

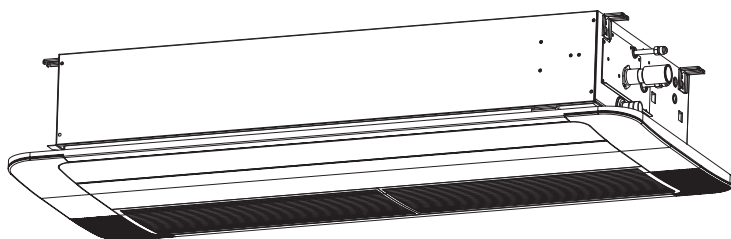
HITACHI

VRF AIR CONDITIONERS

- INDOOR UNIT -

HITACHI

Technical Data for Indoor Unit



Models

• 1-Way Cassette Type

RCIS-1.0FSKDNQ

RCIS-1.3FSKDNQ

RCIS-1.6FSKDNQ

RCIS-2.0FSKDNQ

RCIS-2.5FSKDNQ

IMPORTANT NOTICE

- HITACHI pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- HITACHI cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable, if local regulations are not available.
International Organization for Standardization, ISO5149 or European Standard, EN378 or Japan Standard, KHKS0010.
- No part of this manual may be reproduced without written permission.
- The following words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

⚠ DANGER

: Immediate hazards which WILL result in severe personal injury or death.

⚠ WARNING

: Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ CAUTION

: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

NOTE

: Useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the distributor should add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of HITACHI.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well as for other models.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

IMPORTANT NOTICE



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
Claim for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard usage of the unit shall be explained in these instructions.

Therefore, the use of the unit other than those given in these instructions is not recommended.

Please contact your local agent as the occasion arises.

Hitachi's liability shall not cover defects arising from the alteration performed by a customer without Hitachi's consent in a written form.

SAFETY SUMMARY** DANGER**

- Use the specified non-flammable refrigerant to the outdoor unit in the refrigerant cycle. Do not charge material other than specified refrigerant into the unit such as hydrocarbon refrigerants (propane or etc.), oxygen, flammable gases (acetylene or etc.) or poisonous gases when installing, maintaining and moving. These flammables are extremely dangerous and may cause an explosion, a fire, and injury.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Electric Leakage Breaker). In the event of a fault, there is danger of an electric shock or a fire if it is not used.
- Do not install the outdoor unit where there is a high level of oil mist, flammable gases, salty air or harmful gases such as sulphur.

** WARNING**

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one (1) meter from the system.
- If circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it lead electric shock. Do not connect the ground wiring to gas piping, water piping, lightning conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Do not put any foreign material on the unit or inside the unit.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- Before performing any brazing work, check to ensure that there is no flammable material around.
When using refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals.
If not protected, rats may gnaw at unprotected parts and which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.

SAFETY SUMMARY

 CAUTION

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.
 - Supply electrical power to the system to energize the oil heater for 12 hours before startup after a long shutdown.
 - Do not step or put any material on the product.
 - Provide a strong and correct foundation so that;
 - a. The outdoor unit is not on an incline.
 - b. Abnormal sound does not occur.
 - c. The outdoor unit will not fall down due to a strong wind or earthquake.
-

NOTES:

- It is recommended that the room be ventilated every 3 to 4 hours.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, it is recommended that auxiliary heating equipment be used in the field when the unit is installed in a low temperature region.

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1. General Data

Indoor Unit Type		1-Way Cassette Type		
Model		RCIS-1.0FSKDNQ	RCIS-1.3FSKDNQ	RCIS-1.6FSKDNQ
Power Supply		AC 1 Φ, 220-240V/50Hz AC 1 Φ, 220V/60Hz		
Nominal Cooling Capacity	kW	2.8	3.6	4.5
	kcal/h	2,400	3,100	3,900
	Btu/h	9,600	12,300	15,400
Cooling Power Consumption	kW	0.02	0.03	0.04
Nominal Heating Capacity	kW	3.2	4.0	5.0
	kcal/h	2,800	3,400	4,300
	Btu/h	11,000	13,600	17,100
Heating Power Consumption	kW	0.03	0.04	0.05
Sound Pressure Level				
Nominal Cooling	dB	32/31/30/29/28/27	37/35/34/32/30/28	41/37/34/33/31/30
Nominal Heating	dB	35/34/32/31/29/28	40/36/35/33/30/29	43/39/35/33/31/29
Outer Dimensions				
Height	mm	192	192	192
	(in.)	(7-9/16)	(7-9/16)	(7-9/16)
Width	mm	910	910	910
	(in.)	(35-13/16)	(35-13/16)	(35-13/16)
Depth	mm	470 (18-1/2)	470 (18-1/2)	470 (18-1/2)
	(in.)			
Net Weight	kg	19	20	20
	(lbs.)	(42)	(44)	(44)
Refrigerant	—	R410A (Nitrogen-Charged for Corrosion-Resistance)		
Indoor Fan				
Air Flow Rate	m ³ /h (cfm)	396/372/336/306/288/276 (233/219/198/180/170/163)	498/438/408/372/336/306 (293/258/240/219/198/180)	600/498/408/378/342/312 (353/293/240/223/201/184)
Connections		Flare-Nut Connection (with Flare Nuts)		
Refrigerant Piping				
Liquid Line	mm	Φ6.35	Φ6.35	Φ6.35
	(in.)	(1/4)	(1/4)	(1/4)
Gas Line	mm	Φ12.7	Φ12.7	Φ12.7
	(in.)	(1/2)	(1/2)	(1/2)
Condensate Drain	—	VP25	VP25	VP25
Approximate Packing Measurement	m ³	0.19	0.19	0.19
Adaptable Panel Model	—	P-N45SNKQAE		
Color	—	Neutral White		
Outer Dimensions				
Height	mm	55	55	55
	(in.)	(2-3/16)	(2-3/16)	(2-3/16)
Width	mm	1100 (43-5/16)	1100 (43-5/16)	1100 (43-5/16)
	(in.)			
Depth	mm	550	550	550
	(in.)	(21-5/8)	(21-5/8)	(21-5/8)
Net Weight	kg	5	5	5
	(lbs.)	(11)	(11)	(11)
Approximate Packing Measurement	m ³	0.10	0.10	0.10

NOTES:

- The nominal cooling capacity is the combined capacity of the Hitachi standard split system.

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27°C DB (80°F DB)
19.0°C WB (66.2°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 7°C DB (45°F DB)
6°C WB (43°F WB)

Piping Length: 7.5 Meters Piping Lift: 0 Meter

- The sound pressure level is based on following conditions.

1.5m below the unit.

The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.

Indoor Unit Type		1-Way Cassette Type	
Model		RCIS-2.0FSKDNQ	RCIS-2.5FSKDNQ
Power Supply		AC 1Φ, 220-240V/50Hz AC 1 Φ, 220V/60Hz	
Nominal Cooling Capacity	kW	5.6	7.1
	kcal/h	4,800	6,100
	Btu/h	19,100	24,200
Cooling Power Consumption	kW	0.04	0.08
Nominal Heating Capacity	kW	6.3	8.0
	kcal/h	5,400	6,900
	Btu/h	21,500	27,300
Heating Power Consumption	kW	0.05	0.10
Sound Pressure Level			
Nominal Cooling	dB	40/38/35/33/32/31	46/42/40/37/34/32
Nominal Heating	dB	41/39/36/35/33/31	48/46/43/40/37/33
Outer Dimensions			
Height	mm	192	192
	(in.)	(7-9/16)	(7-9/16)
Width	mm	1180	1180
	(in.)	(46-7/16)	(46-7/16)
Depth	mm	470	470
	(in.)	(18-1/2)	(18-1/2)
Net Weight	kg	24	24
	(lbs.)	(53)	(53)
Refrigerant	—	R410A(Nitrogen-Charged for Corrosion-Resistance)	
Indoor Fan			
Air Flow Rate	m ³ /h (cfm)	726/594/528/492/468/396 (427/350/311/290/275/233)	936/756/672/594/504/426 (551/445/396/350/297/251)
Connections		Flare-Nut Connection (with Flare Nuts)	
Refrigerant Piping			
Liquid Line	mm	Φ6.35	Φ9.53
	(in.)	(1/4)	(3/8)
Gas Line	mm	Φ15.88	Φ15.88 (5/8)
	(in.)	(5/8)	
Condensate Drain	—	VP25	VP25
Approximate Packing Measurement	m ³	0.24	0.24
Adaptable Panel Model	—	P-N71SNKQAE	
Color	—	Neutral White	
Outer Dimensions			
Height	mm	55	55
	(in.)	(2-3/16)	(2-3/16)
Width	mm	1370	1370 (53-15/16)
	(in.)	(53-15/16)	
Depth	mm	550	550
	(in.)	(21-5/8)	(21-5/8)
Net Weight	kg	6	6
	(lbs.)	(13)	(13)
Approximate Packing Measurement	m ³	0.12	0.12

NOTES:

- The nominal cooling capacity is the combined capacity of the Hitachi standard split system.

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27°C DB (80°F DB)
19.0°C WB (66.2°F WB)

Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 7°C DB (45°F DB)
6°C WB (43°F WB)

Piping Length: 7.5 Meters Piping Lift: 0 Meter

- The sound pressure level is based on following conditions.

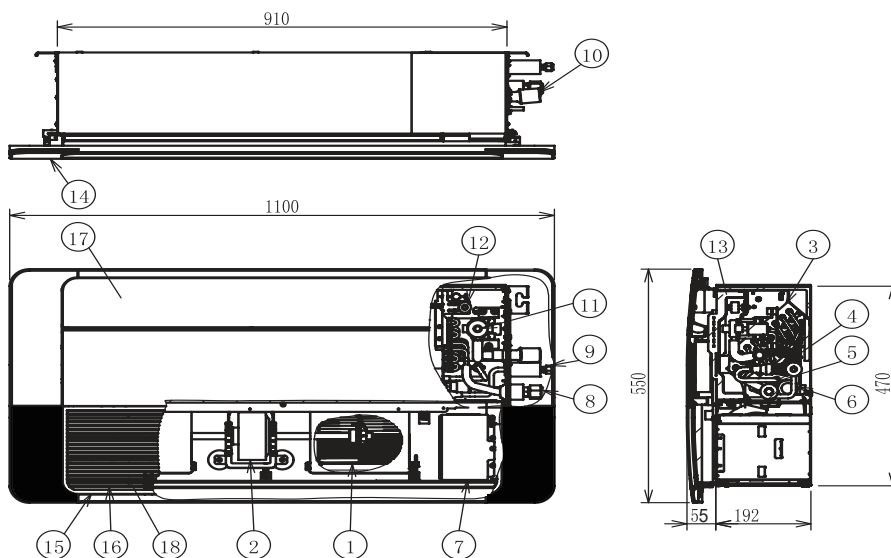
1.5m below the unit.

The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.

2. Dimensional Data

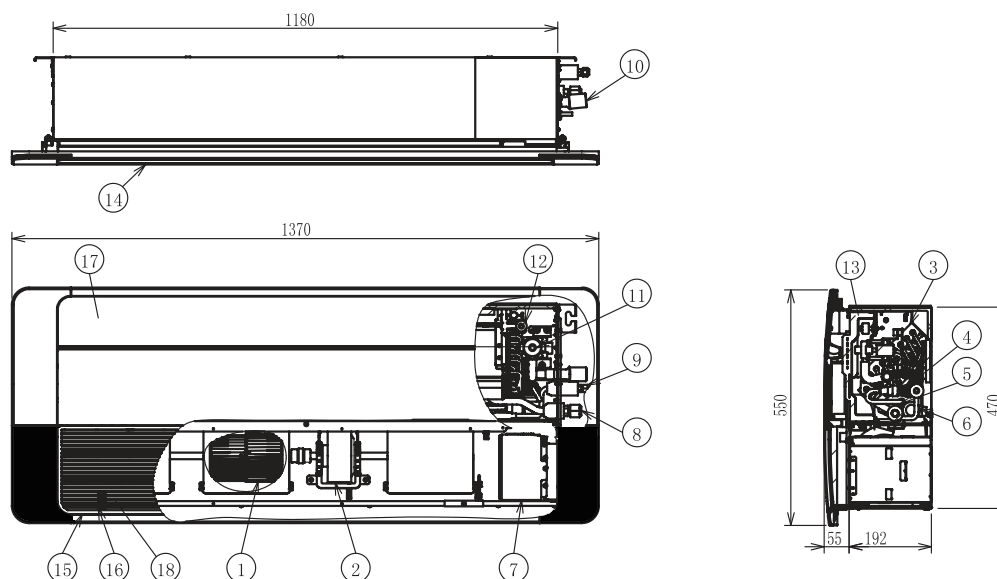
Models: 1.0~1.6

Unit:mm



Models: 2.0~2.5

Unit:mm



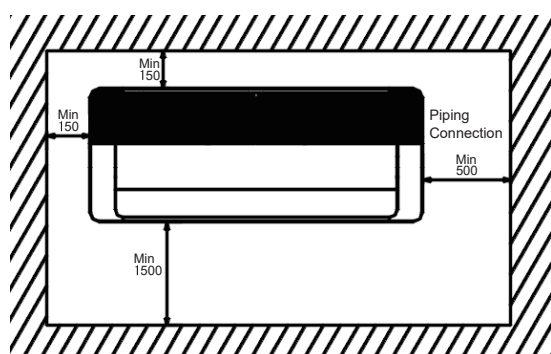
No.	Name	Remark
1	Turbo Fan	
2	Motor	
3	Heat Exchanger	
4	Splitter	
5	Filter	
6	EXP. VALVE	
7	Power Source	
8	Refrigerant Gas Pipe Connection	with ϕa Flare Nut
9	Refrigerant Liquid Pipe Connection	with ϕb Flare Nut
10	Drain Pipe Connection	VP25
11	Pump	
12	Float SW	
13	Water Connecting Plate	
14	Panel P-N45SNKQA with Model 1.0~1.6 P-N71SNKQA with Model 2.0~2.5	Optional
15	Air Inlet Grille	
16	Air Filter	
17	Air Outlet	
18	Air Inlet	

Model	a	b
1.0	12.7	6.35
1.3	12.7	6.35
1.6	12.7	6.35
2.0	15.88	6.35
2.5	15.88	9.53

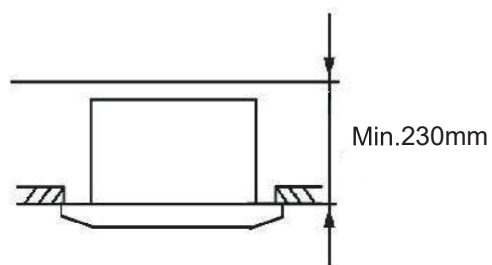
3. Selection Data

- Service Space

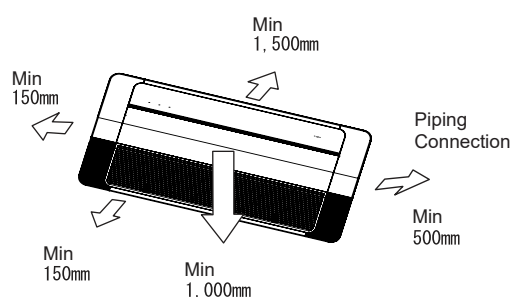
Unit:mm



Distance to Wall



Unit Hight in False Ceiling

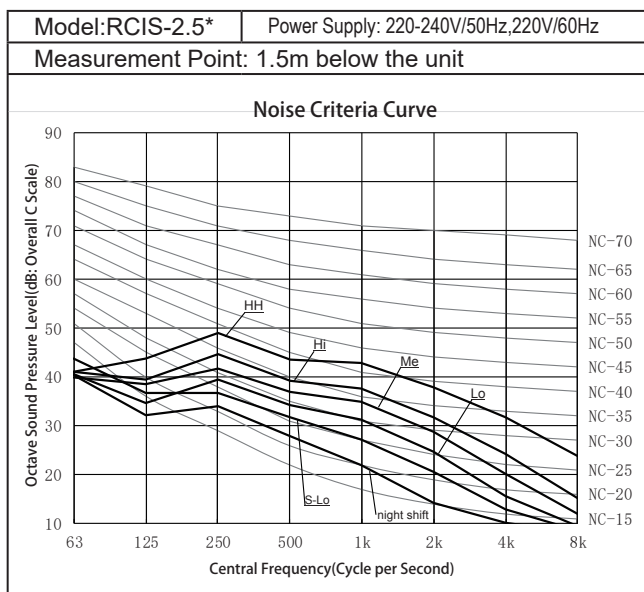
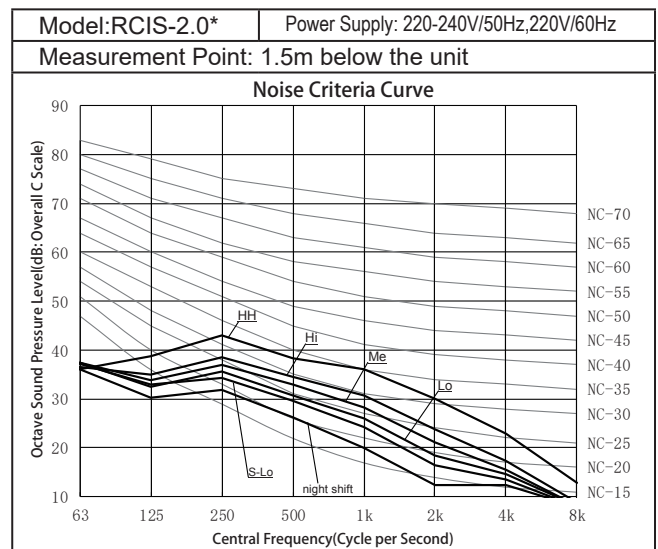
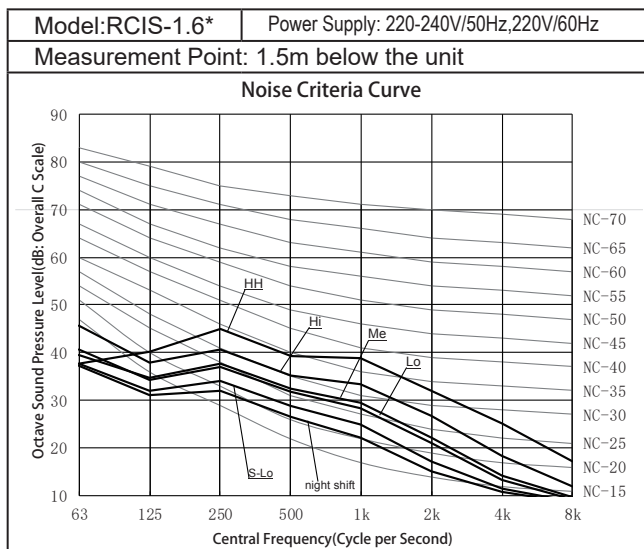
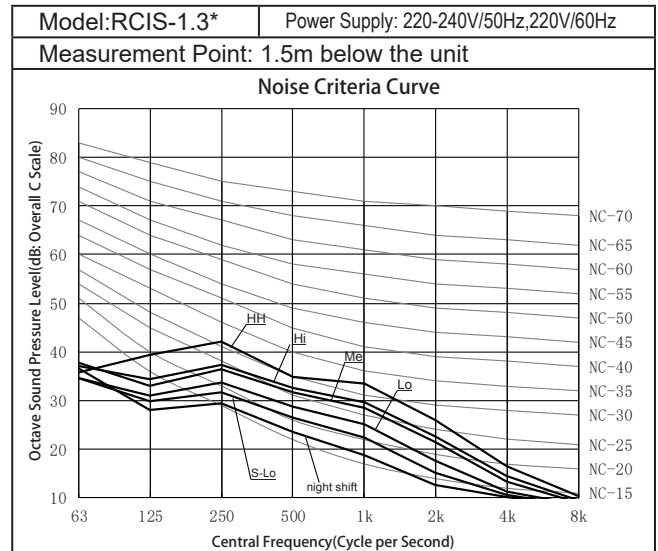
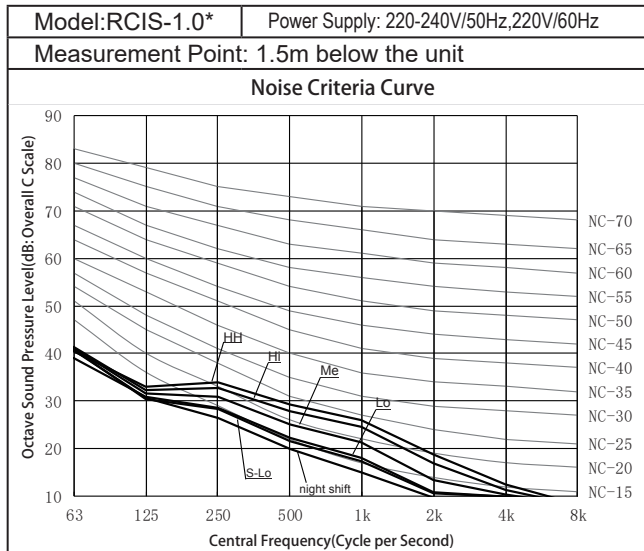


Service Space

- Sensible Heat Factor (SHF)

Indoor Unit Model	SHF					
	Super-Hi	Hi	Me	Lo	Super-Lo	Mute
RCIS-1.0*	0.81	0.69	0.69	0.69	0.69	0.69
RCIS-1.3*	0.77	0.72	0.68	0.72	0.72	0.72
RCIS-1.6*	0.75	0.71	0.67	0.71	0.71	0.71
RCIS-2.0*	0.74	0.70	0.67	0.70	0.69	0.70
RCIS-2.5*	0.70	0.68	0.66	0.69	0.68	0.68

• Sound Data

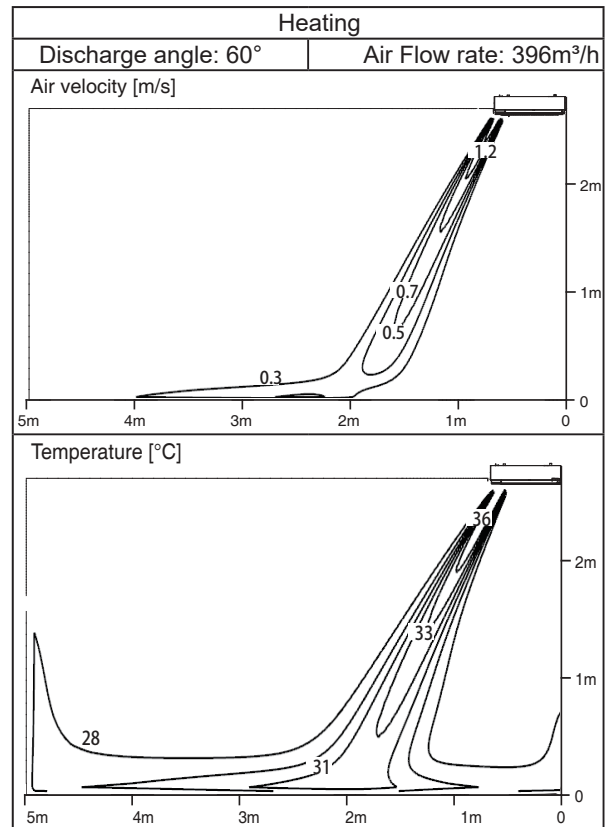
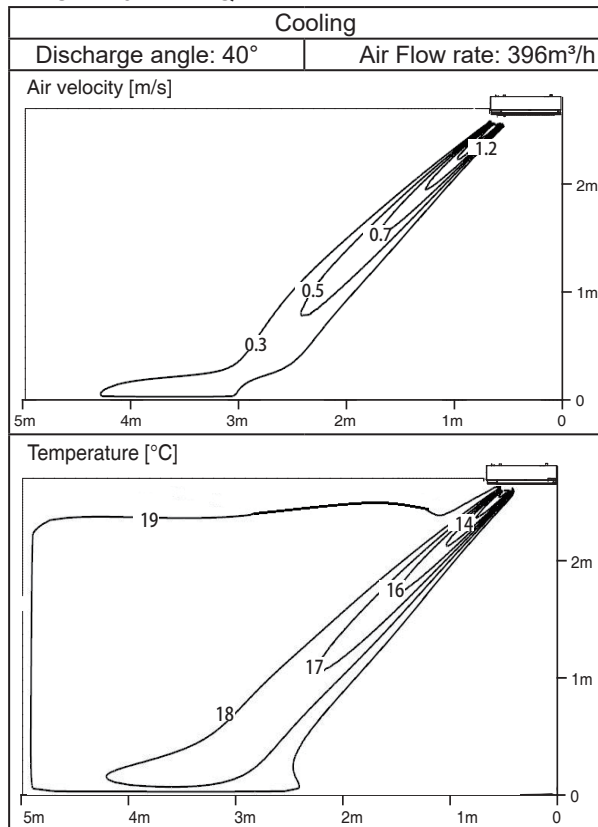


Selection Data

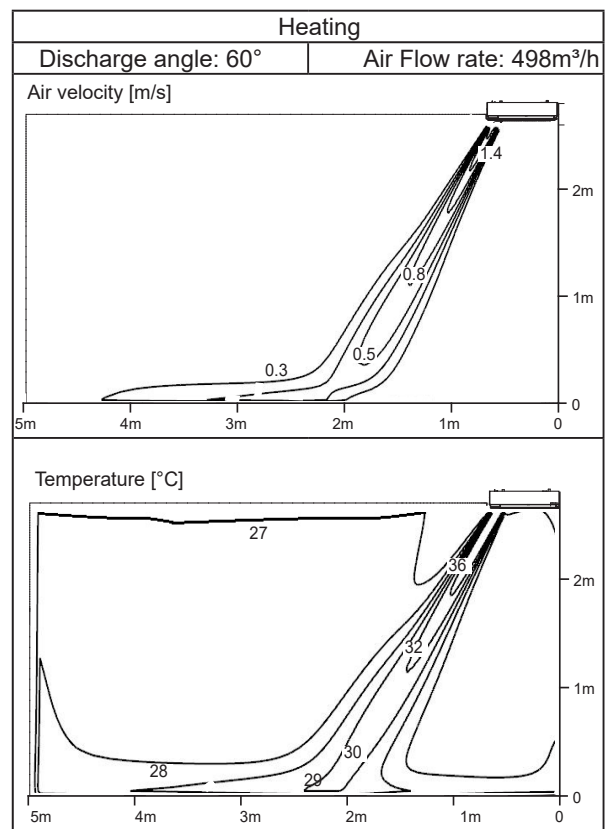
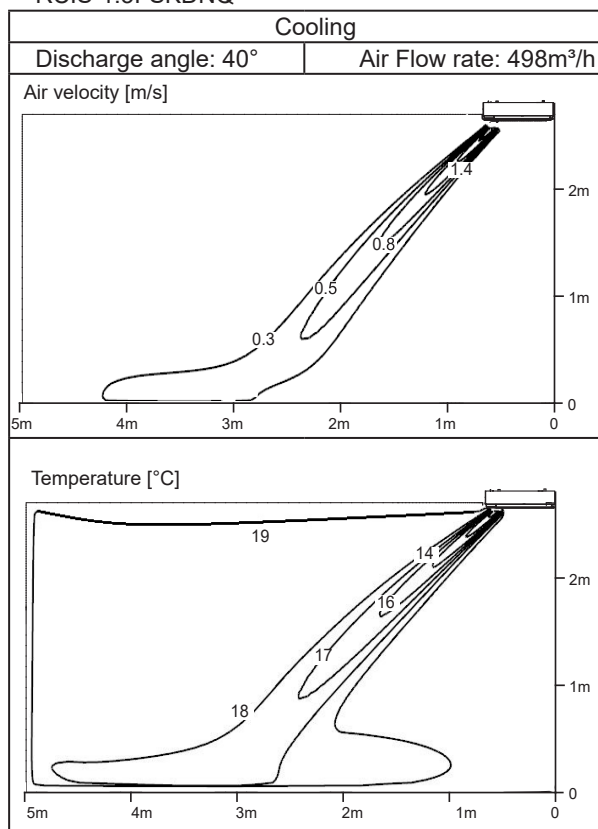
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- Temperature Data

RCIS-1.0FSKDNQ

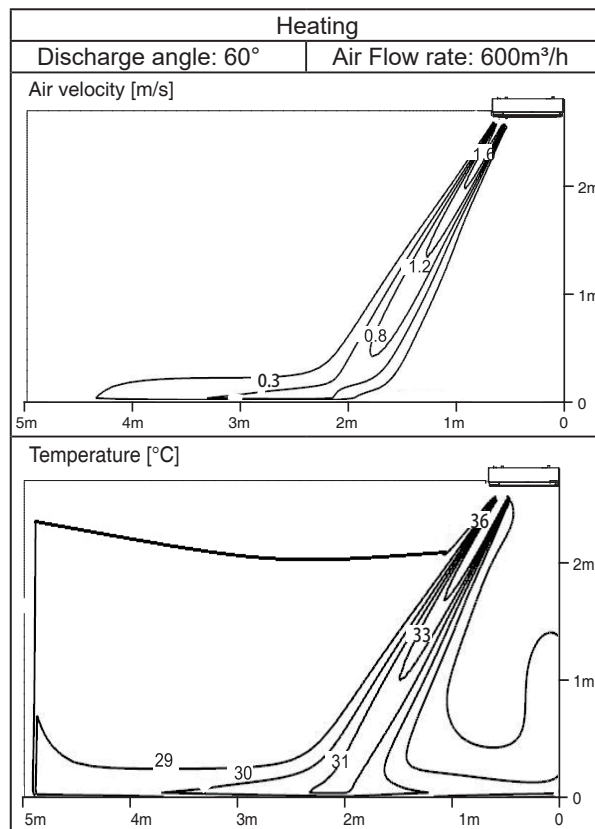
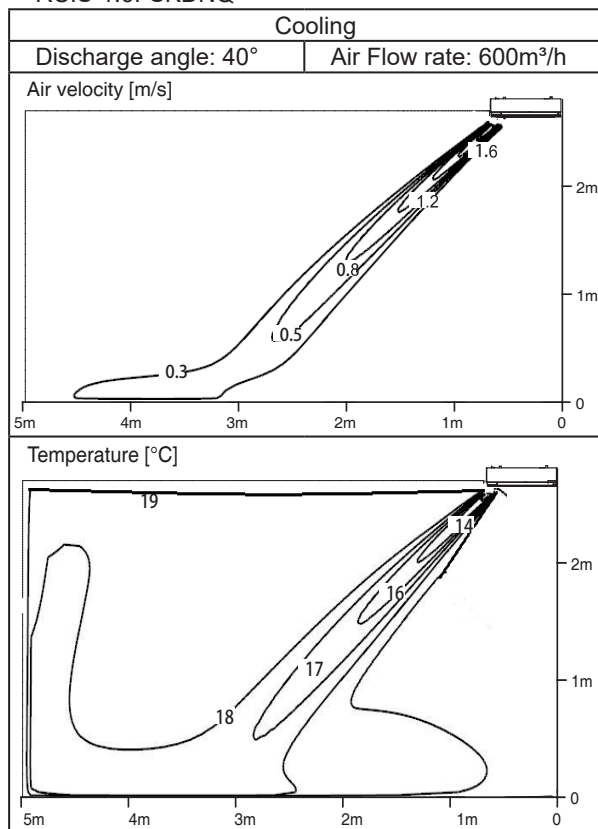


RCIS-1.3FSKDNQ

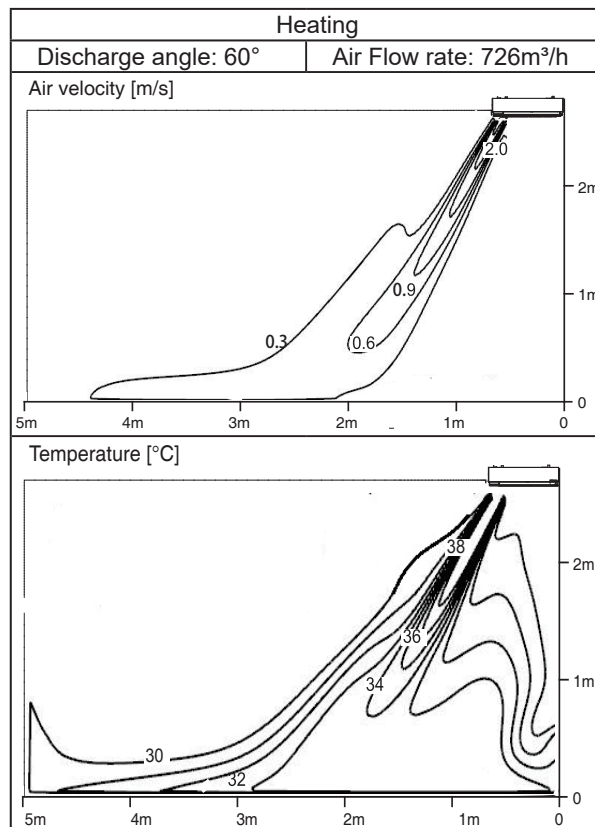
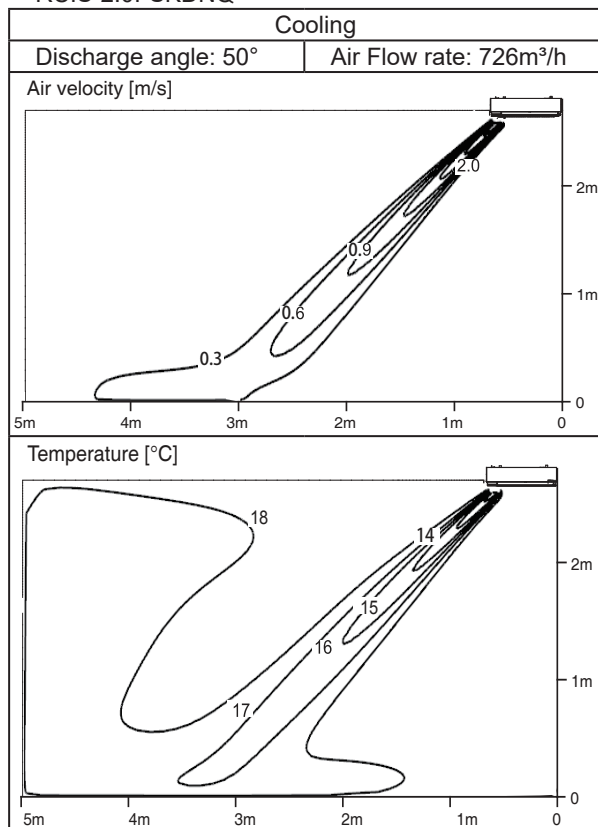


Note: The standard setup height is 2.7m. Diagrams show the distribution measured at the ceiling height of 2.7m Fan operating mode is High.

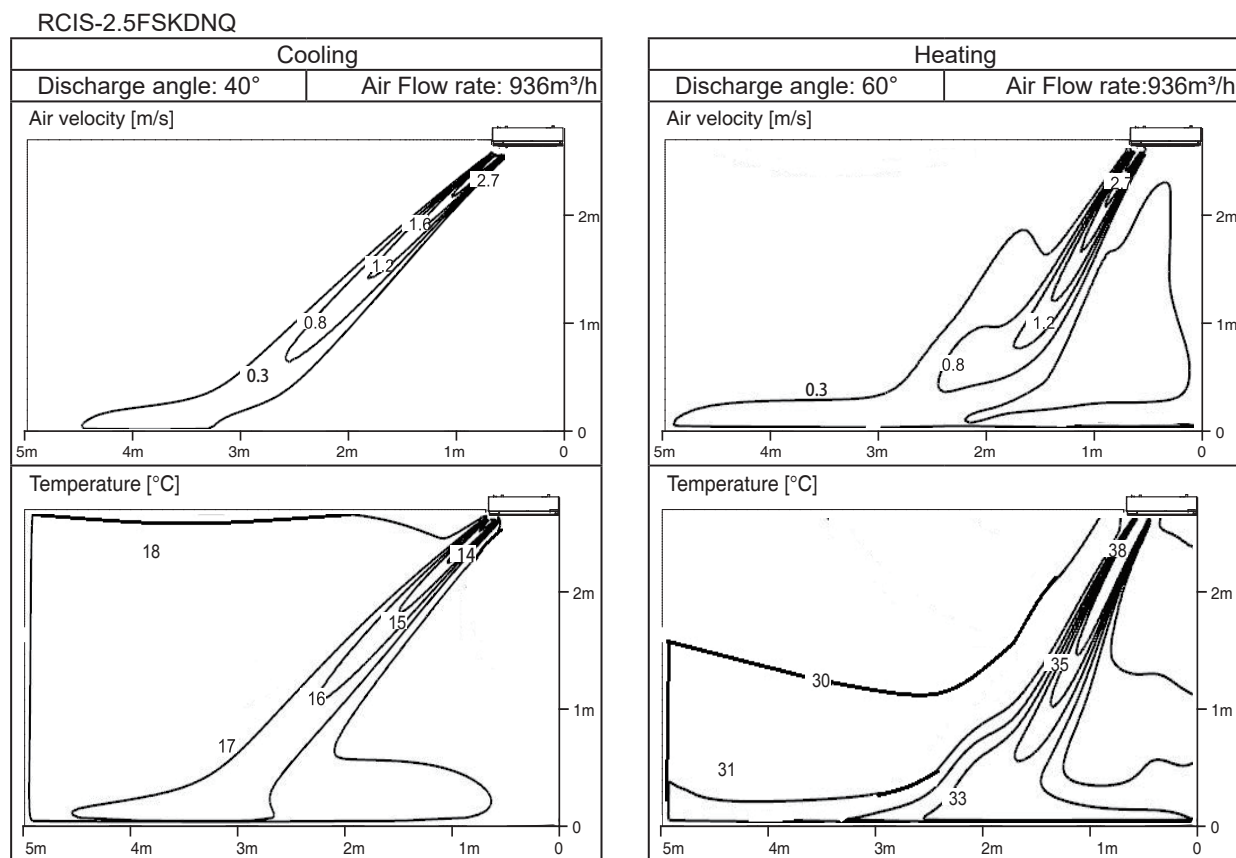
RCIS-1.6FSKDNQ



RCIS-2.0FSKDNQ



Note: The standard setup height is 2.7m. Diagrams show the distribution measured at the ceiling height of 2.7m
Fan operating mode is High.



Note: The standard setup height is 2.7m. Diagrams show the distribution measured at the ceiling height of 2.7m
Fan operating mode is High.

4. Component Data

Indoor Heat Exchanger and Fan

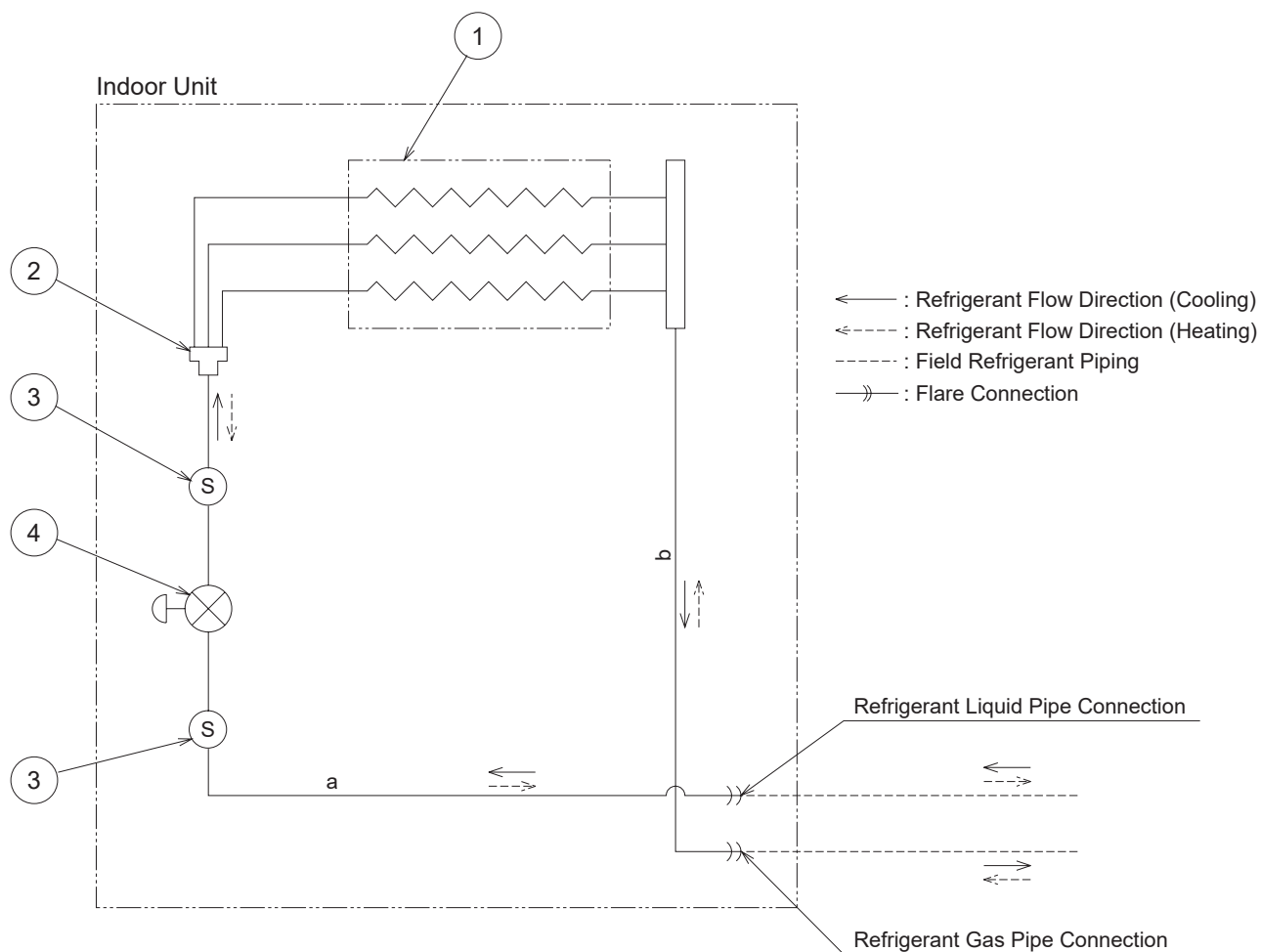
Model		RCIS-1.0*	RCIS-1.3*	RCIS-1.6*
Heat Exchanger Type	-	Multi-Pass Cross Finned Tube		
Tube Material		Copper Tube		
Outer Diameter	mm	7.0	7.0	7.0
Rows	-	2	3	3
Fin Material		Aluminum		
Pitch	mm	1.6	1.6	1.6
Maximum Operating Pressure	MPa	4.15	4.15	4.15
Total Face Area	m ²	0.15	0.15	0.15
Number of Coil/Unit	-	1	1	1
Indoor Fan		Centrifugal Fan		
Number/Unit	-	2	2	2
Outer Diameter	mm	130	130	130
Revolution	rpm	786/740/687/ 633/608/586	1100/934/887/ 820/750/687	1250/1059/934/ 887/820/750
Nominal Air Flow	m ³ /h	396/372/336/ 306/288/276	498/438/408/ 372/336/306	600/498/408/ 378/342/312
Indoor Fan Motor		IP20		
Starting Method	-	Control software		
Nominal Output*	W	40	40	40
Quantity	-	1	1	1
Insulation Class	-	E	E	E

Model		RCIS-2.0*	RCIS-2.5*
Heat Exchanger Type	-	Multi-Pass Cross Finned Tube	
Tube Material		Copper Tube	
Outer Diameter	mm	7.0	7.0
Rows	-	3	3
Fin Material		Aluminum	
Pitch	mm	1.6	1.6
Maximum Operating Pressure	MPa	4.15	4.15
Total Face Area	m ²	0.2	0.2
Number of Coil/Unit	-	1	1
Indoor Fan		Centrifugal Fan	
Number/Unit	-	3	3
Outer Diameter	mm	130	130
Revolution	rpm	1159/980/890/ 843/803/710	1440/1196/1080/ 980/855/750
Nominal Air Flow	m ³ /h	726/594/528/ 492/468/396	936/756/672/ 594/504/426
Indoor Fan Motor		IP20	
Starting Method	-	Control software	
Nominal Output*	W	60	60
Quantity	-	1	1
Insulation Class	-	E	E

*: Nominal output is the power on the nameplate of motor;

5. Refrigerant Cycle

1.0~2.5Model



Mark	Part Name
1	Heat Exchanger
2	Splitter
3	Filter
4	Micro-Computer Control Expansion Valve

6. Electrical Data

< 50 Hz >

Indoor Unit

Model		Unit Main Power			Applicable Voltage		Indoor Fan Motor		
		VOL	PH	HZ	Maximum	Minimum	PH	RNC	IPT
1-Way Cassette Type	RCIS-1.0*	220~240/220V	1	50/60	264	198	1	0.17/0.27	0.014/0.024
	RCIS-1.3*							0.27/0.37	0.024/0.034
	RCIS-1.6*							0.37/0.47	0.034/0.044
	RCIS-2.0*							0.37/0.47	0.034/0.044
	RCIS-2.5*							0.57/0.67	0.074/0.094

VOL: Rated Unit Power Supply Voltage (Plated)(V)

PH: Phase (ϕ)

HZ: Frequency (Hz)

RNC: Running Current (A)

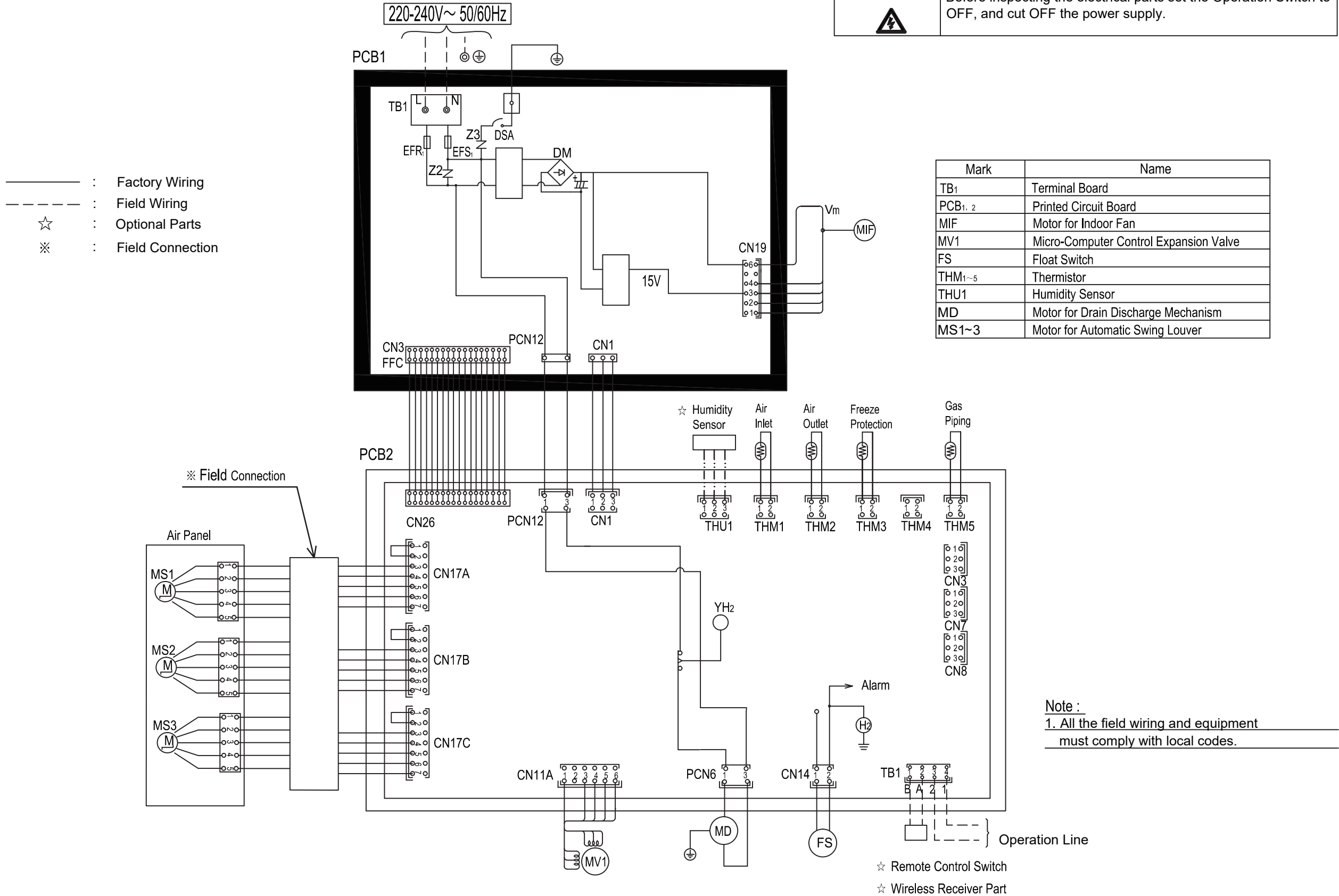
IPT: Input (kW)

Safety and Control Device Setting

Model		RCIS-1.0~2.5*	
For Control Circuit Fuse Capacity	A	5	
Freeze Protection Thermostat	Cut-Out	°C	0
	Cut-In	°C	14
Thermostat Differential	°C	2	

(MODELS: RCIS-1.0~2.5*)

HEAT PUMP ELECTRICAL WIRING DIAGRAM



8. Indoor Unit Optional Parts

Type	Model	1-Way Cassette Type
Controller	PC-ARF/PC-ARF1	•
	PC-AR	•
	HCWA10NEGQ	•
	PC-ARFG	•
	PC-ARH1	•
	PC-AWR	•
	PC-LH3A	•
	PC-LH7QE	•
Centralized Control	PSC-A32MN	•
	PSC-A64GT	•
	PSC-A64S	•
	PSC-A1T	•
	PSC-A16RS	•
	PSC-A128EX	•
BMS Interfaces	HC-A64BNP1	•
	HC-A(8/64)MB	•

9. Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the indoor unit

Air Panel (optional)

Indoor Unit	Panel Selected
1.0~1.6	P-N45SNKQAE
2.0~2.5	P-N71SNKQAE

NOTE

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

! WARNING

After checking the accessories, make sure the air grille is installed on the unit again, or it may cause a serious accident.

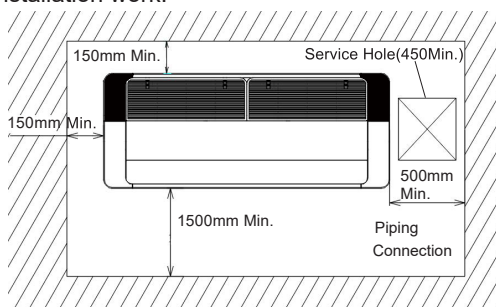
Table Factory-Supplied Accessories

Accessory	Q'ty	Purpose
Screw	8	For Unit Installation
Washer	8	
Drain Hose	1	For Drain Hose Connection
Hose Clamp	1	
Magnet Ring	1	
Cord Clamp	1	For Fixing Magnet Ring

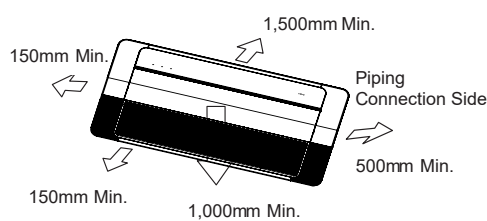
10. Installation

10.1 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown below.
- Provide a service access door near the unit piping connection area on the ceiling.
- Check to ensure that the ceiling has a sufficient strength to hang the indoor unit.
- Check the ceiling surface is flat for the air pane installation work.



Distance From Wall Side



Service Space

Fig. Space around Indoor Unit

- Select the installation location as follows
 - (A) Minimum Space
 - (B) Down Slope Pitch of Drain Piping: 1/25-1/100

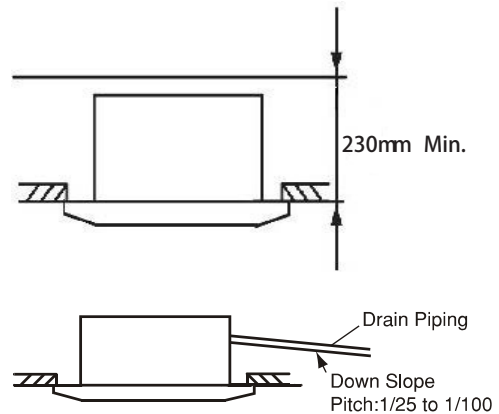


Fig. Installation Location of Indoor Unit

- 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.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.
- Do not install the indoor unit in a machinery shop or kitchen where vapor from oil or its mist flows to the indoor unit.
The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform or even break the plastic parts of the indoor unit.
- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment, etc.
 - (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
 - (B) Install the indoor unit and components as far as practical or at least 3 meters from the electromagnetic wave radiator.
 - (C) 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 the tube.
 - (D) Install a noise filter when the power supply emits harmful noises.

To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment. In an application where the indoor unit is to be utilized under such environmental conditions, it is recommended that the corrosion-proof type unit be used.

! WARNING

- Special Attention Regarding Refrigerant Gas Leakage.

Pay attention to the critical gas concentration to avoid accidental refrigerant gas leakage before installing air conditioning systems.

$$\frac{R: \text{Total Quantity of Charged Refrigerant (kg)}}{V: \text{Room Volume (m}^3\text{)}} \leq C: \text{Critical Concentration (0.42kg/m}^3\text{)}$$

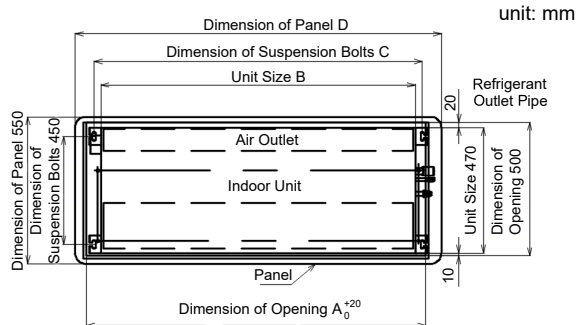
- * This value should be decided according to the each country's regulation such as ISO5149, EN378 and ASHRAE Standard 15. In the case that the calculated critical concentration is higher than this value, take the following actions:
- (1) Provide a gas leakage detector and exhaust fan controlled by its gas leakage detector.
 - (2) Provide effective opening in the wall or door for ventilation to next door so that the critical gas concentration can be maintained lower than the above value. (Provide an opening with area greater than 0.15% of the floor surface at the lower part of a door.)

! CAUTION

1. Maximum Permissible Concentration of HFC GAS R410A.
The refrigerant R410A is an incombustible and non-toxic gas.
However, if leakage occurs and gas fills a room, it may cause suffocation.
Once leakage occurs, it is a must to take effective actions to make the concentration of R410A lower than 0.42 kg/m³.
2. Calculation of Refrigerant Concentration
 - (1) Calculate the total quantity of refrigerant R (kg) charged in the system connecting all the indoor units of target rooms.
 - (2) Calculate the volume of the room installing this unit V (m³).
3. Calculate the refrigerant concentration C (kg/m³) of the room according to the above equation.
Please follow local codes or regulations, if any.

10.2 Installation

- Opening of False Ceiling and Suspension Bolts
- (1) Determine the final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.
 - (2) Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown below.



unit: mm

Model	A	B	C	D
RCIS-1.0FSKDNQ				
RCIS-1.3FSKDNQ	1000	910	958	1100
RCIS-1.6FSKDNQ				
RCIS-2.0FSKDNQ	1270	1180	1228	1370
RCIS-2.5FSKDNQ				

Fig. Opening of False Ceiling and Suspension Bolts

- (3) Check to ensure that the ceiling is horizontally level, otherwise drainage can not flow.
- (4) Strengthen the opening parts of the false ceiling.
- (5) Mount suspension bolts, as shown below.

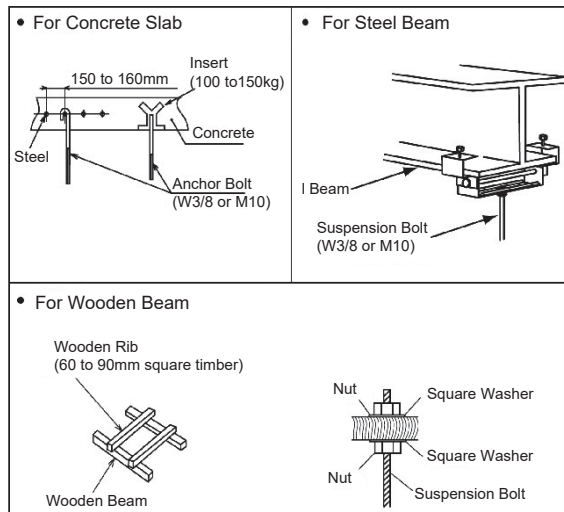


Fig. Mounting the Suspension Bolts

10.3 Mounting the Indoor Units

- (1) Mount the nuts and washers to the suspension bolts.

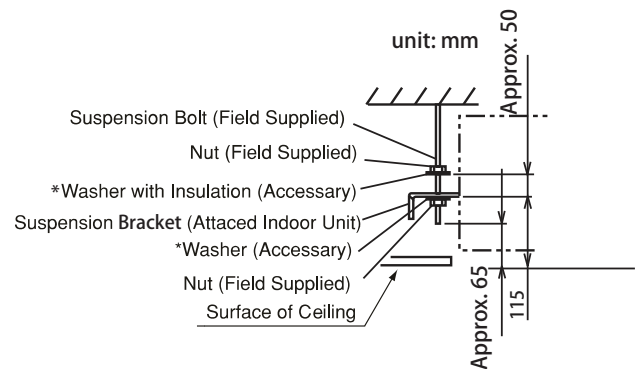


Fig. Mounting Nuts and Washers

*Put the washer so that the surface with insulation can faces downwards.

- (2) Lift the Indoor Unit by hoist, and do not apply any force on the drain pan.
- (3) Use a gradienter or transparent plastic hose filled with water to level the two directions of indoor unit, length and width sides.

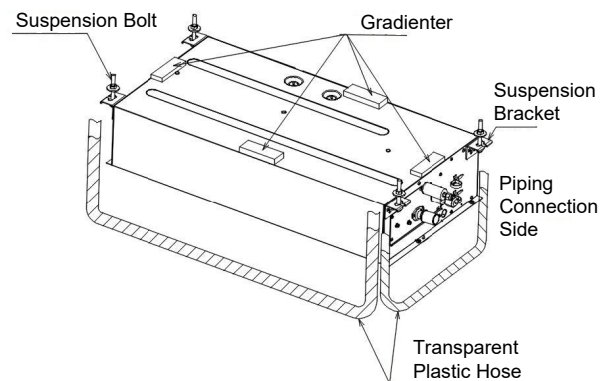


Fig Mounting the indoor Unit

CAUTION

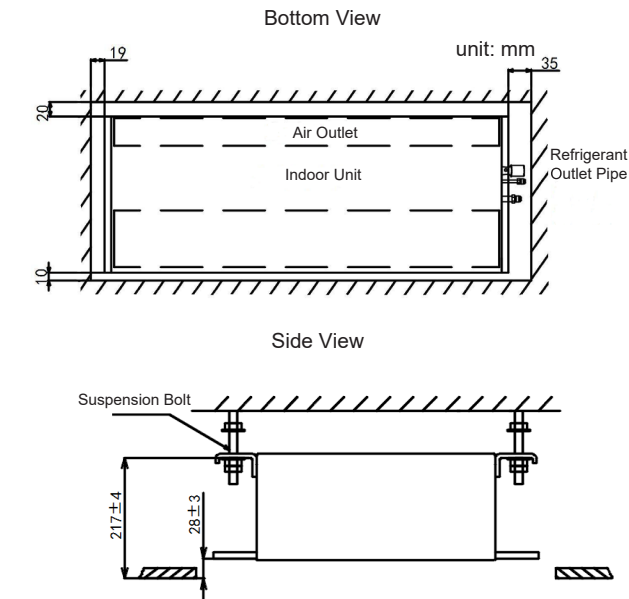
If indoor unit is installed in a position inclined to the reverse direction, it may cause false operation of float switch and there result in leakage.

- (4) Secure the indoor unit by using the nuts and washers.

NOTE

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

- Adjusting the Space between Indoor Unit and False Ceiling Opening

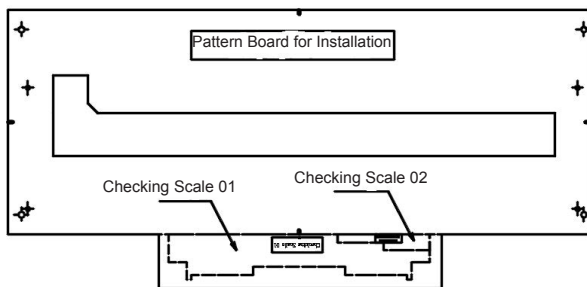


CAUTION

- Check the level of the drain pan using a water level to avoid incorrect operation of the drain discharge mechanism in the indoor unit. The drain piping side of the indoor unit must be approximately 5mm lower than the other part.
- Tighten the nuts of the suspension brackets after the adjustment is completed. Apply LOCK-TIGHT paint* to the bolts and nuts in order to prevent them from loosening. If not done, abnormal noises or sounds may occur and the indoor unit may fall down.

LOCK-TIGHT paint*: Paint the lock bolts and nuts. Adjust the indoor unit to the correct position while checking with the checking scales (factory-supplied).

- (1) Pattern Board for Installation is provided in the packing, please cut it off.



- (2) Adjust the distance between indoor unit and ceiling. Adjust the indoor unit to a proper position with the checking scale provided by the factory.

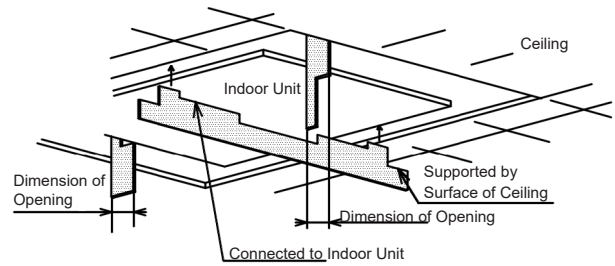
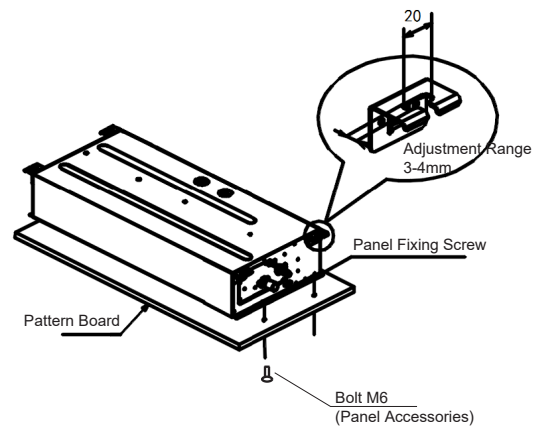


Fig. Adjustment of Distance to Indoor Unit

(3) Cutting the Ceiling

Mount ceiling opening to the indoor unit with screws (four) by using pattern board. Cut the ceiling based on opening dimension of the pattern board and mount the panel.



After installation is completed, remove the pattern board off the ceiling.

Installation Details for Air Panel

- The details of installation work for air panel shall be according to the Installation Manual for Air Panel.
- Check to ensure that the connection of connectors between the indoor unit and the air panel.

11. Refrigerant Piping Work

⚠ DANGER

Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tightness test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

11.1 Piping Materials

- (1) Prepare locally-supplied copper pipes
- (2) Select the piping size from the following table.

unit: mm(in.)

Model	Gas Piping	Liquid Piping
1.0~1.6	Φ12.7 (1/2)※	Φ6.35 (1/4)
2.0	Φ15.88 (5/8)※	Φ6.35 (1/4)
2.5	Φ15.88 (5/8)※	Φ9.53 (3/8)

- (3) Select clean copper pipes. Make sure there is no dust and moisture inside. Purge the pipes with nitrogen or dry air to remove any dust or foreign matters before connecting pipes.

11.2 Piping Connection

- (1) Position of piping connection is shown below. (Indoor Unit)

unit: mm

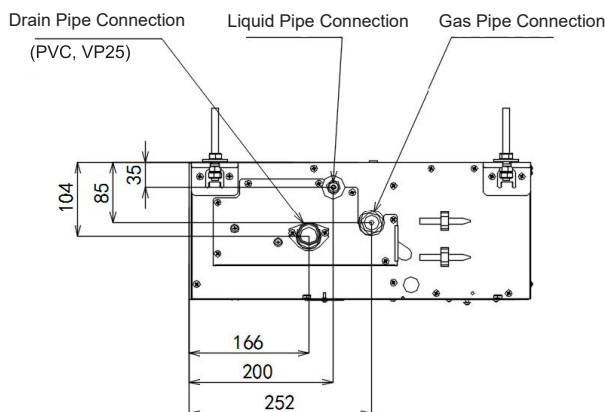
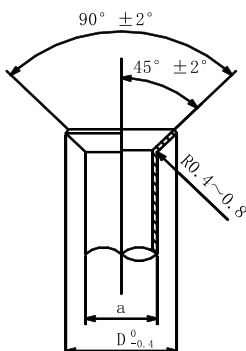


Fig. Position of Piping Connection

*Flaring Dimension

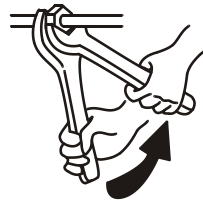
Perform the flaring work as shown below.



unit: mm(in.)

Pipe Diameter (a)	Φ12.7 (1/2)	Φ15.88 (5/8)
Flaring Diameter (D)		
R22, R407C	16.2	19.4
R410A	16.6	19.7

- (2) When tightening the flare nut, use two spanners as shown below.



Pipe Size	Tightening Torque (N.m)
Φ6.35mm	20
Φ9.53mm	40
Φ12.7mm	60
Φ15.88mm	80

Fig. Tightening Work of Flare Nut

- (3) After connecting the refrigerant piping, seal the refrigerant pipes by using the factory-supplied insulation material as shown below.

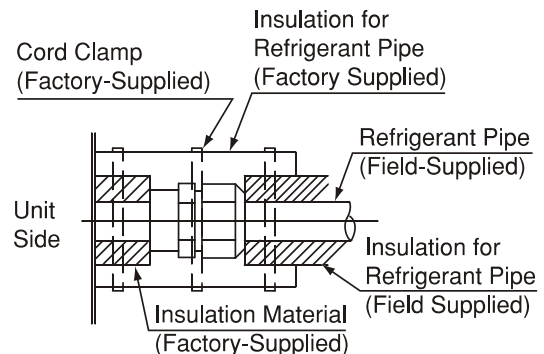
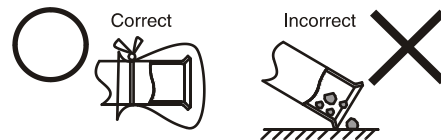


Fig. Insulation on Pipes

⚠ CAUTION

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



- (4) Evacuation and refrigerant charging procedures should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

12. Drain Piping

⚠ CAUTION

- Do not create an upslope or rise for the drain piping, since drain water can flow back to the indoor unit and leakage into the room will occur when the system operation is stopped.
- Do not connect the drain pipe with sanitary or 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 common piping. The pipe size of the common drain pipe must be large enough according to the unit size and number of units.
- After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure.
- Checking with the Float Switch

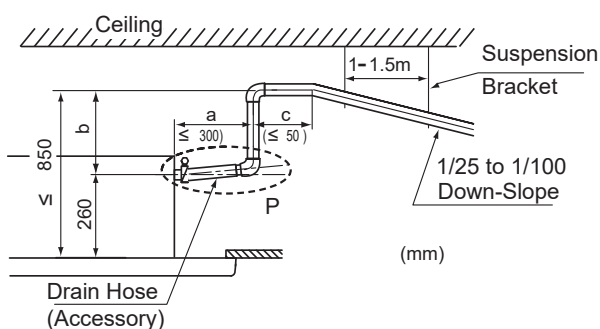
(A) Switch ON the power supply .

(B) Pour 1.5 or 2.5 liters of water into the drain pan.

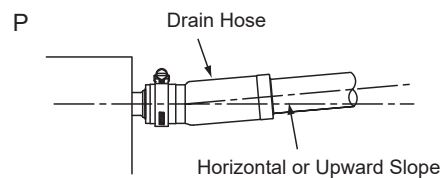
(C) Check to ensure that the water flows smoothly or whether no water leakage occurs.
When water cannot be found at the end of the drain piping, pour another 1.5 or 2.5 liters of water into the drain.

(D) Switch ON the power supply and press the RUN/STOP button.

- (1) The position of the drain pipe connection is shown below
- (2) Prepare a polyvinyl chloride pipe with a 32mm outer diameter.
- (3) Fasten the tubing to the drain hose with the adhesive agent and the factory-supplied clamp. The drain piping must be performed with a down-slope pitch of 1/25 to 1/100.



*The total length of a+b+c shall be within 950mm



Drain pipe must be installed horizontally or in upward slope to prevent occurrence of air column, otherwise water will flow from rear of the equipment to cause leakage or abnormal noise when the equipment is shut down.

- (A) Use the drain pipe and hose clamp provided by the manufacture.
- (B) Do not impose too much force on the pipe joint to prevent damage to it.
- (C) Do not use any bent or twisted pipe, which may cause leakage.
- (D) Complete insert the drain pipe provided by the manufacturer, otherwise leakage may be caused.

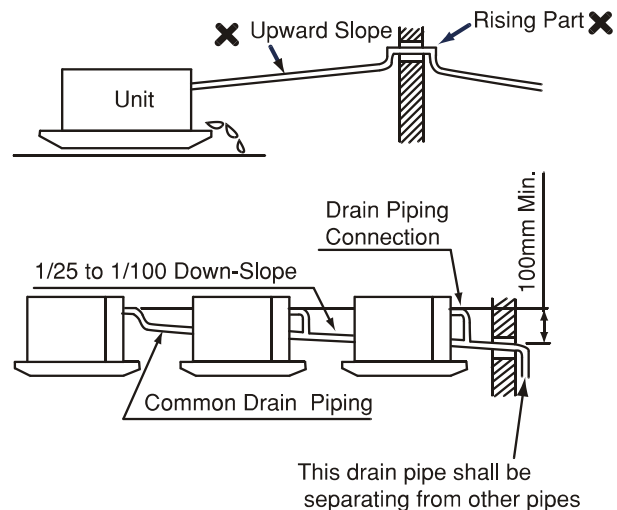
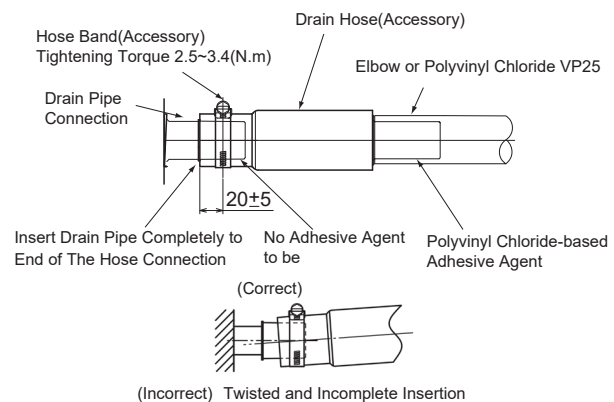
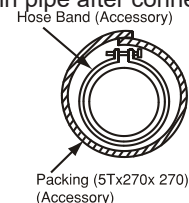


Fig. Drain Piping

*In case of lifting the drain pipe at the outlet part perform the drain piping work as shown in the above figure.

- (4) Insulate the drain pipe after connecting the drain hose.



13. Electrical Wiring

WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for at least 10 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals.
If not protected, rats may gnaw at unprotected parts and at the worst, a fire will break out.
- Prevent any wire from contacting with refrigerant tube, edge of metal plate and electrical part in the equipment, otherwise the wire may be damaged or even thereby cause fire.
- ELB with intermediate induction rate (with shorter than 0.1 second or fewer) shall be used, or otherwise electric shock or a fire may be caused.
- Wire shall be fixed securely, since external force imposed to the connecting terminal may make it loose and thereby cause a fire.
- Do not use the power terminal strip used for the air conditioner to sub-connect any power cable, but use power branch box to sub- connect power wire at indoor unit side instead, and be sure to calculate wire capacity, otherwise low capacity may cause a fire.
- The system shall not be started until all inspections have been performed properly.

CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the sealing material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of the remote control switch using the cord clamp inside the electrical box.
- Tighten screws according to the following torque.

M4	1.0~1.3 N.m
M5	2.0~2.4 N.m
M6	4.0~5.0 N.m
M8	9.0~11.0 N.m
M10	18.0~23.0 N.m

13.1 General Check

- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the specified electrical data. Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the power supply voltage is within +10% of the rated voltage.
- (3) Check the capacity of the electrical wires. In case of low capacity, the system cannot start due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch
Install a multi-pole main switch with a space of 3.5mm or more between each phase.

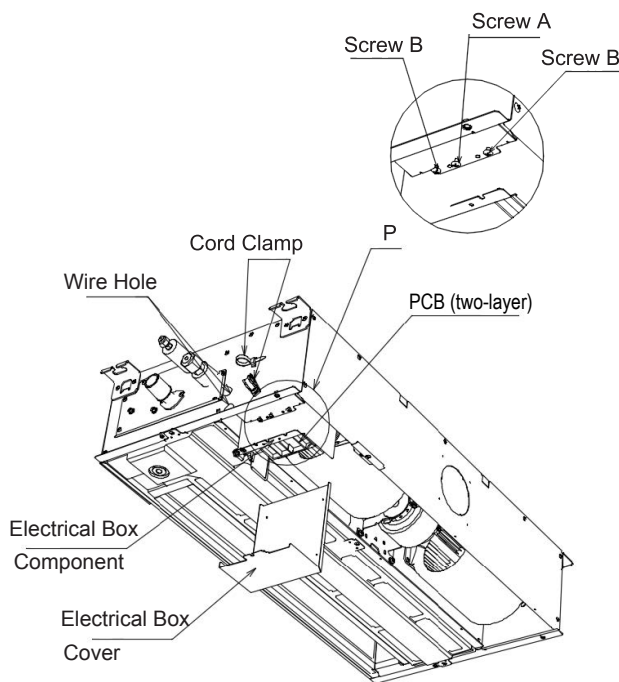
13.2 Electrical Wiring Connection

The electrical wiring connection for the indoor unit is shown next page. The intermediate connection between the indoor unit and the air panel should be referred to in the "Installation Manual for Air Panel".

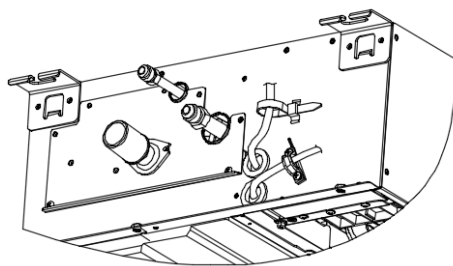
- (1) Connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box through the connecting hole in the cabinet.
- (2) Connect the power supply and earth wires to the terminals in the electrical box.
- (3) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.
- (4) Tightly clamp the wires using the cord clamp.

- **Field Minimum Wire Sizes for Power Source**

Refer to the item "15 Common".



Transmission Wiring



Power Source Wiring

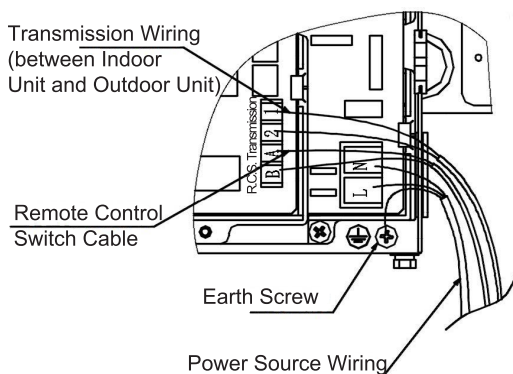


Fig. Electrical Wiring Connection for Indoor Unit

- (C) Fix the wire harness from connecting port to electrical box with cord clamp to prevent it from scratched by edge of container of other component.
- (D) Mount a magnetic ring to the communication cable, which shall be wound by three circles around the wire and then fixed with cord clamp provided in the accessory pouch.
- (E) Upon completion of wiring, mount electrical box, and take care not to press any wire.

CAUTION

- After wire is connected to terminal board, be sure to fix it with cord clamp and lay the wire in cable tray to prevent it from being squeezed or a fire.

14. Test Run

Test run should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

WARNING

- Do not operate the system until all the check points have been cleared.
 - (A) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electric leakage is located and repaired.
 - (B) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
 - (C) Check to ensure that the switch on the main power source has been ON for more than 12 hours to heat up the compressor oil by the crankcase heater.
- Pay attention to the following items while the system is running.
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.
 - (B) DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.

- (A) Remove electrical box cover (by loosening one screw (A)).
- (B) Loosen two screws (B) on electrical box component and pull out the component.

15. Common

15.1 Field Minimum Wire Sizes for Power Source

! WARNING

- Use an ELB (Electric Leakage Breaker). If not used, it will cause an electric shock or a fire.
- Run through the cables using conduit tube, and completely seal the end of conduit tube with sealing materials.

Field Minimum Wire Sizes for Power Source

Model	MCA	Power Line Size	Communication Cable size
		EN60335-1 *1	EN60335-1 *1
1.0	0.4A	2.5mm ²	0.75mm ²
1.3~1.6	0.5~0.7A		
2.0	0.7A		
2.5	0.9A		

NOTES:

- (1) Follow local codes and regulations when selecting field wires.
- (2) The wire sizes marked with *1 in the above table are selected at the maximum current of the unit according to the European Standard, EN60335-1. Use wires which are not lighter than the ordinary polyvinyl chloride sheathed flexible cord (code designation H05VV-F).
- (3) Use a shielded cable for the transmitting circuit and connect it to ground.
- (4) In the case that power lines are connected in series, add each unit maximum current and select as below.

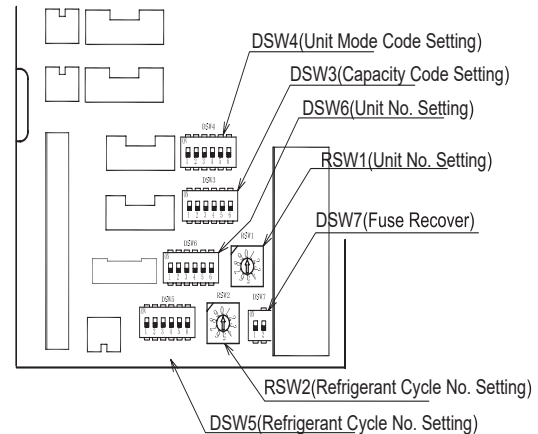
Selection According to EN60 335-1

Current (A)	Wire Size (mm ²)
I<3	2.5
3<I<6	2.5
6<I<10	2.5
10<I<16	4
16<I<25	6
25<I<32	10
32<I<50	16
50<I<63	25
63<I	*1

*1 In the case that current exceeds 63A, do not connect power lines in series.

15.2 Setting of Dip Switches

(A) Position of Dip Switches



(B) The PCB in the indoor unit is equipped with 2 rotary switches and 5 DIP switches. Before testing unit, set these DIP switches according to the following instructions. Unless these DIP switches are set in the field, the unit can not be operated.

- (1) Unit No. Setting (RSW1&DSW6) Setting is required. Set the unit No. of a indoor units respectively and in sequence by following setting position shown in the table below. Numbering must start from "0" for every outdoor unit.

Unit No. Setting

DSW6 (Tens Digit)	RSW1 (Units Digit)	Ex.) Set at No.16 Unit
Before shipment, DSW6 and RSW1 are set to "0". Max.64 units are available to set when all the equipment to be connected are corresponding to Hi-NET. Max.16 units when the units corresponding/ non-corresponding to Hi-NET are combined.		
Set No.1 Pin ON Set at "6"		

- (2) Unit Mode Code Setting(DSW4)

No setting is required

Setting the model code of the indoor unit.



- (3) Capacity Code Setting(DSW3)

NO setting is required, due to setting before shipment.

This switch is utilized for setting the capacity code which corresponds to the horse power of the indoor unit.

Capacity ×10 ³ Btu/h	1.0	1.3	1.6
Setting Position			
Capacity ×10 ³ Btu/h	2.0	2.5	
Setting Position			

- (4) Refrigerant Cycle No. Setting(RSW2&DSW5) Setting is required. Setting positions before shipment are at OFF.

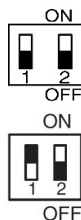
Refrigerant Cycle No. Setting

DSW5 (Tens Digit)	RSW2 (Units Digit)	Ex.) Set at No.5 Cycle
Before shipment, DSW5 and RSW2 are set to "0". Max. 64 cycles are available to set when all the equipment to be connected are corresponding to H-NET. Max. 16 cycles when the units corresponding/ non-corresponding to H-NET are combined.	Set by inserting slotted screwdriver into the groove.	Set All Pins OFF RSW2 Set at "5"

- (5) Fuse Recover (DSW7)

*Factory Setting

*In the case of applying high voltage to the terminal 1,2 of TB2, the fuse on the PCB is cut. In such a case, firstly connect the wiring to TB2, and then turn on NO.1 pin.



NOTE

The "■" mark indicates position of DIP switches Figures show setting before shipment.

CAUTION

Before setting dip switches, firstly turn OFF power source and set the position of the dip switches. If the switches are set without turning OFF the power source, the switches can not function.

16. Setting of Automatic Swing Louver

When the SWING LOUVER switch is pressed, the swing louver starts its operation.

When "■" is moving, it indicates the operation of the louver continuously. When the swinging operation of the louver is not required press the SWING LOUVER switch again. The louver is stopped at an angle indicated by the direction of this mark "■".

NOTE

- (1) There exists a time lag between the actual outlet air angle and the liquid crystal indication.
- (2) When the SWING LOUVER switch is pressed, the louver will not stop immediately. The louver will move one extra swing.
- (3) During the cases in item (A), the louvers are fixed automatically. However, indication of the louvers is changed at setting before.
(A) Outlet air angle is fixed at horizontal position during start-up of heating operation and defrosting operation and when thermostat is ON. When the outlet air temperature reaches higher than approximately 30°C, swinging of louvers is started.
- (4) During the defrosting operation, fan stops running.

CAUTION

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

17. Filter Cleaning

CAUTION

Do not operate the system without the air filter to protect the indoor unit heat exchanger against being clogged.

Turn OFF the main power switch before taking out the filter. (The previous operation mode may appear.)

17.1 Taking Out the Filter

The indication, "FILTER" is shown on the display of the remote control switch after approximately 1,200 hour operation.

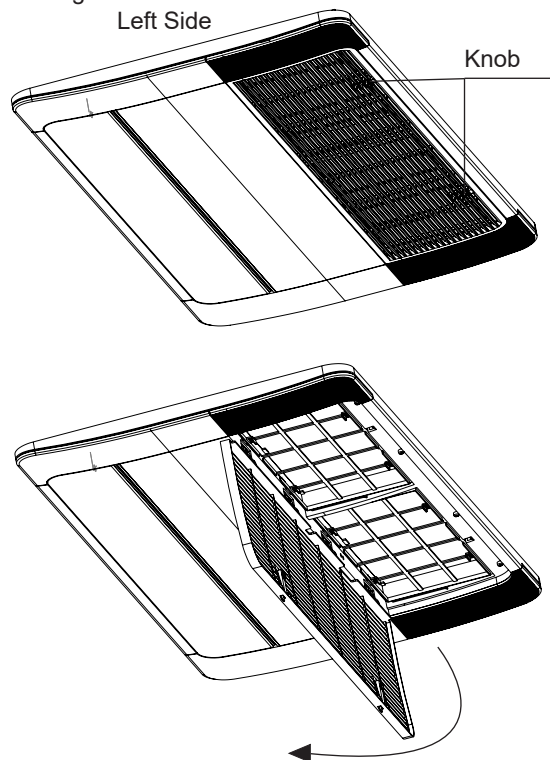
Take out the air filter according to the following steps.

Step 1

Open the air inlet grille after pushing the two knobs as shown by the arrow mark.

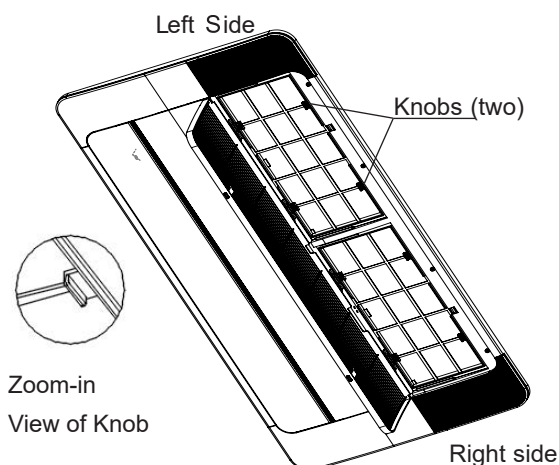
Step 2

Take out the air filter from the air inlet grille by supporting the air grille and lifting the air filter after detaching the filter from hinges.



Note:

There are two grilles on the panel of P-N71SNKQAE, which should be removed respectively.



17.2 Clean the Filter

Clean the air filter according to the following steps

Step 1

Use a vacuum cleaner or let water flow onto the air filter for removing the dirt from the air filter.
removing the dirt from the air filter.

CAUTION

Do not use hot water higher than approximately 40°C.

Step 2

Dry the air filter in the shade after shaking off water.

17.3 Reset of Filter Indication

After cleaning the air filter, press the "RESET" button. The FILTER indication will disappear and the next cleaning time will be set.

18. Troubleshooting

CAUTION

When overflow of drain water from the indoor unit occurs, stop the operation and contact your contractor.

When you smell or see white smoke coming from the unit, turn OFF the main power supply and contact your contractor.

18.1 If Trouble Persists

If the trouble persists, contact your contractor and inform them of the following items.

- (1) Unit Model Name
- (2) Content of Trouble
- (3) Alarm Code No. on Liquid Crystal Display

18.2 No Operation

Check whether the SET TEMP is set at the correct temperature.

18.3 Not Cooling or Heating Well

- Check for obstruction of air flow of the outside or inside units.
- Check if too many heat sources exist in the room.
- Check if the air filter is clogged with dust.
- Check to see if the doors or windows are opened or not.
- Check if the temperature condition is not within the operation range.

18.4 This is Not Abnormal

• Smells from Indoor Unit

Smell adheres on indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.

• Sound from Deforming Parts

During system starting or stopping, an abrading sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.

• Steam from Outdoor Heat Exchanger

During defrosting operation, ice on the outdoor heat exchanger is melted, resulting making steam.

• Dew on Air Panel

When the cooling operation continues for a long period of time under high humidity conditions (higher than 27°C /80% R.H.), dew can form on the air panel.

• Refrigerant Flow Sound

While the system is being started or stopped, sound from the refrigerant flow may be heard.

NOTE

Except for a long period of shutdown, keep the main switch ON, since the oil heater is energized when the compressor is stopped.

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