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IVX SERIES



Service manual

Outdoor Units: 3~12 HP
Indoor Units Type:
- 4-Way Cassette
- 2-Way Cassette
- Wall
- Ceiling
- In-the-Ceiling
- Floor
- Floor Concealed

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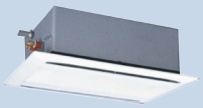
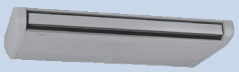
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◆ Unit code list

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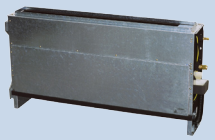
MODEL CODIFICATION Please check by model name your air conditioner type, its abbreviation and reference number in this technical catalogue.

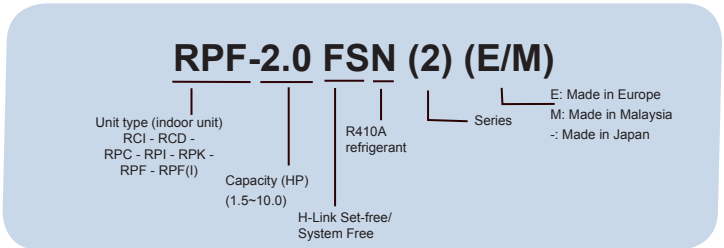
FSN(2)(E) INDOOR UNITS							
4-Way Cassette		4-Way Mini Cassette		2-Way Cassette		Ceiling	
Unit	Code	Unit	Code	Unit	Code	Unit	Code
RCI-1.5FSN2E	7E400002	RCIM-1.5FSN2	60278013	RCD-1.5FSN2	60278030		
RCI-2.0FSN2E	7E400003	RCIM-2.0FSN2	60278014	RCD-2.0FSN2	60278031	RPC-2.0FSNE	7E440003
RCI-2.5FSN2E	7E400004			RCD-2.5FSN2	60278032	RPC-2.5FSN2E	7E440004
RCI-3.0FSN2E	7E400005			RCD-3.0FSN2	60278033	RPC-3.0FSN2E	7E440005
RCI-4.0FSN2E	7E400007			RCD-4.0FSN2	60278034	RPC-4.0FSN2E	7E440007
RCI-5.0FSN2E	7E400008			RCD-5.0FSN2	60278035	RPC-5.0FSN2E	7E440008
RCI-6.0FSN2E	7E400009					RPC-6.0FSN2E	7E440009
							
RCI		RCIM		RCD		RPC	
☀ ❄ 1~							

RPI-3.0 FSN (2) (E)

- Unit type (indoor unit) RCI(M) - RCD - RPC - RPI - RPK - RPF - RPF(I)
- Capacity (HP) 2.0-2.5-3.0-4.0-5.0-6.0-8.0-10.0
- H-Link Set-free/ System Free
- R410A refrigerant
- Series
- E: Made in Europe -: Made in Japan

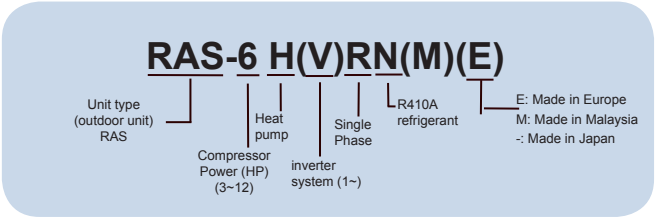
FSN(2)(E/M) INDOOR UNITS

Duct				Wall		Floor Enclosure		Floor Concealed Enclosure	
Unit	Code	Unit	Code	Unit	Code	Unit	Code	Unit	Code
RPI-1.5FSN2E	7E420002 NEW	RPIM-1.5FSN2E	7E430002 NEW	RPK-1.5FSN2M	60277942	RPF-1.5FSN2E	7E450002	RPFI-1.5FSN2E	7E460002
RPI-2.0FSN2E	7E420003 NEW			RPK-2.0FSN2M	60277943	RPF-2.0FSN2E	7E450003	RPFI-2.0FSN2E	7E460003
RPI-2.5FSN2E	7E420004 NEW			RPK-2.5FSN2M	60277944	RPF-2.5FSN2E	7E450004	RPFI-2.5FSN2E	7E460004
RPI-3.0FSN2E	7E420005 NEW			RPK-3.0FSN2M	60277945	-	-	-	-
RPI-4.0FSN2E	7E420007 NEW			RPK-4.0FSN2M	60277946				
RPI-5.0FSN2E	7E420008 NEW								
RPI-6.0FSN2E	7E420009 NEW								
RPI-8.0FSNE	70886723								
RPI-10.0FSNE	70886733								
									
RPI		RPIM		RPK		RPF		RPFI	
☀ ❄ 1~									

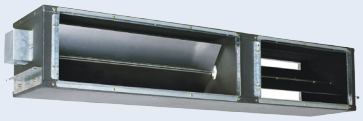


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OUTDOOR UNITS (IVX)			
HVRNME OUTDOOR UNITS		HRNM(E) OUTDOOR UNITS	
Unit	Code	Unit	Code
RAS-3HVRNME	7E300005		
RAS-4HVRNME	7E300007	RAS-4HRNME	7E300107
RAS-5HVRNME	7E300008	RAS-5HRNME	7E300108
RAS-6HVRNME	7E300009	RAS-6HRNME	7E300109
		RAS-8HRNM	60278972
		RAS-10HRNM	60278973
		RAS-12HRNM	60278974
			
1~		3~	

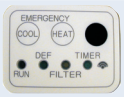
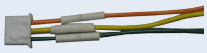
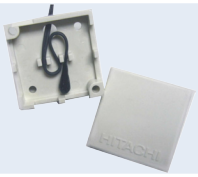


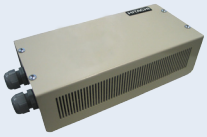
COMPLEMENTARY SYSTEMS

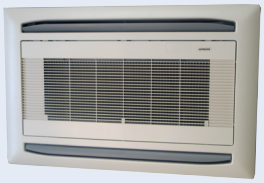
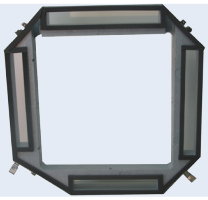
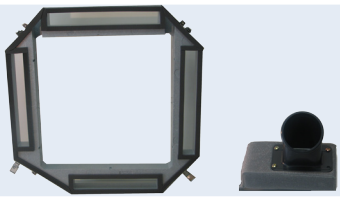
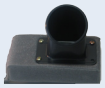
Accessory	Name	Code	Figure
KPI-502E1E	Total heat exchanger	70600001 NEW	
KPI-502E1E	Total heat exchanger	70600002 NEW	
KPI-1002E1E	Total heat exchanger	70600003 NEW	
KPI-1502E1E	Total heat exchanger	70600004 NEW	
KPI-2002E1E	Total heat exchanger	70600005 NEW	
KPI-3002H1E	Total heat exchanger	70600107 NEW	
EF-5GE	Econofresh kit	7E774148	

ACCESSORY CODE LIST

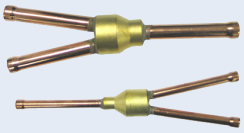
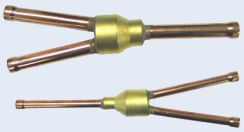
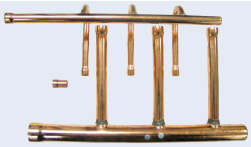
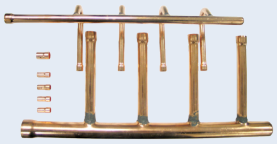
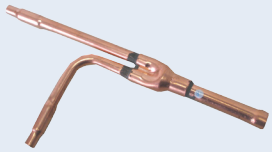
Accessory	Name	Code	Figure
PC-P2HTE	Remote control switch with timer	7E899954	
PSC-A64S	Central control	60291479 NEW	
PSC-A1T	Programmable timer	60291482 NEW	
PC-P5H	Optional remote controller	60290879	

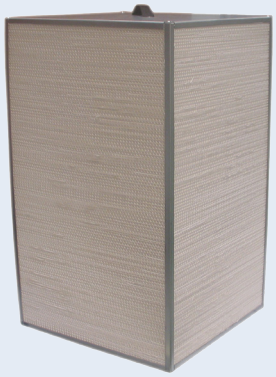
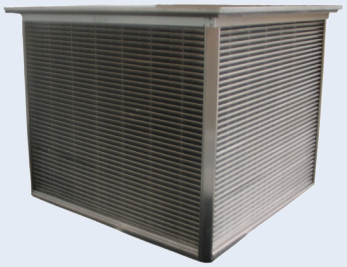
Accessory	Name	Code	Figure
PC-ART	Wall-mounted remote control switch with timer	70510000 NEW	
PC-LH3A	Wireless remote control switch	60291056	
PC-ARH	Optional remote controller	60291486 NEW	
PC-ALH	Receiver kit (for RCI-FSN2E -on the panel-)	60291464 NEW	
PC-ALHD	Receiver kit (for RCD-FSN2· -on the panel-)	60291467 NEW	
PC-ALHZ	Receiver kit (for RCI, RCD, RPC, RPI, RPK, RPF(I) - (FSN2E) -on the wall-)	60291473 NEW	
PC-ALHC	Receiver kit (for RCIM-FSN2E -on the panel-)	60291476 NEW	Image not available
PSC-5HR	H-LINK relay	60291105	
PCC-1A	Optional function connector	60199286	
PRC-10E1	2-pin extension cord	7E790211	
PRC-15E1	2-pin extension cord	7E790212	
PRC-20E1	2-pin extension cord	7E790213	
PRC-30E1	2-pin extension cord	7E790214	
THM-R2AE	Remote sensor (THM4)	7E799907	

Accessory	Name	Code	Figure
HARC-BXE (A)	Lonwork BMS Interface (7 inputs up to 6 units)	60290874 NEW	
HARC-BXE (B)	Lonwork BMS Interface (4 inputs up to 32 units)	60290875	
HARC MOD BUS	Integration with installations with intelligent control (Building Management System) Gateway Interface to LON-WORKS BMS systems.	70513200 NEW	
HC-A64BNP	Integration with installations with intelligent control (Building Management System) Gateway Interface to BAC NET BMS systems.	60xxxx11	
CSNET-WEB	Control System	7E891938 NEW	
TS001 WEB SCREEN	15-inch touch-screen display	7E891935 NEW	
HARC I&O	Integration of teams into H-Link	70519000 NEW	
HARC SMS Alarm	SMS alarm warning device	70519100 NEW	
DBS-26	Drain discharge connection	60299192	
P-N23WA	Air panel for RCI-FSN2E	70530000	

Accessory	Name	Code	Figure
P-N23WAM	Air panel for RCIM-FSN2	60197160	
P-N23DWA	Air panel for RCD-FSN2	60291574	
P-N46DWA	Air panel for RCD-FSN2	60291575	
B-23H4	Adapter for deodorant filter	60199790	
F-23L4-K	Antibacteria filter	60199791	
F-23L4-D	Deodorant filter	60199793	
F-46L4-D	Deodorant filter	60199794	
PDF-23C3	Duct connection flange	60199795	
PDF-46C3	Duct connection flange	60199796	
OACI-232	Fresh-air intake kit	60199797	
PD-75	Fresh-air intake kit	60199798	
PI-23LS5	3-way outlet parts	60199799	
TKCI-232	T-duct connecting kit	60199801	

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Accessory	Name	Code	Figure
TE-03N	Branch pipe	70800007	
TE-04N	Branch pipe	70800008	
TE-05N	Branch pipe	70800009	
TE-08N	Branch pipe	70800003	
TE-10N	Branch pipe	70800004	
TRE-06N	Branch pipe	70800005	
TRE-810N	Branch pipe	70800010	
QE-810N	Branch pipe	70800006	
E-162SN	Branch pipe	60291201	
E-102SN	Branch pipe	60291202	
AG-335A	Air outlet diffuser (one for each fan)	60291431	
WSP-335A	Wind guard	60291432	
ASG-NP335F	Snow guard (one for each fan)	60291433	
ASG-NP335B	Snow guard (one for each fan)	60291434	
ASG-NP335L	Snow guard	60291435	

Accessory	Name	Code	Figure
ER-500	Energy exchanger for KPI (energy recovery)	70550001	
ER-750		70550002	
ER-1000		70550003	
ER-1500		70550004	
ER-2000		70550005	
HR-500	Energy exchanger for KPI (heat recovery)	70550101	
HR-750		70550102	
HR-1000		70550103	
HR-1500		70550104	
HR-2000		70550105	
HR-2900		70550107	
STL-30-200-L600	Sound attenuator (Heat/energy recovery)	70550200	
STL-30-250-L600		70550201	
STL-30-300-L600		70550202	
STL-30-355-L600		70550203	
STL-30-450-L600		70550204	

1. UNITS INSTALLATION

This chapter provides information about the procedures you must follow to install the IVX H(V)RNME and HRNM series outdoor units and the complete range of Hitachi indoor units.

1

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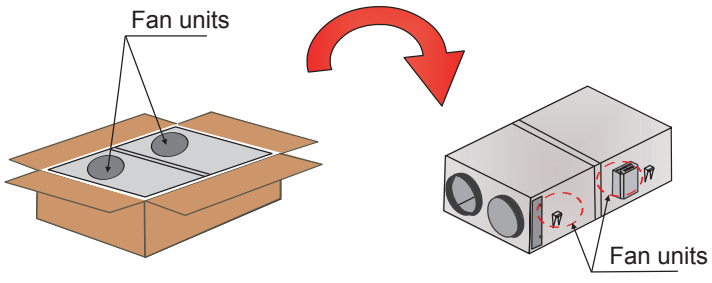
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WARNING

- *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 exists 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 units of more than 50 mm, and avoid obstacles that could hamper air intake, when installing more than one unit 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 into the outdoor fan.*
- *For cleaning, use non-inflammable and nontoxic cleaning liquid. Use of inflammable agent may cause explosion or fire.*
- *Work with sufficient ventilation, for working in an enclosed space could cause oxygen deficiency. Toxic gas may be produced when cleaning agent is heated to high temperature by, e.g., being exposed to fire.*
- *Cleaning liquid shall be collected after cleaning.*
- *Pay attention not to clamp cables when attaching the service cover to avoid electric shock or fire.*

CAUTION

- *Check the foundation to be flat, leveled and strongly enough.*
- *Install the unit in a restricted area not accessible by the general public.*
- *Aluminium fins have very sharp edges. Pay attention to the fins in order to avoid injury.*
- *Do not install the indoor units in a flammable environment to avoid a fire or an explosion.*
- *Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.*
- *Do not install the indoor units, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators, such as medical equipment.*
- *Do not install the indoor units in a machinery shop or kitchen, where vapor from oil or mist flows to the indoor units. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform. In the worst case, the oil damages the plastic parts of the indoor unit.*
- *To avoid any corrosive action to the heat exchangers, do not install the indoor units in an acid or alkaline environment.*
- *When lifting or moving the indoor unit, use appropriate slings to avoid damage and be careful not to damage the insulation material on units surface.*
- *This appliances are not intended for use by people (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision and instruction concerning the use of the appliance by a person responsible for their safety.*
- *Turn OFF all power switches before maintenance is performed.*
- *Do not start the cleaning procedures before 5 minutes of the stop of the unit.*
- *Only for KPI: before installation, take into account that the unit is packed upwards. Be careful with the fan units when taking out the unit from its package and placing it in the ground.*

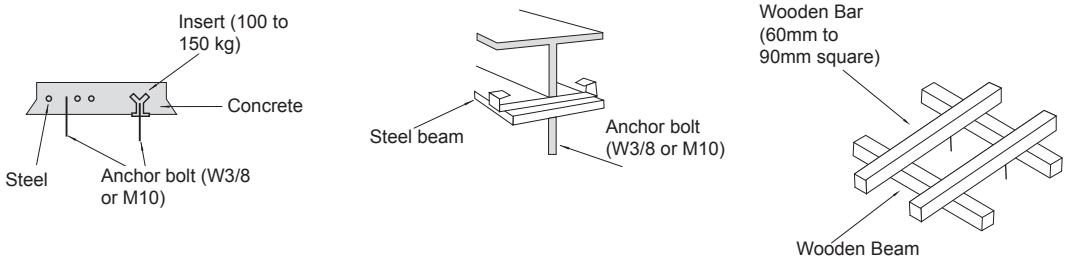


WARNING

- *Check and 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 to use a fan in order to obtain an uniform air temperature in the room.*
- *Avoid obstacles which may hamper the air intake or the air discharge flow.*
- *Children must be supervised to ensure that they do not play with the electrical appliances.*
- *Before obtaining access to terminals, all supply circuits bust be disconnected.*

WARNING

- *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 and similar.*
- *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 a electrical heater in the field.*
- *Mount suspension bolts using M10 (W3/8) as size, as shown below:*



Concrete Beam **Steel Beam** **Wooden Beam**

- *Do not put any foreign material into the indoor unit and check to ensure that none exist in the indoor unit before the installation and test running. Otherwise a fire or failure may occur.*

NOTE

- *Hitachi indoor units are designed for free air discharge (Static Pressure, Pst=0), except ducted indoor units as RPIM, which require to be connected to discharge air ducts. For these units see flow-static pressure chart.*

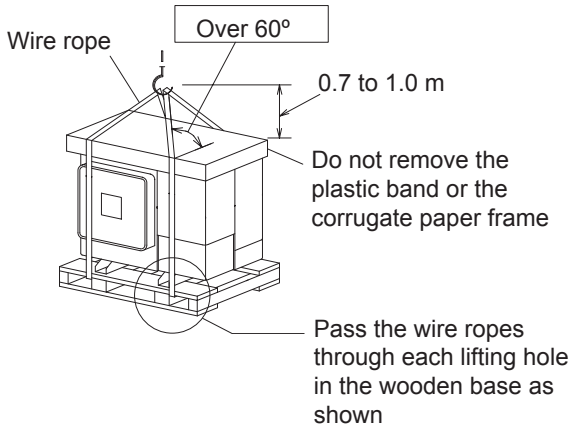
1.1. RAS-3HVRNME

1.1.1. Transportation of outdoor unit

⚠	***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 will occur.*	

- **Hanging Method**

When hanging the unit, ensure the balance of the unit, check safety and lift it up smoothly. Do not remove any packing materials and hang the unit under packing condition with two ropes, as shown in the figure.

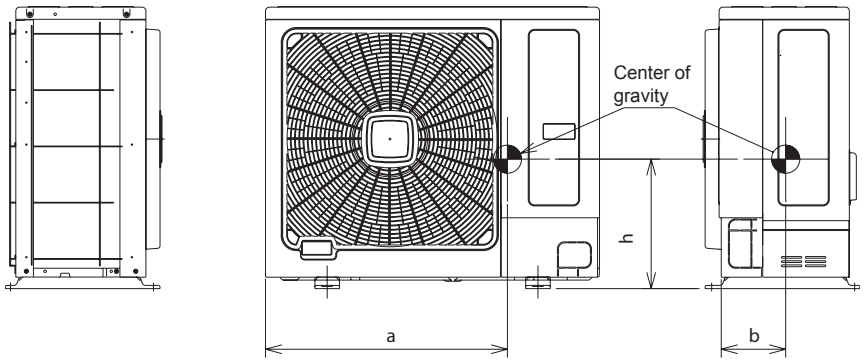


⚠	***CAUTION***
- *Lift the outdoor unit in its factory packaging with 2 wire ropes.* - *For safety reasons ensure that the outdoor unit is lifted smoothly and does not lean.* - *Do not attach lifting equipment to the plastic band or the corrugated paper frame, because of the ropes will slip or break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

1.1.2. Center of gravity

- **When using handles**

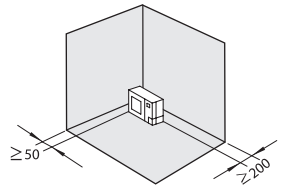
When manually lifting the unit using the handles, pay attention to the following: do not remove the wooden base from outdoor unit to prevent it from overturning, paying attention to the center of gravity as shown in the below figure. Two persons are needed to move this unit.

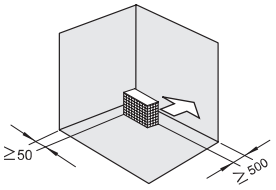


Measures	(mm)
a	590
b	185
h	370

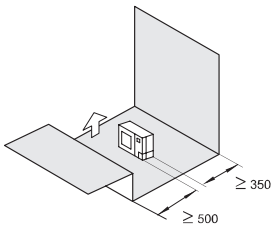
1.1.3. Installation space (Initial check)

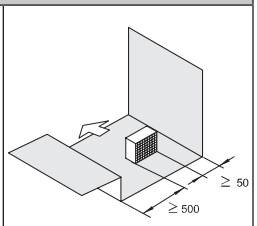
a) In case of front side and either of the sides are open (single unit)



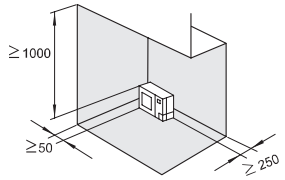


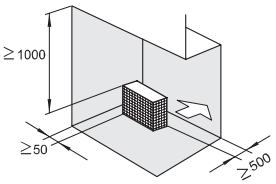
b) In case that surrounding wall exist (single unit)

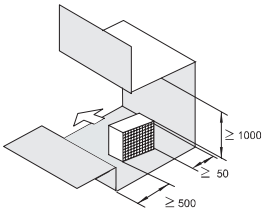


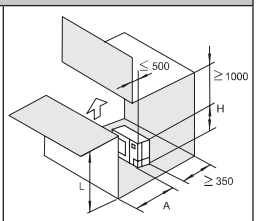


c) In case that upper side obstacles exist (single unit)

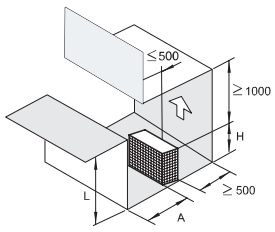






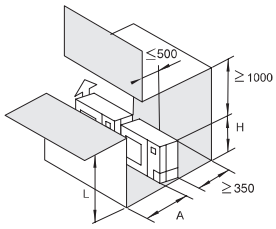


0 < **L** ≤ 1/2H → **A** ≥ 600
1/2H < **L** ≤ H → **A** ≥ 1200

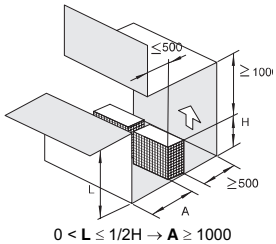


0 < **L** ≤ 1/2H → **A** ≥ 1000
1/2H < **L** ≤ H → **A** ≥ 350

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

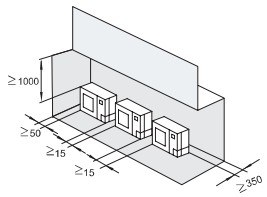


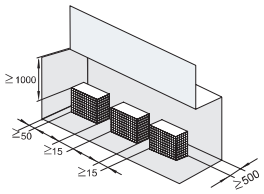
0 < **L** ≤ 1/2H → **A** ≥ 600
1/2H < **L** ≤ H → **A** ≥ 1200



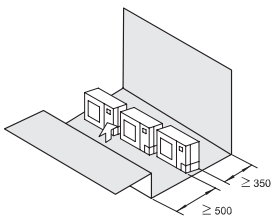
0 < **L** ≤ 1/2H → **A** ≥ 1000
1/2H < **L** ≤ H → **A** ≥ 350

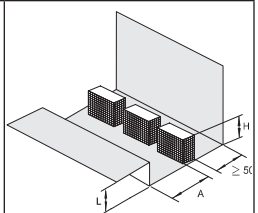
e) In case of front side and either of the sides are open (serial unit)



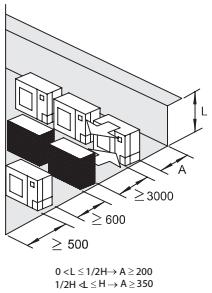
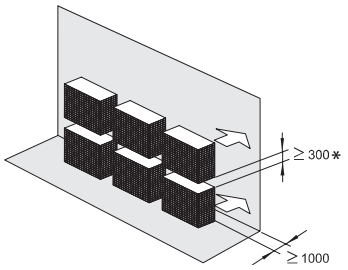
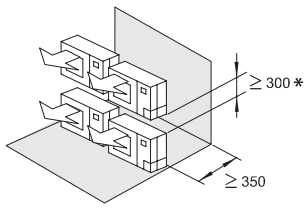


f) In case that surrounding wall exist (serial unit)





0 < L ≤ 1/2H→ A ≥ 200
1/2H < L ≤ H → A ≥ 350

g) Horizontal (multiple units)	h) Vertical (multiple units)	
		

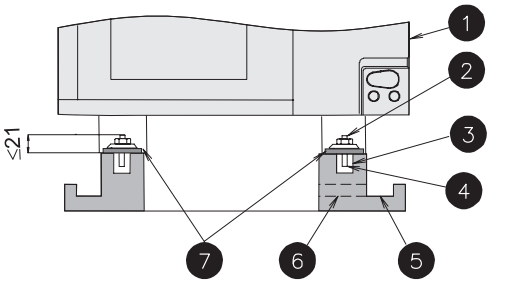
	NOTE
- *All units are in (mm).* - *Do not stack more than two units in height.* - *Close gap (*) to avoid recirculating discharge air flow.*	

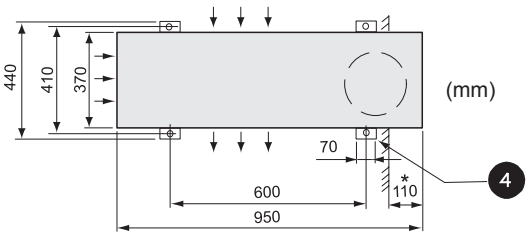
1.1.4. Place provision

- **Concrete Foundation**

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

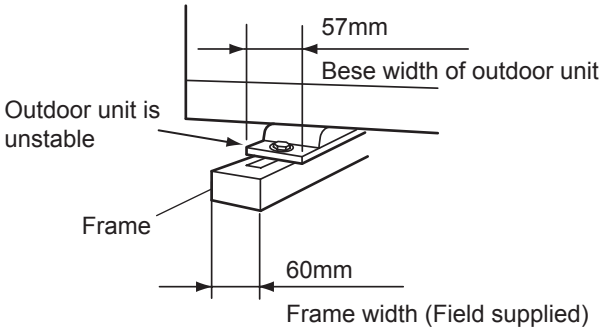
1. Outdoor unit
2. Cut this portion of bolt If not, it's difficult to remove Service cover
3. Mortar hole (Ø100 x Depth 150)
4. Anchor bolt M10 (Ø12.5 Hole)
5. Drainage (Wide 100 x Depth 150)
6. Drainage
7. Vibration-proof rubber

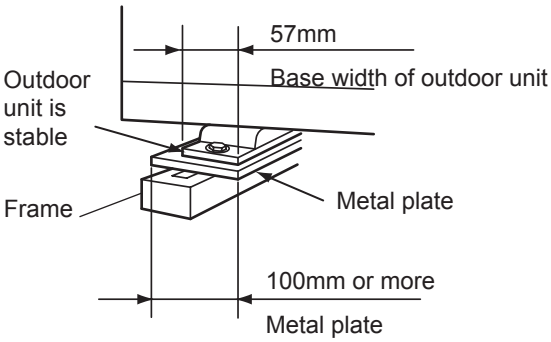




*** Space for downward piping space**

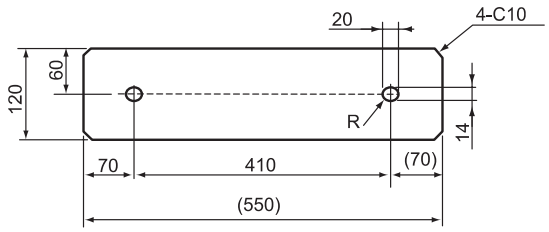
The whole base of the outdoor unit should be installed on a foundation. When using vibration-proof material, it should also be positioned in the same place. When installing the outdoor unit on a fieldsupplied frame, use metal plates to adjust the frame width for stable installation as shown in the figure below.



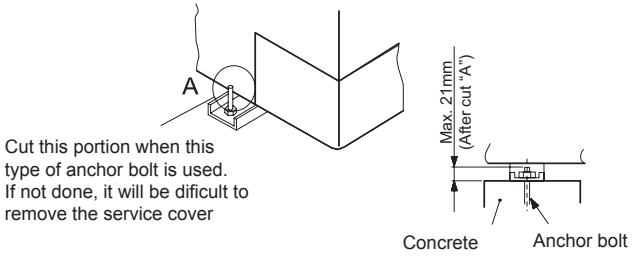


Recommended Metal Plate Size

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

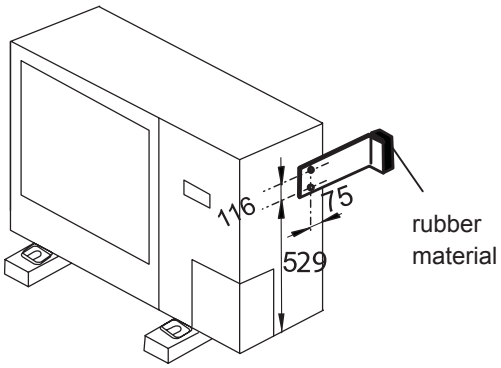


- **Example of fixing outdoor unit by anchor bolts**



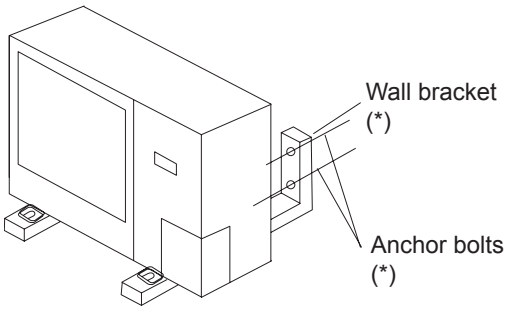
- **Fix Unit to the wall**

1. Fix the unit onto the wall as the figure indicates. (Field supplied stay)
2. Ensure the foundation so that deforming and noise are avoided.
3. In order to prevent vibration transfer to the building, use rubber material.



- **Suspended unit**

1. Suspend the unit as the drawing indicates.
2. Ensure that wall can resist the outdoor unit weight indicated in specification label plate.
3. It is recommended to select each foot support to bear the full weight of the unit (in order to consider stress fatigue applied when unit is also working).



(*) Field supplied

	CAUTION

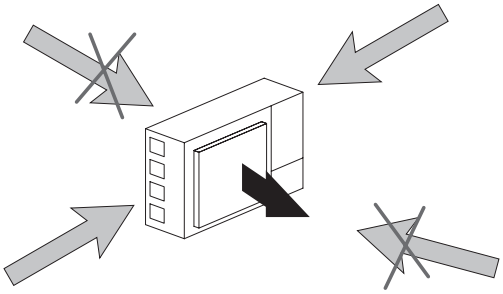
Pay attention to the following for installation:

- *Installation shall ensure that outdoor unit will not incline, vibrate, make noise or fall down by a blast of wind or in an earthquake. Calculate quake-resistance strength to ensure that installation is strong enough against falling. Fix the unit with wires (field supplied) when installing in a location without walls or windbreak and likely exposed to a blast of wind.*
- *Apply vibration-proof material where necessary.*

- **Installing location where the unit will be exposed to strong wind.**

Follow the instructions below to install on the rooftop or a location without surrounding buildings, where strong wind is expected against the product.

1. Choose a location where the outlet or inlet side of the product will not be exposed to strong wind.
2. When the outlet is exposed to strong wind:
   Direct strong wind may cause lack of air flow and adversely affect to normal function.



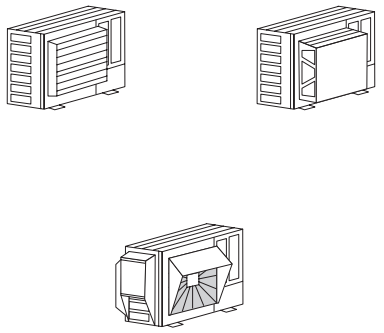
	CAUTION

- *Excessive strong wind against the outdoor unit outlet may cause inverse rotation and damage the fan and motor.*

1.1.5. Installation of windward and snow protection hood.

- **Air flow guide, wind guard and snow protection hood**

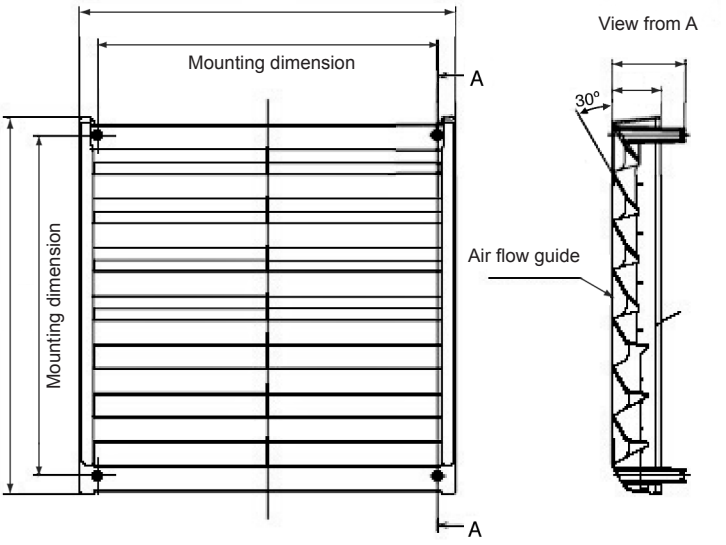
Optional parts			HP	Model
Air flow guide			3	AG-335A
Wind guard				WSP-335A
Snow protection hood	Stainless plate (SUS304)	Air outlet	3	ASG-NP335F
		Air inlet of rear side		ASG-NP335B
		Air inlet of side face		ASG-NP335L
		Air outlet	3	ASG-NP335F
		Air inlet of rear side		ASG-NP335B
		Air inlet of rear side		ASG-NP335L
	Zinc plate	Air outlet	3	ASG-NP335FS
		Air inlet of rear side		ASG-335BS
		Air inlet of side face		ASG-NP335LS
		Air outlet	3	ASG-NP335FS
		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 be installed together.)

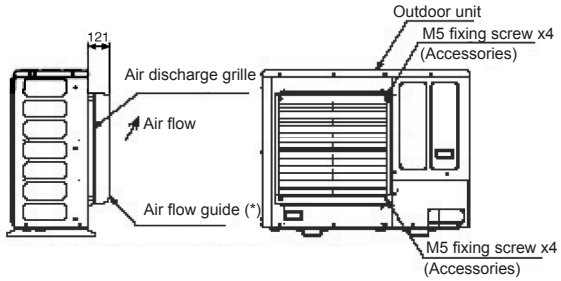


☛ Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

⚠	***CAUTION***
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

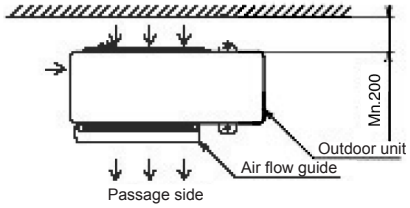
Two windbreak covers installation



(*) Air flow direction of both air flow guides should be the same

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 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.

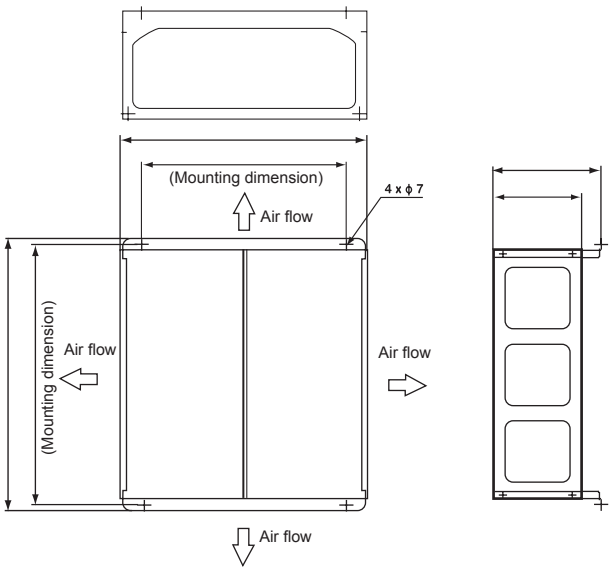


1

- **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

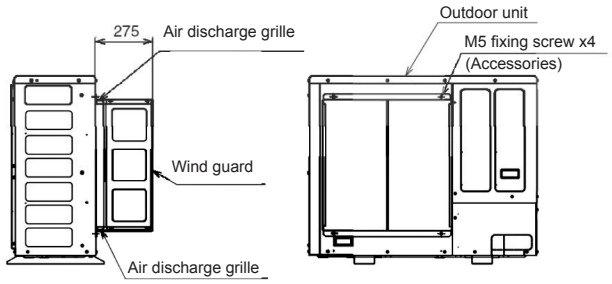


☛ Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

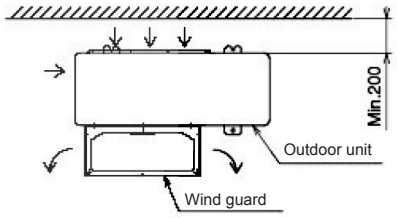
⚠	***CAUTION***
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

Two windguard covers installation



Service space

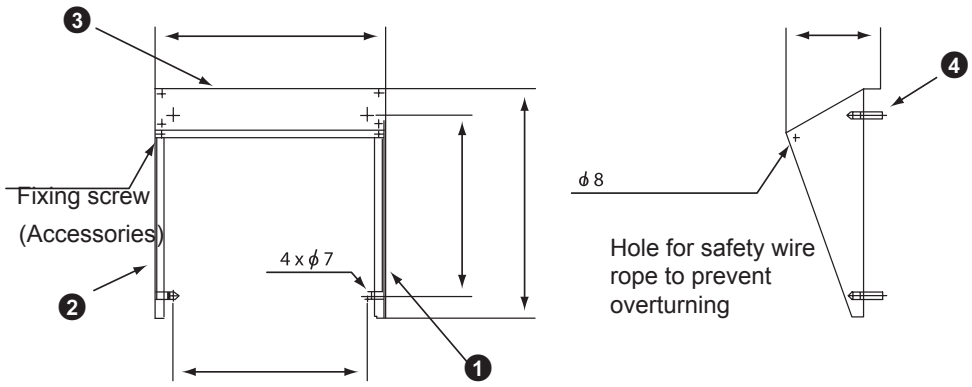
- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



- **Snow protection hood**

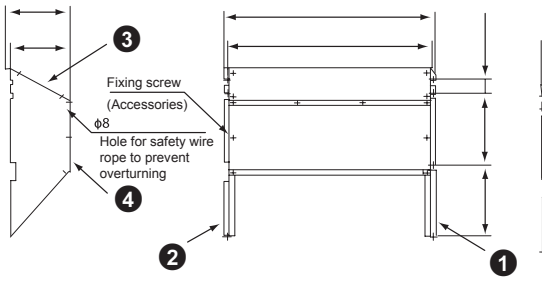
Air discharge hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel	1
❹	Stay	4



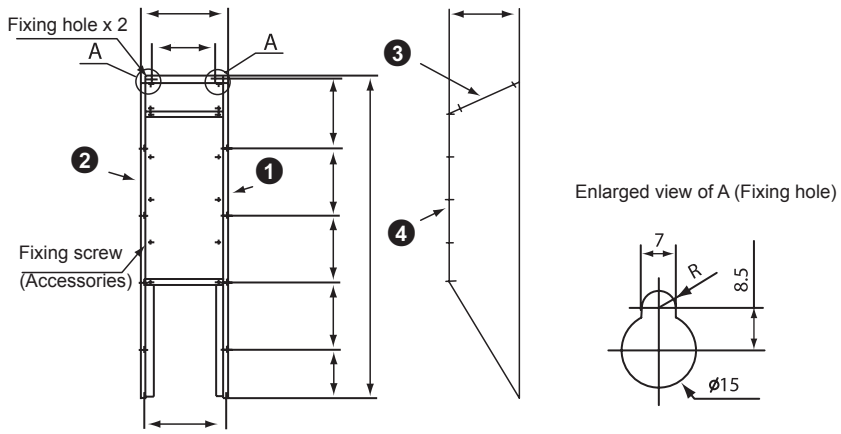
Rear suction hood

No.	Part name	Qty.
❶	Upper right side plate	1
❷	Upper left side plate	1
❸	Upper front panel (Upside)	1
❹	Upper front panel (Downside)	1

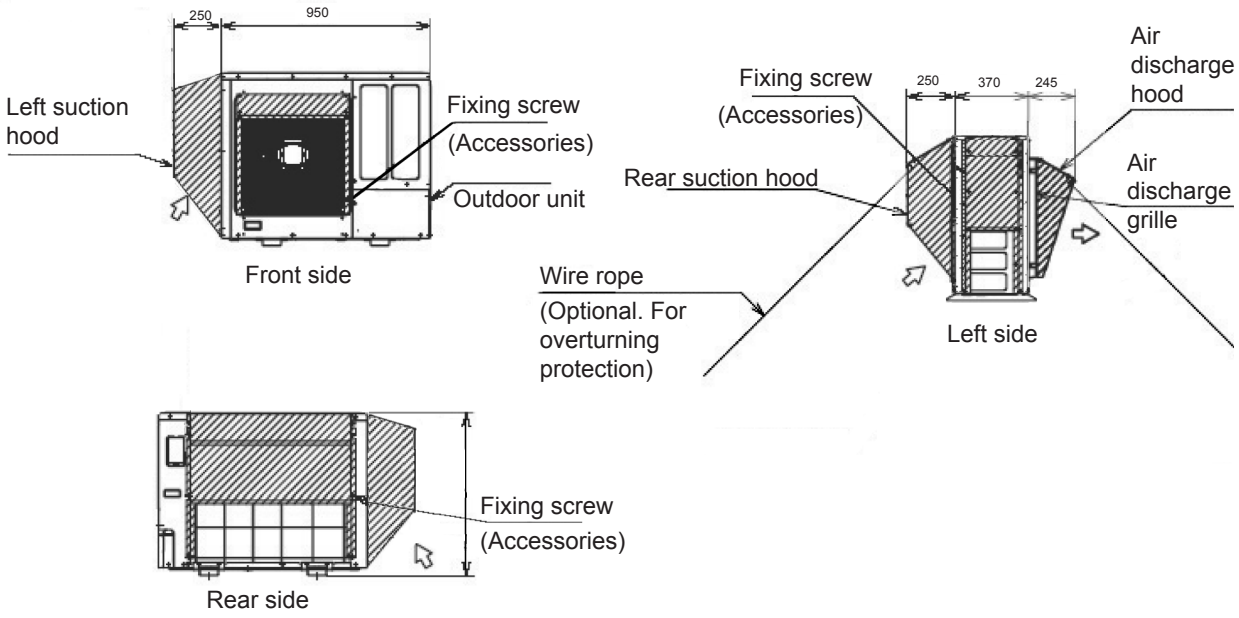


Left suction hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel (Upside)	1
❹	Front panel (Downside)	1



☛ Attaching example 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		1 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 (optional parts)		ASG-SW20A					

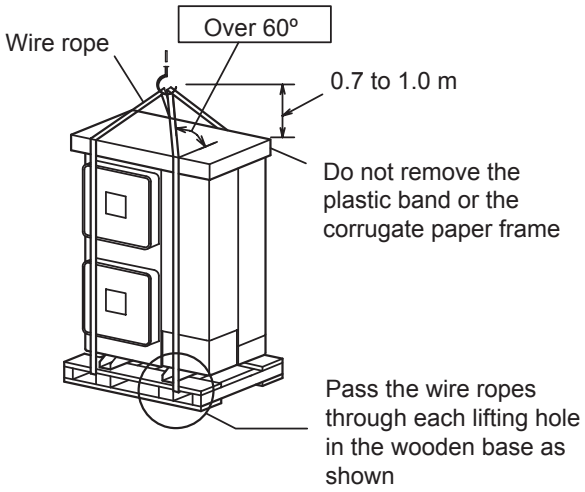
1.2. RAS-(4~6)H(V)RNME

1.2.1. Transportation of outdoor unit

	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 will occur.*

- **Hanging Method**

When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly. Do not remove any packing materials and hang the unit under packing condition with two ropes, as shown in the figure.

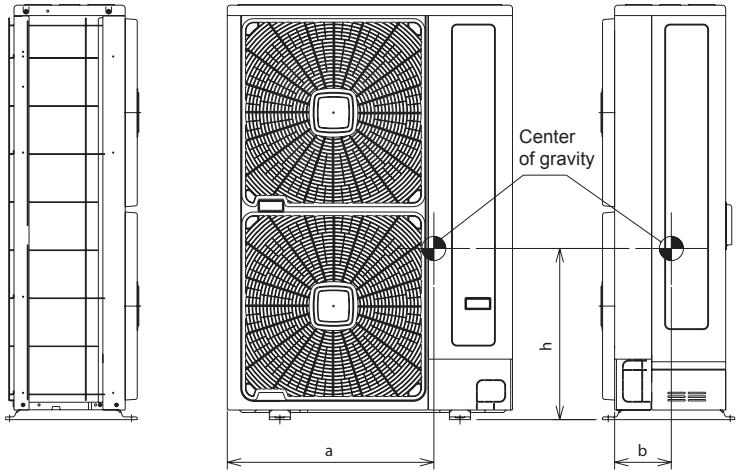


	CAUTION
-	*Lift the outdoor unit in its factory packaging with 2 wire ropes.*
-	*For safety reasons ensure that the outdoor unit is lifted smoothly and does not lean.*
-	*Do not attach lifting equipment to the plastic band or the corrugated paper frame, because of the ropes will slip or break the materials.*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

1.2.2. Center of gravity

- **Hanging Method**

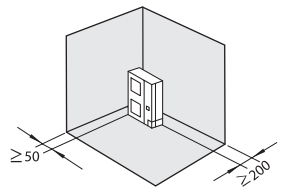
When hanging the unit, ensure the balance of the unit, check safety and lift it up smoothly. Do not remove any packing materials and hang the unit under packing condition with two ropes, as shown in the figure. At least two persons are needed to move this unit.

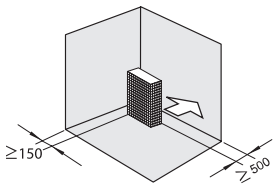


Measures	(mm)
a	615
b	190
h	570

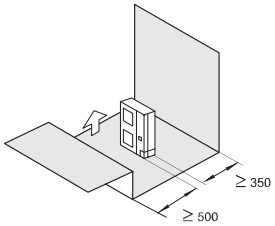
1.2.3. Installation space (Initial check)

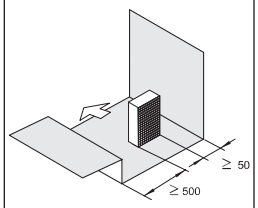
a) In case of front side and either of the sides are open (single unit)



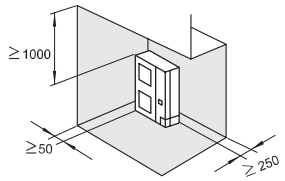


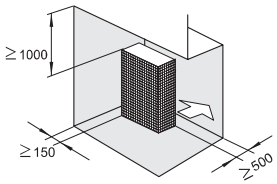
b) In case that surrounding wall exist (single unit)

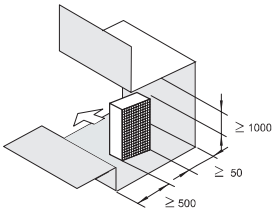


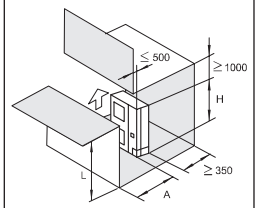


c) In case that upper side obstacles exist (single unit)

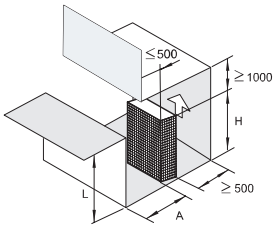






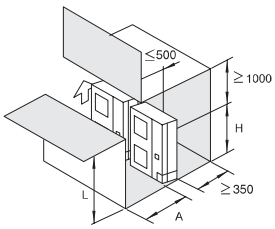


0 < **L** ≤ 1/2H → **A** ≥ 600
1/2H < **L** ≤ H → **A** ≥ 1200

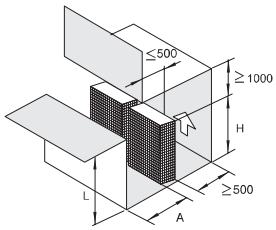


0 < **L** ≤ 1/2H → **A** ≥ 1000
1/2H < **L** ≤ H → **A** ≥ 350

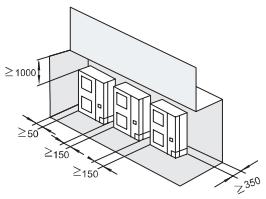
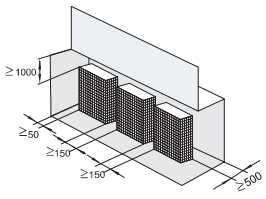
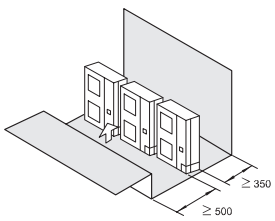
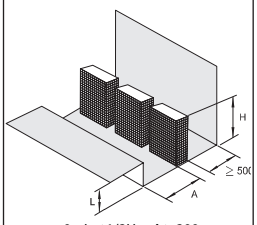
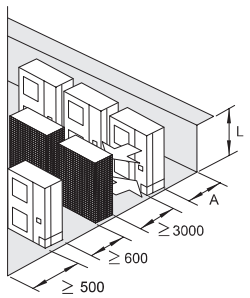
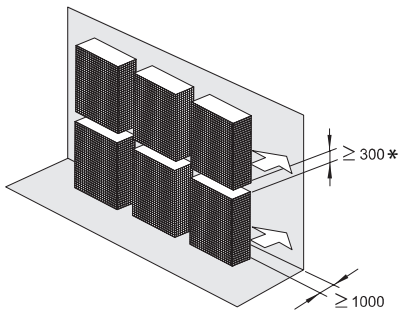
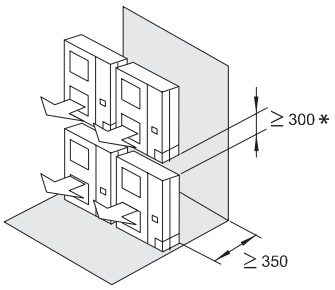
d) In case that upper side obstacles exist (serial units)



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



0 < **L** ≤ 1/2H → **A** ≥ 1000
1/2H < **L** ≤ H → **A** ≥ 350

e) In case of front side and either of the sides are open (serial unit)		f) In case that surrounding wall exist (serial unit)	
			
g) Horizontal (multiple units)		h) Vertical (multiple units)	
			

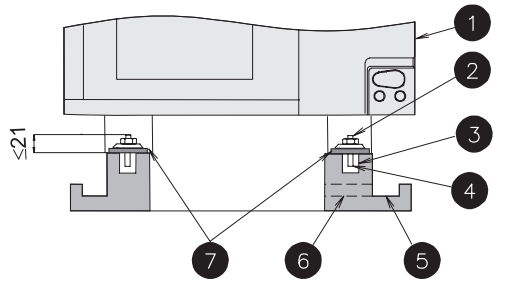
	NOTE
	- *All units are in (mm).* - *Do not stack more than two units in height.* - *Close gap (*) to avoid recirculating discharge air flow.*

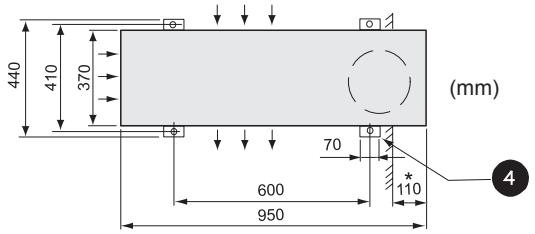
1.2.4. Place provision

- **Concrete Foundation**

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

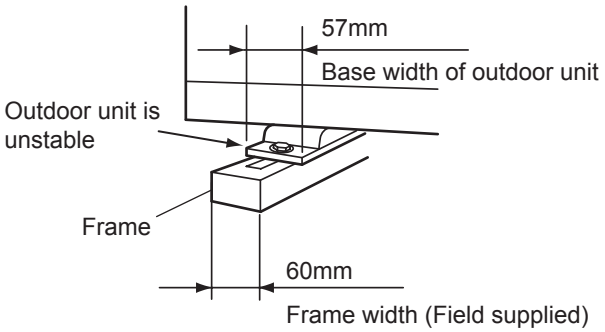
1. Outdoor unit
2. Cut this portion of bolt If not, it's difficult to remove Service cover
3. Mortar hole (Ø100 x Depth 150)
4. Anchor bolt M10 (Ø12.5 Hole)
5. Drainage (Wide 100 x Depth 150)
6. Drainage
7. Vibration-proof rubber

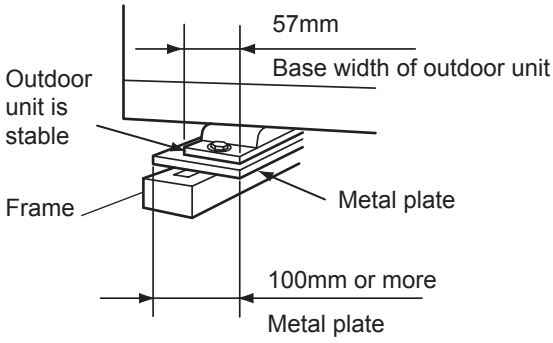




*** Space for downward piping space**

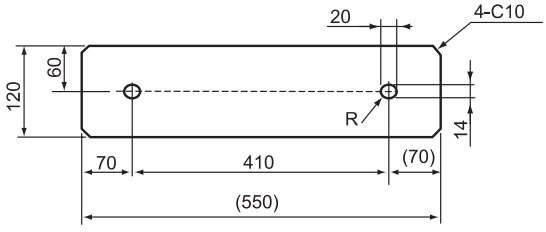
The whole base of the outdoor unit should be installed on a foundation. When using vibration-proof material, it should also be positioned in the same place. When installing the outdoor unit on a fieldsupplied frame, use metal plates to adjust the frame width for stable installation as shown in the figure below.



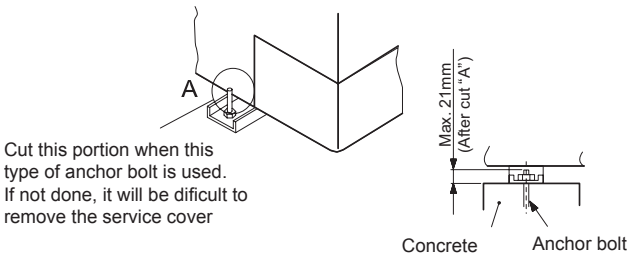


Recommended Metal Plate Size

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

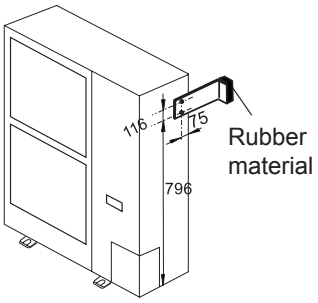


- **Example of fixing outdoor unit by anchor bolts**



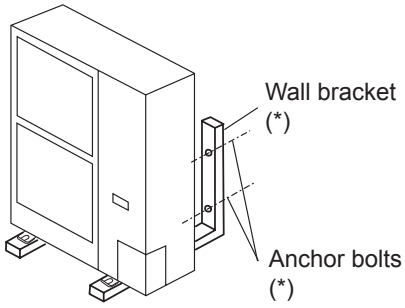
- **Fix Unit to the wall**

1. Fix the unit onto the wall as the figure indicates. (Field supplied stay)
2. Ensure the foundation so that avoid the deforming and noise.
3. In order to prevent vibration transfer to the building, use rubber material.



- **Suspended unit**

1. Suspend the unit as the drawing indicates.
2. Ensure that wall can resist the outdoor unit weight indicated in specification label plate.
3. It is recommended to select each foot support to bear the full weight of the unit (in order to consider stress fatigue applied when unit is also working).



(*) Field supplied

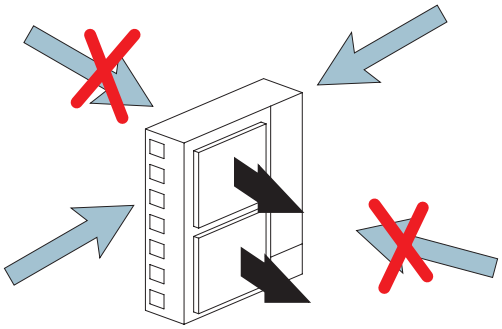
	CAUTION
Pay attention to the following for installation: - *Installation shall ensure that outdoor unit will not incline, vibrate, make noise or fall down by a blast of wind or in an earthquake. Calculate quake-resistance strength to ensure that installation is strong enough against falling. Fix the unit with wires (field supplied) when installing in a location without walls or windbreak and likely exposed to a blast of wind.* - *Apply vibration-proof material where necessary.*	

- **Installing location where the unit will be exposed to strong wind.**

Follow the instructions below to install on the rooftop or a location without surrounding buildings, where strong wind is expected against the product.

1. Choose a location where the outlet or inlet side of the product will not be exposed to strong wind.

2. When the outlet is exposed to strong wind:
   Direct strong wind will cause lack of air flow and adversely affect to normal function.

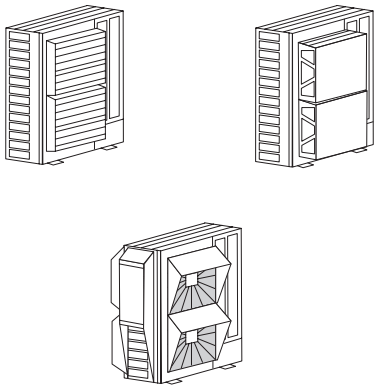


⚠	***CAUTION***
- *Excessive strong wind against the outdoor unit outlet may cause inverse rotation and damage the fan and motor.*	

1.2.5. Installation of windward and snow protection hood.

- **Air flow guide, wind guard and snow protection hood**

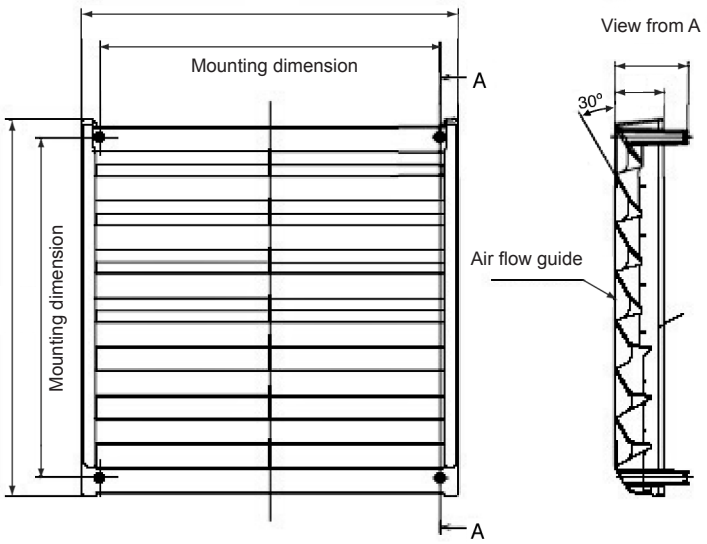
Optional parts			HP	Model
Air flow guide			4~6	AG-335A X 2
Wind guard				WSP-335A X 2
Snow protection hood	Stainless plate (SUS304)	Air outlet	4~6	ASG-NP335F X 2
		Air inlet of rear side		ASG-NP335B
		Air inlet of side face		ASG-NP335L
		Air outlet	4~6	ASG-NP335F X 2
		Air inlet of rear side		ASG-NP335B
		Air inlet of rear side		ASG-NP335L
	Zinc plate	Air outlet	4~6	ASG-NP335FS X 2
		Air inlet of rear side		ASG-335BS
		Air inlet of side face		ASG-NP335LS
		Air outlet	4~6	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 be installed together.)

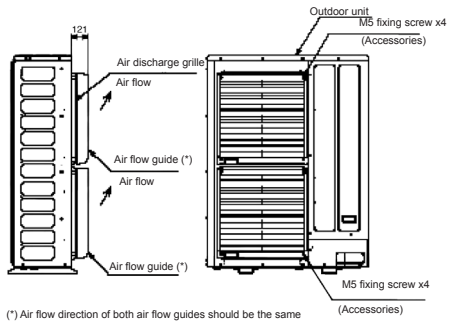


☛ Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

⚠	***CAUTION***
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

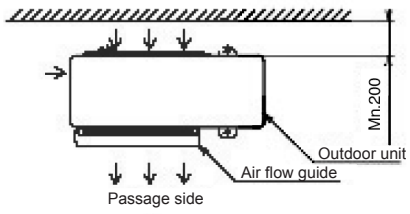
Two windbreak covers installation



(*) Air flow direction of both air flow guides should be the same

Service space (In case of upward air discharge)

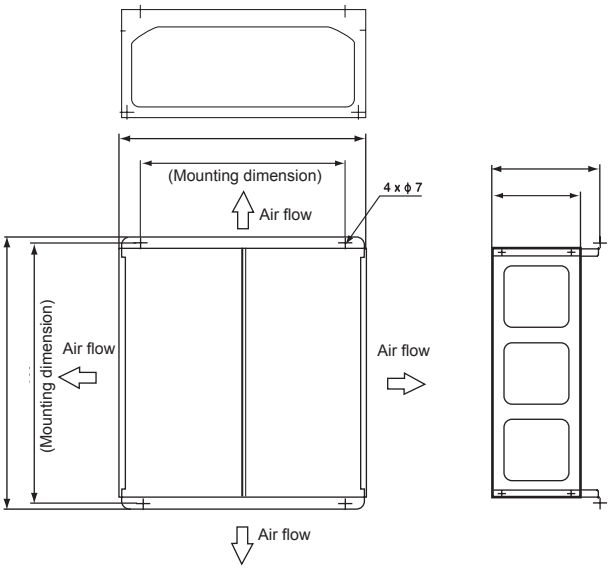
- In case of right and left sides air discharge, enough space for air discharge is required.
- The downward air discharge is also available. In such case, install the base under the unit to secure enough space for air discharge.
- In case of serial units installation, air discharge should be upward.



- **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

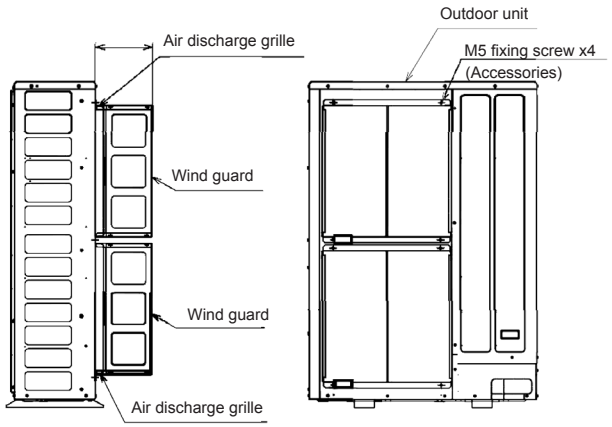


☛ Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

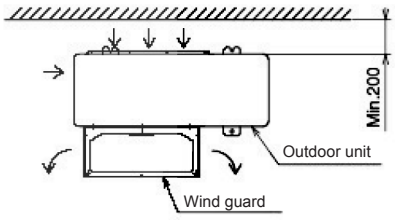
⚠	***CAUTION***
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

Two windguard covers installation



Service space

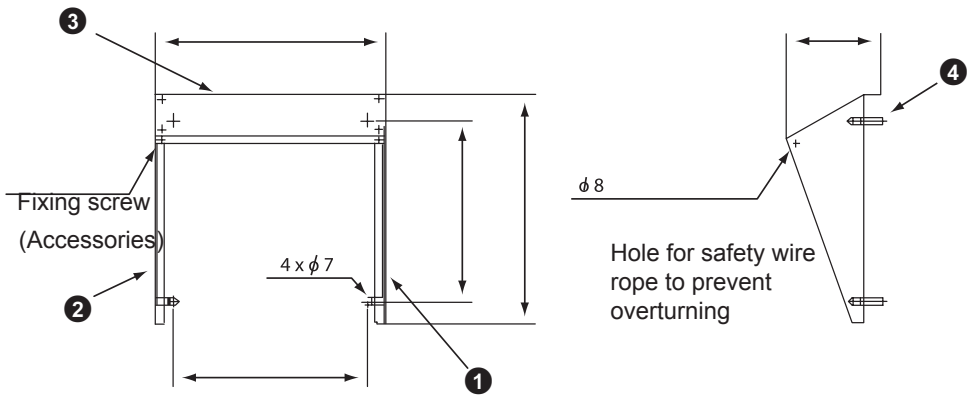
- Both sides of the outdoor unit should be open.
- No obstacles should be placed in the air discharge side.



- **Snow protection hood**

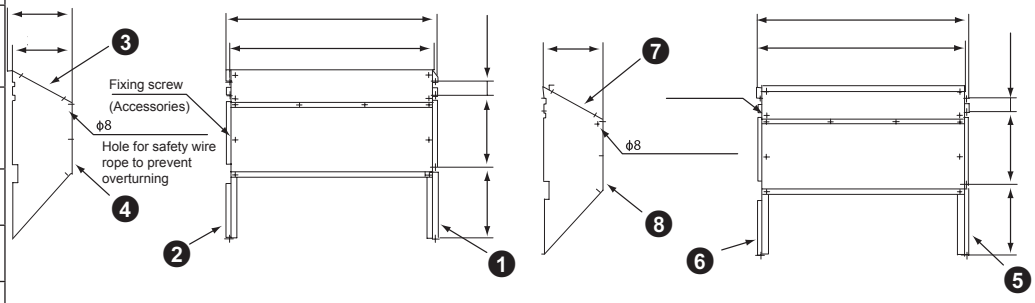
Air discharge hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel	1
❹	Stay	4



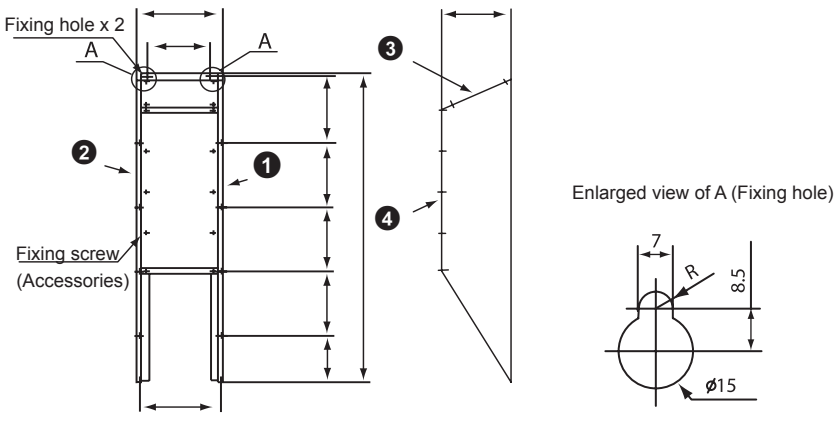
Rear suction hood

No.	Part name	Qty.
❶	Upper right side plate	1
❷	Upper left side plate	1
❸	Upper front panel (Upside)	1
❹	Upper front panel (Downside)	1
❺	Lower right side plate	1
❻	Lower left side plate	1
❼	Upper front panel (Upside)	1
❽	Upper front panel (Downside)	1

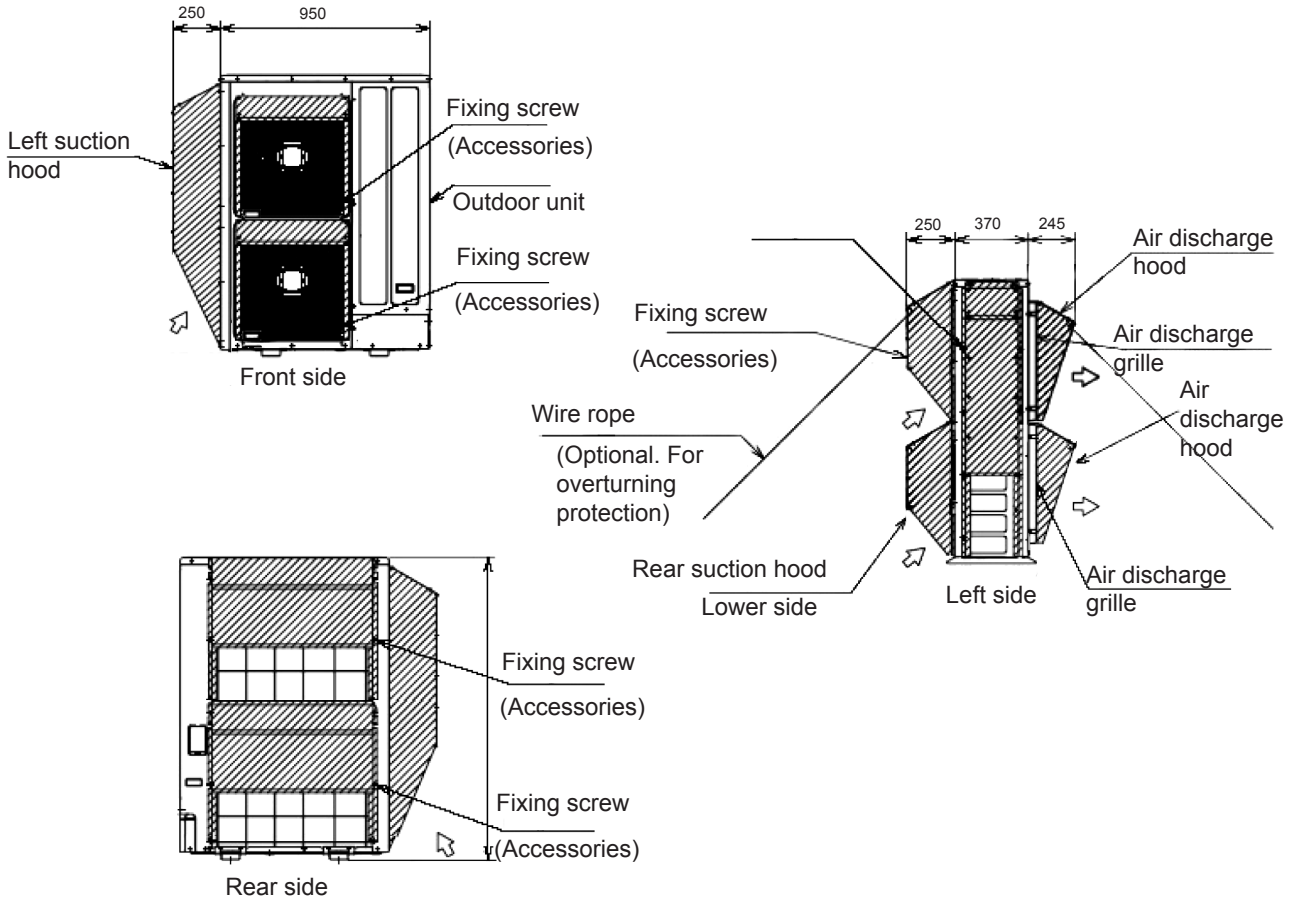


Left suction hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel (Upside)	1
❹	Front panel (Downside)	1



☛ Attaching example 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 (optional parts)		ASG-SW20A					

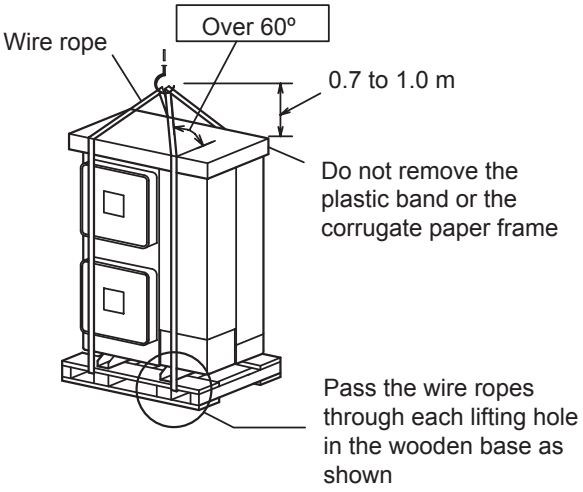
1.3. RAS-(8~12)HRNM

1.3.1. Transportation of outdoor unit

	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 will occur.*

- **Hanging Method**

When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly. Do not remove any packing materials and hang the unit under packing condition with two ropes, as shown in the figure.

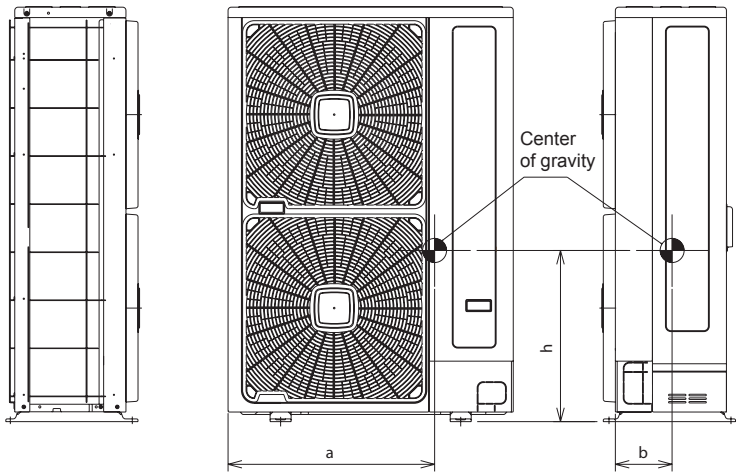


	CAUTION
-	*Lift the outdoor unit in its factory packaging with 2 wire ropes.*
-	*For safety reasons ensure that the outdoor unit is lifted smoothly and does not lean.*
-	*Do not attach lifting equipment to the plastic band or the corrugated paper frame, because of the ropes will slip or break the materials.*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

1.3.2. Center of gravity

- **Hanging Method**

When manually lifting the unit using the handles, pay attention to the following: do not remove the wooden base from outdoor unit to prevent it from overturning, paying attention to the center of gravity as shown in the below figure. At least two persons are needed to move this unit.



Measures	(mm)
a	615
b	190
h	570

1.3.3 Factory-supplied accessories

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

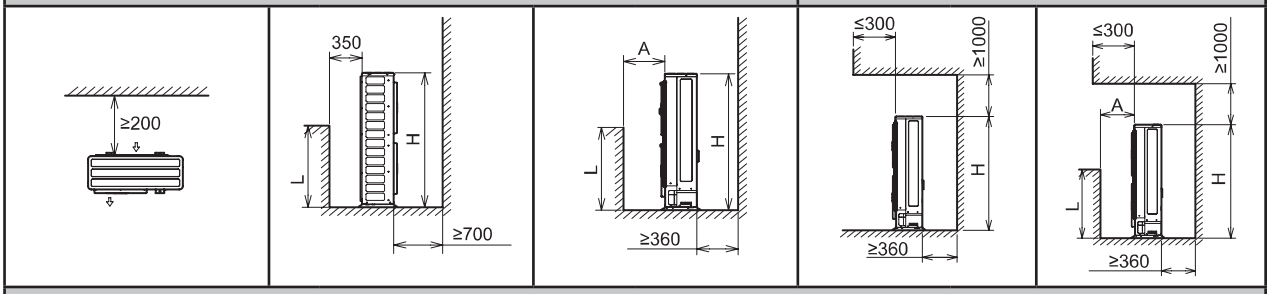
	NOTE
-	*If any of these accessories are not packed with the unit, please contact your dealer.*

Accessory	Appearance	Quantity		
		RAS-8HRNM	RAS-10HRNM	RAS-12HRNM
Gasket		1	1	1
Pipe flange for refrigerant gas piping		1	1	1
Ring core		1	1	1
Cable tie		1	1	1
Compressed sheet		1	1	1

1.3.4. Installation space (Initial check)

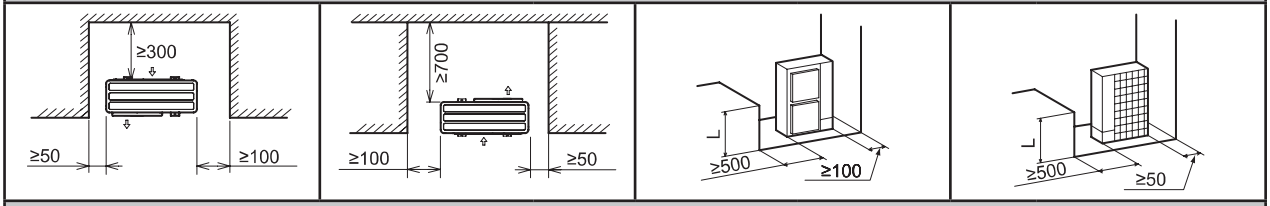
Single installation

Around sides are open

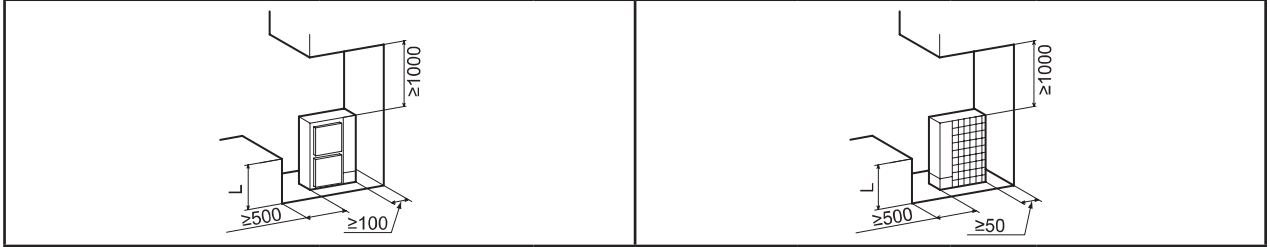


Around sides are open with obstacles above

Around sides are closed

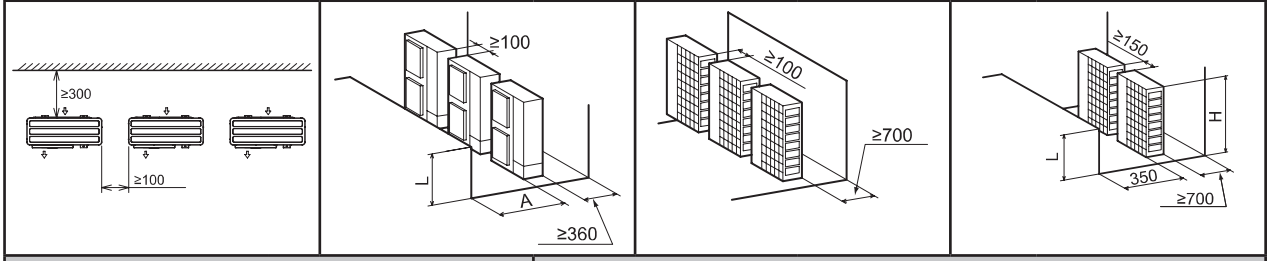


Around sides are open with obstacles above



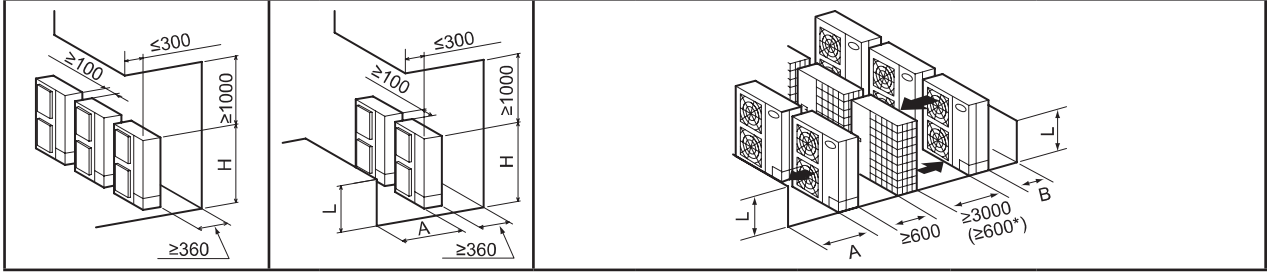
Multiple installation

Around sides are open



Around sides are open with obstacles above

Multi-Row



NOTE

- *All units are in mm.*
- *Do not stack more than two units in height.*
- *If L is larger than H, mount the units on a base so that H is equal or greater than L.*
  H: Unit height (1650 mm) + base concrete height

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

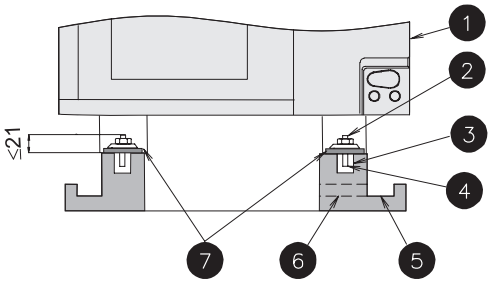
- *In this situation, ensure that the base is closed and does not allow the airflow to short circuit.*
- *In each case, install the outdoor unit so that the discharge flow is not short-circuited.*
- *When the installation dimension results the one marked with an (*) , mount the air flow guide.*

1.3.5. Place provision

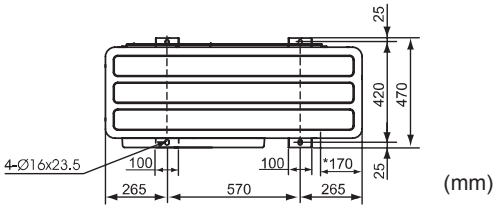
- **Concrete Foundation**

  - Foundation could be on flat and it is recommended to be 100-300 mm higher than ground level.
  - Install a drainage around foundation for smooth drain
  - When installing the outdoor unit, fix it by M12 anchor bolts.
  - When installing the unit on a roof or a veranda, drain water sometimes turns into ice on a cold morning. Therefore, avoid draining in an area that people often use because it may become slippery.

1. Outdoor unit
2. Cut this portion of bolt If not, it's difficult to remove Service cover
3. Mortar hole (Ø100 x Depth 150)
4. Anchor bolt M10 (Ø16 Hole)
5. Drainage (Wide 100 x Depth 150)
6. Drainage
7. Vibration-proof rubber



Metal plate size

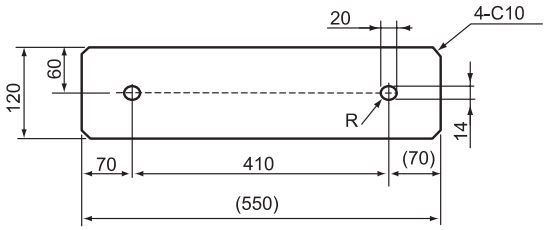


NOTE

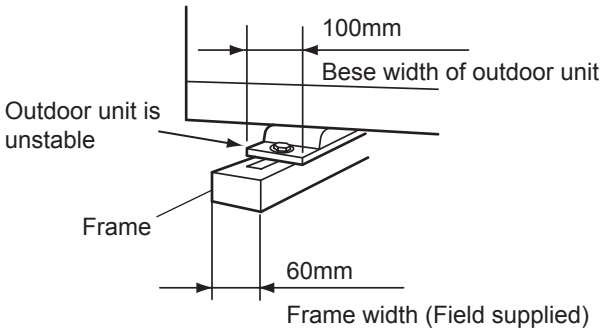
- *When mark (*) dimension is secured, piping work from bottom side is easily done without interference of foundation.*

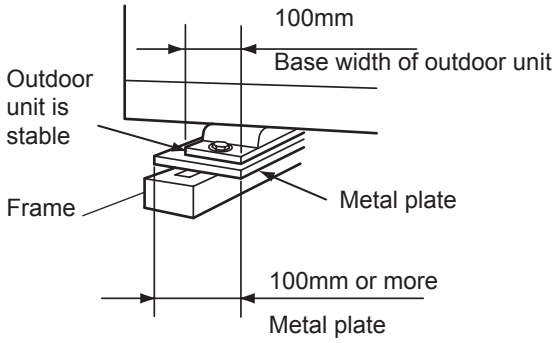
Recommended metal plate size

- (Field-Supplied) Material: Hot-rolled mild steel
- Plate (SPHC) plate thickness: 4.5 T

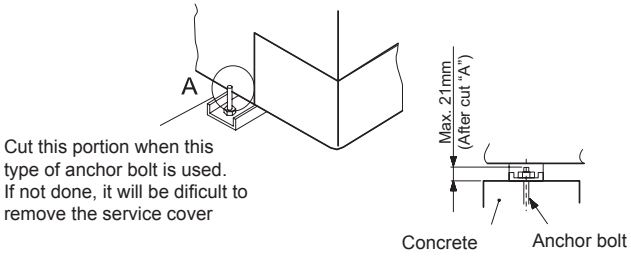


The whole base of the outdoor unit should be installed on a foundation. When using vibration-proof material, it should also be positioned in the same place. When installing the outdoor unit on a fieldsupplied frame, use metal plates to adjust the frame width for stable installation as shown in the figure below.



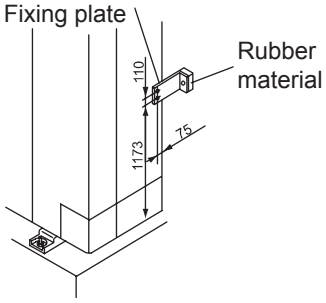


- **Example of fixing outdoor unit by anchor bolts**



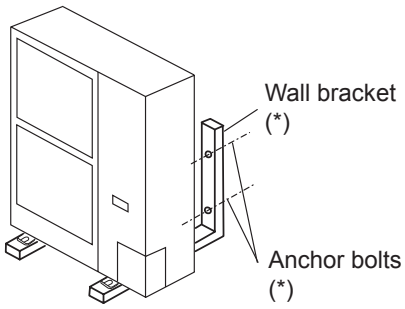
- **Fix Unit to the wall**

1. Fix the unit onto the wall as the figure indicates. (Field supplied stay)
2. Ensure the foundation so that avoid the deforming and noise.
3. In order to prevent vibration transfer to the building, use rubber material.



- **Suspended unit**

1. Suspend the unit as the drawing indicates.
2. Ensure that wall can resist the outdoor unit weight indicated in specification label plate.
3. It is recommended to select each foot support to bear the full weight of the unit (in order to consider stress fatigue applied when unit is also working).



(*) Field supplied

	CAUTION

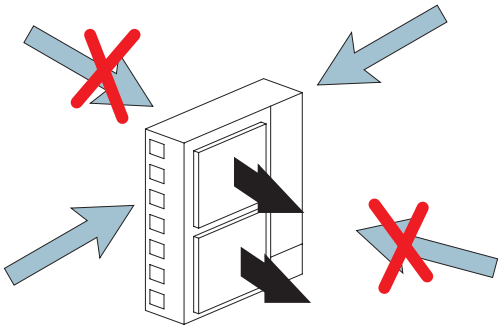
Pay attention to the following for installation:

- *Installation must ensure that outdoor unit will not incline, vibrate, make noise or fall down by a blast of wind or in an earthquake. Calculate quake-resistance strength to ensure that installation is strong enough against falling. Fix the unit with wires (field supplied) when installing in a location without walls or windbreak and likely exposed to a blast of wind.*
- *Apply vibration-proof material where necessary.*

- **Installing location where the unit will be exposed to strong wind.**

Follow the instructions below to install on the rooftop or a location without surrounding buildings, where strong wind is expected against the product.

1. Choose a location where the outlet or inlet side of the product will not be exposed to strong wind.
2. When the outlet is exposed to strong wind:
   Direct strong wind may cause lack of air flow and adversely affect to normal function.



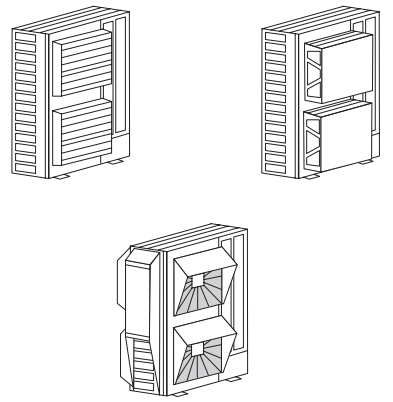
	CAUTION

- *Excessive strong wind against the outdoor unit outlet may cause inverse rotation and damage the fan and motor.*

1.3.6. Installation of windward and snow protection hood.

- **Air flow guide, wind guard and snow protection hood**

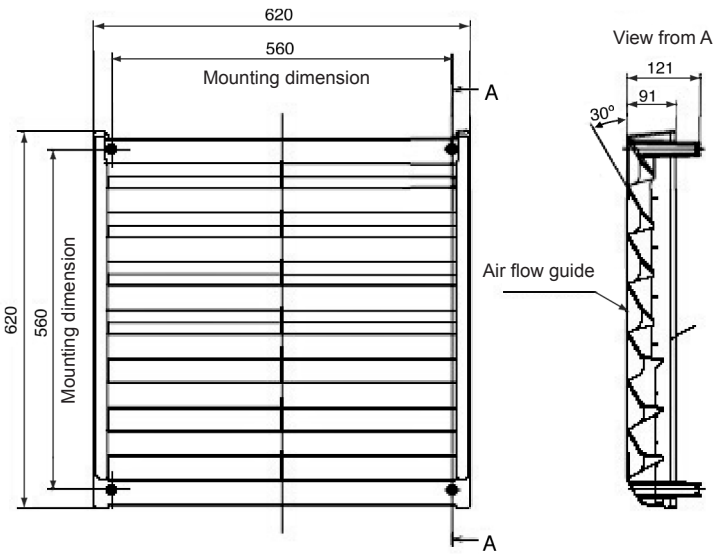
Optional parts			HP	Model
Air flow guide			8 to 12	AG-335A X 2
Wind guard				WSP-335A X 2
Snow protection hood	Stainless plate (SUS304)	Air outlet	8	ASG-NP335F X 2
		Air inlet of rear side		ASG-NP335B
		Air inlet of side face		ASG-NP335L
		Air outlet	10 and 12	ASG-NP335F X 2
		Air inlet of rear side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

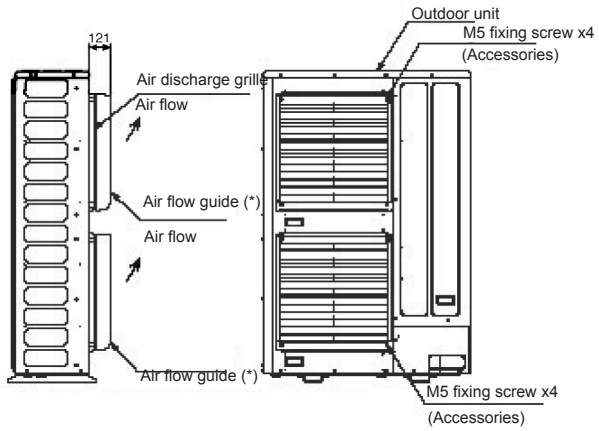


☛ Attaching example of air flow guide

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

⚠	*CAUTION*
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

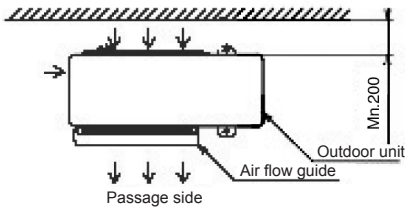
Two windbreak covers installation



(*) Air flow direction of both air flow guides should be the same

Service space (In case of upward air discharge)

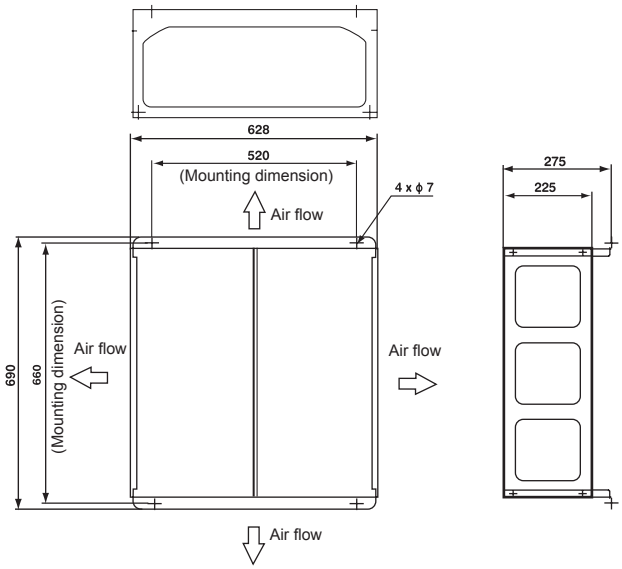
- In case of right and left sides air discharge, enough space for air discharge is required.
- The downward air discharge is also available. In such case, install the base under the unit to secure enough space for air discharge.
- In case of serial units installation, air discharge should be upward.



- **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

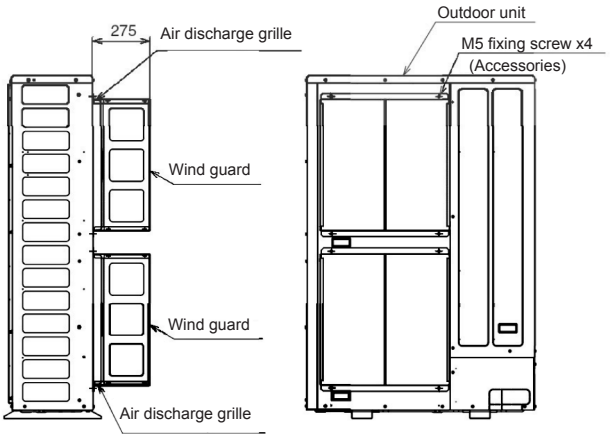


☛ Attaching example of air wind guard

- Attach the air flow guide to the air discharge grille with four (4) screws (supplied).
- The fixing holes 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.

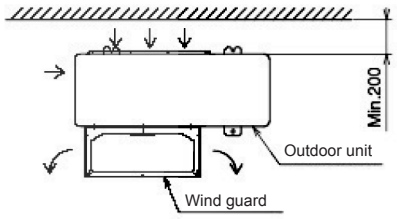
⚠	***CAUTION***
- *If the air guide is installed without discharge grille, it may cause injury due to rotating fan.*	

Two windguard covers installation



Service space

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

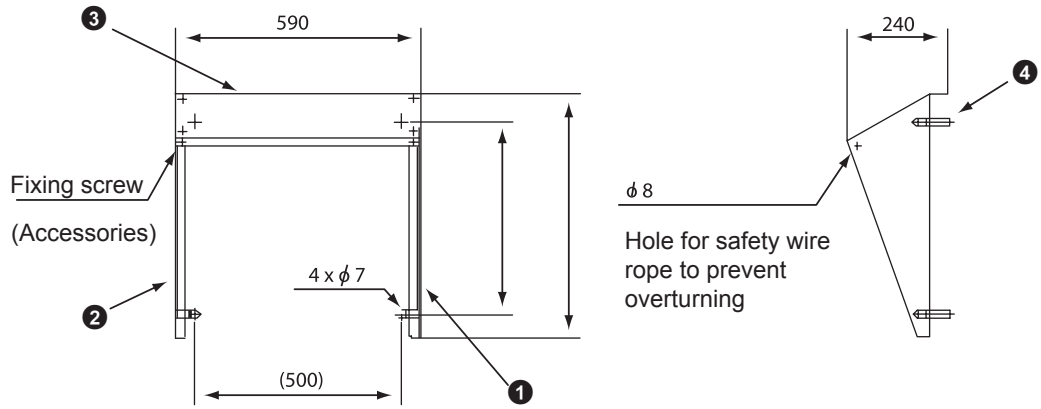


1

- **Snow protection hood**

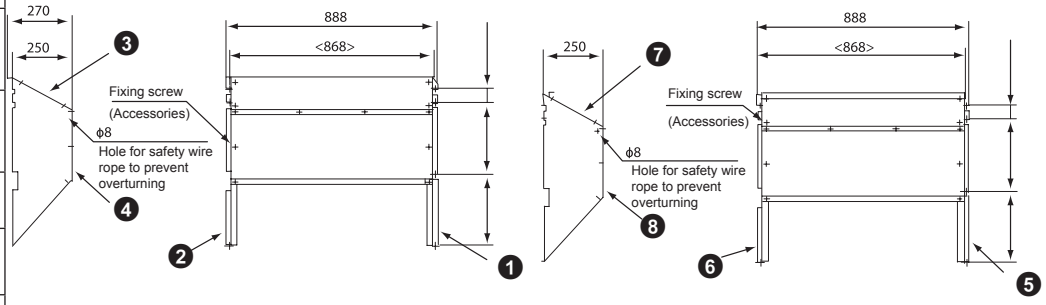
Air discharge hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel	1
❹	Stay	4



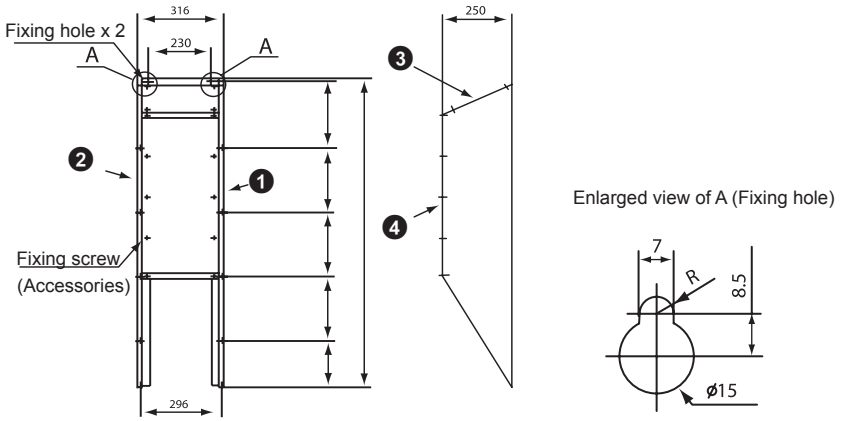
Rear suction hood

No.	Part name	Qty.
❶	Upper right side plate	1
❷	Upper left side plate	1
❸	Upper front panel (Upside)	1
❹	Upper front panel (Downside)	1
❺	Lower right side plate	1
❻	Lower left side plate	1
❼	Upper front panel (Upside)	1
❽	Upper front panel (Downside)	1

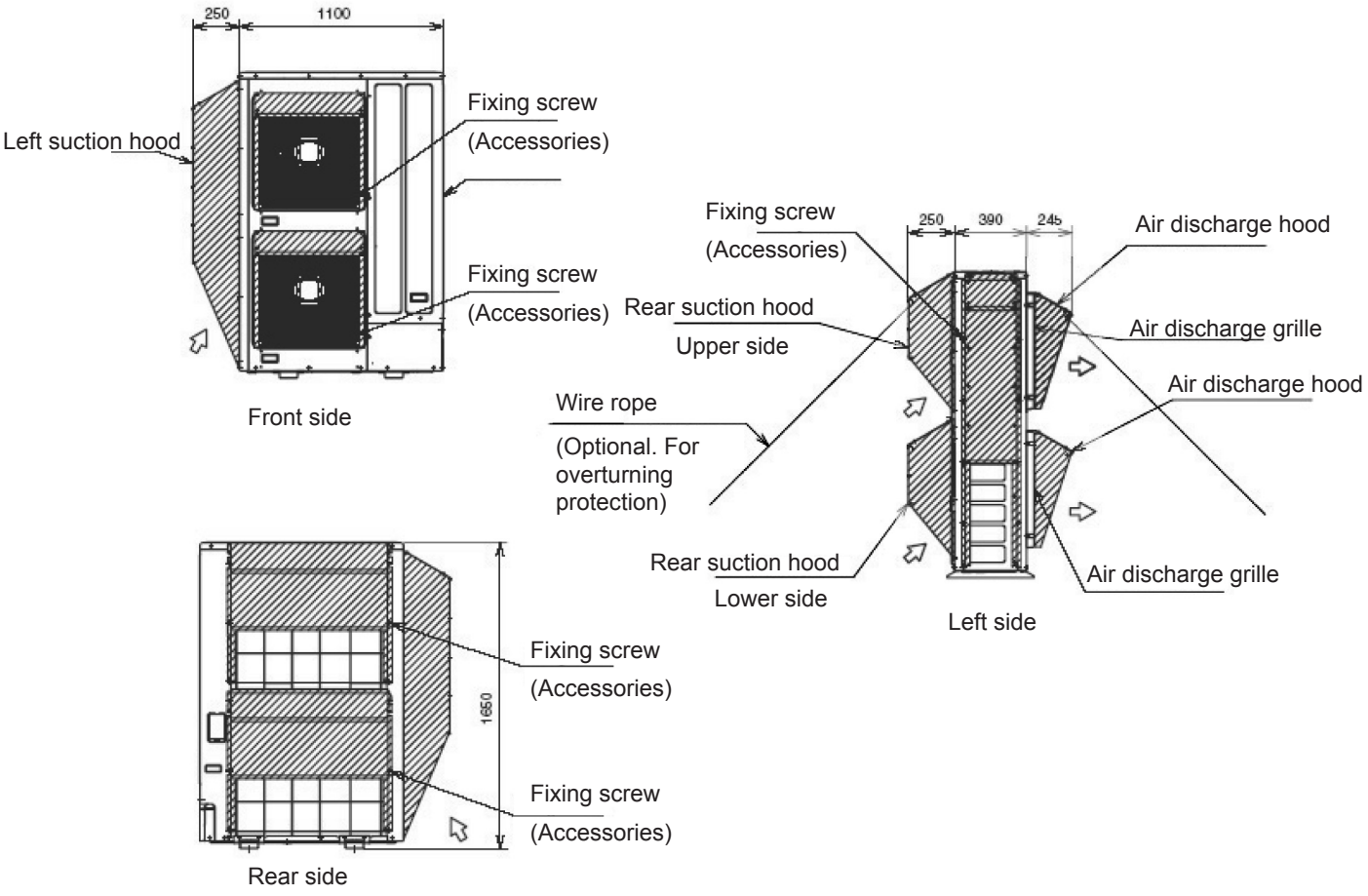


Left suction hood

No.	Part name	Qty.
❶	Right side plate	1
❷	Left side plate	1
❸	Front panel (Upside)	1
❹	Front panel (Downside)	1



☛ Attaching example 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 (optional parts)		ASG-SW20A					

1.4. RCI-(1.5~6.0)FSN2E

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	Appearance	Qty.	Purpose
Paper pattern		*1*	*For adjusting space of false ceiling opening and position of the unit.* (Cut out from carton board).
Scale		*1*	
Cross recessed head screws		*4*	*For fitting paper pattern*
Washer with insulation		*4*	*For unit installation*
Washer		*4*	
Drain hose		*1*	*For drain hose connection*
Wire clamp		*2*	

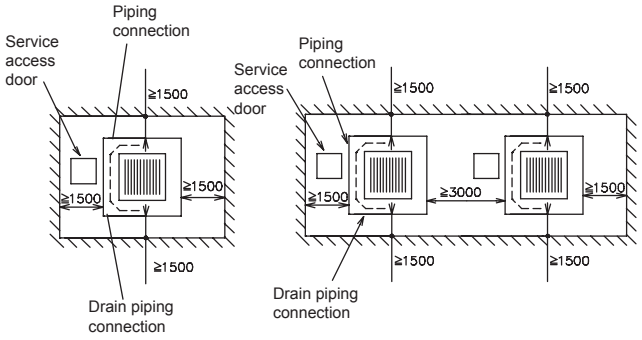
(Cames from page 1-34)

Applicable air panel

Indoor Unit	Applicable air panel
RCI-1.5~6.0	P-N23WA

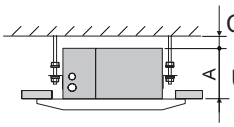
1.4.2. Initial check

- Install the indoor unit with a proper clearance around it, paying careful attention to the direction of the piping and wiring. Also, maintenance working space must be taken into acount, as shown below.
- Provide a service access door near the unit piping connection area on the ceiling, for future operating and maintenance.



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

- Ensure that the ceiling surface is flat for the air panel installation work.
- Check down slope pitch of drain piping to be following the specifications indicated in chapter Piping Installation.
- Check that the space between ceiling and false ceiling is enough as indicated below.



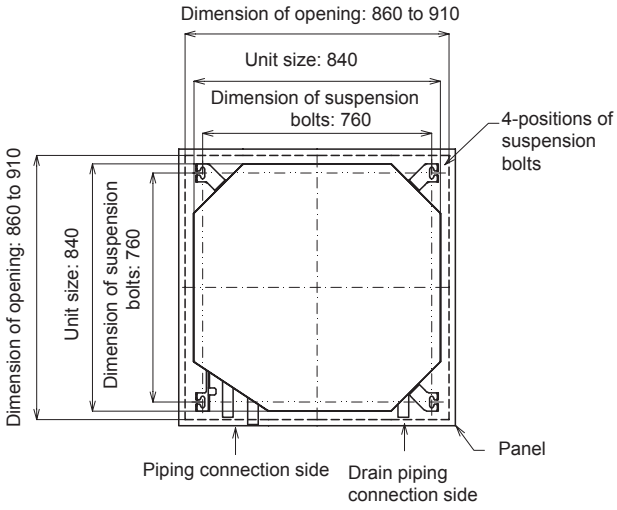
Clearance: 10-20mm

Unit high (A) in false ceiling

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

- **Opening of false ceiling**

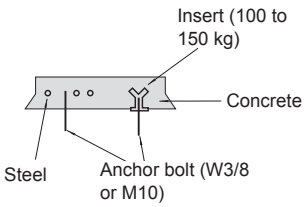
1. Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below.
2. Check to ensure that the ceiling is horizontally leveled, otherwise drain water will not flow.
3. Strengthen the opening parts of the false ceiling.



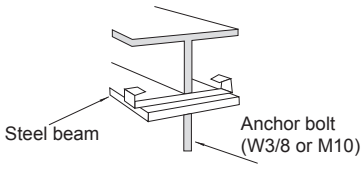
1.4.3. Installation

- **Mount suspension bolts**

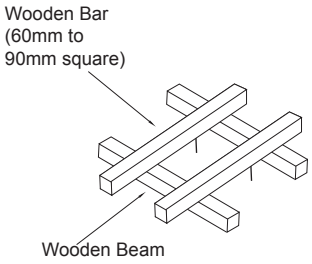
  Mount suspension bolts *using M10 (W3/8) as size, as shown below.*



Concrete Beam



Steel Beam



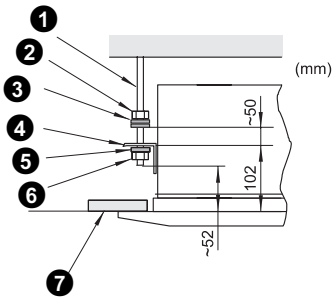
Wooden Beam

- **Mounting the indoor unit**

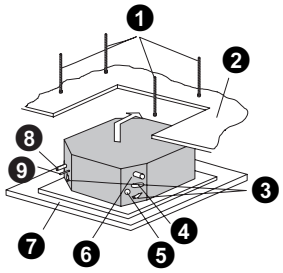
  Initially, screw the nuts and put the washers in place for all the bolts as shown in the figure. Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers. Put the washers with the insulation facing downwards, as shown below. Consider piping connection side before lifting indoor unit.

  Lift this indoor unit by hoist, and do not put any force on the drain pain.

1. Suspension bolts (field-supplied)
2. Nut (field-supplied)
3. Washer with insulation (field-supplied)
4. Suspension bracket (Attached indoor unit)
5. Washer (Accessory)
6. Nut (field-supplied)
7. Ceiling



1. Suspension bolts (4)
2. False ceiling
3. Suspension bracket
4. Open the knockout hole for wiring (Ø32,5)
5. Wiring hole
6. Drain piping connection
7. Panel (to be installed later, shown only as reference
8. Gas piping connection
9. Liquid piping

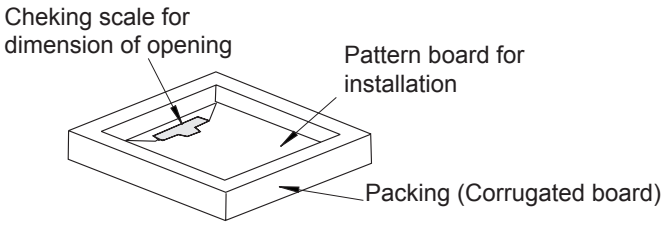


Check the level of the drain pan with a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

	NOTE
-	*If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.*
-	*Use the factory-supplied nuts, flat washers and spring washers to secure the indoor unit (4 pieces each).*

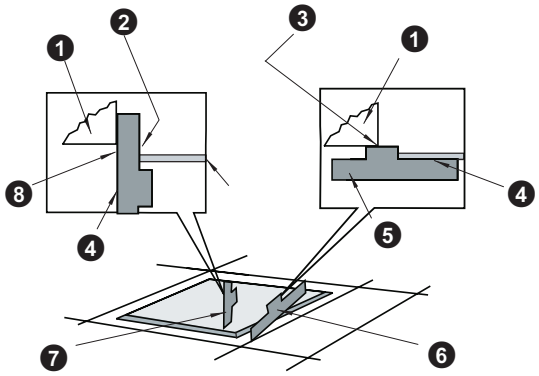
- **Adjusting the space between indoor units and false ceiling opening**

Adjust the indoor unit to the correct position, using the supplied pattern for installation.



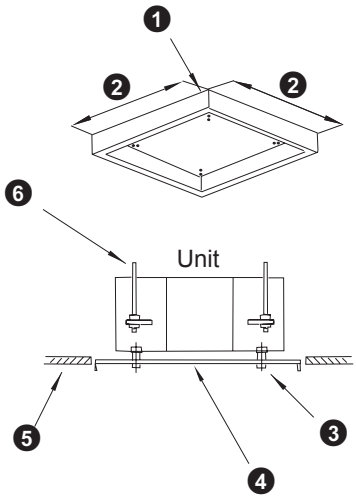
☛ For ceiling already completed with panels.

1. Indoor unit
2. Attach this side of the scale to the inner side of the opening of the ceiling
3. Attach this side of the scale to the lower side of the unit
4. Attach this side of the scale to the ceiling panel
5. Cheking scale
6. Check the height of the ceiling at each corner of the unit
7. Check the dimension of the opening at each side of the unit
8. Attach this side of the scale to the outer side of the opening



☛ Ceiling not completed with panels yet.

1. Pattern paper for installation
2. Dimension for opening
3. Screw (M6) for fixing the air panel to the unit
4. Pattern board for installation
5. Surface of ceiling
6. Suspension bolt



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 due to mechanical vibrations, and the indoor unit may come loose.

1.4.4. Air panel installation

	CAUTION
-	*When the air panel is unpacked, take special care and place it on insulation or soft material to protect the sealing insulation from scratches.*

- **Factory supplied-accessories**

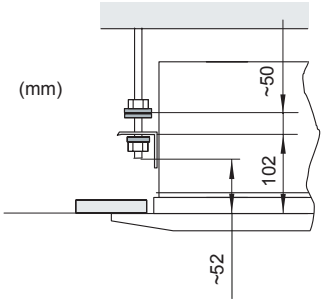
  Chek to ensure that the following accessories are packed with the air panel.

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

Accessory	Appearance	Qty.	Purpose
Long screw (M6x50)		*4*	*For fixing panel*

- **Location of suspension brackets**

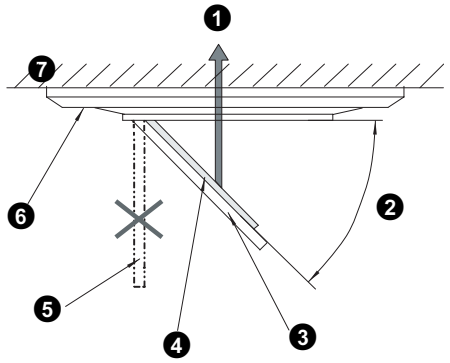
  Check to ensure that the suspension brackets of the indoor unit are located approximatately 102 mm higher than the false ceiling.



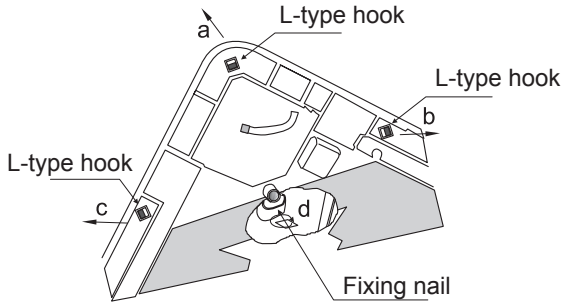
- **Removing the air intake grille from the air panel**

  Let the air intake grille open to an angle of approximately 45º from the surface of the air panel as shown below. Lift the grille keeping it inclined. Do not let it balance freely or the attachment mechanism will break.

1 Take up the grille keeping it inclined
2 45º (Correct)
3 Air intake grille
4 Air filter
5 Wrong
6 Air panel
7 Ceiling

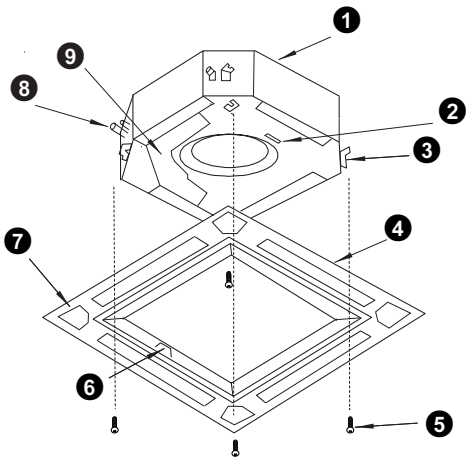


- **Installing the air panel**



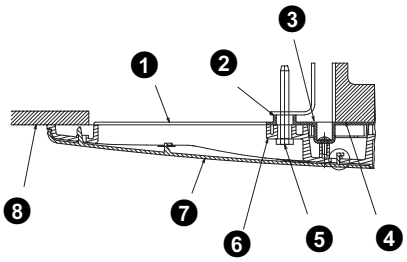
1. Remove the cover of the 4 corner pockets.
2. Pull the fixing nail towards the arrow mark according to the order “a”, “b” and “c”.
3. The corner pocket can be lifted. After lifting, move it in “d” direction, disconnect the L type hook and dismantle the corner pocket.
4. Pull down the U-shaped hook (at 2 positions) located at the indoor unit side.
5. Set the corner for 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).

1 Indoor unit
2 U-shaped hook
3 Fixing plate
4 Air panel
5 Long screw (4)
6 C-shaped hinge (2)
7 Stamp “Ref.pipe”
8 Refrigerant pipe connections
9 Electrical control box



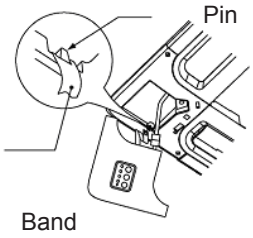
7. Check to ensure that there is no gap around the conctacting surface between the indoor unit and the air panel. Any gap will cause air leakage or dewing.

1. Indoor unit undersurface
2. Fix screw until this end touches it
3. Fixing plate (Indoor unit side)
4. Sealing gasket
5. Long screw
6. Fixing plate (Air panel side)
7. Panel
8. False ceiling

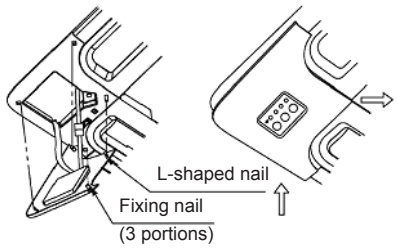


8. Attach the corner pocket covers after mounting air panel:

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

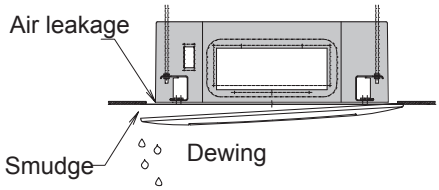


   b) Hook the L-shapped nail located at the rear side of the cover for the corner pockets onto the square hole of the air panel.

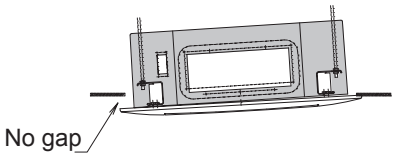


⚠	***CAUTION***
- *Pay attention to the following notes in order to prevent malfunction.*	

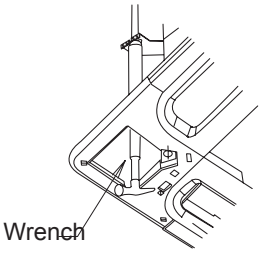
☛ If long screws are insufficiently tighten, something wrong will happen as shown below.



☛ Readjust the height of the indoor unit if any gap is visible. Use long scews and nuts to readjust as shown in the next point.



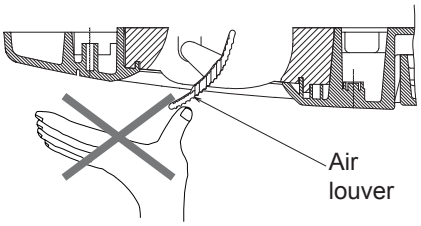
☛ When the panel is installed, you can adjust the final indoor unit height by using the wrench through the corner pocket.



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

CAUTION

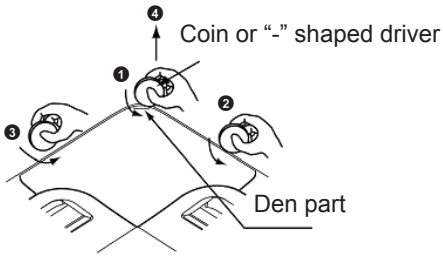
- *Do not turn the air louver by hand. If moved or forced, the louver mechanism will be damaged.*



NOTE

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

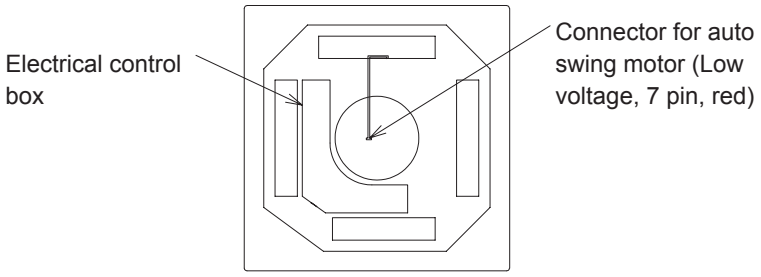
1. *The corner can be lifted when a coin or a "- " shaped driver is inserted into the dent part ❶ and twisted downward. With ❶ lifted, twist a coin or a "-" shaped driver at the positions ❷ and ❸, the whole receiver kit can be lifted.*
2. *After disconnecting the fixing nails (3 positions), slide the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



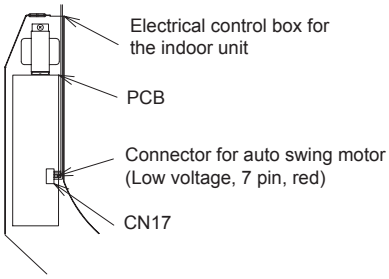
- **Wiring connection for the air panel**

	CAUTION
-	*Before inserting connectors, firstly turn OFF the 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. Insert the connectors as shown below (view from above of the electrical box)



	NOTE
-	*For size and position of piping connection, see chapter 2*

1.5. RCIM-(1.5~2.0)FSN2

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	Appearance	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*
Cable Tie		*6*	*For fixing refrigerant piping insulation*

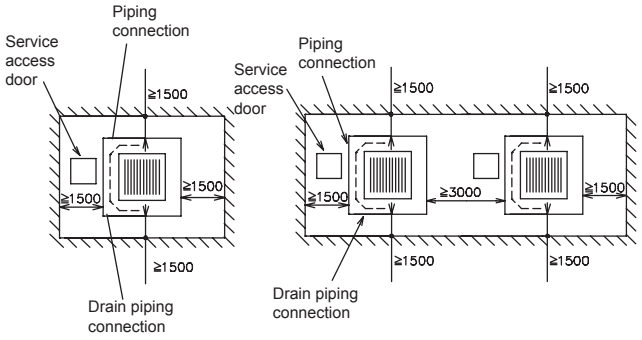
Applicable air panel

Indoor Unit	Applicable air panel
RCIM-1.5~2.0	P-N23WAM

1.5.2. Initial check

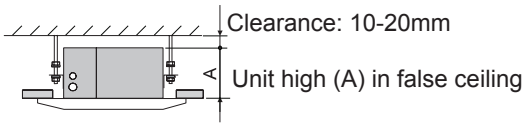
1. Install the indoor unit with a proper clearance around it, paying careful attention to the direction of the piping and wiring. Also, maintenance working space must be taken into acount, as shown below.

2. Provide a service access door near the unit piping connection area on the ceiling, for future operating and maintenance.



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

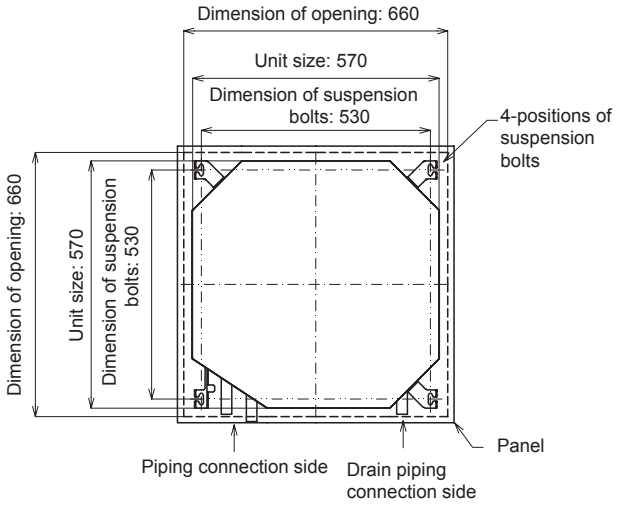
3. Ensure that the ceiling surface is flat for the air panel installation work.
4. Check down slope pitch of drain piping tin order to follow the specifications indicated in chapter 2, drain piping.
5. Check that the space between ceiling and false ceiling is enough as indicated below.



Unit HP	A(mm)
RCIM 1.5~2.0	295

- **Opening of false ceiling**

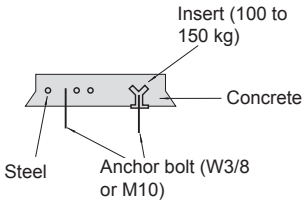
1. Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below.
2. Check to ensure that the ceiling is horizontally leveled, otherwise drain water will not flow.
3. Strengthen the opening parts of the false ceiling.



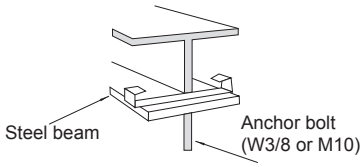
1.5.3. Installation

- **Mount suspension bolts**

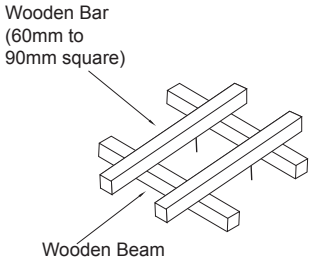
Mount suspension bolts using M10 (W3/8) as size, as shown below.



Concrete Beam



Steel Beam



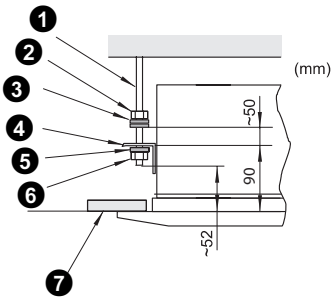
Wooden Beam

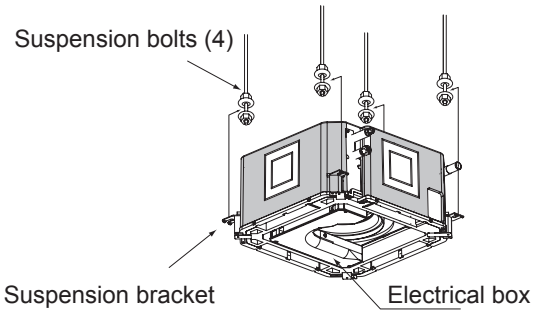
- **Mounting the indoor unit**

Initially, screw the nuts and put the washers in place for all the bolts as shown in the figure. Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers. Put the washers with the insulation facing downwards, as shown below. Consider piping connection side before lifting indoor unit.

Lift this indoor unit by hoist, and do not put any force on the drain pain.

1. Suspension bolts (field-supplied)
2. Nut (field-supplied)
3. Washer with insulation (field-supplied)
4. Suspension bracket (Attached indoor unit)
5. Washer (Accessory)
6. Nut (field-supplied)
7. Ceiling



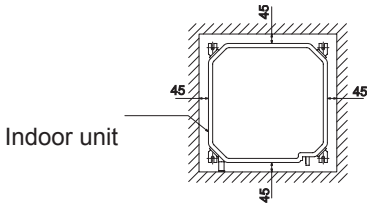


Check the level of the drain pan with a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit.

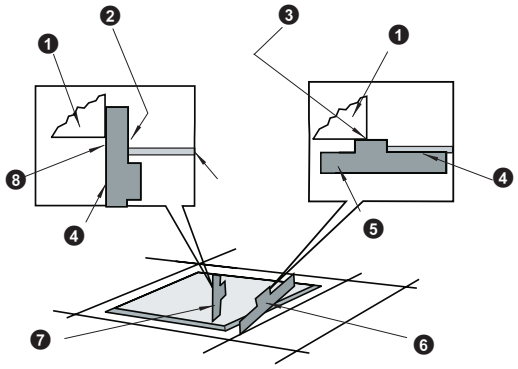
	NOTE
	- *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.* - *Use the factory-supplied nuts, flat washers and spring washers to secure the indoor unit (4 pieces each).*

- **Adjusting the space between indoor units and false ceiling opening**

Adjust the indoor unit to the correct position using the supplied pattern for installation.



☛ For ceiling already completed with panels.



❶ Indoor unit

❷ Attach this side of the scale to the inner side of the opening of the ceiling

❸ Attach this side of the scale to the lower side of the unit

❹ Attach this side of the scale to the ceiling panel

❺ Cheking scale

❻ Check the height of the ceiling at each corner of the unit

❼ Check the dimension of the opening at each side of the unit

❽ Attach this side of the scale to the outer side of the opening

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 due to mechanical vibrations, and the indoor unit may come loose.

1.5.4. Air panel installation

◆ P-N23WAM

	CAUTION
	- *When the air panel is unpacked, take special care and place it on insulation or soft material to protect the sealing insulation from scratches.*

- **Factory supplied-accessories**

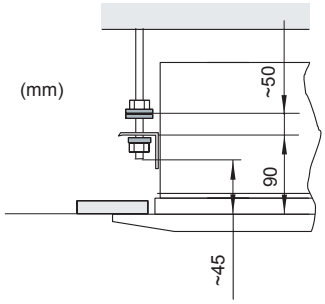
Chek to ensure that the following accessories are packed with the air panel.

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

Accessory	Appearance	Qty.	Purpose
Long screw (M6x50)		*4*	*For fixing panel*

- **Location of suspension brackets**

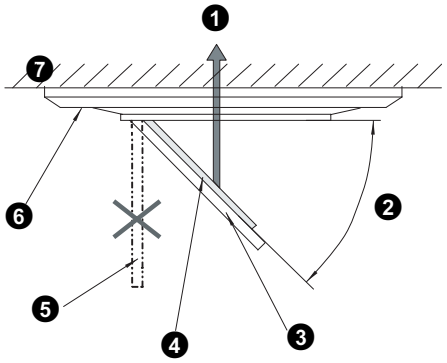
  Check to ensure that the suspension brackets of the indoor unit are located approximatately 90 mm higher than the false ceiling.



- **Removing the air intake grille from the air panel**

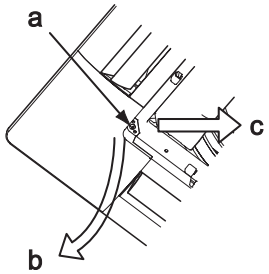
  Let the air intake grille open to an angle of approximately 45º from the surface of the air panel as shown below. Lift the grille keeping it inclined. Do not let it balance freely or the attachment mechanism will break.

1. Take up the grille keeping it inclined
2. 45º (Correct)
3. Air intake grille
4. Air filter
5. Wrong
6. Air panel
7. Ceiling



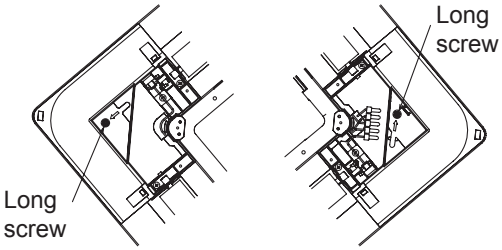
- **Removing cover for corner pocket**

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 to pull the corner pocket toward the arrow mark “c”.



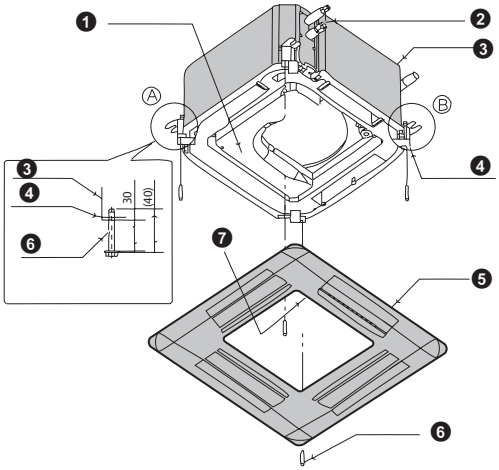
- **Intalling the air panel**

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 and adjusting is available.



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

❶ Electrical control box
❷ Refrigerant pipe connections
❸ Indoor unit
❹ Fixing plate
❺ Air panel
❻ Long screw (4 each)
❼ Indication “PIPE SIDE”



	NOTE
- *Proceed first fixing “A” and “B” positions. Then, proceed with the others.* - *For size and position of piping connection, see chapter 2.*	

1.6. RCD-(1.5~5.0)FSN2

1.6.1. Factory-supplied accessories

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

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

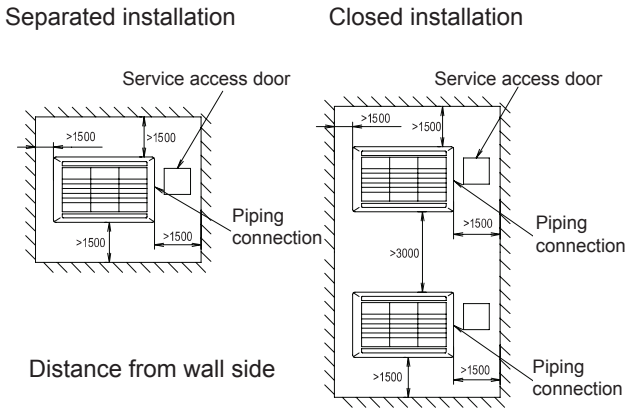
Accessory	Appearance	Qty.	Purpose
Paper pattern (carton board)		*1*	*For adjusting space of false ceiling opening and position of the unit*
Level scaler (taken out from carton board)		*1*	
Cross recessed head screws (M6)		*6*	*For fitting paper pattern*
Flat washer		*8*	*For unit suspension*
WIre clamp		*1*	*For drain hose connection*
Insulation (26IDx100 mm)		*1*	*For refrigerant piping connection*
Insulation (28IDx85 mm)		*1*	
Cable Tie		*8*	*For fixing remote control switch wiring and piping insulation*

Applicable air panel

Indoor Unit	Applicable air panel (Option)
	For wired remote control switch
RCD 1.5~3.0	P-N23DWA
RCD 4.0-5.0	P-N46DWA

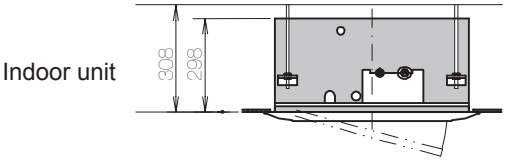
1.6.2. Initial check

1. Install the indoor unit with a proper clearance around it, paying careful attention to the direction of the piping and wiring. Also, maintenance working space must be taken into acount, as shown below.
2. Provide a service access door near the unit piping connection area on the ceiling, for future operating and maintenance.



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

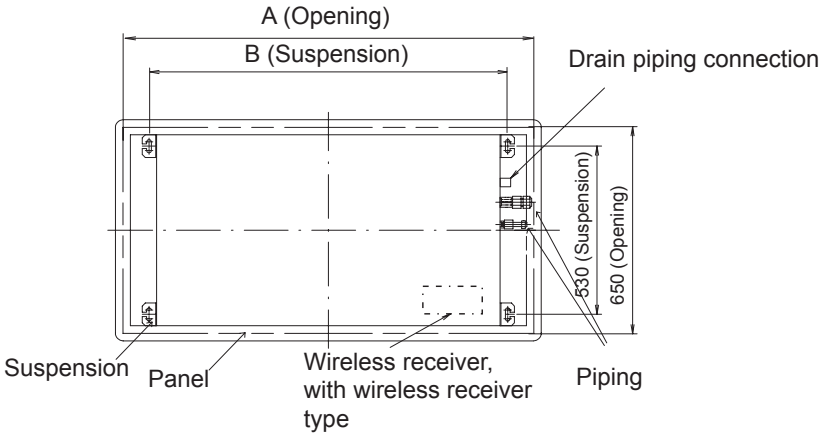
3. Check that the space between ceiling and false ceiling is enough as indicated below.
4. Ensure that the ceiling surface is flat for the air panel installation work.
5. Check down slope pitch of drain piping to be following the specifications indicated in chapter “Drain piping”.



Air panel (option)

- **Opening of false ceiling**

1. Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below.
2. Check that the ceiling is horizontally leveled, otherwise drain water will not flow.
3. Strengthen the opening parts of the false ceiling.

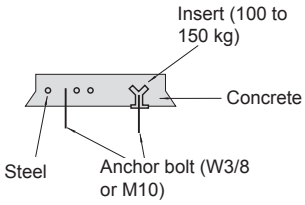


Model	A (mm)	B (mm)
RCD 1.5~3.0	1060	890
RCD 4.0-5.0	1620	1450

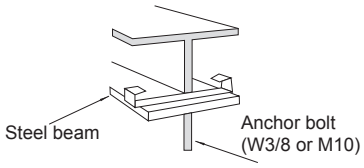
1.6.3. Installation

- **Mount suspension bolts**

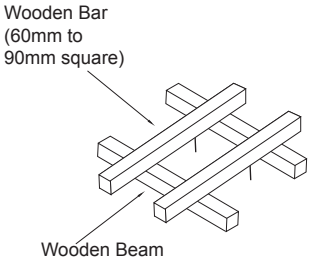
Mount suspension bolts using M10 (W3/8) as size, as shown below.



Concrete Beam



Steel Beam



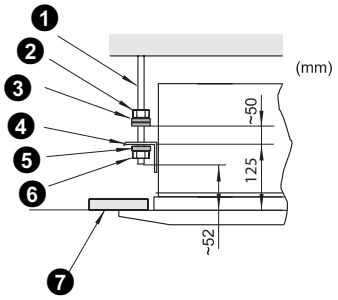
Wooden Beam

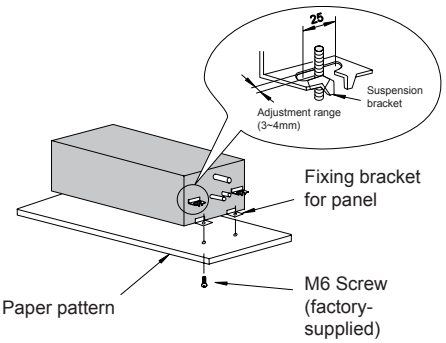
- **Mounting the indoor unit**

Initially, screw the nuts and put the washers in place for all the bolts as shown in the figure. Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers. Put the washers with the insulation facing downwards, as shown below. Consider piping connection side before lifting indoor unit.

Lift this indoor unit by hoist, and do not put any force on the drain pain.

1. Suspension bolts (field-supplied)
2. Nut (field-supplied)
3. Washer with insulation (field-supplied)
4. Suspension bracket (Attached indoor unit)
5. Washer (Accessory)
6. Nut (field-supplied)
7. Ceiling





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

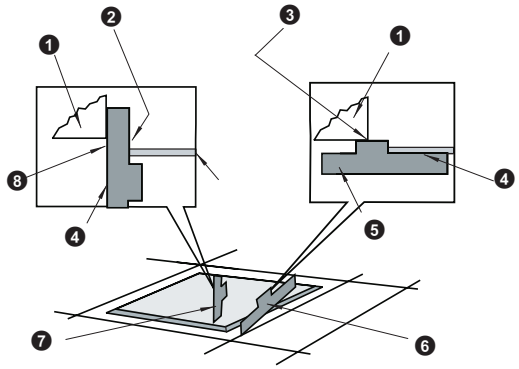
	NOTE
	- *If a false ceiling has already been installed, complete all piping and wiring work inside the ceiling before hooking-up the indoor unit.* - *Use the factory-supplied nuts, flat washers and spring washers to secure the indoor unit (4 pieces each).*

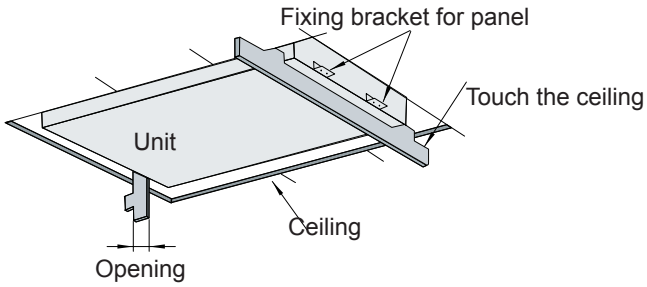
- **Adjusting the space between indoor units and false ceiling opening**

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

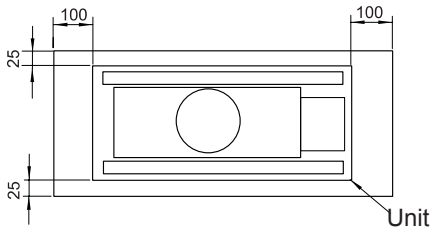
☛ For ceiling already completed with panels.

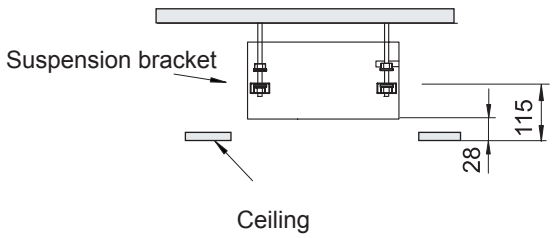
1. Indoor unit
2. Attach this side of the scale to the inner side of the opening of the ceiling
3. Attach this side of the scale to the lower side of the unit
4. Attach this side of the scale to the ceiling panel
5. Cheking scale
6. Check the height of the ceiling at each corner of the unit
7. Check the dimension of the opening at each side of the unit
8. Attach this side of the scale to the outer side of the opening





☛ Ceiling not completed with panels yet.



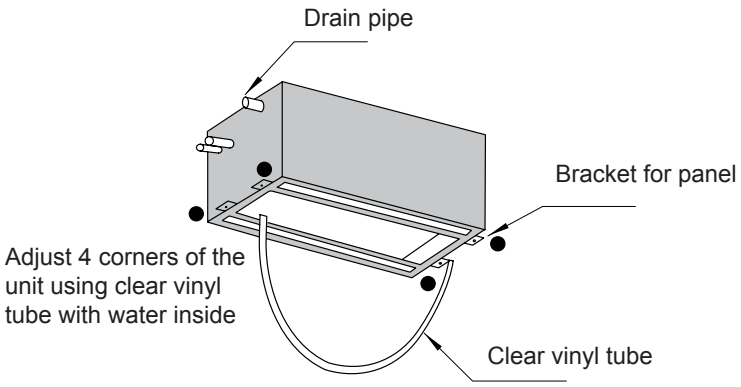


Tighten the nuts of the suspension brackets after adjustment is completed. Apply ***lock-tight*** paint to the bolts and nuts in order to prevent them from loosening. If not done, abnormal noises or sounds may occur due to mechanical vibrations, and the indoor unit may come loose.

	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 sides.*

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



1.6.4. Air panel installation (P-N23DWA, P-N46DWA)

	CAUTION
-	*When the air panel is unpacked, take special care and place it on insulation or soft material to protect the sealing insulation from scratches.*

- **Factory supplied-accessories**

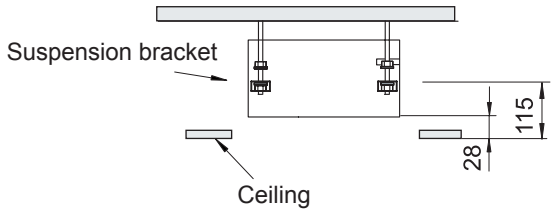
  Chek to ensure that the following accessories are packed with the air panel.

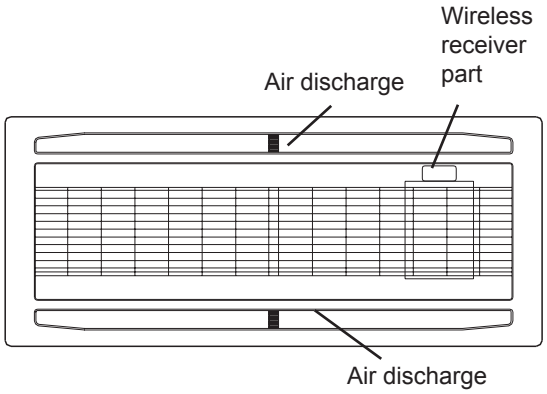
	NOTE
-	*If any of these accessories are not packed with the unit, please contact your dealer.*

Accessory	Appearance	Qty.	Purpose
Long screw (M6x50)		*4*	*For fixing panel*
Long screw (M6x30)		*2*	*For fixing panel (only for P-N46DWA)*

- **Location of suspension brackets**

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

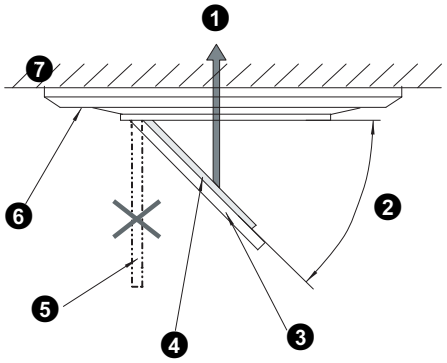




- **Removing the air intake grille from the air panel**

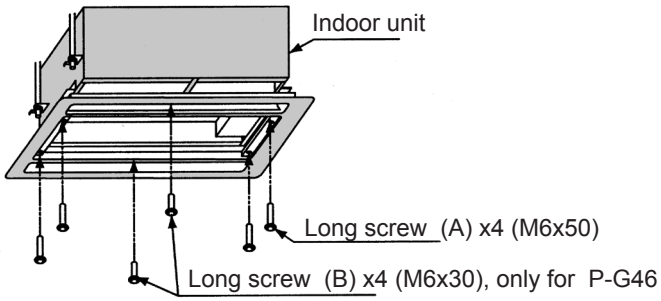
  Let the air intake grille open to an angle of approximately 40º from the surface of the air panel as shown below. Lift the grille keeping it inclined. Do not let it balance freely or the attachment mechanism will break.

1. Take up the grille keeping it inclined
2. Aprox 40º (Correct)
3. Air intake grille
4. Air filter
5. Wrong
6. Air panel
7. Ceiling



- **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 matches 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

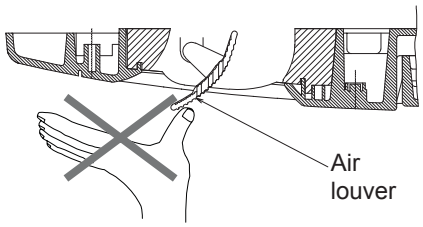
- *To protect the panel from being damaged, the long screws for securing the air panel have stoppers so that tightening is stopped at the setting position. If the air panel does not reach the surface of the ceiling or air leakage from the contacting surface occurs, readjust the installation height level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

	NOTE

- *For size and position of piping connection, see chapter 2.*

	CAUTION

- *Do not turn or force the air louver by hand. If moved, the louver mechanism will be damaged.*

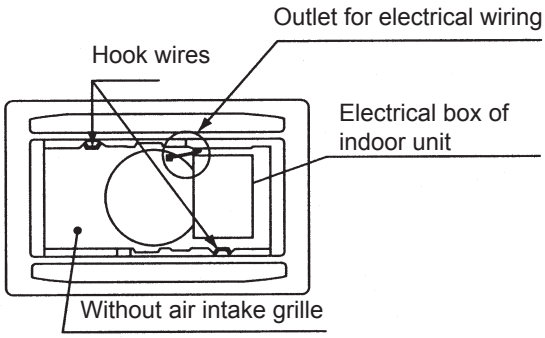


- **Wiring connection for air panel**

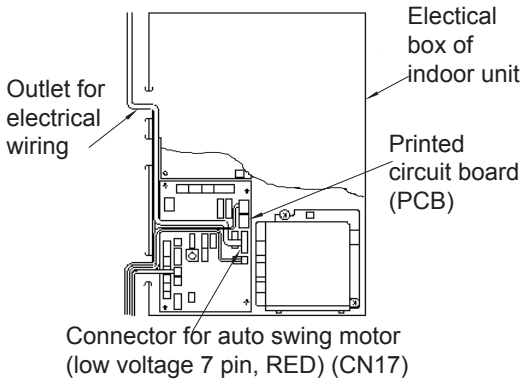
	CAUTION

- *Before connecting connectors, firstly turn power source OFF. If the connectors are connected without turning the power source OFF, 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)



Insert the connectors as shown below (view of the electrical box)



1.7. RPC-(2.0~6.0)FSN2E

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	Appearance	Qty.	Purpose
Suspension bracket		*2*	*For unit suspesion*
Fixing screw		*2*	*For sealing plate*
Drain hose		*1*	*For drain hose connection*
Wire clamp		*2*	
Insulation material (5Tx200x200)		*1*	*For drain pipe connection*
Sealing plate (0,8Tx118x42)		*1*	*For sealing knockout hole*
Sealing plate		*1*	*For piping work*

1.7.2. Initial check

1. Install the indoor unit with a proper clearance around it, paying careful attention to the direction of the piping and wiring, according to the unit and hanging type installation. Also, maintenance working space must be taken into acount, as shown below.

2. Chek down slope pitch of drain piping follows the specification indicated in chapter “Drain piping”.

1.7.3. Installation

- **Mounting the suspension bracket**

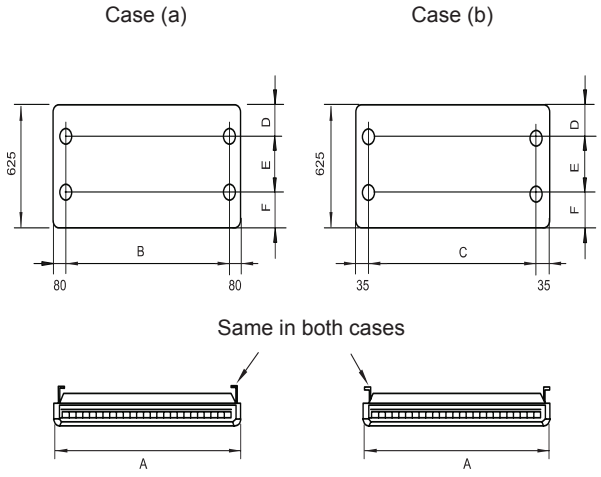
  When installing the indoor unit, cut out and use the installation pattern printed on the inner side of the carton box. Follow the printed instructions over it.



In the installation pattern you can find information regarding to :

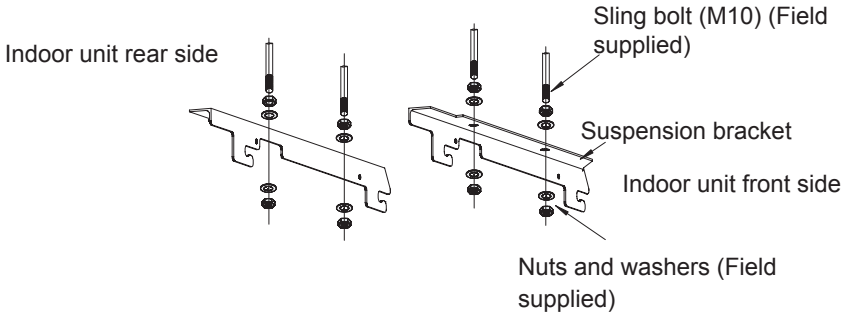
- Pitch of sling bolt for case (a) and case (b) showed below.
- Hole positions of refrigerant piping.
- Hole positions of drain piping.

Suspension bracket has the following two possible positions:



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

- Select the suspension bracket system depending on your needs; for semi-concealed installation, case (a) is recommended.
- Mount the suspension brackets to the slings bolts or anchor bolts and secure them with the factory supplied nuts and washers, as shown below.



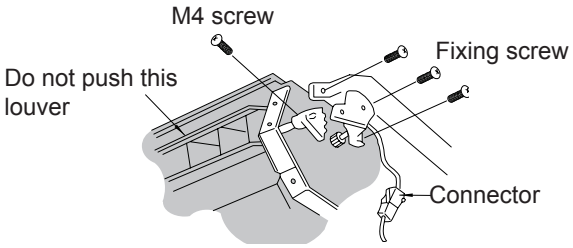
	NOTE
-	*Tighten the nuts of the sling bolts or anchor bolts with the suspension brackets after adjustment is completed. Apply* **lock-tight** *paint to the bolts and nuts in order to prevent them from loosening.*

- **Mounting the indoor unit**

Before lifting or moving the indoor unit, first remove the resin side covers in order to avoid any damage to the resin side covers. Follow the indicated procedure:

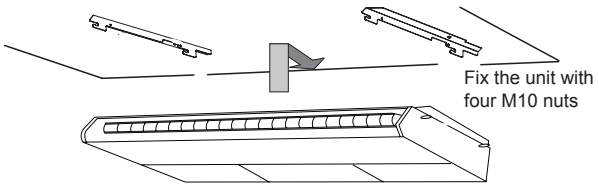
Initially, screw the nuts and put the washers in place for all the bolts .Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers. Consider piping connection side before lifting indoor unit.

	CAUTION
-	*Pay attention to the mechanism of the automatic swing louver. Do not force or move it by hand or other objects. It will damage the mechanism of the automatic swing louver.*



- **For hanging type installation**

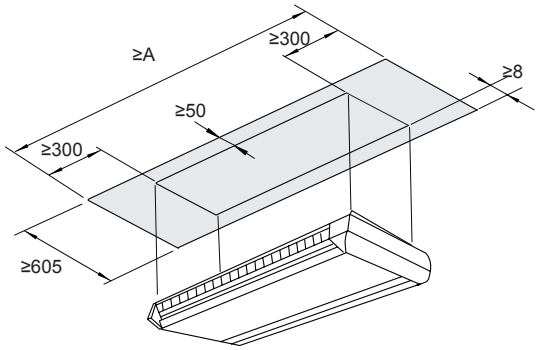
Hook the indoor units on the suspension brackets, by setting the mounting bolts on the units with the notches of the bracket, as shown below. Fix the units with the factory supplied nuts, flat washers and spring washers, as explained above.



	NOTE
-	*When the false ceiling has already been installed, all piping work inside the ceiling has to be completed before the indoor unit is hooked. For size and position of pipe connection, see chapter 2.*

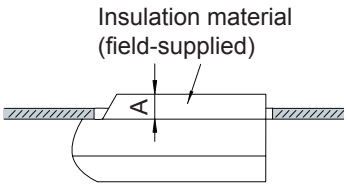
- **For semi-concealed installation**

1. Open a hole in the false ceiling with the according mesures:



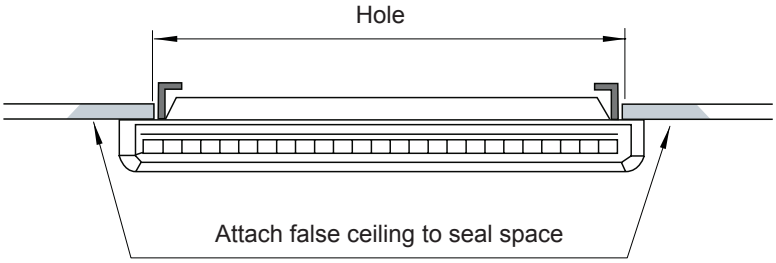
Models	A
RPC-2.0	*1694*
RPC-2.5~4.0	*1914*
RPC-5.0-6.0	*2174*

2. 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.



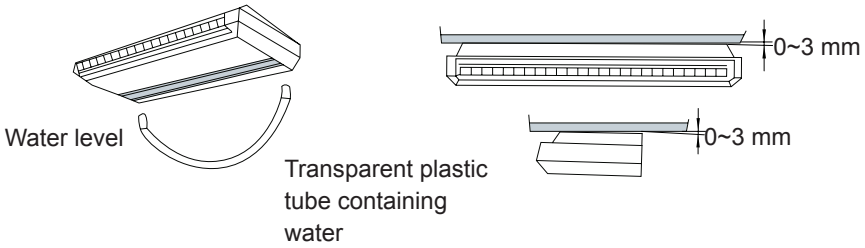
Models	A
RPC-2.0-3.0	*13*
RPC-4.0~6.0	*75*

3. Secure the indoor unit with the suspension bolts and 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 to avoid incorrect position of the drain discharge.



Also, 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.

1.8. RPI(M)-(1.5~6.0)FSN2E

1.8.1. Factory-supplied accessories

(Models: RPI-1.5 FSN2E)
(Models: RPIM-1.5 FSN2E)
(Models: RPI-2.0~6.0 FSN2E)
(Models: RPI-8~10 FSNE)

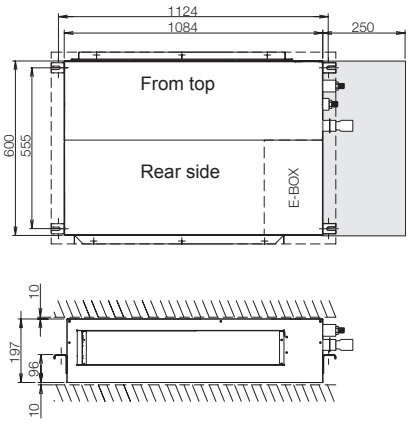
Make sure that the following accessories are packed with the unit.

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

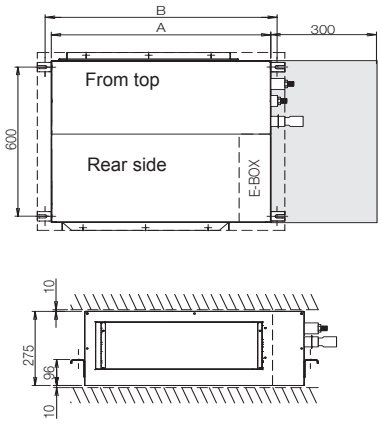
Accessory	Appearance	Qty.	Purpose
Wire clamp		*1*	*For drain connection*
Adjustment bolt for installation with spring washer		*8*	*For RPI 8.0~10.0 unit hanging*

1.8.2. Initial check

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

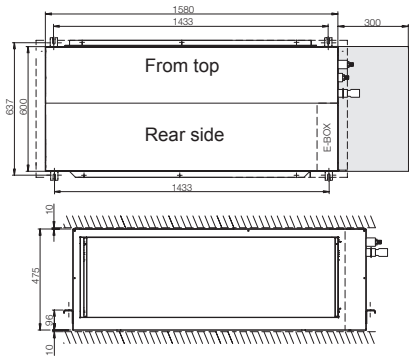


RPI 1.5

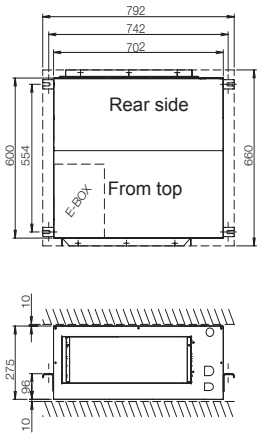


RPI 2.0~6.0

Models	A (mm)	B (mm)
RPI-1.5~3.0	1084	1123
RPI-4.0~6.0	1474	1514



RPI 8.0-10.0

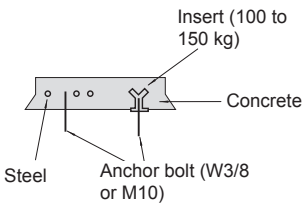


RPIM 1.5

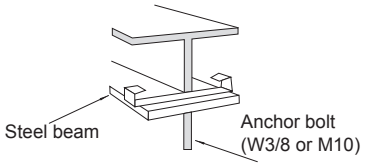
1.8.3 Unit installation

- **Mounting the suspension bolts**

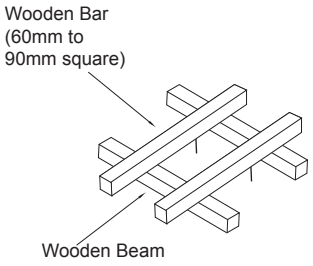
Using the aforementioned dimension, select the final location and installation direction of the indoor unit, paying careful attention to the space for the piping, wiring and maintenance Mount the suspension bolts as shown:



Concrete Beam



Steel Beam

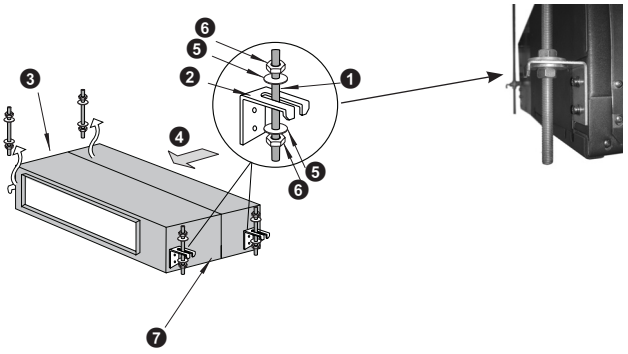


Wooden Beam

- **Mounting the indoor unit**

Initially, screw the nuts and put the washers in place for all the bolts as shown in the figure. Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers.

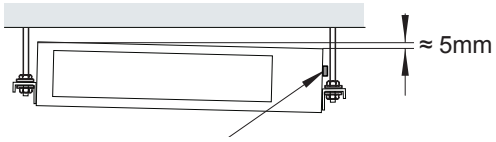
❶ Suspension bolt
❷ Suspension bracket
❸ Left side
❹ Inlet air
❺ Washer
❻ Nut
❼ Right side



NOTE
- *After hanging the machine and adjustment is completed, use the upper nut and washer of each bolt to thight and secure the hole as shown in the photo above.* - *Special plastic paint must be applied to the bolts and nuts in order to prevent them from loosening.*

- **Drain pan level**

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



Condensate drain connection

2. The unit should be installed so that one side of the unit is slightly lower than the other side (approximately 5 mm), in order to avoid the incorrect position of the drain discharge, so that water can flow outside easily. Take into account that the RPIM unit has the drain connection at the back side of the machine.

3. Fasten the drain pipe to the drain hose with an adhesive and the factory-supplied clamp.

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

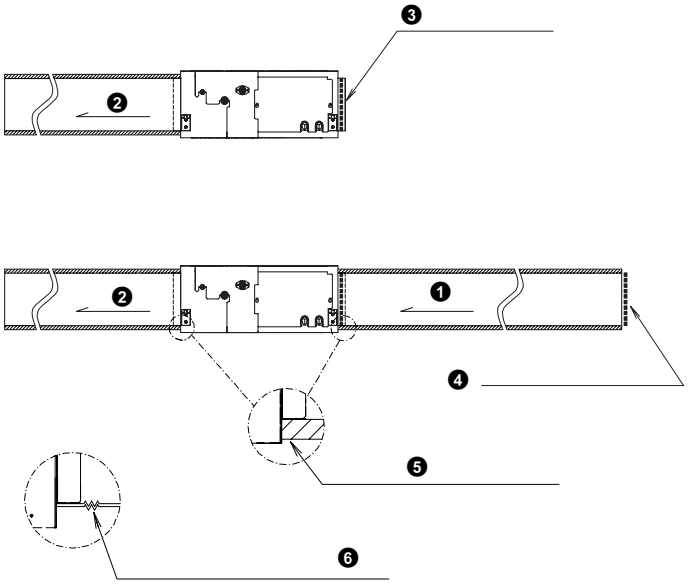
1.8.4. Connecting field supply duct and suction air filter servicing

- **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).

- Consider the following indications depending on the installation:
  a) Keep the standard air filter in case of no suction duct is applied.
  b) In case of applying suction duct, place the air filter at the inlet point of suction duct, removing the standard air filter of the unit. This filter must be field supplied, or an adapted factory-supplied one.
  c) In case of RPIM unit, low static pressure is in the suction duct, so short one is requiered for proper use.

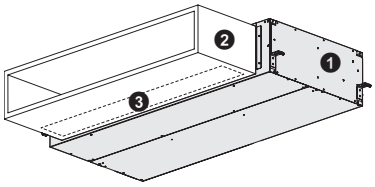
❶ Inlet air
❷ Outlet air
❸ Standard air filter (factory-supplied)
❹ Optional air filter (Field-supplied or adapted factory-supplied one)
❺ Insulated duct (Installed on the outer side of the flanges)
❻ Flexible duct installation (Rubber or textil material)



☛ RPI-(8.0-10.0)

Optionally, if applying suction duct and keeping the standard air filter in its original location (not recommended), be aware of making 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 must be performed by professional installers.

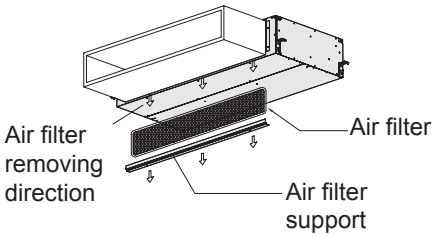
❶ Unit
❷ Air duct
❸ Duct gate (Keep it sealed with aluminium tape)

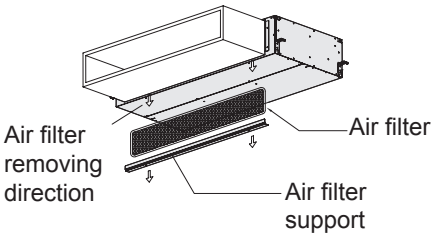


- **Suction air filter servicing**

☛ RPI-1.5, RPI-(2.0~6.0), RPIM-1.5

For RPI 2.0~6.0, remove the 3 screws from the stay support of the unit where the filter is located and pull it down. For RPI 0.8~1.5 and RPIM 0.8~1.5, the unit has only two screws.

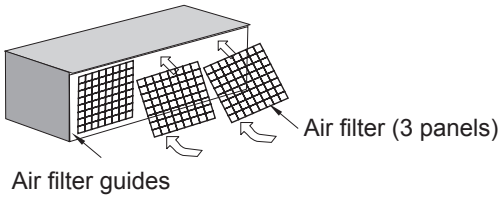




	NOTE
- *For size and position of piping connection, see chapter 2.*	

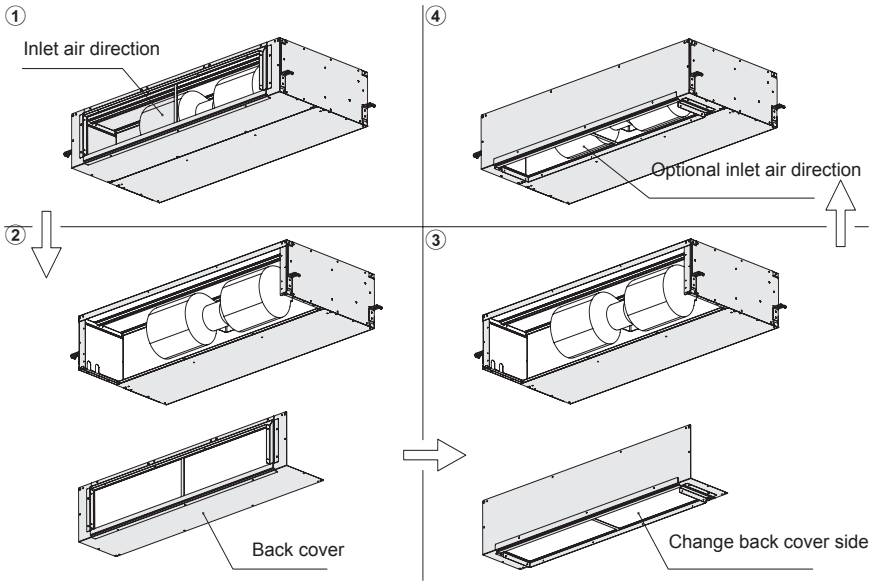
☛ Attention: for RPI-(8.0-10.0)FSNE

The air filter (3 panels) are fixed by frames. Pull up the air filter and remove them as shown in the figure.



1.8.5 Air suction direction change

For RPI-(2.0~6.0)FSN2E and RPIM units, air suction direction could be modified by changing back cover direction as shown in the diagram.

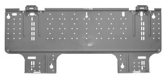
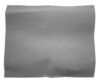


1.9. RPK-(1.5~4.0)FSN2M

1.9.1. Factory supplied-accessories

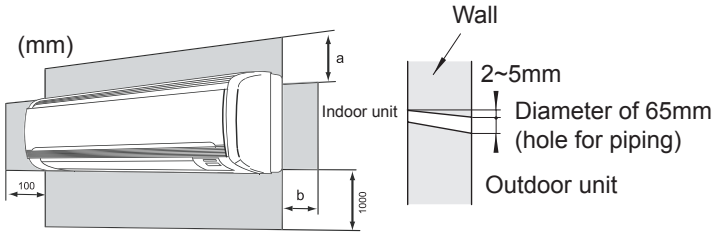
Make sure that the following accessories are packed with the unit.

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

Accessory	Appearance	1.0-1.5	2.0	2.5~4.0	Purpose
Mounting bracket		*1*	*1*	*1*	*For mounting indoor unit*
Screw (Ø4.1x25mm)		*6*	*6*	*8*	*For mounting bracket*
Screw (Ø4.1x40mm)		*2*	*2*	*4*	
Insulation pipe		*1*	*1*	*1*	*For piping insulation*
Insulation		*1*	*1*	*1*	
Harness with connector		*1*	*1*	-	*Cable for PC-P2HTE*
Connector		*2*	*2*	-	
Nut		*1*	*1*	*1*	*For piping*

1.9.2. Initial check

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



Operation and installation space

Models	a (mm)	b (mm)
RPK-1.5	150	100
RPK-2.0~4.0	100	200

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

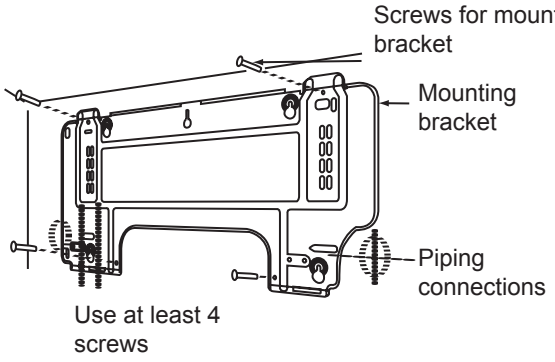
1.9.3. Unit installation

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

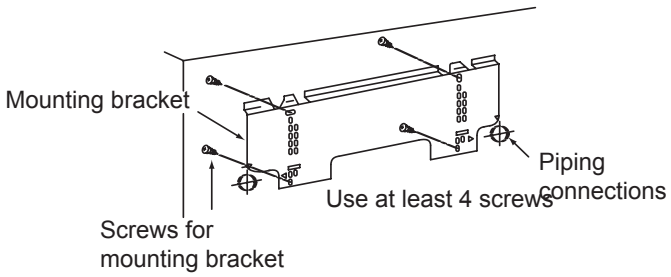
2. Mounting the unit between pillars
   - Do not install the mounting bracket on a pillar.
   - The location where the indoor unit will be installed must be flat. Avoid unbalanced weight distribution.
   - The mounting bracket must be installed to ensure that the drain piping side is connected slightly (about 3mm) lower than the other side, in order to avoid the incorrect position of the drain discharge.

	NOTE
-	*Drain piping connection can be performed both right side and left side of the unit.*

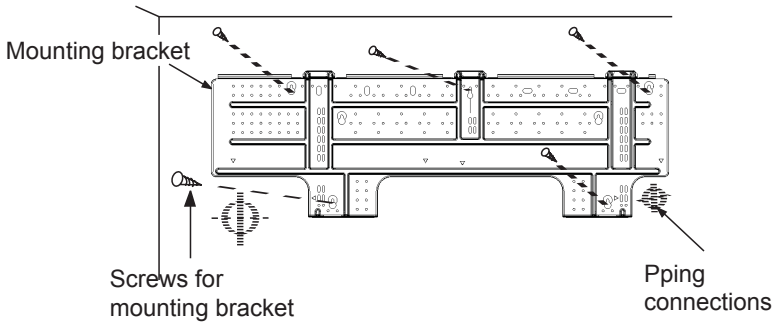
☛ RPK 1.5



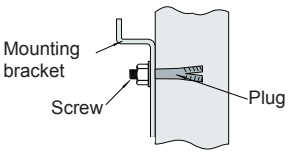
☛ RPK 2.0



☛ RPK 2.5~4.0

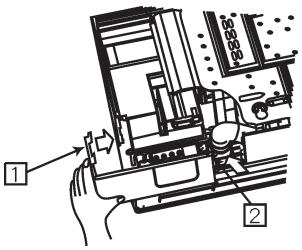


3. Mounting on a concrete wall or a concrete block wall
   - Attach the mounting bracket to the wall with anchor bolts as shown below.

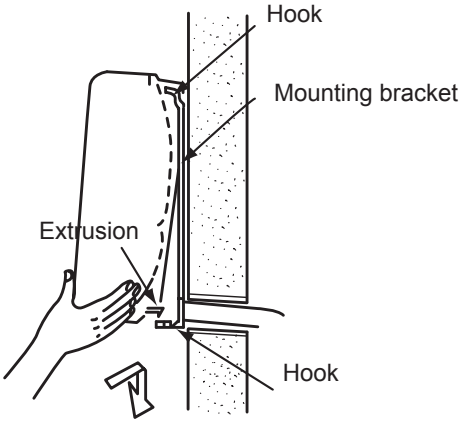
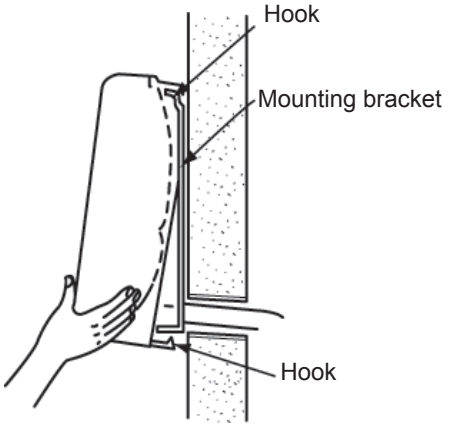


Plug size	Nº	
	RPK-1.5~2.0	RPK-2.5~4.0
M4~M5	4	5

4. Bottom cover for RPK-1.0/1.5/2.5/3.0/4.0 can be removed by pushing parts 1 and 2.



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

RPK-1.5-2.5~4.0	RPK-2.0
	

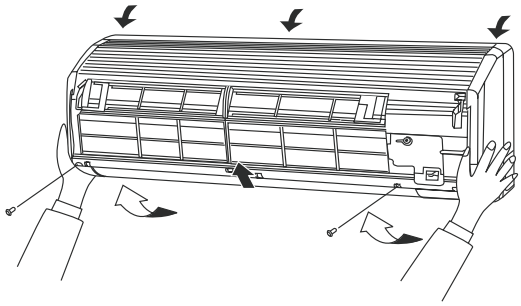
	CAUTION
-	*Check that the unit is completely hooked onto the mounting bracket. If not, it could drop from the bracket.*

- **Removing the front panel**

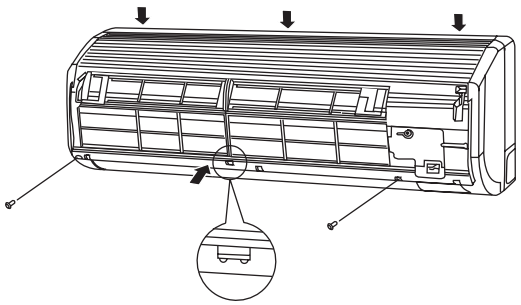
☛ RPK 1.5

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. Be careful and do not scratch the resin components.

1. Open the front panel and remove two screws.



2. Slowly pull the lower side of the front panel at your side by paying attention to the air outlet part without touching the outlet grille.Then, slightly lift the front panel upward in order to release the combined parts (three parts) of upper side of the front panel.

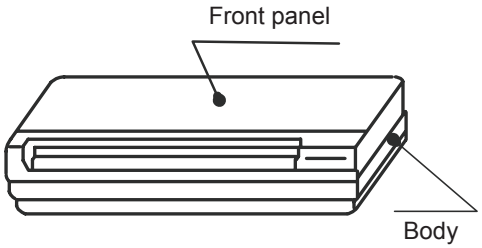


	NOTE
-	*Do not hit the front panel when removing it, otherwise the body will be broken.*

- **Putting back front panel**

1. Firstly put back the upper side of the front panel (three parts), and then fix the hook on bottom center part.

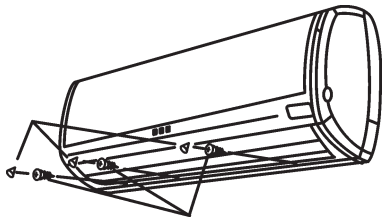
2. There are stoppers inside of the front panel. Check that there is no gap between front panel and unit body.



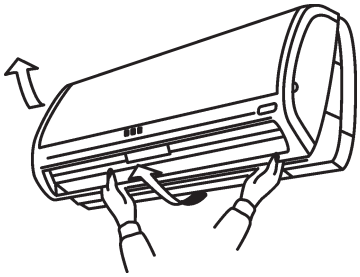
☛ RPK 2.0

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

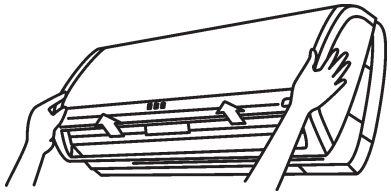
1. Remove three bushings as shown and remove the screws as shown below



2. Slowly pull the lower side of the front panel at your side by paying attention to the air outlet part without touching the outlet grille.



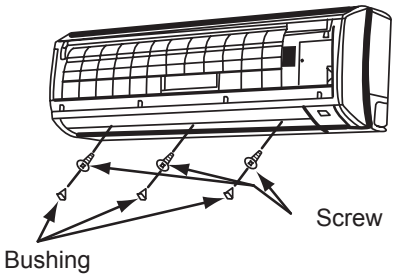
3. Slightly lift the front panel upward in order to release the combined parts (three parts) of upper side of the front panel.



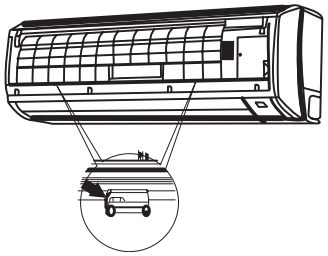
☛ RPK 2.5~4.0

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

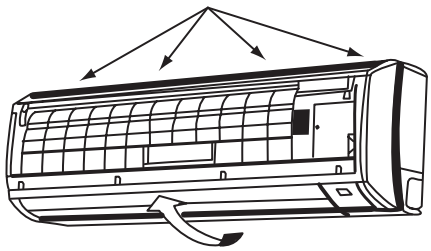
1. Remove three bushings as shown and remove the screws as shown below.

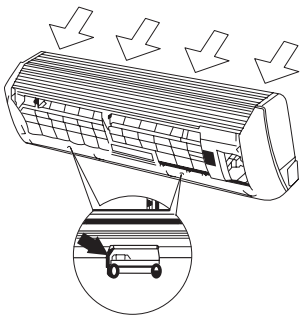


2. Slowly pull the lower side of the front panel at your side by paying attention to the air outlet part without touching the outlet grille.



3. Slightly lift the front panel upward in order to release the combined parts (four parts) of upper side of the front panel.



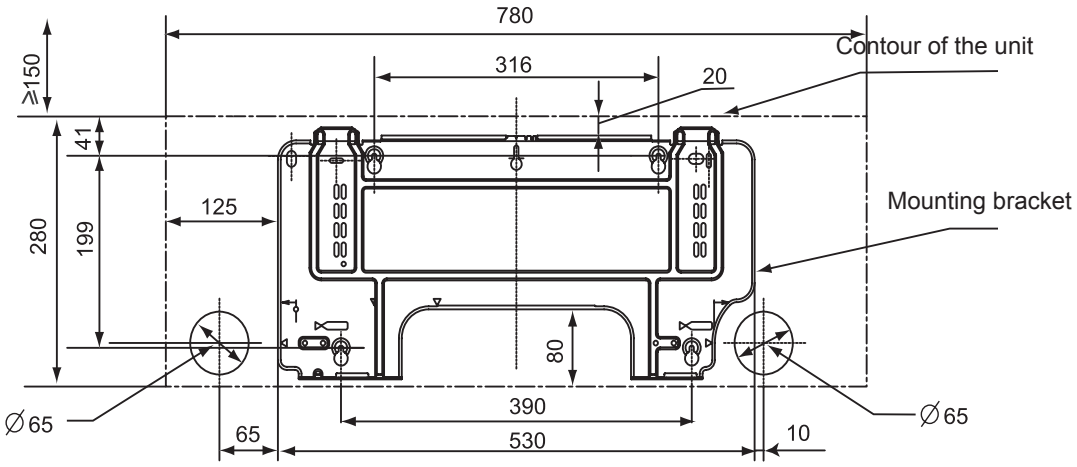


⚠	***CAUTION***
- *Any gap may cause air leakage or dewing.*	

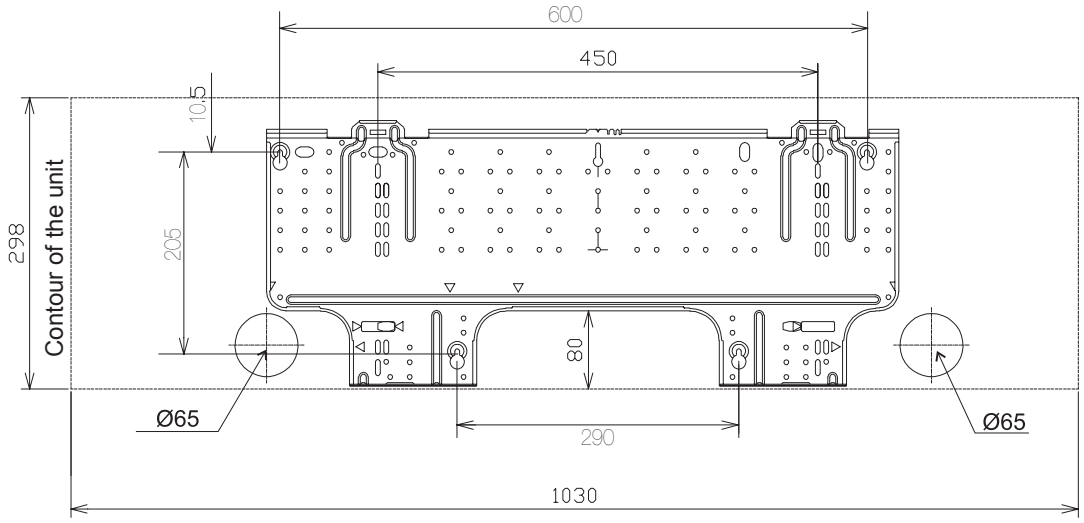
ⓘ	***NOTE***
- *For size and position of piping connection, see chapter 2.*	

1.9.4. Dimension of the mounting bracket

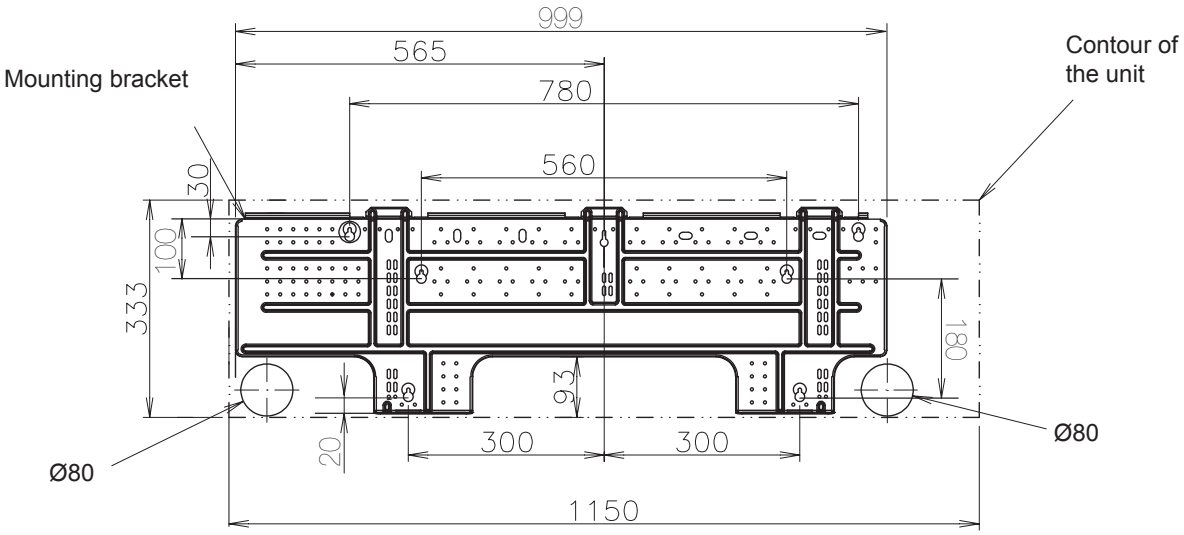
☛ RPK-1.5



☛ RPK-2.0



☛ RPK-2.5~4.0



1.10. RPF(I)-(1.5~2.5)FSN2E

1.10.1. Factory supplied-accessories

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

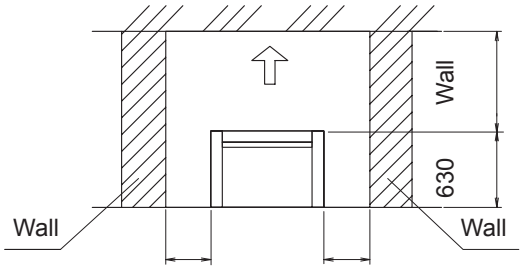
	NOTE
-	*If any of these accessories are not packed with the unit, please contact your dealer.*

Accessory	Appearance	Qty.	Purpose
Adjustment bolt for installation		*1*	*For adjusting the flat level of the unit*
Screw		*2*	*PC-P2HTE*

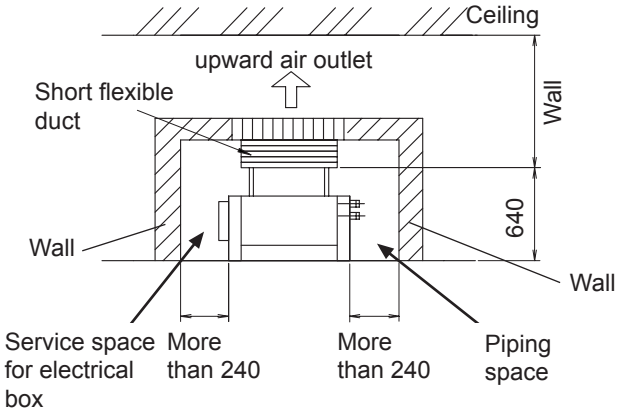
1.10.2. Initial check

Install the indoor unit with a proper clarance around it for operation and maintenance a shown in servie access panel.

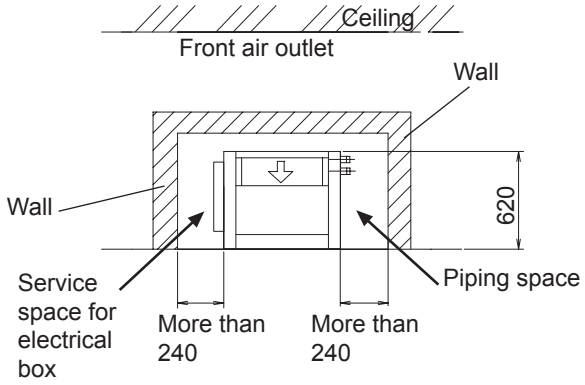
- **RPF**



- **RPFI**



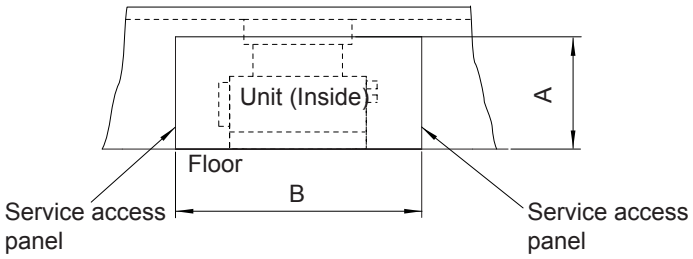
Provide a space so that air can flow smoothly.



Service access panel: provide a service access door or panel as shown beside.

Model	Size			
	A		B	
	RPF	RPFI	RPF	RPFI
RPFI 1.0	630	620	1479	1359
RPFI 1.5				
RPFI 2.0			1729	1609
RPFI 2.5				

(units in mm)

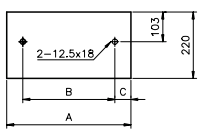


	NOTE
	- *Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.* - *Be sure to use a flat foundation, leveled and sufficiently strong.* - *It is recommended to provide a service access panel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

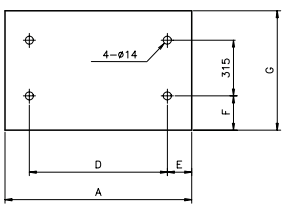
1.10.3 Installation

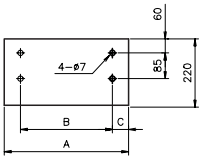
1. Make sure that the fixing position of the unit is as shown below.

Fixing onto floor using wood screws (2-M8) (View from top side)



Fixing onto wall (View from front side)





Fixing onto floor using wood screws (4-M5) (View from top side)

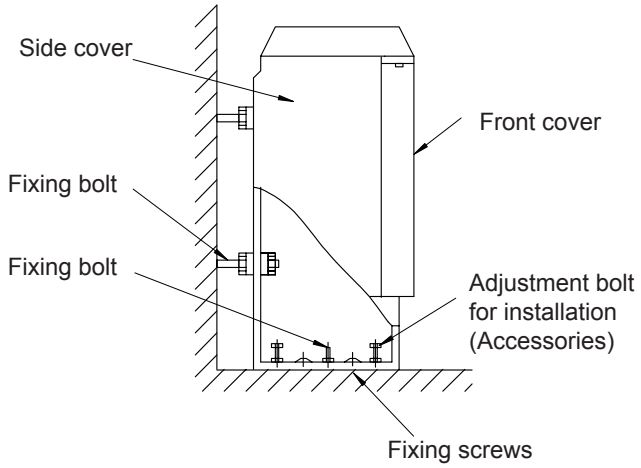
Model	A	B	C	D	E	F	G
RPF-1.0	1045	754	217	732	228	140	630
RPFI-1-5	1170	879		857			
RPFI-1.0	863	754	66	732	77	138	620
RPFI-1.5	988	879		857			
RPF-2.0	1420	1129	11	1107	228	140	630
RPF-2.5							
RPFI-2.0	1234	1129	11	1107	53	139	620
RPFI-2.5							

(units in mm)

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

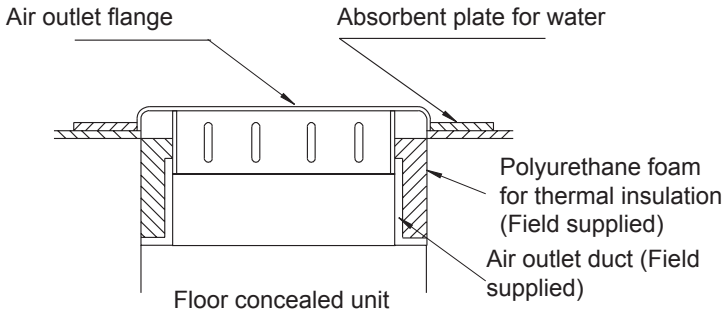
3. Fix the base plate and back plate of the unit with field-supplied fixing bolts and screws. When attaching the adjusting bolts for installation, remove the electrical wiring box.

4. In case of the RPF unit, perform the above work after removing the front cover and side cover of the unit.



☛ Unit installation

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 an hydrophilic porous plastic plate for water absortion and retention around the grille.



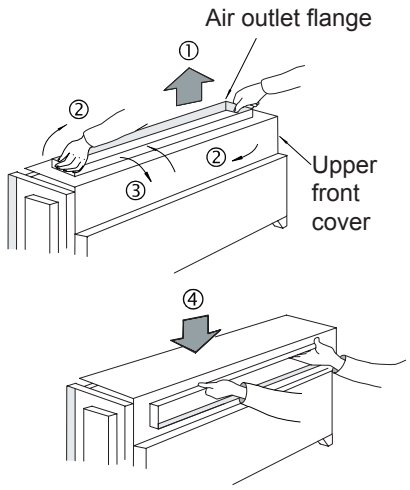
⚠	***WARNING***
- *Provide a service access cover fixed by screws so that the fan runner is not directly touched (Only RPFI model).*	

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

- **Air outlet direction change (RPFI)**

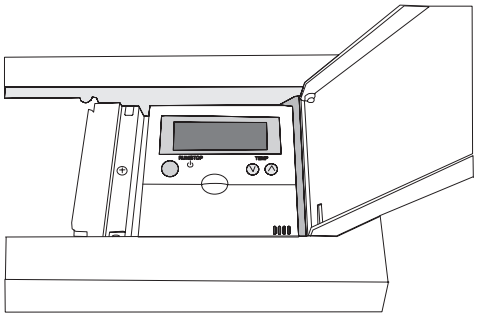
In case of changing the RPFI units air outlet direction from upward to front, follow the procedures below:

1. Remove the fixing screws of the air outlet flange and the upper front cover. Then, remove the flange and the cover.
2. Reverse the flange as indicated in the figure.
3. Put the cover on the top of the unit, and put the flange on the front side of the unit.
4. 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 2.*

1.11. COMPLEMENTARY SYSTEMS

1.11.1. KPI. Energy recovery ventilation units.

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.*

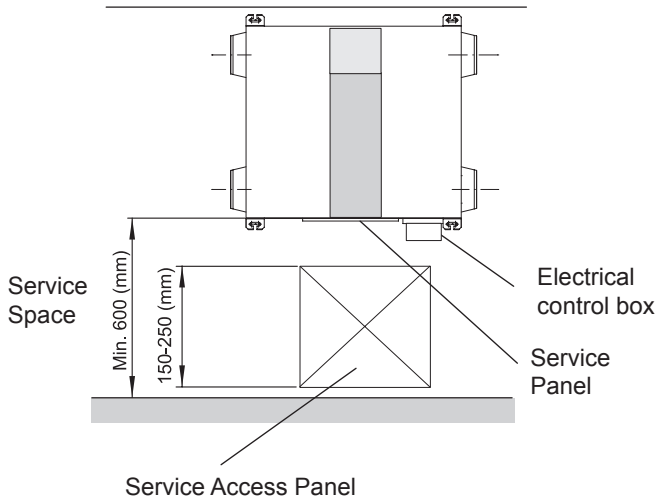
Accessory	Appearance	Qty	Purpose
Flange		*4 (double-flanges at supply air (SA) and exhaust air (EA) sides*	*For duct connecting*
Screw (M4x8)		*16*	
Rubber duct joint		*4*	*For flange connecting*
Vibration absorbing rubber, nut, washer and spring washer		*4,4,4,8*	*For unit hanging*

- **Initial check**

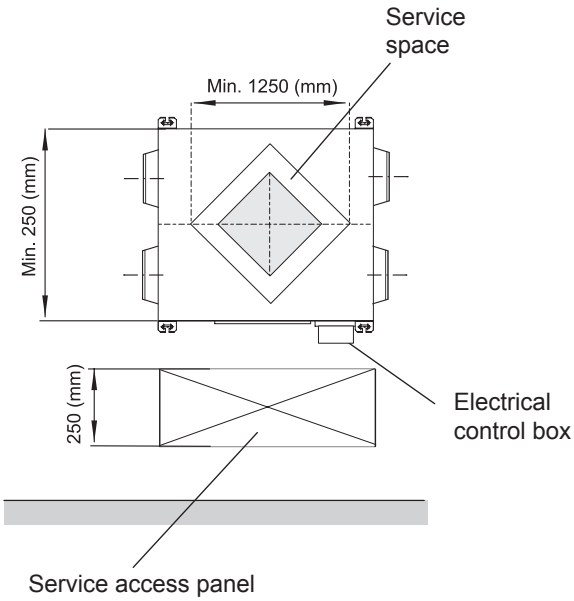
  Install the unit with a proper clearance around it for operation and maintenance working space, as shown in below figure.

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

☛ **KPI-(502~2002)E1E**



☛ **KPI-(3002)H1E**



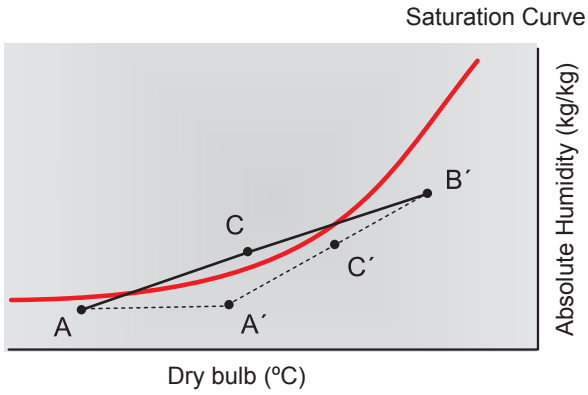
Avoid obstacles which may hamper the air intake or the air discharge flow.

Select a position for introducing the outside air where no exhaust or combustion gases will be sucked into the unit. Also the unit must not be covered by snow.

Do not use this product during winter time, with environmental conditions that may cause dewing in the heat exchange element (the case that the line connecting the protted points of the outdoor/indoor temperature and humidity conditions crosses the saturation curve on the psychometric diagram).

In such a case, heat the A (Outdoor Air) up to the A' point and make the condition so the line connecting the protted points of the outdoor/indoor temperature and humidity conditions does not cross the saturation curve. Then, the total heat exchanger can be used.

The heating method for the A (Outdoor Air) must be determined according to local codes.



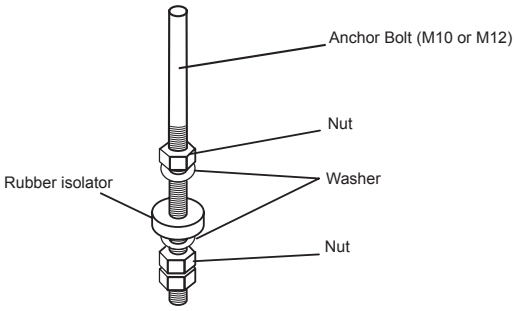
The limit of the environmental conditions for using the total heat exchanger are shown in the table below as an example,at the outdoor air temperature 0 °C, -5 °C and -10 °C with the indoor air temperature at 30 °C. In case that the indoor air humidity is higher than this condition for the outdoor air humidity is extremely high, dewing may occur.

The dew may grow up and the water may flow out of the unit.

Outdoor Air Temperature (DB)	Indoor Air Temperature (DB)	Indoor Air Relative Humidity (%)	Indoor Air Absolute Humidity (kg/kg)
0ºC	30ºC	47	0,0125
-5ºC	30ºC	41	0,0105
-10ºC	30ºC	34	0,0090

- **Mounting the unit**

1. Preparing the sling bolts.



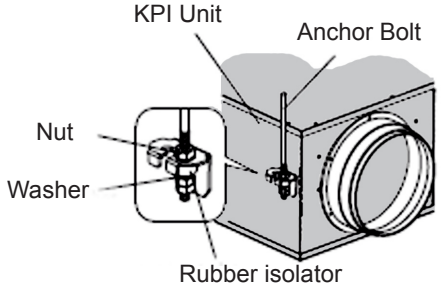
2. Hanging the Unit.

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

Initially, screw the nuts and put the washers in place for all the bolts as shown in the figure. Then, hook two suspension brackets to the nut and washer of each suspension bolt, starting from one side. After checking that the nuts and washers are correctly fixed by the retainers of the suspension bracket, hook the suspension brackets of the other side to their nuts and washers. Lift this indoor unit by hoist. Tighten up securely using double nuts in order to prevent looseness.

	CAUTION
- *The control box is fragile. When suspending the main unit from the ceiling, do not handle it in such a way that pressure of any force will be applied to the control box.*	

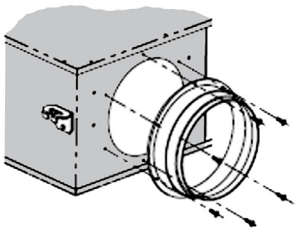
	NOTE
- *In case of too short sling bolts, reattach the suspension bracket in an alternative position.* - *Remove the screws at the top mounting position.* - *Remove the suspension brackets and attach them at a higher mounting position. Tighten up the screws in the screw hole where the suspension brackets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



Example: KPI-(502~2002)E1E

- **Attaching the duct connecting flanges**

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



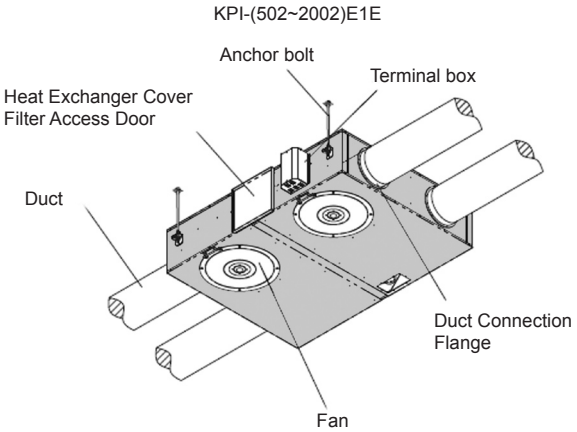
	CAUTION
-	*Before attaching the duct connecting flanges, check that no foreign matter (scraps of paper, vinyl) has found its way inside to lossnay unit. Attach the duct connecting flanges in every duct connection.*

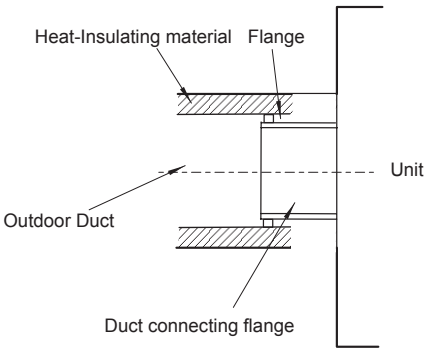
- **Connecting supply duct**

The supply duct should be connected with the unit through flexible duct, in order to avoid abnormal sounds and vibration.

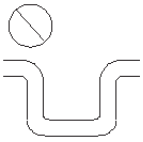
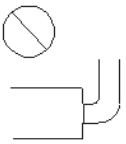
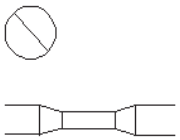
The unit is equipped with a pre-drilled duct flange for the supply duct connection.

1. Fit the ducts securely into the duct connecting flanges, and wind aluminium tape available from hardware stores to prevent air leaks. Duct connection flanges have their own sealing installed.
2. Suspend the ducts from the ceiling so that their weight will not be applied to the unit.
3. The two outdoor ducts must be covered with heat insulating material in order to prevent condensation from forming.

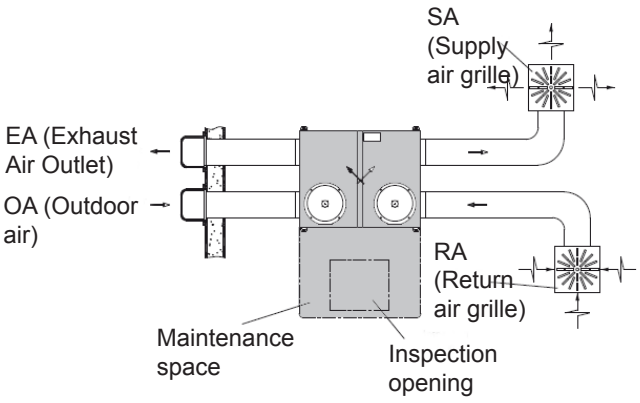


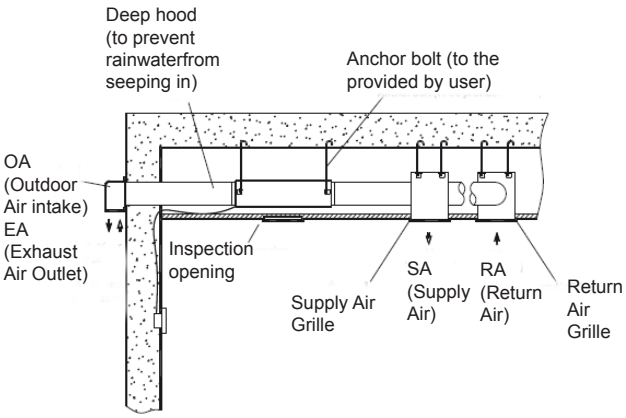


	CAUTION
-	*Before connecting the ducts, check that no sawdust or any other foreign matter (scraps of paper, vinyl, etc.) has found its way inside the ducts.*
-	*Do not touch the damper plate inside the main unit when connecting the ducts.*
-	*Do not install the ducts in the ways illustrated below. Doing so will reduce the air volume and produce abnormal sounds.*

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

☛ Example for installation





1.11.2. Econofresh kit

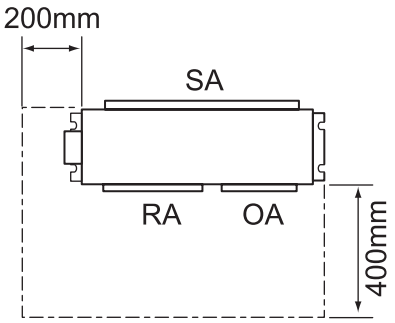
Make sure that the following accessories are packed with the unit.

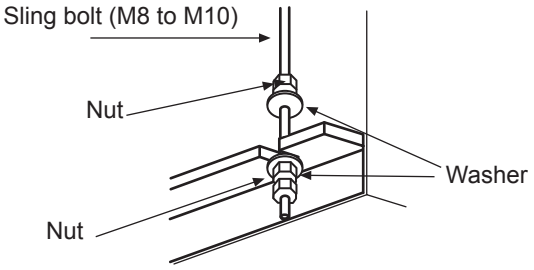
	NOTE
-	*If any of these accessories are not packed with the unit, please contact your dealer.*

Accessory	Appearance	Qty.
Cord AS	To be informed later	*1*
Outdoor thermistor (8mm)	To be informed later	*1*
Screw (for RPI and Econofresh flanges connection)	To be informed later	*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
- *The control box is fragile. When suspending the main unit from the ceiling, do not handle it in such a way that pressure of any force will be applied to the control box.*	

- **Maintenance**

	CAUTION
- *TURN OFF all power switches before maintenance is performed.* - *Do not start the cleaning procedure 5 minutes before the stop of the unit.* - *Use gloves to prevent from injury when handling the unit.* - *Do not operate the system without the air filter to protect the element of the total heat exchanger against being clogged.*	

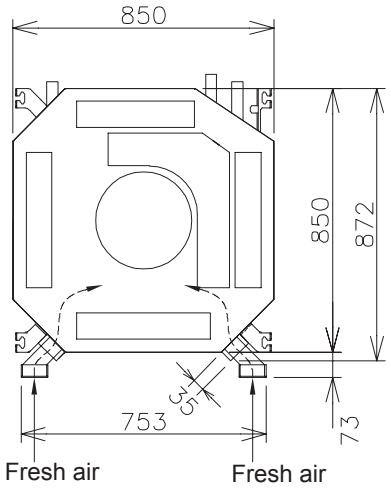
	NOTE
- *Perrform a clean up to the heat exchanging element once or more every two years.* - *Clean up the air filter more than once in year.*	

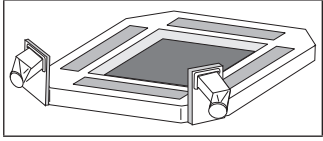
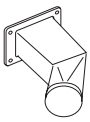
1.12. OPTIONAL ACCESSORIES

1.12.1. Fresh air intake

◆ 1.12.1.1. Connection position of fresh air intake duct (OACI-232 or PD-75)

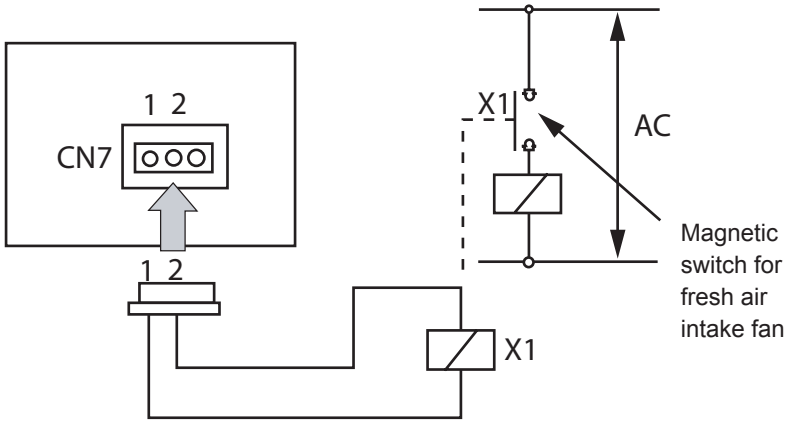
- Intaking of fresh air can be performed by connecting the air intake duct (ref. P-75 for RCI, RCIM) in the position shown in the next drawing.



OACI-232 (Only RCI)	PD-75 (RCI, RCIM)
	

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

- The duct fun must be controlled to operate only when the unit is working, In the following figure is shown an electrical control example (more details in chapter 6 about picking up and connecting the operation signals cables).

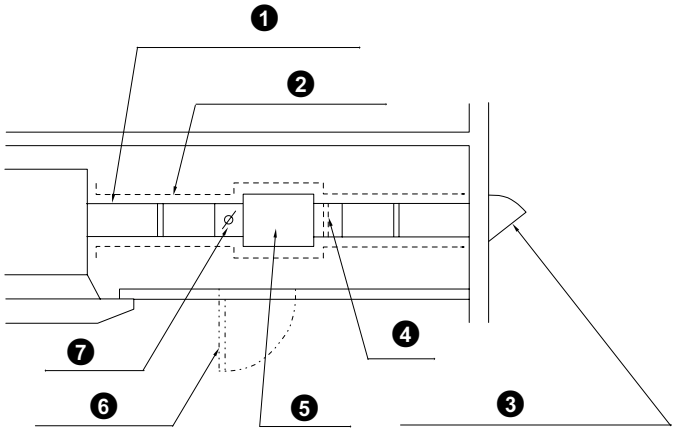


	NOTE
	- *The total height of the unit is increased by approximately 80 mm with the fresh air intake kit (OACI-232) installed. Take care of this when installing the unit.* - *Use a 3P connector cable (PCC-1A) for CN7 of indoor printed circuit board. For further information, refer to chapter 9.*

- The maximum amount of fresh air intake is the 20% of the indoor unit air flow rate. In case of fresh air intake exceeds this amount, 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 graphic chart below.

- Attach an air filter on the air suction side of the fresh-air intake duct at a position with easy servicing.
- Insulate the duct and the duct connection portion with only non-combustible materials.

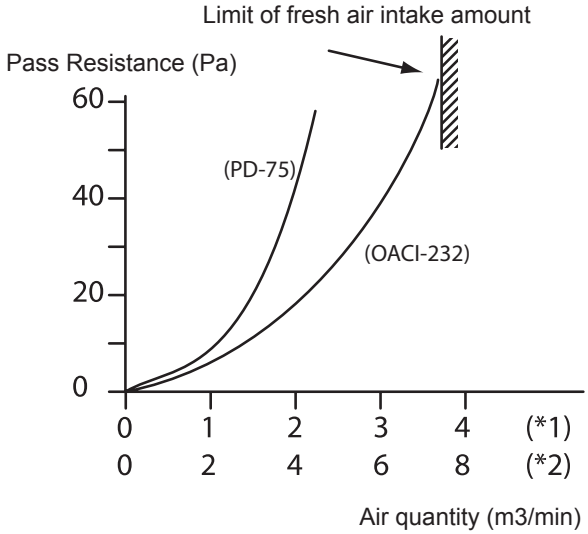
❶ Duct (To be made of only non-combustible materials)
❷ Thermal insulatinon (Non-combustible materials)
❸ Fresh air intake hood with gallery (Atached drip-proff hood type)
❹ Air filter
❺ Duct fan
❻ Inspection panel
❼ Damper



	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, as shown in number ❻.
- In case that a duct fan is larger than the limit of fresh air intake amount, always use a damper and adjust the quantity of air.

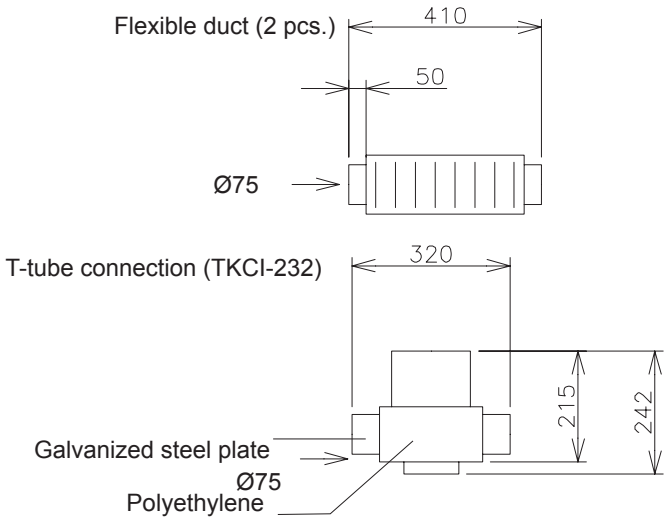
- The duct resistance of the fresh air intake portion will be as shown in the figure below. Use this as a guideline for selecting the duct fan.

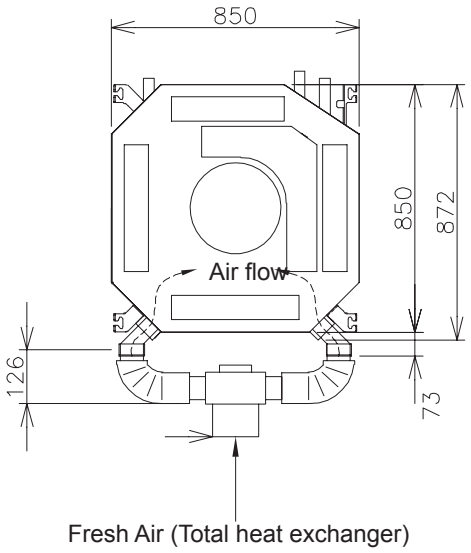


(*1): Installation of the connecting box at one side.
(*2): Installation of the connection box at both sides

◆ 1.12.1.2. T-tube connecting kit (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.

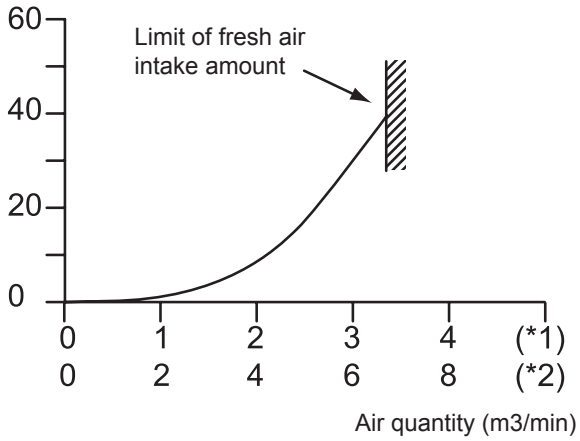




RCI Unit with the T-Tube Connecting Kit. Note that the diameter of the T is increased (Ø90).

	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.*

Pass Resistance (pa)

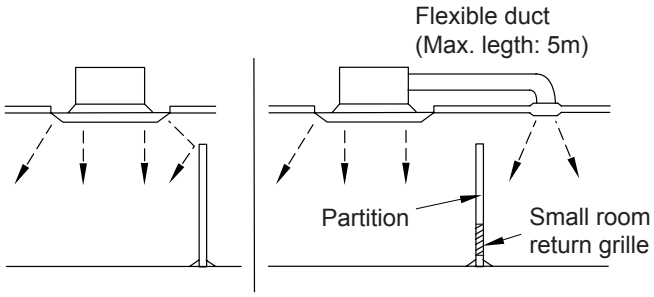


(*1): Installation of the connecting box at one side.
(*2): Installation of the connection box at both sides

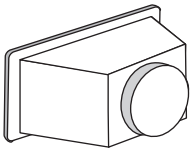
1.12.2. Branch discharge

◆ 1.12.2.1. Branch flange (PDF 23C3; PDF 46C3)

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



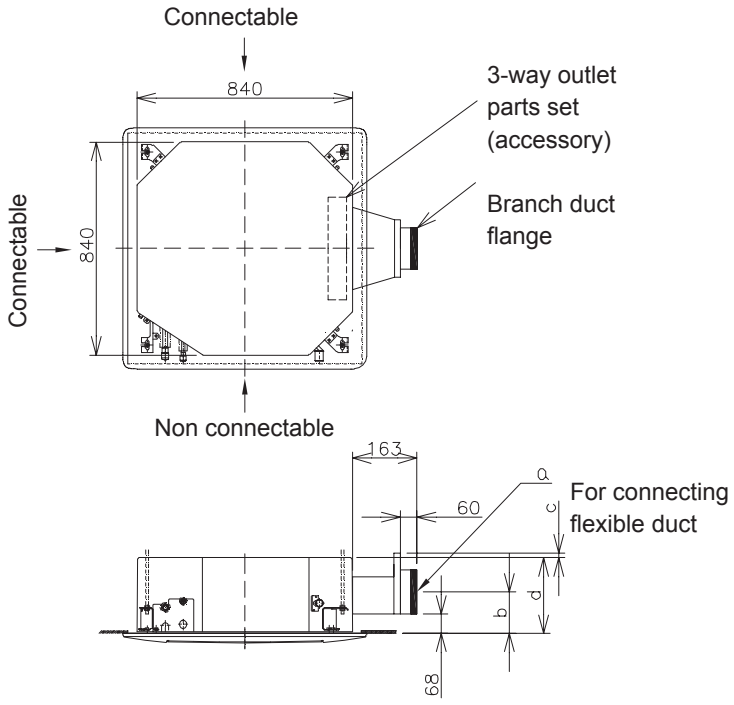
Example of branched duct



Branch duct flange

- **Fitting the branched duct**

1. The branched duct connections are shown in the figure 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 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.



Model	Units	a	b	c	d
PDF-23C3	RCI-1.5~2.5	150	155	9	248
PDF-46C3	RCI-3.0~6.0	200	180	6	298

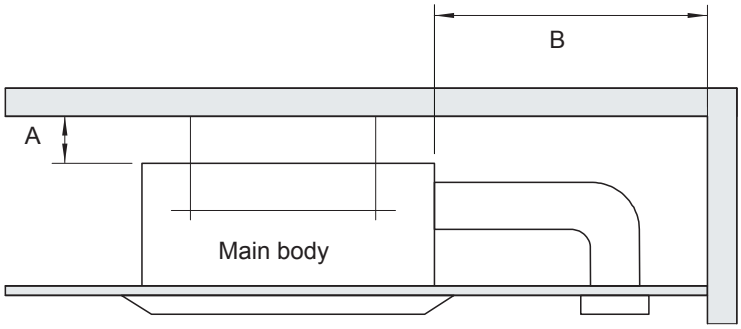
Dimensions of duct connection

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).

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 the table below. If two branch ducts are connected to the unit, 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.

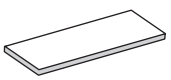
   a) In the case that the branch duct is installed from the standpoint, in order to prevent accidents, keep the dimensions shown in the following drawing.
   b) Use non-combustible materials for the duct.
   c) Install sufficient thermal insulation for the duct (In order to prevent condensation).
   d)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



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

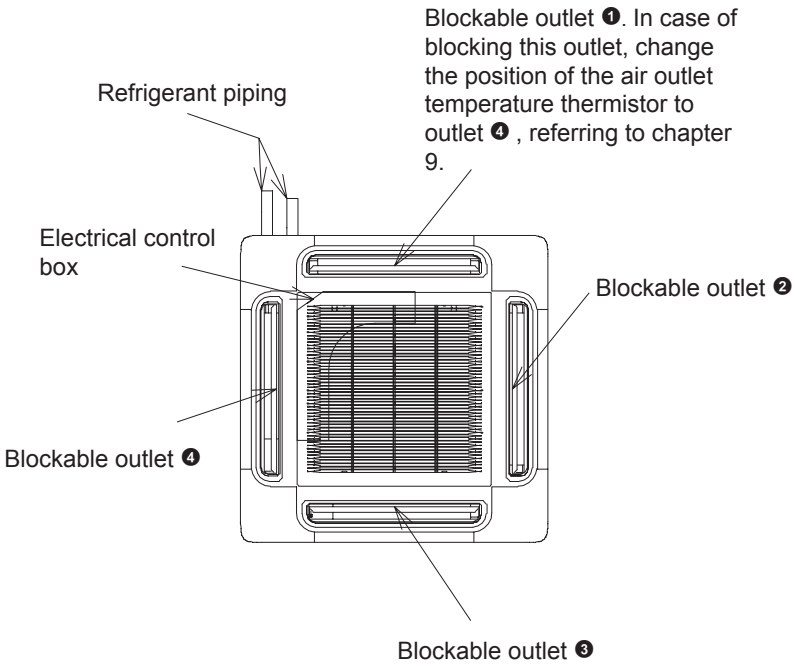
◆ 1.12.2.2. Blockable outlet air flow (PI-23LS5)

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

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

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

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

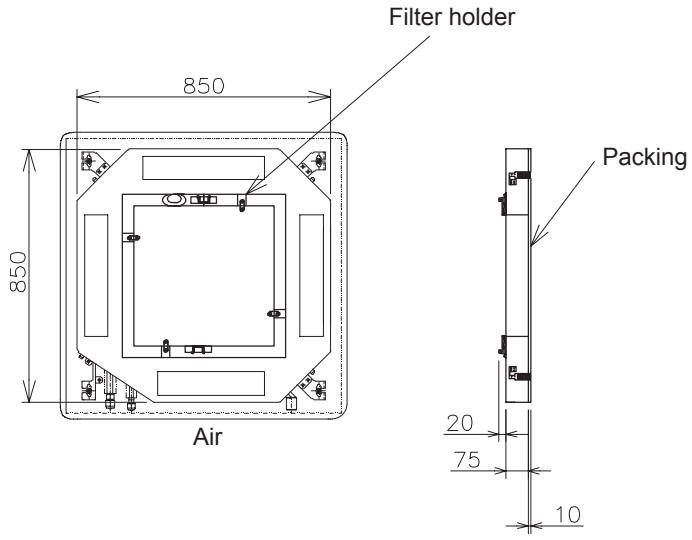


	CAUTION
-	*If 3 outlets are used, the decrease in air quantity will be about 3 to 5%, and within the operation range of the unit, there will be no major difference in particular, in comparison with the 4-way outlet. However, the noise will increase by about 1 to 2 dB.*

1.12.3. Filters

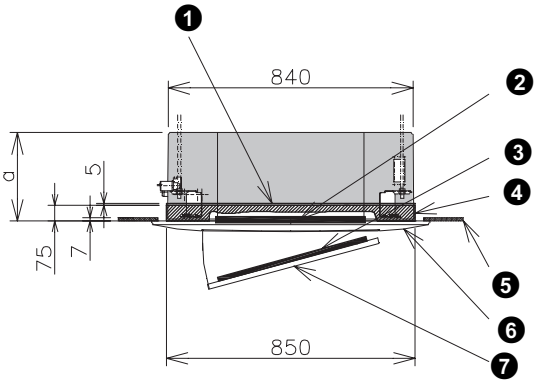
◆ 1.12.3.1. Filter box (B-23H4)

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.

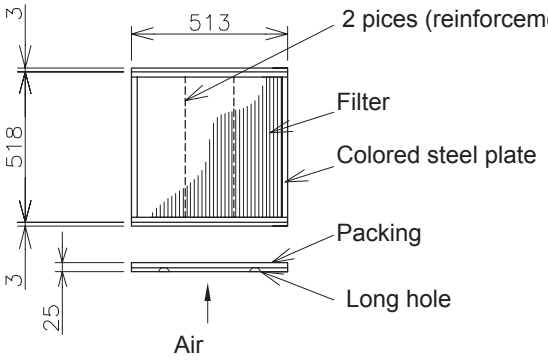
1. Suction grille
2. Air filter (Optional)
3. Long life air filter
4. Filter box
5. Ceiling
6. Air panel (Optional)
7. Suction grille



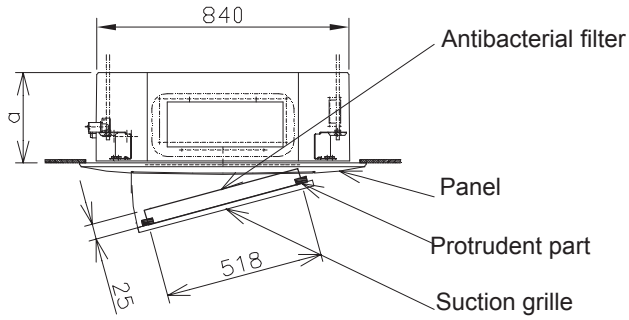
Model	a
RCI - 1.0~2.5	328
RCI - 3.0~6.0	378

◆ 1.12.3.2. ANTI-BACTERIAL (F-23L4-K)

The dimensions of the anti-bacterial long life air filter are described in the figure below.



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



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

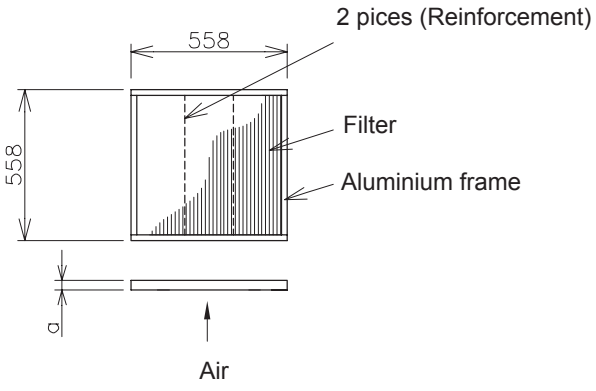
☛ Specifications:

Item	For 4-way cassette type RCI - 1.0~6.0
Dust Collection Efficiency (%)	50 (Gravimetric Method)
Air Flow (m3/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 (* see note below)
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
- *This is a standard life period air filter and it's durability could vary depending on using conditions. Wash this filter by using water or neutral detergent (*).*
- *When using this filter, set the air flow mode to high speed by the remote control switch to maintain the required air volume.*

◆ 1.12.3.3. DEODORANT (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 (m3/min)	20.0	37.0
Initial Pressure Loss Pa (mmAq)	15.7 (1.6)	16.7 (1.7)
End Pressure Loss Pa (mmAq)	42.2 (4.3)	33.3 (3.4)
Life Period	3 Years (with maintenance per 3~6 months)	
Reuse	Available (Dry by sunlight) (*1)	
Cleaning	Available (Wash by water) (*2)	
Weight (Kg)	0.9	1.0
Dimensions a (mm)	26	46
Performance	Absorbs smoke, body odor, etc	
Restricton on usage	Washing by detergent is prohibited	

NOTE

- *This is a standard life period air filter and it's durability could vary depending on the using conditions.*
- *Wash this filter by using water or neutral detergent to prevent it from adsorptive decrease (*2).*
- *When using this filter, set the air flow mode to high speed by the remote control switch to maintain the required air volume.*
- *Some special odors (such as organic solvent and sulfur gas) can not be absorved.*
- *This filter is reusable. Clean it as mentioned above and let it dry by sunlight (*1).*
- *This filter can be used with the deodorant long life filter (optional).*
- *This filter is supplied to be used for one unit as 1 set.*

2. PIPING INSTALLATION

This chapter provides information about the procedures you must follow to perform piping work connections for outdoor and indoor complete range of Hitachi's units.

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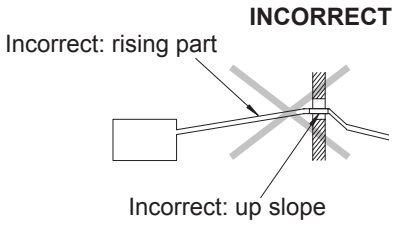
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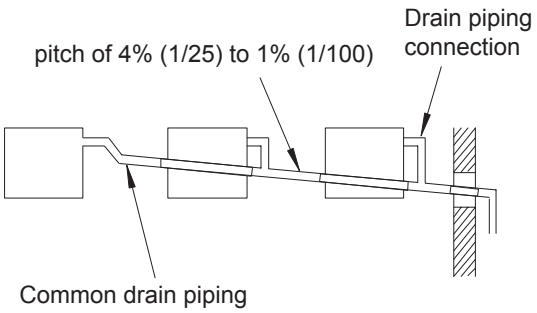
2.1 GENERAL NOTES

CAUTION

- *Do not install the drain-pipe in an up-slope position. Installing it like this, the drain water cannot be evacuated and will flow back to the unit, causing a possible leakage when the operation is stopped. Allways install the unit higher than the exit of the pipe. Making this so, the water will flow easily to the outside.*



- *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 section of the common drain pipe must be wide enough according to the unit size and the unit number.*



- *The drain pipe will require insulation if it is installed in a location where the ambient humidity may condensate on the drain pipe outer surface. This condensation could 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 forming.*
- *The drain trap should be installed next to the indoor unit. The drain trap must be designed according to good practice. The drain trap must be checked with charged water in order to test the correct flow. Do not tie or clamp the drain pipe and the refrigerant pipe together.*

NOTE

- *The installation of a drain trap is mandatory for the for RPI 8/10.*
- *Install the drainage in accordance with national 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**

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

2. 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**

1. Turn the power supply on.
2. Pour approximately 1.8 liters of water into the drain pan. Then, the float switch will be activated. Next, the drain pump will start working automatically.
3. 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, pour again approximately 1.8 liters of water into the drain pan.
4. Turn the power supply off.

	NOTE
-	*Pay attention to the insulation material thickness when the left-side piping is installed. If the insulation material is too thick, you will not be able to install the piping in the unit.*

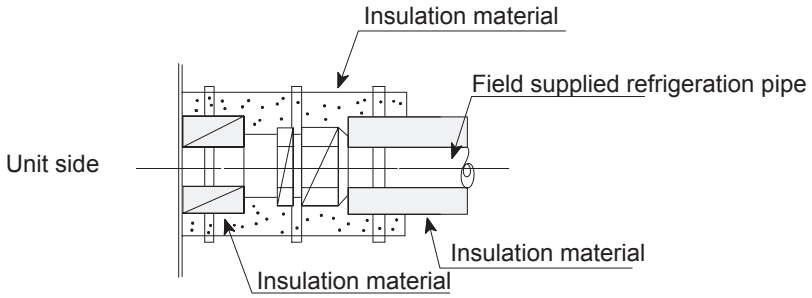
2.2. PIPING WORK CONNECTION CONSIDERATIONS

2.2.1. Piping materials

1. In order to avoid supply problems in terms of local regulations and quality, prepare locally-supplied copper pipes.

	NOTE
-	*In case of using copper pipes for piping sections bigger than Ø 19.05 mm (3/4 inches), flaring work cannot be performed. If necessary, use a joint adapter.*

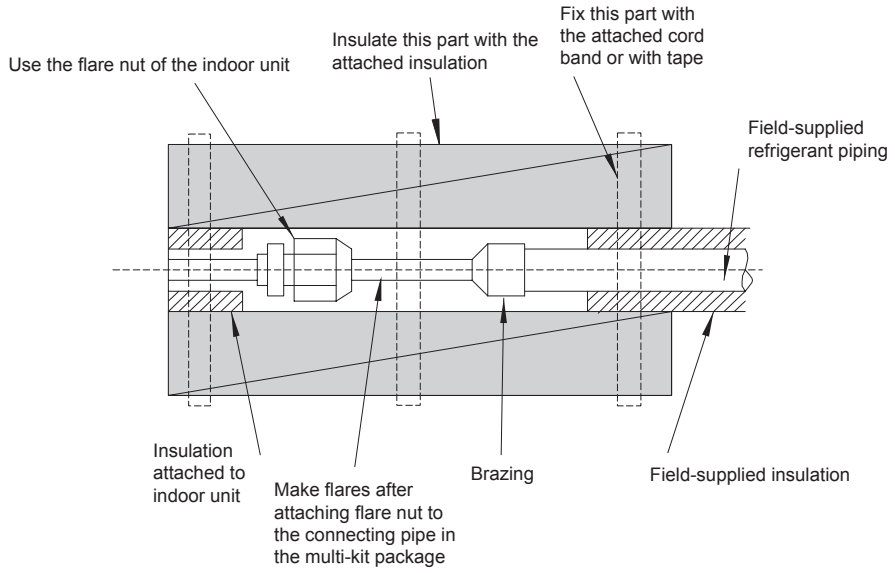
2. Select clean copper pipes. Make sure there is not dust and moisture inside. Blow the inside of the pipes with oxygen free nitrogen to remove any dust and foreign materials before connecting the pipes.
3. After connecting the refrigerant piping, seal the open space between Knockout hole and refrigerant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



	CAUTION
-	*Do not use a saw and a grindstone or other tools which cause copper powder.*
-	*When cutting pipes, secure the part for brazing in accordance with both national and local regulations.*
-	*Use security glasses and gloves for cutting or welding works.*

- **Piping Connection**

When connecting liquid piping for units with piping longer than 15 meters, apply a piping size of Ø9.53 mm (3/8 inches). Fix the connecting pipe as shown in the following figure using the insulation attached to the Indoor Unit.

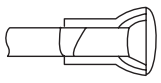
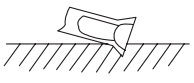


	NOTE

- *A system with no moisture or oil contamination will give maximum performance and lifecycle compared to a poorly prepared system. Take particular care to ensure that all copper piping is clean and dry internally.*
- *To ensure this, blow oxygen-free nitrogen through the pipes.*

	CAUTION

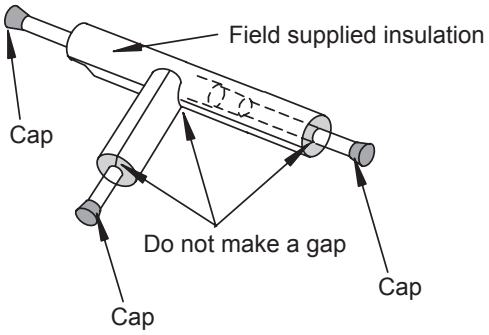
- *When inserting a pipe through any hole protect the end with a cap.*
- *Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe*

Correct	Incorrect
	

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

- **Insulation**

Attach the pipe insulation to each branch using vinyl tape. Attach also insulation to field supplied pipes in order to prevent the capacity decrease according to the ambient air conditions and dewing on the low pressure pipe surface.



NOTE
- *When polyethylene foam is applied, it is recommended the usage of a wall thickness of 10 mm for the liquid piping and 15 mm to 20 mm for the gas piping.*

CAUTION
- *Perform the insulation work after the pipe surface temperature decreases to the room temperature, if not the insulation material may melt.* - *If the ends of the piping system are open after ending the piping work, attach caps or vinyl bags securely to the ends of the piping, avoiding moisture and dust entering.*

2.2.2. Three principles on refrigerant piping work

In case of using refrigerant R410A in the refrigeration cycle, the refrigeration oil should be of a synthetic type one.

In order to avoid oxidation, pay much careful attention to basic piping work control to avoid infiltration of moisture or dust during the refrigerant piping work.

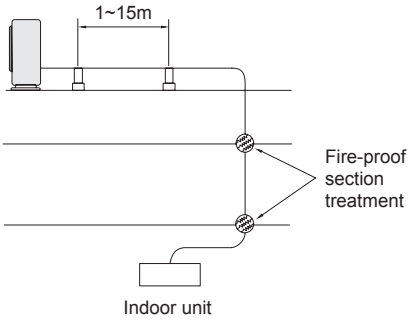
Three principles	Cause of failure	Presumable failure	Preventive action
1. Dry Keep good dryness	- Water infiltration due to insufficient protection at pipe ends - Dewing inside of pipes - Insufficient vacuum pumping time	Icing inside tube at ex. valve (Water choking) + Generation of hydration and oxidation 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 dust or other through the pipe ends - Oxidation film during brazing without blowing nitrogen - Insufficient flushing by nitrogen after brazing	Clogging of expansion 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 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

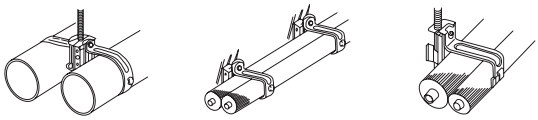
(Comes from page 2-5)

2.2.3. Suspension of refrigerant piping

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



In order to fix the piping to wall or ceilings use suspension and clamping systems as shown in the following figure.

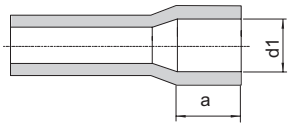


2.2.4. Brazing work

The most important work in the refrigerant piping installation work is the brazing of the pipes. If it accidentally occurs a leakage due to a careless brazing process, it will cause clogged capillary pipes or serious compressor failure.

In order to guarantee a proper brazing neck between different pipes surfaces, accurate pipe dimensions after the expansion process (see the table below):

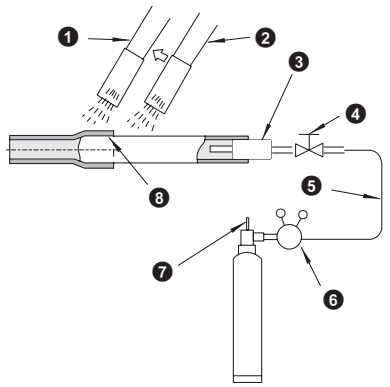
It is important to control the clearance of the pipe fitting portion as shown below. In the case that a cooper tube expansion jig is used, following dimensions should be secured.



Copper pipe size	Ød1	Gap	a	Copper pipe size	Ød1	Gap	a
Ø6.35 +0.08 -0.08	Ø6.5 +0.1 0	0.33 0.07	6	Ø22.22 +0.09 -0.09	Ø22.42 +0.1 0	0.39 0.11	10
Ø9.53 +0.08 -0.08	Ø9.7 +0.1 0	0.35 0.09	8	Ø25.4 +0.12 -0.12	Ø25.6 +0.1 0	0.42 0.08	12
Ø12.7 +0.08 -0.08	Ø12.9 +0.1 0	0.38 0.19	8	Ø28.58 +0.12 -0.12	Ø28.78 +0.1 0	0.42 0.08	12
Ø15.88 +0.09 -0.09	Ø16.1 +0.1 0	0.41 0.13	8	Ø31.75 +0.12 -0.12	Ø32.0 +0.1 0	0.47 0.13	12
Ø19.05 +0.09 -0.09	Ø19.3 +0.1 0	0.44 0.16	10	Ø38.1 +0.12 -0.12	Ø38.3 +0.1 0	0.52 0.18	14

A basic brazing method is shown below.

1. Pre-heat the outer tube for better flowing of the filler metal
2. Heat inner side tube evenly
3. Rubber plug
4. Packless valve
5. High pressure hose
6. 0.03 to 0.05 MPa (0.3 to 0.5 Kg/cm^2 G)
7. Reducer valve: open this valve only when the gas is needed
8. Nitrogen gas flow 0.05m^3/h or smaller



CAUTION

- *Use nitrogen gas for blowing during pipe brazing. If oxygen, acetylene or fluorocarbon gas is used, it will cause an explosion or poisonous gas.*
- *During the brazing work, a lot of oxidation film will be generated inside of the pipes if no oxygen-free nitrogen gas is blown through the pipes. This film will be flecked off after operation and will circulate in the refrigeration cycle, resulting in clogged expansion valves, etc. This coud origin problems in 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 an excessively high pressure is applied to a pipe, it could origin an explosion.*

2.2.5. Refrigerant charge

	CAUTION

- *Do not charge OXYGEN, ACETYLENE, or other flammable and poisonous gases into the refrigerant because an explosion will occur. It is recommended that oxygen free nitrogen be charged for these types of tests cycle when performing a leakage test or an airtight test. These types of gases are extremely dangerous.*
- *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.*
- *If the flare nut is tigthened too hard, the flare nut may crack after a long time and cause refrigerant leakage.*

2.2.6. Caution of the pressure by check joint

When the pressure is measured, use the check joint of gas stop valve (A), and use the check joint of liquid piping (B) in the figure below.

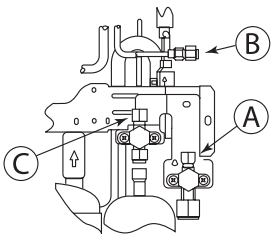
At that time, connect the pressure gauge according to the following table because of high pressure side and low pressure side changes by operation mode.

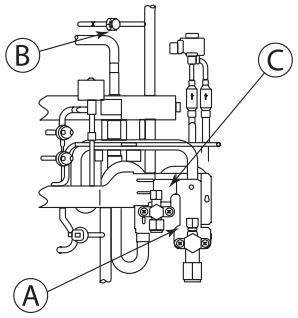
	Cooling operation	Heating operation
Check joint for gas stop valve “A”	Low pressure	High pressure
Check joint for piping “B”	High pressure	Low pressure
Check joint for liquid stop valve “C”	Exclussive for vacuum pump and refrigerant charge	

	NOTE

- *Be careful that refrigerant and oil do not splash to the electrical parts at removing the charge hoses.*

The below figures show examples of 3 HP and 5 HP. The one on the right is an 5H(V)RNME case and the one in the left is an 3 HVRNME case.





2.2.7. Refrigerant charge quantity

Outdoor units has been charged with refrigerant for ℓ(m) of actual piping length. An additional refrigerant charged is required in systems with actual piping length longer than ℓ(m).

1. Determine an additional refrigerant quantity according to the following procedure, and charge it into the system.

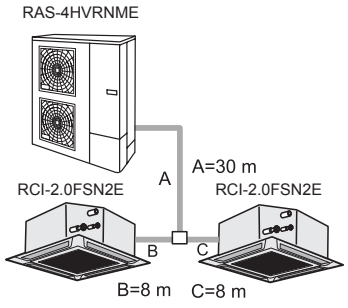
2. Record the additional refrigerant quantity to facilitate service activities thereafter.

⚠	***CAUTION***
	- *When charging refrigerant accurately measure refrigerant to be charged.* - *Overcharging or undercharging of refrigerant can cause compressor trouble* - *In case of actual piping length less than 5 m, consult your distributor.*

☛ Outdoor unit Factory Refrigerant charge (Wo Kg) is the next:

O/U MODEL	Wo (Kg)	Chargeless Length ℓ(m)	Additional Charge Factor (P)
RAS-3H(V)RNME	2.4	30	0.04
RAS-4H(V)RNME	3.9	30	0.06
RAS-5H(V)RNME	4.0	30	0.06
RAS-6H(V)RNME	4.0	30	0.06
RAS-4HVRNSE	2.8	20	0.04
RAS-5HVRNSE	3.3	30	0.06
RAS-6HVRNSE	3.3	30	0.06

1. Refrigerant shall be added if **L** is longer than the chargeles length shown in the table above.
   Calculate the additional amount as follows:



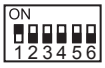
   - Chargeless Length ℓ: for 4HVRNME is 30 m according to the table before.
   - Additional Correction Value **P**: for 4HVRNME, “0.06” according to the table above.
   - Additional Charge amount **W** will be:

   W= (L-ℓ) x P = (46-30) x 0.06 = **0.96 (kg)**

2. Charge the amount **W** calculated by point 1.

3. Setting of pipe length DSW.
   DSW2 setting will be required only when the refrigerant pipe length is shorter than 5 m or longer than 30 m. Pipe length setting shall be performed as shown below.

(The ■ side in the dip switch shows the position)

DSW2 on outdoor PCB1		
Factory setting	Factory setting	Factory setting
		
	Pipe Length 5 m or shorter	Pipe Length 30 m or longer

2.2.8. Pump down refrigerant

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 -0.01 MPa (-100 mmHg), 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 in a measurement higher than -0.01 MPa. If the pressure is lower than -0.01 MPa, the compressor may be faulty.*

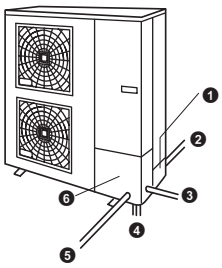
2.3. OUTDOOR UNITS

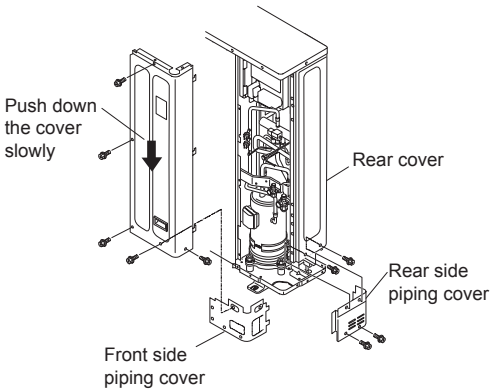
2.3.1. Piping connection

For a list of factory-supplied accessories, please refer to chapter one.

1. The pipes can be connected from any of the following four directions: front, rear, bottom or right side, when facing the outdoor unit.

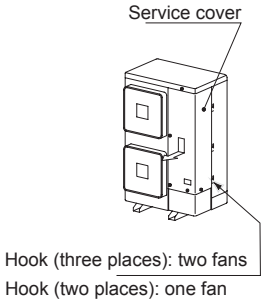
❶ Rear side piping cover
❷ Rear side piping work (Knock-out hole)
❸ Right side piping work (Knock-out hole)
❹ Bottom side piping work (Piping cover)
❺ Front side piping work (Knock-out hole)
❻ Front side piping cover





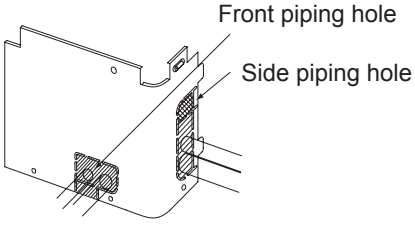
Make holes in the piping cover or cabinet for taking the pipes out. Take the piping cover away from the unit, and make holes by cutting along the guideline at the rear of the cover or punching it with a driver. Remove the burr with a cutter.

	NOTE
-	*Hold the cover with a hand at the same time while removing the screws as the cover may fall down.*



-

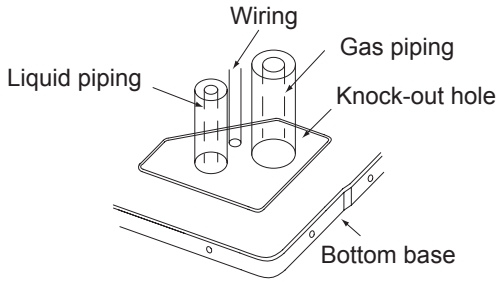
- **For the front and side piping**



To use racking or conduit tubes, check the size and remove the stiped parts, following the slit.

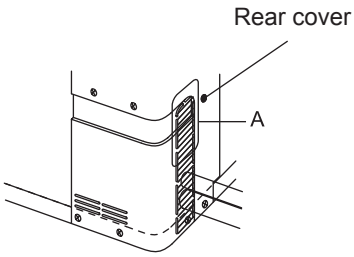
	NOTE
- *Place insulation (field supplied) to protect cables and pipes from being damaged by plate edges.*	

- **For the downward piping**



	NOTE
- The wring must not be in contact directly with the pipes	

- **For the rear side piping**



	NOTE
- *Remove the rear pipe cover under the rear cover and remove the stipped part following the slit.*	

2. Mount the piping cover in order to avoid water entering into the unit. Seal the holes where pipes and wires are inserted, by using an insulation (field-supplied).

3. If the field-supplied piping is connected with stop valves directly, it is recommended to use a tube bender.

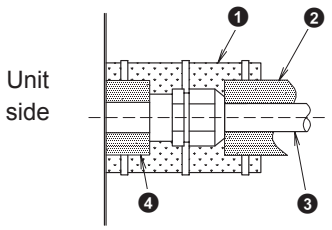
4. Check that the stop valves are closed completely before connecting pipes.

5. Connect the field supplied refrigerant pipes to the indoor unit and outdoor unit. Apply the oil thinly at the seat flare nut and pipe before tightening.

The required tightening torque is as follows:

Pipe Size	Tightening Torque (Nm)
Ø 6.35 mm	20
Ø 9.53 mm	40
Ø 12.70 mm	60
Ø 15.88 mm	80

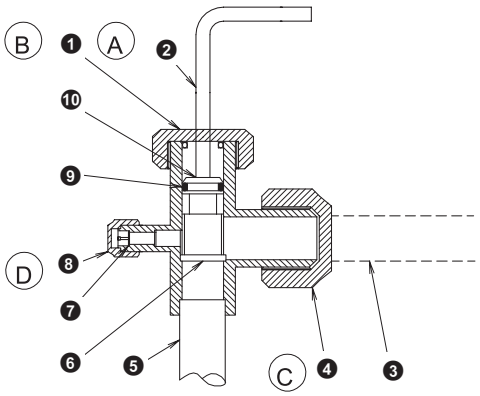
6. After connecting the refrigerant piping, seal the open space between knockout hole and refrigerant pipes by using the insulation material.



Nº	Description
❶	Insulation material
❷	Insulation material
❸	Field supplied
❹	Insulation material

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

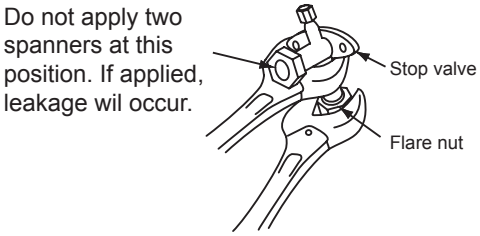
Closed before shipment



Nº	Description	Remaks
❶	Cap	
❷	Allen wrench	Hex 4/5/10 mm
❸	Refrigerant Piping	Field supplied
❹	Cap	
❺	Refrigerant Pressure	To outdoor unit
❻	Seat Surface	Fully closed position
❼	Check Joint	Only the charging those can be connected
❽	Cap	
❾	O-Ring	Rubber
❿	Spindle valve	Open – Counterclockwise
		Close – Clockwise

Tighten torque (N.m)					
Valve type / Model		**A**	**B**	**C**	**D**
Liquid valve	3~6HP	7~9	34~42	34~42	14~18
Gas valve	3~6HP	9~11	34~42	68~82	14~18
Liquid valve	8HP	7~9	37	40	16
	10-12HP	7~9	37	60	16
Gas valve	8~12HP	9~11	49	53~75	9.8

- **Outdoor unit stop valve**

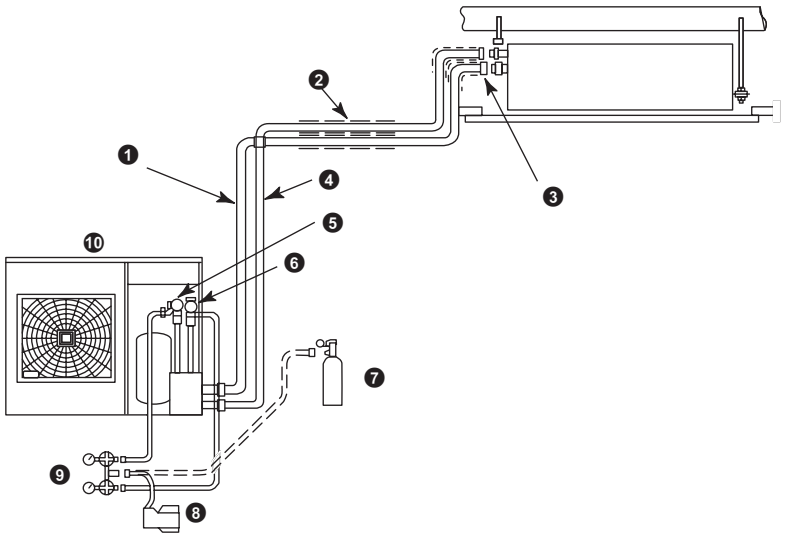


	CAUTION
- *At the test run, fully open the spindle. If not fully opened, the devices will be damaged.* - *Do not attempt to turn service valve rod beyond its stop.* - *Do not loosen the stop ring. If the stop ring is loosened, it is dangerous since the spindle will hop out.* - *Do not apply force to the spindle valve at the end of opening (5N.m. or smaller). The back seat construction o*	

- **Evacuation and refrigerant charge**

- Connect the gauge manifold using charging hoses with a vacuum pump or a nitrogen cylinder to the check joints of the liquid line and the gas line stop valve.
- Check for any gas leakage at the flare nut connection, by using nitrogen gas to increase the pressure at 4.15 MPa for outdoor units inside of the field-supplied piping.
- Operate the vacuum pump for 1 to 2 hours until the pressure decreases lower than a pressure of 756 mmHg in vacuum.
- For charging refrigerant, connect the gauge manifold using charging hoses with a refrigerant charging cylinder to the check joint of the liquid line stop valve.
- Charge the proper quantity of refrigerant according to the piping length (Calculate the quantity of the refrigerant charge).
- Fully open the gas line stop valve, and slightly open the liquid line stop valve.
- Charge refrigerant by opening the gauge manifold valve.
- Charge the required refrigerant within the difference range of ±0.5kg by operating the system in cooling.
- Fully open the liquid line stop valve after completing refrigerant charge.
- Continue cooling operation for more than 10 minutes to circulate the refrigerant.
- See the example below.

1. Gas line
2. Thermal insultaion
3. Cover the flare nut and union of the piping connection with thermal insulation
4. Liquid line
5. Liquid stop valve
6. Gas stop valve
7. Nitrogen tank. For air thight test & nitrogen blow durin brazing.
8. Vacuum cylinder
9. Mainfold gauge
10. Outdoor unit



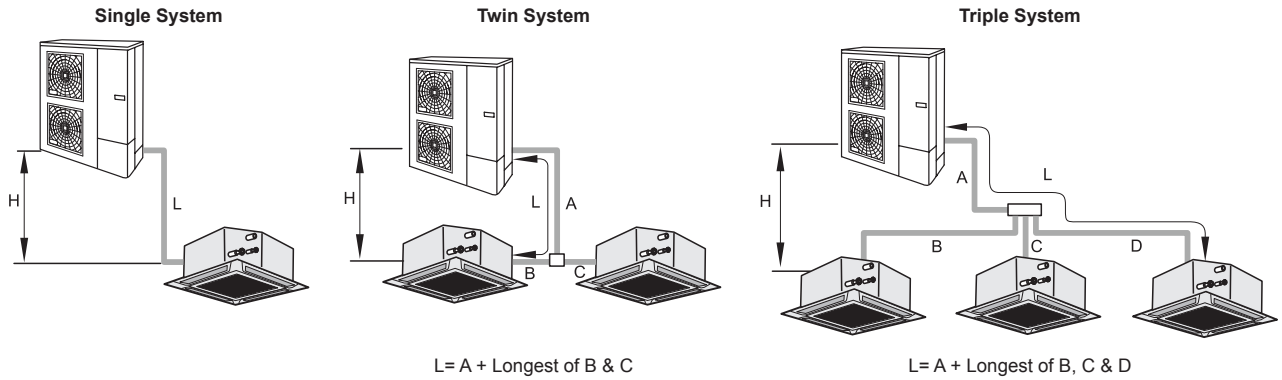
2.3.2. Refrigerant piping length

The refrigerant piping between the indoor unit and the outdoor unit should be designed using the following table.

- **Piping length specification:**

Unit	Maximum piping length between Outdoor and each indoor unit (L) Actual/Equivalent	Maximum Height difference. Outdoor unit is higher than indoor unit/ Indoor unit is higher than Outdoor unit (H)
3HVRNME	50/70	30/20
4H(V)RNME	70/90	
5H(V)RNME	75/95	
6H(V)RNME		

The possible combination between Outdoor Unit and Indoor Unit are the following:



	NOTE

- *L&H are the length & height indicated in the above chart.*
- *For twin, the length is the distance between the outdoor unit and the farthest indoor unit.*
- *Piping length after branch pipe (B,C & D):*
  - *1.After branch pipe B,C & D, the pipe length should be shorter than 10 m.*
  - *2. All branch pipe, B, C & D (it depend of case), should be balanced.*

Twin	B & C difference	≤ 8m
Triple	B,C & D difference	≤ 6m

2.3.3. Refrigerant piping selection

Select the piping connection sizes according to the following procedures:

- Between outdoor unit and branch pipe:
- Select the same pipe connection size as the pipe size of the outdoor unit
- Between branch pipe and indoor unit:
- Select the same pipe connection size as the pipe size of the indoor unit

☛ Piping connection size of outdoor unit, indoor unit & distributor.

Outdoor Unit	Pipe Size		Branch Pipe	
	Gas Pipe (A)	Liquid Pipe (A)	Twin	Triple
3.0 HP	15.88 (5/8)	9.53 (3/8)	TE-03N	-
4.0 HP	15.88 (5/8)	9.53 (3/8)	TE-04N	-
5.0 HP	15.88 (5/8)	9.53 (3/8)	TE-56N	-
6.0 HP	15.88 (5/8)	9.53 (3/8)	TE-56N	TRE-06N

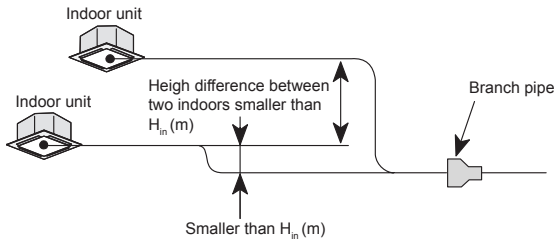
Indoor Unit	Gas piping Size (B,C or D)	Liquid piping Size (B,C or D)
1.5~2.0 HP	∅12.70 (1/2)	∅6.35 (1/4)
2.5~6.0 HP	∅15.88 (5/8)	∅9.53 (3/8)

2.3.4. Twin and triple system installation

- **Height difference between indoor units and distributor**

  Install all indoor units at the same height. When the height difference between the indoor units due to building construction is necessary, this should be less than H_{in} (m). Install the branch pipe at the same height of indoor units or lower, but never higher.

Sample: twin system

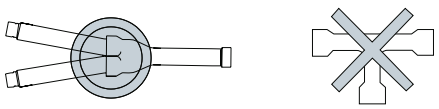


Maximum Height difference between Indoor units	H_{in}
H(V)RNME	3.0

- **Installing distributor**

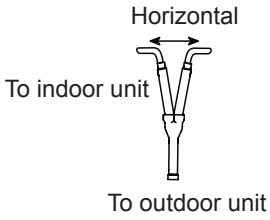
1. Install the Distributor supplied by HITACHI on request. A tee can not be installed instead of a branch pipe.

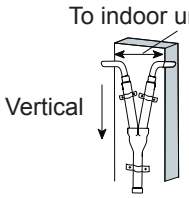
   Sample: twin system



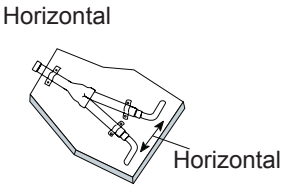
2. Installing the Distributor. Fix the branch pipe horizontally to the pillar, wall or ceiling. Piping must not be fixed rigidly to the wall as thermal expansion and contraction can cause pipe fracture.

   Sample: twin system





Fix the branch pipe to the surface of pillar or wall



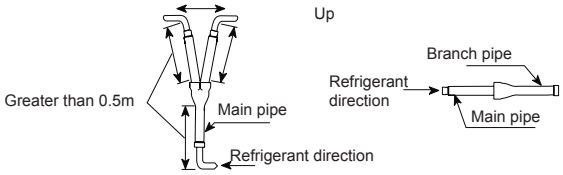
Fixing the branch pipe to ceiling or beam

	NOTE
-	*Fix the piping from outside of insulation or inserting absorber between the pipe and a fixing metal.*

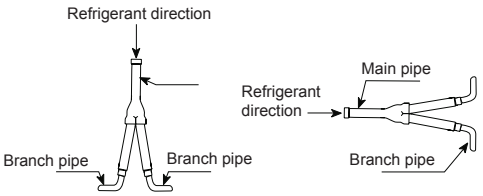
2

3. Correct position of twin distributor

This is the correct position of twin branch pipe:



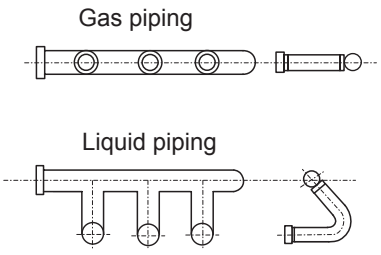
This is wrong position.



4. Correct position of triple branch pipe.

Install the header horizontally

Sample: Triple Branch pipe



2.3.5. Drain discharging boss

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

Model	Applicable Model
DBS-26	H(V)RNM(E)

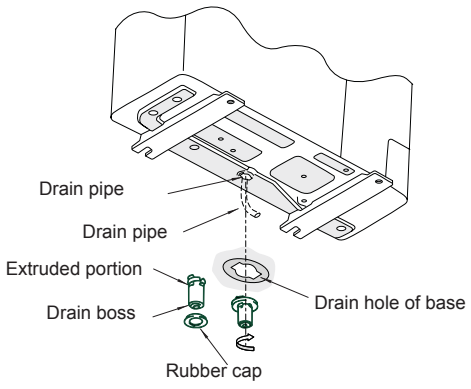
- **Connection procedure**

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. The outer diameter section of the drain boss is 32 mm.
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 may not be sufficient to collect drain water. If collecting a big amount of drain water should be neccessary, provide a drain-pan bigger than the unit base supplied one, and install it under the unit with drainage.*

Bottom base view

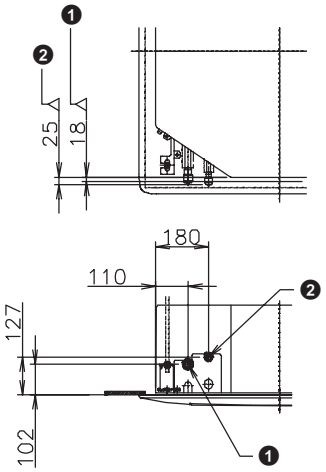


2.4. INDOOR UNITS AND COMPLEMENTARY SYSTEMS

2.4.1. RCI-(1.5~6.0)FSN2E

- **Refrigerant piping**

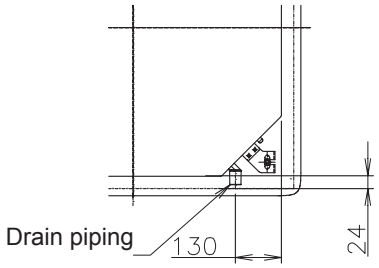
  The correct position of the refrigerant piping connection is shown below. The piping connection must be accessible from all directions (top, left or right).



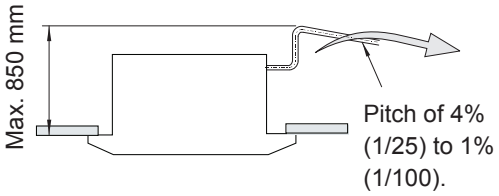
Units	❶ Gas Piping mm (in)	❷ Liquid Piping mm (in)
RCI-1.0~1.5	Ø12.70 (1/2)	Ø6.35 (1/4)
RCI-2.0	Ø15.88 (5/8)	
RCI-2.5~6.0		Ø9.53 (3/8)

- **Drain piping**

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

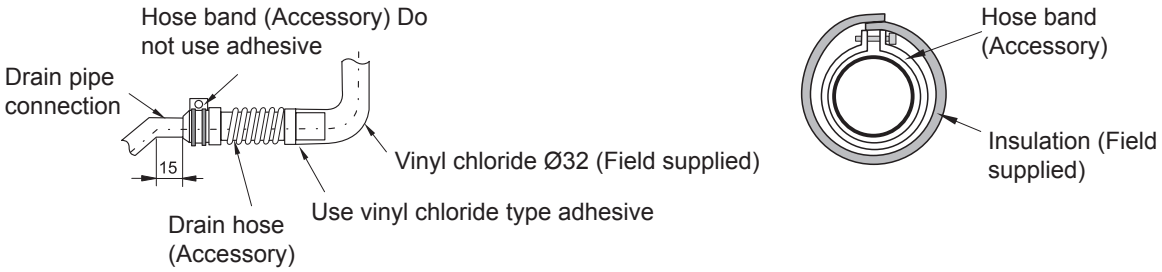


- Prepare a polyvinyl chloride (PVC) pipe with a 32 mm outer diameter.
- Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a down-slope pitch of 4% (1/25) to 1% (1/100).



	CAUTION
- *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.*	

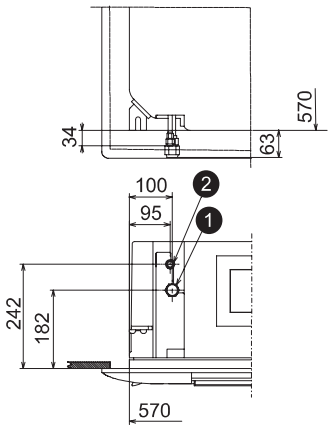
Insulate the drain pipe after connecting the drain hose. Do not use adhesive between the drain piping connection and the drain hose.



2.4.2. RCIM-(1.5-2.0)FSN2

- **Refrigerant piping**

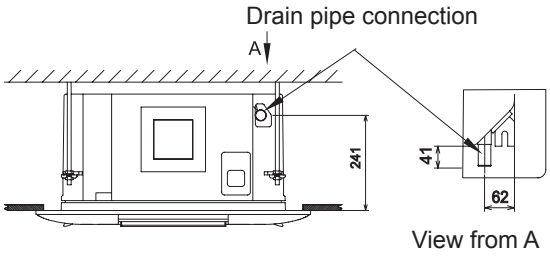
  The correct position of the refrigerant piping connection is shown below. The piping connection must be accessible from all directions (top, left or right).



Units	❶ Gas Piping mm (in)	❷ Liquid Piping mm (in)
RCIM-1.0~1.5	Ø12.80 (1/2)	Ø6.35 (1/4)
RCIM-2.0	Ø15.88 (5/8)	

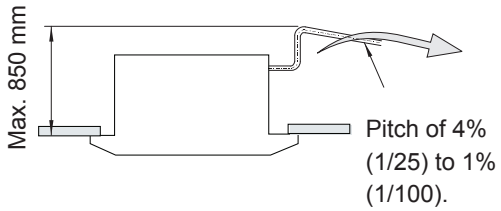
- **Drain piping**

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



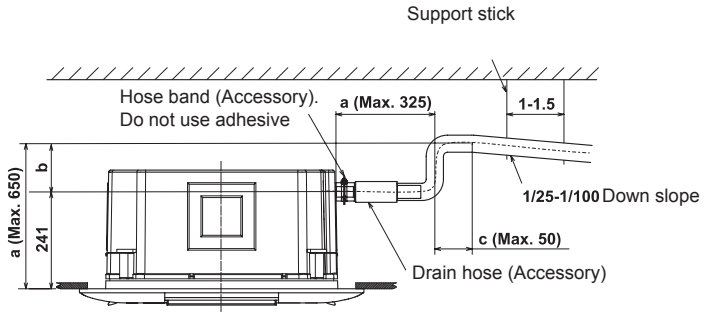
Prepare a polyvinyl chloride (PVC) pipe with a 32 mm outer diameter.

Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a down-slope pitch of 4% (1/25) to 1% (1/100).

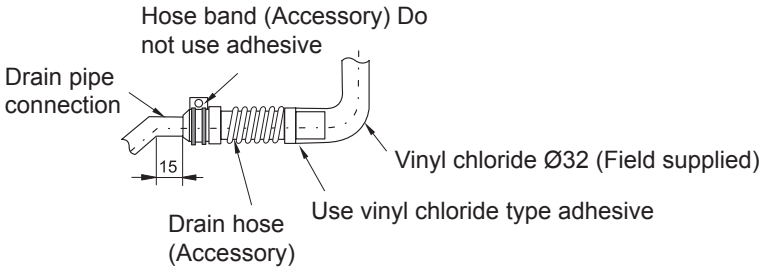


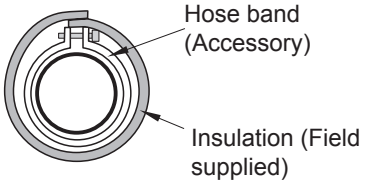
	CAUTION
- *Do not apply excessive force to the drain piping connection. It could cause a damage.* - *Do not use a bent or twisted drain hose. It will cause water leakage.*	

Consider the following dimensions: a + b + c ≤ 780mm



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

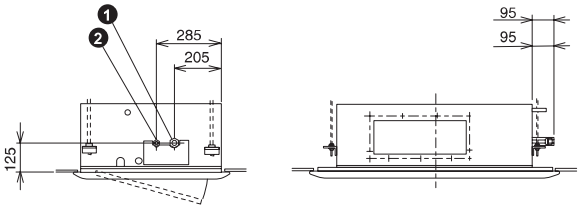




2.4.3. RCD-(1.5~5.0)FSN2

- **Refrigerant piping**

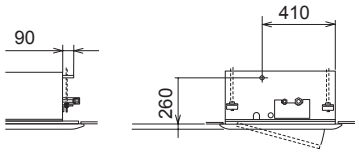
The correct position of the refrigerant piping connection is shown below. The piping connection must be accessible from all directions (top, left or right).



Units	❶ Gas Piping mm (in)	❷ Liquid Piping mm (in)
RCD-1.0~1.5	Ø12.70 (1/2)	Ø6.35 (1/4)
RCD-2.0	Ø15.88 (5/8)	
RCD-2.5~5.0		Ø9.53 (3/8)

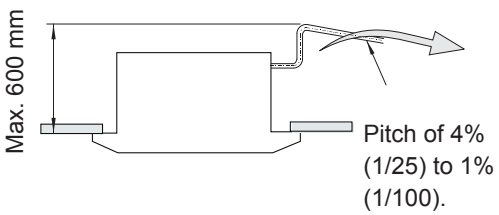
- **Drain piping**

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



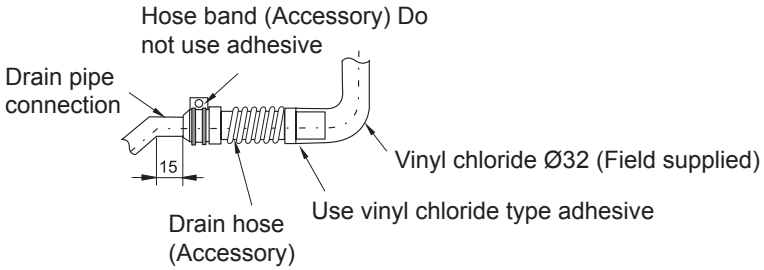
Prepare a polyvinyl chloride (PVC) pipe with a 32 mm outer diameter .

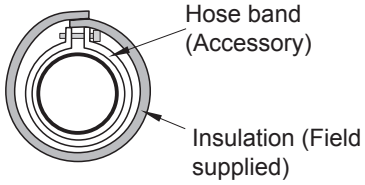
Fasten the pipe to the drain hose with an adhesive and with the factory-supplied clamp. The drain piping must be installed with a down-slope pitch of 4% (1/25) to 1% (1/100).



	CAUTION
	- *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.



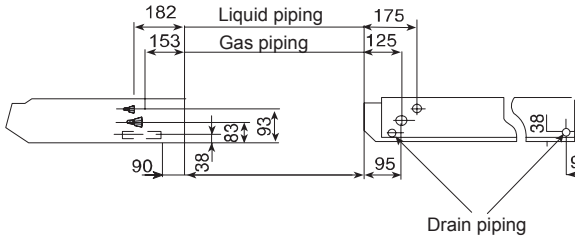


2.4.4. RPC-(2.0~6.0)FSN2E

- **Refrigerant piping**

☛ Piping position

The refrigerant piping can be connected to one of two directions of the indoor unit: upper or rear side, when facing the unit.
- The correct position of the refrigerant piping connection is shown below.
- Each direction has a knockout hole prepared as shown in the piping work sub-chapter.
- Punch the knockout hole for the required direction.



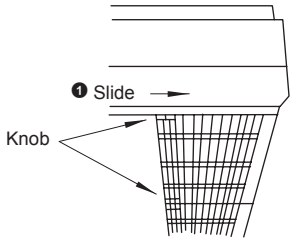
☛ Piping size

Units	Gas Piping mm (in)	Liquid Piping mm (in)
RPC-2.0	Ø15.88 (5/8)	Ø6.35 (1/4)
RCD-2.5~6.0		Ø9.53 (3/8)

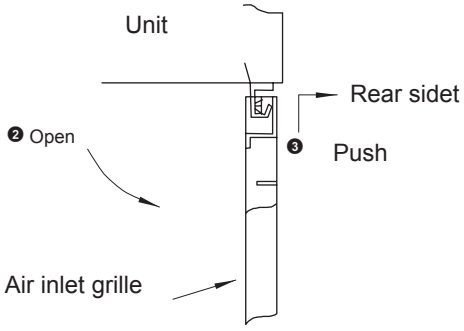
☛ Piping installation work

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

1. Slide the grill knobs to the rear side.



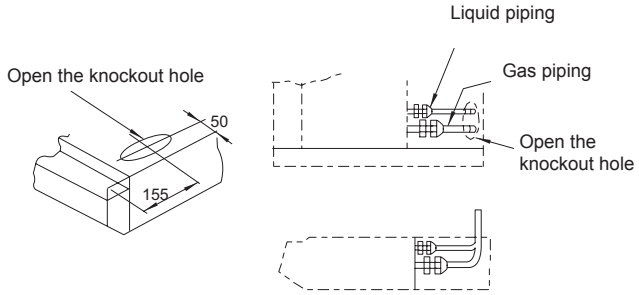
2. Open the air inlet grill. Push and slide the air inlet grill to the rear side.



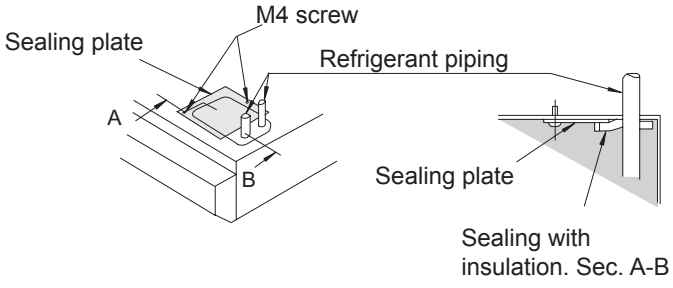
After having selected the piping direction, proceed to punch the selected knockout hole, install the pipes through it and seal the piping with the factory supplied insulation as indicated below:

☛ Upper side connection

1. Knockout hole

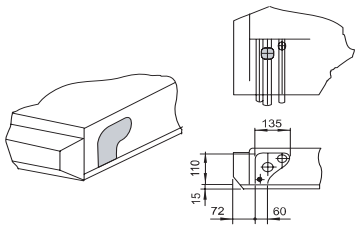


2. Seal piping



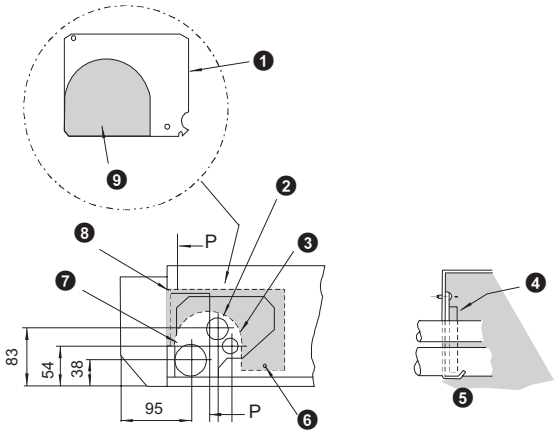
☛ Rear side connection

1. Knockout hole



2. Seal piping

1. Factory-supplied sealing plate (0.8x118x142 mm)
2. Refrigerant gas piping
3. Refrigerant liquid piping
4. Seal with insulation
5. Sec. P.P.
6. M4 screw
7. Sealing plate
8. M4 screw
9. Knockout

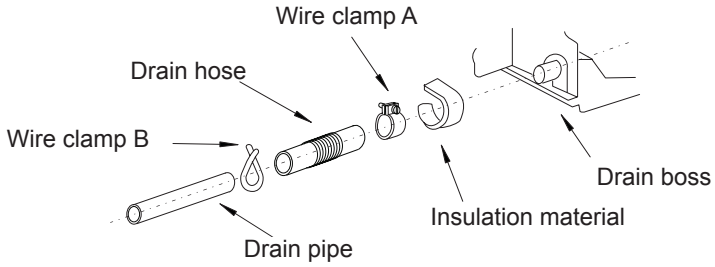


• **Drain piping**

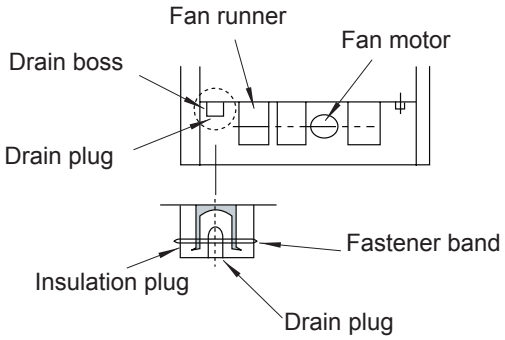
	NOTE
-	*The standard direction of the drain pipe connection is to the right, looking at the unit from the discharge grilles side. However, the pipe connection can be performed from the left side if required due to possible building elements existing in its surrounding.*

☛ Right side connection

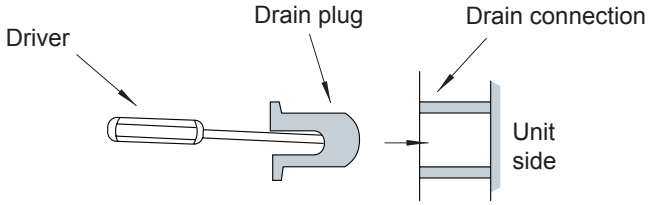
1. Insert the drain hose into the wire clamp A.
2. Push the drain hose onto the drain boss until the hose reaches the end of the drain pan.
3. Tighten the screw for the wire clamp in order to hold the hose around the drain connection without any leakage of drain water as shown below.
4. Insulate the drain hose around the wire clamp inorder to prevent any condensation from forming as shown below
5. Introduce the drain pipe into the drain hose and secure it with the wire clamp B.



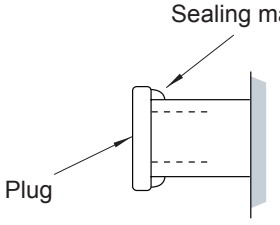
☛ Left side connection



1. Remove the drain plug of the drain hose on the left side as the following procedure explains.
2. Cut the fastener.
3. Remove the insulation material.
4. Remove the drain plug and insert the hose into the wire clamp.
5. Insert the drain plug into the drain boss on the right side by using a screwdriver as shown below.



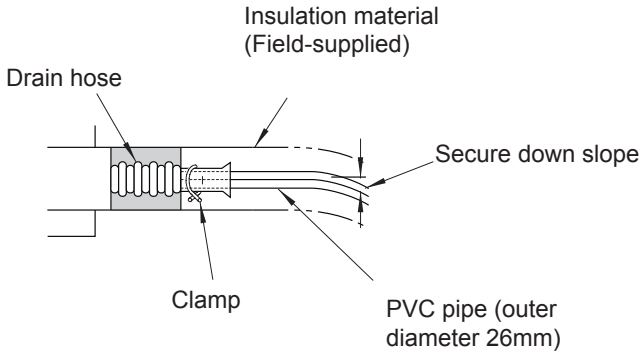
6. After inserting the drain plug into the drain hose located on the right side, seal the jointed part by using a waterproof chloride-type sealing material and secure the jointed part with a fastener.



7. Wrap the insulation material around the drain connection.
8. 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.

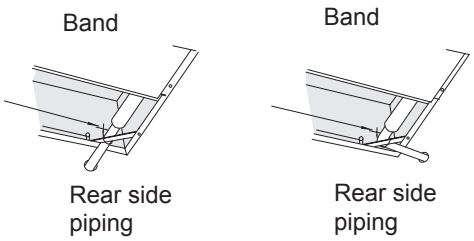
☛ Drain piping connection

- Prepare a PVC pipe with an outer diameter of 26 mm.
- Pay attention to the position of the drain pipe. Keep a down-slope pitch of 4% (1/25) to 1% (1/100). Do not create an up-slope for the drain piping in order to prevent condensate water to settle and getting out.
- 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.



⚠	***CAUTION***
	- 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.
- When installing the drain pipe, do not tie it together with the refrigerant pipe.Tie the drain pipe alone as shown in the cases in the picture below.



- After completing the installation of the drain pipe, pour water into the drain pan in order to secure that the water flows easily as explained in the section General notes.

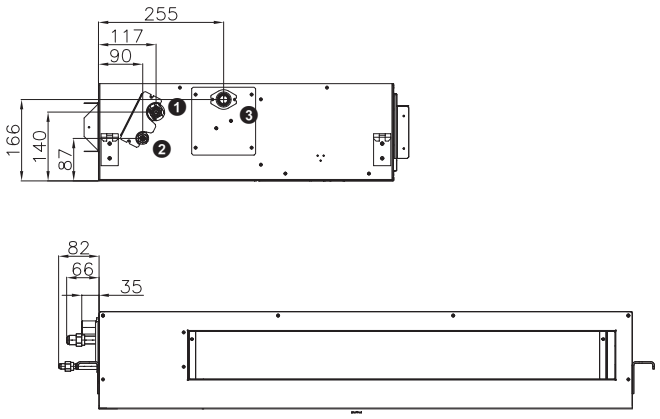
2.4.5. RPI(M)-(1.5~6.0)FSN2E / RPI-(8.0~10.0)FSNE

☛ RPI 1.5

Piping position

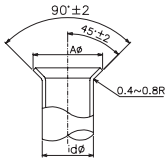
The correct position of the refrigerant piping connection is shown below.

❶ Gas piping
❷ Liquid piping
❸ Drain pipe



Model RPI	0.8~1.5
Gas piping	Ø12.7 (1/2")
Liquid piping	Ø6.35 (1/4")

- **Flare pipe dimensions**

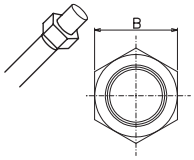


Nominal diameters	Outer diameters	A +0/-0.4 mm
1/4	6.35	9.1
3/8	9.53	13.2
1/2	12.70	16.6
5/8	15.88	19.7

- **Thickness of coper pipes**

Nominal diameters	Outer diameters	Thickness (mm)
1/4	6.35	0.80
3/8	9.53	0.80
1/2	12.70	0.80
5/8	15.88	1.00

- **Flare nut dimensions**



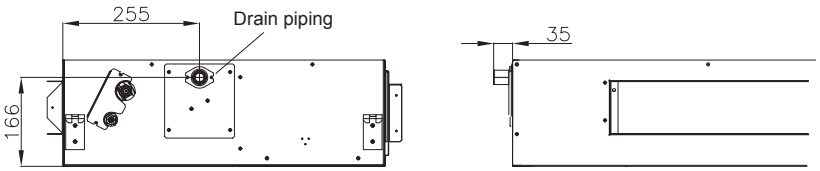
Nominal diameters	Outer diameters	B (mm)
1/4	6.35	17
3/8	9.53	22
1/2	12.70	26
5/8	15.88	29

- **Piping installation work**

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

- **Drain piping**

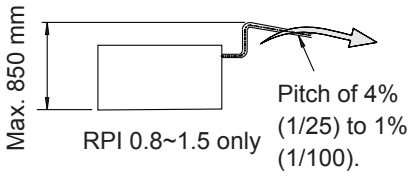
The correct position of the drain piping connection is shown below.



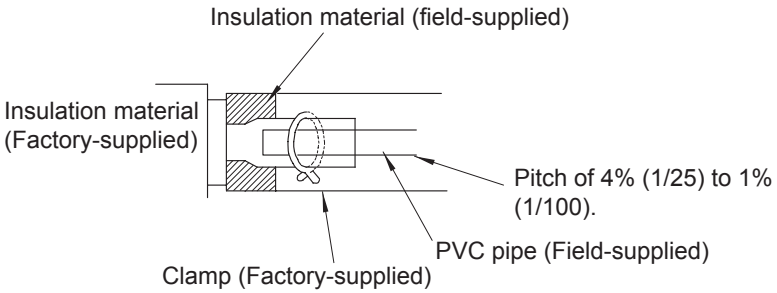
To guarantee free access to both the electrical box and the drain pipe, please refer to RPI 2.0~6.0.

☛ Piping connection

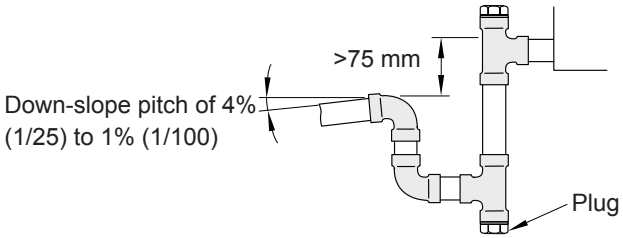
- Prepare a PVC pipe with an outer diameter of 32 mm (RPI-0.8~6.0) or 25 mm (RPI 8/10).
- Fasten the drain pipe to the drain hose with an adhesive and with the factory-supplied clamp (for RPI 8/10 only).
- Pay attention to the position of the drain pipe. Keep a down-slope pitch of 4% (1/25) to 1% (1/100). Do not create an up-slope for the drain piping in order to prevent condensate water to settle and getting out.



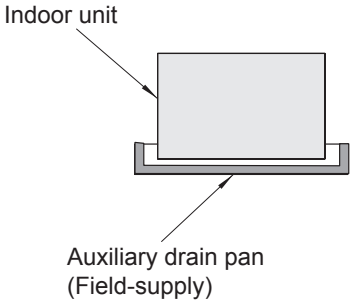
- Insulate the drain pipe after connecting the drain hose (RPI-2.0~6.0 only).



- Connect a siphon to the drain pipe, assuring a down-slope pitch of 4% (1/25) to 1% (1/100), as shown in the next figure (for RPI 8/10).



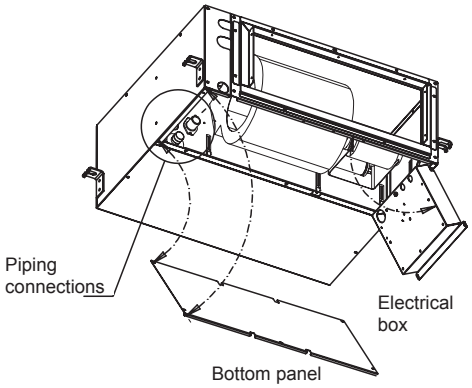
	NOTE
- *When the relative humidity of the inlet or the ambient air exceeds 80%, place an auxiliary drain pan, which is field-supplied, beneath the indoor unit, as shown below.*	



☛ RPIM 1.5

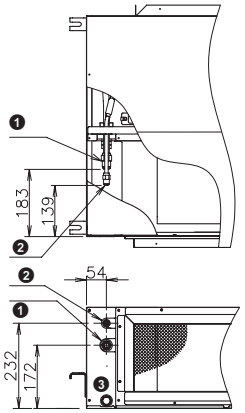
Piping position

Access to the refrigerant piping connection by removing the fan cover from the unit. The piping connections are inside the machine.



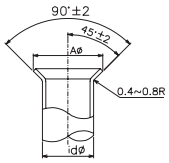
The correct position of the refrigerant piping connection is shown below.

❶ Gas piping
❷ Liquid piping
❸ Drain pipe



Model RPI	0.8~1.5
Gas piping	Ø12.7 (1/2")
Liquid piping	Ø6.35 (1/4")

- **Flare pipe dimensions**

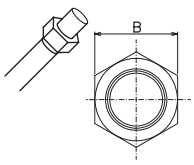


Nominal diameters	Outer diameters	A +0/-0.4 mm
1/4	6.35	9.1
3/8	9.53	13.2
1/2	12.70	16.6
5/8	15.88	19.7

- **Thickness of coper pipes**

Nominal diameters	Outer diameters	Thickness (mm)
1/4	6.35	0.80
3/8	9.53	0.80
1/2	12.70	0.80
5/8	15.88	1.00

- **Flare nut dimensions**



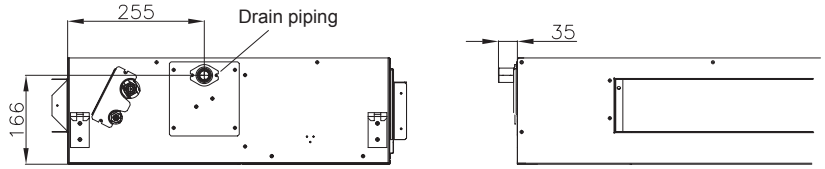
Nominal diameters	Outer diameters	B (mm)
1/4	6.35	17
3/8	9.53	22
1/2	12.70	26
5/8	15.88	29

- **Piping installation work**

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

- **Drain piping**

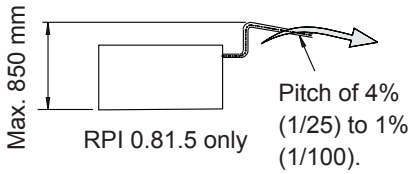
The correct position of the drain piping connection is shown below.



To guarantee free access to both the electrical box and the drain pipe, please refer to RPI 2.0~6.0.

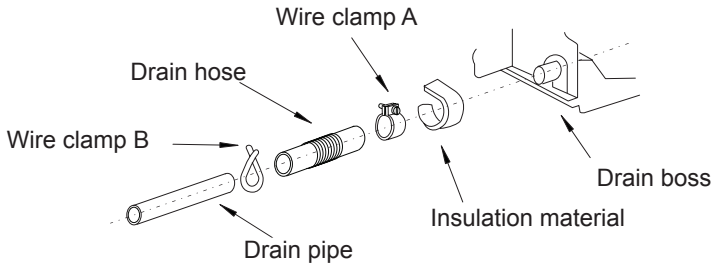
☛ Piping connection

- Prepare a PVC pipe with an outer diameter of 32 mm (RPI-0.8~6.0) or 25 mm (RPI 8/10).
- Fasten the drain pipe to the drain hose with an adhesive and with the factory-supplied clamp (for RPI 8/10 only).
- Pay attention to the position of the drain pipe. Keep a down-slope pitch of 4% (1/25) to 1% (1/100). Do not create an up-slope for the drain piping in order to prevent condensate water to settle and getting out.

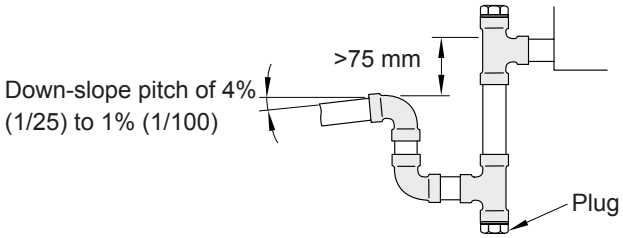


To install the drain pipe follow these steps:

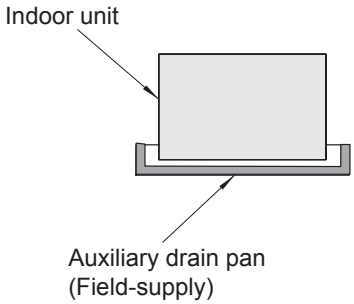
1. Insert the drain hose into the wire clamp A.
2. Push the drain hose onto the drain boss until the hose reaches the end of the drain pan.
3. Tighten the screw for the wire clamp in order to hold the hose around the drain connection without any leakage of drain water as shown below.
4. Insulate the drain hose around the wire clamp inorder to prevent any condensation from forming as shown below
5. Introduce the drain pipe into the drain hose and secure it with the wire clamp B.



- Connect a siphon to the drain pipe, assuring a down-slope pitch of 4% (1/25) to 1% (1/100), as shown in the next figure.



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.*



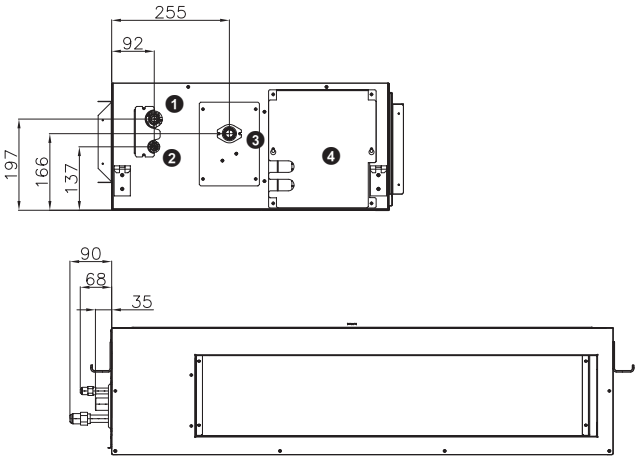
- **Refrigerant piping**

☛ RPI 2.0~6.0

Piping position

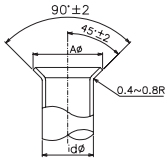
The correct position of the refrigerant piping connection is shown below.

❶ Gas piping
❷ Liquid piping
❸ Drain pipe
❹ Electrical box



Model RPI	2.0	2.5-3.0	4.0~6.0
Gas piping	Ø15.88 (5/8")	Ø15.88 (5/8")	Ø15.88 (5/8")
Liquid piping	Ø6.35 (1/4")	Ø9.53 (3/8")	Ø9.53 (3/8")

- **Flare pipe dimensions**

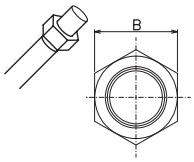


Nominal diameters	Outer diameters	A +0/-0.4 mm
1/4	6.35	9.1
3/8	9.53	13.2
1/2	12.70	16.6
5/8	15.88	19.7

- **Thickness of coper pipes**

Nominal diameters	Outer diameters	Thickness (mm)
1/4	6.35	0.80
3/8	9.53	0.80
1/2	12.70	0.80
5/8	15.88	1.00

- **Flare nut dimensions**



Nominal diameters	Outer diameters	B (mm)
1/4	6.35	17
3/8	9.53	22
1/2	12.70	26
5/8	15.88	29

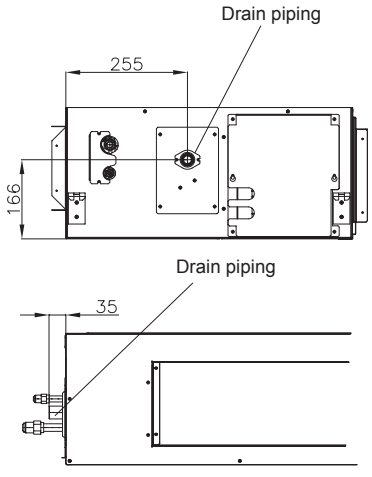
- **Piping installation work**

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

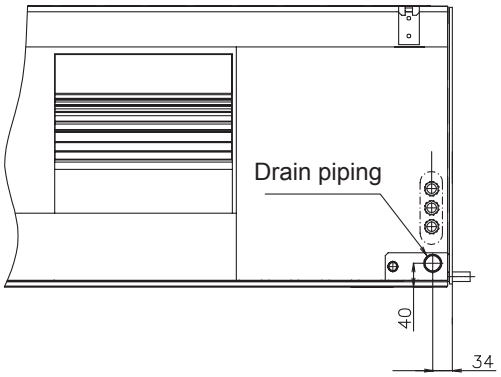
- **Drain piping**

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

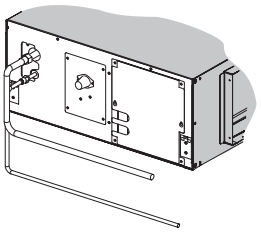
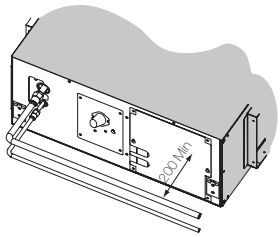
RPI-2.0~6.0



For RPI-8~10

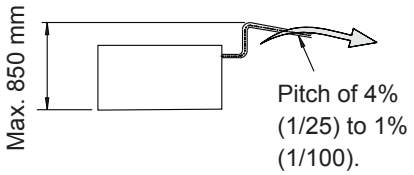


Keep the electrical box and the drain pipe access free of piping. To guarantee free access to both the electrical box and the drain pipe, there are the following possibilities:

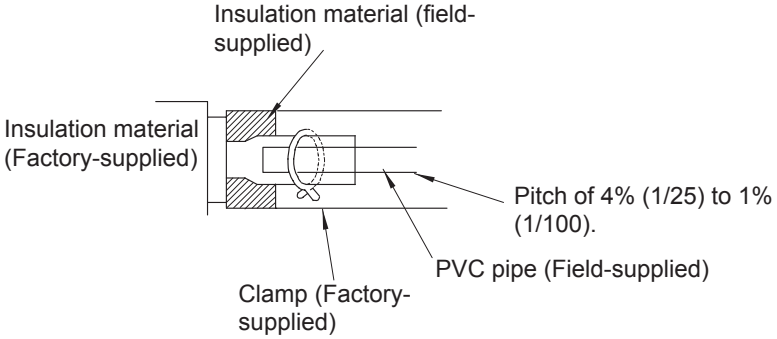
Option 1	Option 2
	

☛ Piping connection

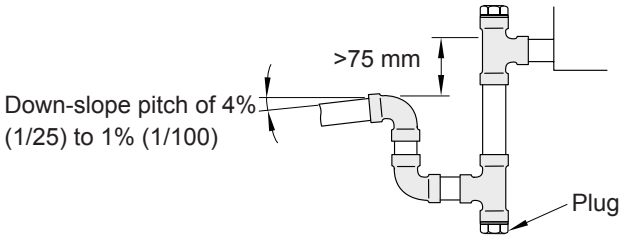
- Prepare a PVC pipe with an outer diameter of 32 mm (RPI-0.8~6.0) or 25 mm (RPI 8/10).
- Fasten the drain pipe to the drain hose with an adhesive and with the factory-supplied clamp (for RPI 8/10 only).
- Pay attention to the position of the drain pipe. Keep a down-slope pitch of 4% (1/25) to 1% (1/100). Do not create an up-slope for the drain piping in order to prevent condensate water to settle and getting out.



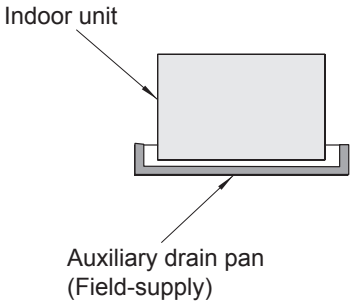
- Insulate the drain pipe after connecting the drain hose (RPI-2.0~6.0 only).



- Connect a siphon to the drain pipe, assuring a down-slope pitch of 4% (1/25) to 1% (1/100), 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.*

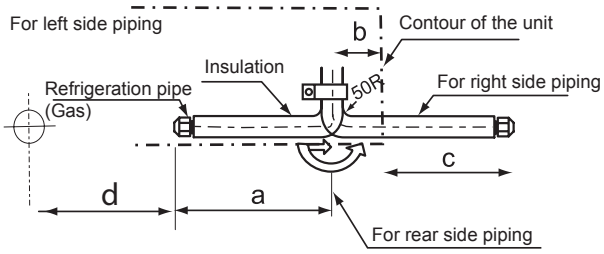


2.4.6. RPK-(1.5~4.0)FSN2M

- **Piping Position**

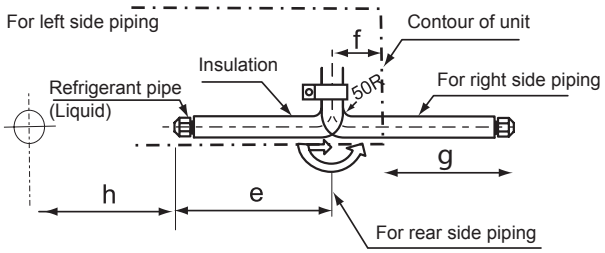
☛ Gas piping connection

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



Model RPK	HP	a (mm)	b (mm)
Diameter Gas Pipe	1.0-1.5	410	108
	2.0	440	150
	2.5~4.0	654	141
	HP	**c (mm)**	**d (mm)**
	1.0-1.5	302	195
	2.0	290	240
	2.5~4.0	513	297

☛ Liquid Piping Position

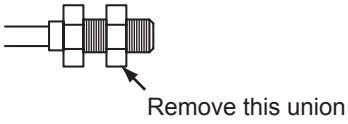


Model RPK	HP	e (mm)	f (mm)
Diameter liquid pipe	1.0-1.5	480	108
	2.0	470	150
	2.5~4.0	572	141
	HP	**g (mm)**	**h (mm)**
	1.0-1.5	372	125
	2.0	320	210
	2.5~4.0	431	379

2

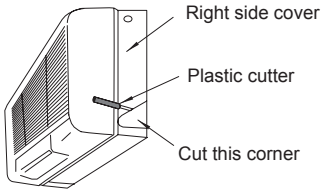
☛ Only for RPK-2.0 HP

In the case that gas piping diameter is Ø 12.7, remove the union attached to the union.

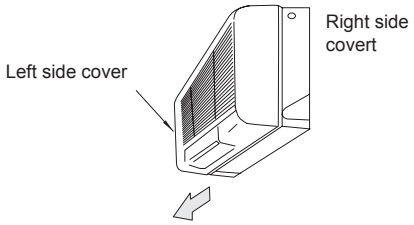


- **Right, Left and Rear Side Position**

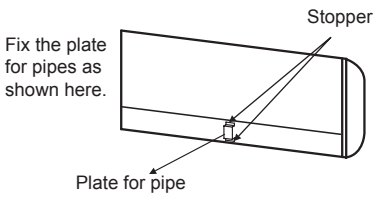
1. Right Side Piping
   Cut the corner using a plastic cutter as shown below and remove sharp edges completely.



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



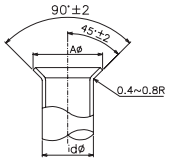
3. Rear Side Piping
   In case of left side piping, draing piping shall be changed also from left side.



☛ Size of piping connection

Model RPK	1.0-1.5	2.0	2.5~4.0
Gas piping	12.7	15.88	15.88
Liquid piping	6.35	6.35	9.53

- **Flare pipe dimensions**

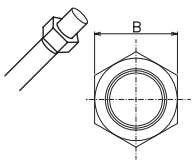


Nominal diameters	Outer diameters	A +0/-0.4 mm
1/4	6.35	9.1
3/8	9.53	13.2
1/2	12.70	16.6
5/8	15.88	19.7

- **Thickness of coper pipes**

Nominal diameters	Outer diameters	Thickness (mm)
1/4	6.35	0.80
3/8	9.53	0.80
1/2	12.70	0.80
5/8	15.88	1.00

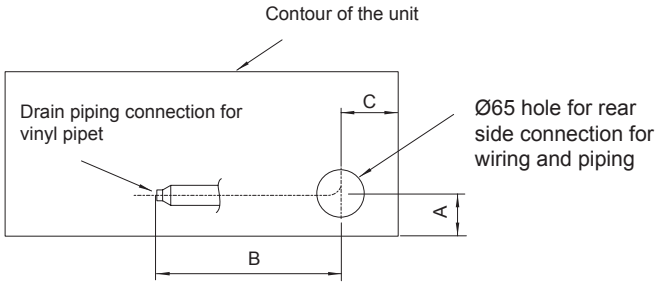
- **Flare nut dimensions**



Nominal diameters	Outer diameters	B (mm)
1/4	6.35	17
3/8	9.53	22
1/2	12.70	26
5/8	15.88	29

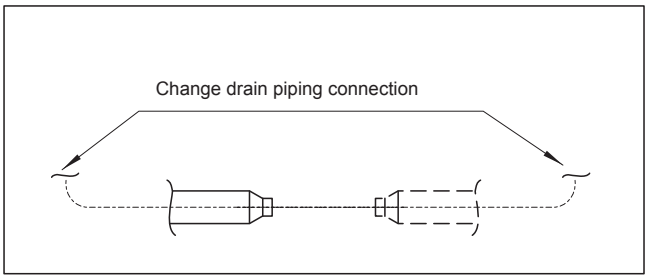
- **Drain pipe connection**

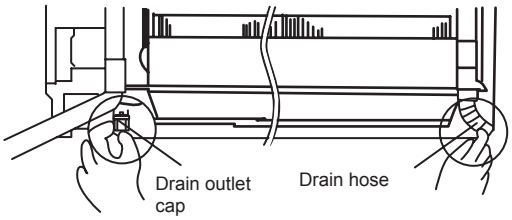
1. The standard direction of drain piping connection is from the right side, as viewed from the discharge grilles. However, it can be performed from the left side or rear side.



HP	A	B	C
1.0-1.5	45	560	115
2.0	45	560	150
2.5~4.0	45	560	150

2. When the left side drain piping connection is performed, remove the cap of left side drain pipe, and then attach this cap to the drain pipe located on the right side, in order to change drain piping connection from right side to left side.

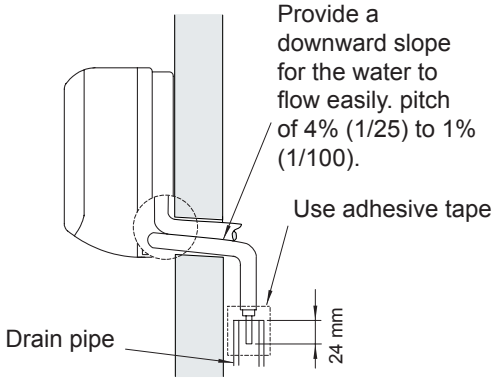






3. Provide a vinyl chloride tube with a 26mm outer diameter

4. Connect a drain piping according to figure.



	NOTE
	- *Do not create an upward slope from the unit.* - *Use vinyl chloride type adhesive for connecting the drain pipe.*

5. After inserting the drain pipe into the drain hose completely, fasten the drain pipe to the drain hose with the factory-supplied clamp.

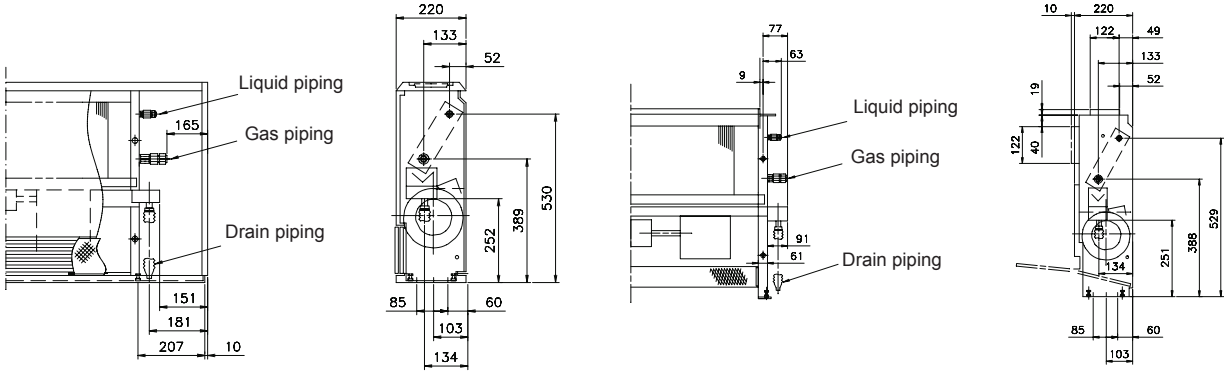
6. Pour water onto the drain pan and check to ensure that water flows easily.

2.4.7. RPF(I)-(1.5~2.5)FSN2E

- **Refrigerant piping**

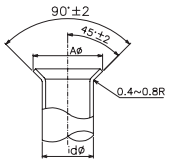
Piping position

The correct position of the refrigerant piping connection is shown below.



Model RPF(I)	1.0-1.5	2.0	2.5
Gas Piping	Ø 12.70 (5/8)	Ø 15.88 (5/8)	Ø 15.88 (5/8)
Liquid piping	Ø 6.35 (1/4)	Ø 6.35 (1/4)	Ø9.53 (3/8)
Drain piping	Ø 18.5 O.D.	Ø 18.5 O.D.	Ø 18.5 O.D.
			Units in mm (pulg.)

- **Flare pipe dimensions**

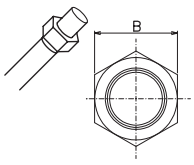


Nominal diameters	Outer diameters	A +0/-0.4 mm
1/4	6.35	9.1
3/8	9.53	13.2
1/2	12.70	16.6
5/8	15.88	19.7

- **Thickness of coper pipes**

Nominal diameters	Outer diameters	Thickness (mm)
1/4	6.35	0.80
3/8	9.53	0.80
1/2	12.70	0.80
5/8	15.88	1.00

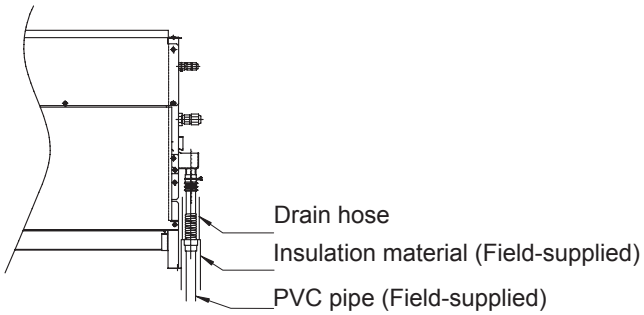
- **Flare nut dimensions**



Nominal diameters	Outer diameters	B (mm)
1/4	6.35	17
3/8	9.53	22
1/2	12.70	26
5/8	15.88	29

- **Drain piping**

  - The correct position of the drain piping connection is shown below.
  - 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 in the figure below.



3. ELECTRICAL WIRING

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

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3.1. GENERAL CHECK

	DANGER

- *Before installing the electrical wiring or before performing a periodical check, turn OFF the main switch to the indoor unit and the outdoor unit. For safety reasons, be sure that the indoor fan and the outdoor fan have stopped.*
- *Prevent the wires from touching the refrigerant pipes, the plate or cutting edges and the electrical components inside the unit, to prevent them getting damaged. In worst cases, a fire may occur.*
- *Tightly secure the wires with the cord clamp inside the indoor unit.*

	NOTE

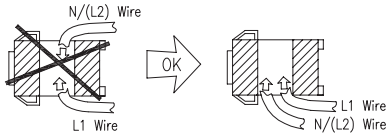
- *In case of performing a test run operation take especially care because some security features are disabled: the units will operate during 2 hours without Thermo-OFF, and the 3-minute guard for compressor protection will not be effective during the test.*
- *Fix rubber bushes with an adhesive on the panel when the conduit pipes to the outdoor unit are not used.*
- *In forced stopped compressor mode, the compressor operation is OFF.*

3.2. ELECTRICAL WIRING FOR THE OUTDOOR UNIT

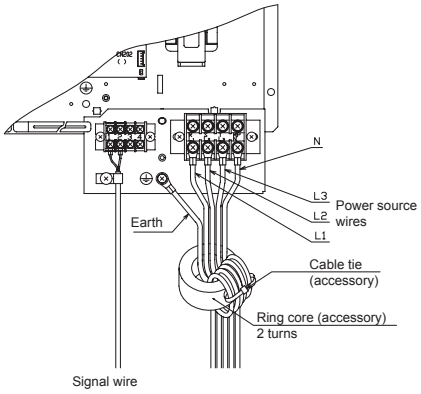
3.2.1. Electrical wiring connection for the outdoor unit

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

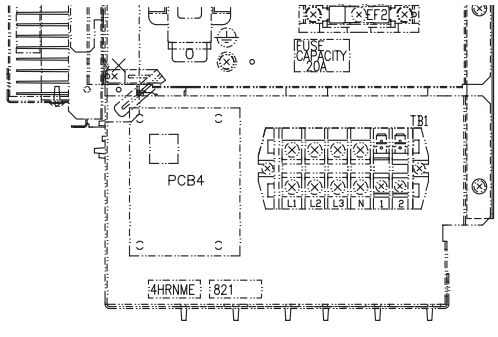
1. Insert the power source cables L1, L2, L3 and N (for 400V/50Hz) or L1 and N (for 230v/50Hz) and the ground cable into the ring core, coiling them with two turns and fix the cables using the cable tie (accessory). As shown in next figure, do not insert the cables from different sides into the ring core.



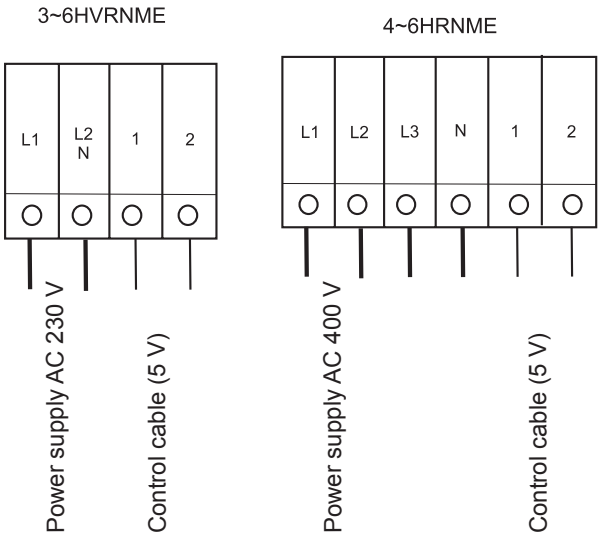
2. Connect the three-phase power supply source wires L1, L2, L3 and N (for 400V\50Hz) to the terminal board. Connect the ground wire to the plate in the electrical box.



Model RAS-(8~12)HRNM



Model RAS-(4~6)HRNME

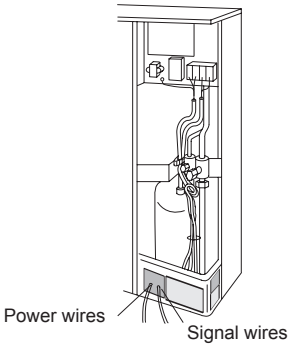


Wiring	System	[Connection (Connection of Terminals)]
Power Supply	DC inverter	[O.U.-O.U.(L1-L1, L2-L2, L3-L3, N-N)]
		[I.U.-I.U.(L1-L1, N-N)]
Operating	DC inverter	[O.U.-I.U., I.U.-I.U.(1-1, 2-2)]
Remote Control	DC inverter	[I.U.-I.U.(A-A, B-B)]

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

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 will not be able to remove the fixing screw.

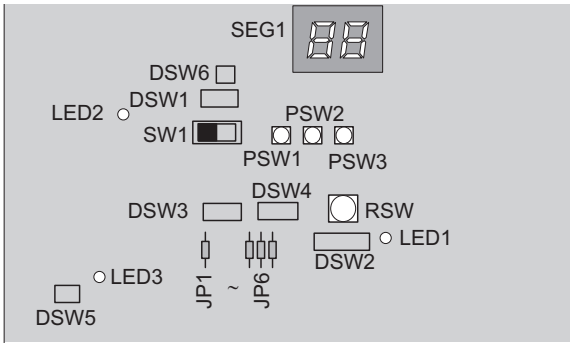


3.2.2. Setting the DIP switches for the outdoor unit

- **Quantity and position of DIP switches**

  The PCB1 (see the electrical wiring diagram - plane a) 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 (DSW) at the PCB1:



	NOTE
	- *The mark "■" indicates the position of dips switches.* - *No mark "■" indicates pin position is not affecting.* - *The figures show the settings before shipment or after selection.*

	WARNING
	- *Before setting dips switches, first turn the power source off and then set the position of the dips switches. In case of setting the switches without turning the power source off, the contents of the setting are invalid.*

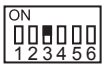
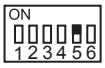
- **DSW1: Test Run**

Function	Setting position
Setting before shipment	
Test run for cooling	
Test Run for heating	
Forced stop of compressor (1) - *The compressor is OFF during this operation.*	

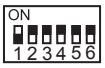
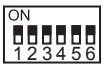
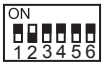
	CAUTION
	- *The cancellation of the outdoor hot start control configuration could damage the compressor if it is usually used. In that case the unit warranty will be void.*

	NOTE
	- *It is possible to select the cancellation of the outdoor hot start control by pushing both PSW1 & PSW3 simultaneously during 3 seconds.* - *This operation is reset once the compressor is in Thermo-ON mode.* - *During the test run operation the units will operate continuously during 2 hours without Thermo-OFF and the 3-minute guard for compressor protection will be effective.*

- **DSW2: Piping length/selection function**

Function		Setting position
Setting before shipment		
Piping length	5 m < Lt	
	Lt > 30 m	
	5 m < Lt < 30 m	
Cancellation of outdoor hot start control. (Not recommended, only available for special testing cases)		
Cancellation of outdoor air temperature control.		
Optional function selection setting (set by PSW)		
External input/output selection signals (set by PSW)		

- **DSW3: Capacity setting**

Unit	Setting position	Unit	Setting position	Unit	Setting position
RAS-8HRNM		RAS-3HVRNME		RAS-4HRNME	
RAS-10HRNM		RAS-4HVRNME		RAS-5HRNME	
RAS-12HRNM		RAS-5HVRNME		RAS-6HRNME	
		RAS-6HVRNME			

- **DSW4 / RSW1: Refrigerant cycle setting**

In case of using an H-Link II net it is required to set the refrigerant cycle number.

	Setting position (DSW4)		Setting position (RSW1)
Setting for tens (second digit)		Setting for units (first digit)	
Example for 16		and	

Rotary switches' positions (RSW1) are set by inserting a screw driver into the groove.

- **DSW5: Transmission setting of end terminal resistance**

  - Before shipment, No. 1 pin of DSW5 is set at ON.
  - In case of having 2 or more outdoor units connected to the same H-link, set for the second unit the pin number 1 of DSW5 at OFF.
  - If only one outdoor unit is used, no setting is required.

Function	Setting position
Setting before shipment	
Cancellation	

- **DSW6: Power source setting / individual operation**

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

- **DSW1 (PCB2): Cancellation of electrical current detection. Only for RAS-8~12 HRNM**

Function	Setting position
Setting before shipment	
Cancellation of electrical current detection	

- **Jumper lead setting (JP1~6)**

  Setting before shipment:

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

0 = Open; 1 = Short circuit

The function selection using the jumper lead setting is shown in the table below.

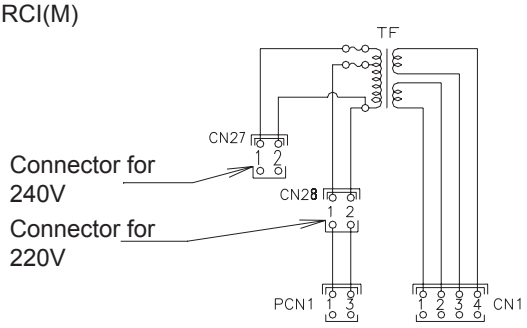
Setting	Function	Details
JP1 (Only for RAS-8~12 HRNM)	Cooling -15ºC & Heating.	When JP1 is set to “open”, temperature range for cooling mode is fixed until -15 ºC. Not available for individual indoor control
JP2	Not used	-
JP3	Not used	-
JP4	Fixing for Cooling Only	When JP4 is set to “open”, operation 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 to “open”, alternative defrosting mode is available. When one of the outdoor units connected by H-LINK II 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 to “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

DANGER

- *Before turning ON the main switch, check if the nominal voltage for the indoor unit is 240V and 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 RCI(M)



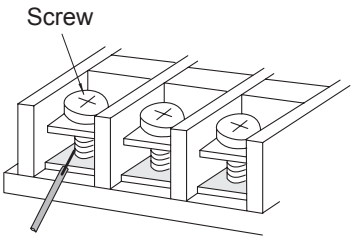
NOTE

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

CAUTION

- *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 of using following specified screws in the terminal box: M4 screw for the power supply and M3.5 screw for the operating line.*

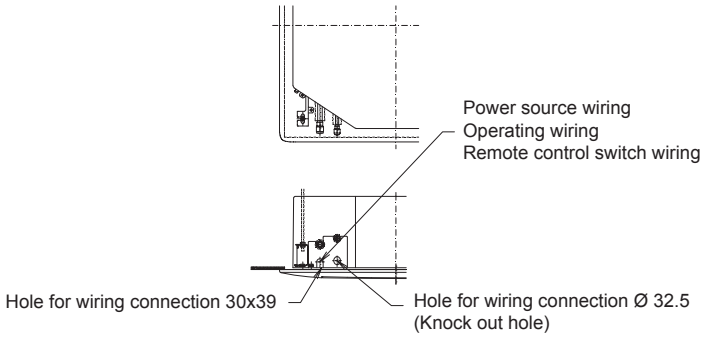
3.3.1. Electrical wiring connection



	NOTE
-	*Use twisted shielded pair cable or shield pair cable 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*

◆ 3.3.1.1. RCI units

The correct 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.

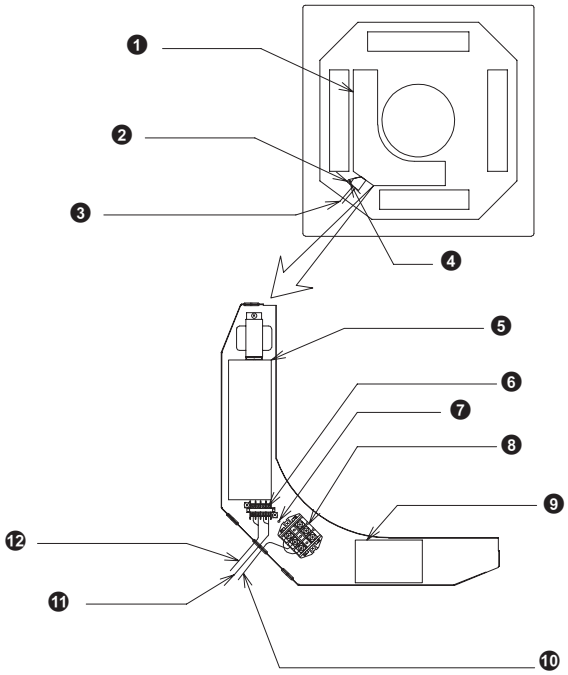


Passing it through the knock-out hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

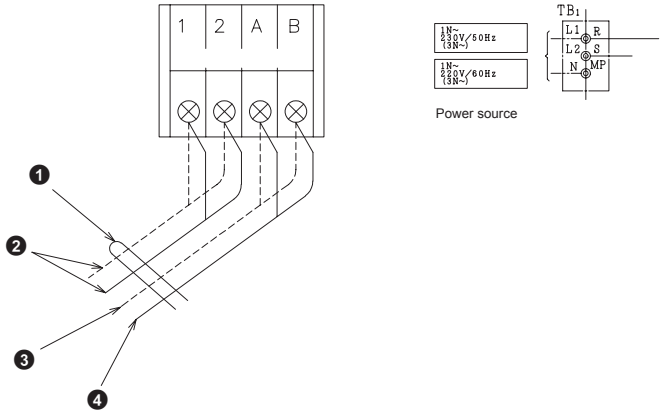
Connect the power supply and ground wires to the terminals in the electrical box (see next figures).

Connect the transmission wires between the indoor unit and the outdoor unit to their terminals in the electrical box (see next figures).

❶ Electrical box
❷ Stopper (Metal)
❸ Power source wiring. Signal wiring. Remote control switch wiring.
❹ Screw
❺ Printed circuit board (PCB)
❻ Terminal board (TB2)
❼ Earth screw
❽ Terminal board (TB1)
❾ Printed circuit board
❿ Power source wiring. Signal wiring between indoor unit and indoor unit.
⓫ Remote control switch wiring
⓬ Signal wiring between indoor unit and outdoor unit

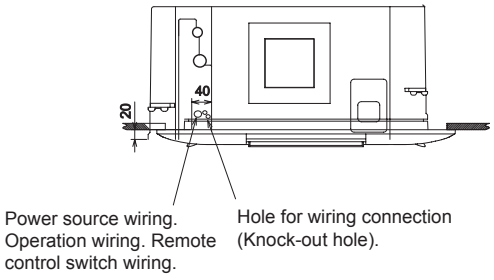


❶ Cable tie
❷ Signal wiring from indoor unit to outdoor unit.and indoor unit to indoor unit
❸ Operation wiring. In case of a group control operation by using a remote control switch
❹ Remote control switch wiring



◆ 3.1.1.2. RCIM Units

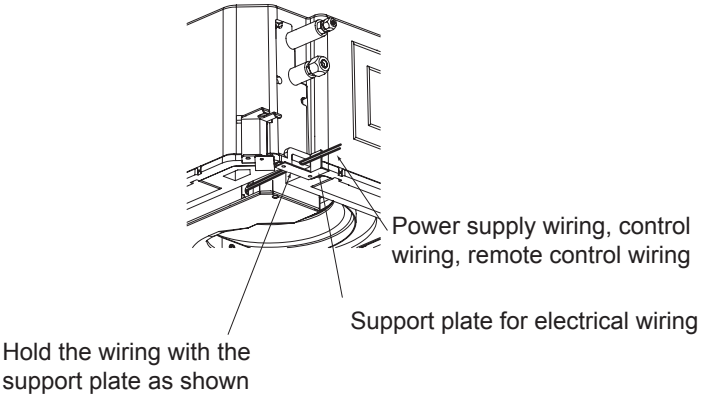
The correct electrical wiring connection for the indoor unit is shown in the following figures. For the intermediate connection between the indoor unit and the air panel, refer to chapter 1.5.



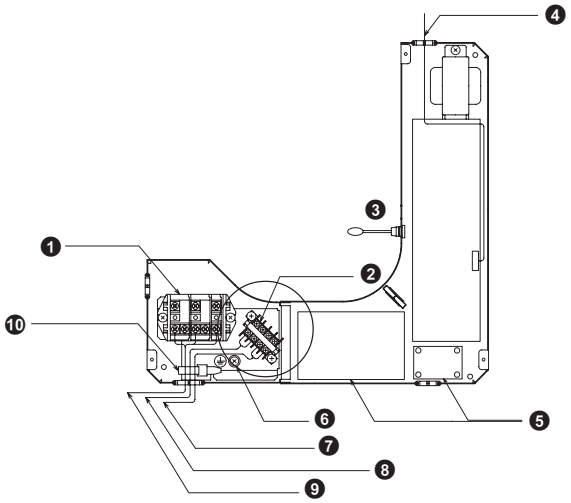
Passing it through the knock-out hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

Connect the power supply and ground wires to the terminals in the electrical box (see next figures).

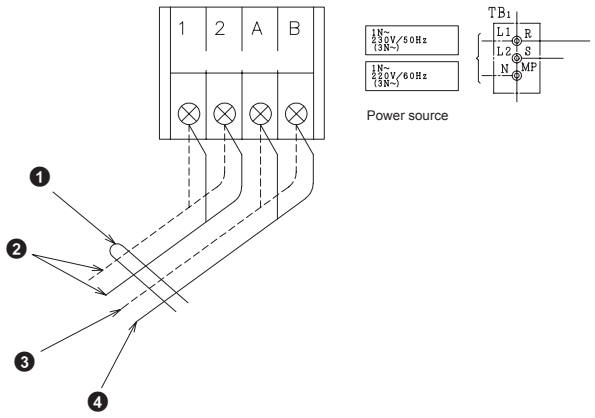
Connect the transmission wires between the indoor unit and the outdoor unit to their terminals in the electrical box (see next figures).



❶ Terminal board (TB1)
❷ Terminal board (TB2)
❸ Outlet Thermistor
❹ Connector for auto swing motor
❺ PCB
❻ Earth screw
❼ Remote control switch wiring
❽ Signal wiring
❾ Power source wiring
❿ Cable tie

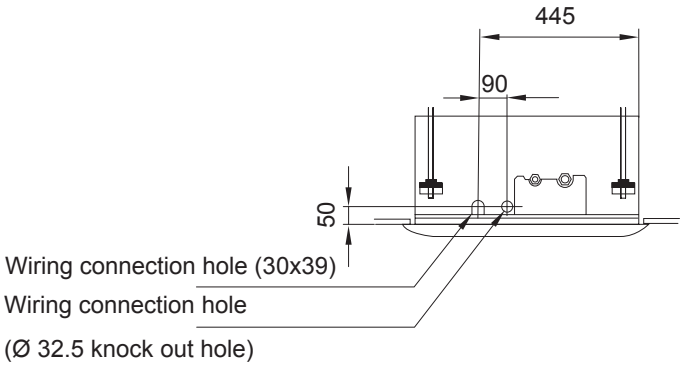


❶ Cable tie
❷ Signal wiring from indoor unit to outdoor unit.and indoor unit to indoor unit
❸ Operation wiring. In case of a group control operation by using a remote control switch
❹ Remote control switch wiring



◆ 3.3.1.3. RCD units

The correct 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 1.6.



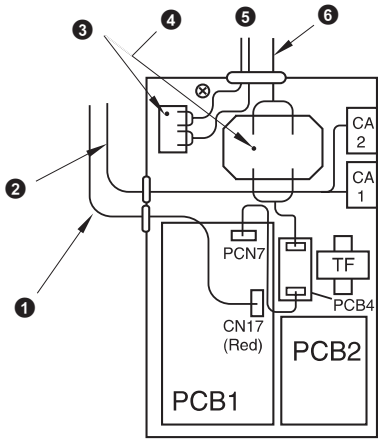
Passing it through the knock-out hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.

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

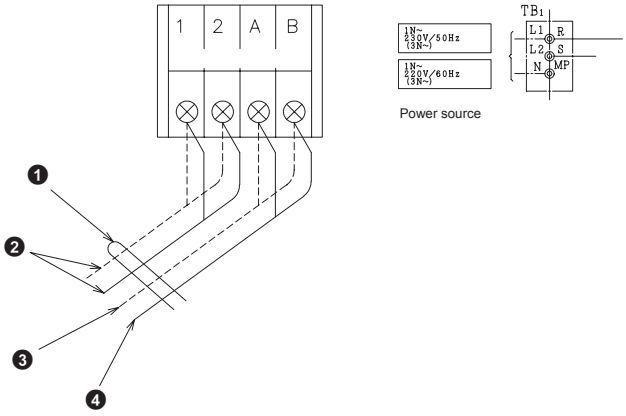
Connect the transmission wires between the indoor unit and the outdoor unit to their terminals in the electrical box.

Phase connection:

❶ Louver motor wiring
❷ Fan motor wiring
❸ Terminal board (TB2)
❹ Terminal board (TB1)
❺ Wiring
❻ Power source



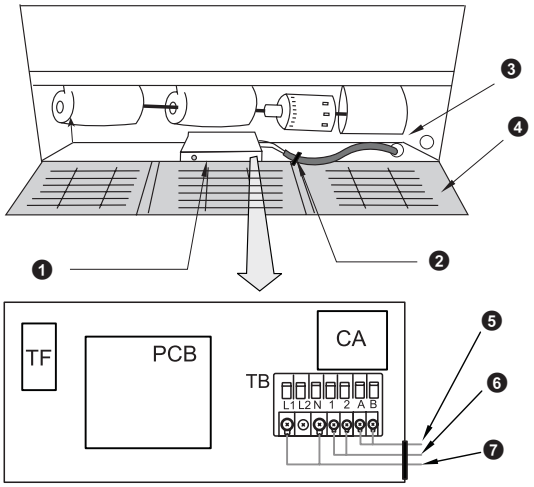
❶ Cable tie
❷ Signal wiring from indoor unit to outdoor unit.and indoor unit to indoor unit
❸ Operation wiring. In case of a group control operation by using a remote control switch
❹ Remote control switch wiring



◆ 3.3.1.4. RPC units

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

❶ Electrical box
❷ Cord clamp
❸ Knock out hole for the wirings
❹ Grille
❺ RCS (optional)
❻ Signal wiring
❼ Power supply wires



Passing it through the knock-out 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 ground wires to the terminals in the electrical box.

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

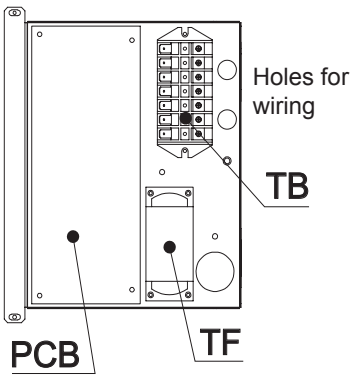
◆ 3.3.1.5. RPI units

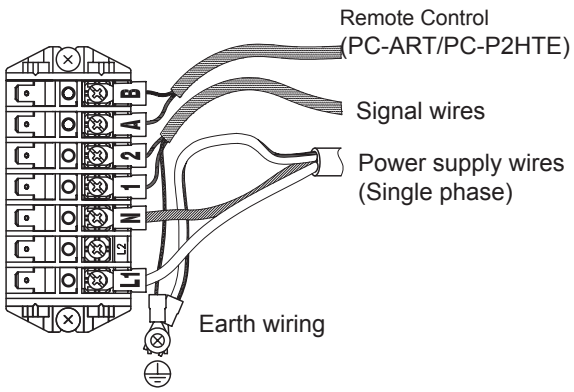
Follow next steps for the correct electrical wiring connection for the indoor unit:

1. Open the service access panel.
2. Cut out the center of the rubber bushing in the wiring connection hole as shown in next figures.
3. Passing it through the knock-out 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.
4. Connect the ground wire to the terminal ground wire in the electrical box.
5. Connect the power supply wires L1 and N or L1 and L2 in the electrical box.
6. Connect the transmission wires between the indoor unit and the outdoor unit to the terminals 1 and 2 in the electrical box.
7. Connect the wires of the remote control switch to terminals A and B in the electrical box.
8. Tightly clamp the wires with the accessory cord clamp inside the electrical box.
9. To protect the unit from the condensate water and the insects, run the cables with the sealing material (cover plate). Next seal the wiring connection hole using sealing material.

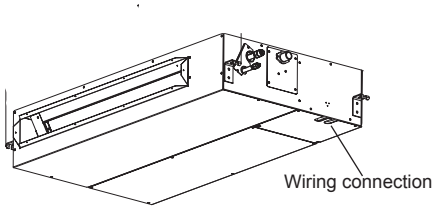
- **RPI - 0.8~1.5**

Terminal board connections:



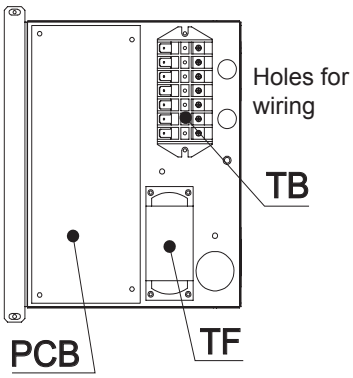


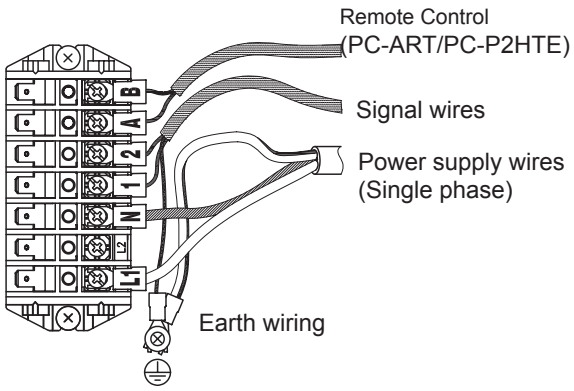
PCB: printed circuit board
TF: transformer
TB: terminal board



- **RPI - 2.0~6.0**

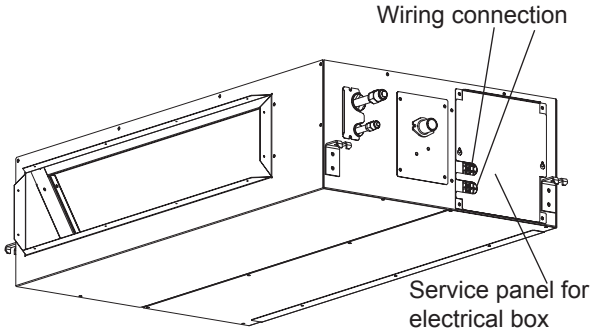
- Terminal board connections:



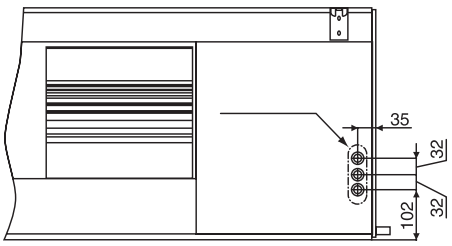


PCB: printed circuit board
TF: transformer
TB: terminal board

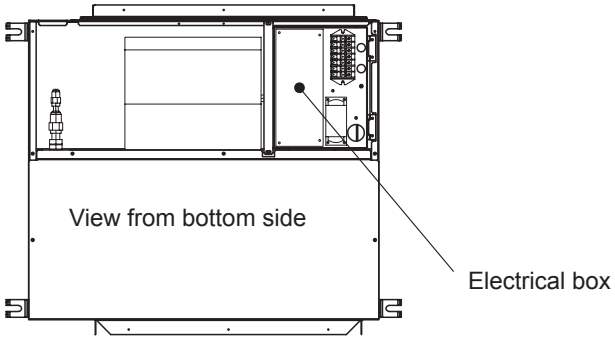
The service panel for the fan motor of the indoor unit is provided at the bottom side of the unit, and the service panel for the electrical box is provided at the right side of the unit as shown below.

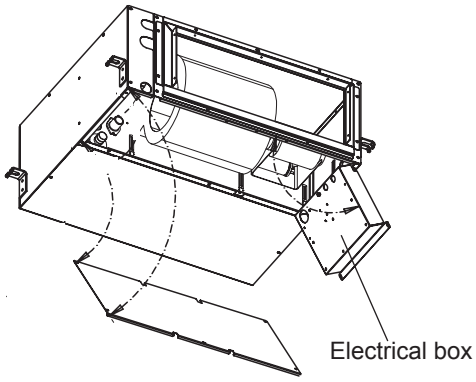


- **RPI - 8.0-10.0**



- **RPIM - 0.8~1.5**

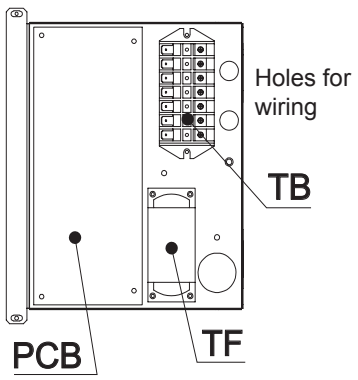


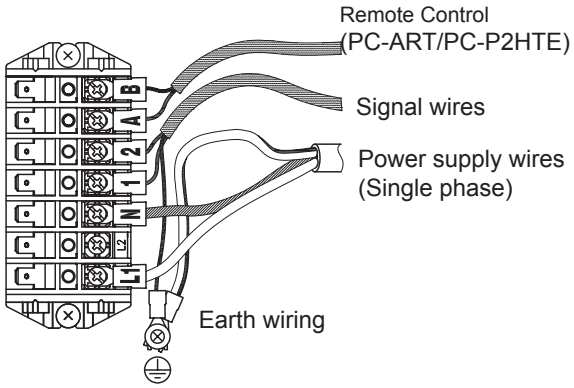


1. Remove the fan cover service panel, located at the bottom side of the unit.
2. Cut out the center of the rubber bushing in the wiring connection hole as shown in the next figures.
3. Passing it through the knock-out hole in the cabinet, connect the cable of the remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box.
4. Connect the ground wire to the terminal ground wire in the electrical box.
5. Connect the power supply wires L1 and N or L1 and L2 in the electrical box.
6. Connect the transmission wires between the indoor unit and the outdoor unit to the terminals 1 and 2 in the electrical box.
7. Connect the wires of the remote control switch to terminals A and B in the electrical box.
8. Tightly clamp the wires with the accessory cord clamp inside the electrical box.

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

- Terminal Board Connections:





PCB: printed circuit board
TF: transformer
TB: terminal board

◆ 3.3.1.6. RPK units

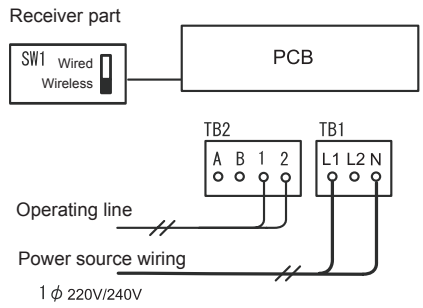
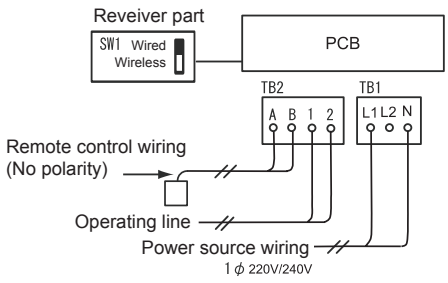
The electrical wiring connection for the indoor unit is shown below.

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

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

3. In case of using PC-ART/PC-P2HTE connect the cables to A,B on the TB2. Set the slide switch (SW1) at the “wired” side (See the drawings).

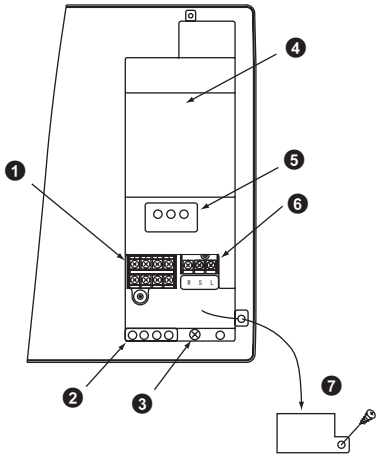
	NOTE
-	*In case of using a remote control PC-ART, PC-P2HTE, PC-ARH or PC-ALHZ, remove the wiring of the connector CN25 for RPK-2.0 or CN25 & CN12 for RPK 2.5~4.0. Otherwise, the system cannot function.*

In case of wireless remote control	In case of wired remote control
	

	NOTE
-	*In the case of “twin” or “tripple” combination, if the H-Link wiring between indoor units is wrong, only one unit, the numeber 1, will run without an alarm during “Test Run” mode.*

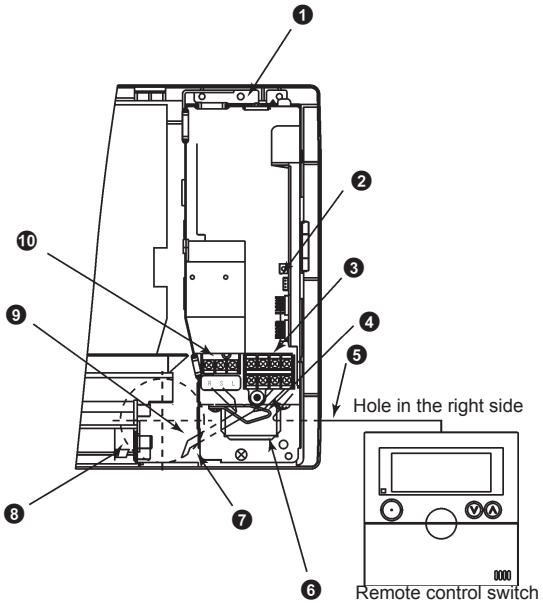
RPK-1.0-1.5

1. Terminal board
2. Fasten wiring with cable tie
3. Screw for earth wire
4. Electrical box cover
5. Receiver PCB
6. Power source terminal board
7. Loose the right side screw to open and to wire power source, wiring transmission wire of outdoor, indoor and remote control wiring to terminal board.



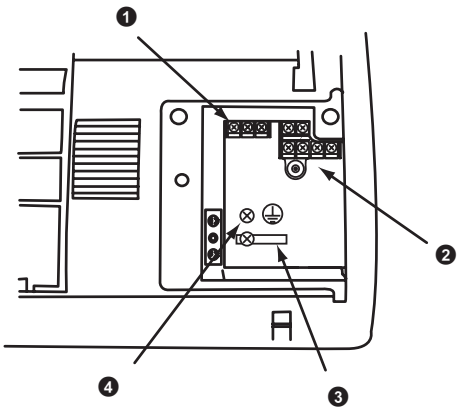
RPK-2.0

1. Electrical box
2. CN13
3. Wired remote control wiring
4. Terminal board
5. Fix cable by clamp
6. Hole for electrical box
7. Operating line
8. Hole for piping and wiring
9. Power source line
10. Power terminal board

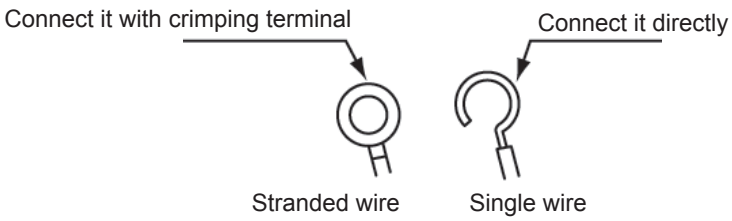


RPK-2.5~4.0

1. Power source terminal board
2. Terminal board
3. Fasten wiring with cable tie
4. Screw for earth wire

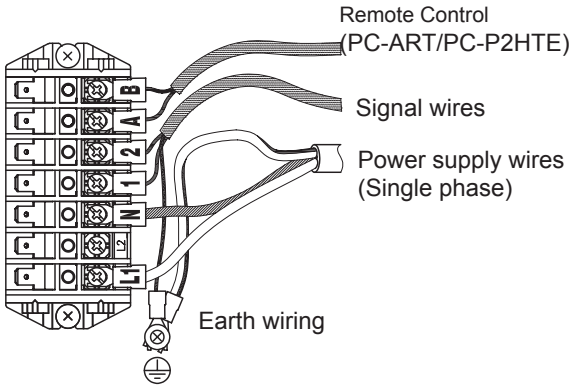


Check that the terminal specification is applied to the screw (M4 for power supply, M3.5 for operating line) of the terminal box. Use the crimping terminal when stranded wiring If a single wire is used, connect the wire directly, as shown in the below figure.



◆ 3.3.1.7. RPF\RPFI units

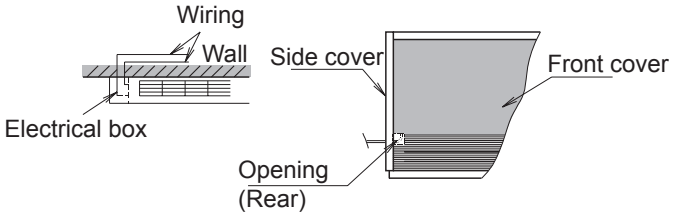
	CAUTION
-	*Use twisted shielded pair cable or shield pair cable for transmission wires between the indoor and the outdoor units, and connect the shielded part to the earth screw in the electrical box of the indoor unit as shown below.*



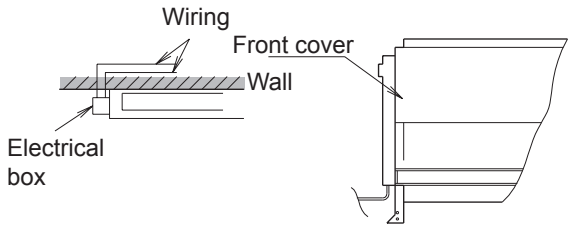
Remove both front and side panels.

The wiring can be performed for such units from the rear-left or the rear-side depending on the adequate wiring running.

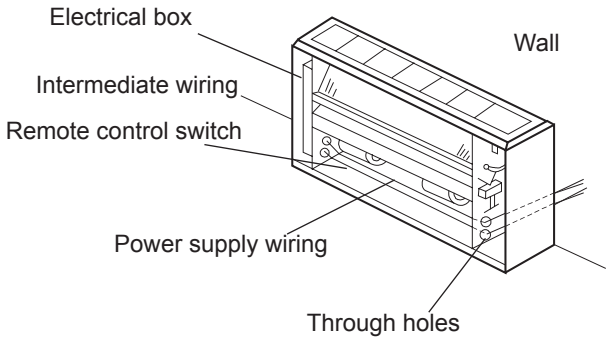
The correct wiring from the left-rear side to the RPF is shown below.



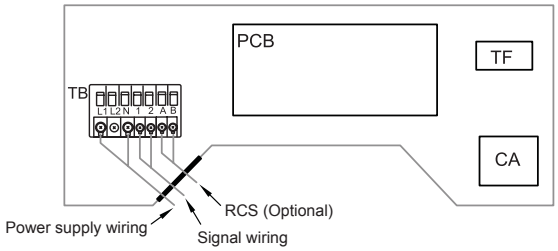
The correct wiring from the left-rear side to the RPFI is shown below.



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



The correct wiring connection to the terminal board is shown below.



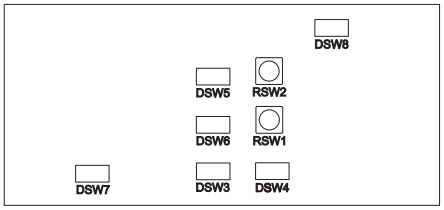
3.3.2. Setting the DIP switches for the indoor unit

Before setting the dip switches it is necessary to define how many indoor units will be connected by setting the RSW.

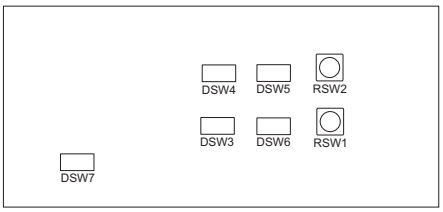
- **Quantity and position of the DIP switches**

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

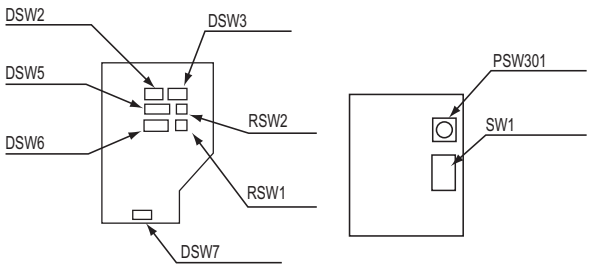
RCI-FSN2E, RCIM-FSN2, RCD-FSN2



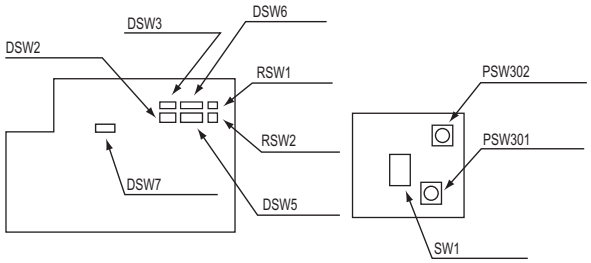
RPC-FSN2E, RPF(I)FSN2E, RPI(0.8~1.5 \ RPI 2.0~6.0 \ RPIM 0.8~1.5) FSN2E



RPK-(1.0~1.5) FSN2M



RPK-(2.0~4.0)FSN2M



	NOTE
-	*The mark "■" indicates the position of dips switches.*
-	*No mark "■" indicates pin position is not affecting.*
-	*The figures show the settings before shipment or after selection.*

	CAUTION
-	*Before setting dips switches, first turn the power source off and then set the position of the dips switches. In case of setting the switches without turning the power source off, the contents of the setting are invalid.*

- **DSW 6 / RSW1: indoor unit address**

  For setting indoor unit address. Set the DSW6 and RSW1 not to overlap the setting of other indoor units in the same refrigerant cycle. (If not set, the automatic address function is performed).

	Setting position (DSW6)		Setting position (RSW1)
Setting for tens (second digit)		Setting for units (first digit)	
Example for 16		and	

  Rotary switches' positions (RSW1) are set by inserting a screw driver into the groove.

- **DSW2: optional functions setting. Only for RPK FSN2M.**

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

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

- **DSW3: capacity code setting**

  No setting is required because the DIP switch is set at the factory 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**
Setting position				
HP	**1.8**	**2.0**	**2.3**	**2.5**
Setting position				
HP	**2.8**	**3.0**	**3.5**	**4.0**
Setting position				

HP	5.0	6.0	8.0	10
Setting position				

(Comes from page 3-20)

- **DSW5 and RSW2: refrigerant cycle number setting**

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

	Setting position (DSW5)		Setting position (RSW2)
Setting for tens (second digit)		Setting for units (first digit)	
Example for 5		and	

Rotary switches' positions (RSW) are set by inserting a screw driver into the groove.

- **DSW4: setting the unit model code (Not available for RCI, RCIM 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	DSW4 setting
RCI-1.0-6.0	
RCIM-1.0-2.0	
RCD-1.0-6.0	
RPC-2.0~6.0	
RPIM-0.8~1.5	
RPI-8.0~10.0	
RPF(I)-1.0~2.5	

- **DSW7: setting the fuse recover and the remote control selection**

<table>
<tr><td rowspan="2">No setting is required. Before shipment, all the setting positions are OFF.
PC-ART/PC-P2HTE: Remote control switch selected.</td><td colspan="2">  </td></tr>
<tr><td rowspan="2">Applying high voltage to the terminals 1 and 2 of the TB1, the fuse on the PCB1(M) will blow out.
If this occurs, first correct the wiring to the TB1. Then, set the ON pin as shown beside.</td><td>Except RPK</td><td>Only RPK-1.0-1.5
FSN2M</td></tr>
<tr><td>  </td><td>  </td></tr>
</table>

- **DSW8: not used (RCI, RCIM only)**

Setting before shipment	
Setting before shipment	

- **KPI. Energy recovery ventilation unit.**

DSW2, DSW4 and DSW6 do not have any function.

- **ECONOFRESH KIT**

You must set the DIP swithces at the RPI PCB.

Setting DIP switches for econofresh mode.

	RPI-5HP DIP switch factory setting	RPI-5HP + Econofresh kit installation DIP switch setting
DWS6		

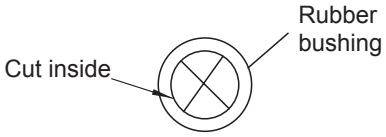
	CAUTION
	- *Before setting dips switches, first turn the power source off and then set the position of the dips switches. In case of setting the switches without turning the power source off, the contents of the setting are invalid.* - *It is not compatible to use the enthalpy sensor together with a CO2 gas sensor in the same econofresh kit.*

	NOTE
	Functions of the econofresh mode: - *Enthalpy sensor: it is used to regulate the entering of outdoor fresh air controlling its humidity.* - *CO2 sensor: it is used to regulate the entering of outdoor fresh air when CO2 gas in the room exceeds a certain value.*

KPI. Energy recovery ventilation units.

The electrical wiring connection for the unit is shown below:

1. Cut out the centre of the rubber bushing in the wiring connection hole, as shown in next figure



2. 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 through the connecting hole in the cabinet.
3. Connect the power supply and earth wires to the terminals in the electrical box.
4. Tightly clamp the wires using the cord clamp inside the electrical box.
5. Seal the wiring connection hole after running the cables with the seal material to protect the unit from condense water or insects.
6. In the case that the power cables are connected in series,check the amount of current is less than 50 A.

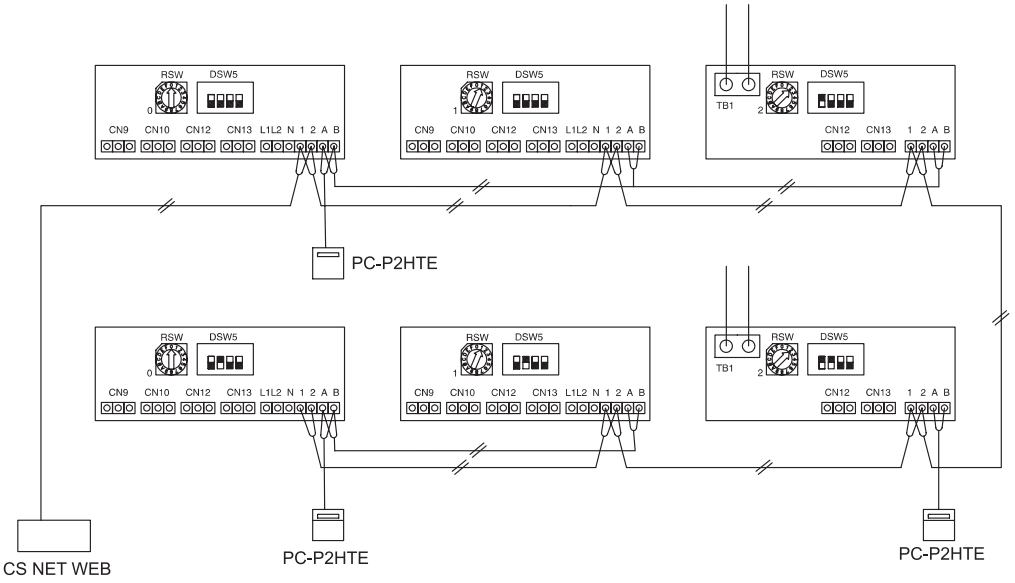
Select the main switches in according to the next table:

Model	Power source	Maximum current (A)	CB (A)	ELB (nº poles/A/mA)
KPI-502E1E	1~, 230V 50 Hz	6	10	2/40/30
KPI-802E1E		6	10	
KPI-1002E1E		10	16	
KPI-1502E1E		10	16	
KPI-2002E1E		10	16	
KPI-3002H1E		15	20	

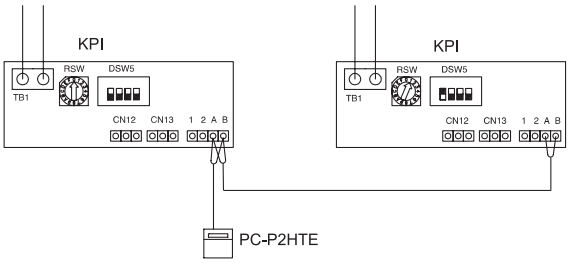
ELB: Earth switch; CB: Switch; (*) Except RPI-8/10HP

	NOTE
	Total heat exchanger definition: *during the temperature regulation process, the indoor unit evacuates the air inside the room and introduces fresh air from the outdoor. The outdoor fresh air temperature is pre-conditioned to the indoor consigned temperature in the total heat exchanger. This pre-treated air is vehiculated to the indoor unit to be finally conditioned and blown inside the room*

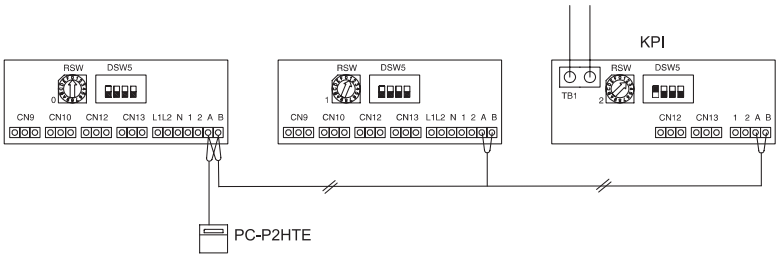
- **Controlled network systems (CS-NET WEB)**



- **KPI Energy recovery ventilation unit + PC-ART/PC-P2HTE**



- **Simultaneous operation (Set-Free + Energy recovery ventilation units)**



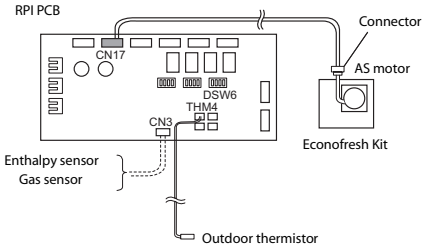
	NOTE
	- *Set the number by using the rotary switch (RSW) on the PCB in the indoor units and the total heat exchanger.* - *Firstly set the unit number for the indoor unit and secondly set the unit number of the total heat exchanger. The unit number of the total heat exchanger should be larger than the unit number of the indoor unit.*

ECONOFRESH KIT

The electrical wiring connection for the Econofresh kit is shown in the following figure.

Mount the outdoor thermistor at a position near the outdoor air inlet.

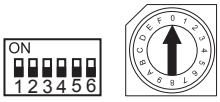
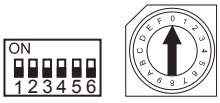
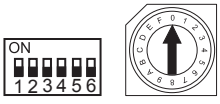
Pay attention when placing the outdoor thermistor. It must not be in contact with direct sunshine or rainwater.



3.4. ELECTRICAL WIRING BETWEEN INDOOR UNIT AND OUTDOOR UNIT

Connect the electrical wires between the indoor unit and the outdoor unit, as shown in next figure.

Double-check 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 the 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.

Unit	Name of Dip Switch	Mark	Setting Before Shipment	Function
Outdoor unit	Refrigerant cycle	DSW4 RSW1	 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
	Terminating resistance	DSW5		For matching impedance of transmission circuit, set the DSW5 according to the quantity of outdoor units in the H-LINK system.
Indoor unit	Refrigerant cycle	DSW5 RSW2	 DSW5 RSW2	For setting refrigerant cycle address of indoor units. Set the DSW5 and RSW2 corresponding to the address of outdoor unit in the same refrigerant cycle.
	Indoor unit address	DSW6 RSW1	 DSW6 RSW1	For setting indoor unit address. Set the DSW6 and RSW1 not to overlap the setting of other indoor units in the same refrigerant cycle. (If not set, the automatic address function is performed).

NOTE

- *Follow the local codes and regulations when performing the electrical wiring (field and equipment).*
- *Use twisted shielded pair wires for transmission wiring between the outdoor unit and the indoor unit and also for the transmission wiring between the indoor units (in case of an H-Link connection). It can be also used shielded pair wiring.*
- *Shield shall be connected to the ground only from one cable side.*
- *Do not use more than 3 ring cores to coil transmission wiring (in case of an H-Link connection). Core ring sizes must be selected according to the national regulations.*

Connect the transmission wiring to the units belonging to the same refrigerant cycle (the refrigerant piping and the transmission wiring should be connected to the same indoor units).

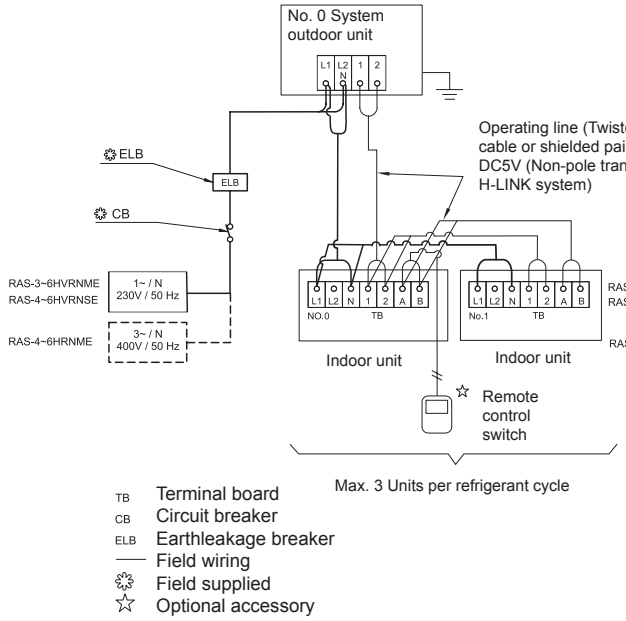
Open a hole near the connection terminal of the power source wiring when multiple outdoor units are connected from one single power source line.

	NOTE
-	*If the refrigerant piping and the control wiring are connected to the units in the different refrigerant cycle, it will cause an abnormal operation.*
-	*Fix rubber bushes with an adhesive on the panel when a conduit pipe for field-wiring is not used.*

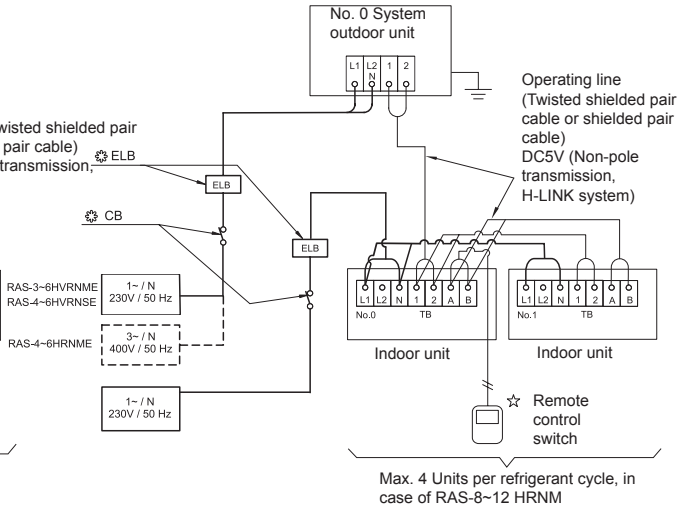
The recommended breaker-switch sizes are shown in the table of electrical data and recommended wiring

	CAUTION
-	*Pay attention to the connection of the operating line. An incorrect connection will cause the failure of the PCB.*

Indoor unit power supply from outdoor unit



Power supply of outdoor unit and indoor unit separately



TB Terminal board
CB Circuit breaker
ELB Earthleakage breaker
—— Field wiring
Field supplied
☆ Optional accessory

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

3.5. WIRE SIZES

- **Field minimum wire sizes for the power source**

Model	Power Source	Max. Current (A)	Power Source Cable Size	Transmitting Cable Size
			EN60 335-1 ❶	EN60 335-1 ❶
All Indoor Units (*)	230V/1φ/50Hz	5	0.75 mm²	0.75 mm²
RPI-8-10		10	1.5 mm²	
RAS-3HVRNME	230V/1φ/50Hz	14	2.5 mm²	
RAS-4HVRNME		18/24	4.0 mm²	
RAS-5HVRNME		26	6.0 mm²	
RAS-6HVRNME		26	6.0 mm²	
RAS-4HRNME	400V/3φ/50Hz	7	2.5 mm²	
RAS-5HRNME		11	2.5 mm²	
RAS-6HRNME		13	2.5 mm²	
RAS-8HRNME		13.2	2.5 mm²	
RAS-10HRNME		17.1	4.0 mm²	
RAS-12HRNME		21.2	4.0 mm²	

(*) (Except RPI-8.0-10.0)

☛ For KPI units:

Model	Power source	Maximum current (A)	Power Source Cable Size
			EN60 335-1 ❶
KPI-502E1E	230V/1φ/50Hz	6	0,75
KPI-802E1E		6	0,75
KPI-1002E1E		10	1
KPI-1502E1E		10	1
KPI-2002E1E		10	1
KPI-3002H1E		15	1,5

NOTE

- *Follow local codes and regulations when selecting field wires.*
- *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 wires not lighter than the ordinary neoprene (polychloroprene) sheathed flexible cord (code designation H05RN-F).*
- *In the case that the power cables are connected in series, add each unit maximum current and select the wire sizes in next table.*
- *The ground cable size must comply local code: IEC 245, No. 571.*

- **Wire size in relationship to the intensity**

  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	1 ≤ 15	0.5
6 < i ≤ 10	1	15 ≤ i < 18	0.75
10 < i ≤ 16	1.5	18 < i ≤ 24	1.25
16 < i ≤ 25	2.5	24 < i ≤ 34	2
25< i ≤ 32	4	34 < i ≤ 47	3.5
32 < i ≤ 40	6	47 < i ≤ 62	5.5
40 < i ≤ 63	10	62 < i ≤ 78	8
63 < i	❸	78 < i ≤ 112	14
		112 < i ≤ 147	22

❸ In case that the 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 ground screw in the electrical box of the indoor unit as shown below.* - *Use wires not lighter than the ordinary neoprene (polychloroprene) sheathed flexible cord (code designation H05RN-F).*	

- **Main switches types**

  Select the main switches (current breaker) in according to the next table:

Model	Power Source	Max. Current (A)	CB (A)	ELB (no. poles/A/Ma)
All Indoor Units (*)	230V/1φ/50Hz	5	6	2/40/30
RPI-8.0-10.0		10	10	
RAS-3HVRNME	230V/1φ/50Hz	14	25	
RAS-4HVRNME		18A/24	32	
RAS-5HVRNME		26	32	
RAS-6HVRNME		26	32	
RAS-4HRNME	400V/3φ/50Hz	7	15	4/40/30
RAS-5HRNME		11	20	
RAS-6HRNME		13	20	
RAS-8HRNM		13.2	20	
RAS-10HRNM		17.1	20	
RAS-12HRNM		21.2	30	

(*) (Except RPI-8.0-10.0); ELB: Earth leakage breaker; CB: Circuit breaker.

3.5.1. H-LINK System

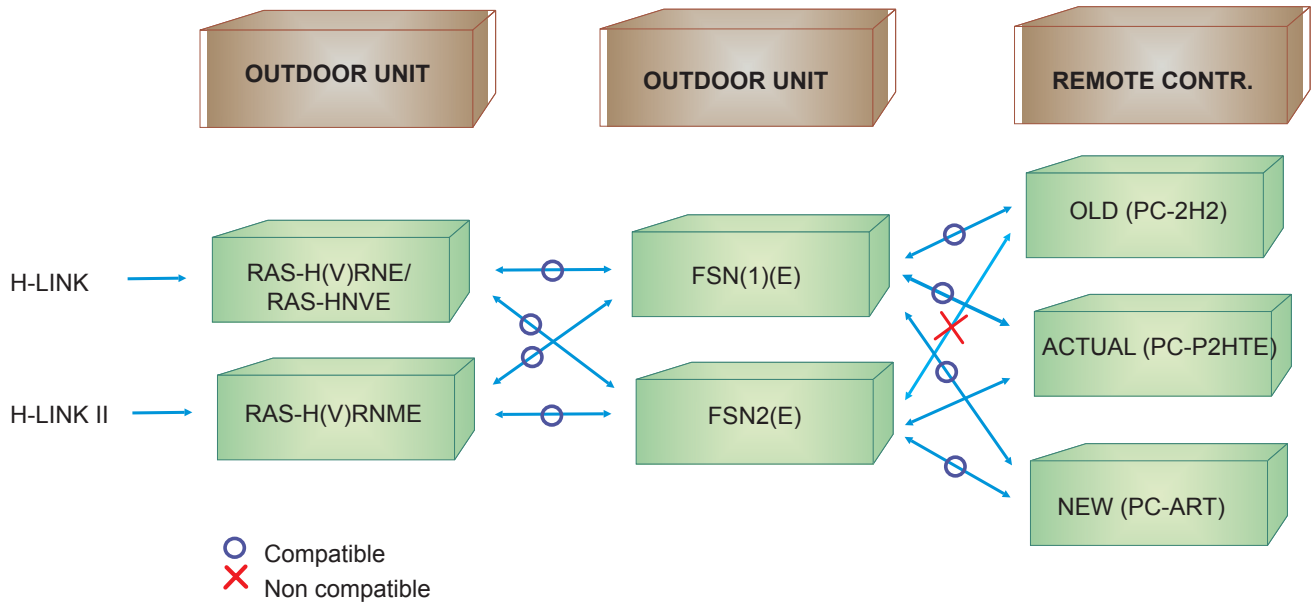
- **Compatibility**

The combinations between units that use H-Link system with units that use H-Link II, and its respective remote controls, is explained here.

It is possible to connect the new Hitachi outdoor units RAS-H(V)RNM(E) with indoor units FSN1(E) and FSN2(E).

Is is also possible to connect new indoor units FSN2(E) with outdoor units RAS-H(V)RNE/H(V)NE y RAS-H(V)RNM(E).

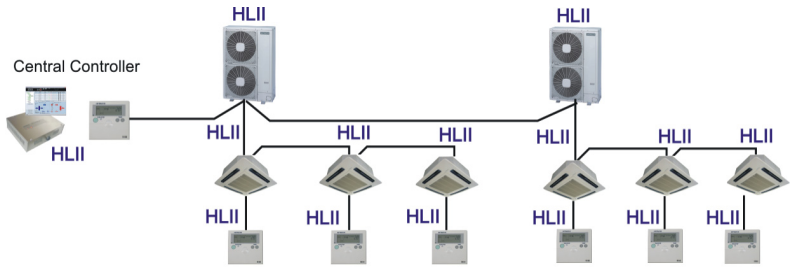
The new H-Link II system operates with newer remote controlers, as PC-P2HTE.



	NOTE
-	*Indoor unit RCI-FSN2E can be connected with P-G23WA2 air panel cutting jumper J4.*

- **Examples with H-LINK Y H-LINK II systems.**

1. Sytem with indoor units, outdoor units, remot control and central control type H-LINK II

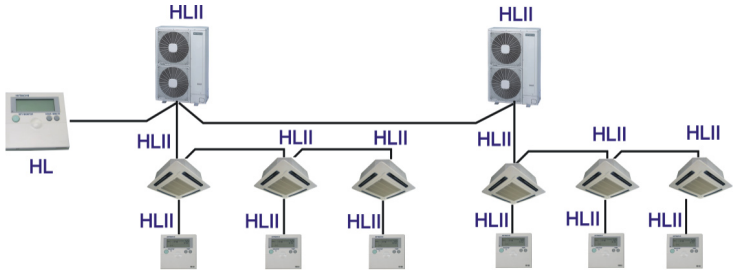


Range number of refrigerant circuits	0-63
Range number of indoor units	0-63

Max. number of indoor units	160
Max. number of sets (*)	200

(*) Sets = Indoor units + outdoor units + central control; HL: H-LINK; HL II: H-LINK II.

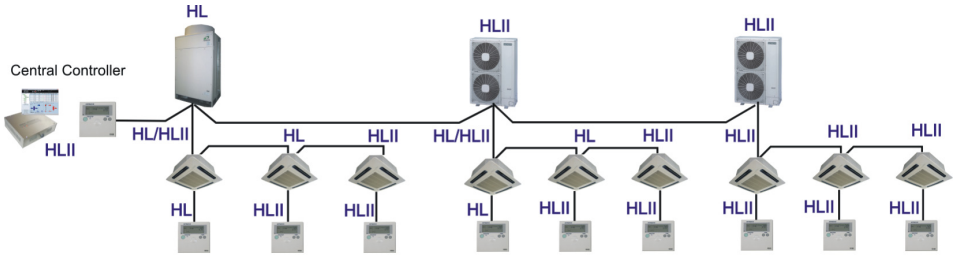
2. System with indoor units, outdoor units, H-LINK II remote control and H-LINK central control.



Range number of refrigerant circuits	0-15
Range number of indoor units	0-15
Max. number of indoor units	128
Max. number of sets (*)	145

(*) Sets = Indoor units + outdoor units + central control; HL: H-LINK; HL II: H-LINK II.

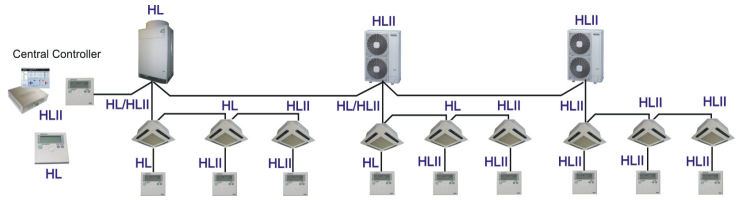
3. System with indoor units, outdoor units, H-LINK remote controls and H-LINK II with H-LINK II central control.



Range number of refrigerant circuits	0-15		0-15	0-63
Range number of indoor units	0-15	0-15	0-63	0-63
Max. number of indoor units		128		
Max. number of sets (*)		145		

(*) Sets = Indoor units + outdoor units + central control; HL: H-LINK; HL II: H-LINK II.

4. System with indoor units, outdoor units, H-LINK and H-LINK II remote control and H-LINK central control.

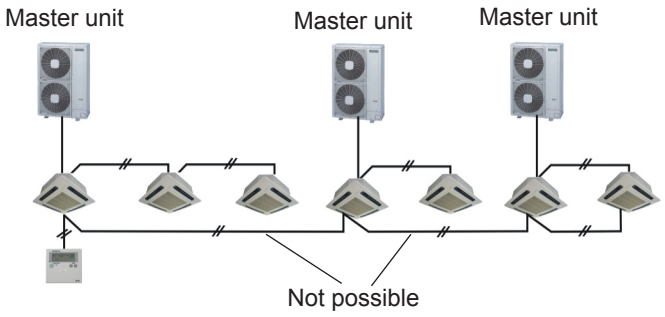


Range number of refrigerant circuits	0-15
Range number of indoor units	0-15
Max. number of indoor units	128
Max. number of sets (*)	145

(*) Sets = Indoor units + outdoor units + central control; HL: H-LINK; HL II: H-LINK II.

3

The following settings are not available:



	NOTE
-	*It is not possible to connect diferent indoor units from diferent systems with the same remote control, once the remote control function wiring has been selected not to be used.*
-	*All optional units connected to CN3 can only be used with master unit with remote control connected to it.*

- **Application**

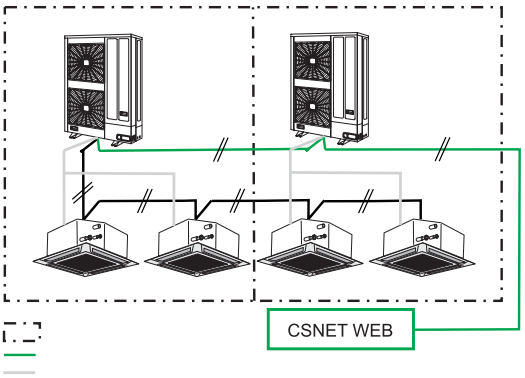
  The H-LINK II wiring system requires only two transmission cables that connect each indoor unit and the outdoor unit for up to 64 refrigerant cycles. This wiring system also requires the connect wires for all the indoor units and all the outdoor units in series. You can apply this H-LINK II system to following models:

Indoor unit	Outdoor unit
RCI	
RDC	
RPI	
RPK	3~12 H(V)RNM(E)
RPF	
RPFI	
RPC	

- **H-LINK II features**

  - It is possible to control up to 160 indoor units (64 groups of indoor units) with only one control panel (using the PSC-64S controller). It is possible to control up to 200 units (indoor unit, outdoor unit and central control).
  - The total wiring length is remarkably reduced.
  - Only one (1) connection is required for the wiring between the indoor unit and the outdoor unit.
  - Easy wiring connection to the central control panels.

Example of an H-LINK II system:



- **H-LINK II specifications:**

  - Transmission wire: 2-wire
  - Polarity of transmission wire: non-polar wire
  - Maximum outdoor units that can be connected: 64 units per H-LINK system.
  - Maximum indoor units that can be connected: 4 units per cycle and 160 units per H-LINK II system (in case of SET FREE series will be added).
  - Maximum wiring length: total 1000m (including CS-NET WEB).
  - Recommended cable: twist shielded pair cable or shielded pair cable with a seccion over 0.75mm
  - Voltage: DC5V

- **System example of H-LINK II**

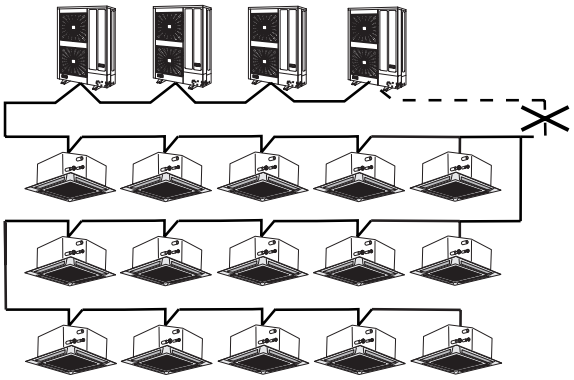
  There are two typical cases of using H-LINK system:

  1. Using H-LINK system with air conditioners only, and

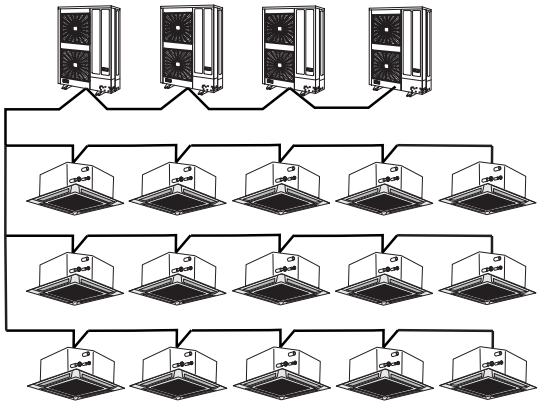
  2. Using H-LINK system with air conditioners with a central control device. The system examples are shown below.

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

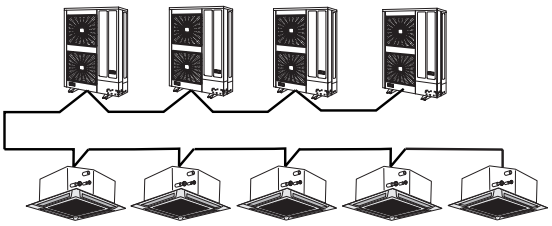
Line connection for all units (including Utopia and/or Set-free, Set-free mini and DC inverter).



Line connection for each floor



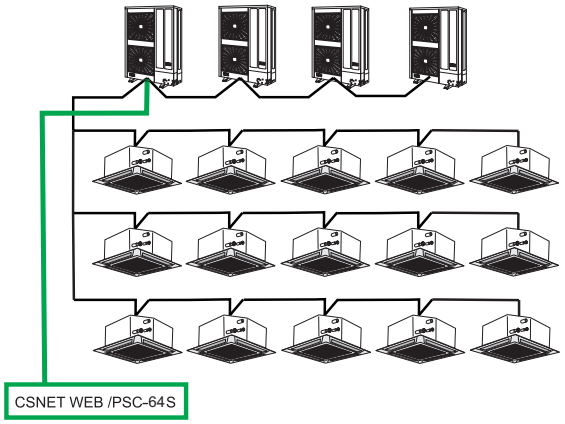
Connection with one main line and with the branch lines for the units



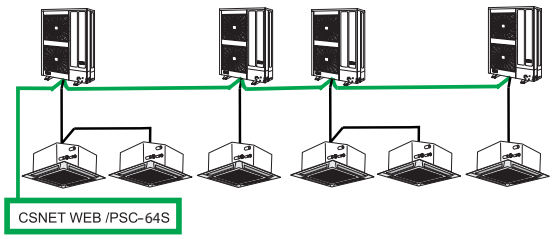
2. Using an H-LINK II system for air conditioning systems with a central control panel (CSNET WEB or PSC-64S).

In case of using a central control panel, you must connect the H-Link II wiring to all the systems. The easiest way of connection to the H-LINK II system is usually to connect the available outdoor units.

In this case, the CS-NET WEB wiring can be connected at any point of the H-LINK II wiring.



In case of not using a central control device when the electrical wiring is performed. In this case, you must connect the H-LINK II wiring to all the systems. Usually, to connect the outdoor units is the easiest implementation to connect them in the system.

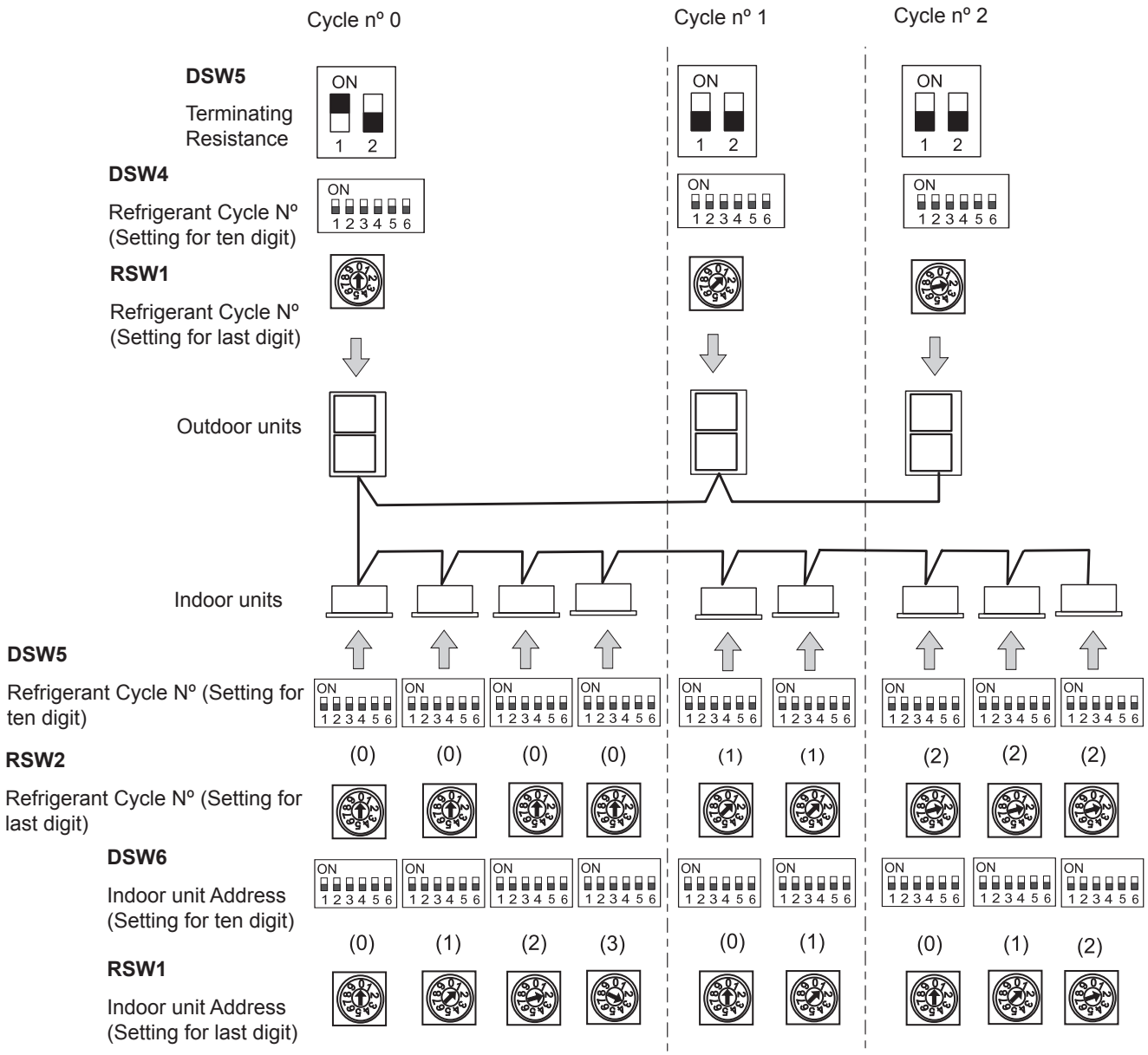


	NOTE
-	*Do not make wiring in a loop. in order to avoid misfunctions of the system.*

- **DIP Switch setting of indoor PCB and Outdoor PCB**

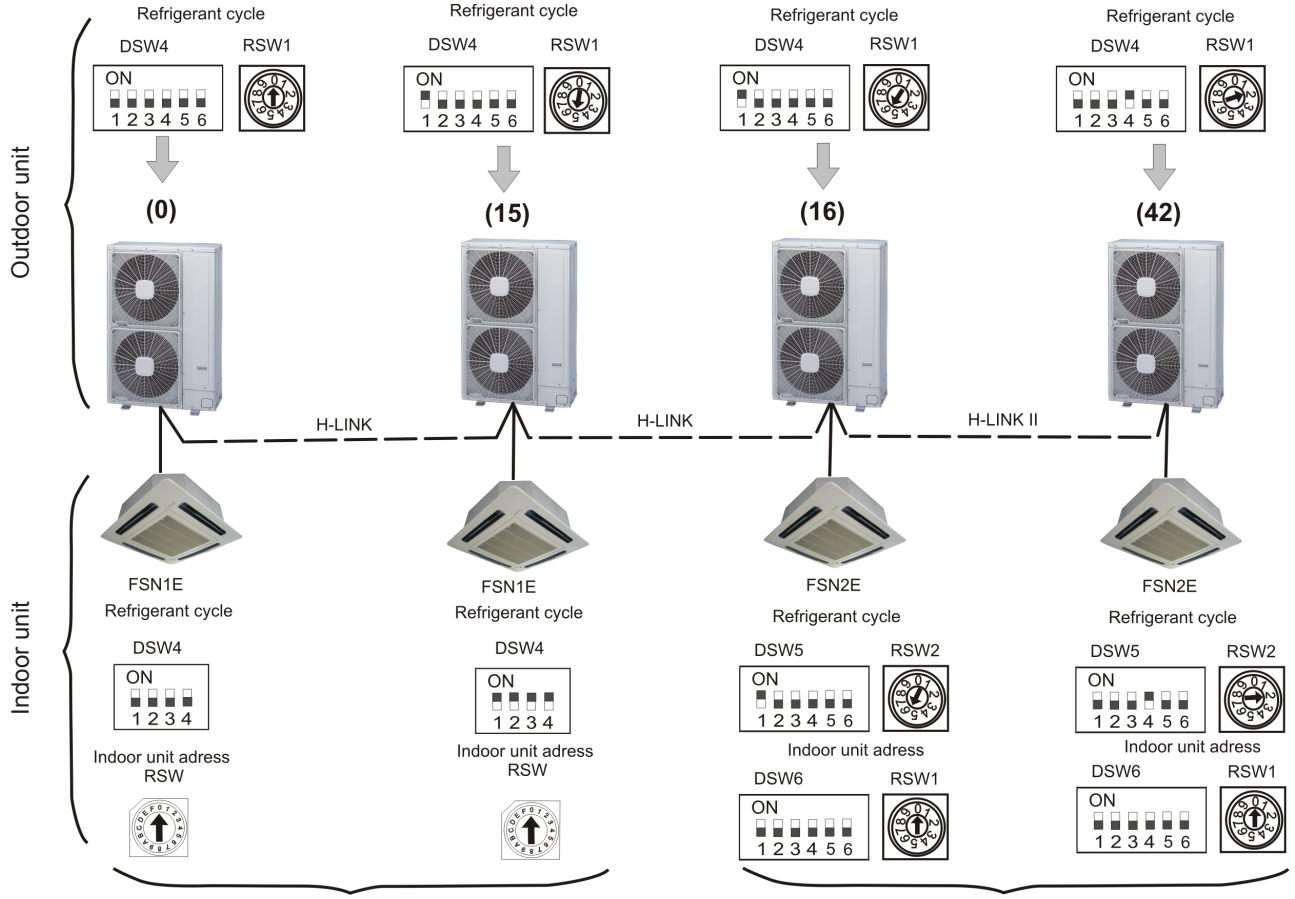
  It is required to set DIP switches of every indoor unit and outdoor unit.

Example of the settings of the DIP switches:



☛ **Connection example between H-LINK and H-LINK II units**

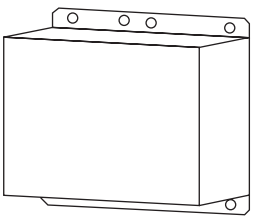
In case of mixed H-LINK and H-LINKII systems, set H-LINK units in the first 16 system positions, as shown in the following figure. There are 42 systems, 16 with FSN1E indoor units type and 26 with FSN2E indoor units type.



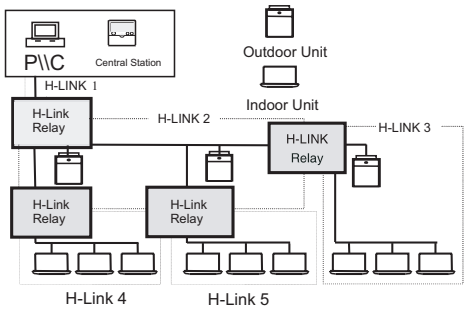
	NOTE
	- *An H-LINK II is caplable of controlling up to 160 indoor units.* - *If using PSC-5S and CSNET WEB 2.0 (only compatible with H-LINK), take into account that it will only recognize 16 indoor units and 16 outdoor units.*

3.5.2. PSC-5HR

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



- **Electrical wiring (System)**

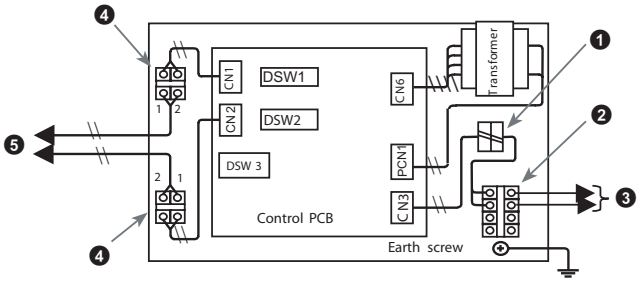


	NOTE
	- *You can install a maximum of 4 H-LINK II relays in one system.* - *Make sure that the quantity of connections is the following:* - *Ref. system quantity: within 64* - *Indoor unit quantity: within 160* - *Total length of each divided H-LINK II: up to 1000m* - *If the H-LINK II is divided into 5 blocks as shown above in the previous figure, set the end terminal resistance in each H-LINK II relay (for details, refer to the DIP switches below).*

3

- **Internal layout**

❶ Ring core
❷ Power source terminal board
❸ Power source
❹ Terminal board for transmision
❺ H-LINK II to the unit to be connected



- **Setting the DIP switches**
  - If there are outdoor units connected to the H-LINK II system, set the end terminal resistance at one of the outdoor units.
  - If there is an HARC-40E building management connected to the H-Link II system, set the end terminal resistance at the HARC-40E.

DSW3 (HARC-40E)


  - If there is a central control device (PSC-64S) connected to the H-Link system, set the end terminal resistance at the PSC-64S.

DSW3 (PSC-5S)


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

DSW1	DSW2
	
(CN1 Side)	(CN2 Side)

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

- **Fuse recovery setting**

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

DSW1	DSW2
	

- **Setting the main\sub relays**

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

The setting of the main\sub relays depends on the number of H-LINK relays connected. Set the main\sub relays as follows:
- If the number of H-LINK relays is only one, then choose Main. (No setting is required).
- If the number of H-LINK relays is more than one, then choose Main for one H-LINK relay and choose Sub for the other H-LINK relays.

DSW3	DSW3
	
Main	Sub

	CAUTION
- *If you do not set this pin correctly, communication alarms will appear.*	

- **Test run**

After completing the installation of the H-LINK system, 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 using the remote control switch.
- In case of using cotrol equipment, perform the connection check at the central control panel.

Transmission alarm:

- Perform the RUN\STOP procedure using the central control panel 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 panel.

Activation state:

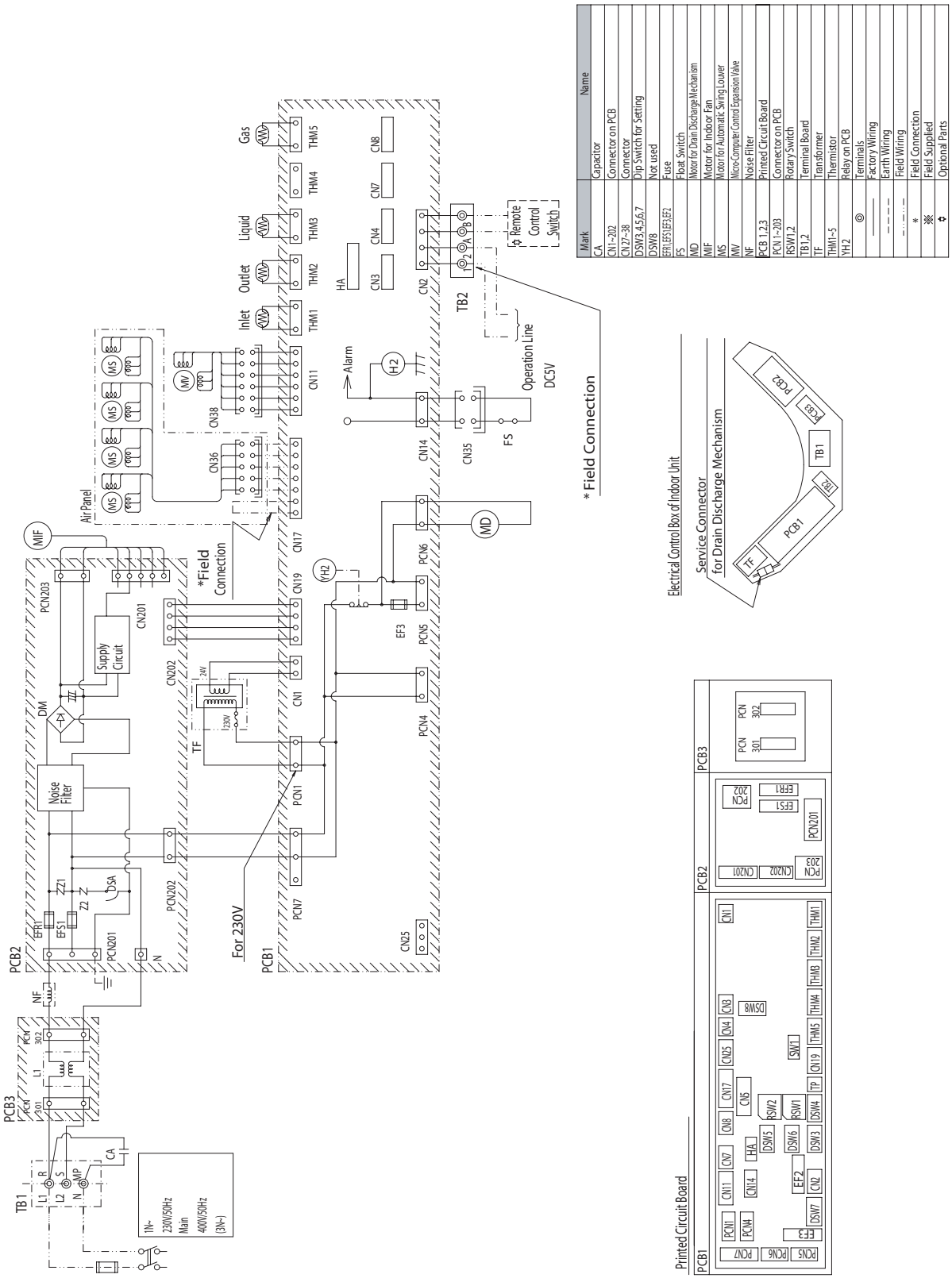
- Monitor the activation state of the LED on the control PCB.
- Make sure that the LED1 does not stay ON due to the continuous failures. The LED can stay ON due to the following causes: Incorrect setting of the master H-LINK relay, incorrect setting of the slave H-LINK relay, incorrect setting of the end terminal resistance, presence of wiring loops, and others. Make sure that the setting is correctly performed. Also, make sure that the wiring is correctly installed acording to instructions described in this chapter.
- 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”.

3.6. ELECTRICAL WIRING DIAGRAMS

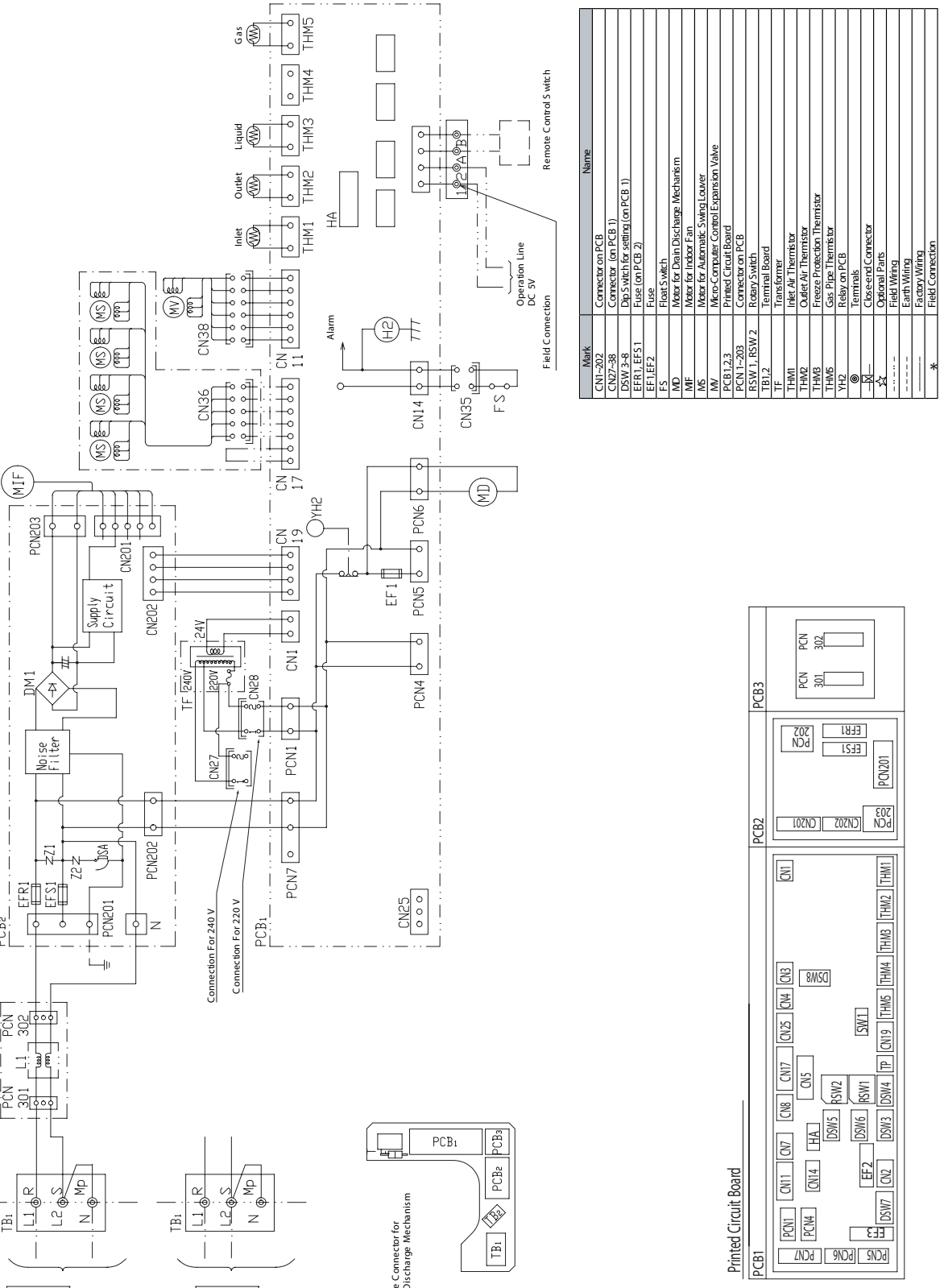
This sub-chapter shows the electrical wiring diagram for each unit of the Hitachi IVX series.

Unit model	Page number
RCI-(1.5~6.0)FSN2E	3-40
RCIM-(1.5~2.0)FSN2	3-41
RCD-(1.5~3.0)FSN2	3-42
RCD-(4.0~5.0)FSN2	3-43
RPC-(2.0~6.0) FSN2E	3-44
RPIM-(1.5)FSN2E	3-45
RPI-(1.5)FSN2E	3-46
RPI-(2.0~6.0)FSN2E	3-47
RPI-(8.0-10.0)FSNE	3-48
RPK-(1.5)FSN2M	3-49
RPK-(2.0)FSN2M	3-50
RPK-(2.5~4.0)FSN2M	3-51
RPF(I)-(1.5~2.5)FSN2E	3-52
KPI-(502-802)	3-53
KPI-(1002-2002)	3-54
KPI-(3002)	3-55
RAS-3HVRNME	3-56
RAS-(4~6)HVRNME	3-57
RAS-(4~6)HRNME	3-58
RAS-(8~12)HRNM	3-59

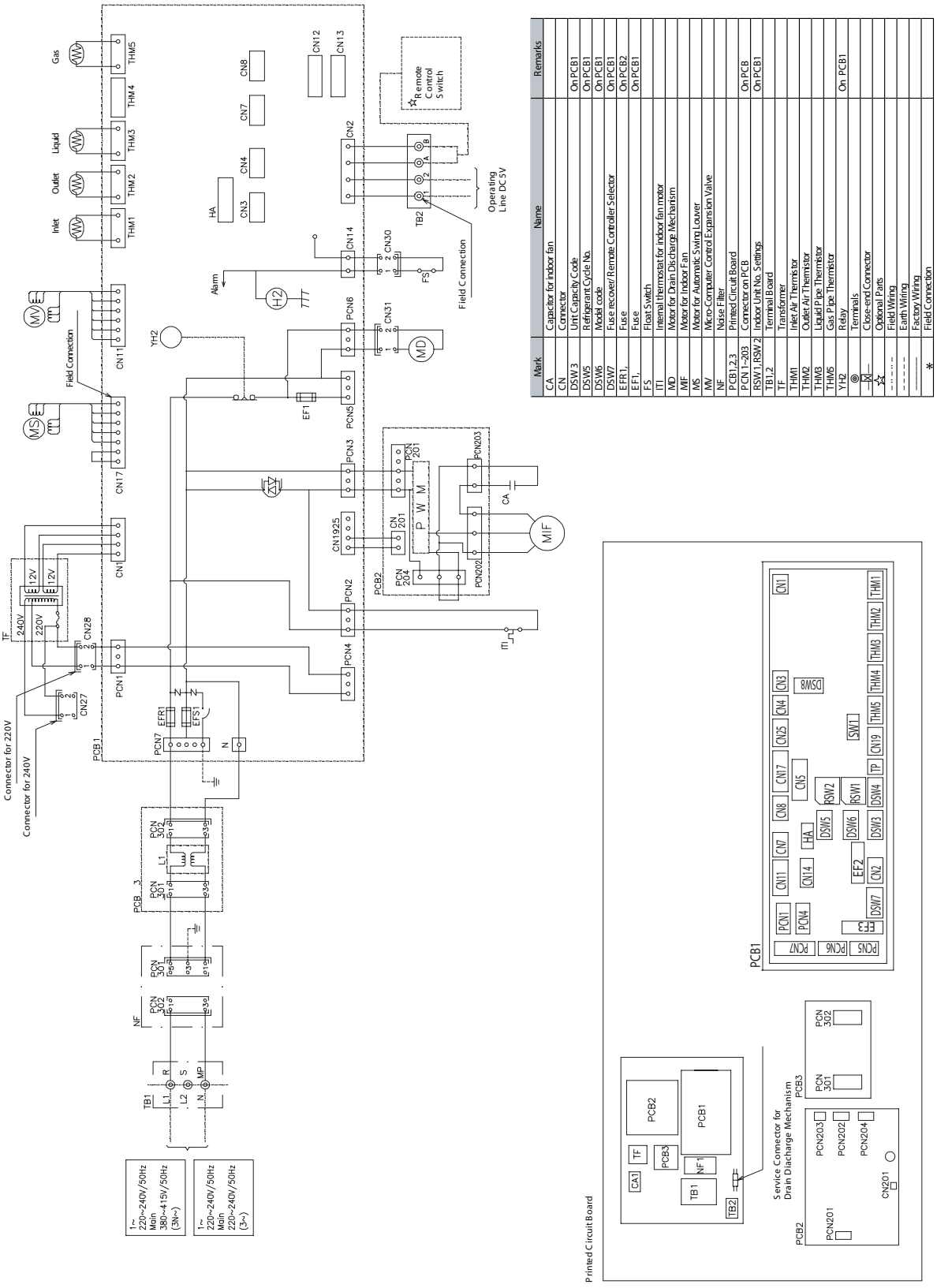
Electrical wiring diagram for models: RCI-(1.0~6.0)FSN2E



Electrical wiring diagram for models: RCIM-(1.5-2.0)FSN2

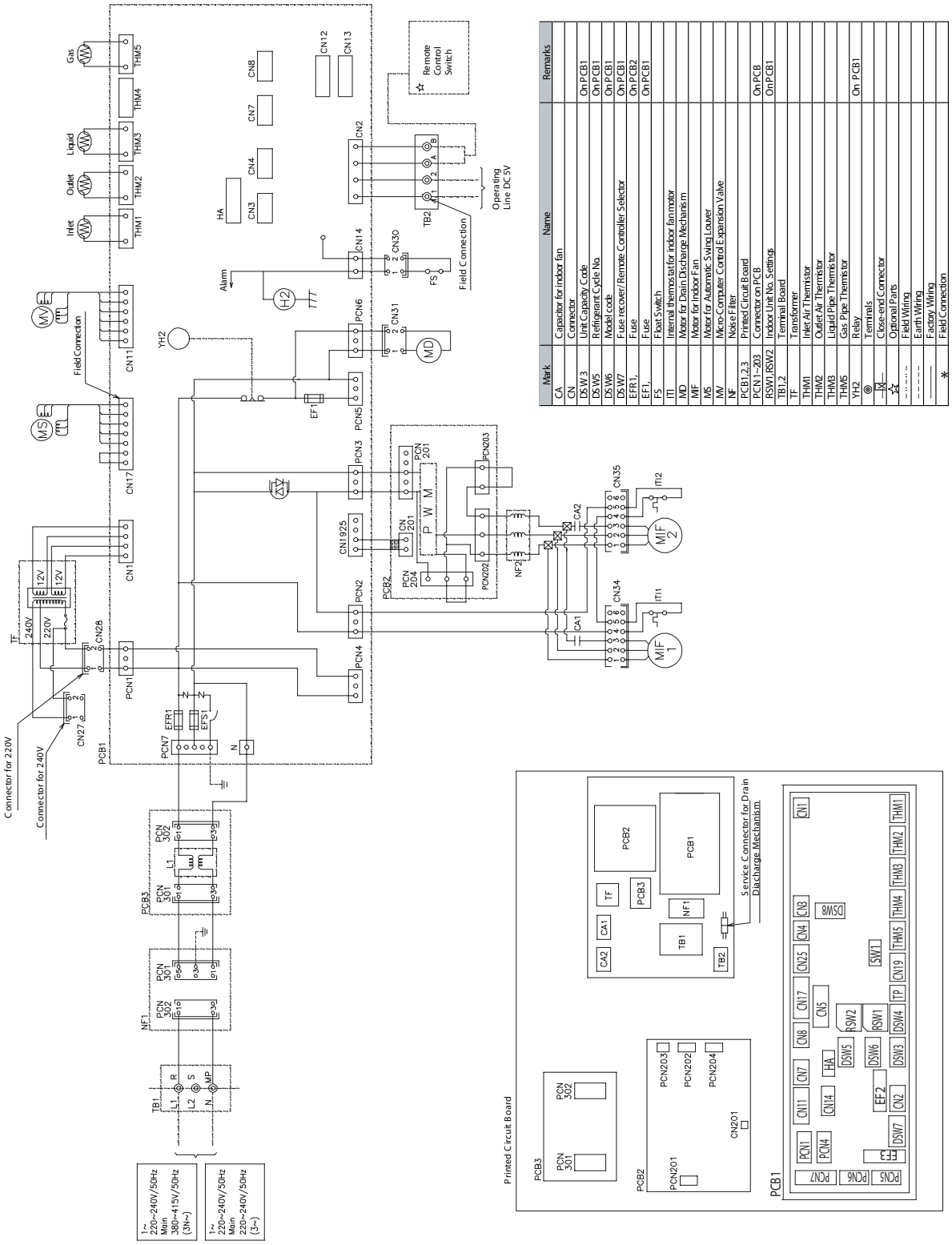


Electrical wiring diagram for models: RCD-(1.5~3.0)FSN2



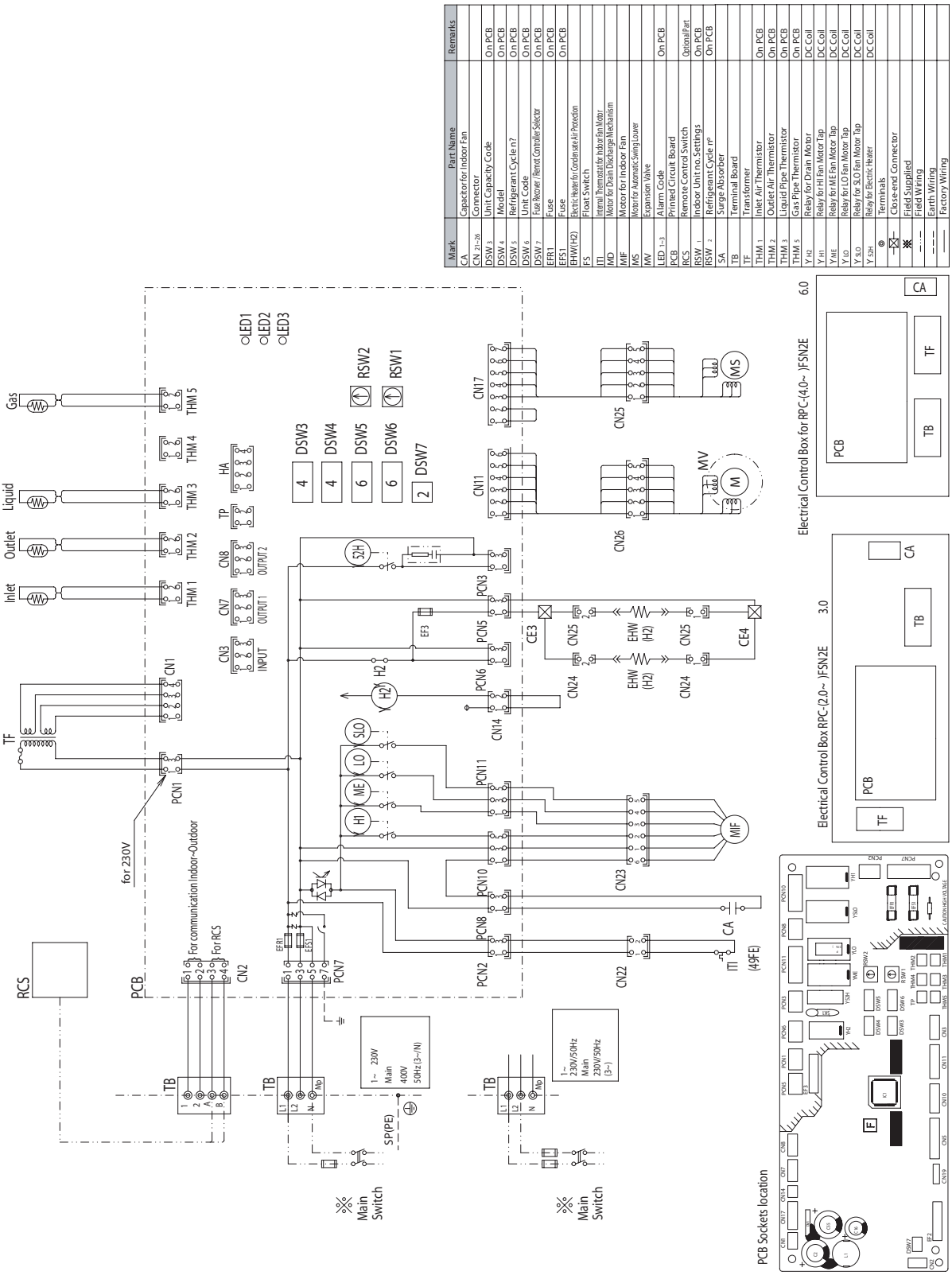
Mark	Name	Remarks
CA	Capacitor for indoor fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB1
DSW5	Refrigerant Cycle No.	On PCB1
DSW6	Model code	On PCB1
DSW7	Fuse recover/Remote Controller Selector	On PCB1
EFR1,	Fuse	On PCB2
EF1,	Fuse	On PCB1
FS	Float Switch	
ITI	Internal thermostat for indoor fan motor	
MD	Motor for Drain Discharge Mechanism	
MF	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	On PCB
PCN 1~203	Connector on PCB	On PCB
RSW1, RSW 2	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	

Electrical wiring diagram for models: RCD-(4.0~5.0)FSN2

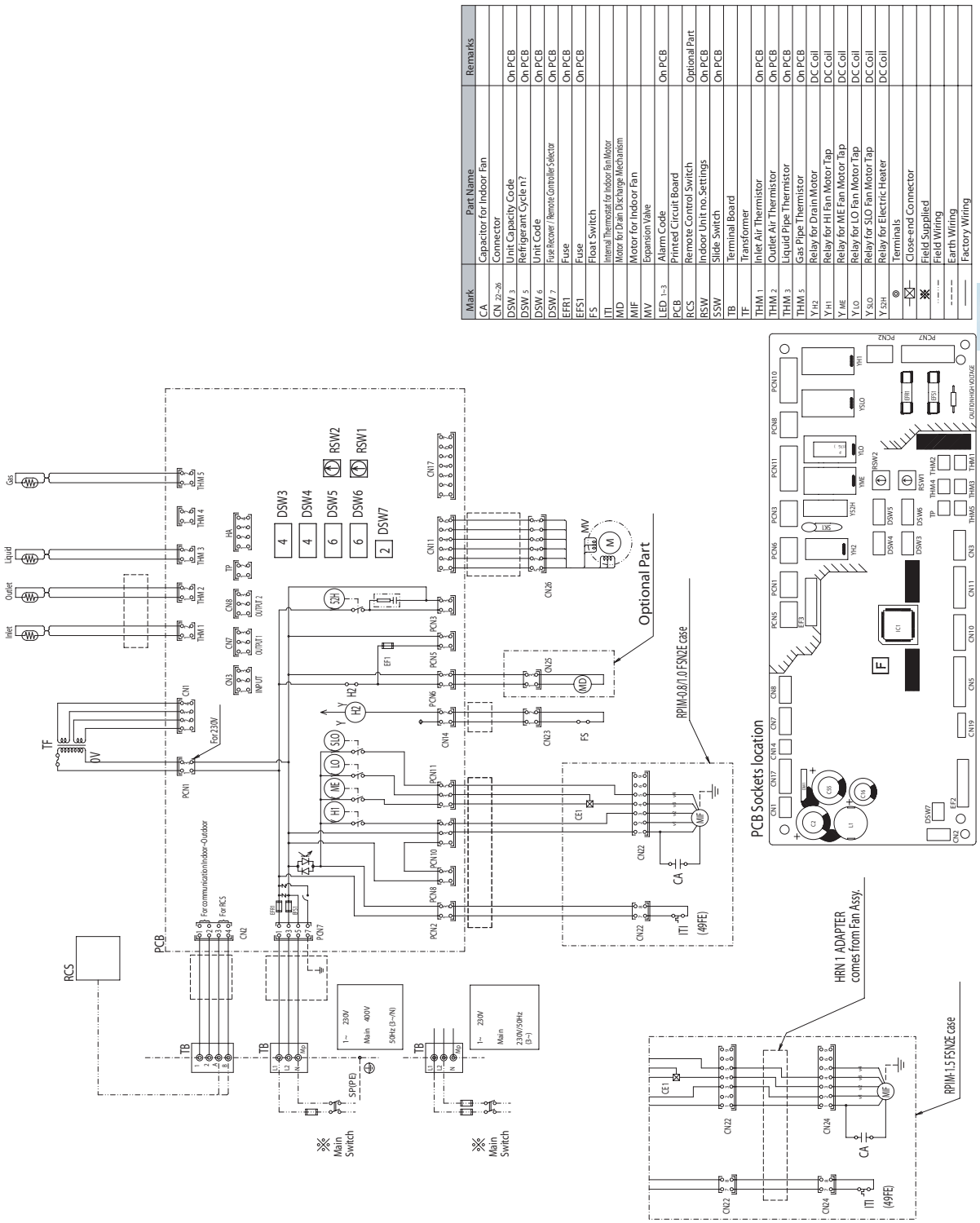


Mark	Name	Remarks
CA	Capacitor for indoor fan	
CN	Connector	
DS W3	Unit Capacity Code	On PCB1
DS W5	Refrigerant Cycle No.	On PCB1
DS W6	Model code	On PCB1
DS W7	Fuse recover/Remote Controller Selector	On PCB1
EFR1,	Fuse	On PCB2
EF1,	Fuse	On PCB1
FS	Float Switch	
ITI	Internal thermostat for indoor fan motor	
MD	Motor for Drain Discharge Mechanism	
MF	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
RSW1,RSW2	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	

Electrical wiring diagram for models: RPC-(2.0~6.0)FSN2E



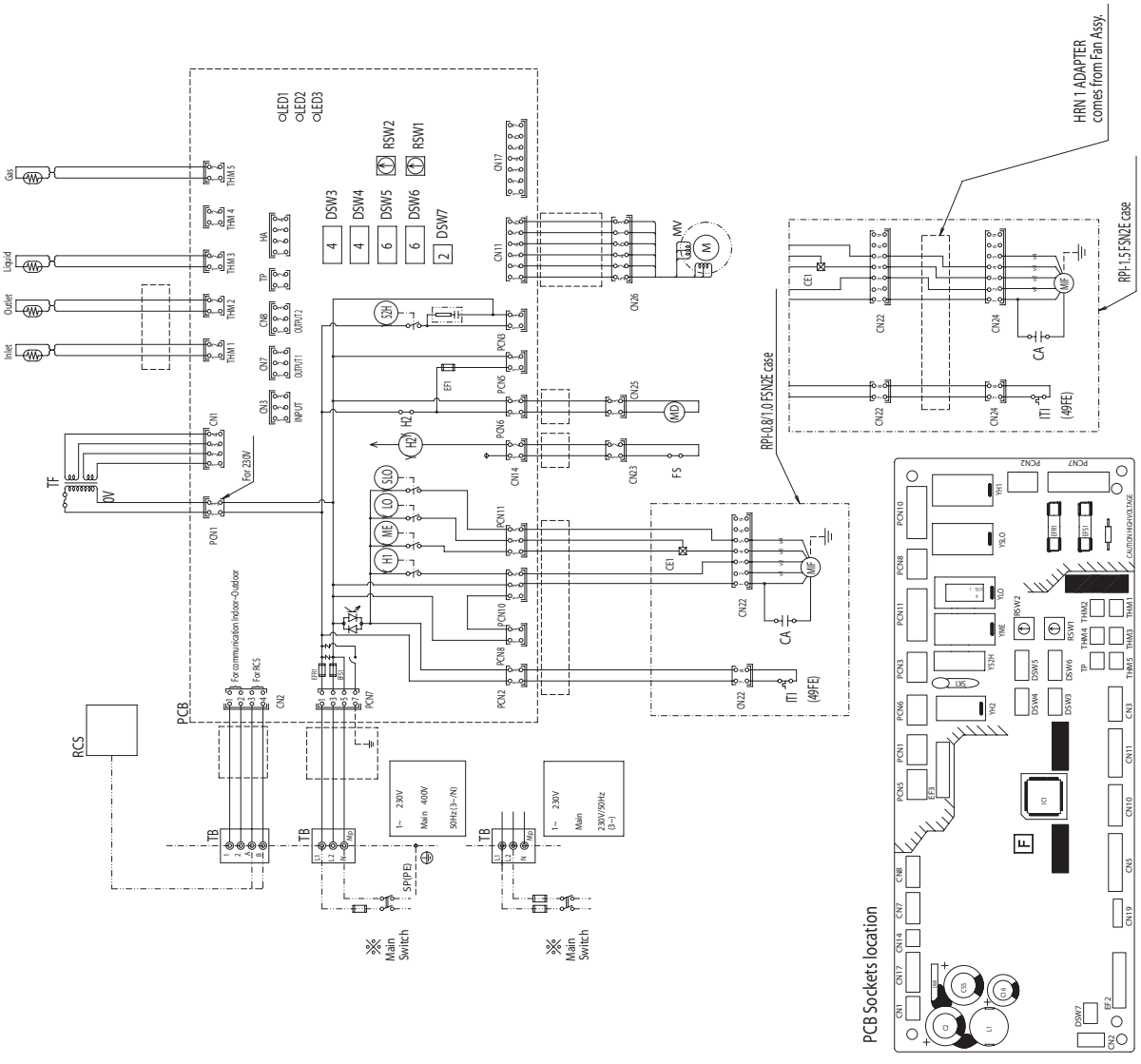
Electrical wiring diagram for models: RPIM-(1.5)FSN2E



Mark	Part Name	Remarks
CA	Capacitor for Indoor Fan	
CN 22~26	Connector	
DSW 3	Unit Capacity Code	On PCB
DSW 4	Refrigerant Cycle n?	On PCB
DSW 5	Unit Code	On PCB
DSW 6	Unit Code	On PCB
DSW 7	Fuse Recover / Remote Controller Selector	On PCB
EFR1	Fuse	On PCB
EFS1	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	Expansion Valve	
LED 1~3	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	
THM 1	Inlet Air Thermistor	On PCB
THM 2	Outlet Air Thermistor	On PCB
THM 3	Liquid Pipe Thermistor	On PCB
THM 5	Gas Pipe Thermistor	On PCB
Y H2	Relay for Drain Motor	DC Coil
Y H1	Relay for HI Fan Motor Tap	DC Coil
Y ME	Relay for ME Fan Motor Tap	DC Coil
Y LO	Relay for LO Fan Motor Tap	DC Coil
Y SLO	Relay for SLO Fan Motor Tap	DC Coil
Y S2H	Relay for Electric Heater	DC Coil
	Terminals	
	Close-end Connector	
	Field Supplied	
	Field Wiring	
	Earth Wiring	
	Factory Wiring	

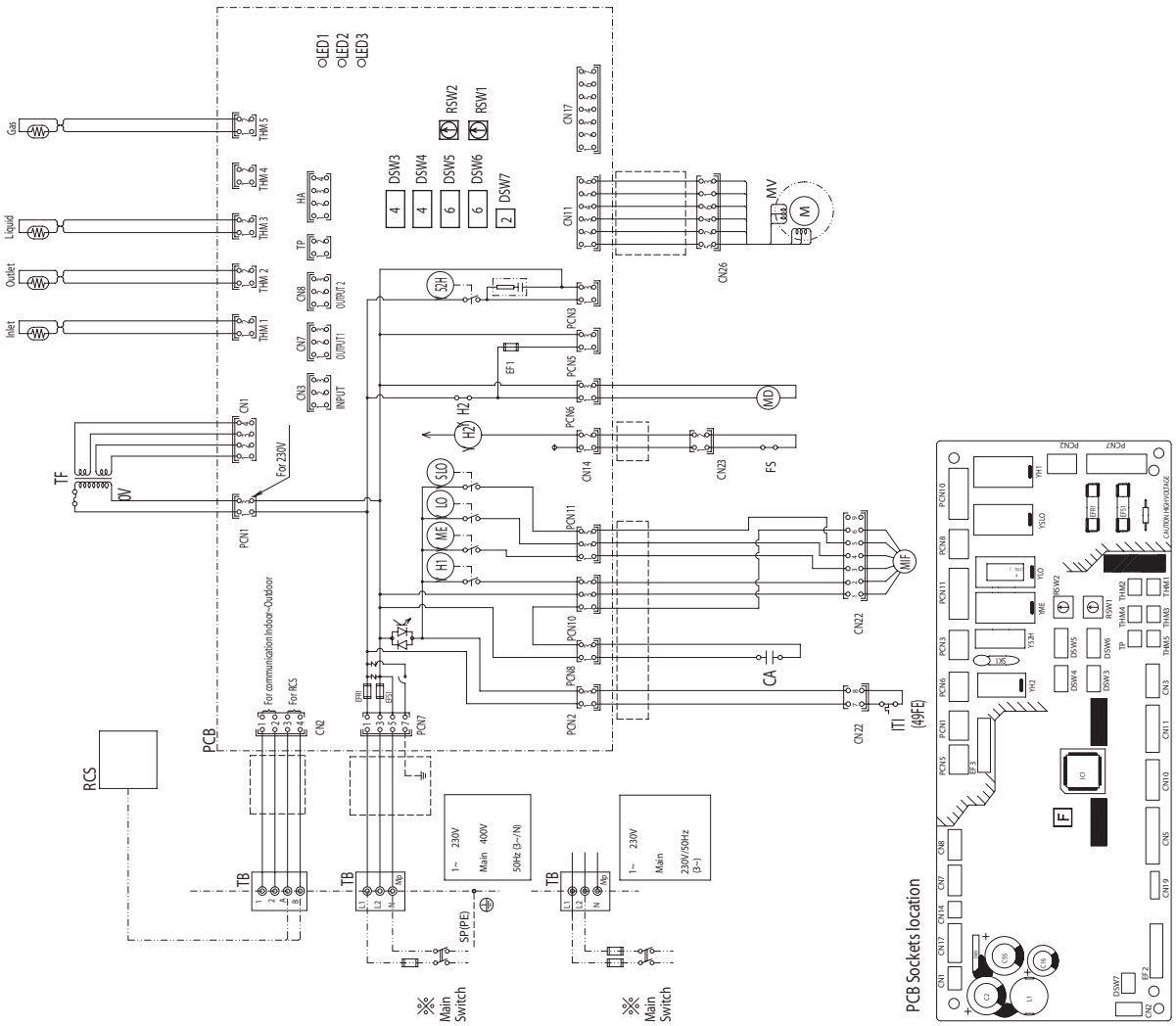
Electrical wiring diagram for models: RPI-(1.5)FSN2E

Mark	Part Name	Remarks
CA	Capacitor for Indoor Fan	
CN 22~26	Connector	
DSW 3	Unit Capacity Code	On PCB
DSW 5	Refrigerant Cycle n?	On PCB
DSW 6	Unit Code	On PCB
DSW 7	Fast Recover / Remote Controller Selector	On PCB
EFR1	Fuse	On PCB
EFS1	Fuse	On PCB
FS	Float Switch	
IT1	Internal Thermostat for Indoor Fan Motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MV	Expansion Valve	
LED 1~3	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	
THM 1	Inlet Air Thermistor	On PCB
THM 2	Outlet Air Thermistor	On PCB
THM 3	Liquid Pipe Thermistor	On PCB
THM 5	Gas Pipe Thermistor	On PCB
Y H2	Relay for Drain Motor	DC Coil
Y H1	Relay for HI Fan Motor Tap	DC Coil
Y ME	Relay for ME Fan Motor Tap	DC Coil
Y LO	Relay for LO Fan Motor Tap	DC Coil
Y SLO	Relay for SLO Fan Motor Tap	DC Coil
Y 52H	Relay for Electric Heater	DC Coil
	Terminals	
	Close-end Connector	
	Field Supplied	
	Field Wiring	
	Earth Wiring	
	Factory Wiring	

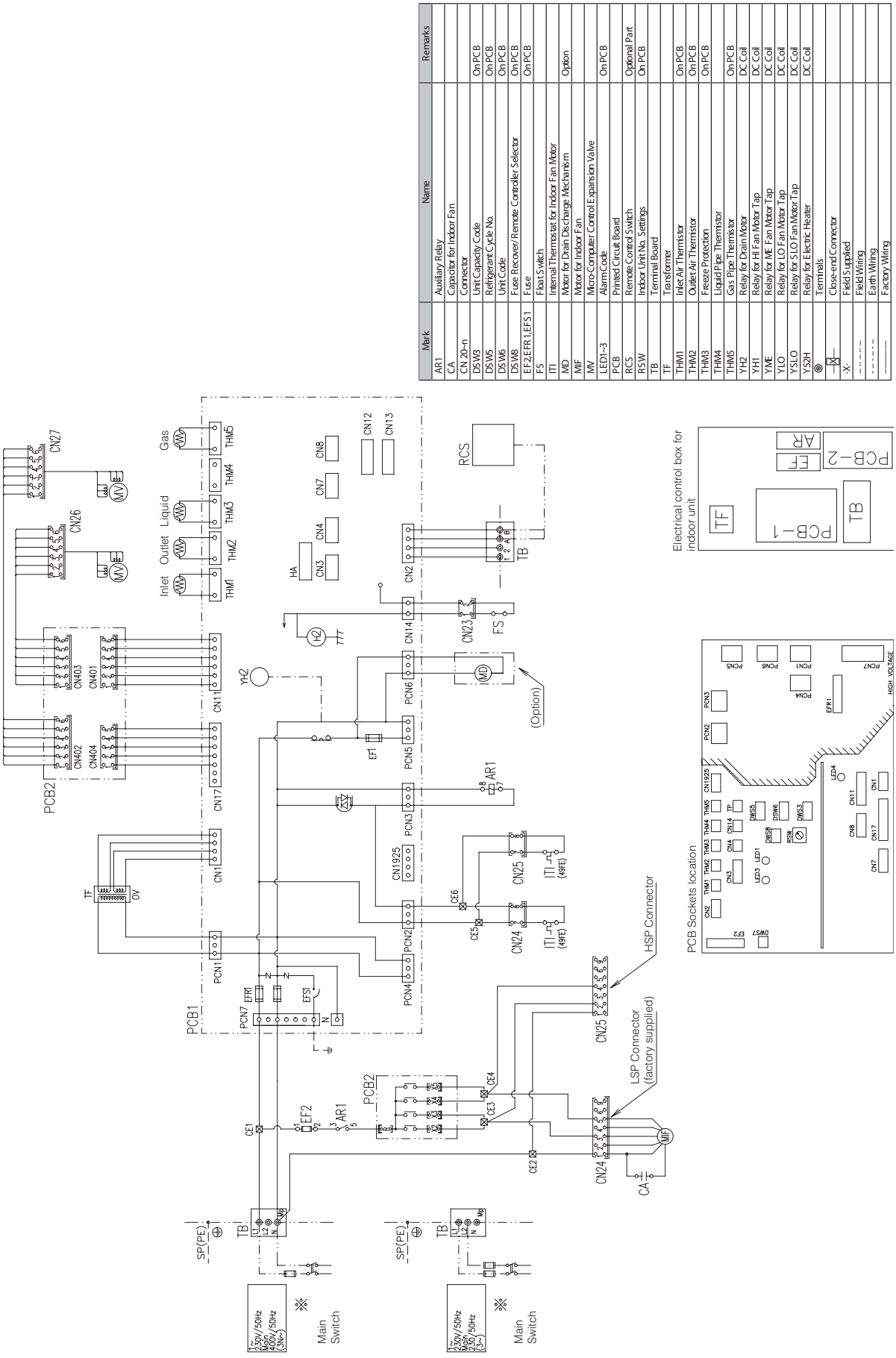


Electrical wiring diagram for models: RPI-(2.0~6.0)FSN2E

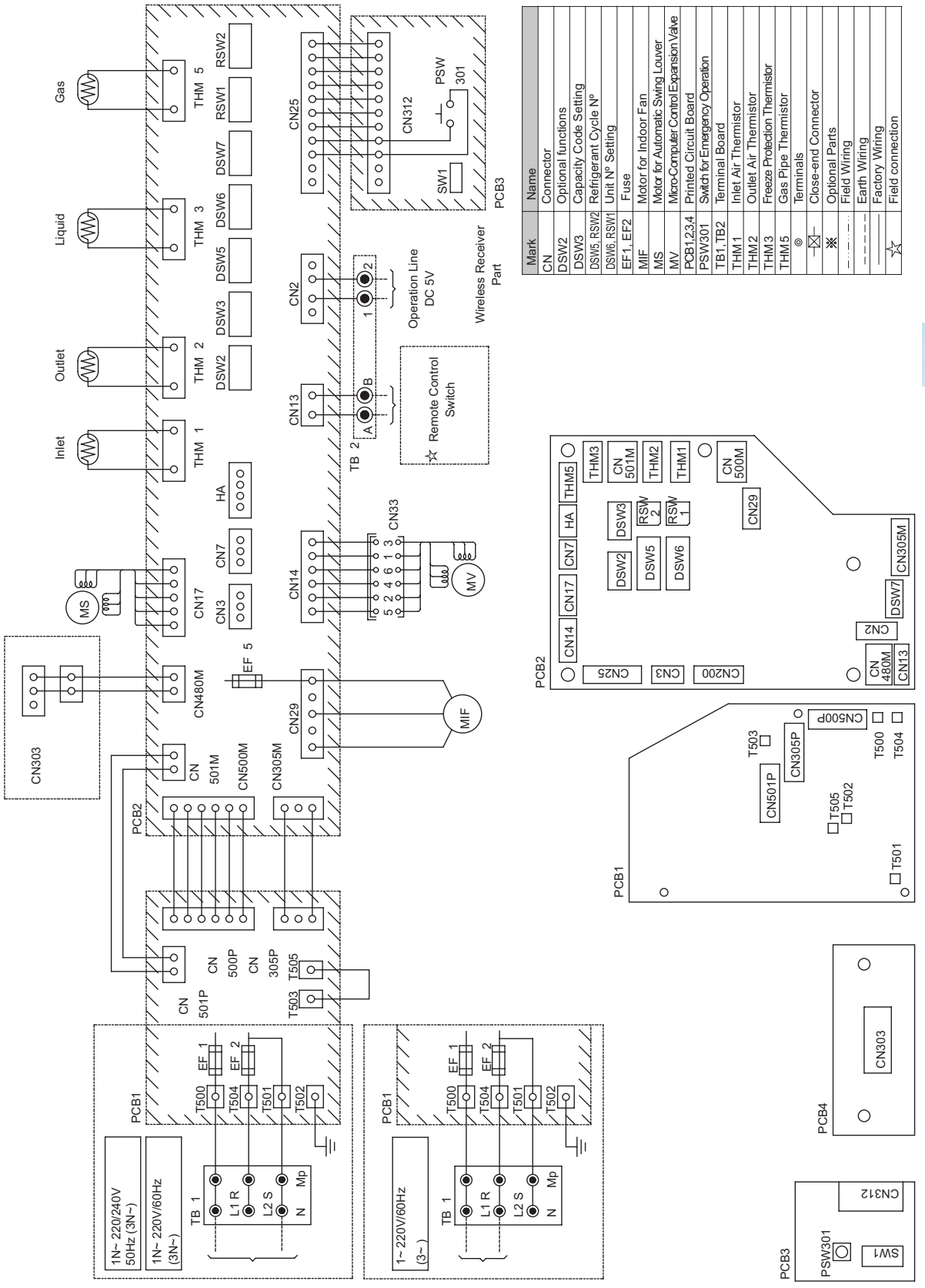
Mark	Part Name	Remarks
CA	Capacitor for Indoor Fan	
CN 22~26	Connector	
DSW 3	Unit CapacityCode	On PCB
DSW 5	Refrigerant Cycle n?	On PCB
DSW 6	Unit Code	On PCB
DSW 7	Fuse Recover/ Remote Controller Selector	On PCB
EFR1	Fuse	On PCB
EFS1	Fuse	On PCB
FS	Float Switch	
ITI	Internal Thermostat for Indoor Fan Motor	
MD	Motor for Drain Discharge Mechanism	
MIF	Motor for Indoor Fan	
MV	Expansion Valve	
LED 1~3	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	
THM 1	Inlet Air Thermistor	On PCB
THM 2	Outlet Air Thermistor	On PCB
THM 3	Liquid Pipe Thermistor	On PCB
THM 5	Gas Pipe Thermistor	On PCB
Y H2	Relay for Drain Motor	DC Coil
Y H1	Relay for HI Fan Motor Tap	DC Coil
Y ME	Relay for ME Fan Motor Tap	DC Coil
Y LO	Relay for LO Fan Motor Tap	DC Coil
Y SLO	Relay for SLO Fan Motor Tap	DC Coil
Y S2H	Relay for Electric Heater	DC Coil
◎	Terminals	
—⊠—	Close-end Connector	
※	Field Supplied	
·—·—·	Field Wiring	
————	Earth Wiring	
————	Factory Wiring	



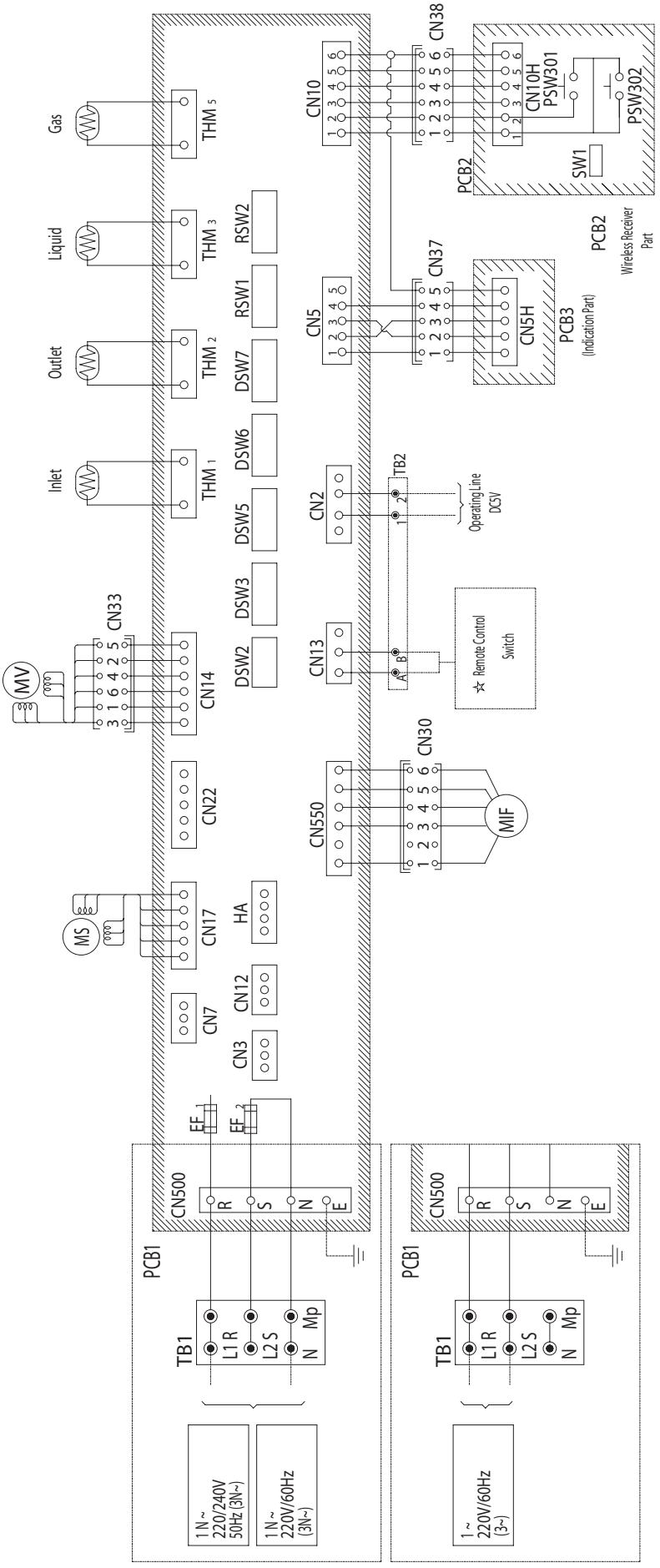
Electrical wiring diagram for models: RPI-(8.0-10.0)FSNE



Electrical wiring diagram for models: RPK-(1.5)FSN2M



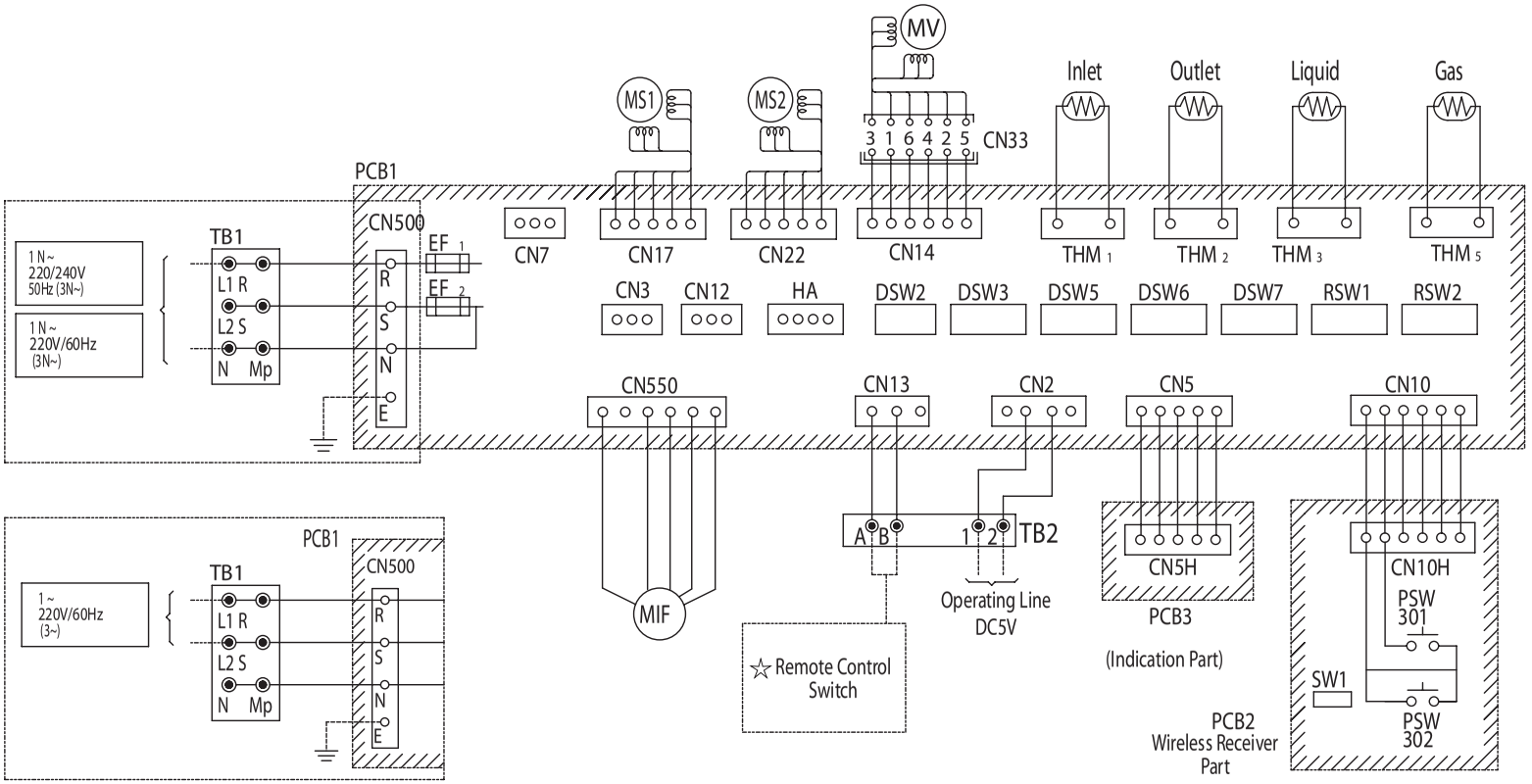
Electrical wiring diagram for models: RPK-(2.0)FSN2M



Mark	Name
CN	Connector
DSW2	Optional functions
DSW3	Capacity Code Setting
DSW5, RSW2	Refrigerant Cycle N°
DSW6, RSW1	Unit N° Setting
EF1, EF2	Fuse
MIF	Motor for Indoor Fan
MS	Motor for Automatic Swing Louver
MV	Micro-Computer Control Expansion Valve
PCB1,2,3,4	Printed Circuit Board
PSW301	Switch for Emergency Operation
TB1,TB2	Terminal Board

Mark	Name
THM 1	Inlet Air Thermistor
THM 2	Outlet Air Thermistor
THM 3	Freeze Protection Thermistor
THM 5	Gas Pipe Thermistor
◎	Terminals
—⊠—	Close-end Connector
※	Optional Parts
— · — · — · —	Field Wiring
— — — — —	Earth Wiring
———	Factory Wiring
☆	Field connection

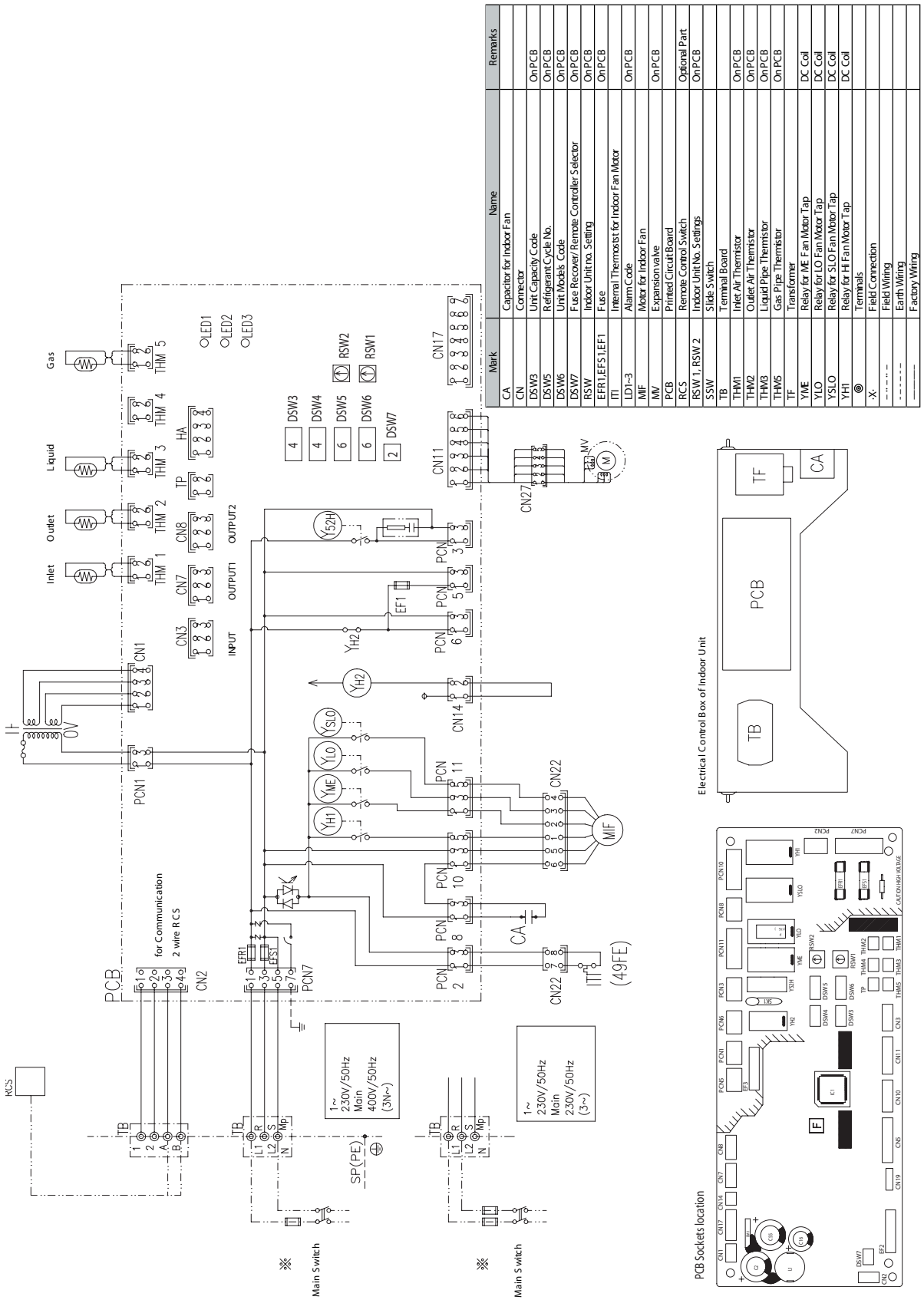
Electrical wiring diagram for models: RPK-(2.5~4.0)FSN2M



Mark	Name
CN	Connector
DSW2	Optional functions
DSW3	Capacity Code Setting
DSW5, RSW2	Refrigerant Cycle Nº
DSW6, RSW1	Unit Nº Setting
EF1, EF2	Fuse
MIF	Motor for Indoor Fan
MS	Motor for Automatic Swing Louver
MV	Micro-Computer Control Expansion Valve
PCB1,2,3,4	Printed Circuit Board
PSW301	Switch for Emergency Operation
TB1,TB2	Terminal Board

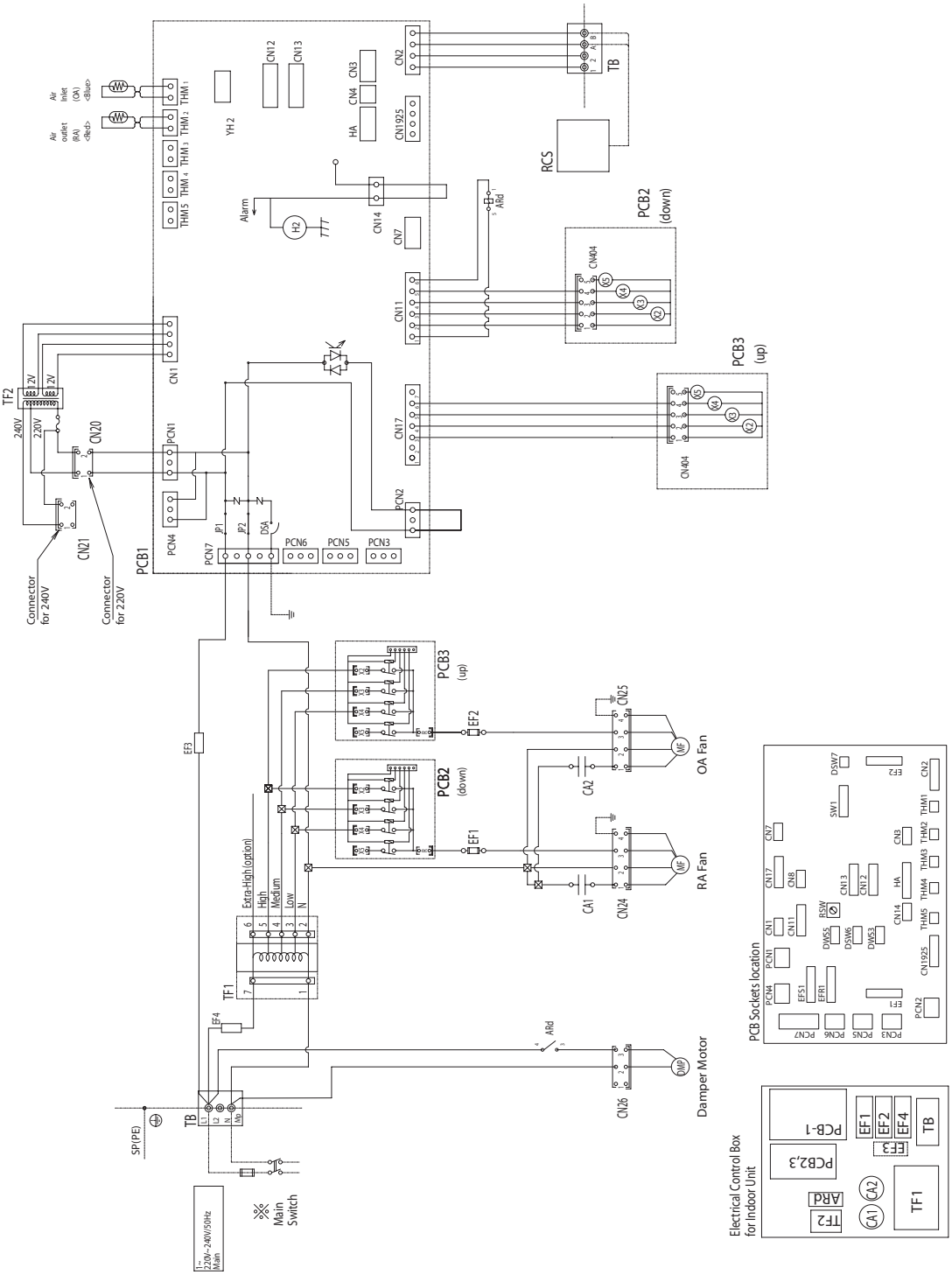
Mark	Name
THM 1	Inlet Air Thermistor
THM 2	Outlet Air Thermistor
THM 3	Freeze Protection Thermistor
THM 5	Gas Pipe Thermistor
◎	Terminals
—⊠—	Close-end Connector
※	Optional Parts
– · – · – · –	Field Wiring
– – – – –	Earth Wiring
———	Factory Wiring
☆	Field connection

Electrical wiring diagram for models: RPF(I)-(1.5~2.5)FSN2E

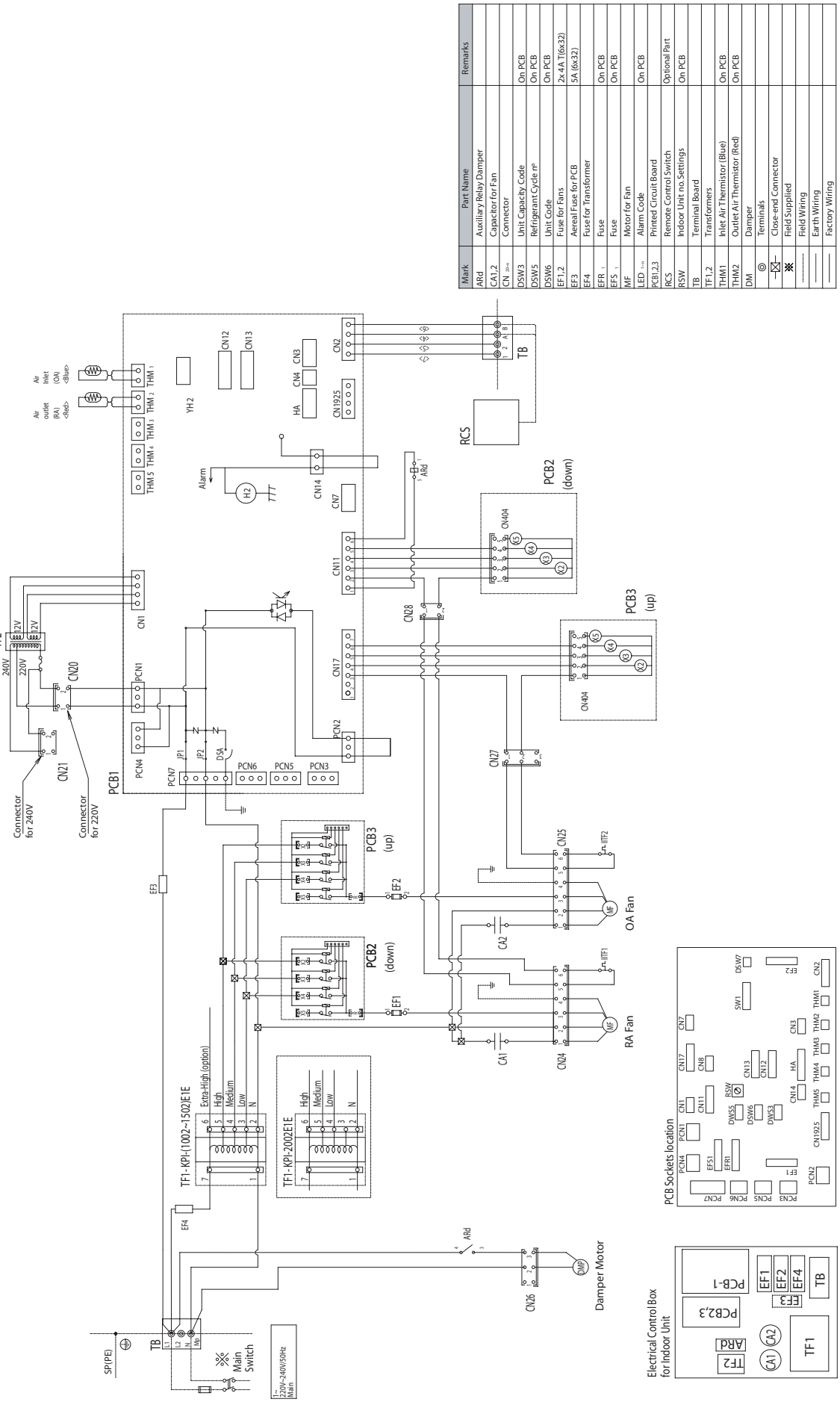


Mark	Name	Remarks
CA	Capacitor for Indoor Fan	
CN	Connector	
DSW3	Unit Capacity Code	On PCB
DSW5	Refrigerant Cycle No.	On PCB
DSW6	Unit Models Code	On PCB
DSW7	Fuse Recover/Remote Controller Selector	On PCB
RSW	Indoor Unit no. Setting	On PCB
EFR1,EFS1,EF1	Fuse	On PCB
ITI	Internal Thermostst for Indoor 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 1, RSW 2	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	

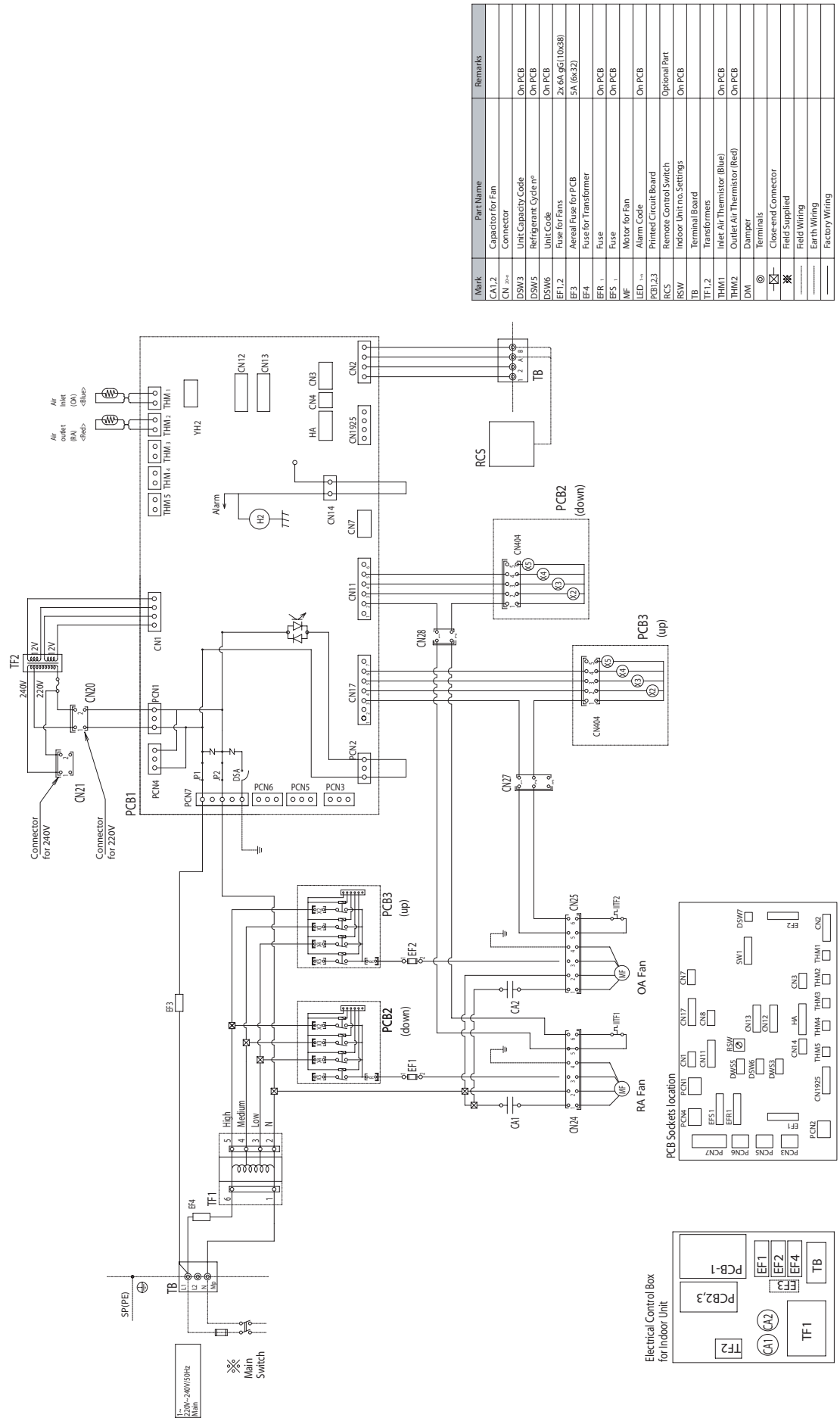
Electrical wiring diagram for models: KPI-(502-802)



Electrical wiring diagram for models: KPI-(1002-2002)

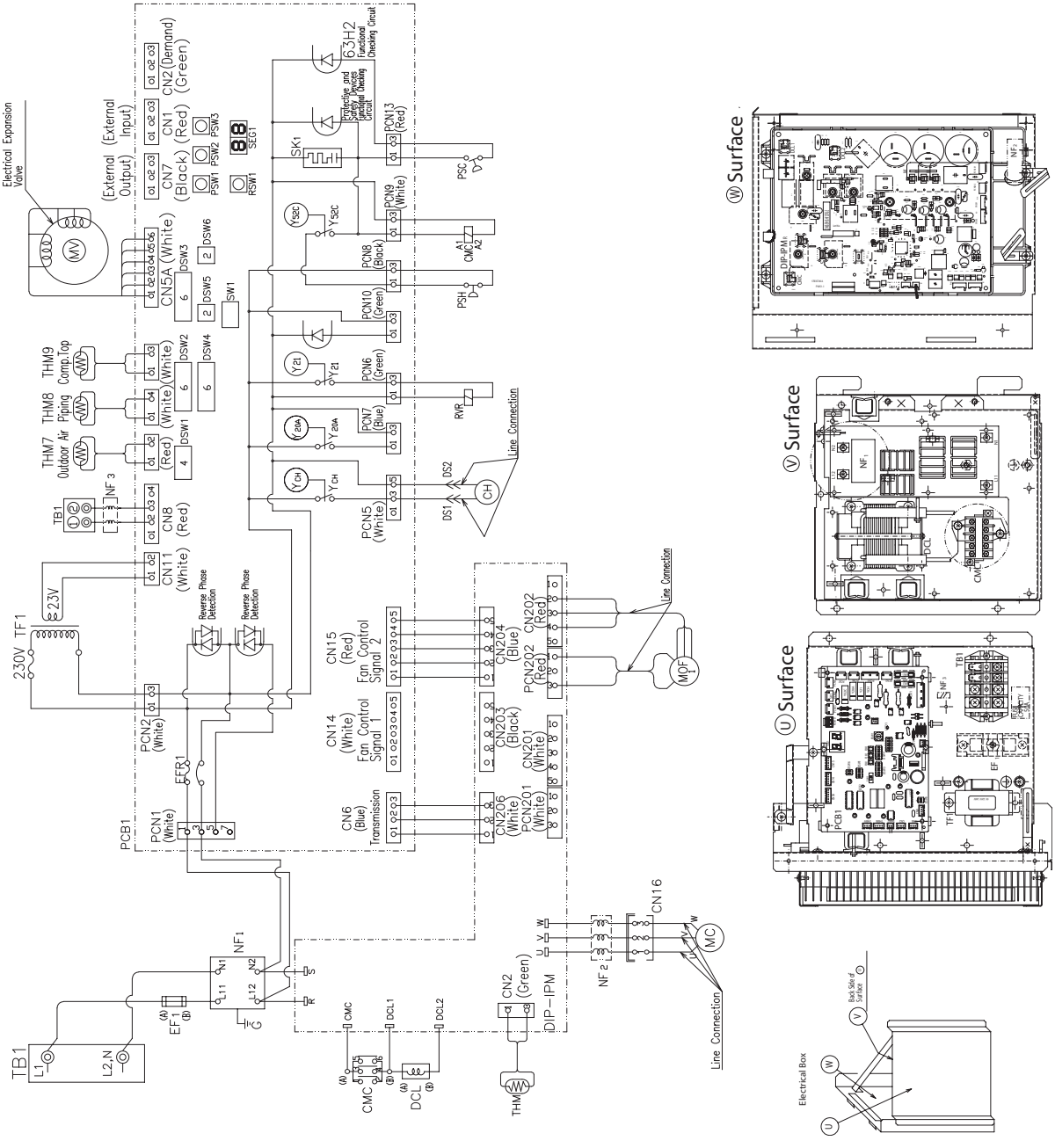


Electrical wiring diagram for models: KPI-(3002)



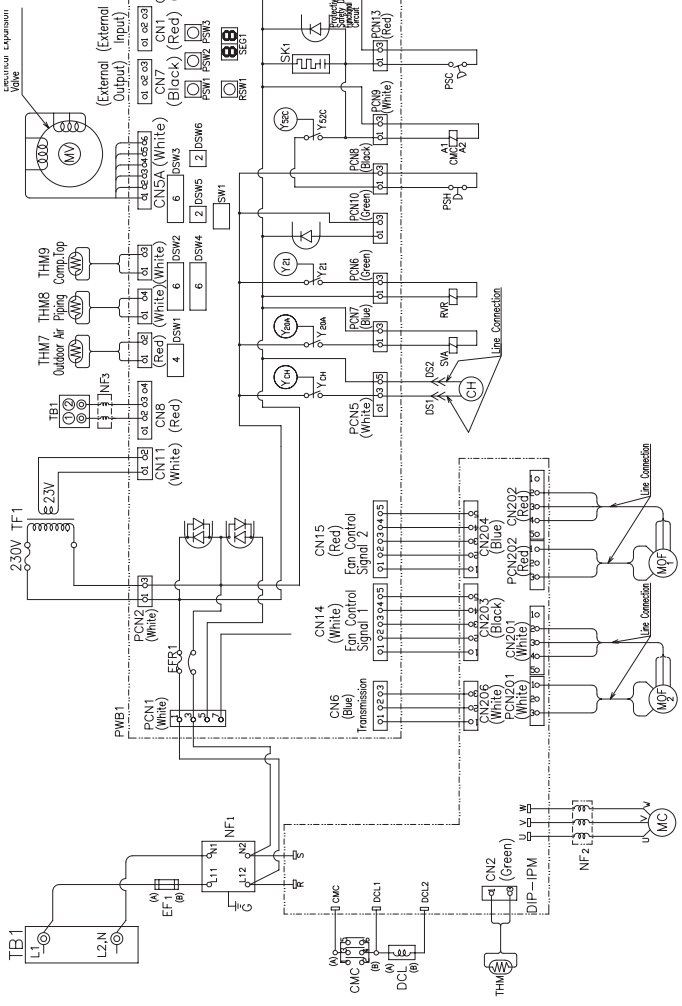
Electrical wiring diagram for models: RAS-3HVRNME

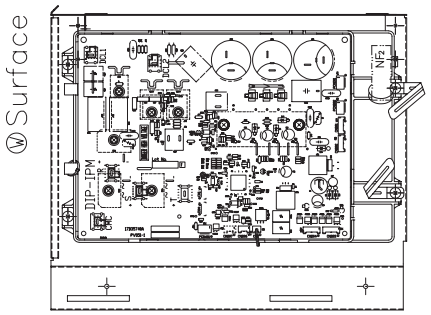
Mark	Name of Parts	Remarks
MC	Motor (for Compressor)	
MOF1	Motor (for Fan)	
EF1	Power Fuse	
CMC	Magnetic Contactor (for Compressor)	
RVR	Magnetic 4 Way Valve	
MV	Electrical Expansion Valve	
TB1,2	Terminal Board	
TF1	Transformer	
PCB1	Printed Circuit Board	
EFR1	Fuse	
Y 52C	Aux.Relay (For Compressor,Magnetic Contactor)	DC Coil
Y 21	Aux.Relay(For Magnetic 4 Way Valve)	DC Coil
Y 20A	Aux.Relay(For Magnetic Valve)	DC Coil
Y CH	Aux.Relay(For C Heater)	DC Coil
THM7	Thermistor (for Outdoor Air)	
THM8	Thermistor (for Piping)	
THM9	Thermistor (for Comp.Top)	
PSH	High Pressure Switch(for Protection)	
PSC	High Pressure Switch(for Control)	
DCL	Reactor	
DIP-IPM	Inverter Module	
NF1~3	Noise Filter	
PSW1	Switch(Forced Defrosting)	On PWB
PSW2	Switch(Checking)	On PWB
PSW3	Switch(Checking)	On PWB
DSW1	Switch(Test Run)	On PWB
DSW2	Switch(Auxiliary Option Setting)	On PWB
DSW3	Switch(Outdoor Capacity Setting)	On PWB
DSW4	Switch(Refrigerant Cycle Setting)	On PWB
DSW5	Switch	On PWB
DSW6	Switch (Power Source Setting)	On PWB
SW1	Switch(Transmission Changeover)	On PWB
CH	Crankcase Heater	
DS 1,2	Inserting Type Connector	
G	Ground	

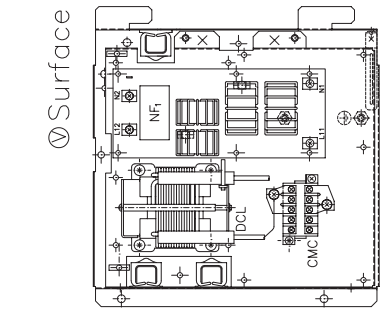


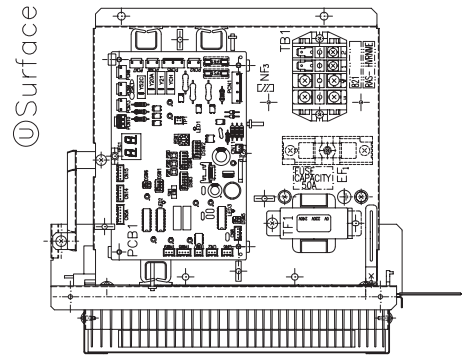
Electrical wiring diagram for models: RAS-(4~6)HVRNME

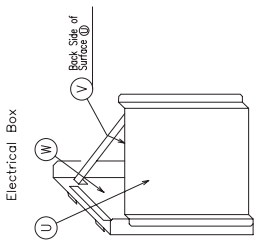
Mark	Name of Parts	Remarks
MC	Motor (for Compressor)	
MOF1,2	Motor (for Fan)	
EF1	Power Fuse	
CMC	Magnetic Contactor (for Compressor)	
RVR	Magnetic 4 Way Valve	
SVA	Solenoid Valve	
MV	Electrical Expansion Valve	
TB1	Terminal Board	
TF1	Transformer	
PCB1	Printed Circuit Board	
EFR1	Fuse	
Y_{52C}	Aux.Relay (For Compressor Magnetic Contactor)	DC Coil
Y_{21}	Aux.Relay(For Magnetic 4 Way Valve)	DC Coil
Y_{20A}	Aux.Relay(For Magnetic Valve)	DC Coil
Y_{CH}	Aux.Relay(For C.Heater)	DC Coil
THM7	Thermistor (for Outdoor Air)	
THM8	Thermistor (for Piping)	
THM9	Thermistor (for Comp. Top)	
PSH	High Pressure Switch(for Protection)	
PSC	High Pressure Switch(for Control)	
DCL	Reactor	
DIP-IPM	Inverter Module	
NF1~3	Noise Filter	
PSW1	Switch(Forced Defrosting)	On PWB
PSW2	Switch(Checking)	On PWB
PSW3	Switch(Checking)	On PWB
DSW1	Switch(Test Run)	On PWB
DSW2	Switch(Auxiliary Option Setting)	On PWB
DSW3	Switch(Outdoor Capacity Setting)	On PWB
DSW4	Switch(Refrigerant Cycle Setting)	On PWB
DSW5	Switch	On PWB
DSW6	Switch (Power Source Setting)	On PWB
SW1	Switch(Transmission Changeover)	On PWB
DS1,2	Inserting Type Connector	
G	Ground	
CH	Crankcase Heater	







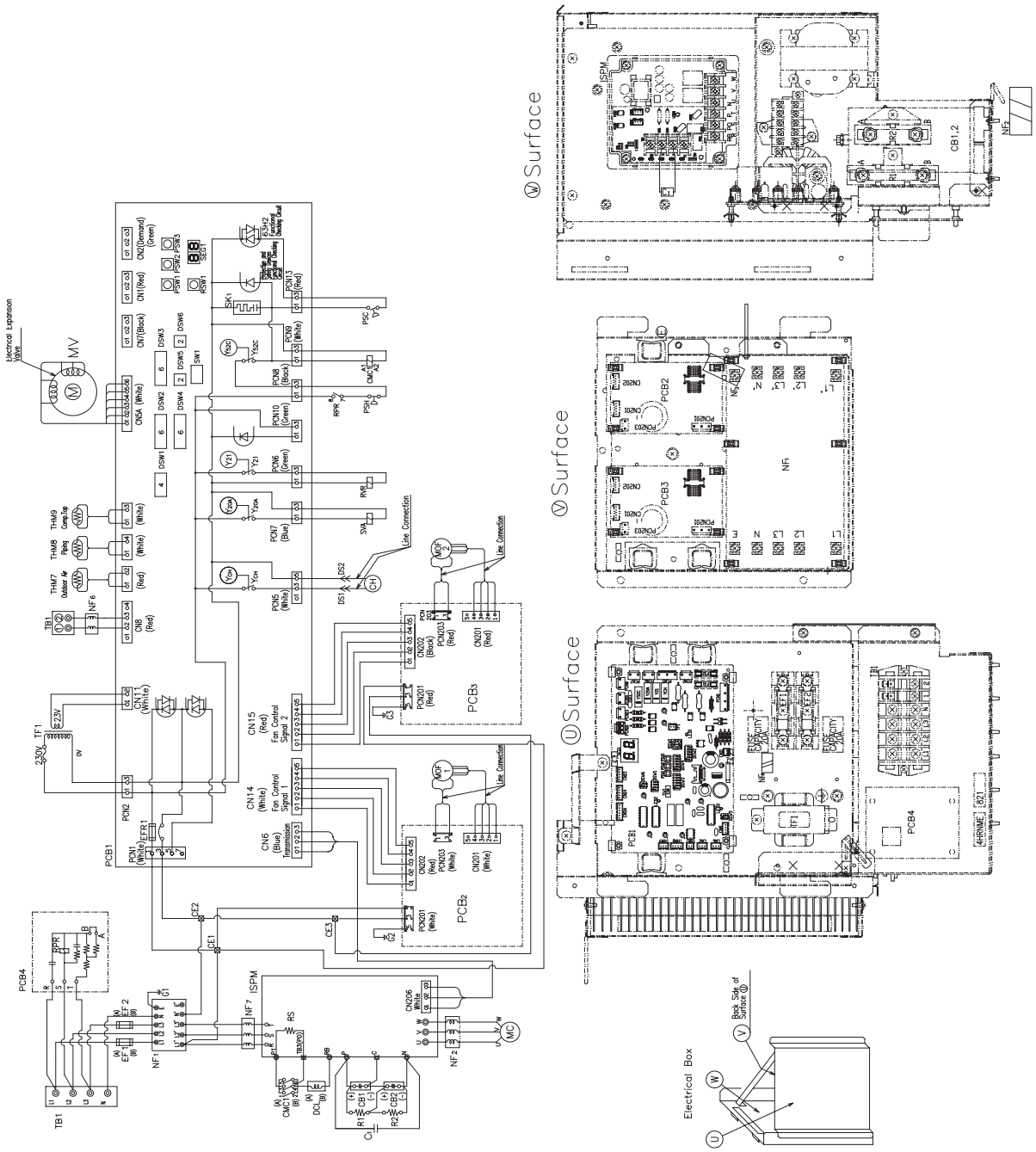




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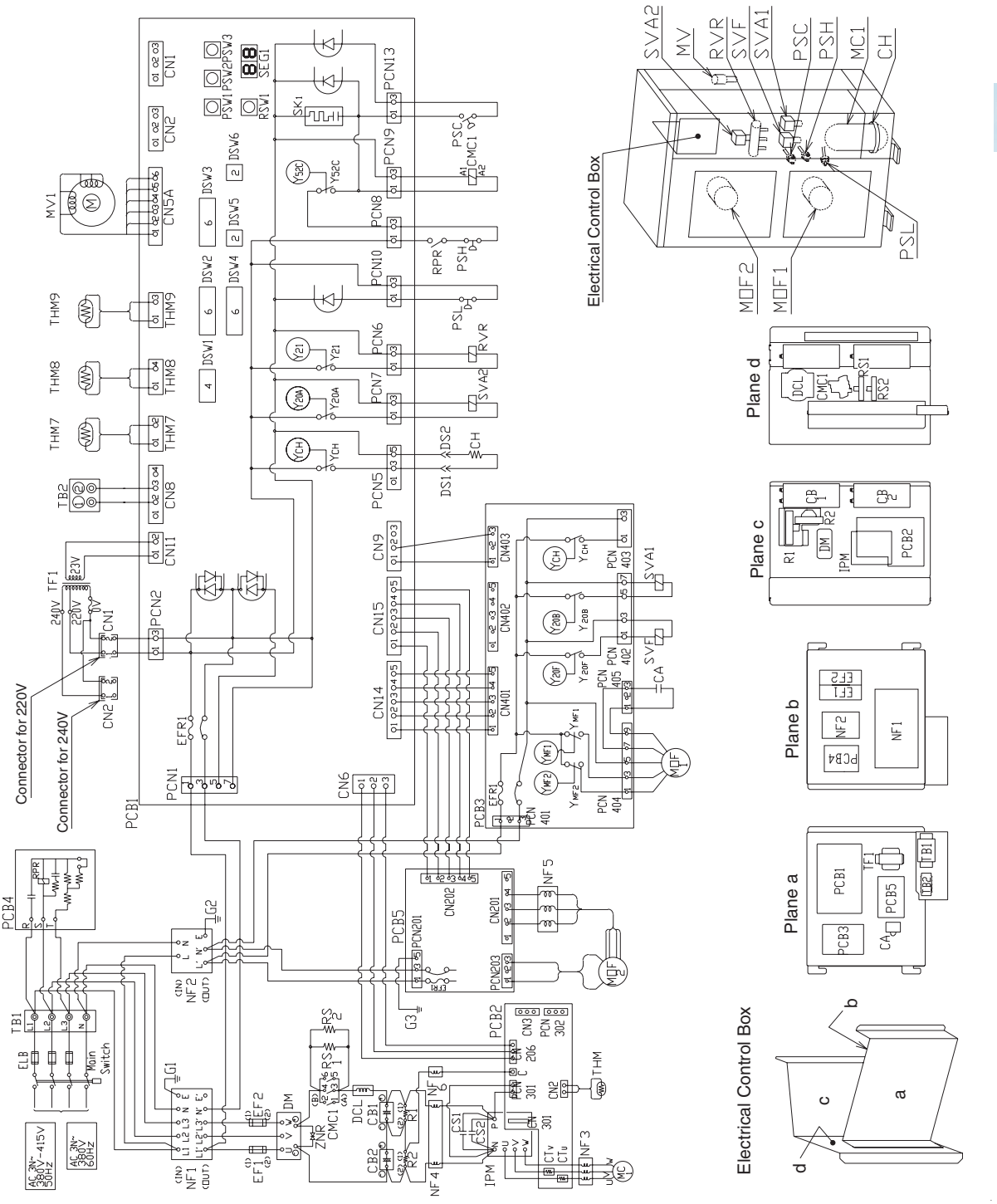
Electrical wiring diagram for models: RAS-(4~6)HRNME

Mark	Name of Parts	Remarks
MC	Motor (for Compressor)	
MOF1,2	Motor (for Fan)	
EF1,2	Power Fuse	
CMC1	Magnetic Contactor (for Compressor)	
RVR	Magnetic 4 Way Valve	
SVA	Solenoid Valve	
MV	Electrical Expansion Valve	
TB1	Terminal Board	
TF1	Transformer	
PCB1	Printed Circuit Board	
PCB2,3	Printed Circuit Board	
PCB4	Printed Circuit Board	
EFR1	Fuse	
Y52C	Aux.Relay(for Compressor Magnetic Contactor)	DC Coil
Y21	Aux.Relay(for Magnetic 4 Way Valve)	DC Coil
Y20A	Aux.Relay(For Magnetic Valve)	DC Coil
YCH	Aux.Relay(For C Heater)	DC Coil
THM7	Thermistor (for Outdoor Air)	
THM8	Thermistor (for Piping)	
THM9	Thermistor (for Comp. Top)	
PSH	High Pressure Switch(for Protection)	
PSC	High Pressure Switch(for Control)	
DCL	Reactor	
CB1,2	Capacitor	
SPM	Inverter Module	
NF1,6,7	Noise Filter	
PSW1	Switch(Forced Defrosting)	On PWB
PSW2	Switch(Checking)	On PWB
PSW3	Switch(Checking)	On PWB
DSW1	Switch(Test Run)	On PWB
DSW2	Switch(Auxiliary Option Setting)	On PWB
DSW3	Switch(Outdoor Capacity Setting)	On PWB
DSW4	Switch(Refrigerant Cycle Setting)	On PWB
DSW5	Switch	On PWB
DSW6	Switch (Power Source Setting)	On PWB
SW1	Switch(Transmission Changeover)	On PWB
C1	Capacitor	
R1,2	Resistance (For Starting)	
RPR	Reverse Protection Relay	
CH	Crankcase Heater	



Electrical wiring diagram for models: RAS-(8~12)HRNM

Mark	Part Name
CA CS1.2	Capacitor
CB1.2	Capacitor
CH	Crankcase heater
CMC1	Contactor for compressor motor
DCL	Reactor
DS 1.2	I.F Connector
DM	Diode module
DSW1~6	Dip switch on PCB1
EF1.2	Fuse
IPM	Inverter system power 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. PSL	Pressure switch for control
PSH	High pressure 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	Transformer
THM	Thermistor for fin temperature
THM 7~9	Thermistor
ZNR	Surge absorber



4. CONTROL SYSTEM

This chapter presents the control system flowcharts for the H(V)RNME Outdoor units series and the complete range of the Hitachi indoor units.

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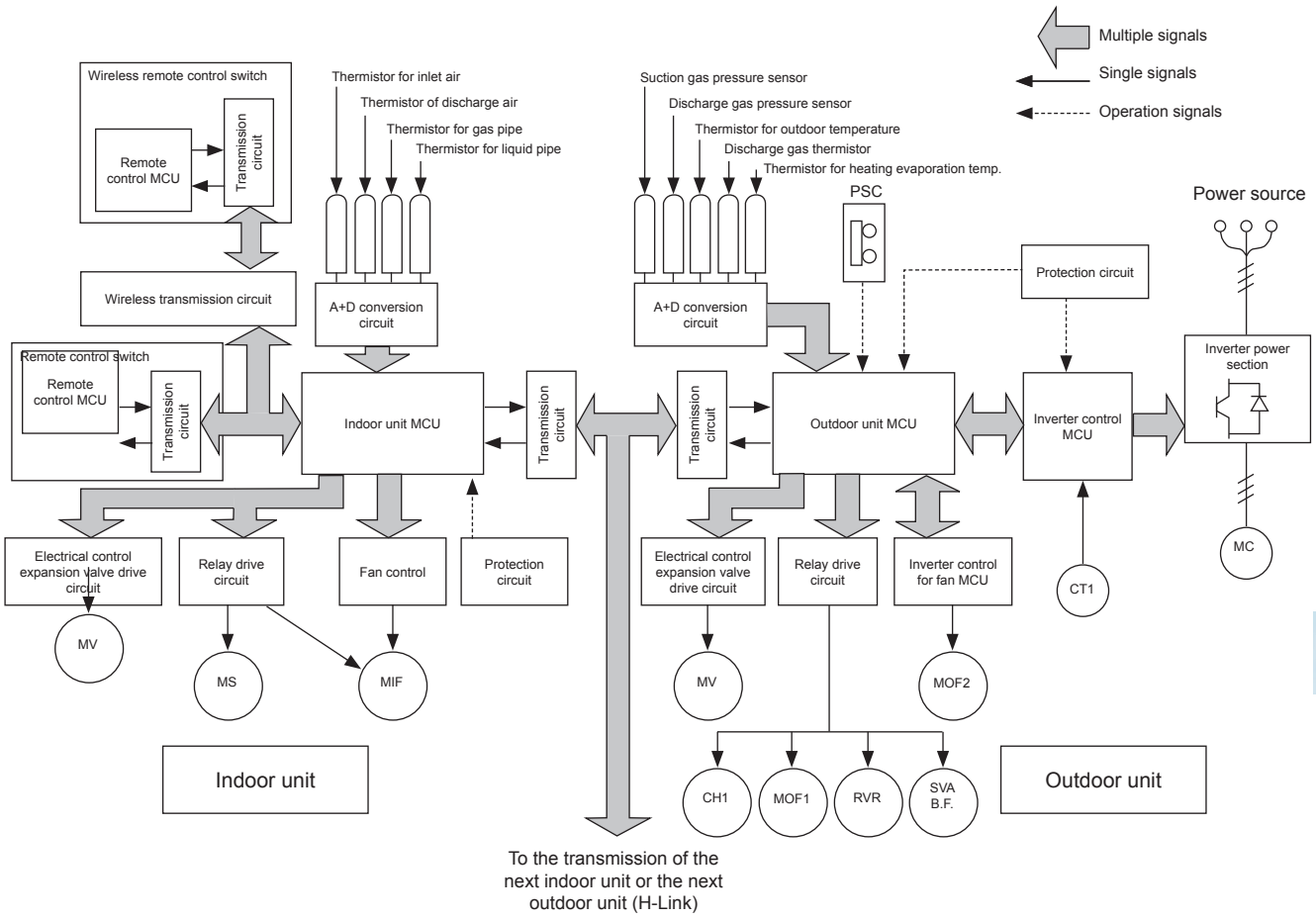
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4.1. DEVICE CONTROL SYSTEM

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 (stop compressor during 30 sec. After defrosting condition was completed.
Opening degree expansion valve of outdoor unit	Fully open	- Control range of expansion valve opening degree is determined to optimize temperature. 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. (RAS-(3~12)H(V)RNM(E)	- 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 (RAS-(3~12)H(V)RNM(E)	Turn ON at starting	Turn ON at starting
Solenoid Valve (SVF) (Oil return)	Turn ON at compressor operation (RAS-(3~12)H(V)RNM(E)	Turn ON at compressor operation	Turn ON at staring
High/Low pressure balance	Turn ON SVA or SVB before compressor starting (RAS-(8~12)H(V)RNM(E)	-	-

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



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

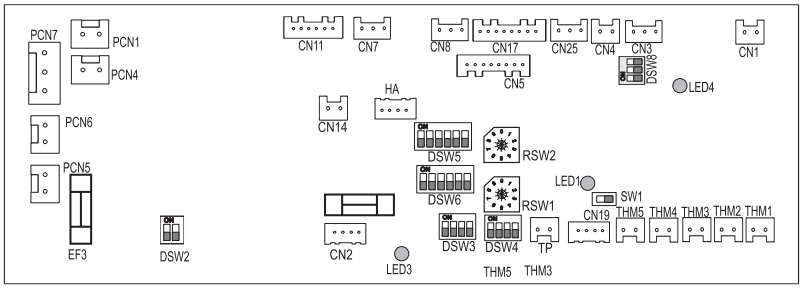
4.2. INDOOR UNIT PCB

4.2.1. Layout of the printed circuit board for RCI, RCIM, RCD

- **PCB drawing**

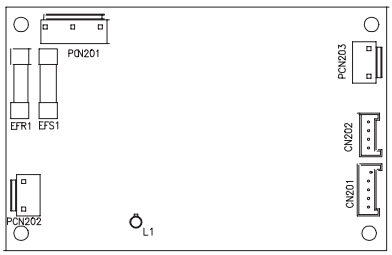
  The PCB in the indoor unit operates with five types of DIP switches, and two rotary switches. The location is as follows:

PCB1

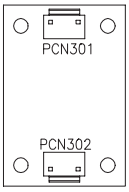


LED indication		
LED1	Red	This LED indicates the transmission status between the indoor unit and the RCS
LED3	Yellow	This LED indicates the transmission status between the indoor unit and the outdoor unit
LED4	Red	Power source for the PCB

PCB2



PCB3



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 II
CN3	Input optional functions
CN4	(Not used)
CN7	Output optional functions
CN8	Output optional functions
CN11	Expansion valve control
CN14	Float switch
CN17	Swing louver motor 4
CN19	PCB2 connection
CN25	(Not used)

Connector indication	
CN201, CN202	PCB1 connection
EFS1	PCB2 fuse
EFR1	PCB2 fuse
EF3	PCB1 fuse
EF2	PCB1 fuse
Switch indication	
DSW3	Capacity code
DSW4	Unit model code
DSW5, RSW2	Ref. cycle N°
DSW7	Fuse recovery
DWS6, RSW1	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.*

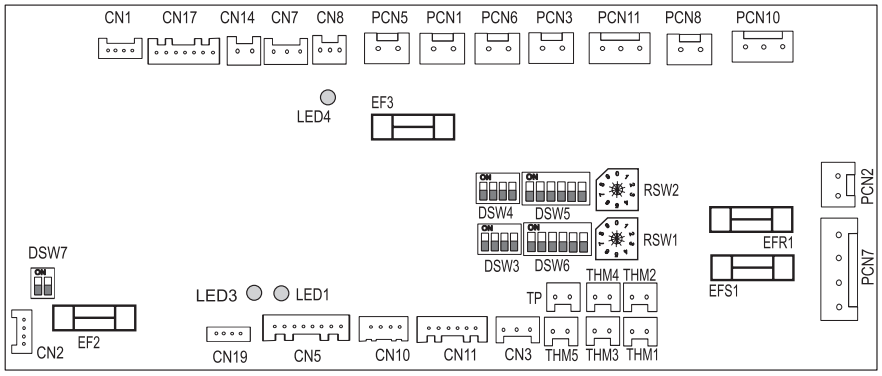
CAUTION

- *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.*

4.2.2. Layout of the printed circuit board for RPIM, 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	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	Green	Power source for the PCB

4

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
TP	(Not used)
EF3	Fuse
EF2	Fuse
EFS1	Fuse

Connector indication	
EFR2	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)
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
DSW4	Unit model code
DSW5, RSW2	Ref. cycle N°
DSW7	Fuse recovery
DSW6, RSW1	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.*

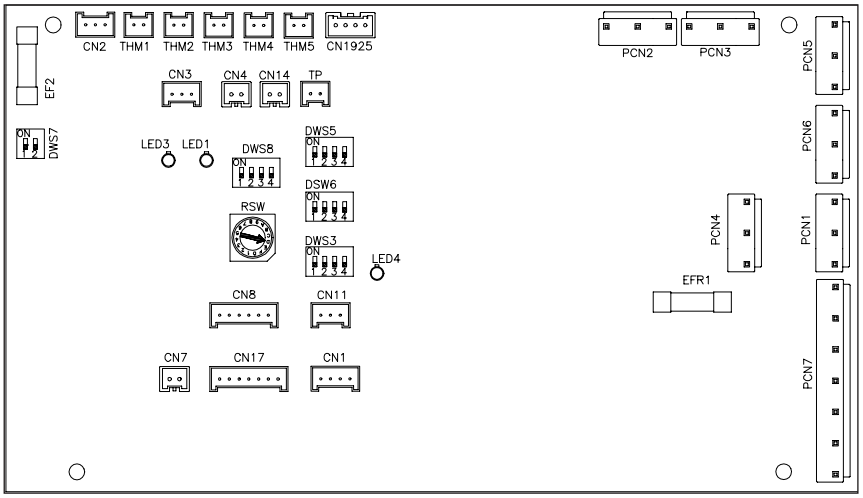
CAUTION

- *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.*

4.2.3. 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 II
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.*

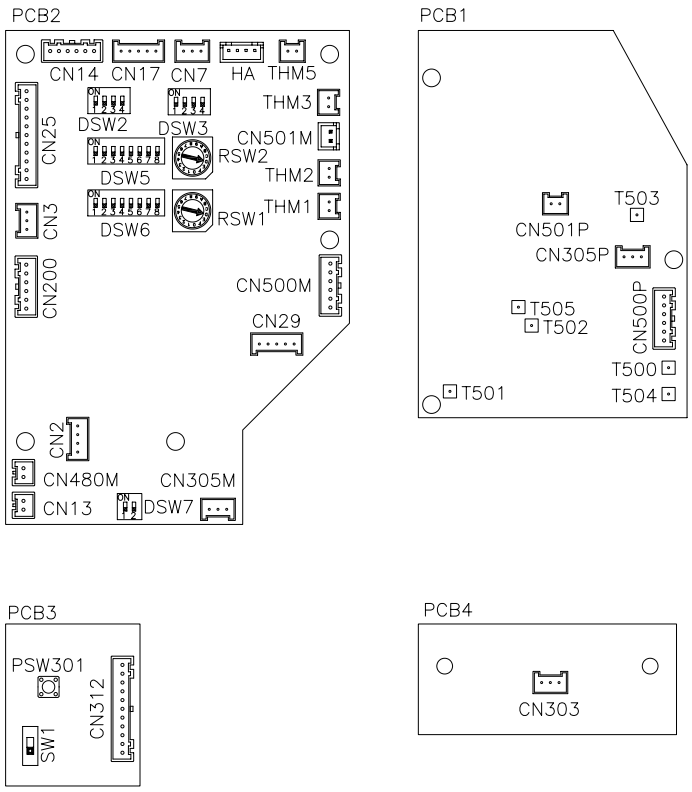
CAUTION

- *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.*

4.2.4. Layout of the printed circuit board for RPK FSN2M

- **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:



Connector indication	
THM1	Air inlet
THM2	Air outlet
THM3	Freeze protection
THM5	Gas pipe
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions
CN7	Output optional functions
CN13	Remote control SW
CN14	Expansion valve control
CN17	Swing louver motor
CN25	PCB3 wireless receiver part connection
CN29	Fan motor

Switch indication	
PSW301	Switch for the emergency operation
DSW6, RSW1	Indoor unit setting
DSW5, RSW2	Refrigerant cycle No.
DSW2	Optional functions
DSW3	Capacity code
DSW7	Fuse recovery

NOTE

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

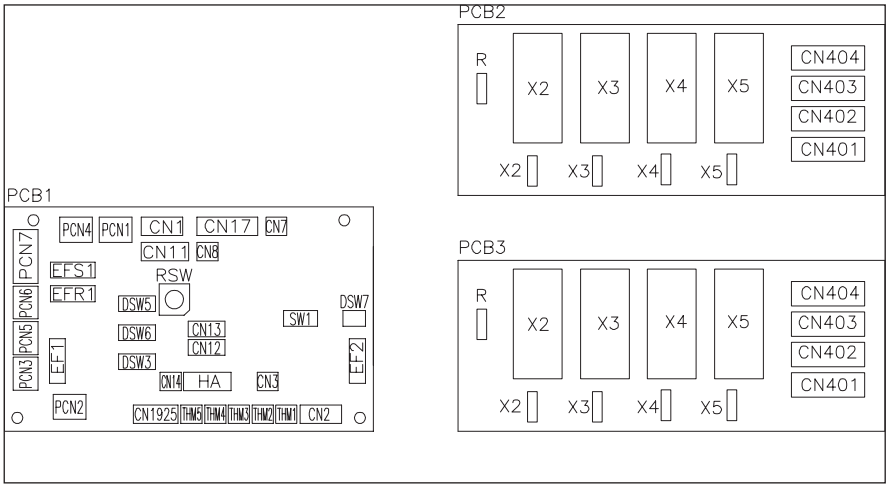
CAUTION

- *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.*

4.3. COMPLEMENTARY SYSTEM

4.3.1. KPI. Enery recovery ventilation unit.

- **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

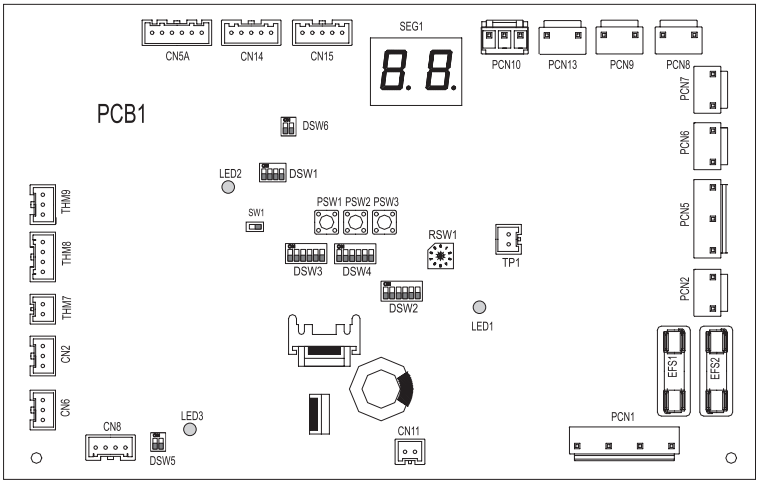
Connector indication	
PCN1	Transformer (220V)
PCN5	Relay on PCB1
PCN7	Power source (1-R, 2-S, 3-N, 4-E)
THM1	Air inlet
THM2	Outlet air
EF1	Fuse
EF2	Fuse
EFS1	Fuse
EFR1	Fuse
CN1	Transformer (pin 1-2: 17.3V / pin 3-4: 20.8V)
CN2	Control circuit for the outdoor unit H-LINK
CN3	Input optional functions (only two)
CN4	Input optional functions
CN7	Output optional functions (only two)
CN8	Output optional functions (#1 #2, only one)

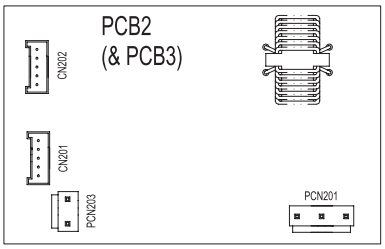
Connector indication	
CN11	PCB3 connection
CN12	Remote control bridge connector for multiple units
CN13	Remote control SW
CN17	PCB2 connection
CN401	Fan motor relay
CN402	Fan motor relay
CN403	Fan motor relay
CN404	Fan motor relay
Switch indication	
DSW3	Capacity code
DSW5	Ref. cycle N°
DSW6	Model code
DSW7	Fuse recovery and remote control selector
RSW	Setting of the indoor unit number
SW1	Selector SW (PC-P2HTE)

4.4. OUTDOOR UNITS PCB

4.4.1. RAS-(3~12)H(V)RNME

- **PCB drawing**





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

Connector indication	
PCN1	Fuse
PCN2	PCB1 connection from outdoor to indoor unit
PCN5	Crankcase heater of compressor (oil)
PCN6	Output optional function
PCN7	Output optional function
PCN8	Pressure switch protection
PCN9	Compressor contactor
PCN13	Pressure switch control
THM7	Outdoor air temperature thermistor
THM8	Pipe temperature thermistor
THM9	Compressor temperature thermistor
CN2	Current transformer
CN5A	Micro electronic expansion valve
CN8	Transmission from outdoor to indoor unit
CN14	Transmission between PCB1 and ISPM
EFS1, 2	Power protection

Switch indication	
DSW1 (PCB1)	Test run
DSW2	Piping length and selection function
DSW3	Capacity code
DSW4/ RSW1	Ref. cycle number
DSW5	End terminal resistor
DSW6	Power source setting

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.*

4.5. 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-(3~6)H(V)RNME**

Model			RAS-3HVRNME	RAS-4HVRNME	RAS-5H(V)RNME	RAS-6H(V)RNME
For compressor High pressure switch	Cut-out	MPa	$4.15^{-0.05}_{-0.15}$			
	Cut-in		$3.20_{\pm 0.15}$			
For control	Fuse 1φ, 230V, 50Hz 3φ, 400V, 50Hz	A	40	40 2X20	50 2X20	50 2X20
	CCP timer setting time	min	Non adjustable 3			
For condenser fan motor Internal thermostat	Cut-out	°C	Automatic reset, non-adjustable (each one for each motor) -	-	-	-
For control circuit Fuse capacity on PCB		A	5			

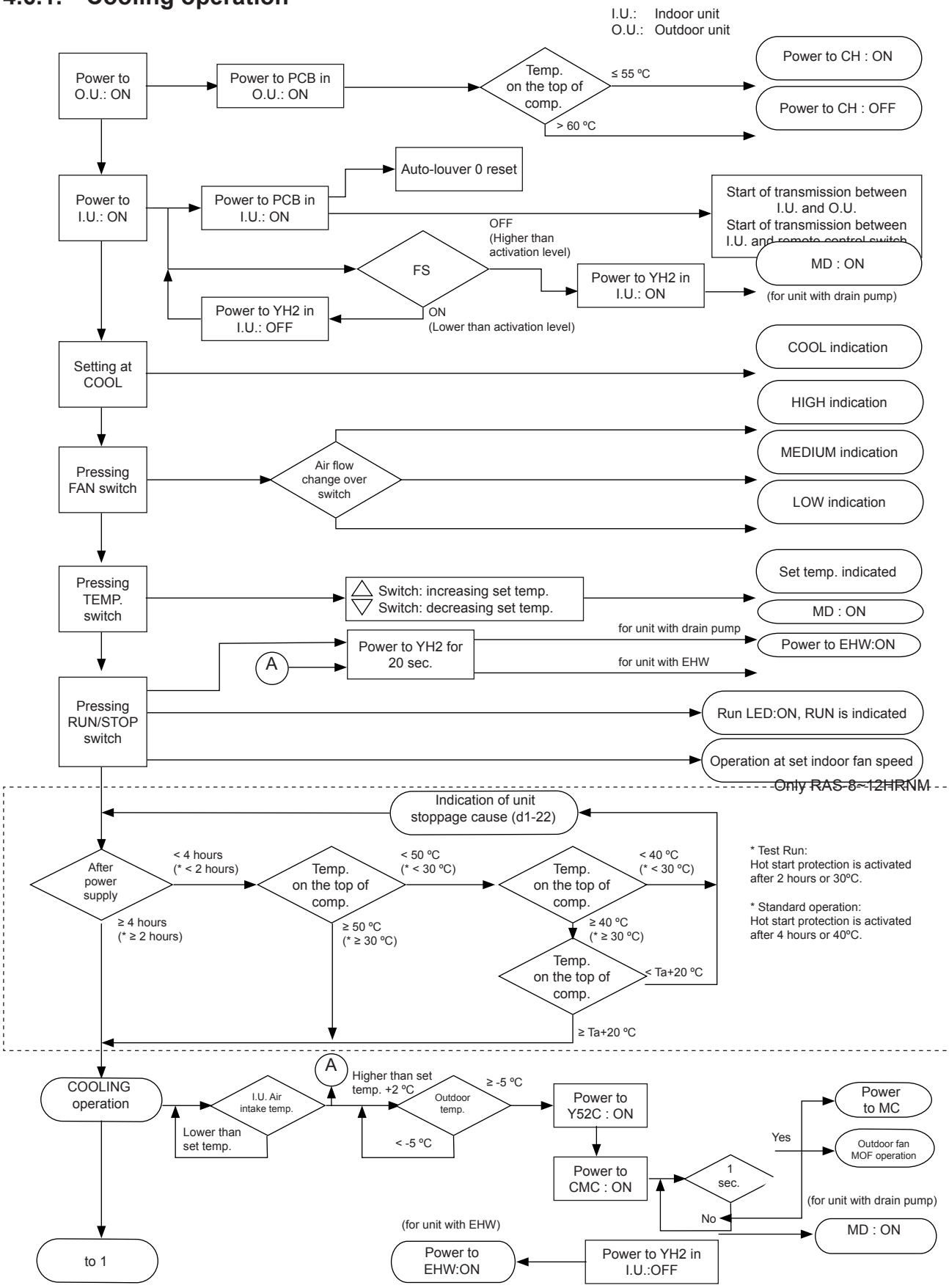
- **RAS-(8~12)HRNM**

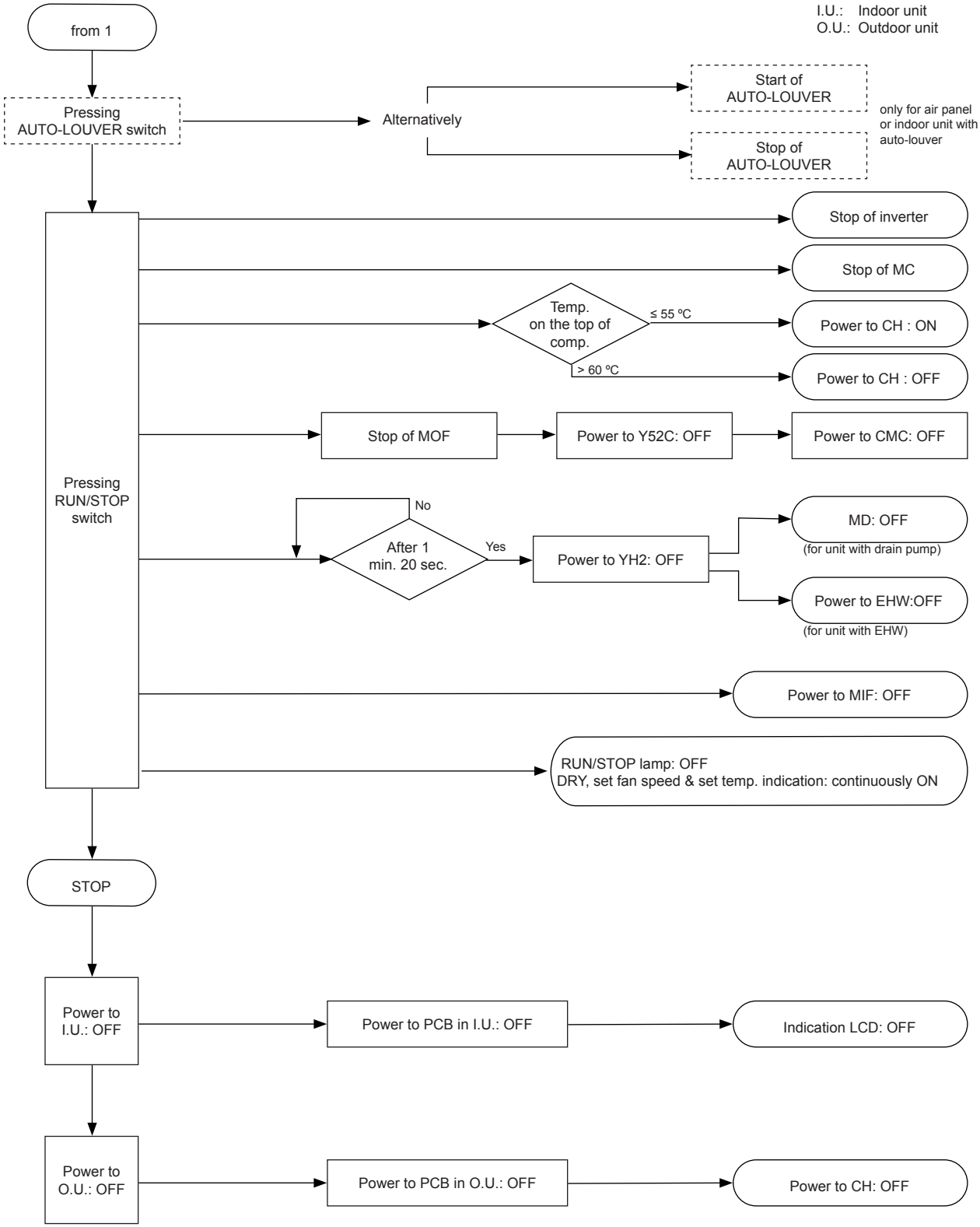
		RAS-8HRNM	RAS-10HRNM	RAS-12HRNM
For compressor Pressure switches High Cut-out Cut-in	 MPa MPa	Automatic reset, non-adjustable (each one for each compressor) $4.15^{-0.05}_{-0.15}$ 3.20 ± 0.15		
For control Fuse 3~, 400V, 50Hz	 A	 40		
CCP timer Setting time	 min	Non-adjustable 3		
For condenser fan motor 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		

4

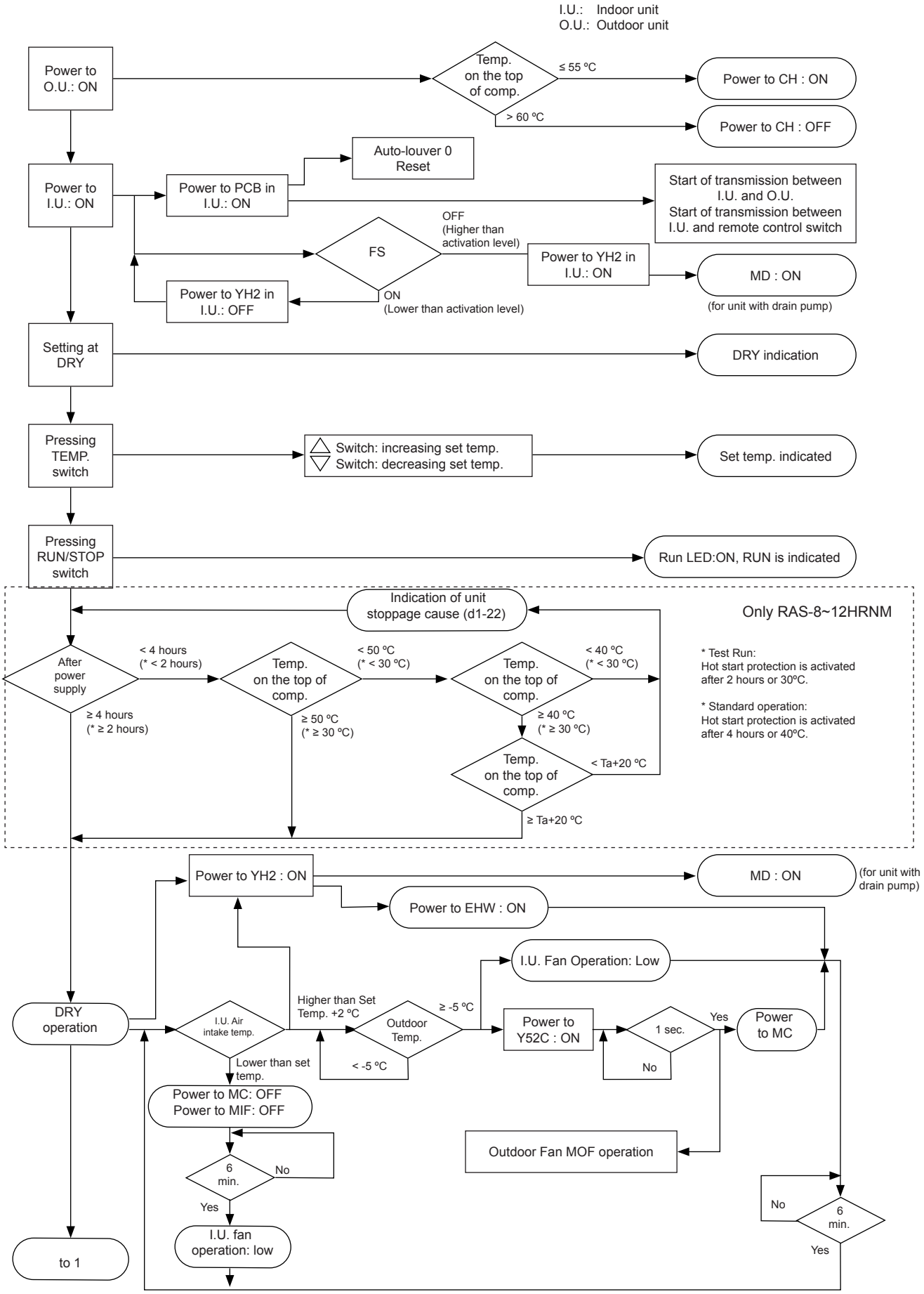
4.6. STANDARD OPERATION SEQUENCE

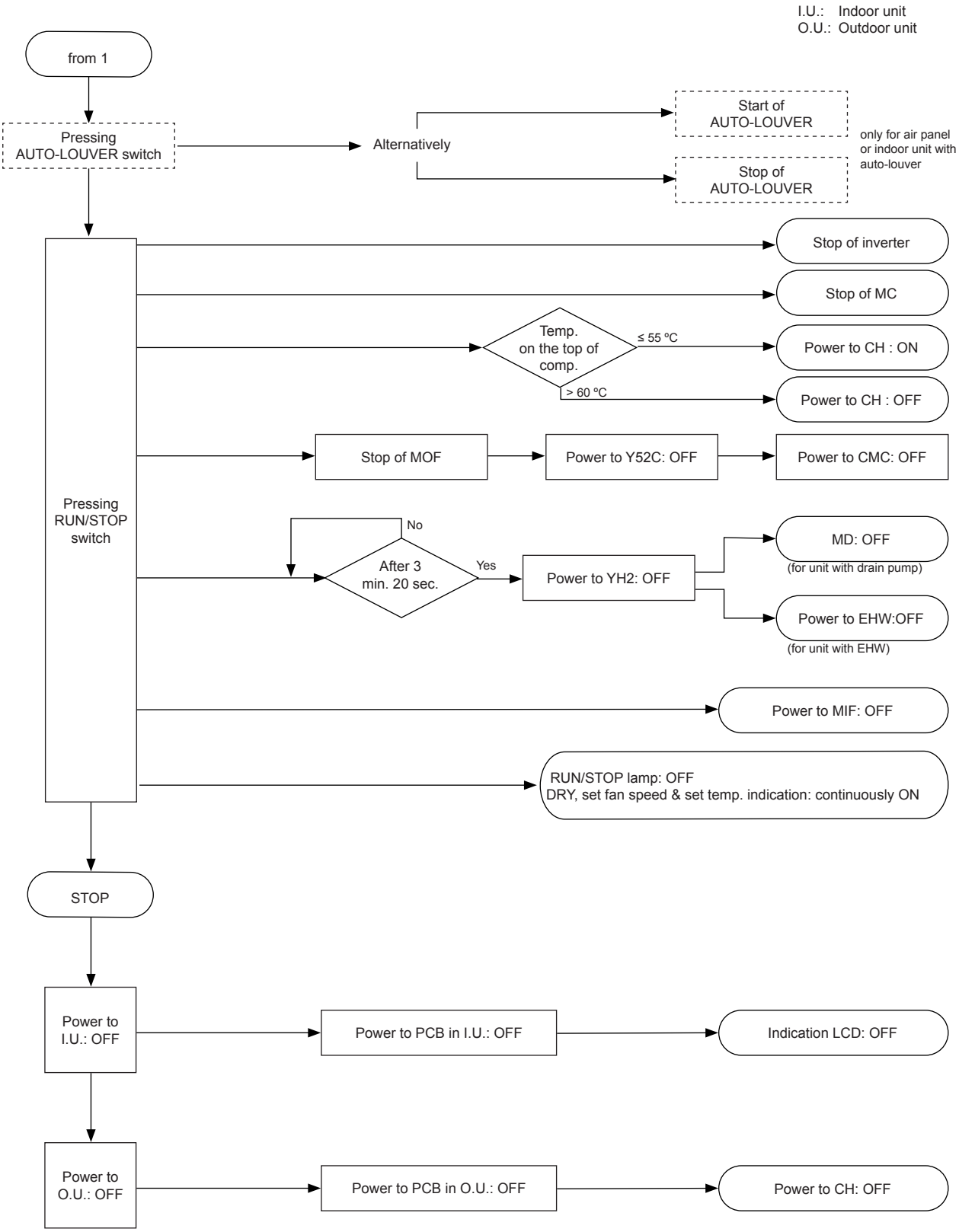
4.6.1. Cooling operation



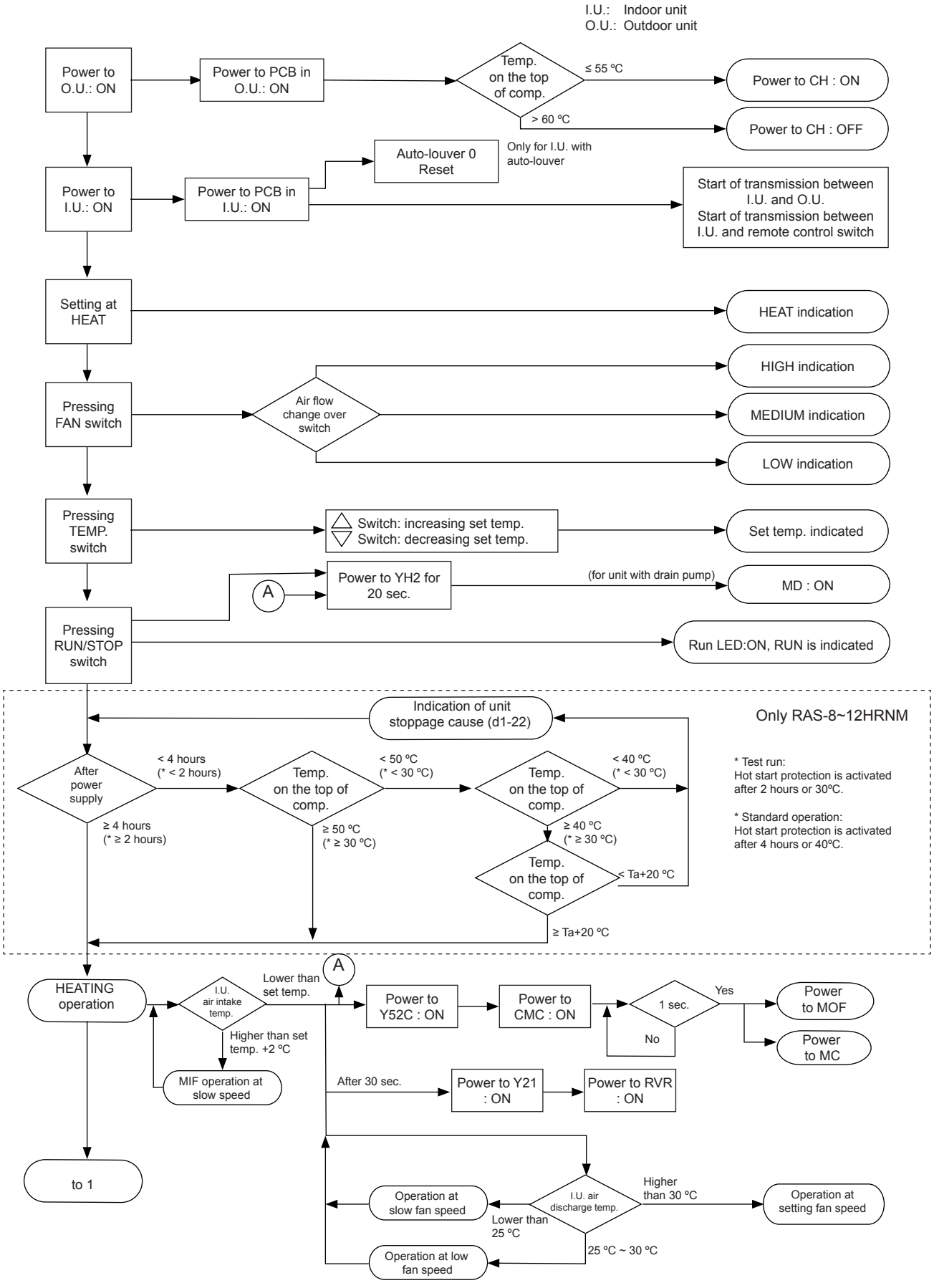

I.U.: Indoor unit
O.U.: Outdoor unit
from 1
Pressing AUTO-LOUVER switch
Alternatively
Start of AUTO-LOUVER
Stop of AUTO-LOUVER
only for air panel or indoor unit with auto-louver
Pressing RUN/STOP switch
Stop of inverter
Stop of MC
Temp. on the top of comp.
≤ 55 °C
> 60 °C
Power to CH : ON
Power to CH : OFF
Stop of MOF
Power to Y52C: OFF
Power to CMC: OFF
No
After 1 min. 20 sec.
Yes
Power to YH2: OFF
MD: OFF
(for unit with drain pump)
Power to EHW:OFF
(for unit with EHW)
Power to MIF: OFF
RUN/STOP lamp: OFF
DRY, set fan speed & set temp. indication: continuously ON
STOP
Power to I.U.: OFF
Power to PCB in I.U.: OFF
Indication LCD: OFF
Power to O.U.: OFF
Power to PCB in O.U.: OFF
Power to CH: OFF

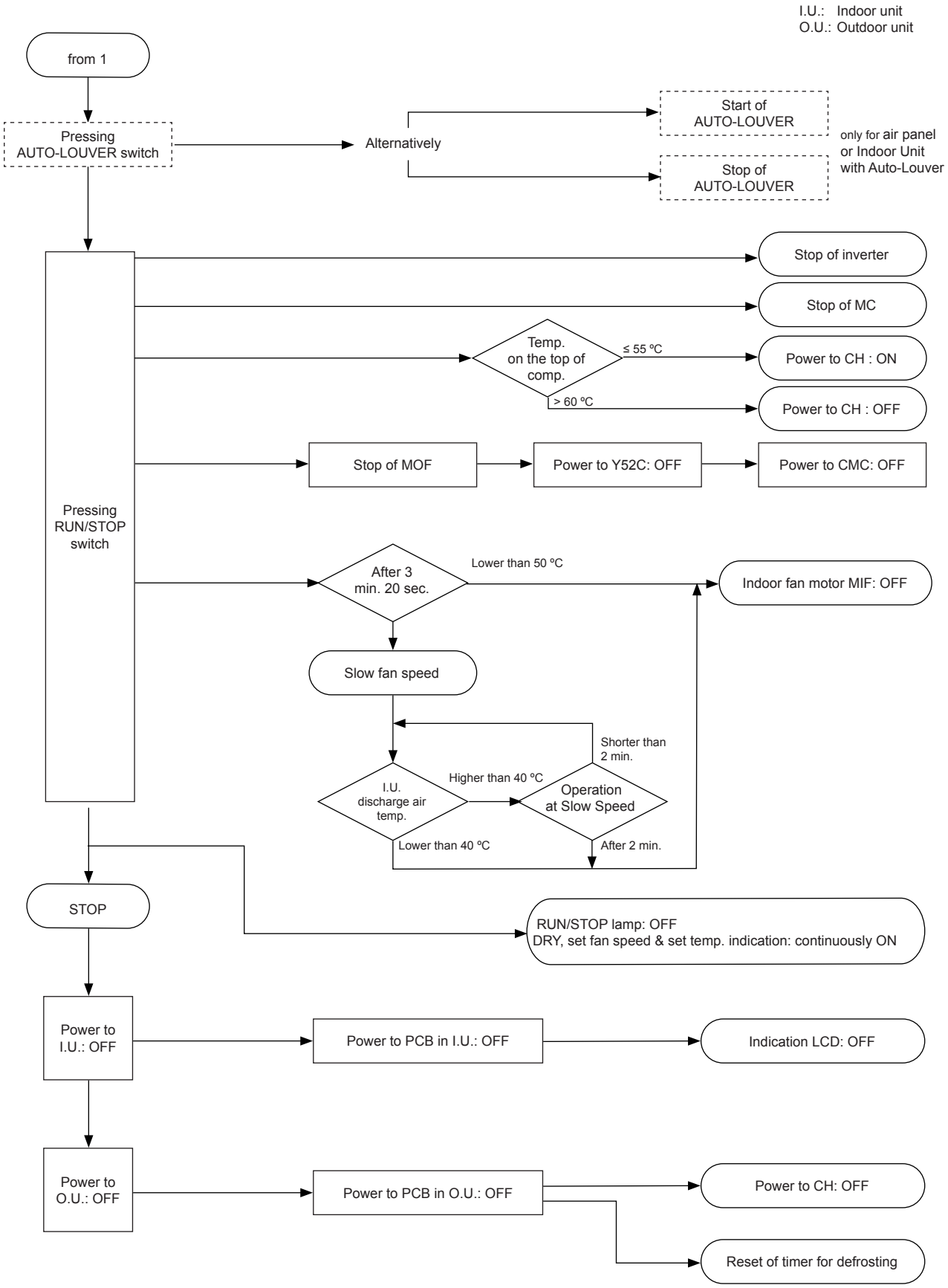
4.6.2. Dry operation



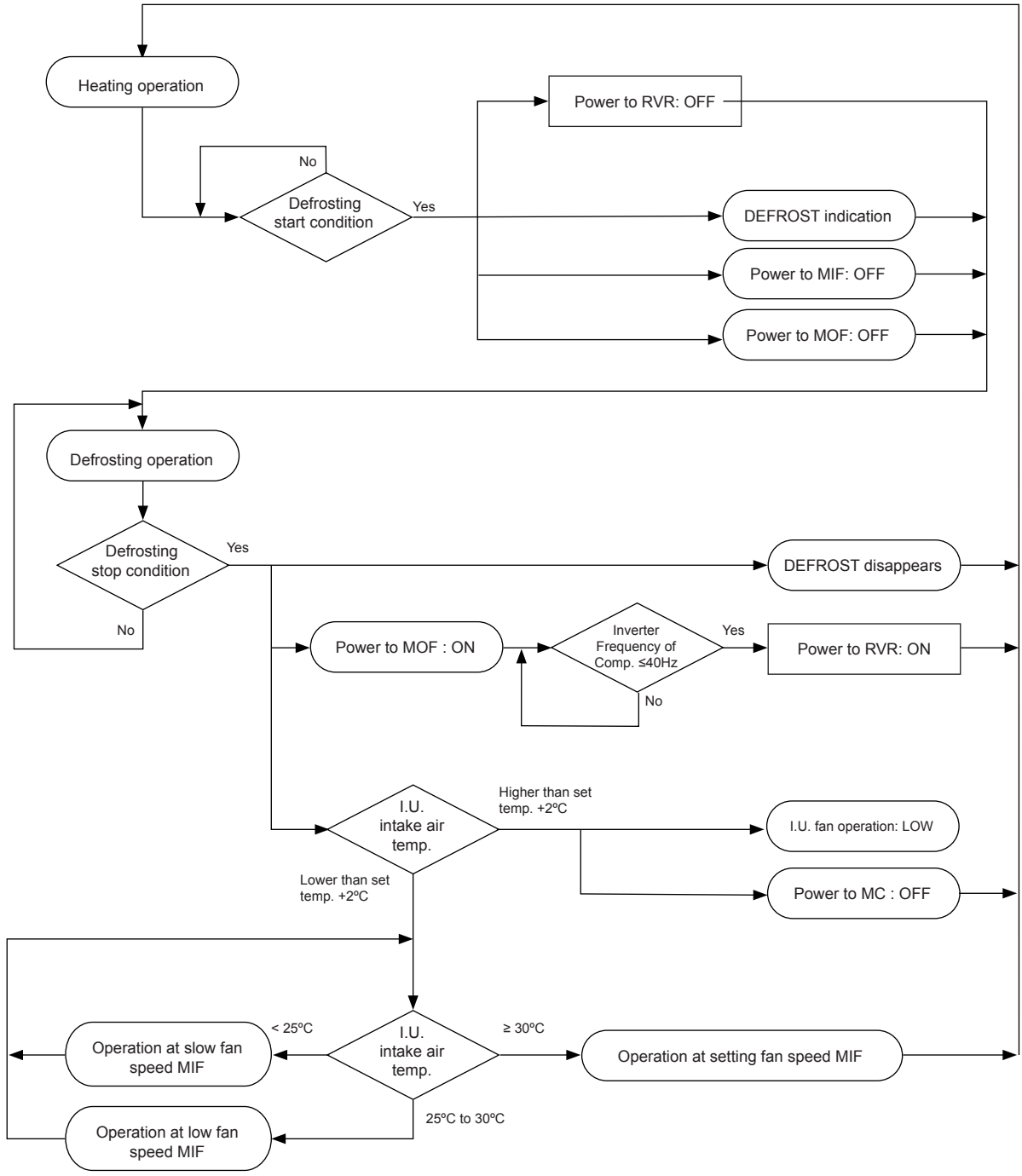

I.U.: Indoor unit
O.U.: Outdoor unit
from 1
Pressing AUTO-LOUVER switch
Alternatively
Start of AUTO-LOUVER
Stop of AUTO-LOUVER
only for air panel or indoor unit with auto-louver
Pressing RUN/STOP switch
Stop of inverter
Stop of MC
Temp. on the top of comp.
≤ 55 °C
> 60 °C
Power to CH : ON
Power to CH : OFF
Stop of MOF
Power to Y52C: OFF
Power to CMC: OFF
No
After 3 min. 20 sec.
Yes
Power to YH2: OFF
MD: OFF
(for unit with drain pump)
Power to EHW:OFF
(for unit with EHW)
Power to MIF: OFF
RUN/STOP lamp: OFF
DRY, set fan speed & set temp. indication: continuously ON
STOP
Power to I.U.: OFF
Power to PCB in I.U.: OFF
Indication LCD: OFF
Power to O.U.: OFF
Power to PCB in O.U.: OFF
Power to CH: OFF

4.6.3. Heating operation



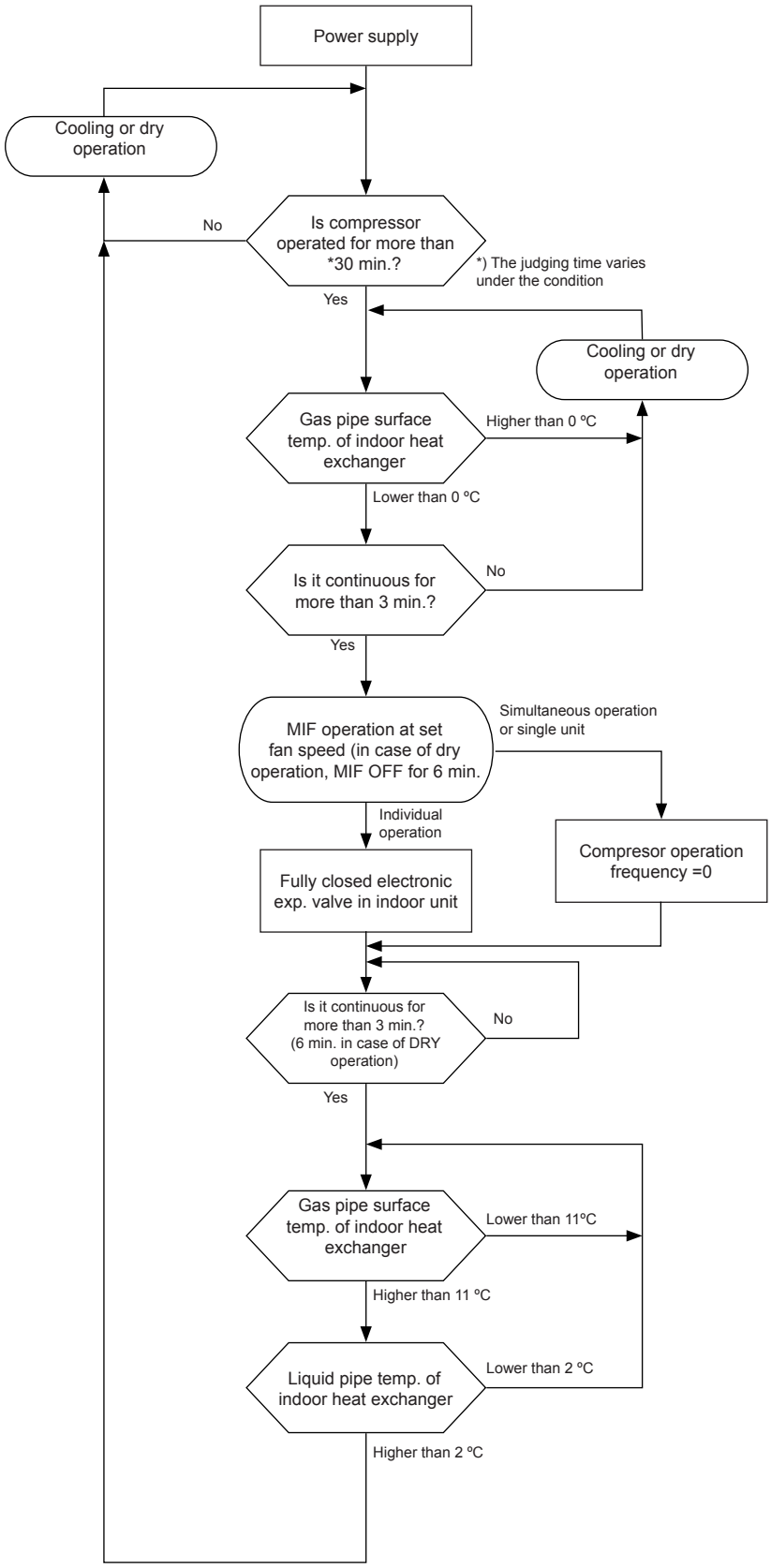

I.U.: Indoor unit
O.U.: Outdoor unit
from 1
Pressing AUTO-LOUVER switch
Alternatively
Start of AUTO-LOUVER
Stop of AUTO-LOUVER
only for air panel or Indoor Unit with Auto-Louver
Pressing RUN/STOP switch
Stop of inverter
Stop of MC
Temp. on the top of comp.
≤ 55 °C
> 60 °C
Power to CH : ON
Power to CH : OFF
Stop of MOF
Power to Y52C: OFF
Power to CMC: OFF
After 3 min. 20 sec.
Lower than 50 °C
Indoor fan motor MIF: OFF
Slow fan speed
Shorter than 2 min.
I.U. discharge air temp.
Higher than 40 °C
Operation at Slow Speed
Lower than 40 °C
After 2 min.
STOP
RUN/STOP lamp: OFF
DRY, set fan speed & set temp. indication: continuously ON
Power to I.U.: OFF
Power to PCB in I.U.: OFF
Indication LCD: OFF
Power to O.U.: OFF
Power to PCB in O.U.: OFF
Power to CH: OFF
Reset of timer for defrosting

4.6.4. Defrost operation control

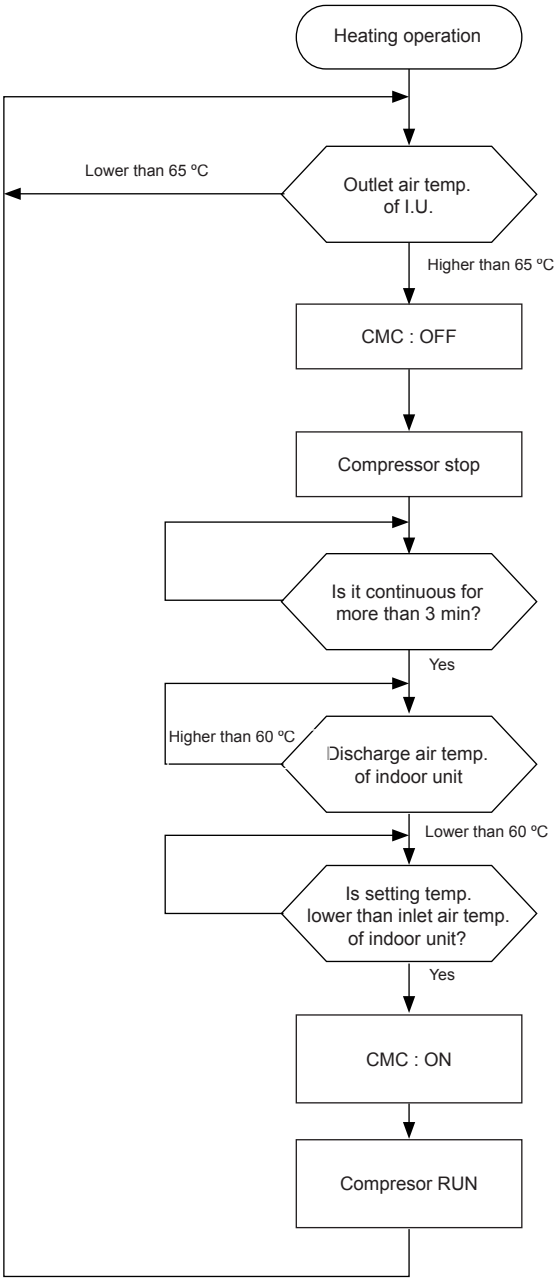


4.7. STANDARD CONTROL FUNCTIONS

4.7.1. Freezing protection during cooling process or dry operation



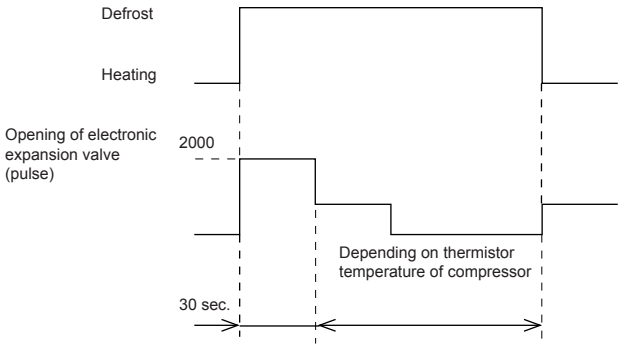
4.7.2. Prevention control for excessively high discharge gas temperature



4.7.3. Indoor 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.
   a) 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



4

Cooling operation

1. Set of target superheat temperature
   Heat exchanger SH:
   3HP => SH = 0 ºC
   4HP => SH = -4 ºC
   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).

H(V)RNM(E)	3.0HP	4.0HP	5.0HP	6.0HP	8.0HP	10HP	12HP
pulse (%)	360 (18)	400 (20)	500 (25)	590 (29)	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).

H(V)RNM(E)	3.0HP	4.0HP	5.0HP	6.0HP	8.0HP	10HP	12HP
pulse (%)	680 (34)	850 (47)	1000 (50)	1140 (57)	950 (47)	1000 (50)	1140 (57)

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

4.7.4. 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 expansion valve is set at a specified opening.
   a) Specified opening during heating operation: 1 minute

4. During the cooling and the defrosting operations, the electronic expansion valve is set at the specified opening.

5. Normal opening of the electronic expansion valve.

Coling operation

- 480 pulse (100%)

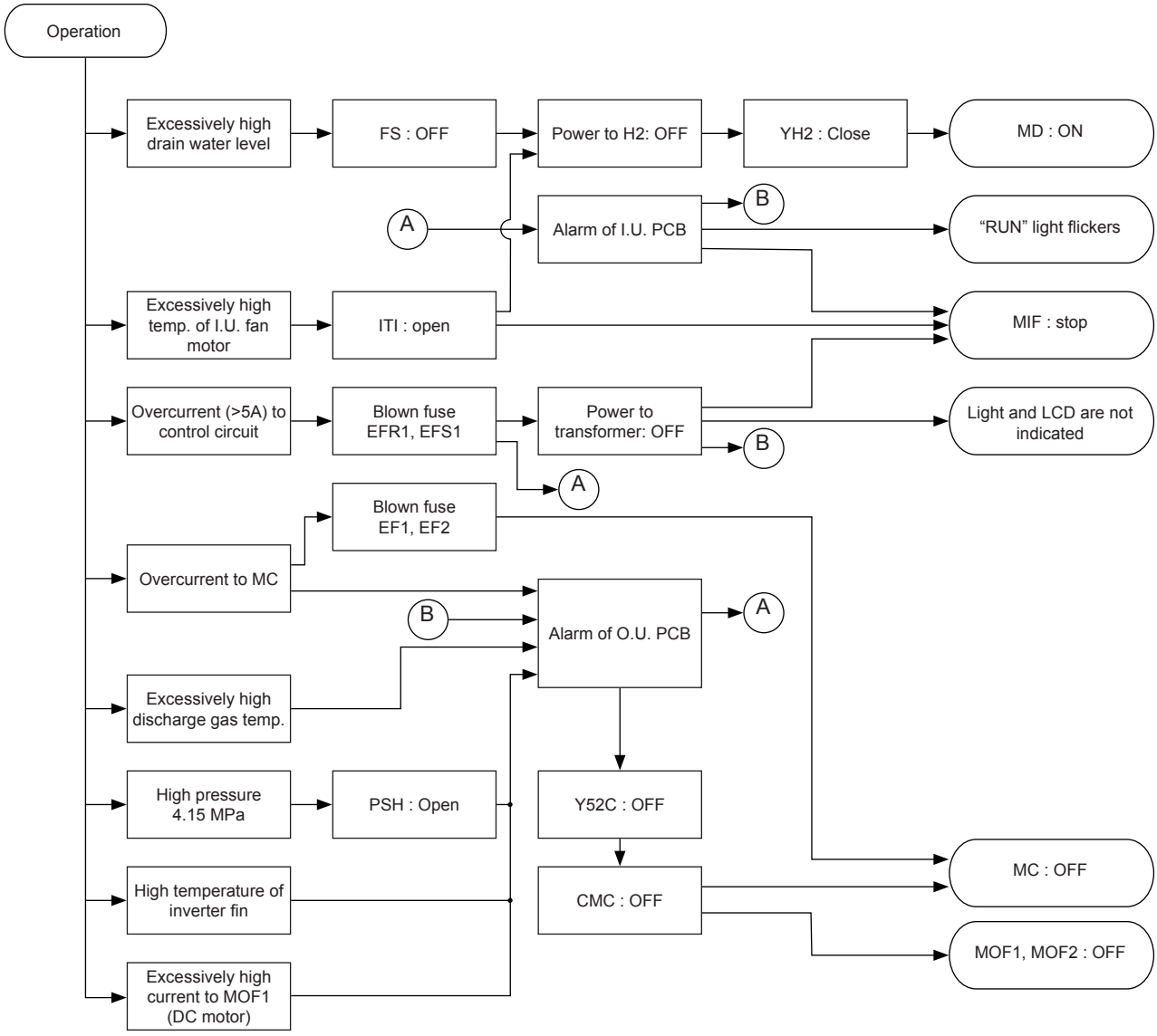
Heating operation

1. Set of target temperature
   TdSH = 20~25 ºC
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).

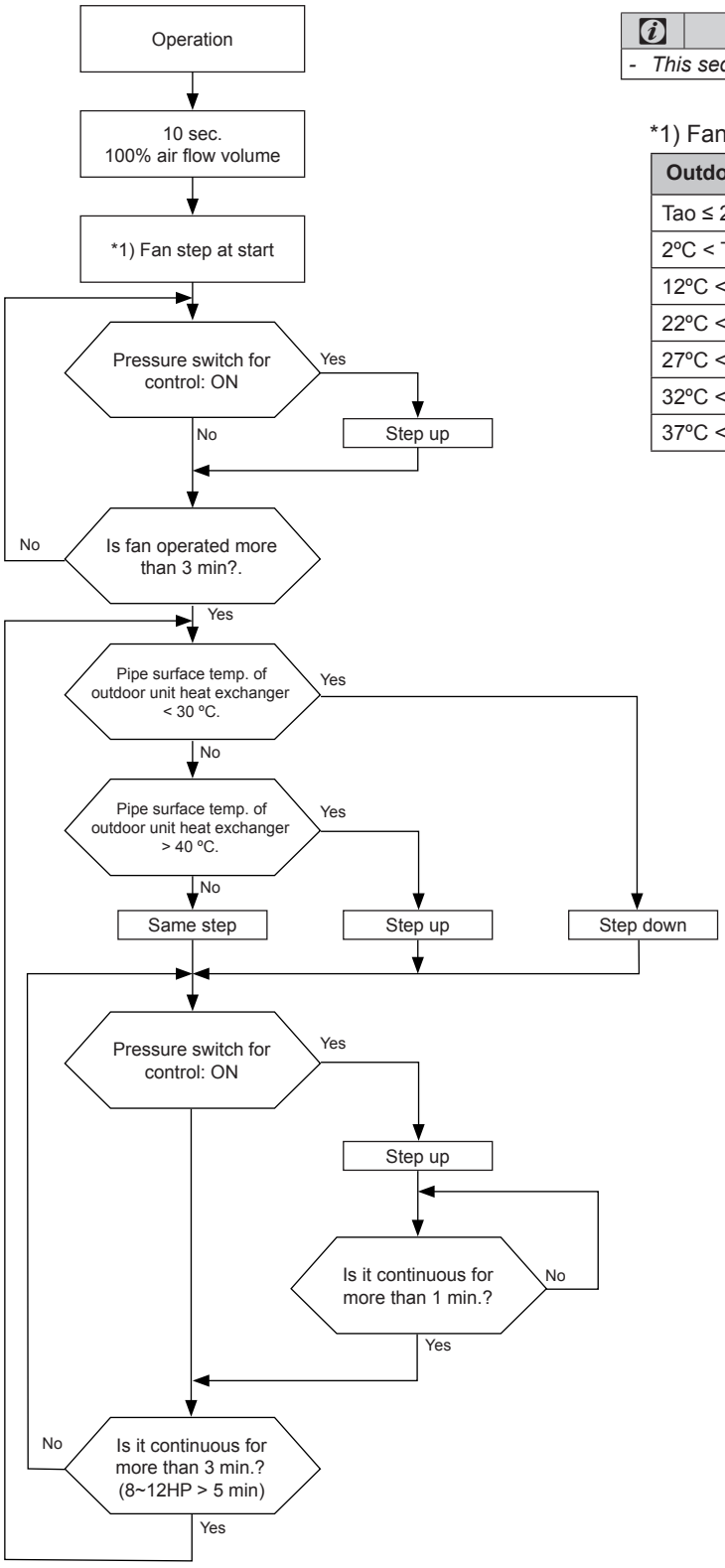
H(V)RNM(E)	3.0HP	4.0HP	5.0HP	6.0HP	8.0HP	10HP	12HP
Expansion valve opening pulse (%)	130 (27)	110 (22)	130 (27)	150 (34)	160 (33)	200 (41)	240 (50)

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

4.7.5. Activation for protection device control



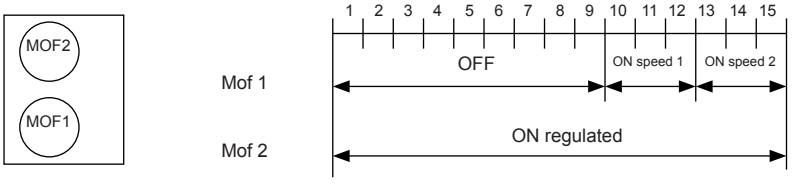
4.7.6. Outdoor fan control during cooling operation



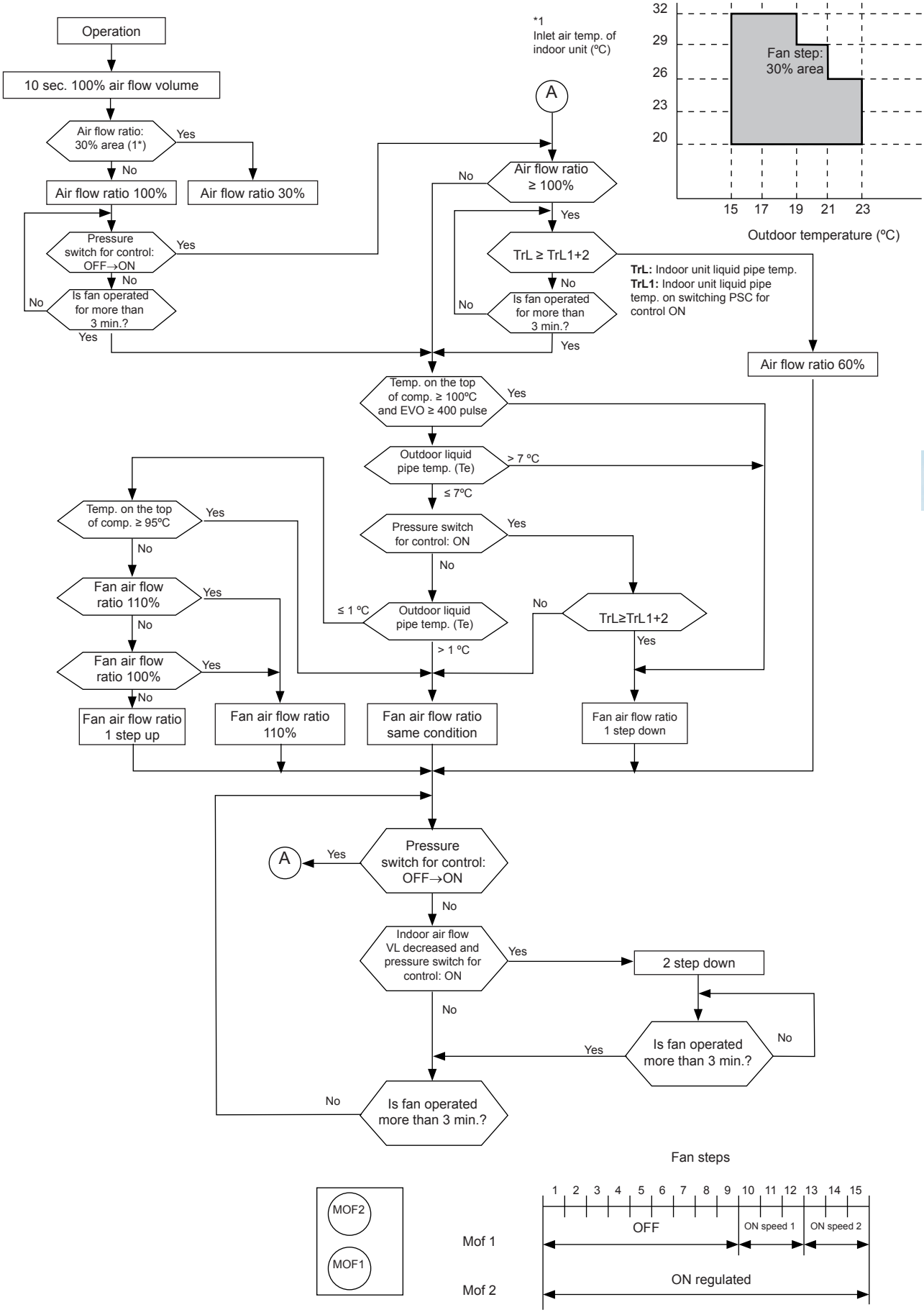
NOTE
- *This sequence is for the standard operation*

*1) Fan step at start

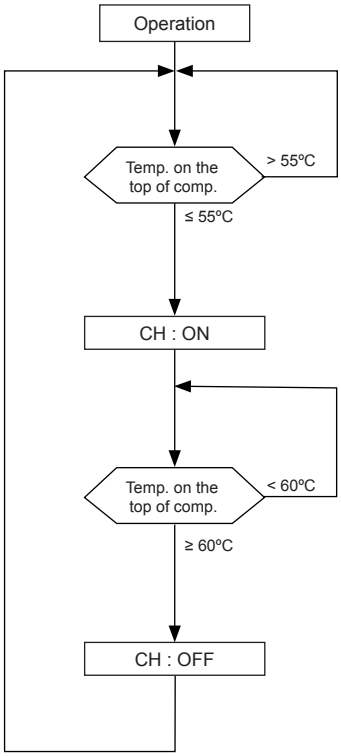
Outdoor temp. (Tao)	Air flow ratio
Tao ≤ 2ºC	15%
2ºC < Tao ≤ 12ºC	25%
12ºC < Tao ≤ 22ºC	40%
22ºC < Tao ≤ 27ºC	60%
27ºC < Tao ≤ 32ºC	80%
32ºC < Tao ≤ 37ºC	100%
37ºC < Tao	110%



4.7.7. Outdoor fan control during heating operation



4.7.8. Preheating control of compressor



4.7.9. 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.

5. AVAILABLE OPTIONAL FUNCTIONS

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5.1.5. Description of optional output signals 5-11

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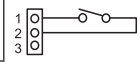
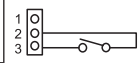
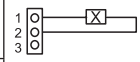
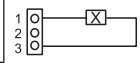
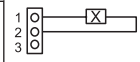
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5.1. INDOOR UNITS

The system has eight input and six 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

5.1.1. Available ports

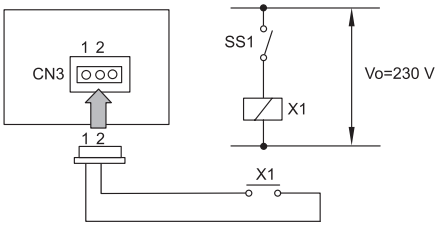
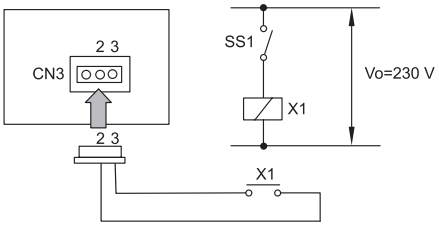
The system has the following input and output ports.

Indication		Setting of the port in the PCB of the indoor unit	Remarks	Output
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

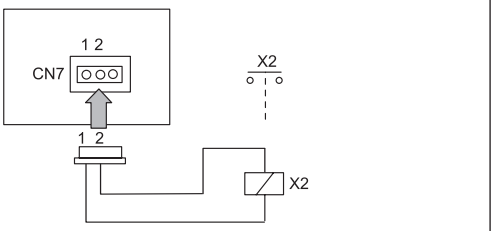
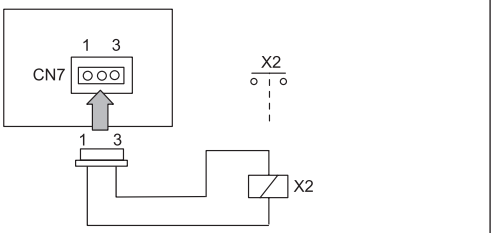
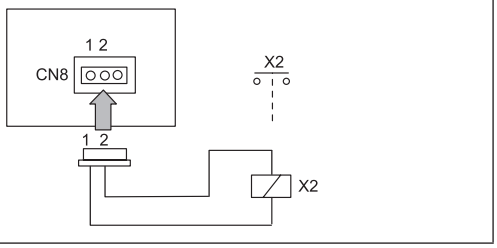
Connection:

The system has the following connections:

- **Input connections**

Indication	Connections
i1	
i2	

- **Output connections**

Indication	Connections
o1	
o2	
o3 (Not for RPK)	

- **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	

NOTE

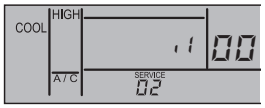
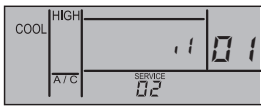
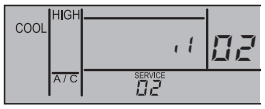
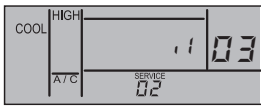
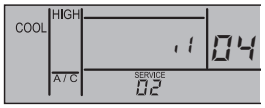
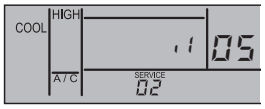
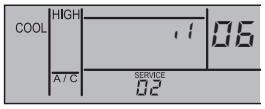
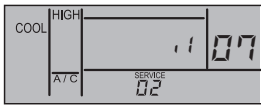
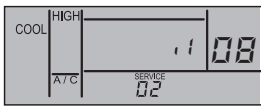
- *The connection of the input signal is only an example.*
- *Make the CN3 wires as short as possible.*
- *Do not run the wires along 230 V/400 V AC power cables. Separately install them at a distance of more than 30cm. (Intersecting as applicable.)*
- *If you install the wires along a power supply wire,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

5.1.2. 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.

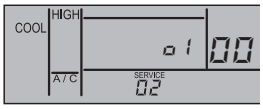
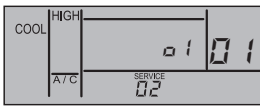
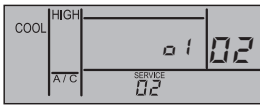
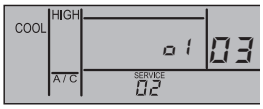
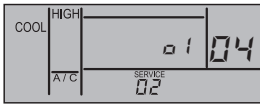
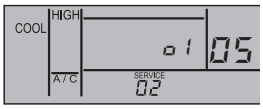
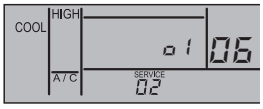
- **Optional input signals**

Indic.	Input signal	Application	Display remote control (input signal)	Port
00	Not set	Not set		CN3
01	Control using the field-supplied room thermostat (cooling)	This signal allows to control the unit using an external thermostat. This could reduce cooling problems in summer for certain applications.		CN3
02	Control using the field-supplied room thermostat (heating)	This signal allows to control the unit using 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 (only CN7 for RPK)
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 (only CN7 for RPK)
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 (only CN7 for RPK)
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 (only CN7 for RPK)
04	Thermo-ON signal during cooling	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8 (only CN7 for RPK)
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 (only CN7 for RPK)
06	Thermo-ON signal during heating	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8 (only CN7 for RPK)

NOTE

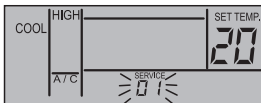
- *o1 must be taken as an example. It may appear o1, o2 or o3.*
- *After setting an output signal, the next signal to set shown on the display changes from "o1" to "o2" and to "o3" (not for RPK)*

5

5.1.3. Programming with the PC-ART

The optional signals are programmed using the remote control switch.

- **Programming and setting mode**

Make sure the unit is stopped. Press the “OK” 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 “OK” switch, and the remote control switch will change to optional setting mode.

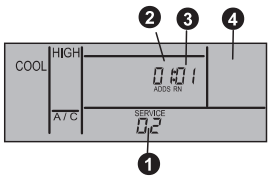
- **Selection of indoor unit**

a. In SERVICE 02 selection mode, the indication of the remote control switch will change as shown in the figure.
   - ❶ The “02” indication is activated.
   - ❷ 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.
   - ❸ 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.
   - ❹ The indication of the setting temperature is turned OFF.

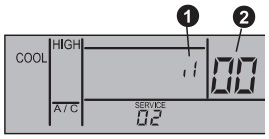
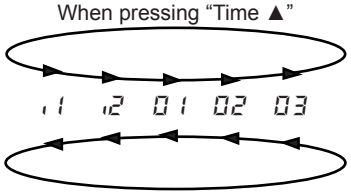
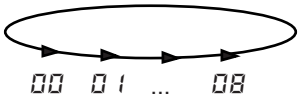
b. In previous point (a), press the “TEMP “ switch ⌃ or the “TEMP “ switch ⌄ of the remote control switch and the indoor unit for which the optional function is to be set, can be changed.

	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 “OK” 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. ❶ 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. ❷ 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 ▼ 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 ▲”  When pressing “Time ▼”
c. Press the “OK” 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 “OK” switch. 

- **Return from optional function setting mode**
  Press the “RESET” switch to memorize the optional functions settings and return to normal mode.

5

- **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

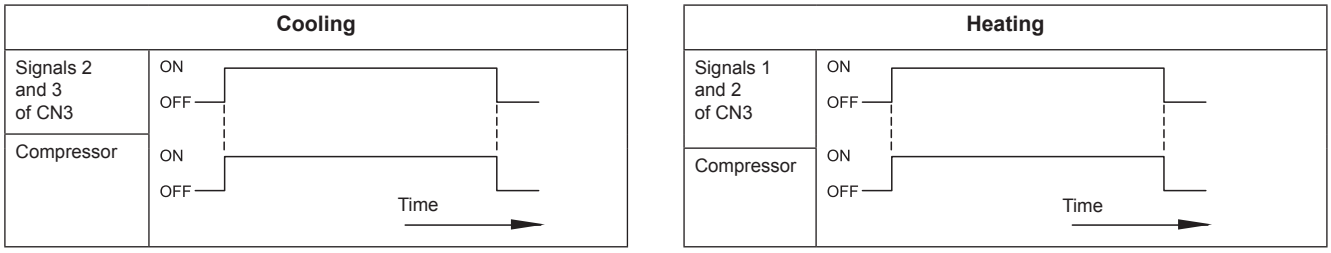
	Connector		Function	Factory fixed settings
	N0.	Pin		
Input	CN3	1-2 (*)	03	Function 1 - remote ON/OFF of the unit
		2-3	06	Cancellation of commands from the remote control switch after forced stoppage
Output	CN7	1-2	01	Operation signal
		1-3	02	Alarm signal
	CN8 (Not for RPK)	1-2	06	Thermo-ON signal during heating

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

5.1.4. Description of optional input signals

- **Control by field-supplied room thermostat (0 102)**

  When operating with a field supplied room thermostat instead of the inlet thermistor of the indoor unit, connect the cable and use the materials as shown in section 5.1.1.



Component	Manufacturer 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 using 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.*

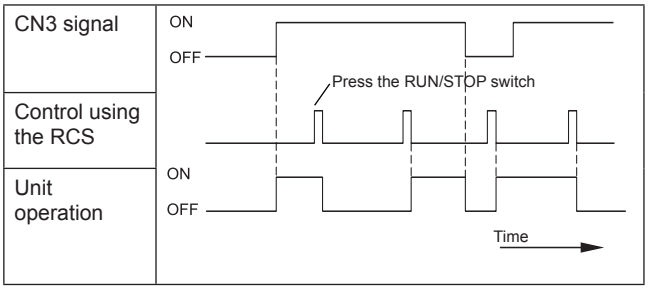
- **Function 1 - remote ON/OFF of unit (03)**

  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 5.1.1.

NOTE

- *When you start the unit using the remote ON/OFF switch, the fan speed is subject to the mode that is memorized in the remote control switch.*

Time chart:

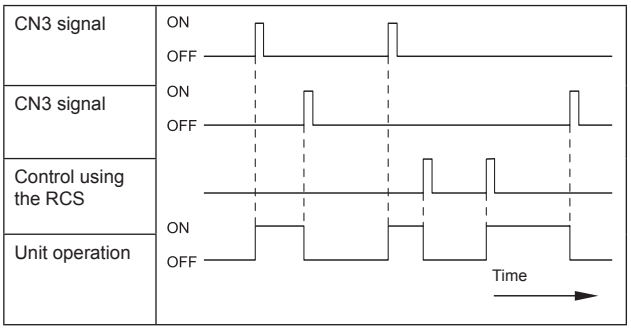


NOTE

- *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 5.1.1.
- **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 5.1.1.
  A time chart with the uses of functions 04/05 is shown below.

Time chart

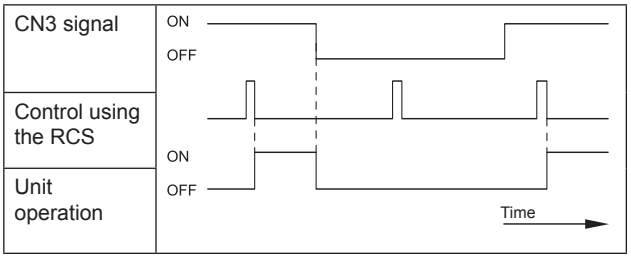


NOTE

- *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 using 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 5.1.1.

Time chart



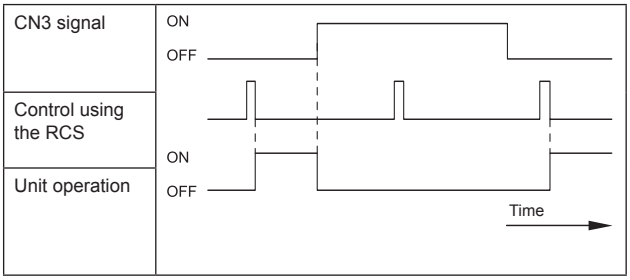
NOTE

- *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 using 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.

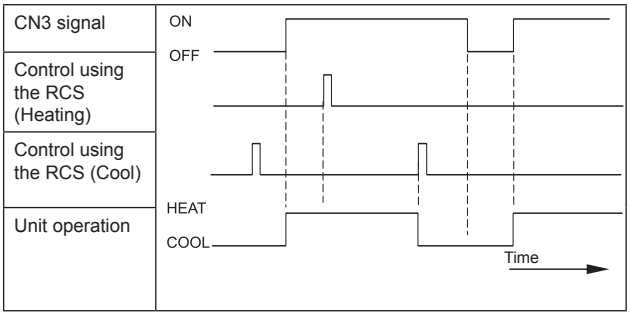
Refer to section 5.4 “optional functions available through the remote-control switch” for more details about contacts A and B.

Time chart

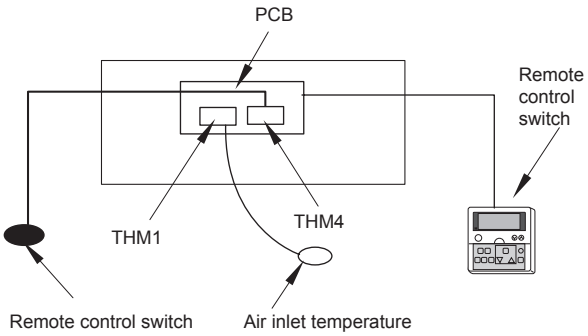


- **Setting the cooling mode or the heating mode (07)**
  By using this optional signal, the cooling or heating operation mode can be changed by sending a contact signal from outside the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.
  Connect the cabling and use the materials as shown in section 5.1.1.

Time chart:



- **Control using 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.



NOTE
- *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 5.4.2).* - *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.*

5.1.5. Description of optional output signals

- **Picking up the operation signal (01)**
  This optional signal is used to pick up the operation signal. Using 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 5.1.1.
  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 5.1.1.
  Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

- **Cooling operation signal (03)**
  This optional signal is used 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 5.1.1.
  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 5.1.1.
  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 5.1.1.
  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 5.1.1.
  The contact of auxiliary relay X2 is closed when the thermos that indication is ON during the heating mode.

5.2. ECONOFRESH KIT

The system has three optional input signals that are programmed in the PCB of the indoor unit using 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 5.4.2 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

5.2.1. 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 2 of section 5.1.1. 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 2 of section 5.1.1. 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 5.1.1.

5.2.2. Compatibilities

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

	Optional function of the PC-ART	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

5.3. H(V)RNM OUTDOOR UNITS

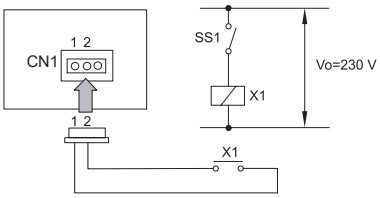
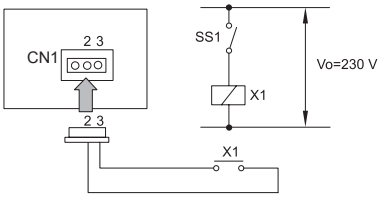
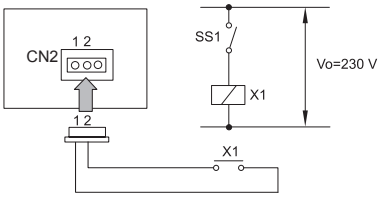
The system has eight input and five output signals that are programmed in the PCB of the outdoor unit using connectors CN1 and CN2 for the input signals and CN7 for the output signal.
Connectors CN1 and CN2 have two and one ports respectively to configure three input options out of the eight options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

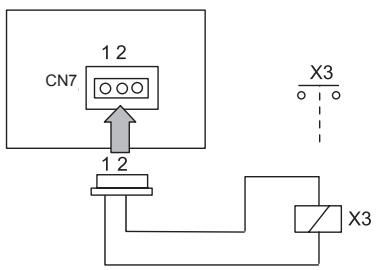
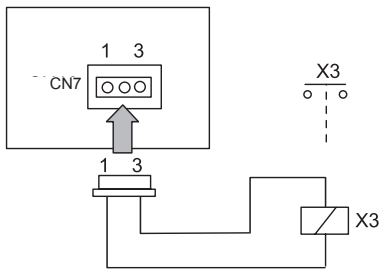
5.3.1. Available ports.

The system has the following input and output ports.

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	

5

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	

NOTE

- *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.*

5.3.2. 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.*

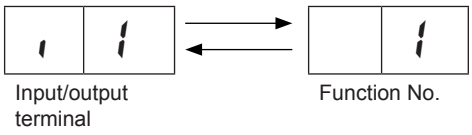
Programming
The optional signals are programmed through the PCB of the outdoor unit.

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**

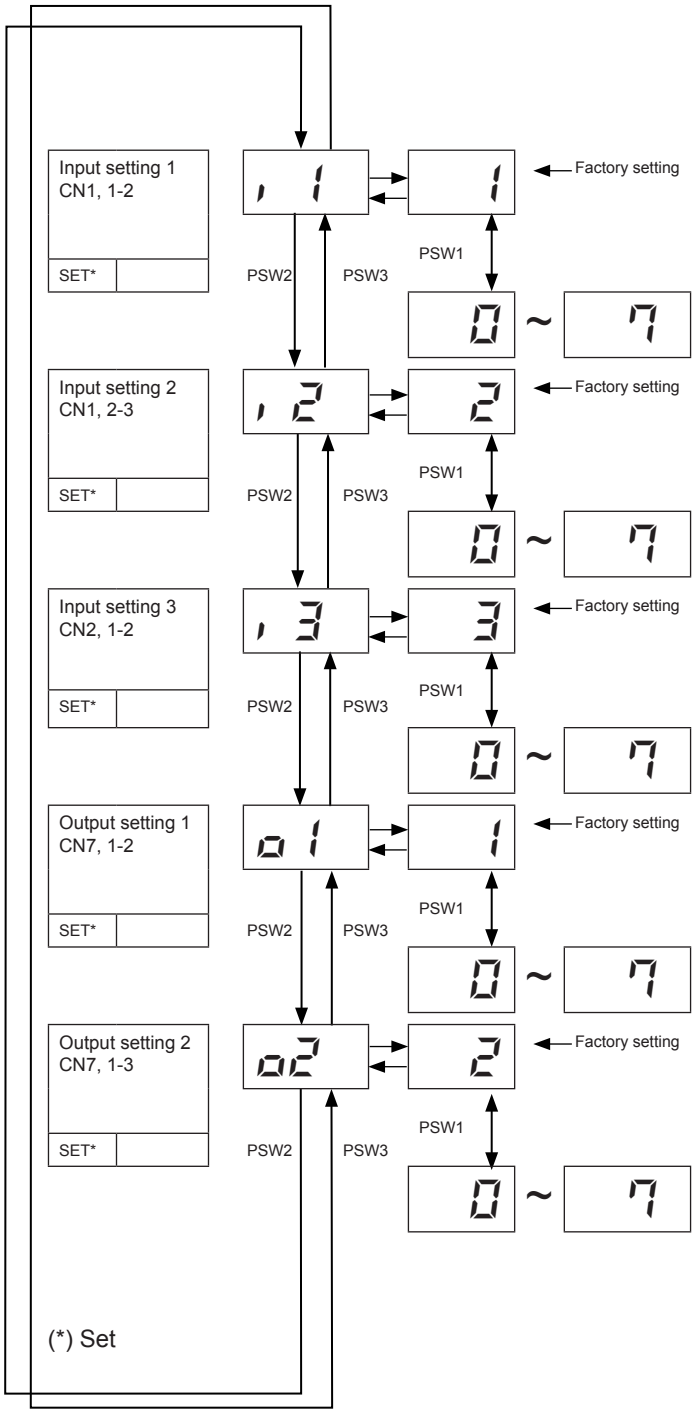
  If the below setting change is required on-site, perform the following instructions:

  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.



  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.



5.3.3. 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.

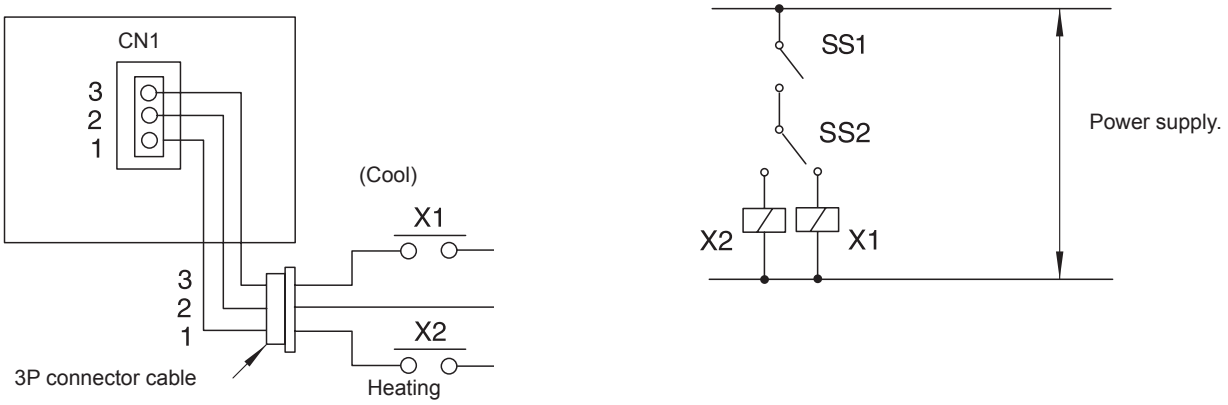
  Short circuit between the terminals 1 and 2 of CN1: set heating mode.

  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 5.3.1.

- **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 5.3.1.

- **Current control demand (5/6/7)**

  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 5.3.1.

  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.

5.3.4. Description of optional output signals

- **Operation signal (1)**

  This optional signal is used 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 5.3.1.

  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 5.3.1.

  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 5.3.1.

  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 5.3.1.

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

5.3.5. 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**

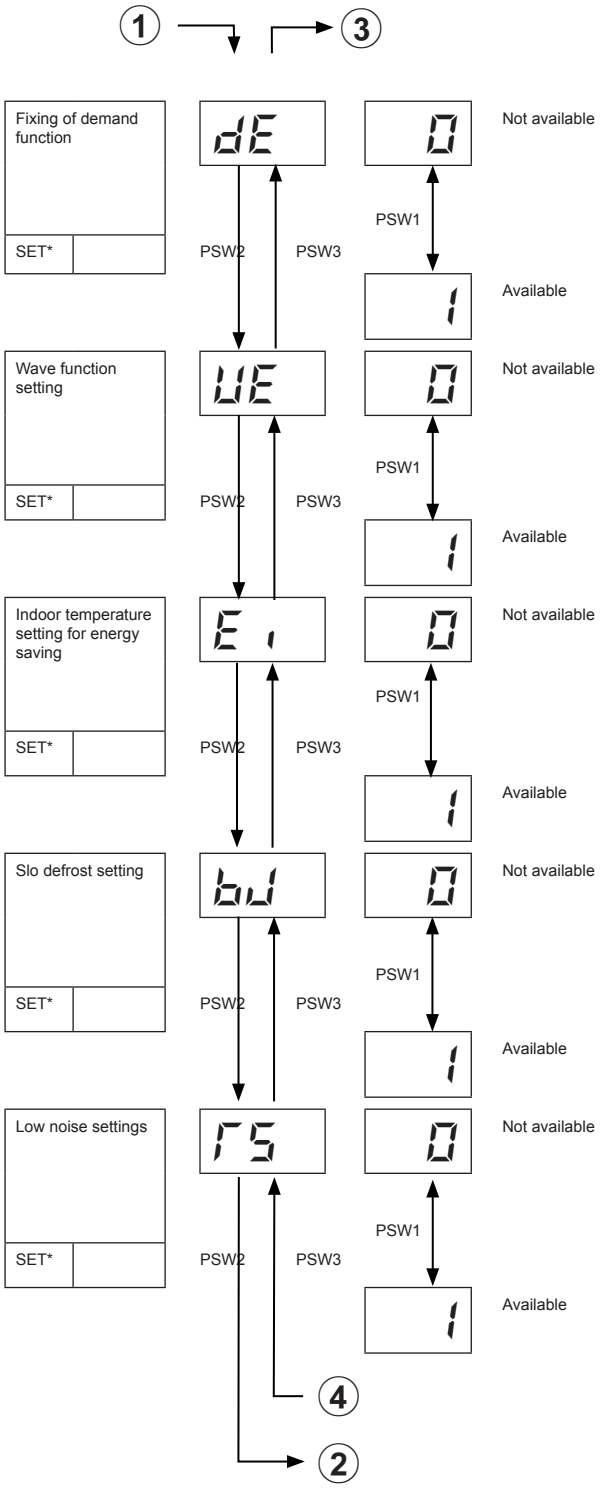
1. While the outdoor unit is ON, set the following DIP switches on the printed circuit board of the indoor unit as follows: set pin 5 of DSW2 to ON. Because of these settings, the function selection mode becomes available and the following indication appears on the 7-segment display.

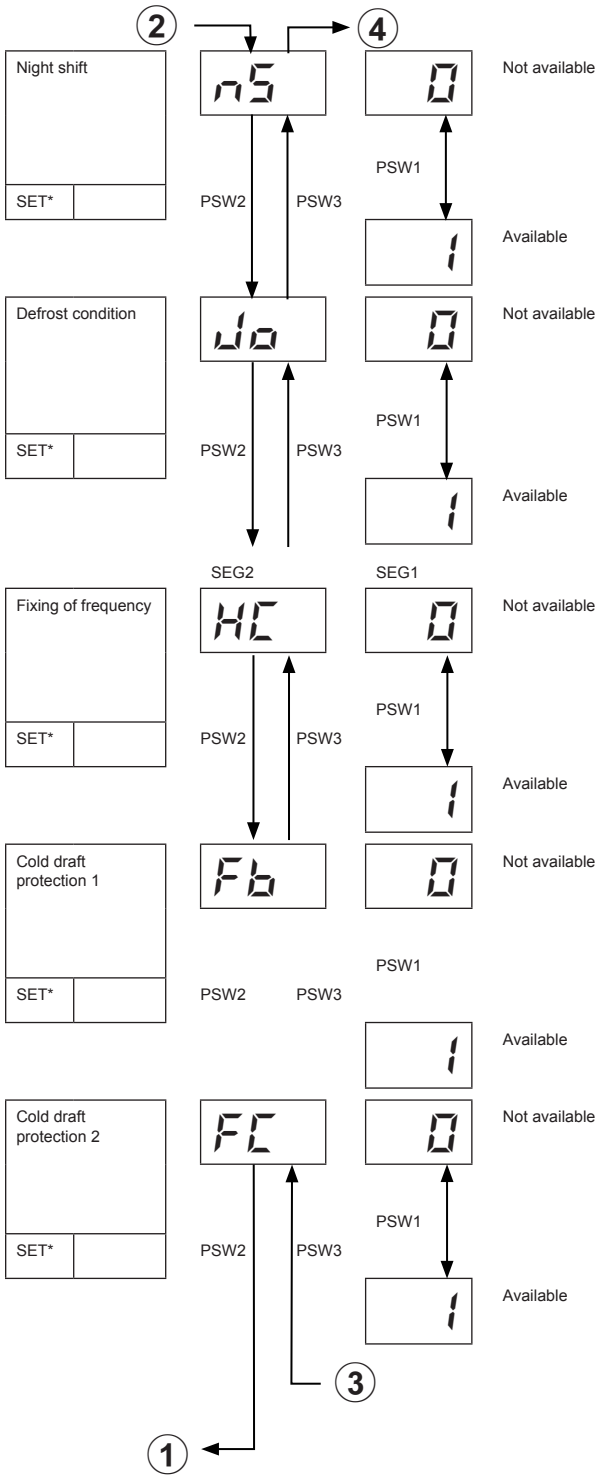


Fixing of demand function Available

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
0
PSW1
1
Not available
Available
Wave function setting
SET*
UE
PSW2
PSW3
0
PSW1
1
Not available
Available
Indoor temperature setting for energy saving
SET*
E1
PSW2
PSW3
0
PSW1
1
Not available
Available
Slo defrost setting
SET*
bJ
PSW2
PSW3
0
PSW1
1
Not available
Available
Low noise settings
SET*
rS
PSW2
PSW3
0
PSW1
1
Not available
Available
4
2


2
4
Night shift
SET*
nS
PSW2
PSW3
0
PSW1
1
Not available
Available
Defrost condition
SET*
dO
PSW2
PSW3
0
PSW1
1
Not available
Available
SEG2
SEG1
Fixing of frequency
SET*
HC
PSW2
PSW3
0
PSW1
1
Not available
Available
Cold draft protection 1
SET*
Fb
PSW2
PSW3
0
PSW1
1
Not available
Available
Cold draft protection 2
SET*
FC
PSW2
PSW3
0
PSW1
1
Not available
Available
3
1

5

- **Fixing of demand function**

  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%.

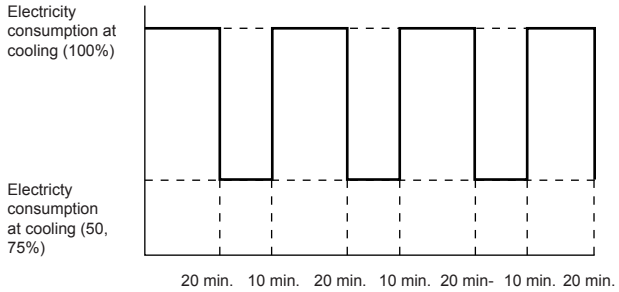
  This function can be activated when the demand is selected at one of input terminal indications ｲ1, ｲ2 and ｲ3

  In case that multiple demand functions are set the input terminal indications, ｲ1, ｲ2 and ｲ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 ｲ1, ｲ2 and ｲ3.

  The minimum limit of running current control is according to the set value of the demand function.

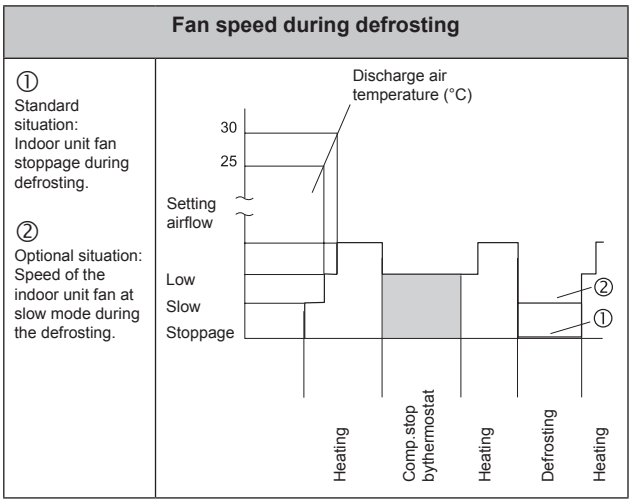
  If the demand function is not set at the input terminal indication, this function can not be activated.

- **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**

  Using this option, you can select the speed of the indoor unit fan during the defrost period.



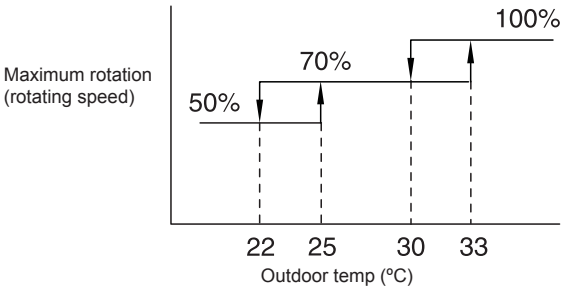
- **Low noise setting.**

  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**

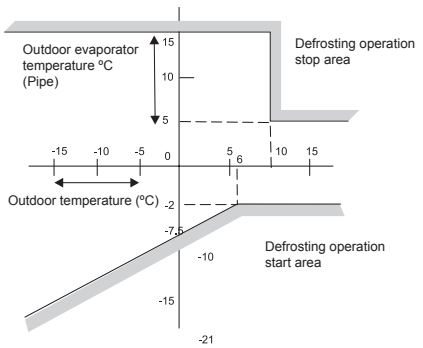
This function allows to change the operation conditions in defrosting mode.

The change is shown in the following illustrations:

5

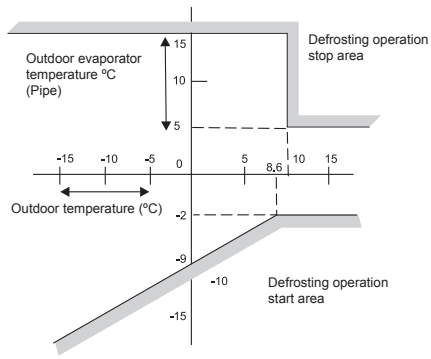
Normal defrosting condition

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 (Only for RAS-8~12HRNM).**
  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.

5.4. OPTIONAL FUNCTIONS AVAILABLE THROUGH THE REMOTE CONTROL SWITCH

5.4.1. Optional function setting

The remote control switch is changed to the optional setting mode by the following procedures.

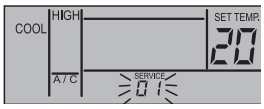
Programming with the PC-ART

The optional signals are programmed using the remote control switch.

- **Programming and setting mode**

  Make sure the unit is stopped. Press the "↵ OK" 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.

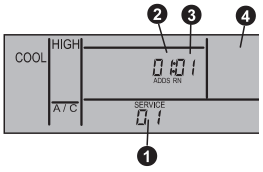


- **Selecting SERVICE 01**

  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 "↵ OK" 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.



❶ The "01" indication is activated.
❷ 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.
❸ 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.
❹ The indication of the setting temperature is turned OFF.

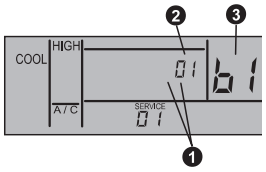
b. In previous point (a), press the "TEMP " switch ⌃ or the "TEMP " switch ⌄ of the remote control switch and the indoor unit for which the optional function is to be set, can be changed.

	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 "OK" switch, the remote control switch is changed to the optional setting mode.

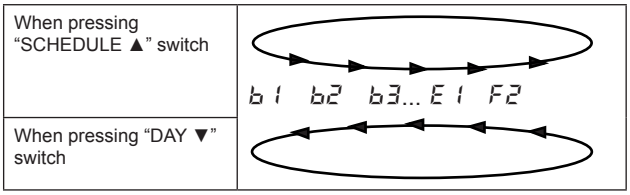
- **Changing the optional signals and setting conditions**

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

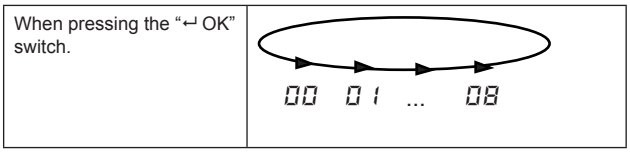


❶ The indications of “ADDS” and “RN” are turned OFF.
❷ The setting condition of the optional function is indicated in the segments of the time indication of the timer setting.
❸ The item number of the optional function is indicated in the segment for the set temperature indication.

b. Press the DAY ▼switch or the SCHEDULE ▲ 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.



c. Press the “↵OK” 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.



- **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 “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.

- **Setting items of the optional functions**

Legend		
● Available	✕ Not available	—— Not used

	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	
——	bA	Not prepared			
●	bb	Cooling temperature compensation	00	Not available	Standard (no compensation)
			01	Available	Compensation in –1°C
			02	Available	Compensation in –2°C
——	bC	Not prepared	00	Not used (standard 00)	
			01		
——	bd	Not prepared	00	Not used (standard 00)	
			01		
——	bE	Not prepared	00	Not used (standard 00)	
			01		
——	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	

5

	Item.	Optional functions	Setting	Contents of parts	Content
●	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			
X	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			
___	Cd	Not prepared	00	Not used (standard 00)	
			01		
___	CE	Not prepared	00	Not used (standard 00)	
			01		
●	CF	Change of louver swing angle	00	Standard (7 steps)	
			01	Draft prevention (5 steps)	For draft prevention option, the two last louver position will be not available
			02	High ceiling (5 steps)	For high celing option, the two first louver position will be not available
___	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	
●	d4	Prevention cooling for discharge air temperature decrease	00	Not available	
			01	Available	
●	d5	Prevention heating for discharge air temperature decrease	00	Not available	
			01	Available	
●	d6	Room temperature control for energy saving	00	Not available	
			01	Available	
___	d7	Not prepared	00–07	Not used (standard 00)	
●	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	Automatic ventilation	This function is used to set the ventilation mode of the total heat exchanger.
			01	Ventilation by 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			

	Item.	Optional functions	Setting	Contents of parts	Content
●	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			
●	E6	Indoor fan operation timer after cooling operation stopage	00	Not available	This function delays the indoor fan start
			01	60 minutes	
			02	120 minutes	
___	E7	Not prepared	00	Not used (standard 00)	
			01		
●	E8	Fan operation control at heating thermo OFF	00	Not used (standard 00)	
			01		
___	E9	Not prepared	00	Not used (standard 00)	
			01		
——	EA	Not prepared	00	Not used (Standard 00)	
			01		
			02		
●	Eb	Fan operation control at cooling thermo OFF	00	Available	
			01	Low	
			02	Slow	
●	EC	Forced thermo-ON stoppage at cooling	00	Available	
			01	Not available	
___	Ed	Not prepared	00	Not used (standard 00)	
			01		
●	EE	Automatic fan speed control	00	Available	
			01	Not available	
X	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	
X	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	-
X	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	
X	F9	Temp lock	00	Not available	
			01	Available	
X	FA	Fan lock	00	Not available	This function eliminates the possibility of changing fan speed from RCS or central control
			01	Available	
X	Fb	Louver lock	00	Not available	
			01	Available	
X	Fc	Cooling temperature range limit	00~10	Standard 00	+1 -10°C
X	Fd	Heating temperature range limit	00~10	Standard 00	-1 ~ -10°C
●	FE	Heating automatic operation temp.	00	5°C	
			01	10°C	
			02	15°C	

NOTE

- *You can only change the setting condition of functions with "X" in the individual settings when you select the optional function for "all rooms".*
- *Items marked with "——" are not available. Do not change its setting condition "00".*

5.4.2. Optional functions of the remote control switch

Removal of heating temperature calibration (b 1)

This function is used 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.

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 used.

<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 preferences and behaviours.* - *It is therefore recommended to discuss this with customers thoroughly and then, set the unit accordingly.*	

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.*	

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

Fixing the operation mode (b5)

This function is used when changes in operation modes are not required. When this function is valid, the operation mode that has been set cannot be changed.

Fixing of setting temperature (b6)

This function is used when changes in setting temperature are not required. When this function is valid, the setting temperature that has been set cannot be changed.

Fixing of operation as exclusive cooling unit (b7)

This function is used 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.

Automatic COOL/HEAT operation (b8)

This function is used 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.

Fixing of fan speed (b9)

This function is used to fix the fan speed. When this function is valid, the fan speed is not changes by the remote control switch.

Not prepared (bA)

Cooling Setting Temperature Compensation (bb)

This function is used to provide the longer cooling operation time. When this function is valid, Thermo-ON/OFF is controlled under the lower temperature conditions than the setting temperature (indicated value) of the remote control switch.

Setting Temperature for Room Temperature Control at Cooling

Setting Condition	Actual Control Temperature
00 (Standard)	Remote Control Switch Setting Temperature (Indicated Value)
01	Remote Control Switch Setting Temperature (Indicated Value) -1ºC
02	Remote Control Switch Setting Temperature (Indicated Value) -2ºC

NOTE

- *The setting temperature lower limit after compensation is 19ºC.*

Not prepared (bC)

Not prepared (bd)

Not prepared (bE)

Not prepared (C1)

Not prepared (C2)

Not prepared (C3)

Drain pump in heating (when the humidifier is installed) (C4)

This function is used to operate the drain pump in heating operation.

High speed (C5)

This function is used to increase the fan speed due to the high ceiling. (Only available for RCI and RCD Units). In case of RPI units, this setting is used to select the static pressure.

High speed at heating thermo-OFF (C6)

This function is used to increase the fan speed with function **(C5)** when thermo-OFF in heating operation. (The fan speed is not increased when thermo-OFF in heating operation at the function **(C5)** setting). (Only available for RCD units).

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 used to cancel the “enforced 3 minutes minimum operation time of compressor” function.

Remote control switch thermistor (C8)

This function is used 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.

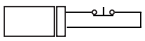
However, even when this function is set at “01” or “02” if the temperature detected is abnormal due to the failure of the remote control thermistor. etc., the indoor unit suction air thermistor is used automatically.

Not prepared (C9)

Not prepared (CA)

Selection of forced stoppage logic (Cb)

This function is used to select the logic of the contact for forced stoppage signal input. The setting condition and the logic of the contact are as shown below.

Setting condition				
↓	Logic of contact	Sequence	Activation contact	
			“Open”	“Close”
00	Contact A		Normal.	Enforced stoppage
01	Contact B		Enforced stoppage	Normal.

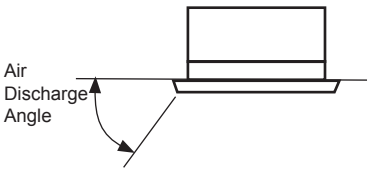
Not prepared (Cd)

Not prepared (CE)

Change of Louver Swing Angle (CF)

This function is used to change the Louver swing angle

Setting condition	Louver Swing Angle (Air Discharge Angle)	Purpose
00	Approx. 30º to 60º	Standard Operation
01	Approx. 30º to 50º	Draft Prevention
02	Approx. 40º to 60º	For High Ceiling



Power supply ON/OFF 1 (d 1)

This function is used to start and stop the unit according to the power supply ON/OFF. When this function is used 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.*

Not prepared (d2)

Restart function after power failure (d3)

This function is used 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.*

5

Prevention for Cooling Discharge Air temperature decrease (d4)

This function is used to change Thermo-ON/OFF conditions at cooling operation and prevent discharge air temperature decrease. In the result, the perception of cold draft is eliminated.

<Thermo-OFF Conditions>

(a) Cooling Operation (including Dry Operation) and

(b) Indoor air discharge temp. <11ºC has been kept for 3 minutes.

(Thermo-OFF when discharge air temperature is low.)

<Thermo-ON Conditions>

(a) Indoor discharge air temp. >13ºC and

(b) Thermo-ON depends on indoor discharge air temperature.

(Not Thermo-ON when discharge air temperature is low.)

Prevention for Heating Discharge Air temperature decrease (d5)

This function is used to prevent discharge air temperature decrease by lowering actual fan speed than the indications on the remote control switch.

Indications on Remote Control Switch	Actual Fan Speed
HIGH	MEDIUM
MEDIUM	LOW
LOW	LOW

Room Temperature Control for Energy Saving (d6)

When outdoor temperature air thermistor is detecting that the air-conditioning load is low from the outdoor temperature. This function is used to automatically save energy.

Nor prepared (d7)

Ventilation mode (KPI) (E 1)

This function is used to set the ventilation mode of the total heat exchanger.

The setting condition and the ventilation 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) (E 1)

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

Increasing supply air volume (KPI) (E2)

This function is used 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 used to set the enthalpy sensor input.

The setting condition is showing next.

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.*

With humidifier (indication only) (KPI) (E3)

Not prepared.

Precooling/preheating period (KPI) (E4)

This function is used 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 (standard)
01	30 minutes
02	60 minutes

Gas sensor (econofresh) (E4)

This function is used 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

Not prepared (E5)

Indoor Fan Operation Timer After Cooling Operation Sttopage (E6)

This function is used to prevent dew condensation "SLOW" indoor fan operation (for 60 minutes or 120 minutes depending on the setting) while cooling operation is stopped. Additionally, it is effective to prevent fangs or abnormal odor.

Not prepared (E7)

Fan Operation Control at heating Thermo OFF (E8)

This function is used to prevent the perception of cold draft by reducing indoor fan speed at heating thermo-OFF.

Setting Condition	Fan Operation at Thermo-OFF
00	LOW
01	SLOW

Not prepared (E9)

Not prepared (EA)

Fan Operation Control at Cooling Thermo OFF (Eb)

This function is used to control odor diffusion and humidity level indoor fan speed at cooling thermo-OFF.

Setting Condition	Fan Operation at Thermo-OFF
00	Operation at Setting Fan Speed
01	LOW
02	SLOW

Forced Thermo-ON Stoppage at Cooling (EC)

This function is used to stop operation by forced thermo-ON when cooling operation is stopped.

It is effective to prevent abnormal odor because the heat exchanger is kept in the clean condition such as the heat exchanger is rinsed with drain water.

Automatic Fan speed Control (EE)

This function is used to economize the operation. The fan speed is automatically controlled when the room temperature is near the setting temperature.

Automatic setting for OFF timer (F1)

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 ~ 24	Available	Turns OFF after running for 1 hour
		Turns OFF after running for 24 hour

Remote control main-sub setting (F2)

This function is used to set two remote-control switches in a same installation; 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

Mode lock (FB)

This function is used to lock the operation mode.

The setting condition is showing below

Setting condition		Contents of parts
00	Not available	-
01	Available	-

Temperature lock (F9)

This function is used to lock the temperature.

The setting condition is showing below

Setting condition		Contents of parts
00	Not available	-
01	Available	-

3Fan lock (FA)

This function is used to lock the fan.

The setting condition is showing below

Setting condition		Contents of parts
00	Not available	-
01	Available	-

Louver lock (Fb)

This function is used to lock the louver.

The setting condition is showing below

Setting condition		Contents of parts
00	Not available	-
01	Available	-

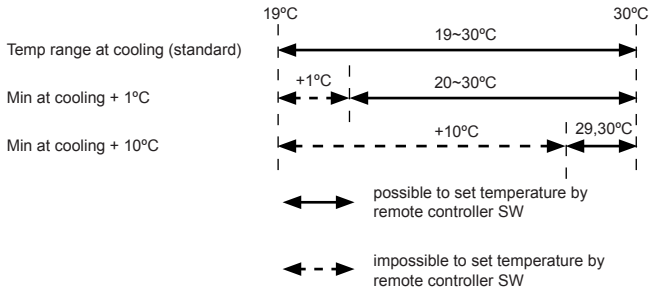
Cooling temperature range limit (Fc)

This function is used 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:



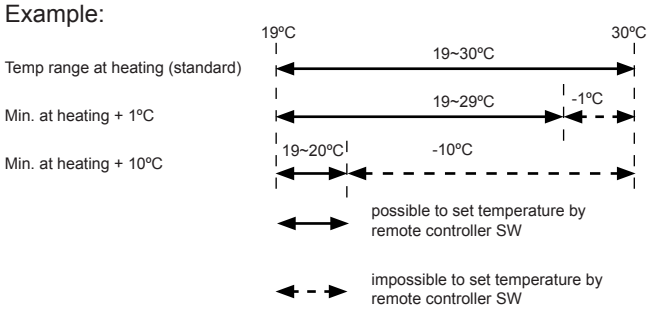
Heating temperature range limit (Fd)

This function is used 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 upper limit in 1ºC
		Working range is reduced in 10ºC, decreased the upper limit in 10ºC

Example:



Heating automatic temperature range limit (FE)

This function is used 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	Available	Setting temperature 5ºC
02		Setting temperature 10ºC
03		Setting temperature 15ºC

5.5. OPTIONAL FUNCTIONS AVAILABLE THROUGH THE REMOTE CONTROL SWITCH (PC-ARH)

1. **Switching to optional setting mode:**

   Press the “MODE” and “FAN SPEED” buttons at the same time for at least 3 seconds when the air conditioning unit is off.

   The screen will change, as shown in the diagram, when optional setting mode is activated.

2. **Changing options and setting elements:**

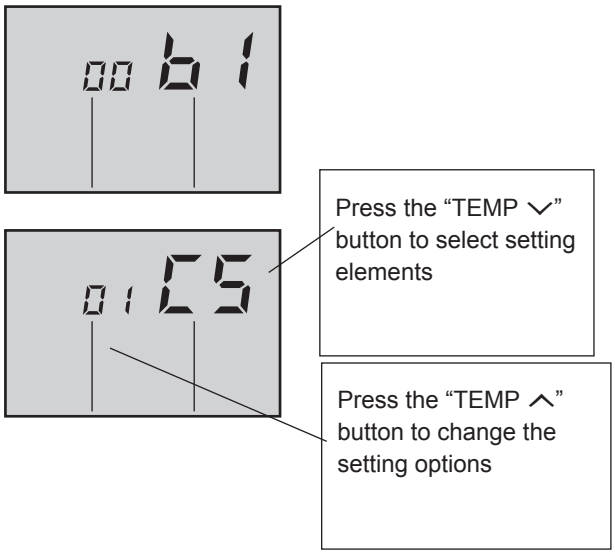
   Press “V TEMP” to change certain setting elements when shown.

   To change setting options, press the “TEMP ” button.

   Consult the following table for setting elements and options.

3. **Cancelling the function selection mode:**

   To return to normal mode from 2., press the “MODE” and “FAN SPEED” buttons at the same time.



- **Optional setting elements**

Code	Element	Setting
b1	Cancelling heating temperature setting	00: Normal (temperature setting +4 °C) 01: Cancelled (temperature setting) 02: Temperature setting +2 ºC *1
b8	Automatic cooling/heating mode	00: Off 01: On
C5	Indoor fan increase	00: Off 01: High 1 02: High 2
C8	Remote control thermostat *2	00: Off 01: Switch from indoor inlet thermistor to remote control thermostat 02: Unit control using the average value of the indoor inlet thermistor and the remote control thermostat
F2	Setting primary and secondary remote controls	00: Primary 00: Secondary
FC	Minimum setting for cooling temperature *3	00: Normal temperature margin 01-10: Minimum cooling limit +1 ºC - +10 ºC
Fd	Maximum setting for heating temperature *4	00: Normal temperature margin 01-10: Maximum heating limit -1 ºC - 10 ºC
H1	Maintenance alarm	00: Show 01: Hide
H2	No automatic control indication	00: Show 01: Hide
H3	Operation mode change restriction *5	00: Operation mode change off (hide operation mode) (factory setting) 01: Operation mode set by the central control unit + “FAN” mode 02: Unlimited operation
H4	Ventilation changeover (total heat exchanger only)	00: Air conditioning only 01: Ventilation only 02: Air conditioning + ventilation
H5	Central control available after forced stoppage.	00: Off 01: On

*1. Certain indoor units do not accept the setting “02”.
*2. If installed on a bedside table, use the setting “00”.*3. Applies to “FAN”, “COOL” and “DRY” modes.*4. Applies to “HEAT” mode.*5. “01” is only available when using a remote control. Do not use this setting when using two remote controls (primary/secondary).

NOTE

- *When connecting several indoor units, the same settings are applied to all units.*
- *To change the settings, wait at least three minutes after switching the power on.*
- *Some indoor and outdoor units do not accept certain settings or do not have the functions that relate to the activated settings. Check the available settings beforehand.*
- *Note down the option selected in the “settings” column on the table.*

5.5.1 Alarm indication

The run LED (green) will flash. The LCD screen will show the following information:

– No. of indoor unit affected by the alarm.
– Alarm code.
– Unit model.
– No. of indoor units connected to the system.

NOTE

- *For more information on alarm indications, check the installation and operation manual for the outdoor unit.*

5.6. 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

Optional function	DIP switch			
	1	2	3	4
Setting of sub receiver part	○	-	-	-
Identifying the indoor unit	-	○(1)		

⚠	*CAUTION*
-	*Turn OFF all the power sources before setting the DIP switches.*

(1) Only for PC-ALHD, 11, 13

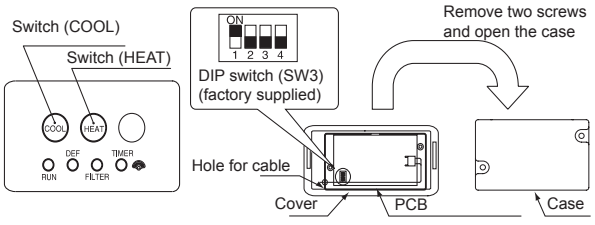
Setting of sub-receiver part

For this optional function set pin marked with ❶ to ON.

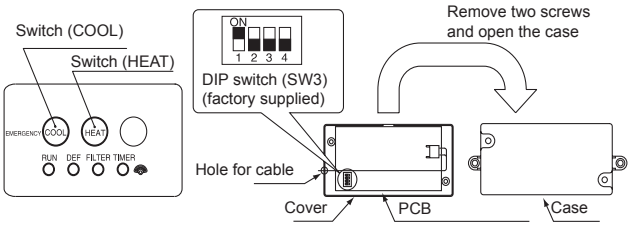
PC-RLH8/9/11/13

Open the lid of case by removing two screws so that the following functions are available.

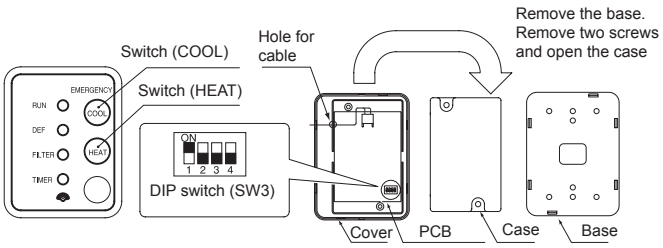
PC-ALH



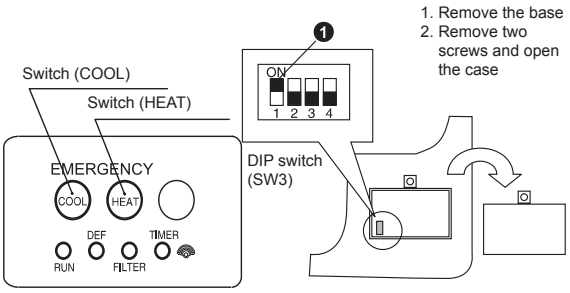
PC-ALHD



PC-ALHZ



PC-ALHC



6. TEST RUN

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6.2. Test run procedure using the remote control switch 6-4
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6.1. CHECKING PROCEDURE BEFORE THE TEST RUN

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.*
  - *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.*
  - *Make sure that the stop valves of the outdoor unit are fully open. Then, start the system.*
  - *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.*
  - *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.*
  - *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 switch1. Make sure that the stop valve of the gas line and the stop valve of the liquid line are fully open.*

- **Checking procedure**

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, DSW6 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, or L1 and N for single phase) is correctly connected at the power source.

NOTE

- *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.*
- *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.)*
- *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.*
- *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.*
- *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.*
- *Check to ensure that the main source has been ON for more than 12 hours to warm the compressor oil by the oil heater.*
- *Check to ensure the operating temperature:*

Cooling operation:
Indoor DB21.5 ºC and above,
Indoor WB16 ºC and above,
Outdoor DB0 ºC and above.
Heating operation:
Indoor DB27 ºC and below.

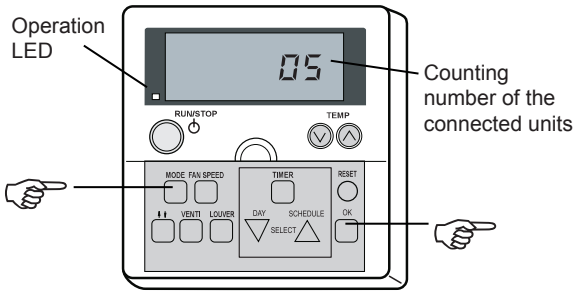
NOTE

- *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.*

6.2. TEST RUN PROCEDURE USING THE REMOTE CONTROL SWITCH

❶ 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.



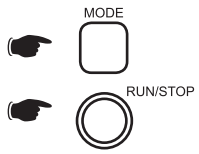
❸

RCS 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 remote control and the unit is correct. 2. Connecting points of the remote control cable. 3. The contact of the connectors of the remote control cable. 4. 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).	5. Setting of the DIP switches on the printed circuit board. 6. Wire connection order of the bridge cable. 7. Connecting points of the bridge cable. 8. 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.

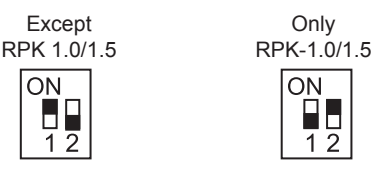


❻

RCS 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

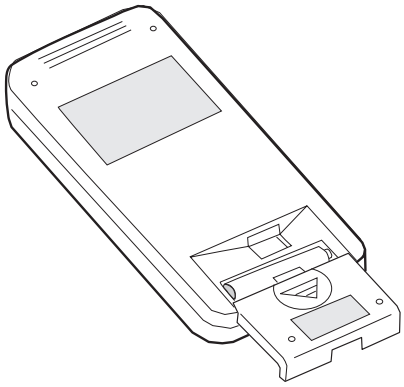
❼ Instructions for the recovery when the fuse of the transmission circuit is blown out:
1. Correct the wiring to the terminal board.
2. Set the 1st pin of DSW7 on the indoor unit PCB to ON.
Only for RPK-1.0/1.5:
Set the 2nd pin of DSW7 on the indoor unit PCB to ON.



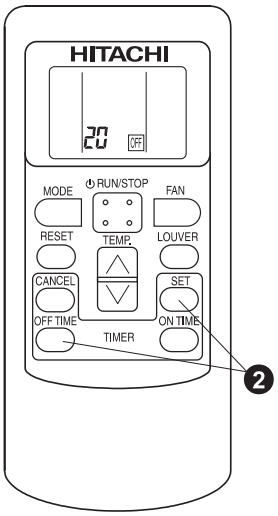
6.3. TEST RUN PROCEDURE USING THE WIRELESS REMOTE CONTROL SWITCH

NOTE

- *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.*

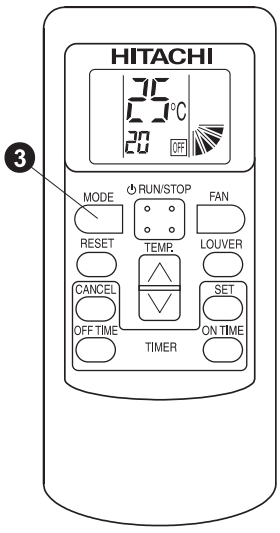


1. Perform the test run after completing the installation.
   a) Set the batteries for the remote control switch.
   b) Turn ON the power source of the indoor units and the outdoor units.
   c) The yellow '((' LED on the receiver of the indoor unit flickers (0.25 seconds ON ↔ 0.25 seconds OFF). Then, 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.

6

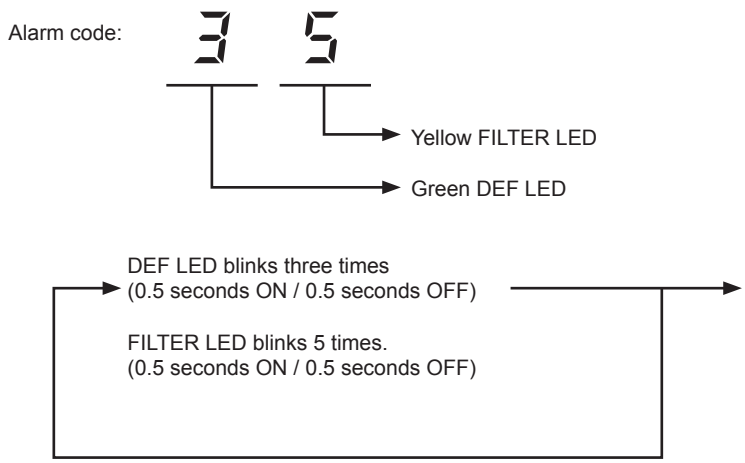
b) Set the louver angle by pressing the LOUVER switch.

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.
   a) 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.
   b) 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).*

   c) 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 7.2.1 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:

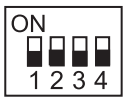


      - The red RUN LED (1 second ON / 1 second OFF) means that there is an abnormal transmission between the indoor units and the outdoor unit.

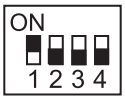
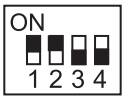
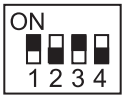
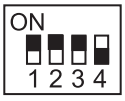
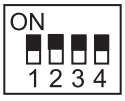
6.4. TEST RUN PROCEDURE FROM THE OUTDOOR UNIT SIDE

The test run procedure from the outdoor unit side is shown below.
You can set this DIP switch while the power source is 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 components while you are setting the switches on the PCB.* - *Do not attach or detach the service access panel when the power source for the outdoor unit is ON and the outdoor unit is operating.* - *Set all the DIP switches of DSW1 to OFF after completing the test run.*	

	Dip switch seting	Operation	Remarks
Test run	1. Setting 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 	- The indoor unit automatically starts to operate when the test run of the outdoor unit is set. - You can perform the ON/ OFF operation from the remote control switch or the DSW1-1 of the outdoor unit. - Continuous operation during 2 hours is performed without the Thermo-OFF condition.	- Make sure that the indoor units start to operate in accord with the test run of the outdoor unit. - If you start the test run from the outdoor unit and you stop the test run 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. - If the more than one indoor unit is connected with one remote control switch, all the units start the test run at the same time. Therefore, turn OFF the power source so that the indoor units do not perform the test run. If this is the case, the TEST RUN indication of the remote control switch may flicker. 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 DSW1-1 ON 	- When DSW1-4 is ON during the compressor operation, the compressor stops operating immediately and the indoor unit is under the Thermo-OFF condition. - When DSW1-4is OFF, the compressor starts to operate after the cancellation of the 3-minute guard.	- Do not turn ON and OFF the compressor frequently

6.5. 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/cm²G
   Suction pressure: Ps= kg/cm²G
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?_____

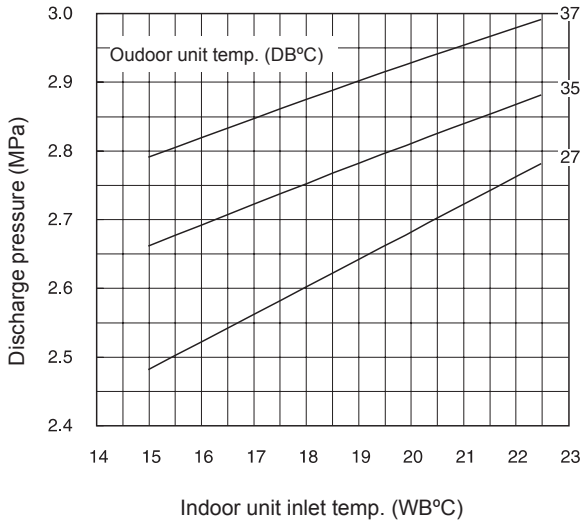
- **Normal operation pressure**

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**

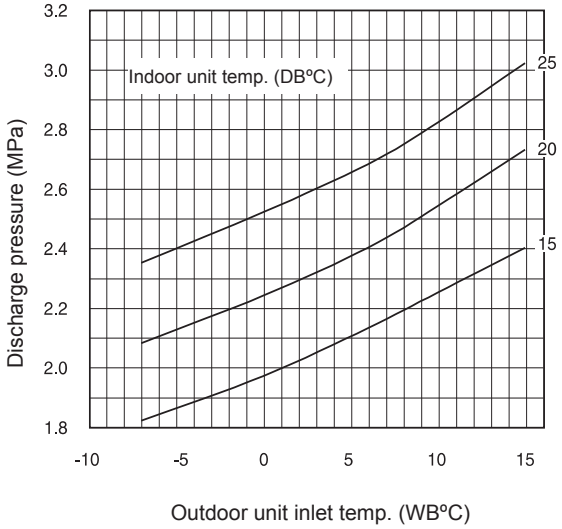
Cooling operation

Discharge pressure **Pd** (MPa)

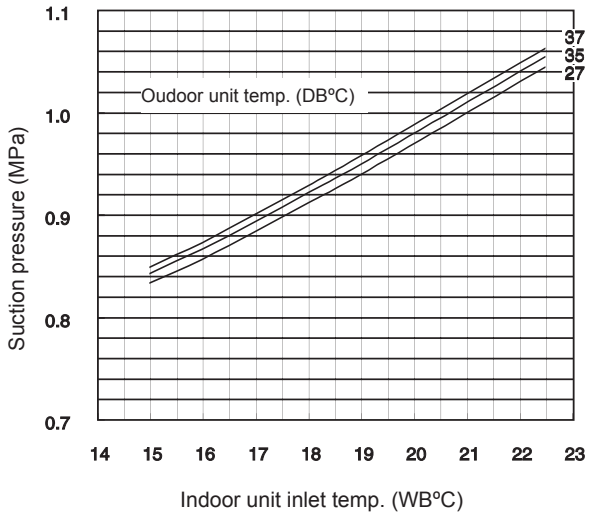


Heating operation

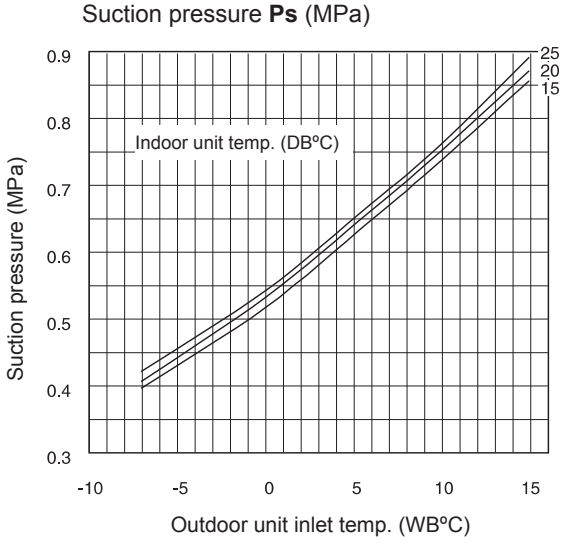
Discharge pressure **Pd** (MPa)



Suction pressure **Ps** (MPa)



Suction pressure **Ps** (MPa)

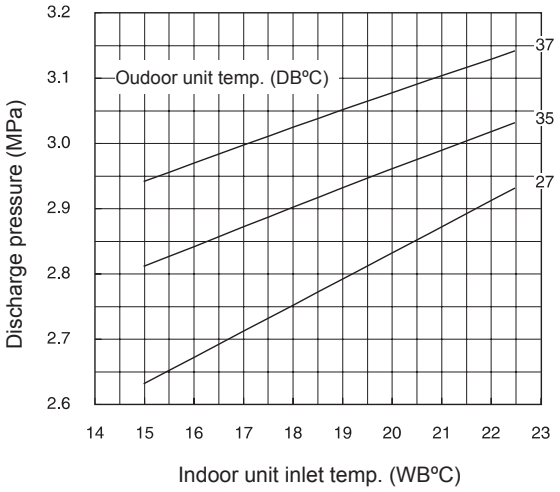


NOTE
- *The above curves indicate pressures under the following conditions:*   - *Indoor fan speed: HIGH*   - *Indoor total capacity: 100% compared with the capacity of the outdoor unit. (Connected 4 indoor units.)*   - *Piping length: 7.5m (main piping: 5m, branch piping: 2.5m x 4)* - *Do not use the above data for the refrigerant charge procedure.*   *These data should be used as a reference for the checking of operating conditions.*

- **Model RAS-10HRNM**

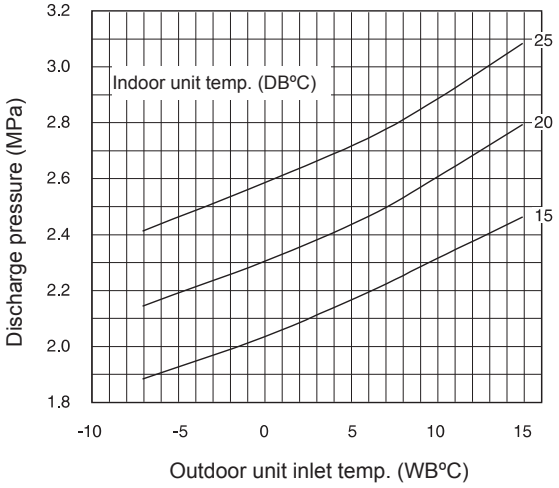
Cooling operation

Discharge pressure **Pd** (MPa)

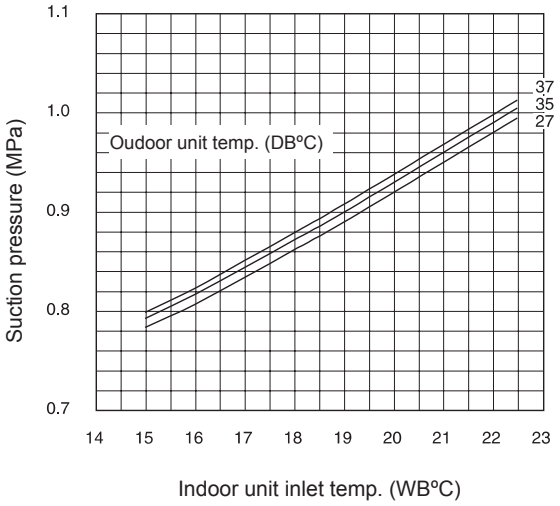


Heating operation

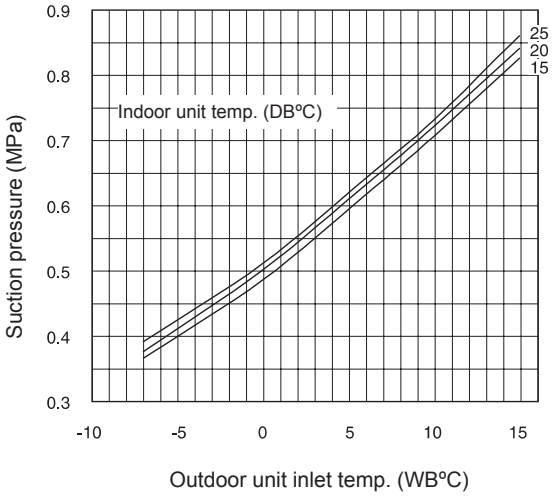
Discharge pressure **Pd** (MPa)



Suction pressure **Ps** (MPa)



Suction pressure **Ps** (MPa)

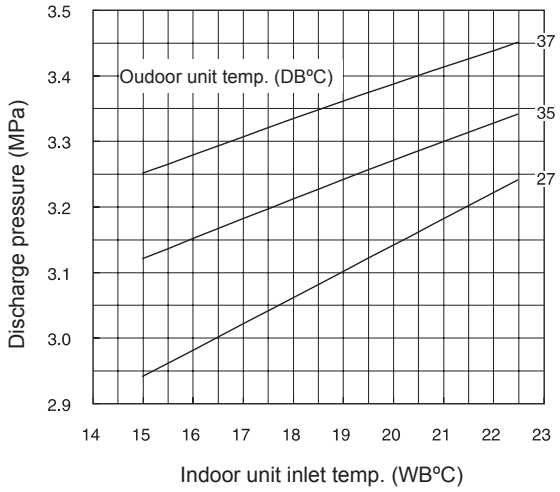


	NOTE
- *The above curves indicate pressures under the following conditions:* - *Indoor fan speed: HIGH* - *Indoor total capacity: 100% compared with the capacity of the outdoor unit. (Connected 4 indoor units.)* - *Piping length: 7.5m (main piping: 5m, branch piping: 2.5m x 4)* - *Do not use the above data for the refrigerant charge procedure.* *These data should be used as a reference for the checking of operating conditions.*	

- **Model RAS-12HRNM**

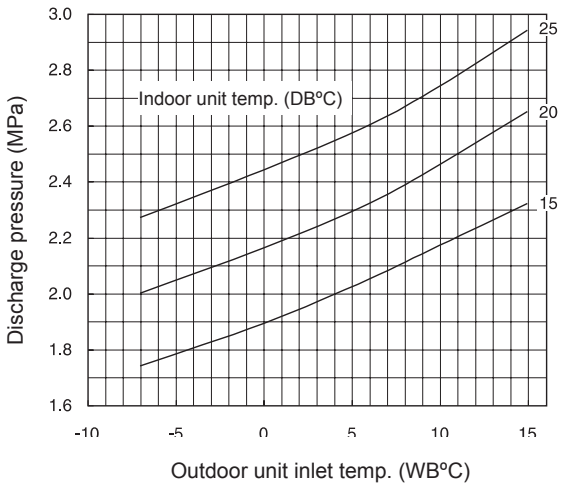
Cooling operation

Discharge pressure **Pd** (MPa)

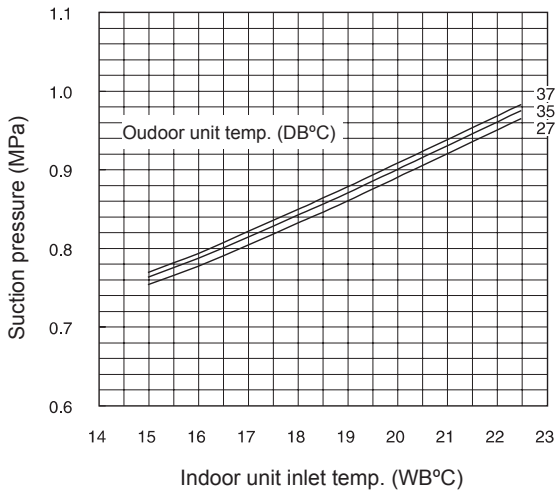


Heating operation

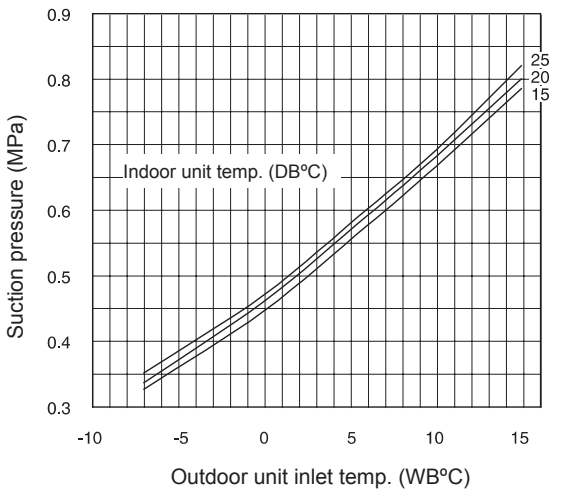
Discharge pressure **Pd** (MPa)



Suction pressure **Ps** (MPa)



Suction pressure **Ps** (MPa)



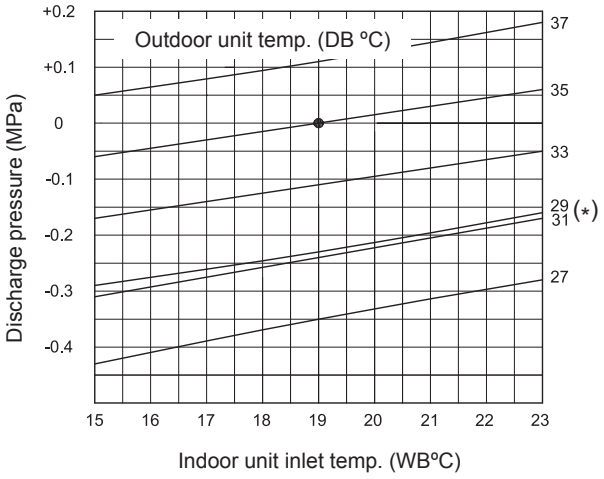
6

NOTE
- *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)* - *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.*

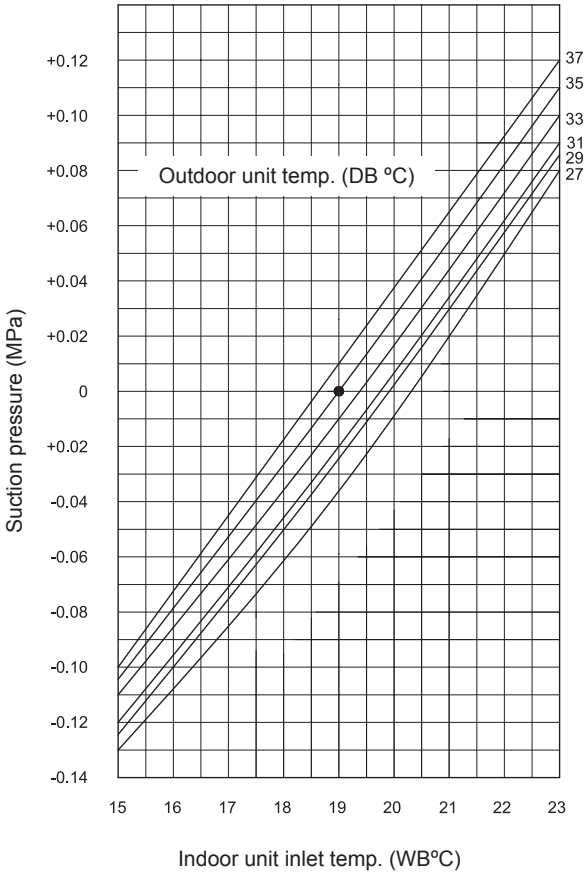
- **RAS-(3~6)H(V)RNME**

Cooling operation

Discharge pressure **Pd** (MPa)

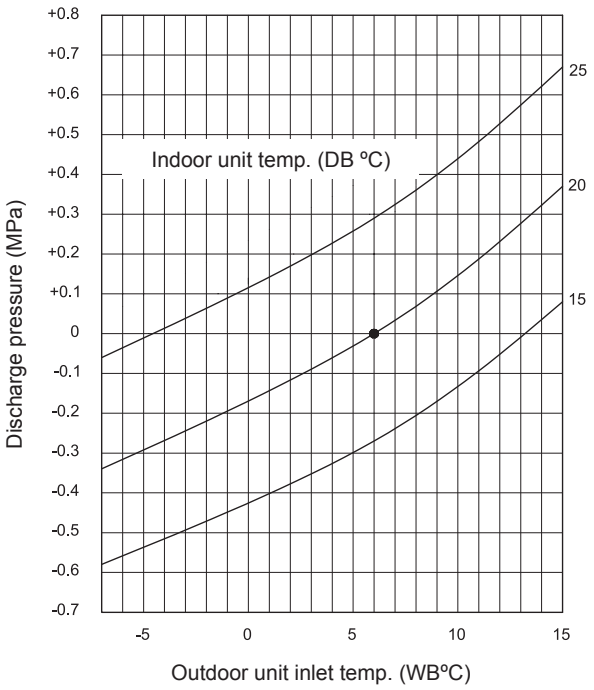


Suction pressure **Ps** (MPa)

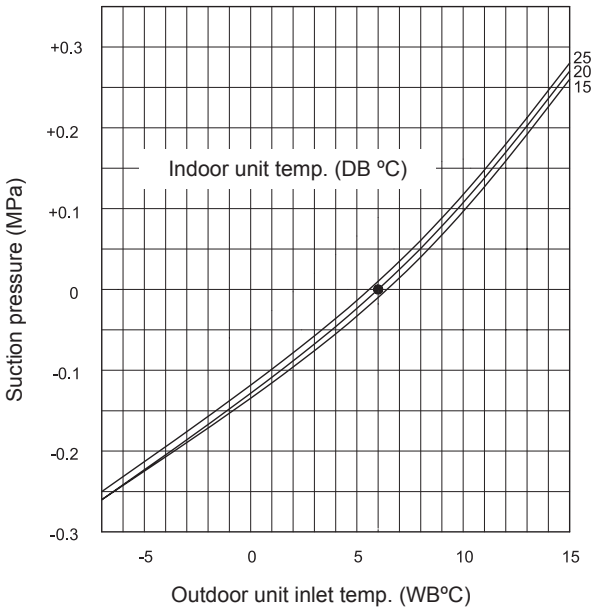


Heating operation

Discharge pressure **Pd** (MPa)



Suction pressure **Ps** (MPa)



(*) When ambient temperature is less than 30ºC, outdoor fan volume decrease.

NOTE

- *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 1 indoor unit)*
  - *Piping length: 7.5m (main piping: 5m, branch piping: 2.5m x 4)*
- *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.
- *Nominal Pd and Ps Indoor unit combination:*

Nominal value (MPa)			RCI	RCD	RPC	RPI	RPK
Cooling	3 HP	Pd	2.76	2.74	2.76	2.77	2.77
		Ps	0.89	0.84	0.84	0.85	0.85
Heating		Pd	2.56	2.54	2.56	2.57	2.57
		Ps	0.74	0.70	0.70	0.70	0.70
Cooling	4 HP	Pd	2.58	2.56	2.54	2.55	2.52
		Ps	0.87	0.85	0.83	0.83	0.78
Heating		Pd	2.32	2.52	2.68	2.57	2.57
		Ps	0.70	0.70	0.70	0.70	0.70
Cooling	5 HP	Pd	2.70	2.69	2.68	2.69	2.68
		Ps	0.82	0.79	0.83	0.83	0.79
Heating		Pd	2.49	2.55	2.63	2.40	2.40
		Ps	0.68	0.68	0.68	0.68	0.68
Cooling	6 HP	Pd	2.75	2.74	2.73	2.76	2.76
		Ps	0.78	0.76	0.80	0.80	0.78
Heating		Pd	2.64	2.64	2.72	2.72	2.72
		Ps	0.66	0.66	0.66	0.66	0.66

- **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	If the expansion valve 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.
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 failure.

7. TROUBLESHOOTING

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7.1. INITIAL TROUBLESHOOTING

7.1.1. Checking using the 7-segment display

- **Simple checking procedure using the 7-segment display**
  1. Turn on all the indoor units which are connected to the outdoor unit.
  2. Turn on the outdoor unit
  3. Auto-addressing starts. (Outdoor unit printed circuit board PCB 1)
     During the auto-addressing, you can check the following items using the 7-segment display of the outdoor unit.
     a) Disconnection of the power supply to the indoor unit.
     b) Duplication of the indoor unit number.

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:

Cause	Indication	Remarks
a. The indoor units are not supplied with power.	03	continues to flash after 30 seconds.
b. Disconnection of the operating line between the outdoor units and the indoor units.	03	continues to flash after 30 seconds.
c. Duplicated settings of the indoor unit number on the rotary switch RSW (Refer to the section 7.2.2, "Troubleshooting using the alarm code" for the description of the alarm code "35").		

7.1.2. 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 using 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 using 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 using 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 7.3.2.
*2):Refer to section 7.3.1.

7.1.3. 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
Failure of the remote control switch		Check the remote control switch using 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 using the self-check mode *2)	Replace PCB if it failed

*1):Refer to section 7.3.2.
*2):Refer to section 7.3.1.

7.1.4. Abnormal operation of the devices

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
RUN LED is ON and the LCD is indicated However, the system does not operate (For example, the indoor fan, the outdoor fan or the compressor does not operate)	Failure of the indoor unit fan motor	Disconnected coil	Measure the coil resistance using the tester	Replace the indoor unit fan motor
		Burnt-out coil	Measure the insulation resistance	
	Failure of the outdoor unit fan motor	Disconnected coil	Measure the coil resistance using the tester	Replace the outdoor unit fan motor
		Burnt-out coil	Measure the insulation resistance	
	Failure of the magnetic switch for the outdoor unit fan motor	Insufficient contacting	Measure the voltage between the contacting parts	Replace PCB for the outdoor unit
	Failure of the comp. motor		Measure the resistance between two wires	Replace the compressor
	Failure of the comp.		Check for an abnormal sound from the comp.	
	Failure of the magnetic switch for comp.	Insufficient contacting	Check that the magnetic switch activates correctly or not	Replace the magnetic switch
	Failure of one of PCBs	Disconnected wiring to PCB	Check the connections	Correctly connect the wiring
		Failure of PCB	Check PCB using the self-check mode *1)	Replace PCB if it failed
The comp. does not stop or start even if the setting temperature on the LCD changes to *3)	Failure of air inlet thermistor	Failure of thermistor	Check it by self-checking *2)	Replace or correctly connect the wires if abnormal operation exists
		Disconnection of thermistor		
	Abnormal operation of the remote control switch cord			
	Failure of the indoor unit PCB		Check PCB using the self-check mode *1)	Replace PCB if it failed

Abnormal operation of the devices (Cont.)

Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
The comp. does not stop or start even if the setting temperature on LCD changes to *3)	Incorrect optional setting	Check the setting condition of "remote control thermostat" using the optional setting Setting and control: "00": Control using the indoor thermistor for the suction air "01": Control using the thermostat of the remote control switch "02": Control using the average value of the indoor thermistor for the suction air and the thermostat of the remote control switch	If the thermostat of the remote control switch is not used, set at “00”
	Incorrect input/output setting	Check setting condition of “i1” and “i2” by input/output setting. * Setting and ontrol: “01”: Room thermostat (cooling) “02”: Room thermostat (heating)	In case that room thermostat is not used, set for input signal actuallt used. If no signal is used, set at “00”

*1):Refer to section 7.3.2.
*2):Refer to section 7.3.1.
*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 operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Indoor fan speed does not change	Failure of the discharge air temp. thermistor	Failure of the thermistor	Check the thermistor using the self-check mode *2)	Replace or correctly connect the wiring when it is abnormal
		Disconnected wire of the thermistor		
	Failure of the remote control switch		Check it using the self-check mode *1)	Replace if it failed
	Failure of PCB for the indoor unit			Replace if PCB fails
No defrost operation mode is available during the heating process or the defrost operation continues	Failure of thermistor for outdoor evaporating temp. during heating	Failure of thermistor	Replace or correctly connect when it is abnormal	
		Disconnected wire of thermistor		
	Failure of 4-way valve	Disconnected 4-way valve coil	Measure the resistance of coil	Replace the 4-way valve
		Incorrect activation of 4-way valve	Enforced power supply	
	Disconnected control wires between indoor unit and outdoor unit		Check the connectors	Correctly connect the wiring
	Failure of the outdoor units of PCB	Disconnected wiring to PCB	Check the connectors	Correctly connect the wiring
		Failure of PCB	Check PCB using the self-check mode *1)	Replace PCB when the check mode is not available
	Failure of the indoor unit of PCB	Disconnected wiring to PCB	Check the connectors	Correctly connect the wiring
		Failure of PCB	Check PCB using the self-check mode *1)	Replace if PCB fails
The LED and the LCD on the remote control switch remain ON	Failure of PCB in the indoor unit or the remote control switch			

*1):Refer to section 7.3.2.
*2):Refer to section 7.3.1.

Abnormal operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Insufficient cooling process	Indoor cool load is greater than the cooling capacity		Calculate the cool load	Use a bigger unit
	Excessively low suction pressure	Gas leakage or shortage of refrigerant	Measure superheat	Correctly charge the refrigerant after repairing the gas leakage
		Excessively small diameter tube or long piping	Measure and check the field-supplied pipes	Use the correct pipes
		Incorrect activation of the check valve of the outdoor unit	Check whether or not the temp. difference exists before/after the check valve	Replace the check valve for the outdoor unit
		Failure or malfunction of the expansion valve	Check for clogging	Remove the clogging
			Check the connection cord and the connector	Replace the connector
			Is there an operation sound from the coil?	Replace the coil
			Is the thermistor on the compressor normal?	Replace the thermistor
			Is the thermistor installed correctly on compressor?	Correctly install the thermistor
		Clogged strainer in the indoor unit; clogging at the low pressure piping	Check the temp. difference at the inlet and the outlet of the strainer	Replace the strainer in the indoor unit
		Clogging at the low pressure piping	Check the temp. difference	Remove the clogging
		Insufficient air flow to the indoor unit heat exchanger	Check for clogged air filter	Clean the air filter
			Check for an obstacle at the inlet or the outlet	Remove the obstacles
		Excessively low air temp. to the indoor unit heat exchanger	Insufficient speed of the indoor unit fan motor?	Replace the fan motor
			Short-circuited indoor unit air?	Remove the cause of the short-circuited air

Abnormal operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Insufficient cooling process	Excessively high discharge pressure	Insufficient air flow to the outdoor unit heat exchanger	Clogging of the outdoor unit heat exchanger?	Remove the clogging
			Obstacles at the inlet or the outlet of the outdoor unit heat exchanger	Remove the obstacles
			Is the service area for the outdoor unit sufficient?	Secure the service area
			Correct fan speed?	Replace the fan motor
		Excessively high air temp. to the outdoor unit heat exchanger	Short-circuited air to the outdoor unit?	Remove the cause of the short-circuited air
			Any other heat load near the outdoor unit?	Remove the heat source
		Excessively charged refrigerant	Expansion valve opening	Correctly charge the refrigerant
		Non-condensate gas in cycle	Check each temp. and each pressure	Charge the refrigerant after the vacuum pumping
		Clogging of the discharge piping	Check for clogging	Remove the clogging
		Failure or malfunction of the expansion valve	Check for clogging	Remove the clogging
			Check the connection cord and the connector	Replace the connector
			Is there an operation sound from the coil?	Replace the coil
			Is the thermistor on the compressor normal?	Replace the thermistor
			Is the thermistor installed correctly on the compressor?	Correctly install the thermistor
	Malfunction or internal leakage of the 4-way valve		Check the temp. difference at the inlet and the outlet of the 4-way valve	Replace the 4-way valve
	Excessively high suction pressure	Malfunction or internal leakage of the 4-way valve	Check the temp. difference between the inlet and the outlet of 4-way valve	Replace the 4-way valve
	Discharge temp. of the indoor unit is unstable		Check the expansion valve of the indoor unit in the same system	Replace the failed expansion valve of the indoor unit

Abnormal operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Insufficient heating process	Indoor heat load is greater than the heating capacity		Calculate the heat load	Replace the unit with a bigger unit
	Excessively low suction pressure	Gas leakage or insufficient refrigerant charge	Measure superheat	Correctly charge the refrigerant after the gas leakage check and repairing
		Excessively small diameter or long piping	Measure the field-supplied piping	Use the specified pipes
		Failure or malfunction of the expansion valve	Check for clogging	Remove the clogging
			Check the connection cord and the connector	Replace the connector
			Is there an operation sound from the coil?	Replace the coil
			Is the thermistor on the compressor normal?	Replace the thermistor
			Is the thermistor installed correctly on compressor?	Correctly install the thermistor
		Clogging of I.U./O.U. strainer	Check the temp. difference between the inlet and the outlet of strainer	Replace the strainer for the outdoor unit or the indoor unit
		Clogging of suction piping	Check the temp. difference of each part	Remove the clogging
		Insufficient air flow through the outdoor unit heat exchanger	Is the outdoor unit heat exchanger clogged?	Remove the clogging
			Are there any obstacles at the inlet or the outlet of outdoor unit?	Remove the obstacles
			Is the service area for the outdoor unit sufficient?	Secure a sufficient service area
			Check the speed of the outdoor unit fan	Replace the fan motor
		Excessively low air temp. through the outdoor unit heat exchanger	Check for any short-circuited air to the outdoor unit	Remove the cause of the short-circuited air
		Defrosting is insufficiently completed	Check the thermistor for the defrost operation	Replace the thermistor for the defrost operation

Abnormal operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Insufficient heating process	Excessively high discharge pressure	Insufficient air flow to the indoor unit heat exchanger	Check the filter for a clogging	Remove the clogging
			Check for any obstacles at the inlet or the outlet of the indoor unit	Remove the obstacles
			Check the indoor fan speed	Replace the fan motor
		Excessively high air temp. to the indoor unit heat exchanger	Check whether or not the short-circuited air exists	Remove the cause of the short-circuited air
		Excessively charged refrigerant	Check the refrigerant quantity *1)	Correctly charge the refrigerant
		Non-condensate gas in ref. cycle	Check the refrigerant quantity *1)	Recharge the refrigerant after the vacuum pumping
		Clogging of the discharge pr. piping	Check for clogging	Remove the clogging
	Malfunction or internal leakage of the 4-way valve		Check the temp. difference at the inlet and the outlet of the 4-way valve	Replace the 4-way valve
	Malfunction of the check valve of the outdoor unit		Check the temp. difference at the inlet and the outlet of the check valve	Replace the check valve
	Excessively high suction pressure	Malfunction or internal leakage of 4-way valve	Check the temp. difference at the inlet and the outlet of the 4-way valve	Replace the 4-way valve
	Discharge temp. of the indoor unit is unstable		Check the expansion valve of the indoor unit in the same system	Replace the failed expansion valve of the indoor unit

*1):Refer to chapter 7 of TC.

Abnormal operation of the devices (Cont.)

Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Cooling or heating process with an abnormal sound	Foreign particles inside of the fan casing		Visually inspect it	Remove the foreign particles
	Indoor unit fan runner is hitting the casing		Visually inspect it	Adjust the position of the fan runner
	Outdoor unit propeller fan is hitting the shroud		Visually inspect it	Adjust the position of the propeller fan
	Abnormal sound from the compressor	Faulty Installation	Check that each part is tightly fixed	Tightly fix each part
		Liquid ref. compression	Adjust the suction gas temp. and pressure	Ensure superheat
		Wear or breakage of the internal comp. parts	Abnormal sound from the inside of the compressor	Replace the compressor
		No heating by the oil heater	Check the resistance (oil heater, fuse)	Replace the oil heater or the fuse
	Humming sound from the magnetic conductor		Check the surface of the contacts	Replace the magnetic switch
	Abnormal vibration of the cabinets		Check each fixing screw	Tightly fix each screw
Outdoor fan does not operate when the compressor operates	Obstacle at the outdoor fan		Check the obstacles	Remove the obstacles
	Watching condition for the heating process		Wait for the switching of the 4-Way valve (1 ~ 3 minutes)	If the 4-Way valve does not switch, check for insufficient refrigerant
Indoor fan does not operate when the compressor operates	Discharge pressure does not increase higher than 1.5 Mpa due to the insufficient refrigerant		Check the operation pressure *1)	Add the refrigerant
	Disconnected wiring for the indoor fan		Check the wiring	Connect the wiring correctly

*1):Refer to chapter 10 of TC.

7.2. TROUBLESHOOTING PROCEDURE

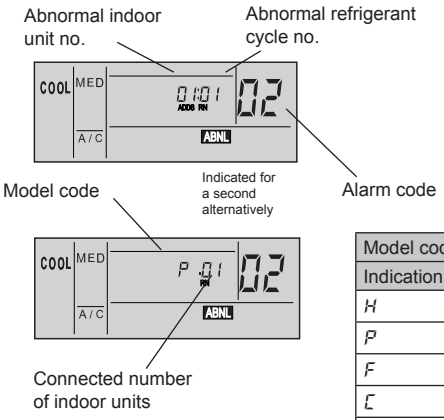
7.2.1. Alarm code

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
b	IVX individual operation
L	KPI

- **Alarm code table**

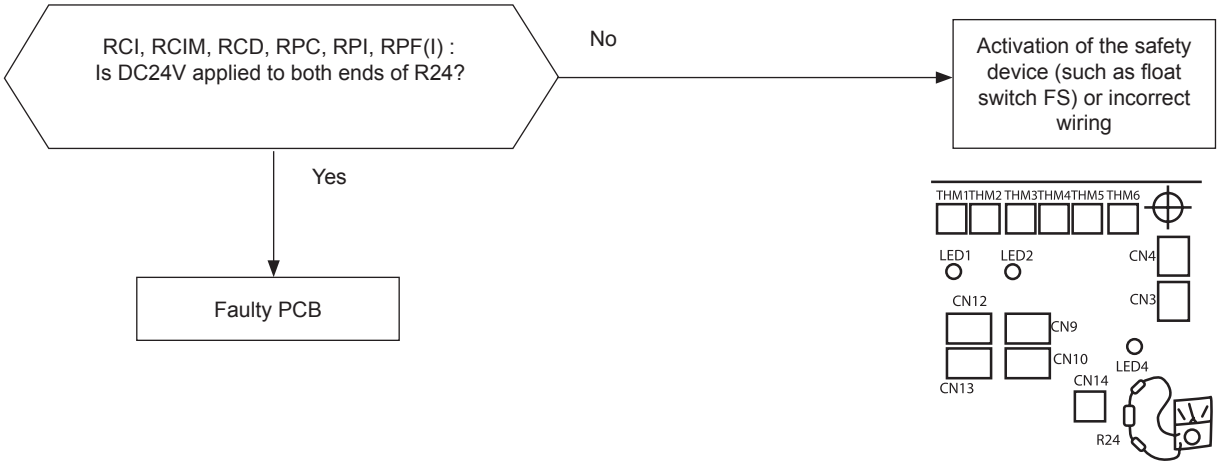
Code No.	Category	Content of abnormality	Leading cause
01	Indoor unit	Activating of protection device	Failure of pcb and float switch
02	Outdoor unit	Activating of protection device	Activation of PSH, locked motor, abnormality of power supply phase
03	Transmission	Abnormality between indoor (or outdoor) 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
05	Transmission	Abnormality of power source wiring	Reverse phase incorrect wiring.
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	
15		Fresh outdoor air thermistor (econofresh)	
19		Tripping of protection device for fan motor	Failure of fan motor
20	Sensor on outdoor 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.

Code No.	Category	Content of abnormality	Leading cause
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
51	Inverter	Abnormality of current sensor for inverter	Failure of control PCB, IPM or PCB2
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
96	Sensor on the KPI unit	Room temperature thermistor	Failure of thermistor, sensor, connection.
97		Outdoor temperature thermistor	
EE	Compressor	Compressor protection alarm	Failure of compressor.

7.2.2. Troubleshooting by alarm code

Alarm code	Description
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.

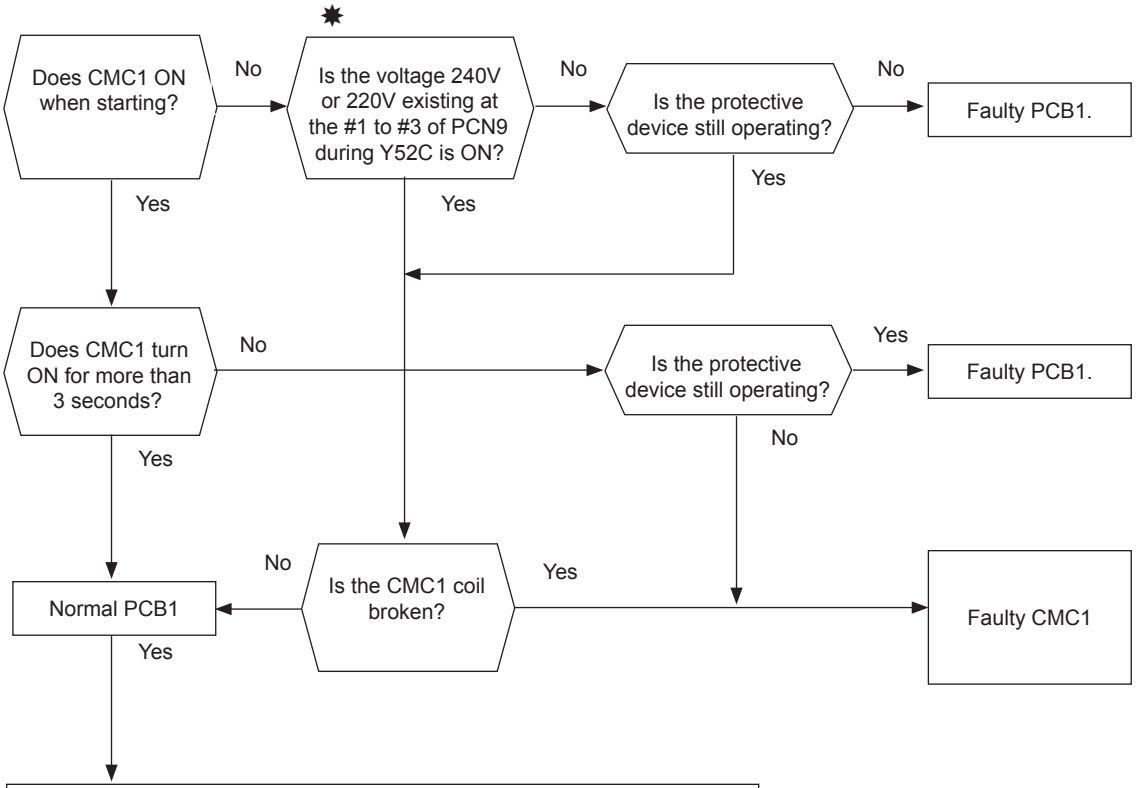


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the float switch	High drain level	Clogging of the drainage	Check the drain pump and drain discharge boss	Remove the clogged foreign particles
	Faulty float switch	Fault	Check the continuity when the drain level is low	Replace the float switch if faulty
		Faulty contacting	Measure the resistance using the tester	Fix the looseness and Replace the connector
		Faulty connection	Check the connections	Repair the connection
Faulty indoor unit PCB			Check PCB using the self-check mode *1)	Replace PCB if faulty

*1):Refer to section 7.3.1 and 7.3.3.
Alarm code "01" is not displayed at the RPK series.

Alarm code	Description
02	**Activation of the safety device in 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 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 using 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

Alarm code	Description
03	**Abnormal transmission between the indoor units and the outdoor unit**

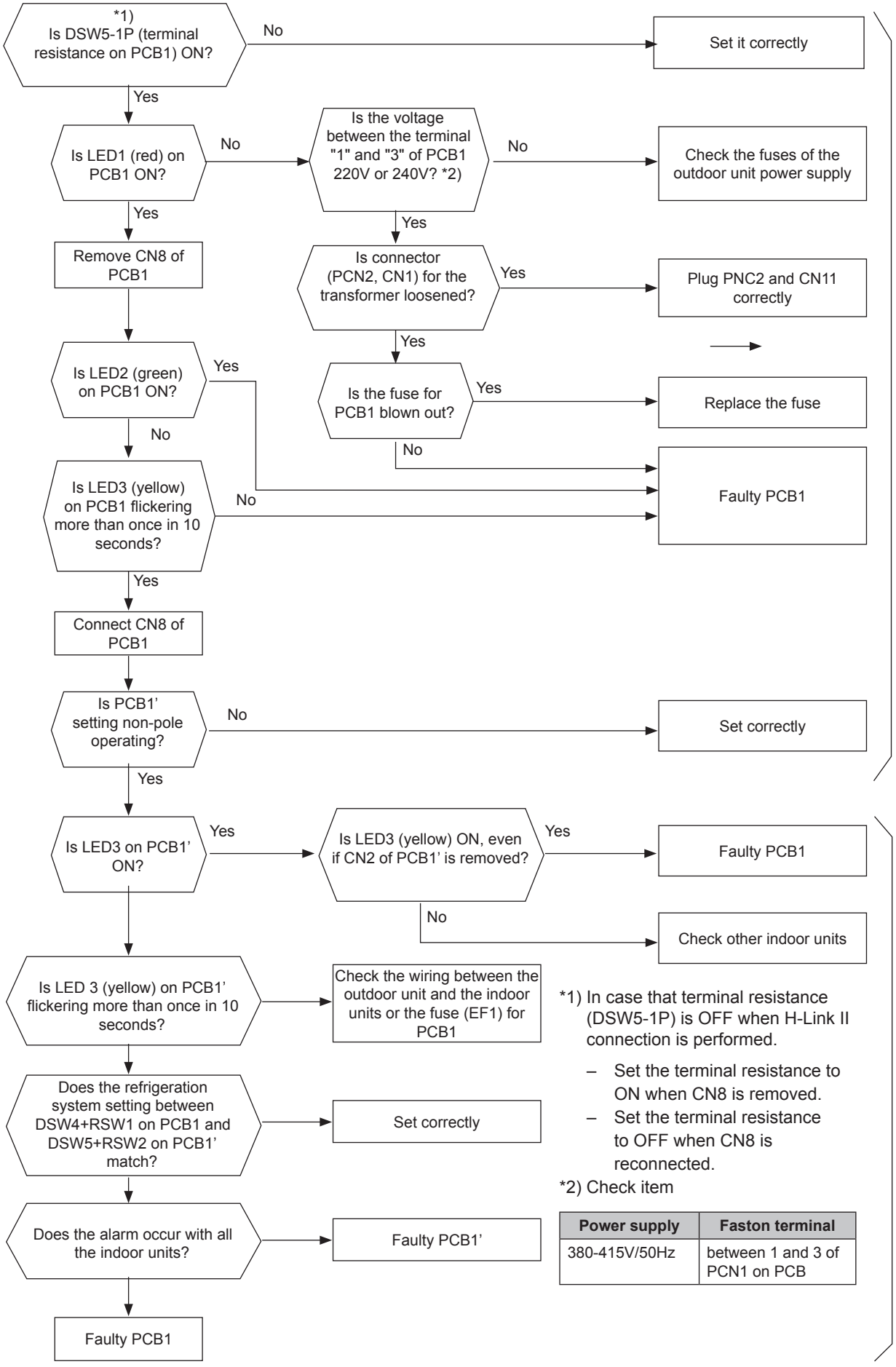
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm is displayed 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



*1) In case that terminal resistance (DSW5-1P) is OFF when H-Link II connection is performed.

- Set the terminal resistance to ON when CN8 is removed.
- Set the terminal resistance to OFF when CN8 is reconnected.

*2) Check item

Power supply	Faston terminal
380-415V/50Hz	between 1 and 3 of PCN1 on PCB

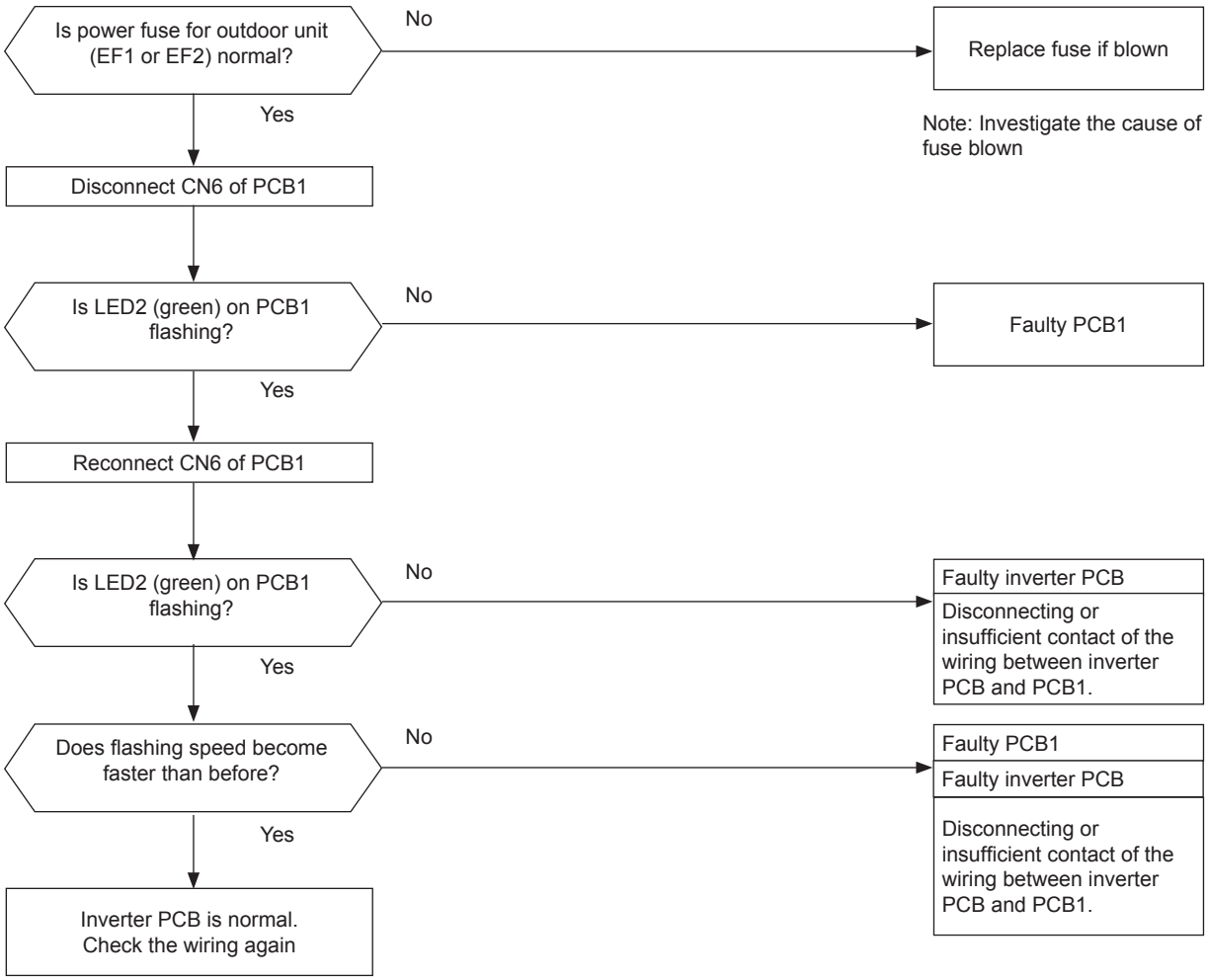
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Power failure or no power supply		Measure the voltage using the tester	Supply the power
Blown out fuse for the power source or activation of the outdoor unit breaker	Short circuit between wires	Check the insulation material for breaks	Remove the short circuit and replace the fuse
	Short-circuited wire to ground	Measure the insulation resistance	Remove the short circuit to ground and replace the fuse
	Faulty comp. motor	Measure the resistance between the wires and the insulation resistance	Replace the comp. and the fuse
	Faulty outdoor unit fan motor	Measure the resistance between the wires and the insulation resistance	Replace the outdoor unit fan motor and the fuse
Blown out fuse for control circuit or activation of outdoor unit breaker	Short circuit between wires	Check the insulation material for breaks	Remove the short circuit and replace the fuse
	Short circuit of the control circuit (to ground)	Measure the insulation resistance	Remove the short circuit and replace the fuse
	Faulty solenoid coil for the magnetic switch for the comp. motor	Measure the resistance of coil	Replace the magnetic switch and the fuse
	Failure of the outdoor unit fan motor	Measure the resistance between the wires and the insulation resistance	Replace the outdoor unit fan motor and fuse
Faulty transformer		Measure input voltage	Replace transformer
Disconnected wires insufficient contacting or incorrect connection	Between outdoor unit and indoor unit	Check the continuity of the wires. Check for looseness of the connection screws. Check the terminal nos.	Replacing wires repairing and tightening the screws and the correct wiring
	Power source wiring for the outdoor unit		
Faulty PCB (outdoor unit, indoor unit)	Disconnected wires to PCB	Check the connections	Correctly connect the wires
	Faulty PCB	-	Replace PCB if faulty
Incorrect wiring	Disconnected wire; insufficient contacting	Check the continuity and the looseness of connection screws	Replacing wires, repairing and tightening the screws
	Incorrect wiring	Check the terminal Nos.	Correctly connect the wires

*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	Description
04	**Abnormal transmission between Inverter PCB and Outdoor PCB1**

- 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 inverter PCB. 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.

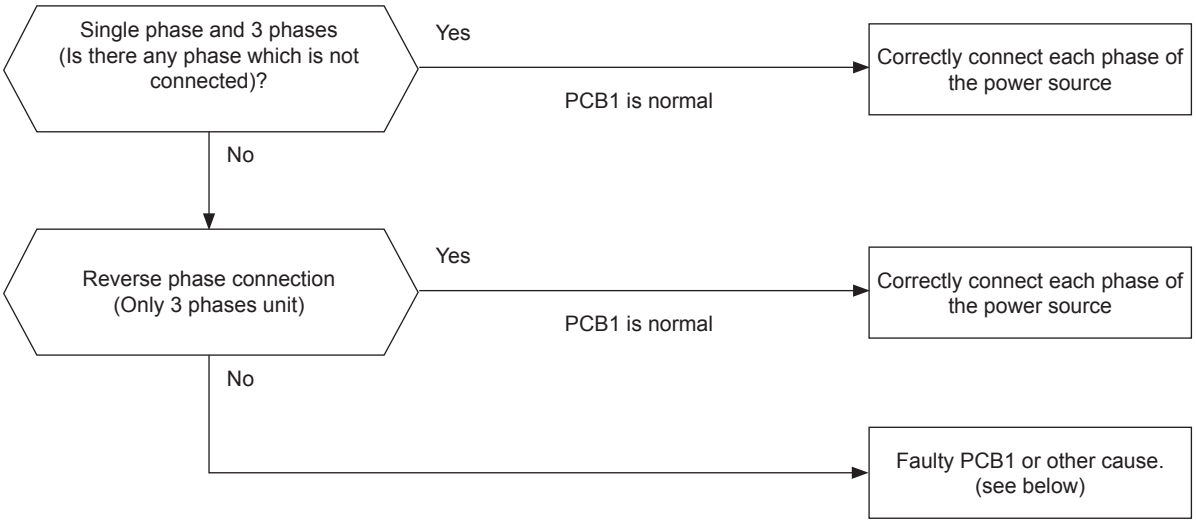


PCB1: Control PCB in outdoor unit
Inverter dipIPM RAS-(3~6HVRNME)
Inverter ISPM RAS-(3~6HRNME)
Inverter IPM RAS (8~12HRNM)

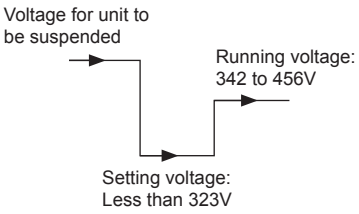
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Disconnected wires, insufficient contacting or incorrect connection	Between control PCB, inverter PCB and FANM	Check the continuity of wires. Check for looseness of the connection screws. Check the connection No.	Replacing wires, repairing, tightening screws and incorrect wiring
	Power source wiring for the outdoor unit		
Faulty PCB (PCB1 for the control, PCB for the inverter)	Disconnected wires to PCB	Check the connections	Repair the wiring connections
	Faulty PCB		Replace PCB if faulty
Incorrect wiring	Disconnected wires; insufficient contacting	Check the continuity. Check for looseness of connection screws	Replacing wires, repairing, tightening screws
	Incorrect wiring	Check the connection nos.	Correctly connect the wires

Alarm code	Description
05	**Code abnormal operation of picking up phase signal**

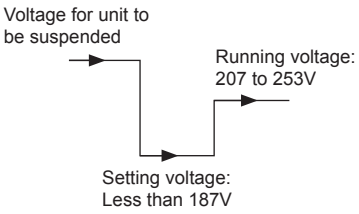
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm is displayed when the main power source phase is reversely connected or one phase is not connected.



- **RAS-4~12HRNM(E)**



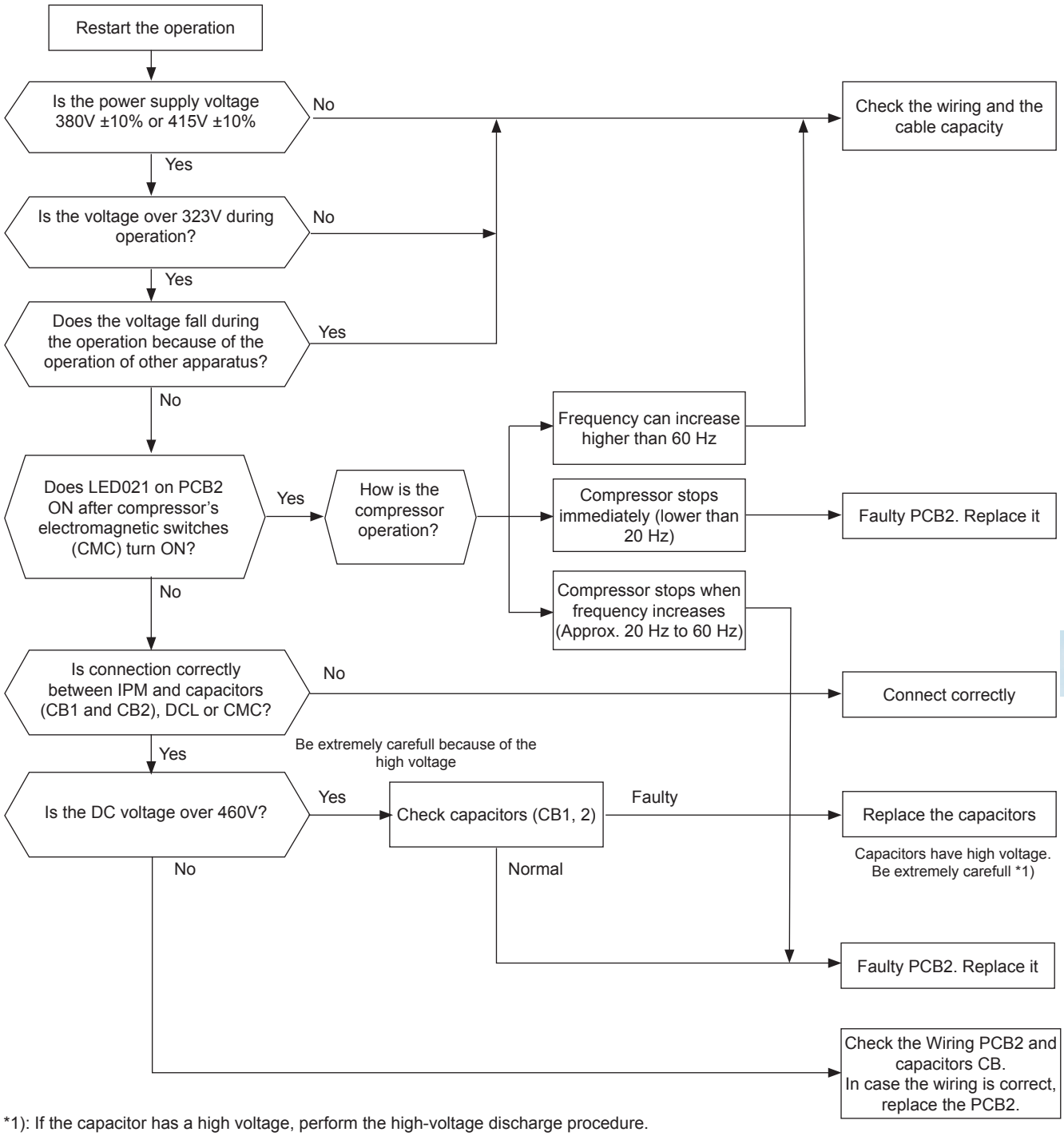
- **RAS-3~6HVRNME**



Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Activation of reverse phase sensor in the outdoor unit	Reverse or single phase	Check it according to the electrical wiring	Replacing wires, repair, tightening screws or correct wiring
	Faulty outdoor unit PCB	–	Replace PCB if faulty

Alarm code	Description
06	**Excessively low voltage or excessively high voltage for the inverter (RAS-8~12HRNM)**

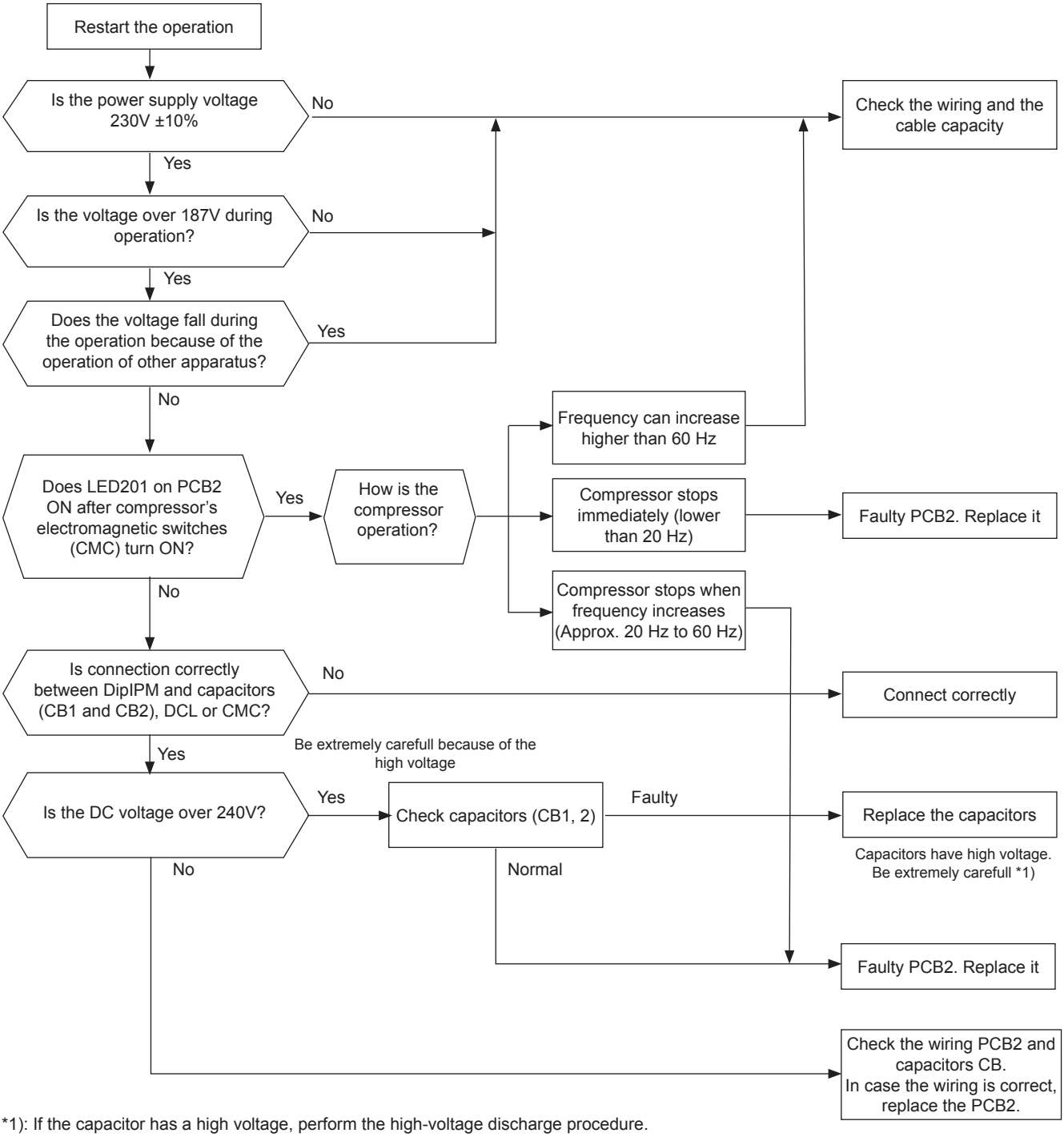
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed 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 7.3.4.
*2): Checking procedures of the diode module are displayed in item 7.3.4.

Alarm code	Description
06	**Excessively low voltage or excessively high voltage for the inverter (RAS-3~6HRVNME)**

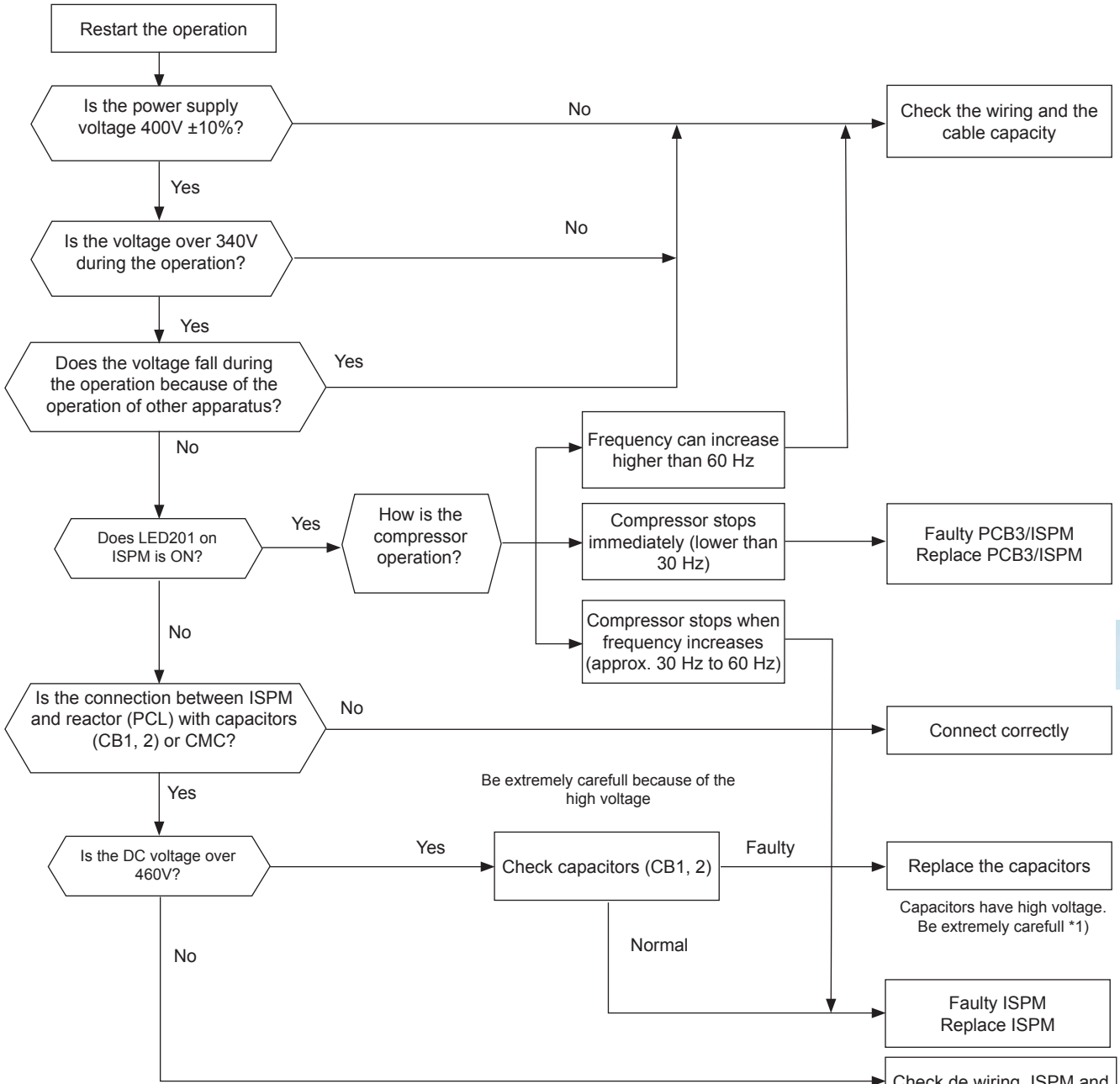
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed when the voltage between terminal “P” and “N” of Dip 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 7.3.4.
*2): Checking procedures of the diode module are displayed in item 7.3.4.

Alarm code	Description
06	**Excessively low voltage or excessively high voltage for the inverter (RAS-4~6HRNME)**

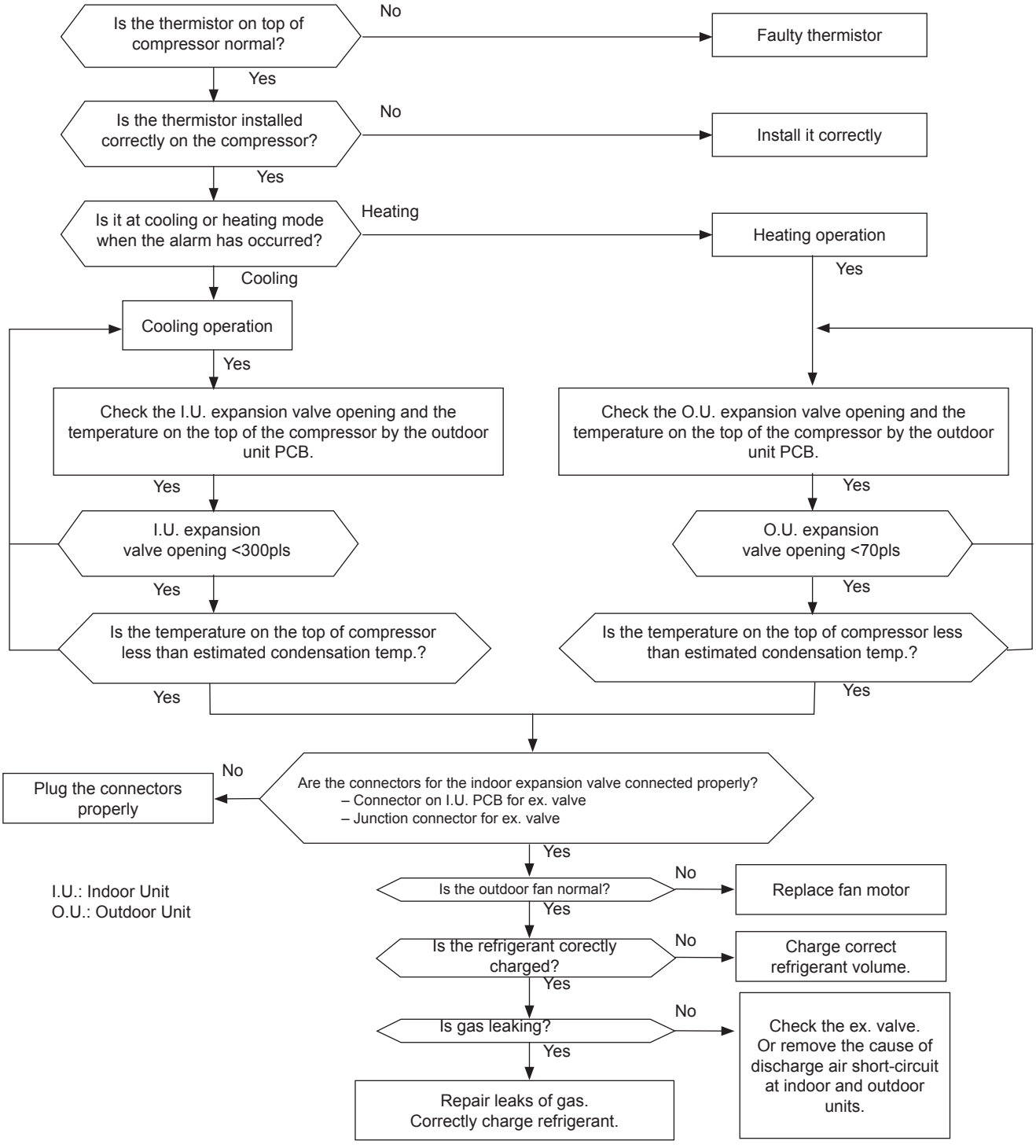
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the voltage between terminal “P” and “N” of ISPM is insufficient and the alarm has three occurrences in 30 minutes. If the number of occurrences is smaller than two, the retry operation is performed. The alarm code “06” means fan controller abnormal operation.



*1): If the capacitor has a high voltage, perform the high-voltage discharge procedure.
Refer to section 7.3.4
*2): Checking procedures of the diode module are displayed in item 7.3.4
*3): DC voltage measuring position:
ISPM “P” terminal to “+” terminal of tester, “N” terminal to “–” terminal of tester measuring position:
DC 1000V.

Alarm code	Description
07	**Decrease of Discharge Gas Superheat**

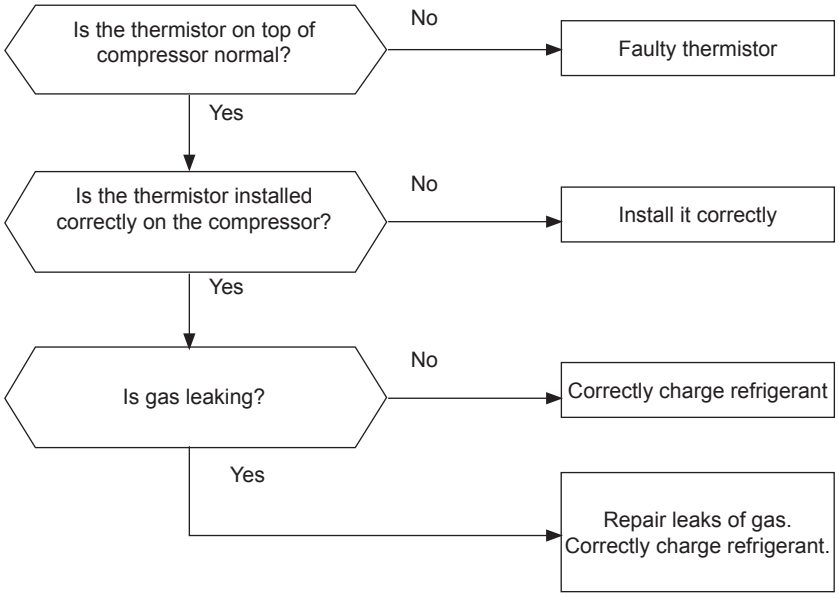
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  This alarm code is indicated 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.
  – The compressor is stopped and then the retry operation is performed after 30 minutes.



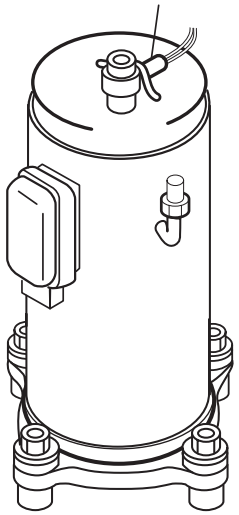
Alarm code	Description
08	**Excessively High Discharge Gas Temperature at the Top of Compressor Chamber**

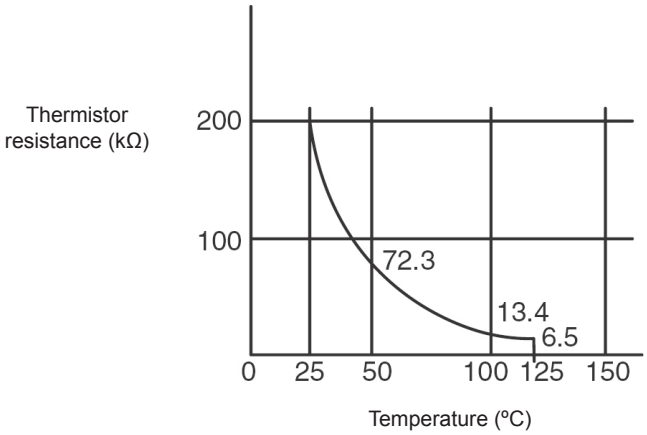
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm is indicated 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 (1).
  - 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 (1)

(1) For RAS-3HVRNME the temperature is 115 ºC and 125 ºC in cooling and heating mode



Thermistor for high discharge gas temperature at the top of compressor chamber (TH9)

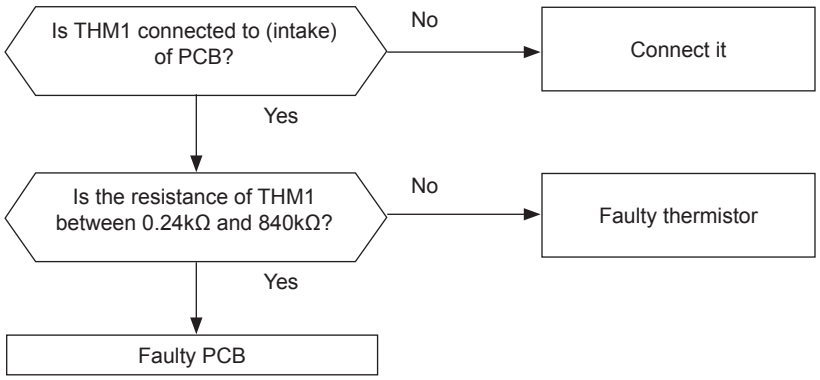


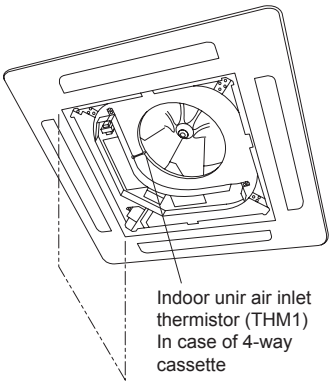


Thermistor resistance characteristics

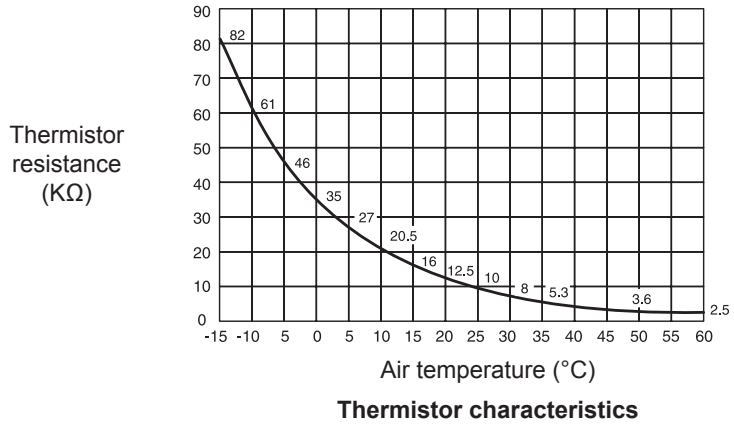
Alarm code	Description
11	**Abnormal operation of thermistor for the indoor unit air inlet temperature (air inlet thermistor)**

- 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



Thermistor characteristics

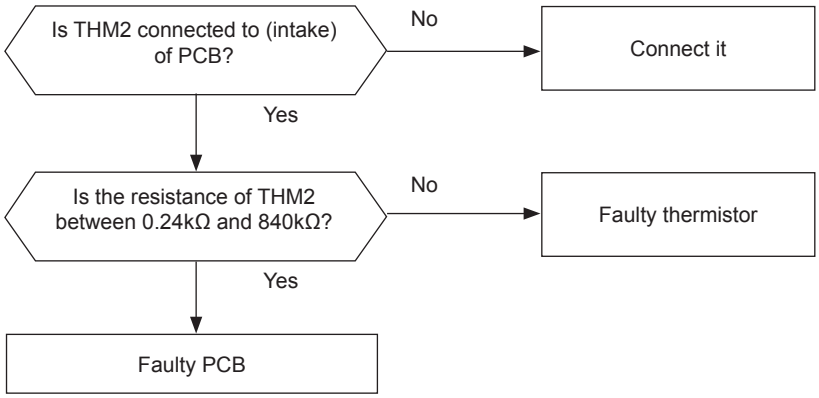
NOTE

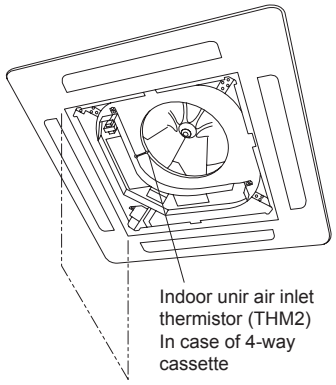
- This data is applicable to the following thermistors:

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	Description
12	**Abnormal operation of the thermistor for the indoor discharge air temperature (air outlet thermistor)**

- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - This alarm code is displayed when the thermistor is short-circuited (less than 0.24 kΩ) or cut (greater than 840 kΩ) during the cooling process or the heating process. The system is automatically restarted when the fault is removed.

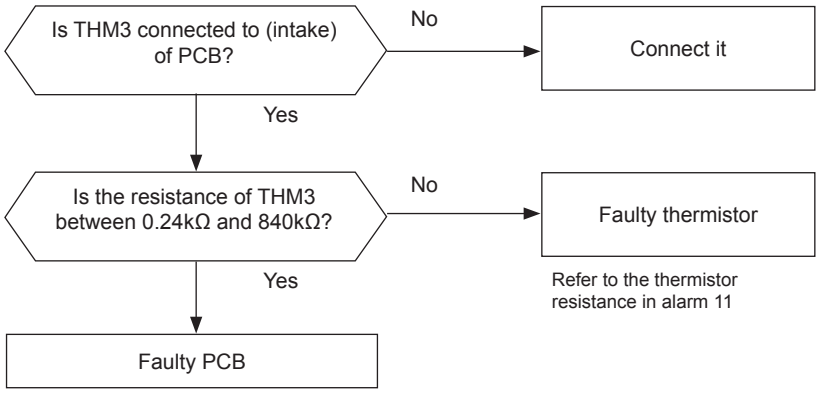


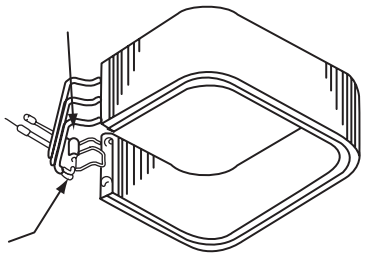


Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty air outlet thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Description
13	**Abnormal operation of the thermistor for the indoor unit heat exchanger liquid pipe temperature (freeze protection 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.



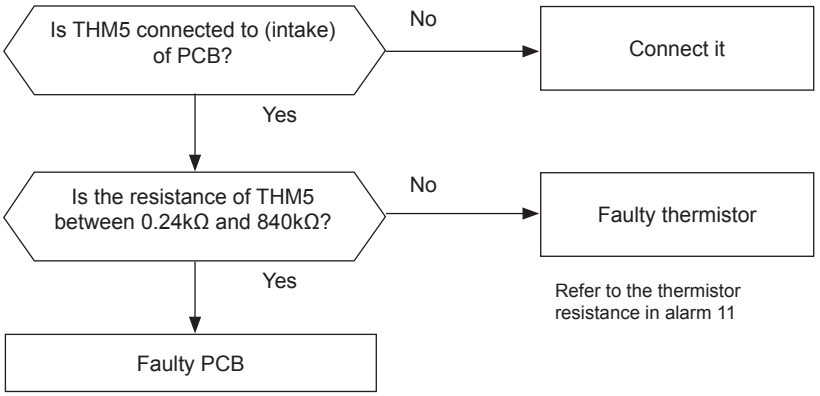


Freeze protection thermistor (THM3)
In case of 4-way cassette

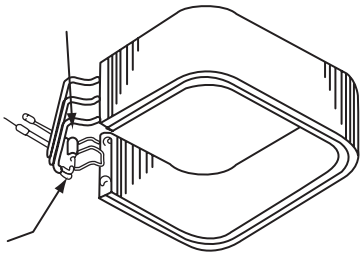
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty freeze protection thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Description
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.



Refer to the thermistor resistance in alarm 11

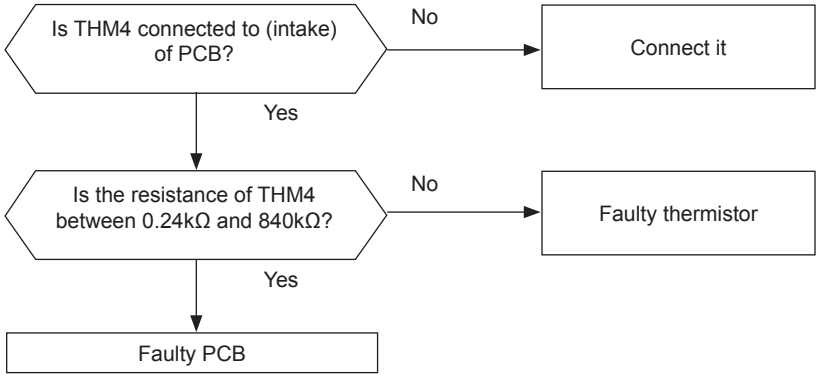


Heat exchanger gas pipe thermistor (THM3) In case of 4-way cassette

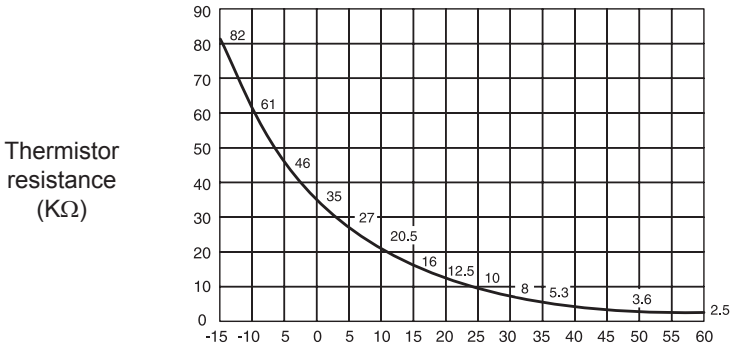
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty gas piping thermistor	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the connection	Repair the wiring and connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Alarm code	Description
15	**Abnormal operation of thermistor for fresh outdoor air (Econofresh)**

- 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 fresh outdoor air (econofresh) 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

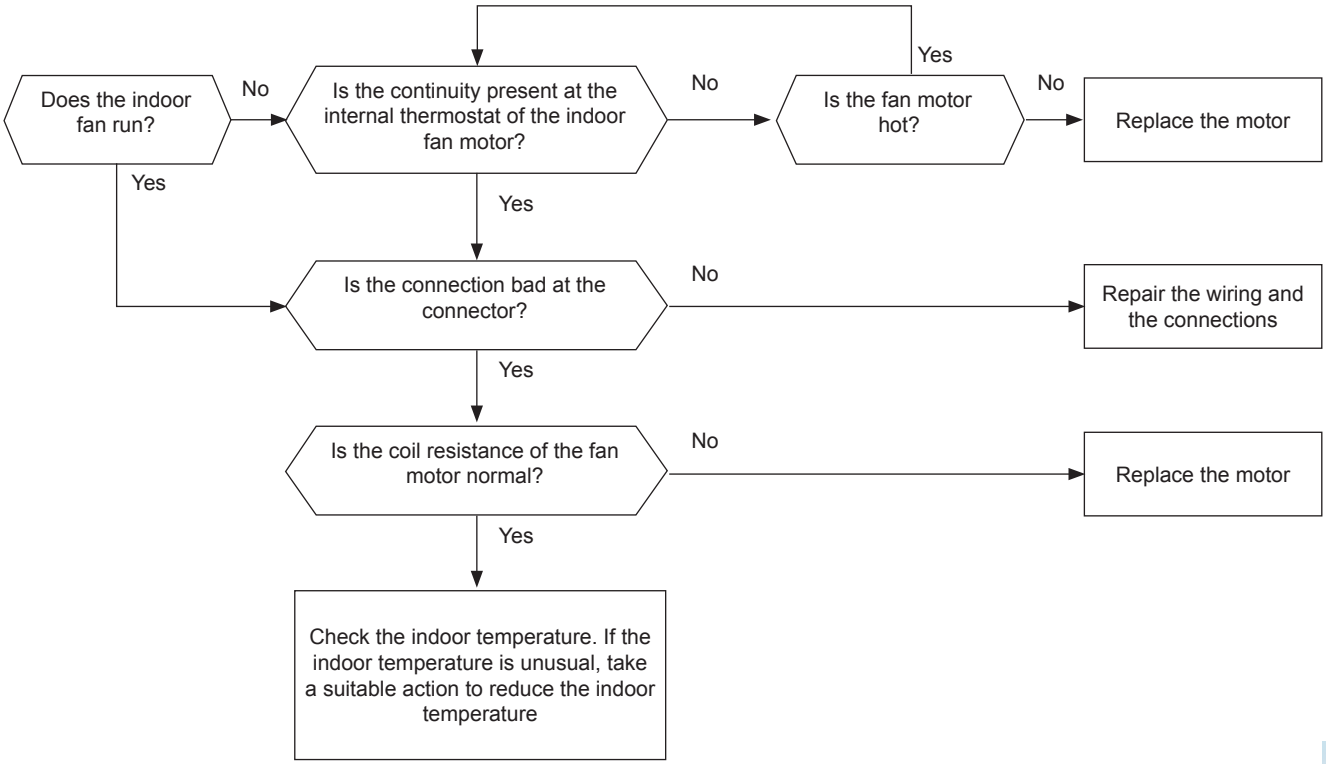
NOTE

- 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	Description
19	**Activation of the protection device for the indoor fan motor (except RCI, RCIM 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.

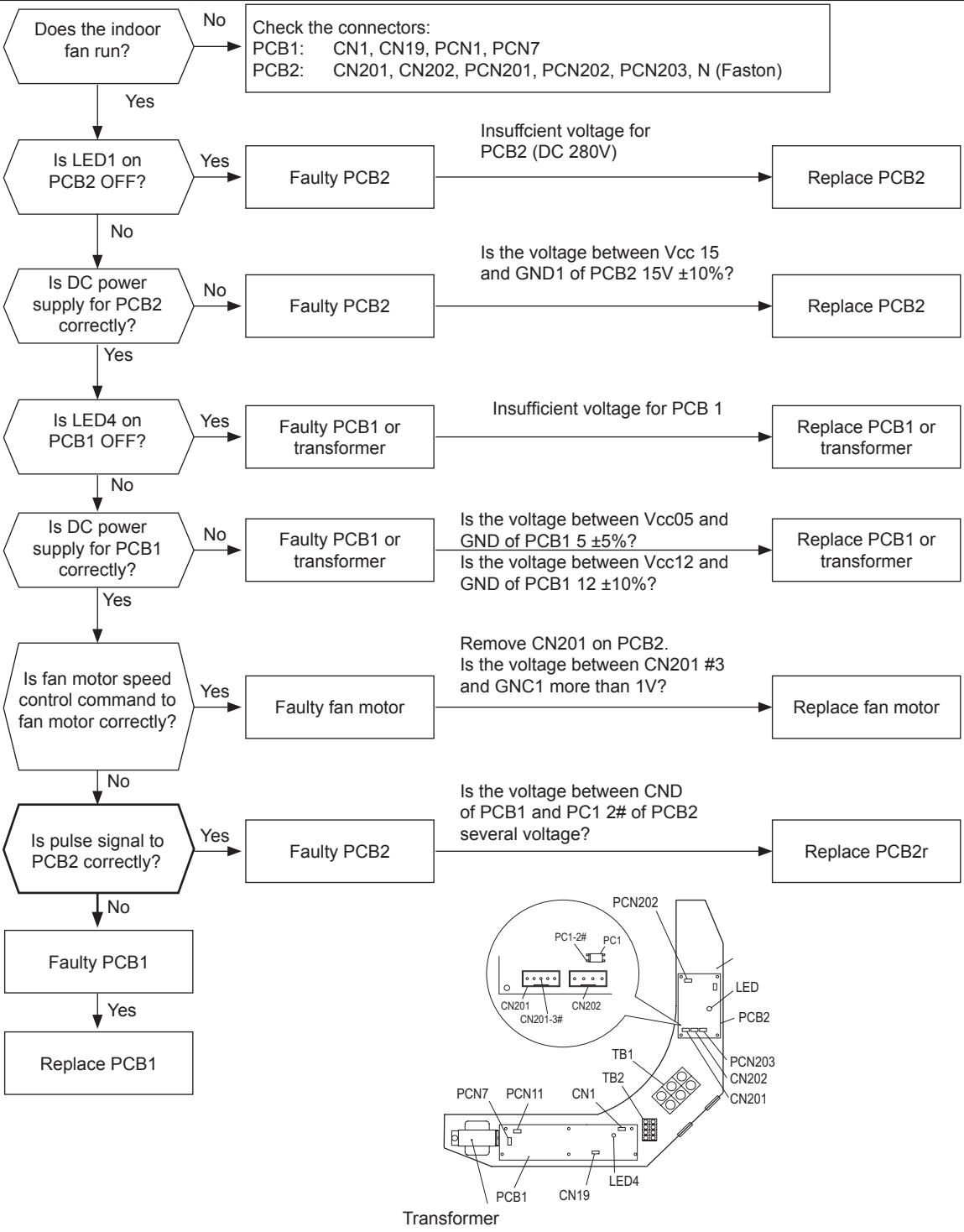


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the internal thermostat for the indoor unit fan motor	Faulty indoor unit fan motor		Measure the coil resistance and the insulation resistance	Replace the motor if faulty
	Faulty internal thermostat	Fault	Check the continuity after the fan motor temperature decreases to room temp	Replace the fan motor if there is no continuity
		Insufficient contacting	Measure the resistance using the tester	Correct looseness. Replace the connectors
		Incorrect connection	Check the connections	Repair the connections

Alarm code	Description
19	**Activation of the protection device for the indoor fan motor (RCI, RCIM)**

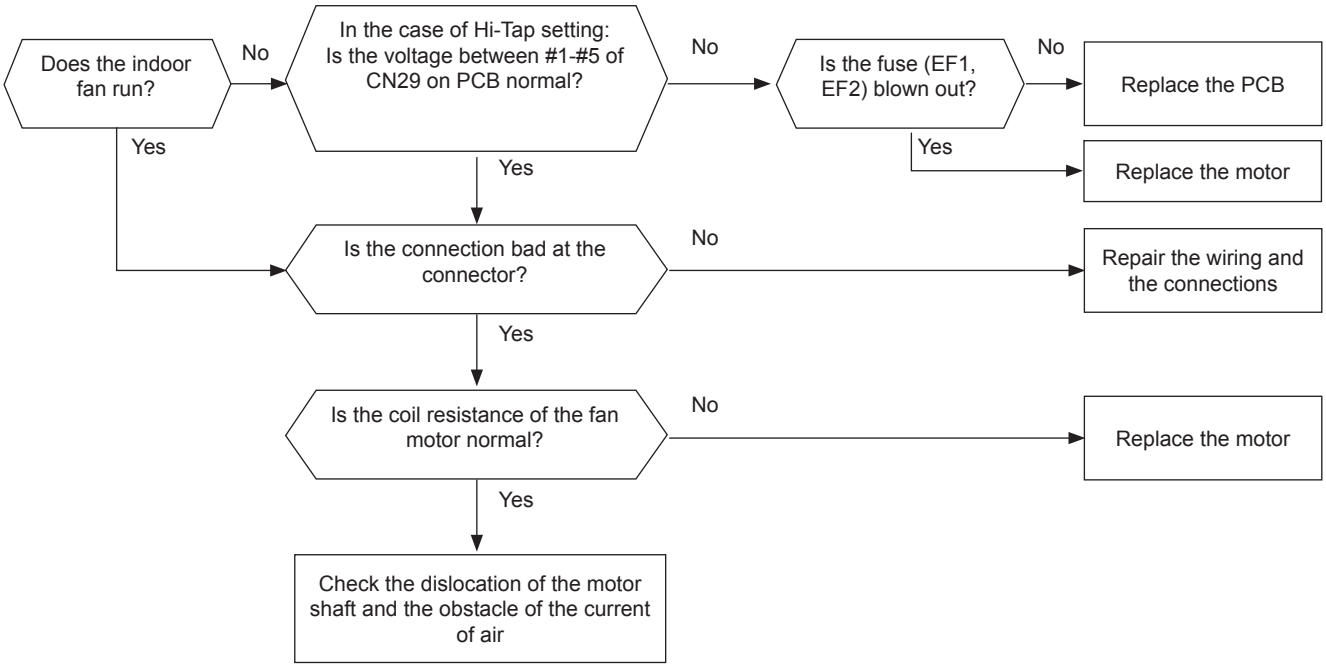
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. and the alarm code is indicated on the display of the outdoor unit PCB.
  - This alarm code is indicated when the following condition occurs thre times in 30 minutes: Indoor fan rotates less than 70 rpm for 5 seconds during operation.

When the cause is checked using this flow chart, confirm that fan speed setting is Hi.



Alarm code	Description
19	**Activation of the protection device for the indoor fan motor (RPK)**

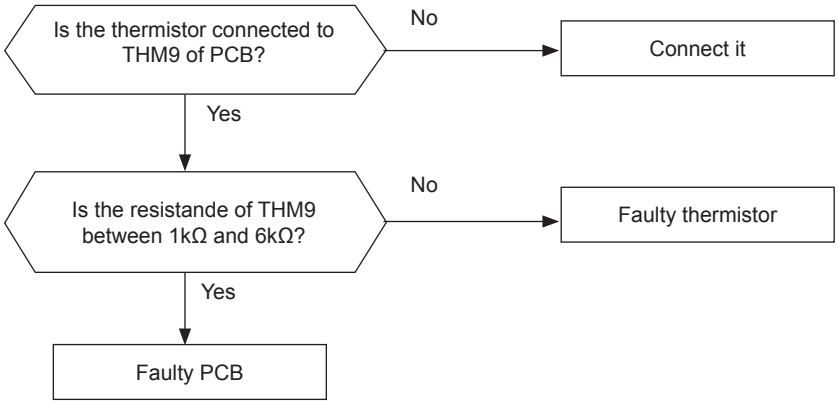
- The RUN LED flickers and "ALARM" is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section.
  The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is displayed when the running current of the indoor fan motor is higher than 1A.

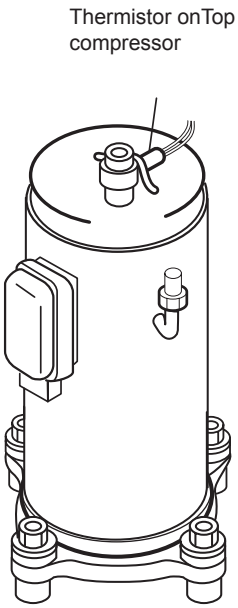


Phenomenon	Cause		Check item	Action (Turn OFF the main switch)
Activation of the overcurrent protection device for the indor fan motor	Faulty indoor unit fan motor		Measure the coil resistance and the insulation resistance	Replace the motor if faulty
	Faulty PCB	Fault	Check the output voltage and the fuse in case of HiTap setting	Replace the fan motor if there is no continuity
		Insufficient contacting	Measure the resistance using the tester	Correct looseness. Replace the connectors
		Incorrect connection	Check the connections	Repair the connections

Alarm code	Description
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.





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

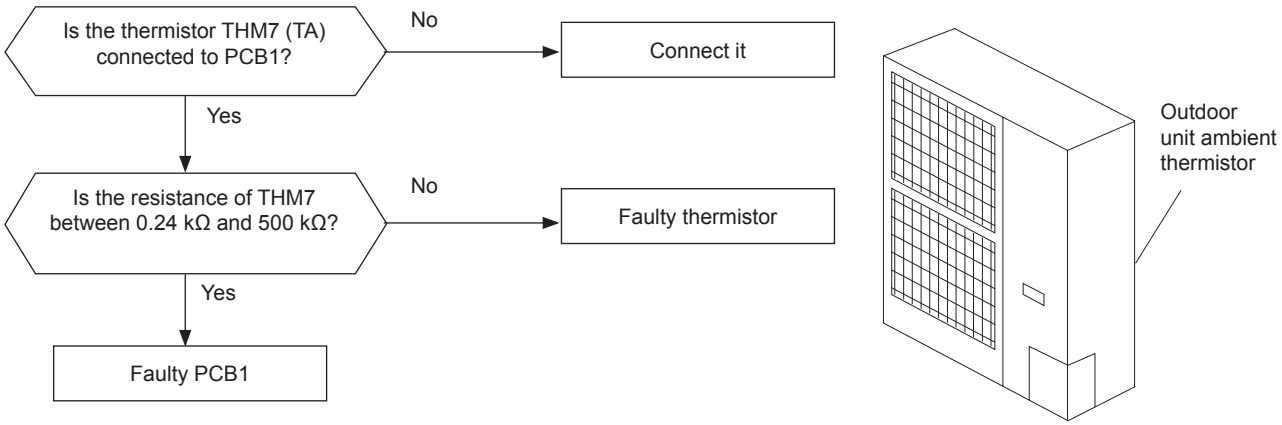
Temperature (ºC)	Resistance (kΩ)
45	87.74
50	72.32
55	59.97
60	49.96
65	41.79
70	35.11
75	29.61
80	25.07
85	21.31

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

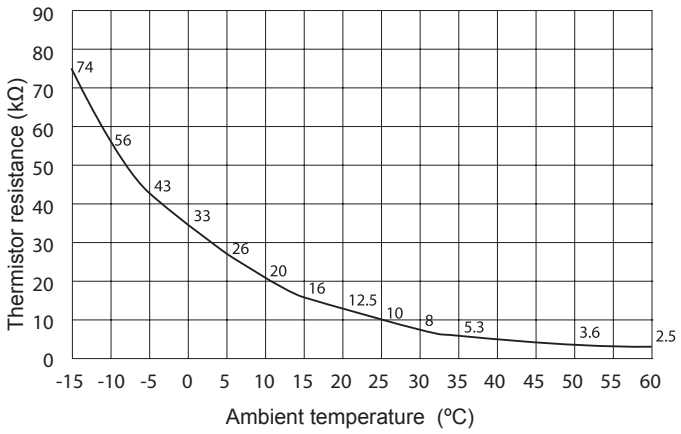
The resistance value have fudge factor (+10%).

Alarm code	Description
22	**Abnormal operation of the thermistor for the outdoor temperature (outdoor unit ambient 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 0.2 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).



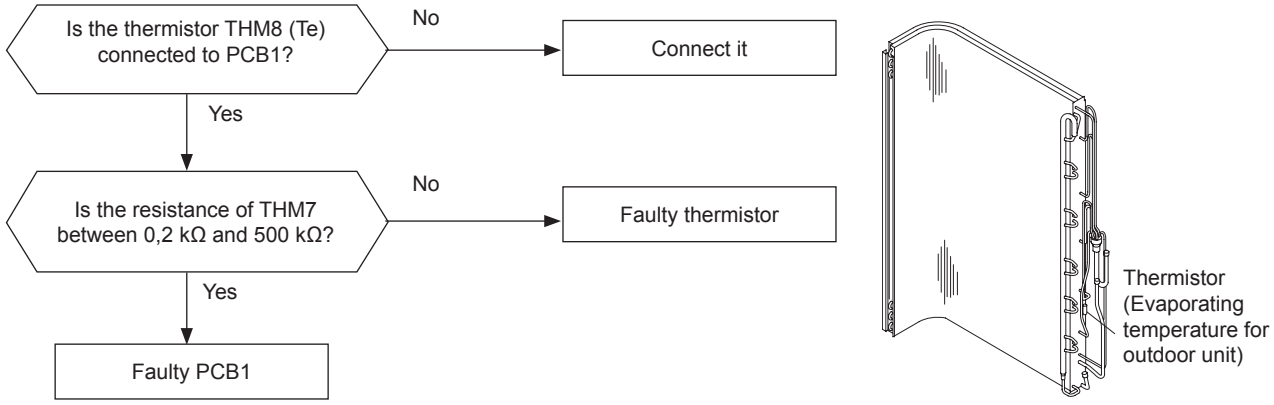
Thermistor characteristics



Phenomenon	Cause	Check item	Action (Turn OFF main switch)
Faulty thermistor for the outdoor unit ambien	Fault	Check resistance	Replace thermistor if faulty
	Incorrect connection	Check wiring to PCB	Repair wiring and connections
Faulty PCB1		Replace PCB1 and check operation	Replace PCB if faulty

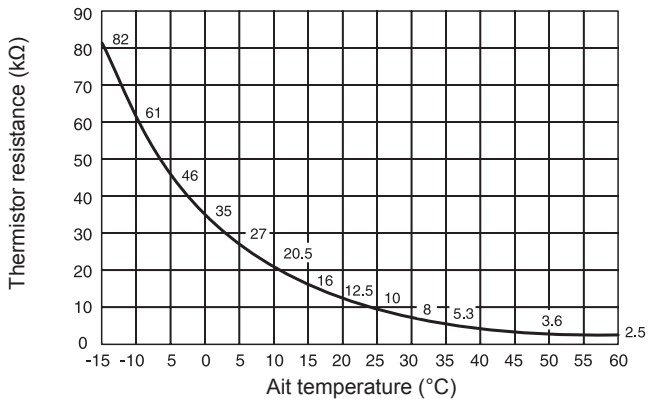
Alarm code	Description
24	**Abnormal operation of the thermistor for the evaporating temperature during the heating process (outdoor unit)**

- 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.



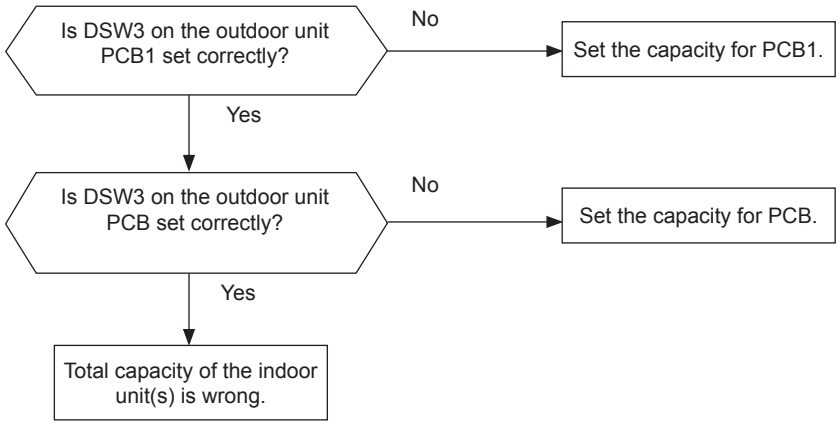
Phenomenon	Cause	Check item	Action (Turn OFF the main switch)
Faulty thermistor for the evaporating temperature during heating	Fault	Check the resistance	Replace the thermistor if faulty
	Incorrect connection	Check the wiring to PCB	Repair the wiring and the connections
Faulty PCB		Replace PCB and check the operation	Replace PCB if faulty

Thermistor characteristics



Alarm code	Description
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. Outdoor unit capacity setting is not correct.



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	Description
35	**Incorrect indoor number setting**

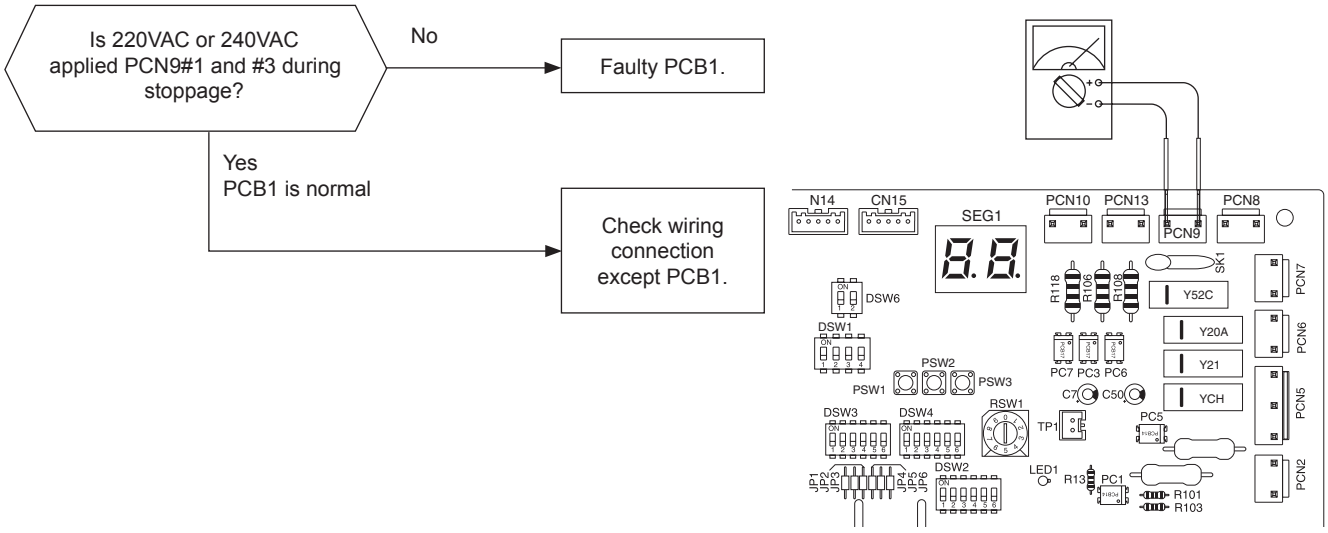
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – This alarm code is indicated 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	Description
38	**Abnormality of protective circuit for protection (outdoor unit)**

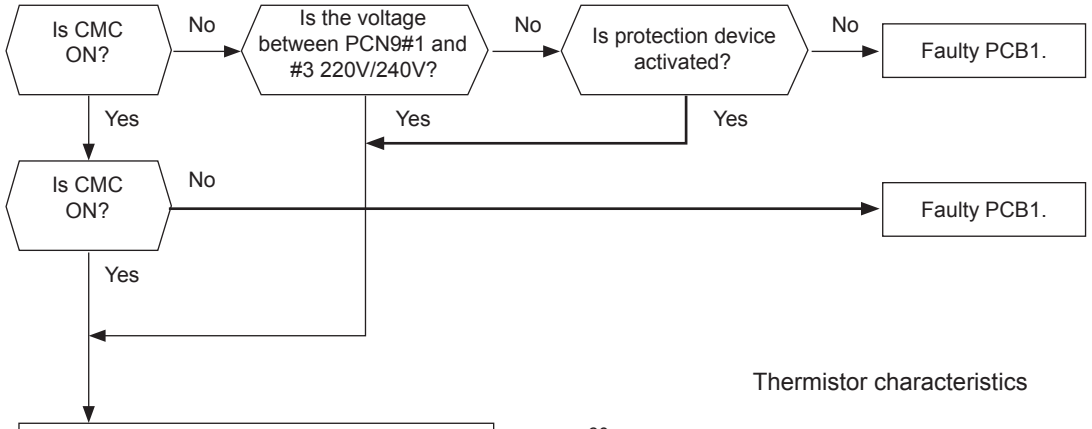
- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  - ✶ This alarm code is 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

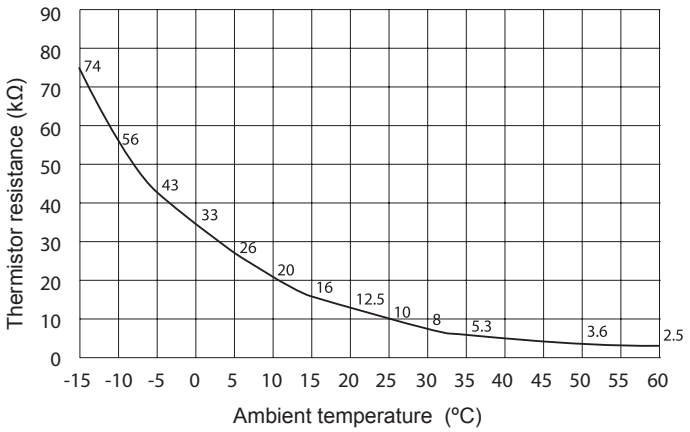
Alarm code	Description
41	**Cooling overload (high pressure switch will be activated)**

- 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



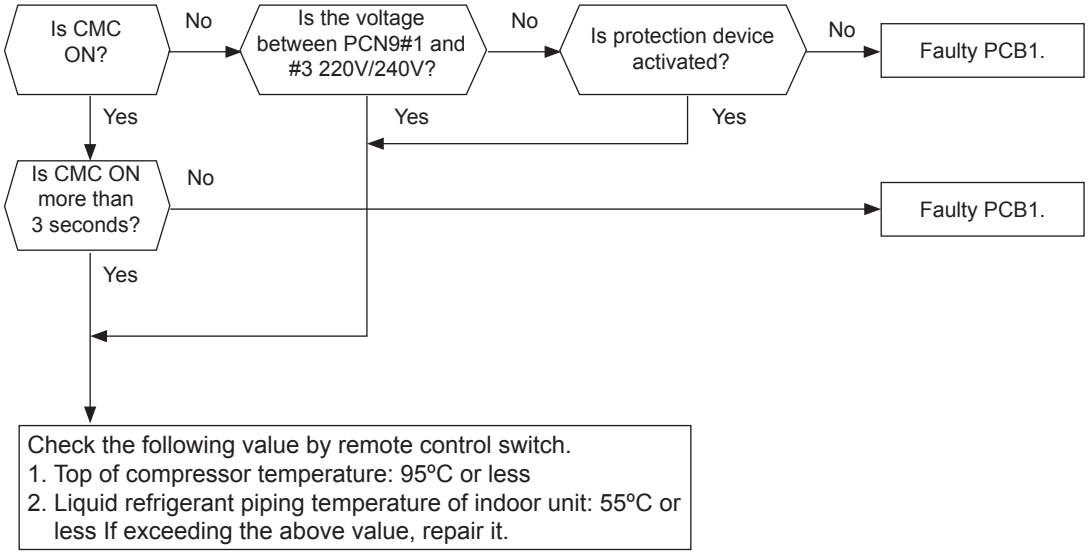
Phenomenon	Cause		Check item	Action (Turn OFF main switch)
Activation of high pressure switch due to excessively high discharge pressure during cooling operation	Insufficient air flow to heat exchanger of outdoor unit		Clogging of heat exchanger?	Remover clogging
			Check for dust on air filter	Remove dust
			Check the service space	Secure service space
			Check for speed: Outdoor fan: cooling Indoor fan: heating	Replace fan motor if faulty
	Excessively high temp. air to outdoor unit heat exchanger		Check for hot air near the ceiling.	Make good circulation.
			Check for short circuited air.	Remove short-circuited air.
			Check for other heat source.	Remove heat source.
	Faulty high pressure switch	Faulty pressure switch	Measure discharge pressure. Check continuity after decreasing of pressure.	Replace it if faulty.
		Insufficient contacting	Measure resistance by tester.	Repair looseness. Replace connector.
		Incorrect connection	Check connections.	Repair connections.
	Overcharged refrigerant		Check cycle operating temp.	Charge refrigerant correctly.
	Mixture of non-condensable gas in refrigerant cycle		Check ambient temp. and pressure.	Recharge refrigerant after vacuum pumping.
	Clogging of discharge piping		Check for clogging.	Remove clogging.
	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.
	Liquid line stop valve or gas line stop valve are not in operation		Check stop valves.	Fully open stop valve.
	Locking up outdoor unit expansion valve closure		Check expansion valve actuation.	Replace outdoor expansion valve.

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	Description
42	**Heating 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. Liquid refrigerant piping temperature of indoor unit is more than 55 ºC and top of compressor temperature is more than 95 ºC.



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.

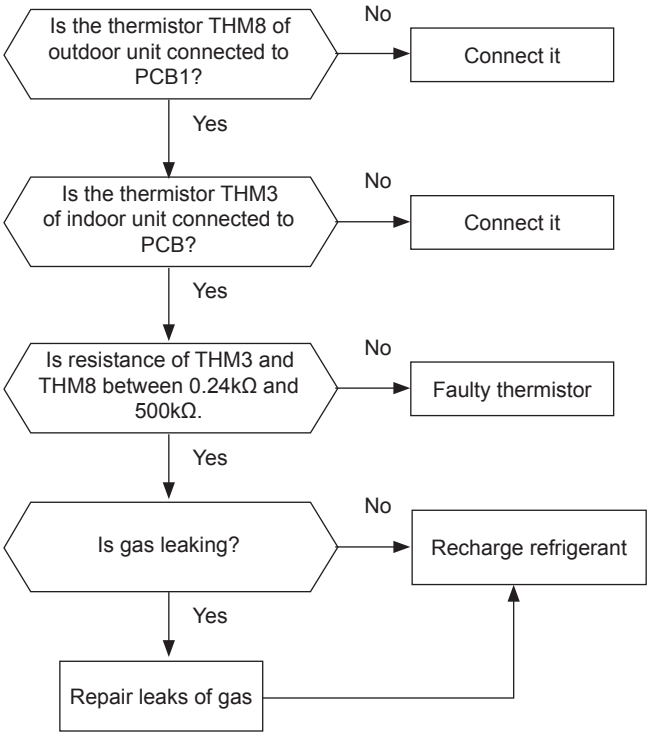
Phenomenon	Cause		Check item	Action (Turn OFF main switch)
Activation of high pressure switch due to excessively high discharge pressure during heating operation	Excessively high temp. air to indoor unit heat exchanger		Calculate heat load.	Reduce heat load or use a bigger unit.
			Check for hot air near the ceiling.	Make good circulation.
			Check for short circuited air.	Remove short-circuited air.
			Check for other heat source.	Remove heat source.
	Faulty high pressure switch	Faulty pressure switch	Measure discharge pressure. Check continuity after decreasing of pressure.	Replace it if faulty.
		Insufficient contacting	Measure resistance by tester.	Repair looseness. Replace connector.
		Incorrect connection	Check connections.	Repair connections.
	Faulty of outdoor fan control		Check decreasing air flow volume at pressure switch for control activative.	Replace thermistor for evaporating temp. if faulty.
	Faulty of pressure switch for control		Check activated pressure and connecting wire.	Replace it if pressure switch for control is faulty.
	Overcharged refrigerant		Check cycle operating temp.	Charge refrigerant correctly.
	Mixture of non-condensable gas in refrigerant cycle		Check ambient temp. and pressure.	Recharge refrigerant after vacuum pumping.
	Clogging of discharge piping		Check for clogging.	Remove clogging.
	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.
	Liquid line stop valve or gas line stop valve are not in operation		Check stop valves.	Fully open stop valve.

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.*

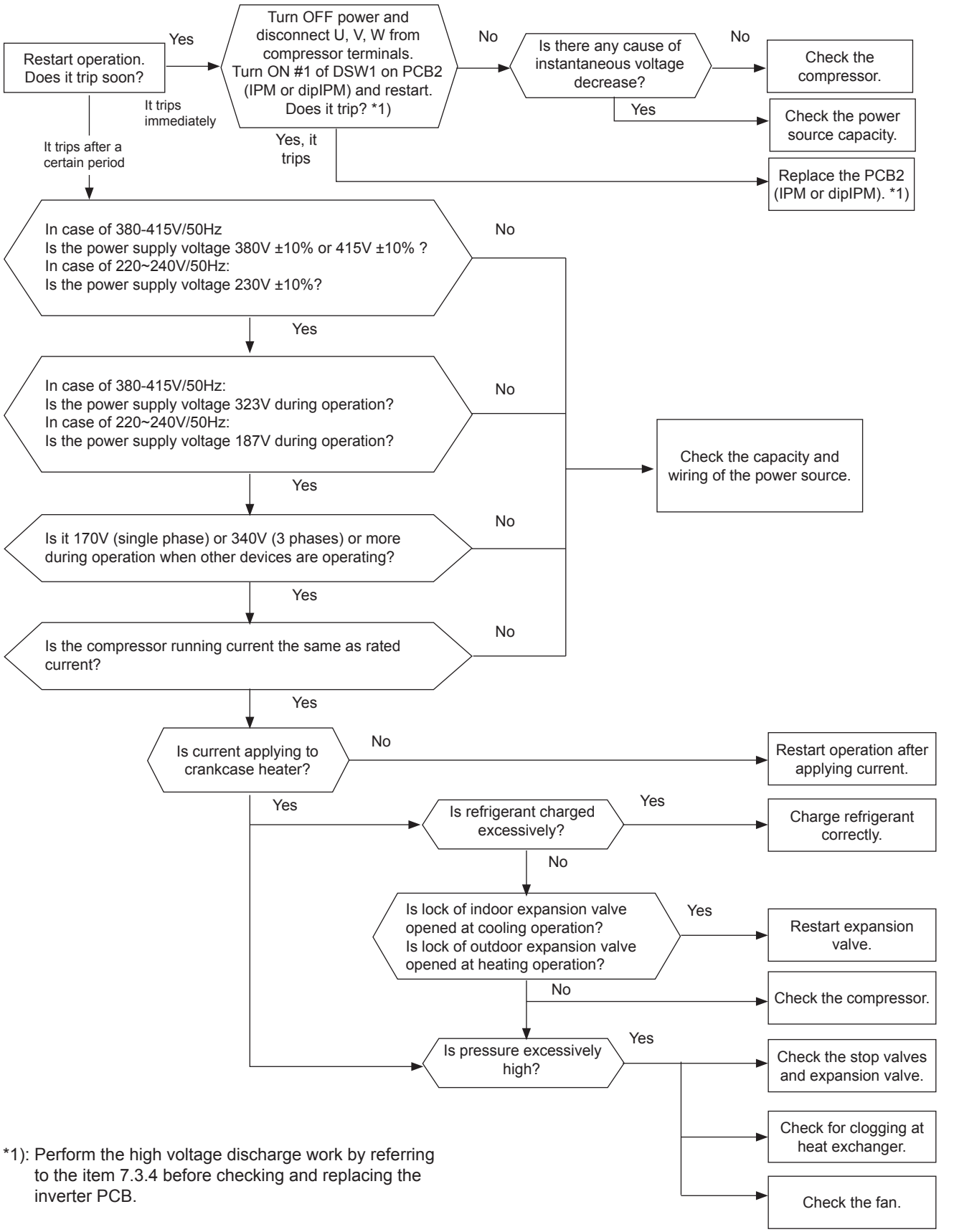
Alarm code	Description
47	**Activation to protect system from excessively low suction pressure (protection from vacuum operation)**

- 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 ºC (250~350 kΩ) and the thermistor on top of compressor is higher than 90 ºC. 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.

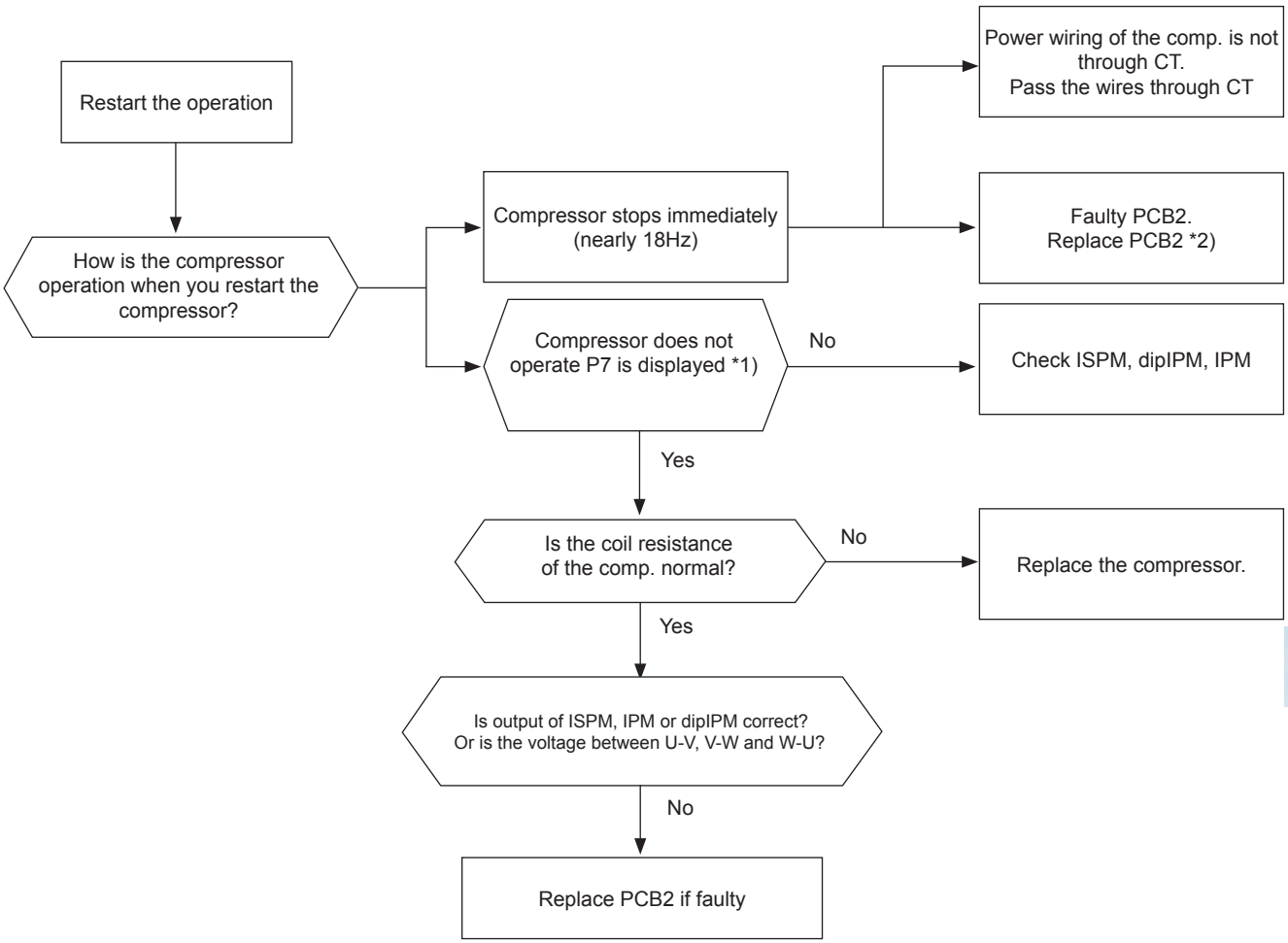
Alarm code	Description
48	**Overcurrent protection activation**



*1): Perform the high voltage discharge work by referring to the item 7.3.4 before checking and replacing the inverter PCB.

Alarm code	Description
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).

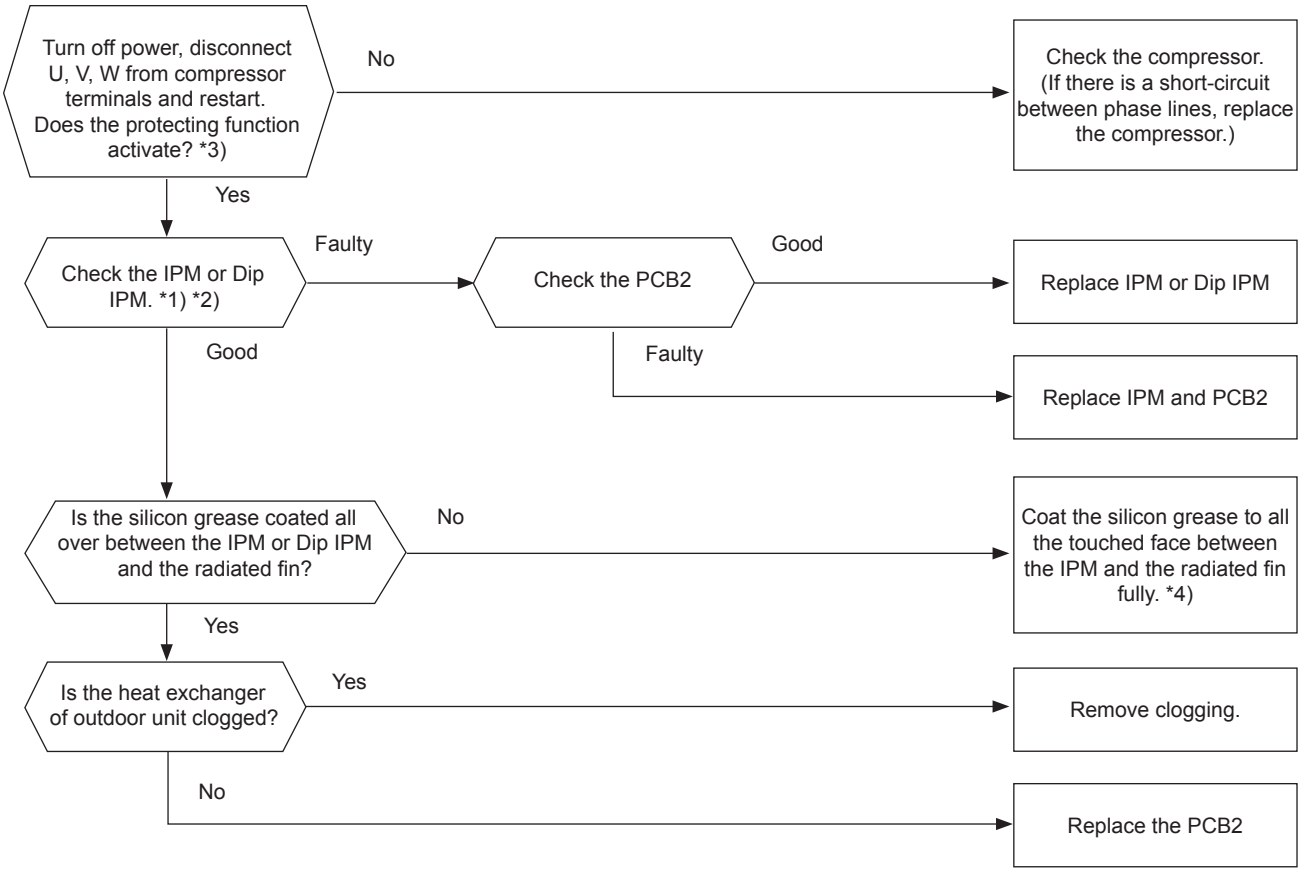


*1): P7 is shown at 7-segment on the outdoor unit PCB.
*2): Perform the high voltage discharge work by referring to the item 7.3.4 before checking and replacing the inverter parts.

Alarm code	Description
53	**Protection activation of IPM or DipIPM and PCB2 (RAS-8~12HRNM and RAS-3~6HVRNME)**

- 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 or Dip 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 or Dip IPMand PCB2
or
Control voltage decrease

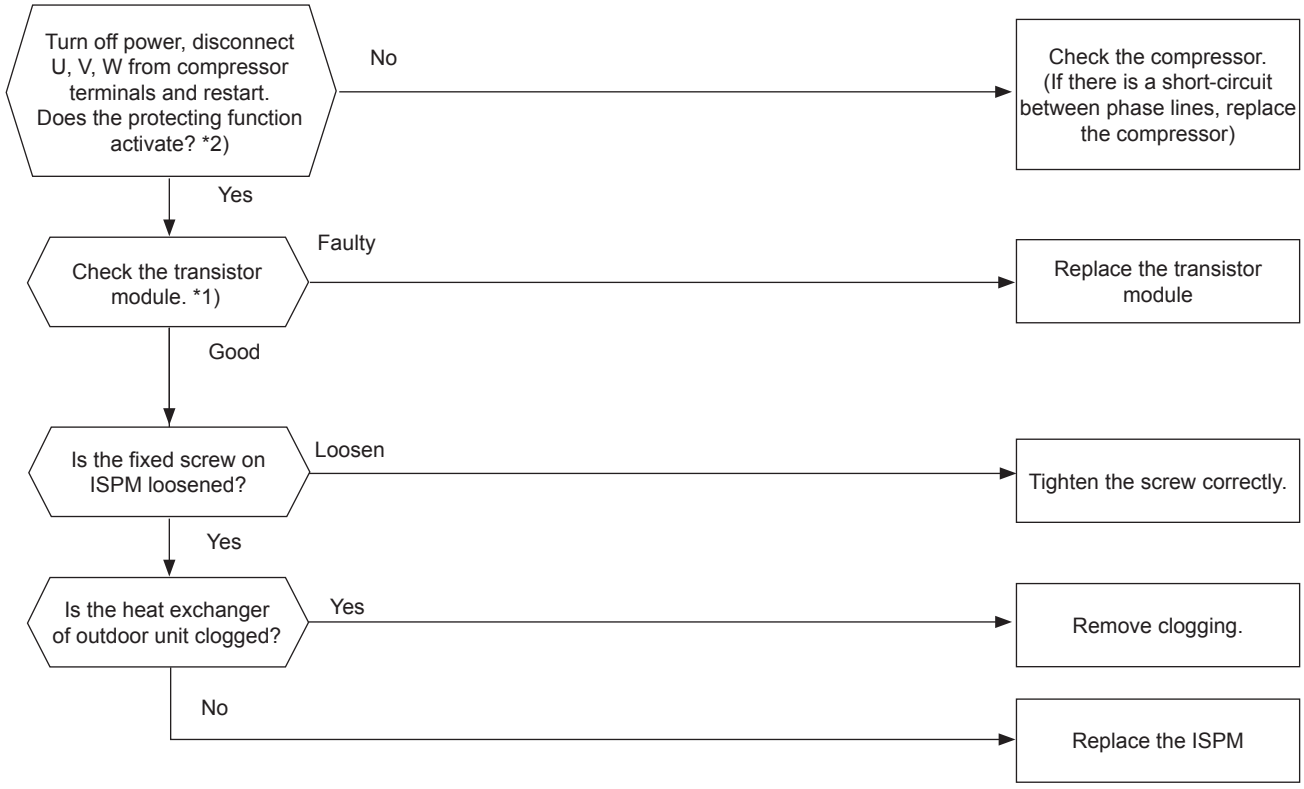


*1) Perform the high voltage discharge work by referring to the item 7.3.4 before checking and replacing the inverter components.
*2) Regarding replacing or checking method for inverter components, refer to the item 7.3.4.
*3) Turn ON the No.1 switch of the dip switch DSW1 on PCB2 when restarting with 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).

	NOTE
	- *When alarm code “53” is indicated, the outdoor fan motor (DC motor) ensure that DC fan motor is checked according to the item 7.3.4.*

Alarm code	Description
53	**Activation for protecting the ISPM (RAS-3~6HRNME)**

- The RUN LED flickers and “ALARM” is displayed on the remote control switch.
- The unit number, the alarm code and the unit code are alternately displayed on the set temperature section. The unit number and the alarm code are displayed on the display of the outdoor unit PCB.
  – ISPM has a detection function of the abnormal operation. This alarm is displayed when the ISPM module detects the abnormal operation 7 times or more than 7 times in 30 minutes. The retry operation is performed six times.
  Conditions:
  the abnormal current to the ISPM, such as short-circuited, grounded, overcurrent or control voltage decrease.



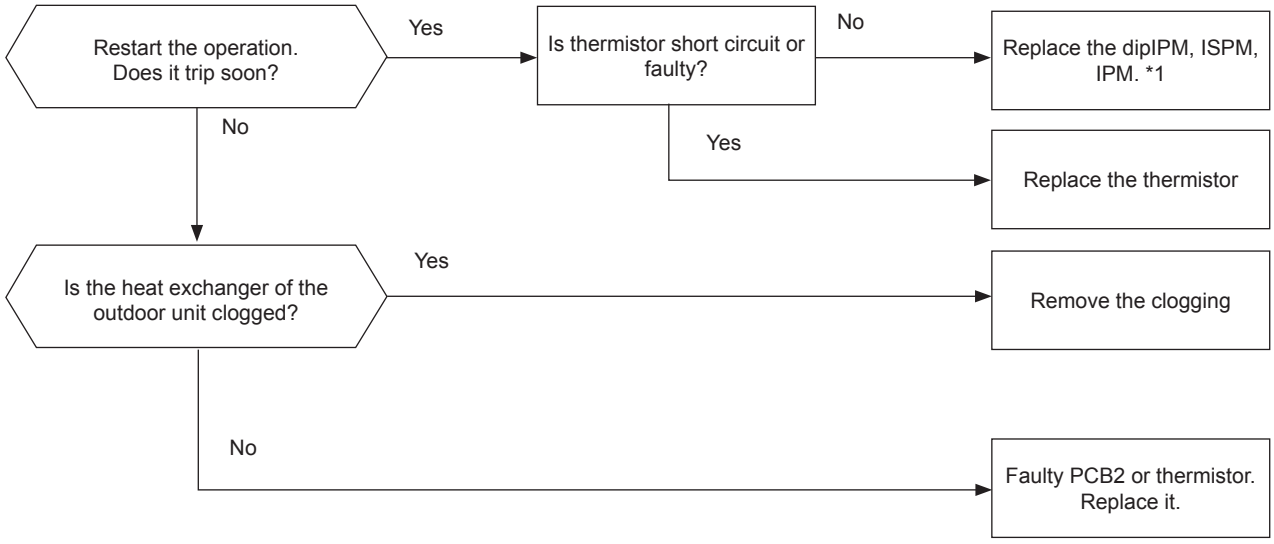
1*): Regarding replacing or checking method for the ISPM refer to item 7.3.4.
2*): Set the #1 pin of DIP switch DSW1 on ISPM to ON when you are restarting with the terminals of the compressor disconnected. After the troubleshooting, set the #1 pin of DIP switch DSW1 on ISPM to OFF.

Alarm code	Description
54	**Increase in the inverter fin temperature**

- 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 100 ºC (RAS-4~12HRNM(E), 80 ºC (RAS-3~6HVRNME) 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 7.3.4 before checking and replacing the inverter components.

Alarm code	Description
55	**IPM or PCB2 abnormality**

- 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:

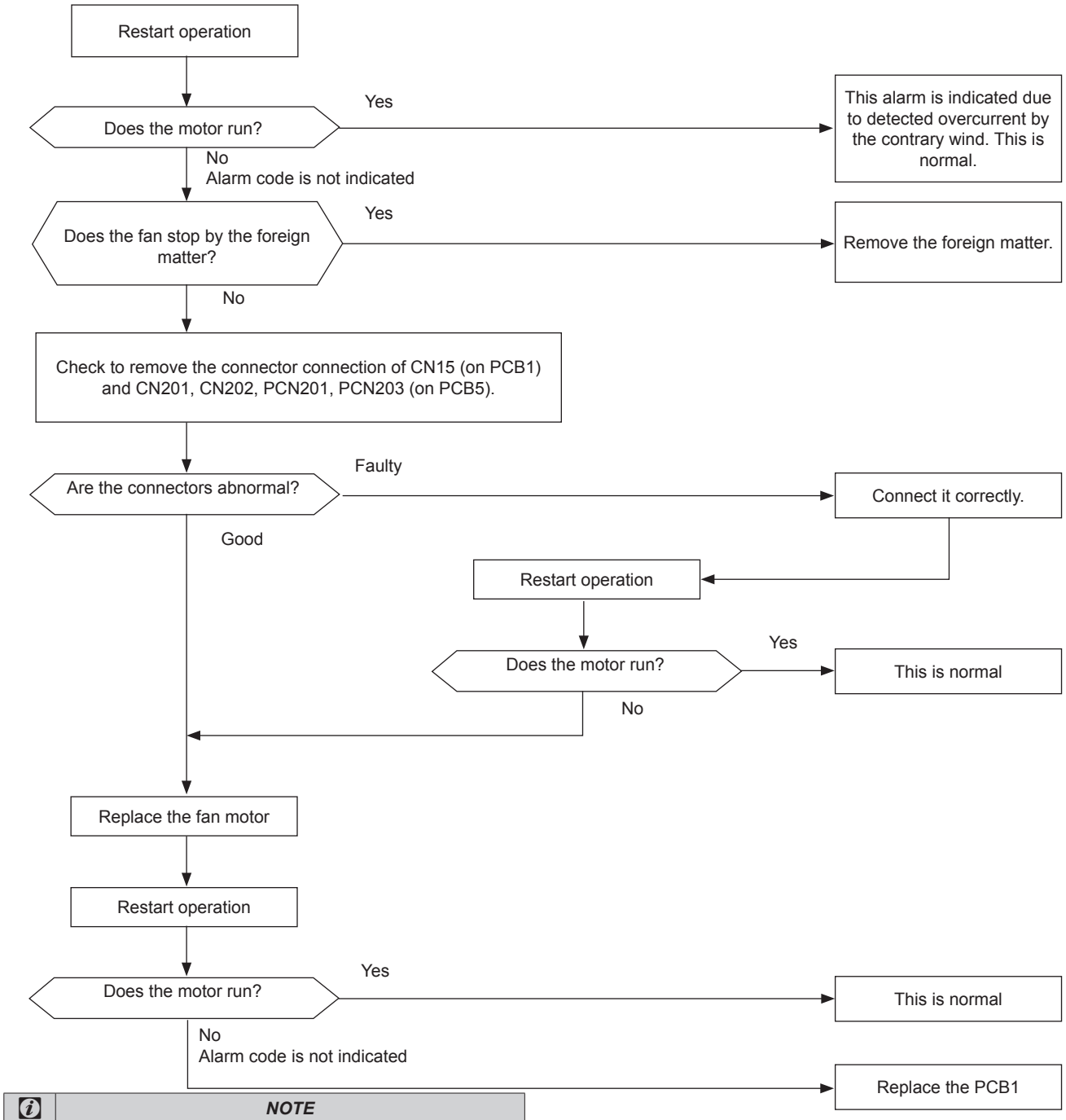
When the transmitting abnormality occurs between dipIPM (or IPM) and PCB2), this alarm is indicated and the operation is stopped.

Troubleshooting:

Replace the PCB2.

Alarm code	Description
57	**Abnormality of fan motor protection (DC fan motor)**

- 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.



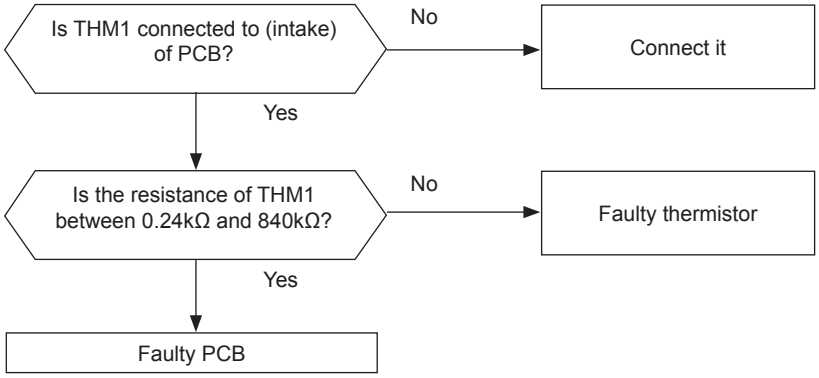
NOTE

- *Check to ensure that DC Fan Motor is checked according to the item 7.3.4.*

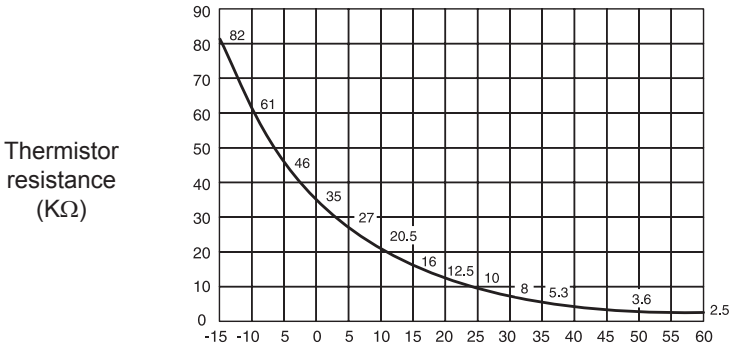
In the case that the fan motor does not run even the PCB1 is replaced, replace PCB5.

Alarm code	Description
96	**Abnormal operation of thermistor for the KPI (room temperature 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 or cut during the KPI operation. 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



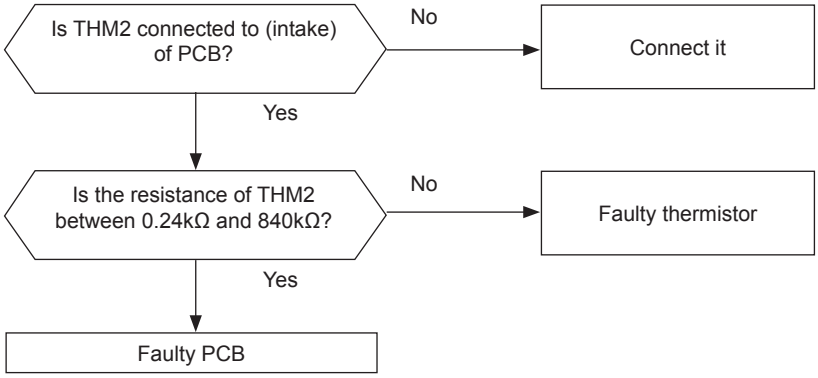
Thermistor characteristics

NOTE

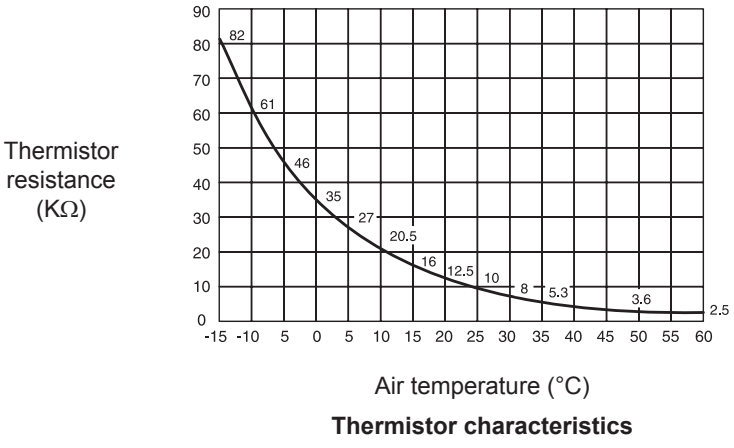
- *This data is applicable to the following thermistors:*
  1. *Indoor unit discharge air temperature,*
  2. *Indoor unit liquid refrigerant temperature*
  3. *Indoor unit air inlet temperature*
  4. *Outdoor temperature*
  5. *Outdoor unit evaporating temperature*
  6. *Indoor unit gas piping*

Alarm code	Description
97	**Abnormal operation of thermistor for the KPI (outdoor temperature 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 or cut during the KPI operation. 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	Description
EE	**Compressor protection**
• 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.	

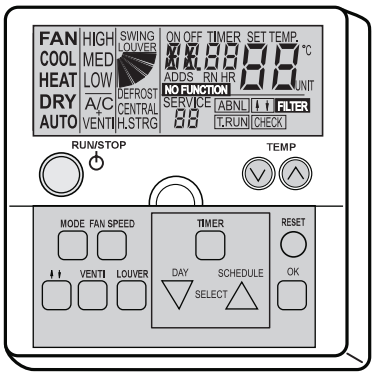
Alarm code	Content of abnormality
02	Tripping of protection device in outdoor unit
07	Decrease in discharge gas superheat
08	Increase in discharge gas temperature
41	Cooling overload
42	Heating overload
47	Low pressure decrease protection activating

You can check these alarms using 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.**

7.2.3. 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

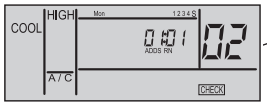
- Check mode 1: Current data will be displayed
- Check mode 2: The data which was held immediately before the failure will be displayed

Pres “OK” for more than 3 seconds

Normal mode

– 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 " 1" 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



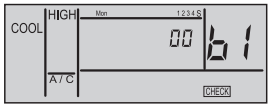
The alarm code that identifies the last fault that has occurred in the displayed unit.
The unit number of the connected unit or the unit number for which the checking mode was selected previously.
ADDS: Number of the indoor unit in no. ** cycle
RN: No. ** refrigerant cycle

After seven seconds ← (A)

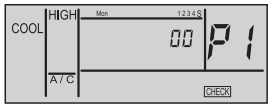
Within seven seconds to check another unit

Forward:
Press the "⌃" switch to increase from 00 to 01 to 02 ···
Backward:
Press the "⌄" switch to decrease from 15 to 14 to 13 ···

Check mode 1



Press "⌄" to see the previous indication
Press "⌃" to see the next indication



Pres “OK” for more than 3 seconds

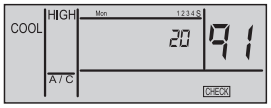
Unit number and alarm code displayed



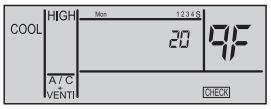
Press "⌃" to see the next data
Press "⌄" to see the previous data

After seven seconds ← See (A)

Check mode 2 (Refer to "check mode 1" for details)



Press "⌃"

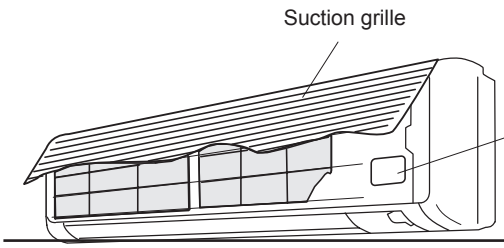


– In the check mode 2, the data of the first three units that are connected serially to a remote control switch are available.
– You can press the “OK” switch to disable the check mode 2. Check mode 1 cannot be disabled even if you press the “OK” switch.

Pres “OK” for more than 3 seconds

Check mode disabled

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-P2HTE.



NOTE

- *The unit does not operate by pressing the operation switch.*
- *The above function is available only when the alarm occurs.*
- *The PCB check using the remote control switch is not available.*
- *The indication is the data when you are connecting PC-P2HTE. The indication is not the data before the alarm occurs.*

- **Contents of the check mode 1**

The next indication is shown if you press the part "△" of the TEMP switch.

If you press the part "▽" of the TEMP switch, the previous indication is shown.

Temperature indication

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
11	Thermo temp. of the remote control switch	bb 23

Indication of the category code
Indication of the temperature, etc

Normal ... Temperature displayed

Abormal
- -- (Thermistor is open-circuited or PCB is defective)
or
129 (Temp. for top of comp.)
or
FF (Thermistor is short-circuited or PCB is defective)
or
255
or
127 (Temp. for top of comp.)

Refer to section 7.3.1 "self-checking procedure of PCB using 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 "--".

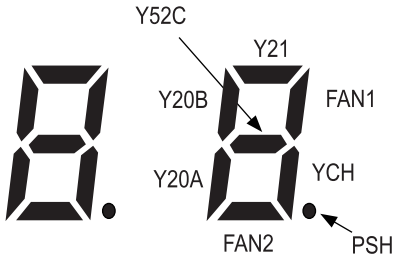
This indicates the internal information for the remote control switch

(Ex.) During the operaton of several compressors, the average temperature of two compressors is indicated.

If the temperature is higher than 126 ºC, " 126"

Indication of micro-computer input/output

12	Micro-computer input/ output in indoor unit	C 1	4
13	Micro-computer input/ output in outdoor unit	C2	-



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

Indication of unit stoppage cause

14	Cause of stoppage	d 1	01

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 (<=-5ºC), 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 (<=-20ºC)
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

- *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.
- *Even if stoppage is caused by "Alarm", "02" is not always displayed.*
- *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.*
- *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.
- *In the system "20" will be indicated at the diference between indoor units.*

Abnormal operation occurrence counter

15	Abnormal operation occurrence counter	E 1	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

Countable up to 99.
Over 99 times, "99" is always displayed.

NOTE

- *If a transmission error continues for three minutes, one is added to the occurrence counter.*
- *The memorized data can be cancelled by the method which is explained in section 7.3.1 "self-checking procedure of PCB using the remote control switch".*

Indication of automatic louver condition

19	Louver sensor	F 1	00

00 : Normal
FF : Abnormal

Compressor pressure/frequency indication

20	Discharge pressure (high) (x 0.1 MPa)	H1 18
21	Suction pressure (low) (x 0.01 MPa)	H2 04
22	Control information	H3 44
23	Operation frequency (Hz)	H4 44

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.

Indoor unit capacity indication

24	Indoor unit capacity	J1 08
25	Outdoor unit code	J2 Fn
26	Refrigerant cycle number	J3 01
27	Refrigerant cycle number	J4 00

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: 1 ~ 4

J3: 01 ~ 64 (01: when shipment (DSW5+RSW2), decimal indication

J4: 00 ~ 40 (00: when shipment (DSW5+RSW2), indication with 16 numbers

Expansion opening indication

28	Indoor unit expansion valve opening (%)	L1 20
29	Outdoor unit expansion valve MV1 opening (%)	L2 99
30	Outdoor unit expansion valve MV2 opening (%)	L3 99
31	Outdoor unit expansion valve MVB opening (%)	L4 00

The indication of 255 is normal

Estimated electric current indication

32	Compressor running current (A)	P1 25

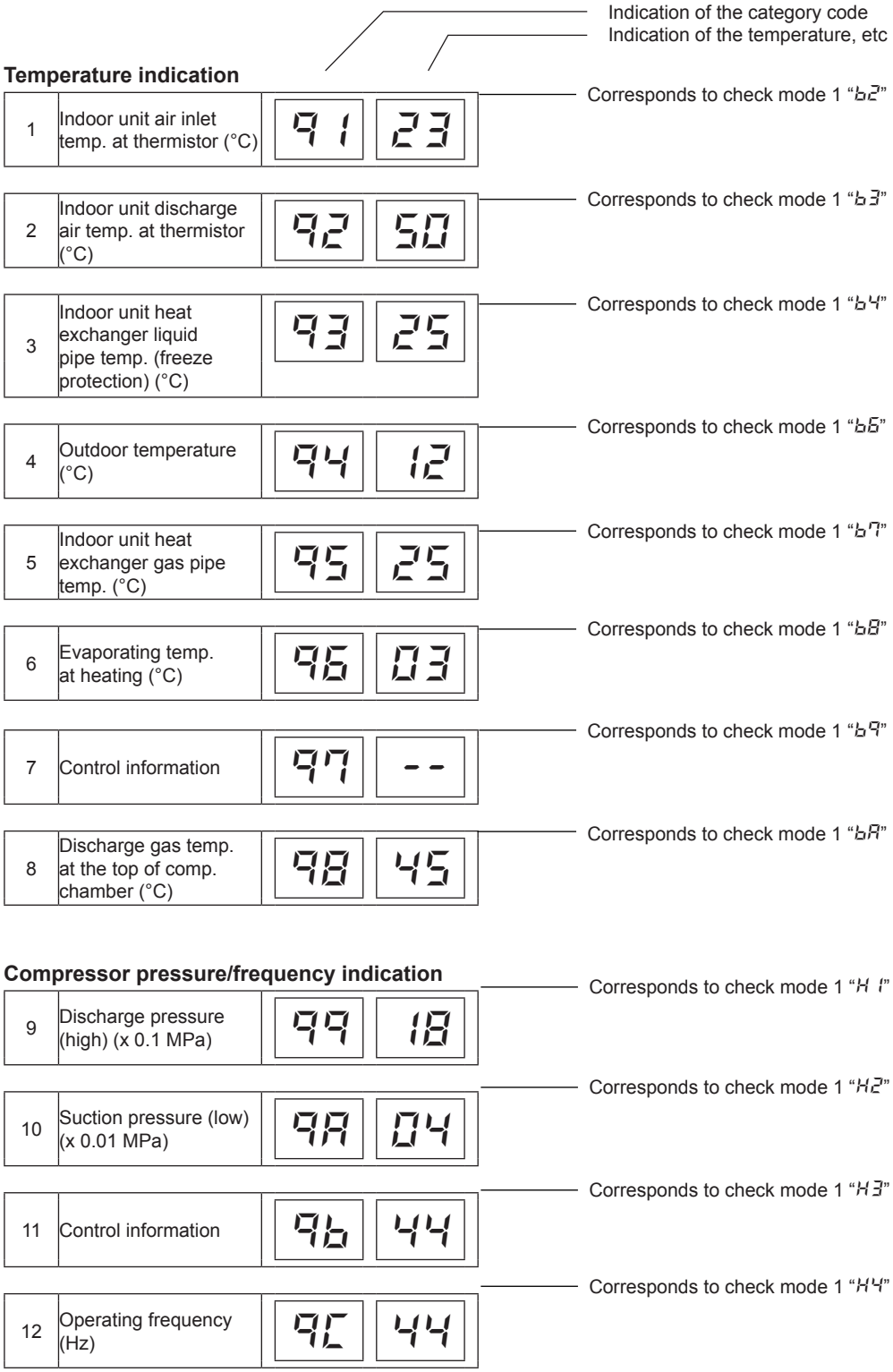
The total current is displayed when several compressors are running. In case of the inverter compressor, the running current of the primary side of the inverter is displayed.

☛ Returns to **temperature indication**

7

- **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.



Expansion opening indication

13	Indoor unit expansion valve opening (%)	9d 20

Corresponds to check mode 1 "H2"

14	Outdoor unit expansion valve mv1 opening (%)	9E 99

Corresponds to check mode 1 "H3"

Estimated electric current indication

15	Compressor running current (A)	9F 20

Corresponds to check mode 1 "H4"
The total value is displayed when several compressors are running

☛ Returns to **temperature indication**

7.2.4. Troubleshooting using 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

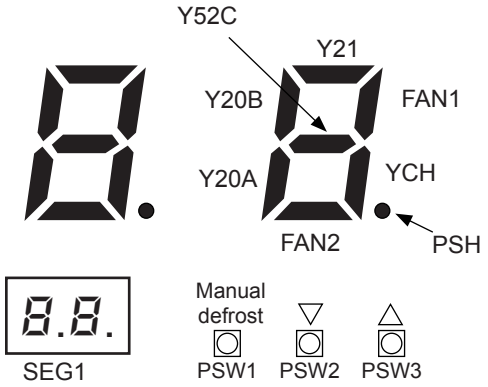
Outdoor unit, circuit board, PCB1

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 indicated 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 seconds.

Item	Item		Indication data		
	Check No.	Indic.	Indic.	Contents	
Total capacity of indoor unit connected	01	CP	22	00~96	
Input/output state of outdoor micro-computer	02	SC	3	Indicates only for the segments corresponding to the equipment in the figure. (See figure above)	
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 (%) In 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	-2	-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, ISPM, dipIPM 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.

7.2.5 Troubleshootong using 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

7.2.6 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, ISPM, dipIPM 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	dipIPM, ISPM or IPM temperature increase protection	Inverter fin temperature RAS-4~12HRNM(E) > 100 ºC RAS-3~6HVRNME > 80 ºC => 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.

NOTE

- *During protection control (except during alarm stoppage), the protection control code is indicated.*
- *The protection control code is indicated during protection control and turns off when canceling the protection control.*
- *After retry control, the condition of monitoring is continued for 30 minutes.*
- *The maximum value (*1) and (*2) are as follows:*

*(*1)*

HP	380 – 415V						220 – 240V			
	4	5	6	8	10	12	3	4	5	6
Current (A)	8.0	12.0	12.0	17.5	20.0	21.0	16.0	16.0	24.0	24.0

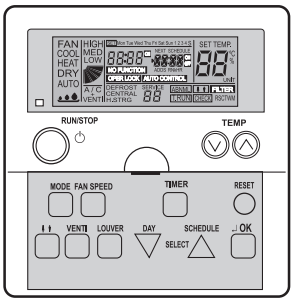
*(*2)*

	HP / Demand setting	380 – 415V						220 – 240V			
		4	5	6	8	10	12	3	4	5	6
Current (A)	100%	4.0	5.5	20.0	8.5	10.0	12.0	11.5	13.0	17.0	20.0
	75%	3.0	4.0	15.0	6.0	8.0	12.0	8.5	10.0	13.0	15.0
	50%	2.0	2.0	10.0	4.0	5.0	7.5	5.5	6.5	8.5	10.0

7.3. PROCEDURE FOR CHECKING EACH MAIN PART

7.3.1. Self-checking procedure of PCB using the remote control switch

Use the following troubleshooting procedure for testing the PCB in the indoor unit and the outdoor unit:



Stop operation

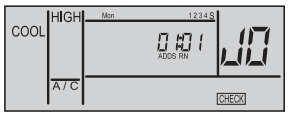
☛ Press RUN/STOP

PCB check mode

☛ Press both switches for three seconds TEMP OK

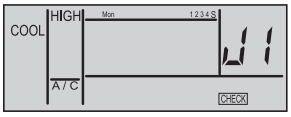
(ex.) Indication of unit No. "0"

Indication of unit number



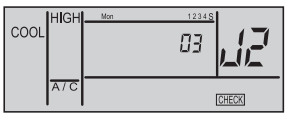
After 7 seconds

Operating automatic PCB check



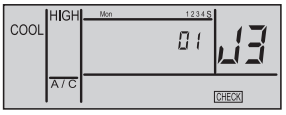
After approx. 5 seconds (max. 30 seconds in case of a transmission failure between the indoor unit and the outdoor unit).
Max. three types of abnormal operations indicated.

Abnormal operation (1)



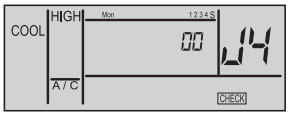
After 1 second

Abnormal operation (2)



After 1 second

Abnormal operation (3)



After 1 second

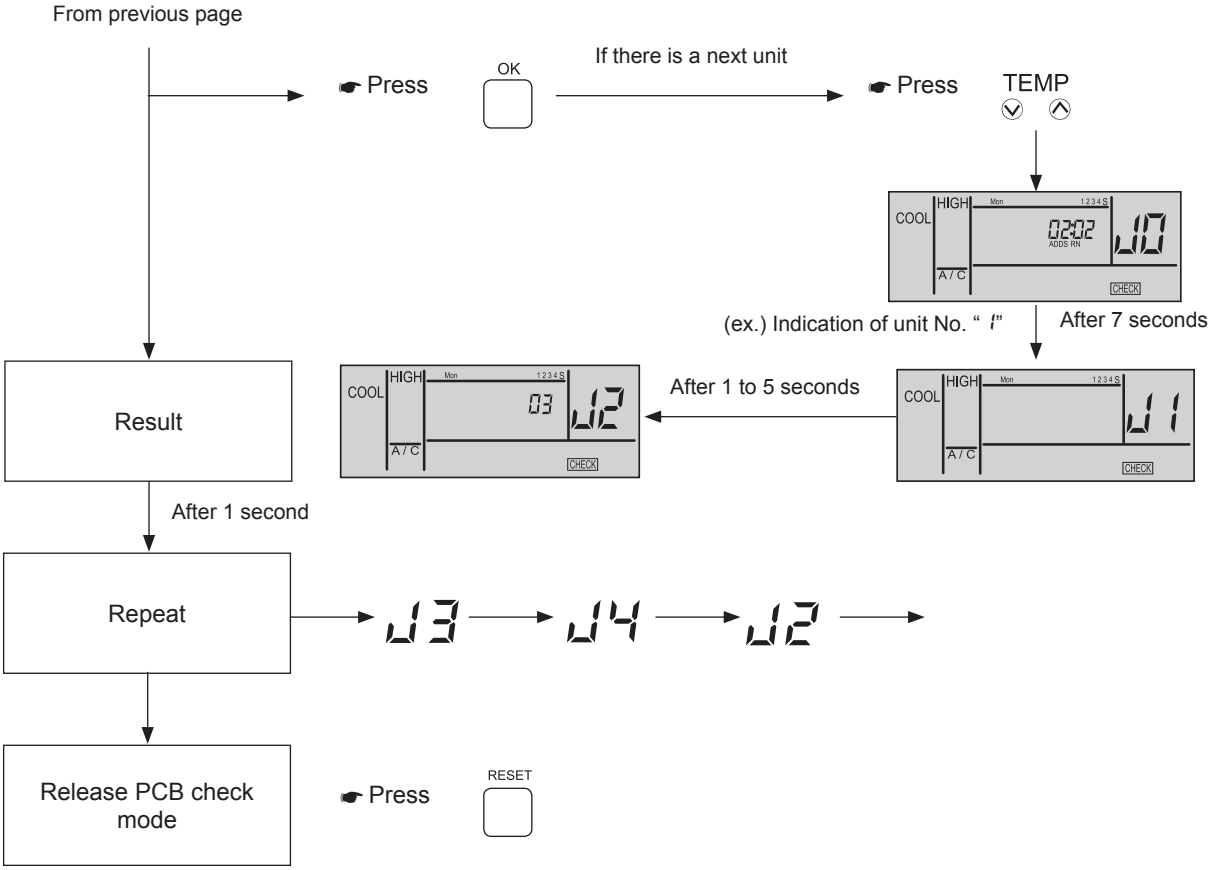
To next page

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:

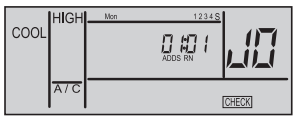
1. Turn OFF the power supply.
2. Disconnect the connector (CN25) on PWB(M).
3. Connect the PC-ART.
4. Turn ON the power supply.

After finishing the checking, turn OFF the power supply again and reconnect the connectors according to the previous situation before the checking.



NOTE

- *If this indication continues and the alarm code "U 1" 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.

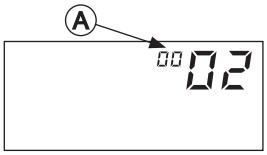


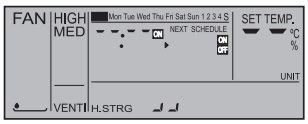
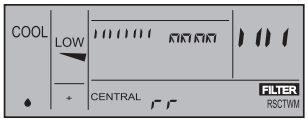
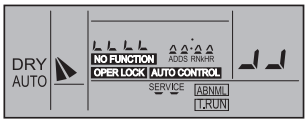
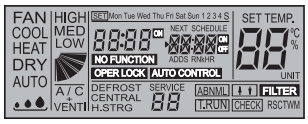
- *In this troubleshooting procedure, checking of the following parts of the PCB is not available.*
  PCB in indoor unit: relay circuit, DIP switch, option circuit, fan circuit, protection circuit.
  PCB in outdoor unit: relay circuit, DIP switch, option circuit.
- *If this troubleshooting is performed in the system using the central station, the indication of the central station may change during this procedure. However, this is not abnormal.*
- *After this troubleshooting, the memory of the abnormal operation occurrence counter, which was described before, will be deleted.*

7.3.2. Self-checking procedure of the remote control switch

Cases where the CHECK switch is used:

1. If the remote control switch displays a malfunction.
2. For the regular maintenance check.

1	Turn ON the power source
2	Simultaneously press the following three switches. (During the operation, you can press the switches.) TEMP ⊙ ⊙ MODE □
3	The LCD changes as shown in the right figure.
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. 
6	The LCD changes as shown below. The remote control switch automatically starts to check the transmission circuit 

No.	LCD indication	Indicating period (sec.)
1		1
2		1
3		1
4		1
5		3

Only for the cancellation of EEPROM, press the following three switches simultaneously during the changes of the LCD.

TEMP ⊙ ⊙ MODE □

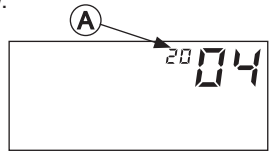
To 11

NOTE

- *Unless all the switches are pressed, the checking does not proceed to the next item.*
- *You can press the switches in any order.*
- *Pressing two or more switches simultaneously is invalid and not counted.*

NOTE

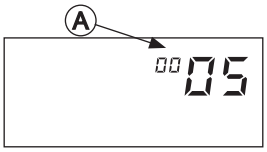
- *In case that the transmission circuit is abnormal, the LCD remains as shown in the left figure and the checking does not proceed to the next item.*

7	The LCD changes as shown below. The detected temperature of the remote control thermostat is displayed at the (A) part in the figure below. 

→ If the indicators "- -" or "FF" are displayed at the "A" part, the remote control thermostat is abnormal.

8	The LCD changes as shown below. 

→ If you press the RESET switch or you leave the switches for 15 seconds, the data of EEPROM (storage cell inside of the remote control switch) is cleared. At this time, the number is displayed at the (A) part, which is shown in the figure below. When the number "99" is displayed, EEPROM is abnormal.



9	The LCD changes as shown below.  After several seconds have passed, the remote control switch is automatically activated again.

← If the number which is displayed at the (A) part is "99", the checking does not proceed to the next item.

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

- *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.*
- *There is a case where the operation is automatically stopped after the automatic operation when the remote control switch is activated again.*

Cancellation of EEPROM
(from step 3)

11	The LCD changes as shown below and the remote control switch automatically cancels the EEPROM. 

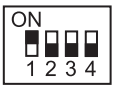
12	The LCD changes as shown below  After several seconds have passed, the remote control switch is automatically activated again. In this case, the operation is not started automatically.

7.3.3. Self-checking procedure of the indoor unit PCB (only for RPK)

- **Self-checking procedure using 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 using the CHECK switch on the remote control switch and the self-checking function.

- **Procedure**
  1 Turn OFF the main power switch.
  2 Disconnect the connectors CN7 and CN8.
  3 Set the DIP switch DSW2 as shown below.

Set the #1 switch to ON and #2 switch to OFF



DIP switch DSW2

4 Turn ON the main power switch.
Check mode starts. (Refer to the next page.)
A Analog test
B Relay test
5 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.	

7

7.3.4. Procedure of checking other main parts

1. High voltage discharge work for replacing parts

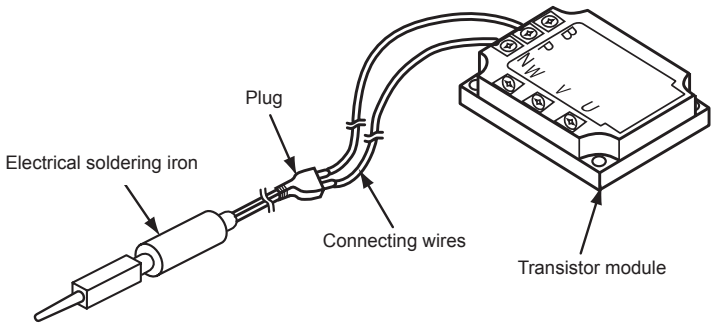
	WARNING
-	*Perform this high voltage discharge work to avoid an electric shock*

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 soldering iron

c Connect the wires to terminals, P and N on IPM. => Discharging is started, resulting in hot soldering iron. Pay

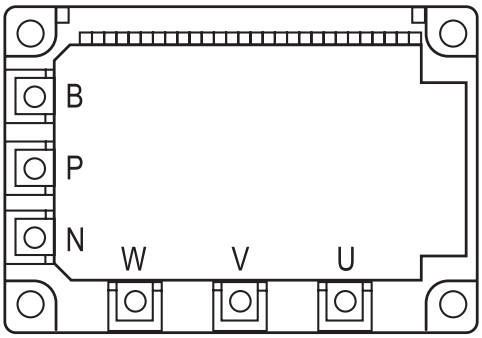


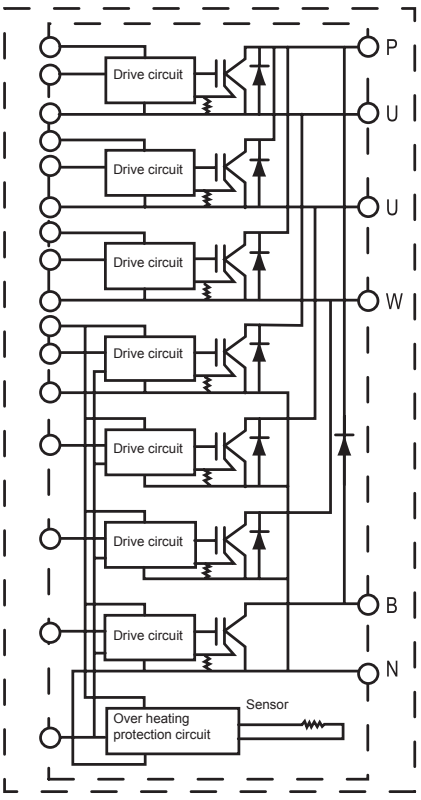
attention not to short-circuit between terminal P and N

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

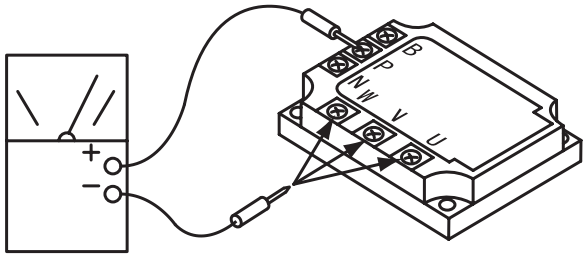
Outer appearance and internal circuit of transistor module



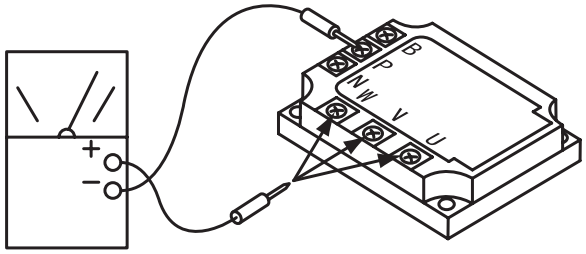


Remove all the terminals of the transistor module before check. If items (a) to (d) are performing and the results are satisfactory, the transistor module is normal. Measure it under 1kΩ range of a tester.
Do NOT use a digital tester.

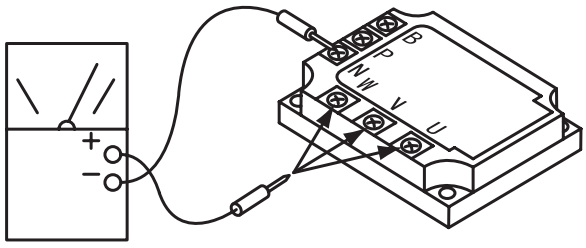
a. By touching the + side of the tester to the P terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.



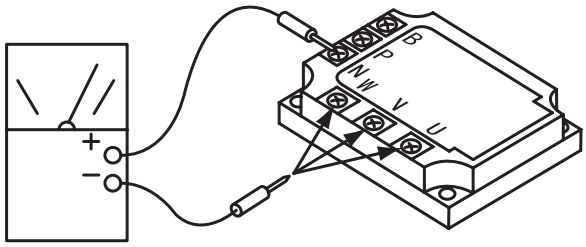
b. By touching the - side of the tester to the P terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



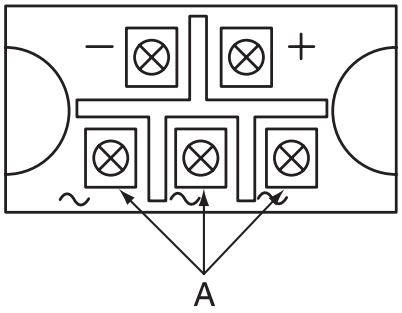
c. By touching the - side of the tester to the N terminal of transistor module and the + side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are from 1 to 5kΩ, it is normal.

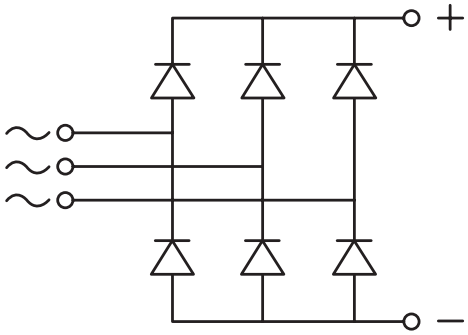


d. By touching the + side of the tester to the N terminal of transistor module and the - side of tester to U, V and W of transistor module, measure the resistance. If all the resistances are greater than 100kΩ, it is normal.



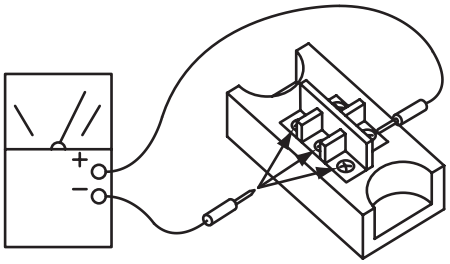
3. Checking method of diode module
   Outer appearance and internal circuit of diode module



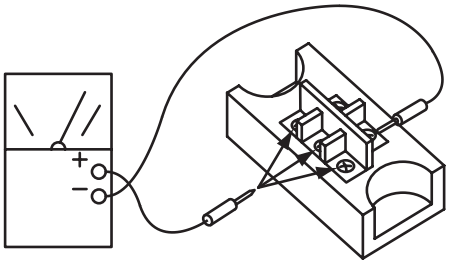


If items (a) to (d) are performing and the results are satisfactory, the diode module is normal.
Measure it under 1kΩ range of a tester. Do NOT use a digital tester.

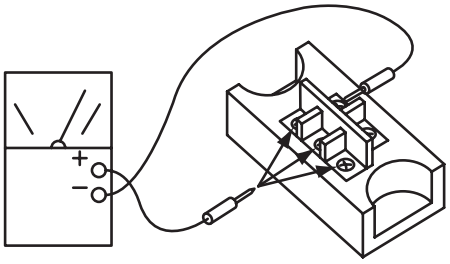
(a) By touching the + side of the tester to the + terminal of diode module and the - side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are from 5 to 50kΩ, it is normal.



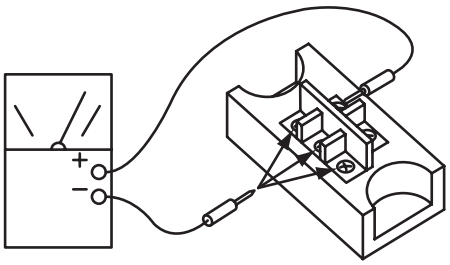
(b) By touching the - side of the tester to the + terminal of diode module and the + side of tester to the ~ terminals (3 NOs.) of the diode module, measure the resistance. If all the resistances are greater than 500kΩ, it is norma



(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.



- **Fault diagnosis of DC fan motor**

Fault diagnosis of DC fan motor. About fan motor fault diagnosis:

When ISPM/DIP-IPM is faulty and Alarm 53 appears, the fan motor may also be damaged. To prevent ISPM/DIP-IPM damage which may result from operation combined with a faulty fan motor, check also if the fan motor is not damaged when ISPM/DIP-IPM is replaced

⚠	***CAUTION***
- *Turn OFF main power before start working.* - *Working and checking with the power ON may disturb correct diagnosis and may result in failure.*	

Models:

DC motor(s) included in different models:

Model	Pieces
RAS-3HVRNME	1
RAS-(4~6)HVRNME	2
RAS-(4~6)HRNME	2
RAS-(8~12)HRNM	1 (Upper motor)

Fault diagnosis procedure

1. Remove fan motor connectors from the control PCB ISPM or DIP-IPM and turn the fan motor shaft by hand.

Normal:	Fan motor shaft turns smoothly.
Faulty:	No continuous rotary torque movement felt when turning the motor by hand. This occurs because the internal magnet of the fan motor breaks the movement when the internal electronic circuit of the fan motor has a short-circuit faul

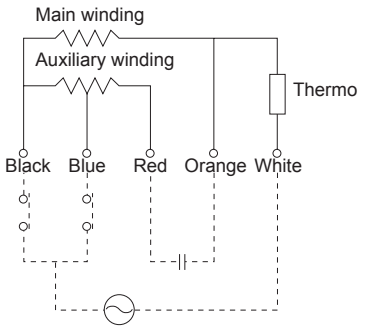
2. Measure the fan motor resistance using a tester.

Measurement procedure:	
1.	Remove the fan motor connector from the control PCB, ISPM or DIP-IPM.
2.	Connect the black test lead of the tester to the black wire pin of the fan motor connector
3.	Connect the red test lead to the wire connector pin to be checked
Results	
Normal:	Observed values will be close to the normal values in the table below
Faulty:	Observed values will be deviated from the normal values in the table below. Generaly an open-circuit fault shows ∞, and a short-circuit fault shows several Ω-kΩ.) Internal electronic circuit fault of the fan motor including short-circuit and breakage can be checked

Model	Motor model	Wire color for checking (Normal value) Ω			
		Red-black	White-black	Yellow-black	Blue-black
RAS-4H(V)RNME (upper) RAS-(4~6)H(V)RNME (lower)	SIC-65FV-D840-1	1M or greater	26~50k	168~312k	1M or greater
RAS-3HVRNME RAS-(5-6)HVRNME (upper) RAS-(5-6)HRNME (upper)	SIC-68FV-D851-7	1M or greater	42-78k	168~312	1M or greater
RAS-(8~12)HRNM (upper)	SIC-61FV-D8138-1	1M or greater	42-78k	168~312	1M or greater

(*) Values are shown for referenctial purpose. While actual values may vary depending on the type of the tester; any tester can be used to determine any short-ciuit or breakage based on ∞ or sdeveral Ω/several kΩ or 0Ω

Coil resistance of electrical parts (Lower fan motor)

Part name	Model	Fan motor model/ Rated power	Wiring diagram	Lead wire color	Resistance (Ω) (at 20°)
Outdoor unit lower fan motor	RAS-(8-10) HRNM	SC121HSA/120W		Bet.Black-White Bet.Blue-Red Bet.Black-Blue	23.3 ± 10% 0.8 ± 10% 12.8 ± 10%
	RAS-12HRNM	SC230HSA/200W		Bet.Black-White Bet.Blue-Red Bet.Black-Blue	14.3 ± 10% 8.5 ± 10% 12.5 ± 10%

- **Checking procedure for the ISPM**

Remove all the terminals of the ISPM before check. If items (a) to (h) are performed and the results are satisfactory, ISPM is normal. Measure it under 1 kΩ range of a tester.

⚠	***CAUTION***
- *Perform the high voltage discharge procedure as described* - *Do not use a digital tester.*	

a. By touching the + side of the tester to the P1 terminal of ISPM and the - side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.

b. By touching the - side of the tester to the P1 terminal of ISPM and the + side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.

c. By touching the - side of the tester to the N terminal of ISPM and the + side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.

d. By touching the + side of the tester to the N terminal of ISPM and the - side of the tester to R and S of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.

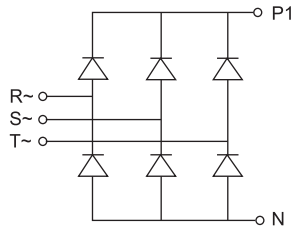
e. By touching the + side of the tester to the P terminal of ISPM and the - side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.

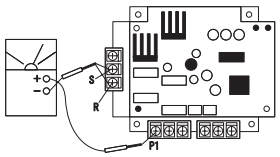
f. By touching the - side of the tester to the P terminal of ISPM and the + side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.

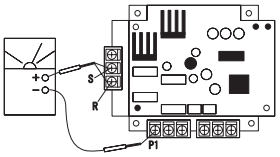
g. By touching the - side of the tester to the N terminal of ISPM and the + side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 100 kΩ, it is normal.

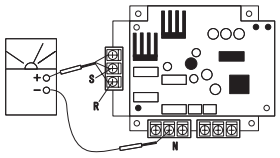
h. By touching the + side of the tester to the N terminal of ISPM and the - side of the tester to U, V and W of ISPM, measure the resistance. If all the resistances are more than 1 kΩ, it is normal.

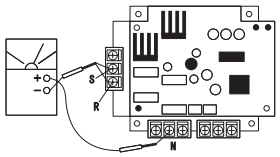
Rectification parts of internal circuit of ISPM (common)

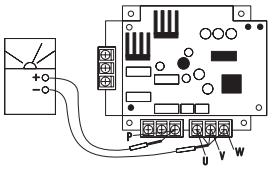


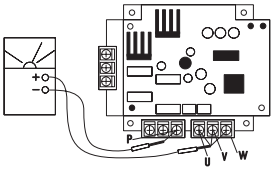


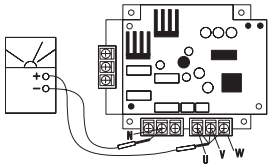


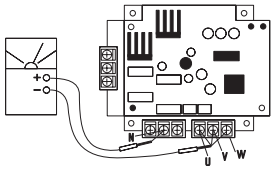




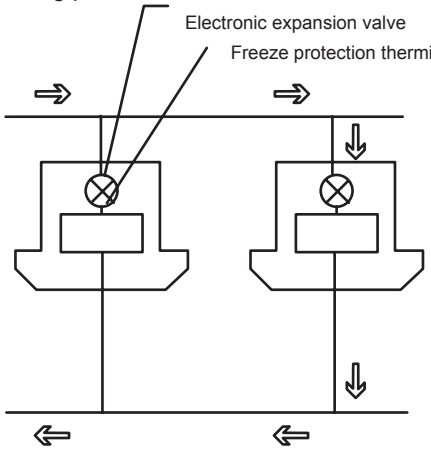








- **Checking procedure for the electronic expansion valve**

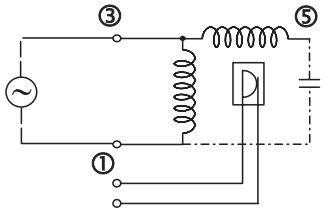
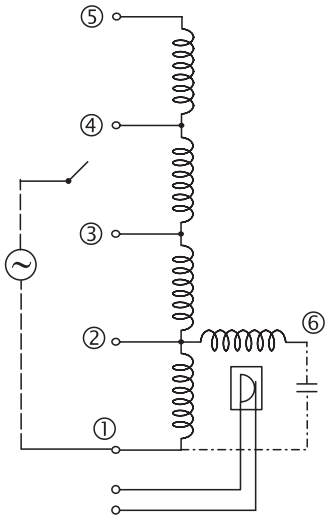
	Indoor unit electronic expansion valve	Outdoor unit electronic expansion valve
Locked with fully closed	Check the liquid pipe temperature during the heating process. It is abnormal if the temperature does not increase.	It is abnormal if the liquid pipe pressure does not increase during the cooling process.
Locked with slightly open	It is abnormal under the following condition: the temperature of the freeze protection thermistor becomes lower than the suction air temperature when the unit which is under chechink 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.

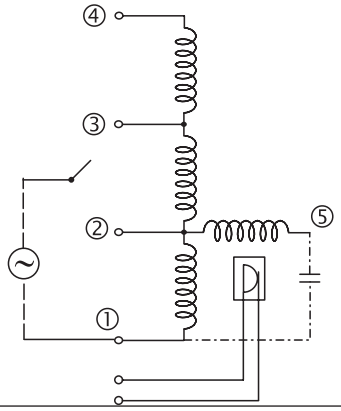
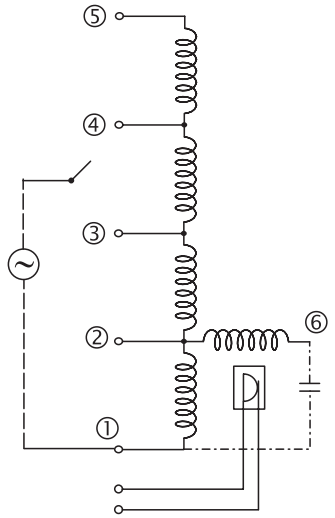
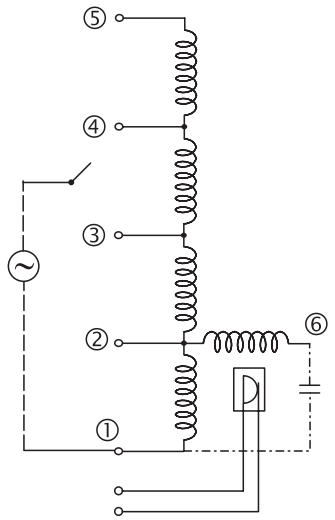
- **Checking procedure for the electrical coil parts**

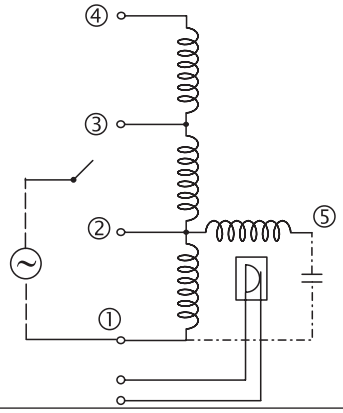
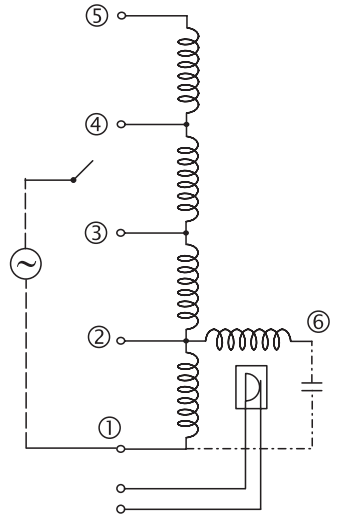
Abbreviations used for colors:

Black	Brown	Red	Yellow	Green	Blue	Grey	Orange	White
BLK	BRN	RED	YEL	GRN	BLU	GRY	ORN	WHT

Fan motor for the indoor units:

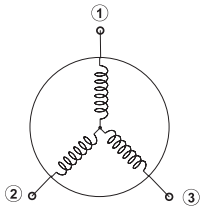
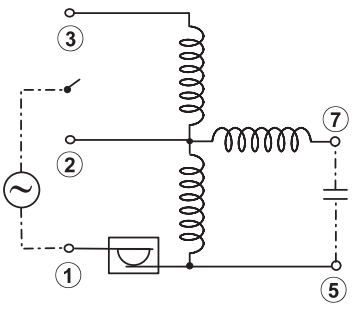
Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RCI-1.5FSN2E RCI-2.0FSN2E RCI-3.5FSN2E RCI-3.0FSN2E	56 W	DC Motor	—	—
RCI-3.5FSN2E RCI-4.0FSN2E RCI-5.0FSN2E RCI-6.0FSN2E	108 W	DC Motor	—	—
RCIM-1.5FSN2 RCIM-2.0FSN2 RCIM-2.5FSN2	52 W	DC Motor	—	—
RCD-1.5FSN2 RCD-2.0FSN2	35 W		BLK ①-③ RED RED ③-⑤ WHT	159.00 92.00 at 20 °C
RCD-2.5FSN2 RCD-3.0FSN2	55 W		BLK ①-③ RED RED ③-⑤ WHT	70.90 81.70 at 20 °C
RCD-4.0FSN2	35 W x 2		BLK ①-③ RED RED ③-⑤ WHT	159.00 92.00 at 20 °C
RCD-5.0FSN2	55 W x 2		BLK ①-③ RED RED ③-⑤ WHT	70.90 81.70 at 20 °C
RPC-2.0FSN2E RPC-2.5FSN2E RPC-3.0FSN2E	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 °C

Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RPC-4.0FSN2E RPC-5.0FSN2E RPC-6.0FSN2E	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-0.8FSN2E RPI-1.0FSN2E	88W 88W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	23.60 23.50 23.40 23.50 38,40 at 20 ºC
RPI-1.5FSN2E	85W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY GRY ④-⑤ YEL RED ②-⑥ WHT	23.60 23.50 23.40 23.50 38,40 at 20 ºC
RPI-2.0FSN2E RPI-2.5FSN2E	101W 132W		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 25.10 181.00 at 20 ºC
RPI-3.0FSN2E	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 20 ºC
RPI-4.0FSN2E RPI-5.0FSN2E	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-6.0FSN2E	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 4.80 24.60 at 20 ºC

Indoor units	Power consumption	Electrical wiring diagram	Wiring No.	Resistance (Ω)
RPIM-0.8FSN2E RPIM-1.0FSN2E RPIM-1.5FSN2E	68W		BLK ①-② RED RED ②-③ BLU BLU ③-④ GRY RED ②-⑤ WHT	214.40 29.90 30.60 61.30 at 20 ºC
RPK-1.0FSN2M RPK-1.5FSN2M RPK-2.0FSN2M	20 W	DC Motor	—	—
RPK-2.5FSN2M RPK-3.0FSN2M	40 W			
	41 W			
RPF(I)-1.0FSN2E RPF(I)-1.5FSN2E	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)-2.0FSN2E RPF(I)-2.5FSN2E	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

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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-1.0~6FSN2E RCIM-1.5~2.5FSN RPI-2.0~6.0FSN2E	ADP-1403	139.00 at 21 ºC
	RCD.1.0~6.0FSN	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	If the expansion valve 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.
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. SPARE PARTS

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8.2.1. RAS-3HVRNME 8-17

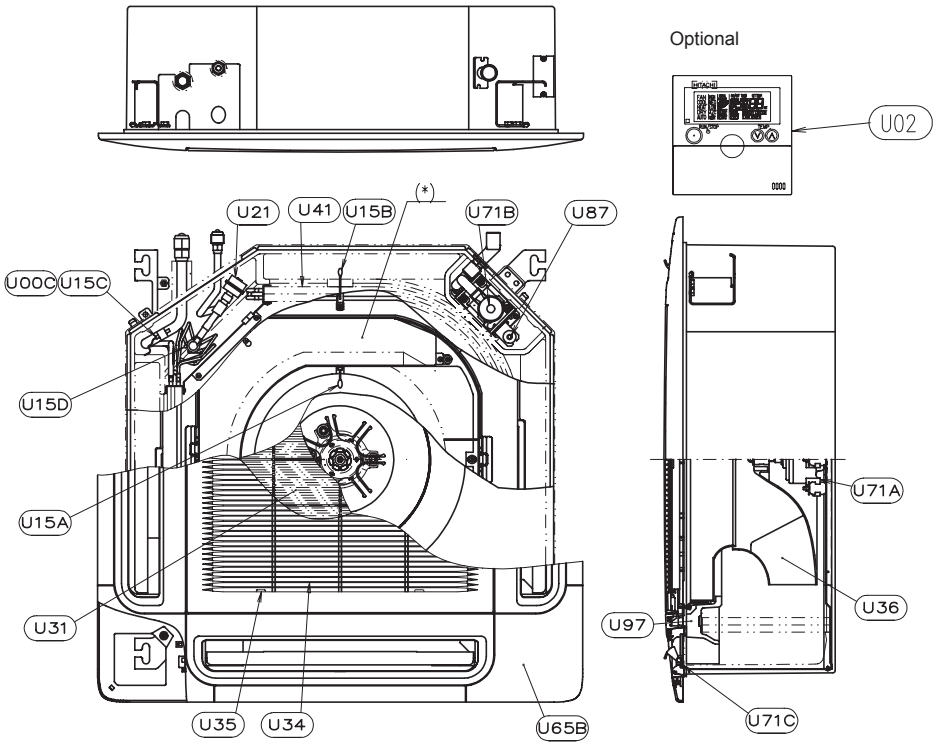
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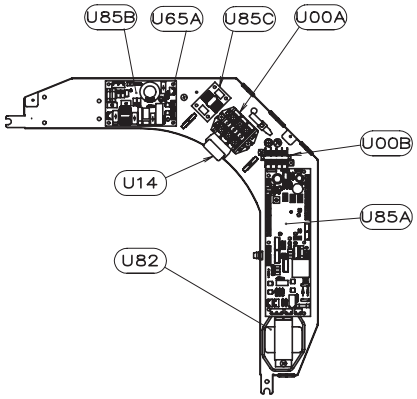
8

8.1. INDOOR UNITS

8.1.1. RCI-(1.5~6.0)FSN2E



(*) Electrical Parts

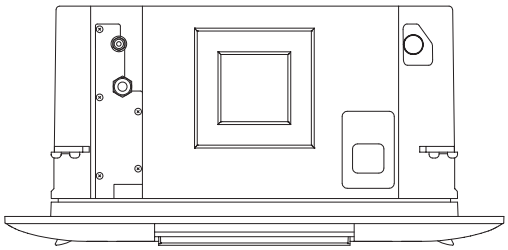


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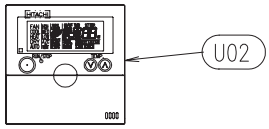
No.	Part name	Remarks
U00A	Terminal board	
U00B	Terminal board	
U00C	P-Spring	Gas
U02	Remote control switch	PC-P2HTE / PC-ART (optional)
U14	Condenser assy	
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Gas pipe
U15D	Thermistor	LIquid pipe
U21	Expansion valve	
U31	Air filter	
U34	Air grille	
U35	Grille knob	

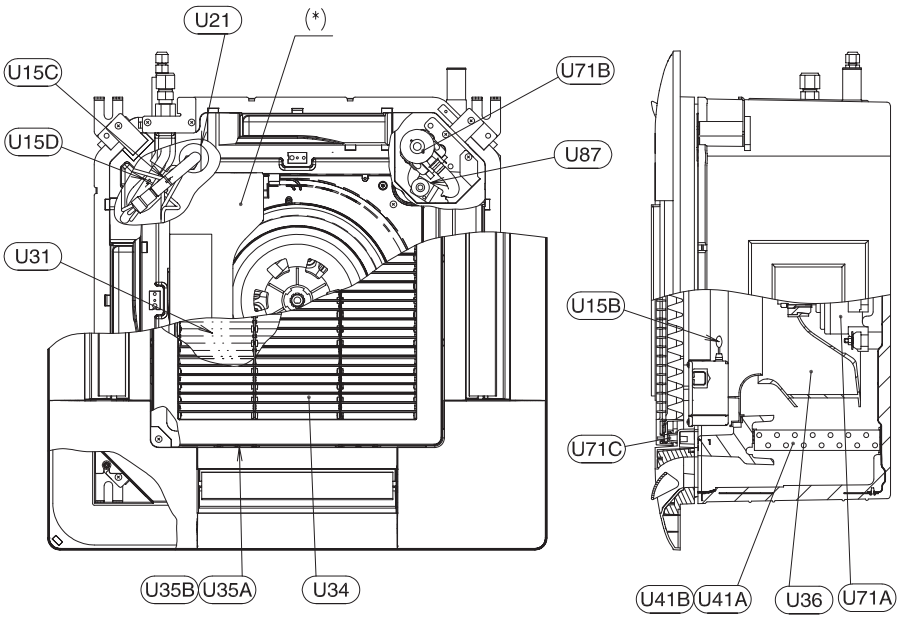
No.	Part name	Remarks
U36	Turbo fan	Fan runner
U41	Heat exchanger	Assy
U65A	Spacer	
U65B	CP cover	
U71A	Fan motor	
U71B	Drain pump	
U71C	AS motor	Assy
U82	Transformer	
U85A	PI064 EX	PCB
U85B	PI012 assy	PCB
U85C	PI979 assy	PCB
U87	Float switch	
U97	Drain pan	Assy

8.1.2. RCIM-(1.5-2.0)FSN2

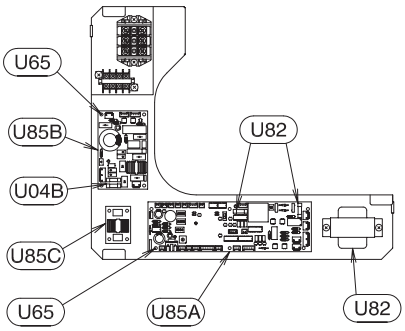


Optional





(*) Electrical parts

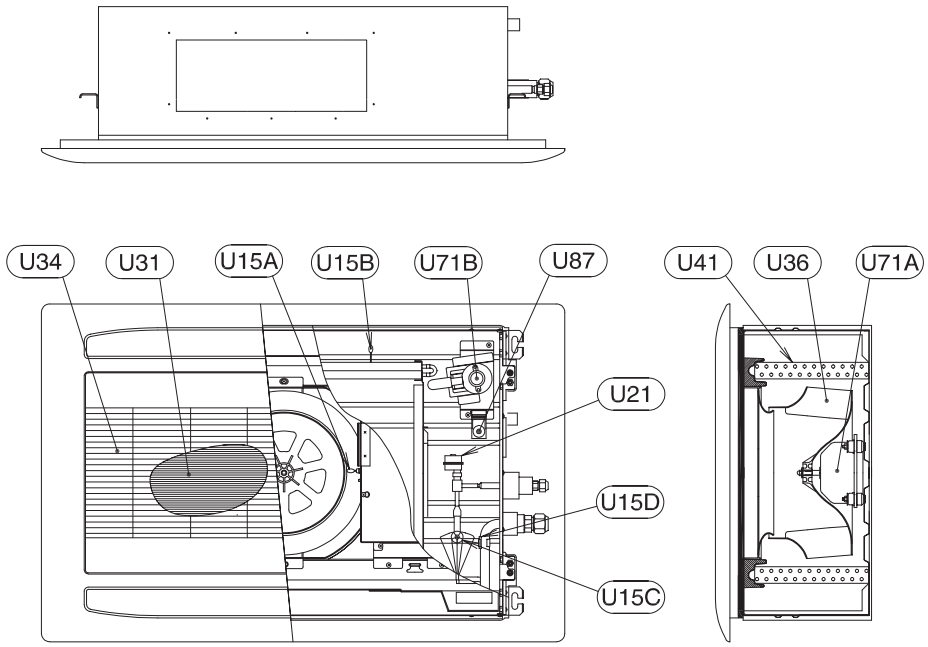


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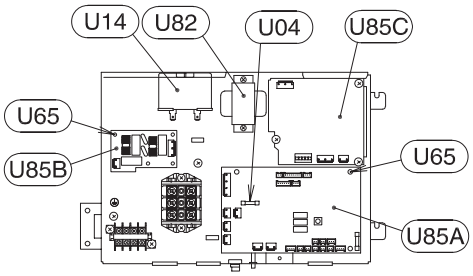
No.	Part name	Remarks
U02	Remote control swicth	PC-P2HTE / PC-ART (optional)
U04A	Fuse	0.5A for control circuit
U04B	Fuse	5A for power source
U15A	Thermistor	THM1 air inlet
U15B	Thermistor	THM2 air outlet
U15C	Thermistor	THM3 freeze protection
U15D	Thermistor	THM5 gas
U21	Expansion valve	
U31	Air filter	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

No.	Part name	Remarks
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	

8.1.3. RCD-(1.5~3.0)FSN2



(*) Electrical Parts

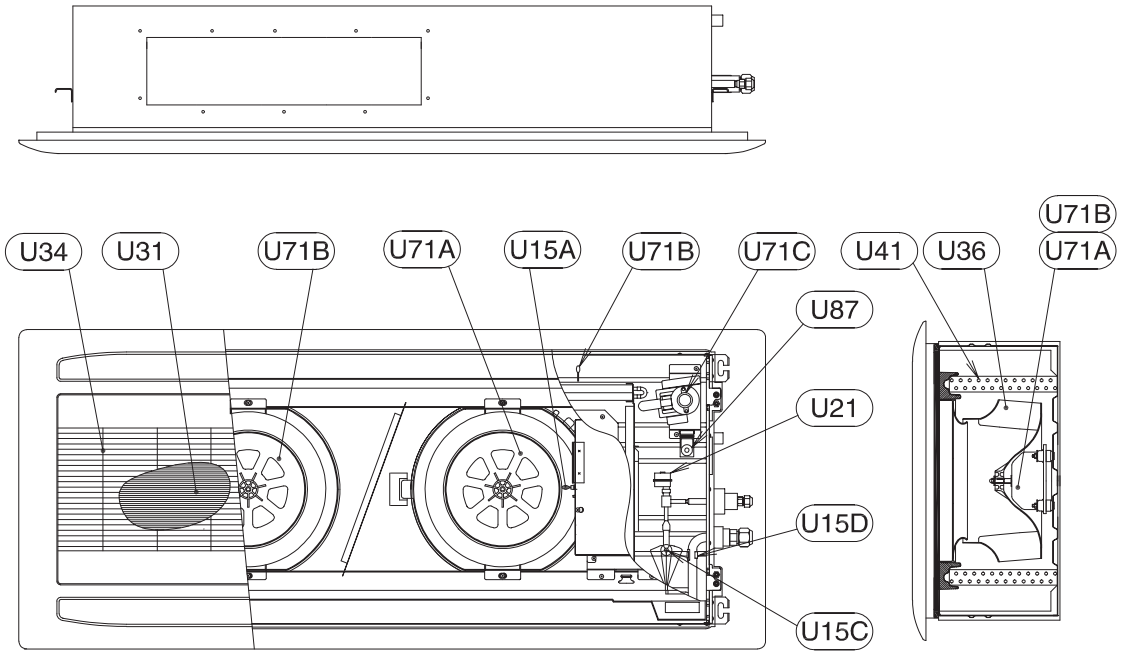


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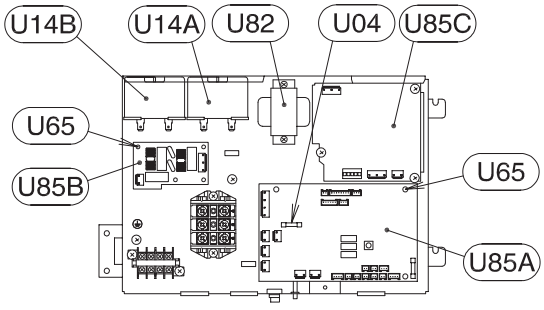
No.	Part name	Remarks
U04	Fuse	5A for control circuit
U14	Capacitor	4/5 mF 440vac
U15A	Thermistor	Thm1 air inlet
U15B	Thermistor	Thm2 air outlet
U15C	Thermistor	Thm3 freeze protection
U15D	Thermistor	Thm5 gas
U21	Exp. valve	
U31	Air filter	For P-G23DWA1
U34	Air grille	(With air filter)
U36	Fan runner	
U41	Heat exchanger	

No.	Part name	Remarks
U65	Spacer	
U71A	Motor	Fan motor 35W
U71B	Motor	Drain discharge mechanism
U71C	Motor	Swing motor assy for P-N23DWA
U82	Transformer	
U85A	Printed circuit board	Main PCB
U85B	Printed circuit board	Noise protection
U85C	Printed circuit board	Modulation
U87	Float SW	

8.1.4. RCD-(4.0~6.0)FSN2



Electrical parts

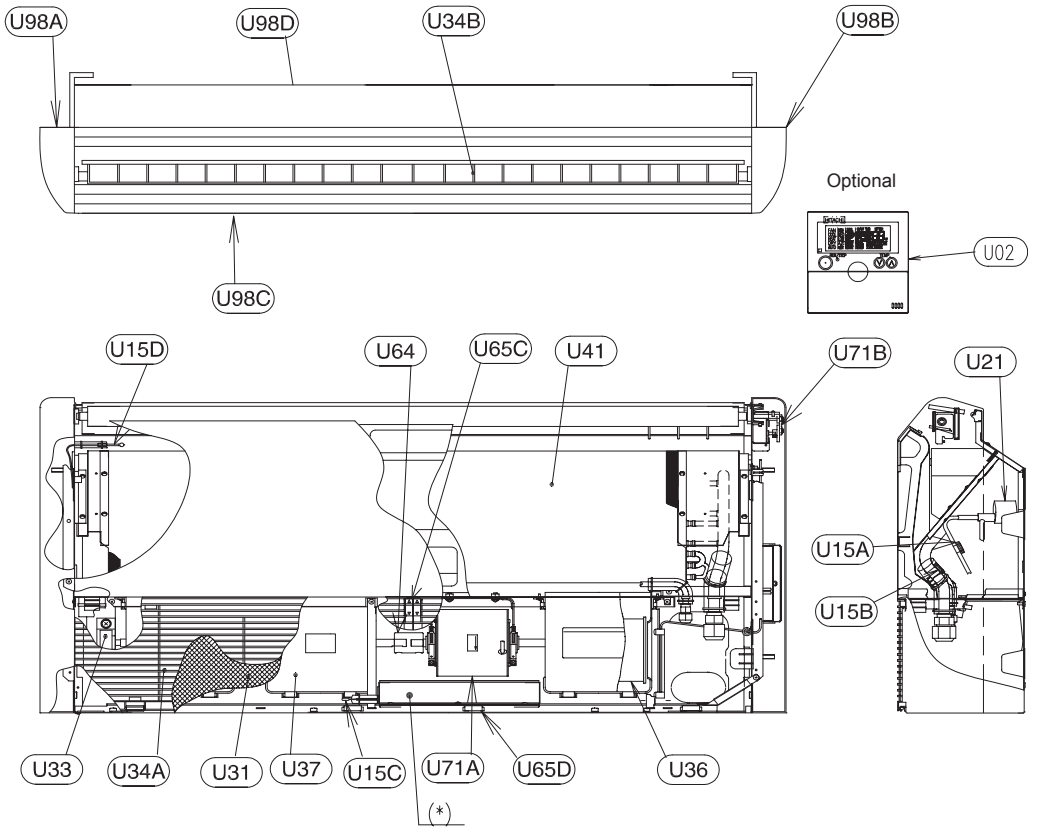


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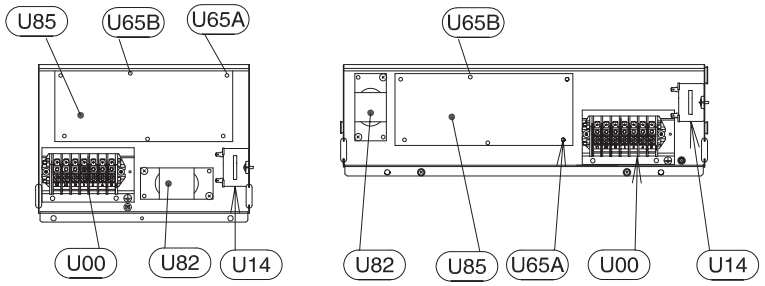
No.	Part Name	Remarks
U04	Fuse	5A for control circuit
U14A	Capacitor	4mF 440vac
U14B	Capacitor	5mF 440vac
U15A	Thermistor	Thm1 air inlet
U15B	Thermistor	Thm2 air outlet
U15C	Thermistor	Thm3 freeze protection
U15D	Thermistor	Thm5 gas
U21	Exp. valve	
U31	Air filter	For P-G46DWA1
U34	Air grille	For P-G46DWA1 (with air filter)
U36	Fan runner	
U41	Heat exchanger	

No.	Part Name	Remarks
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	

8.1.5. RPC-(2.0~6.0)FSN2E



(*) Electrical Parts

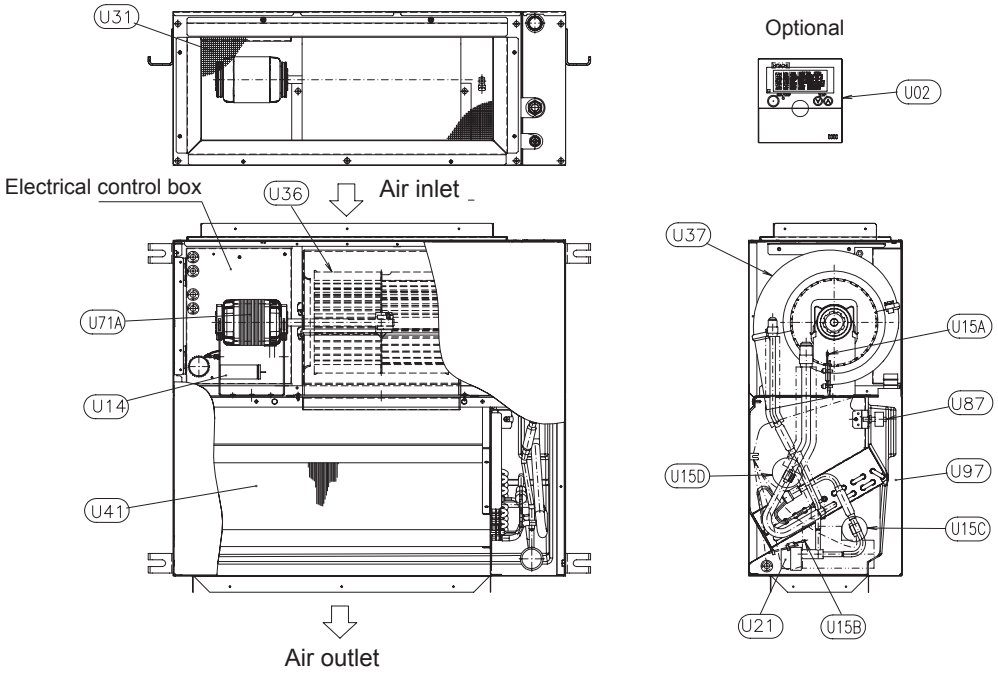


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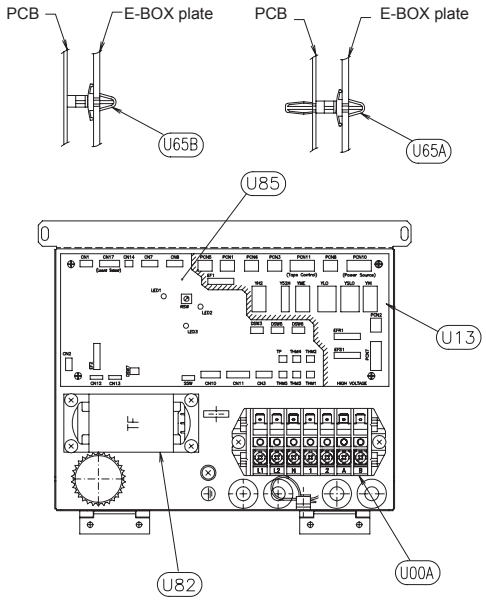
No.	Part name	Remarks
U00	Terminal board	
U02	Remote control SW	PC-P2HTE/PC-ART (optional)
U14	Capacitor	3μF/ 4,5μF/ 5μF/ 6μF/
U15A	Thermistor	Liquid pipe (freeze protection)
U15B	Thermistor	Gas pipe
U15C	Thermistor	Air inlet
U15D	Thermistor	Air outlet
U21	Expansion valve	
U31	Air filter	
U33	Bearing	
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

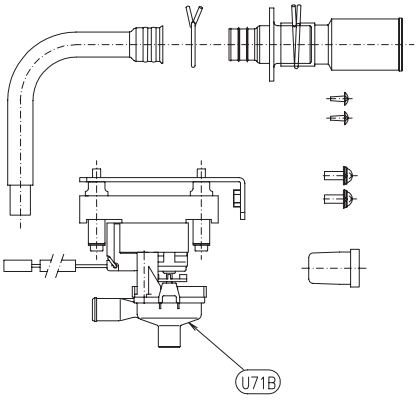
8.1.6. RPIM-(1.5)FSN2E



Location of electrical equipment



Drain pump kit DU-M1E
(optional accessory)

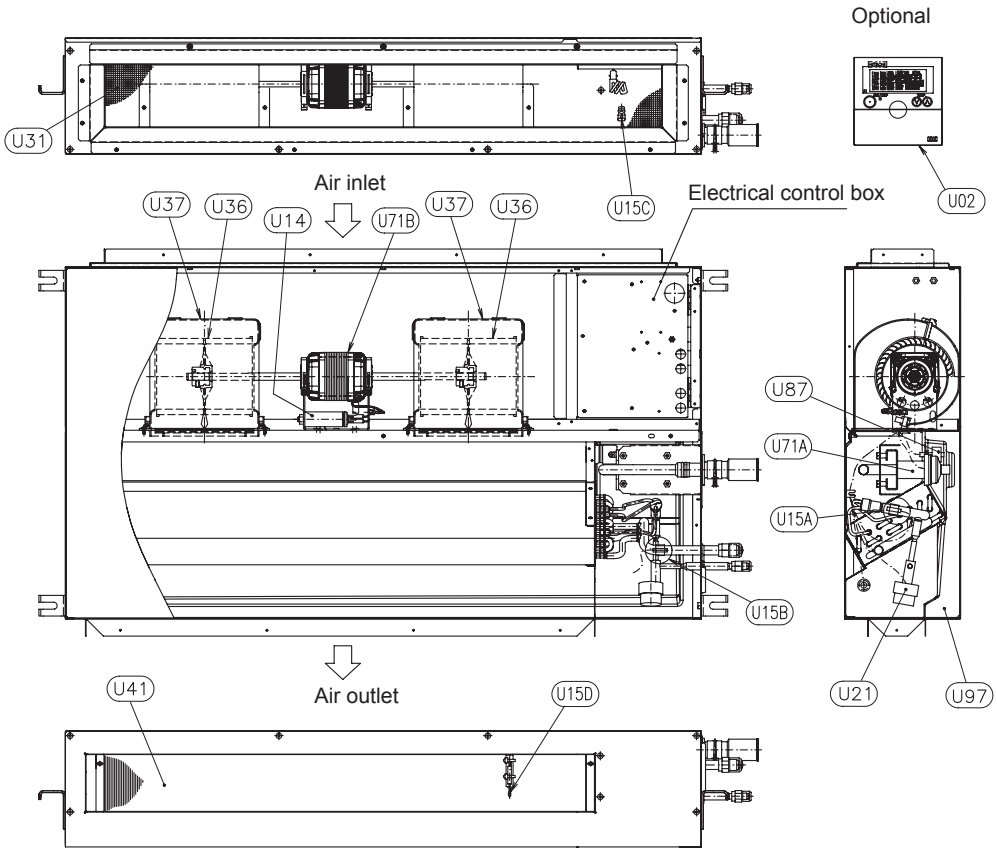


Drawing number: EPN-0806A-1B

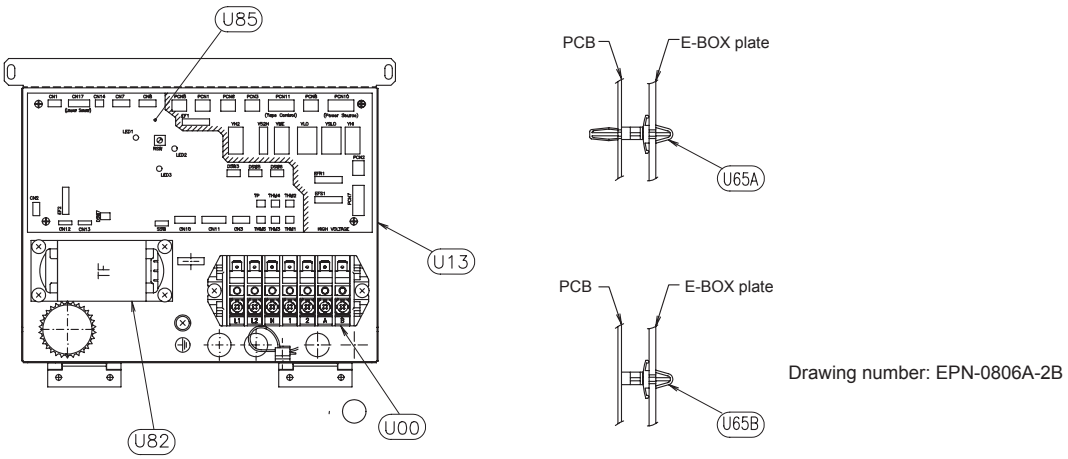
No.	Part Name	Remarks
U00A	Terminal board	
U02	Remote control switch	PC-P2HTE/PC-ART (optional)
U13	Electrical box	
U14	Capacitor	2,5µF
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Freeze protection (liquid pipe)
U15D	Thermistor	Gas piping
U21	Expansion valve	
U31	Filter	
U36	Runner	

No.	Part Name	Remarks
U37	Fan casing	
U41	Heat exchanger	Assembly
U65A	Spacer	For fixing the PCB
U65B	Push spacer	For fixing the PCB
U71A	Fan motor	
U82	Transformer	
U85	Printed circuit board	
U87	Float swicth	
U97	Drain pan	Assembly
U71B	Drain pump	Only for DU-M1E

8.1.7. RPI-(1.5)FSN2E



Location of electrical equipment

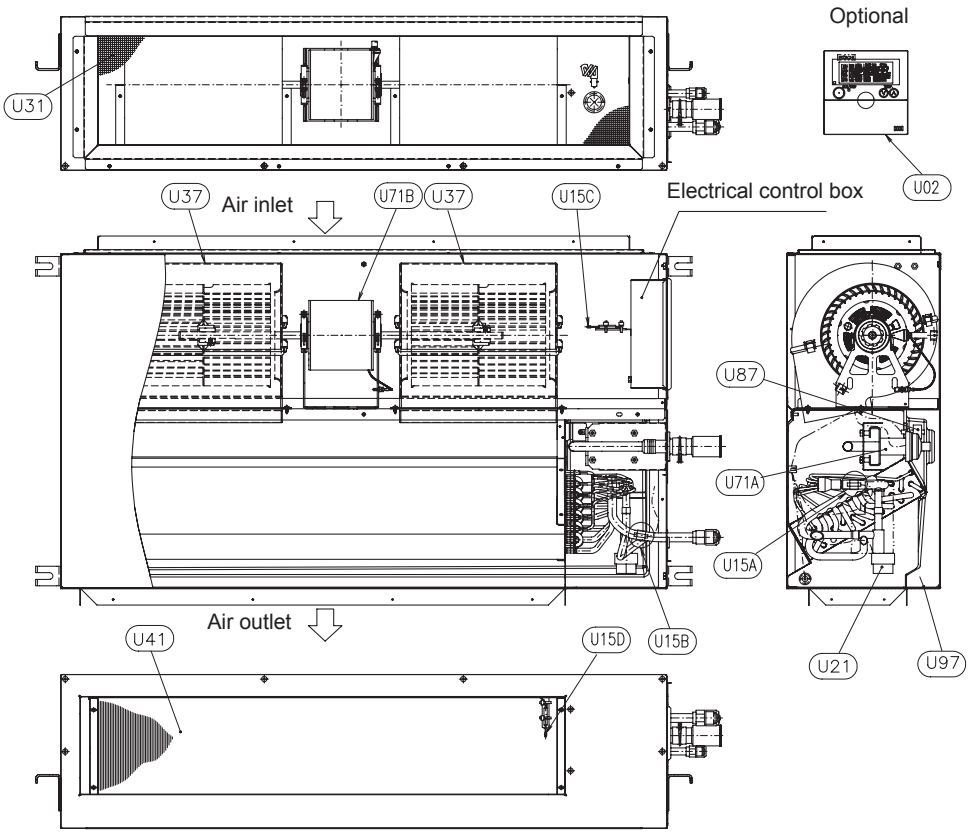


Drawing number: EPN-0806A-2B

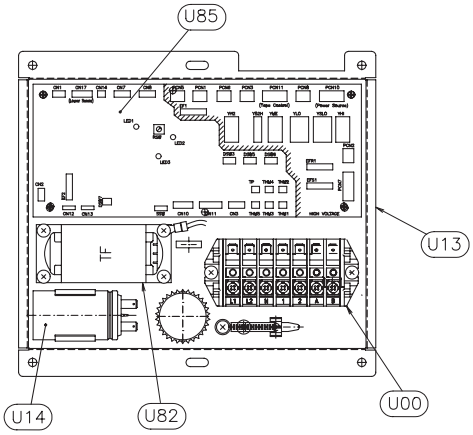
No.	Part Name	Remarks
U00A	Terminal board	
U02	Remote control switch	PC-P2HTE/PC-ART (optional)
U13	Electrical box	
U14	Capacitor	2,5µF
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Freeze protection (liquid pipe)
U15D	Thermistor	Gas piping
U21	Expansion valve	
U31	Filter	
U36	Runner	

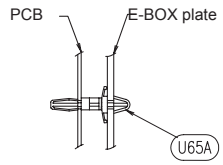
No.	Part Name	Remarks
U37	Fan casing	
U41	Heat exchanger	Assembly
U65A	Spacer	For fixing the PCB
U65B	Push spacer	For fixing the PCB
U71A	Fan motor	
U82	Transformer	
U85	Printed circuit board	
U87	Float swicth	
U97	Drain pan	Assembly
U71B	Drain pump	Only for DU-M1E

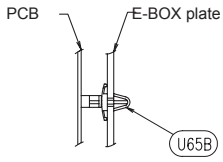
8.1.8. RPI-(2.0~3.0)FSN2E



Location of electrical equipment





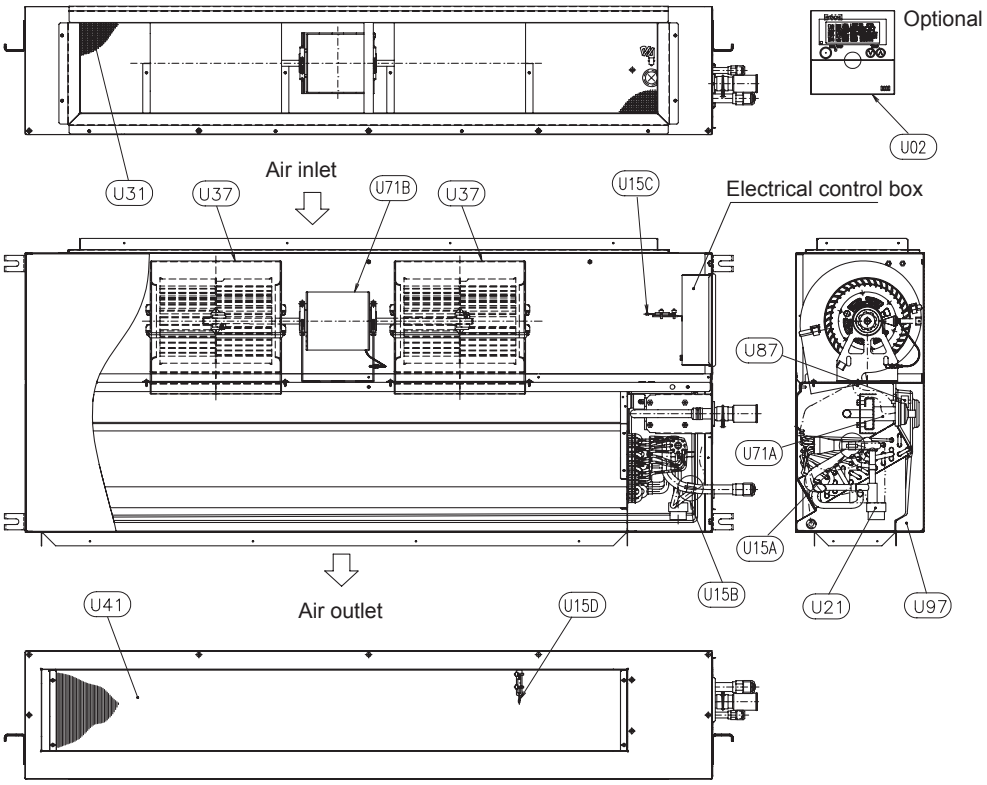


Drawing number: EPN-0806A-3B

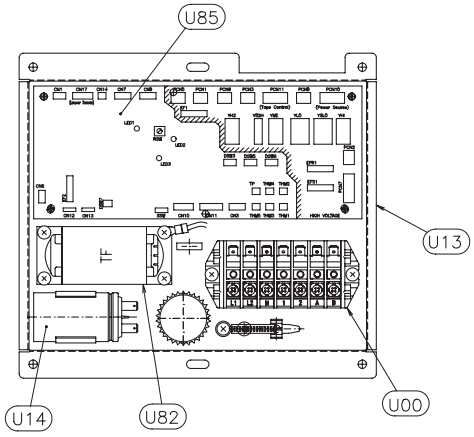
No.	Part name	Remarks
U00	Terminal board	
U02	Remote control SW	PC-P2HTE/PC-ART (optional)
U13	Electrical box	
U14	Capacitor	2.5μF, 8.0μF, 5.0μF, 3.15μF, 6.3μF
U15A	Thermistor	For liquid pipe
U15B	Thermistor	For gas pipe
U15C	Thermistor	For inlet air
U15D	Thermistor	For outlet air
U31	Filter	
U36	Runner	

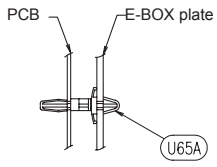
No.	Part name	Remarks
U37	Fan casing	
U41	Heat exchanger	Assembly
U65A	Spacer	For PCB fixing
U65B	Push spacer	For PCB fixing
U71A	Drain pump	
U71B	Fan motor	
U82	Transformer	
U85	Printed circuit board	
U87	Float switch	
U97	Drain pan	Assembly

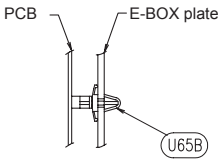
8.1.9. RPI-(4.0~6.0)FSN2E



Location of electrical equipment





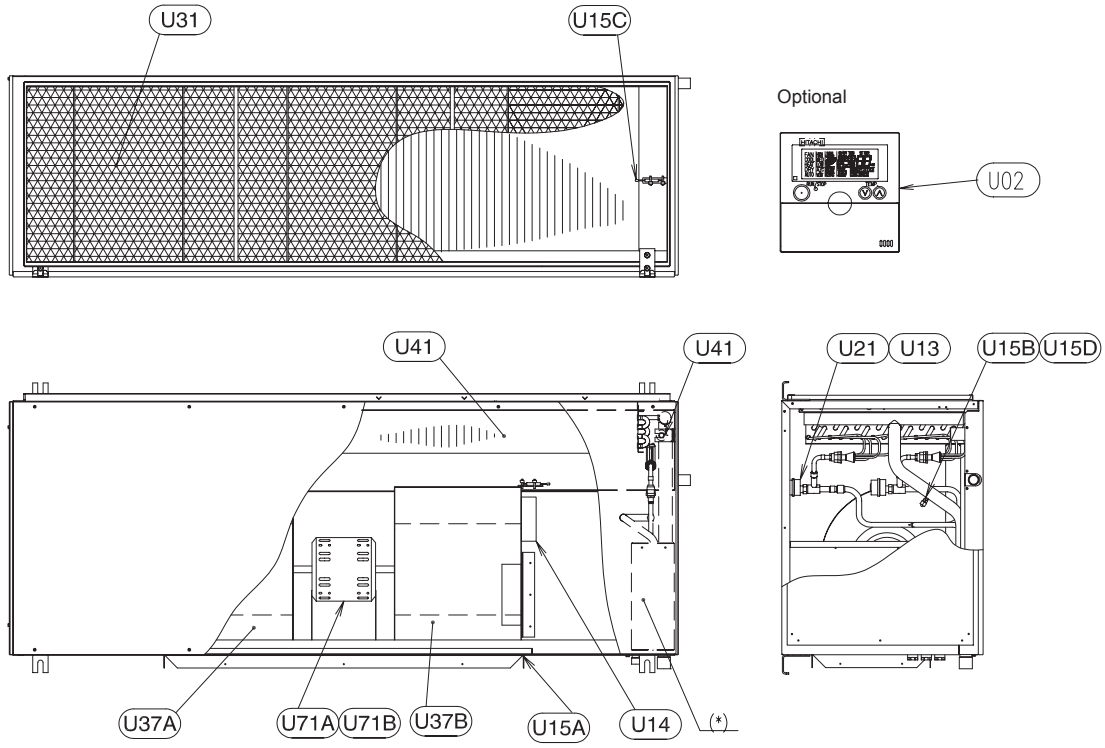


Drawing number: EPN-0806A-4B

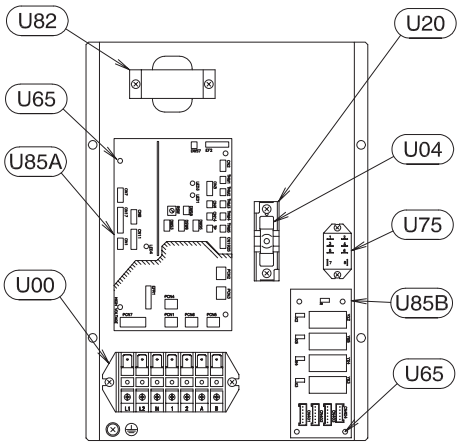
No.	Part name	Remarks
U00	Terminal board	
U02	Remote control SW	PC-P1HE/PC-ART (optional)
U14	Capacitor	2.5μF, 8.0μF, 5.0μF, 3.15μF, 6.3μF
U15A	Thermistor	For liquid pipe
U15B	Thermistor	For gas pipe
U15C	Thermistor	For inlet air
U15D	Thermistor	For outlet air
U31	Filter	
U36	Runner	
U37	Fan casing	

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

8.1.10. RPI-(8.0~10.0)FSNE



(*) Electrical parts

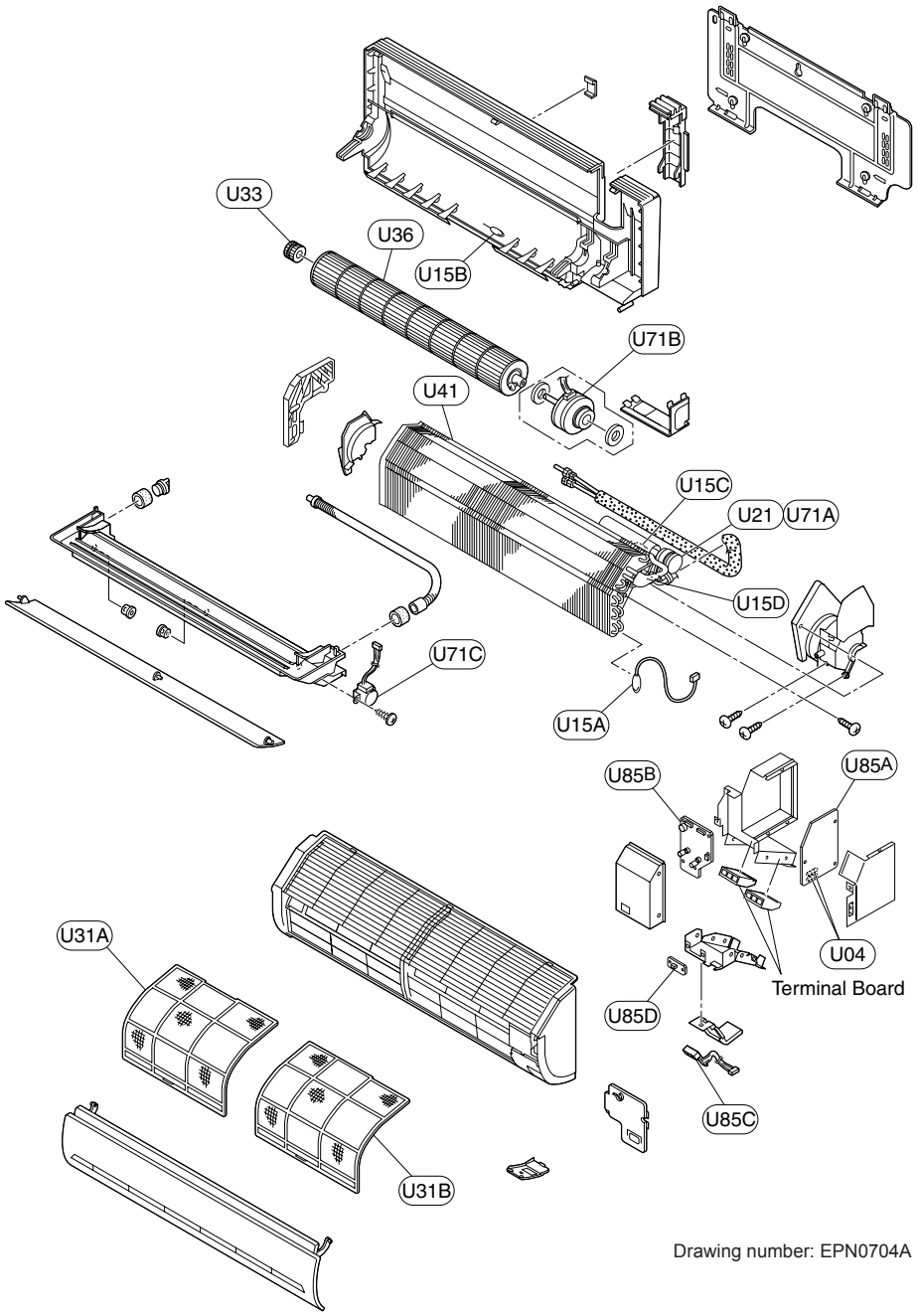


Drawing number: EPN0523A

No.	Part name	Remarks
U00	Terminal board	
U02	Remote control switch	PC-P2HTE/PC-ART (optional)
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	

No.	Part name	Remarks
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	

8.1.11. RPK-1.5FSN2M

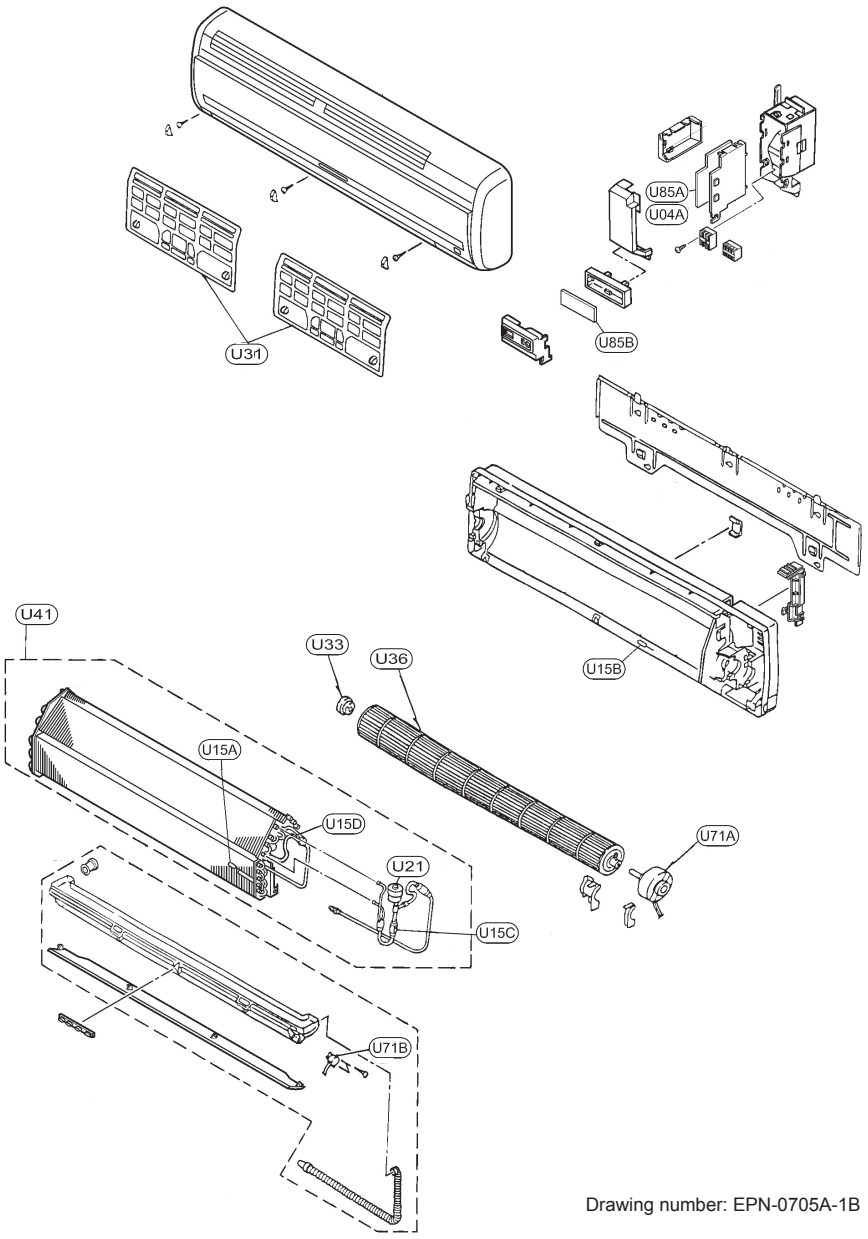


Drawing number: EPN0704A

No.	Part name	Remarks
U02	Remote control switch	PC-LH3 (optional)
U04A	Fuse	5A (For control circuit)
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Freeze protection
U15D	Thermistor	Gas
U21	Exp.valve	
U31A	Air filter R	For right side
U31B	Air filter L	For left side

No.	Part name	Remarks
U33	Bearing	
U36	Fan runner	
U41	Heat exchanger	
U71A	Fan motor	30W
U71B	As motor	For auto swing louver
U85A	Printed circuit board	
U85B	Printed circuit board	
U85C	Printed circuit board	

8.1.12. RPK-2.0FSN2M

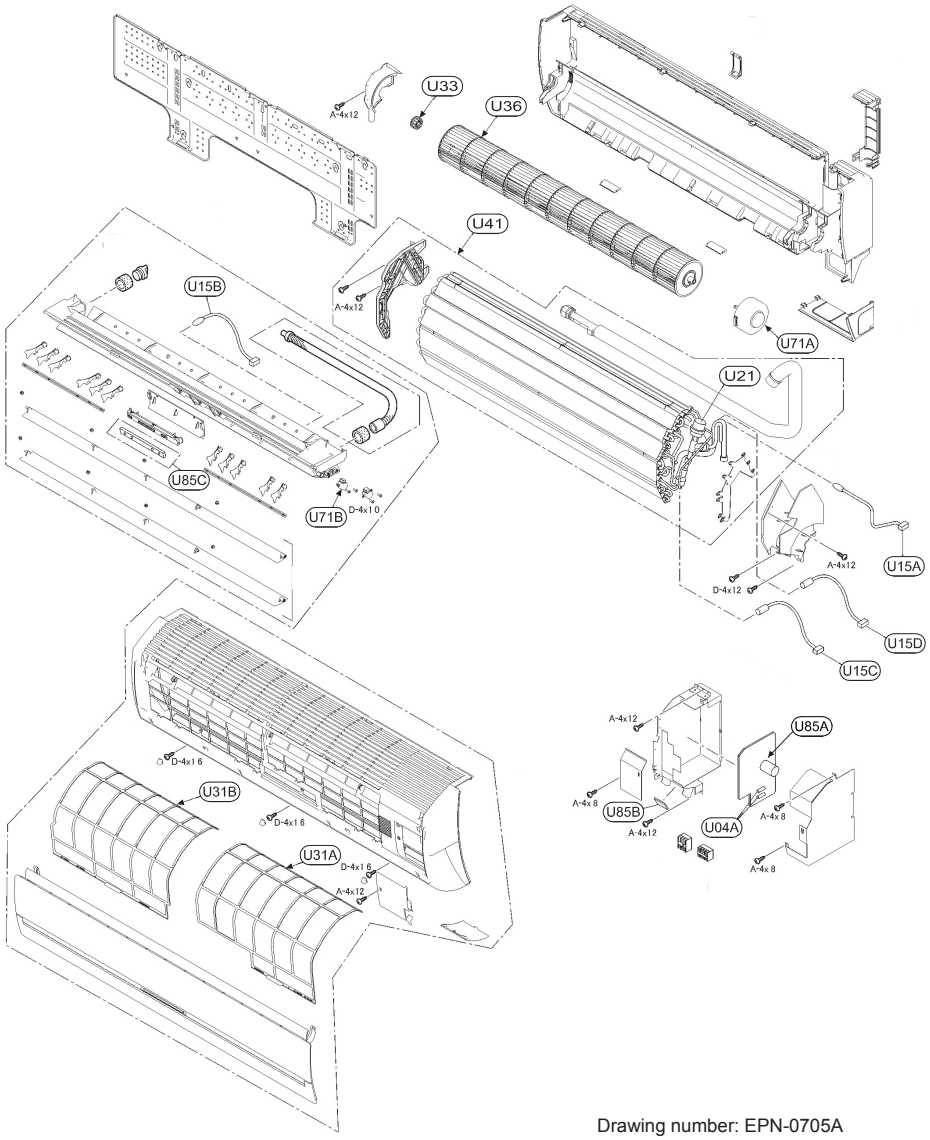


Drawing number: EPN-0705A-1B

No.	Part name	Remarks
U02	Remote control switch	PC-LH3A (optional)
U04A	Fuse	(For control circuit)
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Freeze protection
U15D	Thermistor	Gas
U21	Exp.Valve	
U31	Air filter	
U31A	Air filter R	For right side

No.	Part name	Remarks
U31B	Air filter L	For left side
U33	Bearing	
U36	Fan runner	
U41	Heat exchanger	
U71A	Fan motor	30W
U71B	As motor	For auto swing louver
U85A	Printed circuit board	
U85B	Printed circuit board	For wireless receiver
U85C	Printed circuit board	Indication LED

8.1.13. RPK-(2.5~4.0)FSN2M

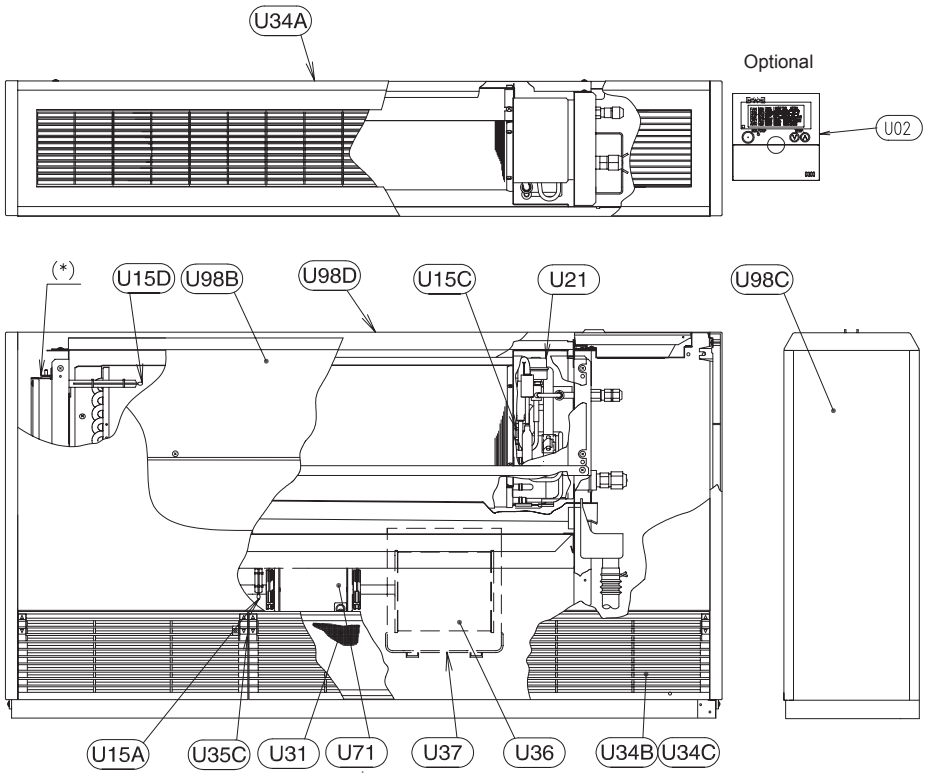


Drawing number: EPN-0705A

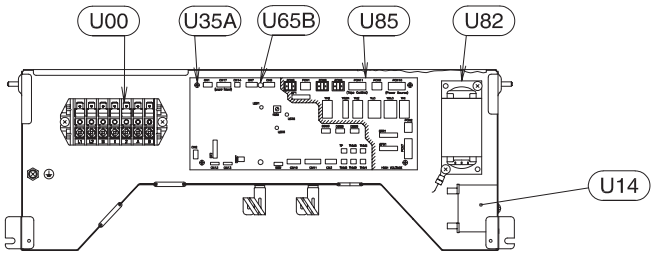
No.	Part name	Remarks
U02	Remote control switch	PC-LH3A (optional)
U04A	Fuse	(For control circuit)
U15A	Thermistor	Air inlet
U15B	Thermistor	Air outlet
U15C	Thermistor	Freeze protection
U15D	Thermistor	Gas
U21	Exp.valve	
U31	Air filter	
U31A	Air filter R	For right side

No.	Part name	Remarks
U31B	Air filter L	For left side
U33	Bearing	
U36	Fan runner	
U41	Heat exchanger	
U71A	Fan motor	30W
U71B	As motor	For auto swing louver
U85A	Printed circuit board	
U85B	Printed circuit board	For wireless receiver
U85C	Printed circuit board	Indication LED

8.1.14. RPF-(1.5~2.5)FSN2E



(*) Electrical Parts

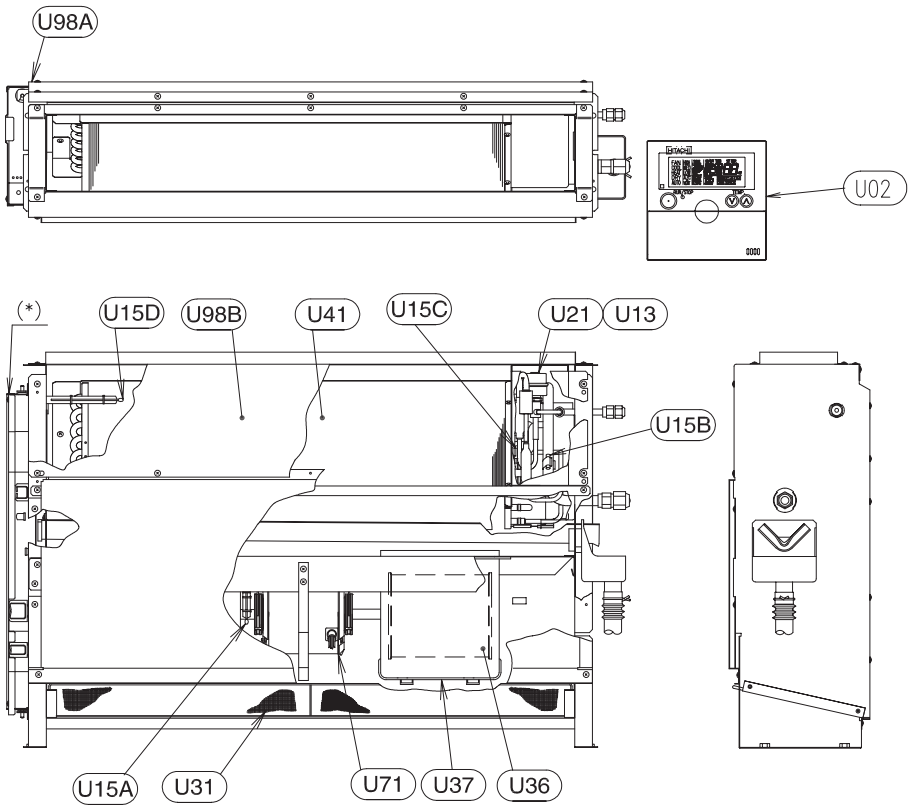


Drawing number: EPN-808A-1A

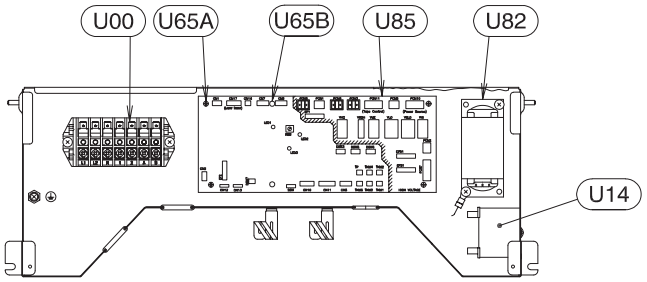
No.	Part name	Remarks
U00	Terminal board	
U02	Remote control switch	PC-P2HTE/PC-ART
U12	Exp. valve cord	
U13	Exp. valve cord	
U14	Capacitor	2µF / 4µF
U15A	Thermistor	Inlet
U15B	Thermistor	Gas
U15C	Thermistor	Liquid
U15D	Thermistor	Outlet
U21	Expansion valve	
U31	Air filter	
U34A	D grille	Air outlet
U34B	Air inlet grille	Air inlet
U34C	Air inlet grille	Air inlet

No.	Part name	Remarks
U36	Runner	
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	

8.1.15. RPFI-(1.5~2.5)FSN2E



(*) Electrical parts



Drawing number: EPN808A-2B

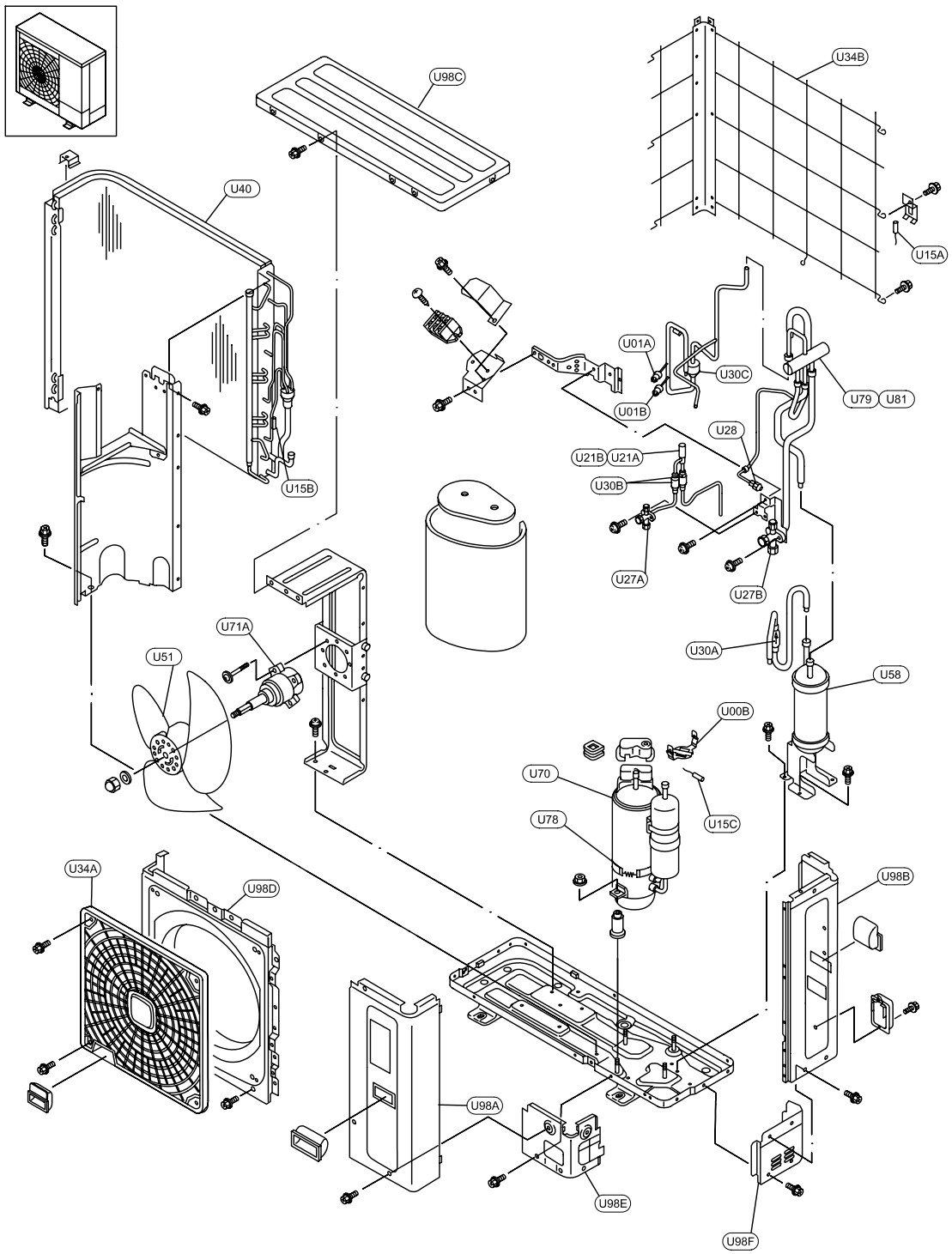
No.	Part name	Remarks
U00	Terminal board	
U02	Remote control switch	PC-ART
U12	Exp. valve cord	
U13	Exp. valve cord	
U14	Capacitor	2μF / 4μF
U15A	Thermistor	Inlet
U15B	Thermistor	Gas
U15C	Thermistor	Liquid
U15D	Thermistor	Outlet
U21	Expansion valve	

No.	Part name	Remarks
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

8.2. OUTDOOR UNITS

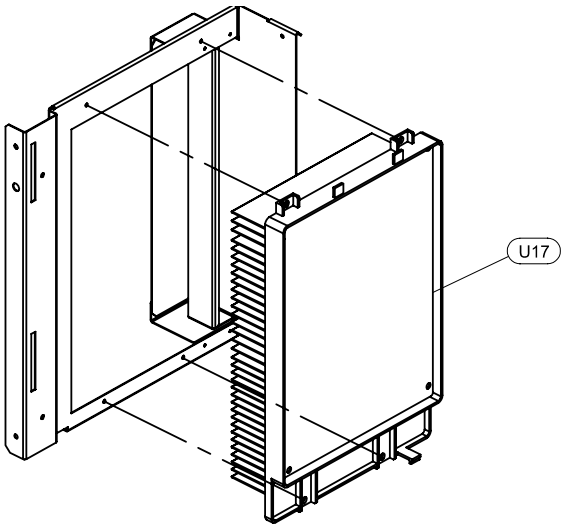
8.2.1. RAS-3HVRNME

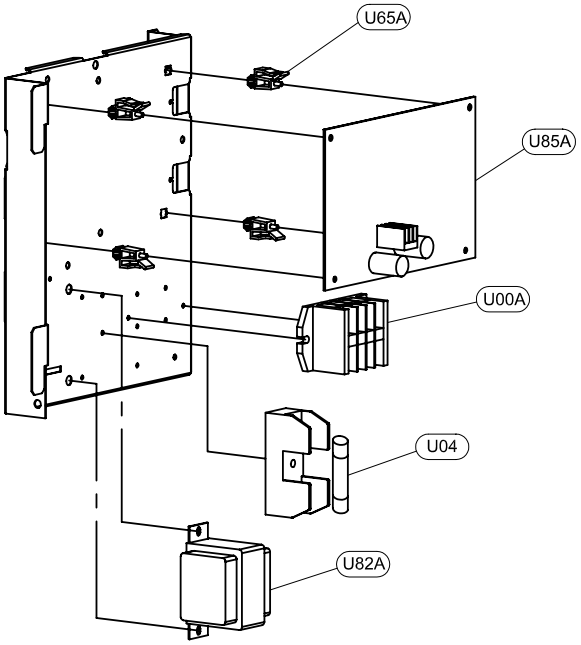
◈ ***Cycle and structural parts***

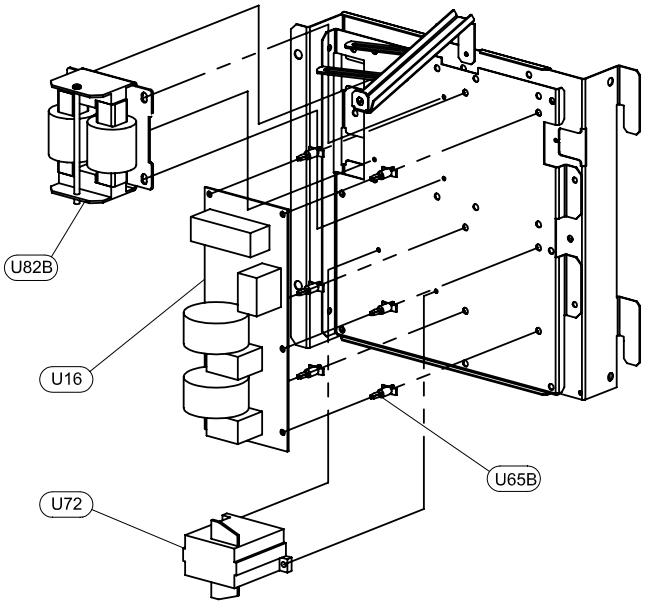


Drawing number: EPN0803A-1A

◈ ***Electrical parts***







Drawing number: EPN0803A-2A

RAS-3HVRNME - Cycle and structural parts

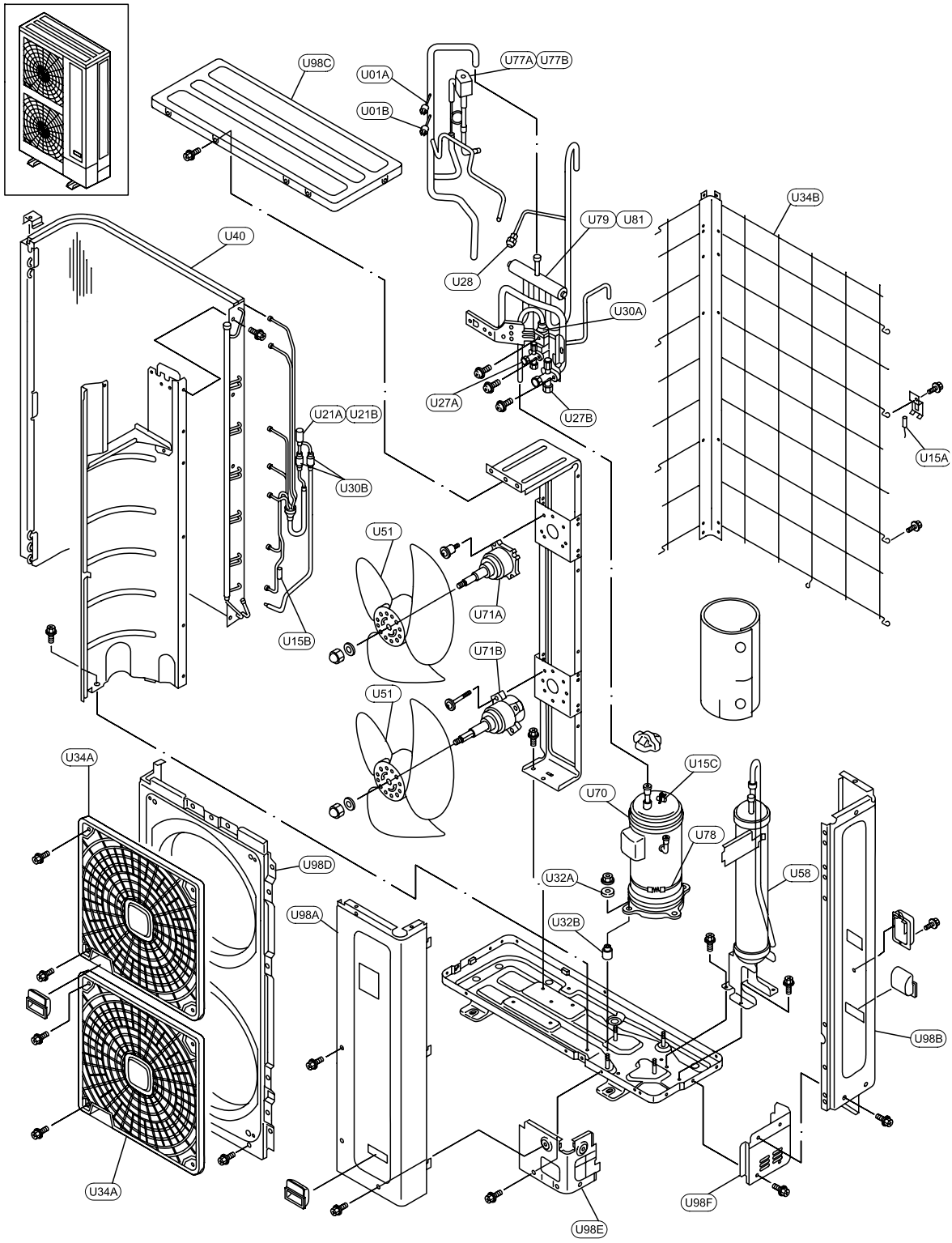
No.	Part name	Remarks
U00A	Terminal board	
U00B	THM support D	
U01A	Pressure SW	Protection
U01B	Pressure Sw	Control
U04	Fuse	40A
U15A	Thermistor	Air
U15B	Thermistor	Piping
U15C	Thermistor	Compressor
U16	Noise filter	30A
U17	Inverter fin assy	DIP-IPM (17A)
U21A	Expansion valve	
U21B	EXPV coil	
U27A	S valve 3/8	Liquid
U27B	S valve 5/8	Gas
U28	Check JA	
U30A	Strainer	
U30B	Strainer	
U30C	Silencer	
U32A	VP-RUBBER 2	
U32B	VP-RUBBER 1	
U34A	Front protector net	Outlet
U34B	Protector net S assy	Inlet
U40	Condenser	Assembly
U51	Propeller fan	
U58	Accumulator	
U65A	Holder	
U65B	Spacer	

RAS-3HVRNME - Electrical parts

No.	Part name	Remarks
U71A	Fan motor	74W
U72	MG SW	
U78	Oil heater	30W
U79	4 way valve	
U81	Coil for 4 way valve	
U82A	Transformer	
U98A	Service cover S assy	Assembly
U98B	Rear cover S assy	Assembly
U98C	Upper cover assy	Assembly
U98D	Shroud S	
U98E	S cover B	
U98F	Pipe cover B	

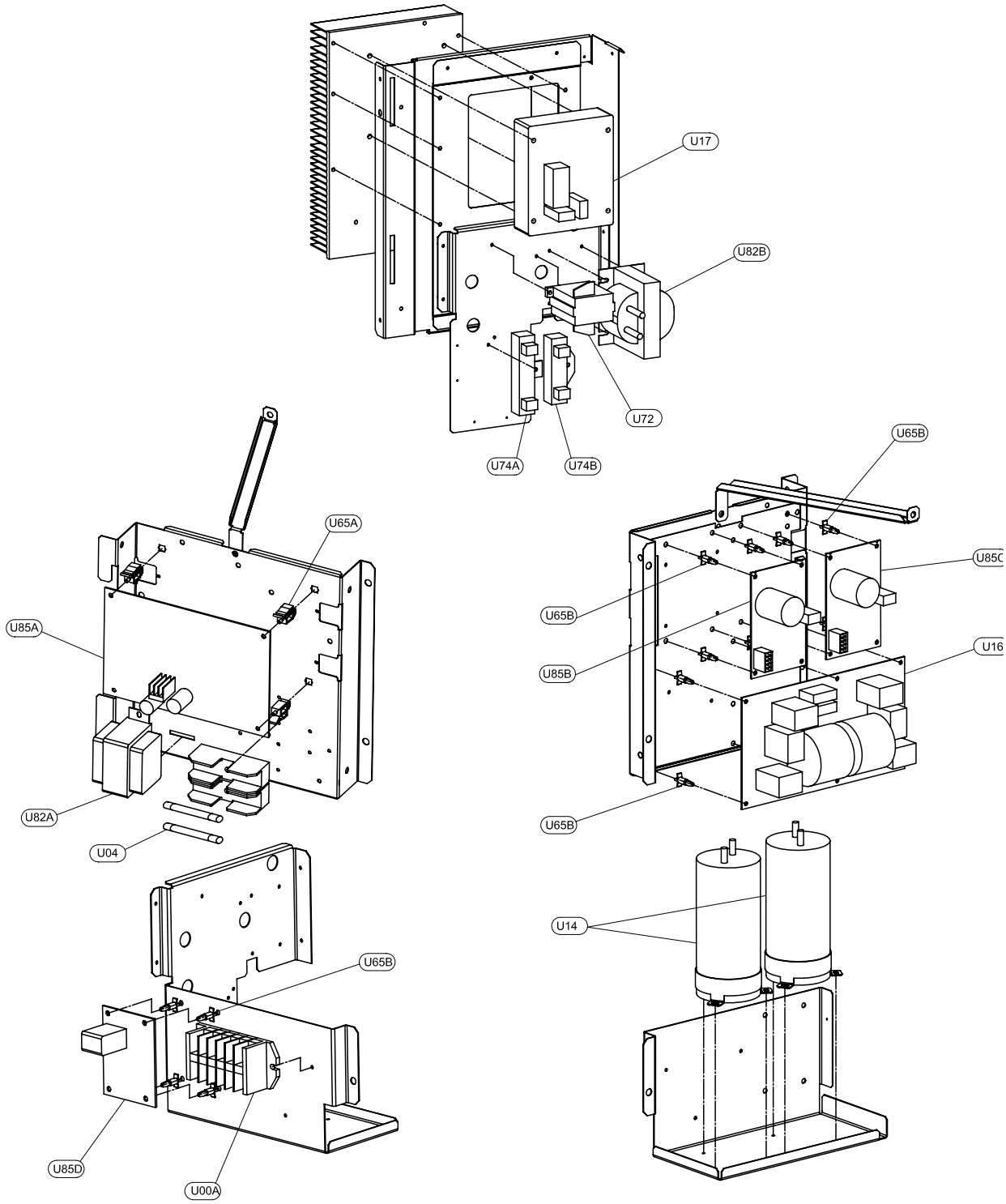
8.2.2. RAS-(4~6)HRNME

◈ ***Cycle and structural parts***



Drawing number: EPN0803A-1A

◈ ***Electrical parts***



Drawing number: EPN0803A-2A

8

RAS-(4~6)HRNME - Cycle and structural parts

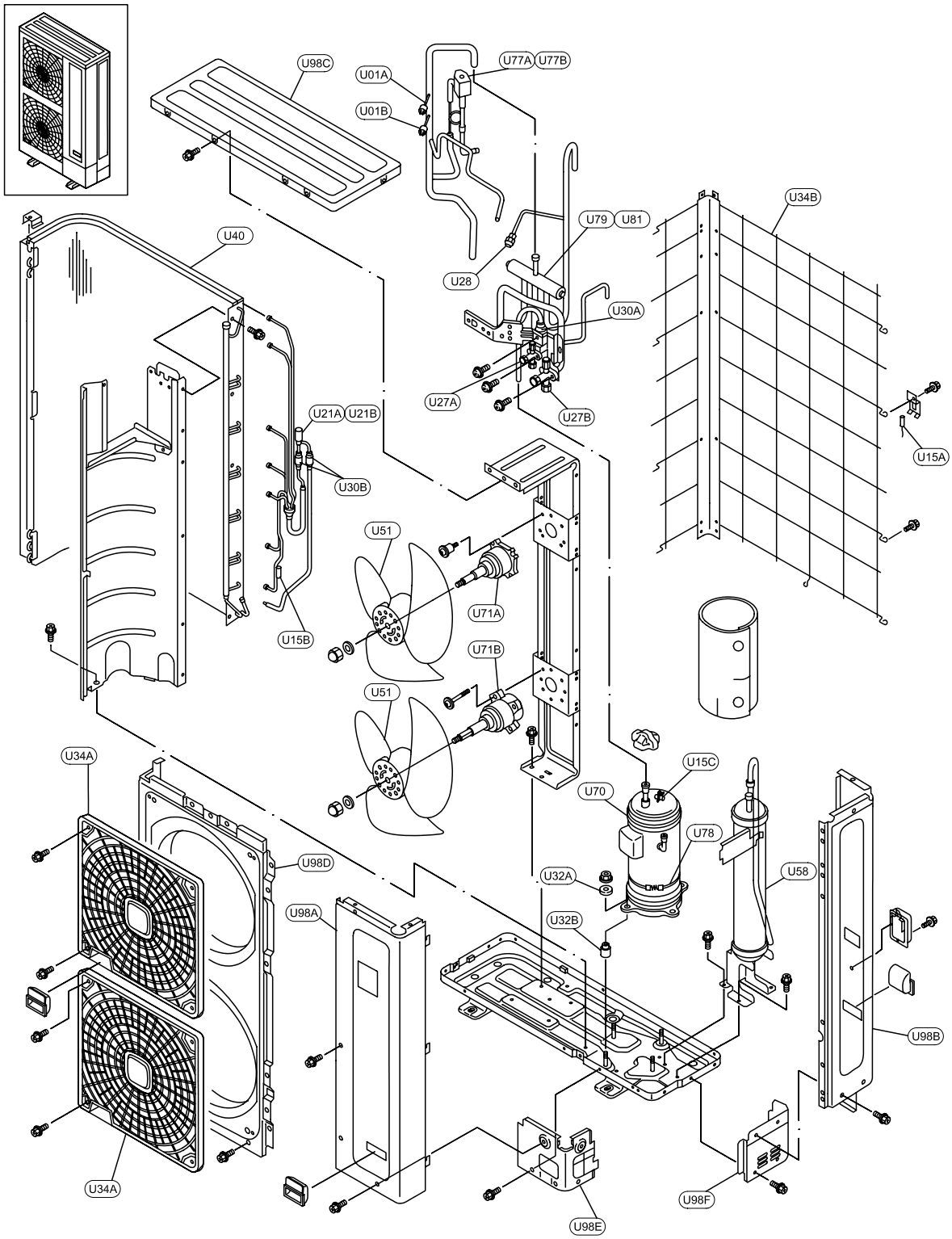
No.	Part name	Remarks
U00A	Terminal board	
U01A	Pressure SW	Protection
U01B	Pressure Sw	Control
U04	Fuse	20A
U14	Capacitor	2700µf
U15A	Thermistor	Air
U15C	Thermistor	Compressor
U16	Noise filter	30A
U17	Inverter module	ISPM
U21A	Expansion valve	
U21B	EXPV coil	
U27A	S valve 3/8	Liquid
U27B	S valve 5/8	Gas
U28	Check JA	
U30A	Strainer	
U30B	Strainer	
U32A	VP-RUBBER 2	
U32B	VP-RUBBER 1	
U34A	Front protector net	Outlet
U34B	Protector net L assy	Inlet
U40	Condenser	Assembly
U51	Propeller fan	
U58	L-Tank	
U65A	Holder	
U65B	Spacer	

RAS-(4~6)HRNME - Electrical parts

No.	Part name	Remarks
U70	Compressor	
U71A	Fan motor	74W
U71B	Fan motor	74W
U72	MG SW	
U74A	Resistor	
U74B	Resistor	
U77A	Solenoid valve	
U77B	Coil for solenoide valve	
U78	Oil heater	40W
U79	4 way valve	
U81	Coil for 4 way valve	
U82A	Transformer	
U82B	Reactor	
U85A	Printed circuit board	PCB main (PO052 assy)
U85B	Printed circuit board	PCB2 for motor 1(PO024 assy)
U85C	Printed circuit board	PCB2 for motor 2 (PO024 assy)
U85D	RPP relay	Reversing phase protection
U98A	Service cover L assy	Assembly
U98C	Upper cover assy	Assembly
U98D	Shroud L	
U98E	S cover B	
U98F	Pipe cover B	

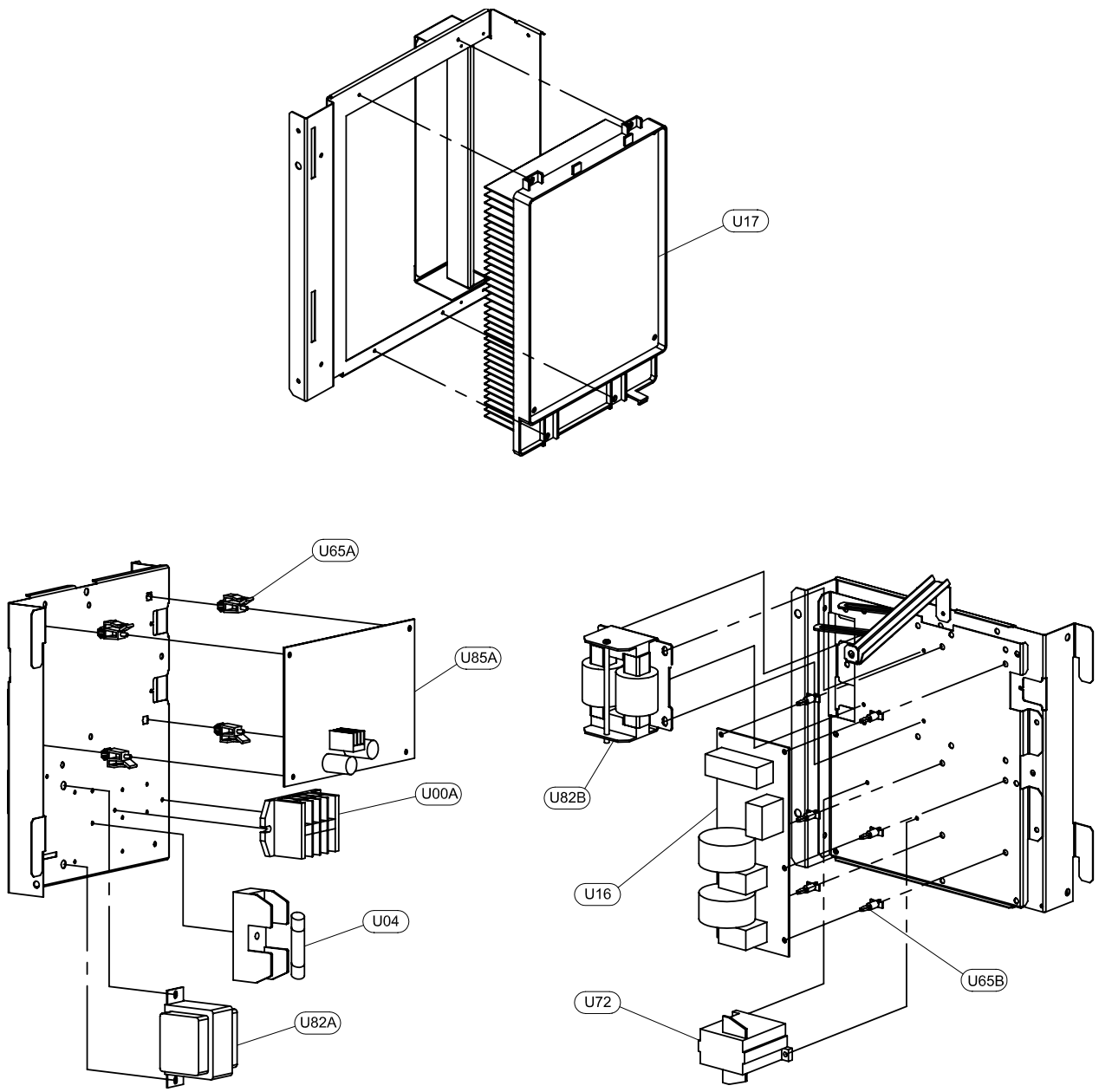
8.2.3. RAS-(4~6)HVRNME

◈ ***Cycle and structural parts***



Drawing number: EPN0803A-1A

◈ ***Electrical parts***



Drawing number: EPN0803A-2A

RAS-(4~6)HVRNME - Cycle and structural parts

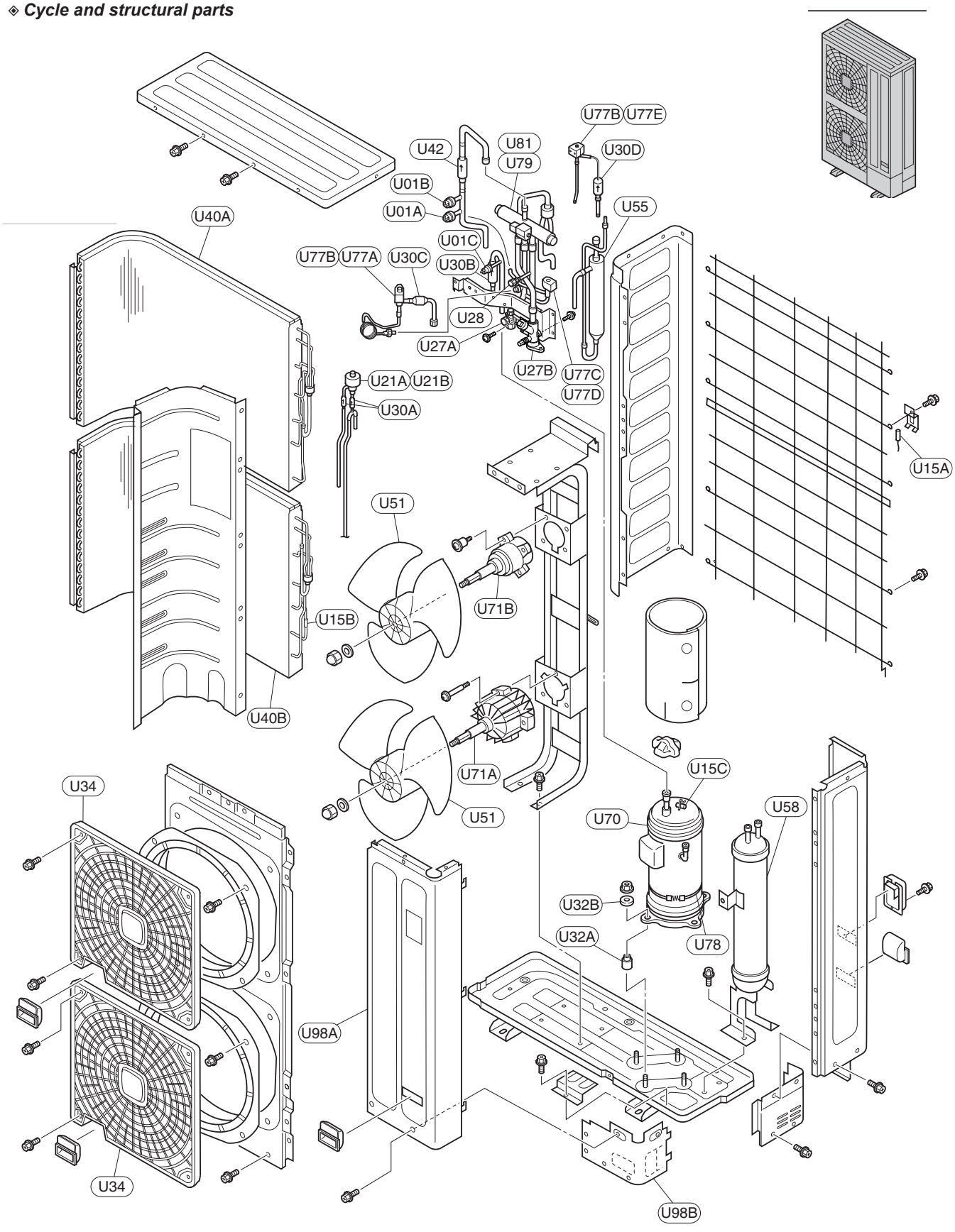
No.	Part name	Remarks
U00A	Terminal board	
U01A	Pressure SW	Protection
U01B	Pressure Sw	Control
U04	Fuse	40A, 5/6 HP 50A
U15A	Thermistor	Air
U15B	Thermistor	Piping
U15C	Thermistor	Compressor
U16	Noise filter	30A
U17	Inverter fin assy	DIP-IPM (17A) 576 (25A)
U21A	Expansion valve	
U21B	EXPV Coil	
U27A	S valve 3/8	Liquid
U27B	S valve 5/8	Gas
U28	Check JA	
U30A	Strainer	
U30B	Strainer	
U32A	VP-RUBBER 2	
U32B	VP-RUBBER 1	
U34A	Front protector net	Outlet
U34B	Protector net L assy	Inlet
U40	Condenser	Assembly
U40	Condenser	Assembly
U51	Propeller fan	
U58	L-Tank	
U65A	Holder	
U65B	Spacer	

RAS-(4~6)HVRNME - Electrical parts

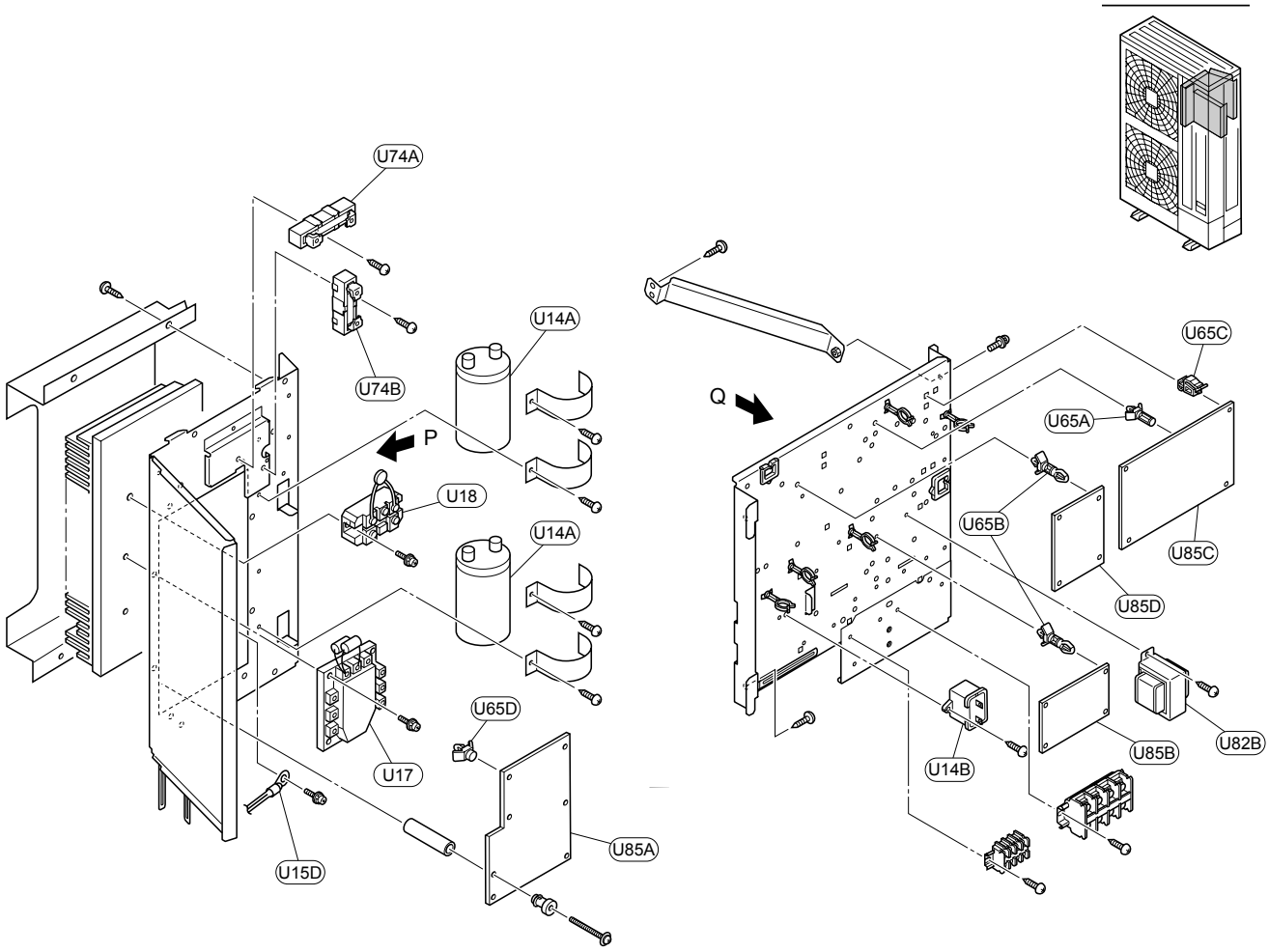
No.	Part name	Remarks
U70	Compressor	
U71A	Fan motor	74W
U71B	Fan motor	74W
U72	MG SW	
U77A	Solenoid valve	
U77B	Coil for solenoide valve	
U78	Oil heater	40W
U79	4 way valve	
U81	Coil for 4 way valve	
U82A	Transformer	
U85A	Printed circuit board	PCB main (PO052 assy)
U98A	Service cover L assy	Assembly
U98B	Rear cover S assy	Assembly
U98C	Upper cover assy	Assembly
U98D	Shroud L	
U98E	S cover B	
U98F	Pipe cover B	

8.2.4. RAS-(8~12)HRNM

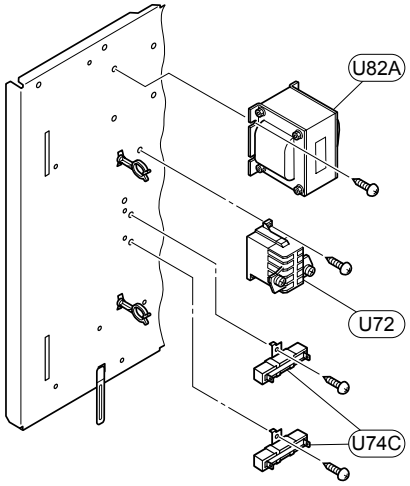
◈ ***Cycle and structural parts***



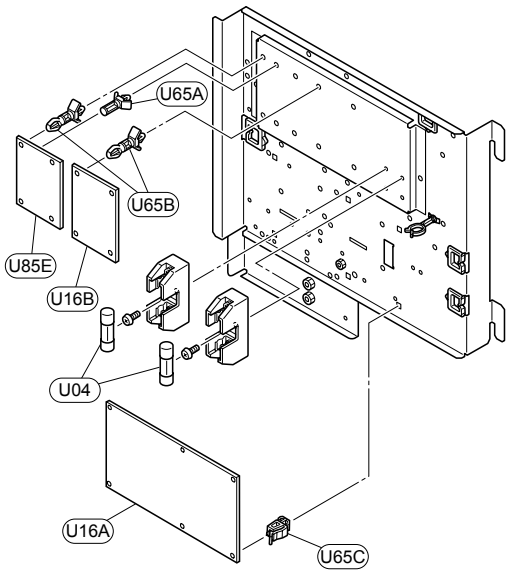
◈ ***Electrical parts***



View from P



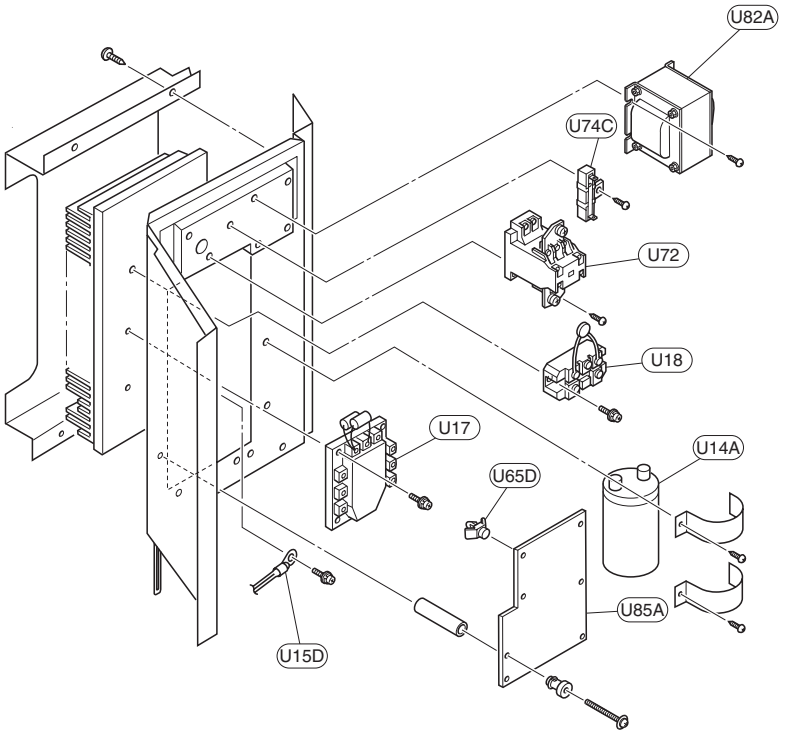
View from Q

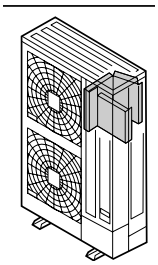


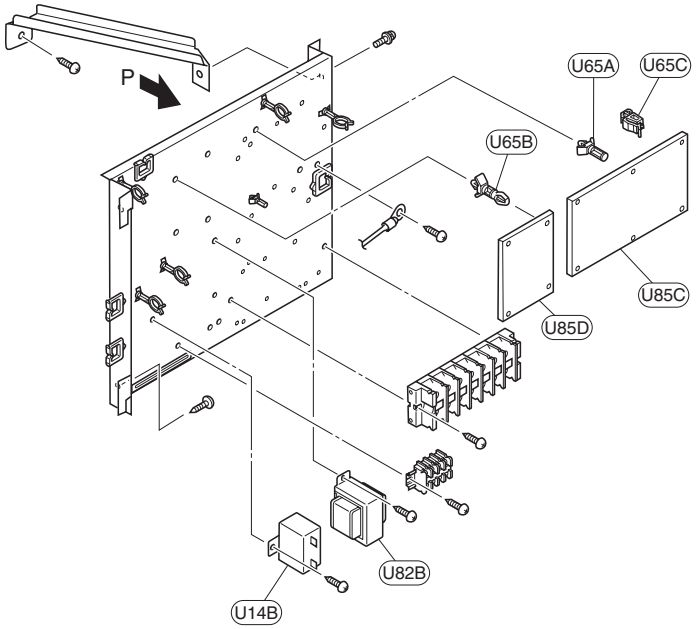
Drawing number: SPN200617
(RAS-8~12HRNM)

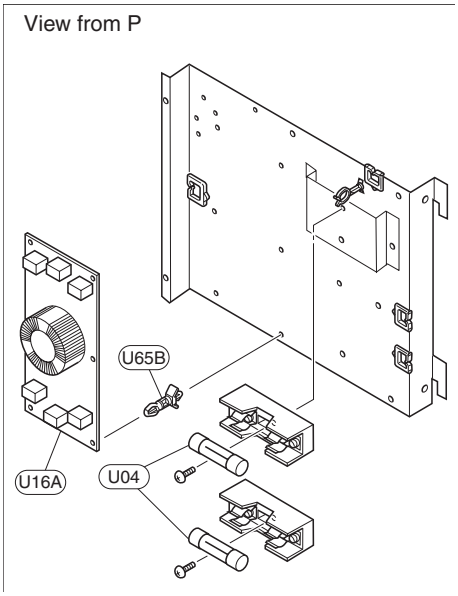
8

◈ ***Electrical parts (cont)***









Drawing number: SPN200617
(RAS-8~12HRNM)

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	

No.	Part name	Remarks
U58	L-tank ass'y	
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	

9. SERVICING

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DANGER

- *Before performing any of the service operations described in this chapter, turn all the main switches off and place security lockers or convenient warning indicators in order to prevent them from turning on accidentally.*
- *In case of blocked or stucked parts, use appropiated tools and eventually lubricants to release them.*
- *In case of sharped edged parts, as covers, use security gloves to avoid getting injured.*
- *When performing brazing work, besides security gloves it is a must to wear convenient eye protection.*
- *Check and be sure that the LED201 (Red) on the inverter PCB is OFF for all electrical maintenance.*
- *Do NOT touch the electrical components when the LED201 (Red) on the inverter PCB is ON to avoid electrical shock.*

NOTE

- *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.*
- *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.*
- *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.*

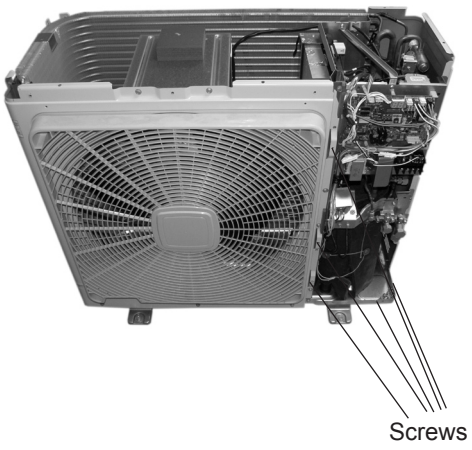
9.1. OUTDOOR UNIT RAS-3HVRNME

9.1.1. Removing service cover

Remove the main parts according to the following procedures.

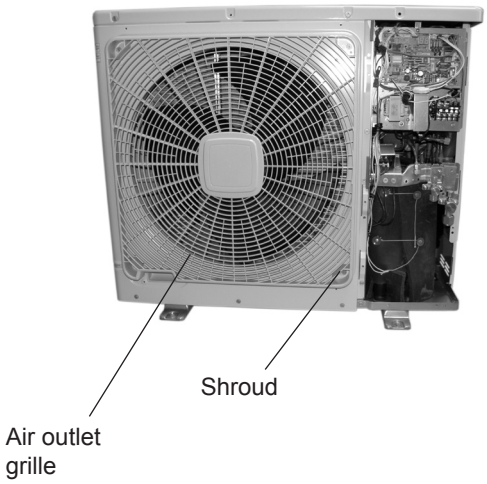
	NOTE
-	*To reassemble perform the procedures in reverse.*
-	*To prevent contamination of the refrigerant with water or foreign particles, do not expose open to atmosphere for long periods.*
-	*If necessary, seal pipe ends using caps or tape.*

1. Remove the five (5) fixing screws.
2. Slide the service cover downward and remove it.
2. Pay attention of not falling off the service cover.



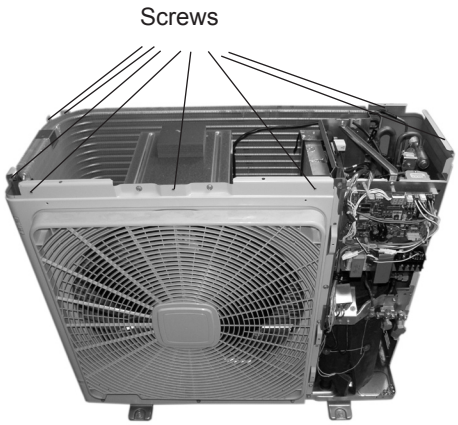
9.1.2. Removing air outlet grille

1. Remove the four (4) fixing screws.
2. Lift the air outlet grille holding the lower parts.
3. Release the extruded hook of the air outlet grille from the shroud.



9.1.3. Removing upper cover

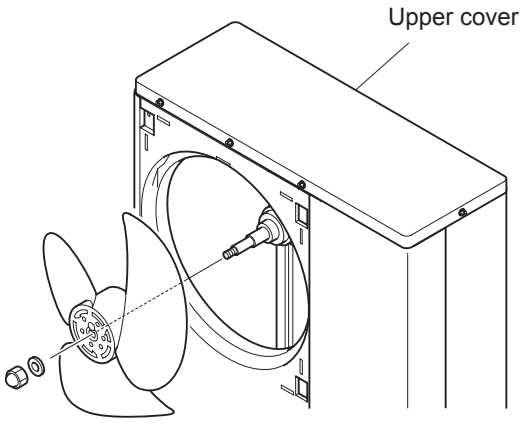
1. Remove the eight (8) fixing screws.
2. Lift the upper cover upwards.

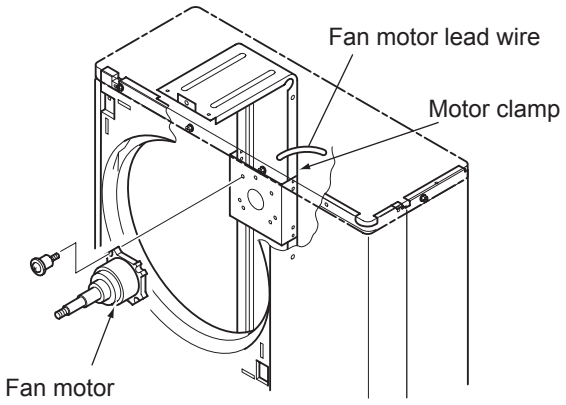


9.1.4. Removing outdoor fan motor

1. Remove the service cover according to the section “Removing service cover” in this chapter.
2. Remove the air outlet grille according to the section “Removing air outlet grille” in this chapter.
3. Remove the upper cover according to the section “Removing upper cover” in this chapter.
4. Disassemble the fan blade by removing the cap nuts and washers fixing the fan blade onto the motor shaft.
5. Remove the fan motor connector from the PCN202 at the electrical box.
   – Cut off the cable tie that fixes the lead wire of the fan motor.
   – Remove the four (4) screws that fix the motor to the motor clamp.
6. Fix the motor wire with the cable tie or the cord clamp. If not, it may cause the disconnection of the fan motor’s lead wire.
7. In order to avoid cutting edges, mount the rubber bush at the partition plate when inserting the motor wire through it. If not, it may cause the disconnection to the fan motor’s lead wire.

	NOTE
	- *When assembling the motor, ensure the cables section directly downwards. Fix the protection tube edge end downwards to ensure water from keeping inside it* - *Fix the motor wires onto the motor clamp with a cable tie to prevent them from collisioning the fun blades.* - *Assembling the fan blade: Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft, and fix the screw after dismounting the screwed part of the shaft. (Tightening Torque of 20 N.m)* - *.When connecting the motor wire, check to ensure that the colors of the connectors on the PCN202 are matched with the wires.* - *Fix the air outlet grille firmly to the shroud.*





Fan components and technical features		
Power supply		**230V/50Hz**
Fan motor	DC fan motor	DPI IPM PCN202 (1, 3) PCN202 (2, 3, 4)
Screw for motor fixing	DC Fan Motor	M4 Screw with spacer x 4

9.1.5. Removing the compressor

1. Remove the service cover and the lower part of the service panel according to the section “Removing service cover” and the section “Removing lower part of service panel and rear panel”. In case that the outdoor unit is installed close to a wall closely, sepparate first the outdoor unit from the wall.

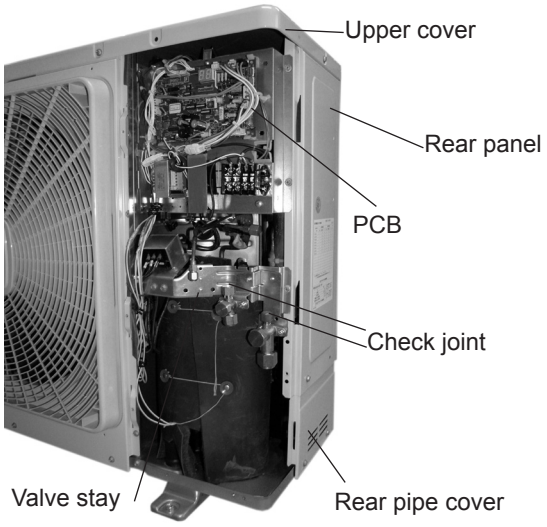
2. Collect the refrigerant from the liquid stop valve, the gas stop valve and the check joint at the piping.

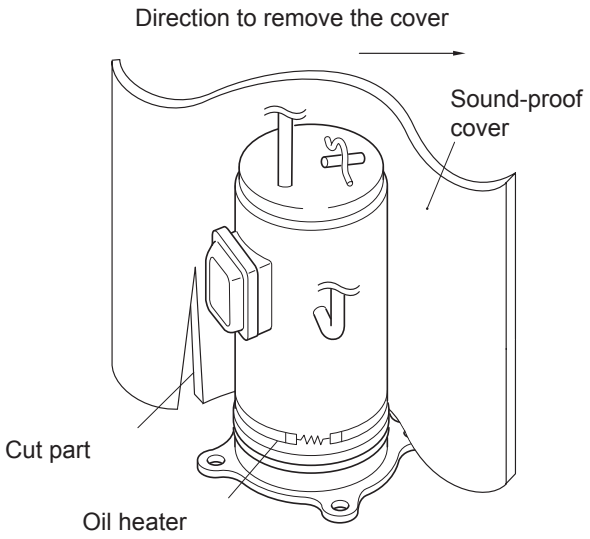
3. Open the sound insulation cover wrapped around the compressor and remove the terminal box cover at the compressor fixed by one (1) screw. Disconnect the compressor wires in the terminal box and remove the sound insulation cover.

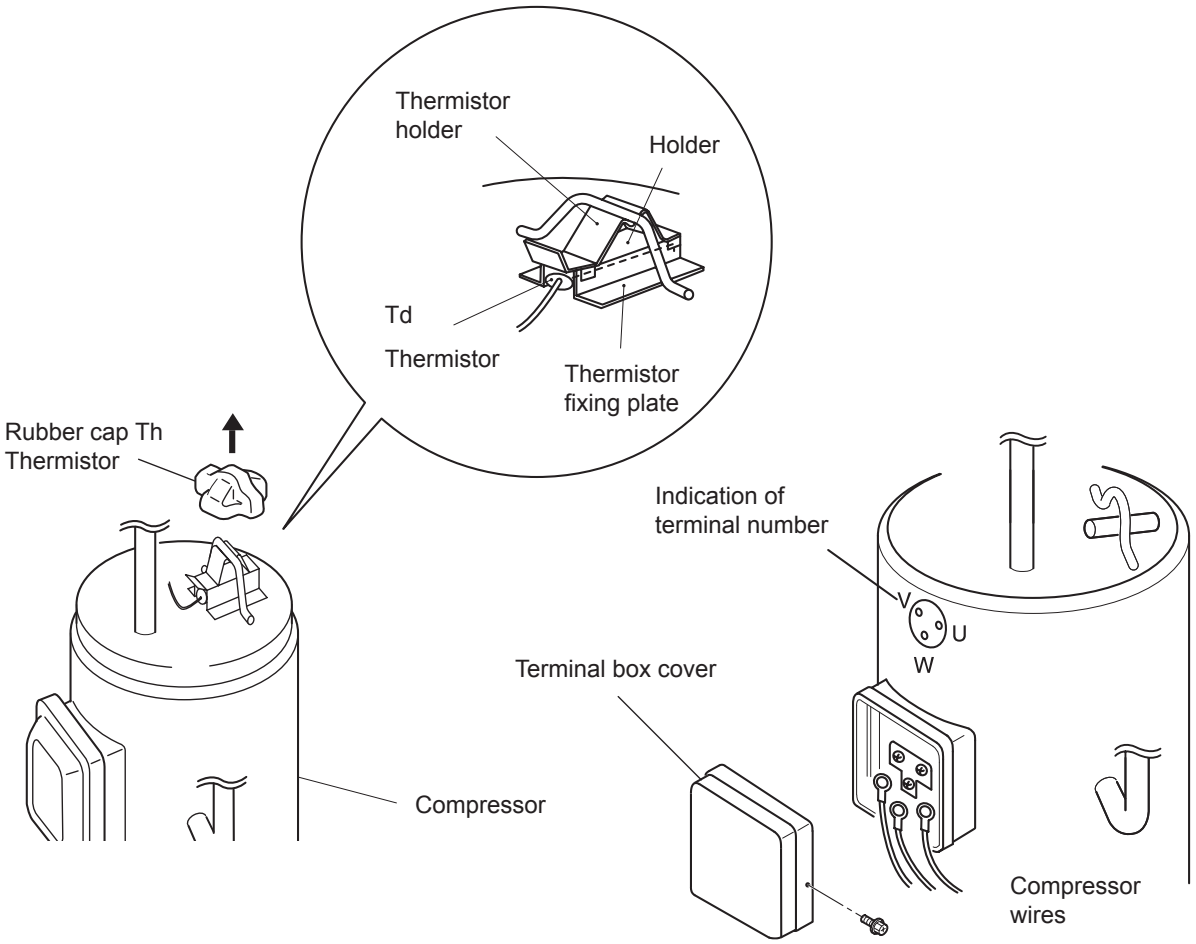
	NOTE
-	*Check and take note of each terminal number and indications for its correct connection at the reasembling process. If wires are connected in incorrect order, it will lead to a compressor failure.*

4. Remove the rubber cap and the thermistor on the top of the compressor.

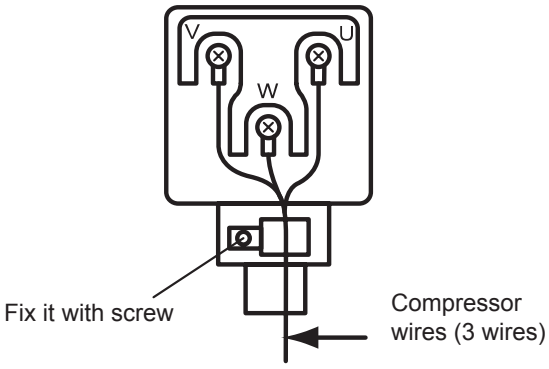
5. Remove the crankcase heater.(Oil heater on the lower case).







Details for compressor terminals



NOTE

- *Do not expose the refrigerant cycle to the atmosphere for a long period in order to avoid water and foreign particles entering into the refrigerant cycle. After removing the compressor, replace it quickly. If it is exposed to the ambiance for a long period, seal both suction and discharge pipes.*
- *Remove the cap for the compressor just before replacing the compressor. Before assembling the compressor, seal the suction pipe and discharge pipe with tape to protect the compressor interior from foreign particles. Remove the tape when connecting the pipes.*

WARNING

- *All compressor pipes must be brazed to be connected to the refrigerant circuit. Ensure that all the sourrounding is free of flammable objects and liquids when performing piping brazing work.*

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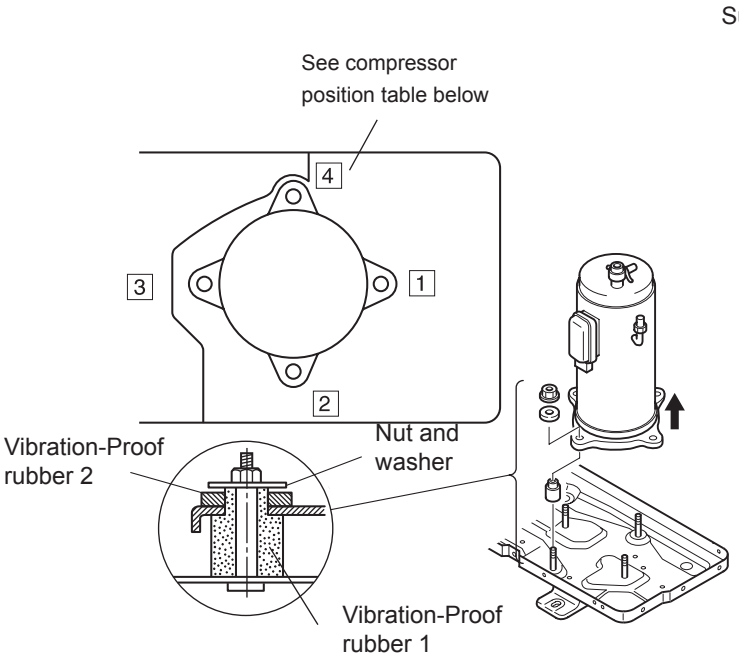
6. Remove the suction pipe and the discharge pipe from the compressor. Isolate the wires and electrical components to protect them from the burner flame when brazing the connection pipes.

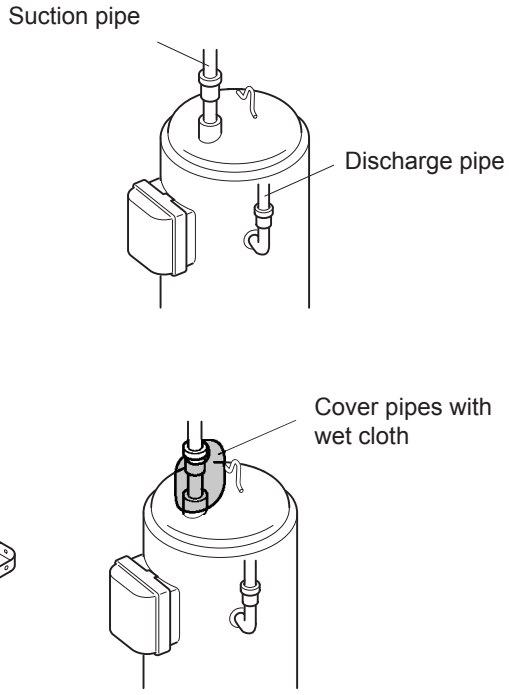
7. Remove the two (2) nuts fixing the compressor and remove the compressor from the unit by lifting it. Slightly incline it forward and lift.

8. For brazing the compressor connection pipes, first cool down the compresor piping side covering it with wet clooth. Then brazing material will not enter into the compressor. If the brazing material enters the compressor, it will cause compressor failures.

9. Reassemble the parts in the reverse order of the indicated removing procedures.
   - Tighten the screws (U, V and W) for compressor wires with 2.5N.m.
   - Fix the lead wire firmly.

	NOTE
	- Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.





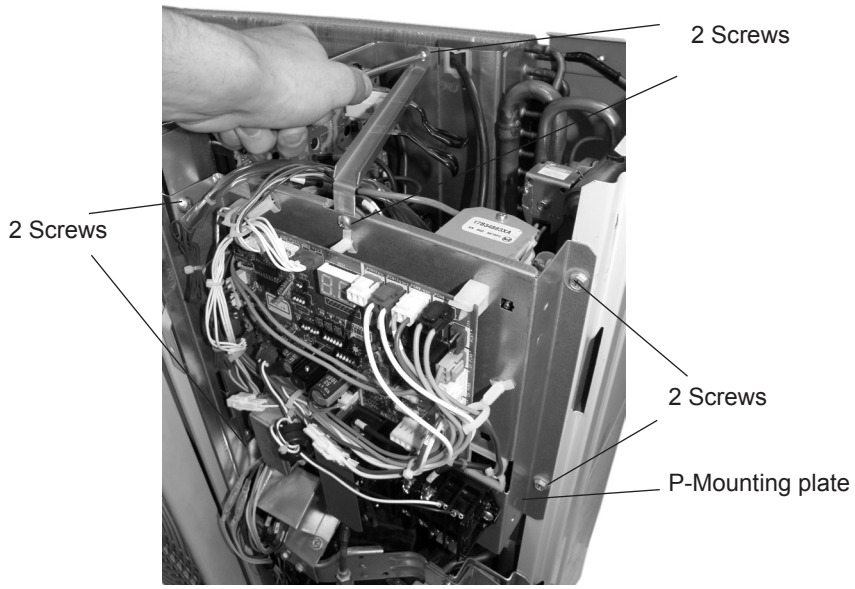
Fixation of the compressor to the bottom plate				
Compressor position	**1**	**2**	**3**	**4**
Vibration-proof rubber 1	○	○	○	○
Vibration-proof rubber 2	○	○	–	–
Nut	○	○	–	–

	NOTE
	- Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.

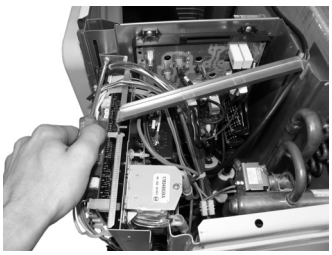
9.1.6. Opening electrical box (P-mounting plate)

1 Remove the service cover according to the section “Removing the service cover” in this chapter.
- Remove the six (6) screws fixing the electrical box. Open the P-mounting plate by rotating it to the left.

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*	









9

9.1.7. Removing reversing valve coil

1 Remove the service cover according to the section “Removing service cover” in this chapter.

2. Open the P-mounting plate according to the section “Opening electrical box (P-Mounting Plate)” in this chapter..

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*	

3. Remove the connectors on the control PCB of the electrical box.

4. Remove the reversing valve coil by removing the screw fixing the coil.



9.1.8. Removing expansion valve coil

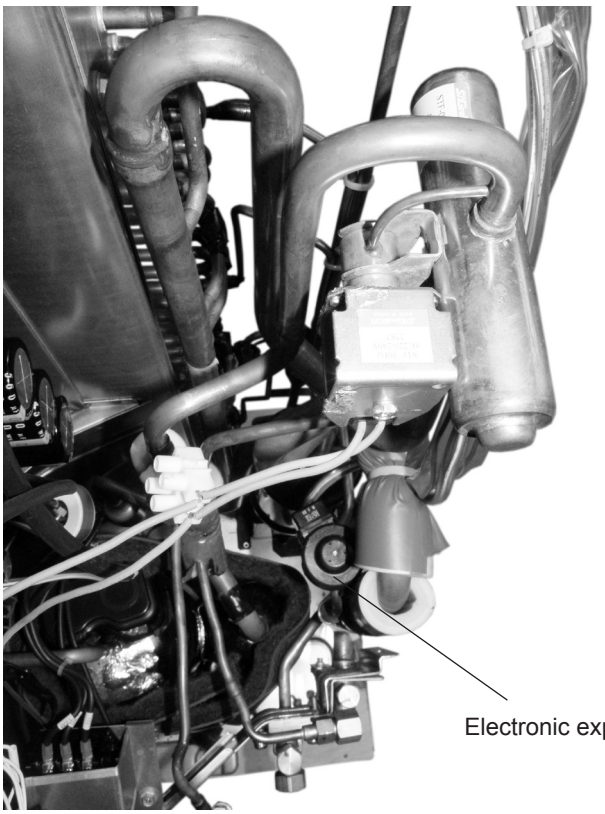
1. Remove the service cover according to the section “Removing service cover” in this chapter..

2. Open the P-mounting plate according to the section “Opening electrical box (P-Mounting Plate)”in this chapter .

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an 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 figure below to replace the electrical valve. The lock mechanism is equipped with the expansion valve coil. Check to ensure that the expansion valve coil is locked.



9.1.9. Removing reversing valve

1. Remove the service cover and the rear service panel according to the section “Removing Service Cover” and the section “Removing lower part of service panel and rear service panel”in this chapter.

2. Collect the refrigerant from the check joint according to the section “Removing compressor”.

3. Remove the reversing valve coil according to the section “Removing reversing valve coil”.

4. Remove one (1) fixing screw for the valve-mounting plate.

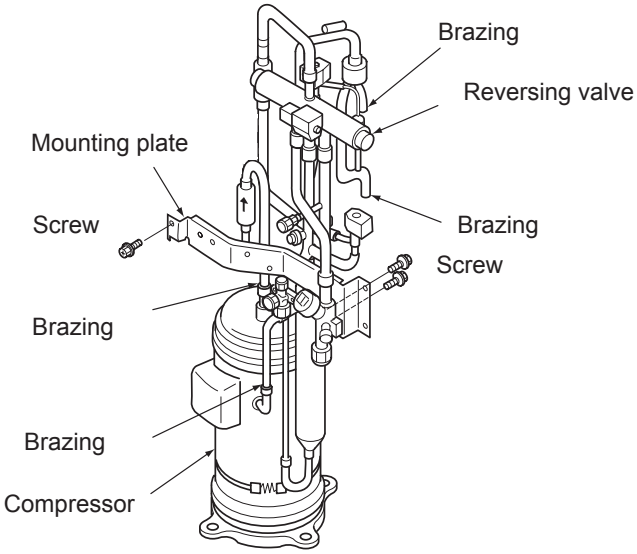
5. Remove the stop valve at the gas side from the valve-mounting plate by removing the two (2) screws.

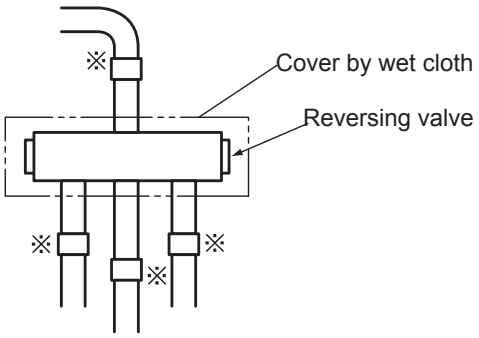
6. Remove the reversing valve assemblies from the 4 brazed parts where it is fixed. Remove the brazing of the reversing valve and the stop valve at the gas using a blowtorch. Cool down the piping side covering it with wet cloth, in order to avoid brazing material entering the reversing valve. Protect the connecting wires and pipe insulation from the brazing frame.

7. Remove the reversing valves from its assemblies 4 brazed parts ※.

   Perform the brazing with a blowtorchto remove and reassemble the reversing valve by cooling the pipes first with wet cloth in order to avoid brazing material entering the reversing valve.

8. Reassemble the parts in the reverse order of removing procedures contained in this chapter. When SFV is removed, fix it according to the section “Removing the Reversing Valve and the Solenoid Valve”contained in this chapter.





9.1.10. Removing expansion valve

1. Remove the service cover and rear service panel according to the section “Removing Service Cover” and the section “Removing Lower Part of Service Panel and Rear Service Panel”.

2. Collect the refrigerant from the check joint according to the section “Removing Compressor”.

3. Remove the coils according to the section “Removing Electronic Expansion Valve Coil”.

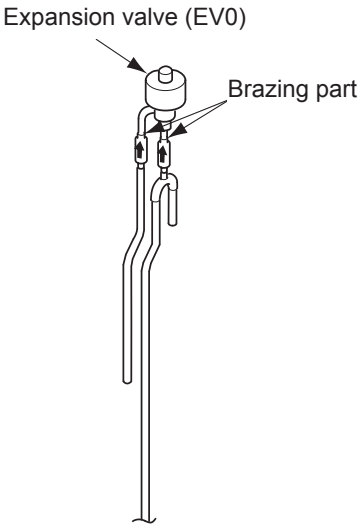
4. Remove the brazing as shown in the figure below.

   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.



9.1.11. Removing solenoid valve

1. Remove the service cover and the rear service panel according to the sections “Removing Service Cover” and “Removing lower part of service panel and rear panel”, described in this chapter .

2. Collect the refrigerant from the check joint according to the section “Removing compressor” in this chapter.

3. Remove the solenoid valve coil according to the section “Removing coils for reversing valve and solenoid valve” in this chapter.

4. Remove the brazing and flare nuts. Using a blowtorch and previously cooling the pipe side with wet cloth in order to avoid brazing material entering the reversing valve.

5. Perform the brazing to remove and reassemble the solenoid valve.

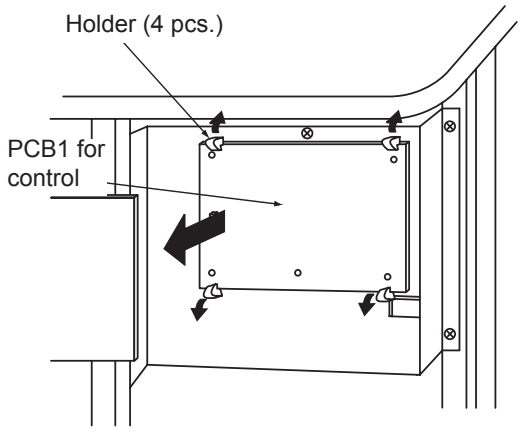
6. Protect the connecting wires and pipe insulation from the brazing flame.

7. Remove the flare nuts with two spanners to avoid twisting.

8. Reassemble the parts in the reverse order of removing order of removing procedures.

9.1.12. Removing electrical components

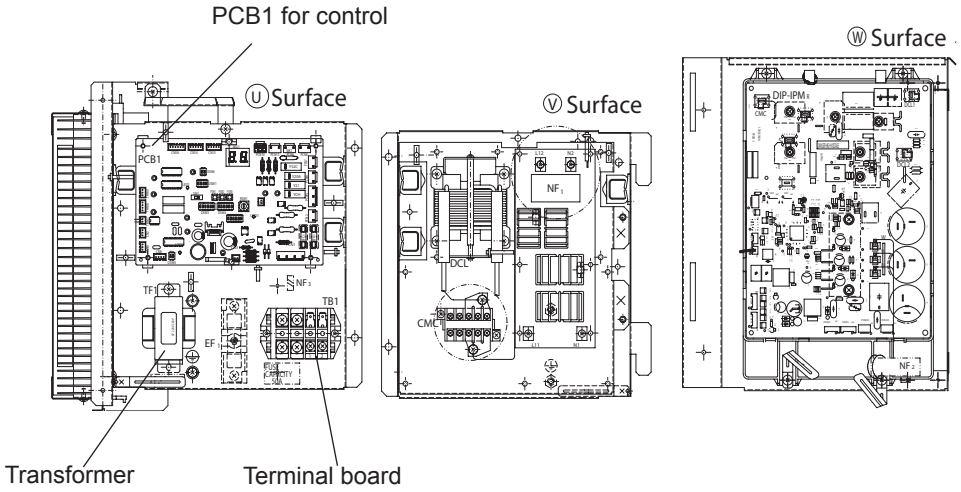
	DANGER
	- *Do not touch the electrical components of the PCB directly.* - *When handling the PCB, take care of components. Do not apply excesive force to them, in order to avoid damaging the motherboard and failures.*



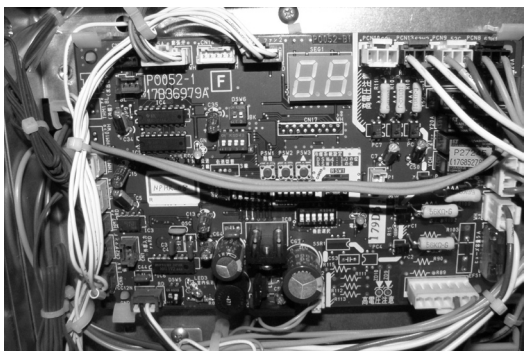
1. Remove the service cover according to section “Removing service cover” in this chapter.
   - Disconnect all the connectors in the PCB.
   - Remove the PCB by sliding four (4) holders in the arrow direction.
   - Remove the PCB for power distribution of the compressor and the motor.

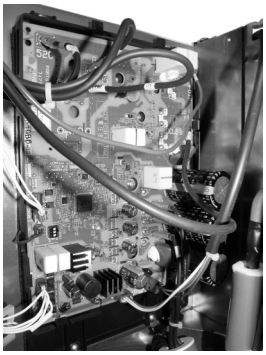
   To remove the PCB, slide de four (4) holders in the arrow direction.

2. Removing the relay PCB
   – Remove the service cover according to the section “Removing Service Cover” in this chapter.
   – Disconnect all the wires connected to the relay PCB.









9.1.13. Removing “W” electrical components surface

1. Remove the service cover according to the section “Removing service cover” in this chapter.

2. Open the P-mounting plate by rotating 90 degrees to the left according to the section “Opening electrical box” (P-Mounting Plate) in this chapter.

3. Use a screw driver to push and release the plastic holders retaining the “W” electrical components surface.

DANGER

- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.*
- *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*

NOTE

- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *Check to ensure that the electrical wires will not be caught between the assembled electrical components and the mounting plates when the “W” electrical components surface is reassembled.*

DANGER

- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *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.*
- *Do not apply strong force to the electric components and PCBs to avoid damage.*

9.1.14. Removing other electrical components

1. Remove the service cover according to the section “Removing service cover”in this chapter.

2. Open the P-mounting plate by rotating it to the left according to the section “Opening electrical box (P-Mounting Plate) in this chapter.

3. Check to ensure the LED201 (Red) of the inverter PCB is off when opening P-mounting plate.

4. Remove other electrical components according to the procedure below, and the figures on Cchapter 9.

DANGER

- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.*
- *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*

NOTE

- *Disconnect all the wires connected with the smoothing capacitor (CB, CB1, CB2, CA).*
- *The wire has polar characters. Identify the wire mark band and the indication on the smoothing capacitor when wire connecting.*
- *Remove the two (2) screws fixing the smoothing capacitor and remove the smoothing capacitor.*
- *Disconnect all the wires connecting with the magnetic contactor (CMC1).*
- *Remove the two (2) screws fixing the magnetic contactor and remove the magnetic contactor.*
- *Remove the 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 the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*

9.2. OUTDOOR UNIT RAS-(4~6)H(V)RNME

9.2.1. Removing service cover

Remove the main parts according to the following procedures.

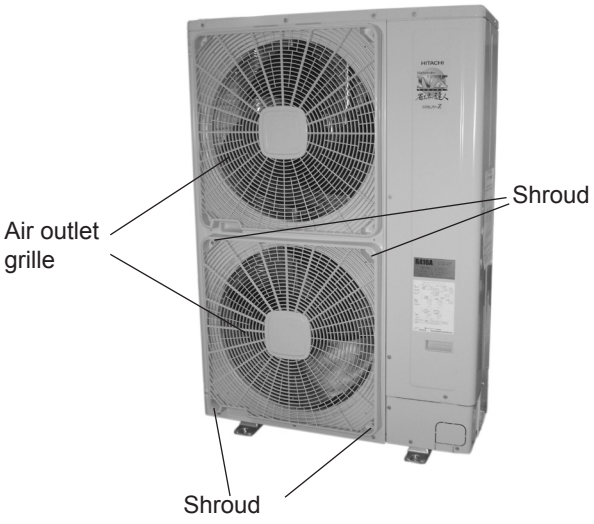
	NOTE
	- *To reassemble perform the procedures in reverse.* - *To prevent contamination of the refrigerant with water or foreign particles, do not expose open to atmosphere for long periods.* - *If necessary, seal pipe ends using caps or tape.*

1. Remove the four (4) fixing screws.
2. Slide the service cover downward and remove it.
2. Pay attention of not falling off the service cover.



9.2.2. Removing air outlet grille

1. Remove the eight (8) fixing screws.
2. Lift the air outlet grille holding the lower parts.
3. Release the extruded hook of the air outlet grille from the shroud.



9

9.2.3. Removing upper cover

1. Remove all the screws fixing the upper cover, both on the front and back of the machine.

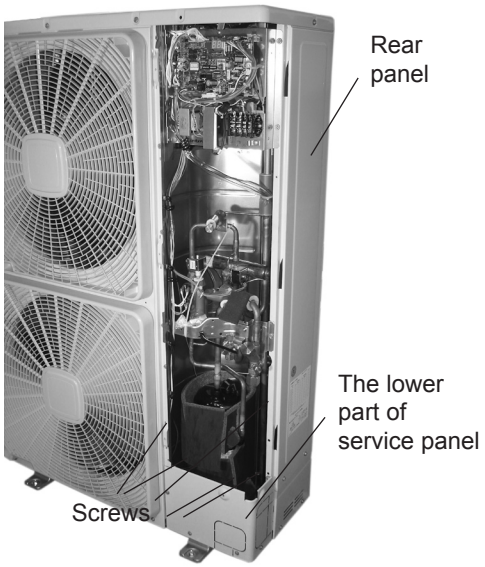
2. Lift the upper cover upwards.



9.2.4. Removing the lower part of service panel and rear panel

1. Remove the five (5) fixing screws at the lower part of the service panel and remove the lower part of the service panel by pulling towards the front side. Remove the upper cover according to section “Removing upper cover” in this chapter.

	NOTE
-	*The length of fixing scews for the outdoor temperature thermistor is different than all other screws in the machine, as an assembly poka-yoke.*



9.2.5. Removing outdoor fan motor

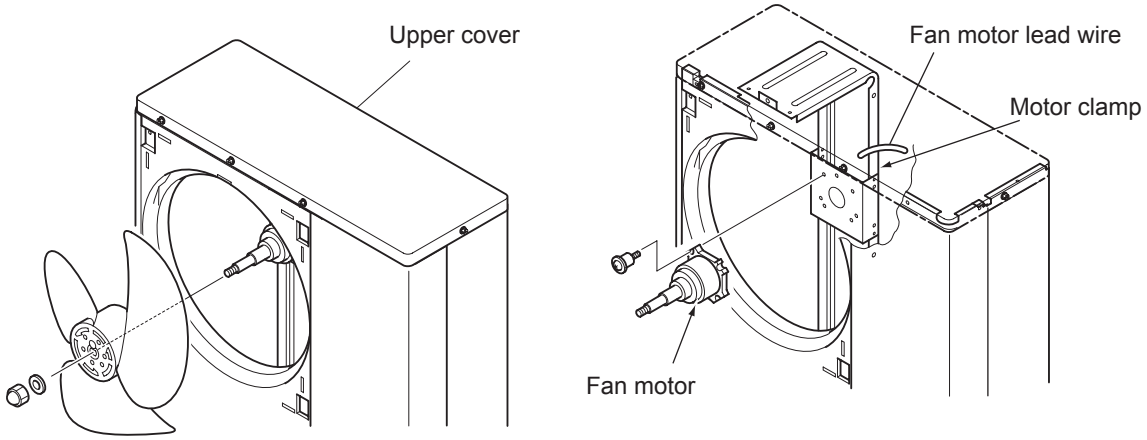
1. Remove the service cover according to the section “Removing service cover” in this chapter.

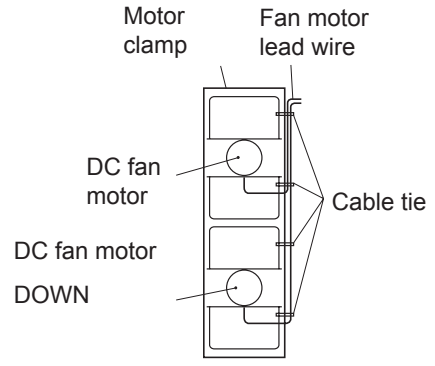
2. Remove the air outlet grille according to the section “Removing air outlet grille” in this chapter.

3. Remove the upper cover according to the section “Removing upper cover” in this chapter.

4. Disassembly the fan blade by removing the cap nuts and washers fixing the fan blade onto the motor shaft.

   If the fan blade get stuck when trying to remove it, use a puller to disassembly the fan.

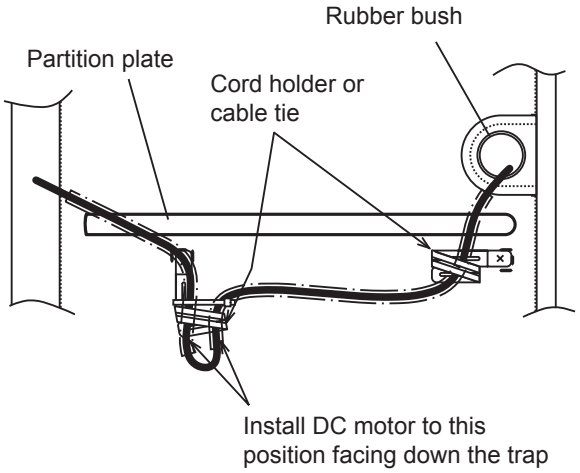


Fan components and technical features		
Power supply		**230V/50Hz** **400V/50Hz**
Fan motor comp. No.	DC fan motor UP	DIP IPM PCN202 (1, 3) PCN202 (2, 3, 4)
	DC fan motor DOWN	DIP IPM PCN201 (1, 3) PCN201 (2, 3, 4)
Screw for motor fixing	DC Fan Motor UP M4	Screw witvh spacer x 4
	DC Fan Motor DOWN	M4 Screw with spacer x 4
Motor clamp and wiring fixing position		

5. Remove the fan motor connector from the PCN202 and PCN203 at the electrical box.
   – Cut off the cable tie that fixes the lead wire of the fan motor.
   – Remove the four (4) screws that fix the motor to the motor clamp.

6. Fix the motor wire with the cable tie or the cord clamp. If not, it may cause the disconnection of the fan motor's lead wire.

7. In order to avoid cutting edges, mount the rubber bush at the partition plate when inserting the motor wire through it. If not, it may cause the disconnection to the fan motor's lead wire.



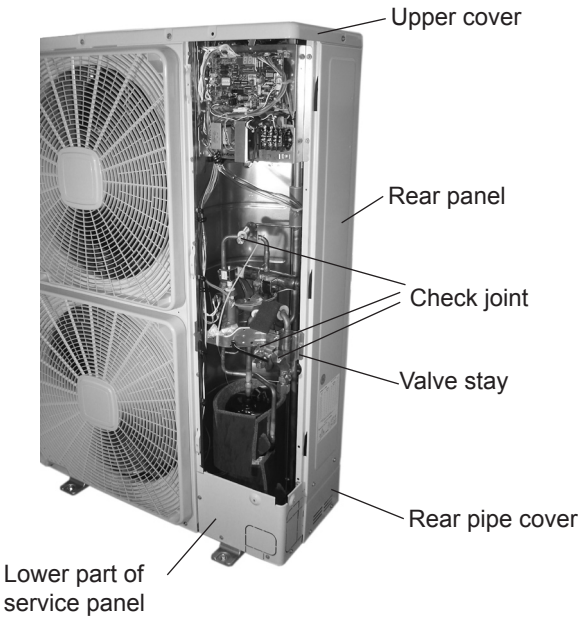
	NOTE
-	*When assembling the motor, ensure the cables section directly downwards. Fix the protection tube edge end downwards to ensure water from keeping inside it*
-	*Fix the motor wires onto the motor clamp with a cable tie to prevent them from collisioning the fun blades.*
-	*Assembling the fan blade: Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft, and fix the screw after dismounting the screwed part of the shaft. (Tightening Torque of 20 N.m)*
-	*.When connecting the motor wire, check to ensure that the colors of the connectors on the PCN201 and PCN202 are matched with the wires.*
-	*Fix the air outlet grille firmly to the shroud.*

9.2.6. Removing the compressor

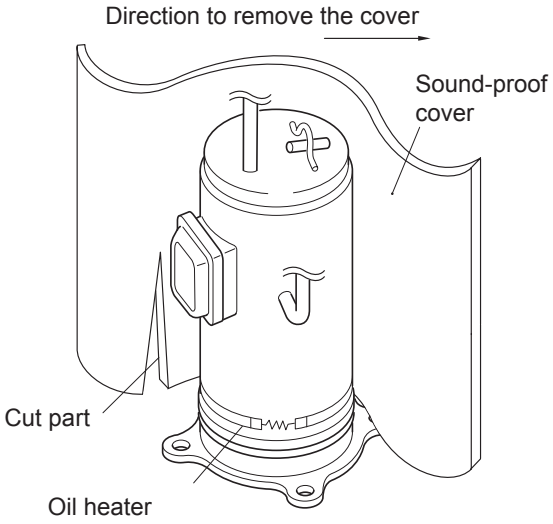
1. Remove the service cover and the lower part of the service panel according to the section "Removing service cover" and the section "Removing lower part of service panel and rear panel". In case that the outdoor unit is installed close to a wall closely, sepparate first the outdoor unit from the wall.

2. Collect the refrigerant from the liquid stop valve, the gas stop valve and the check joint at the piping.

3. Open the sound insulation cover wrapped around the compressor and remove the terminal box cover at the compressor fixed by one (1) screw. Disconnect the compressor wires in the terminal box and remove the sound insulation cover.

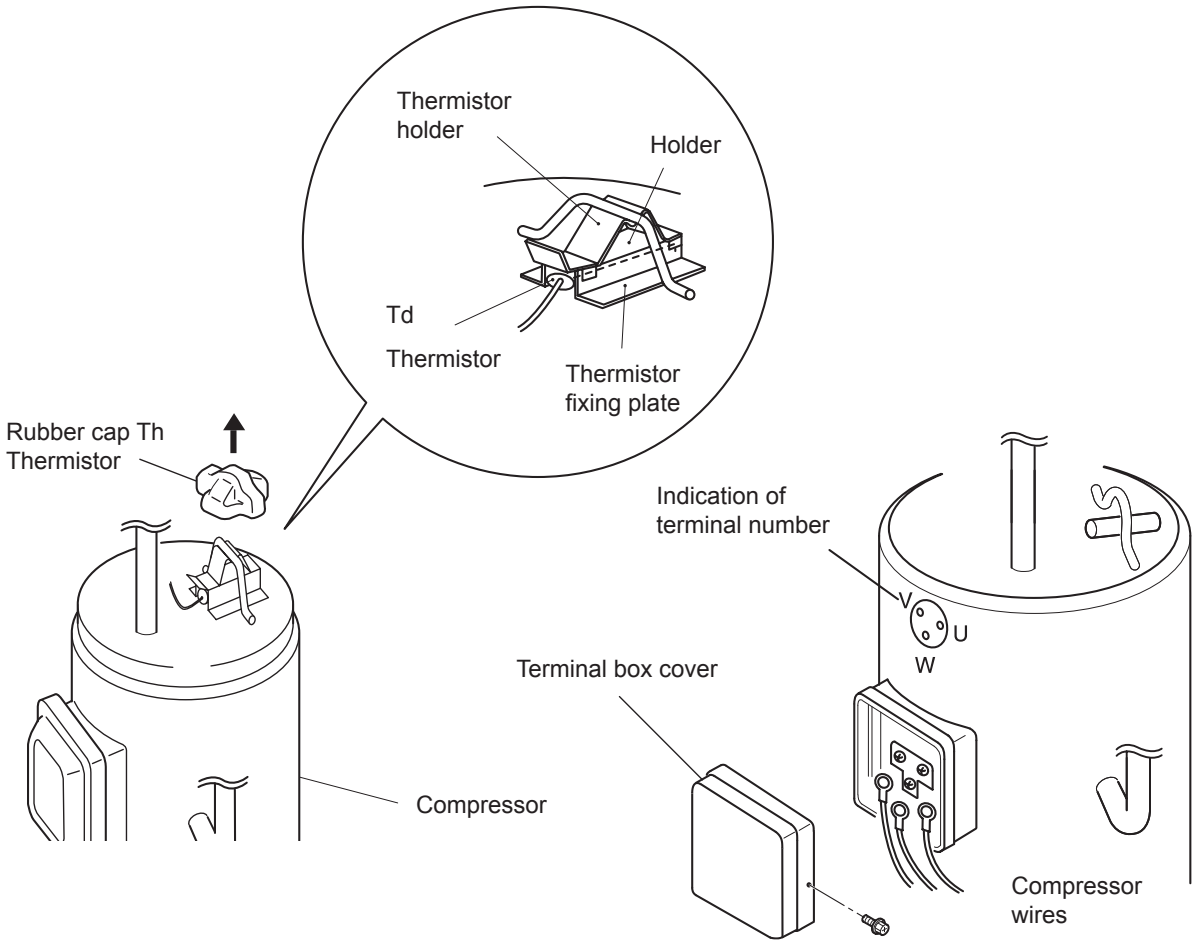


	NOTE
-	*Check and take note of each terminal number and indications for its correct connection at the reasembling process. If wires are connected in incorrect order, it will lead to a compressor failure.*

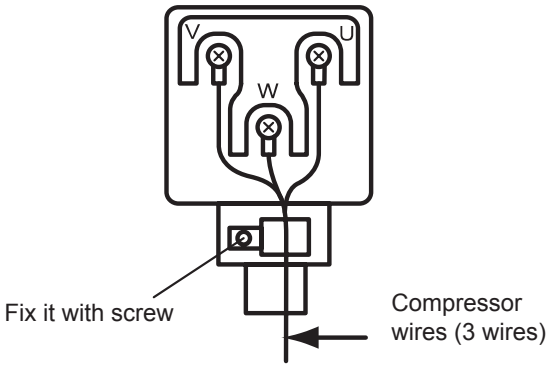


4. Remove the rubber cap and the thermistor on the top of the compressor.

5. Remove the crankcase heater.(Oil heater on the lower case).



Details for compressor terminals



NOTE

- *Do not expose the refrigerant cycle to the atmosphere for a long period in order to avoid water and foreign particles entering into the refrigerant cycle. After removing the compressor, replace it quickly. If it is exposed to the ambiance for a long period, seal both suction and discharge pipes.*
- *Remove the cap for the compressor just before replacing the compressor. Before assembling the compressor, seal the suction pipe and discharge pipe with tape to protect the compressor interior from foreign particles. Remove the tape when connecting the pipes.*

WARNING

- *All compressor pipes must be brazed to be connected to the refrigerant circuit. Ensure that all the sourrounding is free of flammable objects and liquids when performing piping brazing work.*

9

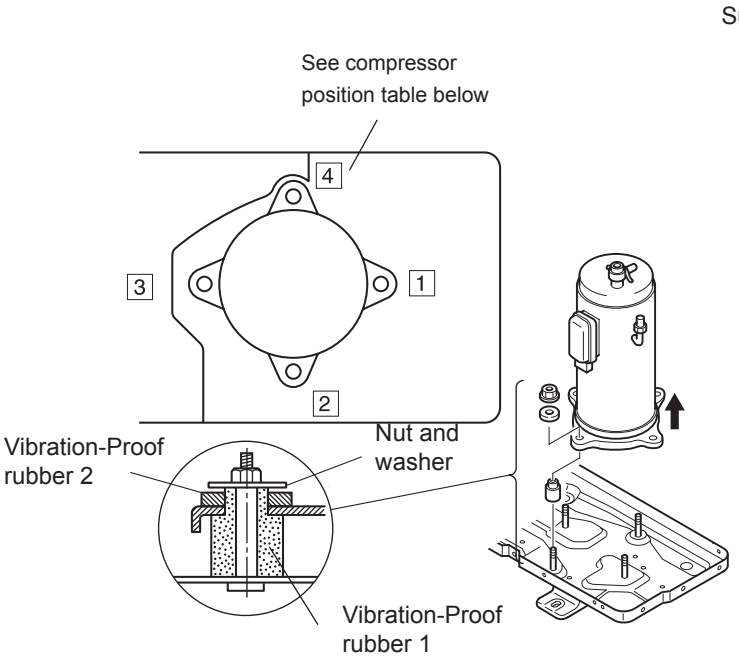
6. Remove the suction pipe and the discharge pipe from the compressor. Isolate the wires and electrical components to protect them from the burner flame when brazing the connection pipes.

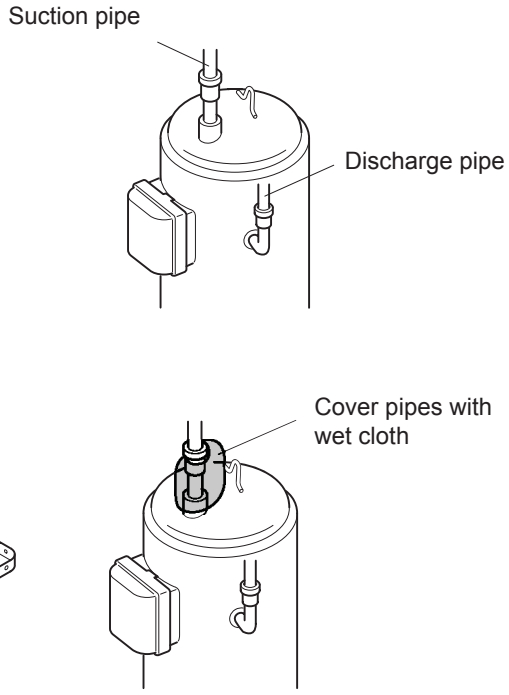
7. Remove the two (2) nuts fixing the compressor and remove the compressor from the unit by lifting it. Slightly incline it forward and lift.

8. For brazing the compressor connection pipes, first cool down the compresor piping side covering it with wet clooth. Then brazing material will not enter into the compressor. If the brazing material enters the compressor, it will cause compressor failures.

9. Reassemble the parts in the reverse order of the indicated removing procedures.
   - Tighten the screws (U, V and W) for compressor wires with 2.5N.m.
   - Fix the lead wire firmly.

	NOTE
	- Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.





Fixation of the compressor to the bottom plate				
Compressor position	**1**	**2**	**3**	**4**
Vibration-proof rubber 1	○	○	○	○
Vibration-proof rubber 2	○	○	–	–
Nut	○	○	–	–

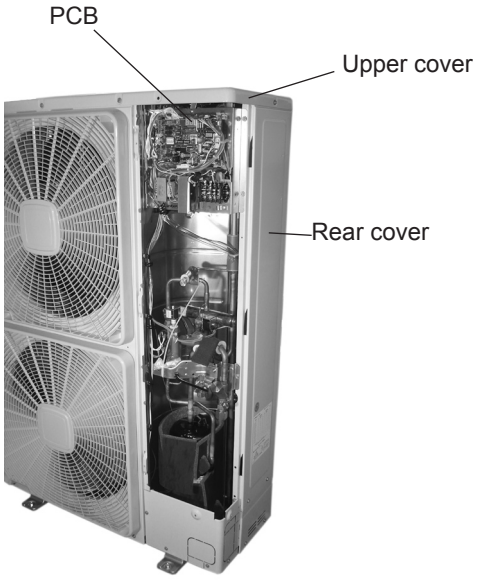
	NOTE
	- Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.

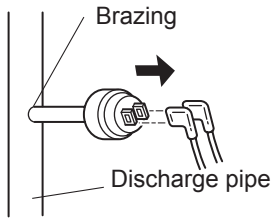
9.2.7. Removing high pressure switch and control pressure switch

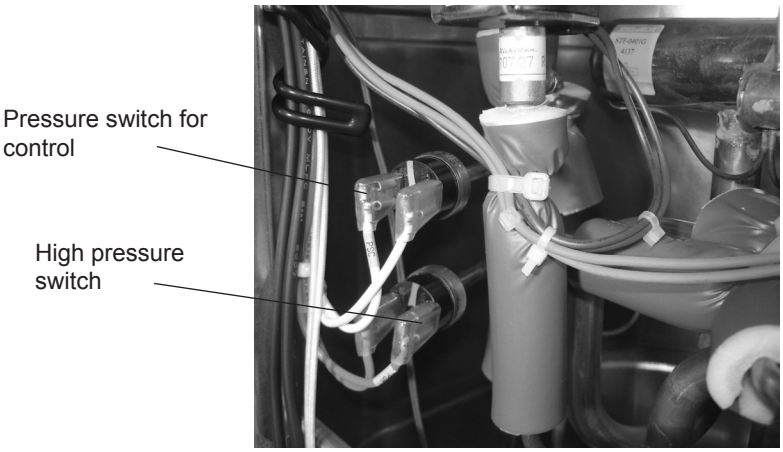
1 Remove the service cover according to the section “Removing service cover” in this chapter.

2. Collect the refrigerant from the check joint according to the section “Removing the compressor” in this chapter.

3 Disconnect the fasten terminals from the pressure switches.
– Cut the high pressure switch and control pressure switch from the brazing neck using a burner.



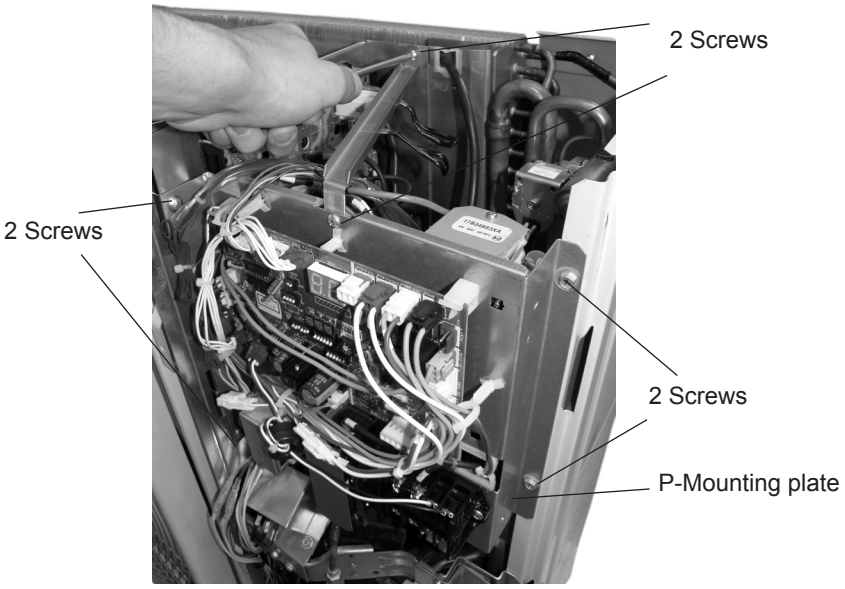


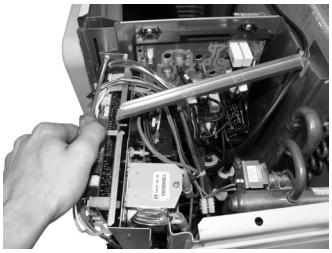


9.2.8. Opening electrical box (P-mounting plate)

1 Remove the service cover according to the section "Removing the service cover" in this chapter.
- Remove the six (6) screws fixing the electrical box. Open the P-mounting plate by rotating it 90 degrees to the left.

	DANGER
- *Check that the LED201 (red) located on the "W" surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the "W" surface PCB is ON in order to avoid an electrical shock.*	





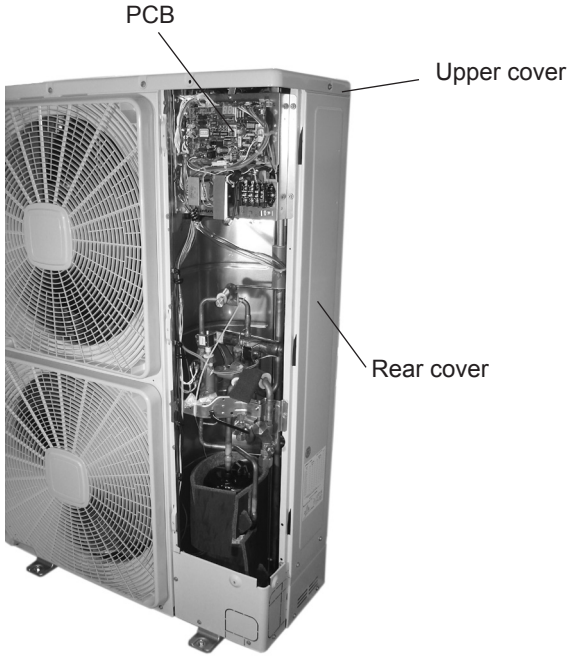


9.2.9. Removing the coils for the reversing and solenoid valves (SVA1, SVA2 and SVF)

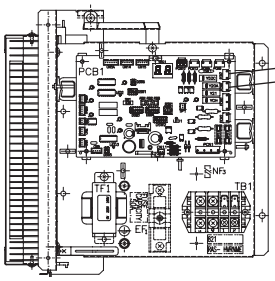
1 Remove the service cover according to the section "Removing service cover" in this chapter.

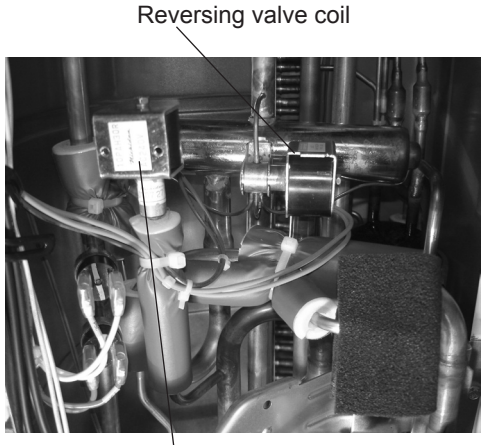
2. Open the P-mounting plate according to the section "Opening electrical box (P-Mounting Plate)" in this chapter..

	NOTE
- *Do not touch the electrical components when the LED201 (Red), located on surface "W" PCB is ON in order to avoid electrical shock.* - *Remove the connectors on the control PCB of the electrical box.* - *Remove the reversing valve coil by removing the screw fixing the coil.*	

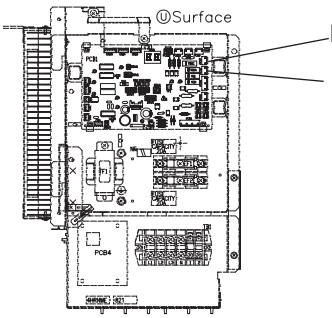


RAS-(4~6)HVRNME





RAS-(4~6)HRNME



9.2.10. Removing expansion valve coil

1. Remove the service cover according to the section “Removing service cover”.

2. Open the P-mounting plate according to the section “Opening electrical box (P-Mounting Plate)”in this chapter .

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an 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 figure below to replace the electrical valve. The lock mechanism is equipped with the expansion valve coil. Check to ensure that the expansion valve coil is locked.



9.2.11. Removing reversing valve

1. Remove the service cover and the rear service panel according to the section “Removing Service Cover” and the section “Removing lower part of service panel and rear service panel”in this chapter.

2. Collect the refrigerant from the check joint according to the section “Removing compressor”.

3. Remove the reversing valve coil according to the section “Removing reversing valve coil”.

4. Remove one (1) fixing screw for the valve-mounting plate.

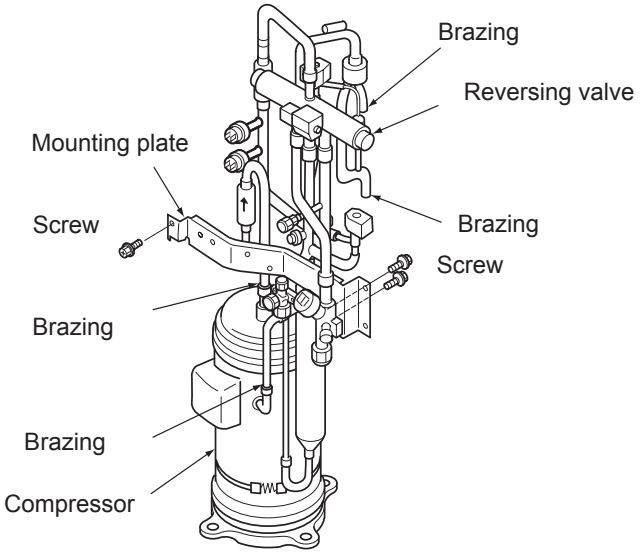
5. Remove the stop valve at the gas side from the valve-mounting plate by removing the two (2) screws.

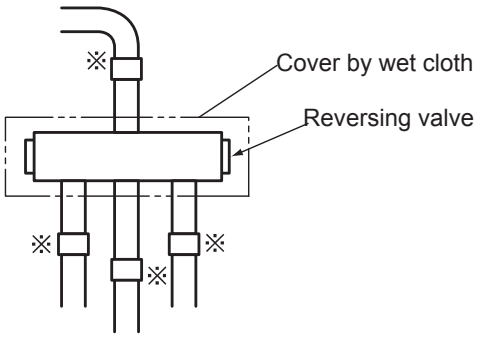
6. Remove the reversing valve assemblies from the 4 brazed parts where it is fixed. Remove the brazing of the reversing valve and the stop valve at the gas using a blowtorch. Cool down the piping side covering it with wet cloth, in order to avoid brazing material entering the reversing valve. Protect the connecting wires and pipe insulation from the brazing frame.

7. Remove the reversing valves from its assemblies 4 brazed parts ※.

   Perform the brazing with a blowtorchto remove and reassemble the reversing valve by cooling the pipes first with wet cloth in order to avoid brazing material entering the reversing valve.

8. Reassemble the parts in the reverse order of removing procedures contained in this chapter. When SFV is removed, fix it according to the section “Removing the Reversing Valve and the Solenoid Valve”contained in this chapter.





9.2.12. Removing expansion valve

1. Remove the service cover and rear service panel according to the section “Removing Service Cover” and the section “Removing Lower Part of Service Panel and Rear Service Panel”.

2. Collect the refrigerant from the check joint according to the section “Removing Compressor”.

3. Remove the coils according to the section “Removing Electronic Expansion Valve Coil”.

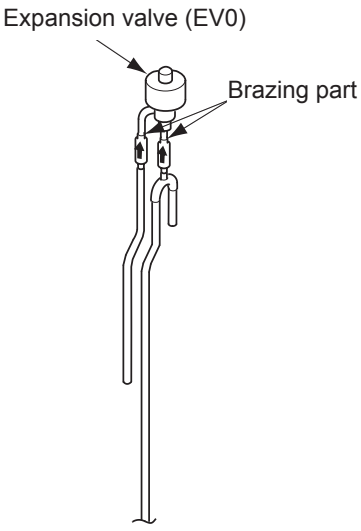
4. Remove the brazing as shown in the figure below.

   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.



9

9.2.13. Removing solenoid valve

1. Remove the service cover and the rear service panel according to the sections “Removing Service Cover” and “Removing lower part of service panel and rear panel”, described in this chapter .

2. Collect the refrigerant from the check joint according to the section “Removing compressor” in this chapter.

3. Remove the solenoid valve coil according to the section “Removing coils for reversing valve and solenoid valve” in this chapter.

4. Remove the brazing and flare nuts as shown. Using a blowtorch and previously cooling the pipe side with wet cloth in order to avoid brazing material entering the reversing valve.

5. Perform the brazing to remove and reassemble the solenoid valve.

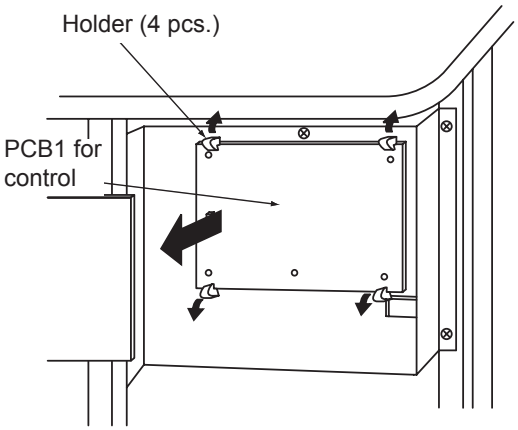
6. Protect the connecting wires and pipe insulation from the brazing flame.

7. Remove the flare nuts with two spanners to avoid twisting.

8. Reassemble the parts in the reverse order of removing procedures.

9.2.14. Removing electrical components

	DANGER
-	*Do not touch the electrical components of the PCB directly.*
-	*When handling the PCB, take care of components. Do not apply excesive force to them, in order to avoid damaging the motherboard and failures.*

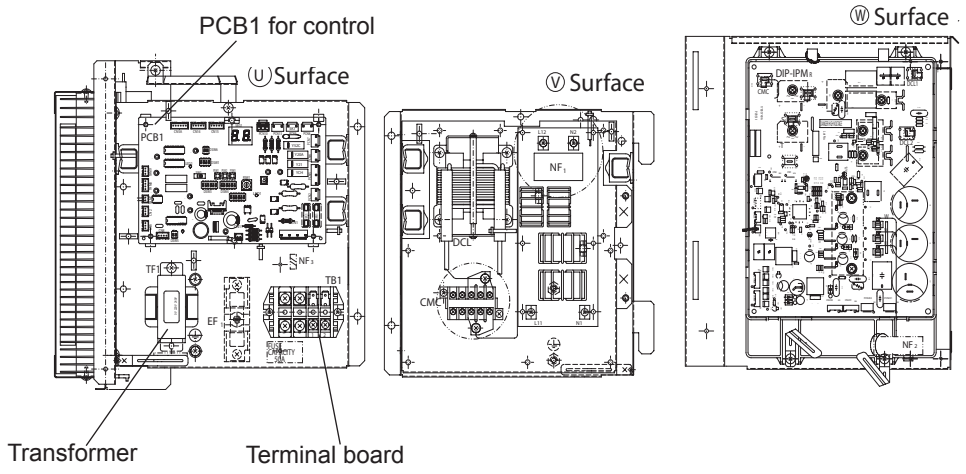


1. Remove the service cover according to section “Removing service cover” in this chapter.
   - Disconnect all the connectors in the PCB.
   - Remove the PCB by sliding four (4) holders in the arrow direction.
   - Remove the PCB for power distribution of the compressor and the motor.

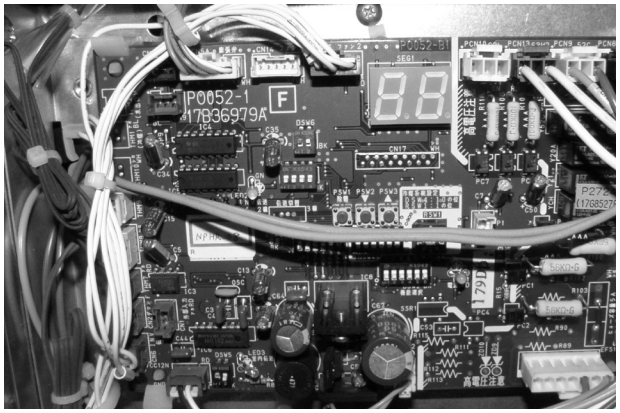
   To remove the PCB, slide de four (4) holders in the arrow direction.

2. Removing the relay PCB
   – Remove the service cover according to the section “Removing Service Cover” in this chapter.
   – Disconnect all the wires connected to the relay PCB.

RAS-(4~6)HVRNME







9.2.15. Removing “W” electrical components surface

1. Remove the service cover according to the section “Removing service cover” in this chapter.

2. Open the P-mounting plate by rotating 90 degrees to the left according to the section “Opening electrical box” (P-Mounting Plate) in this chapter.

3. Use a screw driver to push and release the plastic holders retaining the “W” electrical components surface.

	DANGER

- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.*
- *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*

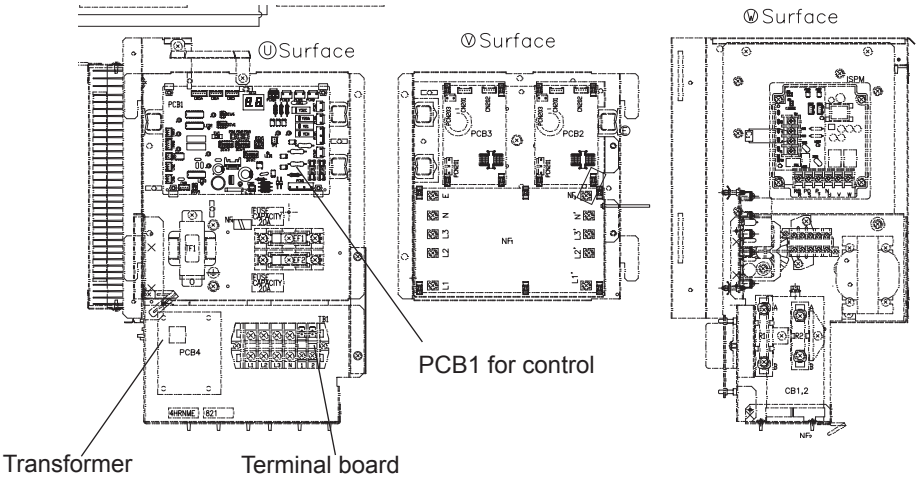
	NOTE

- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *Check to ensure that the electrical wires will not be caught between the assembled electrical components and the mounting plates when the “W” electrical components surface is reassembled.*

	DANGER

- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *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.*
- *Do not apply strong force to the electric components and PCBs to avoid damage.*

RAS-(4~6)HRNME



9.2.16. Removing other electrical components

1. Remove the service cover according to the section “Removing service cover”in this chapter.

2. Open the P-mounting plate by rotating it 90 degrees to the left according to the section “Opening electrical box (P-Mounting Plate) in this chapter.

3. Check to ensure the LED201 (Red) of the inverter PCB is off when opening P-mounting plate.

4. Remove other electrical components according to the procedure below, and the figures on Chapter 9.

	DANGER
	- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*

	NOTE
	- *Disconnect all the wires connected with the smoothing capacitor (CB, CB1, CB2, CA).* - *The wire has polar characters. Identify the wire mark band and the indication on the smoothing capacitor when wire connecting.* - *Remove the two (2) screws fixing the smoothing capacitor and remove the smoothing capacitor.* - *Disconnect all the wires connecting with the magnetic contactor (CMC1).* - *Remove the two (2) screws fixing the magnetic contactor and remove the magnetic contactor.* - *Remove the 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 the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*

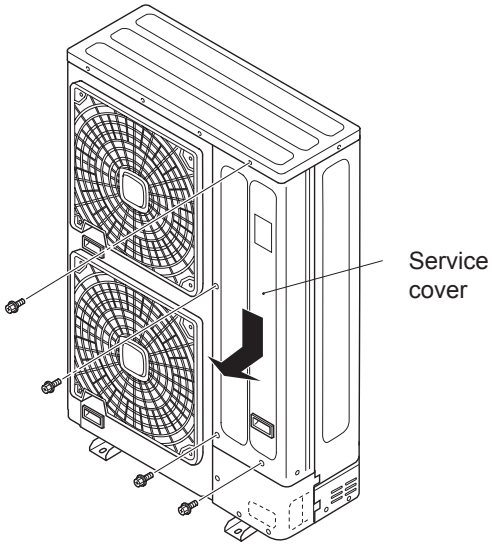
9.3. OUTDOOR UNIT RAS-(8~12)HRNM

9.3.1. Removing service cover

Remove the main parts according to the following procedures.

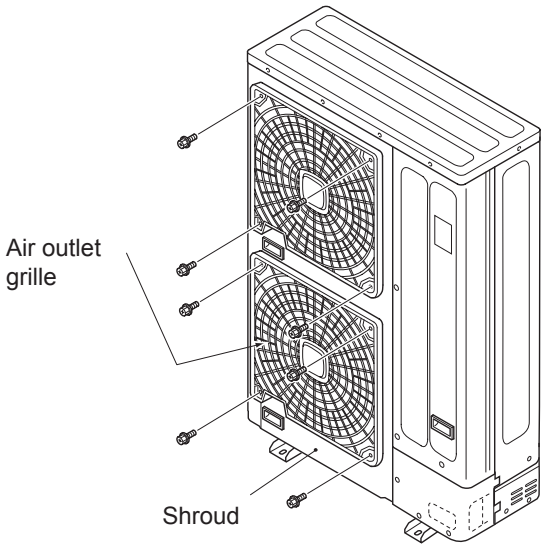
	NOTE
	- *To reassemble perform the procedures in reverse.* - *To prevent contamination of the refrigerant with water or foreign particles, do not expose open to atmosphere for long periods.* - *If necessary, seal pipe ends using caps or tape.*

1. Remove the four (4) fixing screws.
2. Slide the service cover downward and remove it.
2. Pay attention of not falling off the service cover.



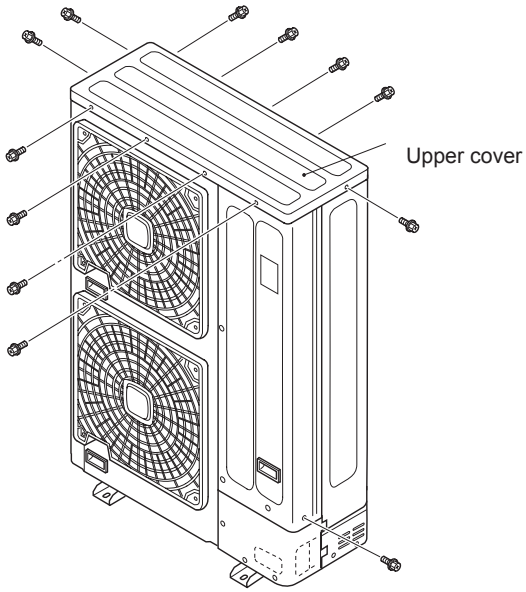
9.3.2. Removing air outlet grille

1. Remove the eight (8) fixing screws.
2. Lift the air outlet grille holding the lower parts.
3. Release the extruded hook of the air outlet grille from the shroud.



9.3.3. Removing upper cover

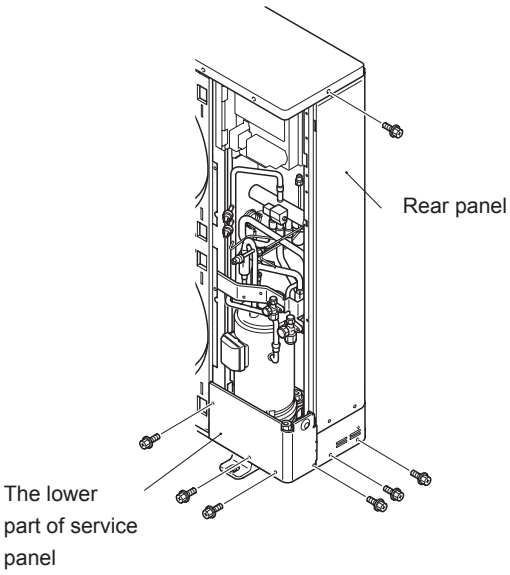
1. Remove the eleven (11) screws fixing the upper cover
2. Lift the upper cover upwards.



9.3.4. Removing the lower part of service panel and rear panel

1. Remove the five (5) fixing screws at the lower part of the service panel and remove the lower part of the service panel by pulling towards the front side. Remove the upper cover according to section “Removing upper cover” in this chapter.

	NOTE
-	*The length of fixing scews for the outdoor temperature thermistor is different than all other screws in the machine, as an assembly poka-yoke.*



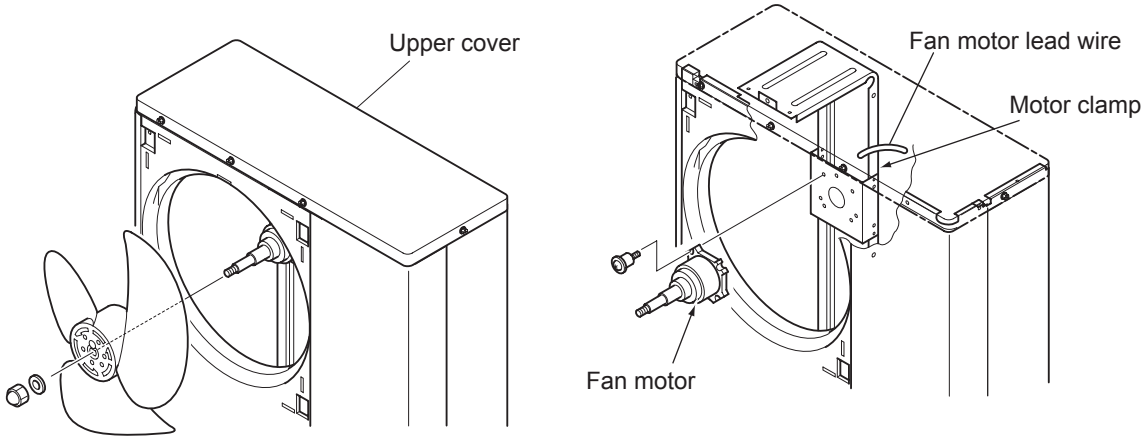
9.3.5. Removing outdoor fan motor

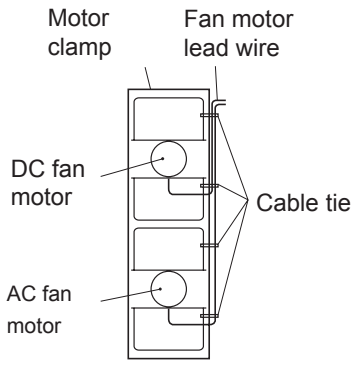
1. Remove the service cover according to the section "Removing service cover" in this chapter.

2. Remove the air outlet grille according to the section "Removing air outlet grille" in this chapter.

3. Remove the upper cover according to the section "Removing upper cover" in this chapter.

4. Disassembly the fan blade by removing the cap nuts and washers fixing the fan blade onto the motor shaft.



Fan components and technical features		
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		

9.3.6. Removing outdoor fan motor

1. Remove the service cover according to the section “Removing service cover” in this chapter.
2. Remove the air outlet grille according to the section “Removing air outlet grille” in this chapter.
3. Remove the upper cover according to the section “Removing upper cover” in this chapter.
4. Disassembly the fan blade by removing the cap nuts and washers fixing the fan blade onto the motor shaft.

   If the fan blade get stuck when trying to remove it, use a puller to disassembly the fan.
5. Remove the fan motor connector from the PCB3 and PCB5 at the electrical box.
   – Cut off the cable tie that fixes the lead wire of the fan motor.
   – Remove the four (4) screws that fix the motor to the motor clamp.
6. Fix the motor wire with the cable tie or the cord clamp. If not, it may cause the disconnection of the fan motor’s lead wire.
7. In order to avoid cutting edges, mount the rubber bush at the partition plate when inserting the motor wire through it. If not, it may cause the disconnection to the fan motor’s lead wire.

NOTE

- *When assembling the motor, ensure the cables section directly downwards. Fix the protection tube edge end downwards to ensure water from keeping inside it*
- *Fix the motor wires onto the motor clamp with a cable tie to prevent them from collisioning the fun blades.*
- *Assembling the fan blade: Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft, and fix the screw after dismounting the screwed part of the shaft. (Tightening Torque of 20 N.m)*
- *.When connecting the motor wire, check to ensure that the colors of the connectors on the PCB3 and PCB5 are matched with the wires.*
- *Fix the air outlet grille firmly to the shroud.*

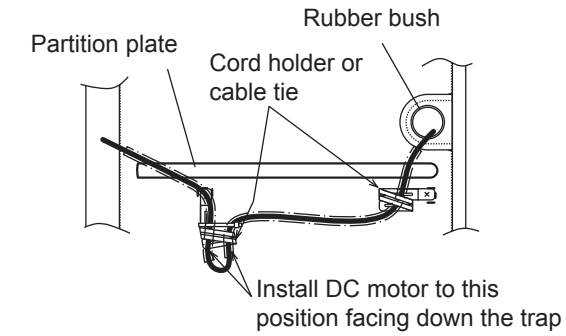
9.3.7. Removing the compressor

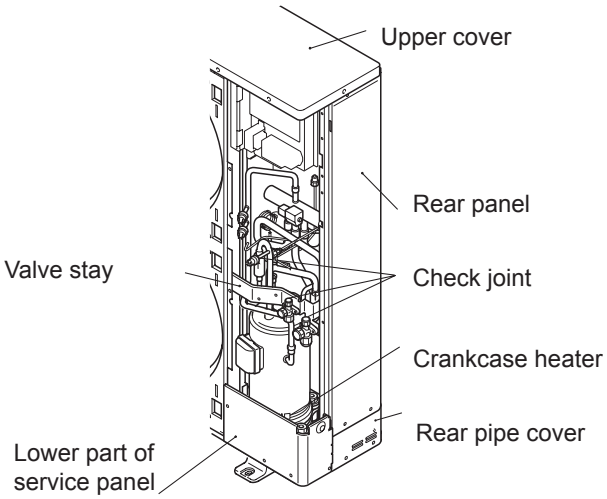
1. Remove the service cover and the lower part of the service panel according to the section “Removing service cover” and the section “Removing lower part of service panel and rear panel”. In case that the outdoor unit is installed close to a wall closely, sepparate first the outdoor unit from the wall.
2. Collect the refrigerant from the liquid stop valve, the gas stop valve and the check joint at the piping.
3. Open the sound insulation cover wrapped around the compressor and remove the terminal box cover at the compressor fixed by one (1) screw. Disconnect the compressor wires in the terminal box and remove the sound insulation cover.

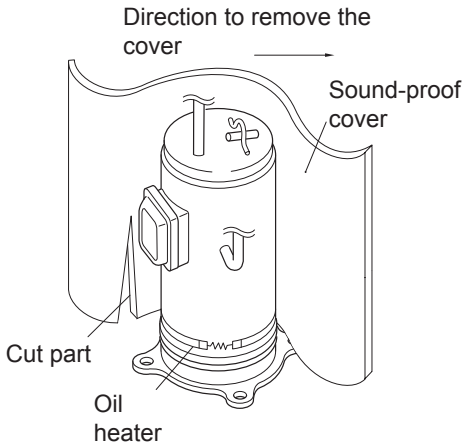
NOTE

- *Check and take note of each terminal number and indications for its correct connection at the reasembling process. If wires are connected in incorrect order, it will lead to a compressor failure.*

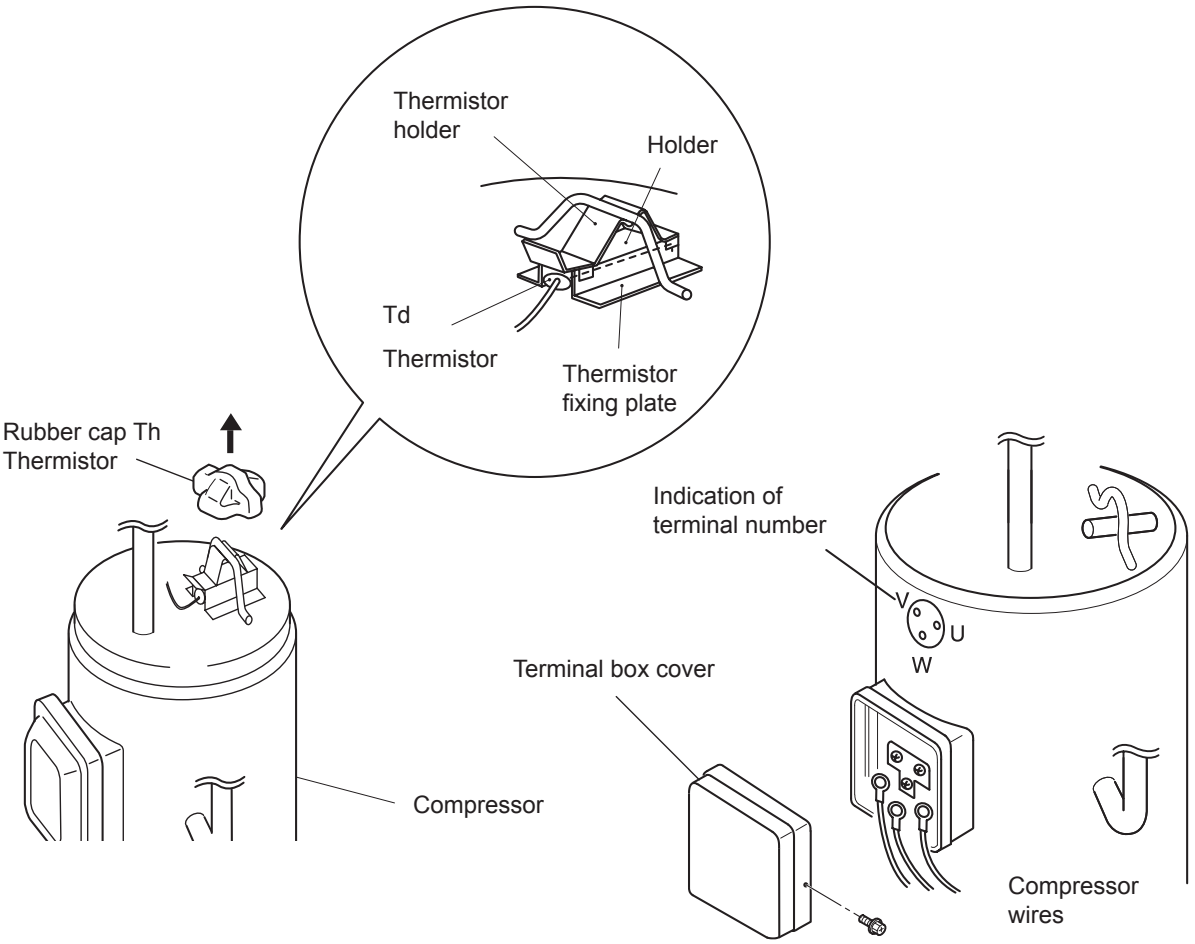
4. Remove the rubber cap and the thermistor on the top of the compressor.
5. Remove the crankcase heater.(Oil heater on the lower case).



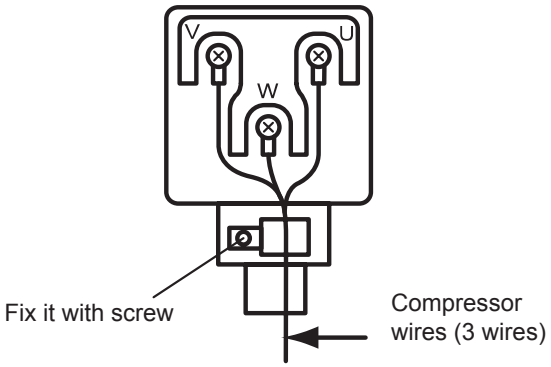




9



Details for compressor terminals



NOTE

- *Do not expose the refrigerant cycle to the atmosphere for a long period in order to avoid water and foreign particles entering into the refrigerant cycle. After removing the compressor, replace it quickly. If it is exposed to the ambiance for a long period, seal both suction and discharge pipes.*
- *Remove the cap for the compressor just before replacing the compressor. Before assembling the compressor, seal the suction pipe and discharge pipe with tape to protect the compressor interior from foreign particles. Remove the tape when connecting the pipes.*

WARNING

- *All compressor pipes must be brazed to be connected to the refrigerant circuit. Ensure that all the sourrounding is free of flammable objects and liquids when performing piping brazing work.*

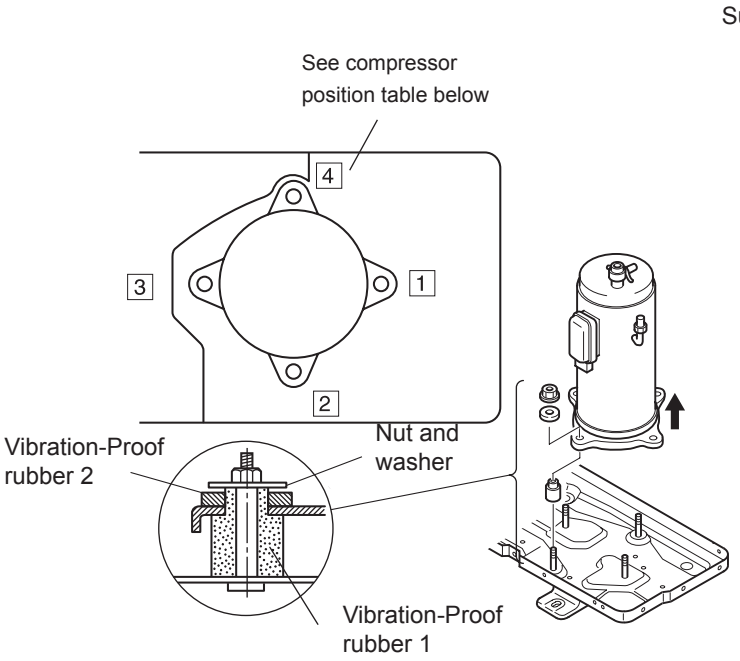
6. Remove the suction pipe and the discharge pipe from the compressor. Isolate the wires and electrical components to protect them from the burner flame when brazing the connection pipes.

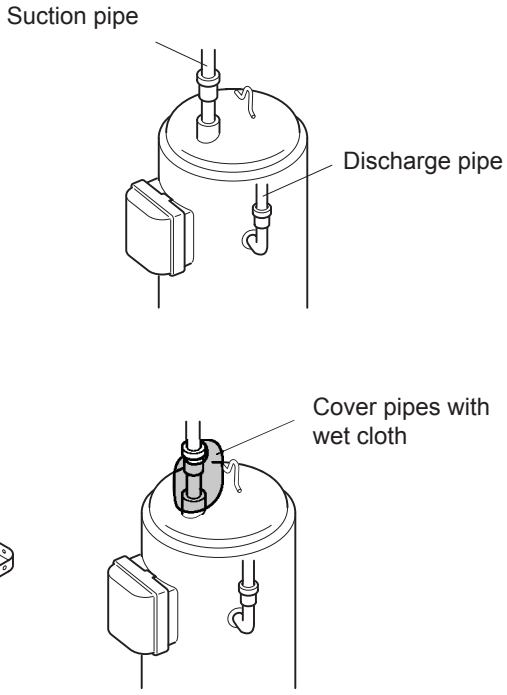
7. Remove the two (2) nuts fixing the compressor and remove the compressor from the unit by lifting it. Slightly incline it forward and lift.

8. For brazing the compressor connection pipes, first cool down the compresor piping side covering it with wet clooth. Then brazing material will not enter into the compressor. If the brazing material enters the compressor, it will cause compressor failures.

9. Reassemble the parts in the reverse order of the indicated removing procedures.
   - Tighten the screws (U, V and W) for compressor wires with 2.5N.m.
   - Fix the lead wire firmly.

	NOTE
	- *Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.*





Fixation of the compressor to the bottom plate				
Compressor position	**1**	**2**	**3**	**4**
Vibration-proof rubber 1	○	○	○	○
Vibration-proof rubber 2	○	○	–	–
Nut	○	○	–	–

	NOTE
	- *Fix the lead wire for the compressor firmly using a cable tie to aviod contacting the metal sheet sharp edges and the high temperature piping.*

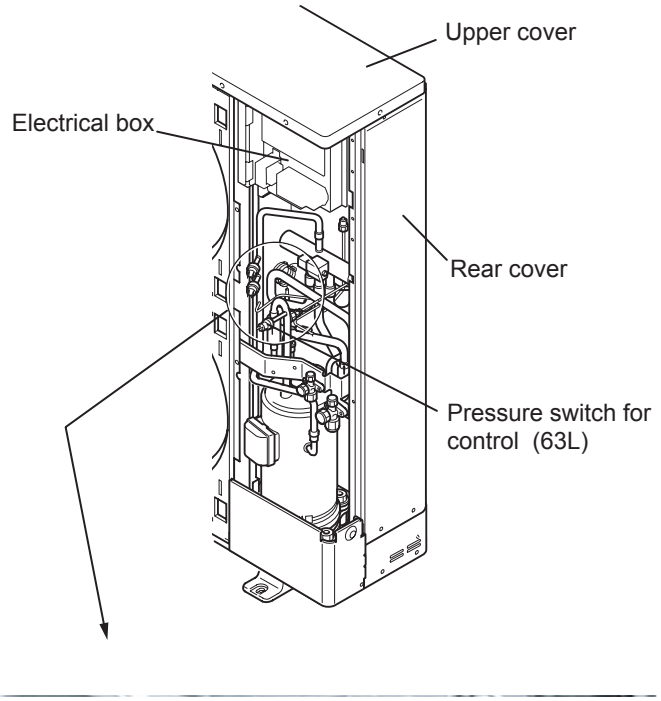
9

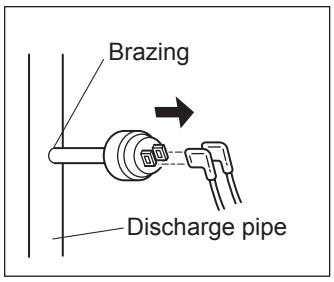
9.3.8. Removing high pressure switch and control pressure switch

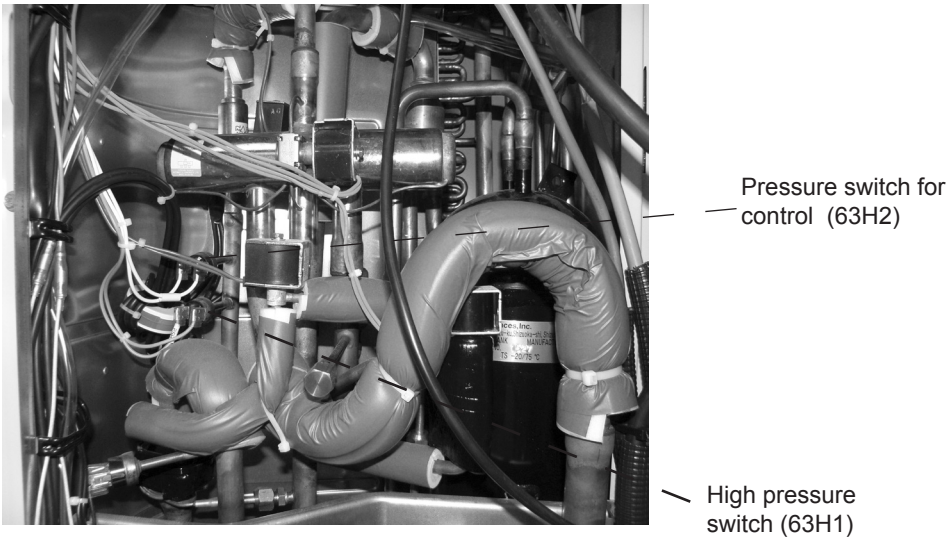
1 Remove the service cover according to the section "Removing service cover" in this chapter.

2. Collect the refrigerant from the check joint according to the section "Removing the compressor" in this chapter.

3 Disconnect the fasten terminals from the pressure switches.
– Cut the high pressure switch (63H1) and control pressure switch (63H2) from the brazing neck using a burner.



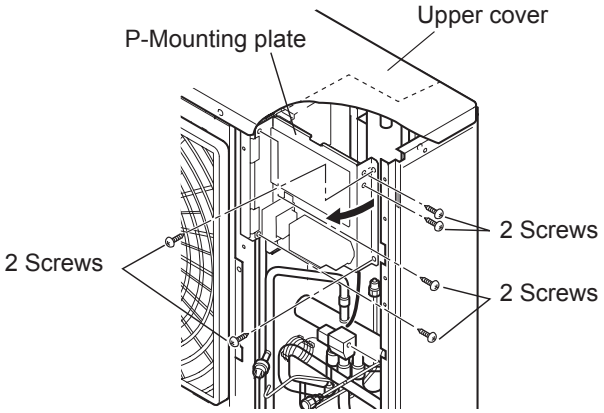




9.3.9. Opening electrical box (P-mounting plate)

1 Remove the service cover according to the section “Removing the service cover” in this chapter.
   - Remove the six (6) screws fixing the electrical box. Open the P-mounting plate by rotating it 90 degrees to the left.

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*	

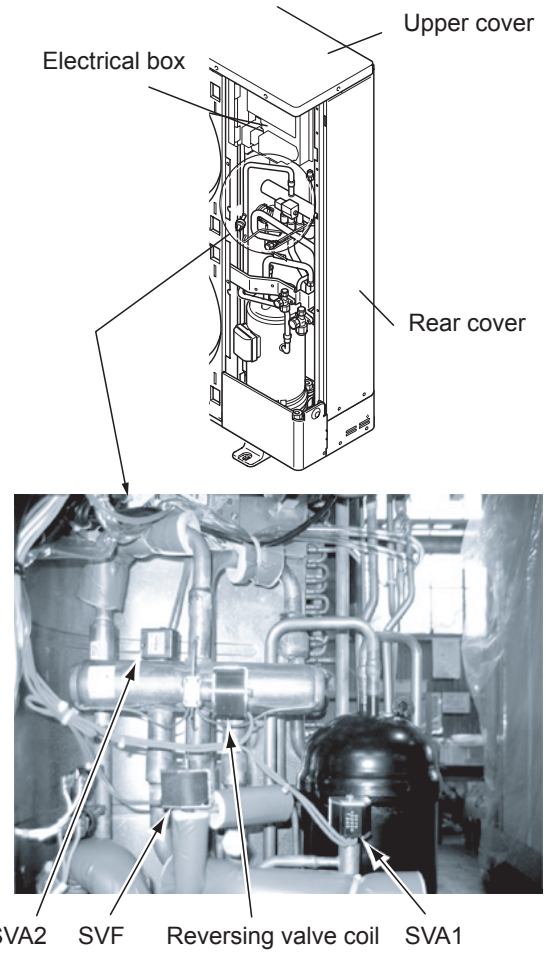


9.3.10. Removing the coils for the reversing and solenoid valves (SVA1, SVA2 and SVF)

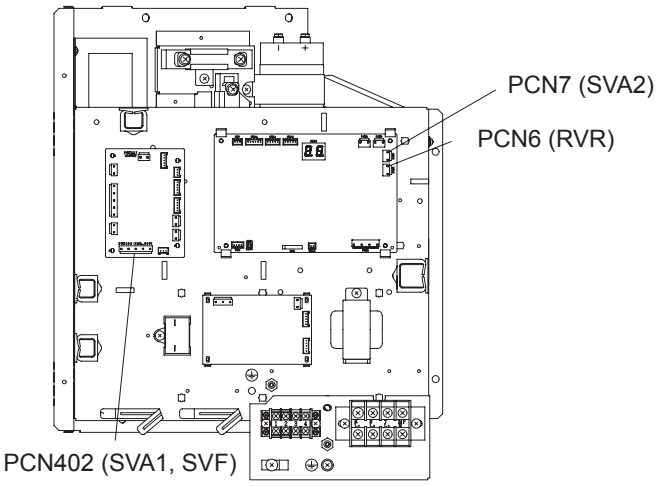
1 Remove the service cover according to the section "Removing service cover" in this chapter.

2. Open the P-mounting plate according to the section "Opening electrical box (P-Mounting Plate)" in this chapter..

	NOTE
- *Do not touch the electrical components when the LED201 (Red), located on "W" surface PCB is ON in order to avoid electrical shock.* - *Remove the connectors on the control PCB of the electrical box.* - *Remove the reversing valve coil by removing the screw fixing the coil.*	



380-415V/50Hz, 380V/60Hz



9.3.11. Removing expansion valve coil

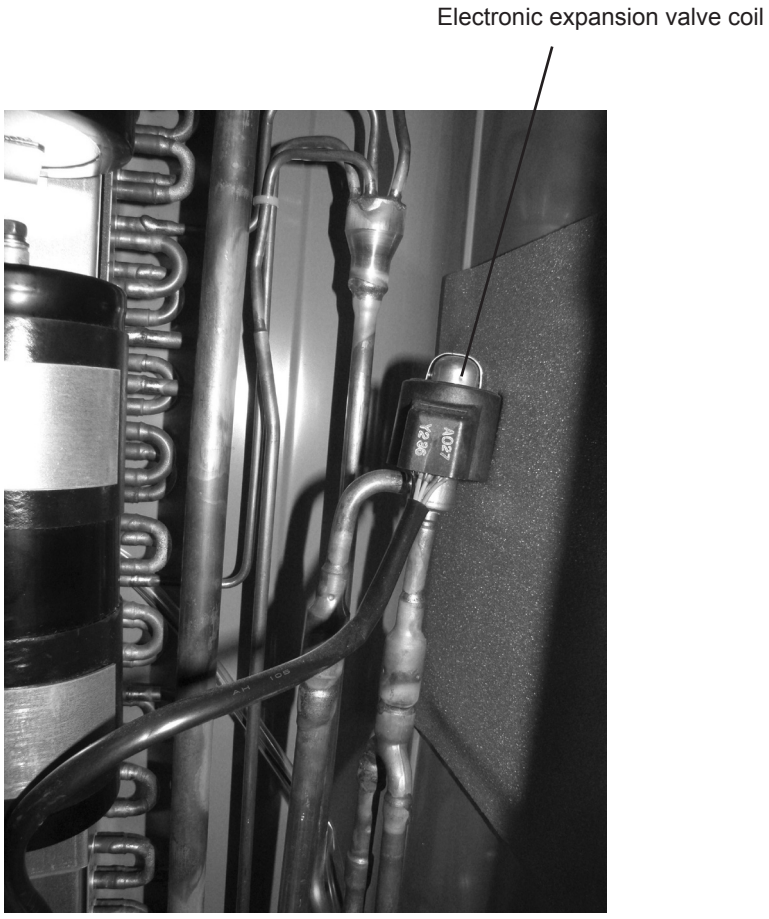
1. Remove the service cover according to the section “Removing service cover”.

2. Open the P-mounting plate according to the section “Opening electrical box (P-Mounting Plate)”in this chapter .

	DANGER
- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an 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 figure below to replace the electrical valve. The lock mechanism is equipped with the expansion valve coil. Check to ensure that the expansion valve coil is locked.



9.3.12. Removing reversing valve

1. Remove the service cover and the rear service panel according to the section “Removing Service Cover” and the section “Removing lower part of service panel and rear service panel”in this chapter.

2. Collect the refrigerant from the check joint according to the section “Removing compressor”.

3. Remove the reversing valve coil according to the section “Removing reversing valve coil”.

4. Remove one (1) fixing screw for the valve-mounting plate.

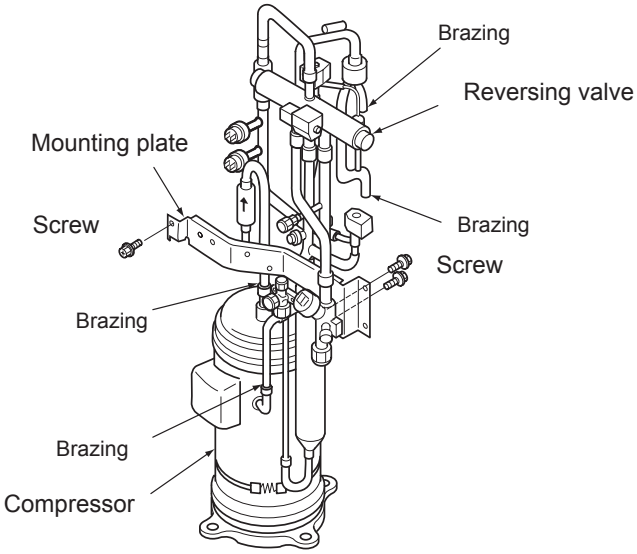
5. Remove the stop valve at the gas side from the valve-mounting plate by removing the two (2) screws.

6. Remove the reversing valve assemblies from the 4 brazed parts where it is fixed. Remove the brazing of the reversing valve and the stop valve at the gas using a blowtorch. Cool down the piping side covering it with wet cloth, in order to avoid brazing material entering the reversing valve. Protect the connecting wires and pipe insulation from the brazing frame.

7. Remove the reversing valves from its assemblies 4 brazed parts ※.

   Perform the brazing with a blowtorchto remove and reassemble the reversing valve by cooling the pipes first with wet cloth in order to avoid brazing material entering the reversing valve.

8. Reassemble the parts in the reverse order of removing procedures contained in this chapter. When SFV is removed, fix it according to the section “Removing the Reversing Valve and the Solenoid Valve”contained in this chapter.



9.3.13. Removing expansion valve

1. Remove the service cover and rear service panel according to the section “Removing Service Cover” and the section “Removing Lower Part of Service Panel and Rear Service Panel”.

2. Collect the refrigerant from the check joint according to the section “Removing Compressor”.

3. Remove the coils according to the section “Removing Electronic Expansion Valve Coil”.

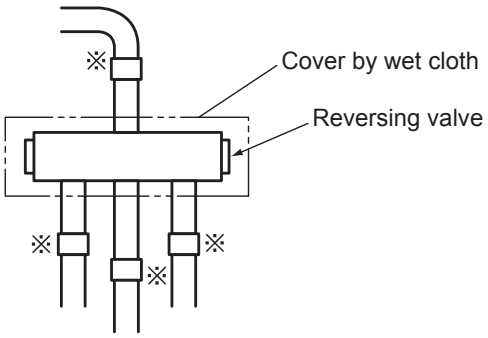
4. Remove the brazing as shown in the figure below.

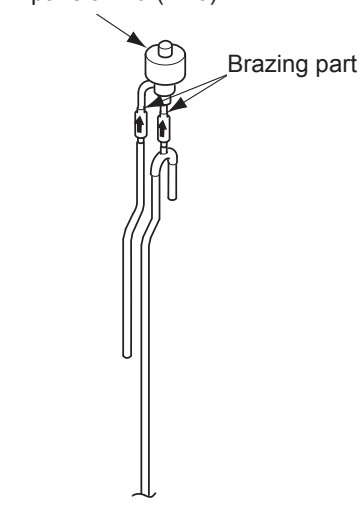
   Electronic Expansion Valve (EV0): 2 brazing parts.

   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.





9.3.14. Removing solenoid valve

1. Remove the service cover and the rear service panel according to the sections “Removing Service Cover” and “Removing lower part of service panel and rear panel”, described in this chapter .

2. Collect the refrigerant from the check joint according to the section “Removing compressor” in this chapter.

3. Remove the solenoid valve coil according to the section “Removing coils for reversing valve and solenoid valve (SVA1, SVA2 and SVF)” in this chapter.

4. Remove the brazing and flare nuts as shown in the figure below. Using a blowtorch and previously cooling the pipe side with wet cloth in order to avoid brazing material entering the reversing valve.
   - Solenoid Valve (SVA1): 2 brazing parts
   - Solenoid Valve (SVA2): 2 brazing parts
   - Solenoid Valve (SVF): 2 brazing coils

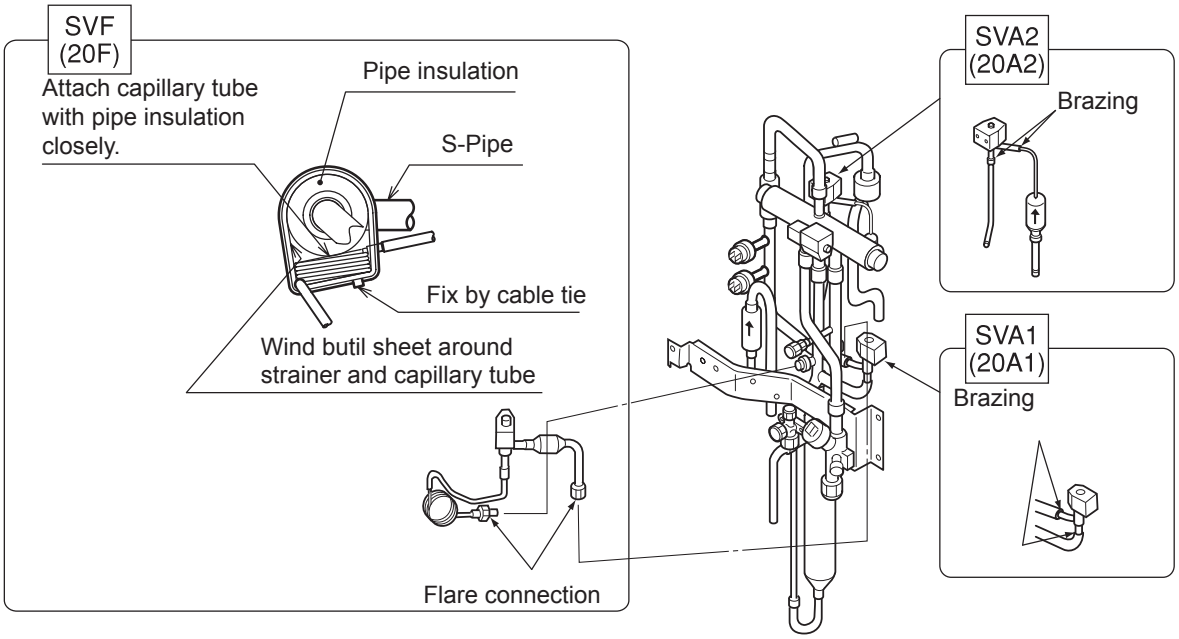
5. Perform the brazing to remove and reassemble the solenoid valve.

6. Protect the connecting wires and pipe insulation from the brazing flame.

7. Remove the flare nuts with two spanners to avoid twisting.

8. Reassemble the parts in the reverse order of removing order of removing procedures.

   Fix the solenoid valve SVF as shown in the figure below.



9.3.15. Removing electrical components

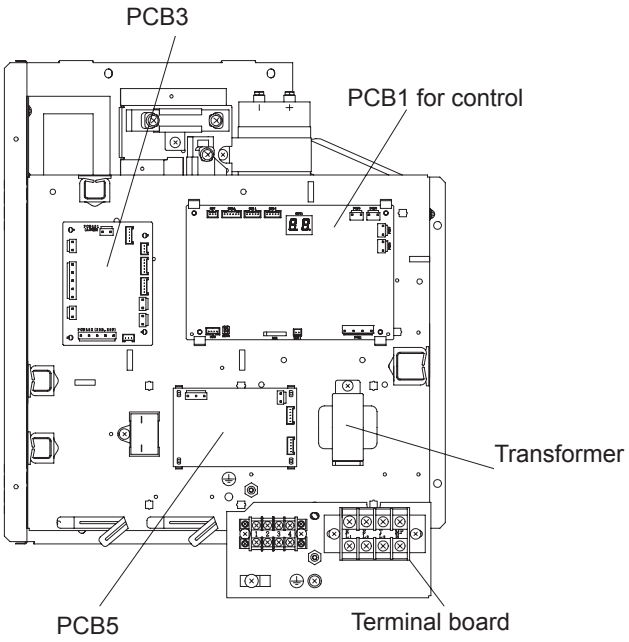
	DANGER
	- *Check that the LED201 (red) located on the "W" surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the "W" surface PCB is ON in order to avoid an electrical shock.*

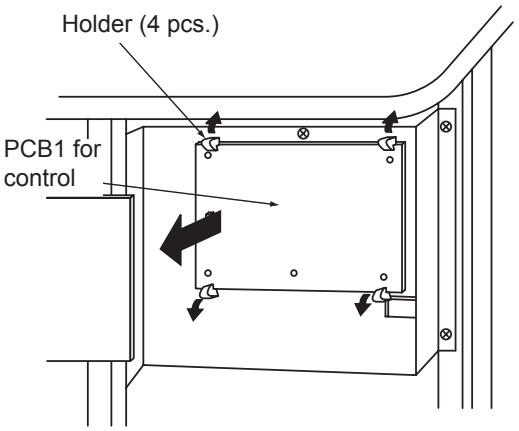
1. Remove the service cover according to section "Removing service cover" in this chapter.
   - Disconnect all the connectors in the PCB.
   - Remove the PCB by sliding four (4) holders in the arrow direction.
   - Remove the PCB for power distribution of the compressor and the motor.

   To remove the PCB, slide de four (4) holders in the arrow direction.

2. Removing the relay PCB
   – Remove the service cover according to the section "Removing Service Cover" in this chapter.
   – Disconnect all the wires connected to the relay PCB.

(380-415V/50Hz, 380V/60Hz)





9.3.16. Removing inverter components

1. Remove the service cover according to the section "Removing service cover" in this chapter.

2. Open the P-mounting plate by rotating 90 degrees to the left according to the section "Opening electrical box (P-Mounting Plate) in this chapter.

DANGER

- *Check that the LED201 (red) located on the "W" surface PCB is OFF when opening the P-mounting plate.*
- *Do not touch the electrical components when LED201 (Red) located on the "W" surface PCB is ON in order to avoid an electrical shock.*

- **Removing the PCB2**

  Check to ensure that the LED201 (Red) of the PCB2 is OFF.

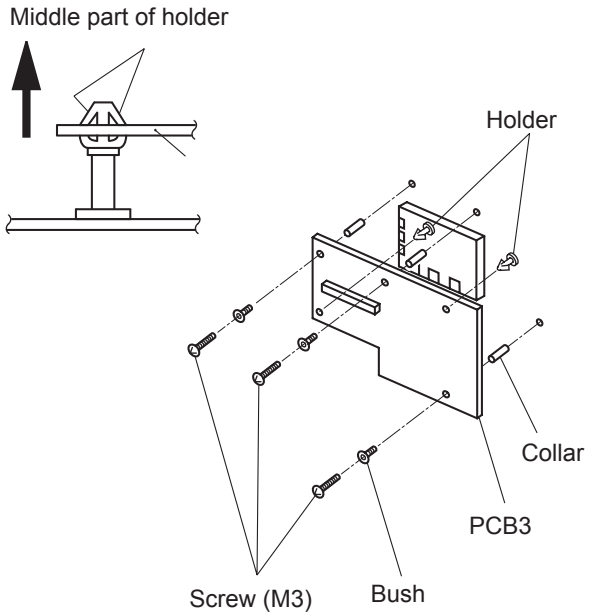
  After removing the three (3) M3 fixing screws, remove the bushes and the collars from the PCB2. When reassembling the components, attach those bushes and collars.

NOTE

- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *Check to ensure that the electrical wires will not be caught between the assembled electrical components and the mounting plates when the PCB2 is reassembled.*

DANGER

- *Do not touch the electrical parts when LED201 (Red) on the PCB2 is lit to prevent from an electrical shock.*
- *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.*
- *Identify the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*
- *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.*
- *When mounting PCB and the sheet metal part for PCB, pay attention not to clamp the electrical wiring together.*
- *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.*
- *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.*
- *Do not apply strong force to the electric components and PCBs to avoid damage.*



9.3.17. Removing diode module and transistor module

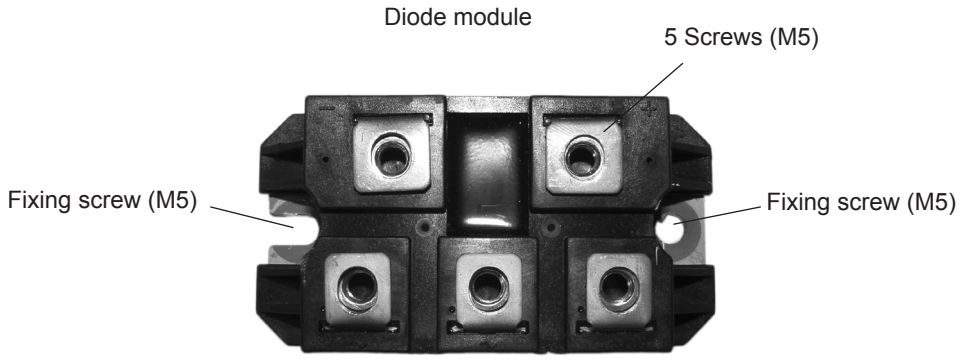
Check to ensure that the LED201 (Red) of the PCB2 is off.

1. Disconnect all the wirings connected to the diode module as shown below.
   - Disconnect the wirings of the terminals +, - , U, V, W on the diode module.
   - Remove the two (2) screws fixing the diode module.
   - Remove the diode module from the electrical box.

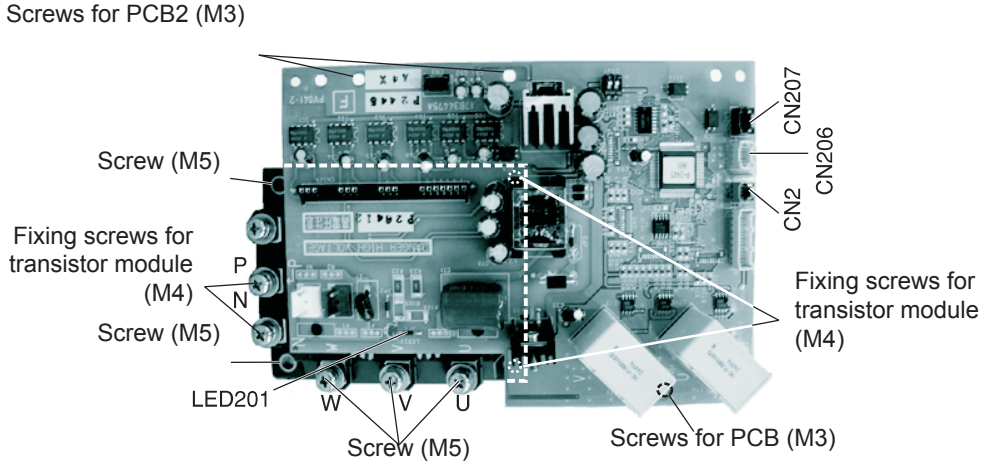
2. Disconnect all the wirings connected to the transistor module as shown below.
   - Disconnect the wirings of connector CN2, CN206 and CN207.
   - Disconnect the wirings from P, N, U, V, W on the transistor module.
   - Remove the three (3) screws fixing the PCB2 and then remove the PCB2 from the transistor module.
   - Remove the four (4) fixing screws on the transistor module.
   - Remove the transistor module from the electrical box.

NOTE

- *The correct position of the marks on the PCB2 is upside down when being assembled.*
- *Identify the terminal Nos. with the mark band Nos. when reassembling. If incorrectly connected, malfunction or damage will occur.*
- *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.*
- *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.*



PCB2 and transistor module



9.3.18. Removing other electrical components

1. Remove the service cover according to the section “Removing service cover”in this chapter.

2. Open the P-mounting plate by rotating it 90 degrees to the left according to the section “Opening electrical box (P-Mounting Plate) in this chapter.

3. Check to ensure the LED201 (Red) of the inverter PCB is off when opening P-mounting plate.

4. Remove other electrical components according to the procedure below, and the figures on Cchapter 9.

	DANGER
	- *Check that the LED201 (red) located on the “W” surface PCB is OFF when opening the P-mounting plate.* - *Do not touch the electrical components when LED201 (Red) located on the “W” surface PCB is ON in order to avoid an electrical shock.*

	NOTE
	- *Disconnect all the wires connected with the smoothing capacitor (CB, CB1, CB2, CA).* - *The wire has polar characters. Identify the wire mark band and the indication on the smoothing capacitor when wire connecting.* - *Remove the two (2) screws fixing the smoothing capacitor and remove the smoothing capacitor.* - *Disconnect all the wires connecting with the magnetic contactor (CMC1).* - *Remove the two (2) screws fixing the magnetic contactor and remove the magnetic contactor.* - *Remove the 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 the terminal numbers with mark band. When reassembling, the terminals have to be connected to the correct numbers . If incorrectly connected, malfunctions or damages will occur.*

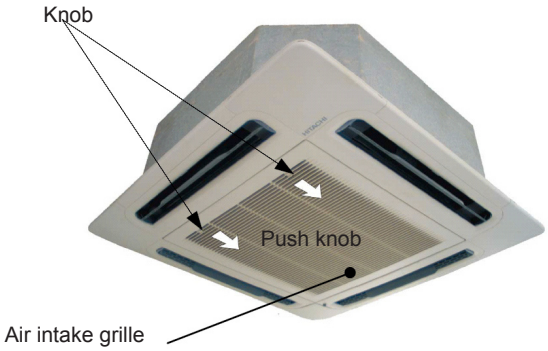
9.4. RCI-(1.5~6.0)FSN2E

4-Way Cassette

9.4.1. Removing the long life filter

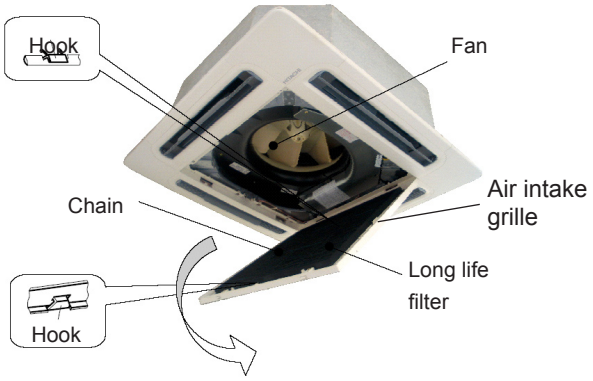
1. The long life filter is located inside of the air intake grille. Remove the filter after opening the air intake grille. The air intake grille can be dissambled by pushing the knob in the arrow mark direction.

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 extruded part.



9.4.2. Removing the air intake grille

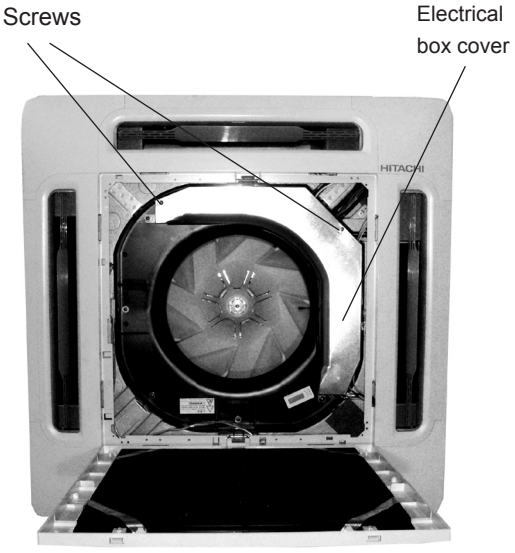
The air intake grille can be disassembled by lifting the air intake grille at an angle of approximately 30°, releasing its holding chain, and removing it by holding it upwards and then towards you. If the chain is released and the angle is 90°, the air intake grille can not be removed.



9.4.3. Removing the electrical box cover

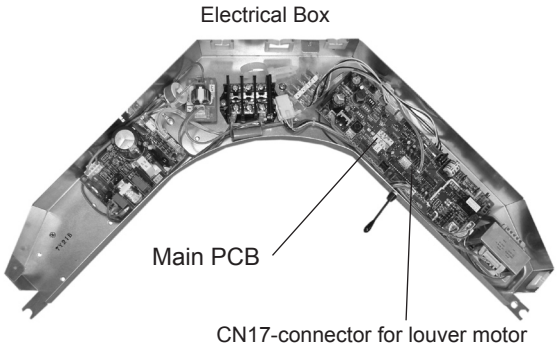
The electrical box can be disassembled by opening the air intake grille.

Remove the two (2) screws fixing the electrical box cover and then, remove the cover.



9.4.4. Removing the optional air panel

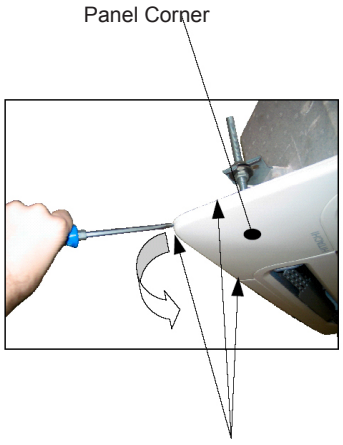
1. Remove the electrical box cover according to the section "Removing the electrical box cover" in this chapter. Disconnect the connector CN17 for the louver motor on the indoor main PCB.

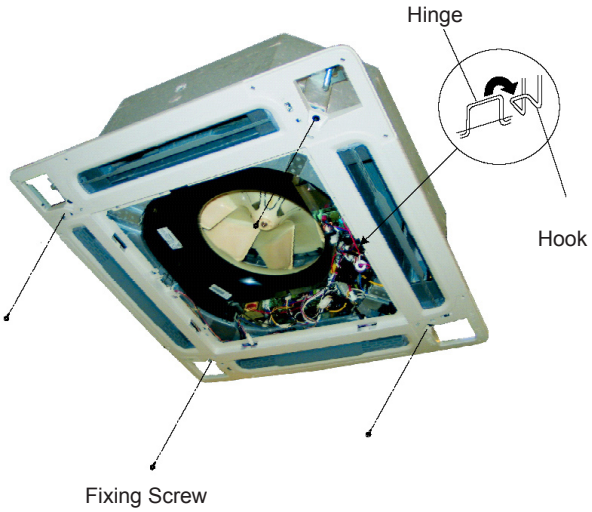


2. Remove the air intake grille from the optional air panel.

3. Remove the four panel (4) corners pockets from its sockets as shown in the picture below. Insert a slotted screwdriver or a coin into the three (3) slots in each corner socket and unhook the bracket of corner socket.

4. Remove the four (4) screws of the optional air panel and hook it to the hinge of the drain pan as shown in the figure. Remove the optional air panel from the unit.

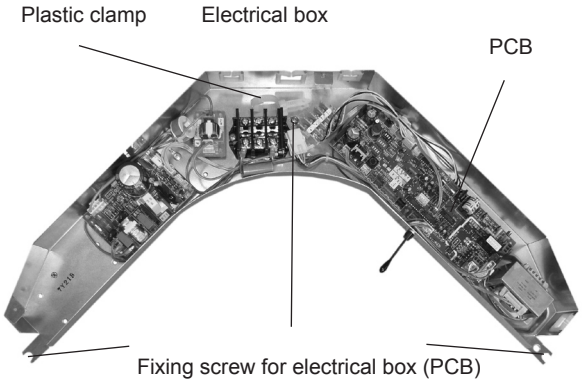


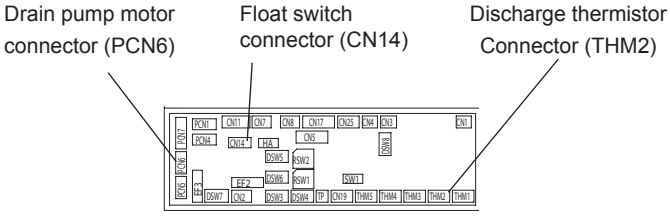


9.4.5. Removing the fan runner and fan motor

1. Remove the air intake grille according to the section "Removing the Air Intake Grille" in this chapter.

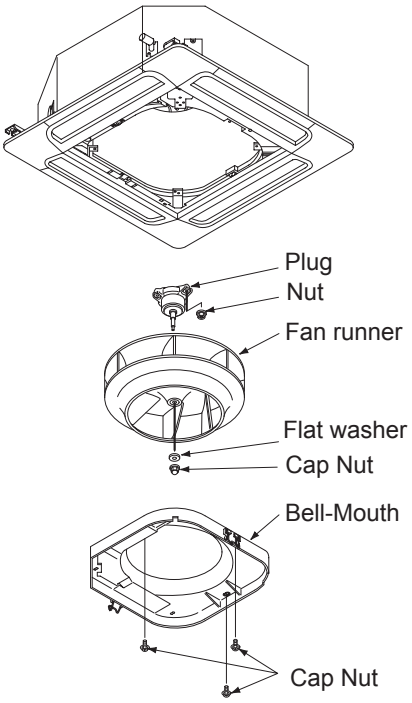
2. Drawing Electrical box:
   - Disconnect the thermistors (THM2), drain motor connector (PCN6) and float switch connector (CN14) from the PCB.
   - Loosen the screw of the wire clamp and remove the wire clamp.
   - Remove the three (3) fixing screws of the electrical box and hang the electrical box out.





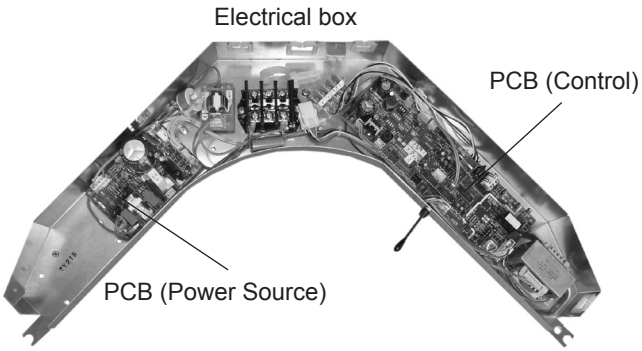
9.4.6. Removing the bell-mouth

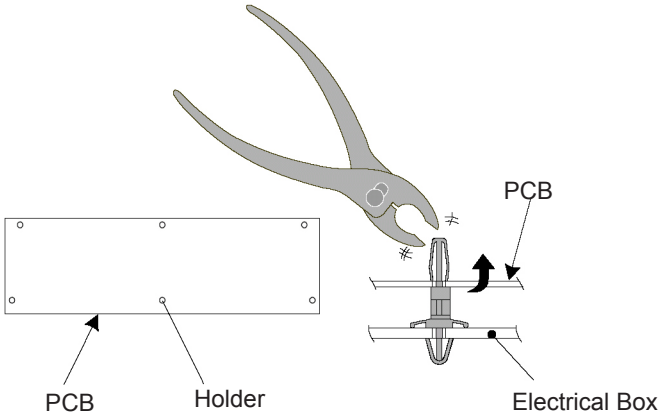
1. Remove the three (3) screws fixing the bell-mouth onto the drain pan and remove the bell-mouth.
2. Remove the runner by removing the nut and the washer fixing it.
3. Remove the earth wire for the fan motor. (Only for 4, 5 and 6 HP).
4. Disconnect the fan motor connector.
5. Remove the fan motor by removing the three (3) nuts fixing it. (When reassembling the fan motor, tighten the fan motor with a maximum torque around 8 N-m.)



9.4.7. Removing the printed circuit board (PCB)

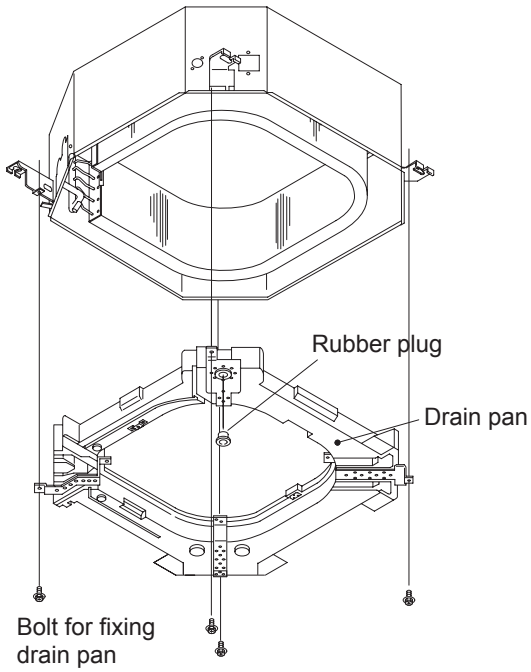
1. Remove the air intake grille according to the section "Removing the air intake grille" in this chapter.
2. Remove the electrical box cover according to the section "Removing the electrical box cover"in this chapter.
3. Disconnect all wiring connectors of the PCBs.
4. Remove the PCBs by pressing the expanded part of the holders using long-nose pliers as shown in the picture below.





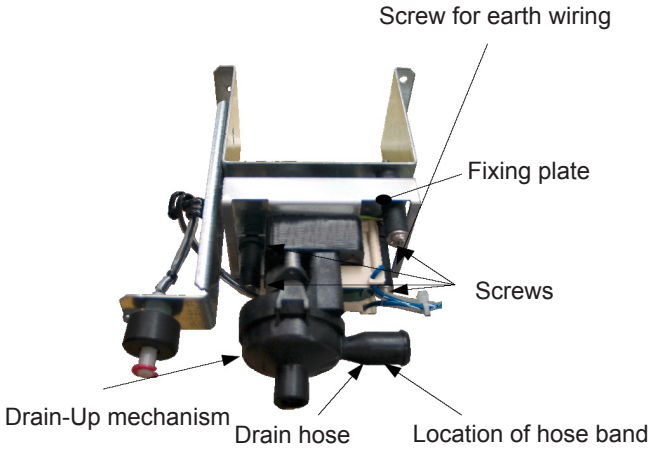
9.4.8. Removing the drain pan

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.
2. Remove the electrical box cover according to the section "Removing the electrical box cover" in this chapter. 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 section "Removing the fan runner and fan motor" in this chapter.
4. Check if the drain hole is clogged.(Do not use a cutter when removing the rubber plug. If used, the rubber plug will be damaged.)
5. Remove the drain pan by removing the four (4) bolts fixing it.



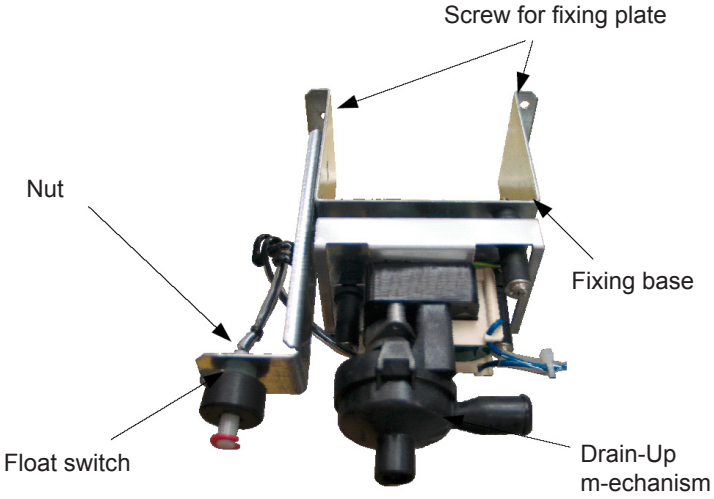
9.4.9. Removing the drain-up mechanism

1. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
2. Remove the hose band and remove the drain hose.
3. Remove the screw of the ground wiring.
4. Hold the drain-up mechanism and remove the three (3) screws of the fixing plate for the drain-up mechanism.
5. Remove the drain-up mechanism together with the fixing plate.



9.4.10. Removing the float switch

1. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
2. Loosen the resin nut for fixing the float switch and remove the float switch. Remove the two (2) screws of fixing base fixing the drain-up mechanism when removing the drain-up mechanism.

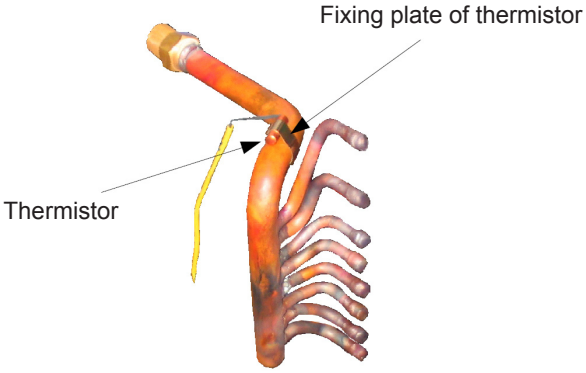


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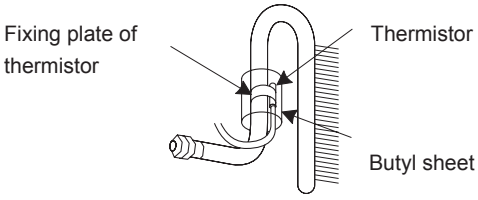
9.4.11. Removing the thermistor for liquid pipe and gas pipe

1. Remove the optional air panel according to the section "Removing the Optional Air Panel" in this chapter.
2. Remove the bell-mouth according to the section "Removing the fan runner and fan motor" in this chapter.
3. Remove the drain pan according to the section "Removing the Drain Pan" in this chapter.
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.

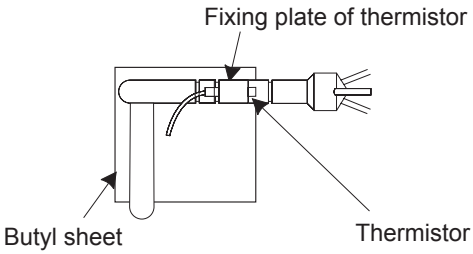
(Up-close view of thermistor installation)



(Thermistor gas pipe)

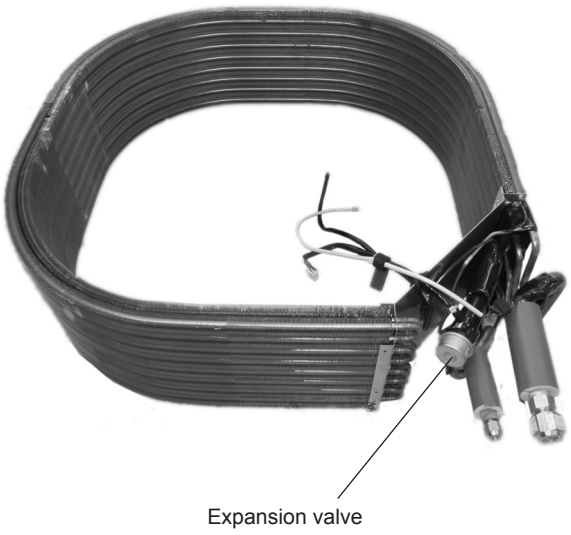


(Thermistor liquid pipe)



9.4.12. Removing the electronic expansion valve coil

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.
2. Remove the bell-mouth according to the section "Removing the fan runner and fan motor" in this chapter.
3. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
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 break.*

6. Tturn the lock nut by a few turns, and then, 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.

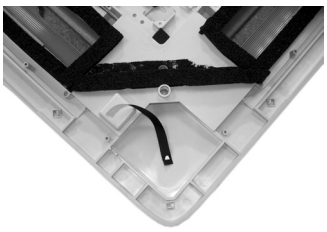
	NOTE
-	*During replacement work, pay attention to the separation part and prevent the dust, foreign particle, etc. from entering into the separation part. (The exposed part by separation is the mechanical part of the valve.)*
-	*Do not damage the junction part of the valve with the tools.*

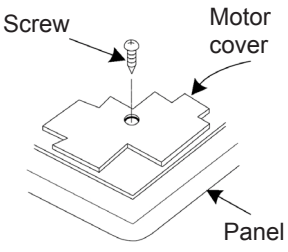
8. Put the drive part onto the valve body, hold them with their axes matching and attach the lock nut to the screw part of the valve body.

9. Tighten the lock nut with a spanner after tightening it 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 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 in the right 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.*

10. After completion of the replacement, attach the electronic expansion valve in the reverse procedures for removing.





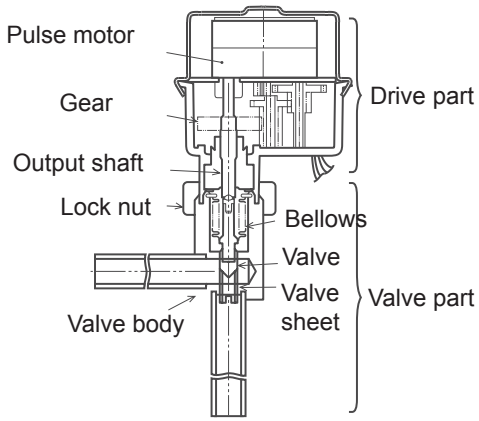
9.4.13. Removing the automatic louver motor

1. Remove the optional air panel according to the section “Removing the Optional Air Panel” in this chapter.

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.



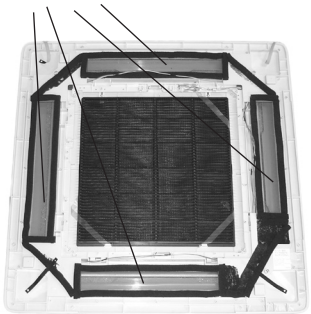
Adjustment of direction is not required.

(However, pay attention not to touch the pipes or the drain pan.)

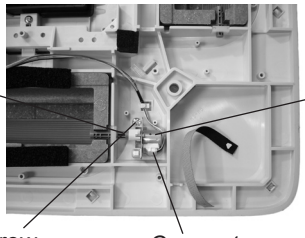


Direction of drive part

4 Automatic swing louvers



(Air pannel corner)

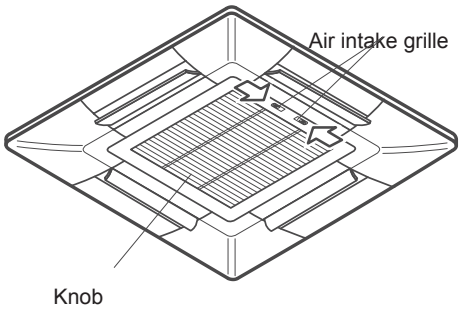


9.5. RCIM-(1.5-2.0)FSN2

9.5.1. Removing the air filter

1. The air filter is located inside the air intake grille. Detach the filter after opening the air intake grille by pushing the knob in the arrow mark direction. Then, the air intake grille can be opened.

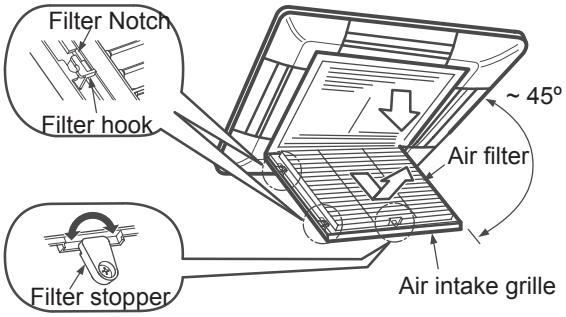
2. The filter can be removed from the air intake grille by supporting the lower side of the air intake grille and filter, and unhooking it from the extruded part.



9.5.2. Removing the air intake grille

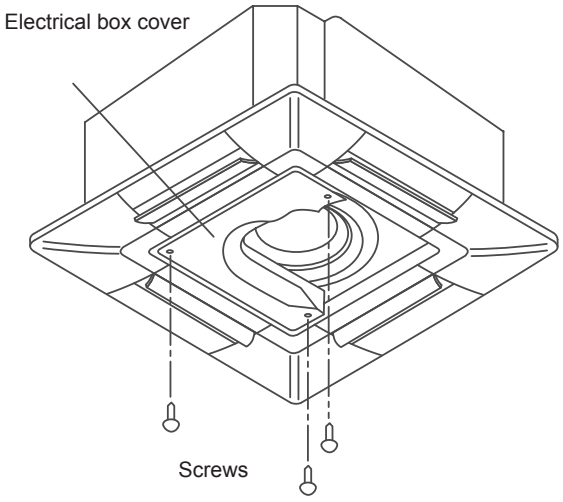
1. By lifting the air intake grille at an angle of approximately 45° and releasing its chain, the air intake grille can be removed by holding it upwards and then towards you. If the chain is released and the angle is 90°, the air intake grille can not be removed, and could break the plastic holders.

	NOTE
-	*If the louvers are moved due to cleaning or for any reason, set the "Auto swing" mode to turn the four louvers into the same position*



9.5.3. Removing the electrical box cover

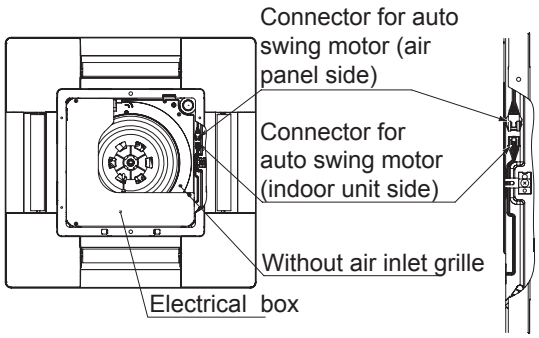
1. By opening the air intake grille, the electrical box can be seen. Remove the three (3) screws fixing the electrical box cover and remove the cover.



9.5.4. Removing the optional air panel

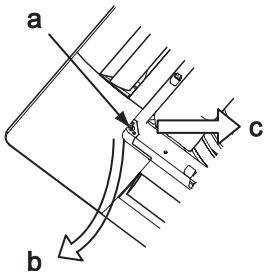
1. Open the intake air grille and disconnect the connector for the auto louver

Enlarged view

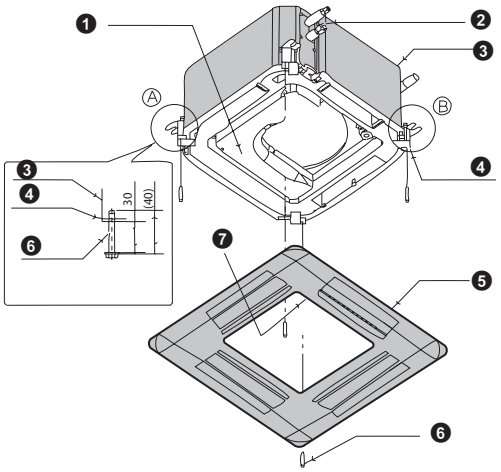


2. Removing the four (4) corner covers of the optional air panel. Remove screw (a) from the front panel side. Unhook two hinges by moving in the arrow mark direction (b). Remove the four corner covers by moving in the arrow mark direction (c).

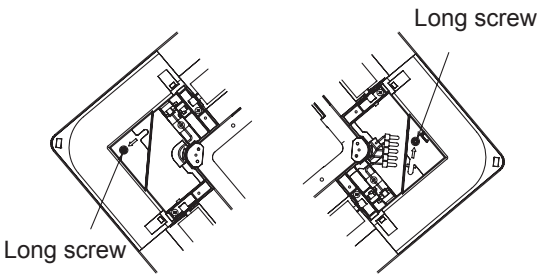
3. Loosen two screws, A and B fixing the air panel onto the indoor unit. Remove other two screws. (Remove the screw located on the printed “PIPE SIDE” and the screw located on the opposite side).



❶ Electrical control box
❷ Refrigerant pipe connections
❸ Indoor unit
❹ Fixing plate
❺ Air panel
❻ Long screw (4 each)
❼ Indication “PIPE 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.

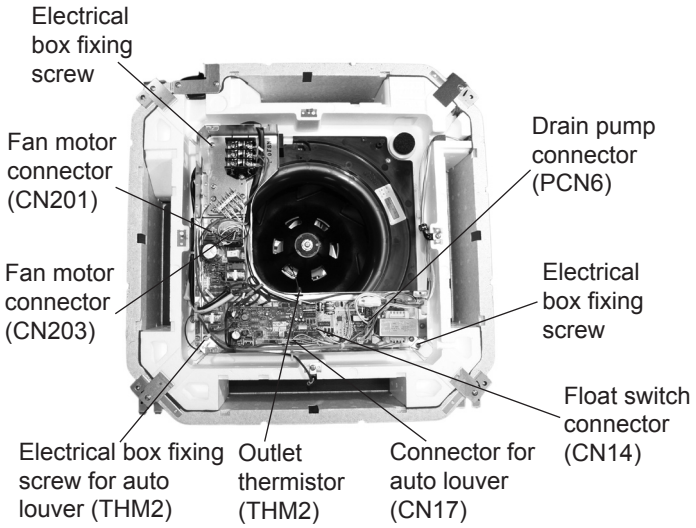


9

9.5.5. Removing the fan runner and fan motor

1. Remove the intake air grille according to the sections “Removing air filter” and “Removing the intake air grille” in this chapter.

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.

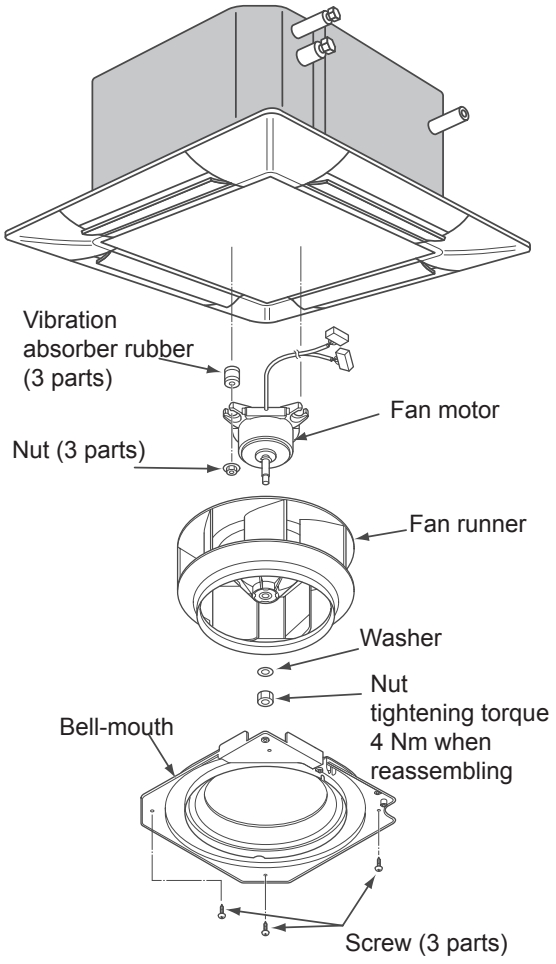


9.5.6. Removing the bell-mouth

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.*



9.5.7. Removing the printed circuit board (PCB)

1. Remove the air intake grille according to the section "Removing the air intake grille" in this chapter.
2. Remove the electrical box cover according to the section "Removing the electrical box cover" in this chapter.
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

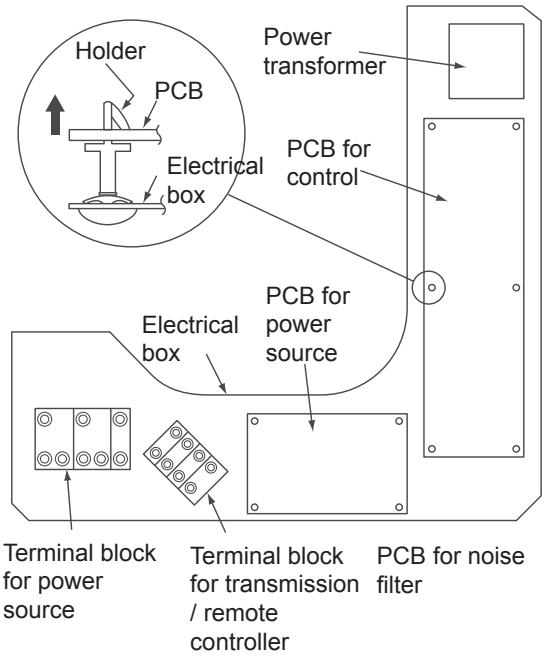
- *Do not touch the electrical components on the PCBs.*
- *If big force is applied to the PCB, it will be faulty.*
- *Pay attention to the connector's position on PCB when reassembling. If assembled at the incorrect position, PCB will be faulty.*

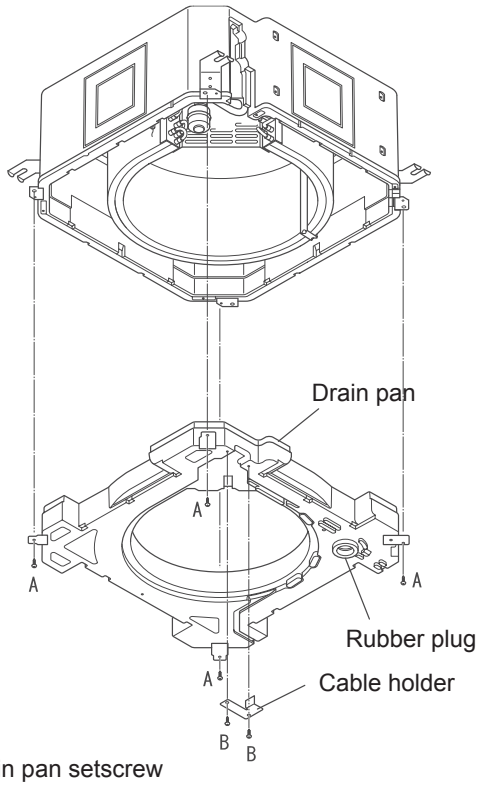
9.5.8. Removing the drain pan

1. Remove the optional air panel according to "Removing optional air panel" in this chapter.
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 the two (2) 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 its bottom.
   – (Do not damage or pull out 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 (4) screws fixing the drain pan onto the indoor unit.
   – Remove the drain pan by pulling it downwards.

NOTE

- *Do not use sharp-sectioned 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.*



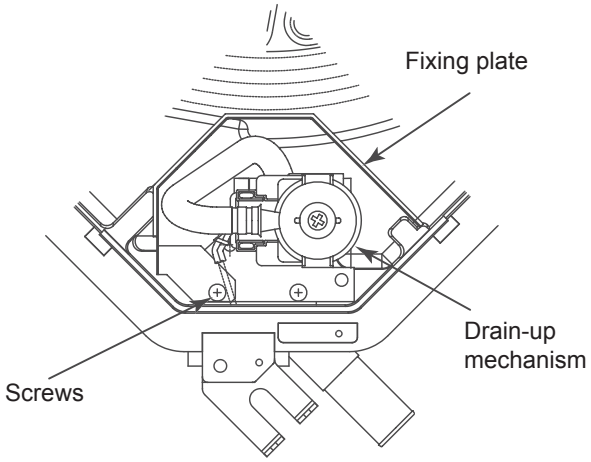


A : Drain pan setscrew

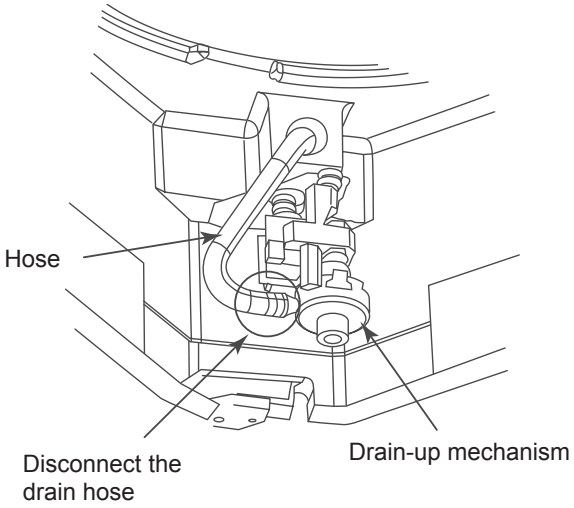
B : Screw for cable holde

9.5.9. Removing the drain-up mechanism

1. Remove the drain pan according to the section "Removing the drain pan" in this chapter.

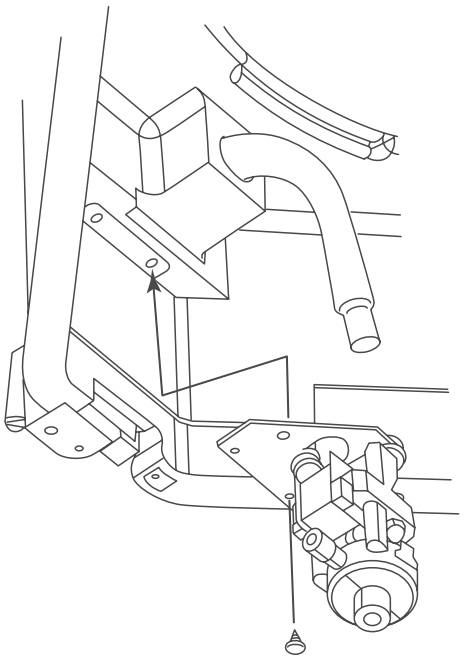


2. Remove the hose band and remove the drain hose.



3. Remove the screw of the ground 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.*

9.5.10. Removing the float switch

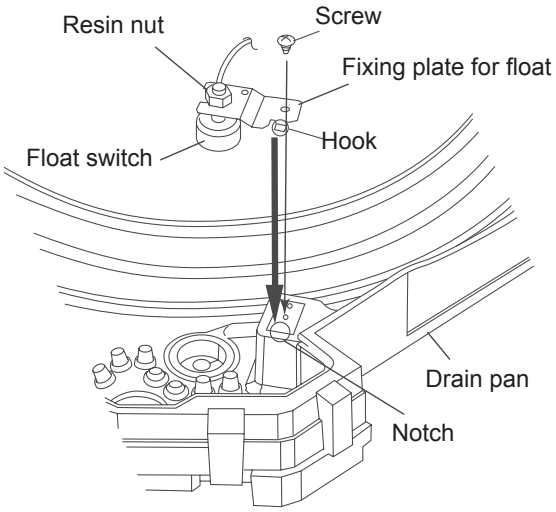
1. Remove the drain pan according to the section “Removing drain pan” in this chapter.

2. Removing the 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.

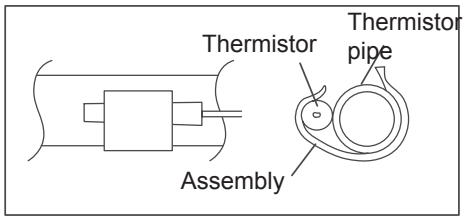
	NOTE
-	*When reassembling, the tightening torque for the resin nut shall be within the range of 0.3 – 0.4 Nm.* *If the tightening torque is hither than this, the resin nut will be damaged.*

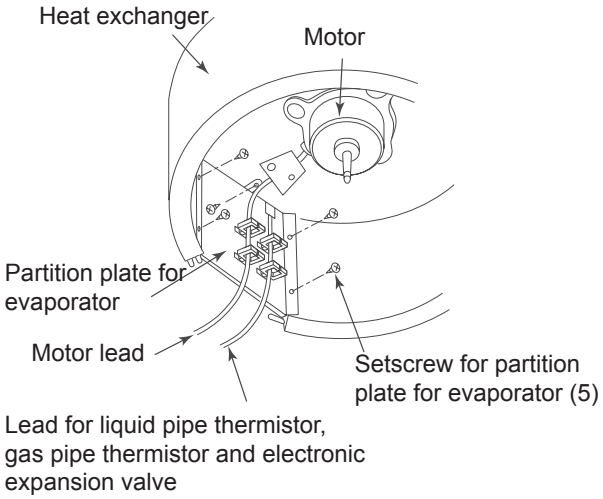


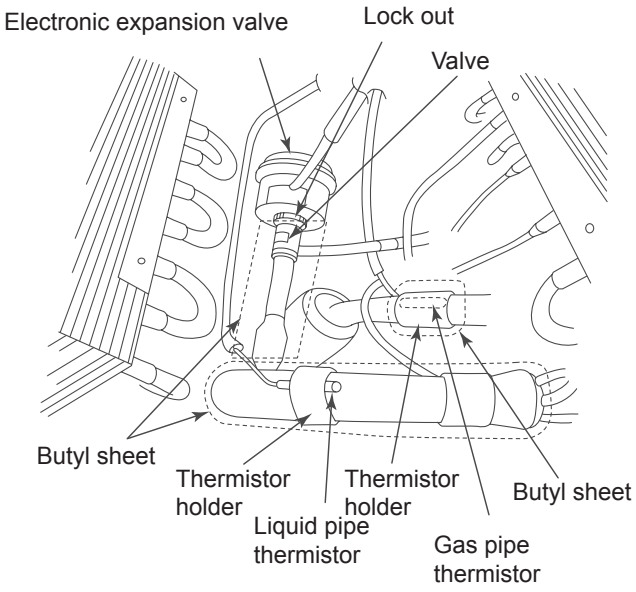
9.5.11. Removing the thermistor for liquid pipe and gas pipe

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.
2. Remove the bell-mouth according the section "Removing the fan runner and fan motor" in this chapter.
3. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
4. Remive the partition plate for evaporator fixing the heat exchanger by removing the five (5) 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:



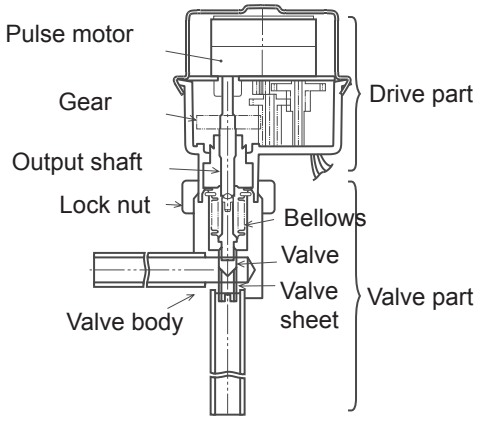




9.5.12. Removing the electronic expansion valve coil

1. Remove the optional air panel according to the section “Removing the optional air panel” in this chapter.
2. Remove the bell-mouth according to the section “Removing the fan runner and fan motor” in this chapter.
3. Remove the drain pan according to the section “Removing the drain pan” in this chapter.
4. Remove the butyl sheet wrapped around the electronic expansion valve.
5. 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 drive part when loosening the lock nut by spanners. The base of the drive part may turn idle and be broken.*



Adjustment of direction is not required.

(However, pay attention not to touch the pipes or the drain pan.)



Direction of drive part

6. Turn the lock nut by a few turns. Then, the drive part separates from the screw and can be removed.

7. 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 sensitive part of the valve is its mechanical system.)* *Do not damage 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 must be within the range of:
   12 Nm – 15 Nm.

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 in the right 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.*

10. After the replacement, attach the electronic expansion valve in the reverse procedures for removing. Apply the butyl sheet firmly.

NOTE
- *Check that the cables do not touch the fun runner after assembling.*

9.5.13. Removing the automatic louver motor

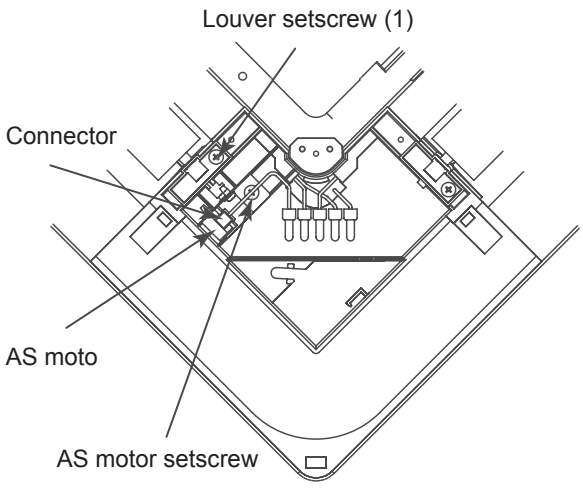
1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.

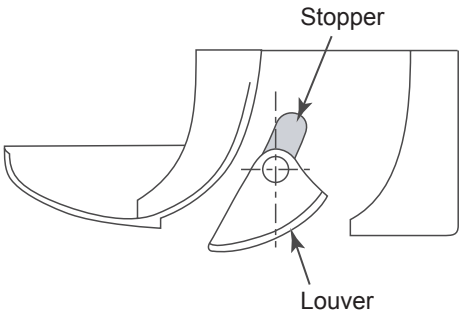
2. Disconnect the connecter connected to the AS motor.

3. Remove one (1) 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.





9.6. RCD-(1.5~5.0)FSN2

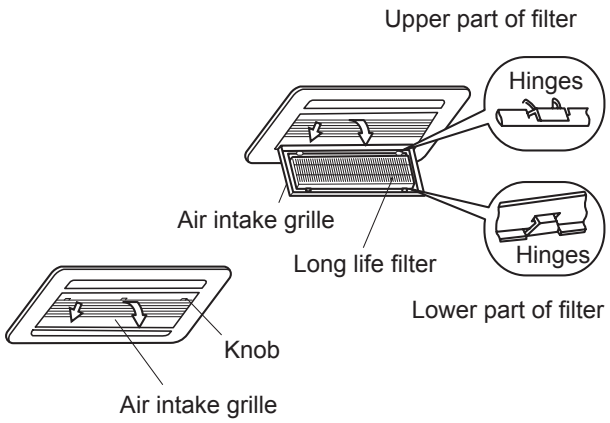
2-way cassette

9.6.1. 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 knobs as shown besides.

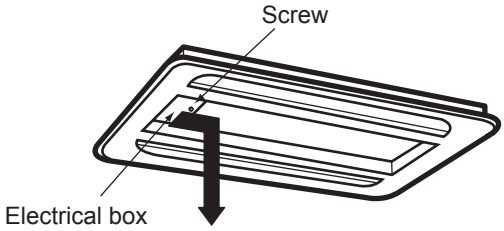
2. Detach the filter after opening the air inlet grille. You can remove the filter from the air inlet panel by supporting the louver side of the air inlet grille and the filter, and by unhooking the grille from the extruded part.

3. The air inlet grille can be remove by releasing the chain of the air inlet grille, lifting the chain upwards, and then drawing the chain towards you.



9.6.2. Removing the electrical box panel

The electrical box can be disassembled by opening the air intake grille. Loosen one (1) screw that fix the electrical box panel and remove the panel.

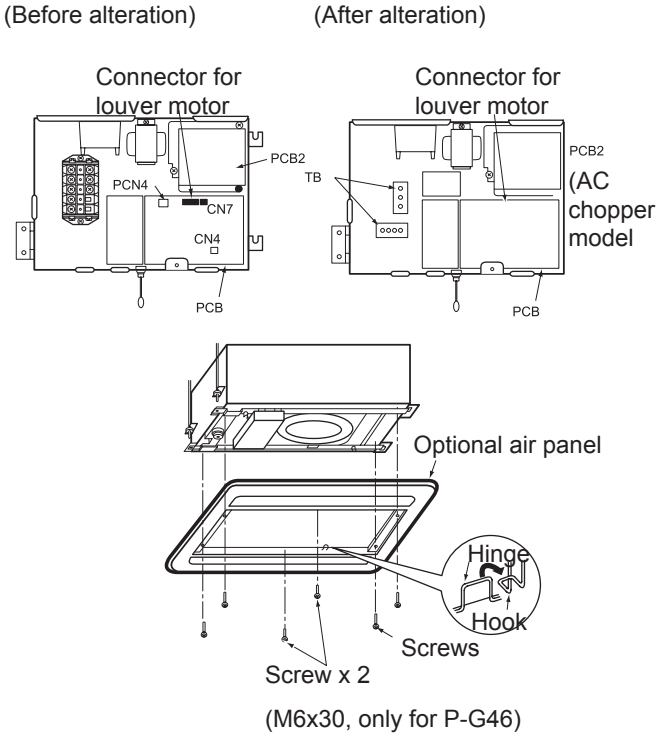


9.6.3. Removing the optional air panel

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 (4) screws that fix the optional air panel.

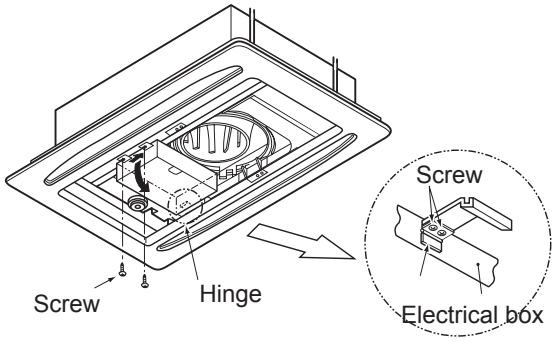
3. Remove the optional air panel after unhooking the hinge off the hooks at the two positions near the drain pan.



9.6.4. Removing the fan runner and the fan motor

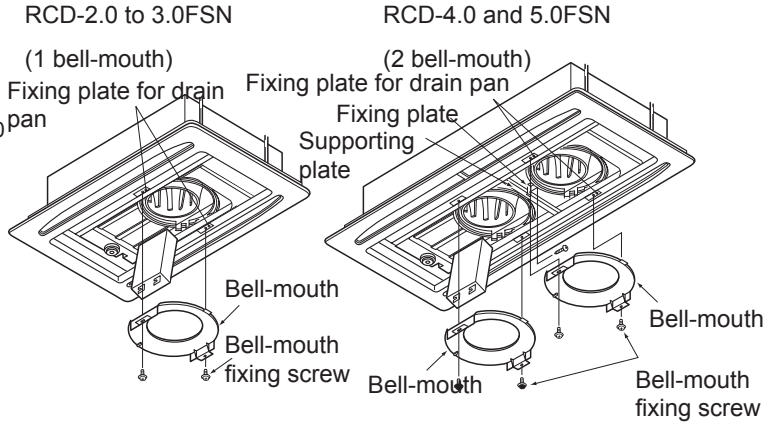
1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.

2. Removing the electrical box.
   – Disconnect the connectors for each wire.
   – Remove the two screws that fix the electrical box and turn the electrical box downwards by approximately 90°. (The electrical box is hung by the hinge. Do not remove the fixing screw for the hinge).



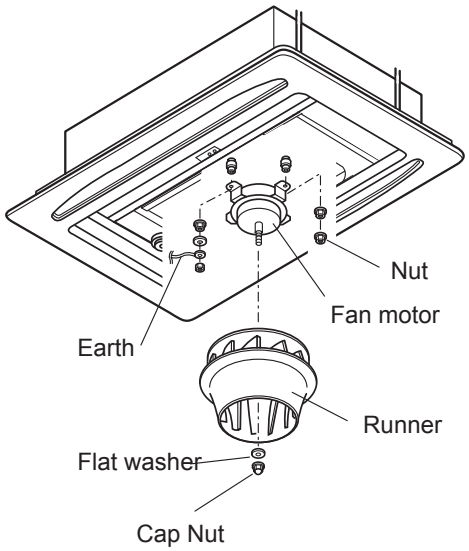
3. Removing the bell mouth

   Remove the fixing plate after removing one (1) screw fixing 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 (2) screws that fix the bell mouth onto the fixing plate for the drain pan of the indoor unit



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).

	NOTE
-	*Qty of fan runner and fan motor:* *RCD-2.0 to 3.0FSN): 1* *RCD-4.0 and 5.0FSN): 2*



9

9.6.5. 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) using long-nose pliers.
4. Remove the three fixing screws for the AC chopper. (When reassembling, pay attention not to squeeze, because the sealed ground wire and the transformer ground wire are commonly squeezed by one screw).

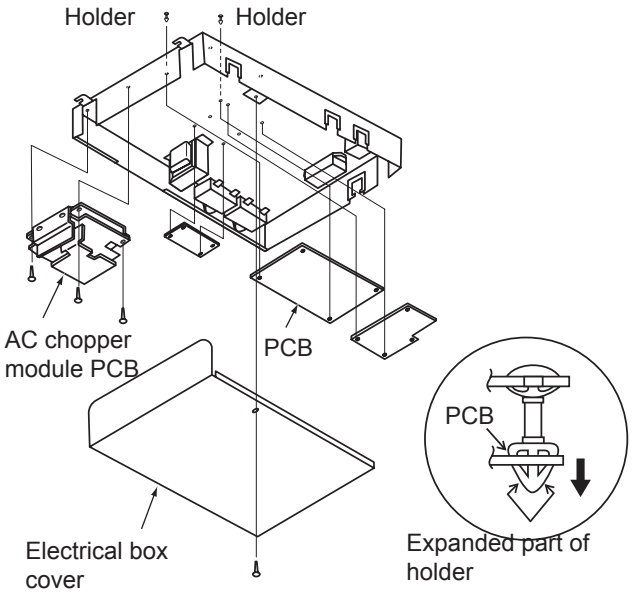
	NOTE
-	*Do not touch the electrical components on the PCB. If you apply a great force to the PCB, the PCB will be faulty.*

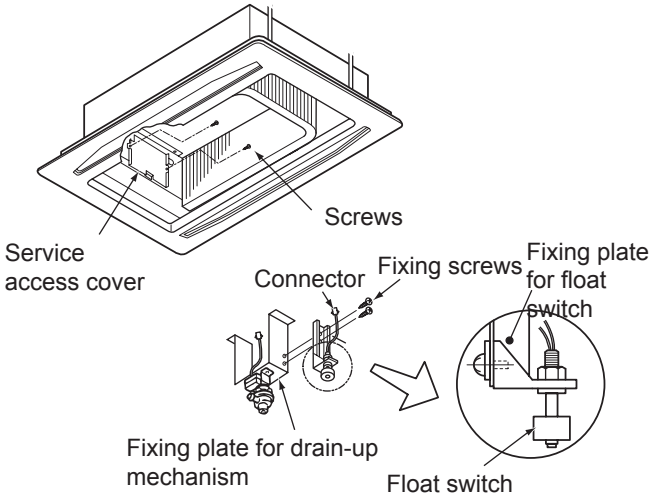
9.6.6. Removing the float switch

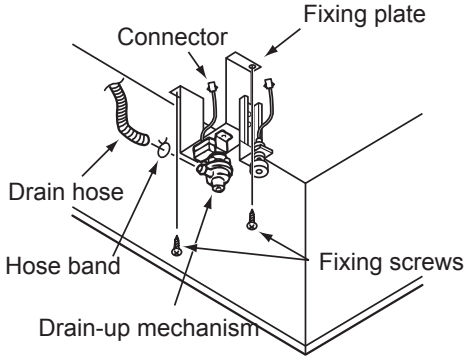
1. Remove the air inlet grille according to the section Removing the long-life filter and the Air inlet grille" in this chapter..
2. Remove the bell mouth according to the section "Removing the Fan runner and the Fan motor".
3. Remove the panel after removing the two (2) fixing screws for the panel of 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 the two (2) screws fixing the fixing plate for the float switch onto the fixing plate for the drain-up mechanism.

9.6.7. 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. After that, remove the hose band from the drain hose. Then, disconnect the drain hose, and finally remove the drain-up mechanism.







9.6.8. Removing the drain pan

1. Remove the air inlet grille according to the section "Removing the long-life filter and the Air inlet grille" in this chapter.

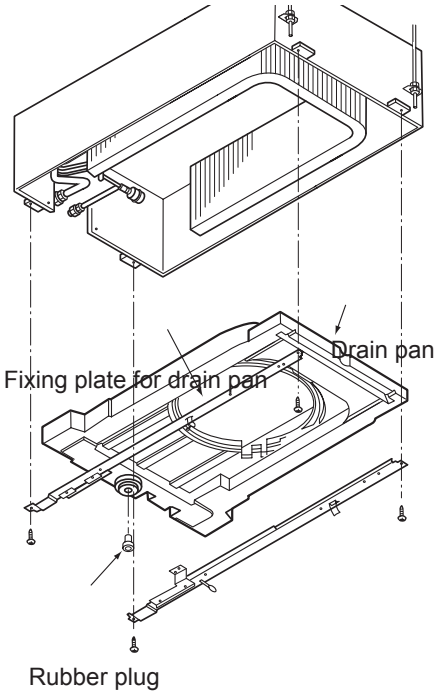
2. Open the electrical box panel according to the section "Removing the electrical box panel". Disconnect the connect wire between the indoor unit and the outdoor unit, the electrical wiring for the electrical box and the connectors inside of the electrical box.

3. Remove the bell-mouth according to the section "Removing the Fan runner and the Fan motor in this chapter.".

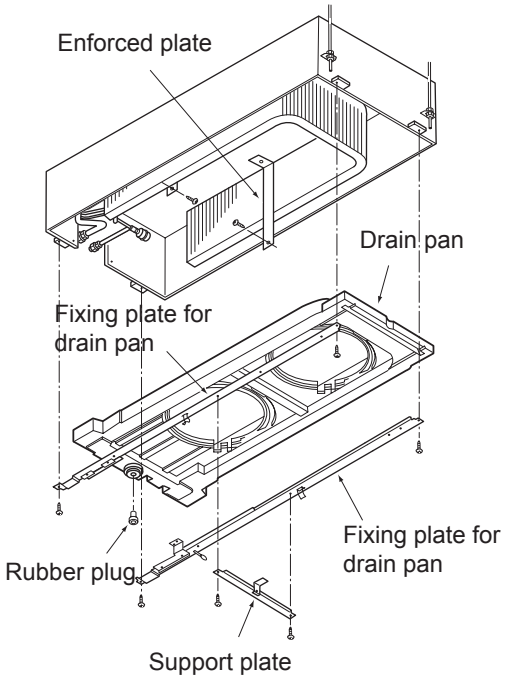
4. Discharge the drain water on the drain pan by removing the rubber plug. The sealing agent is used around the rubber plug. However, you can remove the rubber plug by pulling out the rubber plug. Do not scratch the rubber plug with a cutter and others. Make sure that the water hole is not clogged by pricking the water hole with a pencil or similar.

5. Removing the drain pan:
   – Remove the two (2) 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 3.0 FSN

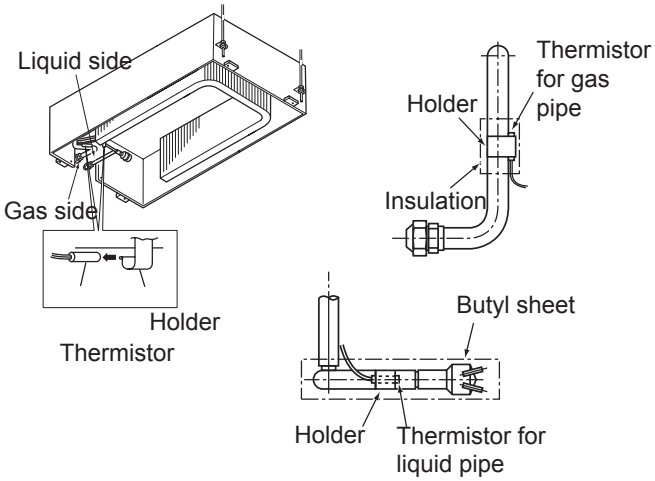


RCD-4.0 and 5.0 FSN



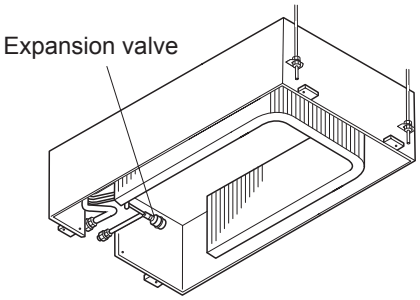
9.6.9. Removing the thermistor for liquid pipe and gas pipe

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.
2. Remove the bell mouth according to the section "Removing the fan runner and the fan motor" in this chapter.
3. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
4. Remove the insulation material for the pipe, remove the thermistor holder from the gas piping and remove the thermistor for the gas pipe.
5. Remove the butyl sheet, remove the thermistor holder from the liquid piping and remove the thermistor for the liquid pipe.



9.6.10. Removing the electronic expansion valve coil

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.
2. Remove the fan assembly according to the section, "Removing the fan runner and the fan motor" in this chapter.
3. Remove the drain pan according to the section "Removing the drain pan" in this chapter.
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 using 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 sensitive part of the valve is its mechanical system.) Do not damage the junction part of the valve with the tools.*

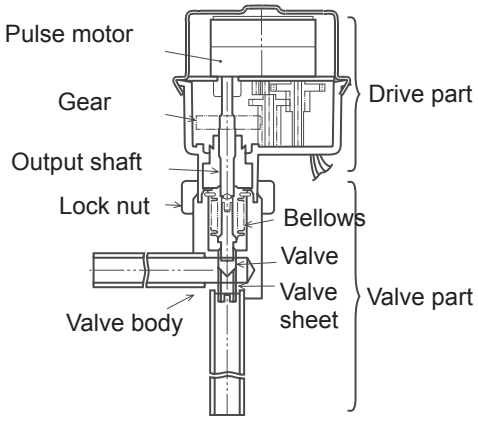
8. Put the drive part onto the valve body, hold the drive part and the valve body with their axes matching and attach the lock nut to the screw part of the valve body.

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

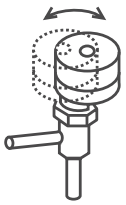
- *Do not apply great forces, such as the rotating torque and the bending load, to the motor by holding the motor by hand when you are tightening the lock nut.*
  The direction of the eccentric part of the motor is assembled as the eccentric part of the expansion valve. Although the motor is directed 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 in the right 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.

10. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.



Adjustment of direction is not required.

(However, pay attention not to touch the pipes or the drain pan.)



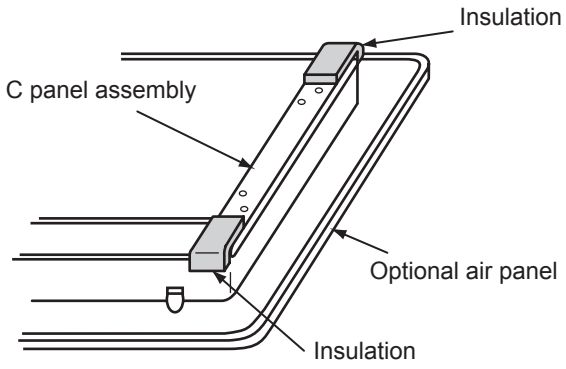
Direction of drive part

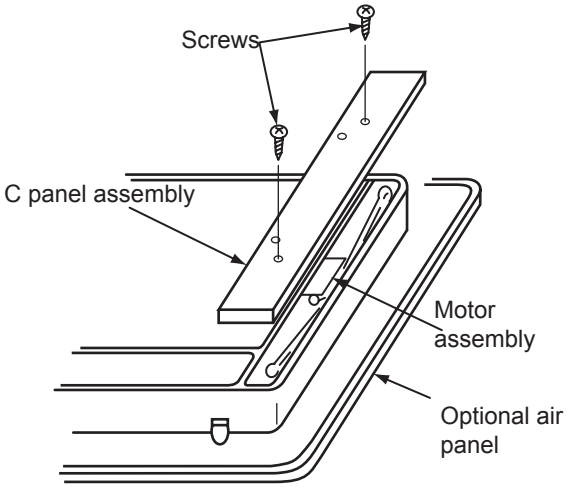
9

9.6.11. Removing the automatic louver motor

1. Remove the optional air panel according to the section "Removing the optional air panel" in this chapter.

2. Remove the insulation material that is mounted with the adhesive at both sides of the C panel assembly.

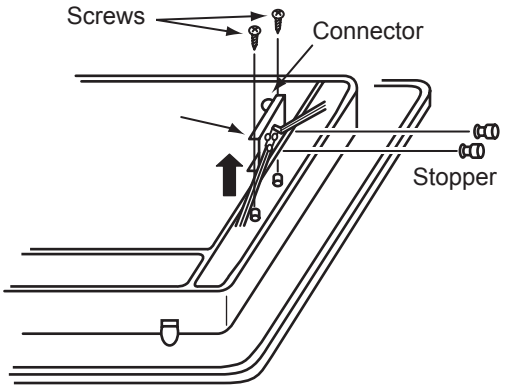


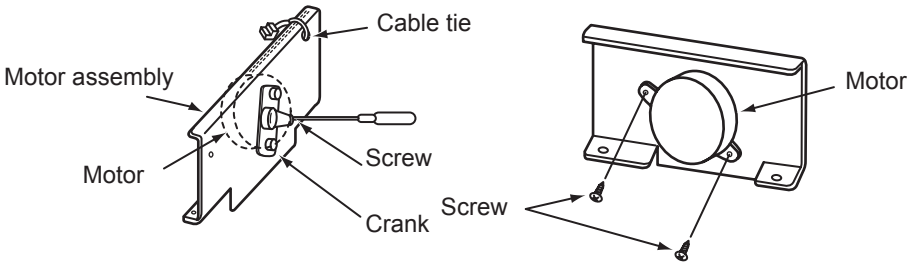


3. Remove the two (2) screws that fix the C panel assembly and remove the C panel assembly from the optional air panel.

4. Remove the two (2)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 (1) screw that fixes the crank and cut the cable tie that fixes the motor cord.
   Remove the motor after removing the two fixing screws.





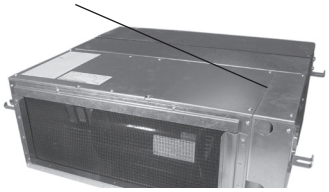
9.7. RPI-(1.5~6.0)FSN2E

9.7.1. Removing the electrical box and electrical parts

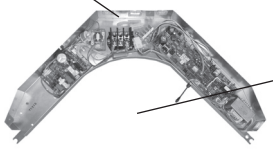
1. Remove Electrical box cover, for accessing the electrical components.

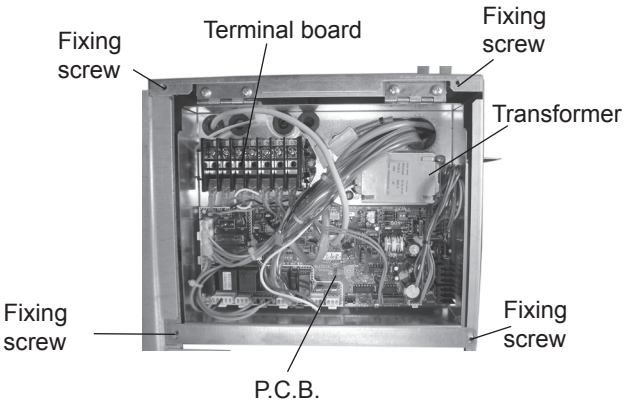
	NOTE
-	*The photographs ilustrates the servicing procedures for the RPI 0.8~1.5 FSN2E duct unit model. For RPI 2.0~6.0 FSN2E and RPI 8.0~10.0 FSN1E, the servicing procedures are carried out in the same way.*
-	*RPIM 1.5 servicing procedures are ilustrated before the following explanation of the RPI units.*

Electrical box cover location



Electrical Box cover





2. It is possible to remove electrical box from the unit by taking out the attaching screws. The electrical box is equiped with a hinge.



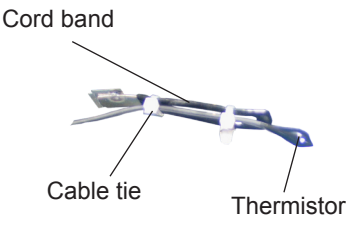
9.7.2. Removing the inlet air thermistor

	NOTE
-	*To disconnect this component properly from the PCB, see the Electrical wiring diagram chapter of this manual.*

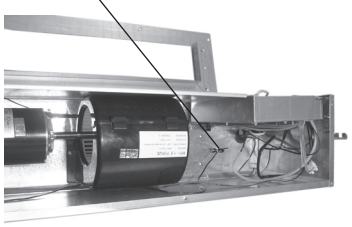
1. Remove the screws that fix the back cover.

   The thermistor is located as shown in the detail

Cord band



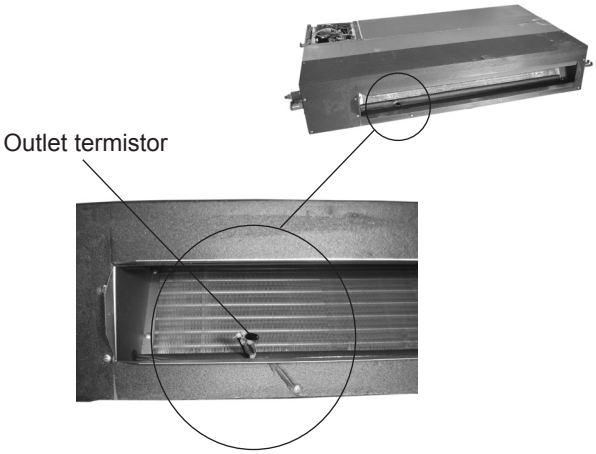
Air inlet thermistor location



9.7.3. 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.

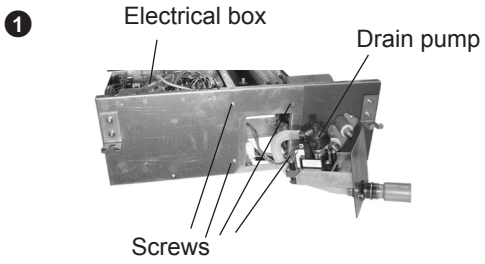


9.7.4. Removing the liquid and gas pipe themistors

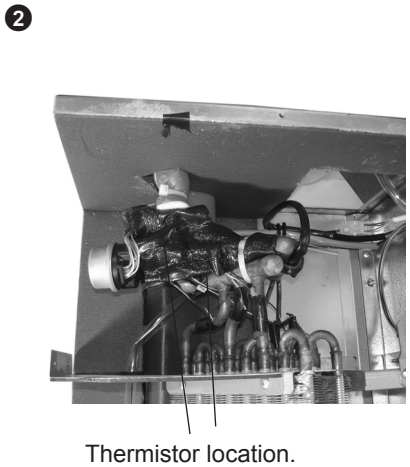
	NOTE
-	*To disconnect this component properly from the PCB, see the Electrical wiring diagram chapter of this Manual.*
-	*Cover the thermistors with the cork tape or pipe insulation according to each location. Both materials are factory supplied. Replace them if damaged during the servicing.*

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.



9.7.5. Removing the fan parts

Parts list: (Fan motor / Fan casing / Runner).

1. Remove the tape located on the center of the casing, push clousing lockers and remove the half part of the casing.

2. Take out the screws from the fixing brackets, and remove fan motor together with the fan runners carefully.

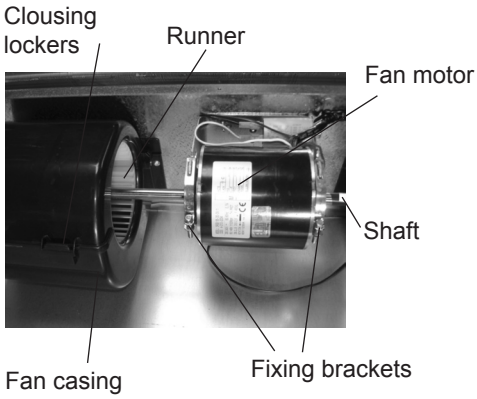
3. Loosen the screws that fix fan runners from the shaft.

4. In case of removing the whole fan casing, it must be removed first the second half of the fan casing, removing the screws which fix it to the fan motor stay.

❶



❷



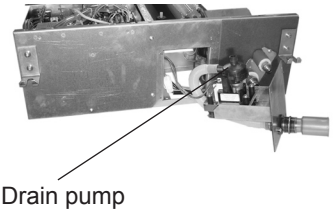
9.7.6. Removing the drain pump

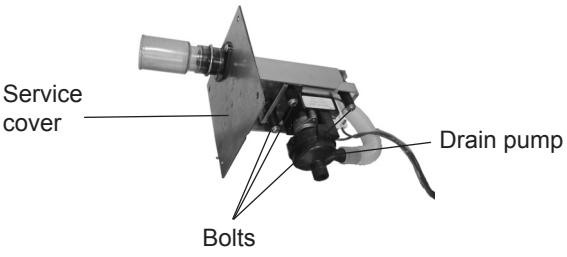
	NOTE
-	*To disconnect this component properly from the PCB, see the electrical wiring diagram chapter of this manual*

1. Take out the drain pump from the drain pump support by removing the bolts.

2. 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.*



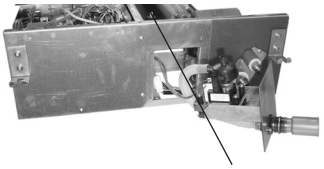


9.7.7. Removing the float switch

	NOTE
-	*To disconnect this component properly from the PCB, see the Electrical wiring diagram chapter of this Manual*

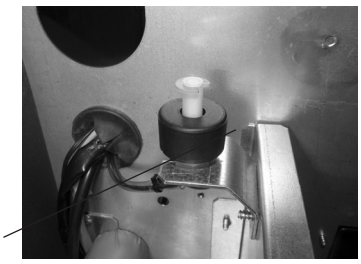
1. Perform steps for removing the covers described before.
2. Loosen the screws that fix the float switch to the stay.

❶



Float switch location

❷

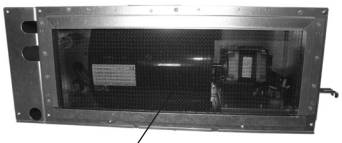


Float switch

9.7.8. Removing the air filter

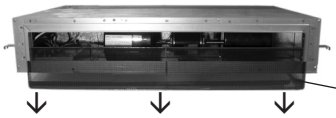
1. Take out the air filter support by removing the screws.
2. Slide down the air filter.

❶



Air filter support

❷



Air filter



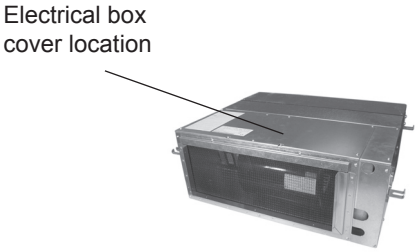
Air filter support

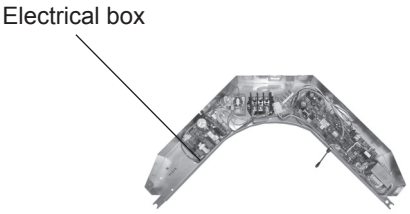
Screws

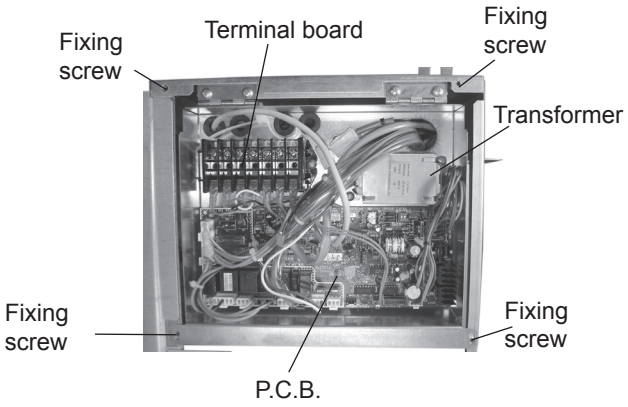
RPIM 1.5 FSN2E

◆ 9.7.1.1. Removing the electrical box and electrical parts

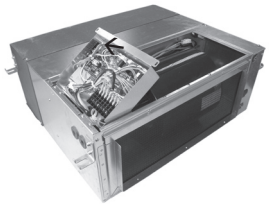
1. Remove Electrical box cover, for accessing the electrical components.







2. It is possible to remove the electrical box from the unit by taking out the attaching screws.

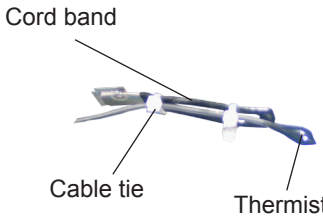


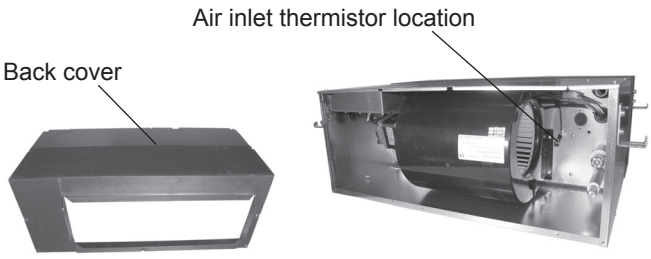
◆ 9.7.1.2. Removing the inlet air thermistor

	NOTE
-	*To disconnect this component properly from the PCB, see the Eeectrical wiring diagram chapter of this manual*

1. Remove the screws that fix the back cover.

   The thermistor is located as shown in the detail



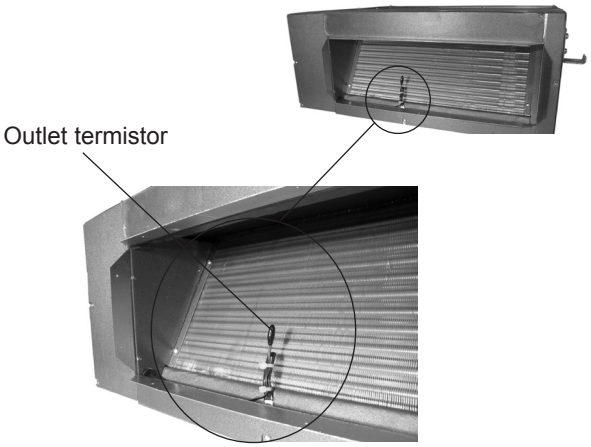


9

◆ 9.7.1.3 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.

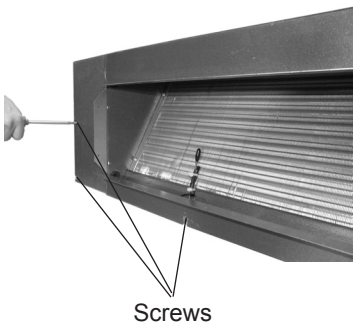


◆ 9.7.1.4. Removing the liquid and gas pipe themistors

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.

❶



❷

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.



Thermistor location.

Black connector: liquid th.

Yellow connector: gas th.

◆ 9.7.1.5. **Removing the fan parts**

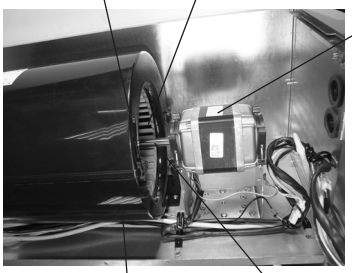
Parts list: (Fan motor / Fan casing / Runner).

1. Perform steps for removing the covers described before.
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 the fan motor together with the fan runners carefully.
4. Loosen the screws fixing the fan runners from the shaft.
5. In case of removing the whole fan casing, it shall be removed the second half of the fan casing by removing the screws which fix it to the Fan motor stay.

❶



❷

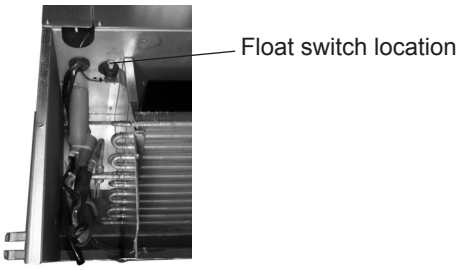


◆ 9.7.1.6. **Removing the float switch**

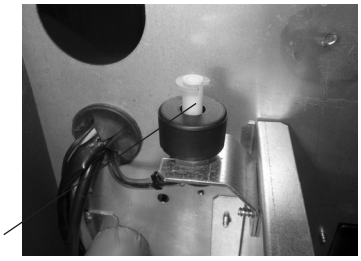
	NOTE
-	*To disconnect this component properly from the PCB, see the Electrical wiring diagram chapter of this Manual*

1. Perform steps for removing the covers described before.
2. Loosen the screws that fix the float switch to the stay.

❶



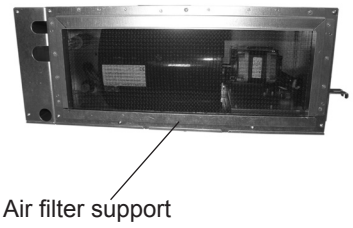
❷



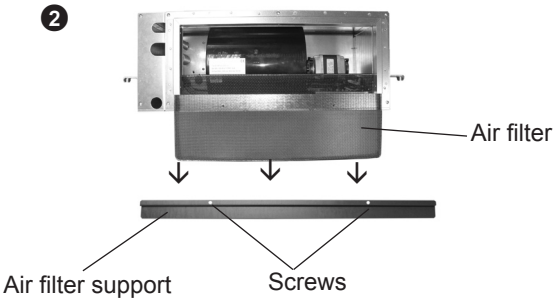
◆ 9.7.1.7. **Removing the air filter**

1. Take out the air filter support by removing the screws.
2. Slide down the air filter.

❶

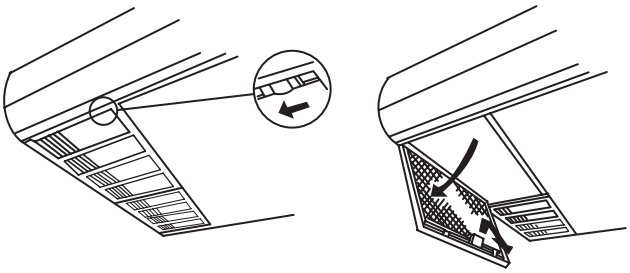


❷



9.8. RPC-(2.0~6.0)FSN2E

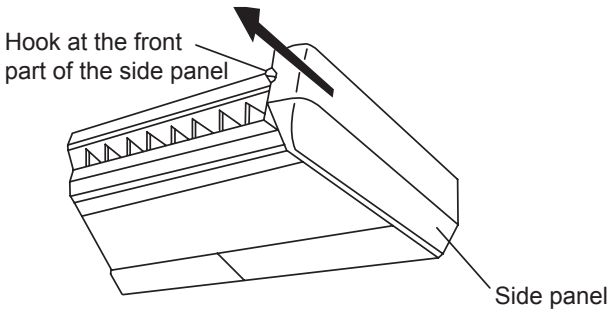
Ceiling type



9.8.1. Removing the air filter

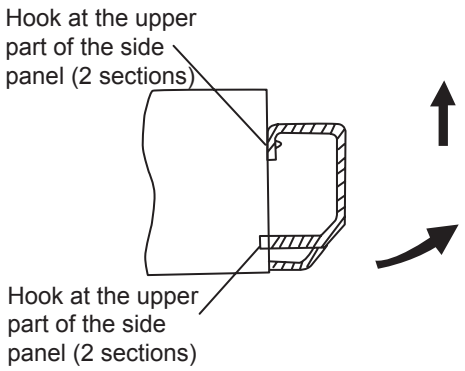
The air filter is located inside of the air inlet grille. Remove the air filter after opening the air inlet grilles.

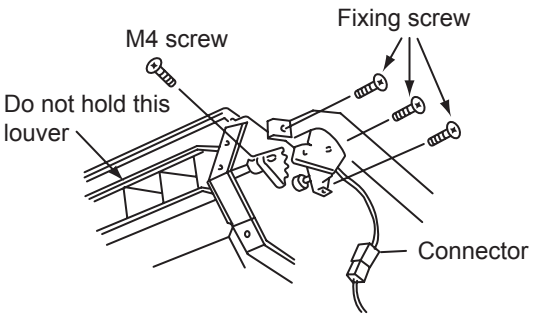
1. Push the knobs of the air inlet grille backwards.
2. Open the air inlet grille downwards.
3. By lifting up the knob, you can remove the filter.



9.8.2. Removing the side panel

1. Pull the side panel towards you.
2. Unhook the hook at the lower part of the side panel.
3. Lift up the side panel.

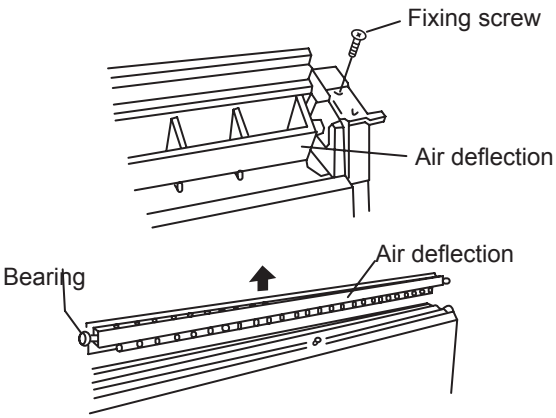




9.8.3. Removing the discharge air grille

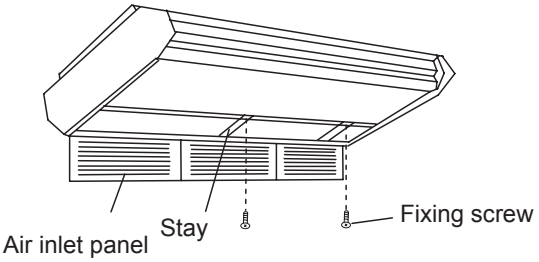
1. Remove the side panel according to the section "Removing the side panel" in this chapter.
2. Remove the crank assembly that is mounted on the right-side shaft of the air deflector.

Deflector including the bearing after removing the four fixing screws at the right and the left.

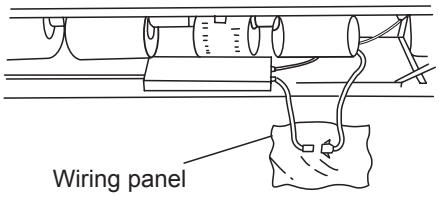


9.8.4. Removing the fan motor

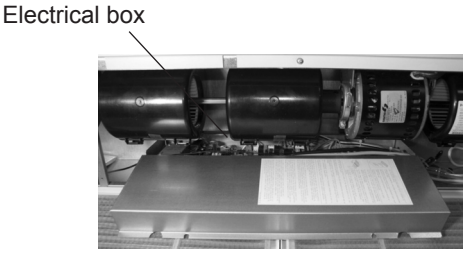
1. Open the air inlet grille according to the section "Removing the air filter" in this chapter.



2. Remove the stay at the air inlet.

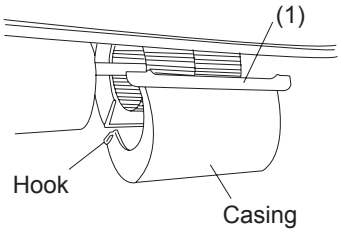


3. Disconnect the connector for the indoor fan motor.

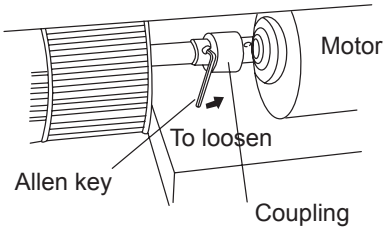


4. Hook the electrical box on the lower frame after removing the screws that fix the electrical box.

	NOTE
-	*During this work, support the electrical box by hand and make sure not to drop it*

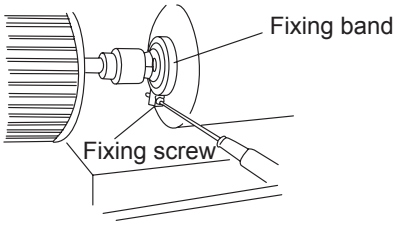


5. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.



6. Loosen the screws using an allen key.

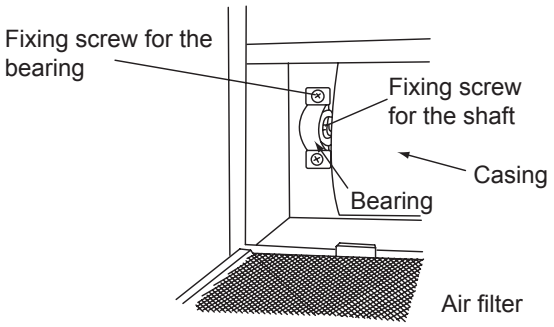
7. After removing the fixing band, remove the fan motor by sliding the fan motor backwards. Pay attention not to drop the fan motor.



9

9.8.5. 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).

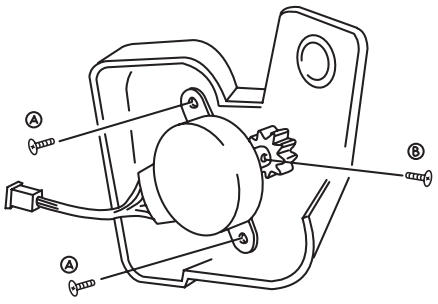


9.8.6. Removing the coupling

1. Remove the side panel according to the section "Removing the side panel" in this chapter.
2. Separate the casing into two pieces according to the section "Removing the fan motor" in this chapter. Loosen the screw for the coupling using a hexagon wrench.
3. Remove the M8 screw that fixes the bearing, according to the section "Removing the bearing" in this chapter..
4. Remove the coupling after removing the shaft and the fan assembly.

9.8.7. Removing the automatic louver motor

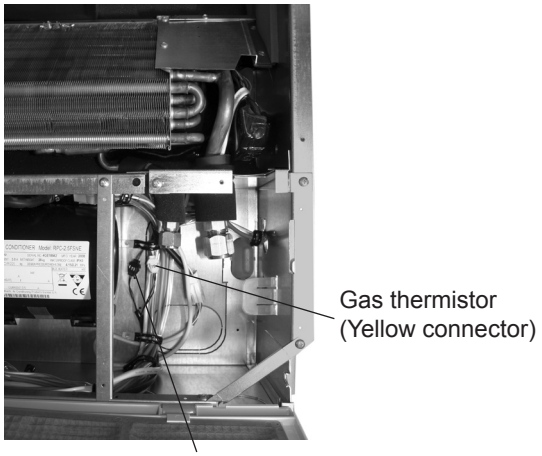
1. Remove the right-side panel according to the section "Removing the side panel".
2. Remove the M4 screws and remove the AS motor assembly from the right shaft of the discharge air grille. Pay attention not to damage the AS motor assembly.
3. Remove the two screws (A) that fix the motor for the auto-louver 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.

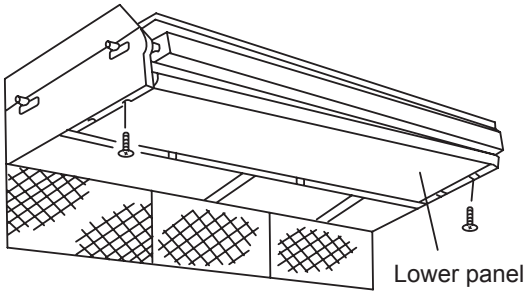


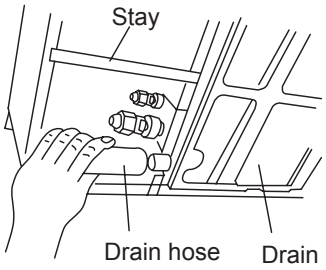
	NOTE
-	*When you are assembling, tighten the two screws (A) with a torque of 0.8Nm (8kg-cm) and one screw (B) with a torque of 0.4 Nm (4kg-cm) using a torque wrench.*

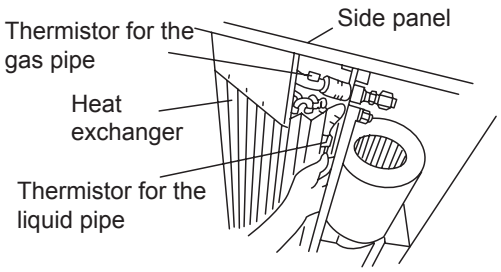
9.8.8. Removing the thermistors for liquid pipe and gas pipe

1. Remove the right-side panel and the left-side panel according to the section "Removing the sidepPanel".
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.





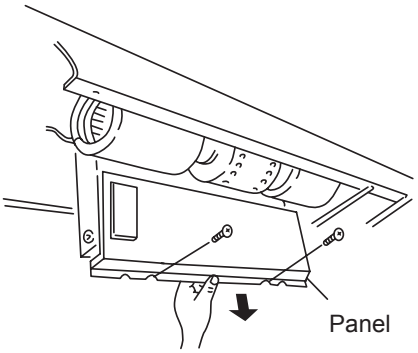


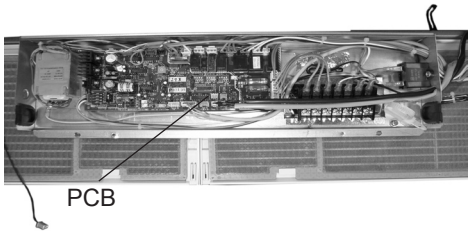


9.8.9. Removing the printed circuit board (PCB)

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 section 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.

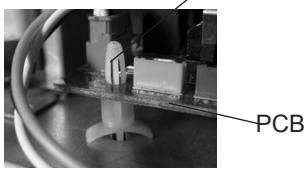
	NOTE
-	*During this work, support the electrical box and make sure not to drop the electrical box.*





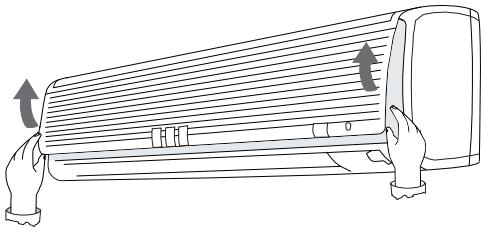
5. Four holders support the PCB. Pinch the expanded part of the holder using long-nose pliers.

	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 be faulty.*



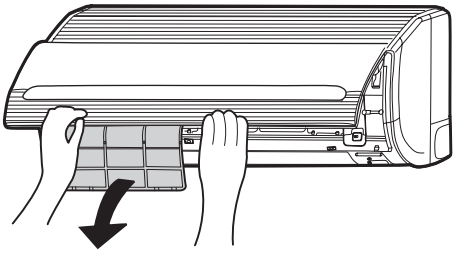
9.9. RPK-(1.5-2.0)FSN2M

9.9.1. Removing the air filter



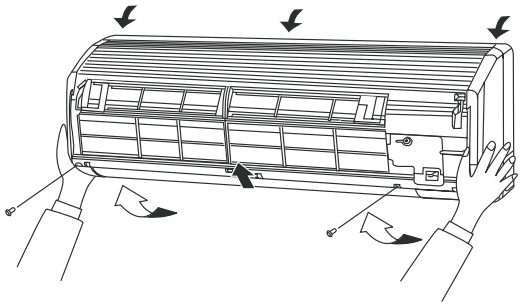
1. Pull up the right side and the left side of the air inlet grille as shown in the figure.

2. Pull down the air filter after lifting the grille and remove the air filter from the hinge.



9.9.2. Removing the front panel

☛ RPK 1.0~1.5



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. Be careful and do not scratch the resin components.

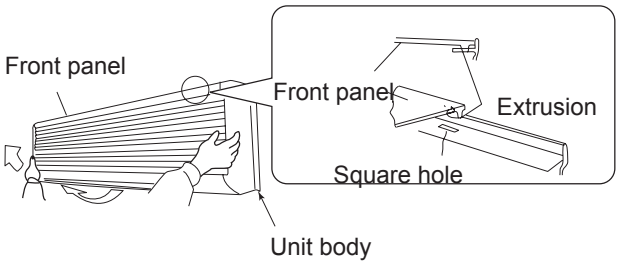
1. Press the "PUSH" marks at both ends of the front panel and open the suction grille by pulling toward the front side.

2. Remove one (1) 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 the three (3) 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.

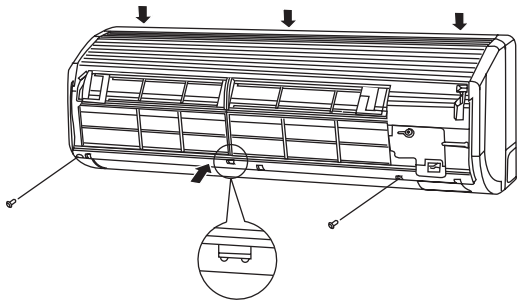


	NOTE
-	*Do not hit the front panel when you are removing the front panel. If you do so, you may break the unit body.*

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.



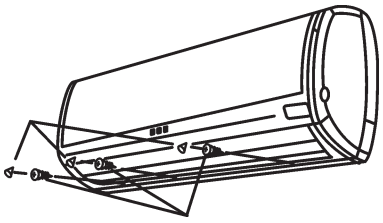
	NOTE
-	*If there is a gap between the front panel and the air outlet, the gap may cause an air leakage and dew may appear at the front panel. Then, dewing may occur.*

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.

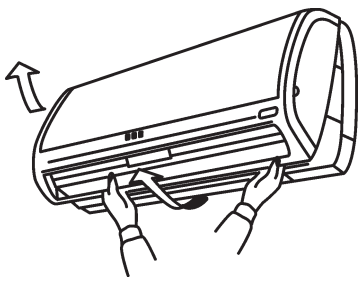
☛ RPK 2.0

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

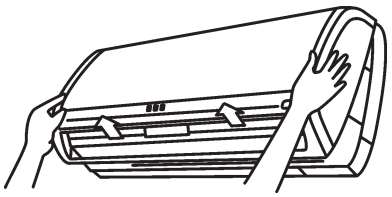
1. Remove three bushings as shown and remove the screws as shown below



2. Slowly pull the lower side of the front panel at your side by paying attention to the air outlet part without touching the outlet grille.



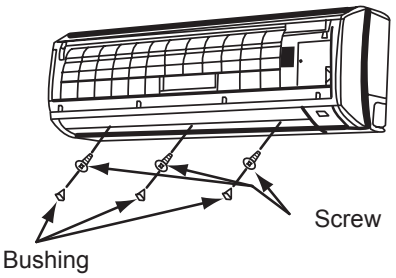
3. Slightly lift the front panel upward in order to release the combined parts (three parts) of upper side of the front panel.



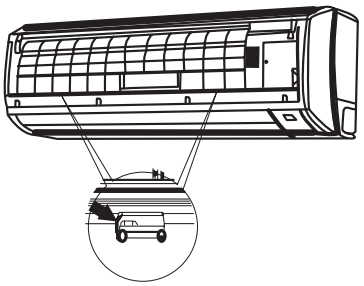
☛ RPK 2.5~4.0

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

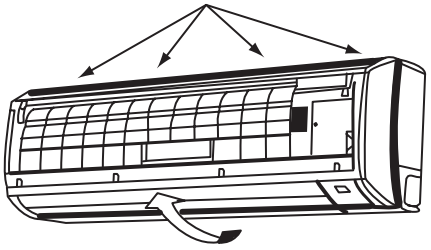
1. Remove three bushings as shown and remove the screws as shown below.



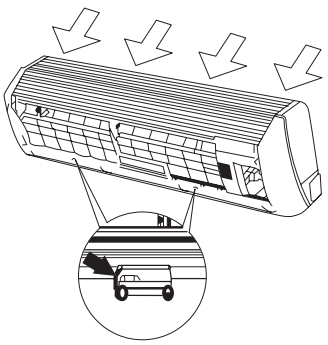
2. Slowly pull the lower side of the front panel at your side by paying attention to the air outlet part without touching the outlet grille.



3. Slightly lift the front panel upward in order to release the combined parts (four parts) of upper side of the front panel.



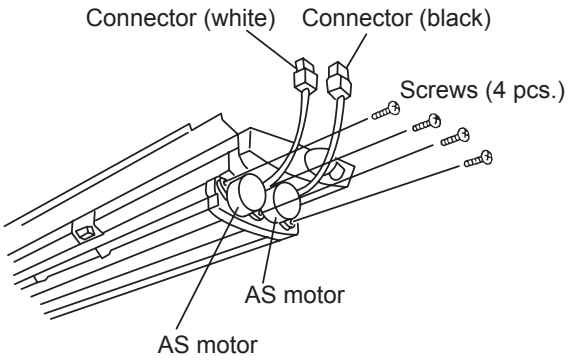
	CAUTION
- *Any gap may cause air leakage or dewing.*	

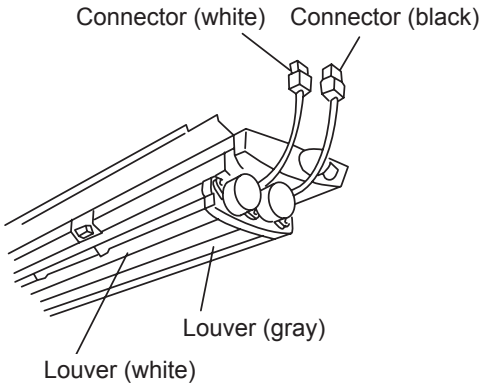


	NOTE
- *For size and position of piping connection, see chapter 2.*	

9.9.3. Removing the motor for the automatic louver

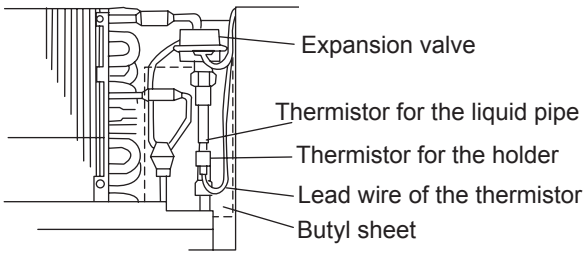
1. Remove the front panel according to the section "Removing the front panel" in this chapter.
2. Remove the electrical box according to the section "Removing the electrical box panel" in this chapter.
3. Remove the four (4) screws which fix the AS motor.
4. Draw out the AS motor horizontally. The AS motor separates from the louver shaft.
5. For reassembling 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.

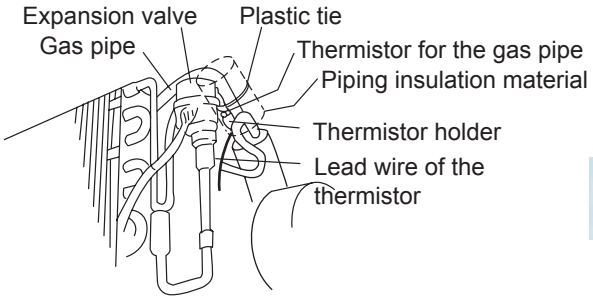




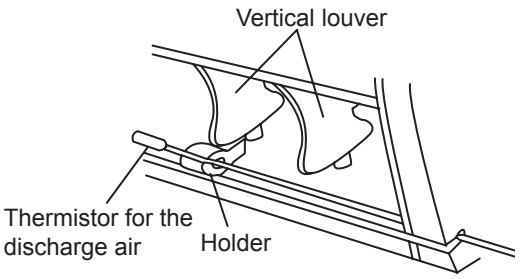
9.9.4. Removing the thermistor for liquid pipe, gas pipe, discharged air and suction air

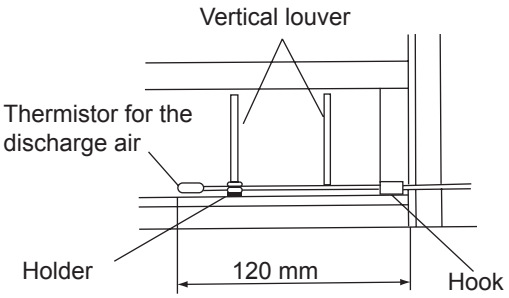
1. Remove the front panel according to the section "Removing the front panel" in this chapter.
2. Remove the electrical box according to the section "Removing the electrical box" in this chapter.
3. To remove the thermistor for the liquid pipe, remove the butyl sheet that protects the thermistor for the liquid pipe and remove the thermistor from the holder.
4. To remove 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.



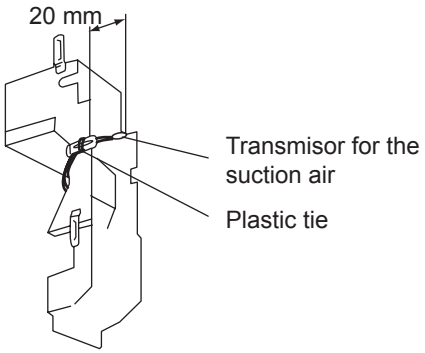


5. To remove the thermistor for the discharge air, remove it from the holder of the vertical louver and the hook at the right side of the air outlet.



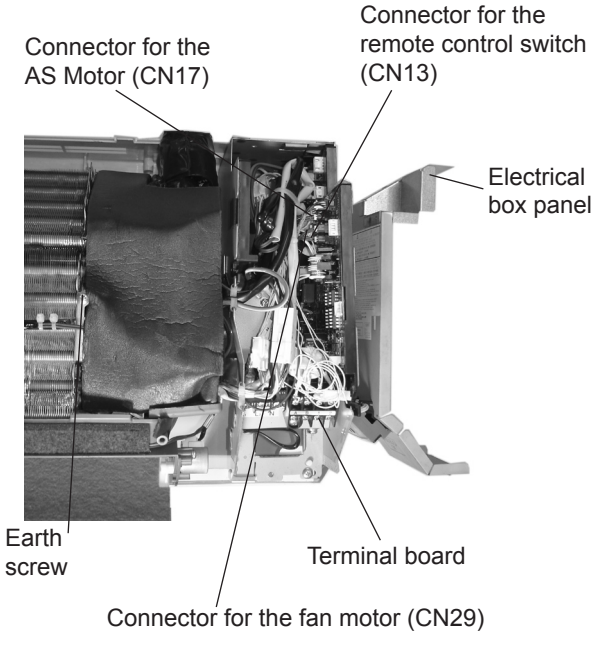


6. To remove the thermistor for the suction air, cut the cable tie that fixes the thermistor onto the right side of the electrical box.



9.9.5. Removing the electrical box panel

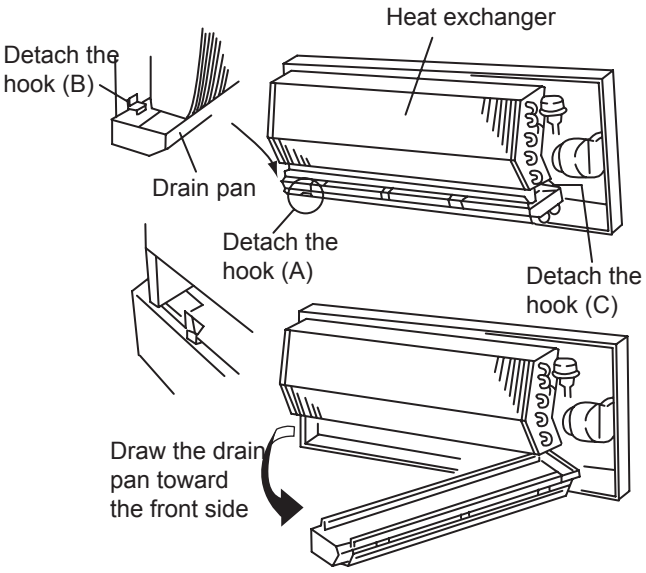
1. Remove the front panel according to the section "Removing the front panel" in this chapter..
2. Remove one screw for the electrical box panel.
3. Remove the power supply wiring and the wiring connection between the indoor unit and outdoor unit.
4. Remove the lead wires for the expansion valve, the 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.



9.9.6. Removing the drain pan

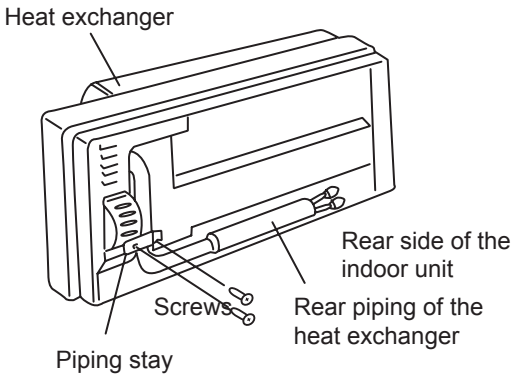
1. Remove the front panel according to the section "Removing the front panel".
2. Remove the electrical box according to the section "Removing the electrical box panel".
3. Remove the drain pan from the unit by detaching the hooks (A) and (B) from the left side of the drain pan, and by detaching the 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.*

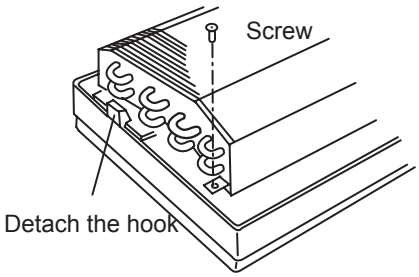


9.9.7. Removing the heat exchanger

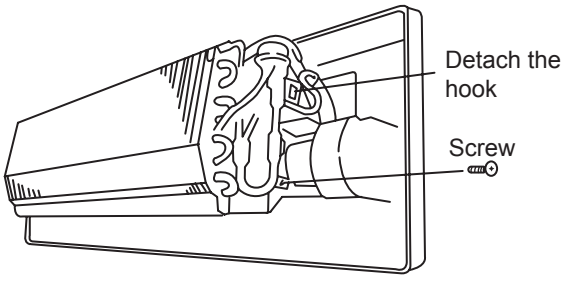
1. Remove the front panel according to the section "Removing the front panel".
2. Remove the electrical box according to the section "Removing the electrical box panel".
3. Remove the drain pan according to the section "Removing the drain pan".
4. Remove the piping stay at the rear side of the indoor unit.



5. Detach the hook that holds the left side of the heat exchanger and remove one screw that fixes the heat exchanger.



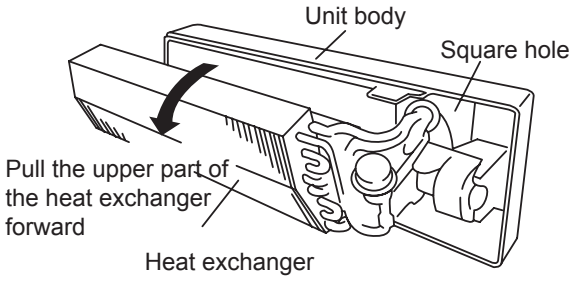
6. Remove one screw that fixes the heat exchanger and detach the hook that holds the right side of the heat exchanger.



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.

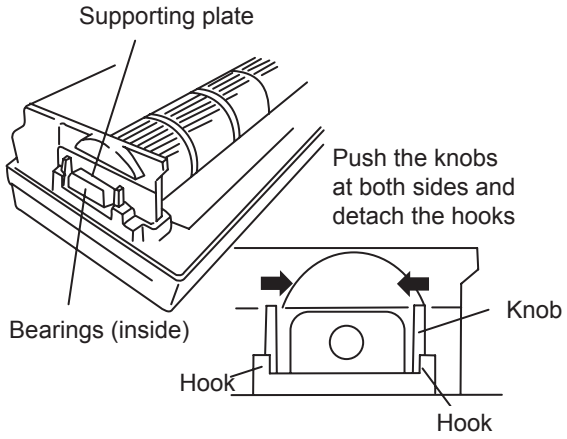
	NOTE
-	*After attaching the heat exchanger, make sure that the hooks and the screws at the right side and the left side of the heat exchanger are correctly attached.*



9.9.8. Removing the fan motor

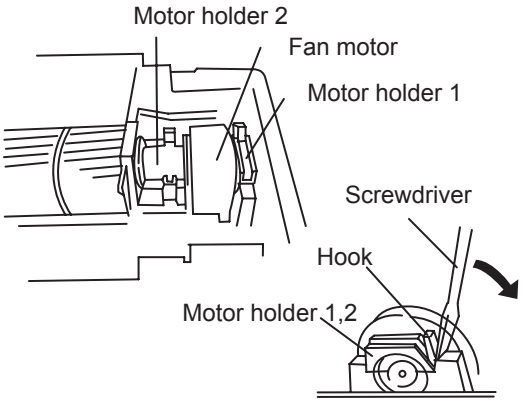
1. Remove the heat exchanger according to the section "Removing the heat exchanger".

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.

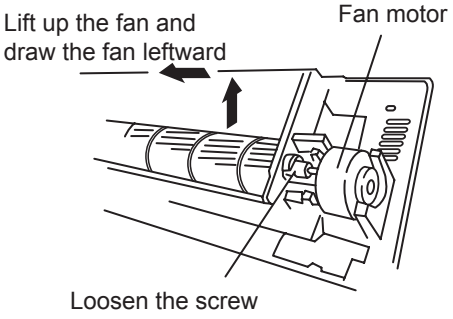


3. Remove the motor holders 1 and 2 that fix the fan motor. In order to remove the motor holder, insert the screwdriver at the hook part as shown in the figure.

4. After removing the motor holder 1, loosen one screw (1) that fixes the motor shaft and the fan.



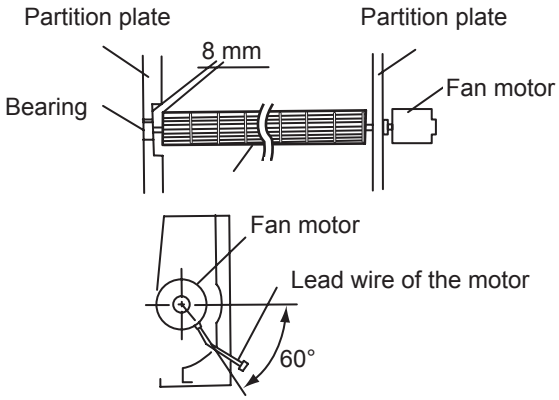
5. Draw the fan leftward while you are lifting up the bearing side of the fan slightly. Then, the fan and the fan motor can be removed.



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.



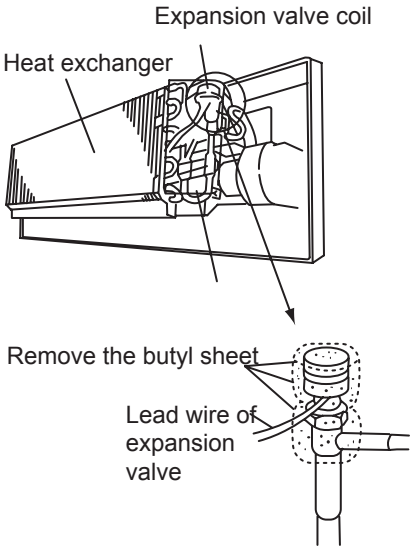
9.9.9. Removing the electronic expansion valve

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 using 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 sensitive part of the valve is its mechanical system).* *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

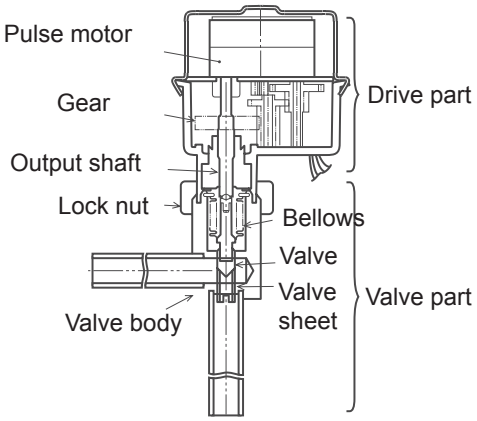
the valve body with their axes matching and attach the lock nut to the screw part of the valve body. Tighten the lock nut with a spanner after tightening lightly by hand.

The tightening torque should be within the range of 12Nm(120kg-cm) ~ 15Nm (150kg-cm).

	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.*

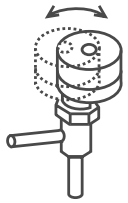
5. Wrap the electronic expansion valve with butyl sheet again.

6. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.



Adjustment of direction is not required.

(However, pay attention not to touch the pipes or the drain pan.)

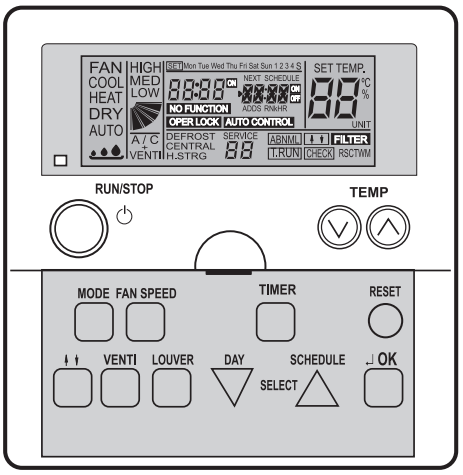


Direction of drive part

9.10. RPK-(2.5~4.0)FSN2M

	NOTE
-	*In order to remove the filter, you need to change the louver position using one of the remote control switches* PC-P2HTE and PC-RLH3A.

n In case of PC-P2HTE



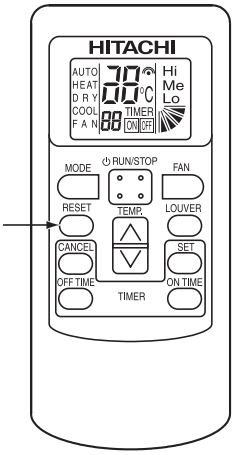
1. Press the "↓↑" switch.
   The symbol "↓↑" (Up & down panel operation) will be displayed in the Liquid crystal display.

2. When you are operating multiple indoor units using a remote control switch, press the TEMP. (Temperature setting) switch "⌄⌃" and set the address that you need to open.

3. By pressing the TIMER (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.

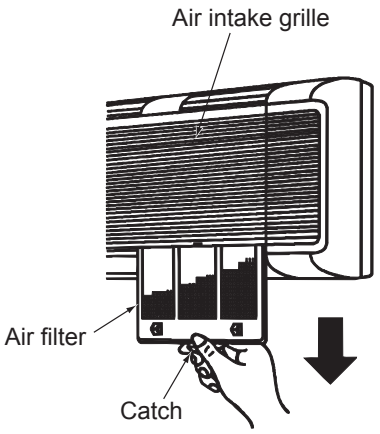
   If you press the "△" when the louver angle is at the horizontal position, the louver angle will move to the closing position.

n 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.



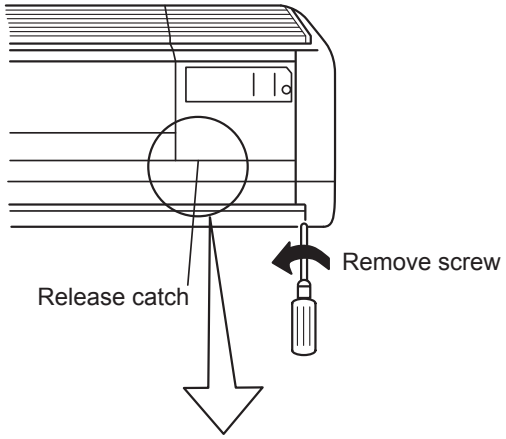
3. Pull the air filter downward from the air filter grille and clean it.

4. Press the "Reset" switch again on the remote control switch after cleaning the air filter.

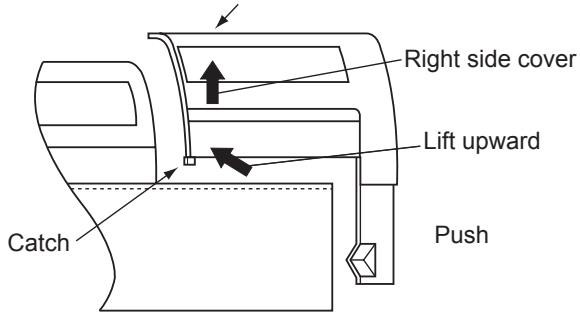
9

9.10.1. Removing the right side cover

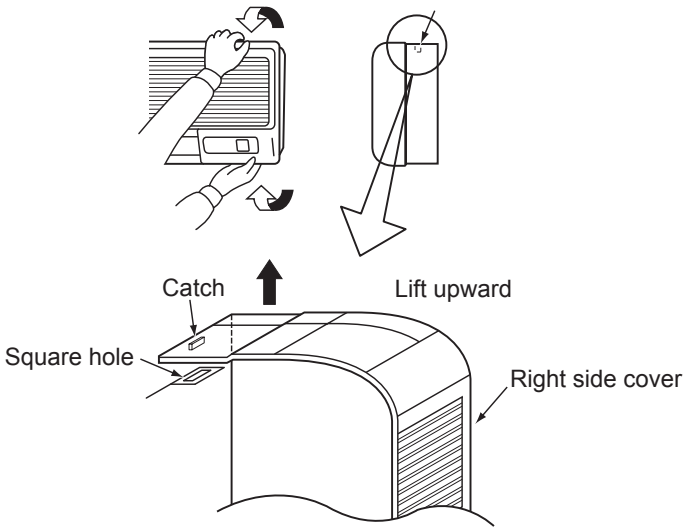
1. Remove one screw fixing the right side cover



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.

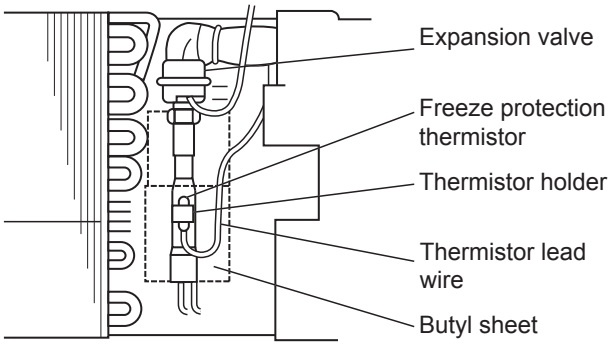


9.10.2. Removing the thermistors for liquid pipe, gas pipe, discharge air and suction air

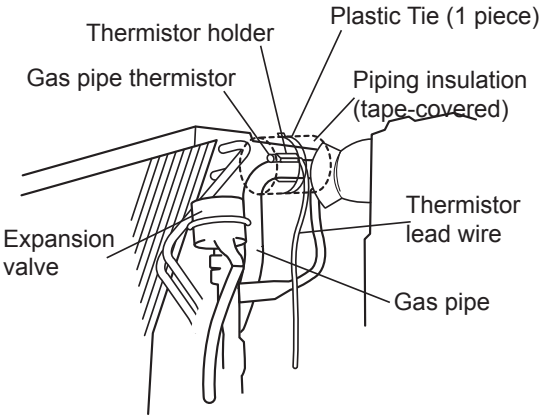
1. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.

2. Remove the electrical box according to the section “Removing the electrical box panel”.

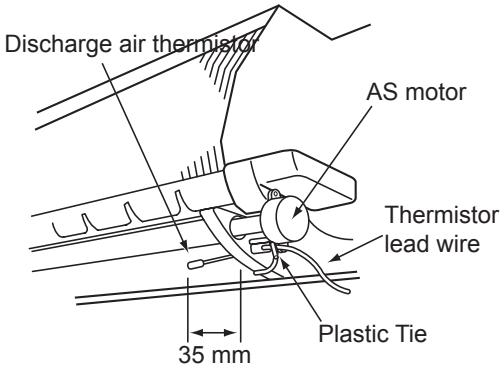
3. To remove the thermistors for the liquid pipe, first remove the butyl sheet that protects it and remove the thermistor from its holder.



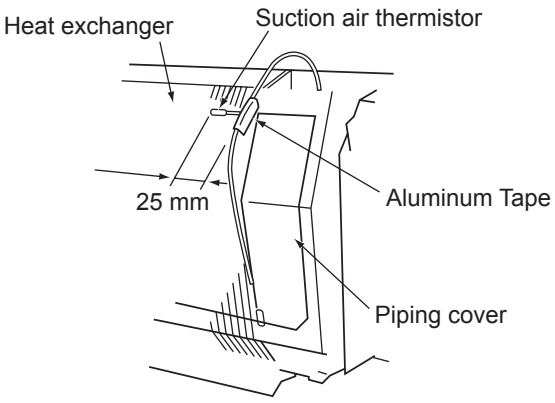
4. Remove the thermistor for the gas pipe by removing the piping insulation material that protects the thermistor for the gas pipe and cutting the plastic and the surrounding tapes. Then, remove the thermistor from the holder.



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.

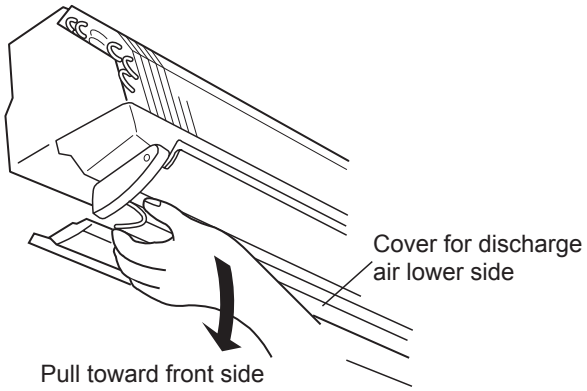


6. Remove the thermistor for the suction air by cutting the aluminium tape that fix the thermistor onto the right side of the electrical box.

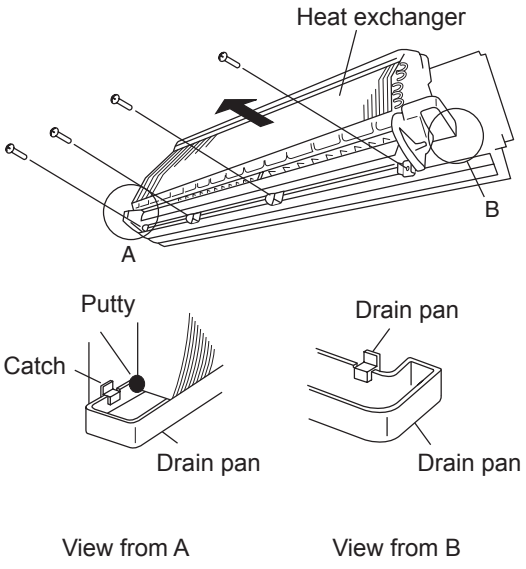


9.10.3. Removing the drain pan

1. Remove the right side cover according to the section “Removing right side cover” in this chapter, 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 the four (4) screws fixing the drain pan toward the lower side and remove it.



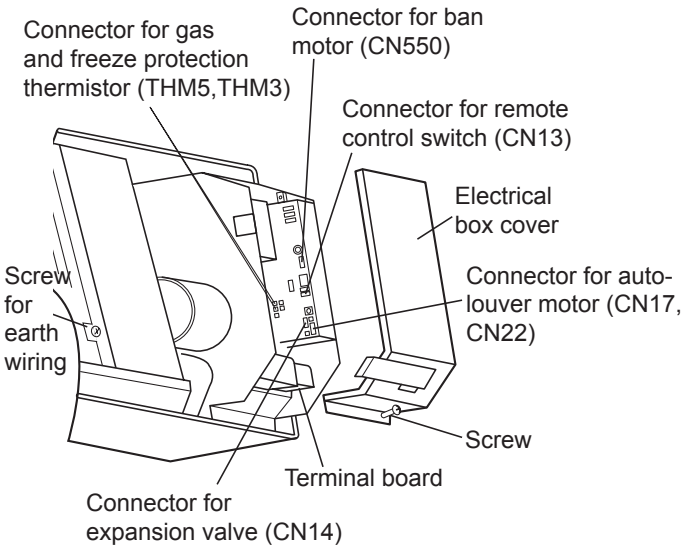
4. Remove the right side cover according to the section “Removing right side cover”, and remove the suction air grille.
5. Pull the cover of the discharge air lower side toward the front side, and remove it.
6. Remove 4 screws fixing the drain pan toward the lower side and remove it.

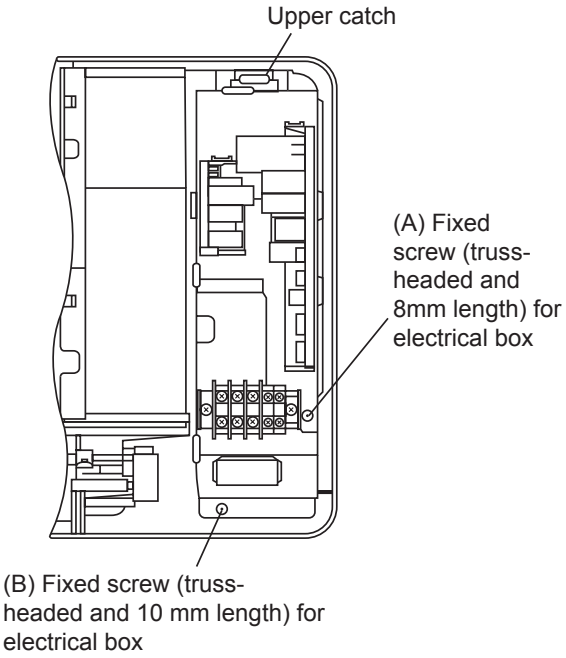


9.10.4. Removing the electrical box panel

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. To reassemble the electical box, put it in its place an reconnect all the connectors in the same place where they were disconnected.

⚠	***CAUTION***
- *Make sure that there are two different length of screws.* *(A) M4x8* *(B) M4x10*	



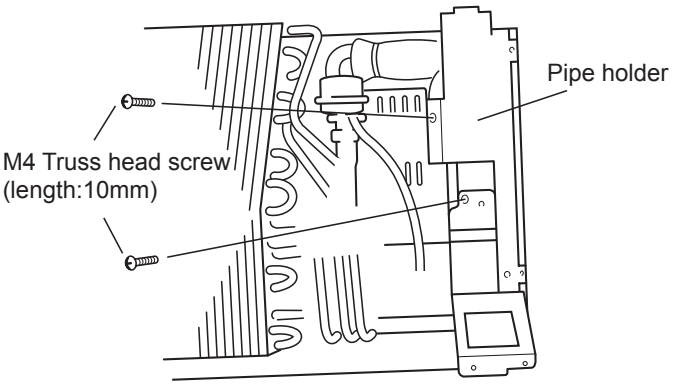


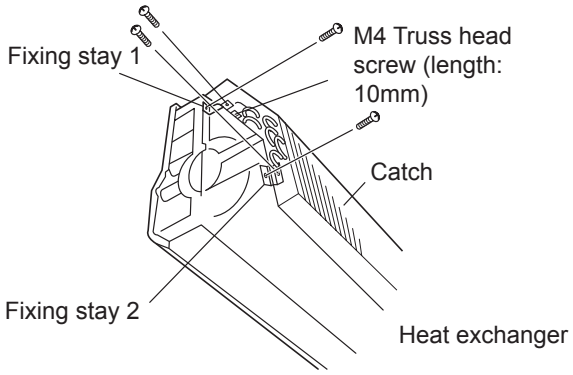
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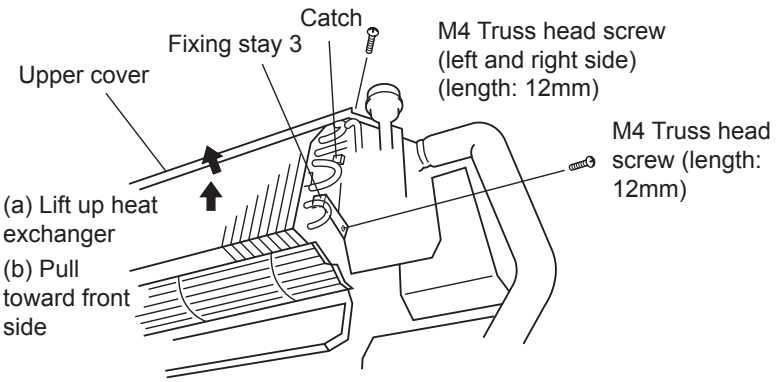
9.10.5. Removing the heat exchanger

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 1, stay 2 at 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, the hook could break down.*



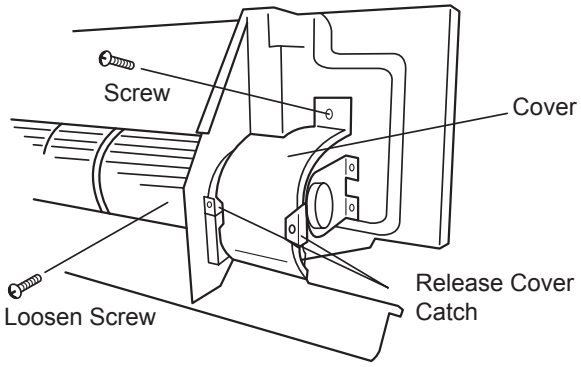




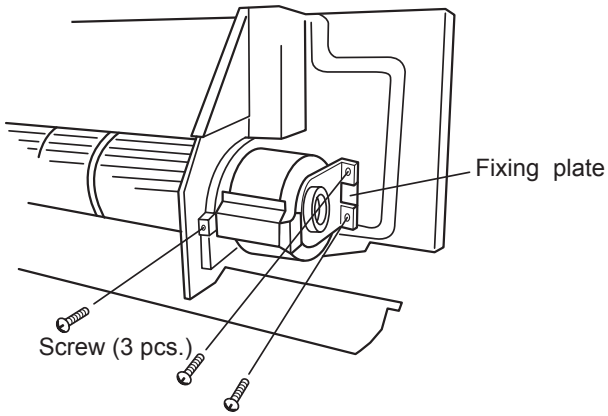
9.10.6. Removing the fan and the fan motor

1. Remove the heat exchanger according to the section “Removing the heat exchanger”.

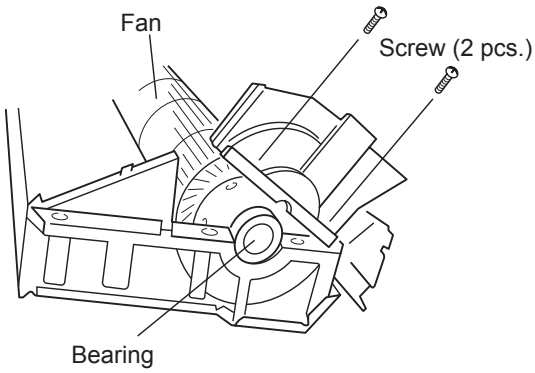
2. Remove one screw and two catches at the cover of the upper side fan motor and remove the cover.



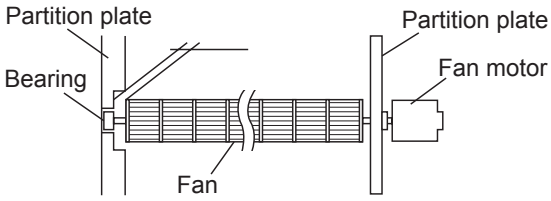
3. Loose one screw fixing the motor shaft and the fan.



4. Remove three screws fixing the fan motor plate and remove the fan motor.

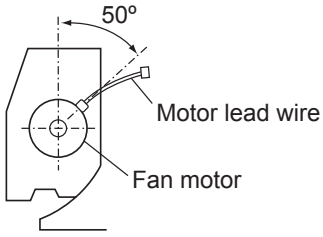


5. Remove the two screws fixing the fan motor and the fan, perform the reverse procedures for removing.



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 shown below.50°

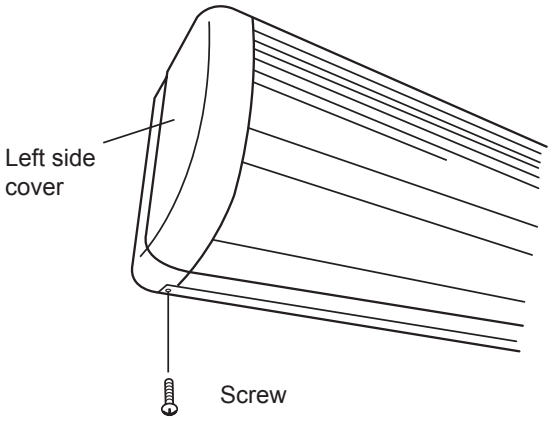


9

9.10.7. Removing the suction air grille

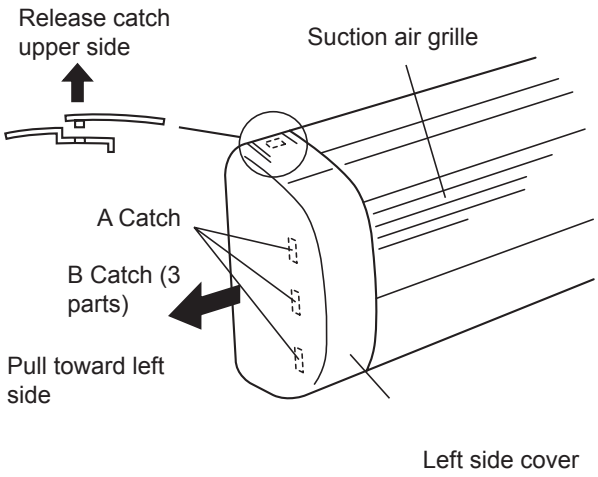
1. Remove the right side cover according to the section “Removing right side cover”.

2. Remove one screw of the left side cover.



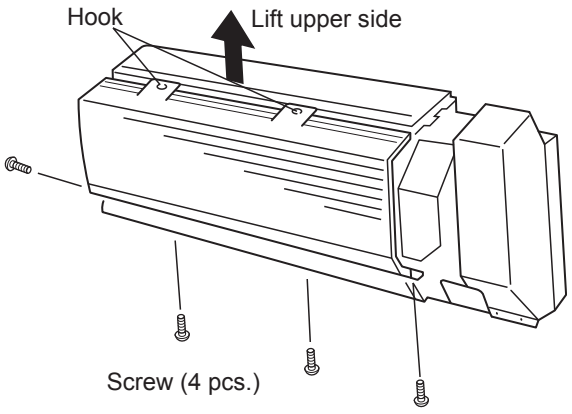
3. Detach the hook (A) of left side cover.

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.



9.10.8. Removing the electronic expansion valve coil

1. Remove the front panel according to the section "Removing the front panel" in this chapter.

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.

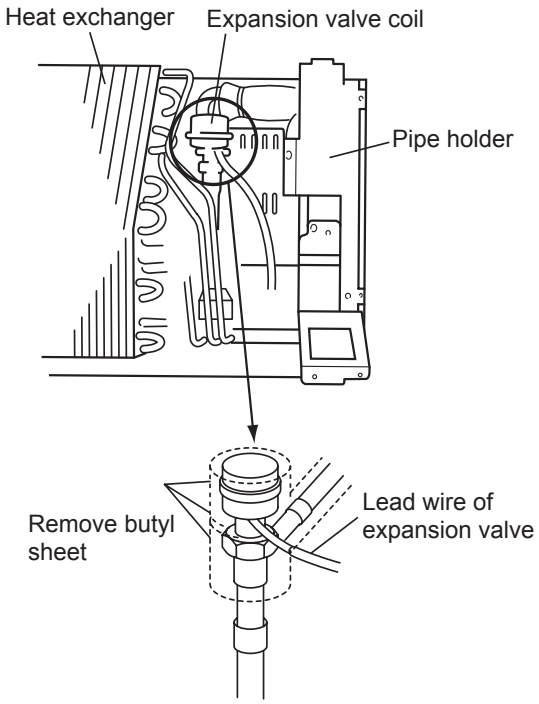
4. Prepare two spanners. Hold the part of the valve body with one spanner and loosen the lock nut with another spanner by turning the lock nut counterclockwise.

	NOTE
-	*Do not hold the motor part when you are loosening the lock nut using 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 sensitive part of the valve is its mechanical system).* *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).

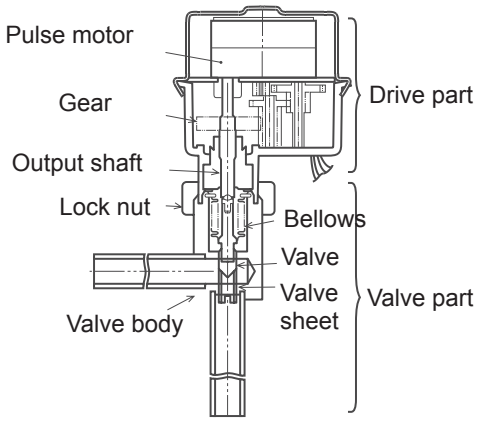


NOTE

- *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.

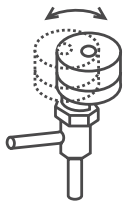
7. Wrap the electronic expansion valve with butyl sheet again.

8. After finishing the replacement, attach the electronic expansion valve by performing in reverse order the procedure for removing the electronic expansion valve.



Adjustment of direction is not required.

(However, pay attention not to touch the pipes or the drain pan.)



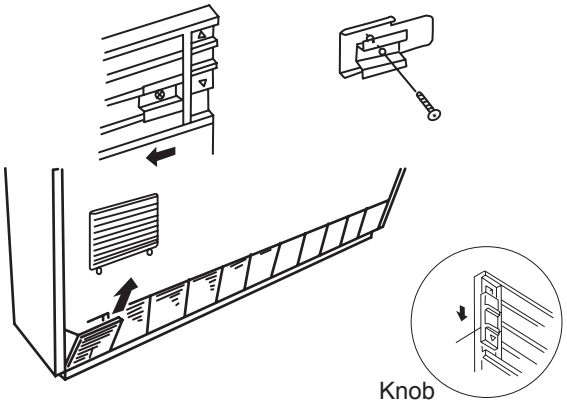
Direction of drive part

9.11. RPF-(1.5~2.5)FSN2E

Floor Type

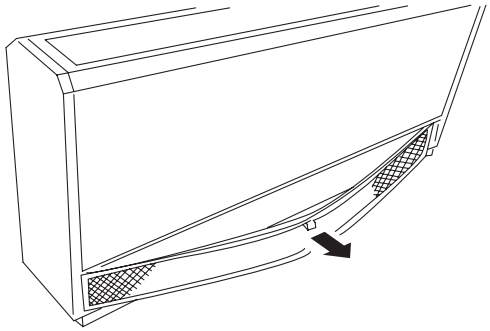
9.11.1. Removing the air inlet grille

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.



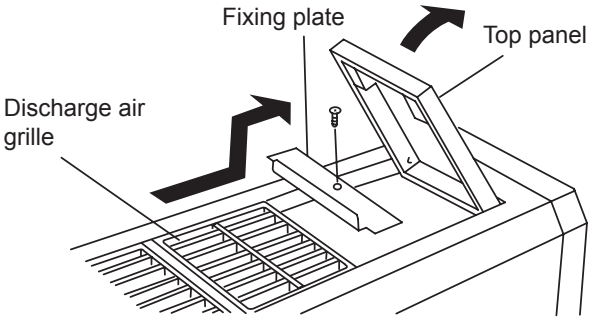
9.11.2. Removing the air filter

1. The air filter is located on the inner side of the air inlet grille. Remove all the air inlet grilles.
2. Remove the air filter by pulling the knob of the air filter.



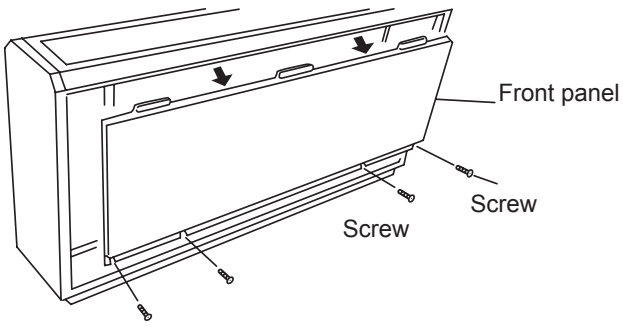
9.11.3. Removing the discharge air grille

1. Fixing plate
2. Top panel
3. Discharge air grille
4. The discharge air grilles are mounted on the top using a guide rail.
5. By opening the top panel and by sliding the discharge air grilles, you can remove the discharge air grilles.



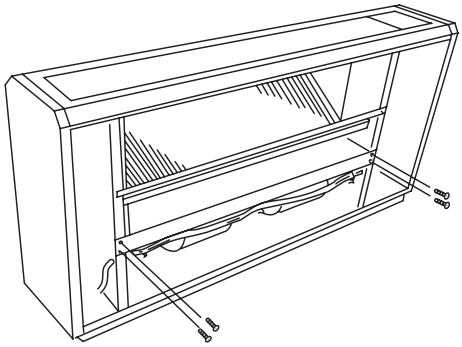
9.11.4. Removing the front panel

1. Remove the air filter according to the section "Removing the air filter" in this chapter.
2. Remove the front panel from the slit after removing the four fixing screws at the lower part and pulling out the front panel downwards.



9.11.5. Removing the fan motor

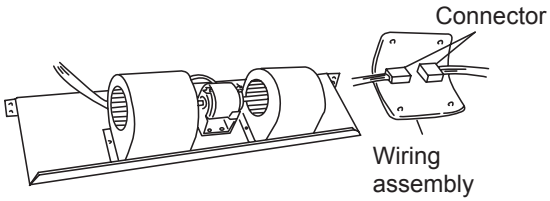
1. Remove the air inlet grille according to the section "Removing the air inlet grille".



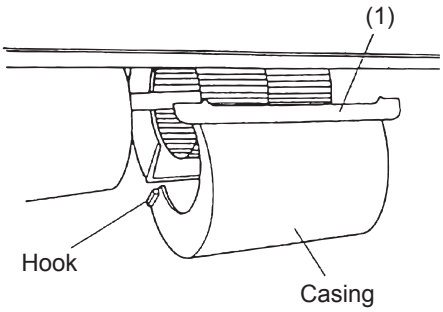
2. Remove the air filter according to the section "Removing the air filter".

3. Remove the front panel according to the section "Removing the front panel".

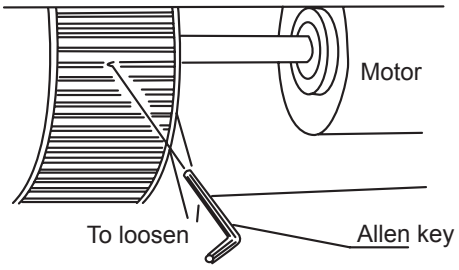
4. Remove the mounting plate for the fan motor after removing the four fixing screws.



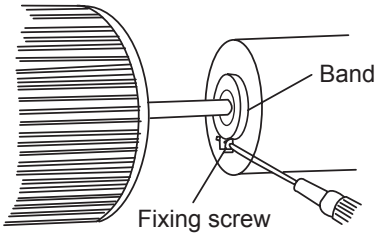
5. Disconnect the wiring connector for the fan motor. Remove the wiring assembly and the connector.



6. Remove the casing (1) by pressing the hook part at the four positions towards the inner side.



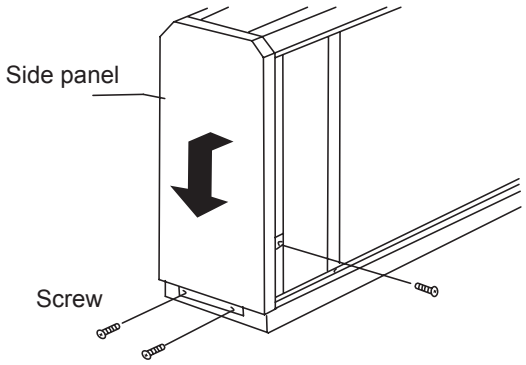
7. Loosen the screws using an Allen key.

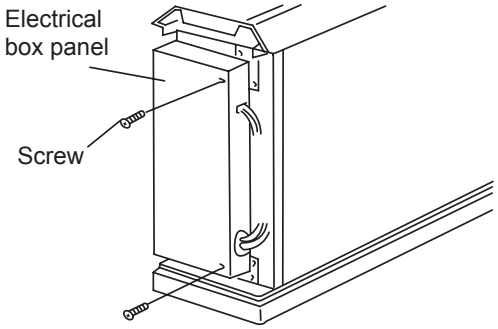


8. After removing the fixing plate, remove the fan motor by sliding the fan motor backwards. Pay attention because when releasin the fan motor, it could drop suddenly.

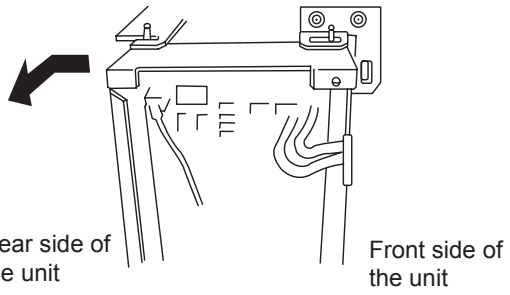
9.11.6. Removing the printed circuit board (PCB)

1. Remove the air inlet grille according to the section "Removing the air inlet grille" in this chapter.
2. Remove the air filter according to the section "Removing the air filter" in this chapter.
3. Remove the front panel according to the section "Removing the front panel" in this chapter.
4. You can remove the side panel by removing the three (3) fixing screws and pulling the side panel downwards.
5. Remove the electrical box panel after removing the two fixing screws.





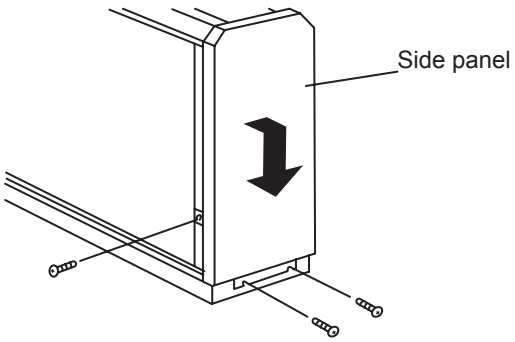
6. The electrical box can be turned up to an angle of 90° by removing the two (2) fixing screws and by unhooking the hook at the rear side of the electrical box.
7. Four holders support the PCB. Pull out the PCB from the PCB hole by pushing the expanded part of the holder using long-nose pliers and by placing a finger near the hole of the PCB.



	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.*
-	*When you are reassembling, make sure that each terminal is correctly connected. Refer to the wire marks and the terminal codes. If you connect the terminals incorrectly, a malfunction or a damage of the electrical components will occur.*

9.11.7. Removing the thermistors for liquid pipe and gas pipe

1. Remove the air inlet grille according to the section "Removing the air inlet grille"in this chapter.
2. Remove the air filter according to the section "Removing the air filter"in this chapter.
3. Remove the front panel according to the section "Removing the front panel" in this chapter.
4. Remove the side panel after removing the three (3) fixing screws.



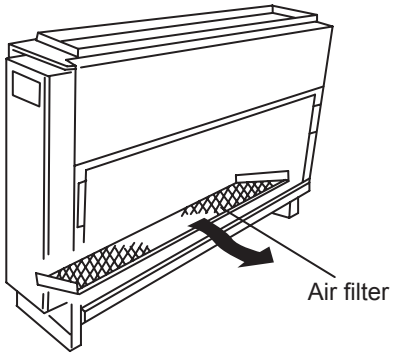
9.12. RPFI-(1.5~2.5)FSN2E

Floor-concealed type

9.12.1. Removing the air filter

1. The air filter is located at the inner upper part of the inlet.

3. Remove the air filter by pulling the center knob and bend the filter.

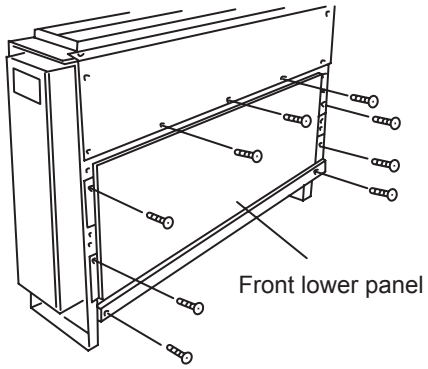


9.12.2. Removing the front panel

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.

3. Remove the front upper panel after removing the eleven fixing screws.



9.12.3. Removing the fan motor

1. Remove the air filter according to the section "Removing the air filter".

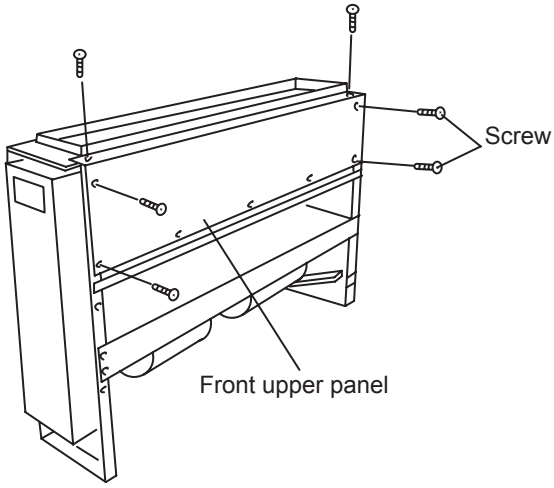
2. Remove the front panel according to the section "Removing the front panel".

3. Remove the fan motor as explained in sections 4 to 8 of the section "Removing the fan motor".

9.12.4. 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 the section "Removing the printed circuit board (PCB)".



9.12.5. 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".

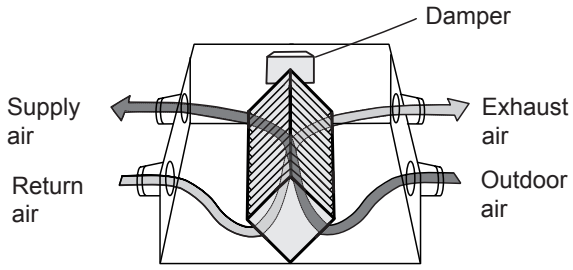
3. Remove the thermistor as explained in sections 4 to 6 of the section, "Removing the thermistors for the liquid pipe and the gas pipe".

9.13. KPI - ENERGY RECOVERY VENTILATION UNITS

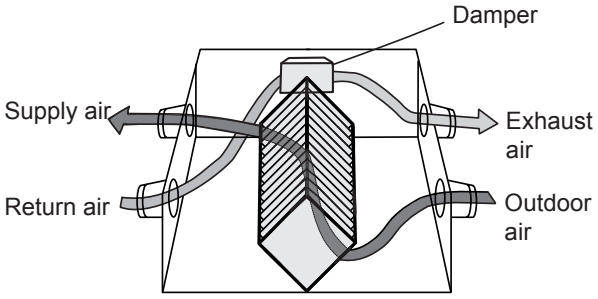
☛ System description

Example of system is as follows. Check to ensure that the system is checked by your distributor or dealer of HITACHI.total heat

Exchange Mode. Air returned from the indoor side passes through the total heat exchanger element and it is ejected outside. Outdoor air is supplied through total heat exchanger.



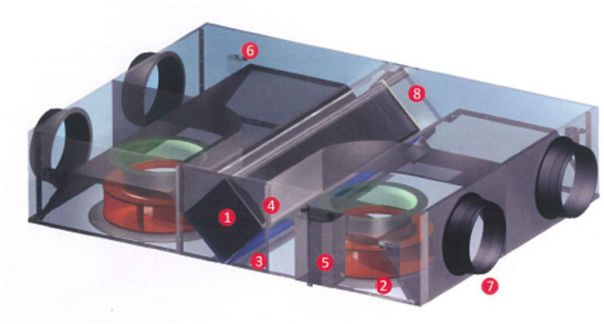
Bypass Ventilation Mode. Air returned from the indoor side is exhausted without heat exchange.



Automatic Choice Mode. (Setting before Shipment) Operation mode is automatically selected according to the temperature (outdoor, indoor and set temp.) conditions.

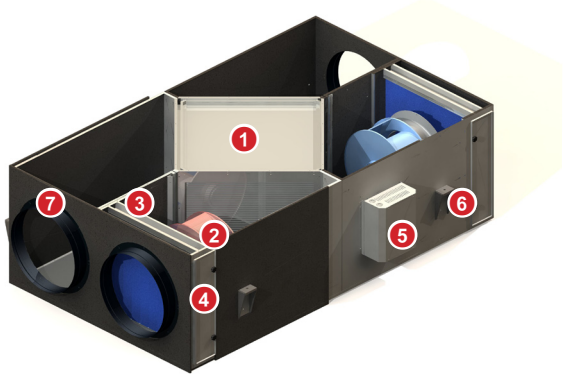
9.13.1. Structure and parts names

☛ KPI-(502~2002)E1E



1. Heat exchanger
2. Fans
3. Filters
4. Service door
5. Electrical box
6. Unit hangers
7. Air duct connection
8. Damper

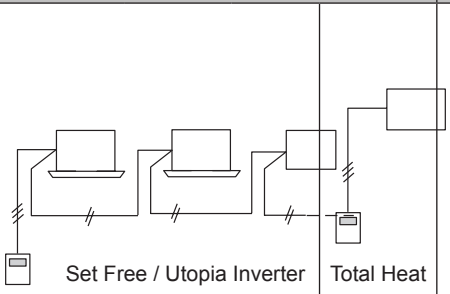
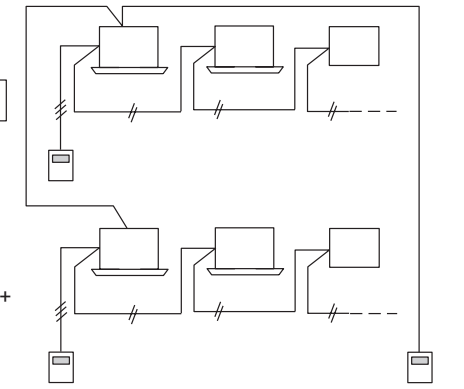
☛ KPI-3002H1E



1. Heat exchanger
2. Fans
3. Filters
4. Service door
5. Electrical Box
6. Unit hangers
7. Air duct connection

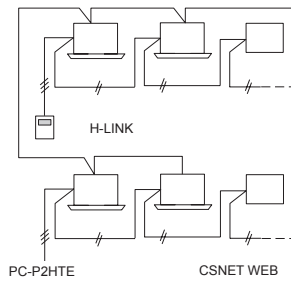
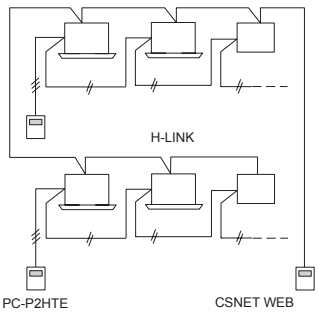
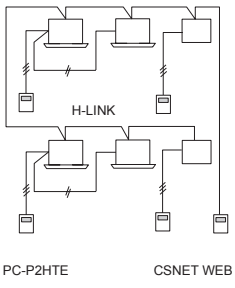
9.13.2. Standard connection system and central station

LEGEND	NOTES:
: Indoor Unit : Total Heat Exchanger : Available : Not available : Not used	(1*): PSC-5S can not change the fan speed of the unit. (2*): Set table by Remote control switch Set the unit number of all indoor unit respectively and serially by using RSW1 and DSW5 (Indoor Unit) In case of H-LINK, set one refrigeration number to each Total heat exchanger In case of CSNET WEB, impossible to operate “AUTO COOL/HEAT”. In case of using Remote Control ON/OFF Function (optional function), impossible to operate the Total heat exchanger individually.

	Standard connection		Central station (PSC-5S)	
Example of systems		Total Heat Exchanger + PC-P2HTE		
Outlook of systems	Able to control up to 16 Indoor Units and Total Heat exchanger Units	Able to control with PC-P2HTE directory	Able to control up to 256 Indoor Units consist of 16 refrigeration series	
Components of systems	Remote Control Switch (PC-P2HTE)	Remote Control Switch (PC-P2HTE)	Central Station (PSC-5S) Remote control switch (PC-P2HTE)	
Remote control location	PC-P2HTE	PC-P2HTE	Central station	PC-P2HTE

			Standard connection				Central station (PSC-5S)			
Setting of Remote Ctrl. Switch			A/C+ VENTI	A/C	VENTI	VENTI	A/C+ VENTI	A/C	A/C+ VENTI	A/C
Functions	RUN/STOP	A/C	●	●	X	X	●	●	●	●
		Total heat exchanger		X	●	●		X		X
	FAN SPEED	A/C	●	●	X	X	X(1*)	(1*)	●	●
		Total heat exchanger		X	●	●				X
	VENTI MODE	Auto	●	X	●	●	X(2*)	X	●	X
		Total heat exchanger								
		Bypass ventilation								
	Pre-Cool Pre-Heat		●	X	—	—	X(2*)	X	●	X
	Air volume up		●	X	●	●	X(2*)	X	●	X
	Filter sign		●	●	●	●	X	X	●	●

9.13.3. Controlled network system

	Hitachi Computer Controlled Network System CS-NET		
Example of systems			
Outlook of systems	Able to Control up to 128 Indoor Units consist of 16 Refrigeration Series		
Components of systems	CSNET WEB Remote control switch (PC-P2HTE)	CSNET WEB Remote control switch (PC-P2HTE)	CSNET WEB Remote control switchh (PC-P2HTE)
Remote control location	CSNET WEB / PC-P2HTE	CSNET WEB / PC-P2HTE	CSNET WEB / PC-P2HTE
Setting of remote control switch	A/C+ VENTI / A/C / VENTI / A/C+ VENTI / A/C / VENTI	A/C+ VENTI / A/C / VENTI / A/C+ VENTI / A/C / VENTI	VENTI / VENTI

			Hitachi Computer Controlled Network System CS-NET														
Functions	RUN/ STOP	A/C	●	●	✕	●	●	✕	●	●	✕	●	●	✕	✕	✕	●
		Total Heat Exchanger		✕	●		✕	●		✕	●		✕	●	●	●	
	FAN SPEED	A/C	●	●	✕	●	●	✕	●	●	✕	●	●	✕	✕	✕	●
		Total Heat Exchanger		✕	●		✕	●		✕	●		✕	●	●	●	
	VENTI MODE	Auto	✕(2*)	✕	✕(2*)	●	✕	●	✕(2*)	✕	✕(2*)	●	✕	●	✕(2*)		●
		Total Heat Exchanger															
		Bypass Ventilation															
	Pre-Cool Pre-Heat		✕(2*)	✕	——	●	✕	——	✕(2*)	✕	——	——	✕	——	——		——
	Air Volume up		✕(2*)	✕	✕(2*)	●	✕	●	✕(2*)	✕	✕(2*)	●	✕	●	✕(2*)		●
	Filter sign		✕	✕	✕	●	●	●	✕	✕	✕	●	●	●	✕		●

9.13.4. Filter maintenance

- **KPI-(502-2002)E1E**

	DANGER
	- *Turn off all power switches before maintenance is performed.* - *Do not start the cleaning procedure 5 minutes before the stop of the unit* - *Use gloves to prevent from injury when handling the unit.* - *Do not operate the system without the air filter to protect the element of the total heat exchanger against being clogged.*

	NOTE
	- *Clean up the heat exchanging element once or more every two years* - *Clean up the air filter more than once in a year.*

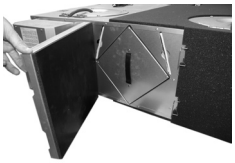
Step 1:

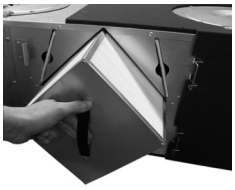
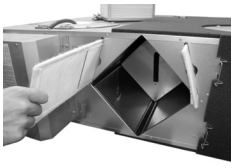
Pull back the hinges, open the service cover and remove the cover.



Step 2:

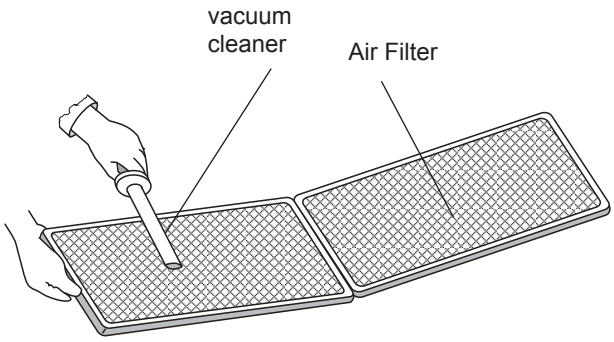
Draw out the air filters which are located at the bottom left and right part, close to the total heat exchanger element.



Step 3:

Use a vacuum cleaner to suck up the dust. To remove stubborn dirt, dissolve some neutral detergent in cold or lukewarm water, wash the filters by pressing on them in the water, take them out and leave them to dry.



	CAUTION
	- *Never wash the filters in very hot water and never wash them by rubbing them.* - *Do not dry the filters by exposing them to a flame.* - *Types R15 and R29 are washable to a limited extend. Types R17, R50 and R20 are fully washable. The R- series media can be cleaned in warm water (30º-40º) with an addition of a household detergent, if necessary. Drying should be done in a flat surface.* - *R-series media can also be cleaned by blowing with compressed air in the opposite direction of filter airflow.*

Step 4:

Set the filter

Step 5:

Close the service cover

Step 6:

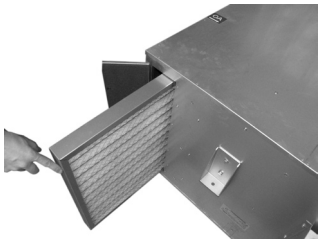
Press the RESET switch of the remote control switch.

- **Air filter cleaning kpi-3002h1e models**

☛ **Step 1:**

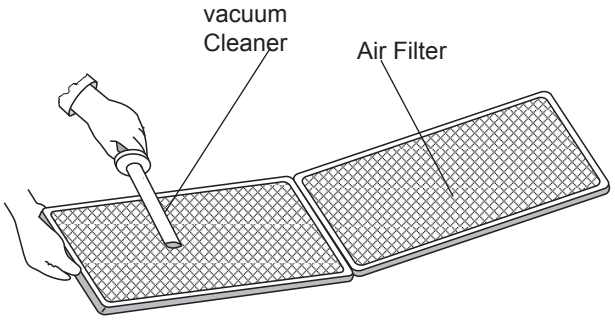
Open the filter access door and pull out the filters.





☛ **Step 2:**

Use a vacuum cleaner to suck up the dust. To remove stubborn dirt, dissolve some neutral detergent in cold or lukewarm water, wash the filters by pressing on them in the water, take them out and leave them to dry.



9.13.5. Energy recovery ventilation units element cleaning

- **kpi-(502~2002)e1e models**

Clean the element once or more every two years. In order to avoid decreasing airflow and efficiency.

☛ **Step 1:**

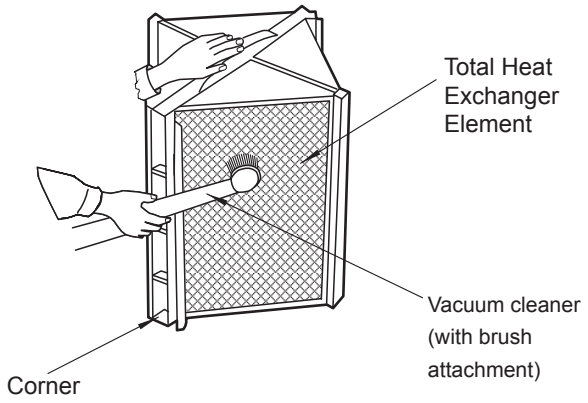
Take hold of the handle and draw the total heat exchanger elements (two elements) out from the main unit.



☛ **Step 2:**

Use a vacuum cleaner to suck up the dust and dirt on the exposed surfaces of the total heat exchange elements.

Attach a nozzle with a brush to the vacuum cleaner for this job and clean the elements by passing the brush lightly over their exposed surfaces.



⚠	***CAUTION***
	- *Do not wash the element with water under any circumstance.* - *Do not use the hard nozzle of the vacuum cleaner. It may damage the exposed surfaces of the lossnay.*

☛ **Step 3:**

Set the element.

☛ **Step 4:**

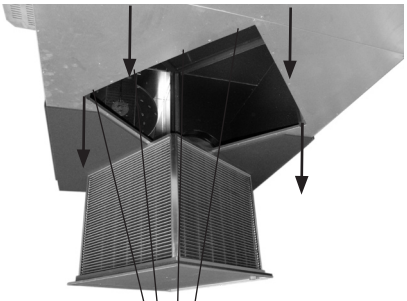
Set the air filter

☛ **Step 5:**

Close the service cover

- **kpi-3002h1e models**

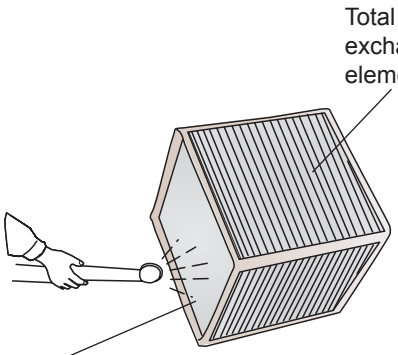
	CAUTION
	Remove the screws and pull down to take out the heat exchanger element. Pay attention when handling and taking out the Heat exchanger. It is a heavy object and it may fall down quickly from its casing.



Four (4) screws at each side

Step 1:

Aluminium heat exchanger can be cleaned using vapour.

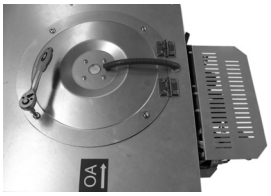


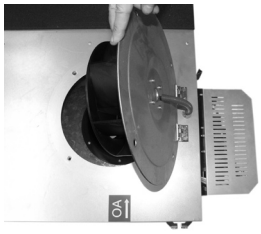
9.13.6. Energy recovery ventilation units fan units and connectors

- **kpi-(502~2002)e1e models**

Step 1:

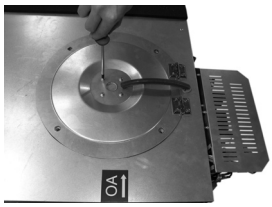
Remove the four (4) allen screws of the fan cover.



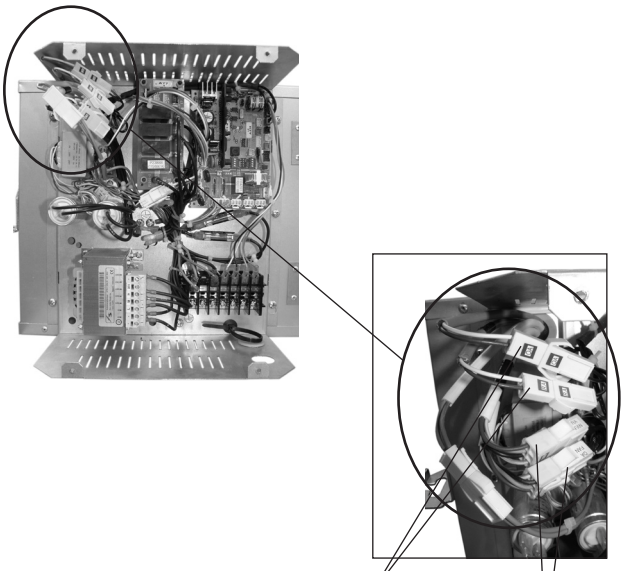


Step 2:

To remove motors, unscrew the four (4) screws fixing each fan motor.



To change the fan motors, remove the four (4) screws fixing the electrical box and access to the connector, as shown in the next photos.



Thermistor connectors

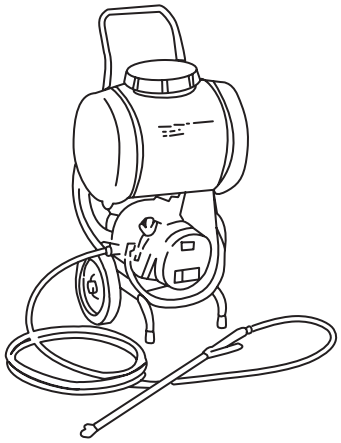
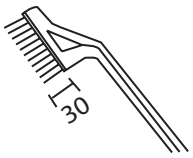
Fan connectors

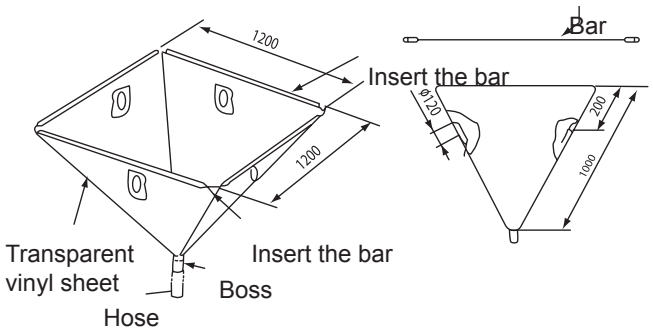
	NOTE
	- *EA: exhaust air outlet.* - *OA: outdoor air.* - *SA: supply air grille.* - *RA: return air.*

9.14. CLEANING THE INDOOR HEAT EXCHANGER

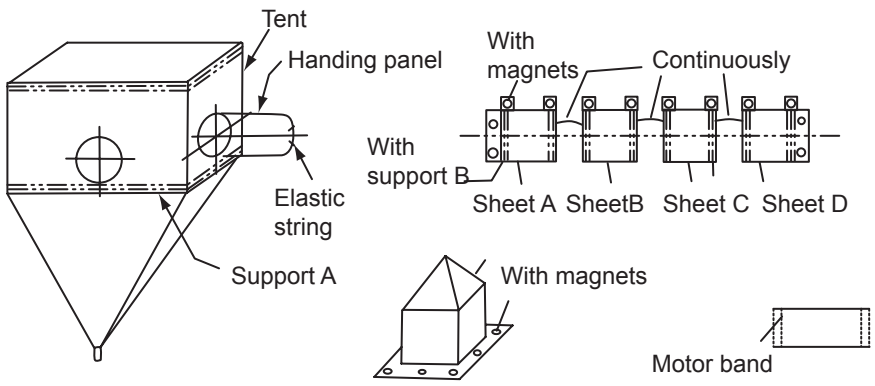
9.14.1. Required tools for cleaning (for all indoor units)

	DANGER
-	*Before performing any of the service operations described in this chapter, turn all the main switches off and place security lockers or convenient warning indicators in order to prevent them from turning on accidentally.*

No.	Tool	Remarks
1	Cleaning water pump 	A water pump 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 type of 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 0.5 mm thickness
16	Gloves	

17	Cleaning water collector – In the celing 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 (see table below)

No	Part	Material	Remarks	Qty
1	Tent with handling panel	Vinyl chloride sheet	1t, with handling panel 0.3 t	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



9.14.2. Cleaning the 4-way cassette indoor unit

	NOTE
-	*Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before performing this work.*

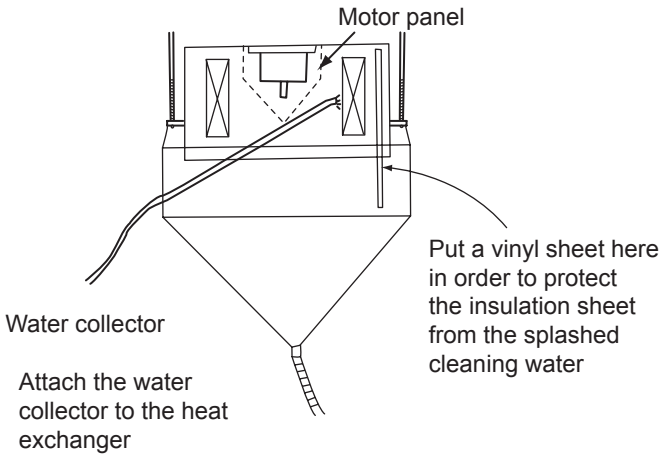
Procedure:

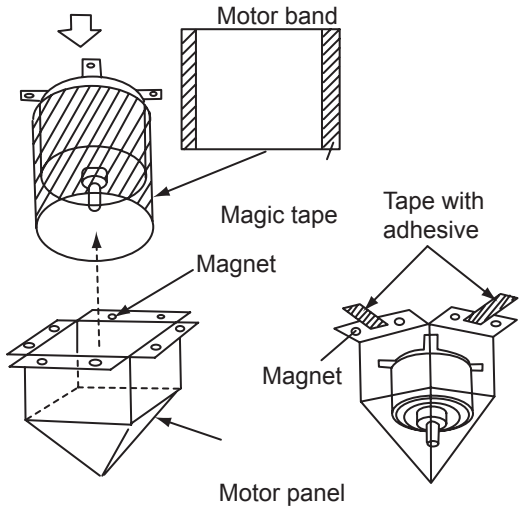
1. Remove the optional air panel according to the section "Removing the optional air panel".
2. Remove the electrical box after opening the electrical box panel and after disconnecting the connectors between the indoor units and the outdoor units and other connectors, according to the section, "Removing the electrical box panel".
3. Remove the bell mouth and the fan according to the section, "Removing the turbo fan and the fan motor".
4. Remove the drain pan according to the section "Removing the drain pan".
5. Remove the float switch according to the section "Removing the float switch".

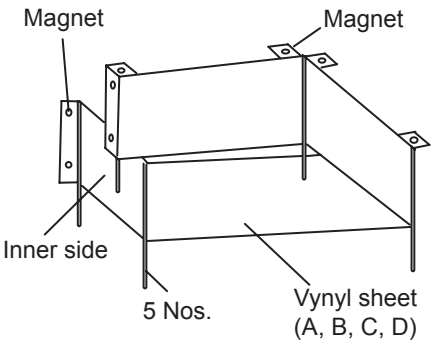
	NOTE
-	*Remove the drain pan after removing the drain water on the drain pan.*
-	*Remove the drain water on the drain pan after pulling out the rubber plug. Make sure that water can flow easily through the hole by pricking the hole with a pencil.*
-	*Remove the drain pan after removing the four (4) fixing 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 it. Handle the drain pan carefully to avoid damages to 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 using an adhesive tape and seal the gap between the vinyl sheets in the same way.

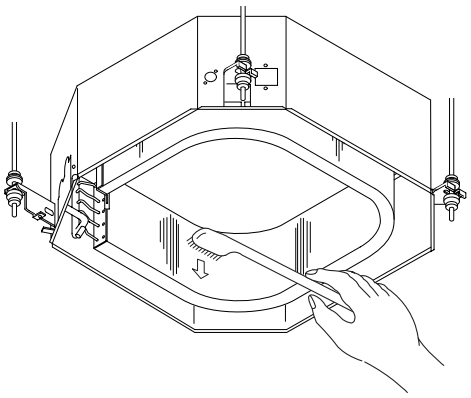
	NOTE
-	*Allways wear gloves to avoid any injury caused by the fins of the heat exchanger.* *In addition to the magnets, fix the motor panel using an adhesive tape.*



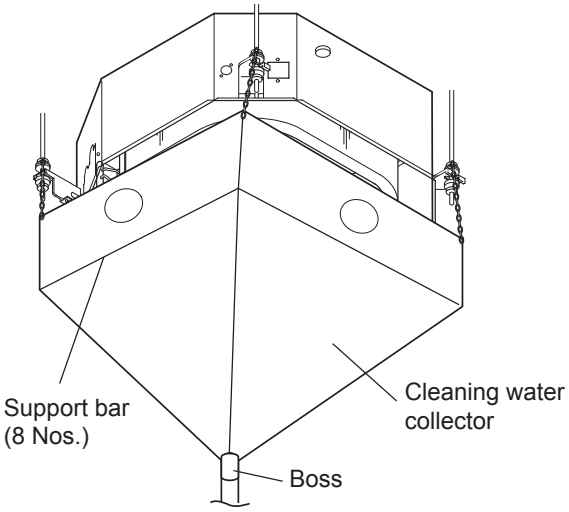




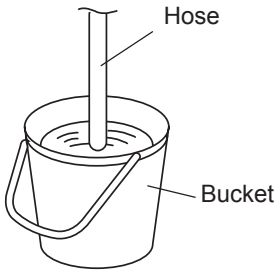
2. Scratch off the dust on the inner surface of the heat exchanger downwards using a brush. Collect all the dust in a bucket or a carton box.

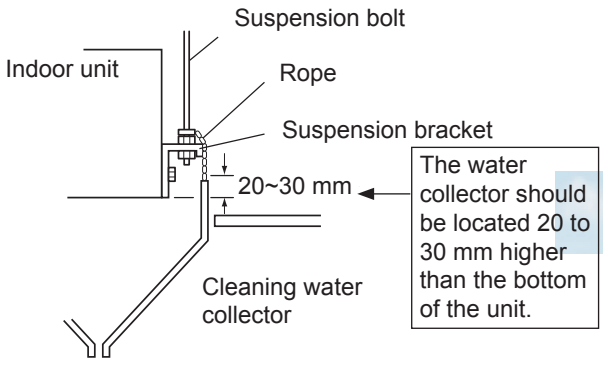


3. Suspend the cleaning water collector from the indoor unit.
   1. Tie the rope on the suspension bolts for the indoor unit and put the rope downwards.
   2. Insert the support bars into the holes of the water collector.
   3. Tie the rope on the support bar of the water collector and suspend the water collector.
   4. Connect a hose to the boss and place its end of in a bucket.



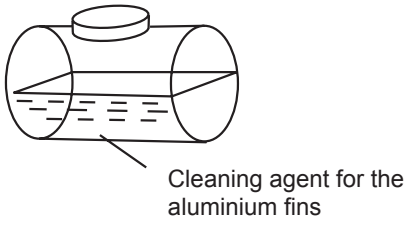
4. Put approximately 15 liters of the cleaning agent for the aluminium fins in a supply tank.





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 and remove all rests of 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 rusted. 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 before.

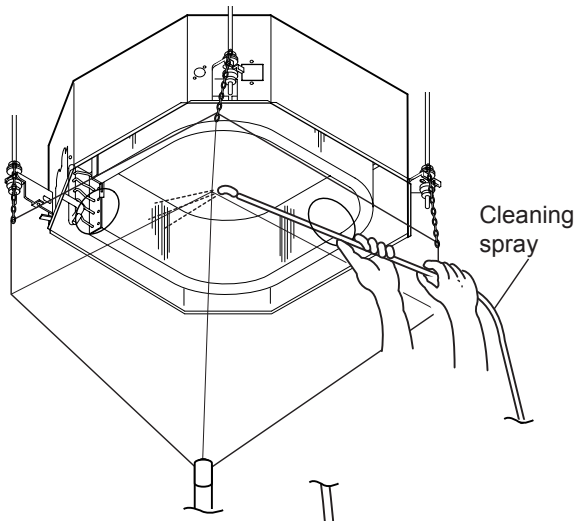
NOTE
- *If the cleaning water collector is removed, wipe off the drops from the indoor unit.*

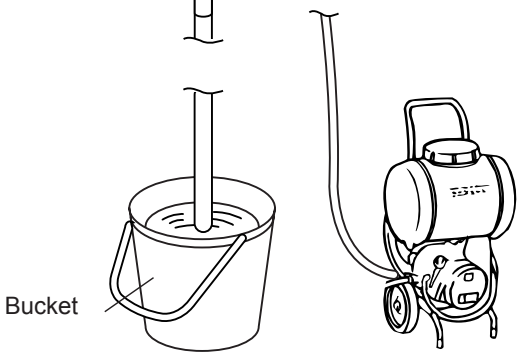
7. Check the insulation of the drain pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V are applied. Use a proper insulation checking device.

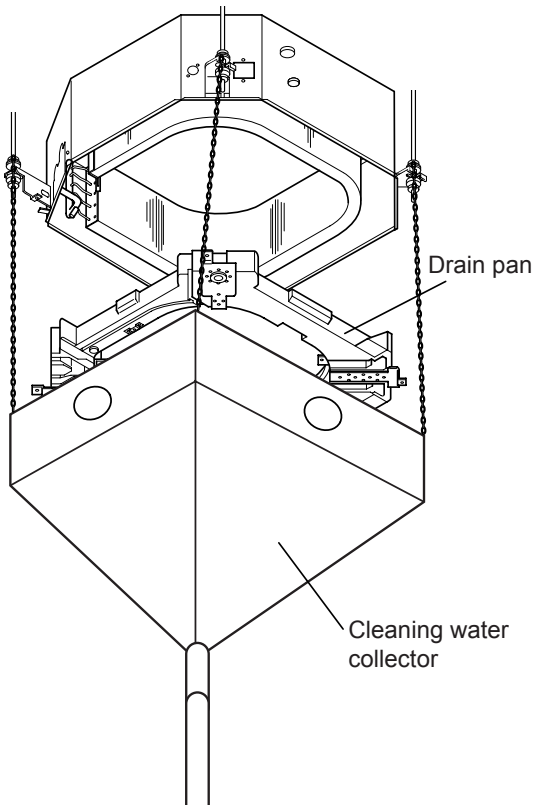
8. Connect the wiring as the wiring was connected before.

9. Neutralization treatment after the cleaning

The cleaning agent that is specified in the section “Required tools for cleaning” 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 to the resultant water before disponsing it.

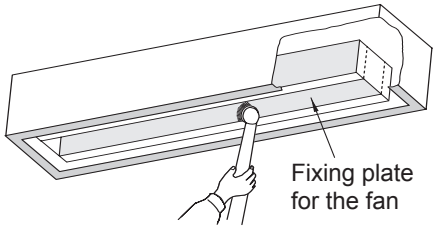






9.14.3. Cleaning the 2-way cassette indoor unit

Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before doing this work.



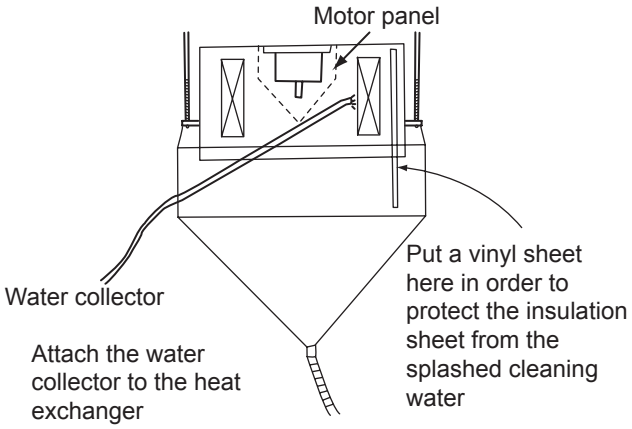
1. Remove the drain pan according to the section, "Removing the drain pan". Clean the drain pan after removing the drain pan.

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 using a tape with adhesive.
Seal the gap between the vinyl sheets using a tape with adhesive.



	NOTE
- *Allways wear gloves to avoid any injury caused by the fins of the heat exchanger.* - *Put a vinyl sheet in order to avoid the splashed cleaning water.*	

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 rusted. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.*

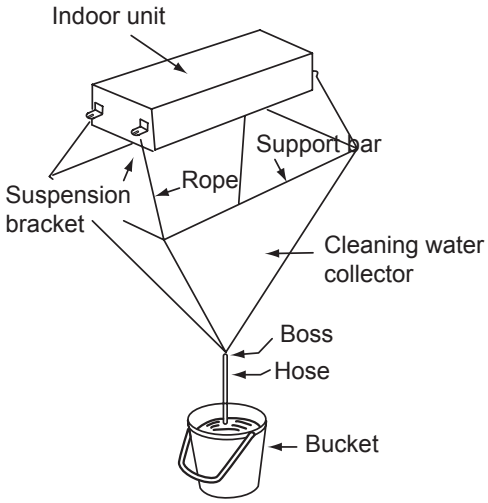
9. After you finish the cleaning and the dropping water stops, attach the fan assembly and the drain pan.

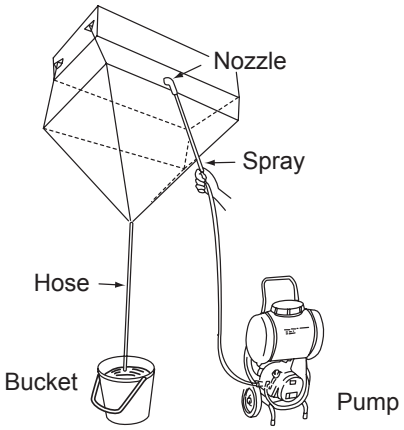
10. Check the insulation of the drain-up pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V are applied. Use a proper insulation checking device.

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 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 to the resultant water before disposing it.



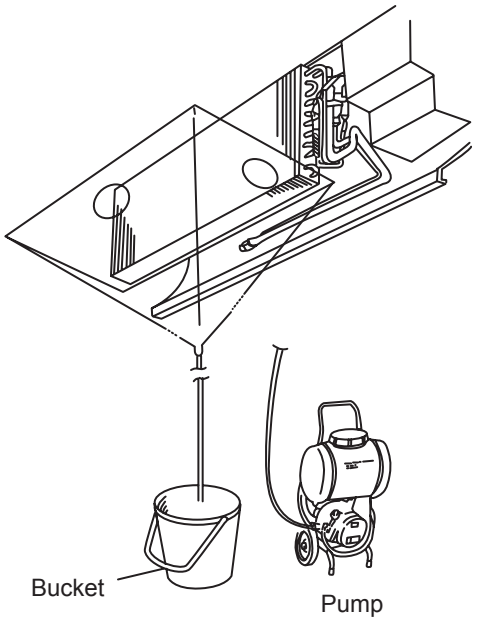


9.14.4. Cleaning the wall type indoor unit

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 the electrical components carefully with a vinyl sheet in order to protect them 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 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 to the resultant water before disposing it.



	NOTE
-	*If the cleaning water stays, the fins will be rusted. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.*

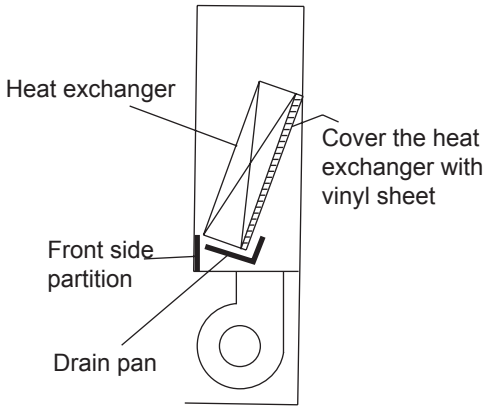
9.14.5. Cleaning the floor type indoor unit and the floor concealed type indoor unit

NOTE
- *Spread a vinyl sheet over the floor in order to protect furniture and others from the cleaning water before performing this work.*

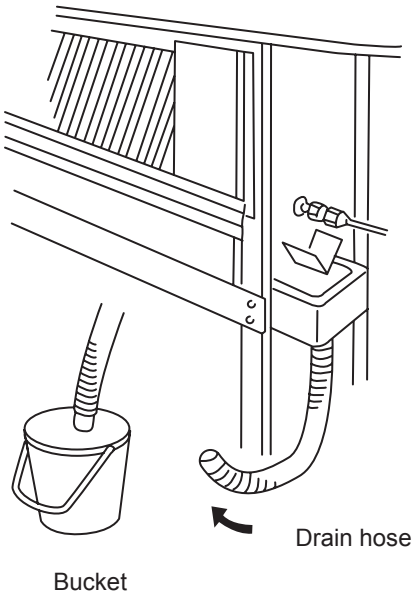
1. Remove the front panel according to the section "Removing the front panel".

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.

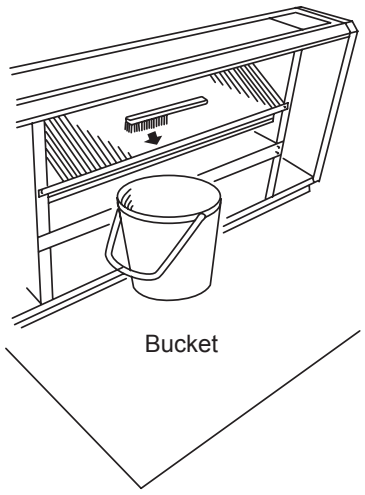


4. Lift the drain hose and place its end in a bucket.



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.

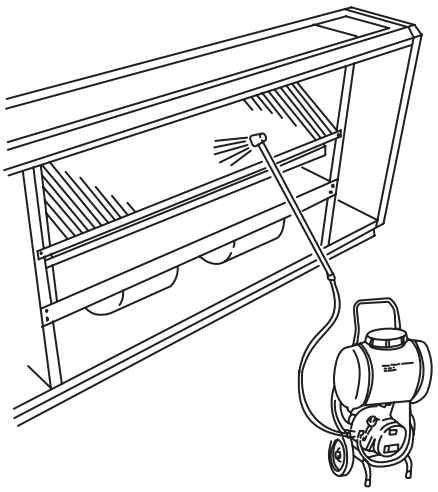


6. Spray the cleaning water over the fins of the heat exchanger.

7. Cleaning with the clean water

   Cover the wiring connectors with the insulation tape. Ensure the control's tape is closed. 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.



	NOTE
-	*If the cleaning water stays, the fins will be rusted. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins.*

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 1 MΩ when 500V are applied. Use a proper insulation checking device.

10. Neutralization treatment after the cleaning

    The cleaning agent that is specified 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 to the resultant water before disposing it.

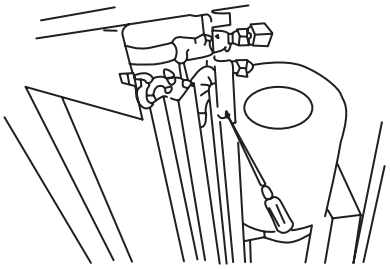
9.14.6. Cleaning the ceiling type indoor unit

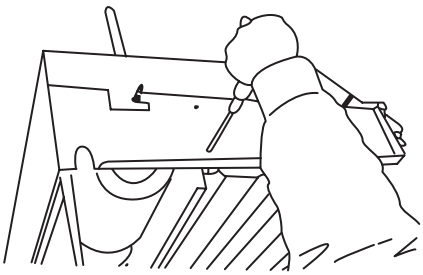
Spread a vinyl sheet over the floor in order to avoid the cleaning water before doing this work.

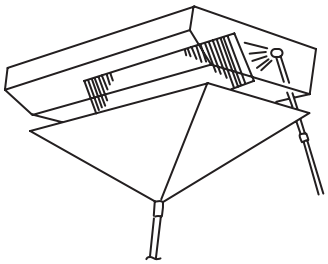
1. Remove the left-side panel and the right-side panel according to the section, "Removing the side panel".
2. Remove the discharge deflector according to the section "Removing the discharge air grille".
3. Open the air inlet grille according to the section "Removing the air filter".
4. Remove the lower 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.
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 first.
11. Cleaning with 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.

	NOTE
- *Allways wear gloves to avoid any injury caused by the fins of the heat exchanger.* - *If the cleaning water stays, the fins will be rusted. Adjust the pressure of the pump at 2.5 to 5.0 kg/cm² in order not to damage the fins. Pay attention for the drain pan not to overflow.*	

12. Check the insulation of the drain-up pump with a megohm-meter. Make sure that the insulation is greater than 1 MΩ when 500V are applied. Use a proper insulation checking device.
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 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 to the resultant water before disposing it.



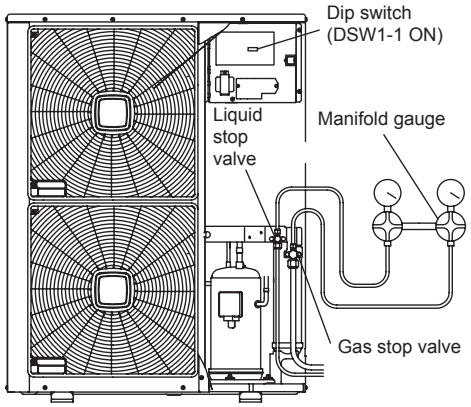




9.15. COLLECTING REFRIGERANT FOR REPLACING INDOOR UNIT

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 allways over -0.01MPa. If the pressure is lower than -0.01MPa, the compressor may be faulty.*

10. MAIN PARTS

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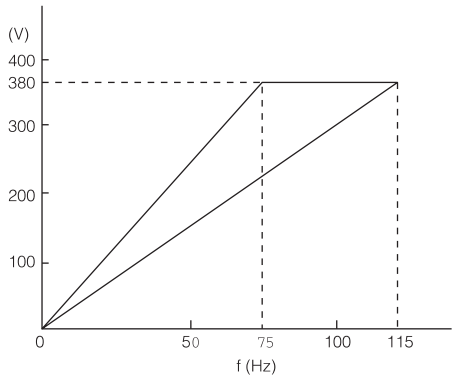
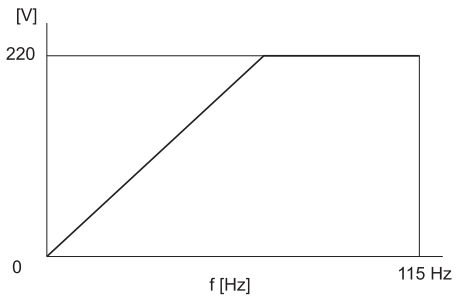
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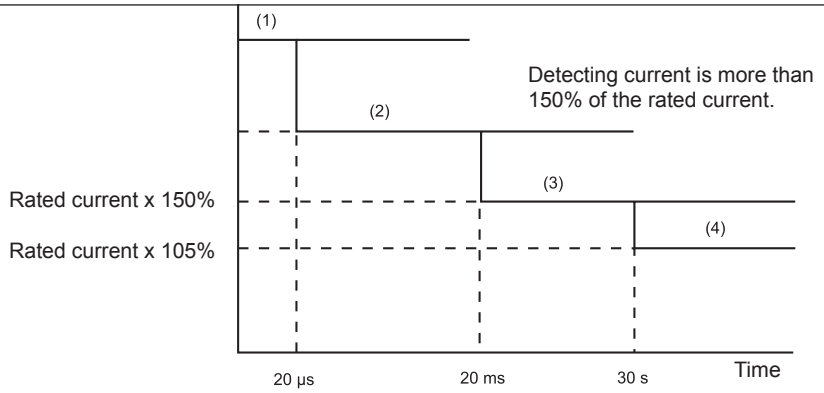
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10

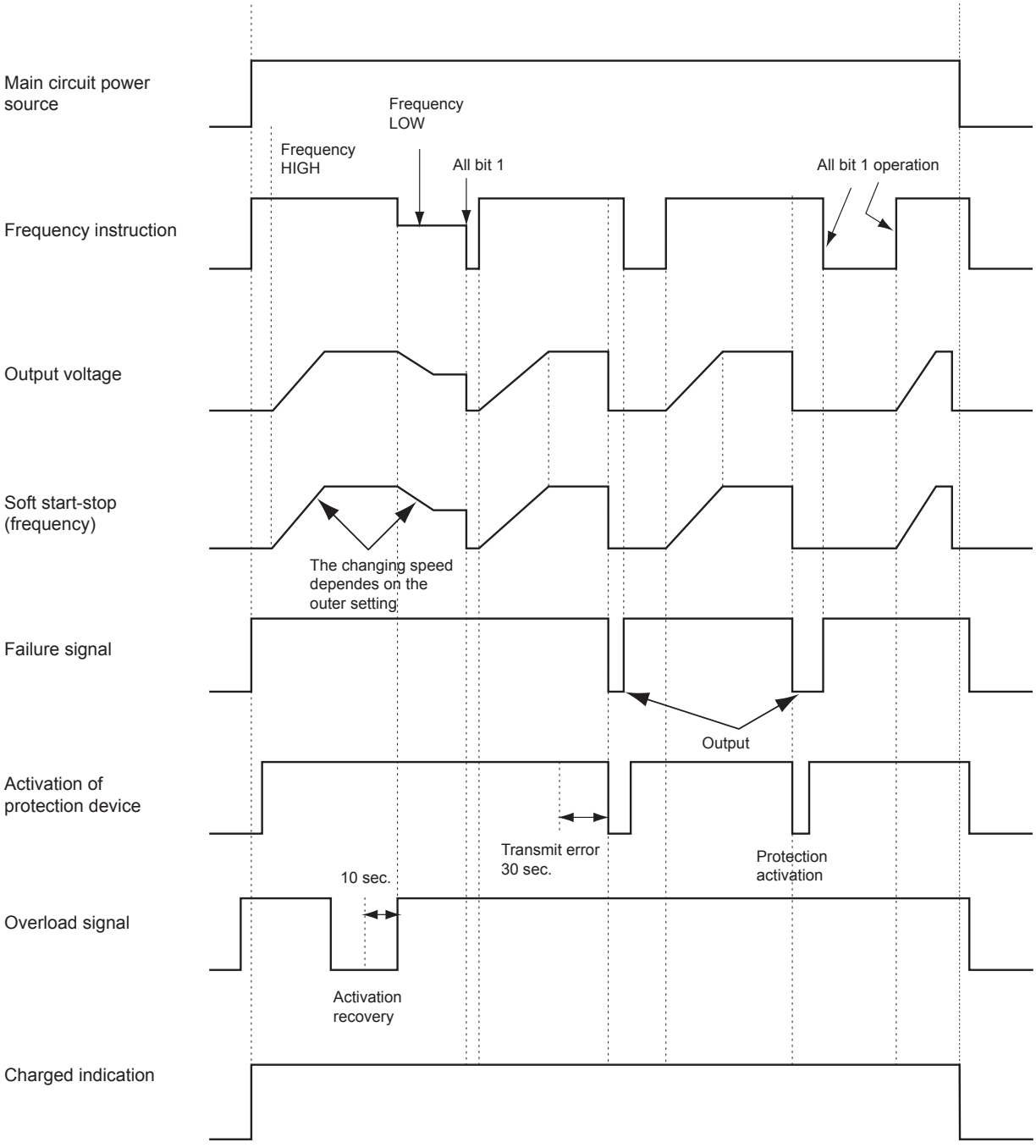
10.1. INVERTER

10.1.1. Specifications of inverter

Aplicable model	RAS-(4~12)HRNM	RAS-(3~6)HVRNME
Aplicable power source	3 Phase 380-415V,50 Hz RAS-(8~12)HRNM 3 Phase 400V, 50 Hz RAS-(4~6)HRNME	1 Phase. 230V, 50 Hz
Input current	RAS-4~12HRNM 6~25A	RAS-3~6HVRNME 15~30A
Control Method	Vector control	To be informed later
Range output frequency	20~115HZ	To be informed later
Accuracy of frequency	0,01	To be informed later
Controlled frequency	0,01 Hz at applicable frequency range	To be informed later
Output / characteristics	Conditions: 1. Power source voltage AC380/415V 2. Non-loading (free output) 3. Ammeter type volt-meter (X1.1) 	Conditions 1. Power source voltage AC220/240V 2. Non-loading (free output) 3 Ammeter type volt-meter (X1.1) 
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	Excessive low voltage at a voltage is lower than 194V DC Excessive high voltage at a voltage is higher than 420V DC
Abnormality of current sensor (0A detection)	Stoppage at a current of compressor smaller than 1.5A. When the frequency is 15 to 18Hz after starting. Cause of abnormality: Failure of current sensor Failure of IPM/DIP-IPM/ ISPM Failure of compressor / fan motor Disconnected wiring	

Protection function	
Overcurrent protection for inverter	 *) Internal protection IPM (1) Short-circuit trip of arm *) (2) Instantaneous overcurrent trip *) (3) Instantaneous overcurrent trip (4) Electronic thermal trip Condition is maintained longer than 30 seconds or accumulated longer than 3 minutes during 10 minutes sampling time.
Protection of transistor module	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.
Overload control	Overload control as a current greater than (rated current X105%). Overload control release at a current smaller than (rated current X 88%).
Fin temperature increase	The unit is stopped when the fin temperature is higher than 100°C.
Earth detection	The unit is stopped when the compressor is earthing.

10.1.2. Inverter time chart



10.1.3. 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	400V, 50Hz / 380-415V, 50Hz	230V, 50Hz
(A)	750	440
(B)	350	194

   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/DIP-IPM/ISPM
   a) Level of detection
   When some of the output terminals between “U” and “V”, “V” and “W”, “W” and “U” of IPM/dip IPM/ISPM are short-circuited, an abnormality is detected.
   When the running current of IPM/DIP-IPM/ISPM 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/DIP-IPM/ISPM 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 100 ºC, 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.

10.1.4. 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.

10.2. AC CHOPPER

(Only for RCD indoor unit)

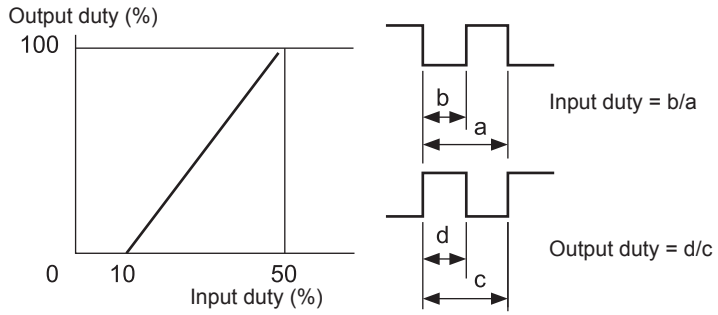
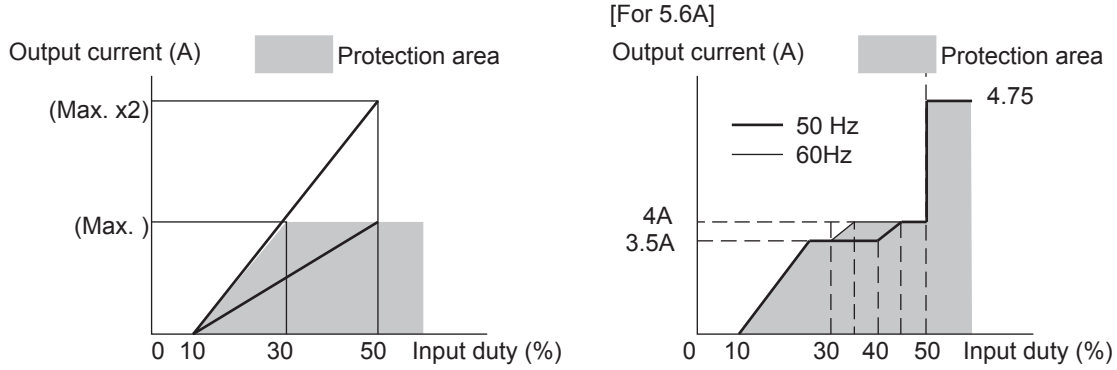
Reduction of electromagnetic sound
Fan motor control by AC chopper:
Lower electromagnetic sound and vibration have been achieved by AC chopper control than thyristor control.

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.

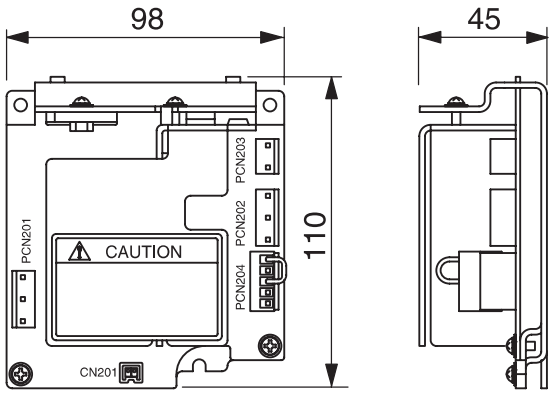
Features:
– Sinusoidal wave pattern and remarkable low level of electromagnetic sound
– No generation of harmonic current1.

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 		

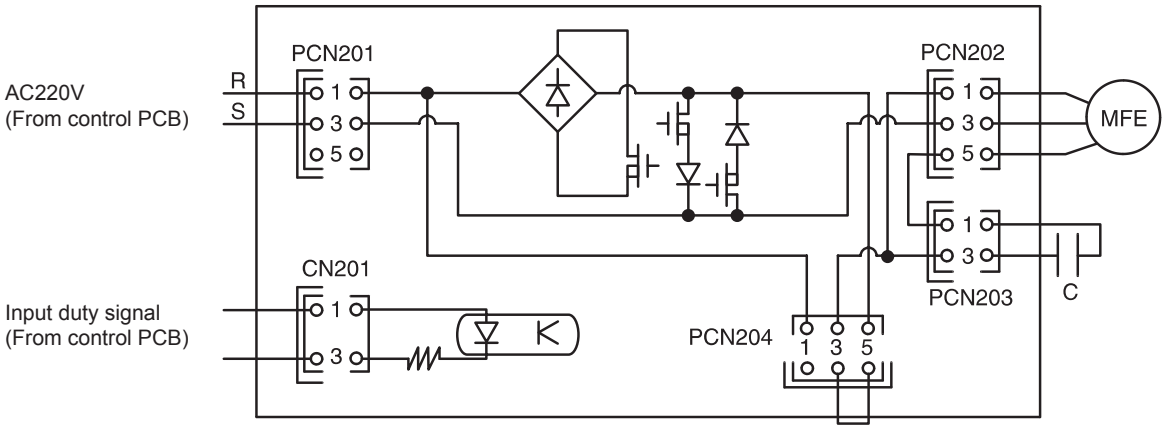
2. Structure

2.1A (For indoor units: RCD (2.0 to 2.5HP) models)



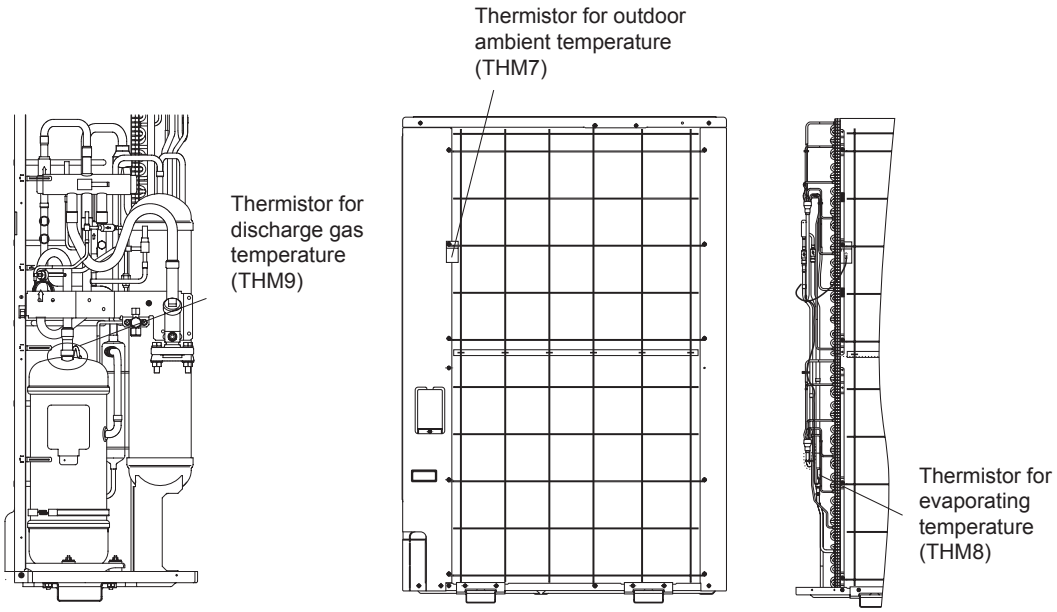
3. Circuit diagram (outline)

2.1A

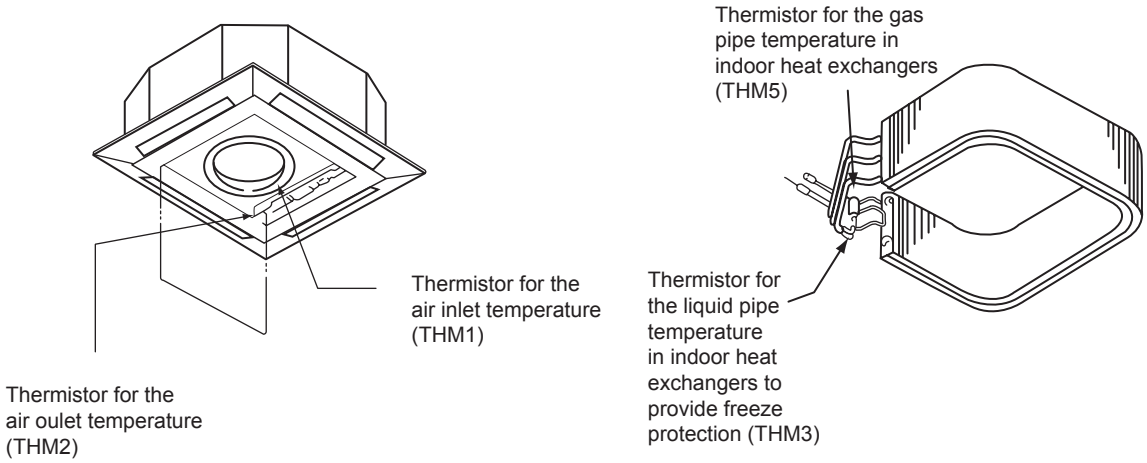


10.3. THERMISTOR

Thermistors for the outdoor unit

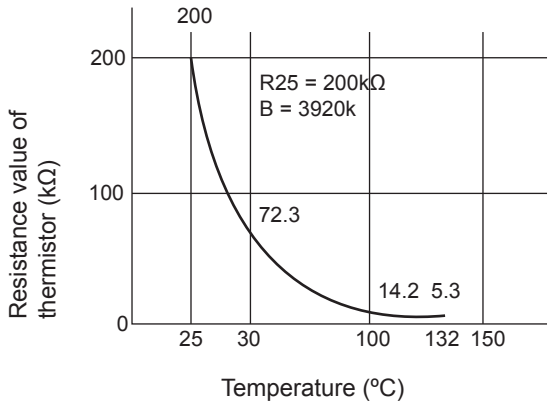


Thermistors for the indoor unit



- **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.



Resistance characteristics of thermistor for discharge gas overheating protection

In cooling operation, the above function is also available.

d. If compressor upper part temperature increases excessively, the protection control is activated and the compressor is stopped according to the following method.

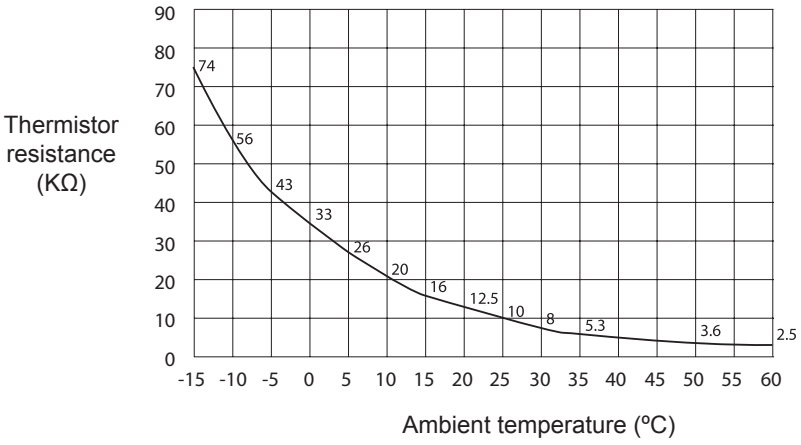
Operation	Upper part temperature of compressor	Defecting period
Cooling	Over 132ºC	10 minutes (continuously)
	Over 140ºC	5 seconds (continuously)
Heating	Over 132ºC	10 minutes (continuously)
	Over 140ºC	5 seconds (continuously)
Defrosting	Over 132ºC	5 seconds (continuously)

- **Thermistor for outdoor ambient temperature**

  The thermistor resistance characteristics are shown in the figure below.

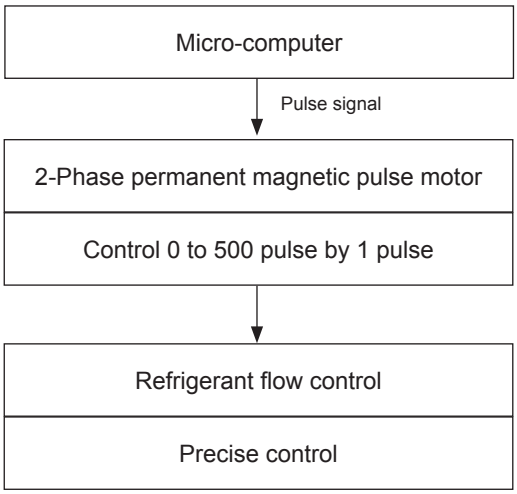
- **Thermistor for evaporating temperature of outdoor unit in heating operation (for defrosting)**
  The characteristics for the thermistor is the same with the value of outdoor ambient temperature thermistor as shown in the figure below.

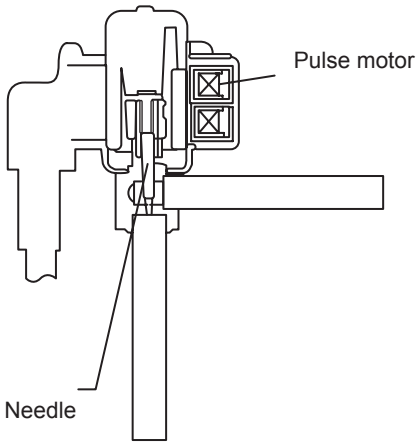
Thermistor characteristics

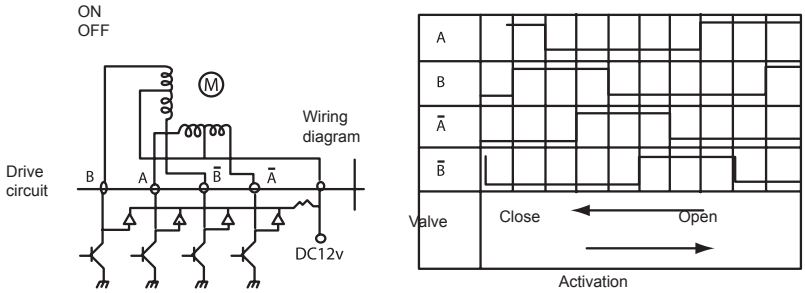


10.4. ELECTRONIC EXPANSION VALVE

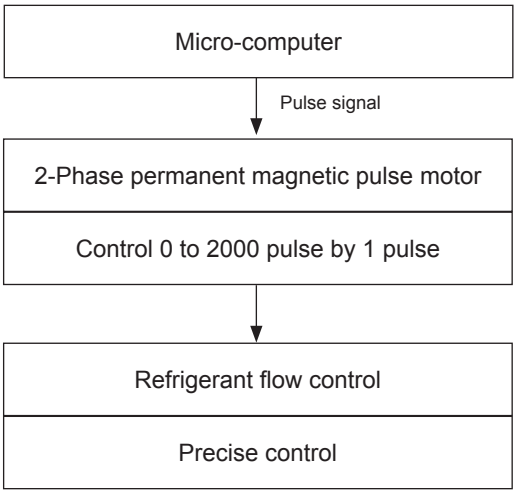
10.4.1. Electronic expansion valve for the outdoor unit

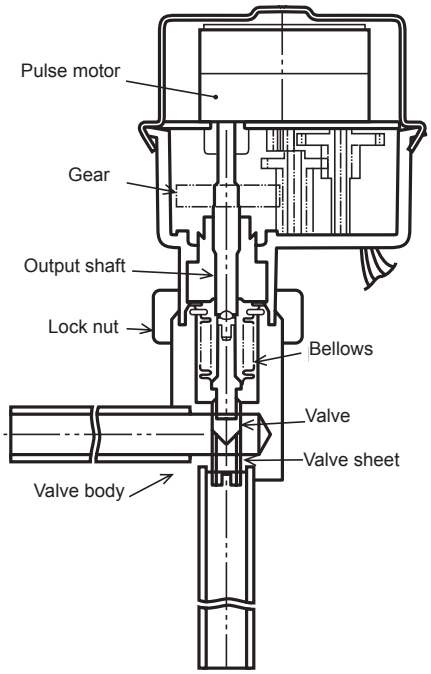


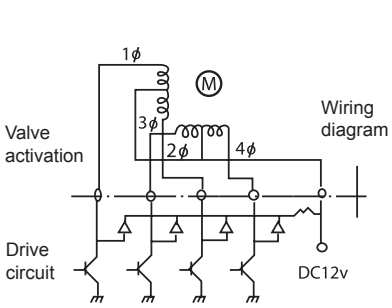
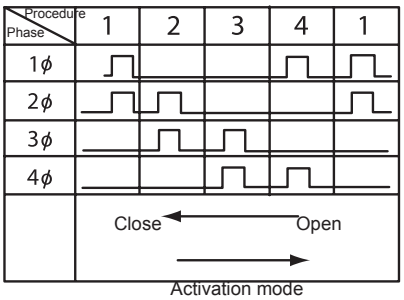


Items	Specifications
Applicable to the models	For the main cycle of: RAS-(4~12)H(V)RNM(E)
Type	UKV(10.0 USRT) series/UKV (5.0USRT) series for MVB
Refrigerant	R410A
Working temperature range	-30°C ~ 65°C (operation time of the coil: less than 50%)
Mounting direction	Drive shaft in vertical direction within 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	

10.4.2. Electronic expansion valve for the indoor unit

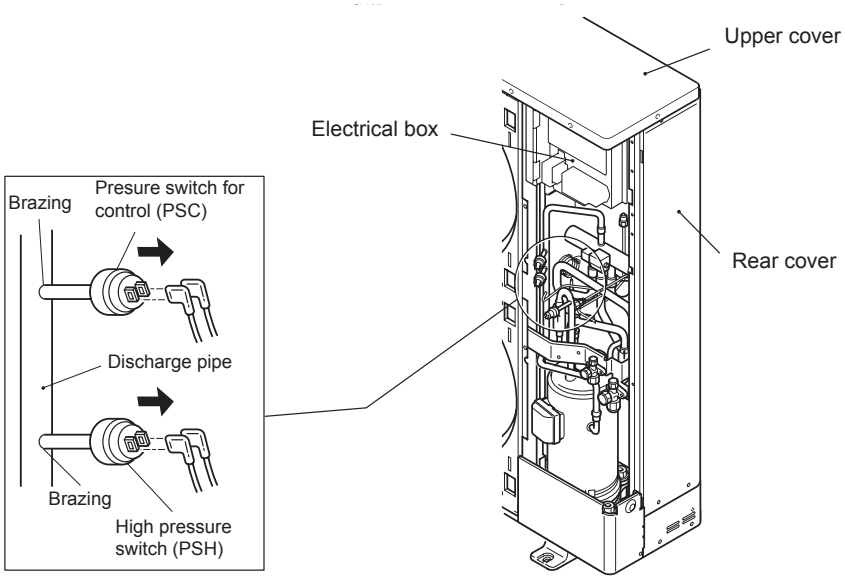




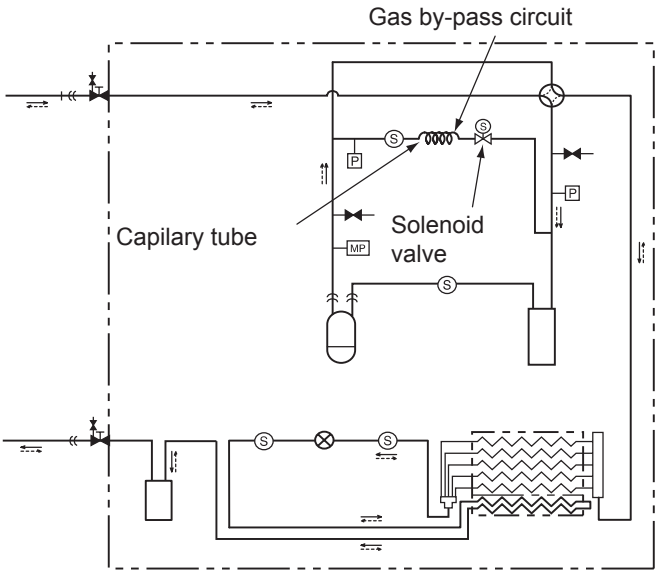
Items	Specifications
Type	EDM type
Refrigerant	R410A
Working temperature range	-30°C ~ 70°C (with coils which are not electrified)
Mounting direction	Drive shaft in vertical direction, motor upside and 90° in four direction
Flow direction	Reversible
Drive method	4-phase pulse motor
Voltage rate	DC12V±1.2V
Drive condition	100Ω ± 250PPS (pulse width over 3mm) 2 phase excitation
Coil resistance (each phase)	150Ω ± 10% (at 20°C)
Wiring diagram, drive circuit and activation mode	 

10.5. 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.



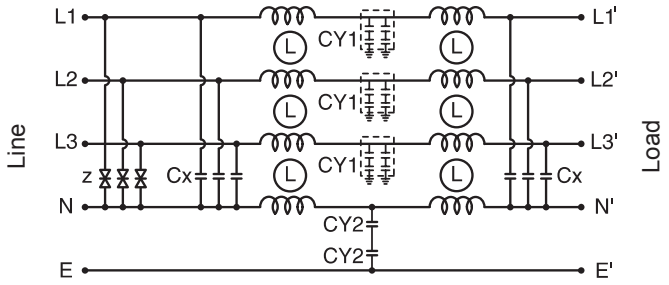
1. For controlling the high pressure not to increase excessively during heating operation, the gas by-pass circuit and the air volume of the outdoor fan is controlled automatically.
2. The gas by-pass circuit, which is composed of the solenoid valve and the capillary tube for flow adjustment, control the high pressure not to increase excessively by leading the high pressure gas to the low pressure side.

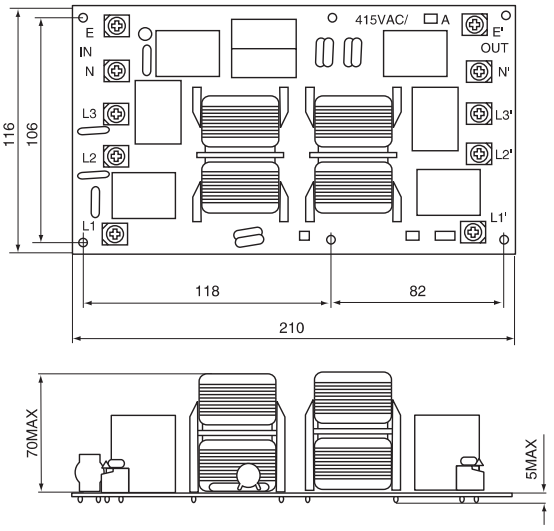


10.6. NOISE FILTER (NF)

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-(8~12)HRNM (380-415V/50Hz), RAS-(4~6)HRNME (400V/50Hz), RAS-(4~6)HVRNME (230V/50Hz)

Items	Specifications
Model	4LFB-16830-2FB
Rated current	AC415V 27A
Permissible temperature range	-20ºC to 85ºC
Circuit diagram HRNM(E)	

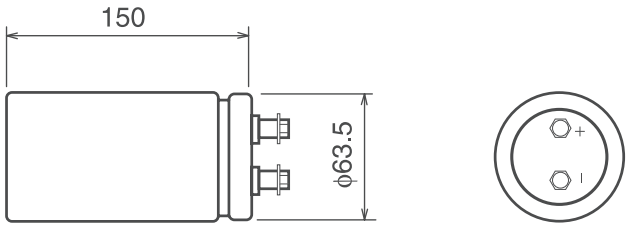


10.7. CAPACITOR (CB1, CB2)

This part is used for changing the alternative current to the direct current for the inverter. Connect two capacitor in line and used.

RAS-(8~12)HRNM (380-415V/50Hz), RAS-(4~6)HRNME (400V/50Hz)

Items	Specifications
Models	LNX2G472MSEAHE
Capacity of static electricity	4700μF
Rated voltage	400 VDC
Permissible temperature range	-25ºC to 95ºC

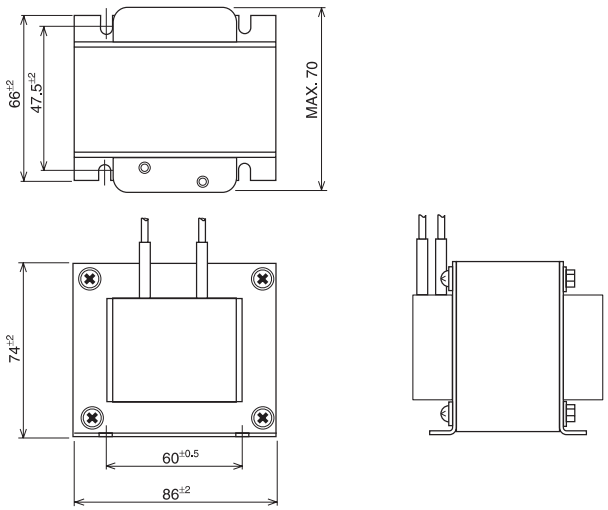


10.8. REACTOR (DCL)

This part is used for changing the alternative current to the direct current for the inverter.

RAS-(8~12)HRNM (380-415V/50Hz), RAS-(4~6)HRNME (400V/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

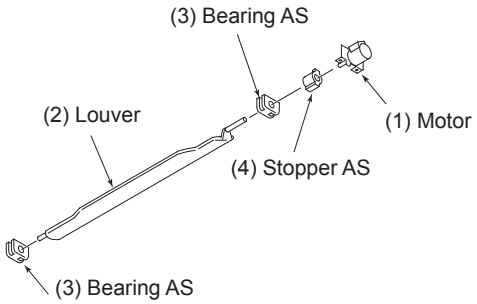


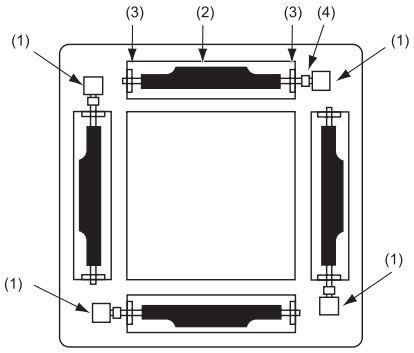
10.9. AUTO LOUVER MECHANISM

10.9.1. RCI (4-way cassette type)

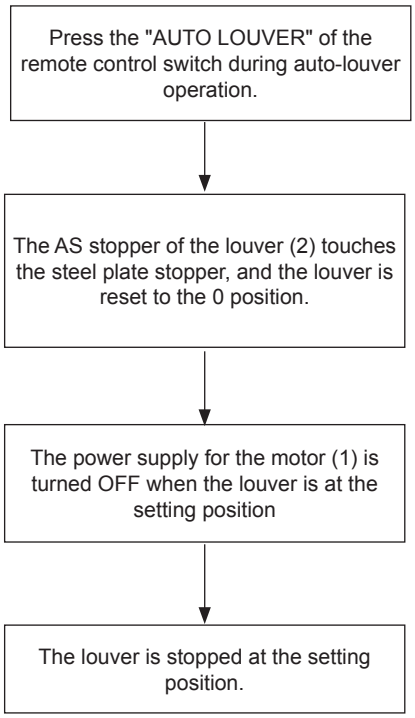
1. Auto-louver operation
   The louvers of the optional air panel with auto-louver swing simultaneously by four drive motor.
   The parts of the auto-louver mechanism are shown below.
   The motor (1) is installed to the louver directly. The louver (2) is operated by rotating the motor.
   Four pieces of the motor (1) are installed to the unit and rotated simultaneously.

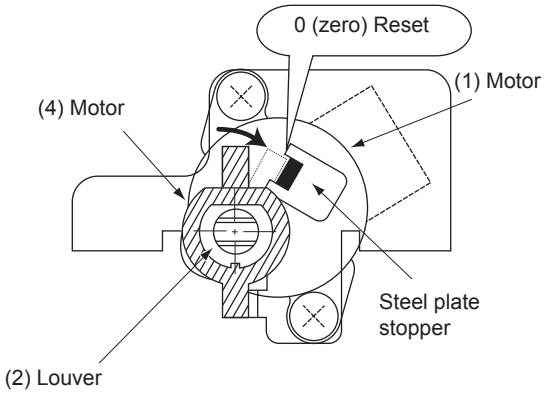
No.	Part name	No.	Part name
1	Motor	3	Bearing
2	Louver	4	Stopper AS





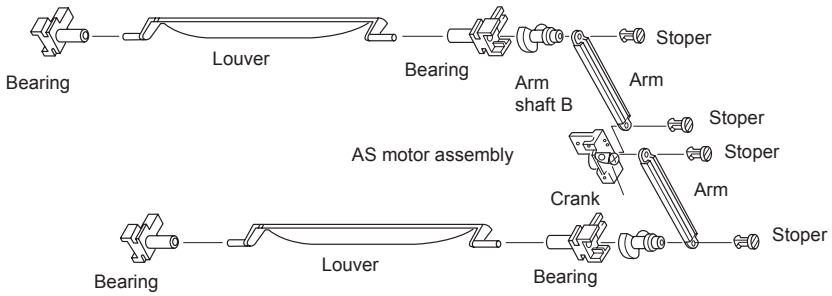
2. Auto-louver stoppage





10.9.2. RCD (2-way cassette type)

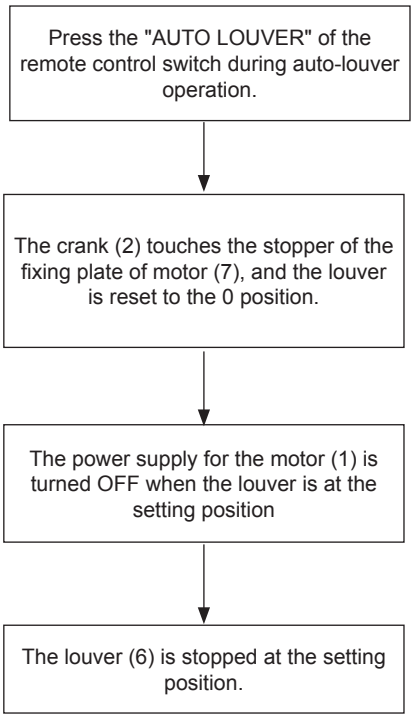
1. Auto-louver operation
   The louvers of the optional air panel with auto-louver swing simultaneously by a drive motor.
   The parts of the auto-louver mechanism are shown below.

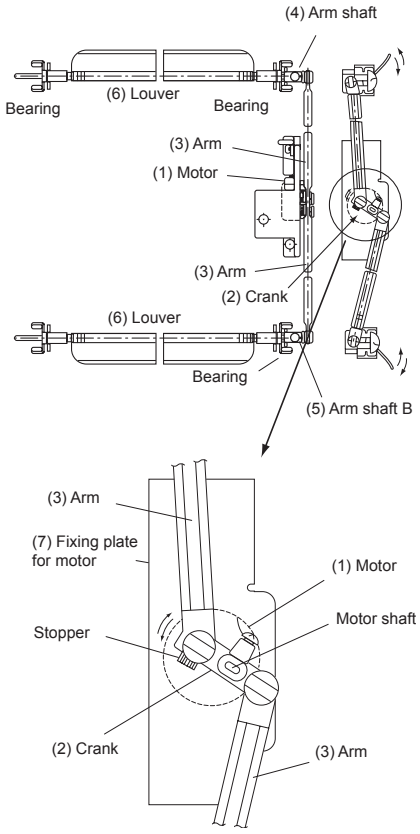


The principle of the auto-louver mechanism is as follows;
The motor (1) rotates, the crank (2) fixed to the shaft of the motor (1) rotates, the rotating torque is changed at the arm (3) and transmitted to the arm shaft A (4) and the arm shaft B (5).
The circular reciprocating force gives the driving 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		

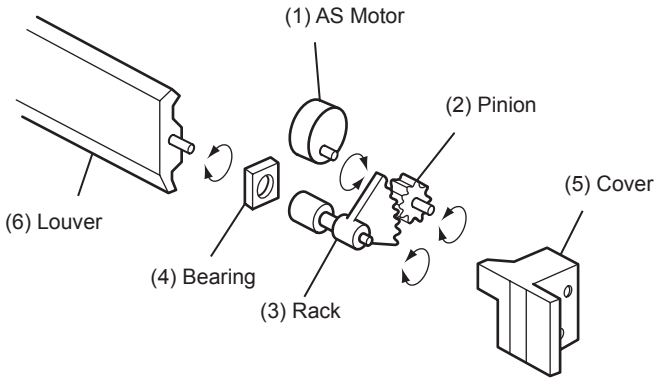
2. Auto-louver stoppage



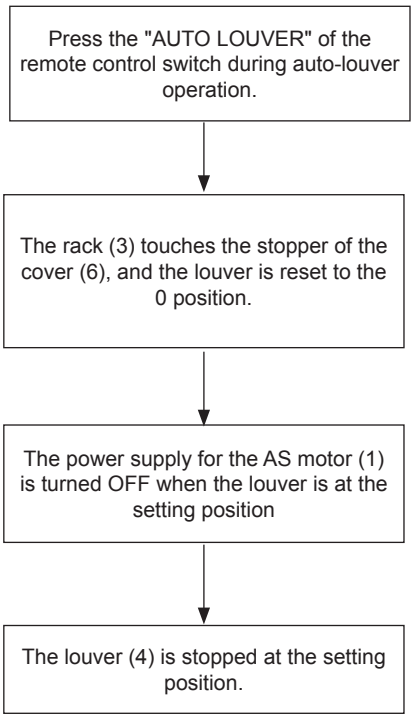


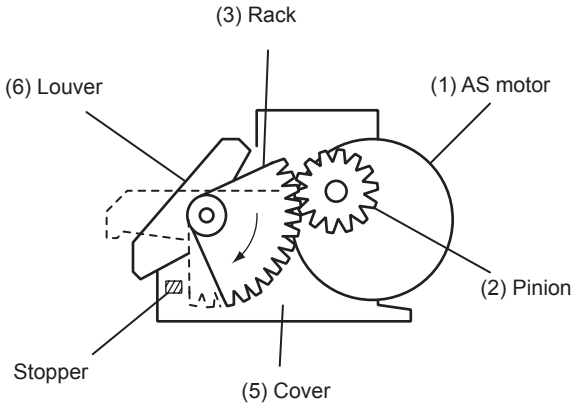
10.9.3. RPC (ceiling type)

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





10.10. SCROLL COMPRESSOR

10.10.1. Reliable mechanism for low vibrating and low sound

1. The rotating direction is definite.
2. The pressure inside of the chamber is high pressure, and the surface temperature of the chamber is 60 °C to 110 °C.

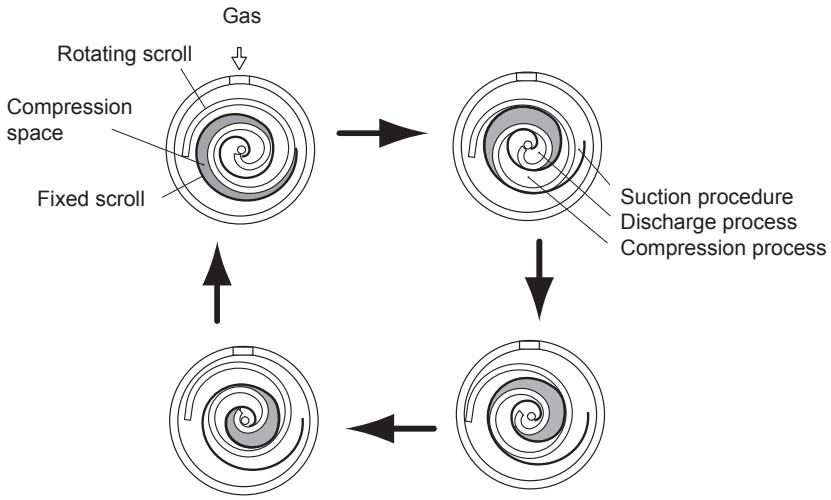
10.10.2. Principle of compression

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.



11. FIELD WORK INSTRUCTION

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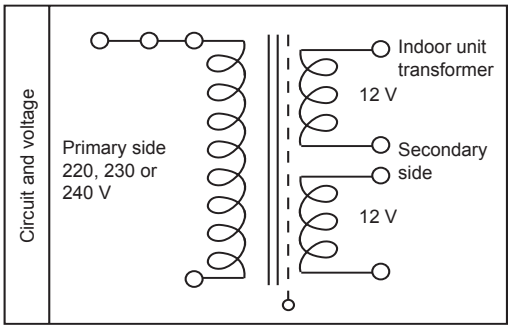
11.11. Service and maintenance record by means of the 7-segment display 11-9

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11.13. Pump-down method for replacing the compressor 11-11

11.1. CHECKING THE POWER SOURCE AND THE WIRING CONNECTION

Check the following items in the case of abnormal operation:

No.	Check item	Procedure
1	Is the breaker of the fuse cut out?	Check the secondary voltage of the breaker and the fuse by means of a tester.
2	Is the secondary power source on the transformer correct?	Disconnect the sedcondary side of the transformer and check the voltage by means of a tester. 
3	Is the wiring loosened or incorrectly connected?	Check the wiring connection on the PCB. – Thermistor connectors – Connector of the remote control cable – Connector of the transformer – Each connector in a high-voltage circuit Check the connectors according to the **electrical wiring** diagram.

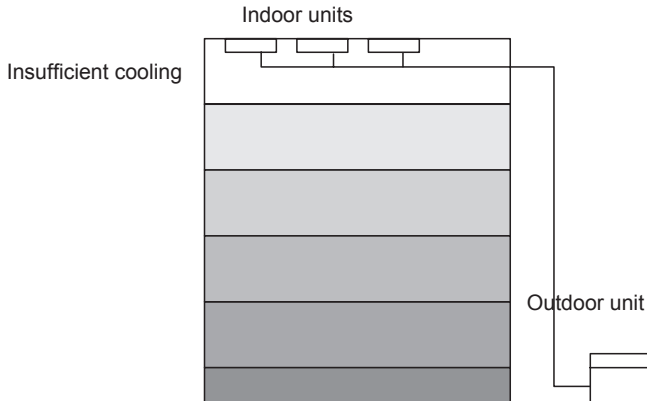
11.2. BURNT-OUT COMPRESSOR DUE TO AN INSUFFICIENT REFRIGERANT CHARGE

- **Question and answer for the field work**

Example 1: Burnt-out compressor due to an insufficient refrigerant charge	
Phenomenon	After commissioning, the alarm code "08" sometimes occurred and the compressors were burnt out after operating for two months.
Cause	The refrigerant piping work was performed during the summer season. The additional refrigerant was not sufficiently charged from the discharge gas side. This insufficient refrigerant charge resulted in the overheating of the discharge gas and the oil deterioration, which was finally due to the separated operation despite the alarm code "08".
Countermeasure	1. The compressor was replaced with a new compressor. 2. The correct refrigerant amount was charged according to the refrigerant piping length and the connected indoor units.
Remarks	Additional refrigerant charge: Open the liquid stop valves slightly when you charge the additional refrigerant from the check joint of the liquid stop valves (the discharge gas side) during the cooling process. If the liquid stop valve is fully open, it is difficult to charge the additional refrigerant. Do not charge the refrigerant from the gas stop valve.

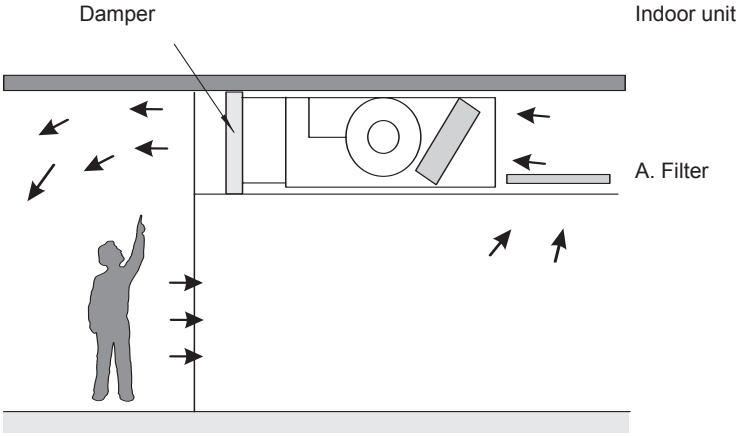
11.3. INSUFFICIENT COOLING PERFORMANCE WHEN A LONG PIPING IS APPLIED

- **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 DSW2 was changed.
Remarks	Pay special attention to the size of liquid pipe. Refer to "piping work in TC" for details

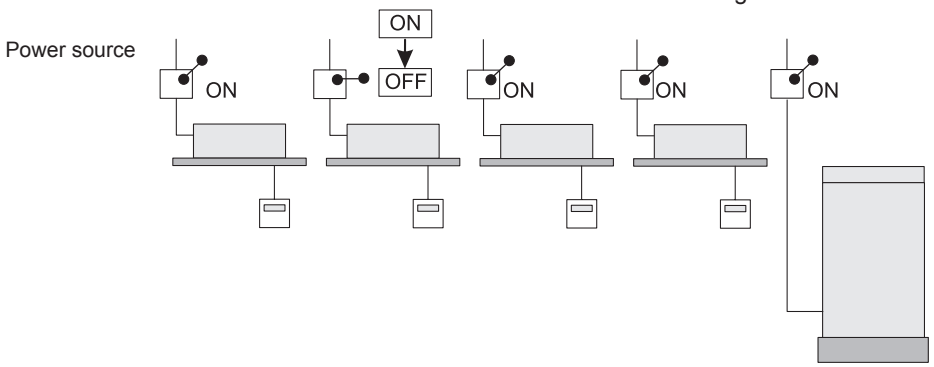
11.4. ABNORMALLY HIGH OPERATION SOUND (IN-THE-CEILING TYPE INDOOR UNIT)

- **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.

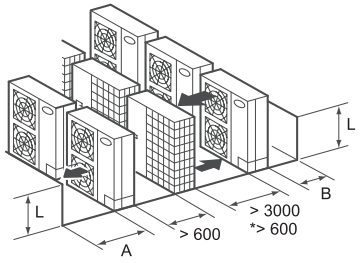
11.5. ALARM CODE "31"

- **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.

11.6. 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.*

11.7. 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 =10HP
Total drain flow volume	10HP× 3 (l/hr × HP) = 30 (l/hr)

2. Select the drain pipe from the table A and the table B

Horizontal common pipe with the slope 1/50	VP 20 for the above example
Horizontal common pipe with the slope 1/100	
Vertical common pipe	VP 25 for the above example

Table A. Permissible drain flow volume of the horizontal vinyl pipe

JIS symbol	Inner diameter (mm)	Permissible flow volume (l/hr]	
		Slope=1/50	Slope=1/100
VP20	20	39	27
VP25	25	70	50
VP30	31	125	88
VP40	40	247	175
VP50	51	472	334

NOTE

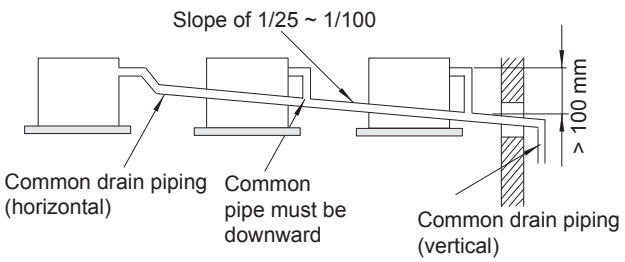
- VP20 and VP25: Not applicable to the common pipe
- VP30, VP40 and VP50: Applicable to the common pipe

Table B. Permissible drain flow volume of the vertical vinyl pipe

JIS symbol	Inner diameter (mm)	Permissible flow volume (l/hr]
VP20	20	220
VP25	25	410
VP30	31	730
VP40	40	1400
VP50	51	2760
VP65	67	5710
VP75	77	8280

NOTE

- VP20, VP25 and VP30: Not applicable to the common pipe
- VP40, VP50, VP65 and VP75: Applicable to the common pipe



11.8. 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.

11.8.1. Maximum permissible concentration of the HCFC gas

The refrigerant R410A, which is charged in the SET-FREE IVX system, is an incombustible non-toxic gas. However, if the leakage occurs and the gas fills a room, the gas may cause suffocation.
The maximum permissible concentration of the HCFC gas and the R410A in the air is 0.44 kg/m³, according to the refrigeration and air conditioning system standard (KHK S 0010) by the KHK (high-pressure gas protection association) of Japan. Therefore, you must take some effective measures in order to lower the R410A concentration in the air below 0.44 kg/m³, if there is a leakage.

11.8.2. 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.	

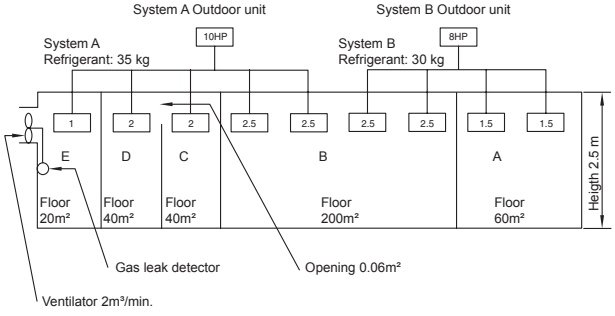
11.8.3. Countermeasure for the refrigerant leakage according to the KHK standard

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	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



11.9. 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 4: Safety and control device 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.

11.10. 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
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

11.11. SERVICE AND MAINTENANCE RECORD USING 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								

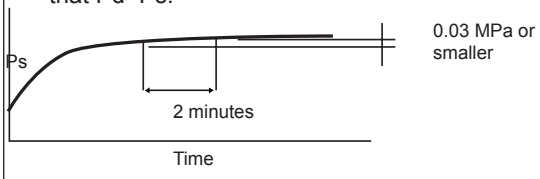
O.U.: Outdoor unit, I.U: Indoor unit
FAN1,FAN2: Constant speed fan, 52C: CMC, PSH: High pressure switch
20A: Solenoid valve (SVA), 20F: Solenoid valve (SVF), 21: Reversing valve (RVR), CH: Oil heater
*: Multiply 1/8 by the code on the 7-segment.

11.12. 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					

11.13. PUMP-DOWN METHOD FOR REPLACING THE COMPRESSOR

No.	Procedure	Remarks
1	Turn off the main switch of the outdoor unit.	
2	Remove the covers, the thermistor, the crankcase heater, the power wirings, and other items according to the chapter "removing the parts of the oudoor unit".	Make sure that the terminal part of the detached power supply wires is not exposed by the winding insulation tape and other items.
3	Attach the manifold to the check joint of the high-pressure side and the low-pressure side of the outdoor unit.	
4	Turn on the main switch of the outdoor unit.	
5	Set the exclusion of the compressor by setting the DSW so that a broken compressor will not work. You can set the exclusion of the compressor by setting the DSW1-4 in ON position.	
6	The compressor replacing mode is performed: – The DSW1-4 on the outdoor unit PCB→ ON (The cooling is run).	– This operation is performed for up to a maximum of ten minutes. – If the inverter compressor is excluded, the operation starts after three minutes.
7	The operation finishes when one of the following conditions occurs: 1) Ten minutes have passed and STP is displayed in seven segments. 2) "08" is displayed in seven segments. 3) When Ps< 0.1MPa is continued for one minute, in ten minutes STP is displayed in seven seconds and the operation finishes.	– The operation may finished when any of the conditions 1) to 3) occurs.
8	Close the liquid stop valve completely.	To avoid the spillage of all the refrigerant if the check valve is broken.
9	Check for a leakage of the check valve on the discharge gas side: – DSW4-4 (enforced stoppage of the compressor) → ON, so that the compressor will not run although the running command is sent from the remote control switch. – Check that variation of Ps on the outdoor unit PCB is 17 seconds. Make sure that the Ps increase is within 0.03 Mpa in two minutes after the Ps increase at the stoppage (during approximately five minutes). Also make sure that Pd>Ps. 	– When you stop the compressor for replacing: – You can check the leakage of the check valve by means of the Ps variation because the SVA opens so that the discharge gas side of the inverter compressor can connect to the low-pressure side. – 0.03 Mpa / 2 minutes is within the permissible limits for the check valve on the discharge gas side. – The leakage of the check valve may cause an incorrect brazing, due to the gas pressure at the brazing of the discharge piping. – If the compressor-replacing mode is performed again, set the DSW4-4 to OFF and keep the DSW4-4 at the OFF side during ten minutes. Then, start according to the procedure No. 6.
10	Collect the refrigerant by means of the refrigerant collection: – Perform either A or B, depending on the process 10. A: The leak rate at the process 10 is within the specification → Collect the refrigerant only at the low-pressure side. B: The leak rate at the process 10 is greater than the specification → Collect all the refrigerant of the outdoor unit side by means of the machine.	– The discharge of the refrigerant in the atmosphere is strictly forbidden. Make sure that the refrigerant is collected by the collector. – Keep a note of the quantity of the collected refrigerant.

No.	Procedure	Remarks
11	After collecting the refrigerant, remove the change hose (collector side) of the low-pressure side, so that the low-pressure side of the refrigerant cycle will be the atmosphere pressure.	– Make sure that there is no pressure increase of the low-pressure sides after collecting the refrigerant. – Make sure that the refrigerant cycle is the atmosphere pressure. Otherwise, problems such as the blowing of gas and the suction of the cutting material) may occur when you are removing the compressors.
12	Turn OFF the main switch of the outdoor unit.	
13	Perform the replacement of the compressor and the change of the refrigerant oil according to the section "replacing the compressor".	Make sure that you follow the instructions.
14	Perform the vacuum from the check joint of the low-pressure side.	If you collect the refrigerant only on the low-pressure side (**A** in 11). You cannot perform the vacuum of the refrigerant from the check joint of the high-pressure side.
15	Open the liquid stop valve and the gas stop valve completely when you finish the vacuum.	
16	Make sure that the power is turned OFF and attach the following items: the power supply wire, the thermistor, the crankcase heater, the 63H wiring, the panel and the nut).	
17	Set the DSW back to the original setting. Make sure that all the wirings to the compressor are connected correctly.	
18	Recharge the refrigerant that is collected in the process by the stop valve of the liquid side during the cooling at the TEST RUN mode.	If the replacement of the compressor takes more than two hours, an additional change of the refrigerant is necessary. Additional change = (replacing time – 2 hours) x 0.5kg.

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