HITACHI
Inspire the Next

DC-INVERTER HVRNE SERIES

Service Manual

Outdoor Units: 3 ~ 6 HP
Indoor Units Type:

- 4-Way Cassette
- 2-Way Cassette
- Ceiling
- In-the-Ceiling
- Wall
- Floor
- Floor Concealed

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Code List Units

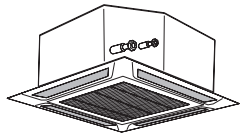
NOTE:

MODELS CODIFICATION

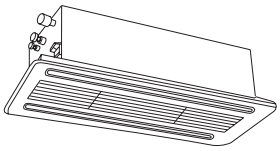
Please check, according to the model name, which is your air conditioner type and how it is abbreviated and referred to in this technical catalogue.

INDOOR UNITS FSN(E/M)

4-Way-Cassette		2-Way-Cassette		Ceiling		In-The-Ceiling	
Unit	**Code**	**Unit**	**Code**	**Unit**	**Code**	**Unit**	**Code**
RCI–1.5FSN1E	7E861619	**RCD–1.5FSN**	60277814	**–**	–	**RPI–1.5FSNE**	7E877304
RCI–2.0FSN1E	7E861621	**RCD–2.0FSN**	60277815	**RPC–2.0FSNE**	7E872055	**RPI–2.0FSNE**	7E872024
RCI–2.5FSN1E	7E861620	**RCD–2.5FSN**	60277816	**RPC–2.5FSNE**	7E872030	**RPI–2.5FSNE**	7E872025
RCI–3.0FSN1E	7E871770	**RCD–3.0FSN**	60277817	**RPC–3.0FSNE**	7E872058	**RPI–3.0FSNE**	7E872031
RCI–3.5FSN1E	7E871779	**–**	–	**RPC–3.5FSNE**	7E872057	**RPI–3.5FSNE**	7E872035
RCI–4.0FSN1E	7E871780	**RCD–4.0FSN**	60277818	**RPC–4.0FSNE**	7E872059	**RPI–4.0FSNE**	7E872032
RCI–5.0FSN1E	7E871790	**RCD–5.0FSN**	60277819	**RPC–5.0FSNE**	7E872060	**RPI–5.0FSNE**	7E872033
RCI–6.0FSN1E	7E871794	**–**	–	**RPC–6.0FSNE**	7E872061	**RPI–6.0FSNE**	7E872034



RCI



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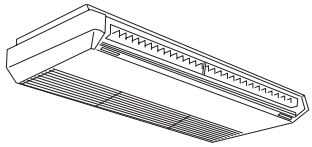
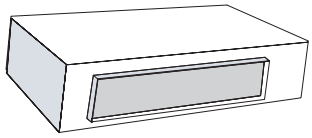


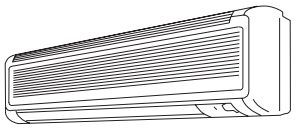
RPC



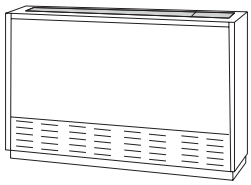
RPI

INDOOR UNITS FSN(E/M)

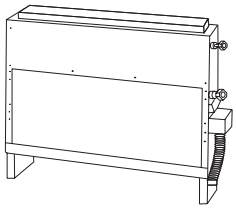
Wall		Floor		Floor Concealed	
Unit	**Code**	**Unit**	**Code**	**Unit**	**Code**
RPK–1.5FSNM	60277825	**RPF–1.5FSNE**	7E877716	**RPFI–1.5FSNE**	7E877720
RPK–2.0FSNM	60277826	**RPF–2.0FSNE**	7E877309	**RPFI–2.0FSNE**	7E877311
RPK-2.5FSNM	60277844	**RPF–2.5FSNE**	7E877310	**RPFI–2.5FSNE**	7E877312
RPK-3-0FSNM	60277845	**–**	–	**–**	–
RPK-4.0FSNM	60277847	**–**	–	**–**	–



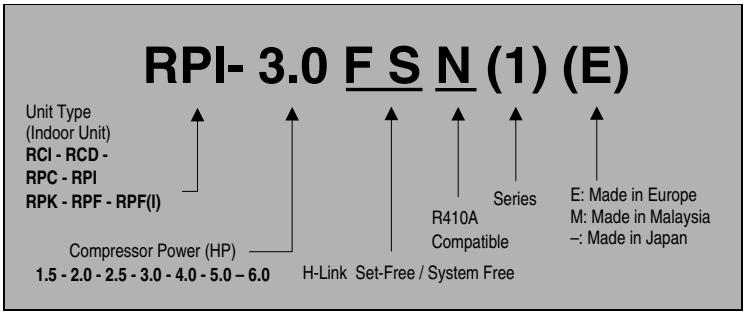
RPK

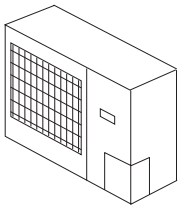
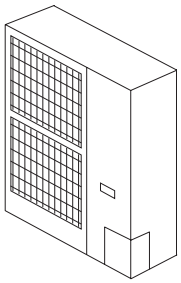


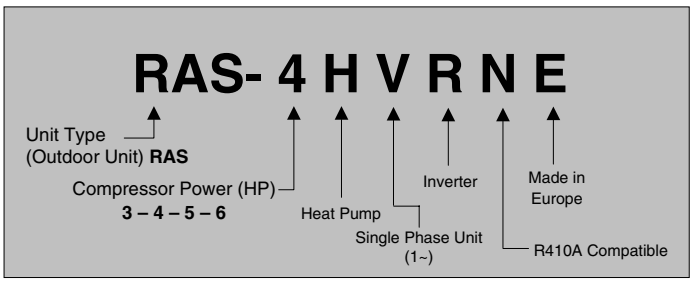
RPF



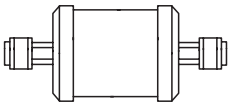
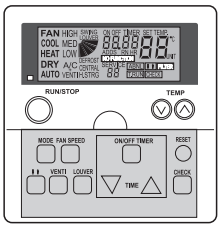
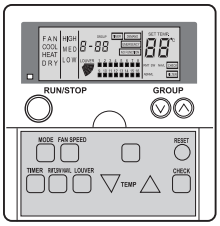
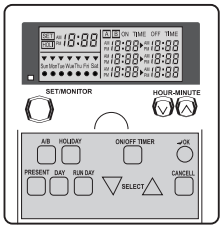
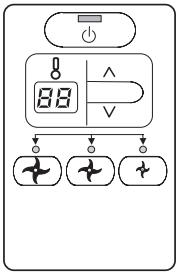
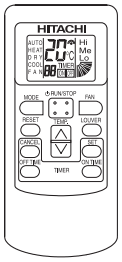
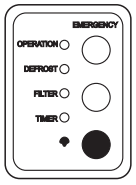
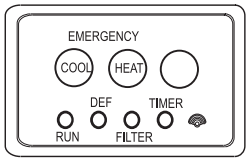
RPFI

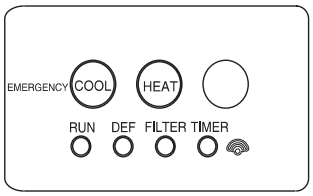
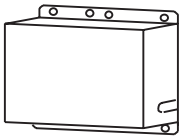
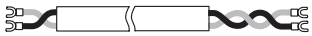
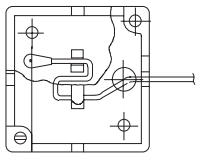
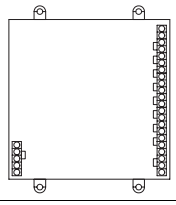
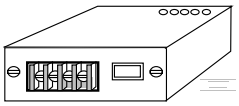
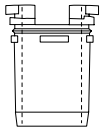
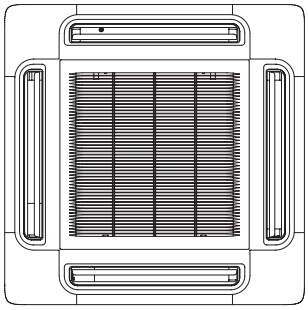
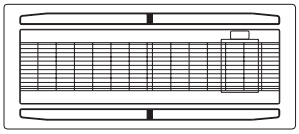


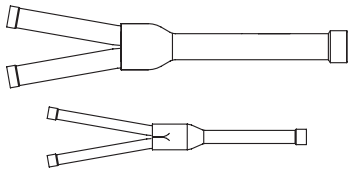
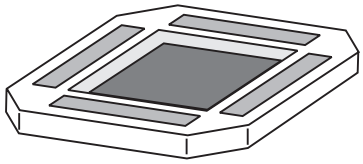
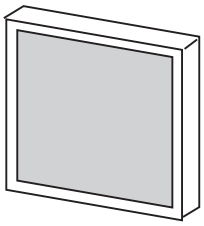
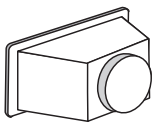
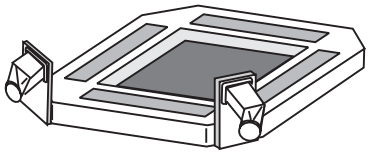
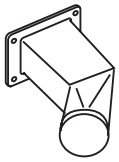
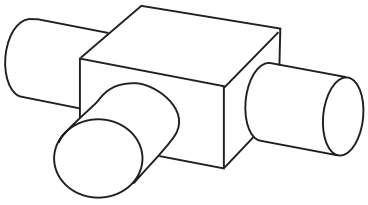
DC INVERTER			
Model	**Code**	**Model**	**Code**
RAS-3HVRNE	7E878651		
		RAS-4HVRNE	7E878652
		RAS-5HVRNE	7E878653
		RAS-6HVRNE	7E878656
❄ 1~			
			



CODE LIST ACCESSORIES

Accesory	Name	Code	Figure
D-2AVE	Drier R407C	7E799901	
D-2HVE	Drier R407C	7E799902	
D-10AVE	Drier R407C	7E799903	
D-10HVE	Drier R407C	7E799904	
PC-P1HE	Remote Control Switch	7E799954	
PSC-5S	Central Station	60291050	
PSC-5T	7 Day Timer	60291052	
PC-P5H	Optional Remote Controller	60290879	
PC-LH3A	Wireless Control Switch	60291059	
PC-RLH11	Receiver Kit for RCI, RCD, RPC, RPI, RPK and RPF(I) on the wall	60291109	
PC-RLH8	Receiver kit for RCI-FSN1E on the panel	60299961	

Accesory	Name	Code	Figure
PC-RLH9	Receiver Kit for RCI-FSN on the panel	60291107	
PSC-5HR	H-LINK Relay	60291105	
PCC 1A	Optional Function Connector	60199286	
PRC-10E1	2P Extension Cord	7E790211	
PRC-15E1	2P-Extension Cord	7E790212	
PRC-20E1	2P-Extension Cord	7E790213	
PRC-30E1	2P-Extension Cord	7E790214	
THM-R2AE	Remote Sensor (THM4)	7E799907	
HARC-BXE (A) HARC-BXE (B)	Interface	60290874 60290875	
CS-NET (HARC-40E)	CS-Net + Interface	6E191922	
DBS-26	Drain Discharging Boss	60299192	
P-G23WA2	Air Panel for RCI-FSN1E	60290535	
P-G23DWA1	Air Panel for RCD-FSN	60299570	
P-G46DWA1	Air Panel for RCD-FSN	60299571	

Accesory	Name	Code	Figure
TE-03N	Distributors	7E800007	
TE-04N	Distributors	7E800008	
TE-56N	Distributors	7E800009	
B-23H4	Adapter for deodorant filter	60199790	
F-23L4-K	Anti bacteria filter	60199791	
F-23L4-D	Deodorant filter	60199793	
F-46L4-D	Deodorant filter	60199794	
PDF-23C3	Duct connection flange	60199795	
PDF-46C3	Duct connection flange	60199796	
OACI-232	Fresh air intake kit	60199797	
PD-75	Fresh air intake kit	60199798	
PI-23LS5	3 Way outlet parts	60199799	
TKCI-232	T duct connecting kit	60199801	

1 UNITS INSTALLATION

This chapter provides information about the procedures you must follow to install the DC Inverter outdoor units and the complete range of Hitachi indoor units..

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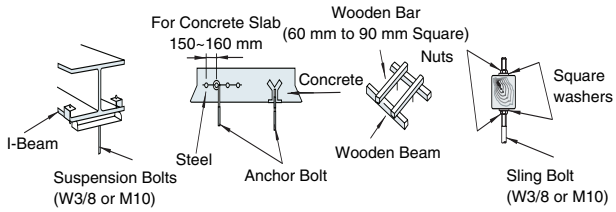
WARNING:

- *Check to ensure that the accessories are packed with the indoor unit.*
- *Do not install the indoor units outdoors. If installed outdoors, an electric hazard or electric leakage will occur.*
- *Consider the air distribution from each indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained. It is recommended that the indoor units be installed 2.3 to 3 meters from the floor level. If the unit is installed higher than 3 meters, it is also recommended that a fan be utilised to obtain uniform air temperature in the room.*
- *Avoid obstacles which may hamper the air intake or the air discharge flow.*
- *Pay attention to the following points when the indoor units are installed in a hospital or other places where there are electronic waves from medical equipment, etc.*
- *Do not install the indoor units where electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.*
- *Install the indoor units and components as far as practical or at least 3 meters from the electromagnetic wave radiator.*
- *Prepare a steel box and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then connect the ground wire with the box and tube.*
- *Install a noise filter when the power supply emits harmful noises.*
- *This unit is exclusive non-electrical heater type indoor unit. It is prohibited to install an electrical heater in the field.*
- *Mount suspension bolts using M10 (W3/8) as size, as shown below:*



CAUTION:

- *Do not install the indoor units in a flammable environment to avoid a fire or an explosion.*
- *Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.*
- *Do not install the indoor units, outdoor unit, remote control switch and cable within approximately 3 meters of strong electromagnetic wave radiators such as medical equipment.*
- *Do not install the indoor units in a machinery shop or kitchen where vapor from oil or mist flows to the indoor units. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform. In the worst case, the oil damages the plastic parts of the indoor unit.*
- *To avoid any corrosive action to the heat exchangers, do not install the indoor units in an acid or alkaline environment.*

1.1. TRANSPORTATION OF THE OUTDOOR UNIT

Transport the product as close to the installation location as practical before unpacking.

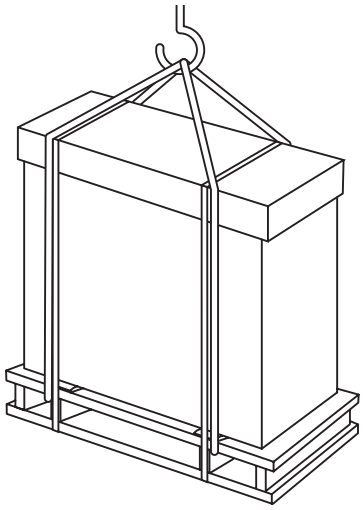
CAUTION:
- *Do not put any material on the product.*
- *Apply two lifting wires onto the outdoor unit, when lifting it by crane.*

■ Hanging Method
When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly.

1 Do not remove any packing materials.

2 Hanging Method

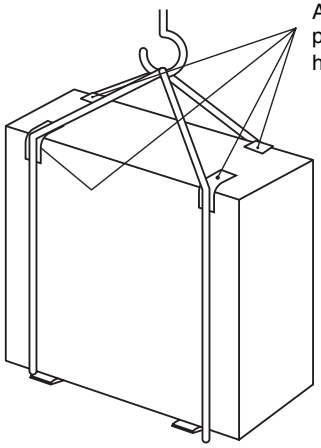
Hang the unit under packing condition with four (4) ropes. Push through the wire ropes into the hang hole and clamp the wires by using shackle as shown below.



Hanging Work for Transportation

NOTE:
In case of transportation after unpacking, protect the unit with the splints or cloth.

■ Hanging Work without Wooden Base



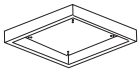
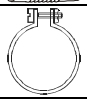
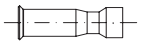
WARNING:
Do not put any foreign material into the outdoor unit and check to ensure that none exists in the outdoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

1.2. RCI (4-WAY CASSETTE TYPE)

1.2.1. FACTORY-SUPPLIED ACCESSORIES

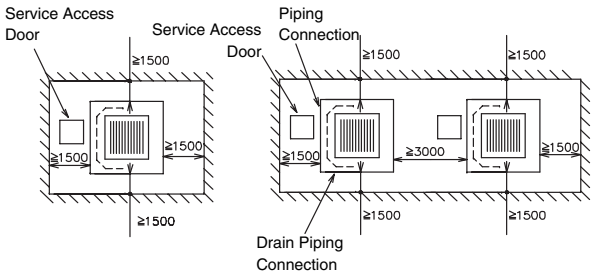
Make sure that the following accessories are packed with the unit.

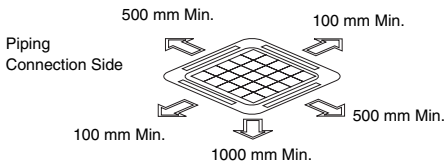
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

Accessory	Qty.	Purpose
Paper Pattern (Carton Board) 	1	For Adjusting Space of False Ceiling Opening and Position of the Unit
Cross Recessed Head Screws 	4	For Fitting Paper Pattern
Washer with Insulation 	4	For Unit Installation
Washer (M10) 	4	
Drain Hose 	1	For Drain Hose Connection
Wire Clamp 	2	
Reducer 	1	For RCI-(4.0/5.0/6.0) FSN1E (R410A only)

1.2.2. INITIAL CHECK

- Install the indoor unit with a proper clearance around it paying careful attention to the installation direction for the piping, wiring and maintenance working space, as shown below.
- Provide a service access door near the unit piping connection area on the ceiling.

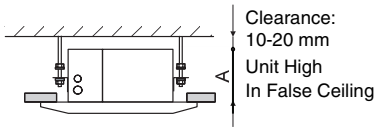




Service Space

CAUTION:
The minimum distance between the wall and panel edge must be 1500 mm to prevent short-circuiting.

- Check space between ceiling and false ceiling is enough as indicated below.
- Check the ceiling surface is flat for the air panel installation work.

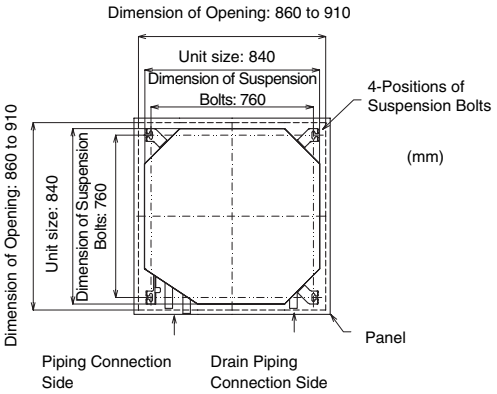


Unit HP	A(mm)
RCI-1.5 to 2.5HP	248
RCI-3.0 to 6.0HP	298

- Check down slope Pitch of Drain Piping is following the specifications indicated in chapter Drain Piping.

■ Opening of false ceiling

- Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below:



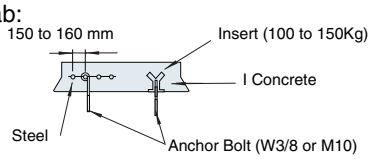
- Check to ensure that the ceiling is horizontally level, otherwise water can not flow.
- Strengthen the opening parts of the false ceiling.

1.2.3. INSTALLATION

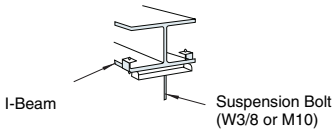
■ Mounting the suspension bolts

- Mount the suspension bolts, as shown.

For concrete slab:

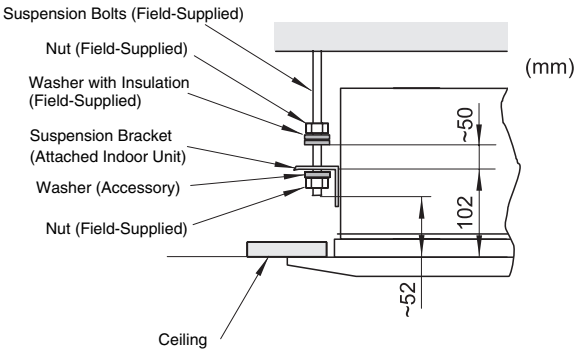


For steel beam:

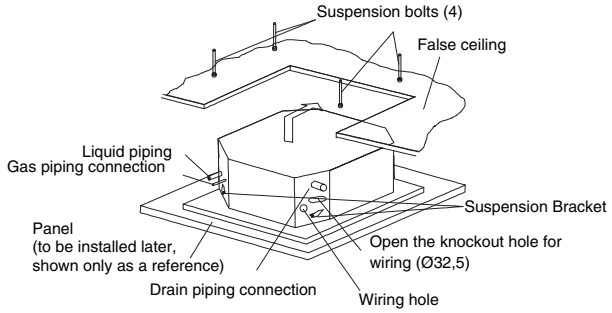


■ Mounting the indoor unit

- Mount the nuts and the washers to the suspension bolts.
- Put the washer so that the surface with insulation can face downwards as shown below:



- Consider piping connection side before lift indoor unit.
- Lift the indoor unit by hoist, and do not put any force on the drain pan.
- Secure the indoor unit using the nuts and washers.



- Check the level of the drain pan by a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

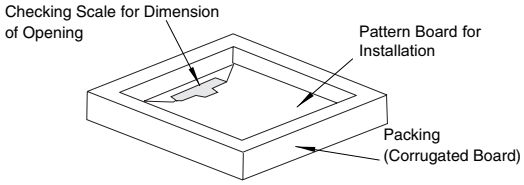
NOTE:

– *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*

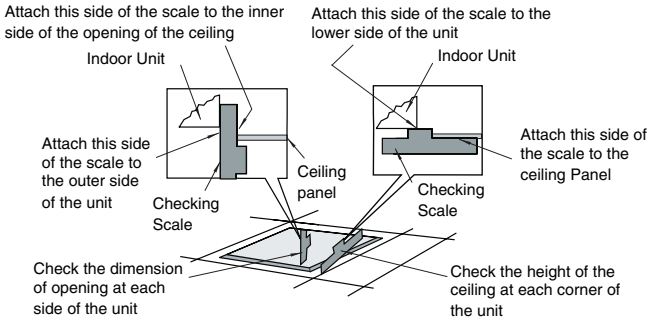
– *Secure the indoor unit using the nuts, flat washers and spring washers. (These nuts and washers are supplied, 4 pieces each).*

■ Adjusting the space between indoor units and false ceiling opening

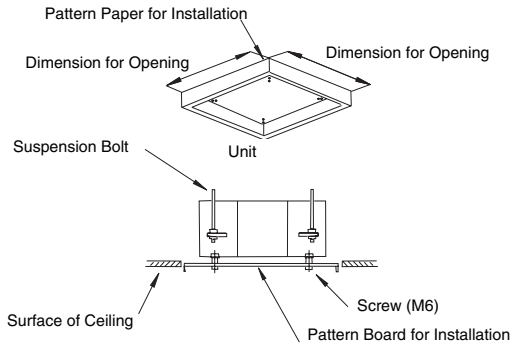
- Adjust the indoor unit to the correct position while checking with the pattern for installation.



■ For ceiling already completed with panels.



■ Ceiling not completed with panels yet.



– Tighten the nuts of the suspension brackets after the adjustment is completed. Apply LOCK-TIGHT paint to the bolts and nuts in order to prevent them from loosening. If not done, abnormal noises or sounds may occur and the indoor unit may come loose.

1.2.4. AIR PANEL INSTALLATION

P-G23WA2

CAUTION:

When the air panel is unpacked, place it on insulation material, etc. to protect the sealing insulation from scratches.

■ Factory-supplied accessories

Check to ensure that the following accessories are packed with the air panel.

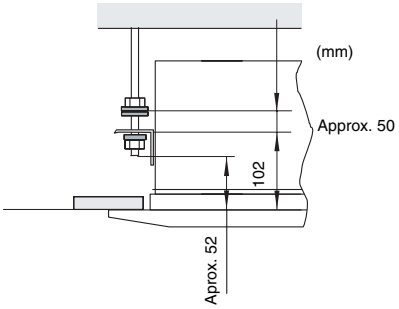
NOTE:

If any of these accessories are not packed with the unit, please contact your dealer.

Accessory	Quantity	Purpose
Long screw (M6×50)	4	For Fixing Panel

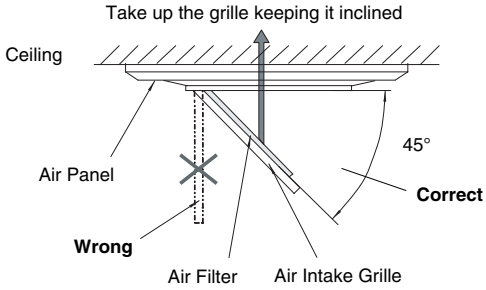
■ Location of suspension brackets

- Check to ensure that the suspension brackets of the indoor unit are located approximately 102 mm higher the false ceiling.



■ Removing the air intake grille from the air panel

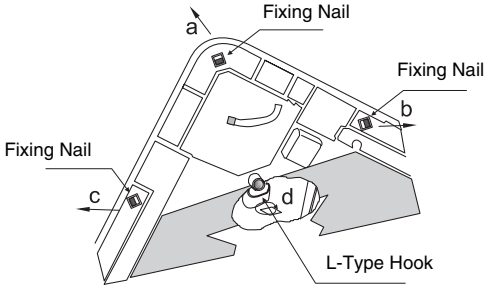
1. Open the air intake grille to an angle of approximately 45° from the surface of the air panel as shown below.



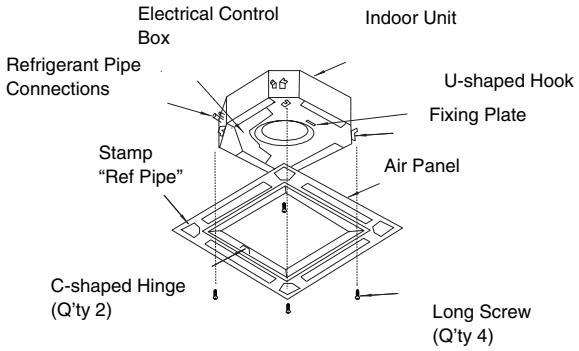
2. Lift the grille keeping it inclined.
3. Draw the grille towards the open space after lifting.

■ Installing the air panel

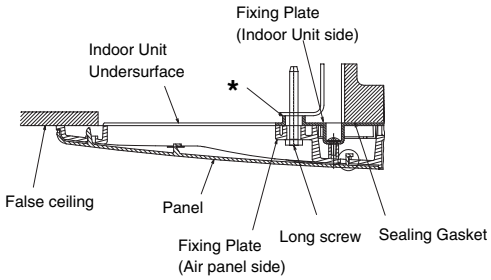
1. Remove the cover of the corner pocket (4 portions).



2. Pull the fixing nail towards the arrow mark according to the order "a", "b" and "c".
3. The corner pocket can be lifted. After lifting, move it in "d" direction, disconnect the L type hook and dismantle the corner pocket.
4. Pull down the U-shaped hook (at 2 positions) located at the indoor unit side.
5. Set the corner fo the refrigerant connection portion of the indoor unit to the position indicated as "Ref. Piping", and hook the C-shaped hinge (2 positions) onto the U-shapped hooks (2 positions) so that temporary positioning is available.
6. Mount the air panel onto the air panel fixing position by using the factory-supplied fixing screws (M6 cross screws)

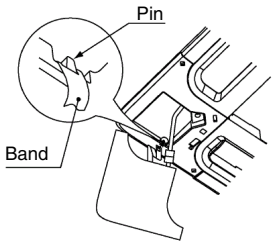


7. Check to ensure that there is no gap around the conctacting surface between the indoor unit and the air panel. Any gap may cause air leakage or dewing.

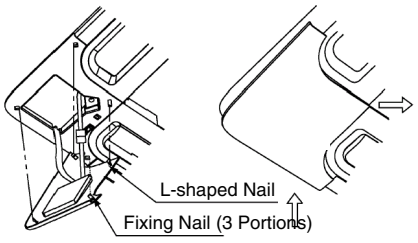


8. Attach the corner pocket covers after mounting air panel:

8.1. Hook the band at the rear side of the cover for the corner pockets onto the pin of the panel as shown below.

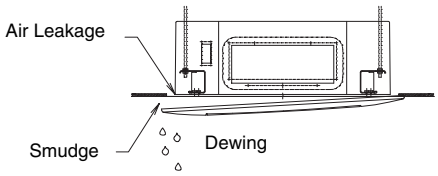


8.2. Hook the L-shapped nail located at the rear side of the cover for the corner pockets onto the square hole of the air panel.

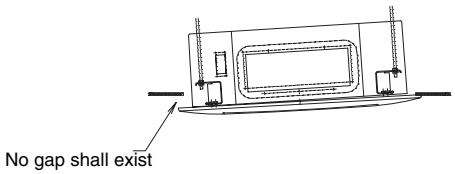


CAUTION:

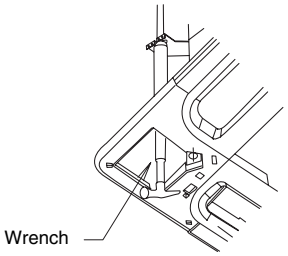
– *If tighten long screws insufficient, may cause something wrong as below.*



– *If any gap has even though tighten long screws sufficient, readjust the height of indoor unit.*

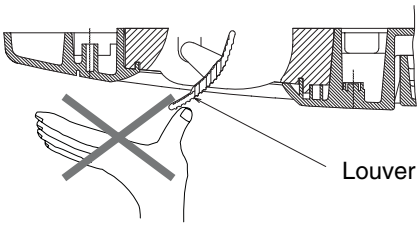


– *When the panel is installed, you can adjust the indoor unit height by using the wrench from the corner pocket.*



– *Too considerable adjustment of height cause dewing from drain-pain.*

– *Do not turn the air louver by hand. If moved, the louver mechanism would be damaged.*



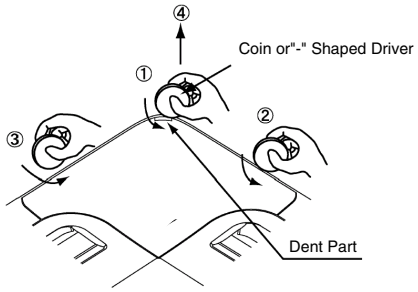
***:** Fix screw until this end touches it

NOTE:

In case that the corner pocket is dismantled after installing the air panel:

1. *The corner can be lifted when a coin or a "- " shaped driver is inserted into the dent part ① and twisted downward.With ① lifted, twist a coin or a "- " shaped driver at the positions ② and ③.*
2. *After disconnecting the fixing nails (3 positions), slide the corner in the arrow direction ④ and remove the receiver kit.*

.

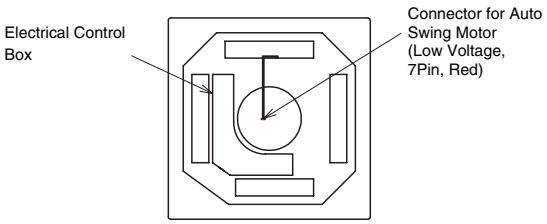


■ Wiring connection for the air panel

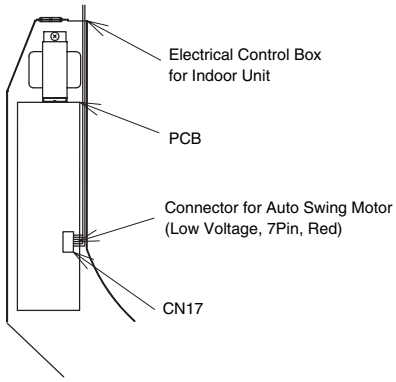
CAUTION:

Before connecting connectors, firstly turn OFF power source. If the connectors are connected without turning OFF the power source, the auto-swing louver cannot function.

1. The following connector is used with the air panel (view from lower surface of air panel without air intake grille)



2. Connect the connectors as shown below (view of the electrical box)



1.3. RCD (2-WAY CASSETTE TYPE)

1.3.1. FACTORY-SUPPLIED ACCESSORIES

Make sure that the following accessories are packed with the unit.

NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

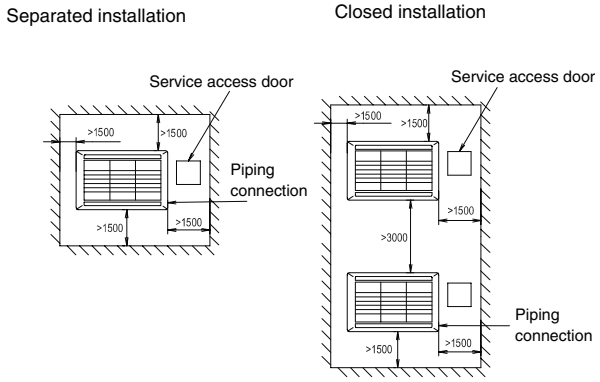
Accessory	Quantity	Purpose
Paper pattern (carton board)	1	For adjusting space of false ceiling opening and position of the unit
Level scaler (take out of paper pattern)	1	
Cross recessed head screws (M6)	6	For fitting paper pattern
Flat washer	8	For unit suspension
Wire clamp	1	For drain hose connection
Insulation (26IDx100 mm)	1	For refrigerant piping connection
Insulation (28IDx85 mm)	1	
Cord band	8	For fixing remote control switch wiring and insulation of piping
Packing (5Tx50x200)	1	For covering wiring connection
Reducer	1	For RCD (4.0/5.0) FSN (R410A only)

Applicable air panel (option)

Indoor unit	Applicable air panel (option)
	For wired remote control switch
RCD-1.5~2.5	P-G23DWA1
RCD-3.0~5.0	P-G46DWA1

1.3.2. INITIAL CHECK

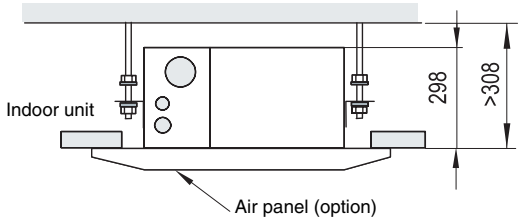
- Install the indoor unit with a proper clearance around it paying careful attention to the installation direction for the piping, wiring and maintenance working space, as shown below.
- Provide a service access door near the unit piping connection area on the ceiling.



Distance from wall side

CAUTION:
The minimum distance between the wall and panel edge must be 1500 mm to prevent short-circuiting.

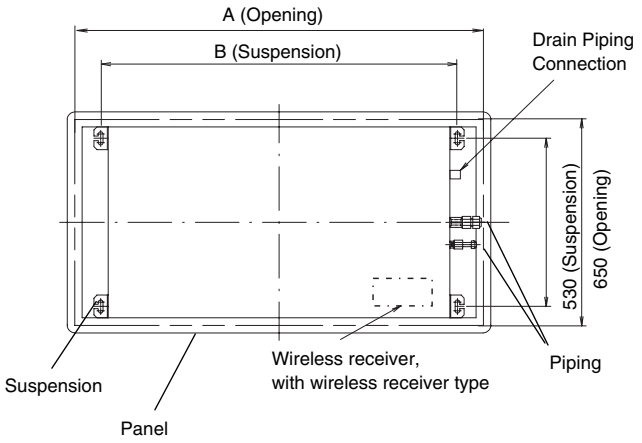
- Check space between ceiling and false ceiling is enough as indicated below.
- Check the ceiling surface is flat for the air panel installation work.



- Check that the down slope pitch of the drain piping follows the specifications indicated in chapter "Drain Piping".

■ Opening of False Ceiling

- Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below.



View from top

Model	**A** (mm)	**B** (mm)
RCD-1.5 RCD-2.0 RCD-2.5 RCD-3.0	1060	889
RCD-4.0 RCD-5.0	1620	1450

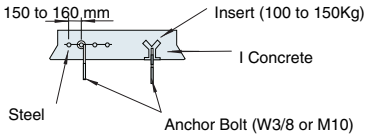
- Check to ensure that the ceiling is horizontal, otherwise drain water cannot flow away.
- Strengthen the opening parts of the false ceiling.

1.3.3. INSTALLATION

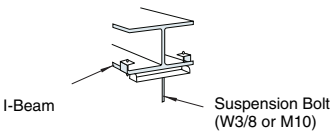
■ Mounting suspension bolts

- Mount the suspension bolts, as shown.

For concrete slab:

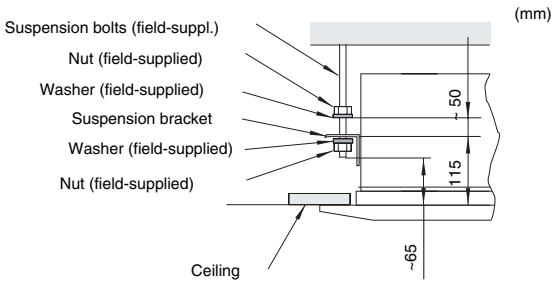


For steel beam:

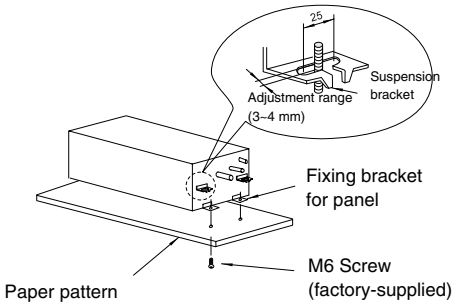


■ Mounting the indoor unit

- Mount the suspension brackets to the suspension bolts and fix them with nuts (factory -supplied), as shown below.
- Put the washer so that the surface with insulation can face downwards as shown below:



- Lift the indoor unit by hoist, and do not apply any force on the drain pan.
- Hook the indoor unit on the suspension brackets.
- Fix the unit using the nuts, flat washers and spring washers (These nuts and washers are supplied (4 pieces each)).



- Check the level of the drain pan by a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

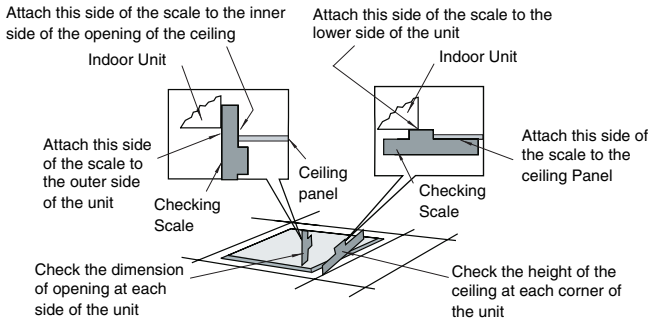
NOTE:

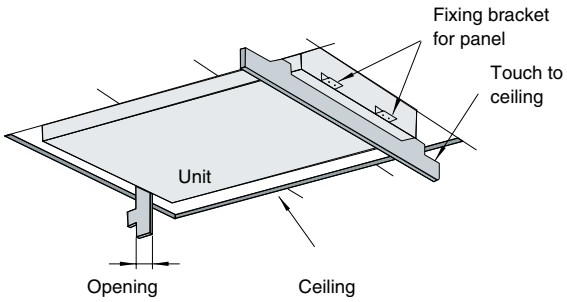
- *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*
- *Secure the indoor unit using the nuts, flat washers and spring washers. (These nuts and washers are supplied, 4 pieces each).*

■ Adjusting space between indoor unit and false ceiling opening

- Adjust the indoor unit to the correct position while checking with the installation pattern and gauge (factory-supplied) as shown below.

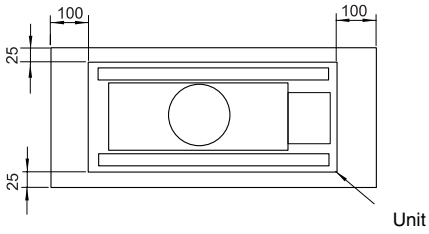
■ For ceiling already completed with panels

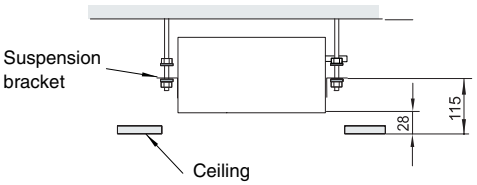




■ Ceiling not completed with panels yet

(mm)

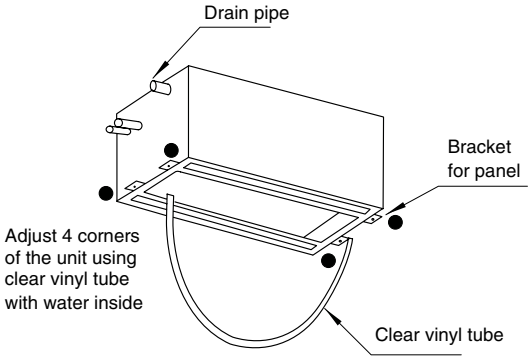




– Tighten the nuts of the suspension brackets after adjustment is completed. Apply LOCK-TIGHT paint* to the bolts and nuts in order to prevent them from loosening. If not done, abnormal noises or sounds may occur and the indoor unit may fall down.

CAUTION:
Check the level of the unit using a water level or transparent plastic tube containing water, as shown below, to avoid incorrect operation of the drain discharge mechanism in the indoor unit. The drain piping side of the indoor unit must be approximately 5 mm lower than the other parts.

- Adjust the indoor unit to the correct position while checking with the checking scales (factory-supplied).



1.3.4. AIR PANELS INSTALLATION

P-G23DWA1, P-G46DWA1

CAUTION:
When the air panel is unpacked, place it on insulation material, etc. to protect the sealing insulation from scratches.

■ Factory-supplied accessories

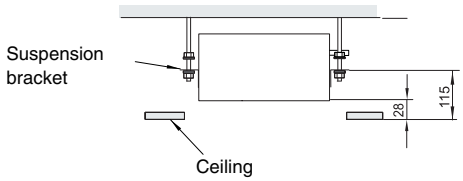
Make sure that the following accessories are packed with the air panel.

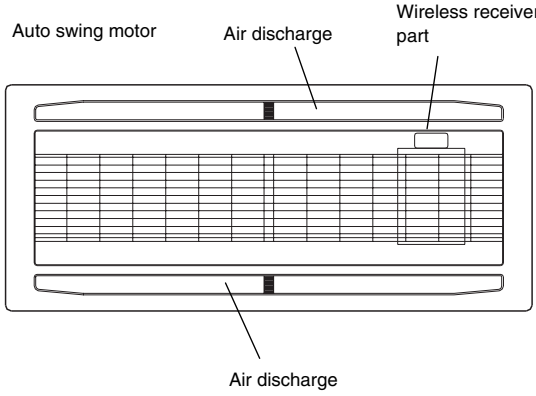
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

Accessory		Quantity	Purpose
Long screw (M6×50)		4	For fixing panel
Long screw (M6×30)		2	For fixing panel (only for P-G46)

■ Location of suspension brackets

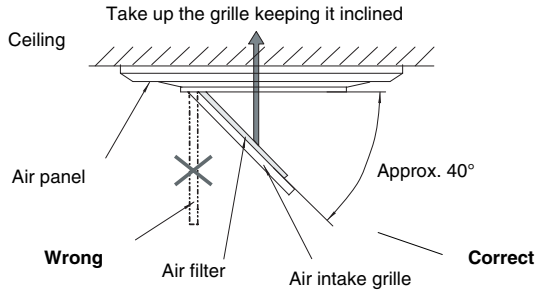
– Check to ensure that the suspension brackets of the indoor unit are located approximately 115 mm higher the false ceiling.





■ Removing the air intake grille from the air panel:

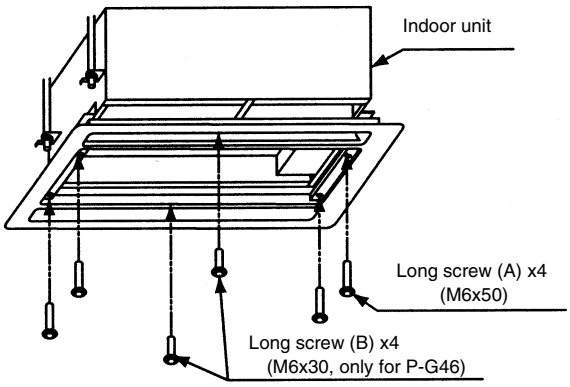
1. Open the air intake grille to an angle of approx. 40° from the surface of the air panel.



2. Lift the grille keeping it inclined.
3. Draw the grille towards the open space after lifting.

■ Installing the air panel:

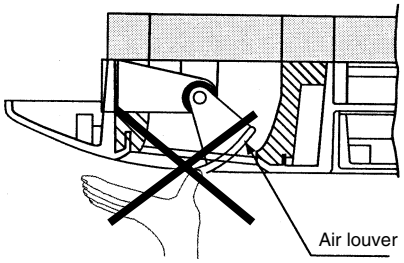
1. Hang the air panel from the indoor unit by hooking the U-shaped wires of the air panel into the hook wires of the indoor unit.
2. Make sure that the location of the electrical box of the Indoor unit coincides with the location of the wiring outlet of the air panel.
3. Raise up the air panel onto the indoor unit, then fix the air panel by using factory-supplied long screws.



4. Make sure that there is no gap around the contacting surface between the indoor unit and the air panel. Any gap may cause air leakage or dewing.

CAUTION:
To protect the panel from being damaged, the long screws for securing the air panel have stoppers so that tightening is stopped at the setting position. If the air panel does not reach the surface of the ceiling or air leakage from the contacting surface occurs, readjust the installation height level of the indoor unit.

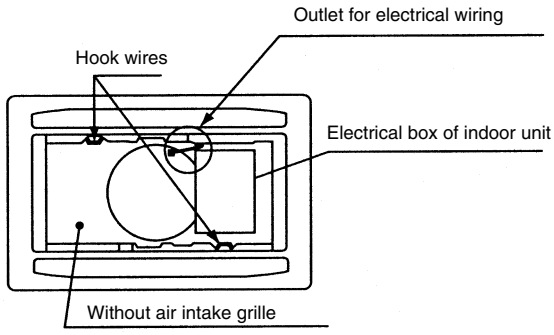
CAUTION:
Do not turn the air louver by hand. If moved, the louver mechanism will be damaged.



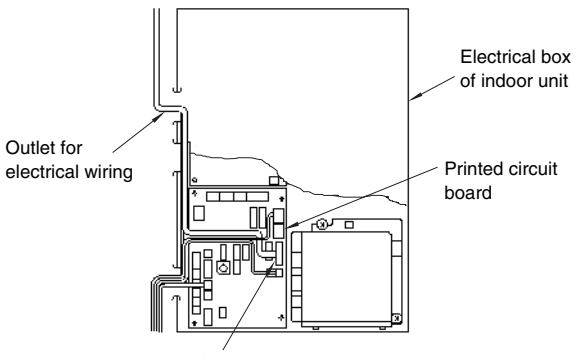
■ Wiring connection for air panel.

CAUTION:
Before connecting connectors, firstly turn OFF power source. If the connectors are connected without turning OFF the power source, the auto-swing louver cannot function.

- The following connector is used with the air panel (view from lower surface of air panel without air intake grille)



- Connect the connectors as shown below (view of the electrical box).



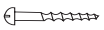
Connector for auto swing motor
(low voltage 7 pin, RED) (CN17)

1.4. RPC (CEILING TYPE)

1.4.1. FACTORY SUPPLIED ACCESSORIES

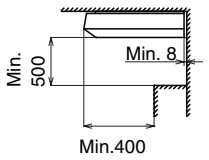
- Make sure that the following accessories are packed with the unit.

NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

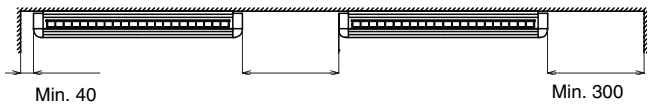
Accessory	Qty	Purpose
Suspension bracket 	2	For unit suspension
Fixing screw (M4 x 10mm) 	2	
Drain hose 	1	
Wire clamp 	2	For connecting drain hose and drain pipe
Insulation material (5Tx200x200 m) 	1	For drain pipe connection
Sealing plate (0.8Tx118x42 mm) 	1	For sealing knockout hole
Ring core 	2	

1.4.2. INITIAL CHECK

– Install the indoor unit with proper clearance around it for operation and maintenance working space, as shown below.



(mm)

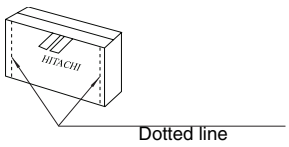


Check down slope pitch of drain piping follows the specification indicated in chapter "Drain Piping".

1.4.3. INSTALLATION

■ **Mounting suspension bracket**

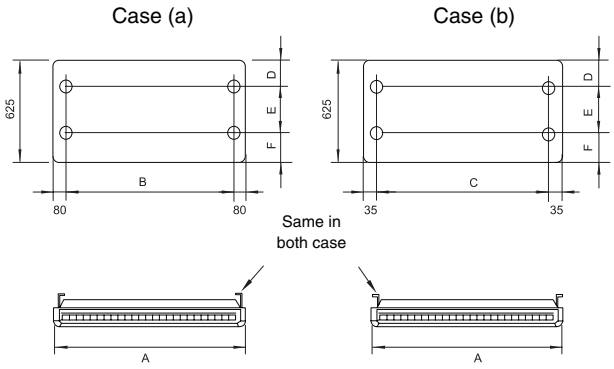
When installing the indoor unit, use the installation pattern printed on the inner side of the carton box, cutting the carton box along dotted lines when unpacking is performed.



– Installation pattern is giving the following information:

  Pitch of sling bolt for case (a) and case (b) showed below.
  - Hole positions of refrigerant piping.
  - Hole positions of drain piping.

– Suspension bracket has the following two (2) possible positions:

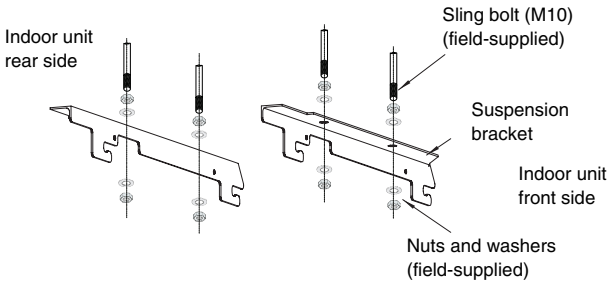


(mm)

Model	A	B	C	D	E	F
RPC-2.0	1094	920	1010	150	220	255
RPC-2.5 RPC-3.0	1314	1140	1230	150	220	255
RPC-4.0	1314	1140	1230	110	280	235
RPC-5.0/6.0	1574	1400	1490	110	280	235

– Select the suspension bracket system depending of your needs; for semi-concealed installation Case (a) is recommended.

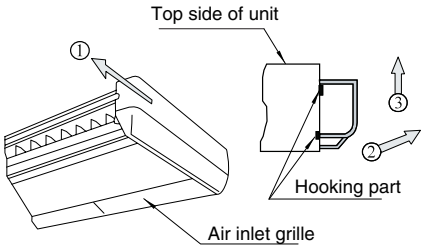
– Mount the suspension brackets to the slings bolts or anchor bolt and secure them with nuts (field-supplied), as shown below.



NOTE:
Tighten the nuts of the sling bolts or anchor bolts with the suspension brackets after the adjustment is completed. Apply Lock-Tight paint to the bolts and nuts in order to prevent them from loosening.

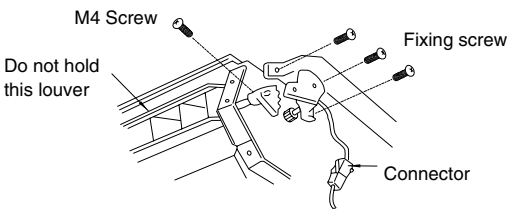
■ Mounting the indoor unit

- Remove side covers of the unit.
- To avoid damage to the resin side covers, before lifting or moving the indoor unit, remove the resin side covers as indicated in the following procedure.

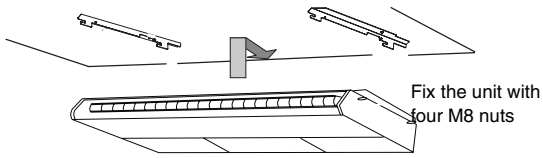


1. Slide the resin side covers forward approximately 15 mm.
2. Carefully pull the bottom of the side covers away from the indoor unit approximately 10 mm.
3. Remove the resin side covers upward.

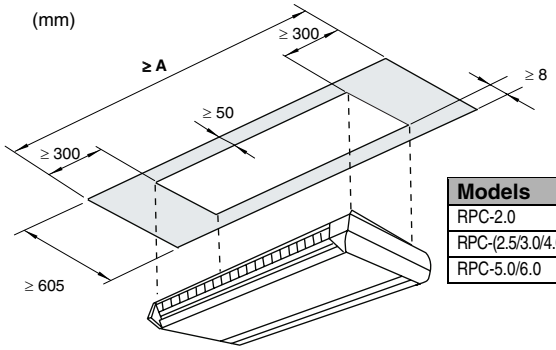
CAUTION:
The mechanism of the automatic swing louver is utilized. Do not move the swing louver by hand or other objects. This can damage the mechanism of the automatic swing louver.



- For hanging type installation.
  - Hook the indoor units on the suspension brackets, by setting the mounting bolts on the units with the notches of the bracket, as shown below. Fix the units with the nuts, flat washers and spring washers. (Each four nuts and washers are supplied.)

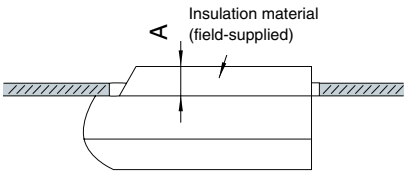


- For semi-concealed installation.
  - Open a hole in the false ceiling.



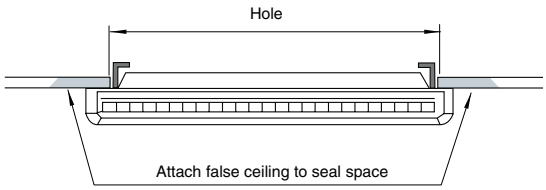
Models	A
RPC-2.0	1560
RPC-(2.5/3.0/4.0)	1780
RPC-5.0/6.0	2040

  - When installing the indoor unit as shown in the following figure, insulate the top part of the cabinet which will be concealed in the ceiling because dew may occur under cooling operation.



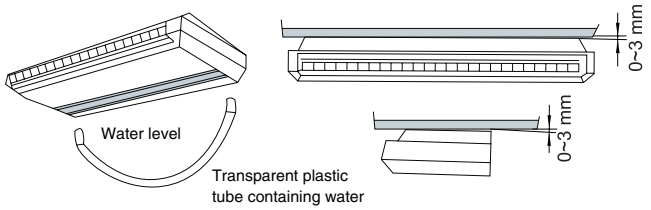
Models	A
RPC-(2.0/2.5/3.0)	13
RPC-(4.0/5.0/6.0)	75

  - Secure the indoor unit with the suspension bolts. Position the false ceiling panels along the indoor unit.



■ Drain pan level

- The level of the drain pan has to be checked by a water level of a transparent plastic tube containing water, as shown below so as to avoid the incorrect position of the drain discharge.



- The unit should be installed so that the rear side of the unit is slightly (approximately 3 mm) lower than the front side, in order to avoid the incorrect position of the drain discharge.
- Tighten the nuts of the suspension bolts with the suspension brackets after adjustment is completed. Special plastic paint must be applied to the bolts in order to prevent them from loosening.

NOTE:
When the false ceiling has been already installed, all piping work inside the ceiling has to be completed before the indoor unit is hooked.

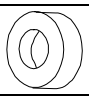
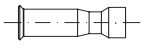
1.5. RPI (IN-THE-CEILING)

1.5.1. FACTORY-SUPPLIED ACCESSORIES

(Models: RPI-(1.5~6.0FSNE)

Make sure that the following accessories are packed with the unit.

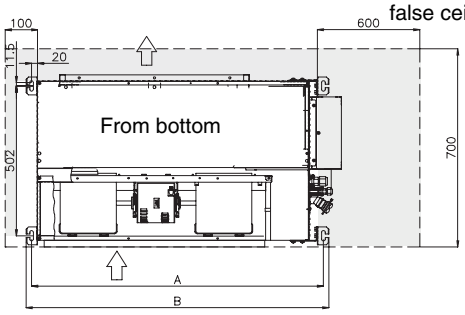
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

Accessory		Qty	Purpose
Wire clamp		1	For drain connection (only for 1.5~6.0)
Ring core		2	
Reducer		1	For RCI (4.0/5.0/6.0) FSNE (R410A only)

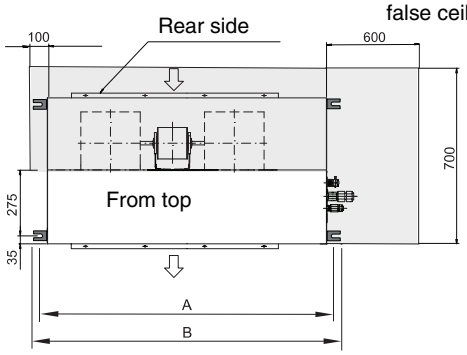
1.5.2. INITIAL CHECK

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown below.

RPI-1.5



RPI-2.0~6.0



Operation and maintenance space

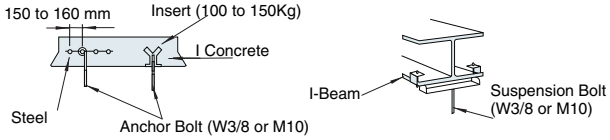
Models	**A** (mm)	**B** (mm)
RPI-1.5	969	1005
RPI-2.0~6.0	1113	1163

1.5.3. INSTALLATION

■ Mounting the suspension bolts

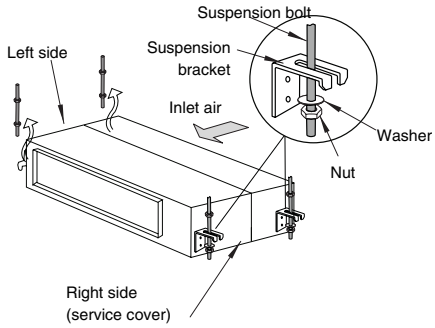
- Using the aforementioned dimension select the final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.
- Mount the suspension bolts, as shown.

For concrete slab: For steel beam:



■ Mounting the indoor unit

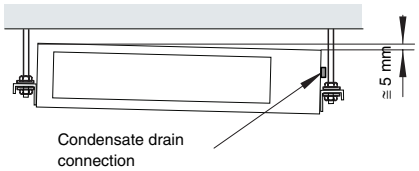
- Hook suspension bracket to the nut and washer of each suspension bolt, as shown, starting from one side.
- After checking that the nut and washer are correctly fixed by the retainers of the suspension bracket, hook the suspension bracket of the other side to nut and washer.



■ Drain pan level

Make sure that the foundation is flat, taking into account the maximum foundation gradient.

Front view



- The unit should be installed so that one side of the unit is slightly (approximately 5 mm) lower than the other side, in order to avoid the incorrect position of the drain discharge.
- Tighten the nuts of the suspension bolts with the suspension brackets after adjustment is completed. Special plastic paint must be applied to the bolts and nuts in order to prevent them from loosening.
- Fasten the tubing to the drain hose with an adhesive and the factory-supplied clamp.

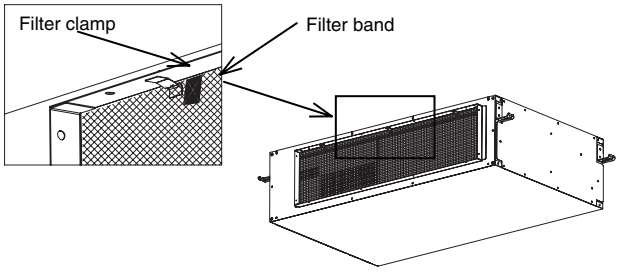
NOTE:
Keep the unit as well as relevant equipment covered with the vinyl cover during installation work.

1.5.4. CONNECTING THE SUPPLY AIR DUCT

The supply air duct should be connected with the indoor unit through flexible duct, in order to avoid abnormal sound vibration. The unit is equipped with supply and return air duct flanges for this purpose

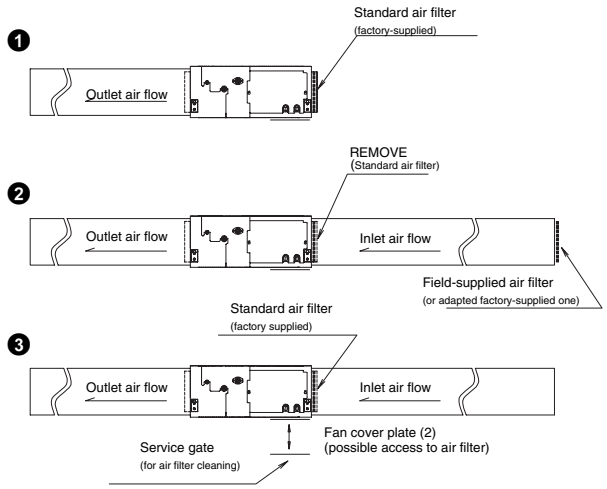
1.5.5. FIX FLEXIBLE DUCT TO EXTERNAL FACES OF FLANGES

- Suction filter
  - The factory-supplied filter must be fixed using the 6 clamps on internal faces of flanges for this purpose.



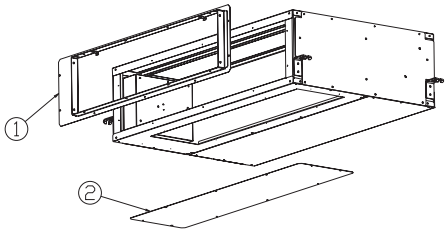
- When the unit is installed, the filter should be fixed, installed and uninstalled through the fan cover access.

RPI 1.5~6.0



1.5.6. AIR SUCTION DIRECTION CHANGE

- Air suction direction could be modified changing back cover (2) for fan cover (1). Each cover uses 10 fixing screws. This feature is available for RPI 2.0~6.0 only.

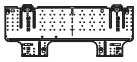
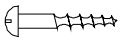
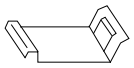
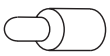
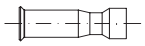


1.6. RPK (WALL TYPE)

1.6.1. FACTORY-SUPPLIED ACCESSORIES

Make sure that the following accessories are packed with the unit.

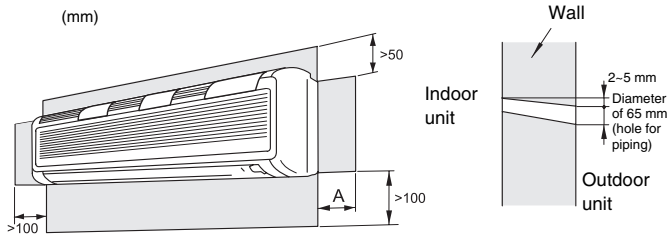
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

Accessory	Qty (S)	Qty (SBF)	Purpose
Mounting bracket 	1	-	For mounting indoor unit
Mounting bracket 	-	1	
Screw (Ø4.1×25 mm) 	6	8	For mounting bracket
Screw (Ø4.1×40 mm) 	2	4	
Plate 	1	-	For drain hose setting
Insulation pipe 	1	1	For pipe
Insulation 	1	1	For pipe
Harness with connector 	1	1	Cable for PC-P1HE
Connector 	2	2	
Reducer 	–	1	For RPK-4.0FSNM (R410A only)

S: RPK Summit
SBF: RPK Super Big Flow

1.6.2. INITIAL CHECK

- Install the indoor unit with a proper clearance around it for operation and maintenance working space as shown below.



(Operation and installation space) (Hole for piping on the wall)

(mm)

HP	A
RPK-1.5~2.0	100
RPK-2.5~4.0	200

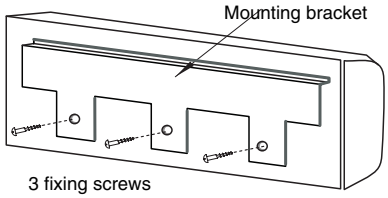
NOTE:
– *Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.*

1.6.3. INSTALLATION

■ Mounting the suspension bracket

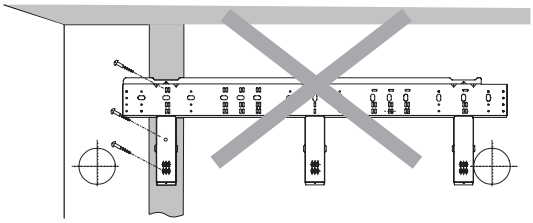
Although the illustrations used for some examples belong to RPK-1.5~4.0 models, the information supplied applies to all the wall type models.

- Before Installation:
  Remove the mounting bracket after removing three (3) fixing screws for installation as shown in the next figure:



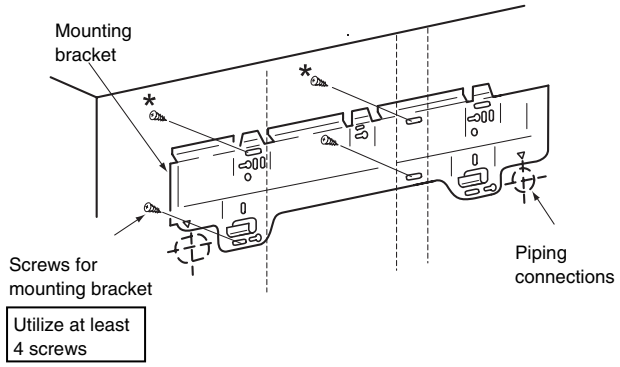
- Mounting bracket onto wall
  When the mounting bracket is directly attached to a wood wall or a concrete wall, make sure that the wall is strong enough to support a weight of 200 kg.

- Mounting the unit between pillars
  - Screws for wood should be tightened utilizing the upper hole.
  - Do not fix the mounting bracket onto one pillar as shown below.



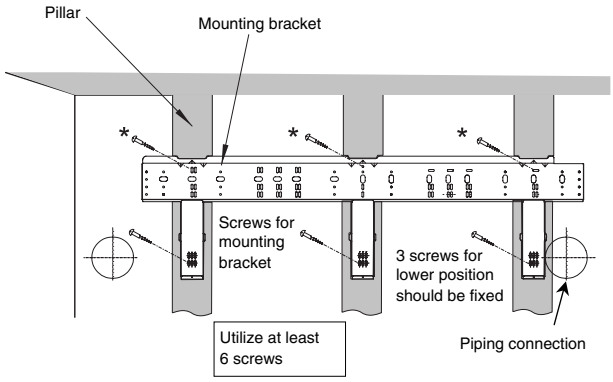
  - The location where the indoor unit is to be installed should be so selected that an unbalanced weight distribution is avoided.
  - The mounting bracket should be installed so that the side of drain piping connected is slightly (about 3 mm) lower than the other side, in order to avoid the incorrect position of the drain discharge. (Drain piping connection can be performed both right side and left side of the unit.)

■ RPK-1.5 ~ 2.0

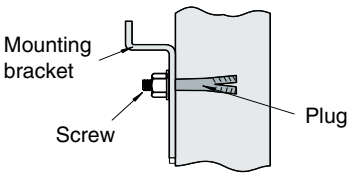


■ RPK-2.5 ~ 4.0

Screws marked with * should be tightened utilizing upper holes



- Mounting on a concrete wall or a concrete block wall. Attach the mounting bracket to the wall with anchor bolts as shown below.

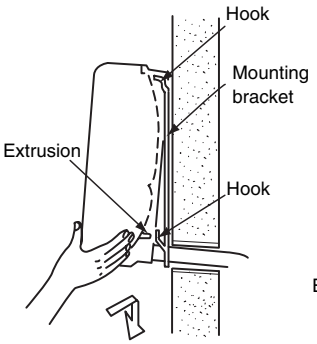


Utilize at least six-anchor bolts (M5).

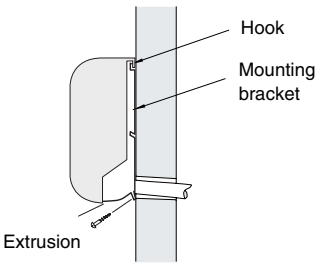
■ Mounting the indoor units

- Hook the indoor unit to the mounting bracket, maintaining the indoor unit upright. Fix the bottom cover and the mounting bracket by three screws.

■ RPK-1.5 ~ 2.0



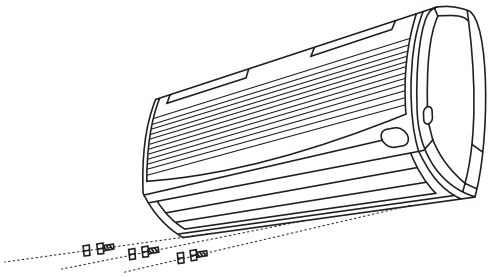
■ RPK-2.5 ~ 4.0



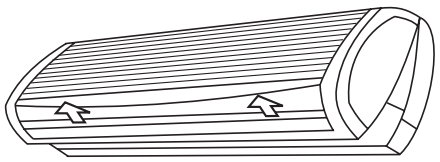
Make sure that the unit is completely hooked onto the mounting bracket. If not, it may drop from the bracket, resulting in a serious accident.

■ Removing the front panel

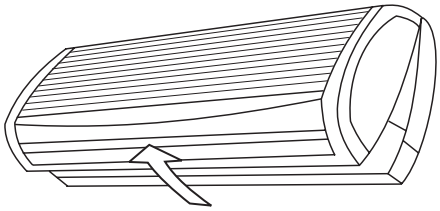
- Although the illustrations used for some examples belong to RPK-1.5~2.0 models, the information supplied applies to all the wall type models.
- In order to connect the refrigerant piping, the wiring and to check the drain water flow, it is necessary to remove the front panel. Perform this work according to the following instructions. Be careful not to scratch the resin components.
- Remove three bushings as shown and remove the screws as shown below.



- Slowly pull the lower side of the front panel at your side. The air outlet must not touch the outlet grille.



- Slightly lift the front panel upward in order to release the three hooks of upper side of the front panel.

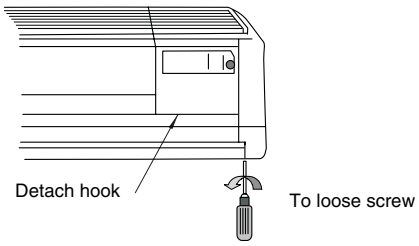


■ Putting back the front panel (RPK-2.5 ~ 4.0)

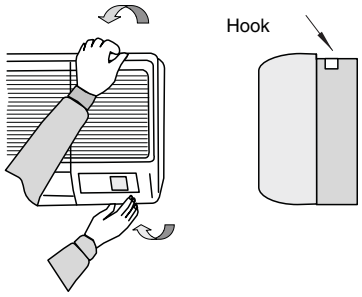
- First put back the lower side of the front panel, and then attach the three hooks at the upper side of the front panel.
- There are three stoppers inside the front panel. Make sure that there is no gap between the front panel, the drain pan and the unit body.

■ Removing the right side cover (RPK-2.5 ~ 4.0)

- In order to connect the refrigerant piping, wiring and to check drain water flow, removing the right side cover is needed. Perform this work according to the following instructions. Pay an attention to the resin components not to scratch.



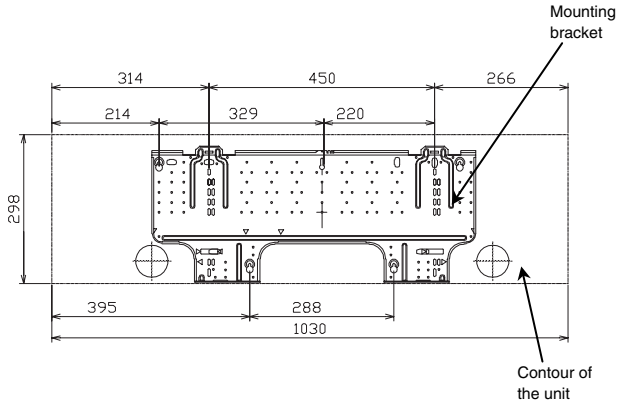
- Slowly pull the lower side of the right side cover and detach the upper hook.



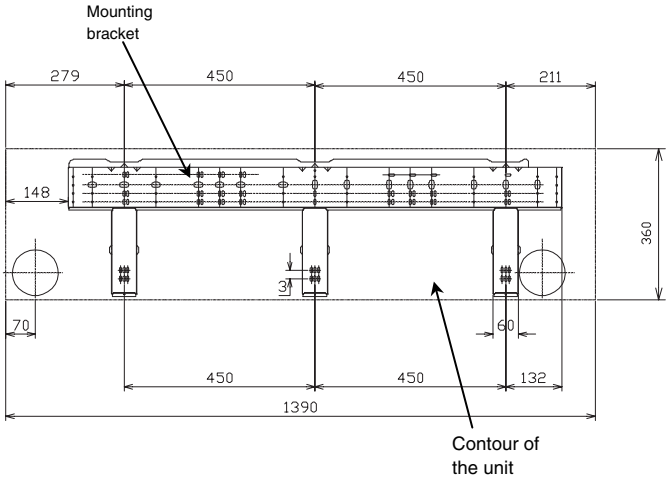
CAUTION:
Any gap may cause air leakage or dewing.

1.6.4. DIMENSIONS OF THE MOUNTING BRACKET

■ RPK-1.5 ~ 2.0



■ RPK-2.5 ~ 4.0



1.7. RPF (FLOOR TYPE)/RPFI (FLOOR-CONCEALED TYPE)

1.7.1. FACTORY-SUPPLIED ACCESSORIES

Make sure that the following accessories are packed with the unit.

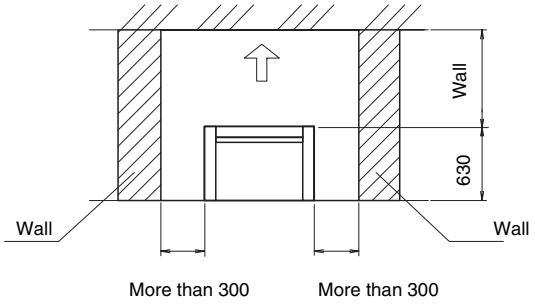
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

Accessory	Qty	Purpose
Adjustment bolt for installation 	4	For adjusting the flat level of the unit
Ring core 	2	
Screw	2	PC-P1HE

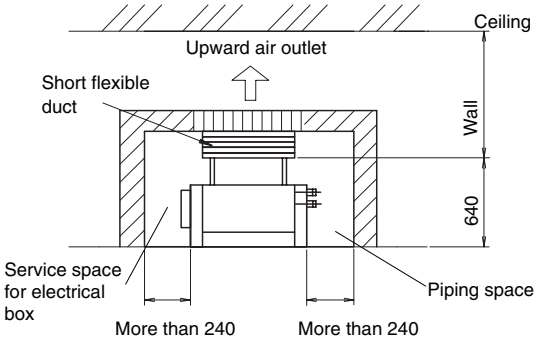
1.7.2. INITIAL CHECK

- Install the indoor unit with a proper clearance around it for operation and maintenance as shown in Service Access panel.

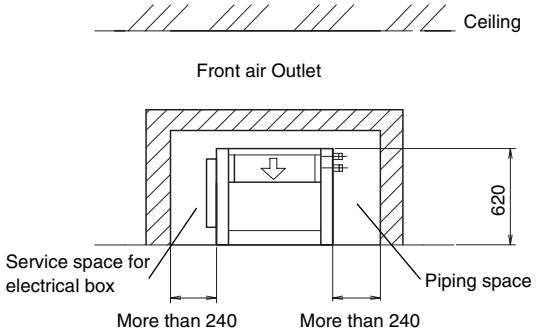
RPF



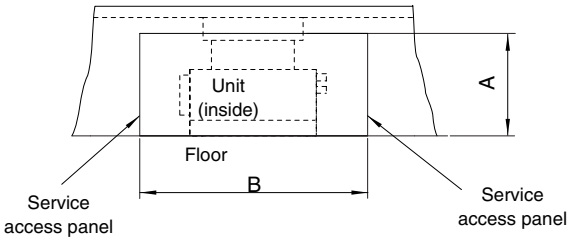
RPFI



Provide a space so that air can flow smoothly.



- Service access panel
  Provide a service access door or panel as shown below.



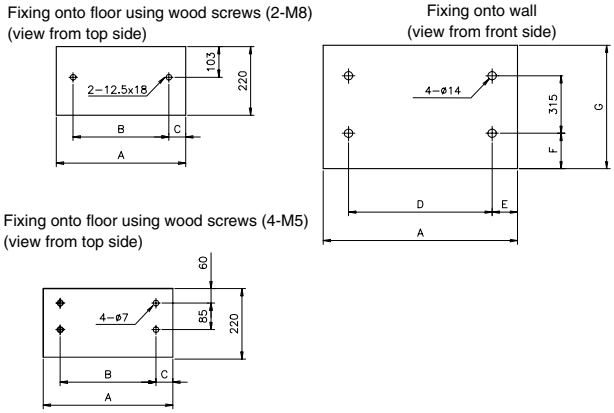
(Space around indoor unit)

Model	Size	
	A	B
RPFI-1.5	640	1380
RPFI-2.0		1634
RPFI-2.5		

NOTE:
Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
Make sure that the foundation is flat, level and sufficiently strong.
It is recommended that a service access panel for floor- concealed type indoor units be provided. The access panel must be fixed with screw(s) so that service engineer(s) only is accessible.

1.7.3. INSTALLATION

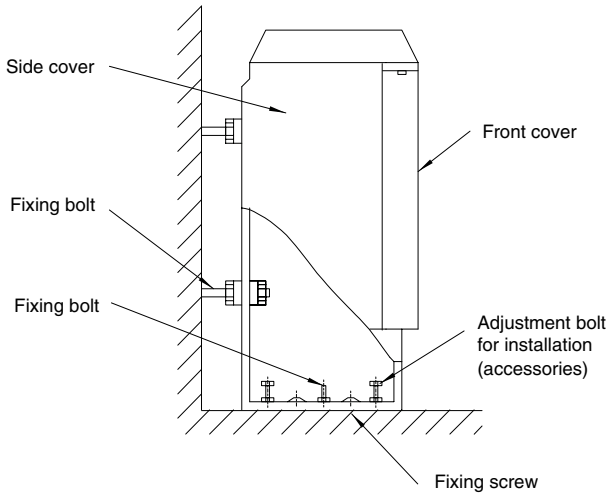
- Make sure that the fixing position of the unit is as shown below.



(mm)

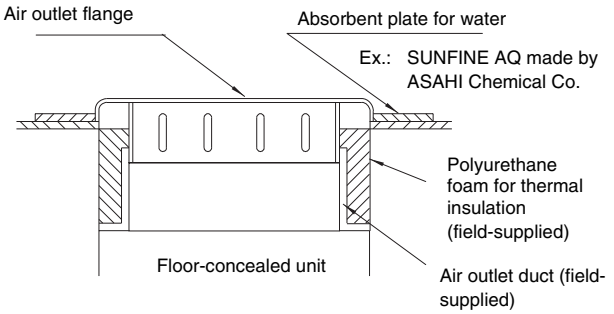
Model	A	B	C	D	E	F	G
RPFI-1.5	973	829	72	857	50	139	620
RPFI-2.0	1223	1079	72	1107	50	139	620
RPFI-2.5							

- Adjust the flat level of the unit by loosening or tightening the bolts for installation that are attached in the unit. Make the drain pipe side lower than the opposite side for smooth drain.
- Fix the base plate and back plate of the unit with field-supplied fixing bolts and screws. When attaching the adjusting bolts for installation, remove the electrical wiring box.
- In case of the RPF unit, perform the above work after removing the front cover and side cover of the unit.



(Installation unit)

- Install the optional air outlet grille of the RPFI unit as shown in the following figure. If installed in a comparatively high humid place, condensation may occur. Therefore, attach a plate that can absorb water, like SUNKEN AQ made by ASAHI Chemical Co., around the grille.



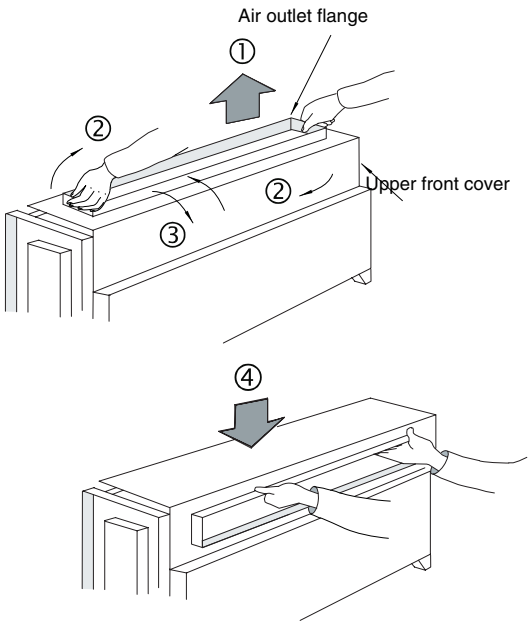
WARNING:
Provide a service access cover that is fixed by screws so that the fan runner is not directly touched (Only RPFI model).

CAUTION:
The optional air outlet grille of the RPFI unit cannot be used in a highly humid place like a kitchen, because condensation may occur on the grille surface.

■ Air outlet direction change (RPFI)

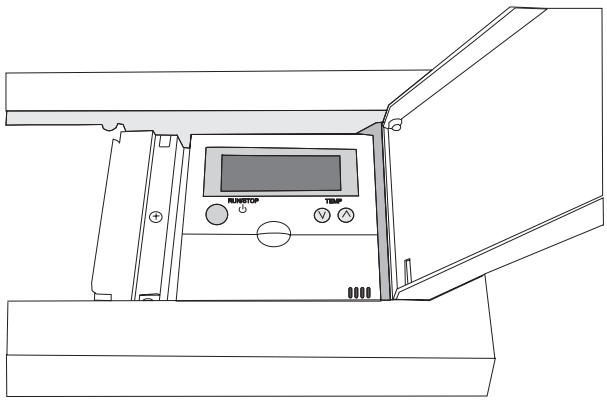
In case of changing the RPFI units air outlet direction from upward to front, follow the procedures below:

- Remove the fixing screws of the air outlet flange and the upper front cover. Then, remove the flange and the cover.
- Reverse the side of the flange right and left.
- Put the cover on the top of the unit, and put the flange on the front side of the unit.
- Fix the flange and the cover.



■ Optional location for PC-P1HE (RPF)

In case of RPF Unit, it is possible to install the PC-P1HE under the plastic cover as shown in the figure below:



1.8. RAS - OUTDOOR UNIT

WARNING:

- *Install the outdoor unit with sufficient clearance around it for operation and maintenance as shown in the next figures.*
- *Install the outdoor unit where good ventilation is available*
- *Do not install the outdoor unit where is a high level of oil mist, salty air or sulphurous atmosphere.*
- *Install the outdoor unit as far as practical (being at least 3 meters) from electromagnetic wave radiator (such as medical equipment).*
- *Keep clearance between the units of more than 50mm, and avoid obstacles that may hamper air intake, when installing more than one units together.*
- *Install the outdoor unit in the shade or not exposed to direct sunshine or direct radiation from high temperature heat source.*

CAUTION:

- *Check to ensure that the foundation is flat, level and sufficiently strong.*
- *Install the unit in a restricted area not accessible by the general public*
- *Aluminum fins have very sharp edges. Pay attention to the fins to avoid injury.*
- *In case that the Outdoor Unit is installed toward a public way, it is recommended to change the air flow upward to prevent pedestrian from annoyance. Therefore install air deflector at the discharge side.*

ATTENTION:

- *Do not put obstacles in the left and right sides of the units*
- *When surrounding wall exist, in case than L dimension is higher than H dimension, install the unit over base in order to reach H + Base = L or higher. (L and H dimensions are indicated in the next drawings).*
- *For serial units installation, when surrounding wall exist, do not install more than 3 units together.*

1.8.1. FACTORY SUPPLIED ACCESSORIES

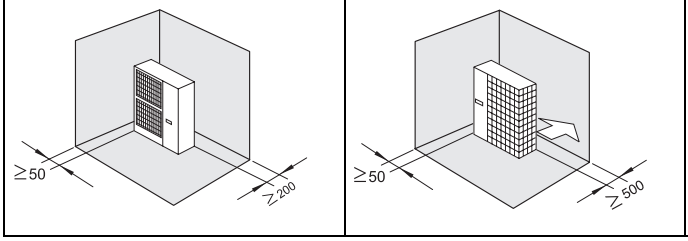
Check to ensure that the following accessories are packed with the outdoor unit.

NOTE:
If any of these accessories are not packed with the unit, please contact your contractor.

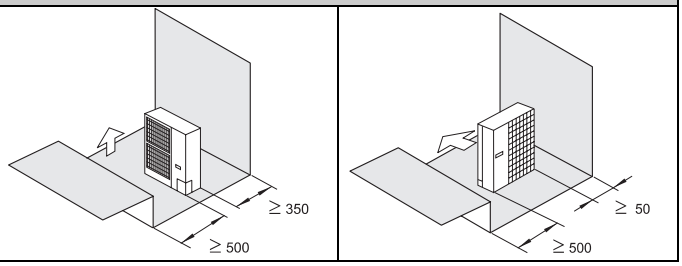
Accessory	Q'ty	Purpose
Special Washer	4	Fixing Anchor Bolt
Rubber Bush	2	For Connection Hole of Power Source Wiring For Connection Hole of Operating Wiring

1.8.2. INSTALLATION SPACE

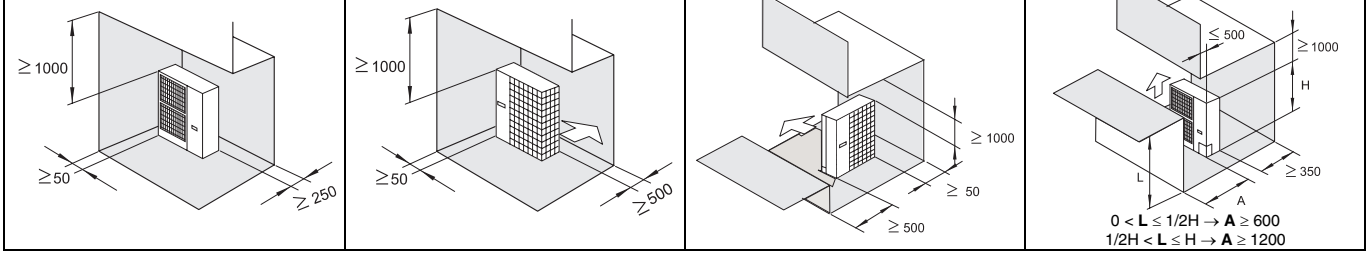
a) In case of front side and either of the sides are open (single unit)



b) In case that surrounding wall exist (single unit)

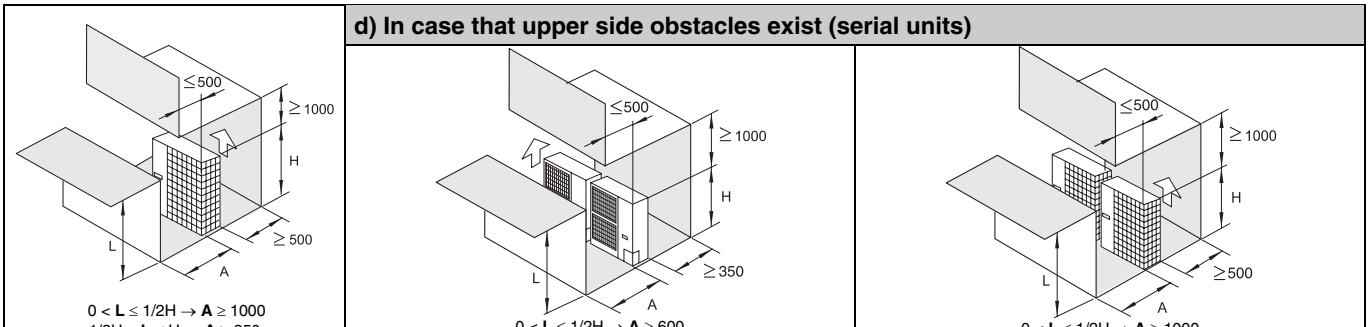


c) In case that upper side obstacles exist (single unit)



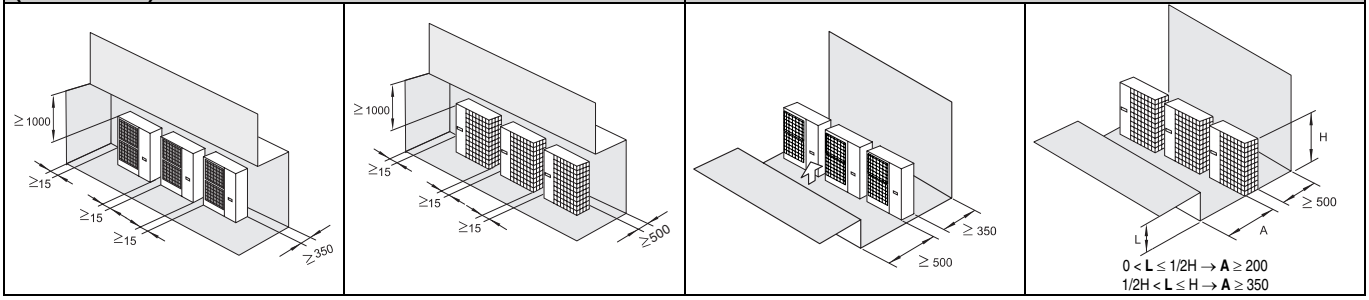
0 < **L** ≤ 1/2H → **A** ≥ 600
1/2H < **L** ≤ H → **A** ≥ 1200

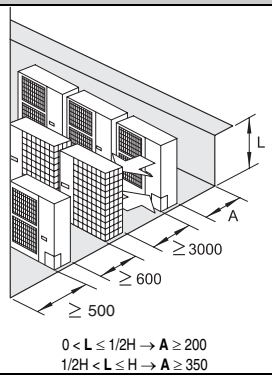
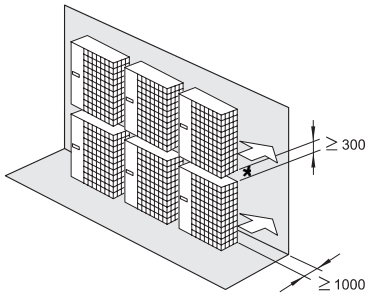
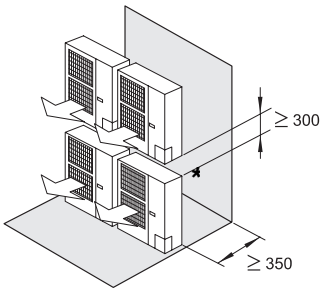
d) In case that upper side obstacles exist (serial units)



e) In case of front side and either of the sides are open (serial units)

f) In case that surrounding wall exist (serial units)

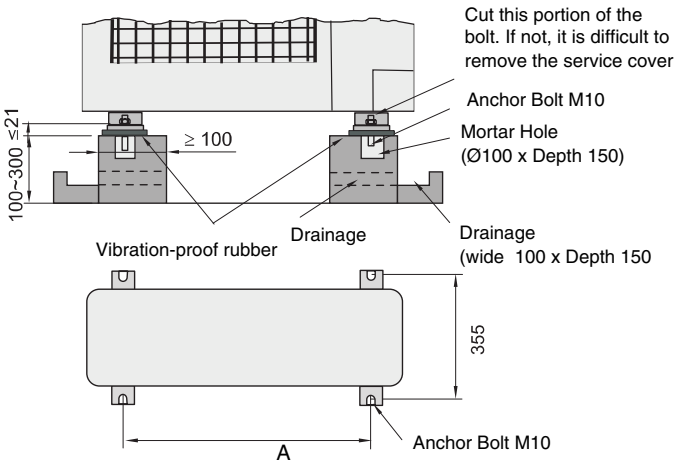


g) Horizontal (multiple units)	h) Vertical (multiple units)	
 0 < **L** ≤ 1/2H → **A** ≥ 200 1/2H < **L** ≤ H → **A** ≥ 350		

1.8.3. INSTALLATION PLACE PROVISION

■ **Concrete Foundation**

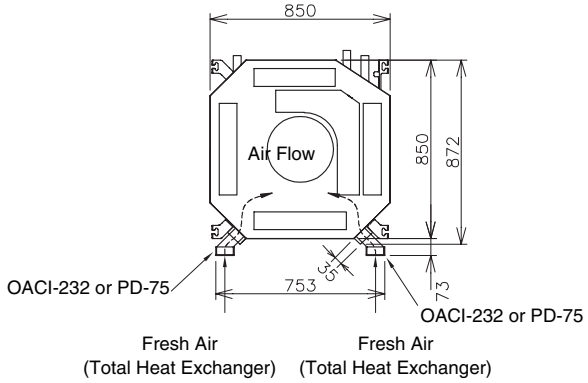
1. Foundation could be on flat and is recommended be 100-300 mm higher than ground level.
2. Install a drainage around foundation for smooth drain
3. When installing the outdoor unit fix the unit by anchor bolts of M10
4. When installing the unit on a roof or a veranda, drain water sometimes turns to ice on a cold morning. Therefore, avoid draining in an area that people often use because it is slippery.



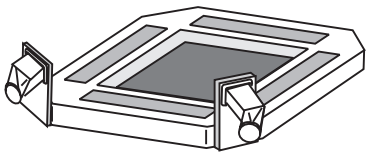
1.9. OPTIONAL ACCESSORIES

1.9.1. FRESH AIR INTAKE FOR 4-WAY CASSETTE INDOOR UNITS (OACI-232) OR (PD-75)

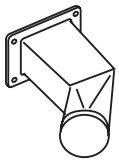
- Connection position of fresh air intake duct. Fresh air can be taken in by connecting the duct to the position shown in the next drawing.



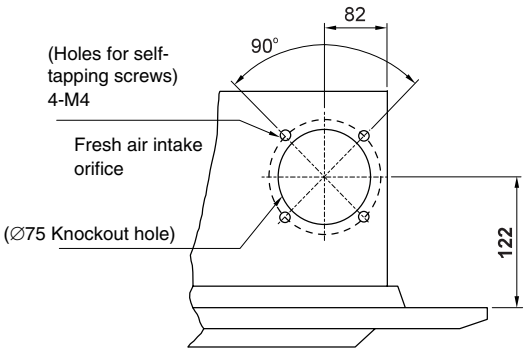
OACI-232



PD-75

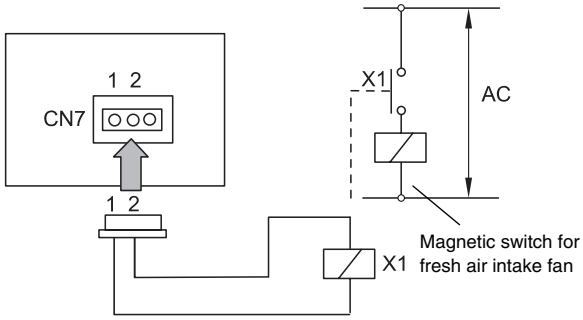


- This unit cannot draw in fresh air by itself. It must be connected to a duct containing a fan and control damper.



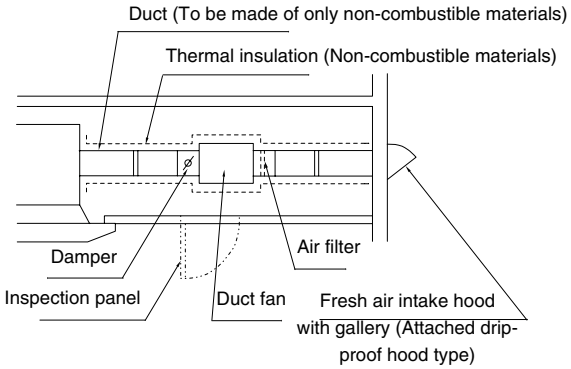
Connection position of fresh air intake duct

– Control the duct fan so that it will operate only when the main unit is operating. In following figure, an electrical control example is shown (more details in chapter 6.1.7. of picking up the operation signals).



NOTE:
The total height of the unit is increased by approximately 80 mm with the fresh air intake kit installed.
Use a 3P connector Cable (PCC-1A) for CN7 of indoor printed circuit board. For further information, refer to Chapter 9.6.3 in document TCGB0030.

– The maximum amount of fresh air intake is the 20% of Indoor Unit Air Flow Rate. In the case that fresh air that exceeds this amount is taken in, there is risk of water condensing on the lower surface of the drain-pan (Air Intake Orifice), and in certain cases troubles such as dew formation will occur. Always limit to the values shown in the table.
– Attach an air filter on the air suction side of the duct for fresh air intake at a position where servicing may be carried out easily. (Air passing through the duct does not pass through the filter of the main unit.)
– Insulate the duct and the duct connection portion. In addition, use only non-combustible materials for the duct and insulation.

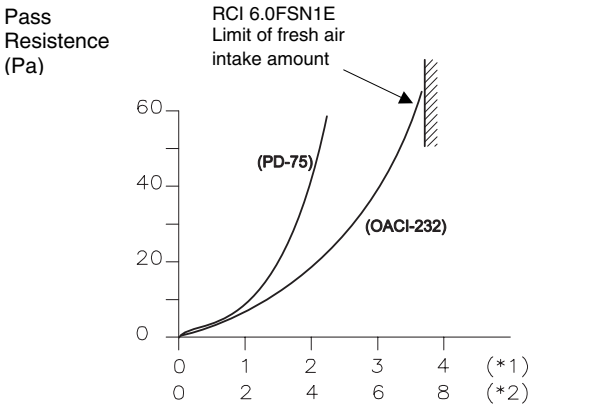


(Duct fan attachment drawing)

NOTE:
All parts of the above figure are field-supplied.

– Install an inspection panel below the duct fan for servicing the air filter and the damper.
– In the case that a duct fan larger than the limit of fresh air intake amount, always use a damper and adjust the quantity of air.
– The duct resistance of the fresh air intake portion will be as shown in the figure below. Use this as a guideline for selecting the duct fan.

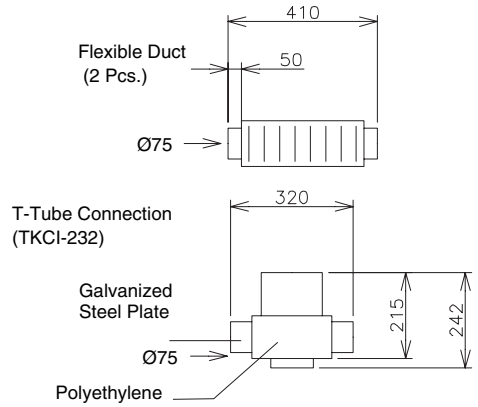
Duct resistance of fresh air intake portion



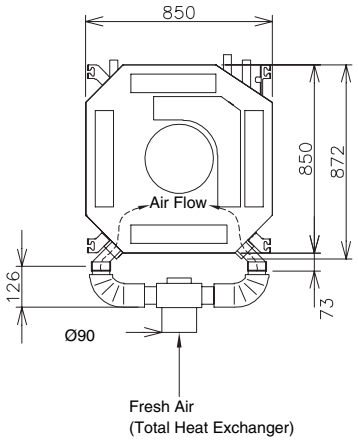
(*1): Installation of the connecting box at one side.
(*2): Installation of the connection box at both sides.

1.9.2. T-TUBE CONNECTING KIT FOR 4-WAY CASSETTE INDOOR UNITS (TKCI-232)

The T-Tube Connecting Kit is intended to make easy the connections between the Fresh Air intake and the connection duct. Below, there are shown the two basic pieces of the kit. Therefore, T-Tube Connecting Kit can be installed only when both the fresh air intake kit (optional) and filter box (optional) are used.



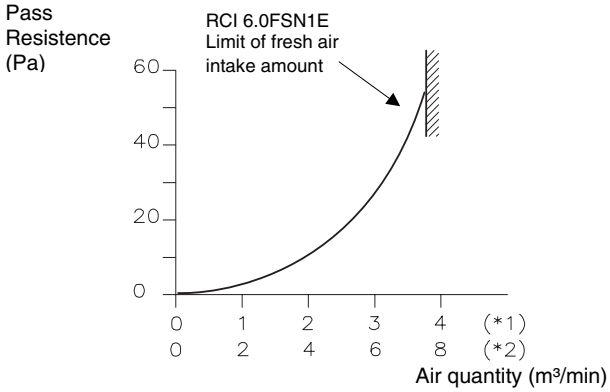
The next drawing shows a RCI Unit with the T-Tube Connecting Kit. Note that the diameter of the T is increased (Ø90).



NOTE:

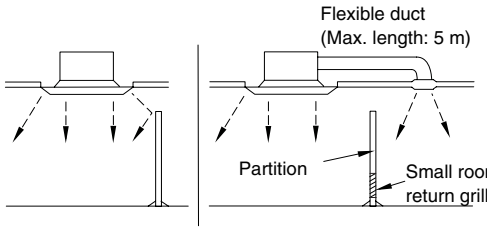
When the T.Tube Connecting Kit is used, the duct resistance of the fresh air intake portion will be increased as shown in the figure below. Use this as a guideline for selecting the duct fan.

Duct resistance of fresh air intake portion

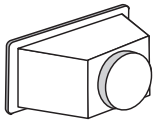


1.9.3. BRANCH DISCHARGE FOR 4-WAY CASSETTE INDOOR UNITS (PDF-23C3; PDF-46C3

If there are obstacles, such as partitions, inside a room and they prevent air from circulating well, you can install branched ducts to provide uniform temperature air conditioning. You must install the required return air grilles, depending on the amount of return air. If an adjoining room is air-conditioned, install always a return grille.



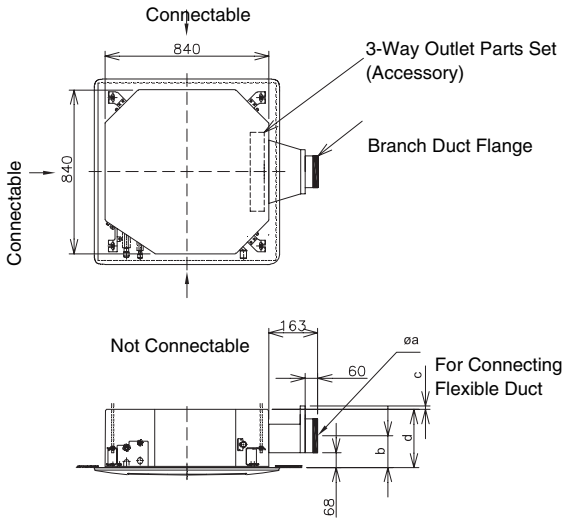
(Example of branched duct)



Branch duct Flange

■ Fitting the branched duct

1. The branched duct connections are shown in the Fig. below. There are knockout holes. After cutting the insulation material of the outside surface in a circular shape by aligning the notches of the four corners, use a screwdriver or the similar and remove it.
   As for the connection duct, prepare the square-shaped duct (field-supplied) or use a flexible duct with a diameter of Ø150 or Ø200. The connection flange used in this case shall be prepared at the site by referring to the dimensions shown in Fig. B. After attaching the connection flange to the indoor unit Knockout hole portion, it must be thermally insulated by insulation material the dimensions of which are shown in Fig. C.



Dimensions of duct connection

Model	a	b	c	d
RCI-1.5~2.5	150	155	9	248
RCI-3.0~6.0	200	180	6	298

2. Perform sufficient insulation treatment for the attachment portion between the connection flange and the indoor unit main body as well as the attachment portion between the duct and the connection flange. Use a 3-Way Outlet Part set (Optional parts) and completely block the air outlet of the branched duct side of the panel. (For prevention of condensation and divert the air to the branched duct.)

3-way outlet parts set

Model	Unit model	Remarks
PI-23LS5	RCI-1.5~6.0	To be attached to the outlet of the panel. See Chapter 1.9.2 for details

The following flexible duct, outlet box, and outlet panel are available as optional parts. (Refer to the following table.)

Optional parts for cassette type air conditioners

Name of item	Model	Applied Product Model	Remarks
Flexible duct	FD-1B (Ø150)	RCI-1.5~2.5	Length 1 m 1 piece
	FD-2B (Ø150)		Length 2 m 1 piece
	FD-1A (Ø200)	RCI-3.0~6.0	Length 1 m 1 piece
	FD-2A (Ø200)		Length 2 m 1 piece
Outlet Box with Outlet Panel	PDB-15W1	RCI-1.5~2.5	1 piece
	BPD-W1	RCI-3.0~6.0	

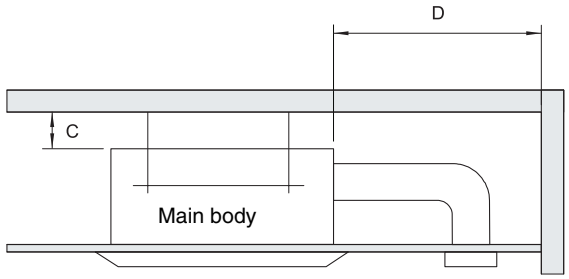
Attach supports to the flexible duct and fix it in position so that it will not bend. (Minimum radius 500 mm or above.)

3. Air quantity ratio of branched duct side is shown as a ratio of the unit air quantity in the table below. If 2 branch ducts are connected to the unit, as shown by the*, the branch duct side air quantity will become greater, and the air velocity of the 3-way outlet side will drop. Consequently the warm air throw distance will become shorter.

Air quantity ratio of Branch Duct Side

Model	Number of ducts attached	
	One FD-2B (duct side resistance approx. 1.0 mmAq)	Two FD-2B (duct side resistance approx. 1.0 mmAq)
RCI-1.5~6-0	About 25%	* (About 40%)

– In the case that the branch duct is installed from the standpoint of prevention against accidents, keep the dimensions shown in the following drawing.
– Use non-combustible materials for the duct.
– Install sufficient thermal insulation for the duct. (This is to prevent condensation).
– Follow the local code in the field, or use the dimensions shown in the next figure, if no code is applicable.



(Space between the unit and the wall)

Material of walls and pillars

Space	Material of walls and pillars	
	Combustible materials	Non-combustible materials
C	10 cm or above	5 cm or above
D	100 cm or above	60 cm or above

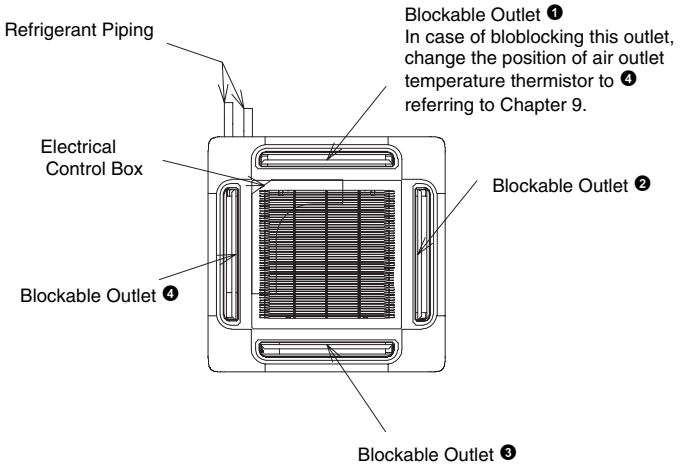
1.9.4. DIRECTION AIR FLOW FOR 4-WAY CASSETTE TYPE INDOOR UNITS

In the event that only three outlets are required, utilize the 3-way outlet parts set shown in the table below.

Model	Unit model
PI-23LS5	RCI-1.5~6.0

NOTE:
The blocking plates must be fitted as shown on the drawing.

Only one of the 4 outlets can be blocked as shown below.

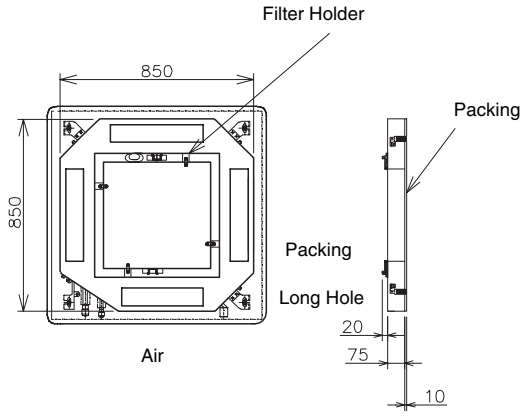


(Attachable position of 3-way outlet parts set)

CAUTION:
In case 3 outlets are used, the decrease in air quantity will be about 3 to 5%, and within the operation range of the unit, there will be no major difference in particular, in comparison with the 4-way outlet. However, the noise will increase by about 1 to 2 dB.

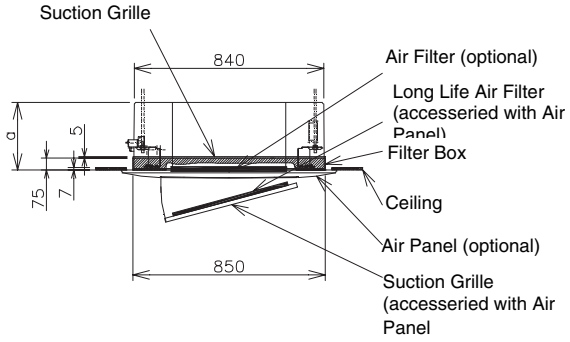
1.9.5. FILTER BOX FOR 4-WAY CASSETTE TYPE INDOOR UNITS (B-23H4)

The dimensions of the Filter Box are described in the drawing below.



The total height of the unit is increased by approximately 85 mm with the filter box installed. Therefore, pay attention to the installation space.

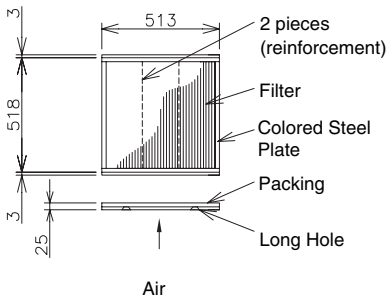
Note that the packing dimension before compression is 10 mm but, after compression is reduced to 5 mm.



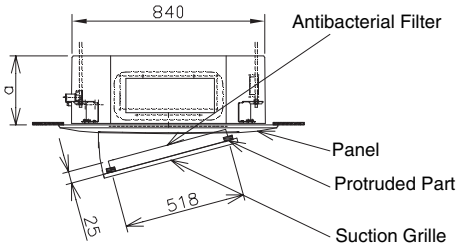
Model	a
RCI-1.5~2.5	328
RCI-3.0~6.0	378

1.9.6. ANTI-BACTERIAL LONG LIFE AIR FILTER FOR 4-WAY CASSETTE TYPE INDOOR UNITS (F-23L4-K)

The dimensions of the Anti-Bacterial Long Life Air Filter are described in the drawing below.



To mount the filter, put the filter's long hole into the protruded part of the suction grille as shown in the following drawing.



Model	a
RCI-1.5~2.5	248
RCI-3.0~6.0	298

Specifications:

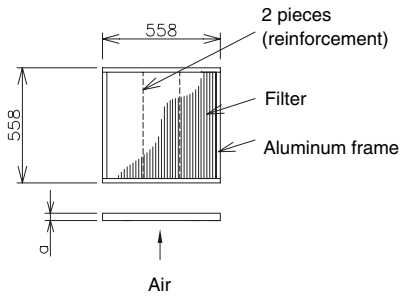
Item		For 4 Way Cassette Type RCI-1.5~6.0
Dust Collection Efficiency	%	50 (Gravimetric Method)
Air Flow	m^3/min.	37.0
Initial Pressure Loss	Pa (mmAq)	17.7 (1.8)
End Pressure Loss	Pa (mmAq)	44.1 (4.5)
Color	Filter/Frame/ Packing	White / Brown / -
Life Period		4 Years (with maintenance per 1250 hours)
Cleaning		Available (*)
Weight	Kg	0.7
Performance		Prevent bacteria and mold from multiplying
Filter material	Antiabacterial Fiber	Modified Acrylic Fiber 1 (Inorganic Antibacterial Substance Contained)
	Reinforce Net	Modified Acrylic Fiber 2 (Organic Antibacterial Substance Contained)

NOTE:

The life of this filter is the standard period and it may vary depending on the using conditions.
Wash this filter by using water or neutral detergent (*).
When using this filter, set the air flow mode at High Speed by the remote control switch to maintain the required air volume.

1.9.7. DEODORANT AIR FILTER FOR 4-WAY CASSETTE TYPE INDOOR UNITS (F-23L4-D AND F-46L4-D)

The dimensions of the Deodorant Air Filter are described in the following drawing.



Note that the thickness depends on the models.

Model	a
RCI-1.5~2.5	26
RCI-3.0~6.0	42

To mount the filter, you need to use the Filter Box.

Specifications:

Item		RCI-1.5~2.5 F-23L4-D	RCI-3.0~6.0 F-46-L4D
Dust Collection Efficiency	%	50 (Gravimetric Method)	
Air Flow	m^3/min.	20.0	37.0
Initial Pressure Loss	Pa (mmAq)	15.7 (1.6)	16.7 (1.7)
End Pressure Loss	Pa (mmAq)	42.2 (4.3)	33.3 (3.4)
Life Period		3 Years (with maintenance per 3~6 months)	
Reuse		Available (Dry by sunlight) (*1)	
Cleaning		Available (Wash by water) (*2)	
Weight	Kg	0.9	1.0
Dimensions	a (mm)	26	46
Performance		Absorbs smoke, body odor, etc.	
Restricton on usage		Washing by detergent is prohibited	

NOTE:

- *The life of this filter is the standard period, and the life may be varied by the using conditions.*
- *Wash this filter by using water or neutral detergent for prevention from adsorptive decrease(*2).*
- *When using this filter, set the air flow mode at High Speed by the remote control switch to maintain the required air volume.*
- *Some special odors (such as organic solvent and sulfur gas) can not be absorved.*
- *This filter is reusable by atmospheric emission of absorved odor by drying by sunlight (*1).*
- *This filter can be used with the deodorant long life filter (optional).*
- *This filter is supplied by the quantity to be used for one unit as 1 set.*

2 DRAIN PIPING

This chapter describes the procedures that you must follow to install the drain piping elements for the DC Inverter outdoor units and for the full range of Hitachi indoor units.

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2 DRAIN PIPING _____ 1

2.1. General _____ 2

2.2. Indoor Units _____ 3

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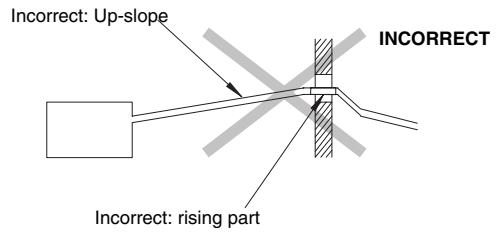
2.2.2. RCD (2-WAYCassette) _____ 3
2.2.3. RPC (ceiling type) _____ 4
2.2.4. RPI (In-the-Ceiling Type) _____ 5
2.2.5. RPK (wall type) _____ 6
2.2.6. RPF and RPFI (floor type and floor concealed type) _____ 6

2.3. Drain discharging Boss for DC INVERTER _____ 7

2.1. GENERAL

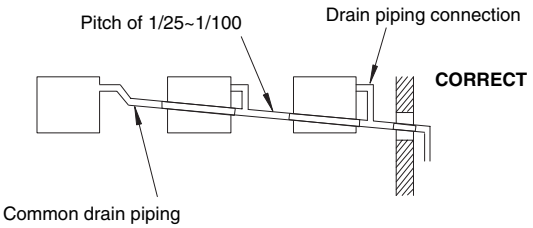
CAUTION:

– *Do not create an up-slope for the drain pipe. If you do so, the drain water will flow back to the unit. Then, leakage to the room will occur when the unit operation is stopped.*



– *Do not connect the drain pipe with the sanitary piping, the sewage piping or any other drainage piping.*

– *When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the position of the common drain piping. The pipe size of the common drain pipe must be large enough according to the unit size and the unit number.*



– *The drain pipe will require insulation if it is installed in a location where condensation may form on the outside of drain pipe. This condensation may drop and cause damage.*
The insulation for the drain pipe must be selected in order to ensure that the vapor is sealed and in order to prevent the condensation from forming.

– *The drain trap should be installed next to the indoor unit. The drain trap must be designed according to good practice. The drain trap must be also checked with charged water in order to test the correct flow. Do not tie the drain pipe and the refrigerant pipe together. Do not clamp the drain pipe and the refrigerant pipe together.*

NOTE:
Install the drainage in accordance with national codes and local codes.

After installing the drain piping and the electrical wiring, make sure that the water flows smoothly as the following procedure explains.

■ Checking the unit without the drain-up mechanism

– Pour approximately 1.8 liters of water into the drain pan.

– Make sure that the water flows smoothly and that no water leakage occurs. If you cannot find water at the end of the drain pipe, once again pour approximately 1.8 liters of water into the drain pan.

■ Checking the unit with the drain-up mechanism and the float switch

– Turn on the power supply.

– Pour approximately 1.8 liters of water into the drain pan. Then, the float switch will be activated. The drain pump will start working automatically.

– Make sure that the water flows smoothly and that no water leakage occurs. If you cannot find water at the end of the drain pipe, once again pour approximately 1.8 liters of water into the drain pan.

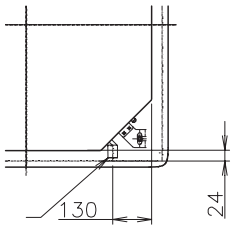
– Turn off the power supply.

NOTE:
Pay attention to the thickness of the insulation material when the left-side piping is installed. If the insulation material is too thick, you cannot install the piping in the unit.

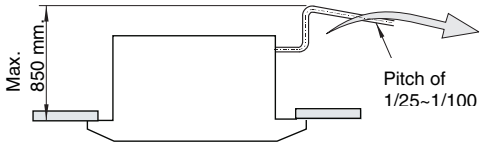
2.2. INDOOR UNITS

2.2.1. RCI (4-WAY CASSETTE)

– The position of the drain piping connection is shown below.

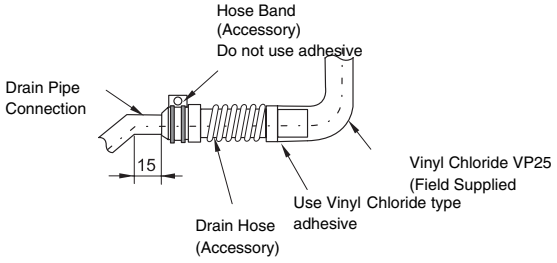


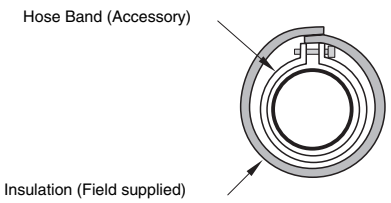
– Prepare a PVC pipe with a 32 mm outer diameter.
– Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a pitch of 1/25 to 1/100.
– Do not apply excessive force to the drain piping connection. It could cause a damage.
– Do not use a bent or twisted drain hose. It will cause water leakage.



Gradient of drain piping

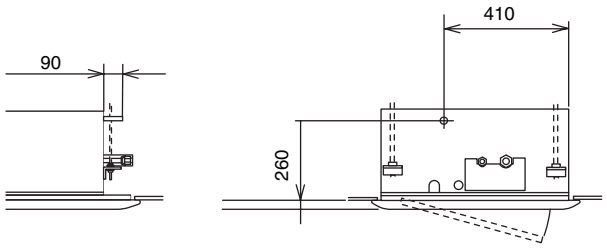
– Insulate the drain pipe after connecting the drain hose. Do not use adhesive between the drain piping connection and the drain hose.



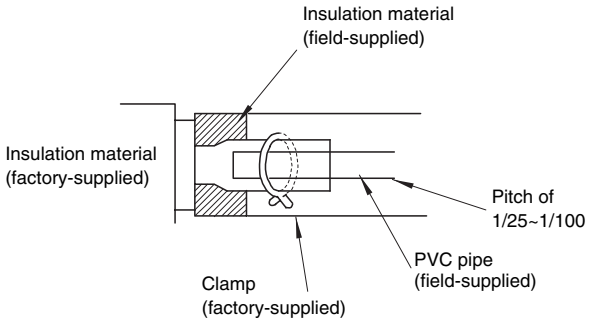


2.2.2. RCD (2-WAYCASSETTE)

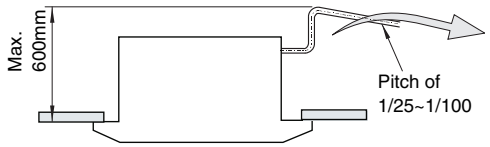
– The position of the drain piping connection is shown below.



– Prepare a PVC pipe with an outer diameter of 32mm.
– Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a pitch of 1/25 to 1/100.



Drain piping



Gradient of drain piping

– Insulate the drain pipe after connecting the drain hose.

2.2.3. RPC (CEILING TYPE)

The standard direction of drain pipe connection is to the right side looking at the unit from the discharge grilles. However, the pipe connection can be performed from the left side if this is required due to the building construction.

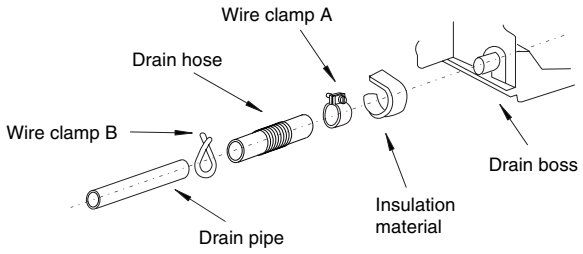
■ **For the right-side connection**

– Insert the hose into the wire clamp.

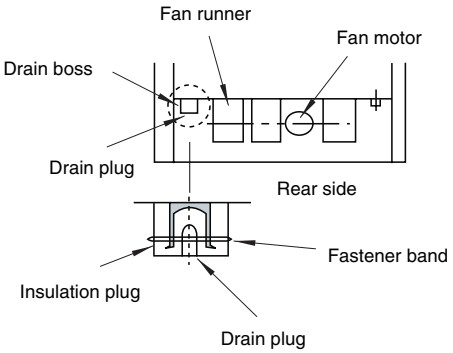
– Push the drain hose onto the drain boss until the hose reaches the end of the drain pan.

– Tighten the screw for the wire clamp in order to hold the hose around the drain connection without any leakage of drain water as shown below.

– Insulate the drain hose around the wire clamp in order to prevent any condensation from forming as shown below.



■ **For the left-side connection**



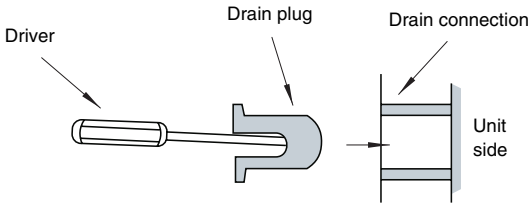
Remove the drain plug of the drain boss on the left side as the following procedure explains.

– Cut the fastener.

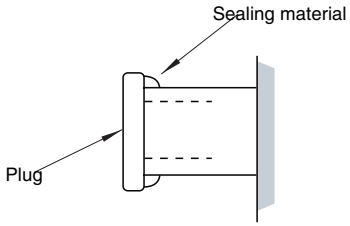
– Remove the insulation material.

– Remove the drain plug.

– sert the drain plug into the drain boss on the right side by using a driver as shown below.



– After inserting the drain plug into the drain boss on the right side, seal the jointed part by using a waterproof chloride-type sealing material and secure the jointed part with a fastener.



– Wrap the insulation material around the drain connection.

– Connect the drain hose to the drain connection on the left side according to the same procedure for the drain connection on the right side.

■ **Connecting a drain piping**

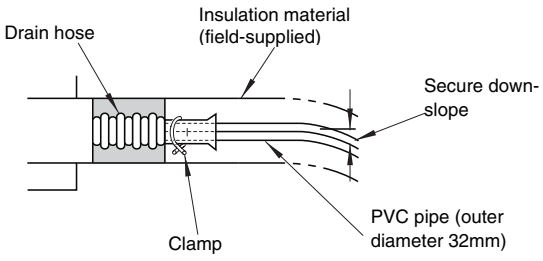
– Prepare a PVC pipe with an outer diameter of 25mm.

– Pay attention to the position of the drain pipe. Keep a down-slope pitch of 1/25 to 1/100. Do not create an up-slope for the drain piping.

– Seal the connecting part of the drain pipe by using the waterproof chloride-type sealing material.

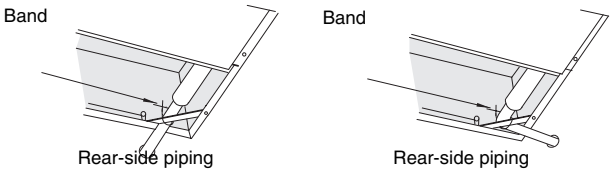
– Wrap the insulation material around the connecting part perfectly.

– Fasten the drain pipe to the connecting part with the factory-supplied clamp.



Wrapping the insulation material

– Do not connect the drain pipe with the sanitary piping, the sewage piping or any other drainage piping.
– When you are installing the pipe, do not tie the drain pipe and the refrigerant pipe together. Tie the drain pipe as shown below.

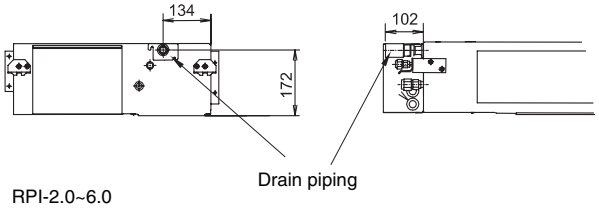


– After completing the installation of the drain pipe, pour water into the drain pan and make sure that the water flows smoothly as explained in section 2.1.

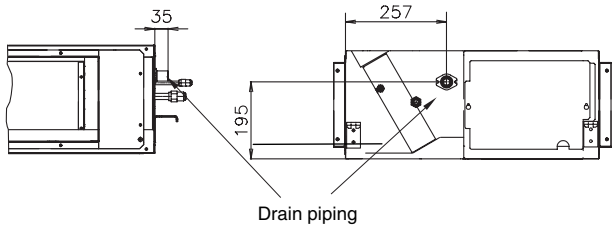
2.2.4. RPI (IN-THE-CEILING TYPE)

– The position of the drain pipe connection is shown in the next figure.

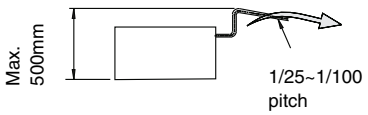
RPI-1.5



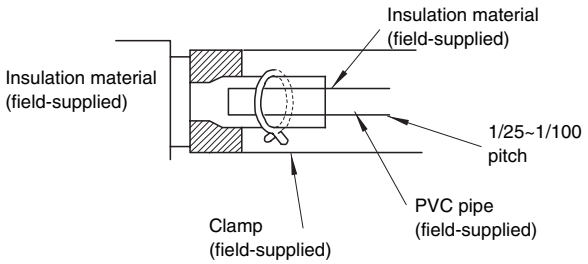
RPI-2.0~6.0



– Prepare a polyvinyl chloride pipe with an outer diameter of 32mm.
– Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must
be installed with a down-slope pitch of 1/25 to 1/100.

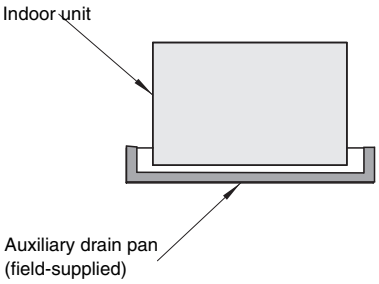


– Insulate the drain pipe after connecting the drain hose.



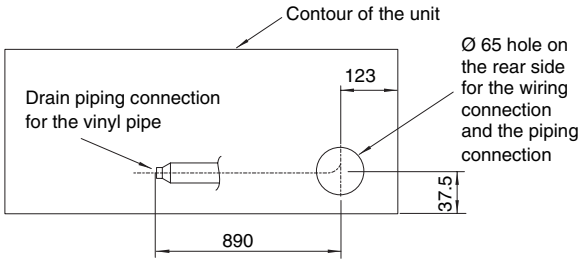
(Drain piping)

NOTE:
When the relative humidity of the inlet or the ambient air exceeds 80%, place an auxiliary drain pan, which is field-supplied, beneath the indoor unit as shown below.

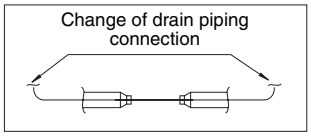


2.2.5. RPK (WALL TYPE)

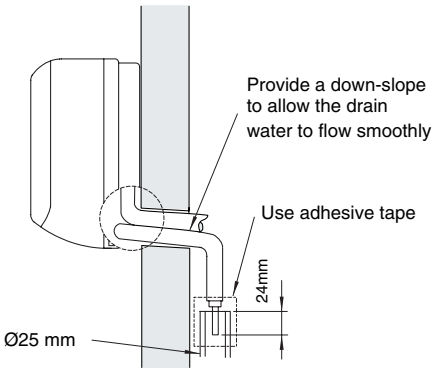
– The standard direction of drain piping connection is to the right side when the unit is viewed from the discharge grilles. However, the connection can be performed from the left side or the rear side.



– When the drain piping connection is performed on the left side, remove the cap of left-side drain pipe. Then, attach this cap to the right-side drain pipe in order to change the drain piping connection from the right side to the left side.



– Prepare a PVC pipe with an outer diameter of 25mm.
– Connect a drain piping according to the figure below.

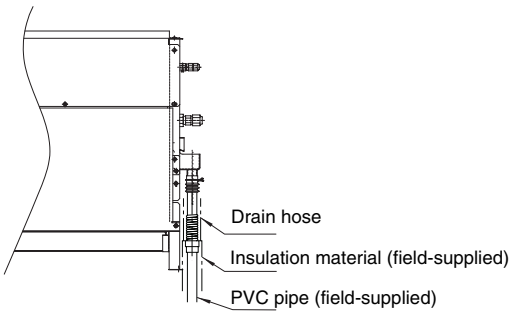


  – Do not create an up-slope from the unit.
  – Use chloride-type adhesive for connecting the drain pipe.

– Tightly squeeze the drain hose with the wire clamp after inserting the drain pipe into the drain hose completely.
– Pour water onto the drain pan and make sure that the water flows smoothly.

2.2.6. RPF AND RPFI (FLOOR TYPE AND FLOOR CONCEALED TYPE)

– The position of the drain pipe connection is shown in the figure.
– Prepare a PVC pipe with an outer diameter of 18.5 mm.
– Fasten the pipe to the drain hose with an adhesive.
– Insulate the drain pipe after connecting the drain hose as shown.



2.3. DRAIN DISCHARGING BOSS FOR DC INVERTER

When the base of the outdoor unit is temporarily utilized as a drain receiver and the drain water in it is discharged, this drain boss is utilized to connect the drain piping.

Model	Applicable Model
DBS-26	RAS-HVRNE

■ Connecting the drain discharging boss

- Insert the rubber cap into the drain boss up to the extruded portions
- Insert the boss into the unit base and turn approximately 40 degree counterclockwise.
- Size of the drain boss is 32 mm (O.D.)
- A drain pipe should be field-supplied

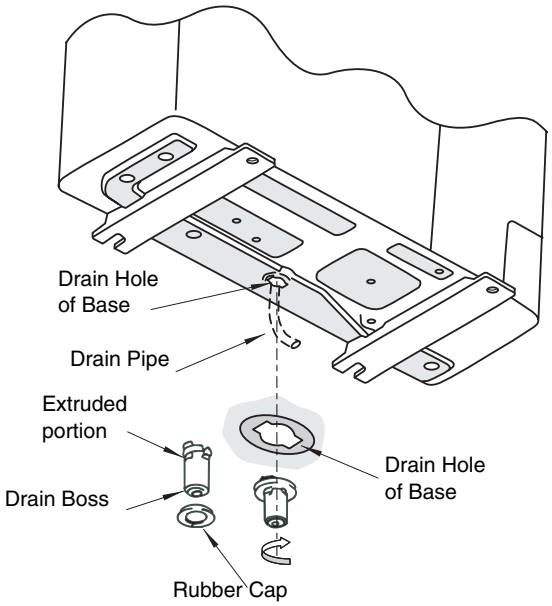
NOTES:

– *Do not use this drain boss set in a cold area, because the drain water may freeze.*

– *This drain boss is not sufficient to collect all the drain water. If collecting drain water is completely required, provide a drain-pan that is bigger than the unit base and install it under the unit with drainage.*

– *In order to guarantee the proper condensate draining, the siphon installation is very important.*

DC INVERTER



3 ELECTRICAL WIRING

This chapter describes the procedures that you must follow to create the electrical wiring connections for the DC Inverter Series outdoor units and for the full range of Hitachi indoor units.

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3 ELECTRICAL WIRING _____ 1

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3.2. Electrical Wiring for the Outdoor Unit _____ 2

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3.2.2. Setting the Dip Switches for the Outdoor Unit _____ 3

3.3. Electrical Wiring for the Indooor Unit and the Complementary Systems _____ 5

3.3.1. Electrical Wiring Connection _____ 5
3.3.2. Setting the Dip Switches for the Indoor Unit _____ 8

3.4. Common Wiring _____ 11

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3.4.2. Wiring Size _____ 12
3.4.3. H-LINK System _____ 13
3.4.4. PSC-5HR _____ 14

3.1. GENERAL CHECK

ATTENTION:

– *Before installing the electrical wiring or before performing a periodical check, turn OFF the main switch to the indoor unit and the outdoor unit.*

– *Before installing the electrical wiring or before performing a periodical check, make sure that the indoor fan and the outdoor fan have stopped.*

– *Protect the wires, the drain pipe, the electrical components and any other parts from rats or other small animals. If all these parts are not protected, rats or other small animals may gnaw at these parts. In the worst case, a fire may occur.*

– *Prevent the wires from touching the refrigerant pipes, the plate edges and the electrical components inside the unit. Otherwise, the wires will be damaged. In the worst case, a fire may occur.*

CAUTION:

Tightly secure the wires with the cord clamp inside the indoor unit.

NOTE:

Fix the rubber bushes with adhesive when the conduit tubes to the outdoor unit are not used.

1. Make sure that the field-selected electrical components (main switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical specifications in this service manual. Make sure that the electrical components comply with the National Electrical Code (NEC).
2. Make sure that the power supply voltage is within ±10% of the rated voltage.
3. Check the capacity of the electrical wires. If the power source capacity is too low, you cannot start the system due to the voltage drop.
4. Make sure that the ground wire is connected.
5. Main Switch
   Install a multi-pole main switch with a distance of 3.5 mm or more between each phase.

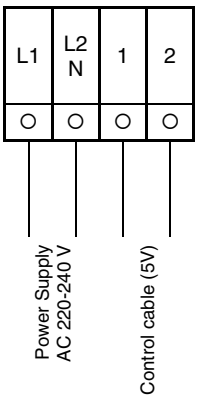
3.2. ELECTRICAL WIRING FOR THE OUTDOOR UNIT

3.2.1. ELECTRICAL WIRING CONNECTION FOR OUTDOOR UNIT

1 Connect the power supply wires to L1 and L2 (3 Phase 3 Wires) or L1 and N (3 Phase 4 Wires) for the single phase power source 1ϕ 220-240/220V, 50Hz on the terminal board and ground wires to the terminals in the electrical control box as shown

2 Correct wiring for power and control cables:

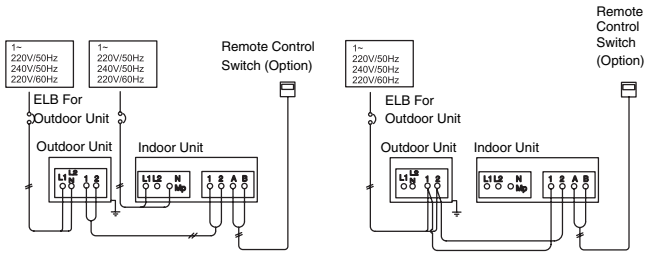
RAS-3~6HVRNE



Do not connect the main power wires of 380/415V.

3 Connect the wires between the outdoor and indoor units to terminals 1 and 2 on the terminal board.
If power supply wiring is connected to 1 and 2 of terminal board (TB1), printed circuit board will be damaged.

CORRECT **INCORRECT**

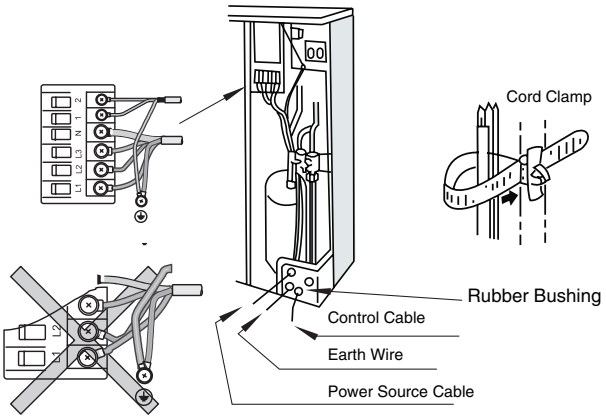


Do not connect the Power Source Line to the terminal 1 and 2. These terminals are for the Control Line. If connected, the printed circuit board will be damaged.

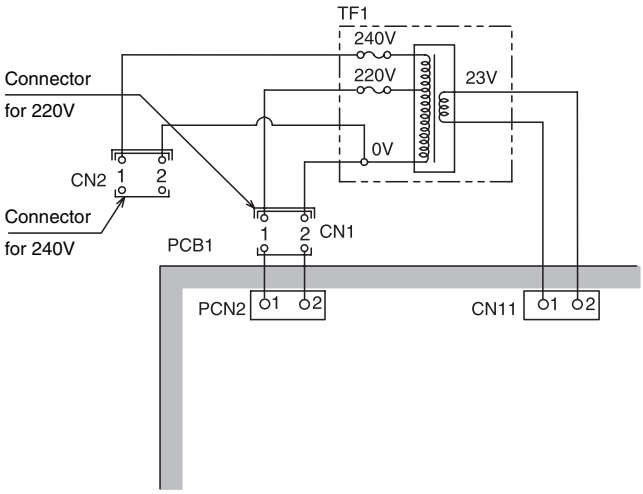
4 Do not wire in front of the fixing screw of the service panel. If do, the screw can not be removed.

5 Instructions for wiring on Electrical board and clamping wires:

- Keep a distance between each wiring terminal and attach insulation tape or sleeve as shown in the figure.
- Insert the wires into the cord clamp and clamp them as shown in the figure.
- Ensure the wires are installed away from the Ps, Pd sensor
- Perform wiring so that wires do not touch the compressor, refrigerant pipes or edge of the covers.
- Make a loop of wires so that it is not necessary disconnect when replacing parts.
- Fasten the wires so that wires do not touch the high-temperature compressor, refrigerant pipes or edge of the covers.



6 In case that the power source is 240V (nominal voltage), change CN1 (connector) to CN2 of transformer in the electrical control box as next figure shows.



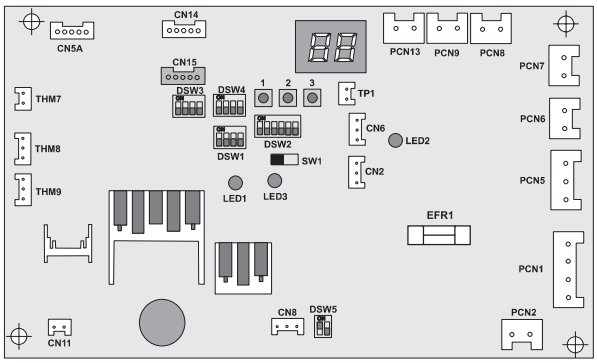
Connector of Transformer of Outdoor Unit

3.2.2. SETTING THE DIP SWITCHES FOR THE OUTDOOR UNIT

- Quantity and position of the DIP switches

The PCB in the Outdoor Unit is operating with 5 types of DIP switches, . The location is as follows

Position of the DIP switches for 3~6 HP:



LEDs INDICATION *	
LED1	Alarm Indication
LED2	Alarm Indication
LED3	Alarm Indication

(*): See Troubleshooting Chapter for more Indications

NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting

CAUTION:
Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

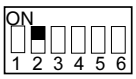
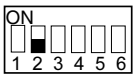
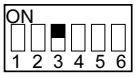
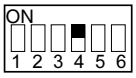
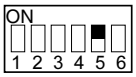
■ Dip Switch Settings

TURN OFF all power sources before setting.
Without turning OFF, the switches do not work and the contents of the setting are invalid. Mark of "■" indicates the position of dip switches. The absence of mark "■" indicates unaffected. Set the dip switches according to the following Information.

■ DSW1: For Test Run

Setting before shipment	
Test Run (Cooling)	
Test Run (Heating)	
Compressor Forced Stop	

■ DSW2: Optional Function Setting

Setting before shipment	
Energy saving operation (ON: Cancel; OFF: Set)	
Night-Shift Mode (Low Sound) (OFF: No set; ON: Set)	
Cancellation of Outdoor Ambient Temp. limit (OFF: No set; ON: Set	
Cancellation of Fan Stop Operation during Defrost (OFF: No set; ON: Set)	

■ DSW3: Capacity (Unit type)

Model	RAS-3HVRNE	RAS-4HVRNE
Setting Position		
	RAS-5HVRG	**RAS-6HVRNE**
		

■ DSW4: Refrigerant Cycle No. Setting

In the same refrigerant cycle, set the same refrigerant cycle No. for the outdoor unit and the indoor units as shown below.

Setting position	**Unit No. 0**	**Unit No. 1**	**Unit No. 2**	**Unit No. 3**
				
Setting position	**Unit No. 4**	**Unit No. 5**	**Unit No. 6**	**Unit No. 7**
				
Setting position	**Unit No. 8**	**Unit No. 9**	**Unit No. 10**	**Unit No. 11**
				
Setting position	**Unit No. 12**	**Unit No. 13**	**Unit No. 14**	**Unit No. 15**
				

Set each outdoor unit from No. 0, 1, 2, etc. at site. (factory set: No. 0)

■ DSW5: Transmission Setting of End Terminal Resistance

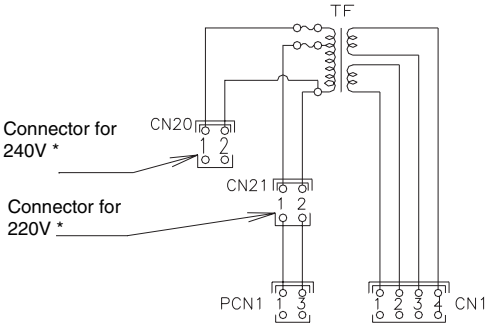
Before shipment, No. 1 pin of DSW5 is set at the ON side. In the case that the outdoor units quantity in the same H-link is 2 or more, set No. 1 pin of DSW5 at the OFF side from the 2nd unit. If only one outdoor unit is used, no setting is required.

Before shipment	
Cancellation	

3.3. ELECTRICAL WIRING FOR THE INDOOOR UNIT AND THE COMPLEMENTARY SYSTEMS

ATTENTION:

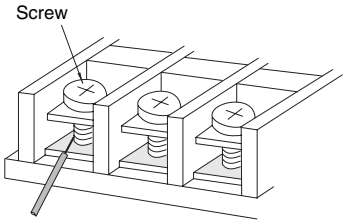
– *Before turning ON the main switch, check the item below. If the nominal voltage for the indoor unit is 240V, change the connector CN21 to CN20 of the transformers TF in the electrical box as shown in the figure below.*



*) For RCI, RCD, RPK and KPI: change the connector CN27 instead of the connector CN20. Also, change the connector CN28 instead of the connector CN21.

ATTENTION:

– *To prevent the screws from falling, you cannot remove the screws from the terminal box. When you are fastening the terminal, make sure that you fasten the screw through the hole of the terminal.*

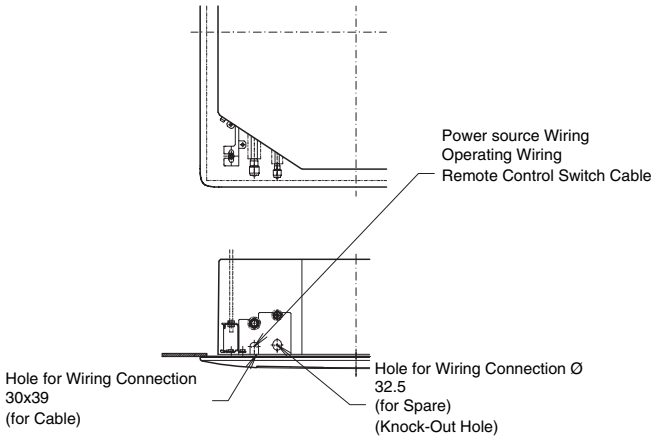


– *Make sure that you apply the terminal specification to the following screws of the terminal box: M4 screw for the power supply and M3.5 screw for the operating line.*

3.3.1. ELECTRICAL WIRING CONNECTION

RCI units

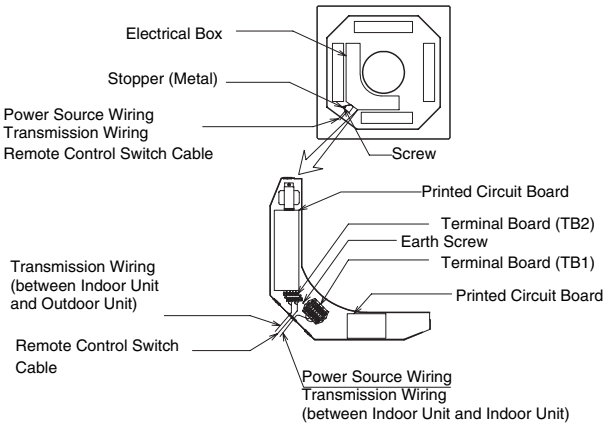
The electrical wiring connection for the indoor unit is shown below.
For the intermediate connection between the Indoor unit and air panel, refer to chapter 1.2

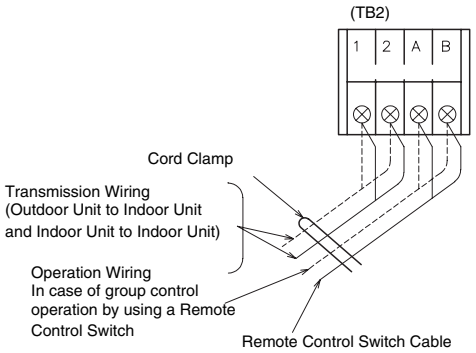


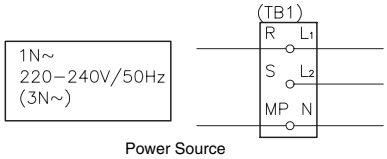
– Connect the cable of an optional remote control switch or an optional extension cable to the terminals inside the electrical box through the connecting hole in the cabinet.

– Connect the power supply and earth wires to the terminals in the electrical box.

– Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.



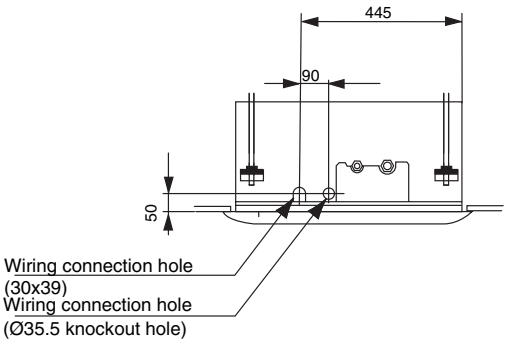




RCD units

The electrical wiring connection for the indoor unit is shown in the following figures. For the intermediate connection between the indoor unit and the air panel, refer to chapter 1.3.

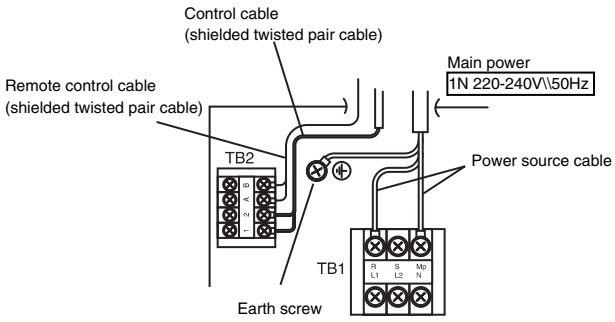
– Through the wiring connection hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

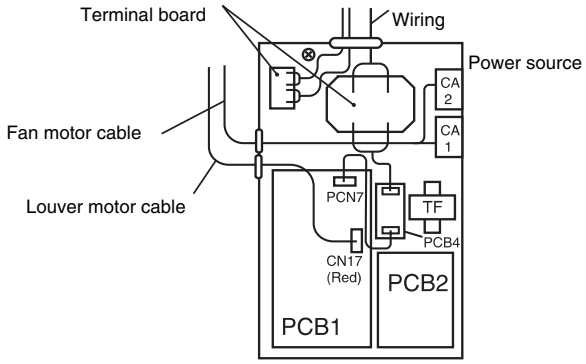


– Connect the power supply wires and the ground wire to the terminals in the electrical box.

– Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box as shown below.

Phase connection

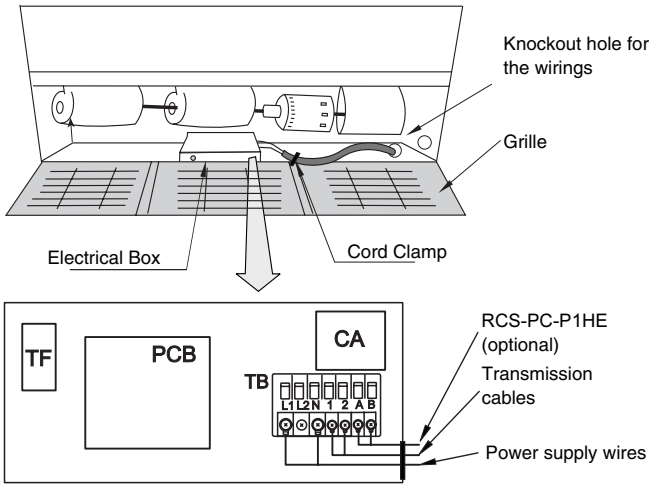




RPC units

The electrical wiring connection for the indoor unit is shown in the following figures.

– Through the wiring connection hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.



– Connect the power supply wires and the ground wire to the terminals in the electrical box.

– Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

RPI units

The electrical wiring connection for the indoor unit is shown in the following figures.

– Open the service access panel.

– Cut out the center of the rubber bushing in the wiring connection hole as shown in the next figures.

– Through the wiring connection hole in the cabinet, connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

– Connect the power supply wires and the ground wire to terminals 1 and 2 in the electrical box.

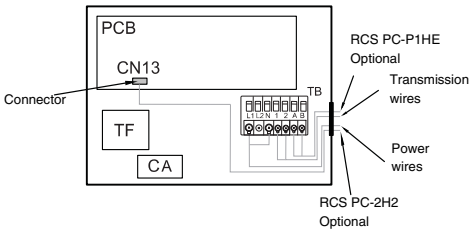
– Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

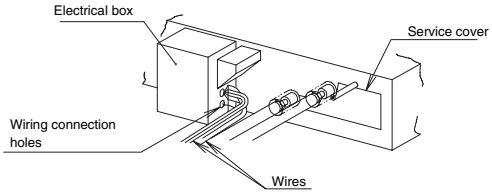
– Connect the wires of the remote control switch to terminals A and B in the electrical box.

– Tightly clamp the wires with the cord clamp inside the electrical box.

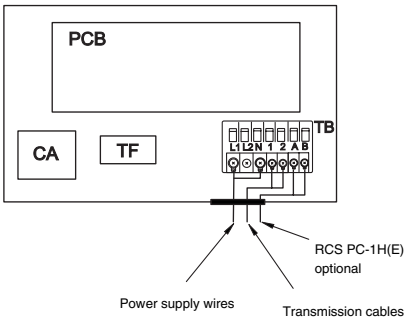
– To protect the unit from the condensate water and the insects, run the cables with the sealing material (cover plate). Then, seal the wiring connection hole.

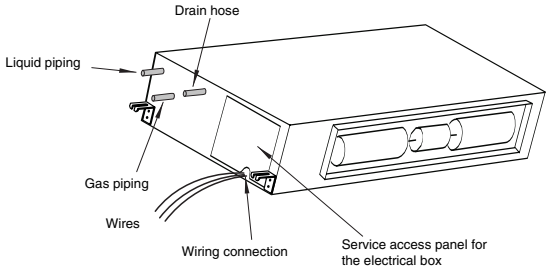
RPI-1.5





RPI-2.0~6.0





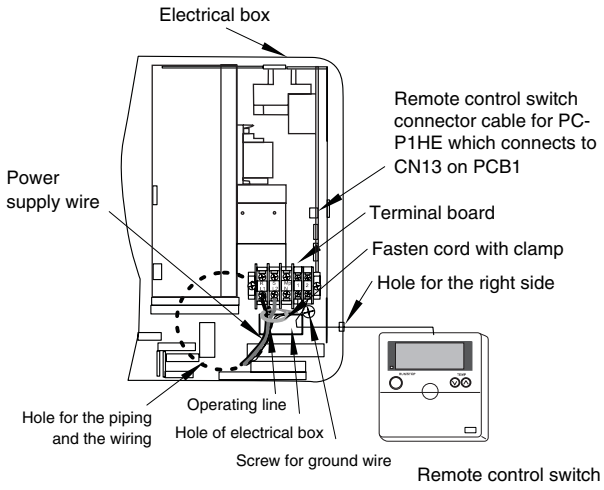
RPK units

The electrical wiring connection for the indoor unit is shown in the following figures.

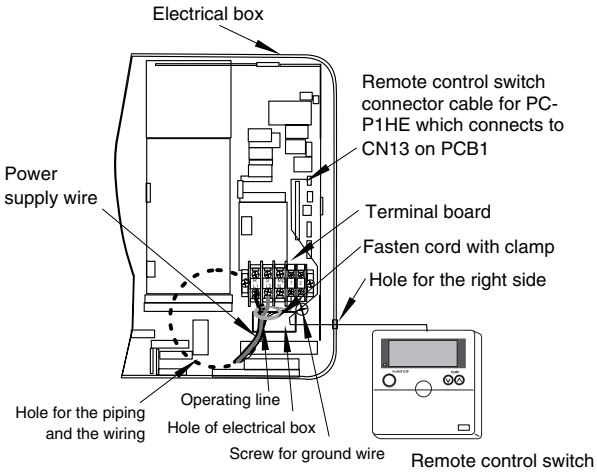
1. Through the wiring connection hole in the cabinet, connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.
2. Connect the power supply wires and the ground wire to the terminals in the electrical box.
3. Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

NOTE:
If you are using PC-P1HE, PC-P5H or PC-RLH11, remove the wiring of the connector CN25 for RPK-0.8~2.0 or CN25 & CN12 for RPK-2.5~4.0. Otherwise, the system cannot function.

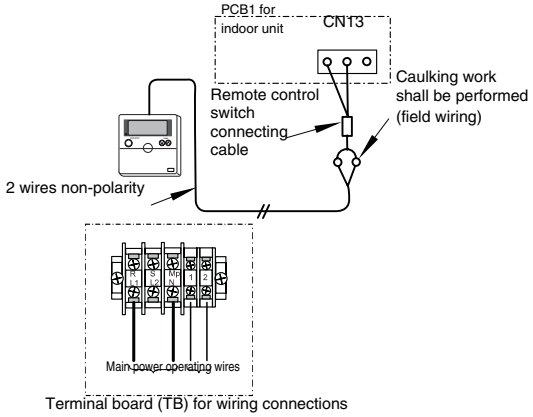
■ RPK-1.5~2.0



■ RPK-2.5~4.0



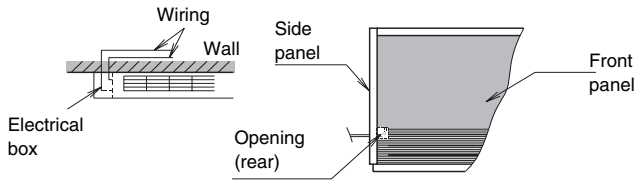
The following figure provides further details of the wiring connection for RPK-0.8~2.0 and RPK-2.5~4.0 units:



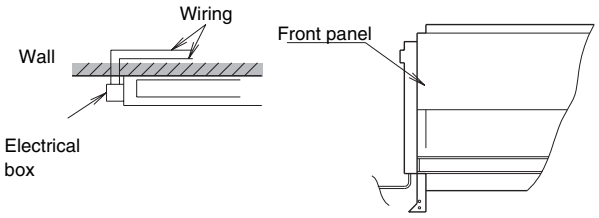
RPF/RPFI units

Remove the front panel and the side panel.

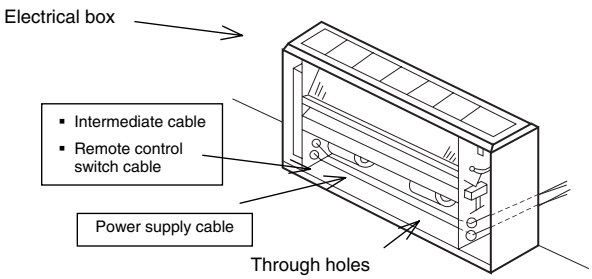
1. The wiring from the left-rear side to the RPF is shown below.



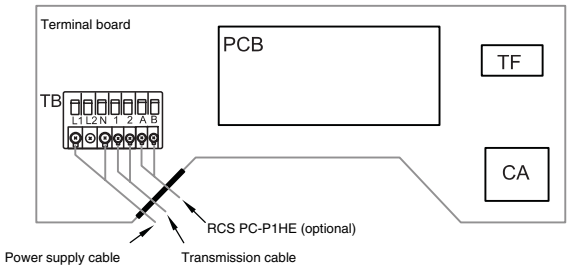
2. The wiring from the left-rear side to the RPFI is shown below.



3. The wiring from the right-rear side is shown below.



4. The wiring connection is shown below.

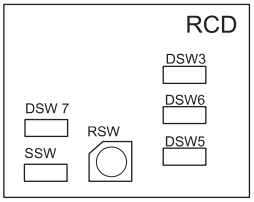


3.3.2. SETTING THE DIP SWITCHES FOR THE INDOOR UNIT

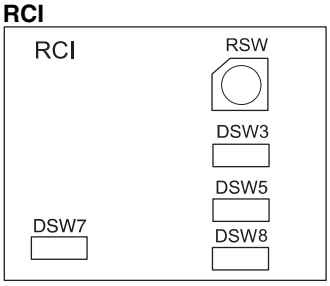
Quantity and position of the DIP switches.
The PCB in the indoor unit operates with three, four or five types of DIP switches and rotary switches.
The position of the DIP switches is the following:

Indoor Unit PCB

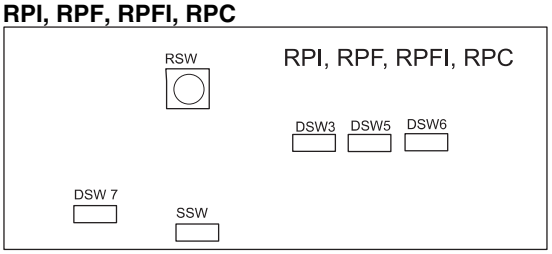
RCD



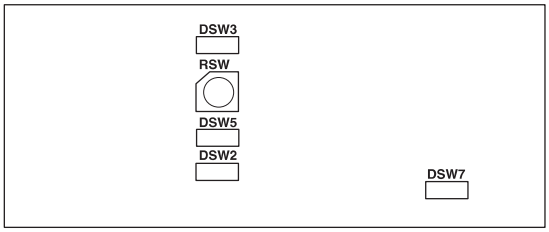
RCI



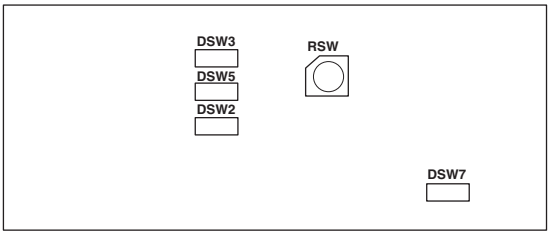
RPI, RPF, RPFI, RPC



RPK-1.5~2.0



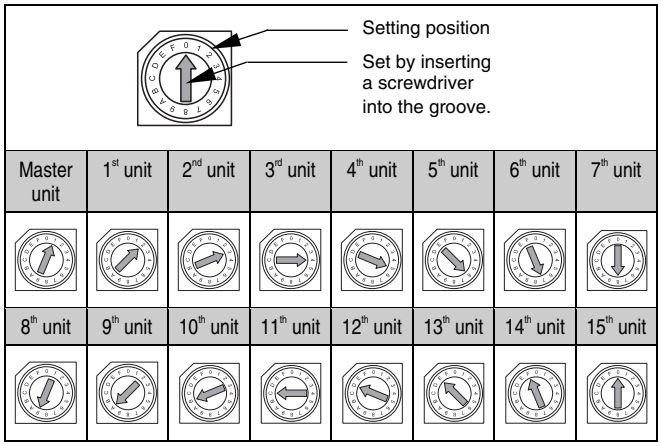
RPK-2.5~4.0



NOTE:
The mark "■" indicates the position of the DIP switches. The figures show the settings before shipment.

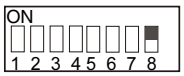
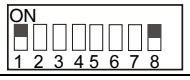
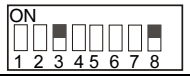
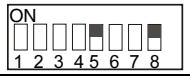
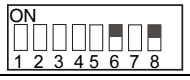
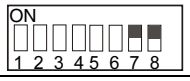
CAUTION:
Before setting the DIP switches, first turn off the power source and set the position of the DIP switches. If you do not turn off the power source and you set the DIP switches, the contents of the setting are invalid.

RSW: unit number setting
The unit number setting is required. Set the unit number of all the indoor units respectively and serially, according to the setting position that is shown in chapter 9 Numbers must start from "0" for every outdoor unit.



DSW2: optional functions setting (only RPK)

No setting is required. Use this switch for setting the optional functions as shown below.

Factory setting	
Self-inspection function	
Room thermostat is used	
Automatic operation when power supply is ON	
Remote On\\Off control which uses pulse signal is available	
Automatic restart after power failure	

DSW3: capacity code setting

No setting is required because the DIP switch was set before the shipment. Use this DIP switch for setting the capacity code that corresponds to the horsepower of the indoor unit.

HP	1.5	1.8	2.0	2.3
Setting position				
HP	**2.5**	**2.8**	**3.0**	**4.0**
Setting position				
HP	**5.0**	**6.0**		
Setting position				

DSW5: setting the refrigerant cycle number

Setting the refrigerant cycle number is required. Before the shipment, all the setting positions are OFF.
(The refrigerant cycle number is 0).

Cycle No.	0	1	2	3
Setting position				
Cycle No.	**4**	**5**	**6**	**7**
Setting position				
Cycle No.	**8**	**9**	**10**	**11**
Setting position				
Cycle No.	**12**	**13**	**14**	**15**
Setting position				

DSW6: setting the unit model code
(Not available for RCI and RPK)

No setting is required. Use this switch for setting the model code which corresponds to the indoor unit type.

Indoor unit model code	DSW6 setting
RCD-1.5~5.0	
RPC-2.0~6.0	
RPI-1.5	
RPI-2.0~6.0	
RPF(I)-1.5~2.5	

DSW7: setting the fuse recover and the remote control selection

<table>
<tr><td>No setting is required. Before the shipment, all the setting positions are OFF. PC-P1HE: Remote control switch selected.</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="2">If you apply high voltage to the terminals 1 and 2 of the TB1, the fuse on the PCB1(M) is blown out. If that is the case, first correct the wiring to the TB1. Then, set the ON pin as shown beside.</td><td>Except RPK</td><td>Only RPK</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>PC-2H2: Remote control switch selected (except RCI, RCD and RPK).
(See also SSW)</td><td colspan="2"> 
</td></tr>
</table>

DSW8: No setting is required.
Setting position before shipment is all off.

SSW: remote control system

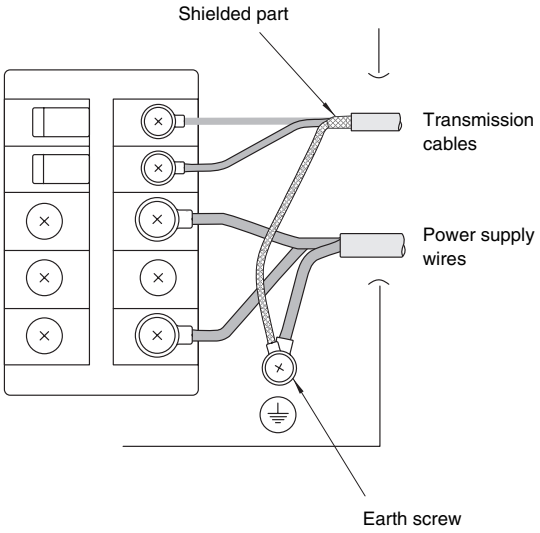
<table>
<tr><td rowspan="2">PC-P1HE
Before shipment.</td><td>New</td><td>Old</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>PC2H2
(Refer to the DSW7 settings)</td><td colspan="2"></td></tr>
</table>

3.4. COMMON WIRING

3.4.1. ELECTRICAL WIRING BETWEEN THE INDOOR UNIT AND THE OUTDOOR UNIT

CAUTION:

– *Use the shielded twisted pair cable or the shielded pair cable for the transmission cables between the indoor unit and the outdoor unit. Connect the shielded part to the earth screw in the electrical box of the indoor unit as shown below. Also use these cables for the operation wiring between one indoor unit and another indoor unit (H-LINK connection).*



– *Connect the electrical cables between the indoor unit and the outdoor unit as shown in the wiring diagram.*

– *Make sure that the terminals for the power supply wiring and the terminals for the intermediate wires between the indoor unit and the outdoor unit coincide correctly. For AC 220-240V, the terminals for the power supply wiring are "L1" to "L1" and "N" to "N". For the operating line, the terminals for the intermediate wires are "1 and 2" to "1 and 2" of each terminal board for DC 5V. Otherwise, you may damage some components.*

– *When you are installing the electrical wiring, follow the local codes and the local regulations.*

– *Connect the operation wiring to the units in the same refrigerant cycle. (You should connect the refrigerant piping and the control wiring to the same indoor units). If you connect the refrigerant piping and the control wiring to the units in the different refrigerant cycle, an abnormal operation may occur.*

– *You must connect the shielded part to earth only in one cable side.*

– *Do not use more than three cores for the operation wiring (H-LINK). Select the core sizes according to the national regulations.*

– *If there are multiple outdoor units that are connected to one power supply wire, open a hole near the connection hole for the power supply wiring.*

– *The recommended breaker sizes are shown in the table of electrical data and recommended wiring, breaker size\\1 O.U.*

– *If a conduit tube for the field wiring is not used, fix the rubber bushes on the panel with adhesive.*

– *All the field wiring and the equipment must comply with the local codes and the international codes.*

– *Make sure that the power source voltage is correct.*

– *An incorrect wiring may cause a breakdown of the transformer PSC-5HR or the units*

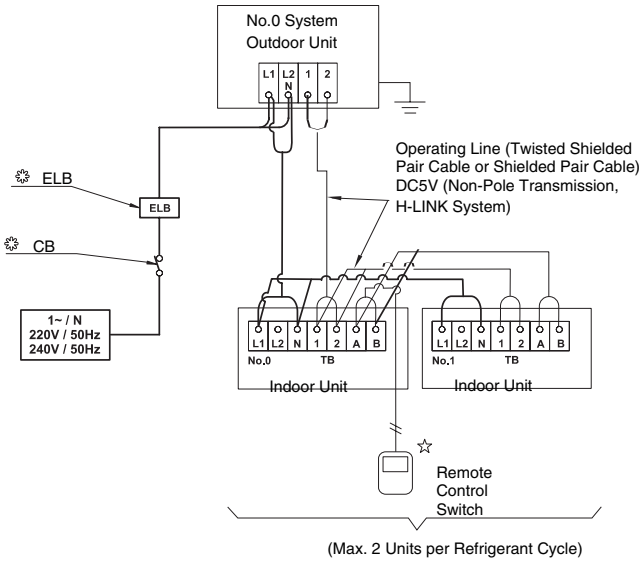
– *Especially, DO NOT connect the power source to the terminal board for transmission.*

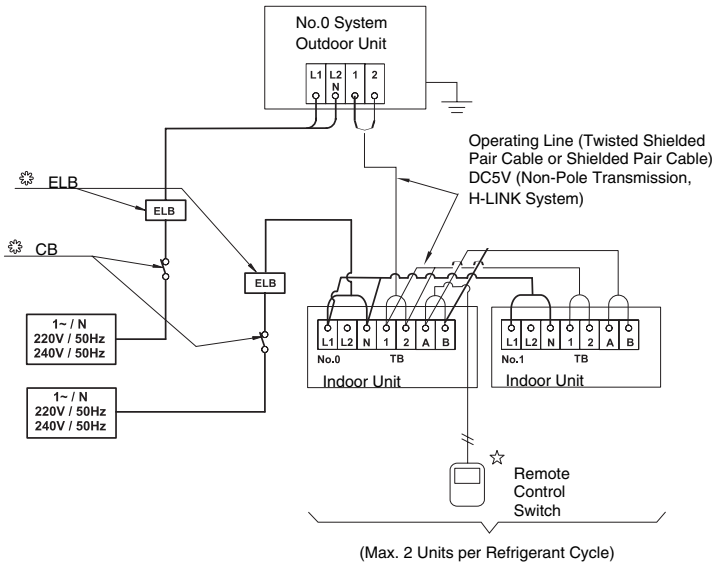
– *DO NOT install the H-LINK wires along the power supply wire, other signal wires, and others. If you install the H-LINK wires along those wires, there may be a malfunction due to the electrical noise. If you need to install the H-LINK wires near those wires, provide a distance of 15cm or more. Or alternatively, insert the wires into the steel pipe and ground one end of the pipe.*

Unit	Name of DIP switch	Mark	Setting before the shipment	Function
Outdoor unit	Refrigerant cycle	DSW1		For setting the refrigerant cycle address of the outdoor unit. Make sure that the setting of the DSW1 does not overlap the setting of other outdoor units in the same H-Link system.
	End terminal resistance	DSW10-1P		For matching the impedance of the transmission circuit. Set the DSW10 according to the quantity of the outdoor units in the H-Link system. Setting of the end terminal resistance. Before the shipment, the No.1 pin of DSW10 is set at the ON side. If the quantity of indoor units in the same H-LINK is two or more, set the No.1 pin of DSW10 in the second unit to OFF. If only one outdoor unit is used, no setting is required.
Indoor unit	Refrigerant cycle	DSW5		For setting the refrigerant cycle address of the indoor unit. Set the DSW5 according to the address of the outdoor unit in the same refrigerant cycle.
	Address of indoor unit	RSW		For setting the address of the indoor unit. Make sure that the setting of the RSW does not overlap the setting of other indoor units in the same refrigerant cycle. (If you do not set the RSW, the automatic address function is performed).

ATTENTION:

Pay attention to the connection of the operating line. An incorrect connection may cause the failure of the PCB.





TB : Terminal Board
CB : Circuit Breaker
ELB : Earthleakage Breaker
——— : Field Wiring
——— : Field Wiring
: Field-Supplied
: Optional Accessory

In case of RAS-4HP,RAS-5HP and RAS-6HP, Power Supply shall be connected to Outdoor Unit and Indoor Unit separately

3.4.2. WIRING SIZE

Recomended minimum sizes for field provided wires:

Model	Power Source	Max. Current	Power Source Cable Size		Transmitting Cable Size	
			EN60 335-1 ❶	MLFC ❷	EN60 335-1 ❶	MLFC ❷
All Indoor Units	220-240V/1ϕ/50Hz	5 A	0.75 mm²	0.5 mm²	0.75 mm²	0.5 mm²
RAS-3HVRNE	220-240V/1ϕ/50Hz	21 A	2.5 mm²	3.5 mm²		
RAS-4HVRNE		28 A	4 mm²	3.5 mm²		
RAS-5HVRNE		29 A	4 mm²	3.5 mm²		
RAS-6HVRNE		30 A	4 mm²	3.5 mm²		

– The above wire sizes marked with ❶ are selected at the maximum current of the unit according to the European Standard, EN60 335-1.

– The above wire sizes marked with ❷ are selected at the maximum current of the unit according to the wire, MLFC (Flame Retardant Polyflex Wire) manufactured by HITACHI Cable Ltd. Japan.

■ In case that the power cables are connected in series, add each unit maximum current and select according to the next table.

Selection according to EN60 335-1		Selection according to MLFC (at cable Temp. Of 60 ºC)	
Current i (A)	Wire Size (mm²)	Current i (A)	Wire Size (mm²)
I ≤ 6	0.75	I ≤ 15	0.5
6 < i ≤ 10	1	15 < i ≤ 18	0.75
10 < i ≤ 16	1.5	18 < i ≤ 24	1.25
16 < i ≤ 25	2.5	24 < i ≤ 34	2
25 < i ≤ 32	4	34 < i ≤ 47	3.5
32 < i ≤ 40	6	47 < i ≤ 62	5.5
40 < i ≤ 63	10	62 < i ≤ 78	8
63 < i	❸	78 < i ≤ 112	14
		112 < i ≤ 147	22

❸ *In case that current exceeds 63 A do not connect cables in series*

NOTE:

– *Follow local codes and regulations when selecting field wires, Circuit breakers and Earth Leakage breakers*

– *Use the wires which are not lighter than the ordinary polychloroprene sheathed flexible cord (code designation H05RN-F)*

■ Select the main switches in according to the next table :

Model	Power Source	Max. Current	CB (A)	ELB no. poles/A/mA
All Indoor Units	220-240V/ 1ϕ/50Hz	5 A	6	2/40/30
RAS-3HVRNE	220-240V/ 1ϕ/50Hz	21 A	25	
RAS-4HVRNE		28 A	32	
RAS-5HVRNE		29 A		
RAS-6HVRNE		30 A		

3.4.3. H-LINK SYSTEM

NOTE:
The H-LINK system can not be applied to the cycle with the old model unit or the unit with old transmission.

■ Application

The new H-LINK wiring system requires only two (2) transmission wires connecting each indoor unit and outdoor unit for up to 16 refrigerant cycles, and connecting wires for all indoor units and all outdoor units in series.

This H-LINK system can be applied to the following models.

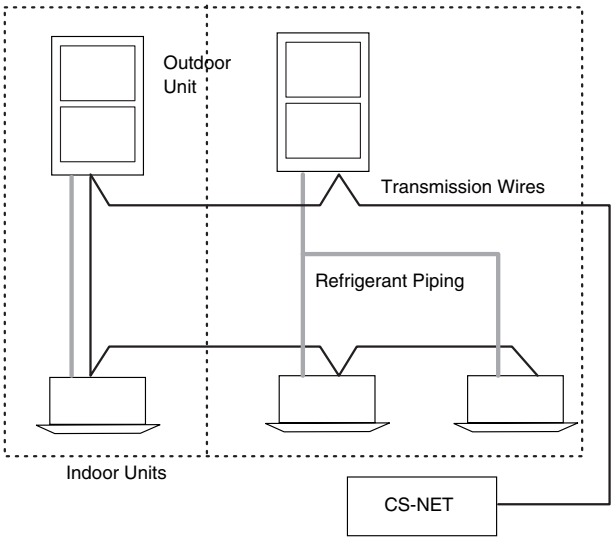
Indoor unit	Outdoor unit
RCI-○○○FSNE RCD-OOOFSN RPC-○○○FSNE RPI-○○○FSNE RPK-○○○FSNM RPF-○○○FSNE RPFI-○○○FSNE	RAS-○○○HVRNE

■ Features

The H-LINK has the following features and specifications:
Features:
The total wiring length is remarkably reduced.
Only one (1) connection is required for the wiring between the indoor unit and outdoor unit.

Easy wiring connection to the central controllers

Example of H-LINK System:



■ Specifications:

- Transmission Wire: 2-Wire
- Polarity of Transmission Wire: Non-Polar Wire
- Maximum Outdoor Units To Be Connected: 16 Units per H-LINK system.
- Maximum Indoor Units To Be Connected: 2 Units per cycle and 32 Units per H-LINK system (in case of all DC Inverter Series).
- Maximum Wiring Length: Total 1000m (including CS-NET).
- Recommended Cable: Twist Shielded Pair Cable or Shielded pair cable over 0.75mm
- Voltage: DC5V

■ System Example of H-LINK

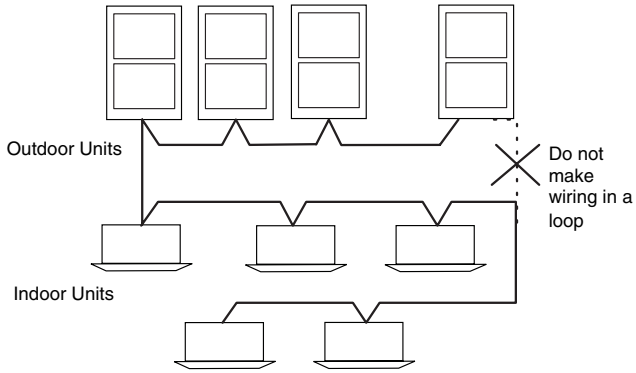
There are two typical cases of using H-LINK system;

1 Using H-LINK System with Air Conditioners only, and

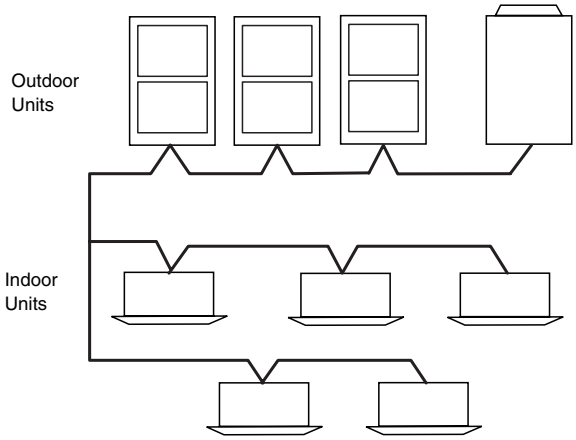
2 Using H-LINK System with Air Conditioners with Central Control Device, and the system examples are as shown

■ Using H-Link connection with Air Conditioners only

- Line Connection with all units

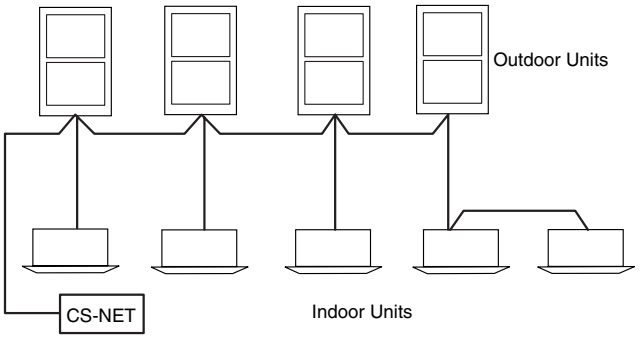


- Line Connection for Each Floor

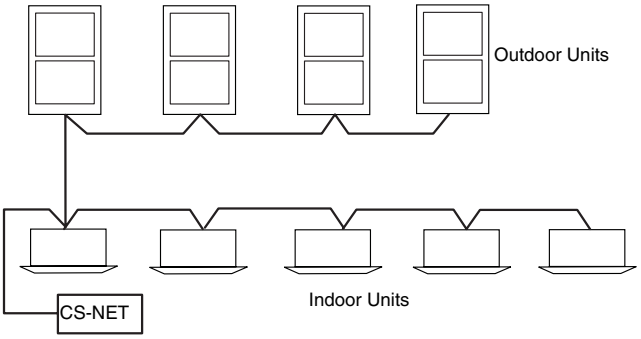


■ Using H-Link connection for conditioning with central control device

- In case that H-LINK is not applied when electrical wiring is performed



- In case that H-LINK is applied when electrical wiring is performed



NOTE:
The maximum quantity of units to be connected is 16 outdoor units and 32 indoor units.
Do not make a wiring in a loop.

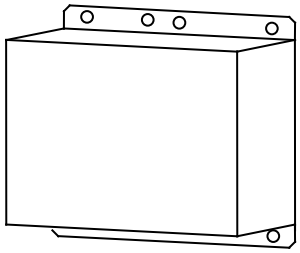
■ Dip Switch Setting of Indoor PCB and Outdoor PCB

It is required to set DIP switches of every indoor unit and outdoor unit

3.4.4. PSC-5HR

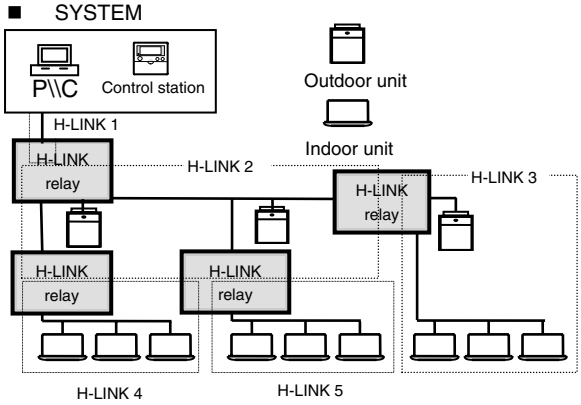
■ Installation of PSC-5HR

Refer to "Installation & Operation Manual of PSC-5HR (PMML 0094A)" for details concerning the safety summary and the installation work.



■ Electrical wiring

■ SYSTEM



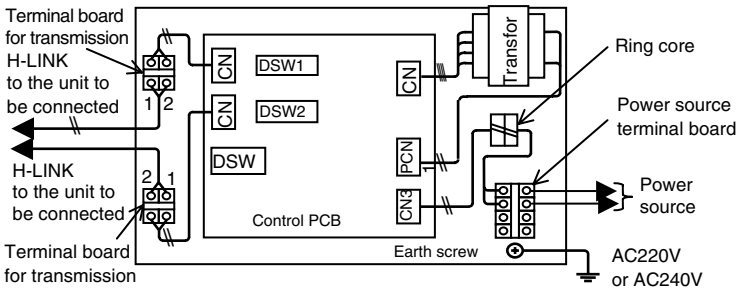
NOTE:
You can install a maximum of Four H-LINK relays in one system.

Make sure that the quantity of connections is the following:

- *Ref. System Quantity: within 16*
- *Indoor Unit Quantity: within 32*
  Total Length of each divided H-LINK: up to 1000m

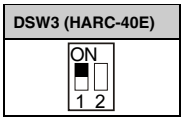
If the H-LINK is divided into five blocks as shown beside, set the end terminal resistance in each H-LINK relay.(For details, refer to the DIP switches below).

■ Internal layout

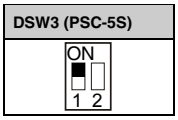


■ Setting the DIP switches

- If there is an outdoor unit in the drived H-LINK, set the end terminal resistance at one of the outdoor units.
- If there is a HARC-40E system, set the end terminal resistance at the HARC-40E.



- If there is a central control device (PSC-5S), set the end terminal resistance at the PSC-5S.



– If there are only indoor units, set the end terminal resistance at the H-LINK relay. If the H-LINK relay is connected to CN1, set the No.1 pin of DSW1 at the ON side. If the H-LINK relay is connected to CN2, set the No.1 pin of DSW2 at the ON side.

DSW1	DSW2
	
(CN1 Side)	(CN2 Side)

– If the H-LINK relays are directly connected to each other, set the end terminal resistance at one of the H-LINK relays. If the H-LINK relay is connected to CN1, set the No.1 pin of DSW1 at the ON side. If the H-LINK relay is connected to CN2, set the No.1 pin of DSW2 at the ON side.

■ Fuse recovery setting

If the fuse is blown out, you can recover by setting the No. 2 pin of DSW1 (at CN1 side) at the ON side or by setting the No. 2 pin of DSW2 (at CN2 side) at the ON side.

DSW1	DSW2
	

■ Setting the main\\sub relays

Set the main\\sub relays by means of the No.1 pin of DSW3 on the control PCB as shown below. (The No.2 pin, the No.3 pin and the No.4 pin are not used).

The setting of the main\\sub relays depends on the number of H-LINK relays. Set the main\\sub relays as follows:

If the number of H-LINK relays is only one, then choose Main. (No setting is required).

If the number of H-LINK relays is more than one, then choose Main for one H-LINK relay and choose Sub for the other H-LINK relays.

DSW3	DSW3
	
Main	Sub

ATTENTION:
If you do not set this pin correctly, there may appear communication alarms.

■ Test run

After completing the installation of the H-LINK, you need to perform the test run of the PSC-5HR. Check the following items:

Connection conditions of the air conditioning systems:

– Check the model code and the quantity of connected units by means of the remote control switch.

– If control equipment is used, perform the connection check at the central control device.

Transmission alarm:

– Perform the RUN\\STOP procedure by means of the central control device or the remote control switch.

– Make sure that no transmission alarm, such as alarm numbers 03, 32, 35, 60, 61 and 256, occurs. The alarm numbers 60, 61 and 256 correspond only to the central control device.

Activation state:

– Monitor the activation state of the LED on the Control PCB.

– Make sure that the LED1 does not stay ON due to the continuous collision. The LED can stay ON due to the following causes: Incorrect setting of the master H-LINK relay, incorrect setting of the slave H-LINK relay, incorrect setting of the end terminal resistance, presence of wiring loops, and others. Make sure that setting is correctly performed. Also, make sure that the wiring is correctly installed.

– Make sure that the LED2, the LED3 and the LED4 are flickering. If those LED are not flickering, check the transmission state on the LED of the PCB in the other unit. If the above LED on the H-LINK relay is not flickering despite the sending signal from the other unit, check the wiring connection, the setting of the end terminal resistance, the types of wires and the wiring length. If the fuse in the transmission circuit is blown out due to the incorrect wiring, refer to "Fuse Recovery Setting".

4 INSTALLATION OF THE OPTIONAL REMOTE CONTROL SWITCH

This chapter describes the procedures that you must follow to install the optional remote control switches that work with the DC Inverter outdoor units and the full range of Hitachi indoor units.

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DANGER:

– *DO NOT pour water into the remote control switch. These products are equipped with electrical components. If you pour water into these products, you may cause a serious electrical shock.*

– *If your hands are wet, DO NOT operate the switches. You may cause an electrical shock.*

– *If the protection devices function often or if the operation switches do not function well, turn OFF the main power source. Then, contact your HITACHI distributor or your HITACHI dealer.*

– *If you find any other abnormal operations, stop the system and turn OFF the main power source. Then, contact your HITACHI distributor or your HITACHI dealer.*

WARNING:

– *DO NOT perform the installation work and the electrical wiring connection.*

– *If the repair work, the maintenance work or other service work is required, contact your HITACHI distributor or your HITACHI dealer.*

– *DO NOT modify the electrical wiring. You may cause serious accidents.*

CAUTION:

– *DO NOT install the remote control switch and the cable in the following places:*

  ▪ *Places where there is oil vapor and the oil is dispersed.*

  ▪ *Places that are near hot springs (in a sulfuric environment).*

  ▪ *Places where the generation of flammable gas, the flowing of flammable gas, the leaking of flammable gas or the existence of flammable gas is detected.*

  ▪ *Places that are near the sea (in a salty environment).*

  ▪ *Places in an acid environment or an alkaline environment.*

  ▪ *Places within the reach of children.*

  ▪ *Places where the air from the air conditioning system is directly discharged.*

– *DO NOT install the indoor unit, the outdoor unit, the remote control switch and the cable within approximately three meters from strong electromagnetic radiators, such as those that are used in medical equipments.*

– *If you install the remote control switch in a place where there is electromagnetic radiation, shield the remote control switch and the cable as follows: cover the remote control switch and the cable with the steel box; also, run the cable through the metal conduit tube.*

– *If there is electric noise at the power source of the indoor unit, provide a noise filter.*

CAUTION:

– *DO NOT use the multi-core wire for the electrical wiring. If you use the multi-core wire, some signals of one system will transfer to the other system and the signals will interfere with each other. This will cause a malfunction.*

– *DO NOT use thin-shielded cable such as the CPEVS. These cables have a high electrostatic capacity and can make the transmission signal dull. Also, if you use long cables, transmission errors may occur.*

– *DO NOT run any transmission cable and any signal cable along the power supply wire (220-240V, 380-415V).*

– *DO NOT run any transmission cable and any signal cable along other transmission cables and other signal cables.*
If you need to run all these cables along, keep a distance of more than 30cm between each cable. Alternatively, insert the cables for each transmission system into the metal conduit tube and ground one end of the conduit tube.

■ Location of the remote control switch

1. With the customer's acceptance, select a suitable handling place and determine the installation place for the remote control switch.
2. If the installation includes a remote control thermostat, select the installation place according to the following considerations:
   - A place where the average room temperature can be detected.
   - A place that is out of the reach of children.
   - A place where the thermostat is not directly exposed to the sun.
   - A place where there are no heat sources nearby.
   - A place where the outdoor air that is caused by the opening and the closing of doors does not affect the thermostat.
   - A place where the air from the air conditioning system is not directly discharged.
   - If you are installing the wireless remote control onto the wall, keep a distance of more than 30cm from the power supply wire.

NOTE:

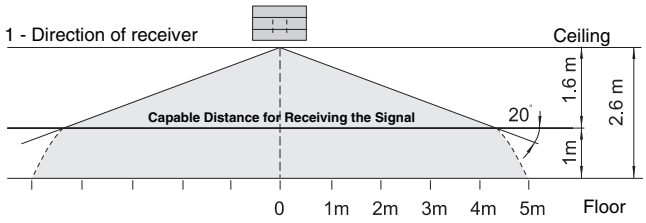
To extend the 2-core connector cable between the units for the simultaneous operation of multiple units, use the field-supplied control cable or the optional extension cable.

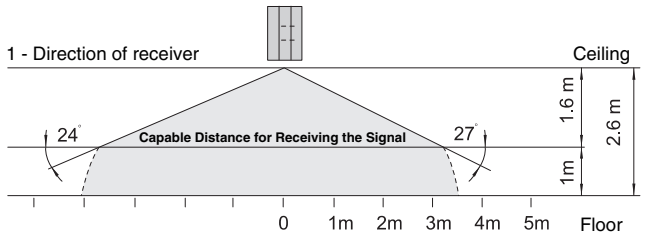
To connect the wires, cut the remote control cable in the middle. Then, solder the wires and insulate the wires.

For one remote control switch, the maximum total cable length (including the signal cable between the units) is the following: if you are using a cable that is 0.3mm² thick, 30m; if you are using a cable which is thicker than 0.75mm², 500m.

Standard capable distance for receiving the air panel signal for the wireless control.
(Example with the 4-way cassette)

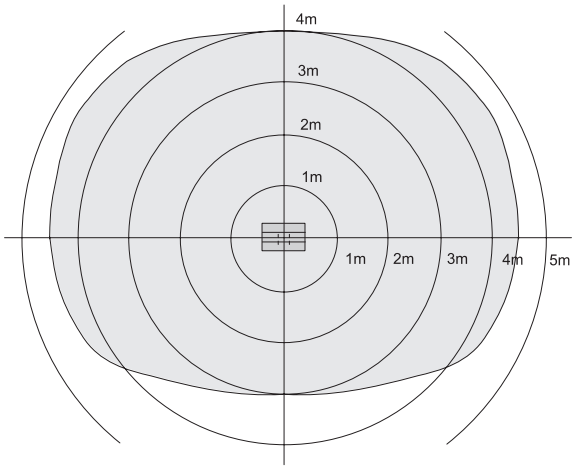
Conditions:
- Typical office room.
- No electronic lamp within 1m around the receiver part of the panel or the receiver kit.





Standard efficient distance for receiving the air panel signal for the wireless control.
(View from above)
(Example with the 4-way cassette)

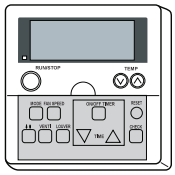
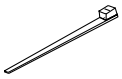
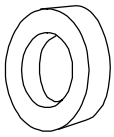
Conditions:
- Operation of the wireless remote control from the following position: 2.6m from the ceiling level and 1m from the floor level.
- Typical office room.
- No electronic lamp within 1m around the receiver part of the panel or the receiver kit.



4.1. INSTALLATION OF THE REMOTE CONTROL SWITCH <PC-P1HE>

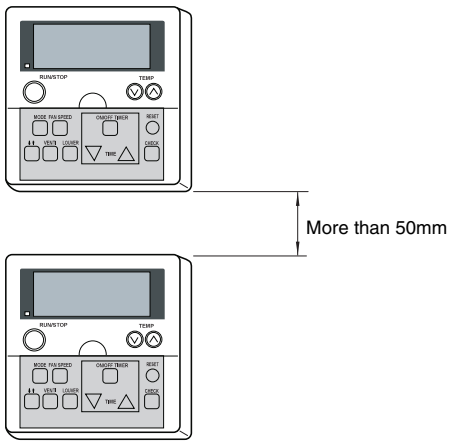
4.1.1. BEFORE THE INSTALLATION

Check the contents and the number of accessories in the packing.

			
Remote control switch for the operation control	Two screws Ø4x16L for fixing the holding bracket onto the Wall	One band for fixing the cable to the ring core	Ring core

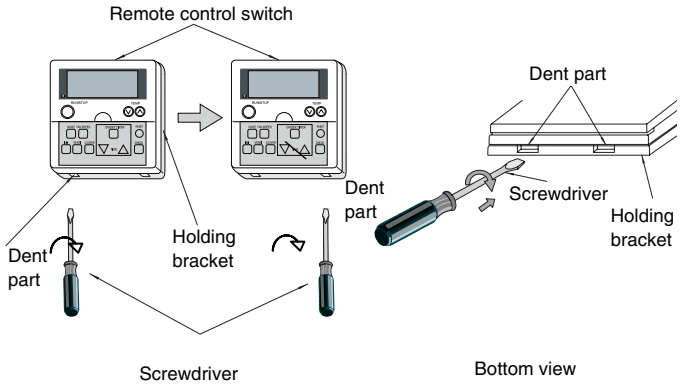
4.1.2. INSTALLATION AREA

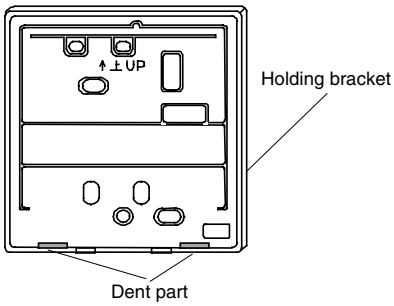
If you are installing the remote control switches vertically, keep a distance of more than 10mm between the remote control switches. If the distance is shorter than 10mm, the front panel of the remote control switch cannot open wide enough.



4.1.3. INSTALLATION PROCEDURE

– Insert the edge of the flat-headed screwdriver into the dent parts at the bottom of the holding bracket. Next, push and turn the screwdriver. Then, remove the remote control switch from the holding bracket as shown in the figure below.

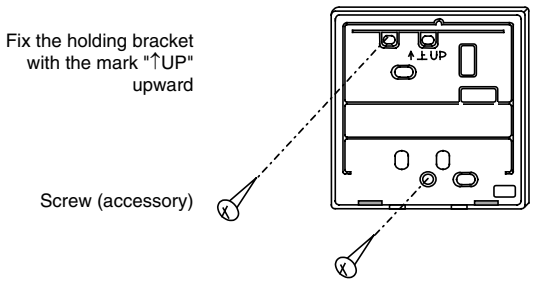




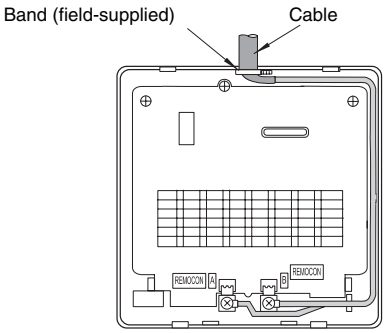
– Attach the remote control switch to the holding bracket as follows.

■ **If you are exposing the remote control cable**

– Fix the holding bracket onto the wall as shown in the figure below.



– Attach the stopper to the cable inside the draw-out hole.

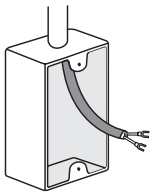


– Peel the sheath of the cable and lead the cable through the groove.

– Peel back the insulation material from the end of the cable and clamp the M3 solderless terminals.

■ **If you are using the switch box**

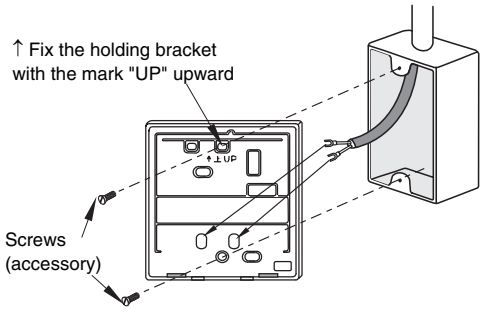
– Field-supplied JIS Box (JIS 8336-1998).



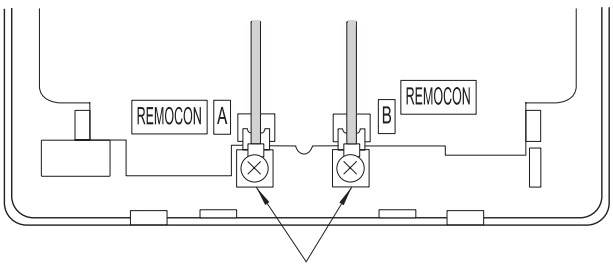
The following five types are available:
1. Switch box for one remote control switch (without panel)
2. Switch box for two remote control switches (without panel)
3. Switch box for one remote control switch (with panel)
4. Switch box for two remote control switches (with panel)
5. Outlet box (with panel)

Run the cable through the conduit tube in the wall.

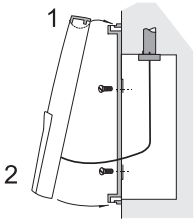
– Fix the holding bracket to the switch box.



– Peel back the insulation material from the end of the cable and clamp the M3 solderless terminals.



– Mounting procedures.

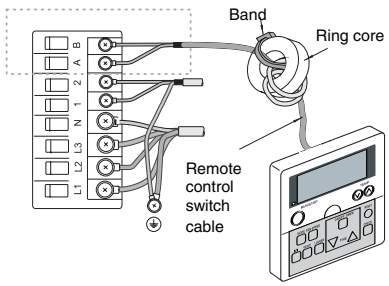


1. Insert the hooks of the remote control switch into the holes at the top of the holding bracket.
2. Push the lower part toward the holding bracket.
3. When you hear a clicking sound, the remote control switch is already attached to the holding bracket. You have finished the mounting work.

CAUTION:
Make sure that the cable is not slack. If the cable is slack as shown in the above figure, the cable cord (especially the naked part) may be clamped at the hole. This may cause a faulty operation.

4.1.4. ELECTRICAL WIRING

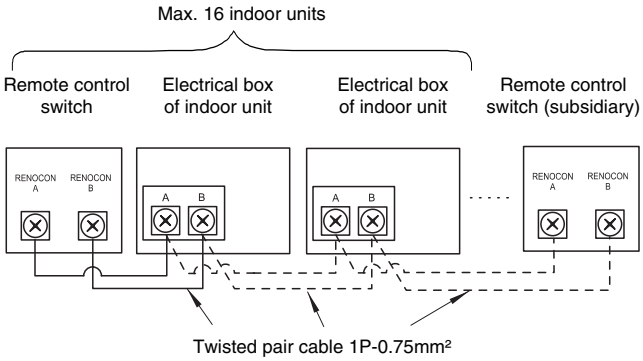
■ Standard wiring



ATTENTION:
– *When you are installing the unit, attach the black ring core (accessory).*
– *Before connecting the cable of the remote control switch to the terminal board, insert this cable into the ring core with two turns as shown in the figure above. If the wiring is 0.75 mm², you need to peel off the outside cover.*
– *Fix the cable with the band (accessory).*

■ Electrical wiring for multiple units

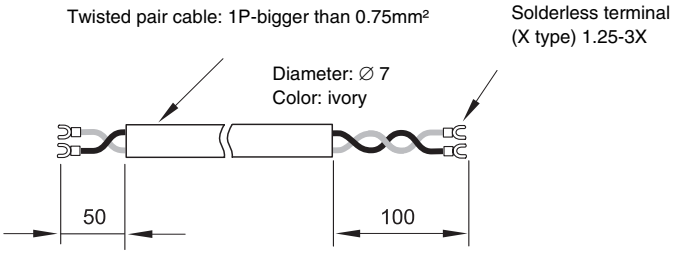
This remote control switch can control up to a maximum of sixteen units.
If you are going to modify the electrical wiring, perform the wiring connection and other works as the following procedures explain.
You can connect two remote control switches in the same unit or the same unit groups. The second remote control is the subsidiary remote control switch as shown below. Refer to chapter 6 "Available optional functions" for details.



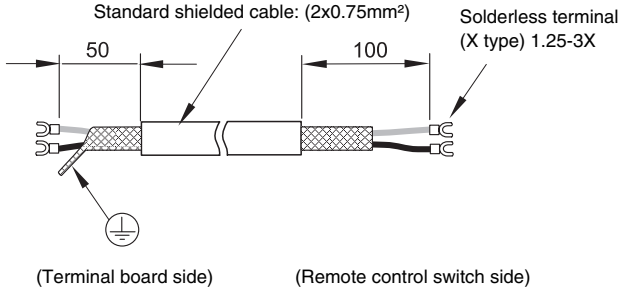
There are optional cables of 0.75 mm² wire. The cables have different lengths. The cables are also fitted with connectors.

Remote control cable (optional)

Cable model	PRC-10E1	PRC-15E1	PRC-20E1	PRC-30E1
Length (m)	10	15	20	30



To connect the shielded part to earth at the side of the electrical box, you can also use the standard shielded cable (2×0.75mm²). The maximum total length is 500m.

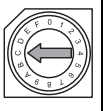
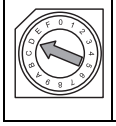
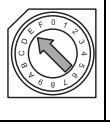


CAUTION:
– *To prevent a malfunction, use the twisted pair cable (1P-0.75 mm²) as a transmission cable. The maximum total length is 500 m.*
If the total cable length is within 30 m, you can use cables that are bigger than 0.3 mm².
– *Keep a distance of more than 30 cm between the remote control cable and the transmission cable of the indoor units.*

If multiple indoor units are controlled simultaneously, set the refrigerant cycle number and the address of the indoor units as shown below.

Address of the indoor units:

Master unit	1st unit	2nd unit	3rd unit
			
4th unit	**5th unit**	**6th unit**	**7th unit**
			

8th unit	9th unit	10th unit	11th unit
			
12th unit	**13th unit**	**14th unit**	**15th unit**
			

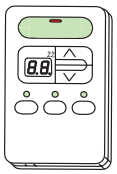
4.2. INSTALLATION OF THE REMOTE CONTROL SWITCH (CORE-FUNCTION) <PC-P5H>

4.2.1. SELECTING THE INSTALLATION PLACE

- With the customer's acceptance, select a suitable handling place and determine the installation place for the remote control switch.
- Do not install the remote control switch in the following places:
  - Places that are within the reach of children;
  - Places where the air from the air conditioning system is directly discharged.

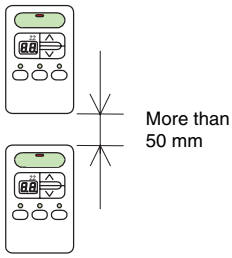
4.2.2. BEFORE THE INSTALLATION

Check the contents and the number of accessories in the packing.

				
Remote control switch for the operation control	Two screws ø4x16 for fixing the holding bracket onto the wall	Ring core1	Band for fixing the cable to the ring core	Cable (20 cm)

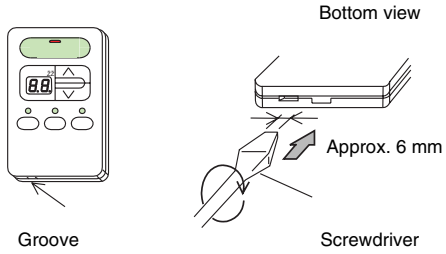
4.2.3. INSTALLATION AREA

- If you are installing the remote control switches vertically, keep a distance of more than 50 mm between the remote control switches.
  If the distance is shorter than 50 mm, the front panel of the remote control switch cannot open wide enough.



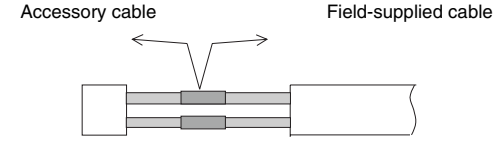
4.2.4. INSTALLATION PROCEDURES

- Insert the edge of the screwdriver into the grooves at the bottom of the holding bracket. Next, push and turn the screwdriver. Then, remove the remote control switch from the holding bracket.



- Connecting the cables

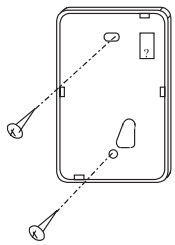
  Connect the accessory cable to the field-supplied cable by soldering the accessory cable.



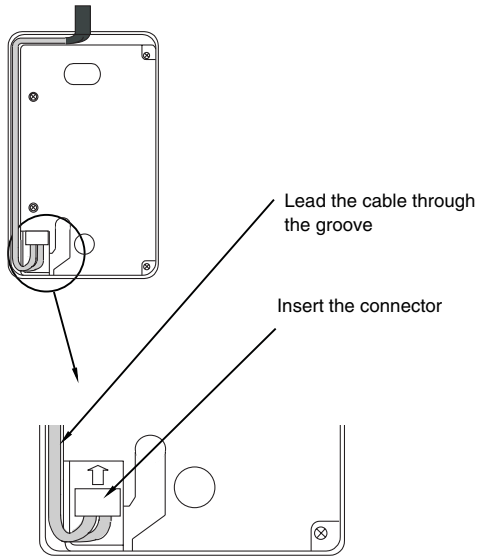
(Insulate the connecting end with the chloride-type adhesive)

- Attach the remote control switch to the holding bracket and connect the cable as follows.

  If you are exposing the remote control cable:

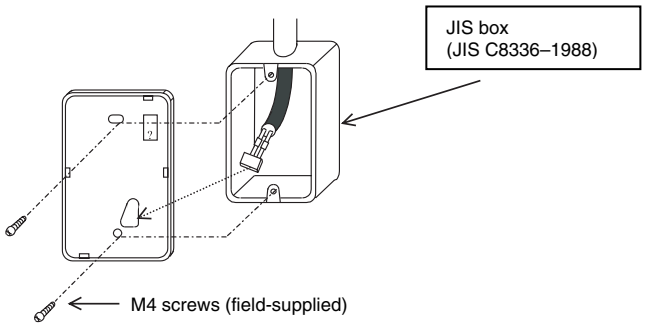


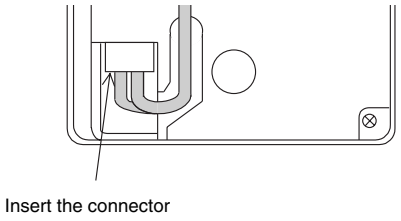
Fix the holding bracket onto the wall with screws (accessory)



If you are using the switch box:

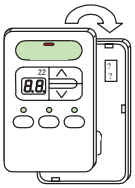
Prepare the field-supplied JIS Box (JIS C8336-1988).





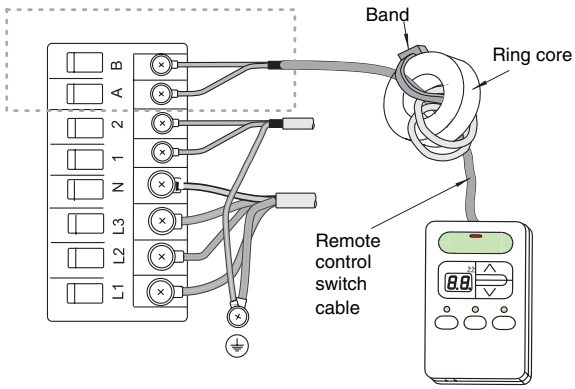
– Attach the remote control switch to the holding bracket.

First, attach the upper side. Then, attach the lower side.



4.2.5. ELECTRICAL WIRING

■ Standard wiring



ATTENTION:

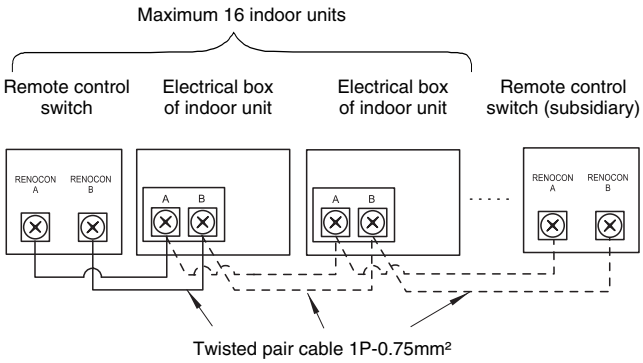
- *When you are installing the unit, attach the black ring core (accessory.*
- *Before connecting the cable of the remote control switch to the terminal board, insert this cable into the ring core with two turns as shown in the figure above. If the wiring is 0.75 mm², you need to peel off the outside cover.*
- *Fix the cable with the band (accessory).*

■ Electrical wiring for multiple units

This remote control switch can control up to a maximum of sixteen units.

If you are going to modify the electrical wiring, perform the wiring connection and other works as the following procedures explain.

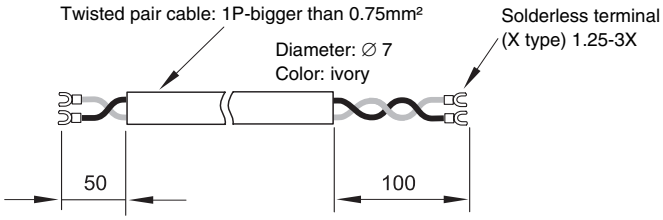
You can connect two remote controls in the same unit or the same unit groups. The second remote control is the subsidiary remote control switch as shown below.



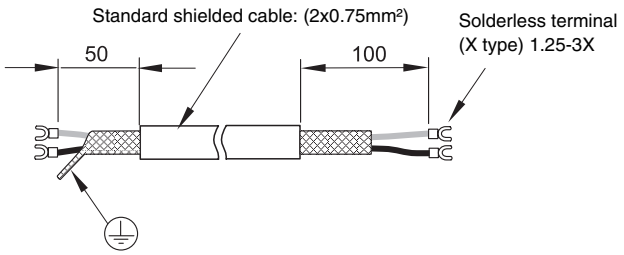
There are optional cables of 0.75 mm² wire. The cables have different lengths. The cables are also fitted with connectors.

Remote control cable (optional)

Cable model	PRC-10E1	PRC-15E1	PRC-20E1	PRC-30E1
Length (m)	10	15	20	30



To connect the shielded part to earth at the side of the electrical box, you can also use the standard shielded cable (2×0.75mm²). The maximum total length is 500m.



CAUTION:

- *To prevent a malfunction, use the twisted pair cable (1P-0.75 mm²) as a transmission cable. The maximum total length is 500 m.*
  If the total cable length is within 30 m, you can use cables that are bigger than 0.3 mm².
- *Keep a distance of more than 30 cm between the remote control cable and the transmission cable of the indoor units.*

CAUTION:

If multiple indoor units are controlled simultaneously, set the refrigerant cycle number and the address of the indoor units as shown below.

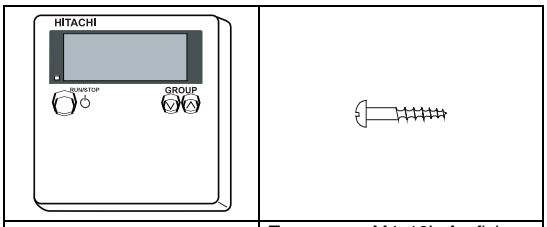
Address of the indoor units:

Master unit	1st unit	2nd unit	3rd unit
4th unit	5th unit	6th unit	7th unit
8th unit	9th unit	10th unit	11th unit
12th unit	13th unit	14th unit	15th unit

4.3. INSTALLATION OF THE CENTRAL STATION <PSC-5S>

4.3.1. ACCESSORIES

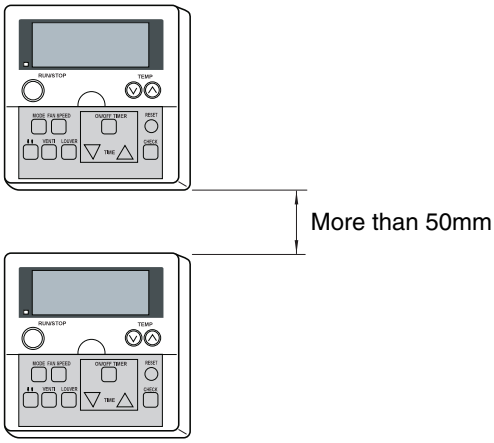
Check the contents and the number of accessories in the packing.

	
Central station	Two screws M4x16L. for fixing the holding bracket onto the wall

NOTE:
The central station is divided into two parts: the linked control part and the power supply part.

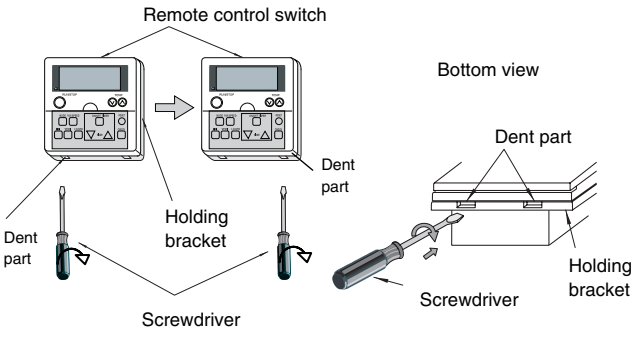
4.3.2. INSTALLATION AREA

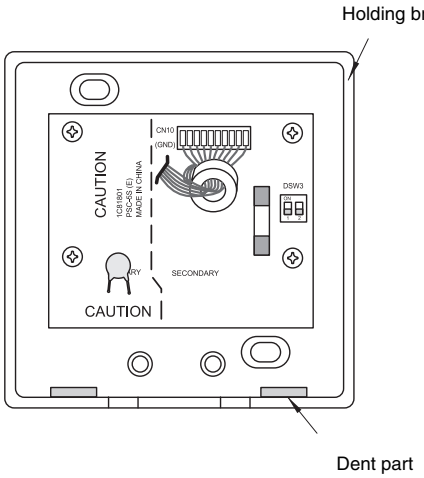
If you are installing the remote control switches vertically, keep a distance of more than 50mm between the remote control switches. If the distance is shorter than 50mm, the front panel of the remote control switch cannot open wide enough.



4.3.3. INSTALLATION PROCEDURE

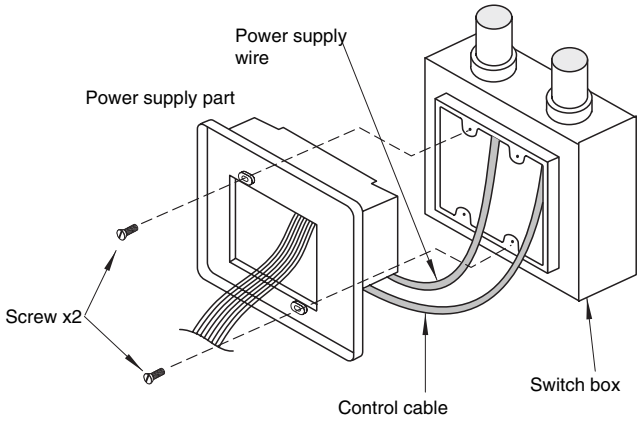
1. Insert the edge of the flat-headed screwdriver into the dent parts at the bottom of the holding bracket. Next, push and turn the screwdriver. Then, remove the linked control part from the power supply part as shown in the next figure.



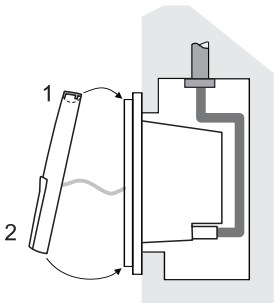


2. Attach the power supply part to the switch box.

NOTE:
Do not run the power supply wire and the control cable through the same conduit tube.



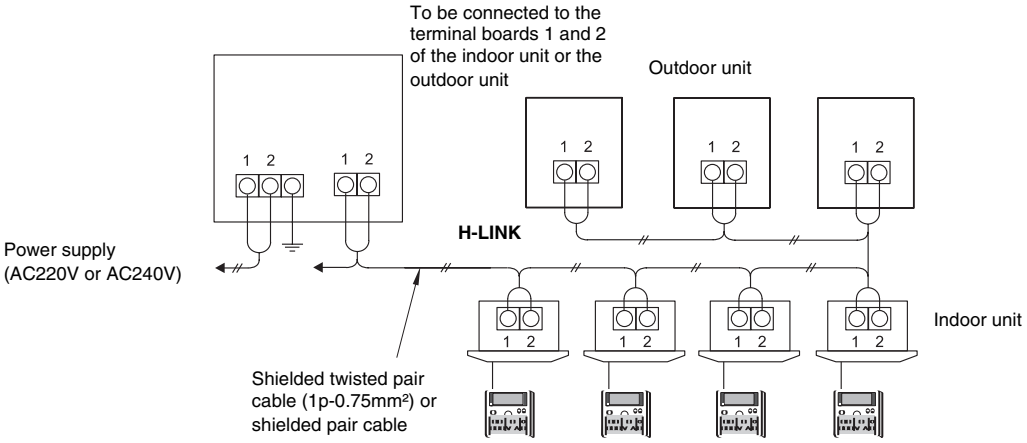
3. Attach the linked control part to the power supply part. First, attach the upper side. Then, attach the lower side.



4.3.4. ELECTRICAL WIRING

■ Wiring connection

You can connect up to eight central stations to the H-LINK.



■ Setting the DIP switch

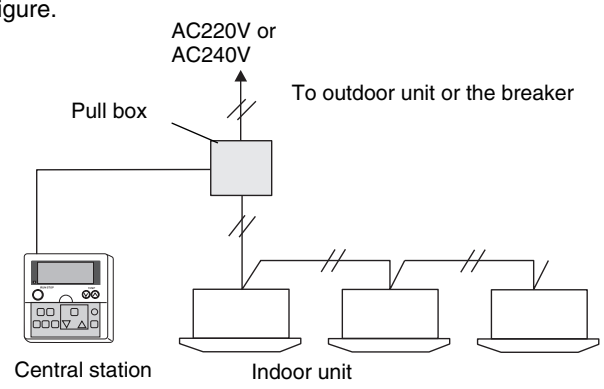
Set the DSW1 as shown below.
When you connect more than one central station (maximum eight units) to the H-LINK, the address setting is required.

NOTE:
Before the shipment, all the setting positions of the DIP switches are OFF.

■ Address setting of the DSW1

Address 1	Address 2	Address 3	Address 4
ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
Address 5	**Address 6**	**Address 7**	**Address 8**
ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4

Divide the power supply wire for the central station from the main power supply wire with a pull box as shown in the next figure.



CAUTION:
Make sure that the wiring is correct. An incorrect wiring may cause a malfunction of the central station.

Before installing the wiring, turn OFF the power supply of the air conditioning system and the central station. If you install the wiring while the power supply of the central station is being supplied, you may cause a malfunction of the central station.

Do not run the transmission cable for the central station along the power supply wire and other transmission cables. If you do so, you may cause a malfunction due to the electrical noise. If you need to run the transmission cable for the central station along the power supply wire and other transmission cables, keep the cable at a distance of more than 30cm away from other cables. Alternatively, run the cable through a metal conduit tube and ground one end of the conduit tube.

If you apply high voltage to the TB2, you may blow out the fuse on the PCB. If that is the case, first correct the wiring to the TB1. Then, set the No.2 pin to ON.

■ System layout

Each central station can control up to 16 indoor units or 16 groups of indoor units. (One group of indoor units is all the units that are controlled by the same remote control switch).

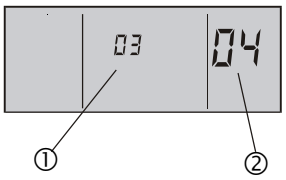
Master unit: The indoor unit that defines a group. The central station sends the orders for one group only to the master unit of that group. You can set as the master unit only one unit from the group of units that are controlled by the same remote control switch.

Slave unit: The indoor unit that is controlled by the same remote control switch that controls the master unit. You must set in the same group number all the units that are controlled by the same remote control switch. The central station will not send any order to the slave units. Instead, the central station will send orders to the master unit, which will then forward the orders to the other units. You should not set as slave units the units that have a unique remote control switch or the units that do not have a remote control switch.

■ Automatic group configuration

When you first power ON the unit and when you need to initialize, the automatic group configuration is performed. (Refer to the procedure in section 4.3.7).

During the automatic configuration, the LCD (Liquid Crystal Display) of the central station is the following:



① Refrigerant cycle on the connection check

② Number of checked indoor units that are connected in the refrigerant cycle on the connection check

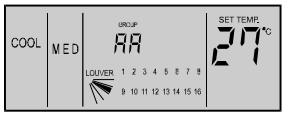
The instructions for the automatic group configuration from group 1 to group 16 are the following:

1 For the group 1, check all the units whose address of indoor unit is 0. The unit that has the lowest refrigerant cycle address is set as the master unit.

2 Repeat the step 1 for all the groups until the group 16.

The automatic group configuration can last several minutes because the central station is checking all the possible units.

If all the units have unique addresses of indoor unit and all the units are controlled by different remote control switches, no additional group setting is required. If that is the case, the display after the automatic group configuration is the following:



Otherwise, the display is the following:

1. Changing to the group setting mode

- Press the CHECK switch for three seconds. During this time the units of all groups are stopped. Then, the central station changes to the check mode, the CHECK indication is turned ON, and "1" (mode for setting the master unit) is displayed at the 7-segment display for checking.
- Press the CHECK switch. Then, "1" changes to "2" (mode for setting the subgroup unit) at the 7-segment display for checking.
- Press the RESET switch. Then, the check mode changes to the normal mode.

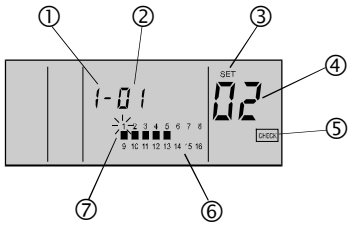
ATTENTION:

- *If there is a group in operation, you cannot change the central station to the check mode.*
- *When you perform the group setting, use the check table for the group setting. You can also write down the group number on the surface inside of the switch cover.*

2. Setting the master unit

▪ Display of the mode for setting the master unit

When the central station changes to the mode for setting the master unit, the LCD of the central station is the following. The number of the group that you need to set is flickering ⑦. The refrigerant cycle number ② and the address of indoor unit ④ indicate the address of the indoor unit that is set as the master unit of the group that you need to set. If the master unit of the group is already set, the group number indicator "■" flickers. When the SET indication appears ③, the indoor unit that is displayed on the LCD is set as the master unit. If the master unit is not set, the indicator "--" is displayed at the refrigerant cycle number ② and the address of indoor unit ④. Also, the SET indication ③ does not appear.



① "1" means the mode for setting the master unit.

② The refrigerant cycle number of the indoor unit which you need to set. (You can change the number by pressing the "▽" TEMP switch).

③ When the SET indication appears, the indoor unit that is displayed on the LCD is set as the master unit. (When the SET indication does not appear, the master unit is not set).

④ The address of the indoor unit which you need to set. (You can change the address by pressing the "△" TEMP switch).

⑤ When the CHECK indication appears, the central station is in the check mode.

⑥ The condition of the master unit setting for each group: (■ is ON: The master unit is set; ▪ is OFF: The master unit is not set).

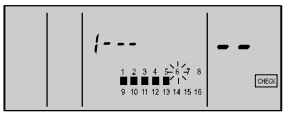
⑦ The group number which you need to set.

▪ Instructions for setting the master unit

Set the master unit for each group as follows:

a. Selection of the group that you need to set

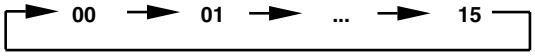
Select the group that you need to set by pressing the GROUP switch. Every time you press the GROUP switch, you move the flickering group number indicator.

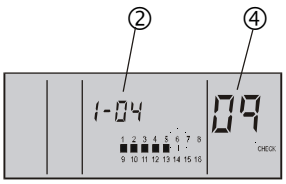


The flickering group number indicator moves, for example when you are selecting the group number 6.

b. Selection of the indoor unit that you need to set

Change the refrigerant cycle number ② by pressing the "∇" TEMP switch. Change the address of indoor unit ④ by pressing the "Δ" TEMP switch and select the indoor unit which you need to set. The indication changes in the order that is shown below:



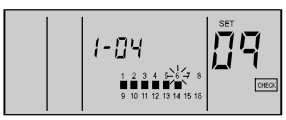


ATTENTION:

- *When the indicator of the refrigerant cycle number ② is "--", the indicator of the address of indoor unit ④ is also "--". In such a case, you cannot change the address of indoor unit although you press the "Δ" TEMP switch.*
- *The following items are not displayed: the refrigerant cycle number that does not have an indoor unit connected; the address of indoor units that are not connected.*
- *The indoor unit that is already set as the master unit is not displayed.*

c. Setting procedure

After selecting the indoor unit, press the RUN/STOP switch. The displayed unit is set as the master unit. The indicator "■" and the SET indication appear.
(Every time you press the RUN/STOP switch, the master unit is set and cancelled alternately.)



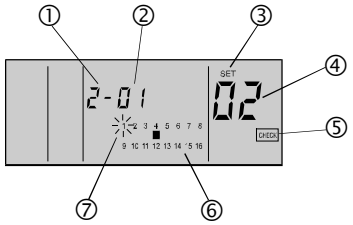
CAUTION:

- *You can set only one indoor unit as the master unit in one group. If the master unit is already set, you cannot set another indoor unit as the master unit for the group. In order to set the present master unit as the master unit for another group, cancel the present master unit setting and perform the setting for another group.*
- *If there are indoor units with the auto-louver and indoor units without the auto-louver in the same group, set the indoor unit with the auto-louver as the master unit. If you set the indoor unit without the auto-louver as the master unit, the auto-louver setting will not be available for all the units of the group.*

3. Setting the slave unit

▪ Display of the mode for setting the slave unit

When the central station changes to the mode for setting the slave unit, the LCD of the central station is the following. The number of the group that you need to set is flickering ⑦. The refrigerant cycle number ② and the address of indoor unit ④ indicate the address of the indoor unit that has the smallest address among the slave units of the group that you need to set. If the slave units of the group are already set, the group number indicator "■" flickers. If the slave unit is not set, the indicator "--" is displayed at the refrigerant cycle number ② and the address of indoor unit. ④



① "2" means the mode for setting the slave unit.

② The refrigerant cycle number of the indoor unit that you need to set. (You can change the number by pressing the "∇" TEMP switch).

③ When the SET indication appears, the indoor unit that is displayed on the LCD is set as the slave unit. (When the SET indication does not appear, the slave unit is not set).

④ The address of the indoor unit which you need to set. (You can change the address by pressing the "Δ" TEMP switch).

⑤ When the CHECK indication appears, the central station is in the check mode.

⑥ "■" means the group with indoor units which you need to set. (The above figure shows that the indoor unit with the refrigerant cycle number 1 and with the address of indoor unit 2 is set as the slave unit of the group number 4).

⑦ Only the group which has the master unit already set is displayed. The group that you need to set is flickering.

▪ Instructions for setting the slave unit

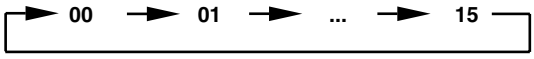
Set the slave unit for each group as follows.

a. Selection of the group that you need to set

Select the group that you need to set by pressing the GROUP switch. Every time you press the GROUP switch, the flickering group number indicator changes to the next group. You cannot select the group that does not have the master unit setting.

b. Selection of the indoor unit that you need to set

Change the refrigerant cycle number by pressing the "∇" TEMP switch. Change the address of indoor unit by pressing the "Δ" TEMP switch and select the indoor unit which you need to set. The indication changes in the order that is shown below:



ATTENTION:

- *The following items are not displayed: the refrigerant cycle number that does not have an indoor unit connected; the address of indoor units that are not connected.*
- *When the selected unit is already set as the slave unit, the group number indicator "■" of the unit and the SET indication appear.*
- *The indoor unit that is already set as the master unit is not displayed.*

c. Setting procedure

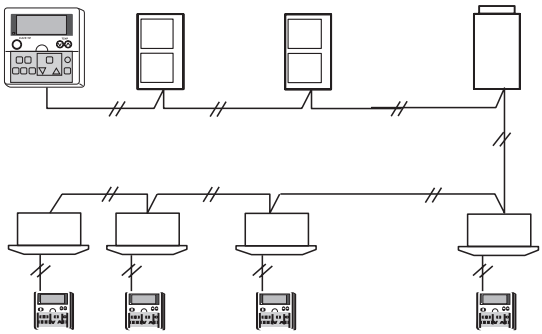
After selecting the indoor unit, press the RUN/STOP switch. The displayed unit is set as the slave unit. The indicator "■" and the SET indication appear.
(Every time you press the RUN/STOP switch, the slave unit is set and cancelled alternately.)

CAUTION:

- *You can set up to 15 slave units in one group. (The maximum in one group is 16 units, including the master unit).*
- *In order to change the setting of a slave unit to another group, cancel the present slave unit setting and perform the setting for another group.*
- *If all the units are set as master units, you cannot change the central station to the slave unit setting.*

Example A:

A system where all the units have a unique address of indoor unit and all the units are controlled by different remote control switches. The result is the following:

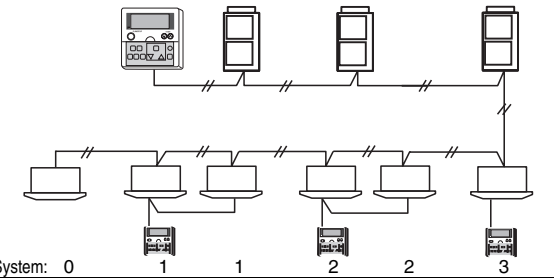


Setting of I.U. Rotary Switch:	0	1	2	3
Group Number:	1	2	3	4

You do not need to perform additional group settings.

Example B:

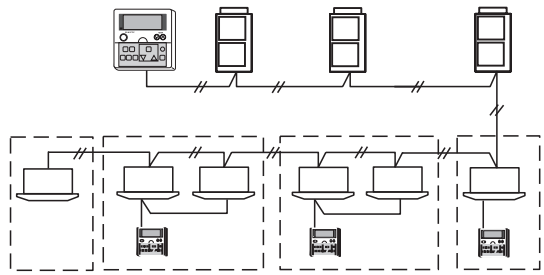
A system where the units have a repeated address of indoor unit and some units are controlled by the same remote control switch.



Refrigerant System:	0	1	1	2	2	3
Setting of I.U. Rotary Switch:	0	0	1	0	1	0
Group Number:	1	X	2	X	X	X

You need to perform additional settings in order to include units that are not set in the automatic group configuration. You also need to perform additional settings in order to set the indoor units that are controlled by the same remote control switch in the same group.

In the manual group setting, you can set the system as follows:



Refrigerant system:	0	1	1	2	2	3
Setting of I.U. rotary switch:	0	0	1	0	1	0
Group number:	1	2	2	3	3	4

4.3.5. INPUT/OUTPUT FUNCTION

The central station has two input functions and two output functions as shown below.

Input setting mode, output setting mode and connector.

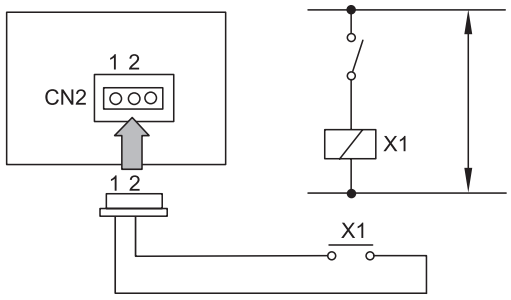
Mode	Port	Setting of the DSW2		
		ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
Input 1	CN2 1-2	Simultaneous operation / stoppage level signal		Simultaneous operation, pulse signal
Input 2	CN2 2-3	Demand	Emergency stoppage	Simultaneous stoppage, pulse signal
Output 1	CN3 1-2	Simultaneous operation output		
Output 2	CN3 1-3	Simultaneous alarm output		

Specifications of the required components:

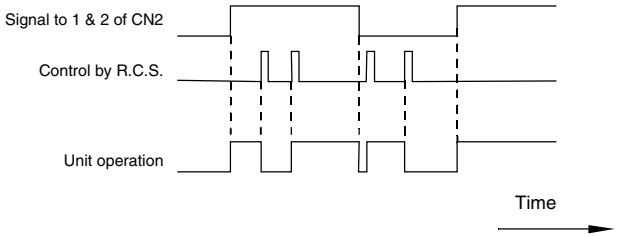
- DC12V non-Voltage A connection
- OMRON MY relay
- PCC-1A

1. Simultaneous operation / stoppage level signal

This is a remote ON/OFF function that uses the level signal (ON/OFF).
The basic wiring and the time chart are shown below.

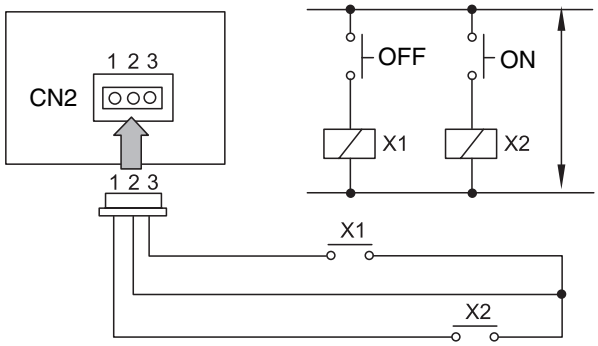


■ Time chart

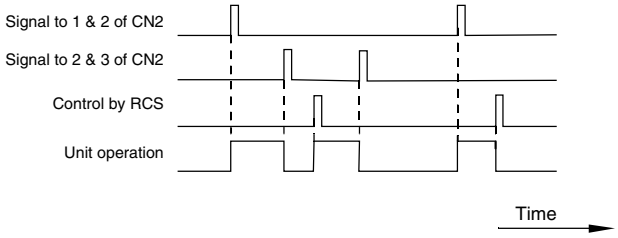


2. Simultaneous operation, pulse signal; simultaneous stoppage, pulse signal

This is a remote ON/OFF function that uses the pulse signal.
The basic wiring and the time chart are shown below.

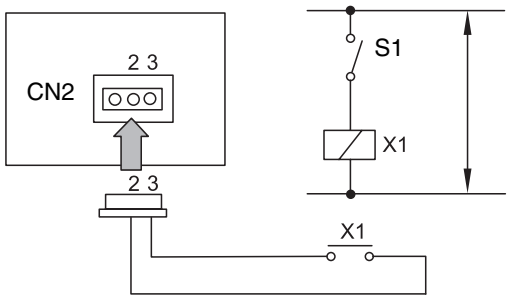


■ Time chart

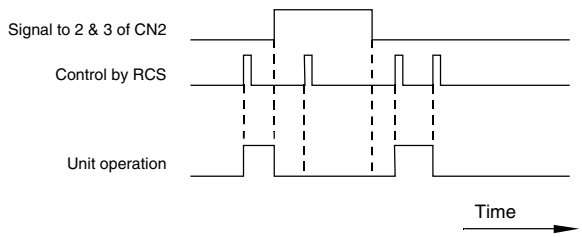


3. Emergency stoppage

This is a remote emergency OFF function that uses the pulse signal. All units that are controlled by the central station are forced to stop. Then, further setting with RCS is not enabled until the remote emergency OFF function is removed.
The basic wiring and the time chart are shown below.

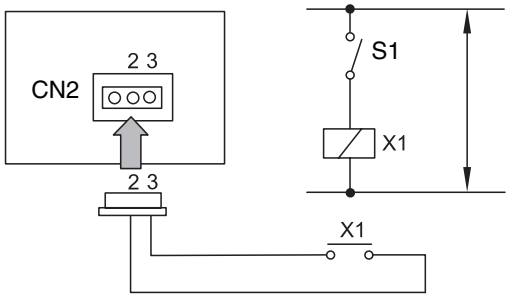


■ Time chart

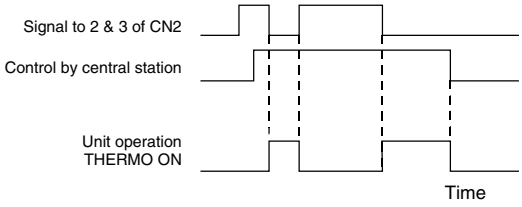


4. Demand

This is a remote thermostat signal for the selected units. Only the units with the DEMAND indication will follow this order. Refer to the section "Demand setting procedure" below.
The basic wiring and the time chart are shown below.



■ Time chart



NOTE:
The units with the DEMAND indication are always controlled by the central station.

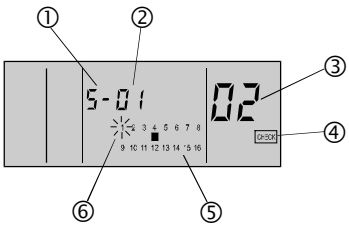
■ Demand setting procedure

– Changing to the change mode

Press the CHECK switch for more than 3 seconds. The central station changes to the check mode.

– Changing to the demand setting mode

Press the CHECK switch. Then, "5" (demand setting mode) is displayed at the 7-segment display for checking. The LCD of the central station is the following.



① "5" means the demand setting mode.

② The refrigerant cycle number of the indoor unit that is set as the master unit of the group that you need to set.

③ The address of the indoor unit that is set as the master unit of the group that you need to set.

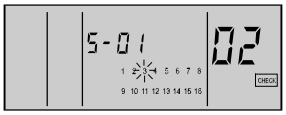
④ When the CHECK indication appears, the central station is in the check mode.

⑤ The group that is already set with the demand control is displayed: (■ is ON: the demand is set; ■ is OFF: the demand is not set).

⑥ Only the group which has the master unit already set is displayed. The group that you need to set is flickering.

– Selection of the group that you need to set

Select the group that you need to set by pressing any of the GROUP switches. Every time you press the GROUP switch, you move the flickering group number indicator.



The flickering group number indicator moves, for example when you are selecting the group number.

The indicator "■" and DEMAND indication: ON. (The demand control is set).

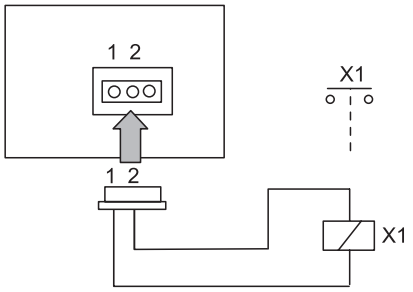
The following is displayed: the refrigerant cycle number and the address of the indoor unit which is set as the master unit of the selected group which you need to set. The indicator "■" appears at the group which is already set with the demand control. The DEMAND indication also appears.

– Setting procedure

Press the RUN/STOP switch. The selected group is set with the demand control. The indicator "■" and the DEMAND indication appear.
(Every time you press the RUN/STOP switch, the demand control is set and cancelled alternately.)

5. Simultaneous operation output

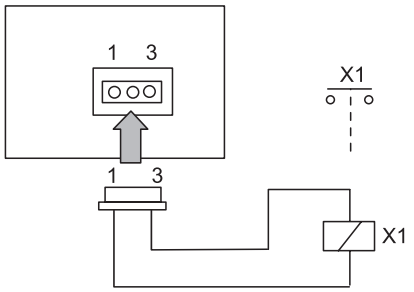
You use this function in order to check the operation status of the units that are controlled by the central station. If any unit is turned ON, the simultaneous operation output will be ON.
The basic wiring is shown below.



6. Simultaneous alarm output

You use this function in order to check the alarm status of the units that are controlled by the central station. If any unit is under alarm status, this output will be ON.

The basic wiring is shown below.



4.3.6. OPTION SETTING

1. Changing to the option setting mode

a. Press the CHECK switch for three seconds. During this time the units of all groups are stopped. The central station changes to the option setting mode. Then, the CHECK indication is turned ON and the "1" (mode for setting the master unit) is displayed at the 7-segment display for checking.

ATTENTION:

If there is a group in operation, you cannot change the central station to the check mode.

b. Press the CHECK switch and change the display of the 7-segment display.

7–Segment	Function
A	Fixing the operation mode
b	Fixing the setting temperature
c	Fixing the cooling only
d	Fixing the air volume
E	Automatic cooling/heating operation

c. Setting procedure:

- Press the CHECK switch and select the options A - E.
- Select the group that you need to set by pressing the GROUP switch.
- Press the RUN/STOP switch. The option setting is done. Then, the indicator "■" appears. The SET indication also appears. (Every time you press the RUN/STOP switch, the optional function is set and cancelled alternately).

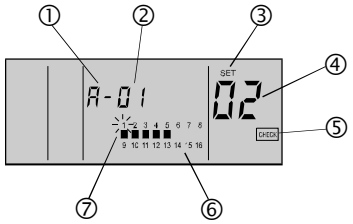
d. Press the RESET switch. Then, the central station changes to the normal mode.

NOTE:

Refer to section 6.3.2. for a description of the option setting.

2. Display of the option setting mode

When the central station changes to the option setting mode, the LCD of the central station is the following. The number of the group that you need to set is flickering. The refrigerant cycle number and the address of indoor unit indicate the address of the indoor unit that is set as the master unit of the group that you need to set. If the option setting is already done, the group number indicator "■" flickers. When the SET indication appears, the indoor unit that is displayed on the LCD is already set as the optional function.



① "A" means the option setting mode.

② The refrigerant cycle number of the indoor unit that is set as the master unit of the group that you need to set.

③ When the SET indication appears, the indoor unit that is displayed on the LCD is set with the optional function.

④ The address of the indoor unit that is set as the master unit of the group that you need to set.

⑤ When the CHECK indication appears, the central station is in the check mode.

⑥ The condition of the option setting for each group: ("■" is ON: the option is set; "■" is OFF: the option is not set).

⑦ The group number that you need to set.

CAUTION:

- *If the optional functions are set by the central station, you need to set the same optional functions for the group controlled by means of the remote control switch.*
- *If the optional functions, which are the setting items A - E as shown above, are set by the remote control switch, you need to set the same optional functions for the group controlled by means of the central station.*

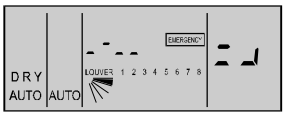
4.3.7. INITIALIZATION OF THE CENTRAL STATION

The instructions for initializing the group setting and the optional setting are as follows.

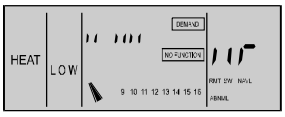
1. Changing to the self-check mode

Press the GROUP (∨ and ∧) switch and the MODE switch simultaneously. Then, the central station changes to the self-check mode. If there is a group in operation, the NO FUNCTION indication appears and you cannot change the central station to the self-check mode.
When the central station changes to the self-check mode, the LCD changes from (i) to (vii) as shown below.
Before the LCD changes to (vii), press the GROUP (∨ and ∧) switch and the MODE switch simultaneously again. Keep the switches pressed until the initialization starts. Then, the central station changes to the initialization mode.

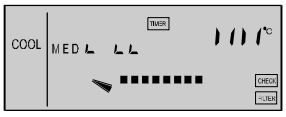
(i)



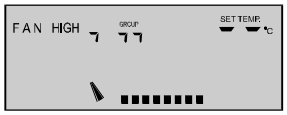
(ii)



(iii)



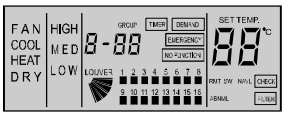
(iv)



(v)

(All indications: OFF)

(vi)



(All indications: ON)

(vii)

(All indications: OFF)

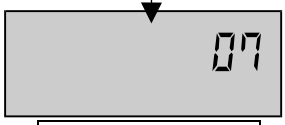
NOTE:
If you do not press the GROUP (∨ and ∧) switch and the MODE switch again, the self-check operation continues.

2. Initialization

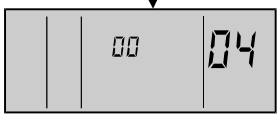
When the central station changes to the initialization mode, the LCD of the central station is as shown below. In this condition, press the RESET switch. The flickering 06 indication changes to ON. Then, the initialization is performed.
(If the initialization is not required, press the CHECK switch. Then, the LCD automatically changes as shown below).

"06" flickers. Press RESET switch and "06" changes to ON. In case of EEPROM initialization, it takes approximately 30 - 60 seconds

Press RESET switch or CHECK switch



To connection check



Group setting table of central station

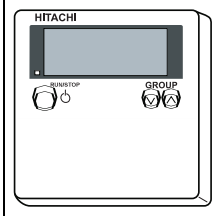
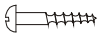
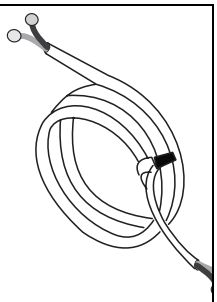
RSW of indoor unit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Indication of PSC-5S	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
00																
01																
02																
03																
04																
05																
06																
07																
08																
09																
10																
11																
12																
13																
14																
15																

Fill the gap number (1-16) in the above table.
Circle the unit number of the master unit.

4.4. INSTALLATION OF THE 7-DAY TIMER <PSC-5T>

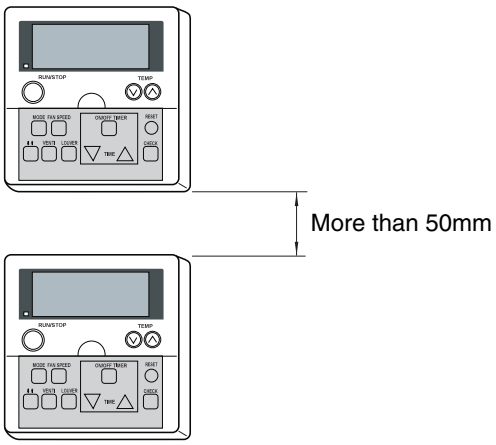
4.4.1. ACCESSORIES

The packing contains the following items:

		
Control timer	Two screws M4x16L. for fixing the holding bracket onto the wall.	Cable (1m)

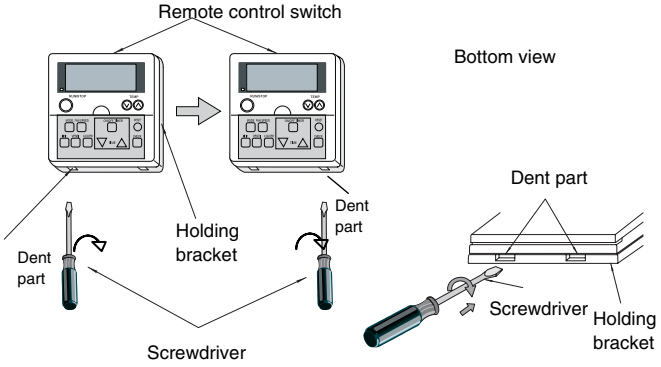
4.4.2. INSTALLATION AREA

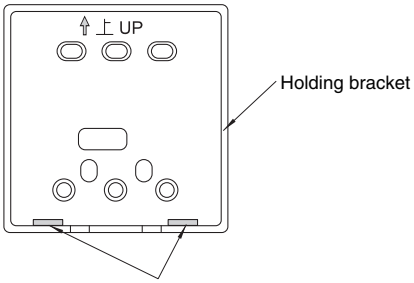
If you are installing the remote control switches vertically, keep a distance of more than 50mm between the remote control switches. If the distance is shorter than 50mm, the front panel of the remote control switch cannot open wide enough.



4.4.3. INSTALLATION PROCEDURE

1. Insert the edge of the flat-headed screwdriver into the dent parts at the bottom of the holding bracket. Next, push and turn the screwdriver. Then, remove the remote control switch from the holding bracket as shown in the next figure.

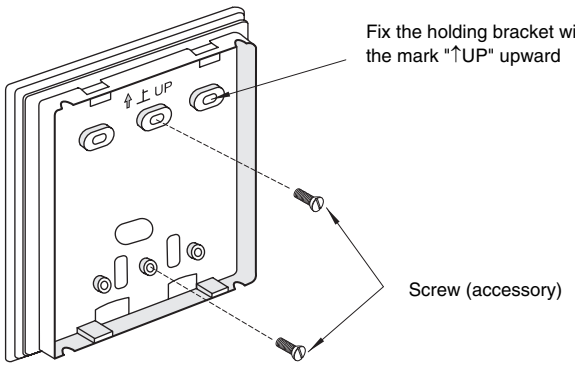




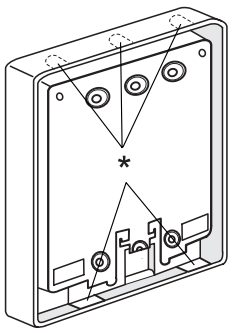
2. Attach the timer to the holding bracket and connect the cable as follows.

■ **If you are exposing the remote control cable**

1. Fix the holding bracket onto the wall as shown in the figure below.

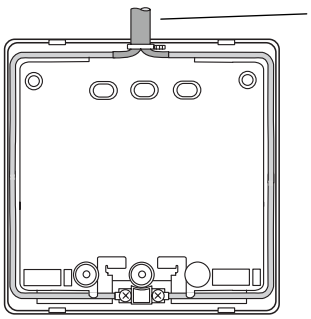


2. Select and cut the knockout hole according to the direction for drawing out the cable.

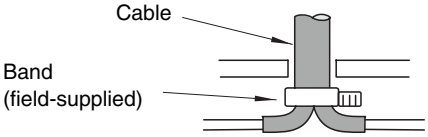


According to the cable arrangement, determine the direction for drawing out the cable and cut the knockout hole. (The knockout hole is one of the positions that is marked with * in the left figure).
If you are using an accessory cable, draw out the cable from one of the knockout holes at the lower side.

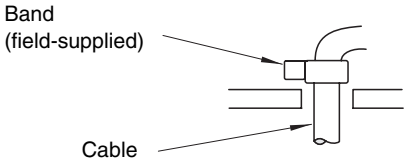
3. Lead the cable through the groove.



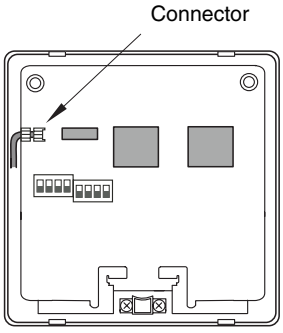
Twisted pair cable

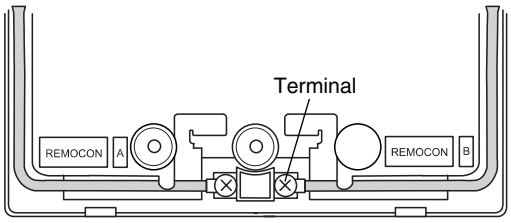


Accessory cable

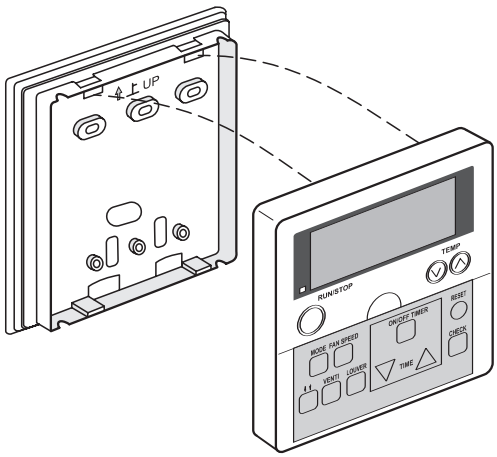


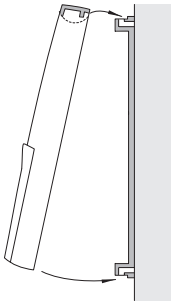
If you are connecting the accessory cable to the connector, remove the protection case.





4. Attach the timer onto the holding bracket.





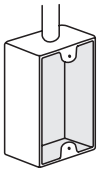
Step 1:
Insert the hooks of the timer to the holes at the top side of the holding bracket.

Step 2:
Push the lower part of the timer toward the holding bracket.

Step 3:
When you hear a clicking sound, the timer is already attached to the holding bracket. You have finished the mounting work. Make sure that four hooks at the position * are correctly inserted.

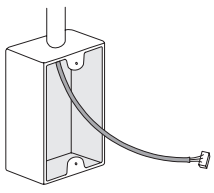
■ If you are using the switch box

1. Field-supplied JIS box (JIS 8336-1998).



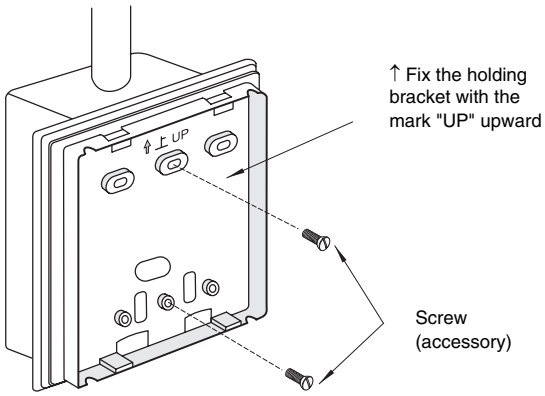
The following five types are available:
1. Switch box for one remote control switch (without panel)
2. Switch box for two remote control switches (without panel)
3. Switch box for one remote control switch (with panel)
4. Switch box for two remote control switches (with panel)
5. Outlet box (with panel)

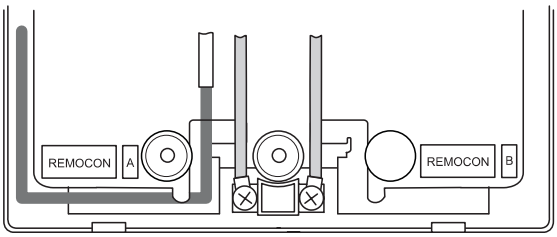
2. Run the cable through the conduit tube in the wall.



The cable is not exposed. Run the cable through the conduit tube in the wall and connect the cable inside the switch box.

3. Attach the holding bracket onto the switch box.





4.4.4. ELECTRICAL WIRING

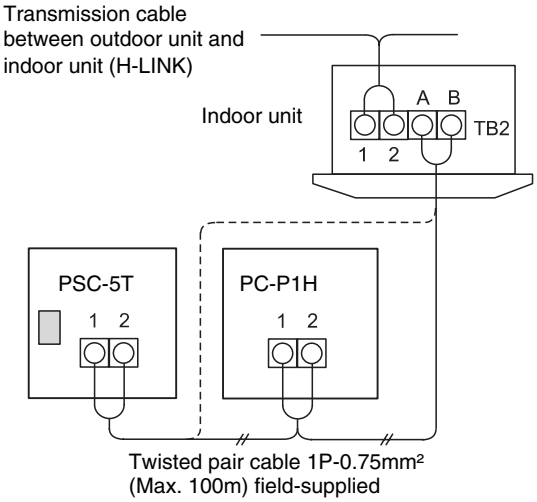
Use this timer with the remote control switch or the central station.

CAUTION:

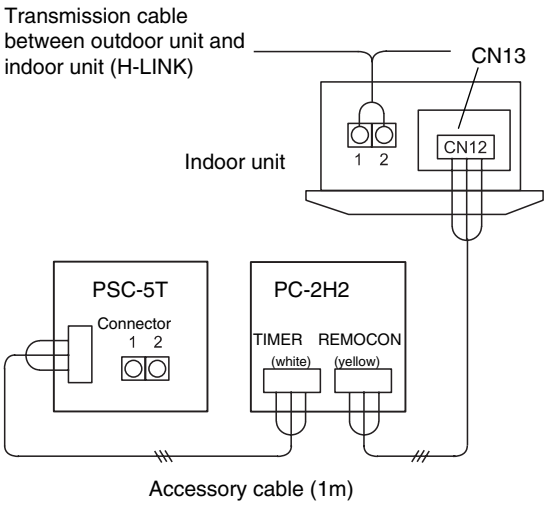
To prevent a malfunction, use the twisted pair cable (1P-0.75mm²) as a transmission cable.

Keep a distance of more than 30cm between the remote control cable and the transmission cable of the indoor units.

1. If you are using a timer with PC-P1HE:

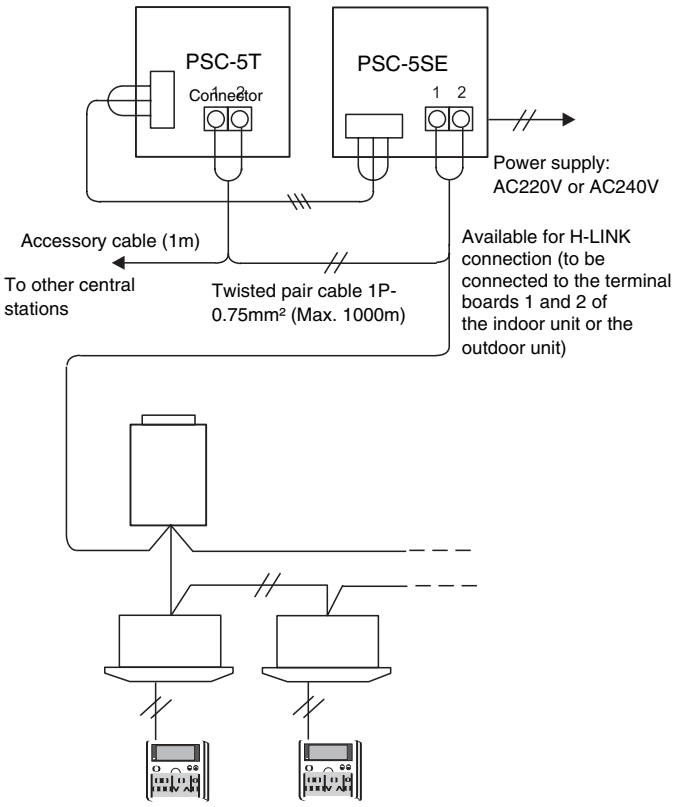


2. If you are using a timer with PC-2H2:



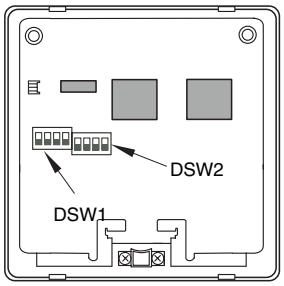
3. If you are using a timer with PSC-5SE (central station):

– You can connect up to eight units of central station (PSC-5S) and timer (PSC-5T) to the H-LINK system. One timer can control only one central station.



4.4.5. SETTING THE DIP SWITCHES

Set the two DIP switches on the PCB as follows. (The factory settings of the DSW1 and the DSW2 are all OFF).



Setting of the DSW1 (For the address setting)

Address	0	1	2	3
Setting of the DSW1				
Address	**4**	**5**	**6**	**7**
Setting of the DSW1				

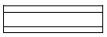
Settings of the DIP switches

	Pin No.	Contents of the settings	Settings of the DSW		Remarks
			OFF	ON	
DSW1	1	For the address setting	Refer to the table above		Setting is required only when the central station (PSC-5S) is used together. Set the address of the central station to be controlled.
	2				
	3				
	4	For the remote control switch used together	Except for PC-P1HE	PC-P1HE	When the remote control switch PC-P1HE is used together, set the No.4 pin to ON.
DSW2	1	Setting for prohibition of the remote control operation after stopping at OFF TIME	Setting is not available	Setting is available	Remote control operation is not available after stopping at OFF TIME. Remote control operation is available again at ON TIME while the unit is stopped. (This setting is available only when the remote control switch (PC-P1HE) or the central station (PSC-5S) is used together).
	2	For the remote control switch used together	PSC-5S	Except for PSC-5S	Set the No.2 pin according to the other remote control switch used together.
	3	Not used	-	-	Do not change the setting. (No.3 pin set to OFF).
	4	Not used	-	-	Do not change the setting. (No.4 pin set to OFF).

4.5. INSTALLATION OF THE RECEIVER KIT <PC-RLH8>

(for RCI-FSN1E Units)

■ The packing contains the following parts. Check the contents and the number of the parts.

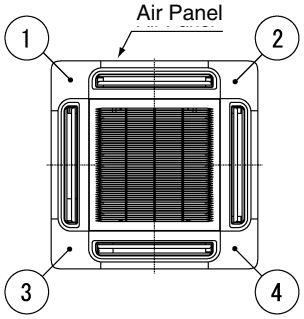
Mod.	Name	Qty	Remarks
PC-RLH8	Receiver Kit 	1	With Connection Wire
	Connecting Cable 	3	With Connection Wire
	Band 	1	For Fixing Cable
	Cover 	1	For Protection of Connecting Cable

4.5.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

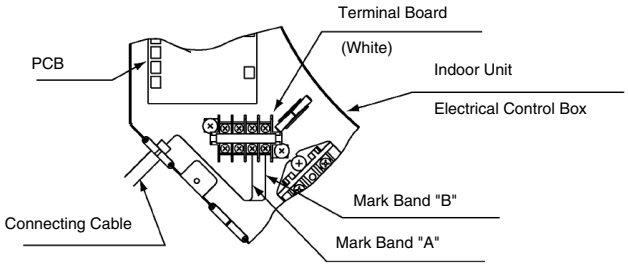
⚠ ***CAUTION:***
Pay attention to the following installation procedures. If not, it may drop from the panel, resulting in a serious accident.

■ **PC-RLH8**

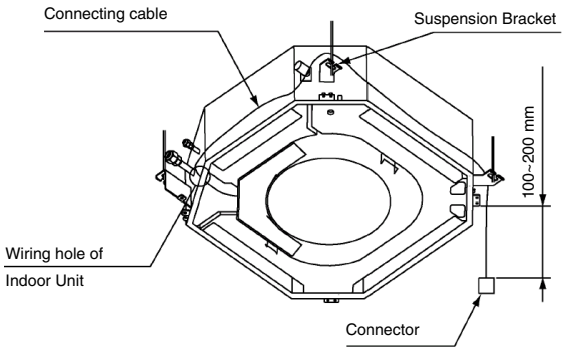
1) Install the wireless receiver kit, the indoor unit and the air panel at the same time.
2) In case that the wireless receiver kit is installed after installing the indoor unit, turn off the power source of the indoor unit and remove the air panel.
3) This receiver kit can be installed at the position 1, 2, 3 or 4.



4) Remove the cover of indoor unit electrical controlbox and connect the cable to the terminal board (white) as shown below.

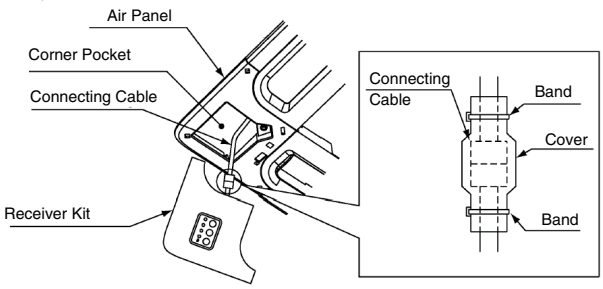


5) Draw out the connecting cable from the wiring hole of the indoor unit, and lead the cable over the suspension bracket of the indoor unit to the installing position of the receiver kit. Bundle the extra cable with a band.

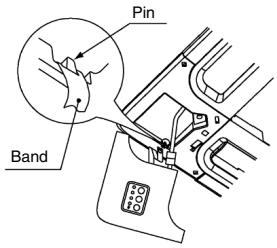


6) Install the air panel (option) onto the indoor unit.
7) Attach the receiver kit in the following procedure.

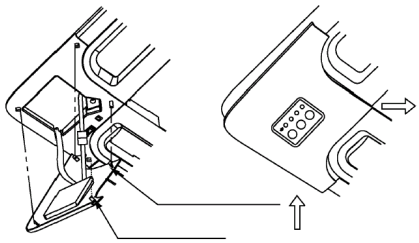
① Draw out the connecting cable from the pocket and connect the connecting cable and the wire of the receiver kit. After connecting the cable, wrap the connector with the cover and fix them with a band.



② Hook the band on the rear side of the receiver kit at the pin of the air panel as shown bellow.



③ Hook L- shaped nail on the rear side of receiver kit at the square hole of the air panel.

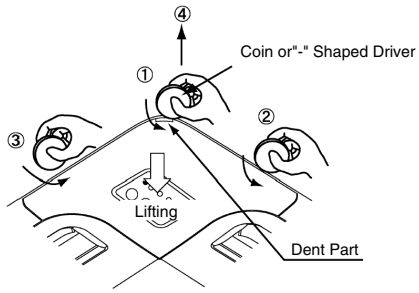


8) Hook the other fixing nails (3 positions) at the square holes of air panel.

NOTE:

When removing the receiver kit after installing the air panel:

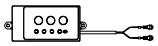
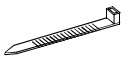
- *The corner position of the receiver kit can be lifted when a coin or a "-" shaped driver is inserted into the dent part ① and twisted downward. With ① lifted, twist a coin or a "-" shaped driver at the positions of ② and ③, the whole receiver kit can be lifted.*
- *After disconnecting the fixing nails (3 positions), slide the receiver kit in the arrow direction ④ and remove the receiver kit.*



4.6. INSTALLATION OF THE RECEIVER KIT TO RCD UNIT <PC-RLH9>

(for RCD-FSN Units)

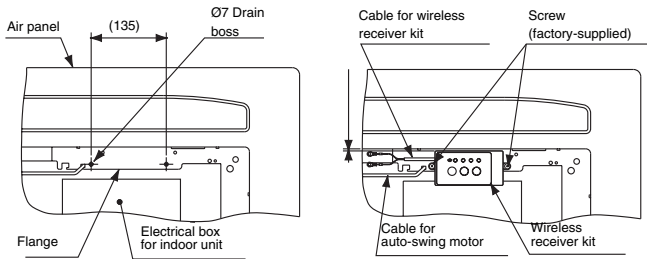
The packing contains the following items. Check the contents and the number of items in the packing.

Mod.	Name	Qty	Remarks
PC-RLH9	Receiver kit 	1	With the connector cable
	Screw 	2	For fixing the receiver kit
	Band 	2	For fixing the cable

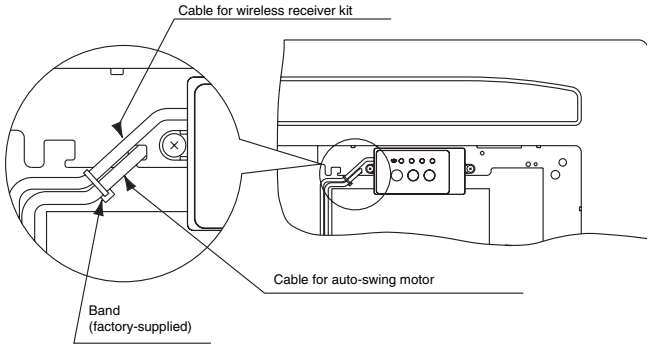
4.6.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

NOTE:
Install the wireless receiver kit into the indoor unit.

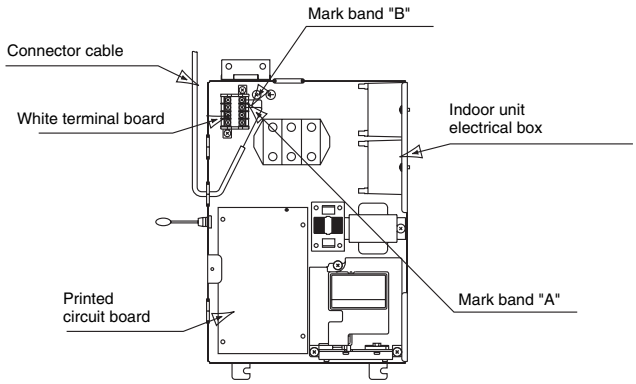
1. Install the wireless receiver kit, the indoor unit and the air panel at the same time.
2. If you install the wireless receiver kit after installing the indoor unit, turn off the power source of the indoor unit. Then, remove the air inlet grille.
3. Fix the wireless receiver kit to the air panel by means of the screws. (The tightening torque must be 0.8Nm).



4. Lead the cable along the cable for the auto-swing motor. Then, tie the cables with the band.

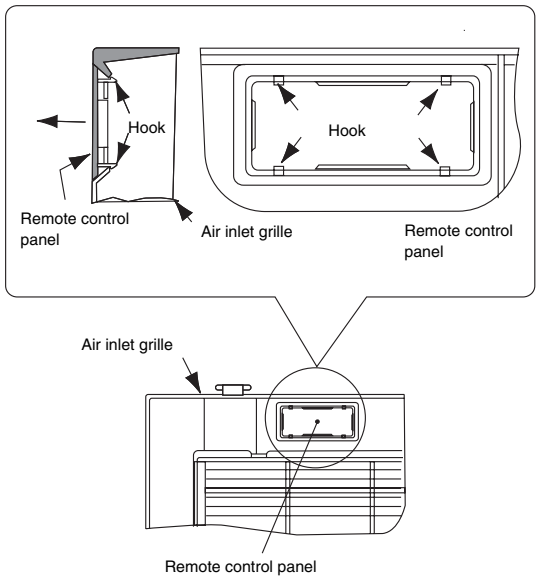


5. Remove the panel of the electrical box of the indoor unit. Then, connect the cable to the terminals A and B of the white terminal board.

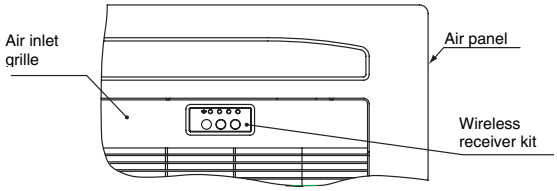


NOTE:
After connecting the cable, tie the remaining cable length with the factory-supplied band. Then, place the cables in the electrical box.

6. Remove the remote control panel of the air inlet grille.
   - Press the hooks of the remote control panel by hand.

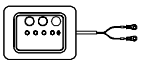
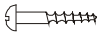
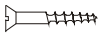


7. After fixing the air panel, attach the air inlet grille to the air panel.
   - Make sure that the location of the square hole of the air inlet grille coincides with the location of the wireless receiver kit of the air panel.
   - Make sure that the square hole of the air inlet grille does not clamp the cable of the wireless receiver kit.



4.7. INSTALLATION OF THE EXTERNAL RECEIVER KIT <PC-RLH11>

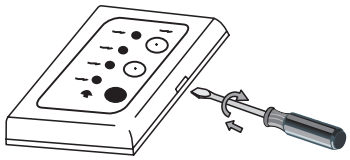
The packing contains the following items. Check the contents and the number of items in the packing.

Mod.	Name	Qty	Remarks
PC-RLH11	Receiver kit 	1	With the connector cable
	Band 	1	For fixing the cable
	Screw 	4	For fixing the receiver kit
	Screw 	2	For fixing the clamp
	Clamp 	2	For fixing the cable

4.7.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

NOTE:
Install the receiver kit onto the wall or the ceiling near the indoor unit.

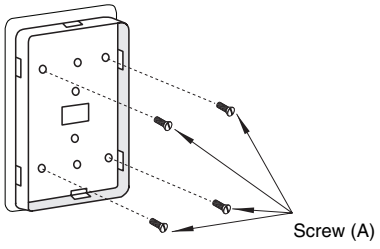
1. Install the wireless receiver kit and the indoor unit at the same time.
2. If you install the wireless receiver kit after installing the indoor unit, turn off the power source of the indoor unit.
3. Make sure that the distance between the wireless receiver kit and the indoor unit is less than 5m.
4. Remove the panel by using a minus screwdriver.



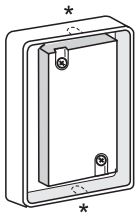
5. Install the wireless receiver kit onto the wall or the ceiling as follows:

A. If you are exposing the cable

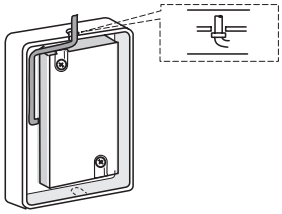
❶ Fix the fixing bracket of the wireless receiver kit by means of the screw (A) at the four locations.



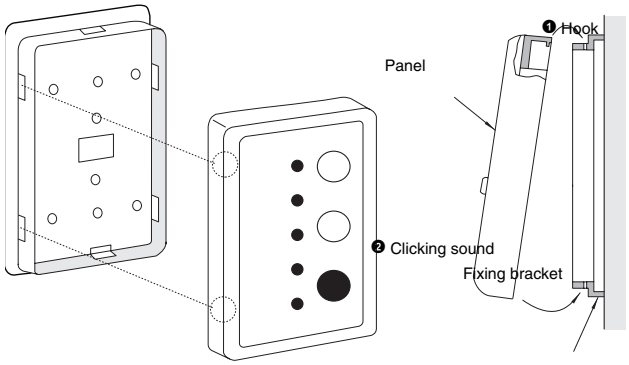
❷ Cut one of the knockout holes (*) at the panel.



❸ Lead the cable through the groove and draw out the cable from the knockout hole.

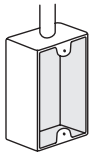


❹ Attach the panel. Do not clamp the cable when you are attaching the panel.



B. If you are concealing the cable

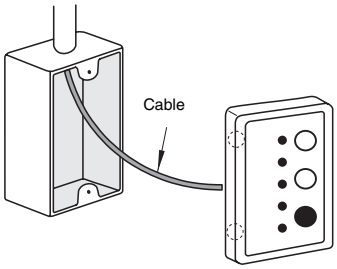
❶ Prepare the following field-supplied box.



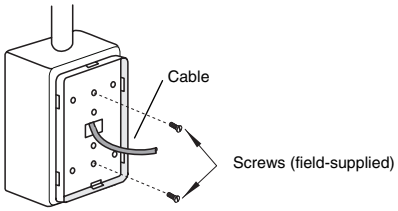
JIS box (JIS C8336-1991)
1. Switch box for one remote control switch (without panel)
2. Small switch box for one remote control switch (without panel)
3. Switch box for one remote control switch (with panel)

- Rigid metal conduit tube (more than ø20)
- M4 screw (field-supplied)

❷ Insert the cable into the rigid metal conduit tube.



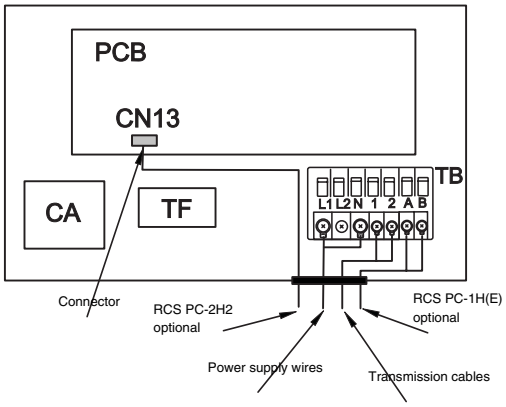
❸ Fix the fixing bracket of the wireless receiver kit by means of the field-supplied screws.



This figure shows the case of the switch box for one remote control switch.

❹ Attach the panel that is the same as A ❹.

6. Remove the panel of the electrical box of the indoor unit. Then, connect the cable to the terminals A and B of the white terminal board.

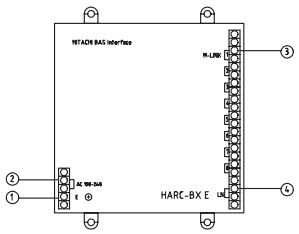


Example: RPI-3.0

4.8. HARC-BX(A/B)

4.8.1. PART NAMES

Each part name of the HARC-BX E is shown in the next figure.



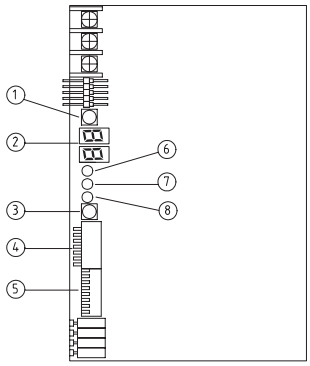
① Power source terminal to be connected to the AC220V~AC240V power source.

② Earth terminal to be grounded.

③ Terminal board for the unit transmission to connect the H-LINK.

④ Terminal board for the upper monitoring system to connect the transmission line for the upper monitoring system.

■ **Board**



① **PSW1 (MCLR)**: the push switch for checking the quantity of connected units.

② **7-Segment Display(*)**: the present state of the HARC-BX E.

③ **PSW2 (LON-SERV)**: the push switch for the transmission neuron ID. (Service pin).

④ **8P DSW1 (S201) (**)**: the DIP switch for setting the system of the HARC-BX E.

⑤ **8P DSW2 (S202) (***)**: the DIP switch for setting the functions of the HARC-BX E.

⑥ **LED of the power source (PWR)**: the LED is ON when the power is supplied.

⑦ **LED of the transmission (H-L)**: the transmission status with the H-LINK.

⑧ **LED of the transmission for the upper monitoring system (LON)**: the transmission status with the upper monitoring system.

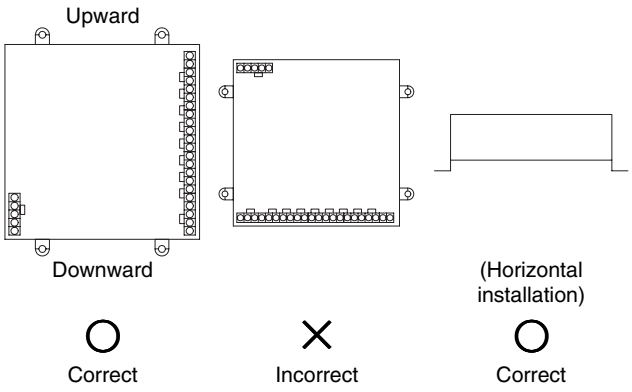
(*) 7-segment display:
Read 4.8.5 "Test run" and 4.8.6 "Maintenance and service" for the details of 7-segment display.

(**) 8P DSW No.1 S201:
Refer to "Setting the DIP switch" in section 4.8.5 for details and the functions of the HARC-BX E.

(***) 8P DSW2 (S202):
Refer to "Setting the DIP switch" in section 4.8.5: (8P DSW1 and 8P DSW2).

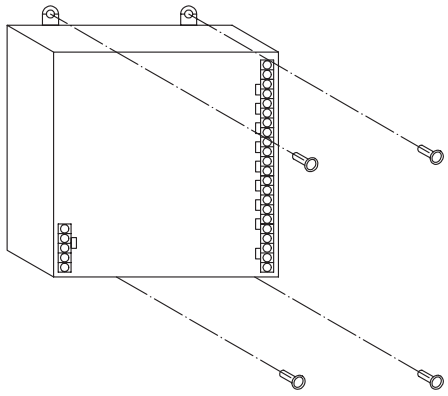
4.8.2. INSTALLATION PROCEDURE

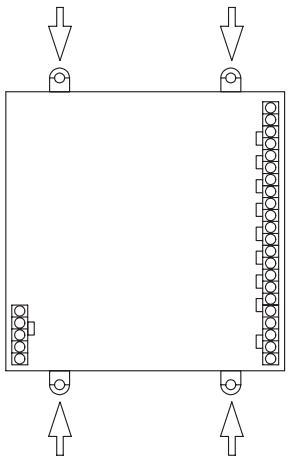
1. Install the HARC-BX E by keeping the screw terminal board at the lower side.



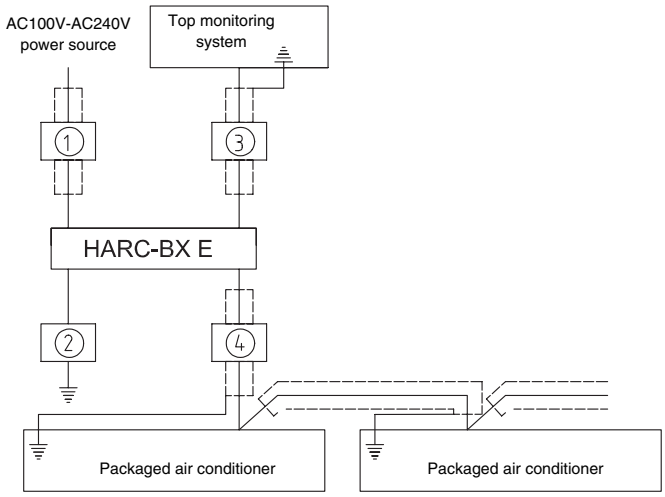
2. Fixing method by means of the M4 screws (field-supplied).

   Fix the HARC-BX E onto the wall by means of the M4 screws at the four locations.





1. You need to install the power supply wiring for the HARC-BX E, the transmission cable between the packaged air conditioners, and the transmission cable between the upper monitoring systems.
2. Wiring method.



No.	Connecting equipment	Specifications of the wiring
①	Power supply wiring for the HARC-BX E	AC100V, 2mm^2, 2 cores, shielded
②	Ground cable	Follow the local standards
③	Upper monitoring system	Follow the instructions of the management personnel (**)
④	Transmission line for the packaged air conditioners	1P-0.75mm^2 twisted pair cable (*)

(*) Make sure that you apply the twisted cables.

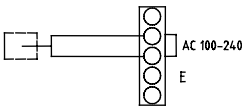
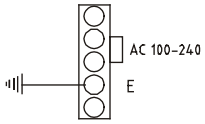
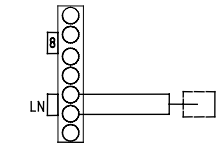
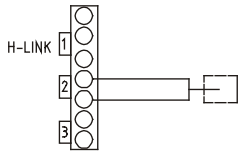
Recommended types of cables:

	Japan Cable Industrial Associations	Hitachi Cable Co., Ltd.	Japan Cable Co., Ltd.	Integral power consumption
Non-shielded	JKEV	KPEV	KNPEV	KPEV
Shielded (copper foil)	JKEV-S	KPEV-S	KNPEV-S	KPEV-S
Shielded (twisted)	JKEV-SB	KPEV-SB	KNPEV-SB	KPEV-SB

4.8.3. ELECTRICAL WIRING

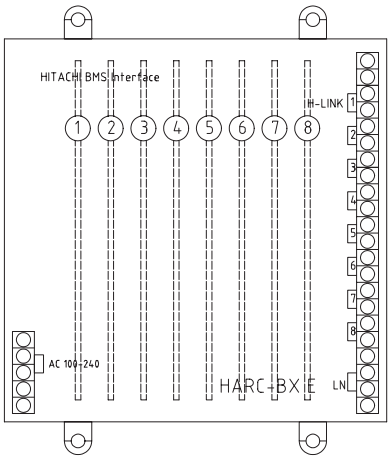
1. To install the wiring, turn OFF the main switch that is connected to the wire of the HARC-BX E and the surrounding equipment.
2. You should install the wiring according to the table below. The "No." in the table indicates the wire in the section "Wiring method".

■ Electrical wiring

Section		No.	Wiring method	Remarks
Power supply wire	1~220V/240 V power source HARC-BX E	①		
	Ground wire	②		
Control circuit	Upper monitoring system HARC-BX E	③		Non-polar
	HARC-BX E Packaged air conditioner	④		Non-polar

4.8.4. ARRANGEMENT OF THE INSTALLATION OF PCB AND H-LINK TERMINALS

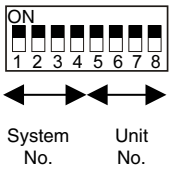
As described in the figure below, 8 PCBs which are built into HARC-BX E and H-LINK Terminals correspond to the both sides of the same numbers, 1 to 8 within ○ and □ respectively.
In order that PCB would be able to communicate with unit it must be connected to same H-LINK than unit.



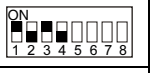
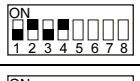
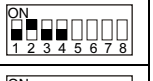
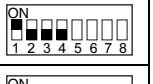
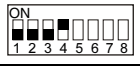
4.8.5. TEST RUN

■ Setting the DIP switch

1. Set the DIP switch before turning on the power supply.
2. Remove the front board in order to set the DIP switch.
3. The setting of the DIP switches for each PCB is different.
4. Setting the 8-pin DIP switch (S201)
   The settings of the 8-pin DIP switch (S201) depend on the system numbers and the unit numbers of the applicable indoor units that the PCB controls. The setting procedures for the system number and the unit number are shown in the table below.

Setting of the 8-pin DIP switch (S201)	Description
	The settings of the 8-pin DIP switch (S201) depend on the system numbers and the unit numbers of the applicable indoor units that the PCB controls. In case of the standard specification and the specification of the option A, the PCB will control eight units from the system numbers and unit numbers that you have set. For example, if you set the system No.1 along with the unit No.1, the relevant PCB will control the units No.1 to No.8 from the system No.1. You should set the unit number from either No.1 or No.9. In case of the specification of the option B, the PCB will control four units from the system numbers and unit numbers that you have set. For example, if you set the system No.1 along with the unit No.1, the relevant PCB will control the units No.1 to No.4 from the system No.1. You should set the unit number from No.1, No.5, No.9 or No.13.

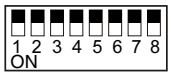
The details are outlined below.
The settings for the required system numbers are shown in the table below.

System No.	Setting pin No.1 to No.4	System No.	Setting pin No.1 to No.4
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	

4.8.6. MAINTENANCE AND SERVICE

■ Self-Inspection of the HARC-BX E
In order to identify the abnormal operation of the HARC-BX E, perform the self-inspection according to the following instructions.

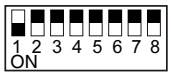
1. Set all the pins of DSW S201 and DSW S202 to OFF.



8-Pin DSW (S201)

8-Pin DSW (S202)

2. Turn ON the power supply.
   "8" is displayed on the 7-segment display and OFF is lit.
3. Set to ON only the No.1 pin of DSW S201.

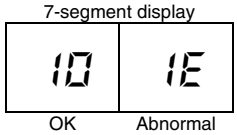


8-Pin DSW (S201)

8-Pin DSW (S202)

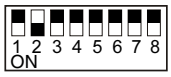
With this setting, the communication between the HARC PCB and the LONWORKS network is performed.

The results are the following:



In case of abnormal operation, either there is some problem with the LONWORKS network or the HARC PCB is damaged.

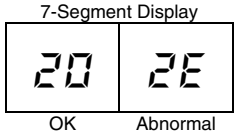
4. Set the No.1 pin of the 8-pin DSW S201 to OFF. Then, set to ON only the No.2 pin.



8-Pin DSW (S201)

8-Pin DSW (S202)

The results are the following:



In case of abnormal operation, either the HARC PCB is damaged or there is some problem with the H-LINK line, for example an incorrect wiring or an incorrect setting of the end terminal resistance.

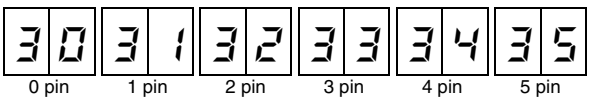
5. Set the No.2 pin of the 8-pin DSW S201 to OFF. Then, set to ON only the No.3 pin.

8-pin DSW (S201)

8-pin DSW (S202)

With this setting, you perform the checking procedure of the No.1 pin, the No.2 pin, the No.3 pin, the No.4 pin and the No.5 pin of DSW S202. The number below shows the number of pins that are set to ON.

The results are the following:



In case of abnormal operation, the HARC PCB is damaged.

4.9. CS-NET INTERFACE (HARC40) CONNECTION

■ HARC40 with the USB connection

Since the ISA Board connections have been phased out in the computer design, an **external interface** with a **USB** connection has been developed for the H-LINK connection to the CS-NET system. This external interface also makes the application more flexible because the external interface can be connected to a portable computer. A service engineer can then use the portable computer in order to monitor the systems that are not connected to a CS-NET system.
You must perform the installation as shown below.

NOTE:
All the cables must be shielded and must have a cross-section of at least 0.75mm². The maximum total length is 1000m.

■ Installation

Before starting the HARC installation, install the CS-NET program.
Turn off the computer.
Connect the HARC40 interface to the computer by means of the USB connector cable.
Turn on the computer. Windows will automatically detect that the interface is connected and that the device "HARCUSB" is available at the CD/CDROM. Windows will automatically complete the installation of the device.
Connect the CS-NET cable of the interface to the H-LINK connection on any of the indoor units or any of the outdoor units.

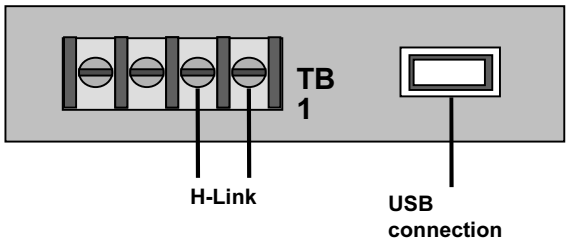
■ Interface connections

The available interface connections are the following:
Terminal board **TB1.** (Refer to the opposite diagram).

1. Main H-LINK connection for the 2-core cable to the system.
2. USB connection to the USB port on the computer.

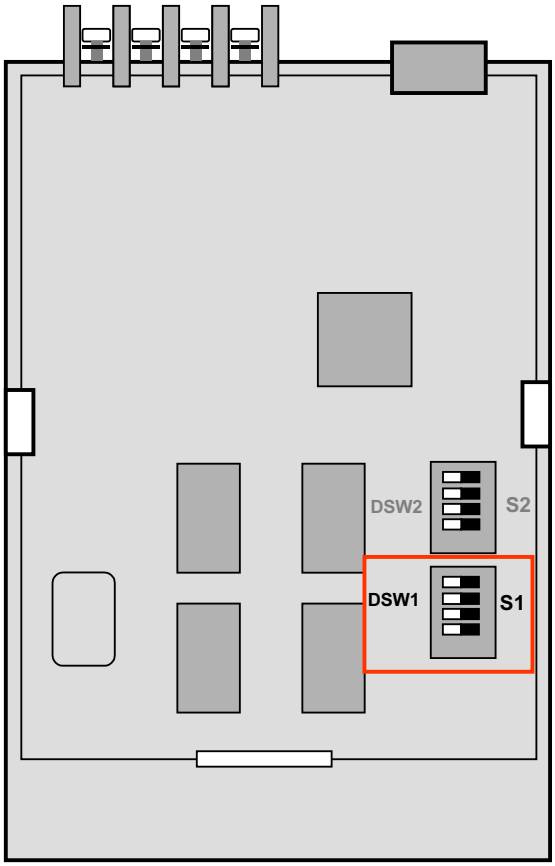
NOTE:
The power supply for the HARC40 is provided by the USB connection. Therefore, you do not need any external power supply.

Rear view of the HARC40 interface



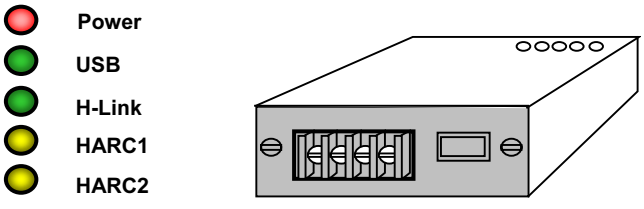
■ Layout of the HARC40 interface

On the opposite side you can see the layout of the printed circuit board of the HARC40 interface. The layout, which is a bottom view, includes the positions of the DIP switches and the connections.
If you install more than one interface, you must set the DIP switch **DSW1**. Refer to page 24 in TCGB0028 to get further details.
You must not change the **DSW2**.



■ LED indicators

POWER	When the power from the computer is applied, POWER is continuously lit.
USB	When the transmission between the computer and the interface is available, USB blinks.
H-Link	When the transmission between the interface and the system is available, H-Link blinks.
HARC1	Communication status (not used).
HARC2	Communication status (not used).



5. CONTROL SYSTEM

This chapter presents the control system flowcharts for the DC Inverter Series operations.

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5.1. DEVICE CONTROL SYSTEM

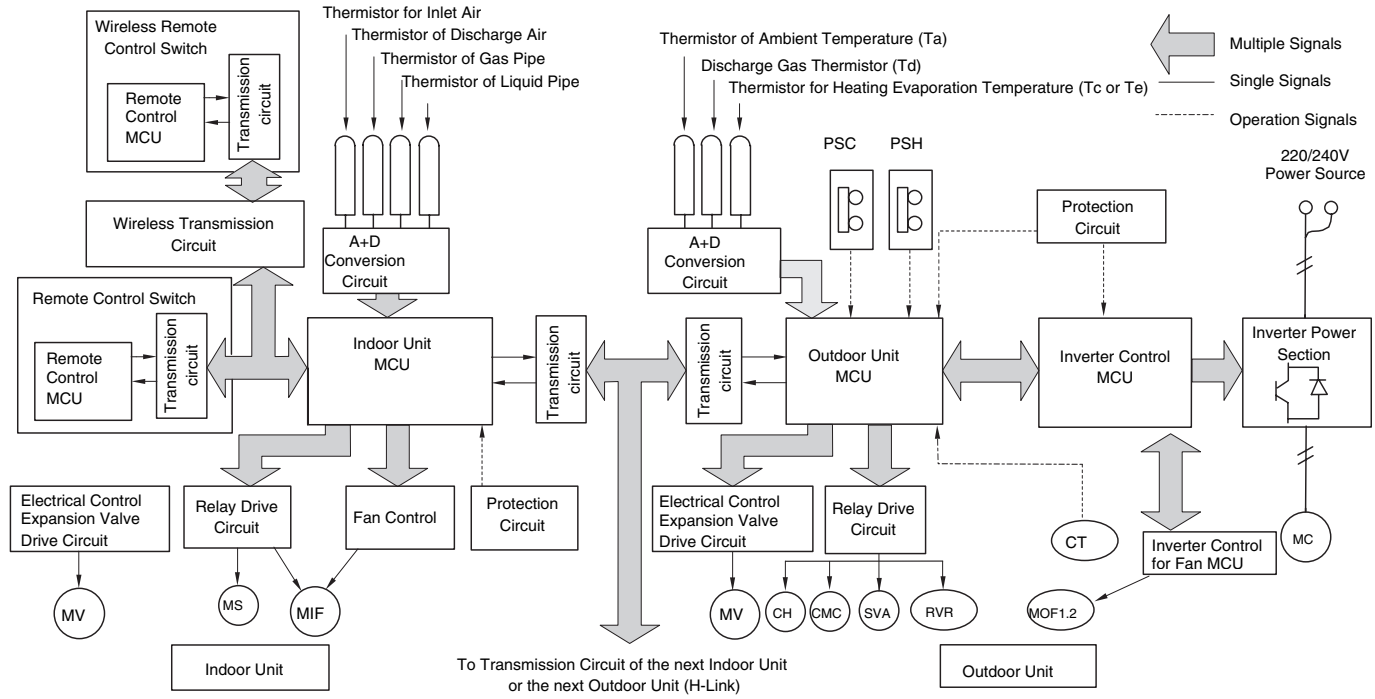
5.1.1. RAS-3~6HVRNE - REFRIGERANT CYCLE CONTROL

Control Subject	Purpose	
	Cooling Operation	Heating Operation
Inverter Frequency of Compressor	Difference Temp. of Air Inlet and Setting Temp.	Difference Temp. of Air Inlet and Setting Temp.
Opening Degree Expansion Valve of Outdoor Unit	For controlling Temp. of Discharge Gas super heat: tdSH (TdSH = 20K) SC (Sub Cool) = 3K	For Controlling Temp. of Discharge Gas
Opening Degree Expansion Valve of Indoor Unit	For Controlling Temp. of Discharge Gas Super-Heat: TdSH TdSH=20K	Difference Temp. of discharge gas and Liquid Pipe of Indoor Unit Heat Exchanger
Outdoor Fan	Tc Temp. <33ºC and Liquid Pipe Temp. of I.U. ≦ 0ºC => 1 Step Down Tc Temp > 43°C => 1 Step Up	Td ≧ 100ºC and Evo ≧ 400pls => 1 Step Down Te ≦ 0ºC and Ambient Temp. ≧ 4ºC => 1 Step Up

I.U.: Indoor Unit
Tc or Te: Condensing Temperature or Evaporating Temperature
Td: Discharge Temperature
Cap: Capacity
Temp.: Temperature

Figure below shows the outline of the control system.

The figure below shows the outline of the control system.



Symbol	Name
MC	Motor (for Compressor)
MIF	Motor (for Indoor Fan)
$MOF_{1,2}$	Motor (for Outdoor Fan)
MS	Motor (for Auto-Louver)
MV	Electronic Expansion Valve
CMC	Compressor Magnetic Contactor

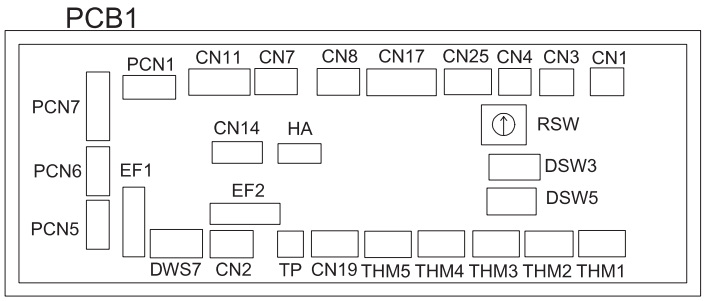
Symbol	Name
CH	Crankcase Heater
CT	Current transformer
RVR	4-Way Valve
PS(H)	Pressure Switch for protection
PS(C)	Pressure Switch for control
SVA	Solenoid Valve for gas bypass

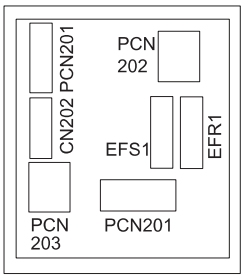
5.2. INDOOR UNIT PCB

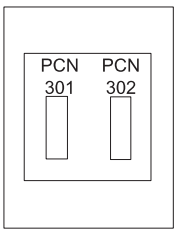
5.2.1. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RCI

■ **PCB drawing**

The PCB in the indoor unit operates with 3 types of DIP switches, and one rotary switch. The location is as follows:







LED INDICATION		
LED1	Red	This LED indicates the transmission status between the indoor unit and the RCS
LED3	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED4	Red	Power source for the PCB

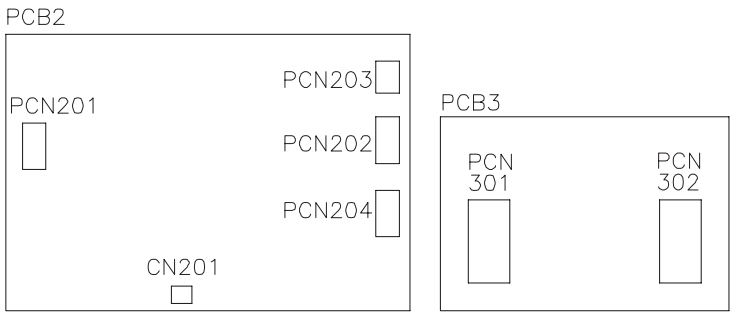
CONNECTOR INDICATION	
PCN1	Transformer 220V
PCN5	Electrical Heater for the dew prevention
PCN6	Drain Pump Motor
PCN7	Power source (1-R, 3-S)
PCN201	Power source (1-R, 3-S)
PCN202	Power source (1-R, 3-S)
PCN203	DC-Motor control
PCN301	Terminal Board Connection
PCN302	PCB2 Connection
THM1	Air inlet
THM2	Air outlet
THM3	Liquid pipe
THM4	Remote Thermistor
THM5	Gas pipe
CN1	Transformer (pin 1-2: 17.3V / pin 3-4: 20.8V
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions
CN4	Input optional functions
CN7	Output optional functions
CN8	Output optional functions
CN11	Expansion valve control
CN14	Float Switch
CN17	Swing louver motor 4

CONNECTOR INDICATION	
CN19	PCB2 Connection
CN25	(Not used)
CN202	PCB1 Connection
EFS1	PCB2 Fuse
EFR1	PCB2 Fuse
EFS2	PCB1 Fuse
EFR2	PCB1 Fuse
SWITCH INDICATION	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

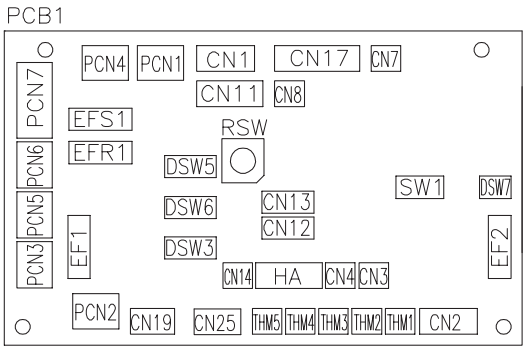
5.2.2. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RCD

■ PCB drawing

The PCB in the indoor unit operates with 4 types of DIP switches, and one rotary switch. The location is as follows:



LED INDICATION		
LED1	Red	This LED indicates the transmission status between the indoor unit and the RCS
LED2	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED4	Red	Power source for the PCB



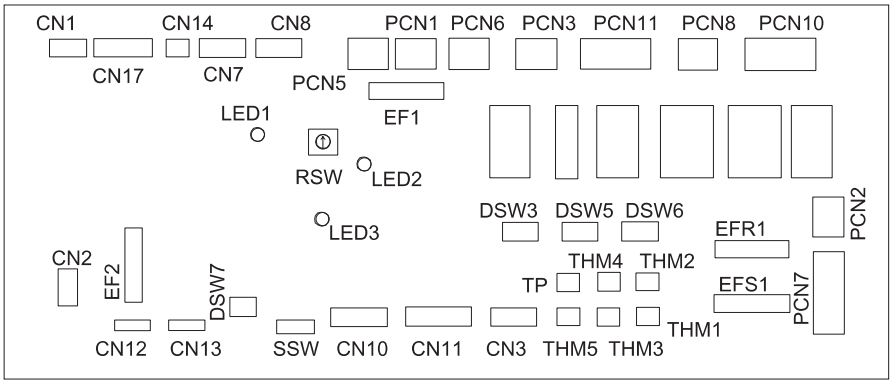
CONNECTOR INDICATION	
PCN1	Transformer 220V
PCN2	Internal thermostat for the indoor fan motor
PCN3	PCB2 connection
PCN4	(Not used)
PCN5	Relay on PCB
PCN6	Drain Pump Motor
PCN7	Power source (1-R, 3-S)
PCN201	Power source (1-R, 3-S)
PCN202	Fan Motor
PCN203	Capacitor
PCN301	Terminal Board Connection
PCN302	PCB1 Connection
THM1	Air inlet
THM2	Air outlet
THM3	Liquid pipe
THM4	Remote Thermistor
THM5	Gas pipe
CN1	Transformer (pin 1-2: 17.3V / pin 3-4: 20.8V
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions
CN4	Input optional functions
CN7	Output optional functions
CN8	Output optional functions
CN11	Expansion valve control
CN14	Float Switch
CN17	Swing louver motor 1

CONNECTOR INDICATION	
CN19	PCB1 Connection
CN25	PCB2 wireless receiver part connection
CN201	PCB1 Connection
EFS1	PCB1 Fuse
EFR1	PCB1 Fuse
EFS2	PCB1 Fuse
EFR2	PCB1 Fuse
SWITCH INDICATION	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW6	Model code
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

5.2.3. LAYOUT OF THE PRINTED CIRCUIT BOARD (EXCEPT RCI, RCD AND RPK)

■ PCB drawing

The PCB in the indoor unit operates with 4 types of DIP switches, one sliding switch, and one rotary switch. The location is as follows:



LED INDICATION		
LED1	Green	This LED indicates the transmission status between the indoor unit and the RCS
LED2	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED3	Red	Power source for the PCB

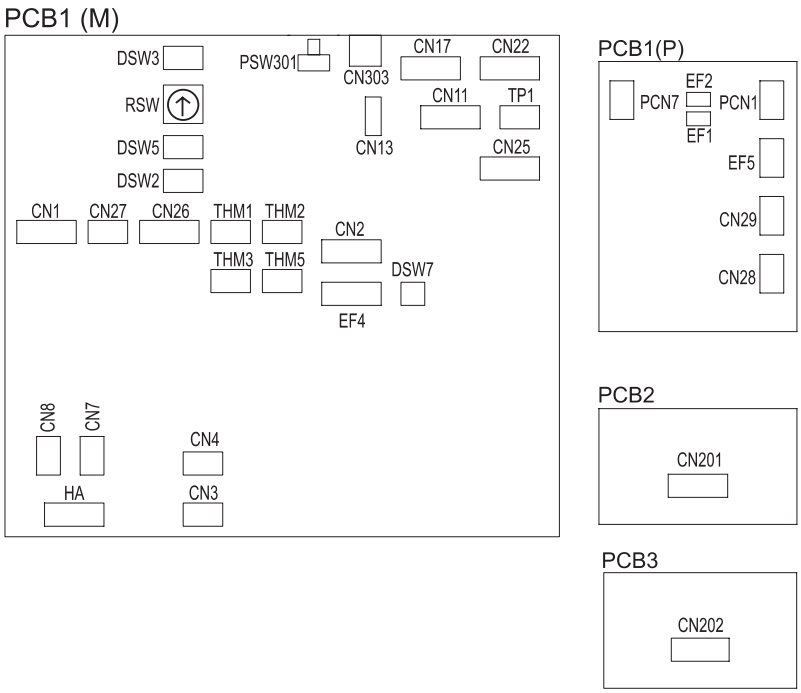
CONNECTOR INDICATION	
PCN1	Transformer (220V)
PCN2	Internal thermostat for the indoor fan motor
PCN3	(Not used)
PCN5	(Not used)
PCN6	Drain pump motor (RPI)
PCN7	Power source (1-R, 2-S, 3-N, 4-E)
PCN8	Capacitor
PCN10	Fan motor power
PCN11	Fan motor speed control
THM1	Air inlet
THM2	Outlet air
THM3	Liquid pipe
THM4	Remote thermistor (THM-R2 AE)
THM5	Gas pipe
EF1	Fuse
EF2	Fuse
EFS1	PCB2 Fuse
EFR2	PCB2 Fuse

CONNECTOR INDICATION	
CN1	Transformer (pin 1-2: 17.3V / pin 3-4: 20.8V
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions (only two)
CN7	Output optional functions (only two)
CN8	Output optional functions (#1 #2, only one)
CN11	Expansion valve control
CN12	Remote control bridge connector for multiple units
CN13	Remote control SW
CN14	Float switch (/RPI)
CN17	Swing louver motor
SWITCH INDICATION	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW6	Model code
DSW7	Fuse recovery and remote control selector
RSW	Setting of the indoor unit number
SSW	Selector SW (PC-2H2/PC-P1HE)

5.2.4. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RPK

■ PCB drawing

The PCB in the indoor unit operates with five types of DIP switches, one sliding switch, one rotary switch and one push switch. The location is as follows:



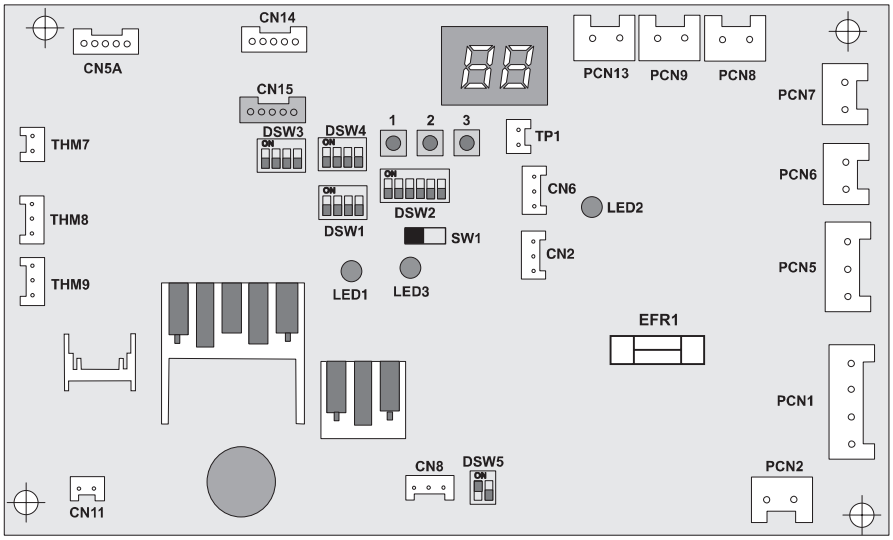
LED INDICATION		
LED1	Red	This LED indicates the transmission status between the indoor unit and the RCS
LED3	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED4	Red	Power source for the PCB

CONNECTOR INDICATION	
PCN1	Transformer 220V
PCN7	Power source (1-R, 3-S)
THM1	Air inlet
THM2	Air outlet
THM3	Liquid pipe
THM5	Gas pipe
EF1	PCP1(P) Fuse
EF2	PCP1(P) Fuse
EF4	PCP1(M) Fuse
EF5	PCP1(P) Fuse
CN1	Transformer (pin 1-2: 17.3V / pin 3-4: 20.8V
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions
CN4	Input optional functions
CN7	Output optional functions
CN8	Output optional functions
CN11	Expansion valve control
CN13	Remote control SW
CN17	Swing louver motor 1

CONNECTOR INDICATION	
CN22	Swing louver motor 2
CN25	PCB2 wireless receiver part connection
CN26	PCB1 (P) connection
CN27	Not used
CN28	PCB1 (M) connection
CN29	Fan motor
CN201	PCB1 wireless receiver part connection
CN202	LEDs checking control
CN303	Not used
SWITCH INDICATION	
PSW301	Switch for the emergency operation
DSW2	Optional functions
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW6	Model code
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

5.3. OUTDOOR UNITS PCB

■ PCB drawing



LED INDICATION		
LED1	Red	This LED indicates the transmission status between the indoor unit and the RCS
LED2	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED3	Green	Power source for the PCB

CONNECTOR INDICATION		
PCN1		Fuse
PCN2		PCB1 connection from Outdoor to Indoor unit
PCN5	CH	Crankcase Heater of Compressor (Oil)
PCN6		Output optional function
PCN7		Output optional function
PCN8	PSH	Pressure switch protection
PCN9	CMC	Compressor contactor
PCN13	PSC	Pressure switch control
THM7	AIR	Outdoor Air temperature Thermistor
THM8	PIPE	Pipe Temperature Thermistor
THM9	COMP	Compressor Temperature Thermistor
CN2	CT	Current Transformer
CN5A	MV	Micro electronic expansion valve
CN8	H-Link	Transmission from Outdoor to Indoor Unit
CN14		Transmission between PCB1 and ISPM
EFR1	FUSE	Power Protection

NOTE:
The mark "■" indicates position of dips switches.
Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting

CAUTION:
Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

SWITCH INDICATION	
DSW1	Test Run
DSW2	Capacity
DSW3	Optional functions
DSW4	Ref. cycle N°
DSW5	Fuse recovery

5.4. PROTECTION AND SAFETY CONTROL

Compressor protection
The following devices and their combinations protect the compressor:

High-Pressure switch	This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.
Oil heater	This band heater protects against the oil carry-over during the cold starting, as the band heater is energized while the compressor is stopped.
Fan motor protection	Internal thermostat that is embedded in the fan motor winding: this internal thermostat cuts out the operation of the fan motor when the temperature of the fan motor winding exceeds the setting.

5.5. SAFETY AND CONTROL DEVICE SETTING

Safety and control device setting for the indoor units

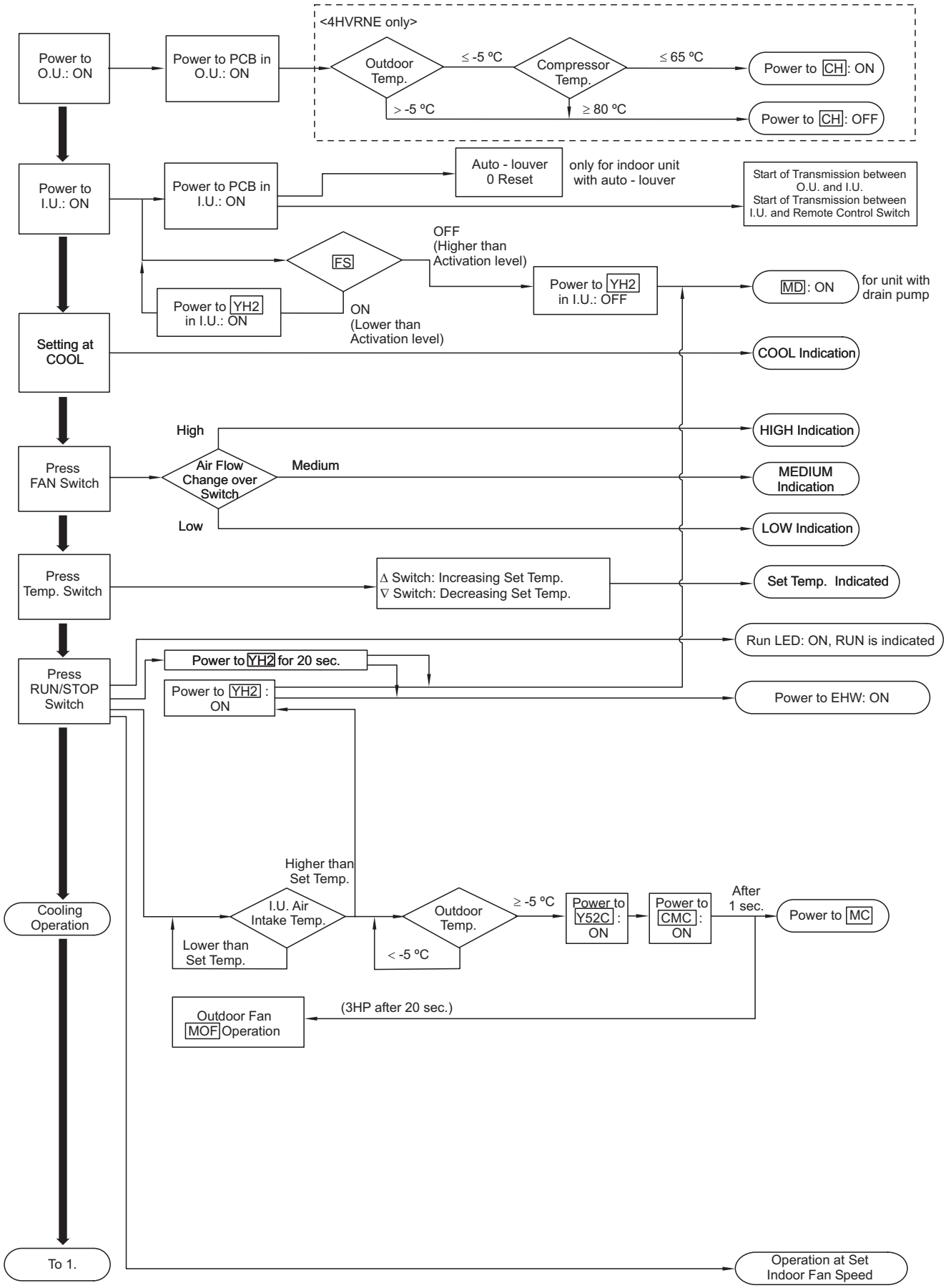
Model		RCI	RCD	RPC	RPI	R/PK	RPF	RPFI	Remarks
For the evaporator fan motor: Internal thermostat	°C								Automatic reset, non-adjustable (each one for each motor)
Cut-Out	°C	145±5	130±5	135±5	140±5	130±5	130±5	130±5	
Cut-In	°C	90±15	83±15	90±15	90±15	83±15	83±15	83±15	
For the control circuit: fuse capacity	A	5							
Freeze protection thermostat:									
Cut-out	°C	0							
Cut-in	°C	14							
Thermostat differential	°C	2							

Safety and control device setting for the outdoor units

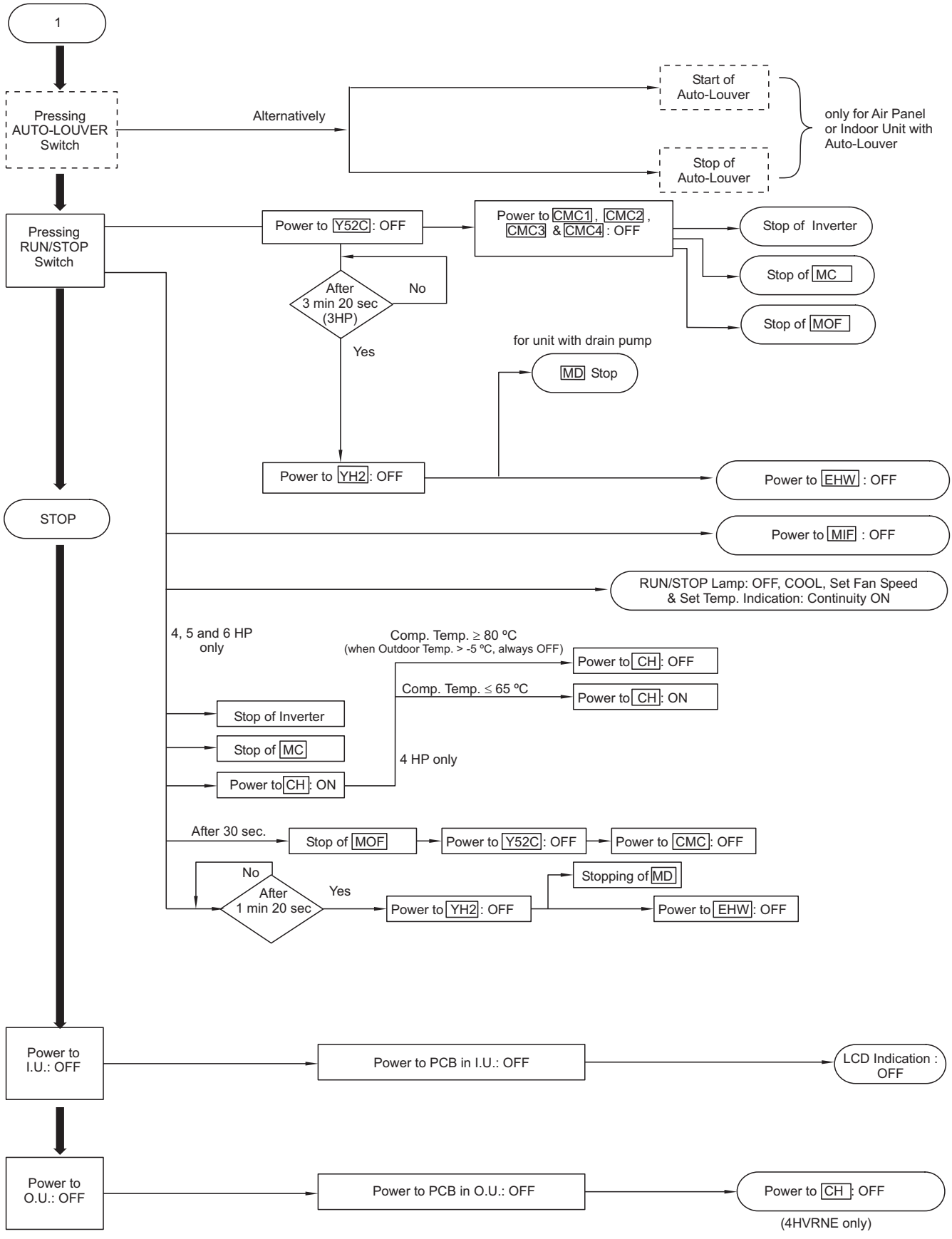
Model			RAS-3HVRNE	RAS-4HVRNE	RAS-5HVRNE	RAS-6HVRNE
High Pressure switch for compressor	Cut-out	MPa	$4^{-0.05}_{-0.15}$			
	Cut-in		$4^{+0.15}_{-0.15}$			
For control						
Fuse 1ϕ, 220/240V, 50Hz		A	40	50	50	50
CCP Timer			Non adjustable			
setting time		min	3	3	3	3
For condenser fan motor			Automatic Reset, Non-Adjustable (each one for each motor)			
Internal thermostat	Cut-out	°C	120 ±5	120 ±5	120 ±5	120 ±5
For control circuit Fuse capacity con PCB		A	5	5	5	5

5.6. STANDARD OPERATION SEQUENCE

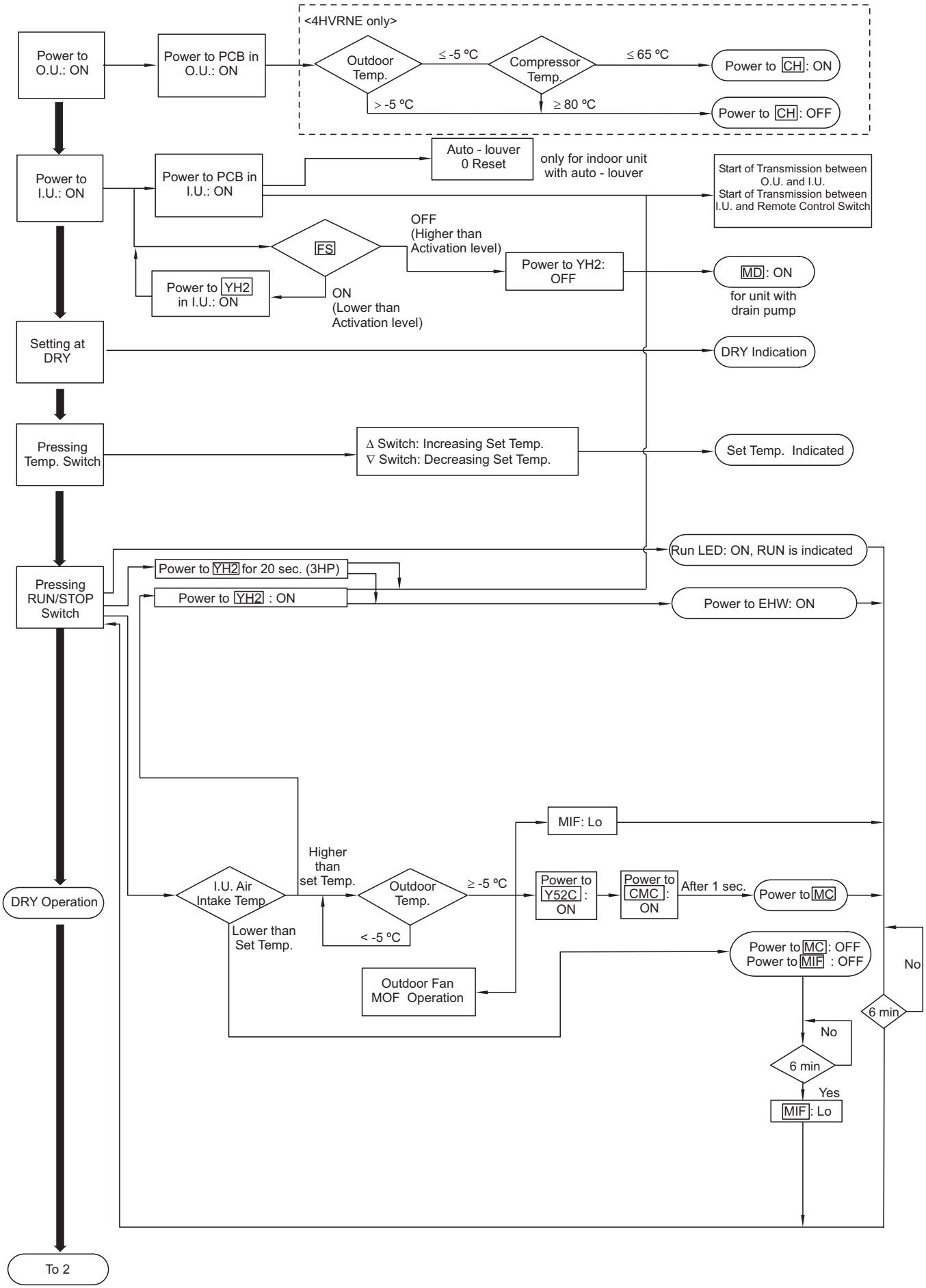
5.6.1. COOLING PROCESS



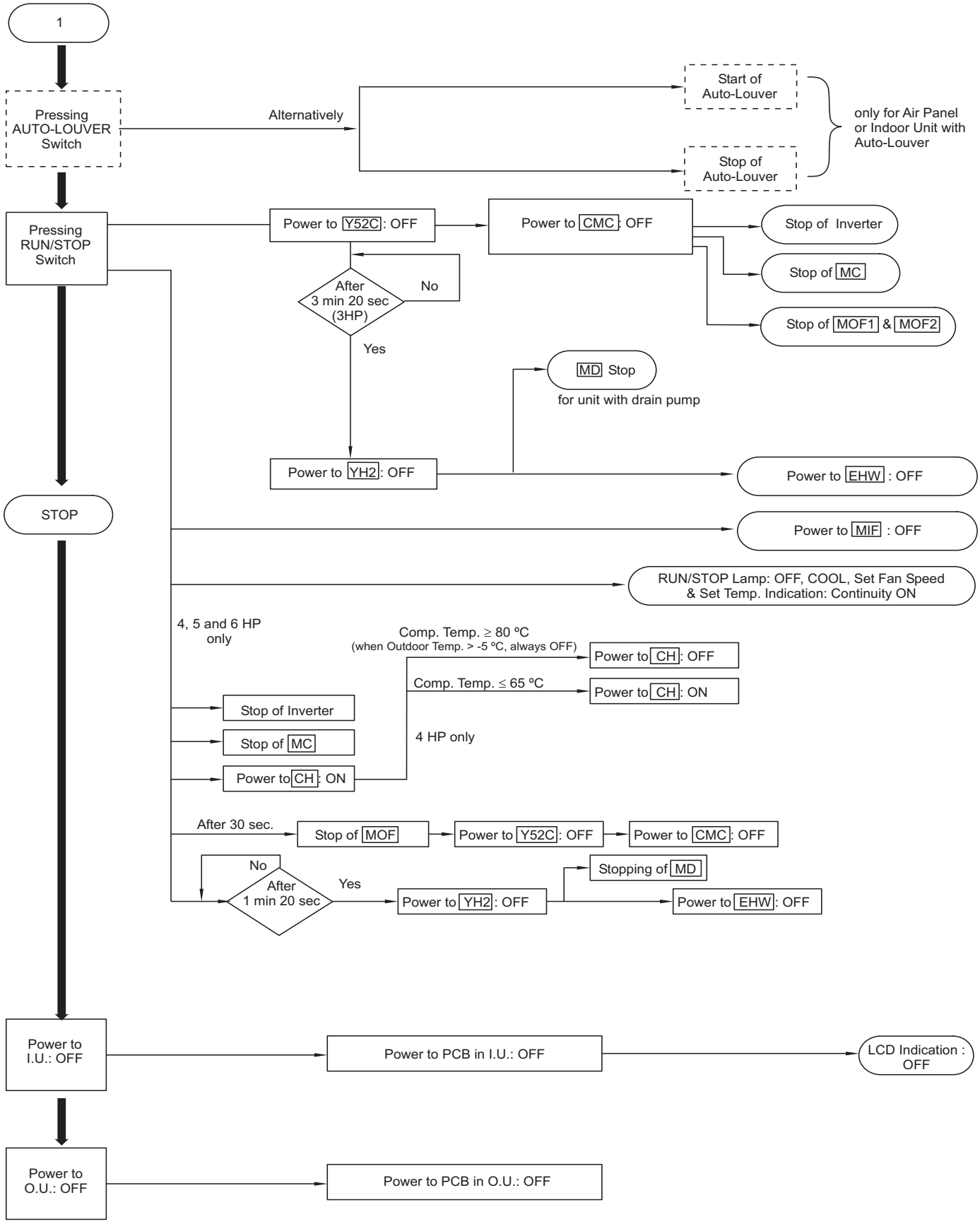
■ Cooling process (cont.)



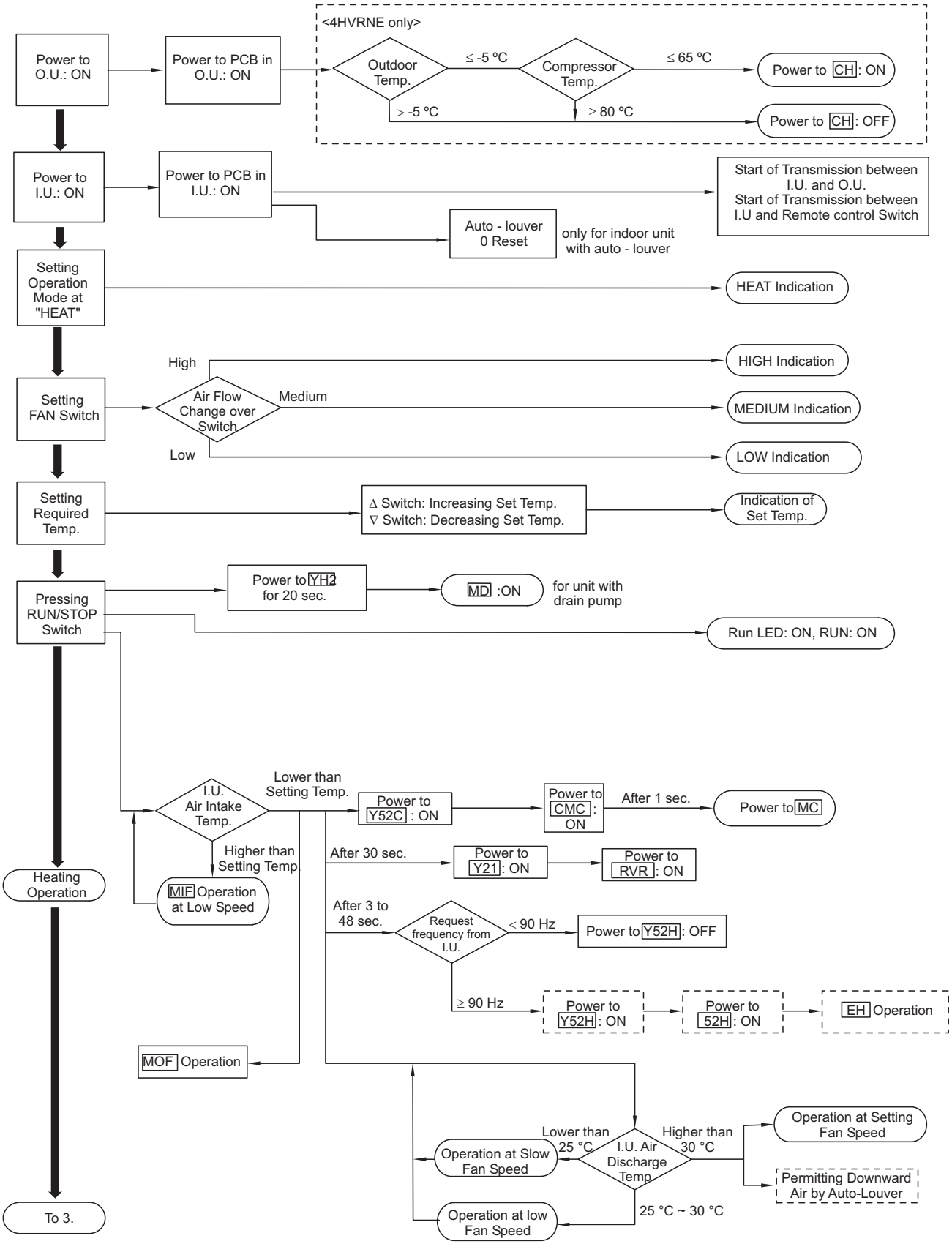
5.6.2. DRY OPERATION



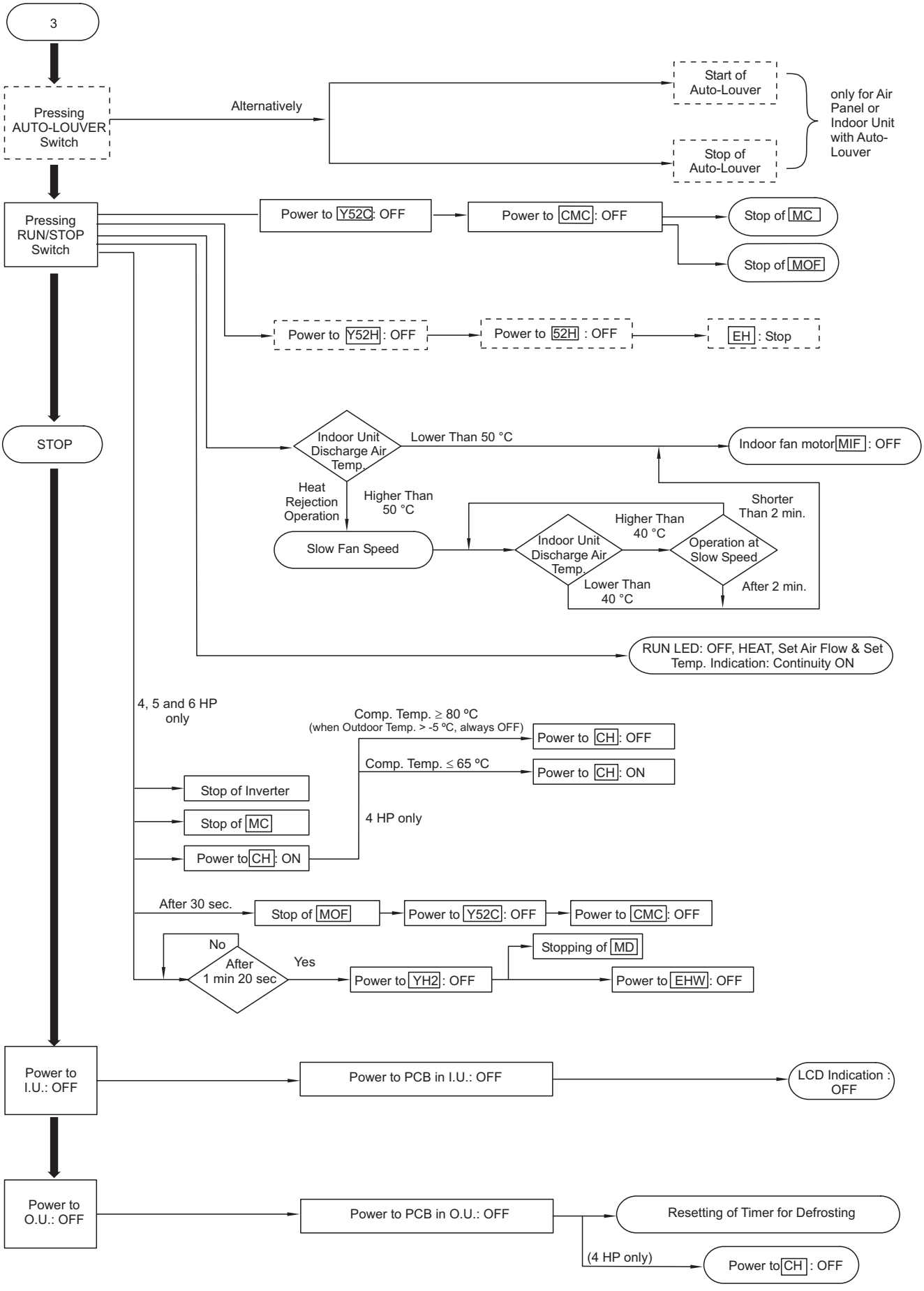
■ Dry operation (cont.)



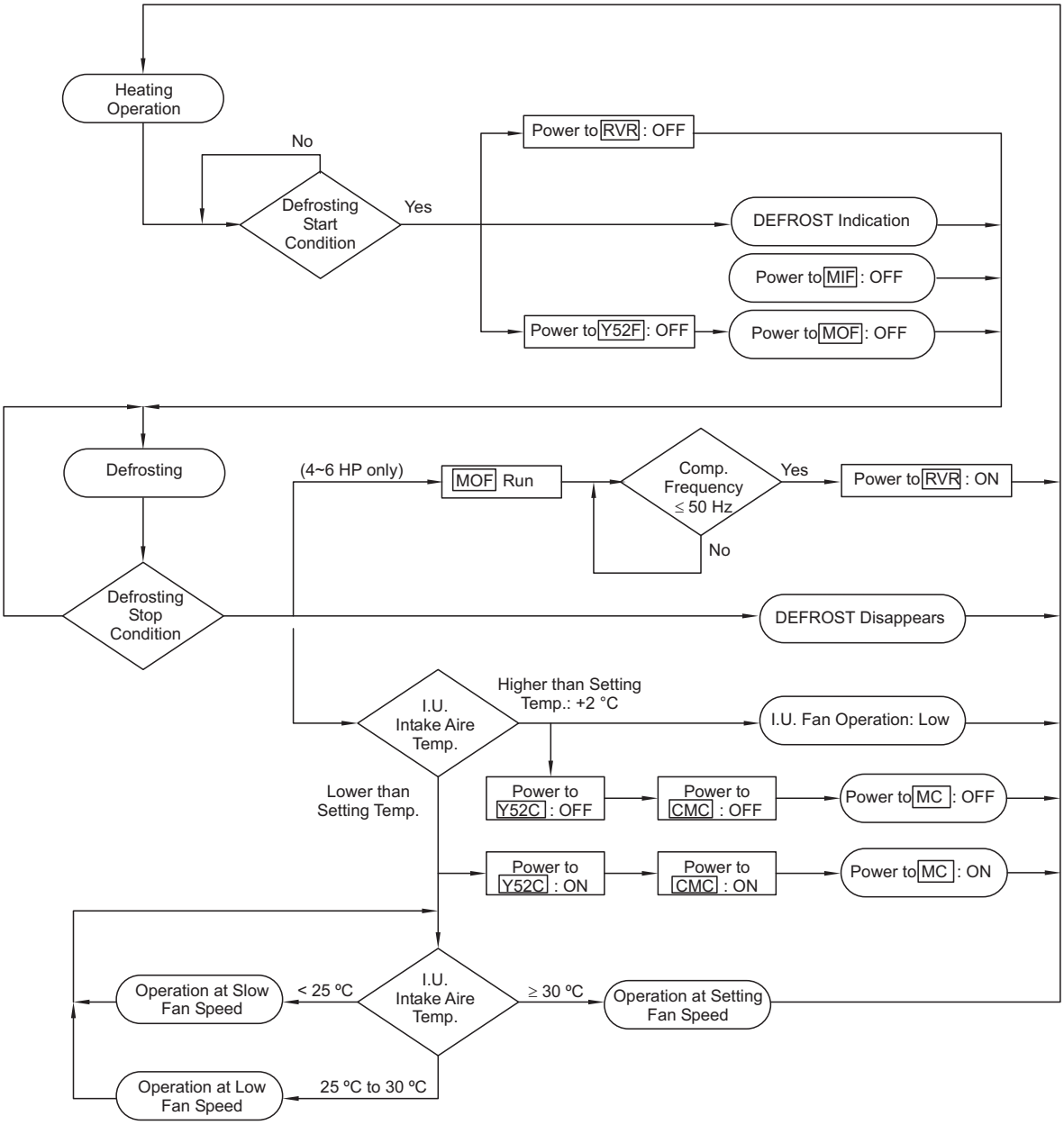
5.6.3. HEATING PROCESS



■ Heating process (cont.)

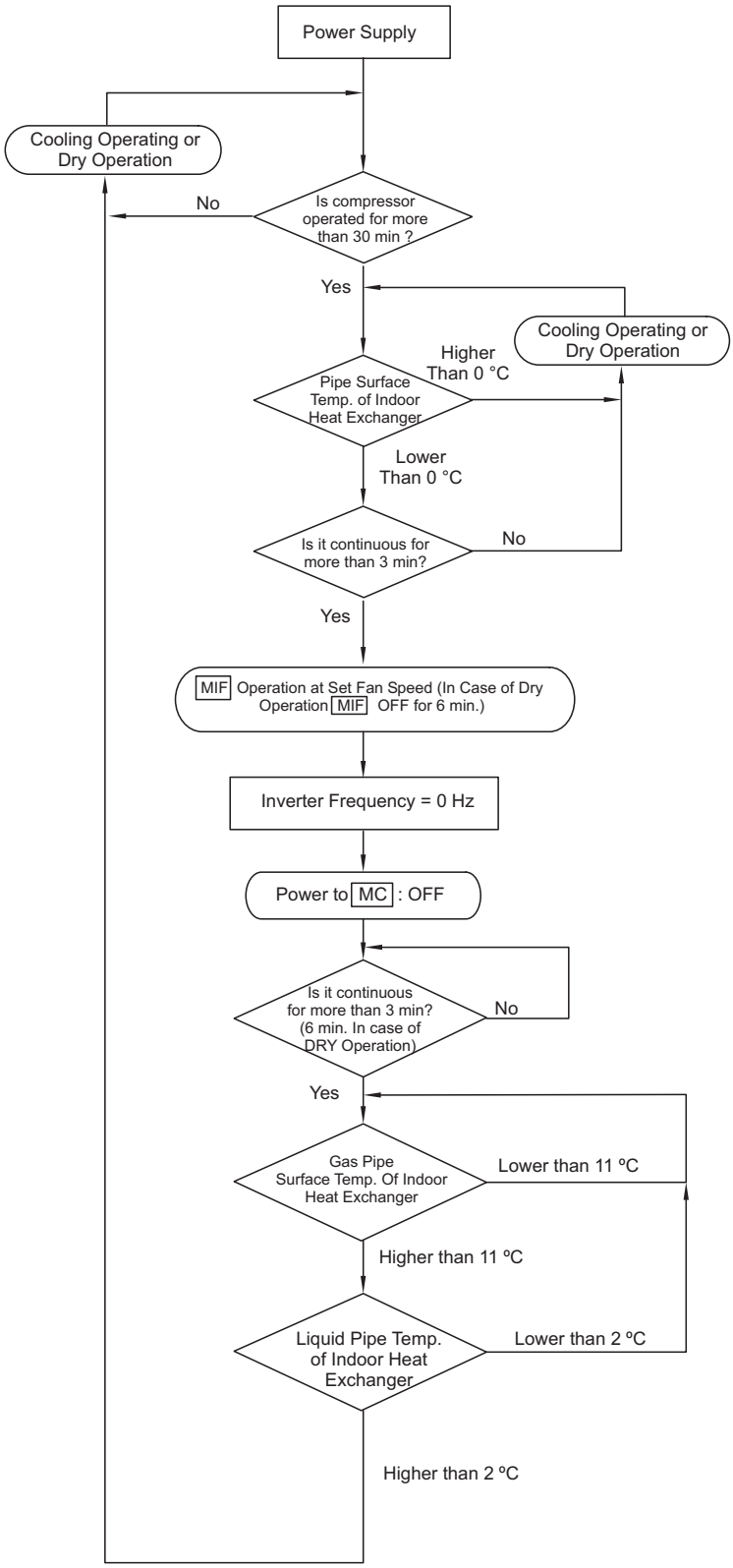


5.6.4. DEFROST OPERATION CONTROL

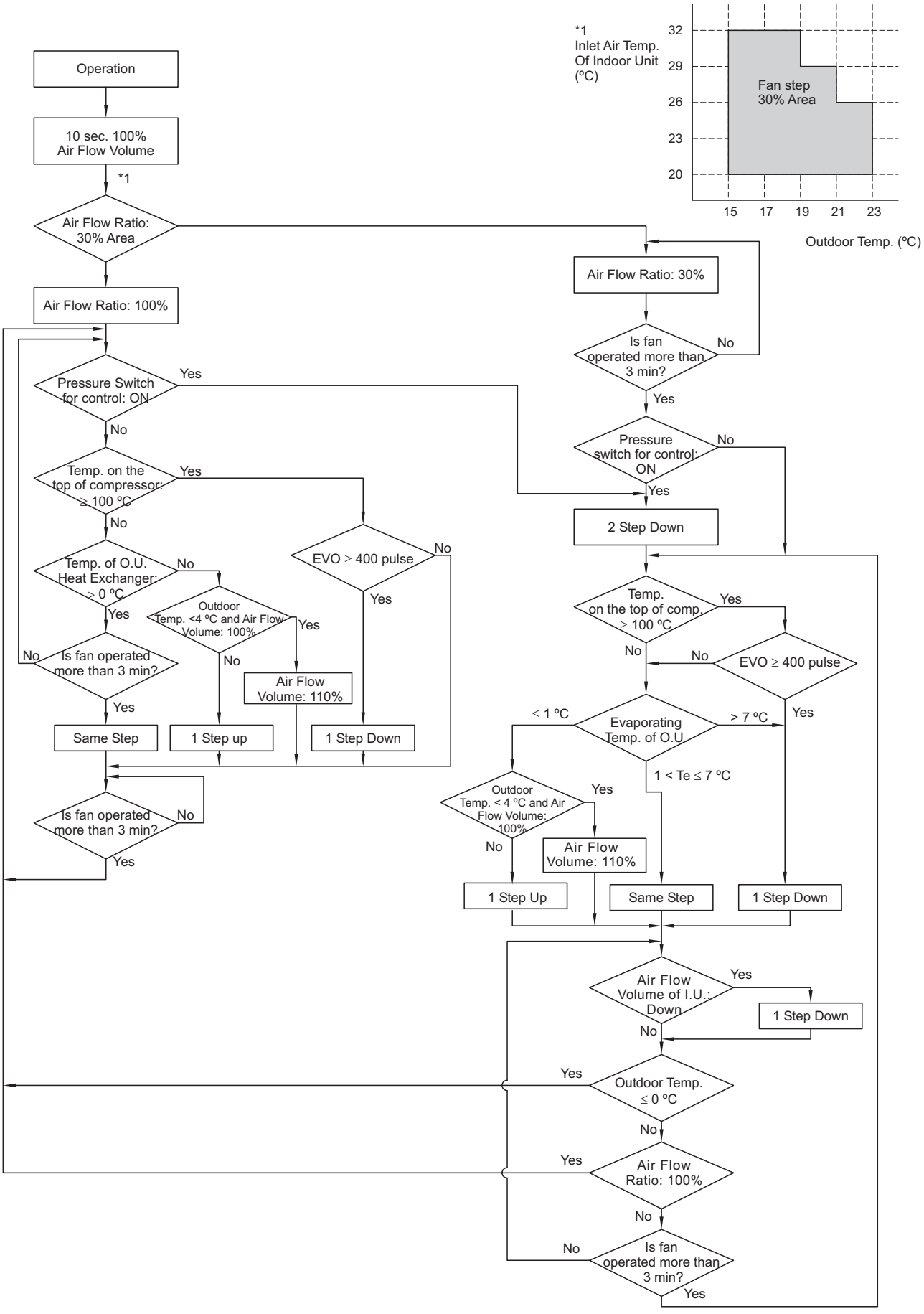


5.7. STANDARD CONTROL FUNCTIONS

5.7.1. FREEZING PROTECTION DURING THE COOLING PROCESS OR DRY OPERATION



5.7.2. OUTDOOR FAN CONTROL DURING HEATING OPERATION



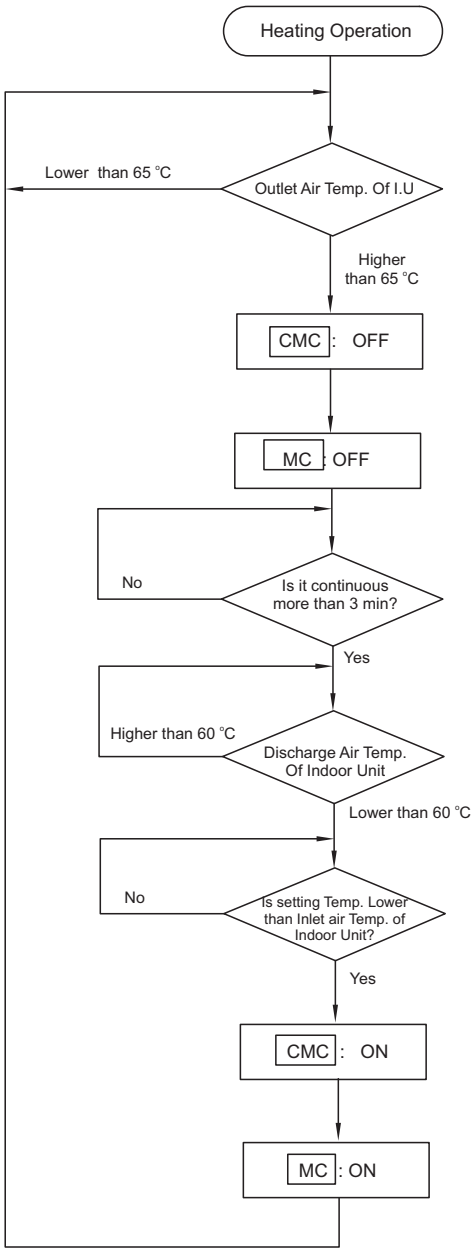
5.7.3. PREVENTION CONTROL FOR HIGH PRESSURE INCREASE

This function is performed to prevent the abnormal condition (Alarm: 02) when the outdoor air flow is decreased by a seasonal wind against air outlet.
When the CMC is ON during cooling operation, PSC is ON and Tc is ≥ than Tc1+4 °C (4/5HP) or Tc ≥ Tc1+ 3 °C and Compressor Top Temperature > 90 °C, forced thermo-off operation will be performed.

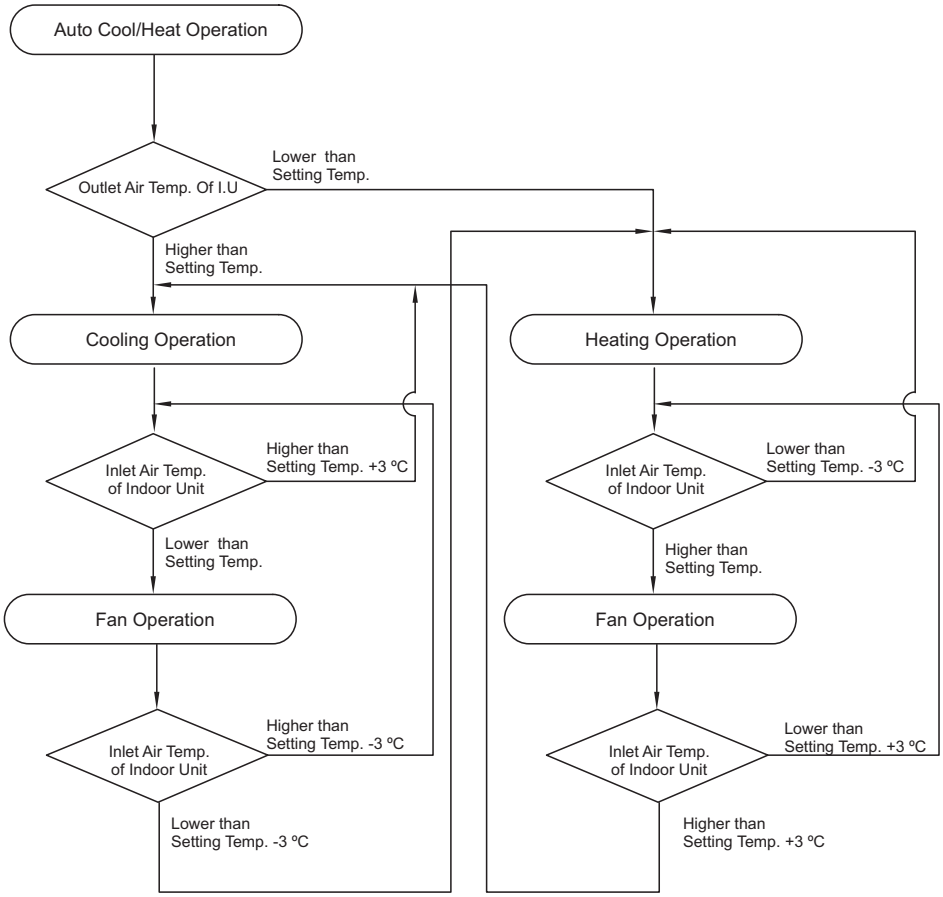
Tc: Outdoor Piping Temperature
Tc1: Outdoor Piping Temperature when PSC is ON
PSC ON:3.6 MPa, PSC OFF: 2.85 MPa

However, if it occurs more than 7 times during operation, forced thermo-off operation will not be performed.
Cause of stoppage will be 13.

5.7.4. PREVENTION CONTROL FOR EXCESSIVELY HIGH DISCHARGE GAS TEMPERATURE



5.7.5. CONTROL FOR THE AUTOMATIC COOLING/HEATING OPERATION



NOTE:

In case of twin system:

- *Thermo OFF when one unit reach the setting temperature*
- *Thermo ON when both units are:*
  - *Over set +3 °C for cooling*
  - *Lower set -3 °C for heating*
- *Change operation mode when both units reach:*
  - *Set -3 °C for cooling to heating*
  - *Set +3 °C for heating to cooling*

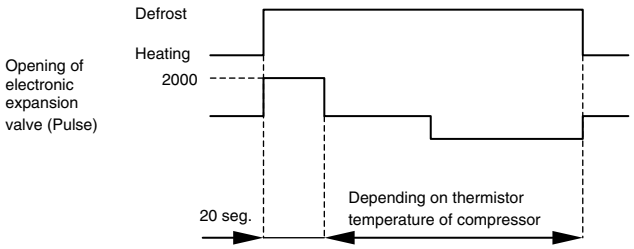
5.7.6. INDOOR UNIT ELECTRICAL EXPANSION VALVE CONTROL

1. After supplying power source, the electronic expansion valve is completely closed in order to initialize its opening
2. When the compressor is stopped, the electronic expansion valve is completely closed to adjust its opening
3. At starting operation (compressor is operated), opening of the electronic expansion valve is set at a specified opening.
   - Specified opening during cooling operation: 1 minute.
4. During heating operation, the electronic expansion valve is set at a specified opening.
5. During defrosting, the electronic expansion valve is set at a specified opening.
6. Normal opening of the electronic expansion valve (cooling operation)
   a. Set of target temperature Td0
      – Cooling operation: TdSH = 20K
   b. Simulation PI control for the electronic expansion valve
      The opening of the electronic expansion valve is controlled so that the thermistor temperature for the compressor can reach the target temperatures. The electronic expansion valve opening is controlled as shown in the below table when the unit is operated under a test run (cooling operation: Indoor Temperature 27 °C DB/ outdoor temperature 35 °C DB)

      Standard opening of indoor expansion valve for target temperature.

HVRNE		3 HP	4 HP	5 HP
Opening of Expansion Valve	pulse (%)	280 (14)	540 (27)	600 (30)

Time Chart



Td0 is compensated by the following conditions.
Td0 = Tds1+Td1+Td2+Td4
Tds1 = Target temperature at nominal cooling operation

HVRNE	3 HP	4 HP	5 HP
Tds1 (°C)	70	65	69

Td1: Influence of indoor inlet temperature (Ti)
Td1 = 0.25 x (Ti – 27)

Td2: Influence of outdoor inlet temperature (Ta)
- In case of 29°C<Ta; Td2=Ta – 35
- In case of 0°C ≤Ta≤29°C; Td2 = 5
- In case of Ta < 0°C; Td2 = 0.5 x (Ta – 5)

5.7.7. OUTDOOR UNIT ELECTRICAL EXPANSION VALVE CONTROL

1. After supplying power source, the electronic expansion valve is completely closed in order to initialize its opening
2. When the compressor is stopped, the electronic expansion valve is completely closed to adjust its opening
3. At starting operation (compressor is operated), opening of the electronic expansion valve is set at a specified opening.
   – Specified opening during heating operation: 1 minute.
4. During a cooling an defrosting operation, the electronic expansion valve is set at a specified opening.
5. Normal opening of the electronic expansion valve (heating operation)
   a. Set of target temperature Td0
   – Heating operation: TdSH = 20K
   The maximum target temperature is 90°C and the lowest temperature is 50 °C)
   b. Simulation PI control for the electronic expansion valve
   The opening of the electronic expansion valve is controlled so that the thermistor temperature for the compressor can reach the target temperatures. The electronic expansion valve opening is controlled as shown in the below table when the unit is operated under a test run (heating operation: Indoor Temperature 20 °C DB / outdoor temperature 7 °C DB)

   Standard opening of outdoor expansion valve for target temperature.

HVRNE		3 HP	4 HP	5 HP
Opening of Expansion Valve	pulse (%)	135 (28)	160 (33)	200 (41)

Td0 is compensated by the following conditions.

Td0 = Tds1 + Td1 + Td2 + Td3 + Td4 + Td5

Tds1 = Target temperature under nominal heating operation

HVRNE	3 HP	4 HP	5 HP
Tds1 (°C)	54	71	75

Td1: Influence of indoor inlet air temperature (Ti)
Td1 = (Ti – 20)

Td2: Influence of outdoor inlet air temperature (Ta)
Td2 = 0.25 x (Ta – 7)

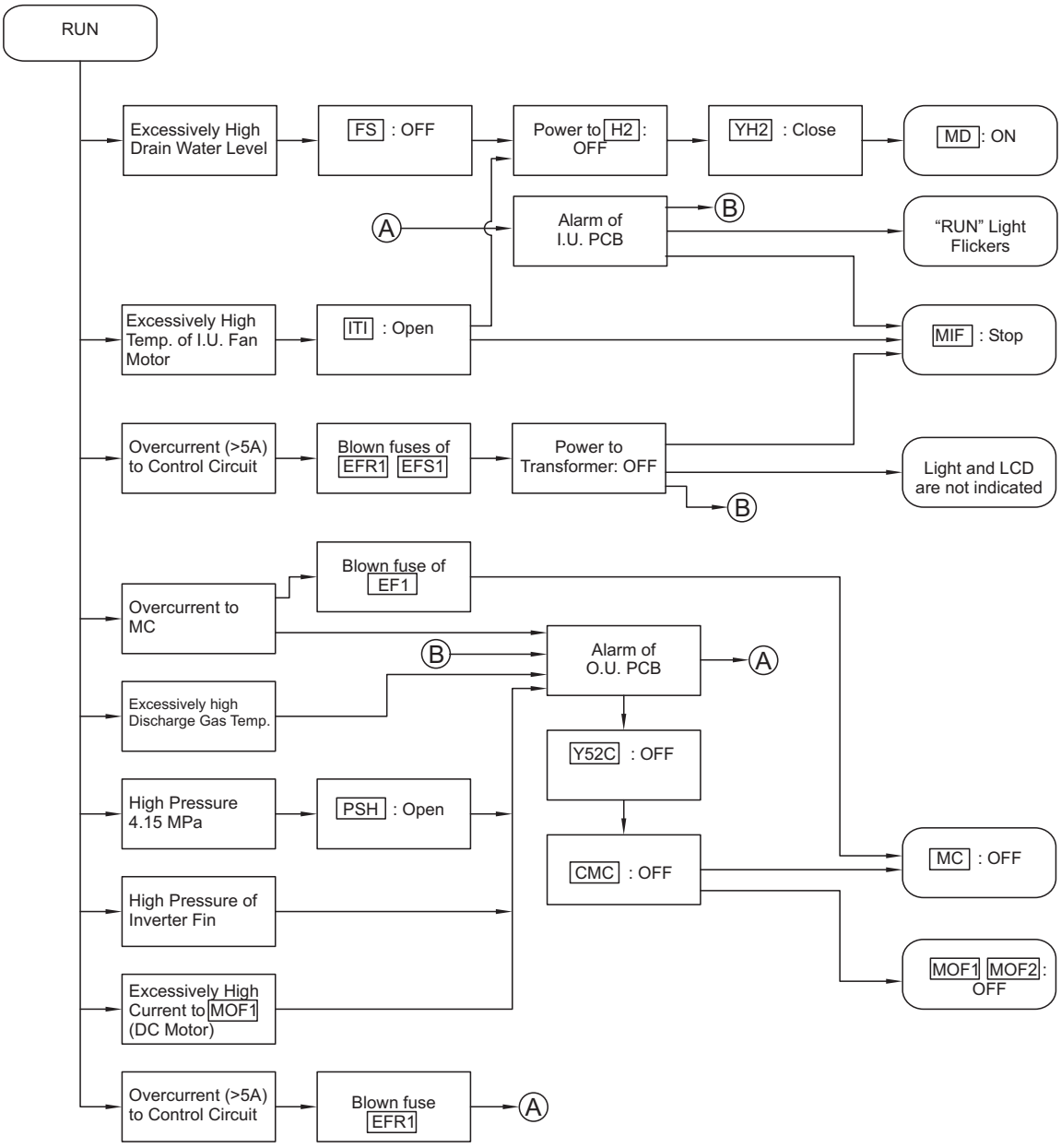
Td3: Influence of air flow for the indoor fan
at low fan speed wind (Lo) Td3 = 5
at medium fan speed wind (Me) Td3 = 3
at high fan speed wind (Hi) Td3 = 0

Td4: Influence of compressor frequency (Hz)
Td4 = 0.25 (4/5HP), 0.1 (3HP)

Td5: Influence by temperature conditions before defrosting operation

Outdoor pipe temperature (Te) ≤ temperature conditions before defrosting operation: Td5 = –10

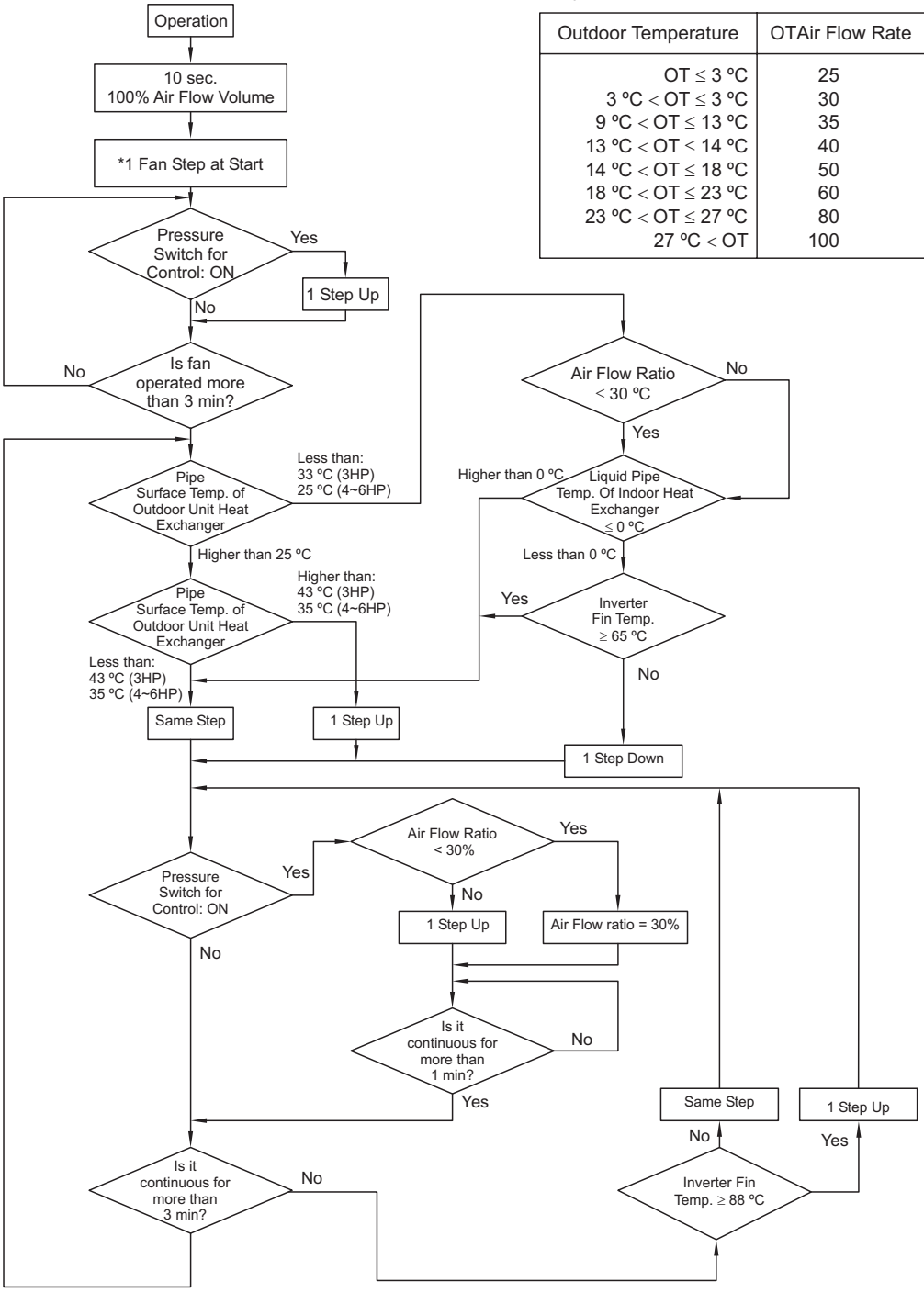
5.7.8. ACTIVATION FOR PROTECTION DEVICE



5.7.9. OUTDOOR FAN CONTROL DURING COOLING OPERATION

1* Fan step at start

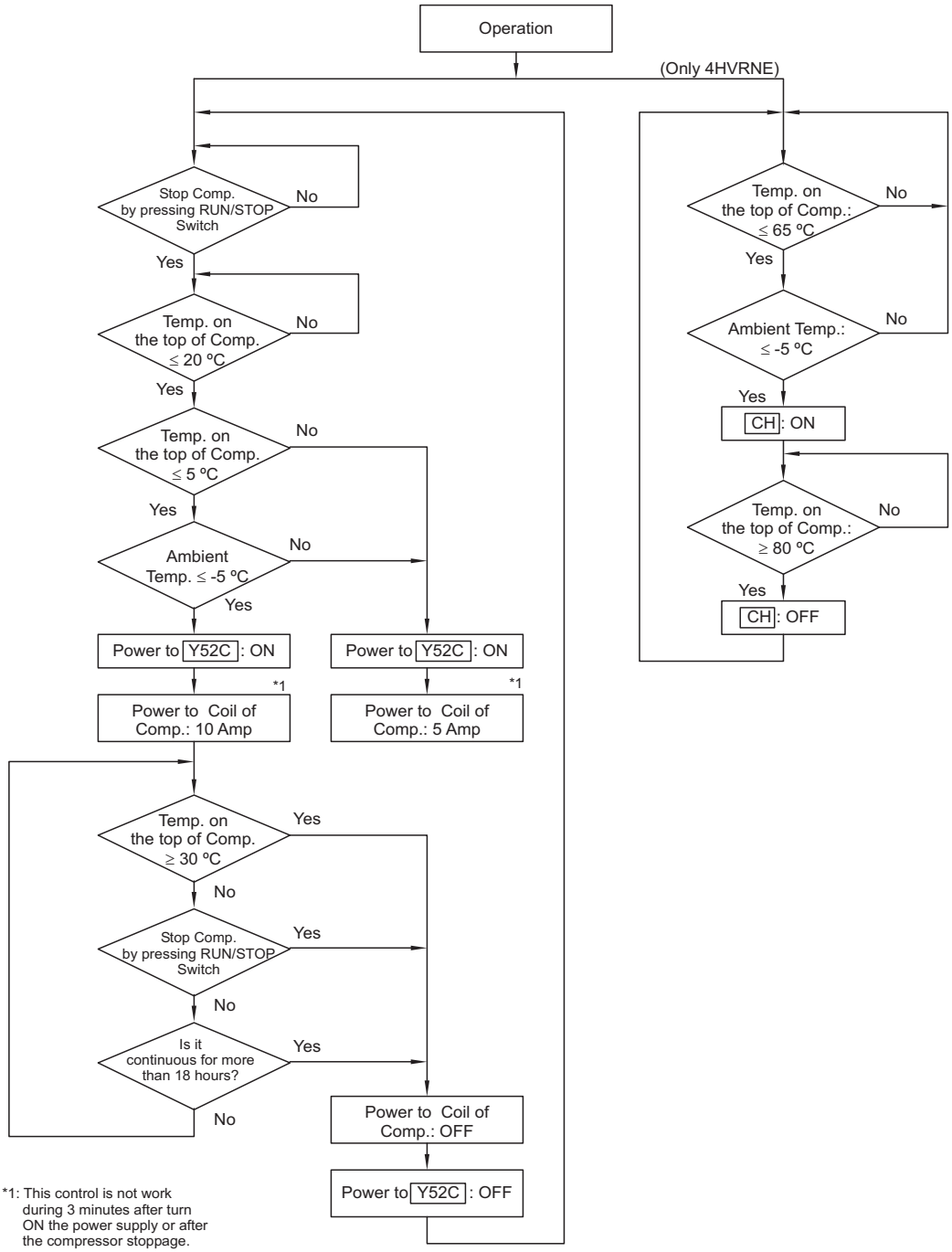
Outdoor Temperature	OTAir Flow Rate
OT ≤ 3 ºC	25
3 ºC < OT ≤ 3 ºC	30
9 ºC < OT ≤ 13 ºC	35
13 ºC < OT ≤ 14 ºC	40
14 ºC < OT ≤ 18 ºC	50
18 ºC < OT ≤ 23 ºC	60
23 ºC < OT ≤ 27 ºC	80
27 ºC < OT	100



NOTE:

1. *Td. (*1): temperature at the top of the compressor.*
2. *TD (*2): Td entered the suitable temperature area by means of PID control of expansion valve for plate heat exchanger as shown in the graph.*

5.7.10. PREHEATING CONTROL OF COMPRESSOR



*1: This control is not work during 3 minutes after turn ON the power supply or after the compressor stoppage.

6 AVAILABLE OPTIONAL FUNCTIONS

This chapter provides information about the optional functions available for the DC Inverter outdoor units and the complete range of Hitachi indoor units.

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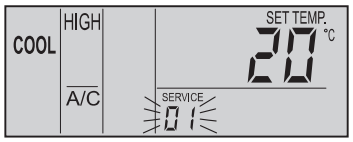
6.1. INDOOR UNIT (EXCEPT RPK)

6.1.1. INPUT SETTING AND OUTPUT SETTING OF THE CONNECTOR OF THE INDOOR UNIT PCB

For the external input signal and the external output signal, there are two input ports (CN3) and three output ports (CN7, CN8) on the indoor unit PCB.
If you are changing the factory setting, perform the following instructions by means of the PC-P1HE remote control.

- **Field setting mode**

  Make sure that the unit stops. Then, press the CHECK switch and the RESET switch on the remote control switch simultaneously for more than three seconds. Then, the remote control switch changes to the field setting mode. When the remote control switch is in the field setting mode, the SERVICE indication is displayed and "01" flickers below the SERVICE indication.



- **Input setting mode and output setting mode**

  In the field setting mode, which is described in the above item, press the TEMP ⓥ switch or the TEMP ⓒ switch. Then, the flickering number below the SERVICE indication changes (01 <=> 02).
  Set the flickering number at "02". Leave this condition for seven seconds or press the CHECK switch. Then, the remote control switch changes to the input setting mode or the output setting mode of the indoor unit.

- **Selection of the indoor unit**

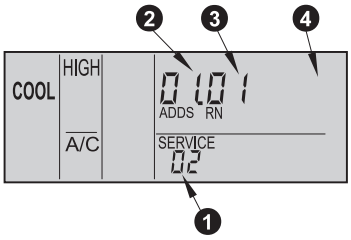
a. At the input setting mode and the output setting mode, the indication on the remote control switch changes as shown in the figure below.

❶ The 02 indication is turned ON.

❷ The address of the indoor unit, for which you need to set an optional function, is displayed at the segments of the time indication of the timer setting. The ADDS indication is displayed below.

❸ The refrigerant cycle number of the indoor unit for the input setting and the output setting is displayed at the segments of the time indication of the timer setting. The RN indication is displayed below.

❹ The setting temperature indication is turned OFF.



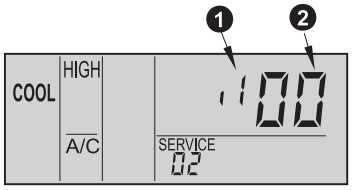
b. At the condition of the above item (a), press the TEMP ⓥ switch or the TEMP ⓒ switch of the remote control switch. Then, you can change the indoor unit for the input setting and the output setting.

NOTE:
You can select the indoor unit among the indoor units that are connected to the remote control switch.
If both the indication of the address and the indication of the refrigerant cycle number is AA, all the indoor units that are connected to the remote control switch are selected. In this case, you cannot perform the individual setting for each indoor unit.

c. After selecting the indoor unit, leave the condition for seven seconds or press the CHECK switch. Then, the remote control switch changes to the input setting mode and the output setting mode.

- **Setting procedures**

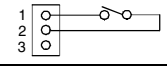
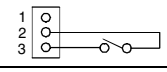
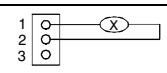
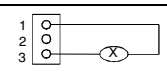
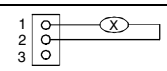
a. At the input setting mode and the output setting mode, the indication on the remote control switch changes as shown in the figure below.



❶ The allocated port for the input signal and the output signal is displayed at the segments of the time indication of the timer setting.
Refer to the table below for the displayed port and the connector of the indoor unit PCB.

❷ The codes of the input signal and the output signal are displayed at the segments for the setting temperature indication.
Refer to the table below for the displayed code, the input signal and the output signal.

Indications and settings of the ports

Indication	Settings of the port	Remarks
i1	1-2 of CN3 on the indoor unit PCB	
i2	2-3 of CN3 on the indoor unit PCB	
o1	1-2 of CN7 on the indoor unit PCB	
o2	1-3 of CN7 on the indoor unit PCB	
o3	1-2 of CN8 on the indoor unit PCB	

Indications, the input signals and the output signals

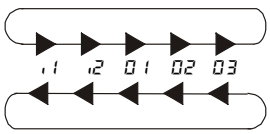
Indication	Input signal	Output signal
00	Not set	Not set
01	Control by means of the field-supplied room thermostat (cooling)	Operation signal
02	Control by means of the field-supplied room thermostat (heating)	Alarm signal
03	ON/OFF function 1 of the remote control	Cooling signal
04	ON/OFF function 2 of the remote control (operation)	Thermo-ON signal during the cooling
05	ON/OFF function 2 of the remote control (stop)	Heating signal
06	Cancellation of the commands from the remote control switch after the enforced stoppage	Thermo-ON signal during the heating
07	Setting of the cooling mode or the heating mode	Total operation signal of the heat exchanger
08	Input signal for the UP/DOWN grille (not available)	Output signal for the UP/DOWN grille (not available)

Factory setting

	Connector No.	Pin No. of connector	Function	Setting before the shipment
Input signal	CN3	#1-#2	03	ON/OFF function 1 of the remote control
		#2-#3	06	Cancellation of the commands from the remote control switch after the enforced stoppage
Output signal	CN7	#1-#2	01	Operation signal
		#1-#3	02	Alarm signal
	CN8	#1-#2	06	Thermo-ON signal during the heating

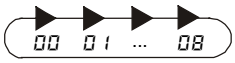
b. Press the Time ∇ switch or the Time Δ switch. Then, the port indication at the segments for time indication of the timer setting changes as shown below.
Select the port for allocating the input signal and the output signal.

When you are pressing the TIME Δ switch
When you are pressing the TIME ∇ switch



c. Press the CHECK switch. Then, the input signal code and the output signal code at the segments for the setting temperature indication changes as shown below.
Select the input signal and the output signal that you need to allocate to the port.

When you are pressing the CHECK switch



- **Selection of other indoor unit**

  At the optional setting mode, press the TEMP ⊙ switch or the TEMP ⊙ switch. Then, the condition of the remote control switch changes and you can select the indoor unit for the input setting and the output setting that is described in "Selection of the Indoor Unit".

- **Return from the input setting mode and the output setting mode**

  Press the RESET switch. The input setting and the output setting are memorized and the mode returns to the normal condition.

- **Specifications of the required components**

Component		Manufacturer or specifications	Remarks
Auxiliary relay (X1, X2)		OMRON Mini Power Relay Model: MY1F or equivalent	Voltage AC220V or AC240V
Changeover switch (SS2, SS3)		Manual type	
3-Pin connector cord		Optional part PCC-1A (capable of connecting the JST Connector XHP-3)	Five cords with connectors as one set
Cord (inside the unit)	Low voltage	0.3mm²	Less than 12V
	AC220V/AC240V class	0.5mm²	
Cord (outside the unit)	Low voltage	0.5mm²	Less than 12V
	AC220V/AC240V class	0.5mm²	

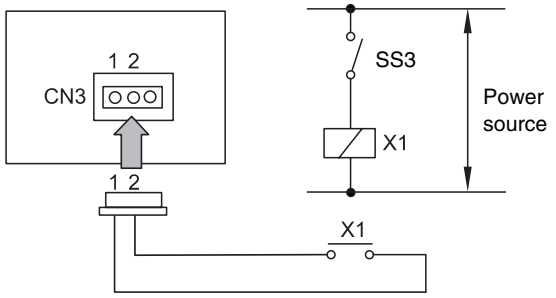
NOTE:
Make the CN3 wires as short as possible. Do not install the wires along the power supply wire of AC230V-AC400V. Install the wires separately at a distance of more than 30cm. (You can intersect the wires). If you install the wires along the power supply wire, insert the wires in a metal conduit tube and ground one end of a wire. The maximum wiring length is 70m. If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.

6.1.2. ON/OFF FUNCTION OF THE REMOTE CONTROL

This function provides a control to stop the system and to start the system from a remote place. There are two methods that use each signal from a BMS (Building Management System).

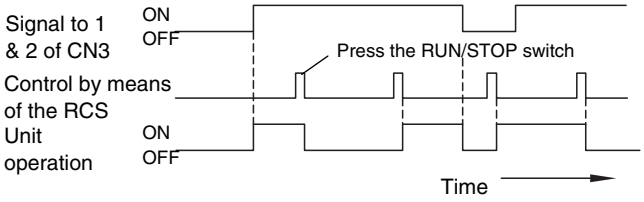
- **ON/OFF function 1 of the remote control (level signal input) 03**

  This is a remote ON/OFF function that uses the level signal (ON/OFF). The basic wiring and the time chart are shown below.
  You should set the function input 03 according to the section 6.1.1.
  (In case of "Remote Control 1", the signal input to #1 and #2 of CN3).



NOTE:
When you start the unit by means of the remote ON/OFF switch, the fan speed is subject to the mode that is memorized in the remote control switch.

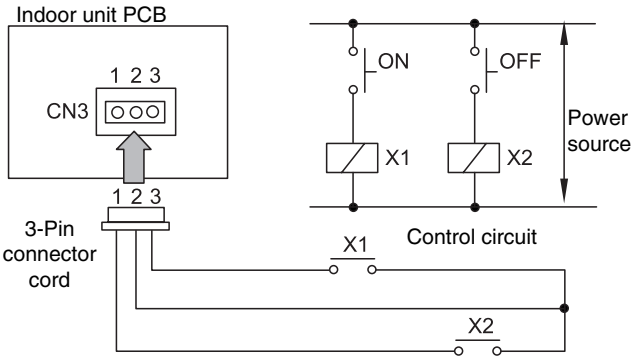
Time chart:



NOTE:
Operation priority is given to the remote ON/OFF signal or the signal the remote control switch that is given last.
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

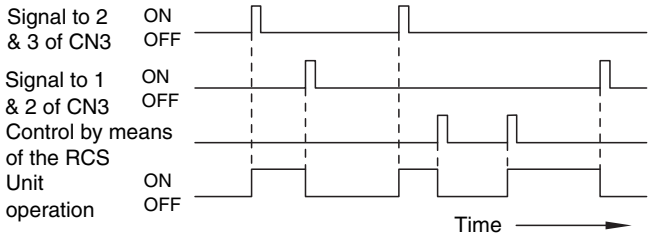
- **ON/OFF function 2 of the remote control operation 04 / stop 05 (pulse signal input)**

  This is a remote ON/OFF function that uses the pulse signal. The basic wiring and the time chart are shown below.
  You should set the function input 04 and the function input 05 according to the section 6.1.1.
  (In case of ON, the signal input to #2 and #3 of CN3; in case of OFF, the signal input to #1 and #2 of CN3).



NOTE:
The pulse width must be wider than 200ms.

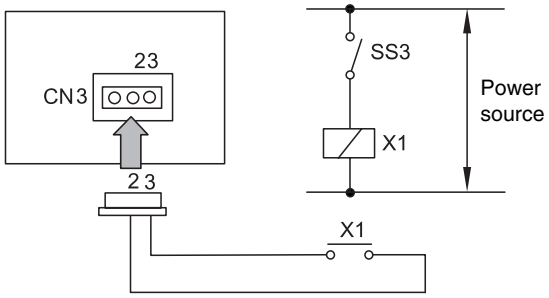
Time chart:



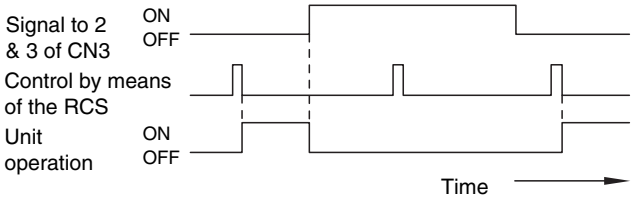
NOTE:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

6.1.3. CANCELLATION OF THE COMMANDS FROM THE REMOTE CONTROL SWITCH AFTER THE RENFORCED STOPPAGE 06

You can stop the air conditioning systems by means of the signal from a building management system. Then, the individual commands from the remote control switch are cancelled.
The basic wiring and the time chart are shown below.
The required parts are shown in section 6.1.1.
(In case of "Cancellation of the Commands from the Remote Control Switch after Enforced Stoppage Function 06", the signal input to #2 and #3 of CN3).



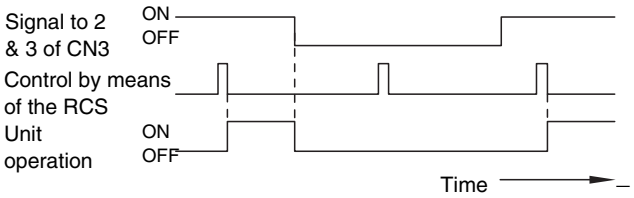
Time chart:



NOTE:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

At this function, you can use the B contact by means of the optional setting of the remote control switch. The time chart, which provides the information about when you can use the B contact, is shown below.

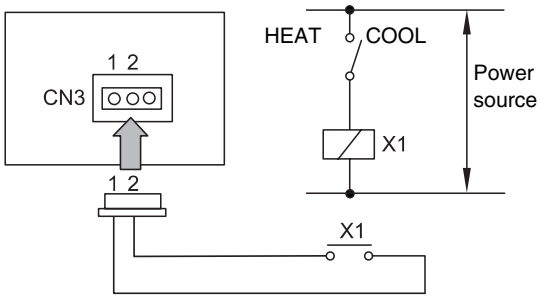
Refer to section 6.4 "Optional Functions available through RCS" for more details about the contact A and the contact B.



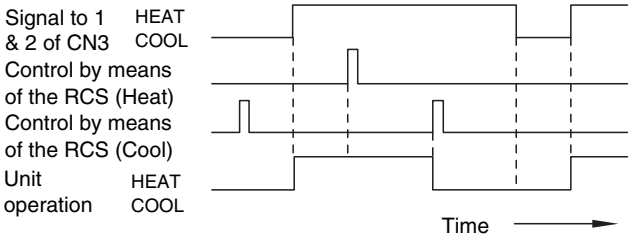
NOTE:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

6.1.4. SETTING THE COOLING MODE OR THE HEATING MODE 07

By means of this function, you can change the cooling mode or the heating mode by giving a contact signal from the outside to the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.
(In case of "Cooling or Heating Operation mode Setting Change by External Input", the signal input to #1 and #2 of CN3.

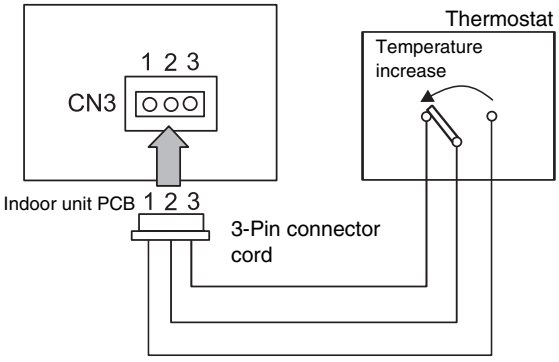


Time chart:



6.1.5. CONTROL BY MEANS OF A FIELD-SUPPLIED ROOM THERMOSTAT (0 1/02)

If you use a field-supplied room thermostat instead of the air inlet thermistor of the indoor unit, connect the wires as shown below. The required parts are shown in item 10.1.1. (In case of "Room Thermostat (Cooling) Function 01", the signal input to #2 and #3 of CN3; in case of "Room Thermostat (Heating) Function 02", the signal input to #1 and #2 of CN3).



Cooling process:	Compressor is ON by closing the terminal 2 and the terminal 3 at CN3. Compressor is OFF by closing the terminal 2 and the terminal 3 at CN3.
Heating process:	Compressor is ON by closing the terminal 1 and the terminal 2 at CN3. Compressor is OFF by closing the terminal 1 and the terminal 2 at CN3.

Component	Manufacturer or specifications
Thermostat	Equivalent to YAMAKATE R7031P005, R7031Q005

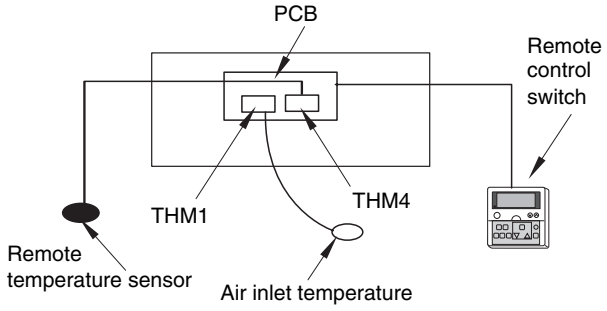
NOTE:

- *When you use a field-supplied room thermostat, select the specified thermostat as explained below:*
  Contactor load: DC12V
  Differential: more than 1.5 degrees
- *Do not use a thermostat that uses mercury.*
- *The remote control switch must remain connected to the unit. When the power supply is restored, you must start the unit by pressing the RUN button. The compressor will then operate under the control of the field-supplied thermostat. All other functions are controlled by the remote control in the usual way.*

6.1.6. CONTROL BY MEANS OF A REMOTE TEMPERATURE SENSOR

By using an optional remote temperature sensor, the following functionalities are available:

1. The unit is controlled by the average temperature of the air inlet thermistor and the remote temperature sensor.
2. If the discharge air temperature exceeds 60°C, the fan speed increases from Medium to High or from Low to Medium.



NOTE:

1. *You cannot use the remote temperature sensor together with the remote control thermistor. (Refer to section 6.4.2).*
2. *During the heating process, the function "Heating Temperature Calibration" is automatically cancelled. (Refer to section 6.4.2).*
3. *If you are using this remote sensor, select the location for installing the remote sensor according to the following requirements:*
   - *A location where the average room temperature can be detected.*
   - *A location where the thermistor (sensor) is not directly exposed to the sunlight.*
   - *A location where a heat source is not near the thermistor.*
   - *A location where the outdoor air that is caused by opening and closing the doors does not affect the room temperature.*

6.1.7. PICKING UP THE SIGNALS

By means of this function, you can pick up the signals that are displayed. These signals provide information about how the unit is working so that you can activate the necessary additional devices.

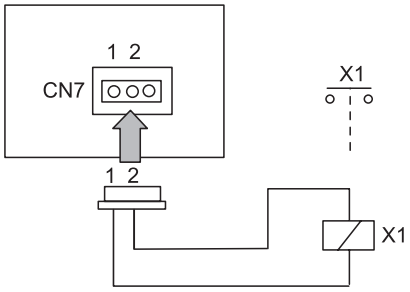
Required Parts for the Modification

Part name	Specifications / Model
Auxiliary relay*	OMRON High Power Relay Model LY2F DC12V
Connector cable	PCC-1A (3P connector cable)

*: Do not use the relay with the diode.

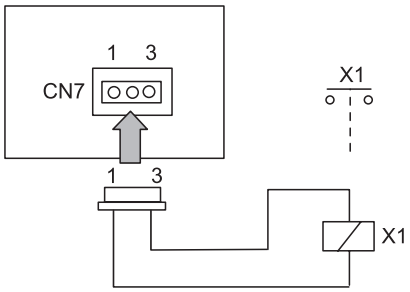
1. Picking up the operation signal (01)

You use this function in order to pick up the operation signal. By means of this function, you can check the operation signal at a remote place. You can also interlock the operation at the motor of the fresh-air intake fan. Connect the wires as shown below. Note that the contact of the auxiliary relay X1 is closed when this operation signal is given.
(If you are giving the operation signal to 1# and 2# of CN7).



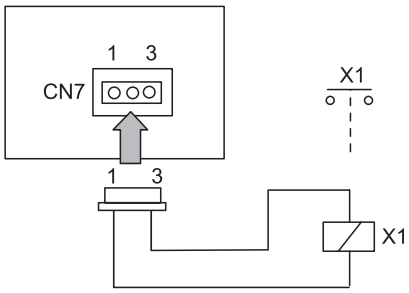
2. Picking up the alarm signal (02)

You use this signal in order to pick up the activation of safety devices. The signal is normally displayed on the remote control switch. However, this function is not available under abnormal transmission conditions. Connect the wires as shown below. Note that the contact of the auxiliary relay X1 is closed when one of the safety devices is activated.
(If you are giving the operation signal to 1# and 3# of CN7).



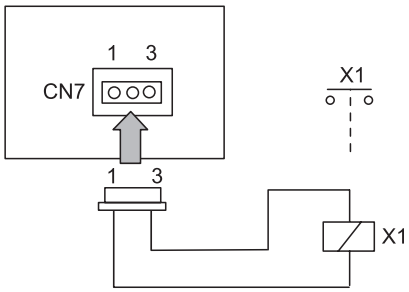
3. Picking up the cooling process signal (03)

You use this function in order to pick up the cooling process signal. The contact of the auxiliary relay X1 is closed when the cooling process signal is ON despite the Thermo-ON signal or the Thermo-OFF signal. Connect the wires as shown below.
(If you are giving the cooling process signal to 1# and 3# of CN7).



4. Picking up the Thermo-ON signal during the cooling process (04)

You use this function in order to pick up the Thermo-ON signal of the running compressor during the cooling process. Connect the wires as shown below.
The contact of the auxiliary relay X1 is closed when the THERMOSTAT indication is ON during the cooling mode.
(If you are giving the Thermo-ON signal to 1# and 3# of CN7 during the cooling process).

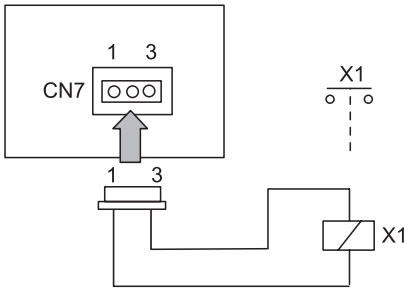


NOTE:

- *Thermo-ON indicates the microcomputer control function where the THERMOSTAT indication is ON as a thermostat.*
- *Refer to the item regarding the setting of the remote control switch for the wiring and the output signal.*

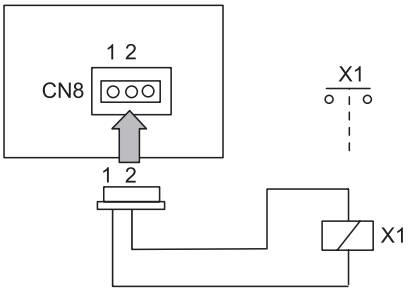
5. Picking up the heating process signal (05)

You use this function in order to pick up the heating process signal. The contact of the auxiliary relay X1 is closed when the heating process signal is ON despite the Thermo-ON signal or the Thermo-OFF signal. Connect the wires as shown below.
(If you are giving the heating process signal to 1# and 3# of CN7).



6. Picking up the Thermo-ON signal during the heating process (06)

You use this function in order to pick up the Thermo-ON signal of the running compressor during the heating process. You use this function in order to control a circulator or a humidifier. Connect the wires as shown below.
The contact of the auxiliary relay X1 is closed when the THERMOSTAT indication is ON during the heating mode. (If you are giving the Thermo-ON signal to 1# and 2# of CN8 during the heating process).



NOTE:
– *Thermo-ON indicates the microcomputer control function where the THERMOSTAT indication is ON as a thermostat.*

6.2. INDOOR UNIT (RPK ONLY)

The following table shows the available input signals and the available output signals:

		Setting option	Connector No.	Wireless		PC-P1HE optional function
				Pin No.	DSW2	
Inputs	1	Remote control 1 (level signal input)	CN4	2-3	ON 1 2 3 4 5 6 7 8	–
	2	Remote control 2 (pulse signal input)	CN4	1-2-3	ON 1 2 3 4 5 6 7 8	–
	3	Cancellation of commands RCS enforced stoppage	CN4	1-2	CUT JP2	–
	4	Remote cooling/heating mode changeover	CN4	1-2	–	–
	5	Operation when power supply is ON	–	–	ON 1 2 3 4 5 6 7 8	d1
	6	Restart function after the power failure	–	–	ON 1 2 3 4 5 6 7 8	d3
	7	Control by means of the field-supplied room thermostat	CN3	1-2-3	ON 1 2 3 4 5 6 7 8	–
Outputs	8	Picking up the operation signal	CN7	1-2	–	–
	9	Picking up the alarm signal	CN7	1-3	–	–

NOTE:
When the PC-P1HE is used, the power ON/OFF functions (5 and 6) are only available by means of the configuration (d1 and d3) of the remote control switch. The DSW2 is cancelled for this function.

All the other functions are set by the DSW2. The service 2 of PC-P1HE is not available for the RPK units.

6.2.1. REMOTE ON/OFF OPERATION (1/2)

This function provides a control to stop the system and to start the system from a remote place. There are two methods that use each signal from a BMS (Building Management System).

NOTE:
Operation priority is given to the remote ON/OFF signal or the signal of the remote control switch that is given last.

Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

When the remote device is controlling the unit, the operation mode is subject to the setting that is memorized in the remote control switch.

CAUTION:
Turn OFF the main switch before setting the DIP switches.

The specifications of the required components are the following:

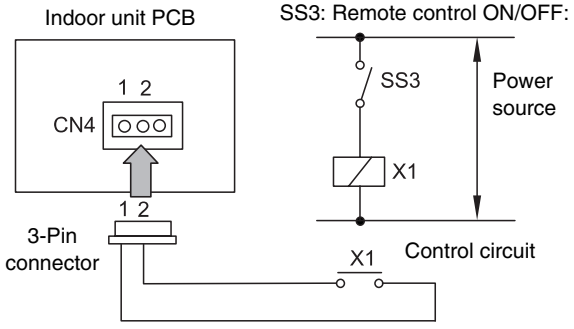
Component		Manufacturer or specifications	Remarks
Auxiliary relay (X1, X2)		OMRON Mini Power Relay Model: MY1F or equivalent	Voltage AC220V or AC240V
Changeover switch (SS2, SS3)		Manual type	
3-Pin connector cord		Optional part PCC-1A (capable of connecting the JST connector XHP-3)	Five cords with connectors as one set
Cord (inside the unit)	Low voltage	0.5mm²	Less than 12V
	AC220V/AC240V class	~0.5mm²	
Cord (outside the unit)	Low voltage	~0.5mm²	Less than 12V
	AC220V/AC240V class	0.5mm²	

NOTE:
Make the CN4 wires as short as possible. Do not install the wires along the power supply wire of AC230V-AC400V. Install the wires separately at a distance of more than 30cm. (You can intersect the wires). If you install the wires along the power supply wire, insert the wires in a metal conduit tube and ground one end of a wire. The maximum wiring length is 70m. If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.

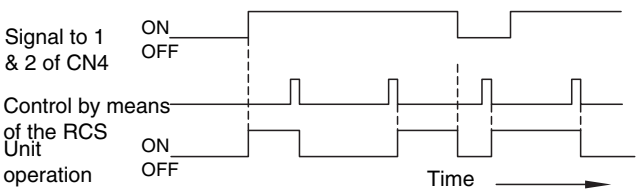
- **Remote control 1 (level signal input) (1)**

This is a remote ON/OFF function that uses the level signal (ON/OFF). The basic wiring and the time chart are shown below.

Example of Wiring Diagram of the Remote Control 1:



Time chart:

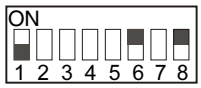


NOTE:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

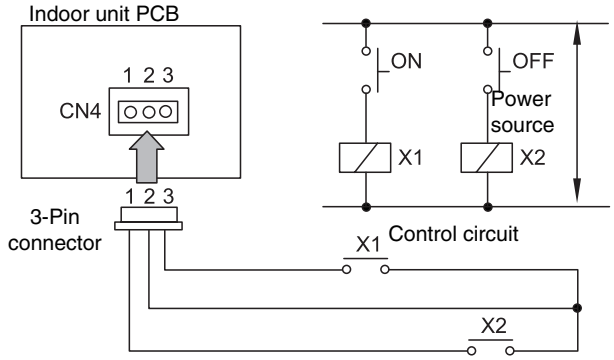
- **Remote control 2 (pulse signal input) (2)**

This is a remote ON/OFF function that uses the pulse signal. The basic wiring and the time chart are shown below.
Turn OFF the main switch before setting the DIP switch as shown below.

DSW2

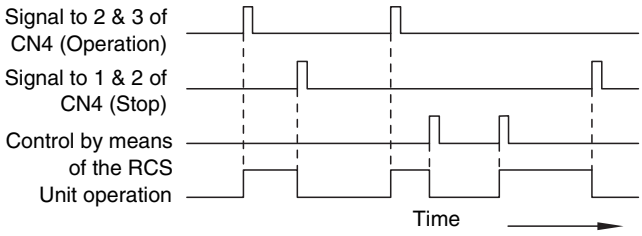


Example of wiring diagram of the remote control 2:



NOTE:
The pulse width must be wider than 200ms.

Time chart:



NOTE:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

6.2.2. CANCELLATION OF THE COMMAND FROM THE REMOTE CONTROL SWITCH AFTER THE ENFORCED STOPPAGE(3)

This function, which uses the level signal, provides a control to stop the system and to lock the remote control switch automatically from a remote place.

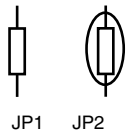
NOTE:

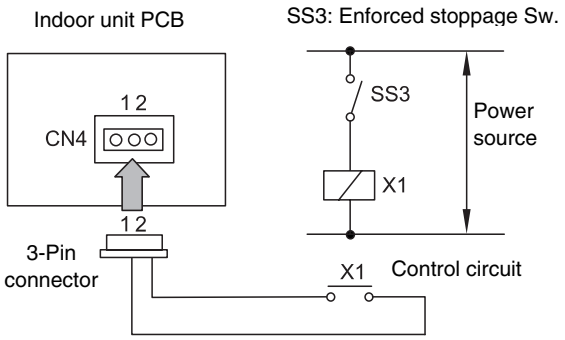
The specifications of the required components that are explained in the above section are applicable to this device too.

You cannot use this option with the function "Remote Control 1" and the function "Remote Cooling/Heating Mode ChangeOver".

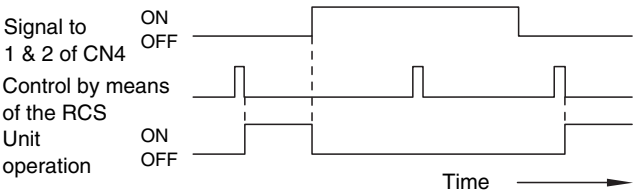
After setting #1 and #2 of CN4 to OFF, the unit remains stopped and the remote control switch is available.

The basic wiring and the time chart are shown below.
Turn OFF the main switch before cutting the jumper JP2 of the indoor unit PCB.





Time chart:



NOTE:

Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

6.2.3. REMOTE COOLING / HEATING MODE CHANGEOVER (4)

By means of a remote position, you can change the operation mode of the unit from the heating mode to the cooling mode and vice versa.
The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

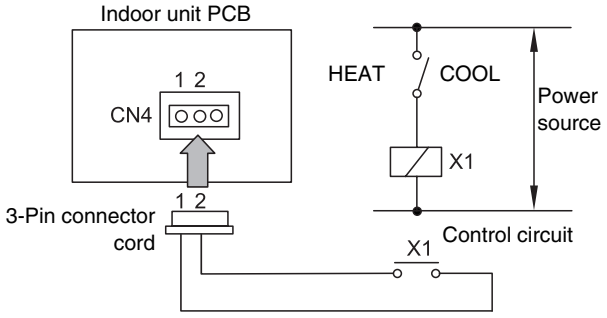
NOTE:

This option is only available for the heat pump models.

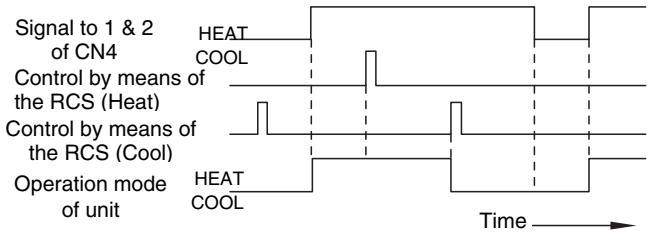
The specifications of the required components that are explained in the above section are applicable to this device too.

You cannot use this function together with the function "Remote Control 2" and the function "Cancellation of the Commands from the Remote Control Switch after the Enforced Stoppage".

Example of wiring diagram of the remote control 3:



Time chart:



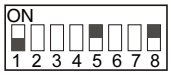
NOTE:

Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

6.2.4. AUTOMATIC OPERATION WHEN POWER SUPPLY IS ON (5)

If the power supply is interrupted for short periods of time (up to two seconds), the remote control switch will retain the settings. The unit will restart when the power supply is restored.

If the power supply is interrupted for periods of time that are longer than two seconds, the automatic restart is required. You can set the automatic restart by changing the setting of the DIP switches as shown below.



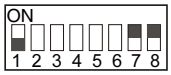
NOTE:

All the settings of the other DIP switches must correspond to the factory settings for the particular indoor unit.

The unit will start even if you turned OFF the unit before the power failure.

6.2.5. RESTART FUNCTION AFTER POWER FAILURE (6)

If the power supply is interrupted for short periods of time (up to two seconds), the remote control switch will retain the settings. The unit will restart when the power supply is restored. If the power supply is interrupted for periods of time that are longer than two seconds, the automatic restart is required. You can set the automatic restart by changing the setting of the DIP switches as shown below.



6.2.6. CONTROL BY MEANS OF THE FIELD SUPPLIED ROOM THERMOSTAT (7)

When you are operating the unit with a field-supplied room thermostat instead of the air inlet thermistor of the indoor unit, you should make the connections as shown below:

Heating:	Use the connections 1 & 2. (Only the heat pump models).
Cooling:	Use the connections 2 & 3.

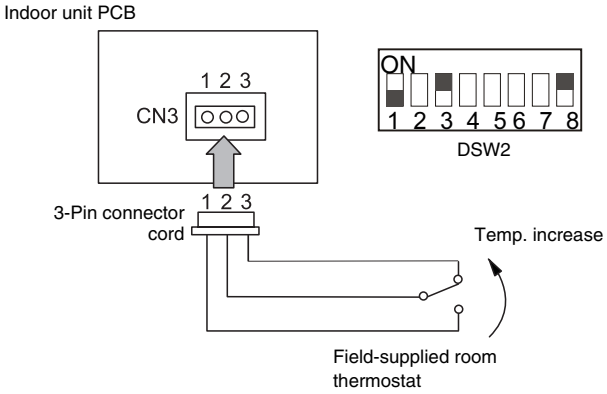
- When you are setting the DSW2, first turn OFF the main switch. Then, set the DIP switch. If you do not turn OFF the main switch and you set the DIP switch, the DIP switch will not function.
- The remote control switch must remain connected to the unit. When the power supply is restored, you must start the unit by pressing the RUN button. The compressor will then operate under the control of the field-supplied thermostat. All other functions are controlled by the remote control in the usual way.

Component	Manufacturer or specifications
Thermostat	Equivalent to YAMAKATE R7031P005, R7031Q005

NOTE:

– *When you use a field-supplied room thermostat, select the specified thermostat as explained below:*
Contactor load: DC12V
Differential: more than 1.5 degrees

– *Do not use a thermostat that uses mercury.*



6.2.7. PICKING UP THE SIGNALS

By means of this function, you can pick up the signals that are displayed. These signals provide information about how the unit is working so that you can activate the necessary additional devices.

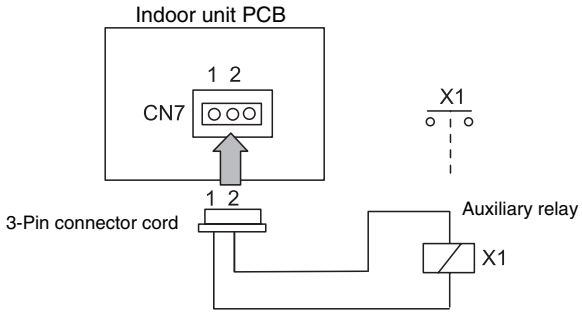
Required Parts for the Modification

Part name	Specifications / Model
Auxiliary relay*	OMRON High Power Relay Model LY2F DC12V
Connector cable	PCC-1A (3P connector cable)

*: Do not use the relay with the diode.

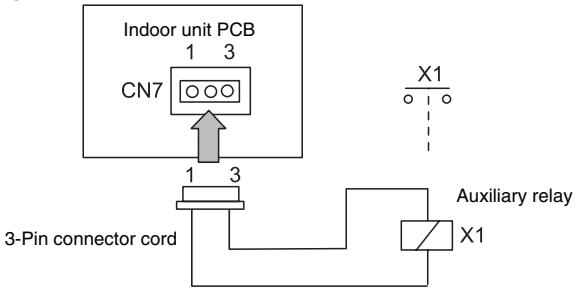
▪ Picking up the operation signal (8)

You use this function in order to pick up the operation signal. By means of this function, you can check the operation signal at a remote place. You can also interlock the operation at the motor of the fresh-air intake fan. When you turn on the unit, the auxiliary relay RY is energized by closing the contacts RYa.



▪ Picking up the alarm signal (9)

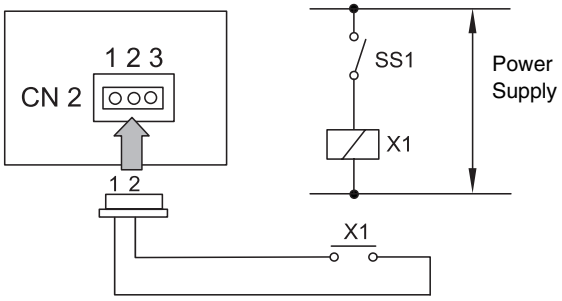
You use this option to provide a remote indication of a fault on the unit, in addition to the LED on the standard remote control. (RUN LED flickers 5 times/5 seconds). When a fault occurs, the auxiliary relay RY is energized and remains energized until you clear the fault and you reset the unit by means of the standard remote control. The details of the wiring are shown below.



6.3. OUTDOOR UNITS

6.3.1. DEMAND

In the case that the demand input terminals on the outdoor unit printed circuit board are short-circuited, compressor is stopped. (In this case, the indoor unit(s) is put under thermo-OFF condition).The stoppage code No. “d1-10” is given. By disconnecting the demand switch contact, restarting is
available.



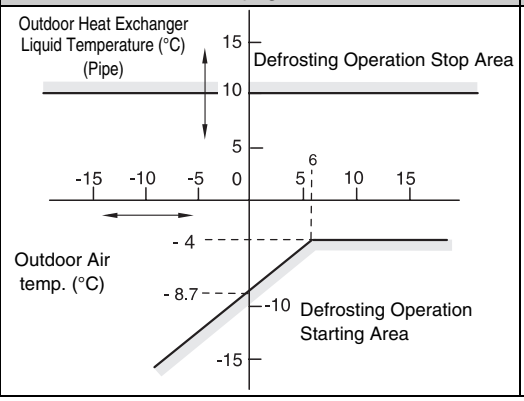
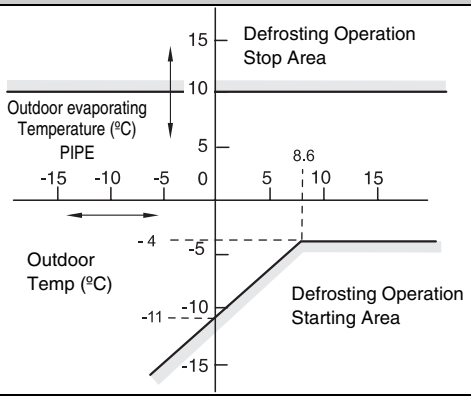
The specification required of Mainports is the following.

Parts		Specifications	Remarks
Auxiliary Relay (X1, X2)		Mini-Power Relay, MY1F (or 2F) made by OMRON	220/240V
Changeover Switch (SS1)		Manual Switch	220/240V
3 Pin Connector Cord		PCC-1A (connected to JST connector, XARP -3)	five cords with connectors as one set
Cord (inside of Unit)	Low Volt.	0.3mm²	lower than 24V
	220/240V	0.5~0.75mm²	
Cord. (outside of Unit)	Low Volt	0.5~0.75mm²	lower than 24V
	220/240V	2mm²	

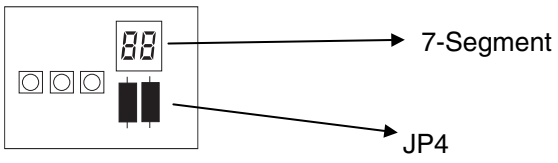
NOTE:
Make the wire to the terminals as short as possible. Do not run the wires along high voltage cable. (crossing is applicable.) If necessary to run wires along high voltage cable, insert the low voltage cable(s) into metal tube and ground it at one end. If sealed wires are used at the low voltage wire side, ground it at one end of shield wires. The maximum length should be 70m.

6.3.2. DEFROSTING CONDITION CHANGEOVER

By cutting of JP4, defrosting operation conditions can be changed.

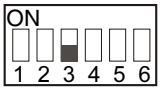
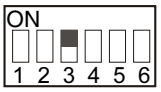
Jumper Wire	Standard Specification (Factory Setting)	Warm Climate Specification
	With JP4	Cut JP4
Defrosting Operation		

- **Outdoor Unit PCB**



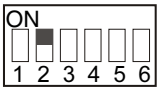
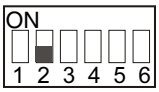
6.3.3. NIGHT SHIFT (LOW SOUND) OPERATION

The night shift (low sound) operation can be set by switching No. 3 pin of the dip switch to the “ON” position (only for cooling mode).

Dip Switch (DSW2)	
Standard Specification (Factory Setting)	Night Shift Mode (Low Sound)
	 Set No. 3 at “ON”

6.3.4. ENERGY SAVING OPERATION

In case of customer request energy operation, set the dip switch on the Outdoor printed circuit board as shown below.

Dip Switch (DSW2)	
Standard Specification (Factory Setting)	Energy Saving Operation
	 Set No. 2 at “OFF”

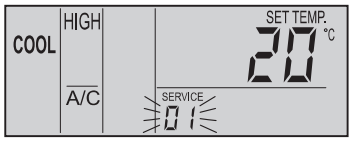
6.4. OPTIONAL FUNCTIONS AVAILABLE THROUGH REMOTE CONTROL SWITCH

6.4.1. OPTIONAL FUNCTIONS SETTING

The remote control switch is changed to the optional setting mode by the following procedures.

- **Field setting mode**

  Check to ensure that the unit is stopped, press the "CHECK" switch and the "RESET" switch on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode. When the remote control switch is at the field setting mode, the "SERVICE" is indicated and the "01" flickers below the "SERVICE" indication.

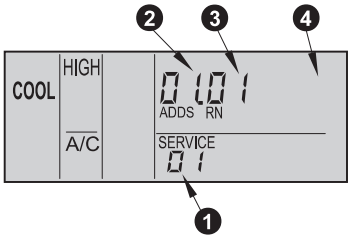


- **Optional setting mode**

  At the field setting mode as described in the above item, press the "TEMP ⌃" switch or the "TEMP ⌄ " switch and the number flickering below the "SERVICE" indication is changed (01 <=> 02). Set the flickering number at "01", leave this condition for 7 seconds or press the "CHECK" switch, and the remote control switch is changed to the optional setting mode.

- **Selection of indoor unit**

  a. At the optional setting mode, the indication on the remote control switch is changed as shown in the figure below.



  ❶ The indication of "01" is turned ON.

  ❷ The address of the indoor unit which the optional function is to be set, is indicated at the segments for timer setting time indication, and the "ADDS" is indicated below.

  ❸ The refrigerant cycle number of the outdoor unit for which the optional function is to be set is indicated at the segments for timer setting time indication and the "RN" is indicated below.

  ❹ The indication of the setting temperature is turned OFF.

  b. At the condition of the above item (a), press the "TEMP ⌄" switch or the "TEMP ⌃" switch of the remote control switch and the indoor unit for which the optional function is to be set, can be changed.

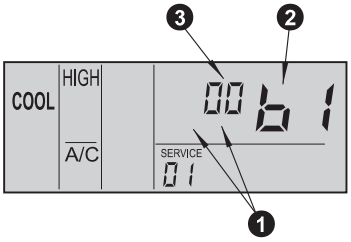
NOTE:

- *The indoor unit can be selected among the indoor units connected to the remote control switch.*
- *In case that both the indications of the address and the refrigerant cycle number is "AA", the settings of all the indoor units is same.*

c. After selecting the indoor unit, leave the condition for 7 seconds or press the "CHECK" switch, the remote control switch is changed to the optional setting mode.

▪ Changing the optional functions and setting conditions

a. At the optional setting mode, the indication on the remote control switch is changed as shown below.



❶ The indications of "ADDS" and "RN" are turned OFF.

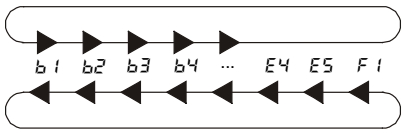
❷ The item number of the optional function is indicated at the segment for the setting temperature indication.

❸ The setting condition of the optional function item is indicated at the segments for timer setting time indication.

b. Press the "TIME ▽" switch or the "TIME △" switch; the optional function item is changed as shown below.

When pressing the "TIME △" switch

When pressing the "TIME ▽" switch



c. Press the "CHECK" switch, and the setting condition of the optional function is changed as shown below.

When pressing the "CHECK" switch

▪ Selection of other indoor unit

At the optional setting mode, press the "TEMP ▽" switch or the "TEMP △", the condition of the remote control switch is changed so that the Indoor Unit can be selected to set the optional function described before.

▪ Return from optional function setting mode

Press the "RESET" switch, the optional function setting is memorized and the mode is returned to the normal condition.

Setting items of optional functions

Items	Optional functions	Setting condition	Contents	Description
b1	Removal of heating temperature calibration	00 01	Not available Available	This function is used to eliminate the 4-ºC shift.
b2	Circulation function at heating Thermo-OFF	00 01	Not available Available	This function is to avoid the stratification of air.
b3	Enforced 3 minutes minimum operation time of compressor	00 01	Not available Available	This function is used to guard the compressor when it frequently starts and stops.
b4	Change of filter cleaning time	00 01 02 03 04	Standard 100 hours 1200 hours 2500 hours Not indication	With this function is possible to change the time when the remote controller advise about when is necessary to change the air filter.
b5	Fixing the operation mode	00 01	Not available Available	This function eliminates the possibility of changing operation mode.
b6	Fixing the setting temperature	00 01	Not available Available	This function eliminates the possibility of changing setting temperature.
b7	Fixing the operation as exclusive cooling unit	00 01	Not available Available	This function eliminates Heating mode.
b8	Automatic COOL/HEAT operation	00 01	Not available Available	This function changes automatically from cool to heat.
b9	Fixing the air volume	00 01	Not available Available	This function eliminates the possibility of changing fan speed.
C1	Not prepared			
C2	Not prepared			
C3	Not prepared			
C4	Drain pump in heating	00 01	Not available Available	This function is used to activate the drain pump in heating mode.
C5	Static pressure selection (RPI)	00 01 02	Medium static pressure (factory setting) High static pressure Low static pressure	This function is used to change the static pressure levels from the remote controller on the RPI units.
	Increasing fan speed (RCI and RCD)	00 01 02	Normal Increasing speed 1 Increasing speed 2	This function is used to change the fan speed due to the high ceiling.
C6	High speed at heating Thermo-OFF	00 01	Not available Available	This function is used to increase the fan speed when Thermo-OFF.
C7	Canceling the "Enforced 3 minutes minimum operation time of compressor"	00 01	Not available Available	This function is used to cancel the "Enforced 3 minutes minimum operation time of compressor".
C8	Thermistor of remote control switch	00 01 02	Control by indoor suction thermistor Control by thermistor of remote control switch Control by average value of indoor suction thermistor and thermistor of remote control switch	This function is used to control the unit with the thermistor of remote control.
C9	Not prepared			
CA	Not prepared			
Cb	Selection of forced stoppage logic	00 01	Forced stoppage input A contact Forced stoppage input B contact	With this function we select the forced stoppage logic.
CC	Not prepared			
d1	Power supply ON/OFF 1	00 01	Not available Available	This function retains the settings of the unit if power supply is interrupted. The unit will start when power is restored.
d2	Not prepared			

Items	Optional functions	Setting condition	Contents	Description
d3	Power supply ON/OFF 2	00 01	Not available Available	This function retains the settings of the unit if power supply is interrupted. The unit will restart when power is restored if the unit was ON before the power failure.
E3	Not Prepared			
E5	Not Prepared			
F1	Automatic setting for OFF timer	00 01 02 ~ 23 24	No function OFF timer by 1 hour OFF timer by 2 hours OFF timer by 23 hours OFF timer by 24 hours	This function is used to set the OFF timer function automatically when the unit is started by the remote control switch.
F2	Remote control main-sub setting	00 01	Main Sub	This function is used when to remote control are installed in one system.

NOTE:

- *As for the optional functions with "X" at the individual setting, only when the "All Rooms" is selected to set the optional function, the setting condition can be changed.*
- *The items "C1" and "C3" are not available. Do not change the setting condition "00".*

6.4.2. OPTIONAL FUNCTIONS OF REMOTE CONTROL SWITCH

1. Removal of heating temperature calibration (b1)

This function is utilized when the temperature settings of the remote control switch and the suction air temperature of the indoor unit are required to be equal.

In standard heating operation, the suction air temperature is higher than the room temperature, therefore the suction air temperature is calibrated -4°C.

(Indicated Setting Temperature = Suction Air Temperature -4°C → Return to 0 °C).

This is useful when the thermistor at the suction side of an Indoor Unit is removed and installed into another place.

The following table presents the indicated setting temperature and the suction air temperature after removal of heating temperature calibration.

Activation temperature			Set temperature on remote controller (°C)						
			18	20	22	24	26	28	30
Cooling		ON	–	22	24	26	28	30	32
		OFF	–	20	22	24	26	28	30
Heating	b1=00 Standard	ON	22	24	26	28	30	30	30
		OFF	24	26	28	30	32	32	32
	b1=01 After removal	ON	18	20	22	24	26	28	30
		OFF	20	22	24	26	28	30	32

2. Circulator function at heating thermo-off (b2)

In case that the fan speed is changed to "LOW" tap at heating Thermo-OFF, there is a case that the room air is stratified because warm air stagnates near the ceiling. In this case, it is recommended that the circulator function explained below be utilized.

<Circulator Function>

The function keeps the fan speed at Thermo-OFF at the same level as thermo-ON. In this case, air movement in the room will be kept on the same level as Thermo-ON, ensuring a homogenous air distribution. In the case that an Auto Louver is equipped, this operation will be also held on when the heating is turned Thermo-OFF.

NOTE:

Perceptions of coolness, heat and airflow are subject to personal tastes and behaviors. It is therefore recommended to discuss this with customers thoroughly and then to set the unit accordingly.

3. Enforced 3 minutes minimum operation time of compressor (b3)

When a compressor frequently starts and stops in short intervals, this function should be used to guard the compressor. By setting this function, the mode of a minimum 3 minutes operation will be added. (The mode of a minimum 3 minutes stoppage is standard.)

NOTE:

When the safety device is activated or the "ON/OFF" switch is pressed, the compressor is stopped immediately.

4. Change of filter cleaning time (b4)

The period for filter sign indication is set for each indoor unit model when shipping. The filter sign is indicated according to the filter cleaning time (Factory-Setting). However, this filter cleaning time can be changed depending on the condition of the filter as shown in the next table.

	Period for filter sign indication			
	Approx. 100 hrs	Approx. 1,200 hrs	Approx. 2,500 hrs	No indication
In case of 4-way cassette type	○	○	⊙	○
Liquid crystal display on remote control switch	01 b4	02 b4	03 b4 or 00 b4 ❖	04 b4

⊙: Factory-setting
○: Changed setting period
❖: In the case of RPK model, the factory setting is 200 hrs.

5. Fixing the operation mode (b5)

This function is utilized when changes in operation modes are not required. When this function is valid, the operation mode that has been set cannot be changed.

6. Fixing the setting temperature (b6)

This function is utilized when changes in setting temperature are not required. When this function is valid, the setting temperature that has been set cannot be changed.

7. Fixing the operation as exclusive cooling unit (b7)

This function is utilized when exclusive cooling operation is required. This function invalidates the heating operation and the automatic COOL/HEAT operation, as the operation of exclusive cooling unit.

8. Automatic COOL/HEAT operation (b8)

This function is utilized to operate the unit with changing cooling and heating operation automatically.
This function is invalid when the outdoor unit is cooling only model or the function of "Fixing Operation as Exclusive Cooling Unit" is valid.

9. Fixing the fan speed (b9)

This function is utilized to fix the fan speed. When this function is valid, the fan speed is not changes by the remote control switch.

10. Not prepared (C1)

11. Not prepared (C2)

12. Not prepared (C3)

13. Drain pump in heating (when the humidifier is installed) (C4)

This function is utilized to operate the drain pump in heating operation. However, in case of DC Inverter the indoor units do not have humidifier.

Do not change the setting condition "00" of the item "C4".

14. High speed (C5)

This function is utilized to increase the fan speed due to the high ceiling. (Only available for RCD Units)

15. High speed at heating Thermo-off (C6)

This function is utilized to increase the fan speed when thermo-OFF in heating operation with the function (14). (The fan speed is not increased when thermo-OFF in heating operation at the function (14) setting). (Only available for RCD Units)

16. Canceling the enforced 3 minutes minimum operation time of compressor (C7)

In case of SET-FREE, "Enforced 3 Minutes Minimum Operation Time of Compressor" described in the item (3) is the standard function.

This function is utilized to cancel the "Enforced 3 Minutes Minimum Operation Time of Compressor" function.

17. Thermistor of remote control switch (C8)

This function is utilized to control the unit by the built-in thermistor of the remote control switch (remote control thermistor) instead of the thermistor for suction air.

Set this function at "01" or "02" when utilizing this function.

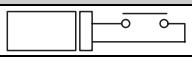
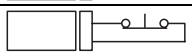
However, even when this function is set at "01" or "02", the detecting temperature is abnormal due to the failure of the remote control thermistor. etc., the thermistor to be used is changed to the thermistor for such air of the indoor unit automatically.

18. Not prepared

19. Not prepared

20. Selection of forced stoppage logic (Cb)

This function is utilized to select the logic of the contact for forced stoppage signal input. The setting condition and the logic of the contact are as shown below.

Setting condition	Logic of contact	Sequence	Activation	
			Contact "Open"	Contact "Close"
00	A Contact		Normal	Forced stoppage
01	B Contact		Forced stoppage	Normal

21. Not prepared

22. Power supply ON/OFF 1 (d1)

This function is utilized to start and stop the unit according to the power supply ON/OFF. When this function is utilized in the condition that there is no person to operate the unit, make the system with monitoring for disaster prevention.

NOTE:
The unit is started and stopped according to the power supply ON/OFF due to the power failure. When the power failure is occurred during stoppage by the remote control switch operation, the unit is started again automatically after the power supply is recovered.

23. Not prepared

24. Power supply ON/OFF 2 (d3)

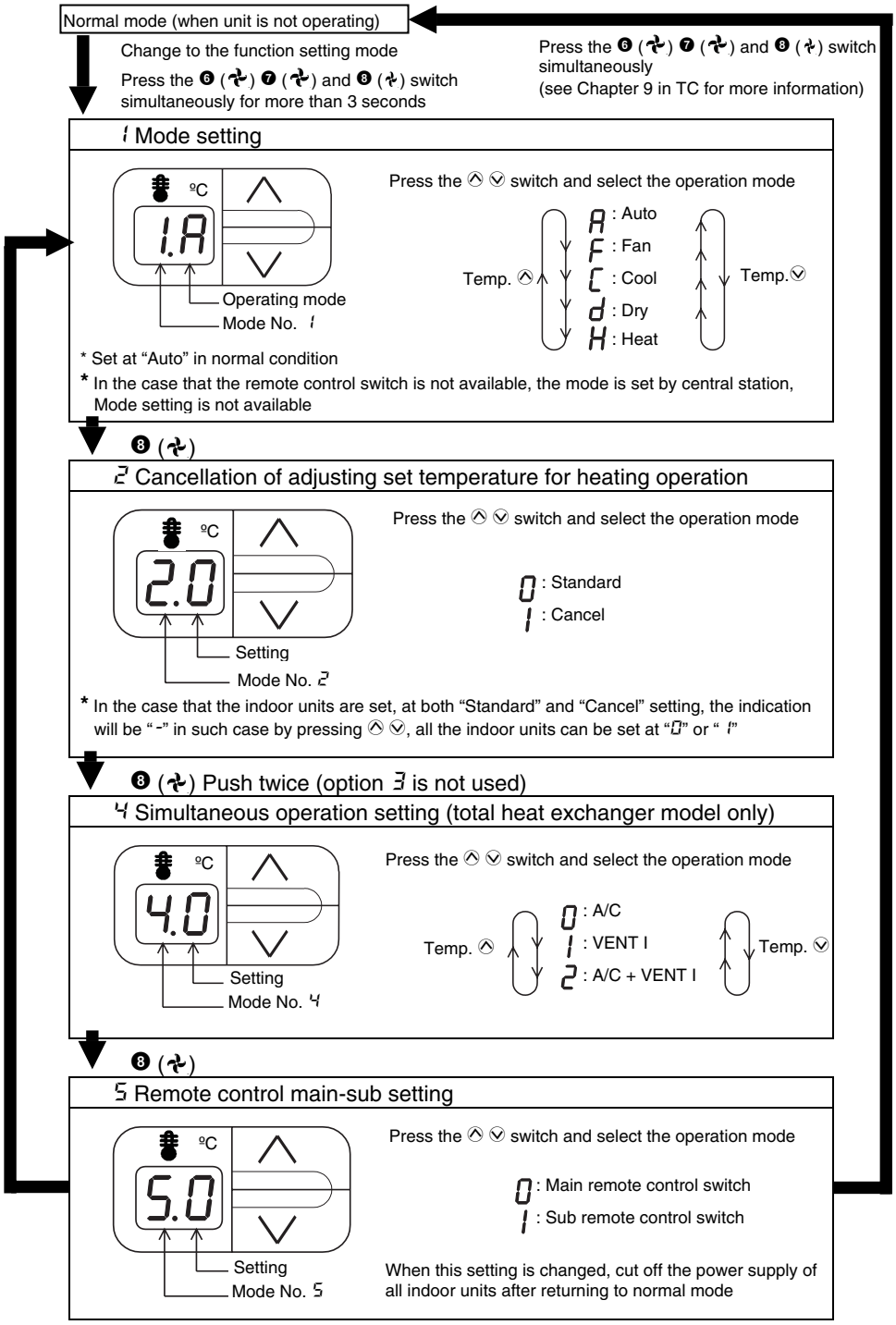
This function is utilized to start the unit operation again automatically when the power supply is recovered after the power failure over 2 seconds.

The standard unit is started operation again automatically with all the same operating conditions such as operation mode, etc. in case of the power failure within 2 seconds.

(The compressor unit is started operation again after three minutes guard in addition to 2 seconds power failure as a maximum.)

NOTE:
In case of power failure during the unit stoppage, the unit is stopped after recovering the power supply.

6.5. OPTIONAL FUNCTIONS AVAILABLE THROUGH REMOTE CONTROL SWITCH (PC-P5H)



6.6. OPTIONAL FUNCTIONS AVAILABLE THROUGH WIRELESS REMOTE CONTROL SWITCH (PC-LH3A + RECEIVER)

6.6.1. OPTIONAL FUNCTIONS

The following optional functions can be set by the DIP switches of the receiver part.

- **PC-RLH8/9/11**

Optional function	DIP switch			
	1	2	3	4
Setting of sub receiver part	○	-	-	-

CAUTION:
Turn OFF all the power sources before setting the DIP switches.

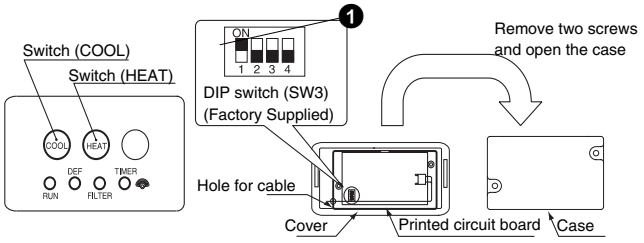
- **Setting of sub-receiver part**

For this optional function set pin marked with ❶ to ON.

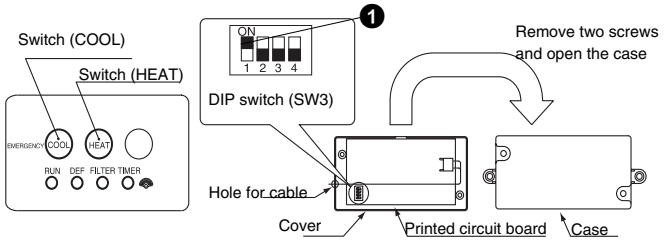
PC-RLH8/9/11

Open the lid of case by removing two screws so that the following functions are available.

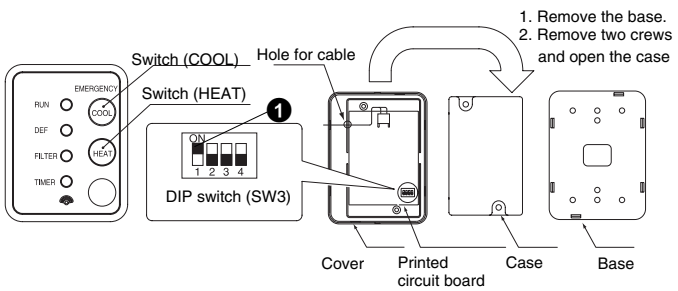
- **PC-RLH8**



- **PC-RLH9**



- **PC-RLH11**



7 TEST RUN

This chapter describes the procedures that you must follow to test run the DC Inverter Series air conditioning systems.

CONTENTS

7 TEST RUN _____ 1
7.1. Checking procedure before the Test Run _____ 2
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7.5. Checking to the refrigerant quantity _____ 8

When you have finished the installation, perform the test run according to the following procedure. After performing the test run, hand over the system to the customer. Perform the test run of the indoor units one by one in order. Make sure that the electrical wiring and the refrigerant piping are correctly connected.

Start the indoor units one by one in order to make sure that the indoor units are correctly numbered.

You should perform the test run according to the "7.2 Test Run Procedure" on the next page.

WARNING:

- *Do not operate the system until all the check points have been cleared.*
  a. *Measure the resistance between the ground and the terminal of the electrical components. Make sure that the electrical resistance is more than 1 MΩ. Otherwise, do not operate the system until you find the electrical leakage and you repair the electrical leakage. Do not impress the voltage on the terminals for transmission 1 and 2.*
  b. *Make sure that the stop valves of the outdoor unit are fully open. Then, start the system.*
  c. *Make sure that the switch on the main power source has been ON for more than twelve hours in order to warm the compressor oil by means of the oil heater.*
- *Pay attention to the following items while the system is running.*
  a. *Do not touch any of the parts at the discharge gas side with your hands because the compressor chamber and the pipes at the discharge gas side are hot at a temperature that is higher than 90°C.*
  b. *DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). If you do, you will cause a serious accident.*
- *Do not touch any electrical components for more than three minutes after turning OFF the main switch.*

7.1. CHECKING PROCEDURE BEFORE THE TEST RUN

1. Make sure that the stop valve of the gas line and the stop valve of the liquid line are fully open.
2. Make sure that there is no refrigerant leakage. The flare nuts sometimes loosen because of the vibration during the transportation.
3. Make sure that the refrigerant piping and the electrical wiring belong to the same system. Make sure that the setting of unit number of the DSW1 for the indoor units corresponds to the system.
4. Make sure that the setting of the DIP switches on the printed circuit board of the indoor units and the outdoor units are correct. Especially, pay attention to the setting of the lift between the indoor units and the outdoor units. Refer to chapter 3 "Electrical Wiring" for details.
5. Make sure that the switch on the main power source has been ON for more than twelve hours in order to warm the compressor oil by means of the oil heater.
6. Check whether or not the electrical wiring of the indoor units and the outdoor units are connected as shown in chapter 3 "Electrical Wiring".
7. Make sure that each wire terminal (L1, L2, L3 and N) is correctly connected at the power source.

NOTE:

1. *Make sure that the field-supplied electrical components (main switch fuse, fuse-free breaker, earth leakage breaker, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data in the technical catalog of the unit. Also, make sure that the field-supplied electrical components comply with the national codes and the local codes.*
2. *Use the shielded cables for the field wiring in order to avoid the electrical noise. (The length of the shielded cable should be less than 1000m. The size of shielded cable should comply with the local codes.)*
3. *Make sure that the terminals for the power supply wiring ("L1" to "L1" and "N" to "N" of each terminal board for AC380-415V. "R" to "R" and "T" to "T" of each terminal board for AC220V) and the terminals for the intermediate wires between the indoor unit and the outdoor unit (Operating Line: terminals of each terminal board for DC5V) coincide correctly. Otherwise, you may damage some components*

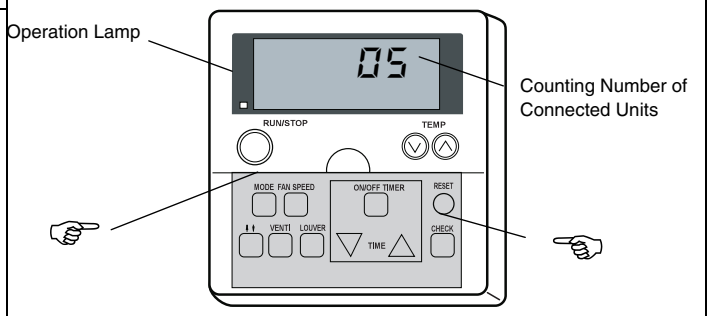
7.2. TEST RUN PROCEDURE BY MEANS OF THE REMOTE CONTROL SWITCH

❶ Turn ON the power source of the Indoor and Outdoor Units

❷ Set the TEST RUN mode by remote control switch.
Depress the "MODE" and the "CHECK" switches simultaneously for more than 3 seconds.

a) If "TEST RUN" and the counting number of the connected units to the remote control switch (for example "01") are indicated on the remote control switch, the connection of remote control cable is correct. Go to ❹

b) If no indication or "00" appear or the number of the units indicated is smaller than the actual number of the units, some abnormalities exist. Go to •



❸

Remote Control Switch Indication	Fault	Inspection Points after Power Source OFF
No indication	▪ The power source is not turned ON. ▪ The connection of the remote control cable is incorrect. ▪ The connecting wires of power supply line are incorrect or loosened.	1. Connection between the connector and the wires: Red wire-No. 1, Black wire-No. 2, White wire-No. 3 2. Connecting Points of Remote Control Cable 3. Contact of Connectors of Remote Control Cable 4. Connection Order of each Terminal Board 5. Screw Fastening of each Terminal Boards.
Counting number of connected units is incorrect	▪ The setting of unit number is incorrect ▪ The connection of control cables between each indoor units are incorrect. (When one remote control switch controls multiple units)	6. Dip Switch Setting on Printed Circuit Board 7. Wire Connecting Order of Bridge cable 8. Connecting Points of Bridge Cable 9. Contact of Connectors of Bridge Cable

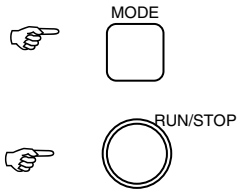
Back to ❶ after checking

❹ Select TEST RUN MODE by depressing MODE Switch (COOL OR HEAT)

❺ Depress RUN/STOP switch.

a) The "TEST RUN" operation will be started. (The "TEST RUN" operation will be finished after 2 hours unit operation or by depressing the RUN/STOP switch again).

b) IF the unit do not start or the operation lamp on the remote control switch is flickered, some abnormalities exist. Go to ❻



❻

Remote Control Switch Indication	Unit Condition	Fault	Inspection Points after Power Source OFF
The operation lamp flickers. (1 time/1 sec.) And the Unit No. and Alarm Code "03" flicker	The unit does not start.	The connecting wires of operating line are incorrect or loosened.	1. Connecting Order of each Terminal Boards. The fuse on the PCB may be blown out due to miswiring. (Can be recovered only once by the DSW on the PCB). (See ❼) 2. Screw fastening of each Terminal Boards. 3. Connecting Order of Power Line Between Indoor Units and Outdoor Unit.
The operation lamp flickers. (1 time/2 sec.)	The unit does not start.	The connection of remote control cable is incorrect	This is the same as item ❸ 1, 2, and 3
Indication of flicker different to above	The unit does not start, or start once and the stops	The connection of thermistor or other connectors are incorrect. Tripping of protector exists, or else.	Check by the alarm code table in the service manual (Do it by service people).
Normal	The outdoor fans rotate reversely	The connection order of power supply line is incorrect.	Connecting Order of the Terminal Board: TB1 in the Outdoor Unit
	The outdoor fans do not start.	Some wires of power supply line are disconnected.	Connecting Point of Power Supply Line. Contact Outdoor Fan Motor Connector.

Back to ❶ after checking

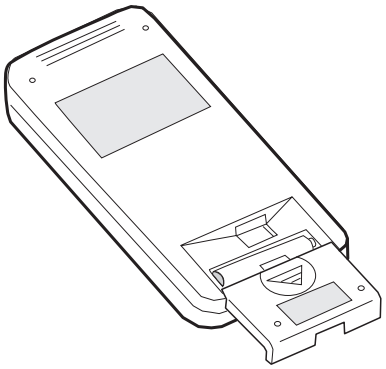
❼ Procedure for Recovery When Transmitting Circuit Fuse is Blown Out:
1. Correct the wiring for the terminal board.
2. Switch the 1st pin of the DSW7 on the Indoor PCB to "ON"
3. Switch the 2nd pin of the DSW7 on the Indoor PCB to "ON" (only for RPK).

Indoor PCB DSW7

Indoor PCB DSW7 RPK

7.3. TEST RUN PROCEDURE BY MEANS OF THE WIRELESS REMOTE CONTROL (PC-LH3A)

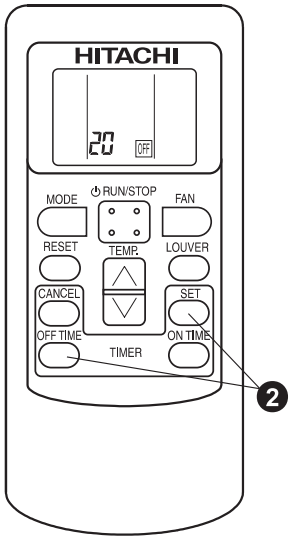
ATTENTION:
If the wired remote control switch is used or if multiple units (SET-FREE, DC INVERTER and UTOPIA Series) are operating simultaneously, you cannot perform the test run by means of the remote control switch. If that is the case, perform the test run by means of the wired remote control switch.



1) Perform the test run after completing the installation.
   a) Set the batteries for the remote control switch.
   b) Turn ON the power source of the indoor units and the outdoor units.
   c) The yellow '((•))' LED on the receiver of the indoor unit flickers (0.25 seconds ON ⇔ 0.25 seconds OFF). Then, the yellow LED turns OFF. While the LED is flickering, the unit will not operate because the unit is initializing.

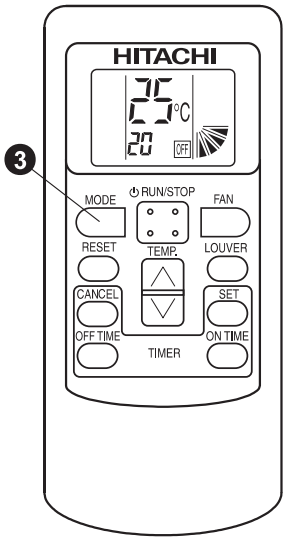
2) Set the TEST RUN mode by pressing the SET switch and the OFF TIME switch simultaneously for more than three seconds. The LCD should look like the LCD on the right figure.

   The TEST RUN mode is not operating.



3) Set the operation mode by pressing the MODE switch.

   The TEST RUN mode is operating.



4) Operate the test run by pointing the transmitter towards the receiver of the indoor unit. Then, press the RUN/STOP switch. When the indoor unit receives the commands, the yellow '((•))' LED of the receiver will turn on briefly.
   Make sure that the commands are received well and the selected mode 3) is set correctly.
   In the TEST RUN mode, the red RUN LED of the receiver is turned ON and the green TIMER LED flickers (0.5 seconds ON ⇔ 0.5 seconds OFF) (*2).
   Then, the timer switches off for two hours.

   NOTE:
   1. *If the yellow '((•))' LED does not turn ON, the commands from the remote control switch may not have reached the receiver. Send the commands again.*
   2. *(*2) In the case of the RPK model, the TIMER LED is turned OFF.*

5) Adjust the angle of the air grille as follows.
   The air louver has a mechanism for the auto-swing function.
   Do not move the louver by hand forcefully.
   a) Select the FAN mode by pressing the MODE switch.
   b) Set the louver angle by pressing the LOUVER switch.

6) Stop the test run (normal)
   a) The test run stops automatically after two hours.
   b) You stop the test run by pressing the RUN/STOP switch again.
   After the test run has finished, check that the red RUN LED and the green TIMER LED turn OFF.

7) Stop the test run (abnormal) for the PC-RLH 8/9/11.

If you cannot use the PC-LH3A because of battery shortage or any other reason, perform the emergency operation as follows.

(1) COOL switch: Press the COOL switch in order to start the cooling process.

Press the COOL switch again in order to stop the cooling process.

(2) HEAT switch: Press the HEAT switch in order to start the heating process.

Press the HEAT switch again in order to stop the heating process.

NOTE:
During the emergency operation, the yellow LED blinks (0.5 seconds ON / 0.5 seconds OFF).

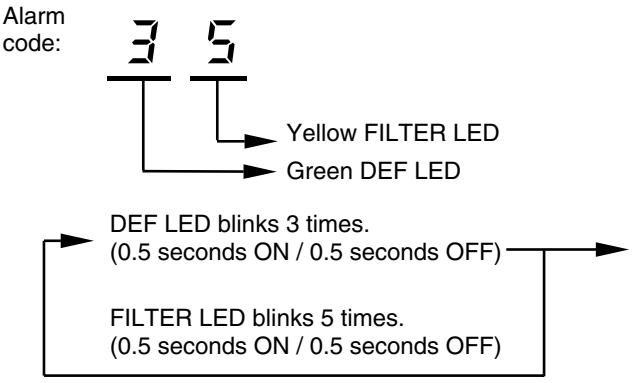
(3) Alarm code display

- If some malfunction occurs because of the activation of a safety device or any other reason, the red RUN LED blinks (0.5 seconds ON / 0.5 seconds OFF).
- Refer to the installation manual of the outdoor unit for the alarm code table.
- The alarm code displays the number of blinks of the green DEF LED and the yellow FILTER LED as shown bellow:

  Green DEF LED: Digit 2 of the alarm code blinks.

  Yellow FILTER LED: Digit 1 of the alarm code blinks. (Alphabet Code: A=10 blinks, B=11 blinks, C=12 blinks, etc.).

Example:



- The red RUN LED (1 second ON / 1 second OFF) means that there is an abnormal transmission between the indoor units and the outdoor units.

■ Test run and maintenance record

MODEL: **SERIAL NO.** **COMPRESSOR MFG. No.**

CUSTOMER'S NAME AND ADDRESS: **DATE:**

1. Is the rotating direction of the indoor coil fan correct?
2. Is the rotating direction of the outdoor coil fan correct?
3. Is there any abnormal compressor sound?
4. Has the unit been operating for at least twenty (20) minutes?
5. Check the room temperature:
   Inlet: No.1 DB /WB °C , No.2 DB /WB °C ,
   Outlet: DB /WB °C , DB /WB °C ,
6. Check the outdoor temperature:
   Inlet: DB °C , WB °C
   Outlet: DB °C , WB °C
7. Check the refrigerant temperature: Operation mode (cool or heat)
   Discharge gas temperature: Td= °C
   Liquid pipe temperature: Te= °C
8. Check the pressure:
   Discharge pressure: Pd= kg/cm^2G
   Suction pressure: Ps= kg/cm^2G
9. Check the voltage:
   Rated voltage V
   Operating voltage: L1-N or RT V
   Starting voltage: V
   Phase imbalance: $1 - \frac{V}{Vm} =$
10. Check the compressor input running current
    Input: kW
    Running current: A
11. Is the refrigerant charge adequate?
12. Do the operation control devices operate correctly?
13. Do the safety devices operate correctly?
14. Has the unit been checked for refrigerant leakage?
15. Is the unit clean inside and outside?
16. Are all the cabinet panels fixed?
17. Are all the cabinet panels free from rattles?
18. Is the filter clean?
19. Is the heat exchanger clean?
20. Are the stop valves open?
21. Does the drain water flow smoothly from the drain pipe?

NOTE:
Refer to chapter 8.2.1 for the alarm code table.

7.4. TEST RUN PROCEDURE FROM THE OUTDOOR UNIT SIDE

The procedure of test run from outdoor unit side is indicated below. Setting of this DIP switch is available with the power source ON.

Setting of Dip Switch (Before Shipment)

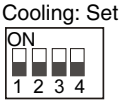
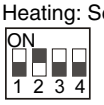
DSW1
Switch for Setting of Service Operation and Function    1. Test Run 2. COOL/HEAT Setting (ON: Heating Operation) 3. OFF (Fixed) 4. Manual Compressor OFF

WARNING:

Do not touch any other electrical parts when operating switches on the PCB.

Do not attach or detach service cover when the power source for the outdoor unit is ON and the outdoor unit is operated.

Turn all DIP switches of DSW1 OFF when the test run operation is completed.

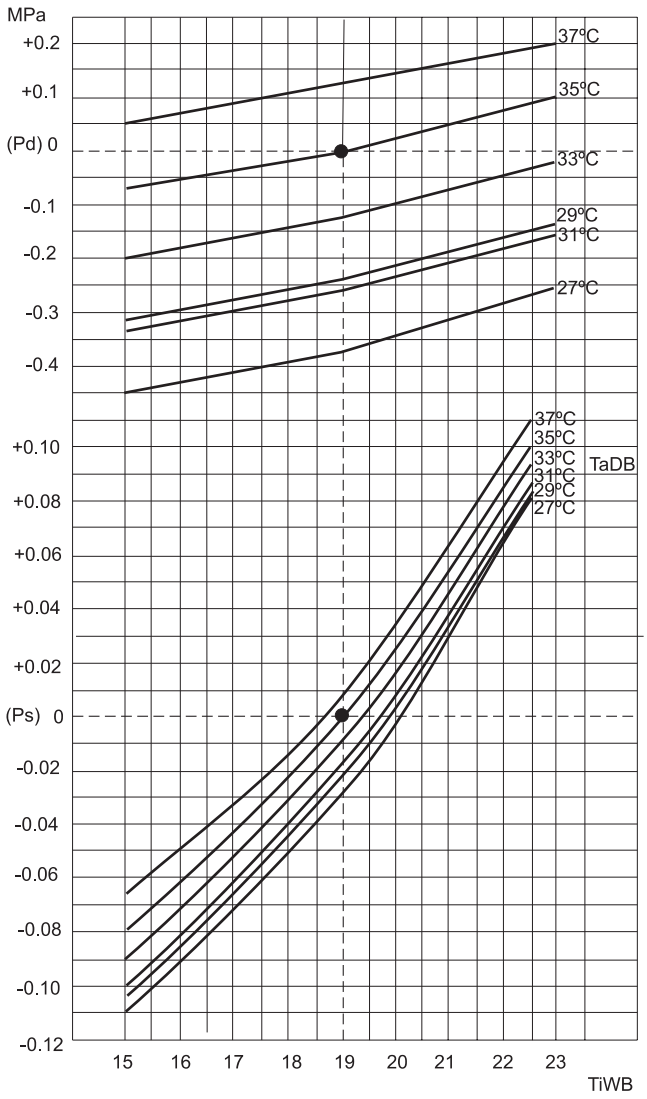
	Dip Switch Setting	Operation	Remarks
Test Run	❶ Setting of Operation Mode Cooling: Set DSW1-2 OFF.  Heating: Set DSW1-2 ON.  ❷Starting Test Run Set DSW1-1 ON and the operation is started after a few ~20 seconds.  When heating operation, leave DSW1-2 at ON  	❶ The indoor unit automatically start to operate when the test run of the outdoor unit is set. ❷ The ON/OFF operation can be performed from the remote control switch or DSW1-1 of the outdoor unit. ❸ Continuous operation during 2 hours is performed without Thermo-OFF.	Take care that the indoor units start operation in accord with the test run operation of the outdoor unit. The test run is started from the outdoor unit and stopped from the remote control switch, the test run function of the remote control switch is cancelled. However, the test run function of the outdoor unit is not cancelled In case that the plural indoor units are connected with one remote control switch, all the units start test run operation at the same time, therefore, turn the power source OFF for the indoor units not to operate test run. In this case, the "TEST RUN" indication of the remote control switch may flicker, and this is not abnormal. The setting of DSW1 is not required for the test run from the remote control switch.
Manual OFF of Compressor	❶ Setting -Compressor Manual OFF: Set DSW1-4 ON.  -Compressor ON: Set DSW1-4 OFF.  	❶ When DSW1-4 is ON during compressor operation, the compressor stops to operate immediately and the indoor unit is under the condition of Thermo-OFF. ❷ When DSW1-4 is OFF, the compressor starts to operate after the cancellation of 3-minutes guard.	Do not repeat compressor ON/OFF frequently.
Manual Defrost	❶ Manual Defrost Operation Starts Press PSW1 for more than 3 seconds during heating operation, the defrost operation is started after 2 minutes.This function is not available within 5 minutes after starting heating operation ❷ Manual Defrost Operation Finishes Defrost operation is automatically ended and the heating operation is started.	❶Defrost operation is available regardless of frosting condition and total time of heating operation. ❷Defrost operation in not performed when the temperature of outdoor heat exchanger is higher than 10°C, high pressure is higher than 3.3MPa (33kgf/cm^{2}G) or Thermo-OFF.	Do not repeat defrost operation frequently.

7.5. CHECKING TO THE REFRIGERANT QUANTITY

You can check the excess or the deficiency of the refrigerant in comparison with the following chart and actual pressure measurement The following checking procedure is useful during test run and maintenance work.

■ Checking procedures

Cooling process



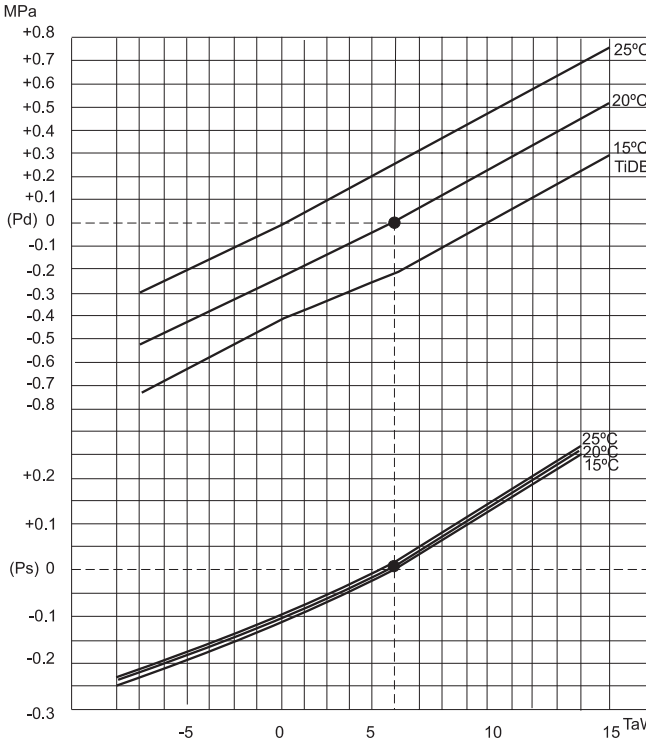
(MPa)

HP Outdoor units	Indoor units	
	Pd	Ps
RAS- 3.HVRNE	2.86	0.97
RAS- 4.HVRNE	2.75	0.96
RAS- 5.HVRNE	2.86	0.90
RAS- 6.HVRNE	2.94	0.89

Frequency compressor (Hz)

RAS- HVRNE	3HP	4HP	5HP	6HP
	62	52	54	62

Heating process



(MPa)

HP Outdoor units	Indoor units	
	Pd	Ps
RAS- 3HVRNE	2.46	0.57
RAS- 4HVRNE	2.40	0.71
RAS- 5HVRNE	2.58	0.68
RAS- 6HVRNE	2.73	0.68

Frequency compressor (Hz)

RAS- HVRNE	3HP	4HP	5HP	6HP
	71	57	57	64

1. In the table above, operation pressure of outdoor unit connect to one indoor unit is indicated.
   Calculate the operation pressure by adding connection value to cooling or heating standard operation pressure (tables above).
   - Cool/Heat inverter outdoor unit Model: RAS-HVRNE
2. Operation pressure shown in the graphics and tables indicates the values when indoor airflow is "high" and piping length is 7.5 m
3. Compressor operation frequency during test run mode is automatically set as shown in the frequency compressor table at test run mode.
   In this case, the frequency is different from the value indicated in remote controller

8 TROUBLESHOOTING

This chapter provides information about the troubleshooting procedures available to detect system malfunctions and the required actions to fix them.

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8.1. INITIAL TROUBLESHOOTING

8.1.1. CHECKING BY MEANS OF THE 7-SEGMENT DISPLAY

■Simple checking procedure by means of the 7-segment display

1	❖Turn on all the indoor units
2	Turn on the outdoor unit
3	Turn auto-addressing starts

❖ All the indoor units which are connected to the outdoor unit.

During the auto-addressing, you can check the following items by means of the 7-segment display of the outdoor unit.

1. Disconnection of the power supply to the Indoor Unit.
2. Duplication of the Indoor Unit number.

Outdoor unit printed circuit board PCB 1

Normal case	The 7-segment display of the outdoor unit is not indicated.

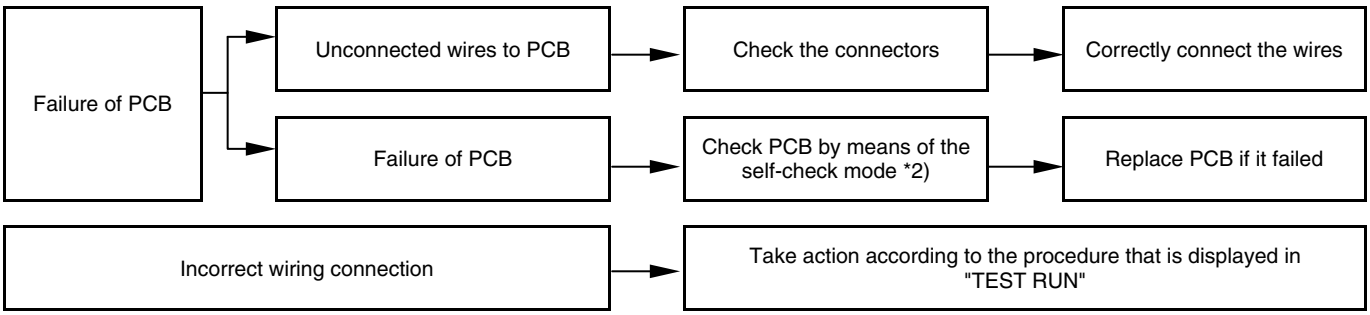
Abnormal case	If there is something wrong, the 7-segment display of the outdoor unit displays the following indications: a. The indoor units are not supplied with power. ➡  continues to flash after 30 seconds. b. Disconnection of the operating line between the outdoor units and the indoor units. ➡  continues to flash after 30 seconds. c. Duplicated settings of the indoor unit number on the rotary switch RSW (Refer to the section 8.2.2, "Troubleshooting by means of the Alarm Code" for the description of the alarm code "35").

8.1.2. FAILURE OF THE POWER SUPPLY TO THE INDOOR UNIT AND THE REMOTE CONTROL SWITCH

- The LED and the LCD are not indicated.
- Not operated

  If the fuses are blown out or a breaker is activated, investigate the cause of the overcurrent and take the necessary action.

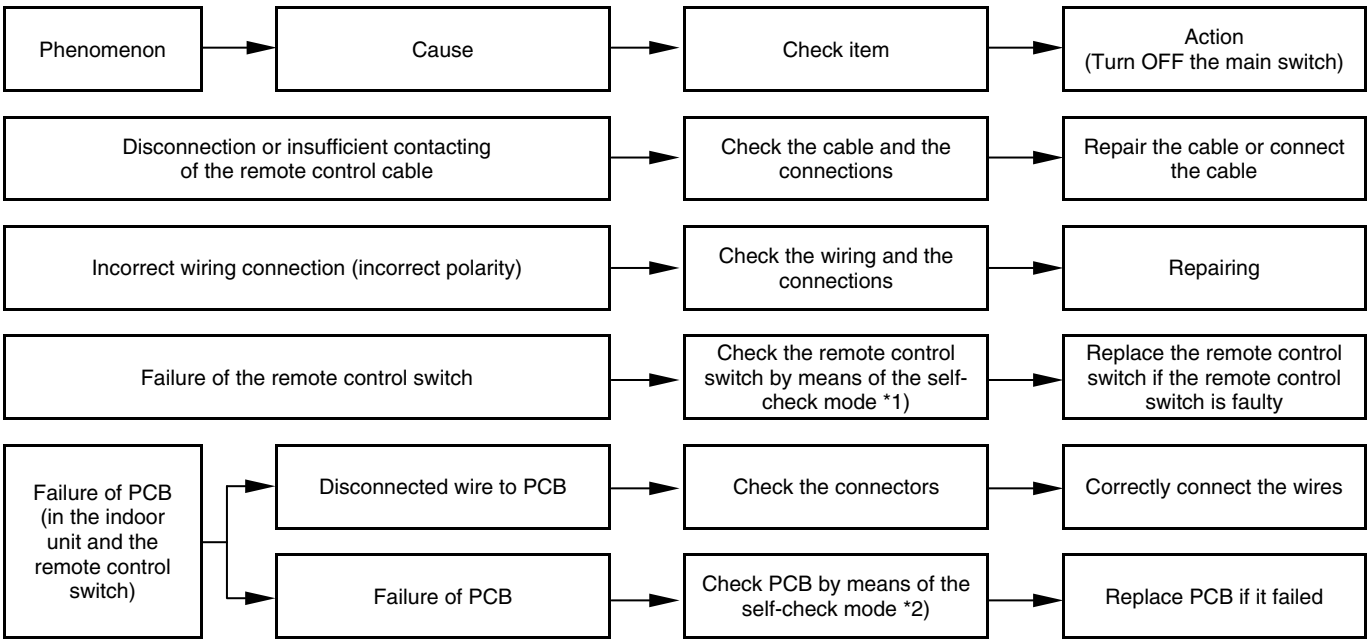
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Power failure or power is not ON		Measure the voltage by means of the voltmeter	Supply the power
Blown out fuse or activation of the breaker at the power source	Short circuit supplied between the wires	Check for any uncovered part of the wires	Remove the cause of the short circuit and replace the fuse
	Short circuit of the wires to earth	Measure the insulation resistance	Remove the cause of the short circuit and replace the fuse
	Failure of I.U fan motor	Measure resistance between wires and insulation resistance	Replace the control for Indoor fan, fan motor and fuse
	Failure of I.U fan control		Replace the control for Indoor Fan
Blown out fuse at the control circuit	Short circuit supplied between the wires	Check for any uncovered part of the wires	Remove the cause of the short circuit and replace the fuse
	Short circuit of the control circuit to earth	Measure the insulation resistance	Remove the cause of the short circuit and replace the fuse
	Failure of I.U fan motor	Measure resistance between wires and insulation resistance	Replace the control for Indoor fan, fan motor and fuse
	Failure of I.U fan control		Replace the control for Indoor Fan
Failure of the transformer at the indoor unit side		Measure the voltage at the secondary side	Replace the transformer
Disconnected cable of the remote control switch		Connect the cable	Replace the cable or repair the cable
Insufficient contacting at the connectors of the remote control switch	Insufficient connection or incorrect connection of the indoor unit PCB	Check the connectors	Correctly connect the connector
	Insufficient connection or incorrect connection of the indoor unit PCB in the remote control switch		
Failure of the remote control switch		Check the remote control switch by means of the self-check mode *1)	Replace the remote control switch if it failed



*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.

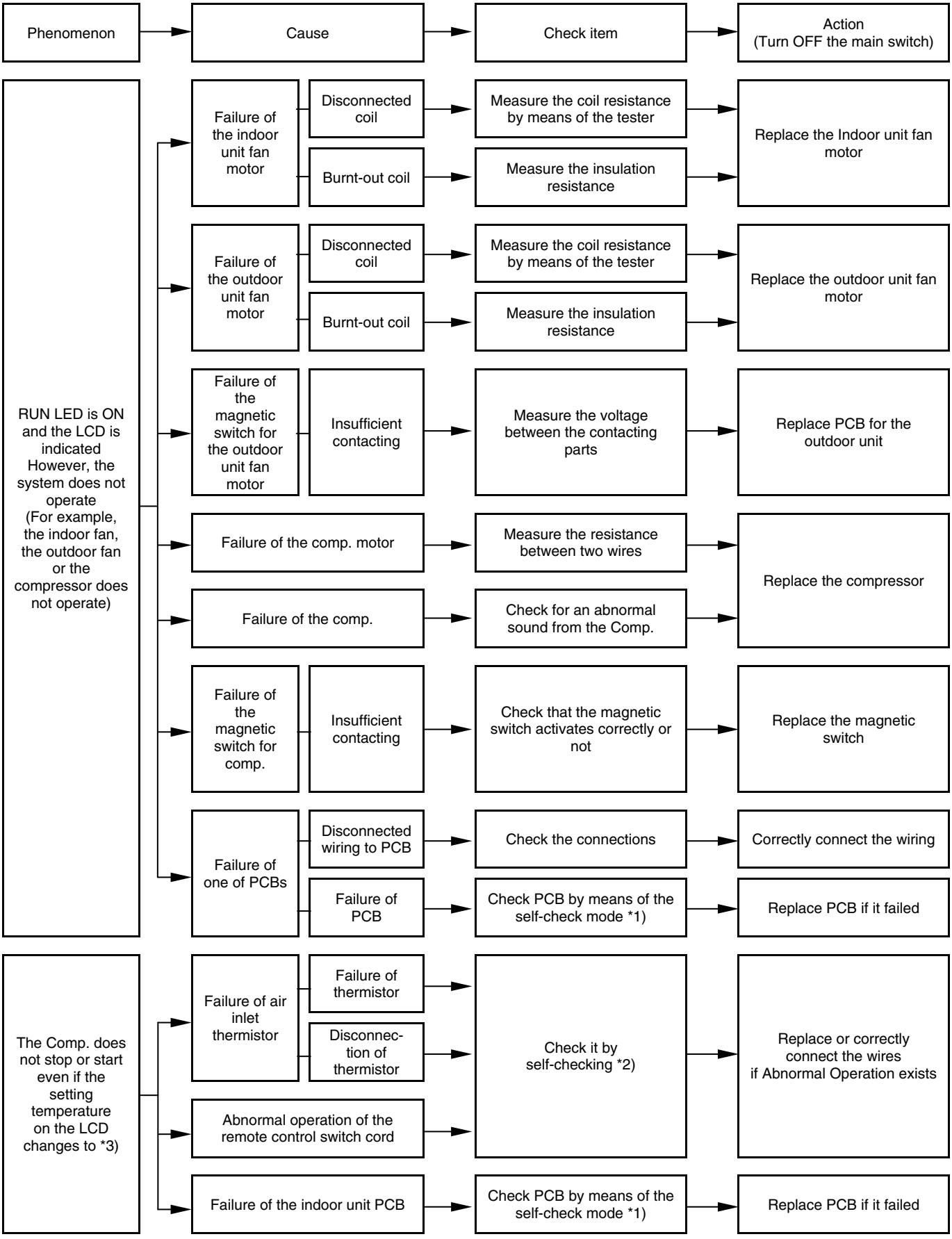
8.1.3. ABNORMAL TRANSMISSION BETWEEN THE REMOTE CONTROL SWITCH AND THE INDOOR UNIT

- RUN LED on the remote control switch:
  Flickering every 2 seconds.



*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.

8.1.4. ABNORMAL OPERATION OF THE DEVICES

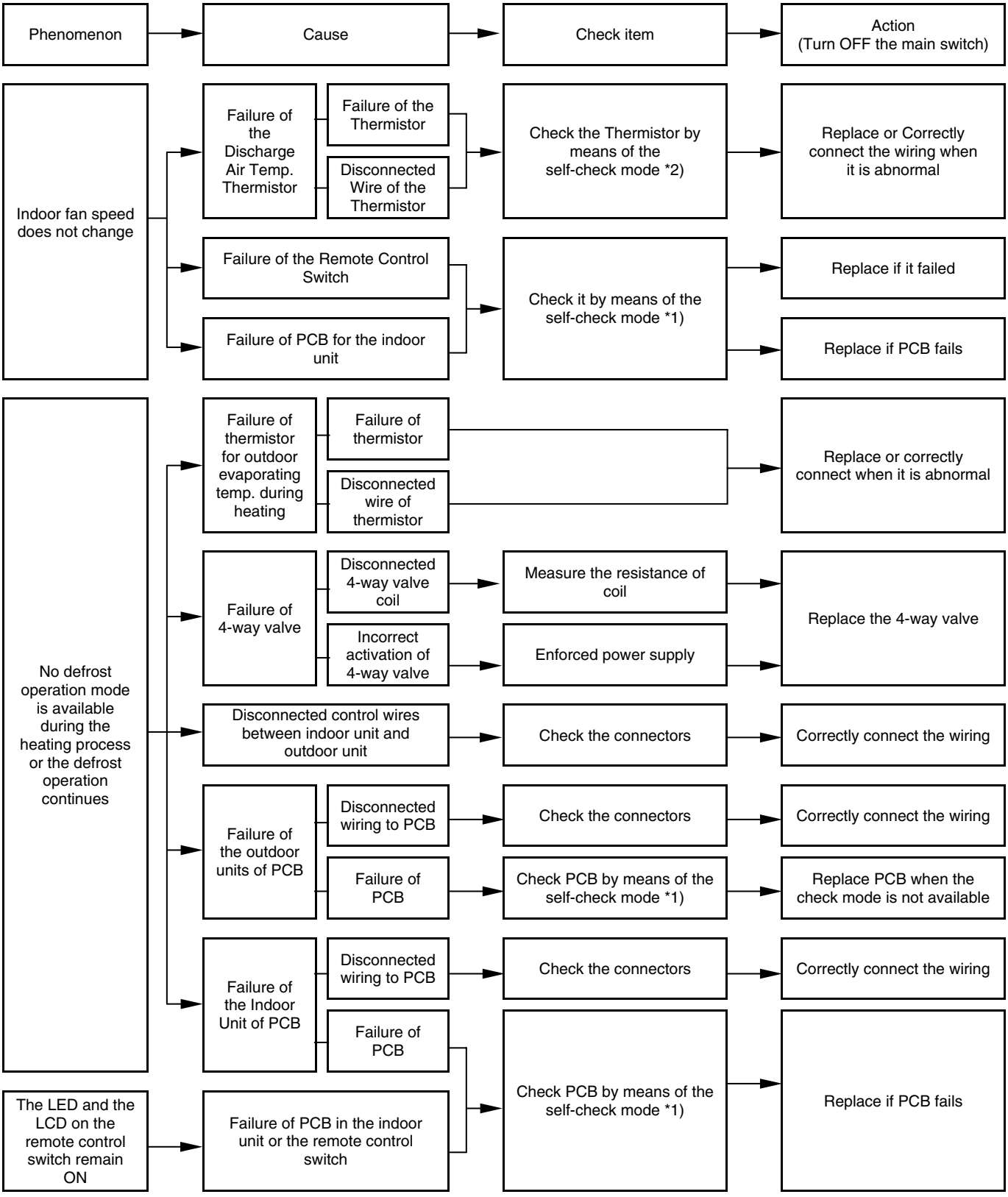


ABNORMAL OPERATIONS OF THE DEVICES (Cont.)

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
The Comp. does not stop or start even if the setting temperature on LCD changes to *3)	Incorrect optional setting	Check the setting condition of "remote control thermostat" by means of the optional setting Setting and control: "00": Control by means of the indoor thermistor for the suction air "01": Control by means of the thermostat of the remote control switch "02": Control by means of the average value of the indoor thermistor for the suction air and the thermostat of the remote control switch	If the thermostat of the remote control switch is not used, set at "00"

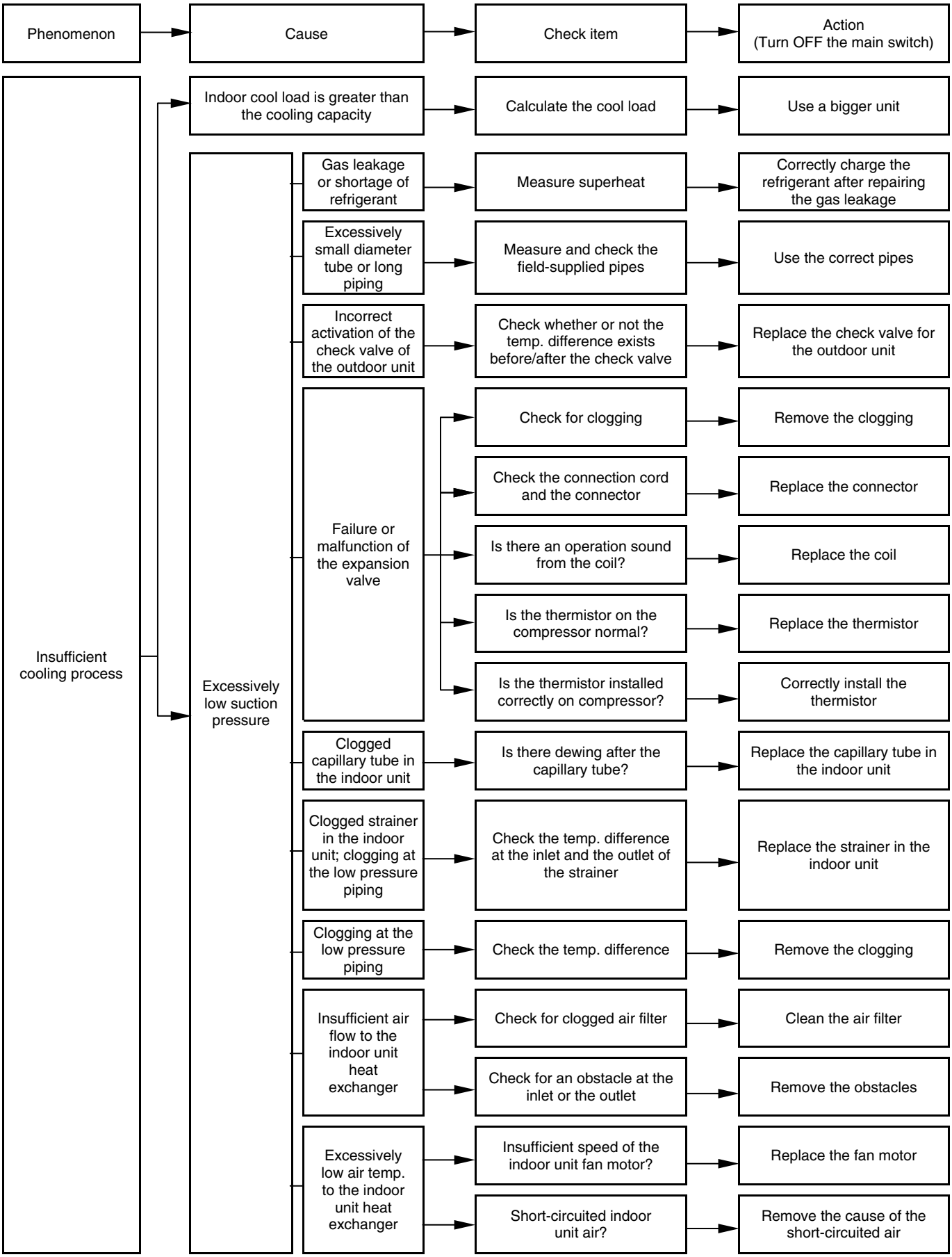
*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.
*3): Even if the remote control switches are normal, the compressor does not operate under the following conditions:
1. Indoor temp. is lower than 21°C or outdoor temp. Is lower than -5°C during the cooling process (DB).
2. Indoor temp. is higher than 27°C (DB) or outdoor temp. is higher than 15°C (WB) during the heating process.
3. When a cooling (or heating) process signal is given to the outdoor unit and a different mode as heating (or cooling) process signal is given to the indoor units.
4. When an emergency stop signal is given to outdoor unit.

ABNORMAL OPERATIONS OF DEVICES (Cont.)

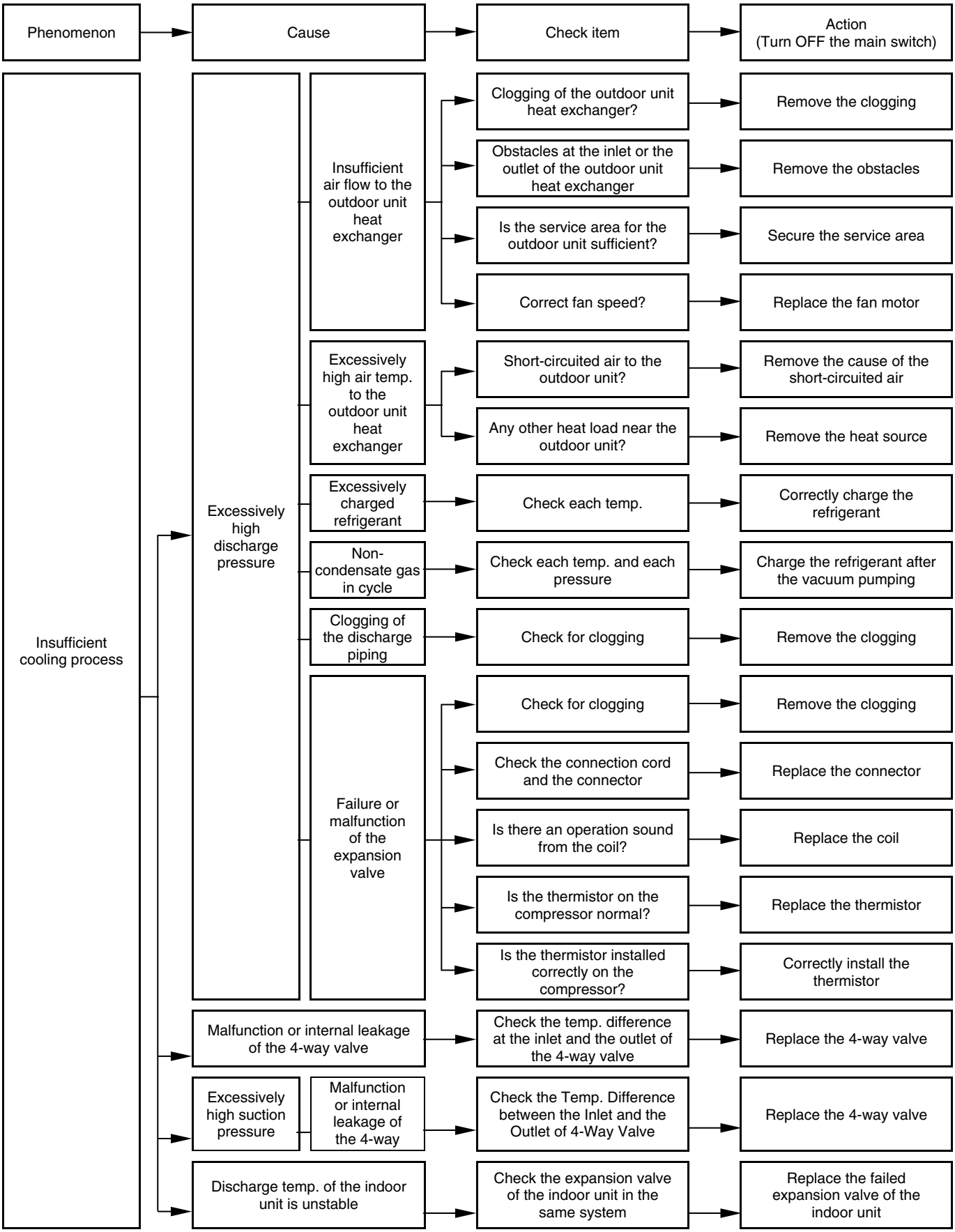


*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.

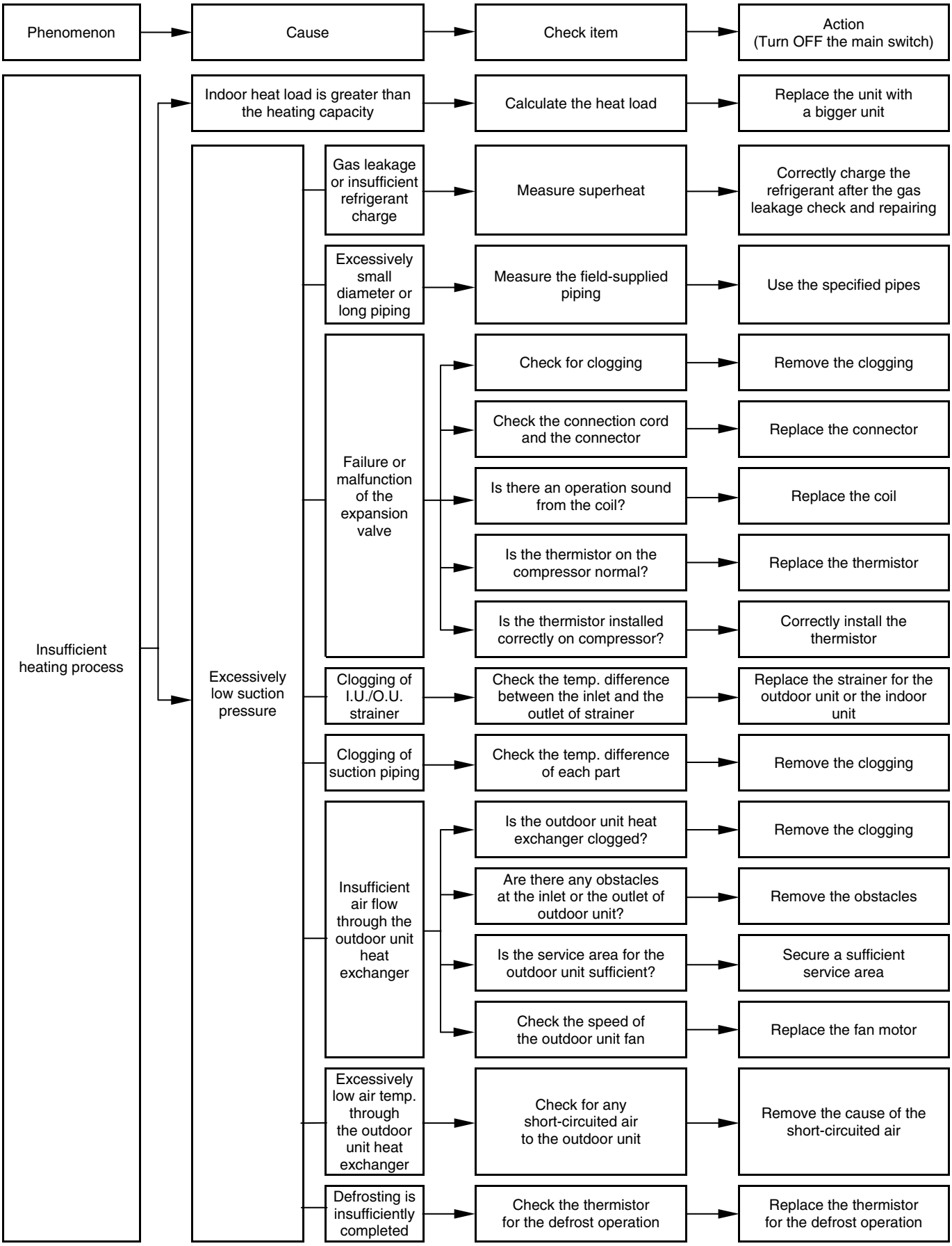
ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



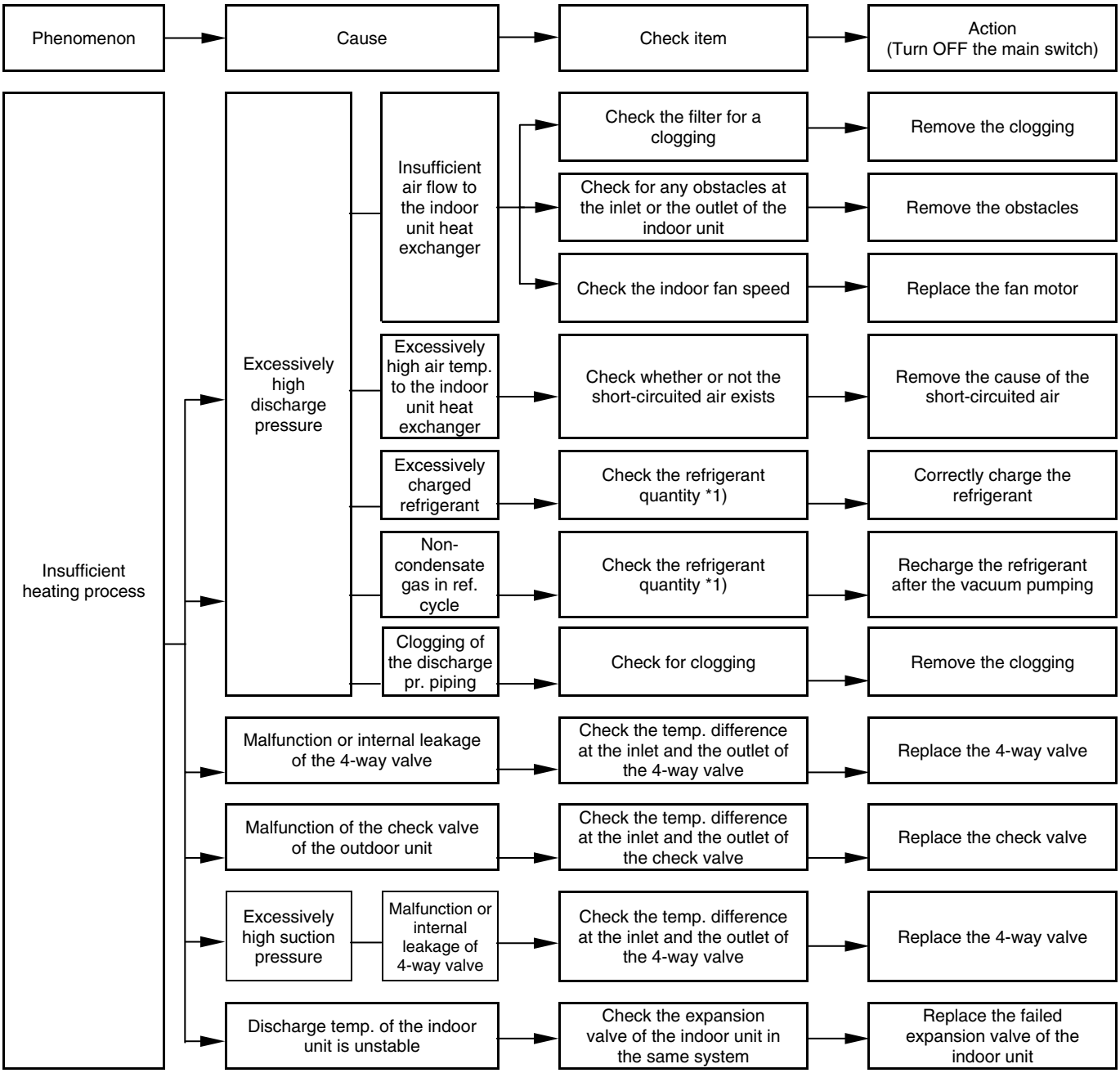
ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



ABNORMAL OPERATIONS OF THE DEVICES (Cont.)

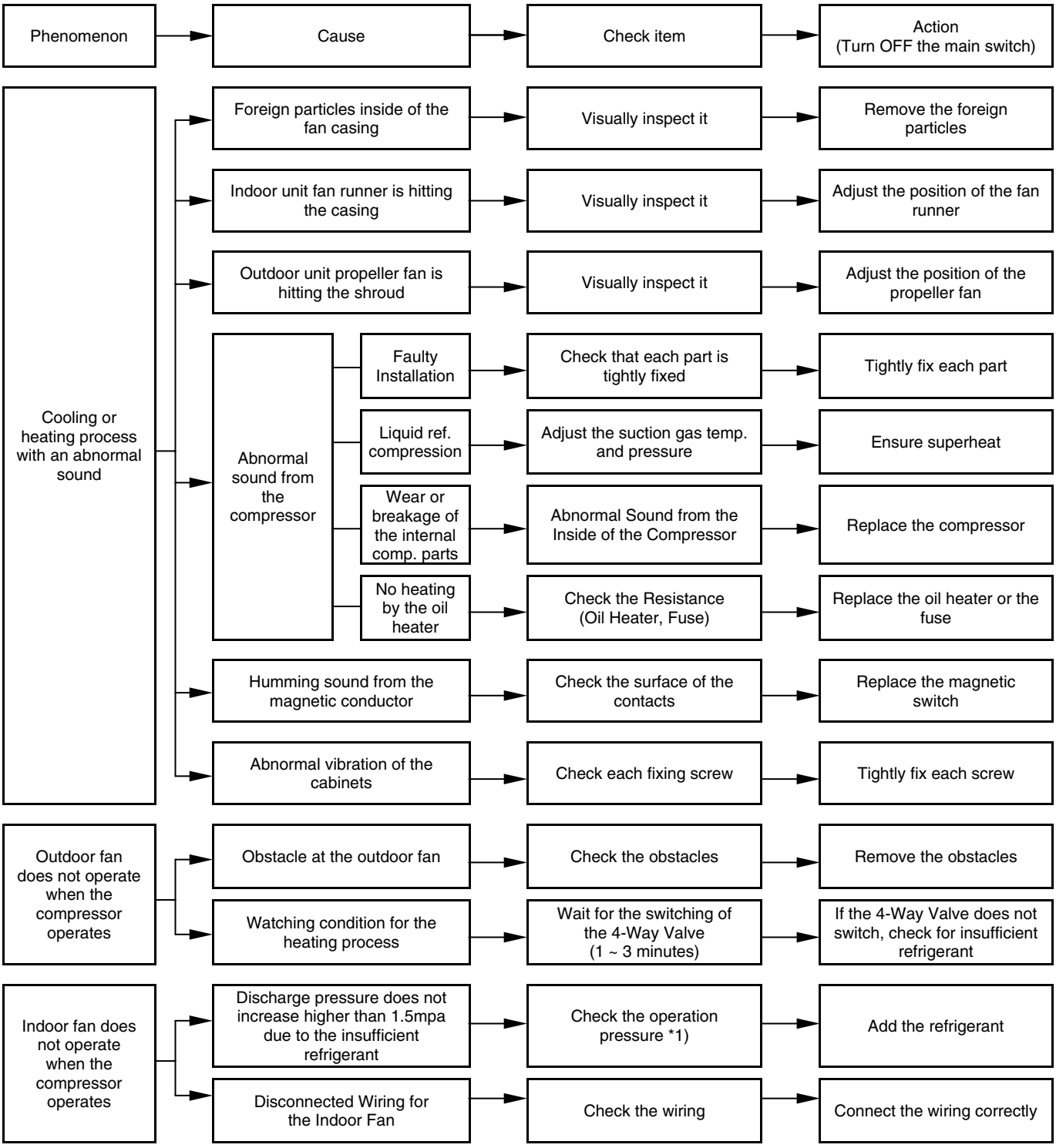


ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



*1): Refer to chapter 10 of TC.

ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



*1): Refer to chapter 10 of TC.

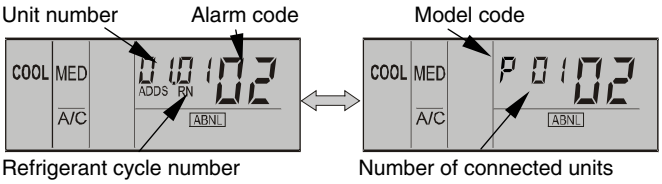
8.2. TROUBLESHOOTING PROCEDURE

8.2.1. ALARM CODE TABLE

If the RUN LED flickers for 2 seconds, there is a failure in the transmission between the Indoor Unit and the Remote Control Switch. Possible causes are:

Broken remote cable
Contact failure in the remote control cable
Defective IC or defective microcomputer
In any case, ask your retailer for service

If the RUN LED flickers 5 times (5 seconds) with the unit number and the alarm code displayed, make a note of the alarm code (refer to the table below) and ask your retailer for service.

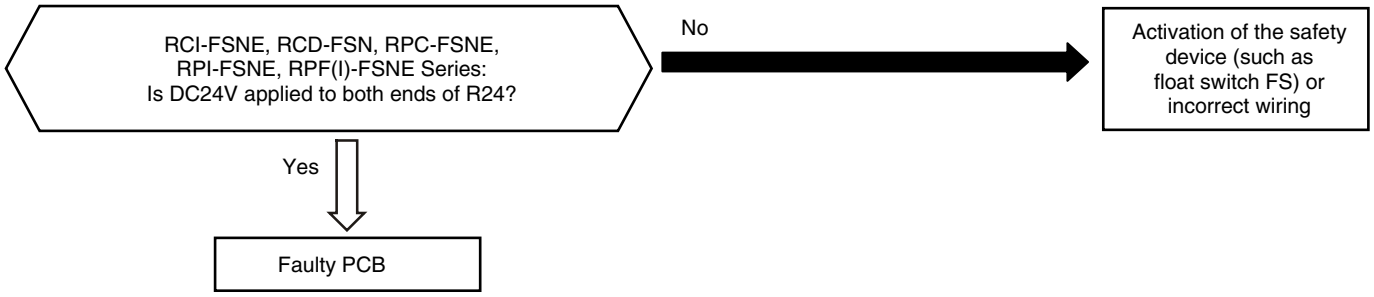


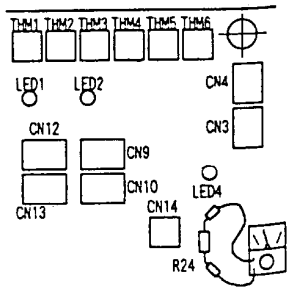
Code No.	Category	Content of abnormal operation	Leading cause
01	Indoor unit	Tripping of the protection device	Failure of the fan motor, the drain discharge, PCB, the relay
02	Outdoor unit	Tripping of the protection device	Activation of PSH
03	Transmission	Abnormal operation between the indoor (or the outdoor) and the outdoor (or the indoor)	Incorrect wiring. Failure of PCB. Tripping of fuse Power supply OFF
04	Inverter	Abnormal operation between the inverter and the control PCB	Transmission failure in fan controller
05	Transmission	Abnormal operation of the power source wiring	Reverse phase incorrect wiring
06	Voltage drop	Voltage drop by excessively low or high voltage to the outdoor unit	Voltage drop of the power supply. Incorrect wiring or insufficient capacity of the power supply wiring
07	Cycle	Decrease in the discharge gas superheat	Excessive refrigerant charge. Expansion valve open lock
08		Increase in the discharge gas temperature	Insufficient refrigerant. Ref. leakage, clogging or expansion valve close lock
11	Sensor on the indoor unit	Air inlet thermistor	Failure of the thermistor, the sensor, the connection
12		Air outlet thermistor	
13		Freeze protection thermistor	
14		Gas piping thermistor	
15		Fresh outdoor air thermistor (Econofresh)	
19		Tripping of the protection device for the fan motor	Failure of the fan motor
20	Sensor on the Outdoor Unit	Discharge gas thermistor on comp.	Failure of the thermistor, the sensor, the connection
22		Outdoor thermistor	
24		Evaporating thermistor	
31		Incorrect setting of outdoor and indoor unit	Incorrect setting capacity code
35		Incorrect setting in the indoor unit no.	Existence of the same indoor unit No. in the same refrigerant cycle
38		Abnormal operation of the protective circuit in the outdoor unit	Failure of the indoor unit PCB. Incorrect wiring. Connection to PCB in the indoor unit
39		Abnormal operation of the running current at the constant speed compressor	Overcurrent, blown fuse or failure of the current sensor
41	Pressure	Excessive Overload during Cooling Operation	Heat Exchanger Airflow obstacle, short circuit and locked fan motor.
42		Excessive Overload during Heating Operation	Heat Exchanger Airflow obstacle, short circuit.
47		Low-pressure decrease protection activating	Insufficient refrigerant
51	Inverter	Abnormal operation of the current sensor for the inverter	Failure of the sensor on the inverter PCB
52		Overcurrent protection activating	Overload, overcurrent, locking to the compressor
53		ISPM protection activating	Automatic stoppage of transmission module (overcurrent, low voltage or overheating)
54		Increase in the inverter fan temperature	Abnormal inverter fan thermistor Abnormal outdoor fan
57	Outdoor Fan	Fan Motor Abnormality	Disconnect wire of incorrect wiring between Control PCB and inverter PCB. Incorrect wiring or Fan Motor abnormality.
EE	Compressor	Compressor protection	Failure of compressor

8.2.2. TROUBLESHOOTING BY ALARM CODE

Alarm code	
01	**Activation of the safety device in the indoor unit**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the contact between #1 and #2 of CN14 is not closed over 120 seconds during the cooling process, the heating process or the fan operation.



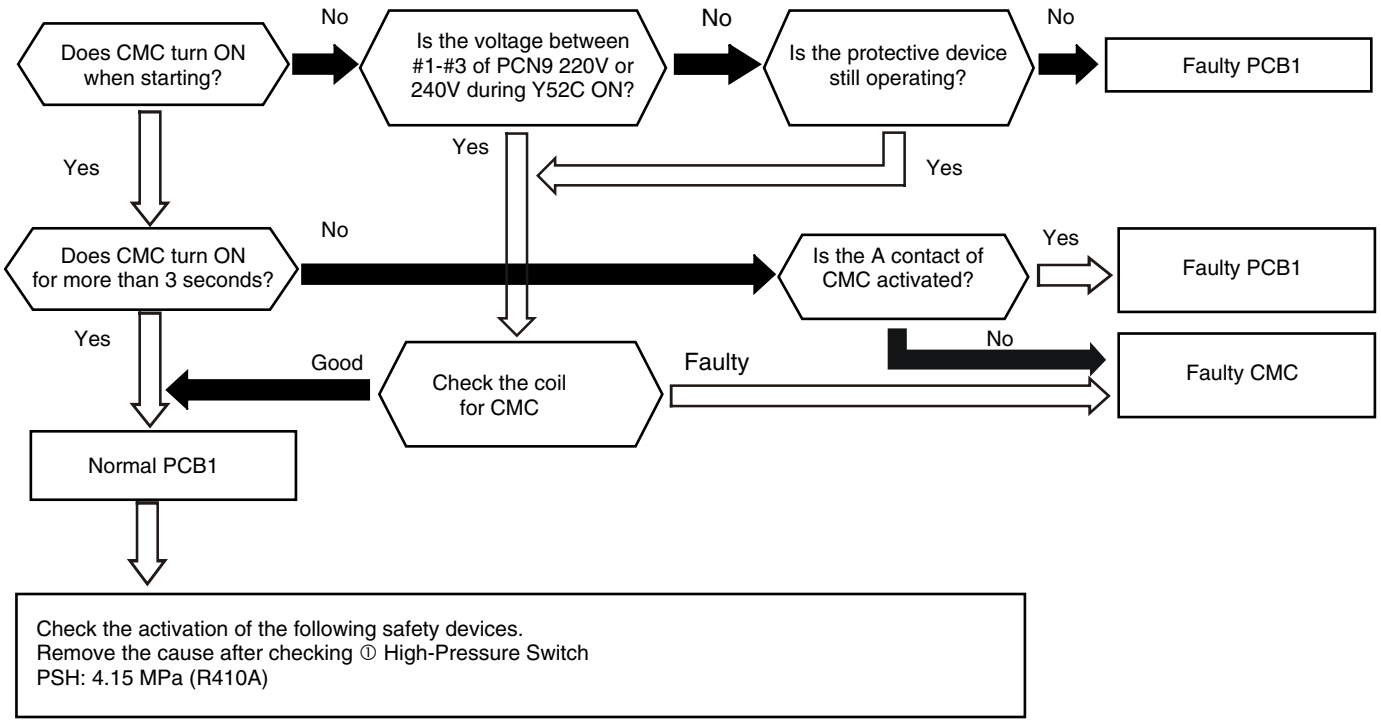


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the float switch	High Drain Level	Clogging of the drainage	Check the drain pan	Remove the clogged foreign particles
	Faulty float switch	Fault	Check the continuity when the drain level is low	Replace the float switch if faulty
		Faulty contacting	Measure the resistance by means of the tester	Fix the looseness and Replace the connector
		Faulty connection	Check the connections	Repair the connection
Faulty indoor unit PCB			Check PCB by means of the self-check mode *1)	Replace PCB if faulty

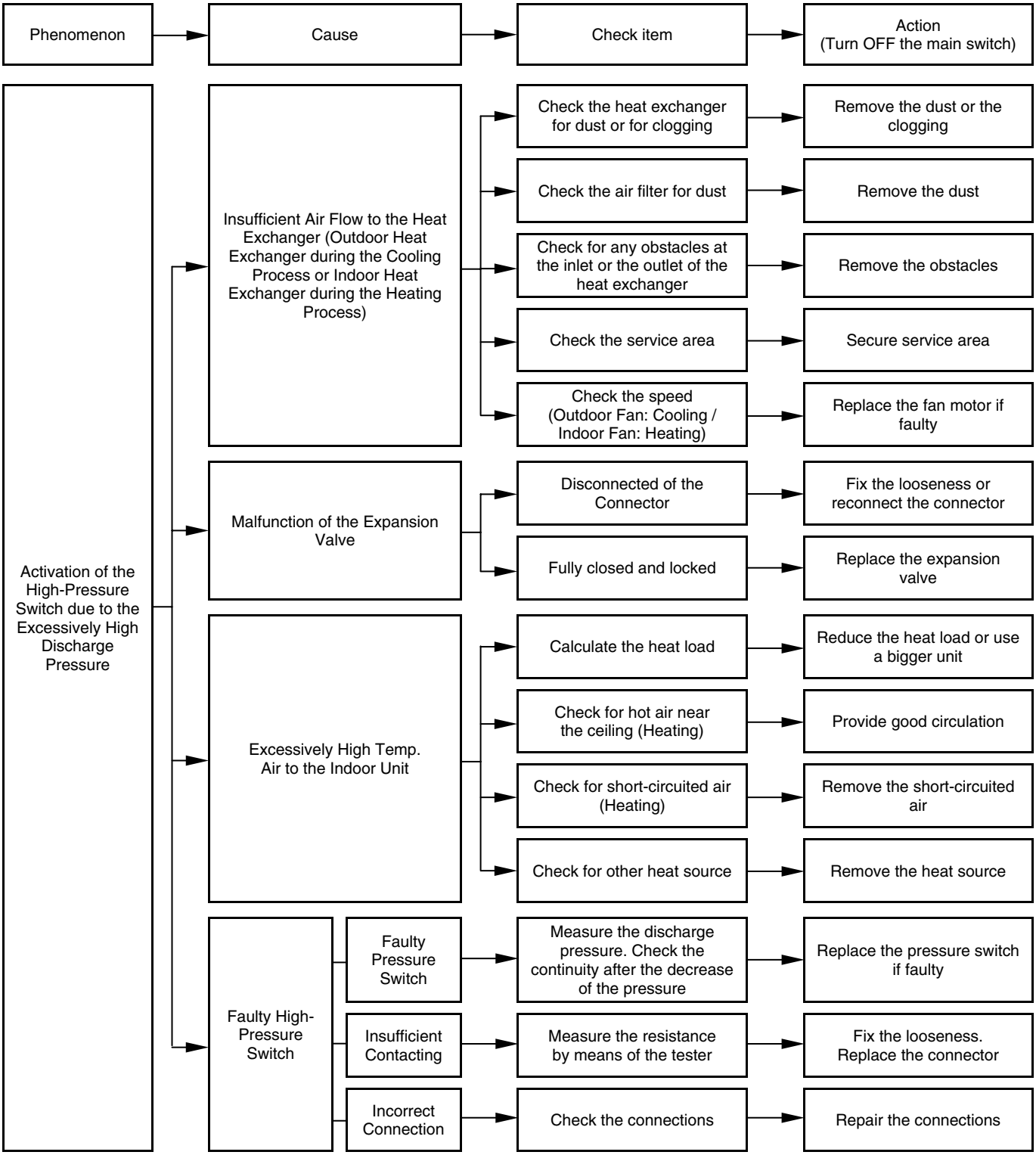
*1): Refer to section 8.3.1 and 8.3.3.
Alarm code "01" is not displayed at the RPK series.

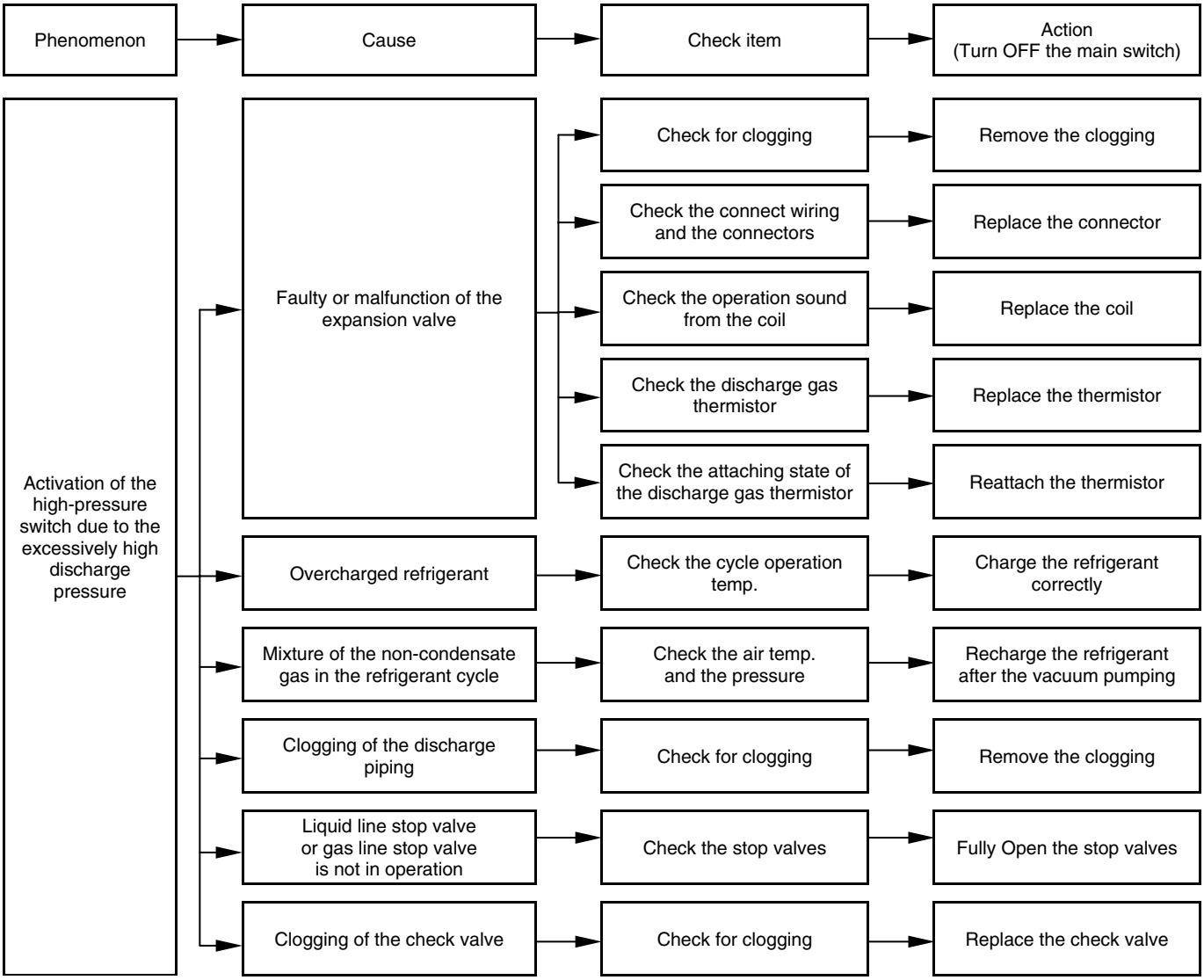
Alarm code	Activation of the safety device in the outdoor unit
02	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
- The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
- If the stoppage of unit is caused by cooling overload or heating overload, the alarm code 41 or 42 is indicated.
  – This alarm is displayed when one of the safety devices is activated during the compressor operation.



Check item		
Connector for CMC	Fasten terminal	Connector for the protection device
PCN9	N	PCN6


Phenomenon
Cause
Check item
Action (Turn OFF the main switch)
Activation of the High-Pressure Switch due to the Excessively High Discharge Pressure
Insufficient Air Flow to the Heat Exchanger (Outdoor Heat Exchanger during the Cooling Process or Indoor Heat Exchanger during the Heating Process)
Check the heat exchanger for dust or for clogging
Remove the dust or the clogging
Check the air filter for dust
Remove the dust
Check for any obstacles at the inlet or the outlet of the heat exchanger
Remove the obstacles
Check the service area
Secure service area
Check the speed (Outdoor Fan: Cooling / Indoor Fan: Heating)
Replace the fan motor if faulty
Malfunction of the Expansion Valve
Disconnected of the Connector
Fix the looseness or reconnect the connector
Fully closed and locked
Replace the expansion valve
Excessively High Temp. Air to the Indoor Unit
Calculate the heat load
Reduce the heat load or use a bigger unit
Check for hot air near the ceiling (Heating)
Provide good circulation
Check for short-circuited air (Heating)
Remove the short-circuited air
Check for other heat source
Remove the heat source
Faulty High-Pressure Switch
Faulty Pressure Switch
Measure the discharge pressure. Check the continuity after the decrease of the pressure
Replace the pressure switch if faulty
Insufficient Contacting
Measure the resistance by means of the tester
Fix the looseness. Replace the connector
Incorrect Connection
Check the connections
Repair the connections


Phenomenon
Cause
Check item
Action
(Turn OFF the main switch)
Activation of the high-pressure switch due to the excessively high discharge pressure
Faulty or malfunction of the expansion valve
Check for clogging
Remove the clogging
Check the connect wiring and the connectors
Replace the connector
Check the operation sound from the coil
Replace the coil
Check the discharge gas thermistor
Replace the thermistor
Check the attaching state of the discharge gas thermistor
Reattach the thermistor
Overcharged refrigerant
Check the cycle operation temp.
Charge the refrigerant correctly
Mixture of the non-condensate gas in the refrigerant cycle
Check the air temp. and the pressure
Recharge the refrigerant after the vacuum pumping
Clogging of the discharge piping
Check for clogging
Remove the clogging
Liquid line stop valve or gas line stop valve is not in operation
Check the stop valves
Fully Open the stop valves
Clogging of the check valve
Check for clogging
Replace the check valve

Alarm code	Abnormal transmission between the indoor units and the outdoor unit
03	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm is displayed when an abnormal operation is maintained for three minutes after the normal transmission between the indoor units and the outdoor unit. Also, an abnormal operation is maintained for 30 seconds after the micro-computer is automatically reset.
    The alarm is displayed when the abnormal transmission is maintained for 30 seconds from the starting of the outdoor unit.
  - Investigate the cause of the overcurrent and take the necessary action when the fuses are blown out or the breaker for the outdoor unit is activated.

(Refer to the next page)

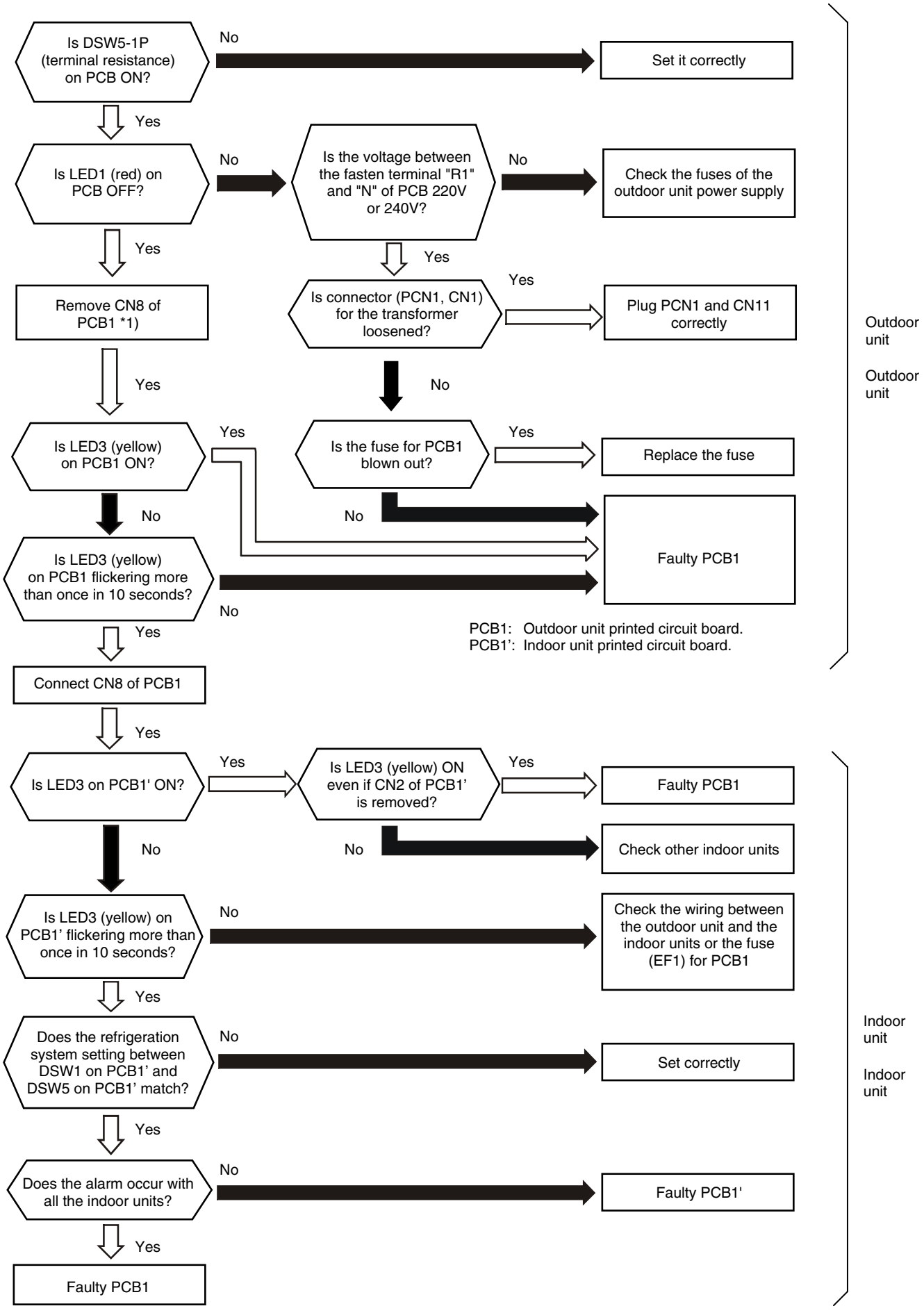
Note from next page:

*1) In case that the terminal resistance (DSW5-1P) is OFF when the H-Link Connection is performed.
Set the terminal resistance to ON when CN8 is removed.
Set the terminal resistance to OFF when CN8 is reconnected.

Check item	
Power supply	Fasten terminal
220-240 50Hz	Between R1 and N

*2) Factory setting of PCB for non-pole transmission

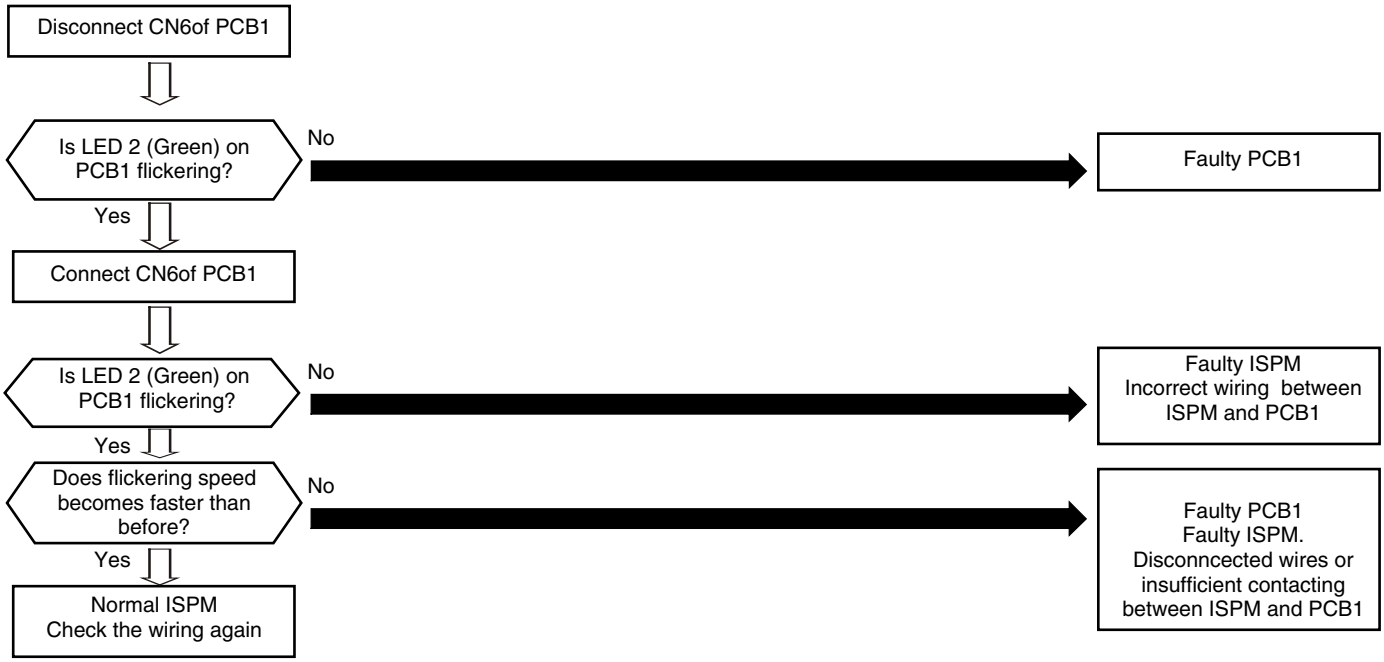
Item	Setting position
SW1	Left side (New transmission side)
JP1	Short circuit
CN1	Transmission wire connector
CN18	Non-occupied


Is DSW5-1P (terminal resistance) on PCB ON?
No
Set it correctly
Yes
Is LED1 (red) on PCB OFF?
No
Is the voltage between the fasten terminal "R1" and "N" of PCB 220V or 240V?
No
Check the fuses of the outdoor unit power supply
Yes
Yes
Remove CN8 of PCB1 *1)
Is connector (PCN1, CN1) for the transformer loosened?
Yes
Plug PCN1 and CN11 correctly
Yes
No
Is LED3 (yellow) on PCB1 ON?
Yes
Is the fuse for PCB1 blown out?
Yes
Replace the fuse
No
No
Is LED3 (yellow) on PCB1 flickering more than once in 10 seconds?
Faulty PCB1
No
Yes
PCB1: Outdoor unit printed circuit board.
PCB1': Indoor unit printed circuit board.
Connect CN8 of PCB1
Yes
Is LED3 on PCB1' ON?
Yes
Is LED3 (yellow) ON even if CN2 of PCB1' is removed?
Yes
Faulty PCB1
No
No
Check other indoor units
Is LED3 (yellow) on PCB1' flickering more than once in 10 seconds?
No
Check the wiring between the outdoor unit and the indoor units or the fuse (EF1) for PCB1
Yes
Does the refrigeration system setting between DSW1 on PCB1' and DSW5 on PCB1' match?
No
Set correctly
Yes
Does the alarm occur with all the indoor units?
No
Faulty PCB1'
Yes
Faulty PCB1
Outdoor unit
Outdoor unit
Indoor unit
Indoor unit

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Power failure or no power supply		Measure the voltage by means of the tester	Supply the power
Blown out fuse for the power source or activation of the outdoor unit breaker	Short circuit between wires	Check the insulation material for breaks	Remove the short circuit and replace the fuse
	Short-circuited wire to ground	Measure the insulation resistance	Remove the short circuit to ground and replace the fuse
	Faulty comp. motor	Measure the resistance between the wires and the insulation resistance	Replace the comp. and the fuse
	Faulty outdoor unit fan motor	Measure the resistance between the wires and the insulation resistance	Replace the outdoor unit fan motor and the fuse
Blown out fuse for control circuit or activation of outdoor unit breaker	Short circuit between wires	Check the insulation material for breaks	Remove the short circuit and replace the fuse
	Short circuit of the control circuit (to ground)	Measure the insulation resistance	Remove the short circuit and replace the fuse
	Faulty solenoid coil for the magnetic switch for the comp. motor	Measure the resistance of coil	Replace the magnetic switch and the fuse
	Failure of the outdoor unit fan motor	Measure the resistance between the wires and the insulation resistance	Replace the outdoor unit fan motor and fuse
Disconnected wires insufficient contacting or incorrect connection	Between outdoor unit and indoor unit	Check the continuity of the wires. Check for looseness of the connection screws. Check the terminal Nos.	Replacing wires repairing and tightening the screws and the correct wiring
	Power source wiring for the outdoor unit		
Faulty PCB (outdoor unit, indoor unit)	Disconnected wires to PCB	Check the connections	Correctly connect the wires
	Faulty PCB		Replace PCB if faulty
Incorrect wiring	Disconnected wire; insufficient contacting	Check the continuity and the looseness of connection screws	Replacing wires, repairing and tightening the screws
	Incorrect wiring	Check the terminal Nos.	Correctly connect the wires

Alarm code	
04	**Abnormal transmission between the inverter and the outdoor PCB1 and ISPM**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB1.
  - This alarm is displayed when the abnormal operation is maintained for 30 seconds after the normal transmission between the outdoor unit PCB1 and ISPM. Also, the abnormal operation is maintained for 30 seconds after the micro-computer is automatically reset. The alarm is displayed when the abnormal transmission is maintained for 30 seconds from the starting of the outdoor unit.
  - The alarm code "04." is displayed when the abnormal transmision is maintained between ISPM and fan controller.

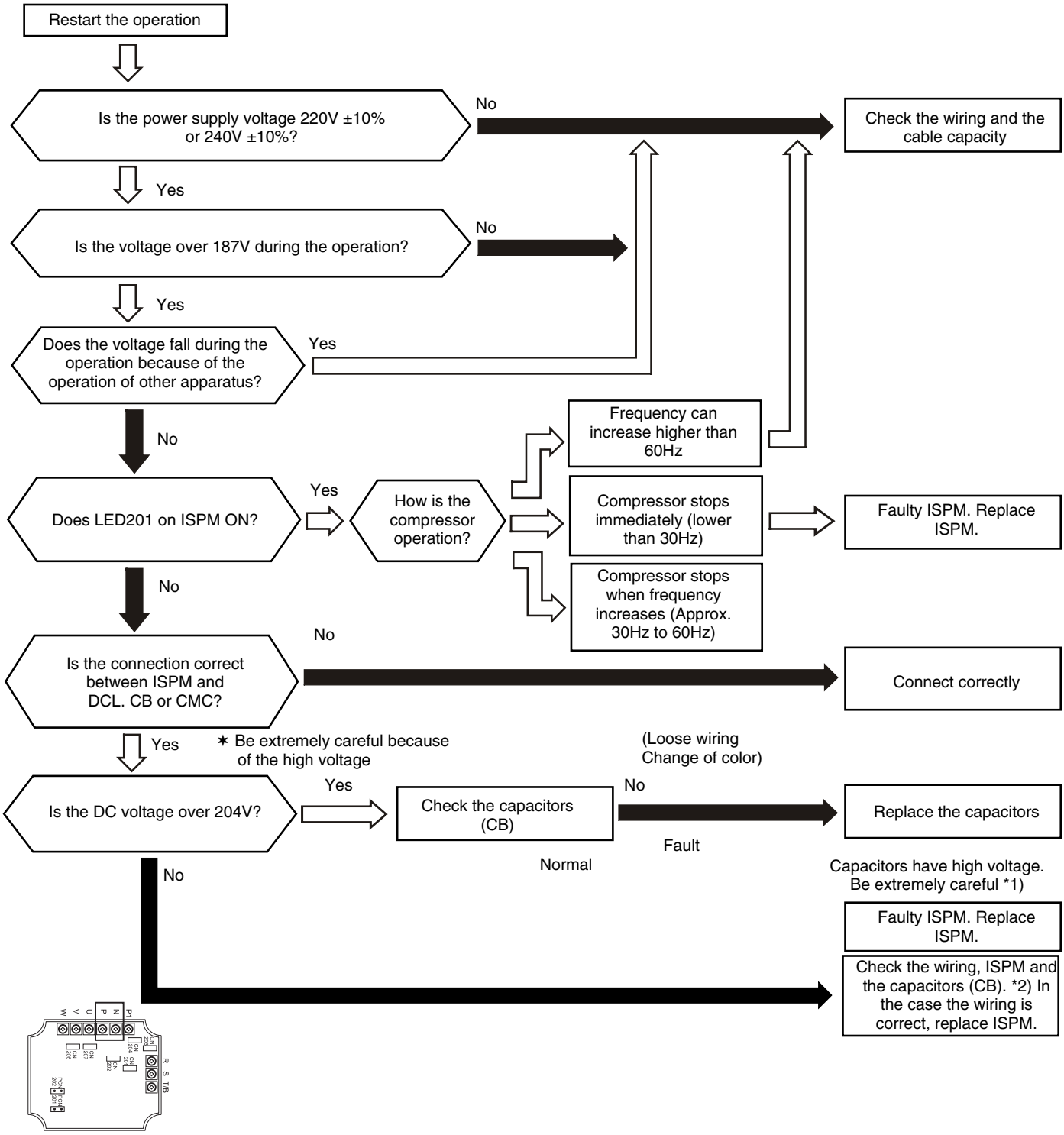


PCB1: Control PCB in the outdoor unit
ISPM: Inverter system power module

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Disconnected wires, insufficient contacting or incorrect connection	Between control PCB, ISPM and fan controller	Check the continuity of wires. Check for looseness of the connection screws. Check the connection No.	Replacing wires, repairing, tightening screws and incorrect wiring
	Power source wiring for the outdoor unit		
Faulty PCB (for the inverter and ISPM)	Disconnected wires to PCB	Check the connections	Repair the wiring connections
	Faulty PCB		Replace PCB if faulty
Incorrect wiring	Disconnected wires; insufficient contacting	Check the continuity. Check for looseness of connection screws	Replacing wires, repairing, tightening screws
	Incorrect wiring	Check the connection Nos.	Correctly connect the wires

Alarm code	
06	**Excessively low voltage or excessively high voltage for the inverter**

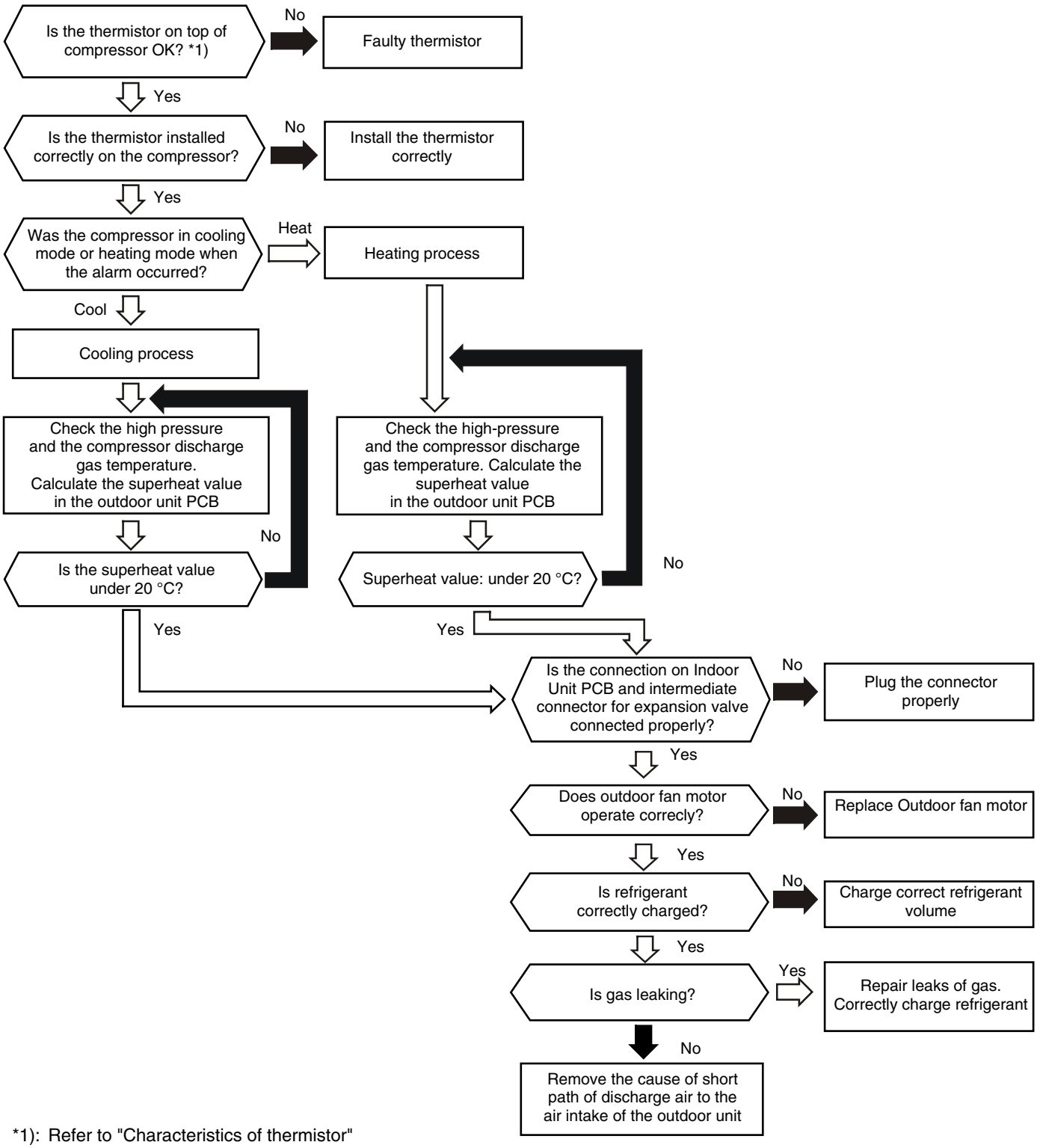
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the voltage between terminal "P" and "N" of ISPM is insufficient and the alarm has three occurrences in 30 minutes. If the number of occurrences is smaller than two, the retry operation is performed. The alarm code "06" means fan controller Abnormal Operation.



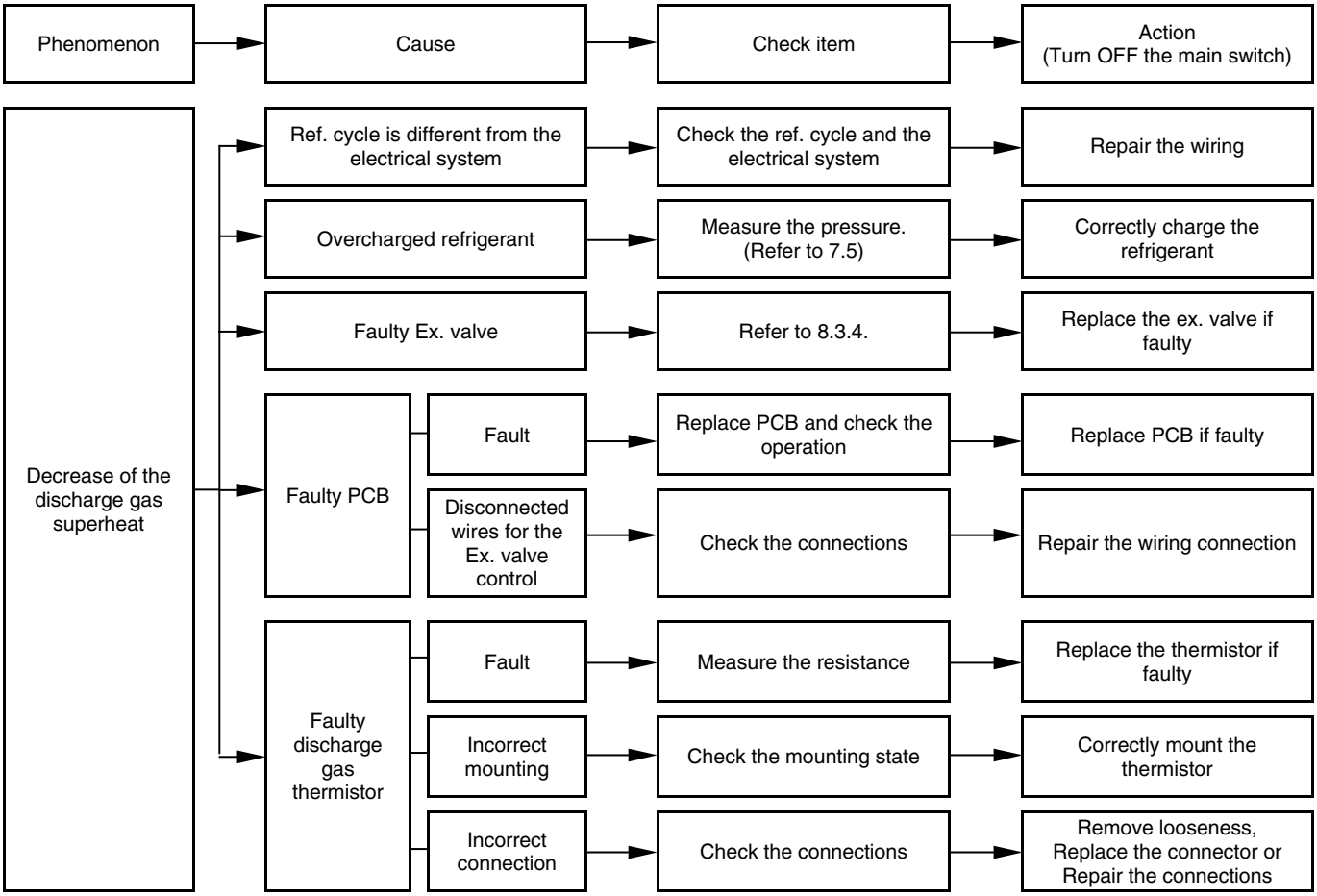
*1): If the capacitor has a high voltage, perform the high-voltage discharge procedure. Refer to section 8.3.4.
*2): DC voltage measuring position:
ISPM "P" Terminal to "+" Terminal of Tester, "N" Terminal to "–" Terminal of Tester Measuring Position: DC 1000V.

Alarm code	Decrease of the discharge gas superheat
07	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - If the discharge gas superheat is below 20 °C. at the top of the compressor for 30 minutes, the retry operation is performed. However, if the alarm occurs twice in addition to the first occurrence within two hours, this alarm code is displayed.



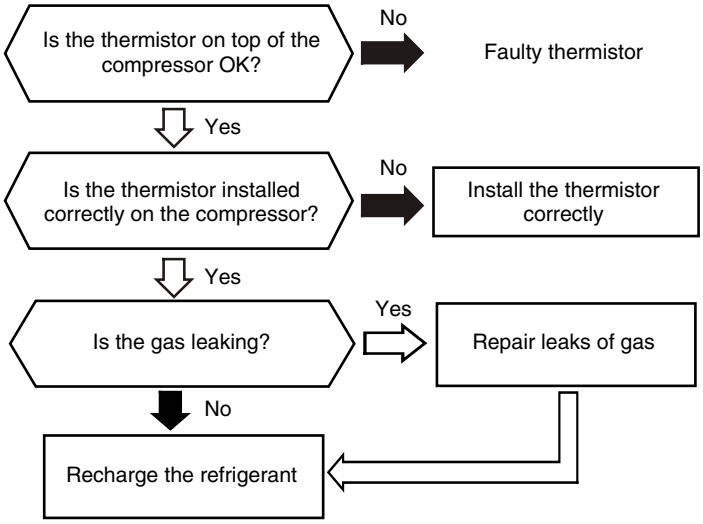
*1): Refer to "Characteristics of thermistor"

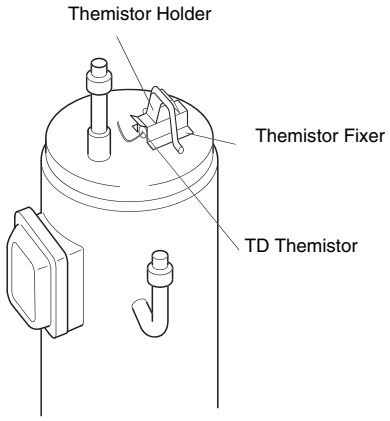

Phenomenon
Cause
Check item
Action
(Turn OFF the main switch)
Decrease of the discharge gas superheat
Ref. cycle is different from the electrical system
Check the ref. cycle and the electrical system
Repair the wiring
Overcharged refrigerant
Measure the pressure. (Refer to 7.5)
Correctly charge the refrigerant
Faulty Ex. valve
Refer to 8.3.4.
Replace the ex. valve if faulty
Faulty PCB
Fault
Replace PCB and check the operation
Replace PCB if faulty
Disconnected wires for the Ex. valve control
Check the connections
Repair the wiring connection
Faulty discharge gas thermistor
Fault
Measure the resistance
Replace the thermistor if faulty
Incorrect mounting
Check the mounting state
Correctly mount the thermistor
Incorrect connection
Check the connections
Remove looseness, Replace the connector or Repair the connections

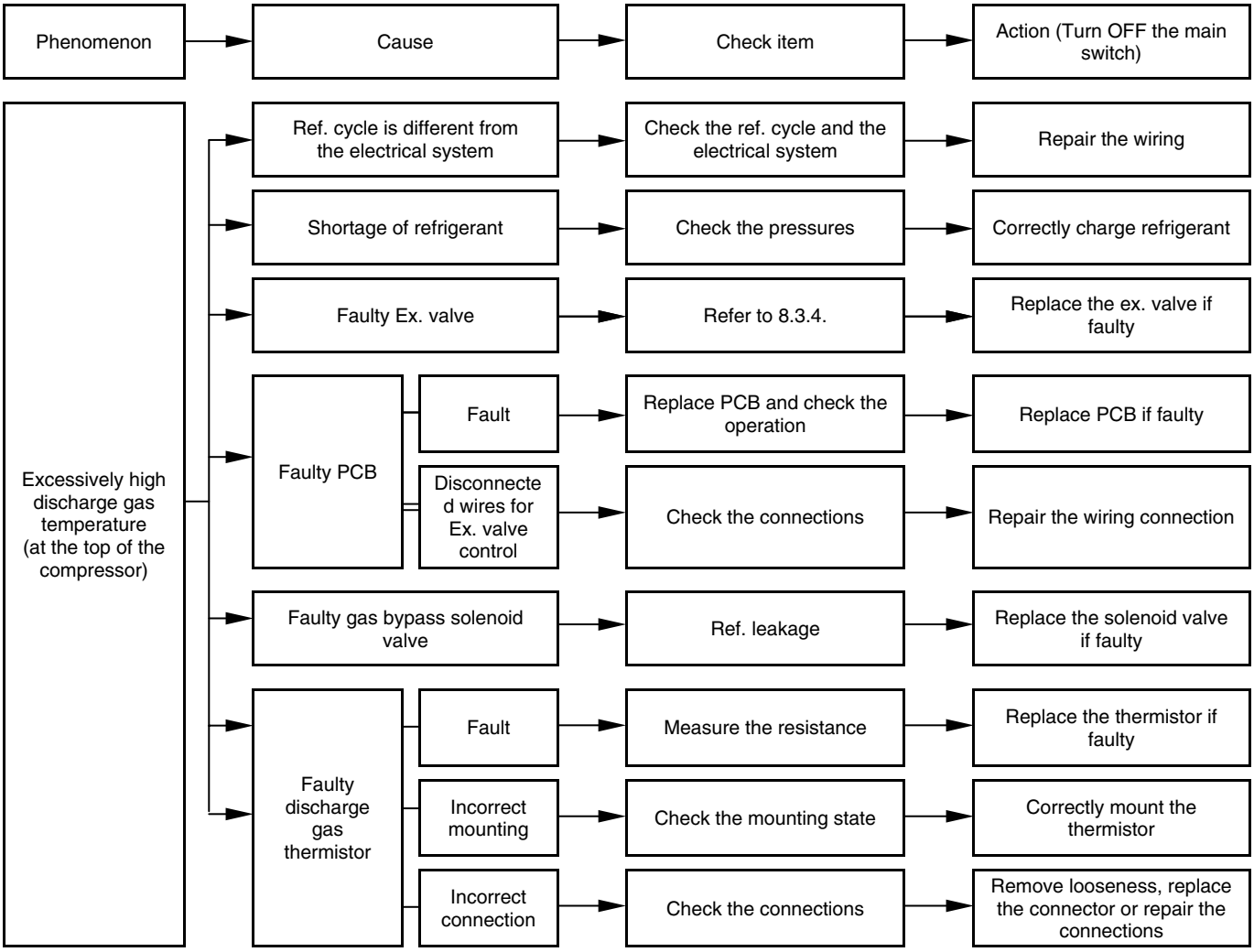
Alarm code	
08	**Excessively high discharge gas temperature at the top of the compressor chamber**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.

– This alarm is displayed when the following conditions occur three times within one hour:
(1) The temperature of the thermistor on the top of the compressor is maintained higher than 127 °C (115 °C for 3HVRNE) for ten minutes or the temperature of the thermistor on the top of the compressor is maintained higher than 140 °C (125 °C for 3HVRNE) for five seconds during cooling.
(2) The temperature of the thermistor on the top of the compressor is maintained higher than 120 °C (115 °C for 3HVRNE) for ten minutes or the temperature of the thermistor on the top of the compressor is maintained higher than 140 °C (125 °C for 3HVRNE) for five seconds during heating

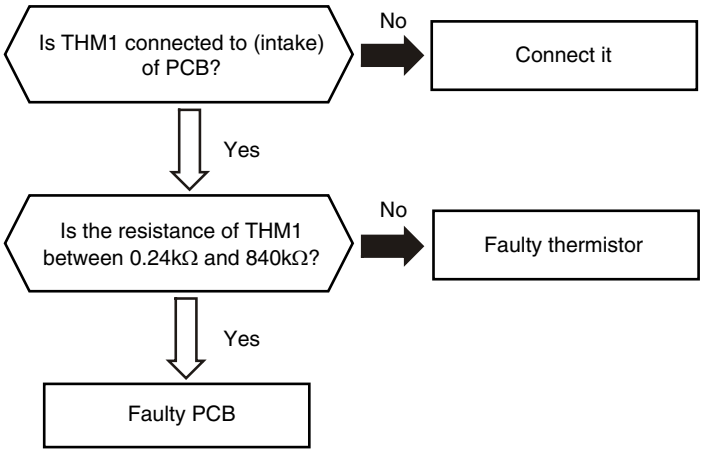


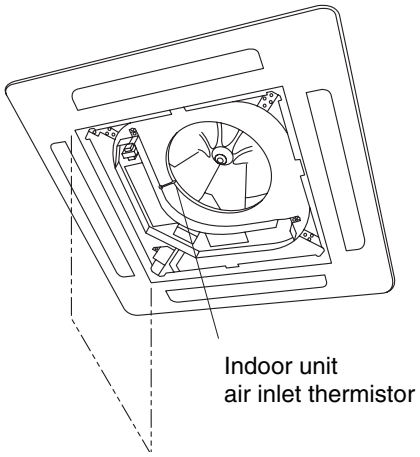



Phenomenon
Cause
Check item
Action (Turn OFF the main switch)
Excessively high discharge gas temperature (at the top of the compressor)
Ref. cycle is different from the electrical system
Check the ref. cycle and the electrical system
Repair the wiring
Shortage of refrigerant
Check the pressures
Correctly charge refrigerant
Faulty Ex. valve
Refer to 8.3.4.
Replace the ex. valve if faulty
Faulty PCB
Fault
Replace PCB and check the operation
Replace PCB if faulty
Disconnected wires for Ex. valve control
Check the connections
Repair the wiring connection
Faulty gas bypass solenoid valve
Ref. leakage
Replace the solenoid valve if faulty
Faulty discharge gas thermistor
Fault
Measure the resistance
Replace the thermistor if faulty
Incorrect mounting
Check the mounting state
Correctly mount the thermistor
Incorrect connection
Check the connections
Remove looseness, replace the connector or repair the connections

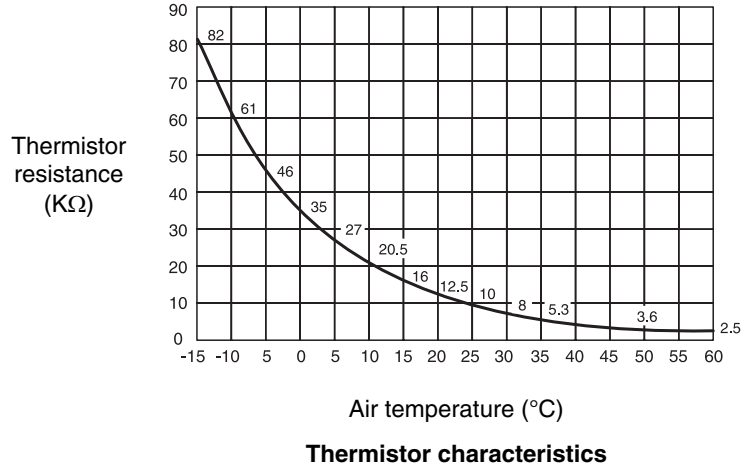
Alarm code	Abnormal operation of thermistor for the indoor unit air inlet temperature (air inlet thermistor)
11	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling process or the heating process. The system is automatically restarted when the fault is removed.





Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air inlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

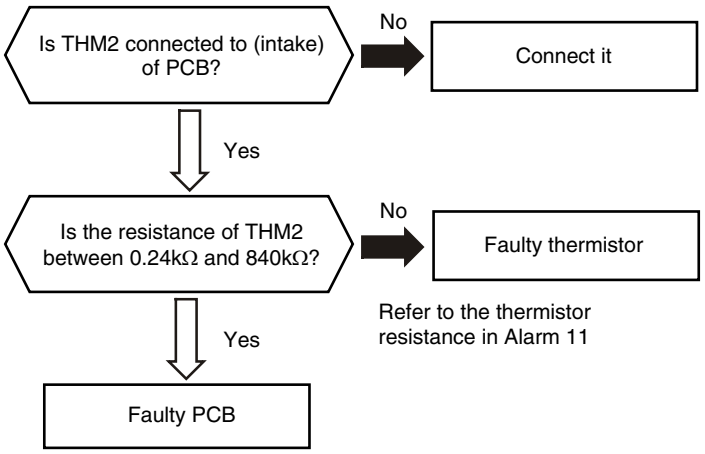


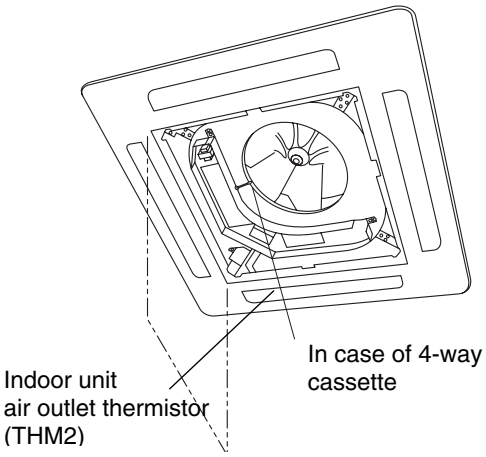
Thermistor characteristics

NOTE:
This data is applicable to the following thermistors:
1. *Indoor unit discharge air temperature,*
2. *Indoor unit liquid refrigerant temperature*
3. *Indoor unit air inlet temperature*
4. *Outdoor temperature*
5. *Outdoor unit evaporating temperature*
6. *Indoor unit gas piping*

Alarm code	
12	**Abnormal operation of the thermistor for the indoor discharge air temperature (air outlet thermistor)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling process or the heating process. The system is automatically restarted when the fault is removed.

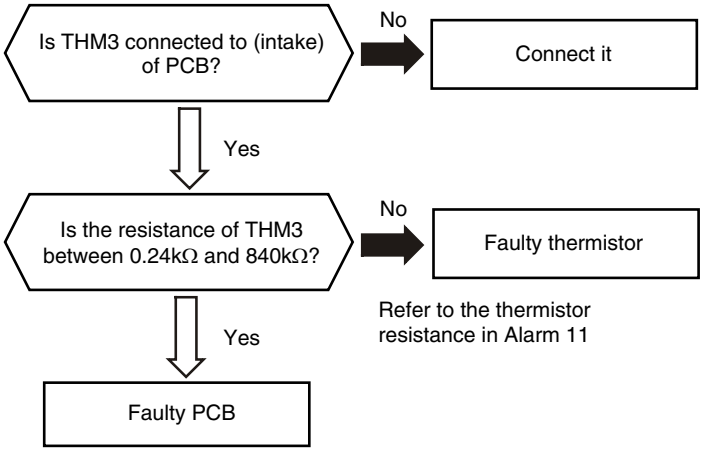


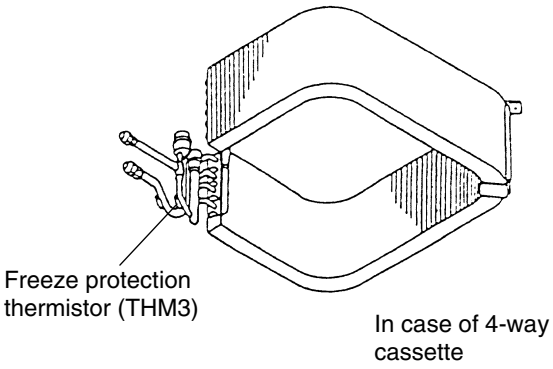


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air outlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Abnormal operation of the thermistor for the indoor unit heat exchanger liquid pipe temperature (freeze protection thermistor)
13	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling process or the heating process. The system is automatically restarted when the fault is removed.

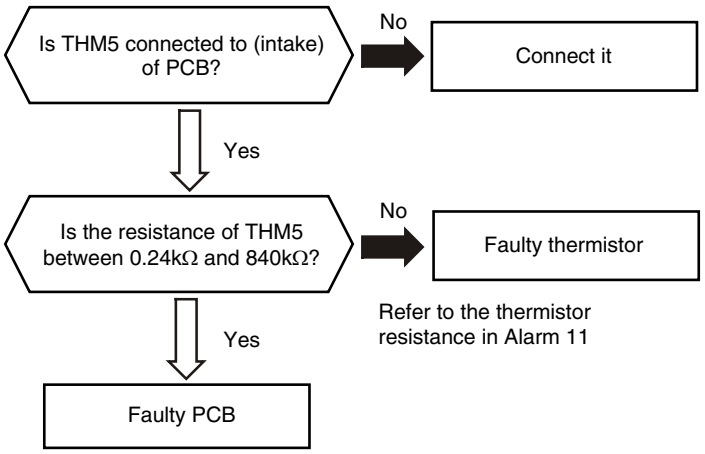


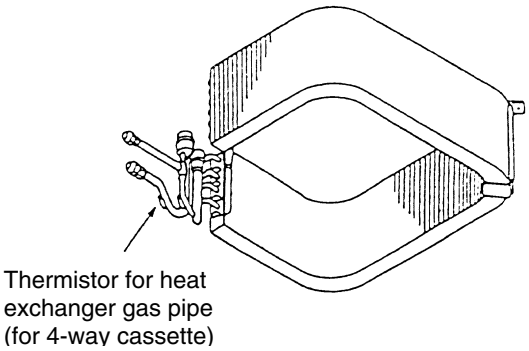


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty I.U. gas pipe air inlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Abnormal operation of the thermistor for the indoor unit heat exchanger gas pipe temperature (gas piping thermistor)
14	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling process or the heating process. The system is automatically restarted when the fault is removed.

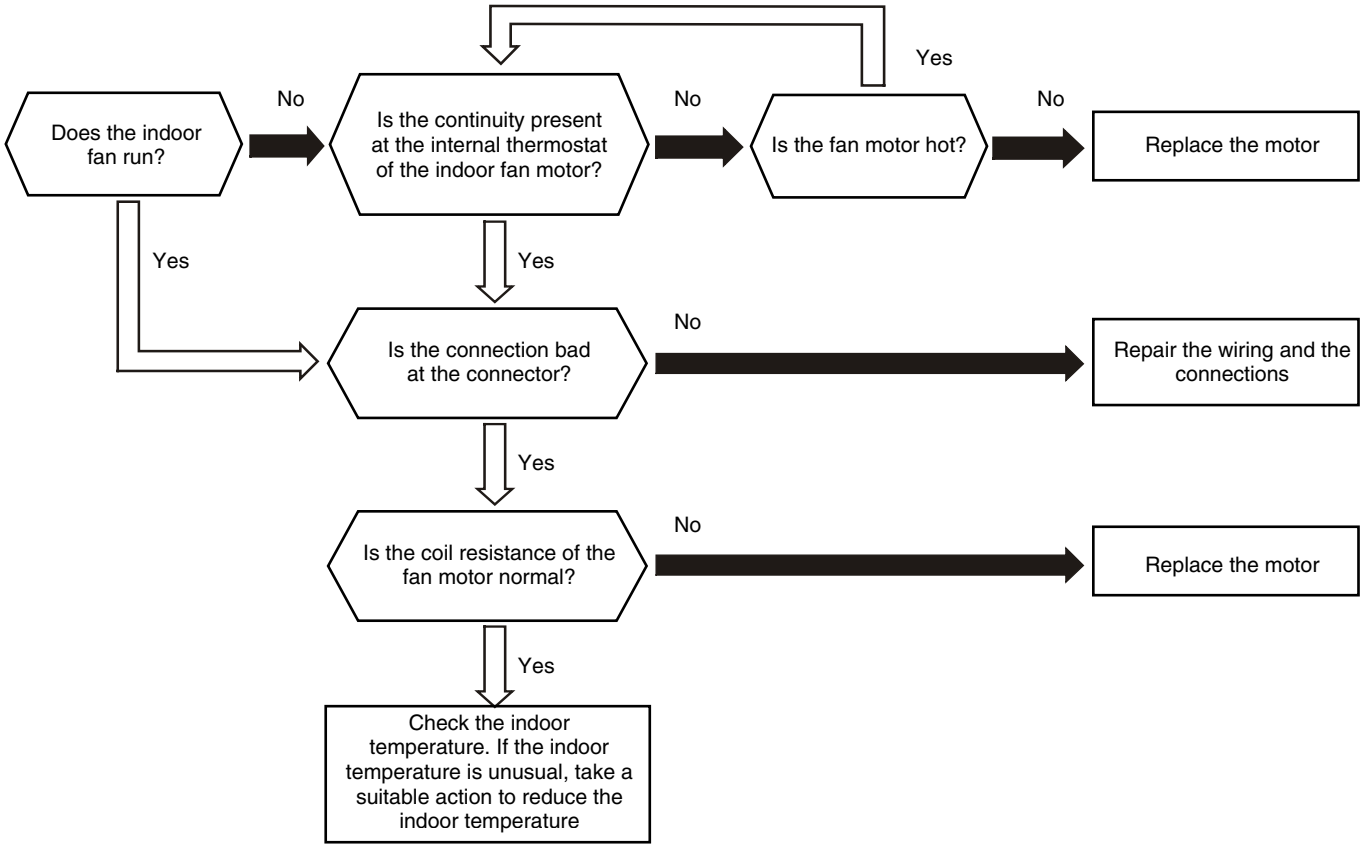




Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air inlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Activation of the protection device for the indoor fan motor (except RCI and RPK-Model 1.5-2.0 HP)
19	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed when the temperature of the internal thermostat for the indoor fan motor is higher than 130 °C.



Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the internal thermostat for the indoor unit fan motor	Faulty indoor unit fan motor		Measure the coil resistance and the insulation resistance	Replace the motor if faulty
	Faulty internal thermostat	Fault	Check the continuity after the fan motor temperature decreases to room temp	Replace the fan motor if there is no continuity
		Insufficient contacting	Measure the resistance by means of the tester	Correct looseness. Replace the connectors
		Incorrect connection	Check the connections	Repair the connections

Alarm code	
19	**Activation of protection device for indoor fan motor (RCI-Model)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. and the alarm code is indicated on the display of the outdoor unit PCB.
  – This alarm code is indicated when the following condition occurs thre times in 30 minutes.
  – Indoor fan rotates less than 70 rpm for 5 seconds during operation.

Does the indoor fan run?

When the cause is checked by this flow chart, confirm with the fan speed setting is Hi

↓ No

Check the connector as shown on the right

PCB1: CN1, CN19, PCN1, PCN7
PCB2: CN201, CN202, PCN201, PCN202, PCN203, N (Faston)

↓ Yes

Is LED 1 on PCB2 OFF? — Yes → Faulty PCB2 → Insuffcient voltage for PCB2 (DC 280V) → Replace PCB2

↓ No

Is DC power supply for PCB2 correctly? — No → Faulty PCB2 → Is the voltage between Vcc 15 and GND1 of PCB2 15V ±10% → Replace PCB2

↓ Yes

Is LED 4 on PCB1 OFF? — Yes → Faulty PCB1 or Transformer → Insuffcient voltage for PCB 1 → Replace PCB1 or Transformer

↓ No

Is DC power supply for PCB1 correctly? — No → Faulty PCB1 or Transformer → Is the voltage between Vcc05 and GND of PCB1 5 ±5%; Is the voltage between Vcc12 and GND of PCB1 12 ±10% → Replace PCB1 or Transformer

↓ Yes

Is fan motor speed control command to fan motor correctly? — Yes → Faulty fan motor → Remove CN201 on PCB2. Is the voltage between CN201 #3 and GNC1 more than 1V? → Replace fan motor

↓ No

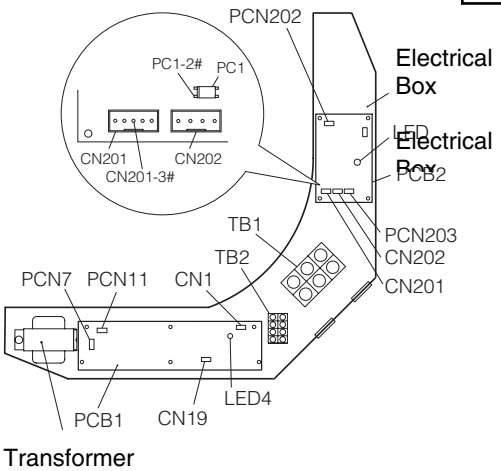
Is ulse signal to PCB2 correctly? — Yes → Faulty PCB2 → Is the voltage between CND of PCB1 and PC1 2# of PCB2 several voltage? → Replace PCB2

↓ No

Faulty PCB1

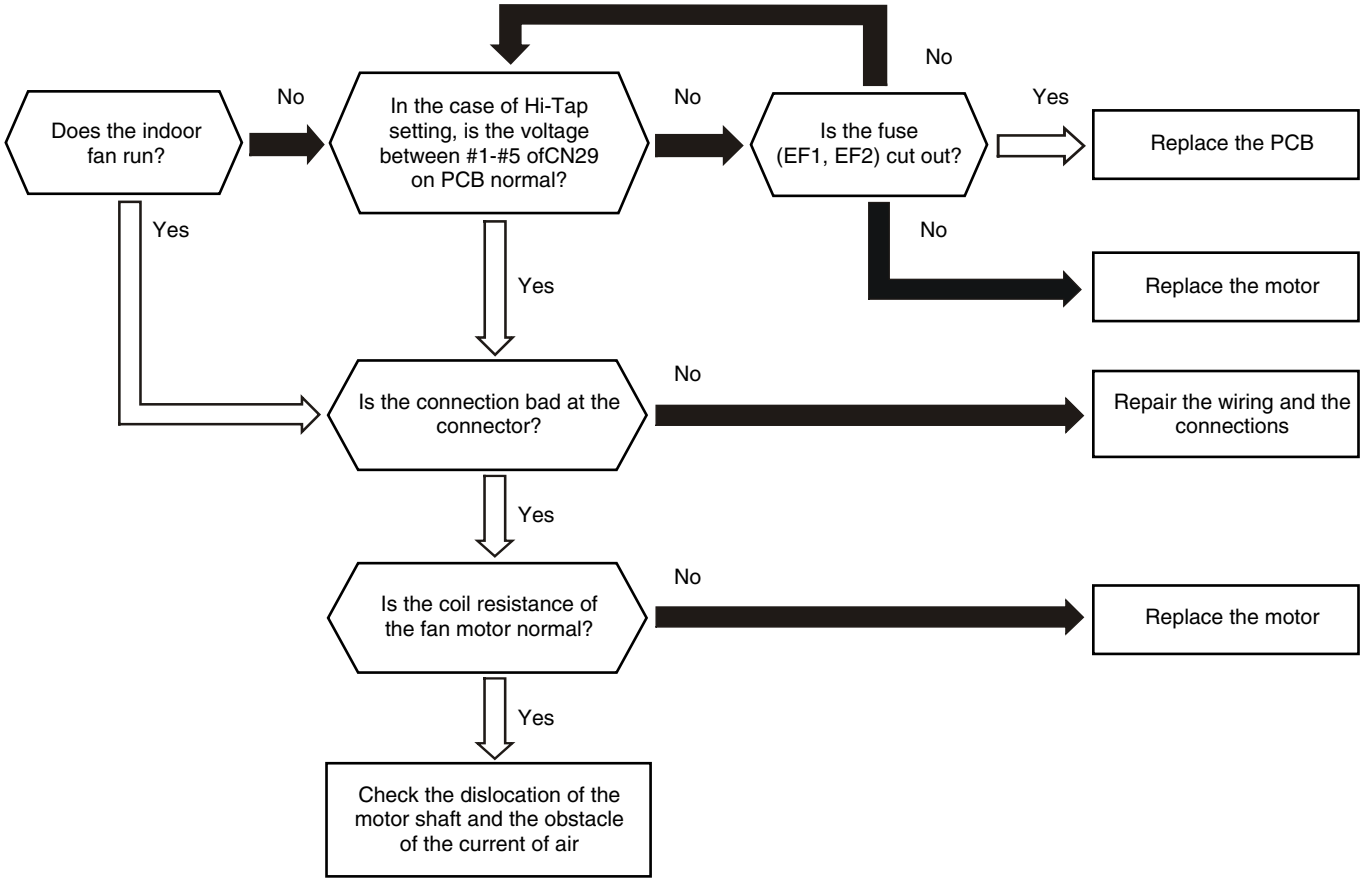
↓ Yes

Replace PCB1



Alarm code	
19	**Activation of protection device for indoor fan motor (RPK-Model)**

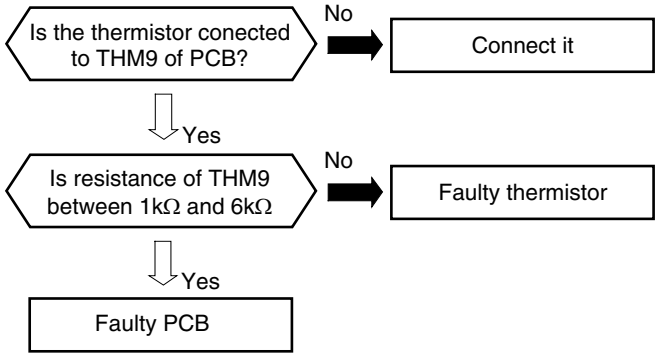
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed when the running current of the indoor fan motor is higher than 1A.

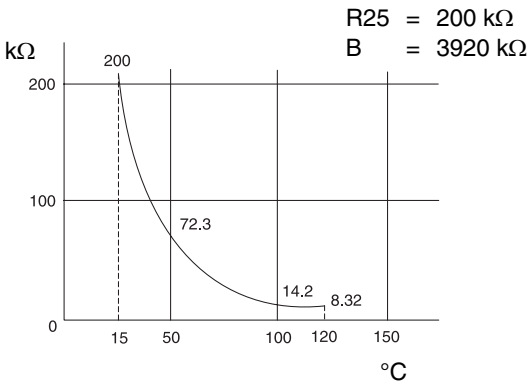


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the overcurrent protection device for the indoor fan motor	Faulty indoor unit fan motor		Measure the coil resistance and the insulation resistance	Replace the motor if faulty
	Faulty PCB	Fault	Check the output voltage and the fuse in the case of Hi-Tap setting	Replace the fan motor if there is no continuity
		Insufficient contacting	Measure the resistance by means of the tester	Correct looseness. Replace the connectors
		Incorrect connection	Check the connections	Repair the connections

Alarm code	
20	**Abnormality of Thermistor for Discharge Gas Temperature (Compressor Thermistor)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are indicated on the display of the outdoor unit PCB.
  - This alarm code is indicated when the thermistor is short-circuited (less than 1 kΩ) or cut (greater than 6 MΩ) during the cooling or heating operation.





Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty Top of Compressor thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check wiring to PCB1	Repair the wiring and the connections
Faulty PCB1		Replace PCB1 and check the operation	Replace PCB1 if faulty

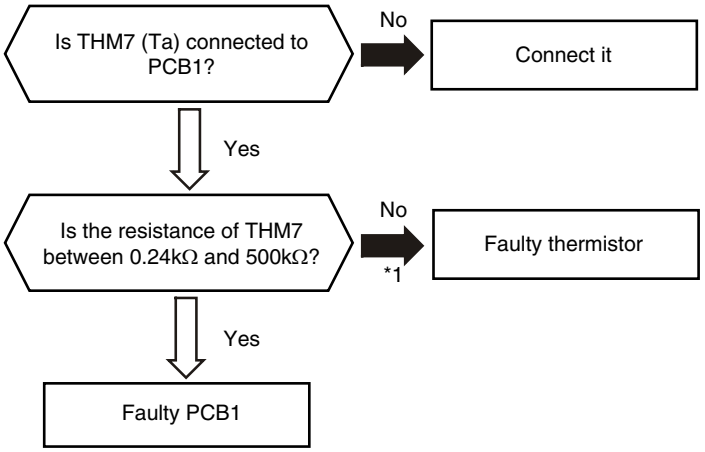
Temperature (°C)	Resistance (kΩ)
0	640.44
5	500.66
10	394.16
15	312.41
20	249.20
25	200.00
30	161.45
35	131.06
40	106.96
45	87.74
50	72.32
55	59.97
60	49.96

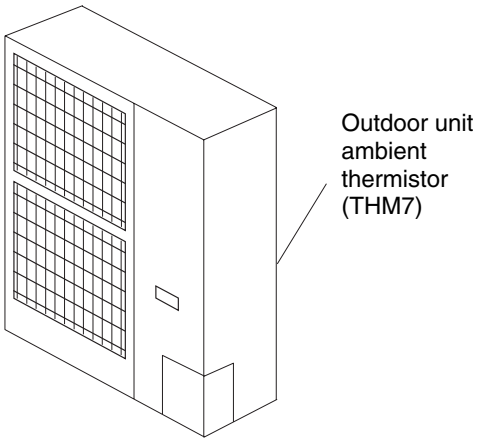
Temperature (°C)	Resistance (kΩ)
65	41.79
70	35.11
75	29.61
80	25.07
85	21.31
90	18.17
95	15.55
100	13.35
105	11.50
110	9.93
115	8.60
120	7.47
125	6.51

The resistance value has fudge factor (±10%)

Alarm code	Abnormal operation of the thermistor for the outdoor temperature (outdoor unit ambient thermistor)
22	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.2 kΩ) or cut (greater than 500 kΩ) during the operation. However, this alarm occurs during the test run mode only. In the case that the thermistor is abnormal during the operation, the operation continues based on the assumption that the outdoor temperature is 35 °C (Cooling) / 6 °C (Heating).



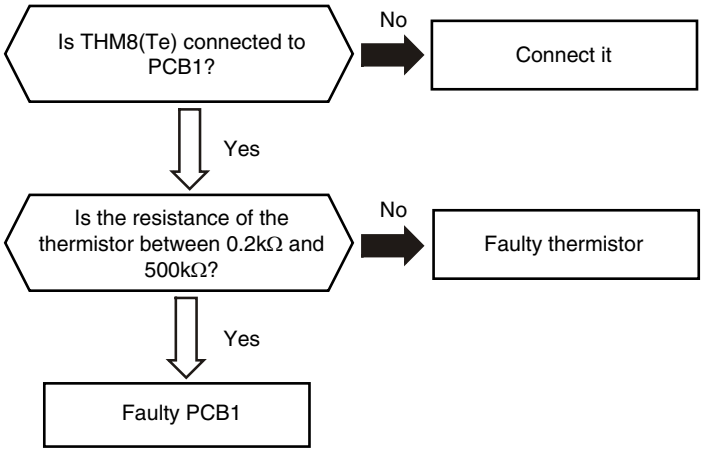


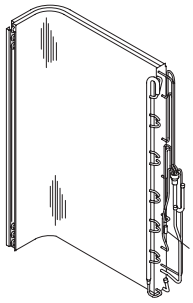
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty thermistor for the outdoor unit ambient	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the wiring to PCB	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

(*1) To check the thermistor chart refer to Alarm 12

Alarm code	
24	**Abnormal operation of the thermistor for the evaporating temperature during the heating process (outdoor unit)**

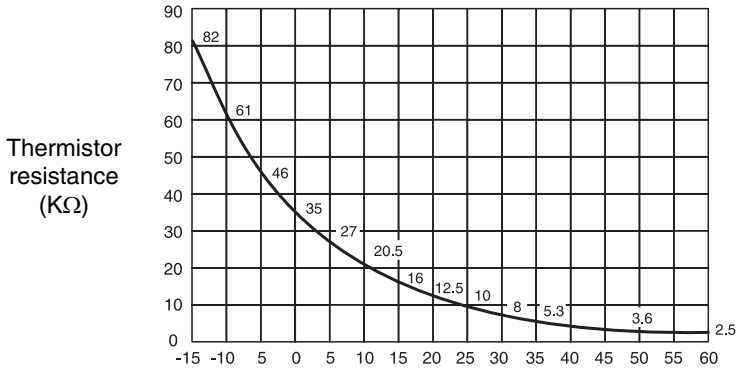
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB. If you find an abnormal operation of the thermistor, check all the thermistors as shown below.
  – The evaporating thermistor during the heating process is attached to the heat exchanger as shown in the figure below.
  If this the thermistor is faulty, such as short-circuit (less than 0,2kΩ) or cut (more than 840kΩ) during eight minutes continuously, this alarm is displayed. The position is indicated below.





Thermistor
(Evaporating Temperature for Outdoor Unit)

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty thermistor for the evaporating temperature during heating	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect Connection	Check the wiring to PCB	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty



Thermistor characteristics

Alarm code	Incorrect capacity setting or combined capacity between the indoor units and the outdoor unit
31	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
  The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  - This alarm code is displayed when the total indoor unit capacity is smaller than 80% or greater than 120% of the combined outdoor unit capacity.

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Incorrect capacity setting of the indoor unit		Check capacity setting on indoor units PCB	Correctly set the DIP switch DSW3
Incorrect capacity setting of the outdoor unit		Check tcapacity setting on outdoor unit PCB	Correctly set the DIP switch DSW3
Refrigeration cycle setting of outdoor unit and indoor unit is different		Check refrigerant cycle setting on outdoor unit PCB and indoor unit PCB	Set them correctly

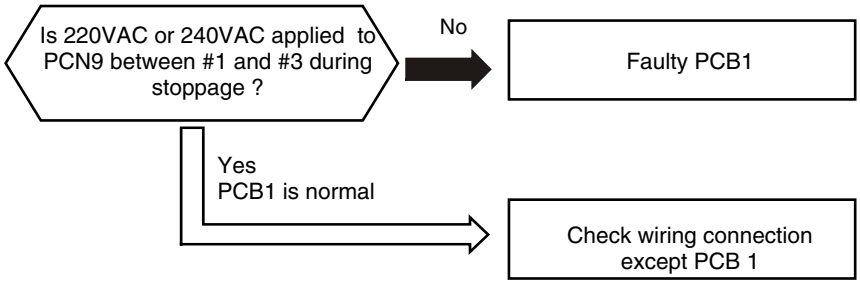
Alarm code	
35	**Incorrect indoor unit number setting**

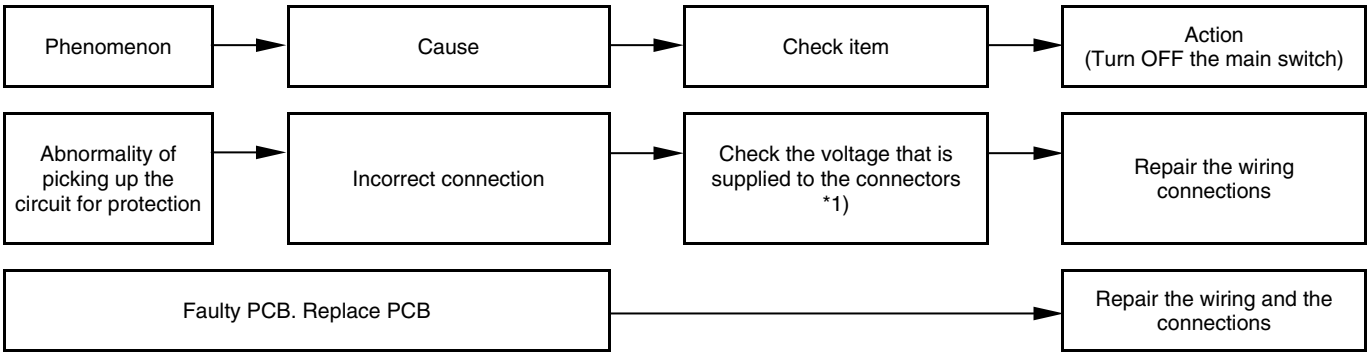
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed five minutes after the power is supplied to the outdoor unit when the indoor unit number which is connected to the outdoor unit is duplicated by the setting of the RSW.

In the case of H-LINK System, this alarm code is displayed when the DSW1 or DSW4 of the outdoor unit PCB and the DSW5 of the indoor unit PCB are incorrectly set.
In this case, correctly set DSW1 or DSW4 on the outdoor unit PCB and DSW5 on the indoor unit PCB after turning off the main switch.

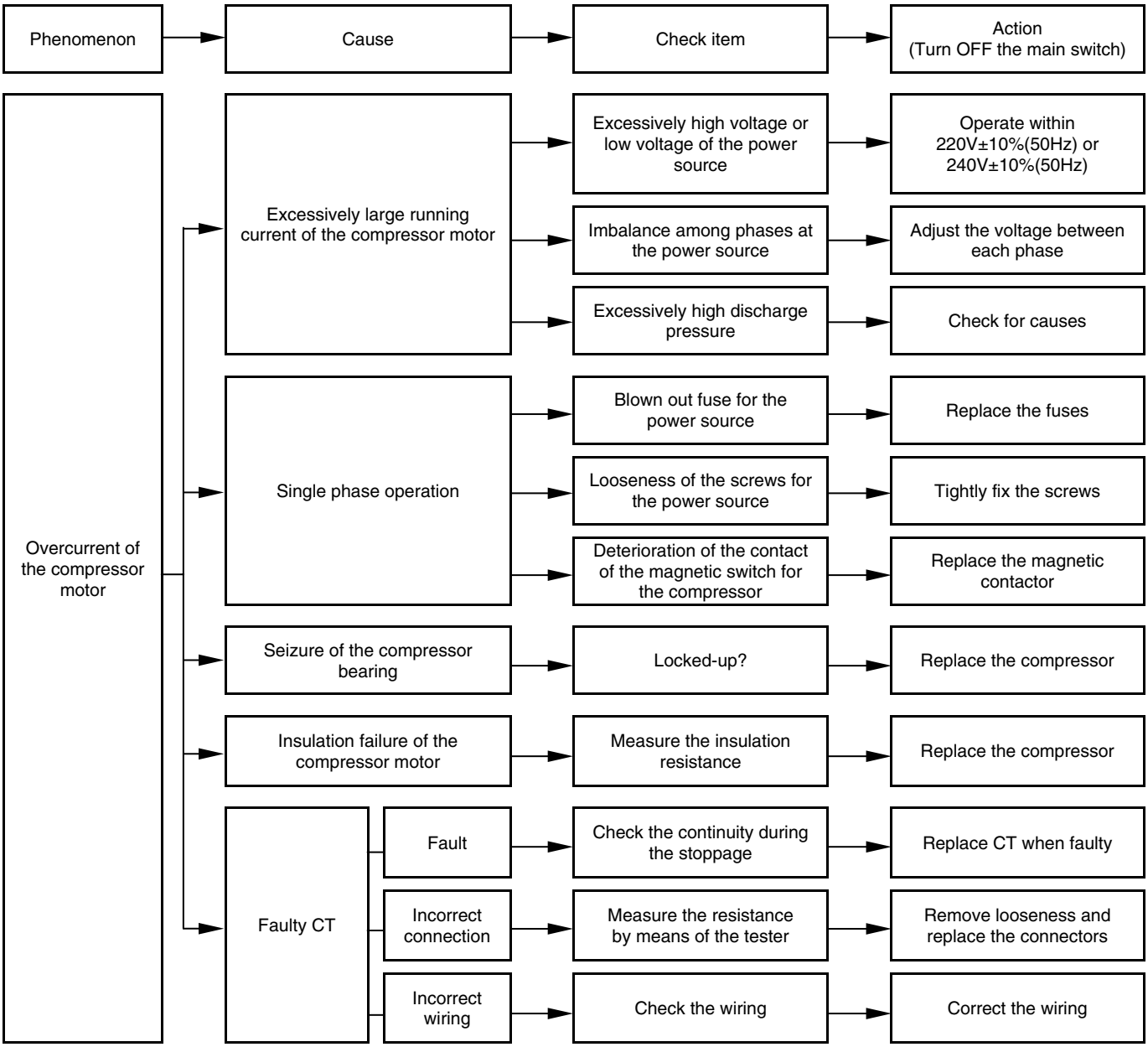
Alarm code	
38	**Abnormal operation of picking up the circuit for the protection (outdoor unit)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed when AC220V or AC240V is supplied to the voltage between the terminals #1 and #3 of PCN9 and Faston terminal N on PCB in the outdoor unit during compressor stoppage.



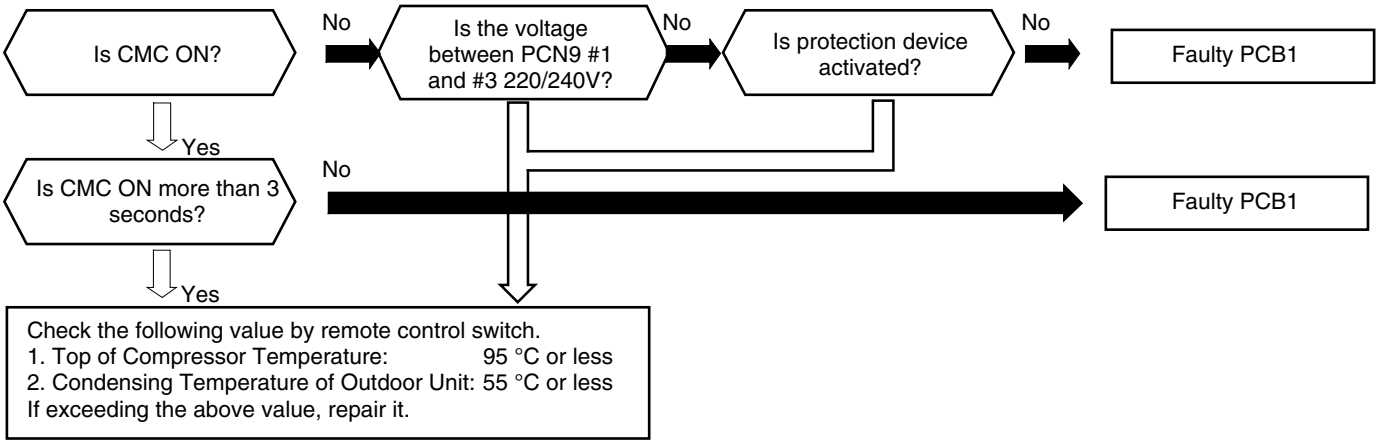


*1): Check the wiring system connecting PCN9 on PCB.


Phenomenon
Cause
Check item
Action
(Turn OFF the main switch)
Overcurrent of the compressor motor
Excessively large running current of the compressor motor
Excessively high voltage or low voltage of the power source
Operate within 220V±10%(50Hz) or 240V±10%(50Hz)
Imbalance among phases at the power source
Adjust the voltage between each phase
Excessively high discharge pressure
Check for causes
Single phase operation
Blown out fuse for the power source
Replace the fuses
Looseness of the screws for the power source
Tightly fix the screws
Deterioration of the contact of the magnetic switch for the compressor
Replace the magnetic contactor
Seizure of the compressor bearing
Locked-up?
Replace the compressor
Insulation failure of the compressor motor
Measure the insulation resistance
Replace the compressor
Faulty CT
Fault
Check the continuity during the stoppage
Replace CT when faulty
Incorrect connection
Measure the resistance by means of the tester
Remove looseness and replace the connectors
Incorrect wiring
Check the wiring
Correct the wiring

Alarm code	Cooling overload (High pressure switch will be activated)
41	

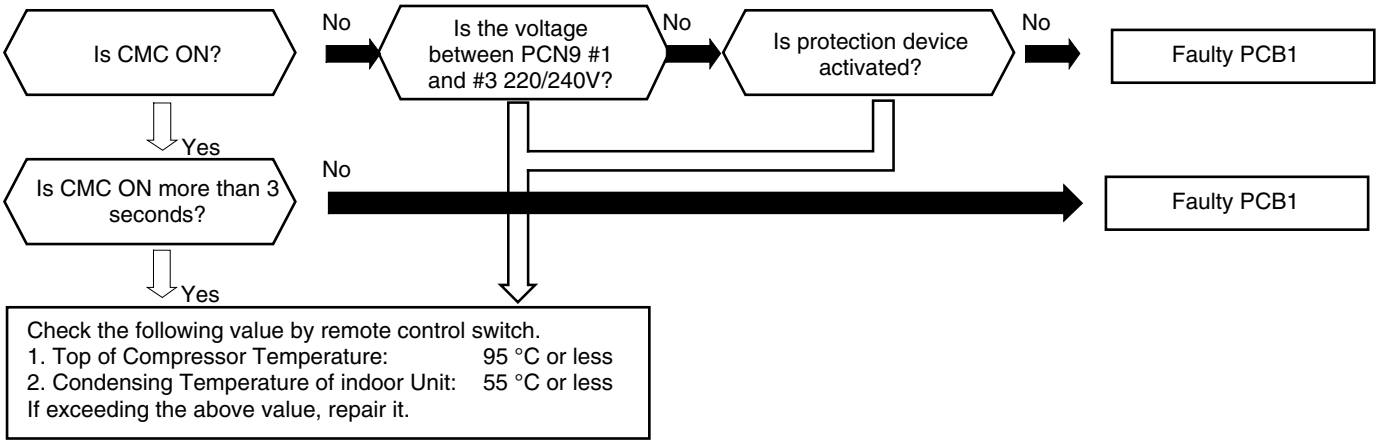
- The RUN LED flickers and "ALARM" code displayed flickers (1 time / 1 second).
  - This alarm code is indicated when outdoor pipe temperature (THM8) is higher than 55 °C and top compressor temperature (THM9) is higher than 95 °C.



Phenomenon	Cause		Check Item	Action (Turn OFF main switch)
Cooling overload	Excessively High Discharge Pressure	Insufficient Air Flow to Outdoor Unit Heat Exchanger	Clogging of Outdoor Unit Heat Exchanger?	Remove Clogging.
			Obstacles at Inlet or outlet of outdoor unit heat exchanger.	Remove obstacles.
			Is service space for outdoor unit sufficient?	Secure service space.
			Correct Fan Speed?	Replace fan motor.
		Excessively High Air Temp. to Outdoor Unit Heat Exchanger	Short-Circuited Air to Outdoor Unit?	Remove cause of short-circuited Air.
			Any Other Heat Load near Outdoor Unit?	Remove heat source.
		Excessively Charged Refrigerant	Check each Temp.	Correctly Charge Refrigerant.
		Non-Condensed Gas in Cycle	Check each Temp. and Pressure.	Charge Refrigerant after Vacuum Pumping.
		Clogging of Discharge Piping	Check for Clogging.	Remove Clogging.

Alarm code	Heating overload (High pressure switch will be activated)
42	

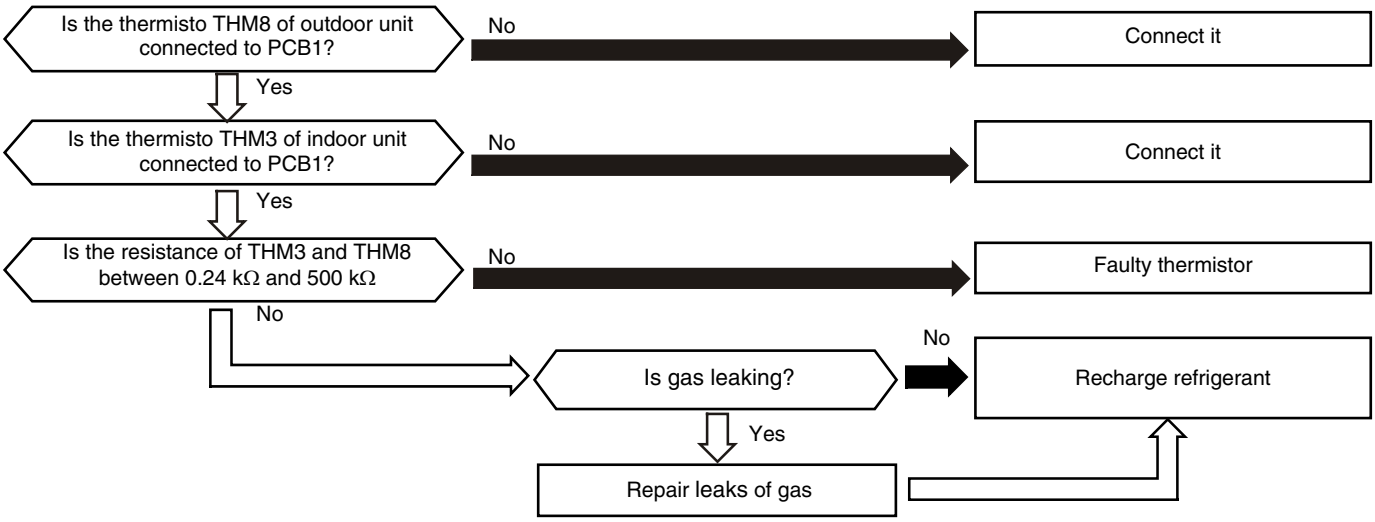
- The RUN LED flickers and "ALARM" code displayed flickers (1 time / 1 second).
  - This alarm code is indicated when indoor pipe temperature (THM5) is higher than 55 °C and top compressor temperature (THM9) is higher than 95 °C.



Phenomenon	Cause		Check Item	Action (Turn OFF main switch)
Heating Overload	Excessively High Discharge Pressure	Insufficient Air Flow to Indoor Unit Heat Exchanger	Check for filter Clogging	Remove Clogging.
			Check for any obstacles at inlet and outlet of Indoor Unit	Remove obstacles.
			Check Indoor Fan speed	Replace Fan motor
		Excessively High Air Temp. to Indoor Unit Heat Exchanger	Check whether or not short-circuited air exist	Remove cause of short-circuited Air.
		Excessively Charged Refrigerant	Check refrigerant	Correctly Charge Refrigerant.
		Non-Condensed Gas in Cycle	Check each Temp. and Pressure.	Charge Refrigerant after Vacuum Pumping.
		Clogging of Discharge Piping	Check for Clogging.	Remove Clogging.

Alarm code	Activation for protecting the system from excessively low suction pressure (protection from the vacuum operation)
47	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - In the case that the evaporating temperature (cooling: liquid refrigerant piping temperature of the indoor unit, or heating: evaporating temperature of outdoor unit) is lower than 35 °C retry operation is performed 3 minutes after compressor stoppage. However, when the state occurs more than 3 minutes including 3 in one hour, this alarm code is indicated.

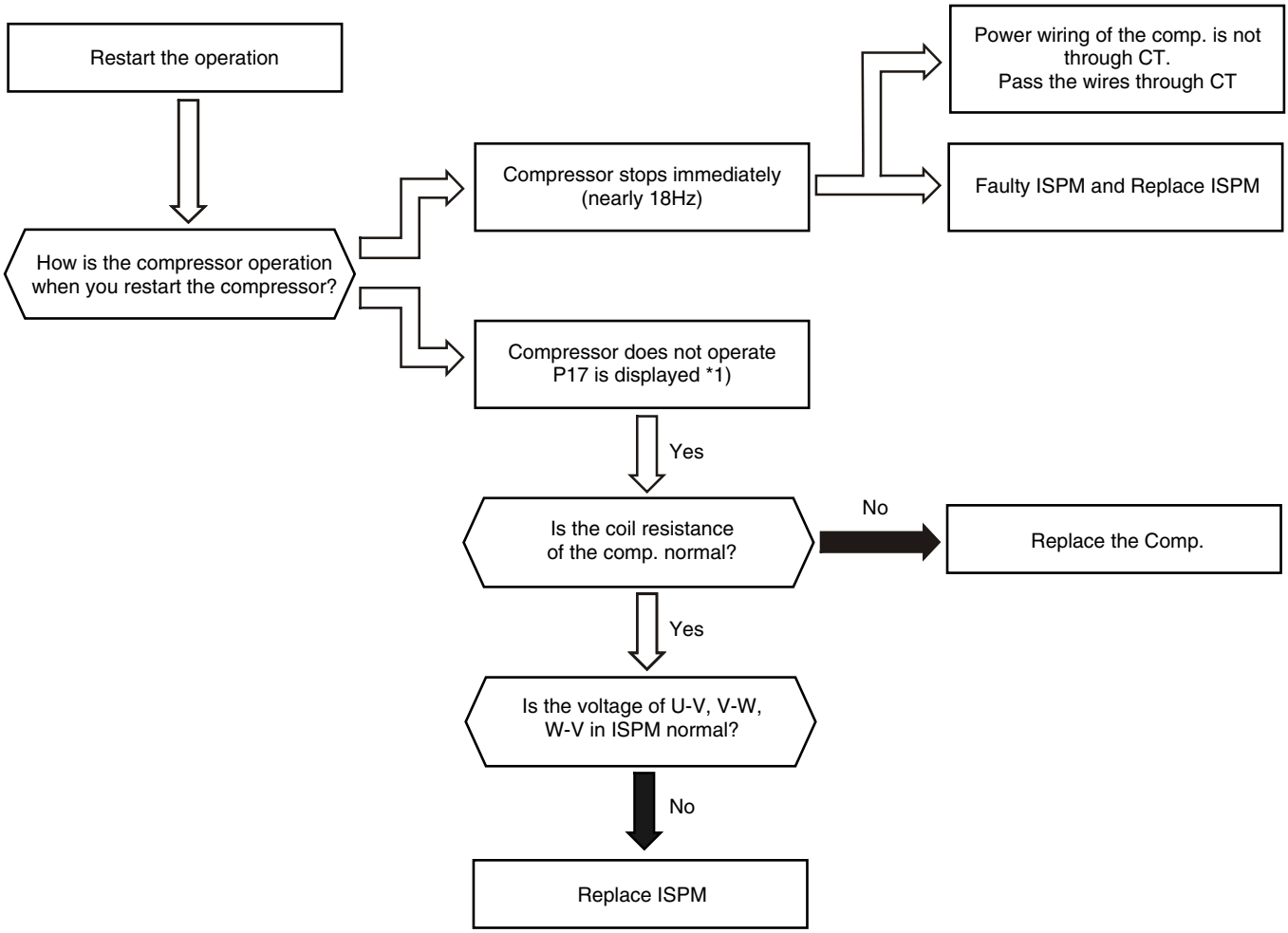


Phenomenon	Cause	Check Item	Action (Turn OFF main switch)
Excessively Low Suction Pressure (in Vacuum)	Shortage of Ref.	Check ref. charged volume or check for leakage.	Repair leakage and correctly charge.
	Closed Stop Valve	Check stop valve. .	Open stop valve.
	Abnormal Evaporating thermistor (Te)	Check connector for PCB.	Replace pressure sensor if faulty.
	Incorrect Connection between Indoor Unit and Outdoor Unit	Check electrical system and ref. cycle.	Correctly connect between indoor unit and outdoor unit.
	Locked capilary	Check capilary.	Replace capilary.

Alarm code	
51	**Abnormal operation of the current transformer (0a detection)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the current transformer is abnormal (0A detection or 5A alarm condition) and the alarm has more than three occurrences in 30 minutes.

Condition of Activation: When the frequency of the compressor is maintained at 15~18Hz after the compressor is started, one of the absolute values of the running current at each phase U+, U-, V+ and V- is less than 0.5A (including 0.5A).



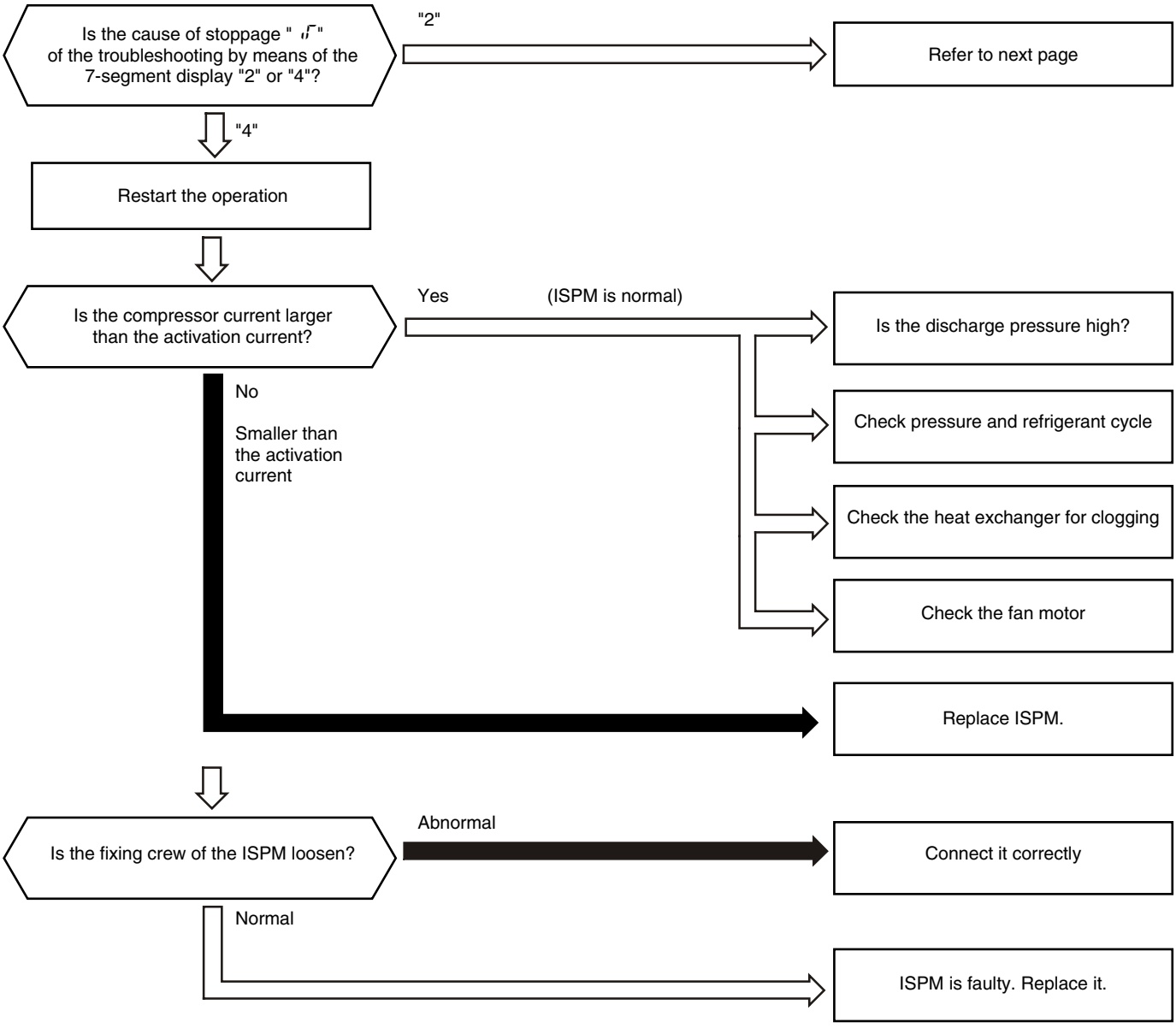
*1): P17 is displayed on the 7-segment display on the outdoor unit PCB.

Alarm code	Activation for protecting the inverter against the instantaneous overcurrent (1)
52	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - If the alarm code "51" or "54" occurs 3 times within 30 minutes, the alarm code which occurred for the third time, the retry operation is performed twice.
  - Conditions: The inverter current with 105% of the rated current ① runs continuously for 30 seconds or ② runs intermittently and the accumulated time reaches up to 3.5 minutes, in 10 minutes.

Current values appear in the next table:

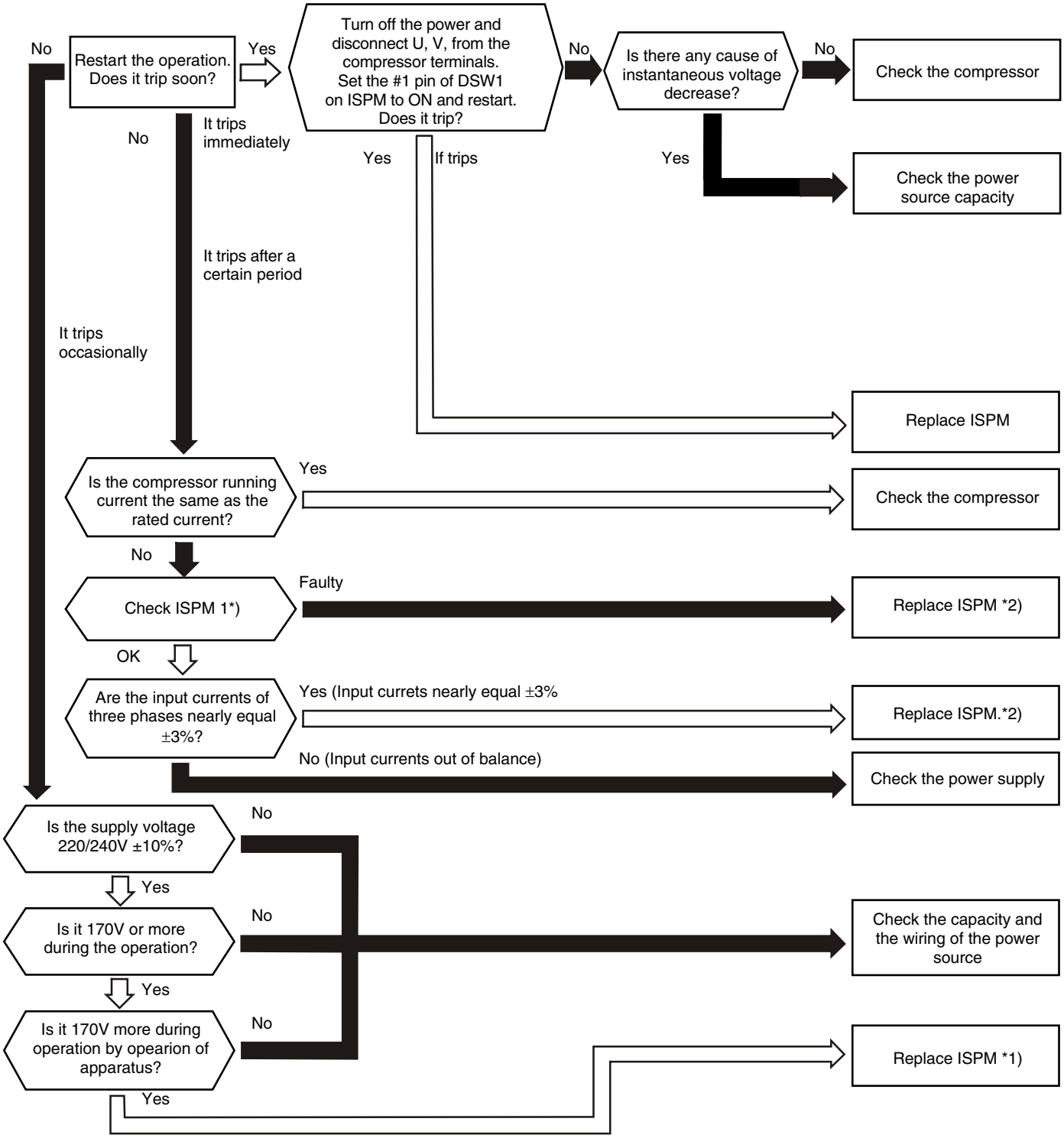
Model	Rated current 220-240V 50Hz
3 HVRNE	14.5 A
4 HVRNE	15.0 A
5 HVRNE	19.0 A
6 HVRNE	21.0 A



*1): Before replacing or the checking of inverter components, refer to item 8.3.4 regarding electrical discharge.

Alarm code	
52	**Activation for protecting the inverter against the instantaneous overcurrent (2)**

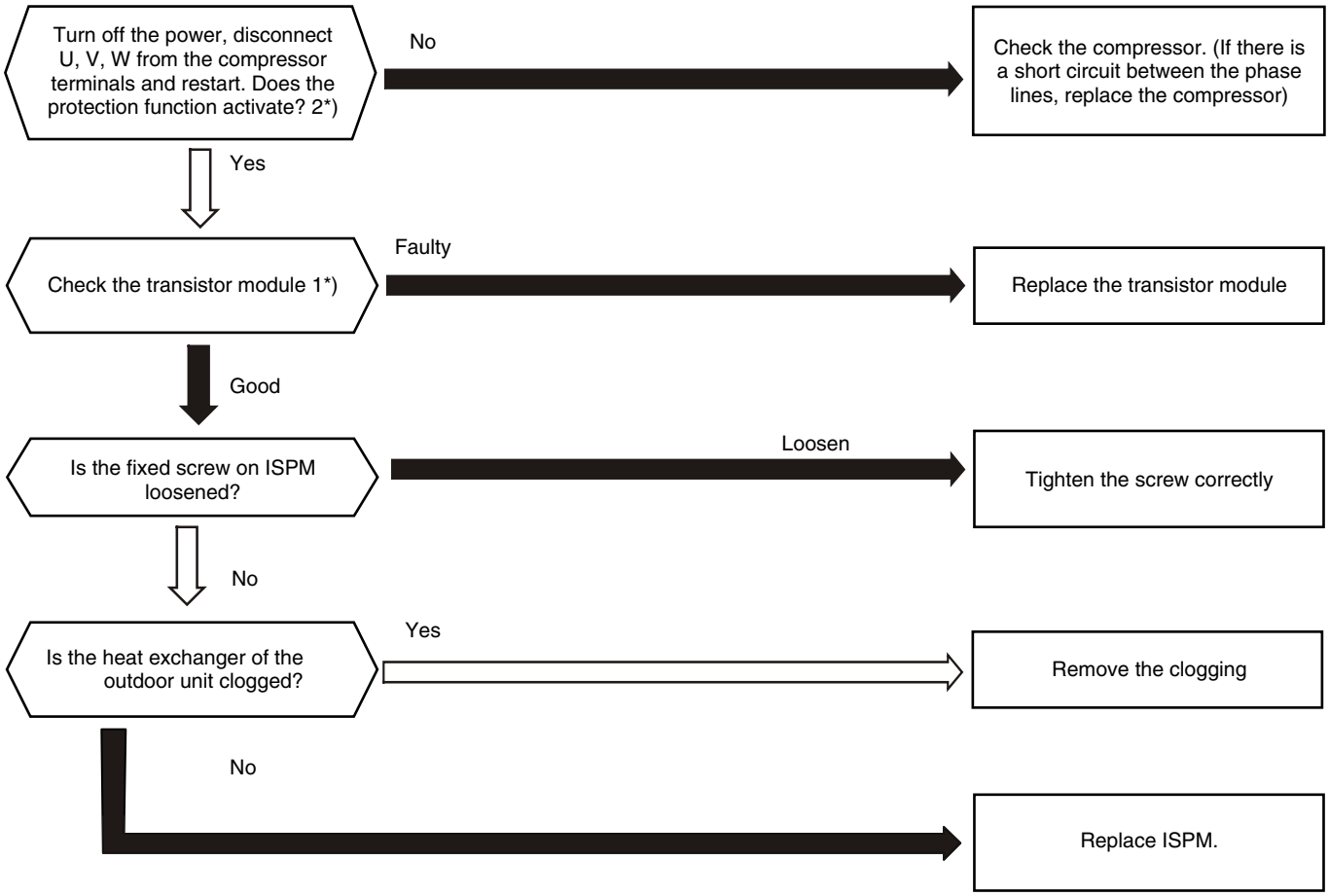
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - If the alarm code "51" or "54" occurs 3 times within 30 minutes, the alarm code which occurred for the third time, the retry operation is performed twice.
  - Conditions: The inverter current with 105% of the rated current ① runs continuously for 30 seconds
  - Conditions: the inverter current is 150% of the rated current during 30 seconds continuously or intermittently, and the accumulated time is more than 3.5 minutes during 10 minutes. The inverter current is 150% or greater of the rated current.



1*, 2*): Regarding the checking of inverter components refer to item 8.3.4.

Alarm code	
53	**Activation for protecting the ISPM**

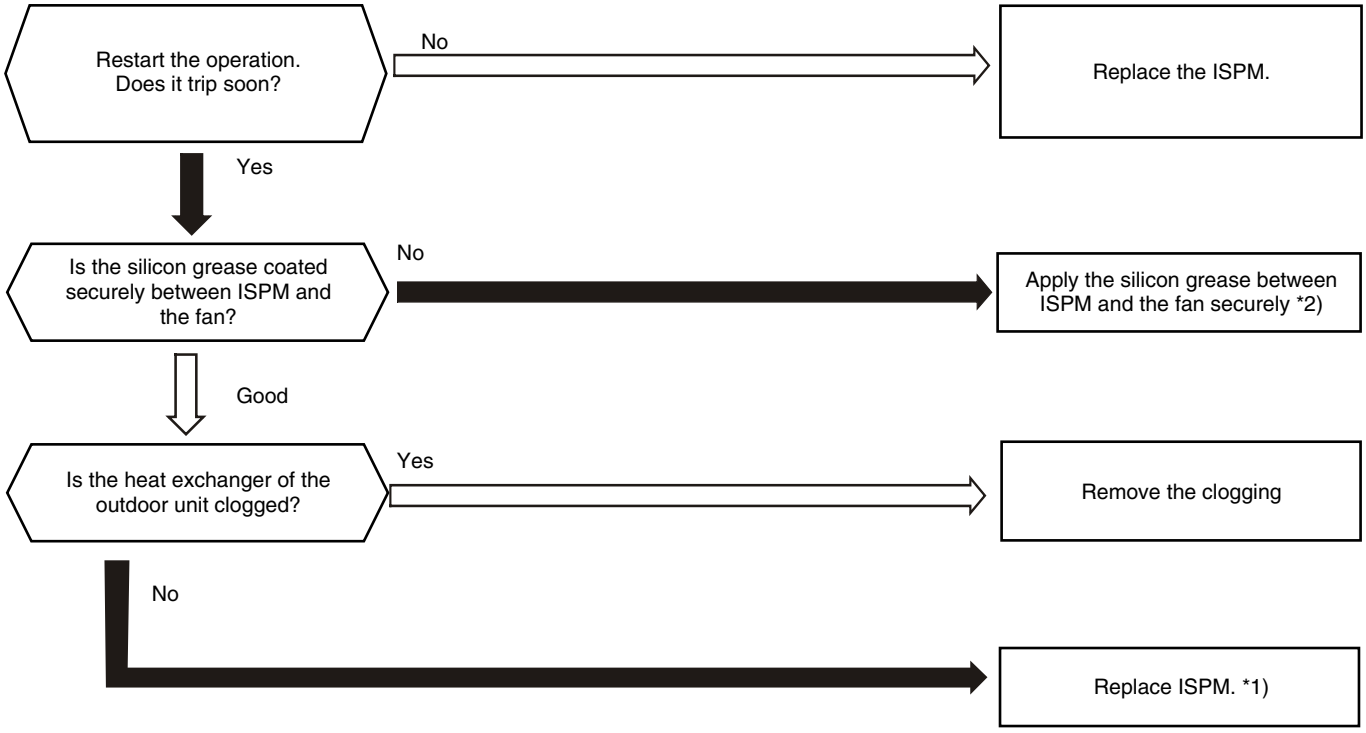
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - ISPM have detecting function abnormality. If the alarm code "51" or "54" occurs three times within 30 minutes, the alarm code which occurred for third time is displayed. The retry operation is performed twice. Conditions: the abnormal current to the ISPM, such as short-circuited, grounded, overcurrent or control voltage decrease.



1*): Regarding replacing or checking method for the ISPM refer to item 8.3.4.
2*): Set the #1 pin of DIP switch DSW1 on ISPM to ON when you are restarting with the terminals of the compressor disconnected. After the troubleshooting, set the #1 pin of DIP switch DSW1 on ISPM to OFF.

Alarm code	Increase in the inverter fan temperature
54	

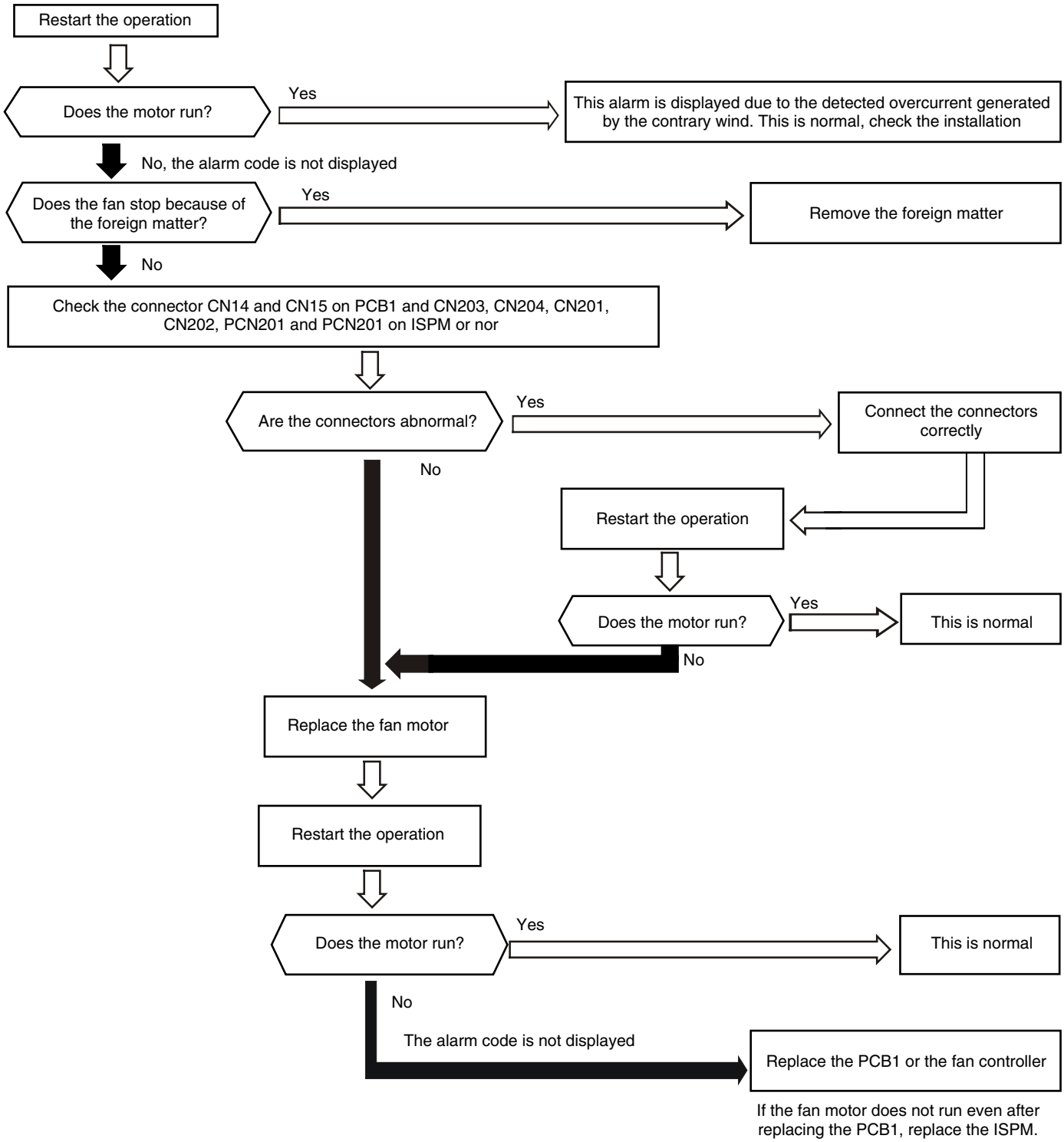
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  * If the alarm code "51" or "54" occurs three times within 30 minutes, the alarm code which occurred for the third time is displayed. The retry operation is performed twice. Conditions: This alarm is displayed when the temperature of the internal themostat for ISPM is higher than 100ºC.



1*): Refer to "Procedure for Checking other main parts" for the replacing procedure and the checking procedure for the ISPM.
2*): Use the silicon grease that is provided as an spare part.

Alarm code	Fan controller protection activating
57	

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  * This alarm is displayed when the revolution pulse output from the fan motor is 10rpm or less and the reverse revolution signal is detected. The fan motor stops once. After ten seconds, the fan motor restarts. If this occurs more than ten times in 30 minutes, this alarm is displayed. The abnormal operation occurs when the fan motor stops and clogs.



Alarm code	Compressor protection
EE	

* This alarm code is displayed when one of the following alarms occurs three times within six hours. If the outdoor unit operates continuously without removing the cause of the alarm, the compressor may be seriously damaged.

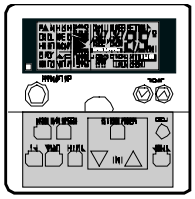
Alarm code:	Content of abnormal operation
02	Tripping of the protection device in the outdoor unit
07	Decrease in the discharge gas superheat
08	Increase in the discharge gas temperature
41	Cooling overload
42	Heating oveload
47	Low pressure decrease protection activating

You can check these alarms by means of the check mode 1. Follow the action that is indicated in each alarm chart. You can clear these alarms only by turning OFF the main switch to the system. **However, you must pay careful attention before starting, because there is a possibility of causing serious damages to the compressors.**

8.2.3. TROUBLESHOOTING IN CHECK MODE

Use the CHECK switch of the remote control in the following cases:

1. When the RUN LED is flickering.
2. To trace back the cause of the malfunction after restarting from the stoppage while the RUN LED is flickering.
3. To check during the normal operation or during the stoppage.
4. To monitor the inlet air temperature and the discharge air temperature.



Check mode

- Check mode 1: Current data will be displayed
- Check mode 2: The data which was held immediately before the failure will be displayed

Normal mode

CHECK

Press for more than three seconds

- The indication will delay as the transmission between the remote control switch and the indoor unit takes about ten seconds.
- All the data may be displayed as "FF" or "- -" or "255". These transient data, which are produced temporarily by the software, do not affect the device functions at all. (The alarm code may also be displayed as "FF".)

Unit number and alarm code displayed

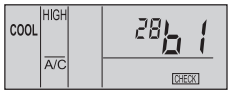
The alarm code that identifies the last fault that has occurred in the displayed unit.
The unit number of the connected unit or the unit number for which the checking mode was selected previously.

ADDS: Number of the Indoor Unit in No. ** Cycle
RN: No. ** Refrigerant Cycle

After seven seconds ← (A)

Within seven seconds to check another unit

Check mode 1



Forward:	Press the "⌃" switch to increase from 00 to 01 to 02 ···
Backward:	Press the "⌄" switch to decrease from 15 to 14 to 13 ···

Press "⌄" to see the previous indication
Press "⌃" to see the next indication

CHECK

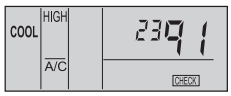
Press for more than three seconds

Unit number and alarm code displayed

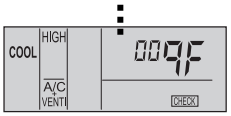
Press "⌃" to see the next data
Press "⌄" to see the previous data

After seven seconds ← See (A)

Check mode 2
(Refer to "Check mode 1" for details)



Press "⌃"



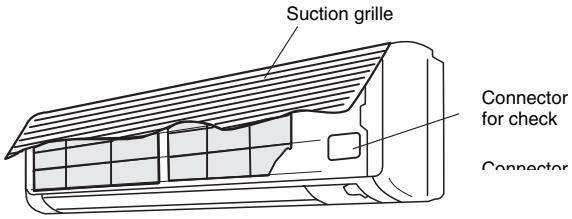
- In the Check mode 2, the data of the first three units that are connected serially to a remote control switch are available.
- You can press the CHECK switch to disable the Check mode 2.
  Check mode 1 cannot be disabled even if you press the CHECK switch.

Check mode disabled

CHECK

Press for more than three seconds

Although the wireless controller is used for the wall type indoor unit with the built-in receiver part, you can check the alarm code by connecting the PC-P1HE.



NOTE:

1. *The unit does not operate by pressing the operation switch.*
2. *The above function is available only when the alarm occurs.*
3. *The PCB check by means of the remote control switch is not available.*
4. *The indication is the data when you are connecting PC-P1HE. The indication is not the data before the alarm occurs.*

Contents of the Check mode 1

The next indication is shown if you press the part "▲" of the TEMP switch. If you press the part "▼" of the TEMP switch, the previous indication is shown.

Temperature indication

Indication of the category code
Indication of the temperature, etc

1	Indoor unit temp. setting (°C)	b1 22
2	Indoor unit air inlet temp. at thermistor (°C)	b2 20
3	Indoor unit discharge air temp. at thermistor (°C)	b3 55
4	Indoor unit heat exchanger liquid pipe temp °C	b4 20
5	Temperature at remote sensor (°C)	b5 25
6	Outdoor unit ambient temp. (°C)	b6 10
7	Indoor unit heat exchanger gas pipe temp. (°C)	b7 25
8	Outdoor unit evaporating temp. during heating (°C)	b8 02
9	Control information	b9 --
10	Discharge gas temp. at the top of the comp. chamber (°C)	bA 41

to next page

Normal
. . . Temperature displayed

Abnormal
- – – (Thermistor is open-circuited or PCB is defective)
- or
- 129 (Temp. for top of comp.)
- FF (Thermistor is short-circuited or PCB is defective)
- or
- 255
- or
- 127 (Temp. for top of comp.)

Refer to section 8.3.1 “Self-Checking Procedure of PCB by means of the Remote Control Switch"

During the transient periods such as starting time and other, the indicators "--" or "00" may be displayed for a limited time.

This is indicated only when a remote sensor is connected.
The indicator "--" is normally displayed.
RPK series cannot connect a remote sensor.
Therefore, the indicator is "--".

This indicates the internal information for the remote control switch.
In case of SET-FREE, this indication shows the number of running compressors.

(Ex.) During the operation of several compressors, the average temperature of two compressors is indicated.

If the temperature is higher than 126°C, " 126".

11	Thermo temp. of the remote control switch	bb 23

↓

Indication on micro-computer input /output

12	Micro-computer input/output in indoor unit	C1 4
13	Micro-computer input/output in outdoor unit	C2 -

↓

Indication of unit stoppage cause

14	Cause of stoppage	d1 01

↓

Abnormal operation occurrence counter

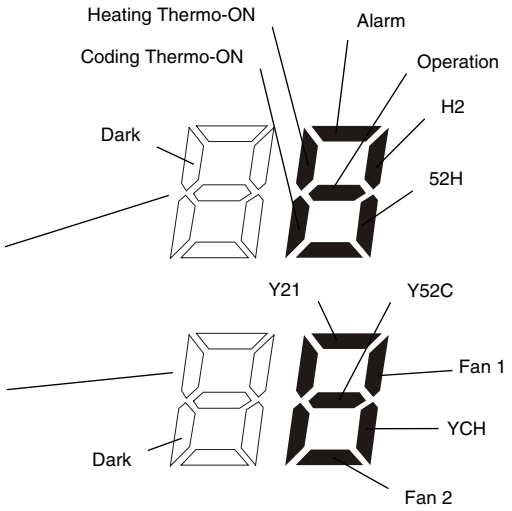
15	Abnormal operation occurrence counter	E1 01
16	Instantaneous power failure occurrence counter in indoor unit	E2 00
17	Transmission error occurrence counter between remote control switch and indoor unit	E3 00
18	Abnormal operation occurrence counter on inverter	E4 00

↓

Indication of automatic louver condition

19	Louver sensor	F1 00

↓to next page



	PCB Relay	Part Name
	YH2	Relay for Drain pump (MD) and/or Dew Heater (EHW)
	Y52H	Relay for Electric Heater (CEH)
	Y21	Relay for Reversing Valve Relay
	Y52C	Relay for Compressor
	Fan 1	Relay for Outdoor Fan 1
	Fan 2	Relay for Outdoor Fan 2
	YCH	Relay for Crancase heater

Symbols with a letter Y are relays of PCB

00	Operation OFF, Power OFF
01	Thermo - OFF (Note 1), Activating Float Switch
02	Alarm (Note 2)
03	Freeze Protection, Overheating Protection
05	Instantaneous Power Failure at Outdoor Unit, Reset (Note 3)
06	Instantaneous Power Failure at Indoor Unit, Reset (Note 4)
07	Stoppage of Cooling Operation due to Low Outdoor Air Temperature, Stoppage of Heating Operation due to High Outdoor Air Temperature
10	Demand, Enforced Stoppage
13	Retry due to High Pressure Increase
15	Retry due to Abnormal High Temperature of Discharge Gas, Excessive Low Suction Pressure
16	Retry due to Decrease of Discharge Gas Superheat
17	Retry due to Inverter Tripping Retry due to Abnormal Current to Comp.
18	Retry due to Voltage Decrease, other Retry due to Inverter
19	Expansion Valve Opening Change Protection
20	Operation Mode Changeover of Indoor Unit
21	Enforced Thermo-OFF (Twin Type Only) (Note 5)
24	Thermo-OFF during Energy Saving Operation

NOTE:

1. *Explanation of Terms*
   Thermo-ON: A condition than an Indoor Unit is requesting compressor to operate.
   Thermo-OFF: A condition than an Indoor Unit is not requesting compressor to operate.
2. *Even if stoppage is caused by "Alarm", "02" is not always indicated.*
3. *If transmission between the inverter printed circuit board and the control printed circuit board is not performed during 30 seconds, stoppage is d1-05 cause and the alarm code "04" may be indicated.*
4. *If transmission between the Indoor Unit and the Outdoor Unit is nor performed during 3 minutes, Indoor Units are stopped. In this case, stoppage is d1-06 cause and the alarm code "03" may be indicated.*
5. *In the system "21" will be indicated at the difference mode between Indoor Units.*

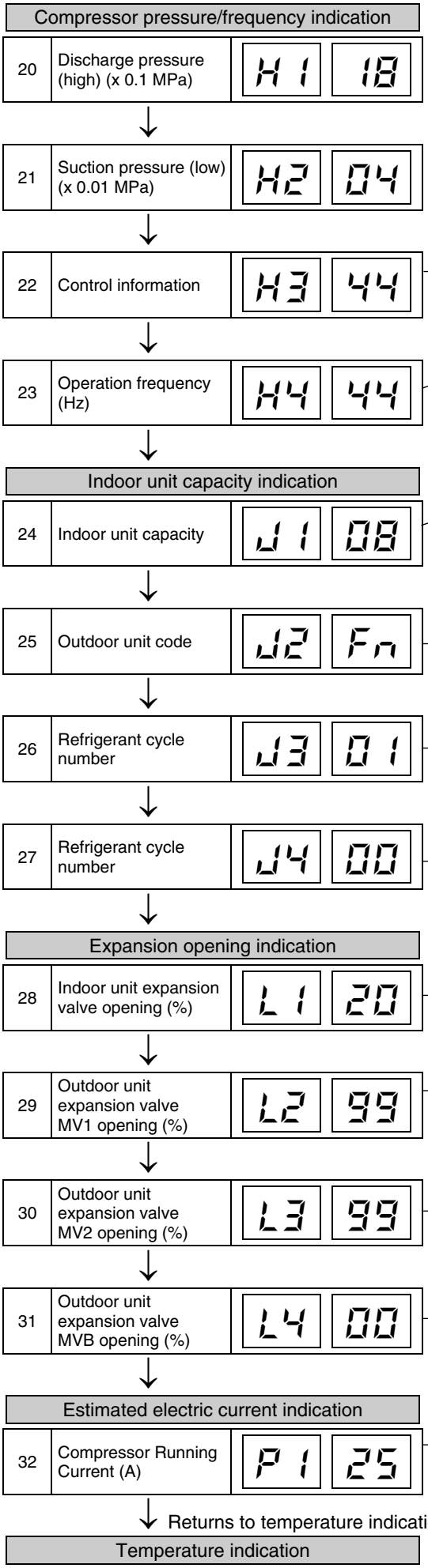
Countable up to 99.
Over 99 times, "99" is always indicated.

NOTE:

1. *If a transmitting error continues, one is added to the occurrence times.*
2. *The memorized data can be cancelled by the method indicated in 8.3.1 "Self-checking of PCBs using Remote Control Switch"*

00 : Normal
FF : Abnormal

00	Operation OFF, Power OFF



This is an indication for internal information for the remote control switch. This does not have any specific meaning.

The total frequency is indicated when two compressors are running

The capacity of the Indoor Unit is indicated as shown in the table below.

Capacity Code of Indoor Unit

Indication Code	Equivalent Capacity (HP)
13	1.5
16	2.0
20	2.5
26	3.0
32	4.0
40	5.0

In case of twin type the indication will be “P02”

J3: 01 ~ 16 (01: when shipment (DSW4), Decimal indication
J4: 00 ~ 0F (00: when shipment (DSW4), Indication with 16 numbers

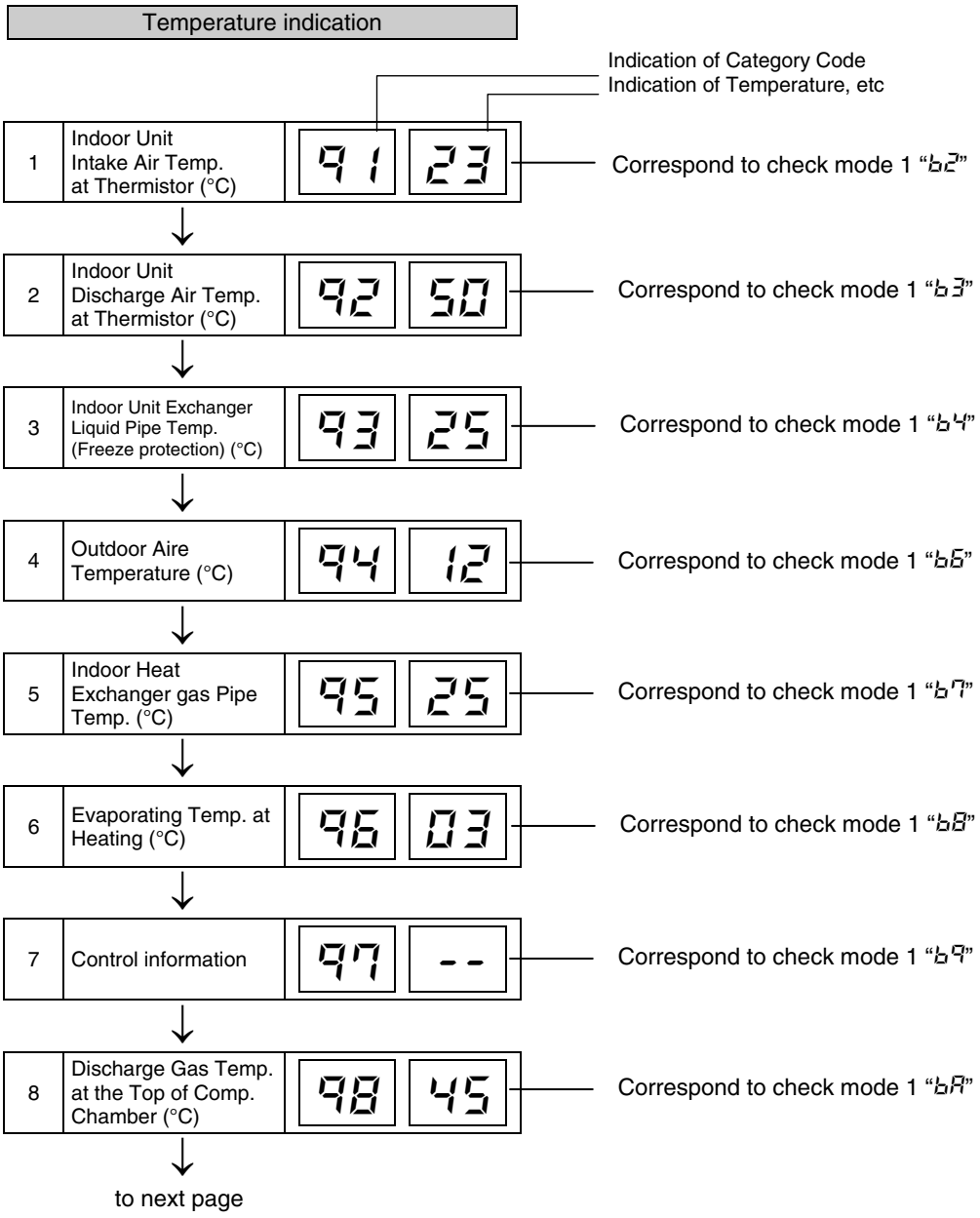
The capacity of the Indoor Unit is indicated as shown in the table below.

The indication of “225” is normal

The total current is indicated when several compressors are running.
In case of inverter compressor, the running current of primary side of inverter is indicated

Contents of the Check mode 2

The latest data of the first three indoor units only connected serially are indicated when more than three indoor units are connected to one remote control switch.
By pressing the "⌃" part of "TEMP" switch, the next display is indicated. If the part "⌄" of "TEMP" switch is pressed, the previous display is indicated.



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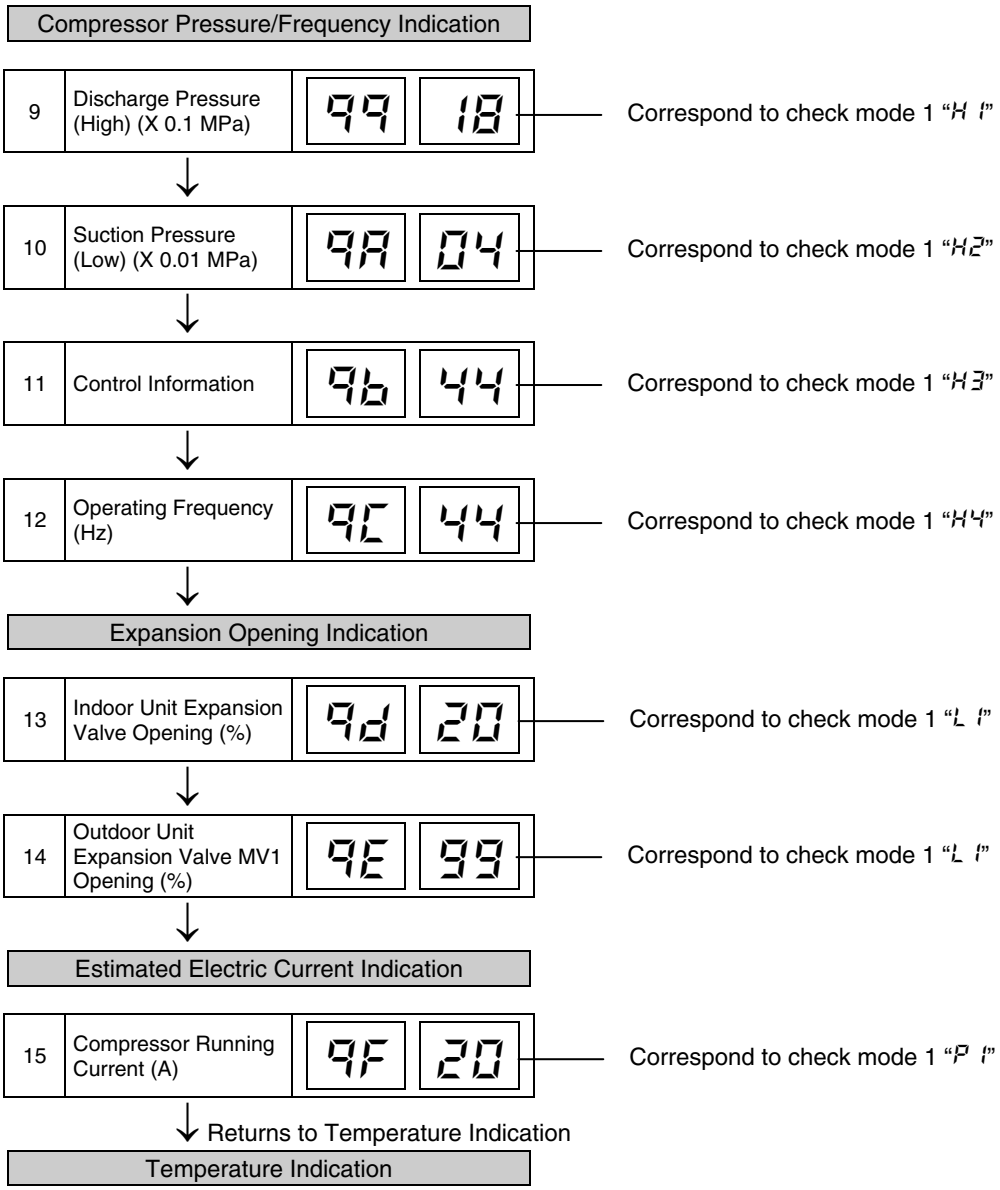

Compressor Pressure/Frequency Indication
9
Discharge Pressure (High) (X 0.1 MPa)
99 18
Correspond to check mode 1 "H 1"
10
Suction Pressure (Low) (X 0.01 MPa)
9A 04
Correspond to check mode 1 "H2"
11
Control Information
9b 44
Correspond to check mode 1 "H3"
12
Operating Frequency (Hz)
9C 44
Correspond to check mode 1 "H4"
Expansion Opening Indication
13
Indoor Unit Expansion Valve Opening (%)
9d 20
Correspond to check mode 1 "L 1"
14
Outdoor Unit Expansion Valve MV1 Opening (%)
9E 99
Correspond to check mode 1 "L 1"
Estimated Electric Current Indication
15
Compressor Running Current (A)
9F 20
Correspond to check mode 1 "P 1"
Returns to Temperature Indication
Temperature Indication

8.2.4. TROUBLESHOOTING BY MEANS OF THE 7-SEGMENT DISPLAY

■Simple checking by 7-segment display

1	❖Turn on All Indoor Units
↓	
2	Turn on All Outdoor Units
↓	
3	Auto--addressing starts

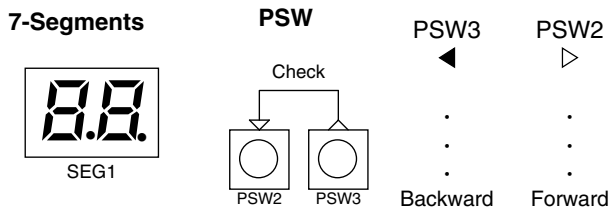
❖ All the Indoor Units Connected to the Outdoor Unit

During auto-addressing, the following items can be checked using the outdoor unit's on-board 7-segment LED display.

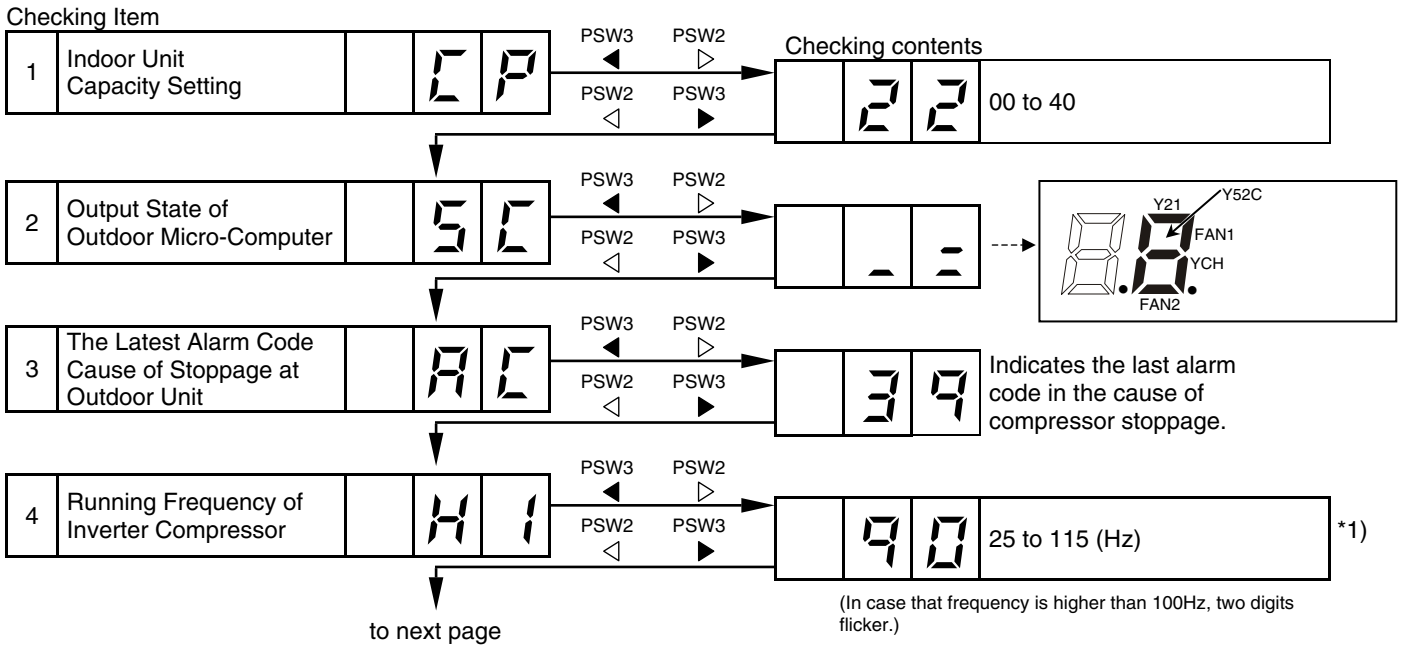
1. Disconnection of power supply to the Indor Unit.
2. Reverse connection of the operating line between the Outdoor and Indoor Units
3. Duplication of Indoor Unit number.

■Checking method by 7-segment display

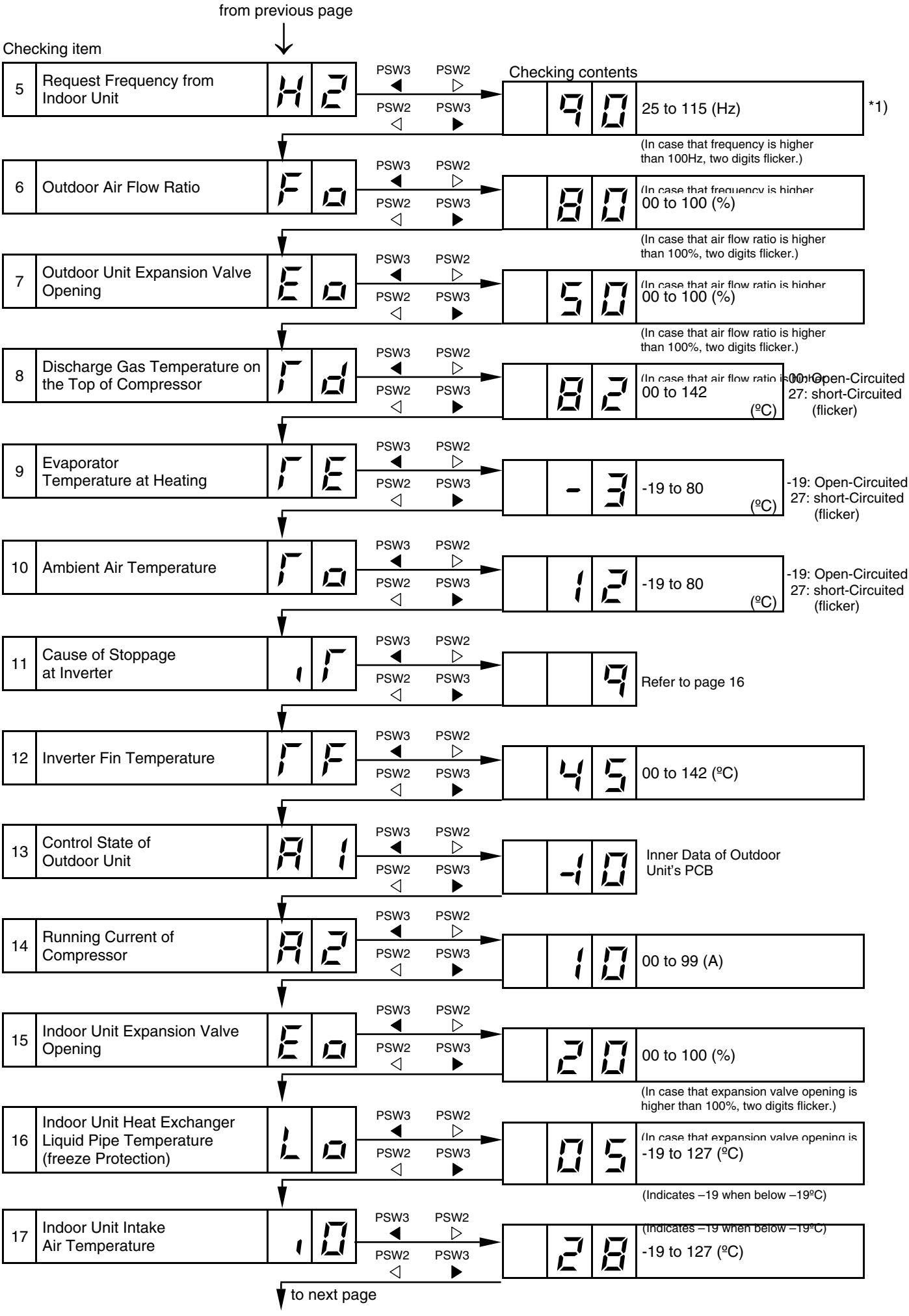
By using the 7-segments and check switch (PSW) on the PCB1 in the Outdoor Unit, total quantity of combined Indoor Units, 7-segments operation conditions and each part of refrigerant cycle can be checked.

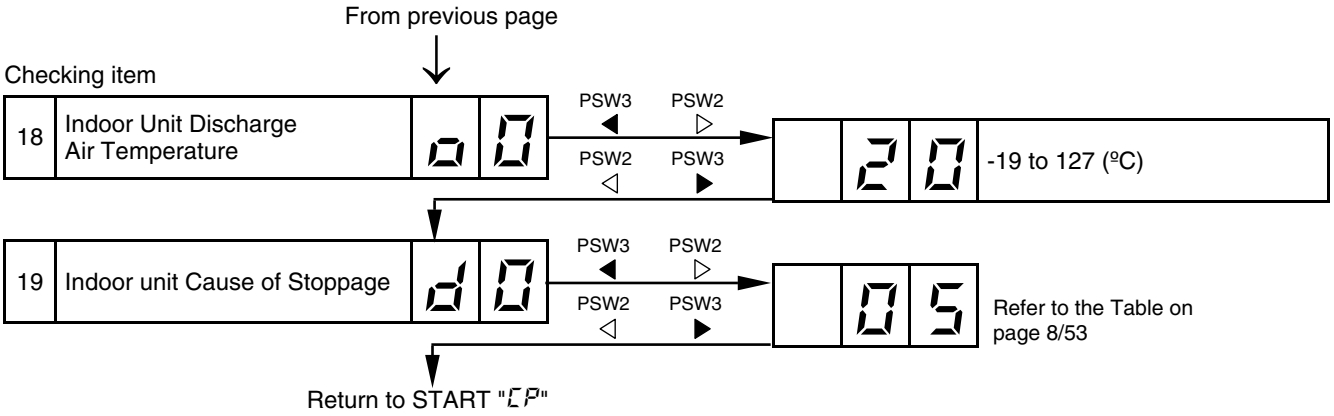


- To start checking, press the "PSW2" switch for more than 3 seconds.
- To proceed checking, press the "PSW2" switch for less than 2 seconds.
- To proceed reversely, press the "PSW3" for less than 2 seconds.
- To cancel this checking, press the "PSW2" switch for more than 3 seconds. The display will be changed to the indication one step before. Then, press the "PSW2" switch once again for more than3 seconds.



*1) The pole of comp. Is four, it is indicated the half value of actual frequency.


from previous page
Checking item
Checking contents
5 Request Frequency from Indoor Unit
H2
PSW3 PSW2 PSW2 PSW3
90
25 to 115 (Hz)
*1)
(In case that frequency is higher than 100Hz, two digits flicker.)
6 Outdoor Air Flow Ratio
Fo
80
00 to 100 (%)
(In case that air flow ratio is higher than 100%, two digits flicker.)
7 Outdoor Unit Expansion Valve Opening
Eo
50
00 to 100 (%)
(In case that air flow ratio is higher than 100%, two digits flicker.)
8 Discharge Gas Temperature on the Top of Compressor
Fd
82
00 to 142 (ºC)
00: Open-Circuited
27: short-Circuited
(flicker)
9 Evaporator Temperature at Heating
FE
-3
-19 to 80 (ºC)
-19: Open-Circuited
27: short-Circuited
(flicker)
10 Ambient Air Temperature
Fo
12
-19 to 80 (ºC)
-19: Open-Circuited
27: short-Circuited
(flicker)
11 Cause of Stoppage at Inverter
cF
9
Refer to page 16
12 Inverter Fin Temperature
FF
45
00 to 142 (ºC)
13 Control State of Outdoor Unit
A1
-10
Inner Data of Outdoor Unit's PCB
14 Running Current of Compressor
A2
10
00 to 99 (A)
15 Indoor Unit Expansion Valve Opening
Eo
20
00 to 100 (%)
(In case that expansion valve opening is higher than 100%, two digits flicker.)
16 Indoor Unit Heat Exchanger Liquid Pipe Temperature (freeze Protection)
Lo
05
-19 to 127 (ºC)
(Indicates –19 when below –19ºC)
17 Indoor Unit Intake Air Temperature
c0
28
-19 to 127 (ºC)
(Indicates –19 when below –19ºC)
to next page



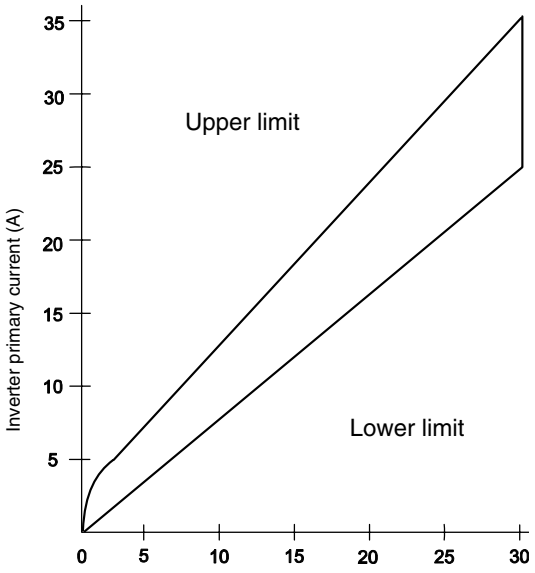
NOTE:

The protection control code being indicated on 7-segment display is changed to an alarm code when the abnormal operation occurs. Also, the same alarm code is indicated on the remote control switch.

8.2.5. RUNNING CURRENT OF THE COMPRESSOR

■Inverter primary current

The inverter primary current is estimated from the running current of the compressor displayed on the 7-segment display, as shown on the right chart.



■Cause code of stoppage for the inverter (content of check item " ")

Code	Cause	Cause of Stoppage for Corresponding Unit	Remark	
			Indication during Retry	Alarm Code
1	Automatic Stoppage of Transistor Module (IPM Error) (Over Current, Decrease Voltage, Increase Temperature)	17	P7	53
2	Instantaneous Over Current	17	P7	52
3	Inverter Fin Thermistor Error, Protection	17	P7	54
4	Electronic Thermal Activation	17	P7	52
5	Inverter Voltage Decrease	18	P8	06
6	Increase Voltage	18	P8	06
8	Abnormal Current Sensor	17	P7	51
9	Instantaneous Power failure Detection	18	-	-
b	Reset of Micro-Computer for Inverter	18	-	-
C	Earth Fault Detection for Compressor (Only Starting)	17	P7	53

8.2.6. PROTECTION CONTROL CODE ON THE 7-SEGMENT DISPLAY

1. The protection control indication can be seen on 7-segment when a protection control is activated.
2. The 7-segment continues ON while function is working, and goes out when released.
3. When several protection controls are activated, code number with higher priority will be indicated (see below for the priority order).

- Higher priority is given to protection control related to frequency control than the other.

  Priority Order:

  - Low Pressure Ratio Protection
  - High Pressure Ratio Protection
  - High Pressure Increase Protection
  - Input Protection
  - Current Protection
  - Discharge Gas Temperature Increase Protection
  - Frost Protection

- In relation to retry control, the latest retrial will be indicated unless a protection control related to frequency control is indicated.

Code		Protection Control
P	0	Low Pressure Ratio Control
P	1	High Pressure Ratio Control
P	2	High Pressure Increase Protection
P	3	Current Protection
P	4	Inverter Module Temperature Increase Protection
P	5	Discharge Gas Temperature Increase Protection
P	6	Frost Protection
P	7	Inverter Trip Retry
P	8	Insuficient Voltage / Excessively High Voltage Retry
P	9	Imbalanced Voltage Protection

In the case that degeneration control is activated, c is indicated instead of 0 (*mark)

- Retry indication continues for 30 minutes unless a protection control is indicated.
- Retry indication disappears if the stop signal comes from all rooms.

NOTE:
The protection control code being indicated on 7-segment display is changed to an alarm code when the abnormal operation occurs. Also, the same alarm code is indicated on the remote control switch.

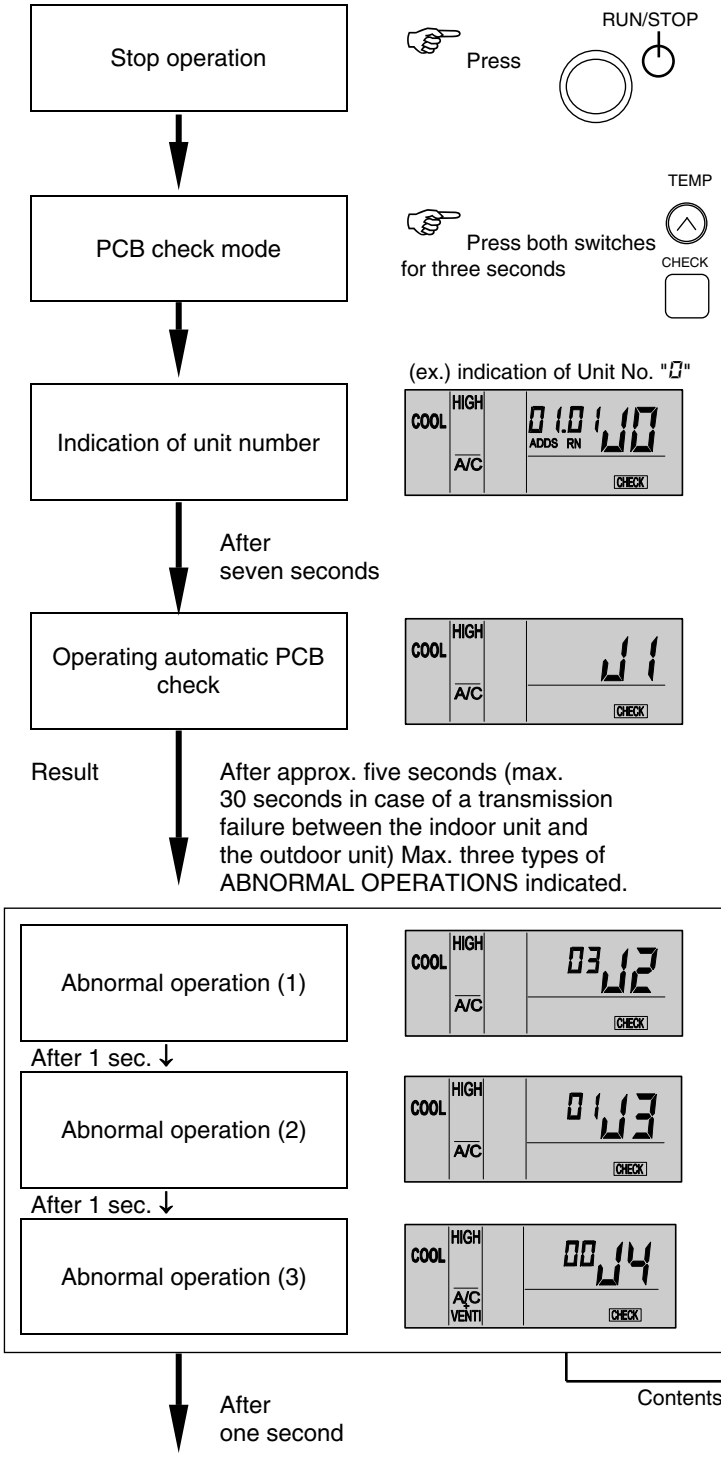
8.2.7. ACTIVATING CONDITION OF THE PROTECTION CONTROL CODE

P0	Low pressure ratio control (cooling)	Compression ratio estimation by Tc, TL < 2.2 → Frequency increase	Tc: Outdoor pipe temperature TL: Indoor liquid pipe temperature
P1	High pressure ratio control (heating)	Compression ratio estimation by TL, Te ≥ 7.5 → Frequency decrease	TL: Indoor liquid pipe temperature Te: Outdoor pipe temperature
P2	High pressure increase protection	PSC activation → Frequency decrease	PSC: Pressure switch for control
P3	Current protection	Inverter input, Output current ≥ 14.5 (3HP), 20.0 (4HP), 25.0 (5HP) → Frequency decrease	–
P4	Inverter module temperature Increase protection	Inverter module temperature ≥ 89 ºC → Frequency decrease	–
P5	Discharge gas temperature Increase protection	Temperature at the top of the compressor is high → Frequency decrease (maximum temperature is different, depends on the frequency)	–
P6	Frost protection (cooling)	Incase of TL ≤ 2 ºC for over 3 min → Frequency decrease	–
P7	Inverter trip retry	Inverter module microprocessor trip	
P8	Insufficient voltage / Excessive high voltage retry	Insufficient / Excessive high voltage at the inverter module circuit	
P9	Imbalance voltage protection	Imbalance voltage at the inverter module circuit	

8.3. PROCEDURE FOR CHECKING EACH MAIN PART

8.1.1. SELF-CHECKING PROCEDURE OF PCB BY MEANS OF THE REMOTE CONTROL SWITCH

Use the following troubleshooting procedure for testing the PCB in the indoor unit and the outdoor unit



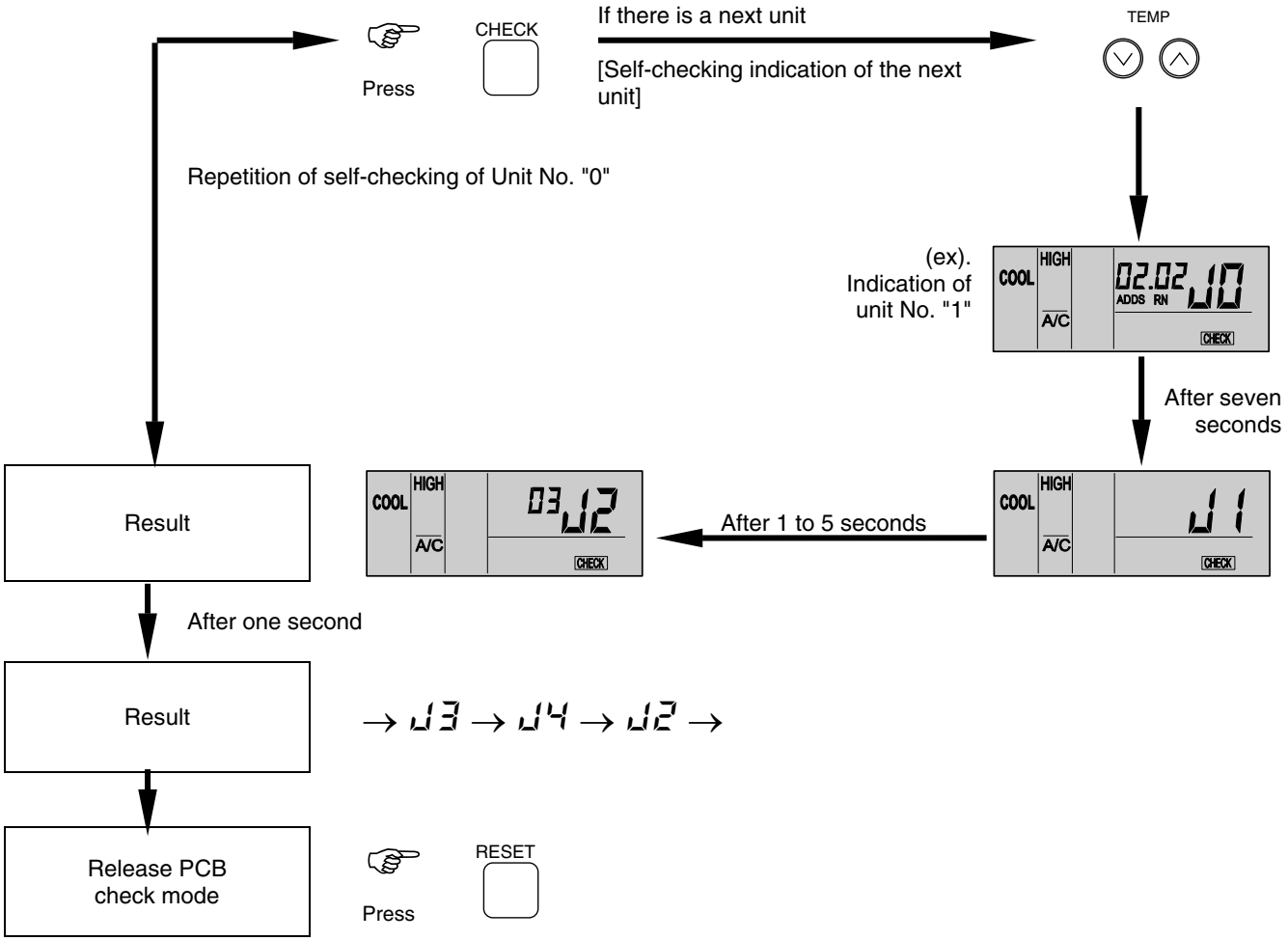
Indication	Contents	
00	Normal	
	Abnormality (open-circuit, short-circuit, etc.) in circuit for:	
01	Air inlet temp. thermistor	Indoor unit PCB
02	Discharge air. temp. thermistor	
03	Liquid pipe temp. thermistor	
04	Remote thermistor abnormality	
05	Gas pipe temp. thermistor	
06	Remote sensor	
08	Transmission of central station	
0A	EEPROM	
0b	Zero cross input failure	
EE	Transmission of indoor units during this checking operation	
07	Transmission of outdoor unit	Outdoor unit PCB
F4	ITO input failure	
F5	PSH input failure	
F6	Protection signal detection circuit	
F7	Phase detection	
F8	Transmission of inverter	
FA	High-pressure sensor	
Fb	Comp. discharge gas temp. thermistor	
FC	Low-pressure sensor	
Fd	Heat exchanger evaporation temp. thermistor	
FF	Ambient air temp. thermistor	

If you are using a wireless remote control switch with the built-in receiver part of the wall-type indoor unit and you need to perform the above checking, perform the following procedure:

1. *Turn OFF the power supply.*
2. *Disconnect the connector (CN25) on PWB(M).*
3. *Connect the PC-P1HE.*
4. *Turn ON the power supply.*

After finishing the checking, turn OFF the power supply again and reconnect the connectors according to the previous situation before the checking.

From previous page



NOTE:

1. *If this indication continues and the alarm code "U1" is not displayed, this means that each one of indoor unit is not connected to the remote control switch.*
   Check the wiring between the remote control switch and the indoor unit.

2. *In this troubleshooting procedure, checking of the following parts of the PCB is not available.*
   PCB in Indoor Unit: Relay circuit, DIP switch, option circuit, fan circuit, protection circuit.
   PCB in Outdoor Unit: Relay circuit, DIP switch, option circuit.
3. *If this troubleshooting is performed in the system by means of the central station, the indication of the central station may change during this procedure. However, this is not abnormal.*
4. *After this troubleshooting, the memory of the abnormal operation occurrence counter, which was described before, will be deleted.*

8.3.2. SELF-CHECKING PROCEDURE OF THE REMOTE CONTROL SWITCH

Cases where the CHECK switch is used.
1. If the remote control switch displays a malfunction.
2. For the regular maintenance check.

1 Turn ON the power source

↓

2 Simultaneously press the following three switches. (During the operation, you can press the switches.)

TEMP MODE

↓

3 The LCD changes as shown in the right figure. →

Only for the cancellation of EEPROM, press the following three switches simultaneously during the changes of the LCD.

TEMP

MODE

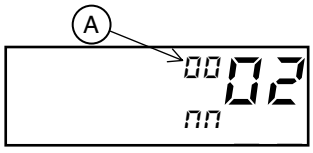
↓ To 11

↓

4 After the LCD changes as shown in the right figure, the RUN indicator flickers twice.

↓

5 The LCD changes as shown below. Press all the switches (13 switches) one by one. Every time you press the switch, the number of the indication of the part (A) in the figure below increases one.



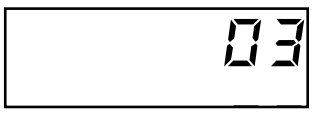
→ Unless all the switches are pressed, the checking does not proceed to the next item.

NOTES:
You can press the switches in any order.

Pressing two or more switches simultaneously is invalid and not counted.

↓

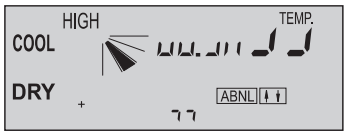
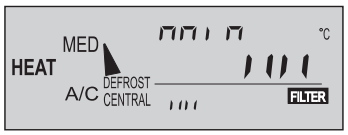
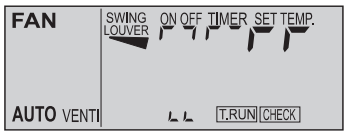
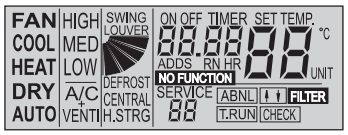
6 The LCD changes as shown below. The remote control switch automatically starts to check the transmission circuit.



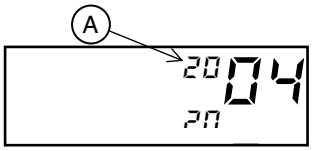
→ In case that the transmission circuit is abnormal, the LCD remains as shown in the left figure and the checking does not proceed to the next item.

↓

To the next page

No.	LCD indication	Indicating period (sec.)
1 ↓		For one second
2 ↓		For one second
3 ↓		For one second
4 ↓		For one second
5		For three seconds

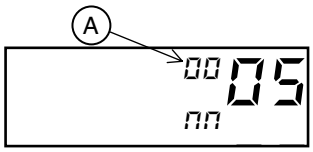
7 The LCD changes as shown below. The detected temperature of the remote control thermostat is displayed at the (A) part in the figure below.



→ If the indicators "--" or "FF" are displayed at the "A" part, the remote control thermostat is abnormal.

8 The LCD changes as shown below.

→ If you press the RESET switch or you leave the switches for 15 seconds, the data of EEPROM (storage cell inside of the remote control switch) is cleared.
At this time, the number is displayed at the (A) part, which is shown in the figure below. When the number "99" is displayed, EEPROM is abnormal.



If the number which is displayed at the (A) part is "99", the checking does not proceed to the next item.

9 The LCD changes as shown below.

After several seconds have passed, the remote control switch is automatically activated again.

10 When the remote control switch is activated again, the RUN indicator is ON and the operation is started. Therefore, press the RUN/STOP switch and stop the operation.

NOTE:

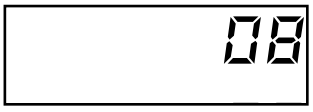
1. *In case that the operation is not automatically started when the remote control switch is activated again, the detection circuit for the momentary stoppage may be abnormal. However, the detection circuit will not interfere with the normal operation.*
2. *There is a case where the operation is automatically stopped after the automatic operation when the remote control switch is activated again.*

Cancellation of EEPROM

3 ↓

11 The LCD changes as shown below and the remote control switch automatically cancels the EEPROM.

12 The LCD changes as shown below



After several seconds have passed, the remote control switch is automatically activated again. In this case, the operation is not started automatically.

8.3.3. SELF-CHECKING PROCEDURE OF THE INDOOR UNIT PCB (ONLY FOR RPK)

■Self-checking procedure by means of the relays on the indoor unit PCB

- To check the abnormal operation on the indoor unit PCB due to a malfunction.
- To check the abnormal operation on the indoor unit PCB according to the results of the checking procedure by means of the CHECK switch on the remote control switch and the self-checking function.

- *Procedure*

❶ Turn OFF the main power switch.

❷ Disconnect the connectors CN7 and CN8. Set the DIP switch DSW2 as shown below.
Set the #1 pin to ON and the #2 pin to OFF.

DIP Switch DSW2

❸ Turn ON the main power switch.
Check Mode starts. (Refer to the next page.)

A Analog Test
B Relay Test

❹ After finishing the self-checking procedure, turn OFF the power and reset the DIP switch as before.

■Self-checking procedures in the check mode for RPK-FSNM

Check item	State of mode	Confirmation method
(A) Initialize Exp. valve and auto-louver ↓	Exp. Valve fully open → fully closed Auto-louver is horizontally stopped.	
(B) Analog test ↓	If the thermistors for the inlet air temperature, for the discharge air temperature and for the freeze protection are normal, proceed to the next step.	
(C) Each relay test ↓ Perform repeatedly	52H1, 2, 3 Fan (Low) Wireless receiver part (Red) Wireless receiver part (Green) Wireless receiver part (Yellow)	Check the ON/OFF sound of the relays and the LED.
Termination	Turn OFF and reset all the DIP switches as before.	

8.3.4. PROCEDURE FOR CHECKING OTHER MAIN PARTS

■High-voltage discharge procedure for replacing the parts

DANGER:
Perform this high-voltage discharge procedure in order to avoid an electrical shock.

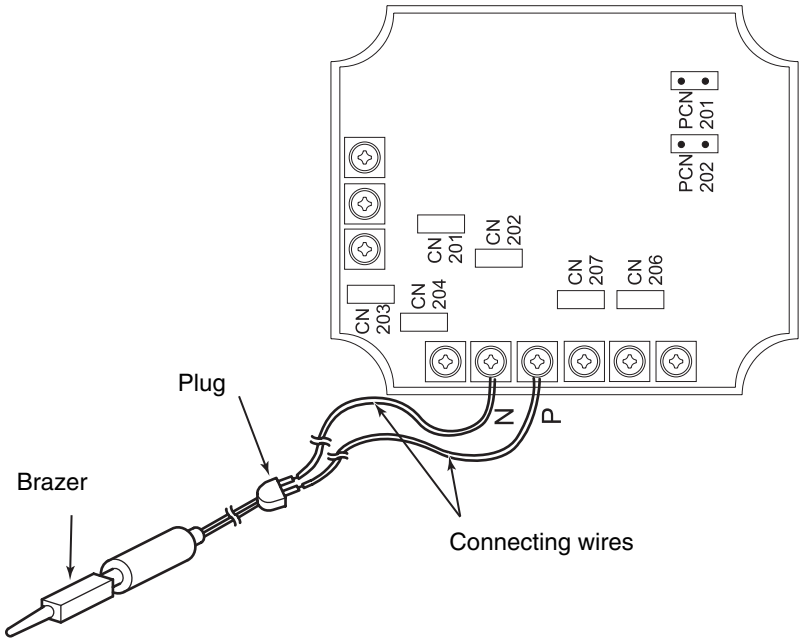
Procedure:

a. Turn OFF the main switches and wait for three minutes. Make sure that no high voltage exists. If LED201 is ON after the start and LED201 is OFF after turning OFF the power source, the voltage will decrease to lower than DC50V.

b. Connect the connect wires to an electrical brazer. The discharging starts and this results in a hot brazer. Pay attention not to short-circuit between the terminal P and N.

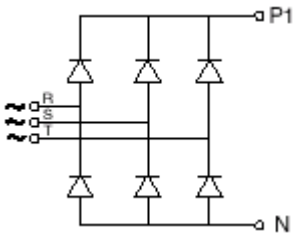
c. Connect the wires to terminals, P and N on ISPM.

d. Wait for two or three minutes and measure the voltage once again. Make sure that no voltage is charged.



■Checking procedure ISPM

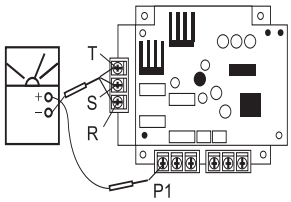
Rectification Parts of Internal Circuit of ISPM (Common)



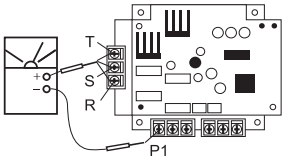
Remove all the terminals of the ISPM before check.
If items (a) to (h) are performed and the results are satisfactory, ISPM is normal. Measure it under 1 kΩ range of a tester.

CAUTION:
Do not use a digital tester.

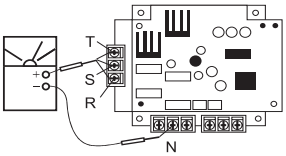
a. By touching the + side of the tester to the P1 terminal of ISPM and the - side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.



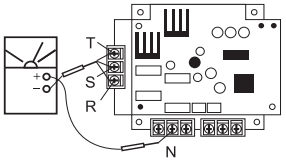
b. By touching the - side of the tester to the P1 terminal of ISPM and the + side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.



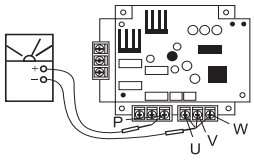
c. By touching the - side of the tester to the N terminal of ISPM and the + side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.



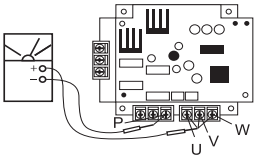
d. By touching the + side of the tester to the N terminal of ISPM and the - side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.



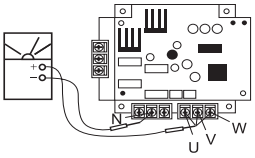
e. By touching the + side of the tester to the P terminal of ISPM and the - side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.



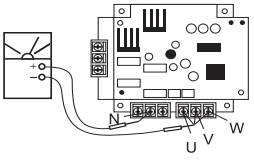
f. By touching the - side of the tester to the P terminal of ISPM and the + side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.



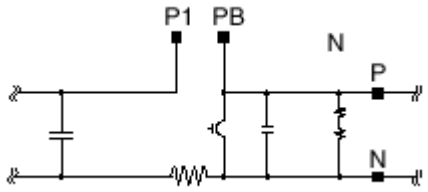
g. By touching the - side of the tester to the N terminal of ISPM and the + side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.



h. By touching the + side of the tester to the N terminal of ISPM and the - side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.



Active Parts of Internal Circuit of ISPM (for 3 and 4HP)



i. Perform the item (a) to (h).

j. By touching the + side of the tester to the RB terminal of ISPM and the - side of the tester to P terminal of ISPM.
If the resistance is more than 1 kΩ, it is normal.

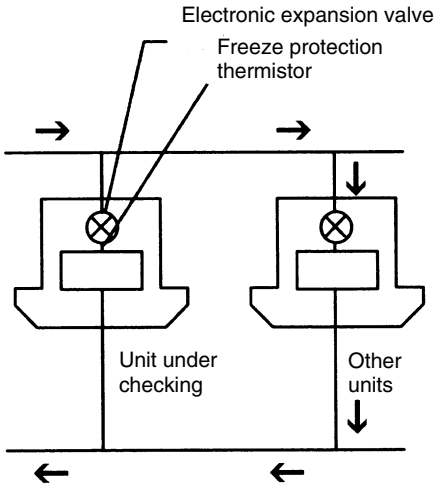
k. By touching the - side of the tester to the RB terminal of ISPM and the + side of the tester to P terminal of ISPM.
If the resistance is more than 100 kΩ, it isnormal.

l. By touching the + side of the tester to the RB terminal of ISPM and the - side of the tester to N terminal of ISPM.
If the resistance is more than 90 kΩ, it isnormal.

m. By touching the - side of the tester to the RB terminal of ISPM and the + side of the tester to N terminal of ISPM.
If the resistance is more than 90 kΩ, it isnormal.

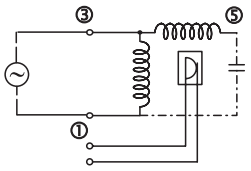
If item (i) to (m) are performed and the results are satisfactory, ISPM is normal.
Measure it under 1 kΩ range of a tester. Do not use a digital tester.

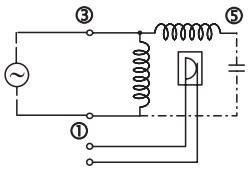
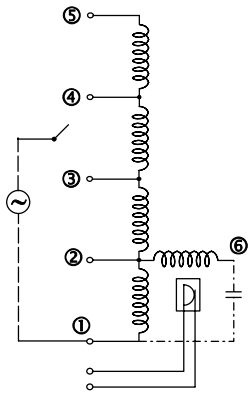
■Checking procedure for the electronic expansion valve

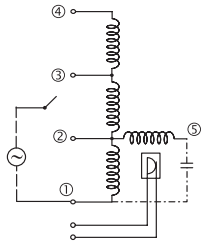
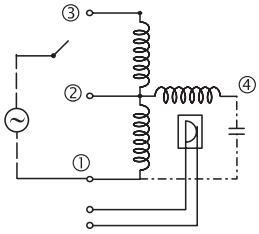
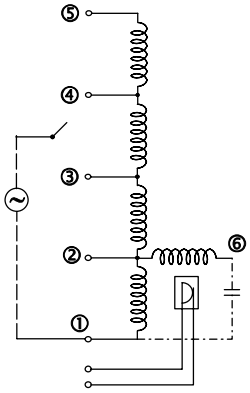
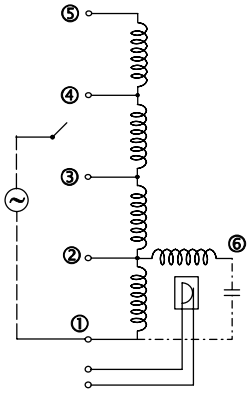
<table>
<tr><th></th><th>Indoor unit electronic expansion valve</th><th>Outdoor unit electronic expansion valve</th></tr>
<tr><td>Locked with fully closed</td><td>Check the liquid pipe temperature during the heating process.
It is abnormal if the temperature does not increase.</td><td>It is abnormal if the liquid pipe pressure does not increase during the cooling process.</td></tr>
<tr><td>Locked with slightly open</td><td rowspan="2">It is abnormal under the following conditions: the temperature of the freeze protection thermistor becomes lower than the suction air temperature when the unit which is under checking stops and the other units are under the cooling process.
 
</td><td>It is abnormal if the liquid pipe pressure does not increase and the outlet temperature of the expansion valve decreases after the cooling process starts.</td></tr>
<tr><td>Locked with fully open</td><td>It is abnormal under the following conditions: after the heating process for more than 30 minutes, the discharge gas temperature of the compressor is not 10°C higher than the condensing temperature and there is no other faults, such as an excessive charge of refrigerant and others.</td></tr>
</table>

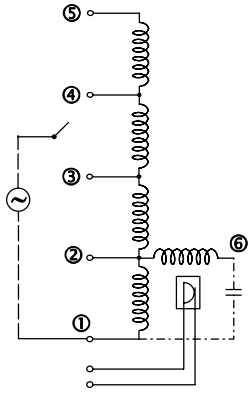
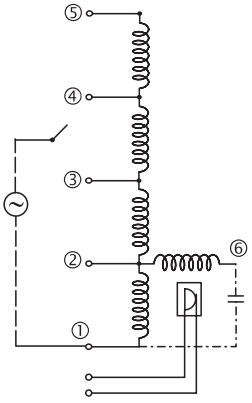
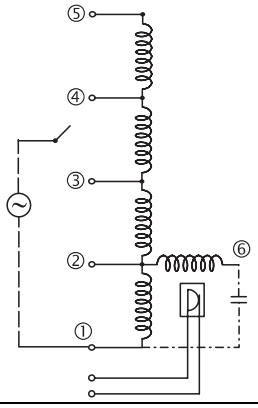
■Checking procedure for the electrical coil parts

Abbreviations used for colors	
Black	BLK
Brown	BRN
Red	RED
Yellow	YEL
Green	GRN
Blue	BLU
Grey	GRY
Orange	ORN
White	WHT

Part names	Model	Electrical wiring diagram	Wiring No.	Resistance (Ω)
Fan motor for the indoor unit for: RCI-1.5FSN1E RCI-2.0FSN1E RCI-2.5FSN1E RCI-3.0FSN1E	56W	DC Motor	--	--
Fan motor for the indoor unit for: RCI-4.0FSN1E RCI-5.0FSN1E RCI-6.0FSN1E	108W	DC Motor	--	--
Fan motor for the indoor unit for: RCD-1.0FSN RCD-1.5FSN RCD-2.0FSN	35W		BLK① - ③RED RED③ - ⑤WHT	159.0 92.0 at 20 °C
Fan motor for the indoor unit for: RCD-2.0FSN RCD-2.5FSN RCD-3.0FSN	55W		BLK① - ③RED RED③ - ⑤WHT	70.9 81.7 at 20 °C

Part names	Model	Electrical wiring diagram	Wiring No.	Resistance (Ω)
Fan motor for the indoor unit for: RCD-4.0FSN	35Wx2		BLK① - ③RED RED③ - ⑤WHT	159.0 92.0 at 20 °C
Fan motor for the indoor unit for: RCD-5.0FSN	55Wx2		BLK① - ③RED RED③ - ⑤WHT	70.9 81.7 at 20 °C
Fan motor for the indoor unit for: RPC-2.0FSNE RPC-2.5FSNE RPC-3.0FSNE	65W		BLK① - ②RED RED② - ③YEL YEL③ - ④GRY GRY④ - ⑤BLU RED② - ⑥WHT	59.90 16.90 15.80 15.80 63.60 at 20.1 °C

Part names	Model	Electrical wiring diagram	Wiring No.	Resistance (Ω)
Fan motor for the indoor unit for: RPC-4.0FSNE RPC-5.0FSNE RPC-6.0FSNE	180W		BLK① - ②RED RED② - ③YEL YEL③ - ④GRY RED② - ⑤WHT	32.10 24.50 24.50 44.70 at 25 °C
Fan motor for the indoor unit for: RPI-1.5FSNE	55W		BLK① -②RED RED② -③BLU BLU③ -④GRY	119.70 87.98 52.08 at 20 °C
Fan motor for the indoor unit for: RPI-2.0FSNE RPI-2.5FSNE	80W		BLK① -②RED RED ② - ③BLU BLU③ - ④GRY GRY④ - ⑤YEL RED② - ⑥WHT	50 13 13 13 110 at 20 °C
Fan motor for the indoor unit for: RPI-3.0FSNE	225W		BLK① -②RED RED ② - ③BLU BLU③ - ④GRY GRY④ - ⑤YEL RED② - ⑥WHT	20 14.5 7.3 7.3 26.5 at 21 °C

Part Names	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
Fan motor for the indoor unit for: RPI-4.0FSNE RPI-5.0FSNE RPI-6.0FSNE	350W		BLK① -②RED RED ② - ③BLU BLU③ - ④GRY GRY④ - ⑤YEL RED② - ⑥WHT	10.5 8.4 4.2 4.2 25 at 20 °C
Fan motor for the indoor unit for: RPK-1.5FSNM RPK-2.0FSNM	20W	DC Motor	--	-
Fan motor for the indoor unit for: RPK-2.5FSNM RPK-3.0FSNM	40W			
Fan motor for the indoor unit for: RPK-4.0FSNM	41W			
Fan motor for the indoor unit for: RPF(I)-1.5FSNE	28W		BLK① -②RED RED② - ③WHT RED③ - ④BLU BLU④ -⑤ORN ORN⑤- ⑥YEL	231.7 198.7 136.2 71.2 202.4 at 21 °C
Fan motor for the indoor unit for: RPF(I)-2.0FSNE RPF(I)-2.5FSNE	45W		BLK① -②RED RED② - ③WHT RED③ - ④BLU BLU④ -⑤ORN ORN⑤- ⑥YEL	97.9 138.1 61.6 35.2 61.0 at 20 °C

Part names	Model code	Resistance (Ω)
Drain-up motor for: RCI-1.5FSN1E, RCI-2.0FSN1E, RCI-2.5FSN1E RCI-3.0FSN1E, RCI-4.0FSN1E, RCI-5.0FSN1E RCI-6.0FSN1E	ADP-1403	256 at 20 °C
Drain-up motor for: RCD-1.0FSN, RCD-1.5FSN, RCD-2.0FSN, RCD-2.5FSN, RCD-3.0FSN, RCD-4.0FSN, RCD-5.0FSN	KJV-1004	347 at 20 °C

Part Names	Model	Electrical Wiring Diagram	Wiring No.	Resistance (Ω)
Fan motor for the outdoor unit RAS-3-6HVRNE.				
4-way valve. RAS-3-6HVRNE				
Solenoid valve RAS-3-6HVRNE				
Inverter compressor motor RAS-3HVRNE		To be informed later		
Inverter compressor motor RAS-4HVRNE				
Inverter compressor motor RAS-5HVRNE				
Inverter compressor motor RAS-6HVRNE				

■Checking procedure for the compressor

CHECK LIST ON THE COMPRESSOR

Client:	Model:	Date:
Serial No:	Production date:	Checker:

No.	Check item	Check method	Result	Remarks
1	Is THM9 correctly connected? THM9: Discharge gas thermistor	① Are the wires of each thermistor correctly connected in a visual inspection?		
2	Is the thermistor THM9 disconnected?	① Make sure that thermistor on the top of comp. is correctly mounted in a visual inspection.		
3	Are the connectors for current sensor correctly connected	① Make sure that indications A1, A2, A3 and A4 are 0 during the compressor stoppage. ② Make sure that indications A1, A2, A3 and A4 are not 0 during the compressor operation.		
4	Is current sensor faulty?			
5	Is current sensing part on PCB3 faulty?			
6	Is the direction of current sensor (CTU, CTV) reverse?	Check the direction → in a visual inspection.		
7	Are the power supply wires U and V inserted correctly into the current sensor?	Make sure that the wires are correctly inserted.		
8	Is the ex. valve MV correctly connected?	Make sure that MV~CN5A is correctly connected.		
9	Is the ex. valve coil MV1 correctly mounted?	Make sure that each coil is correctly mounted on the valve.		
10	Is the refrigerant cycle and electrical wiring system incorrectly connected?	Make sure that the refrigerant is flowing into the indoor units by operating one refrigerating cycle only from the outdoor unit.		
11	Is the opening of ex. valve completely closed (locked)?	Check the following by means of the check mode of the outdoor unit. ① Liquid pipe temp.(TL)< Inlet air temp.(Ti) during the cooling process ② Liquid pipe temp.(TL)> Inlet air temp.(Ti) during the heating process		
12	Is the opening of ex. valve fully opened (locked)?	Make sure that the liquid pipe temp. is lower than the inlet air temp. of the stopped indoor unit when other indoor units are operating under the cooling process.		
13	Are the contacts for the comp. magnetic switch CMC faulty?	Check the surface of each contact (L1, L2 and L3) in a visual inspection.		
14	Is there any voltage malfunction among L1-N or L2-N?	Make sure that the voltage imbalance is smaller than 3%. Note that the power source voltage must be within 220V±10 %.		
15	Is the comp. oil acidified during the burning of the compressor motor?	Make sure that the oil color is not black.		

Additional information for "CHECK LIST ON THE COMPRESSOR"

Check item	Additional information (mechanism of the compressor failure)
1 & 2	The discharge gas temperature (Td) controls the liquid refrigerant return volume to the compressor. If THM9 is connected in the reverse order, the liquid refrigerant return volume will decrease even if the actual discharge gas temperature is high, because PCB is checking the wrong compressor temperature. Therefore, this abnormal overheating process will result in the insulation failure of the motor winding.
3, 4 & 5	The current sensor performs the overcurrent control (the operation frequency control) by detecting the current. In this case, the insulation failure of the motor winding will occur because the control is not available in spite of the actually high current.
6, 7	The current sensor checks the phase and adjusts the output electrical wave, in addition to the above-mentioned items. If a fault occurs, the output electrical wave becomes unstable. This generates stress to the motor winding and results in the insulation failure of the motor winding.
8, 9	During a cooling process, the fan speed of the outdoor unit controls the Pd and the MV of each indoor unit controls the Td. During a heating process, MV control the Td. If the expansion valve IS incorrectly connected, the correct control is not available. This results in the compressor seizure depending on the returning conditions of the liquid refrigerant. Also, this may result in the insulation failure of the motor winding depending on the overheating conditions.
10	If the refrigerant cycle and the electrical system are incorrectly connected, an abnormally low suction pressure operation is maintained or an abnormally high discharge pressure operation is maintained. This results in further stress to the compressor because the correct control of the compressor is not available.
11	Ditto.
12	The compressor may be locked due to the return operation of the liquid refrigerant during the cooling process.
13	If the contacting resistance becomes large, the voltage imbalance among each phase will cause an abnormal overcurrent.
14	In this case, the overcurrent will occur, the efficiency will decrease or the motor winding will be excessively heated.
15	In this case, it will result in the burning of the motor or the compressor seizure.

9 SERVICING

This chapter provides detailed information about the servicing procedures for the DC Inverter Series outdoor units and the complete range of Hitachi indoor units.

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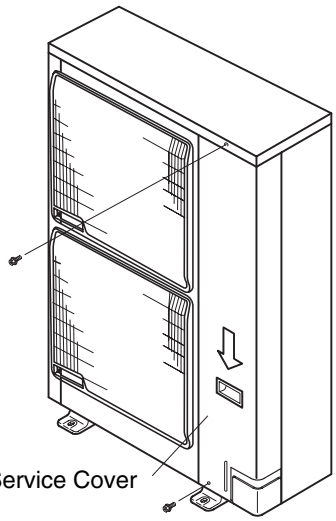
9.1. OUTDOOR UNIT

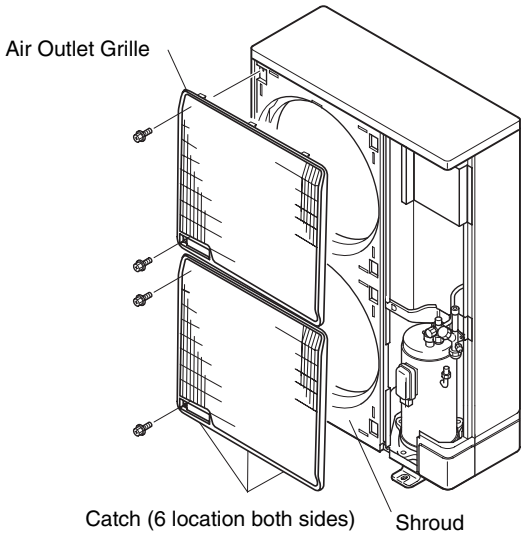
9.1.1. REMOVING SERVICE COVER

1. Remove the main parts according to the following procedures. To reassemble perform the procedures in reverse.
2. To prevent contamination of the refrigerant with water or foreign particles, do not expose open to atmosphere for long periods.
3. If necessary, seal pipe ends using caps or tape.
4. Remove the two fixing screws (upper part 1, lower part 1), slide the service cover downward and remove.



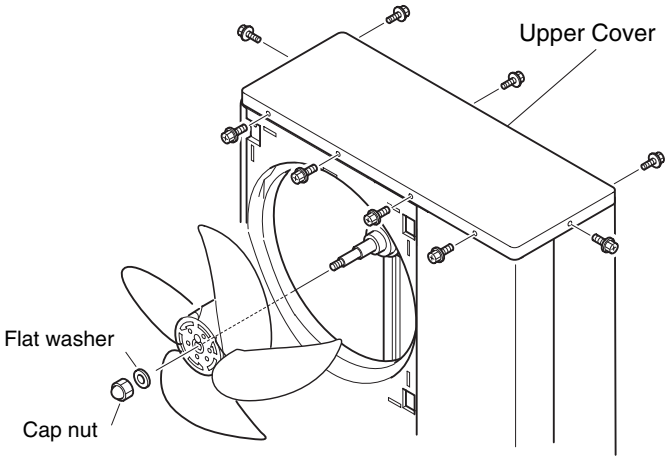
9.1.2. REMOVING AIR OUTLET GRILLE

1. Remove the two (2) fixing screws of the shroud. Lift the air outlet grille holding the lower parts and unhook the extrusion (3 locations) of the air outlet grille from the shroud.



9.1.3. REMOVING OUTDOOR FAN

1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove the air outlet grille according to the item 9.1.2 “Removing Air Outlet Grille”.
3. Remove the fans by removing the cap nuts and the flat washers fixing the propeller fans onto the motor shaft. If it is difficult to remove the fan, use pullers.
4. Remove the eight (8) screws fixing the upper cover and remove the upper cover.



9.1.4. REMOVING OUTDOOR FAN MOTOR

1. Disconnect the connectors for the motors in the electrical box. (2) Cut the plastic tie of the motor clamp by using nipper. (3) Remove the four (4) fixing screws for the motor.

NOTES:

1. When mounting the motor, ensure the cables point directly downward. Fix the protection tube edge downward to ensure the water may not keep in it.

2. Fix the motor wires onto the motor clamp with a plastic tie to prevent them obstructing the propeller fans.

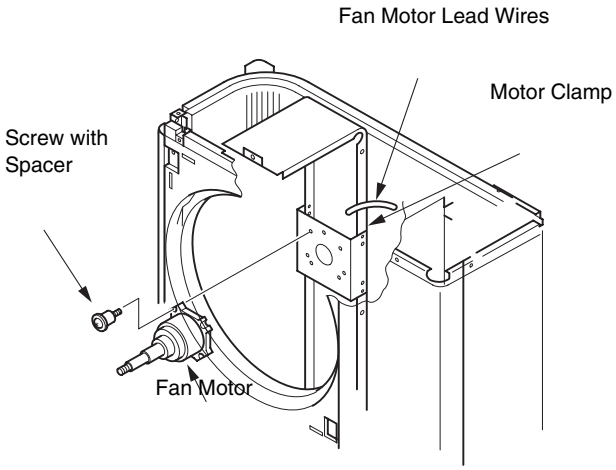
CAUTION:

When mounting the fan motor, don't touch the shaft of connector pins. Static electricity could damage the motor.

3. Mounting Propeller Fan:
Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft, and fix the screw after exerting screw part of the shaft. (Tightening Torque of 8.0 N.m: 80 kg.cm)

4. When connecting the motor wire, check to ensure that the colors of the connectors on the PCB are matched with wires.

5. Firmly fix the air outlet grille to the shroud.



9.1.5. REMOVING COMPRESSOR

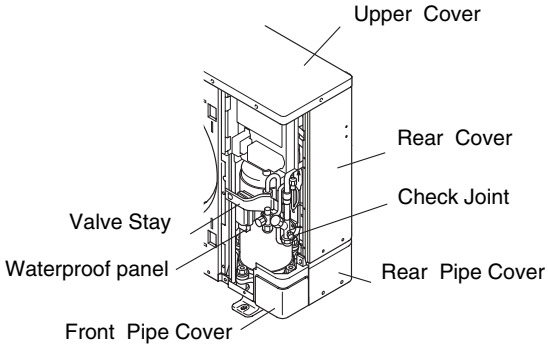
1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”. If the outdoor unit is installed close to a wall, disconnect the refrigerant pipe and move the outdoor unit away from the wall.
2. Collect the refrigerant from the check joint.
3. Remove the valve stay.
4. Release the lace for the waterproof panel. Open the waterproof panel from the front side.

NOTE:

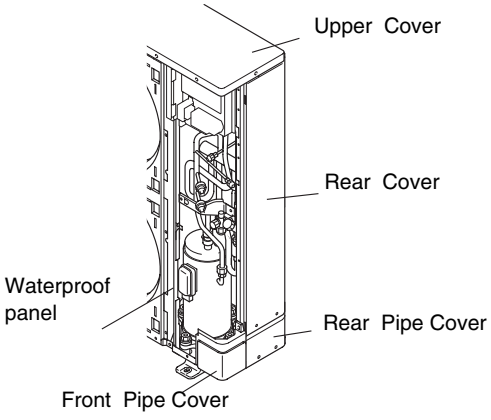
Remove the waterproof panel in the arrow mark direction as shown.

Do not deform any piping when you are removing the panel. If you deform the piping, the welded portion may be broken. Pay attention to the sharp edges of the side panel in order to avoid any injury.

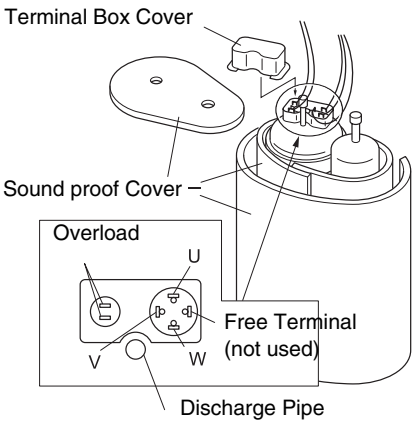
■ RAS-3HVRNE



■ RAS-4~6HVRNE



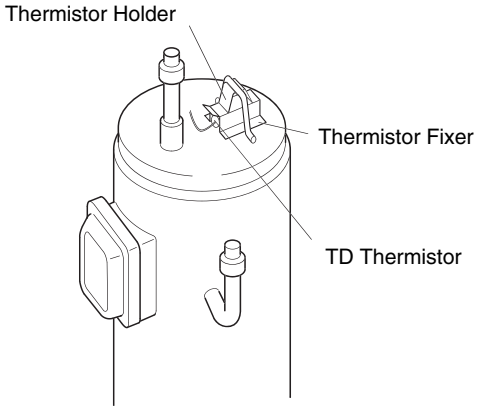
5. Remove the terminal panel for the compressor and disconnect the wiring to the compressor terminals. Make sure that the terminal numbers and the mark band are correct. If the terminal numbers and the mark band are not identified, this will cause incorrect wiring when you are reassembling.



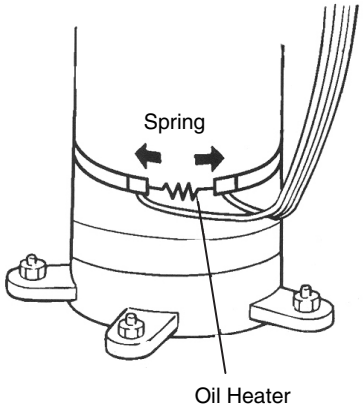
NOTES:

- *Make sure that the fasten terminals for the compressors are normal. When a pulling force of 20N or more is required, it is normal. Otherwise, replace the fasten terminals with new terminals.*
- *Make sure that the wires are correctly inserted.*
- *It is recommended that the fasten terminals be clamped to increase the contacting force after replacing the compressor.*

6. Remove the thermistor holder and remove the thermistor.

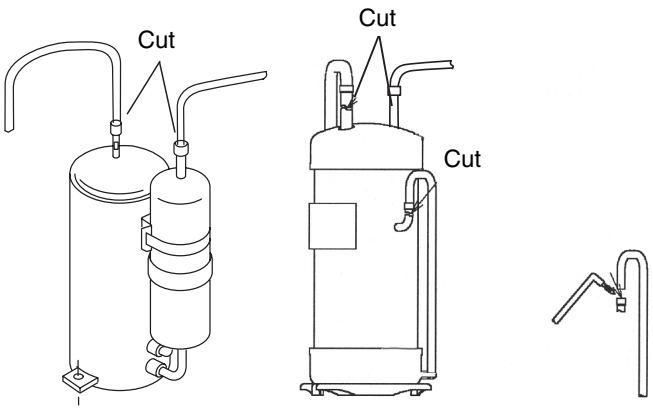


7. Remove the oil heater by releasing the spring. Remove the spring by expanding as shown in the figure beside.



8. Disconnect the discharge and suction pipes of the compressor.
   Make sure that there is no positive pressure inside the pipes. Cut the pipe at the compressor side of the brazing part. Remove the cut pipe of the compressor.
9. Removing by using burner after cuting

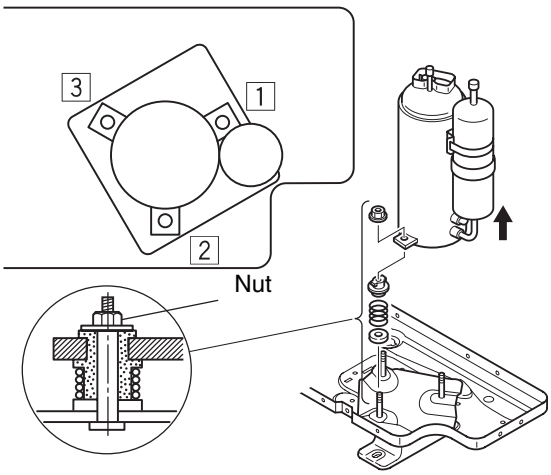
■ RAS-3HVRNE ■ RAS-4~6HVRNE



NOTES:

- *Completely clean the oil if the oil has spread to the other parts such as the compressor panel, the wiring bottom base, and others.*
- *Make sure that the pipes are cut before working with a burner.*

10. Remove the three nuts that fix the compressor and remove the compressor. There is no nut at the rear side. When you are removing the compressor, pay special attention not to touch or deform the surrounding pipes.



NOTES:

- *Pay special attention to the edges of the plates and others when you are working.*
- *If you are removing the compressor with the oil pipe, cover the end of the pipe with the tape in order to avoid a spill.*
- *Do not expose the refrigerant cycle to the environment for a long period in order to avoid mixing the water with foreign particles. Mount the new compressor quickly.*
- *If you cannot measure the oil level, charge an additional 300 (cm^3).*
- *If the oil is foul, replace the old oil with the new oil.*

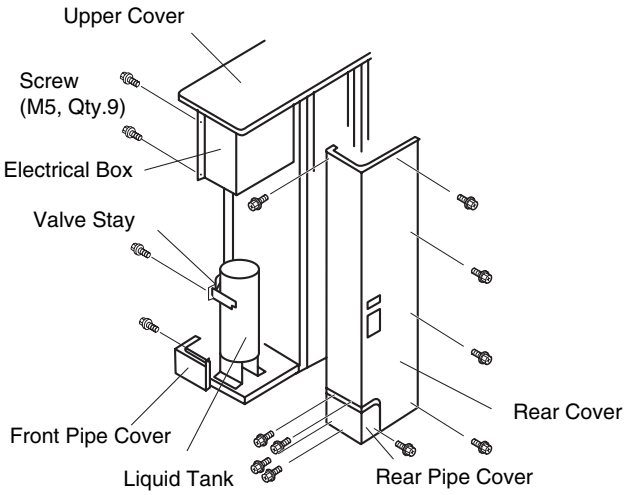
11. Attach the new compressor. Perform the brazing according to the following order:
    1. Discharge Pipe.
    2. Suction Pipe.
    3. Bypass pipe

NOTES:

- *Attach the compressor with the cap. Remove the cap just before you start the brazing work.*
- *Connect the change hose for the pressure release to the check joint of the low-pressure side.*
- *When you are brazing the suction pipe, make sure that the connecting part is firmly inserted and that the compressor side is cooled in order to avoid the brazing material from entering the compressor.*

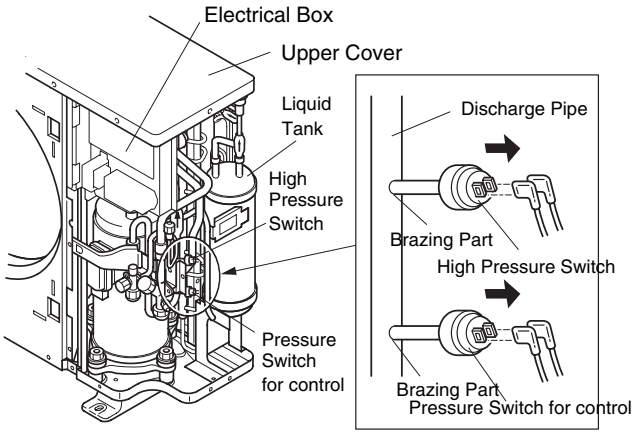
9.1.6. REMOVING HIGH PRESSURE SWITCH AND PRESSURE SWITCH FOR CONTROL

1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove the nine (9) M5 screws fixing the rear cover and the five (5) M5 screws fixing the pipe rear cover. Slide the rear cover and pipe cover downward.

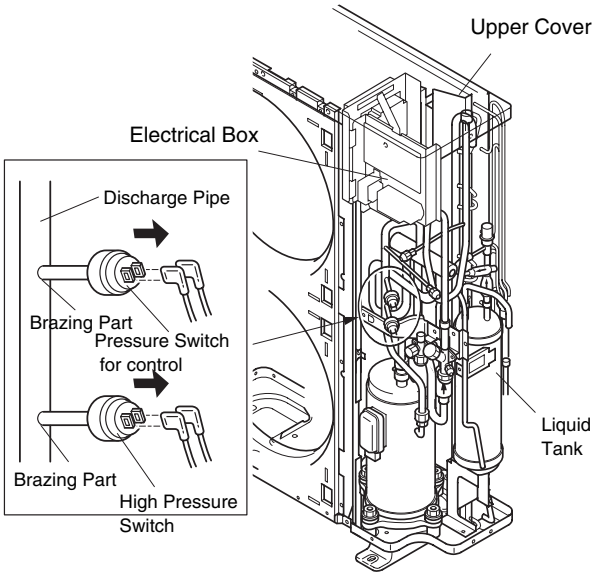


3. Collect the refrigerant from the check joint according to the item 9.1.5 “Removing Compressor”.
4. Disconnect the fasten terminals.
5. Remove the high pressure switch and pressure switch for control from the brazing part by a burner.

■ RAS-3HVRNE



■ RAS-4~6HVRNE



9.1.7. REMOVING COIL FOR REVERSING VALVE

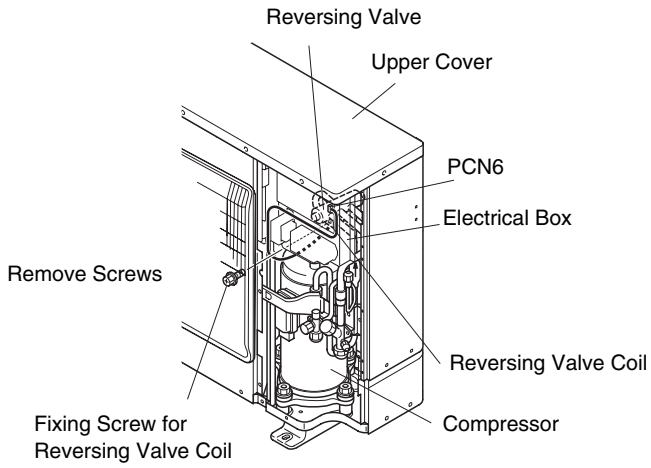
DANGER:
Do not touch the electrical parts when LED201 (Red) on the ISPM is lit to prevent from an electrical shock.

1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove three (3) screws fixing the power plate and turn the one toward the front side.

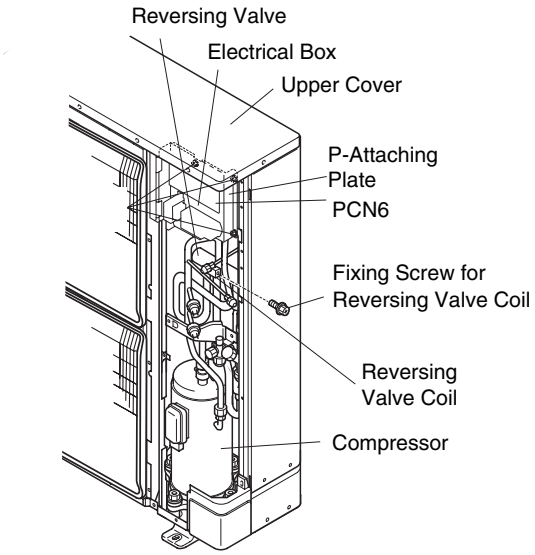
NOTE:
- *Check to ensure that LED201 (Red) is OFF when turning the power plate.*
- *Refer to section 9.1.11 for LED 201 location*

3. Disconnect the PCN6 on the PCB1 of the electrical box.
4. Remove the coil for the reversing valve after removing the fixing screw (1 piece).

■ RAS-3HVRNE



■ RAS-4~6HVRNE



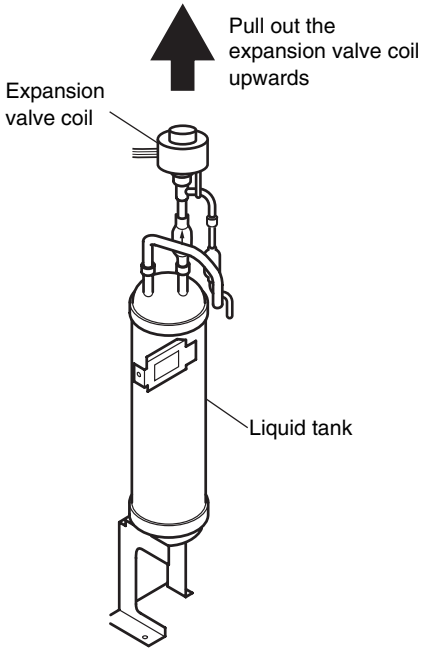
9.1.8. REMOVING COIL FOR EXPANSION VALVE

DANGER:
Do not touch the electrical parts when LED201 (Red) on the ISPM is lit to prevent from an electrical shock.

1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove the three (3) screws fixing the electrical box and turn the power plate toward the front side as shown in the item 2.1.7 “Removing Coil for Reverse Valve”.

NOTE:
Check to ensure that LED201 (Red) is OFF when turning the power plate.

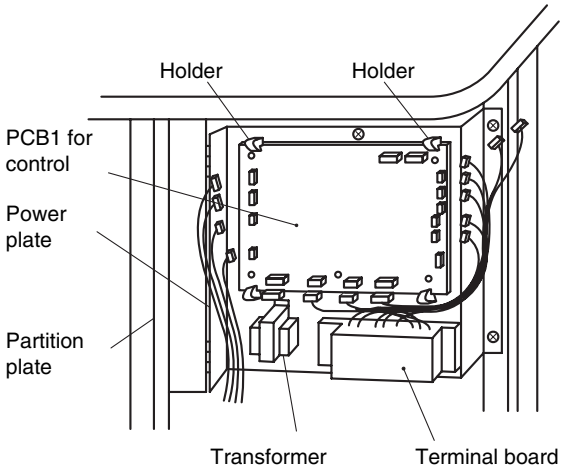
3. Disconnect the CN5A connector on the PCB1 of the electrical box.
4. Pull out the coil for expansion valve on the liquid tank upwards.

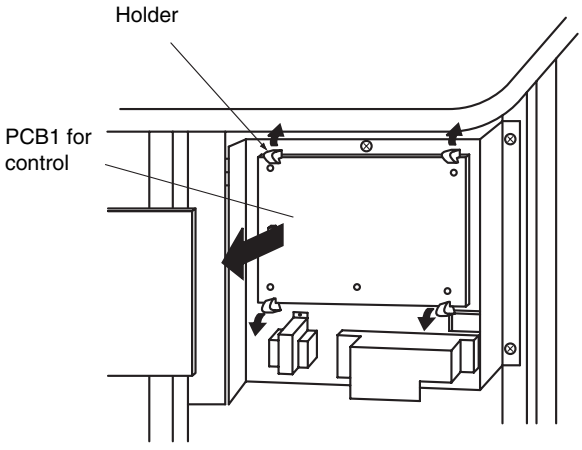


9.1.9. REMOVING PCB1

DANGER:
Do not touch the electrical components.
When handling the PCB1, take care of not to use excessive force as this will cause damage.

1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Disconnect all the connectors connected to the PCB1.
3. Pull out the PCB1 from the power plate by unhooking the extrusion parts.





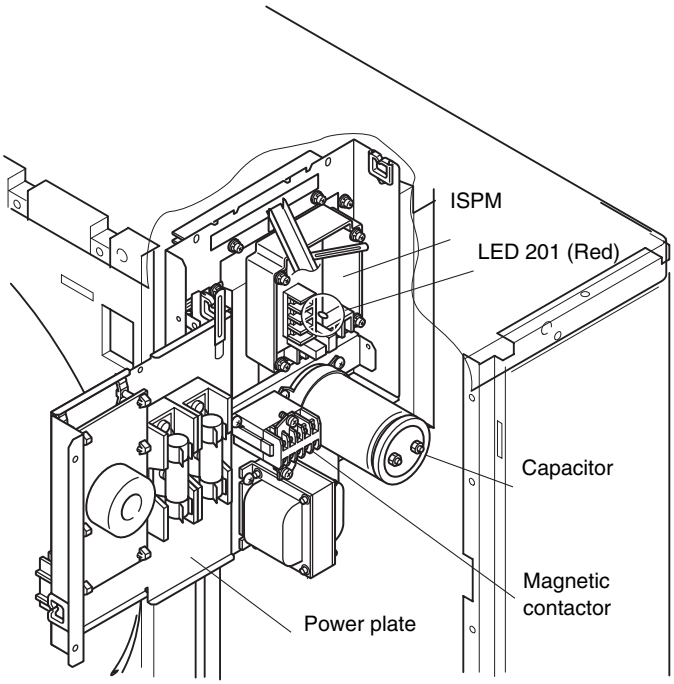
9.1.10. REMOVING ISPM

DANGER:
Do not touch the electrical parts when LED201 (Red) on the ISPM is lit to prevent from an electrical shock.

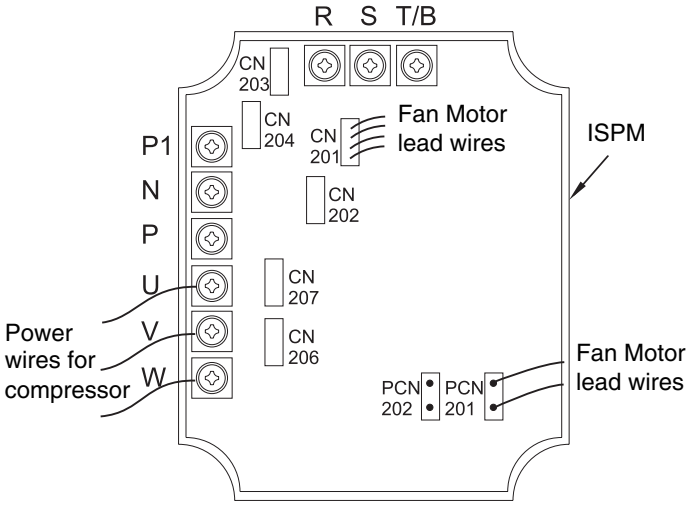
1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove the three (3) screws fixing the electrical box and turn the power plate toward the front side.

NOTE:
- *Check to ensure that LED201 (Red) is OFF when turning the power plate.*
- *Identify terminal Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunction or damage to the electrical parts will occur.*
- *When changing the PCB, ensure to set all the dip switches to the same configuration as the original.*

3. Disconnect all wires connecting to the ISPM.
   - Disconnect CN201, CN202, PCN201, PCN202 (Wire for Fan Motor) Disconnect CN203, CN204, CN206,
   - Disconnect TB, N, P, P1 and R, S, U, V, W on the terminal board and the faston terminal TB3 of ISPM.
4. Remove the four (4) screws fixing the ISPM.



NOTE:
- *Do not hold the PCB on the ISPM when removing the ISPM. When handling the PCB, take care of not to use excessive force as this will cause damage.*
- *Do not remove the insulation part from the screw after removing the screws.*
- *Identify terminal number with the mark band number when reassembling. If incorrectly connected, malfunction or damage to the electrical parts will occur.*
- *Pay attention not to clamp the wires when close the power plate.*



9.1.11. REMOVING ELECTRICAL COMPONENTS

DANGER:
Do not touch the electrical parts when LED201 (Red) on the ISPM is lit to prevent from an electrical shock.

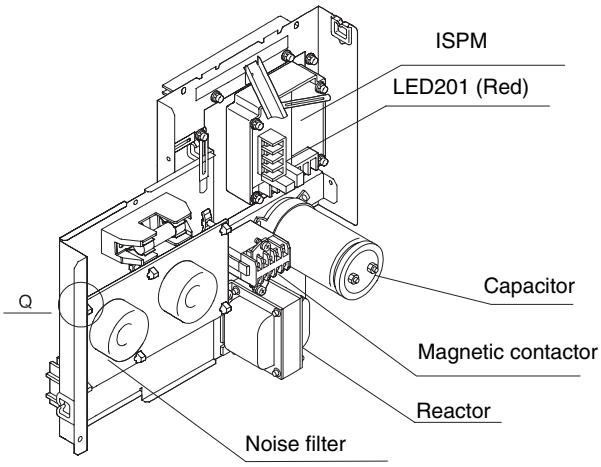
1. Remove the service cover according to the item 9.1.1 “Removing Service Cover”.
2. Remove three (3) screws fixing the electrical box and turn the power plate toward the front side.

NOTE:
- *Check to ensure that LED201 (Red) is OFF when turning the power plate.*
- *Capacitor has polarity (+ and -), check to ensure each terminal No*

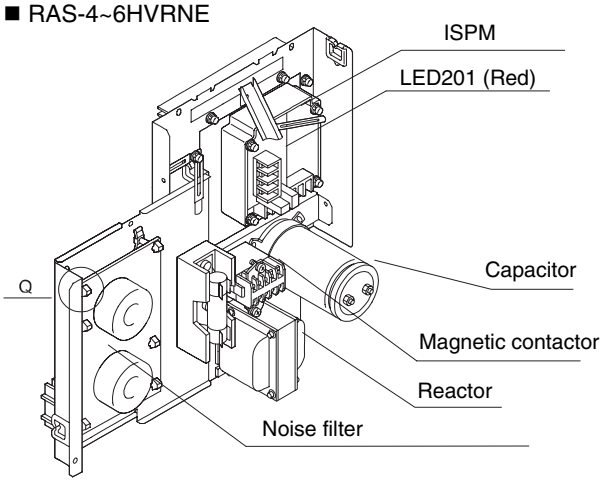
3 Removing Other Electrical Components
- Remove the wire connecting to the capacitor.
- Disconnect the wire connecting to the magnetic contactor.
  Remove the magnetic contactor by removing two (2) screws.
- Remove the reactor by removing four (4) screws. (In case of 4/5 HP the screws are eight.)
- Disconnect the wire connecting to the noise filter.
- Remove the noise filter by holding the expanded part of the holders (6 pcs.) with long-nose pliers.

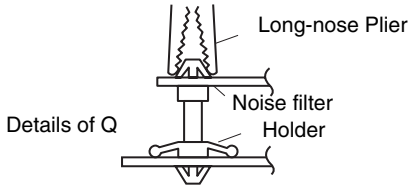
NOTE:
When reassembling, identify terminal number with the mark band number.

■ RAS-3HVRNE



■ RAS-4~6HVRNE



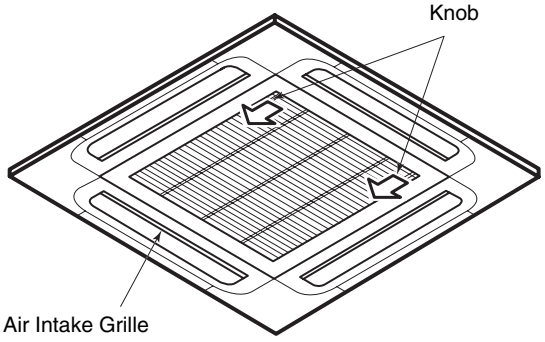


9.2. RCI (4-WAY CASSETTE TYPE)

WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

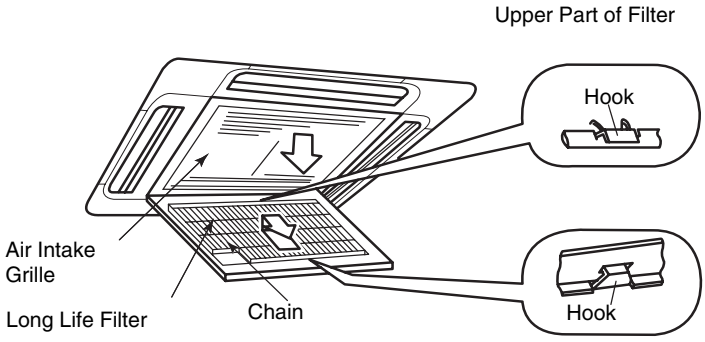
9.2.1. REMOVING THE LONG LIFE FILTER

1. The long life filter is located inside of the air intake grille. Detach the filter after opening the air intake grille. By pushing the knob in the arrow mark direction, the air intake grille can be opened.
2. The filter can be removed from the air intake grille by supporting the lower side of the air intake grille and filter, and unhooking it from the extrusion part.



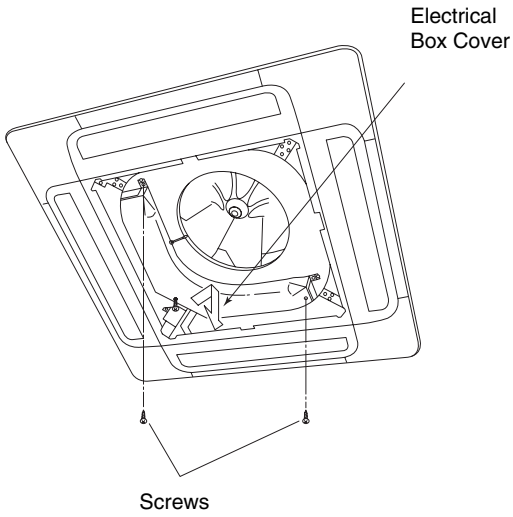
9.2.2. REMOVING THE AIR INTAKE GRILLE

By lifting the air intake grille at an angle of approximately 30° and releasing its chain, the air intake grille can be removed by holding it upwards and then towards you. If the chain is released and the angle is 90°, the air intake grille can not be removed.



9.2.3. REMOVING THE ELECTRICAL BOX COVER

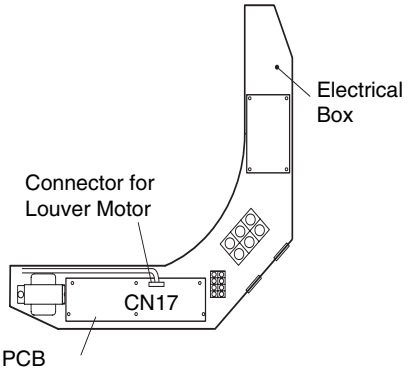
By opening the air intake grille, the electrical box can be seen. Remove two (2) screws fixing the electrical box cover and remove the cover.



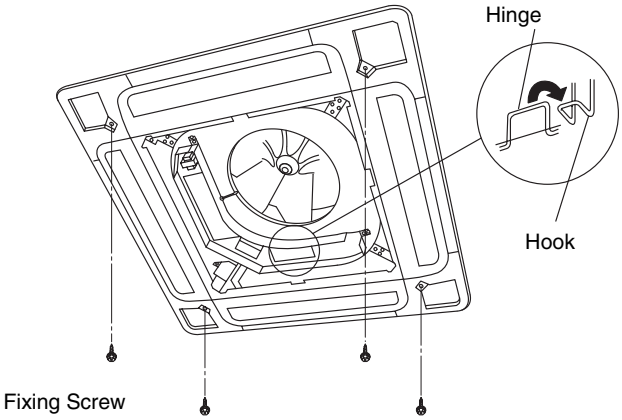
WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

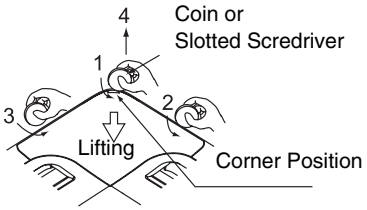
9.2.4. REMOVING THE OPTIONAL AIR PANEL

1. Remove the electrical box cover according to the item 9.2.3 "Removing the Electrical Box Cover".
   Disconnect the connector CN17 for louver motor on the indoor PCB.



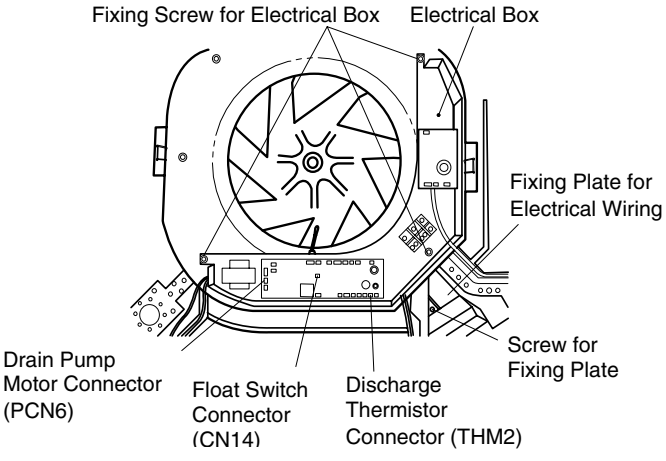
2. Remove the air intake grille from the optional air panel.
3. Remove the four (4) corner pockets as below.
   Insert slotted screwdriver or coin into the slot of corner pocket and unhook the hook of corner pocket in number order of 1 to 4.
4. Remove four (4) screws of the optional air panel and hook it by using the hinge to the hook of the drain pan as shown in the figure.
   Remove the optional air panel from the unit.





9.2.5. REMOVING THE FAN RUNNER AND FAN MOTOR

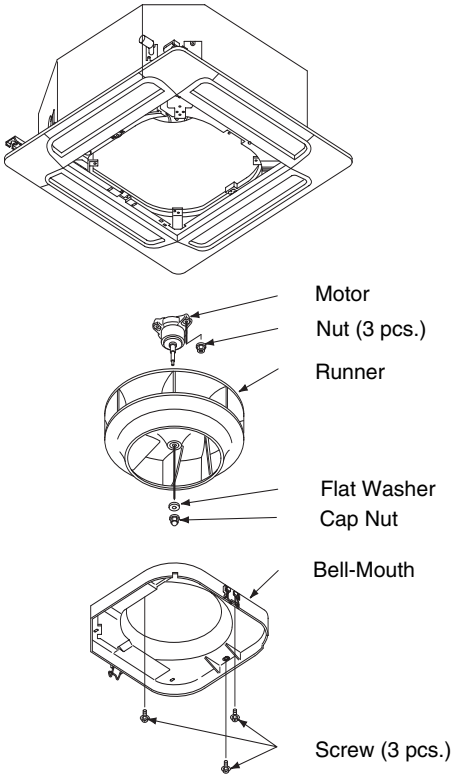
1. Remove the air intake grille according to the item 9.2.2 "Removing the Air Intake Grille".
2. Drawing Electrical box.
   - Disconnect the thermistors, drain motor connector (PCN6) and float switch connector from the PCB.
   - Loosen screw of the wire clamp and remove the wire clamp.
   - Remove 3 screws fixing the electrical box and hang the electrical box.



WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

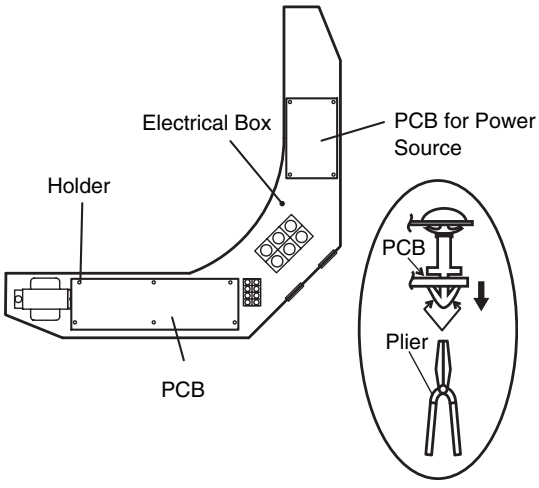
9.2.6. REMOVING THE BELL-MOUTH

1. Remove three (3) screws fixing the bell-mouth onto the drain pan and remove the bell-mouth.
2. Remove nut and washer fixing the runner and remove the runner.
3. Remove the earth wire for the fan motor. (Only for 4 and 5HP).
4. Disconnect the fan motor connector.
5. Remove three (3) nuts fixing the fan motor and remove the fan motor. (When reassembling the fan motor, tightening torque of the nut for the fan motor is approximately 8 N-m.)



9.2.7. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

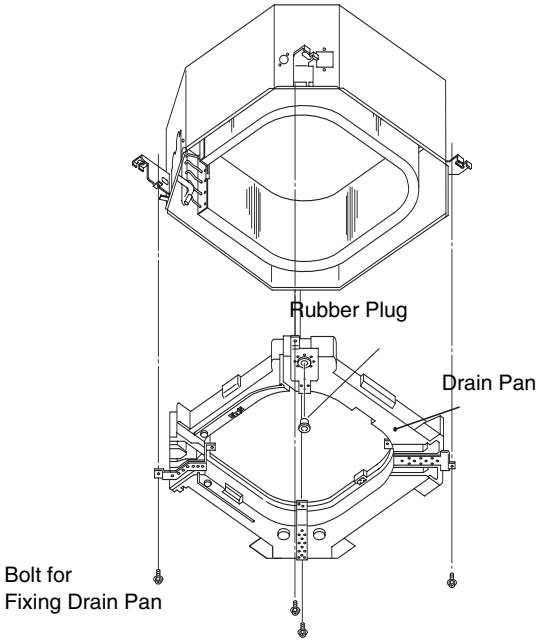
1. Remove the air intake grille according to the item 9.2.2 "Removing the Air Intake Grille".
2. Remove the electrical box cover according to the item 9.2.3 "Removing the Electrical Box Cover".
3. Disconnect the all wiring connectors of the PCBs.
4. Remove the PCBs by holding the expanded part of the holders using long-nose pliers.



WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

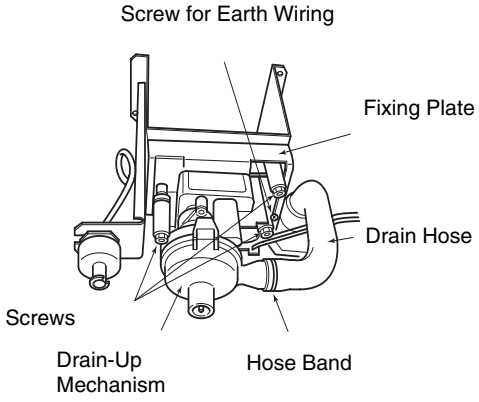
9.2.8. REMOVING THE DRAIN PAN

1. Remove the optional air panel according to the item "Removing the Optional Air Panel".
2. Remove the electrical box cover according to the item "Removing the Electrical Box Cover".
   Disconnect the connectors of the air outlet thermistor, piping thermistors (2), electronic expansion valve, drain pump, float switch and fan motor.
3. Remove the fan runner and fan motor according to the item "Removing the Fan Runner and Fan Motor".
4. Check clogging at the drain hole.
   (Do not use a cutter when removing the rubber plug. If used, the rubber plug will be damaged.)
5. Remove four (4) bolts for fixing the drain pan and remove the drain pan.



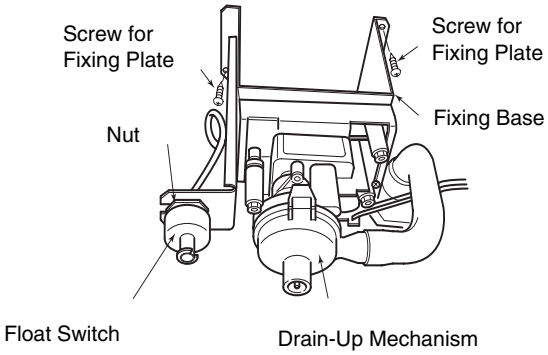
9.2.9. REMOVING THE DRAIN-UP MECHANISM

1. Remove the drain pan according to the item "Removing the Drain Pan".
2. Remove the hose band and remove the drain hose.
3. Remove screw of earth wiring.
4. Hold the drain-up mechanism and remove three (3) screws of the fixing plate for the drain-up mechanism.
5. Remove the drain-up mechanism with the fixing plate.



9.2.10. REMOVING THE FLOAT SWITCH

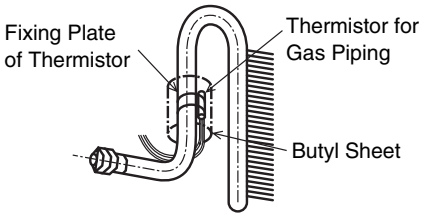
1. Remove the drain pan according to the item "Removing the Drain Pan".
2. Loosen the resin nut for fixing the float switch and remove the float switch.
   Remove two (2) screws of fixing base for fixing the drain-up mechanism when removing the drain-up mechanism.

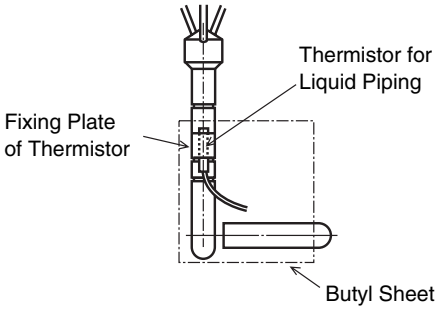


WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

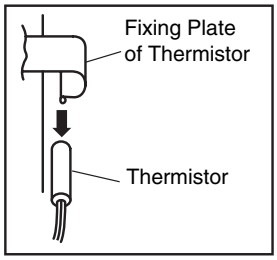
9.2.11. REMOVING THE THERMISTOR FOR LIQUID PIPE AND GAS PIPE

1. Remove the optional air panel according to the item 9.2.4 "Removing the Optional Air Panel".
2. Remove the bell-mouth according to No.3 of the item "Removing the Fan Runner and Fan Motor".
3. Remove the drain pan according to the item "Removing the Drain Pan".
4. Remove the butyl sheet, pull out the fixing plate for the thermistor from the gas pipe, where the thermistor is located, and then pull out the thermistor.
5. Remove the butyl sheet, pull out the fixing plate for the thermistor from the liquid pipe, where the thermistor is located, and then pull out the thermistor.



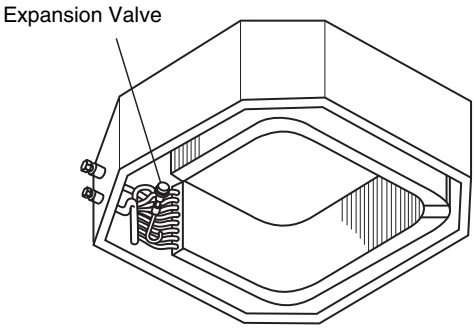


Up-Close View of Thermistor Installation



9.2.12. REMOVING THE ELECTRONIC EXPANSION VALVE COIL

1. Remove the optional air panel according to the item "Removing the Optional Air Panel".
2. Remove the bell-mouth according to No.3 of item "Removing the Fan Runner and Fan Motor".
3. Remove the drain pan according to the item "Removing the Drain Pan".



4. Remove the butyl sheet at the electronic expansion valve.
5. Prepare two (2) spanners. Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.

NOTE:

Do not hold the motor part when loosening the lock nut by spanner. The base of the drive part may turn idle and be broken.

WARNING: *TURN OFF all the main switches and disconnect the power supply from the unit.*

6. Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
7. Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.

NOTE:

During replacement work, pay attention to the separation part and prevent the dust, foreign particle, etc. from entering into the separation part. (The exposed part by separation is the mechanical part of the valve.)

Do not hurt the junction part of the valve with the tools.

8. Put the drive part onto the valve body, hold them with their axes matching and attach the lock nut to the screw part of the valve body.
9. Tighten the lock nut with spanner after tightening lightly by hand.
   The tightening torque shall be within the range of 12 Nm (120 kg-cm) to 15 Nm (150 kg-cm).

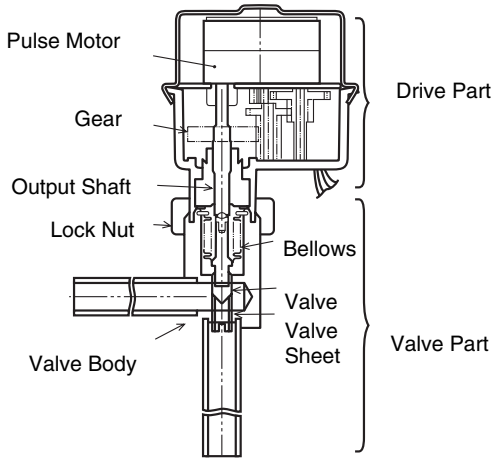


Fig. 1 Expansion Valve

NOTE:

Do not apply the strong forces such as the rotating torque and the bending load to the motor by holding the motor by hand when tightening the lock nut.
The direction of the eccentric part of the motor is assembled as the eccentric part of although the motor is directed toward the counter direction of the fittings for piping at the valve body, the alteration of this direction do not affect the open/close function of the valve. Therefore, the adjustment of the direction of the motor part is not required if the position of the motor is moved toward the rotating direction after replacement as shown below. However, pay attention to the direction of the motor for the coil of the electronic expansion valve not to touch other pipings and the side plate of the electrical box.

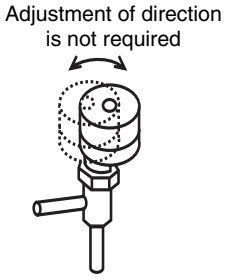
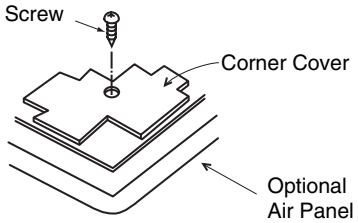


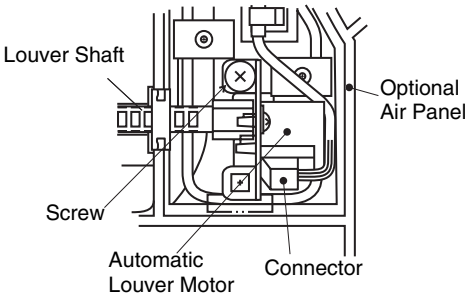
Fig. 2 Direction of Drive Part

10. After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.

9.2.13. REMOVING THE AUTOMATIC LOUVER MOTOR

1. Remove the optional air panel according to the item "Removing the Optional Air Panel".
2. Remove the motor cover after removing one (1) screw fixing the motor cover for the automatic louver motor.
3. Draw out the louver shaft from the automatic louver motor and remove the automatic louver motor with fixing plate.
4. Disconnect all the connectors connected to the motor.

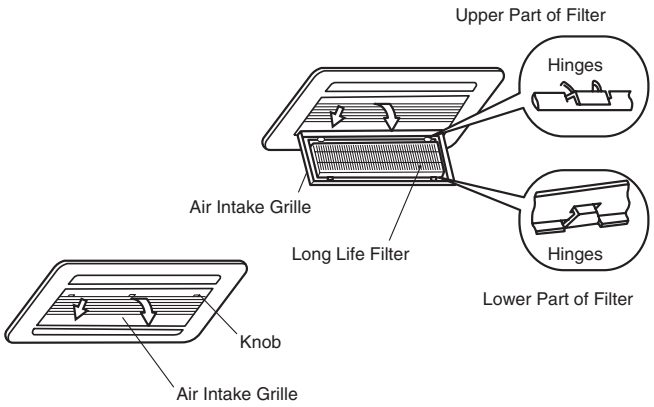




9.3. RCD (2-WAY CASSETTE)

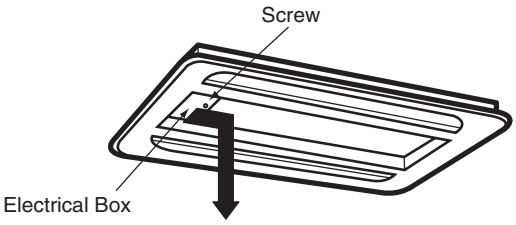
9.3.1. REMOVING THE LONG-LIFE FILTER AND THE AIR INLET GRILLE

1. The long-life filter is located inside of the air inlet grille. You can open the air inlet grille by pushing the knob as shown below.
2. Detach the filter after opening the air inlet grille. You can remove the filter from the air inlet panel by supporting the louver side of the air inlet grille and the filter, and by unhooking the grille from the extrusion part.
3. You can remove the air inlet grille by releasing the chain of the air inlet grille, lifting the chain upwards, and then drawing the chain towards you.



9.3.2. REMOVING THE ELECTRICAL BOX PANEL

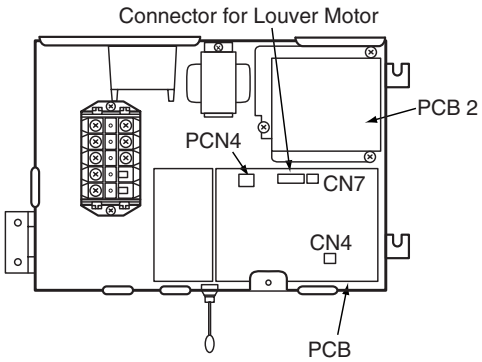
If you open the air inlet grille, you can see the electrical box. Loosen one screw that fix the electrical box panel and remove the panel.



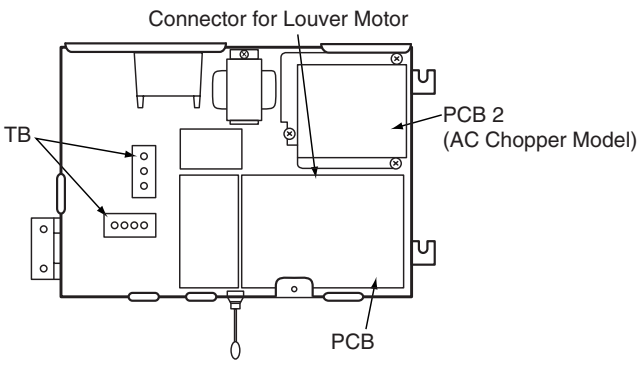
9.3.3. REMOVING THE OPTIONAL PANEL

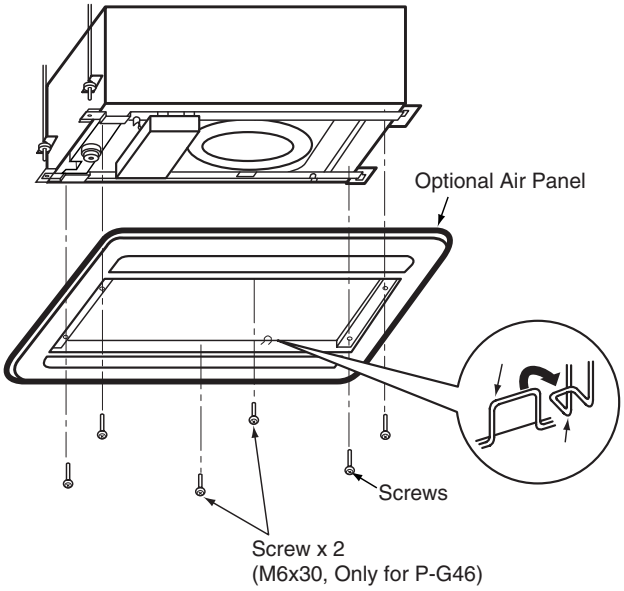
1. Remove the electrical box panel by opening the air inlet grille.
   Disconnect the connector (CN17) for the auto-louver on the indoor unit PCB.
2. Remove the air inlet grille from the optional air panel.
   Remove the four screws that fix the optional air panel.
3. Remove the optional air panel after unhooking the hinge off the hooks at the two positions near the drain pan.

(Before Alteration)



(After Alteration)

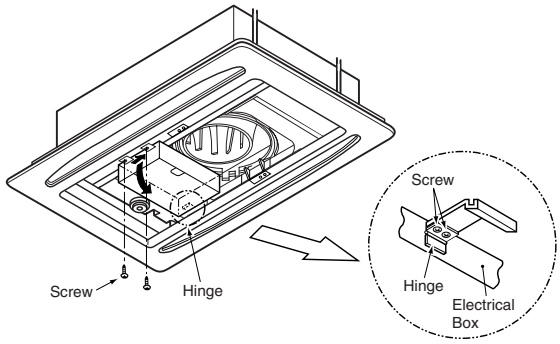




WARNING: *TURN OFF all the main switches*

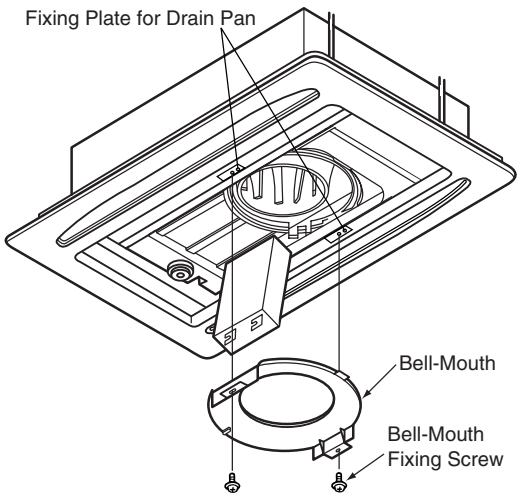
9.3.4. REMOVING THE FAN RUNNER AND THE FAN MOTOR

1. Remove the optional air panel according to the section 9.3.3, "Removing the Optional Air Panel".
2. Removing the Electrical Box.
   - Disconnect the connectors for each wire.
   - Remove the two screws that fix the electrical box and turn the electrical box downwards by approximately 90º. (The electrical box is hung by the hinge. Do not remove the fixing screw for the hinge).

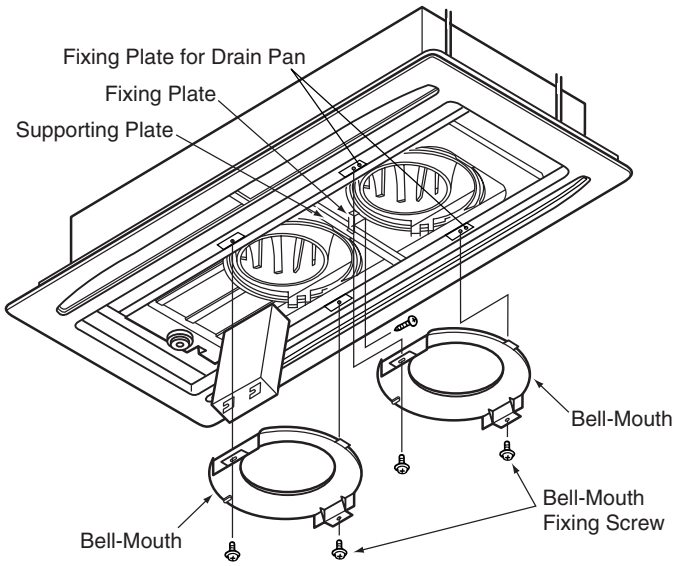


3. Removing the Bell Mouth
   Remove the fixing plate after removing one screw that fix the fixing plate on the support plate of the indoor unit. (For 4.0 and 5.0HP)
   Remove the bell mouth by removing the two screws that fix the bell mouth onto the fixing plate for the drain pan of the indoor unit.
   * Q'ty of Bell Mouth: 1 (RCD-1.0 to 3.0FSN)
     2 (RCD-4.0 to 5.0FSN)

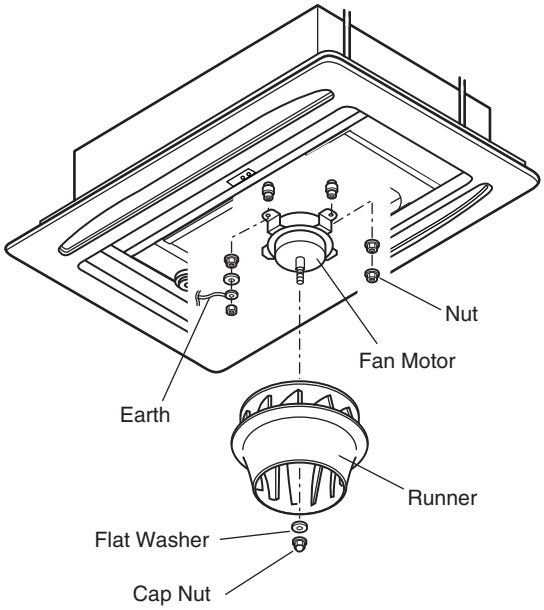
● RCD-1.0 to 3.0 FSN



● RCD-4.0 to 5.0 FSN



4. Remove the fan runner and the fan motor
   Remove the fan runner after removing the cap nut and the washer that fixes the fan runner.
   – Disconnect the ground wire for the fan motor.
   – Remove the four nuts that fix the fan motor and remove the fan motor.
   (When you are reassembling, the required tightening torque for the cap nut is approximately 8N-m (80kg-cm).
   * Qty of the Fan Runner and the Fan Motor:
   Each 1 (RCD-1.0 to 3.0FSN)
   Each 2 (RCD-4.0 to 5.0FSN)



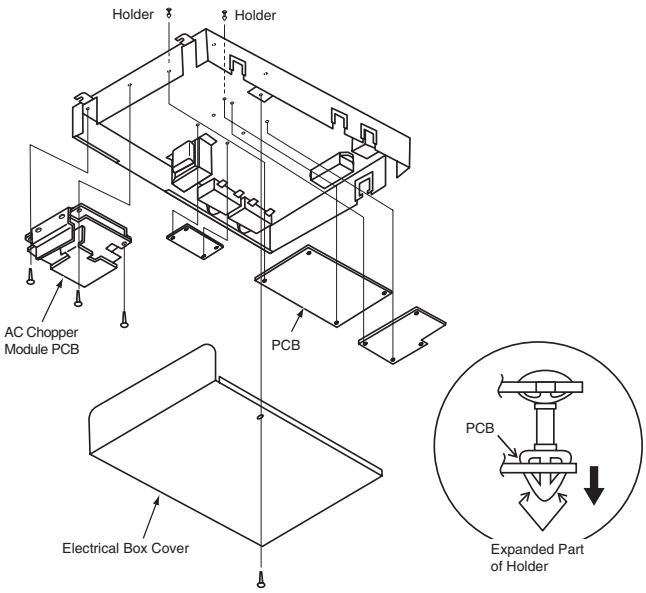
WARNING: *TURN OFF all the main switches*

9.3.5. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Remove the air inlet grille according to the section 9.3.1, "Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the electrical box panel according to the section 9.3.2, "Removing the Electrical Box Panel".
3. Pull out the PCB by pinching the expanded part of the PCB holders (which hold the PCB at four positions) by means of long-nose pliers.
4. Remove the three fixing screws for the AC chopper.
   (When you are reassembling, pay attention not to squeeze, because the sealed ground wire and the transformer ground wire are commonly squeezed by one screw).

NOTE:

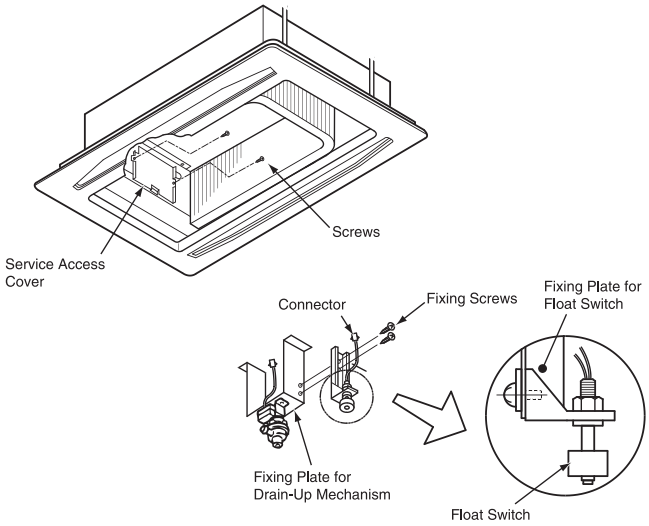
Do not touch the electrical components on the PCB. If you apply a great force to the PCB, the PCB will become faulty.



WARNING: *TURN OFF all the main switches*

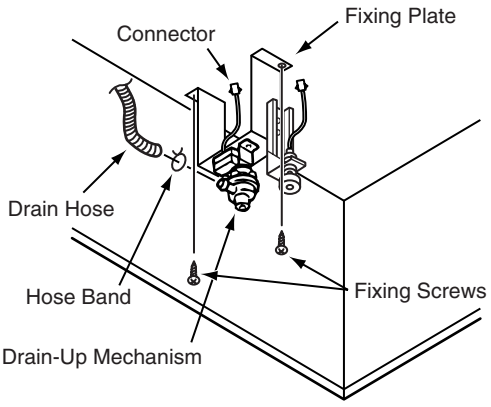
9.3.6. REMOVING THE FLOAT SWITCH

1. Remove the air inlet grille according to the section 9.3.1, "Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the bell mouth according to the section 9.3.4, "Removing the Fan Runner and the Fan Motor".
3. Remove the panel after removing the two fixing screws for the panel of the service access hole near the pipes inside the unit.
4. Removing THE FLOAT SWITCH
   Disconnect the connectors and remove the float switch after removing two screws which fix the fixing plate for the float switch onto the fixing plate for the drain-up mechanism.



9.3.7. REMOVING THE DRAIN-UP MECHANISM

1. Remove the air inlet grille according to the section 9.3.1, "Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the bell mouth according to the section 9.3.4, "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section 9.3.8, "Removing the Drain Pan".
4. After disconnecting the wire connector, remove the two fixing screws for the fixing plate for the drain-up mechanism. First support the drain-up mechanism by hand in order not to drop the drain-up mechanism. Then, remove the hose band from the drain hose. Then, disconnect the drain hose, and finally remove the drain-up mechanism.

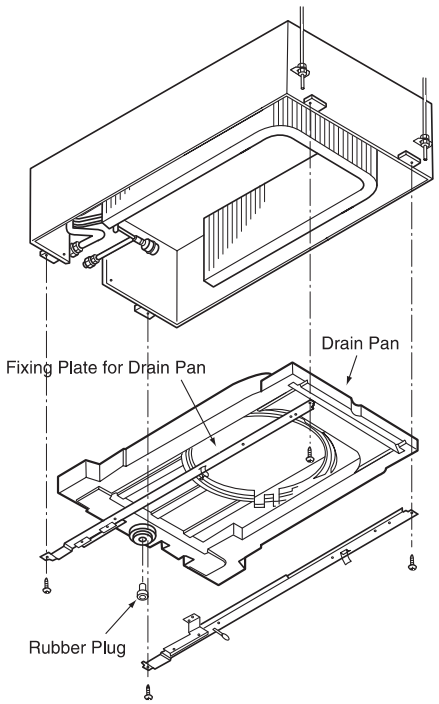


WARNING: *TURN OFF all the main switches*

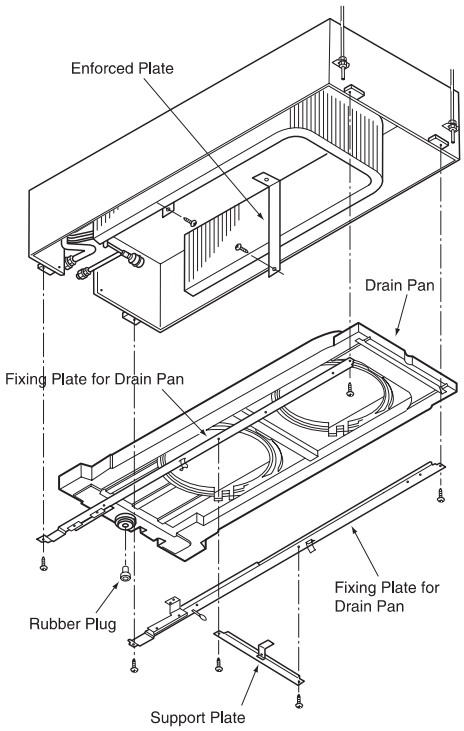
9.3.8. REMOVING THE DRAIN PAN

1. Remove the air inlet grille according to the section 9.3.1, "Removing the Long-Life Filter and the Air Inlet Grille".
2. Open the electrical box panel according to the section 9.3.2, "Removing the Electrical Box Panel". Disconnect the connect wire between the indoor unit and the outdoor unit, the electrical wiring for the electrical box and the connectors inside of the electrical box.
3. Remove the bell-mouth according to the section 9.3.4, "Removing the Fan Runner and the Fan Motor".
4. Discharge the drain water on the drain pan by removing the rubber plug. The sealing agent is used around the rubber plug. However, you can remove the rubber plug by pulling out the rubber plug. Do not scratch the rubber plug with a cutter and others. Make sure that the water hole is not clogged by pricking the water hole with a pencil.
5. Removing the drain pan
   - Remove two screws that fix the enforced plate onto the fixing plate for the drain pan. Remove the two screws that fix the support plate onto the fixing plate for the drain pan and remove the support plate. (For RCD-4.0FSN and RCD-5.0FSN)
   - Remove the two fixing plates for the drain pan.
   - Remove the drain pan.

● RCD-1.0 to 3.0 FSN



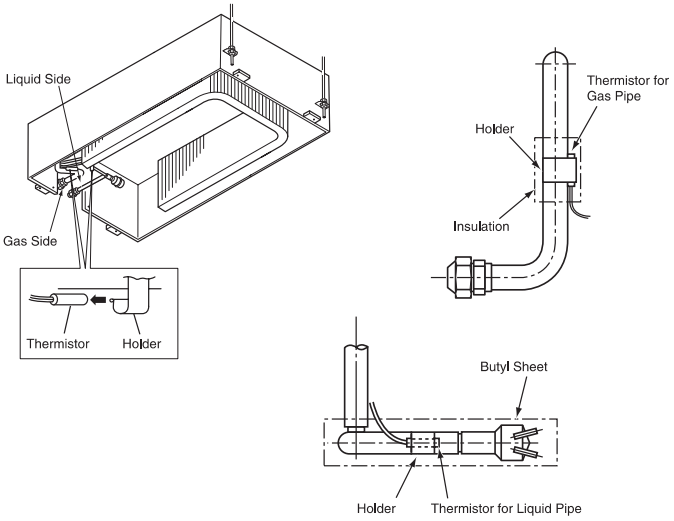
● RCD-4.0 to 5.0 FSN



WARNING: *TURN OFF all the main switches*

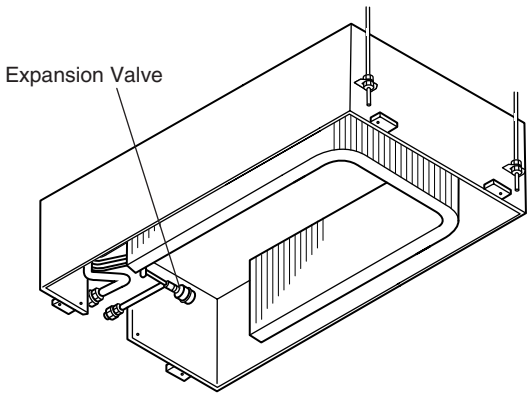
9.3.9. REMOVING THE THERMISTORS FOR THE LIQUID PIPE AND THE GAS PIPE

1. Remove the optional air panel according to the section 9.3.3, "Removing the Optional Air Panel".
2. Remove the bell mouth according to the section 9.3.4, "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section 9.3.8, "Removing the Drain Pan".
4. Remove the insulation material for the pipe, remove the thermistor holder from the gas piping and remove the thermistor for the gas pipe.
5. Remove the butyl sheet, remove the thermistor holder from the liquid piping and remove the thermistor for the liquid pipe.



9.3.10. REMOVING THE ELECTRONIC EXPANSION VALVE COIL

1. Remove the optional air panel according to the section 9.3.3, "Removing the Optional Air Panel".
2. Remove the fan assembly according to the section 9.3.4, "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section 9.3.8, "Removing the Drain Pan".
4. Remove the butyl sheet at the electronic expansion valve.
5. Prepare two spanners (#19 and #14). Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.



NOTE:

Do not hold the motor part when you are loosening the lock nut by means of a spanner. The base of the drive part may turn idle and may break.

6. Turn the lock nut by a few turns. Then, the drive part separates from the screw and you can remove the drive part.
7. Prepare the new drive part for replacement (service part) with the position of the driver (drive screw) already adjusted.

NOTE:

During the replacement work, pay attention to the separation part and prevent the dust, the foreign particles and others from entering the separation part. (The part that is exposed by the separation is the mechanical part of the valve.) Do not damage the junction part of the valve with the tools.

8. Put the drive part onto the valve body, hold the drive part and the valve body with their axes matching and attach the lock nut to the screw part of the valve body.

WARNING: *TURN OFF all the main switches*

9. Tighten the lock nut with a spanner after tightening lightly by hand. The tightening torque should be within the range of 12Nm (120kg-cm) to 15Nm (150kg-cm).

NOTE:

Do not apply great forces, such as the rotating torque and the bending load, to the motor by holding the motor by hand when you are tightening the lock nut.
The direction of the eccentric part of the motor is assembled as the eccentric part of the expansion valve. Although the motor is directed toward the counter direction of the fittings for piping at the valve body, the alteration of this direction does not affect the open/close function of the valve. Therefore, the adjustment of the direction of the motor part is not required if the position of the motor is moved toward the rotating direction after the replacement, as shown below.
However, make sure that the direction of the motor for the coil of the electronic expansion valve does not touch other piping and the side plate of the electrical box.

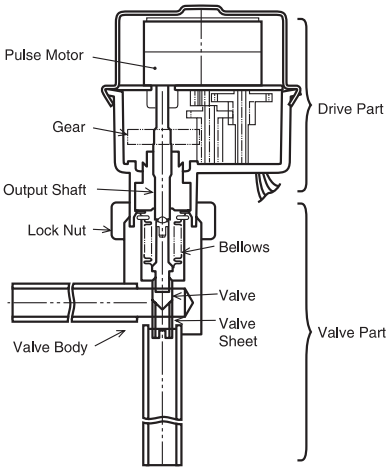


Fig. 1 Expansion Valve

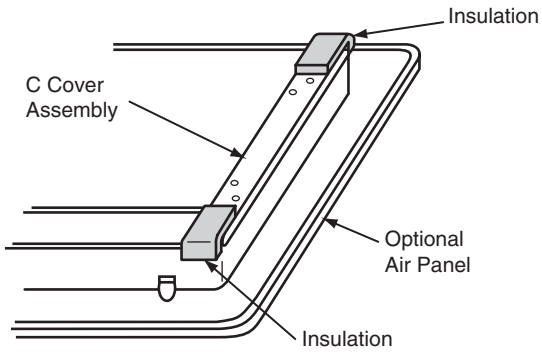
Adjustment of direction is not required.

Fig. 2 Direction of Drive Part

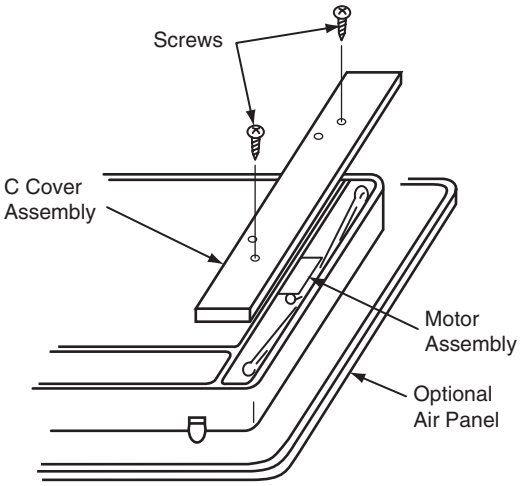
10. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.

9.3.11. REMOVING THE AUTOMATIC LOUVER MOTOR

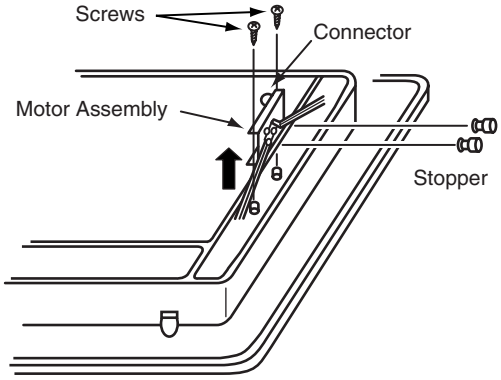
1. Remove the optional air panel according to the section 9.3.3, "Removing the Optional Air Panel".
2. Remove the insulation material that is mounted with the adhesive at both sides of the C panel assembly.



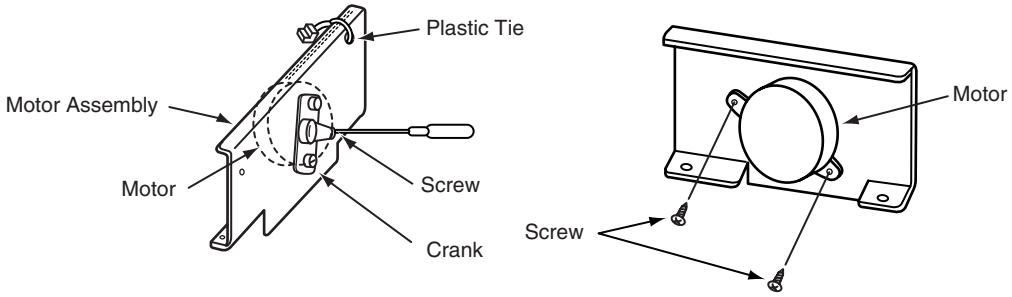
3. Remove the two screws that fix the C panel assembly and remove the C panel assembly from the optional air panel.



4. Remove the two screws that fix the motor assembly and remove the two stoppers by lifting the motor assembly upwards (to the arrow direction) by hand.
   You can remove the stopper by pulling the stopper. You can remove the motor assembly by removing the connector at the same time.



5. Remove one screw that fixes the crank and cut the plastic tie that fixes the motor cord.
   Remove the motor after removing the two fixing screws.

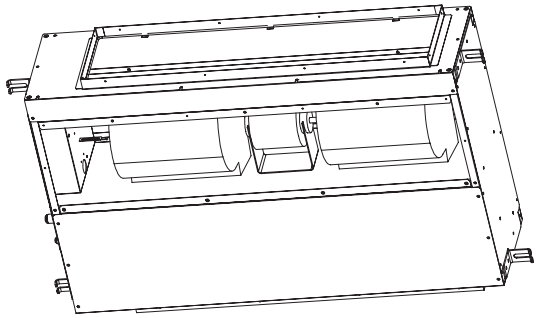


9.4. RPI

IN-THE-CEILING TYPE (MODELS: RPI-2.0 5.0 FSNE)

9.4.1. REMOVING THE AIR INLET THERMISTOR

1. Remove the screws that fix the fan panel.
2. The thermistor is located on the left side.

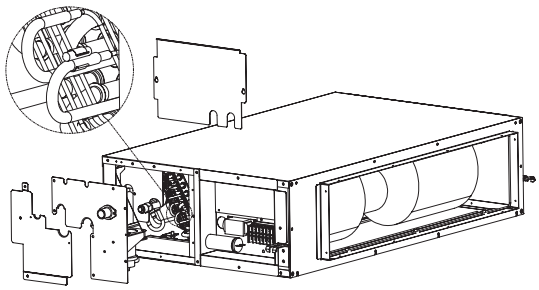


9.4.2. REMOVING THE THERMISTORS FOR THE LIQUID PIPE AND THE GAS PIPE

1. Remove the screws that fix the electrical box panel. (This panel slides vertically).
2. Remove the float switch cover.
3. Remove the cork tape and pull out the thermistors after removing the fixing plate for the thermistor.
4. The thermistors are located in front of the float switch cover.

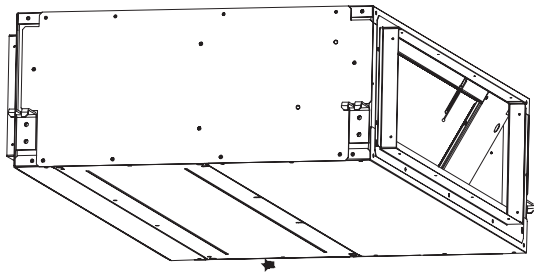
NOTE:

Carefully handle the float switch.
Do not drop the float switch on the floor. If you drop the float switch, a malfunction may occur.
When you are mounting, do not use a motor-driven screwdriver.



9.4.3. REMOVING THE THERMISTOR OUTLET

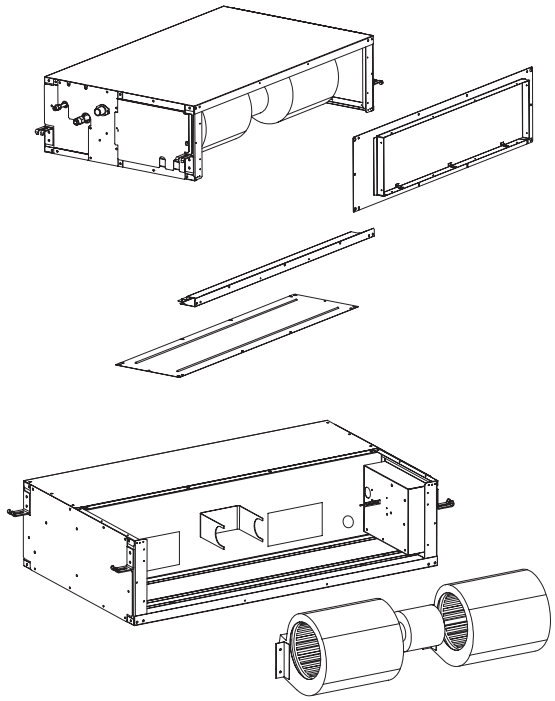
1. The thermistor is located on the outlet side.



WARNING: *TURN OFF all the main switches*

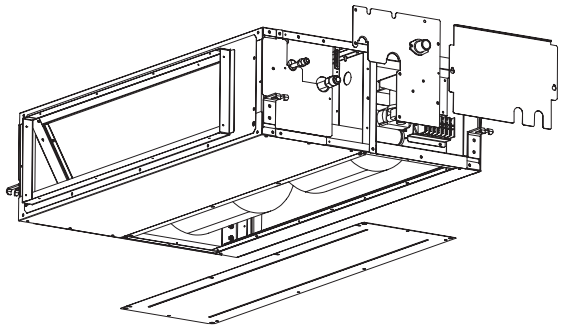
9.4.4. REMOVING THE FAN UNIT

1. Remove the screws that fix the fan panel.
2. Remove the screws that fix the back panel.
3. Remove the fan motor.
4. Loosen the screw that fixes each fan runner.
5. Remove the screws that fix each casing and pull out each casing.
6. Remove the holding band for the motor and remove the motor carefully.



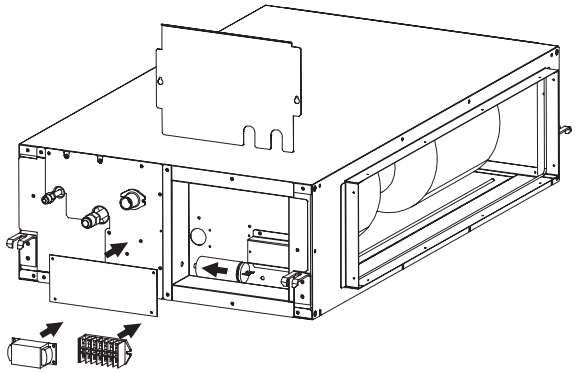
9.4.5. REMOVING THE DRAIN PUMP

1. Remove the screws that fix the fan panel.
2. Remove the screws that fix the electrical box panel. (This panel slides vertically).
3. Remove the float switch cover.
4. Remove the drain pump.



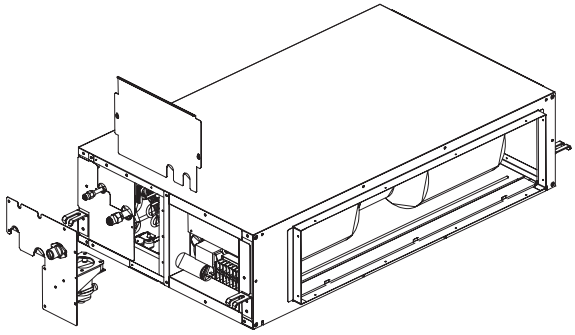
9.4.6. REMOVING THE ELECTRICAL BOX

1. Remove the screws that fix the electrical box panel. (This panel slides vertically).
2. The transformer and the terminal board are on the front side.
3. The PCB is behind the transformer and the terminal board.
4. The capacitor is behind the PCB.



9.4.7. REMOVING THE FLOAT SWITCH

1. Remove the screws that fix the electrical box panel. (This panel slides vertically).
2. Remove the float switch cover.
3. The Float Switch is located behind the electrical box panel.

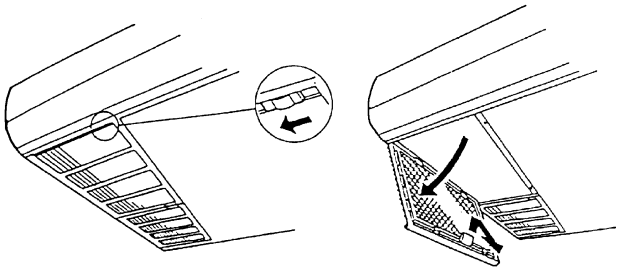


9.5. RPC

CEILING TYPE

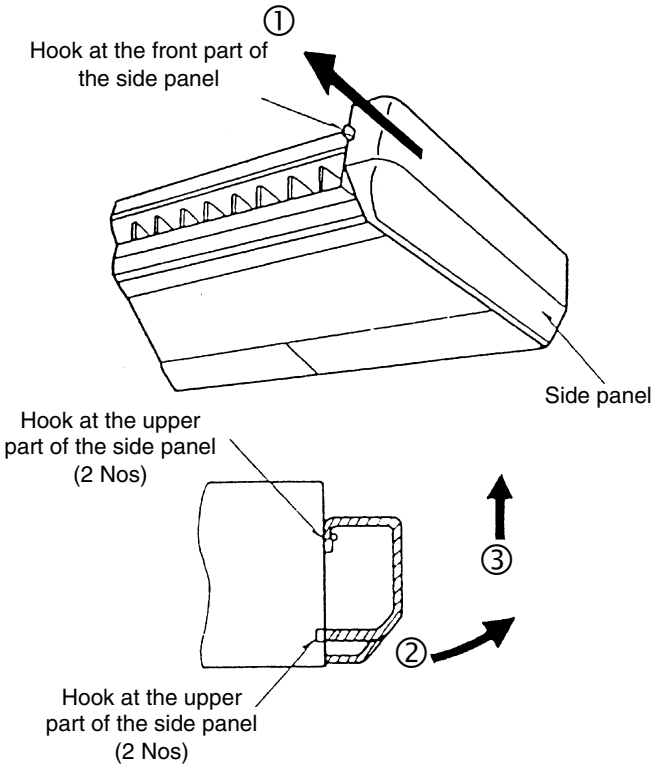
9.5.1. REMOVING THE AIR FILTER

1. The air filter is located inside of the air inlet grille. Remove the air filter after opening the air inlet grilles.
2. Push the knobs of the air inlet grille backwards.
3. Open the air inlet grille downwards.
4. By lifting up the knob, you can remove the filter.



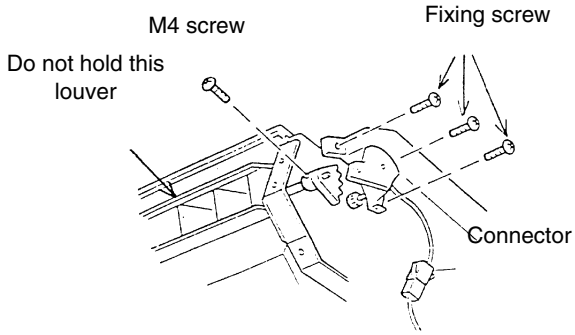
9.5.2. REMOVING THE SIDE PANEL

5. Pull the side panel towards you.
6. Unhook the hook at the lower part of the side panel.
7. Lift up the side panel.



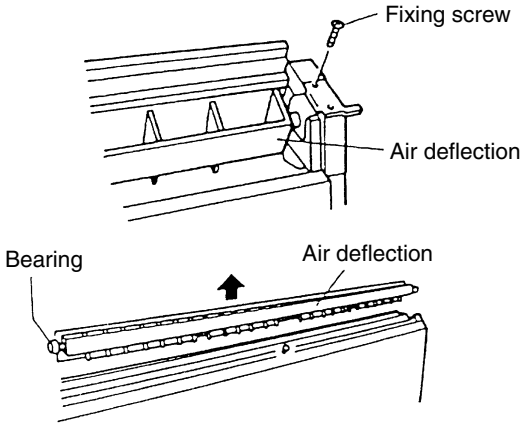
9.5.3. REMOVING THE DISCHARGE AIR GRILLE

1. Remove the side panel according to the section 9.5.2, "Removing the Side Panel".
2. Remove the crank assembly that is mounted on the right-side shaft of the air deflector.



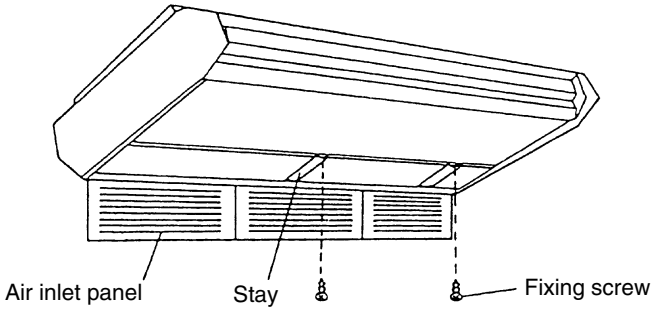
WARNING: *TURN OFF all the main switches*

3. Pull out the deflector including the bearing after removing the four fixing screws at the right and the left.

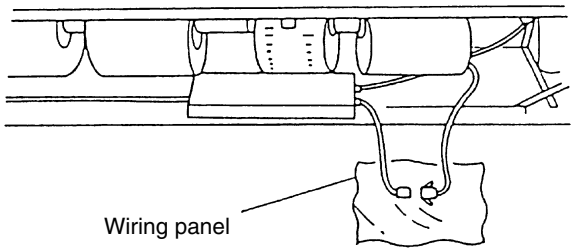


9.5.4. REMOVING THE FAN MOTOR

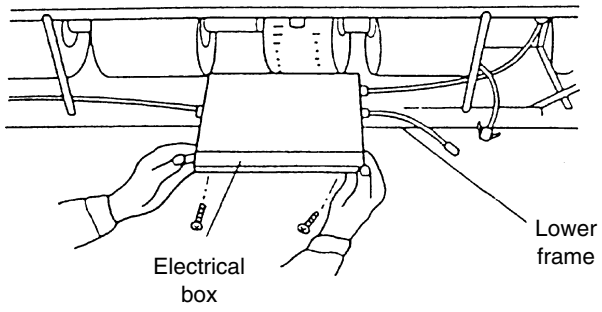
1. Open the air inlet grille according to the section 9.5.1, "Removing the Air Filter".
2. Remove the stay at the air inlet.



3. Disconnect the connector for the indoor fan motor.



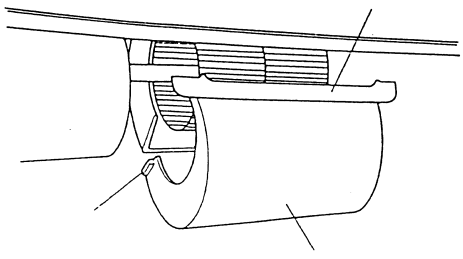
4. Hook the electrical box on the lower frame after removing the screws that fix the electrical box.



NOTE:

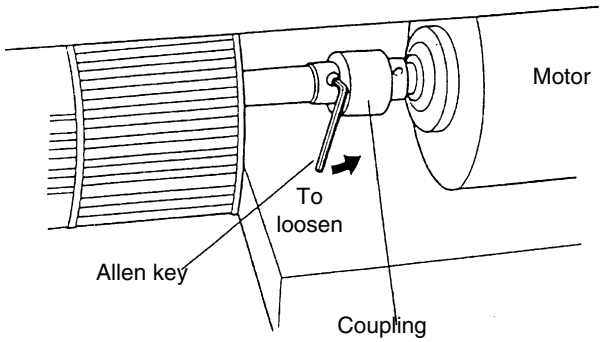
During this work, support the electrical box by hand and make sure not to drop the electrical box.

5. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.

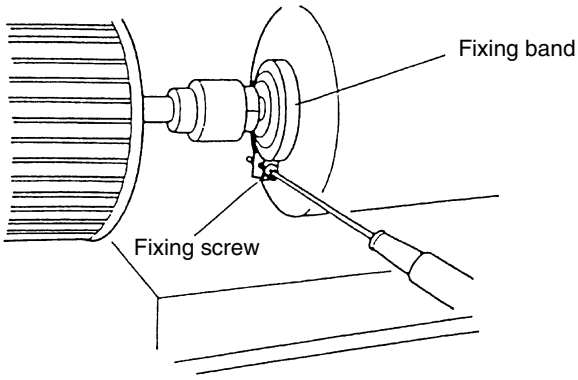


WARNING: *TURN OFF all the main switches*

6. Loosen the screws by means of a hexagon wrench.

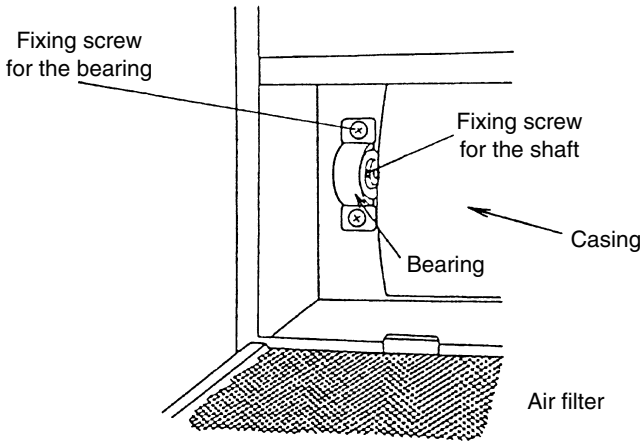


7. After removing the fixing band, remove the fan motor by sliding the fan motor backwards. Pay attention not to drop the fan motor.



9.5.5. REMOVING THE BEARING

1. Remove the side panel according to the section 9.5.2, "Removing the side panel".
2. Loloosen the two screws that fix the bearing and the shaft by means of a hexagon wrench.
3. Remove the bearing after removing the two fixing screws (M8).



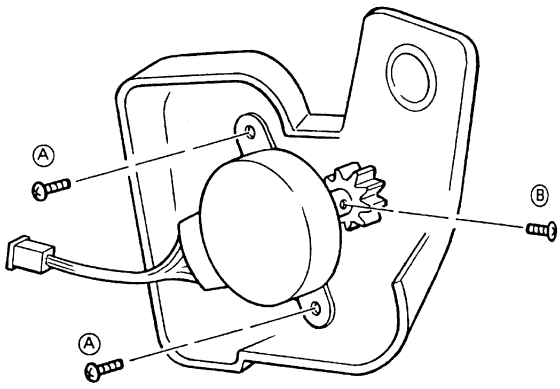
9.5.6. REMOVING THE COUPLING

1. Remove the side panel according to the section 9.5.2, "Removing the Side Panel".
2. Separate the casing into two pieces according to the section 2.8.4, "Removing the Fan Motor".
   Loosen the screw for the coupling by means of a hexagon wrench.
3. Remove the M8 screw that fixes the bearing, according to the section 9.5.5, "Removing the Bearing".
4. Remove the coupling after removing the shaft and the turbo fan assembly.

WARNING: *TURN OFF all the main switches*

9.5.7. REMOVING THE AUTOMATIC LOUVER MOTOR

1. Remove the right-side panel according to the section 9.5.2, "Removing the Side Panel".
2. Remove the M4 screws and remove the AS motor assembly from the right shaft of the discharge air grille. Pay attention not to damage the AS Motor assembly.
3. Remove the two screws (A) that fix the motor for the auto-louver and remove the motor from the AS Motor fixing plate. Remove one screw (B) that fixes the shaft of the motor for the auto-louver and the pinion AS.

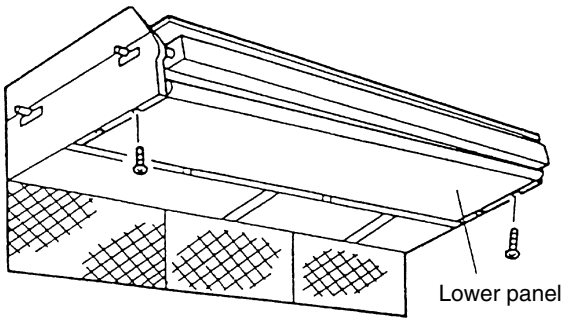


NOTE:

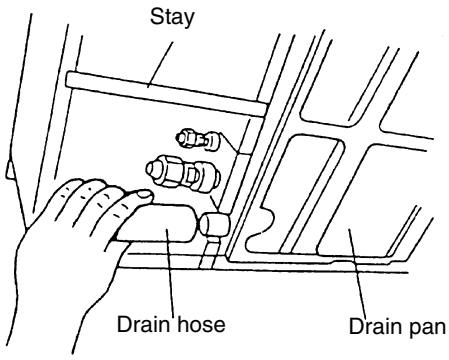
When you are assembling, tighten the two screws (A) with a torque of 0.8Nm (8kg-cm) and one screw (B) with a torque of 0.4 Nm (4kg-cm) by means of a torque wrench.

9.5.8. REMOVING THE THERMISTORS FOR THE LIQUID PIPE AND THE GAS PIPE

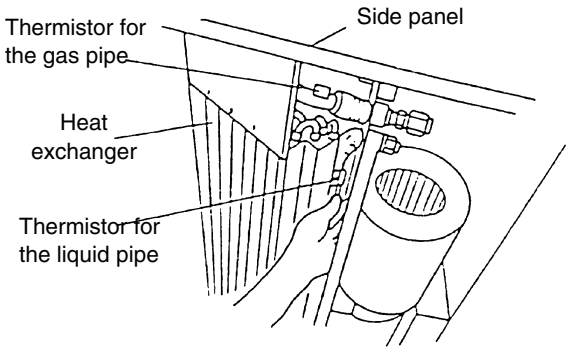
1. Remove the right-side panel and the left-side panel according to the section 9.5.2, "Removing the Side Panel".
2. Remove the lower panel.



3. Remove the drain pan after disconnecting the drain hose.



4. Remove the thermistors for the liquid pipe and the gas pipe.



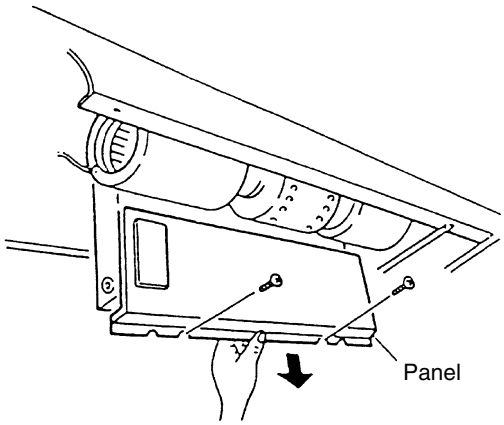
WARNING: *TURN OFF all the main switches*

9.5.9. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Open the air inlet panel according to the section 9.5.1, "Removing the Air Filter".
2. Disconnect the wiring connector for the fan motor.
3. Turn the electrical box according to item 4 of the section 9.5.4, "Removing the Fan Motor" and hook the electrical box at the lower frame.
4. Remove the panel after removing the two screws that fix the electrical box panel.

NOTE:

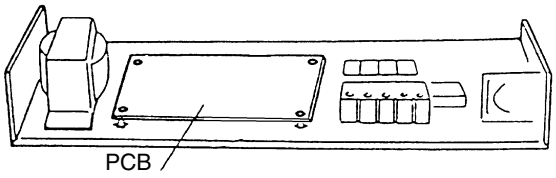
During this work, support the electrical box and make sure not to drop the electrical box.

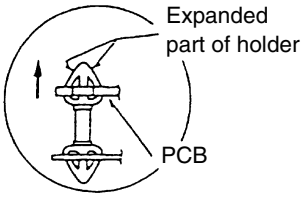


5. Four holders support the PCB. Pinch the expanded part of the holder by means of long-nose pliers.

NOTE:

Do not touch the electrical components. Do not apply a great force to the PCB. If you apply a great force, the PCB will become faulty.





9.6. RPK

Information about this unit will be available with the new version.

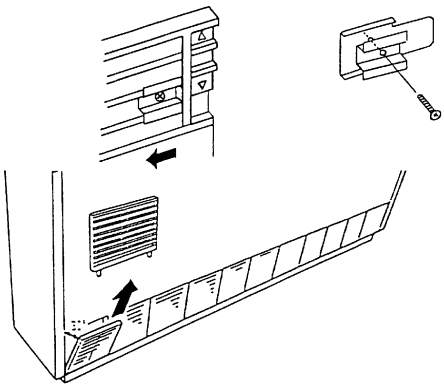
WARNING:
Turn OFF all the main switches and disconnect the power supply from the unit.

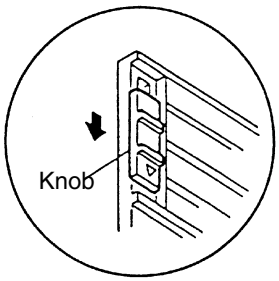
9.7. RPF

Floor Type

9.7.1. REMOVING THE AIR INLET GRILLE

1. Loosen the screws for the fixing plate at the right side of each air inlet grille. Then, move the fixing plates.
2. By pushing the knob at both sides of the air inlet grille towards the arrow mark direction, the air inlet grille can be opened with an angle of 30°.
3. Remove the air inlet grille from the hinged part.

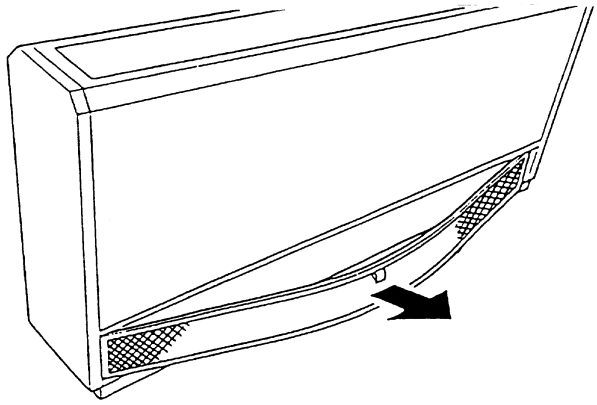




WARNING: *TURN OFF all the main switches*

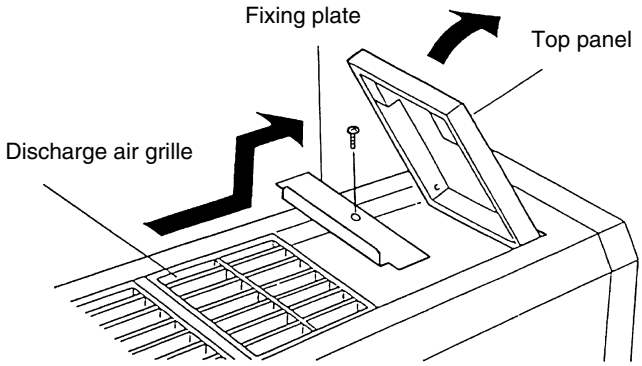
9.7.2. REMOVING THE AIR FILTER

1. The air filter is located on the inner side of the air inlet grille. Remove all the air inlet grilles.
2. Remove the air filter by pulling the knob of the air filter.



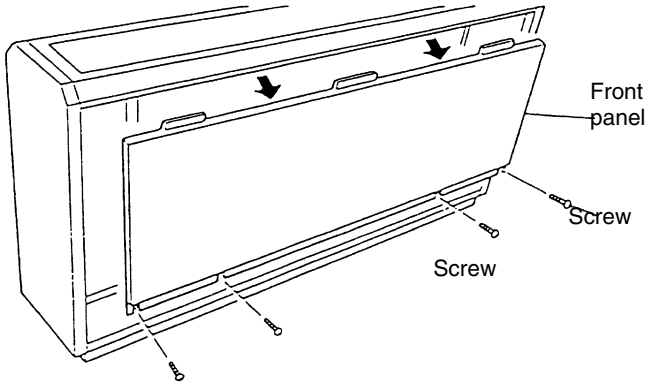
9.7.3. REMOVING THE DISCHARGE AIR GRILLE

1. The discharge air grilles are mounted on the top by means of a guide rail.
2. By opening the top panel and by sliding the discharge air grilles, you can remove the discharge air grilles.



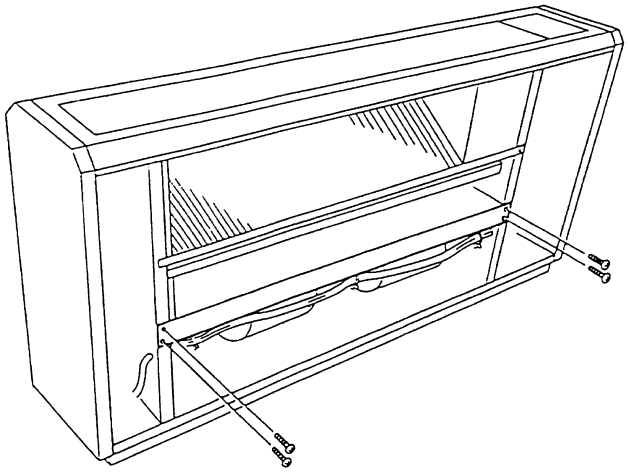
9.7.4. REMOVING THE FRONT PANEL

1. Remove the air filter according to the section 9.7.2, "Removing the Air Filter".
2. Remove the front panel from the slit after removing the four fixing screws at the lower part and pulling out the front panel downwards.



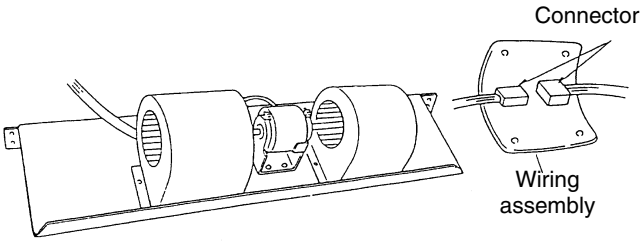
9.7.5. REMOVING THE FAN MOTOR

1. Remove the air inlet grille according to the section 9.7.1, "Removing the Air Inlet Grille".
2. Remove the air filter according to the section 9.7.2, "Removing the Air Filter".
3. Remove the front panel according to the section 9.7.4, "Removing the front panel".
4. Remove the mounting plate for the fan motor after removing the four fixing screws.

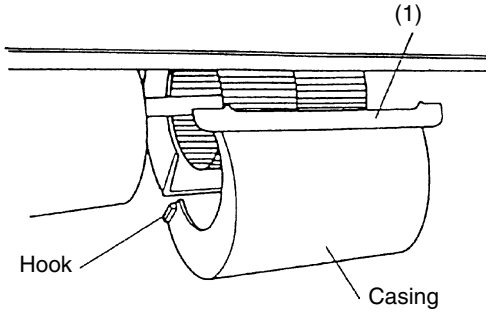


WARNING: *TURN OFF all the main switches*

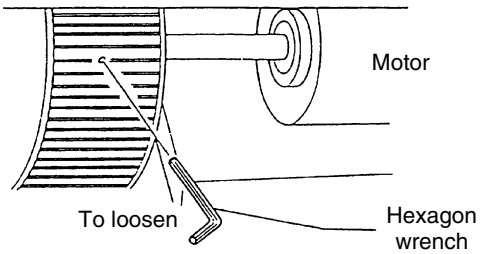
5. Disconnect the wiring connector for the fan motor. Remove the wiring assembly and the connector.



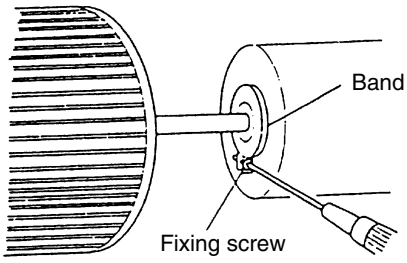
6. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.



7. Loosen the screws by means of a hexagon wrench.

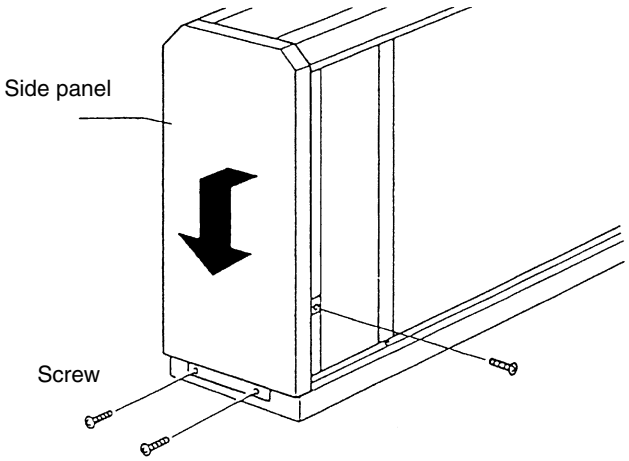


8. After removing the fixing plate, remove the fan motor by sliding the fan motor backwards. Pay attention not to drop the fan motor.



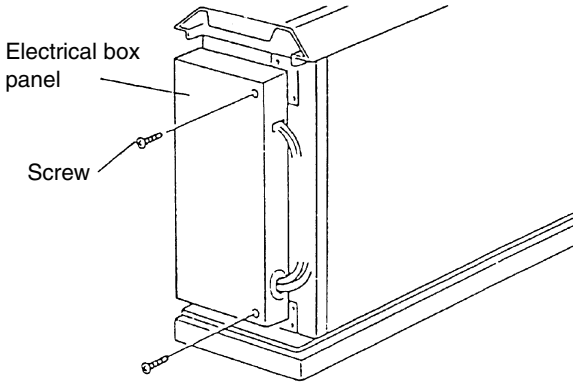
9.7.6. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Remove the air inlet grille according to the section 9.7.1, "Removing the Air Inlet Grille".
2. Remove the air filter according to the section 9.7.2, "Removing the Air Filter".
3. Remove the front panel according to the section 9.7.4, "Removing the front panel".
4. You can remove the side panel by removing the three fixing screws and pulling the side panel downwards.



WARNING: *TURN OFF all the main switches*

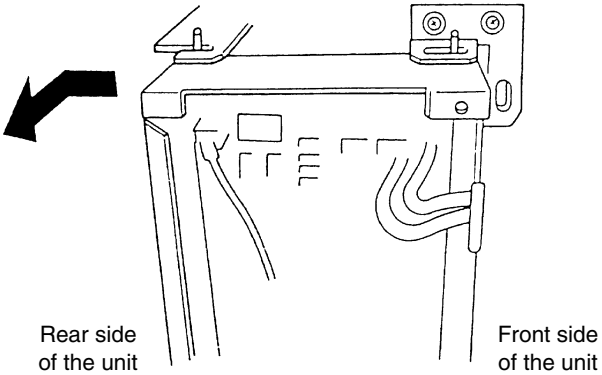
5. Remove the electrical box panel after removing the two fixing screws.

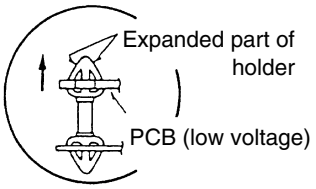


6. You can turn the electrical box up to an angle of 90° by removing the two fixing screws and by unhooking the hook at the rear side of the electrical box.
7. Four holders support the PCB. Pull out the PCB from the PCB hole by pushing the expanded part of the holder by means of long-nose pliers and by putting a finger near the hole of the PCB.

NOTES:

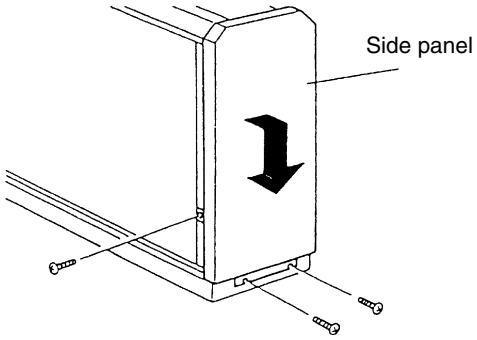
- *Do not touch the electrical components. Do not apply a great force to the PCB. If you apply a great force, the PCB will become faulty.*
- *When you are reassembling, make sure that each terminal is correctly connected. Refer to the wire marks and the terminal codes. If you connect the terminals incorrectly, a malfunction or a damage of the electrical components will occur.*





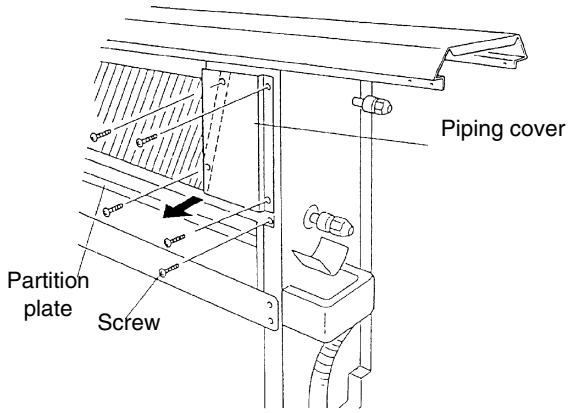
9.7.7. REMOVING THE THERMISTORS FOR THE LIQUID PIPE AND THE GAS PIPE

1. Remove the air inlet grille according to the section 9.7.1, "Removing the Air Inlet Grille".
2. Remove the air filter according to the section 9.7.2, "Removing the Air Filter".
3. Remove the front panel according to the section 9.7.4, "Removing the front panel".
4. Remove the side panel after removing the three fixing screws.

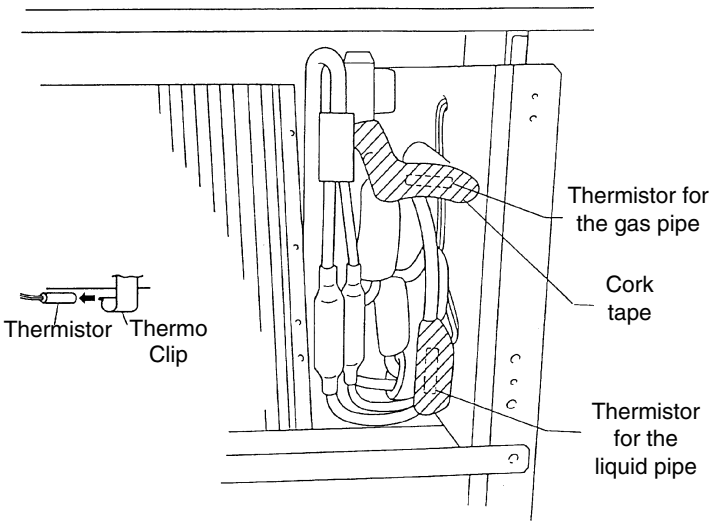


WARNING: *TURN OFF all the main switches*

5. Remove the piping cover after removing the two fixing screws for the partition plate and the four fixing screws for the piping cover.



6. Remove the CORK TAPE and pull out the thermistor after removing the thermo clip for the thermistors.
7. Seal the thermistor with the CORK TAPE.
8. Mount the thermistor as shown beside.

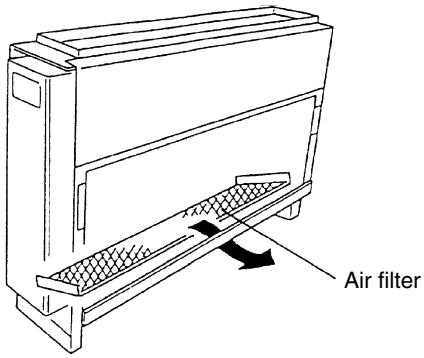


9.8. RPFI

Floor-Concealed Type

9.8.1. REMOVING THE AIR FILTER

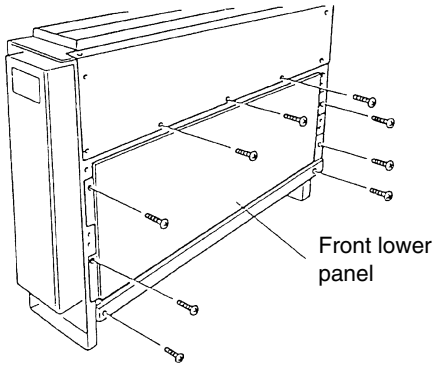
1. The air filter is located at the inner upper part of the inlet.
2. Remove the air filter by pulling the center knob and by bending the filter.



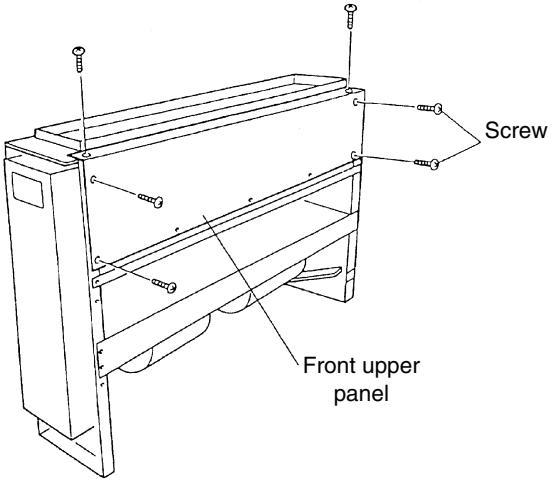
WARNING: *TURN OFF all the main switches*

9.8.2. REMOVING THE FRONT PANEL

1. Remove the air filter according to the section 9.7.1, "Removing the Air Filter".
2. Remove the front lower panel after removing the screws (1.0HP: 9 pcs. 1.5HP: 10 pcs.) at the lower part of the front panel.



3. Remove the front upper panel after removing the eleven fixing screws.



9.8.3. REMOVING THE FAN MOTOR

1. Remove the air filter according to the section 9.7.1, "Removing the Air Filter".
2. Remove the front panel according to the section 9.7.2, "Removing the Front Panel".
3. Remove the fan motor as explained in items 4 to 8 of the section 9.7.5, "Removing the Fan Motor".

9.8.4. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

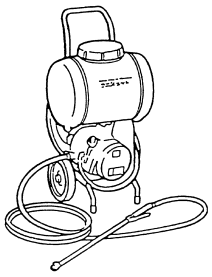
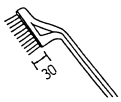
1. Remove the front panel according to the section 9.7.2, "Removing the Front Panel".
2. Remove the PCBs as explained in items 5 to 7 of the section 9.7.6, "Removing the Printed Circuit Board (PCB)".

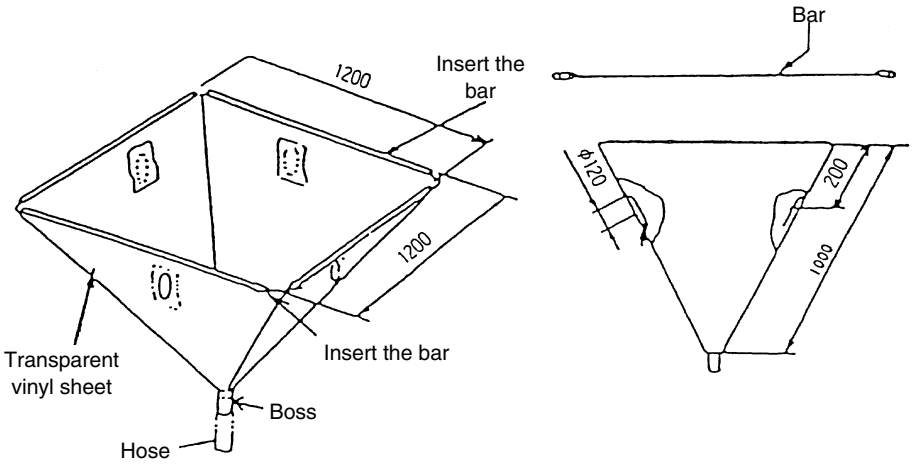
9.8.5. REMOVING THE THERMISTORS FOR THE LIQUID PIPE AND THE GAS PIPE

1. Remove the air filter according to the section 9.7.1, "Removing the Air Filter".
2. Remove the front panel according to the section 9.7.2, "Removing the Front Panel".
3. Remove the thermistor as explained in items 4 to 6 of the section 9.7.7, "Removing the Thermistors for the Liquid Pipe and the Gas Pipe".

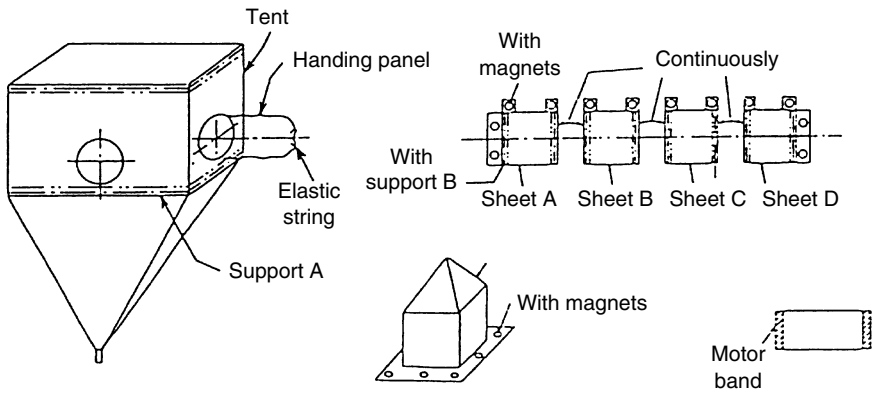
9.9. CLEANING THE INDOOR HEAT EXCHANGER

9.9.1. REQUIRED TOOLS FOR CLEANING (FOR ALL INDOOR UNITS)

No.	Tool	Remarks
1	Cleaning water pump 	A water pump that is equipped with a tank is recommended
2	Water tank clean water	Approx. 18 liters
3	Nozzle	
4	Brush (non-metal) 	If the heat exchanger is heavily clogged with dust, remove the dust with this brush. The length of brush should be 25 ~ 35mm.
5	Hose for water pan	Select a hose according to the site requirements
6	Bucket	2 for 5 liters
7	Phillips screwdriver	1
8	Nipper	1
9	Adjustable wrench	1
10	Megohm tester	500V
11	Cleaning agent	Select a neutral-type cleaning agent
12	Spray	To spray the cleaning water
13	Tape with adhesive	To fix the vinyl sheet in order to protect the room from the cleaning water
14	Rope	1m, 4 Pieces
15	Vinyl sheet	Select a vinyl sheet with 0.5mm thickness
16	Gloves	

No.	Remarks
17	Cleaning water collector ■ In-the-ceiling type ■ 2-way cassette ■ Wall type ■ Ceiling type  Inner side of Ø120 hole should be covered with felt sheet in order to insert the spray nozzle.
18	Cleaning water collector kit ■ 4-way cassette

No	Part	Material	Remarks	Qty
1	Tent with handling panel	Vinyl chloride sheet	1t, with handling panel 0.3t	1
2	Support A	Stainless		8
3	Sheet A	Vinyl chloride sheet	1t, with support B and magnet	1
4	Sheet B	Vinyl chloride sheet	1t, with support B and magnet	1
5	Sheet C	Vinyl chloride sheet	1t, with support B and magnet	1
6	Sheet D	Vinyl chloride sheet	1t, with support B and magnet	1
7	Motor panel	Vinyl chloride sheet	1t, with magnet	1
8	Motor band	Vinyl chloride sheet	1t, magic tape	1
9	Wiring panel	Vinyl chloride sheet		1
10	Gloves	Rubber		1
11	Sling rope		1 m	4



WARNING: *TURN OFF all the main switches*

9.9.2. CLEANING THE 4-WAY CASSETTE INDOOR UNIT

■ Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.

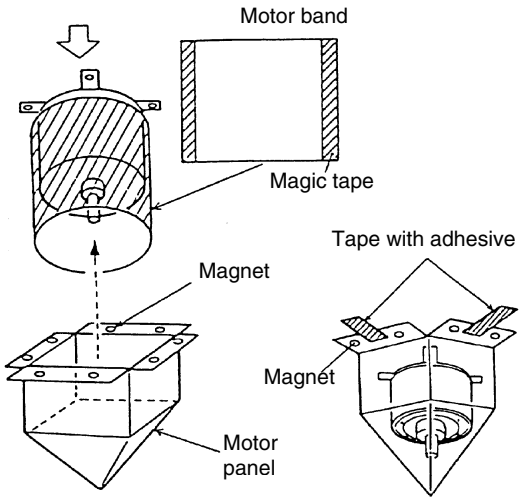
Procedure:

- Remove the optional air panel according to the section 9.2.4, "Removing the Optional Air panel".
- Remove the electrical box after opening the electrical box panel and after disconnecting the connectors between the indoor units and the outdoor units and other connectors, according to the section 9.2.3, "Removing the Electrical box Panel".
- Remove the bell mouth and the fan according to the section 9.2.5, "Removing the Turbo Fan and the Fan Motor".
- Remove the drain pan according to the section 9.2.8, "Removing the Drain Pan".
- Remove the float switch according to the section 9.2.7, "Removing the Float Switch".
-

1. Attach a vinyl sheet around the heat exchanger so that the cleaning water will not be splashed over the insulation surface and the drain-up pump. Fix the vinyl sheet on the side plate of the heat exchanger by means of a tape with adhesive. Seal the gap between the vinyl sheets by means of a tape with adhesive.

NOTE:

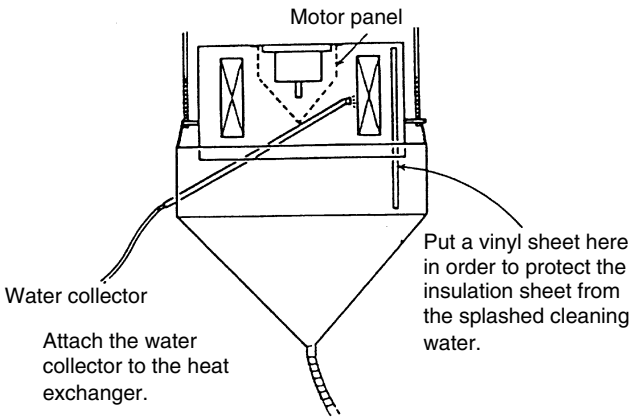
Wear gloves to avoid any injury by the fins of the heat exchanger.
In addition to the magnets, fix the motor panel by means of a tape with adhesive

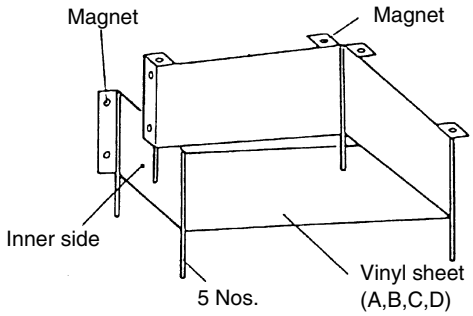


NOTES:

Remove the drain pan after removing the drain water on the drain pan.

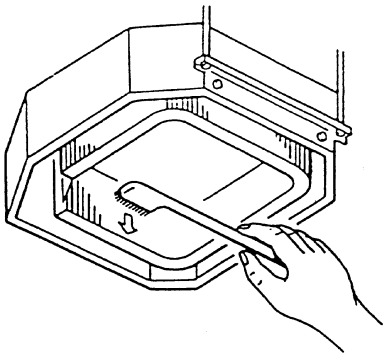
- *Remove the drain water on the drain pan after pulling out the rubber plug. Make sure that water can flow smoothly through the hole by pricking the hole with a pencil.*
- *Remove the drain pan after removing the four fixing screws. Carefully remove the drain pan, because the drain water may remain at the bottom of the drain pan.*
- *Clean and dry the drain pan after removing the drain pan. Carefully handle the drain pan to avoid damaging the drain pan.*



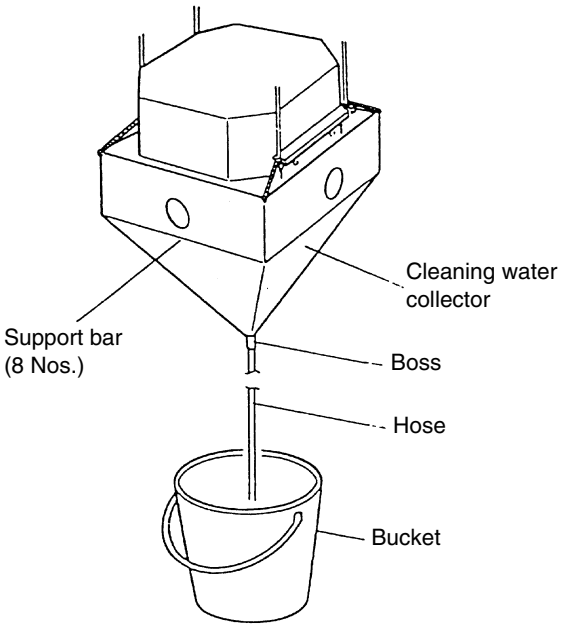


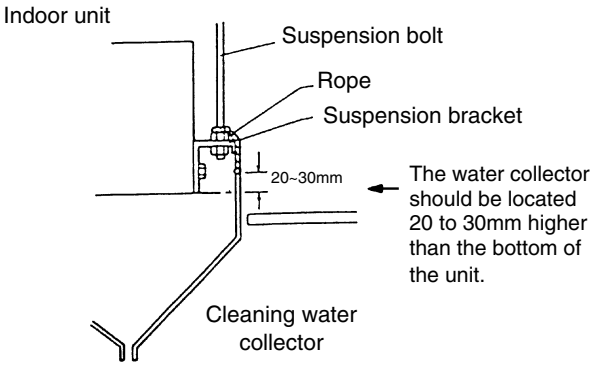
WARNING: *TURN OFF all the main switches*

2. Scratch off the dust on the inner surface of the heat exchanger downwards by means of a brush. Collect all the dust in a bucket or a carton box.

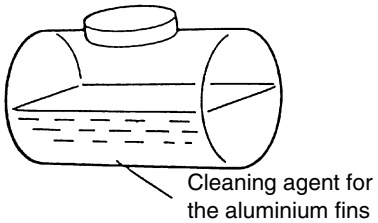


3. Suspend the cleaning water collector from the indoor unit.
   - Tie the rope on the suspension bolts for the indoor unit and put the rope downwards.
   - Insert the support bars into the holes of the water collector.
   - Tie the rope on the support bar of the water collector and suspend the water collector.
   - Connect a hose to the boss and put the end of the hose in a bucket.





4. Put approximately 15 liters of the cleaning agent for the aluminium fins in a supply tank.

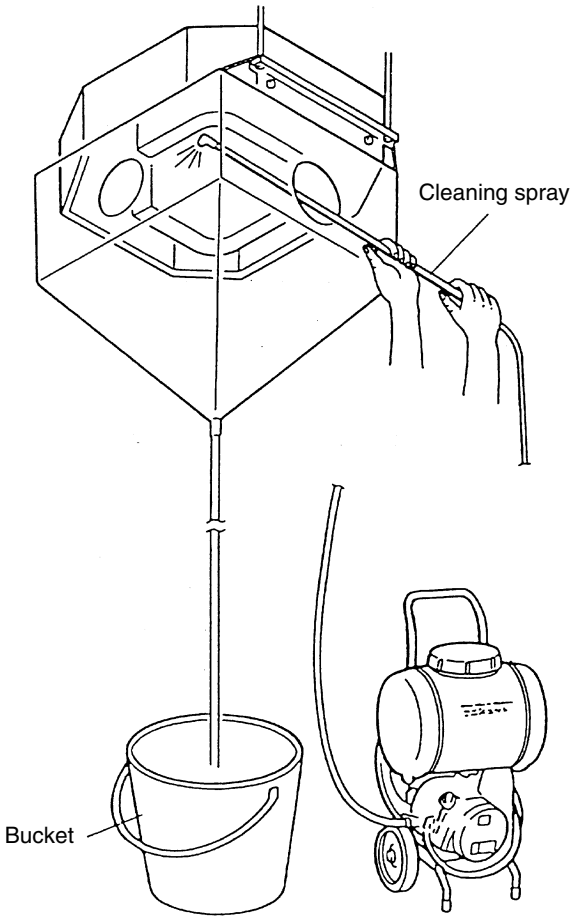


WARNING: *TURN OFF all the main switches*

5. Insert the spray nozzle through the hole of the cleaning water collector. Operate the water pump and clean the dust on the heat exchanger. After cleaning, spray the clean water in order to remove the cleaning water.
   Adjust the pressure of the water pump in order not to damage the fins.

NOTE:

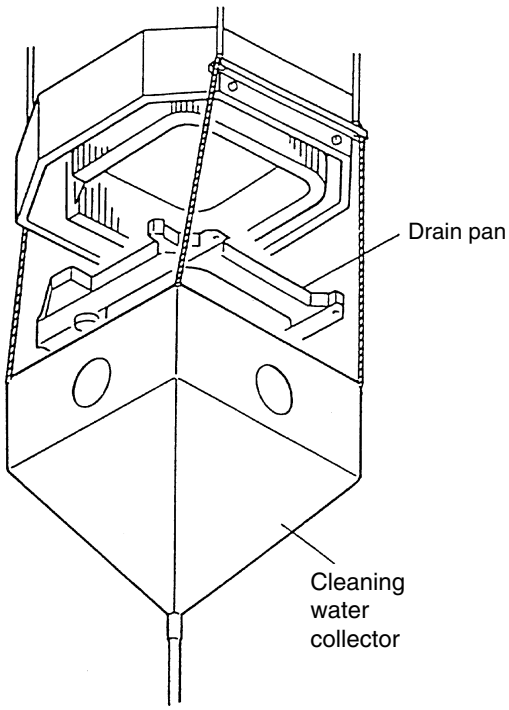
If the cleaning water stays, the fins will be corroded. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.



6. After cleaning, mount the drain pan by extending the rope downwards.

NOTE:

If the cleaning water collector is removed, wipe off the drops from the indoor unit.



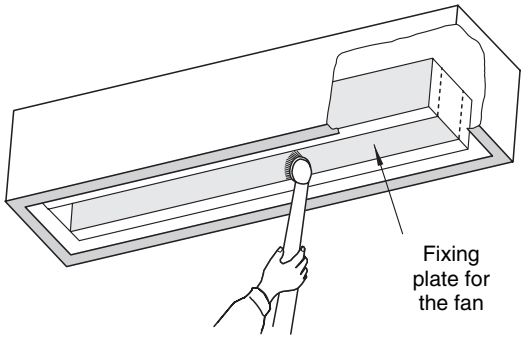
WARNING: *TURN OFF all the main switches*

7. Check the insulation of the drain pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V is applied.
8. Connect the wiring as the wiring was connected before.
9. Neutralization Treatment after the Cleaning
   The cleaning agent that is specified in the section 9.10.1 is neutral-type. However, the cleaning water after the use may not be neutral. Collect all the cleaning water and make the necessary neutralization treatment for the cleaning water.

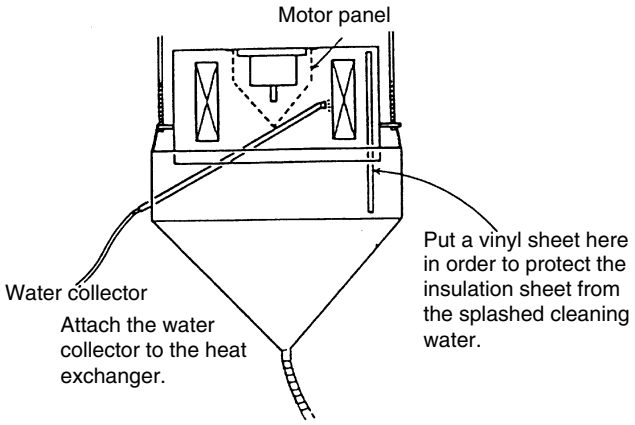
9.9.3. CLEANING THE 2-WAY CASSETTE INDOOR UNIT

Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.

1. Remove the drain pan according to the section 9.3.8, "Removing the Drain Pan". Clean the drain pan after removing the drain pan.
2. Remove the float switch according to the section 9.3.6, "Removing the Float Switch"
3. Remove the drain-up mechanism according to the section 9.3.7, "Removing the Drain-Up Mechanism".



4. Removing the Dust on the Heat Exchanger
   Remove the dust on the fins at the inlet side of the heat exchanger by scratching off downwards.
   Collect all the dust in a bucket or a carton box.



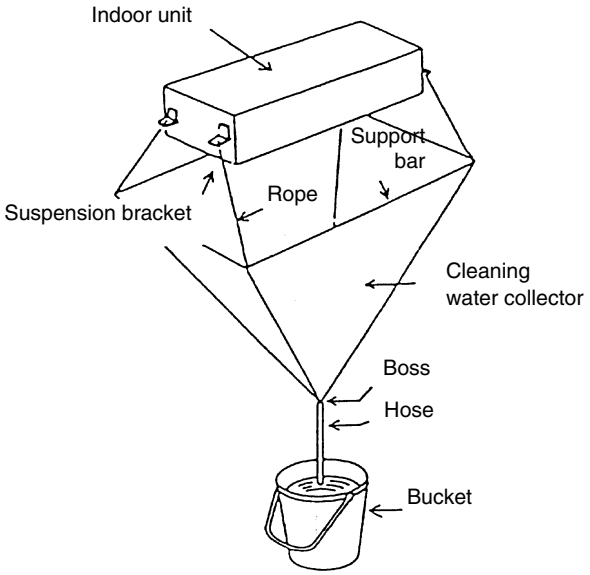
5. Put a vinyl sheet around the heat exchanger so that the cleaning water will not be splashed over the insulation surface and the drain-up pump. Fix the vinyl sheet on the side plate of the heat exchanger by means of a tape with adhesive.
   Seal the gap between the vinyl sheets by means of a tape with adhesive.

NOTE:

It is recommended that gloves be used during this work in order to avoid any injury.
Put a vinyl sheet in order to avoid the splashed cleaning water.

WARNING: *TURN OFF all the main switches*

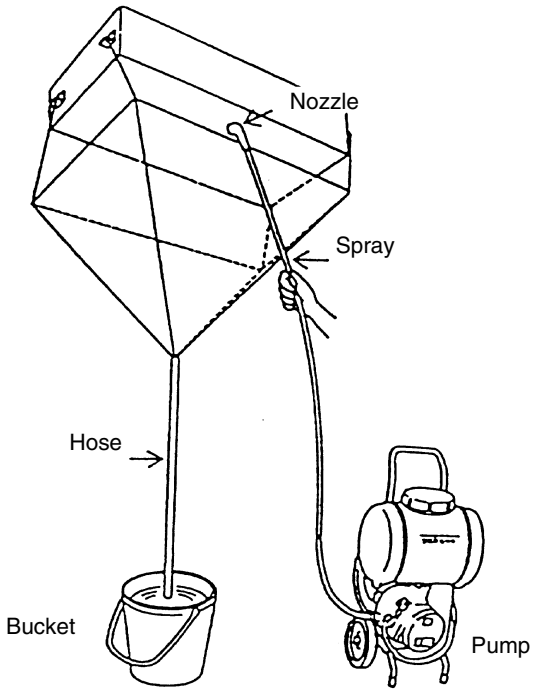
6. Suspend the cleaning water collector from the indoor unit.
   - Connect a rope to the suspension bracket of the indoor unit and put the rope downwards.
   - Insert the support bar into the hole of the cleaning water collector.
   - Suspend the cleaning water collector with the rope from the indoor unit.
   - Connect a hose to the boss for the cleaning water collector and put the other end in a bucket.
7. Spraying the Cleaning Water
   Spray the cleaning water over the fins of the heat exchanger.



8. Cleaning with clean water
   Insert the spray nozzle through the hole of the cleaning water collector.
   Operate the pump and clean the fins with the clean water.
   Adjust the pressure of the water pump in order not to damage the fins.

NOTE:

If the cleaning water stays, the fins will be corroded. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.



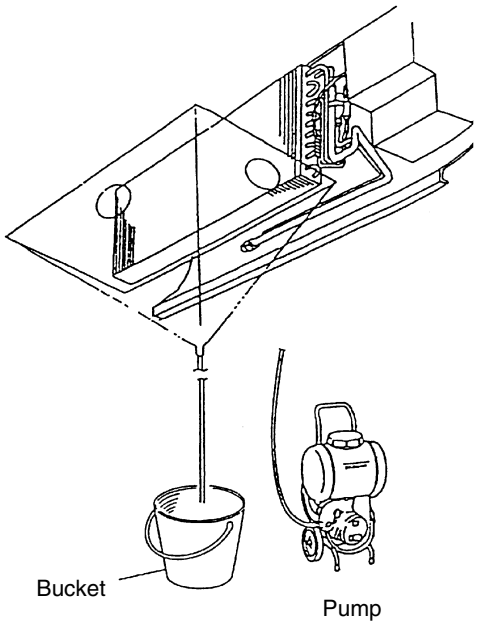
9. After you finish the cleaning and the dropping water stops, attach the fan assembly and the drain pan.
10. Check the insulation of the drain-up pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V is applied.
11. Connect the wiring as the wiring was connected before. Mount the air distribution chamber and the optional air panel
12. Neutralization Treatment after the Cleaning
    The cleaning agent that is specified in the section 9.10.1 is neutral-type. However, the cleaning water after the use may not be neutral. Collect all the cleaning water and make the necessary neutralization treatment for the cleaning water.

WARNING: *TURN OFF all the main switches*

9.9.4. CLEANING THE WALL TYPE INDOOR UNIT

Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.

1. Remove each part according to the section 9.6, "Wall Type".
2. Remove the front panel according to the section 9.6.2, "Removing the Front Panel".
3. Remove the electrical box according to the section 9.6.5, "Removing the Electrical Box Panel".
4. Remove the drain pan according to the section 9.6.6, "Removing the Drain Pan".
5. Remove the heat exchanger according to the sections 9.6.7 and 9.6.8, "Removing the Heat Exchanger and the Fan Motor".
6. Cleaning
   - Remove the dust with a brush.
   - Cover a vinyl sheet over the electrical components in order to protect the electrical components from the splashed cleaning water.
   - If you use the cleaning agent, clean the heat exchanger with the clean water completely.
   - Adjust the pressure of the pump in order not to damage the fins.
7. Neutralization Treatment after the Cleaning
   The cleaning agent that is specified in the section 9.10.1 is neutral-type.
   However, the cleaning water after the use may not be neutral.
   Collect all the cleaning water and make the necessary neutralization treatment for the cleaning water.



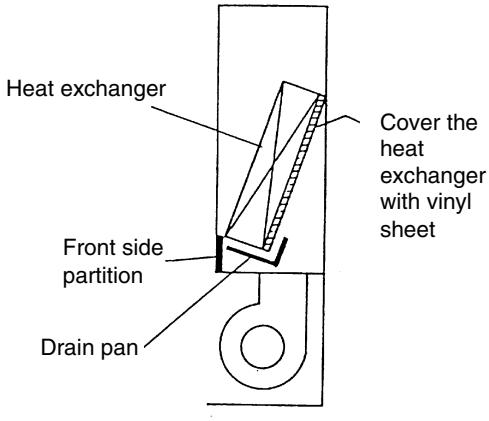
NOTES:

If the cleaning water stays, the fins will be corroded. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.

9.9.5. CLEANING THE FLOOR TYPE INDOOR UNIT AND THE FLOOR CONCEALED TYPE INDOOR UNIT

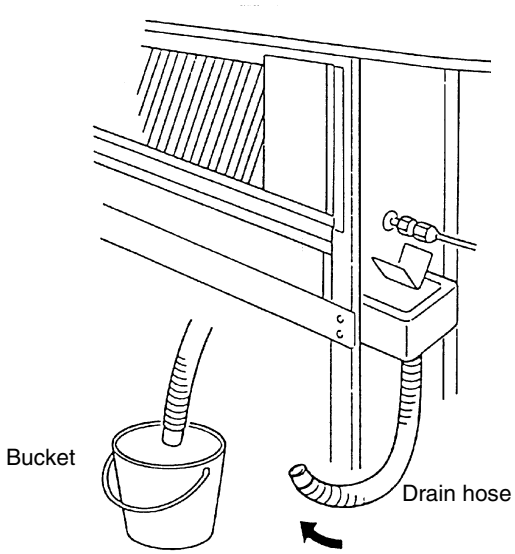
Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.

1. Remove the front panel according to the section 9.7.3, "Removing the Front Panel".
2. Disconnect the drain hose from the field-supplied pipe.
3. Cover the rear side of the heat exchanger with a vinyl sheet after removing the front side partition and the drain pan. After covering the rear side, remount the front side partition and the drain pan.

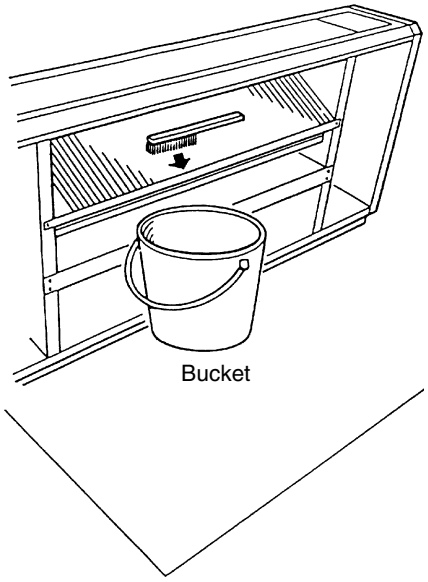


WARNING: *TURN OFF all the main switches*

4. By lifting the drain hose, put the end of the hose in a bucket.

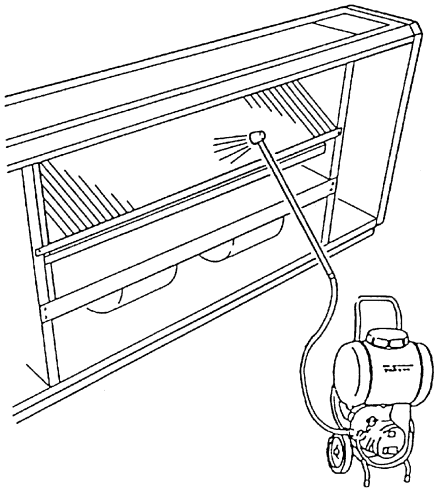


5. Removing the Dust on the Heat Exchanger
   Remove the dust on the heat exchanger with a brush by scratching the dust downwards. Collect all the dust in a bucket or a carton box.



6. Spray the cleaning water over the fins of the heat exchanger.

7. Cleaning with the clean water
   Cover the wiring connectors with the insulation tape.
   Operate the pump and clean the heat exchanger with the clean water completely.
   Adjust the pressure of the pump in order not to damage the fins.



NOTES:

If the cleaning water stays, the fins will be corroded. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.

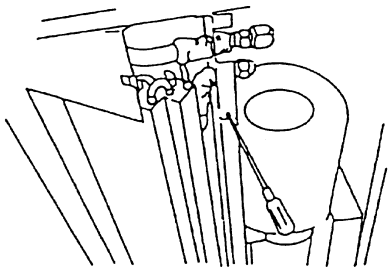
WARNING: *TURN OFF all the main switches*

8. After checking that no power is supplied, connect the drain pipe and remove the insulation tape for the wiring connectors. Then, mount the front panel correctly.
9. Check the insulation of the terminal board in the electrical box. If the insulation is greater than 1MΩ by a 500 Megohm-meter, the insulation is normal.
10. Neutralization Treatment after the Cleaning
    The cleaning agent that is specified in the section 9.6.1 is neutral-type. However, the cleaning water after the use may not be neutral. Collect all the cleaning water and make the necessary neutralization treatment for the cleaning water.

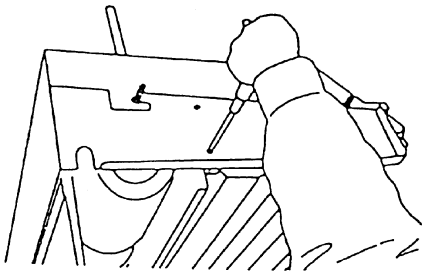
9.9.6. CLEANING THE CEILING TYPE INDOOR UNIT

Spread a vinyl sheet over the floor in order to avoid the cleaning water before doing this work.

1. Remove the left-side panel and the right-side panel according to the section 9.5.2, "Removing the Side Panel".
2. Remove the discharge deflector according to the section 9.5.3, "Removing the Discharge Air Grille".
3. Open the air inlet grille according to the section 9.5.1, "Removing the Air Filter".
4. Remove the lower panel and the drain pan according to the section 9.5.8, "Removing the Thermistors for the Liquid Pipe and the Gas Pipe".
5. Remove the indoor fan motor and the fan assembly according to the section 9.5.4, "Removing the Fan Motor".
6. Remove the partition plate 2 after removing the two fixing screws.



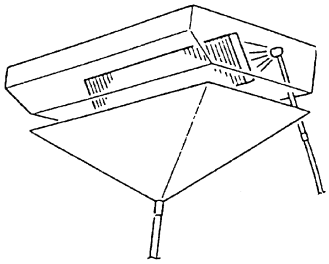
7. Remove the fixing plate for the fan after removing the two screws at the left-side partition and one screw at the right-side partition.



8. Attach the drain pan and the lower panel according to the procedures in reverse order in the section 4.

WARNING: *TURN OFF all the main switches*

9. Cover all the components (except the drain pan) with a vinyl sheet in order to avoid the splashed cleaning water.
10. Spray the cleaning water over the fins from the rear side of the heat exchanger. If the heat exchanger is heavily covered with the dust, use a brush in order to wipe off the dust.
11. Cleaning with the Clean Water
    a. Operate the pump and clean the heat exchanger with the clean water completely.
    b. Adjust the pressure of the pump in order not to damage the fins.



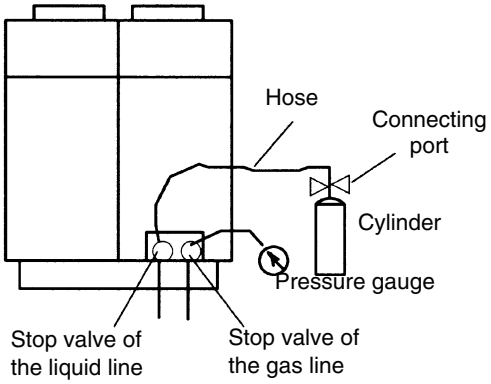
NOTES:

Wear the gloves in order to avoid any injury during this work due to the sharp edges of the fins.
If the cleaning water stays, the fins will be corroded.
Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.
Pay attention to the drain pan not to overflow.

12. Check the insulation of the terminal board with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V is applied.
13. Make sure that the water can flow smoothly after pouring the water on the drain pan.
14. Neutralization Treatment after the Cleaning
    The cleaning agent that is specified in the section 9.10.1 is neutral-type. However, the cleaning water after the use may not be neutral.
    Collect all the cleaning water and make the necessary neutralization treatment for the cleaning water.

9.10. COLLECTING THE REFRIGERANT FOR REPLACING THE INDOOR UNIT

1. Prepare an empty refrigerant cylinder at -760mmHg with a charging hose. Measure the weight of the empty cylinder.
2. After shutting the stop valve on the cylinder, connect the charging hose to the stop valve of the liquid line. Connect a pressure gauge in order to the check joint on the stop valve of the gas line.
3. Air-purge inside of the hose between the stop valve of the liquid line and the cylinder by loosening the connection of the stop valve of the liquid line. Then, close the connecting port of the cylinder after finishing the air purging.
4. Operate the inverter compressor only in cooling mode by setting DIP switch DSW4.
5. Open the stop valve of the liquid line on the cylinder in order to collect the refrigerant into the cylinder. The cylinder capacity should be equivalent to half of the total refrigerant capacity. Check the refrigerant quantity by measuring the weight.
6. Close the stop valve of the liquid line on the cylinder gradually during the cooling process.
7. Fix the opening of the stop valve of the liquid line at a slightly opened position. Continue the cooling process.
8. Finally, close the stop valve of the liquid line. Then, close the stop valve of the gas line and stop the units when the pressure at the stop valve of the liquid line reaches -400mmHg.



NOTES:

The cylinder capacity should be equivalent to half of the total refrigerant capacity.

If you recharge the collected refrigerant into the system, charge the collected refrigerant by placing the cylinder up side down so that the refrigerant and the oil can be charged together.

10. MAIN PARTS

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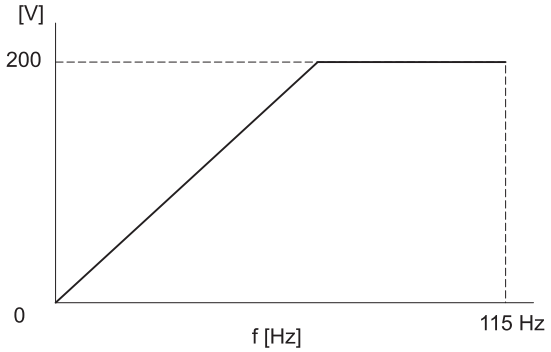
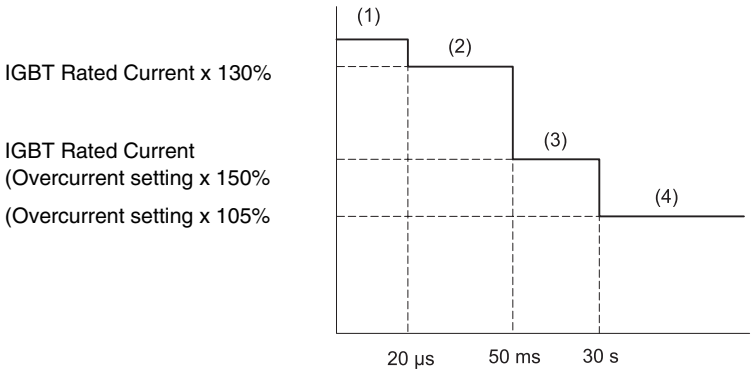
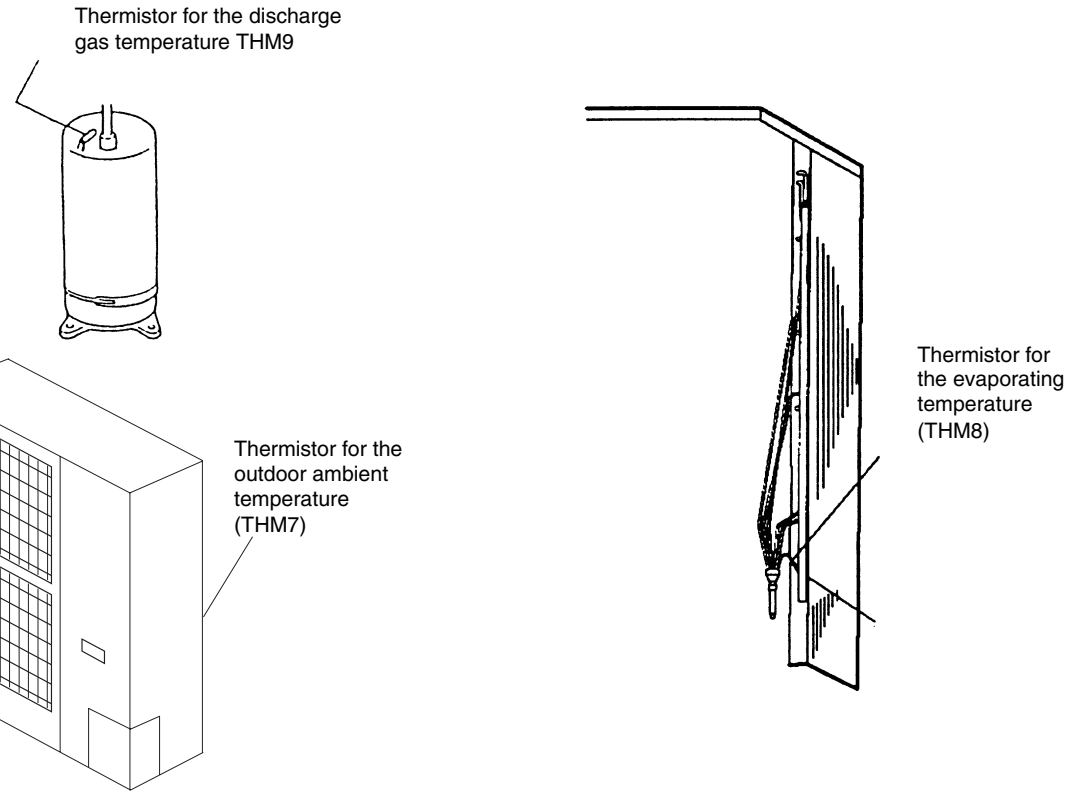
10.1. INVERTER

10.1.1. SPECIFICATIONS OF INVERTER

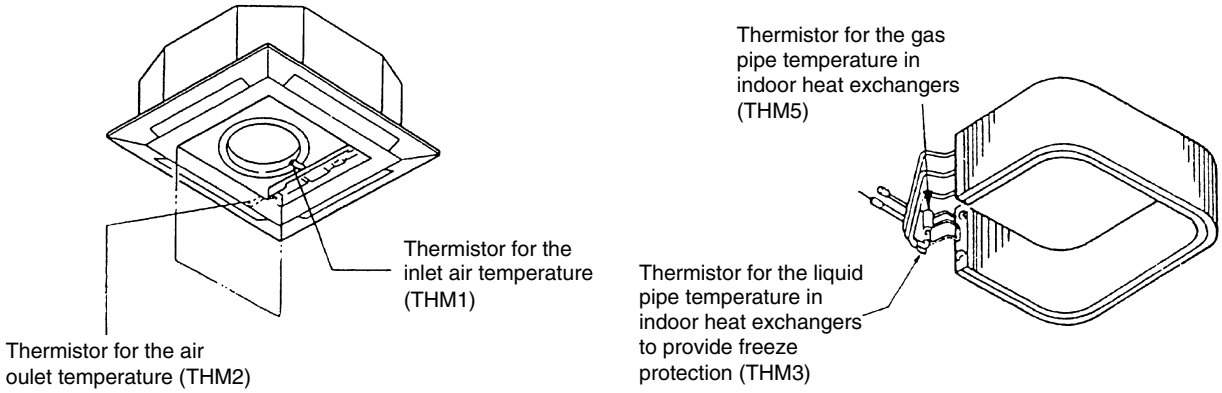
Applicable Model	RAS-3HVRNE, RAS-4HVRNE, RAS-5HVRNE, RAS-6HVRNE
Applicable Power Source	1 Phase, 220V, 240V 50Hz/220V 60 Hz
Input Voltage	180 ~ 264 VAC
Input Current	RAS-3HVRNE: 24A; RAS-4~6HVRNE:30A (at Rated current 220/240V 50Hz)
Control Method	Vector Control
Range Output Frequency	20 to 115Hz
Accuracy of Frequency	0.01Hz at Applicable Frequency Range
Controlled Frequency	1Hz
Output / Characteristics	 Characteristics are general idea.
Soft Start Stop	0.125 ~ 3.00 Hz/s
Protection Function Excessive High or Low Voltage for Inverter	Excessive Low Voltage at a voltage is lower than 194V DC Excessive High Voltage at a voltage is higher than 420V DC
Abnormality of Current Sensor (0A Detection)	Stoppage at a current of compressor smaller than 1.5A. When the frequency is 15 to 18Hz after starting. Cause of Abnormality: Failure of Current Sensor Failure of ISPM Failure of Compressor / Fan motor Disconnected Wiring
Protection Function Overcurrent Protection for Inverter	 (1) Short-Circuit Trip of Arm (2) Instantaneous Overcurrent Trip (3) Instantaneous Overcurrent Trip } Internal Protection of ISPM (4) Electronic Thermal Trip Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.
Protection of ISPM	ISPM has four protection function for self-protection (1) Some of the output terminals between "U" and "V", "V" and "W", "W" and "U" has a short-circuit. (2) Running current reaches the maximum rated current. (3) Temperature is measured by internal thermistor increases excessively. (4) Control voltage decreases excessively.
Overload Control	Overload control as a current greater than (Rated Current X105%). Overload control release at a current smaller than (Rated Current X 88%).
Fin Temperature Decrease	The unit is stopped when the ISPM temperature is higher than 100°C.
Earth Detection	The unit is stopped when the compressor is earthing.

10.2. THERMISTOR

Thermistors for the outdoor unit



Thermistors for the indoor unit



10.2.1. RESISTANCE VALUE OF THE THERMISTOR

■ **Overheating prevention of the discharge gas (Thermistor for checking the upper part of compressor: THM9)**

a. There is a thermistor that checks the temperature of the upper part of the compressor in order to prevent the discharge gas from overheating. If the discharge gas temperature increases excessively, the deterioration of the lubrication oil and its lubrication properties will occur. This will cause a shorter compressor life.

b. If the discharge gas temperature increases excessively, the compressor temperature increases. In the worst case, the winding of the compressor motor will burn out.

c When the temperature of the upper part of the compressor increases during the heating process, the unit is controlled according to the following method:

1. An electronic expansion valve of the liquid bypass opens and the high-pressure refrigerant returns to the compressor through the accumulator. This decreases the compressor temperature.
2. If the temperature of the upper part of the compressor exceeds 127°C for 10 minutes, the compressor will stop. Even if an electronic expansion valve opens in that situation, the compressor will also stop. This way, the compressor is protected. Resistance values of the thermistor are shown in Fig. 10.1.

d. If the temperature of the upper part of the compressor exceeds 127°C for 10 minutes during the cooling process, the compressor will stop. (Refer to the block diagram for details.)

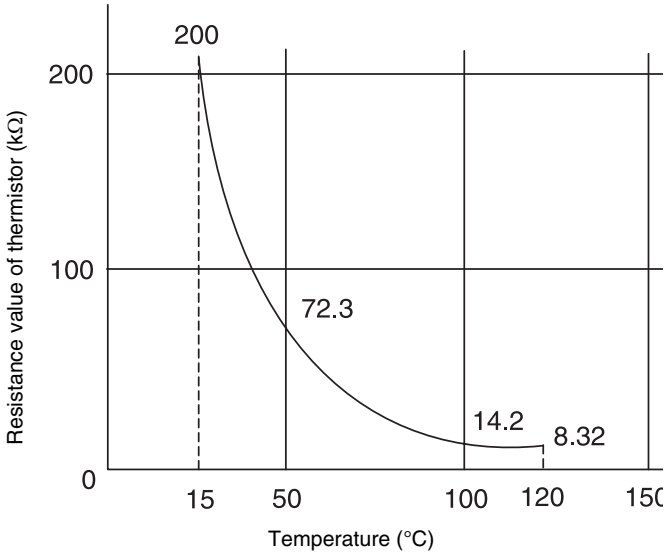


Fig. 10.1. Resistance values of the thermistor for overheating protection of the discharge gas

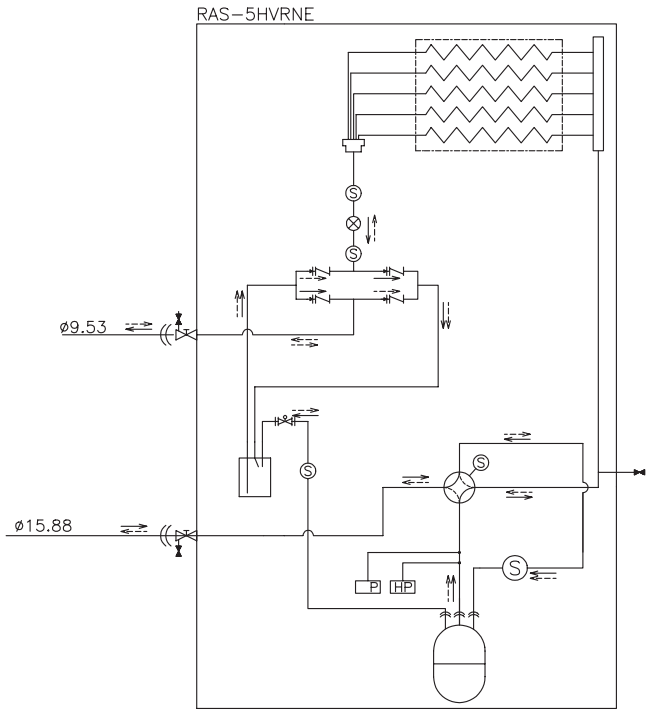
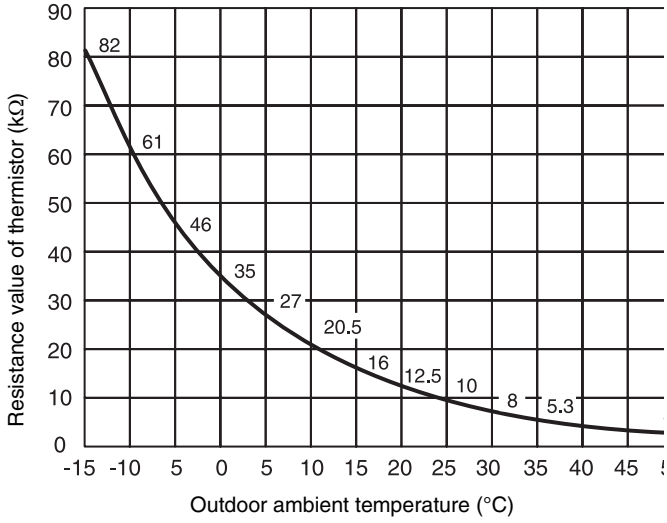


Fig. 10.2. Refrigerant cycle of the outdoor unit (RAS-5HVRNE)

■ **Thermistor for the outdoor temperature (THM7)**

When the outdoor ambient temperature decreases to -8°C or a lower temperature during the cooling process, the compressor will stop. Resistance values of the thermistor are shown in Fig. 10.3.



■ **Thermistor for the defrost operation (THM8)**

The resistance values of this thermistor are the same as the resistance values of the thermistor for the outdoor ambient temperature.

■ Thermistor for the room temperature control (thermistor for the inlet air temperature of the indoor unit, THM1)

The thermistor for the inlet air temperature (THM1) controls the room temperature. The remote control switch displays the selected temperatures by means of figures. Set the room temperature so that the room temperature does not become too cool or too hot. It is recommended to set the room temperature in the following ranges.
Economical cooling mode: 27°C to 29°C
Economical heating mode: 18°C to 20°C
The resistance values of the thermistor are shown in Fig. 10.4.

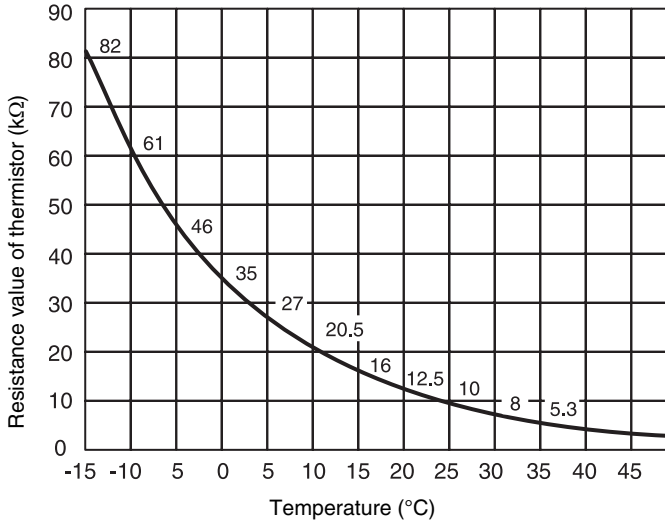


Fig. 10.3. Resistance values of the thermistor for the inlet air temperature

CAUTION:
The thermo-off valve of the thermistor for the inlet air temperature of the indoor unit is set at a higher temperature than the temperature displayed on the remote control switch by 4°C (the maximum inlet air temperature is 34º). The suction air temperature during the heating process has a tendency to become higher than the temperature of the occupied zone in order to provide a more efficient heating operation.

■ Thermistor for the control of the discharge air temperature (Thermistor for the discharge air temperature of the indoor unit, THM2)

The thermistor for the discharge air temperature (THM2) prevents the cold blow during the heating process. The resistance values of the thermistor are shown in Fig. 10.4.

■ Thermistor for the liquid pipe temperature of the indoor heat exchanger

When the temperature of the indoor heat exchanger decreases to 0°C or a lower temperature for 3 minutes, the thermostat automatically turns off. When the temperature of the indoor heat exchanger increases to 16°C or a higher temperature, the thermostat turns on.

↓

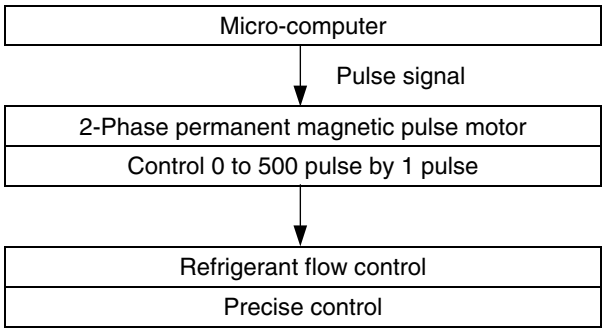
The purpose of this function is to prevent frosting on the indoor heat exchanger during the cooling process and the dry operation.
The resistance values of the thermistor are shown in Fig. 10.4.

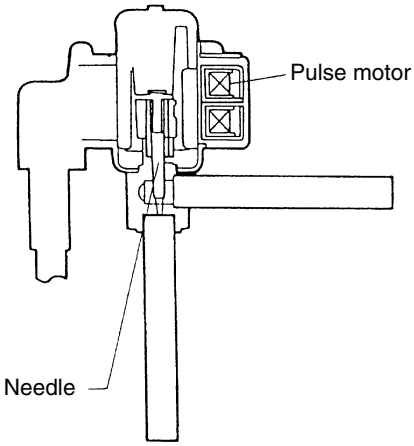
■ Thermistor for the gas pipe temperature of the indoor heat exchanger

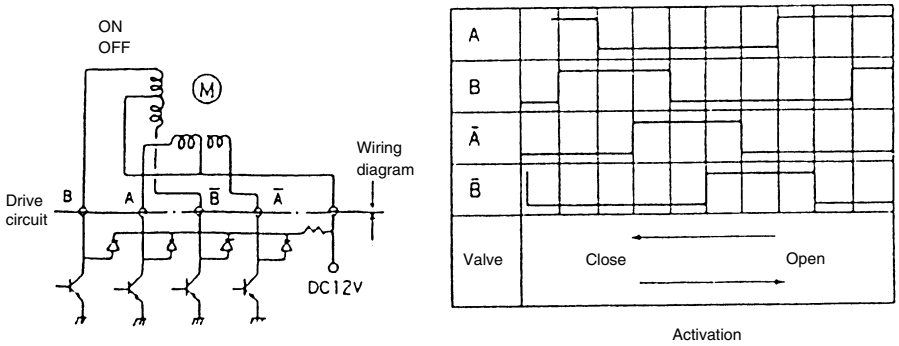
The thermistor for the gas pipe temperature senses the evaporating temperature during the heating process. The resistance values of the thermistor are shown in Fig. 10.4.

10.3. ELECTRONIC EXPANSION VALVE

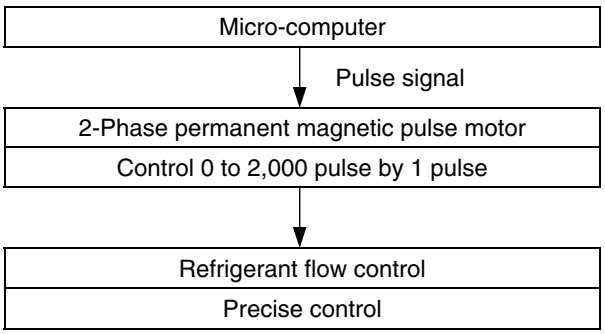
10.3.1. ELECTRONIC EXPANSION VALVE FOR THE OUTDOOR UNIT

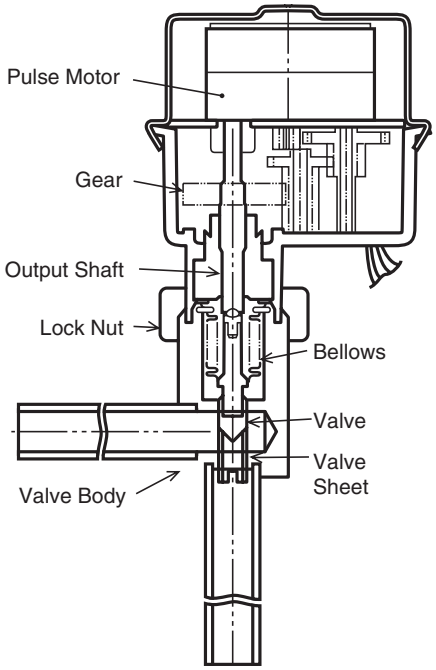


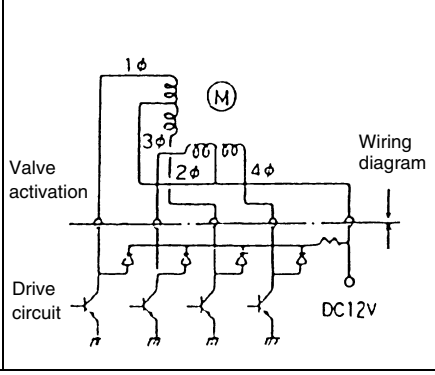
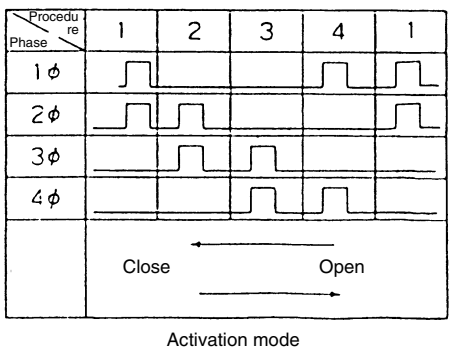


Items	Specifications
Applicable to the models	For the main cycle of: RAS-3HVRNE, RAS-4HVRNE, RAS-5HVRNE, RAS-6HVRNE,
Type	EKV (10.0USRT) series
Refrigerant	R410A
Working temperature range	-30°C ~ 65°C (Operation time of the coil: less than 50%)
Mounting direction	Drive shaft in vertical direction within an angle of 45° as maximum
Flow direction	Reversible
Drive method	4-Phase canned motor method
Rated voltage	DC12V±1.8V
Drive condition	83PPS (Pulse width at ON: 36mm sec, OFF: 60mm sec) 1,2 Phase excitation
Coil resistance (each phase)	46Ω ± 10% (at 20°C)
Wiring diagram, Drive circuit and activation mode	

10.3.2. ELECTRONIC EXPANSION VALVE FOR THE INDOOR UNIT





Items	Specifications
Type	EDM type
Refrigerant	R410A
Working temperature range	-30°C ~ 70°C (with coils which are not electrified)
Mounting direction	Drive shaft in vertical direction, motor upside and 90° in four direction
Flow direction	Reversible
Drive method	4-Phase pulse motor
Voltage rate	DC12V±1.2V
Drive condition	100Ω ± 250PPS (Pulse width over 3mm) 2 Phase excitation
Coil resistance (each phase)	150Ω ± 10% (at 20°C)
Wiring diagram, drive circuit and activation mode	 

Activation mode

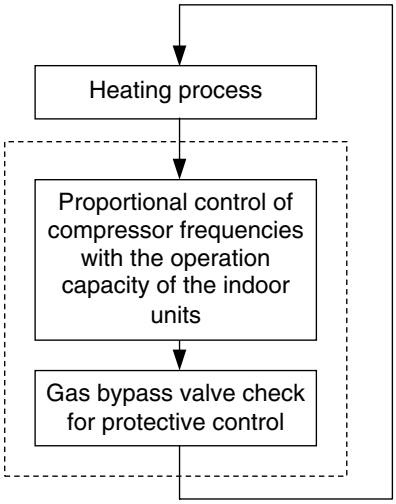
10.4. HIGH PRESSURE SWITCH AND PRESSURE SWITCH FOR CONTROL

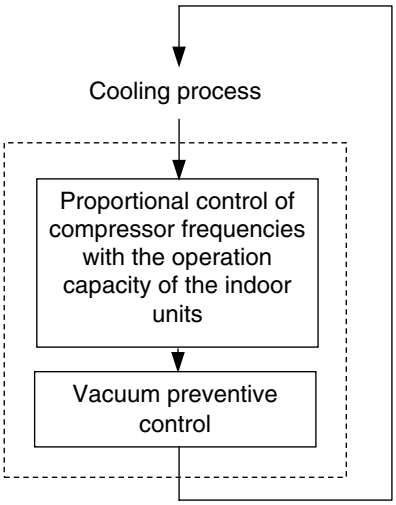
■ High-pressure control

A high-pressure sensor detects the high pressure during the heating process. The proportional control with the operation capacity of the indoor units controls the compressor frequencies. This way the high pressure is controlled within an appropriate range. The output of the high-pressure sensor during the heating process performs the protective control and the control of the gas bypass valve.

■ Low-pressure control

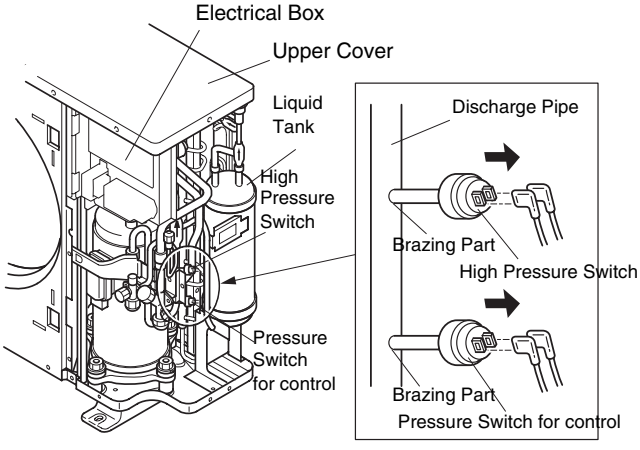
A low-pressure sensor detects the suction pressure during the cooling process. The proportional control with the operation capacity of the indoor units controls the compressor frequencies. This way the suction pressure is controlled within an appropriate range. If the suction pressure becomes excessively low, the cooling action may be insufficient and the parts in the refrigerant cycle may be damaged. Therefore, if the output of the low-pressure sensor indicates vacuum and the valve remains in the same position for 12 minutes or longer, the compressor will stop in order to avoid damage.



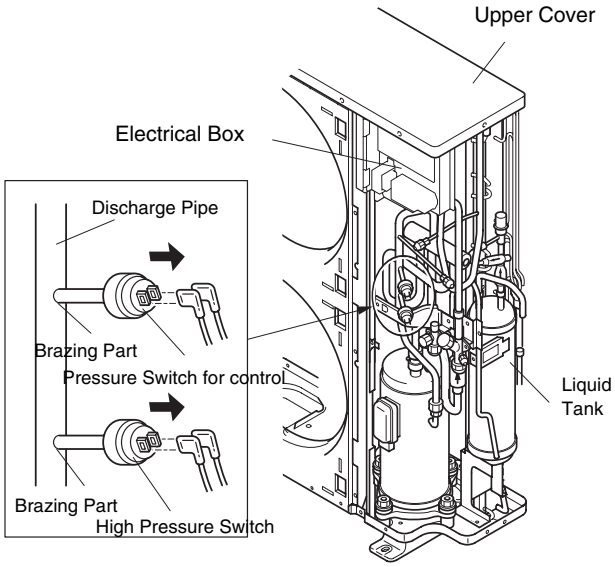


1. High Pressure Switch (for Protection)
   When the discharge pressure reaches 4.15MPa, compressor is stopped to protect the refrigerant cycle components.
2. Pressure Switch for Control
   When the discharge pressure reaches 3.2MPa during heating operation, gas by-pass control or fan control are performed.

RAS-3HVRG



RAS-4~6HVRG



10.5. AUTO LOUVER MECHANISM

10.5.1. RCI (4-WAY CASSETTE TYPE)

1. Auto-Louver Operation

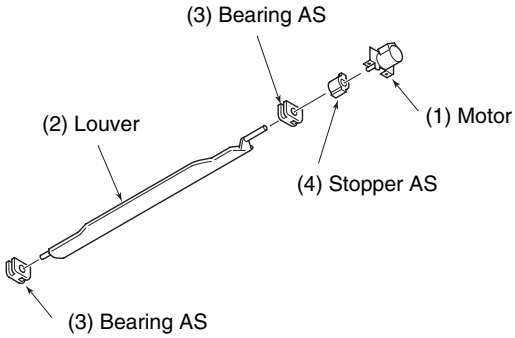
The louvers of the optional air panel with auto-louver swing simultaneously by four drive motor.

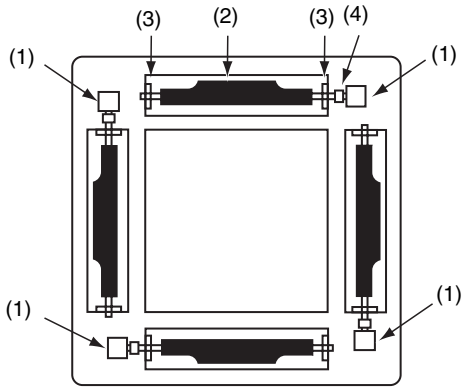
The parts of the auto-louver mechanism are shown below.

The motor (1) is installed to the louver directly.
The louver (2) is operated by rotating the motor.

Four pieces of the motor (1) are installed to the unit and rotated simultaneously.

No.	Part Name	No.	Part Name
1	Motor	3	Bearing
2	Louver	4	Stopper AS





2. Auto-Louver Stoppage

Press the "AUTO LOUVER" of the remote control switch during auto-louver operation.

↓

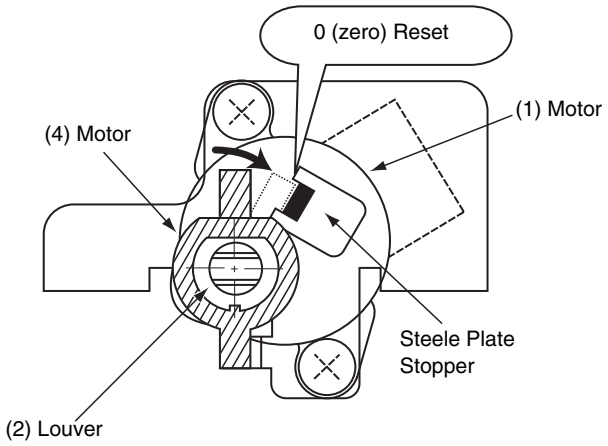
The AS stopper of the louver (2) touches the steel plate stopper, and the louver is reset to the 0 position.

↓

The power supply for the motor (1) is turned OFF when the louver is at the setting position.

↓

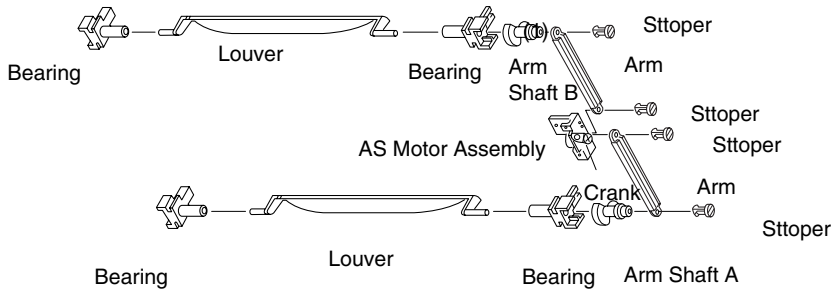
The louver is stopped at the setting position.



10.5.2. RCD (2-WAY CASSETTE TYPE)

1. Auto-Louver Operation

The louvers of the optional air panel with auto-louver swing simultaneously by a drive motor. The parts of the auto-louver mechanism are shown below.



The principle of the auto-louver mechanism is as follows;
The motor (1) rotates, the crank (2) fixed to the shaft of the motor (1) rotates, the rotating torque is changed at the arm (3) and transmitted to the arm shaft A (4) and the arm shaft B (5).
The circular reciprocating force gives the driving force to the louver (6) and rotates the louver.

No.	Part Name	No.	Part Name
1	Motor	5	Arm Shaft B
2	Crank	6	Louver
3	Arm	7	Fixing Plate of Motor
4	Arm Shaft A		

2. Auto-Louver Stoppage

Press the "AUTO LOUVER" of the remote control switch during auto-louver operation.

↓

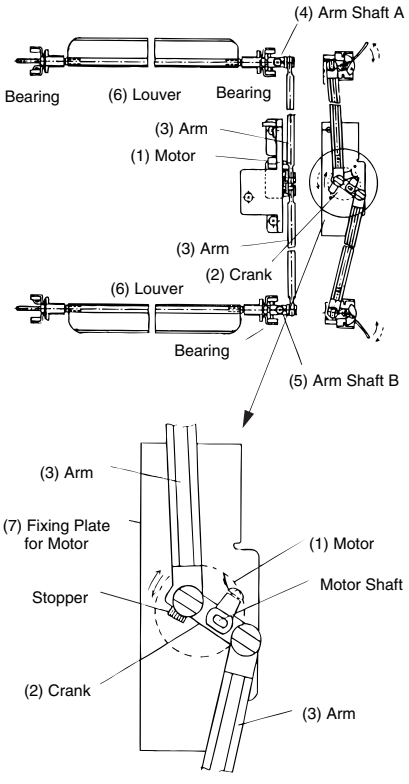
The crank (2) touches the stopper of the fixing plate of motor (7), and the louver is reset to the 0 position.

↓

The power supply for the motor (1) is turned OFF when the louver is at the setting position.

↓

The louver (6) is stopped at the setting position.



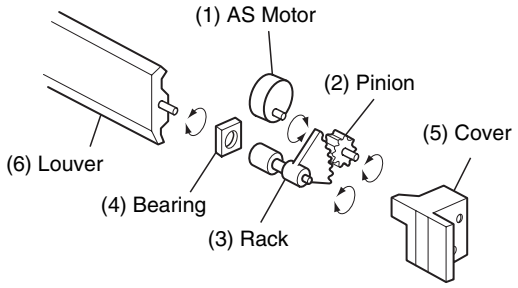
10.5.3. RPC (CEILING TYPE)

1. Auto-Louver Operation

   The louvers of the optional air panel with autolouver swing simultaneously by a drive motor.

   The parts and the principle of the auto-louver mechanism are shown in the right figure.

   The AS motor (1) rotates, the pinion (2) fixed to the shaft of the AS motor (1) rotates, the rotating torque is changed at the rack (3) and the circular reciprocating force gives the driving force to the louver (4) and rotates the louver.



2. Auto-Louver Stoppage

Press the "AUTO LOUVER" of the remote control switch during auto-louver operation.

↓

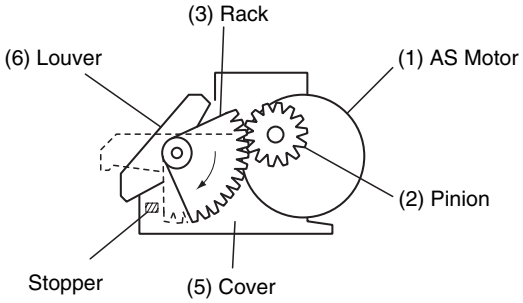
The rack (3) touches the stopper of the cover (6), and the louver is reset to the 0 position.

↓

The power supply for AS motor (1) is turned OFF when the louver is at the setting position.

↓

The louver (4) is stopped at the setting position.



10.6. SCROLL COMPRESSOR

10.6.1. RELIABLE MECHANISM FOR LOW VIBRATION AND LOW SOUND

1. The rotating direction is definite.
2. The pressure inside of the chamber is high pressure, and the surface temperature of the chamber is 60 °C to 110 °C.

10.6.2. PRINCIPLE OF COMPRESSION

1. The gas is inhaled from the inlet port at the outer frame of the fixed scroll

⇩

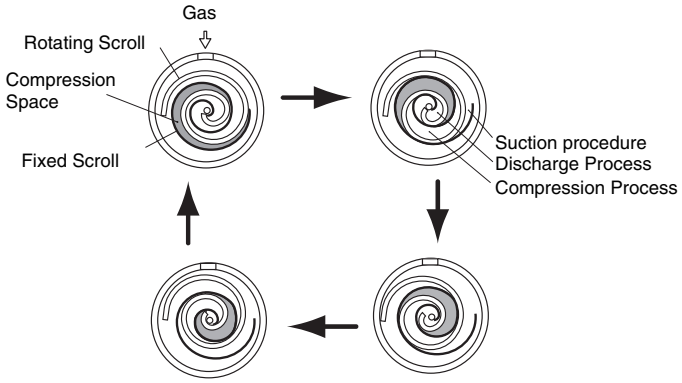
2. The gas inside of the compression space is compressed toward the center of the scroll.

⇩

3. The compression space is minimum at the center of the scroll, and the gas compressed at the maximum is discharged from the outlet port of at the center of the scroll.

⇩

4. The above procedures (Suction Compression Discharge) is repeated continuously.



11 FIELD WORK INSTRUCTION

This chapter provides information to help you perform on-site troubleshooting and maintenance work.

CONTENTS

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11.6.3. Countermeasure for the Refrigerant Leakage According to the KHK Standard _____ 5

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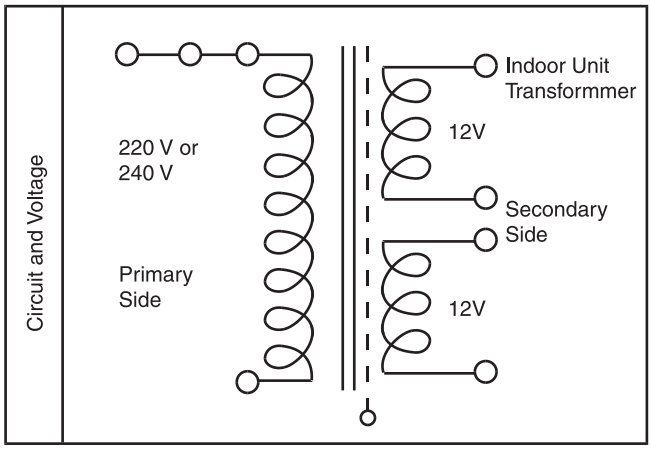
11.8. Service and maintenance record _____ 6

⚠ ***WARNING:*** *TURN OFF all the main switches.*

11.1. CHECKING THE POWER SOURCE AND THE WIRING CONNECTION

Check the following items in the case of abnormal operation:

No.	Check item	Procedure
1	Is the breaker of the fuse cut out?	Check the secondary voltage of the breaker and the fuse by means of a tester.
2	Is the secondary power source on the transformer correct?	Disconnect the secondary side of the transformer and check the voltage by means of a tester. 
3	Is the wiring loosened or incorrectly connected?	Check the wiring connection on the PCB. ■ Thermistor connectors ■ Connector of the remote control cable ■ Connector of the transformer ■ Each connector in a high-voltage circuit Check the connectors according to the **Electrical Wiring** diagram.

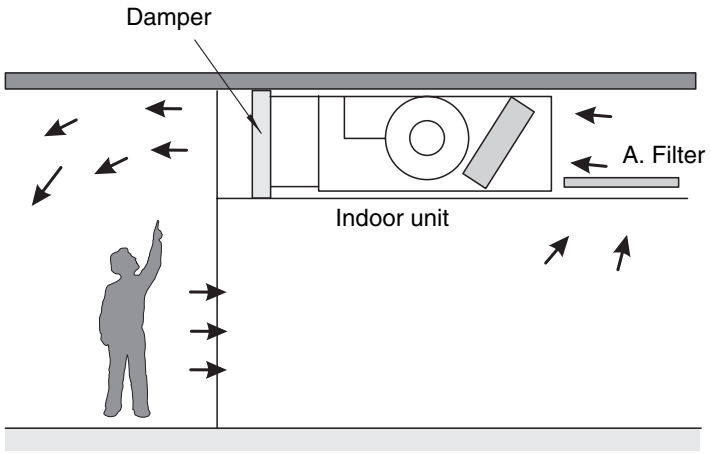
11.2. BURNT OUT COMPRESSOR DUE TO AN INSUFFICIENT REFRIGERANT CHARGE

■ Question and answer for the field work

Example 1: Burnt-out compressor due to an insufficient refrigerant charge	
Phenomenon	After commissioning, the alarm code "08" sometimes occurred and the compressors were burnt out after operating for two months.
Cause	The refrigerant piping work was performed during the summer season. The additional refrigerant was not sufficiently charged from the discharge gas side. This insufficient refrigerant charge resulted in the overheating of the discharge gas and the oil deterioration, which was finally due to the separated operation despite the alarm code "08".
Countermeasure	1. The compressor was replaced with a new compressor. 2. The correct refrigerant amount was charged according to the refrigerant piping length and the connected indoor units.
Remarks	Additional refrigerant charge: Open the liquid stop valves slightly when you charge the additional refrigerant from the check joint of the liquid stop valves (the discharge gas side) during the cooling process. If the liquid stop valve is fully open, it is difficult to charge the additional refrigerant. Do not charge the refrigerant from the gas stop valve.

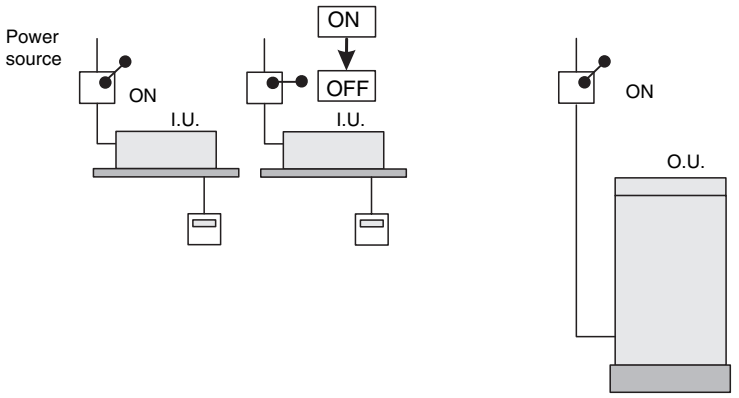
11.3. ABNORMALITY HIGH OPERATION SOUND (IN-THE-CEILING TYPE INDOOR UNIT)

■ **Question and answer for the field work**

Example 3: Abnormally high operation sound (in-the-ceiling type indoor unit)	
Phenomenon	The operation sound at the "HIGH" speed was abnormally high.
Cause	The indoor units were installed without the ducts. Since there scarcely was any external static pressure, an abnormally big air volume was supplied. This resulted in a higher air speed through the heat exchanger. 
Countermeasure	In order to reduce the airflow rate, a plate that is used as a damper at the discharge gas side was added.
Remarks	Note that the running current is increased when no external pressure is given to the indoor unit. This results in an overheating.

11.4. ALARM CODE "31"

■ **Question and answer for the field work**

Example 4: Alarm code "31"	
Phenomenon	Alarm code "31" sometimes occurred and the system stopped.
Cause	The combination of the indoor units and the outdoor unit was the following.  This system was used in a tenant building. One of tenant's customers turned off the main switch for the indoor unit while other indoor units are running. This results in a different setting of the total indoor unit capacity in the same refrigerant cycle.
Countermeasure	All the main switches for the indoor units were always ON.

11.5. GUIDELINE FOR SELECTING THE DRAIN PIPE FOR THE INDOOR UNIT

■ Method for selecting the drain pipe diameter

1. Calculation of the Drain Flow Volume
   Calculate that the drain flow volume is approximately 3 (l/hr) per 1HP of the nominal capacity of the indoor unit.

   For Example:

Common drain pipe for four 2HP indoor units and four 2.5HP indoor units.	
Total horsepower of the indoor unit	4 × 2HP + 4 × 2.5 HP=18HP
Total drain flow volume	18HP× 3 (l/hr × HP) = 54 (l/hr)

2. Select the drain pipe from the Table A and the Table B

Horizontal common pipe with the slope 1/50	VP30 for above Example
Horizontal common pipe with the slope 1/100	VP30 for above Example
Vertical common pipe	VP30 for above Example

Table A. Permissible drain flow volume of the horizontal vinyl pipe

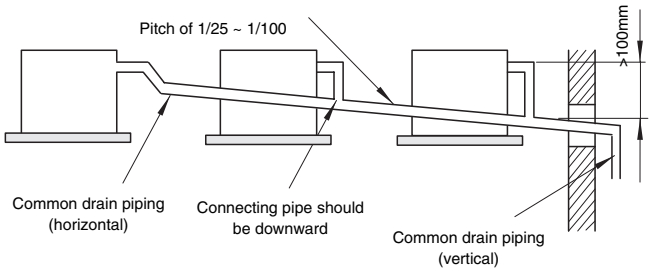
JIS symbol	Inner diameter (mm)	Permissible flow volume (l/hr]	
		Slope=1/50	Slope=1/100
VP20	20	39	27
VP25	25	70	50
VP30	31	125	88
VP40	40	247	175
VP50	51	472	334

NOTE:
VP20 and VP25: Not Applicable to the Common Pipe
VP30, VP40 and VP50: Applicable to the Common Pipe

Table B. Permissible drain flow volume of the vertical vinyl pipe

JIS symbol	Inner diameter (mm)	Permissible flow volume (l/hr]
VP20	20	220
VP25	25	410
VP30	31	730
VP40	40	1400
VP50	51	2760
VP65	67	5710
VP75	77	8280

NOTE:
VP20, VP25 and VP30: Not applicable to the common pipe
VP40, VP50, VP65 and VP75: Applicable to the common pipe



11.6. CAUTION WITH REFRIGERANT LEAKAGE

The designers and the installers have the responsibility to follow the local codes and the local regulations that specify the safety requirements against the refrigerant leakage.

11.6.1. MAXIMUM PERMISSIBLE CONCENTRATION OF THE HCFC GAS

The refrigerant R410A, which is charged in the SET-FREE FSN system, is an incombustible non-toxic gas. However, if the leakage occurs and the gas fills a room, the gas may cause suffocation.
The maximum permissible concentration of the HCFC gas and the R410A in the air is 0.44 kg/m³, according to the refrigeration and air conditioning system standard (KHK S 0010) by the KHK (High-Pressure Gas Protection Association) of Japan.
Therefore, you must take some effective measures in order to lower the R410A concentration in the air below 0.44 kg/m³, if there is a leakage.

11.6.2. CALCULATION OF THE REFRIGERANT CONCENTRATION

1. Calculate the total quantity of refrigerant R (kg) that is charged in the system that connects all the indoor units of the rooms that need air conditioning systems.
2. Calculate the room volume V (m³) of each room.
3. Calculate the refrigerant concentration C (kg/m³) of the room according to the following equation:

$\frac{R}{V} = C$	R: Total quantity of charged refrigerant (kg) V: Room volume (m³) C: Refrigerant concentration (≤0.44* kg/m³ for the R410A)

* Use this value only for reference because this value is not fixed yet.

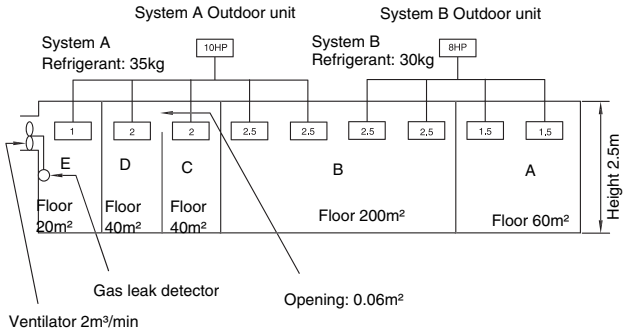
11.6.3. COUNTERMEASURE FOR THE REFRIGERANT LEAKAGE ACCORDING TO THE KHK STANDARD

According to the KHK standards, you should arrange the facility as follows so that the refrigerant concentration will be bellow 0.44 kg/m³.

1. Provide a shutterless opening that will allow the fresh air to circulate into the room.
2. Provide a doorless opening with a size of 0.15% or more to the floor area.
3. Provide a ventilator, which must be linked with a gas leak detector, with a ventilating capacity of 0.5m³/min or more per Japanese Refrigeration Ton (=compressor displacement m³/h/8.5 of the air conditioning system which uses the refrigerant).

O.U. model	ton
RAS-3HVRNE	1.21
RAS-4HVRNE	1.61
RAS-5HVRNE	2.02
RAS-6HVRNE	2.42

4. Pay a special attention to the place, such as a basement and others, where the refrigerant may stay, because the refrigerant is heavier than the air.



Room	R (kg)	V (m³)	C (kg/m³)	Countermeasure
A	30	150	0.2	-
B	65	500	0.13	-
C	35	100	0.35	-
D	35	100	0.35	-
C+D	35	200	0.175	-
E	35	50	0.7	2m³/min

11.7. MAINTENANCE WORK

■ For the indoor unit and the outdoor unit

1. Fan and fan motor

   Lubrication: All the fan motors are prelubricated and sealed at the factory. Therefore, no lubrication maintenance is required.
   - Sound and vibration: Check for abnormal sounds and vibrations.
   - Rotation: Check the clockwise rotation and the rotating speed.
   - Insulation: Check the electrical insulation resistance.
2. Heat exchanger
   - Clog: Inspect the heat exchanger at regular intervals and remove any accumulated dirt and any accumulated dust from the heat exchanger. You should also remove from the outdoor units other obstacles, such as the growing grass and the pieces of paper, which might restrict the airflow.
3. Piping connection
   - Leakage: Check for the refrigerant leakage at the piping connection.
4. Cabinet
   - Stain and Lubrication: Check for any stain and any lubrication. Remove the stain and the lubrication.
   - Fixing Screw: Check for any loosened screw or any lost screw. Fix the loosened screws and the lost screws. Insulation Material: Check for any peeled thermal insulator on the cabinet. Repair the thermal insulator.
5. Electrical equipment
   - Activation: Check for an abnormal activation of the magnetic contactor, the auxiliary relay, the PCB and others.
   - Line condition: Pay attention to the working voltage, the working amperage and the working phase balance. Check for any faulty contact that is caused by the loosened terminal connections, the oxidized contacts, the foreign matter, and other items. Check the electrical insulation resistance.
6. Control device and protection device
   - Setting: Do not readjust the setting in the field unless the setting is maintained at a point that is different from the point that is listed in the section "5.6. SAFETY AND CONTROL DEVICE SETTING".

■ For the indoor unit

1. Air filter
   - Cleaning: Check for any accumulated dirt and any accumulated dust. Remove the dirt and the dust.
2. Drain pan, drain-up mechanism and drain pipe
   - Drain line: Check and clean the condensate drain pipe at least twice a year.
   - Drain-up mechanism: Check the activation of the drain-up mechanism.
3. Float switch
   - Activation: Check the activation of the float switch.

■ For the outdoor unit

1. Compressor
   - Sound and vibration: Check for abnormal sounds and vibrations.
   - Activation: Check that the voltage drop of the power supply line is within 15% at the start and within 2% during the operation.
2. Reverse valve
   - Activation: Check for any abnormal activation sound.
3. Strainer
   - Clog: Check that there is no temperature difference between both ends.
4. Ground wire
   - Ground line: Check for the continuity to earth.
5. Oil heater
   - Activation: You should activate the oil heater at least twelve hours before the start-up by turning ON the main switch.

11.8. SERVICE AND MAINTENANCE RECORD

No.	Check Item	Action	Judgement
1	Is service space sufficient?		YES or NO
2	Short Circuit of Discharge Air?		YES or NO
3	Any Heat Influence		YES or NO
4	Is earth wire connected?		YES or NO
5	Refrigeration Piping		GOOD or NOT GOOD
6	Fixing of Units		GOOD or NOT GOOD
7	Any Damage on Outer or Internal Surface?		YES or NO
8	Checking of Screw and Bolts	Tighten if loosen.	TIGHTENED or NOT TIGHTENED
9	Tightening of Terminal Screws	Tighten all terminal screws by phillips driver.	TIGHTENED or NOT TIGHTENED
10	Are compressor terminals tightly fixed?	Push all terminals.	PUSHED or NOT PUSHED
11	Insulation Resistance	Measure insulation resistance by insulation resistance-meter. Comp. and Fan Motor: greater than 3 MΩ Others: greater than 3 MΩ	GOOD or NOT GOOD
12	Does drain water smoothly flow?	Check for smooth flow by pouring water.	GOOD or NOT GOOD
13	Check for leakage at compressor.	Check for any leakage.	GOOD or NOT GOOD
14	Check for leakage at outdoor heat exchanger.	ditto	GOOD or NOT GOOD
15	Check for leakage at indoor heat exchanger.	ditto	GOOD or NOT GOOD
16	Check for leakage at 4-way valve.	ditto	GOOD or NOT GOOD
17	Check for leakage at check valve.	ditto	GOOD or NOT GOOD
18	Check for leakage at liquid tank.	ditto	GOOD or NOT GOOD
19	Check for leakage at strainer.	ditto	GOOD or NOT GOOD
20	Check for leakage at electronic Ex. Valve.	ditto	GOOD or NOT GOOD
21	Check for leakage at piping.	ditto	GOOD or NOT GOOD
22	Check direction of fans.	by Viewing or Air Flow Volume	GOOD or NOT GOOD
23	Voltage among each Phase.	higher than 220V	GOOD or NOT GOOD
24	Vibration and Sound	Check fan, compressor, piping, etc.	GOOD or NOT GOOD
25	Activation of Each Operation Mode	Check activation of COOL, HEAT, STOP and TEMP. switches.	GOOD or NOT GOOD
26	High Pressure Cut-out Switch	Check actual activation value.	GOOD or NOT GOOD
27	Check activation of drain mechanism.	Check it during cooling operation.	GOOD or NOT GOOD
28	Indoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
29	Indoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
30	Outdoor Inlet Air Temp. (DB/WB)		°C DB/ °C WB
31	Outdoor Outlet Air Temp. (DB/WB)		°C DB/ °C WB
32	Operating Voltage		V
33	Operating Current		A
34	Instruction Cleaning of Air Filter to Client		DONE or NOT YET
35	Instruction for Cleaning Method to Client		DONE or NOT YET
36	Instruction for Operation to Client		DONE or NOT YET

Hitachi Air Conditioning Products Europe, S.A.
Ronda Shimizu, 1 - Políg. Ind. Can Torrella
08233 Vacarisses (Barcelona) España
ISO 9001 certified by AENOR, Spain

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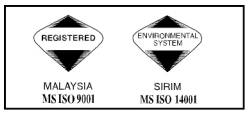

Hitachi Air Conditioning Products (M) Sdn. Bnd.
Lot No. 10, Jalan Kemajan Bangi Industrial Estate
43650 Bandar Baru Bangi
Selangor Darul Ehsan, Malaysia
Certification ISO 9001, Malaysia

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