case of a new building, conduct the test before it is furnished with the ceiling.
4. Be sure to conduct this test even when the unit is installed in the heating season.

Procedures

1. Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.
2. Check the drain while cooling operation.





If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.

⑦Drain pipe (continued)

Drain pump operation

○In case electrical wiring work finished

Drain pump can be operated by remote controller (wired).

For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

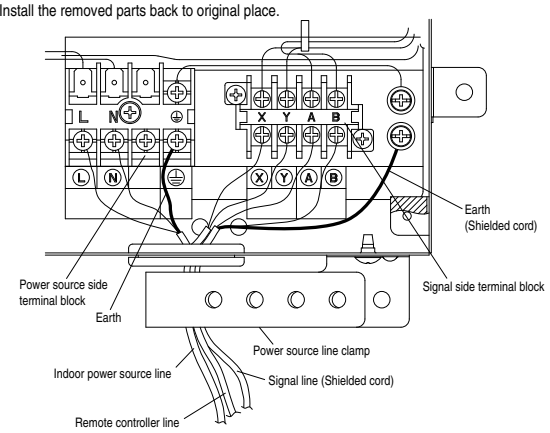
○In case electrical wiring work not finished

Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

⑧Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type grounding work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (3 screws) and the wiring cover (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



⑨Check list after installation

●Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

(i) Wallmounted type (FDK)

PHA012D033

①Before installation

●Install correctly according to the installation manual.
●Confirm the following points:
○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Installation-related items

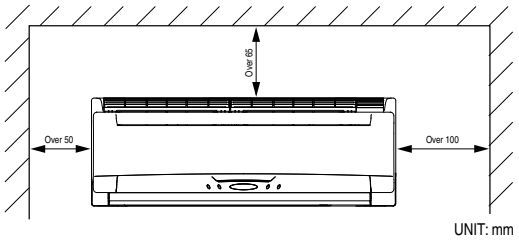
Mounting plate	Tapping screw	Insulation	Strap
1	10	1	4
Attached to the backside of the indoor unit.	For the mounting plate, 4mm (dia.) x 25mm (length)	For heat insulation, 50mm x 160mm	For wire clamp

②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 23°C and relative humidity is lower than 80%. This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

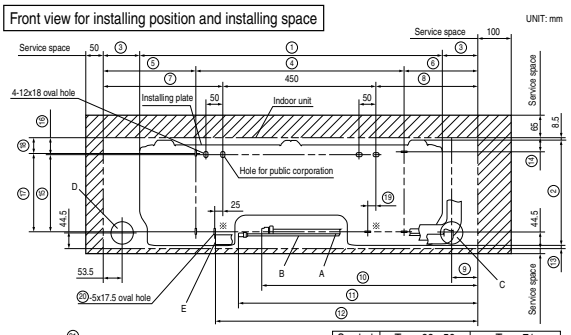
Space for installation and service

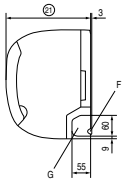


ATTENTION
●Secure a working space for inspection and maintenance.

③Preparation before installation

Front view for installing position and installing space





Symbol	
A	Gas piping
B	Liquid piping
C	Wall pulling hole for right rear piping
D	Wall pulling hole for left rear piping
E	Drain piping
F	Outlet for wiring
G	Outlet for piping

Symbol	Type 22 - 56	Type 71
①	693	886
②	284.2	301.8
③	73.5	106
④	-	610
⑤	-	269
⑥	-	219
⑦	207.5	349
⑧	182.5	299
⑨	63.5	77
⑩	533.5	633.5
⑪	603.5	703.5
⑫	515	772
⑬	5.3	7.7
⑭	-	43
⑮	220.5	221.5
⑯	47.5	49.5
⑰	-	225
⑱	-	46
⑲	0	25
⑳	2 (※)	6
㉑	259	248

④Installation of indoor unit

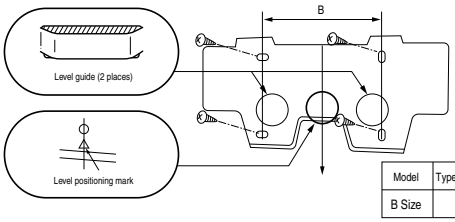
Haulage

ATTENTION
●In carrying the unit into an installation site, carry it in the original packaging to a point as close to the proposed installation site as possible.
●When the unit needs to be unpacked during haulage due to a compelling reason, wrap it with nylon slings or the like to prevent possible damages.
Note: Do not hold the unit by the diffuser louver in carrying it.
●When the unit needs to be laid on a floor after unpacking, always lay it with its front facing upward.

Installation of the mounting plate

ATTENTION
●This unit cannot be installed directly onto a wall surface. Regardless of the surface it is to be installed onto, you should use the mounting plate supplied with the unit.

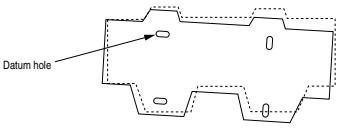
○Install it securely by spotting a structural member running underneath the wall (stud or the like) and after ascertaining its levelness.



UNIT: mm

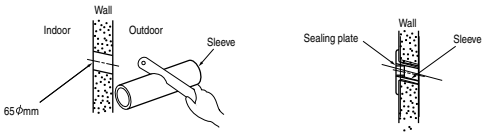
Model	Type 22~56	Type 71
B Size	450	450,610

○The levelness of the mounting plate should be adjusted with the four fixing screws fastened temporarily.



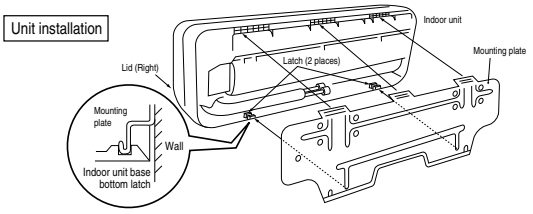
○Rotate the plate around the datum hole to achieve the levelness.

Hints for making a hole on a wall



○Give a descending grade of 5° from the interior to the exterior.

④Installation of indoor unit (continued)



- To remove the unit from the mounting plate, first remove the right and left lids and then disengage the indoor unit base bottom latches.

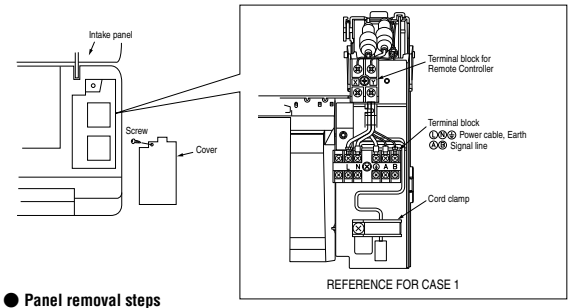
Installation steps	
 ①Hang the upper part of the indoor unit onto the mounting plate.	 ②Push the lower part of the indoor unit lightly against the wall for one-touch installation.

⑤Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

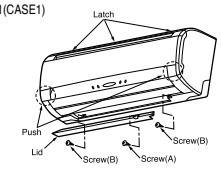
CASE 1 : MODEL 22 ～ 56, CASE 2 : MODEL 71

1. Open the intake panel. (Pull the lower part of the intake panel holding both ends, disengage the latches and then lift it until you feel some drag. The intake panel will stay open at an angle of about 60°)
2. Remove the screw and detach the cover.
3. Connect the remote control line to the upper one of the two terminal blocks provided in the control box.
4. Connect the power cable, grounding line and signal line to the lower terminal block.
5. Attach the cover and fasten the screw.
6. Close the intake panel.
   (Note)
   ・Connect each line to terminal block according to number on label of terminal block.



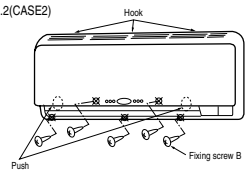
- **Panel removal steps**
1. Remove the cap.(CASE1.only)
2. Remove the fixing screw A and detach the unit bottom guide.(CASE1.only)
3. Remove the fixing screw B.
4. Pull the lower part of the front panel off the unit toward you, and then push it up to detach its upper part from the unit.
   (Disengage three hooks located on the top part)

Fig.1(CASE1)



- **Panel attachment steps**
1. Always remove the air filter beforehand.
2. Place the front panel over the unit.
3. Engage it onto the unit by pressing the areas marked with ◌ in the drawing from the front.
4. Fasten the fixing screw B.
5. Set the air filter.
6. Attach the unit bottom guide and fasten the fixing screw A.(CASE1.only)
7. Attach the cap.
   (Plug it in securely until the end so that it won't come off easily) (CASE1.only)

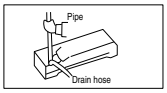
Fig.2(CASE2)



⑥Shaping of pipes and drain hoses

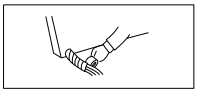
(When it is routed through the rear)

○Shaping of pipes



●Hold the root of the pipe to change its direction, straighten it and then shape it.

○Tape wrapping

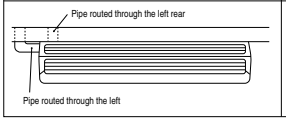
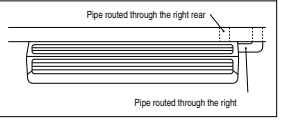


Make sure that wires are connected securely onto the terminal block, before you dress them with a tape after shaping the pipe.

●Wrap a tape for the length that corresponds to a penetration through the wall.
●The connecting wires must be wrapped together with the pipe.

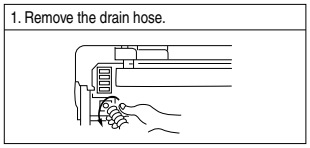
(Points for attention when the pipe is routed through the left or the rear of the unit.)

〈View from the top〉

Pipe routed through the left	Pipe routed through the right
	

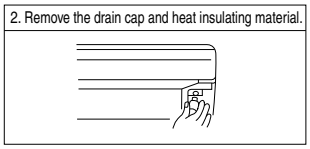
〈Steps to change drain hose connection positions〉

1. Remove the drain hose.



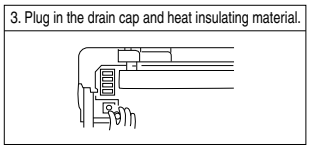
●Turn the drain hose and pull it out.

2. Remove the drain cap and heat insulating material.



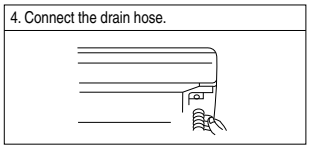
●Remove it either manually or with pliers.

3. Plug in the drain cap and heat insulating material.



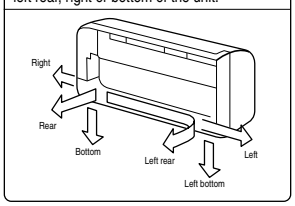
●Plug the drain cap removed in the step 2 securely into the hole with a hexagonal wrench or the like.
Note: Pay attention that a drain cap not properly plugged in can cause a water leak.

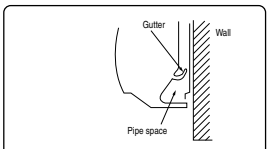
4. Connect the drain hose.



●Insert the drain hose securely by turning it.
Note: Pay attention that a drain hose not properly plugged in can cause a water leak.

The pipe can be routed through the rear, left, left rear, right or bottom of the unit.





This air conditioner is designed to collect dew formed on its back in the drain pan for discharging, so do not lay power cables, etc. in any part above the gutter.

⑦Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

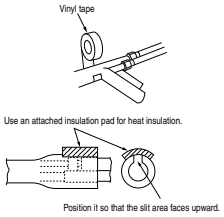
●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   ●Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ6.35	14 to 18
ϕ9.52	34 to 42
ϕ12.7	49 to 61
ϕ15.88	68 to 82



⑧Drain pipe

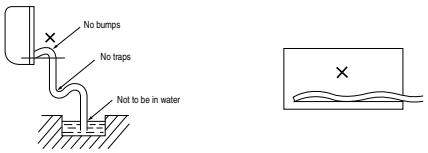
Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods， etc.
● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
● Connect the pipe securely to avoid water leakage from the joint.
● Insulate the pipe properly to avoid condensation drop.
● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

1. A general-purpose hard PVC pipe VP-16 can be connected to the drain hose tip as a part of drain piping.
2. Drain piping must be given a descending grade so that drain water may flow smoothly and it must not have any trap or bump within the system.
   (The pipe can be routed through the left, right, rear or bottom of the unit)
   Hard PVC pipes (VP-16) laid indoors must be kept warm.

⑧Drain pipe (continued)

3. Pour water into the drain pan placed underneath the heat exchanger to make sure that it is properly drained outdoors.
   (For removal of the front panel, refer to ⑤Wiring-out position and wiring connection in this manual.



Drain test

● After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
● Do drain test even if installation of heating season.

⑨Check list after installation

●Check the following items after all installation work completed.

Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

PHA012D033

(j) Ceiling suspended type (FDE)

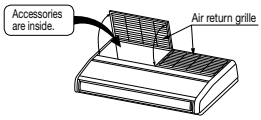
PFA012D618

①Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  - ○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For unit hanging		For refrigerant pipe			For drain pipe				For air return grille
Flat washer (M10)	Paper pattern	Pipe cover (large)	Pipe cover (small)	Strap	Drain hose (with clamp)	Fixing bracket	Screw (M4)	Heay insulation	Screw
8	1	1	1	4	1	1	2	1	4
For unit hanging	For unit hanging and adjustment	For heat insulation of gas pipe	For heat insulation of liquid pipe	For fixing of pipe cover	For drain pipe connection	For fixing of drain hose	For installing of fixing bracket	For drain hose	For fixing air return grille



②Selection of installation location for the indoor unit

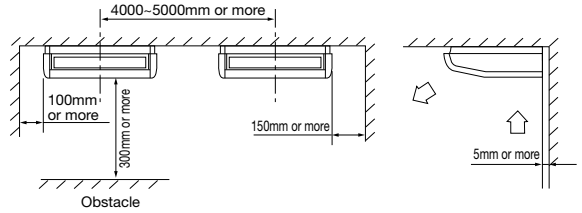
① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 23°C and relative humidity is lower than 80%. This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ If there are 2 units of wireless type, keep them away for more than 6m to avoid malfunction due to cross communication.

④ When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service



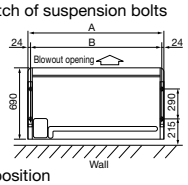
③Preparation before installation

- If suspension bolt becomes longer, do reinforcement of earthquake resistant.
  - ○For grid ceiling
    When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
  - ○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
    When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
- Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

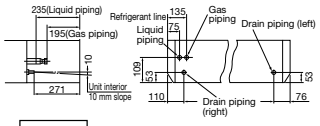
③Preparation before installation (continued)

Pitch of suspension bolts and pipe position

Pitch of suspension bolts



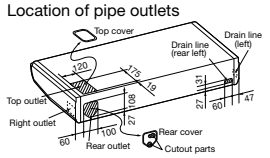
Pipe position



(mm)

Series	type	A	B
Single Split (PAC) series	40 to 50type	1070	1022
	60 to 71type	1320	1272
	100 to 140type	1620	1572
VRF (KX) series	36 to 56type	1070	1022
	71type	1320	1272
	112 to 140type	1620	1572

Location of pipe outlets



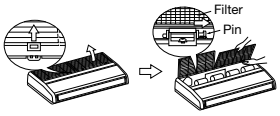
※The outlet through which the pipings are taken out is available in three directions.

Haulage

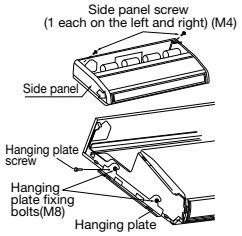
- Move the box as close to the installation area as possible packed.
- If it must be unpacked, wrap the unit with a nylon sling, and be careful not to damage the unit.
- If you need to lay the unit on a floor after unpacking, always put it with the intake grille facing upward.

Preparation before instalation

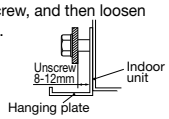
1. **Remove the air return grille.**
   Slide stoppers (4 places) of the catches, then pull out the pins (4 or 6 places).



2. **Remove the side panel.**
   Remove the screw and detach the side panel by sliding it toward the direction indicated by the arrow mark.



3. **Remove the hanging plate.**
   Remove the screw, and then loosen the fixing bolts.



④Remote controller

Installation of remote controller

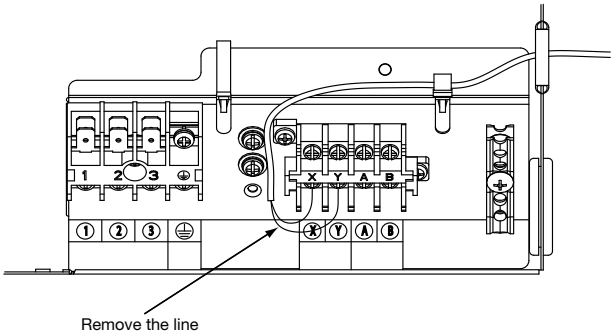
Up to two receiver or wired remote controller can be installed in one indoor unit group.

- When both wired and wireless remote controller are used
  It is necessary to set wired or wireless remote controller as slave.
  (For the method of changing the setting, refer to the installtion manual attached to remote controller or wireless kit.)

- When wired remote controller are used only (wireless type)
  It is necessary to remove the line that is connected to the receiver.
  Remove signal line connected to the receiver from primary side of terminal block (X, Y).

ATTENTION

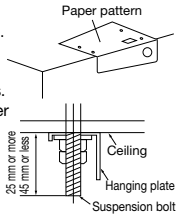
①Insulate with tape the removed line.
②The LED of that removed connector will not be able to make any indication.



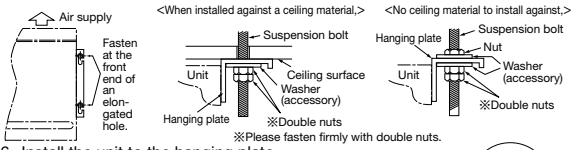
⑤Installation of indoor unit

Work procedure

1. Select the suspension bolt locations and the pipe hole location.
   (1) Use enclosed paper pattern as a reference, and drill the holes for the suspension bolts and pipe.
   ※Decide the locations based on direct measurements.
   (2) Once the locations are properly placed, the paper pattern can be removed.
2. Install the suspension bolts in place.
3. Fix with 4 suspension bolts, which can endure load of 500N.
4. Check the measurements given at the right figure for the length of the suspension bolts.



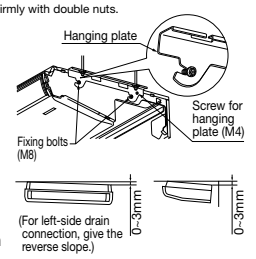
5. Fasten the hanging plate onto the suspension bolts.



※Please fasten firmly with double nuts.

6. Install the unit to the hanging plate.
   (1) Slide the unit in from front side to get it hanged on the hanging plate with the bolts.
   (2) Fasten the four fixing bolts (M8: 2 each on the left and right sides) firmly.
   (3) Fasten the two screws (M4: 1 each on the left and right sides).

⚠**WARNINIG** : Hang a side panel on from the panel side to the rear side and then fasten it securely onto the indoor unit with screws.



※To ensure smooth drain flow, install the unit with a descending slope toward the drain outlet.

⚠ **CAUTION** : Do not give the reversed slope, which may cause water leaks.

⑥Refrigerant pipe

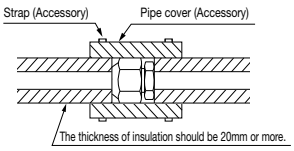
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  ・Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation. In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   ●Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ●Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ●When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

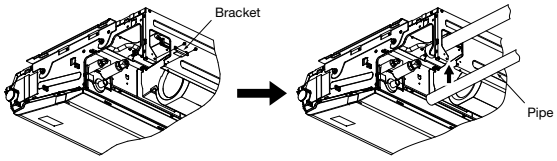
Pipe diameter	Tightening torque N·m
ø 6.35	14 to 18
ø 9.52	34 to 42
ø 12.7	49 to 61
ø 15.88	68 to 82
ø 19.05	100 to 120



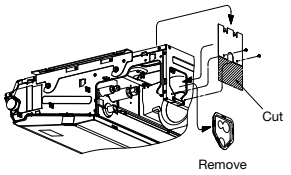
⑥Refrigerant pipe (continued)

The pipe can be connected from three different directions. (back, reight, top)

- When the pipe is routed through the back.
  If the bracket is removed, piping work will become easy.
  ※After piping, reinstall the removed bracket.



- When the pipe is routed through the back.
  Cut the removed top cover, and install to the rear panel instead of rear cover.



⑦Drain pipe

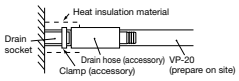
The drain pipes may face out towards the back to the left, or to the right side.

Caution

- Install the drain pipe according to the installation manual in order to drain properly. Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful andinflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

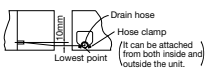
Work procedure

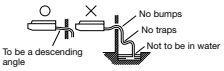
1. Insert drain hose completely to the base, and tighten the drain hose clamp securely. (adhesive must not be used.)
   ※When plumbing on the left side, move the rubber plug and the cylindrical insulating materials by the pipe connecting hole on the left side of the unit to the right side.



⚠Beware of a possible outflow of water that may occur upon removal of a drain plug.

2. Fix the drain hose at the lowest point with a hose clamp supplied as an accessory.
   ※Give a drain hose a gradient of 10mm as illustrated in the right drawing by laying it without leaving a slack.
   ●Take head of electrical cables so that they may not run beneath the drain hose.





⚠A drain hose must be clamped down with a hose clamp. There is a possibility that drain water overflows.

3. Connect VP-20(prepare on site) to drain hose. (adhesive must not be used.)
   ※ Use commercially available rigid PVC general pipe VP-20 for drain pipe.
4. Do not to make the up-down bending and trap in the mid-way while assuming that the drain pipes is downhill. (more than 1/100)
   ● Never set up air vent.
5. Insulate the drain pipe.
   ● Insulate the drain hose clamp with the heat insulation supplied as accessories.
   ● When the unit is installed in a humid place, consider precautions against dew condensation such as heat insulation for the drain pipe.

Drain test

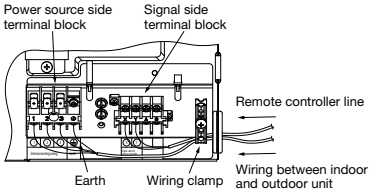
- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
- Do drain test even if installation of heating season.

⑧Wiring-out position and wiring connection

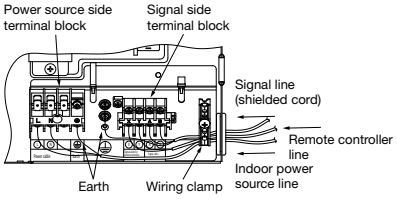
- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the electrical box (2 screws).
2. Hold each wiring inside the unit and connect to a terminal block surely.
3. Fix the wiring by clamps.
4. Install the removed parts back to original place.

Single split (PAC) series



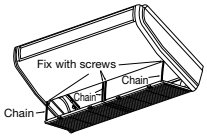
VRF(KX) series

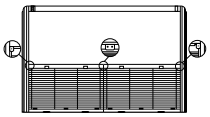


⑨Attaching the air return grille

- The air return grille must be attached when electrical cabling work is completed.

1. Fix the chains tied to the air return grille onto the indoor unit with screws supplied as accessories (4 pieces).
2. Close the air return grille.
   This completes the unit installtion work.





⑩Check list after installation

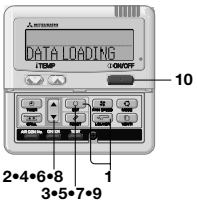
- Check the following items after all installation work completed.

Check if	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

⑪How to set the airflow direction

It is possible to change the movable range of the louver on the air outlet from the wired remote controller. Once the top and bottom position is set, the louver will swing within the range between the top and the bottom when swing operation is chosen. It is also possible to apply different setting to each louver.

1. Stop the air conditioner and press SET button and LOUVER button simultaneously for three seconds or more.
   - The following is displayed if the number of the indoor units connected to the remote controller is one. Go to step 4.
     "DATA LOADING"
     ↓
     "No.1 ▲"
   - The following is displayed if the number of the indoor units connected to the remote controller are more than one.
     "SELECT I/U"
     ↓
     "I/U000 ▲"



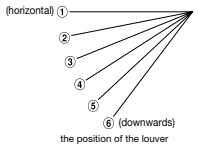
2. Press ▲or▼button.(selection of indoor unit) ●Select the indoor unit of which the louver is set.
   [EXAMPLE]
   "I/U000 ▲"⇔"I/U001 ⇕"⇔"I/U002 ⇕"⇔
   "I/U003 ⇕"

3. Press SET button.(determination of indoor unit) ●Selected indoor unit is fixed.
   [EXAMPLE]
   "I/U001" (displayed for two seconds)
   ↓
   "DATA LOADING"
   ↓
   "No.1 ▲"

4. Press▲or▼button.(selection of louver No.) ●Select the louver No. to be set according to the right figure.
   [EXAMPLE]
   "No.1 ▲"⇔"No.2 ⇕"⇔"No.3 ⇕"⇔
   "No.4 ▼"

5. Press SET button.(Determination of louver No.)
   ●The louver No. to be set is confirmed and the display shows the upper limit of the movable range.
   [EXAMPLE] If No.1 louver is selected,
   "No.1 UPPER2 ⇕" ←current upper limit position

6. Press▲or▼button.(selection of upper limit position)
   - Select the upper limit of louver movable range.
     "position 1" is the most horizontal, and "position 6" is the most downward.
     "position --" is to return to the factory setting.
     If you need to change the setting to the default setting, use "position --".



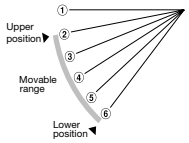
"No.1 UPPER1 ▼" (the most horizotal)
⇔"No.1 UPPER2 ⇕"
⇔"No.1 UPPER3 ⇕"
⇔"No.1 UPPER4 ⇕"
⇔"No.1 UPPER5 ⇕"
⇔"No.1 UPPER6 ⇕" (the most downwards)
⇔"No.1 UPPER-- ▲" (return to the default setting)

7. Press SET button.(Fixing of the upper limit position)
   ●The upper limit position is fixed and the setting position is displayed for two seconds. Then proceed to lower limit position selection display.
   [EXAMPLE]
   No.1 UPPER2 (displayed for two seconds)
   ↓
   No.1 LOWER5 ⇕ (shows current setting)

8. Press▲or▼button.(Selection of lower limit position)
   ●Select the lower limit position of louver.
   "position 1" is the most horizontal, and "position 6 "is the most downwards.
   "position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

No.1 LOWER1 ▼ (the most horizontal)
No.1 LOWER2 ⇕
No.1 LOWER3 ⇕
No.1 LOWER4 ⇕
No.1 LOWER5 ⇕
No.1 LOWER6 ⇕ (the most downwards)
No.1 LOWER-- ▲ (return to the default setting)

9. Press SET button.(Fixing of the lower limit position)
   ●Upper limit position and lower limit position are fixed, and the set positions are displayed for two seconds, then setting is completed.
   - After the setting is completed, the louver which was set moves from the original position to the lower limit position, and goes back to the original position again. (This operation is not performed if the indoor unit and/or indoor unit fan is in operation.)
   [Example]
   No.1 U2 L6 (displayed for two seconds)
   SET COMPLETE
   No.1 ▲



10. Press ON/OFF button.
    ●Louver adjusting mode ends and returns to the original display.

Caution

If the upper limit position number and the lower limit position number are set to the same position, the louver is fixed at that position auto swing does not funtion.

ATTENTION

If you press RESET button during settings, the display will return to previous display.If you press ON/OFF button during settings, the mode will be ended and return to original display, and the settings that have not been completed will become invalid.

When plural remote controllers are connected, louver setting operation cannot be set by slave remote controller.

PFA012D618

(k) Floor standing (with casing) type (FDFL)

PGD012D005

① Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  - ○ Unit type/Power supply specification ○ Pipes/Wires/Small parts ○ Accessory items

Accessory item

For installation		For refrigerant pipe					For drain pipe
Floor bracket	Tapping screw	Pipe cover	Pipe cover		Strap	Joint pipe	Drain hose
2	2	2	1	1	8	1	1
	For installing remote controller (M4 x l 12)	For heat insulation of gas pipe	For on site side of liquid pipe (150 mm length)	For liquid pipe between Heat exchanger/ expansion valve box(70 mm length)	For pipe cover fixing	For connecting gas pipe	For drain pipe connecting

② Selection of installation location for the indoor unit

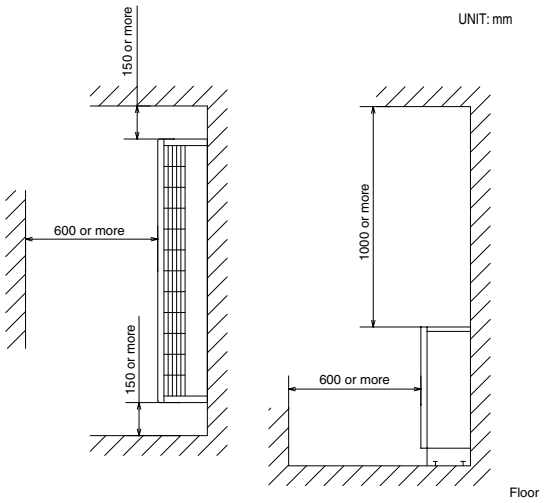
This indoor unit can be installed either to the floor or to the wall. Select a location with the following suitable conditions.

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 23°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause the unit falling down and injury.

③ When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

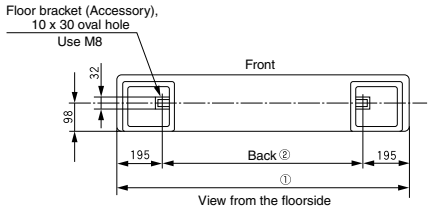
Space for installation and service



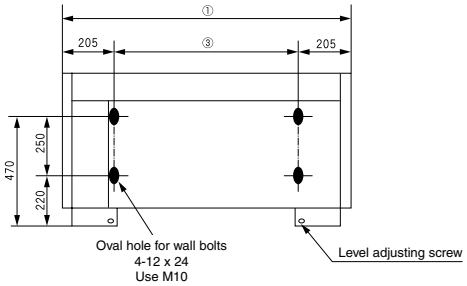
③ Preparation before installation

Position of bolts for floor bracket and for wall installation bolts

Position of floor bracket bolts

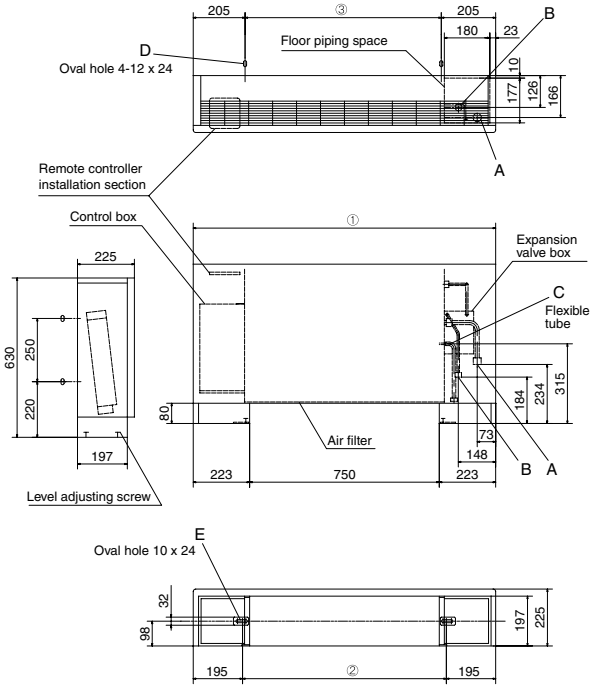


Position of wall installation bolts



UNIT:mm

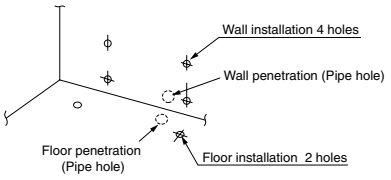
Model No. \ Item	①	②	③
Type 28,45,56	1,196	806	786
Type 71	1,481	1,091	1,071



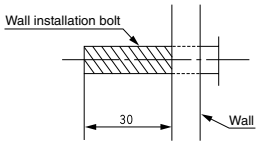
Symbol	Contents
A	Refrigerant gas side piping (provided)
B	Refrigerant liquid side piping
C	Drain piping (provided)
D	Wall installation hole
E	Floor bracket (provided)

④ Installation of indoor unit

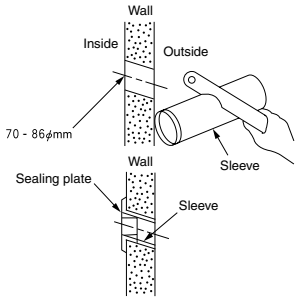
Choose the floor bracket bolt location or the wall installation bolt location, and the location of the pipe hole. Open the holes for the bolts and the pipe.
Choose the positions by the measured values.



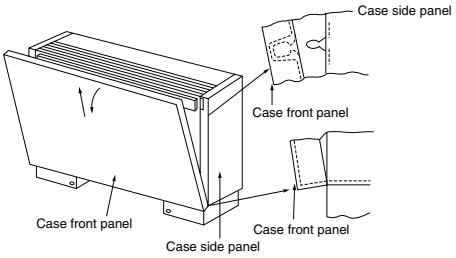
Strictly adhere to the following measurements for the wall installation bolts.

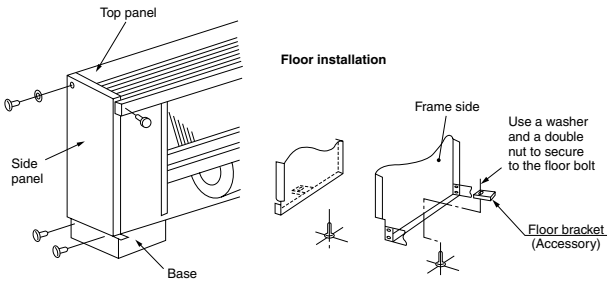


Here is the method to drill the holes on the wall.

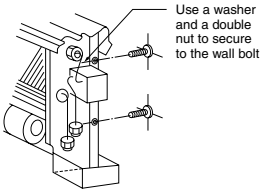


(1) Remove the front panel and the side panel.
(2) Eliminate looseness with a level adjusting screw.
(3) Firmly secure as instructed below.
The side panel and the front panel have been installed.





Wall installation



⑤ Refrigerant piping

Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  ・Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe.
  Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

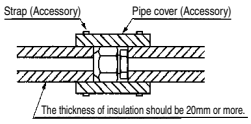
1. Remove the flare nut and blind flanges on the pipe of the indoor unit. (The connection of Liquid/Gas side of heat exchange, Inlet/outlet of the expansion valve box) (4 places)
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)

2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ○ Make sure to connect the liquid pipe between the heat exchanger and expansion valuve box (indicated in Section A of the figure).
   ○ Pipes can be take out in 2 directions, from the rear and from the floor.
   ○ Use the provided joint pipes to connect gas pipes. Connect in the direction that the pipe will be removed.
   ※ Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※ Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.

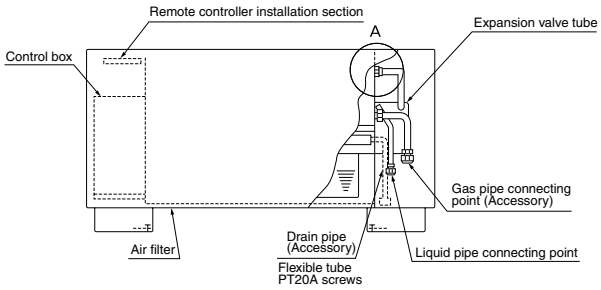
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※ Incomplete insulation may cause dew condensation or water dropping.

4. Refrigerant is charged in the outdoor unit
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120



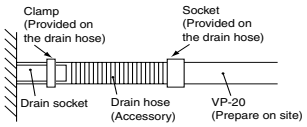
○ There are "System name" and "Refrigerant amount" columns on the name plate of the outdoor unit. Write the system name and the amount of the refrigerant in the columns.



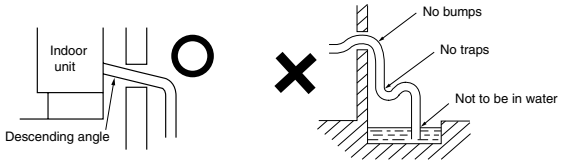
⑥ Drain pipe

Caution

Insert the attached drain hose to the indoor unit completely, tighten the drain hose with the attached clamp and secure it well.(Disapprove of the adhesive joint)



- Install the drain pipe according to the installation manual in order to drain properly. Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.
- Insert the attached drain hose completely to the base.
- Tighten the drain hose with the strap and secure it well.



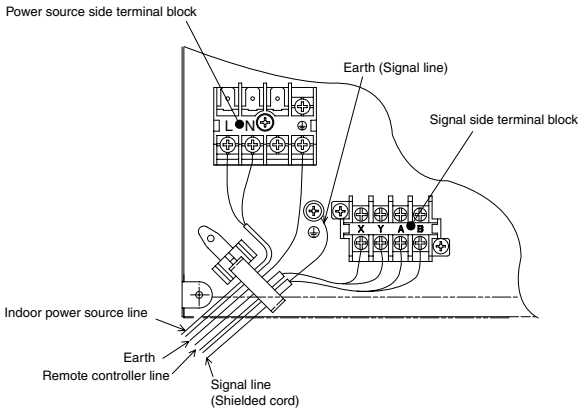
Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
- Do drain test even if installation of heating season.

⑦ Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country. Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.

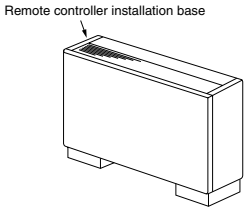


⑧ Remote Controller

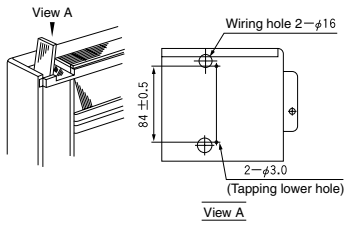
Caution

- Appearance

When installing the remote controller and selecting the line of remote controller of the unit, refer to the Electric Wiring Instruction Manual provided in the unit and Installation Manual provided for wired remote controller.

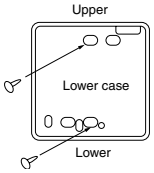


(1) Remove the front panel



(2) Installation of remote controller

- Install the lower case with the provided tapping screws (M4 x 12)

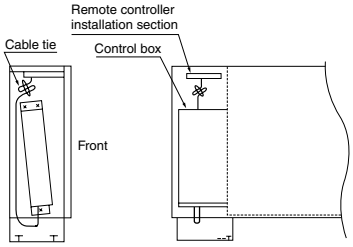


(3) Caution for Installing the remote controller

- Make sure that the cord length is too much long 30 cm or more. (It is necessary when remove the front panel and servicing the unit.)

(4) Wiring route

- Connect wires to the terminal block through the wiring hole on the back of the control box.
- Bind the remaining length of the wire with a band.



(Check)

- Ensure that the wires are not hitting the edges.
- Conduct a test run to confirm there are no problems.

⑨Check list after installation

●Check the following items after all installation work completed.

Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

PGD012D005

(I) Floor standing (without casing) type (FDFU)

PGD012D006

① Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  - ○ Unit type/Power supply specification ○ Pipes/Wires/Small parts ○ Accessory items

Accessory item

For installation	For refrigerant pipe					For drain pipe
Floor bracket	Pipe cover	Pipe cover		Strap	Joint pipe	Drain hose
2	2	1	1	8	1	1
	For heat insulation of gas pipe	For on site side of liquid pipe (150 mm length)	For liquid pipe between Heat exchanger/ expansion valve box(70 mm length)	For pipe cover fixing	For connecting gas pipe	For drain pipe connecting

② Selection of installation location for the indoor unit

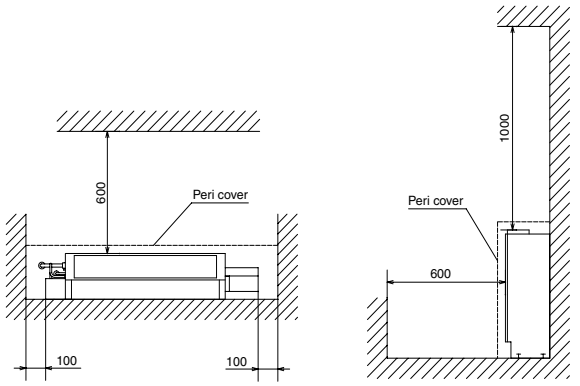
This indoor unit can be installed either to the floor or to the wall. Select a location with the following suitable conditions.

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 23°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause the unit falling down and injury.

③ When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Installation spaces for the indoor unit

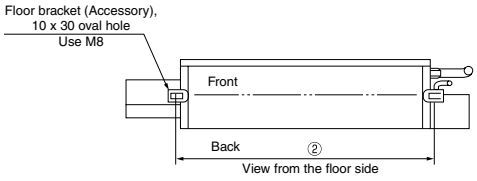


UNIT: mm

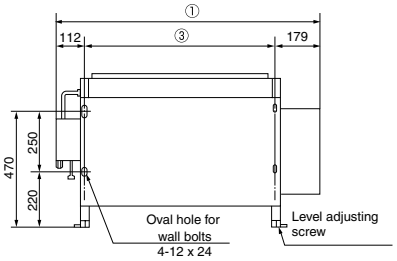
③ Preparation before installation

Position of bolts for floor bracket and for wall installation bolts

Position of floor bracket bolts

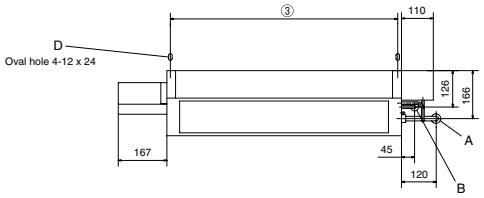


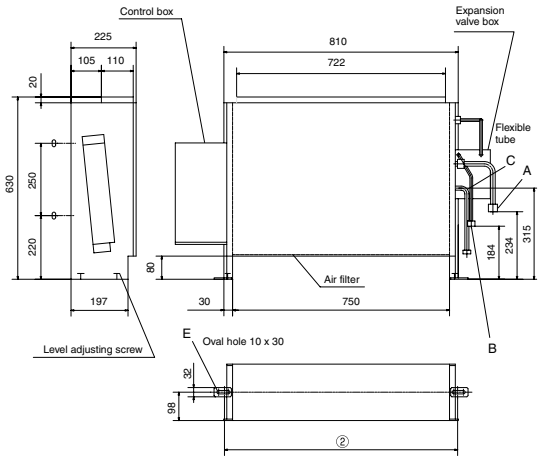
Position of wall installation bolts



UNIT:mm

Model No. \ Item	①	②	③
Type 28,45,56	1,150	806	786
Type 71	1,435	1,091	1,071

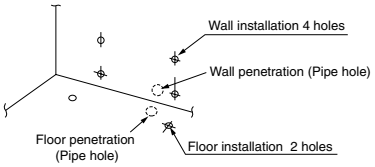




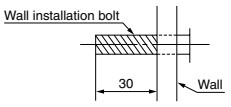
Symbol	Contents
A	Refrigerant gas side piping (provided)
B	Refrigerant liquid side piping
C	Drain piping (provided)
D	Wall installation hole
E	Floor bracket (provided)

④ Installation of indoor unit

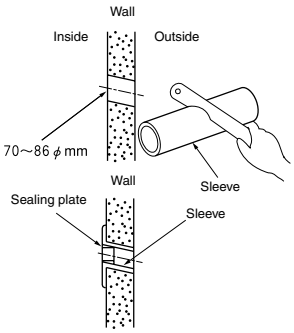
Choose the floor bracket bolt location or the wall installation bolt location, and the location of the pipe hole. Open the holes for the bolts and the pipe.
Choose the positions by the measured values.



Strictly adhere to the following measurements for the wall installation bolts.

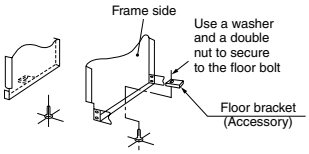


Here is the method to drill the holes on the wall.

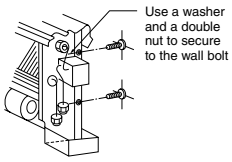


(1) Eliminate looseness with a level adjusting screw.
(2) Firmly secure as instructed below.

Floor installation

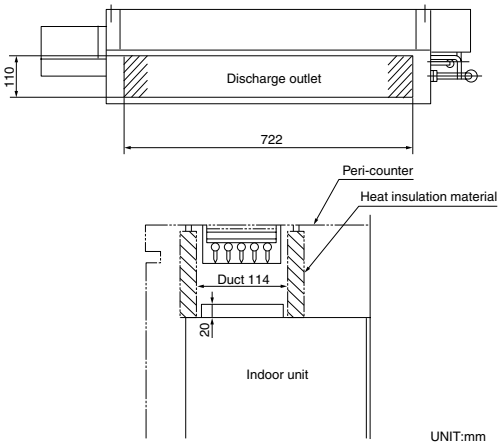


Wall installation



Example of discharge duct installation

○ Heat insulation materials, a discharge grille and a peri-counter are not included in the items supplied with a unit (to be prepared on site)
○ A duct must be installed securely so that cooled air may not leak inside the peri-counter.



⑤ Refrigerant piping

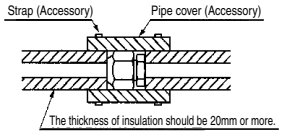
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  ・Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe.
  Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

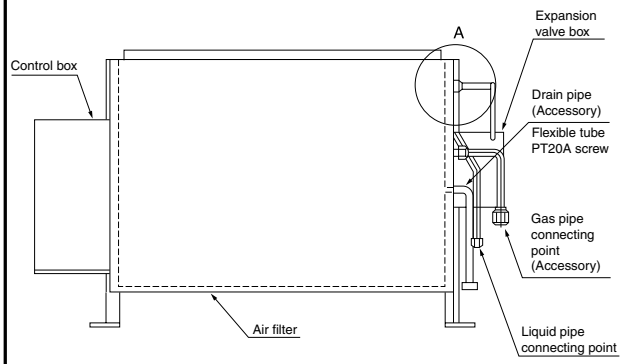
Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit. (The connection of Liquid/Gas side of heat exchange, Inlet/outlet of the expansion valve box) (4 places)
   ※Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ○ Make sure to connect the liquid pipe between the heat exchanger and expansion valuve box (indicated in Section A of the figure).
   ○ Pipes can be take out in 2 directions, from the rear and from the floor.
   ○ Use the provided joint pipes to connect gas pipes. Connect in the direction that the pipe will be removed.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120



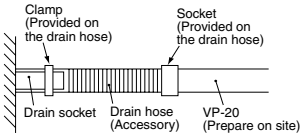
○ There are "System name" and "Refrigerant amount" columns on the name plate of the outdoor unit. Write the system name and the amount of the refrigerant in the columns.



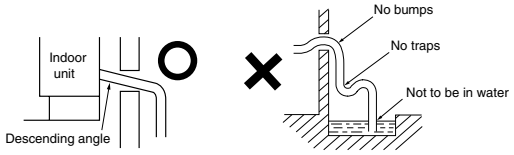
⑥ Drain pipe

Caution

Insert the attached drain hose to the indoor unit completely, tighten the drain hose with the attached clamp and secure it well.(Disapprove of the adhesive joint)



- Install the drain pipe according to the installation manual in order to drain properly. Imperfection in draining may cause flood indoors and wetting the household goods etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/ or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.
- Insert the attached drain hose completely to the base.
- Tighten the drain hose with the strap and secure it well.



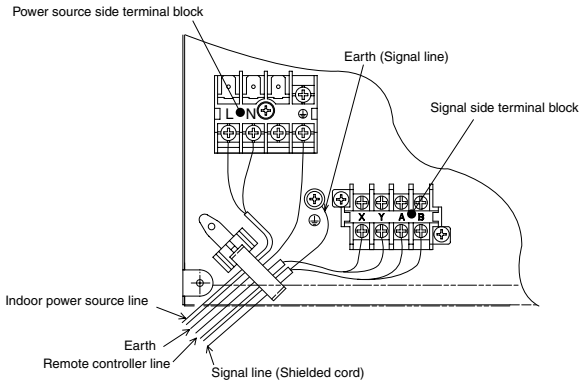
Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
- Do drain test even if installation of heating season.

⑦ Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country. Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.



⑧ Check list after installation

●Check the following items after all installation work completed.

Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

PGD012D006

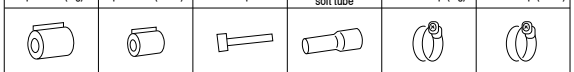
(m) Duct Connected-Compact & Flexible type (FDUH)

PJC012D200 A

①Before installation

●Install correctly according to the installation manual.
●Confirm the following points:
○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

For refrigerant pipe			For drain pipe		
Pipe cover(big)	Pipe cover (small)	Strap	Transparent soft tube	Hose clamp (big)	Hose clamp (small)
					
1	1	4	1	1	1
For heat insulation of gas pipe	For heat insulation of liquid tube	For pipe cover fixing	For drain pipe connecting	For drain hose mounting	For drain hose mounting

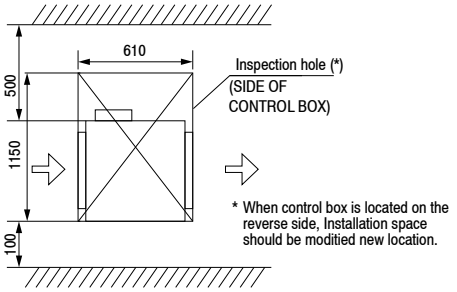
②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

Space for installation and service

●Install the indoor unit at a height of more than 2.5m above the floor.



③Preparation before installation

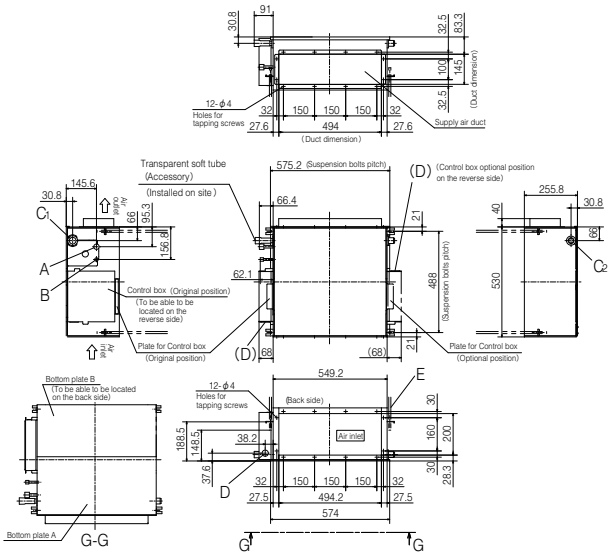
●If suspension bolt becomes longer, do reinforcement of earthquake resistant.
○For grid ceiling
When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
○When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

③Preparation before installation (continued)

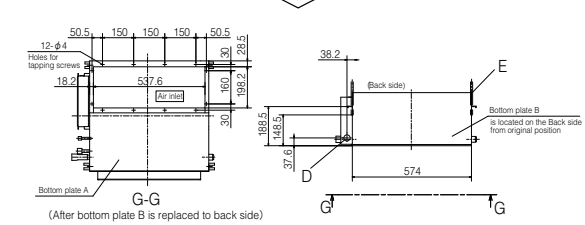
Ceiling opening, Suspension bolts pitch, Pipe position

Symbol	Content		
	Model	FDUH22KXE6,28KXE6	FDUH36KXE6
A	Gas piping	φ9.52(3/8") (Flare)	φ12.7(1/2") (Flare)
B	Liquid piping	φ6.35(1/4") (Flare)	
C_1	Drain piping	VP20 Note(2)	
C_2	Drain piping	To be used instead of "C_1"	
D	Hole for wiring	φ30	
E	Suspension bolts	(M10)	

Notes (1) The model name label is attached on the fan case inside the air return grille.
(2) Prepare the connecting socket(VP20) on site. (As for drain piping, it is possible to choose C_1 or C_2)



<Normal setting>

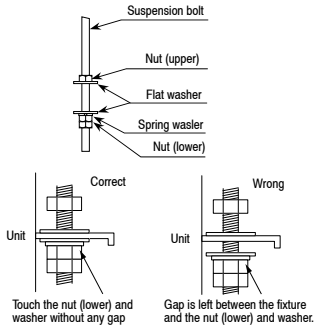


<Bottom Suction setting>

④Installation of indoor unit

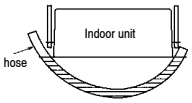
Work procedure

1. Arrange the suspension bolt at the right position (488mm×576mm).
2. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.



④Installation of indoor unit (continued)

3. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
4. Tighten four upper nuts and fix the unit after height and levelness adjustment.

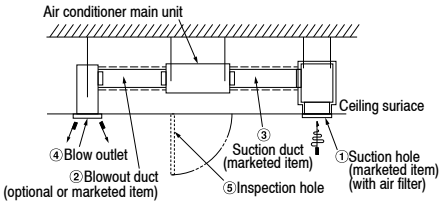


Caution

●Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.

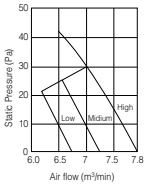
●Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.

⑤Duct work



Request

①●Calculate air capacity and the outside static pressure to select the duct's length and shape, and blow outlet.



Caution

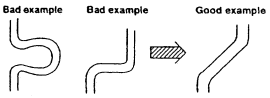
●Take care that the outside static pressure does not exceed 30 Pa. The unit has condensation owing to the decrease in air capacity, possibly causing the ceiling and household goods to become wet.

②The main body of the air conditioner is not provided with an air filter. Assemble it into the suction grill for which cleaning is easy.

③Blow duct

●Make the duct the shortest in length.

●Bend a lot less abruptly. (Make the bend radius a lot larger.)

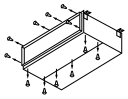


●When connecting the main body to the duct flange of the blow outlet, attach the insulation material to the fixed portion to protect it from condensation.

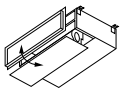
●Conduct the duct work before ceiling attachment.

④ Inlet port

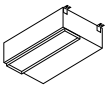
●When placing the inlet port to carry out suction from the bottom side, use the following procedure to replace the suction duct joint (prepare on site) and the bottom plate.



●Remove the screws which fasten the bottom plate and the duct joint (prepare on site) on the inlet port side of the unit.



●Replace the removed bottom plate and duct joint (prepare on site).



●Fit the duct join (prepare on site) with a screw; fit the bottom plate.

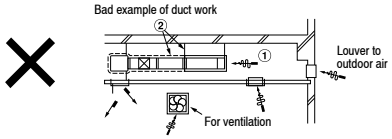
⑤ Make sure to keep the suction duct warm to protect it from condensation.

⑥ Install the blowout hole where air can flow all over the room.

⑦ Make sure to install the inspection opening in the ceiling. It is needed for the maintenance of electrical parts, the motor and other parts.

⑤Duct work (continued)

Example of bad duct work



①If the suction duct is made in the ceiling without using the suction side duct, the temperature inside the ceiling will be high owing to the ventilating fan's performance, the strength of any wind blowing against the outdoor air louver, weather (on a rainy day) and other factors.

●The outside plate of the unit may have condensation, causing water to drip on the ceiling. Also, in the case of a new house of a concrete structure, the temperature may be high without a duct inside the ceiling. In such a case, keep the whole unit warm using glass wool (25mm). (Cover the glass wool with wire netting or the like.)

●The unit may be beyond its operation limit, causing overloading of the compressor, and other trouble.

●Because the blowing capacity of the unit increases, owing to the ventilating fan's performance and any wind blowing against the outdoor air louver, up to its use limit, draining liquid from the heat exchanger does not flow into the drain pan, possibly flowing to the outside and causing water leaks (in which drained liquid drips on the ceiling).

⑥Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

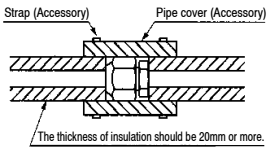
●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   ● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120



⑦Drain pipe

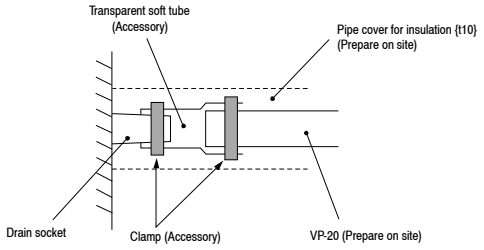
Caution

- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods,etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

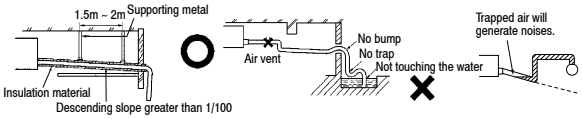
Work procedure

1. Connect the drain pipe (VP-20) to drain socket using "transparent soft tube (accessory)" and secure firmly with a clamp.
   - Do not apply adhesives on both side.

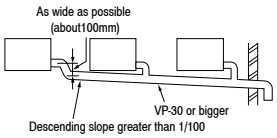
   {*1 If the drain tube is directly connected with drain socket, the drain socket and drain pan would not be able to be removed.}
   {*2 As optional setting, rubber hose (inside diameter ϕ19) can be connected directly with clamp to above drain socket under the later condition.}



2. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



- When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.

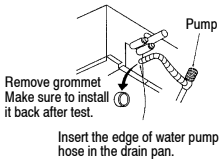


3. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

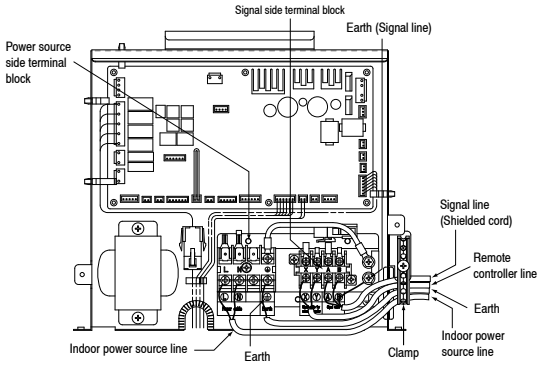
1. Remove the drain grommet, and pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
3. Make sure to install the grommet back to original place.
4. Insulate the drain pipe properly finally.



⑧Wiring-out position and wiring connection

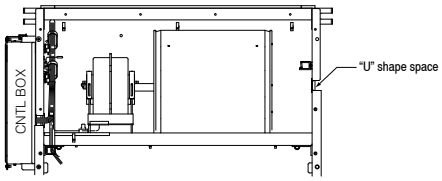
- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.

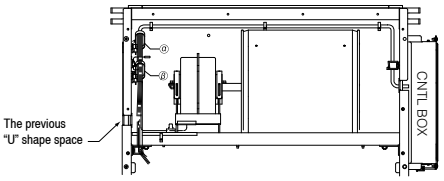


> Procedure for optional setting of control box
(i) Remove bottom plate.
(ii) Unfasten two (2) "straps" for wire.
(iii) Remove the plate for control box. (2 screws), and set it at optional position (oposite side).
(iv) Remove the control box (2 screws), and set it at optional position (oposite side).
(v) Cut insulation of "U" shape space.
Through this cutting, set and fix all wires by four (4) "clamps" and two (2) "straps".
(vi) Close the previous "U" shape wiring space by insulation, and set the bottom plate again.

① Wiring Location (Original)



② Wiring Location (Optional)
After fix ⓐ, the modification of wiring length should be done, by ⓑ



⑨Check list after installation

- Check the following items after all installation work completed.

Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

PJC012D200 A

5.2 Electrlc wiring work instruction

PSB012D922 A

Electrical wiring work must be performed by an electrician qualified by a local power provider according to the electrical installation technical standards and interior wiring regulations applicable to the installation site.

Security instructions

● **Accord with following items. Otherwise, there will be the risks of electric shock and fire caused by overheating or short circuit.**

⚠ WARNING

● **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
Power source with insufficient capacity and improper work can cause electric shock and fire.

● **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
Loose connections or hold could result in abnormal heat generation or fire.

● **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
Improper fitting may cause abnormal heat and fire.

● **Make sure there is no dust or clogging on both the plug and the socket nor loose connection of the socket before plugging, and plug in securely to the end of the blade.**
Accumulation of dust, clogging on the socket or plug, or loose installation of the socket could cause electric shock and fire. Replace the socket if it is loose.

● **Use the genuine optional parts. And installation should be performed by a specialist.**
If you install the unit by yourself, it could cause water leakage, electric shock and fire.

● **Do not repair by yourself. And consult with the dealer about repair.**
Improper repair may cause water leakage, electric shock or fire.

● **Consult the dealer or a specialist about removal of the air conditioner.**
Improper installation may cause water leakage, electric shock or fire.

● **Turn off the power source during servicing or inspection work.**
If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.

● **Shut off the power before electrical wiring work.**
It could cause electric shock, unit failure and improper running.

⚠ CAUTION

● **Perform earth wiring surely.**
Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.

● **Make sure to install earth leakage breaker on power source line. (countermeasure thing to high harmonics.)**
Absence of breaker could cause electric shock.

● **Use the circuit breaker of correct capacity.**
Using the incorrect capacity one could cause the system failure and fire.

● **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
Connecting the circuit by wire or copper wire could cause unit failure and fire.

● **Use power source line of correct capacity.**
Using incorrect capacity one could cause electric leak, abnormal heat generation and fire.

● **Do not mingle solid cord and stranded cord on power source and signal side terminal block.**
In addition, do not mingle difference capacity solid or stranded cord.
Inappropriate cord setting could cause loosing screw on terminal block, bad electrical contact, smoke and fire.

● **Do not turn off the power source immediately after stopping the operation.**
Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.

● **Do not control the operation with the circuit breaker.**
It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

① Electrical Wiring Connection

● Install an over-current and earth leakage breaker (threshold current: 30mA) specified for each unit without fail.
● Provide a dedicated branching circuit and never share a branching circuit with other equipment. If shared, disconnection at the circuit breaker may occur, which can cause secondary damage.
● Set earth of D-type.
● Connection of a cable beyond 3.5 mm² is not permitted. When cables of over 5.5 mm² are in use, provide a dedicated pull box to take a branch to an indoor unit.
● Keep "remote controller line" and "power source line" away from each other on constructing of unit outside.
● Run the lines (power source, remote controller and "between indoor and outdoor unit") upper ceiling through iron pipe or other tube protection to avoid the damage by mouse and so on.
● Do not add cord in the middle of line (of indoor power source, remote controller and signal) route on outside of unit. If connecting point is flooded, it could cause problem as for electric or communication.
(In the case that it is necessary to set connecting point on the signal line way, perform thorough waterproof measurement.)
● Do not connect the power source line [220V/240V/380V/415V] to signal side terminal block. Otherwise, it could cause failure.
● Screw the line to terminal block without any looseness, certainly.
● Do not turn on the switch of power source, before all of line work is done.

① Electrical Wiring Connection (continued)

● **Electrical wiring work must be performed by an electlician an qualified by a local power provider. These wiring specifications are determined on the assumption that the following instructions are observed:**
① Do not use cords other than copper ones.
Do not use any supply line 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);
② Provide a separate power outlet for each outdoor or indoor unit.
③ All indoor units grouped in one system must have power source that can be turned on or off simultaneously.
④ Pay extra attention so as not to confuse signal line and power source line connection, because an error in their connection can be burn all the boards at once.

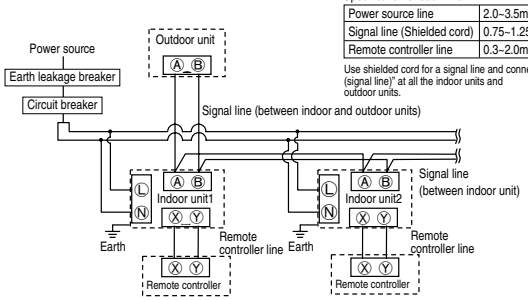
● **Connection of the line ("Between indoor and outdoor unit", Earth and Remote controller)**
① Remove lid of control box before connect the above lines, and connect the lines to terminal block according to number pointed on label of terminal block.
In addition, pay enough attention to confirm the number to lines, because there is electrical polarity except earth line. Furthermore, connect earth line to earth position of terminal block of power source.
② Install earth leakage breaker on power source line. In addition, select the type of breaker for inverter circuit as earth leakage breaker.
③ If the function of selected earth leakage breaker is only for earth-fault protection, hand switch (switch itself and type "B" fuse) or circuit breaker is required in series with the earth leakage breaker.

Cabling system diagram (Outdoor/indoor unit connection procedure)

Specification of each line

Power source line	2.0~3.5mm²
Signal line (Shielded cord)	0.75~1.25mm²
Remote controller line	0.3~2.0mm²

Use shielded cord for a signal line and connect "earth (signal line)" at all the indoor units and outdoor units.



Power source line specification

Wiring specification

Unit type	Earth leakage breaker	Circuit breaker		Wiring size				
		Switch breaker	Over-current protector rated capacity	Power source line	Wire length	Signal line	Remote controller line	Earth line
22-36	15A 30mA 0.1sec	30A	15A	2.0mm² x2	304m	0.75~1.25mm²x2	0.3mm² x2cores	2.0mm²
45-90					216m			
112-160					129m			
In case of Duct connected -High static pressure- type								
71-140	15A 30mA 0.1sec	30A	15A	2.0mm² x2	87m	0.75~1.25mm²x2	0.3mm² x2cores	2.0mm²
224,280					48m			

Note (1) The cord distances are calculated with a voltage drop of 2%. If the distance should exceed the above data, review the cord thickness to use in accordance with your extension cord regulations.
(2) When total extension of remote controller line is more than 100m, change the size of cord according to "③ Remote Control, Wiring and functions".

In case of Heat recovery 3-pipe systems

Branching controller of heat recovery 3-pipe systems wiring

● When this unit is used as a "Heat Recovery 3-pipe Systems", refer to the installation manual of a branching controller (option).

② Address setting

Address setting is done by (1) Manual address setting or (2) Automatic address setting.
In the case of (2) "Automatic address setting", it is possible to change address setting by wired remote controller after once complete setting.
As for details of setting procedure, refer to instructions attached to the outdoor unit for details.

③ Remote Control, Wiring and functions

● Do not install it on the following places.
(1) Place exposed to direct sunlight
(2) Places near heat devices
(3) High humidity places
(4) Hot surface or cold surface enough to generate condensation
(5) Place exposed to oil mist or steam directly.
(6) Uneven surface

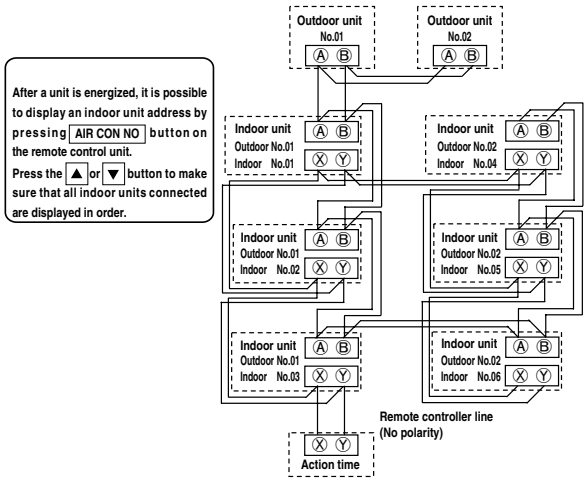
Installation and wiring of remote controller

① Install remote controller referring to the attached manual.
② Wiring of remote controller should use 0.3mm² x2 core wires or cables. (on-site configuration)
③ Maximum prolongation of remote control wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm². Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.
100-200m ..... 0.5mm²x2 core
Under 300m ..... 0.75mm² × 2 core
Under 400m ..... 1.25mm² × 2 core
Under 500m ..... 2.0mm² × 2 core
④ Avoid using multi-core cables to prevent malfunction.
⑤ Keep remote controller line away from earth (frame or any metal of building).
⑥ Make sure to connect remote controller line to the remote controller and terminal block of indoor unit. (No polarity)

③ Remote Control, Wiring and functions (continued)

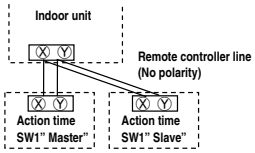
Control plural indoor units by a single remote controller

① A remote controller can control plural indoor units (up to 16)
In above setting, all plural indoor units will operate under same mode and temperature setting.
② Connect all indoor units with 2 core remote controller line for group control.
③ Use the function of manual address setting to set the indoor and outdoor address number.
○Do not forget to set the number for the outdoor units.
④ As shown in the following figure, the remote control can be used to control multiple outdoor units.
⑤ One remote control is able to perform group control for multiple units (maximum 16 units).
○Use the rotary SW1 and SW2 provided on the indoor unit PCB (Printed circuit board) to set unique remote control communication address avoiding duplication.



Confirming method of indoor units

When indoor unit address number is displayed on remote controller, pushing the (MODE) button to make the indoor unit with that number blow air (Display example:"I/U001 ≋ ").
Push the (MODE) button again to stop the operation.
However, this operation is invalid on the air-conditioning running.



Switch	Setting	Contents
Wired remote controller: SW1 Wireless kit: SW1-2	Master	Master remote controller
	Slave	Slave remote controller

Master/slave setting when more than one remote control unit are used

A maximum of two remote control units can be connected to one indoor unit (or one group of indoor units.)
Latest "function setting" is superior than previous one.
Acceptable combination is "two (2) wired remote controllers", "one (1) wired remote controller and one (1) wireless kit" or "two (2) wireless kits".
Set SW1 to "Slave" for the slave remote control unit. It was factory set to "Master" for shipment.
Note:The setting "Remote control unit sensor enabled" is only selectable with the master remote control unit in the position where you want to check room temperature.

④ Trial operation

The method of trial cooling operation

Operate the remote control unit as follows.
1. Starting a cooling test run.
①Start the system by pressing the ON/OFF button.
②Select " ❄ (Cool)" with the (MODE) button.
③Press the TEST button for 3 seconds or longer.
The screen display will switch to: "❄ TEST RUN ▼ "
④When the (SET) button is pressed while " ❄ TEST RUN ▼ " is indicated, a cooling test run will start.
The screen display will switch to " ❄ TEST RUN ".
2. Ending a cooling test run.
Pressing the ON/OFF button, the (TEMP) button or (MODE) button will end a cooling test run. (Cooling test run will end after 30 minutes pass.)
" ❄ TEST RUN " shown on the screen will go off.

④ Trial operation (continued)

Checking operation data

Operation data can be checked with remote control unit operation.
1. Press the CHECK button.
The display change " OPER DATA ▼ "
2. Press the (SET) button while " OPER DATA ▼ " is displayed.
3. When only one indoor unit is connected to remote controller, " DATA LOADING " is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step 7.
4. When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
[Example]:
" SELECT I/U" (blinking 1 seconds) → " I/U000 ▲ " blinking.
5. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
6. Determine the indoor unit number with the (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
" I/U000" (The address of selected indoor unit is blinking for 2 seconds.)
↓
" DATA LOADING " (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.
7. Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 01.
The items displayed are in the following table.
※Depending on models, the items that do not have corresponding data are not displayed.
8. To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.
9. Pressing the ON/OFF button will stop displaying data.
Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.
◎If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

Number		Data Item
01	❄	(Operation Mode)
02	SET TEMP___℃	(Set Temperature)
03	RETURN AIR___℃	(Return Air Temperature)
04	SENSOR___℃	(Remote Controller Thermistor Temperature)
05	THI-R1___℃	(Indoor Unit Heat Exchanger Thermistor / U Bend)
06	THI-R2___℃	(Indoor Unit Heat Exchanger Thermistor /Capillary)
07	THI-R3___℃	(Indoor Unit Heat Exchanger Thermistor /Gas Header)
08	I/U FANSPEED___	(Indoor Unit Fan Speed)
09	DEMAND___Hz	(Frequency Requirements)
10	ANSWER___Hz	(Response Frequency)
11	I/U EEV___P	(Pulse of Indoor Unit Expansion Valve)
12	TOTAL I/U RUN___H	(Total Running Hours of The Indoor Unit)
21	OUTDOOR___℃	(Outdoor Air Temperature)
22	THO-R1___℃	(Outdoor Unit Heat Exchanger Thermistor)
23	THO-R2___℃	(Outdoor Unit Heat Exchanger Thermistor)
24	COMP___Hz	(Compressor Frequency)
25	HP___MPa	(High Pressure)
26	LP___MPa	(Low Pressure)
27	Td___℃	(Discharge Pipe Temperature)
28	COMP BOTTOM___℃	(Comp Bottom Temperature)
29	CT___AMP	(Current)
34	O/U FANSPEED___	(Outdoor Unit Fan Speed)
35	63H1	(63H1 On/Off)
36	DEFROST	(Defrost Control On/Off)
37	TOTAL COMP RUN___H	(Total Running Hours of The Compressor)
38	O/U EEV1___P	(Pulse of The Outdoor Unit Expansion Valve EEVC)
39	O/U EEV2___P	(Pulse of The Outdoor Unit Expansion Valve EEVH)

Trail operation of drain pump

Drain pump operation from remote control unit is possible. Operate a remote control unit by following the steps described below.
1. To start a forced drain pump operation.
①Press the TEST button for three seconds or longer.
The display will change " ❄ TEST RUN ▼ "
②Press the ▼ button once and cause " DRAIN PUMP ⇕ " to be displayed.
③When the (SET) button is pressed, a drain pump operation will start.
Display: " TO STOP "
2. To cancel a drain pump operation.
①If either (SET) or ON/OFF button is pressed, a forced drain pump operation will stop. The air conditioning system will become OFF.

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

*

⑤ Function Setting by Remote Controller

The functional setting.

- The initial function setting for typical using is performed automatically by the indoor unit connected, when remote controller and indoor unit are connected.
  As long as they are used in a typical manner, there wiil be no need to change the initial settings.
  If you would like to change the initial setting marked "○" , set your desired setting as for the selected item.
  The procedure of functional setting is shown as the following diagram.

[Flow of function setting]

Start : Stop air-conditioner and press "○" (SET) and "☼" (MODE) buttons at the same time for over three seconds.
Finalize : Press "○" (SET) button.
Reset : Press "⌀" (RESET) button.
Select : Press ▲ ▼ button.
End : Press ON/OFF button.
It is possible to finish above setting on the way, and unfinished change of setting is unavailable.

Record and keep the setting

Note 1: The initial setting marked ※is decided by connected indoor and outdoor unit, and is automatically defined as following table.

Function No.	Item	Default	Model
Remote controller function02	AUTO RUN SET	AUTO RUN ON	"Auto-RUN" mode selectable indoor unit.
		AUTO RUN OFF	Indoor unit without "Auto-RUN" mode
Remote controller function06	FAN SPEED SW	VALID	Indoor unit with two or three step of air flow setting
		INVALID	Indoor unit with only one of air flow setting
Remote controller function07	LOUVER SW	VALID	Indoor unit with automatically swing louver
		INVALID	Indoor unit without automatically swing louver
Remote controller function13	I/U FAN	HI-MID-LO	Indoor unit with three step of air flow setting
		HI-LO	Indoor unit with two step of air flow setting
		HI-MID	
		1 FAN SPEED	Indoor unit with only one of air flow setting
Remote controller function15	MODEL TYPE	HEAT PUMP	Heat pump unit
		COOLING ONLY	Exclusive cooling unit

⑤ Function Setting by Remote Controller (continued)

(i) Remote controller function

"○" : Initial settings
"※" : Automatic criterion

Stop air-conditioner and press (SET) + (MODE) buttons at the same time for over three seconds.

FUNCTION SET

FUNCTION

Function	setting		
01 GRILLE ↑↓ SET			When you use at 50Hz area
	↑↓ INVALID	○	
	50Hz ZONE ONLY		When you use at 50Hz area
	60Hz ZONE ONLY		When you use at 60Hz area
02 AUTO RUN SET			
	AUTO RUN ON	※	
	AUTO RUN OFF	※	Automatical operation is impossible
03 TEMP SW			
	VALID	○	
	INVALID		Temperature setting button is not working
04 MODE SW			
	VALID	○	
	INVALID		Mode button is not working
05 ON/OFF SW			
	VALID	○	
	INVALID		On/Off button is not working
06 FAN SPEED SW			
	VALID	※	
	INVALID	※	Fan speed button is not working
07 LOUVER SW			
	VALID	※	
	INVALID	※	Louver button is not working
08 TIMER SW			
	VALID	○	
	INVALID		Timer button is not working
09 SENSOR SET			
	SENSOR OFF	○	Remote thermistor is not working.
	SENSOR ON		Remote thermistor is working.
	SENSOR +3.0℃		Remote thermistor is working, and to be set for producing +3.0 C increase in temperature.
	SENSOR +2.0℃		Remote thermistor is working, and to be set for producing +2.0 C increase in temperature.
	SENSOR +1.0℃		Remote thermistor is working, and to be set for producing +1.0 C increase in temperature.
	SENSOR -1.0℃		Remote thermistor is working, and to be set for producing -1.0 C increase in temperature.
	SENSOR -2.0℃		Remote thermistor is working, and to be set for producing -2.0 C increase in temperature.
	SENSOR -3.0℃		Remote thermistor is working, and to be set for producing -3.0 C increase in temperature.
10 AUTO RESTART			
	INVALID	○	
	VALID		
11 VENT LINK SET			
	NO VENT	○	
	VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit.
	NO VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), you can operate /stop the ventilation device independently by (VENT) button.
12 TEMP RANGE SET			
	INDN CHANGE	○	If you change the range of set temperature, the indication of set temperature will vary following the control.
	NO INDN CHANGE		If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature.
13 I/U FAN			
	HI-MID-LO	※	Airflow of fan becomes the three speed of - - .
	HI-LO	※	Airflow of fan becomes the two speed of - .
	HI-MID		Airflow of fan becomes the two speed of - .
	1 FAN SPEED	※	Airflow of fan is fixed at one speed.
14 POSITION			If you change the remote controller function "14 POSITION ", you must change the indoor function "04 POSITION" accordingly.
	4POSITION STOP	○	You can select the louver stop position in the four.
	FREE STOP		The louver can stop at any position.
15 MODEL TYPE			
	HEAT PUMP	※	
	COOLING ONLY	※	
16 EXTERNAL CONTROL SET			
	INDIVIDUAL	○	If you input signal into CNT of the indoor printed circuit board from external, the indoor unit will be operated independently according to the input from external.
	FOR ALL UNITS		If you input into CNT of the indoor printed circuit board from external, all units which connect to the same remote controller are operated according to the input from external.
17 ROOM TEMP INDICATION SET			
	INDICATION OFF	○	
	INDICATION ON		In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote controller can be indicated.)
18 INDICATION			
	INDICATION ON	○	
	INDICATION OFF		Heating preparation indication should not be indicated.
19 ℃/℉ SET			
	℃	○	Temperature indication is by degree C
	℉		Temperature indication is by degree F

ON/OFF button (finished)

⑤ Function Setting by Remote Controller (continued)

(ii) Indoor unit function

"○" : Initial settings
"※" : Automatic criterion

Stop air-conditioner and press (SET) + (MODE) buttons at the same time for over three seconds.

FUNCTION SET ▼

I/U FUNCTION ▲

Indoor unit No. are indicated only when plural indoor units are connected.

I/U000 ▲
I/U001
I/U002
I/U003
I/U004

To set other indoor unit, press AIRCON NO. button, which allows you to go back to the indoor unit selection screen (for example: I/U 000 ▲).

Function	setting		
02 FAN SPEED SET	STANDARD	※	
	HIGH SPEED 1	※	
	HIGH SPEED 2		
03 FILTER SIGN SET	INDICATION OFF		
	TYPE 1	○	The filter sign is indicated after running for 180 hours.
	TYPE 2		The filter sign is indicated after running for 600 hours.
	TYPE 3		The filter sign is indicated after running for 1000 hours.
	TYPE 4		The filter sign is indicated after running for 1000 hours, then the indoor unit will be stopped by compulsion after 24 hours.
04 POSITION			If you change the indoor function "04 POSITION", you must change the remote controller function "14 POSITION" accordingly.
	4POSITION STOP	○	You can select the louver stop position in the four.
	FREE STOP		The louver can stop at any position.
05 EXTERNAL INPUT			
	LEVEL INPUT	○	
	PULSE INPUT		
06 OPERATION PERMISSION/PROHIBITION			
	INVALID	○	
	VALID		Permission/prohibition control of operation will be valid.
07 EMERGENCY STOP			
	INVALID	○	
	VALID		With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately. When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately.
08 ※SP OFFSET	OFFSET +3.0℃		To be reset for producing +3.0 C increase in temperature during heating.
	OFFSET +2.0℃		To be reset for producing +2.0 C increase in temperature during heating.
	OFFSET +1.0℃		To be reset for producing +1.0 C increase in temperature during heating.
	NO OFFSET	○	
09 RETURN AIR TEMP	OFFSET +2.0℃		To be reset producing +2.0 C increase in return air temperature of indoor unit.
	OFFSET +1.5℃		To be reset producing +1.5 C increase in return air temperature of indoor unit.
	OFFSET +1.0℃		To be reset producing +1.0 C increase in return air temperature of indoor unit.
	NO OFFSET	○	
	OFFSET -1.0℃		To be reset producing -1.0 C increase in return air temperature of indoor unit.
	OFFSET -1.5℃		To be reset producing -1.5 C increase in return air temperature of indoor unit.
	OFFSET -2.0℃		To be reset producing -2.0 C increase in return air temperature of indoor unit.
10 ※FAN CONTROL			
	LOW FAN SPEED	○	When heating thermostat is OFF, fan speed is low speed.
	SET FAN SPEED		When heating thermostat is OFF, fan speed is set speed.
	INTERMITTENCE		When heating thermostat is OFF, fan speed is operated intermittently.
	FAN OFF		When heating thermostat is OFF, the fan is stopped. When the remote thermistor is working, "FAN OFF" is set automatically. Do not set "FAN OFF" when the indoor unit's thermistor is working.
11 FROST PREVENTION TEMP			Change of indoor heat exchanger temperature to start frost prevention control.
	TEMP HIGH		
	TEMP LOW	○	
12 FROST PREVENTION CONTROL			Working only with the Single split series.
	FAN CONTROL ON	○	To control frost prevention, the indoor fan tap is raised.
	FAN CONTROL OFF		
13 DRAIN PUMP LINK			
	❄💧	○	Drain pump is run during cooling and dry.
	❄💧 AND ※		Drain pump is run during cooling, dry and heating.
	❄💧 AND ※ AND ≋		Drain pump is run during cooling, dry, heating and fan.
	❄💧 AND ≋		Drain pump is run during cooling, dry and fan.
14 ❄FAN REMAINING			
	NO REMAINING	○	After cooling is stopped or cooling thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for half an hour.
	1 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for an hour.
	6 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for six hours.
15 ※FAN REMAINING			
	NO REMAINING	○	After heating is stopped or heating thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for half an hour.
	2 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for two hours.
	6 HOUR		After heating is stopped or heating thermostat is OFF, the fan perform extra operation for six hours.
16 ※FAN INTERMITTENCE			
	NO REMAINING	○	
	20minOFF 5minON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after twenty minutes' OFF.
	5minOFF 5minON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after five minutes' OFF.

Note1: Fan setting of "HIGH SPEED"

Fan tap		Indoor unit air flow setting		
		❄▂▃▅▆ — ❄▂▃▅▆ — ❄▂▃▅▆	❄▂▃▅▆ — ❄▂▃▅▆	❄▂▃▅▆ — ❄▂▃▅▆
FAN SPEED SET	STANDARD	HI-MID-LO	HI-LO	HI-MID
	HIGH SPEED1, 2	UHI-HI-MID	UHI-MID	UHI-HI

Initial function setting of some indoor unit is "HIGH SPEED".

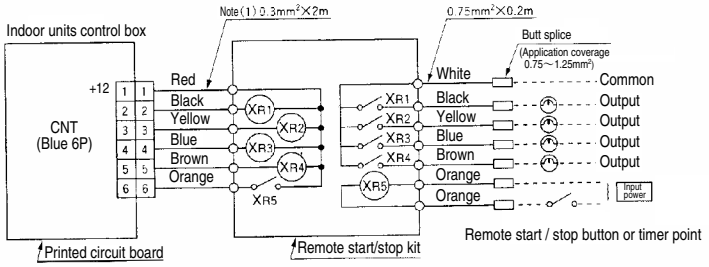
ON/OFF button (finished)

⑥ Control mode switching

●The control content of indoor units can be switched in following way. (☐ is the default setting)

Switch No.	control content	
SW1	Indoor unit address (tens place)	
SW2	Indoor unit address (ones place)	
SW3	Outdoor unit address (tens place)	
SW4	Outdoor unit address (ones place)	
SW5－1	ON	Fixed previous version of Super Link protocol
	OFF	Automatic adjustment of Super Link protocol
SW5－2	Indoor unit address (hundreds place)	
SW6－1 ~ 4	Model capacity setting	
SW7－1	ON	Operation check, Drain motor test run
	OFF	Normal operation

⑦ Function of CNT connector of indoor printed circuit board



Note (1): Do not use the length over 2 meter

●CNT connector (local) vendor model
Connector : Made by molex 5264-06
Terminals : Made by molex 5263 T

●Function

Output 1:	Operation output (there is output when unit is in operation.)		
Output 2:	Heating output (there is output when operation MODE is HEATING.)		
Output 3:	Thermo ON output		
Output 4:	Inspection output (there is out put when unit is stopped by error.)		
Input 5:	Factory set	X_{R5} OFF ⇒ ON	UNIT ON
		X_{R5} ON ⇒ OFF	UNIT OFF
	Local set	X_{R5} OFF ⇔ ON	Receiving pulse signal, "ON/OFF" is reversed.

Refer to instruction manuals of "Branching controller", when the indoor unit is connected to "Heat recovery 3-pipe systems".

⑧Troubleshooting

The operation data is saved when the situation of abnormal operation happen, and the data can be confirmed by remote controller.

[Operating procedure]

1. Press the CHECK button.
   The display change "OPER DATA ▼"
2. Once, press the ▼ button, and the display change "ERROR DATA ▲".
3. Press the (SET) button and abnormal operation data mode is started.
4. When only one indoor unit is connected to remote controller, following is displayed.
   ①The case that there is history of abnormal operation.
   → Error code and "DATA LOADING" is displayed.
   [Example]: [E8] (ERROR CODE)
   "DATA LOADING" is displayed (blinking indication during data loading).
   Next, the abnormal operation data of the indoor unit will be displayed.
   Skip to step 7.
   ②The case that there is not history of abnormal operation.
   → "NO ERROR" is displayed for 3 seconds and this mode is closed.
5. When plural indoor units is connected, following is displayed.
   ①The case that there is history of abnormal operation.
   → Error code and the smallest address number of indoor unit among all connected indoor unit is displayed.
   [Example]: [E8] (ERROR CODE)
   "I/U000 ▲" blinking
   ②The case that there is not history of abnormal operation.
   → Only address number is displayed.
6. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
7. Determine the indoor unit number with the (SET) button.
   [Example]: [E8] (ERROR CODE)
   "I/U000 ▲" (The address of selected indoor unit is blinking for 2 seconds.)
   ↓
   [E8] "DATA LOADING" (A blinking indication appears while data loaded.)
   Next, the abnormal operation data is indicated.
   If the indoor unit doing normal operation is selected, "NO ERROR" is displayed for 3 seconds and address of indoor unit is displayed.
8. By the ▲ ▼ button, the abnormal operation data is displayed.
   Displayed data item is based on ④ Trial operation .
   ※Depending on models, the items that do not have corresponding data are not displayed.
9. To display the data of a different indoor unit, press the AIR CON No. button, which allows you to go back to the indoor unit slection screen.
10. Pressing the ⏻ON/OFF button will stop displaying data.

Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

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

Error code of indoor unit

Display on remote controller	LED on indoor circuit board		Content		
	red (checking)	green (normal)			
Off	Off	Continuous blinking	Normal		
	Off	Off	Fault on power, indoor power off or lack phase		
E1	Off	Continuous blinking	Fault on the transmission between indoor circuit board and remote control		
	Not sure	Not sure	Indoor computer abnormal		
E2	blinking once	Continuous blinking	Duplication of indoor address No. (can only be detected during operation) Excess number of remote controllers (can only be detected during operation)		
E3	blinking twice	Continuous blinking	Outdoor power off or lack phase There is no corresponding outdoor unit address.		
E5	blinking twice	Continuous blinking	Fault on outdoor-indoor transmission		
E6	blinking once	Continuous blinking	Indoor heat exchange sensor interrupted or short-circuit		
E7	blinking once	Continuous blinking	Indoor air inhaling sensor broken or short-circuit		
E9	blinking once	Continuous blinking	Float SW actions (only with FS)		
E10	Off	Continuous blinking	Excess number of remote controller connections		
E11	Off	Continuous blinking	The master indoor unit is not set properly.		
E12	blinking once	Continuous blinking	Super link	Indoor unit address SW	
				Indoor No.	Outdoor No.
			New specification	001～127	49
			Old specification	0～47	48，49
				48，49	0～47
E16	blinking once	Continuous blinking	Fan motor abnormal		
E18	blinking once	Continuous blinking	The address configuration fault for master-slave indoor units.		
E19	blinking once	Continuous blinking	Configuration fault on running checking model		
E28	Off	Continuous blinking	Remote controller sensor interrupted		
Over E30	Off	Continuous blinking	Outdoor unit checking (outdoor circuit board LED checking)		
E63	Off	Continuous blinking	Emergency stop.		

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5.3 Installation manual for wired remote controller (Option parts)

Read together with indoor unit's installation manual.

⚠WARNING

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work.
  Otherwise, electric shock, malfunction and improper running may occur.

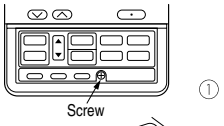
⚠CAUTION

- DO NOT install the remote controller at the following places in order to avoid malfunction.
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- DO NOT leave the remote controller without the upper case.
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

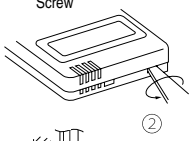
Accessories	Remote controller, wood screw (Φ3.5×16) 2 pieces
Prepare on site	Remote controller cord (2 cores) [In case of embedding cord] Erectrical box, M4 screw (2 pieces) [In case of exposing cord] Cord clamp (if needed)

Installation procedure

① Open the cover of remote controller , and remove the screw under the buttons without fail.

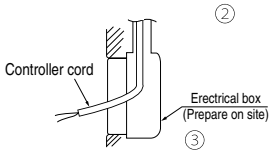


② Remove the upper case of remote controller.
Insert a flat-blade screwdriver into the dented part of the upper part of the remote controller, and wrench slightly.

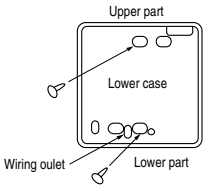


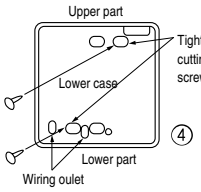
[In case of embedding cord]

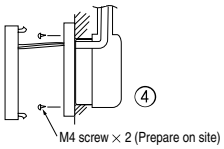
③ Embed the erectrical box and remote controller cord beforehand.



④ Prepare two M4 screws (recommended length is 12-16mm) on site, and install the lower case to erectrical box.
Choose either of the following two positions in fixing it with screws.

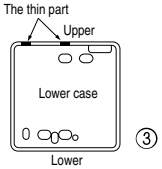






⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y). (X and Y are no polarity)

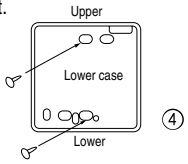
⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.



[In case of exposing cord]

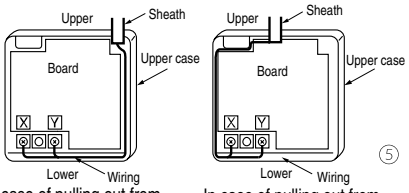
③ You can pull out the remote controller cord from left upper part or center upper part.
Cut off the upper thin part of remote controller lower case with a nipper or knife, and grind burrs with a file etc.

④ Install the lower case to the flat wall with attached two wooden screws.



PJA012D728A Ⓒ

⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y).
(X and Y are no polarity)
Wiring route is as shown in the right diagram depending on the pulling out direction.

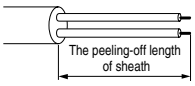


In case of pulling out from upper left

In case of pulling out from upper center

The wiring inside the remote controller case should be within 0.3mm^2 (recommended) to 0.5mm^2.
The sheath should be peeled off inside the remote controller case.
The peeling-off length of each wire is as below.

Pulling out from upper left	Pulling out from upper center
X wiring : 215mm Y wiring : 195mm	X wiring : 170mm Y wiring : 190mm



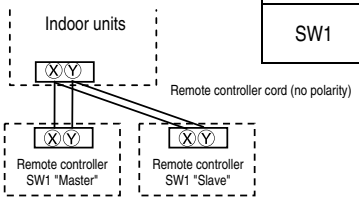
⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.
⑦ In case of exposing cord, fix the cord on the wall with cord clamp so as not to slack.

Installation and wiring of remote controller

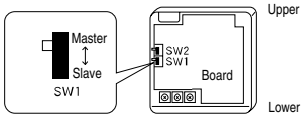
① Wiring of remote controller should use 0.3mm^2 × 2 core wires or cables. (on-site configuration)
② Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm^2 . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.
100 - 200m·····0.5mm^2 × 2 cores
Under 300m·····0.75mm^2 × 2 cores
Under 400m·····1.25mm^2 × 2 cores
Under 600m·····2.0mm^2 × 2 cores

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

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



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

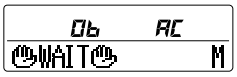


Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.
Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

The indication when power source is supplied

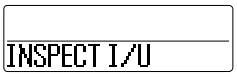
When power source is turned on, the following is displayed on the remote controller until the communication between the remote controller and indoor unit settled.
Master remote controller : "☺WAIT☺ M"
Slave remote controller : "☺WAIT☺ S"

At the same time, a mark or a number will be displayed for two seconds first.
This is the software's administration number of the remote controller, not an error cord.



※ The left mark is only an example. Other marks may appear.

When remote controller cannot communicate with the indoor unit for half an hour, the below indication will appear.
Check wiring of the indoor unit and the outdoor unit etc.



The range of temperature setting

When shipped, the range of set temperature differs depending on the operation mode as below.

Heating : 16~30°C (55~86°F)

Except heating (cooling, fan, dry, automatic) : 18~30°C (62~86°F)

●Upper limit and lower limit of set temperature can be changed with remote controller.

Upper limit setting: valid during heating operation. Possible to set in the range of 20 to 30°C (68 to 86°F).

Lower limit setting: valid except heating (automatic, cooling, fan, dry) Possible to set in the range of 18 to 26°C (62 to 79°F).

When you set upper and lower limit by this function, control as below.

1. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "INDN CHANGE" (factory setting),

   【If upper limit value is set】

   During heating, you cannot set the value exceeding the upper limit.

   【If lower limit value is set】

   During operation mode except heating, you cannot set the value below the lower limit.

2. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "NO INDN CHANGE"

   【If upper limit value is set】

   During heating, even if the value exceeding the upper limit is set, upper limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.

   【If lower limit value is set】

   During except heating, even if the value lower than the lower limit is set, lower limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.

●How to set upper and lower limit value

1. Stop the air-conditioner, and press (SET) and (MODE) button at the same time for over three seconds .

   The indication changes to "FUNCTION SET ▼".
2. Press ▼ button once, and change to the "TEMP RANGE▲ " indication.
3. Press (SET) button, and enter the temperature range setting mode.
4. Select "UPPER LIMIT ▼" or "LOWER LIMIT ▲" by using ▲ ▼ button.
5. Press (SET) button to fix.
6. When "UPPER LIMIT ▼" is selected (valid during heating)

   ① Indication: "☝ ∨ ∧ SET UP" → "UPPER 30°C ∨"

   ② Select the upper limit value with temperature setting button ∨ ∧. Indication example: "UPPER 26°C ∨ ∧" (blinking)

   ③ Press (SET) button to fix. Indication example: "UPPER 26°C" (Displayed for two seconds)

   After the fixed upper limit value displayed for two seconds, the indication will return to "UPPER LIMIT ▼".
7. When "LOWER LIMIT ▲" is selected (valid during cooling, dry, fan, automatic)

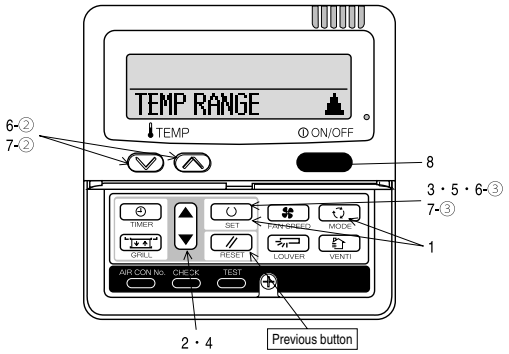
   ① Indication: "☝ ∨ ∧ SET UP" → "LOWER 18°C ∧"

   ② Select the lower limit value with temperature setting button ∨ ∧. Indication example: "LOWER 24°C ∨ ∧" (blinking)

   ③ Press (SET) button to fix. Indication for example: "LOWER 24°C" (Displayed for two seconds)

   After the fixed lower limit value displayed for two seconds, the indication will return to "LOWER LIMIT ▼".
8. Press ON/OFF button to finish.

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.



The functional setting

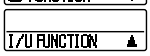
Refer to page 180

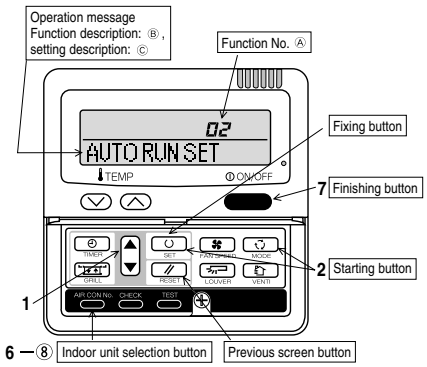
How to set function

1. **Stop air-conditioner and press (SET) (MODE) buttons at the same time for over three seconds, and the "FUNCTION SET ▼" will be displayed.**

2. **Press (SET) button.**
3. **Make sure which do you want to set, "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).**
4. **Press ▲ or ▼ button.**
   Selecct "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).

5. **Press (SET) button.**

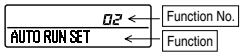




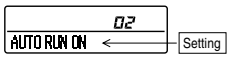
6. **【On the occasion of remote controller function selection】**

① "DATA LOADING" (Indication with blinking)
↓
Display is changed to "01 GRILLE ↑↓SET".

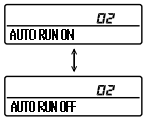
② Press ▲ or ▼ button.
"No. and function"are indicated by turns on the remote controller function table, then you can select from them.
(For example)



③ Press (SET) button.
The current setting of selected function is indicated.
(for example) "AUTO RUN ON" ← If "02 AUTO RUN SET" is selected



④ Press ▲ or ▼ button.
Select the setting.



⑤ Press (SET)
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, Set as the same procedure if you want to set continuously ,and if to finish, go to 7.

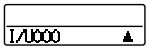
7. **Press ON/OFF button.**
   Setting is finished.

【On the occasion of indoor unit function selection】

① "DATA LOADING" (Blinking for 2 to 23 seconds to read the data)
↓
Indication is changed to "01 AUTO FILTER CLEANING".
Go to ②.

[Note]

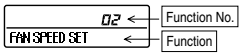
(1) If plural indoor units are connected to a remote controller, the indication is "I/U 000" (blinking) ← The lowest number of the indoor unit connected is indicated.



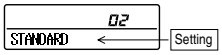
(2) Press ▲ or ▼ button.
Select the number of the indoor unit you are to set
If you select "ALL UNIT ▼", you can set the same setting with all unites.

(3) Press (SET) button.

② Press ▲ or ▼ button.
"No. and function" are indicated by turns on the indoor unit function table, then you can select from them.
(For example)



③ Press (SET) button.
The current setting of selected function is indicated.
(For example) "STANDARD" ← If "02 FAN SPEED SET" is selected.



④ Press ▲ or ▼ button.
Select the setting.

⑤ Press (SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, set as the same procedure if you want to set continuously , and if to finish, go to 7.

※ When plural indoor units are connected to a remote controller, press the AIRCON NO. button, which allows you to go back to the indoor unit selection screen. (example "I/U 000 ▲")

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.
- Setting is memorized in the controller and it is saved independently of power failure.

【How to check the current setting】

When you select from "No. and funcion" and press set button by the previous operation, the "Setting" displayed first is the current setting.
(But, if you select "ALL UNIT ▼", the setting of the lowest number indoor unit is displayed.)

5.4 Installation of outdoor unit

KX SERIES INSTALLATION MANUAL

Designed for R410A refrigerant

PSB012D942C

Outdoor unit capacity
FDC400-1360

◎This installation manual deals with outdoor 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 EN61000-3-11.
- For outdoor unit, EN61000-3-2 and EN61000-3-12 are not applicable as consent by the utility company or notification to the utility company is given before usage.

⚠WARNING

- Carry out installation work properly according to this installation manual.
  Improper installation work can result in a water leak, an electric shock, a fire, or injury from a fall of the unit.
- Ask your dealer or a specialized service provider to install the unit.
  Improper installation work performed on the part of a user can result in a water leak, an electric shock, a fire or injury from a fall of the unit.
- Always turn off power before you work inside the unit such as for installation or servicing.
  A failure to observe this instruction can result in an electric shock.
- When an indoor unit is installed in a small room, it is necessary to take some safety precaution to keep refrigerant gas from building up beyond the upper limit concentration even if it leaks in the room. For safety precautions to prevent a concentration build-up beyond the upper limit, please consult with the dealer.
  If refrigerant leaks and its concentration builds up beyond the upper limit, it can cause a lack-of-oxygen accident.
- Install the unit securely onto a structure that is strong enough to sustain its weight.
  Insufficient strength can cause a drop or fall of the unit and resultant injury.
- Install the unit according to the prescribed installation specifications so that it can withstand strong winds, such as typhoons, and earthquakes.
  Improper installation work can cause an accident such as from a fall of the unit.
- Wrap the unit with ropes properly rated for its weight at the specified points in hoisting it for haulage.
  An improper hauling method can cause a fall of the unit and resultant death or major injury.
- Use only parts supplied with the unit and approved supply parts for installation work.
  A failure to use genuine parts approved by the manufacturer may result in a fall of the unit, a water leak, a fire, an electric shock, a refrigerant leak, substandard performance or a control failure.
- Ask your dealer or a specialized service provider to install them.
  Improper installation work performed on the part of a user can result in a water leak, electric shock or fire.
- Electrical installation work must be performed by an electrical installation service provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  A defect in power supply circuits such as insufficient capacity or improper installation can cause an electrical shock or fire.
- Always use specified cables and connect them securely. Fasten cables securely so that the terminal connections may not be subject to external force working through the cables.
  Improper connection or fastening can cause heat generation, a fire or an electric shock.
- 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.
  Dust deposits, clogging or wobble can result in an electric shock or fire.
- Neatly arrange the cables so that they may not get loose, and put on the service panel securely. Improper installation can cause heat generation, a fire or an electric shock.
- In installing the unit, be sure to connect the refrigerant pipe before operating the compressor.
  If you run the compressor without connecting the refrigerant pipe and with the service valves open, you may incur frost bite or injury from an abrupt refrigerant outflow. An abnormal pressure build-up may also occur in the refrigeration cycle as a result of the inhalation of air, which can result in pipe rupture or injury.
- Never open the service valves (either liquid or gas side) until refrigerant pipe installation work, an air-tightness test and evacuation are completed.
  A failure to observe this instruction can result in frost bite or injury from an abrupt refrigerant outflow. If refrigerant gas leaks during installation work, immediately stop pipe blazing and other work and ventilate the room. Refrigerant gas, if it comes into contact with bare fire, can cause the generation of a toxic gas.
- Use pipes, flare nuts and tools specifically designed for R410A.
  The use of existing materials (designed for refrigerant other than R410A) can result in a unit failure as well as a serious accident such as refrigeration cycle rupture or injury.
- Tighten a flare nut to a specified torque with two torque wrenches used together as a set. Over-tightening a flare nut can cause a refrigerant gas leak from flare nut breakage after years of operation. If a flare gets loose or breaks off, refrigerant gas will leak, which can cause a lack-of-oxygen accident.
- In carrying out a pump-down process, stop the compressor before you detach the refrigerant pipe.
  If you detach the refrigerant pipe with the compressor running and the valves open, you may incur frost bite or injury from an abrupt refrigerant outflow. An abnormal pressure build-up may also occur in the refrigeration cycle as a result of the inhalation of air into the compressor, which can result in pipe rupture or injury.
- If refrigerant gas leaks during installation work, ventilate the room.
  Refrigerant gas, if it comes into contact with bare fire, can cause the generation of a toxic gas.
- When installation work is completed, check the system for refrigerant gas leaks.
  If refrigerant gas leaks indoors and comes into contact with bare fire such as of a fan heater, stove or cooking stove, it can cause the generation of a toxic gas.

- Don't open the operation valves (both for gas and fluid) till the refrigerant piping work, air tightness test and air purge are completed.
  It could cause frostbite or injury due to sudden leakage of refrigerant.
- Do not run the drain piping directly into the sewer where a toxic gas such as sulfuric gas is generated.
  This will pose a risk of a toxic gas flowing back into the room. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- In installing or transferring an air conditioning system, never allow air or other foreign matters than specified refrigerant (R410A) to get into the refrigerant cycle.
  If air or other foreign matters gets into the refrigerant cycle, an abnormal pressure build-up will occur, which can result in pipe rupture or injury.

⚠CAUTION

- Secure a service space for inspection and maintenance as specified in the manual.
  An insufficient service space can result in a fall from the installation point and resultant injury.
- When the outdoor unit is installed on a roof top or in an elevated position, provide permanent ladders and handrails along the access path and fences or handrails surrounding the outdoor unit to prevent an accidental fall.
- Perform installation work properly according to this installation manual.
  Improper installation can cause abnormal vibrations or increased noise generation.
- When refrigerant pipe installation is completed, check the system for leaks by conducting an air-tightness test with nitrogen gas.
  Should refrigerant gas leak in a small room and exceed the upper limit concentration, it can cause a lack-of-oxygen accident.
- Dress the refrigerant piping with a heat insulation material to prevent condensation.
  Improper heat insulation given to refrigerant piping for condensation prevention can result in leaking or dripping water soaking household effects.
- Install an earth leakage breaker.
  A failure to install an earth leakage breaker can cause a fire or electric shock.
- Install drain piping according to the installation manual to ensure good drainage, and give it heat insulation to prevent condensation.
  Improper installation can result in a flood of water in the room and soaked household effects.

- Ensure that the unit is properly grounded. Do not connect the grounding wire to a gas pipe, a water pipe, a lightning rod, the grounding wire of a telephone or other appliances. Improper grounding can result in electric shocks or fire when any trouble or earth leakage occurs.
  Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.

- Don't use for any special purposes such as for storing of foods, animals or plants, precision devices or objects of art.
  It could deteriorate the quality of stored items.
- Do not install the outdoor unit in a place where small animals are likely to inhabit.
  If they enter the unit and touch electrical parts inside, they may cause a unit failure, smoke generation or ignition. Please ask the customer to keep the surroundings clean.
- Do not handle the package by holding a packing band.
- Do not handle wooden packaging materials with bare hands.
- Do not install the unit in a place with a risk of inflammable gas leaks or where an inflammable material exists. It can cause a fire where an inflammable gas leaks, flows out or in, or stagnates or where carbon fibers are suspended in the air.
- Do not install the outdoor unit where its fan winds directly hit an animal or plant. Fan winds can affect adversely to the plant etc.
- Do not operate the outdoor unit with any article placed on it, or you may incur property damage or personal injury from a fall of the article.
- Do not step onto the outdoor unit, or 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

Caution
If superlink I (previous superlink) is selected, all the range of usage and limitations, not only the limitations of connectable indoor capacity and connectable number of indoor unit but also of the piping length, operating temperature range and etc., become same as those of KX4 (See technical manual '07 · KX · KXR-T-114). In addition to above limitations, all of new functions for KX6 such as automatic address setting function for multiple refrigerant systems and etc. will be cancelled.

1. BEFORE BEGINNING INSTALLATION (Check that the models, power supply 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.
- For the installation of an indoor unit, please refer to the installation manual of an indoor unit.
- For piping work, optional 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.

ACCESSORY

Name	Quantity	Usage location	
Wiring	2	In operating the unit in the silent mode or the forced cooling/heating mode, insert it to the outdoor 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 side panel below the operation valve.

COMBINATION PATTERNS

- The possible outdoor 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 controller	Connection OK/NO
FD○△△KXE6	RC-E3(2 cores)	OK
FD○A△△KXE4R, KXE4BR, KXE5R	RC-E1R(3 cores)	OK
FD○A△△KXE4, KXE4(A), KXE4A	RC-E1(3 cores)	NO

Notabilia

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

- For 335 capacity units, however, two different model types are available, one corresponding to a standalone installation and the other to a combined installation. So please pay attention to their model types in selecting a model.
  (A 335 capacity unit to be used alone should be FDC335KXE6, while a unit to be used in combination is FDC335KXE6-K)
- Model type differs on the unit with 560 capacity depending on whether the unit is used independently and with the combined capacity of 1065 or 1130, or with the combined capacity of 1180.
  (When the unit is used independently and with the combined capacity of 1065 or 1130, the model type is FDC560KXE6. When the unit is used with the combined capacity of 1180, the model type is FDC560KXE6-K.)
- Please note that an installation involving a combination other than those listed below is not operable.(For example, you cannot operate 560 and 680 in combination)

Outdoor unit		Indoor unit	
Capacity	Combination patterns	Number of connectable units (units)	Range of the total capacity of indoor units connected in a system※
400	Single	1~36	200~800
450	Single	1~40	225~900
504	Single	1~36	252~806
560	Single	1~40	280~896
615	Single	2~44	308~984
680	Single	2~49	340~1088
735	Combination (400+335-K)	2~53	368~1176
800	Combination (400+400)	2~58	400~1280
850	Combination (400+450)	2~61	425~1360
900	Combination (450+450)	2~65	450~1440
960	Combination (450+504)	2~69	477~1526
1010	Combination (504+504)	2~59	504~1311
1065	Combination (504+560)	2~62	532~1384
1130	Combination (560+560)	2~66	560~1456
1180	Combination (615+560-K)	3~69	588~1528
1235	Combination (615+615)	3~72	615~1599
1300	Combination (615+680)	3~76	650~1690
1360	Combination (680+680)	3~80	680~1768

[Optional parts]

Refrigerant distribution piping components supplied as optional parts will become necessary in installing the unit.
As refrigerant distribution piping components, branching pipe sets (model type: DOS) for the outdoor unit side piping, branching pipe sets (model type: DIS) and header sets (model type: HEAD) for the outdoor unit side piping are available.
Select according to the application. Please refer to "4. Refrigerant piping work" in selecting.
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 than 130%.

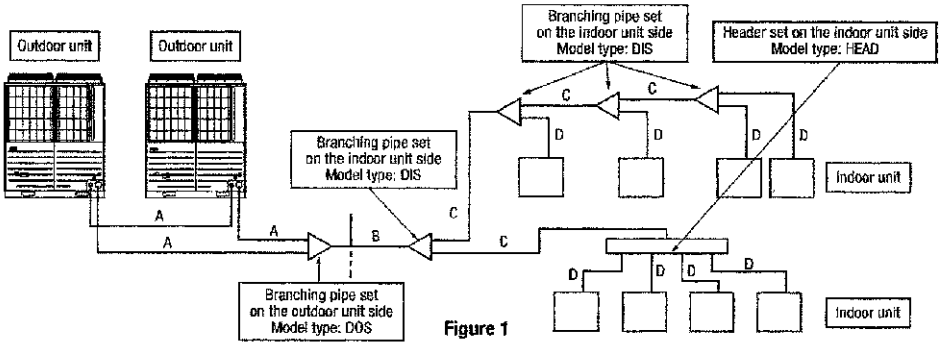


Figure 1

*

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

2-1. Selecting the installation location

- ○ Where air is not trapped.
- ○ Where the installation fittings can be firmly installed.
- ○ Where wind does not hinder the intake and outlet pipes.
- ○ Out of the heat range of other heat sources.
- ○ Where strong winds will not blow against the outlet pipe.
- ○ A place where stringent regulation of electric noises is applicable.
- ○ Where it is safe for the drain water to be discharged.
- ○ Where noise and hot air will not bother neighboring residents.
- ○ Where snow will not accumulate.
- ○ A place where no TV set or radio receiver is placed within 5m.
  (If electrical interference is caused, seek a place less likely to cause the problem)

Please note

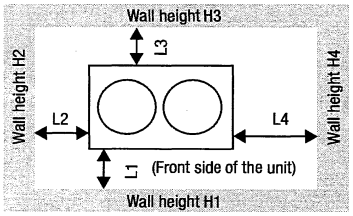
a) A four-sided enclosure cannot be used. Leave a space of at least 1m above the unit.
b) If there is a danger of a short-circuit, then install a wind direction variable adapter.
c) When installing multiple units, provide sufficient intake space so that a short-circuit does not occur.
d) In areas where there is snowfall, install the unit in a frame or under a snow hood to prevent snow from accumulating on it.
(Inhibition of collective drain discharge in a snowy country)
e) Do not install the equipment in areas where there is a danger for potential explosive atmosphere.
* Please ask your distributor about optional parts such as wind vane adapters, snow guard hoods, etc.

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

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)

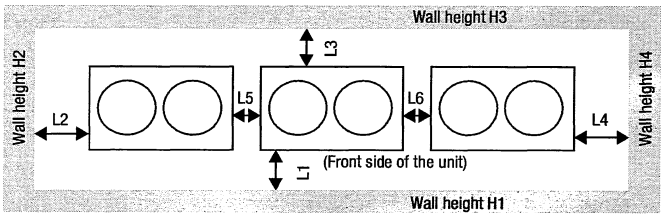
①When one unit is installed



Dimensions \ Example installation	I	II	III
L1	500	500	Open
L2	10	50	10
L3	100	50	100
L4	10	50	Open
H1	1500	1500	Open
H2	No limit	No limit	No limit
H3	1000	1000	No limit
H4	No limit	No limit	Open

For a normal installation, leave a 10 mm or wider space on both sides of the unit (L5 and L6) as workspace. It is also possible to install at a 0mm interval (continuous installation) with future renewal, etc. in mind.
For your information:
the footprint of an outdoor unit is 1350x720 for all models throughout the series (335–K–680).

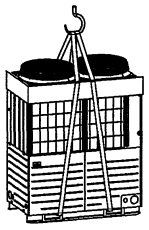
②When more than one unit are installed



Dimensions \ Example installation	I	II
L1	500	Open
L2	10	200
L3	100	300
L4	10	Open
L5	10 (0)	400
L6	10 (0)	400
H1	1500	No limit
H2	No limit	No limit
H3	1000	No limit
H4	No limit	No limit

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

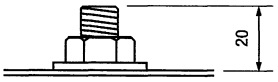
- By defining a cartage path, carry in the entire package containing a unit to its installation point.
- In slinging a unit, use two canvas belts with plates, cloth pads or other protections applied to the unit to prevent damage.

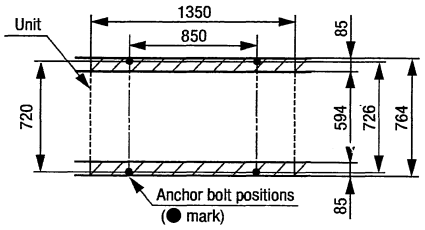
Please note

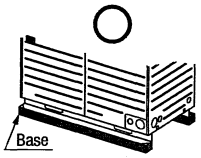
a) Please do not fail to put belts through the rectangular holes of a unit's anchoring legs.
b) Apply cloth pads between a canvas belt and a unit to prevent damage.

3-2. Notabilia for installation

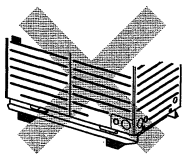
(1) Anchor bolt positions
- Use four anchor bolts (M10) to fix an outdoor unit's anchoring legs at all times. Ideally, an anchor bolt should protrude 20mm.



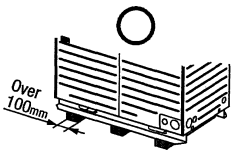




Normally, it is desirable that a base as specified in the drawing above is provided.



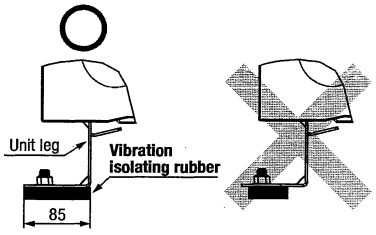
A base used for a former model is wrongly oriented and not acceptable.



Please use it for renewal installation. (Please add a base on the center) It is necessary to prevent sagging.

(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 an outdoor unit's anchoring leg) shown on the above drawing or larger.
- Please orient a base in the traversal direction (direction of W1350mm) of an outdoor unit as illustrated in the drawing above.

(3) Vibration isolating rubber
- A vibration isolating rubber must support an outdoor unit's anchoring leg by its entire bottom area.



Please note

1) Install a vibration isolating rubber **in such a manner that the entire bottom area of an outdoor unit's anchoring leg will rest on it.**
2) Do not install an outdoor unit in such a manner that a part of the bottom area of its anchoring leg is off a vibration isolating rubber.

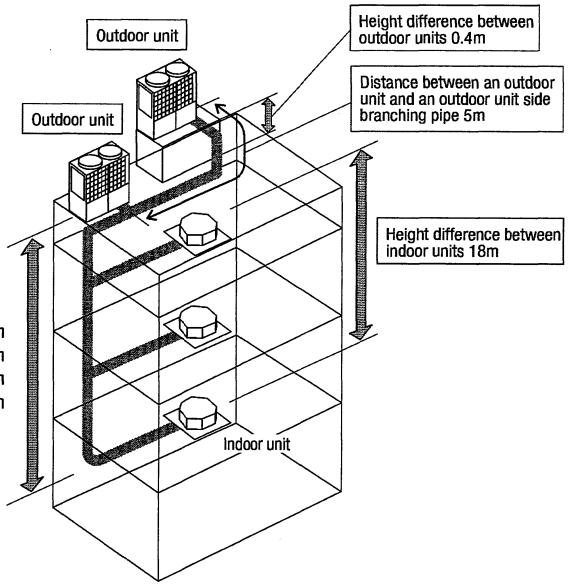
4. REFRIGERANT PIPING

4-1. 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 an outdoor 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 Section (3) (b).
- Total pipe length ····· 1000 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 an outdoor unit is installed above ····· 50 m or less
  (b) When an outdoor unit is installed below ····· 40 m or less※
  ※ It must be less than 30 m when conducting the cooling operation with the outdoor air temperature lower than 10°C.
  (c) Difference in the elevation of indoor units in a system ····· 18 m or less
  (d) Elevation difference between the first branching point and the indoor unit ····· 18 m or less
- Restrictions on piping applicable to the section between an outdoor unit andan outdoor unit side branching pipe (combination unit)
  (a) Difference in the elevation ····· 0.4 m or less
  (b) Distance between an outdoor unit and an outdoor 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.



Important
When the Additional refrigerant quantity for piping (P) is over the following table, please separate the refrigerant line.

Outdoor unit	P (kg)
400-680	50
735-1360	100

Difference in the elevation	50m
Actual length	160m
Equivalent length	185m
Total length	1000m

(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-0, 1/2H, JIS H3300)
  Use C1220T-1/2H for ϕ19.05 or larger, or C1220T-0 for ϕ15.88 or smaller
- Do not use ϕ28.58 x t1.0, ϕ31.8 x t1.1, ϕ34.92 x t1.2 and ϕ38.1 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 ϕ19.05 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 P.8 4-3(3) Method of operating operation valves.
- In installing pipes, observe the restrictions on the use of pipes set out in 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

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

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

Outdoor unit	Outdoor unit outlet pipe specifications					
	Gas pipe	Connection method	Liquid pipe	Connection method	Oil equalizing tube	Connection method
335-K,400	ϕ25.4 (ϕ28.58) × t 1.0	Blazed	ϕ12.7× t 0.8	Flare	ϕ9.52× t 0.8 ※1	Flare
450	ϕ28.58× t 1.0					
504						
560						
615						
680						

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

(b) Main (Outdoor unit side branching pipe – Indoor unit side first branching pipe): Section B in Figure 1

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

<table>
<tr><th rowspan="2">Outdoor unit</th><th colspan="2">Main pipe size (normal)</th><th colspan="2">Pipe size for an actual length of 90m or longer</th></tr>
<tr><th>Gas pipe</th><th>Liquid pipe</th><th>Gas pipe</th><th>Liquid pipe</th></tr>
<tr><td>400</td><td>φ25.4 (φ28.58) × t1.0</td><td rowspan="6">φ12.7× t0.8</td><td>φ28.58× t1.0</td><td rowspan="2">φ12.7× t0.8</td></tr>
<tr><td>450</td><td rowspan="5">φ28.58× t1.0</td><td rowspan="5">φ31.8× t1.1
(φ28.58× t1.0)</td></tr>
<tr><td>504</td><td rowspan="4">φ15.88× t1.0</td></tr>
<tr><td>560</td></tr>
<tr><td>615</td></tr>
<tr><td>680</td></tr>
<tr><td>735</td><td rowspan="5">φ31.8 × t1.1
(φ34.92× t1.2)</td><td rowspan="5">φ38.1× t1.35
(φ34.92× t1.2)</td><td rowspan="5">φ19.05× t1.0</td></tr>
<tr><td>800</td><td rowspan="4">φ15.88× t1.0</td></tr>
<tr><td>850</td></tr>
<tr><td>900</td></tr>
<tr><td>960</td></tr>
<tr><td>1010</td><td rowspan="7">φ38.1× t1.35
(φ34.92× t1.2)</td><td rowspan="7">φ19.05× t1.0</td><td rowspan="7">φ22.22× t1.0</td></tr>
<tr><td>1065</td></tr>
<tr><td>1130</td></tr>
<tr><td>1180</td></tr>
<tr><td>1235</td></tr>
<tr><td>1300</td></tr>
<tr><td>1360</td></tr>
</table>

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

(c) 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 *1	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	φ19.05× t1.0
700 or more but less than 1100	φ31.8× t1.1 (φ34.92× t1.2)	
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.
*1: When connecting indoor units of 280 at the downstream and the main gas pipe is of ø22.22 or larger, use the pipe of ø22.22x t1.0.

(d) 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	22, 28	φ 9.52× t0.8	φ 6.35× t0.8
	36, 45, 56	φ 12.7× t0.8	
	71, 80, 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 an outdoor 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)

Outdoor unit	Branching pipe set
For two units (for 735 – 1360)	DOS-2A-1

Please note

a) In connecting an outdoor unit, please use a pipe conforming to the pipe size specified for outdoor unit connection.
b) Choose a different-diameter pipe joint matching a main pipe size specified in the following section in installing pipes (= main pipes) on the outdoor unit side.
c) Always install branching joints (for both gas and liquid) in such a manner that they form either correct horizontal or vertical branch.

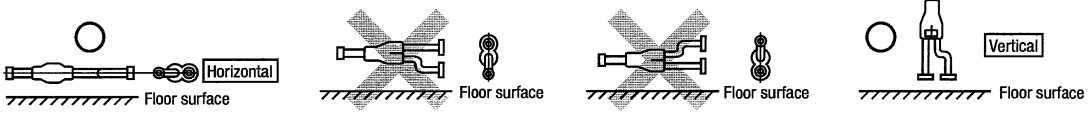
(5) Selection of an indoor unit side branching pipe set

(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-22-1
180 or more but less than 371	DIS-180-1
371 or more but less than 540	DIS-371-1
540 or more	DIS-540-2

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

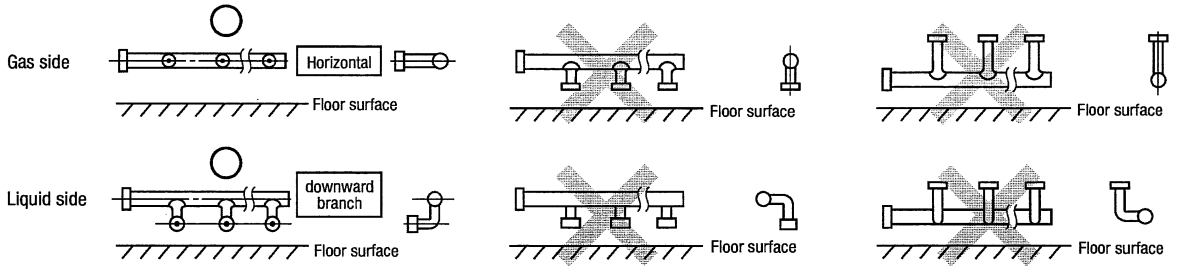


(b) Header Method

- 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 (optional part).

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

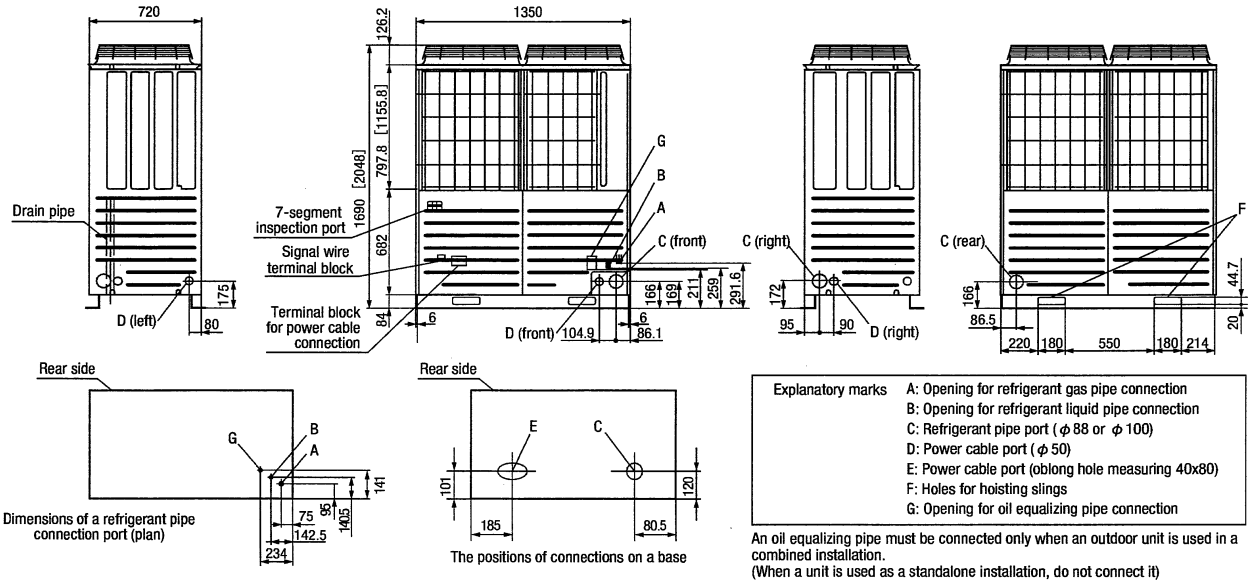
Please note a) In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.
b) **In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**
c) Indoor units 224 and 280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



4-2. Pipe connection position and pipe direction

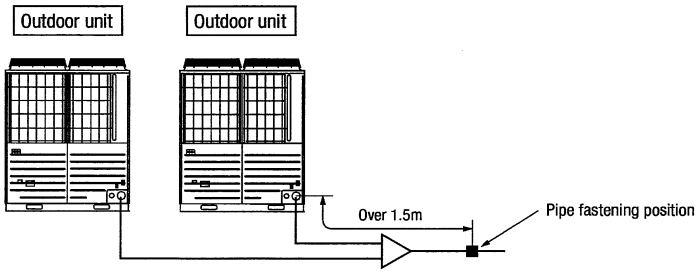
(1) Pipe connecting position and pipe outgoing direction

Although this drawing illustrates an installation involving a 450 or smaller capacity unit, an installation involving a 504 or a larger capacity unit should be arranged in the same manner as long as pipe connection points and directions are concerned, except that the height of a unit is different.
Measurements in [ ] indicate those of a 504 or larger capacity unit.



An oil equalizing pipe must be connected only when an outdoor unit is used in a combined installation.
(When a unit is used as a standalone installation, do not connect it)

- A pipe can be laid through the front, right, bottom or rear of a unit as illustrated on the above drawings.
- In laying pipes on the installation site, cut off the casing's half blank (φ88 or φ100) that covers a hole for pipe penetration with nippers.
- 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 (to be arranged on the user's part) to connect control valves to the piping.
- In anchoring piping on the installation site, give 1.5m or a longer distance between an outdoor unit and an anchoring point where the piping is secured as illustrated below. (A failure to observe this instruction may result in a pipe fracture depending on a method of isolating vibrations employed.)

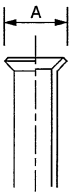


(2) Piping work

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 outdoor unit.

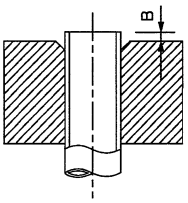
Important

- 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.
- An outdoor 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

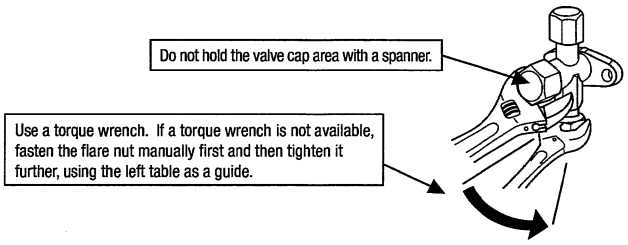


Copper pipe protrusion for flaring: B (mm)

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)
Ø6.35 (1/4")	14~18	45~60	150
Ø9.52 (3/8")	34~42	30~45	200
Ø12.7 (1/2")	49~61	30~45	250
Ø15.88 (5/8")	68~82	15~20	300
Ø19.05 (3/4")	100~120	15~20	450

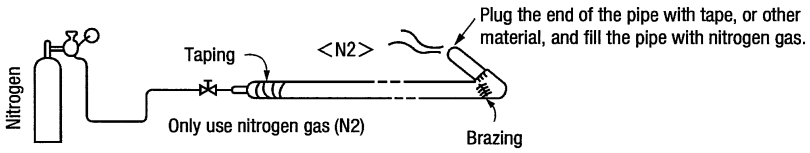


- Do not apply any oil on a flare joint.
- Pipes are to be blazed to connect an outdoor unit's gas pipe with refrigerant piping or refrigerant piping with a branching pipe set.
- **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized 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).

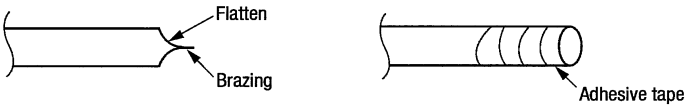
Operation procedure

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

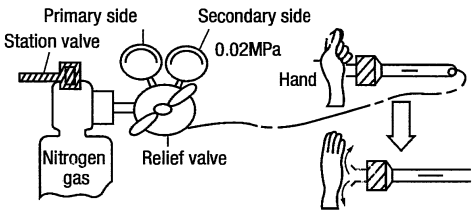
② **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.



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.**

4-3. Air tightness test and air purge

(1) Air tightness test

① Although an outdoor 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 outdoor 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 an outdoor 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 drops.

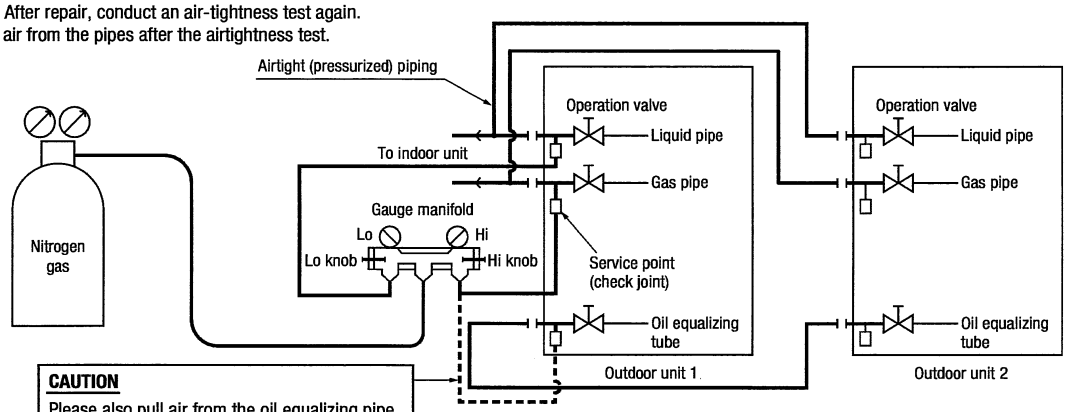
b) **Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes** to see if the pressure drops.

c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.

d) **If no pressure drop is observed with an installation pressurized to** the specified level **and left for about one day, it is acceptable.** When the ambient temperature changes 1℃, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.

e) If a pressure drop is observed in checking e) and a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

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



> **CAUTION**
> Please also pull air from the oil equalizing pipe.

(2) Vacuuming

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

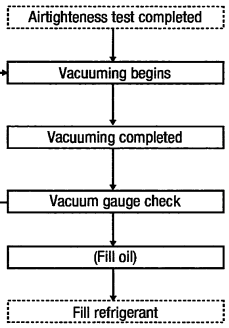
Please also **pull air from the oil equalizing pipe.** (Please pull air separately from the rest of the piping by using the oil equalizing valve check joint)

<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.**



> **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.

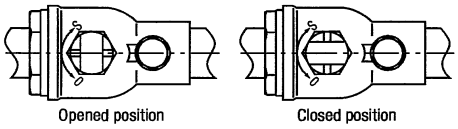
Pay attention to the following points in addition to the above for the R410A and compatible machines.

○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.

(3) Additional oil charge

When the total pipe length is longer than 510 m, charge 1,000 cc of M-MA32R refrigeration machine oil from the check joint of gas pipe operation valve after the vacuuming.



(4) Method of operating operation valves

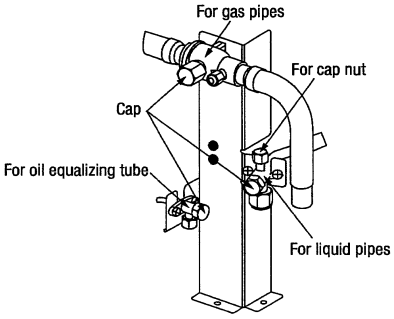
Method of opening/closing a valve

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

○For the liquid side pipe and oil equalizing 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	7.85 (MAX 15.7)	29.4 (MAX 39.2)	8.8 (MAX 14.7)
For oil equalizing tube	4.9 (MAX 11.8)	16.2 (MAX 24.5)	8.8 (MAX 14.7)

For fastening torque of a flare nut, please refer to Section 4-2 (2) Piping work on site.

4-4. 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 outdoor 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 **<400~680: 11.5 kg, 735~1360: 23.0 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) = S+P+I

S: standard additional refrigerant quantity (kg)

Outdoor unit	S (kg)
400	1.3
450	3.1
504	4.8
560	5.9
615	7.1
680	8.4

Outdoor unit	S (kg)
735	1.7
800	2.6
850	4.4
900	6.2
960	7.9
1010	9.6

Outdoor unit	S (kg)
1065	10.7
1130	11.8
1180	13.0
1235	14.2
1300	15.5
1360	16.8

P: Additional refrigerant quantity for piping (kg)

P = (L1×0.37) + (L2×0.26) + (L3×0.18) + (L4×0.12) + (L5×0.059) + (L6×0.022)

L1 : φ22.22 total length (m) L2 : φ19.05 total length (m) L3 : φ15.88 total length (m)

L4 : φ12.7 total length (m) L5 : φ9.52 total length (m) L6 : φ6.35 total length (m)

Refrigerant liquid pipe size	φ22.22	φ19.05	φ15.88	φ12.7	φ9.52	φ6.35	Remarks
Additional fill quantity (kg/m)	0.37	0.26	0.18	0.12	0.059	0.022	

I: Additional refrigerant quantity for indoor units (kg)

If the total indoor units capacity is larger than 1.3 times of outdoor unit capacity, then calculate the additional refrigerant quantity for indoor units.

D = {(Total indoor units capacity) - (outdoor unit capacity) x 1.3}

I = D x 0.01

When D > 0, calculate I using the above equation;

When D ≦ 0, take it as I = 0.

Important

When the Additional refrigerant quantity for piping (P) is over the following table, please separate the refrigerant line.

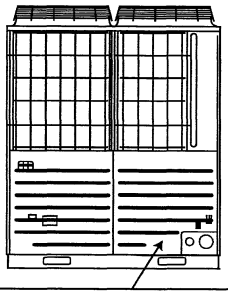
Outdoor unit	P (kg)
400-680	50
735-1360	100

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 5. (Pink for R410A). Always confirm this.
- Do not use a charge cylinder under any circumstances. There is a danger that the composition of the refrigerant will change when R410A is transferred to a cylinder.
- When charging refrigerant, use liquid refrigerant from a cylinder. If refrigerant is charged in a gas form, the composition may change considerably.

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.

4-5. Heating and condensation prevention

①Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

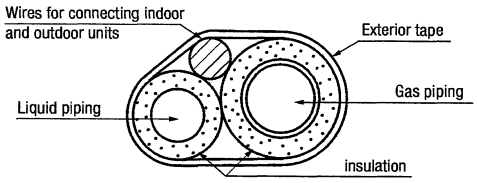
②Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

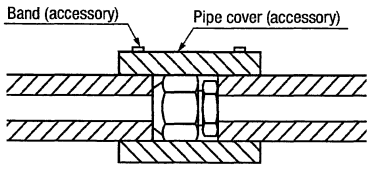
a) The gas pipe can cause during a cooling operation dew condensation, which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60℃ to 110℃, posing a risk of burns, when touched accidentally. So, do not fail to dress it with a 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, the dripping of water may occur when it is operated in a high-humidity atmosphere (23℃ or a higher dew point temperature). In such a case, apply an additional heat insulation material of 10 to 20 mm thick to dress an indoor unit body, piping and drain pipes.
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.





5. Drainage

- Where water drained from the outdoor unit may freeze, connect the drain pipe using optional drain elbow and drain grommet.

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 supplies for the indoor and outdoor units.**

c) A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.

d) **The power supplies 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 supply 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.

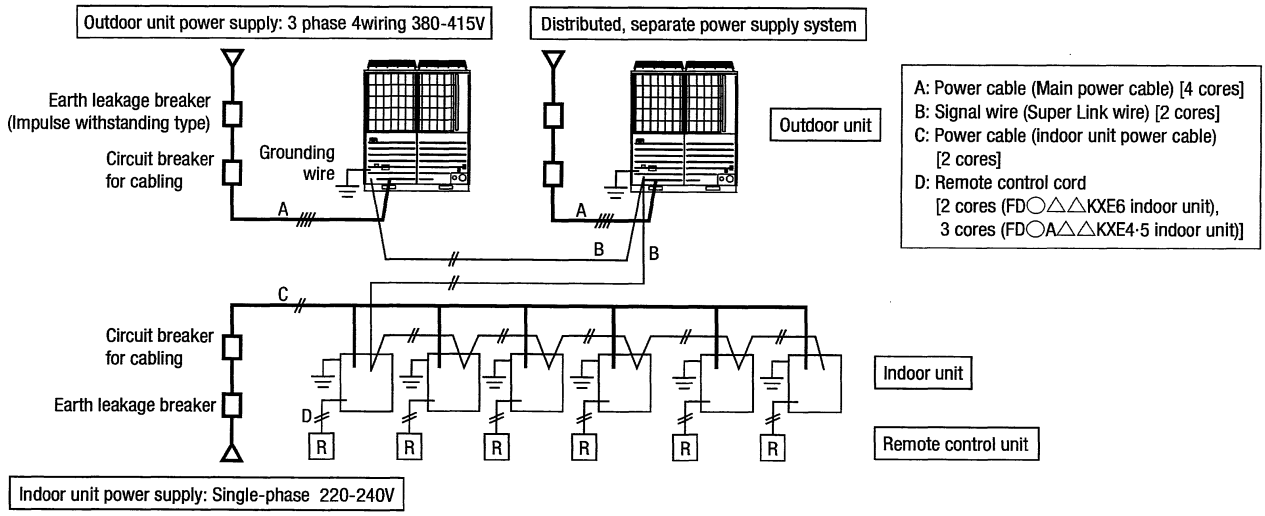
k) Fasten cables so that they may not touch the piping, etc.

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.

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

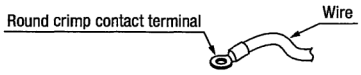
- As shown on the drawing in Section 4-2 (1), cables can be laid through the front, right, left or bottom casing.
- In wiring on the installation site, cut off a half-blank (ϕ50 or oblong hole measuring 40x80) covering a penetration of the casing with nippers.

(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.
- To connect a cable to the power terminal block, use a round crimp contact terminal.
- 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 list shown at right.
- 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)		
M4	Outdoor signal line terminal block	0.9~1.2
M5	Power cable terminal block, Earth wire	2.00~2.35



(3) Outdoor unit power supply specifications : 3 phase 380-415V

Model	Power source	Cable size for power source (mm²)	Wire length (m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Earth wire	
				Rated current	Switch capacity		Size (mm²)	Screw type
335-K,400	3 phase 4 wire 380-415V 50Hz/ 380V60Hz	22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
450		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
504		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
560		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
615		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5
680		22	92	75	100	75A100mA less than 0.1 sec	5.5	M5

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 supply system, the listed data represent those of an outdoor unit.
c) For details, please refer to the installation manual supplied with the indoor unit.

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

Combined total capacity of indoor units	Cable size for power source (mm²)	Wire length (m)	Moulded-case circuit breaker (For ground fault, overload and short circuit protection)	Signal wire size (mm²)
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 mm². For 8 mm² or more, use a dedicated pull box and branch to indoor units with 5.5 mm² or less.
e)③ terminal on the terminal block is specified to connect only an optional auxiliary heater (power supply for heater).

#

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 controller. 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	Up to 1,500 m for 0.75 mm² shielding wire (MVVS) Up to 1,000 m for 1.25 mm² shielding wire (MVVS)
Signal cable (furthest length)	Up to 1000m	Up to 1000m
Connectable units to a network	Units not supporting new SL (FD○A△△KXE4·5 series) Units supporting new SL (FD○△△KXE6 series) 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.

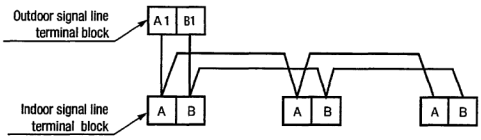
① Confirm that signal cables are prevented from applying 220/240 V or 380/415 V.

② Before turning the power on, check the resistance on the signal cable terminal block. If it is less than 100Ω, power supply cables may be connected to the signal cable terminal block.
Standard resistance value = 46,000÷{(Number of FD○A△△ KXE4·5 Series units connected × 5) + (Number of FD○△△KXE6 Series units connected × 9)}
If the resistance value is less than 100Ω, disconnect the signal cables temporarily to divide to more than one network, to reduce the number of indoor units on the same network, and check each network.

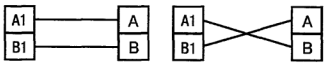
Indoor and outdoor units signal cables

- Connect the signal cable between indoor and outdoor units and the signal cable between outdoor units belonging to the same refrigerant line to A1 and B1.
- Connect the signal line between outdoor 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 outdoor units.

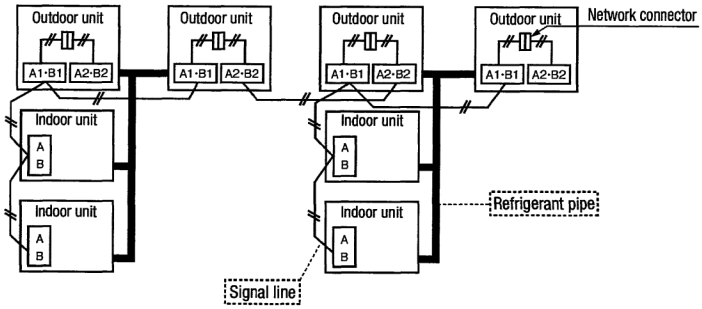
(1) When one outdoor unit is used.



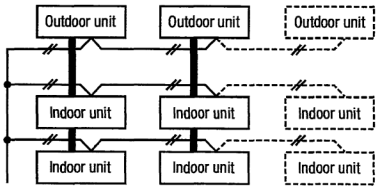
○Indoor and outdoor signal lines do not have a polarity.
Any of the connections in the following illustration can be made.



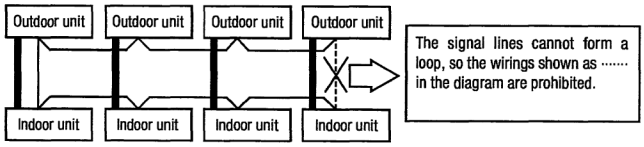
(2) When plural outdoor units are used



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



⚠ Important ○Loop wiring prohibited.



Remote controller wiring specifications

(1) **A standard remote controller wire is 0.3mm² x 2 cores (FDC○△△KXE6 indoor unit), 0.3mm² x 3 cores (FD○A△△KXE4·5 indoor unit).** It can be extended **up to 600m. For a remote controller wire exceeding 100m,** please upgrade wire size **as specified in the table below.**

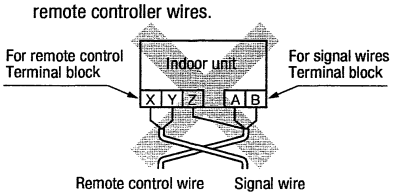
Length (m)	Wire size	
	FD○△△KXE6 indoor unit	FD○A△△KXE4 indoor unit
100 to 200	0.5mm² × 2 cores	0.5mm² × 3 cores
To 300	0.75mm² × 2 cores	0.75mm² × 3 cores
To 400	1.25mm² × 2 cores	1.25mm² × 3 cores
To 600	2 mm² × 2 cores	2 mm² × 3 cores

#

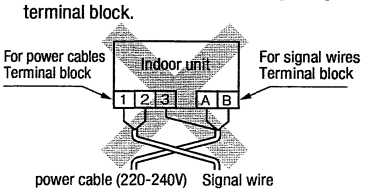
(2) When the remote controller wire runs parallel to another power supply wire or when it is subject to outside noise, such as from a high-frequency device, use shielded wire. (Be sure to ground only one end of the shielded wire.)

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

① Wrong wiring between signaling wires and remote controller wires.

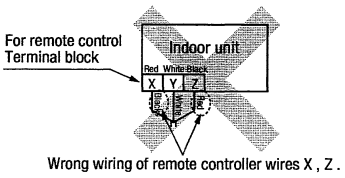


② Connecting power cables to the signaling wire terminal block.



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

③ Wrong wiring of remote controller wires.



Wrong wiring of remote controller wires X , Z .

Error indication:E1

7. CONTROLLER SETTINGS

7-1. Unit address setting

This control system controls the controllers of more than one air conditioner's outdoor unit, indoor unit and remote control unit through communication control, using the microcomputers built in the respective controllers. Address setting needs to be done for both outdoor and indoor units. Turn on power in the order of the outdoor units and then the indoor units.

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 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.

When communication is established after setting addresses, check the communication protocol with the 7 segment display panel of the outdoor unit.

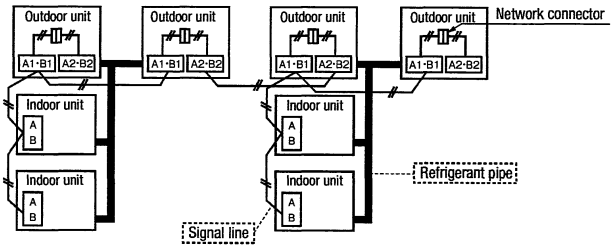
●Address setting methods

The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one.
Please use the automatic address setting function after reading this manual carefully.

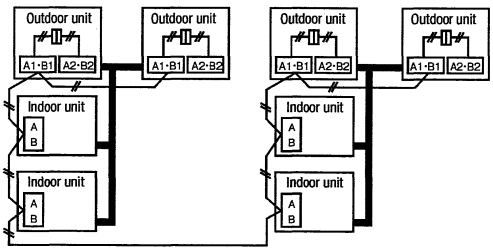
Communication protocol		new SL		previous SL	
Address setting method		Automatic	Manual	Automatic	Manual
When plural refrigerant systems are linked with signal lines (e.g., to implement centralized control)	Case 1 When signal lines linking plural refrigerant systems are provided between outdoor units. (When the network connector is disconnected, refrigerant systems are separated each other)	OK※1	OK	×	OK
	Case 2 When signal lines linking plural refrigerant systems are provided between indoor units.	×※2	OK	×	OK
When only one refrigerant system is involved (signal lines do not link plural refrigerant systems)		OK	OK	OK	OK

※1 Do not connect the signal line between outdoor units on the different refrigerant lines to A1 and B1. Do not connect the signal line between outdoor 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 outdoor unit to A2 and B2. This may interrupt proper address setting. (Case 4)

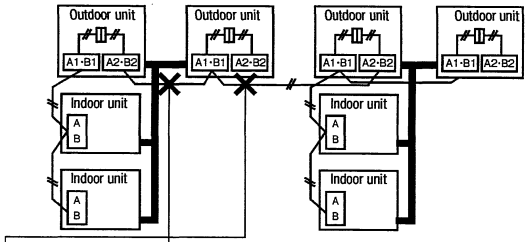
※2 In Case 2, automatic address setting is not available. Set addresses manually.



CASE 1



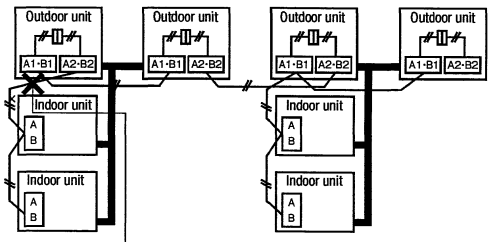
CASE 2



CASE 3

Incorrect cable connection
(Cables between outdoor units on the same refrigerant line are connected to A2/B2.)

Incorrect cable connection
(Cables between outdoor units on different refrigerant lines are connected to A1/B1.)



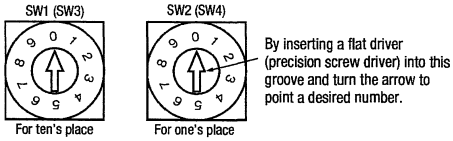
CASE 4

Incorrect cable connection
(Cables between indoor and outdoor units are connected to A2/B2.)

●Address No. setting

Set SW1 through 4 and SW5-2 provided on the PCB and SW1 & 2 provided on the outdoor unit PCB as shown in the drawings below.

Indoor PCB	SW1, 2 (blue)	For setting indoor No. (The ten's and one's)
	SW3, 4 (green)	For setting outdoor No. (The ten's and one's)
	SW5-2	Indoor No. switch (The hundred's Place) [OFF : 0, ON : 1]
Outdoor PCB	SW1, 2 (green)	For setting outdoor No. (The ten's and one's)



●Summary of address setting methods (figures in [ ] should be used with previous SL)

	Units supporting new SL			Units NOT supporting new SL		
	Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
	Indoor No. switch	Outdoor No. switch	Outdoor No. switch	Indoor No. switch	Outdoor No. switch	Outdoor No. switch
Manual address setting (previous SL/new SL)	000~127[47]	00~31[47]	00~31[47]	00~47	00~47	00~47
Automatic address setting for single refrigerant system installation (previous SL/new SL)	000	49	49	49	49	49
Automatic address setting for multiple refrigerant systems installation (with new SL only)	000	49	00~31	×	×	×

Do not set numbers other than those shown in the table, or an error may be generated.

Note: When units supporting new SL are added to a network using previous SL such as one involving FD○A△△KXE4·5 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.

- An outdoor unit No., which is used to identify which outdoor unit and indoor units are connected in a refrigerant system, is set on outdoor unit PCB and indoor unit PCB. Give the same outdoor unit No. to all outdoor unit and indoor units connected in same refrigerant system.
- An indoor unit No. is used to identify individual indoor units. Assign a unique number that is not assigned to any other indoor units on the network.

Unless stated otherwise, the following procedures apply, when new SL is chosen for the communication protocol.

When previous SL is chosen, use figures shown in [ ] in carrying out these procedures.

Manual address setting Generally applicable to new SL/previous SL, use figures in [ ] with previous SL.

① Outdoor unit address setting

Set as follows before you turn on power. Upon turning on power, the outdoor unit address is registered.

Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

Set **the Outdoor Unit No. switch to a number 00 - 31 [in the case of previous SL: 00 - 47].**

- Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31 [in the case of previous SL:00-47].**
- Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON.** (Set both master and slave units to the same outdoor unit number.)

Refrigerant system	Outdoor unit	SW1	SW2	SW4-7	Address on a network
A	Master	2	0	OFF	20
	Slave	2	0	ON	21
B	Master	2	2	OFF	22
	Slave	2	2	ON	23
C	Master	3	1	OFF	31
	Slave	3	1	ON	00

CAUTION

A slave unit's address will be set to "the master unit's address +1." When you set a master unit's address, take care not to assign an address duplicating with one used in another system. You cannot operate the installation with a duplicating address assigned. (Error indication: E-31)

This table shows an examples of address settings. **As illustrated with the refrigerant systems A and B in the above example, when successive numbers are used in setting addresses, care must be taken so that an address assigned to the master unit of the refrigerant system B will not duplicate with one assigned to the slave unit of the refrigerant system A.**

② Indoor unit address setting

Set as follows before you turn on power. Upon turning on power, the indoor unit address is registered.

Set **the Indoor Unit No. switch to a number 000 - 127 [in the case of previous SL: 00 - 47].**

Set **the Outdoor Unit No. switch** to the outdoor unit No. of the associated outdoor unit within the range of **00 - 31 [in the case of previous SL: 00 - 47].**

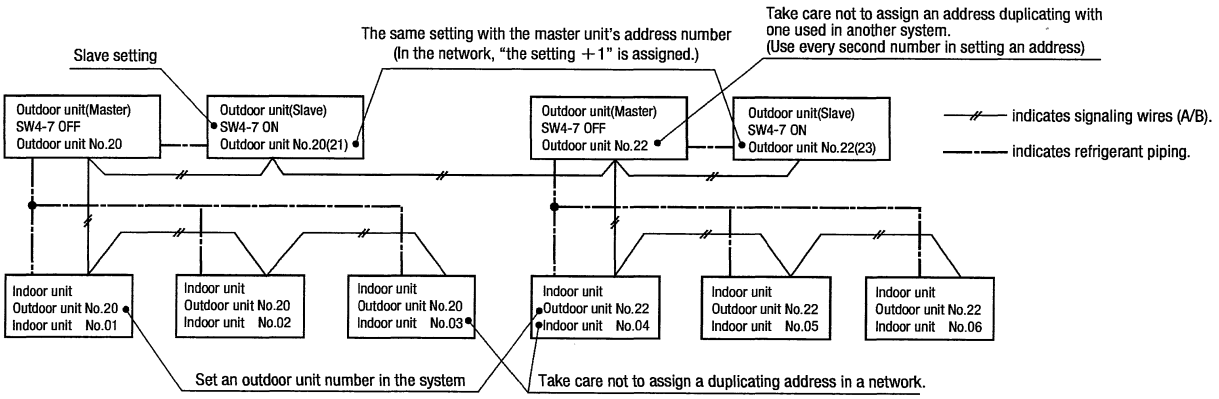
Set a unique number by avoiding the numbers assigned to other indoor units on the network.

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

* When there are some units not supporting new SL connected in the network, set SW5-5 to ON to choose the previous SL communication mode.

In the case of previous SL, the maximum number of indoor units connectable in a network is 48.

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 Outdoor unit address setting
Set as follows before you turn on power.
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

- **Similarly for the master unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting).**
- **Similarly for the slave unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting). Then, set the dipswitch SW4-7 of the slave unit to ON.**

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

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

The **master unit** will be registered as **"49"** regardless of the SW1 and SW2 settings (49).
The **slave unit** will be registered as **"00"** because of its SW4-7 setting as indicated in the table above.

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 [in the case of previous SL: 49] (factory setting).**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them. Unlike the procedure set out in (2) below, you need not change settings from the 7 segment display panel.

④ Make sure that the number of indoor units indicated on the 7 segment display panel agrees with the number of the indoor units that are actually connected to the refrigerant system.

(2) In the case of a multiple refrigerant systems installation (Applicable to new SL only. In the case of previous SL, set addresses with some other method.)

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

Address setting procedure (perform these steps for each outdoor unit)

[STEP1] (Items set before turning on power)

① Outdoor unit address setting
Set as follows before you turn on power.
Set **the Outdoor Unit No. switch** to a number **00 - 31**. Set a unique number by avoiding the numbers assigned to other outdoor units on the network.
- Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31.**
- Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON.** (Set both master and slave units on the same outdoor unit number.)

② Indoor unit address setting
Set as follows before you turn on power.
Make sure that the **Indoor Unit No. switch** is set to **000 (factory setting).**
Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting).**

③ Isolate the present refrigerant system from the network.
Disengage the **network connectors (white 2P)** of the outdoor units. (Turning on power without isolating each refrigerant system will result in erroneous address setting.)

[STEP2] (Power on and automatic address setting)

④ Turn on power to the outdoor unit
Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

⑤ Select and enter "1" in P31 on the 7 segment display panel of each outdoor unit (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 outdoor 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 outdoor 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 outdoor unit. (You can input it from P33 on the 7 segment display panel.)When the number of connected indoor units is entered, the 7 segment display panel indication will switch to "AUX" and start 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 outdoor 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.

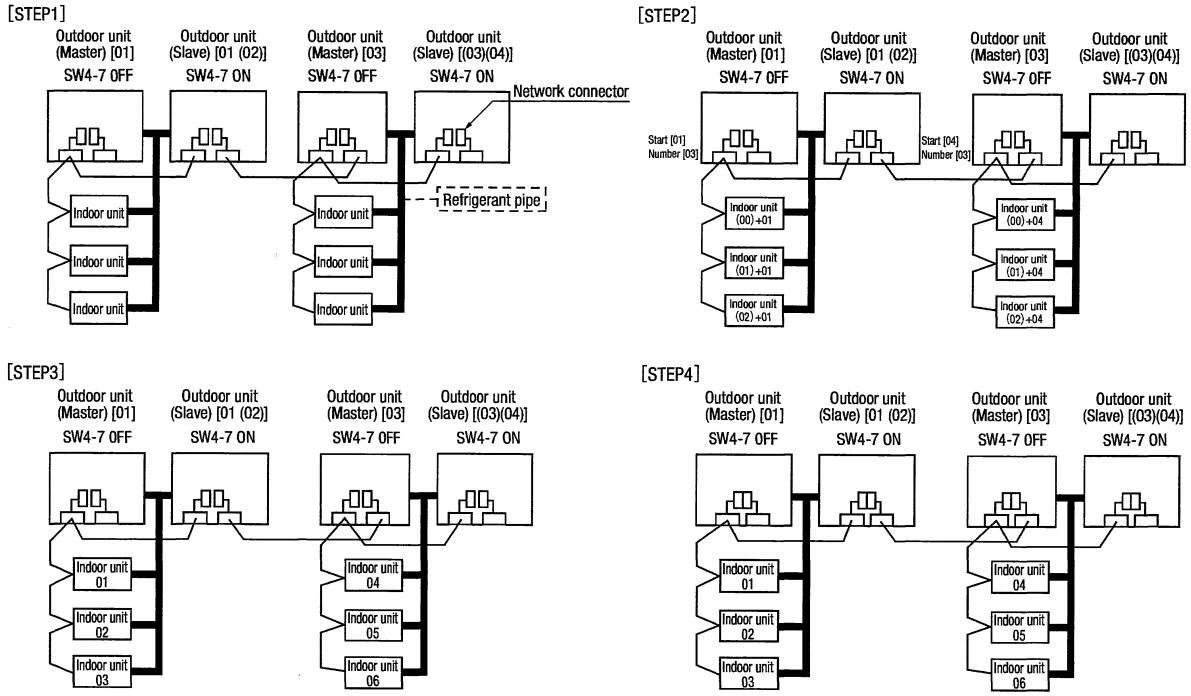
[STEP4] (Network definition setting)

⑨ Network connection
When you have confirmed an "AUE" indication on the display of each outdoor unit, **engage the network connectors** again.

⑩ Network polarity setting
After you have made sure that the network connectors are engaged in ⑧, select and enter "1" in P34 on the 7 segment display panel of **any outdoor 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	–	–
Outdoor unit power source	①OFF	④ON	–	–
Indoor unit (indoor/outdoor No.SW)	②indoor000/outdoor 49 (factory setting)	–	–	–
Outdoor unit (outdoor No.SW)	①01,03(Ex)	–	–	–
Network connectors	③Disconnect(each outdoor unit)	–	–	⑨Connect(each outdoor unit)
Start automatic address setting		⑤ Select "Automatic Address Start" on each outdoor unit.		
Set starting address		⑥outdoor 01:「01」(Ex) outdoor 03:「04」(Ex)	–	–
Set the number of indoor unit		⑦outdoor 01:「03」(Ex) outdoor 03:「03」(Ex)	–	–
Polarity setting		–	–	⑩ Set in P34 on the 7 segment display panel of any outdoor unit.
7 segment display		⑦ [AUX] (Blink)	⑧ "AUE"(blink), or "A○○" in error events.	⑪ 「End」



- Within a refrigerant system, indoor units are assigned addresses in the order they are recognized by the outdoor unit. Therefore, they are not necessarily assigned addresses in order from the nearest to the outdoor unit first as depicted in drawings above.
- Make sure that power has been turned on to all indoor units.
- When addresses are set, you can have the registered indoor unit address No.'s and the outdoor unit address No. displayed on the remote control unit by pressing its 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 outdoor units normally. Also check the addresses assigned to the indoor units.

Address change (available only with new SL)

"Address Change" is used, **when you want to change an indoor unit address assigned with the "Automatic Address Setting" function from a remote control unit.** Accordingly, the conditions that permit an address change from a remote control unit are as follows.

	Indoor unit address setting		Outdoor unit address setting
	Indoor No.SW	Outdoor No.SW	Outdoor No.SW
Automatic address setting 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 controller "INVALID OPER" .

Operating procedure

(1) When single indoor unit is connected to the remote controller.

	Item	Operation	Display
1	Address change mode	① Press the AIR CON No. switch for 3 seconds or longer.	[CHANGE ADD.▼]
		② Each time when you press the ⬍ switch, the display indication will be switched.	[CHANGE ADD.▼] ⇔[MASTER I/U▲]
		③ Press the SET switch when the display shows "CHANGE ADD. ▼" and then start the address change mode, changing the display indication to the "Indoor Unit No. Setting" screen from the currently assigned address.	[I/U 001 O/U 01] (1sec) →[⬍ SET I/U ADD.] (1sec) →[I/U 001 ⬍] (Blink)
2	To set a new indoor unit No.	④ Set a new indoor unit No. with the ⬍ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ⬍] ⇔[I/U 002 ⬍] ⇔ · · · ⇔[I/U 127▼]
		⑤ After selecting an address, press the SET switch, and then the indoor unit address No. is defined.	[I/U 002] (2sec)
3	To set a new outdoor unit No.	⑥ After showing the defined indoor address No. for 2 seconds, the display will change to the "Outdoor Address No. Setting" screen. The currently assigned address is shown as a default value.	[I/U 002] (2sec Lighting) →[⬍SET O/U ADD.] (1sec) →[O/U 01 ⬍] (Blink)
		⑦Set a new outdoor unit No. with the ⬍ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ⬍] ⇔[O/U 02 ⬍] ⇔ · · · ⇔[O/U 31▼]
		⑧ After selecting an address, press the SET switch, and then the outdoor unit No. and the indoor unit No. are defined.	[I/U 002 O/U 02] (2sec Lighting) →[SET COMPLETE] (2sec Lighting) →Returns to normal condition.

(2) When plural indoor units are connected to the remote controller.
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 controller and the unit No.'s of the outdoor units connected with them.	[I/U 001 O/U 01▲] ⇔[I/U 002 O/U 01 ⬍] ⇔[I/U 003 O/U 01 ⬍] ⇔ · · · ⇔[I/U 016 O/U 01▼]
		⑤ Then the address No. of the indoor unit to be changed is determined and the screen switches to the display " ⬍SET I/U ADD."	[⬍ SET I/U ADD.] (1sec) →[I/U 001 ⬍](Blink)
3	Setting a new indoor unit No.	⑥ Set a new indoor unit No. with the ⬍ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔[I/U 001 ⬍] ⇔[I/U 002 ⬍] ⇔ · · · ⇔[I/U 127▼]
		⑦ After selecting an address, press the SET switch. Then the address No.of the indoor unit is determined.	[I/U 002] (2sec)
4	Setting a new outdoor unit No.	⑧ The display will indicate the determined indoor address No. for 2 seconds and then switch to the " ⬍SET O/U ADD." screen. A default value shown on the display is the current address.	[I/U 002] (2sec lighting) ⇔[⬍ SET O/U ADD.](1sec) ⇔[O/U 01 ⬍] (Blink)
		⑨ Set a new outdoor unit No. with the ⬍ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔[O/U 01 ⬍] ⇔[O/U 02 ⬍] ⇔ · · · ⇔[O/U 31▼]
		⑩ After selecting an address, press the SET switch. Then the address of the indoor unit and outdoor unit are determined.	[I/U 002 O/U 02](2sec lighting) →[⬍ SELECT](1sec lighting) →[I/U SELECTION▼](lighting)
		⑪ If you want to continue to change addresses, return to step ④.	[Press the ⬍switch](1sec) →[SET COMPLETE] (2~10sec lighting)
5	Ending the session	⑫ If you want to end the session (and reflect new address settings) In Step ⑩, press the ▼ switch to select "END ▲." If you have finished changing addresses, press the SET switch while "END ▲" is shown. While new settings are being transmitted, "SET COMPLETE" will be indicated. Then the remote controller display will change to the normal state.	[END▲] →[SET COMPLETE] (2~10sec lighting) →Normal state
		⑬ If you want to end the session (without reflecting new address settings) Before you complete the present address setting session, press the "ON/OFF" switch. Then the display is change to exit from this mode and switch the display to the normal state. All address settings changed in the session will be aborted and not reflected.	[ON/OFF] →Forced termination

The ⬍switch will continuously change the display indication to the next one in every 0.25 seconds when it is pressed for 0.75 seconds or longer.
If the Reset switch is pressed during an operation, the display indication returns to the one that was shown before the last Set switch operation.
Even if an indoor unit No. is changed in this mode, the registered indoor unit No. before address change mode is displayed when [I/U SELECTION▼] is shown.
When "SET COMPLETE" is shown, indoor unit No.'s are registered.

NOTICE Turn on power to centralized control equipment after the addresses are determined.
Turning on power in wrong order may result in a failure to recognize addresses.

● 7 segment display indication in automatic address setting

Items that are to be set by the customer

Code	Contents of a display
P30	Communication protocol 0: 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 outdoor unit.
AUE	Indoor unit address setting is completed normally.
End	Polarity is defined. (Automatic address) Completed normally.

Address setting failure indication

Code	Contents of a display	Please check
A00	Unable to find any indoor unit that can be actually communicated with.	Are signal lines connected properly without any loose connections? Is power for indoor units all turned on?
A01	The number of the indoor units that can be actually communicated with is less than the number specified in P33 on the 7 segment display panel.	Are signal lines connected properly without any loose connections? Input the number of connected indoor units again.
A02	The number of the indoor units that can be actually communicated with is more than the number specified in P33 on the 7 segment display panel.	Are signal lines connected properly without any loose connections? Are the network connectors 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
E2	Duplicating indoor unit address.	• Incorrect manual address setting
E3	Incorrect pairing of indoor-outdoor units.	• An outdoor unit number that does not exist in the network is specified • No master unit exists in combination outdoor unit.
E11	Address setting for plural remote controllers.	• Indoor unit address is set from plural remote controllers.
E12	Incorrect adderess setting of indoor units.	• Automatic address setting and manual address setting are mixed.
E31	Duplicating outdoor unit address.	• Plural outdoor units are exist as same address in same network.
E46	Incorrect setting.	• Automatic address setting and manual address setting are mixed.

7-2. Selection of controls

Controls of outdoor unit may be selected as follows using the dip switches on the PCB and C○○, P○○ on the 7-segment.
To change C○○, P○○ on the 7-segment, hold down SW8 (7-segement display increment up: 1-digit), SW9 (7-segment increment up: 10-digit) and SW7 (Data write/Enter).

Unit set※1	Control selecting method		Content of control
	SW setting on PCB	C○○, P○○ on 7-segment	
Master	SW3-2 to ON	—	Automatic back up operation
Master	SW3-7 to ON *2	Set external input function allocation to "2" *2	Forced cooling mode (It can be fixed at cooling with external input terminals opened, or at heating with them closed.)
Master	SW5-1 to ON + SW5-2 to ON	—	Cooling test run
Master	SW5-1 to ON + SW5-2 to OFF	—	Heating test run
Master	Close the fluid operation valve on outdoor unit and set as follows: (1) SW5-2 on PCB to ON (2) SW5-3 on PCB to ON (3) SW5-1 on PCB to ON	—	Pump down operation
Master	SW4-5:OFF, SW4-6:OFF*2 80% (Factory default) SW4-5:ON , SW4-6:OFF*2 60% SW4-5:OFF, SW4-6:ON*2 40% SW4-5:ON , SW4-6:ON*2 00%	Set allocation of external allocation to "1" *2	Inputting signals to external input terminals selects the demand mode. (J13 short-circuited: Level input, J13 open: Pulse input)
Master	SW5-5	—	Communication method selection ON: Previous SL communication, OFF: New SL communication
Master/slave	SW6-3 to ON	—	High static pressure mode
Master	J13: Closed (Factory default), J13: Opened	—	External input selection (CnS1, CnS2 only) Closed: Level input, Opened: Pulse input
Master/slave	J14: Closed (Factory default), J14: Opened		Defrosting mode is switched. (will enter defrosting mode more frequently)
Master/slave	J15: Closed (Factory default), J15: Opened	—	Defrost selection Closed: Normal defrosting, Opened: Forced defrosting
Master	—	C70	Operation priority selection 0: First push priority (at shipping) 1: Last push priority
Master/slave	—	C75	Outdoor unit fan snow protection control 0: Control disabled (at shipping) 1: Control enabled
	—	P11	Allocation of external input (CnS1)
	—	P12	Allocation of external input (CnS2)
	—	P13	Allocation of external input (CnG1)
	—	P14	Allocation of external input (CnG2)
Master/slave	—	P16	Outdoor unit fan snow protection control ON time setting - 30 sec (at shipping) 10, 30-600 sec

※1 "Unit set" shown in the above table refers to the master/slave setting of units comprising a combined installation.
Master: control mode setting required for the master unit only (setting not required with the slave unit).
Master/slave: control mode setting required for both master and slave units.
※2 Control is switched when both the allocation of external input function (P11～14) and SW are changed.
(Example: To use CnS1 for the input of forced cooling mode, set P11 at 2 and SW3-7 at ON. To use CnS2 for the input of forced cooling mode, set P12 at 2 and SW3-7 at ON.)

By changing the allocation of external input functions (P11～14) 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 closed	With external input terminals opened
"0" : External operation input	Invalid	Valid
"1" : Demand input	Invalid	Valid
"2" : Cooling/heating forced input	Valid	Invalid
"3" : Silent mode input	Valid	Invalid
"4" : Spare		
"5" : Outdoor fan snow guard control input	Valid	Invalid
"6" : Test run external input 1 (equivalent to SW5-1)	Test run start	Normal
"7" : Test run external input 2 (equivalent to SW5-2)	Cooling	Heating
"8" : Silent mode 2	Valid	Invalid
"9" : Spare		

7-3. External input and output terminals specifications

Name	Purpose (Factory default)	Specification	Operating side connector
External input CnS1	External operation input (Closed at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAMK-1 (LF) (SN)
External input CnS2	Demand input (Closed at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XARK-1 (LF) (SN)
External input CnH1	Cooling / Heating forced input (Opened at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAEK-1 (LF) (SN)
External input CnG2	Silencing mode input (Opened at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XASK-1 (LF) (SN)
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 supply terminal block and ground, when measured with a 500V megger, is greater than 1 MΩ.**
(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 6-3. Standard resistance valve.)
(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 outdoor 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.**

> **CAUTION**
> Please make sure that the operation valves (gas, liquid, oil equalizing 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 outdoor 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 outdoor 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 (Outdoor temperature: 0 – 43°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.)

(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 outdoor 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: SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, -7, -8 (Capacity measurement mode). (In case of combination, on both main 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-segent indicator during check operation

Code indicato	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.)
HO	---	Check operation on. (Including preparation operation on). (Indicated only on slave unit of combination.)
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 indicato	Data indicator	Display contents	Check following points
CHL	---	Operation valve is closed. (Refrigerant circuit is shut off partially.)	• Isn't the operation valve of outdoor 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 outdoor 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 outdoor unit? • Are signal cables connected without play? • Hasn't the SW setting been changed during the check operation?
CHE	Abnormal indoor unit No.	Abnormal ending of check operation. Indoor unit of which No. is displayed is abnormal.	• Isn't any error displayed (E??) on the indoor unit or outdoor unit? • Are signal cables connected without play? • Is the power supply to the indoor unit turned on?

※ 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. Refrigerant quantity check

Refrigerant quantity check tells you whether the refrigerant quantity is excessive (over) or insufficient (low).
(Even if the check operation is not practiced, the test run and normal operation can be performed.)
For further details regarding the check operation refer to the technical data.
It must be noted that, during the check operation, the outdoor units and the indoor units are operated automatically.

Important

- **Practice the refrigerant quantity check operation only after charging the measured quantity of additional refrigerant.**
- **It is necessary to add or reduce the refrigerant depending on the result of refrigerant quantity check. Even when it has been judged that proper quantity of refrigerant is retained, the result could become inadequate if the operating conditions are changed.**
- **It should be noted, therefore, that a result under particular conditions cannot cover all operating conditions.**

(1) Guideline of accuracy

Guidelines of judgment on the refrigerant quantity are as shown below.
It should be noted that the result of judgment could vary depending on the conditions of judgment.

Refrigerant quantity over	+10 kg (Single machine) +20 kg (Combination machine)
Low refrigerant quantity	20% of the additional refrigerant quantity for piping (P)

(2) Confirmation before implementing the refrigerant quantity check

Confirm on all of the followings before starting the refrigerant quantity check.

- Confirm that it has been completed all works up to "8-1 Before starting operation".
- Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the outdoor unit capacity.
- Check operation cannot be done when the system communication method is that of previous SL.
- Check operation cannot be done when the system is stopped by an error.
- Practice the check operation within applicable operation temperature range (Outdoor temperature: 10 - 43°C, room temperature: 15 - 32°C). Check operation will not start out of these ranges.
- Start the check operation only at 5 minutes after stopping all indoor units.

(3) Method of refrigerant quantity check operation

(a) Starting the refrigerant quantity check operation

- Confirm that all of the following switches are turned OFF; SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, 7, 8 (Capacity measurement mode). (In case of combination, on both master/slave units)
- At the next, turn the SW3-4 (Refrigerant quantity check operation) OFF → ON (only on master unit in case of combination) so that the check operation will start.
- It takes 60 ~ 75 minutes normally from the start to the end of check operation.

(b) End of refrigerant quantity check operation and result display

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

< Normal ending >

- 7-segment indicator shows "Co End".
- Return the SW3-4 to OFF. 7-segment indicator returns to normal display.

< Abnormal ending >

- 7-segment indicator shows an error alarm.
- Repair the faulty section referring to the guidance, and return the SW3-4 to OFF.
- At the next, repeat the check operation from the Step (2) above.

(4) After the refrigerant quantity check operation

Following codes may be displayed at the end of check operation, other than "Co End".
Check and take action according to the contents of remedy. And then, repeat the check operation.

Display on 7-segment indicator after the check operation (Displayed on master unit only in case of combination.)

Code indicator	Data indicator	Meaning	Remedy
Co	Hi	Refrigerant quantity over	① Too much refrigerant is charged. Reduce the quantity. < Guidelines of reduction > ・Single machine:10 kg ・Combination machine:20 kg Make sure to recover the refrigerant from the check joint of liquid pipe operation valve using the refrigerant recovery device.
Co	Lo	Low refrigerant quantity	① Refrigerant quantity is insufficient. Recharge the refrigerant. < Guideline of recharge> ・20% of the additional refrigerant quantity for piping* (Upper limit: 5 kg) Recharge the refrigerant in the liquid state from the check joint of low pressure line. Make sure to measure the quantity before recharging.
Co	H_L	Couldn't judge.	It cannot judge (a state that it cannot judge properly). State of refrigerant might have been unstable during the check operation due to influence of wind, temperature change, etc. ①Check the expansion valve of indoor unit (disconnected coil, disconnected connector or faulty expansion valve). ② Implement at a later date by changing the conditions.
Co	---	Judgment was interrupted.	Check the following points. ① Haven't you changed the setting of dip switches after the start? Return them to original setting. ② Is any error code (E??) displayed? If Yes, refer to the troubleshooting section in the technical data.
Co	HE	Starting conditions are not met.	Starting conditions are not met so that it cannot start the check operation. Refer to "(2) Confirmation before implementing the refrigerant quantity check".

※ "Additional refrigerant quantity for piping" means the value of "Additional refrigerant quantity for piping (P)" in the Section 4-4 Additional refrigerant charge.

Other errors than above may also be displayed if errors are detected. In such occasion, inspect by referring to the separate technical data.

8-4. Test operation

(1) Test run from an outdoor 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 outdoor 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 an outdoor 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.

8-5. TRANSFER

○Use the instruction manual that came with the outdoor 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 ice machine 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 3, Refrigerant piping.
(4) Diagnostic Inspection Procedures
For the meanings of failure diagnosis messages, please refer to the nameplate provided on the unit (on the back of the controller 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 face of the controller lid)

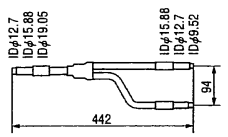
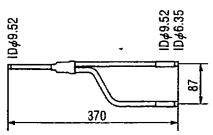
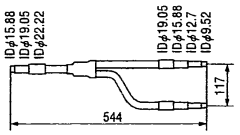
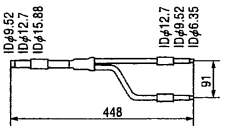
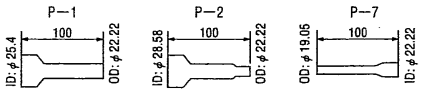
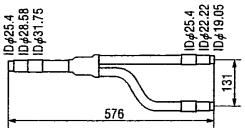
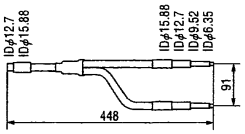
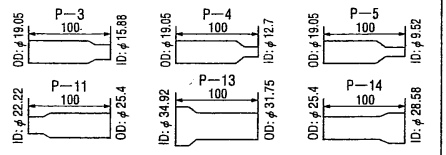
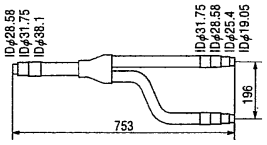
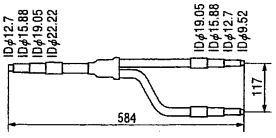
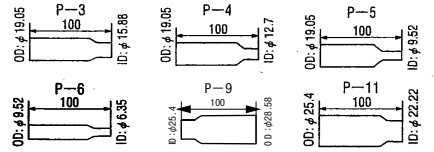
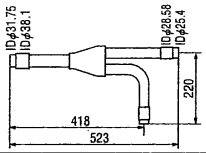
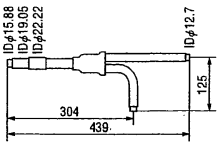
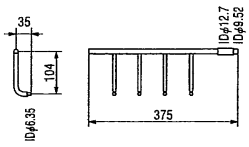
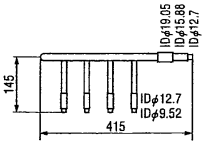
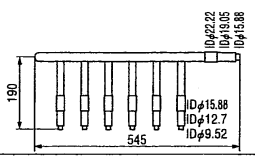
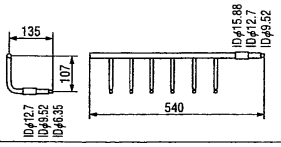
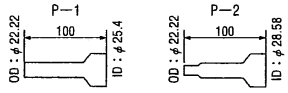
Backup operetion function is only for emergency purpose when one of compressors or one of units is damaged. If backup operation is performed continuously for long period, it may cause the damage of good compressors. Accordingly be sure to repair the damaged unit or to replace the damaged compressor and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

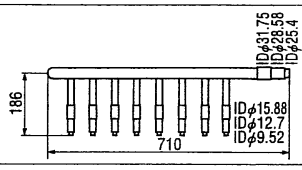
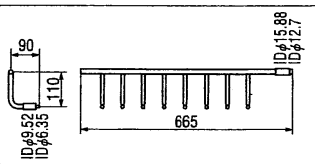
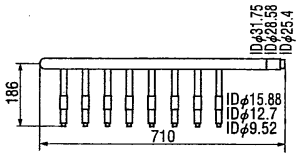
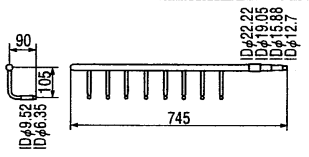
5.5 Instructions for installing the branch pipe set

PSB012D855B

◎This manual describes the specifications of branching pipe set and header set installation. For outdoor unit installation and indoor unit installation, please refer to the respective installation manuals supplied with your outdoor unit and indoor unit.
◎Before you set about installation work, please read this manual carefully so that you can carry out installation work according to the instructions contained herein.
●Please read the safety instructions contained in the installation manual supplied with your outdoor unit carefully and carry out installation work unerringly.
●When installation work is completed, conduct a test run to check the installation for any anomaly. Please also give the customer necessary instructions as to the operation and maintenance of the unit pursuant to the instruction manual (supplied with the indoor unit).
●Please ask the customer to keep the installation manual on the customer's part together with the instruction manual.

PARTS LIST

Branching pipe set type	Gas side	liquid side	Different diameter pipe joint
DIS-22-1			None
DIS-180-1			
DIS-371-1			
DIS-540-2			
DOS-2A-1 (Outdoor units used in combination)			None
HEAD4-22-1			None
HEAD6-180-1			

Branching pipe set type	Gas side	liquid side	Different diameter pipe joint
HEAD8-371-1			None
HEAD8-540-2			

INSTALLATION PROCEDUCE

1. Please select an appropriate branching pipe set model and a pipe size by consulting with the installation manual of the indoor unit or other relevant technical documents.

Attention

①Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and a branching pipe.

②Use a pipe conforming to a pipe size specified for outdoor unit connection for the section between an outdoor branching pipe and an outdoor unit.

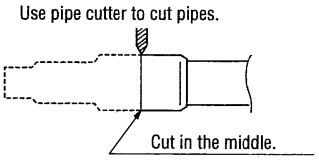
2. Cut a branching pipe set or a different diameter joint with a pipe cutter to make it fit for a selected pipe size before application.

Attention

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

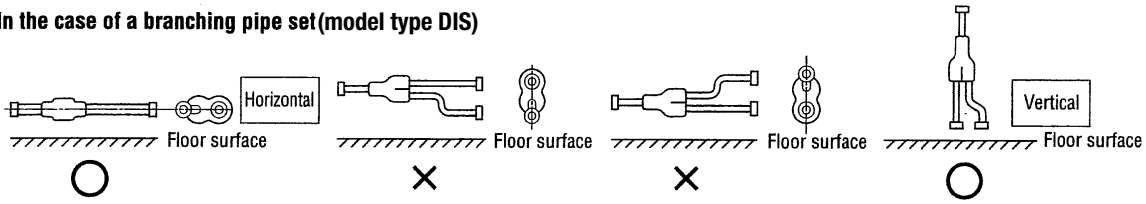
② Take utmost care so that no foreign matter such as dust or water may enter piping during installation work.

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

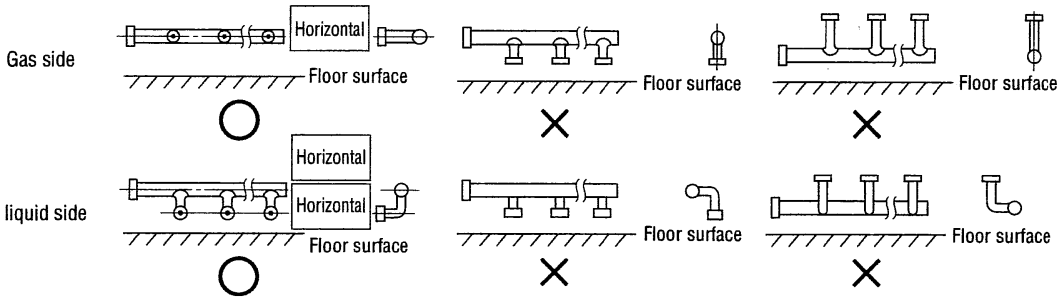


③ A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.

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



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



④ Always apply nitrogen gas when soldering joints. If nitrogen gas is not applied, a large amount of film oxide will be formed which could lead to a critical failure in the unit. Use caution to prevent moisture or any foreign matters from entering the pipe when connecting pipe ends.
For the method of air tightness testing and pulling air, please refer to the installation manual of the outdoor unit.

⑤ Do not leave piping with any open ends uncovered to prevent water or foreign matters from entering inside.

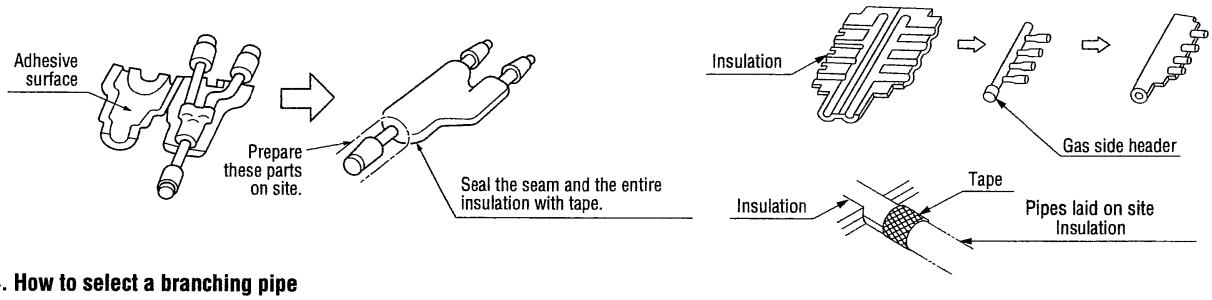
3. Please dress it with an attached insulation sheet for heat insulation. (Please dress both liquid and gas sides)

Attention

① Apply 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) How to select a branching pipe set

- 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-22-1. (Even if the capacity of connected indoor units reaches 180 or higher, select DIS-22-1.)

Total capacity downstream	Branching pipe set model type
less than 180	DIS-22-1
180 or higher – less than 371	DIS-180-1
371 or higher – less than 540	DIS-371-1
540 or more	DIS-540-2

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 HEAD4-22-1. (Even if the capacity of connected indoor units reaches 180 or higher, select HEAD4-22-1.)

Total capacity downstream	Header set model type	Number of branches
less than 180	HEAD4-22-1	Up to 4 branches
180 or higher – less than 371	HEAD6-180-1	Up to 6 branches
371 or higher – less than 540	HEAD8-371-1	Up to 8 branches
540 or more	HEAD8-540-2	Up to 8 branches

Attention

① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between a header and an indoor unit.

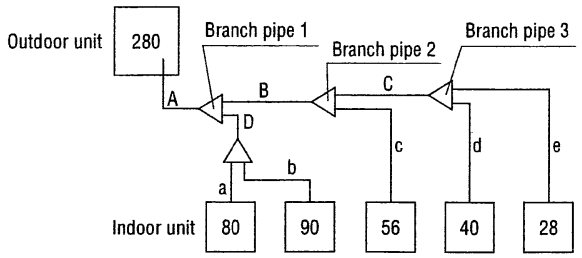
② Always position a header (both gas and liquid headers) in such a way that it branches horizontally.

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

5. Example of piping

Example 1: Branching type configuration

Connected capacity: 294

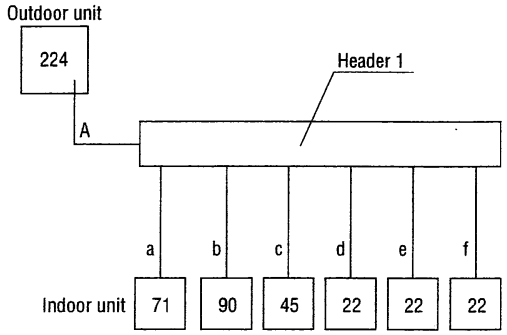


Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (80+90+56+40+28)=294	DIS-180-1
Branch pipe 2	Combined total capacity of indoor units connected downstream (56+40+28)=124	DIS-22-1
Branch pipe 3	Combined total capacity of indoor units connected downstream (40+28)=68	DIS-22-1

Example 2: Header type configuration

Connected capacity: 272

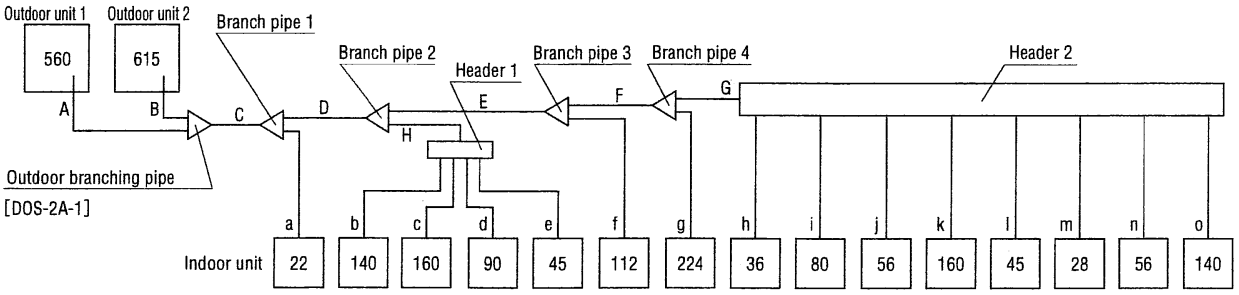


Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (71+90+45+22+22+22)=272	HEAD6-180-1

Example 3: Branching + Header mixed type configuration

Connected capacity: 1394



Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (22+140+160+90+45+112+224+36 +80+56+160+45+28+56+140)=1394	DIS-540-2
Branch pipe 2	Combined total capacity of indoor units connected downstream (140+160+90+45+112+224+36+80 +56+160+45+28+56+140)=1372	DIS-540-2
Branch pipe 3	Combined total capacity of indoor units connected downstream (112+224+36+80+56+160+45+28 +56+140)=937	DIS-540-2
Branch pipe 4	Combined total capacity of indoor units connected downstream (224+36+80+56+160+45+28+56 +140)=825	DIS-540-2

Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (140+160+90+45)=435	HEAD8-371-1
Header 2	Combined total capacity of indoor units connected downstream (36+80+56+160+45+28+56+140)=601	HEAD8-540-2

INVERTER DRIVEN MULTI-INDOOR-UNIT CLIMATE CONTROL SYSTEM

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