HITACHI
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UTOPIA IVX SERIES





Service Manual

Outdoor Units: 8 ~ 12 HP
Indoor Units Type:

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

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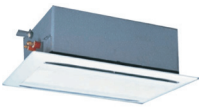
Field work instruction 12

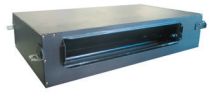
UNITS CODE LIST

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 service manual.

INDOOR UNITS FSN(1)(E/M) – System Free							
4-Way-Cassette		4-Way-Cassette Mini		2-Way-Cassette		Ceiling	
Unit	Code	Unit	Code	Unit	Code	Unit	Code
RCI–2.0FSN1E	7E861621	RCIM–2.0FSN	60277890	RCD–2.0FSN	60277815	RPC–2.0FSNE	7E872055
RCI–2.5FSN1E	7E861620			RCD–2.5FSN	60277816	RPC–2.5FSNE	7E872030
RCI–3.0FSN1E	7E871770			RCD–3.0FSN	60277817	RPC–3.0FSNE	7E872058
RCI–4.0FSN1E	7E871780			RCD–4.0FSN	60277818	RPC–4.0FSNE	7E872059
RCI–5.0FSN1E	7E871790			RCD–5.0FSN	60277819	RPC–5.0FSNE	7E872060
RCI–6.0FSN1E	7E871794					RPC–6.0FSNE	7E872061
							
RCI		RCIM		RCD		RPC	

INDOOR UNITS FSN(1)(E/M) – System Free							
In the ceiling		Wall		Floor		Floor Concealed	
Unit	Code	Unit	Code	Unit	Code	Unit	Code
RPI–2.0FSN1E	7E882024	RPK–2.0FSNM	60277826	RPF–2.0FSNE	7E877309	RPFI–2.0FSNE	7E877311
RPI–2.5FSN1E	7E882025	RPK–2.5FSNM	60277844	RPF–2.5FSNE	7E877310	RPFI–2.5FSNE	7E877312
RPI–3.0FSN1E	7E882031	RPK–3-0FSNM	60277845				
RPI–3.5FSN1E	7E882035	RPK–3.5FSNM	60277846				
RPI–4.0FSN1E	7E882032	RPK–4.0FSNM	60277847				
RPI–5.0FSN1E	7E882033						
RPI–6.0FSN1E	7E882034						
RPI–8.0FSNE	70886723						
RPI–10.0FSNE	70886733						
							
RPI		RPK		RPF		RPFI	

Meaning of model codification: **RPI 3.0 FS N (1) (E)**

Unit Type (Indoor Unit)
RCI -RCIM - RCD - RPC - RPI
RPK - RPF - RPFI

Capacity (HP) 2.0 ~ 10.0

H-Link Set-Free / System Free

R410 A refrigerant

Series

E : Made in Europe
M : Made in Malaysia
– : Made in Japan

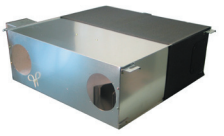
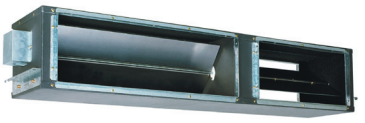
OUTDOOR UNITS HRNM Series	
Unit	**Code**
RAS–8HRNM	60278972
RAS–10HRNM	60278973
RAS–12HRNM	6028974



Meaning of model codification: **RAS 10 H R N M**

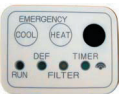
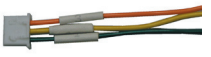
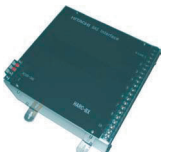
- Unit Type (Outdoor Unit)
- Compressor power (HP) 8 ~ 12
- System: Utopia Heat & Cool
- Compressor type: DC- Inverter
- R410A Refrigerant
- M: Multifunction

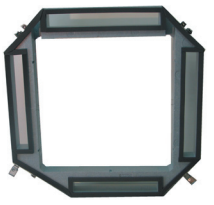
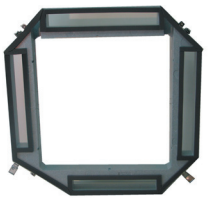
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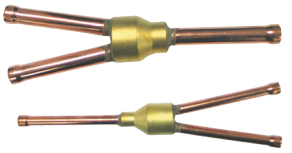
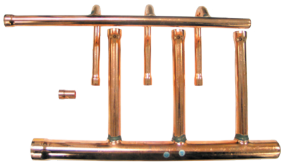
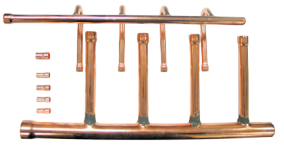
Accessory	Name	Code	Figure
KPI-2521	Total Heat Exchanger	60277481	
KPI-5021	Total Heat Exchanger	60277482	
KPI-8021	Total Heat Exchanger	60277483	
KPI-10021	Total Heat Exchanger	60277484	
EF-5GE	Econofresh Kit	7E774148	

CODE LIST ACCESSORIES

Accessory	Name	Code	Figure
PC-P2HTE	Remote control switch with Timer NEW	7E899954	
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	60291056	

Accessory	Name	Code	Figure
PC-RLH8	Receiver kit for RCI-FSN1E on the panel	60291106	
PC-RLH9	Receiver kit for RCI-FSN on the panel	60291107	
PC-RLH11	Receiver kit for RCI, RCD, RPC, RPI, RPK and RPF(I) on the wall	60291109	
PC-RLH13	Receiver kit for RCIM-FSN on the panel	60291294	(Figure not available)
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)	Lonwork BMS interface (7 inputs up to 6 units	60290874	
HARC-BXE (B)	Lonwork BMS interface (4 inputs up to 32 units	60290875	
CSNET WEB	CSNET WEB +interface	7E891924	
DBS-26	Drain discharge boss	60299192	

Accessory	Name	Code	Figure
P-G23WA2	Air panel for RCI	60290534	
P-N23WAM	Air panel for RCIM	60197160	
P-G23DWA1	Air panel for RCD	60299570	
P-G46DWA1	Air panel for RCD	60299571	
B-32H4	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-23CE	Duct connection flange	60199795	
PDF-46C3	Duct connection flange	60199796	
OACI-232	Fresh air intake kit	60199797	
PD-75	Fesh air intake kit	60199798	
PI-23LS5	3-way oulet parts	60199799	
TKCI-232	T duct connecting kit	60199801	

Accessory	Name	Code	Figure
TE-08N	Branch pipe	70800003	
TE-10N	Branch pipe	70800004	
TRE-810N	Branch pipe	70800010	
QE-810N	Branch pipe	70800006	
AG-335A	Air flow guide	60291431	(Figure not available)
WSP-335A	Wind guard	60291432	
ASG-NP335F	Snow protection hood	60291433	
ASG-NP335B	Snow protection hood	60291434	
ASG-NP335L	Snow protection hood	60291435	

1. Units installation

This chapter provides information about the procedures you must follow to install the UTOPIA IVX HRNM Series outdoor units and the complete range of Hitachi indoor units.

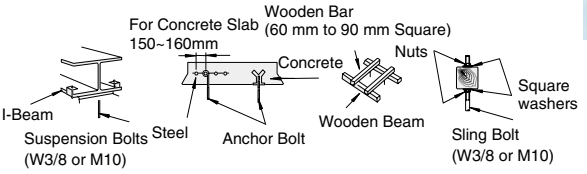
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WARNING:

- *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 utilized to obtain uniform air temperature in the room.*
- *Avoid obstacles that 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 it is not strong enough, the indoor unit may fall down on you.*
- *Outdoor units must be installed in places not accessible to the general public. Install the outdoor unit in an area where people except services engineers cannot touch the unit.*
- *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 it 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.*

NOTE:

This unit is designed for commercial and light industrial application. If installed in house hold appliance, it could cause electromagnetic interference.

1.1. TRANSPORTATION OF OUTDOOR UNIT

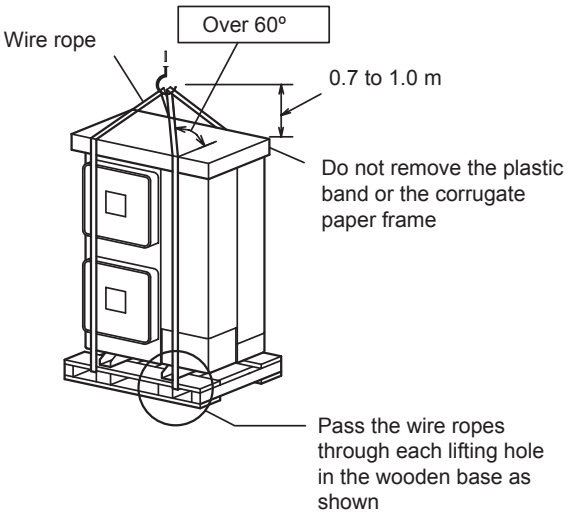
Transport the product as close to installation location as practical before unpacking.

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.

■ 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. Hang the unit under packing condition withtwo (2) ropes, as shown in the figure

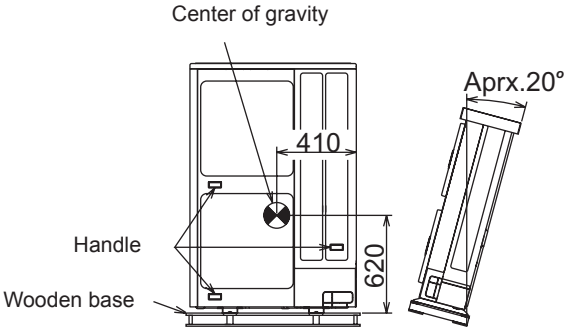


Caution:
- *Lift the outdoor unit in its factory packaging with 2 wire ropes.*
- *For safety reasons ensure that the outdoor unit is lifted smoothly and does not lean.*
- *Do not attach lifting equipment to the plastic band or the corrugated paper frame.*
- *Ensure the exterior of the unit is adequately protected with cloth or paper.*

■ When Using Handles

When manually lifting the unit using the handles, pay attention to the following points.

1. Do not remove the wooden base from outdoor unit.
2. To prevent the unit from overturning, pay attention to the center of gravity as shown in the below figure.
3. Two or more personnel should be used to move the unit.



■ Factory supplied accessories

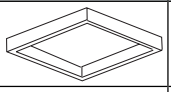
Accessory	Qty
Pipe with flange of refrigerant piping	1
Compressed sheet	1
Ring Core	1
Band	1

1.2. RCI

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.

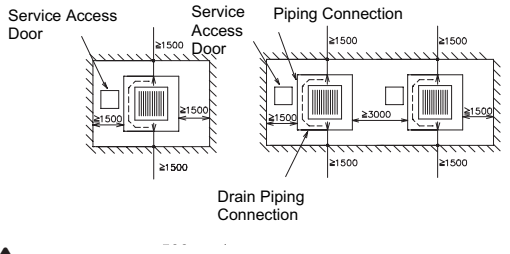
Accessory	Qty.	Purpose
Paper Pattern (Carton Board) 	1	For Adjusting Space of False Ceiling Opening and Position of the Unit
Cross Recessed Head Screws 	4	For Fitting Paper Pattern
Washer with Insulation 	4	For Unit Installation
Washer (M10) 	4	
Drain Hose 	1	For Drain Hose Connection
Wire Clamp 	2	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

Applicable air panel

Indoor unit	Applicable air panel
RCI-2.0~6.0	P-G23WA2

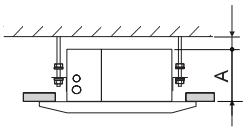
1.2.2. INITIAL CHECK

– 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.



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.

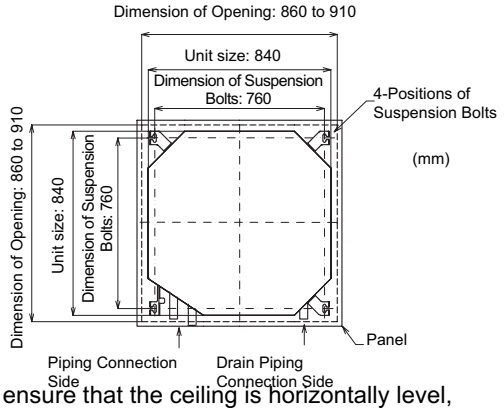


Unit HP	A(mm)
RCI-1.5 to 2.5HP	248
RCI-3.0 to 6.0HP	298

– 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:

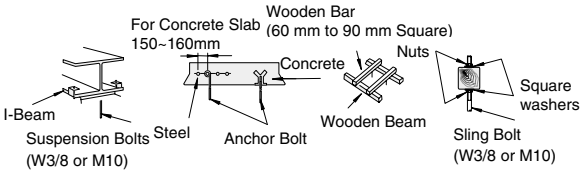


– Check to ensure that the ceiling is horizontally level, otherwise water can not flow.
– Strengthen the opening parts of the false ceiling.

1.2.3. INSTALLATION

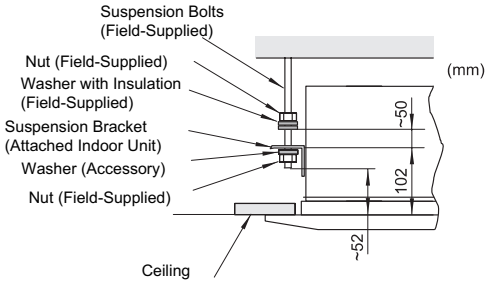
■ Mounting the suspension bolts

– *Mount suspension bolts using M10 (W3/8) as size, as shown below:*

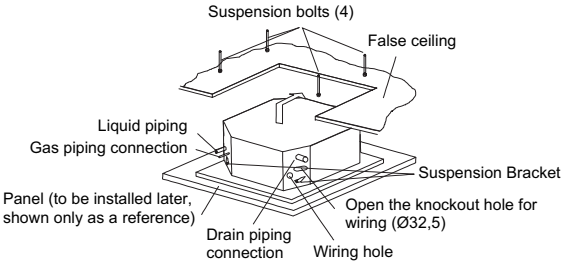


■ Mounting the indoor unit

– 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 pain.
– Secure the indoor unit using the nuts and washers.

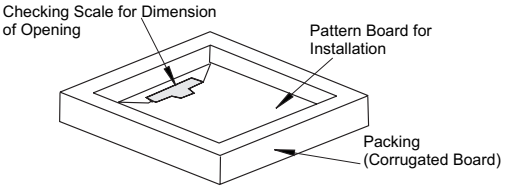


– Check the level of the drain pan by a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

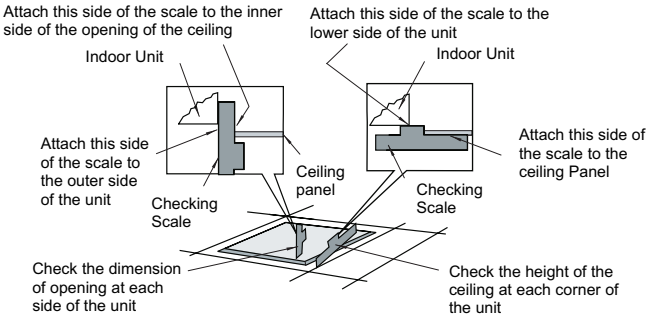
NOTE:
– *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*
– *Secure the indoor unit using the nuts, flat washers and spring washers. (These nuts and washers are supplied, 4 pieces each).*

■ Adjusting the space between indoor units and false ceiling opening

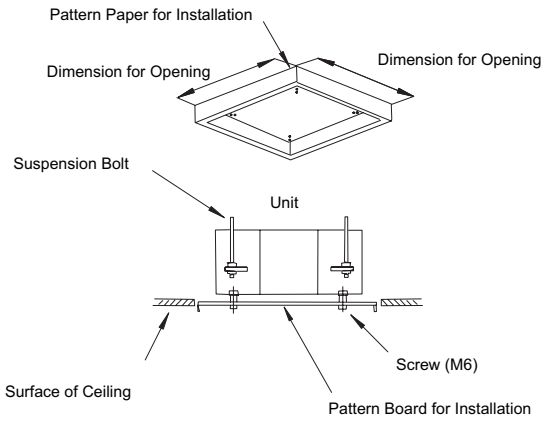
– Adjust the indoor unit to the correct position while checking with the pattern for installation.



■ 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

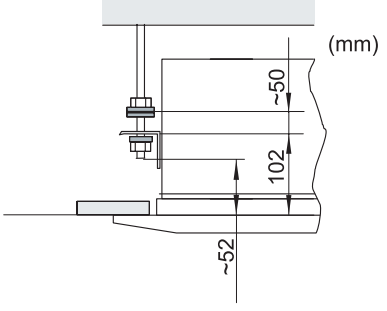
Check to ensure that the following accessories are packed with the air panel.

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

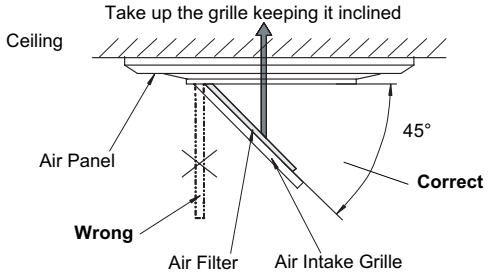
■ Location of suspension brackets

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

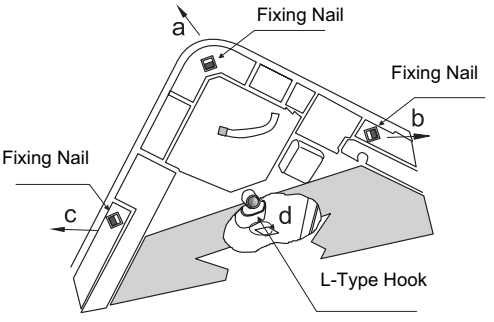
1. Open the air intake grille to an angle of approximately 45° from the surface of the air panel as shown below.



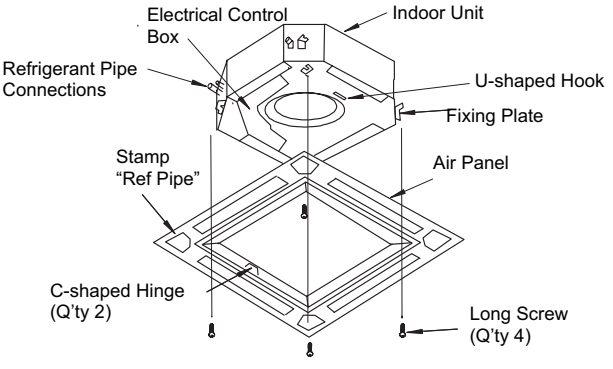
2. Lift the grille keeping it inclined.
3. Draw the grille towards the open space after lifting.

■ Installing the air panel

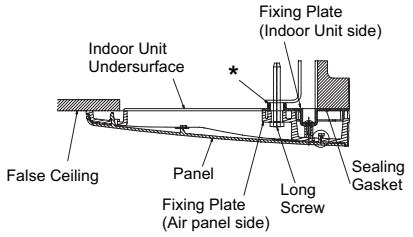
1. Remove the cover of the corner pocket (4 portions).



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 theU-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)



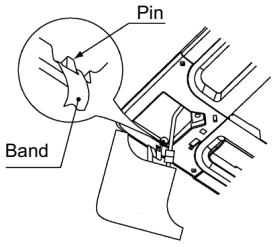
7. Check to ensure that there is no gap around the contacting surface between the indoor unit and the air panel. Any gap may cause air leakage or dewing.



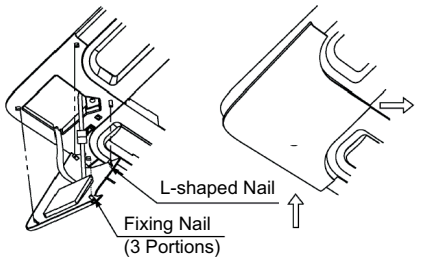
*: Fix screw until this end touches it

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.

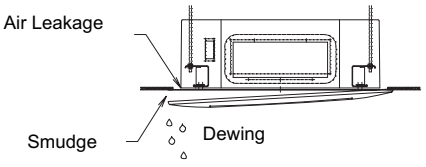


8.2. Hook the L-shaped nail located at the rear side of the cover for the corner pockets onto the square hole of the air panel.

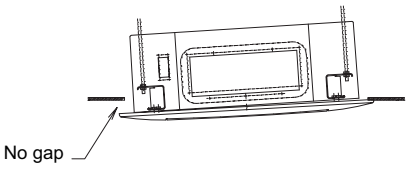


CAUTION:

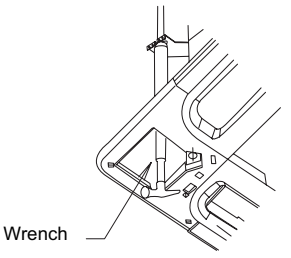
– *If tighten long screws insufficient, may cause something wrong as below.*



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

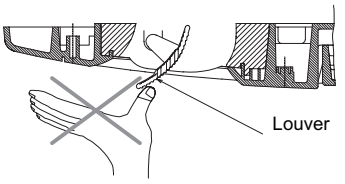


– *When the panel is installed, you can adjust the indoor unit height by using the wrench from the corner pocket.*



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

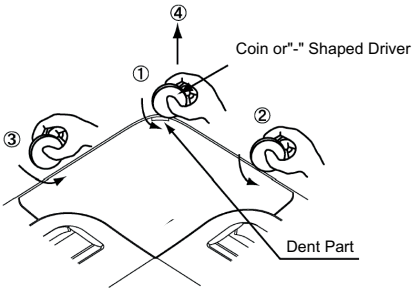
– *Do not turn the air louver by hand. Otherwise the louver mechanism would be damaged.*



NOTE:

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

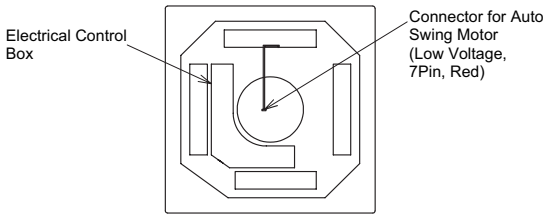
1. *The corner can be lifted when a coin or a "- " shaped driver is inserted into the dent part ① and twisted downward. With ① lifted, twist a coin or a "-" shaped driver at the positions ② and ③, the whole receiver kit can be lifted.*
2. *After disconnecting the fixing nails (3 positions), slide the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



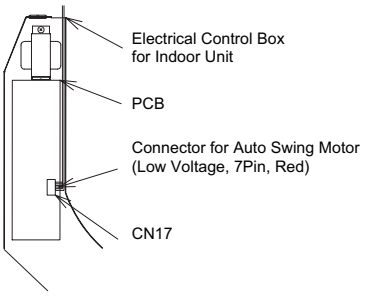
■ Wiring connection for the air panel

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)



NOTE
For size and position of piping connection, see Chapter 2.

1.3. RCIM-FSN

1.3.1. FACTORY-SUPPLIED ACCESSORIES

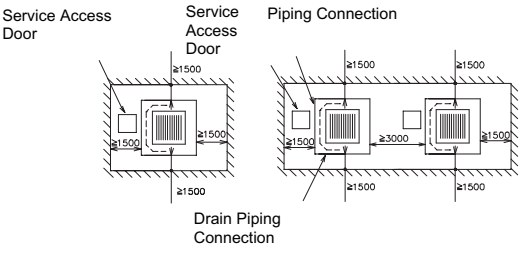
Make sure that the following accessories are packed with the unit.

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

Accessory	Qty.	Purpose
Checking Scale (Cut out from Carton Board)	1	For Unit Installation
Flat Washer with insulation (M10)	4	
Washer (M10)	4	
Drain Hose	1	For Drain Hose Connection
Wire Clamp	1	
Insulation (Big Size)	1	For Refrigerant Piping Connection
Insulation (Small Size)	1	
Insulation (5t)	1	For Drain Hose Insulation
Band	6	For Fixing Refrigerant Piping Insulation

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.

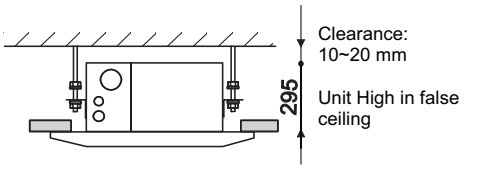


CAUTION:
The minimum distance between the wall and panel edge must be 1500 mm to prevent short-circuiting.

Applicable air panel

Indoor unit	Applicable air panel
RCIM-2.0	P-N23WAM

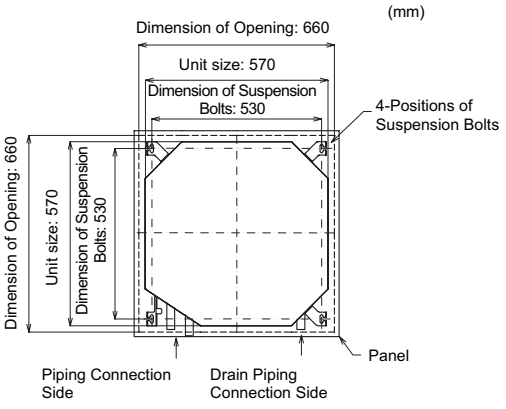
– Check space between ceiling and false ceiling is enough as indicated below.
– Check the ceiling surface is flat for the air panel installation work.



– Check 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:

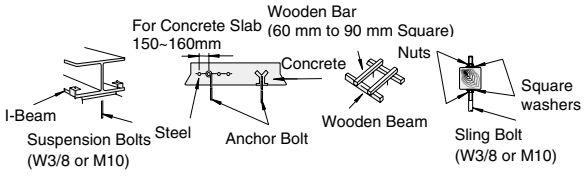


– Check to ensure that the ceiling is horizontally level, otherwise water can not flow.
– Strengthen the opening parts of the false ceiling.

1.3.3. INSTALLATION

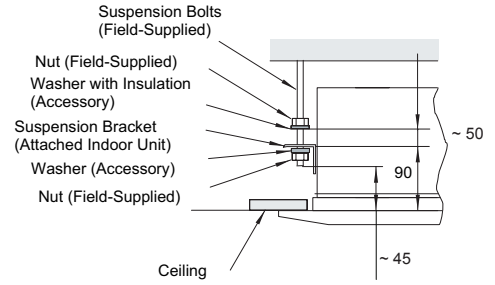
■ Mounting the suspension bolts

– *Mount suspension bolts using M10 (W3/8) as size, as shown below:*

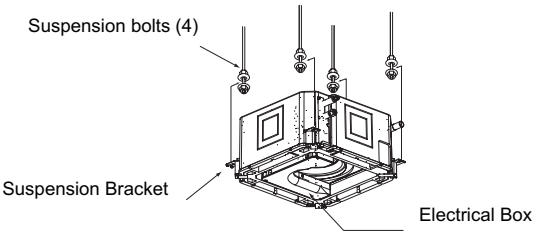


■ Mounting the indoor unit

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



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

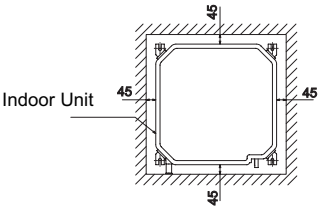


– Check the level of the drain pan by a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

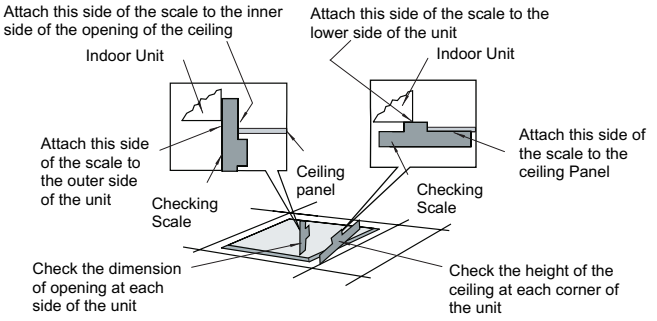
NOTE:
– *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*
– *Secure the indoor unit using the nuts, flat washers and spring washers. (These nuts and washers are supplied, 4 pieces each).*

■ 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.



– 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.

1.3.4. AIR PANEL INSTALLATION

P-N23WAM

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

■ Factory-supplied accessories

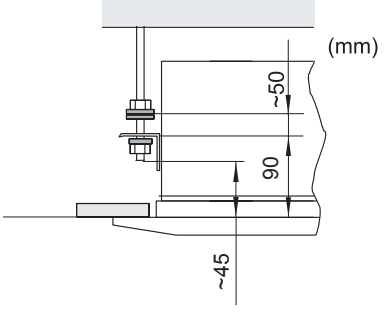
Check to ensure that the following accessories are packed with the air panel.

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

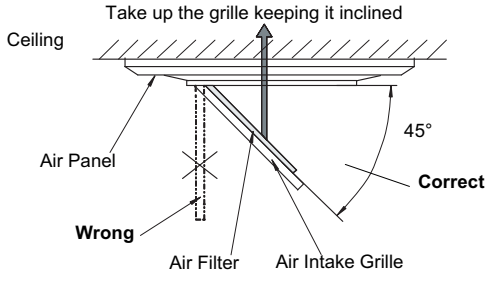
■ Location of suspension brackets

– Check to ensure that the suspension brackets of the indoor unit are located approximately 90 mm higher the false ceiling.



■ Removing the air intake grille from the air panel

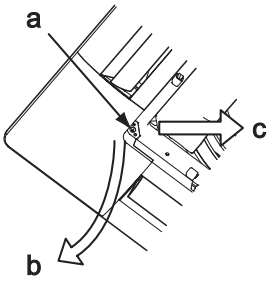
1. Open the air intake grille to an angle of approximately 45° from the surface of the air panel as shown below.



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

■ Removing Cover for Corner Pocekt (Positions)

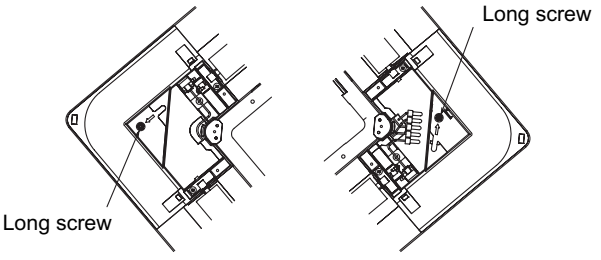
1. Remove the screw at mark “a”.



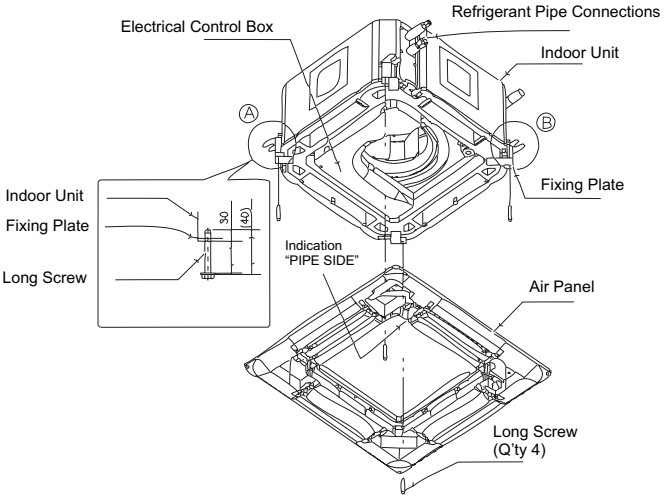
2. Pull the fixing hook towards the arrow mark “b”.
3. The corner pocket can be removed to pull the corner pocket toward the arrow mark “c”.

■ Installing the air panel

1. Fix the long screw to the fixing plate temporary.
2. Set the corner of the refrigerant connection portion of the indoor unit to the position indicated as “PIPE SIDE”.
3. Hook the air panel onto the long screw (2 positions) so that temporary positioning is available.



4. Mount the air panel onto the air panel fixing position by using the factory-supplied fixing screws (M5 cross screws).



NOTE:
Fix the (A),(B) position and after fix the other side.

NOTE
For size and position of piping connection, see Chapter 2.

1.4. RCD

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	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	Only for RCD (4.0/5.0) FSN

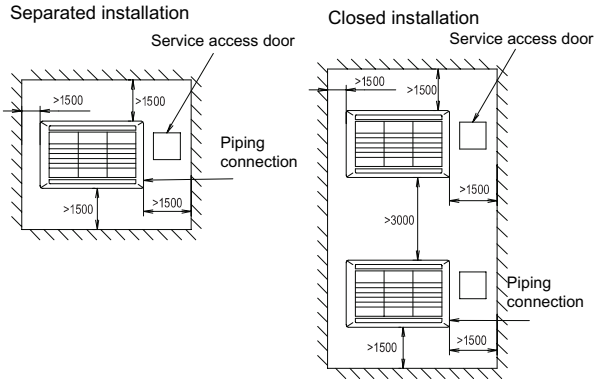
Applicable air panel (option)

Indoor unit	Applicable air panel (option)
	For wired remote control switch
RCD-1.0 ~3.0	P-G23DWA1
RCD-4.0~5.0	P-G46DWA1

1.4.2. 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.

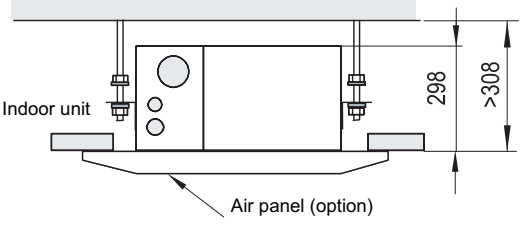


Distance from wall side

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.

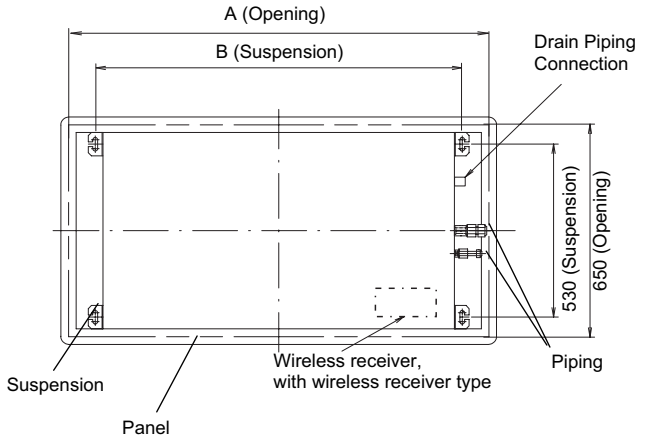
– Check the ceiling surface is flat for the air panel installation work.



– 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

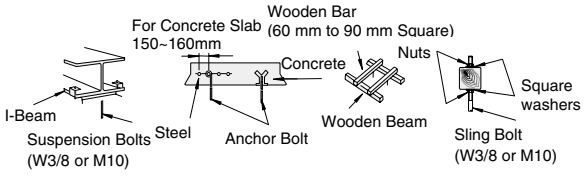
Model	A (mm)	B(mm)
RCD-1.0~3.0FSN	1060	889
RCD-4.0~6.0FSN	1620	1450

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

1.4.3. INSTALLATION

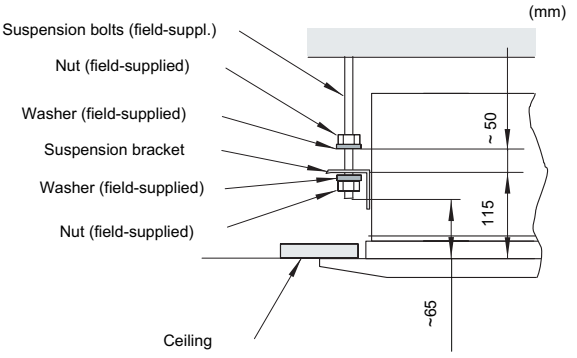
■ Mounting suspension bolts

– *Mount suspension bolts using M10 (W3/8) as size, as shown below:*

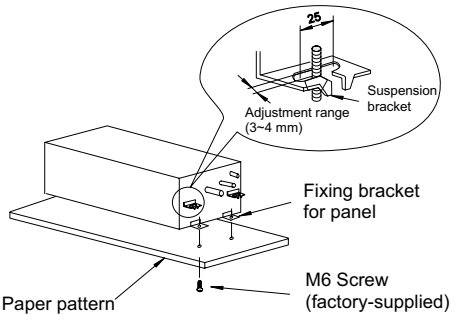


■ Mounting the indoor unit

– 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)).



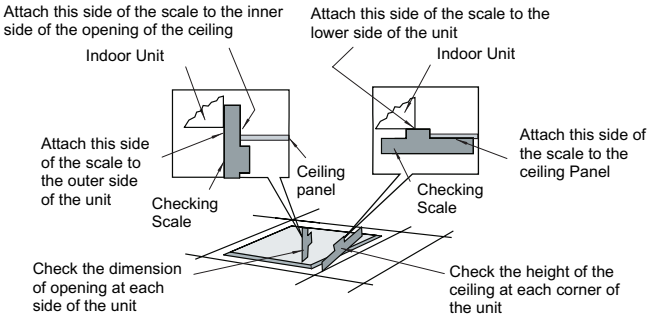
– Check the level of the drain pan by a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

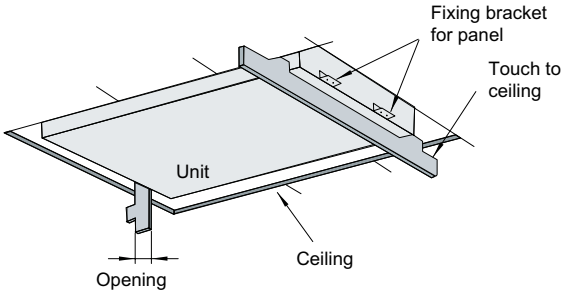
NOTE:
– *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*
– *Secure the indoor unit using the nuts, flat washers and spring washers. (These nuts and washers are supplied, 4 pieces each).*

■ Adjusting space between indoor unit and false ceiling opening

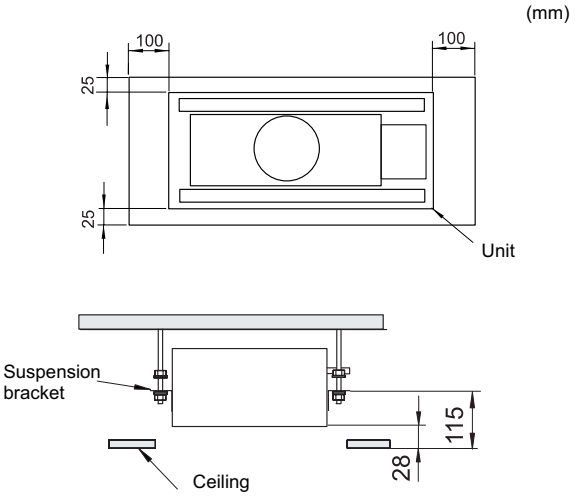
– Adjust the indoor unit to the correct position while checking with the installation pattern and gauge (factory-supplied) as shown below.

■ For ceiling already completed with panels





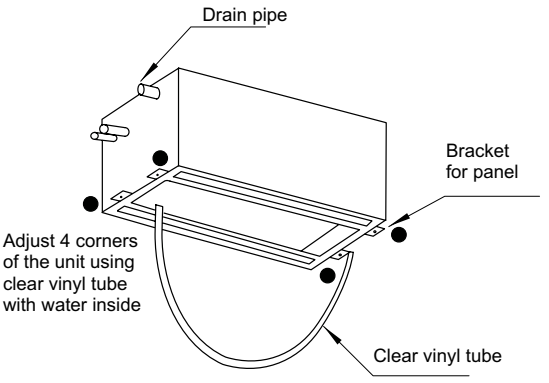
■ Ceiling not completed with panels yet



– 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).



1.4.4. 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

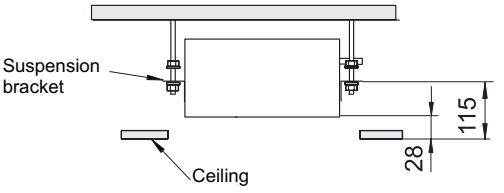
Make sure that the following accessories are packed with the air panel.

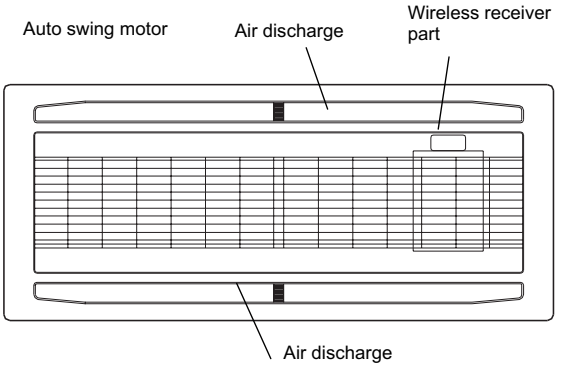
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

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

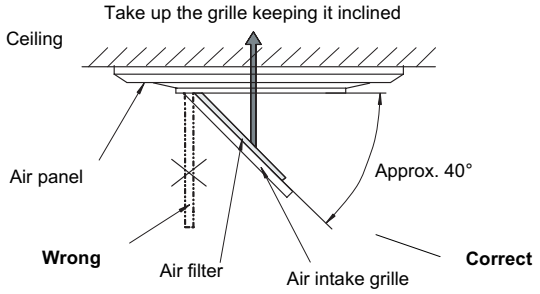
– Check to ensure that the suspension brackets of the indoor unit are located approximately 115 mm higher the false ceiling.





■ Removing the air intake grille from the air panel:

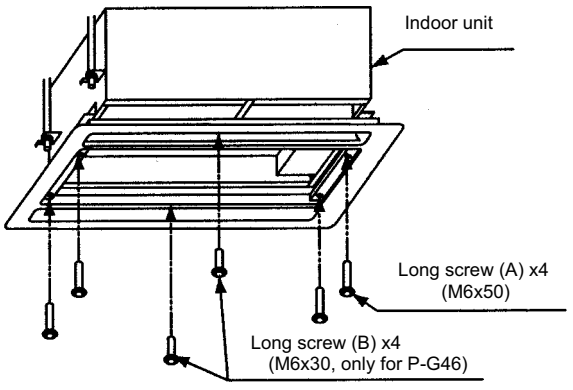
1. Open the air intake grille to an angle of approx. 40° from the surface of the air panel.



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.

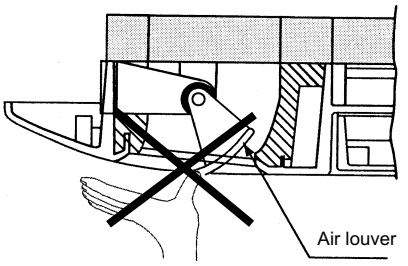


4. Make sure that there is no gap around the contacting surface between the indoor unit and the air panel. Any gap may cause air leakage or dewing.

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.

NOTE
For size and position of piping connection, see Chapter 3.

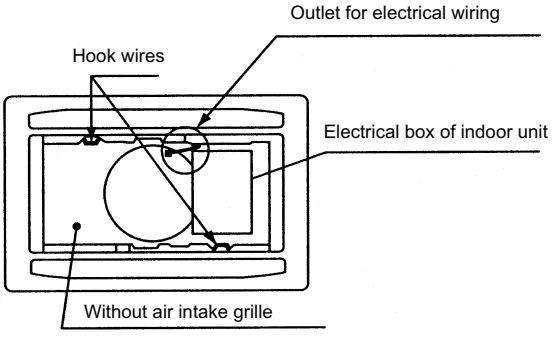
CAUTION:
Do not turn the air louver by hand. If moved, the louver mechanism will be damaged.



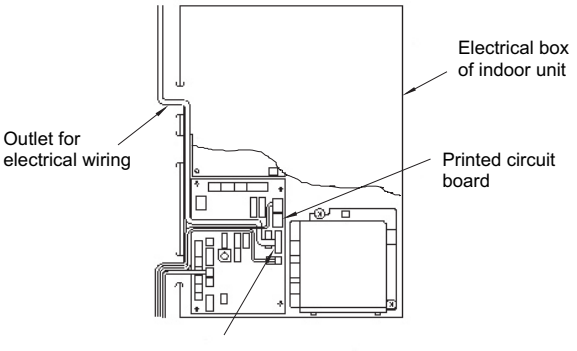
■ Wiring connection for air panel.

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).

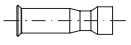


1.5. RPC

1.5.1. 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 10 mm)	2	
Drain hose 	1	
Wire clamp 	2	For connecting drain hose and drain pipe
Insulation material (5Tx200x200 mm) 	1	For drain pipe connection
Sealing plate (0.8Tx118x42 mm) 	1	For sealing knockout hole
Reducer 	1	For RPC-(4.0/5.0/6.0)FSNE

1.5.2. INITIAL CHECK

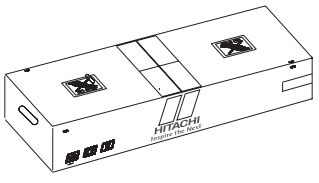
– Install the indoor unit with proper clearance around it for operation and maintenance working space, as shown below.

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

1.5.3. INSTALLATION

■ Mounting the suspension bracket

When installing the indoor unit, use the installation pattern printed on the inne side of the carton box. Follow the printed instructions.



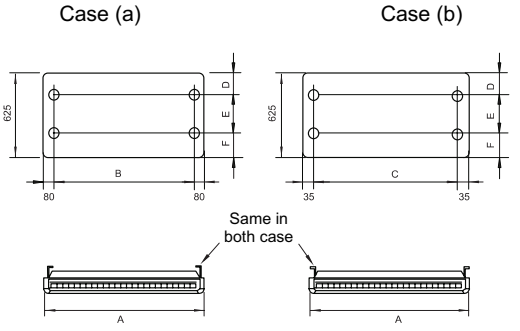
Installation pattern is giving the following information:

– 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:

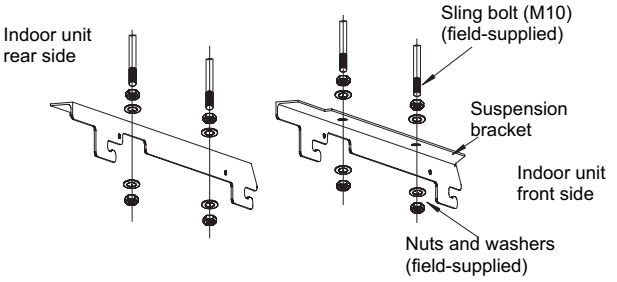


(mm)

Model	A	B	C	D	E	F
RPC-2.0	1094	920	1010	150	220	255
RPC-2.5~3.5	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.

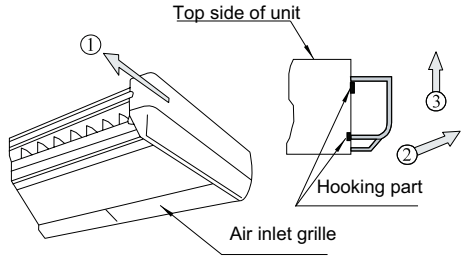


NOTE:
Tighten the nuts of the sling bolts or anchor bolts with the suspension brackets after the adjustment is completed. Apply Lock-Tight paint to the bolts and nuts in order to prevent them from loosening.

■ Mounting the indoor unit

Remove side covers of the unit.

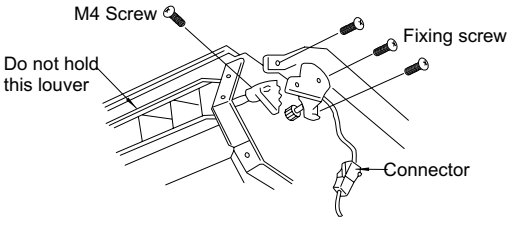
To avoid damage to the resin side covers, before lifting or moving the indoor unit, remove the resin side covers as indicated in the following procedure:



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.

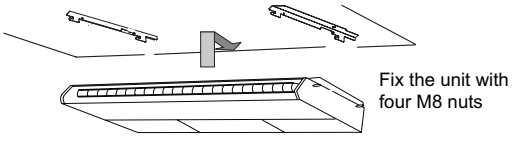
CAUTION:

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.)



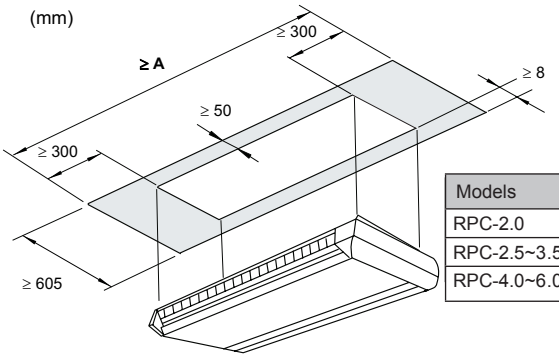
NOTE:

When the false ceiling has been already installed, all piping work inside the ceilling has to be completed before the indoor units is hooked

For size and position of piping connection, see Chapter 3.

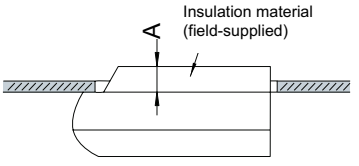
■ For semi-concealed installation.

– Open a hole in the false ceiling.



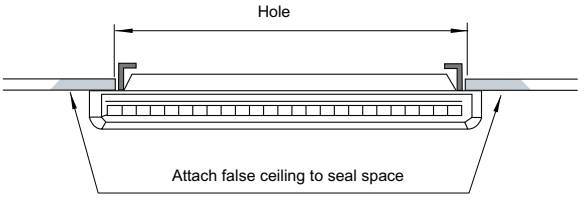
Models	A
RPC-2.0	1560
RPC-2.5~3.5	1780
RPC-4.0~6.0	2040

– 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.



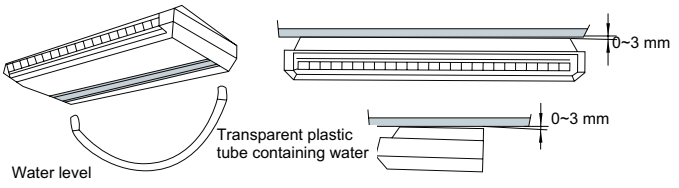
Models	A
RPC-2.0~3.5	13
RPC-4.0~6.0	75

– 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.

1.6. RPI

1.6.1. FACTORY-SUPPLIED ACCESSORIES

(Models: RPI-2.0~6.0FSN1E)
(Models: RPI-8/10FSNE)

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

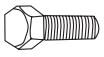
NOTE:

- *If any of these accessories are not packed with the unit, please contact your dealer.*
- *In case of 8/10HP, the pipe reduction for refrigerant pipe connection pipe must be field supplied.*

RPI-0.8~6.0

Accessory		Qty.	Purpose
Wire Clamp		1	For drain connection

RPI-8.0~10.0

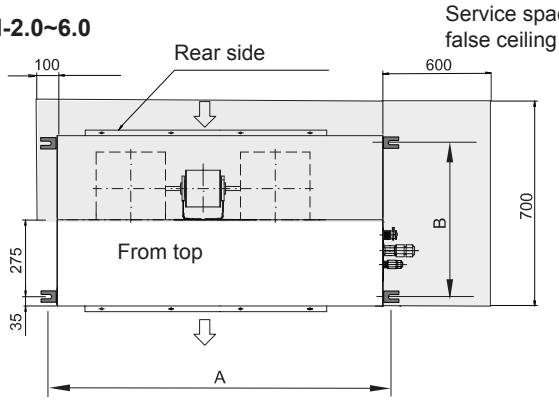
Accessory		Qty.	Purpose
Adjustment Bolt for Installation		8	Unit Hanging
Flat Washer		8	
Spring Washer		8	

1.6.2. INITIAL CHECK

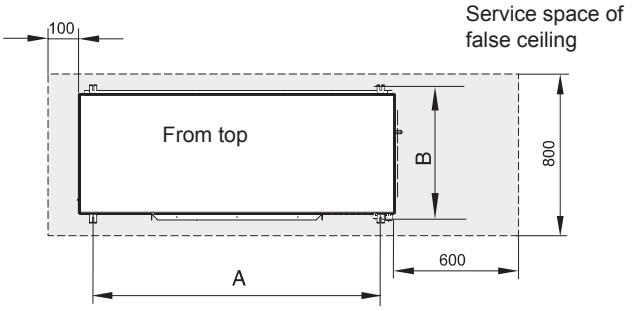
Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown below.

Recommended working space dimensions:

RPI-2.0~6.0



RPI-8.0~10.0



Distance between suspension brackets (A, B):

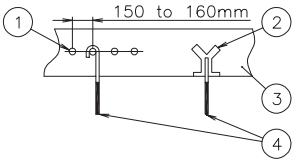
Models	A (mm)	B (mm)
RPI-2.0~3.5	1113	601
RPI-4.0~6.0	1503	601
RPI-8~10	1433	637

1.6.3. UNIT INSTALLATION

■ Mounting the suspension bolts

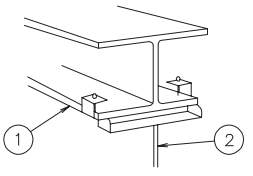
- Using the aforementioned dimension select the final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.
- Mount the suspension bolts, as shown.

For concrete slab:



No.	Description
①	Steel
②	Insert (100 to 150 kg)
③	Concrete
④	Anchor Bolt (W3/8 or M10)

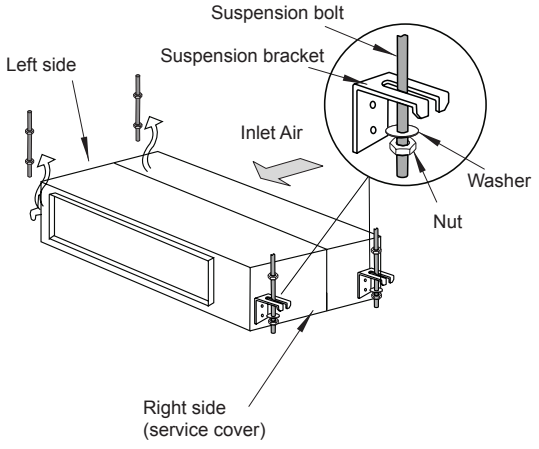
For steel beam:



No.	Description
①	I Beam
②	Suspension Bolt (W3/8 or M10)

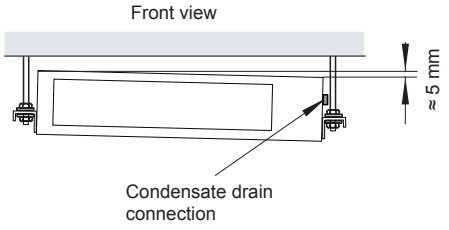
■ Mounting the indoor unit

- 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.



- 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. Lock-tight must be applied to the bolts and nuts in order to prevent them from loosening.
- Fasten the pipe to the drain hose with an adhesive and the factory-supplied clamp (only 0.8~1.5 / 8.0-10.0HP)

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

1.6.4. CONNECTING FIELD SUPPLY DUCT AND SUCTION AIR FILTER SERVICING

■ Field Supply Duct installation

Fix the Flexible Air Duct to External Faces of unit flanges (the unit is equipped with factory supply flanges for this purpose).

It is recommended to use a Flexible field supply Duct portion in order to avoid any abnormal sound vibration.

RPI-units are supplied with standard Air Filter at the suction side. This filter is provided for the cases in which no Suction Duct is applied (or it is very short).

It is recommended the following indications depending on the installation.

- Keep the standard Air Filter in case of no Suction Duct is applied (fig.1) and (fig.3)
- In case of applying Suction Duct, it is recommended to apply Air Filter at the inlet point of Suction Duct, removing the standard Air Filter of the unit (fig. 2)and (fig.4)

RPI-2.0~6.0

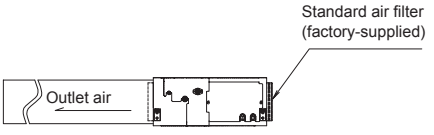


Fig. 1

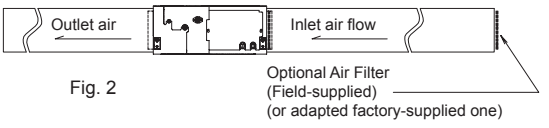


Fig. 2

RPI-8.0/10.0

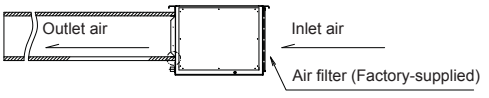


Fig. 3

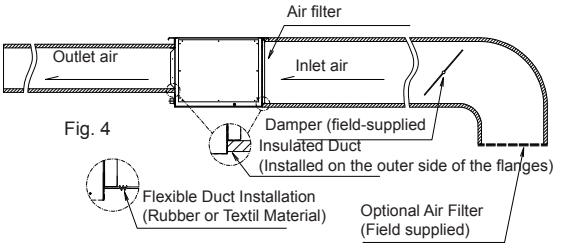
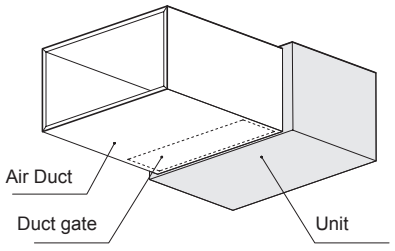


Fig. 4

ATTENTION: (RPI-8.0-10.0 only).

– *Optionally, if applying Suction Duct and keeping the standard Air Filter in its original location (not recommended), be aware to make a servicing gate onto the Suction Air Duct, as shown in the figure. Keep the servicing gate properly sealed by aluminium tape.*

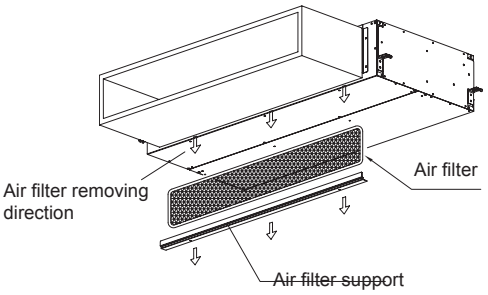
– *Air filter maintenance should be performed by professional installer.*



■ Suction Air Filter Servicing

RPI-2.0~6.0

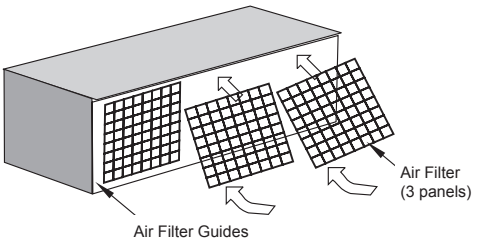
Remove the stay support (3 screws) from the unit and pull down the Air Filter.



NOTE:
For size and position of piping connection, see chapter 3

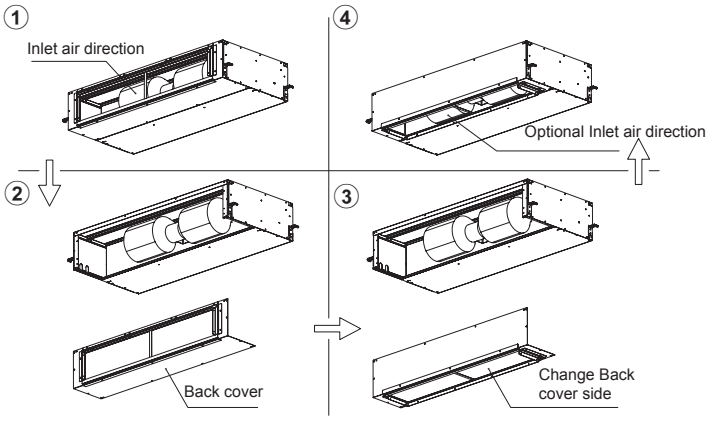
RPI-8.0~10.0

The Air Filter (3 panels) is fixed by frames. Pull up the Air Filter and removed them as shown in the figure.



1.6.5. AIR SUCTION DIRECTION CHANGE

For RPI-2.0~6.0FSN1E units, Air Suction direction could be modified by changing Back Cover direction as shown in the diagram.

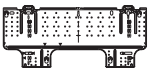
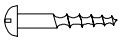
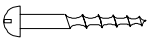
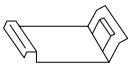
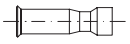


1.7. RPK

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.

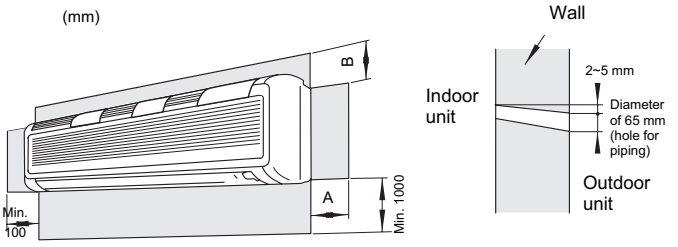
Accessory	Qty (S)	Qty (SBF)	Purpose
Mounting bracket 	1	-	For mounting indoor unit
Mounting bracket 	-	1	
Screw (Ø4.1× 25 mm) 	6	8	For mounting bracket
Screw (Ø4.1× 40 mm) 	2	4	
Plate 	1	-	For drain hose setting
Insulation pipe 	1	1	For pipe
Insulation 	1	1	For pipe
Harness with connector 	1	1	Cable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

S: RPK Summit
SBF: RPK Super Big Flow

1.7.2. INITIAL CHECK

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

■ **RPK**



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

(mm)

Model	A	B
RPK-0.8~2.0FSNM	100	50
RPK-2.5~4.0FSNM	200	50

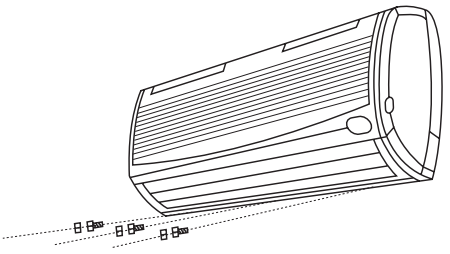
NOTE:
– *Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.*

■ Removing the front panel

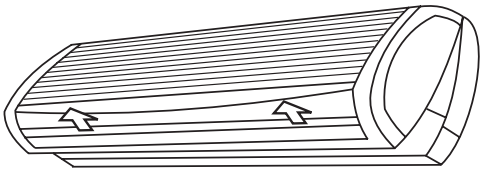
– In order to connect the refrigerant piping, the wiring and to check the drain water flow, it is necessary to remove the front panel. Perform this work according to the following instructions. Be careful not to scratch the resin components.

RPK-2.0~4.0FSNM

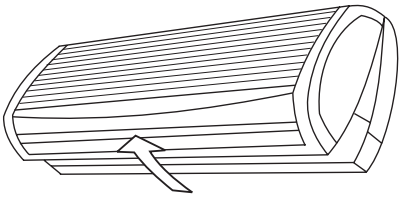
– Remove three bushings as shown and remove the screws as shown below.



– 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-2.5~4.0FSNM

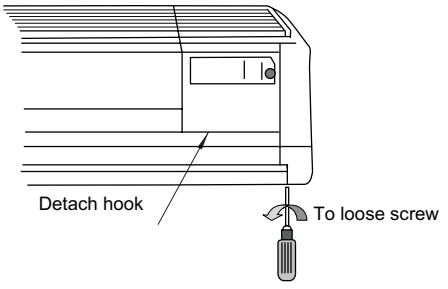
– First put back the lower side of the front panel, and then attach the three hooks at the upper side of the front panel.

– 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.

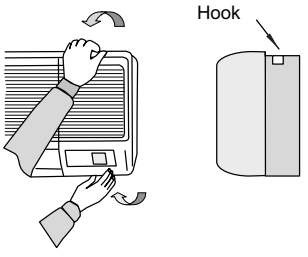
■ Removing the right side cover

RPK-2.5~4.0FSNM

– 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.

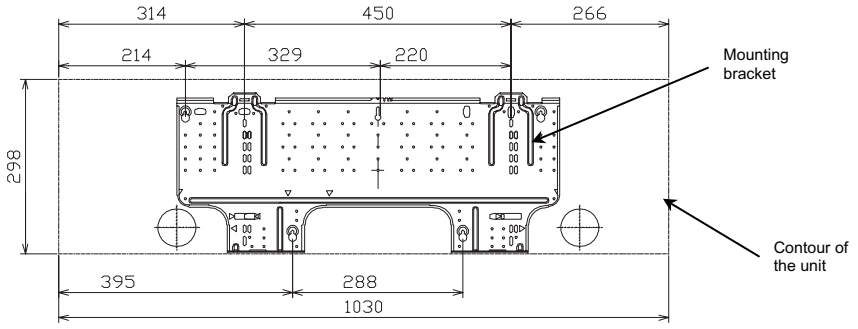


CAUTION:
Any gap may cause air leakage or dewing.

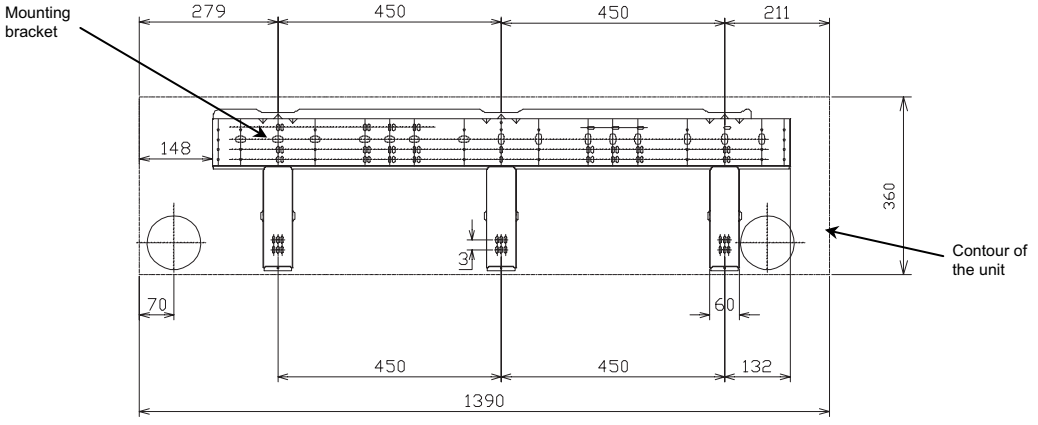
NOTE
For size and position of piping connection, see Chapter 3.

1.7.3. DIMENSIONS OF THE MOUNTING BRACKET

■ RPK-2.0FSNM



■ RPK-2.5~4.0FSNM



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

1.8.1. FACTORY-SUPPLIED ACCESSORIES

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

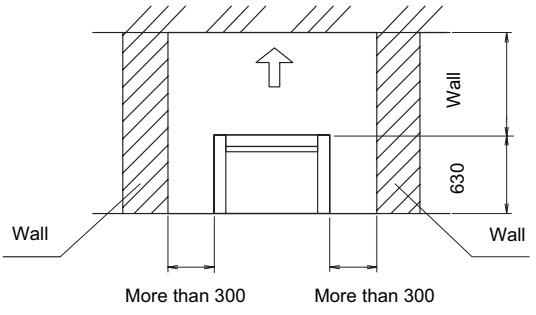
NOTE:
If any of these accessories are not packed with the unit, please contact your dealer.

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

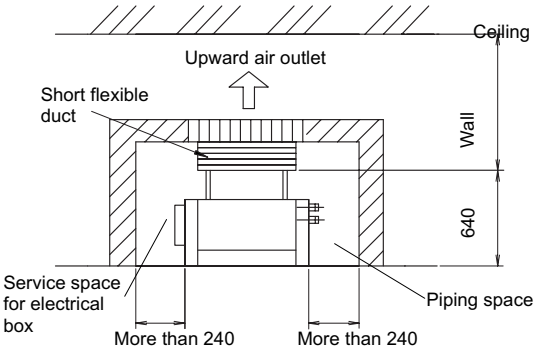
1.8.2. INITIAL CHECK

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

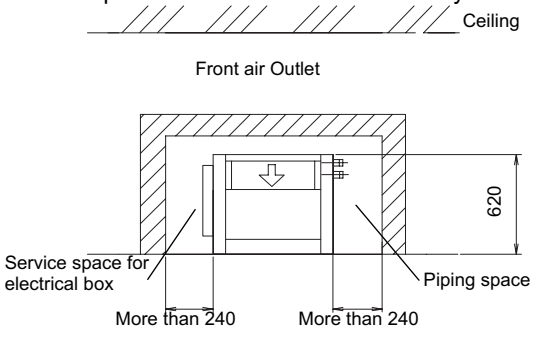
RPF



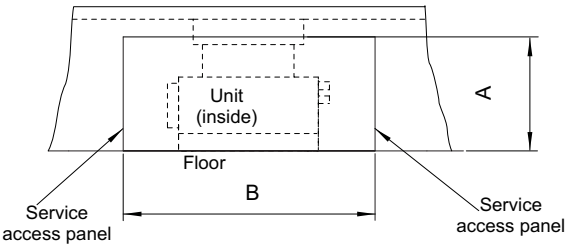
RPFI



Provide a space so that air can flow smoothly.



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



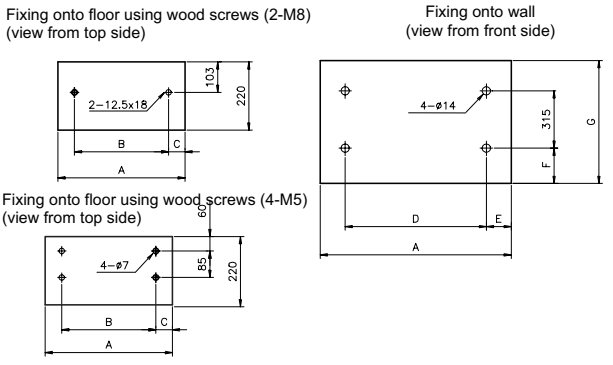
(Space around indoor unit)

Model	Size A	Size B
RPFI-1.0	640	1260
RPFI-1.5		1380
RPFI-2.0/2.5		1634

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.

1.8.3. INSTALLATION

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

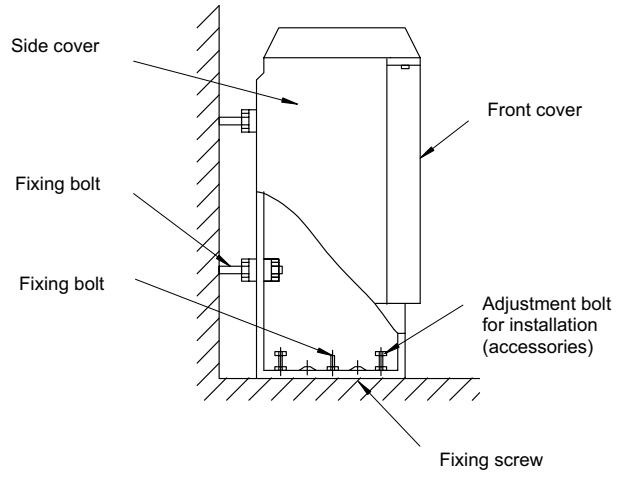


(mm)

Model	A	B	C	D	E	F	G
RPFI-1.0	848	704	72	732	80	139	620
RPFI-1.5	973	829	72	857	50	139	620
RPFI-2.0/2.5	1223	1079	72	1107	50	139	620

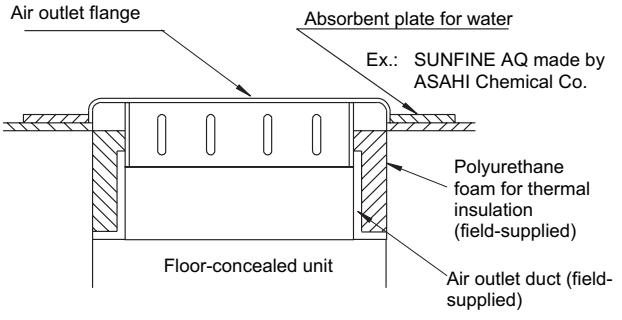
– Adjust the flat level of the unit by loosening or tightening the bolts for installation that are attached in the unit. Make the drain pipe side lower than the opposite side for smooth drain.

– 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.



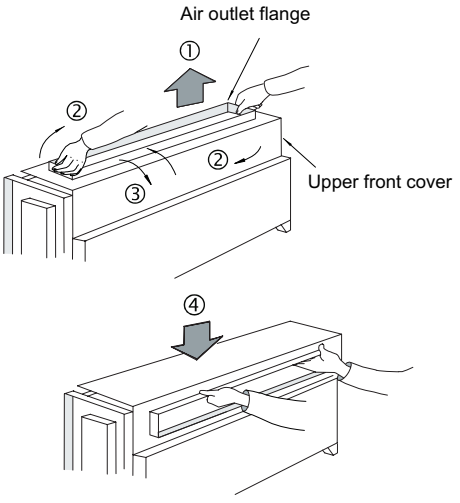
WARNING:
Provide a service access cover that is fixed by screws so that the fan runner is not directly touched (Only RPFI model).

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)

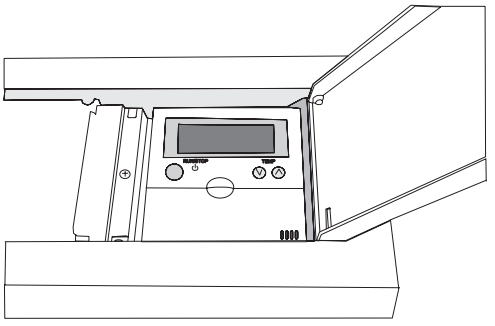
In case of changing the RPFI units air outlet direction from upward to front, follow the procedures below:

– 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 or PC-P2HTE (RPF)

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



NOTE
For size and position of piping connection, see Chapter 3.

1.9 COMPLEMENTARY SYSTEMS

1.9.1 KPI - TOTAL HEAT EXCHANGER

■ Factory-supplied accessories

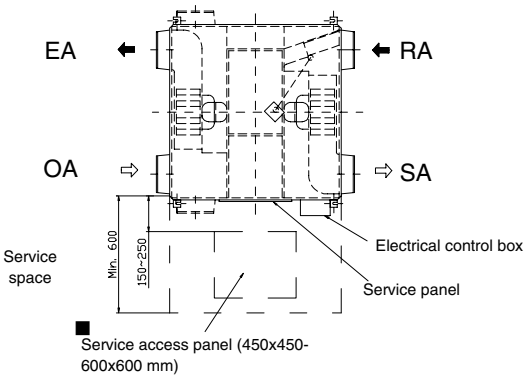
Make sure that the following accessories are packed with the unit.

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

Accessory	Appearance	Qty
Flange		4 (double-flanges at supply air (SA) and exhaust air (EA) sides)
Screw (M4X8)		16

■ Initial check

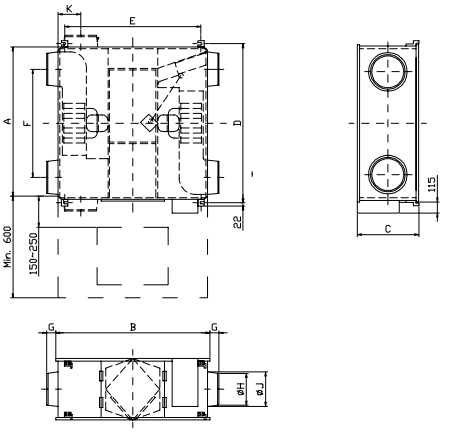
- Install the unit with a proper clearance around it for operation and maintenance working space, as shown in the next figure:



■ Installation

■ Mounting the suspension bolts

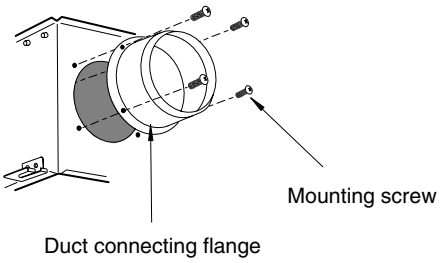
- Mark the positions of the sling bolts, refrigerant piping connections and drain connection.
- Installation dimensions are shown in the next figure.



Models	Outer dimension			For suspension bolt		Duct		Duct diameter		Duct (dir. change)
	A	B	C	D	E	F	G	H	J	K
KPI-2521	735	780	275	765	700	530	63	142	160	102
KPI-5021	1016	888	317	1048	790	745	79	192	208	124
KPI-8021	1004	1164	398	1036	1030	690	79	242	258	149
KPI-10021	1231	1164	398	1263	1030	920	79	242	258	149

■ Attaching the duct connecting flanges

- Use the screws supplied to secure the duct connecting flanges to the unit.

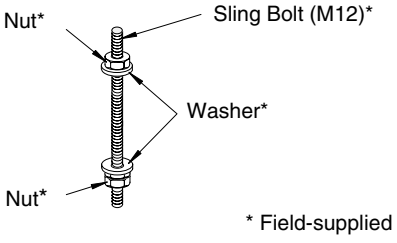


CAUTION:

Before attaching the duct connecting flanges, check that no foreign matter (scraps of paper, vinyl, etc.) has found its way inside the main unit.
Attach the duct connecting flanges with the packing at the SA and RA sides.

■ Mounting the indoor unit

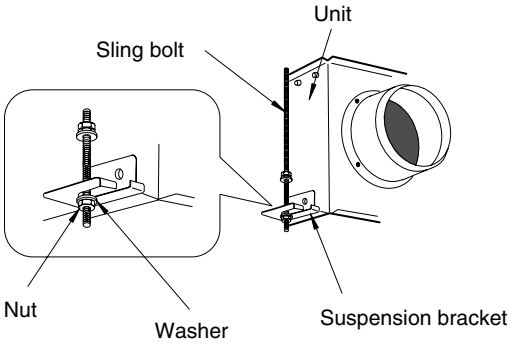
- Preparing the sling bolts.



- Hanging the unit.

  Hang the suspension bracket on the anchor bolts and adjust in such a way that the unit is installed horizontally.

  Tighten up securely using double nuts in order to prevent looseness.

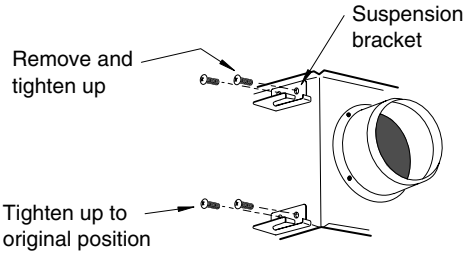


CAUTION:

When suspending the main unit from the ceiling, do not handle it in such a way that force will be applied to the control box.

NOTE:

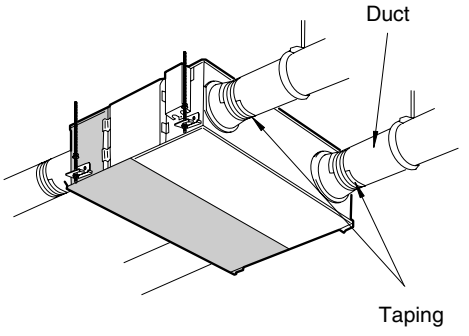
In case of that the sling bolts are too short, re-attach the suspension bracket in an alternative position. Remove the screws at the top mounting position. Remove the suspension brackets and attach them at a higher mounting position.Tighten up the screws in the screw hole where the suspension brackets were removed in order to prevent air leaks.

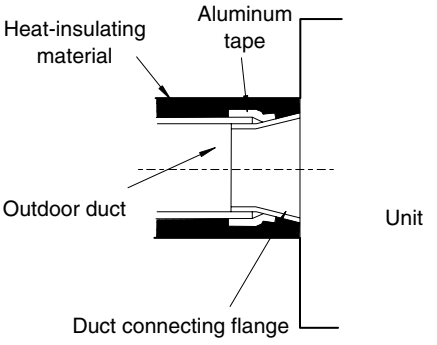


■ Connecting the supply duct

The supply duct should be connected with the unit through flexible duct, in order to avoid abnormal sounds and vibration. The unit is equipped with a pre-drilled duct flange for the supply duct connection.

- Fit the ducts securely into the duct connecting flanges, and wind aluminum tape (field-supplied) around them to prevent air leaks.
- Suspend the ducts from the ceiling so that their weight will not be applied to the unit.
- The two outdoor ducts must be covered with heat-insulating material in order to prevent condensation from forming.

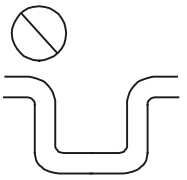
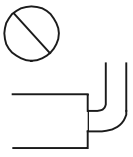
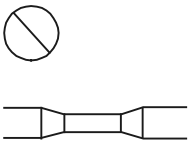




CAUTION:
Before connecting the ducts, check that no sawdust or any other foreign matter (scraps of paper, vinyl, etc.) has found its way inside the ducts.

Do not touch the damper plate inside the main unit when connecting the ducts.

Do not install the ducts in the ways illustrated below. Doing so will reduce the air volume and give rise to abnormal sounds.

Extremely sharp bends	Multiple bends
	
Bends right next to the outlet	**Extreme reduction in the diameter of the connected ducts**
	

1.9.2 ECONOFRESH KIT

■ Factory-supplied accessories

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

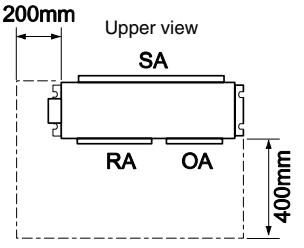
NOTE:
If any of these accessories are not packed with the unit, contact your dealer.

Accessory		Qty
Cord AS		1
Outdoor thermistor (8m)		1
Screw *(for RPI and Econo-Fresh flanges connection)*		12

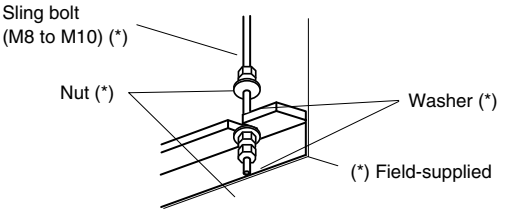
■ Initial check

Before performing the Econo-Fresh kit installation, refer to the indoor unit's Installation and Operation Manual.

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



CAUTION:
When suspending the main unit from the ceiling, do not handle it in such a way that a force will be applied to the control box.



1.10 RAS-HRNM

WARNING:

- *Install the Outdoor Unit with sufficient clearance around it for operation and maintenance as shown in the next pages.*
- *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 50 mm, 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.*
- *Do not install the Outdoor Unit in a place where a seasonal wind directly blows to the Outdoor Fan.*

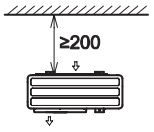
CAUTION:

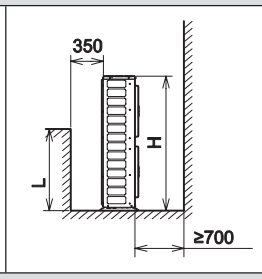
- *Check to ensure that the foundation is flat, level and sufficiently strong.*
- *Install the unit in a restricted area not accessible by the general public*
- *Aluminum fins have very sharp edges. Pay attention to the fins to avoid injury.*

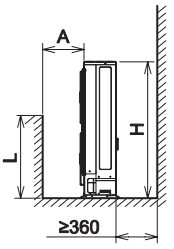
1.10.1 INSTALLATION SPACE

Single Installation

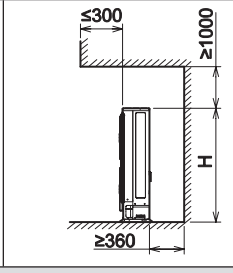
Around sides are open

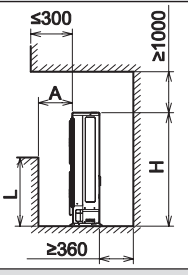




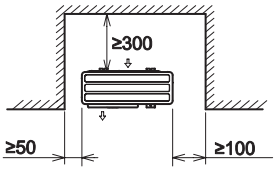


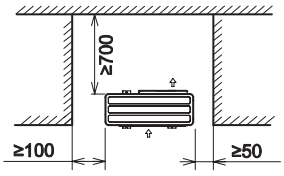
Around sides are open with obstacles above

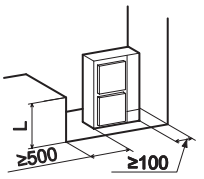


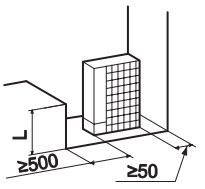


Around sides are closed

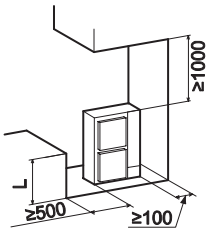


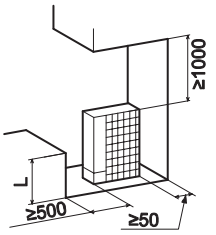






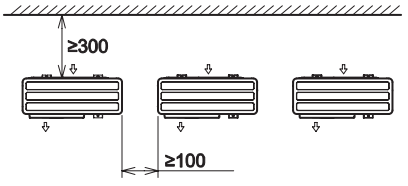
Around sides are closed with obstacles above

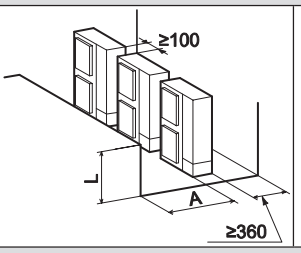


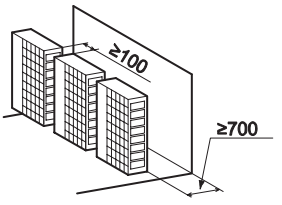


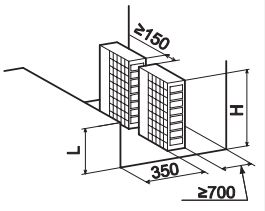
Multiple Installation

Around sides are open

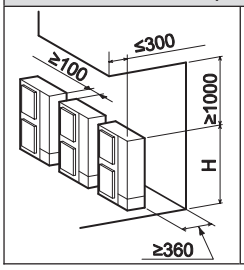


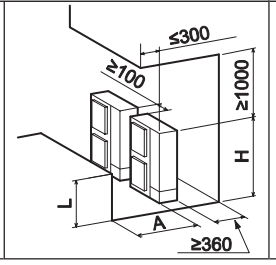




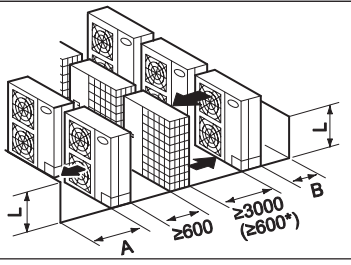


Around sides are open with obstacles above





Multi-Row



NOTE:

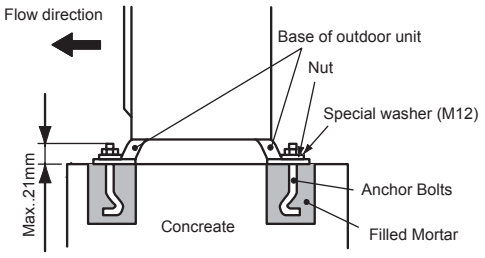
If L is larger than H, mount the units on a base so that H is greater or equal to L.
H: Unit Height (1650mm) + Base Concrete Height.

L	A	B
0 < L ≤ 1/2H	600 or more	300 or more
1/2H < L ≤ H	1400 or more	350 or more

In this situation ensure that the base is closed and does not allow the airflow to short circuit.
In each case, install the outdoor unit so that the discharge flow is not short-circuited.
When the mark (*) dimension is secured, be sure to mount the air flow guide.

1.10.2 INSTALLATION PLACE PROVISION

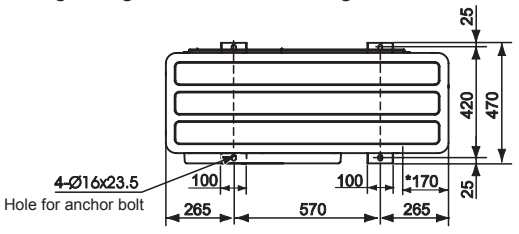
1. Secure the outdoor unit with the anchor



Fix the outdoor unit to the anchor bolts by special washer of factory-supplied accessory.

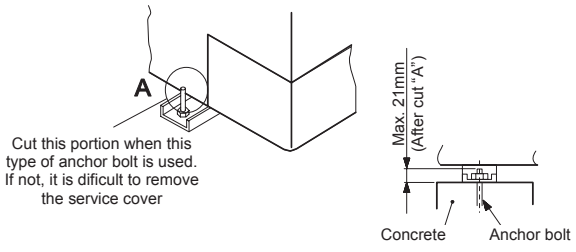
2. When installing the outdoor unit, fix the unit by anchor bolts.

Regarding the location of fixing holes.

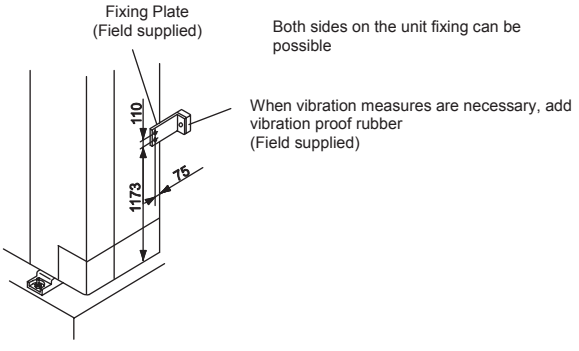


NOTE:
When the mark (*) dimension is secured, piping work from bottom side is easy without interference of foundation.

3. Example of fixing outdoor unit by anchor bolts.



4. Fix the outdoor unit firmly so that declining, making noise, and falling down by strong wind or earthquake is avoided.

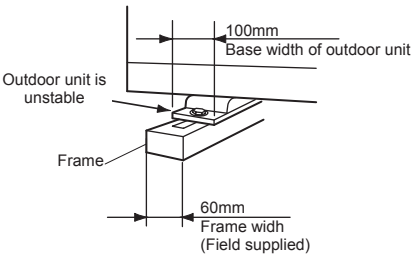


5. When installing the unit on a roof or a veranda, drain water sometimes turns to ice in a cold morning. Therefore, avoid draining in an area where people often use because it is slippery.

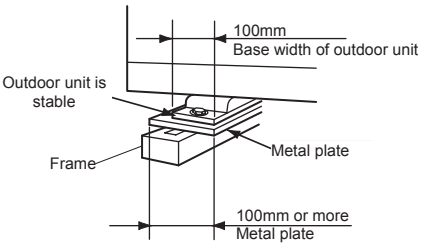
7. The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way.

When installing the outdoor unit on a fieldsupplied frame, use metal plates to adjust the frame width for stable installation as shown in Figure.

INCORRECT

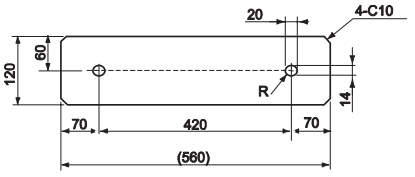


CORRECT



Recommended Metal Plate Size (Field-Supplied)

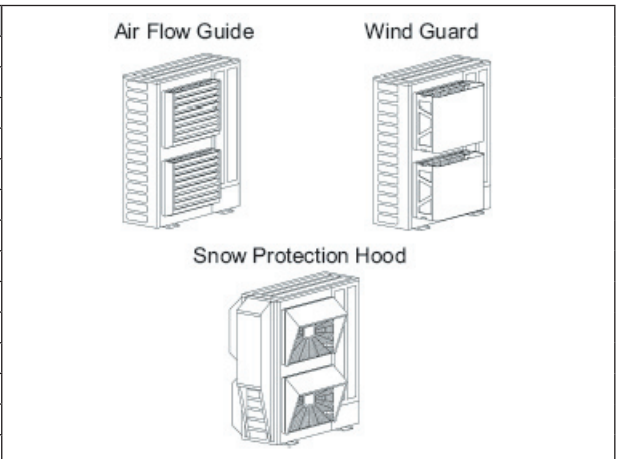
- Material: Hot-Rolled Mild Steel Plate (SPHC)
- Plate Thickness: 4.5T



1.11. INSTALLATION OF WIND WARD AND SNOW PROTECTION HOOD

1.11.1. Air flow guide, wind guard and snow protection hood

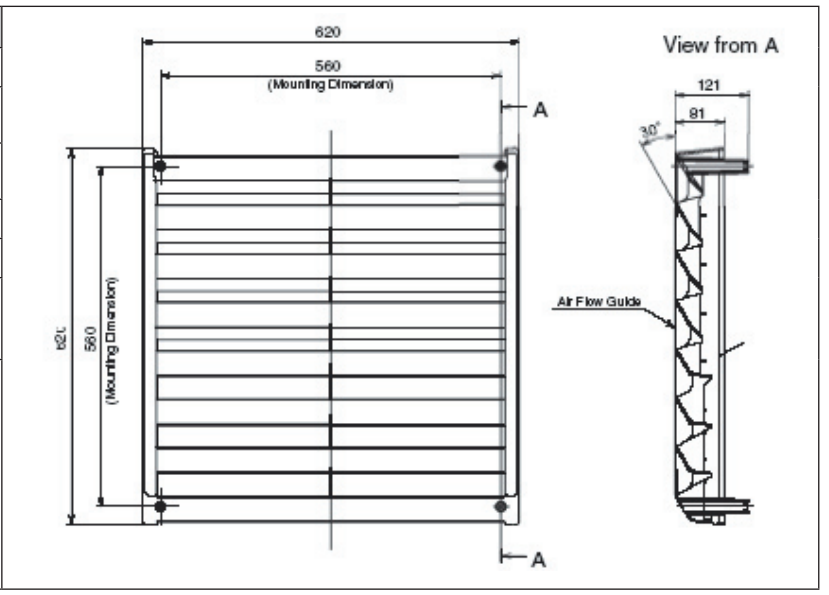
Optional parts			HP	Model
Air flow guide			8 to 12	AG-335A X 2
Wind guard				WSP-335A X 2
Snow protection hood	Stainless plate (SUS304)	Air outlet	8	ASG-NP335F X 2
		Air inlet of rear side		ASG-NP335B
		Air inlet of side face		ASG-NP335L
		Air outlet	10 and 12	ASG-NP335F X 2
		Air inlet of rear side		ASG-NP335B
		Air inlet of rear side		ASG-NP335L
	Zinc plate	Air outlet	8	ASG-NP335FS X 2
		Air inlet of rear side		ASG-335BS
		Air inlet of side face		ASG-NP335LS
		Air outlet	10 and 12	ASG-NP335FS X 2
		Air inlet of rear side		ASG-NP335BS
		Air inlet of rear side		ASG-NP335LS



■ Air flow guide

Specifications

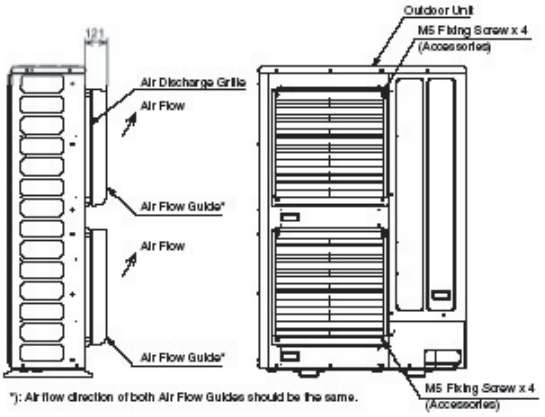
Model	AG-335A
Quantity	2 per unit
Air discharge direction	Upward (downward), left & right
Material	Weather proof polypropylene resin
Color	Gray
Weight	1.9 kg
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual
Installation restriction	“Wind Guard” or “Snow protection hood” is not available to install with air flow guide. (“Guard net” is available to install with.)



Attaching example of air flow guide

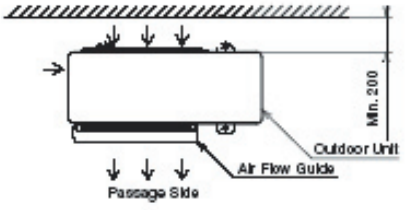
– Attach the air flow guide to the air discharge grille with four (4) screws (accessories).
– The holes for fixing are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1N.m)
– Do not remove the air discharge grille for air flow guide installation.
– If the air guide is installed without discharge grille, it may cause of injury by rotating fan.

Two (2) windbreak covers installation



Service Space (In case of upward air discharge)

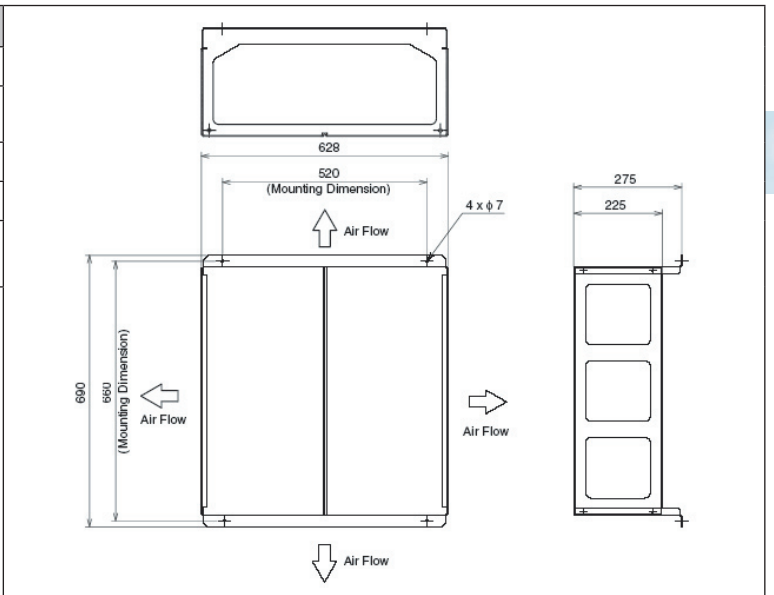
– In case of right and left sides air discharge, enough space for air discharge is required.
– The downward air discharge is also available. In such a case, install the base under the unit to secure enough space for air discharge.
– In case of serial units installation, air discharge should be upward.



■ Wind guard

Specifications

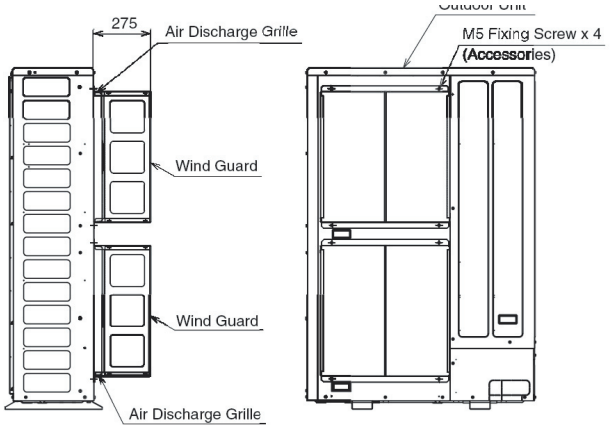
Model	WSP-335A
Quantity	2 per unit
Material	Galvanized sheet metal + baked painting
Color	Gray (1.oY8.5/0.5)
Weight	5.5 kg
Accessories	Fixing screw x 4 [M5 (SUS) x 20] Installation manual
Installation restriction	“Guard net”, “Air flow guide” or “Snow protection hood” is not available to install with Wind guard



Attaching example of air wind guard

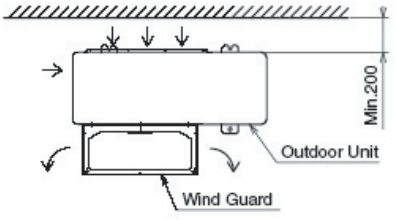
– Attach the wind guard to the air discharge grille with four (4) screws (accessories).
– The holes for fixing are located at 4 positions on the grille. (Screw tightening torque 2.4~3.1N.m)
– Do not remove the air discharge grille for wind guard installation.
– If the wind guard is installed without discharge grille, it may cause of injury by rotating fan.

Two (2) windguard covers installation



Service Space

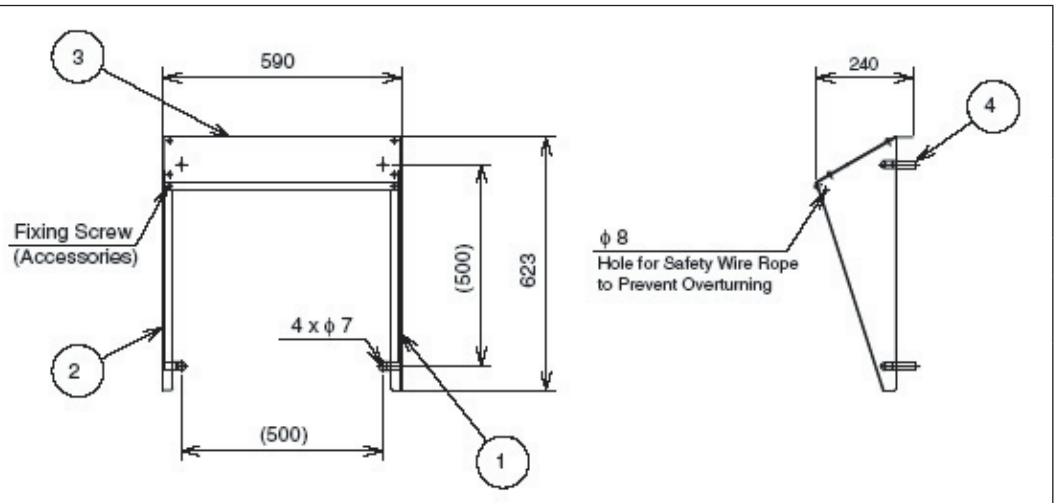
– Both sides of the outdoor unit should be open.
– No obstacles exists in the air discharge side.



■ Snow protection hood

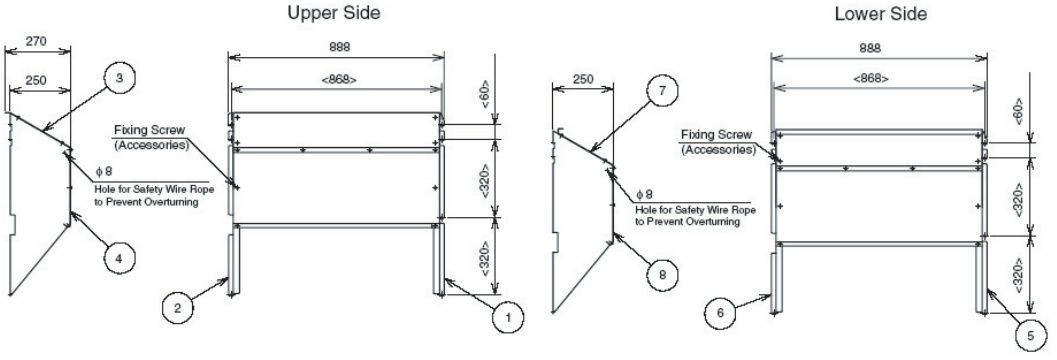
Air discharge hood

No.	Part name	Q'ty
1	Right side plate	1
2	Left side plate	1
3	Front panel	1
4	Stay	4



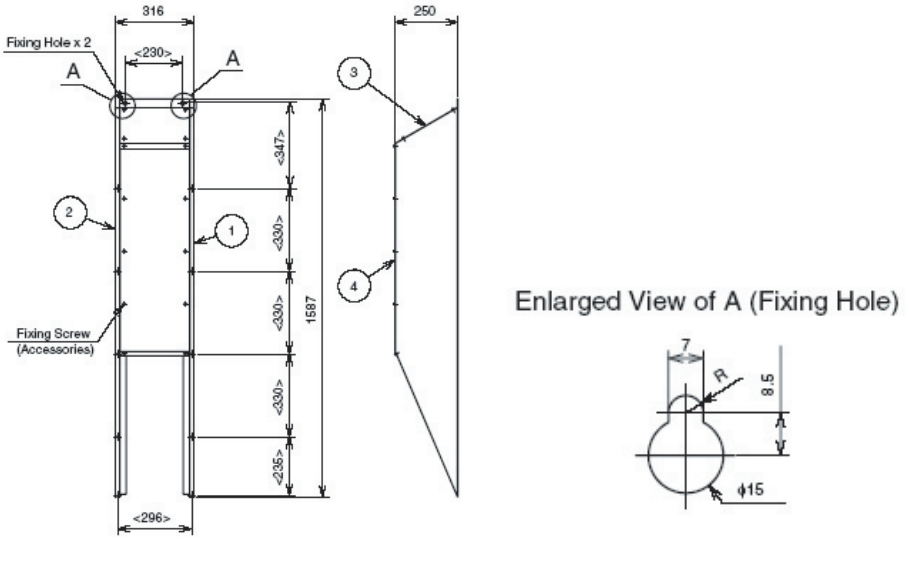
Rear suction hood

No.	Part name	Q'ty
1	Upper right side plate	1
2	Upper left side plate	1
3	Upper front panel (Upside)	1
4	Upper front panel (Downside)	1
5	Lower right side plate	1
6	Lower left side plate	1
7	Upper front panel (Upside)	1
8	Upper front panel (Downside)	1

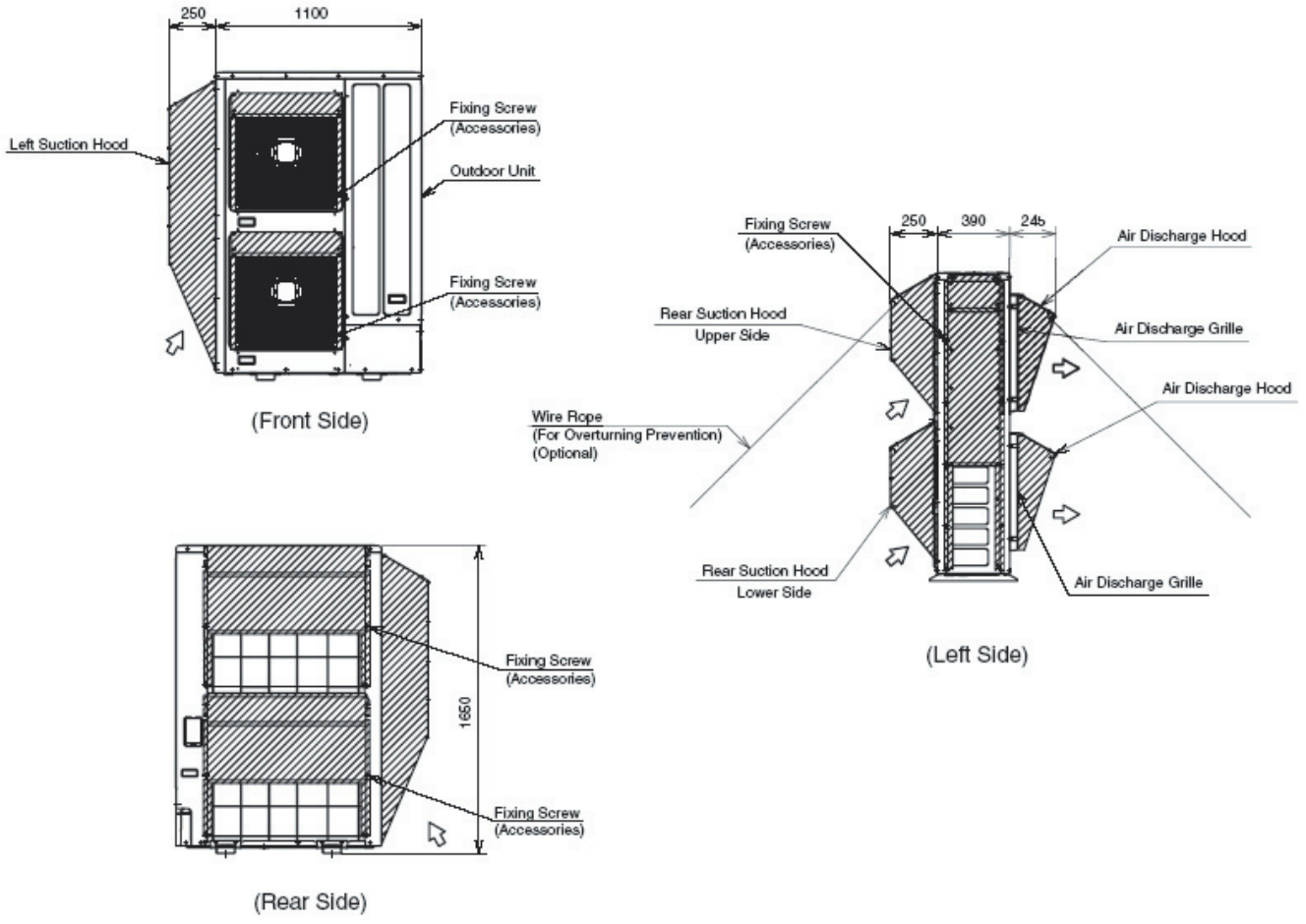


Left suction hood

No.	Part name	Q'ty
1	Right side plate	1
2	Left side plate	1
3	Front panel (Upside)	1
4	Front panel (Downside)	1



Attaching exaple of snow protection hood



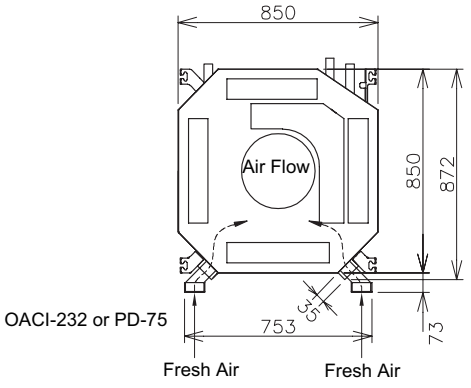
Specifications of snow protection hood

Product name		Air discharge hood		Rear suction hood		Left suction hood	
Model		ASG-NP335F	ASG-NP335FS	ASG-NP335B	ASG-NP335BS	ASG-NP335L	ASG-NP335LS
Quantity		2 per unit		1 per unit			
Material		Bonderized steel sheet Iron	Stainless (SUS304)	Bonderized steel sheet Iron	Stainless (SUS304)	Bonderized steel sheet Iron	Stainless (SUS304)
Color		Gray (1.0Y8.5/0.5 or approximation)	-	Gray (1.0Y8.5/0.5 or approximation)		Gray (1.0Y8.5/0.5 or approximation)	-
Weight		3 kg		14 kg		8 kg	
Assembling		Knockingdown parts (assembled at field)					
Components	Hood	For air discherge part x 1		For rear side air intake x 1 (Upper side x 1, lowe side x 1)		For left side air intake x 1	
	Fixing screw	8 (M5x12 tapping screw)		10 (M5x14 tapping screw)		8 (M5x12 tapping screw)	
	Fixing screw (SUS)	6 (M5x12 tapping screw)	6 (M5x14)	24 (M5x12 tapping screw)	24 (M5x14)	14 (M5x12 tapping screw)	14 (M5x14)
		Installation manual					
Installation restriction		Installation with “Guard net”, “Wind guard” or “Air flow guide” is not available		Installation with “Guard net” is not available			
Safety wire rope for overturning prevention (opcional parts)		ASG-SW20A					

1.12. OPTIONAL ACCESSORIES

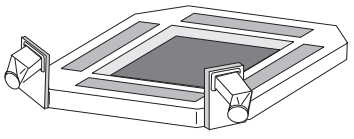
1.12.1. FRESH AIR INTAKE FOR 4-WAY CASSETTE INDOOR UNITS (OACI-232) OR (PD-75)

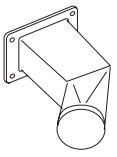
– Connection position of fresh air intake duct. Fresh air can be taken in by connecting the duct to the position shown in the next drawing.



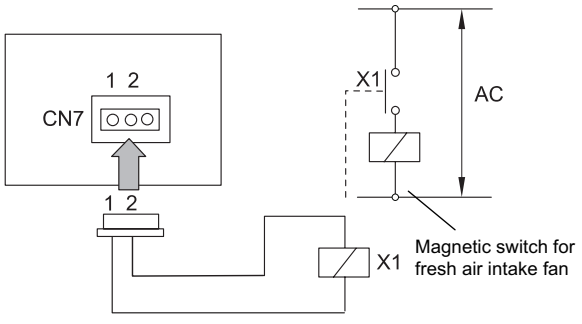
OACI-232
(Only RCI)

PD-75
(RCI, RCIM)





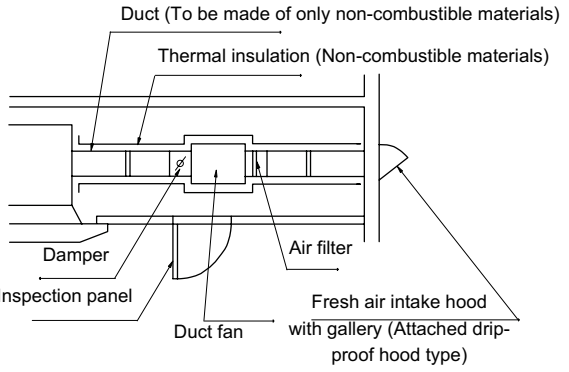
– This unit cannot draw in fresh air by itself. It must be connected to a duct containing a fan and control damper.
– Control the duct fan so that it will operate only when the main unit is operating. In following figure, an electrical control example is shown (more details in chapter 6. of picking up the operation signals).



NOTE:
The total height of the unit is increased by approximately 80 mm with the fresh air intake kit (OACI-232) installed.

Use a 3P connector Cable (PCC-1A) for CN7 of indoor printed circuit board. For further information, refer to document TCGB0046.

– 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.

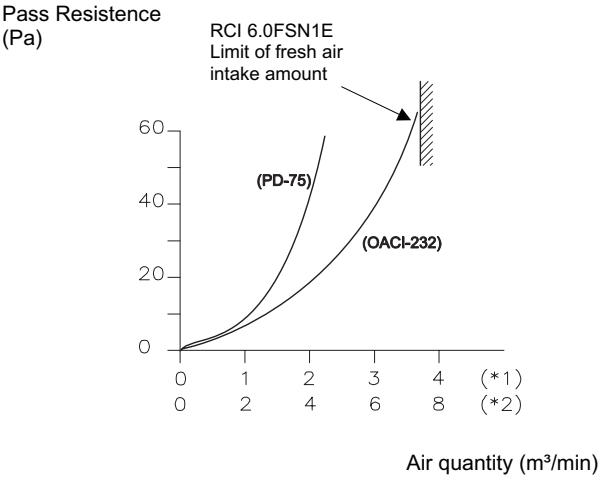


(Duct fan attachment drawing)

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.

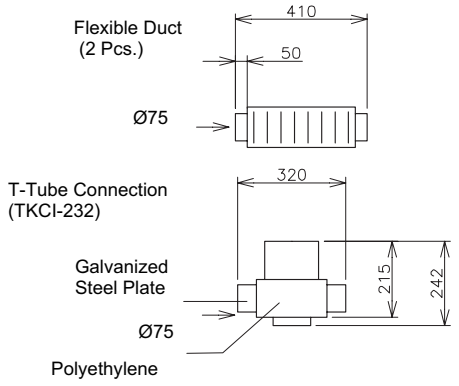
Duct resistance of fresh air intake portion



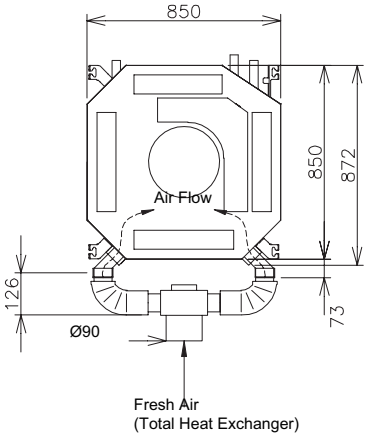
(*1): Installation of the connecting box at one side.
(*2): Installation of the connection box at both sides.

1.12.2. 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.

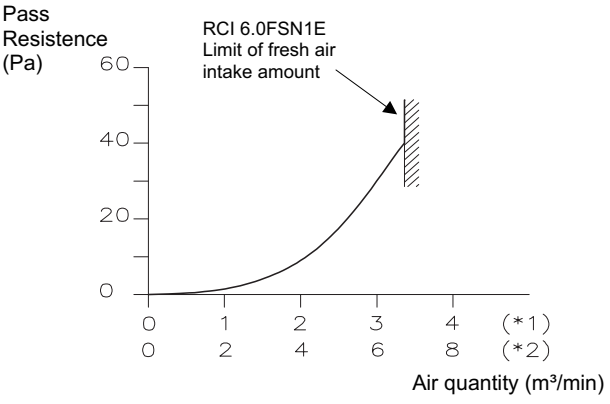


The next drawing shows a RCI Unit with the T-Tube Connecting Kit. Note that the diameter of the T is increased (Ø90).



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.

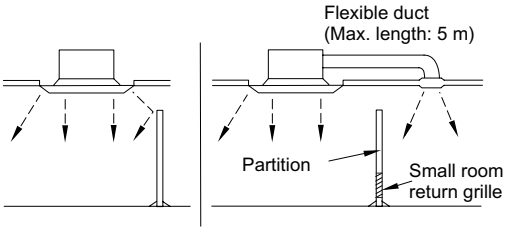
Duct resistance of fresh air intake portion



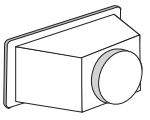
(*1): Installation of the connecting box at one side
(*2): Installation of the connecting box at both sides

1.12.3. 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.



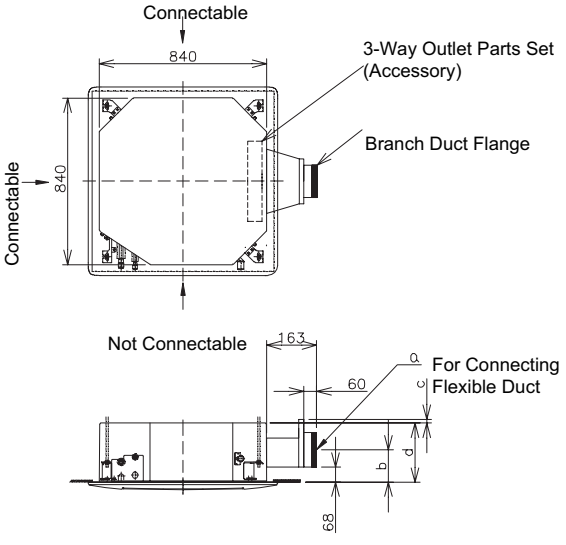
(Example of branched duct)



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.



Dimensions of duct connection

Model	Units	a	b	c	d
PDF-23C3	RCI-1.0~2.5	150	155	9	248
PDF-46C3	RCI-3.0~6.0	200	180	6	298

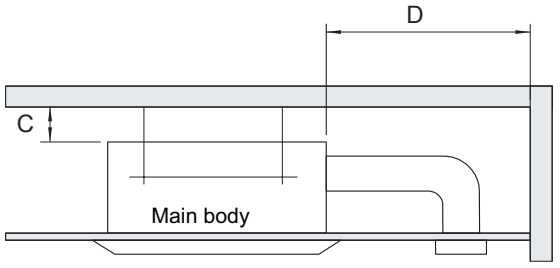
2. Perform sufficient insulation treatment for the attachment portion between the connection flange and the indoor unit main body as well as the attachment portion between the duct and the connection flange.
   Use a 3-Way Outlet Part set (Optional parts) and completely block the air outlet of the branched 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-2.0~6.0	To be attached to the outlet of the panel. See Chapter 1.12.1 for details

3. Air quantity ratio of branched duct side is shown as a ratio of the unit air quantity in subchapter 1.12.1. If 2 branch ducts are connected to the unit, as shown by the (*2), 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.

– 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)

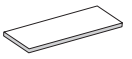
Material of walls and pillars

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

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

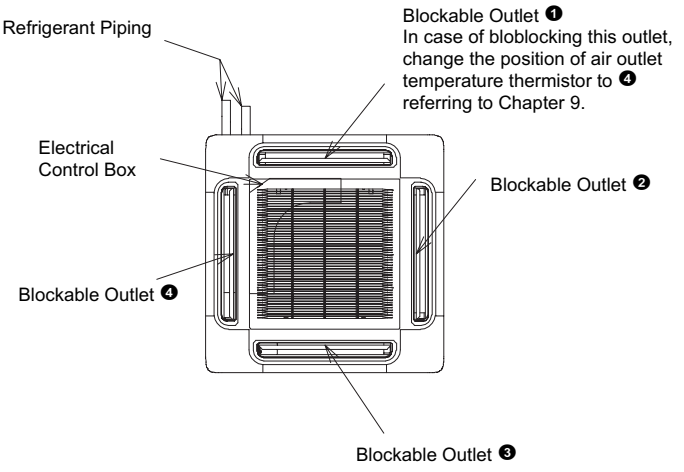
In the event that only three outlets are required, utilize the 3-way outlet parts set shown in the table below.

Model	Unit model
PI-23LS5	RCI-1.0~6.0



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

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

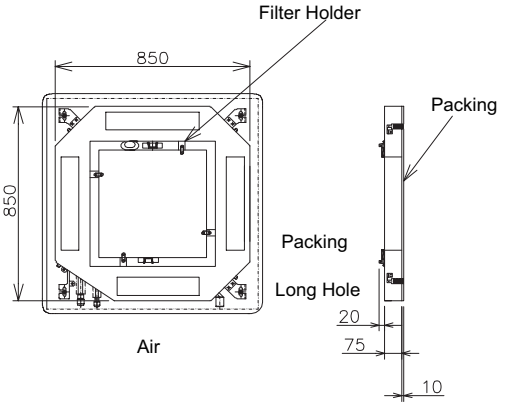


(Attachable position of 3-way outlet parts set)

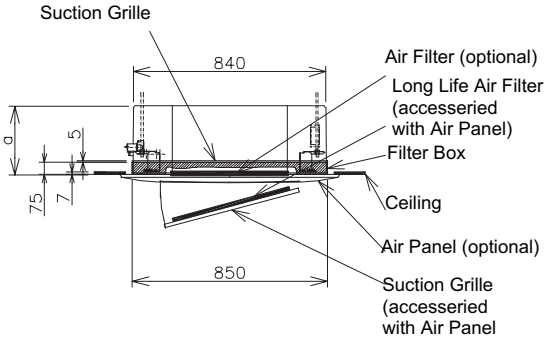
CAUTION:
In case 3 outlets are used, the decrease in air quantity will be about 3 to 5%, and within the operation range of the unit, there will be no major difference in particular, in comparison with the 4-way outlet. However, the noise will increase by about 1 to 2 dB.

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

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



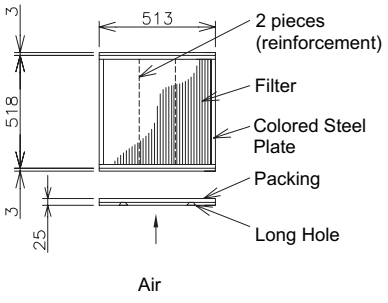
The total height of the unit is increased by approximately 85 mm with the filter box installed. Therefore, pay attention to the installation space.
Note that the packing dimension before compression is 10 mm but, after compression is reduced to 5 mm.



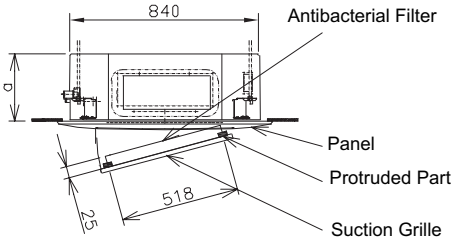
Model	a
RCI-1.0~2.5	328
RCI-3.0~6.0	378

1.12.6. 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-1.0~2.5	248
RCI-3.0~6.0	298

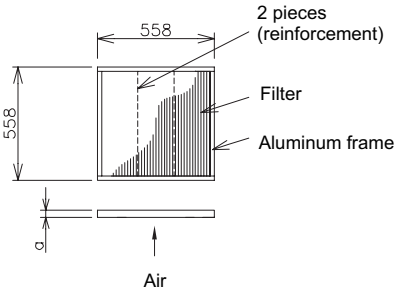
Specifications:

Item		For 4-way Cassette type RCI-1.0~6.0
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.

1.12.7. 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-1.0~2.5 F-23L4-D	RCI-3.0~6.0 F46-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.	
Restriction 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 absorbed.*
- *This filter is reusable by atmospheric emission of absorbed 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. Piping installation

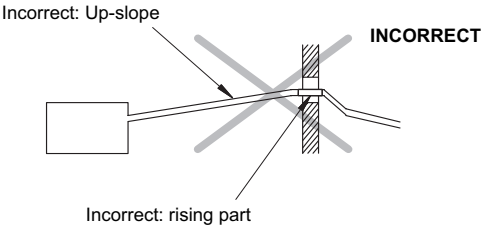
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2.1 GENERAL NOTES

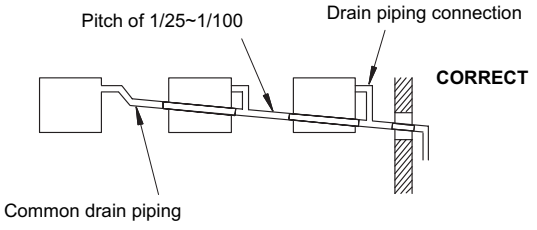
CAUTION:

– *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. For RPI 8/10, it is mandatory to install the drain trap. 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.

CAUTION:

– *Use refrigerant R410A in the refrigerant cycle. Do not charge oxigen, acetylene or other flammable or poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test.*

– *This type of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for this types of test.*

– *Check to ensure that no pressure exists inside the stop valve before removing the flange.*

2.2 PIPING WORK CONNECTION CONSIDERATIONS

2.2.1 PIPING MATERIALS

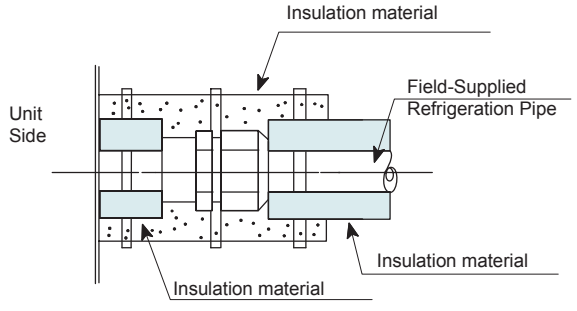
1. Prepare locally-supplied copper pipes.
2. Select the piping size with the correct thickness and correct material which can have sufficient pressure strength, considering that R410A pressure is higher than R407C. Use the table below to select the required pipe.

Nominal Diameter		Thickness (mm)	Cooper type
(mm)	(in)		
6.35	1/4	0.80	Roll
9.53	3/8	0.80	Roll
12.70	1/2	0.80	Pipe/Roll
15.88	5/8	1.00	Roll
19.05	3/4	1.00	Pipe/Roll
22.23	7/8	1.00	Pipe/Roll
25.40	1	1.00	Pipel
28.60	1 1/8	1.25	Pipel
34.93	1 3/8	1.25	Pipe
41.28	1 5/8	1.25	Pipe

NOTE:

If copper pipe is used for piping bigger than ϕ19.05 flaring work can not be performed. If necessary, use a Joint Adapter

3. Select clean copper pipes. Make sure there is not dust and moisture inside. Blow the inside of the pipes with oxygen free nitrogen to remove any dust and foreign materials before connecting pipes.
4. After connecting the refrigerant piping, seal the open space between Knockout hole and refrigerant pipes by using insulation material as shown bellow:

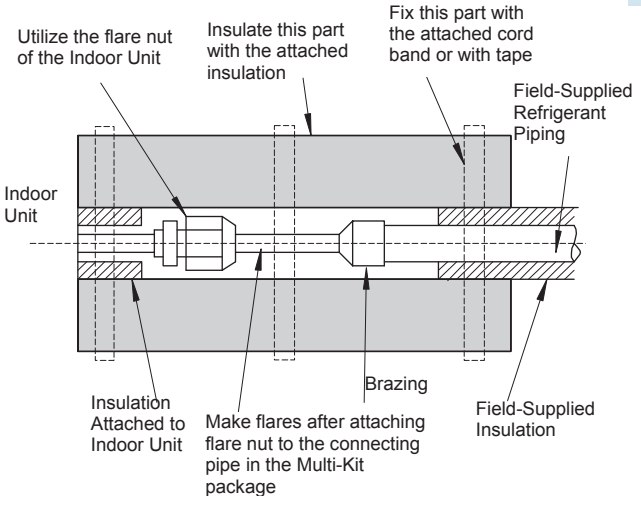


CAUTION:

- *Do not use a saw and a grindstone or others which cause copper powder.*
- *When cuting pipes, secure the part for brazing in accordance with the national and local regulations.*

■ Piping Connection

When connecting liquid piping for the unit where the piping is longer than 15 meters, apply a piping size of Ø9.53. Fix the connecting pipe as shown in the following figure. Utilize the insulation attached to the Indoor Unit.

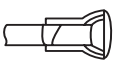


NOTE:

A system with no moisture or oil contamination will give maximum performance and lifecycle compared to that of a poorly prepared system. Take particular care to ensure all copper piping is clean and dry internally.

CAUTION:

- *Cap the end of the pipe when pipe is to be inserted through a hole*
- *Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe*

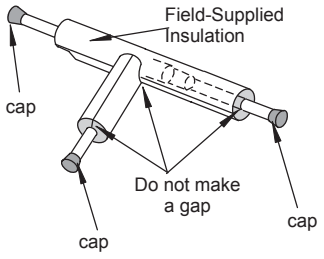
Correct	Incorrect
	

- *If piping installation is not completed until next day or over a longer period of time, braze off the ends of the piping and charge with oxygen free nitrogen through a Schrader valve type access fitting to prevent moisture and particle contamination.*
- *Do not use insulation material that contents NH3 because can damage cooper pipe material and can be a source of future leakage*

■ Insulation

Attach insulation packet with Multi-Kit to each branch utilizing vinyl tape. Also attach insulation to field supplied piping for prevention of the capacity decrease according to the ambient air conditions and dewing on the pipe surface by the low pressure.

- For Line Branch



NOTE:
When polyethylene foam is applied, a thickness of 10 mm for the liquid piping and 15 mm to 20 mm for the gas piping is recommended.

CAUTION:
Perform insulation work after the surface temperature decreases to the room temperature, If not, insulation material may melt.
If the ends of the piping system are open after accomplishing piping work, securely attach caps or vinyl bags to the ends of the piping, avoiding the invasion of moisture and dust.

2.2.2 THREE PRINCIPLES ON REFRIGERANT PIPING WORK

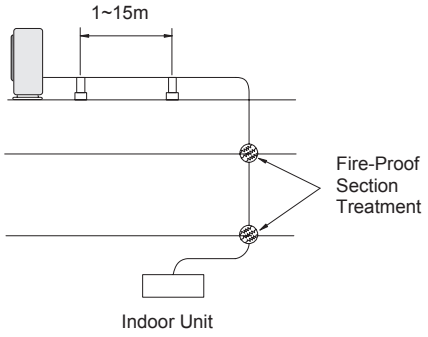
In case of the refrigeration cycle with refrigerant R410A, refrigeration oil should be of synthetic type. Therefore, the oil absorbs moisture quickly when compared with R407C systems and it will cause sludge and oxidation of the oil.

Due to this reason, pay much careful attention to basic piping work control to avoid infiltration of moisture or dusts during refrigerant piping work.

Three Principles	Cause of failure	Presumable Failure	Preventive Action
1. Dry Keep good dryness	Water Infiltration due to insufficient protection at pipe ends. Dewing inside of Pipes Insufficient Vacuum Pumping Time	Icing Inside Tube at Ex. Valve (Water Choking) + Generation of Hydration and Oxidation of Oil ⇩ Clogged Strainer, etc., Insulation Failure and Compressor Failure	Pipe Protection ⇩ 1 Pinching 2 Taping Flushing ⇩ Vacuum Drying One gram of water turns into gas (approx. 1000 lrs) at 1 Torr. Therefore, it takes long time to vacuum-pump by a small vacuum pump
2. Clean No dust Inside of Pipes	Infiltration of Dusts, etc. from Tube Ends Oxidation Film during Brazing without Blowing Nitrogen Insufficient Flushing by Nitrogen after Brazing	Clogging of Ex. Valve, Capillary Tube and Filter ■ Oxidation of Oil ■ Compressor Failure ⇩ Insufficient Cooling or Heating Compressor Failure	Pipe Protection ⇩ 1 Mounting Caps 2 Taping 3 Pinching Flushing
3. No leakage No leakage shall exist	Brazing Failure Failed Flaring Work and Insufficient Torque of Squeezing Flare Insufficient Torque of Squeezing Flanges	Refrigerant Composition Change, Refrigerant Shortage ■ Performance Decrease ■ Oxidation of Oil ■ Overheating of Compressor ⇩ Insufficient Cooling or Heating Compressor Failure	Careful Basic Brazing Work ⇩ Basic Flaring Work ⇩ Basic Flange Connecting Work ⇩ Air Tight Test ⇩ Holding of Vacuum

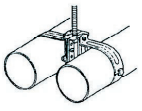
2.2.3. SUSPENSION OF REFRIGERANT PIPING

Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc…
(If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length).

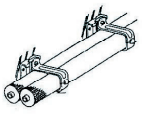


Do not fix the refrigerant piping directly with the metal fittings (The refrigerant piping may expand and contract).
Some examples for suspension method are shown below.

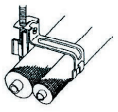
For Suspending Heavies



For Piping Along The Wall

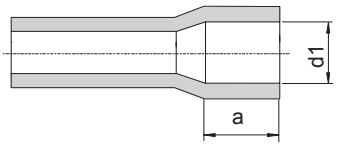


For Instant Installation Work



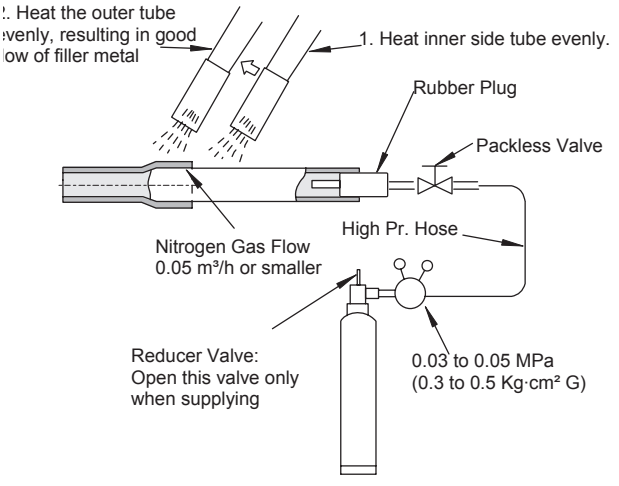
2.2.4 BRAZING WORK

1. The most important work in the refrigerant piping work is brazing work. If leakage due to careless mistakes hydration generation accidentally occurs, it will cause clogged capillary pipes or serious compressor failure.
2. Pipe Dimensions after Expanding.
   It is important to control the clearance of the pipe fitting portion as shown below. In the case that a cooper tube expansion jig is used, the following dimensions should be secured.



Cooper Tube Size	Ø d1	Gap	a	Cooper Tube Size	Ø d1	Gap	a
+0.08 Ø6.35 -0.08	+0.1 Ø6.5 0	0.33 0.07	6	+0.09 Ø22.22 -0.09	+0.1 Ø22.42 0	0.39 0.11	10
+0.08 Ø9.53 -0.08	+0.1 Ø9.7 0	0.35 0.09	8	+0.12 Ø25.4 -0.12	+0.1 Ø25.6 0	0.42 0.08	12
+0.08 Ø12.7 -0.08	+0.1 Ø12.9 0	0.38 0.19	8	+0.12 Ø28.58 -0.12	+0.1 Ø28.78 0	0.42 0.08	12
+0.09 Ø15.88 -0.09	+0.1 Ø16.1 0	0.41 0.13	8	+0.12 Ø31.75 -0.12	+0.1 Ø32.0 0	0.47 0.13	12
+0.09 Ø19.05 -0.09	+0.1 Ø19.3 0	0.44 0.16	10	+0.12 Ø38.1 -0.12	+0.1 Ø38.3 0	0.52 0.18	14

A basic brazing method is shown below.

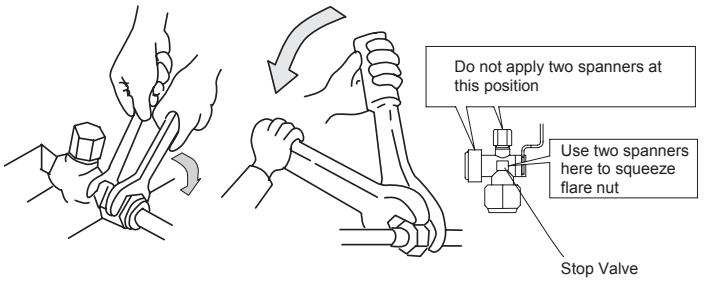


ATTENTION:

- *Use nitrogen gas for blowing during pipe brazing. If oxygen, acetylene or fluorocarbon gas is used, it will cause an explosion or poisonous gas.*
- *A lot of oxidation film will occur inside of tubes if no nitrogen gas blowing is performed during brazing work. This film will be flecked off after operation and will circulate in the cycle, resulting in clogged expansion valves, etc. This will cause bad influence to the compressor.*
- *Use a reducer valve when nitrogen gas blowing is performed during brazing. The gas pressure should be maintained within 0.03 to 0.05 MPa. If a excessively high pressure is applied to a pipe, it will cause an explosion.*

2.2.5. TIGHTENING TORQUE

Tightening work on the flare nut



Operation of stop valve should be performed according to the figure below.

Unit	Valve		Size (mm)		Tightening torque (N.m)		
	Type		Pipe	Hexagonal Wrench (Hex1)	A	B	C
RAS-8	Liquid	Fig.A	Ø9.53 (3/8")*	4	40	37	16
	Gas	Fig.B	Ø25.4 (1")	10	53 to 75	49	9.8
RAS-10	Liquid	Fig.A	Ø12.7 (1/2")	4	60	37	16
	Gas	Fig.B	Ø25.4 (1")	10	53 to 75	49	9.8
RAS-12	Liquid	Fig.A	Ø12.7 (1/2")	4	60	37	16
	Gas	Fig.B	Ø25.4 (1")	10	53 to 75	49	9.8

(*) Select the piping size of the Ø12.7 (1/2") when the length is more than 70m (Only RAS-8)

Fig.A

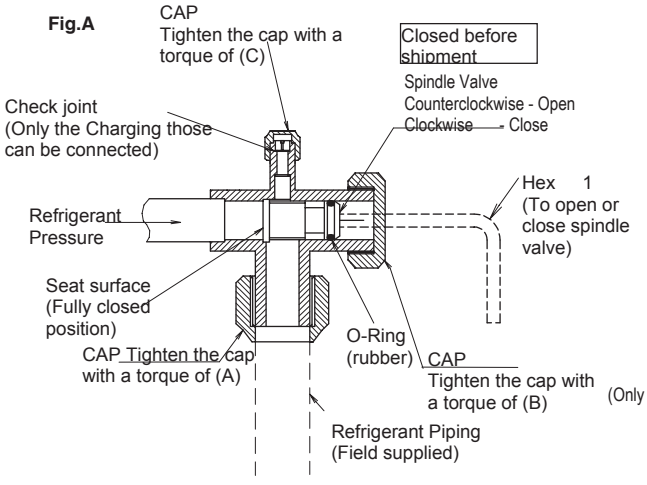
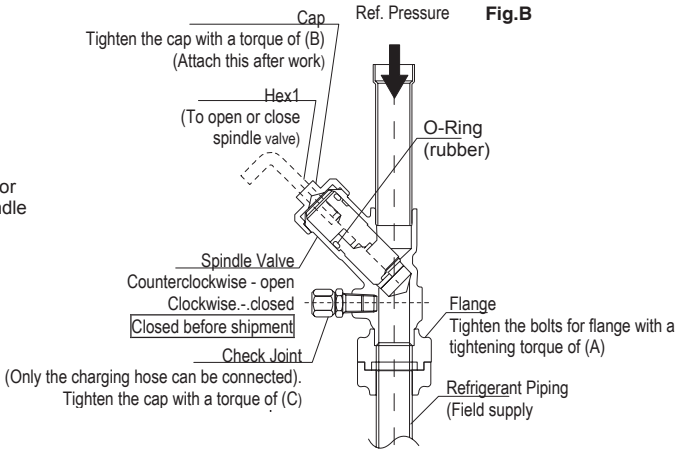


Fig.B



CAUTION:

Do not apply force to the spindle valve at the end of opening (5 N.m or smaller). The back seat construction is not provided.

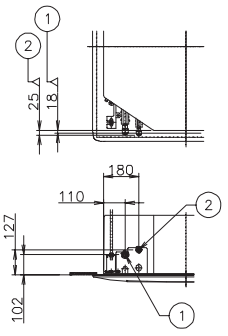
At the test run, fully open the spindle. If not fully opened, the devices will be damaged.

2.3. INDOOR UNITS AND COMPLEMENTARY SYSTEMS

2.3.1 RCI

■ Refrigerant piping

Position of piping connection is the following, which is available from all directions, top, left or right.



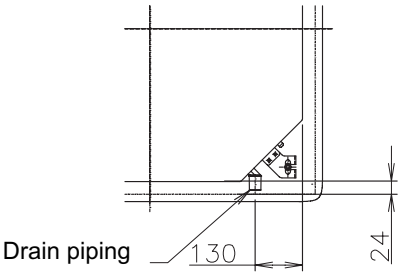
Piping size

mm (in)

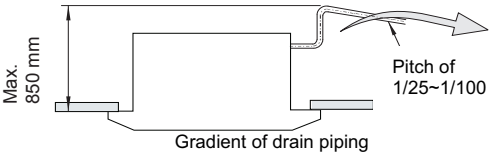
	① Gas Piping	② Liquid Piping
RCI-1.0/1.5	Ø 12.70 (1/2)	∅ 6.35 (1/4)
RCI-2.0	∅ 15.88 (5/8)	
RCI-2.5~6.0		∅ 9.53 (3/8)

■ Drain piping

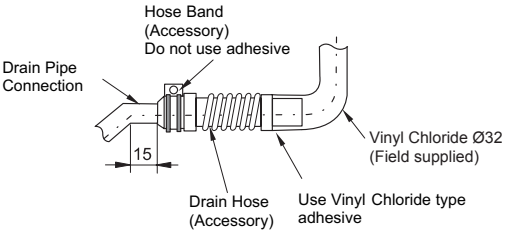
– The position of the drain piping connection is shown below.

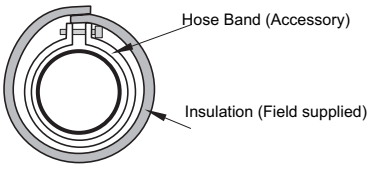


– Prepare a PVC pipe with a 32 mm outer diameter.
– Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a pitch of 1/25 to 1/100.
– Do not apply excessive force to the drain piping connection. It could cause a damage.
– Do not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



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

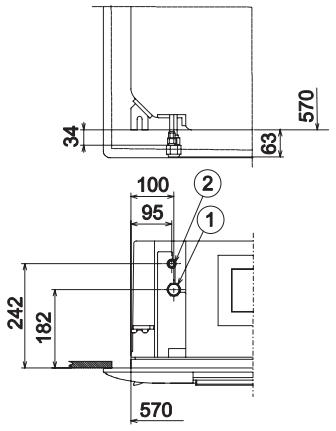




2.3.2 RCIM

■ Refrigerant piping

Piping connection position is the following, which is available from all directions, top, left or right.



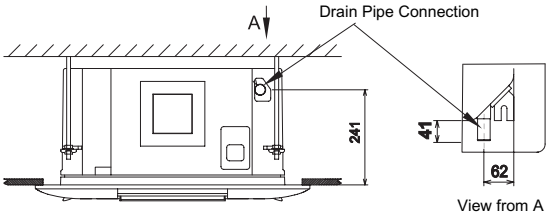
Piping size

(mm)

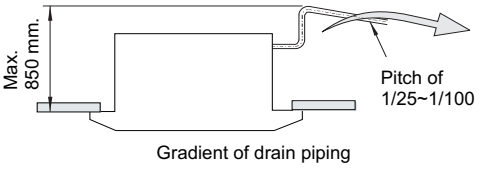
	① Gas piping	② Liquid piping
RCIM-1.0/1.5	Ø12.80 (1/2)	Ø6.35 (1/4)
RCIM-2.0	Ø15.88 (5/8)	

■ Drain piping

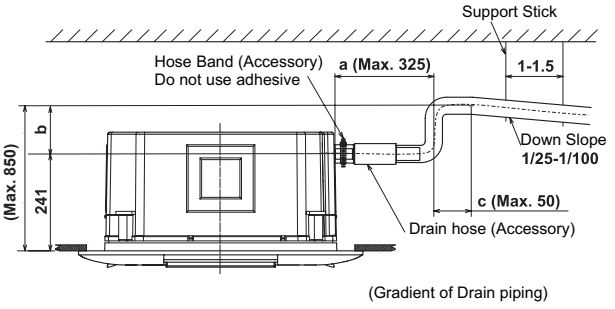
– The position of the drain pipe connection is shown below.



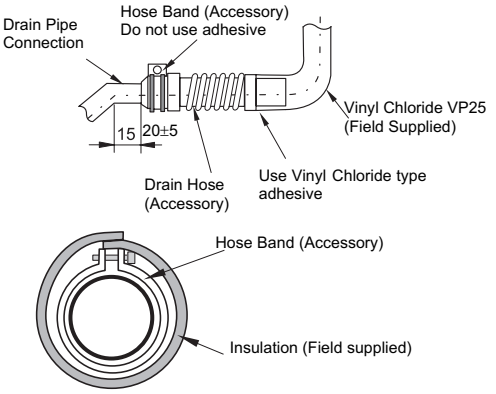
– Prepare a polyvinyl chloride pipe with a 32 mm outer diameter (VP25).
– Fasten the tubing to the drain hose with an adhesive and the factory-supplied clamp. The drain piping must be performed with a down-slope pitch of 1/25 to 1/100.



– Do not apply excessive force to the Drain Pipe connection. It could cause a damage.
– Do not use a bent or twisted Drain Hose. It will cause water leakage.
– Consider the following dimensions: a + b + c ≤ 780mm

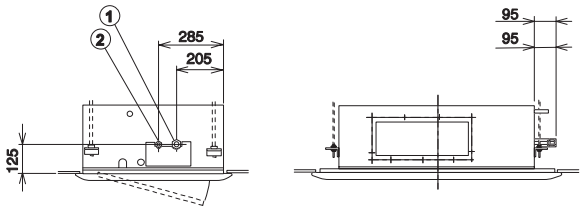


– Insulate the drain pipe after connecting the drain hose. Do not use adhesive between the Drain Pipe connection and the drain hose.



2.3.3 RCD

■ Refrigerant piping



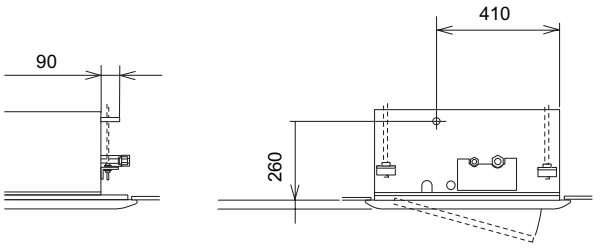
Piping size

mm (in)

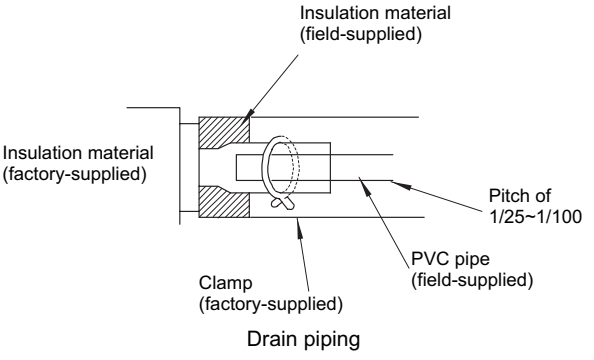
	① Gas Piping	② Liquid Piping
RCD-1.0/1.5	Ø 12.70 (1/2)	Ø 6.35 (1/4)
RCD-2.0	Ø 15.88 (5/8)	
RCD-2.5~5.0		∅ 9.53 (3/8)

■ Drain piping

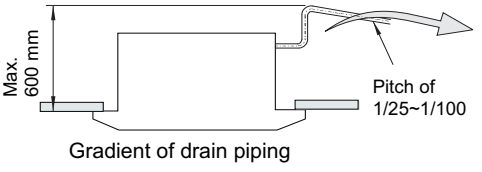
– The position of the drain piping connection is shown below.



– Prepare a PVC pipe with an outer diameter of 32 mm.
– 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.

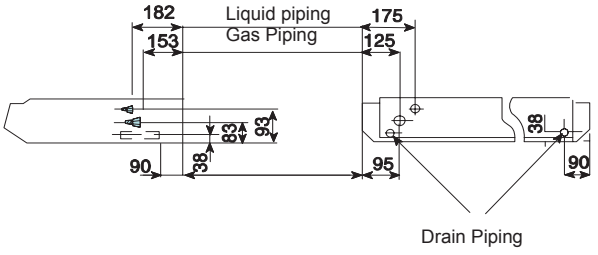
2.3.4 RPC

■ Refrigerant piping

Piping position

The refrigerant piping can be connected to some one of two directions of the Indoor Unit: upper or rear side, when facing the unit.

– The positions of piping are shown below
– Each direction has the prepared knockout hole as shown in piping work sub-chapter.
– Cut the knockout hole for the required direction.



Piping size

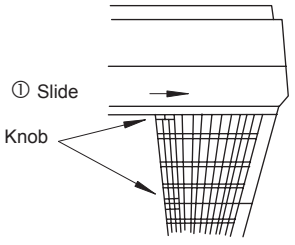
mm (in)

	Gas Piping	Liquid Piping
RPC-2.0	∅ 15.88 (5/8)	∅ 6.35 (1/4)
RPC-2.5~6.0		∅ 9.53 (3/8)

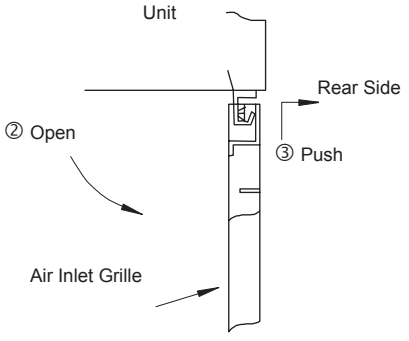
Piping work installation

Piping work should be performed from the bottom side of the unit. Remove the air inlet grille before beginning the piping work, according to the following steps:

1. Slide the Knobs to the rear side.



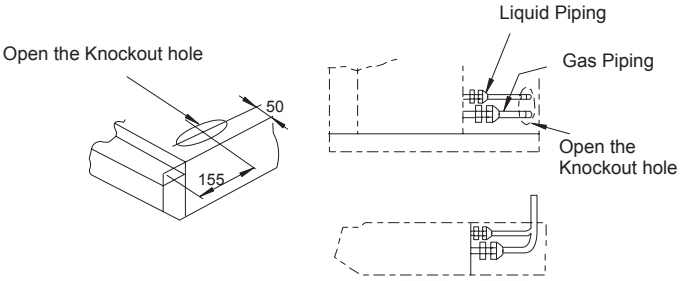
2. Open the air inlet grille, push up and slide the air inlet grilles to the rear side.



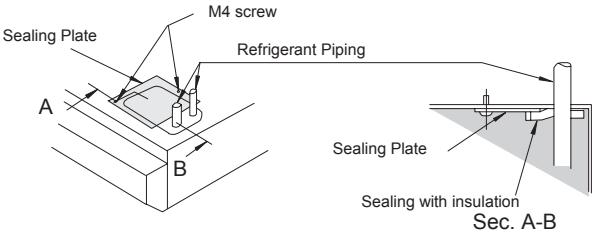
After select the piping direction proceeded to knockout selected hole, install pipes and seal the piping with the factory supplied insulation as indicated below:

Upper side

1. Knockout hole

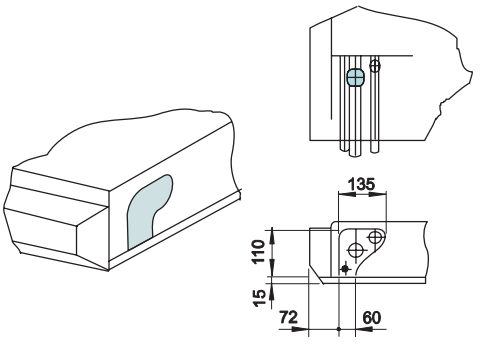


2. Seal piping

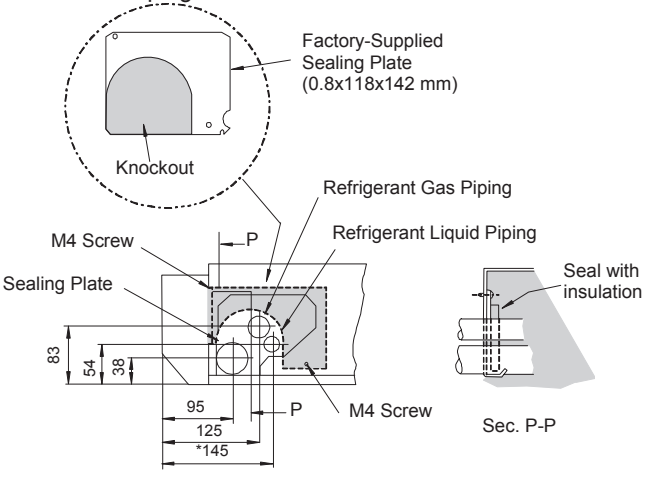


Rear side

1. Knockout hole



2. Seal Piping

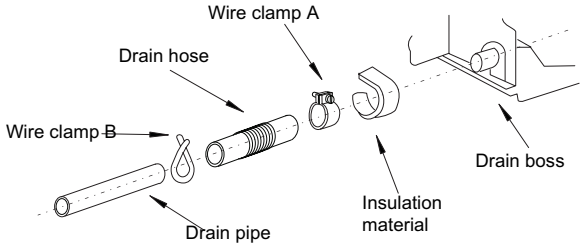


■ Drain piping

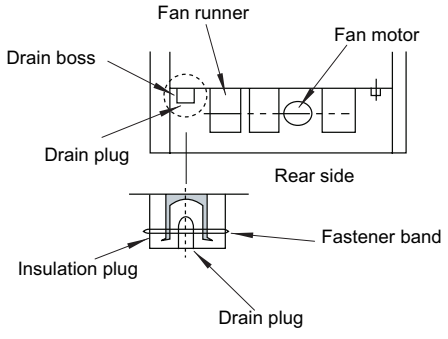
The standard direction of drain pipe connection is to the right side looking at the unit from the discharge grilles. However, the pipe connection can be performed from the left side if this is required due to the building construction.

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.



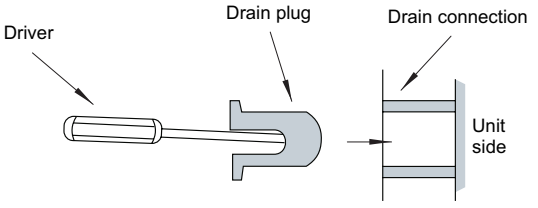
■ For the left-side connection



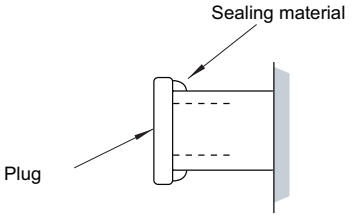
Remove the drain plug of the drain boss on the left side as the following procedure explains.

- Cut the fastener.
- Remove the insulation material.
- Remove the drain plug.

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



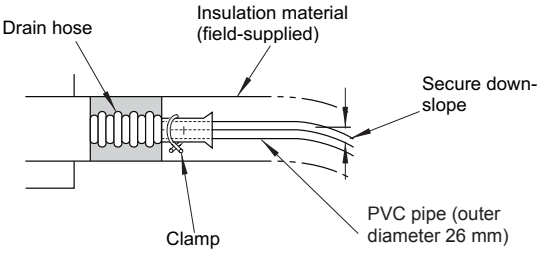
- After inserting the drain plug into the drain boss on the right side, seal the jointed part by using a waterproof chloride-type sealing material and secure the jointed part with a fastener.



- 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.

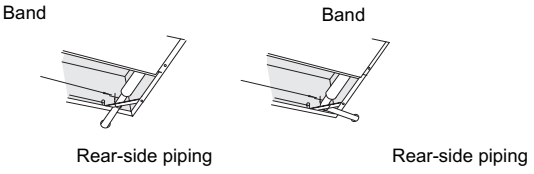
Connecting a drain piping

- Prepare a PVC pipe with an outer diameter of 26 mm. (VP20).
- 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

– When you are installing the pipe, do not tie the drain pipe and the refrigerant pipe together. Tie the drain pipe as shown below.

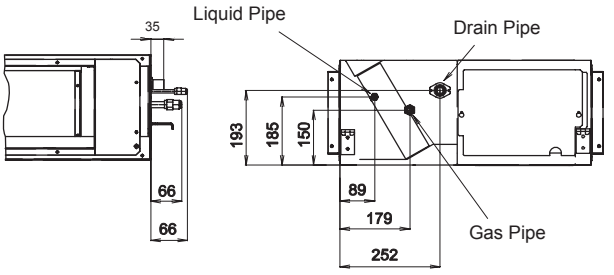


– After completing the installation of the drain pipe, pour water into the drain pan and make sure that the water flows smoothly as explained in section 2.1.

2.3.5 RPI

■ Refrigerant piping

■ RPI (2.0~6.0)



Piping size

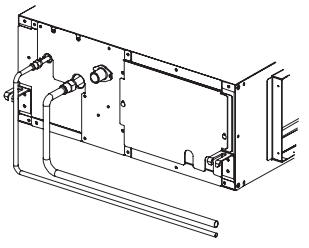
mm (in)

	Gas Piping	Liquid Piping
RPI-0.8~1.5	∅ 12.70 (1/2)	∅ 6.35 (1/4)
RPI-2.0	∅ 15.88 (5/8)	
RPI-2.5~6.0		∅ 9.53 (3/8)

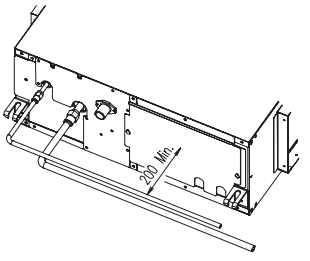
NOTE:
When installing pipes, make sure that enough space is provided for servicing the electrical box.

Keep electrical box and drain pipe access free of piping.

Option 1



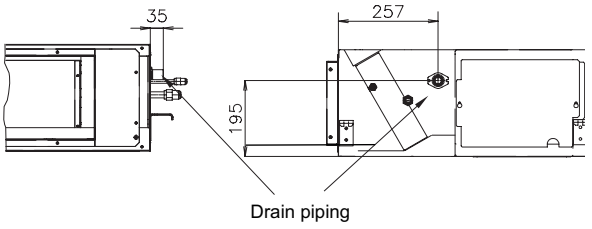
Option 2



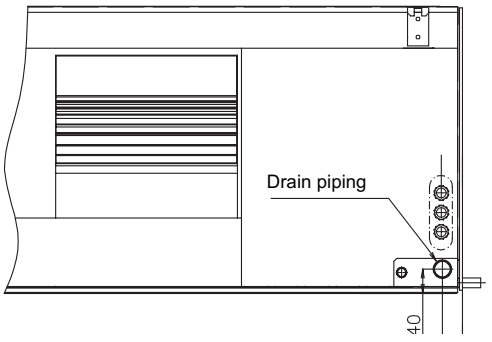
■ Drain piping

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

RPI-2.0~6.0

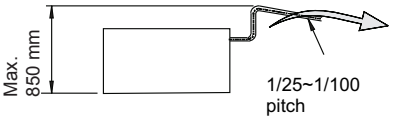


RPI-8/10



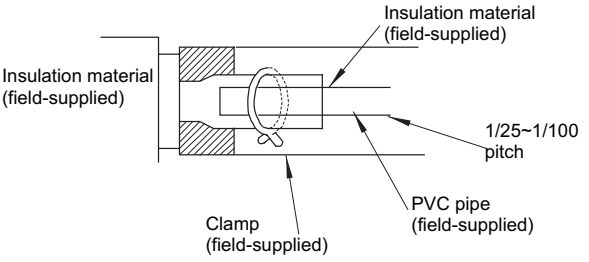
– Prepare a PVC pipe with an outer diameter of 32 mm (RPI-0.8-6.0) or 25 mm (RPI 8/10).

– Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp (For RPI 8/10 only). The drain piping must be installed with a downslope pitch of 1/25 to 1/100.



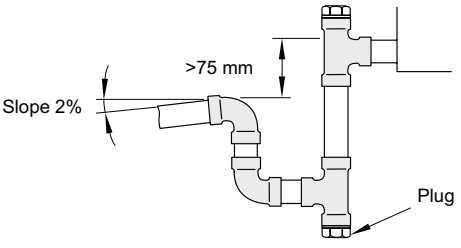
RPI-1.5~6.0 only

– Insulate the drain pipe after connecting the drain hose (RPI-2.0~6.0 only).



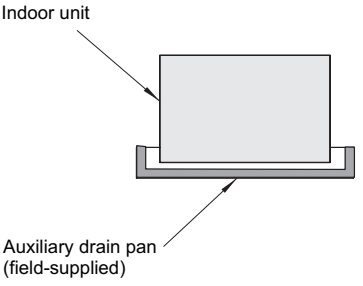
(Drain piping)

– Connect a syphon, as shown in the next figure (for RPI 8/10).



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.



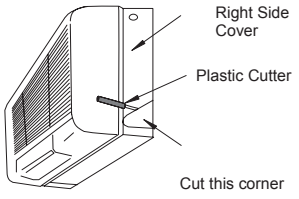
2.3.6 RPK

■ Refrigerant piping

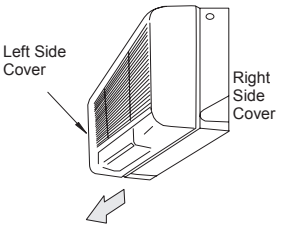
Piping Direction for the Indoor Unit:

Three directions of piping connection to the Indoor Unit can be performed; rear side, right side and left side of the unit, respectively. Therefore, most appropriate piping for a room can be selected.

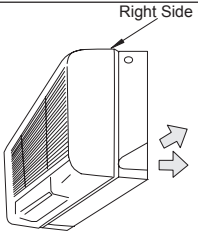
1. Right Side Piping
   Cut the corner using a plastic cutter as shown below and remove sharp edges completely.



2. Left Side Piping
   Cut the corner at the left side using a plastic cutter as for the right side piping.



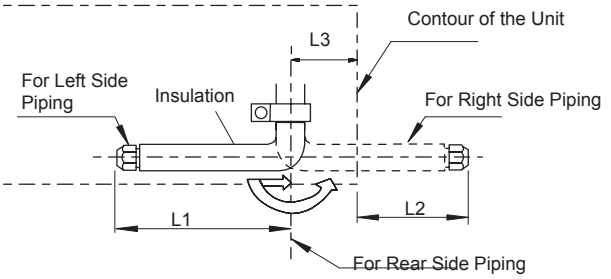
3. Rear Side Piping
   Make a hole by removing the knock-out plate at the rear side.



CAUTION:
Do not twist the pipe when bending the tube.

When bending the tubes, firmly fix the tube at the heat exchanger side.

▪ RPK-0.8 ~ 4.0



mm

Model RPK FSNM	HP	L1	L2	L3
Gas Piping	0.8~1.5	410	268	142
	2.0	440	298	142
	2.5~4.0	550	645	125
Liquid Piping	0.8~2.0	470	328	142
	2.5~4.0	480	575	125

mm

Model RPK FSN1M	HP	L1	L2	L3
Gas Piping	1.0/1.5	410	310	108
Liquid Piping	1.0/1.5	480	330	108

Piping size

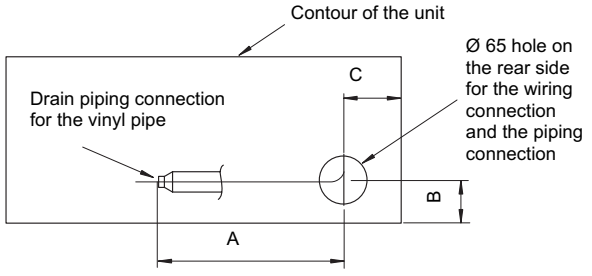
mm (in)

	Gas Piping	Liquid Piping
RPK-0.8~1.5	∅ 12.70 (1/2)	∅ 6.35 (1/4)
RPK2.0	∅ 15.88 (5/8)	
RPI-2.5~4.0		∅ 9.53 (3/8)

■ Drain piping

Right side connection

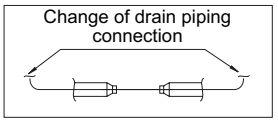
– The standard direction of drain piping connection is to the right side when the unit is viewed from the discharge grilles. However, the connection can be performed from the left side or the rear side.



HP	A	B	C
RPK-0.8~4.0FSNM	890	45	115

Left side connection

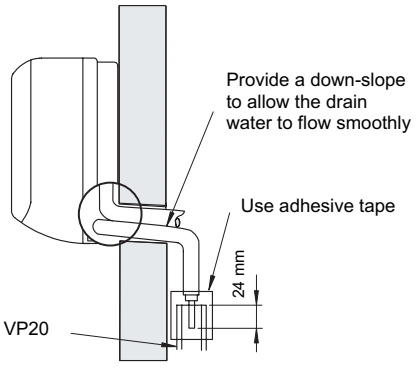
– When the drain piping connection is performed on the left side, remove the cap of left-side drain pipe. Then, attach this cap to the right-side drain pipe in order to change the drain piping connection from the right side to the left side.



Connection a drain pipe

– Prepare a PVC pipe with an outer diameter of 26 mm (VP20).

– 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.

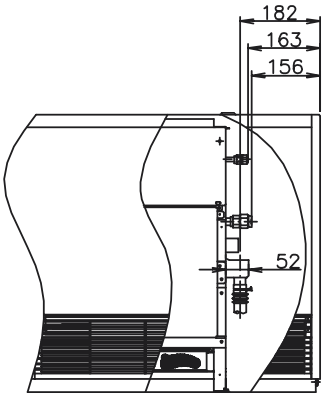
– Tightly squeeze the drain hose with the wire clamp after inserting the drain pipe into the drain hose completely.

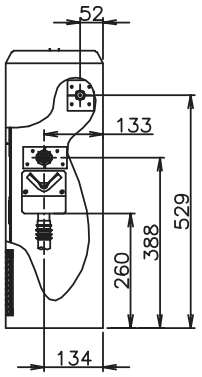
– Pour water onto the drain pan and make sure that the water flows smoothly.

2.3.6 RPF(I)

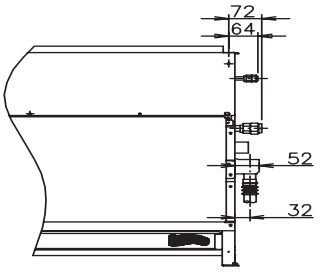
■ Refrigerant piping

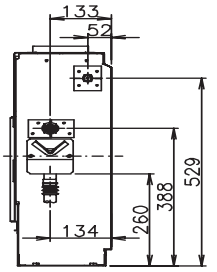
(mm)





Piping Connection of RPF





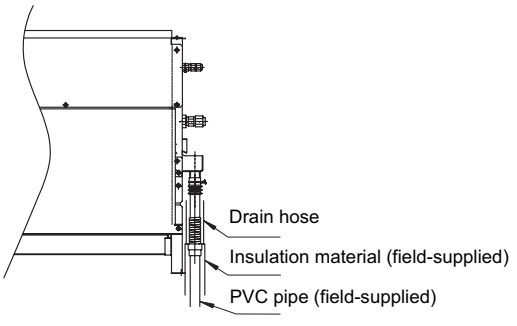
Piping Connection of RPFI

mm (in)

	Gas Piping	Liquid Piping
RPF(I)-1.0/1.5	∅ 12.7 (1/2)	∅ 6.35 (1/4)
RPF(I)-2.0	∅ 15.88 (5/8)	
RPF(I)-2.5		∅ 9.53 (3/8)

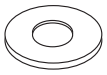
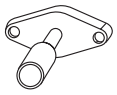
■ Drain piping

- 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.



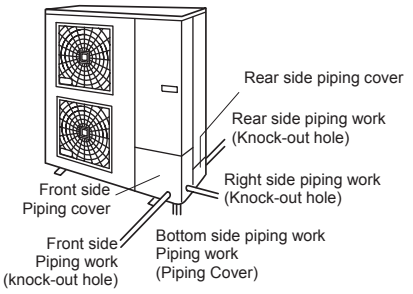
2.4 OUTDOOR UNITS

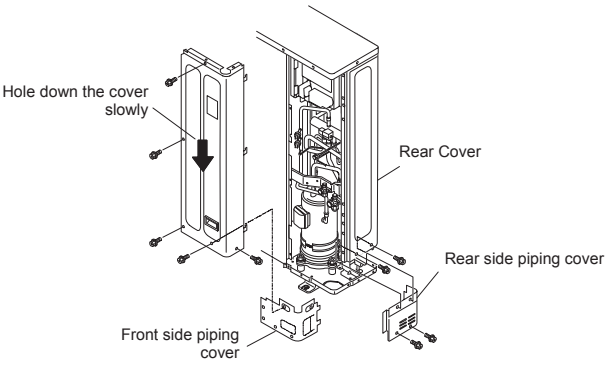
2.4.1. FACTORY SUPPLIED PIPE ACCESSORIES

Accessory		Quantity		
		RAS-8HRNM	RAS-10HRNM	RAS-12HRNM
Gasket		1	1	1
Pipe flange of refrigerant gas piping		1	1	1
Ring core		1	1	1
Band		1	1	1

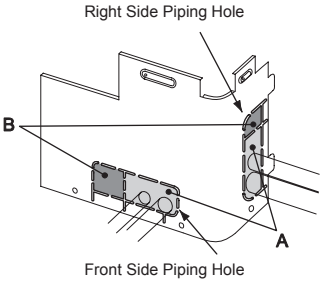
2.4.2. PIPING CONNECTION

- Pipes can be connected from 4 directions. Make holes in the piping cover or cabinet for taking out pipes. Take the piping cover away from the unit, and make holes by cutting along the guideline at the rear of the cover or punching with a driver. Remove the burr with a cutter.





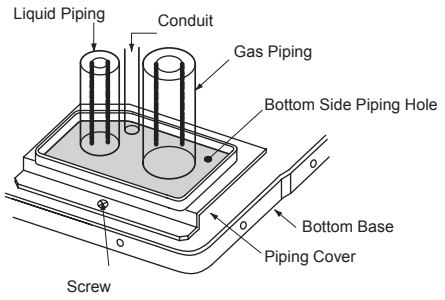
(a) Front and Right Side Piping Work Select the correct knock-out size depending on whether it is for power wiring or transition wiring.



It is available to correct the liquid or gas piping, power wiring less than 14mm^2
and transition wiring from “A” part.

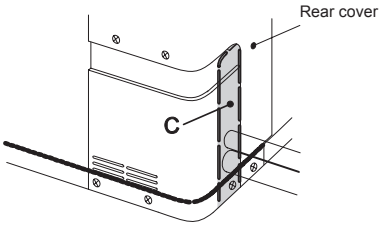
NOTES:
When using conduit, check to the tube size before removing “B” part.

(b) Bottom Side Piping Work
After removing bottom of the piping cover, perform piping and wiring works.



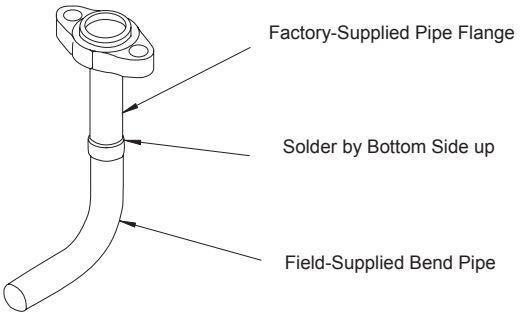
NOTE:
Prevent the cables from coming into direct contact with the piping.

(c) Rear Piping Work
After removing rear piping cover, punch out the “C” holes along the guide line.

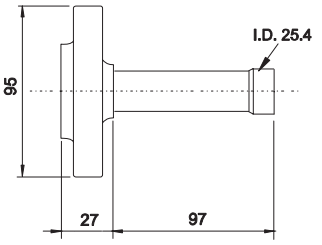


NOTES:
To avoid damage protect cables and pipes with adequate insulation (Field-Supplied).

- After connecting the refrigerant piping, seal the open space between knockout hole and refrigerant pipes by using insulation material.
- Confirm that the valve is closed.
- Prepare a field-supplied bend pipe for liquid line. Connect it to the liquid valve by flare nut through the square hole of bottom base.
- Prepare a field-supplied bend pipe for gas line. Braze it and the factory-supplied pipe flange at the outside of the unit.

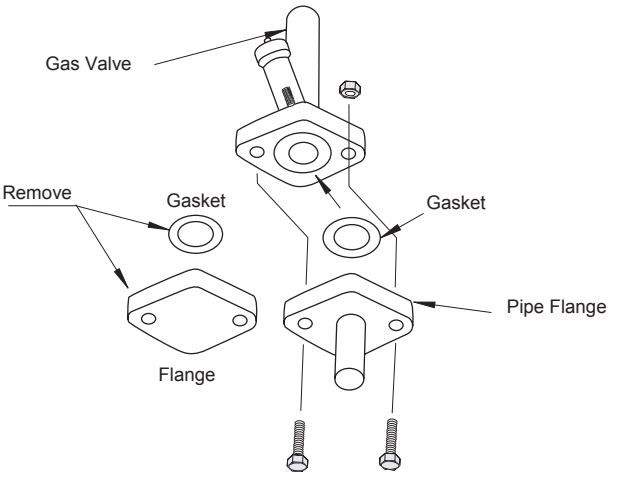


NOTE:
- *For connecting Ø25.4 pipe to RAS-8~12HRNM unit, use the pipe flange (factory-supplied)*



- Remove the flange and the gasket attached to the unit before shipping, and attach the new gasket (factory-supplied) before connecting the pipe flange to the gas valve.

- Do not use the gasket that had been attached to the unit.



- Braze the bend pipes and field piping.

2.4.3. VACUUM AND REFRIGERANT CHARGE

After finish the sumarized evacuation procedure, refrigerant charging procedure should be performed according to the next instructions:

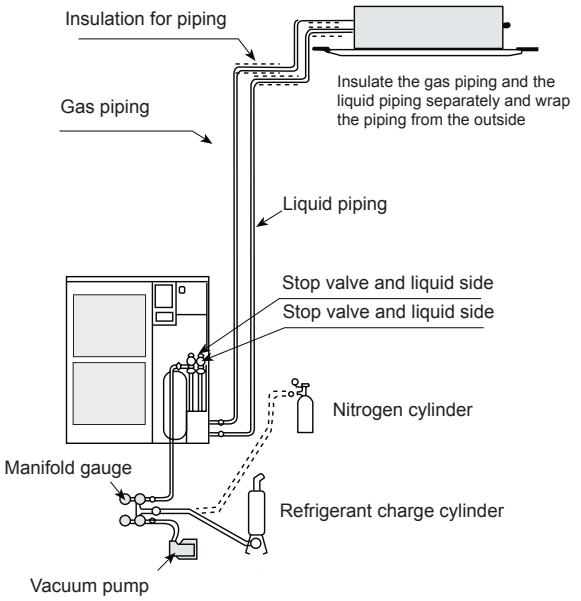
1. The stop valves have been closed before shipment, however, ensure that the stop valves are closed completely.
2. Connect the indoor unit and the outdoor unit with field-supplied refrigerant tubes.
3. Connect the gauge manifold using charging hoses to a vacuum pump, a refrigerant charging cylinder and a nitrogen cylinder to the check joint of the liquid line stop valve.
4. Check for any gas leakage at the flare nut connection, by using oxygen free nitrogen gas to increase the pressure inside of the field-supplied tubes.
5. Operate the vacuum pump until the pressure decreases lower than a pressure of -756 mm Hg in vacuum.
6. Charge refrigerant (only if necessary according to data in chapter 7, Technical Catalogue) by opening the gauge manifold valve. If the required quantity cannot be charged, follow procedures (7) to (9). Otherwise proceed step (10).

NOTE:
An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity as indicated.

7. Fully open the gas line stop valve
8. Slightly open the liquid line stop valve
9. Charge the required refrigerant by operating the system (Setting the remote control switch at cool)
10. Fully open the liquid line stop valve after completing refrigerant charge.

CAUTION:

- Do not charge OXYGEN, ACETYLENE, or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an airtight test. These types of gases are extremely dangerous, because an explosion can occur. It is recommended that oxygen free nitrogen be charged for these types of tests.
- Insulate the unions and flare-nuts at the piping connection part completely.
- Insulate the liquid piping completely to avoid a decrease of performance; if not, it will cause sweating on the surface of the pipe.
- Charge refrigerant correctly. Overcharging or insufficient charging could cause a compressor failure.
- Check for refrigerant leakage in detail. If a large refrigerant leakage occurred, it would cause difficulty with breathing or harmful gases would occur if a fire were being used in the room.



Insulation for Piping:
Gas and liquid piping must be separately insulated

Insulation for Connection Parts:
The connection part must be insulated by the field supplied insulation materials.

Nitrogen:
For Leakage Test and Brazing

2.4.4. DRAIN DISCHARGING BOSS

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.

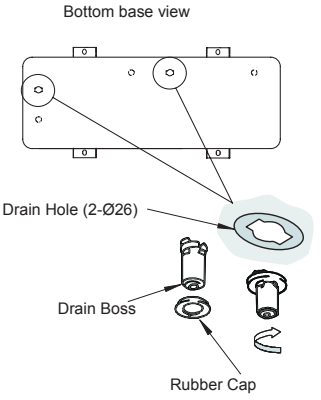
Model	Applicable Model
DBS-26	RAS-HRNM

■ **Connecting procedure**

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

NOTE:
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.



3. Electrical wiring

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

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3. ELECTRICAL WIRING ____ 3-1

3.1. General Check ____ 3-2

3.2. Electrical wiring for the outdoor unit ____ 3.2

3.2.1. Electrical wiring connection for outdoor unit ____ 3-2

3.2.2 Setting the Dip Switches for the outdoor unit ____ 3-3

3.3. Electrical wiring for the indoor unit ____ 3-5

3.3.1. Electrical wiring connection ____ 3-6

3.4. Electrical wiring between indoor unit and outdoor unit ____ 3-15

3.5. Wire sizes ____ 3-17

3.5.1. H-LINK System ____ 3-18

3.5.2. PSC-5HR ____ 3-20

3.6. Electrical wiring diagrams ____ 3-22

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.

NOTES:

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

In case of Test Run operation, continuos operation during 2 hours is performed without Thermo-OFF. And the 3-minute guard for compressor protection is not effective during the test run operation.

In forced stopped compressor, Compressor operation is OFF

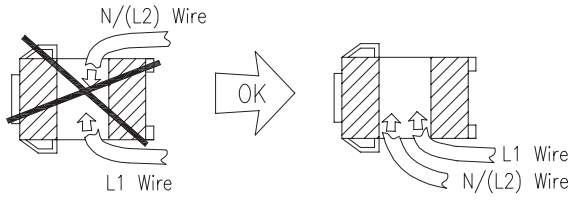
3.2. ELECTRICAL WIRING FOR THE OUTDOOR UNIT

3.2.1. ELECTRICAL WIRING CONNECTION FOR OUTDOOR UNIT

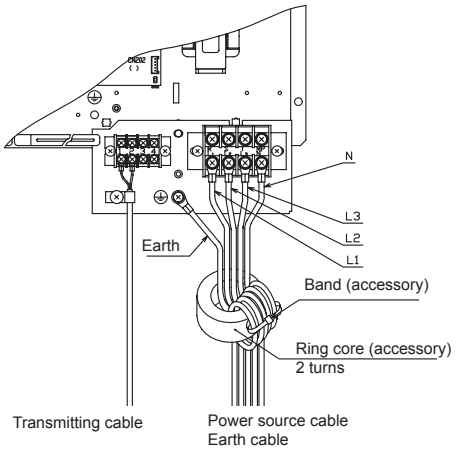
The electrical wiring connection for the outdoor unit is shown below.

1. Insert the power source cables L1, L2, L3 and N (for 380-415V/50Hz), and the earth cable into the ring core (two turns), and fix the cables by using the band (accessory).

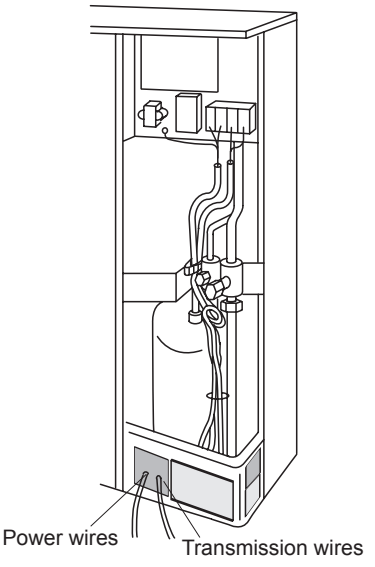
   Do not insert the cables from a different sides into the ring core.



2. Connect the power supply wires to L1, L2, L3 and N (for 380-415V\50Hz) for the three-phase power source on the terminal board. Connect the earth wire to the plate in the electrical box.



3. Connect the wires between the outdoor unit and the indoor unit to the terminals 1 and 2 on the terminal board.
4. Do not run the wires in front of the fixing screw of the service access panel. If you do so, you cannot remove the fixing screw.

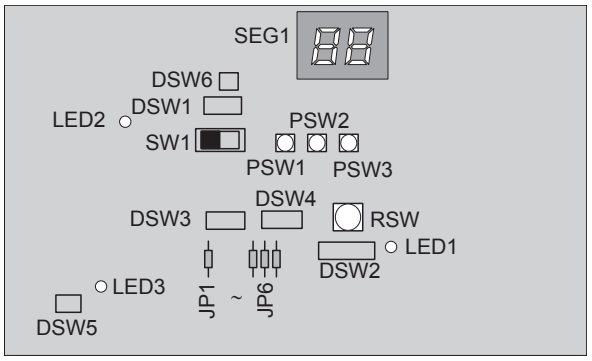


3.2.2. SETTING THE DIP SWITCHES FOR THE OUTDOOR UNIT

■ Quantity and Position of Dip Switches

The PCB in the outdoor unit is operated with 6 types of dip switches, one rotary switch and 3 types of push switch.

Position of DIP switches:



NOTE:

The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.

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.

■ DSW1: Test run

Function	Setting position
Setting before shipment	ON 1 2 3 4
Test run for cooling	ON 1 2 3 4
Test run for heating	ON 1 2 3 4
Forced stoppage of compressor (1)	ON 1 2 3 4

WARNING:

Cancelation of outdoor hot start control configuration, could damage the compressor if it is always used. In that case the unit guarranty will be void.

NOTES

Continuous operation during 2 hours is performed without Thermo-OFF

The 3-minutes guard for compressor protection is effective during the test run operation.

Compresor operation is OFF during operation (1)

■ DSW2: Piping length/selection function

Function		Setting position
Setting before shipment		ON 1 2 3 4 5 6
Piping lenght	5m < Lt	ON 1 2 3 4 5 6
	Lt > 30 m	ON 1 2 3 4 5 6
	6m < Lt < 30 m	ON 1 2 3 4 5 6
Cancelation of outdoor hot start control. (Not recomended, only available for special testing cases)		ON 1 2 3 4 5 6
Cancelation of outdoor air temperature control.		ON 1 2 3 4 5 6
Optional function selection setting (set by PSW)		ON 1 2 3 4 5 6
External input/output selection signals (set by PSW)		ON 1 2 3 4 5 6

■ DSW3: Capacity setting

Function	Setting position
RAS-8HRNM	ON 1 2 3 4 5 6
RAS-10HRNM	ON 1 2 3 4 5 6
RAS-12HRNM	ON 1 2 3 4 5 6

■ DSW4/RSW1: Refrigerant cycle setting

If the H-Link is used, setting the refrigerant cycle number is required.

	Setting position		Setting position
Setting for the ten digit	ON 1 2 3 4 5 6	Seting for the last digit	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.

Function	Setting position
Setting before shipment	
Cancellation	

■ DSW6: Power source setting / indvidual operation

Voltage	Setting position
380~415V (Setting before shipment)	
220~240V	
In case of multiple operation, must activated in OFF position pin No. 1	

■ DSW1 (PCB2): Cancelation of electrical current detection

Function	Setting position
Setting before shipment	
Cancellation of electrical current detection	

■ Jumper lead ssetting (JP1~6)

Setting before shipment:

JP1	JP2	JP3	JP4	JP5	JP6
1	0	0	1	1	1

0 = Open
1 = Short circuit

Function Selection by Jumper Lead Setting are as shown below.

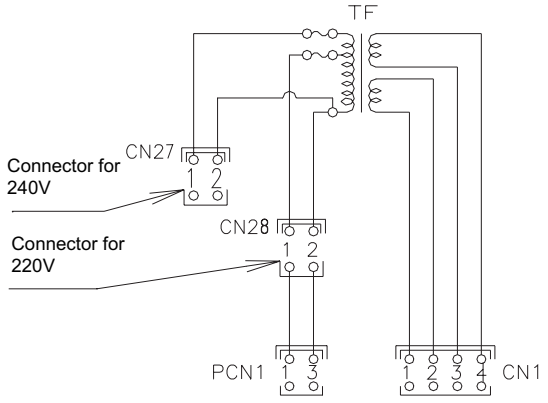
Setting	Function	Details
JP1	Cooling -15ºC & Heating. .	When JP1 is set “open” temperature range for cooling mode is fixed until -15 ºC. Not available for individual indoor control
JP2	Not used	-
JP3	Not used	-
JP4	Fixing for Cooling Only	When JP4 is set “open”, operation mode is fixed for cooling. Thermo-ON is available only by “COOL” or “DRY” mode at indoor unit.
JP5	Alternative Defrosting Mode	When JP5 is set “open”, alternative defrosting mode is available. When one of the outdoor units connected by H-LINK is under defrosting, the other outdoor units defrosting is cancelled. After one outdoor unit defrosting is completed, another outdoor unit starts defrosting operation.
JP6	R407C pipes.	When JP6 is set “open”, existing piping system control is available. High pressure control is performed depending on existing piping strength.

3.3. ELECTRICAL WIRING FOR THE INDOOR UNIT

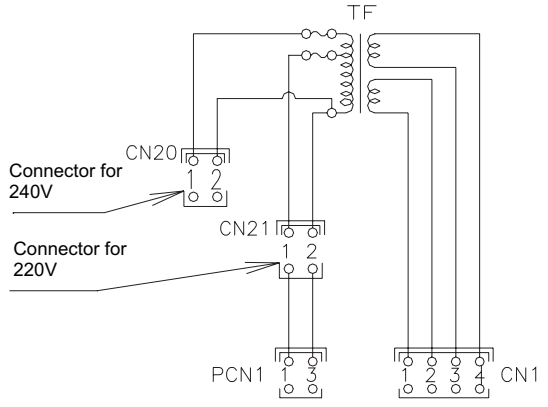
ATTENTION:

– *Before turning ON the main switch, check the item below. If the nominal voltage for the indoor unit is 240V, change the connectors CN of the transformers TF in the electrical box as shown in the figures below.*

CN27 and CN28 in case of RCD and RPK-1.5/2.0FSNM;



CN20 and CN21 in case of RCIM, RPK2.5~4.0FSNM

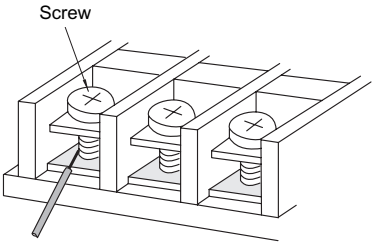


Note

For RCI, RPI, RPC, RPF(I) the nominal voltage is 230V.

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.*

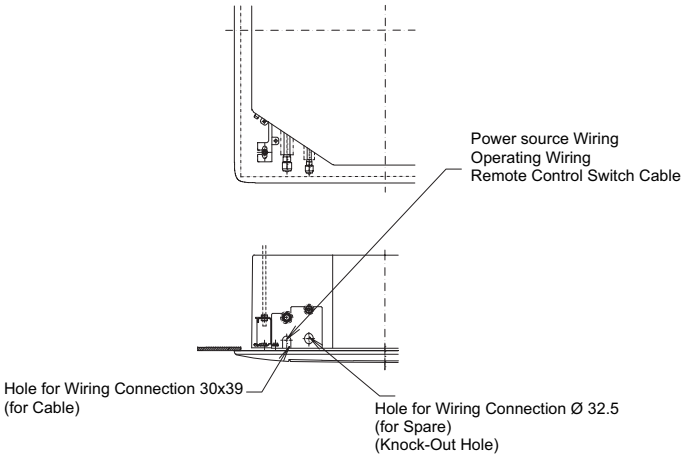


– *Make sure that you apply the terminal specification to the following screws of the terminal box: M4 screw for the power supply and M3.5 screw for the operating line.*

3.3.1. ELECTRICAL WIRING CONNECTION

■ RCI units

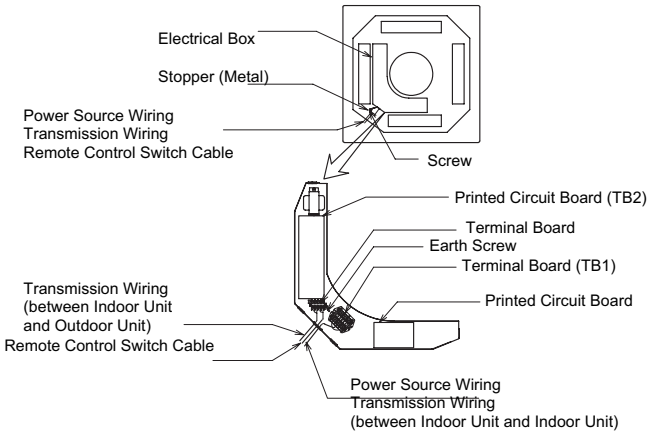
– The electrical wiring connection for the indoor unit is shown in the following figures. For the intermediate connection between the indoor unit and the air panel, refer to chapter 1.2.

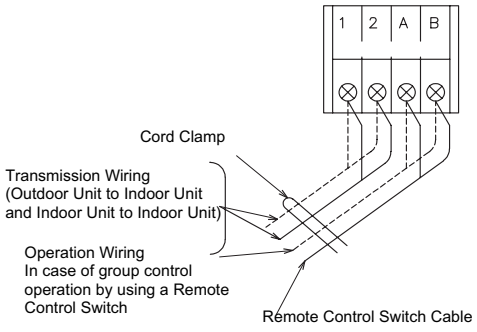


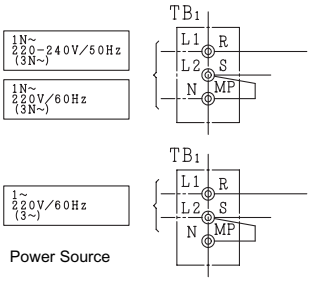
– Through the wiring connection hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

– Connect the power supply 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.

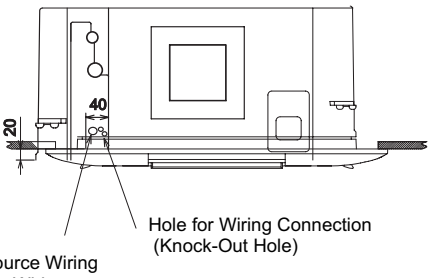






■ RCIM Units

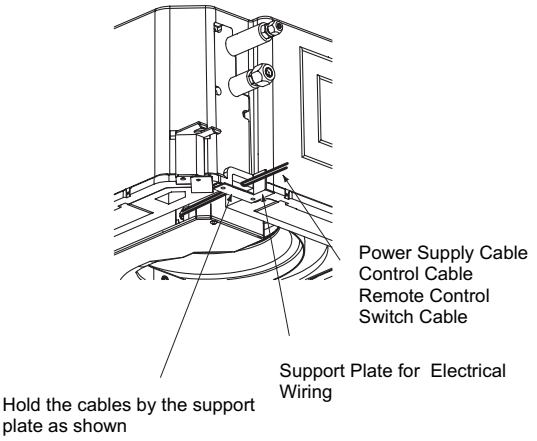
– The electrical wiring connection for the indoor unit is shown in the following figures. For the intermediate connection between the indoor unit and the air panel, refer to chapter 1.3.



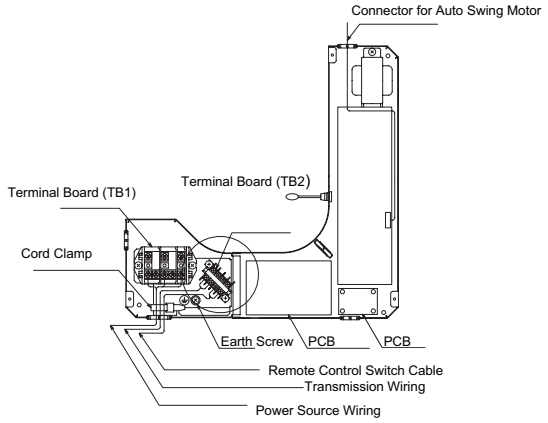
– Through the wiring connection hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

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

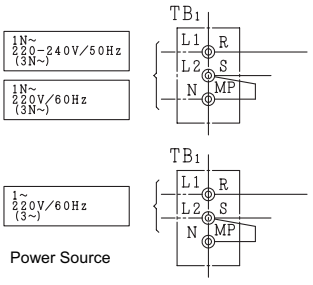
– Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

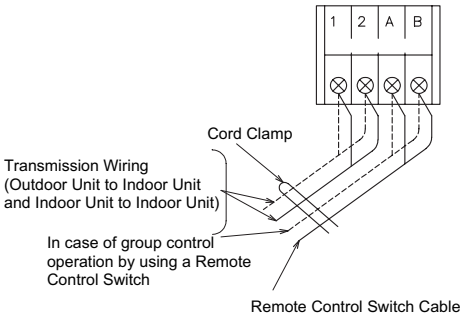


RCIM (cont.)



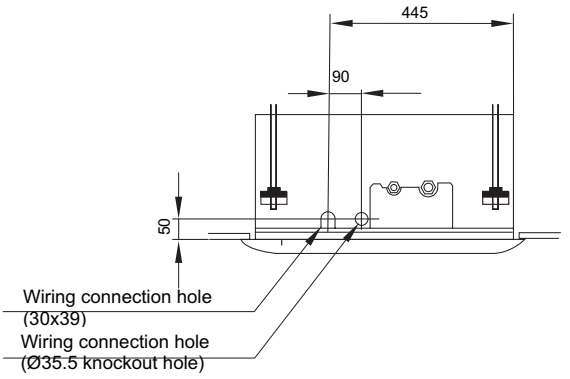
PCB: Printed Circuit Board





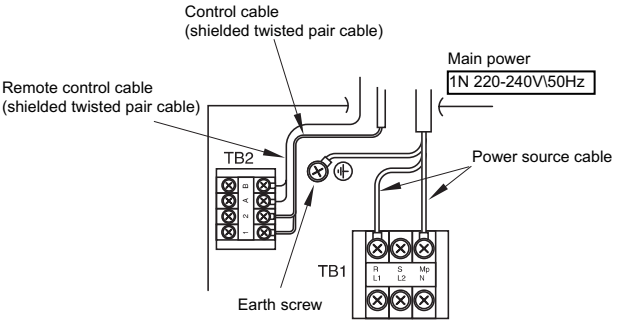
■ RCD units

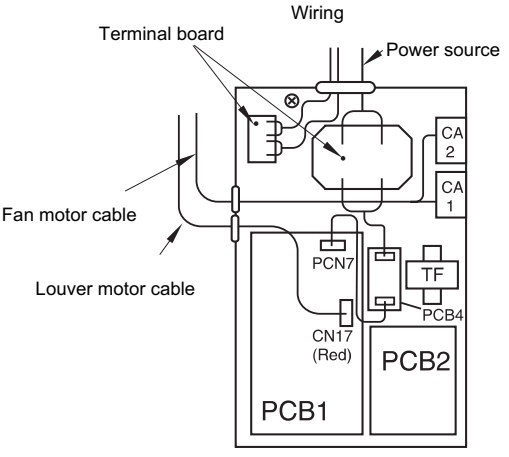
The electrical wiring connection for the indoor unit is shown in the following figures. For the intermediate connection between the indoor unit and the air panel, refer to chapter 1.4.



- 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

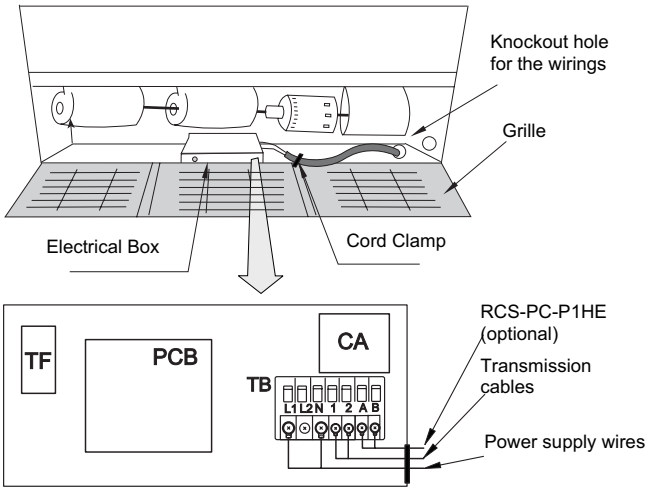




3

■ RPC units

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



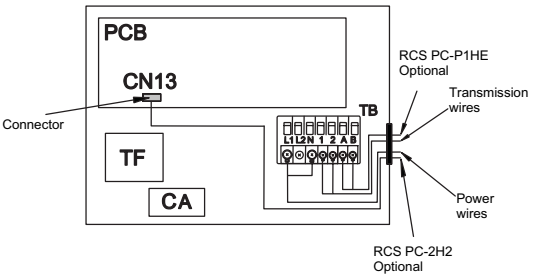
– Through the wiring connection hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.
– Connect the power supply wires and the ground wire to the terminals in the electrical box.
– Connect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

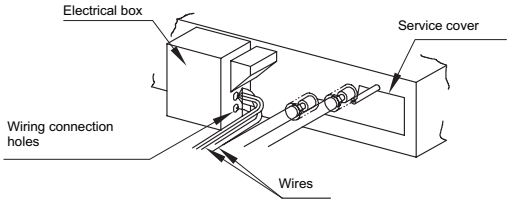
■ RPI units

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

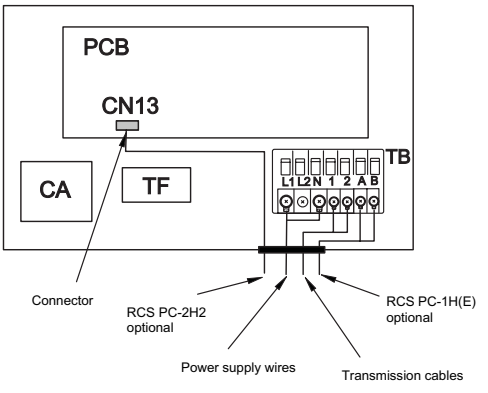
– Open the service access panel.
– Cut out the center of the rubber bushing in the wiring connection hole as shown in the next figures.
– Through the wiring connection hole in the cabinet, connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.
– Connect the ground wire to terminal ground wire in the electrical box.
– Connect the power supply wires L1 and N or L1 and L2 in the electrical box.
– Connect the transmission wires between the indoor unit and the outdoor unit to the terminals 1 and 2 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.

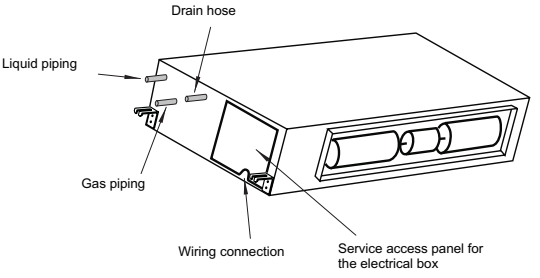
RPI-1.5



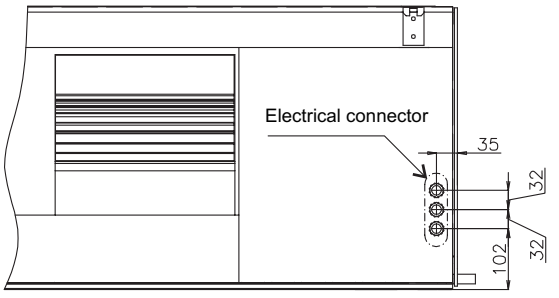


RPI-2.0~6.0





RPI-8/10



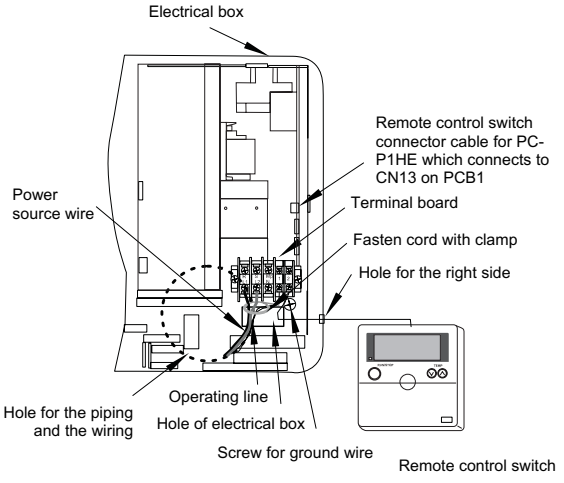
RPK Units

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

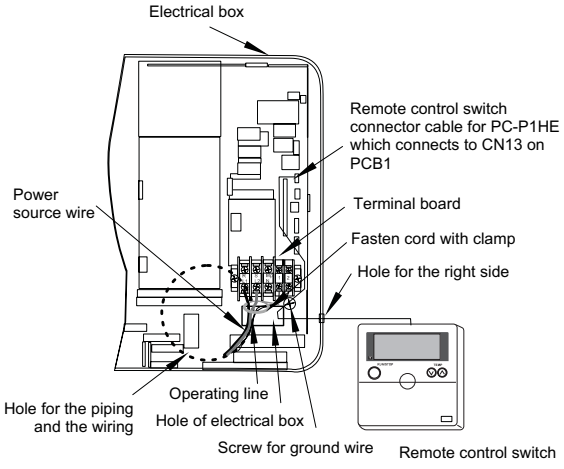
- Through the wiring connection hole in the cabinet, connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.
- Connect the power supply wires and the ground wire to the terminals in the electrical box.
- 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-P2HTE, PC-P5H or PC-RLH11, remove the wiring of the connector CN25 for RPK-2.0 or CN25 & CN12 for RPK-2.5~4.0. Otherwise, the system cannot function.

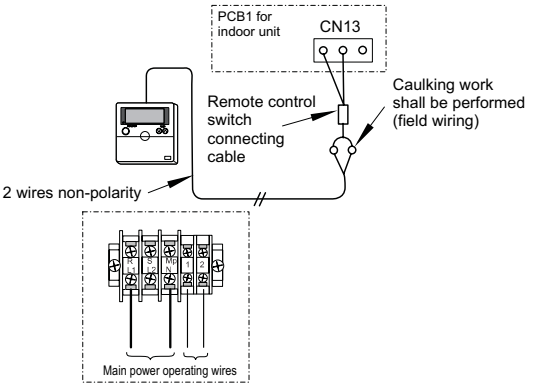
RPK-2.0FSNM



RPK-2.5~4.0FSNM



The following picture provides further details of the wiring connection for RPK-2.0~4.0FSNM units:

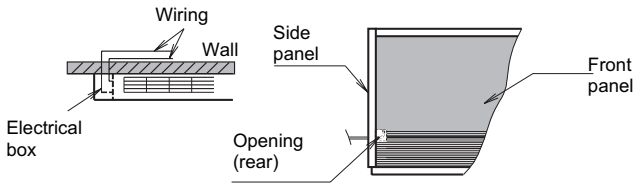


Terminal board (TB) for wiring connections

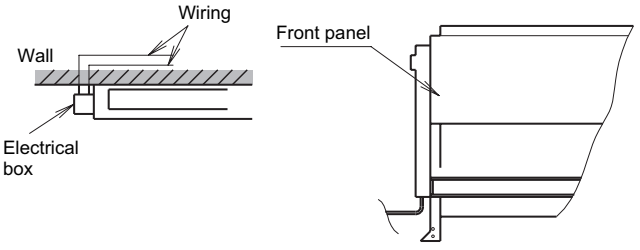
■ **RPF\RPFI units**

Remove the front panel and the side panel.

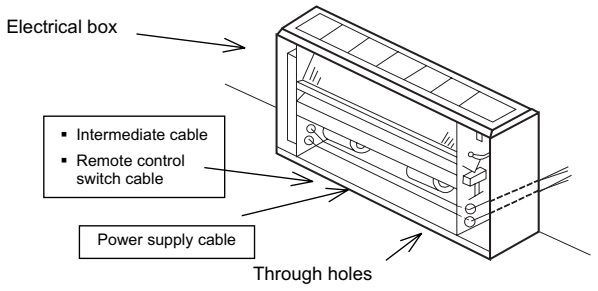
– The wiring from the left-rear side to the RPF is shown below.



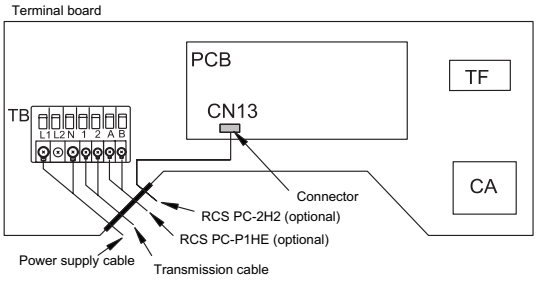
– The wiring from the left-rear side to the RPFI is shown below.



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



– The wiring connection is shown below.

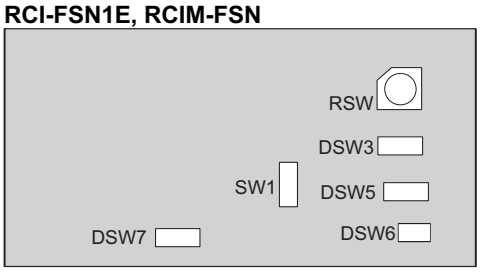


3.3.2 SETTING THE DIP SWITCHES FOR THE INDOOR UNIT

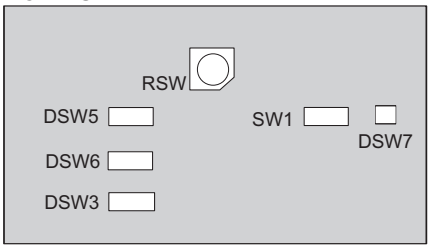
■ **Quantity and position of the DIP switches**

The PCB in the indoor unit operates with DIP switches and rotary switches.
The position of the DIP switches and rotary switches for each Indoor Unit is the following:

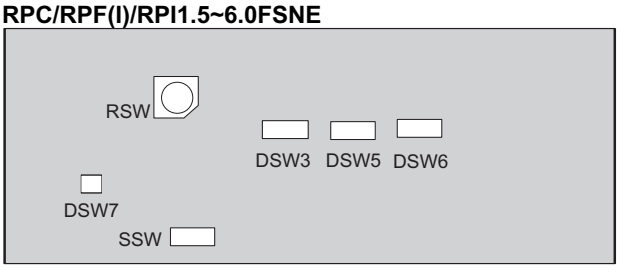
RCI-FSN1E, RCIM-FSN



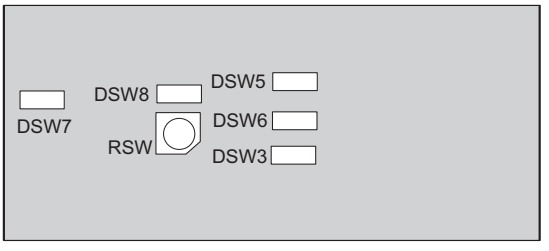
RCD-FSN



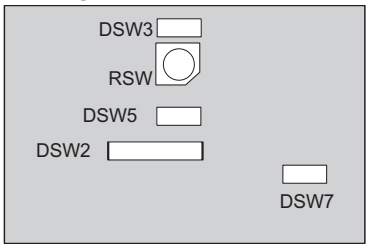
RPC/RPF(I)/RPI1.5~6.0FSNE



RPI-8/10FSNE



RPK-FSNM

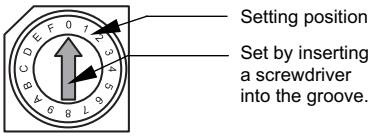


NOTE:
The mark "■" indicates the position of the DIP switches. The figures show the settings before the shipment.

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 the table below. Numbers must start from "1" for every outdoor unit.



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

DSW2: optional functions setting

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

Factory setting	ON 1 2 3 4 5 6 7 8
Self-inspection function	ON 1 2 3 4 5 6 7 8
Room thermostat is used	ON 1 2 3 4 5 6 7 8
Automatic operation when power supply is ON	ON 1 2 3 4 5 6 7 8
Remote On\Off control which uses pulse signal is available	ON 1 2 3 4 5 6 7 8
Automatic restart after power failure	ON 1 2 3 4 5 6 7 8

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	0.8	1.0	1.3	1.5
Seting position	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
HP	1.8	2.0	2.3	2.5
Seting position	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
HP	2.8	3.0	3.5	4.0
Seting position	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
HP	5.0	6.0	8.0	10
Seting position	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4

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

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

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

Indoor unit model code	DSW6 setting
RCD-1.0~6.0	
RPC-2.0~6.0	
RPI-2.0~6.0	
RPI-8.0/10	
RPF(I)-1.0~2.5	

DSW7: setting the fuse recover and the remote control selection

No setting is required. Before the shipment, all the setting positions are OFF. PC-P1HE: Remote control switch selected.		
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.	Except RPK 	Only RPK-FSNM 
PC-2H2: Remote control switch selected (except RCI, RCD and RPK). (See also SSW)		

DSW8: Not used (RCI only)

Setting before shipment.	

SSW: remote control system

	New	Old
PC-P1HE Before shipment.		
PC2H2 (Refer to the DSW7 settings)		

KPI

DSW2, DSW4 and DSW6 do not have any function.

ECONOFRESH KIT

You need to set the DIP switches at the RPI PCB.

	RPI-5HP DIP switch factory setting	RPI-5HP + Econofresh kit installation DIP switch setting
DSW6		

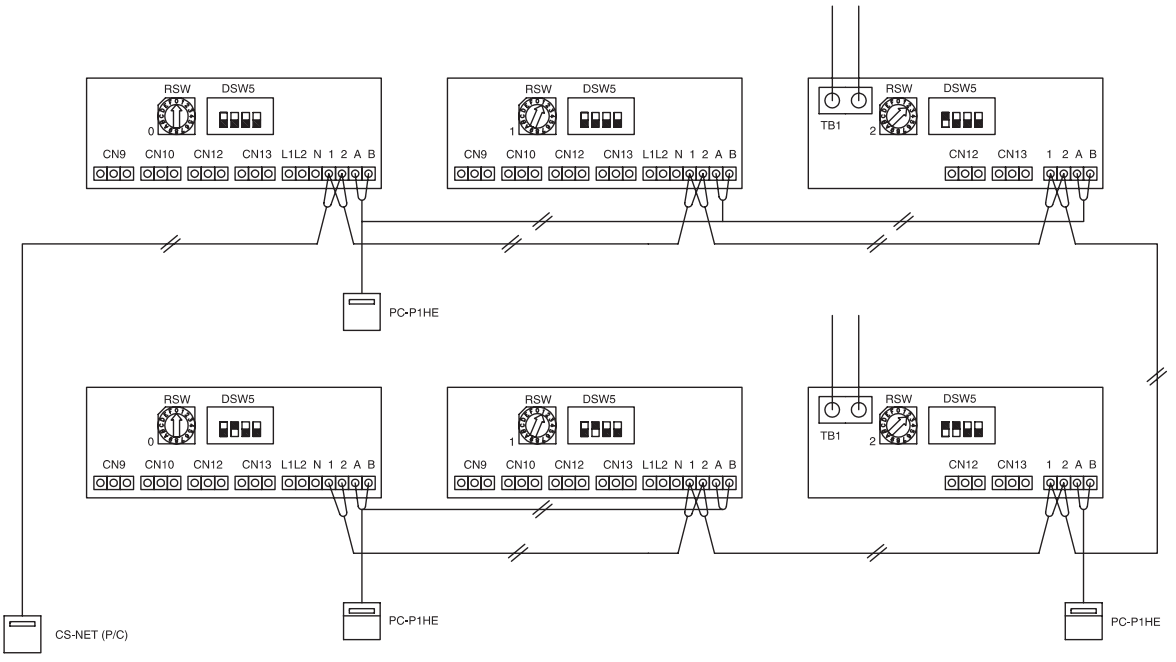
CAUTION:
Turn OFF all power sources before setting the DIP switches. Without turning OFF, the contens of setting will be invalid.
You cannot use the enthalphy sensor together with CO_2 gas sensor, in the same Econofresh kit.

KPI units (Total Heat Exchanger)

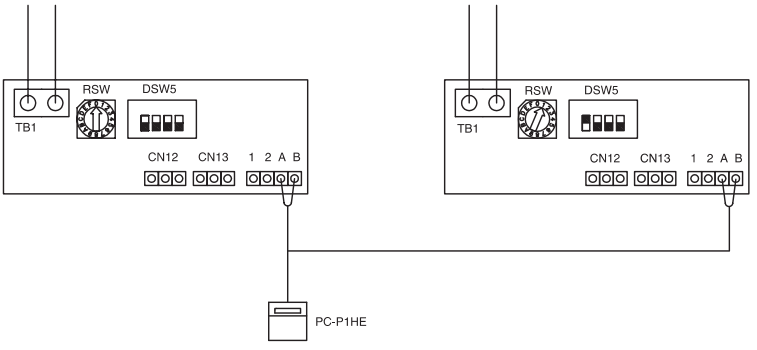
The electrical wiring connection for the KPI unit is shown in the following figures.

- 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 KPI unit and the indoor unit to the terminals in the electrical box.

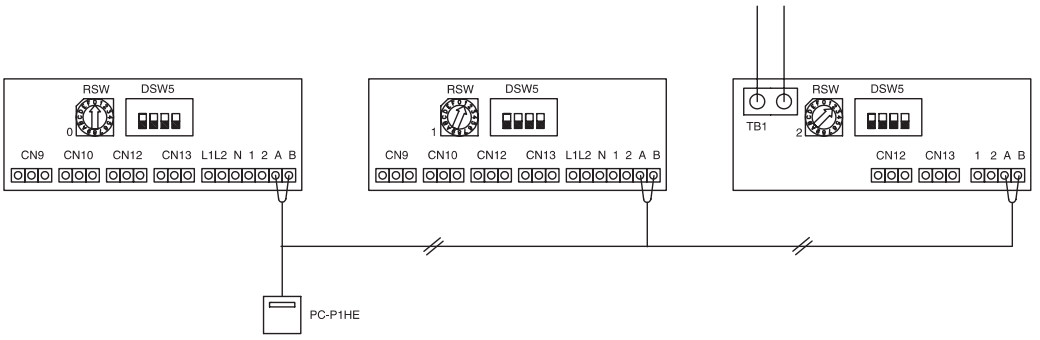
Controlled network system (CS-Net, H-Link)



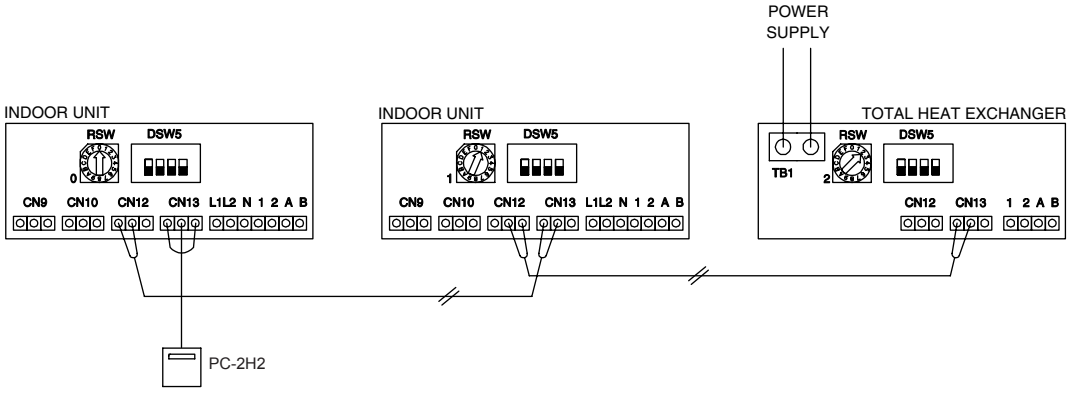
Total Heat Exchanger + PC-P1HE



Simultaneous operation (Set-Free + Total Heat Exchanger)



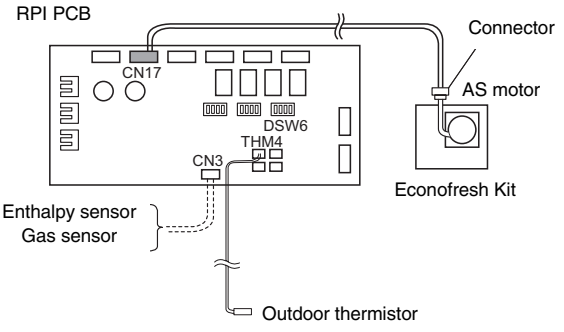
Simultaneous operation (Set-Free + Total Heat Exchanger)
Example for PC-2H2



ECONOFRESH KIT

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

- Mount the outdoor thermistor at a position near the outdoor air inlet.
- Pay attention to the place of the outdoor thermistor. The outdoor thermistor must not be in contact with direct sunshine or rainwater.



3.4. ELECTRICAL WIRING BETWEEN INDOOR UNIT AND OUTDOOR UNIT

Connect the electrical wires between the indoor unit and the outdoor unit, as shown below.

Check to ensure that the terminal for power source wiring (terminals “L1” to “L1”, “L2” to “L2”, “L3” to “L3” and “N” to “N” of each terminal board: AC380-415V), and intermediate wires (Operating Line: terminals “1” to “1” and “2” to “2” of each terminal board: DC5V) between the indoor unit and the outdoor unit coincide correctly. If not, some component will be damaged.

Follow local codes and regulations when performing electrical wiring.

Connect the operation wiring to the units in the same refrigerant cycle (The refrigerant piping and the control wiring should be connected to the same indoor units). If the refrigerant piping and the control wiring are connected to the units in the different refrigerant cycle, it may cause a abnormal operation.

Use twisted shielded pair wiring for operation wiring between outdoor unit and indoor unit, and also for operation wiring between indoor units (H-Link connection)

It can be also used Shielded pair wiring.

Shield shall be connected to earth only in one cable side.

Do not use more than 3 cores for operation wiring (-H-Link). Core sizes must be selected according to the national regulations.

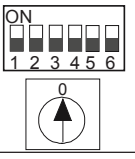
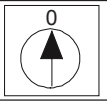
Connect the operating line for the units in the same refrigerant cycle (The refrigerant line shall be connected to the indoor units with the refrigerant piping connected to the same outdoor unit). In the case that each of the refrigerant piping and the operating line is connected to the units of different cycle, it may cause an abnormal operation.

Open a hole near the connection hole of power source wiring when multiple outdoor units are connected from one power source line.

The recommended breaker sizes are shown in Table of electrical data and recommended Wiring, Breaker Size/1 O.U.

In the case that a conduit tube for field-wiring is not used, fix rubber bushes with adhesive on the panel.

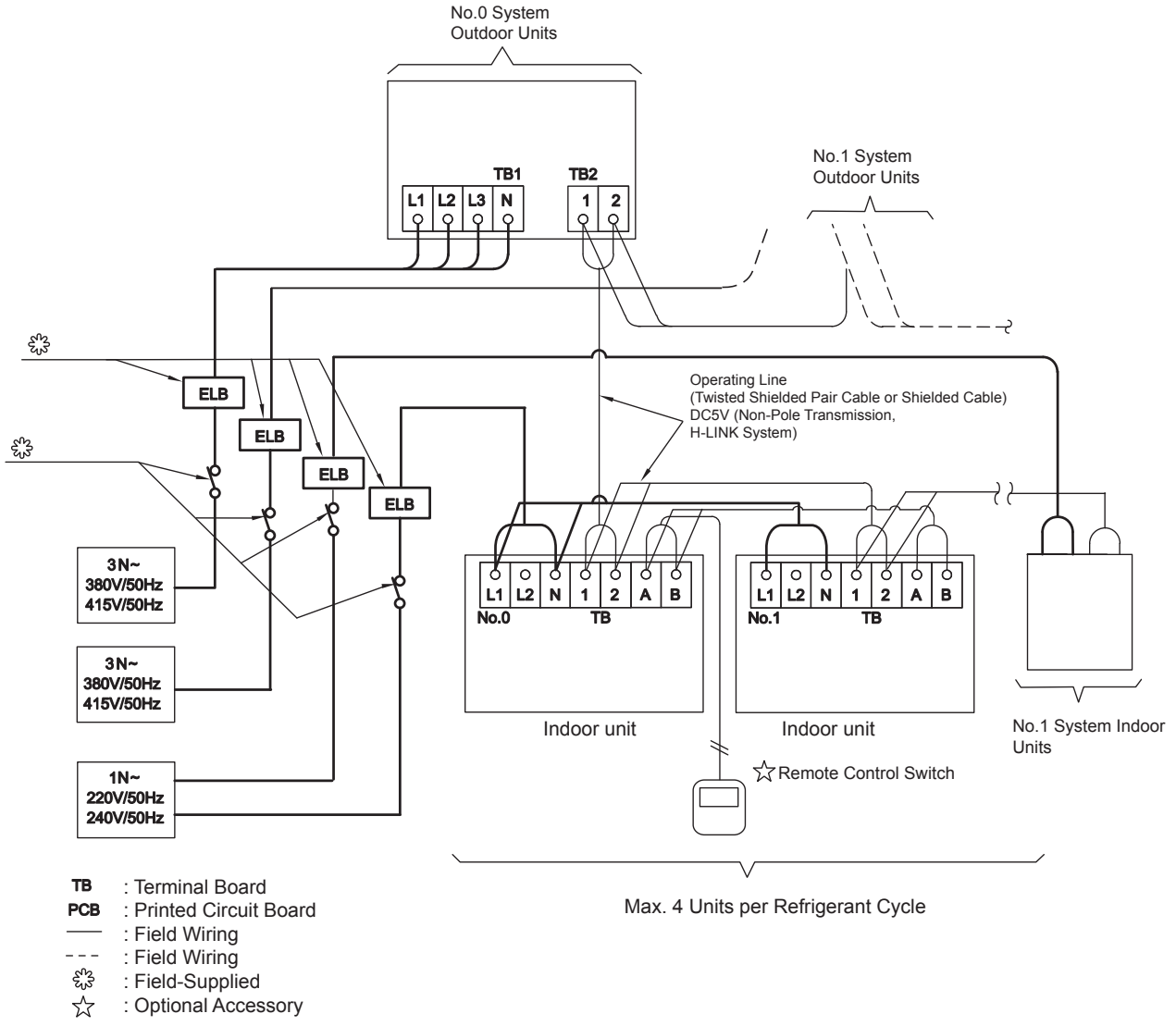
All the field wiring and equipment must comply with local and international codes.

Unit	Name of Dip Switch	Mark	Setting Before Shipment	Function
Outdoor Unit	Refrigerant Cycle	DSW4 & RSW1		For setting refrigerant cycle address of outdoor unit. Set the DSW4 and RSW1 not to overlap the setting of other outdoor units in the same H-LINK system
	End Terminal Resistance	DSW5		For matching impedance of transmission circuit. Set the DSW5 according to the quantity of outdoor units in the H-LINK system. 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.
Indoor Unit	Refrigerant Cycle	DSW5		For setting refrigerant cycle address of indoor unit. Set the DSW5 corresponding to the address of outdoor unit in the same refrigerant cycle.
	Indoor Unit Address	RSW		For setting indoor unit address. Set the RSW not to overlap the setting of other indoor units in the same refrigerant cycle. (If not set, the automatic address function is perfomed.)

ATTENTION:

- *Pay attention to the connection of the operating line. Incorrect connection may cause the failure of PCB.*

Models: RAS-8HRNM
RAS-10HRNM
RAS-12HRNM



TB : Terminal Board
PCB : Printed Circuit Board
—— : Field Wiring
- - - : Field Wiring
❁ : Field-Supplied
☆ : Optional Accessory

NOTE:

- *In case that the indoor unit individual operarion is needed, remote control switch wiring between indoor unit (A,B) are not necessary.*

3.5. WIRE SIZES

- Field Minimum Wire Sizes for Power Source

Model	Power Source	Max. Current	Power Source Cable Size		Transmitting Cable Size	
			EN60 335-1 ❶	MLFC ❷	EN60 335-1 ❶	MLFC ❷
Indoor units 2.0~6.0HP	230V/1ϕ/50Hz	5 A	0.75 mm²	0.5 mm²	0.75 mm²	0.5 mm²
Indoor units 8.0/10.0HP		10 A	1.0 mm²	0.75 mm²		
RAS-8HRNM	400V/3ϕ/50Hz	13.2 A	2.5 mm²	1.25 mm²		0.75 mm²
RAS-10HRNM		17.1 A	4.0 mm²	2.0 mm²		
RAS-12HRNM		21.2 A	4.0. mm²	2.0 mm²		

NOTES:

1. *Follow local codes and regulations when selecting field wires.*
2. *The above wire sizes marked with ❶ are selected at the maximum current of the unit according to the European Standard, EN60 335-1. Use the wires which are not lighter than the ordinary polychloroprene sheathed flexible cord (code designation H05RN-F).*
3. *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.*
4. *In the case that the power cables are connected in series, add each unit maximum current and select wires below.*
5. *The earth cable size complied with local code: IEC 245, No. 571.*

- 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 LFC (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 the case that current exceeds 63 A do not connect cables in series

CAUTION:

Use shielded wires for transmission wires between the indoor and the outdoor units, and connect the shielded part to the earth screw in the electrical box of the indoor unit as shown below.

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:

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

Model	Power Source	Max. Current	CB	ELB no. poles/A/mA
Indoor units 2.0~6.0HP	230V/1ϕ/50Hz	5 A	6 A	2/40/30
Indoor units 8.0/10.0HP		10 A	10 A	
RAS-8HRNM	400V/3ϕ/50Hz	13.2 A	20 A	4/20/30
RAS-10HRNM		17.1 A	30 A	4/30/30
RAS-12HRNM		21.2 A	30 A	

ELB: Earthleakage Breaker; CB: Circuit Breaker

3.5.1. H_LINK SYSTEM

NOTE

The H-LINK system cannot be applied to the cycle with the old unit models or with the units that have an old transmission.

■ Application

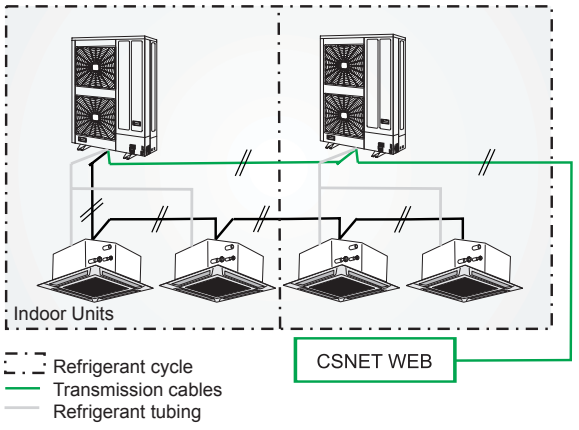
The H-LINK wiring system requires only two transmission cables that connect each indoor unit and the outdoor unit for up to 16 refrigerant cycles. This wiring system also requires the connect wires for all the indoor units and all the outdoor units in series. You can apply this H-LINK system to the following models.

Indoor unit	Outdoor unit
RCI RDC RPI RPK RPF RPFI RPC	RAS--8~12HRNM

■ 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: 4 Units per cycle and 128Units per H-LINK system (in case of SET FREE Series will be added).
– Maximum Wiring Length: Total 1000m (including CSNET WEB).
– Recommended Cable: Twist Shielded Pair Cable or Shielded pair cable over 0.75mm
– Voltage: DC5V

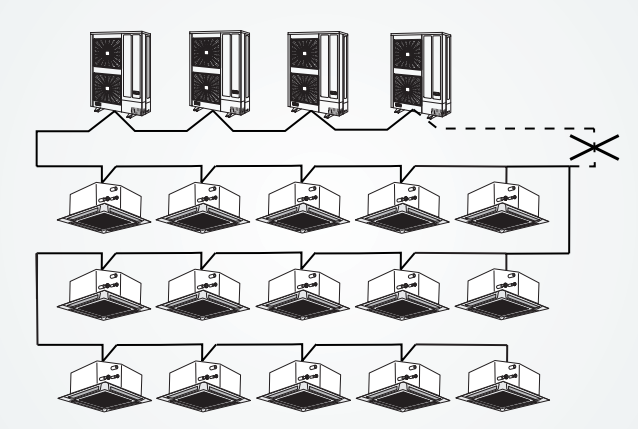
■ System Example of H-LINK

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

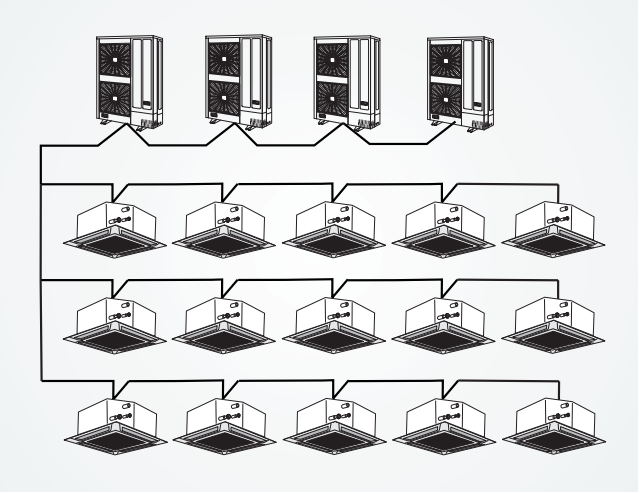
1 Using H-LINK System with Air Conditioners only, and
2 Using H-LINK System with Air Conditioners with Central Control Device, and the system examples are as shown

(1) Using H-LINK System for air conditioning systems without a central control device (CSNET WEB or PSC-5S).

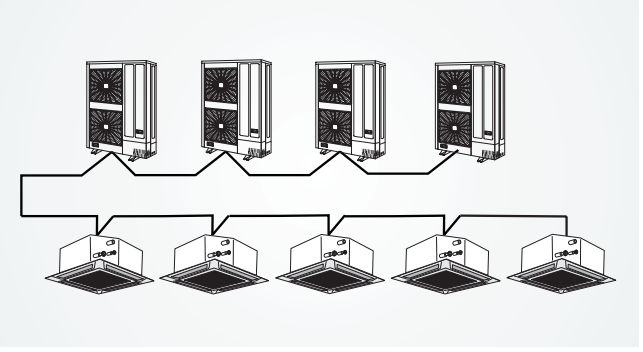
Line Connection with all units (including Utopia and/or Set-Free, Set-Free mini and DC Inverter)



Line connection for each floor

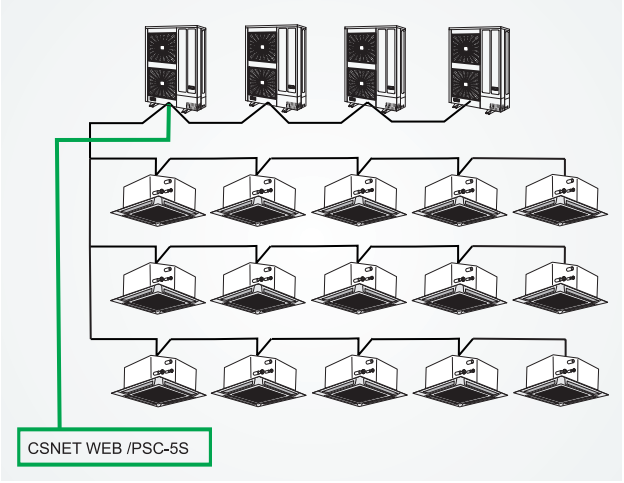


Connection with one main line and with the branch lines for the units

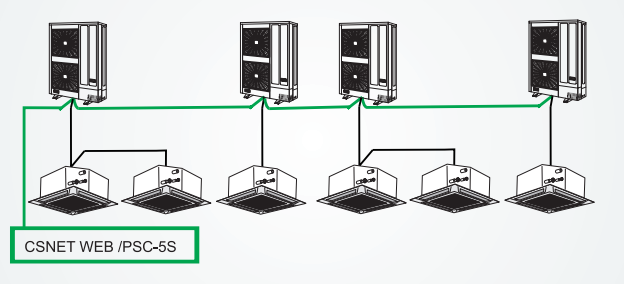


(2) Using H-LINK System for air conditioning systems with a central control device (CSNET WEB or PSC-5S).

– In case that the central control device is applied when electrical wiring is performed. In this case, the CSNET WEB Wiring can be connected at any point of the H-Link wiring.



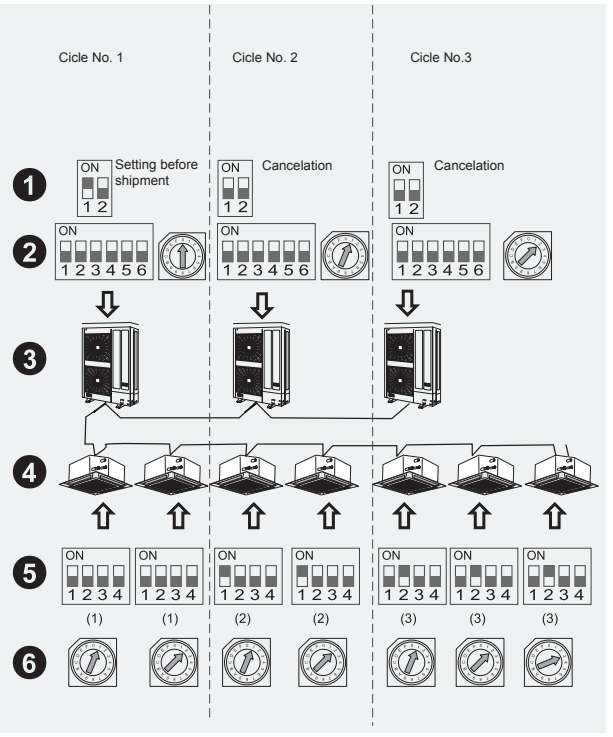
– In case that the central control device is not applied when electrical wiring is performed.In this case, you must connect the H-Link Wiring to all the systems. Usually, to connect the Outdoor Units is the easiest implementation.



NOTE:
The maximum quantity of units to be connected is 16 outdoor units and 128 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.

Example of the settings of the DIP switches

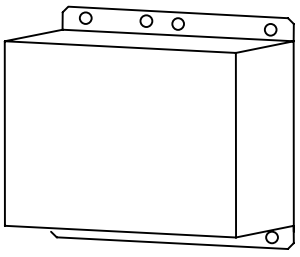


Mark	Description
❶	DSW5 (End terminal Resistance)
❷	DSW4 and RSW1 (Refrigerant cycle)
❸	Outdoor unit
❹	Indoor Units
❺	DSW5 (Refrigerant cycle)
❻	RSW (Address of indoor unit)

3.5.2. PSC-5HR

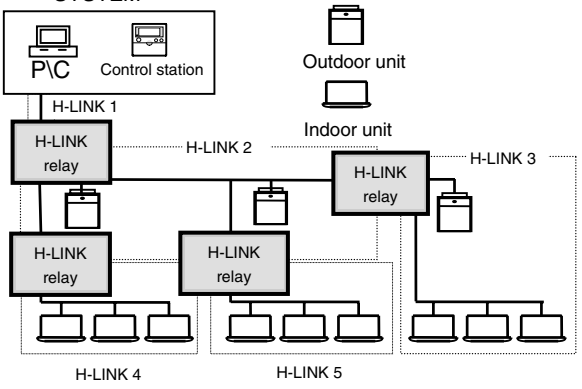
■ Installation of PSC-5HR

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



■ Electrical wiring

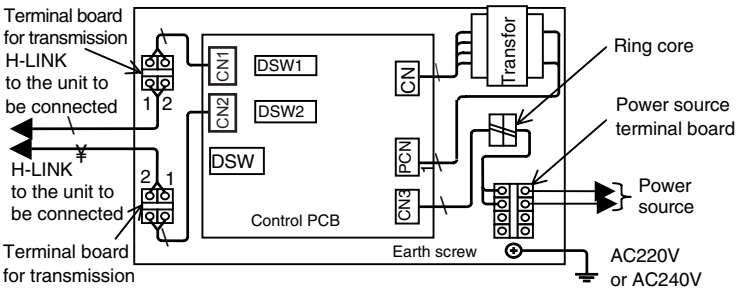
■ SYSTEM



NOTE:

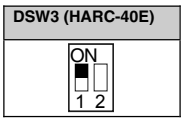
You can install a maximum of Four H-LINK relays in one system.
Make sure that the quantity of connections is the following:
Ref. System Quantity: within 16
Indoor Unit Quantity: within 128
Total Length of each divided H-LINK: up to 1000m
If the H-LINK is divided into five blocks as shown beside, set the end terminal resistance in each H-LINK relay.(For details, refer to the DIP switches below).

■ Internal layout

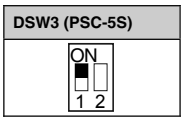


■ Setting the DIP switches

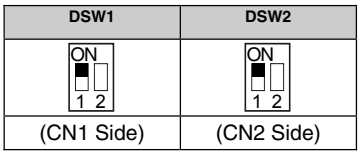
- If there is an outdoor unit in the drived H-LINK, set the end terminal resistance at one of the outdoor units.
- If there is a HARC-40E system, set the end terminal resistance at the HARC-40E.



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



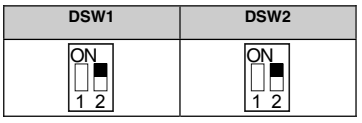
- If there are only indoor units, set the end terminal resistance at the H-LINK relay. If the H-LINK relay is connected to CN1, set the No.1 pin of DSW1 at the ON side. If the H-LINK relay is connected to CN2, set the No.1 pin of DSW2 at the ON side.



- 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.

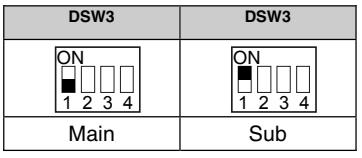
■ Fuse recovery setting

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.



■ 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.



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:

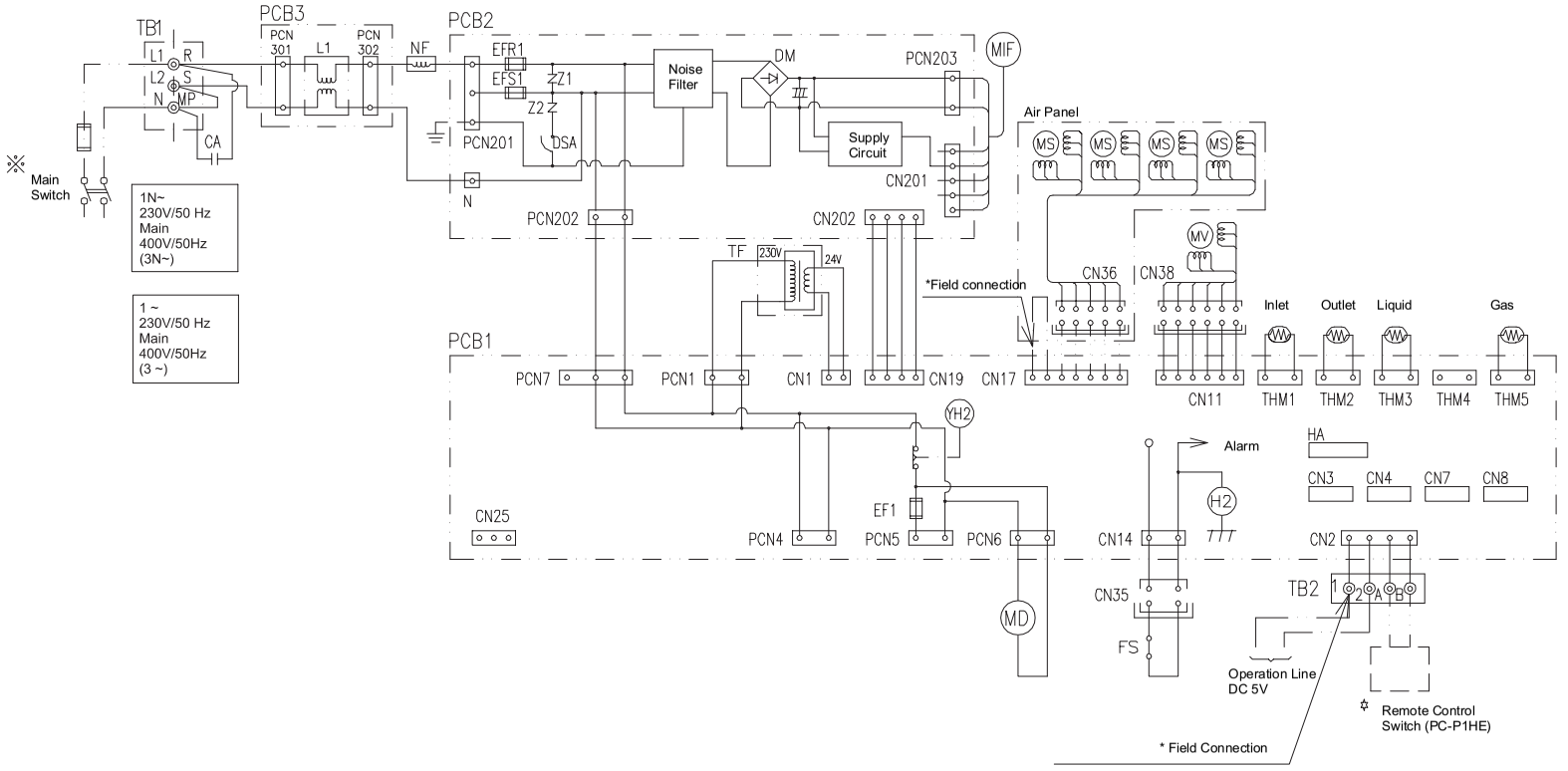
- Connection conditions of the air conditioning systems:
  - Check the model code and the quantity of connected units by means of the remote control switch.
  - If control equipment is used, perform the connection check at the central control device.
- Transmission alarm:
  - Perform the RUN\STOP procedure 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"

3.5 ELECTRICAL WIRING DIAGRAMS

This sub-chapter shows the Electrical Wiring Diagram for each unit of the new Hitachi HRNM Series.

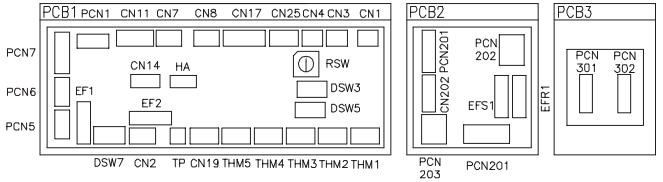
Unit model	Page number
RCI-1.0~6.0FSN1E	3-23
RCIM-1.0~2.0FSN	3-24
RCD-1.0~3.0FSN	3-25
RCD-4.0~6.0FSN	3-26
RPC-2.0~6.0FSNE	3-27
RPI-2.0~6.0FSN1E	3-28
RPI-8.0/10.0FSNE	3-29
RPK-0.8/2.0FSNM	3-30
RPK-2.5/4.0FSNM	3-31
RPF(I)-1.0~2.5FSNE	3-32
KPI	3-33
RAS-8/10/12HRNM	3-34

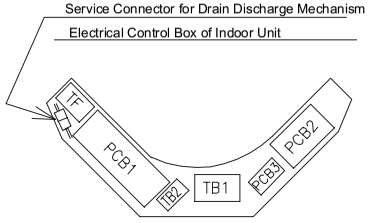
Electrical wiring diagram for models: RCI-1.0~6.0FSN1E



Mark	Name	Remarks
CA	Capacitor	
CN	Connector	
DSW 3	Unit Capacity Code	On PCB1
DSW5	Refrigerant Cycle No.	On PCB1
DSW7	Fuse recover/ Remote Contro Selector	On PCB1
EFR1,	Fuse	On PCB2
EF1,	Fuse	On PCB1
FS	Float Switch	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
LED1~4	Alarm code	On PCB1,2
NF	Noise Filter	
PCB1,2,3	Printed Circuit Board	
PCN 1~203	Connector on PCB	On PCB
RSW	Indoor Unit No. Settings	On PCB1
TB1,2	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	
THM2	Outlet Air Thermistor	
THM3	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	
YH2	Relay	On PCB1
◎	Terminals	
—X—	Close-end Connector	
☆	Optional Parts	
– ·· – ·· –	Field Wiring	
– – – – –	Earth Wiring	
————	Factory Wiring	
*	Field Connection	

Printed Circuit Board

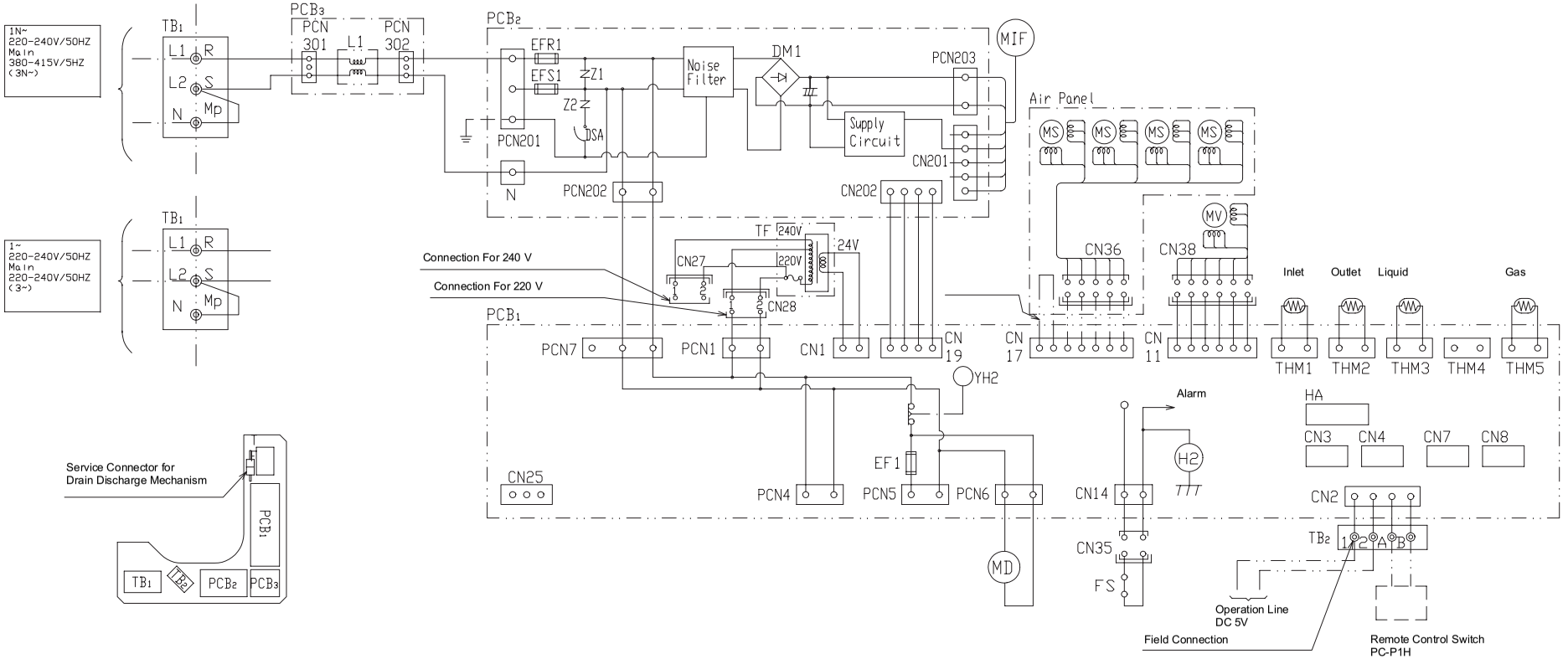


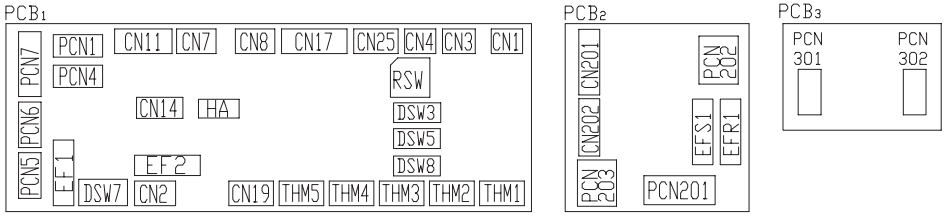


NOTE: All the field wiring equipment must comply with local codes

HITACHI
Inspire the Next

Electrical wiring diagram for models: RCIM-1.0~2.0FSN



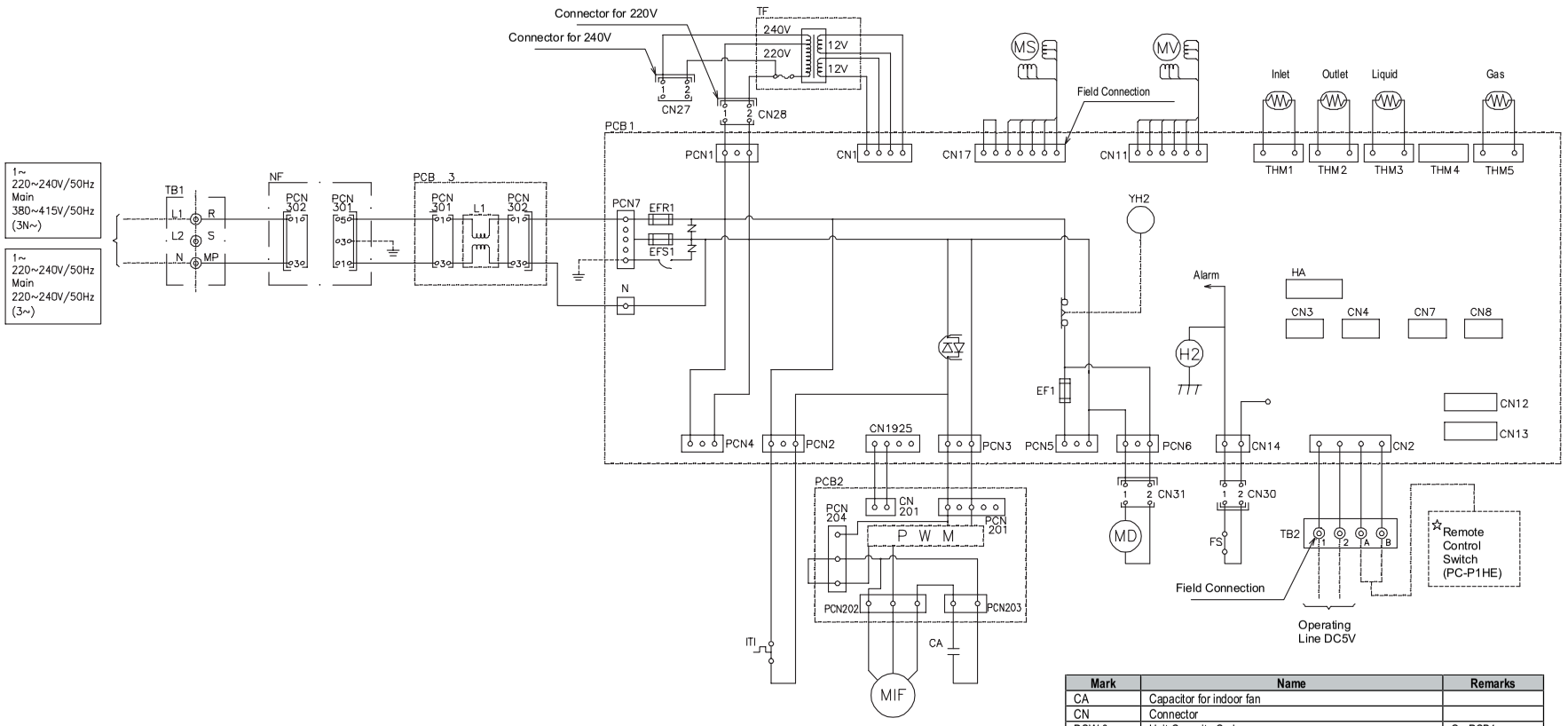


Mark	Name
CN1~202	Connector on PCB
CN27~38	Connector (on PCB 1)
DSW 3~8	Dip Switch for setting (on PCB 2)
EFR1, EFS1	Fuse (on PCB 2)
EF1,EF2	Fuse
FS	Float Switch
MD	Motor for Drain Discharge Mechanism
MIF	Motor for Indoor Fan
MS	Motor for Automatic Swing Louver
MV	Micro-Computer Control Expansion Valve
PCB1,2,3	Printed Circuit Board
PCN 1~203	Connector on PCB
RSW	Rotary Switch
TB1,2	Terminal Board
TF	Transformer
THM1	Inlet Air Thermistor
THM2	Outlet Air Thermistor
THM3	Freeze Protection Thermistor
THM5	Gas Pipe Thermistor
YH2	Relay on PCB
◎	Terminals
—⊠—	Close-end Connector
☆	Optional Parts
– ·· – ·· –	Field Wiring
– – – – –	Earth Wiring
————	Factory Wiring
*	Field Connection

***NOTE**: All the field wiring equipment must comply with local codes*

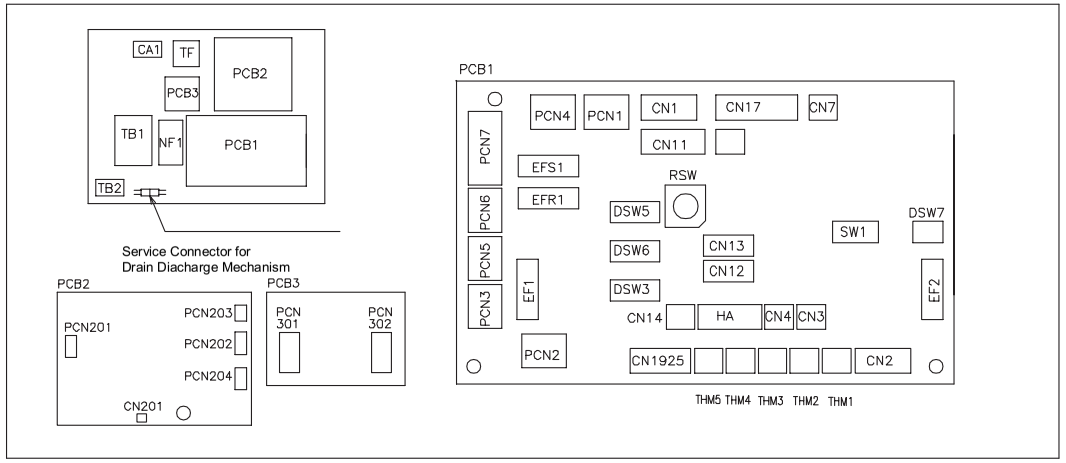
HITACHI
Inspire the Next

Electrical wiring diagram for models: RCD-1.0~3.0FSN



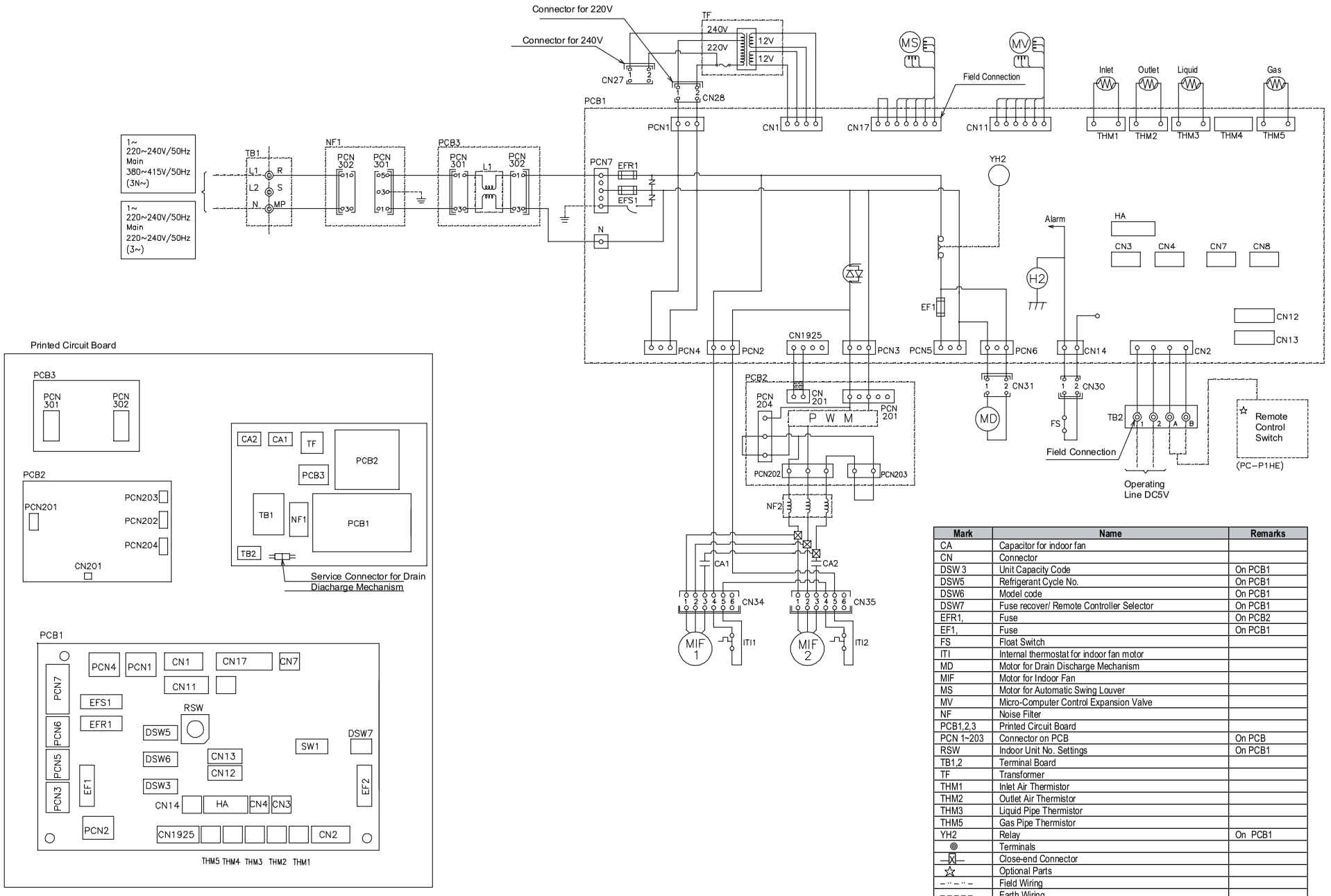
Mark	Name	Remarks
CA	Capacitor for indoor fan	
CN	Connector	
DSW 3	Unit Capacity Code	On PCB1
DSW5	Refrigerant Cycle No.	On PCB1
DSW6	Model code	On PCB1
DSW7	Fuse recover/ Remote Controller Selector	On PCB1
EFR1,	Fuse	On PCB2
EF1,	Fuse	On PCB1
FS	Float Switch	
ITI	Internal thermostat for indoor fan motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
NF	Noise Filter	
PCB1,2,3	Printed Circuit Board	
PCN 1~203	Connector on PCB	On PCB
RSW	Indoor Unit No. Settings	On PCB1
TB1,2	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	
THM2	Outlet Air Thermistor	
THM3	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	
YH2	Relay	On PCB1
◎	Terminals	
—⊠—	Close-end Connector	
☆	Optional Parts	
– ·· – ·· –	Field Wiring	
– – – – –	Earth Wiring	
————	Factory Wiring	
*	Field Connection	

Printed Circuit Board



NOTE: *All the field wiring equipment must comply with local codes*

Electrical wiring diagram for models: RCD-4.0~6.0FSN



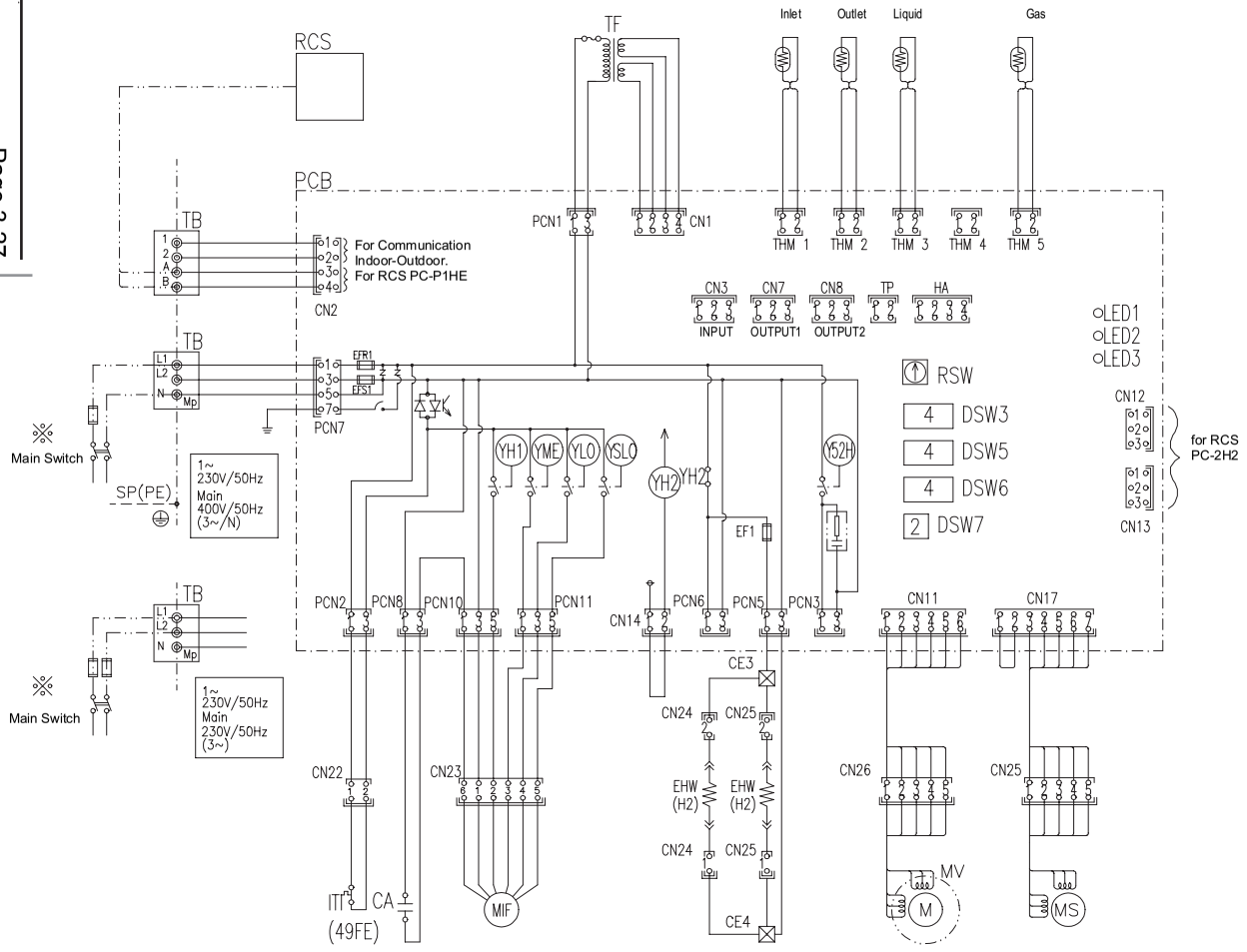
Printed Circuit Board

Mark	Name	Remarks
CA	Capacitor for indoor fan	
CN	Connector	
DSW 3	Unit Capacity Code	On PCB1
DSW5	Refrigerant Cycle No.	On PCB1
DSW6	Model code	On PCB1
DSW7	Fuse recover/ Remote Controller Selector	On PCB1
EFR1,	Fuse	On PCB2
EF1,	Fuse	On PCB1
FS	Float Switch	
ITI	Internal thermostat for indoor fan motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
NF	Noise Filter	
PCB1,2,3	Printed Circuit Board	
PCN 1~203	Connector on PCB	On PCB
RSW	Indoor Unit No. Settings	On PCB1
TB1,2	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	
THM2	Outlet Air Thermistor	
THM3	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	
YH2	Relay	On PCB1
◎	Terminals	
—⊠—	Close-end Connector	
☆	Optional Parts	
– ·· – ·· –	Field Wiring	
– – – – –	Earth Wiring	
————	Factory Wiring	
*	Field Connection	

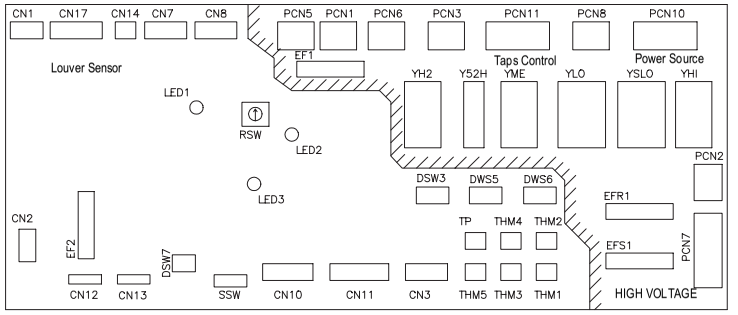
***NOTE**: All the field wiring equipment must comply with local codes*

HITACHI
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Electrical wiring diagram for models: RPC-2.0~6.0FSNE

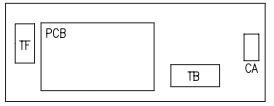


PCB Sockets location

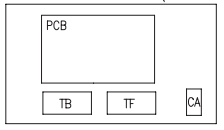


Mark	Name	Remarks
CA	Capacitor for Indoor Fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Code	On PCB
DSW7	Fuse Recover/ Remote Controller Selector	On PCB
EFR1,EFS1,EF1	Fuse	On PCB
EHW(H2)	Electric Heater for Condensate Air Protection	
FS	Float Switch	
ITI	Internal Thermostat for Indoor Fan Motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
LED1~3	Alarm Code	On PCB
PCB	Printed Circuit Board	
RCS	Remote Control Switch	Optional Part
RSW	Indoor Unit No. Settings	On PCB
SA	Surge Absorber	
SSW	Slide Switch	On PCB
TB	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	On PCB
THM2	Outlet Air Thermistor	On PCB
THM3	Liquid Pipe Thermistor	On PCB
THM5	Gas Pipe Thermistor	On PCB
YH2	Relay for HI Fan Motor Tap	DC Coil
YH1	Relay for HI Fan Motor Tap	DC Coil
YME	Relay for ME Fan Motor Tap	DC Coil
YLO	Relay for LO Fan Motor Tap	DC Coil
YSLO	Relay for SLO Fan Motor Tap	DC Coil
◎	Terminals	
—X—	Close-end Connector	
·X·	Field Supplied	
– " – " –	Field Wiring	
– – – – –	Earth Wiring	
————	Factory Wiring	

Electrical Control Box of Indoor Unit (for 2.0, 2.5 and 3.0 HP)



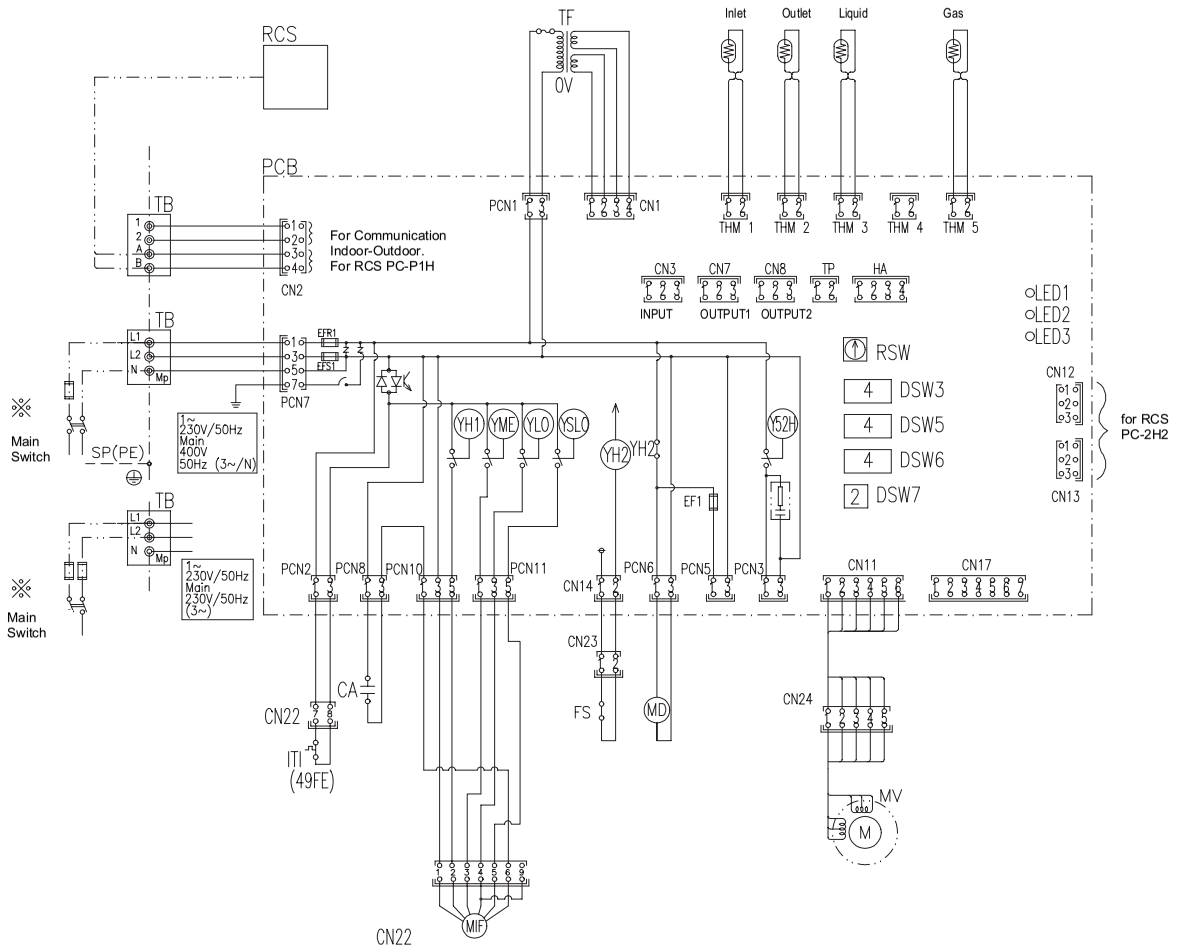
Electrical Control Box of Indoor Unit (for 4.0 to 6.0 HP)



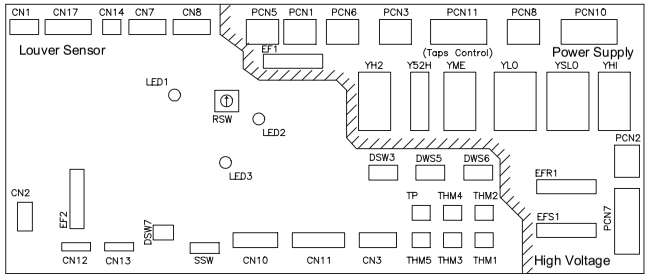
NOTE: *All the field wiring equipment must comply with local codes*

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Electrical wiring diagram for models: RPI-2.0~6.0FSN1E

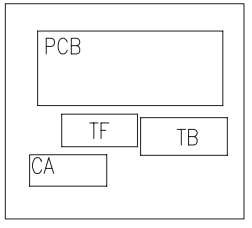


PCB Sockets location



Mark	Name	Remarks
CA	Capacitor for Indoor Fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Code	On PCB
DSW7	Fuse Recover/ Remote Controller Selector	On PCB
EFR1,EFS1,EF1	Fuse	On PCB
FS	Float Switch	
ITI	Internal Thermostat for Indoor Fan Motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MV	Micro-Computer Control Expansion Valve	
LED1~3	Alarm Code	On PCB
PCB	Printed Circuit Board	
RCS	Remote Control Switch	Optional Part
RSW	Indoor Unit No. Settings	On PCB
SSW	Slide Switch	On PCB
TB	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	On PCB
THM2	Outlet Air Thermistor	On PCB
THM3	Liquid Pipe Thermistor	On PCB
THM5	Gas Pipe Thermistor	On PCB
YH2	Relay for HI Fan Motor Tap	DC Coil
YH1	Relay for HI Fan Motor Tap	DC Coil
YME	Relay for ME Fan Motor Tap	DC Coil
YLO	Relay for LO Fan Motor Tap	DC Coil
YSLO	Relay for SLO Fan Motor Tap	DC Coil
◎	Terminals	
—⊠—	Close-end Connector	
·X·	Field Supplied	
– ·· – ·· –	Field Wiring	
- - - - - -	Earth Wiring	
————	Factory Wiring	

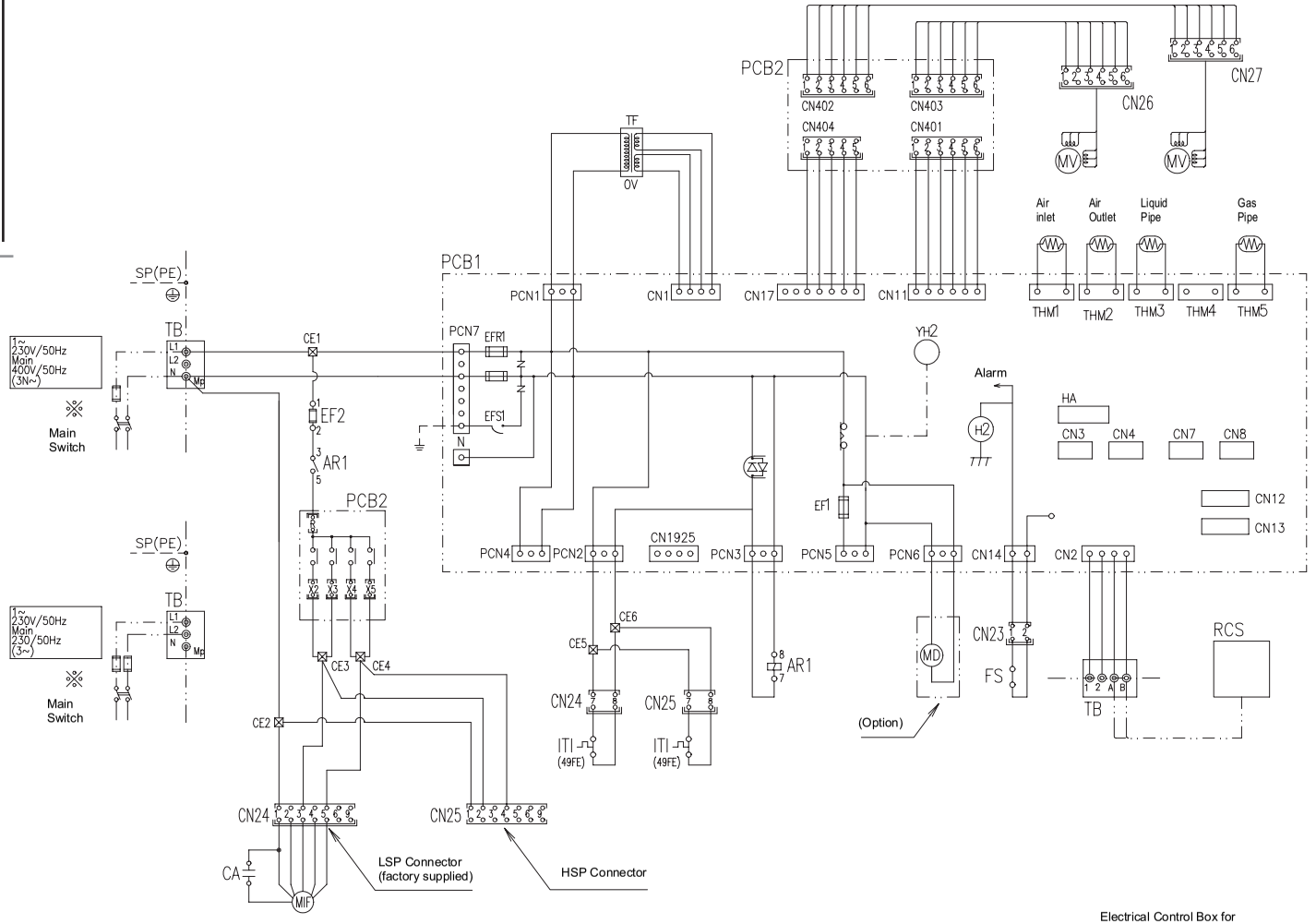
Electrical Control Box of Indoor Unit



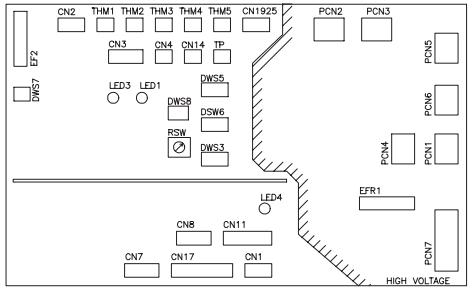
NOTE: *All the field wiring equipment must comply with local codes*

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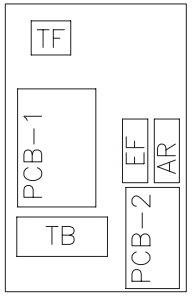
Electrical wiring diagram for models: RPI-8.0/10.0FSNE



PCB Sockets Location



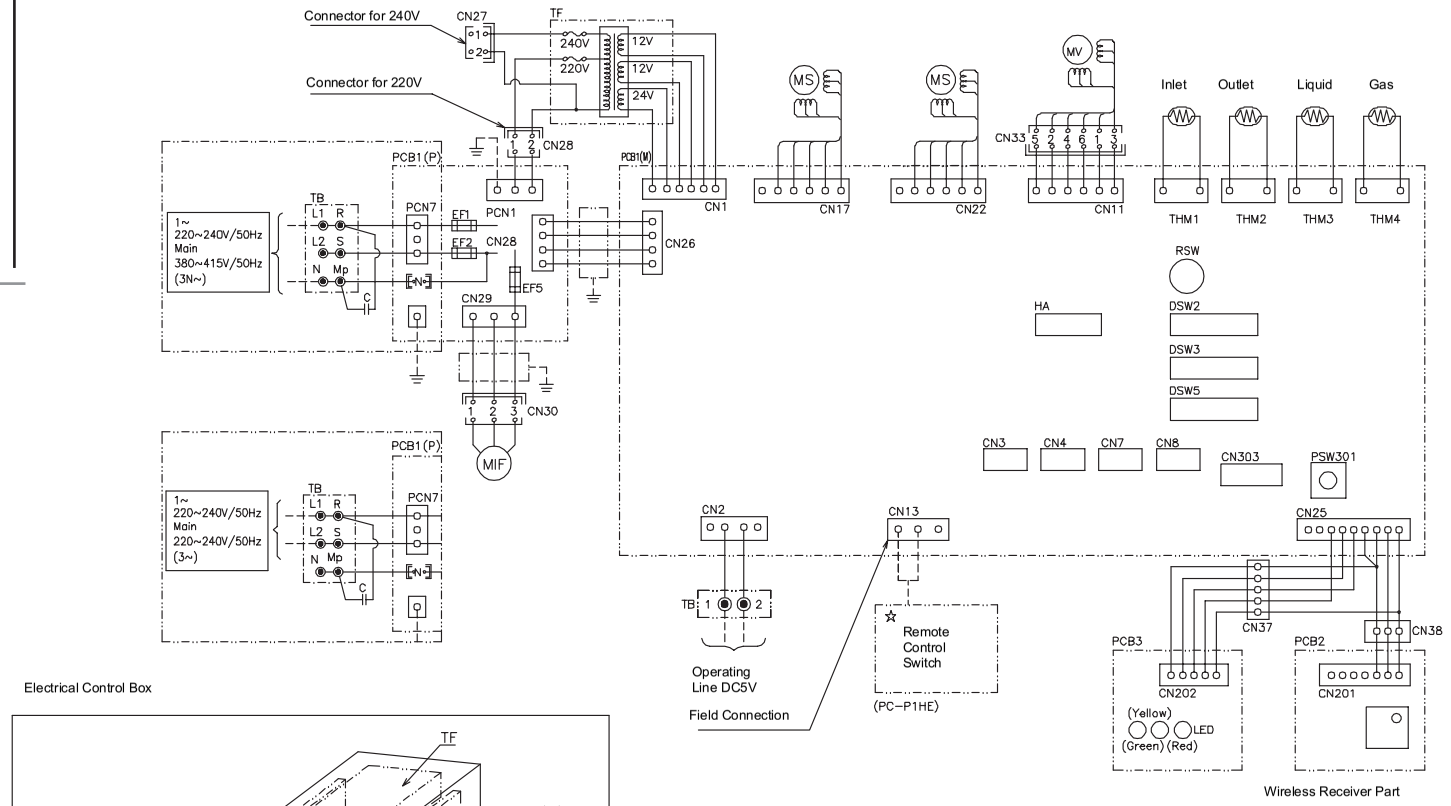
Electrical Control Box for Indoor Unit



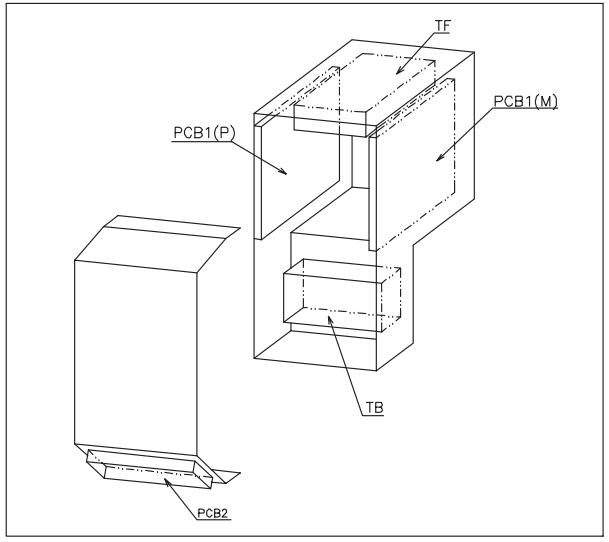
Mark	Name	Remarks
AR1	Auxiliary Relay	
CA	Capacitor for Indoor Fan	
CN 20~n	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Code	On PCB
DSW8	Fuse Recover/ Remote Controller Selector	On PCB
EF2,EFR1,EFS1	Fuse	On PCB
FS	Float Switch	
ITI	Internal Thermostat for Indoor Fan Motor	
MD	Motor for Drain Discharge Mechanism	Option
MIF	Motor for Indoor Fan	
MV	Micro-Computer Control Expansion Valve	
LED1~3	Alarm Code	On PCB
PCB	Printed Circuit Board	
RCS	Remote Control Switch	Optional Part
RSW	Indoor Unit No. Settings	On PCB
TB	Terminal Board	
TF	Transformer	
THM1	Inlet Air Thermistor	On PCB
THM2	Outlet Air Thermistor	On PCB
THM3	Freeze Protection	On PCB
THM4	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	On PCB
YH2	Relay for Drain Motor	DC Coil
YH1	Relay for HI Fan Motor Tap	DC Coil
YME	Relay for ME Fan Motor Tap	DC Coil
YLO	Relay for LO Fan Motor Tap	DC Coil
YSLO	Relay for SLO Fan Motor Tap	DC Coil
Y52H	Relay for Electric Heater	DC Coil
◎	Terminals	
—⊠—	Close-end Connector	
·X·	Field Supplied	
– ·· – ·· –	Field Wiring	
– – – – –	Earth Wiring	
———	Factory Wiring	

***NOTE**: All the field wiring equipment must comply with local codes*

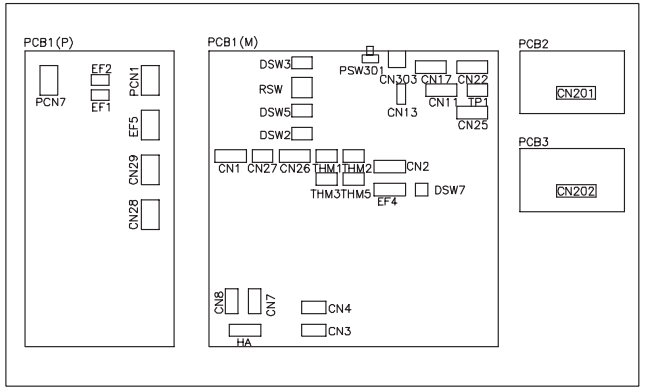
Electrical wiring diagram for models: RPK-0.8/2.0FSNM



Electrical Control Box



Printed Circuit Board

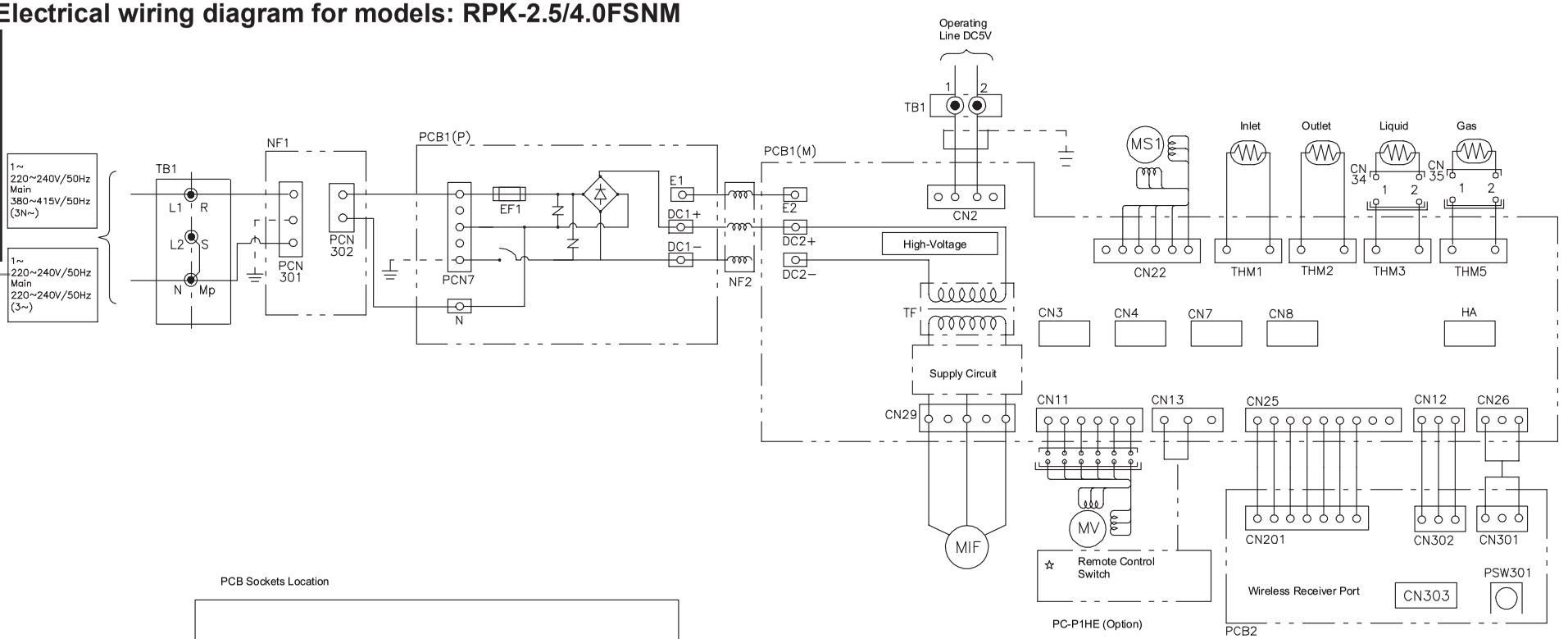


Mark	Name	Remarks
C	Capacitor	
CN	Connector	
DSW2	Optional functions	
DSW3	Unit Capacity Code	On PCB1(M)
DSW5	Refrigerant Cycle No.	On PCB1(M)
EF1, EF2,	Fuse	On PCB(P)
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
LED1~3	Alarm code	On PCB3
PCB1(P),1(M)	Printed Circuit Board	
PCN	Connector on PCB	
PSW301	Switch for emergency operation	
RSW	Indoor Unit No. Settings	On PCB1(M)
TF	Transformer	
TB	Terminal board	
THM1	Inlet Air Thermistor	
THM2	Outlet Air Thermistor	
THM3	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	
YH2	Relay	On PCB1(M)
◎	Terminals	
—⊠—	Close-end Connector	
☆	Optional Parts	
– · · · –	Field Wiring	
– – – – –	Earth Wiring	
————	Factory Wiring	
*	Field Connection	

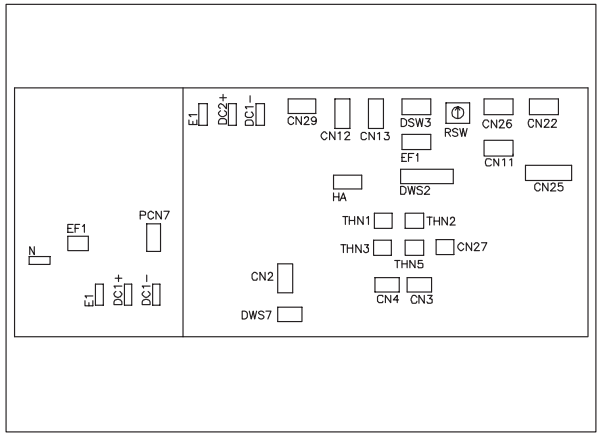
***NOTE**: All the field wiring equipment must comply with local codes*

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Electrical wiring diagram for models: RPK-2.5/4.0FSNM



PCB Sockets Location

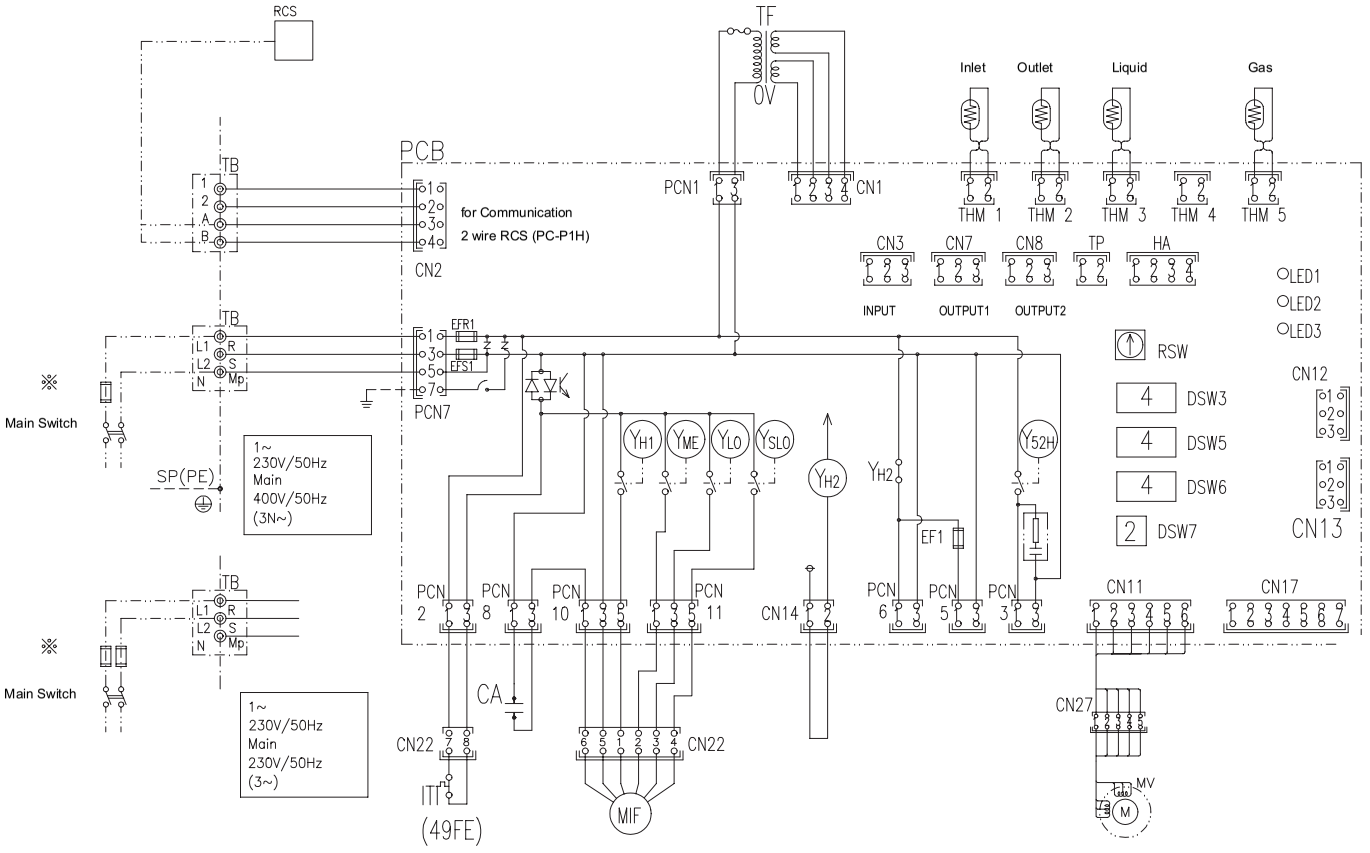


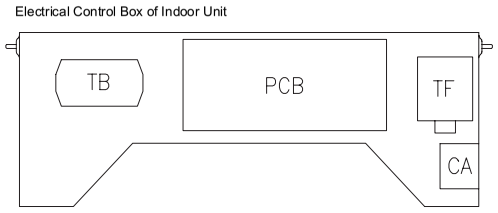
Mark	Name	Remarks
C	Capacitor	
CN	Connector	
DSW2	Optional functions	
DSW3	Unit Capacity Code	On PCB1(M)
DSW5	Refrigerant Cycle No.	On PCB1(M)
EF1, EF2,	Fuse	On PCB(P)
MIF	Motor for Indoor Fan	
MS	Motor for Automatic Swing Louver	
MV	Micro-Computer Control Expansion Valve	
LED1~3	Alarm code	On PCB3
PCB1(P),1(M),2,	Printed Circuit Board	
PCN	Connector on PCB	
PSW301	Switch for emergency operation	
RSW	Indoor Unit No. Settings	On PCB1(M)
TF	Transformer	
TB1	Terminal board	
THM1	Inlet Air Thermistor	
THM2	Outlet Air Thermistor	
THM3	Liquid Pipe Thermistor	
THM5	Gas Pipe Thermistor	
YH2	Relay	On PCB1(M)
◎	Terminals	
—⊠—	Close-end Connector	
☆	Optional Parts	
– ·· – ·· –	Field Wiring	
– – – – –	Earth Wiring	
———	Factory Wiring	
*	Field Connection	

i ***NOTE:*** *All the field wiring equipment must comply with local codes*

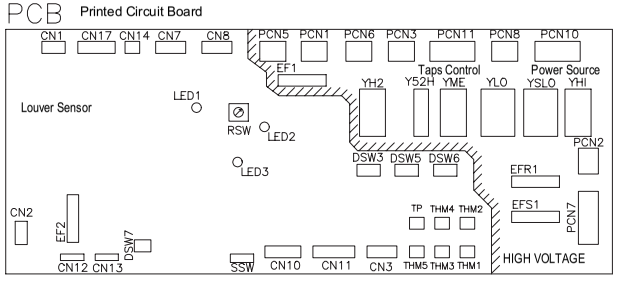
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Electrical wiring diagram for models: RPF(I)-1.0~2.5FSNE





for RCS
PC-2H2

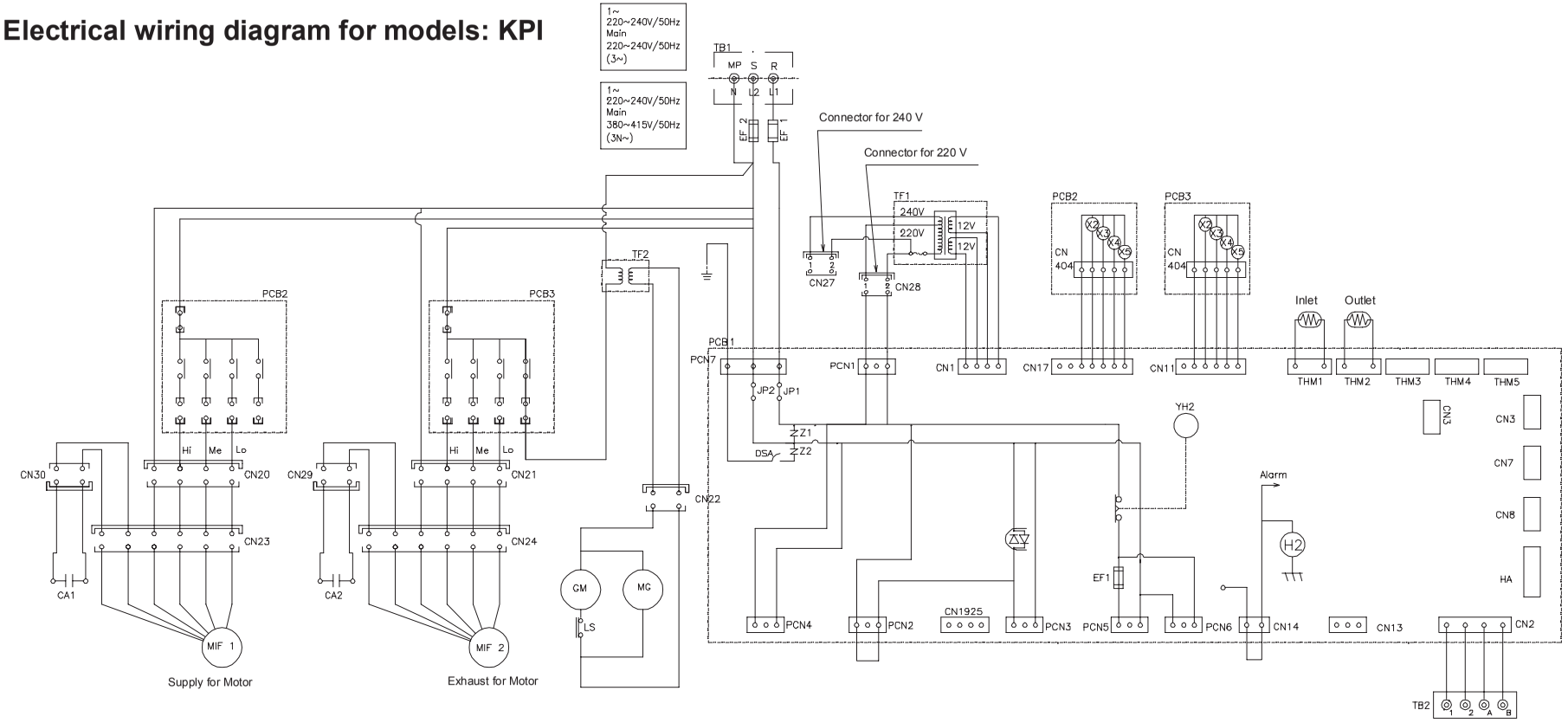


Mark	Name	Remarks
CA	Capacitor for Indoor Fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Models Code	On PCB
DSW7	Fuse Recover/ Remote Controller Selector	On PCB
RSW	Indoor Unit no. Setting	On PCB
EFR1,EFS1,EF1	Fuse	On PCB
ITI	Internal Thermostst for Indoor Fan Motor	
LD1~3	Alarm Code	On PCB
MIF	Motor for Indoor Fan	
MV	Expansion valve	On PCB
PCB	Printed Circuit Board	
RCS	Remote Control Switch	Optional Part
RSW	Indoor Unit No. Settings	On PCB
SSW	Slide Switch	
TB	Terminal Board	
THM1	Inlet Air Thermistor	On PCB
THM2	Outlet Air Thermistor	On PCB
THM3	Liquid Pipe Thermistor	On PCB
THM5	Gas Pipe Thermistor	On PCB
TF	Transformer	
YME	Relay for ME Fan Motor Tap	DC Coil
YLO	Relay for LO Fan Motor Tap	DC Coil
YSLO	Relay for SLO Fan Motor Tap	DC Coil
YH1	Relay for Hi Fan Motor Tap	DC Coil
◎	Terminals	
·X·	Field Connection	
– ·· – ·· –	Field Wiring	
- - - - - -	Earth Wiring	
————	Factory Wiring	

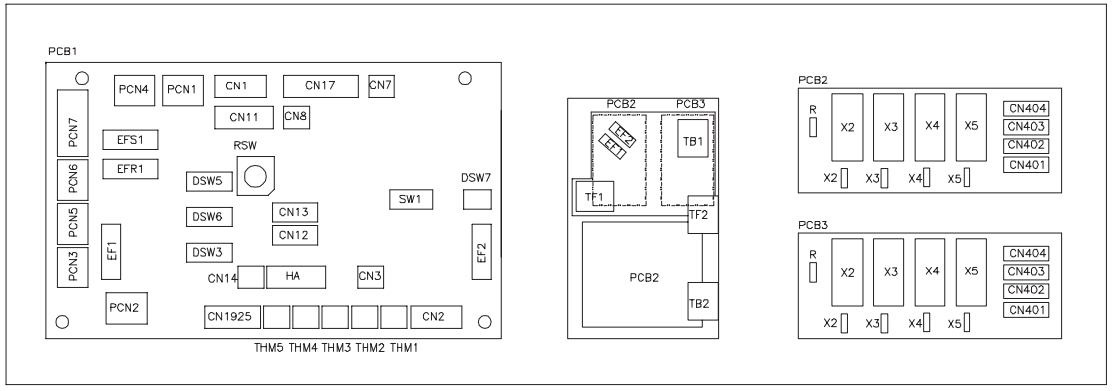
***NOTE**: All the field wiring equipment must comply with local codes*

HITACHI
Inspire the Next

Electrical wiring diagram for models: KPI



Printed Circuit Board

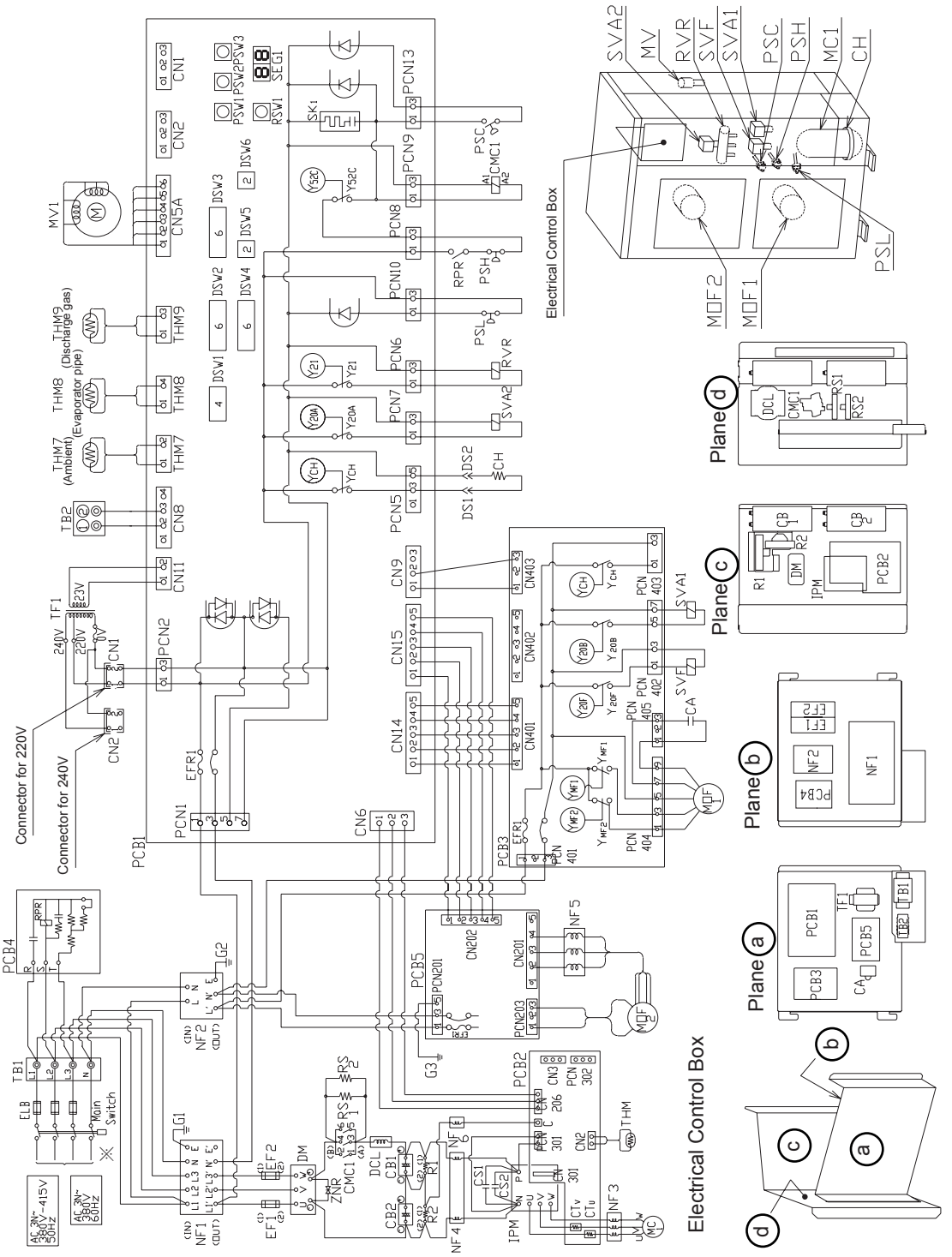


Mark	Name	Remarks
CA	Capacitor for Indoor Fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Models Code	On PCB
RSW	Indoor Unit no. Setting	On PCB
EFR1,EFS1,EF1	Fuse	On PCB
ITI	Internal Thermostst for Indoor Fan Motor	
LD1~3	Alarm Code	On PCB
MIF1,2	Motor for Indoor Fan	
GM	Motor (bypass damper)	
ILS	Magnet for gas by pass damper	
PCB1,2	Printed Circuit Board	
RSW	Indoor Unit No. Settings	On PCB
SSW	Slide Switch	
TB	Terminal Board	
THM1	Inlet Air Thermistor	On PCB
THM2	Outlet Air Thermistor	On PCB
TF	Transformer	
YME	Relay for ME Fan Motor Tap	DC Coil
YLO	Relay for LO Fan Motor Tap	DC Coil
YSLO	Relay for SLO Fan Motor Tap	DC Coil
YH1	Relay for Hi Fan Motor Tap	DC Coil
◎	Terminals	
·X·	Field Connection	
– ·· – ·· –	Field Wiring	
– – · – – · –	Earth Wiring	
———	Factory Wiring	

***NOTE**: All the field wiring equipment must comply with local codes*

Electrical wiring diagram for models: RAS-8/10/12HRNM

Mark	Name
CA, CS1, 2	Capacitor
BC1, 2	Capacitor
CH	Crankcase Heater
CMC1	Contactor for compressor motor
DCL	Reactor
DS1, 1	I.F. Connector
DM	Diode Module
DSW1~6	Dip switch on PCB1
EF1, 2	Fuse
IPM	Inverter System Poer Module
MC1	Motor for compressor
MOF1, 2	Motor for Outdoor Fan
MV1	Micro-computer Control Expansion Valve
NF1~6	Noise Filter
PCB1~5	Printed Circuit Board
PSC, PLS	Pressure switch for control
PSH	High presure switch for protection
PSW1~3	Push switch on PCB1
RS1, 2	Resistor for starting
R1, 2	Resistor
RVR	Reversing Valve Relay
SVA1, A2 SVF	Solenoid Valve for Hot Gas Bypass
TB1, 2	Terminal Board
TF1	Tranformer
THM7~9	Thermistor
ZNR	Surge Absorber
※	Field supplied



4. Remote control switch installation

This chapter describes the procedures that you must follow to install the optional remote control switches that work with the Set-Free FSN(E)/FXN(E)/FSVNE 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 equipment.*
- *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.

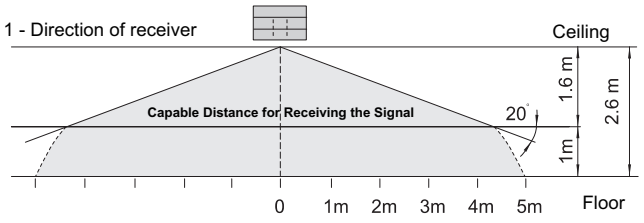
■ Location of the remote control switch

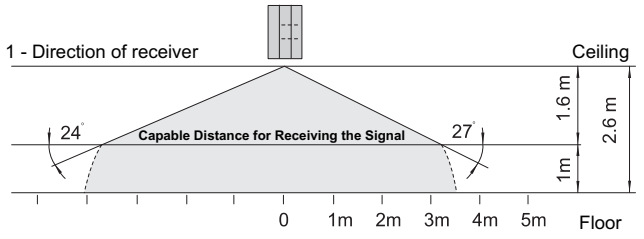
1. With the customer's acceptance, select a suitable handling place and determine the installation place for the remote control switch.
2. If the installation includes a remote control thermostat, select the installation place according to the following considerations:
   - A place where the average 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)

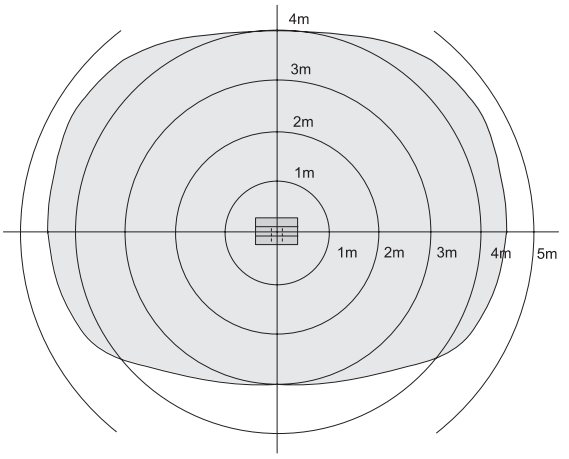
Conditions:
- Typical office room.
- No electronic lamp within 1m around the receiver part of the panel or the receiver kit.





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.

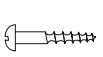
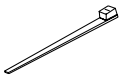
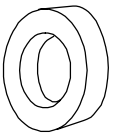


4

4.1. INSTALLATION OF THE REMOTE CONTROL SWITCH <PC-P2HTE, PC-P1HE>

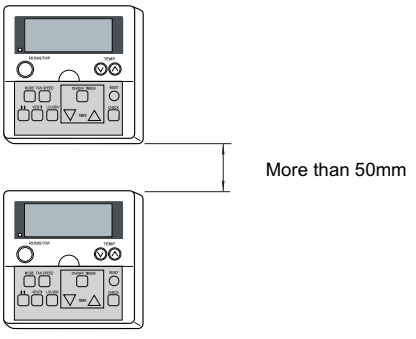
4.1.1. BEFORE THE INSTALLATION

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

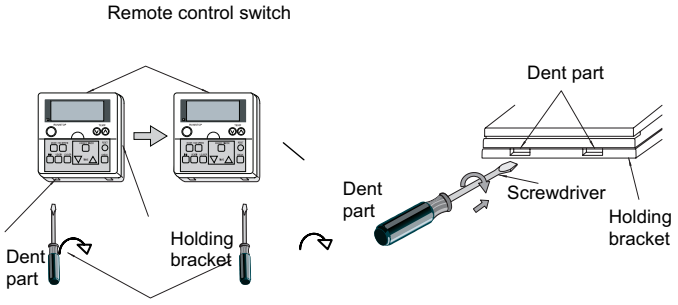
4.1.2. INSTALLATION AREA

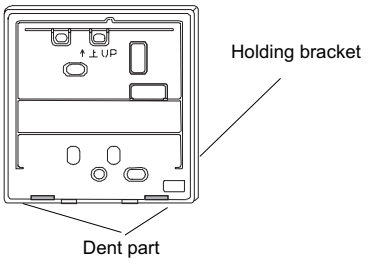
If you are installing the remote control switches vertically, keep a distance of more than 50 mm between the remote control switches. If the distance is shorter than 50 mm, the front panel of the remote control switch cannot open wide enough.



4.1.3. 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.

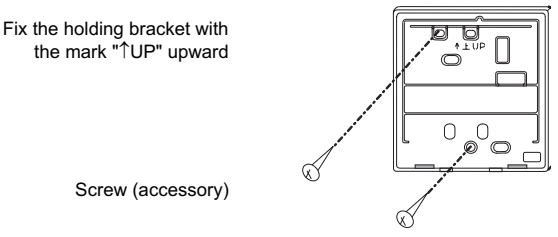




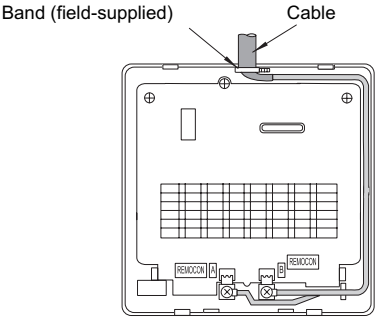
– Attach the remote control switch to the holding bracket as follows.

■ **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.

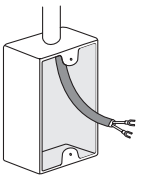


– Peel the sheath of the cable and lead the cable through the groove.

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

■ **If you are using the switch box**

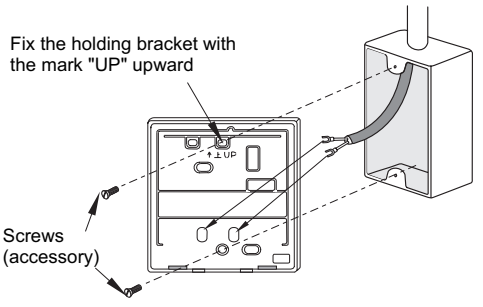
– Field-supplied JIS Box (JIS 8336-1998).



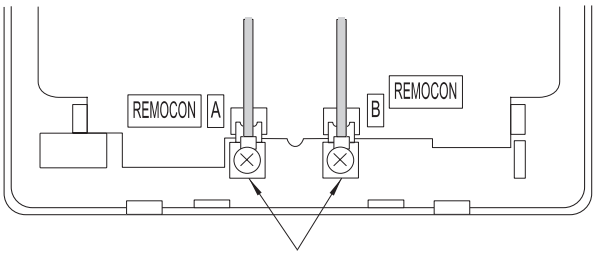
The following five types are available:
1. Switch box for one remote control switch (without panel)
2. Switch box for two remote control switches (without panel)
3. Switch box for one remote control switch (with panel)
4. Switch box for two remote control switches (with panel)
5. Outlet box (with panel)

Run the cable through the conduit tube in the wall.

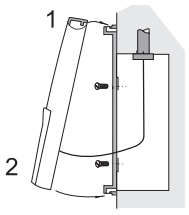
– Fix the holding bracket to the switch box.



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



– Mounting procedures.

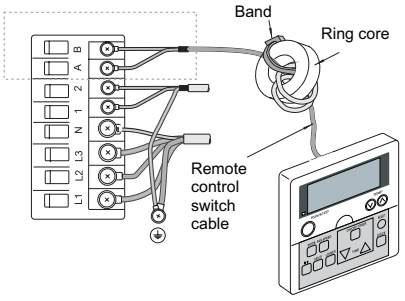


1. Insert the hooks of the remote control switch into the holes at the top of the holding bracket.
2. Push the lower part toward the holding bracket.
3. When you hear a clicking sound, the remote control switch is already attached to the holding bracket. You have finished the mounting work.

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

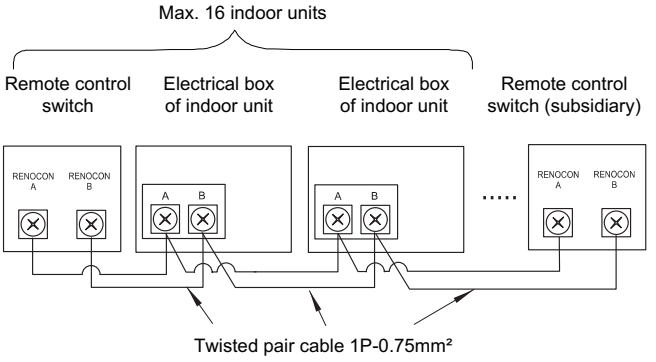
■ Standard wiring



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

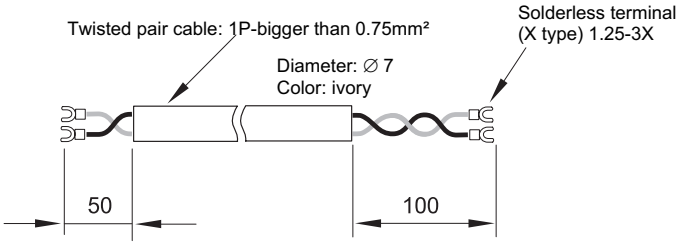
This remote control switch can control up to a maximum of sixteen units.
If you are going to modify the electrical wiring, perform the wiring connection and other works as the following procedures explain.
You can connect two remote control switches in the same unit or the same unit groups. The second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



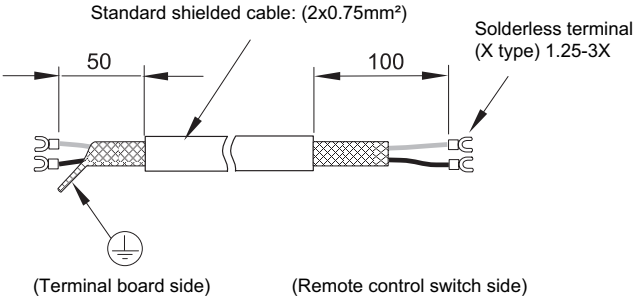
There are optional cables of 0.75 mm² wire. The cables have different lengths. The cables are also fitted with connectors.

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:

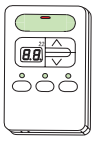
Master unit	1st unit	2nd unit	3rd unit
			
4th unit	5th unit	6th unit	7th unit
			

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>

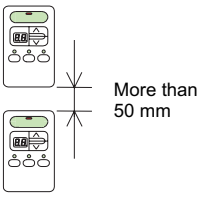
4.2.1. BEFORE THE INSTALLATION

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)

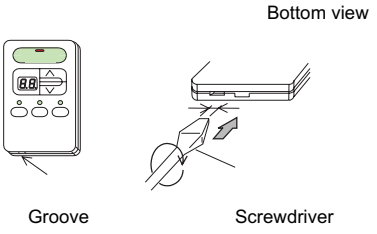
4.2.2. INSTALLATION AREA

– If you are installing the remote control switches vertically, keep a distance of more than 50 mm between the remote control switches.



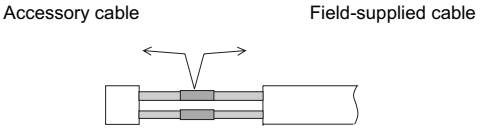
4.2.3. INSTALLATION PROCEDURES

– 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.



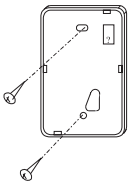
– Connecting the cables

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

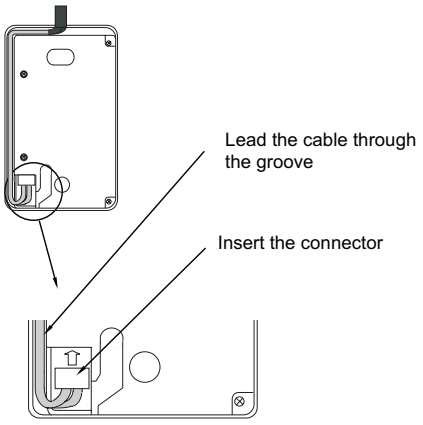


– Attach the remote control switch to the holding bracket and connect the cable as follows.

  If you are exposing the remote control cable:

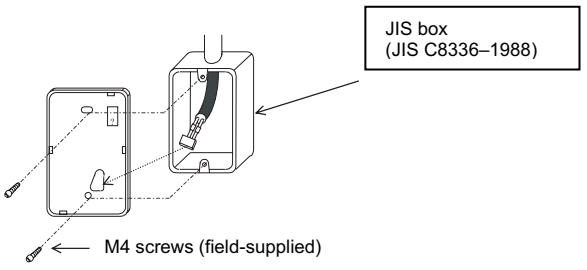


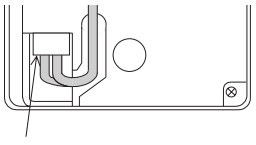
Fix the holding bracket onto the wall with screws (accessory)



If you are using the switch box:

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

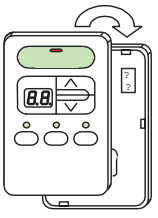




Insert the connector

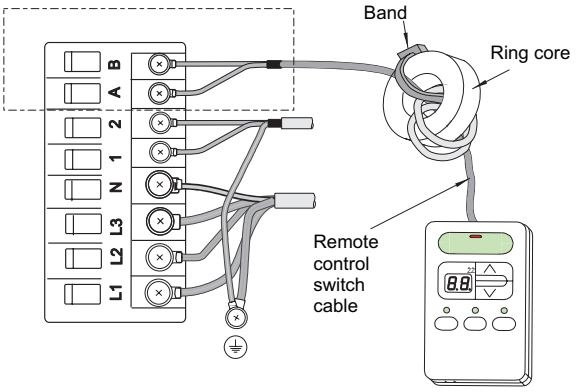
– Attach the remote control switch to the holding bracket.

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



4.2.4. ELECTRICAL WIRING

■ Standard wiring



4

ATTENTION:

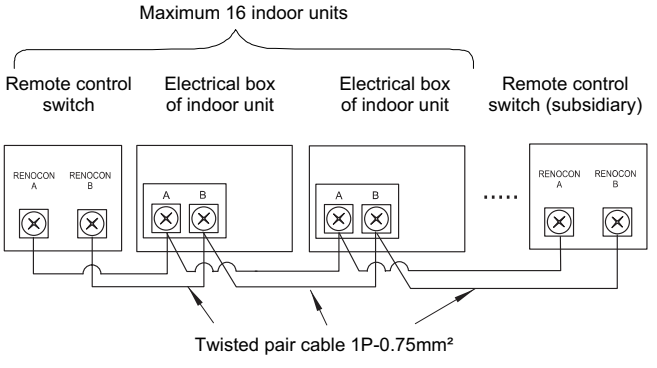
- *When you are installing the unit, attach the black ring core (accessory.*
- *Before connecting the cable of the remote control switch to the terminal board, insert this cable into the ring core with two turns as shown in the figure above. If the wiring is 0.75 mm^2, you need to peel off the outside 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.

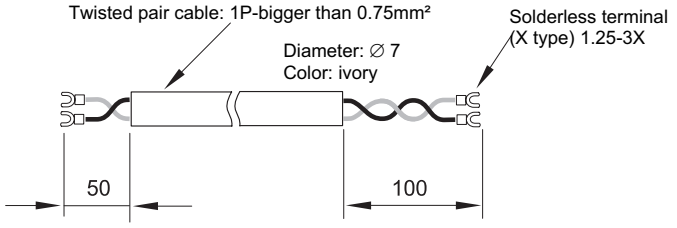
You can connect two remote controls in the same unit or the same unit groups. The second remote control is the subsidiary remote control switch as shown below.



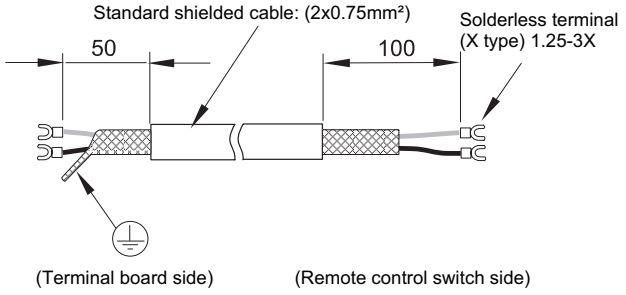
There are optional cables of 0.75 mm² wire. The cables have different lengths. The cables are also fitted with connectors.

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.

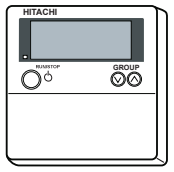
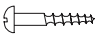
Address of the indoor units:

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

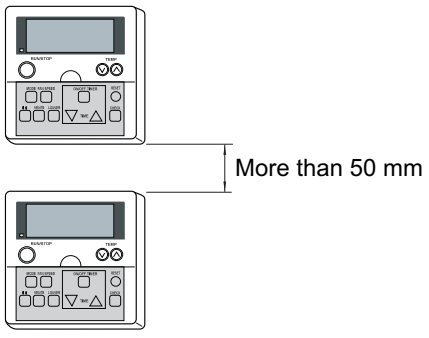
Check the contents and the number of accessories in the packing.

	
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.

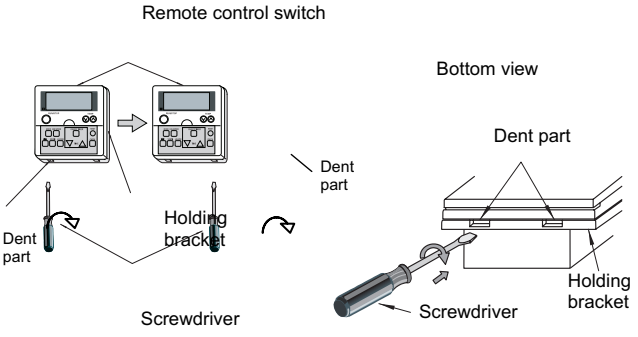
4.3.2. INSTALLATION AREA

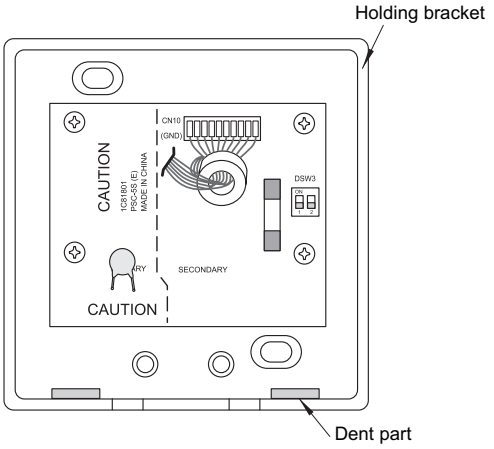
If you are installing the remote control switches vertically, keep a distance of more than 50mm between the remote control switches. If the distance is shorter than 50mm, the front panel of the remote control switch cannot open wide enough.



4.3.3. INSTALLATION PROCEDURE

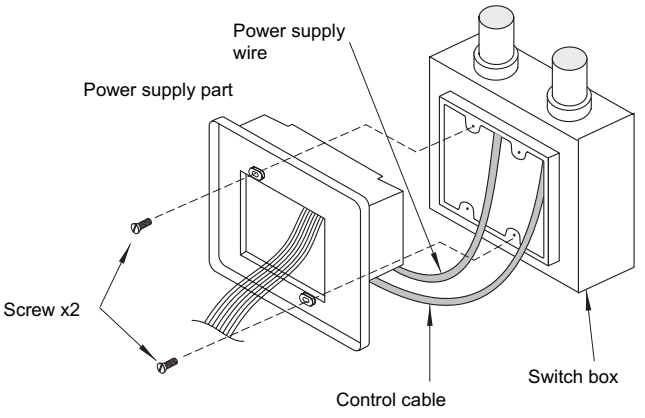
1. Insert the edge of the flat-headed screwdriver into the dent parts at the bottom of the holding bracket. Next, push and turn the screwdriver. Then, remove the linked control part from the power supply part as shown in the next figure.



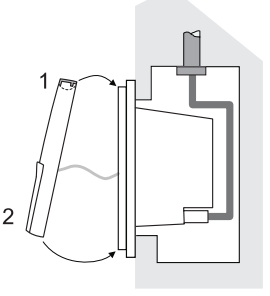


2. Attach the power supply part to the switch box.

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.

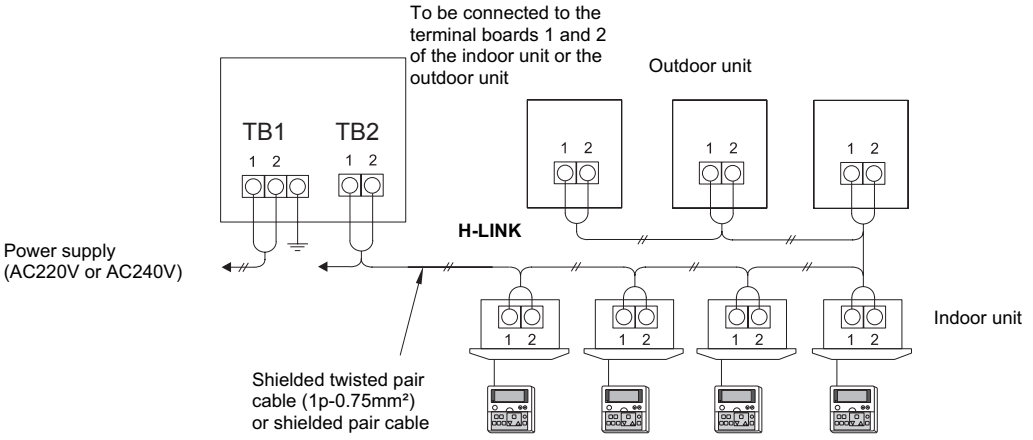


4

4.3.4. ELECTRICAL WIRING

■ Wiring connection

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



■ Setting the DIP switch

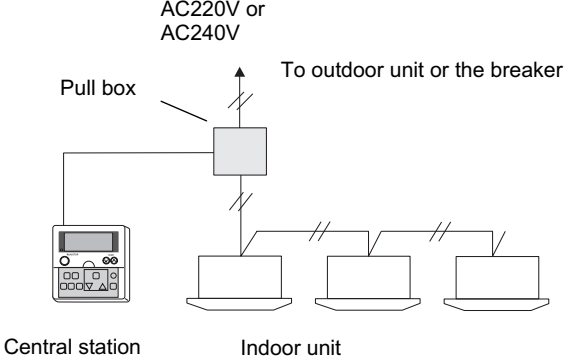
Set the DSW1 as shown below.
When you connect more than one central station (maximum eight units) to the H-LINK, the address setting is required.

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).

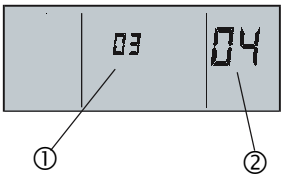
Master unit: The indoor unit that defines a group. The central station sends the orders for one group only to the master unit of that group. You can set as the master unit only one unit from the group of units that are controlled by the same remote control switch.

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

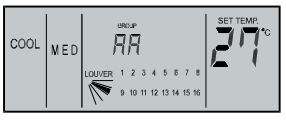
The instructions for the automatic group configuration from group 1 to group 16 are the following:

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.

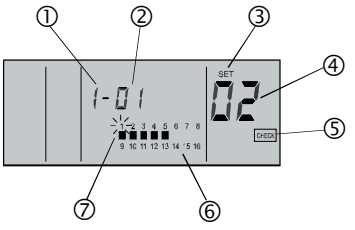
ATTENTION:

- *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).

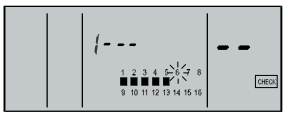
⑦ The group number which you need to set.

▪ 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

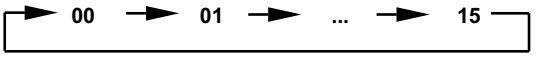
Select the group that you need to set by pressing the GROUP switch. Every time you press the GROUP switch, you move the flickering group number indicator.

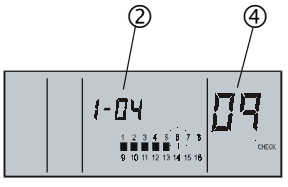


The flickering group number indicator moves, for example when you are selecting the group number 6.

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:



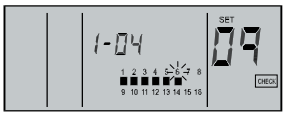


ATTENTION:

- *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.)



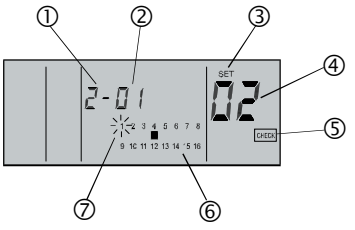
CAUTION:

- *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.

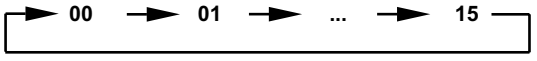
a. Selection of the group that you need to set

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:



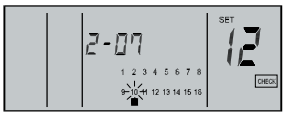


ATTENTION:

- *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.)

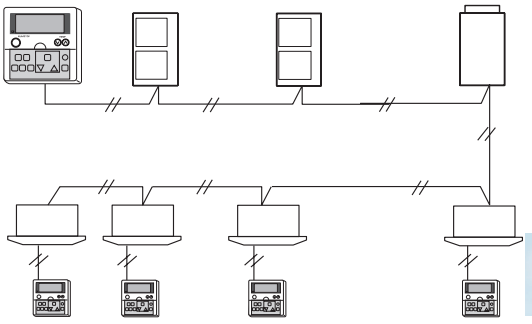


CAUTION:

- *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:

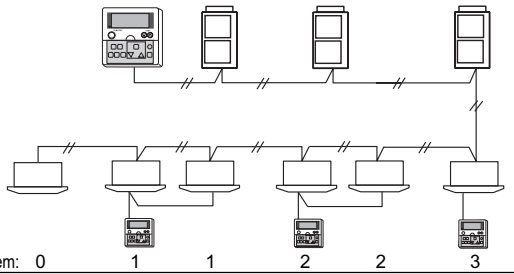


Setting of I.U. Rotary Switch:	0	1	2	3
Group Number:	1	2	3	4

You do not need to perform additional group settings.

Example B:

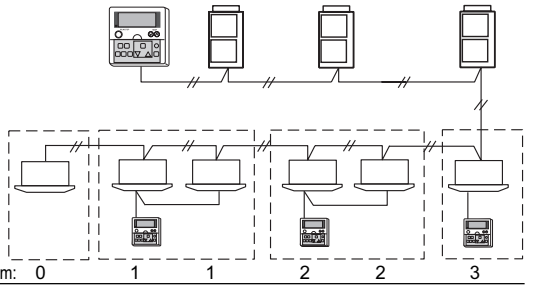
A system where the units have a repeated address of indoor unit and some units are controlled by the same remote control switch.



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.

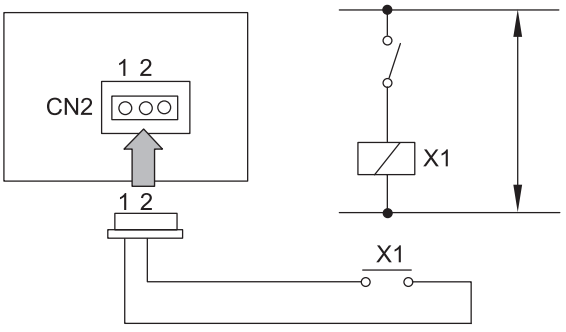
Mode	Port	Setting of the DSW2		
		ON 1 2 3 4	ON 1 2 3 4	ON 1 2 3 4
Input 1	CN2 1-2	Simultaneous operation / stoppage level signal		Simultaneous operation, pulse signal
Input 2	CN2 2-3	Demand	Emergency stoppage	Simultaneous stoppage, pulse signal
Output 1	CN3 1-2	Simultaneous operation output		
Output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

Specifications of the required components:

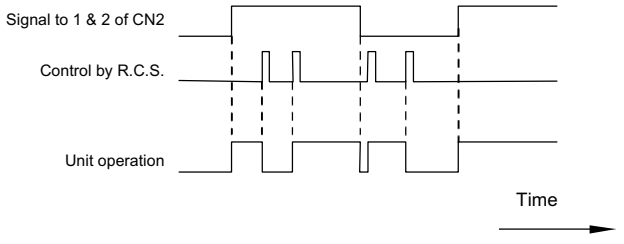
- DC12V non-Voltage A connection
- OMRON MY relay
- PCC-1A

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.

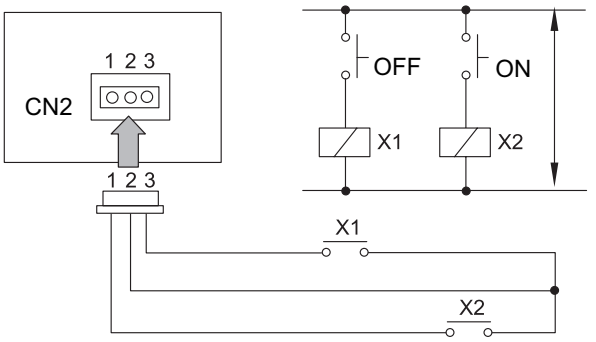


■ Time chart

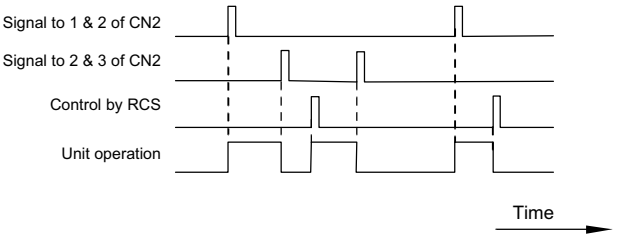


2. Simultaneous operation, pulse signal; simultaneous stoppage, pulse signal

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

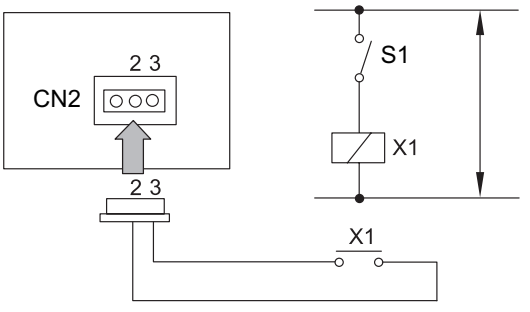


■ Time chart

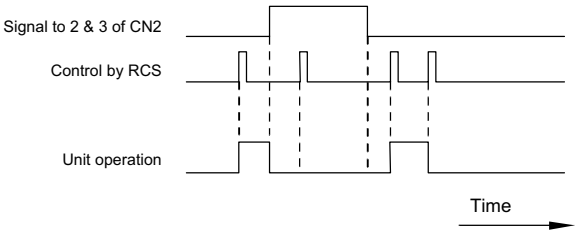


3. Emergency stoppage

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.

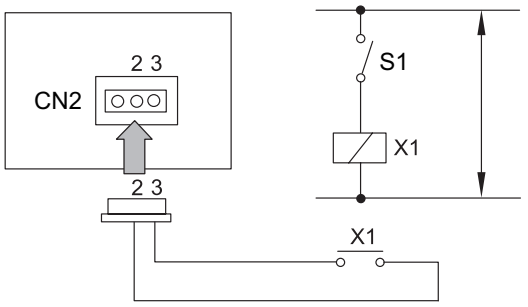


■ Time chart

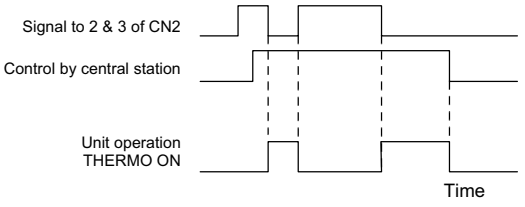


4. Demand

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.

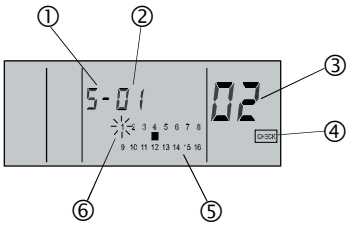
■ Demand setting procedure

– 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).

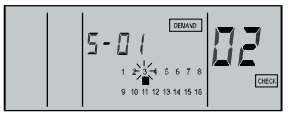
⑥ Only the group which has the master unit already set is displayed. The group that you need to set is flickering.

– 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).

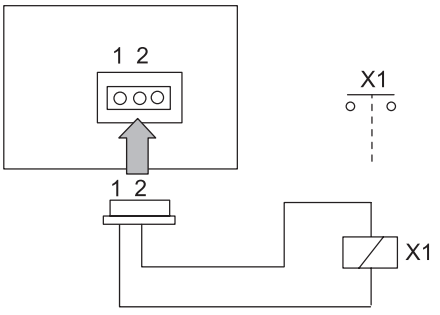
The following is displayed: the refrigerant cycle number and the address of the indoor unit which is set as the master unit of the selected group which you need to set. The indicator "■" appears at the group which is already set with the demand control. The DEMAND indication also appears.

– 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

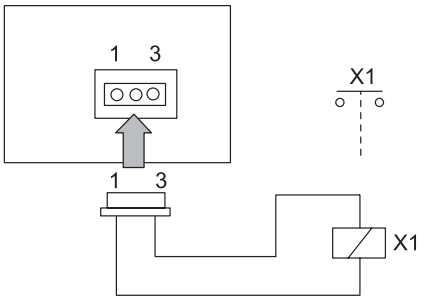
You use this function in order to check the operation status of the units that are controlled by the central station. If any unit is turned ON, the simultaneous operation output will be ON.
The basic wiring is shown below.



4

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

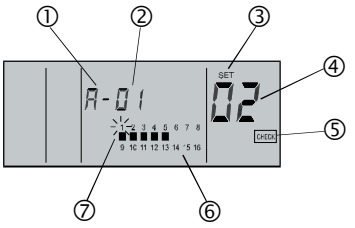
c. Setting procedure:
   – Press the CHECK switch and select the options A - E.
   – Select the group that you need to set by pressing the GROUP switch.
   – Press the RUN/STOP switch. The option setting is done. Then, the indicator "■" appears. The SET indication also appears. (Every time you press 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.*

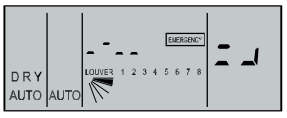
4.3.7. INITIALIZATION OF THE CENTRAL STATION

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

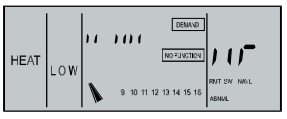
1. Changing to the self-check mode

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.

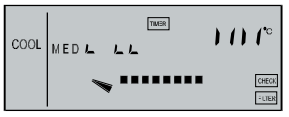
(i)



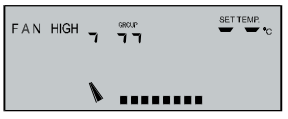
(ii)



(iii)



(iv)

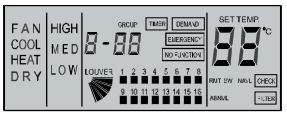


(v)



(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).

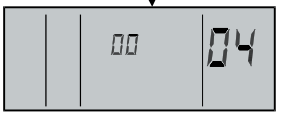


"06" flickers. Press RESET switch and "06" changes to ON. In case of EEPROM initialization, it takes approximately 30 - 60 seconds

Press RESET switch or CHECK switch



To connection check



Group setting table of central station

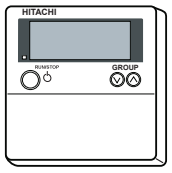
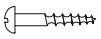
RSW of indoor unit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Indication of PSC-5S	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
00																
01																
02																
03																
04																
05																
06																
07																
08																
09																
10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

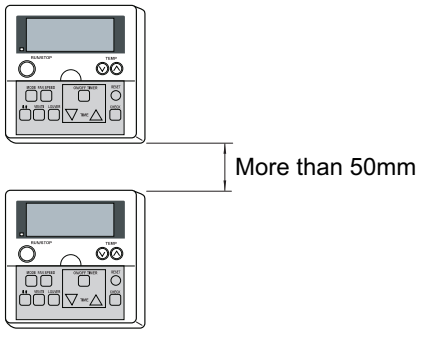
4.4.1. ACCESSORIES

The packing contains the following items:

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

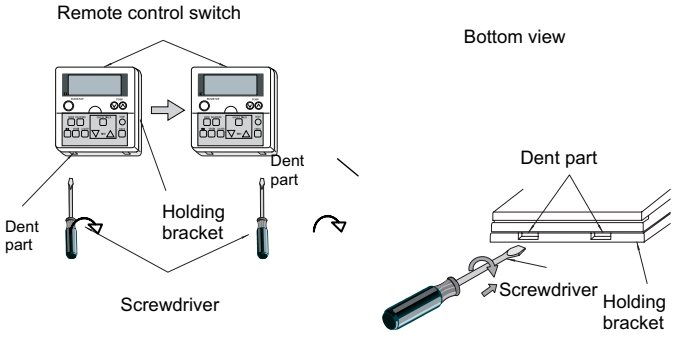
4.4.2. INSTALLATION AREA

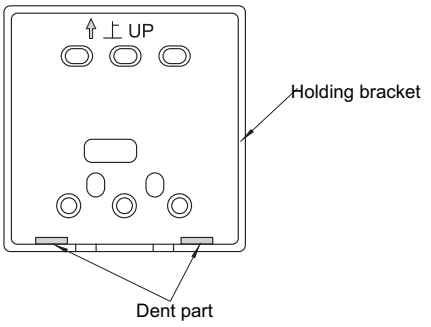
If you are installing the remote control switches vertically, keep a distance of more than 50mm between the remote control switches. If the distance is shorter than 50mm, the front panel of the remote control switch cannot open wide enough.



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.

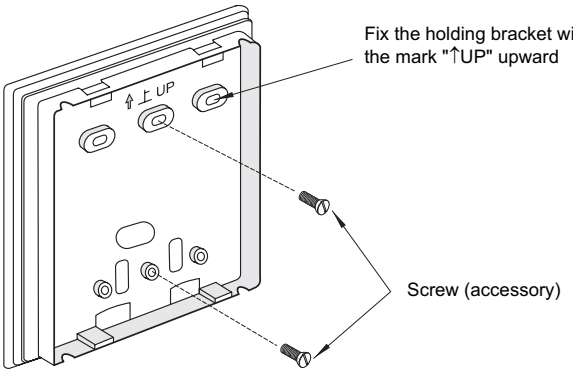




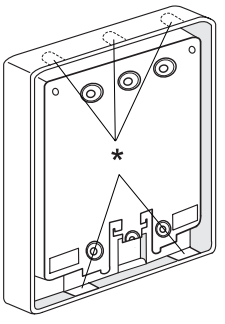
2. Attach the timer to the holding bracket and connect the cable as follows.

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

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

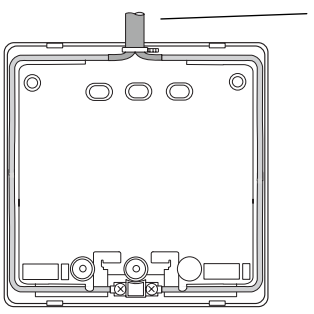


2. Select and cut the knockout hole according to the direction for drawing out the cable.

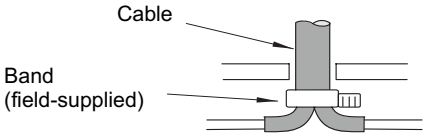


According to the cable arrangement, determine the direction for drawing out the cable and cut the knockout hole. (The knockout hole is one of the positions that is marked with * in the left figure).
If you are using an accessory cable, draw out the cable from one of the knockout holes at the lower side.

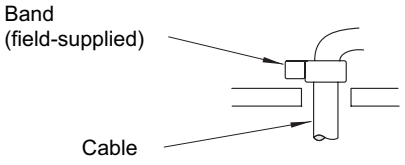
3. Lead the cable through the groove.



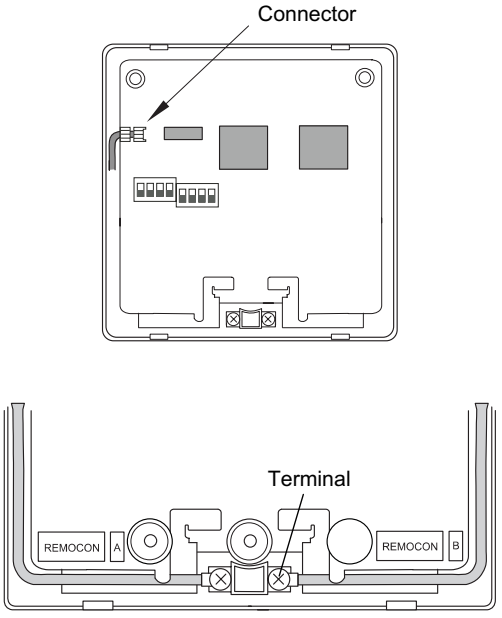
Twisted pair cable



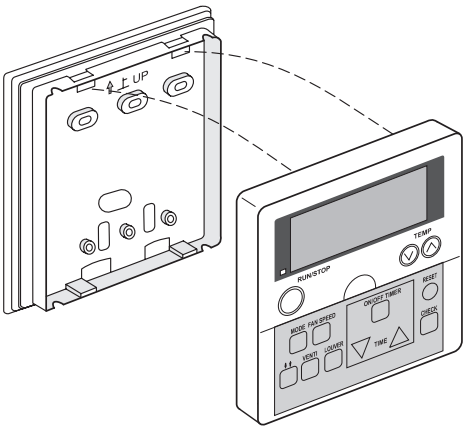
Accessory cable

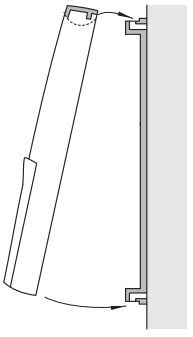


If you are connecting the accessory cable to the connector, remove the protection case.



4. Attach the timer onto the holding bracket.





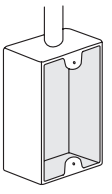
Step 1:
Insert the hooks of the timer to the holes at the top side of the holding bracket.

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.

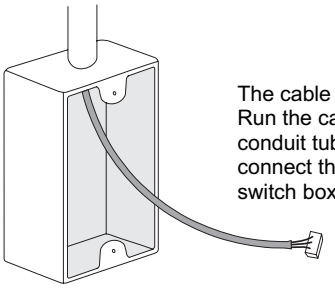
■ If you are using the switch box

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



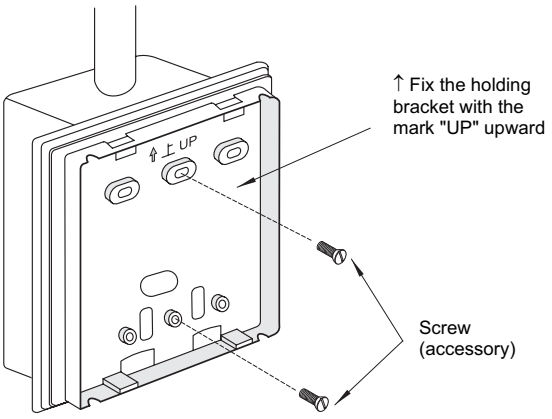
The following five types are available:
1. Switch box for one remote control switch (without panel)
2. Switch box for two remote control switches (without panel)
3. Switch box for one remote control switch (with panel)
4. Switch box for two remote control switches (with panel)
5. Outlet box (with panel)

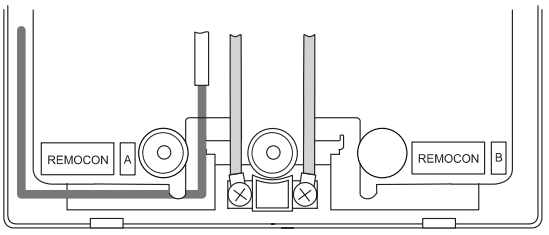
2. Run the cable through the conduit tube in the wall.



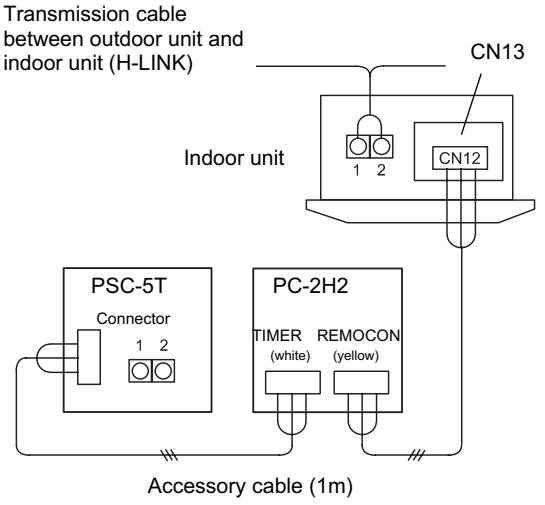
The cable is not exposed. Run the cable through the conduit tube in the wall and connect the cable inside the switch box.

3. Attach the holding bracket onto the switch box.



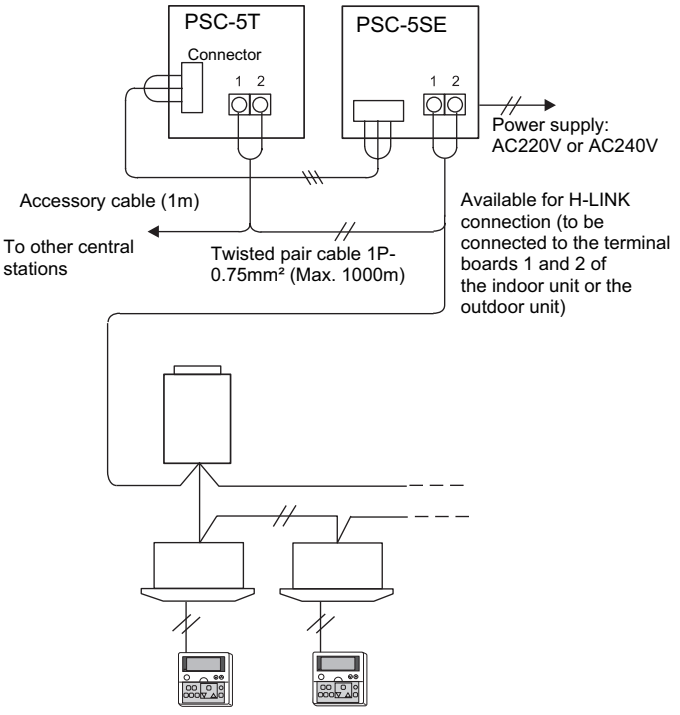


2. If you are using a timer with PC-2H2:



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.



4.4.4. ELECTRICAL WIRING

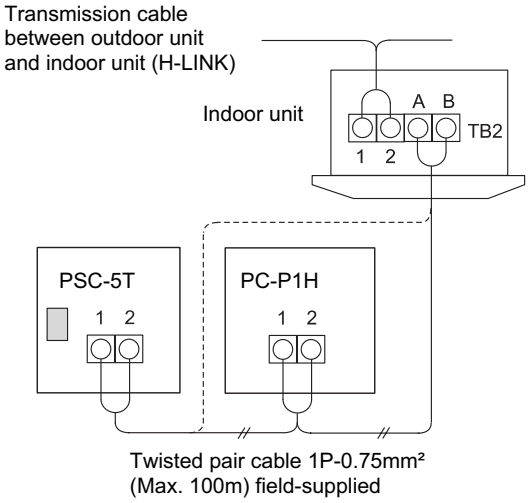
Use this timer with the remote control switch or the central station.

CAUTION:

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

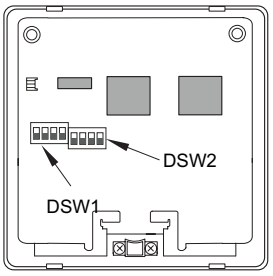
Keep a distance of more than 30 cm between the remote control cable and the transmission cable of the indoor units.

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

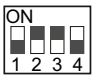
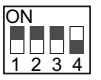


4.4.5. SETTING THE DIP SWITCHES

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				

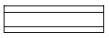
Settings of the DIP switches

	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.

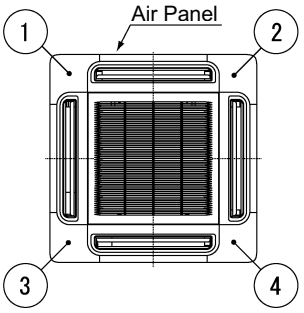
Mod.	Name	Qty	Remarks
PC-RLH8	Receiver Kit 	1	With Connection Wire
	Connecting Cable 	3	With Connection Wire
	Band 	1	For Fixing Cable
	Cover 	1	For Protection of Connecting Cable

4.5.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

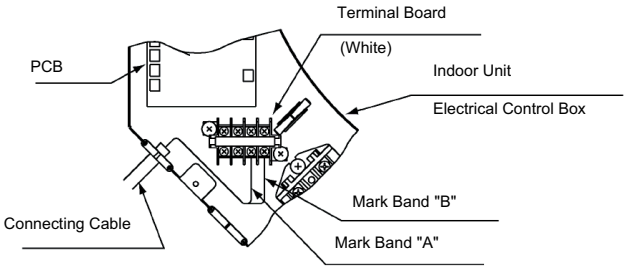
CAUTION:
Pay attention to the following installation procedures. If not, it may drop from the panel, resulting in a serious accident.

■ **PC-RLH8**

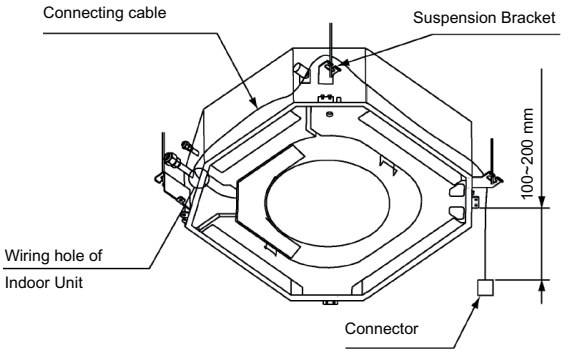
1) Install the wireless receiver kit, the indoor unit and the air panel at the same time.
2) In case that the wireless receiver kit is installed after installing the indoor unit, turn off the power source of the indoor unit and remove the air panel.
3) This receiver kit can be installed at the position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



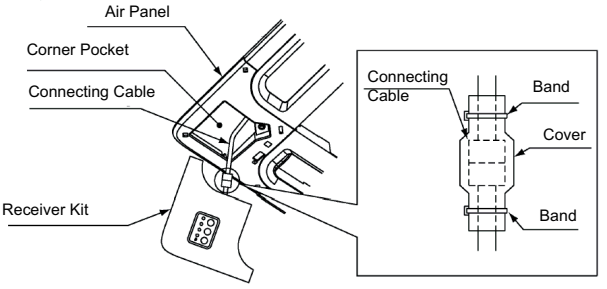
4) Remove the cover of indoor unit electrical controlbox and connect the cable to the terminal board (white) as shown below.



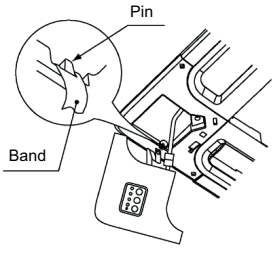
5) Draw out the connecting cable from the wiring hole of the indoor unit, and lead the cable over the suspension bracket of the indoor unit to the installing position of the receiver kit. Bundle the extra cable with a band.



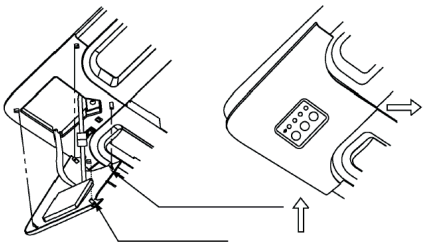
6) Install the air panel (option) onto the indoor unit.
7) Attach the receiver kit in the following procedure.
   a) Draw out the connecting cable from the pocket and connect the connecting cable and the wire of the receiver kit. After connecting the cable, wrap the connector with the cover and fix them with a band.



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



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

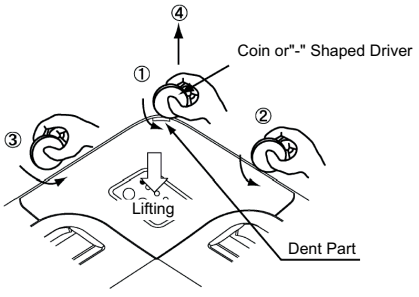


8) Hook the other fixing nails (3 positions) at the square holes of air panel.

NOTE:

When removing the receiver kit after installing the air panel:

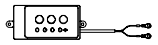
- *The corner position of the receiver kit can be lifted when a coin or a "-" shaped driver is inserted into the dent part ①and twisted downward. With ① lifted, twist a coin or a "-" shaped driver at the positions of ②and ③, the whole receiver kit can be lifted.*
- *After disconnecting the fixing nails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



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

(for RCD-FSN Units)

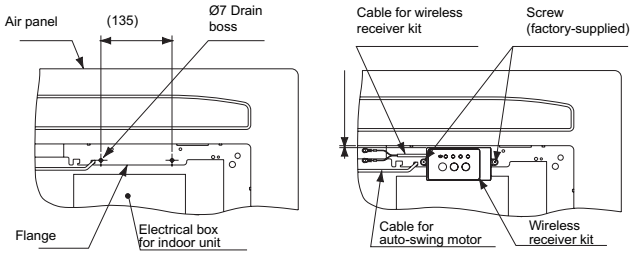
The packing contains the following items. Check the contents and the number of items in the packing.

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

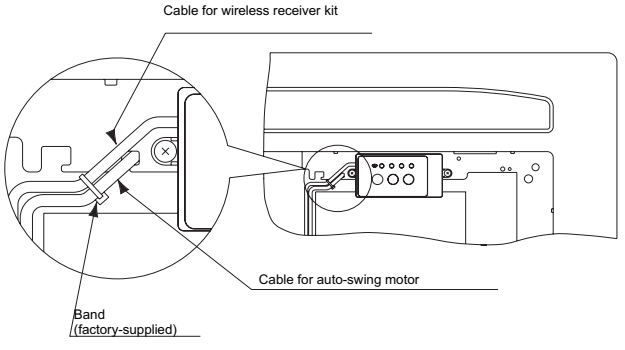
4.6.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

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

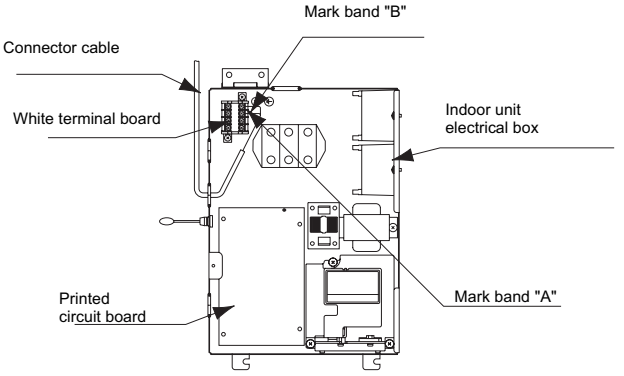
1. Install the wireless receiver kit, the indoor unit and the air panel at the same time.
2. If you install the wireless receiver kit after installing the indoor unit, turn off the power source of the indoor unit. Then, remove the air inlet grille.
3. Fix the wireless receiver kit to the air panel by 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.

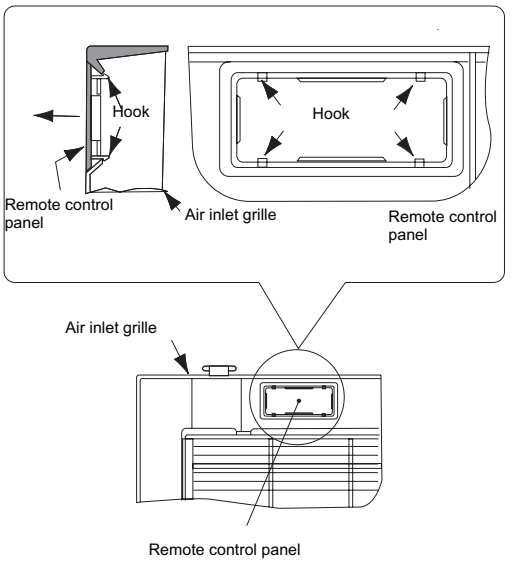


5. Remove the panel of the electrical box of the indoor unit. Then, connect the cable to the terminals A and B of the white terminal board.

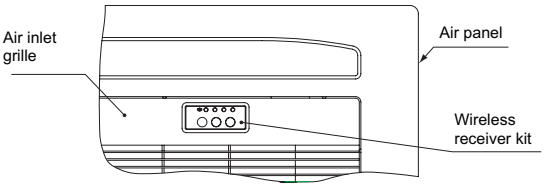


NOTE:
After connecting the cable, tie the remaining cable length with the factory-supplied band. Then, place the cables in the electrical box.

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

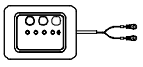
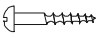
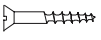


7. After fixing the air panel, attach the air inlet grille to the air panel.
   - Make sure that the location of the square hole of the air inlet grille coincides with the location of the wireless receiver kit of the air panel.
   - Make sure that the square hole of the air inlet grille does not clamp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



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

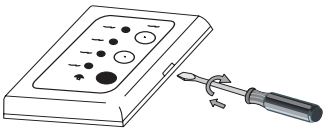
The packing contains the following items. Check the contents and the number of items in the packing.

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.

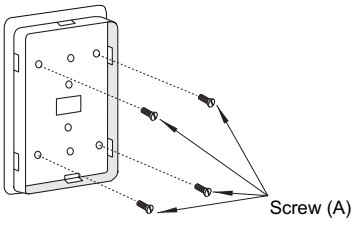
1. Install the wireless receiver kit and the indoor unit at the same time.
2. If you install the wireless receiver kit after installing the indoor unit, turn off the power source of the indoor unit.
3. Make sure that the distance between the wireless receiver kit and the indoor unit is less than 5m.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



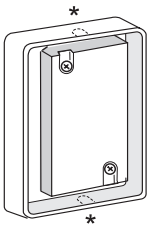
5. Install the wireless receiver kit onto the wall or the ceiling as follows:

A. If you are exposing the cable

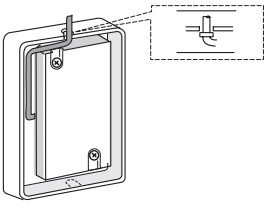
1) Fix the fixing bracket of the wireless receiver kit by means of the screw (A) at the four locations.



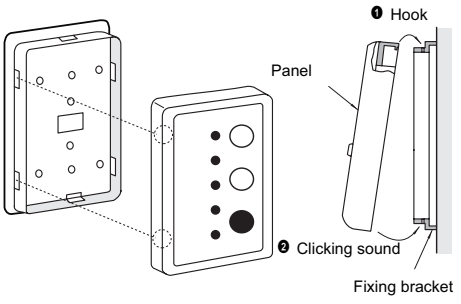
2) Cut one of the knockout holes (*) at the panel.



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

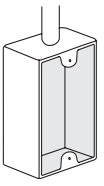


4) Attach the panel. Do not clamp the cable when you are attaching the panel.



B. If you are concealing the cable

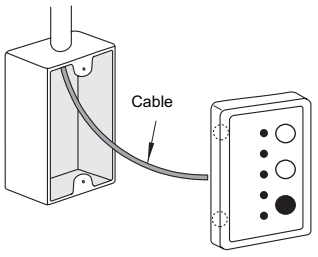
1) Prepare the following field-supplied box.



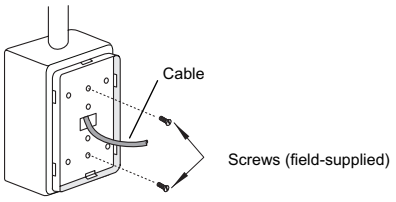
JIS box (JIS C8336-1991)
1. Switch box for one remote control switch (without panel)
2. Small switch box for one remote control switch (without panel)
3. Switch box for one remote control switch (with panel)

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

2) Insert the cable into the rigid metal conduit tube.



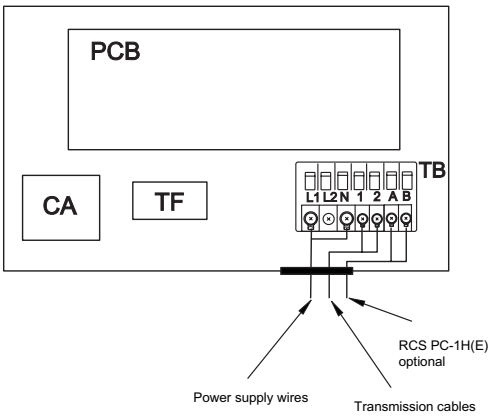
3) Fix the fixing bracket of the wireless receiver kit by means of the field-supplied screws.



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

4) Attach the panel that is the same as A 4

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.

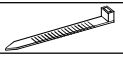
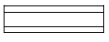


Example: RPI-3.0

4.8. INSTALLATION OF THE RECEIVER KIT <PC-RLH13>

(for RCIM-FSN Units)

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

Name	Qty	Remarks
Receiver Kit 	1	With Connection Wire
Connecting Cable 	1	With Connection Wire
Band 	2	For Fixing Cable
Cover 	1	For Protection of Connecting Cable

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

4.8.1. INSTALLATION OF THE WIRELESS RECEIVER KIT

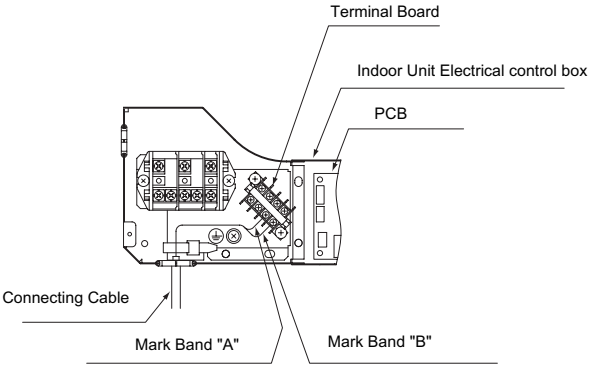
■ PC-RLH13

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 only at one position.

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

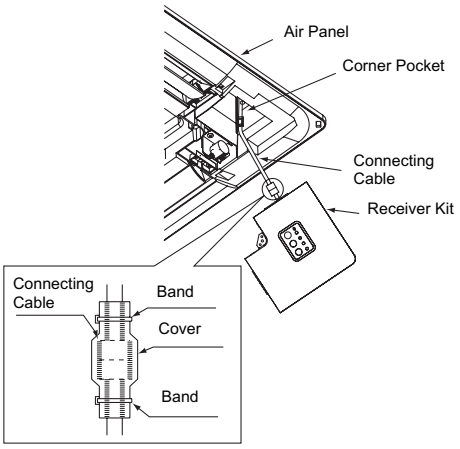


5 Draw out the connecting cable from the wiring hole of the indoor unit, and lead the cable over the to the installing position of the receiver kit.

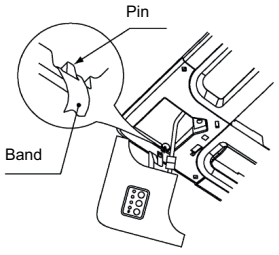
6 Install the air panel (option) onto the indoor unit.

7 Attach the receiver kit in the following procedure.

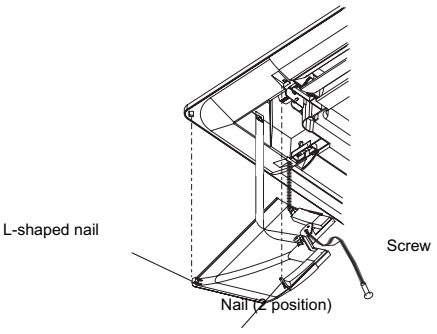
a) Draw out the connecting cable from the pocket and connect the connecting cable and the wire of the receiver kit. After connecting the cable, wrap the connector with the cover and fix them with a band.



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



c) Hook L- shaped nail on the rear side of receiver kit at the square hole of the air panel, and fix it with the screw.



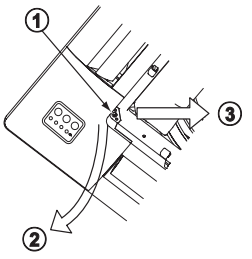
8 Hook the other fixing nails (3 positions) at the square holes of air panel.

NOTE:

When removing the receiver kit after installing the air panel:

1 Remove the screws of ① (4 positions) from the front side of the air panel.

2 Move the receiver kit with hands in the arrow direction ② and remove the nails (2 position) of pocket cover for corner, and slide the receiver kit in the arrow direction ③.

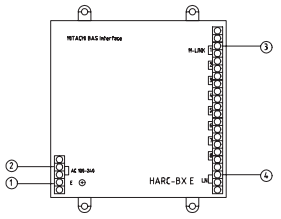


4

4.9. HARC-BX(A/B)

4.9.1. PART NAMES

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



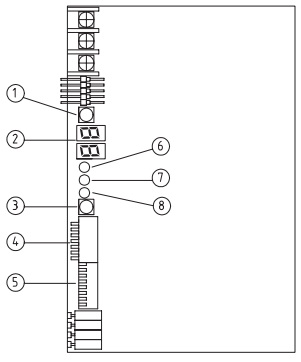
① Power source terminal to be connected to the AC220V~AC240V power source.

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.

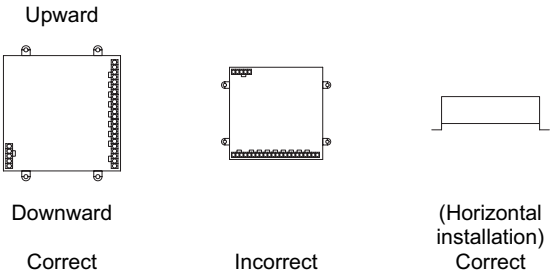
(*) 7-segment display:
Read 4.9.5 "Test run" and 4.9.6 "Maintenance and service" for the details of 7-segment display.

(**) 8P DSW No.1 S201:
Refer to "Setting the DIP switch" in section 4.9.5 for details and the functions of the HARC-BX E.

(***) 8P DSW2 (S202):
Refer to "Setting the DIP switch" in section 4.9.5: (8P DSW1 and 8P DSW2).

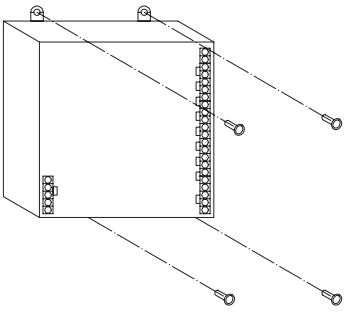
4.9.2. INSTALLATION PROCEDURE

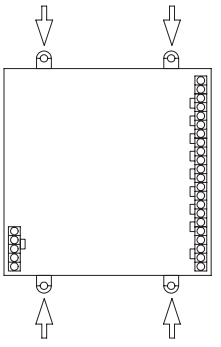
1. Install the HARC-BX E by keeping the screw terminal board at the lower side.



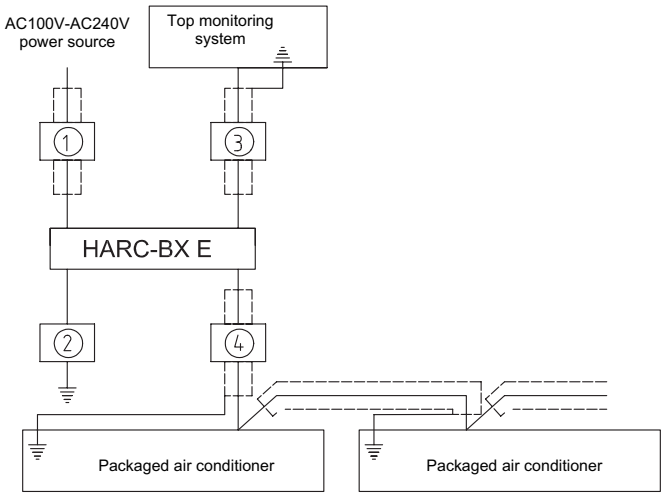
2. Fixing method by means of the M4 screws (field-supplied).

   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.

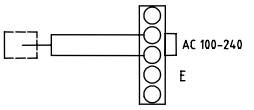
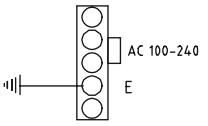
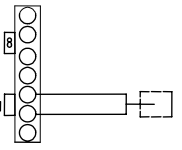
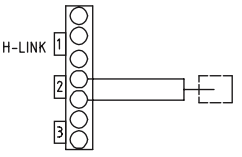
Recommended types of cables:

	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

4.9.3. ELECTRICAL WIRING

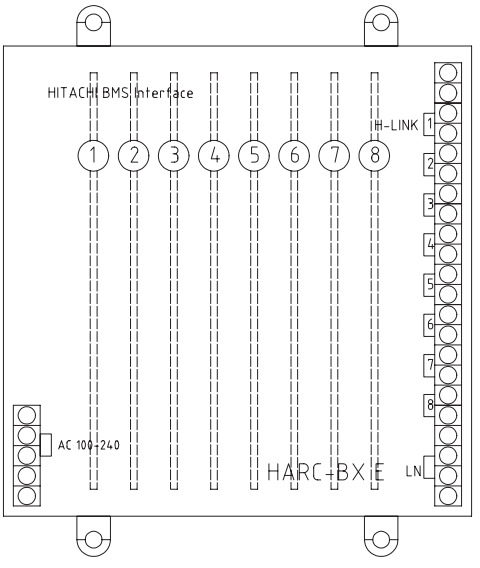
1. To install the wiring, turn OFF the main switch that is connected to the wire of the HARC-BX E and the surrounding equipment.
2. You should install the wiring according to the table below. The "No." in the table indicates the wire in the section "Wiring method".

■ 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

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

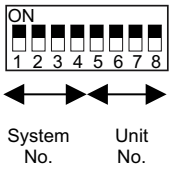
As described in the figure below, 8 PCBs which are built into HARC-BX E and H-LINK Terminals correspond to the both sides of the same numbers, 1 to 8 within ○ and □ respectively.
In order that PCB would be able to communicate with unit it must be connected to same H-LINK than unit.



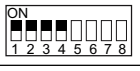
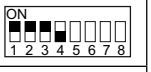
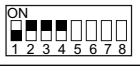
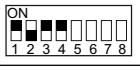
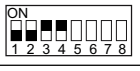
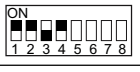
4.9.5. TEST RUN

■ **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	

4.9.6. 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.

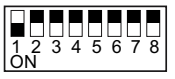


8-Pin DSW (S201)

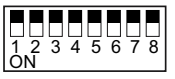


8-Pin DSW (S202)

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.



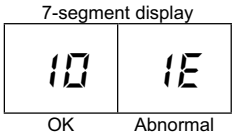
8-Pin DSW (S201)



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.

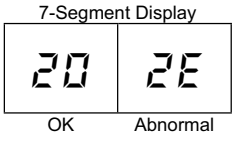


8-Pin DSW (S201)



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.



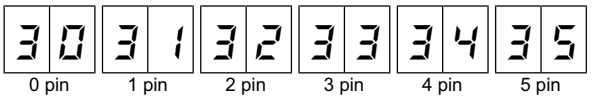
8-pin DSW (S201)



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.

4.10. CSNET WEB INTERFACE CONNECTION

Caution

Do not connect voltage input to the control system before preparation for test run has been correctly completed.

Read this manual carefully before performing installation work.

Read the Operation Manual in order to configure the air conditioning units.

Attention

Do not install CSNET WEB in places... :

- *with vapour, oil or dispersed liquids.*
- *with heat sources nearby (sulphuric surroundings).*
- *where accumulation, generation or leaks of inflammable gases has been detected.*
- *that are near the sea, in saline, acid or alkaline surroundings.*

Attention

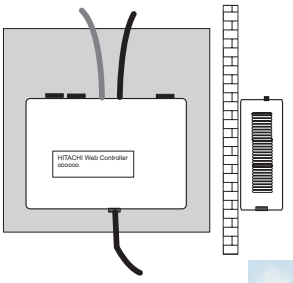
Install CSNET WEB away from possible sources of electromagnetic waves.

Respect local electrical standards.

Use a power circuit that is not subject to peak demands.

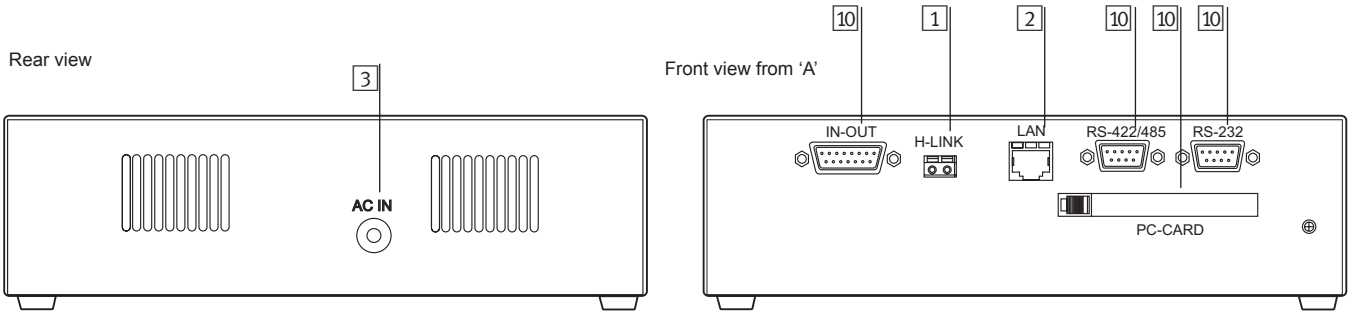
Ensure that there is enough space around the CSNET WEB (50 mm at least) so that the heat may dissipate adequately (refer to "Installation Procedures").

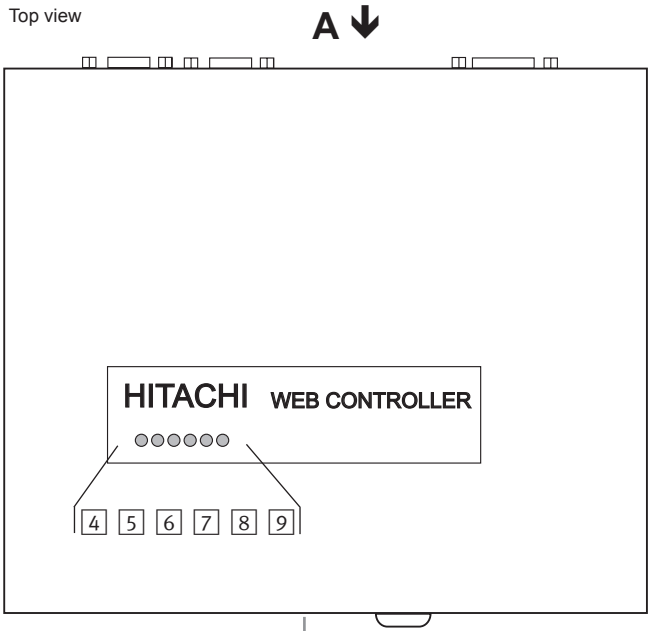
If you install the machine in a vertical position, install the power supply in the lower part and the control outputs in the upper part.



4.10.1. COMPONENT NAMES

The figure shows the names of the CSNET-WEB components





1 H-LINK Connector. Connected to Air Conditioning machines

2 LAN Connector. Connected to the local area network

3 Power Supply Cable. Power supply input

4 POWER: Applied voltage indicator LED

5 H-LINK: Air Conditioning equipment transmission indicator LED

6 RS-422/RS-485: Transmission LED (not used)

7 RS-232-C: Transmission LED (not used)

8 LAN: LAN transmission LED. On when adjusting LAN link

9 ERROR: Fault LED. Blinks in case of error

10 Unused connectors

4.10.2. SPECIFICATIONS

Hardware Specifications

Components	Specifications
Power supply	AC 230 V 1~ ±10% (50Hz)
Consumption	10W (maximum)
Outer dimensions	Width: 240 mm, Depth: 204 mm, Height: 74.5 mm
Weight	1.94 kg
Assembling conditions	Indoors (in a control panel or desktop)
Ambient temperature	0~40 °C
Humidity	20~85% (Without condensation)

Specifications for communication with the units

Components	Specifications
Communication with	Outdoor Units, Indoor Units
Communication line	Twin core, non-polar
Communications system	Half-duplex
Communication method	Asynchronous
Speed of transmission	9600 Bauds
Length of wiring	1000 m maximum (total length)
Number of units	16 Outdoor Units, 128 Indoor Units

Specifications for communication with a local area network

Components	Specifications
Communication with	1000 MHz Processor, 256 MB RAM, hard disk with 200 MB of free space. Internet Browser. Any operating system that supports installing JRE (Java Runtime Environment), a Java runtime platform developed by Sun Microsystems, which allows to run programs on different operating systems

Microsoft® Internet Explorer is a registered trademark of Microsoft Corporation

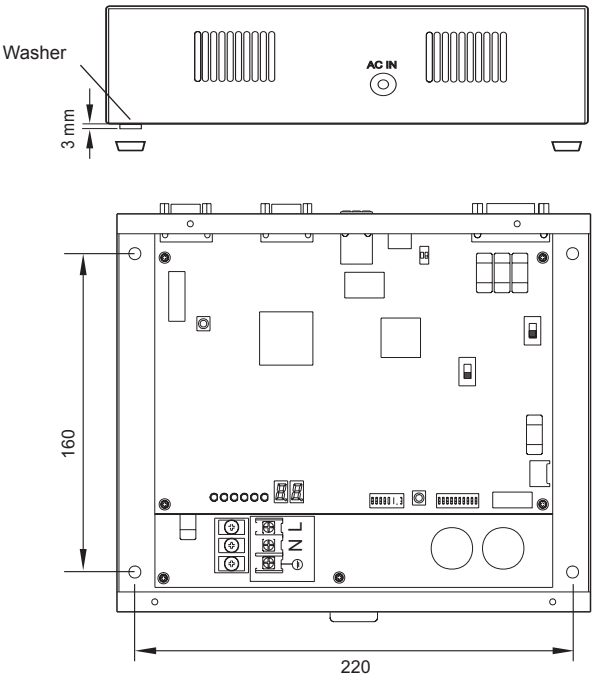
4.10.3. INSTALLATION

When unpacking the machine, check that it has not suffered damage during transport.

■ Fastening

Perform the following procedure:

1 Remove the rubber supports
2 Unscrew the 4 screws from the top cover and remove it
3 Attach the box to the rear vertical board from the inside with M5 screws (not provided) and place 3 mm washers on the outside to separate the box from the wall.
4 Reinstall the top cover. Be careful to position it correctly.



Attention:

- *Before applying power and turning on CSNET-WEB you must ensure that:*
  1. *All the units and refrigerant circuits are under power and are running correctly.*
  2. *All H-Link connections have been set up.*

  Any unit that is not connected or is not under power when turning on CSNET-WEB, will not be recognised and will have to be configured later.

Caution:

- *The signals' cables should be as short as possible. Keep a distance of more than 150 mm from other power cables. Don't wire them together (although they may intersect). If they must necessarily be installed together, take the following measures to avoid noise:*
  - *Protect the signal cable with a metal tube which is earthed at one end.*
  - *For communications, use shielded wire which is earthed at one end.*

Danger:

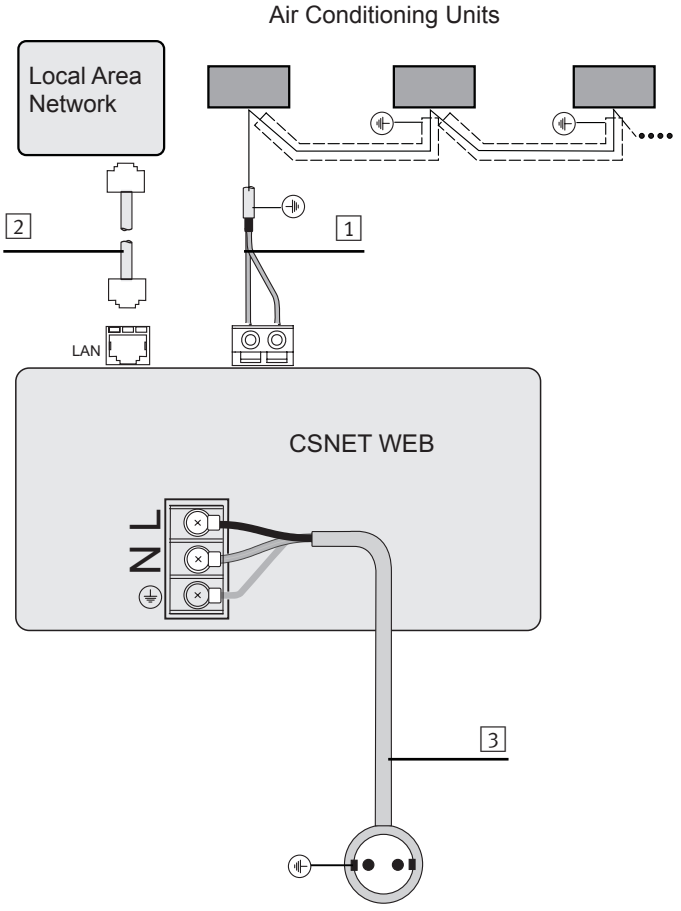
- *Always disconnect the power supply for CSNET-WEB when handling the machine, in order to avoid eletrical discharges.*
- *Do not connect the interface to the power supply until the installation has been completed.*
- *Comply strictly with local security codes and regulations when connecting the machine to the electric network.*
- *You will need a three-wire cable (two cores and earth) with a suitable plug at one end.*

■ Electrical connection

In order to run, CSNET-WEB will have to be connected to the electric network, to the transmission line with the air conditioners (H-Link) and to the Ethernet local area network (LAN).

	Connection	Cable Specifications
1	Transmission cable for the units (H-Link)	Twin core twisted pair cable 1P-0.75 mm². Non-polar. Shielded, earthed at one end. In order to choose the type of cable, refer to the Outdood Unit Installation and Operation Manual.
2	LAN Line	Category 5 or higher LAN cables - A crossed cable is required for direct connection to a PC. - A direct cable is required for connection to a commercial distributor (Hub)
3	Power supply cable Twin core + earth	AC 230V 1~ 50 Hz Ensure that the cable you use complies with local codes and that the plug and the base are properly earthed.

Reinstall the cover once you have made all the connections



Plug, power base and earth wire, in conformity with local codes

5. Control system

This chapter presents the control system flowcharts for the RAS-HRNM series operations.

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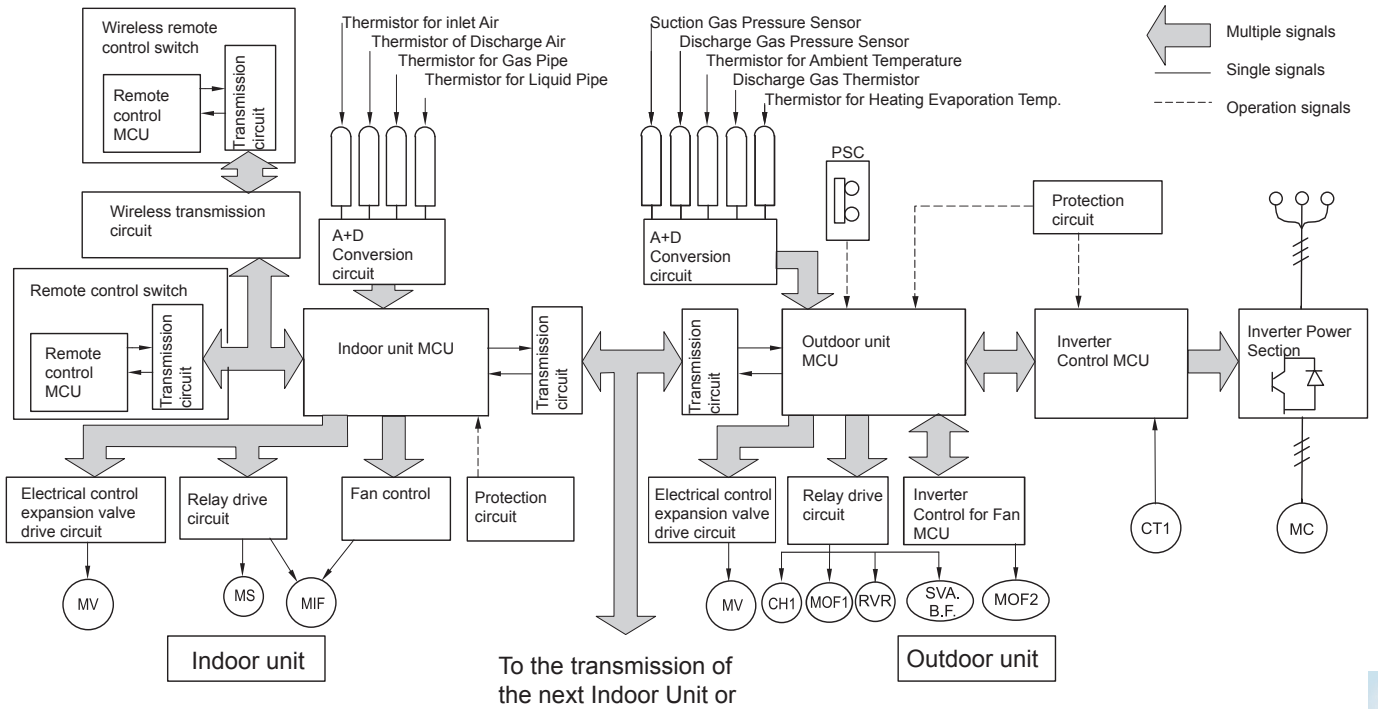
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5.1. DEVICE CONTROL SYSTEM

Control subject	Purpose		
	Cooling operation	Heating operation	Defrost operation
Control Frequency of Inverter Compressor	The frequency Control is determined with the next parameters: - Ratio (I.U. Capacity/O.U. Capacity) - Temperature difference between air inlet temperature and setting air temperature.	The frequency Control is determined with the next parameters: - Ratio (I.U. Capacity/O.U. Capacity) - Temperature difference between air inlet temperature and setting air temperature.	Fixed frequency
Opening Degree Expansion Valve of Outdoor Unit	Fully open	- Control Range of Expansion Valve Opening Degree is Determined to OptimizeTemperature. on the Top of Compressor - When Number of I.U. is Decreased, Determined with I.U. Capacity. Ratio of (Before/ After Decrease or with above condition).	Fully open
Opening Degree Expansion Valve of Indoor Unit	- Control Range of Expansion Valve Opening Degree is Determined to Optimize I.U. Gas Pipe Temp. (Tg) - I.U. Liquid Pipe Temp. (Tl) Difference. - The Expansion Valve Opening Degree is Controlled According to the Number of Connected I.U	- Specified Opening Degree at Normal Control starting. Afterward, Controlled to Optimize I.U. Liquid Pipe Temp. (Tl) - The Expansion Valve Opening Degree is Controlled According to the Number of Connected I.U..	Specified Opening Degrees Controlled by Temp. on the Top of Compressor. (Td).
Outdoor Fan	- Fan Step is Operated for O.U. Liquid Pipe Temp. (Te) Stabilization Control-Increased Number of I.U.: Step-Up Decreased Number of I.U.: Step-Down	- Fan Step is Controlled According to O.U. Liquid Pipe Temp. and Temp. on the Top of Compressor. - Increased Number of I.U.: Step-Up Decreased Number of I.U.: Step-Down (Limited the Lowest by Outdoor Temp.)	Fan Stop.
4-Way Valve (RVR)	OFF	ON	OFF
Solenoid Valve (SVA) (Equalised pressure valve)	- Turn ON at Starting - Turn ON for 1 Min. at Low Pressure Switch Activation.	- Turn ON at Starting - Turn ON for 1 Min. at Low Pressure Switch Activation - Turn ON at Pressure Control Switch Activation.	Turn ON a Defrosting
Solenoid Valve (SVB) (Liquid return)	Turn ON at Starting	Turn ON at Starting	Turn ON at Starting
Solenoid Valve (SVF) (Oil return)	Turn ON at Compressor Operation	Turn ON at Compressor operation	Turn ON at Staring
High/ Low Pressure Balance	Turn ON SVA or SVB before Compressor Starting	-	-

I.U.: Indoor Unit
Tc / Te: Condensing Temperature / Evaporating Temperature
Td: Discharge Temperature
Tl: Liquid Temperature
Tg: Gas Temperature
Cap: Capacity
Temp.: Temperature

The figure below shows the outline of the control system



5

Symbol	Name
MC	Motor (for Compressor)
MIF	Motor (for Indoor Fan)
MOF1, 2	Motor (for Outdoor Fan)
MS	Motor (for Auto-Louver)
MV	Electronic Expansion Valve
CMC	Compressor Magnetic Contactor

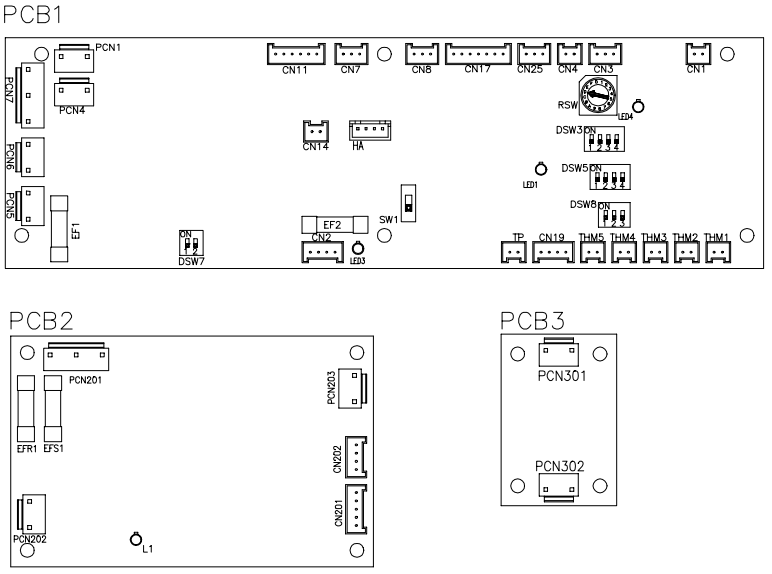
Symbol	Name
CH	Crankcase Heater
CT1	Current transformer
RVR	4-Way Valve
SVA,B,F	Solenoid Valve
PSC	Pressure Switch for control
EHW	Electric Heater

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 three 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
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
EF1	PCB1 Fuse
EF2	PCB1 Fuse
SWITCH INDICATION	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

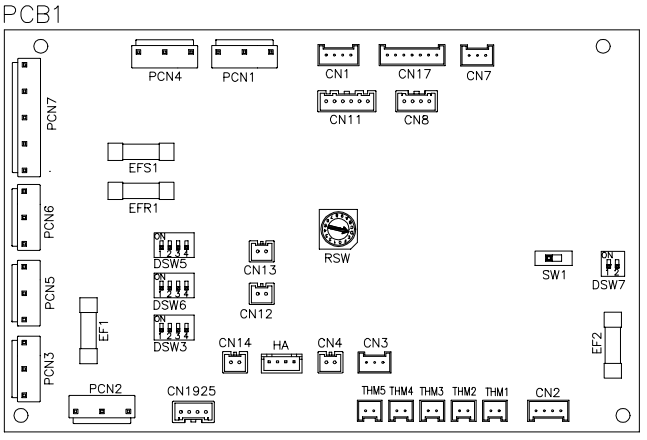
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting.

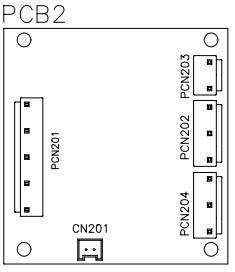
CAUTION:
Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

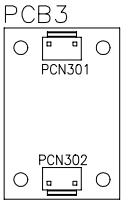
5.2.2. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RCD

■ **PCB drawing**

The PCB in the indoor unit operates with four types of DIP switches, one sliding switch 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
CN7	Output optional functions
CN8	Output optional functions
CN11	Expansion valve control
CN14	Float Switch
CN17	Swing louver motor 4

CONNECTOR INDICATION	
CN19	PCB1 Connection
CN25	PCB2 wireless receiver part connection
CN201	PCB1 Connection
EFS1	PCB1 Fuse
EFR1	PCB1 Fuse
EF1	PCB1 Fuse
EF2	PCB1 Fuse
SWITCH INDICATION	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW6	Model code
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

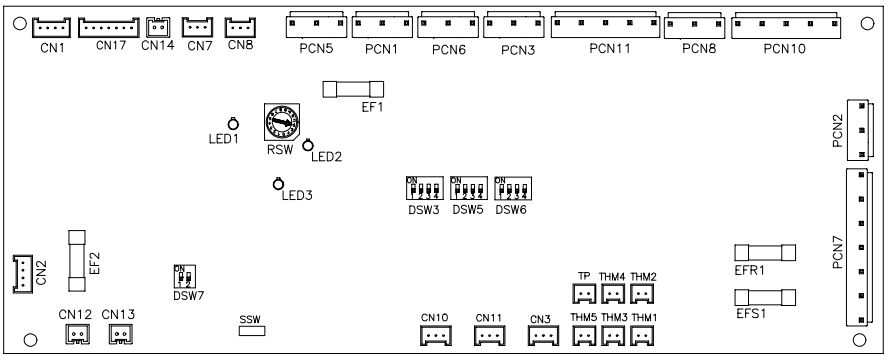
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting.

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.

5.2.3. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RPI 1.5~6.0, RPC, RPF(I)

■ **PCB drawing**

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



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

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	Fuse
EFR2	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)

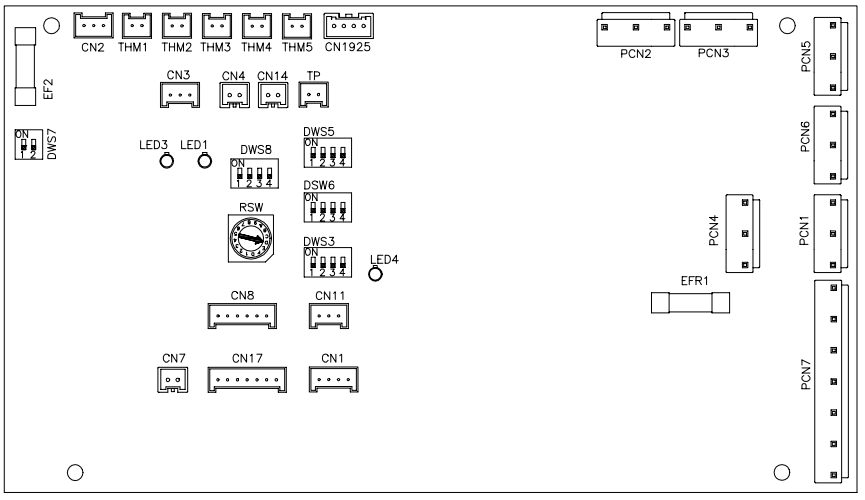
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting.

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.

5.2.4. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RPI 8/10

■ **PCB drawing**

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



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

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
EF2	Fuse
EFR1	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	Expansion Valve Control
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

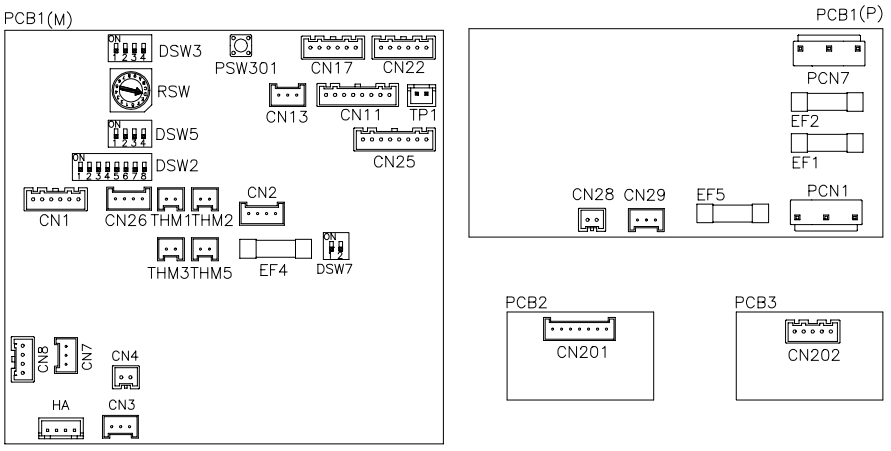
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting.

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.

5.2.5. LAYOUT OF THE PRINTED CIRCUIT BOARD FOR RPK FSNM

■ PCB drawing

The PCB in the indoor unit operates with four 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	PCB1(P) Fuse
EF2	PCB1(P) Fuse
EF4	PCB1(M) Fuse
EF5	PCB1(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°
DSW7	Fuse recovery
RSW	Setting of the indoor unit number

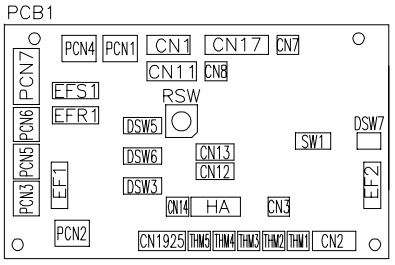
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment or after selection.
Not mark "■" indicates pin position is not affecting.

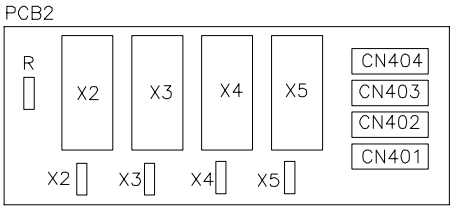
CAUTION:
Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

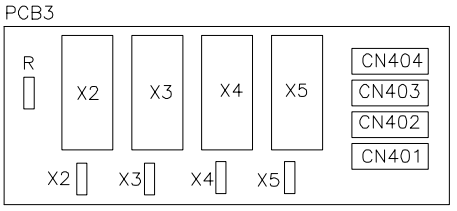
5.3. COMPLEMENTARY SYSTEM

5.3.1. KPI

■ **PCB drawing**





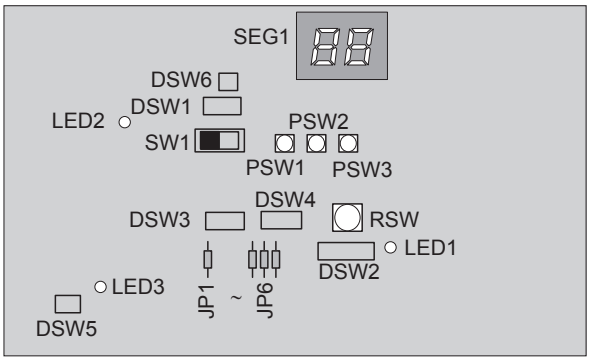


LED INDICATION		
LED1	Green	Power source for the PCB
LED2	Yellow	This LED indicates the transmission status between the indoor unit and the RCS
LED4	Red	This LED indicates the transmission status between the indoor unit and the outdoor unit

CONNECTOR INDICATION	
PCN1	Transformer (220V)
PCN5	Relay on PCB1
PCN7	Power source (1-R, 2-S, 3-N, 4-E)
THM1	Air inlet
THM2	Outlet air
EF1	Fuse
EF2	Fuse
EFS1	Fuse
EFR1	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 (only two)
CN4	Input optional functions
CN7	Output optional functions (only two)
CN8	Output optional functions (#1 #2, only one)
CN11	PCB3 Connection
CN12	Remote control bridge connector for multiple units
CN13	Remote control SW
CN17	PCB2 Connection

CONNECTOR INDICATION	
CN401	Fan motor relay
CN402	Fan motor relay
CN403	Fan motor relay
CN404	Fan motor relay
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
SW1	Selector SW (PC-2H2/PC-P1HE)

5.4. OUTDOOR UNITS PCB



Led indication		
LED1	Red	Power source for PCB1 Normal condition: activated Abnormal condicion: deactivated
LED2	Green	This LED2 indicates the transmission status between PCB1 and PCB3 Normal condition: flickering Abnormal condition: activated or deactivated
LED3	Yellow	This LED3 indicates the transmission status between PCB1 and PCB3 Normal condition: flickering Abnormal condition: activated or deactivated

DIP switch indication	
DSW1	Setting of test run
DSW1 (PCB2)	Setting of Cancellation of electrical current detection
DSW2	Setting of piping length and selection function
DSW3	Setting of capacity code
DSW4/RSW	Setting of refrigerant cycle
DSW5	Transmission setting of end terminal resistor
DSW6	Power source setting

Jumper indication	
JP1	Setting Cooling mode limit –15ºC
JP2	(Not Used)
JP3	(Not Used)
JP4	Setting of Fix cooling mode
JP5	Setting of Defrost condition
JP6	Setting of Pressure piping system.

5.5. 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.

Safety and control device setting for the indoor units

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

Safety and control device setting for the outdoor units

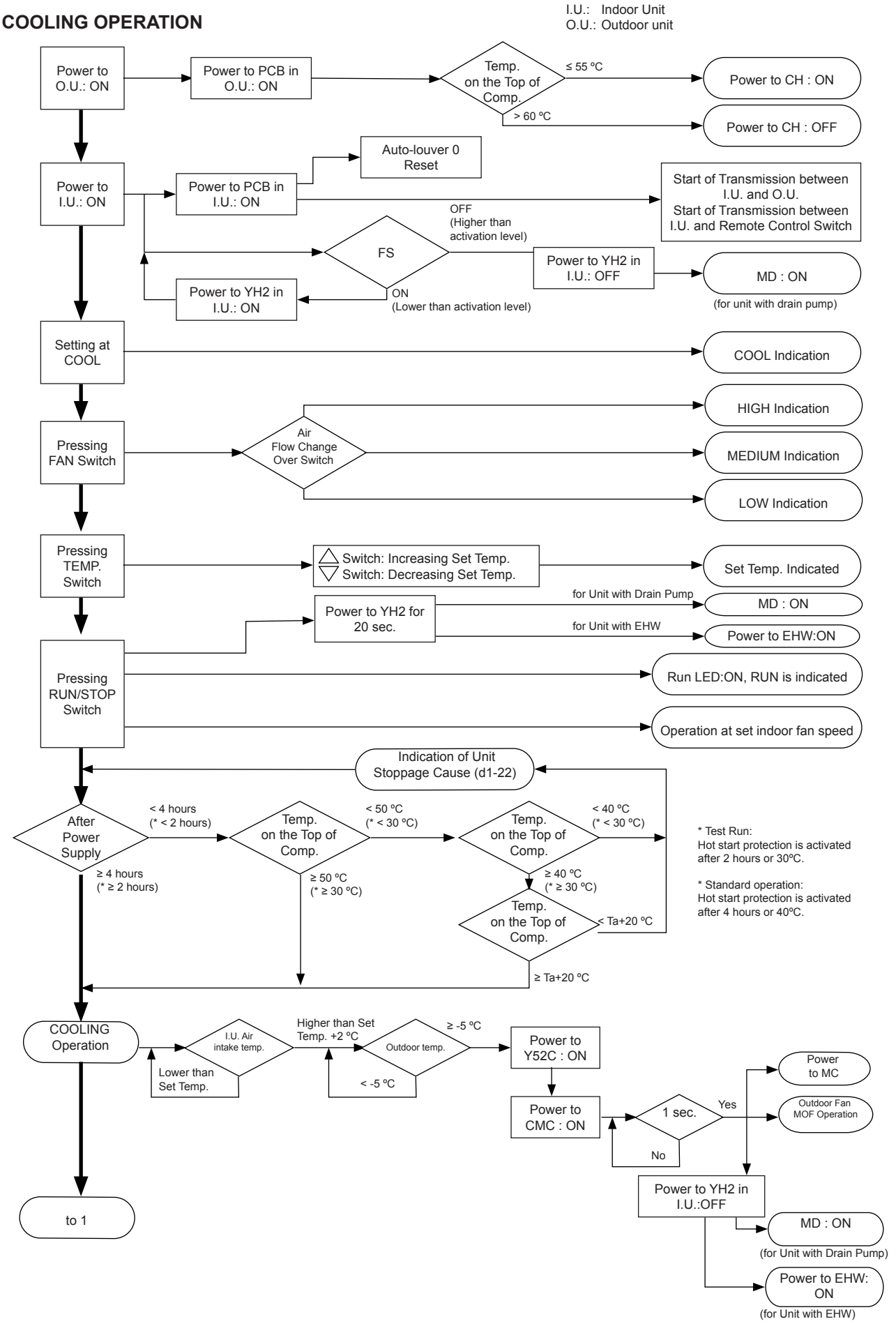
		RAS-8	RAS-10	RAS-12
For Compressor Pressure Switches High Cut-Out Cut-In	 MPa MPa	Automatic Reset, Non-Adjustable (each one for each compressor) $4.15^{-0.05}_{-0.15}$ 3.20 ± 0.15		
For control Fuse 3~, 400V, 50Hz	 A	 40		
CCP Timer Setting Time	 min	Non-Adjustable 3		
For Condenser Fan Motor Internal Thermostat DC Cut-Out Cut-Out AC Cut-In	 ºC ºC ºC	Automatic Reset, Non-Adjustable (each one for each compressor) 120±5 120±5 96±15		
For Control Circuit Fuse Capacity on PCB 1,5 Fuse Capacity on PCB 3	 A	 5 10		

CCP Timer: Enforced 3 minutes operation and stoppage.

5

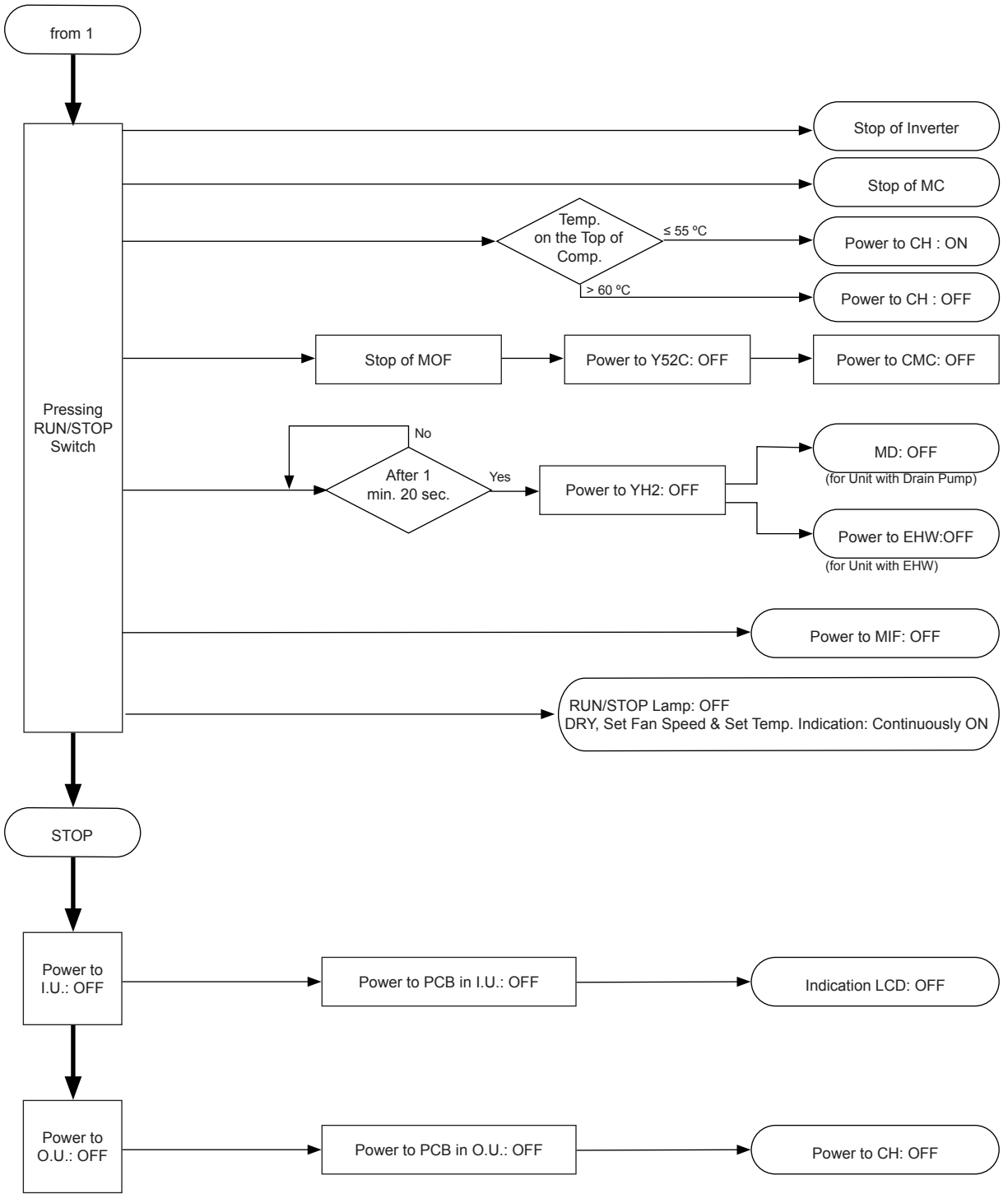
5.6. STANDARD OPERATION SEQUENCE

5.6.1. COOLING OPERATION

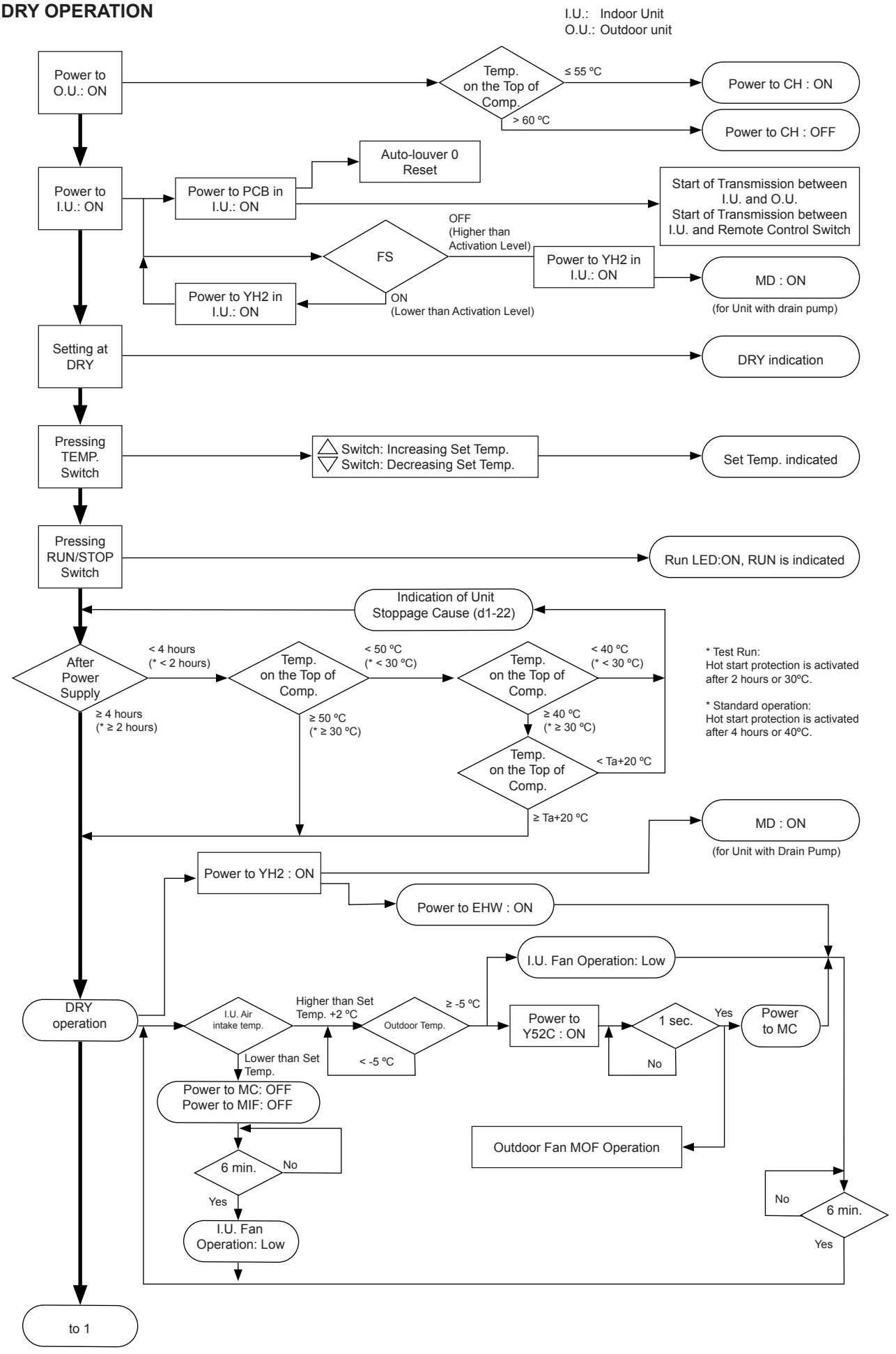


5.6.1. COOLING OPERATION (cont.)

I.U.: Indoor Unit
O.U.: Outdoor unit

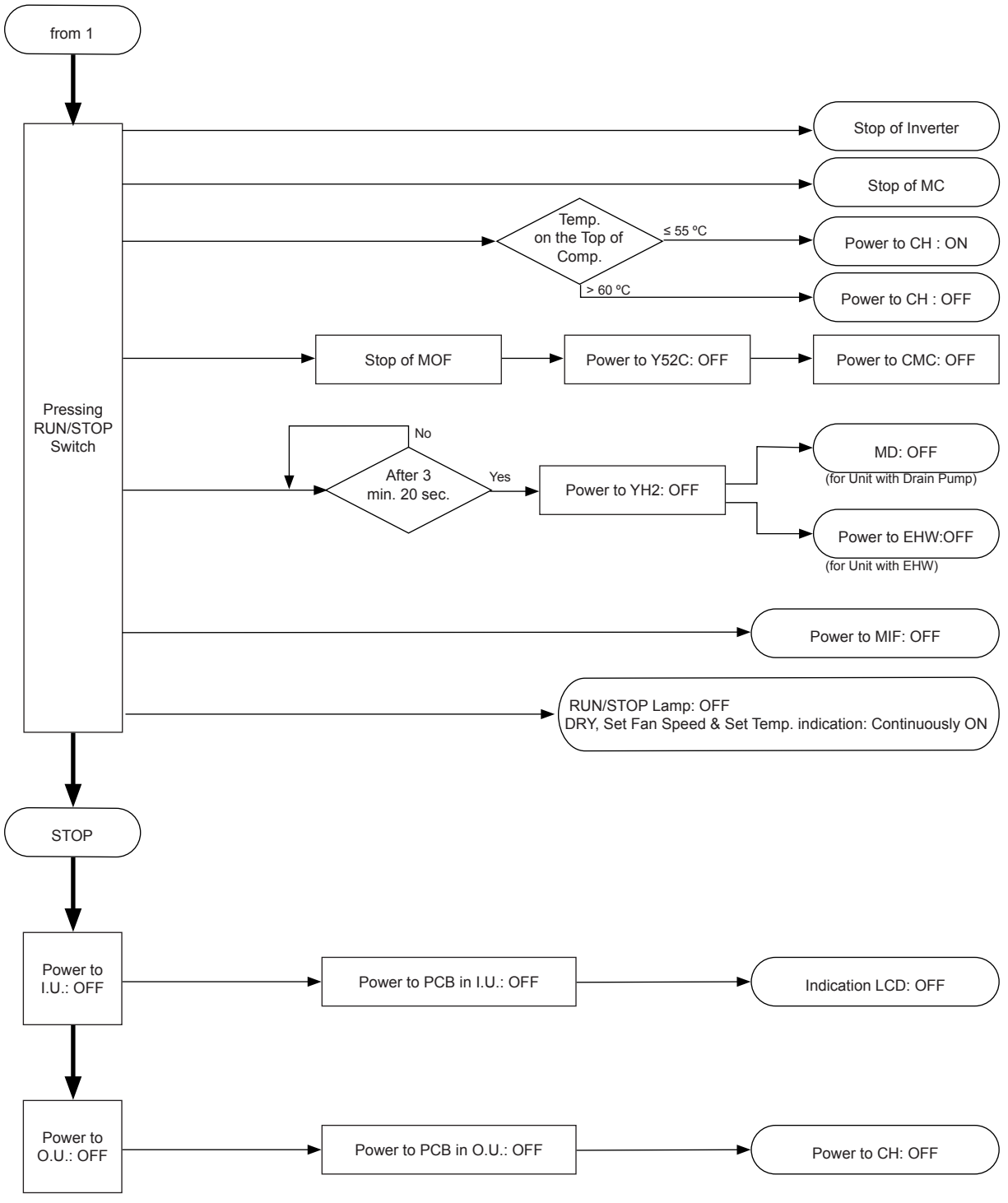


5.6.2. DRY OPERATION

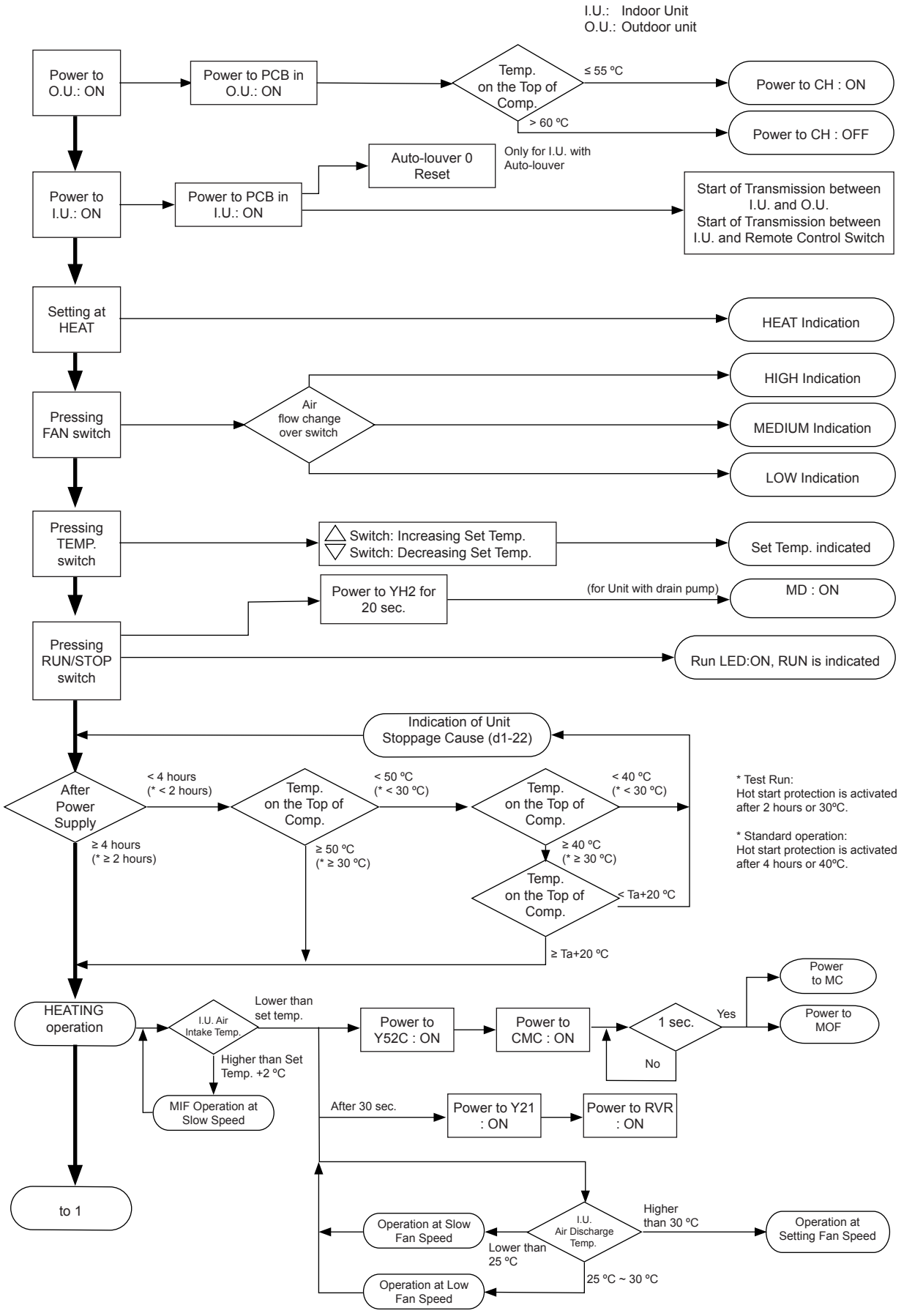


5.6.2. DRY OPERATION (cont.)

I.U.: Indoor Unit
O.U.: Outdoor unit

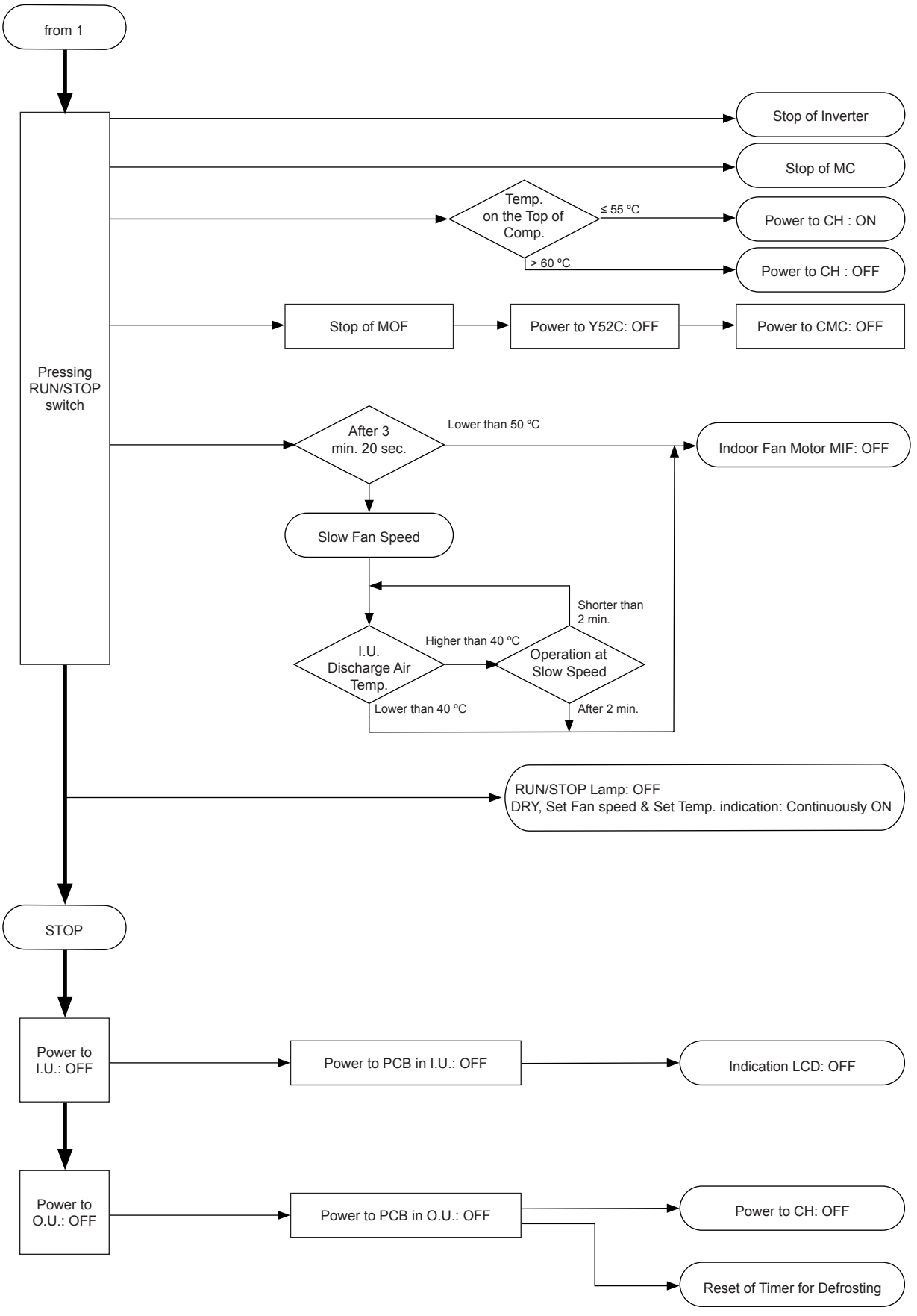


5.6.3. HEATING OPERATION

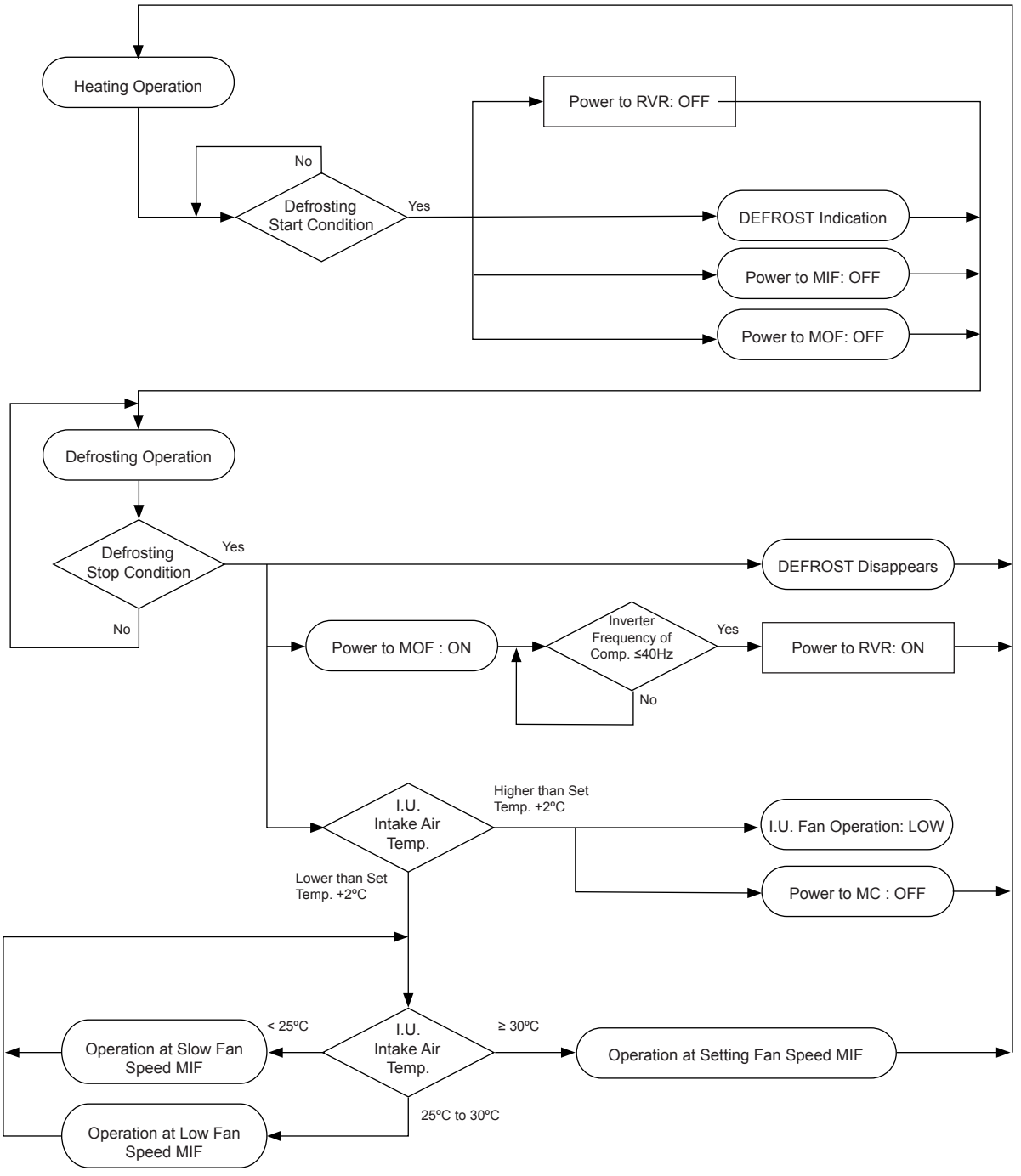


5.6.3. HEATING OPERATION (cont.)

I.U.: Indoor Unit
O.U.: Outdoor unit

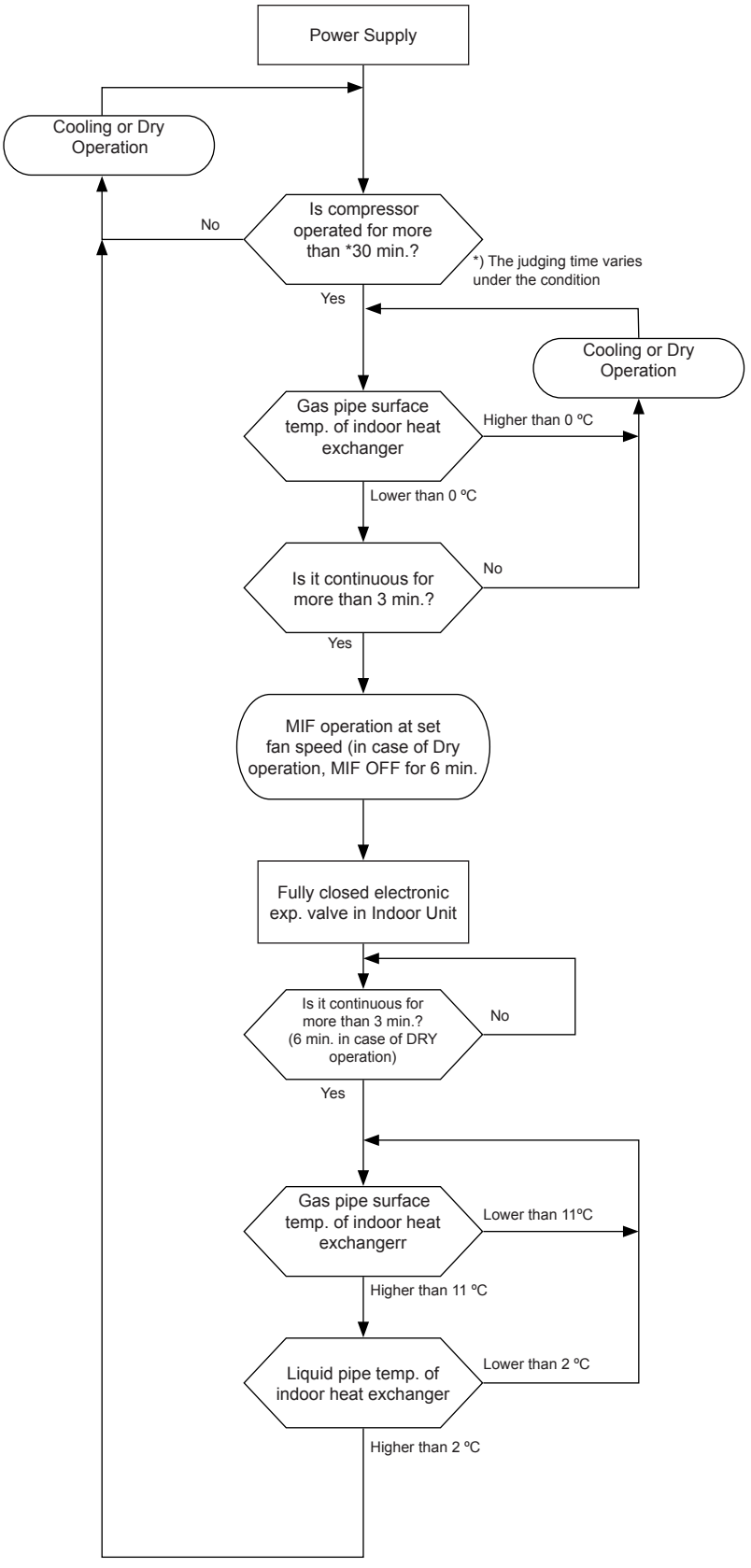


5.6.4. DEFROST OPERATION CONTROL



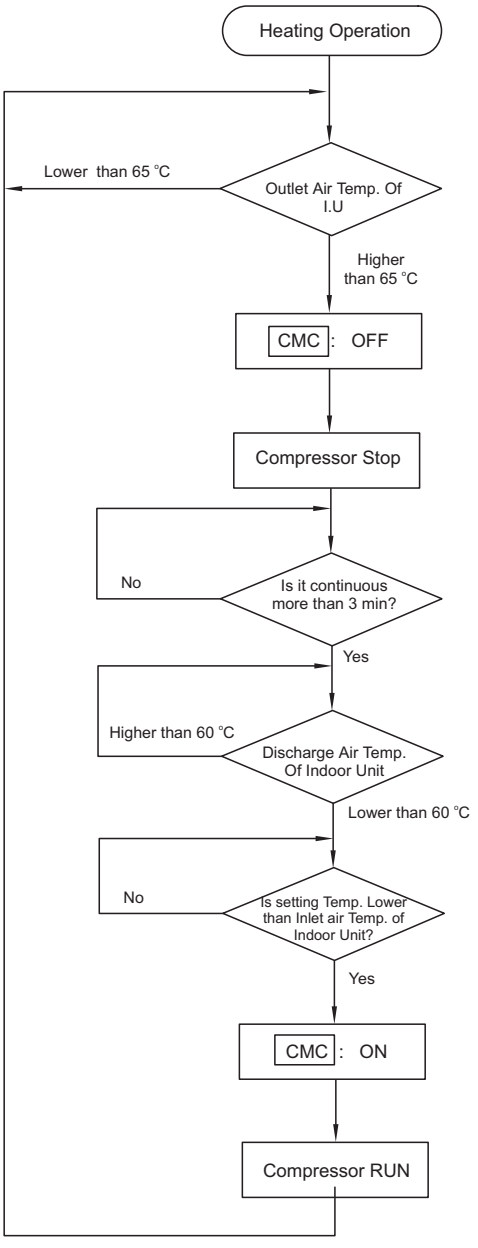
5.7. STANDARD CONTROL FUNCTIONS

5.7.1. FREEZING PROTECTION CONTROL DURING COOLING PROCESS OR DRY OPERATION



5

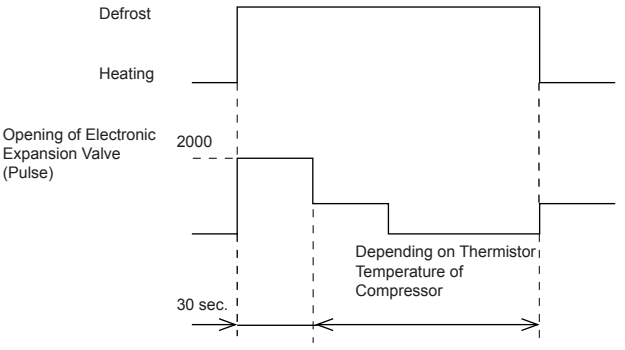
5.7.2. PREVENTION CONTROL FOR EXCESSIVELY HIGH DISCHARGE GAS TEMPERATURE.



5.7.3. 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 the heating operation, the electronic expansion valve is set at the specified opening.
5. During the defrosting, the electronic expansion valve is set at the specified opening as the graphic indicates.
6. Normal Opening of the Electronic Expansion Valve

Time Chart



Cooling Operation

1. Set of Target Temperature
   Heat Exchanger *SH = 0
   Heat Exchanger SH = Tg - TL
   Tg: Indoor Gas Piping Temperature
   TL: Indoor Liquid Piping Temperature
   *SH: Superheat
2. Simulation PI Control for the Electronic Expansion Valve
   The electronic expansion valve opening is controlled so that the heat exchanger SH temperature can reach the target temperature.
   The electronic expansion valve opening is controlled as shown in the below table when the unit is operated under the test run (Cooling Operation: Indoor Temperature 27ºC/Outdoor Temperature 7ºC).

HRNM	8HP	10HP	12HP
pulse (%)	390 (19)	410 (20)	500 (25)

* The above target is for one of the indoor units at the twin connection with 7.5 m piping length.

Heating Operation

1. Set of Target Temperature
   Ti < TL < 45 + 0.5 x Ta
   TL: Indoor Liquid Piping Temperature
   Ti: Indoor Air Inlet Temperature
   Ta: Outdoor Temperature
2. Simulation PI Control for the Electronic Expansion Valve
   The electronic expansion valve opening is controlled so that the indoor liquid piping temperature can reach the target temperature.
   The electronic expansion valve opening is controlled as shown in the below table when the unit is operated under the test run (Heating Operation: Indoor Temperature 20ºC/Outdoor Temperature 7ºC).

HRNM	8HP	10HP	12HP
pulse (%)	950 (47)	1.000 (50)	1.140 (57)

* The above target is for one of the indoor units at the twin connection with 7.5 m piping length.

5.7.4. OUTDOOR UNIT ELECTRICAL EXPANSION VALVE CONTROL

1. After supplying power source, the electronic expansion valve is completely opened.
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 extension valve is set at a specified opening.
   • Specified Opening during Heating Operation: 1 minute
4. During the cooling and the defrosting operations, the electronic extension valve is set at the specified opening.
5. Normal Opening of the Electronic Expansion Valve

Cooling Operation

- 480 pulse (100%)

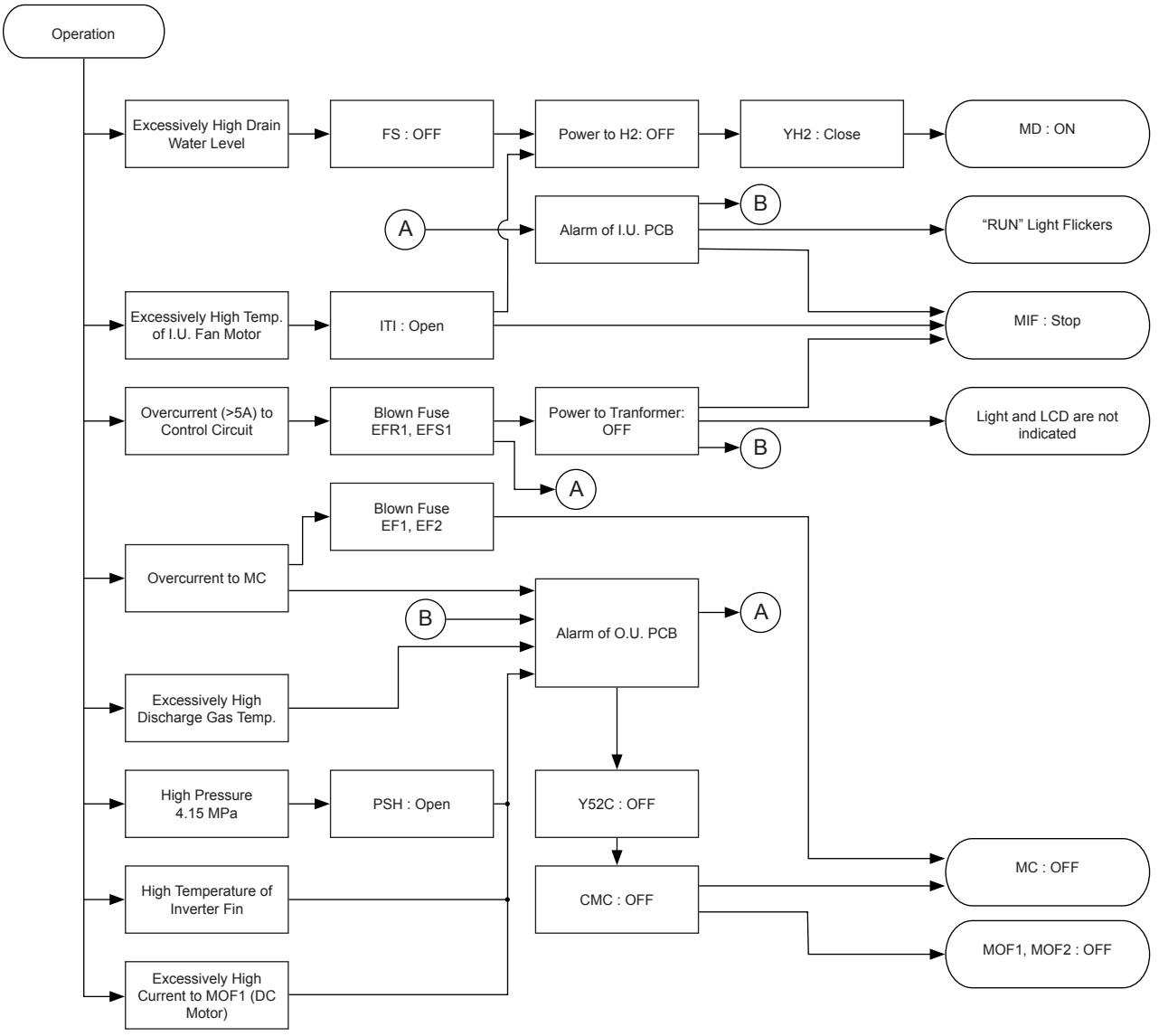
Heating Operation

1. Set of Target Temperature
   TdSH = 20~25K
2. Simulation PI Control for the Electronic Expansion Valve.
   The electronic expansion valve opening is controlled so that the thermistor temperatures for the compressor can reach the target temperature.
   The electronic expansion valve opening is controlled as shown in the below table when the unit is operated under the test run (Heating Operation: Indoor Temperature 20ºC/Outdoor Temperature 7ºC).

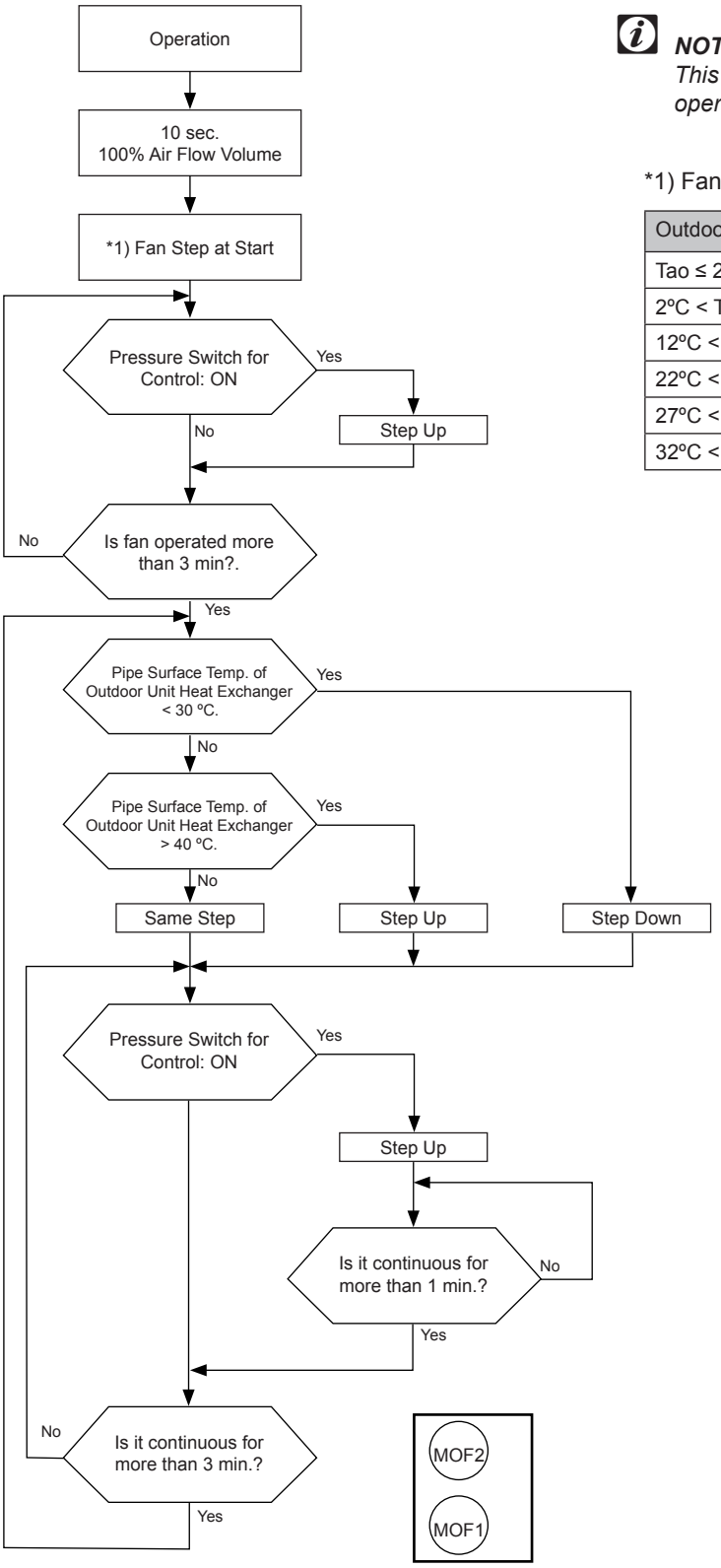
HRNM	8HP	10HP	12HP
pulse (%)	160 (33)	200 (41)	240 (50)

* The above target is for one of the indoor units at the twin connection with 7.5m piping length.

5.7.5. ACTUATION FOR PROTECTION DEVICE CONTROL



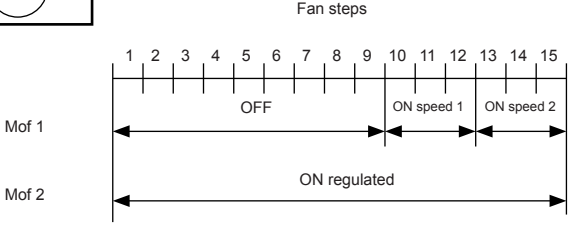
5.7.6. OUTDOOR FAN CONTROL DURING COOLING OPERATION



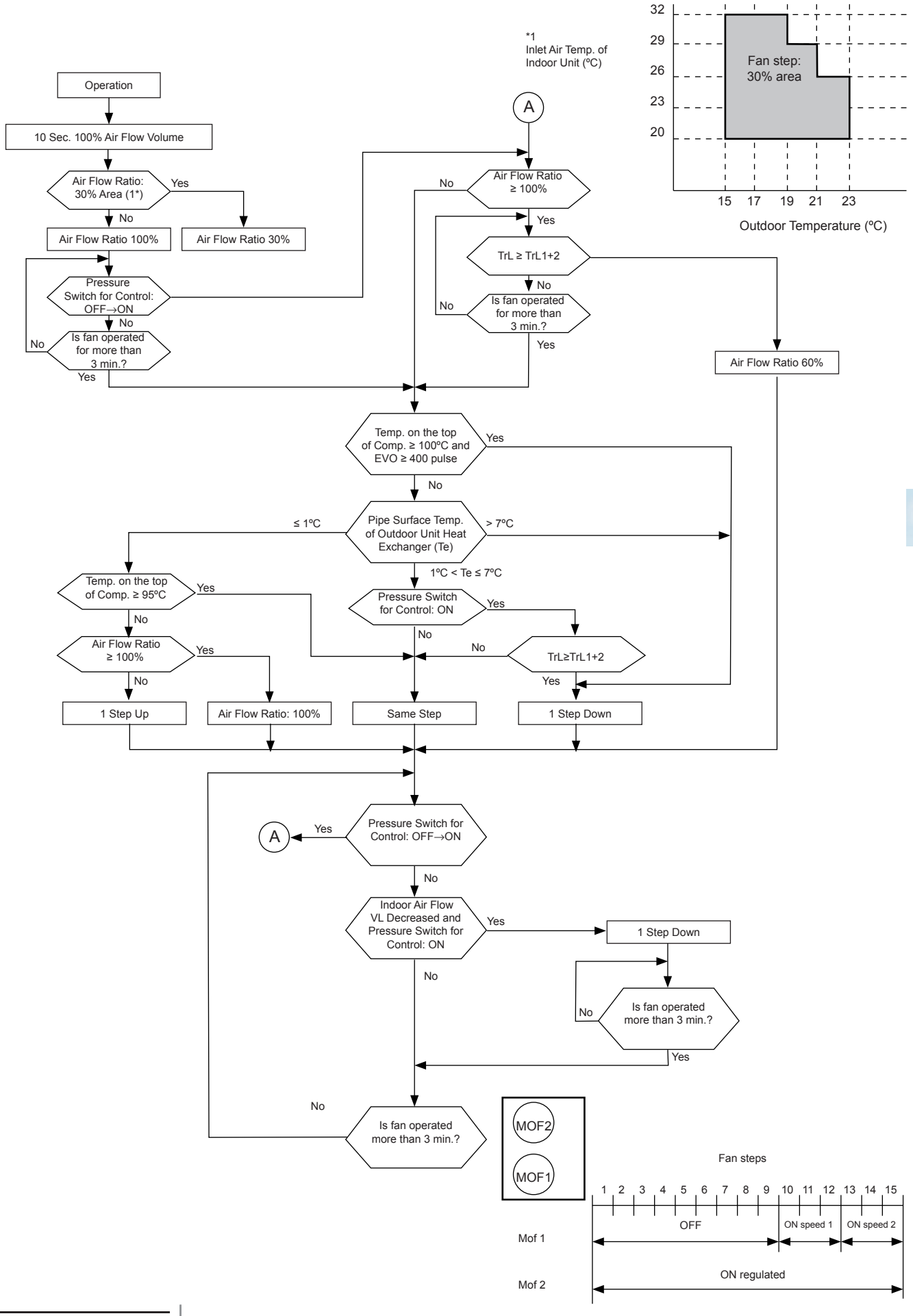
NOTE:
This sequence is for the standard operation

*1) Fan Step at Start

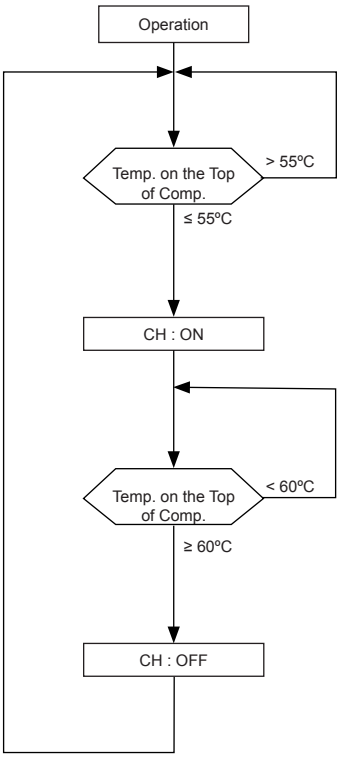
Outdoor Temp. (Tao)	Air Flow Ratio
Tao ≤ 2ºC	15%
2ºC < Tao ≤ 12ºC	25%
12ºC < Tao ≤ 22ºC	40%
22ºC < Tao ≤ 27ºC	60%
27ºC < Tao ≤ 32ºC	80%
32ºC < Tao	100%



5.7.7. OUTDOOR FAN CONTROL DURING HEATING OPERATION



5.7.8. PREHEATING CONTROL OF COMPRESSOR



5.7.9. 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 higher than Tc1+4°C, forced thermo-off operation will be performed.

Tc: Outdoor Piping Temperature
Tc1: Outdoor Piping Temperature when **PSC** is ON
PSC ON: 3.60 MPa

However, if it occurs more than 6 times during operation, forced thermo-off operation will not be performed.
Cause of Stoppage will be 13.

6. Available optional functions

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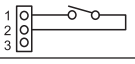
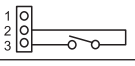
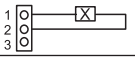
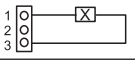
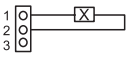
6.1. INDOOR UNITS

The system has eight input and eight output optional signals. Both signals are programmed in the PCB of the indoor unit: with the CN3 connector for the input signals and the CN7 and CN8 connectors for the output signals.
Input connector CN3 has two ports to configure two input options out of the eight options the system has.
The output connectors have two ports (CN7) and one port (CN8) respectively to configure three output options out of the eight options the system has

6.1.1. AVAILABLE PORTS

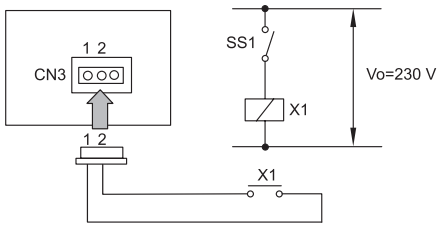
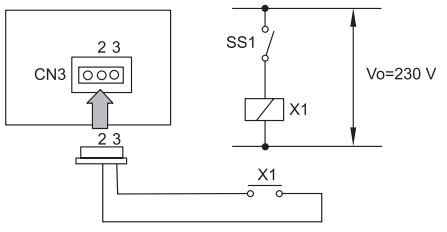
The system has the following input and output ports.

Content

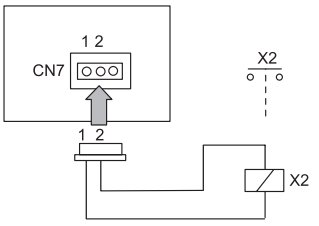
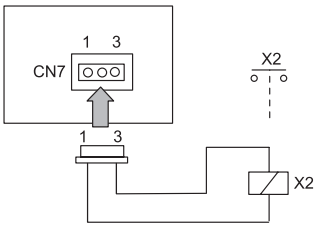
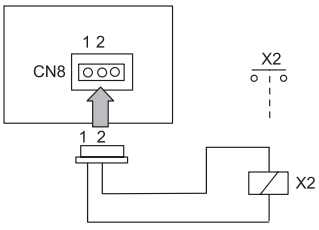
	Indication	Setting of the port in the PCB of the indoor unit	Remarks	Outlet
Input	i1	1-2 of CN3		Contact
	i2	2-3 of CN3		Contact
Output	o1	1-2 of CN7		DC 12V
	o2	1-3 of CN7		DC 12V
	o3	1-2 of CN8		DC 12V

Connection:
The system has the following connections.

■ Input connections

Indication	Connections
i1	
i2	

■ Output connections

Indication	Connections
o1	
o2	
o3	

Specification of the components for a correct installation

Component		Manufacturer or Specifications	Remarks
Auxiliary relay (X2)		OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage between relay terminals 12 Vdc - 75 mA
(SS1) (X1) contact (Example)		Manual Type	Voltage between terminals of the 230V - 5 mA contactor
3P Connector cable		De Optional part PCC-1A (capable of connecting the JST Connector XHP-3)	Five cords with connectors as one set
Wire (control	Voltage: 12V DC.	0.5 mm²	
Wire (power)	Voltage 230V	2.0 mm²	

Notes:

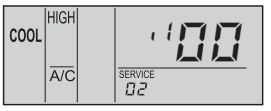
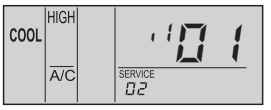
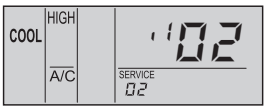
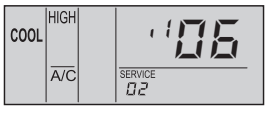
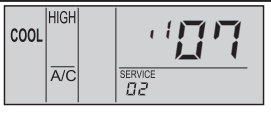
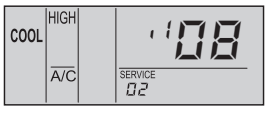
- *The connection of the input signal is only an example.*
- *Make the CN3 wires as short as possible.*
- *Do not run the wires along 230 V/400 V AC power cables. Separately install them at a distance of more than 30cm. (Intersecting as applicable.)*
- *If you install the wires along a power supply wire, insert the wires in a metal conduit tube and ground one end of the tube.*
- *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. CONFIGURATION

Available optional signals

Indoor units have optional signals that are described in the following table. The configuration of the signals is performed via remote control, except for RPK-(0.8~4.0)FSNM units where the configuration is performed via DIP switches.

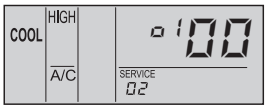
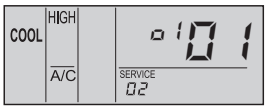
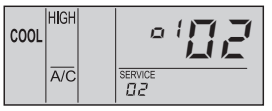
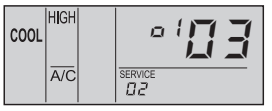
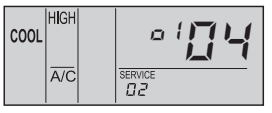
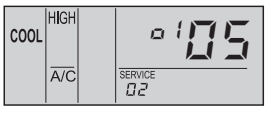
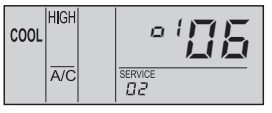
■ **Optional input signals**

Indic.	Input signal	Application	Display Remote Control (Input signal)	Port
00	Not Set	Not Set		CN3
01	Control by means of the field-supplied room thermostat (cooling)	This signal allows to control the unit by means of an external thermostat. This could reduce cooling problems in summer for certain applications.		CN3
02	Control by means of the field-supplied room thermostat (heating)	This signal allows to control the unit by means of an external thermostat. This could reduce the problems due to stratification of indoor air		CN3
03	Function 1 - remote ON/OFF of the unit (by contact)	This signal allows to control the stoppage and start-up of the system from a remote place. This optional function is very useful to hotels and offices buildings to control the indoor units from building management system.		CN3
04	Function2 - turns unit ON. (by pulse)	This signal allows to control the start-up of the system from a remote place. This optional function is very useful in hotels and office buildings to control the indoor units from the building management system.		CN3
05	Function2 - turns unit OFF. (by pulse)	This signal allows to control the stoppage of the system from a remote place. This optional function is very useful in hotels and offices to control the indoor unitsfrom the building management system.		CN3
06	Cancellation of Commands from Remote Control Switch After Forced Stoppage	This signal stops the indoor unit and cancels the commands from the remote controll while it is activated.		CN3
07	Setting of the cooling mode or the heating mode	This signal provides a control to change the operation mode from a remote place.		CN3
08	Input signal for the UP/DOWN grille (not available)	Not Available		CN3

Note:

After setting an input signal, the next signal to set shown on the display changes from "01" to "02".

■ **Optional output signals**

Indic.	Output signal	Application	Remote Control Display (Output signal)	Port
00	Not Set	Not Set		CN7 or CN8
01	Operation Signal	This signal allows to control the status of the machine at all times;it is very useful for centralized applications		CN7 or CN8
02	Alarm Signal	This signal allows to activate mechanisms that protect from and warn of possible failures in the unit; it is very useful for rooms that must always be air-conditioned		CN7 or CN8
03	Cooling Signal	This signal allows to control the status of the compressor. It is very useful to control the THERMO-OFF of the indoor units..		CN7 or CN8
04	Thermo-ON signal during cooling	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8
05	Heating signal	This signal allows to control the status of the compressor. It is very useful to control the THERMO-OFF of the indoor units.		CN7 or CN8
06	Thermo-ON signal during heating	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8

Note:
After setting an output signal, the next signal to set shown on the display changes from "o1" to "o2" and to *"o3".*

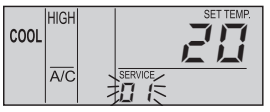
Programming with the PC-P1HE

The optional signals are programmed using the remote control switch.

■ Programming and setting mode

Make sure the unit is stopped. Press the “CHECK” and the “RESET” switches on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode.

The “SERVICE” indication is displayed, and “01” flickers below it.

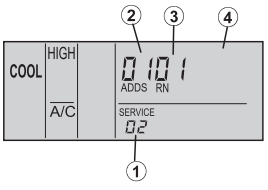


■ Selecting SERVICE 02

When in the programming and setting mode, press the “TEMP ⌃” or the “TEMP ⌄” switch, and the number that flickers below the “SERVICE” indication will change (01 → 02). Set the flickering number to “02”, maintain it during 7 seconds or press the “CHECK” switch, and the remote control switch will change to optional setting mode.

■ Selection of indoor unit

a. In SERVICE 02selection mode, the indication of the remote control switch will change as shown in the figure below.



① The “02” indication is activated.

② The address of the indoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and “ADDS” is indicated below.

③ The refrigerant cycle number of the outdoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and “RN” is indicated below.

④ The indication of the setting temperature is turned OFF.

b. In previous point (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:

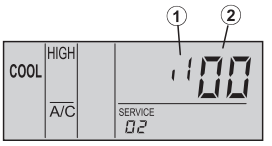
– *The indoor unit can be selected among the indoor units connected to the remote control switch.*

– *If both the indication of the address and the refrigerant cycle number is “AA”, the settings of all the indoor units are the 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 signals and setting conditions

a. At the optional setting mode, the indication on the remote control switch is changed as shown below.

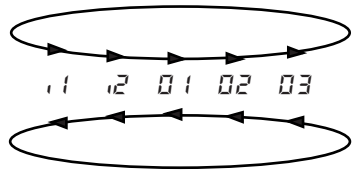


① The allocated port for the input signal and the output signal is displayed in the segments of the time indication of the timer setting.

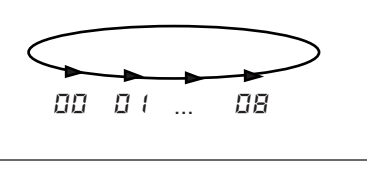
Refer to the table below for the displayed port and the connector of the indoor unit PCB.

② The codes of the input and output signals are indicated in the segments for setting temperature indication.

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 pressing “Time Δ”	
When pressing “Time ∇”	

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 pressing the “CHECK” switch.	

■ Return from optional function setting mode

Press the “RESET” switch to memorize the optional functions settings and return to normal mode.

■ **Selection of other Indoor Unit**

When in optional settings mode, press the "TEMP ⌃" switch or the "TEMP ⌄" switch, the condition of the remote control switch is changed so that the Indoor Unit can be selected to set the optional function described above.

Connectors CN3, CN7 and CN8 are factory set with the following optional functions

	Connector		Function	Factory fixed settings
	N0.	Pin		
Inlet.	CN3	1-2 (*)	03	Function 1 - remote ON/OFF of the unit
		2-3	06	Cancellation of commands from the remote control switch after forced stoppage
Outlet	CN7	1-2	01	Operation Signal
		1-3	02	Alarm Signal
	CN8	1-2	06	Thermo-ON Signal during Heating

Caution

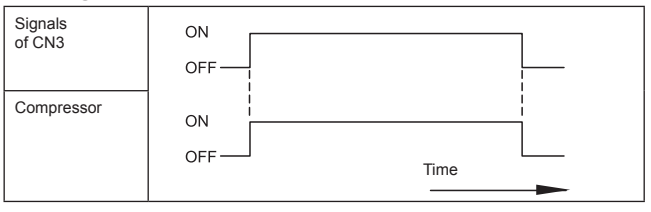
(*) If you connect the Econofresh kit, pins 1 and 2 of CN3 are locked for the enthalpy sensor or CO2 sensor.

6.1.3. DESCRIPTION OF OPTIONAL INPUT SIGNALS

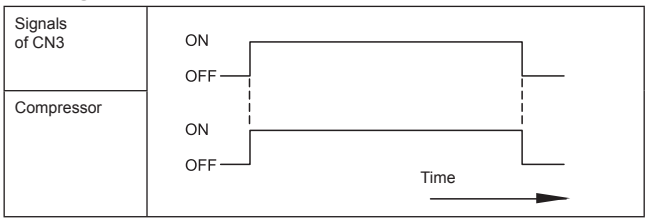
■ **Control by field-supplied room thermostat (0 1/02)**

When operating with a field supplied room thermostat instead of the inlet thermistor of the indoor unit Connect the cabling and use the materials as shown in section 6.1.1.

Cooling:



Heating:



Component	Manufactured or Specifications
Thermostat	Equivalent of YAMAKATE R7031P005, R7031Q005

Note:

- *When you use a field-supplied room thermostat, select the specified thermostat as explained below:*

  Contactor Load: DC 12V

  Differential more than 1.5 degrees

- *Do not use a thermostat utilizing 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.*

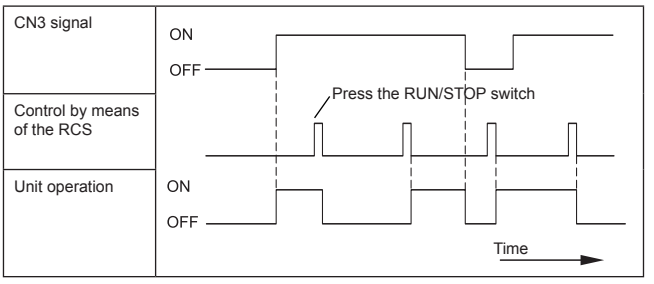
■ **Function 1 - remote ON/OFF of unit (03)**

This is a remote ON/OFF optional signal that uses the level signal (ON/OFF). Connect the cabling and use the materials as shown in section 6.1.1.

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 of the remote control switch that is given last.

Due to the initialization of the components, picking up the signal within 10 seconds after turning ON the main switch is not available.

■ **Function 2 - Remote ON of the unit (04) (pulse signal input)**

This is a remote ON/OFF optional signal that uses the pulse signal.

Connect the cabling and use the materials as shown in section 6.1.1.

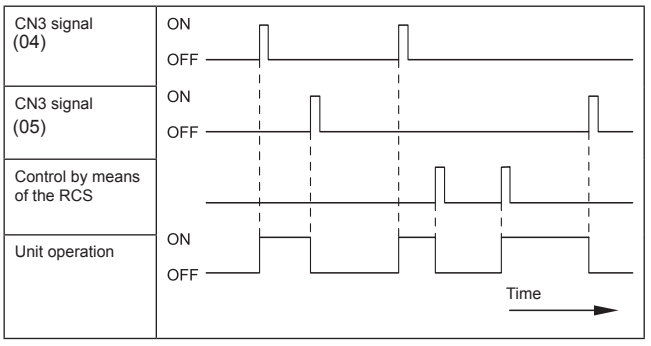
■ Function 2 - Remote OFF of the unit (05) (pulse signal input)

This is a remote OFF optional signal that uses the pulse signal.

Connect the cabling and use the materials as shown in section 6.1.1.

A time chart with the uses of functions 04/05 is shown below.

Time chart



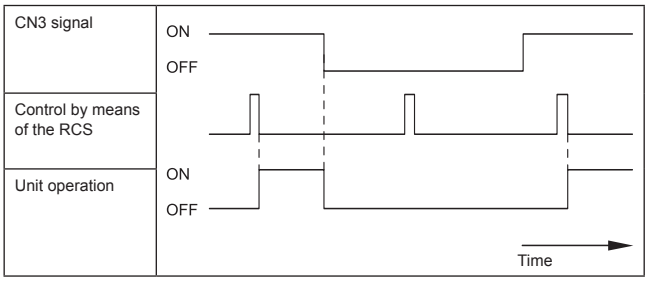
Note:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

■ Cancellation of the commands from the remote control switch following a forced 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.

Connect the cabling and use the materials as shown in section 6.1.1.

Time chart

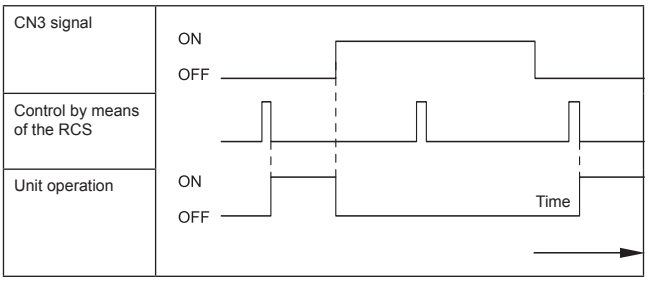


Note:
Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.

With this optional signal, 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 6.6 “Optional Functions available through the remote-control switch” for more details about contacts A and B.

Time chart

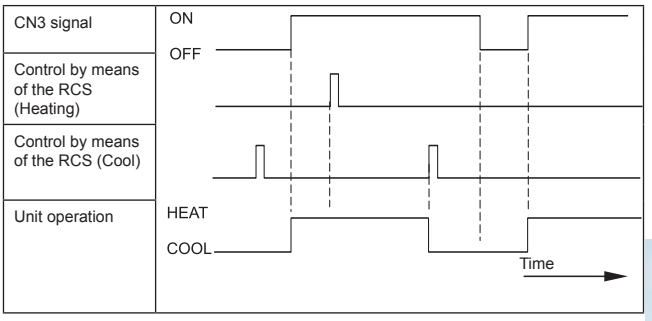


■ Setting the cooling mode or the heating mode (07)

By utilizing this optional signal, the cooling or heating operation mode can be changed by sending a contact signal from outside the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

Connect the cabling and use the materials as shown in section 6.1.1.

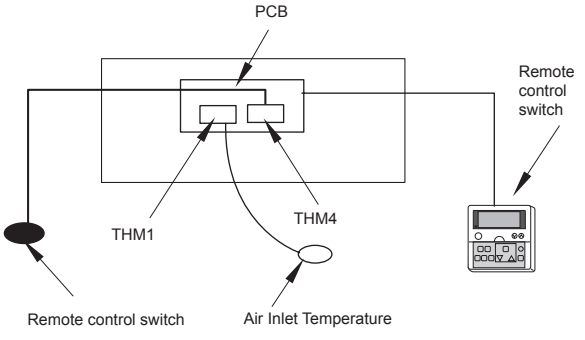
Time Chart:



■ Control by means of a remote temperature sensor (C8)

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. When the discharge Air temperature exceeds 60 ºC, the fan speed is increased from Medium to High or from Low to Medium.



6

Notes:

- *The remote control thermistor cannot be used if a remote temperature sensor is being used*
- *During the heating process, the function "Heating Temperature Calibration" is automatically cancelled. (Refer to section 6.5.2).*
- *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.*

6.1.4. DESCRIPTION OF OPTIONAL OUTPUT SIGNALS

■ **Picking up the operation signal (01)**

This optional signal is utilized to pick up the operation signal. By means of this function, you can check the operation signal at a remote place.

You can use it to lock the operation of the fresh air intake fan.

Connect the cabling and use the materials as shown in section 6.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

■ **Alarm Signal (02)**

This optional signal is used 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.

Connect the cabling and use the materials as shown in section 6.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued

■ **COOLING OPERATION SIGNAL (03)**

This optional signal is utilized to pick up the cooling operation signal.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF.

Connect the cabling and use the materials as shown in section 6.1.1.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF

■ **Thermo-ON signal during the cooling process (04)**

You use this optional signal to pick up the Thermo-ON signal of the running compressor during the cooling process.

Connect the cabling and use the materials as shown in section 6.1.1.

The contact of auxiliary relay X is closed when the thermostat signal is ON during cooling mode.

■ **Heating operation signal (05)**

This optional signal is used to pick up the heating operation signal. The contact of auxiliary relay X2 is closed when the heating operation signal is ON, regardless of whether the thermostat signal is ON or OFF

Connect the cabling and use the materials as shown in section 6.1.1.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF

■ **Thermo-ON signal during the heating process (06)**

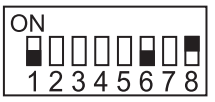
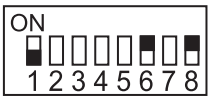
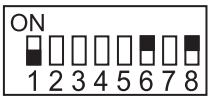
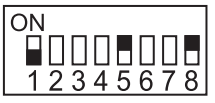
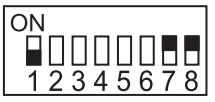
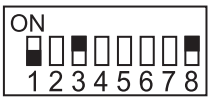
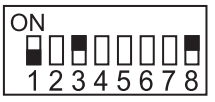
You use this optional signal to pick up the Thermo-ON signal of the running compressor during the heating process. You use this function in order to control a circulator or a humidifier.

Connect the cabling and use the materials as shown in section 6.1.1.

The contact of auxiliary relay X2 is closed when the thermos that indication is ON during the heating mode.

6.2. RPK(0.8~4.0)FSNM UNIT

The following table shows the optional input and output signals available for the RPK-(0.8~4.0FSNM) units.
These Signals are set up using DIP switches

	Setting option	Connector No.	Wireless		PC-P1HE optional function
			Pin Nº	DSW2	
Inputs	Function 1 - remote ON/OFF of the unit	CN4	2-3		-
	Function2 - remote ON of the unit.	CN4	1-2		-
	Function2 - remote OFF of the unit.	CN4	2-3		-
	Cancellation of Commands from Remote Control Switch After Forced Stoppage	CN4	1-2	(Turn OFF JP2)	-
	Setting of the cooling mode or the heating mode	CN4	1-2	-	-
	Automatic operation when power supply is ON	-	-		d1
	Restarting Function after Power Failure	-	-		d3
	Control by means of the field-supplied room thermostat (cooling)	CN3	1-2		-
	Control by means of the field-supplied room thermostat (heating)	CN3	2-3		-
Outputs	Operation Signal	CN7	1-2	-	-
	Alarm Signal	CN7	1-3	-	-

Note:

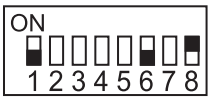
- *When the PC-P1HE is used, the power ON/OFF functions are only available by means of the configuration (d1 and d3) of the remote control switch. The DSW2 is cancelled for this function.*
- *All the other functions are set by the DSW2. Service 2 of PC-P1HE is not available for the RPK.-(0.8~4.0)FSNM units.*

6.2.1. DESCRIPTION OF OPTIONAL INPUT SIGNALS

■ **Function 1: Remote ON/OFF of the unit**

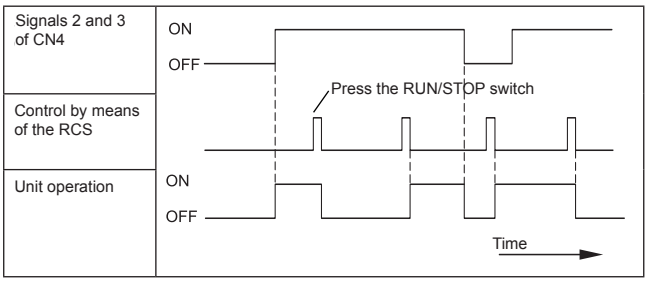
This is a remote ON/OFF function that uses the level signal (ON/OFF). Connect the cabling and use the materials as shown in section 6.1.1.

If an input signal is ON four numbers 2 and 3 of CN4, set the DIP switch as shown below:



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:



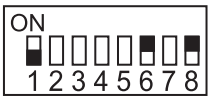
Note:
Operation priority is given either to the remote ON/OFF signal or to the signal of the remote control switch, whichever was last issued.

Due to the initialization of the components, picking up the signal within 10 seconds after turning ON the main switch is not available.

■ **Function 2: Remote ON of the unit (04) (pulse signal input)**

This is a remote ON/OFF optional signal that uses the pulse signal.

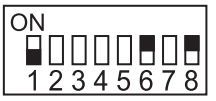
Connect the cabling and use the materials as shown in section 6.1.1. Set the DIP switches as shown below:



■ **Function 2: Remote OFF of the unit (04) (pulse signal input)**

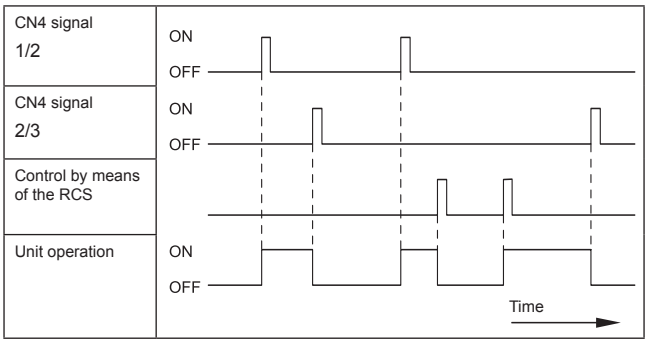
This is a remote OFF optional signal that uses the pulse signal.

Connect the cabling and use the materials as shown in section 6.1.1. Set the DIP switches as shown below:



A time chart with the uses of the functions is shown below

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.

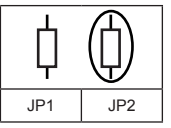
The duration of the pulse must be greater than 200ms.

■ **Cancellation of commands from the remote control switch after forced stoppage**

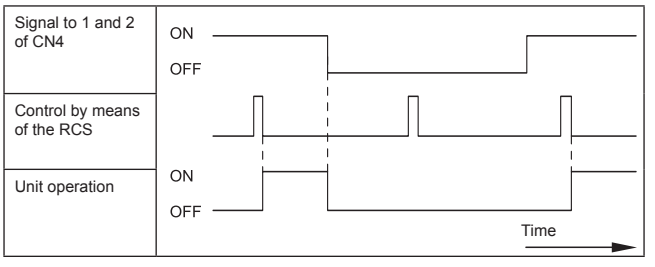
This function, which uses the level signal, provides a control to stop the system and to lock the remote control switch automatically from a remote place.

Note:
- *You cannot use this option with the "Remote Control 1" function nor with the "Remote Cooling/Heating Mode ChangeOver" function.*
- *After setting #1 and #2 of CN4 to OFF, the unit remains stopped and the remote control switch is available.*

Connect the cabling and use the materials as shown in section 6.1.1.

Turn OFF the main switch before cutting the jumper JP2 of the indoor unit PCB.	

Time chart



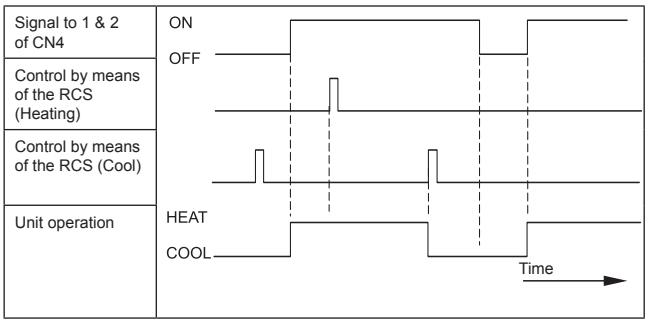
Setting of the cooling mode or the heating mode

By utilizing this function, the cooling or heating operation mode can be changed by giving a contact signal from the outside to the unit.

Connect the cabling and use the materials as shown in section 6.1.1.

In case of “Cooling or Heating Operation mode Setting Change by External Input”, the signal input must be by number 1 and 2 of CN4.

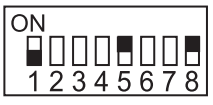
Time Chart:



Automatic operation when power supply is ON

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 start when power 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 DIP switches DSW 2 as shown below.



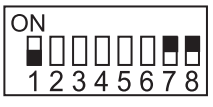
Note:

- *All 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.*

Restarting function after power failure

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 power is restored if the unit was ON before the power failure.

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:

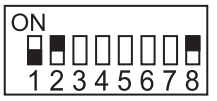
- *All other DIP switches must correspond to the factory settings for the particular Indoor Unit.*

Control by means of the field-supplied room thermostat

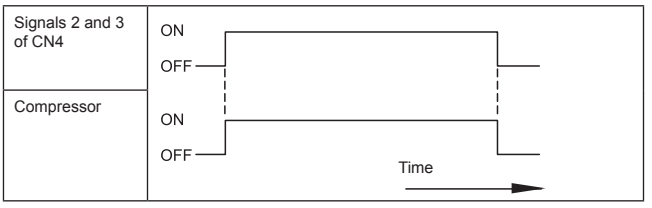
When operating with a field supplied room thermostat instead of the inlet thermistor of the indoor unit. Connect the cabling and use the materials as shown in section 6.1.1.

In case of “Room Thermostat (Cooling) Function 01”, the signal input to numbers 2 and 3 of CN3; in case of “Room Thermostat (Heating) Function 02”, the signal input to 1 and 2 of CN3.

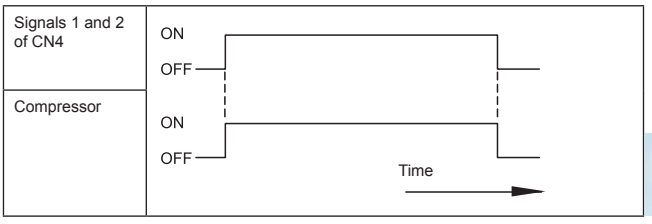
Set the DIP switch as shown below.



Cooling:



Heating:



Component	Manufacturer or specifications
Thermostat	Equivalent of YAMAKATE R7031P005, R7031Q005

Note:

- *When you use a field-supplied room thermostat, select it with the DIP switch as explained above.*
- *All other DIP switches must keep the factory settings for each Indoor Unit*

6.2.2. DESCRIPTION OF OPTIONAL OUTPUT SIGNALS

■ **Operation Signal**

This optional signal is utilized to pick up the operation signal. By means of this function, you can check the operation signal at a remote place.

You can use it to lock the operation of the fresh air intake fan.

Connect the cabling and use the materials as shown in section 6.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

■ **Alarm Signal**

This optional signal is used 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.

Connect the cabling and use the materials as shown in section 6.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

6.3. ECONOFRESH KIT

The system has three optional input signals that are programmed in the PCB of the indoor unit by means of connector CN3 of the RPI unit.
The CN3 connector has two ports to configure the optional input signals the kit has.
Outdoor cooling function E1 does not require setting connector CN3
These signals are set up using the remote control switch, as explained in section 6.6.2 of this chapter.
When DSW6 of the RPI unit is set to use the Econofresh Kit, connectors 1 and 2 of CN3 in the PCB of the RPI unit are locked

6.3.1. DESCRIPTION OF OPTIONAL INPUT SIGNALS

■ **Enthalpy sensor (E2)**

This is a signal that opens and closes the air intake and outlet sluice valves, which provides for mixing fresh air and return air from the econofresh kit, based on the air quality parameters, thus allowing a more precise control of the air quality.

Connect the cabling as shown in item i2 of section 6.1.1. Only pins 1 and 2 of the CN3 can be connected.

The signal has the following control logic.

Connector	Pin No.	X1	Sluice valve
CN3	#1 #2	ON	–
		OFF	On

■ **CO2 gas sensor (E4)**

This signal allows to control the fresh air intake depending on the concentration of CO2 inside the room.

Connect the cabling as shown in item i2 of section 6.1.1. Only pins 1 and 2 of the CN3 can be connected.

The signal has the following control logic.

Connector	Pin No.	X1	Sluice valve
CN3	#1 #2	ON	–
		OFF	On

The specifications of the components required for a correct installation are shown in section 6.1.1.

6.3.2. COMPATIBILITIES

The next table shows the compatibility between the different optional signals.

6

	Optional function of the PC-P1HE	Room thermostat	Thermistor of Remote Control Switch	Remote thermistor	Wireless Remote Control Switch	All fresh control	Enthalpy sensor	CO2 gas sensor
Room thermostat	-	-	-	-	-	-	-	-
Thermistor of Remote Control Switch	C8	-	-	-	-	○	○	○
Remote thermistor	-	-	-	-	-	-	-	-
Wireless Remote Control Switch	-	-	-	-	-	○	○	○
All fresh control	E1	-	○	-	○	-	-	-
Enthalpy sensor	E2	-	○	-	○	-	-	-
Gas sensor	E4	-	○	-	○	-	-	-

○ : Available

- : Not Available

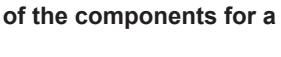
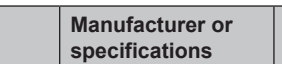
6.4. HRNM OUTDOOR UNITS

The system has eight input and five output signals that are programmed in the PCB of the outdoor unit by means of connectors CN1 and CN2 for the input signals and CN7 for the output signal.
Connectors CN1 and CN2 have two and one ports respectively to configure three input options out of the eight options the system has.
Input connector CN1 has two ports to configure two input options out of the five options the system has.
The system has ten optional functions that are programmed in the PCB of the outdoor unit.

6.4.1. AVAILABLE PORTS.

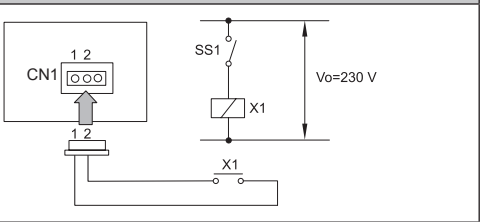
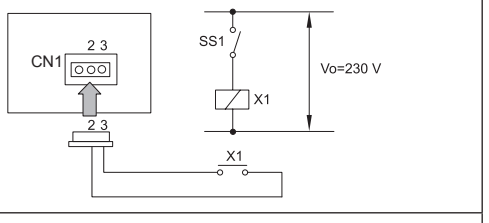
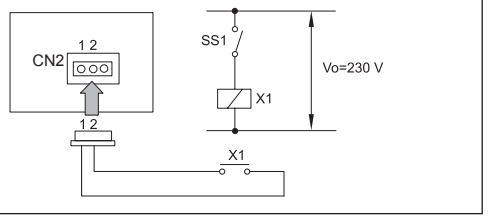
The system has the following input and output ports.

Indication

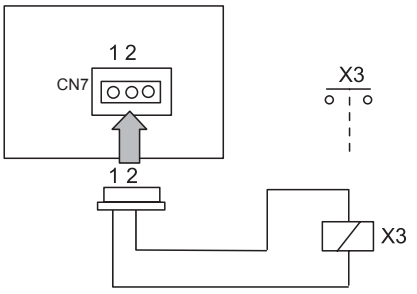
	Content	Setting of the port in the PCB of the indoor unit	Remarks	Outlet
Inputs	i1	1-2 of CN1		Contact
	i2	2-3 of CN1		Contact
	i3	1-2 of CN2		Contact
Outputs	o1	1-2 of CN7		DC 12V
	o2	1-3 of CN7		DC 12V

Connection:
The system has the following connections.

■ Input connections

Indication	Connections
i1	
i2	
i3	

■ Output connections

Indication	Connections
o1	
o2	

Specification of the components for a correct installation

Component		Manufacturer or specifications	Remarks
Auxiliary relay (X3)		OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage between relay terminals 12 Vdc - 75 mA
(SS1) (x1), (x2) contact example		Manual Type	Voltage between terminals of the 230V - 5 mA contactor
3P Connector cable		Optional part PCC-1A (capable of connecting the JST XHP –3 connector)	Five wires with connectors as one set
Wire (control	Voltage: 12V DC.	0.5 mm²	
Wire (power)	Voltage 230V	2.0 mm²	

Notes:

- *The connection of the input signal is only an example.*
- *Keep the CN1 and CN2 wires as short as possible.*
- *Do not run the wires along 230 V/400 V CA power cables Separately install them at a distance of more than 30cm. (The cables may intersect.)*
- *If you install the wires along a power supply wire, insert the wires in a metal conduit tube and ground one end of the tube.*
- *The maximum wiring length is 70 m. If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.*

6.4.2. CONFIGURATION.

Available optional signals

HRNM units have the following signals that are described in the following table.
These signals are set up through the PCB of the outdoor unit.

■ **Input signals**

Ind.	Input signal	Application	Port
0	Nº setting application	Nº setting	
1	Fixing the heating mode	This signal allows to pre-fix the operation mode, in this case the heating mode, independently of what the indoor unit requests. If the indoor units request the oposite mode than the outdoor unit, the compressor will not start. This is very useful to set up a unique operation mode.	CN1 and CN2
2	Fixing the Cooling mode	This signal allows to pre-fix the operation mode, in this case the cooling mode, independentlyof what the indoor unit requests. If the indoor units request the oposite mode than the outdoor unit, the compressor will not start. This is very useful for computer rooms where the cooling mode is fixed throughout the year.	CN1 and CN2
3	Demand thermo OFF	This signal allows to stop the compressor if it reaches a certain power as well as to put the indoor unit in Thermo-OFF. This is very useful for installations with high power consumption.	CN1 and CN2
4	Enforced stoppage	This signal allows to control the stoppage of the compressor and the fans of the indoor as well as outdoor units. This is very useful when used with the alarm signals of the fire prevention systems.	CN1 and CN2
5	Current control demand 50%	This signal allows to regulate Current consumption and establish an average consumption of 50% of the rate point. This is very useful for installations that run 24 hours a day.	CN1 and CN2
6	Current control demand 75%	This signal allows to regulate Current consumption andestablish an average consumption of 75% of the rate point.This is very useful for installations that run 24 hours a day.	CN1 and CN2
7	Current control demand 100%	This signal allows to regulate Current consumption and establish an average consumption of 100% of the rate point. This is very useful for installations that run 24 hours a day	CN1 and CN2

■ **Output signals**

Ind.	Output signal	Application	Port
0	Nº setting application	Nº setting	
01	Operation Signal	This signal allows to pick up the machine's operation signal. This is very useful to start up additional systems such as humidifiers, fans and other additional air-conditioning systems.	CN7
02	Alarm Signal	This signal picks up the machine's alarm. This is very useful to warn that an alarm has been tripped.	CN7
03	Compressor ON signal	This single allows to pick up the compressor's operation signal. It is very useful for checking signals during remote-control operation and for the interlock of the outdoor unit.	CN7
04	Defrost operation signal	This signal allows to pick up the defrosting of the unit. This is very useful to know how the indoor unit is operating if there is an abnormal situation. .	CN7

Note:
Do not set same function (01~04) to multiple input port.

Programming

The optional signals are programmed through the PCB of the outdoor unit.

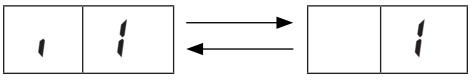
Setting of the optional signals

The optional signals of the outdoor unit are set up from the PCB of the outdoor unit and push switches PSW1, PSW2 and PSW3

■ Selection of the input signal

If the below setting change is required on-site, perform the following instructions:

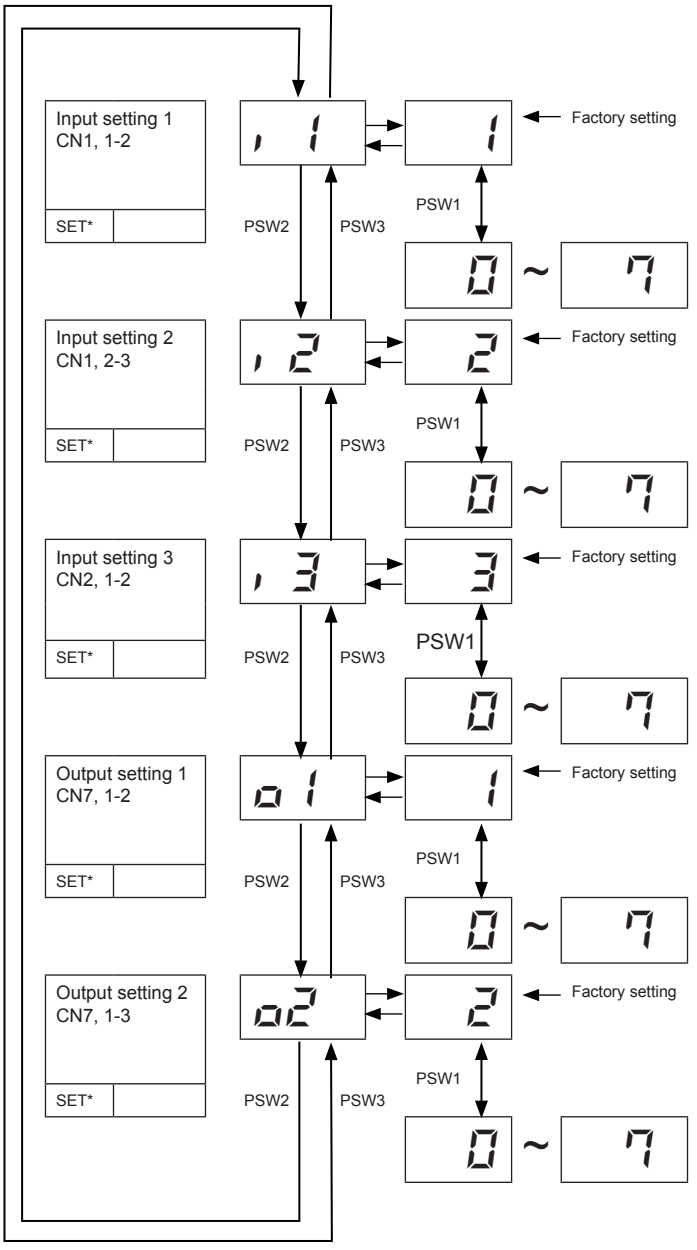
1. While the outdoor unit is ON, set the following DIP switches on the printed circuit board of the outdoor unit as follows: set pin 6 of DSW2 to ON. Because of these settings, the function selection mode becomes available and the following indication appears on the 7-segment display.



Input/output terminal — Function No.

This indicates that function No.1 (set heating mode) is set at input 1.

2. By pressing the push switches PSW1, PSW2 and PSW3, you change the input/output terminal name. The flowchart shown on the side reflects the changes on the 7-segment display when you press PSW2 and PSW3.
3. After selecting the input/output terminal name, select your required function by pushing the PSW1.
4. After setting the pin 6 of DSW2 to OFF, the selected contents are memorized in the PCB of the outdoor unit, and, immediately afterwards, the function selection mode is set to OFF. The memorized data is maintained even when the power supply wires are disconnected. The connection details of each function, as well as the required parts, are described in the first section.



(*) Set

6.4.3. DESCRIPTION OF OPTIONAL INPUT SIGNALS.

■ **Fixing Operation Mode (Heating / Cooling)**

This input function is fixed in terminals CN1 or CN2 of the PCB of the outdoor unit, to use it as a cooling and heating mode. CN1 must be set up as follows

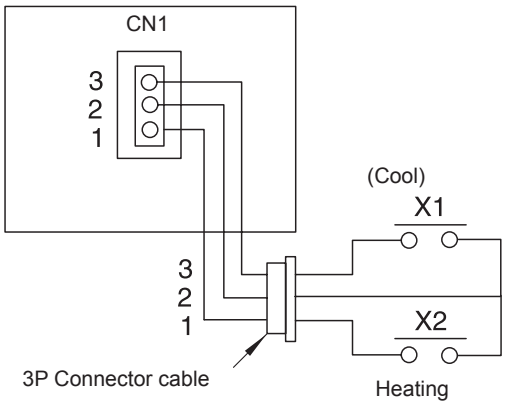
Short circuit between the terminals 1 and 2 of CN1: set heating mode.

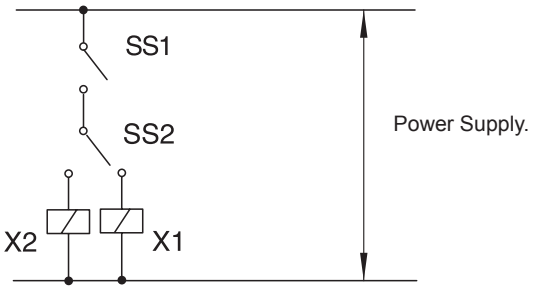
Short circuit between the terminals 2 and 3 of CN1: set cooling mode.

After having pre-fixed the established mode, the remote control can only be used to adjust the temperatures. Stoppage code “d1” “20”will be displayed if an attempt is made to change the operation mode of any of the indoor units with the remote control.

Example of wiring diagram of fixing the operation mode.

Outdoor Unit PCB:





SS1: Fixing operation mode switch
SS2: Changeover switch
X2: Cooling
X1: Heating

■ **Demand Thermo OFF (3)**

This is an input function to control the maximum power that the compressor can consume. When this option is turned on, the outdoor units are stopped completely, and the indoor units go into THERMO-OFF. Alarm “10” is displayed on the remote control. If the switch of this function is disconnected it becomes available again.

Connect the cabling and use the materials as shown in section 6.4.1

■ **Forced stoppage (5)**

This is an input function that turns on when the switch receives a signal that causes the compressor and the fan motor of the indoor unit to stop; alarm “10” displays on a remote-controlled when this option turns on. If the switch of this function is disconnected it becomes available again.

Connect the cabling and use the materials as shown in section 6.4.1

■ **Current control demand (5/7/8/9)**

This is an input function that turns on when it detects that the frequency of the compressor reaches 50%, 75% or 100%. The frequency of the compressor is determined when the maximum current reaches the established limit

Connect the cabling and use the materials as shown in section 6.4.1

If the running current of the outdoor unit exceeds the maximum limit, the unit changes to the Thermo-OFF condition. Stoppage cause code “10” will appear. When the input terminal is opened during the demand current control, the control of the input terminal is reset.

6.4.4. DESCRIPTION OF OPTIONAL OUTPUT SIGNALS

■ **Operation signal (1)**

This optional signal is utilized to pick up the operation signal. It can be used to turn on or off complementary units of the air-conditioning system,such as fans, humidifiers, etc.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ **Alarm signal (2)**

This optional signal is used to pick up the activation of safety devices.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ **Operation signal of the compressor (3)**

This optional signal is used to pick up the signal when the compressor is ON. It can be used to check how the compressor is running at all times. It is very useful for locking the compressor when the fans are locked.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ **Defrosting signal (4)**

This optional signal is used to pick up when defrosting turns on. It is very useful to check if the indoor unit is in Thermo-OFF.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

6.4.5. OPTIONAL FUNCTIONS

Programming

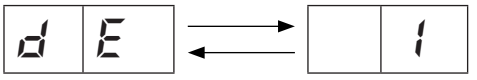
The optional signals are programmed through the PCB of the outdoor unit.

Setting of the optional signals

The optional signals of the outdoor unit are set up from the PCB of the outdoor unit and push switches PSW1, PSW2 and PSW3

■ **Selecting the optional function**

1. While the outdoor unit is ON, set the following DIP switches on the printed circuit board of the indoor unit as follows: set pin 5 of DSW2 to ON. Because of these settings, the function selection mode becomes available and the following indication appears on the 7-segment display.



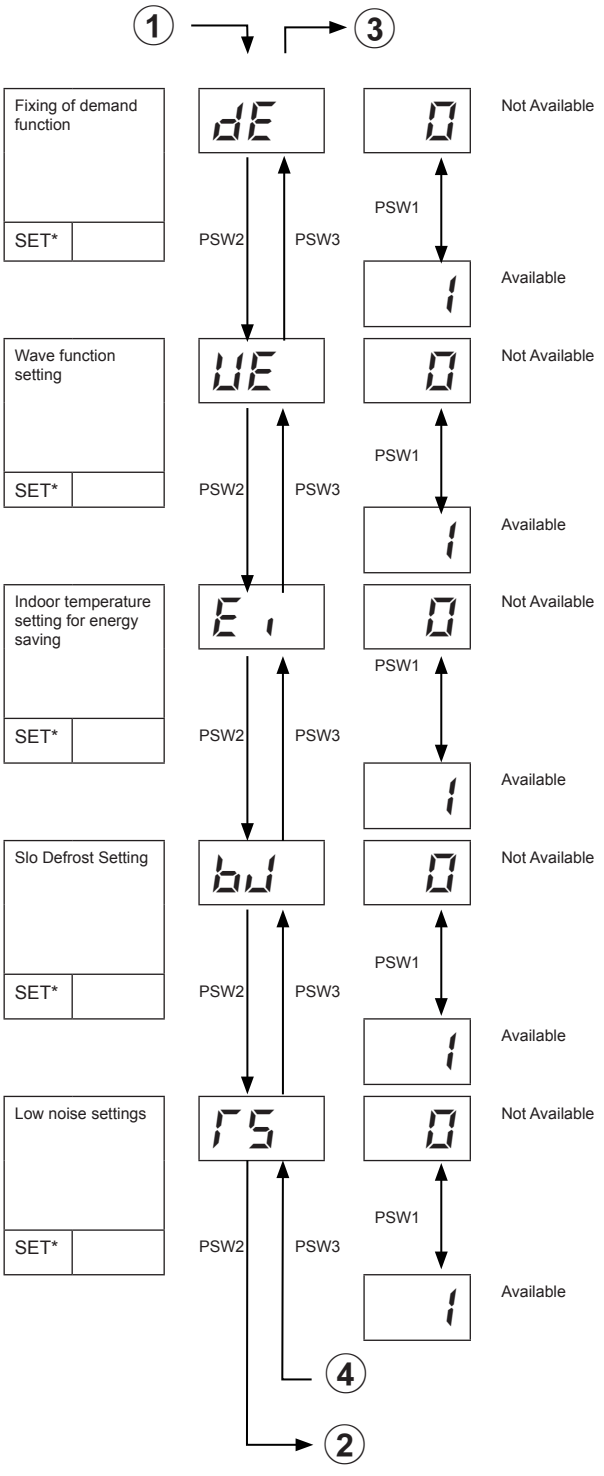
Fixing of demand function Available

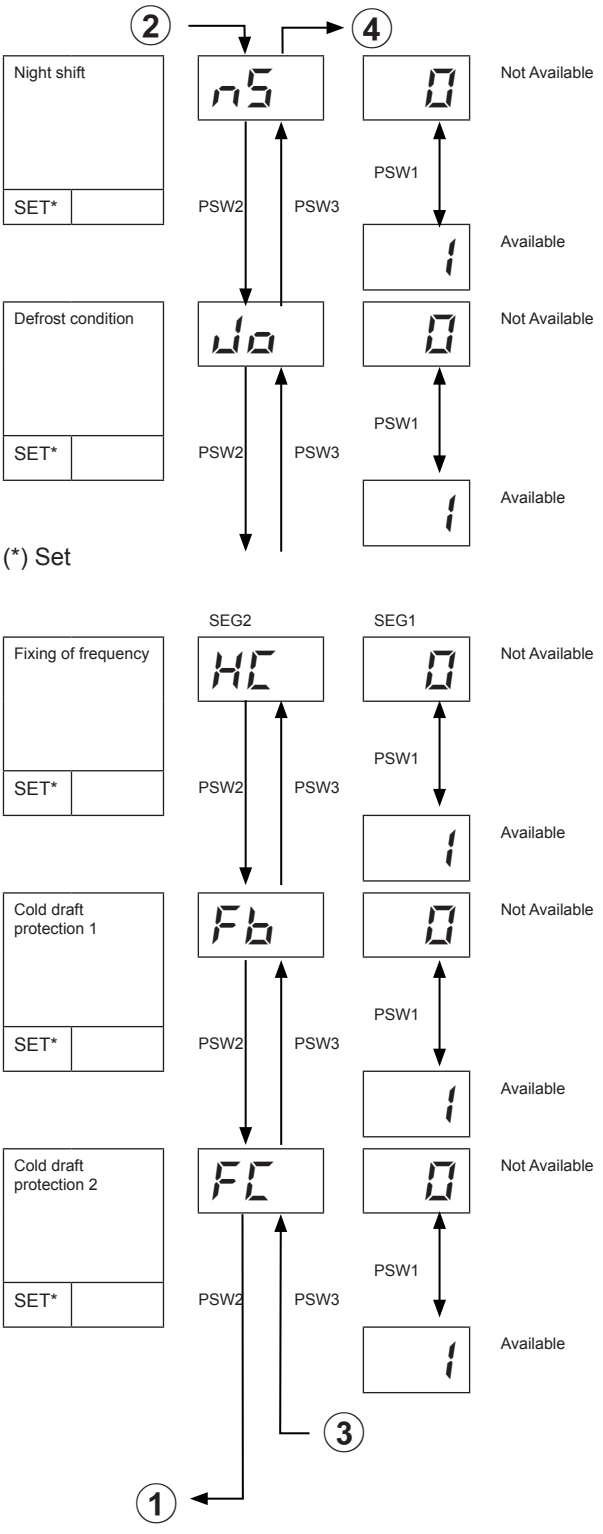
This indicates that the “Fixing of demand” function is available.

2. By pressing push switches PSW2 and PSW3, you change the input/output terminal name. The flowcharts shown on the next page reflects the changes on the 7-segment display when you press PSW2 and PSW3.

   (See the flowcharts on the next page)

3. After selecting the terminal of the function setting, select the availability function by pressing the PSW1.
4. After setting the pin 5 of DSW2 to OFF, the selected contents are memorized in the PCB of the outdoor unit, and, immediately afterwards, the function selection mode is set to OFF. The memorized data is maintained even when the power supply wires are disconnected.


1
3
Fixing of demand function
SET*
dE
PSW2
PSW3
PSW1
0
Not Available
1
Available
Wave function setting
SET*
UE
PSW2
PSW3
PSW1
0
Not Available
1
Available
Indoor temperature setting for energy saving
SET*
E1
PSW2
PSW3
PSW1
0
Not Available
1
Available
Slo Defrost Setting
SET*
bJ
PSW2
PSW3
PSW1
0
Not Available
1
Available
Low noise settings
SET*
rS
PSW2
PSW3
PSW1
0
Not Available
1
Available
4
2

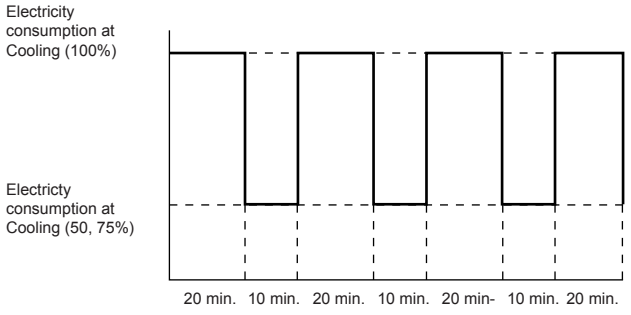

2
4
Night shift
SET*
nS
PSW2
PSW3
PSW1
0
Not Available
1
Available
Defrost condition
SET*
dO
PSW2
PSW3
PSW1
0
Not Available
1
Available
(*) Set
SEG2
SEG1
Fixing of frequency
SET*
HC
PSW2
PSW3
PSW1
0
Not Available
1
Available
Cold draft protection 1
SET*
Fb
PSW2
PSW3
PSW1
0
Not Available
1
Available
Cold draft protection 2
SET*
FC
PSW2
PSW3
PSW1
0
Not Available
1
Available
3
1

■ Fixing of Demand Functionth

This function regulates the running current of the outdoor unit. If the demanded current is above the set current, the indoor unit capacity is reduced. The running current can be regulated both from internal signal. The capacity regulation is 50%, 75%, 100%.
This function can be activated when the demand is selected at one of input terminal indications ｣1, ｣2 and ｣3
In case that multiple demand functions are set the input terminal indications, ｣1, ｣2 and ｣3,
The demand Running current is selected with 5, 6, 7 .
PSW1.

■ Wave function setting

This function regulates the power consumption of the outdoor unit. While this function is activated, the maximum limit of running is changed as shown bellow:



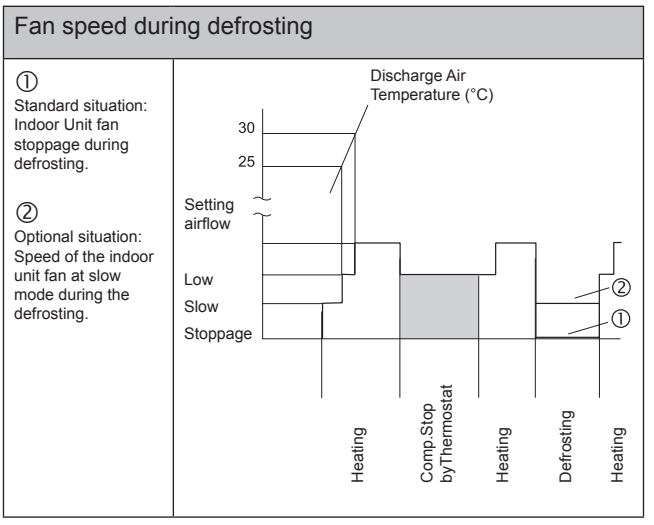
This function can be activated when the demand is selected at one of input terminal indications ｣1, ｣2 and ｣3
The minimum limit of running current control is according to the set value of the demand function.
If the demand function is not set at the input terminal indication, this function can not be activated.

■ Indoor temperature setting for energy saving.

This function can be activated when the customer wants to reduce the system power consumption. The setting temperature will be increased or decreased depends if it is in cooling or heating mode.

■ Setting defrosting at low-speed

By means of this option, you can select the speed of the indoor unit fan during the defrost period.



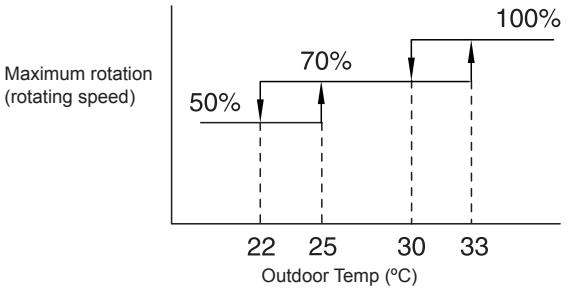
■ Low noise setting.

This function can be activated and then the compressor frequency is set lower than the normal setting. This function can activate in Cooling or Heating mode.

■ Night-shift (low noise)

When you set the operation mode to night mode (low noise), which is used especially during the nighttime, the cooling capacity is decreased to 60%. You should use the night shift operation only when the remaining cooling capacity can supply the requested temperature.

■ Outdoor Fan

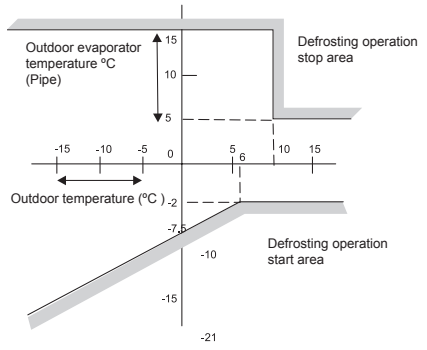


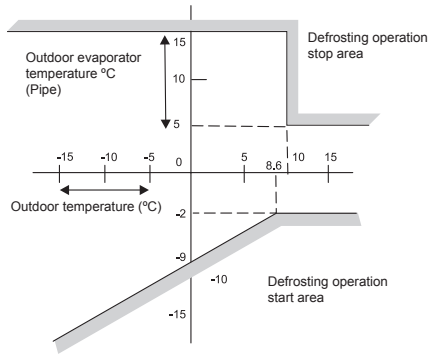
Note:
The maximum rotation (rotating speed) is always 100% for the standard unit. (No limitation of the outdoor temperature).

■ Change of defrost operation conditions

This function allows to change the operation conditions in defrosting mode.

The change is shown in the following illustrations:

Normal Defrosting Condition	
Temperature conditions under defrost operation. When change of defrost condition is NOT set.	

Optional Defrosting Condition	
Temperature conditions under defrost operation. When change of defrost condition is set	

■ Fixing of frequency

No setting for this function is available.

■ Cool Draft protection 1

This function can be activated, when the minimum discharge Air temperature falls down to 8 ºC in cooling operation. Outdoor fan stop and compressor frequency forcibly declines to prevent discharge air temperature from dropping

■ Cool Draft protection 2

This function can be activated, when the minimum discharge Air temperature falls down to 10ºC in cooling operation. Compressor stop. In this case stoppage code Nº 24 is given

■ Optional functions (jumper)

– **New Working Range temperature in cooling mode.**

When this function is activated, the working range in cooling mode will increase until –15ºC.

(Not available the individual indoor control).

To activate this option the Jumper JP1 of the outdoor unit PCB1 must be cut.

– **Fixing cooling mode**

When this function is activated, the operation mode is fixed in cooling mode. Thermo ON is only available for COOL or DRY mode at indoor unit. The minimum temperature is -5 ºC

To activate this option the Jumper JP4 of the outdoor unit PCB1 must be cut.

– **Alternative Defrost mode**

When one outdoor unit is connected with one H-LINK system with other outdoor units, is under defrosting, the other outdoor units defrosting is cancelled.

After one outdoor unit defrosting is completed, another outdoor unit starts defrosting operation.

To activate this option the Jumper JP5 of the outdoor unit PCB1 must be cut..

– **R407C Piping**

If you are using conventional R410A Refrigerant instead of R407C refrigerant pressure will be increased. To avoid pressure increase will activate this function.

To activate this option the Jumper JP6 of the outdoor unit PCB1 must be cut.

6.5. OPTIONAL FUNCTIONS AVAILABLE THROUGH THE REMOTE CONTROL SWITCH

6.5.1. OPTIONAL FUNCTION SETTING

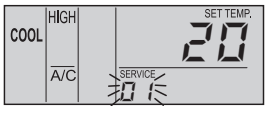
The remote control switch is changed to the optional setting mode by the following procedures.

Programming with the PC-P1HE or PC-P2HTE
The optional signals are programmed using the remote control switch (Example: PC-P1HE)

■ Programming and setting mode

Make sure the unit is stopped. Press the “CHECK” and the “RESET” switches on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode.

The “SERVICE” indication is displayed, and “01” flickers below it.

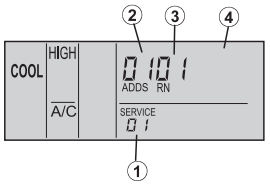


■ Selecting SERVICE 01

When in the programming and setting mode, press the “TEMP ⌃” or the “TEMP ⌄” switch, and the number that flickers below the “SERVICE” indication will change (01 → 02). Set the flickering number to “01”, maintain it during 7 seconds or press the “CHECK” switch, and the remote control switch will change to optional setting mode.

■ Selection of indoor unit

a. In SERVICE 01 selection mode, the indication of the remote control switch will change as shown in the figure below.



① The “01” indication is activated.

② The address of the indoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and “ADDS” is indicated below.

③ The refrigerant cycle number of the outdoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and “RN” is indicated below.

④ The indication of the setting temperature is turned OFF.

b. In previous point (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.

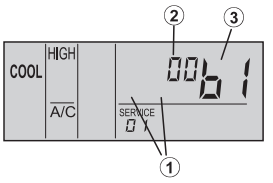
Note:

- *The indoor unit can be selected among the indoor units connected to the remote control switch.*
- *If both the indication of the address and the refrigerant cycle number is “AA”, the settings of all the indoor units are the 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 signals and setting conditions

a. At the optional setting mode, the indication on the remote control switch is changed as shown below.



① The indications of “ADDS” and “RN” are turned OFF

② The setting condition of the optional function is indicated in the segments of the time indication of the timer setting.

③ The item number of the optional function is indicated in the segment for the set temperature indication.

b. Press the TIME ∇ or 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 pressing “TIME Δ” switch When pressing “TIME ∇” switch	b1 b2 b3... E1 F2

c. Press the “CHECK” switch, and the setting condition of the optional function is changed as shown below.

When pressing the “OK” switch.	00 01 ... 08

■ Return to normal mode from the optional functions setting mode

Press the “RESET” switch to memorize the optional functions settings and return to normal mode.

■ Selection of other Indoor Unit

When in optional settings mode, press the “TIME ∇” or Δ” switch, the condition of the remote control switch is changed so that the Indoor Unit can be selected to set the optional function described above.

Setting items of the optional functions

Item.	Optional functions	Setting	Contents of parts	Content
b1	Removal of Heating temperature Calibration	00	Not Available	This function is used to eliminate the 4 °C shift.
		01	Available	
b2	Circulator Function at Heating Thermo-OFF	00	Not Available	This function is to avoid the stratification of air.
		01	Available	
b3	Enforced 3 Minutes Minimum Operation Time of Compressor	00	Not Available	This function is used to guard the compressor when it frequently starts and stops
		01	Available	
b4	Change of Filter Cleaning Time	00	Std.	With this function is possible to change the time when the remote controller advise about when is necessary to change the air filter.
		01	100 Hours	
		02	1200 Hours	
		03	2500 Hours	
		04	No indication.	
b5	Fixing the operation mode	00	Not Available	This function eliminates the possibility of changing operation mode from RCS or central control
		01	Available	
b6	Fixing the setting temperature	00	Not Available	This function eliminates the possibility of changing setting temperature from RCS or central control
		01	Available	
b7	Fixing of Operation as Exclusive Cooling Unit	00	Not Available	This function eliminates Heating mode from RCS or central control
		01	Available	
b8	Automatic COOL/HEAT Operation	00	Not Available	This function changes automatically from Cool to Heat.
		01	Available	
b9	Fixing the air volume	00	Not Available	This function eliminates the possibility of changing fan speed from RCS or central control
		01	Available	
C1	Not Prepared			
C2	Not Prepared			
C3	Not Prepared			
C4	Drain pump in heating	00	Not Available	This function is used to activate the drain pump in Heating mode.
		01	Available	
C5	Static Pressure Selection	00	Medium static pressure (factory setting)	This function is used to change the static pressure levels from the remote controller on the RPI units.
		01	High Static Pressure	
		02	Low Static Pressure	
	Increasing fan speed (RCD) (RCI)	00	Normal.	This function is used to change the fan speed due to the high ceiling.
		01	Increasing speed 1	
		02	Increasing speed 2	
C6	Hi Speed at Heating Thermo-OFF	00	Not Available	This function is used to increase the fan speed when Thermo-OFF
		01	Available	
C7	Cancelling of Enforced 3 Minutes Minimum Operation Time of Compressor	00	Not Available	This function is used to cancel the “enforced 3 minutes minimum operation time of compressor”.
		01	Available	
C8	Thermistor of Remote Control Switch	00	Control by Indoor Suction Thermistor	This function is used to control the unit with the thermistor of remote control.
		01	Control by Thermistor of Remote Control Switch	
		02	Control by Average value of Indoor Suction Thermistor and Thermistor of Remote Control Switch	
C9	Not Prepared			
CA	Not Prepared			
Cb	Selection of Forced Stoppage Logic	00	Forced Stoppage Input A Contact	With this function we select the forced stoppage logic.
		01	Forced Stoppage Input B Contact	
CC	Not Prepared			

Item.	Optional functions	Setting	Contents of parts	Content
d1	ON/OFF 1 unit Power supply	00	Not Available	This function retains the settings of the unit if power supply is interrupted. The unit will start when power is restored.
		01	Available	
d2	Not Prepared			
d3	Restart function after power failure	00	Not 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
		01	Available	
E1	(Econofresh) All Fresh Operation	00	Not Available	This function is able to open the outdoor air damper.
		01, 02	Available	
	(KPI) Ventilation mode	00	Automaticventilation	This function is used to set the ventilation mode of the total heat exchanger.
		01	Ventilationby total heat exchanger	
		02	Bypass Ventilation (No Total Heat Exchanger)	
E2	(Econofresh) Enthalpy Sensor	00	Not Available	This function can set the Enthalpy Sensor Input
		01	Available	
	(KPI) Increasing Supply Air Volume	00	Not Available	This function is used to make the room pressure higher than the surrounded room
		01	Available	
E3	Not Prepared			
E4	(Econofresh) Gas Sensor	00	Not Available	This function can set the Gas Sensor Input
		01, 02	Available	
	(KPI) Precooling/Preheating Period	00	Std.	This function delays the start up of the total heat exchanger operation.
		01	30 minutes	
		02	60 minutes	
E5	Not Prepared			
F1	Automatic setting for OFF timer (only available for PC-P1HE)	00	No Function	This function is used to set the OFF timer function automatically when the unit is started by the remote control switch.
		01	OFF timer by 1 hour	
		02	OFF timer by 2 hours	
		~	...	
		23	OFF timer by 23 hours	
		24	OFF timer by 24 hours	
F2	Remote Control Main-Sub Setting	00	Main	This function is used when to remote control are installed in one system.
		01	Sub	
F3 to F7	Not prepared	-	Not prepared	-
F8	Mode Lock	00	Not available	This function eliminates the possibility of changing operation mode from RCS, but it is possible from central control.
		01	Available	
F9	Temp Lock	00	Not available	
		01	Available	
FA	Fan Lock	00	Not available	This function eliminates the possibility of changing fan speed from RCS or central control
		01	Available	
Fb	Louver Lock	00	Not available	
		01	Available	
Fc	Cooling temperature range limit	00~10	Standard 00	+1 -10ºC
Fd	Heating temperature range limit	00~10	Standard 00	-1 ~ -10ºC
FE	Heating automatic operation temp.	00	5ºC	
		01	10ºC	
		02	15ºC	

Note

– *You can only change the setting condition of functions with "X" in the individual settings when you select the optional func-*

6.5.2. OPTIONAL FUNCTIONS OF THE 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 at –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)

If fan speed LOW is selected at heating Thermo-OFF, the air of the room might become 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 air flow are subject to personal tastes and behaviours.

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.)

In case of SET-FREE, this function is standard even when setting is not available.

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 table below.

	Period for Filter Sign Indication			
	Approx. 100 hours	Approx. 1200 hours	Approx. 2500 hours	No indication.
In Case of 4-Way Cassette Type	Changed period	Changed period	Factory setting	Changed period
Liquid crystal display on remote control switch	01 b4	02 b4	03 b4 or 00 b4 (*)	04 b4

(*) For the RPK model, the factory setting is 200 hours

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 of 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 of 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.

– AS for FXG/FX3 series, cooling and heating operation mode can be changed individually for each indoor unit in same refrigerant cycle

9. Fixing of 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 SET-FREE the Indoor Untis do not have humidifier.

Do not change setting condition “00” of item “C4”.

14. High speed (C5)

This function is utilized to increase the fan speed due to the high ceiling. (Only available for RCI and RCD Units).

15. High Speed at Heating Thermo-OFF (C6)

This function is used to increase the fan speed with function (14) when thermo-OFF in heating operation. (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, the “enforced 3 minutes minimim operation time of compressor” described in item (3) is the standard function.

This function is utilized to cancel the “Enforced 3 Minutes Minimum Operation Time of Compressor” function.

17. Remote control switch thermistor (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 it at “01” or “02” when you use it.

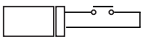
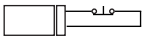
However, even when this function is set at “01” or “02” if the temperature detected is abnormal due to the failure of the remote control thermistor. etc., the indoor unit suction air thermistor is used automatically.

18. Not prepared (C9)

19. Not prepared (CA)

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	
00	Contact A		Normal.	Enforced stoppage
01	B Contact		Enforced 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 (d2)

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.

25. Ventilation mode (KPI) (E 1)

This function is used to set the ventilation mode of the total heat exchanger.

The setting condition and the ventilatrion mode are as shown below.

Setting Condition		
↓	**Ventilation Mode**	**Contents of parts**
00	Auto Ventilation	Selecting effective ventilation mode (Total Heat Exchanging Ventilation or Bypass Ventilation) for energy savingby detecting the temperature difference between the outdoor temperature and the indoor temperature.
01	Total Heat Exchanging Ventilation	The Heat Exchanging is performed continuously when the total Heat Exchanger is operated.
02	Bypass Ventilation	The Heat Exchanging is not performed continuously when the total Heat Exchanger is operated.

All fresh operation (Econofresh) (E1)

This function is able to open the outdoor air damper.

The setting condition is showing below.

Setting Condition		
↓	**All fresh control**	**Contents of parts**
00	Not Available	The outdoor damper is fully closed
01	Available	The outdoor damper is fully open
02	Available	The outdoor damper is fully open

26. Increasing supply air volume (KPI) (E2)

This function is utilized to increase the supply air volume with the one-step high tap of the fan motor for supply air during operation of the total heat exchanger, make the room pressure higher than the surrounded room with the increased supply air volume and prevent polluted air and smell from entering into the room.

The setting air flow model by remote control switch and the actual air flow of the total heat exchanger when setting this function are as shown below.

Setting air flow mode by remote control switch	Air Flow of Total Heat Exchanger
LOW	MED
MED	HIGH
HIGH	HIGH

Enthalpy sensor (Econofresh) (E2)

This function is utilized to set the enthalpy sensor input.

The setting condition is showing below.

Setting Condition		
↓	**Enthalpy sensor**	**Contents of parts**
00	Not Available	The enthalpy sensor is not available
01	Available	The enthalpy sensor is available

Note:
In case that the setting airflow mode by the remote control switch is "HIGH", the airflow of the total heat exchanger is "HIGH" even when this function is set.

27. With humidifier (indication only) (KPI) (E3)

This function is utilized to control the total heat exchanger with the humidifier. However, in case of the total heat exchanger of SET-FREE, the humidifier is not attached. Do not set this function. When this function is not set, the control of the humidifier is not performed.

28. Precooling/preheating period (KPI) (E4)

This function is utilized to delay the start-up of the total heat exchanger operation.

The setting condition and the delay period of operation start-up are as shown below.

Setting Condition	
↓	**Delaying period of Operation Start-up**
00	0 minutes
01	30 minutes
02	60 minutes

Gas sensor (Econofresh) (E4)

This function is utilized to set the gas sensor input.

The setting condition is showing below.

Setting Condition		
↓	**Gas sensor**	**Contents of parts**
00	Not Available	The gas sensor input is not available
01	Available	The gas sensor input is available
02	Available	The gas sensor input is available

29. Not prepared (E5)

30. Automatic setting for OFF timer (F 1)

This function is used to turn on the OFF timer of the indoor units.

Setting Condition		Contents of parts
00	Not Available	OFF timer not set
01	Available	Turns OFF after running for 1 hour
~		
24		Turns OFF after running for 24 hour

31. Remote control main-sub setting (F2)

This function is used to set two remote-control switches in a same insulation; one in main mode and the other one in sub mode.

Setting Condition		Contents of parts
00	Main	The remote control switch is set as main
01	Sub	The remote control switch is set as sub

32. Mode Lock (F8)

This function is utilized to lock the operation mode.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	
01	Available	

33. Temperature Lock (F9)

This function is utilized to lock the temperature.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	
01	Available	

34. Fan Lock (FA)

This function is utilized to lock the fan.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	
01	Available	

35. Louver Lock (Fb)

This function is utilized to lock the louver.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	
01	Available	

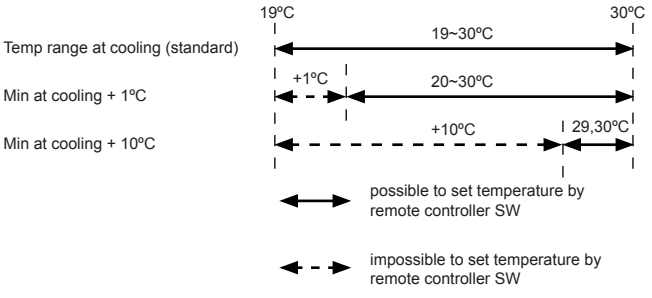
36. Cooling temperature range limit (Fc)

This function is utilized to set the the temperature Range in cooling mode. This function allows reducing the Cooling range, to configurate trough the remote control switch.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	-
01 ~ 10	Available	Working Range is reduced in 1ºC, Increased the lower limit in 1ºC
		Working Range is reduced in 10ºC, Increased the lower limit in 10ºC

Example:



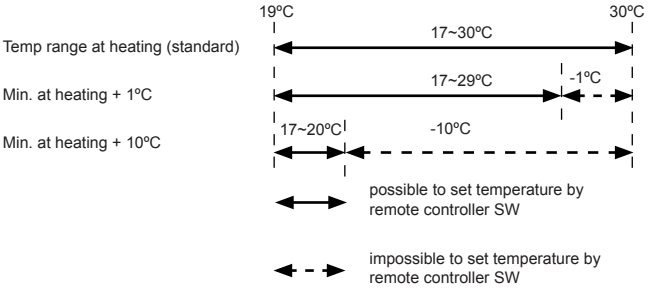
37. Heating temperature range limit (Fd)

This function is utilized to set the the temperature Range in heating mode. This function allows reducing the Heating range, to configurate trough the remote control switch.

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	-
01 ~ 10	Available	Working Range is reduced in 1ºC, decreased the lower limit in 1ºC
		Working Range is reduced in 10ºC, decreased the lower limit in 10ºC

Example:



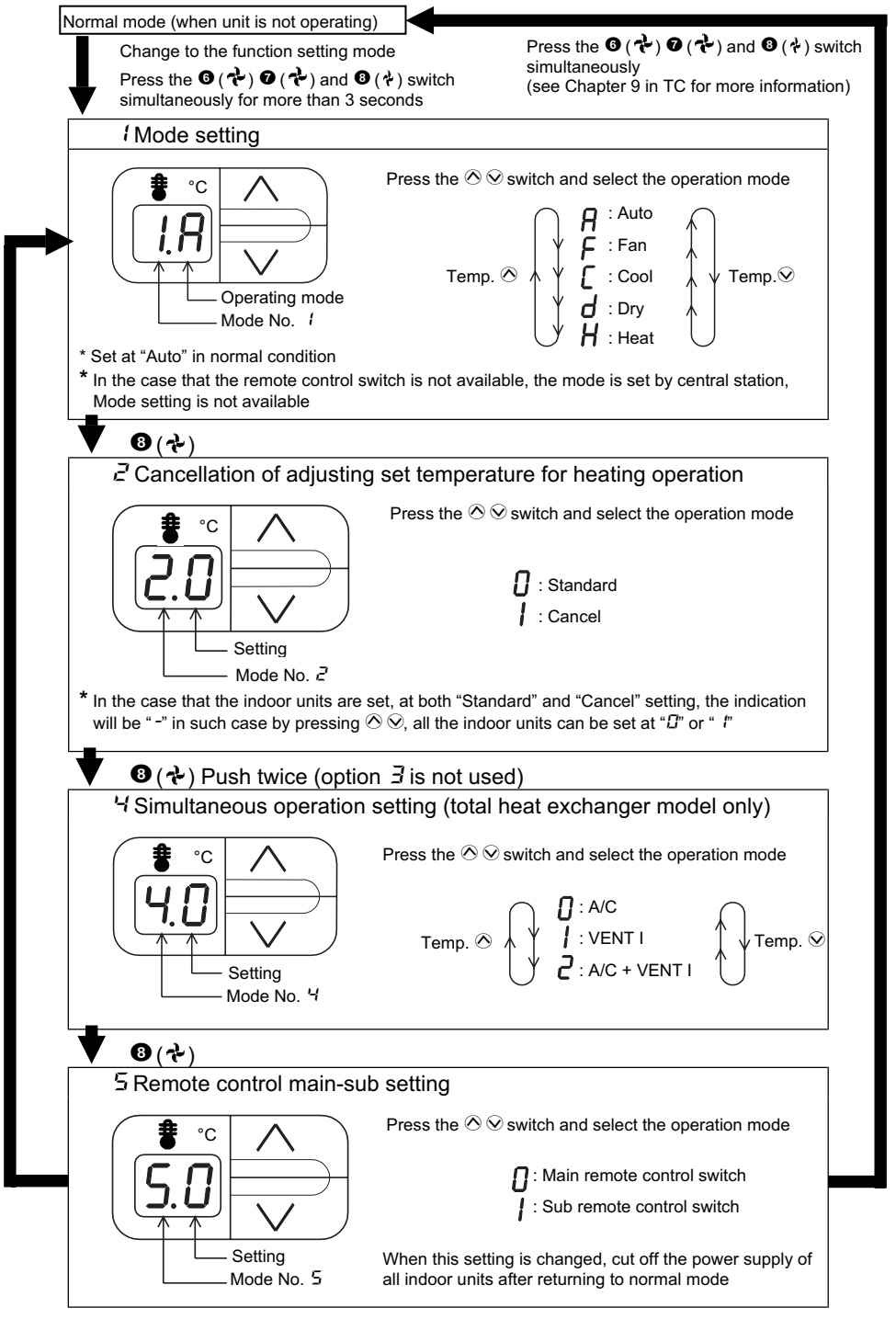
38. Heating automatic temperature range limit (FE)

This function is utilized to avoid anti-froze water pipe protection. The unit will be activated from setting temperature until 19 ºC

The setting condition is showing below

Setting Condition		Contents of parts
00	Not available	-
01 02 03	Available	Setting temperature 5ºC Setting temperature 10ºC Setting temperature 15ºC

6.6. OPTIONAL FUNCTIONS AVAILABLE THROUGH THE REMOTE CONTROL SWITCH (PC-P5H)



6.7. OPTIONAL FUNCTIONS AVAILABLE THROUGH WIRELESS REMOTE CONTROL SWITCH (PC-LH3A + RECEIVER)

You can adjust the following optional functions with the DIP switches of the receiver.

■ PC-RLH8/9/11/13

Optional function	DIP switch			
	1	2	3	4
Setting of sub receiver part	O	-	-	-
Identifying of Indoor Unit	-	O (1)		

(1) Only for PC-RLH9,11,13

CAUTION:
Turn OFF all the power sources before setting the DIP switches.

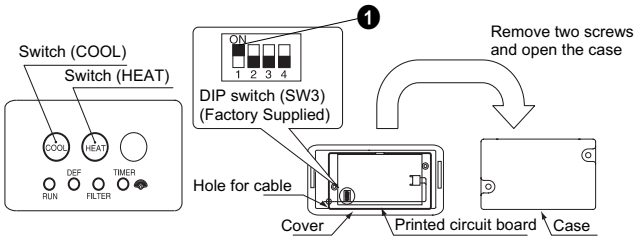
■ Setting of sub-receiver part

For this optional function set pin marked with ❶ to ON.

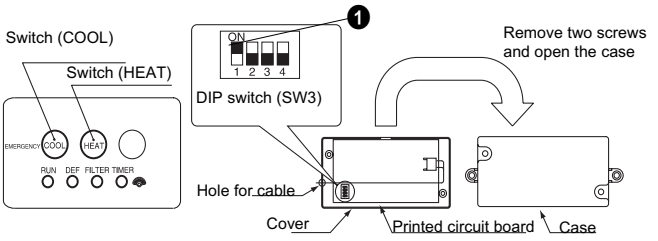
PC-RLH8/9/11

Open the lid of case by removing two screws so that the following functions are available.

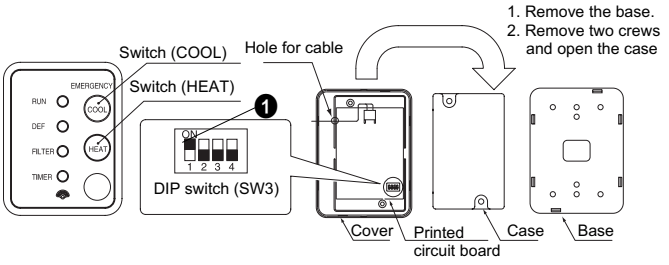
■ PC-RLH8



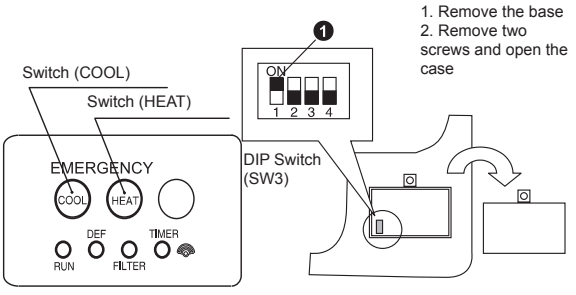
■ PC-RLH9



■ PC-RLH11



■ PC-RLH13



7. Test run

CONTENTS

7. TEST RUN _____ 7-1
7.1. Checking Procedure before the Test Run _____ 7-2
7.2. Test Run Procedure by Means of the Remote Control Switch _____ 7-3
7.3. Test Run Procedure by Means of the Wireless Remote Control (PC-LH3A) _____ 7-4
7.4. Test Run Procedure from the Outdoor Unit Side _____ 7-6
7.5. Check List _____ 7-8

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 the unit number of DSW1 and RSW1 of indoor units correspond 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 DC12V) coincide correctly. Otherwise, you may damage some components.
4. If the KPI is connected to the same remote control switch as an indoor unit, the indoor unit will not perform the test run. You need to disconnect the KPI from the installation.
5. Check to ensure that the crankcase heater is turned ON for more than 4 hours. The operation is not available within 4 hours after turning ON the power supply.
6. Check to ensure that the main source has been ON for more than 12 hours to warm the compressor oil by the oil heater.
7. Check to ensure the operating temperature:

   Cooling Operation:

   Indoor DB21.5oC and above,
   Indoor WB16oC and above,
   Outdoor DB0oC and above.

   Heating Operation:

   Indoor DB27oC and below.

NOTE:

Stoppage of Compressor Operation

The compressor is NOT available within 4 hours after turning ON the power supply.

(Stoppage Code: d1-22) If the compressor should be within 4 hours, turn ON the power and wait for more than 30 seconds. Press PSW1 and PSW3 on the outdoor PCB simultaneously for more than 3 seconds. The forced Thermo-OFF function (d1-22) is canceled and the compressor operation is available.

7.2. TEST RUN PROCEDURE BY MEANS OF THE REMOTE CONTROL SWITCH

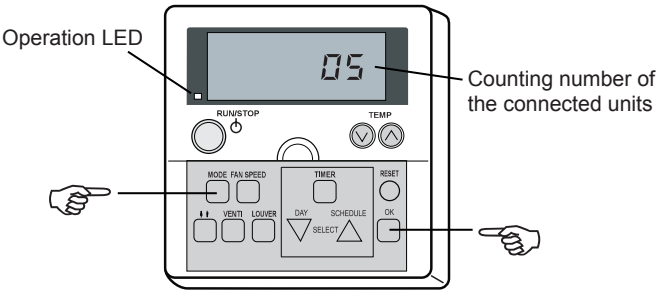
Turn ON the power source of the indoor units and the outdoor units.

❷ Set the TEST RUN mode by means of the remote control switch.
Press the MODE switch and the OK switch simultaneously for more than three seconds.

a) If the TEST RUN indication and the counting number of the connected units to the remote control switch (for example "05") are displayed on the remote control switch, the connection of remote control cable is correct. Go to ❹.

b) If no indication or "00" appears or if the number of the units that is displayed is smaller than the actual number of the units, there is some abnormal operation.

Go to ❸.



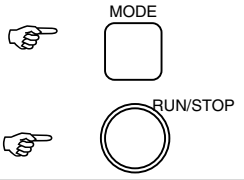
❸

Remote control switch indication	Fault	Inspection points after the power source is OFF
No indication.	▪ The power source is not turned ON. ▪ The connection of the remote control cable is incorrect. ▪ The connect wires of the power supply line are incorrect or loosened.	1. The connection between the connector and the wires: Red wire-No.1, Black wire-No.2, White wire-No.3. 2. Connecting points of the remote control cable. 3. The contact of the connectors of the remote control cable. 4. The connection order of each terminal board. 5. The screw fastening of each terminal board.
The counting number of the connected units is incorrect.	▪ The setting of the unit number is incorrect. ▪ The connection of the control cables between each indoor unit is incorrect. (When multiple units are controlled by one remote control switch).	6. Setting of the DIP switches on the printed circuit board. 7. Wire connection order of the bridge cable. 8. Connecting points of the bridge cable. 9. The contact of the connectors of the bridge cable.

Back to ❶ after the checking.

❹ Select the TEST RUN mode by pressing the MODE switch (COOL OR HEAT).

❺ Press the RUN/STOP switch.
a) The TEST RUN operation will start. (The TEST RUN operation will be finish after two hours. You can also finish the TEST RUN operation by pressing the RUN/STOP switch again).
b) If the unit does not start or if the operation LED on the remote control switch is flickering, there is some abnormal operation. Go to ❻.



❻

Remote control switch indication	Unit condition	Fault	Inspection points after the power source is OFF
The operation LED flickers. (1 time/ 1 sec.) And the unit number and the alarm code "03" flicker.	The unit does not start.	The connect wires of the operating line are incorrect or loosened.	1. The connection order of each terminal board. The fuse on the PCB may have blown out due to an incorrect wiring. (The fuse can be recovered only once by the DSW on the PCB). (Go to ❼). 2. The screw fastening of each terminal board. 3. The connection order of the power supply wire between the indoor units and the outdoor units.
The operation LED flickers. (1 time/2 sec.)	The unit does not start.	The connection of the remote control cable is incorrect.	This is the same as the item ❸ 1, 2, and 3.
The flickering indicator is different from the one above.	The unit does not start. The unit starts once and then the unit stops.	The connection of the thermistor or other connectors is incorrect. There is tripping of the protector.	Check the alarm code table in the service manual. (Service personnel should do the checking).
Normal.	The outdoor fans rotate in the reverse order.	The connection order of the power supply line is incorrect.	The connection order of the terminal board: TB1 in the outdoor unit.
	The outdoor fans do not start.	Some wires of the power supply line are disconnected.	The connecting point of the power supply line. The contact of the motor connector of the outdoor fan.

Back to ❶ after the checking.

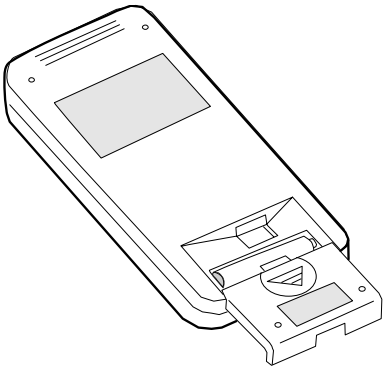
❼ Instructions for the recovery when the fuse of the transmission circuit is blown out:
1. Correct the wiring of the terminal board.
2. Set the 1st pin of DSW7 on the indoor unit PCB to ON.
Set the 2nd pin of DSW7 on the indoor unit PCB to ON.(Only RPK-FSNM)
Set the 1st pin of DSW1 on the outdoor unit PCB2 to ON (PAS-8~12HRNM)

Except RPK	Only RPK-FSNM	Outdoor Unit
		

7

7.3. TEST RUN PROCEDURE BY MEANS OF THE WIRELESS REMOTE CONTROL (PC-LH3A)

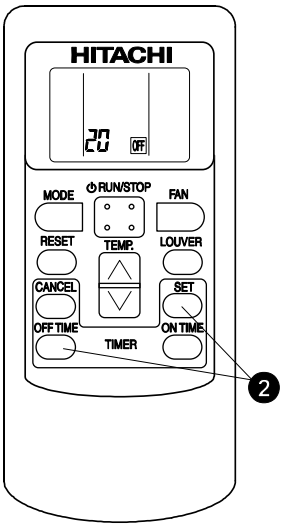
ATTENTION:
If the wired remote control switch is used or if multiple units (SET-FREE, DC INVERTER and Utopia Series) are operating simultaneously, you cannot perform the test run by means of the remote control switch. If that is the case, perform the test run by means of the wired remote control switch.



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.

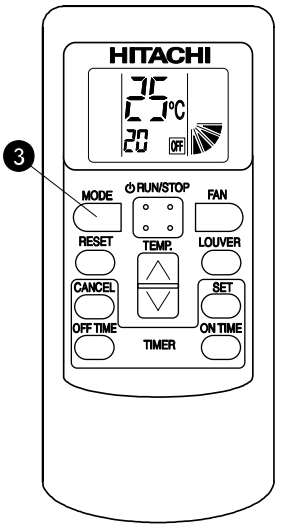
2) Set the TEST RUN mode by pressing the SET switch and the OFF TIME switch simultaneously for more than three seconds. The LCD should look like the LCD on the right figure.

   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:
   - *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) 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 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).

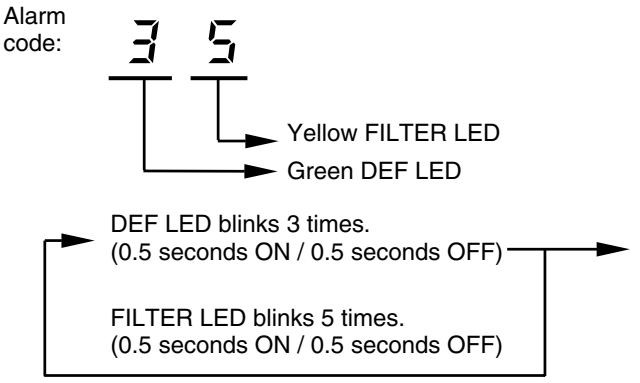
(3) Alarm code display

- 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 chapter 8.2.1 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:

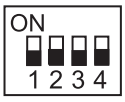


- The red RUN LED (1 second ON / 1 second OFF) means that there is an abnormal transmission between the indoor units and the outdoor units.

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)

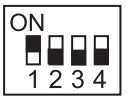
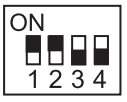
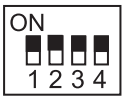
DSW1		
	1	Cooling: Pin 1 ON
	2	Heating: Pin 1, 2 ON
	3	Cooling Intermediate Season: Pin 1, 3 ON
	4	Heating Intermediate Season: Pin 1, 2, 3 ON
	5	Manual Compressor OFF: Pin 1~4 ON

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	1. Setting of Operation Mode (a) Cooling: Set DSW1-1 ON.  (b) Heating: Set DSW1-1 and 2 ON  (c) Cooling Intermediate Season: Set DSW1-1 and 3 ON  (d) Heating Intermediate Season: Set DSW1-1, 2 and 3 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	2. Forced Stoppage of Compressor: Set DSW1~4 ON- 	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.

7.5. CHECK LIST

■ Check list on test run

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 , No.3 DB /WB °C , No.4 DB /WB °C
   - Outlet: DB /WB °C , DB /WB °C , DB /WB °C , DB /WB °C
   - Inlet: No.5 DB /WB °C , No.6 DB /WB °C , No.7 DB /WB °C , No.8 DB /WB °C
   - Outlet: DB /WB °C , DB /WB °C , 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-L2 V, L1-L3 V, L2-L3 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.

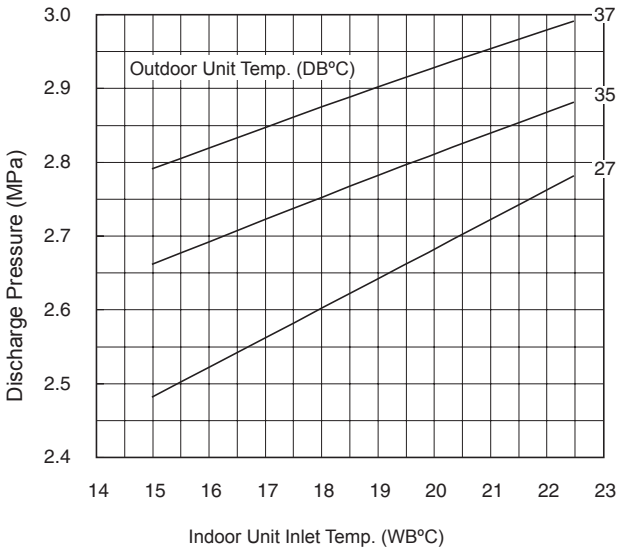
■ Normal operation pressure

You can check the excess or the deficiency of the refrigerant in comparision with the following charts and actual pressure measurement.
The following checking procedure is useful during test run and maintenance work.

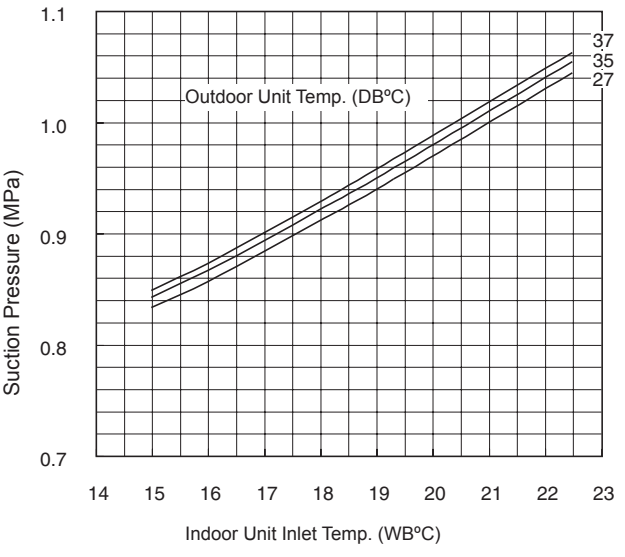
■ Model RAS-8HRNM

Cooling Operation

Discharge Pressure **Pd** (MPa)

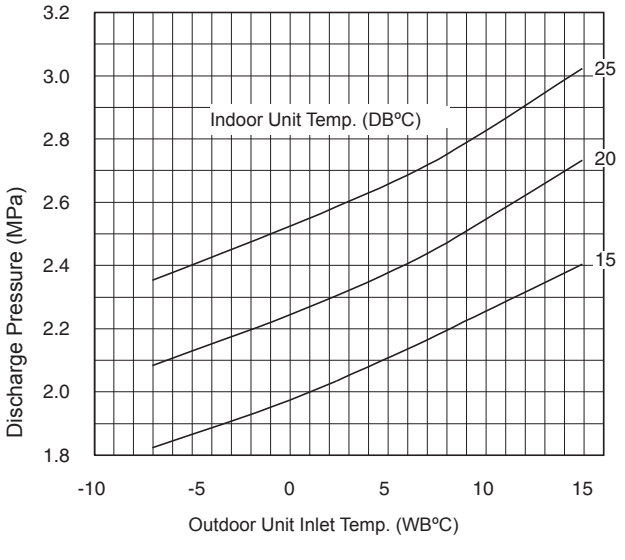


Suction Pressure **Ps** (MPa)

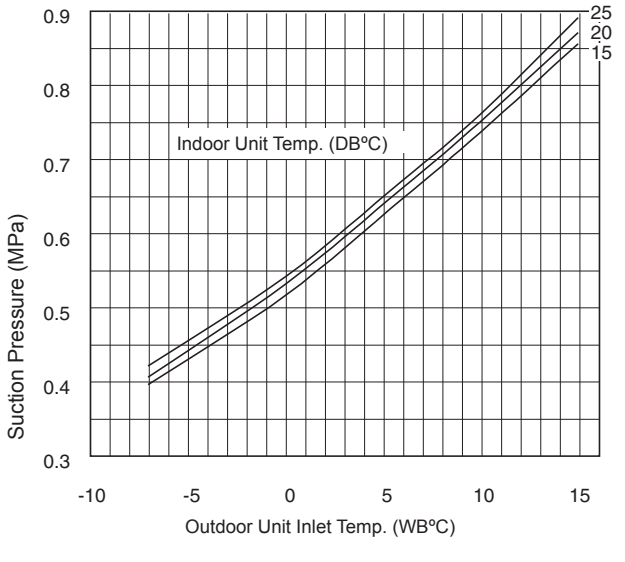


Heating Operation

Discharge Pressure **Pd** (MPa)



Suction Pressure **Ps** (MPa)



NOTES:

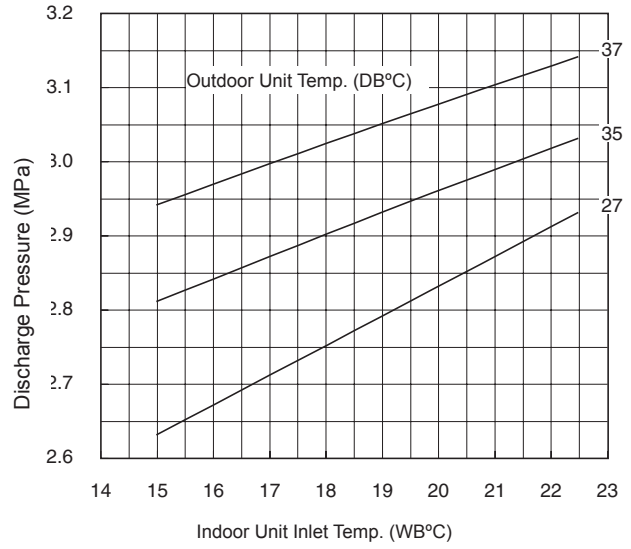
1. *The above curves indicate pressures under the following conditions:*
   - *Indoor Fan Speed: HIGH*
   - *Indoor Total Capacity: 100% compared with the capacity of the outdoor unit. (Connected 4 indoor units.)*
   - *Piping Length: 7.5m (Main Piping: 5m, Branch Piping: 2.5m x 4)*
2. *Do not use the above data for the refrigerant charge procedure.*

   These data should be used as a reference for the checking of operating conditions.

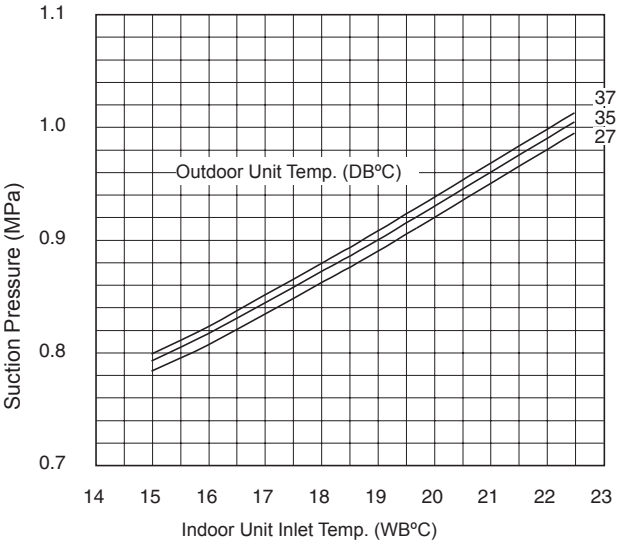
■ Model RAS-10HRNM

Cooling Operation

Discharge Pressure **Pd** (MPa)

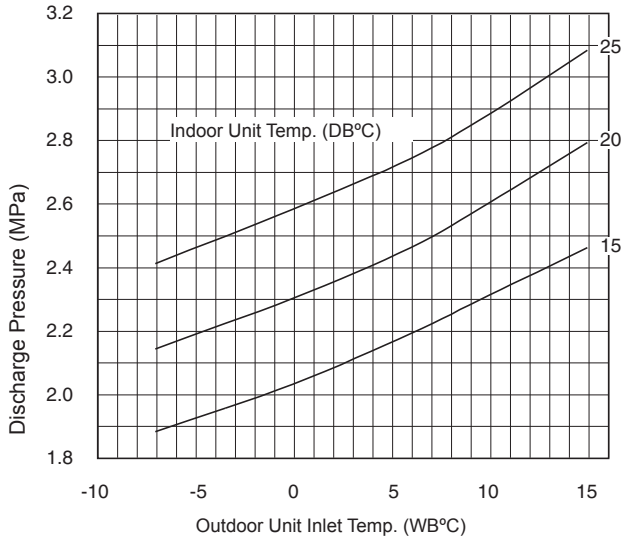


Suction Pressure **Ps** (MPa)

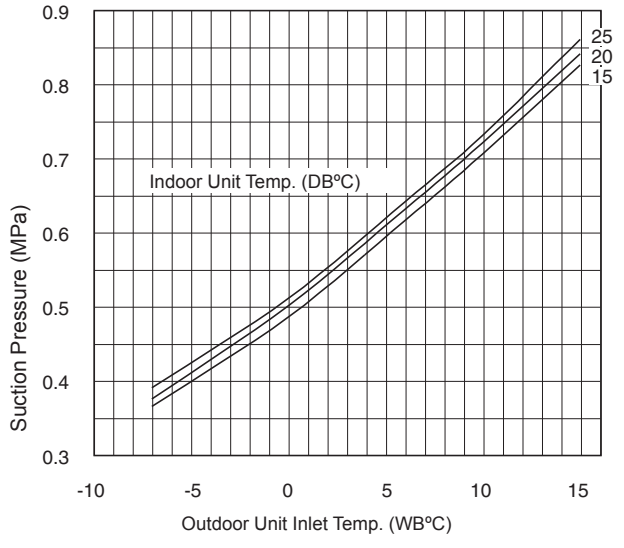


Heating Operation

Discharge Pressure **Pd** (MPa)



Suction Pressure **Ps** (MPa)



7

NOTES:

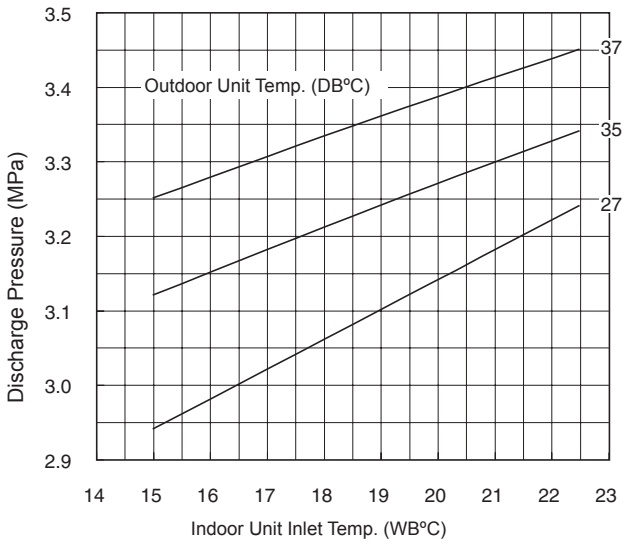
1. *The above curves indicate pressures under the following conditions:*
   - *Indoor Fan Speed: HIGH*
   - *Indoor Total Capacity: 100% compared with the capacity of the outdoor unit. (Connected 4 indoor units.)*
   - *Piping Length: 7.5m (Main Piping: 5m, Branch Piping: 2.5m x 4)*
2. *Do not use the above data for the refrigerant charge procedure.*

   These data should be used as a reference for the checking of operating conditions.

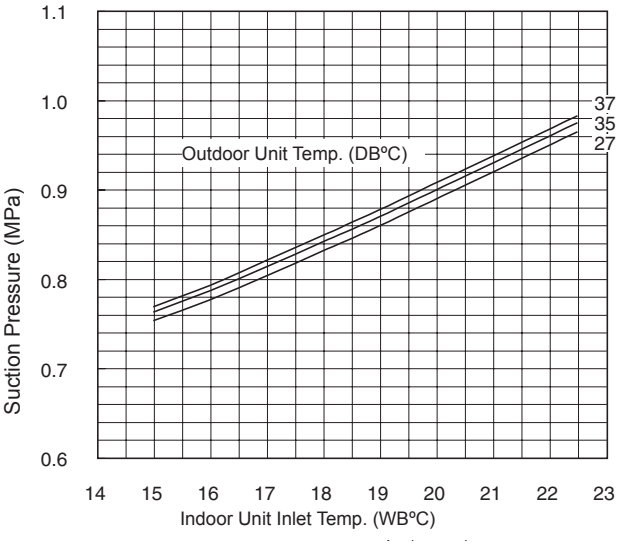
■ Model RAS-12HRNM

Cooling Operation

Discharge Pressure **Pd** (MPa)

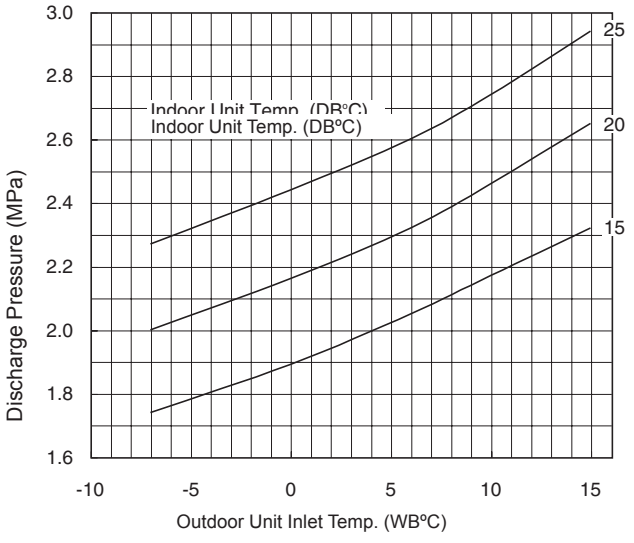


Suction Pressure **Ps** (MPa)

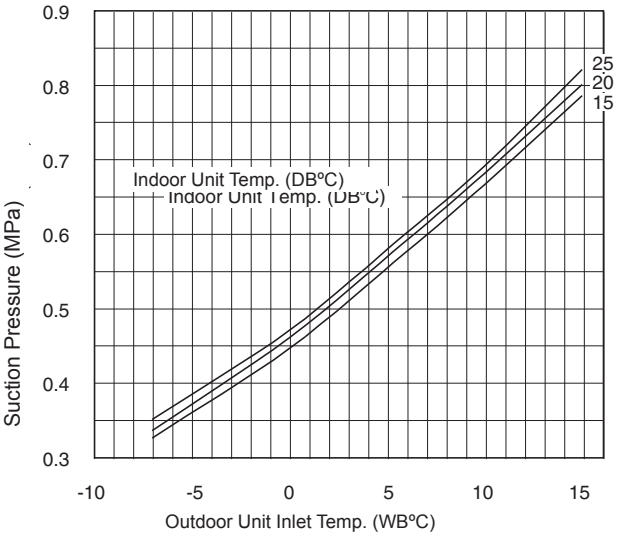


Heating Operation

Discharge Pressure **Pd** (MPa)



Suction Pressure **Ps** (MPa)



NOTES:

1. *The above curves indicate pressures under the following conditions:*
   - *Indoor Fan Speed: HIGH*
   - *Indoor Total Capacity: 100% compared with the capacity of the outdoor unit. (Connected 4 indoor units.)*
   - *Piping Length: 7.5m (Main Piping: 5m, Branch Piping: 2.5m x 4)*
2. *Do not use the above data for the refrigerant charge procedure.*

   These data should be used as a reference for the checking of operating conditions.

■ CHECK LIST ON 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) Is wire of thermistor correctly connected by viewing? (2) Check to ensure the 7-segment indication of Td when comp. is operating. Td: Temperature of THM9		
2	Is thermistor THM9 disconnected?	(1) Check to ensure that thermistor on the top of comp. is correctly mounted by viewing? (2) Check to ensure that actually measured temp. is the same as the indication during check mode.		
3	Is current sensor faulty?	(1) Check to ensure that indication A1 and A2 are 0 during compressor stopping. (2) Check to ensure that indication A1 and A2 are not 0 during compressor running.		
4	Is current sensing part on PCB2 faulty?			
5	Is the direction of current sensor (CTU, CTV) reverse?	Check the direction => by viewing.		
6	Are power source wires, U and V inserted correctly into current sensor?	Check to ensure that wires are correctly inserted.		
7	Is exp. valve (MV1) correctly connected?	Check to ensure that MV1 to CN5A is correctly connected.		
8	Is exp. valve (MV1) coil correctly connected?	Check to ensure that each coil is correctly mounted on the valve.		
9	Are the refrigeration cycle and electrical wiring system incorrectly connected?	Check to ensure that refrigerant is flowing into indoor units by operating one refrigerating cycle only from the outdoor unit.		
10	Is opening of exp. valve completely closed (locked)?	Check the following by the check mode of outdoor units. (1) Liquid Pipe Temp. (TL) < Air Intake Temp. (Ti) during Cooling Operation (2) Liquid Pipe Temp. (TL) > Air Intake Temp. (Ti) during Heating Operation		
11	Is opening of exp. valve fully opened (locked)?	Check to ensure that liquid pipe temp. is lower than air intake temp. of stopping indoor unit when other indoor units are operating under cooling operation.		
12	Are the contacts for comp. magnetic switch CMC1 faulty?	Check the surface of each contact (L1, L2 and L3) by viewing.		
13	Is there any voltage abnormality among L1-L2, L2-L3 and L3-L1?	Check to ensure that voltage imbalance is smaller than 3%. Please note that power source voltage must be within 380V or 220V+10%.		
14	Is the comp. oil acidified during compressor motor burning?	Check to ensure that the oil color is not black.		

■ ADDITIONAL INFORMATION FOR “CHECK LIST ON COMPRESSOR”

Check Item	Additional Information (Mechanism of Compressor Failure)
1 & 2	the liquid refrigerant return volume to the compressor is controlled by the discharge gas temperature Td when compressor is operating. If Td thermistor is disconnected, the liquid refrigerant return volume will become small by detecting the temperature even if the actual discharge gas temperature is high. Therefore, this abnormal overheating by detecting the temperature operation will result in insulation failure of the motor winding.
3 & 4	Overcurrent control (operating frequency control) is performed by detecting current by the PCB2. In this case, winding insulation failure will occur, since control is not available in spite of actually high current.
5 & 6	The current sensor checks phase and adjusts output electrical wave in addition to the above mentioned items. If fault occurs, the output electrical wave becomes unstable giving stress to the motor winding, resulting in winding insulation failure.
7 & 8	During a cooling operation, SH is controlled by MV of each indoor units. During a heating operation, Td is controlled by MV1. If expansion valves are incorrectly connected, correct control is not available, resulting in compressor seizure depending on liquid refrigerant returning conditions or motor winding insulation failure depending on overheating conditions.
9	If the refrigeration cycle and electrical system are incorrectly connected, abnormally low suction pressure operation is maintained or abnormally high discharge pressure operation is maintained, resulting in giving stress to the compressor, since their correct control is not available.
10	ditto
11	The compressor may be locked due to the liquid return operation during the cooling operation.
12	In the case that the contacting resistance becomes big, voltage imbalance among each phase will cause abnormal overcurrent.
13	In this case, overcurrent will occur, efficiency will decrease or the motor winding will be excessively heated.
14	In the case, it will result in motor burning or compressor seizure.

8. Troubleshooting

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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

❖ All the indoor units which are connected to the outdoor unit.

2	Turn on the outdoor unit

3	Turn auto-addressing starts

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
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 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
Failure of PCB	Unconnected wires to PCB	Check the connectors	Correctly connect the wires
	Failure of PCB	Check PCB by means of the self-check mode *2)	Replace PCB if it failed
Incorrect wiring connection		Take action according to the procedure that is displayed in "TEST RUN"	

*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.

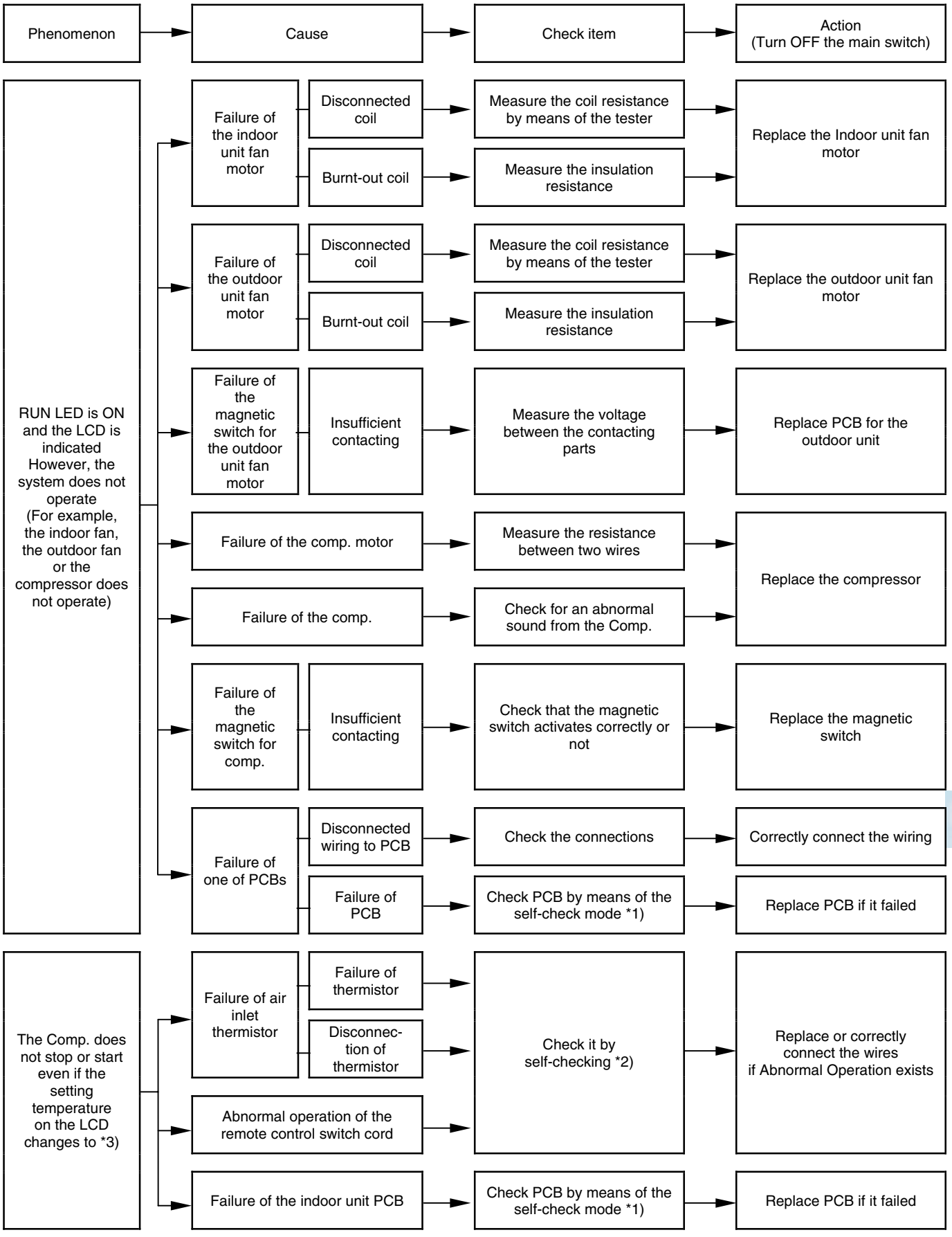
8.1.3. ABNORMAL TRANSMISSION BETWEEN THE REMOTE CONTROL SWITCH AND THE INDOOR UNIT

■ RUN LED on the remote control switch:
Flickering every 2 seconds.

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Disconnection or insufficient contacting of the remote control cable		Check the cable and the connections	Repair the cable or connect the cable
Incorrect wiring connection (incorrect polarity)		Check the wiring and the connections	Repairing
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 the remote control switch is faulty
Failure of PCB (in the indoor unit and the remote control switch)	Disconnected wire to PCB	Check the connectors	Correctly connect the wires
	Failure of PCB	Check PCB by means of the self-check mode *2)	Replace PCB if it failed

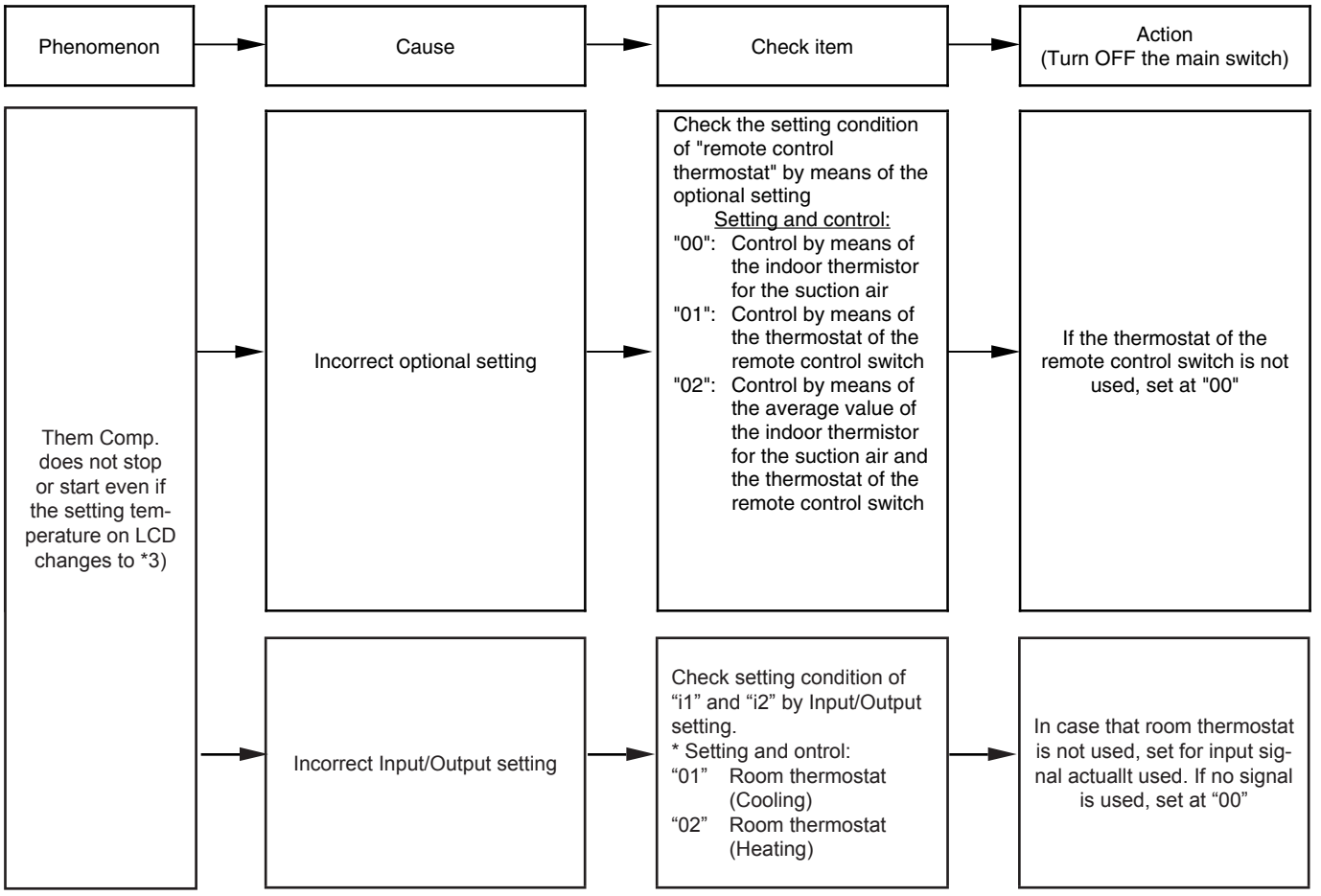
*1): Refer to section 8.3.2.
*2): Refer to section 8.3.1.

8.1.4. ABNORMAL OPERATION OF THE DEVICES



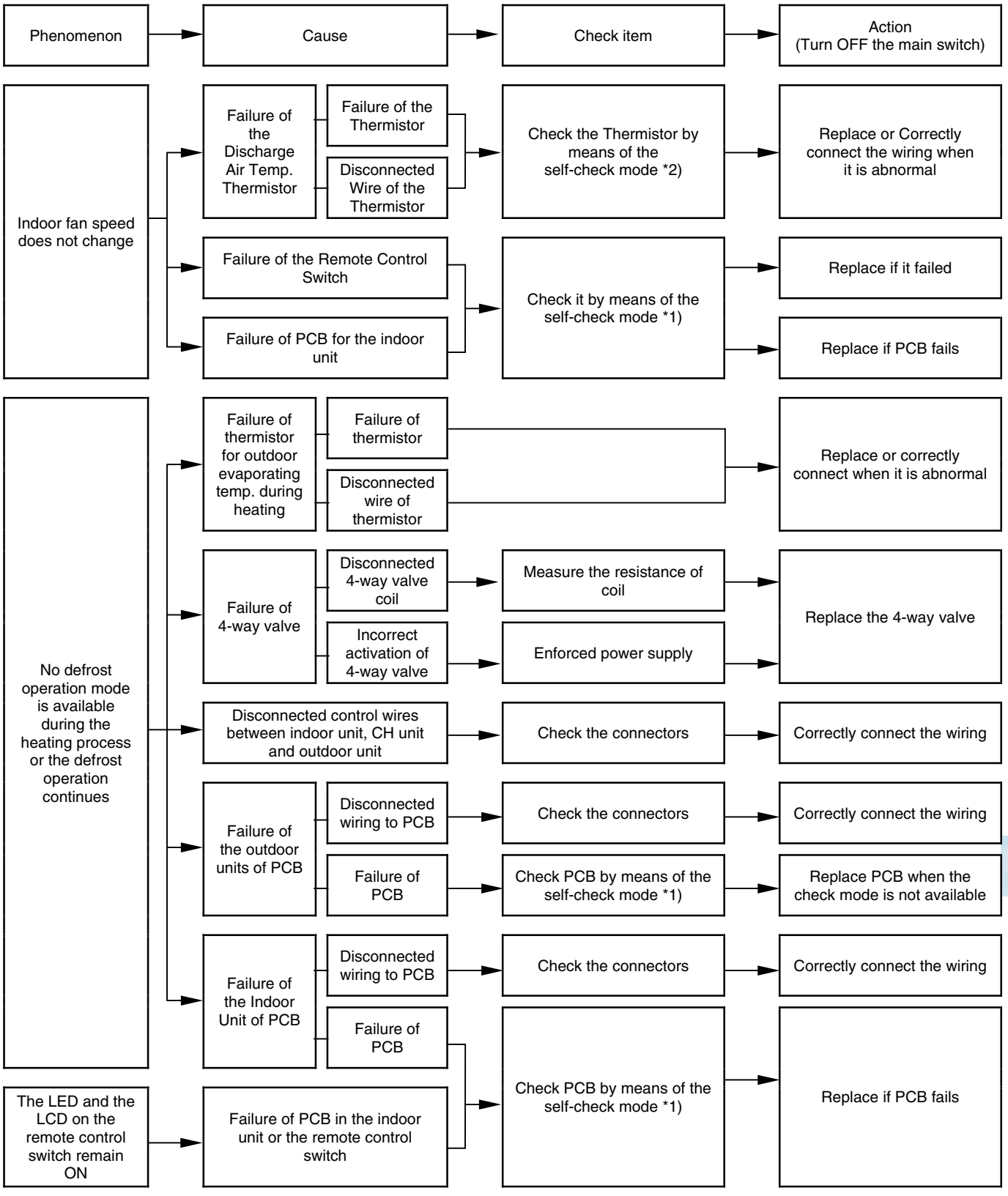
8

ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



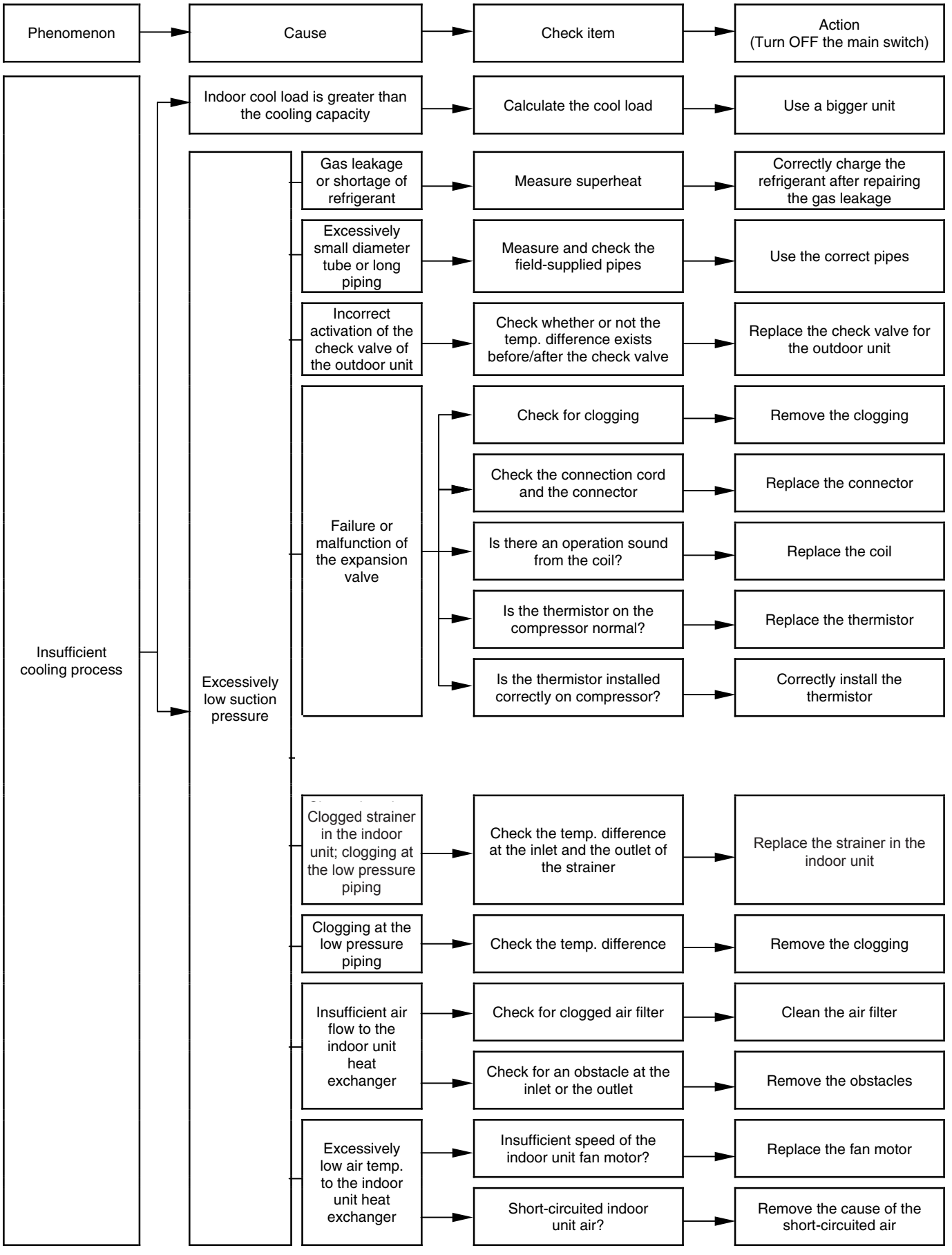
*1): Refer to section 8.3.1~8.3.4.
*2): Refer to section 8.3.1.
*3): Even if the remote control switches are normal, the compressor does not operate under the following conditions:
1. Indoor temp. is lower than 21°C or outdoor temp. Is lower than -5°C during the cooling process (DB).
2. Indoor temp. 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.)

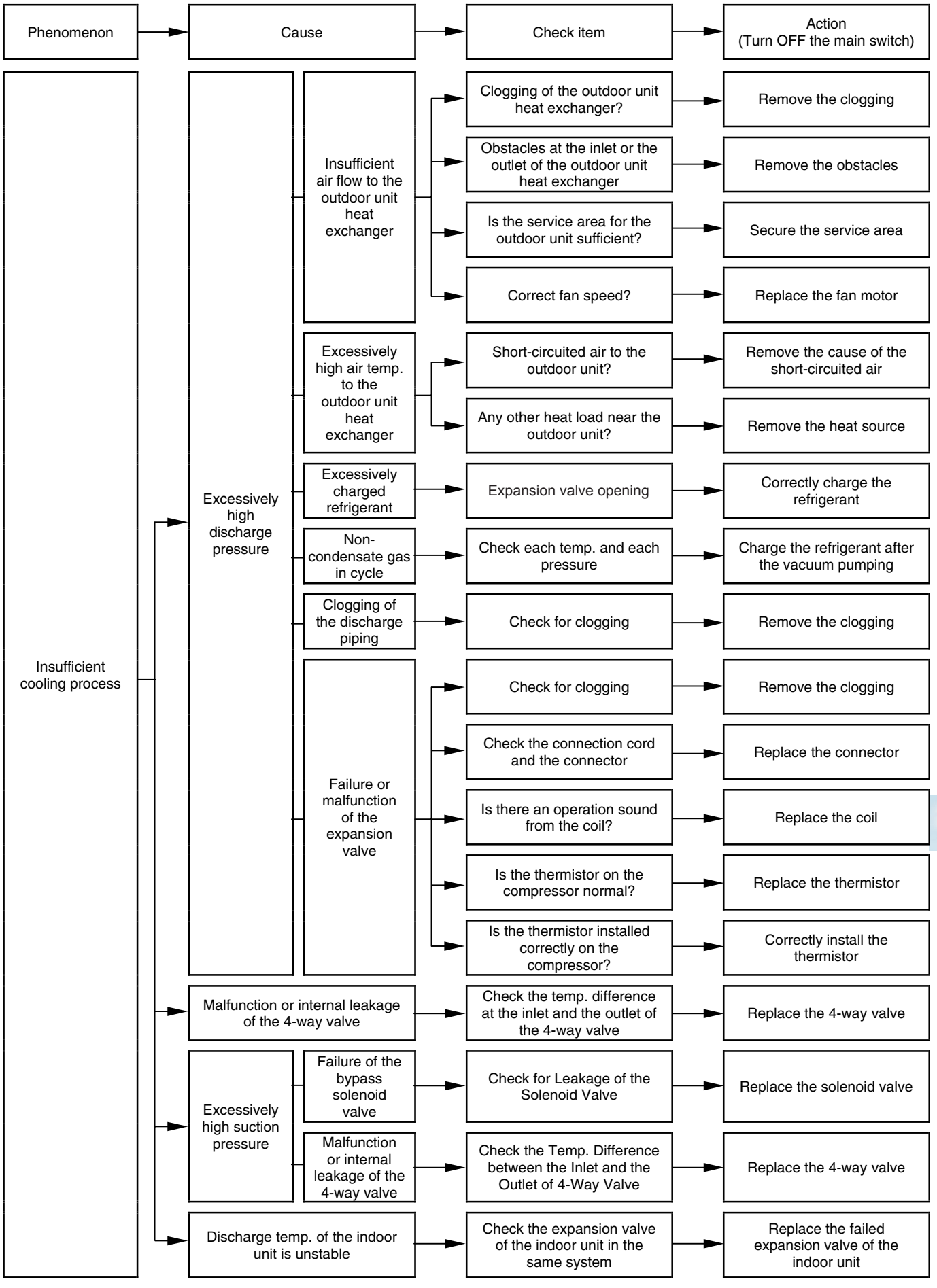


*1): Refer to section 8.3.1~8.3.4.
*2): Refer to section 8.3.1.

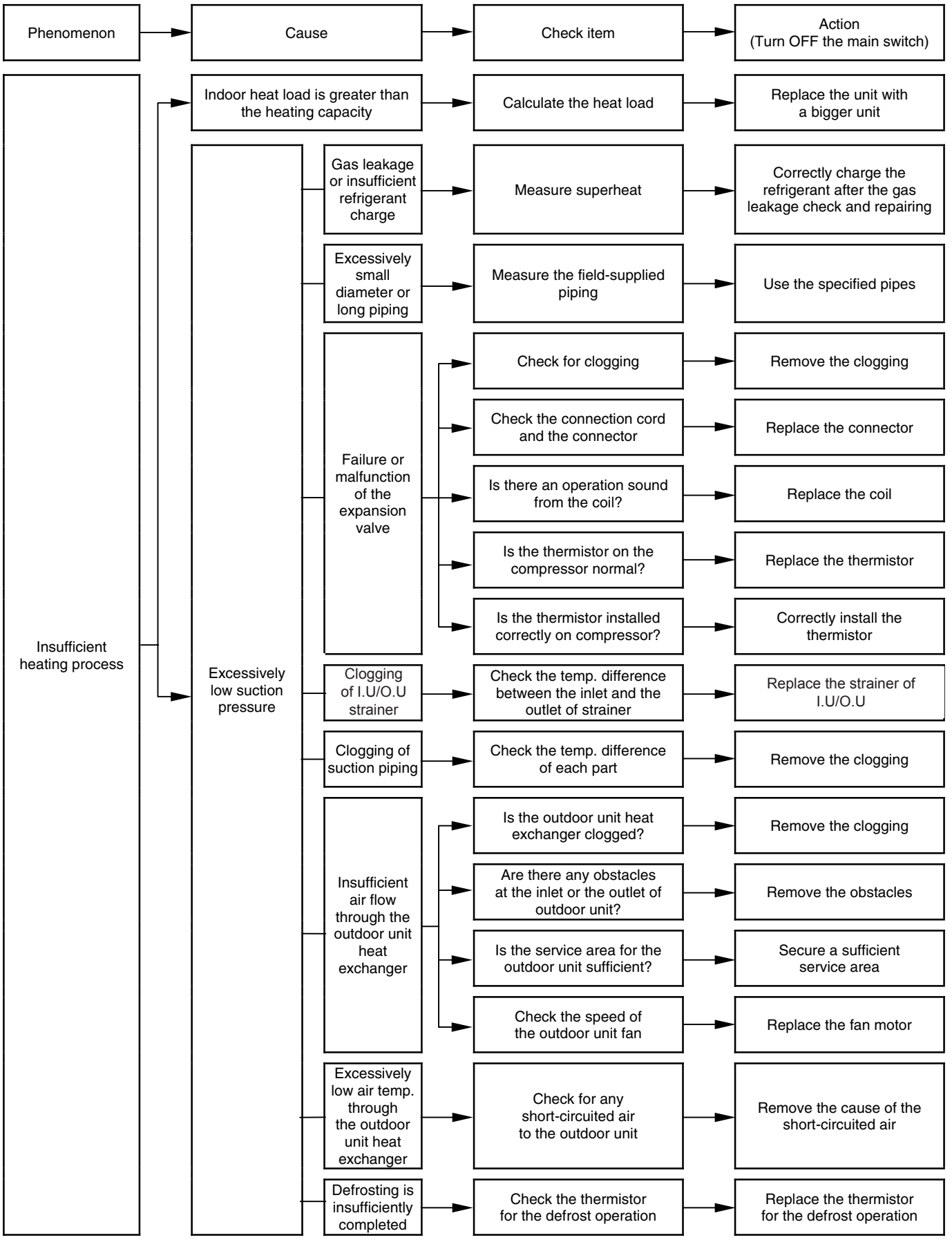
ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



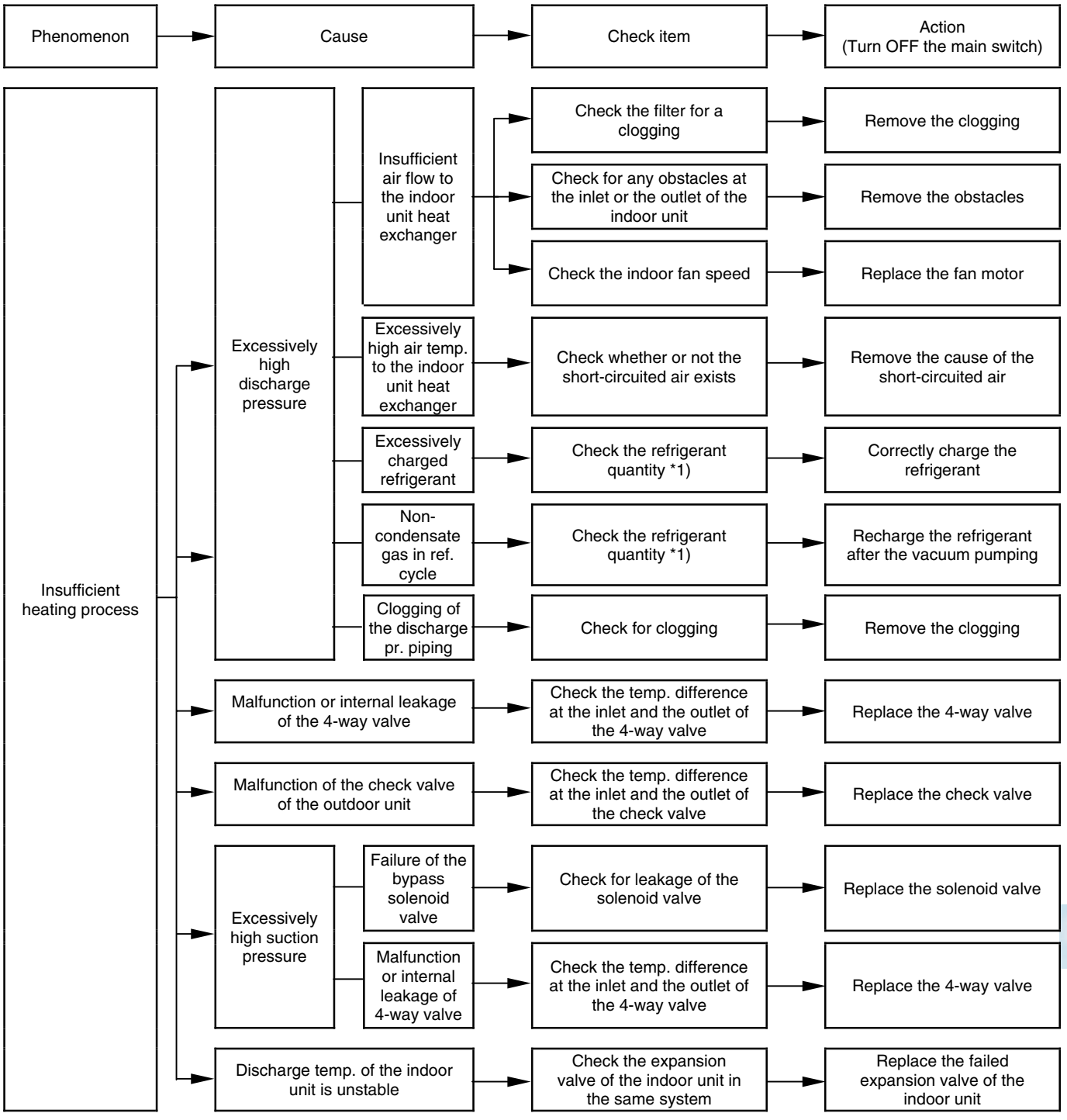
ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



ABNORMAL OPERATIONS OF THE DEVICES (Cont.)

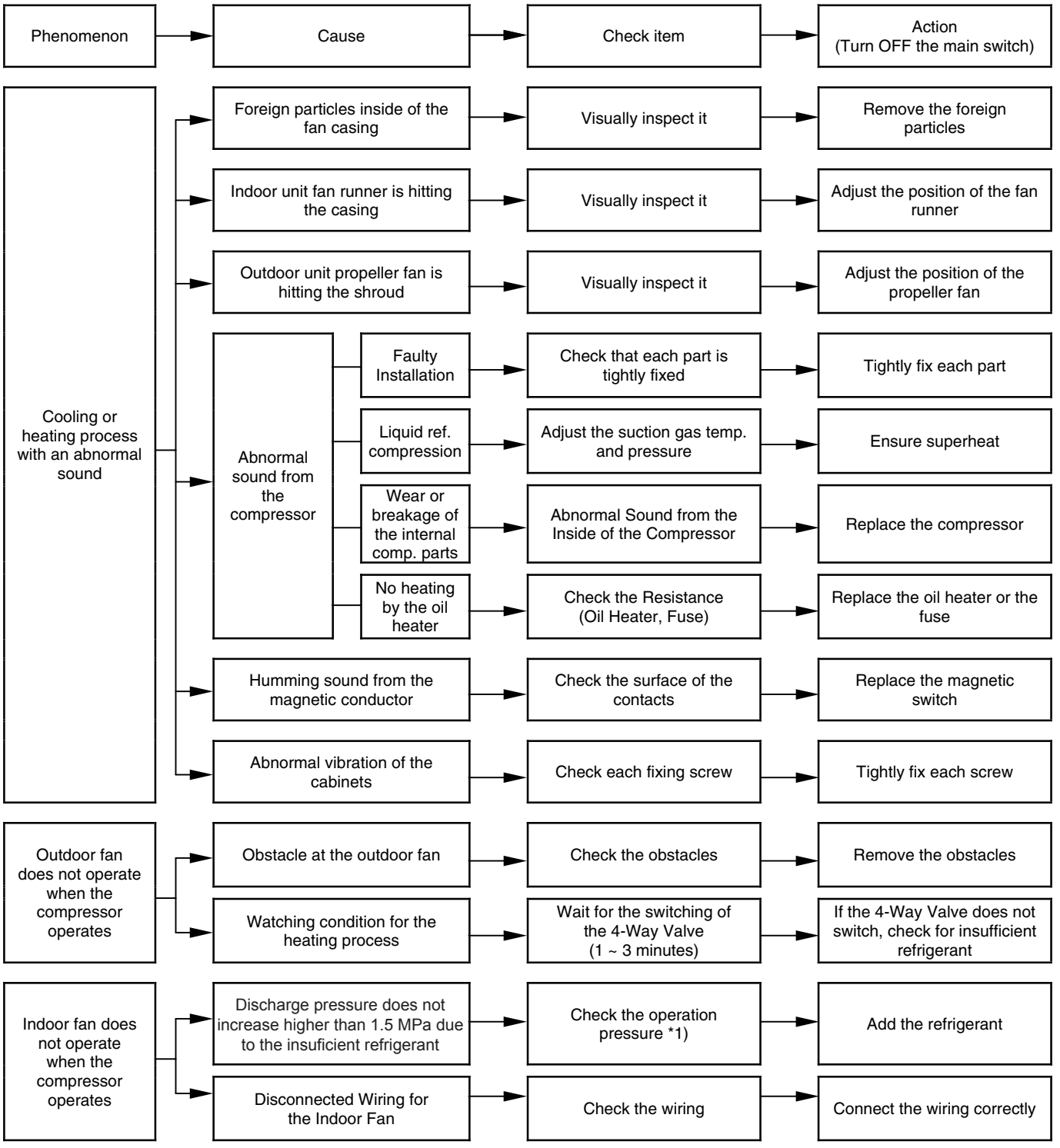


ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



*1) Refer to chapter 7 of TC

ABNORMAL OPERATIONS OF THE DEVICES (Cont.)



*1) Refer to chapter 7 of TC

8.2. TROUBLESHOOTING PROCEDURE

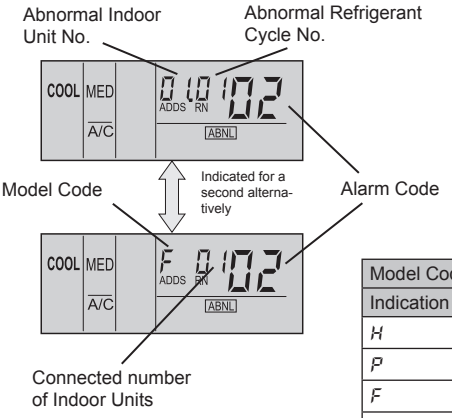
If the RUN LED flickers for 2 seconds, there is a failure in the transmission between the Indoor Unit and the Remote Control Switch.

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.



Model Code	
Indication	Model
H	Heat Pump
P	Inverter
F	Multi
C	Cooling Only
E	Others

8.2.1. ALARM CODE TABLE

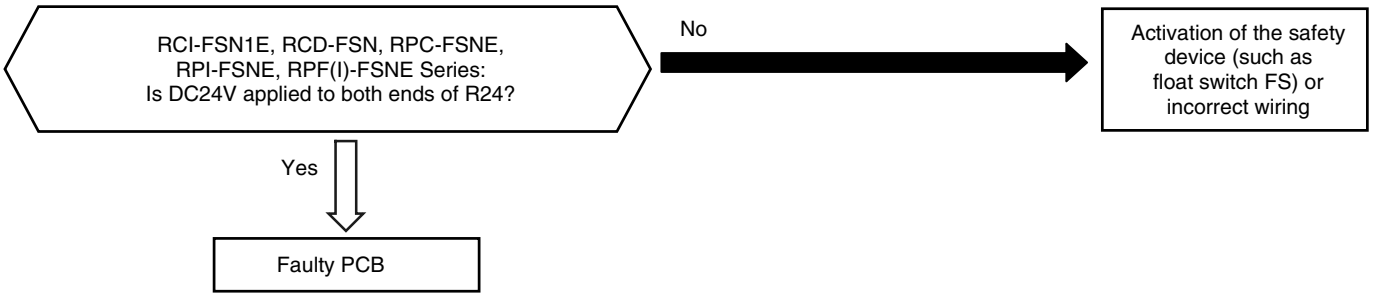
Code No.	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activating of Protection Device	Failure of Fan Motor, Drain Discharge, PCB, Relay, Float Switch activated
02	Outdoor Unit	Activating of Protection Device	Activation of PSH, Locked Motor, Abnormality of power supply phase
03	Transmission	Abnormality between Indoor (or Outdoor) and Outdoor (or Indoor)	Incorrect Wiring. Failure of PCB, Tripping of Fuse, Power Supply OFF
04		Abnormality between Inverter and Control PCB	Failure in transmission between PCBs for Inverter
06	Voltage Drop	Voltage Drop by Excessively Low or High Voltage to Outdoor Unit	Voltage Drop of Power Supply. Incorrect Wiring or insufficient Capacity of Power Supply Wiring.
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge. Expansion Valve Open Lock.
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant. Ref. Leakage, Clogging or Expansion Valve Close Lock
11	Sensor on Indoor Unit	Inlet Air Thermistor	Failure of Thermistor, Sensor, Connection.
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19		Tripping of Protection Device for Fan Motor	Failure of Fan Motor
20	Sensor onOutdoor Unit	Compressor Thermistor	Failure of Thermistor, Sensor, Connection.
22		Outdoor Air Thermistor	
24		Evaporating Thermistor	
31	System	Incorrect Setting of Outdoor and Indoor Unit	Incorrect Setting of Capacity Code.
35		Incorrect Setting in Indoor Unit No.	Duplication of Indoor Unit number
38		Abnormality of Protective Circuit in Outdoor Unit	Failure of Indoor Unit PCB. Incorrect wiring. Connection to PCB in Indoor Unit.
41	Pressure	Overload Cooling (Possibility of high pressure device activation)	O.U. Pipe Thermistor Temp. is Higher than 55ºC and the Comp. Top Temp. is Higher than 95ºC when O.U. Protection Device is activated.
42		Overload Heating (Possibility of high pressure device activation)	I.U. Freeze Protection Thermistor Temp. is Higher than 55ºC and the Comp. Top Temp. is Higher than 95ºC when O.U. Protection Device is activated.
47		Activation of Low Pressure Decrease Protection Device	Stoppage by Excessively Decrease of evaporating Temperature (Te < -35ºC) is activated 3 times in one hour, Locked Motor in Heating Operation.
48		Overcurrent Protection Activation	Failure of IPM or PCB2, Clogging of Heat Exchanger, Locked Compressor

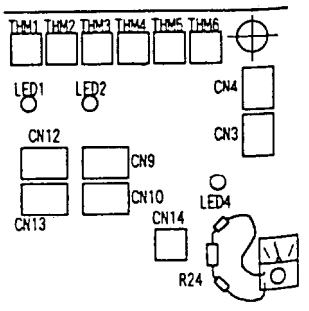
Code No.	Category	Content of Abnormality	Leading Cause
51	Inverter	Abnormality of Current Sensor for Inverter	Failure of Control PCB, IPM or PCB2
52		Thermistor of Onverter Fin abnormality (For Inverter Fin temp.)	Loose connector, disconnected wire, short circuit
53		Protection Activation of IPM or PCB2	IPM or PCB2 Abnormality Failure of Compressor, clogging of Heat Exchanger.
54		Inverter Fin Temperature Increase	Abnormal Inverter Fin Thermistor. Clogging of Heat Exchanger Abnormal Outdoor Fan
55		IPM or PCB2 Abnormality	Failure of IPM or PCB2
57	Outdoor Fan	Fan Motor Abnormality	Disconnected wire of Incorrect wiring between Control PCB and Inverter PCB. Incorrect Wiring or Fan Motor Abnormality
EE	Compressor	Compressor Protection Alarm	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.



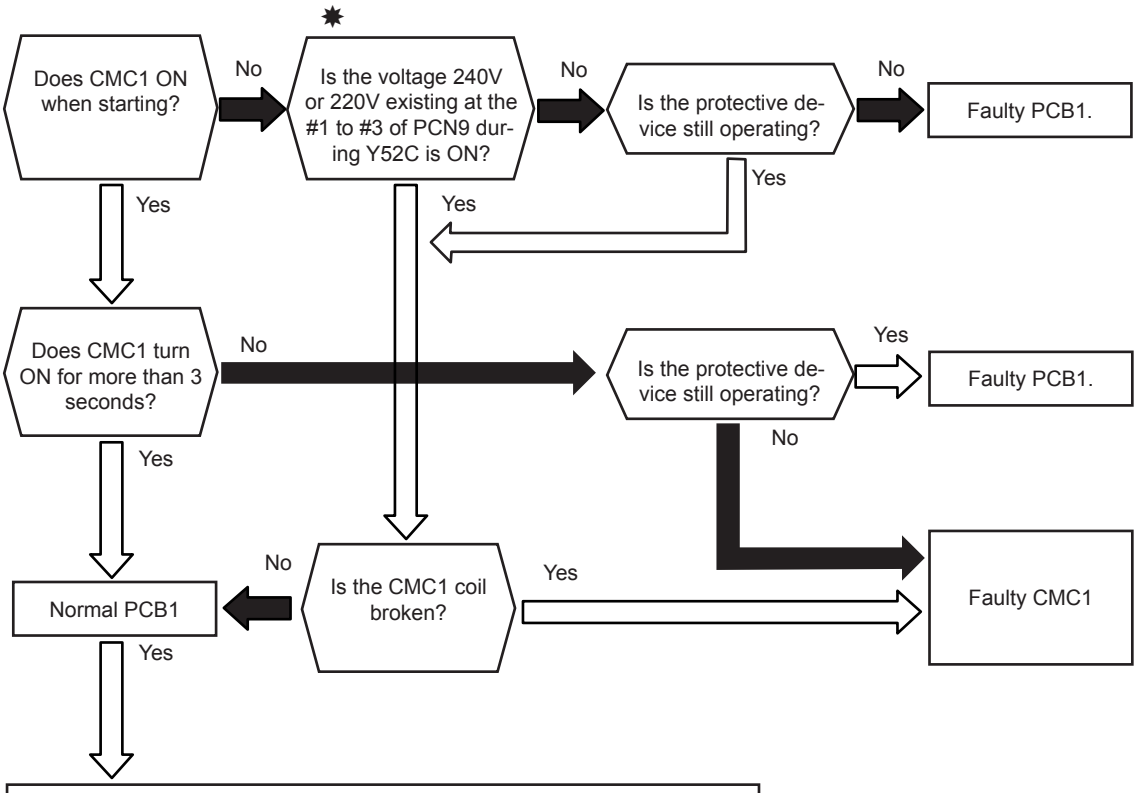


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the float switch	High Drain Level	Clogging of the drainage	Check the drain pan	Remove the clogged foreign particles
	Faulty float switch	Fault	Check the continuity when the drain level is low	Replace the float switch if faulty
		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	
02	**Activation of Safety Device in Outdoor Unit (Except Alarm Code 41 and 42)**

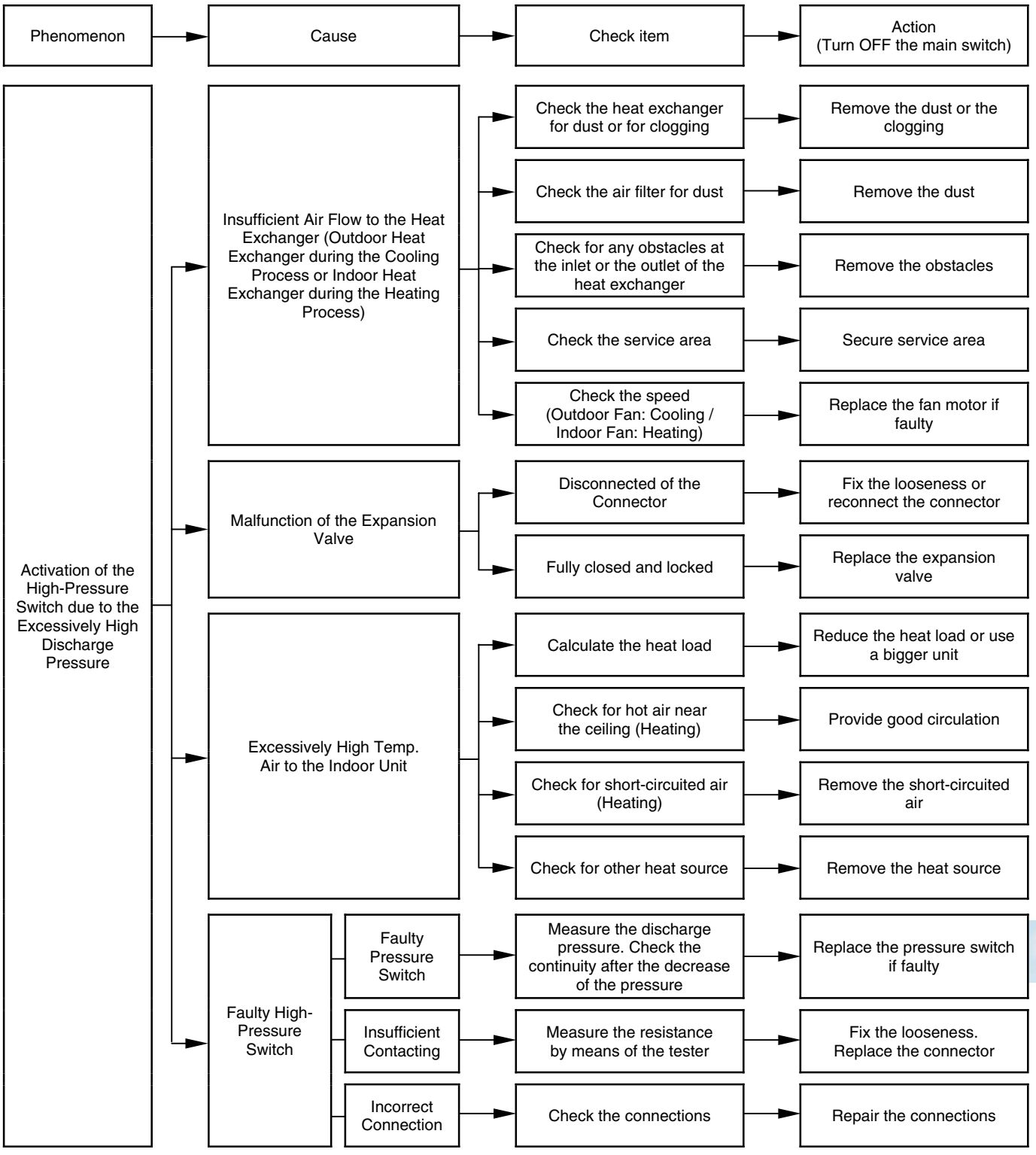
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  ✶ This alarm is indicated when one of safety devices is activated during compressor running.

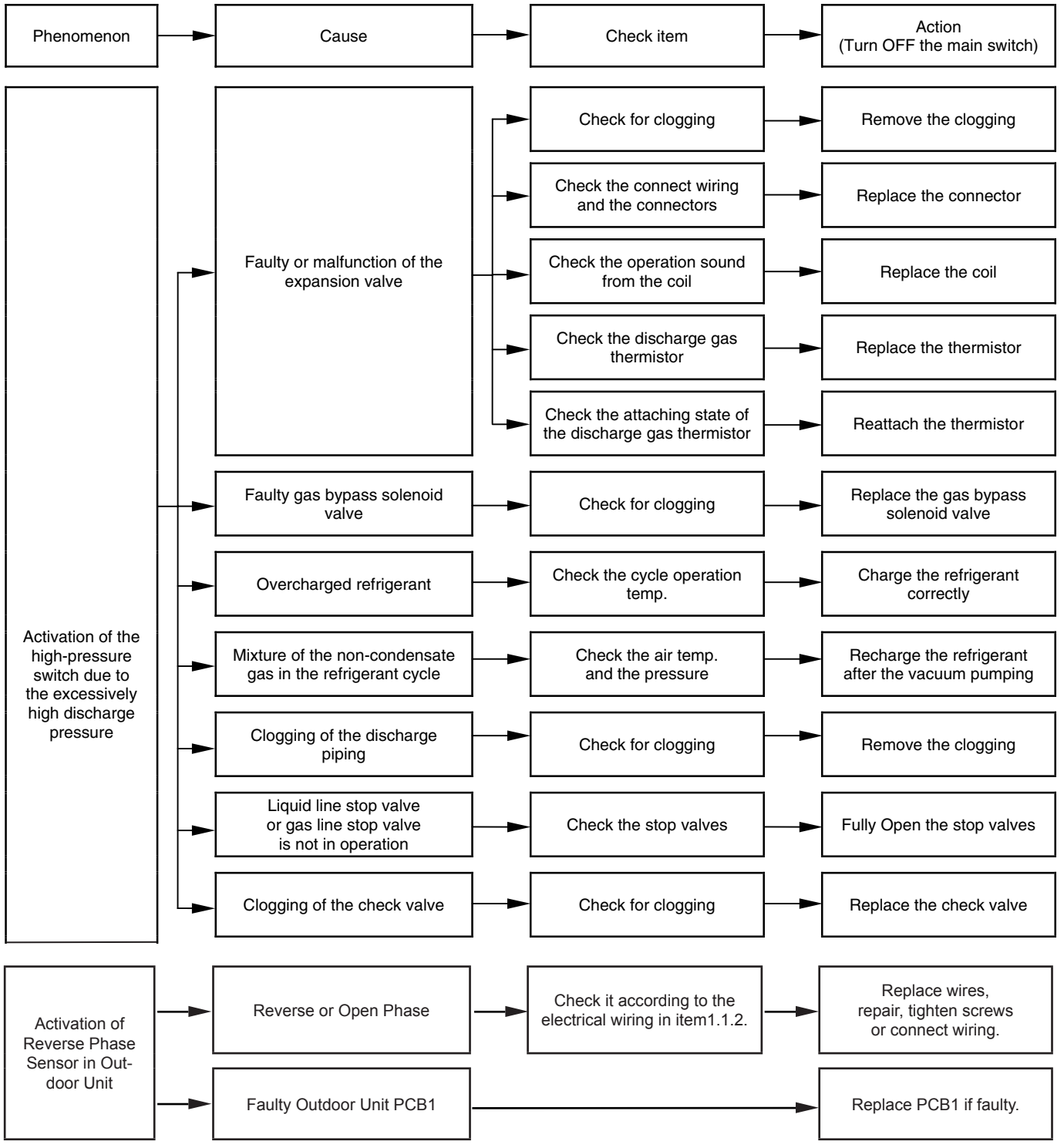


Check activation of the following safety devices and the power source wiring.
Remove the cause after checking.
(1) High Pressure Switch
(PSH: 4.15MPa (41.5 kgf/cm²G))
(2) Is the power source line reverse phase or open phase?
If the wiring is incorrect, perform the wiring correctly again.

✸ Check item

Connector No.	Pin No.
PCN9	#1 to #3


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
Faulty gas bypass solenoid valve
Check for clogging
Replace the gas bypass solenoid valve
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
Activation of Reverse Phase Sensor in Out-door Unit
Reverse or Open Phase
Check it according to the electrical wiring in item1.1.2.
Replace wires, repair, tighten screws or connect wiring.
Faulty Outdoor Unit PCB1
Replace PCB1 if faulty.

Alarm code	
03	**Abnormal transmission between the indoor units and the 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 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)

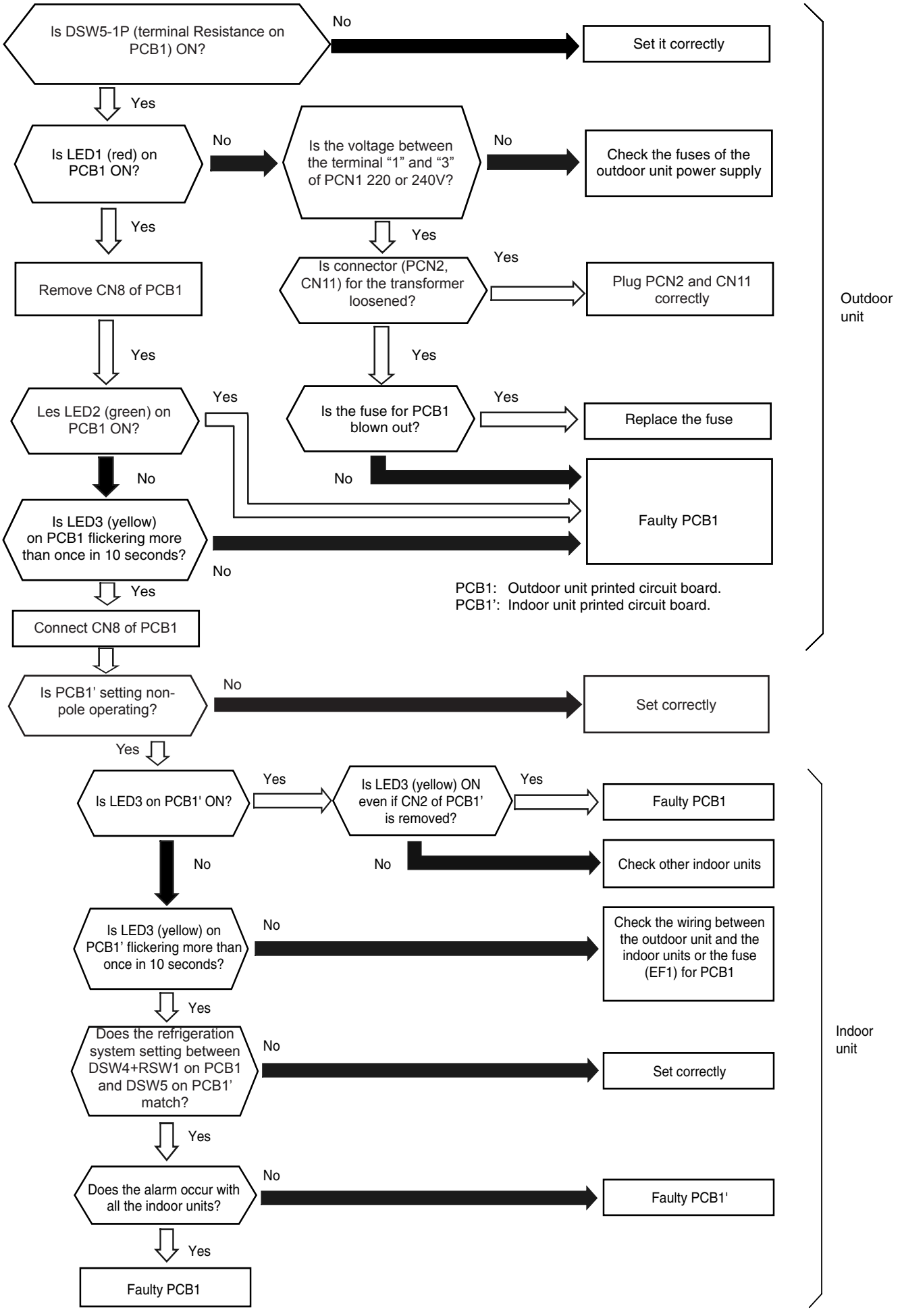
Note from next page:

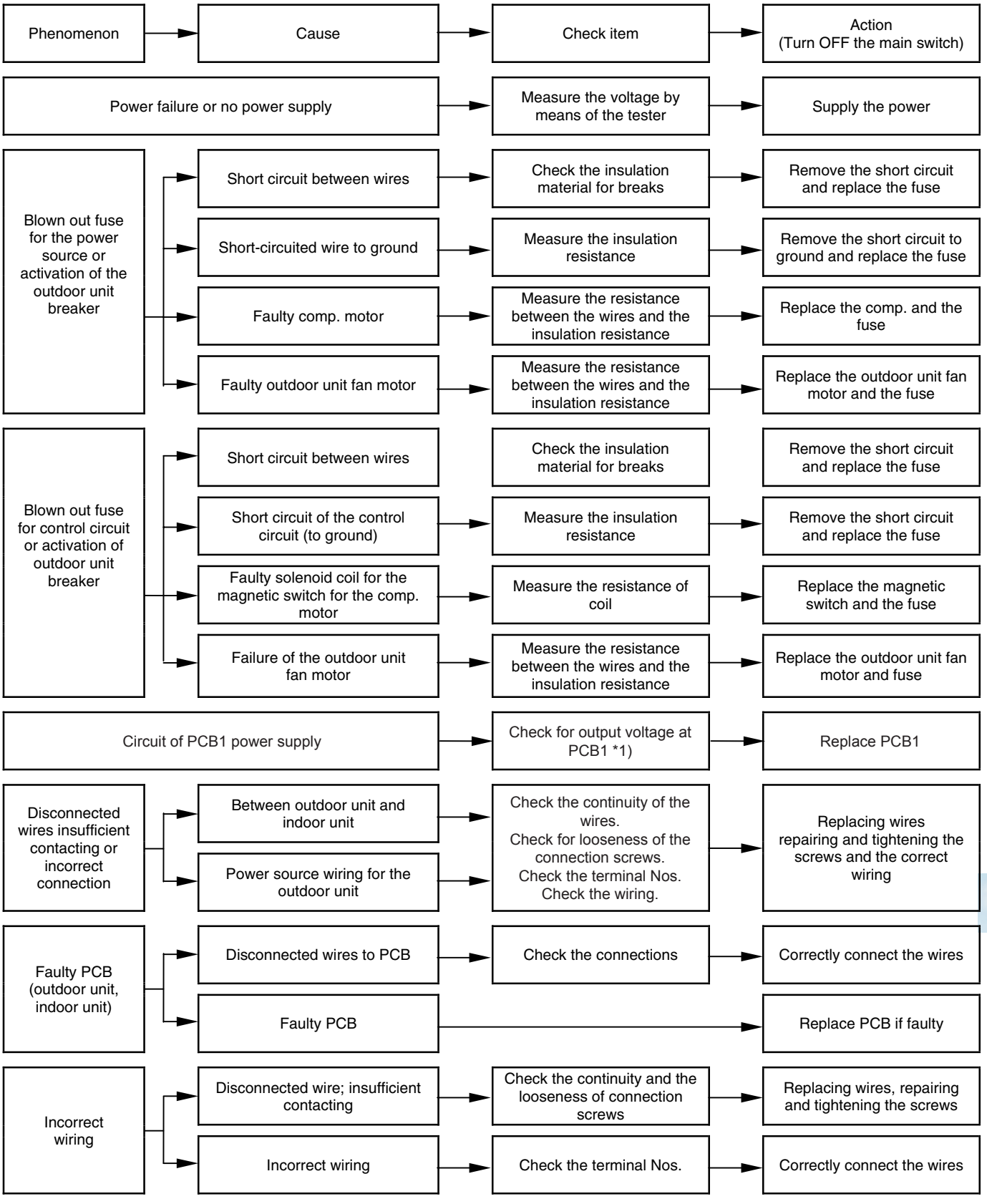
*1) In case that terminal resistance (DSW5-1P) is OFF when H-Link Connection is performed.

- Set the terminal resistance to ON when CN8 is removed.
- Set the terminal resistance to OFF when CN8 is reconnected.

✷ Check item

Power supply	Faston Terminal
380-415V/50Hz	between 1 and 3 of PCN1 on PCB


Is DSW5-1P (terminal Resistance on PCB1) ON?
No
Set it correctly
Yes
Is LED1 (red) on PCB1 ON?
No
Is the voltage between the terminal "1" and "3" of PCN1 220 or 240V?
No
Check the fuses of the outdoor unit power supply
Yes
Remove CN8 of PCB1
Yes
Is connector (PCN2, CN11) for the transformer loosened?
Yes
Plug PCN2 and CN11 correctly
Yes
Les LED2 (green) 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
Connect CN8 of PCB1
PCB1: Outdoor unit printed circuit board.
PCB1': Indoor unit printed circuit board.
Outdoor unit
Is PCB1' setting non-pole operating?
No
Set correctly
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 DSW4+RSW1 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
Indoor unit

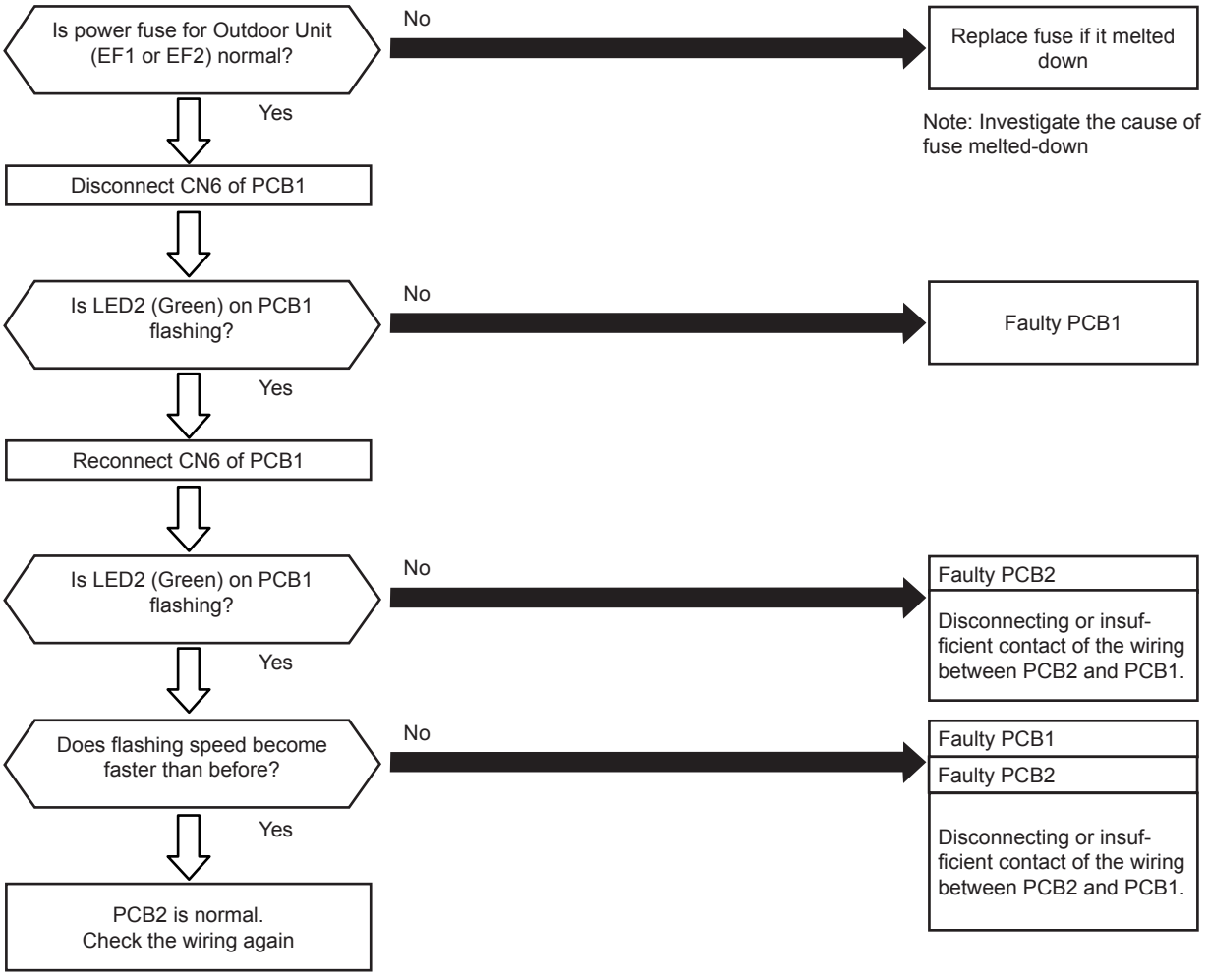


*1)

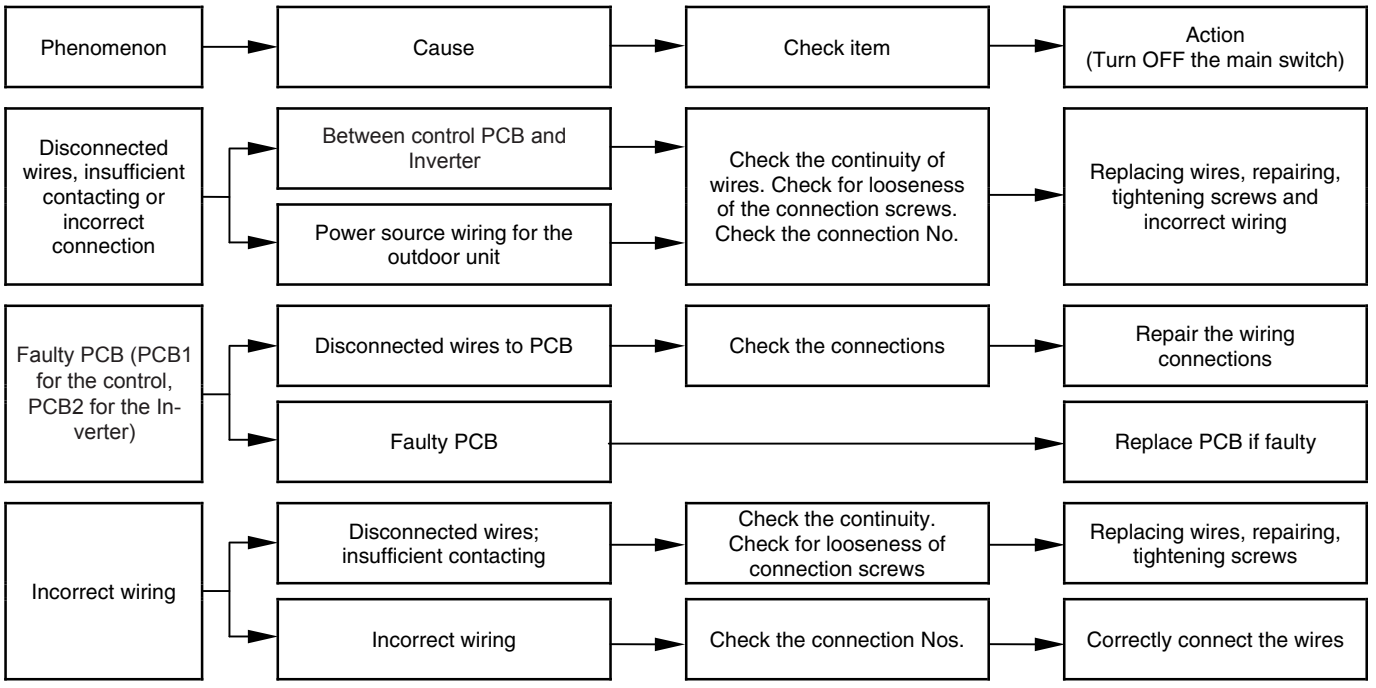
PCB1 Output voltage	Voltage
Vcc 12 - GND2	12VDC
Vcc 05 - GND1	5 VDC
Vcc 15 - GND1	15 VDC
Vcc 24 - GND1	24 VDC
Vcc 12T - GND1	12 VDC

Alarm code	Abnormal transmission between Inverter PCB2 and Outdoor PCB1
04	

- 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 abnormal operation is maintained for 30 seconds after the normal transmission between the outdoor unit PCB1 and PCB2. 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.



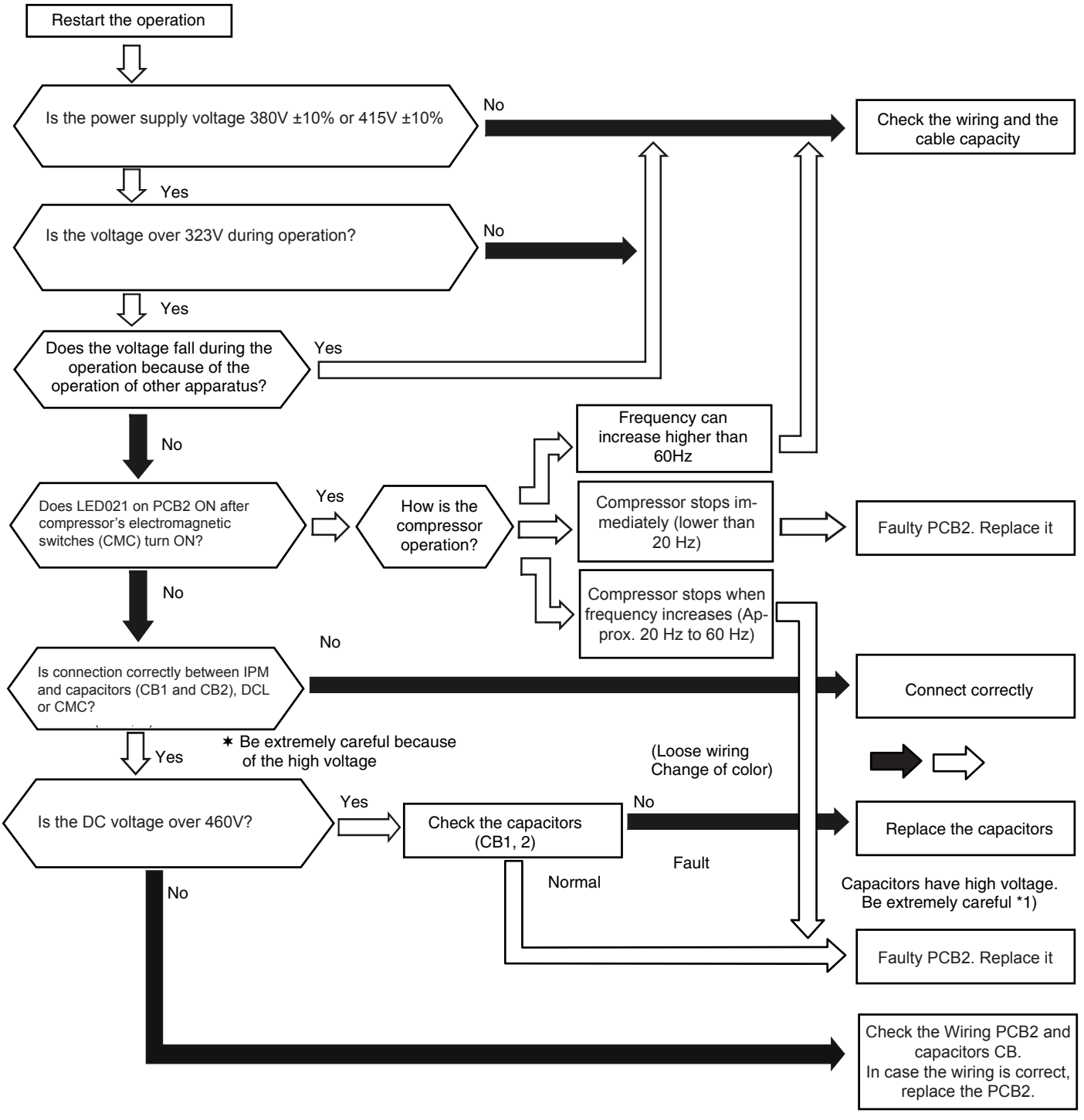
PCB1: Control PCB in Outdoor Unit
PCB2: Inverter PCB


Phenomenon
Cause
Check item
Action
(Turn OFF the main switch)
Disconnected wires, insufficient contacting or incorrect connection
Between control PCB and Inverter
Power source wiring for the outdoor unit
Check the continuity of wires. Check for looseness of the connection screws. Check the connection No.
Replacing wires, repairing, tightening screws and incorrect wiring
Faulty PCB (PCB1 for the control, PCB2 for the Inverter)
Disconnected wires to PCB
Faulty PCB
Check the connections
Repair the wiring connections
Replace PCB if faulty
Incorrect wiring
Disconnected wires; insufficient contacting
Incorrect wiring
Check the continuity. Check for looseness of connection screws
Check the connection Nos.
Replacing wires, repairing, tightening screws
Correctly connect the wires

8

Alarm code	
06	**Excessively low voltage or excessively high voltage for the inverter**

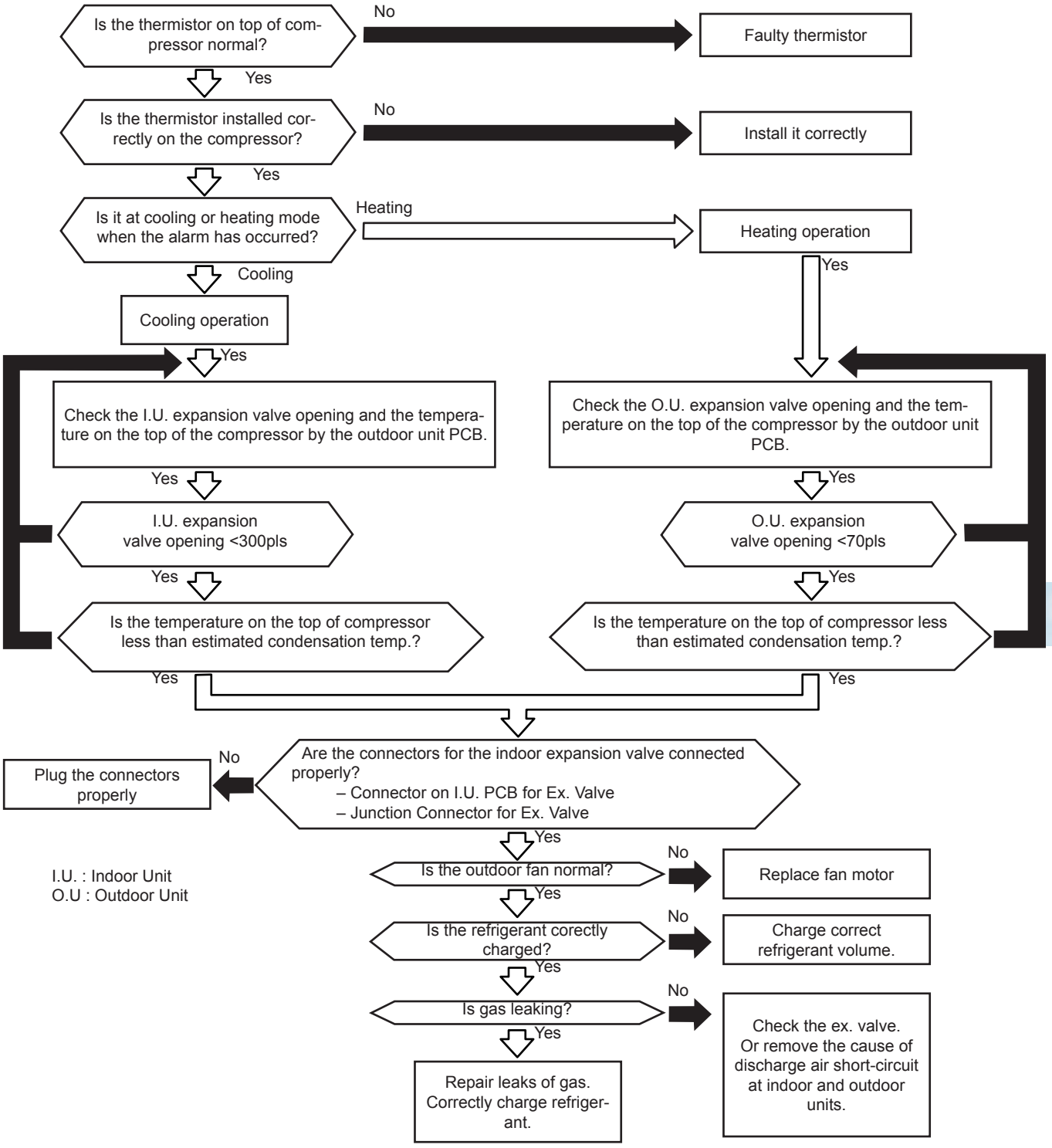
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - ✶ This alarm code is displayed when the voltage between terminal “P” and “N” of IPM 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 8.3.5
*2): Checking procedures of the diode module are displayed in item 8.3.5

Alarm code	Decrease of Discharge Gas Superheat
07	

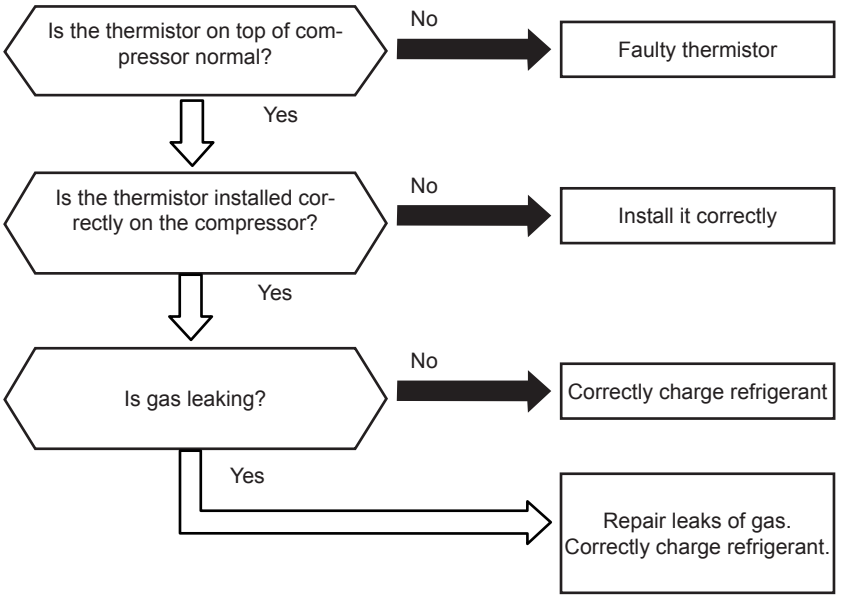
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - ✶ This alarm code is indicated as follows:
  - – The temperature on the top of the compressor is less than the target and also the I.U. expansion valve opening is under 300pls at cooling operation for 30 minutes.
  - – The temperature on the top of compressor is less than the target and also the O.U. expansion valve opening is under 70pls at heating operation for 30 minutes.
  - – he compressor is stopped and then the retry operation is performed after 30 minutes.



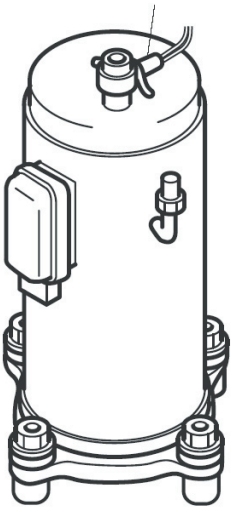
I.U. : Indoor Unit
O.U : Outdoor Unit

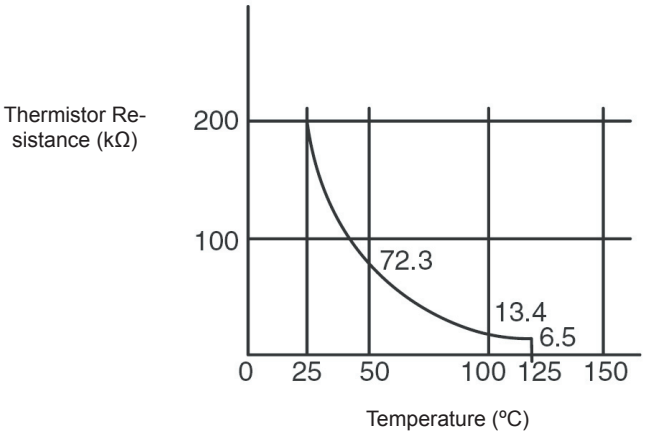
Alarm code	
08	**Excessively High Discharge Gas Temperature at the Top of Compressor Chamber**

- 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 indicated when the temperature of the thermistor on the top of the compressor is maintained higher than 127°C for 10 minutes or higher than 140°C for 5 seconds under cooling operation.
  - ✶ This alarm is indicated when the temperature of the thermistor on the top of the compressor is maintained higher than 120°C for 10 minutes or higher than 140°C for 5 seconds under heating operation.



Thermistor for High Discharge Gas Temperature at the Top of Compressor Chamber (TH9)

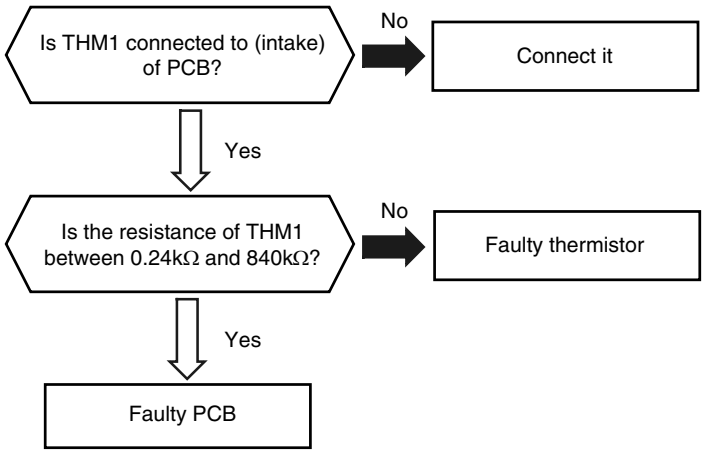


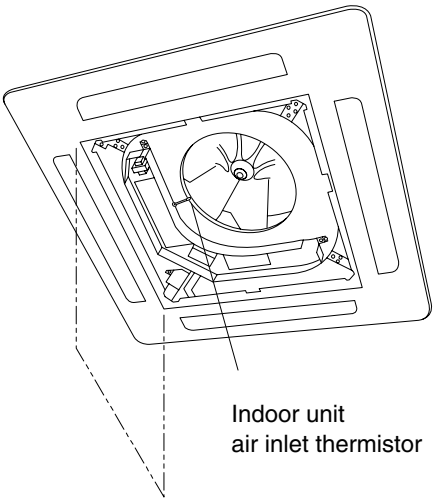


Thermistor Resistance Characteristics

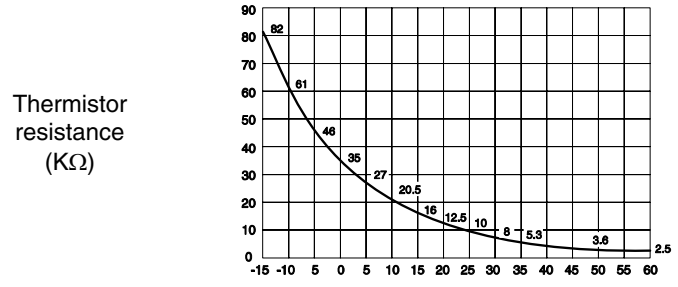
Alarm code	Abnormal operation of thermistor for the indoor unit air inlet temperature (air inlet thermistor)
11	

- 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

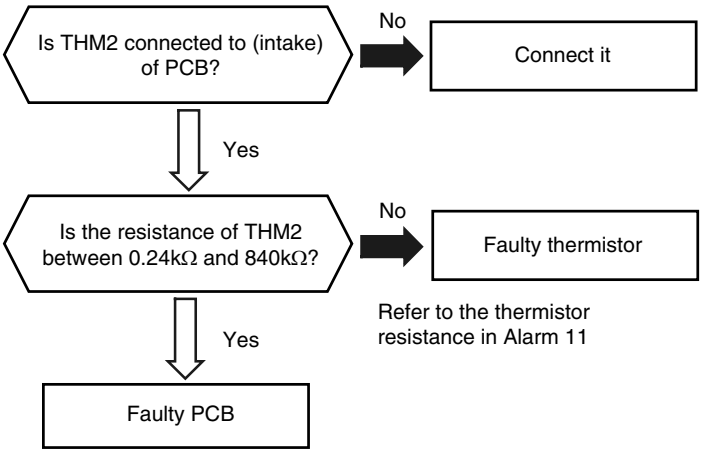


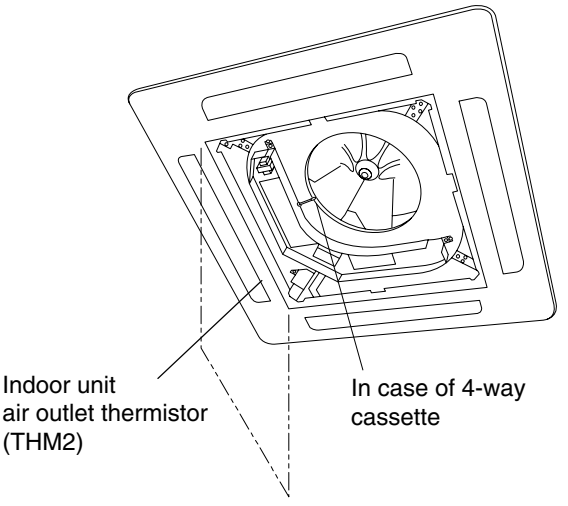
Thermistor characteristics

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	Abnormal operation of the thermistor for the indoor discharge air temperature (air outlet thermistor)
12	

- 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.

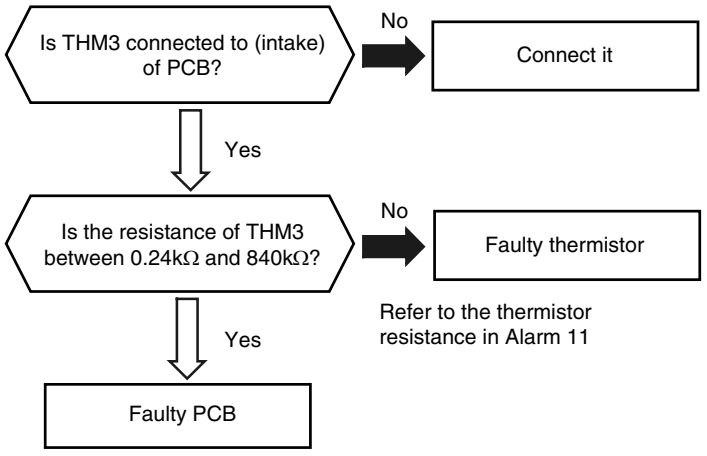


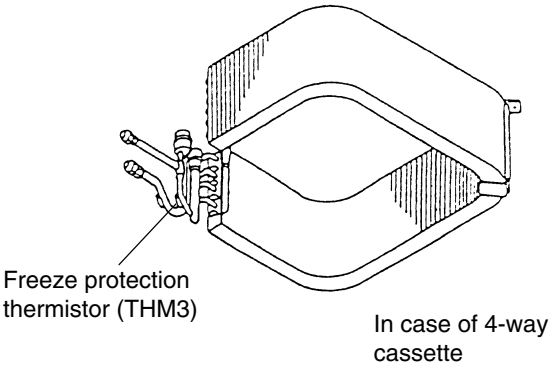


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air outlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

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.

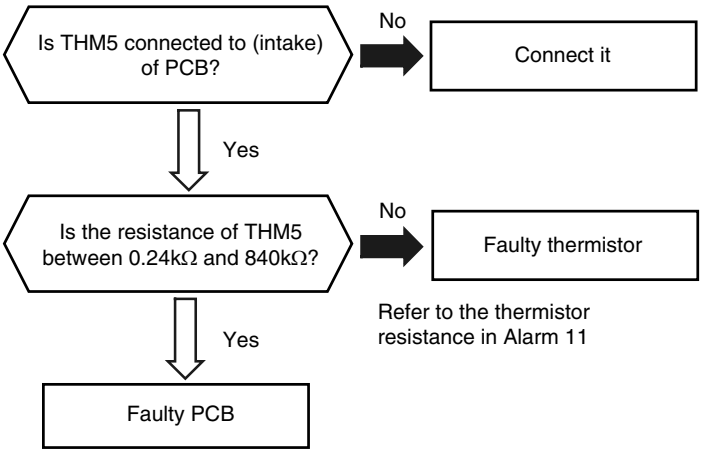


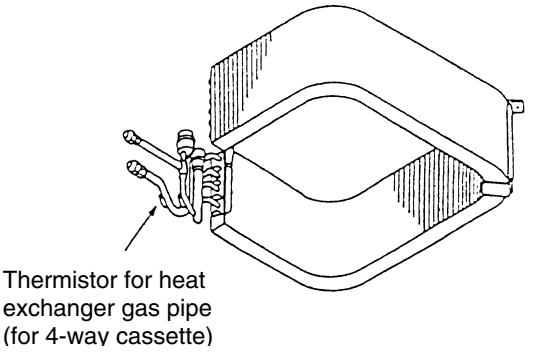


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty I.U. gas pipe air inlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	
14	**Abnormal operation of the thermistor for the indoor unit heat exchanger gas pipe temperature (gas piping 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.

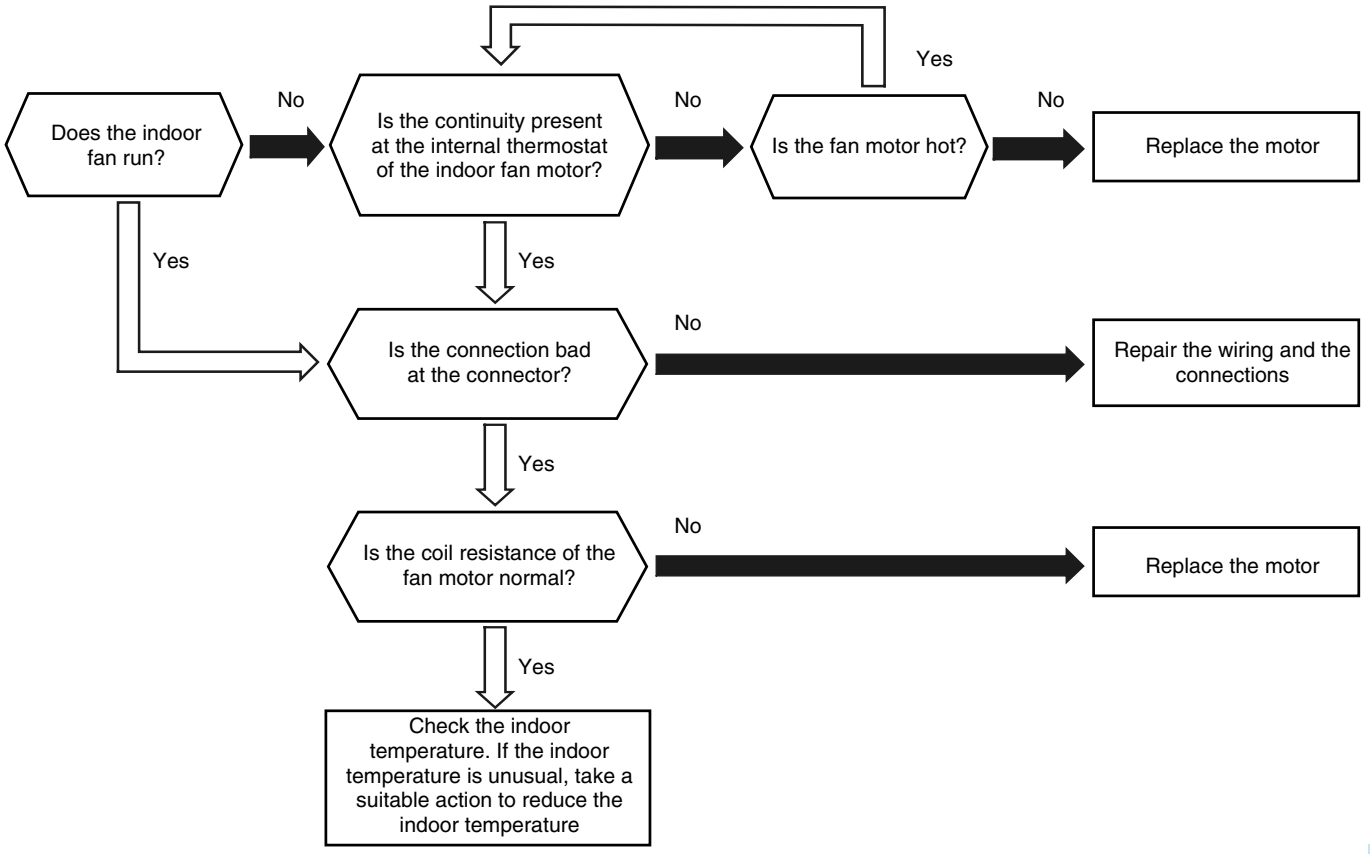




Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air inlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	
19	**Activation of the protection device for the indoor fan motor (except RCI and RPK)**

- 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.



8

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	Activation of protection device for indoor fan motor (RCI-Model)
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. 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

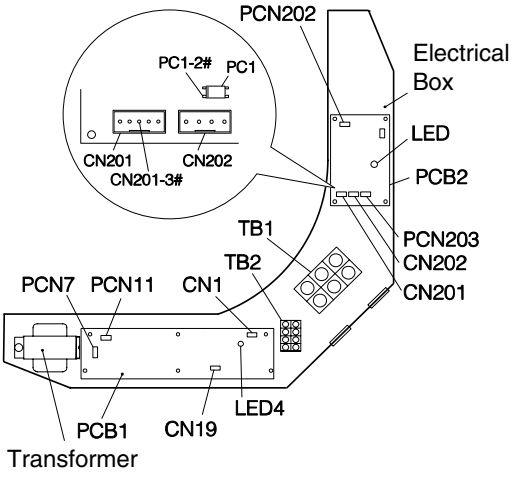
Is ulse signal to PCB2 correctly? — Yes → Faulty PCB2 → Is the voltage between CND of PCB1 and PC1 2# of PCB2 several voltage? → Replace PCB2

No

Faulty PCB1

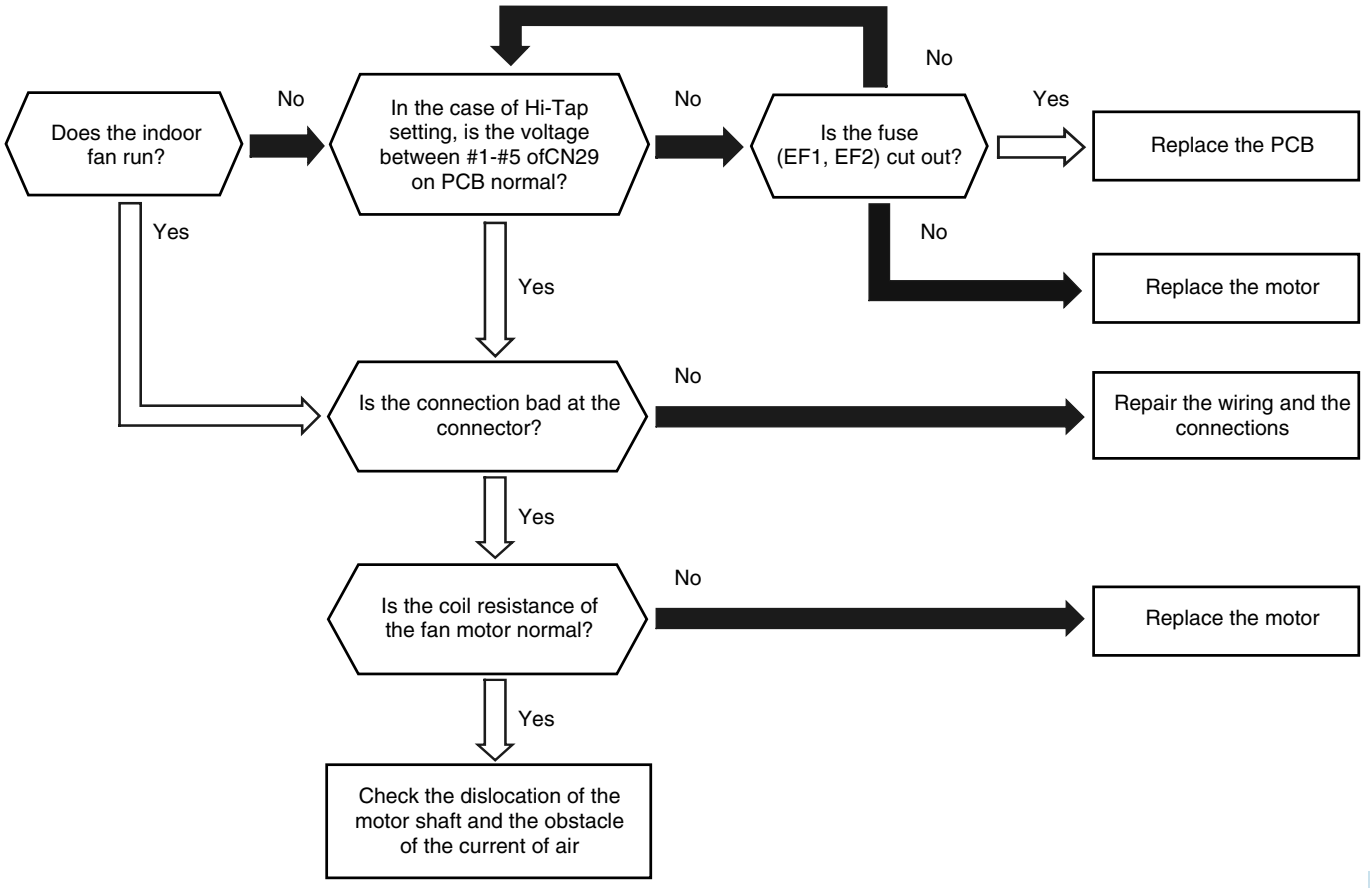
Yes

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.

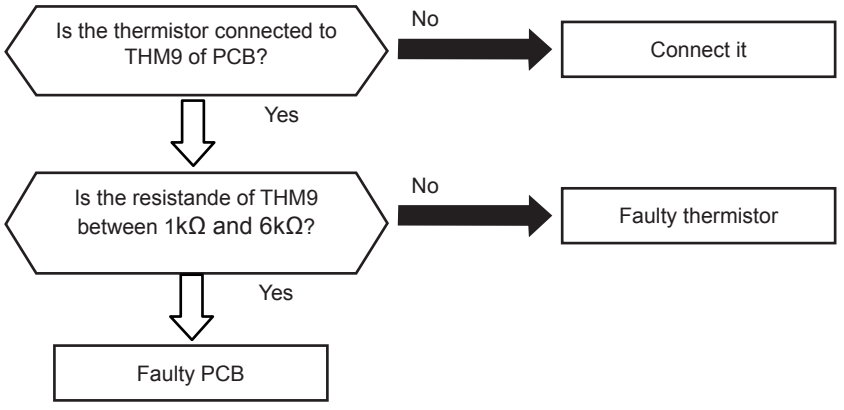


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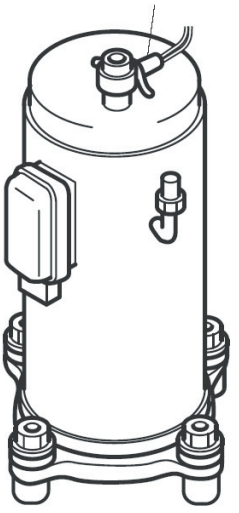
Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the overcurrent protection device for the indoor fan motor	Faulty indoor unit fan motor		Measure the coil resistance and the insulation resistance	Replace the motor if faulty
	Faulty PCB	Fault	Check the output voltage and the 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 displayed 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.



Thermistor onTop of Compressor



Phenomenon	Cause	Check item	Action (Turn OFF Main Switch)
Faulty top of compressor thermistor	Fault	Check resistance	Replace thermistor if faulty
	Incorrect connection	Check wiring to PCB1	Repair wiring and connections
Faulty PCB1		Replace PCB1 and check operation	Replace PCB1 if faulty

Temperature (ºC)	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

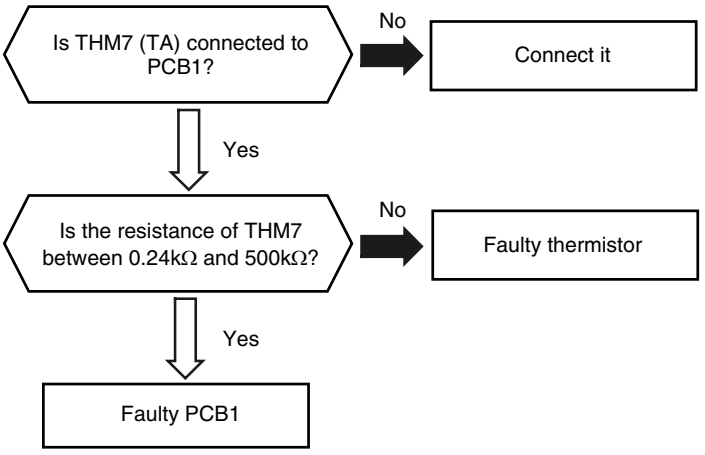
Temperature (ºC)	Resistance (kΩ)
45	87.74
50	72.32
55	59.97
60	49.96
65	41.79
70	35.11
75	29.61
80	25.07
85	21.31

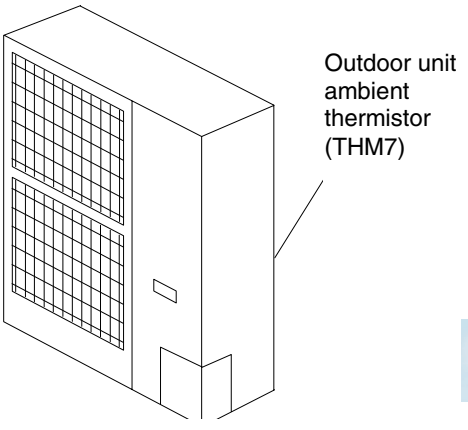
Temperature (ºC)	Resistance (kΩ)
90	18.17
95	15.55
100	13.35
105	11.50
110	9.93
115	8.60
120	7.47
125	6.51

The resistance value have 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).

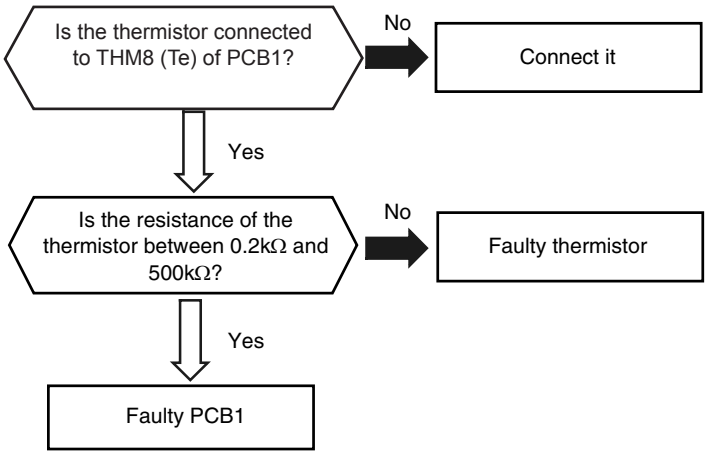


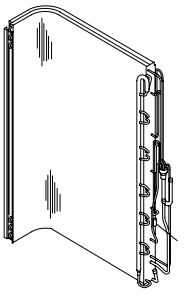


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty thermistor for the outdoor unit ambient	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the wiring to PCB	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	
24	**Abnormal operation of the thermistor for the evaporating temperature during the heating process (outdoor unit)**

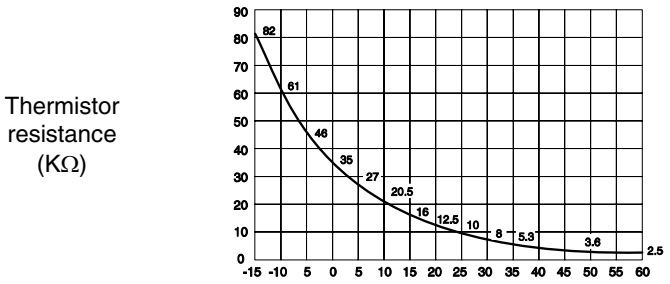
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  The unit number and the alarm code are displayed on the display of the outdoor unit PCB. (*1)
  If you find an 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)

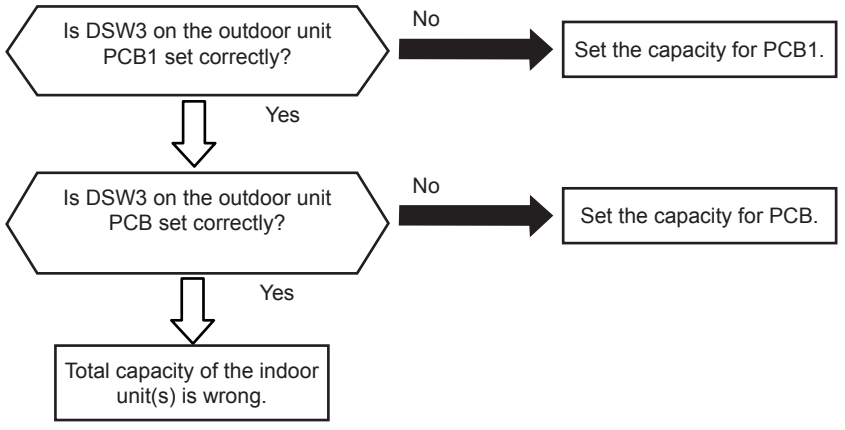
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty thermistor for the evaporating temperature during heating	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect Connection	Check the wiring to PCB	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty



Thermistor characteristics

Alarm code	
31	**Incorrect Capacity Setting or Combined Capacity between Indoor Units and 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 indicated when the total indoor unit capacity is not equal to the combined outdoor unit capacity..



Phenomenon	Cause	Check item	Action (Turn OFF Main Switch)
Incorrect Capacity Setting of Indoor Unit		Check combination of indoor units and capacity setting on PCB.	Correctly set dip switch, DSW3.
Incorrect Capacity Setting of Outdoor Unit		Check capacity setting on outdoor unit PCB.	Correctly set dip switch, DSW3.
Total Indoor Unit Capacity Connected to the Outdoor Unit is Beyond Permissible Range		Check outdoor unit model by calculating total indoor units capacity.	Ensure that total indoor unit capacity is from 80% to 120%.

NOTE:
In case of H-LINK system, this alarm code is indicated when DSW4, RSW1 (for refrigerant system setting) on the outdoor unit PCB and DSW5, RSW2 (for refrigerant system setting) on the indoor unit PCB are incorrectly set.

In this case, set correctly DSW4, RSW1, DSW5 and RSW2 after turning OFF main switch.

(DSW2 is not equipped with some models.)

Alarm code	
35	**Incorrect Indoor 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 indicated 3 minutes after power is supplied to the outdoor unit when the indoor unit No. connected to the outdoor unit is duplicated by setting of RSW.
  ✶ This alarm code is indicated when 5 or more indoor units are connected to one outdoor unit.

NOTE

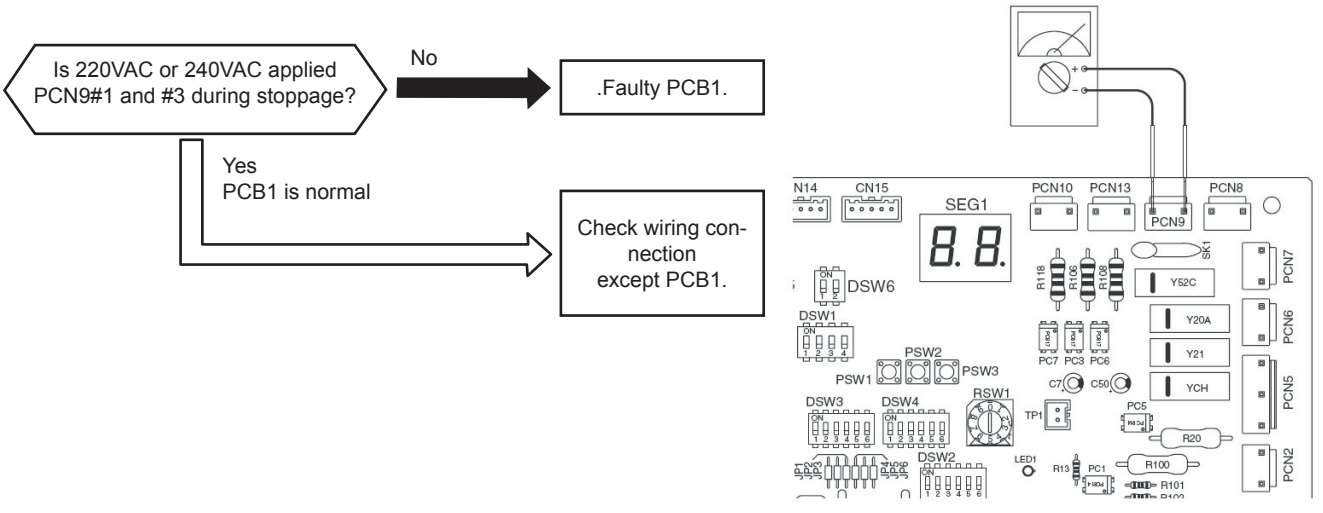
In case of H-LINK system, this alarm code is indicated when DSW4, RSW1 (for refrigerant system setting) on the outdoor unit PCB and DSW5, RSW2 (for refrigerant system setting) on the indoor unit PCB are incorrectly set.

In this case, set correctly DSW4, RSW1, DSW5 and RSW2 after turning OFF main switch.

(DSW2 is not equipped with some models.)

Alarm code	
38	**Abnormality of Protective Circuit for Protection (Outdoor Unit)**

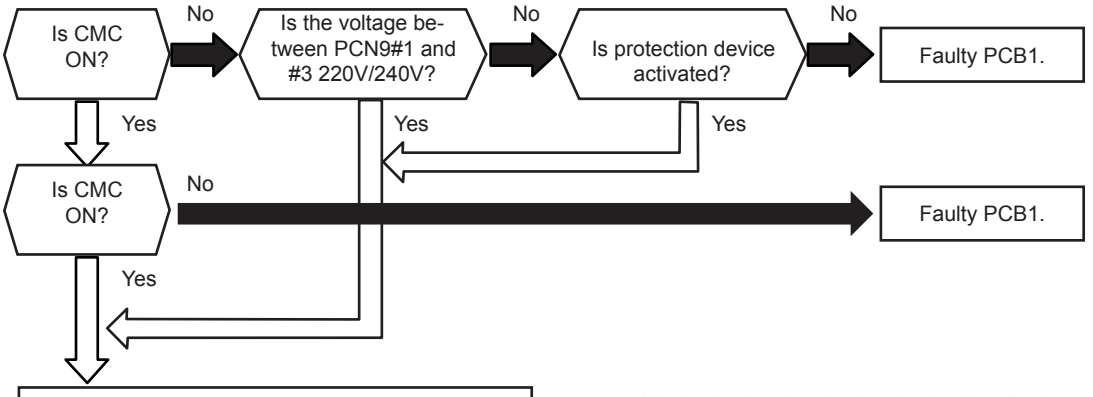
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  ✶ This alarm code is indicated when AC 220V or 240V is supplied to voltage PCN9#1 and #3 on PCB1 in the outdoor unit during CMC is opened...



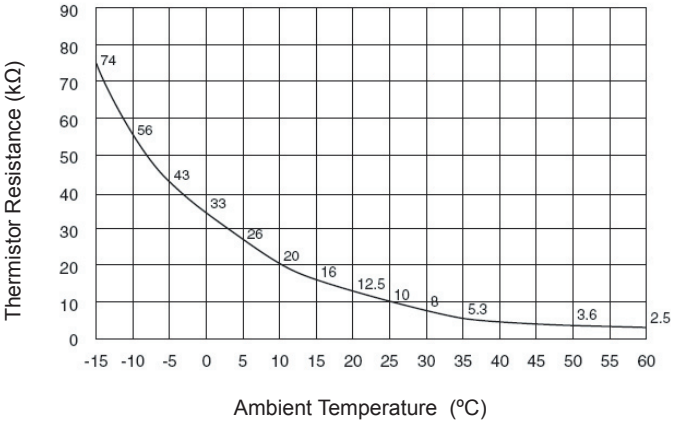
Phenomenon	Cause	Check item	Action (Turn OFF Main Switch)
Faulty PCB1		Check PCB1 by seft-checking	Replace PCB1

Alarm code	
41	**Cooling Overload (High Pressure Switch will be Activate)**

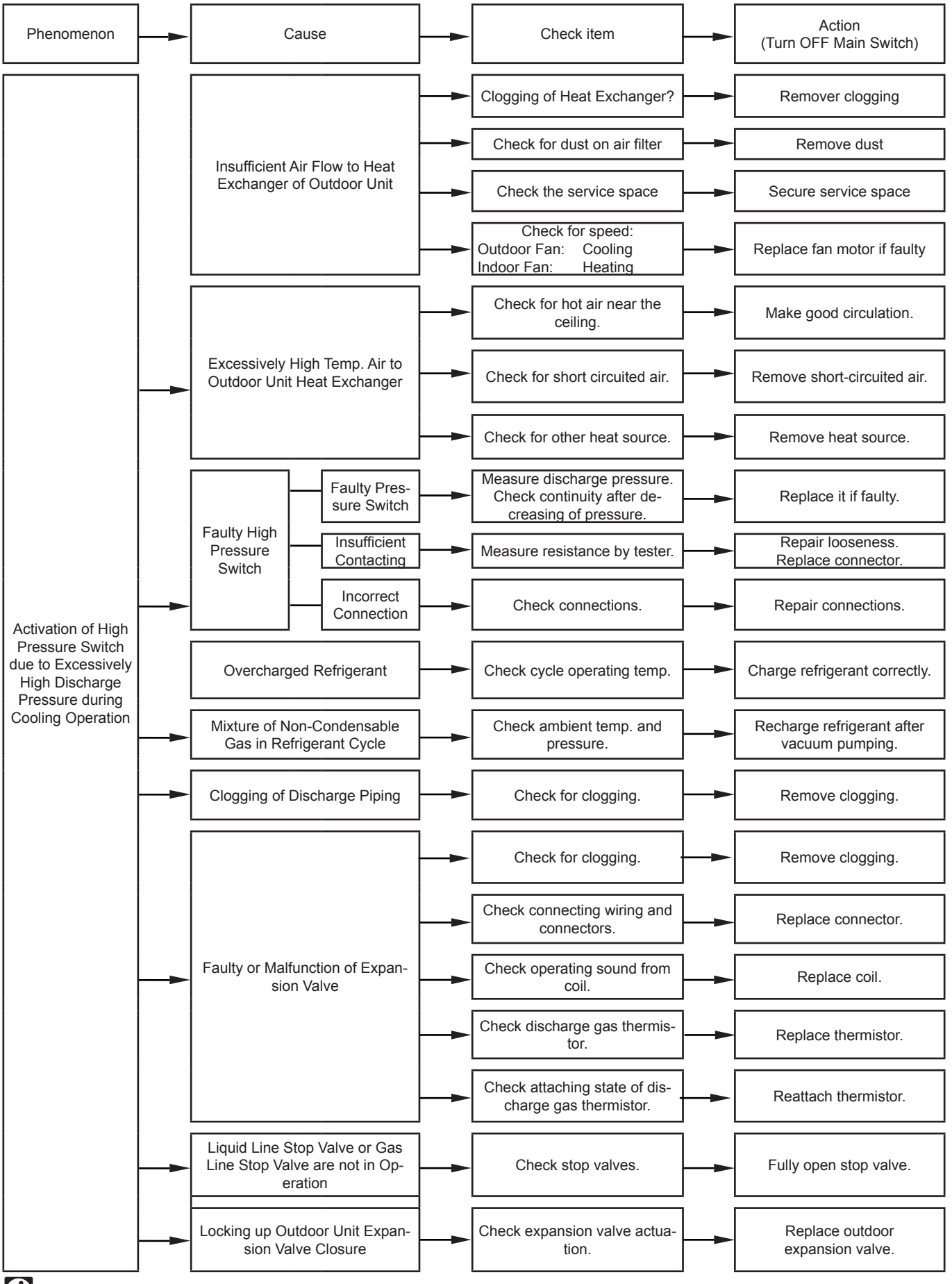
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - ✶ This alarm code is indicated when the protection device is activated at following condition. Evaporation temperature of outdoor unit is more than 55 degree and top of compressor temperature is more than 95 degree.



Check the following value by remote control switch.
1. Top of Compressor Temperature: 95ºC or less
2. Liquid Refrigerant Piping Temperature of Indoor Unit: 55ºC or less If exceeding the above value, repair it.



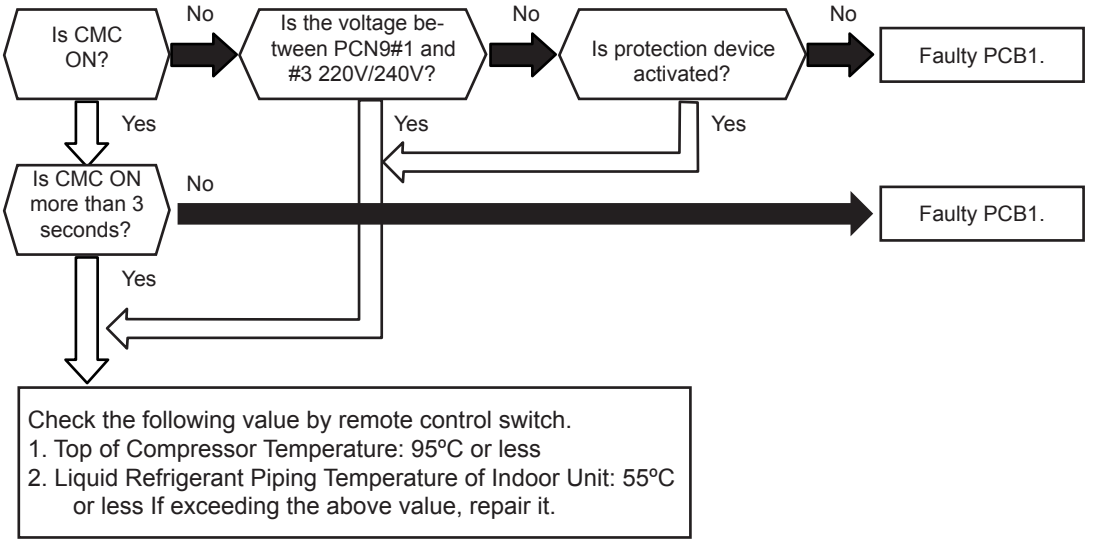
Thermistor Characteristics



NOTE: *This alarm code is indicated when the outdoor unit protective device is activated by high discharge pressure during cooling operation. Accordingly, when this alarm code is indicated, there is high possibility of high pressure switch actuation and the above troubleshooting actions are based on such cases.*

Alarm code	Heating Overload (High Pressure Switch will be Activate)
42	

- 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 indicated when the protection device is activated at following condition. Liquid refrigerant piping temperature of indoor unit is more than 55 degree and top of compressor temperature is more than 95 degree.



8

Phenomenon	Cause	Check item	Action (Turn OFF Main Switch)
Activation of High Pressure Switch due to Excessively High Discharge Pressure during Heating Operation	Insufficient Air Flow to Heat Exchanger of Indoor Unit	Clogging of Heat Exchanger	Remove it
		Check for dust on air filter	
		Check for any obstacle at inlet or outlet of heat exchanger.	
		Check the service space.	Secure service space.
		Check for fan speed. (Cooling: Outdoor Fan Heating: Indoor Fan)	Replace fan motor if faulty.

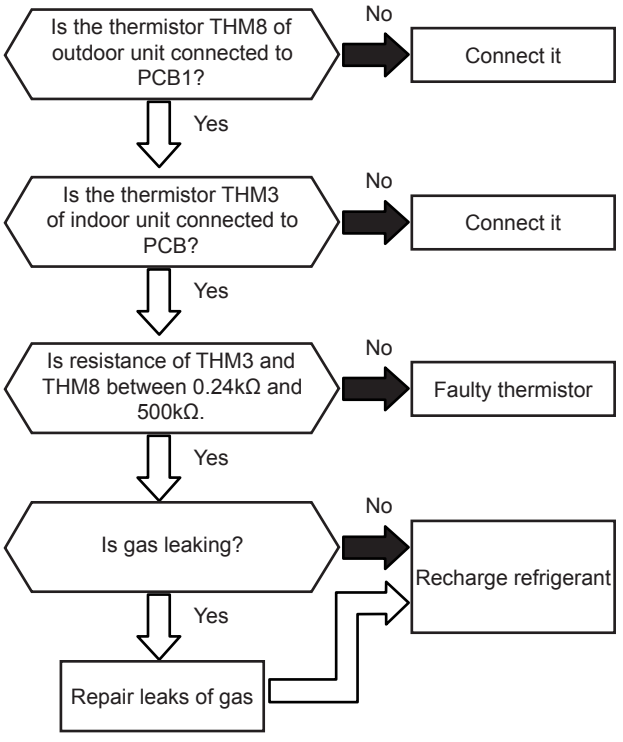


NOTE:

This alarm code is indicated when the outdoor unit protective device is activated by high discharge pressure during heating operation. Accordingly, when this alarm code is indicated, there is high possibility of high pressure switch actuation and the above troubleshooting actions are based on such cases.

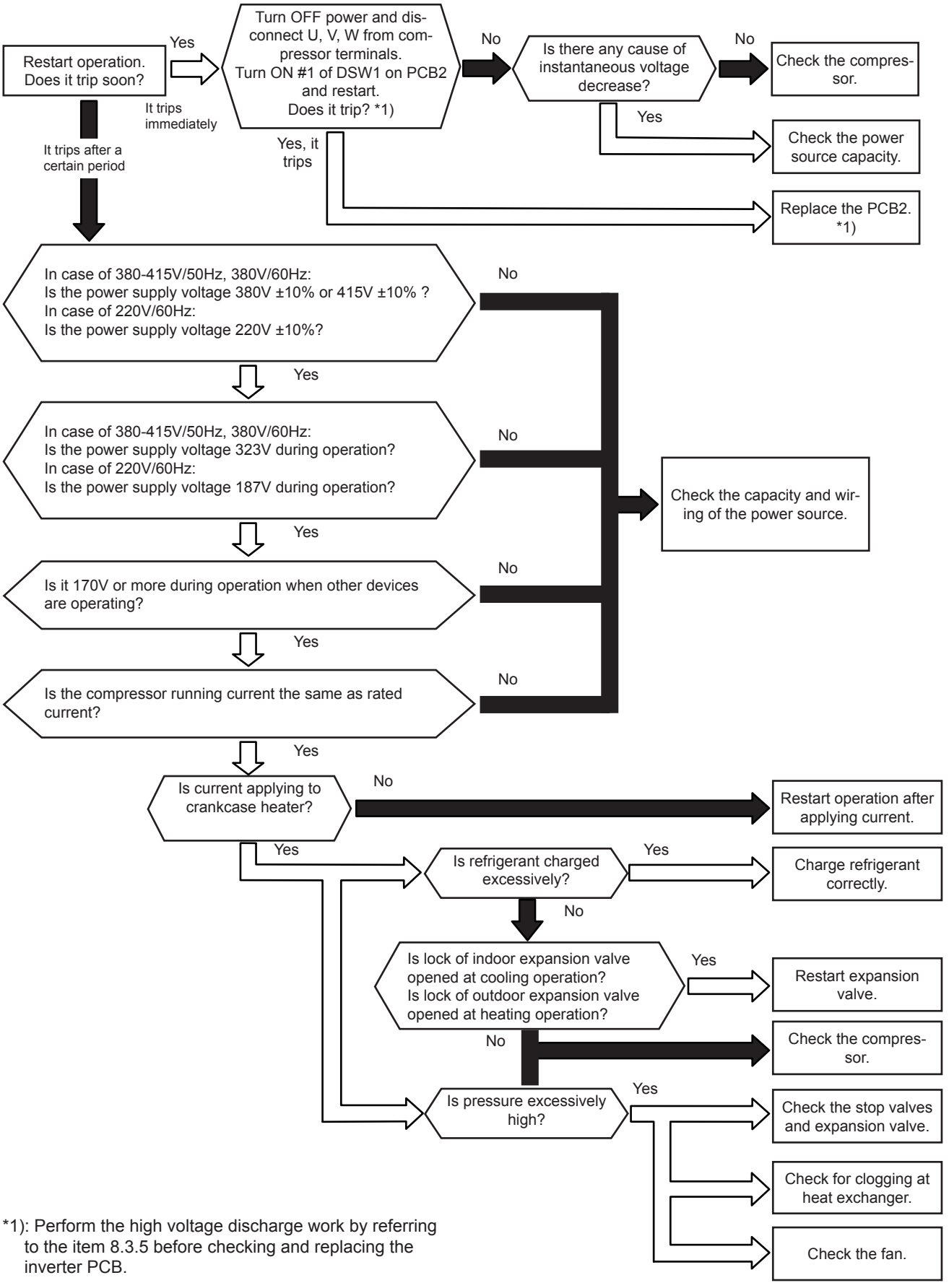
Alarm code	
47	**Activation to Protect System from Excessively Low Suction Pressure (Protection from Vacuum Operation)**

- 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 Temp. of Indoor Unit, Heating: Evaporating Temp. of Outdoor Unit) is lower than -37 deg. and the thermistor on top of compressor is higher than 90 deg. for 3 minutes, retry operation is performed 3 minutes after compressor stoppage.
    However, when the state occurs more than 3 times including 3 in one hour, this alarm code is indicated.



Phenomenon	Cause	Check item	Action (Turn OFF Main Switch)
■ Faulty Freeze Protection ■ Thermistor of Indoor Unit ■ Evaporating Thermistor of Outdoor Unit	Fault	Check resistance.	Replace thermistor if faulty.
	Incorrect Connection	Check wiring to PCB.	Repair wiring and connections.
Faulty PCB (Outdoor Unit, Indoor Unit)		Replace PCB and check operation.	Replace PCB if faulty.
Excessively Low Suction Pressure (in Vacuum)	Liquid Line Stop Valve is not open before Operation	Check stop valve.	Fully open stop valve.
	Faulty or Malfunction of Expansion Valve	Check for clogging.	Remove clogging.
		Check connecting wiring and connectors.	Replace connector.
		Check operating sound from coil.	Replace coil.
		Check discharge gas thermistor.	Replace thermistor.
		Check attaching state of discharge gas thermistor.	Reattach thermistor.
	Refrigerant Leakage	Check each temp. and pressure.	Charge refrigerant after vacuum pumping.
		Check gas leakage part.	Correctly charge refrigerant after repairing gas leakage.
Faulty Outdoor Fan at heating Operation	Faulty Outdoor Fan Motor	Measure coil resistance and insulating resistance.	Replace outdoor fan motor if faulty.

Alarm code	Overcurrent Protection Activation
48	



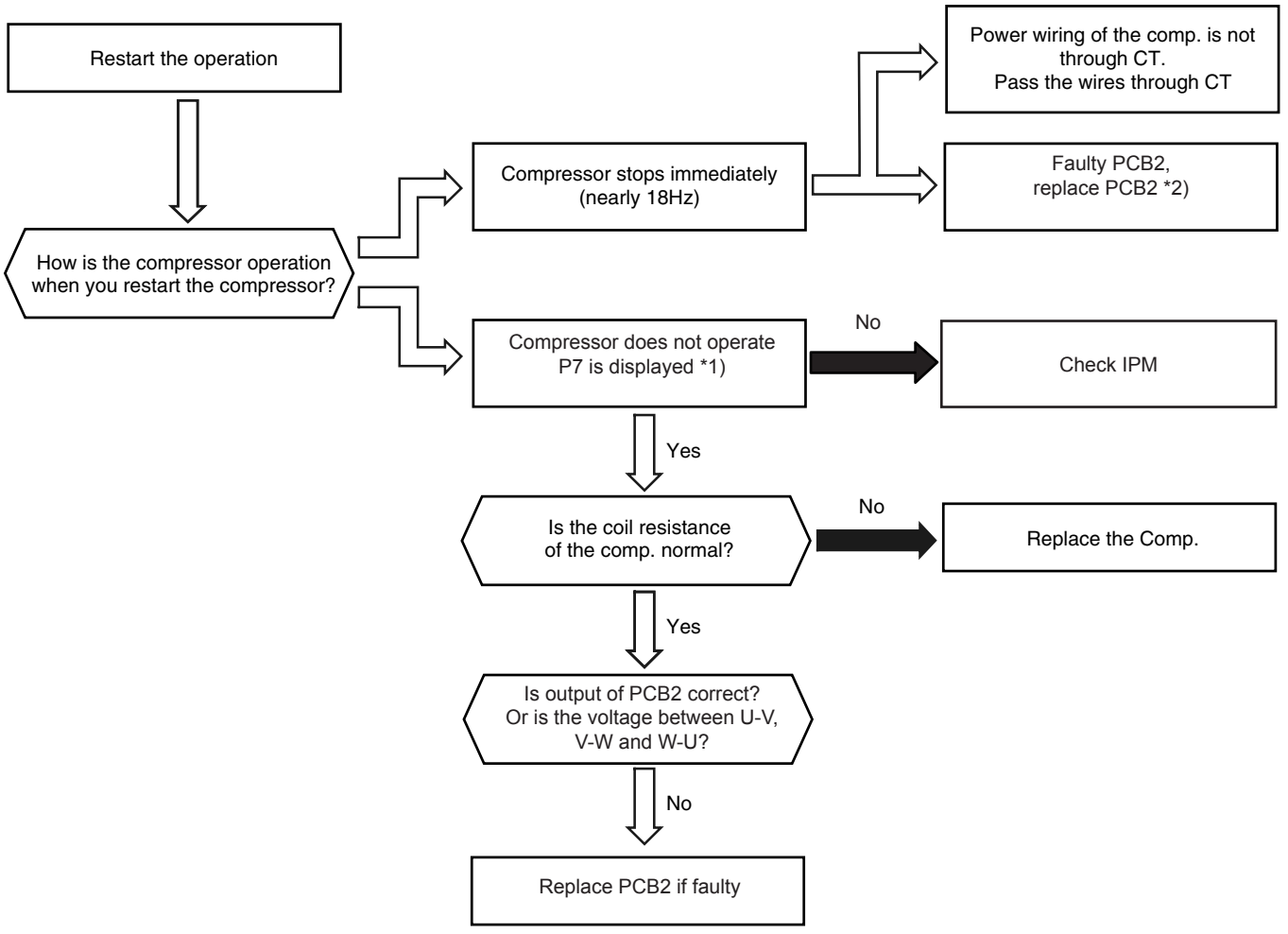
*1): Perform the high voltage discharge work by referring to the item 8.3.5 before checking and replacing the inverter PCB.

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 1.5A (including 1.5A).



*1): P7 is shown at 7-segment on the outdoor unit PCB.

*2): Perform the high voltage discharge work by referring to the item 8.3.5 before checking and replacing the inverter parts.

Alarm code	Protection Activation of IPM or PCB2
53	

- 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.
  - ✶ IPM and PCB2 have detecting function of abnormality.
    This alarm is indicated when the transistor module detect the abnormality 7 times in 30 minutes including 7. Retry operation is performed up to the occurrence of 6 times.

Conditions:

Abnormal Current to the Transistor Module such as

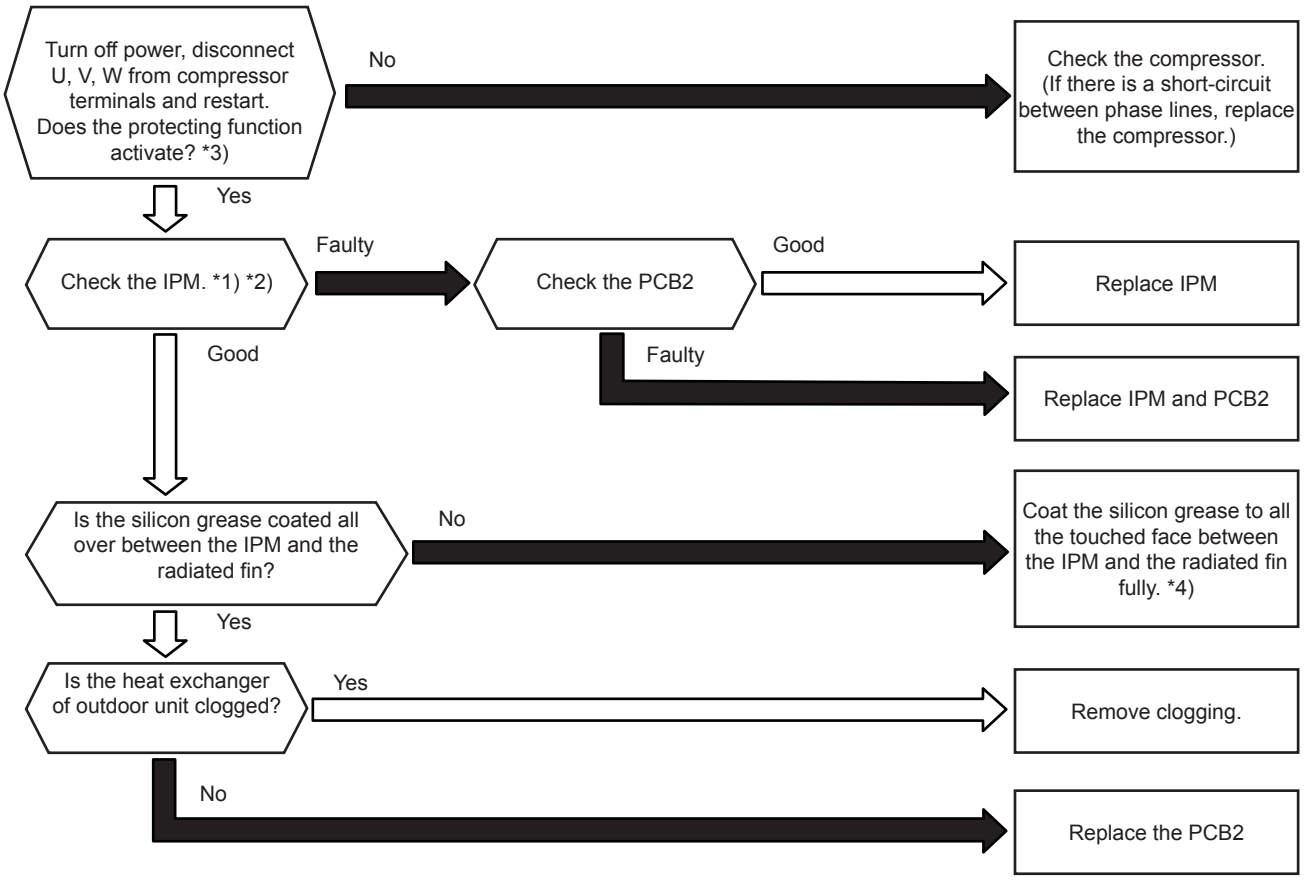
Short Circuited or Grounded

or

Abnormal Temperature of the IPM and PCB2

or

Control Voltage Decrease



*1) Perform the high voltage discharge work by referring to the item 8.3.5 before checking and replacing the inverter components.
*2) Regarding replacing or checking method for inverter components, refer to the item 8.3.5.
*3) Turn ON the No.1 switch of the dip switch DSW1 on PCB2 when restarting with disconnecting the terminals of the compressor. After troubleshooting, turn OFF the No.1 switch of the dip switch DSW1 on PCB2.
*4) Use the silicon grease provided as accessory (Service parts No. P22760).

ATTENTION

When alarm code “53” is indicated, the outdoor fan motor (DC motor) ensure that DC fan motor is checked according to the item 8.3.5.

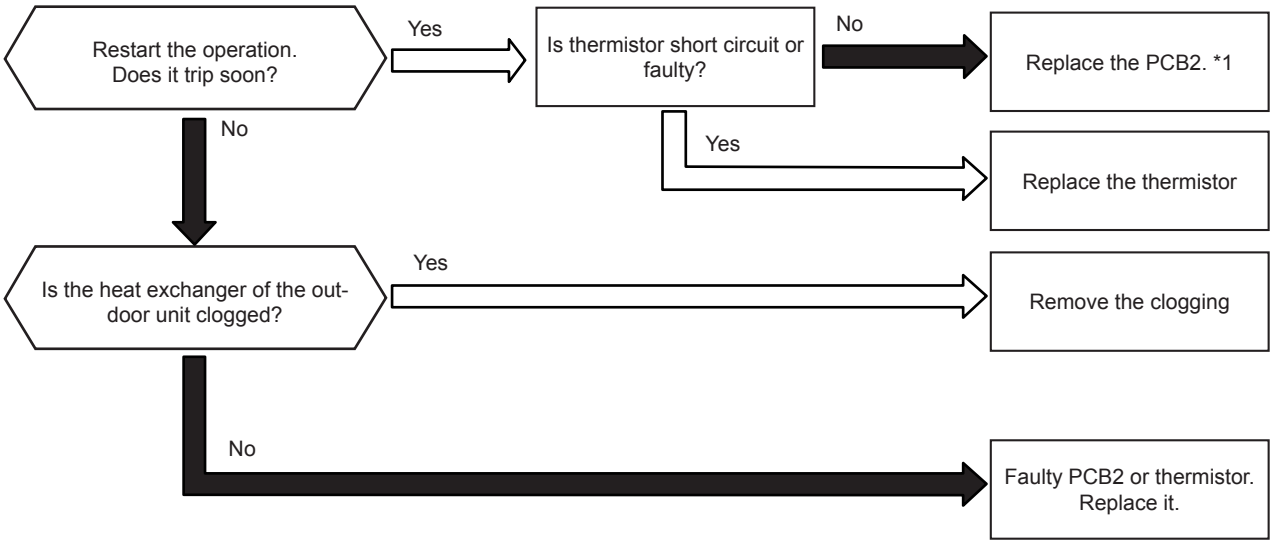
8

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:

When the temperature of the thermistor for inverter fin excess 100ºC 3 times in 30 minutes, this alarm is indicated and the operation is stopped. In the case the occurrence is smaller than 2 times, retry is performed.



1*): Perform the high voltage discharge work by referring to the item 8.3.5 before checking and replacing the inverter components.y.

Alarm code	IPM or PCB2 Abnormality
55	

- 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 case that the abnormality of alarm code 55 occurs four times within 30 minutes, the alarm code of abnormality occurred for the fourth time is indicated. Retry operation is performed up to third time of abnormality occurrence.

Conditions:

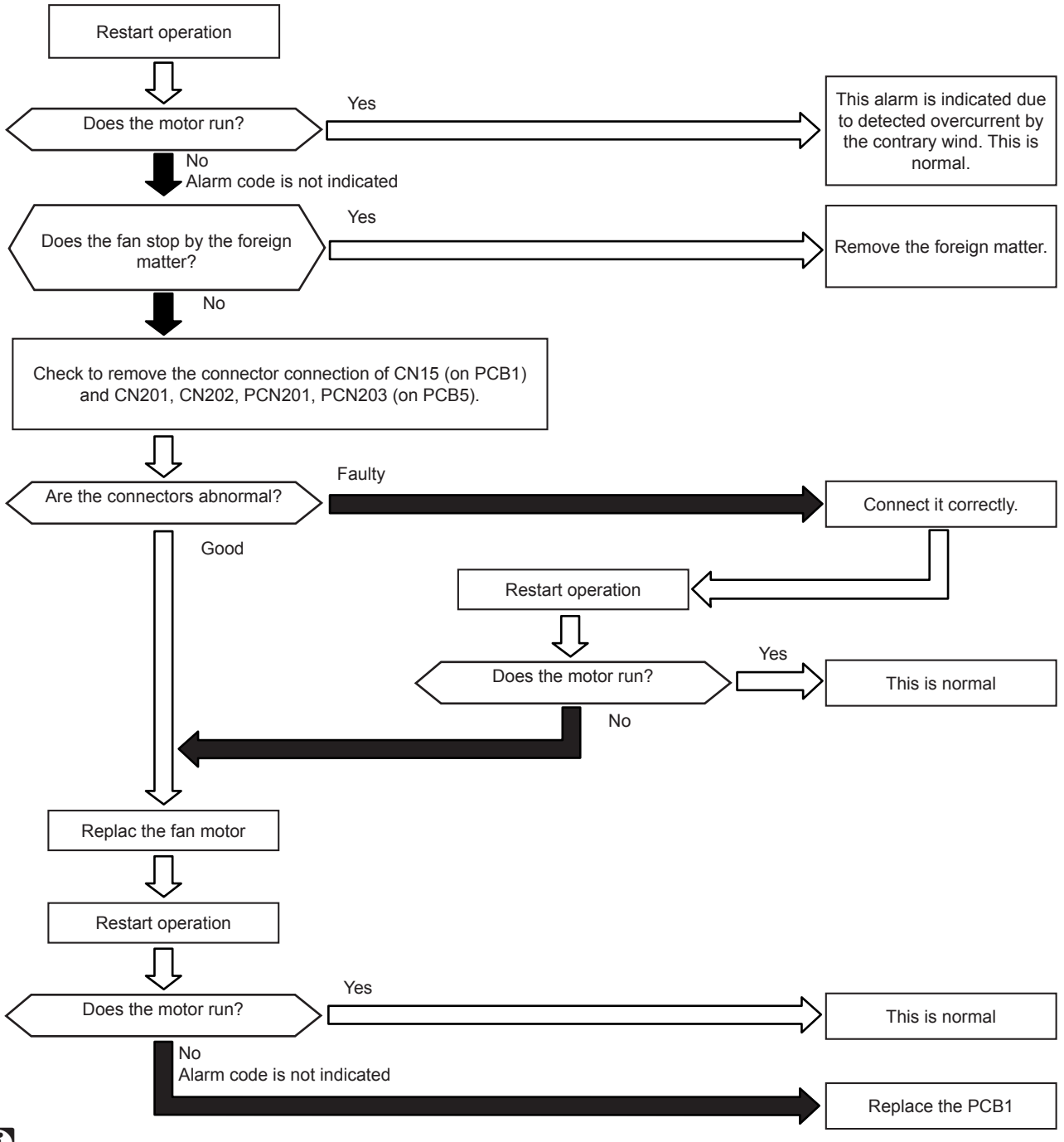
When the transmitting abnormality occurs between IPM and PCB2, this alarm is indicated and the operation is stopped.

Troubleshooting:

Replace the PCB2.

Alarm code	Abnormality of Fan Motor Protection (DC Fan Motor)
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 indicated when the revolution pulse output from the fan motor is 10rpm or less and the reverse revolution signal is detected. The fan motor is stopped once, and restarted after 10 seconds. If it occurs more than 10 times in 30 minutes, this alarm is indicated. The abnormality occurs when the fan motor is stopped.



NOTE:
Check to ensure that DC Fan Motor is checked according to the item 8.3.5.

In the case that the fan motor does not run even the PCB1 is replaced, replace PCB5.

8

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.

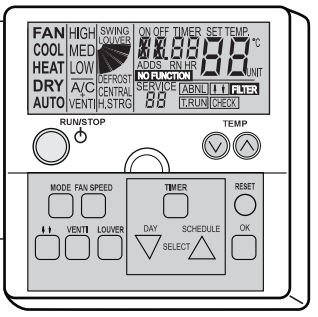
Alarm Code:	Content of Abnormality
02	Tripping of Protection Device in Outdoor Unit
07	Decrease in Discharge Gas Superheat
08	Increase in Discharge Gas Temperature
41	Cooling Overload
42	Heating Overload
47	Low Pressure Decrease Protection Activating

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 OK 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.



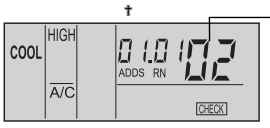
Check mode
- Check mode 1: Current data will be displayed
- Check mode 2: The data which was held immediately before the failure will be displayed

Normal mode

OK — 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

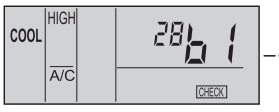


The alarm code that identifies the last fault that has occurred in the displayed unit.
The unit number of the connected unit or the unit number for which the checking mode was selected previously.

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



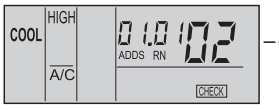
Forward: Press the "▲" switch to increase from 00 to 01 to 02 ···
Backward: Press the "▼" switch to decrease from 15 to 14 to 13 ···



Press "▼" to see the previous indication
Press "▲" to see the next indication

OK — 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 "▲"



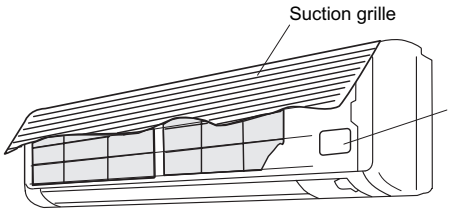
- In the Check mode 2, the data of the first three units that are connected serially to a remote control switch are available.
- You can press the CHECK switch to disable the Check mode 2.
  Check mode 1 cannot be disabled even if you press the CHECK switch.

Check mode disabled

CHECK — Press for more than three seconds

8

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 "v" 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

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.

(Ex.) During the operation of several compressors, the average temperature of two compressors is indicated.

If the temperature is higher than 126°C, " 126".

to next page

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

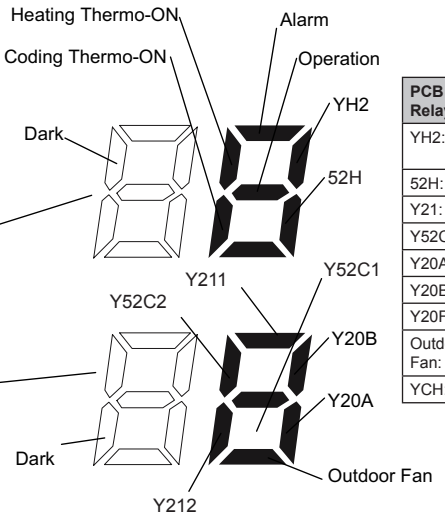
15	Abnormal operation occurrence counter	E1 01
16	Instantaneous power failure occurrence counter in indoor unit	E2 00
17	Transmission error occurrence counter between remote control switch and indoor unit	E3 00
18	Abnormal operation occurrence counter on inverter	E4 00

↓

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).
52H:	Relay for electric heater (CEH)
Y21:	Relay for 4-way valve
Y52C:	Relay for compressor
Y20A:	Relay for Selonoid Valve (SVA2)
Y20B:	Relay for Selonoid Valve (SVA1)
Y20F:	Relay for Selonoid Valve (SVF)
Outdoor Fan:	Relay for Outdoor Fan.
YCH:	Relay for Cranckcase heater

Symbols with a letter Y are relays of PCB

00	Operation OFF, Power OFF
01	Thermo - OFF (Note 1)
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 (<=-5°C), Stoppage of Heating Operation due to high Outdoor Air Temperature, and high indoor air temperature, stoppage of heating operation due to low Outdoor Air Temperature (<=-20°C)
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
18	Retry due to voltage decrease
19	Expansion valve opening change protection
20	Operation mode changeover of indoor unit (Note 5)
21	Enforced thermo-off, when other indoor unit thermo-off
22	Hot start after 4 hours switch on the outdoor unit
24	Cold draft protection 2

NOTE:

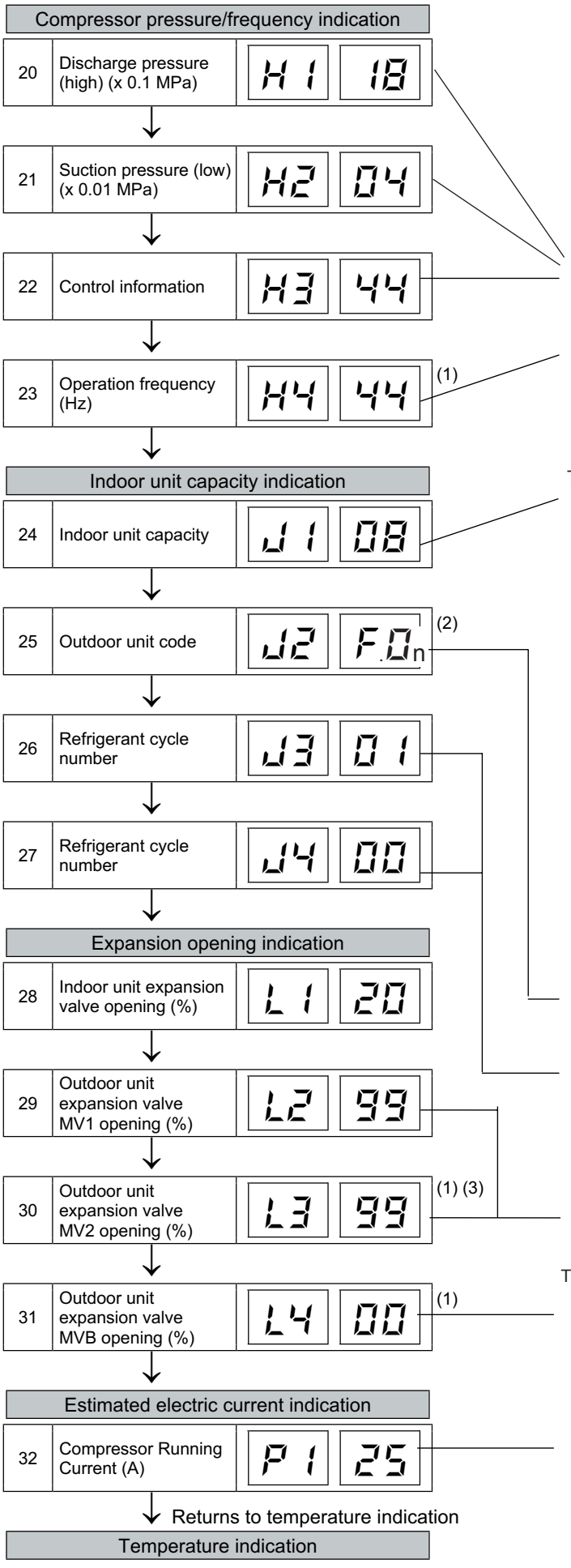
1. *Explanation of Terms*
   Thermo-ON: A condition where an indoor unit is requesting the compressor to operate.
   Thermo-OFF: A condition where an indoor unit is not requesting the compressor to operate.
2. *Even if stoppage is caused by "Alarm", "02" is not always displayed.*
3. *If the transmission between the inverter printed circuit board and the control printed circuit board is not performed during 30 seconds, the stoppage cause is d1-05 and the alarm code "04" may be displayed.*
4. *If the transmission between the indoor unit and the outdoor unit is not performed during three minutes, the Indoor Units are stopped. In this case, the stoppage cause is d1-06 and the alarm code "03" may be displayed.*
5. *In the system "20" will be indicated at the diference between indoor units.*

Countable up to 99.
Over 99 times, "99" is always displayed.

NOTE:

1. *If a transmission error continues for three minutes, one is added to the occurrence counter.*
2. *The memorized data can be cancelled by the method which is explained in section 8.3.1 "Self-checking Procedure of PCB by means of the Remote Control Switch".*

00 : Normal
FF : Abnormal



This is an indication for internal information for the remote control switch. This does not have any specific meaning.

The total frequency is displayed when several compressors are running.

This is an indication for frequency inverter

Capacity code of indoor unit

Indication code	Equivalent capacity (HP)
06	0.8
08	1.0
10	1.3
13	1.5
14	1.8
16	2.0
18	2.3
20	2.5
22	2.8
26	3.0/3.5
32	4.0
40	5.0
48	6.0
64	8.0
80	10.0

"n" indicates the total number of Indoor Units;
n = 1 ~ 4

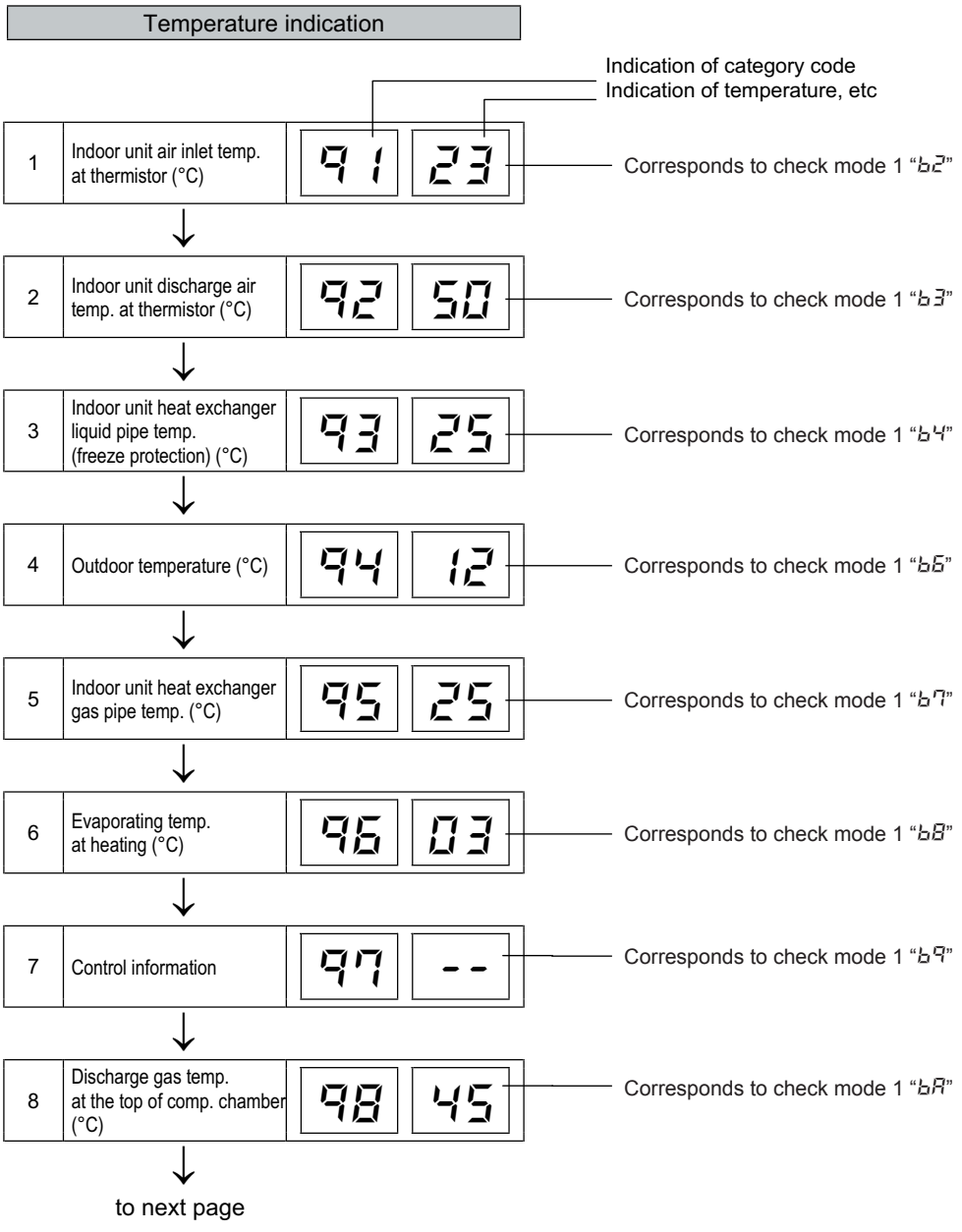
J3: 01 ~ 16 (01: when shipment (DSW5), Decimal indication
J4: 00 ~ 0F (00: when shipment (DSW5), Indication with 16 numbers

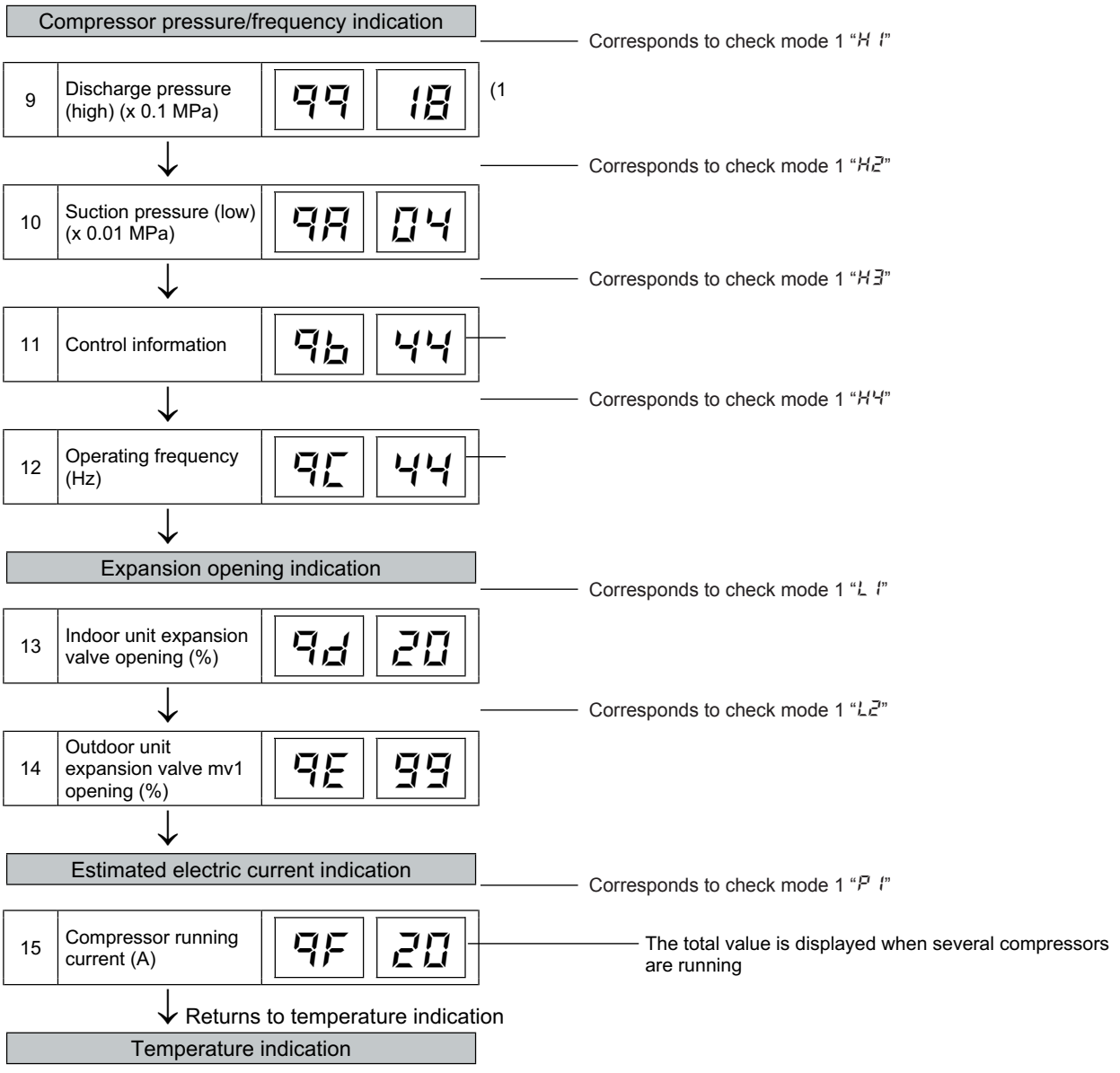
The indication of 255 is normal

The total current is displayed when several compressors are running.
In case of the inverter compressor, the running current of the primary side of the inverter is displayed.

Contents of the Check mode 2

When more than three indoor units are connected to one remote control switch, the latest data of only the first three indoor units that are connected serially are displayed.
If you press the part "⌃" of the TEMP switch, the next display appears. If you press the part "⌄" of the TEMP switch, the previous display appears.




Compressor pressure/frequency indication
Corresponds to check mode 1 "H 1"
9
Discharge pressure (high) (x 0.1 MPa)
99
18
(1
Corresponds to check mode 1 "H2"
10
Suction pressure (low) (x 0.01 MPa)
9A
04
Corresponds to check mode 1 "H3"
11
Control information
9b
44
Corresponds to check mode 1 "H4"
12
Operating frequency (Hz)
9C
44
Expansion opening indication
Corresponds to check mode 1 "L 1"
13
Indoor unit expansion valve opening (%)
9d
20
Corresponds to check mode 1 "L2"
14
Outdoor unit expansion valve mv1 opening (%)
9E
99
Estimated electric current indication
Corresponds to check mode 1 "P 1"
15
Compressor running current (A)
9F
20
The total value is displayed when several compressors are running
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 Inits connected to the Outdoor Unit
↓	
2	Turn ON the Outdoor Unit
↓	
3	Auto-addressing starts

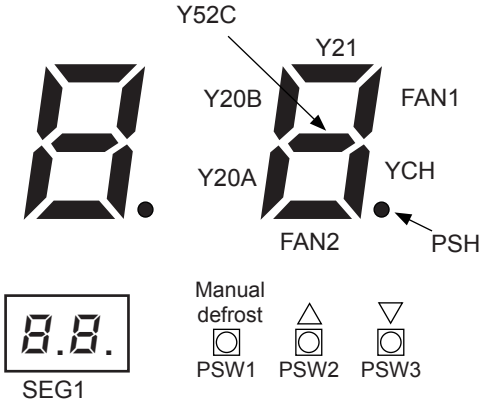
Outdoor Unit, Circuit Board,PCB1

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 indoor 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

Operating conditions and each part of refrigeration cycle can be checked by 7-segment and push switches (PSW) on the PCB in the outdoor unit. During checking data, do not touch the electric parts except for the following switches because 220-240V is applied to them. Pay attention not to contact the tools with electrical parts. If contacted, electrical parts will be damaged



– To start checking, press PSW2 switch for more than three seconds.
– To proceed checking, press the PSW2 switch.
– To back to the previous item, press the PSW3 switch.
– To cancel this checking, press the PSW2 switch for more than 3 secons

Item	Item		Indication data		
	Check No.	Indication	Indication	Contents	
Total Capacity of Indoor Unit Connected	01	CP	22	00~96	
Input/Output State of Outdoor Micro-Computer	02	SC	5	Indicates only for the segments corresponding to the equipment in the figure. (See figure below)	
Alarm Code for Abnormal Stoppage of Compressor	03	AC	08	Alarm Code on Compressor	
Inverter Order Frequency to Compressor	04	H1	74	30~115 (Hz) In case that Frequency is higher than 100Hz, the last two digits flicker	
Indoor Order Frequency to Compressor	05	H2	74	30~115 (Hz) In case that Frequency is higher than 100Hz, last two digits flicker	
Air Flow Ratio	06	Fo	80	00~100 (%) In case that air flow ratio is 100%, "00" flashes	
Outdoor Unit Expansion Valve Opening	07	Eo	30	00~100 (%) Ins case that Expansion Valve Opening is 100%, "00" flashes	
Temperature at the top of Compressor	08	Td	02	00~142 (ºC) In case that Temperature is higher than 100ºC, the last two digits flash	
Evaporating Temperature at Heating	09	TE	42	-19~80ºC	
Ambient Air Temperature	10	To	-3	-19~80ºC	
Cause of Stoppage at Inverter	11	dF	1	(See table at the next page)	
Control Information	12	FF	20	Internal Information of Outdoor Unit PCB	
Control Information	13	A1	12	Internal Information of Outdoor Unit PCB	
Inverter Secondary Current	14	A2	20	00~199 (A)	
Outdoor Unit Address	15	nA	00	00~15	In case of Twin/Triple/Quad-Type Unit, the information of 2nd to the 4th indoor units is indicated repeatedly. The right character of the indication represents the indoor unit setting No. Single: A Twin: A, b Triple: A, b, c Quad: A, b, c, d
Indoor Unit Expansion Valve Opening	16	EA	20	00~100 (%) In case that opening is 100%. "00" flashes	
Liquid Pipe Temperature of Indoor Unit (Freeze Protection)	17	LA	05	-19~127 (ºC)	
Indoor Unit Intake Air Temperature	18	iA	28	-19~127 (ºC)	
Indoor Unit Discharge Air Temperature	19	oA	20	-19~127 (ºC)	
Cause of Indoor Unit Stoppage	20	dA	05	(See table at the next page)	

Cause of inverter stoppage (11)

Indication	Contents
1	IPM error
2	Instantaneous Over Current
3	Inverter Fin Thermistor Protection Activation
4	Electronic Thermal Activation
5	Inverter Voltage Decrease
6	Over Voltage
7	Abnormal Transmission
8	Abnormal Current Detection
9	Instantaneous Power Failure Detection
11	Reset of Micro-Computer for Inverter
12	Earth Fault Detection from Compressor
13	Open Phase Detection
14	Inverter Malfunction
15	Inverter Malfunction
16	Inverter Malfunction
17	Transmission Error
18	Abnormal Current Detection
19	Abnormal Protective Device

Note:
To finish checking: Press the PSW2 switch for more than 3 seconds.

Cause of Indoor Unit stoppage (20)

Indication	Contents
00	Operation OFF, Power OFF
01	Thermo-OFF
02	Alarm
03	Freeze Protection Overheating Protection
05	Instantaneous Power Failure at Outdoor Unit
06	Instantaneous Power Failure at Indoor Unit
07	Stoppage of Cooling Operation due to Low Outdoor Air Temperature Stoppage of Heating Operation due to High Outdoor Air Temperature
10	Demand thermo OFF
13	Retry for Pd Increase Prevention
15	Vacuum/Discharge Gas Temperature Increase Retry
16	Retry Due to Discharge Gas SUPERHEAT Decrease
17	IPM Error Retry, Instantaneous Over Current of Inverter Retry, Electronic Thermal Activation of Inverter Retry, Abnormal Current Sensor of Inverter Retry
18	Retry due to Inverter Voltage Decrease Retry due to Inverter Overvoltage
19	Other Retry
20	Different Operation Mode between Indoor/ Outdoor Units (Only for Individual Twin/Triple/Quad Types)
21	Forced Thermo-OFF (Only for Simultaneous Twin/Triple/Quad Types)
22	Forced Thermo-OFF (During Compressor Pre-heating)
24	Thermo-OFF during Energy Saving Operation Mode

Cancelation of Forced Thermo OFF

Turn ON the power source and wait for more than 30 seconds. Then press PSW1 and PSW3 simultaneously for more than 3 seconds.
Forced Thermo-OFF (Indoor Unit Error Code 22) will be cancelled.
However, this function may damage the compressor, use only on inevitable occasion.

In case of using the remote control switch (PC-P1HE), the cancellation is also available with it.
When “Operation is Limited” indication flashes on the remote control LCD, press FAN SPEED and LOUVER switches simultaneously for more than 3 seconds.
“Operation is Limited” Indication is disappeared and operation is available.

8.2.5 TROUBLESHOOTING BY MEANS OF THE FLASHING ALARM LEDS FOR RPK-FSNM

The red LED located on the panel indicates the following alarms:

Code	Cause	Indication
Alarm 02	Unit protection	This alarm is activated when the blinks sequence is two times ON/two seconds OFF
Alarm 03	Transmission error	This alarm is activated when the blinks sequence is three times ON/two seconds OFF
Alarm 04	Inverter outdoor unit error	This alarm is activated when the blinks sequence is four times ON/two seconds OFF

For the rest of the alarms, the blink sequence is one second ON/one second OFF

8.2.6 CAUSE OF INVERTER STOPPAGE

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, Short Circuit Protection)	17	P7	53
2	Instantaneous Over Current	17	P7	48
3	Abnormal Inverter Fin Thermistor	17	P7	54
4	Electronic Thermal Activation	17	P7	48
5	Inverter Voltage Decrease	18	P8	06
6	Over Voltage	18	P8	06
7	Abnormal Inverter Transmission	18	-	-
8	Abnormal Current Detection	17	P7	51
9	Instantaneous Power Failure Detection	18	-	-
11	Reset of Micro-Computer for Inverter	18	-	-
12	Earth Fault Detection from Compressor (Only Starting)	17	P7	53
13	Abnormal Power Source Phase (Open Phase)	18	-	-
16	Inverter PCB Abnormality	18	P8	55
17	Abnormal Transmission	18	P8	55
18	Abnormal Current Detection	-	-	02
19	Abnormal Protective Device	-	-	38
20 ~ 63	Other factors	18	-	-

■ Protection Control Code on 7-Segment Display

(1) Protection control code is displayed on 7-segment when a protection control is activated.

(2) Protection control code is displayed while function is working, and goes out when released.

(3) When several protection control are activated, code number with higher priority will be indicated (see below for the priority order).

(a) Higher priority is given to protection control related to frequency control than the other.

<Priority Order>

* High-Pressure Increase Protection
* Over Current Protection
* Cold Draft Protection
* Low-Pressure Ratio Control at Cooling Operation

(b) 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 at Cooling Operation
P	1	High-Pressure Ratio Control at Heating Operation
P	2	High-Pressure Increase Protection
P	3	Over Current Protection
P	4	IPM Fin Temperature Increase Protection
P	5	Discharge Gas Temperature Increase Protection

Code		Protection Control
P	6	Frost Formation Protection
P	9	Unbalance Power Source Detecting
P	A	Current Demand Control
P	b	Low-Pressure Decrease Protection
P	C	Cold Draft Protection

– Retry indication continues for 30 minutes unless a protection control is indicated.

– Retry indication disappears if the stop signal comes from all rooms.

Code		Protection Control
P	7	Inverter Retry
P	8	

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.

■ Activating Condition of Protection Control Code

For following the conditions as the temperature change, etc., the control of frequency, etc. is performed to prevent the abnormal conditions by the protection control.
The activating conditions of protection control are shown in the table below.

Code	Protection Control	Activating Condition	Remarks
P0	Low-Pressure Ratio Control at Cooling Operation	Compression Ratio ε < 2.2 => Frequency Increase	ε = (Pd+0.1)/(Ps+0.1)
P1	High-Pressure Ratio Control at Heating Operation	Compression Ratio ε > 7.5 => Frequency Decrease	ε = (Pd+0.1)/(Ps+0.1)
P2	High-Pressure Increase Protection	High Pressure Switch for Control is activated => Frequency Decrease	
P3	Over Current Protection	Inverter Output Current > (*1)A => Frequency Decrease	
P4	IPM Fin Temperature Increase Protection	Inverter Fin Temperature > 82ºC => Frequency Decrease	
P5	Discharge Gas Temperature Increase Protection	Temperature at the top of compressor is high => Frequency Decrease Temperature at the top of compressor > 107oC => Indicate P5	
P6	Frost Formation Protection	TL ≤ 2ºC Over 3 minutes => Frequency Decrease	TL: Liquid Piping, Temperature of Indoor Unit
P9	Unbalance Power Source Detecting	Inverter Output Current > 13A (380A) => Frequency Decrease	
PA	Current Demand Control	Inverter Output Current > (*2)A => Frequency Decrease	In case of Demand Control Setting
Pb	Low-Pressure Decrease Protection	Low Pressure Switch for Control is activated. => Frequency Decrease	
PC	Cold Draft Protection	TO ≤ 10ºC and ε ≥ 2.6 => Frequency Decrease	ε = (Pd+0.1)/(Ps+0.1) TO: Outlet Temperature of Indoor Unit
P7	Inverter Retry	Automatic Stoppage of Transistor Module, Activation of Electronic Thermal or Abnormal Current Sensor	When activating 3 times in 30 minutes, “48”, “51”, “53” or “54” alarm is indicated.
P8	Inverter Retry	Insufficient/Excessive Voltage at Inverter Circuit or PCB Connector Part	When activating 3 times in 30 minutes, “06” or “55” alarm is indicated.

NOTES:

1. During protection control (except during alarm stoppage), the protection control code is indicated.

2. The protection control code is indicated during protection control and turns off when canceling the protection control.

3. After retry control, the condition of monitoring is continued for 30 minutes.

*4. The Maximum value (*1) and (*2) are as follows:*

(*1)
380-415V

HP	8	10	12
Current (A)	17.5	20.0	21.0

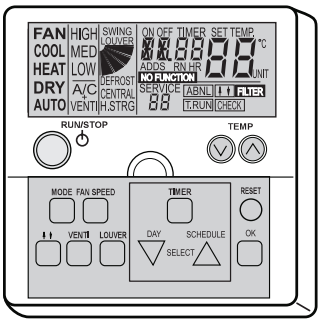
(*2)
380-415V

	Demand Setting	HP		
		8	10	12
Current (A)	100%	8.5	10.0	12.0
	75%	6.0	8.0	12.0
	50%	4.0	5.0	7.5

8.3. PROCEDURE FOR CHECKING EACH MAIN PART

8.3.1. 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



Stop operation

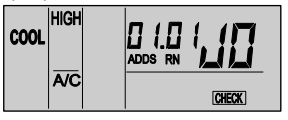
Press RUN/STOP

PCB check mode

Press both switches for three seconds TEMP OK

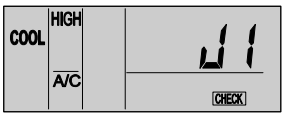
Indication of unit number

(ex.) indication of Unit No. "1"



After seven seconds

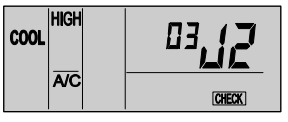
Operating automatic PCB check



Result

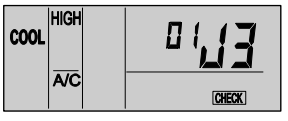
After approx. five seconds (max. 30 seconds in case of a transmission failure between the indoor unit and the outdoor unit) Max. three types of ABNORMAL OPERATIONS indicated.

Abnormal operation (1)



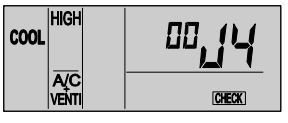
After 1 sec. ↓

Abnormal operation (2)



After 1 sec. ↓

Abnormal operation (3)



Contents

After one second

To next page

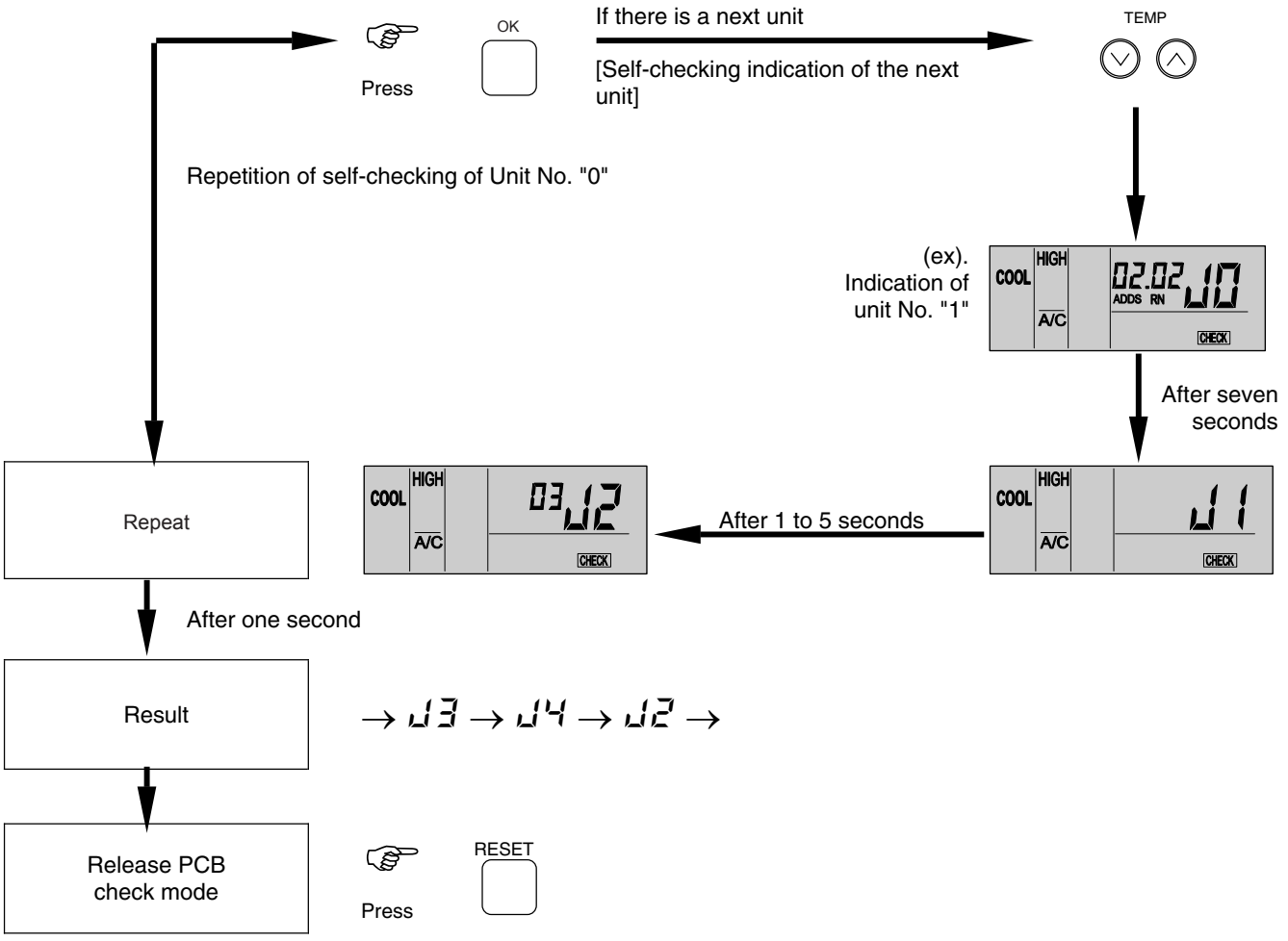
Indication	Contents	
00	Normal	
	Abnormality (open-circuit, short-circuit, etc.) in circuit for:	
01	Air inlet temp. thermistor	Indoor unit PCB
02	Discharge air. temp. thermistor	
03	Liquid pipe temp. thermistor	
04	Remote thermistor abnormality	
05	Gas pipe temp. thermistor	
06	Remote sensor	
08	Transmission 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	Internal thermostat fan input failure	
F5	PSW input failure	
F6	PSH 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) for RPK-0.8~2.0FSNM or (CN25 and CN12) for RPK-2.5~4.0FSNM*
3. *Connect the PC-P1HE.*
4. *Turn ON the power supply.*

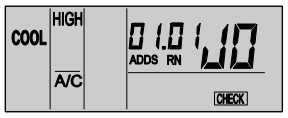
After finishing the checking, turn OFF the power supply again and reconnect the connectors according to the previous situation before the checking.

From previous page



NOTE:

1. *If this indication continues and the alarm code "J1" 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.*

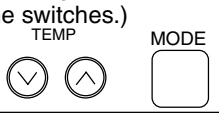
8.3.2. SELF-CHECKING PROCEDURE OF THE REMOTE CONTROL SWITCH

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.)

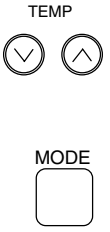


↓

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.

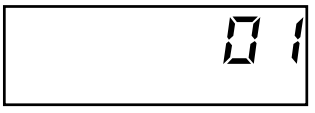


↓

To 11

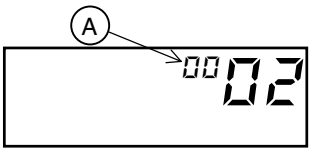
↓

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.



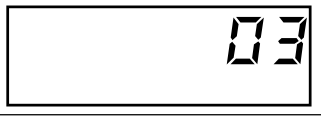
→ Unless all the switches are pressed, the checking does not proceed to the next item.

NOTES:
You can press the switches in any order.

Pressing two or more switches simultaneously is invalid and not counted.

↓

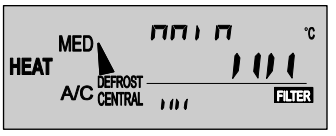
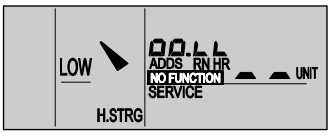
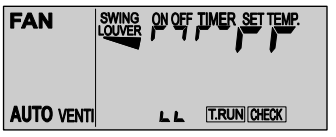
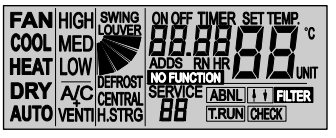
6 The LCD changes as shown below.
The remote control switch automatically starts to check the transmission circuit.

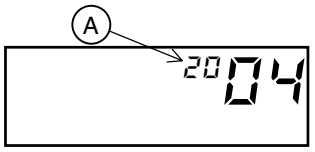
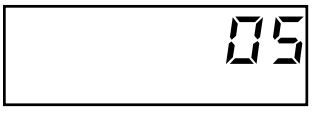
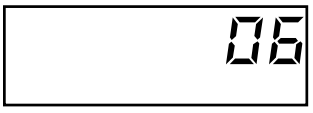


→ In case that the transmission circuit is abnormal, the LCD remains as shown in the left figure and the checking does not proceed to the next item.

↓

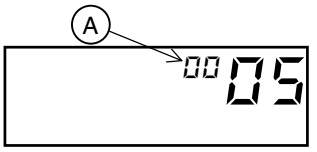
To the next page

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. 
8	The LCD changes as shown below. 
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.*

If the indicators "- -" or "FF" are displayed at the "A" part, the remote control thermostat is abnormal.

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.

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**

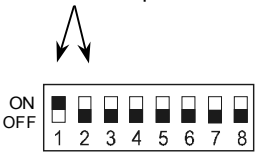
- To check the abnormal operation on the indoor unit PCB due to a malfunction.
- To check the abnormal operation on the indoor unit PCB according to the results of the checking procedure by means of the CHECK switch on the remote control switch and the self-checking function.

■ *Procedure*

Turn OFF the main power switch.

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

Turn ON the main power switch.
Check Mode starts. (Refer to the next page.)

A Analog Test
B Relay Test

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 of Checking Other Main Parts

1. High Voltage Discharge Work for Replacing Parts

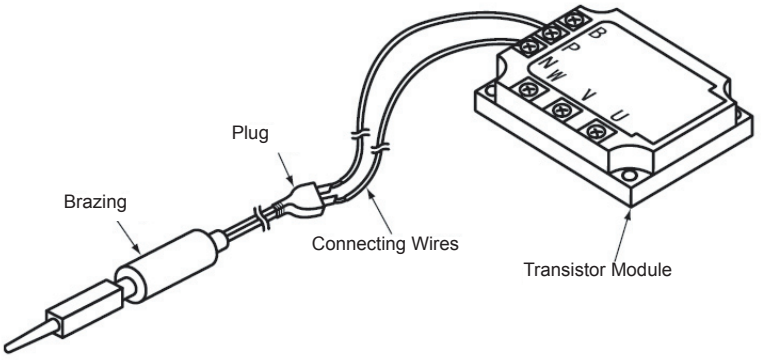
WARNING
Perform this high voltage discharge work to avoid an electric shock

Procedure:

a. Turn OFF the main switches and wait for three minutes. Check to ensure that no high voltage exists. If LED201 is ON after start-up and LED201 is OFF after turning OFF power source, the voltage will decrease lower than DC50V.

b. Connect connecting wires to an electrical solder bit

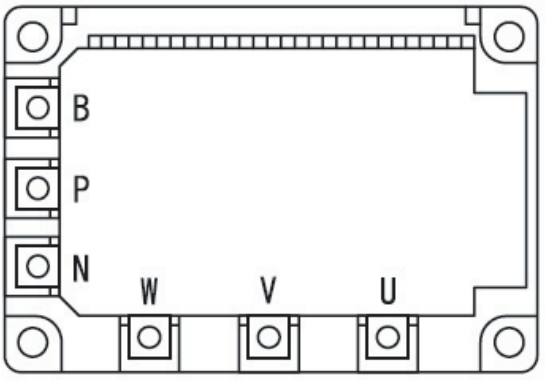
c Connect the wires to terminals, P and N on IPM. => Discharging is started, resulting in hot solder bit. Pay attention not to short-circuit between terminal P and N

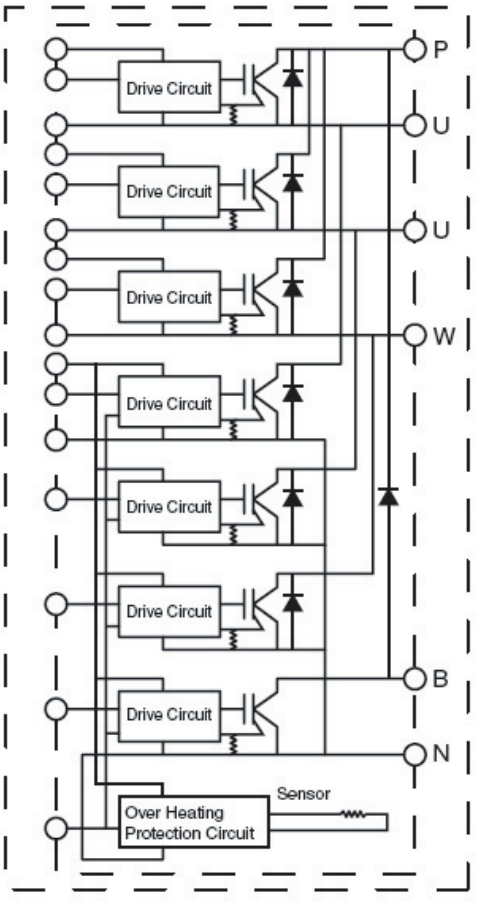


d. Wait for 2 or 3 minutes and measure the voltage once again. Check to ensure that no voltage is charged.

2. Checking Method of Transistor Module

Outer Appearance and Internal Circuit of Transistor Module

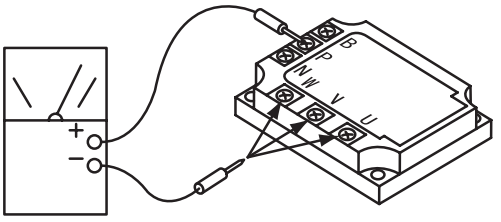




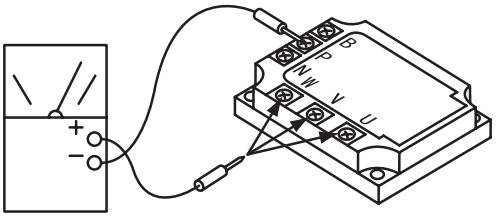
8

Remove all the terminals of the transistor module before check. If items (a) to (d) are performing and the results are satisfactory, the transistor module is normal. Measure it under 1kΩ range of a tester.
Do NOT use a digital tester.

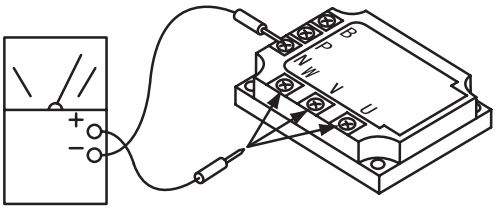
a. By touching the + side of the tester to the P terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.



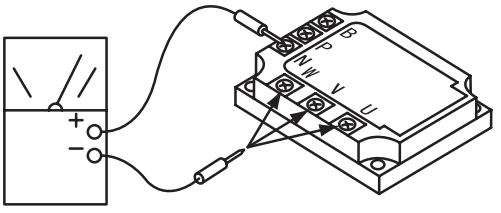
b. By touching the - side of the tester to the P terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



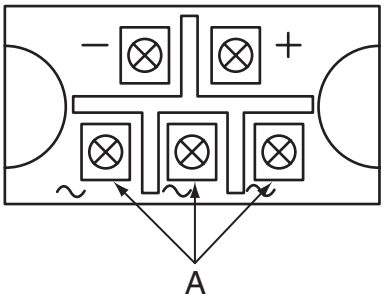
c. By touching the - side of the tester to the N terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.

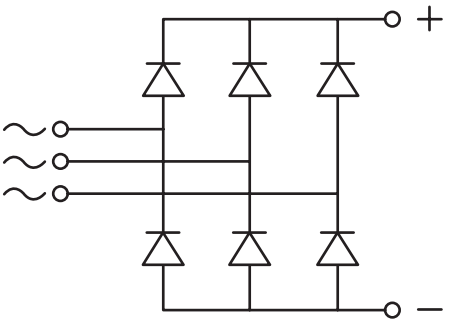


d. By touching the + side of the tester to the N terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



3. Checking Method of Diode Module
   Outer appearance and internal circuit of diode module

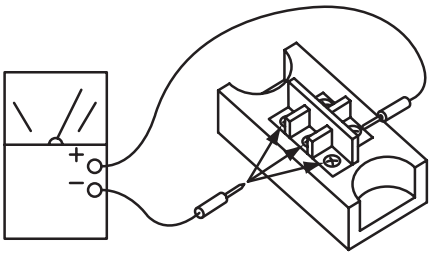




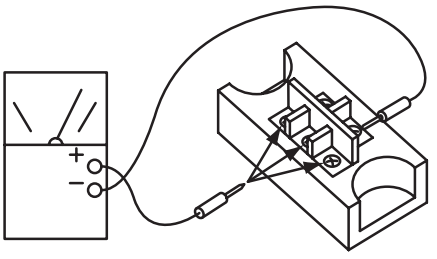
If items (a) to (d) are performing and the results are satisfactory, the diode module is normal.

Measure it under 1kΩ range of a tester. Do NOT use a digital tester.

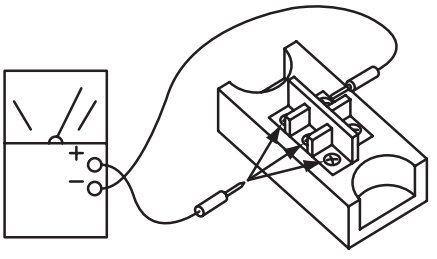
(a) By touching the + side of the tester to the + terminal of diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50kΩ, it is normal.



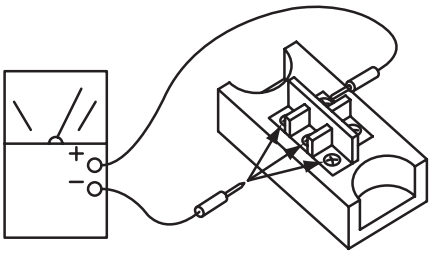
(b) By touching the - side of the tester to the + terminal of diode module and the + side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are greater than 500kΩ, it is norma



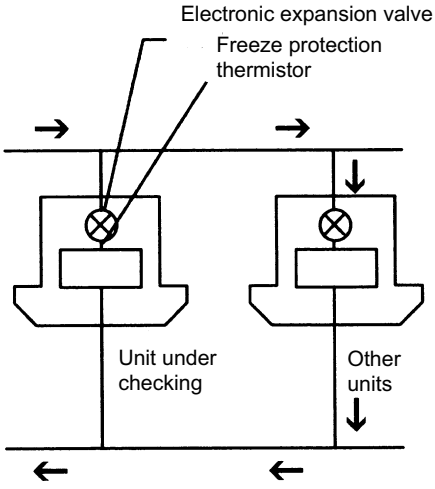
(c) By touching the - side of the tester to the - terminal of diode module and the + side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50kΩ, it is normal.



(d) By touching the + side of the tester to the - terminal of diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are greater than 500kΩ, it is normal.



■ Checking procedure for the electronic expansion valve

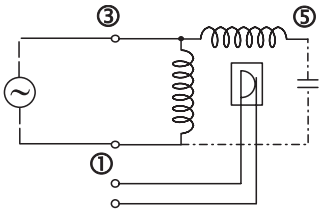
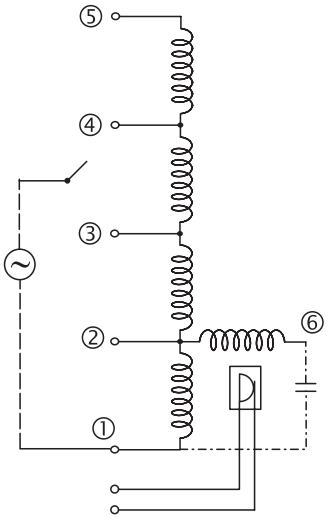
	Indoor unit electronic expansion valve	Outdoor unit electronic expansion valve
Locked with fully closed	Check the liquid pipe temperature during the heating process. It is abnormal if the temperature does not increase.	It is abnormal if the liquid pipe pressure does not increase during the cooling process.
Locked with slightly open	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.  	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.
Locked with fully open		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.

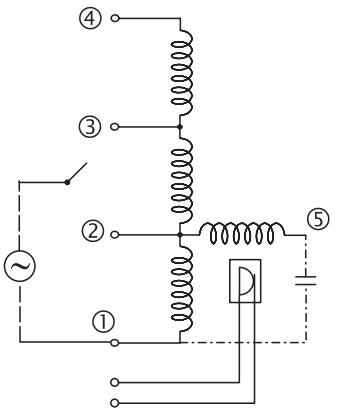
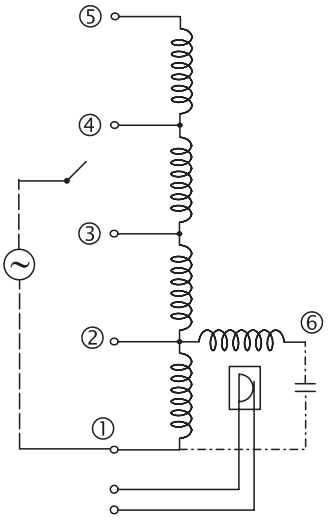
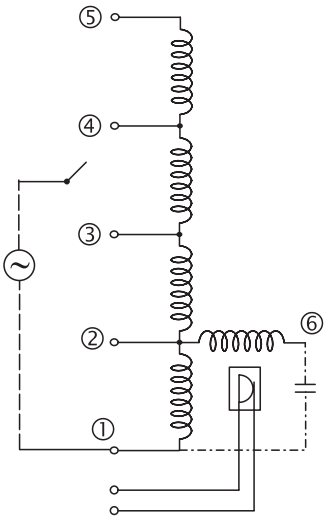
■ Checking procedure for the electrical coil parts

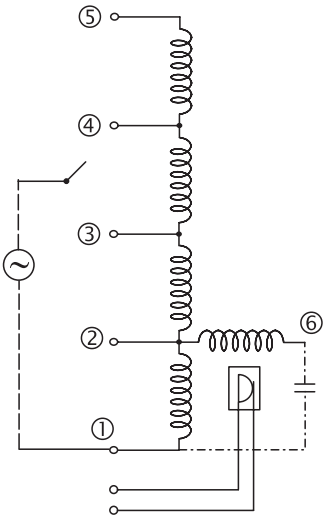
Abbreviations used for colors:

Black	Brown	Red	Yellow	Green	Blue	Grey	Orange	White	Silver	Violet
BLK	BRN	RED	YEL	GRN	BLU	GRY	ORN	WHT	SIL	VIO

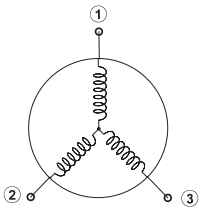
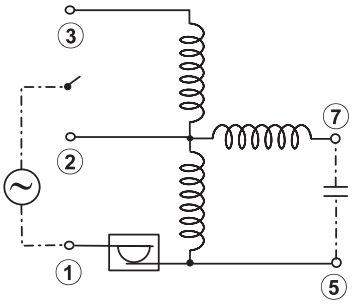
Fan motor for the Indoor Units:

Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RCI-1.0FSN1E RCI-1.5FSN1E RCI-2.0FSN1E RCI-3.5FSN1E RCI-3.0FSN1E	56 W	DC Motor	—	—
RCI-3.5FSN1E RCI-4.0FSN1E RCI-5.0FSN1E RCI-6.0FSN1E	108 W	DC Motor	—	—
RCIM-1.5FSN RCIM-2.0FSN RCIM-2.5FSN	52 W	DC Motor	—	—
RCD-1.0FSN RCD-1.5FSN RCD-2.0FSN	35 W		BLK ①-③ RED RED ③-⑤ WHT	159.00 92.00 at 20 ºC
RCD-2.5FSN RCD-3.0FSN	55 W		BLK ①-③ RED RED ③-⑤ WHT	70.90 81.70 at 20 ºC
RCD-4.0FSN	35 W x 2		BLK ①-③ RED RED ③-⑤ WHT	159.00 92.00 at 20 ºC
RCD-5.0FSN	55 W x 2		BLK ①-③ RED RED ③-⑤ WHT	70.90 81.70 at 20 ºC
RPC-2.0FSNE RPC-2.5FSNE RPC-3.0FSNE	65 W		BLK ①-② RED RED ②-③ YEL YEL ③-④ GRY GRY ④-⑤ BLU RED ②-⑥ WHT	59.90 16.90 15.80 15.80 63.60 at 20 ºC

Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RPC-4.0FSNE RPC-5.0FSNE RPC-6.0FSNE	180 W		BLK ①-② RED RED ②-③ YEL YEL ③-④ GRY RED ②-⑤ WHT	32.10 24.50 24.50 44.70 at 25 ºC
RPI-2.0FSN1E RPI-2.5FSN1E	65W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	75.60 12.80 12.70 12.60 181.00 at 25 ºC
RPI-3.0FSN1E RPI-3.5FSN1E	150W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	19.60 15.70 16.00 16.00 45.20 at 21 ºC
RPI-4.0FSN1E RPI-5.0FSN1E	225W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	15.80 4.00 8.00 8.00 24.00 at 20 ºC
RPI-6.0FSN1E	385W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	10.40 4.70 9.02 4.08 24.60 at 23 ºC

Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RPK-0.8FSNM RPK-1.0FSNM RPK-1.0FSN1M RPK-1.5FSNM RPK-1.5FSN1M RPK-2.0FSNM	20 W	DC Motor	—	—
RPK-2.5FSNM RPK-3.0FSNM	40 W			
RPK-3.5FSNM RPK-4.0FSNM	41 W			
RPF(I)-1.0FSNE RPF(I)-1.5FSNE	28 W		BLK ①-② RED RED ②-③ WHT WHT ③-④ BLU BLU ④-⑤ ORN ORN ⑤-⑥ YEL	231.70 198.70 136.20 71.20 202.40 at 20 ºC
RPF(I)-2.0FSNE RPF(I)-2.5FSNE	45 W		BLK ①-② RED RED ②-③ WHT WHT ③-④ BLU BLU ④-⑤ ORN ORN ⑤-⑥ YEL	97.90 138.10 61.60 35.20 61.00 at 20 ºC

Fan motor for the Outdoor Units

Outdoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
Fan motor for Outdoor Unit for upper side of RAS-8HRNM to RAS-12HRNM	SIC-81FW -D8138-1 138W		RED -WHT WHT - BLK YEL - BLK BLU - BLK	1 M or more 42 - 72 k 168 - 312 k 1 M or more
Fan motor for Outdoor Unit for lower side of RAS-8HRNM	KFC6S -101SB5P		WHT ①-② BLK BLK ②-③ BLU BLK ②-⑦ RED	45.91±10% 51.53±10% 45.03±10% at 20ºC
Fan motor for Outdoor Unit for lower side of RAS-10HRNM	KFC6S -121SL5P		WHT ①-② BLK BLK ②-③ BLU BLK ②-⑦ RED	41.00±10% 45.00±10% 41.00±10% at 20ºC
Fan motor for Outdoor Unit for lower side of RAS-12HRNM	KFC6S -201SB5P		WHT ①-② BLK BLK ②-③ BLU BLK ②-⑦ RED	21.60±10% 32.10±10% 24.40±10% at 20ºC

Other parts

Part name	Unit models	Model code	Resistance (Ω)
Drain up motor	RCI-2.0~5FSN	ADP-1403	256.00 at 20 ºC
	RCD2.0~56.0FSN	KJV-1004	347.00 at 20 ºC
Solenoid gas for gas bypass (3/8)	RAS-8HRNM to RAS-12HRNM	105-52-52 (50Hz)	1540.00 at 20 ºC
		105-52-51 (60Hz)	1250.00 at 20 ºC
Solenoid gas for gas bypass (1/4)		VPV-MOAJ502B1 (50Hz)	1435.00 at 20ºC
		VPV-MOAG579A1 (60Hz)	952.00 at 20ºC
Reversing valve		STF-01AJ502D1 (50Hz)	1435.00 at 20ºC
		STF-01AI511A1 (60Hz)	1358.00 at 20ºC
Compressor motor		E655DHD-65D2 (380-415V)	0.839 at 20ºC
		E655DHD-65A2 (220V)	0.199 at 20ºC

Checking procedure for the compressor

CHECK LIST ON 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. Is wire of thermistor correctly connected by viewing? 2. Check to ensure the 7-segment indication of Td when comp. is operating. Td: Temperature of THM9		
2	Is thermistor THM9 disconnected?	1. Check to ensure that thermistor on the top of comp. is correctly mounted by viewing? 2. Check to ensure that actually measured temp. is the same as the indication during check mode.		
3	Is current sensor faulty?	1. Check to ensure that indication A1 and A2 are 0 during compressor stopping. 2. Check to ensure that indication A1 and A2 are not 0 during compressor running.		
4	Is current sensing part on PCB2 faulty?			
5	Is the direction of current sensor CTU, CTV) reverse?	Check the direction => by viewing.		
6	Are power source wires, U and V inserted correctly into current sensor? .	Check to ensure that wires are correctly inserted		
7	Is exp. valve (MV1) correctly connected?	Check to ensure that MV1 to CN5A is correctly connected		
8	Is exp. valve coil (MV1) correctly connected?	Check to ensure that each coil is correctly mounted on the valve.		
9	Are the refrigeration cycle and electrical wiring system incorrectly connected?	Check to ensure that refrigerant is flowing into indoor units by operating one refrigerating cycle only from the outdoor unit.		
10	Is opening of exp. valve completely closed (locked)?	Check the following by the check mode of outdoor units. 1. Liquid Pipe Temp. (TL) < Air Intake Temp. (Ti) during Cooling Operation 2. Liquid Pipe Temp. (TL) > Air Intake Temp. (Ti) during Heating Operation		
11	Is opening of exp. valve fully opened locked)?	Check to ensure that liquid pipe temp. is lower than air intake temp. of stopping indoor unit when other indoor units are operating under cooling operation.		
12	Are the contacts for comp. magnetic switch CMC1 faulty?	Check the surface of each contact (L1, L2 and L3) by viewing.		
13	Is there any voltage abnormality among L1-L2, L2-L3 and L3-L1?	Check to ensure that voltage imbalance is smaller than 3%. Please note that power source voltage must be within 380V or 220V+10%.		
14	Is the comp. oil acidified during compressor motor burning?	Check to ensure that the oil color is not black.		

Additional Information for "CHECK LIST ON COMPRESSOR"

Check item	Additional information (mechanism of the compressor failure)
1 & 2	The liquid refrigerant return volume to the compressor is controlled by the discharge gas temperature Td when compressor is operating. If Td thermistor is disconnected, the liquid refrigerant return volume will become small by detecting the temperature even if the actual discharge gas temperature is high. Therefore, this abnormal overheating by detecting the temperature operation will result in insulation failure of the motor winding.
3 & 4	Overcurrent control (operating frequency control) is performed by detecting current by the PCB2. In this case, winding insulation failure will occur, since control is not available in spite of actually high current.
5 & 6	The current sensor checks phase and adjusts output electrical wave in addition to the above mentioned items. If fault occurs, the output electrical wave becomes unstable giving stress to the motor winding, resulting in winding insulation failure.
7 &8	During a cooling operation, SH is controlled by MV of each indoor units. During a heating operation, Td is controlled by MV1. If expansion valves are incorrectly connected, correct control is not available, resulting in compressor seizure depending on liquid refrigerant returning conditions or motor winding insulation failure depending on overheating conditions.
9	If the refrigeration cycle and electrical system are incorrectly connected, abnormally low suction pressure operation is maintained or abnormally high discharge pressure operation is maintained, resulting in giving stress to the compressor, since their correct control is not available.
10	ditto
11	The compressor may be locked due to the liquid return operation during the cooling operation.
12	In the case that the contacting resistance becomes big, voltage imbalance among each phase will cause abnormal overcurrent.
13	In this case, overcurrent will occur, efficiency will decrease or the motor winding will be excessively heated.
14	In the case, it will result in motor burning or compressor seizure.

9. Spare parts

Contents

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RCIM-2.0FSN ____ 9-3
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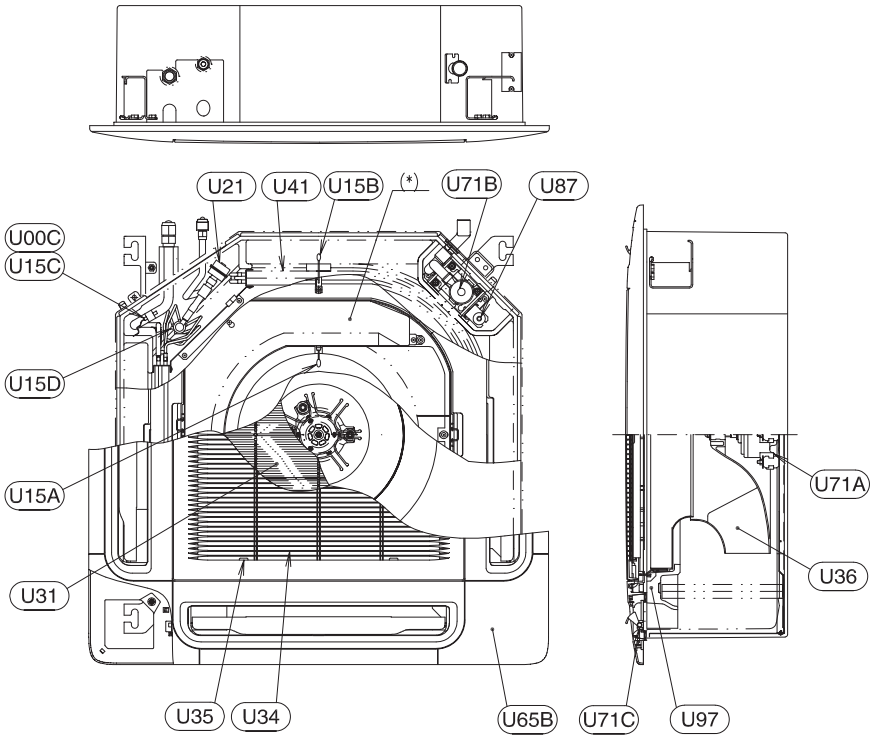
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WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

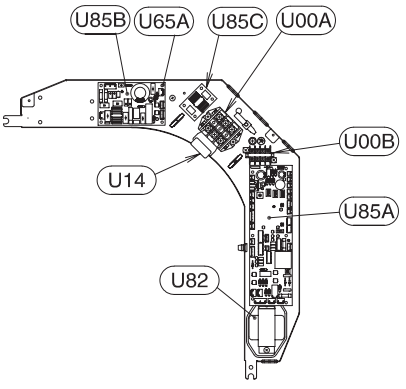
9.1. Indoor Units

System Free - FSN(1)(E/M)

RCI-2.0~6.0FSN1E



(*) Electrical Parts

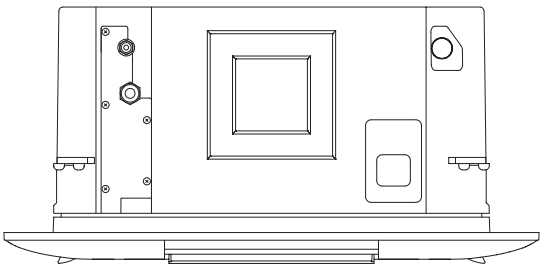


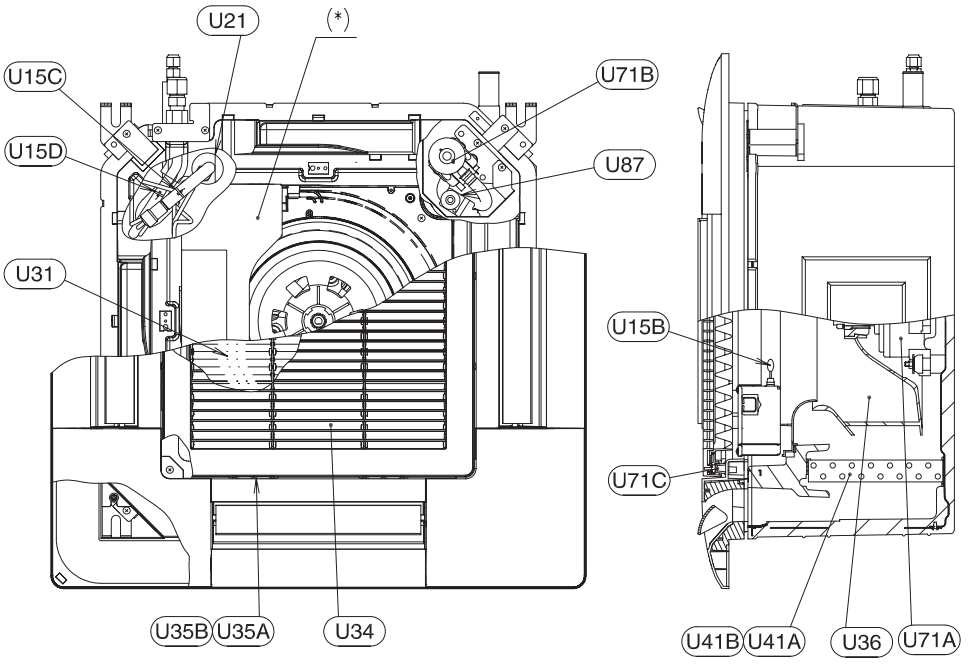
Drawing Number: EPN0465

NO.	PART NAME	REMARKS
U00A	Terminal Board	
U00B	Terminal Board	
U00C	P-Spring	Gas
U14	Condenser Assy	
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Gas pipe
U15D	Thermistor	Llquid pipe
U21	Expansion Valve	
U31	Air Filter	
U34	Air Grille	
U35	Grille Knob	
U36	Turbo Fan	Fan runner
U41	Heat Exchanger	Assy
U65A	Spacer	
U65B	CP Cover	
U71A	Fan Motor	
U71B	Drain Pump	
U71C	AS Motor	Assy
U82	Transformer	
U85A	PI024 EX	PCB
U85B	PI012 Assy	PCB
U85C	PI979 Assy	PCB
U87	Float Switch	
U97	Drain Pan	Assy

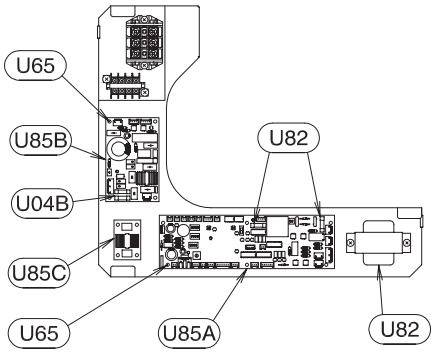
WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RCIM-2.0FSN





(*) Electrical Parts

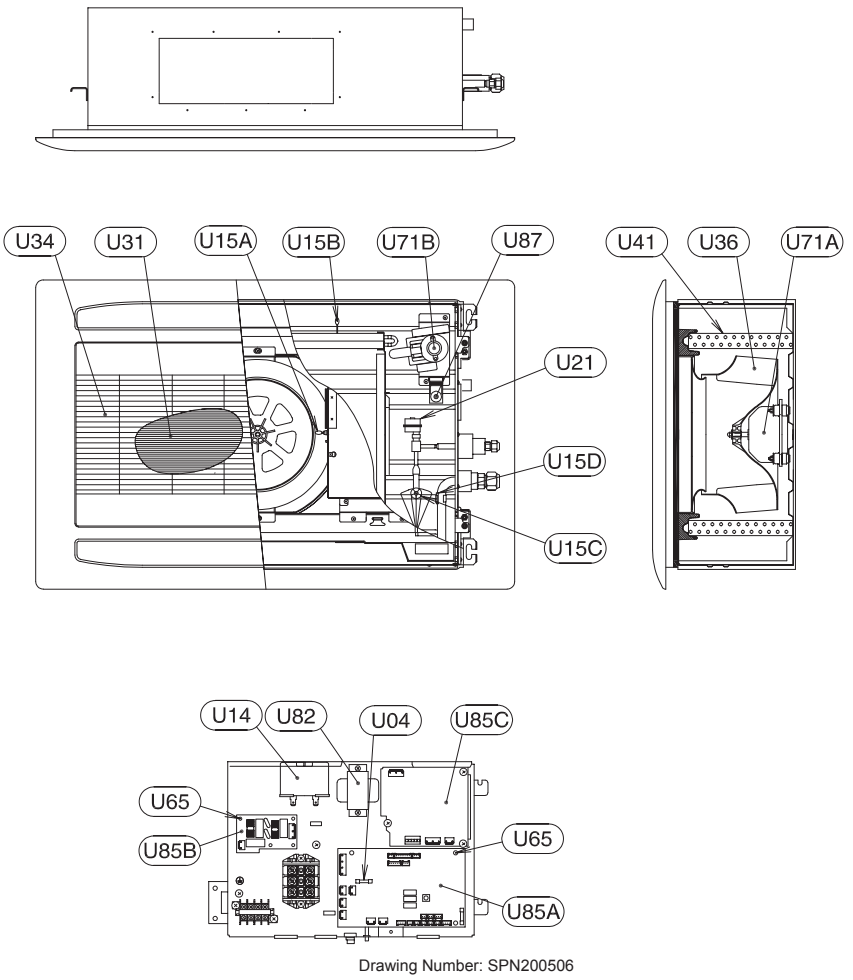


Drawing Number: SPN20051

NO.	PART NAME	REMARKS
U04A	Fuse	0.5A For Control Circuit
U04B	Fuse	5A For Power Source
U15A	Thermistor	THM1 Air Inlet
U15B	Thermistor	THM2 Air Outlet
U15C	Thermistor	THM3 Freeze Protection
U15D	Thermistor	THM5 Gas
U21	Expansion Valve	
U31	Air Filter	For Air Panel P-N23WAM
U34	Air Grille	For Air Panel P-N23WAM
U35A	Knob	For Air Panel P-N23WAM
U35B	Knob	For Air Panel P-N23WAM
U36	Runner	
U41A/B	Heat Exchanger	Assembly
U65	Spacer	For PCB
U71A	Fan Motor	52W
U71B	Fan Motor	Discharge Mechanism
U71C	AS Motor	For Air Panel P-N23WAM
U82	Transformer	
U85A	Printed Circuit Board	Main
U85B	Printed Circuit Board	Power Supply
U85B	Printed Circuit Board	Noise Protection
U87	Float Switch	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RCD-2.0~3.0FSN

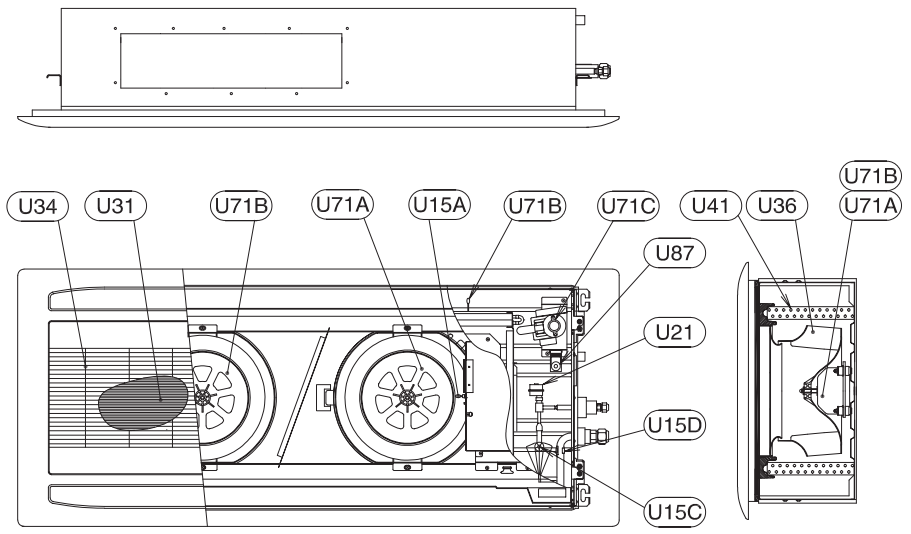


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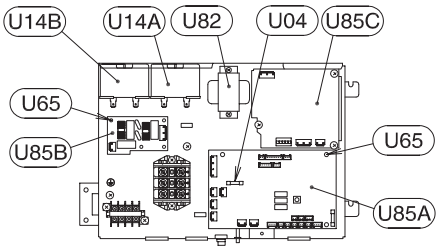
NO.	PART NAME	REMAKS
U04	Fuse	5A for control circuit
U14	Capacitor	4/5 mF 440vac
U15A	Thermistor	Thm1 air inlet
U15B	Thermistor	Thm2 air outlet
U15C	Thermistor	Thm3 freeze protection
U15D	Thermistor	Thm5 gas
U21	Exp. valve	
U31	Air filter	For P-G23DWA1
U34	Air grille	(With air filter)
U36	Fan runner	
U41	Heat exchanger	
U65	Spacer	
U71A	Motor	Fan motor 35W
U71B	Motor	Drian discharge mechanism
U71C	Motor	Swing Motor Assy for P-G23DWA1
U82	Transformer	
U85A	Printed circuit board	Main PCB
U85B	Printed circuit board	Noise protection
U85C	Printed circuit board	Modulation
U87	Float SW	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RCD-4.0~5.0FSN



(*) Electrical Parts

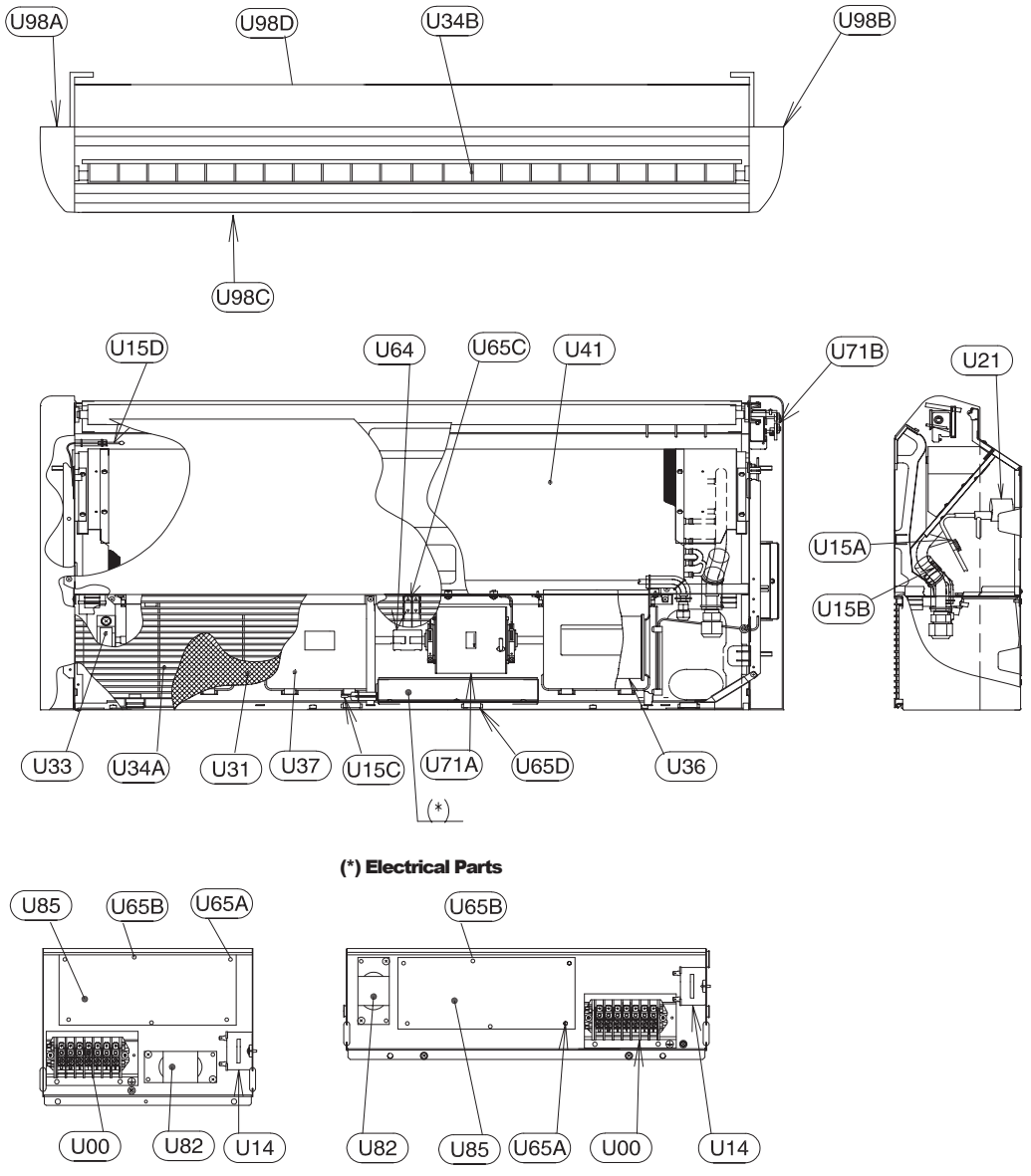


Drawing Number: SPN2005

NO.	PART NAME	REMARKS
U04	Fuse	5A for control circuit
U14A	Capacitor	4mF 440vac
U14B	Capacitor	5mF 440vac
U15A	Thermistor	Thm1 air inlet
U15B	Thermistor	Thm2 air outlet
U15C	Thermistor	Thm3 freeze protection
U15D	Thermistor	Thm5 gas
U21	Exp. valve	
U31	Air filter	For P-G46DWA1
U34	Air grille	For P-G46DWA1 (with air filter)
U36	Fan runner	
U41	Heat exchanger	
U65	Plastic material	
U71A	Motor	55W electrical box side
U71B	Motor	55W the other side
U71C	Motor	Drain discharge mechanism
U71D	Motor	P-G46DWA1 swing motor assy
U82	Transformer	
U85A	Printed circuit board	Main PCB
U85B	Printed circuit board	Noise protection
U85C	Printed circuit board	Pulse width modulation
U87	Float SW	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPC-2.0~6.0FSNE



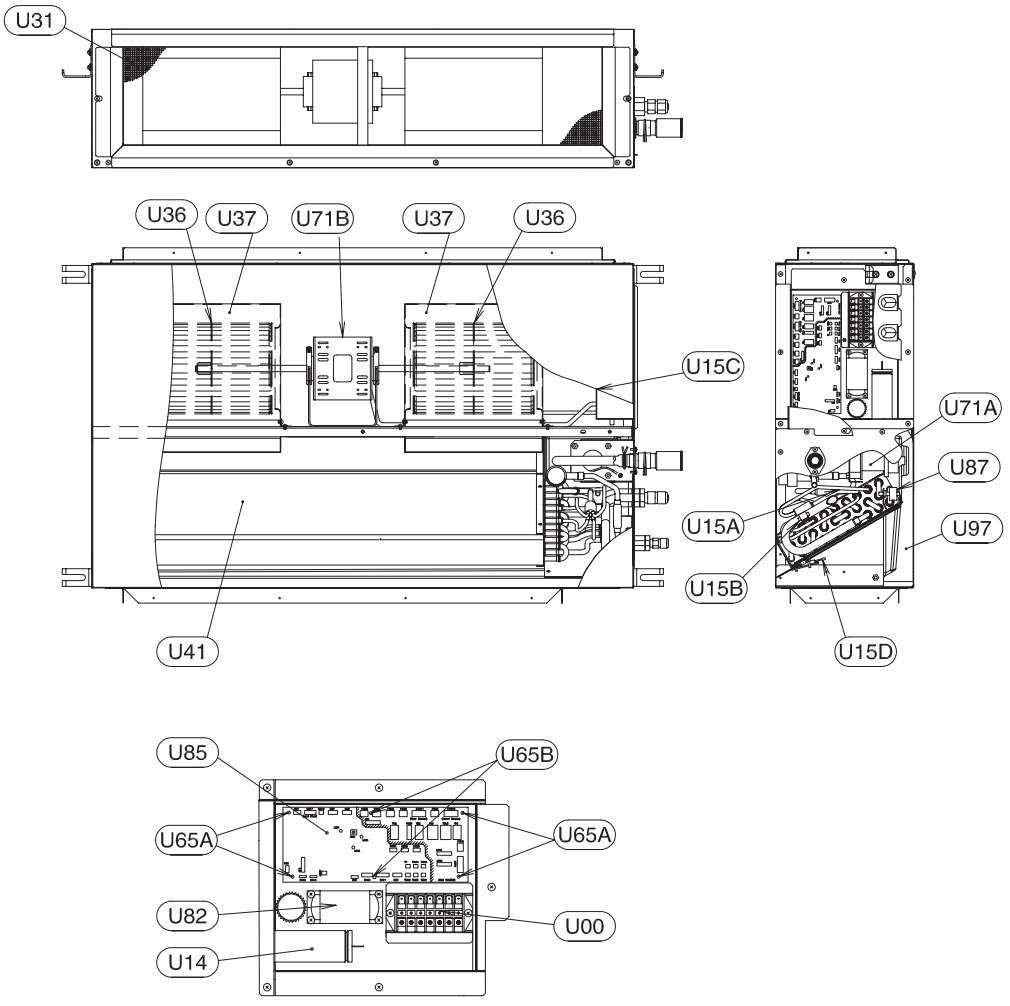
Drawing Number: EPN0454B

NO.	PART NAME	REMARKS
U00	Terminal Board	
U02	Remote Control SW	PC-P1HE (OPTIONAL)
U14	Capacitor	3μF/ 4μF/ 5μF/ 6μF/
U15A	Thermistor	Liquid pipe (Freeze Protection)
U15B	Thermistor	Gas Pipe
U15C	Thermistor	Air Inlet
U15D	Thermistor	Air Outlet
U21	Expansion Valve	
U31	Air Filter	
U33	Bearing	
U34A	Air Intake Grille	Air inlet
U34B	Grille Assy. C	Air Outlet
U36	Runner	
U37	Fan Casing	

NO.	PART NAME	REMARKS
U41	Heat Exchanger	Assembly
U64	Coupling	
U65A	Spacer	
U65B	Push Spacer	
U65C	Grille Knob	
U65D	Grille Support	
U71A	Fan Motor	
U71B	AS Motor	
U82	Transformer	
U85	Printed Circuit Board	
U98A	Side Cover L	Left Side
U98B	Side Cover R	Right Side
U98C	Lower Cover Assy	Lower Side
U98D	Upper Front cover	Assembly

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPI-2.0~6.0FSN1E



Drawing Number: EPN0605A-1B

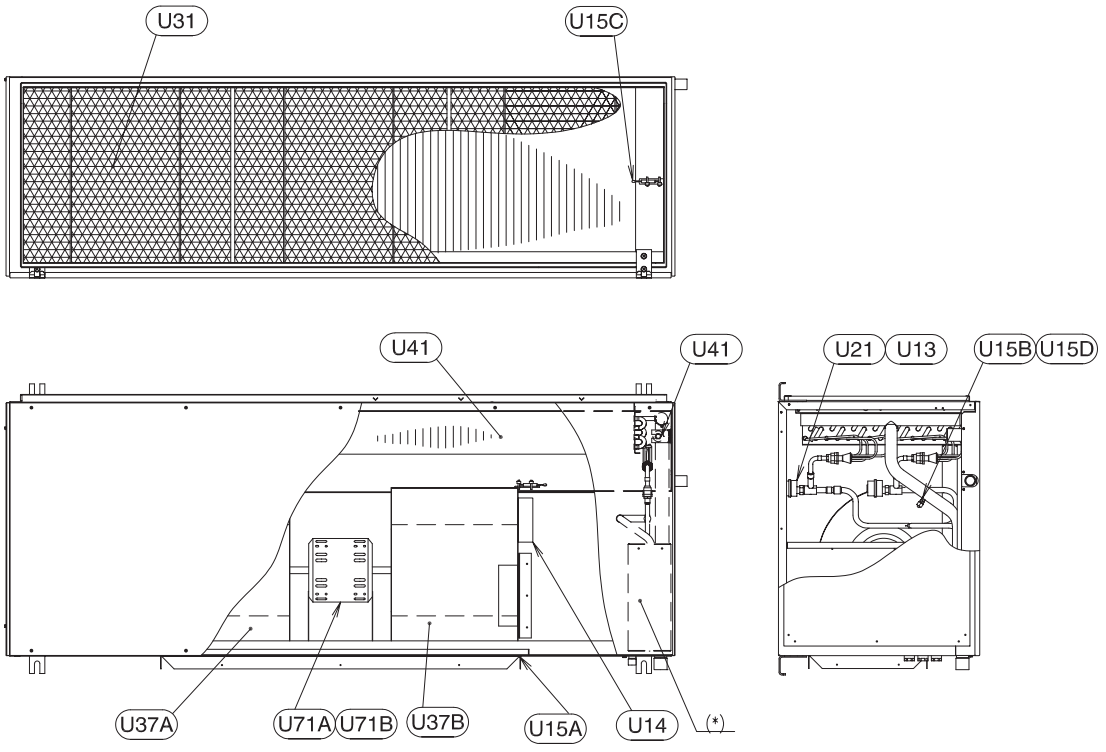
NO.	PART NAME	REMARKS
U00	Terminal Board	
U02	Remote Control SW	PC-P1HE (Optional)
U14	Capacitor	2.5μF, 8.0μF, 5.0μF, 3.15μF, 6.3μF
U15A	Thermistor	For liquid Pipe
U15B	Thermistor	For Gas Pipe
U15C	Thermistor	For Inlet Air
U15D	Thermistor	For Outlet Air
U31	Filter	
U36	Runner	
U37	Fan Casing	

NO.	PART NAME	REMARKS
U41	Heat Exchanger	Assembly
U65A	Spacer	For PCB Fixing
U65B	Push Spacer	For PCB Fixing
U71A	Drain Pump	
U71B	Fan Motor	
U82	Transformer	
U85	Printed Circuit Board	
U87	Float Switch	
U97	Drain Pan	Assembly

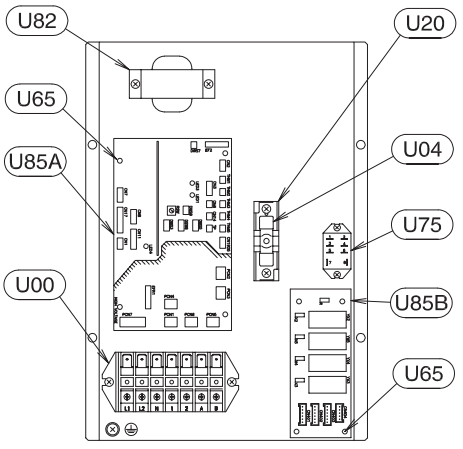
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WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPI-8.0~10.0FSNE



(*) Electrical Parts

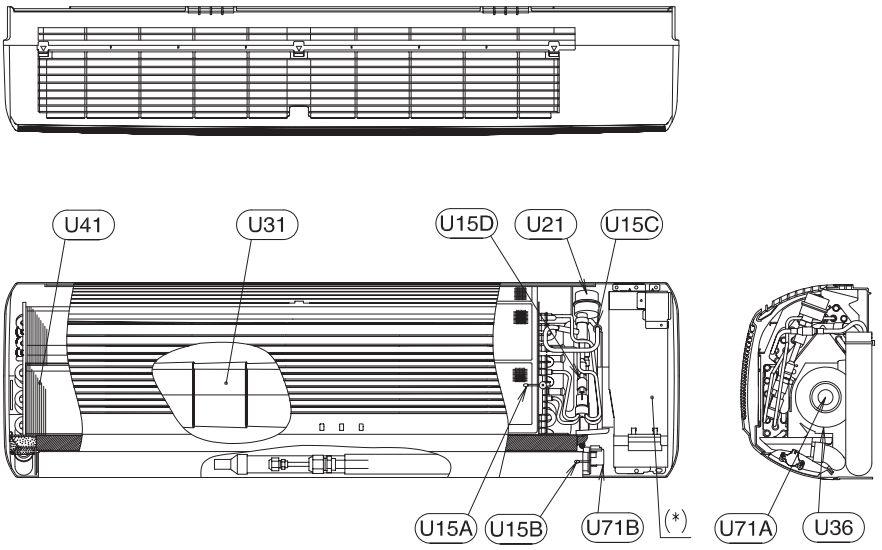


Drawing Number: EPN0523A

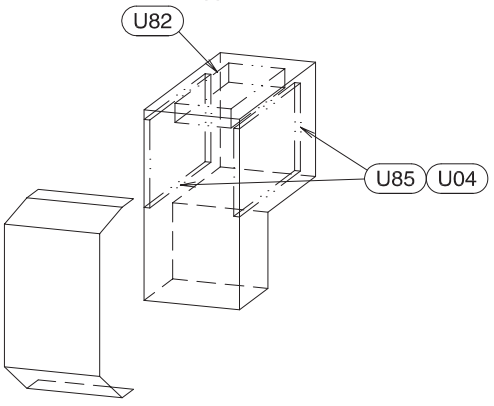
NO.	PART NAME	REMARKS
U00	Terminal Board	
U04	Fuse	10A
U13	Exp. Valve Cord	
U14	Capacitor	18µF / 25µF
U15A	Thermistor	Air Outlet
U15B	Thermistor	Liquid Pipe
U15C	Thermistor	Air Inlet
U15D	Thermistor	Gas Pipe
U20	Fuse Holder	
U21	Exp. Valve	
U31	Air Filter	
U37A	Fan Casing Assy L	Left Side Runner & Casing (only)
U37B	Fan Casing Assy R	Right Side Runner & Casing (only)
U41	Heat Exchanger	Assembly
U65A	Spacer	For fixing the PCB
U71A	Fan Motor Assy.	Fan Unit Assy
U71B	Fan Motor	Fan Motor (only)
U75	Power Relay	
U82	Transformer	
U85A	PI025 Assy.	
U85B	Relay PCB PI005	
U87	Float Switch	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPK-2.0FSNM



(*) Electrical Parts

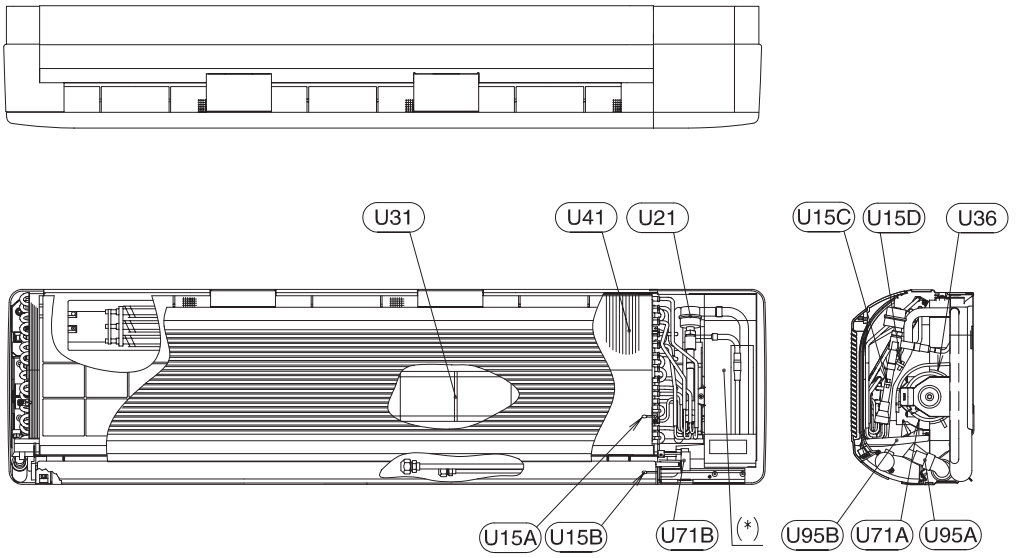


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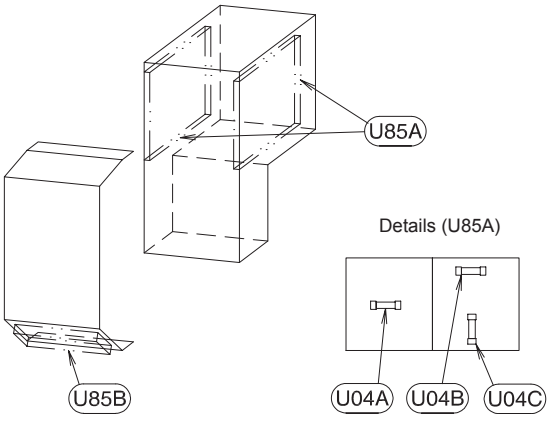
NO.	PART NAME	REMARKS
U04	Fuse	5A (For Control Circuit)
U15A	Thermistor	Air Inlet
U15B	Thermistor	Air Outlet
U15C	Thermistor	Freeze Protection
U15D	Thermistor	Gas
U21	Exp.Valve	
U31	Air Filter	
U36	Fan Runner	
U41	Heat Exchanger	Assembly
U71A	Fan Motor	DC30V, 20W
U71B	As Motor	For Auto Swing Louver
U82	Transformer	
U85	Printed Circuit Board	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPK-2.5~4.0FSNM



(*) Electrical Parts

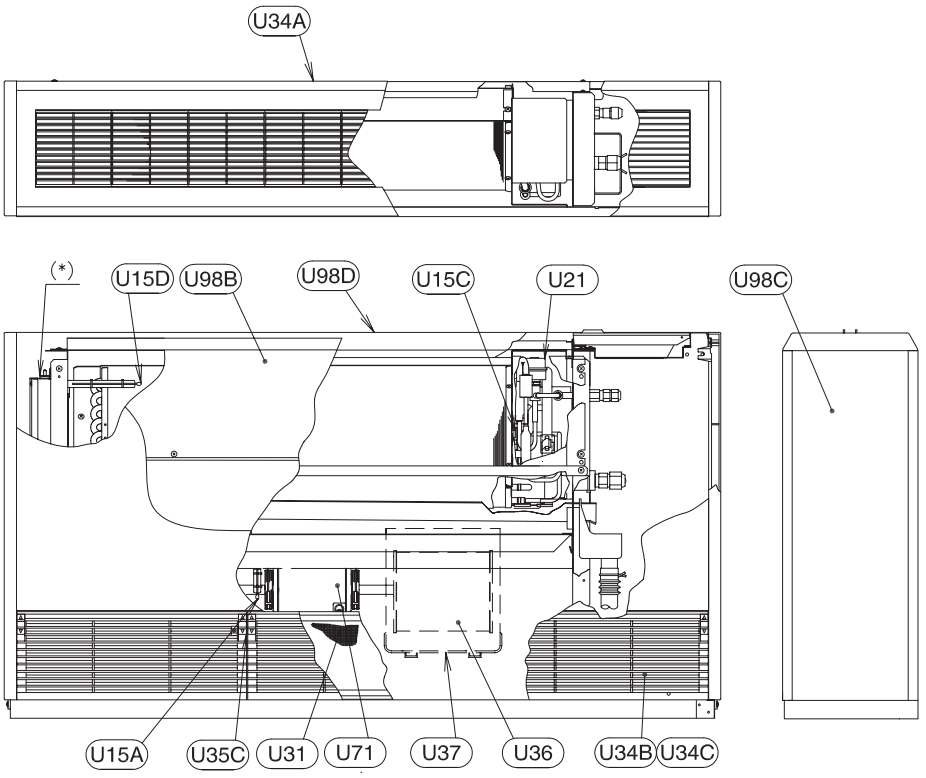


Drawing Number: SPN20051

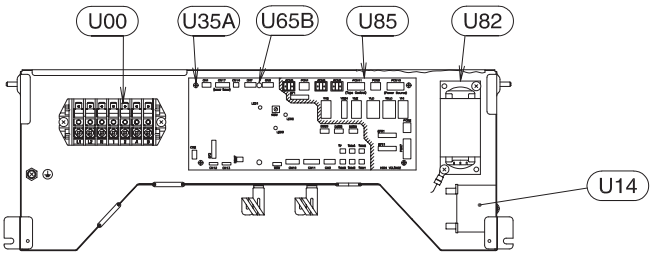
NO.	PART NAME	REMARKS
U04A	Fuse	5A (For Control Circuit)
U04B	Fuse	6A (For Fan Motor)
U04C	Fuse	0,5A (For Control Circuit)
U15A	Thermistor	Air Inlet
U15B	Thermistor	Air Outlet
U15C	Thermistor	Freeze Protection
U15D	Thermistor	Gas
U21	Exp.Valve	
U31	Air Filter	
U36	Fan Runner	
U41	Heat Exchanger	Assembly
U71A	Fan Motor	40/41W
U71B	As Motor	For Auto Swing Louver
U85A	Printed Circuit Board	
U85B	Printed Circuit Board	For Wireless receiver
U95A	Drain Hose	
U95B	Drain Pan	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPF-2.0~2.5FSNE



(*) Electrical Parts



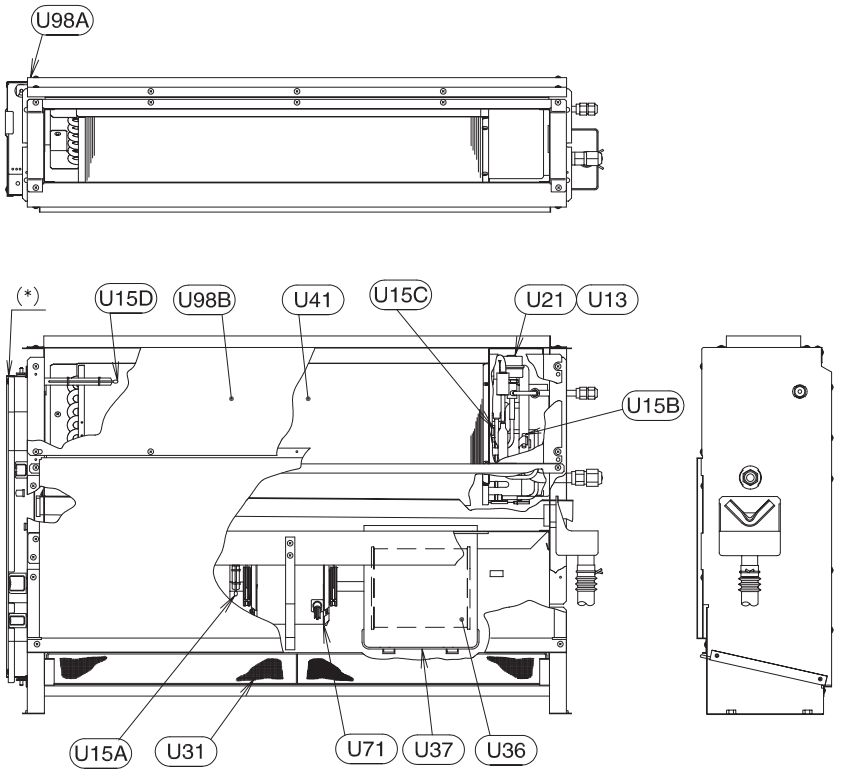
Drawing Number: EPN0457B-1B

NO.	PART NAME	REMARKS
U00	Terminal board	
U12	Exp. Valve Cord	
U13	Exp. Valve Cord	
U14	Capacitor	2μF / 4μF
U15A	Thermistor	Inlet
U15B	Thermistor	Gas
U15C	Thermistor	Liquid
U15D	Thermistor	Outlet
U21	Expansion Valve	
U31	Air Filter	
U34A	D Grille	Air Outlet
U34B	Air Inlet Grille	Air Inlet
U34C	Air Inlet Grille	Air Inlet
U36	Runner	

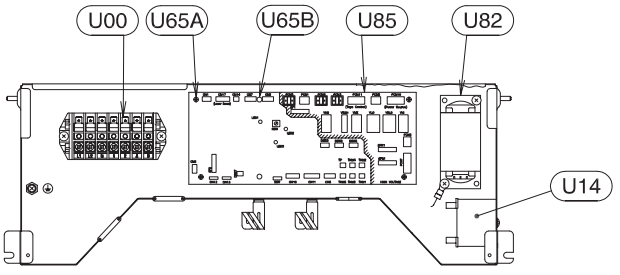
NO.	PART NAME	REMARKS
U37	Fan Casing	
U41	Heat Exchanger	Assembly
U65A	Spacer	For fixing PCB
U65B	Push Spacer	For fixing PCB
U65C	Grille Knob	
U71	Fan Motor	
U82	Transformer	
U85	Printed Circuit Board	
U98A	Back Cover	Assembly
U98B	Front Cover	Assembly
U98C	Side Cover	Assembly
U98D	Upper Cover	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

RPFI-2.0~2.5FSNE



(*) Electrical Parts



Drawing Number: EPN0457B-2B

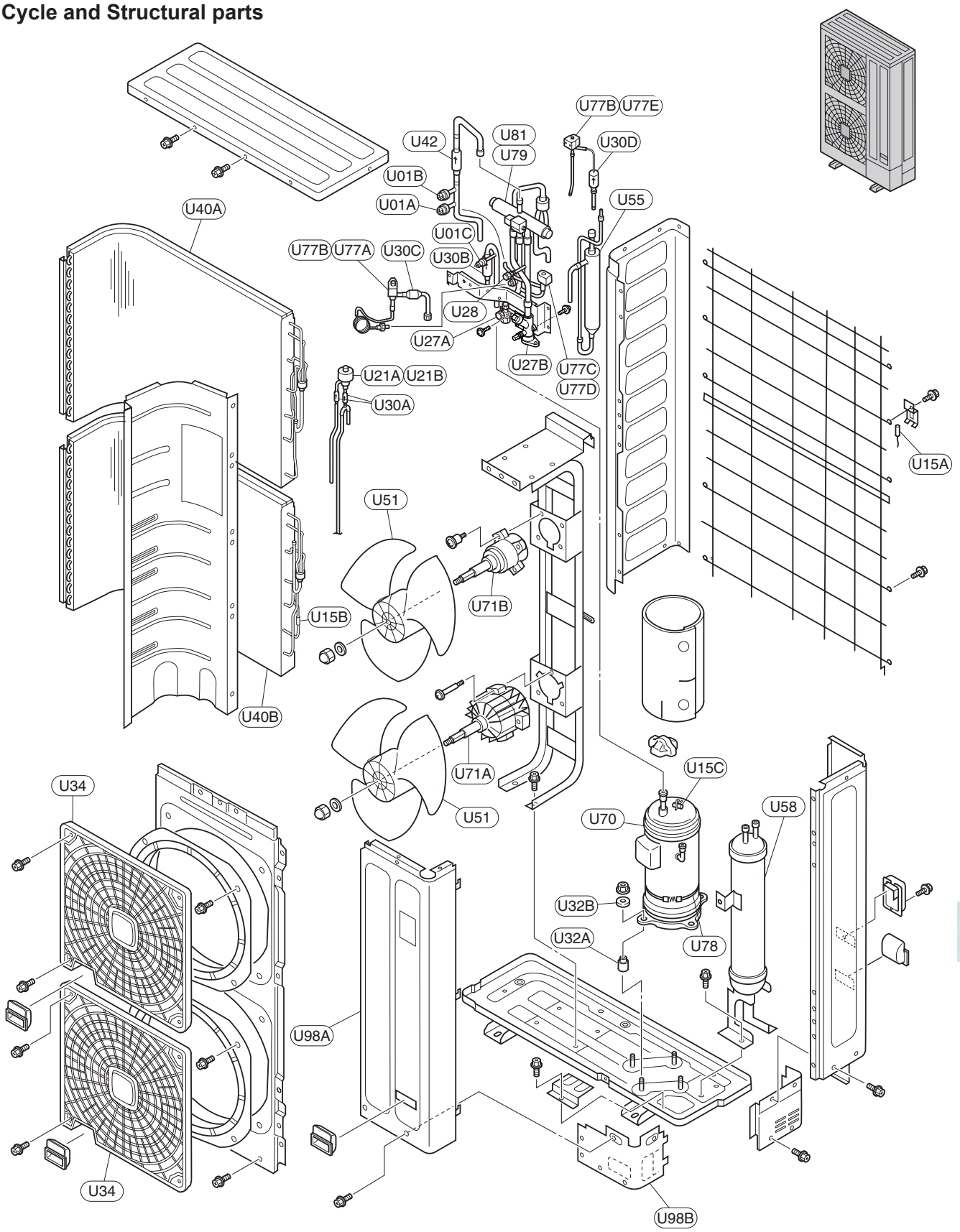
NO.	PART NAME	REMARKS
U00	Terminal board	
U12	Exp. Valve Cord	
U13	Exp. Valve Cord	
U14	Capacitor	2μF / 4μF
U15A	Thermistor	Inlet
U15B	Thermistor	Gas
U15C	Thermistor	Liquid
U15D	Thermistor	Outlet
U21	Expansion Valve	
U31	Air Filter	
U36	Runner	
U37	Fan Casing	
U41	Heat Exchanger	Assembly
U65A	Spacer	For fixing PCB
U65B	Push Spacer	For fixing PCB
U71	Fan Motor	
U82	Transformer	
U85	Printed Circuit Board	
U98A	Back Cover	Assembly

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

9.2. Outdoor Units

RAS-8/10/12HRNM

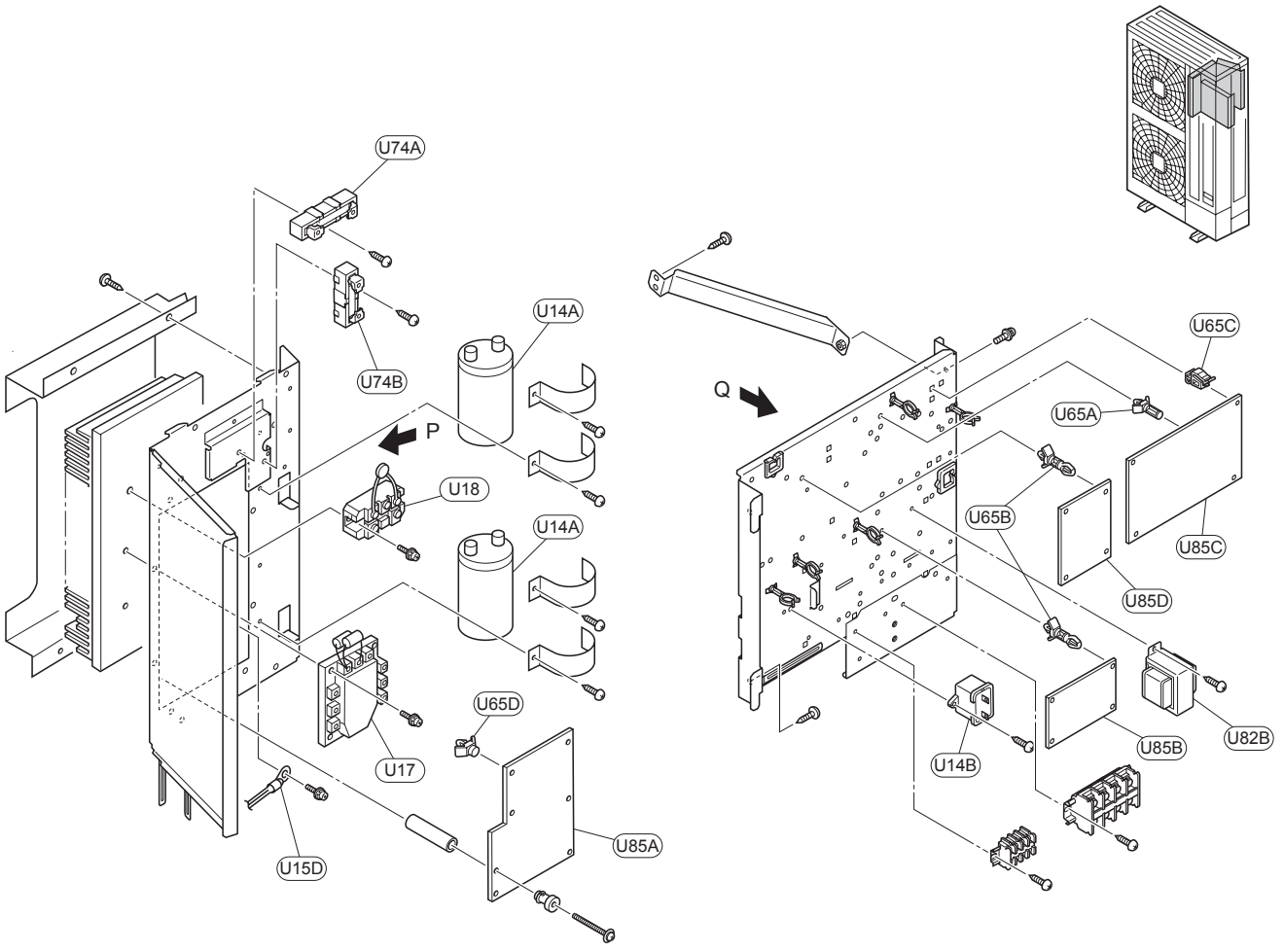
■ Cycle and Structural parts



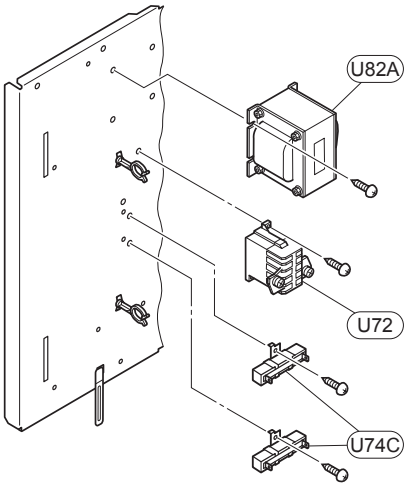
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WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

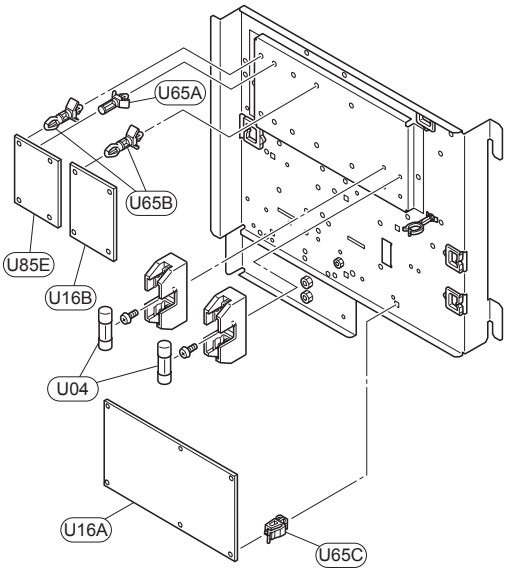
■ Electrical parts



View from P



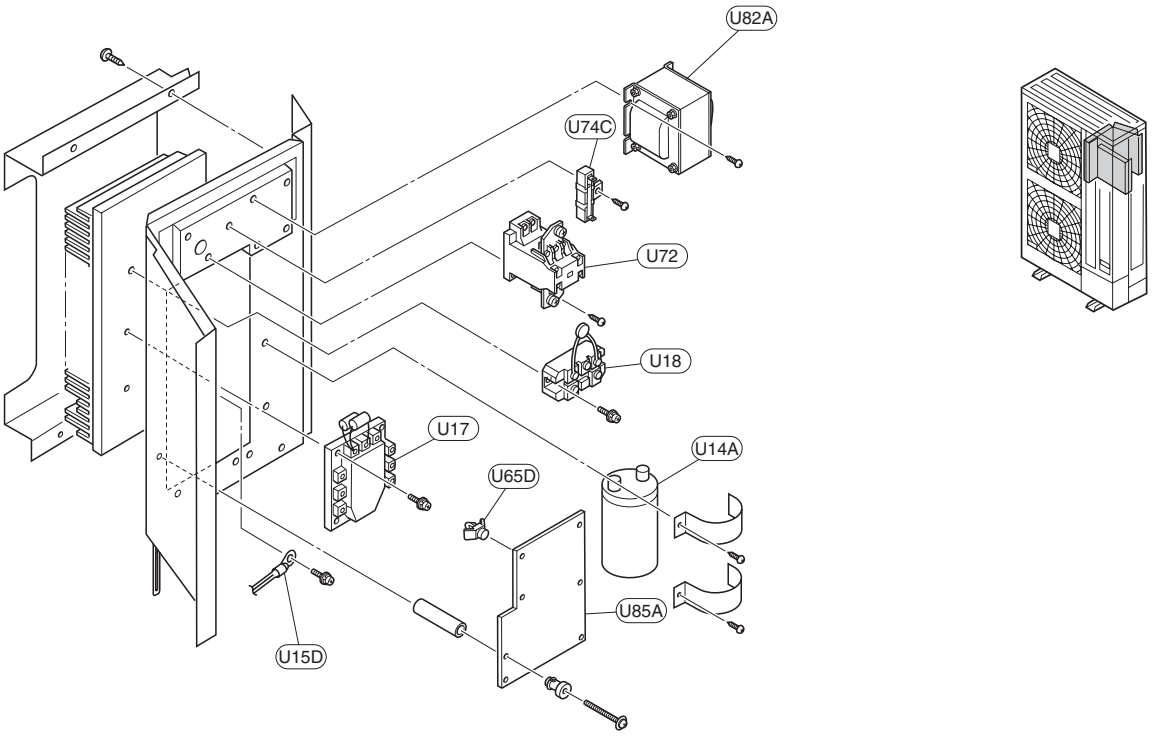
View from Q

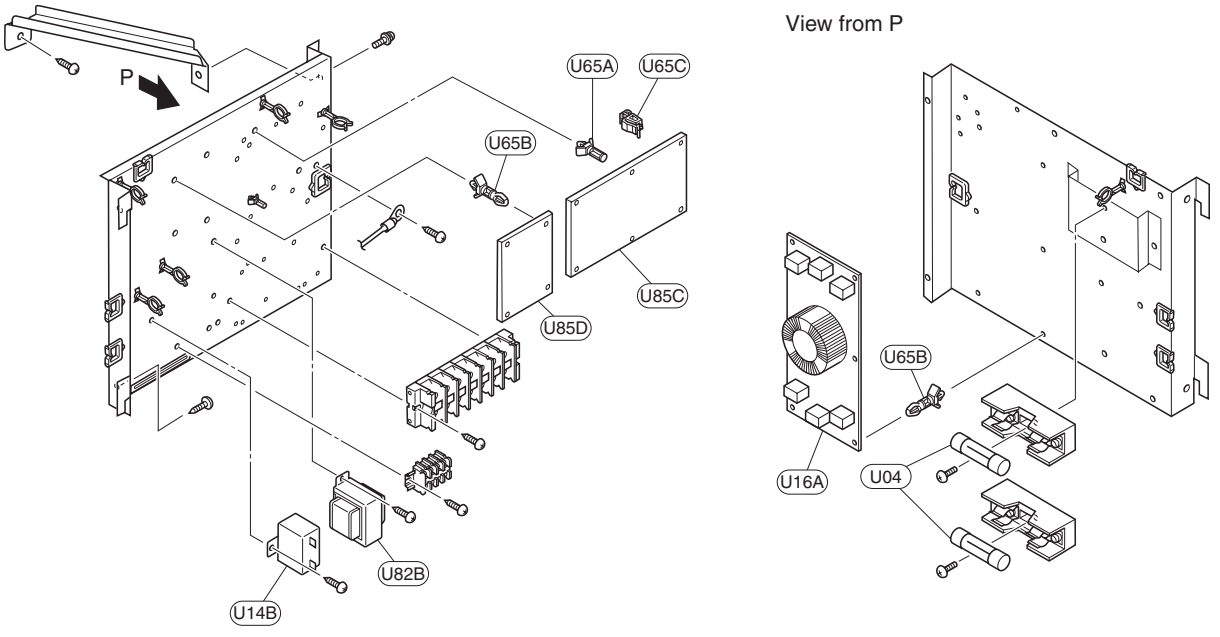


Drawing Number:
SPN200617
(RAS-8~12HRNM)

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

■ Electrical parts (cont)





Drawing Number:
SPN200617
(RAS-8~12HRNM)

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

■ Parts list

No.	Part Name	Remarks
U01A	Pressure Sw	High Pressure
U01B	Pressure Sw	For Control
U01C	Pressure Sw	Low Pressure
U04	Fuse	40A - 60A
U14A	Capacitor	4700μF
U14B	Capacitor	7μF
U15A	Thermistor	
U15B	Thermistor	
U15C	Thermistor	
U15D	Thermistor	
U16A	Noise Filter	
U16B	Noise Filter	
U17	Transistor Module	
U18	Diode Module	
U21A	Exp. Valve Coil For	
U21B	Exp. Valve	
U27A	Stop Valve	
U27B	Stop Valve	
U28	Check Joint	
U30A	Strainer	
U30B	Strainer	
U30C	Strainer	
U30D	Strainer	
U32A	Vibration Absorber	
U32B	Vibration Absorber	
U34	Air Grille	Air Outlet
U40A	Condenser Assembly	
U40B	Condenser Assembly	
U42	Check Valve	
U51	Propeller Fan	
U55	Oil Separator Ass'y	
U58	L-tank Ass'y	

No.	Part Name	Remarks
U65A	Plastic Material	
U65B	Plastic Material	
U65C	Plastic Material	
U65D	Plastic Material	
U70	Compressor	
U71A	Motor	
U71B	Motor	
U72	Mag. Contactor	
U74A	Resistor	
U74B	Resistor	
U74C	Resistor	
U77A	Solenoid Valve	
U77B	Solenoid Valve	
U77C	Solenoid Valve	
U77D	Solenoid Valve	
U77E	Solenoid Valve	
U78	Oil Heater	
U79	Four-way Valve Ass'y	
U81	Coil For 4-way Valve	
U82A	Reactor	
U82B	Transformer	
U85A	Printed Circuit Board	
U85A	Printed Circuit Board	For Inverter P
U85B	Printed Circuit Board	Fan Control
U85C	Printed Circuit Board	For Control
U85D	Printed Circuit Board	Fan Control
U85E	Printed Circuit Board	Phase Detection
U98A	Cabinet Panel	
U98B	Cabinet Panel	

WARNING *This Spare part list can be updated without previous notification. Check unit manufacturing serial number and consult with your Distributor for any update.*

10. Servicing

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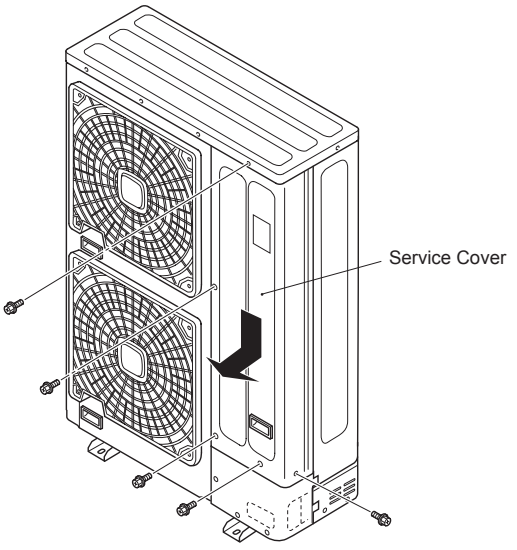
WARNING: *TURN OFF all the main switches*

10.1. OUTDOOR UNIT RAS-HRNM

■ REMOVING SERVICE COVER

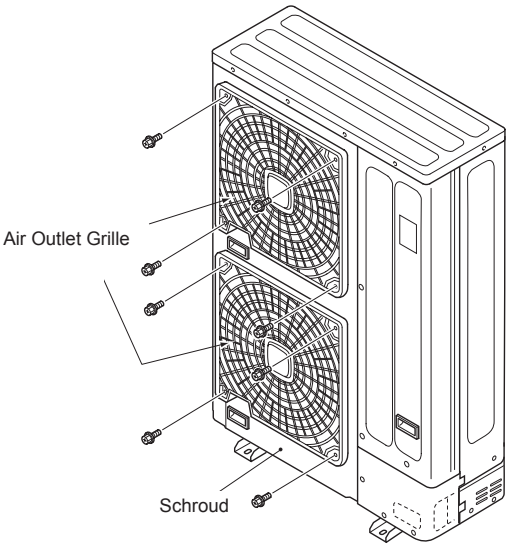
Remove the main parts according to the following procedures.
To reassemble perform the procedures in reverse.
To prevent contamination of the refrigerant with water or foreign particles, do not expose open to atmosphere for long periods.
If necessary, seal pipe ends using caps or tape.

1. Remove the five fixing screws, slide the service cover downward and remove.
2. Pay attention not to fall off the service cover.



■ REMOVING AIR OUTLET GRILLE

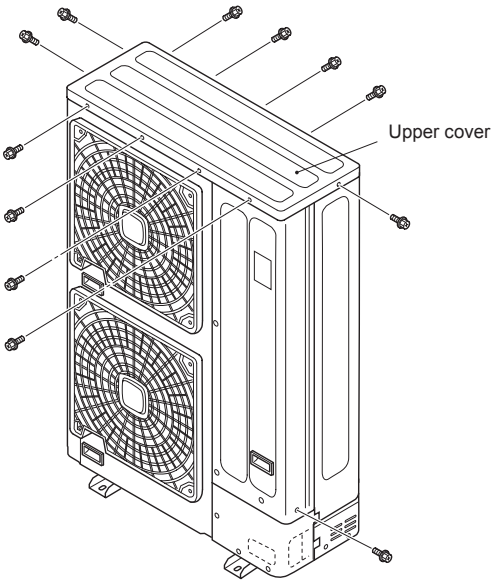
1. Remove the eight (8) fixing screws. Lift the air outlet grille holding the lower parts and unhook the extrusion of the air outlet grille from the shroud.



WARNING: *TURN OFF all the main switches*

■ REMOVING UPPER COVER

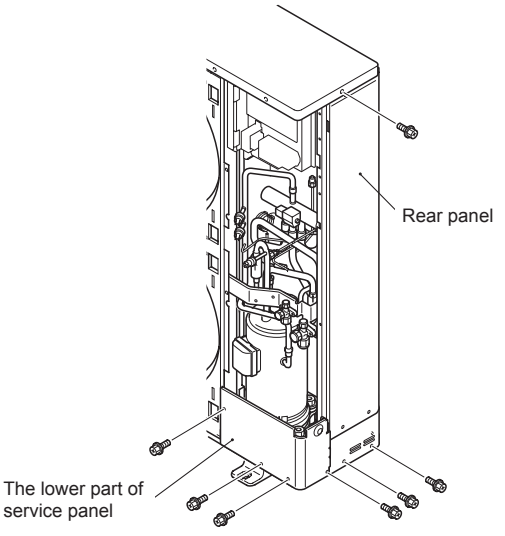
1. Remove eleven (11) screws fixing the upper cover and remove the upper cover upward.



■ REMOVING THE LOWER PART OF SERVICE PANEL AND REAR PANEL

1. Remove five (5) screws fixing the lower part of service panel and remove the lower part of service panel by pulling towards front side. Remove the upper cover according to the item → “Removing Upper Cover”.

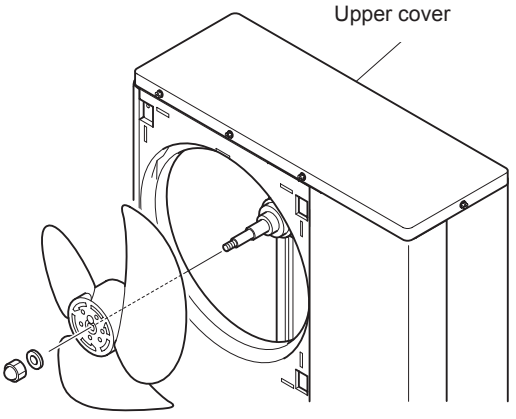
NOTE:
The screw length for fixing outdoor temperature thermistor is different with other screws.

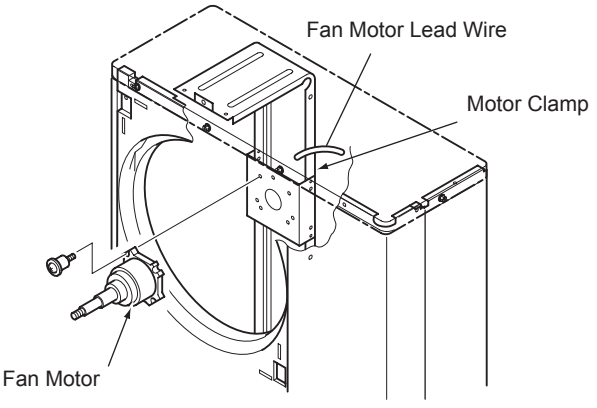


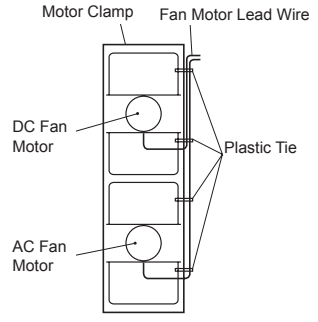
WARNING: *TURN OFF all the main switches*

■ REMOVING OUTDOOR FAN MOTOR

1. Remove the service cover according to the item → "Removing Service Cover".
2. Remove the air outlet grille according to the item → "Removing Air Outlet Grille".
3. Remove the upper cover according to the item → "Removing Upper Cover".
4. Remove the propeller fan by removing the cap nuts and washers fixing the propeller fan onto the motor shaft. (If it is difficult to remove the fan, use puller.)
5. Remove the fan motor connector from the PCB3 and PCB5 at the electrical box.
   - Cut off the plastic tie fan motor lead wire fixing
   - Remove four (4) screws fixing the motor.



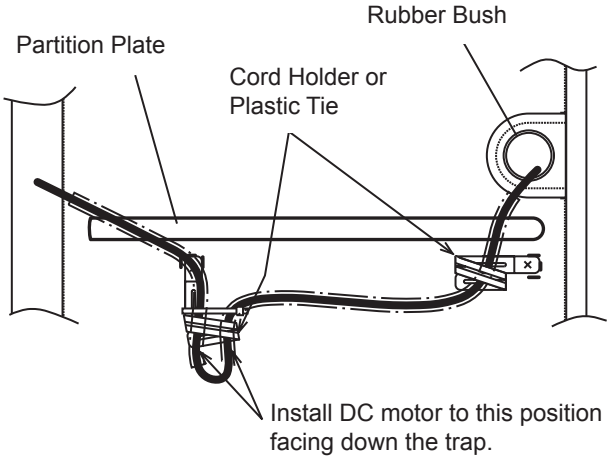


Power supply		**380V/60Hz 380-415V/50Hz**
Fan Motor Comp.No.	DC Fan Motor	PCB5 PCN203 (1, 3) CN201 (2, 3, 4)
	AC Fan Motor	PCB3 PCN404(White)
Screw for Motor Fixing	DC Fan Motor	M6 Screw with spacer x 4
	AC Fan Motor	M8 Screw x 4
Motor Clamp and Wiring Fixing Position		

WARNING: *TURN OFF all the main switches*

6. Fix the motor wire with the plastic tie or the cord clamp. If not, it may cause the disconnection to the fan.
7. Mount the rubber bush at the partition plate when inserting the motor wire through the partition plate.

   If not, it may cause the disconnection to the fan motor lead wire.



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.

3. Mounting Propeller Fan:

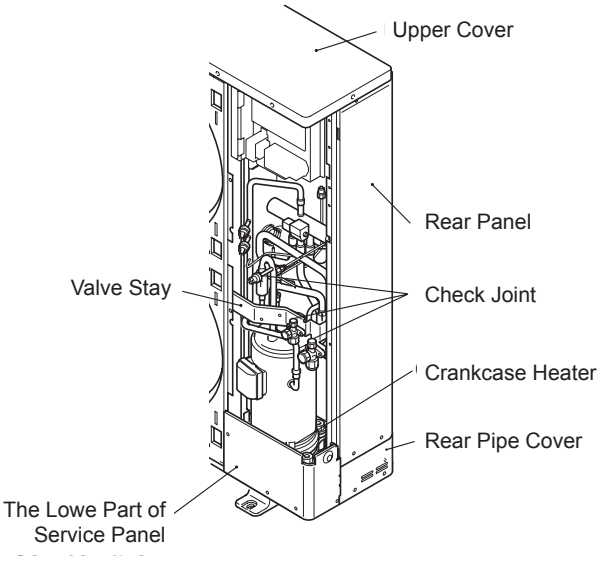
Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft, and fix the screw after exserting screw part of the shaft. (Tightening Torque of 20 N.m)

4. When connecting the motor wire, check to ensure that the colors of the connectors on the PCB3 and PCB5 are matched with wires.

5. Firmly fix the air outlet grille to the shroud.

■ REMOVING THE COMPRESSOR

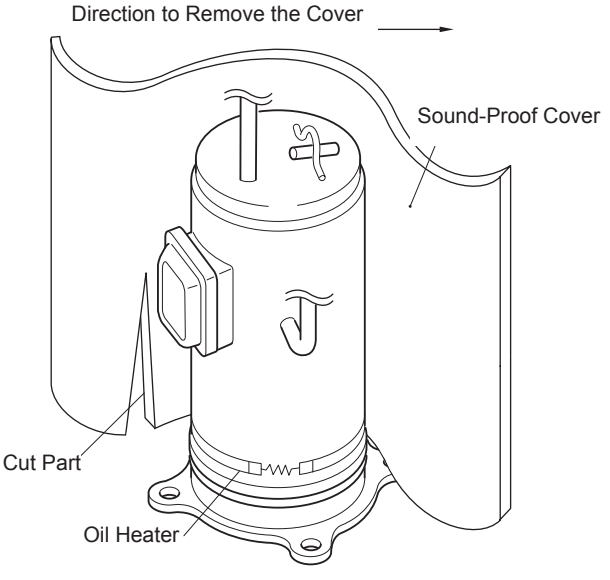
1. Remove the service cover and the lower part of the service panel according to the item → “Removing Service Cover” and the item → “Removing Lower Part of Service Panel and Rear Panel. In case that the outdoor unit is installed close to a wall closely, remove the outdoor unit from the wall.
2. Collect the refrigerant from the check joint. Collect the refrigerant from the liquid stop valve, gas stop valve and check joint at piping.
3. Open the soundproof cover wrapping around the compressor and remove the terminal box cover at the compressor by one (1) screw. Disconnect the compressor wires in the terminal box and remove the soundproof cover.



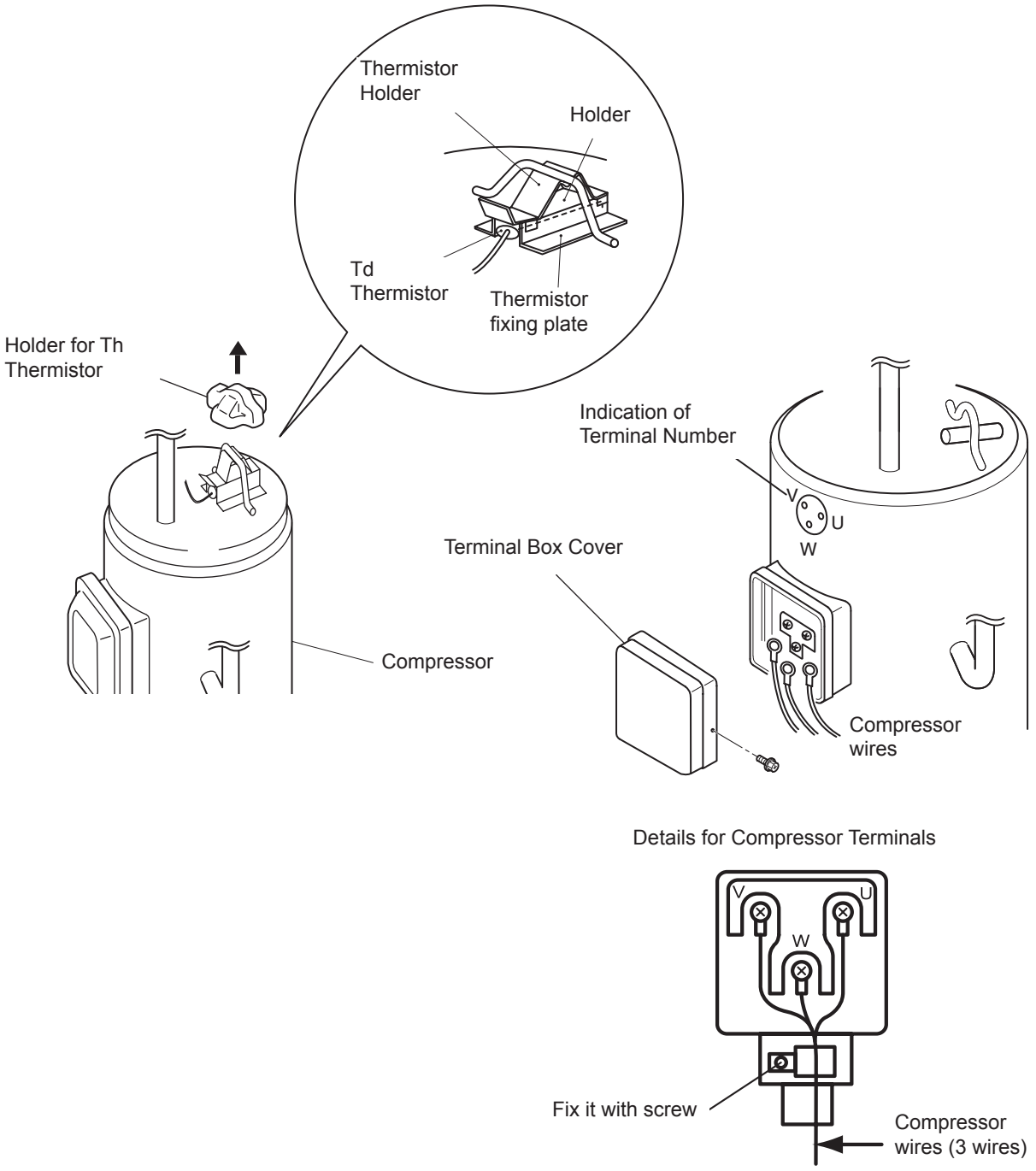
NOTE:

Check to ensure each terminal Nos. and indications. If wires are connected in incorrect order at reassembling, it will lead to compressor failure.

4. Remove the rubber cap and the thermistor on the top of the compressor.
5. Remove the crankcase heater.



WARNING: *TURN OFF all the main switches*



Details for Compressor Terminals

10

NOTES:

1. *All compressors are connected by brazing. Check to ensure whether there are flammable things around or not when using a burner for pipe connections, if not, oil existing pipe inside may ignite.*
2. *Do not expose the refrigerant cycle to the atmosphere for a long period in order to avoid mixing the water and foreign particles into the refrigerant cycle. After removing compressor, replace it quickly. If exposed for a long period, seal the suction pipe and discharge pipe.*
3. *Remove the cap for the compressor just before replacing the compressor. Before mounting the compressor, seal the suction pipe and discharge pipe with a tape to protect the compressor from foreign particles. Remove the tape at pipe connection.*

WARNING: *TURN OFF all the main switches*

6. Remove the suction pipe and discharge pipe from the compressor.

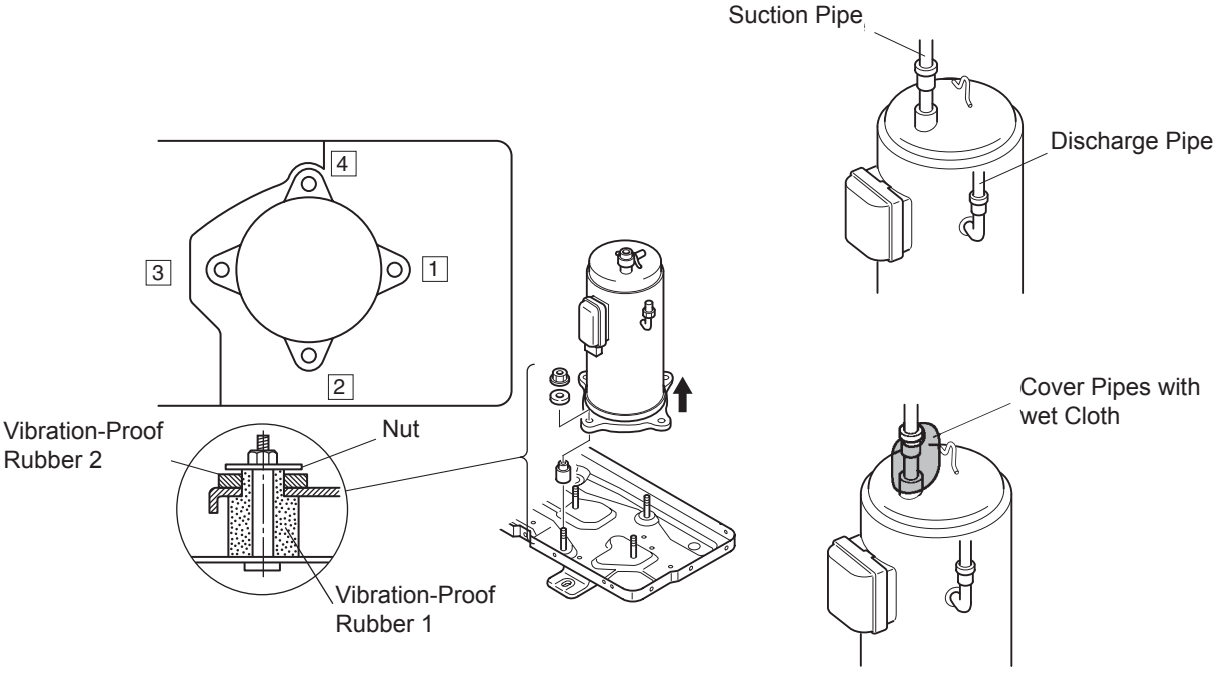
   Isolate the wires and electrical components to protect from the burner flame at brazing.

7. Remove two (2) nuts fixing the compressor and remove the compressor from the unit by lifting in the condition of slightly inclining forward.
8. When brazing the replaced compressor, quickly perform the brazing while the compressor side piping is cooled with wet cloth in order to avoid the brazing material from entering the compressor.

   If the brazing material enters the compressor, it will lead to compressor failure.

9. Reassemble the parts in the reverse order of removing procedures.
   a. Tighten the screws (U, V and W) for compressor wires with 2.5N.m.
   b. Fix the lead wire firmly.

NOTE:
Fix the lead wire for the compressor firmly not to contact with metal sheet edge and high temperature piping.



Compressor position	1	2	3	4
Vibration-Proof Rubber 1	○	○	○	○
Vibration-Proof Rubber 2	○	○	–	–
Nut	○	○	–	–

WARNING: *TURN OFF all the main switches*

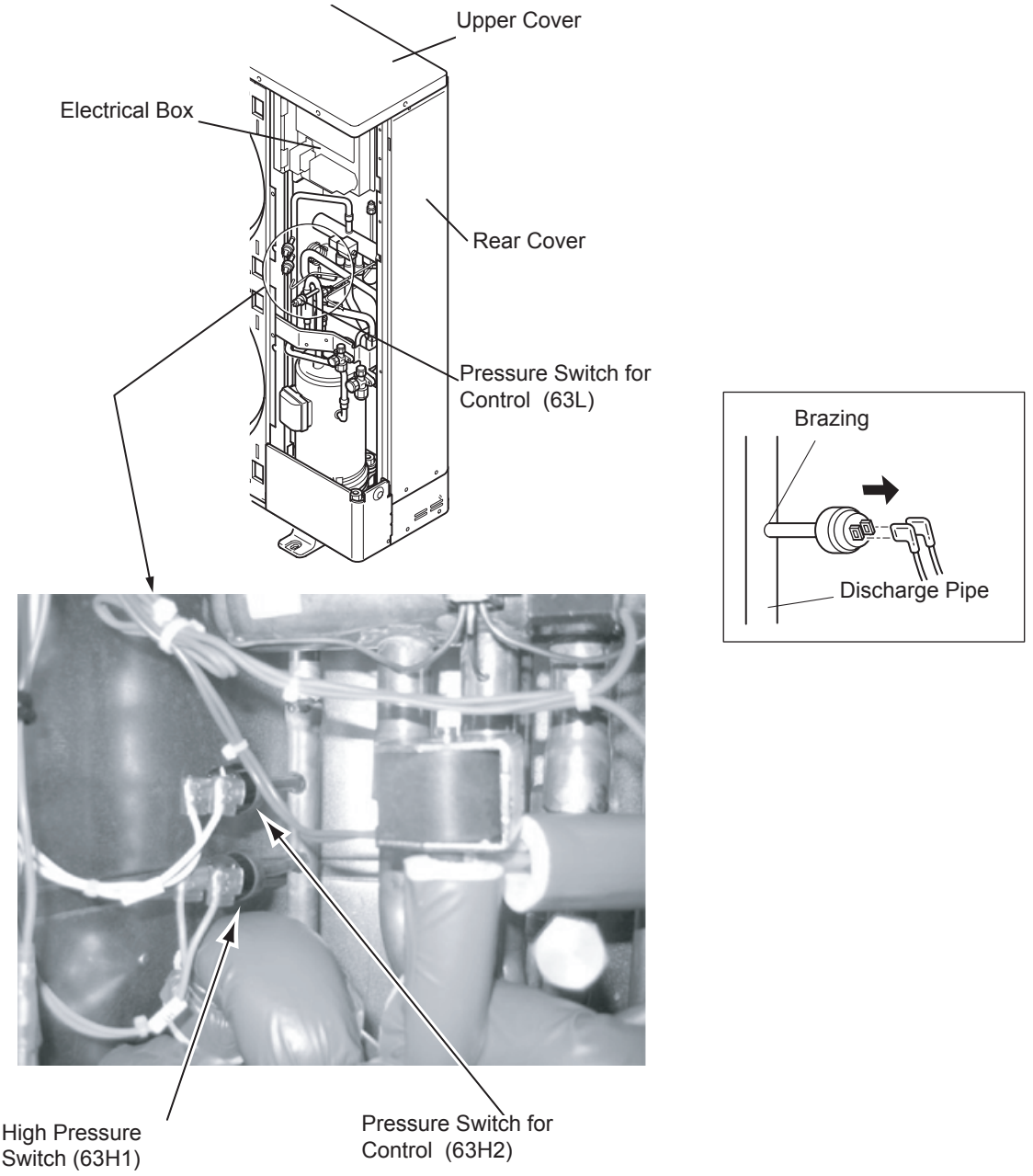
■ REMOVING HIGH PRESSURE SWITCH AND PRESSURE SWITCH FOR CONTROL

1 Remove the service cover according to the item → "Removing Service Cover".

2. Collect the refrigerant from the check joint according to the item → "Removing Compressor".

3 Disconnect the fasten terminals.

– Remove the high pressure switch and pressure switch for control from the brazing part by a burner.



WARNING: *TURN OFF all the main switches*

■ OPENING ELECTRICAL BOX (P-MOUNTING PLATE)

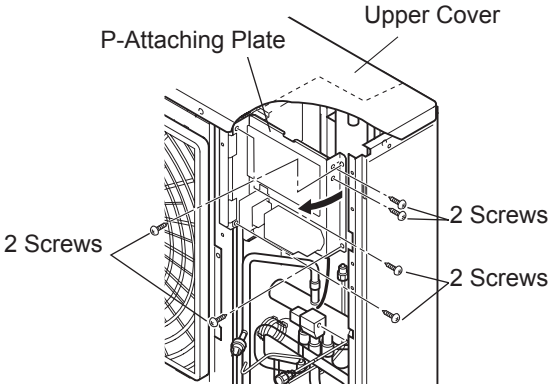
1 Remove the service cover according to the item → "Removing Service Cover".

– Remove six (6) screws fixing the electrical box. Open the P-mounting plate by rotating 90 degrees to the left.

NOTE:

Check to ensure the LED201 (red) of the inverter PCB is OFF when opening P-mounting plate.

Do NOT touch the electrical components when the LED201 (Red) is ON to avoid electrical shock.



WARNING: *TURN OFF all the main switches*

■ REMOVING COILS FOR REVERSING VALVE AND SOLENOID VALVE (SVA1, SVA2 AND SVF)

1 Remove the service cover according to the item → "Removing Service Cover".

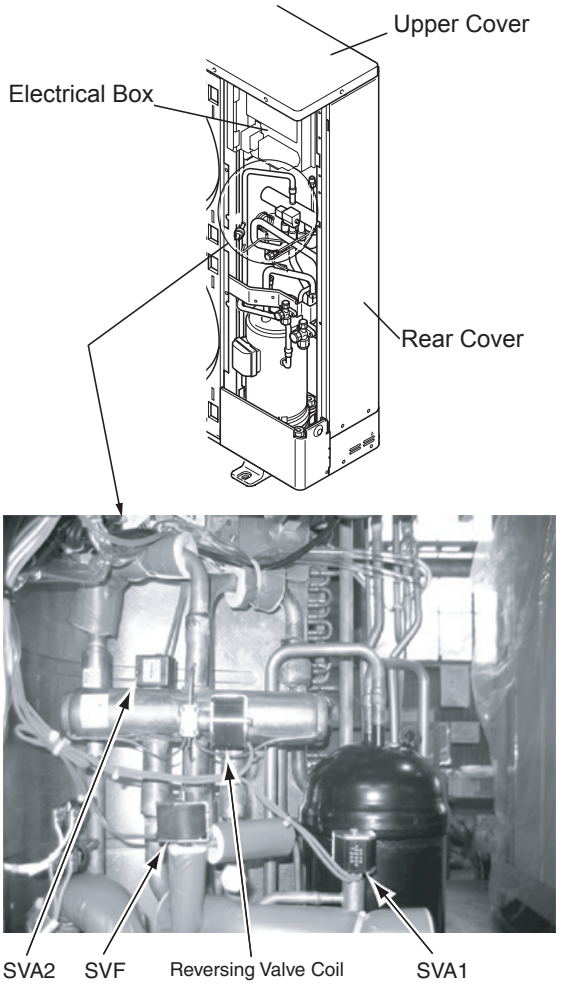
2. Open the P-mounting plate according to the item → "Opening Electrical Box (P-Mounting Plate)".

NOTE:

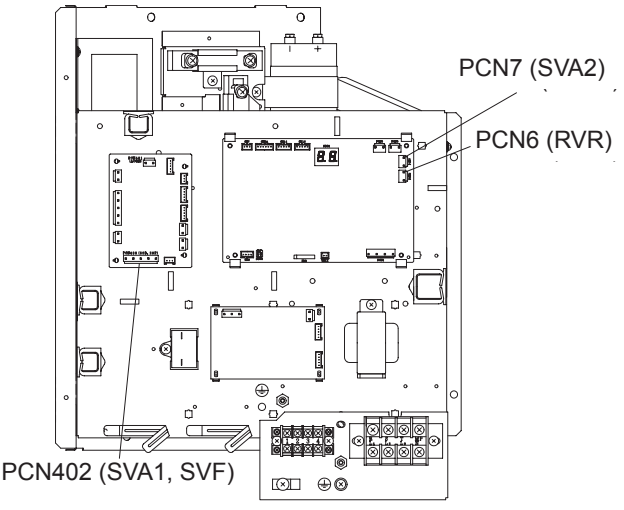
1. Do NOT touch the electrical components when the LED201 (Red) is ON to avoid electrical shock.

2. Remove the connectors on the control PCB of the electrical box.

3. Remove the reversing valve coil by removing one (1) screw fixing the coil.



380-415V/50Hz, 380V/60Hz



WARNING: *TURN OFF all the main switches*

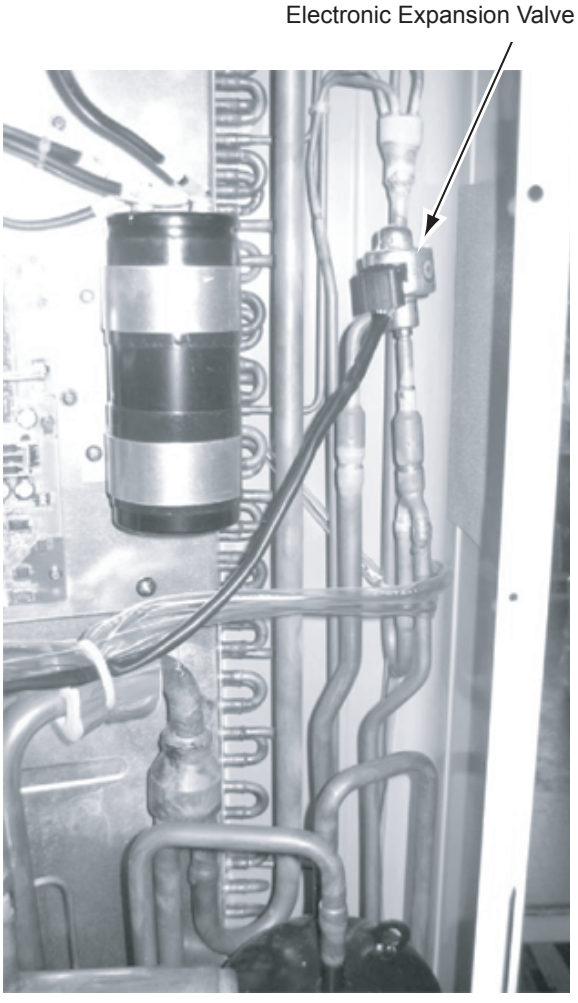
■ REMOVING EXPANSION VALVE COIL

1. Remove the service cover according to the item → "Removing Service Cover".
2. Open the P-mounting plate according to the item → "Opening Electrical Box (P-Mounting Plate)".

   Check to ensure the LED201 (Red) on the inverter PCB is OFF.

NOTE:
Do NOT touch the electrical components when the LED201 (Red) on the inverter PCB is ON to avoid electrical shock.

3. Remove the CN5A connector on the control PCB of the electrical box.
4. Hold the expansion valve coil and slightly rotate, then pull it up. Refer to the right figure, replace the electrical valve. The lock mechanism is equipped with the expansion valve coil. Check to ensure that the expansion valve coil is locked.



WARNING: *TURN OFF all the main switches*

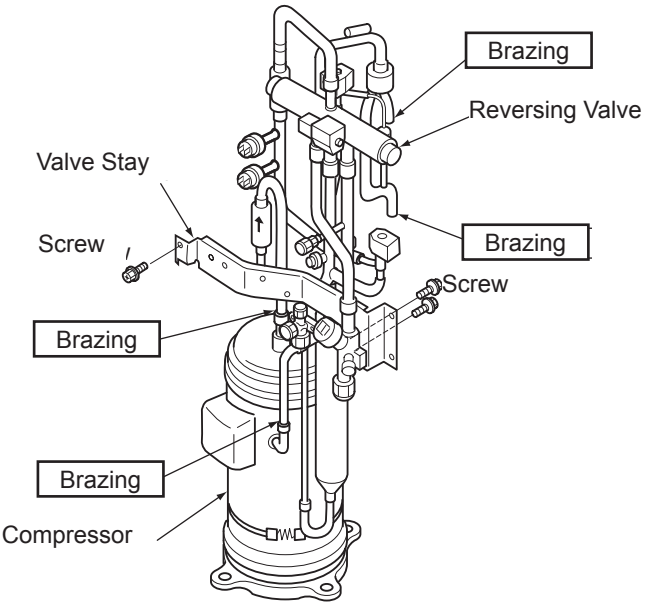
■ REMOVING REVERSING VALVE

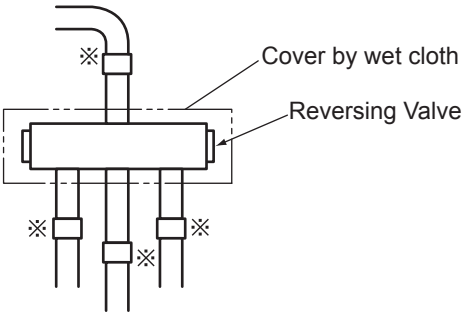
1. Remove the service cover and rear service panel according to the item → “Removing Service Cover” and the item → “Removing Lower Part of Service Panel and Rear Service Panel”.
2. Collect the refrigerant from the check joint according to the item → “Removing Compressor”.
3. Remove the reversing valve coil according to the item → “Removing Reversing Valve Coil”.
4. Remove one (1) fixing screw for valve-mounting plate.
5. Remove the stop valve at gas side from the valve-mounting plate by removing two (2) screws.
6. Remove the reversing valve assemblies from the designated positions. (4 brazing parts)

   Remove the brazing of the reversing valve and the stop valve at gas side by cooling with wet cloth.

   Protect the connecting wires and pipe insulation from brazing frame.
7. Remove the reversing valves from the assemblies (4 portions).

   Perform the brazing to remove and reassemble the reversing valve by cooling with wet cloth.
8. Reassemble the parts in the reverse order of removing procedures. When SFV is removed, fix it according to the item → “Removing Reversing Valve and Solenoid Valve”.





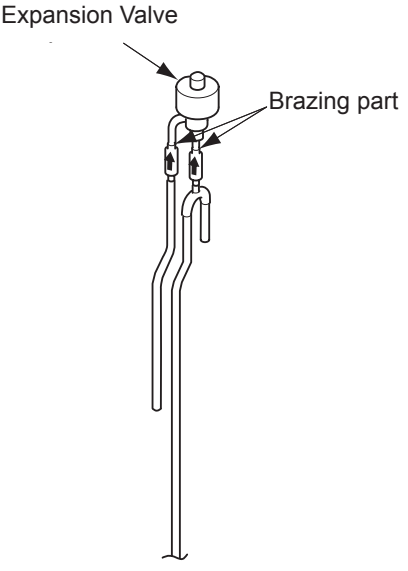
■ REMOVING EXPANSION VALVE

1. Remove the service cover and rear service panel according to the item → “Removing Service Cover” and the item → “Removing Lower Part of Service Panel and Rear Service Panel”.
2. Collect the refrigerant from the check joint according to the item → “Removing Compressor”.
3. Remove the coils according to the item → “Removing Electronic Expansion Valve Coil”.
4. Remove the brazing as shown in the figure below.

   Electronic Expansion Valve (EV0): 2 brazing parts.

   Perform the brazing to remove and reassemble the electronic expansion valve by cooling with wet cloth.

   Protect the connecting wires and pipe insulation from brazing flame.
5. Reassemble the parts in the reverse order of removing procedures.



WARNING: *TURN OFF all the main switches*

■ REMOVING SOLENOID VALVE

1. Remove the service cover and rear service panel according to the item → “Removing Service Cover” and the item → “Removing Lower Part of Service Panel and Rear Panel”.
2. Collect the refrigerant from the check joint according to the item → “Removing Compressor”.
3. Remove the solenoid valve coil according to the item → “Removing Coils for Reversing Valve and Solenoid Valve (SVA1, SVA2 and SVF)”.
4. Remove the brazing and flare nu as shown in the figure below.

   Solenoid Valve (SVA1): 2 brazing parts

   Solenoid Valve (SVA2): 2 brazing parts

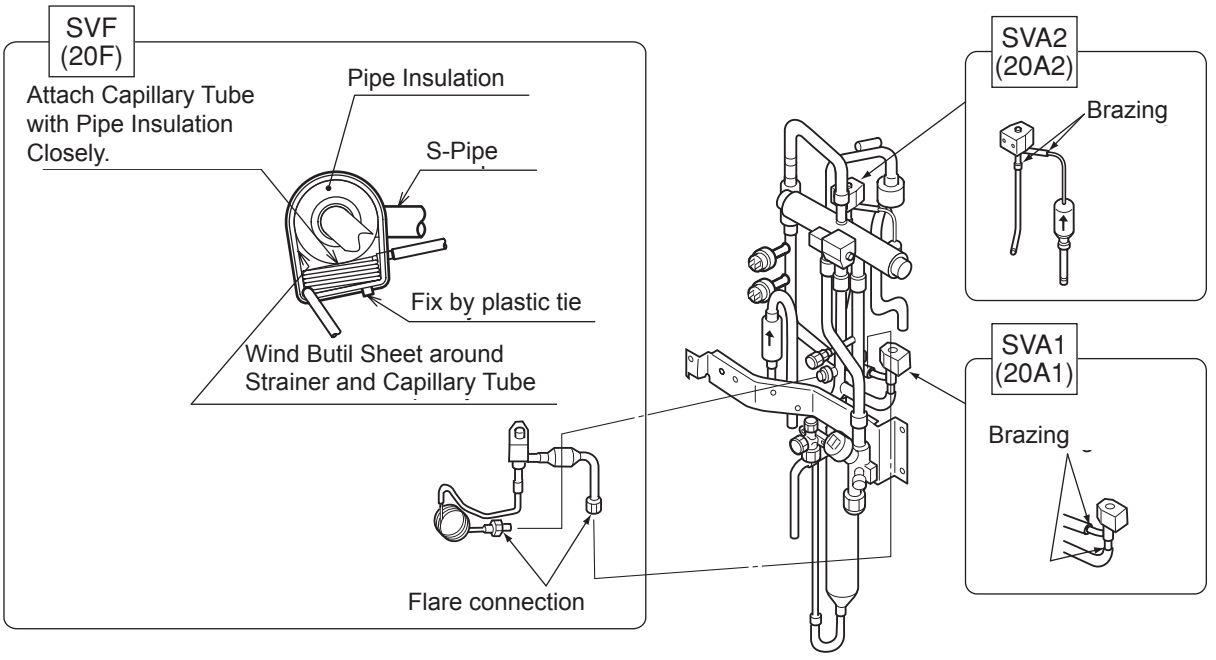
   Solenoid Valve (SVF): 2 brazing coils

   Perform the brazing to remove and reassemble the solenoid valve by cooling with wet cloth.

   Protect the connecting wires and pipe insulation from brazing flame.

   Remove the flare nuts with two spanners to avoid twisting.
5. Reassemble the parts in the reverse order of removing order of removing procedures.

   Fix SVF as shown in the figure below.



WARNING: *TURN OFF all the main switches*

■ REMOVING ELECTRICAL COMPONENTS

DANGER:
Do not touch the electrical components.

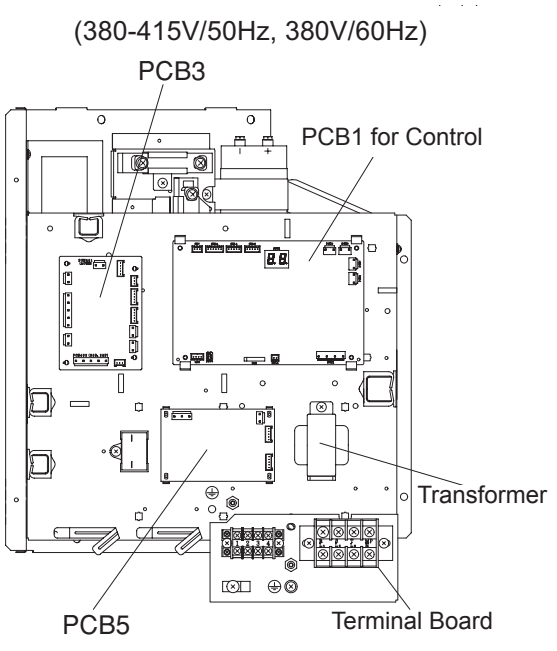
When handling the PCB1, take care of not to use excessive force as this will cause damage.

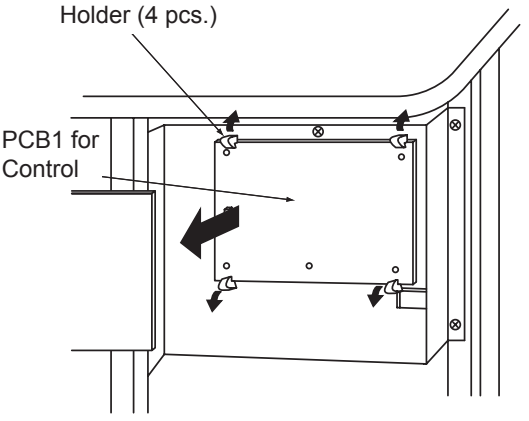
1. Remove the service cover according to item 2.1.1 “Removing Service Cover”.
   - Disconnect all of the connectors connected to the PCB.
   - Remove PCB by sliding four (4) holders in the arrow direction.
   - Remove PCB for Power Distribution of Compressor and Motor

   Clamp the hook of the holders (4 portions) by pinchers and pull it out.
2. Removing Relay PCB
   - Remove the service cover according to the item 2.1.1 “Removing Service Cover”.
   - Disconnect all the wires connected with the relay PCB.
   - Clamp the hook of the holders (4 positions) by pinchers and remove by sliding toward front side.

NOTE:
Do NOT touch the electrical components of the PCB.

Do NOT apply strong force to the electrical components and PCBs to avoid failure.





WARNING: *TURN OFF all the main switches*

■ REMOVING INVERTER COMPONENTS

1. Remove the service cover according to the item → "Removing Service Cover".
2. Open the P-mounting plate by rotating 90 degrees to the left according to the item → "Opening Electrical Box (P-Mounting Plate)

NOTE
Do NOT touch the electrical components when the LED201 (Red) is ON to avoid electrical shock.

■ Removing PCB2

Check to ensure that LED201 (Red) of the PCB2 is OFF.

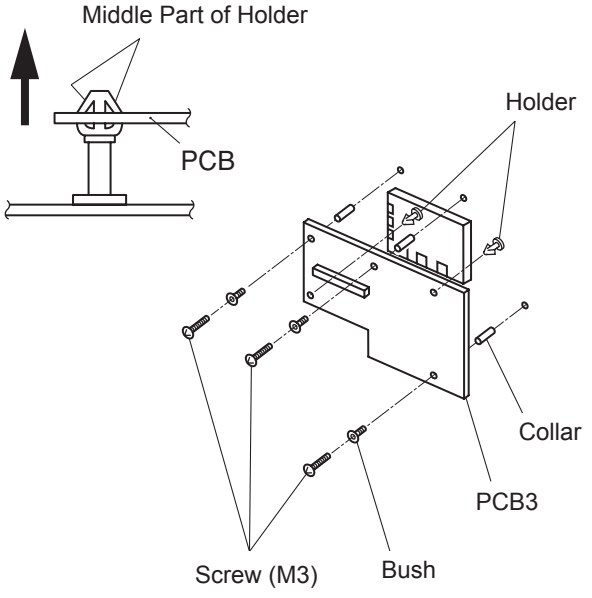
After removing three (3) M3 screws, remove the bushes and the collars from the PCB2. When remounting, attach those bushes and collars.

NOTE:

1. *Identify the terminal Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunction or damage will occur.*
2. *Check to ensure that the electrical wires will not be caught between the mounting electrical components and the mounting plates when the PCB2 is remounted.*

DANGER:
Do not touch the electrical parts when LED201 (Red) on the PCB2 is lit to prevent from an electrical shock.

1. *When replacing the transistor module (IPM) and diode module (DM) on heat radiation fin, slightly apply the heat conducting silicon grease (Manufacture: Shin-Etsu Chemical Co., Ltd, Product No.: G-746) over the fin contact surface.*
2. *Identify the terminal Nos. with the mark band Nos. when reassembling. If connected incorrectly, malfunction or electrical component damage will occur.*
3. *Correctly insert two wires of U and V phases for the power cable of inverter compressor into the current sensor, CTU and CTV on PCB2. Connect Phase U power cable with the current sensor Phase U (CTU) and Phase V power line with current sensor Phase V (CTV). If connected incorrectly, malfunction or electrical component damage will occur.*
4. *When mounting PCB and the sheet metal part for PCB, pay attention not to clamp the electrical wiring together.*
5. *Screws, bushes and collars are used for fixing inverter PCB. Check to ensure that the bushes and collars are used for PCB remounting. If not used, it may cause malfunction.*
6. *In case of replacing control PCB, set all the dip switches as the same position before replacing. If not, malfunction may occur. Refer to the manual attached with the service PCB.*
7. *Do not apply strong force to the electric components and PCBs to avoid damage.*



WARNING: *TURN OFF all the main switches*

■ REMOVING DIODE MODULE AND TRANSISTOR MODULE

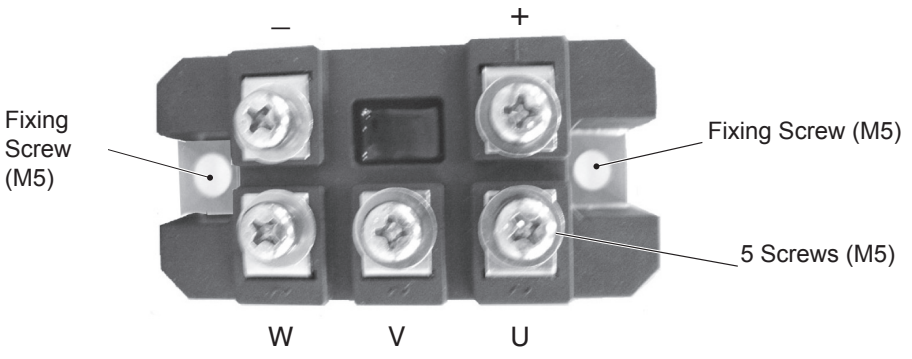
Check to ensure that LED201 (Red) of the PCB2 is off.

1. Disconnect all the wirings connected to the diode module as shown below.
   - Disconnect the wirings of terminal +, - , U, V, W on the diode module.
   - Remove two (2) fixing screws on the diode module.
   - Remove the diode module from the electrical box.
2. Disconnect all the wirings connected to the transistor module as shown below.
   - Disconnect the wirings of connector CN2, CN206 and CN207.
   - Disconnect the wirings of P, N, U, V, W on the transistor module.
   - Remove the three (3) screws for the PCB2 and then remove the PCB2 from the transistor module.
   - Remove four (4) fixing screws on the transistor module.
   - Remove the transistor module from the electrical box.

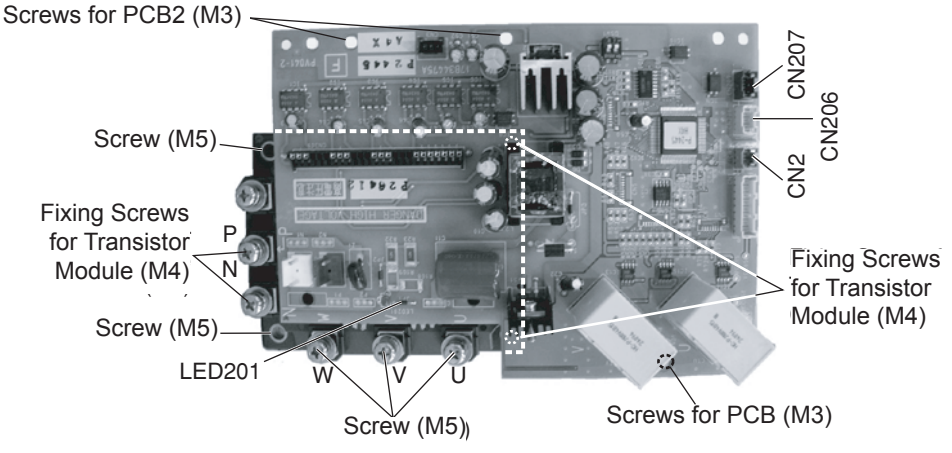
NOTE:

1. *When mounting PCB2, marks on the PCB2 look upside down but this is the correct position.*
2. *Identify the terminal Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunction or damage will occur.*
3. *Check to ensure that the electrical wires will not be caught between the mounting electrical components and the mounting plates when the PCB2 is remounted.*
4. *Apply silicon grease evenly on the whole rear side of the diode module and the transistor module when mounting. Silicon grease is available as a field-supplied accessory.*

Diode Module



PCB2 and Transistor Module



WARNING: *TURN OFF all the main switches*

■ REMOVING OTHER ELECTRICAL COMPONENTS

1. Remove the service cover according to the item → "Removing Service Cover".
2. Open the P-mounting plate by rotating 90 degrees to the left according to the item → "Opening Electrical Box (P-Mounting Plate).

   Check to ensure the LED201 (Red) of the inverter PCB is OFF when opening P-mounting plate.
3. Remove other electrical components according to the procedure below, and the figures on Chapter 9.

DANGER:
Do NOT touch the electrical components when the LED201 (Red) is ON to avoid electrical damage.

NOTES:

– *Disconnect all the wires connected with the smoothing capacitor (CB, CB1, CB2, CA).*

  The wire has the polar characters. Identify the wire mark band and the indication on the smoothing capacitor when wire connecting.

  Remove two (2) screws fixing the smoothing capacitor and remove the smoothing capacitor.

– *Disconnect all the wires connecting with the magnetic contactor (CMC1).*

  Remove two (2) screws fixing the magnetic contactor and remove the magnetic contactor.

– *Remove four (4) screws fixing the reactor and remove the reactor (DCL).*

– *Disconnect all the wires connected with the noise filter (NF1).*

  Remove the noise filter by clamping the top of the holder (6 portions) with a pincher.

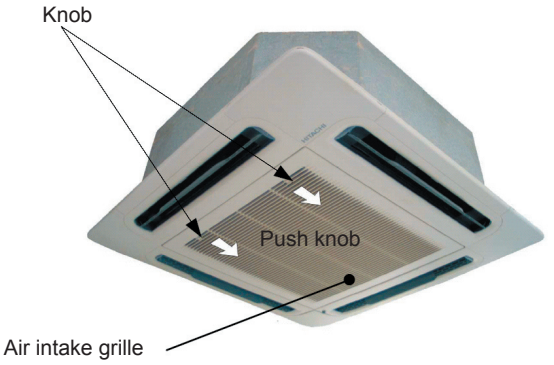
  Identify terminal Nos. with the mark band Nos. when reassembling to avoid incorrect wiring.

10.2. RCI

4-Way Cassette

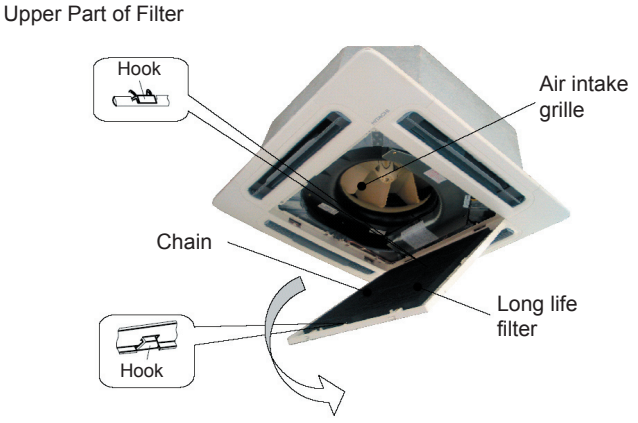
10.2.1. REMOVING THE LONG LIFE FILTER

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.



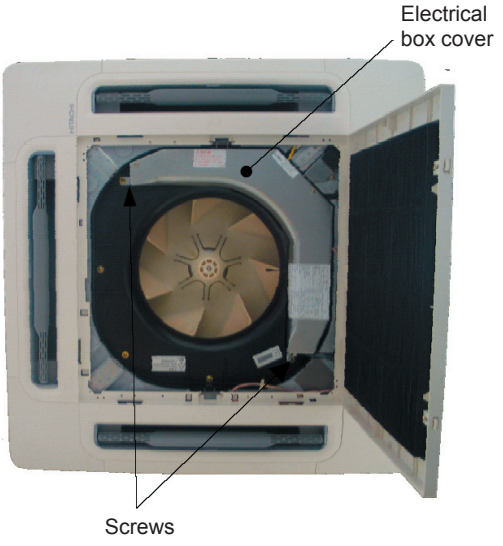
10.2.2. REMOVING THE AIR INTAKE GRILLE

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.



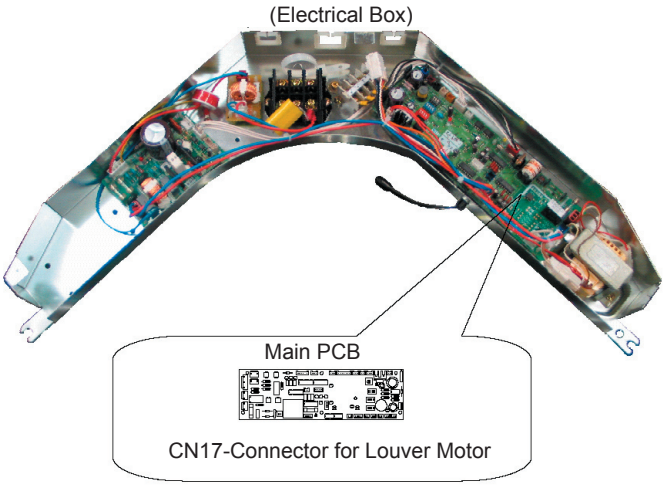
10.2.3. REMOVING THE ELECTRICAL BOX COVER

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.

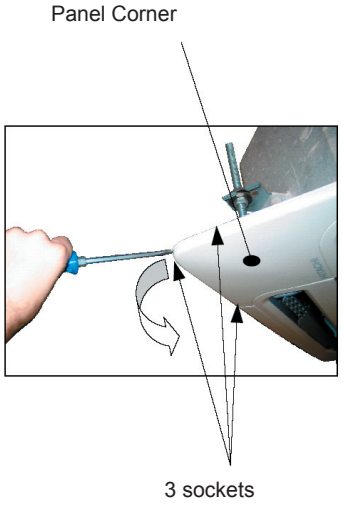


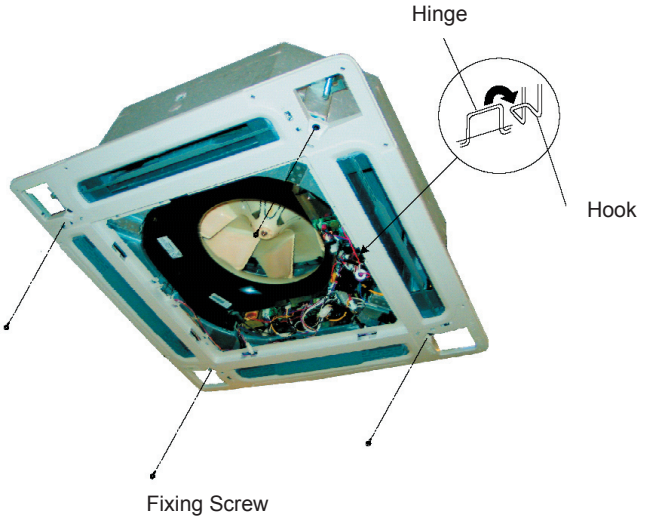
10.2.4. REMOVING THE OPTIONAL AIR PANEL

1. Remove the electrical box cover according to the item "Removing the Electrical Box Cover".
   Disconnect the connector CN17 for louver motor on the indoor PCB.



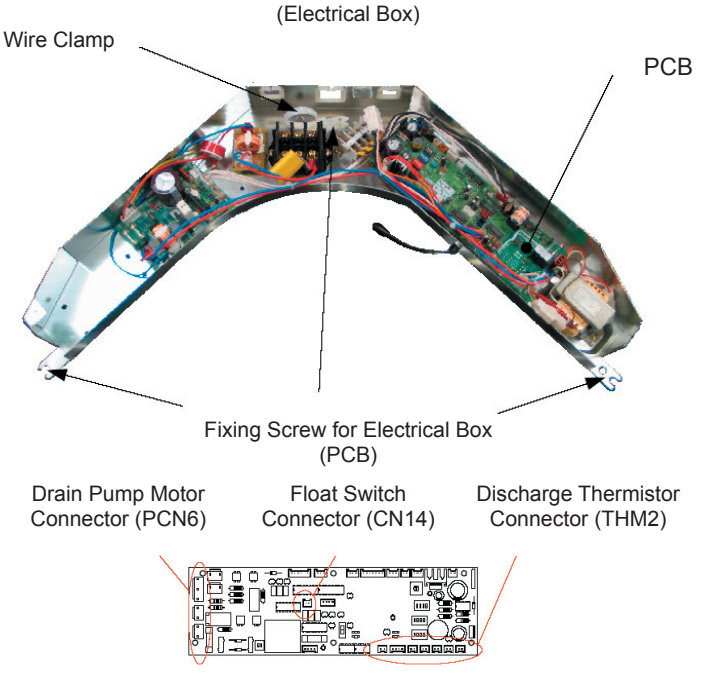
2. Remove the air intake grille from the optional air panel.
3. Remove the four Panel (4) corners pockets as below. Insert slotted screwdriver or coin into the 3 slots in each corner pocket and unhook the hook of corner pocket.
4. Remove four (4) screws of the optional air panel and hook it by using the hinge to the hook of the drain pan as shown in the figure.
   Remove the optional air panel from the unit.





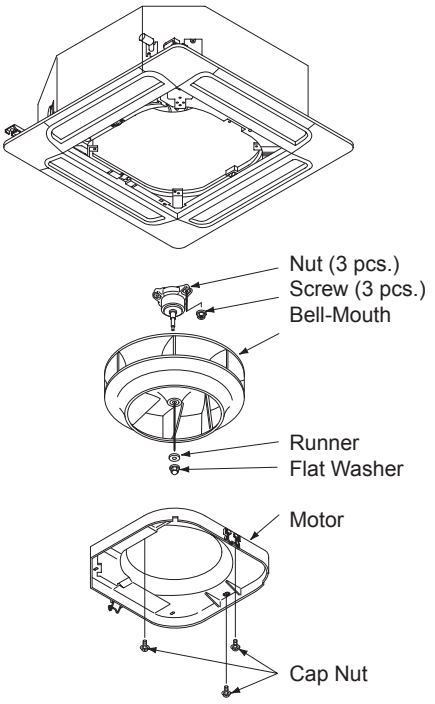
10.2.5. REMOVING THE FAN RUNNER AND FAN MOTOR

1. Remove the air intake grille according to the item "Removing the Air Intake Grille".
2. Drawing Electrical box:
   - Disconnect the thermistors (THM2), drain motor connector (PCN6) and float switch connector (CN14) from the PCB.
   - Loosen screw of the wire clamp and remove the wire clamp.
   - Remove 3 fixing screws of the electrical box and hang the electrical box.



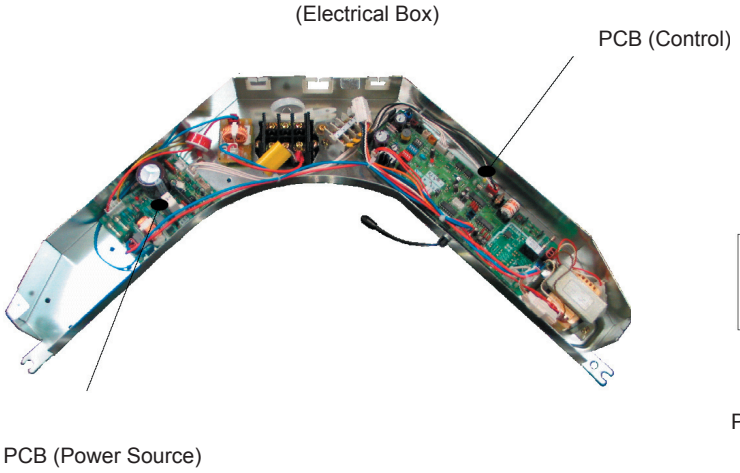
10.2.6. REMOVING THE BELL-MOUTH

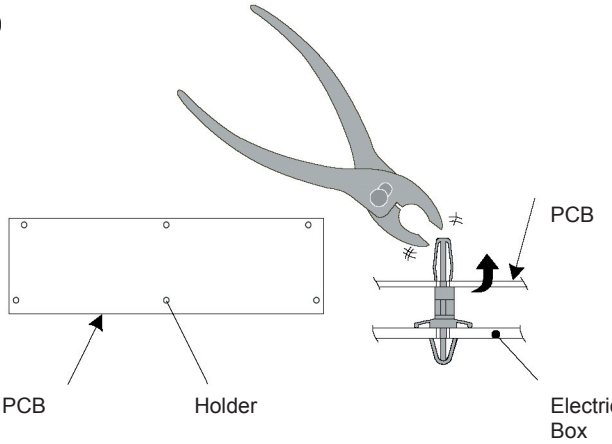
1. Remove three (3) screws fixing the bell-mouth onto the drain pan and remove the bell-mouth.
2. Remove nut and washer fixing the runner and remove the runner.
3. Remove the earth wire for the fan motor. (Only for 4, 5 and 6 HP).
4. Disconnect the fan motor connector.
5. Remove three (3) nuts fixing 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.)



10.2.7. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

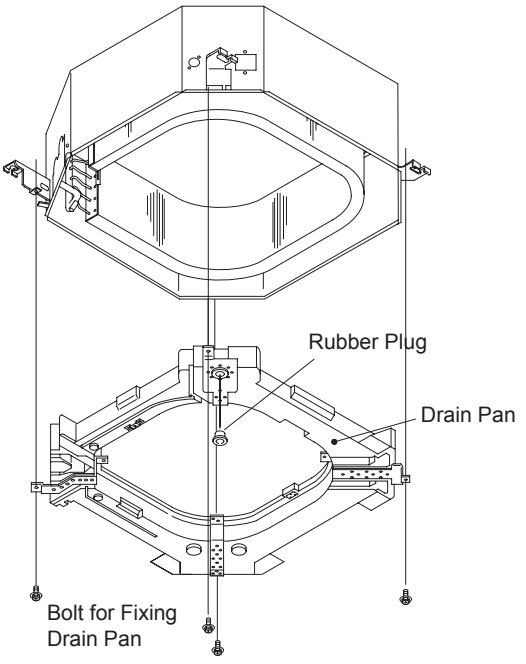
1. Remove the air intake grille according to the "Removing the Air Intake Grille".
2. Remove the electrical box cover according to the item "Removing the Electrical Box Cover".
3. Disconnect the all wiring connectors of the PCBs.
4. Remove the PCBs by holding the expanded part of the holders using long-nose pliers.





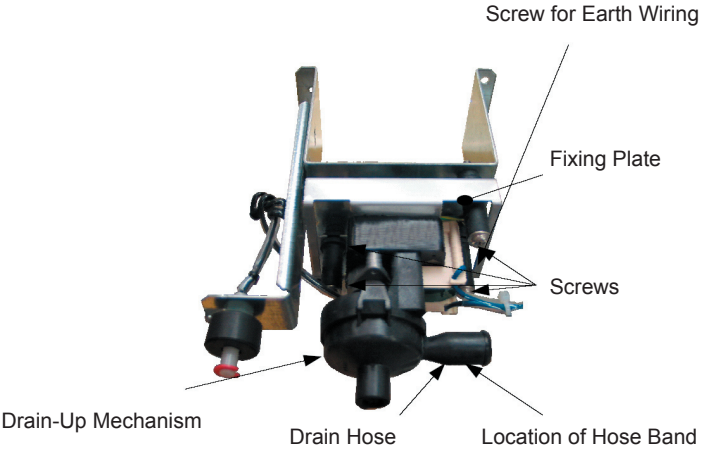
10.2.8. REMOVING THE DRAIN PAN

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.



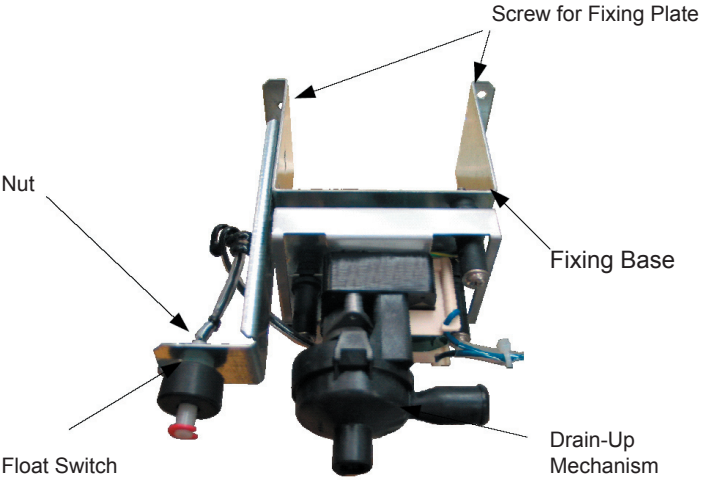
10.2.9. REMOVING THE DRAIN-UP MECHANISM

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.



10.2.10. 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.

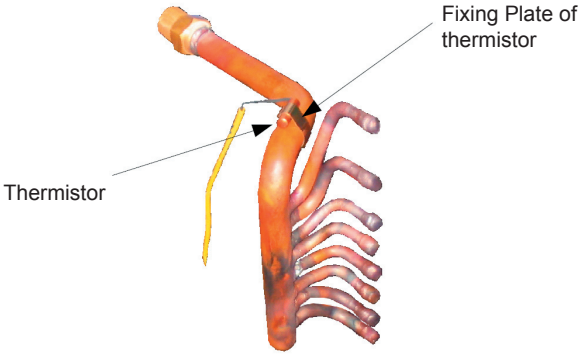


WARNING: TURN OFF all the main switches and disconnect the power supply from the unit.

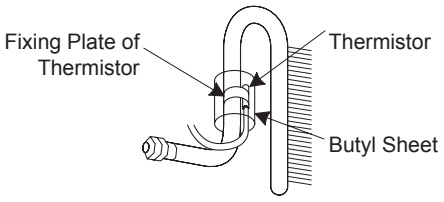
10.2.11.REMOVING THE THERMISTOR FOR LIQUID PIPE AND GAS PIPE

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 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.

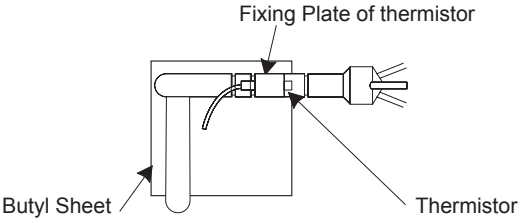
(Up-close view of Thermistor Installation)



(Thermistor Gas Pipe)

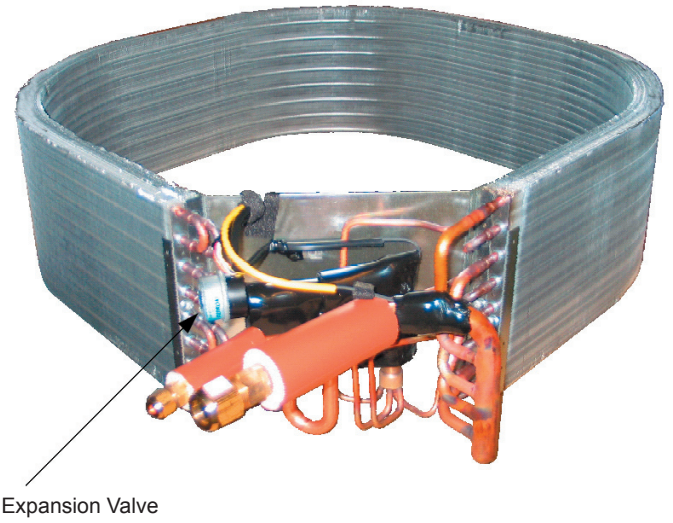


(Thermistor Liquid Pipe)



10.2.12. 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.

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).

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 in Fig. 2. 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.

10. After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.

Fig. 1 Expansion Valve

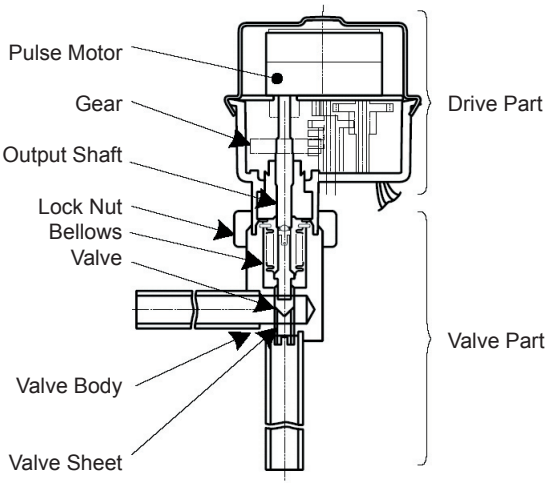
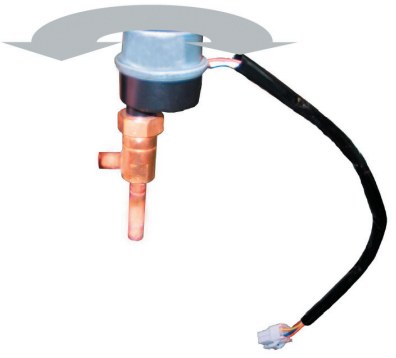


Fig. 2 Direction of Drive Part

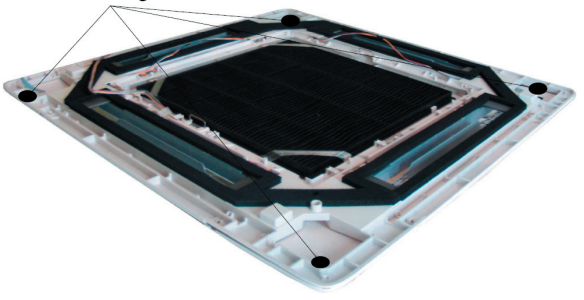


10.2.13. REMOVING THE AUTOMATIC LOUVER MOTOR

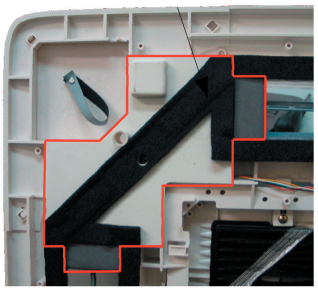
1. Remove the optional air panel according to the item "Removing the Optional Air Panel".
2. Remove the motor cover after removing one (1) screw fixing the motor cover for the automatic louver motor.
3. Draw out the louver shaft from the automatic louver motor and remove the automatic louver motor with fixing plate.
4. Disconnect all the connectors connected to the motor.

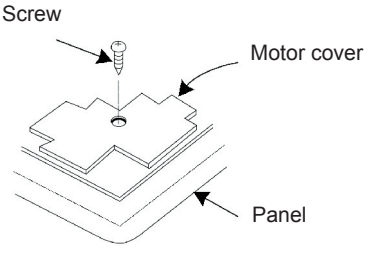
(Air Panel)

4 Corners,
4 Automatic swing Louvers

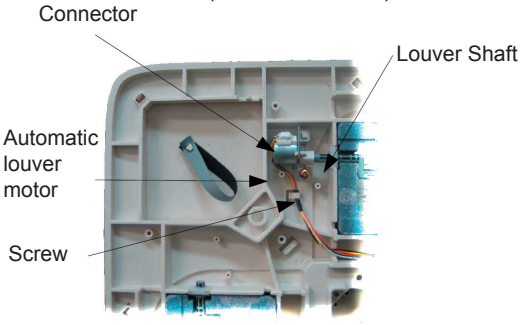


Pannel Corner Motor Cover





(Air Pannel Corner)



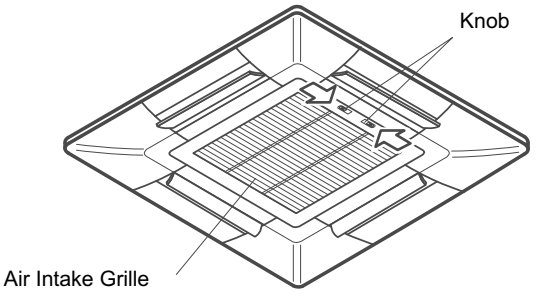
WARNING: *TURN OFF all the main switches*

10.3. RCIM – FSN

4-Way Cassette

10.3.1. REMOVING THE AIR FILTER

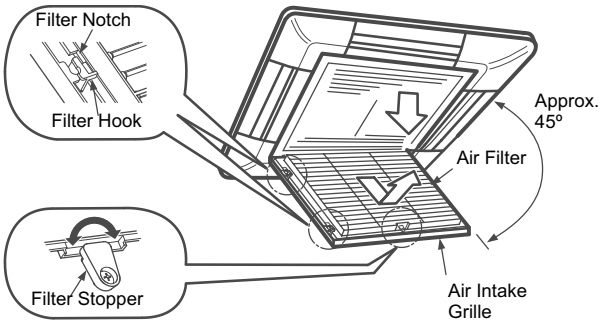
1. The air filter is located inside of the air intake grille. Detach the filter after opening the air intake grille. By pushing the knob in the arrow mark direction, the air intake grille can be opened.
2. The filter can be removed from the air intake grille by supporting the lower side of the air intake grille and filter, and unhooking it from the extrusion part.



10.3.2. REMOVING THE AIR INTAKE GRILLE

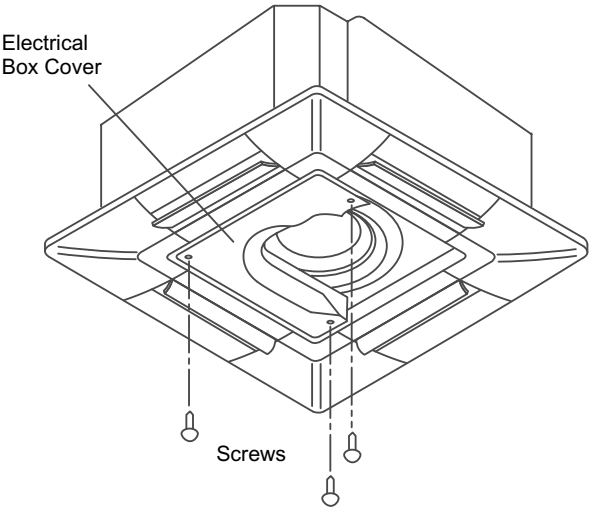
1. By lifting the air intake grille at an angle of approximately 45° and releasing its chain, the air intake grille can be removed by holding it upwards and then towards you. If the chain is released and the angle is 90°, the air intake grille can not be removed.

NOTE:
– *If the louvers are moved due to cleaning or for any reason, set the "Auto Swing" mode to take the four louvers in the same position*



10.3.3. REMOVING THE ELECTRICAL BOX COVER

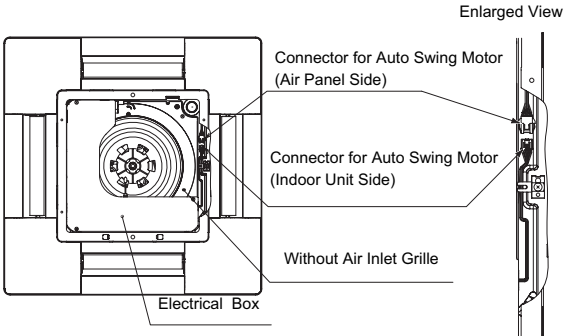
1. By opening the air intake grille, the electrical box can be seen.
   Remove three (3) screws fixing the electrical box cover and remove the cover.



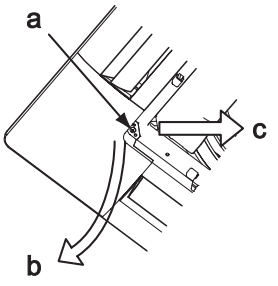
WARNING: *TURN OFF all the main switches*

10.3.4. REMOVING THE OPTIONAL AIR PANEL

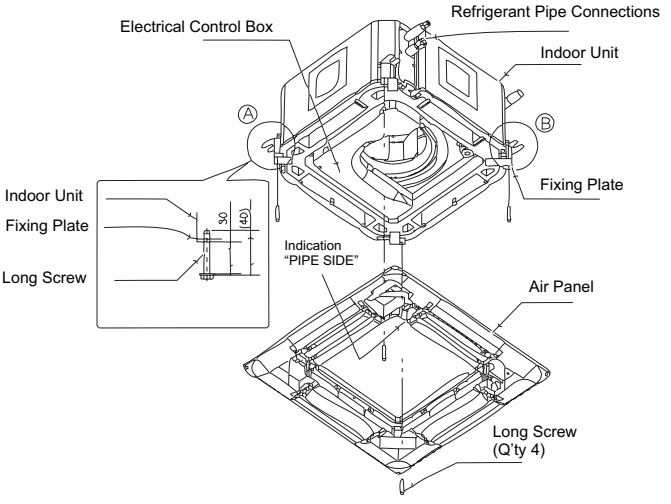
1. Open the intake air grille and disconnect the connector for the auto louver



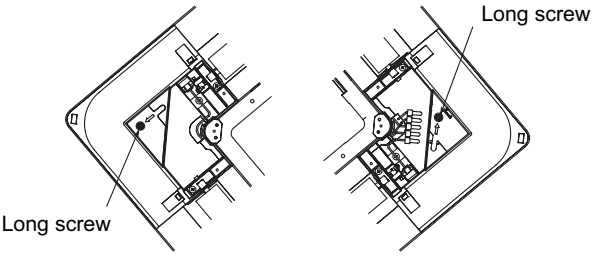
2. Removing four corner covers of the optional air panel.
   Remove screw (a) from the front panel side. Unhook two hinges by moving in the arrow mark direction (b).
   Remove the four corner covers by moving in the arrow mark direction (c).



3. Loosen two screws, A and B fixing the air panel onto the indoor unit.
   Remove other two screws. (Remove the screw located on the printed “PIPE SIDE” and the screw located on the opposite side).



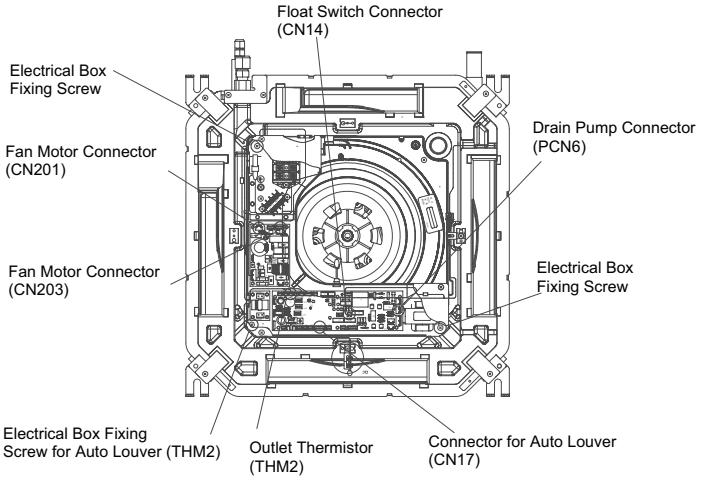
4. Remove the optional air panel after unhooking the hinge onto the hooks at the two positions by rotating the optional air panel in the arrow mark direction.



WARNING: *TURN OFF all the main switches*

10.3.5. REMOVING THE FAN RUNNER AND FAN MOTOR

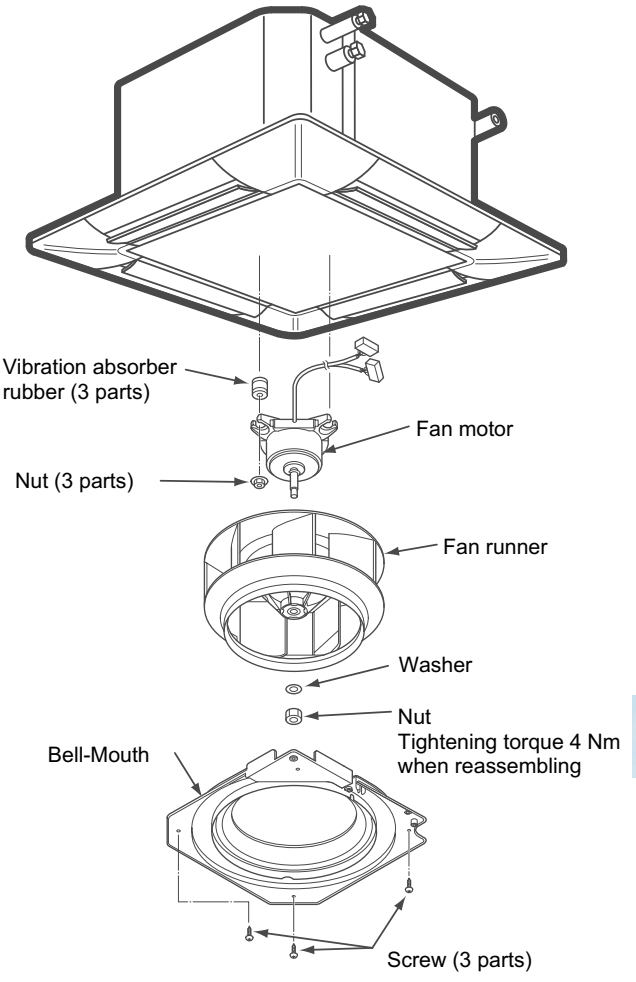
1. Remove the intake air grille according to “1. Removing Air Filter and Intake Air Grille.”
2. Drawing Electrical Box
   – Remove the electrical box cover, and remove the discharge air thermistor (THM2), the drain pump connector (PCN6), the float switch connector (CN14), the connector for auto louver (CN17) and connector for fan motor (PCN203, CN201) from the PCB.
   – Remove three screws fixing the electrical box and suspend the electrical box.



10.3.6. REMOVING THE BELL-MOUTH

1. Remove the three screws fixing the bell mouth onto the drain pan and remove the bell-mouth.
2. Removing Fan Runner and Fan Motor
   – Remove the nut and the washer fixing the fan runner.
   – Remove three nuts fixing the fan motor and remove the fan motor.

NOTE:
Fix the fan runner with a tightening torque of approximately 4 Nm when reassembling.

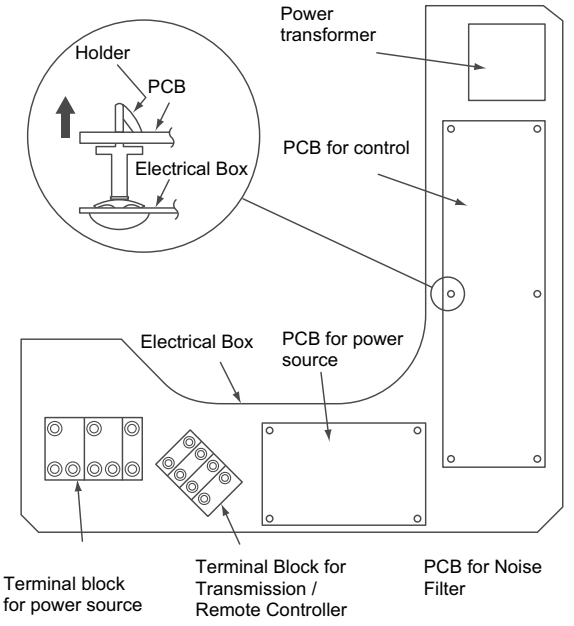


WARNING: *TURN OFF all the main switches*

10.3.7. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Remove the air intake grille according to the "Removing the Air Intake Grille".
2. Remove the electrical box cover according to the item "Removing the Electrical Box Cover".
3. Disconnect the all wiring connectors of the PCBs.
4. Remove the six holders fixing the PCB for control, four (4) holders fixing the PCB for power source and four holders fixing the PCB for the noise filter using long-nose pliers.

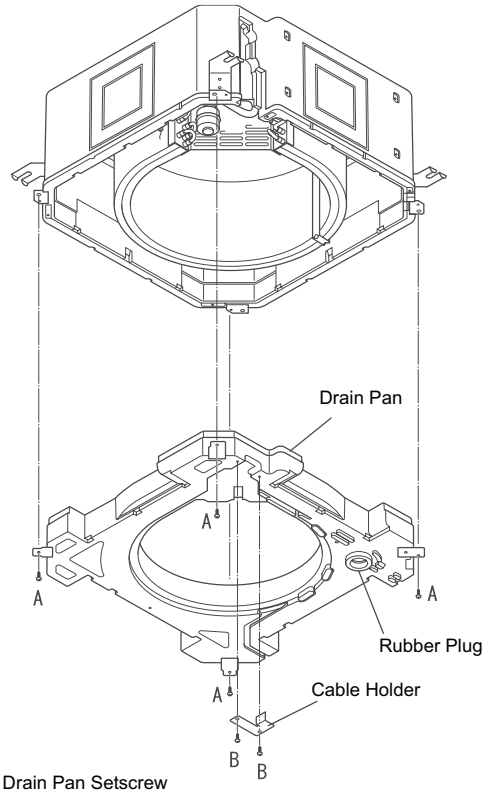
NOTE:
- *Do not touch electrical components on the PCBs*
- *If big force is applied to the PCB, it will be faulty.*
- *Pay attention to the connector's position on PCB when reassembling. If assembled at the incorrect position, PCB will be faulty.*



10.3.8. REMOVING THE DRAIN PAN

1. Remove the optional air panel according to "Removing Optional Air Panel".
2. Disconnect the outlet thermistor, pipe thermistors (liquid:1, gas:1), expansion valve, drain pump, float switch and fan motor after opening the electrical box cover according to "Removing Electrical Box Cover".
3. Remove the electrical box and the bell-mouth according to "Removing Fan Runner and Fan Motor".
4. Remove two screws fixing the cable holder onto the drain pan and remove the cable holder.
5. Remove Drain Water:
   - Remove water on the drain pan by pulling out the rubber plug. Silicon sealant is applied around the rubber plug, but the rubber plug is easily removed by pulling out the bottom of it.
   - (Do not damage or pull out by using sharp-edged articles such as a cutter. Do not remove or damage the rubber plug bottom insulator when reassembling.)
   - Check to ensure that the water hole is not clogged.
6. Removing Drain Pan
   - Remove the four screws fixing the drain pan onto the indoor unit.
   - Remove the drain pan by pulling it downwards.

NOTE:
- *Do not use sharp-pointed articles such as a screwdriver for fixing the rubber plug.*
- *After fixing the rubber plug, there must be 2 - 3mm clearance from the drain pan.*

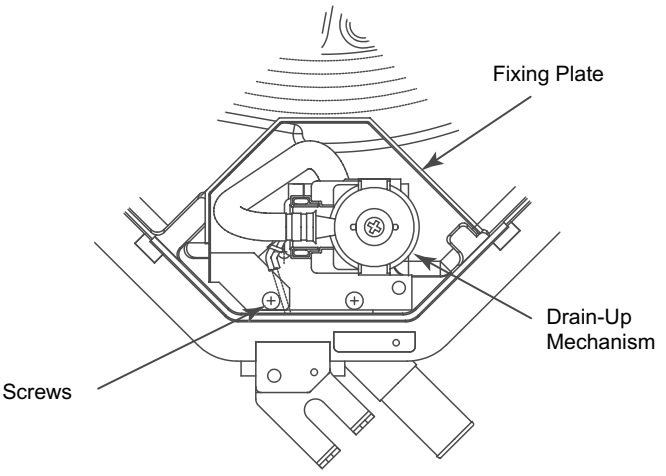


A : Drain Pan Setscrew
B : Screw for Cable Holder

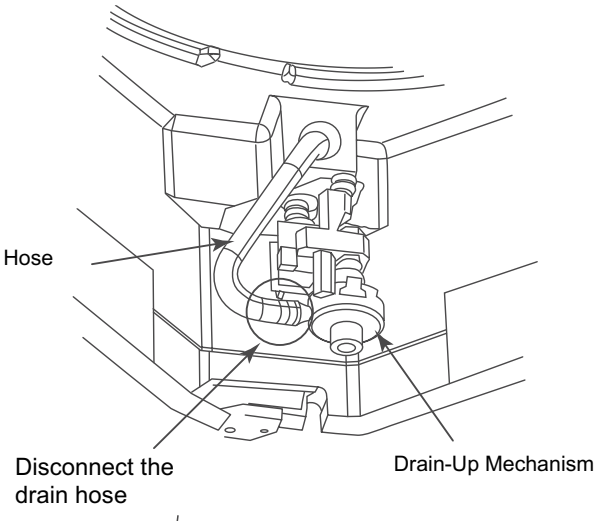
WARNING: *TURN OFF all the main switches*

10.3.9. REMOVING THE DRAIN-UP MECHANISM

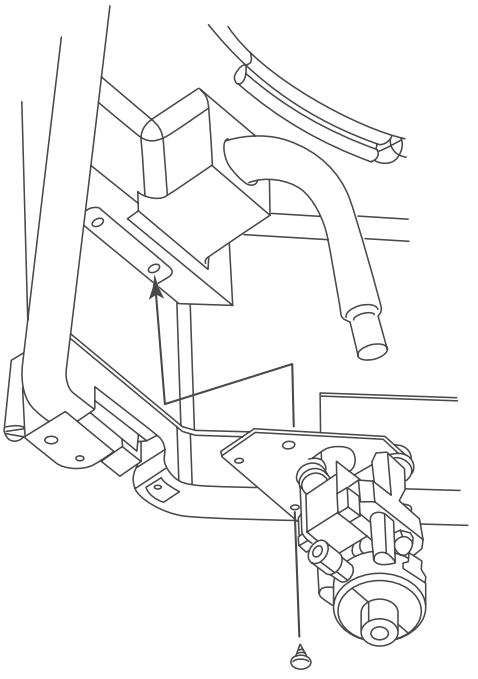
1. Remove the drain pan according to the item "Removing the Drain Pan".



2. Remove the hose band and remove the drain hose.
3. Remove screw of earth wiring.



4. Hold the drain-up mechanism and remove the screw of the fixing plate for the drain-up mechanism.



NOTE:
When reassembling, insert the drain hose fully to the end of the drain pump.

WARNING: *TURN OFF all the main switches*

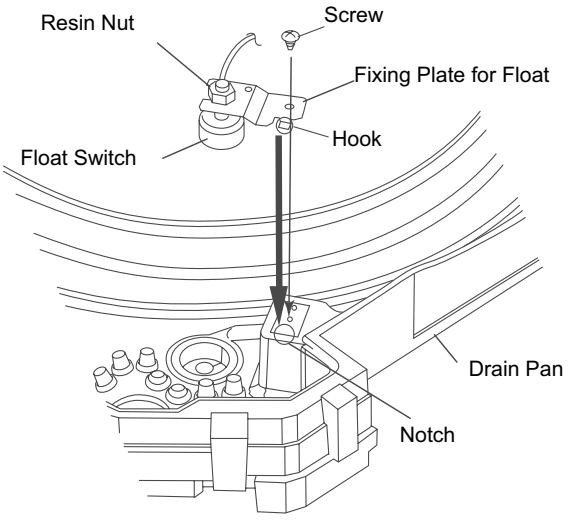
10.3.10. REMOVING THE FLOAT SWITCH

1. Remove the drain pan according to “Removing Drain Pan”.
2. Removing Float Switch:
   – The float switch is located at the rear side of the drain pan.
   – Remove the screw fixing the float fixing plate onto the drain pan.

NOTE:
When reassembling, ensure to fit the hook with the notch and screw up.

3. Loosen the resin nut of the float switch and remove the float switch from the fixing plate.

NOTE:
When reassembling, the tightening torque for the resin nut shall be within the range of 0.3 Nm – 0.4 Nm.
If the tightening torque is hither than this, the resin nut will be damaged.

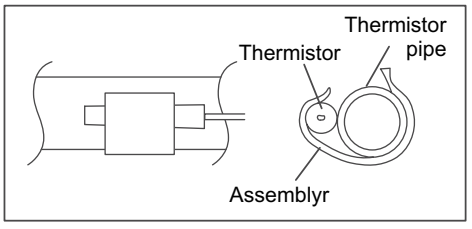


WARNING: *TURN OFF all the main switches*

10.3.11. REMOVING THE THERMISTOR FOR LIQUID PIPE AND GAS PIPE

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 the item "Removing the Fan Runner and Fan Motor".
3. Remove the drain pan according to the item "Removing the Drain Pan".
4. Remive the partition plate for evaporator fixing the heat exchanger (remove five screws).
5. Removing thermistors for liquid pipe and gas pipe:
   Remove the butyl sheet applied to each thermistor, and remove the thermistors for the liquid pipe and the gas pipe. The thermistors are fixed with the thermistor holders.

   Details of assembly:



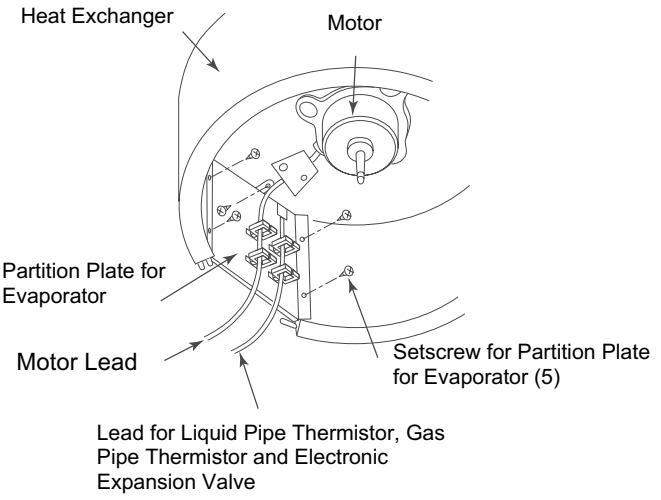
6. Removing the coil for electronic expansion valve.
   Remove the butyl sheet applied to the electronic expansion valve.
7. Prepare two spanners. Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.

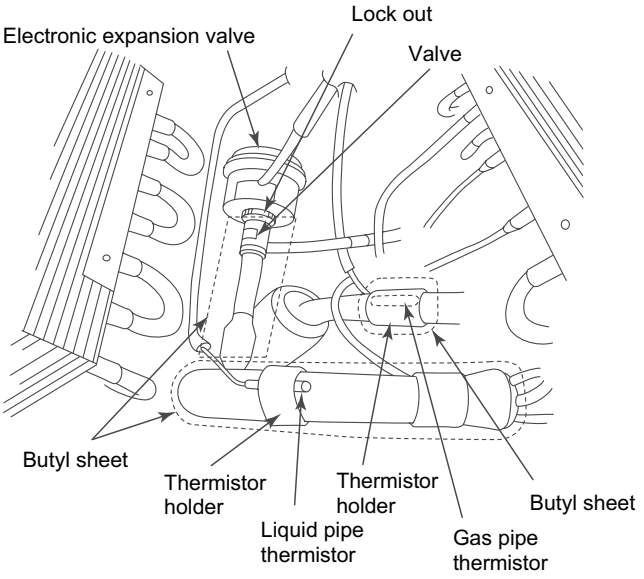
NOTE:
Do not hold the motor part when loosening the lock nut by spanners. The base of the drive part may turn idle and be broken.

8. Turn the lock nut by a few turn, and the drive part is separated from the screw and can be removed.
9. Prepare the new drive part for replacement (servicing 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 damage the junction part of the valve with the tools.

10. 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.
11. Tighten the lock nut with spanner after tightening lightly by hand.
    The tightening torque must be within the range of:
    12 Nm – 15 Nm.



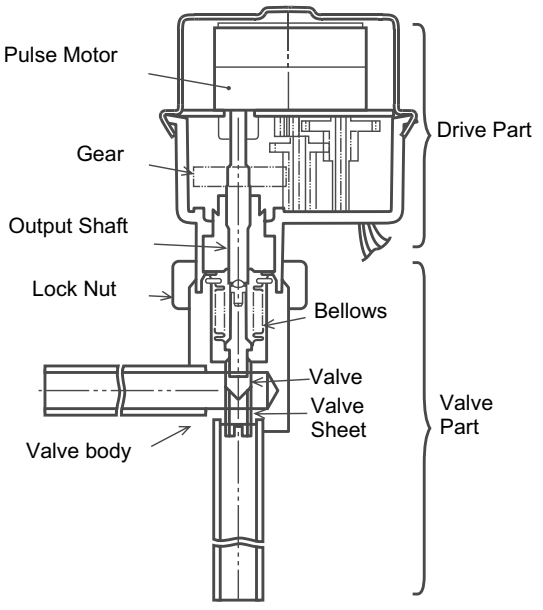


WARNING: *TURN OFF all the main switches*

NOTE:
Do not apply 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 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 in the right figure.

12. After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing. Apply the butyl sheet firmly.

NOTE:
Ensure to check that the cables do not touch the fun runner after assembling.



Expansion Valve

Adjustment of direction is not required.
(However, pay attention not to touch the pipes or the drain pan.)

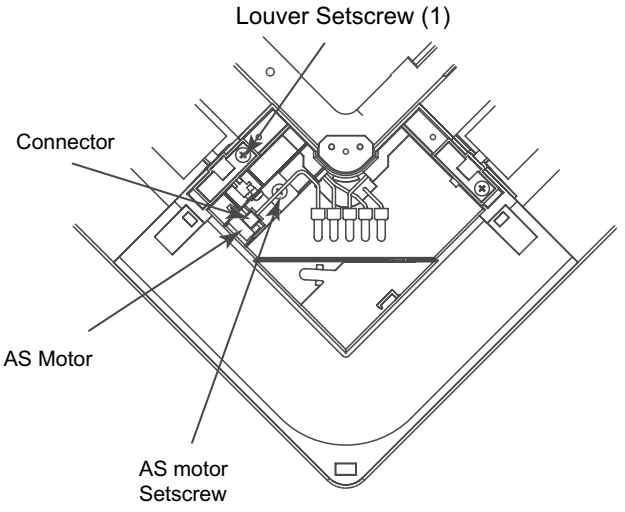


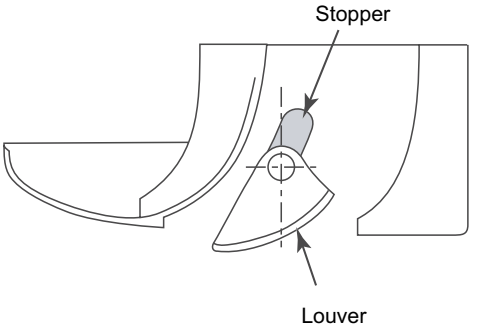
Direction of Drive Part

WARNING: *TURN OFF all the main switches*

10.3.12. REMOVING THE AUTOMATIC LOUVER MOTOR

1. Remove the optional air panel according to the item "Removing the Optional Air Panel".
2. Disconnect the connecter connected to the AS motor.
3. Remove one screw fixing the louver and one(1) screw fixing the AS motor.
4. Remove the AS motor by pulling out with the louver, and then sliding it.
5. After changing the AS motor, reassemble the louver with adjusting the stopper's position as shown in the right figure. At this time, the D cut part of the AS motor shaft must coincide with the D cut part of the louver.





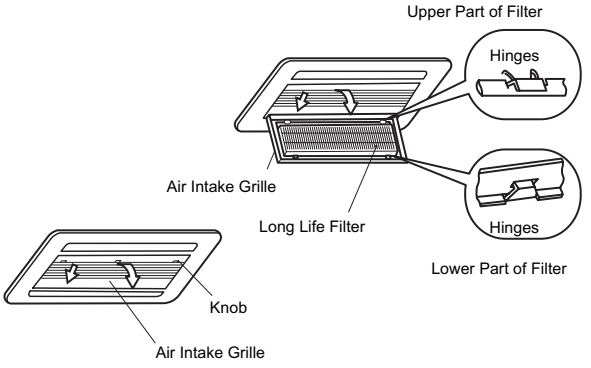
WARNING: *TURN OFF all the main switches*

10.4. RCD

2-way cassette

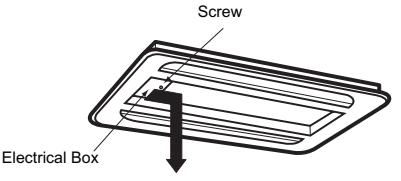
10.4.1. REMOVING THE LONG-LIFE FILTER AND THE AIR INLET GRILLE

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.



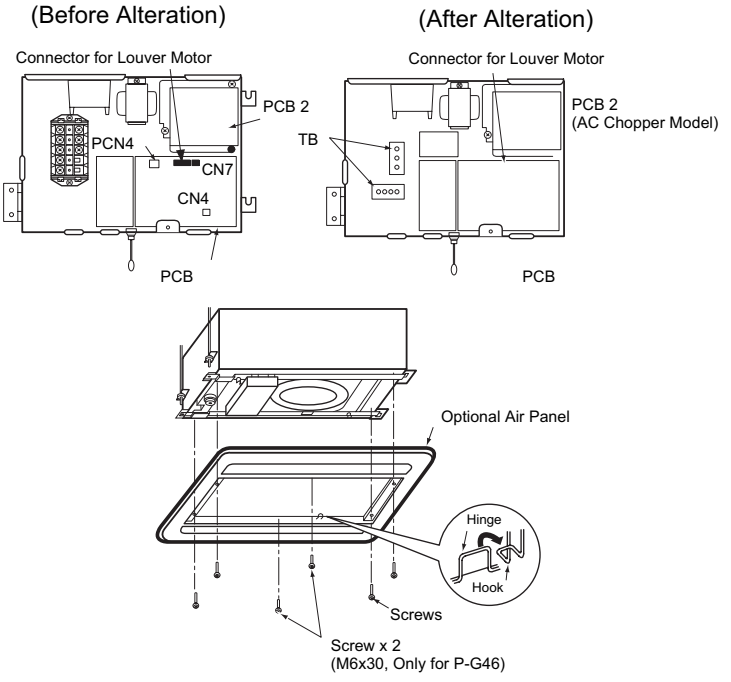
10.4.2. REMOVING THE ELECTRICAL BOX PANEL

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.



10.4.3. REMOVING THE OPTIONAL AIR PANEL

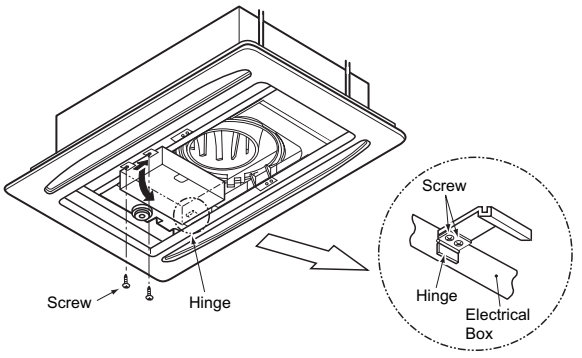
1. Remove the electrical box panel by opening the air inlet grille.
   Disconnect the connector (CN17) for the auto-louver on the indoor unit PCB.
2. Remove the air inlet grille from the optional air panel.
   Remove the four screws that fix the optional air panel.
3. Remove the optional air panel after unhooking the hinge off the hooks at the two positions near the drain pan.



WARNING: *TURN OFF all the main switches*

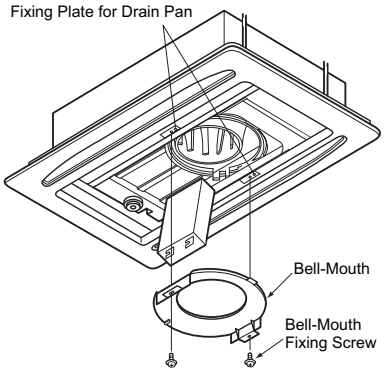
10.4.4. REMOVING THE FAN RUNNER AND THE FAN MOTOR

1. Remove the optional air panel according to the section "Removing the Optional Air Panel".
2. Removing the Electrical Box.
   a. Disconnect the connectors for each wire.
   b. Remove the two screws that fix the electrical box and turn the electrical box downwards by approximately 90°. (The electrical box is hung by the hinge. Do not remove the fixing screw for the hinge).

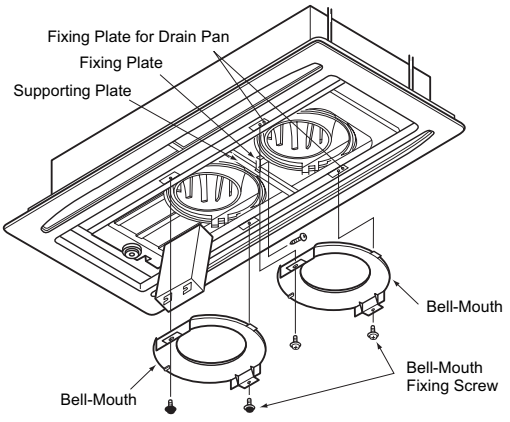


3. Removing the Bell Mouth
   Remove the fixing plate after removing one screw that fix the fixing plate on the support plate of the indoor unit. (For 4.0 and 5.0HP)
   Remove the bell mouth by removing the two screws that fix the bell mouth onto the fixing plate for the drain pan of the indoor unit.
   * Q'ty of Bell Mouth: 1 (RCD-2.0 50 3.0FSN)
     2 (RCD-4.0 to 5.0FSN)

RCD-2.0 50 3.0FSN

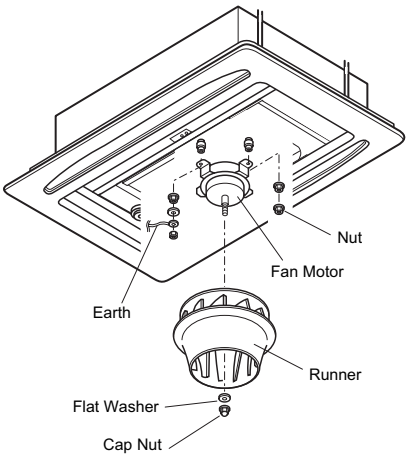


RCD-4.0 to 5.0FSN



WARNING: *TURN OFF all the main switches*

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-2.0 to 3.0FSN)
   Each 2 (RCD-4.0 to 5.0FSN)

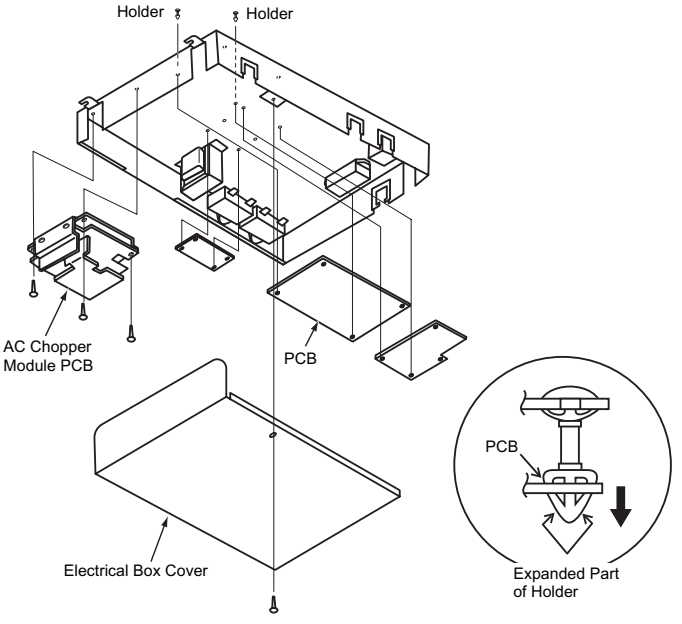


10.4.5. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Remove the air inlet grille according to the section "Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the electrical box panel according to the section "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:

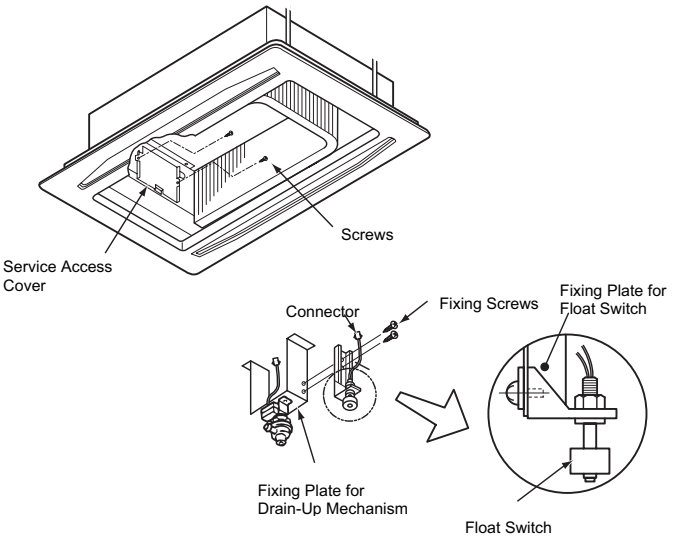
Do not touch the electrical components on the PCB. If you apply a great force to the PCB, the PCB will become faulty.



WARNING: *TURN OFF all the main switches*

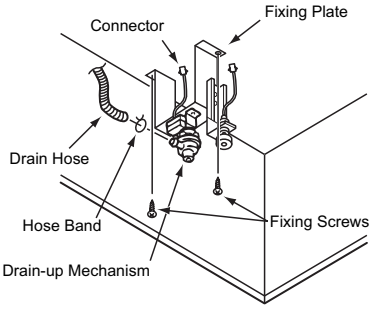
10.4.6. REMOVING THE FLOAT SWITCH

1. Remove the air inlet grille according to the section Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the bell mouth according to the section "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.



10.4.7. REMOVING THE DRAIN-UP MECHANISM

1. Remove the air inlet grille according to the section "Removing the Long-Life Filter and the Air Inlet Grille".
2. Remove the bell mouth according to the section "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section "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.

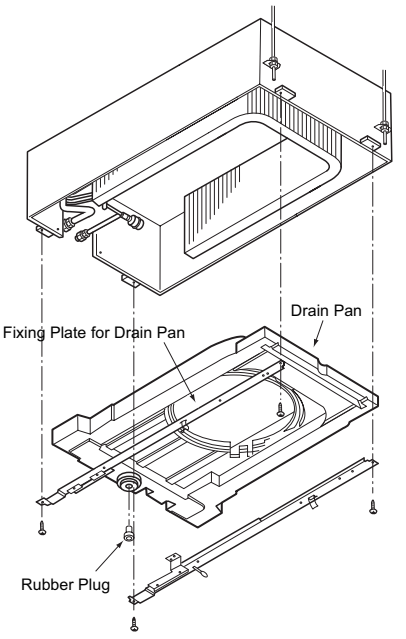


WARNING: *TURN OFF all the main switches*

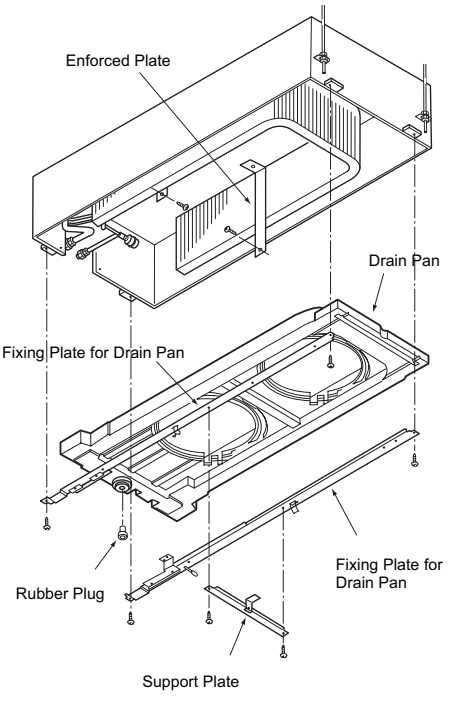
10.4.8. REMOVING THE DRAIN PAN

1. Remove the air inlet grille according to the section "Removing the Long-Life Filter and the Air Inlet Grille".
2. Open the electrical box panel according to the section "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 "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-2.0 to 3.0FSN



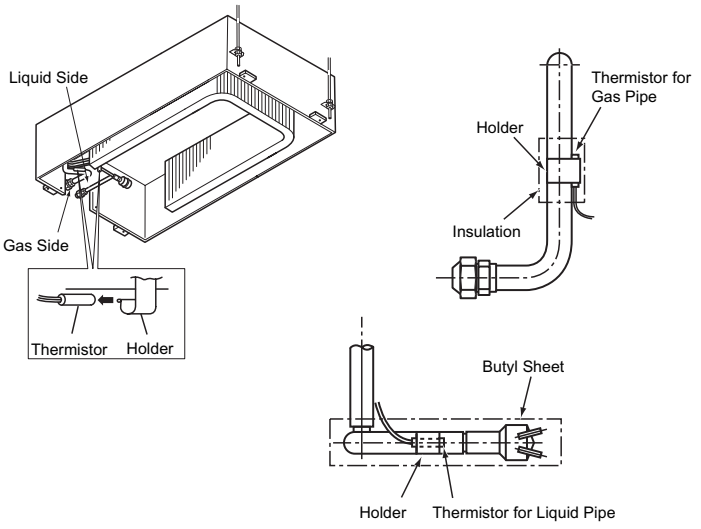
RCD-4.0 to 5.0 FSN



WARNING: *TURN OFF all the main switches*

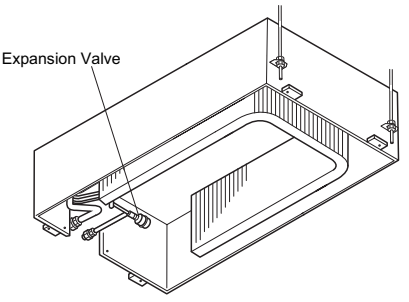
10.4.9. REMOVING THE THERMISTOR FOR LIQUID PIPE AND GAS PIPE

1. Remove the optional air panel according to the section "Removing the Optional Air Panel".
2. Remove the bell mouth according to the section "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section "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.



10.4.10. REMOVING THE ELECTRONIC EXPANSION VALVE COIL

1. Remove the optional air panel according to the section "Removing the Optional Air Panel".
2. Remove the fan assembly according to the section, "Removing the Fan Runner and the Fan Motor".
3. Remove the drain pan according to the section "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.

10. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.

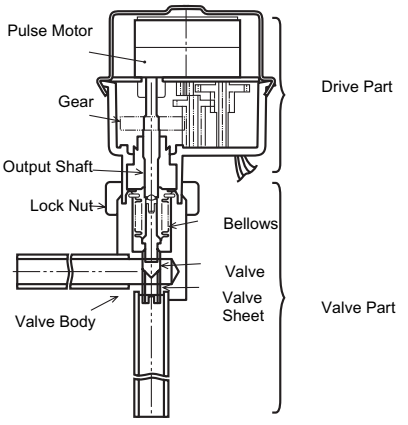


Fig. 1 Expansion Valve

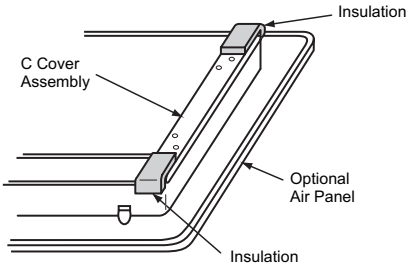
Adjustment of direction is not required



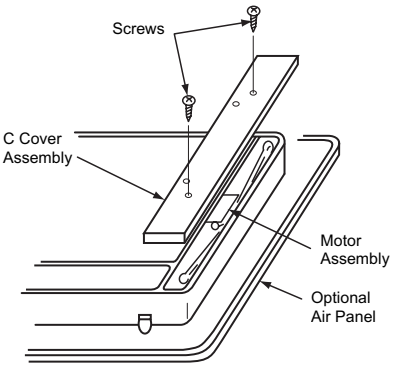
Fig. 2 Direction of Drive Part

10.4.11. REMOVING THE AUTOMATIC LOUVER MOTOR

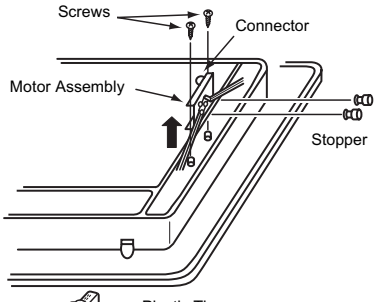
1. Remove the optional air panel according to the section "Removing the Optional Air Panel".
2. Remove the insulation material that is mounted with the adhesive at both sides of the C panel assembly.



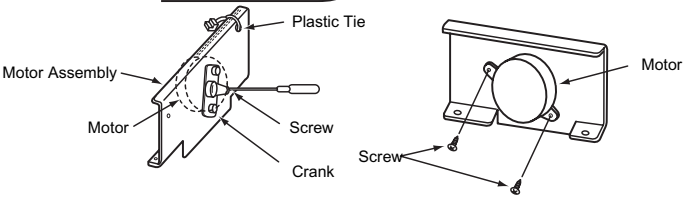
3. Remove the two screws that fix the C panel assembly and remove the C panel assembly from the optional air panel.



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.



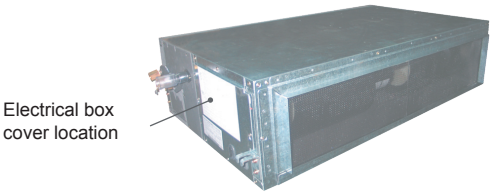
WARNING: *TURN OFF all the main switches*

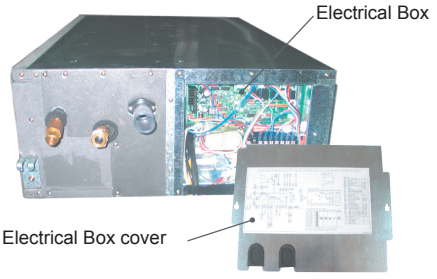
10.5. RPI - IN-THE-CEILING TYPE

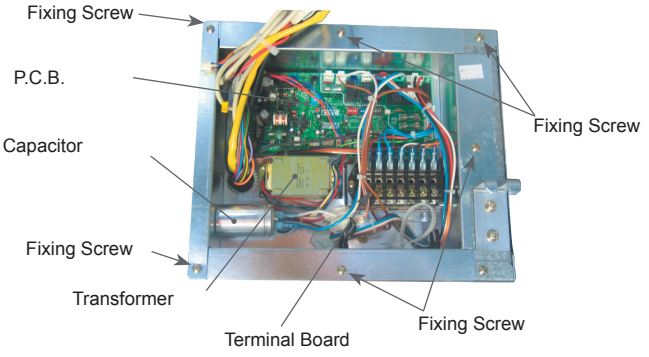
RPI-2.0~6.0 FSN1E

10.5.1. REMOVING THE ELECTRICAL BOX AND ELECTRICAL PARTS

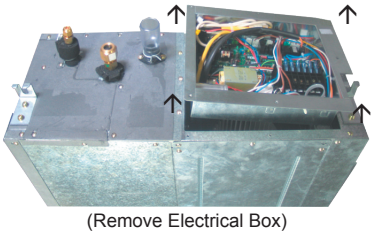
1. Remove Electrical Box cover, for accessing the electrical components.







2. It is possible to remove Electrical Box from the unit by taking out the attaching screws.

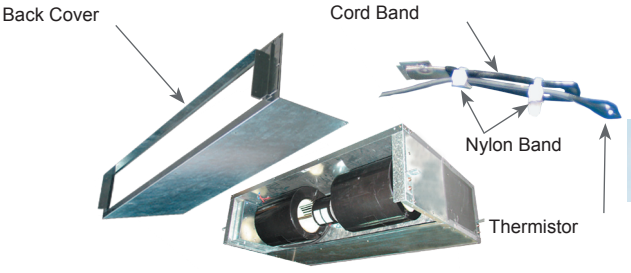

(Remove Electrical Box)

10.5.2. REMOVING INLET AIR THERMISTOR

NOTE:
To disconnect this component properly from the PCB, see the Electrical Wiring Diagram chapter of this Manual.

1. Remove the screws that fix the Back Cover.

   The thermistor is located as shown in the detail



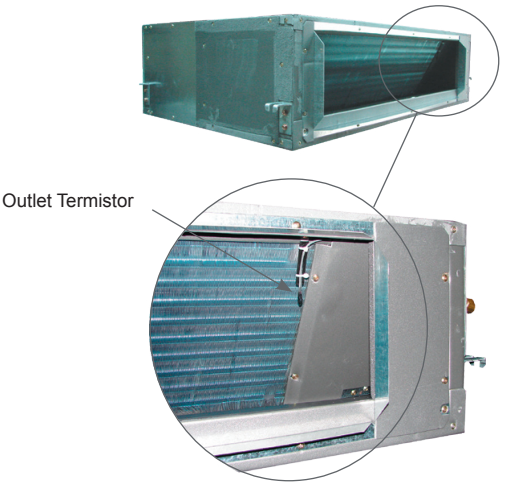


WARNING: *TURN OFF all the main switches*

10.5.3. REMOVING THE OUTLET AIR THERMISTOR

NOTE:
To disconnect this component properly from the PCB, see the Electrical Wiring Diagram chapter of this Manual.

1. The thermistor is located on the outlet side as shown in the detail.

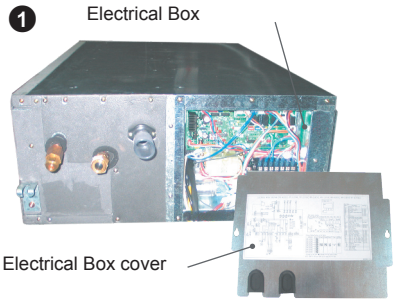


10.5.4. REMOVING THE LIQUID AND GAS PIPE THERMISTORS

NOTE:
To disconnect this component properly from the PCB, see the Electrical Wiring Diagram chapter of this Manual.

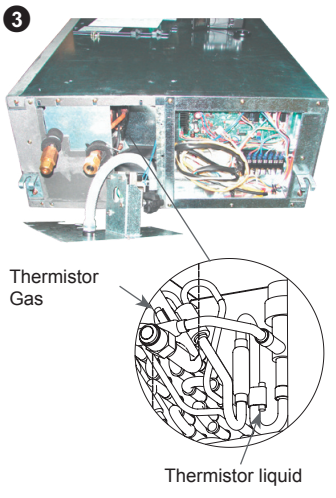
Cover the Thermistors with the Cork Tape or Pipe Insulation according to each location. Both materials are factory supplied. Replace them if damaged during the servicing.

1. Remove the Electrical Box Cover.
2. Remove the Service Cover.





3. Liquid and Gas Thermistors are fixed by Special Clamp on the cuper pipe.
   - Liquid Thermistor is coverd by Cork Tape
   - Gas Thermistor is covered by Pipe Insulation.

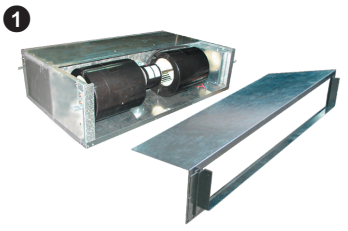


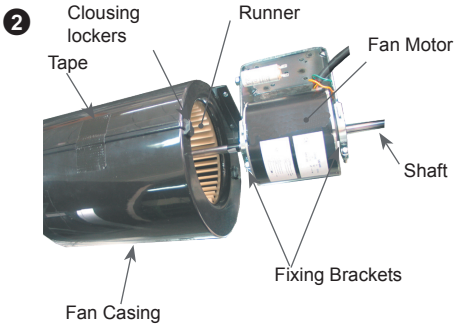
WARNING: *TURN OFF all the main switches*

10.5.5. REMOVING THE FAN PARTS

Parts list: (Fan Motor / Fan Casing / Runner).

1. Perform step 1 from point 10.7.2 of this chapter.
2. Remove the Tape located on the center of the Casing, push clousing lockers and remove the half part of the Casing.
3. Take out the screws from the Fixing Brackets, and remove Fan motor together with the Fan Runners carefully.
4. Loosen the screws that fix Fan Runners from the shaft.
5. In case of removing the whole Fan Caing, it shall be removed the second half of the fan Casing by removing the screws which fix it to the Fan Motor Stay.

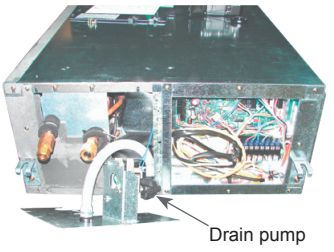


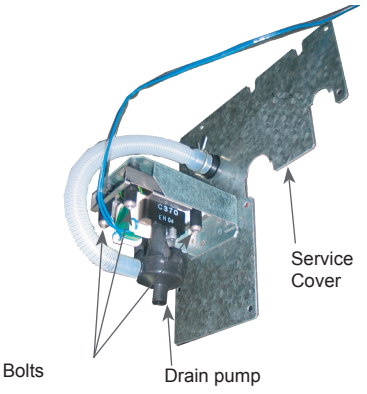


10.5.6. REMOVING THE DRAIN PUMP

NOTE:
To disconnect this component properly from the PCB, see the Electrical Wiring Diagram chapter of this Manual

1. Perform steps 1 and 2 from point 10.7.4 of this chapter.
2. Take out the Drain Pump from the Drain Pump support by removing the bolts.
3. After installing the new Draing Pump seal properly the Draing Pipe joints.





NOTE:
If a new Drain Pump has been installed, is necessary to take out the Electrical Box from the unit for wiring the Drain Pump to the PCB.

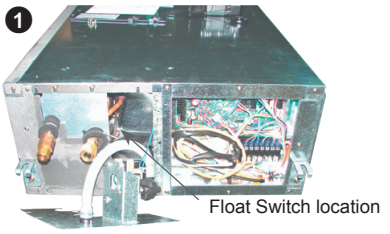
See point 10.7.1 of this chapter to remove electrical box from the unit.

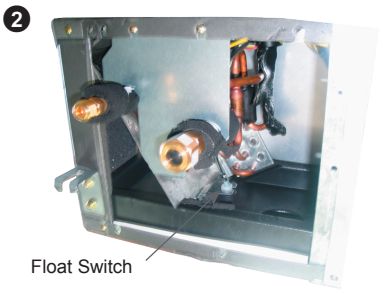
WARNING: *TURN OFF all the main switches*

10.5.7. REMOVING THE FLOAT SWITCH

NOTE:
To disconnect this component properly from the PCB, see the Electrical Wiring Diagram chapter of this Manual

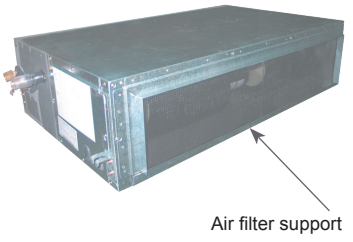
1. Perform steps 1 and 2 from point 10.7.4 of this chapter.
2. Loosen the screws that fix it to the stay.

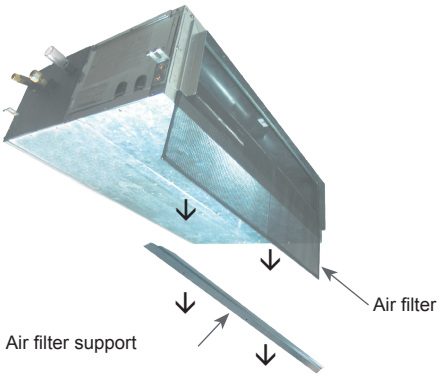




10.5.8. REMOVING THE AIR FILTER

1. Take out the Air Filter Support by removing the screws.
2. Slide down the air filter.





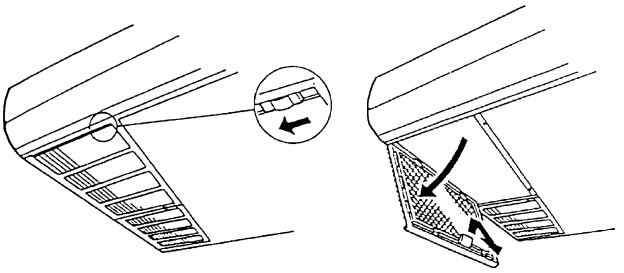
WARNING: *TURN OFF all the main switches*

10.6. RPC

Ceiling type

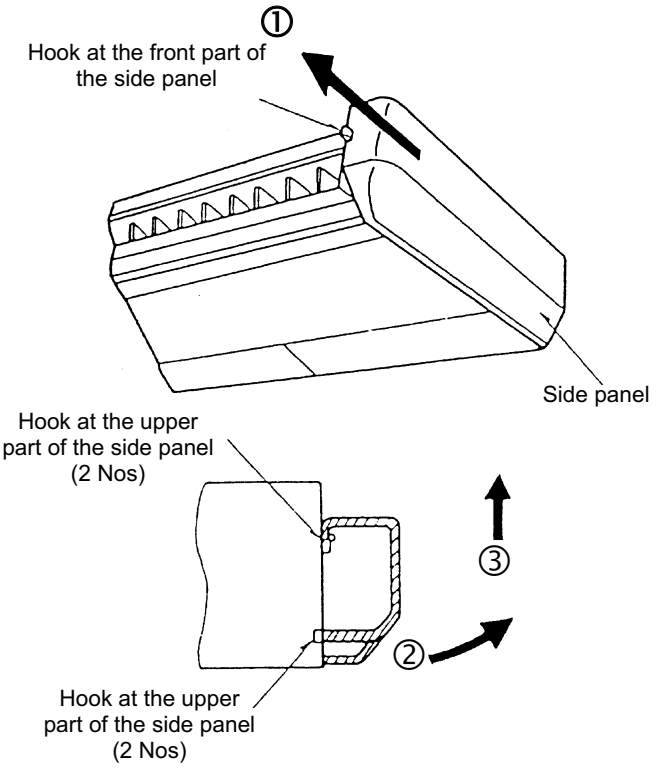
10.6.1. REMOVING THE AIR FILTER

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.



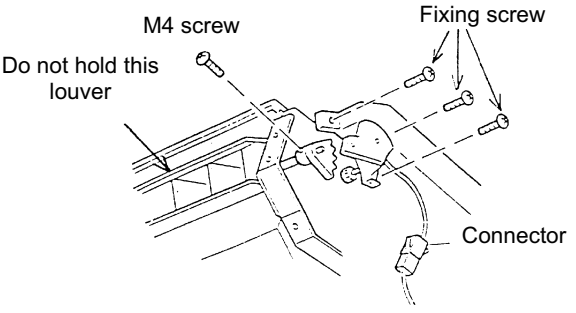
10.6.2. REMOVING THE SIDE PANEL

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.



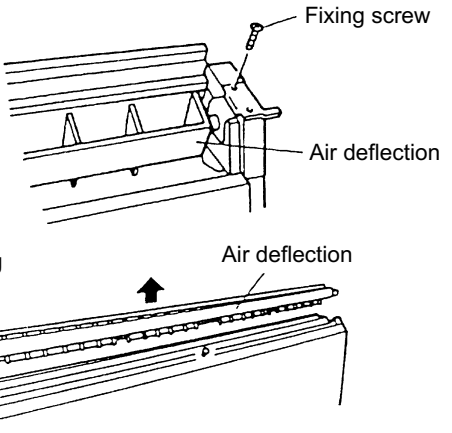
10.6.3. REMOVING THE DISCHARGE AIR GRILLE

1. Remove the side panel according to the section "Removing the Side Panel".
2. Remove the crank assembly that is mounted on the right-side shaft of the air deflector.



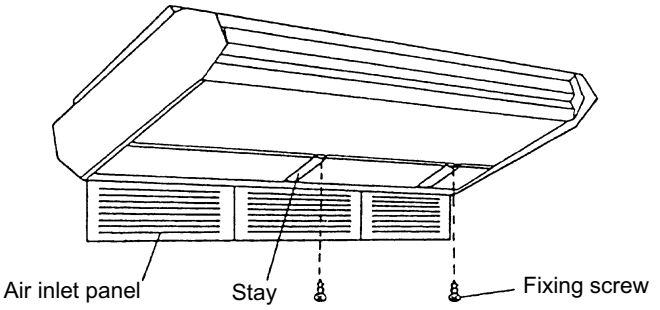
WARNING: *TURN OFF all the main switches*

3. Pull out the deflector including the bearing after removing the four fixing screws at the right and the left.

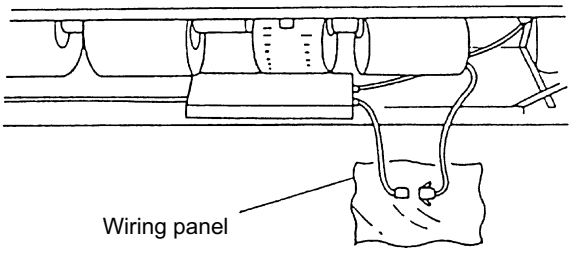


10.6.4. REMOVING THE FAN MOTOR

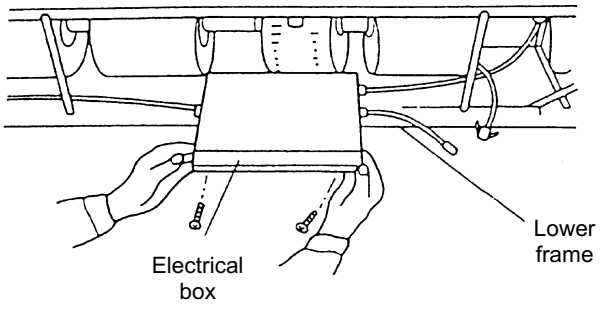
1. Open the air inlet grille according to the section "Removing the Air Filter".
2. Remove the stay at the air inlet.



3. Disconnect the connector for the indoor fan motor.



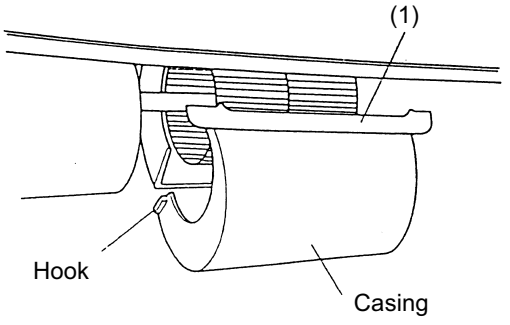
4. Hook the electrical box on the lower frame after removing the screws that fix the electrical box.



NOTE:

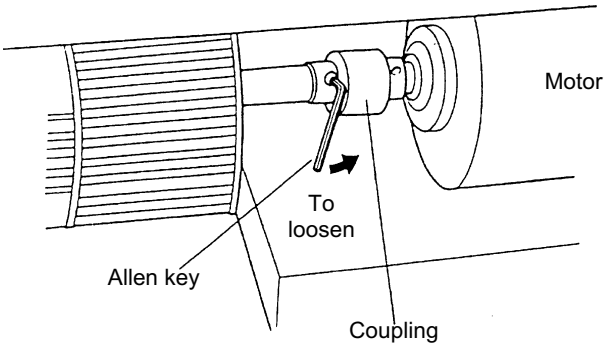
During this work, support the electrical box by hand and make sure not to drop the electrical box.

5. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.

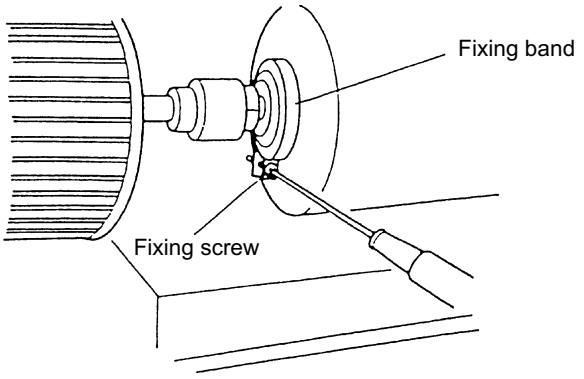


WARNING: *TURN OFF all the main switches*

6. Loosen the screws by means of a hexagon wrench.

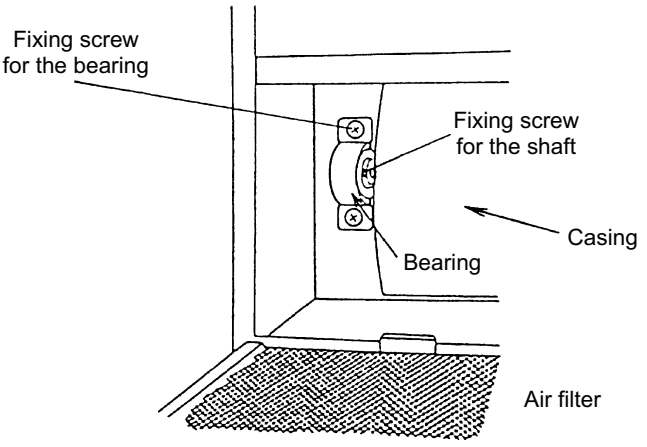


7. After removing the fixing band, remove the fan motor by sliding the fan motor backwards. Pay attention not to drop the fan motor.



10.6.5. REMOVING THE BEARING

1. Remove the side panel according to the section "Removing the side panel".
2. Loosen 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).



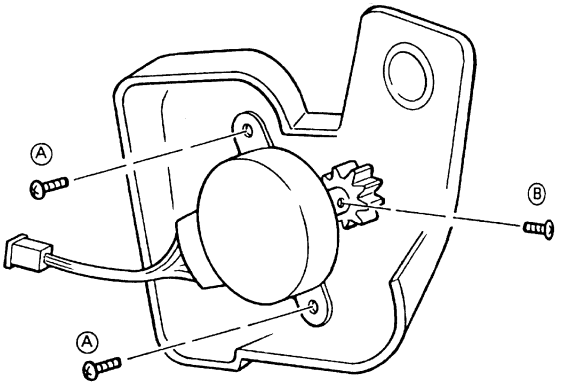
10.6.6. REMOVING THE COUPLING

1. Remove the side panel according to the section "Removing the Side Panel".
2. Separate the casing into two pieces according to the section "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 "Removing the Bearing".
4. Remove the coupling after removing the shaft and the turbo fan assembly.

WARNING: *TURN OFF all the main switches*

10.6.7. REMOVING THE AUTOMATIC LOUVER MOTOR

1. Remove the right-side panel according to the section "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.

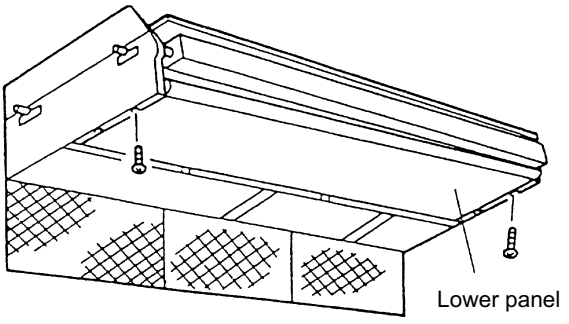


NOTE:

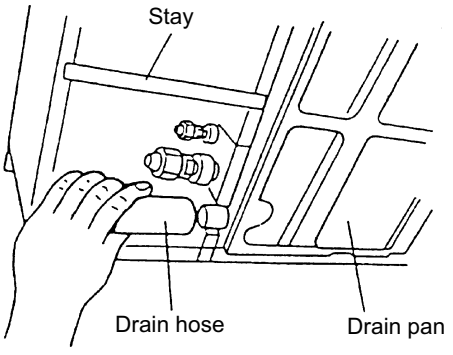
When you are assembling, tighten the two screws (A) with a torque of 0.8Nm (8kg-cm) and one screw (B) with a torque of 0.4 Nm (4kg-cm) by means of a torque wrench.

10.6.8. REMOVING THE THERMISTORS FOR LIQUID PIPE AND GAS PIPE

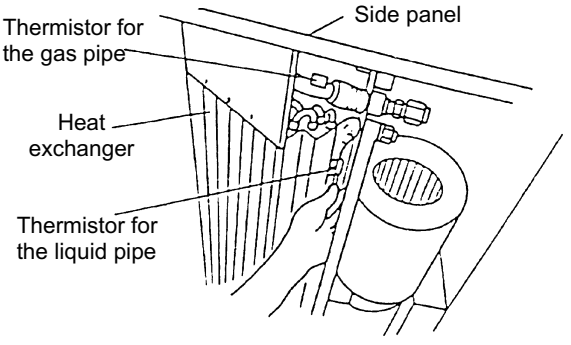
1. Remove the right-side panel and the left-side panel according to the section "Removing the Side Panel".
2. Remove the lower panel.



3. Remove the drain pan after disconnecting the drain hose.



4. Remove the thermistors for the liquid pipe and the gas pipe.



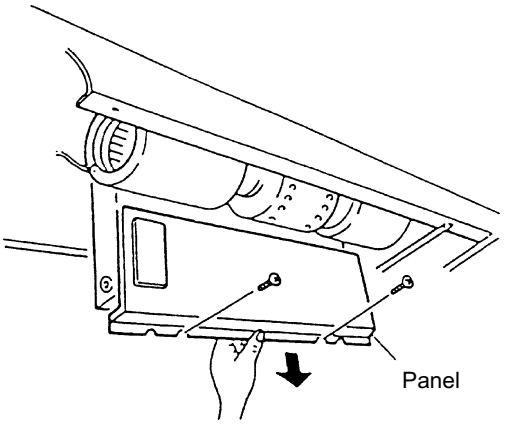
WARNING: *TURN OFF all the main switches*

10.6.9. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Open the air inlet panel according to the section "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 "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:

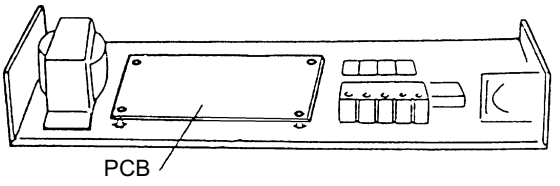
During this work, support the electrical box and make sure not to drop the electrical box.

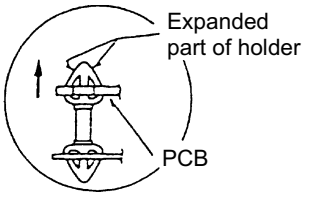


5. Four holders support the PCB. Pinch the expanded part of the holder by means of long-nose pliers.

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.

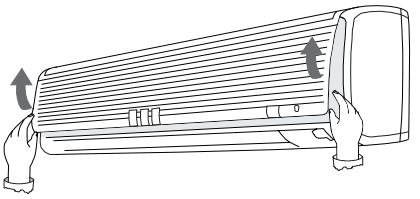




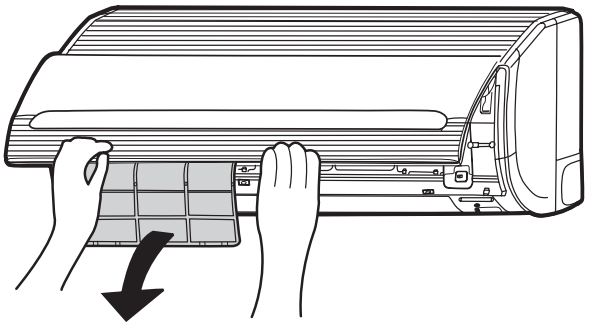
10.7. RPK-2.0

10.7.1. REMOVING THE AIR FILTER

1. Pull up the right side and the left side of the air inlet grille as shown in the figure.

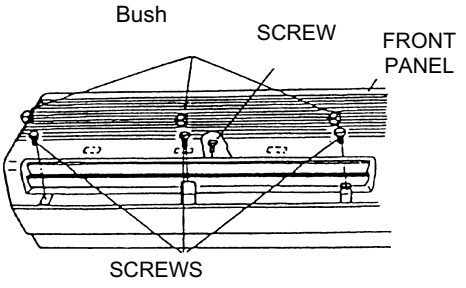


2. Pull down the air filter after lifting the grille and remove the air filter from the hinge.

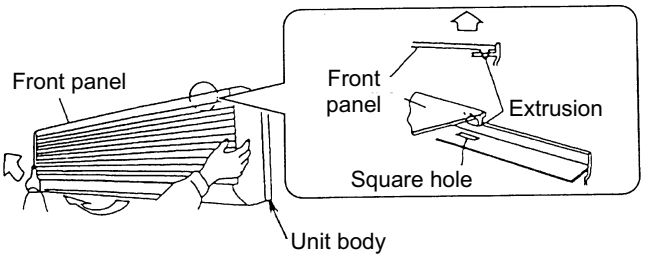


10.7.2. REMOVING THE FRONT PANEL

1. Press the "PUSH" marks at both ends of the front panel and open the suction grille by pulling toward the front side.
2. Remove one screw at the center of the front panel. After removing the screw, close the front panel once.
3. Remove the three bushes at the louver part of the air outlet and remove three screws.



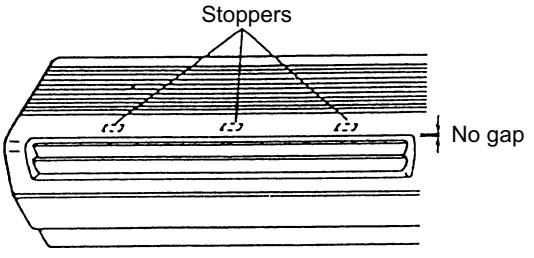
4. Hold both sides of the front panel, pull the front panel toward the front side slowly and lift up the front panel while you pay attention not to touch the louver at the air outlet.
5. Lift up the front panel slightly. Then, the three hooks at the upward part of the front panel are detached from the holes of the unit body and you can remove the front panel toward the front side.



NOTE:

DO NOT hit the front panel when you are removing the front panel. If you do so, you may break the unit body.

6. For attaching the front panel, first attach the front panel at the air outlet side. Then, attach the three hooks at the upper part of the front panel.
7. Open the front panel as the procedure (1) and fix the screw (1 piece) at the center of the front panel.
8. There are three stoppers at the inner side of the front panel. Press the hook part from the front side and make sure that there is no gap between the front panel and the unit body.



NOTE:

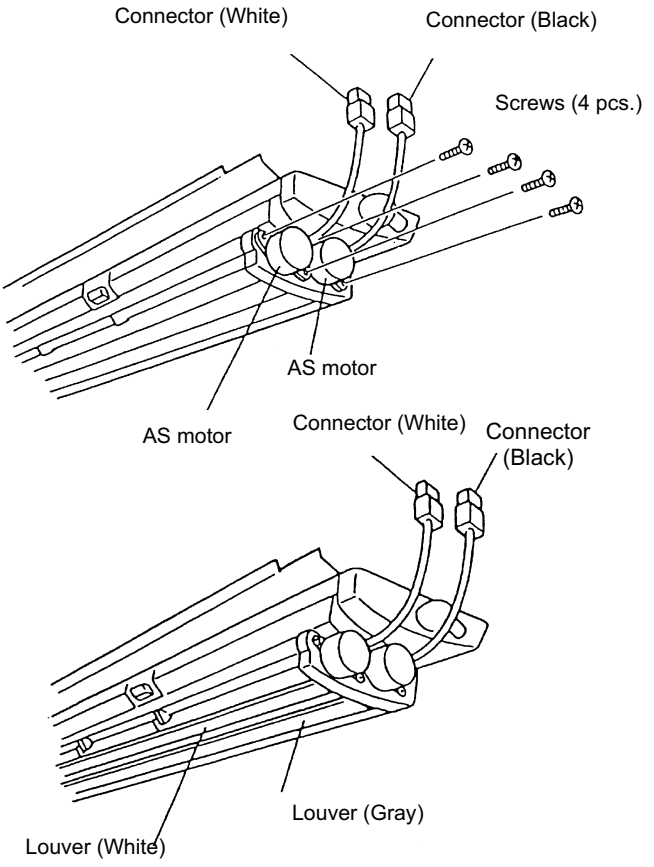
If there is a gap between the front panel and the air outlet, the gap may cause an air leakage and dew may appear at the front panel. Then, the dew may drop.

9. After attaching the front panel, tighten the three screws at the lower part of the air outlet and cover the three screws with the bushes.

WARNING: *TURN OFF all the main switches*

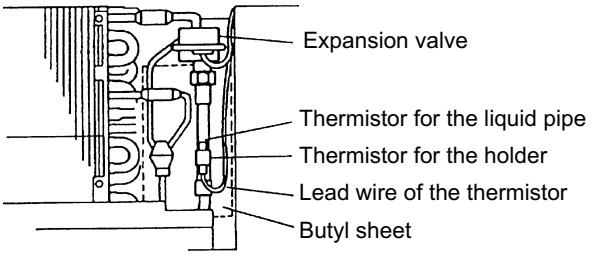
10.7.3. REMOVING THE MOTOR FOR THE AUTOMATIC LOUVER

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box Panel".
3. Remove the four screws which fix the AS motor.
4. Draw out the AS motor horizontally. The AS motor separates from the louver shaft.
5. For attaching the AS motor, insert the shaft of the AS motor into the D-cut hole of the louver, and perform in reverse order the procedure for removing the AS motor.

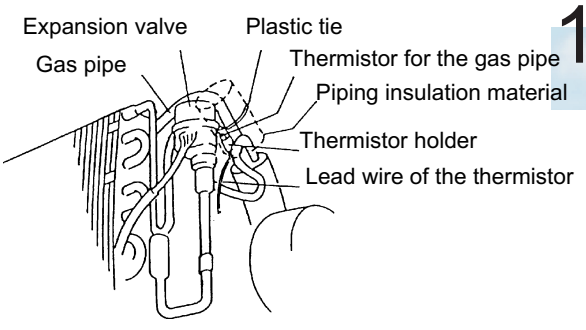


10.7.4. REMOVING THE THERMISTOR FOR LIQUID PIPE, GAS PIPE, DISCHARGED AIR AND SUCTION AIR

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box".
3. Removing the Thermistor for the Liquid Pipe
   Remove the butyl sheet that protects the thermistor for the liquid pipe and remove the thermistor from the holder.

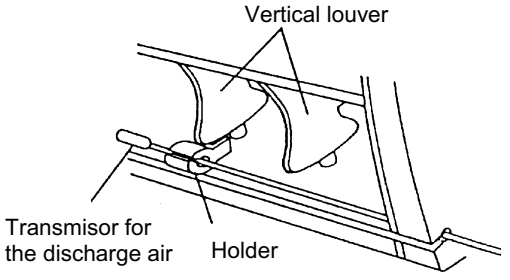


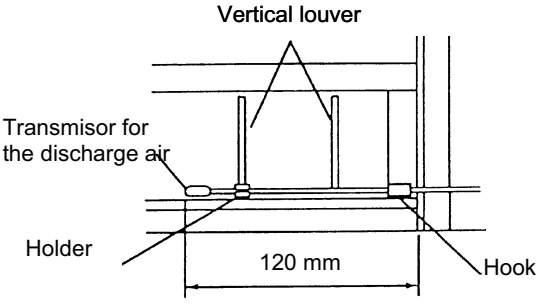
4. Removing the Thermistor for the Gas Pipe
   Remove the piping insulation material that protects the thermistor for the gas pipe, by cutting the plastic tie and the surrounding tapes. Then, remove the thermistor from the holder.



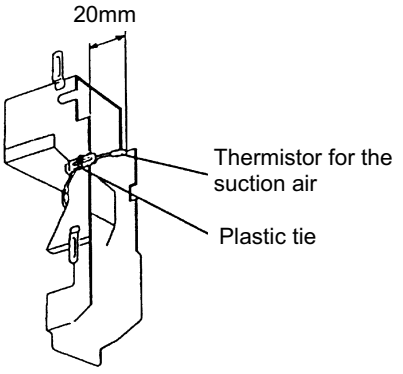
WARNING: *TURN OFF all the main switches*

5. Removing the thermistor for the discharge air
   Remove the thermistor for the discharge air from the holder of the vertical louver and the hook at the right side of the air outlet.



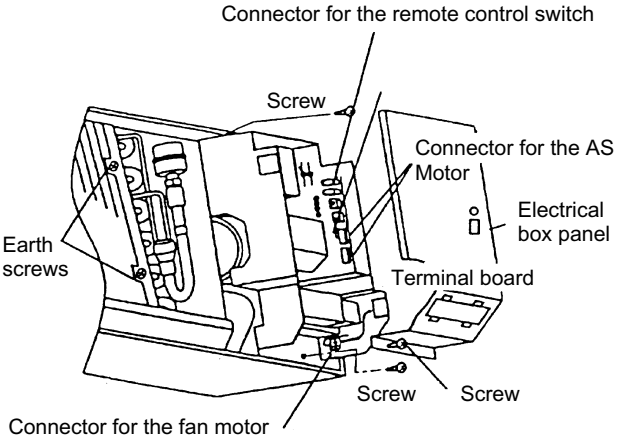


6. Removing the thermistor for the suction air
   Remove the thermistor for the suction air by cutting the plastic tie that fixes the thermistor onto the right side of the electrical box.



10.7.5. REMOVING THE ELECTRICAL BOX PANEL

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove one screw for the electrical box panel.
3. Remove the power supply wiring and the wiring connection between the indoor unit and outdoor unit.



4. Remove the lead wires for the expansion valve, the fan motor, the thermistors for the liquid pipe and the gas pipe, the AS Motor (X 2) and the remote control switch from the connectors. Also, remove ground wires (x2) of the heat exchanger.
5. Remove the thermistor for the discharge air from the holder that is fixed at the vertical louver of the air outlet.
6. Draw out the electrical box toward the front side after removing the two screws that fix the electrical box.
7. For attaching the electrical box, set the electrical box, connect the connectors and perform in reverse order the procedure for removing the electrical box.

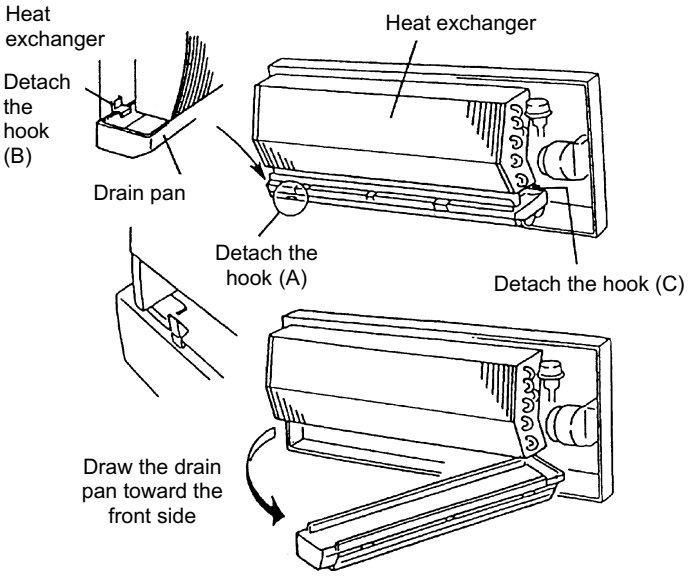
WARNING: *TURN OFF all the main switches*

10.7.6. REMOVING THE DRAIN PAN

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box Panel".
3. Remove the drain pan from the unit by detaching the hooks (A) and (B) from the left side of the drain pan, and by detaching the hook (C) while you are pulling the right side of the air panel toward the front side.
4. For attaching the drain pan, perform in reverse order the procedure for removing the drain pan.

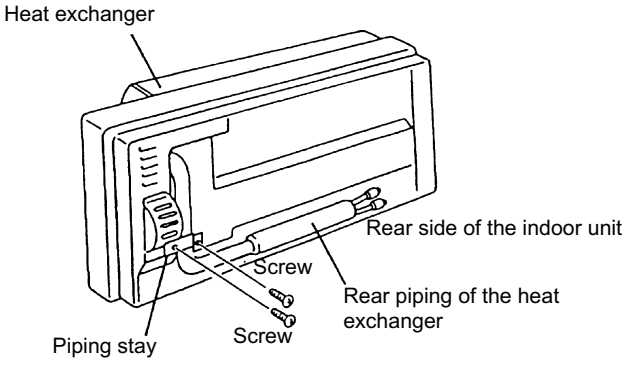
NOTE:

Make sure that the hooks (A), (B) and (C) are hooked correctly.

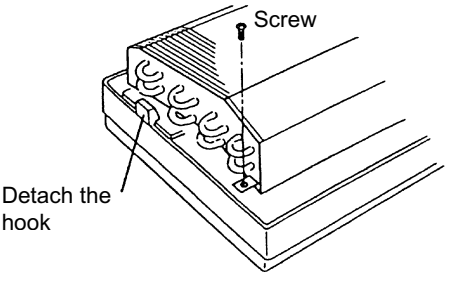


10.7.7. REMOVING THE HEAT EXCHANGER

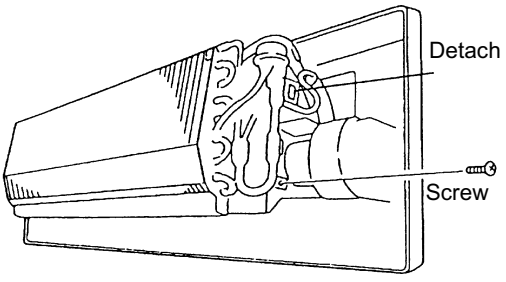
1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box Panel".
3. Remove the drain pan according to the section "Removing the Drain Pan".
4. Remove the piping stay at the rear side of the indoor unit.



5. Detach the hook that holds the left side of the heat exchanger and remove one screw that fixes the heat exchanger.



6. Remove one screw that fixes the heat exchanger and detach the hook that holds the right side of the heat exchanger.

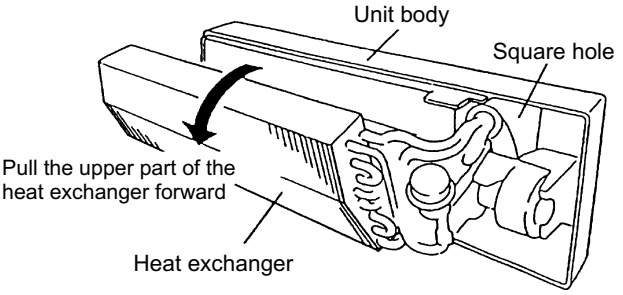


WARNING: *TURN OFF all the main switches*

7. Lift up the heat exchanger. Draw out the rear piping of the heat exchanger from the square hole by pulling the upper part of the heat exchanger forward, and then remove the heat exchanger.
8. For attaching the heat exchanger, perform in reverse order the procedure for removing the heat exchanger.

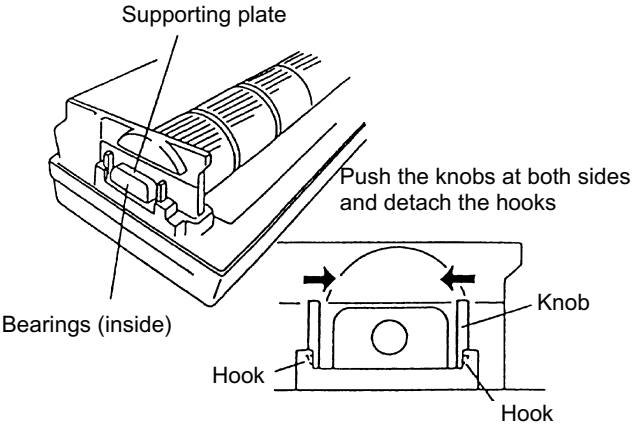
NOTE:

After attaching the heat exchanger, make sure that the hooks and the screws at the right side and the left side of the heat exchanger are correctly attached.

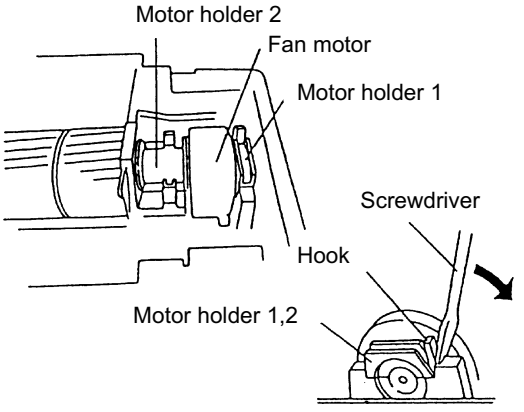


10.7.8. REMOVING THE FAN MOTOR

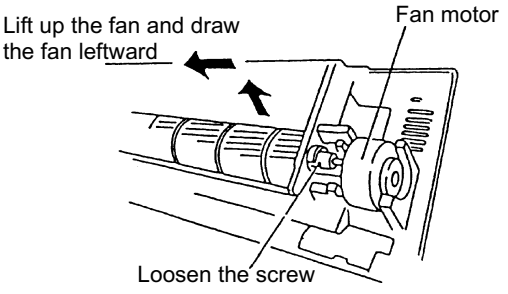
1. Remove the heat exchanger according to the section "Removing the Heat Exchanger".
2. Remove the supporting plate for the bearing by pushing the knobs at both sides of the supporting plate toward the inside and by detaching the hooks.



3. Remove the motor holders 1 and 2 that fix the fan motor. In order to remove the motor holder, insert the screwdriver at the hook part as shown in the figure.
4. After removing the motor holder 1, loosen one screw (1) that fixes the motor shaft and the fan.

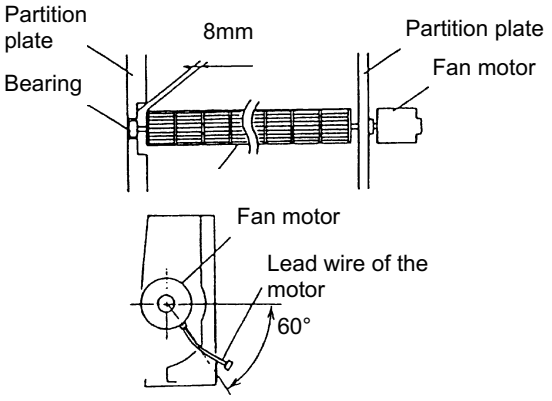


5. Draw the fan leftward while you are lifting up the bearing side of the fan slightly. Then, the fan and the fan motor are removed.



WARNING: *TURN OFF all the main switches*

6. For attaching the fan motor and the fan, perform in reverse order the procedure for removing the fan motor and the fan.
7. Fix the fan at the position with a 8mm clearance between the left end (bearing side) of the fan and the partition plate.
8. Fix the fan motor with the outlet of the lead wire at the position as shown below.



10.7.9. REMOVING THE ELECTRONIC EXPANSION VALVE

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box Panel".
3. The butyl sheet is adhered around the piping of the heat exchanger, the electronic expansion valve and the inlet piping and outlet piping of the electronic expansion valve. Remove the butyl sheet of the surface of the piping, the coil part of the expansion valve and the part of the valve body.
4. Prepare two 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:

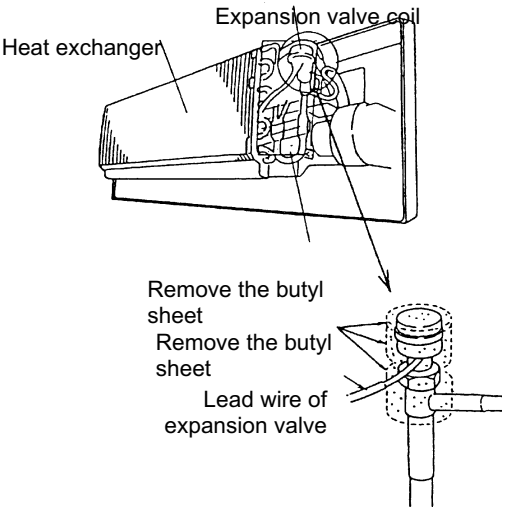
Do not hold the motor part when you are loosening the lock nut by means of a spanner. The base of the drive part may turn idle and may break.

Turn the lock nut by a few turns. Then, the drive part separates from the screw and you can remove the drive part.
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, 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.

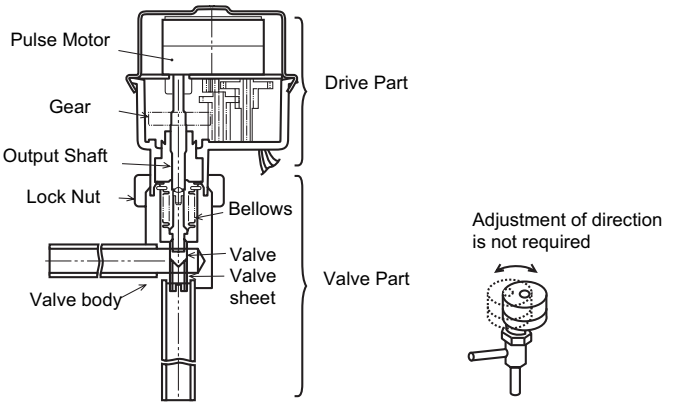
Put the drive part onto the valve body, hold the drive part and the valve body with their axes matching and attach the lock nut to the screw part of the valve body. Tighten the lock nut with a spanner after tightening lightly by hand.
The tightening torque should be within the range of 12Nm(120kg-cm) ~ 15Nm (150kg-cm).



WARNING: *TURN OFF all the main switches*

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.
Although the direction of the eccentric part of the motor is assembled with the eccentric part of the motor directed toward the counterdirection 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 in the figure.
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.



5. Attach the removed butyl sheet to the electronic expansion valve again.
6. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.

WARNING: *TURN OFF all the main switches*

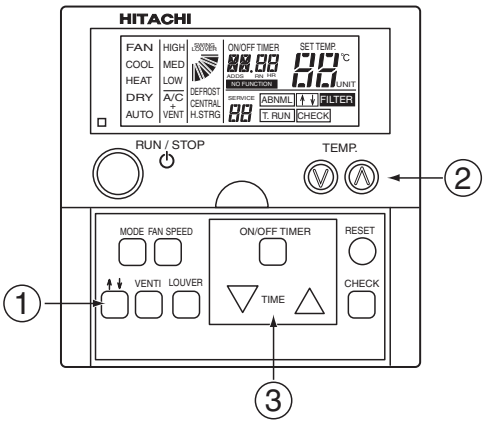
10.8. RPK-2.5-4-0

NOTE:

In order to remove the filter, you need to change the louver position using one of the following remote control switches: PC-P1HE and PC-RLH3A.

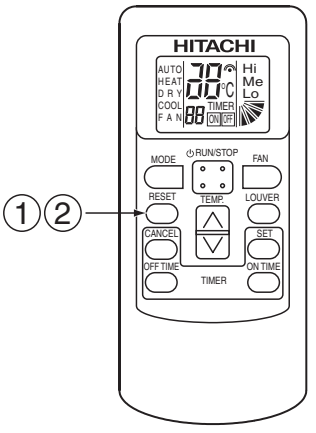
1. Press the "↑↓" switch. "↑↓" (Up & Down Panel Operation) will be displayed in the Liquid Crystal Display.
2. When you are operating multiple indoor units by means of a remote control switch, press the TEMP. (Temperature Setting) switch and set the address that you need to open.
3. By pressing the TIME (Time Setting) switch, you keep the louver at a horizontal position. If you press the "∇" when the louver angle is at a closing position, the louver will move to the horizontal position.

   If you press the "Δ" when the louver angle is at the horizontal position, the louver angle will move to the closing position.

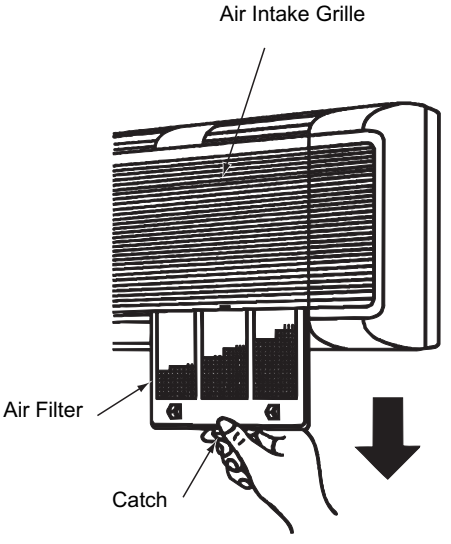


■ In case of PC-LH3A

1. Face the transmitter toward the receiver of the indoor unit and press the RESET switch.
2. Change the louver angle to the horizontal position. If you press the RESET switch when the louver angle is horizontal position, the louver will be moved at the closing position.



3. Pull the air filter downward from the air filter grille.

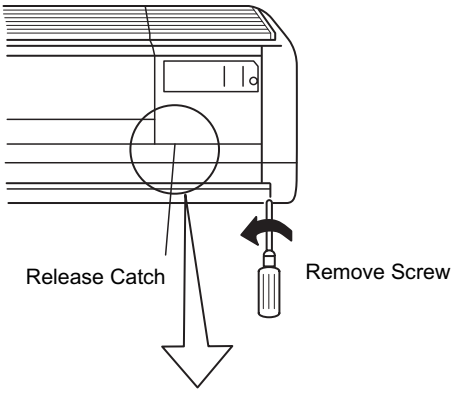


4. Press the “Reset” switch on the remote control switch after cleaning the air filter

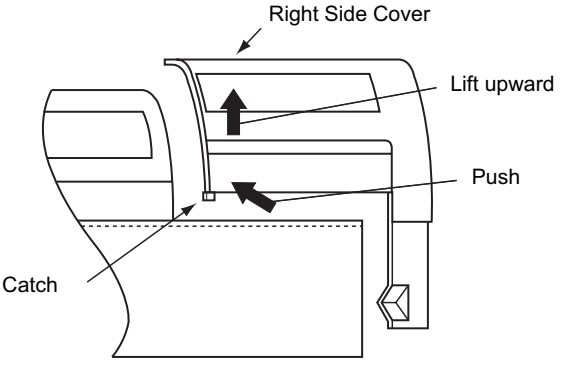
WARNING: *TURN OFF all the main switches*

10.8.1. REMOVING THE RIGHT SIDE COVER

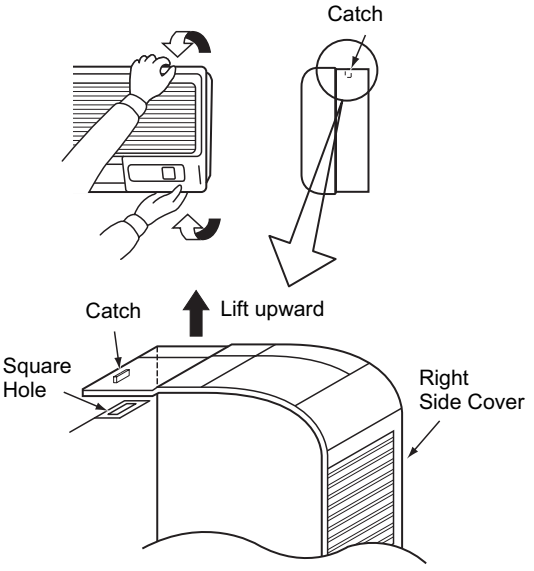
1. Remove one screw fixing the right side cover.



2. Release the lower left side catch of the right side cover. Pull the right cover slighty and release the catch.



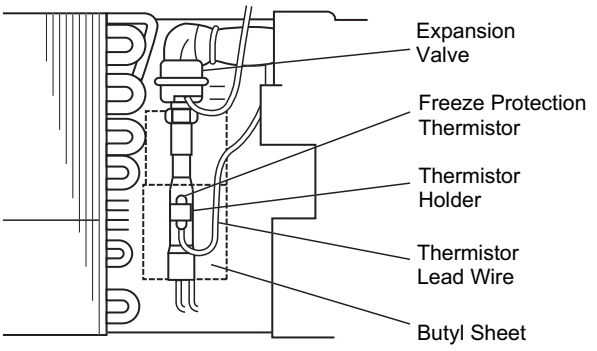
3. Remove the lower side of the right side cover, and release the upper side catch.



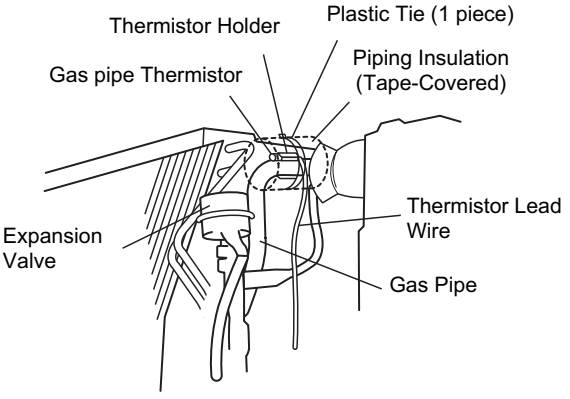
WARNING: *TURN OFF all the main switches*

10.8.2. REMOVING THE THERMISTORS FOR LIQUID PIPE, GAS PIPE, DISCHARGE AIR AND SUCTION AIR

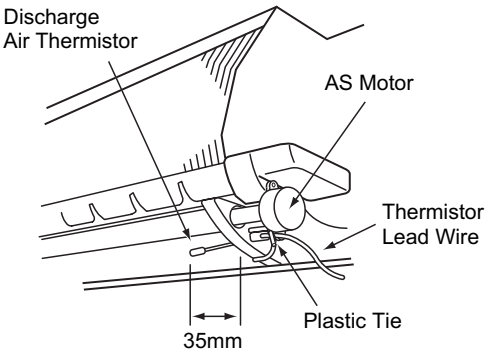
1. Remove the right side cover according to the section "Removing right side cover", and remove the suction air grille.
2. Remove the electrical box according to the section "Removing the electrical box panel".
3. Removing the Thermistor for the Liquid Pipe.
   Remove the butyli sheet that protects the thermistor for the liquid pipe and remove the thermistor from holder.



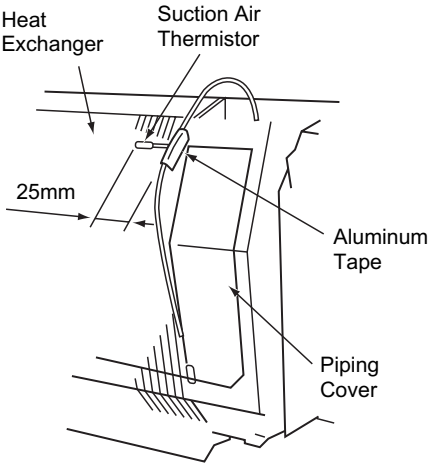
4. Removing the Thermistor for the Gas Pipe.
   Remove the piping insulation material that protects the thermistor for the gas pipe, by cutting the plastic and the surrounding tapes. Then, remove thge thermistor from the holder.



5. Removing the Thermistor for Discharge Air.
   Remove the plastic tie that fix the thermistor for discharge and remove the thermistor from the frame work.



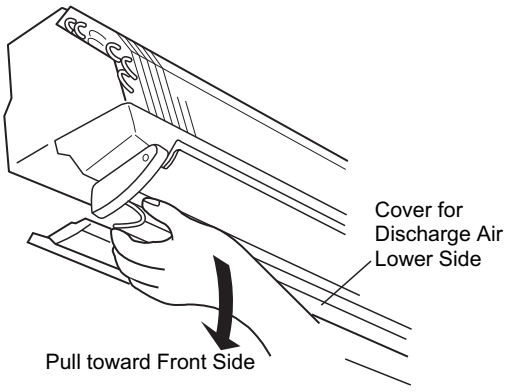
6. Removing the Thermistor for the suction Air.
   Remove the aluminium tape that fix the thermistor onto the right side of the electrical box.



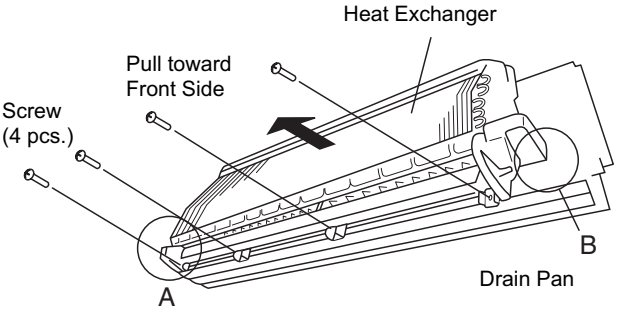
WARNING: *TURN OFF all the main switches*

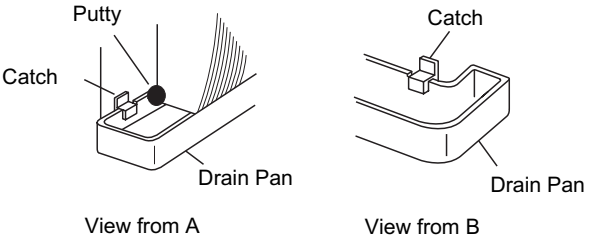
10.8.3. REMOVING THE DRAIN PAN

1. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.
2. Pull the cover of the discharge air lower side toward the front side, and remove it.
3. Remove 4 screws fixing the drain pan toward the lower side and remove it.



4. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.
5. Pull the cover of the discharge air lower side toward the front side, and remove it.
6. Remove 4 screws fixing the drain pan toward the lower side and remove it.



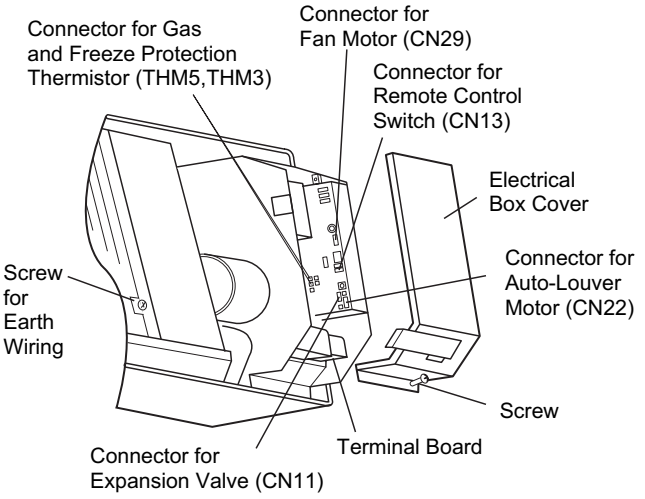


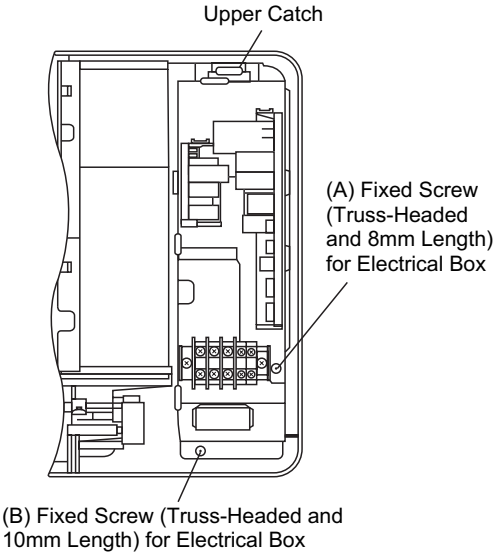
WARNING: *TURN OFF all the main switches*

10.8.4. REMOVING THE ELECTRICAL BOX PANEL

1. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.
2. Remove one screw for the electrical Box Panel.
3. Remove the power supply wiring and the wiring connection between the indoor unit and the outdoor unit.
4. Remove the lead wires for the expansion valve, the fan motor the thermistors for the liquid pipe and the gas pipe, the AS motor and the remote control switch for three connectors. Also, remove ground wires of the heat exchanger.
5. Remove the thermistor for discharge air and suction air.
6. Remove the two screws of electrical box.
7. Detach the hook of upperside of electrical box.
8. For attaching the electrical box, set the electrical box, connect the connectors.

ATTENTION:
Make sure that there are two different length of screws.
(A) M4x8
(B) M4x10





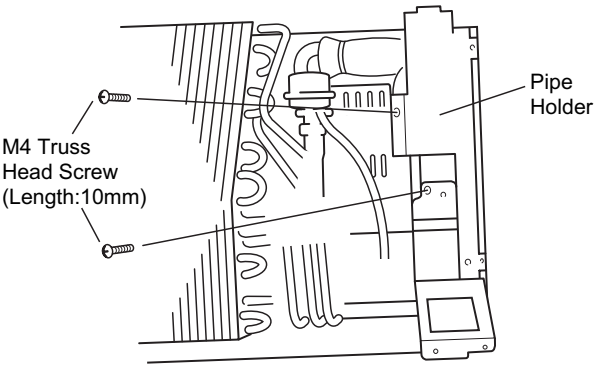
WARNING: *TURN OFF all the main switches*

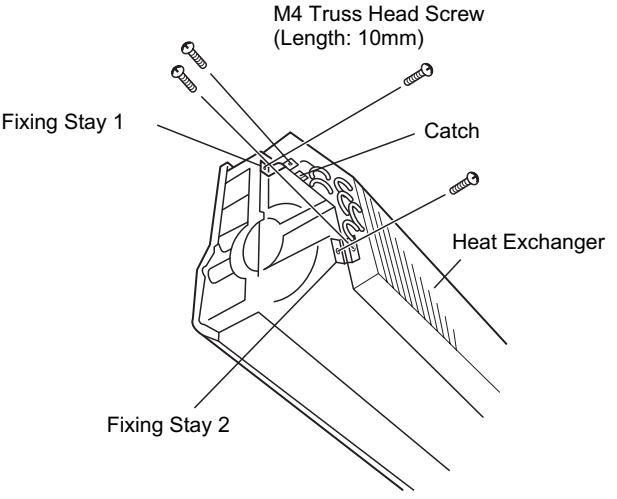
10.8.5. REMOVING THE HEAT EXCHANGER

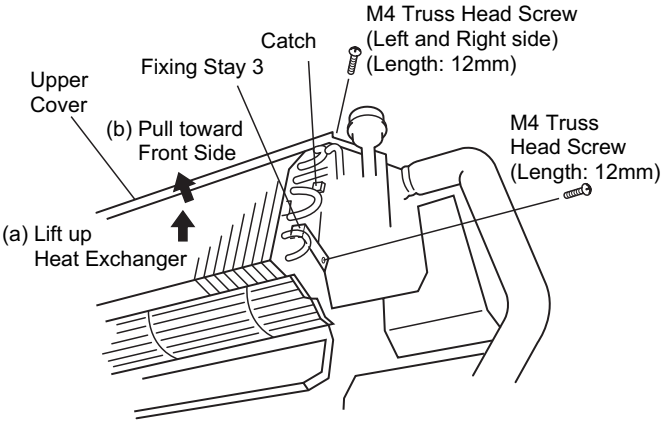
1. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.
2. Remove the drain pan according to the section “Removing the drain pan”.
3. Remove the electrical box panel according to the section ”Removing the electrical box panel”.
4. Remove the piping stay at the back side of the heat exchanger.
5. Remove the stay, stay2 ate the left side of the heat exchanger.
6. Remove the screw of the heat exchanger on the right.
7. Remove the two screws of the upper cover.
8. Detach the hook of the left and right side, by lift up the heat exchanger and draw out the heat exchanger to the fron side.

NOTE:

If you don’t lift up the heat exchanger, hook may break down.



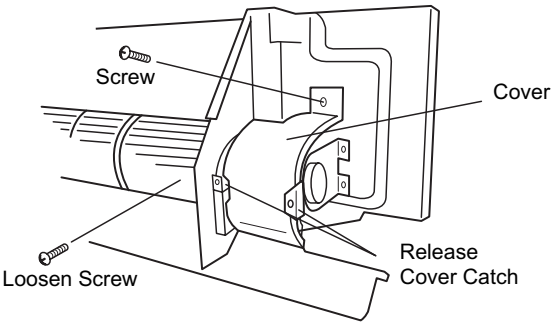




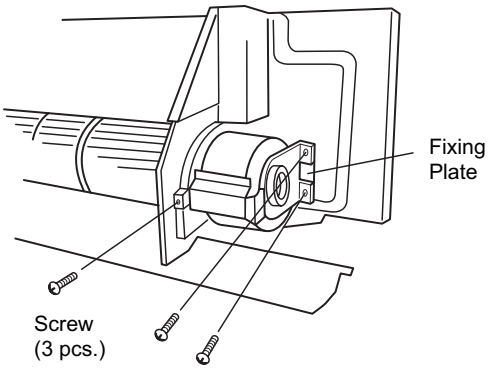
WARNING: *TURN OFF all the main switches*

10.8.6. REMOVING THE FAN AND THE FAN MOTOR

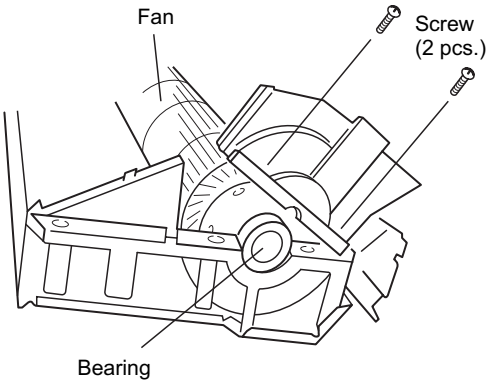
1. Remove the heat exchanger according to the section “Removing the heat exchanger”.
2. Remove one screw and two catches at the cover of the upper side fan motor and remove the cover.
3. Loose one screw fixing the motor shaft and the fan.



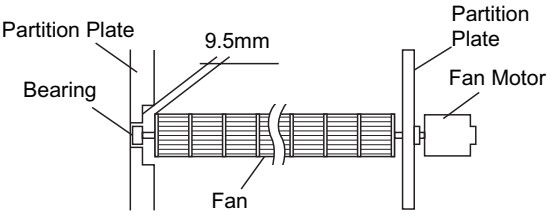
4. Remove three screws fixing the fan motor plate and remove the fan motor.



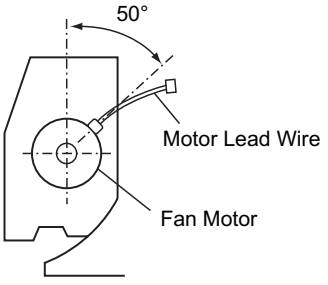
5. Remove the two screws fixing the fan motor and the fan, perform the reverse procedures for removing.



6. Fix the fan at the position with 9.5mm clerance between the left end (Bearing side) of the fan and partition plate.



7. Fix the fan motor with the oulet of lead wire at the position at as shown below.

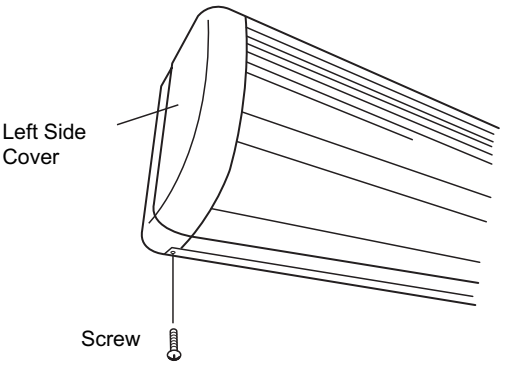


10

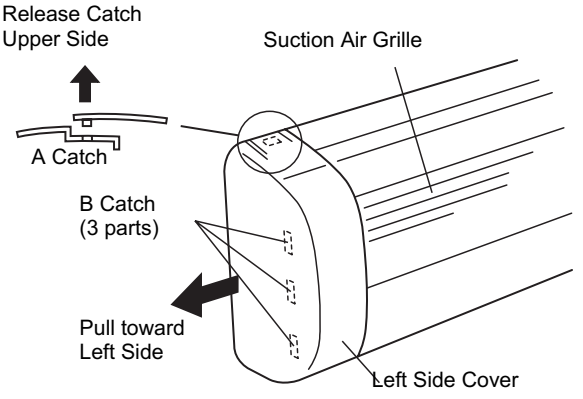
WARNING: *TURN OFF all the main switches*

10.8.7. REMOVING THE SUCTION AIR GRILLE

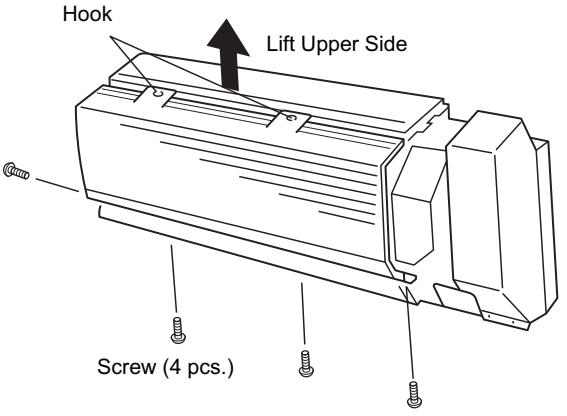
1. Remove the right side cover according to the section “Removing right side cover”.
2. Remove one screw of the left side cover.



3. Detach the hook (A) of left side cover.
4. There are the hook (B) at the left side cover will be removed.



5. Remove four screws of suction air grille.
6. Lift up the suction grille slightly, you can remove the suction air grille by detaching hooks.



WARNING: *TURN OFF all the main switches*

10.8.8. REMOVING THE ELECTRONIC EXPANSION VALVE COIL

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the electrical box according to the section "Removing the Electrical Box Panel".
3. The butyl sheet is adhered around the piping of the heat exchanger, the electronic expansion valve and the inlet piping and outlet piping of the electronic expansion valve. Remove the butyl sheet of the surface of the piping, the coil part of the expansion valve and the part of the valve body.
4. Prepare two 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:

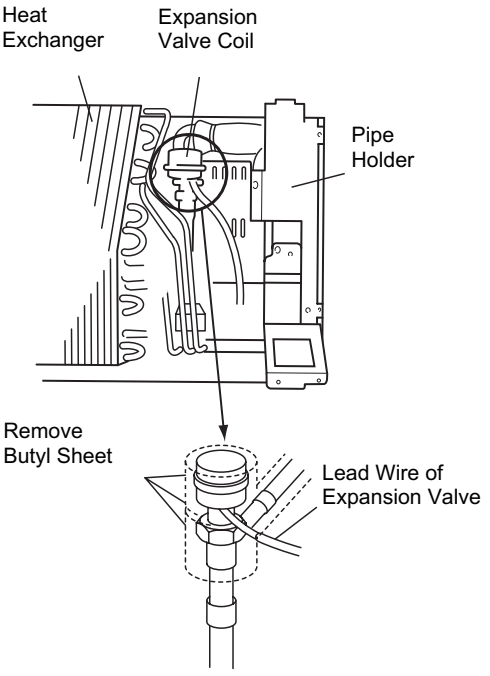
Do not hold the motor part when you are loosening the lock nut by means of a spanner. The base of the drive part may turn idle and may break.

5. Turn the lock nut by a few turns. Then, the drive part separates from the screw and you can remove the drive part.
   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, 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.

6. 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. Tighten the lock nut with a spanner after tightening lightly by hand.
   The tightening torque should be within the range of 12Nm(120kg-cm) ~ 15Nm (150kg-cm).



WARNING: *TURN OFF all the main switches*

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.
Although the direction of the eccentric part of the motor is assembled with the eccentric part of the motor directed toward the counterdirection 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 in the Figure 2.
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.

7. Attach the removed butyl sheet to the electronic expansion valve again.
8. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.

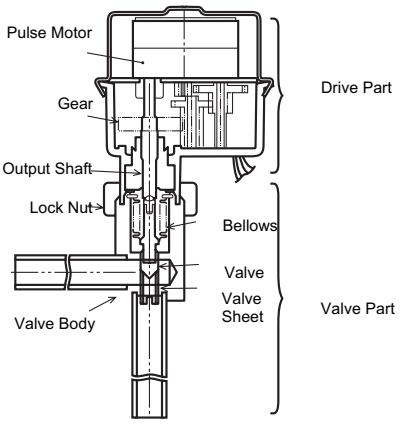


Fig. 1 Expansion Valve

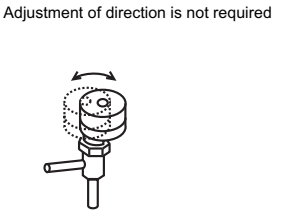


Fig. 2 Direction of Drive Part

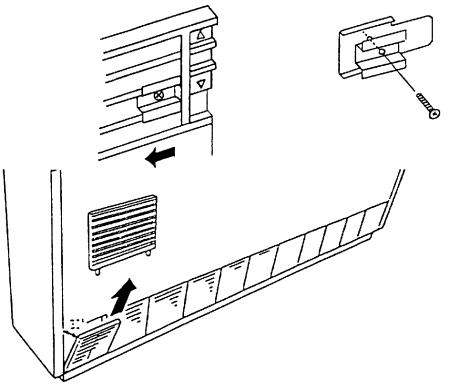
WARNING: *TURN OFF all the main switches*

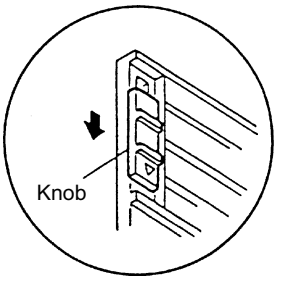
10.9. RPF

Floor Type

10.9.1. REMOVING THE AIR INLET GRILLE

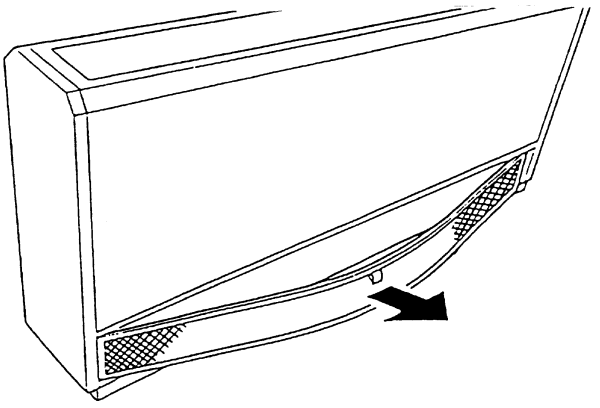
1. Loosen the screws for the fixing plate at the right side of each air inlet grille. Then, move the fixing plates.
2. By pushing the knob at both sides of the air inlet grille towards the arrow mark direction, the air inlet grille can be opened with an angle of 30°.
3. Remove the air inlet grille from the hinged part.





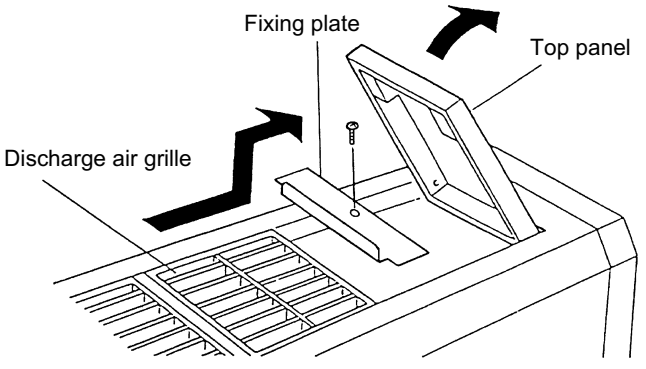
10.9.2. REMOVING THE AIR FILTER

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.



10.9.3. REMOVING THE DISCHARGE AIR GRILLE

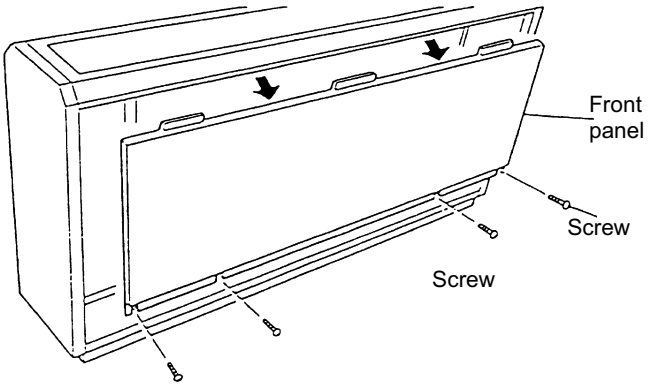
1. The discharge air grilles are mounted on the top by means of a guide rail.
2. By opening the top panel and by sliding the discharge air grilles, you can remove the discharge air grilles.



WARNING: *TURN OFF all the main switches*

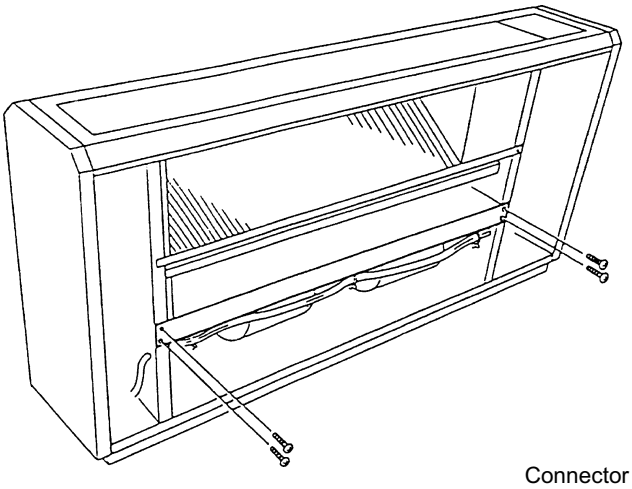
10.9.4. REMOVING THE FRONT PANEL

1. Remove the air filter according to the section "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.

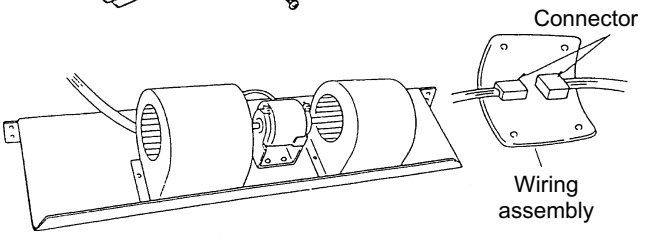


10.9.5. REMOVING THE FAN MOTOR

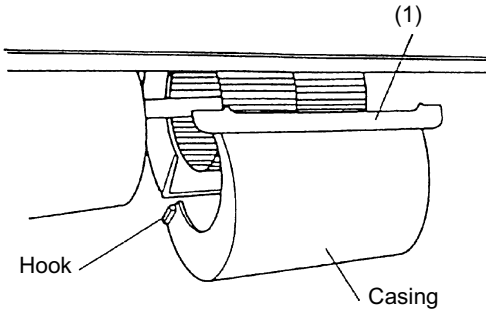
1. Remove the air inlet grille according to the section "Removing the Air Inlet Grille".
2. Remove the air filter according to the section "Removing the Air Filter".
3. Remove the front panel according to the section "Removing the front panel".
4. Remove the mounting plate for the fan motor after removing the four fixing screws.



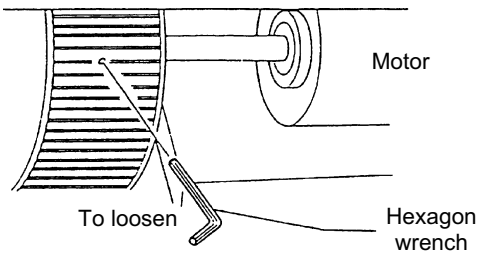
5. Disconnect the wiring connector for the fan motor. Remove the wiring assembly and the connector.



6. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.

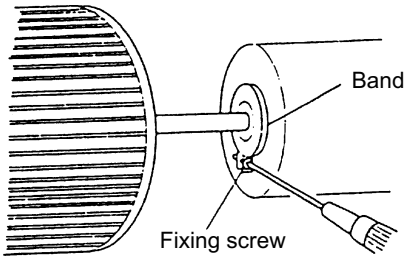


7. Loosen the screws by means of a hexagon wrench.



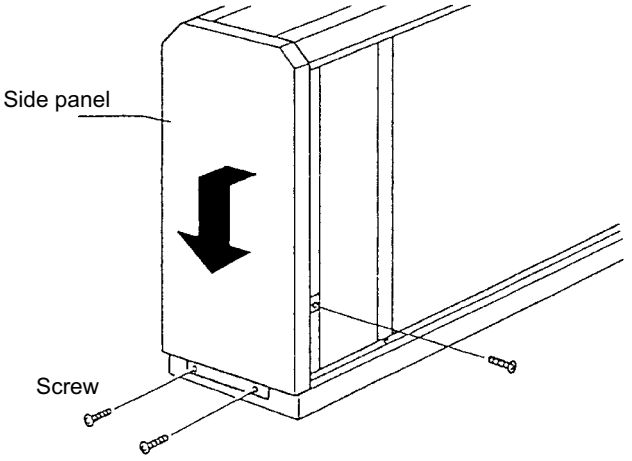
WARNING: *TURN OFF all the main switches*

8. After removing the fixing plate, remove the fan motor by sliding the fan motor backwards. Pay attention not to drop the fan motor.

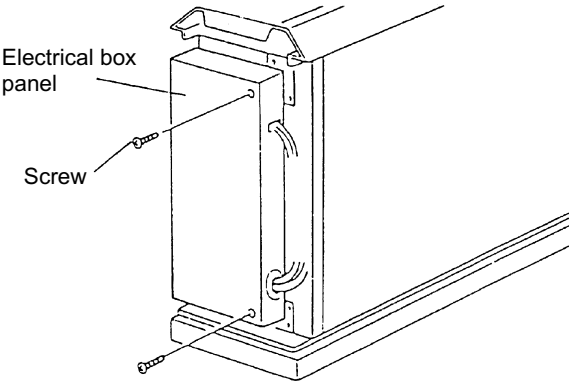


10.9.6. REMOVING THE PRINTED CIRCUIT BOARD

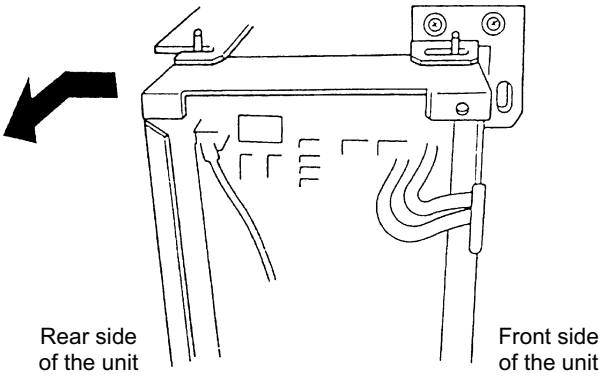
1. Remove the air inlet grille according to the section "Removing the Air Inlet Grille".
2. Remove the air filter according to the section "Removing the Air Filter".
3. Remove the front panel according to the section "Removing the front panel".
4. You can remove the side panel by removing the three fixing screws and pulling the side panel downwards.



5. Remove the electrical box panel after removing the two fixing screws.

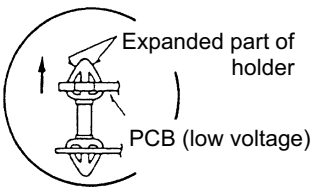


6. You can turn the electrical box up to an angle of 90° by removing the two fixing screws and by unhooking the hook at the rear side of the electrical box.
7. Four holders support the PCB. Pull out the PCB from the PCB hole by pushing the expanded part of the holder by means of long-nose pliers and by putting a finger near the hole of the PCB.



NOTES:

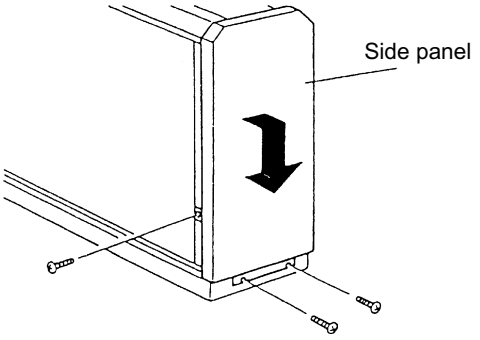
1. *Do not touch the electrical components. Do not apply a great force to the PCB. If you apply a great force, the PCB will become faulty.*
2. *When you are reassembling, make sure that each terminal is correctly connected. Refer to the wire marks and the terminal codes. If you connect the terminals incorrectly, a malfunction or a damage of the electrical components will occur.*



WARNING: *TURN OFF all the main switches*

10.9.7. REMOVING THE THERMISTORS FOR LIQUID PIPE AND GAS PIPE

1. Remove the air inlet grille according to the section "Removing the Air Inlet Grille".
2. Remove the air filter according to the section "Removing the Air Filter".
3. Remove the front panel according to the section "Removing the front panel".
4. Remove the side panel after removing the three fixing screws.

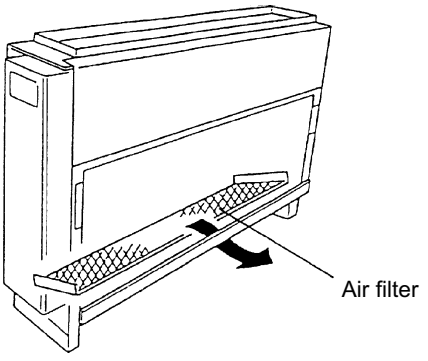


10.10. RPFI

Floor-Concealed Type

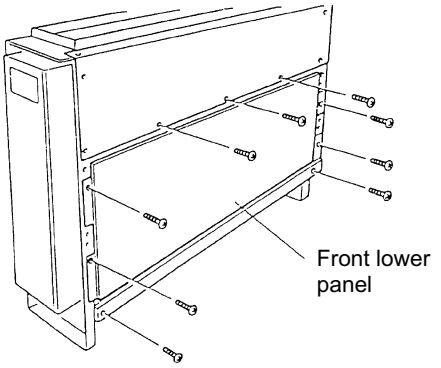
10.10.1. REMOVING THE AIR FILTER

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.



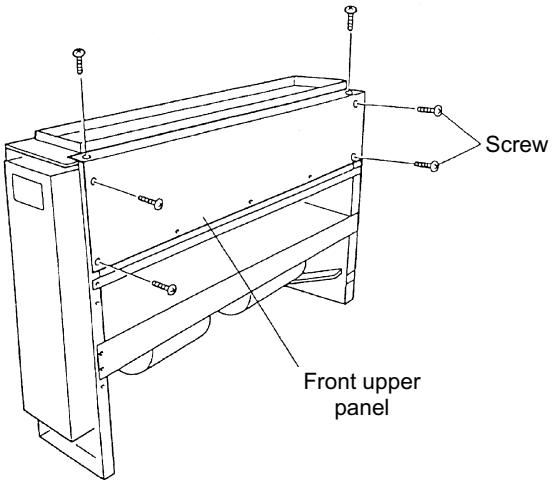
10.10.2. REMOVING THE FRONT PANEL

1. Remove the air filter according to the section "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.



WARNING: *TURN OFF all the main switches*

3. Remove the front upper panel after removing the eleven fixing screws.



10.10.3. REMOVING THE FAN MOTOR

1. Remove the air filter according to the section "Removing the Air Filter".
2. Remove the front panel according to the section "Removing the Front Panel".
3. Remove the fan motor as explained in items 4 to 8 of the section "Removing the Fan Motor".

10.10.4. REMOVING THE PRINTED CIRCUIT BOARD (PCB)

1. Remove the front panel according to the section "Removing the Front Panel".
2. Remove the PCBs as explained in items 5 to 7 of the section "Removing the Printed Circuit Board (PCB)".

10.10.5. REMOVING THE THERMISTORS FOR LIQUID PIPE AND GAS PIPE

1. Remove the air filter according to the section "Removing the Air Filter".
2. Remove the front panel according to the section "Removing the Front Panel".
3. Remove the thermistor as explained in items 4 to 6 of the section, "Removing the Thermistors for the Liquid Pipe and the Gas Pipe".

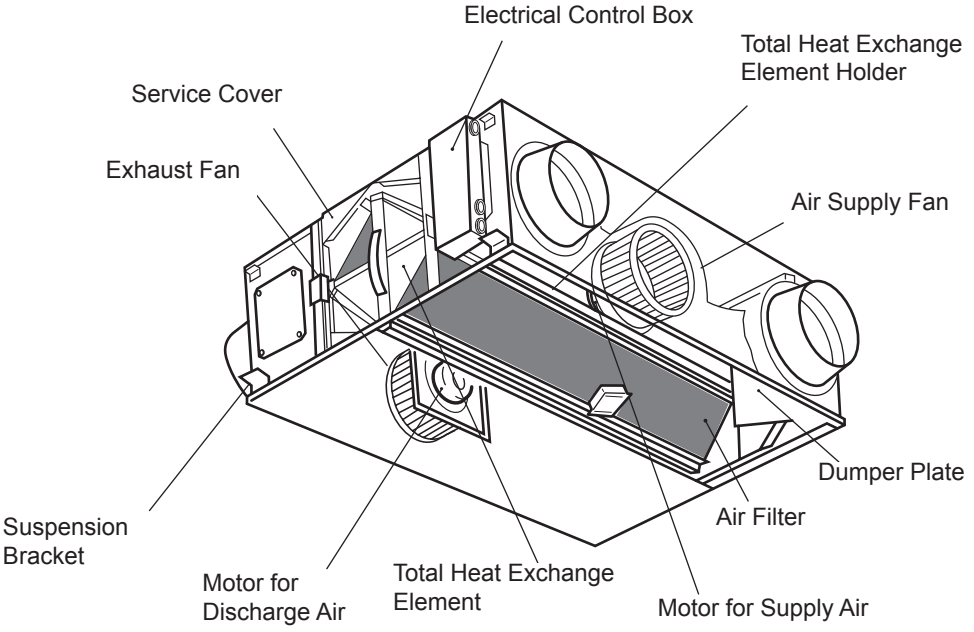
WARNING: *TURN OFF all the main switches*

10.11. TOTAL HEAT EXCHANGER

10.11.1. STRUCTURE

The structure of the total heat exchanger is as shown in the figure.

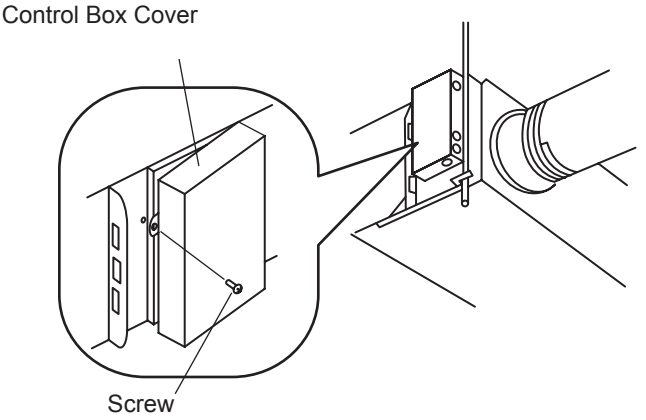
When maintaining, use service access door of ceiling.



10.11.2. REMOVING ELECTRICAL PARTS

1. Remove screws for fixing for the electrical control box cover and remove the corresponded electrical parts.
2. Open the service cover by pulling the handle.

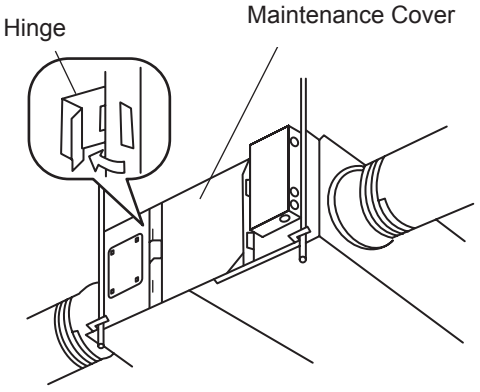
   Remove the total heat exchanger element or air filter.

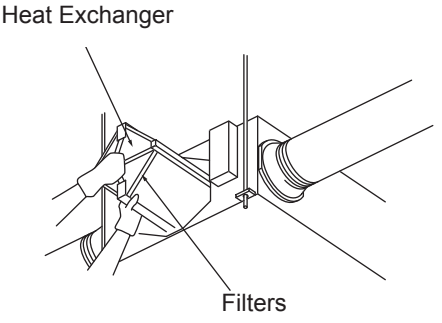


WARNING: *TURN OFF all the main switches*

10.11.3. REMOVING AIR FILTER AND TOTAL HEAT EXCHANGER ELEMENT

1. Open the service cover by pulling the hinge.
2. Remove the air filter or total heat exchanger element.



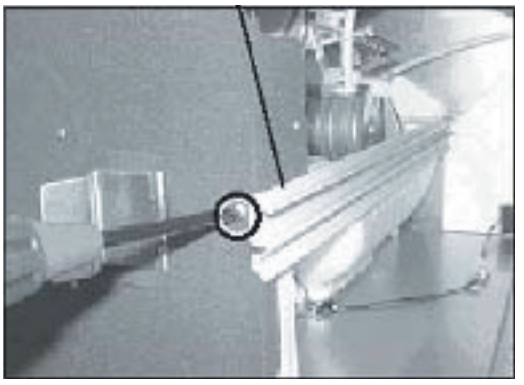


WARNING: *TURN OFF all the main switches*

10.11.4. REMOVING FAN MOTOR

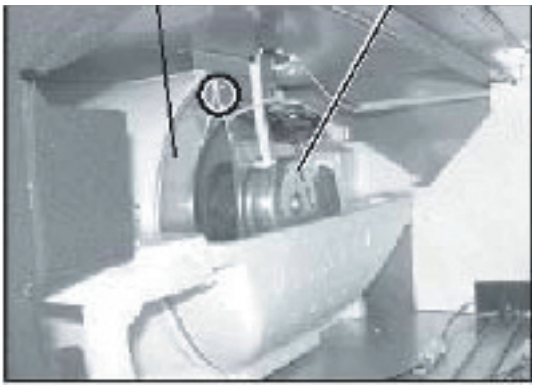
1. Open the service cover by pulling the handle according to the item → “Removing Air Filter and Total Heat Exchager Element”.
2. Remove the air filter according to the item → “Removing Air Filter and Total Heat Exchanger Element”.
3. Remove the heat exchange element according to the item → “Removing Air Filter and Total Heat Exchanger Element”.
4. Remove two (2) screws for fixing the total heat exchange element holder and remove the total heat exchange element holder.
5. Remove the fan casing.

Total heat exchanger element holder



Motor fixing plate

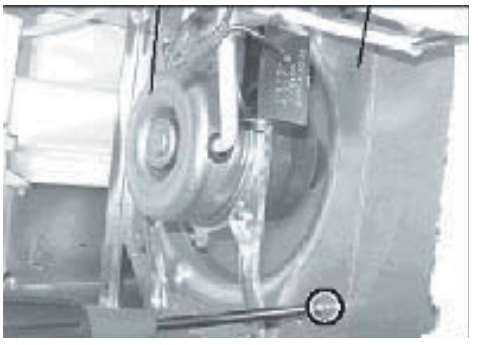
Motor (Discharge air)

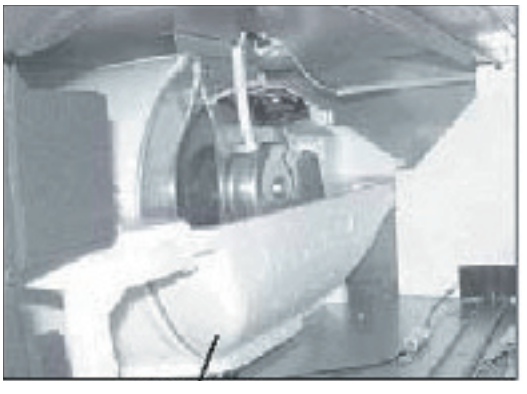


6. Remove six (6) screws for fixing the fan motor for supply air and remove the fan motor for supply air.
7. Remove four (4) screws for fixing the fan motor for discharge air and remove the fan motor for discharge air.

Motor (Supply Air)

Motor Fixing Plate



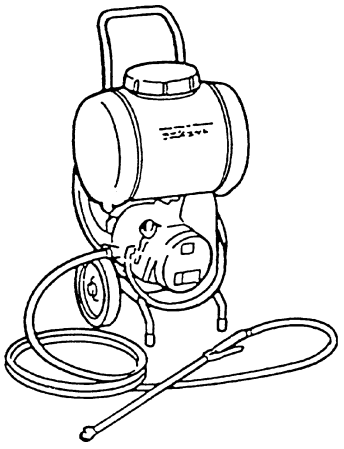
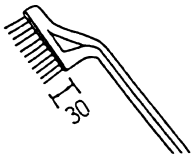


Fan casing

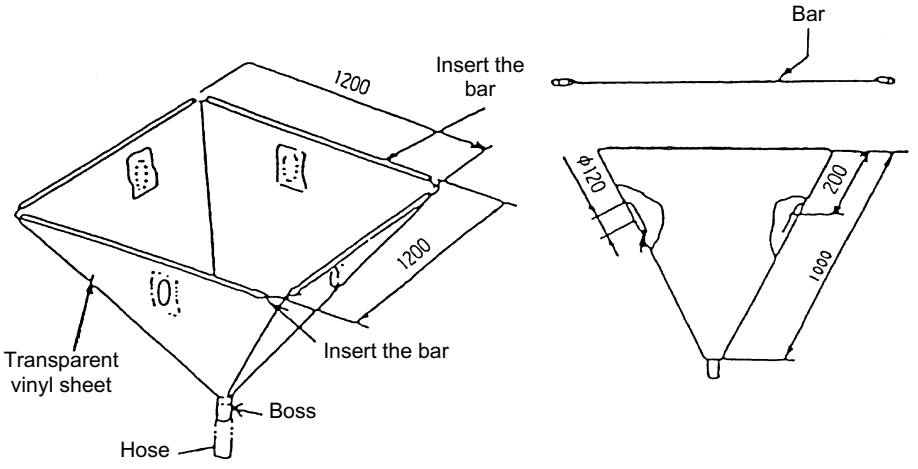
WARNING: *TURN OFF all the main switches*

10.12. CLEANING THE INDOOR HEAT EXCHANGER

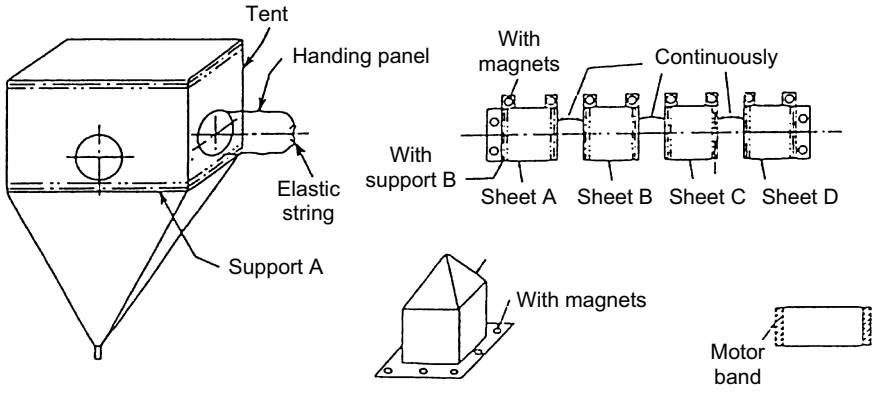
10.12.1. REQUIRED TOOLS FOR CLEANING (FOR ALL INDOOR UNITS)

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	

WARNING: *TURN OFF all the main switches*

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*

10.14.2. 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 "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, "Removing the Electrical box Panel".

– Remove the bell mouth and the fan according to the section, "Removing the Turbo Fan and the Fan Motor".

– Remove the drain pan according to the section "Removing the Drain Pan".

– Remove the float switch according to the section "Removing the Float Switch".

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.*

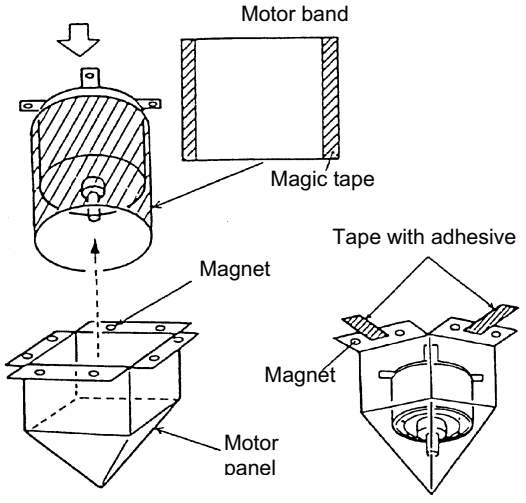
– *Remove the drain pan after removing the four fixing screws. Carefully remove the drain pan, because the drain water may remain at the bottom of the drain pan.*

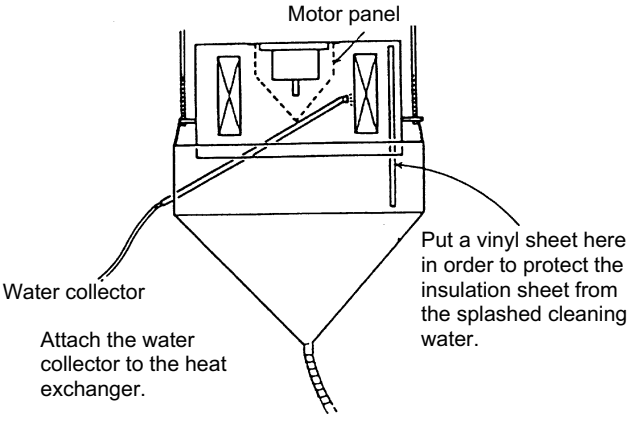
– *Clean and dry the drain pan after removing the drain pan. Carefully handle the drain pan to avoid damaging the drain pan.*

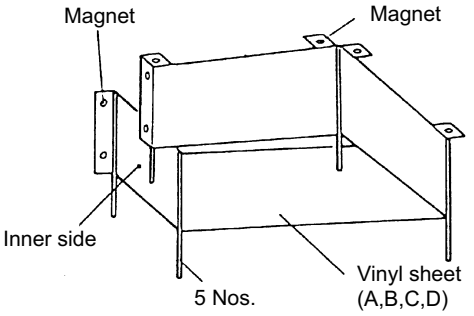
1. Attach a vinyl sheet around the heat exchanger so that the cleaning water will not be splashed over the insulation surface and the drain-up pump. Fix the vinyl sheet on the side plate of the heat exchanger by means of a tape with adhesive. Seal the gap between the vinyl sheets by means of a tape with 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

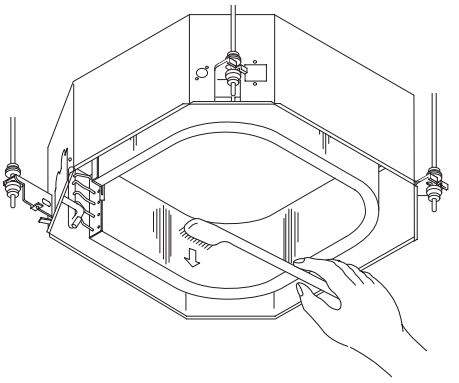




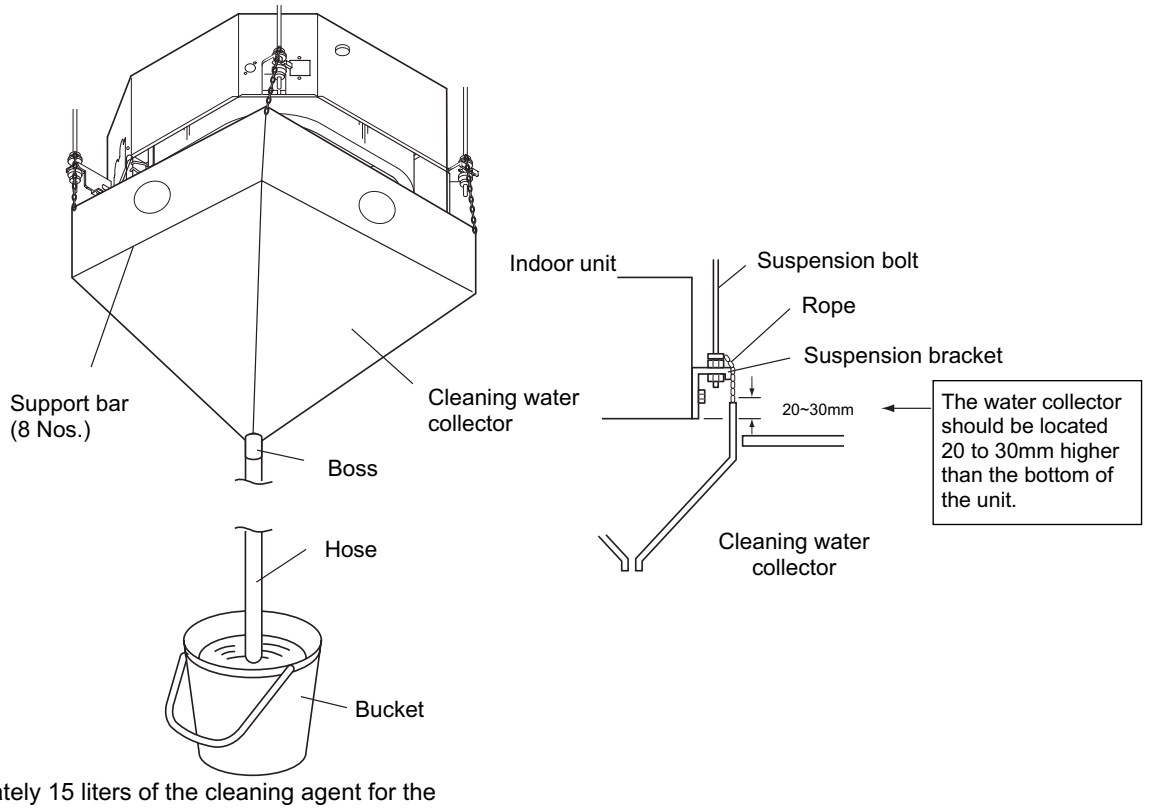


WARNING: *TURN OFF all the main switches*

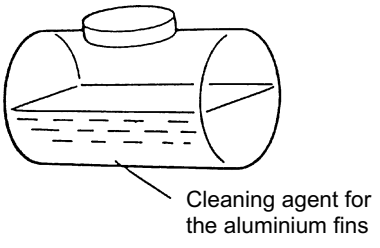
2. Scratch off the dust on the inner surface of the heat exchanger downwards by means of a brush. Collect all the dust in a bucket or a carton box.



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.

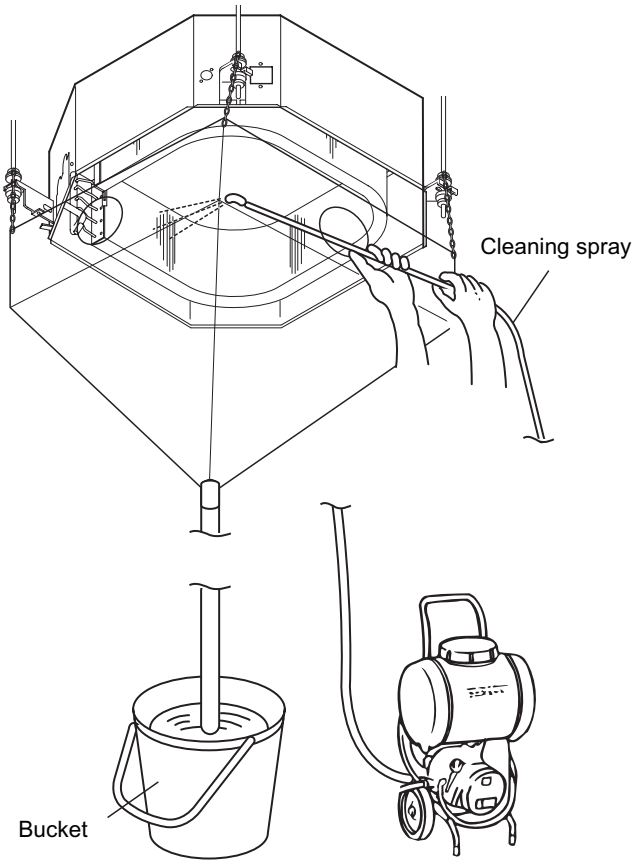


WARNING: *TURN OFF all the main switches*

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:

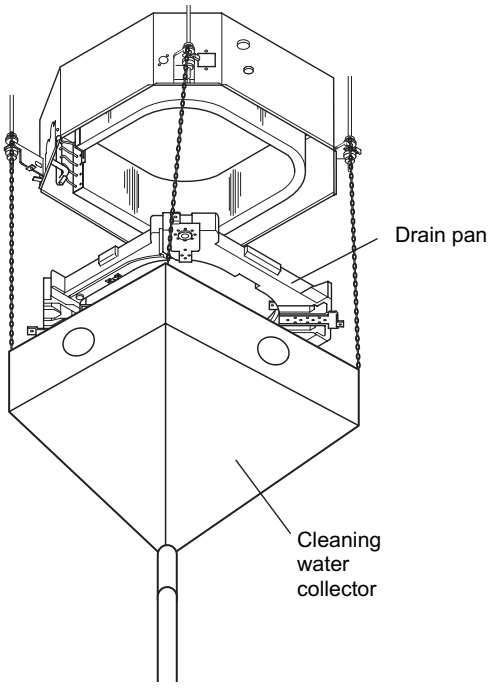
If the cleaning water stays, the fins will be corroded. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.



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.



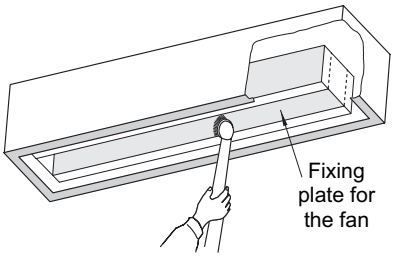
WARNING: *TURN OFF all the main switches*

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 10.14.1 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.

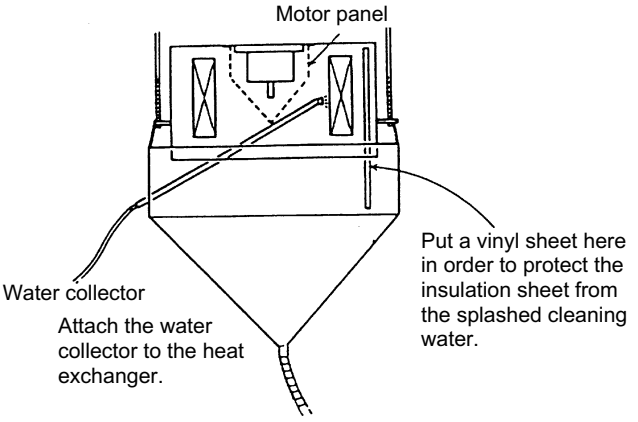
10.12.3. CLEANING THE 2-WAY CASSETTE INDOOR UNIT

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, "Removing the Drain Pan". Clean the drain pan after removing the drain pan.
2. Remove the float switch according to the section, "Removing the Float Switch"
3. Remove the drain-up mechanism according to the section, "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.



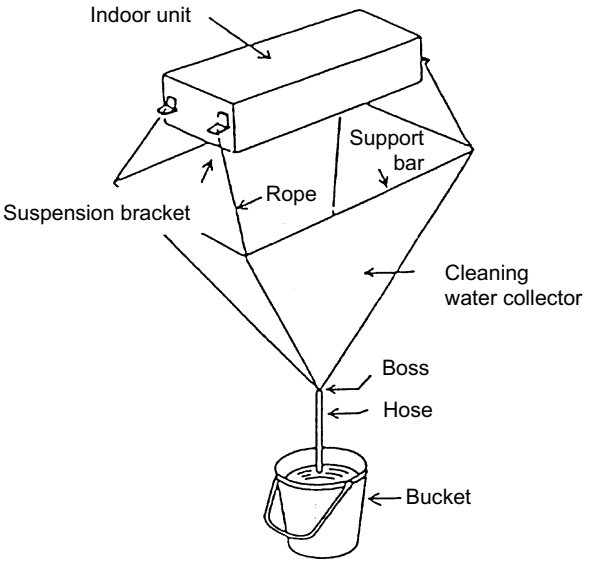
5. Put a vinyl sheet around the heat exchanger so that the cleaning water will not be splashed over the insulation surface and the drain-up pump. Fix the vinyl sheet on the side plate of the heat exchanger by means of a tape with adhesive.
   Seal the gap between the vinyl sheets by means of a tape with 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*

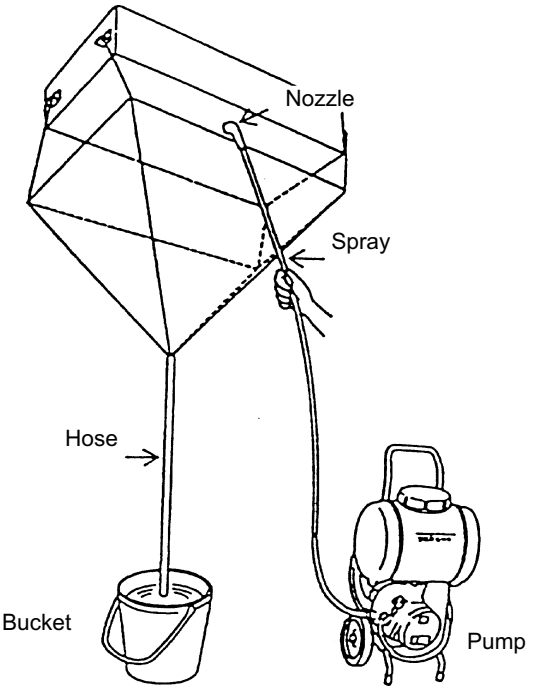
6. Suspend the cleaning water collector from the indoor unit.
   - Connect a rope to the suspension bracket of the indoor unit and put the rope downwards.
   - Insert the support bar into the hole of the cleaning water collector.
   - Suspend the cleaning water collector with the rope from the indoor 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.



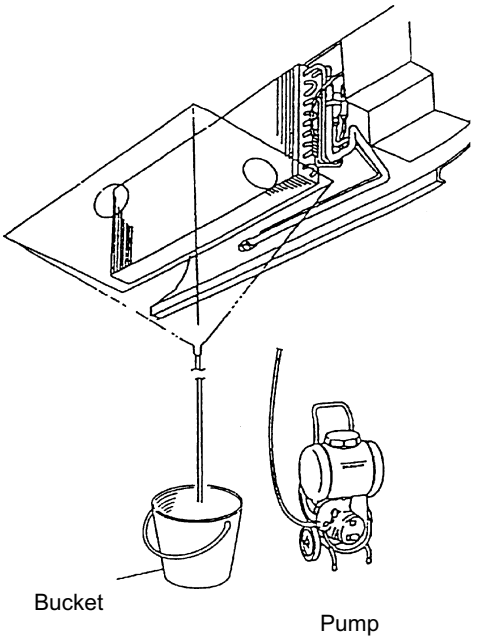
9. After you finish the cleaning and the dropping water stops, attach the fan assembly and the drain pan.
10. Check the insulation of the drain-up pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V is applied.
11. Connect the wiring as the wiring was connected before. 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 10.14.1 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*

10.12.4. 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 "Wall Type".
2. Remove the front panel according to the section, "Removing the Front Panel".
3. Remove the electrical box according to the section, "Removing the Electrical Box Panel".
4. Remove the drain pan according to the section "Removing the Drain Pan".
5. Remove the heat exchanger according to the sections "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 10.14.1 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.



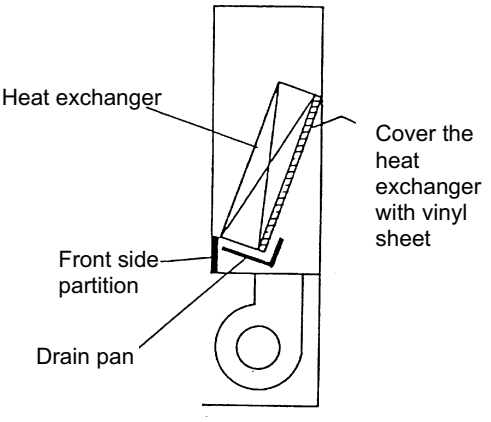
NOTES:

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.

10.12.5. CLEANING THE FLOOR TYPE AND THE FLOOR CONCELAED TYPE INDOOR UNIT

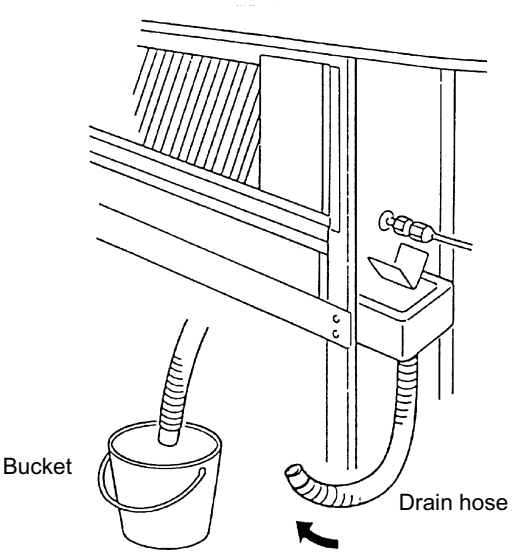
Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.

1. Remove the front panel according to the section "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.

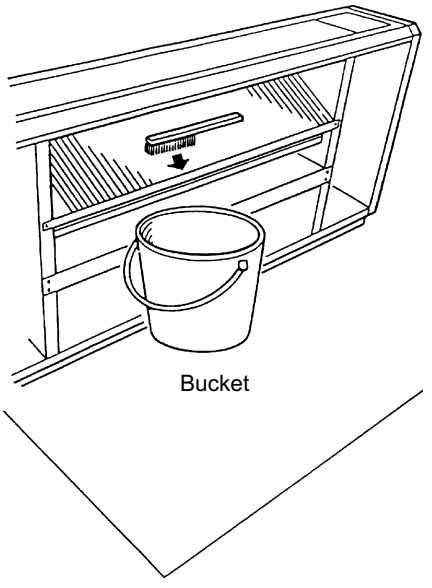


WARNING: *TURN OFF all the main switches*

4. By lifting the drain hose, put the end of the hose in a bucket.

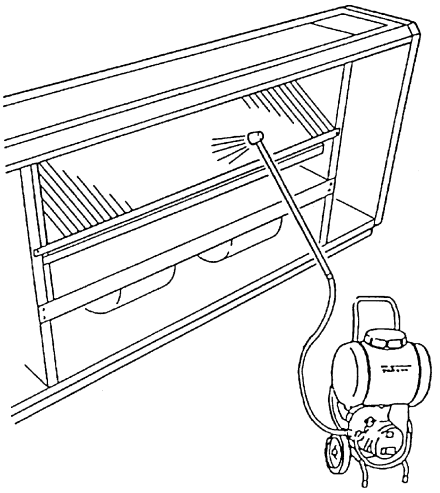


5. Removing the Dust on the Heat Exchanger
   Remove the dust on the heat exchanger with a brush by scratching the dust downwards. Collect all the dust in a bucket or a carton box.



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.

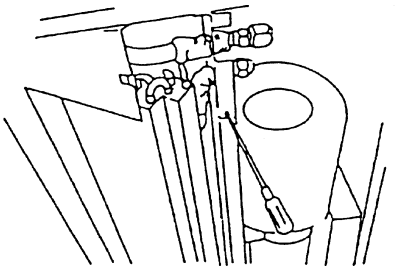
WARNING: *TURN OFF all the main switches*

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 10.14.1 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.

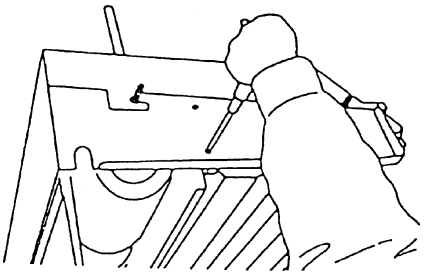
10.12.6. CLEANING THE CEILING TYPE INDOOR UNIT

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, "Removing the Side Panel".
2. Remove the discharge deflector according to the section "Removing the Discharge Air Grille".
3. Open the air inlet grille according to the section "Removing the Air Filter".
4. Remove the lower panel and the drain pan according to the section, "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 "Removing the Fan Motor".
6. Remove the partition plate 2 after removing the two fixing screws.



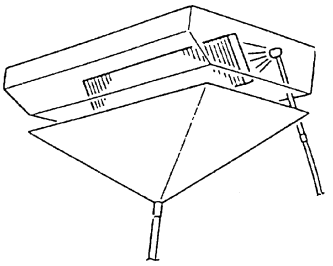
7. Remove the fixing plate for the fan after removing the two screws at the left-side partition and one screw at the right-side partition.



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
    - 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:

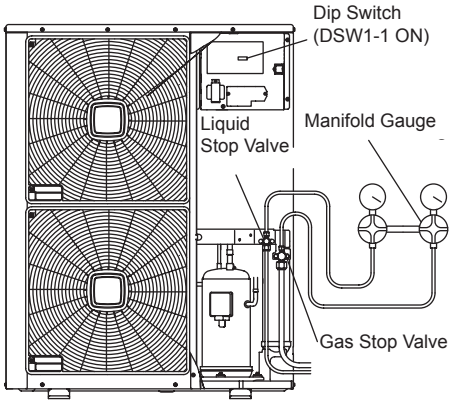
Wear the gloves in order to avoid any injury during this work due to the sharp edges of the fins.
If the cleaning water stays, the fins will be corroded.
Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.
Pay attention to the drain pan not to overflow.

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 10.14.1 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.

10.13 COLLECTING REFRIGERANT FOR REPLACING INDOOR UNIT

When the refrigerant should be collected into the outdoor unit due to indoor/outdoor unit relocation, collect the refrigerant as follows.

1. Attach the manifold gauge to the gas stop valve and the liquid stop valve.
2. Turn ON the power source.
3- Set the DSW1-1 pin of the outdoor unit PCB at the “ON” side for cooling operation. Close the liquid stop valve and collect the refrigerant.
4. When the pressure at lower pressure side (gas stop valve) indicates -0.01MPa (-100mmHg), perform the following procedures immediately.
   - Close the gas stop valve.
   - Set the DSW1-1 pin at the “OFF” side. (To stop the unit operation.)
5. Turn OFF the power source.



CAUTION

Measure the low pressure by the pressure gauge and keep it not to decrease than -0.01MPa. If the pressure is lower than -0.01MPa, the compressor may be faulty.

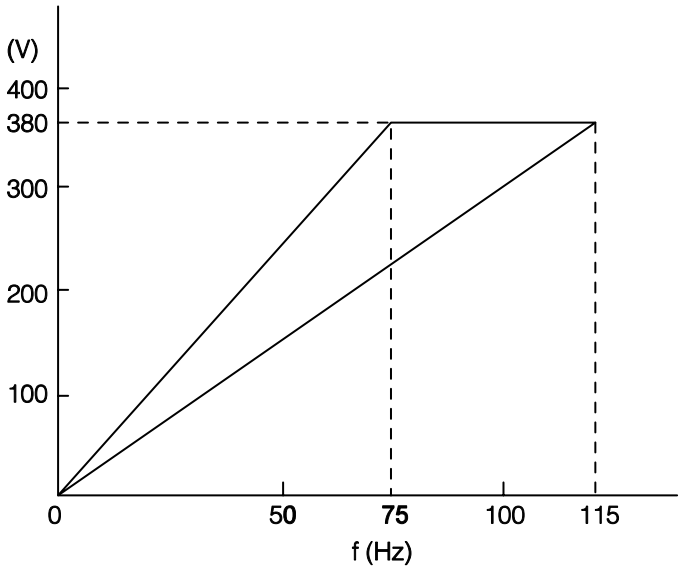
11. Main parts

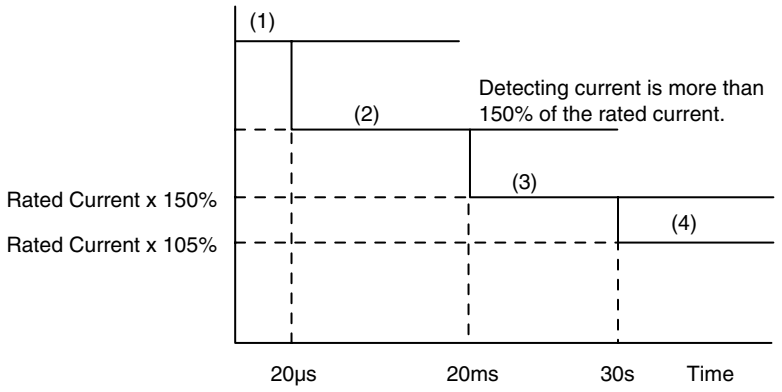
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11.1. INVERTER

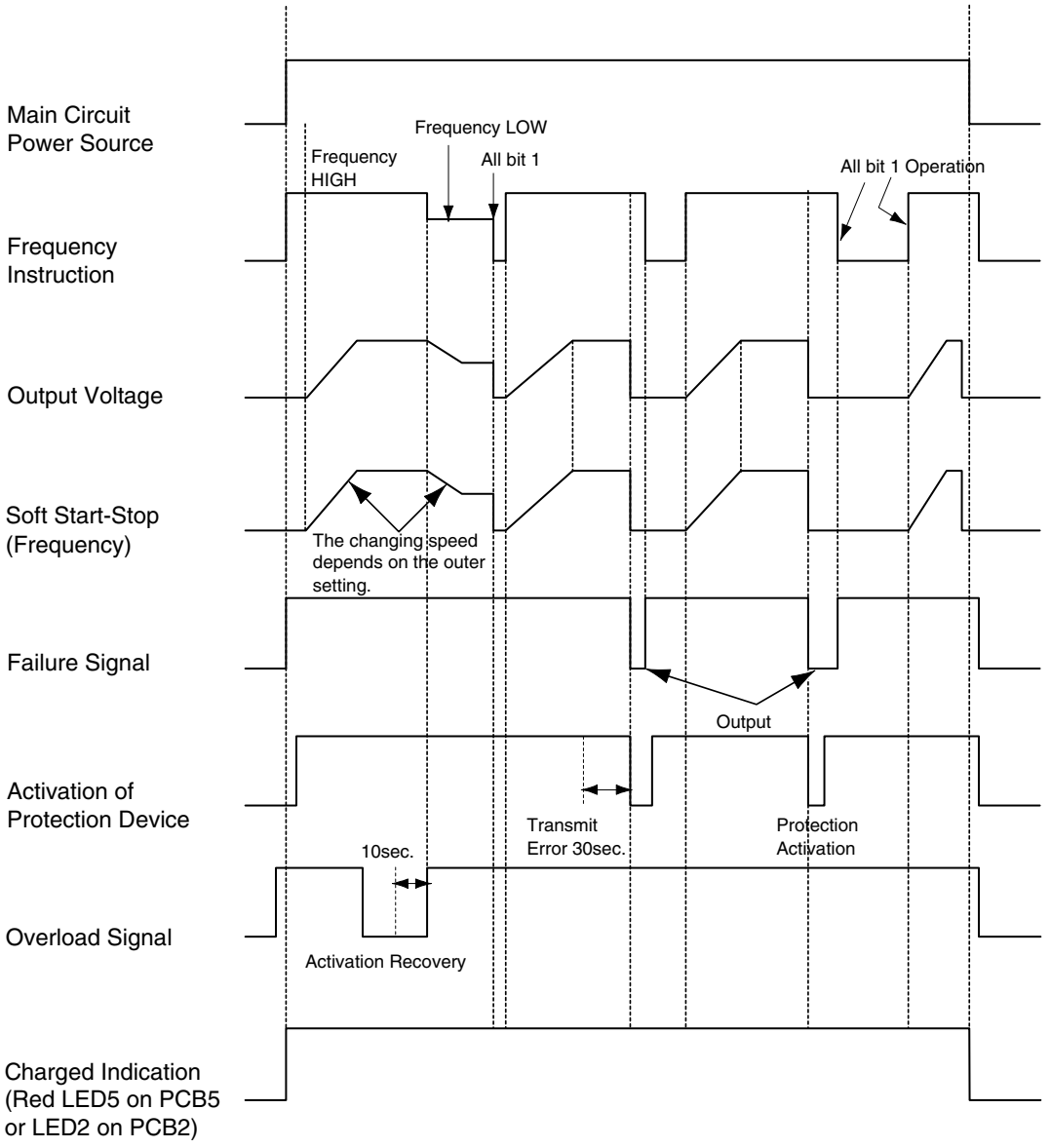
11.1.1. SPECIFICATIONS OF INVERTER

Aplicable model	RAS-8~12HRNM
Aplicable power source	3 Phase. 380V, 415V 50 Hz
Input voltage	RAS-8~12HRNM 14~25A
Control Method	Vector Control
Range Output Frequency	20~115HZ
Accuracy of Frequency	0,01
Controlled Frequency	0,01 Hz at Applicable frequency range
Output / Characteristics	Conditions: 1. Power Source Voltage AC380/415V 2. Non-Loading (Free Output) 3. Ammeter Type Volt-Meter (X1.1)  Refer to the note in next page.
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 350V DC Excessive High Voltage at a voltage is higher than 750V 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 IPM Failure of Compressor / Fan motor Disconnected Wiring

<table>
<tr><td>Protection Function
Overcurrent Protection for Inverter</td><td> 

(1) Short-Circuit Trip of Arm
(2) Instantaneous Overcurrent Trip
(3) Instantaneous Overcurrent Trip
(4) Electronic Thermal Trip
Internal Protection IPM
Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.</td></tr>
<tr><td>Protection of Transistor Module</td><td>IPM 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) Abnormal temperature is measured by internal thermistor.
(4) Control voltage decreases abnormally.</td></tr>
<tr><td>Overload Control</td><td>Overload control as a current greater than (Rated Current X105%).
Overload control release at a current smaller than (Rated Current X 88%).</td></tr>
<tr><td>Fin Temperature Increase</td><td>The unit is stopped when Fin temperature is higher than 100ºC</td></tr>
<tr><td>Earth Detection</td><td>The unit is stopped when the compressor is earthing</td></tr>
</table>

11.1.2. INVERTER TIME CHART



11.1.3. PROTECTIVE FUNCTION

1. Excessive High or Low Voltage for Inverter
   a) Level of Detection
      - When the voltage of direct current is greater than (A) V, abnormalities are detected.
      - When the voltage of direct current is smaller than (B) V, abnormalities are detected.

Power Supply	380 - 415V, 50Hz 380V, 60Hz
(A)	750
(B)	350

   b) Function

      When abnormalities are detected, the inverter compressor is stopped and transmit the signal code of stoppage cause to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is cancelled when a stopping order is given or main power source is cut off.

2. Abnormality of Current Sensor
   a) Level of Detection

      When current of the inverter compressor decreases lower than 0.5A during the inverter compressor frequency between 15Hz and 18Hz, an abnormality is detected.

   b) Function

      When abnormalities are detected, the inverter compressor is stopped, and transmit the signal code of stoppage cause to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is cancelled when a stopping order is issued or main power source is cut off.

3. Overcurrent Protection for Inverter
   a) Level of Detection

      When the current detected by current sensor reaches 150% of the rated current, overcurrent is detected. (Instantaneous Overcurrent)

      When the current detected by current sensor exceeds 105% of the rated current continuously for 30 seconds or for 3.5 minutes in total during a 10 minutes period, overcurrent is detected. (Electric Thermal Relay)

   b) Function

      When abnormalities are detected, the inverter compressor is stopped and transmit the signal code of stoppage cause to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is canceled by stopping order is issued or main power source is cut off.

4. Protection of IPM
   a) Level of Detection

      When some of the output terminals between “U” and “V”, “V” and “W”, “W” and “U” of IPM are short-circuited, an abnormality is detected.

      When the running current of IPM reaches (Maximum Rated Current x 105%), an abnormality is detected.

      When an internal temperature is measured by internal thermistor of IPM, an abnormality is detected.

      When the control voltage of IPM decreases, an abnormality is detected.

   b) Function

      When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.

5. Fin Temperature Increase
   a) Level of Detection

      When the temperature of internal thermistor exceeds more than 100oC, an abnormality is detected.

   b) Function

      When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.

6. Earth Detection
   a) Level of Detection

      When the starting current of the compressor reaches 80% of the overcurrent protection value, an abnormality is detected.

   b) Function

      When abnormalities are detected, the inverter compressor is stopped and the signal code of stoppage cause is transmitted to PCB1.

   c) Cancellation of Protection Function

      Transmission for signal code of stoppage cause is canceled when a stopping order is issued or main power source is cut off.

11.1.4. OVERLOAD CONTROL

a) Level of Detection

When the output current exceeds 105% of the maximum output current, an abnormality is detected.

b) Function

An overload signal is issued when output current exceeds 105% of the maximum output current, and the frequency decreases.

For 10 seconds after the output current decreases lower than 88% of the rated current, the operation is performed with the compressor frequency limited to the upper level frequency when the output current decreases lower than 88% of the rated one.

However, if the frequency order is smaller than the maximum value, the operation is performed according to the order.

c) Cancellation of Protection Function

After the operation described in the above item b. is performed for 10 seconds, this control is canceled.

11.2. AC CHOPPER

(Only for RCD Indoor Unit)

Reduction of Electromagnetic Sound
Fan Motor Control by AC Chopper:
Lower electromagnetic sound and vibration have been achieved by AC Chopper control than thyristor control.

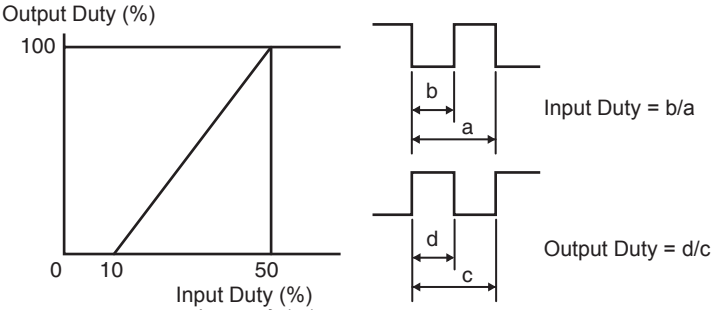
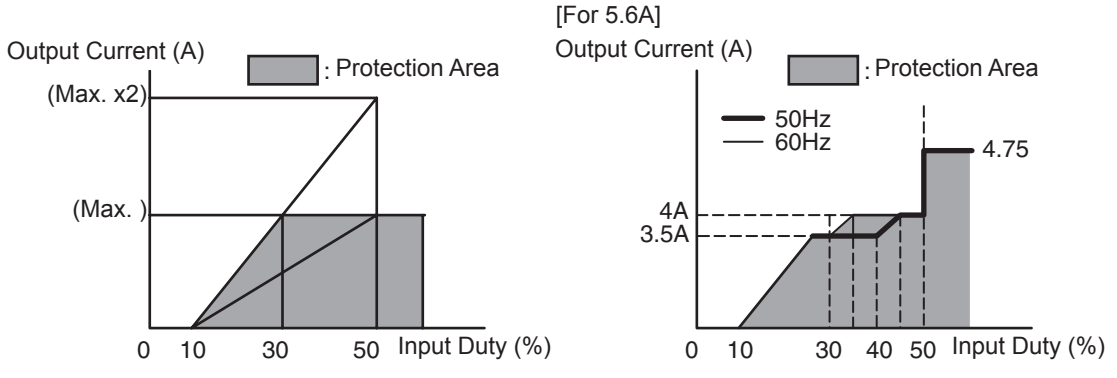
AC Chopper Control
Concept of Fan Speed Control
The voltage applied to the fan motor is controlled by chopping (ON/OFF) the power supply voltage at a frequency of 20kHz.

Features:

– Sinusoidal Wave Pattern and Remarkable Low Level of Electromagnetic Sound

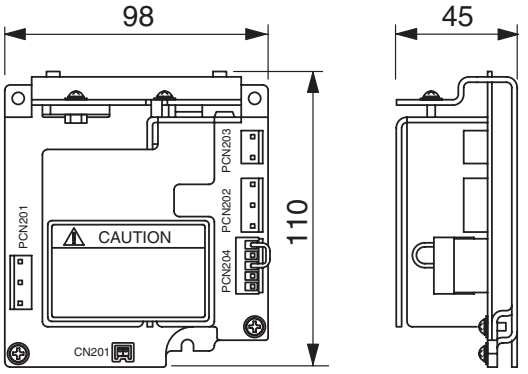
– No Generation of Harmonic Current

1. Specifications:

Rated Current of AC Chopper	2.1 A	5.6 A
Applicable Power Source	Single Phase 220V + 10% 60Hz	
Output Voltage	Single Phase 220V + 10%	
Output Current (Maximum)	2.1 A	5.6 A
Control Method	AC Chopper Control	
Chopping Frequency	20kHz + 20%	
Input Duty Signal	100kHz + 5% Current 2 to 8mA + 10%	
Accuracy of Output Voltage	+ 6%	
Output/Characteristics		
Soft Start	Input Duty: 10%/s	
Overcurrent Protection Method	Current Limiter	
Overcurrent Setting (Minimum)	2.1 A	5.6 A
Overcurrent Protection Area		

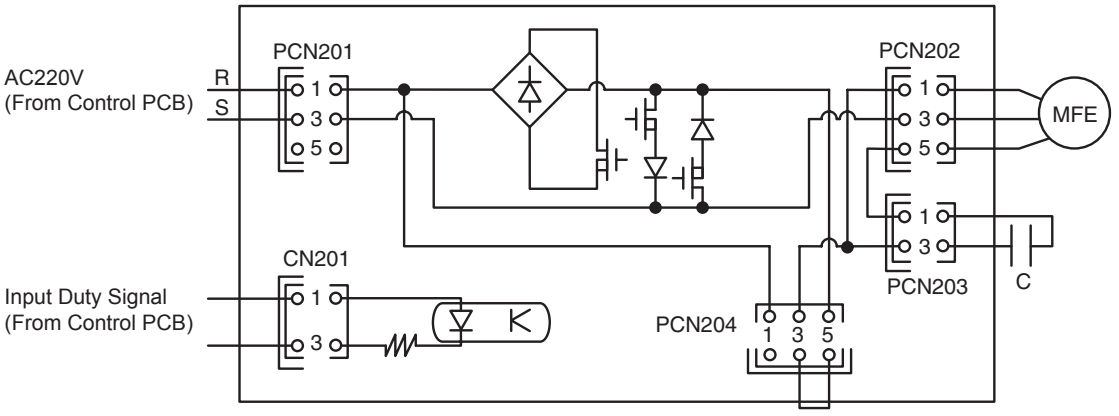
2. Structure

a. 2.1A (For Indoor Units: RCD (2.0 to 2.5HP) Models)



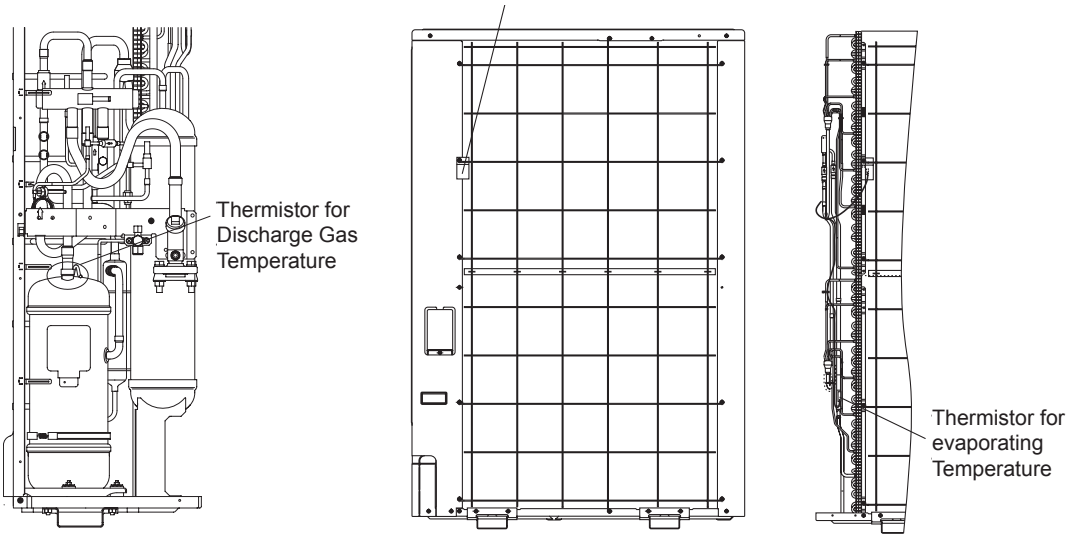
3. Circuit Diagram (Outline)

a. 2.1A

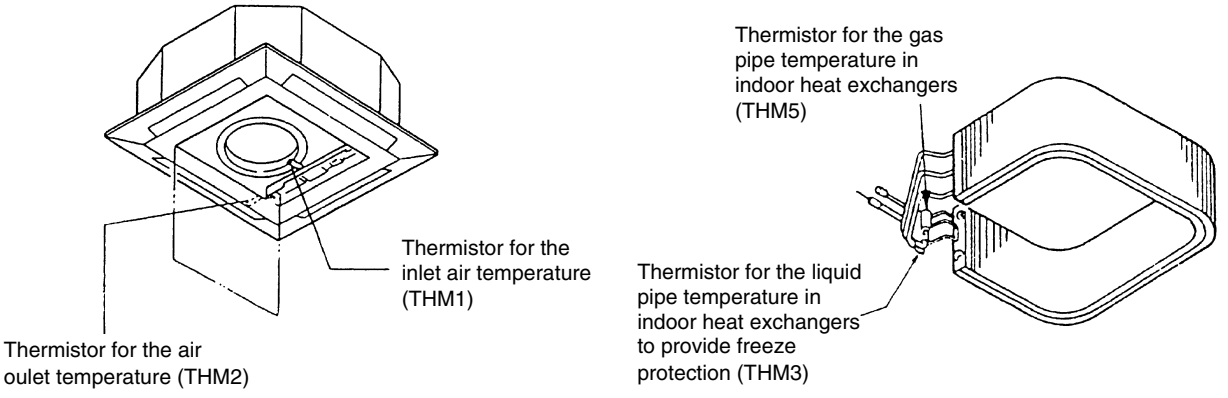


11.3. THERMISTOR

Thermistors for the outdoor unit



Thermistors for the indoor unit



■ Thermistor for upper part temperature of compressor

(For Prevention of Discharge Gas Overheating)

a. A thermistor for the upper part temperature of the compressor is installed to prevent discharge gas from overheating.

   If discharge gas temperature increases excessively lubricating oil deterioration occurs and lubricating properties deteriorate, resulting in short compressor life.

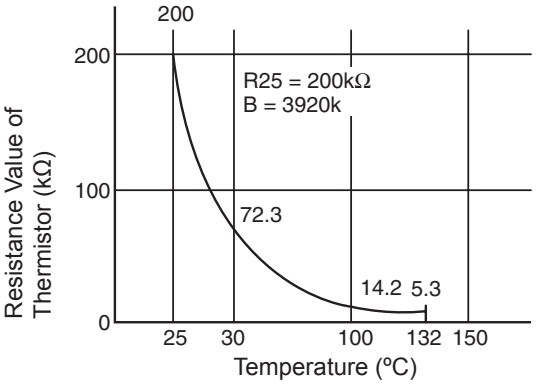
b. If discharge gas temperature increases excessively, compressor temperature increases. At the worst, compressor motor winding will be burnt out.

c. When the upper part temperature of compressor increases during heating operation, the unit is controlled according to the following method

   – An electronic expansion valve of outdoor units is (are) opened to return the liquid refrigerant to the compressor through the accumulator, decreasing compressor temperature.

   – If the compressor upper part temperature increases exceeding 132ºC even if an electronic expansion valve opens, the compressor is stopped, in order to protect the compressor.

     In cooling operation, the above function is also available.



Resistance Characteristics of Thermistor for Discharge Gas Overheating Protection

d. If compressor upper part temperature increases excessively, the protection control is activated and the compressor is stopped according to the following method.

Operation	Upper Part Temperature of Compressor	Defecting Period
Cooling	Over 132ºC	10 minutes (Continuously)
	Over 140ºC	5 seconds (Continuously)
Heating	Over 132ºC	10 minutes (Continuously)
	Over 140ºC	5 seconds (Continuously)
Defrosting	Over 132ºC	5 seconds (Continuously)

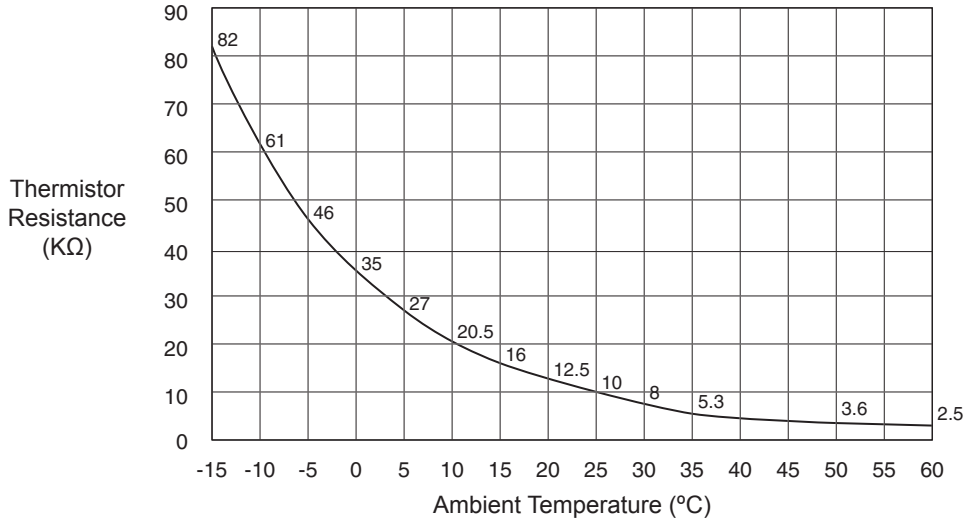
■ Thermistor for Outdoor Ambient Temperature

The thermistor resistance characteristics are shown in the figure below.

■ Thermistor for Evaporating Temperature of Outdoor Unit in Heating Operation (For Defrosting)

The characteristics for the thermistor is the same with the value of outdoor ambient temperature thermistor as shown in the figure below..

Thermistor Characteristics



11.4. ELECTRONIC EXPANSION VALVE

11.4.1. ELECTRONIC EXPANSION VALVE FOR THE OUTDOOR UNIT

Micro-computer

↓ Pulse signal

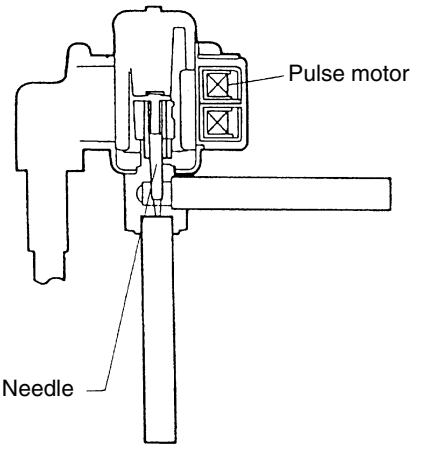
2-Phase permanent magnetic pulse motor

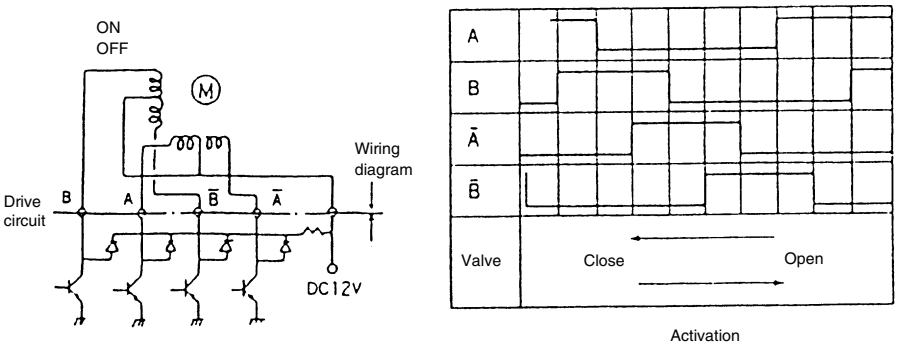
Control 0 to 500 pulse by 1 pulse

↓

Refrigerant flow control

Precise control



Items	Specifications
Applicable to the models	For the main cycle of: RAS-8~12HRNM
Type	UKV(10.0 USRT) Series/UKV (5.0USRT) Series for MVB
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	

11.4.2. ELECTRONIC EXPANSION VALVE FOR THE INDOOR UNIT

Micro-computer

↓ Pulse signal

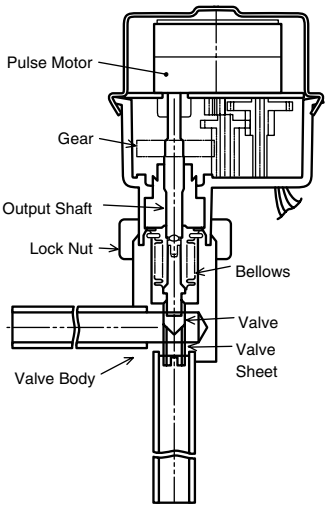
2-Phase permanent magnetic pulse motor

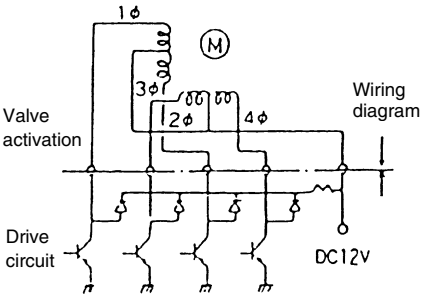
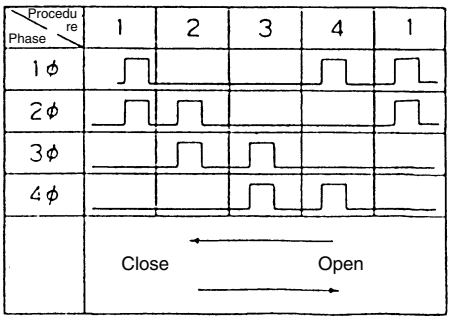
Control 0 to 2,000 pulse by 1 pulse

↓

Refrigerant flow control

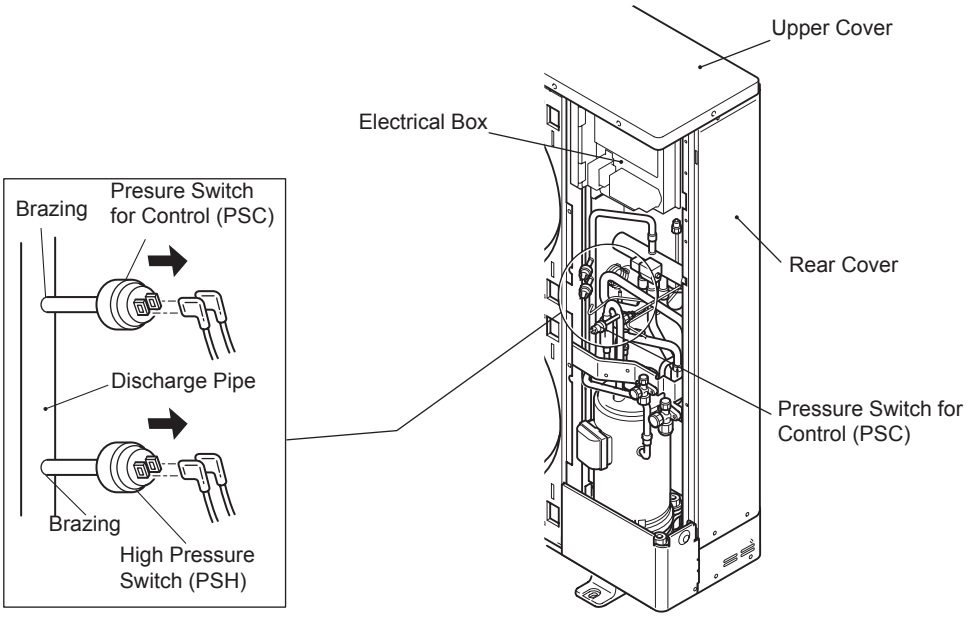
Precise control



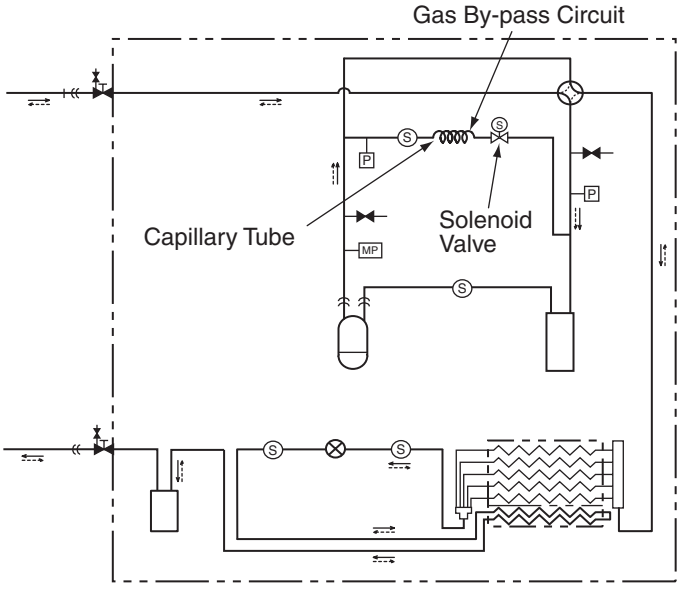
Items	Specifications
Type	EDM type
Refrigerant	R410A
Working temperature range	-30°C ~ 70°C (with coils which are not electrified)
Mounting direction	Drive shaft in vertical direction, motor upside and 90° in four direction
Flow direction	Reversible
Drive method	4-Phase pulse motor
Voltage rate	DC12V±1.2V
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

11.5. HIGH PRESSURE PROTECTION DEVICE

If the discharge pressure is excessively high, the compressor and the component parts of the refrigeration cycle can be damaged. Therefore, in case that the discharge pressure is higher than 4.15MPa (R410A), the protection control is activated and the compressor is stopped.



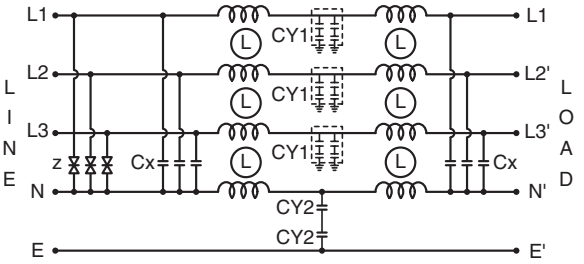
1. For controlling the high pressure not to increase excessively during heating operation, the gas by-pass circuit and the air volume of the outdoor fan is controlled automatically.
2. The gas by-pass circuit, which is composed of the solenoid valve and the capillary tube for flow adjustment, control the high pressure not to increase excessively by leading the high pressure gas to the low pressure side.

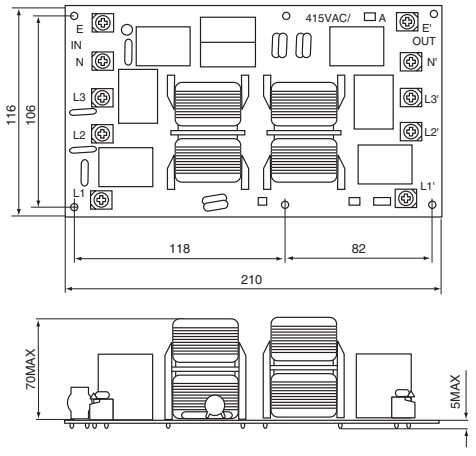


11.6. NOISE FILTER (NF)

The noise filter decreases the leakage of noise made by the inverter to the power supply side. Terminals indicated with “LOAD” are connected to the inverter side and terminals indicated with “LINE” to the power supply side.

RAS-8HRNM to RAS-12HRNM (380-415V/50Hz)

Items	Specifications
Model	4LFB-16830-2FB
Rated Current	AC415V 27A
Permissible Temperature Range	-20ºC to 85ºC
Circuit Diagram	



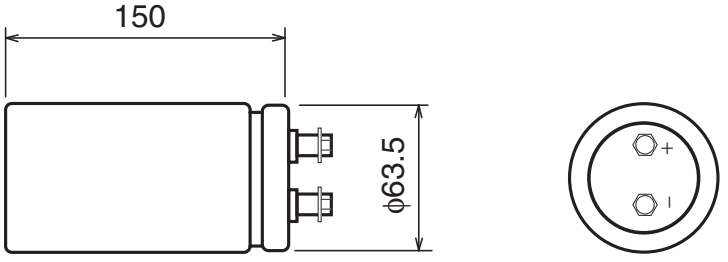
11

11.7. CAPACITOR (CB1, CB2)

This part is used for changing the alternative current to the direct current for the inverter. Connect two capacitor in line and used.

RAS-8HRNM to RAS-12HRNM (380-415V/50Hz)

Items	Specifications
Models	LNX2G472MSEAHE
Capacity of Static Electricity	4700μF
Rated Voltage	400 VDC
Permissible Temperature Range	-25ºC to 95ºC

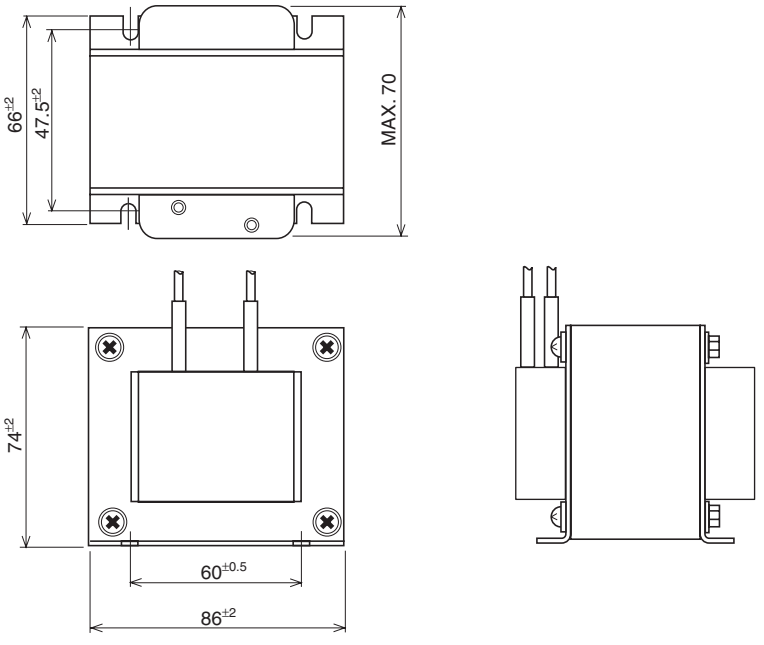


11.8. REACTOR (DCL)

This part is used for changing the alternative current to the direct current for the inverter..

RAS-8HRNM to RAS-12HRNM (380-415V/50Hz)

Items	Specifications
Character	1.0mH+10% (at 1kHz)
Rated Current	30A
Direct Resistance	22.8mΩ+20% (at 20ºC)
Permissible Temperature Range	-20ºC to 65ºC



11.9. AUTO LOUVER MECHANISM

11.9.1. RCI (4-WAY CASSETTE TYPE)

1. Auto-Louver Operation

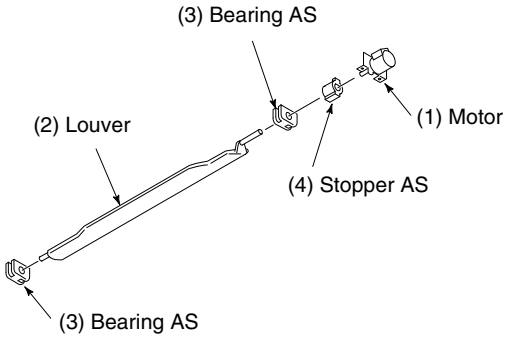
The louvers of the optional air panel with auto-louver swing simultaneously by four drive motor.

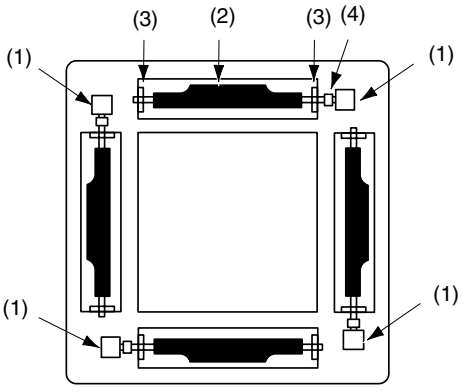
The parts of the auto-louver mechanism are shown below.

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.

↓

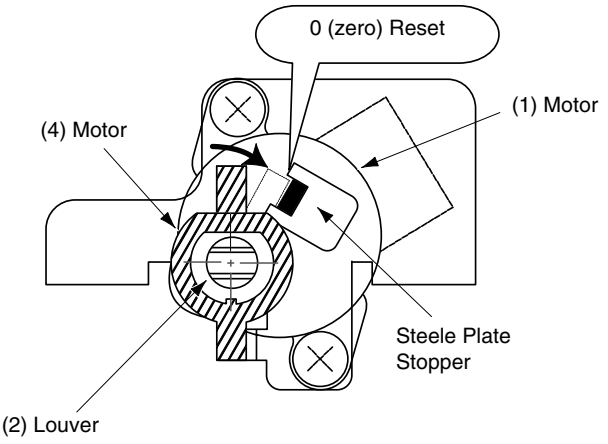
The AS stopper of the louver (2) touches the steel plate stopper, and the louver is reset to the 0 position.

↓

The power supply for the motor (1) is turned OFF when the louver is at the setting position.

↓

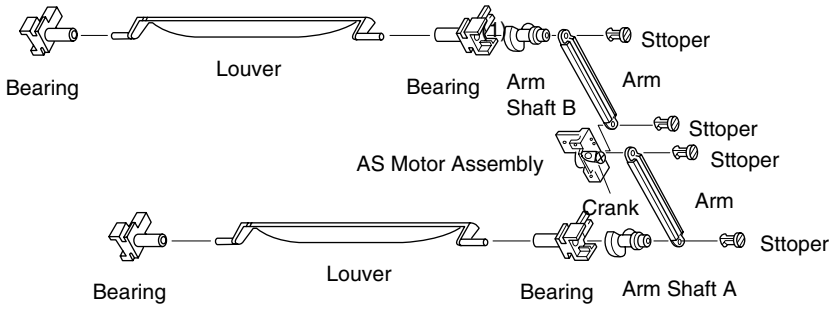
The louver is stopped at the setting position.



11.9.2. 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.

↓

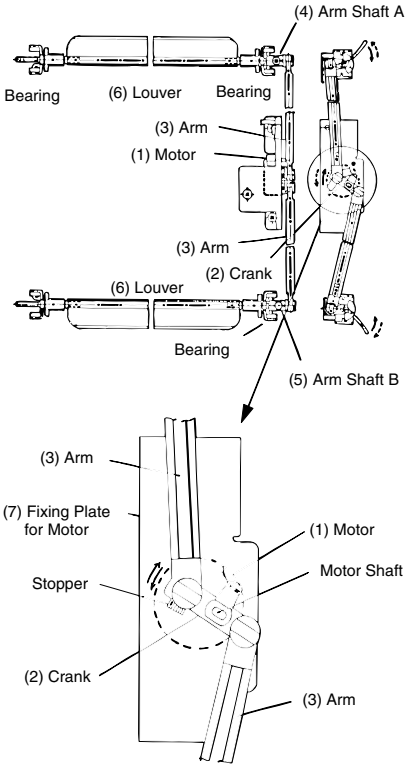
The crank (2) touches the stopper of the fixing plate of motor (7), and the louver is reset to the 0 position.

↓

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.



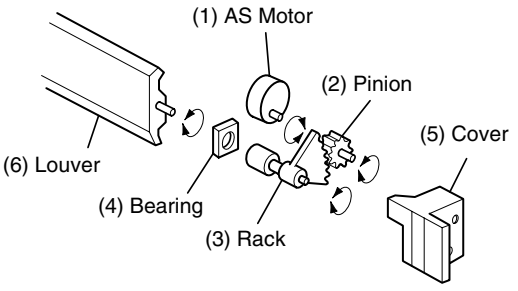
11.9.3. RPC (CEILING TYPE)

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.

↓

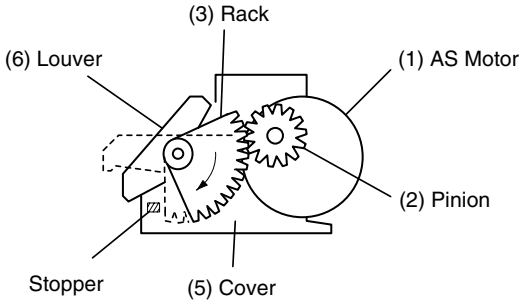
The rack (3) touches the stopper of the cover (6), and the louver is reset to the 0 position.

↓

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.



11.10. SCROLL COMPRESSOR

11.10.1. 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.

11.10.2. PRINCIPLE OF COMPRESSION

1. The gas is inhaled from the inlet port at the outer frame of the fixed scroll

⇩

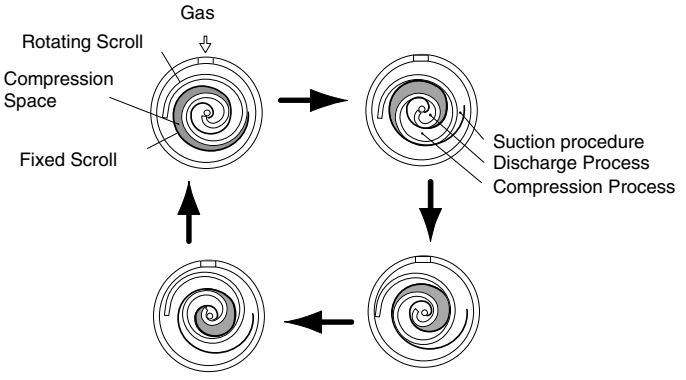
2. The gas inside of the compression space is compressed toward the center of the scroll.

⇩

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.



12. Field work instruction

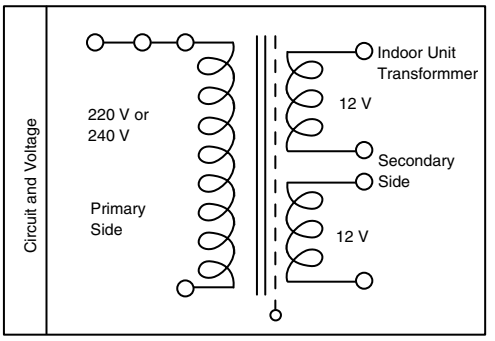
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⚠ ***WARNING:*** *TURN OFF all the main switches.*

12.1. 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.

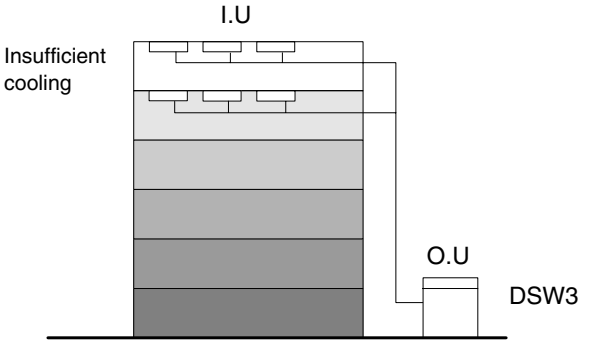
12.2. BURNT-OUT COMPRESSOR DUE TO AN INSUFFICIENT REFRIGERANT CHARGE

■ 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.

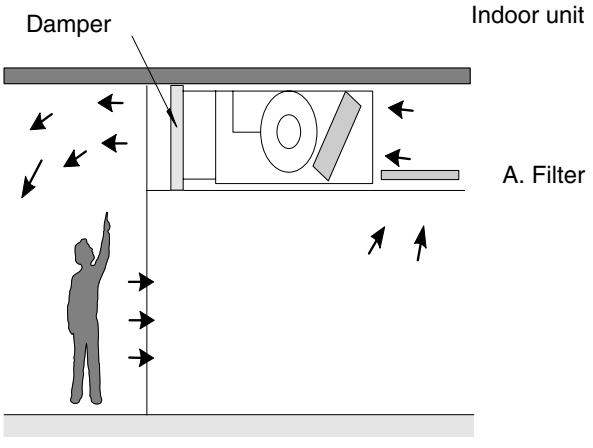
12.3. INSUFFICIENT COOLING PERFORMANCE WHEN A LONG PIPING IS APPLIED

■ **Question and answer for the field work**

Example 2: Insufficient cooling performance when a long piping is applied	
Phenomenon	Sufficient cooling was not available for an indoor unit that was located at the farthest position.
Cause	If the location of an outdoor unit is 20 meters lower than the location of the indoor units, resetting of the DIP switch DSW3 is required. However, no setting was performed. Therefore, the largest discharge pressure was not increased. This resulted in an insufficient cooling performance for the indoor unit. 
Countermeasure	The setting of the DSW3 was changed.
Remarks	Pay a special attention to the size of the liquid pipe if the lift between the indoor units and the outdoor units is higher than 20 meters. Refer to "Piping Work in TC" for details.

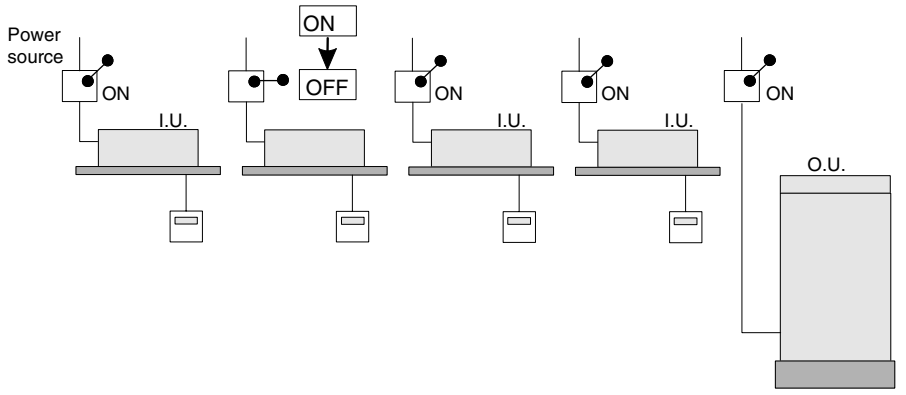
12.4. ABNORMALLY HIGH OPERATION SOUND (IN-THE-CEILING TYPE INDOOR UNIT)

■ **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.

12.5 ALARM CODE “31”

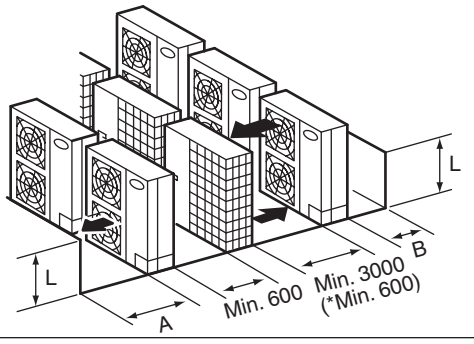
■ **Question and answer for the field work**

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.

12.6 NOT COOLING WELL DUE TO INSUFFICIENT INSTALLATION SPACE FOR THE OUTDOOR UNIT

■ **Question and answer for the field work**

Example 5: Not Cooling Well due to Insufficient Installation Space for Outdoor Unit	
Phenomenon	Cooling operation was well performed through the intermediate season. However, the cooling operation was not well available when the outdoor temperature was higher than 35°C.
Cause	As the outdoor units were installed without a sufficient installation space, the hot discharge air from other outdoor units was circulated. In this case, though the outdoor temperature was 35°C, the actual suction air temperature was nearly 50°C and Protection System from Excessively High Suction Pressure was activated, the frequency of the compressor was decreased and the cooling capacity was also decreased accordingly. As the outdoor units in-line were installed back to back with a distance of 600mm between each outdoor unit’s back, the hot discharged air from other outdoor units was circulated.
Countermeasure	Ensure that sufficient space should be secured for multi-row and multiple-installation.



Keep a distance of more than 15 mm between other units and do not put obstacles on the right and left sides. Dimension B is as shown below.

L	A	B
0 < L < 1/2H	600 or more	300 or more
1/2H < L < H	1400 or more	350 or more

NOTE:
If L is larger than H, mount the units on a base so that H is greater or equal to L.
In this situation ensure that the base is closed and does not allow the airflow to short circuit.
When the mark * dimension is secured, be sure to mount the airflow guide.

12.7 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 2.5HP Indoor Units	
Total horsepower of the indoor unit	4 × 2,5 = 10 HP
Total drain flow volume	10 HP × 3(l/h*HP)=30(l/h)

2. Select the drain pipe from the Table A and the Table B

Horizontal common pipe with the slope 1/50	VP20 for above example
Horizontal common pipe with the slope 1/100	VP25 for above example
Vertical common pipe	VP25 for above example

Table A. Permissible drain flow volume of the horizontal vinyl pipe

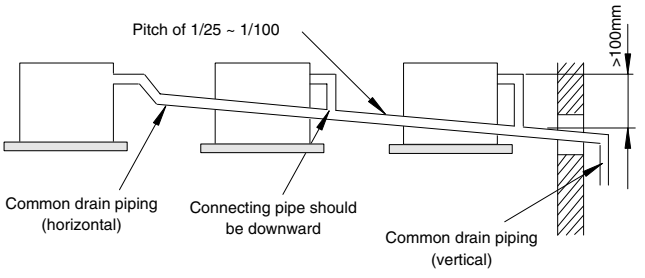
JIS symbol	Inner diameter (mm)	Permissible flow volume (l/hr]	
		Slope=1/50	Slope=1/100
VP20	20	39	27
VP25	25	70	50
VP30	31	125	88
VP40	40	247	175
VP50	51	472	334

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



12.8 CAUTION WITH THE 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.

12.8.1. 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.

12.8.2. 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.

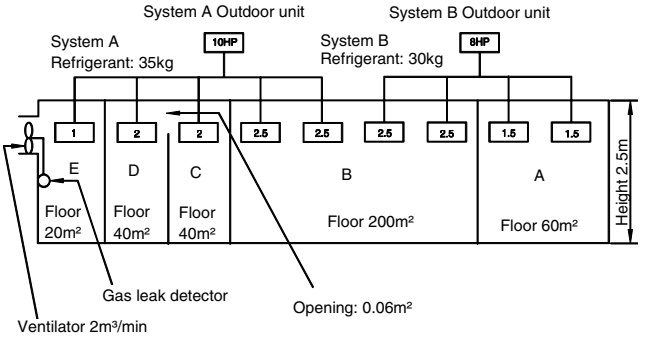
12.8.3. COUNTERMEASURE FOR THE REFRIGERANT LEAKAGE ACCORDING TO THE KHK STANDARD

According to the KHK standards, you should arrange the facility as follows so that the refrigerant concentration will be bellow 0.3 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	O.U.Model Ton
RAS-8HRNM	2.49
RAS-10HRNM	3.32
RAS-12HRNM	4.15

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

12.9 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 listed in the section 5: SAFETY AND CONTROL DEVICE SETTING of “SM”

■ 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.

12.10 SERVICE AND MAINTENANCE RECORD

No.	Check item	Action	Judgement	
1	Is the service area sufficient?		Yes	No
2	Is there a short circuit of the discharged air?		Yes	No
3	Any heat influence?		Yes	No
4	Is the ground wire connected?		Yes	No
5	Refrigerant piping		Good	Not good
6	Fixing the units		Good	Not good
7	Is there any damage on the outer surface or the internal surface?		Yes	No
8	Checking the screw and the bolts	Tighten if loosened.	Tightened	Not tightened
9	Tightening the Terminal Screws	Tighten all the terminal screws with a Phillips screwdriver.	Tightened	Not tightened
10	Are the compressor terminals tightly fixed?	Push all the terminals.	Pushed	Not pushed
11	Insulation resistance	Measure the insulation resistance with an insulation resistance meter. Comp. and fan motor: greater than 3MΩ Others: greater than 3MΩ	Good	Not good
12	Does the drain water flow smoothly?	Check the smooth flow by pouring some water.	Good	Not good
13	Check for a leakage in the compressor.	Check for any leakage.	Good	Not good
14	Check for a leakage in the outdoor heat exchanger.	ditto	Good	Not good
15	Check for a leakage in the indoor heat exchanger.	ditto	Good	Not good
16	Check for a leakage in the 4-way valve.	ditto	Good	Not good
17	Check for a leakage in the check valve.	ditto	Good	Not good
18	Check for a leakage in the accumulator.	ditto	Good	Not good
19	Check for a leakage in the strainer.	ditto	Good	Not good

No.	Check item	Action	Judgement	
20	Check for a leakage in the electronic expansion valve.	ditto	Good	Not good
21	Check for a leakage in the piping.	ditto	Good	Not good
22	Check the direction of the fans.	By viewing the airflow volume	Good	Not good
23	Voltage among each phase	Higher than AC220V	Good	Not good
24	Vibration and sound	Check the fan, the compressor, the piping, and others.	Good	Not good
25	Activation of each operation mode	Check the activation of the COOL switch, the HEAT switch, the STOP switch and the TEMP switch.	Good	Not good
26	High-pressure cut-out switch	Check the actual activation value.	Good	Not good
27	Check the activation of the drain-up mechanism.	Check the activation during the cooling process.	Good	Not good
28	Air inlet temperature of the indoor unit DB/WB		(°C)DB	(°C)WB
29	Air outlet temperature of the indoor unit DB/WB		(°C)DB	(°C)WB
30	Air inlet temperature of the outdoor unit DB/WB		(°C)DB	(°C)WB
31	Air outlet temperature of the outdoor unit DB/WB		(°C)DB	(°C)WB
32	High-pressure switch		kg/cm²G	
33	Low-pressure switch		kg/cm²G	
34	Operating voltage		V	
35	Operating current		A	
36	Instructions to the client for cleaning the air filter		Done	Not yet
37	Instructions to the client about the cleaning method		Done	Not yet
38	Instructions to the client about the operation		Done	Not yet

12.11 SERVICE AND MAINTENANCE RECORD BY MEANS OF THE 7-SEGMENT DISPLAY

Data Sheet for Checking by 7-Segment Display

Customer's Name:_____ Date:_____

Outdoor Unit Model (Serial No.)		RAS- (Serial No.)				RAS- (Serial No.)			
(1) Operation Mode									
(2) Test Run Start Time									
(3) Data Collect Start Time									
(4) Read Out Data from 7-Segment in Outdoor Unit									
Protection Control Code									
Total Capacity of I.U Connected	CP								
Input/Output State of Outdoor Micro-Computer	SC	52C	FAN1	FAN2	20A	52C	FAN1	FAN2	20A
		20F	21	CH	PSH	20F	21	CH	PSH
Alarm Code for Abnormal Stoppage of Compressor	AC								
Inverter Order Frequency to Compressor	H1								
Indoor Order Frequency to Compressor	H2								
Air Flow Ratio	Fo								
O.U. Expansion Valve Opening	Eo								
Temp. at the top of Compressor	Td								
Evaporating Temp. at Heating	TE								
Ambient Air Temp.	To								
Cause of Stoppage at Inverter	iT								
Inverter Secondary Current	A2								
O.U. Address	nA								
Indoor Unit (Unit No. 1)									
I.U. Expansion Valve Opening	EA								
Liquid Pipe Temp. of I.U. (Freeze Protection)	LA								
I.U. Intake Air Temp.	iA								
I.U. Discharge Air Temp.	oA								
Cause of I.U. Stoppage	dA								
Indoor Unit (Unit No. 2)									
I.U. Expansion Valve Opening	EA								
Liquid Pipe Temp of I.U. (Freeze Protection)	LA								
I.U. Intake Air Temp.	iA								
I.U. Discharge Air Temp.	oA								
Cause of I.U. Stoppage	dA								
Indoor Unit (Unit No. 3)									
I.U. Expansion Valve Opening	EA								
Liquid Pipe Temp. of I.U. (Freeze Protection)	LA								
I.U. Intake Air Temp.	iA								
I.U. Discharge Air Temp.	oA								
Cause of I.U. Stoppage	dA								
Indoor Unit (Unit No. 4)									
I.U. Expansion Valve Opening	EA								
Liquid Pipe Temp. of I.U. (Freeze Protection)	LA								
I.U. Intake Air Temp.	iA								
I.U. Discharge Air Temp.	oA								
Cause of I.U. Stoppage	dA								

O.U.: Outdoor Unit, I.U: Indoor Unit
FAN1: FAN2: Constant Speed Fan, 52C: CMC, PSH: High Pressure Switch
20A: Solenoid Valve (SVA), 20F: Solenoid Valve (SVF), 21: Reversing Valve (RVR), CH: Oil Heater
*: Multiply 1/8 by the code on the 7-segment.

12.12. SERVICE AND MAINTENANCE RECORD BY REMOTE CONTROL SWITCH

Data Sheet for Checking by Remote Control Switch

Time				:	:	:	:	:
I.U. Model								
I.U. Serial No.								
I.U. No. / Alarm Code								
		Check Mode 1	Check Mode 2	1 · 2	1 · 2	1 · 2	1 · 2	1 · 2
B	Temp. Indication							
	Set Temp.	b1	- -					
	Inlet Air Temp.	b2	91					
	Discharge Air Temp.	b3	92					
	Liquid Pipe Temp.	b4	93					
	Remote Thermistor Temp.	b5	- -					
	Outdoor Air Temp.	b6	94					
	Gas Pipe Temp.	b7	95					
	Evaporating Temp.at Heating	b8	96					
	Control Information	b9	97					
	Comp. Top Temp.	bA	98					
	Thermo Temp. of Remote Control Switch	bb	- -					
C	Micro-Computer State Indication							
	I.U. Micro-Computer	C1	- -					
	O.U. Micro-Computer	C2	- -					
D	Stopping Cause State Indication							
	Stopping Cause State Indication	d1	- -					
E	Alarm Occurrence							
	Times of Abnormality	E1	- -					
	Times of Power Failure	E2	- -					
	Times of Abnormal Transmitting E3	- -						
	Times of Inverter Tripping	E4	- -					
F	Automatic Louver State							
	Louver Sensor State	F1	- -					
H	Pressure, Frequency State Indication							
	Discharge Pressure	H1	99					
	Suction Pressure	H2	9A					
	Control Information	H3	9b					
	Operating Frequency	H4	9C					
J	I.U. Capacity Indication							
	I.U. Capacity (1/8HP)	J1	- -					
	O.U. Code	J2	- -					
	Refrigerant Cycle Number	J3	- -					
	Refrigerant Cycle Number	J4	- -					
L	Opening of Ex. Valve							
	I.U. Ex. Valve	L1	9d					
	O.U. Ex. Valve 1	L2	9E					
	O.U. Ex. Valve 2	L3	- -					
	O.U. Ex. Valve B	L4	- -					
P	Running Current Indication (Reference)							
	Comp. Current	P1	9F					

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