HITACHI
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UTOPIA H(V)RNE/HN(V)E SERIES

Technical Catalog

Outdoor Units: 2 ~ 12 HP
Indoor Units Type:

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

HITACHI

Specifications in this catalogue are subject to change without notice in order that HITACHI may bring the latest innovations to their customers

Whilst every effort is made to ensure that all dimensions and specifications are correct, any printers' errors not rectified are outside the control of HITACHI, who cannot be held responsible for same

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Code List Units

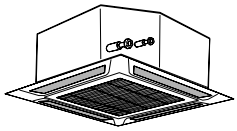
NOTE:

MODELS CODIFICATION

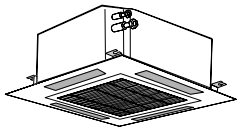
Please check, according to the model name, which is your air conditioner type and how it is abbreviated and referred to in this technical catalogue.

INDOOR UNITS FSN(1)(E/M) – System Free

4-Way-Cassette		4-Way-Cassette Mini		2-Way-Cassette		Ceiling		In-The-Ceiling	
Unit	**Code**	**Unit**	**Code**	**Unit**	**Code**	**Unit**	**Code**	**Unit**	**Code**
RCI–1.5FSN1E	7E861619	**RCIM-1.5FSN**	60277889	**RCD–1.5FSN**	60277814			**RPI–1.5FSNE**	7E877304
RCI–2.0FSN1E	7E861621	**RCIM-2.0FSN**	60277890	**RCD–2.0FSN**	60277815	**RPC–2.0FSNE**	7E872055	**RPI–2.0FSNE**	7E872024
RCI–2.5FSN1E	7E861620			**RCD–2.5FSN**	60277816	**RPC–2.5FSNE**	7E872030	**RPI–2.5FSNE**	7E872025
RCI–3.0FSN1E	7E871770			**RCD–3.0FSN**	60277817	**RPC–3.0FSNE**	7E872058	**RPI–3.0FSNE**	7E872031
RCI–4.0FSN1E	7E871780			**RCD–4.0FSN**	60277818	**RPC–4.0FSNE**	7E872059	**RPI–4.0FSNE**	7E872032
RCI–5.0FSN1E	7E871790			**RCD–5.0FSN**	60277819	**RPC–5.0FSNE**	7E872060	**RPI–5.0FSNE**	7E872033
RCI–6.0FSN1E	7E871794					**RPC–6.0FSNE**	7E872061	**RPI–6.0FSNE**	7E872034
								RPI–8.0FSNE	70886723
								RPI–10.0FSNE	70886733



RCI



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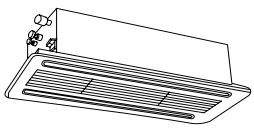
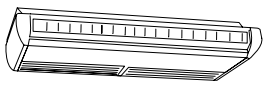
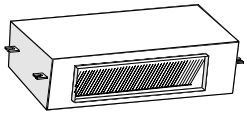


RCD



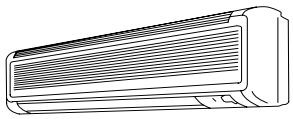
RPC



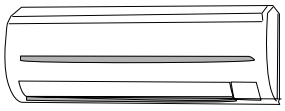
RPI

INDOOR UNITS FSN(1)(E/M) – System Free

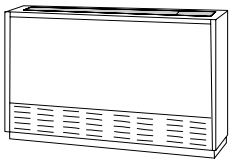
Wall		Wall - Mini		Floor		Floor Concealed	
Unit	**Code**	**Unit**	**Code**	**Unit**	**Code**	**Unit**	**Code**
RPK–1.5FSNM	60277825	**RPK–1.5FSN1M**	60277865	**RPF–1.5FSNE**	7E877716	**RPFI–1.5FSNE**	7E877720
RPK–2.0FSNM	60277826			**RPF–2.0FSNE**	7E877309	**RPFI–2.0FSNE**	7E877311
RPK-2.5FSNM	60277844			**RPF–2.5FSNE**	7E877310	**RPFI–2.5FSNE**	7E877312
RPK-3.0FSNM	60277845						
RPK-4.0FSNM	60277847						



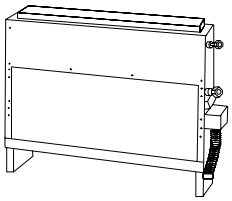
RPK



RPK (mini)



RPF



RPFI

Example of model codification:

RPI 3.0 FS N (1) (E)

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

Capacity (HP)
1.5 ~ 10.0

H-Link Set-Free / System Free

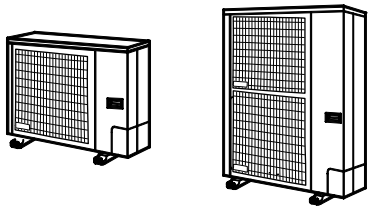
R410 A compatible

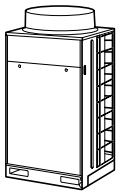
Series

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

OUTDOOR UNITS H(V)RNE – Utopia DC-Inverter

Single Phase		Three Phases			
Unit	**Code**	**Unit**	**Code**	**Unit**	**Code**
RAS-2HVRNE	7E878648				
RAS-2.5HVRNE	7E878649				
RAS-3HVRNE	7E878651				
RAS-4HVRNE	7E878652	**RAS-4HRNE**	7E878657		
RAS-5HVRNE	7E878653	**RAS-5HRNE**	7E878658		
		RAS-6HRNE	7E878659		
				RAS-8HRNE	7E878663
				RAS-10HRNE	7E878664
				RAS-12HRNE	7E878665

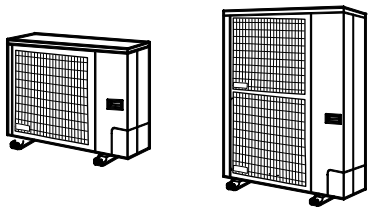




RAS

OUTDOOR UNITS HN(V)E – Utopia N

Single Phase		Three Phases	
Unit	**Code**	**Unit**	**Code**
RAS-2.5HNVE	7E951623	**RAS-2.5HNE**	7E951620
RAS-3HNVE	7E972504	**RAS-3HNE**	7E972541
RAS-4HNVE	7E973504	**RAS-4HNE**	7E973541
		RAS-5HNE	7E974441



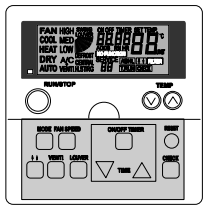
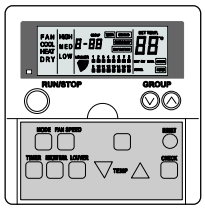
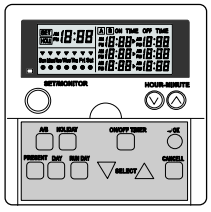
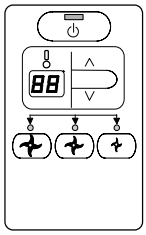
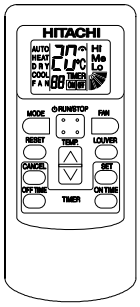
RAS

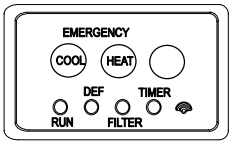
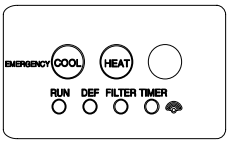
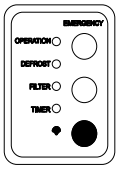
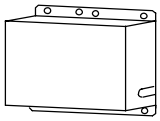
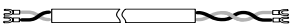
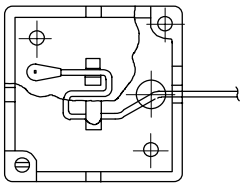
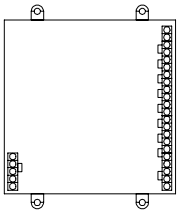
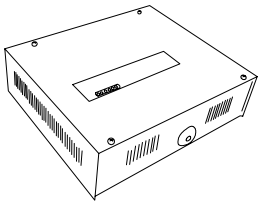
Example of model codification:

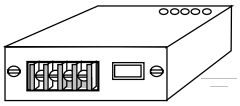
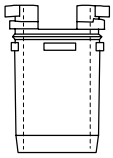
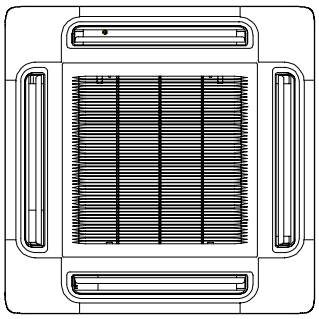
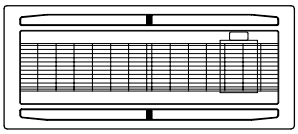
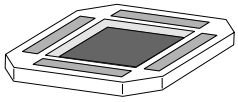
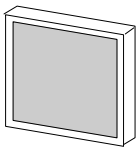
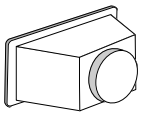
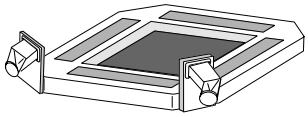
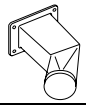
RAS 4 H (V) R N E

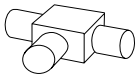
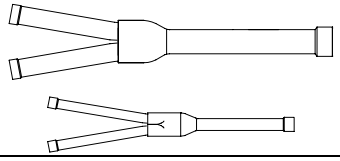
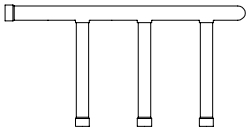
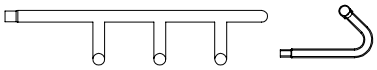
- RAS — Unit Type (Outdoor Unit)
- 2.5 ~ 12.0 — Capacity Power (HP)
- Heat Pump
- V : Single Phase; – : Three Phases
- Inverter
- R410A compatible
- E : Made in Europe; M : Made in Malaysia; – : Made in Japan

CODE LIST ACCESSORIES

Accessory	Name	Code	Figure
PC-P1HE	Remote Control Switch	7E799954	
PSC-5S	Central Station	60291050	
PSC-5T	7 Day Timer	60291052	
PC-P5H	Optional Remote Controller	60290879	
PC-LH3A	Wireless Control Switch	60291056	

Accessory	Name	Code	Figure
PC-RLH8	Receiver kit for RCI-FSN1E on the panel	60291106	
PC-RLH9	Receiver Kit for RCD-FSN on the panel	60291107	
PC-RLH11	Receiver Kit for RCI, RCD, RPC, RPI, RPK and RPF(I) on the wall	60291109	
PC-RLH13	Receiver Kit for RCIM-FSN on the panel	-	(Figure not available)
PSC-5HR	H-LINK Relay	60291105	
PCC 1A	Optional Function Connector	60199286	
-	Radiation filter	P20485	(Figure not available)
PRC-10E1	2P Extension Cord	7E790211	
PRC-15E1	2P-Extension Cord	7E790212	
PRC-20E1	2P-Extension Cord	7E790213	
PRC-30E1	2P-Extension Cord	7E790214	
THM-R2AE	Remote Sensor (THM4)	7E799907	
HARC-BXE (A)	Lonworks BMS Interface (7 inputs up to 64 units)	60290874	
HARC-BXE (B)	Interface Interface (14 inputs up to 32 units)	60290875	
HARC-WEB	Interface Local Area Network Centralised Controller	7E891924	

Accessory	Name	Code	Figure
CS-NET (HARC-40E)	CS-Net + Interface	6E191922	
DBS-26	Drain Discharging Boss	60299192	
P-G23WA2	Air Panel for RCI	60290534	
P-N23WAM	Air Panel for RCIM	60197160	
P-G23DWA1	Air Panel for RCD	60299570	
P-G46DWA1	Air Panel for RCD	60299571	
B-23H4	Adapter for deodorant filter	60199790	
F-23L4-K	Anti bacteria filter	60199791	
F-23L4-D	Deodorant filter	60199793	
F-46L4-D	Deodorant filter	60199794	
PDF-23C3	Duct connection flange	60199795	
PDF-46C3	Duct connection flange	60199796	
OACI-232	Fresh air intake kit	60199797	
PD-75	Fresh air intake kit	60199798	
PI-23LS5	3 Way outlet parts	60199799	

Accessory	Name	Code	Figure
TKCI-232	T duct connecting kit	60199801	
TE-03N	Branch Pipe	70800007	
TE-04N	Branch Pipe	70800008	
TE-56N	Branch Pipe	70800009	
TE-08N	Branch Pipe	70800003	
TE-10N	Branch Pipe	70800004	
TRE-06N	Distributor	70800005	
TRE-810N	Distributor	70800010	
QE-810N	Distributor	70800006	

NOTE:

For Utopia DC-Inverter and Utopia-N series is possible use the total Heat Exchanger and the total Econofresh Kit. To select the information about these, please check the Set Free Technical Catalog and Service Manual.

1 FEATURES AND BENEFITS

This chapter describes the features and benefits of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series outdoor unit, which through its system flexibility and modularity will provide you with the complete solution for your building air conditioning requirements.

CONTENTS

1.1. SYSTEM DESCRIPTION

To help you to quickly discover all the features and benefits of the new Hitachi Utopia series of air conditioning systems, this section provides a general overview of the system, details about the energy efficient and ozone friendly R410A refrigerant, and a description of the various indoor unit combinations available.

The Utopia series includes a wide range of outdoor units that can be adapted to many different installations.

If you are looking for a high performance, noiseless and reliable system with large cooling distances, HITACHI offers the Utopia DC-Inverter H(V)RNE series with outdoor units ranging from 2 HP to 12HP, and which allows systems to be mounted with up to 4 indoor units.
If what you are looking for is an attractively priced system which offers high quality and reliability, HITACHI suggests the Utopia N HN(V)E series.

HITACHI offers the same type of SYSTEM FREE indoor units for both systems.
This system, developed entirely by HITACHI, enables users to design their systems without having to worry about the type of indoor units needed.

1.1.1. NEW UTOPIA SERIES

Hitachi is proud to announce the introduction of the new Utopia series of highly efficient and reliable air conditioning systems using ozone friendly R410A refrigerant.
Nowadays, more and more small buildings and commercial premises require intelligent facilities that provide communication networks, office automation, and a comfortable environment. A conditioned climate is indispensable for such premises in order to offer the maximum comfort for staff and clients.
For such buildings HITACHI has developed the new Utopia Utopia series of air conditioning systems that with their increased efficiency puts them at the top of the class for these types of systems.
To obtain these results HITACHI has developed a proven combination of the scroll compressor coupled with the inverter system. This combination provides increased efficiency with reduced weight, volume and noise.

- Connection: Single, Twin, Triple and Quad units, (this is only possible for the same room; for different rooms, the Mini Set Free series should be used).
- Mixed Type: Various types of indoor units can be connected to the same outdoor unit. The capacities of these indoor units can be different.
- Outdoor Unit Line-up: Depending on the installation requirements, three-phase or single-phase units can be chosen:
  - HVRNE:2,2.5,3,4, and 5HP, 220V~240V Single Phase
  - HRNE:4,5,6,8,10 and 12 HP, 380-415V Three Phase
  - HNVE 2.5,3,and 4HP; 220V~240V Single Phase
  - HNE 2.5,3,4; and 5HP 380-415V Three Phase
- Refrigerant: Ozone friendly and highly energy efficient R410A

1.1.2. SYSTEM FREE

Always with our customers' needs in mind, HITACHI has developed SYSTEM FREE. This unique system enables the same indoor units to be interconnected to all HITACHI systems.
It enables installers to reduce their stock significantly, and obsolete material may be reduced by 200%.
Installation flexibility for the end user, which results in better integration of air conditioning systems in a building's installations.

1.1.3. R410A REFRIGERANT

In 1974, it was discovered that the ozone layer in upper stratosphere might have been damaged by ozone depleting substances such as CFC (chlorofluorocarbon) and HCFC (hidrochlorofluorocarbon) refrigerants.

The R22 refrigerant that was commonly used in air conditioning systems belonged to these families of ozone depleting substances. Consequently, air conditioning system manufacturers changed to R407C, which was an ozone friendly refrigerant because it does not deplete the ozone layer. But now a refrigerant gas called R410A is available that has the same characteristics as R407C but with higher energy efficiency.

R410A adds the following benefits:

- Reduced power consumption.
- Increased system performance.
- Higher heat exchanger coefficient.
- Reduced component size.

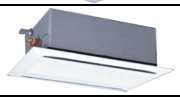
–

1.1.4. A WIDE RANGE OF CHOICE

The line-up of new Utopia series Outdoor units has been extended to provide a range of units covering to 2 to 12 HP
This provides maximum flexibility an solves any type of installation problem.

Series		Outdoor Unit \ HP	2	2.5	3	4	5	6	8	10	12
	Utopia N HN(V)E			●	●						
						●	●				
	Utopia DC-Inverter H(V)RNE		●	●	●						
						●	●	●			
									●	●	●

The line-up of new Utopia series Indoor Units has been extended to 46 Indoor Units in 7 types to cope with different building requirements.

Series		Indoor Unit \ HP	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0
	System Free FSN(1)(E/M)		●	●	●	●	●	●	●	●		
			●	●								
			●	●	●	●		●	●			
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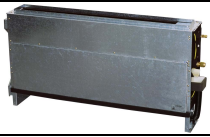
			●	●	●							

1.2. NEW TECHNOLOGY

This section provides details about the new technology features that are used with the Utopia series of air conditioning systems. Specifically, these are:

- A highly efficient Scroll DC Compressor
- A highly efficient refrigerant cycle
- A DC fan motor (Only for DC- Utopia Inverter Series)
- Combinability
- Top class COP efficiency

1.2.1. HIGHLY EFFICIENT SCROLL COMPRESSOR

Hitachi's exclusive Scroll Compressor.

RAS-8~12HRNE **RAS-4~6H(V)RNE**

■ The Strong Points of the New Hitachi High Pressure Scroll Compressor

1. Optimized bearing (2-bearing structure) greatly improves reliability.
2. Asymmetric scroll lap largely reduces intake and leakage loss.
3. Oil return circuit design largely reduces heat loss.
4. Improved lubrication system to provide accurate oiling for the compressor.

All of the above features are unique to the Hitachi scroll compressor.

- **High Pressure Shell**
  - All new Utopia units use a new type of refrigerant oil, FVC68D instead of FVB68D, which is used in all current HVRG units.
  - It acts as an oil separator reducing the amount of oil circulating in the refrigeration system giving better heat exchanger efficiency.
  - Discharge gas temperature is reduced because the motor heat is not added to the suction gas before compression. This is particularly important at low suction temperatures. The discharge gas adequately cools the motor.
  - Refrigerant cannot enter the shell during the off cycle causing oil dilution and oil foaming at start up.

- **Lubrication**
  - HITACHI compressors have been developed to be the most efficient and reliable on the market. Lubrication is one of the most important aspects in a compressor's life. HITACHI has developed a system based on the pressure differences between suction and discharge, with a system equipped with a supporting pump on the base of the compressor. Lubrication is seamless and highly reliable throughout the operating range, even at low frequencies.

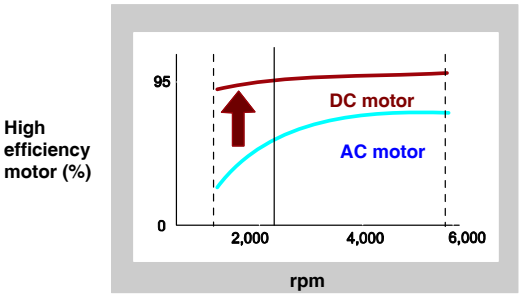
- **Noise and Vibration**
  - The scroll compressor offers lower sound and vibration levels because the compression points are spread evenly over the compression stroke giving a very flat torque curve.
  - This is further enhanced by the minimal number of components used, and the fact that the high pressure shell acts as a silencer.
  - The noise pattern is a high frequency noise and it is easy to reduce it to a very low level using an insulation jacket.

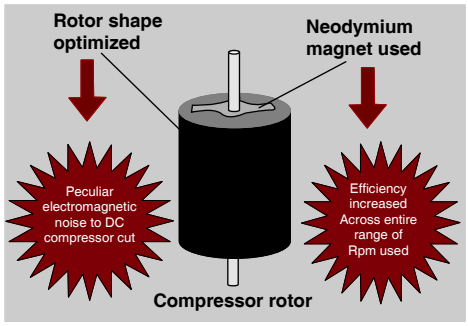
- **Protection against Liquid Return**
  - When the compressor is at rest, the moving Scroll rests on the casing. When the compressor starts to run, the pressure in the chamber under the Scroll builds up through two bleed holes in the medium pressure section of the compression stroke. This pressure then forces the Scroll up against the housing and seals the compression chamber. If liquid returns to the compressor, the resulting increase in pressure forces the Scroll downwards breaking the seal and allowing the liquid to pass back into the compressor body where it will boil due to the higher temperature.

■ DC Compressor Using Neodymium Magnet

– By using DC, the performance is improved in the 30 – 40 Hz range where the operation time of the inverter compressor is longest. Also, to suppress electromagnetic noise interference and achieve low noise, the rotor has been divided into two and the electric pole displaced.

– Characteristics at low speed, which affect the annual running cost, have been significantly improved

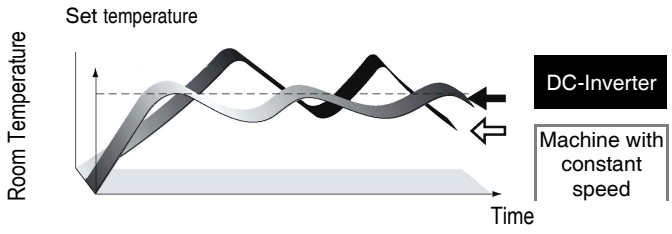




■ Inverter control

The inverter controls compressor speeds from 30 Hz to 115 Hz, quickly reaching the set temperature and maintaining a stable energy-saving operation.

Concept of operation (In heating mode)

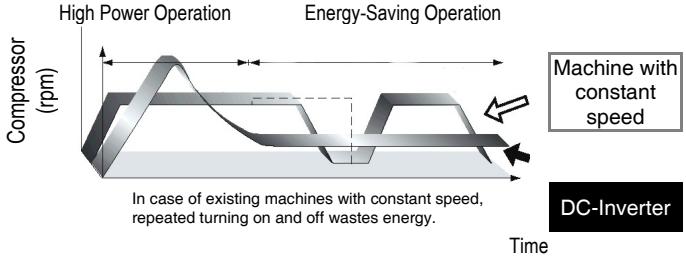


■ **In case of Set-Free**

Quickly reaches the set temperature at high power, then maintains stable energy-saving operation.

■ **In case of existing constant speed machines:**

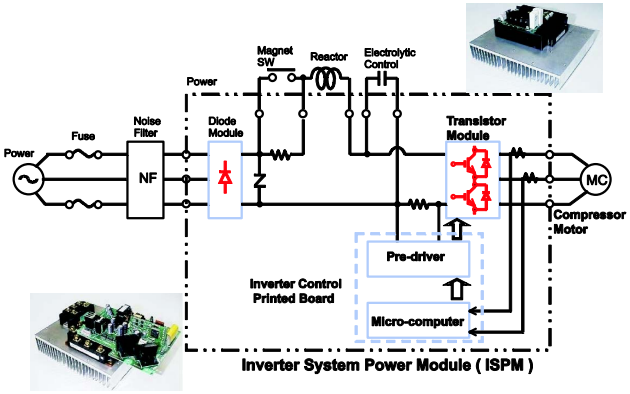
Slowly reaches the set temperature, then turns on and off repeatedly to maintain the temperature, causing uneconomical operation and power waste



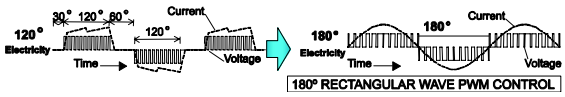
■ New DC Inverter

Newly developed Digital PAM 180º control and New PWM without speed and current sensors.
These two new designs allow the reduction of the harmonic current. At the same time this allows the reduction of volume and weight by 50%.

Concept of operation



DC Motor Drive Control System

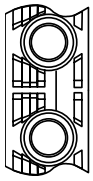


1.2.2. HIGH EFFICIENCY REFRIGERANT CYCLE FOR UTOPIA DC-INVERTER H(V)RNE AND UTOPIA N HN(V)E

The new Utopia RAS-(2~6)H(V)RNE/HN(V)E series has increased efficiency in the refrigerant cycle. HITACHI has developed a new and more efficient heat exchanger.

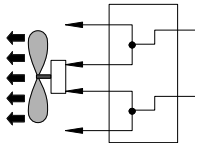
■ New Aluminum Fins Used for Heat Exchanger

The new smaller flow resistance heat exchanger using new aluminium fins and pressure loss in pipe decreases due to optimised path alignment provides power saving.
Also, it has achieved a lower sound operation due to lower fan revolution.



Air flow resistance decreased by 20%.

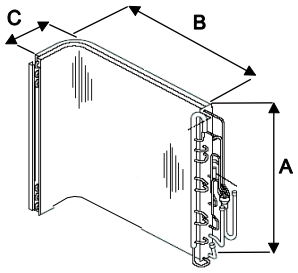
The optimised slit shape minimises noise by reducing air intake resistance



Pressure drop in heat exchanger pipe has been decreased.

■ Bigger Heat Exchanger Size

The new bigger heat exchanger size provides increase to the efficiency. A lower flow resistance makes lower sound operation possible.



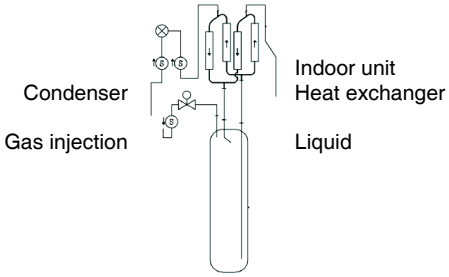
NEW MODELS			
Dim	**RAS-2 HP**	**RAS-2.5/3 HP**	**RAS-4/5/6 HP**
A	770	800	1240
B	650	850	950
C	-	315	315

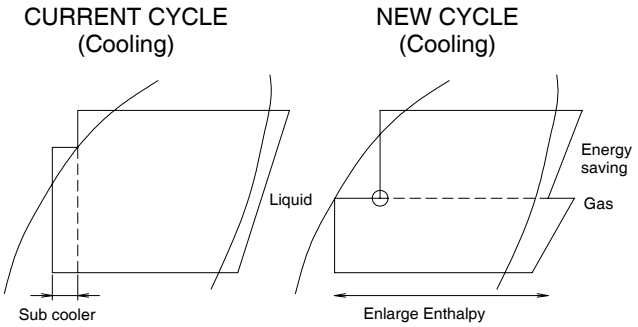
(mm)

■ New Gas Injection System (Only for H(V)RNE Series).

New high pressure gas injection directly to the compressor improves cycle efficiency and reduces compressor input (except for RAS-2/2.5/3H(V)RNE).

Detail of receiver and Gas bypass

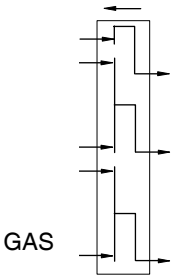




1.2.3. HIGH EFFICIENCY REFRIGERANT CYCLE FOR UTOPIA RAS-8~12HRNE

The new Utopia RAS-8~12HRNE series has increased efficiency in the refrigerant cycle. HITACHI has developed a new and more efficient heat exchanger and a new supercooling circuit.

■ More efficient heat exchanger

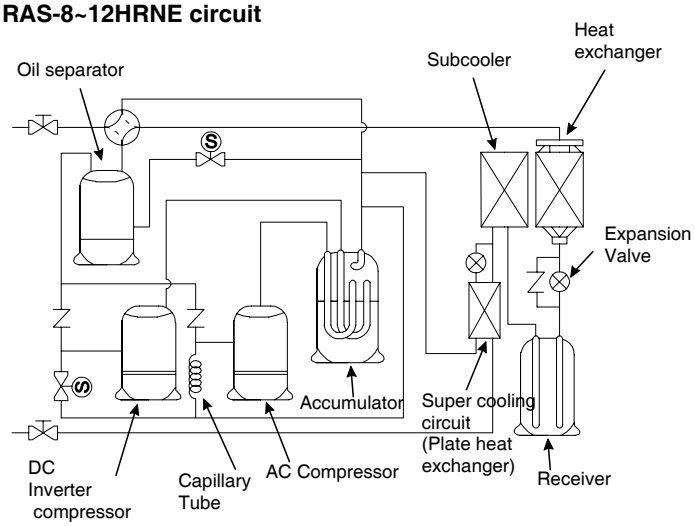


The 2-gas, 1-liquid path arrangement in the Heat Exchanger.

■ Supercooling circuit

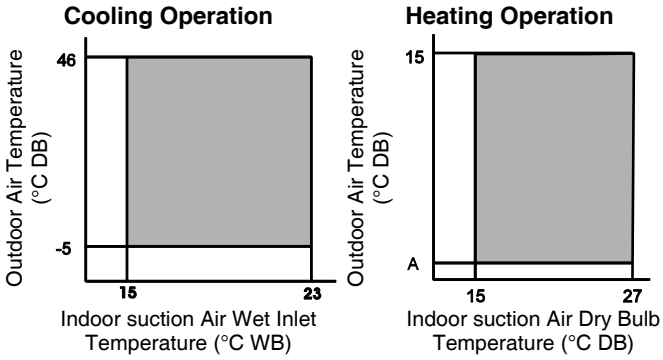
The high efficiency plate type of heat exchanger improves performance.

- RAS-8~12HRNE circuit



1.2.4. NEW TEMPERATURE RANGE

Optimized refrigerant cycle increases temperature range.

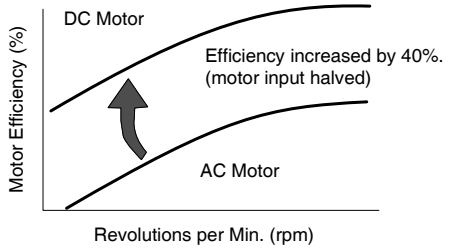


Model	Temperature (A)
RAS-2~3HVRNE	-15°C
RAS-4~12H(V)RNE	-20°C
RAS-2.5~5HN(V)E	-10°C

1.2.5. ENHANCED FAN MOTOR FEATURES

■ DC Fan Motor with Outstanding Efficiency

The DC fan motor greatly improves efficiency compared to conventional products using an AC motor. Also, air blasts are reduced by controlling the rotation speed of the fan. Stable operation is provided against strong head winds of approximately 10 m/s on the front face of the outdoor unit.

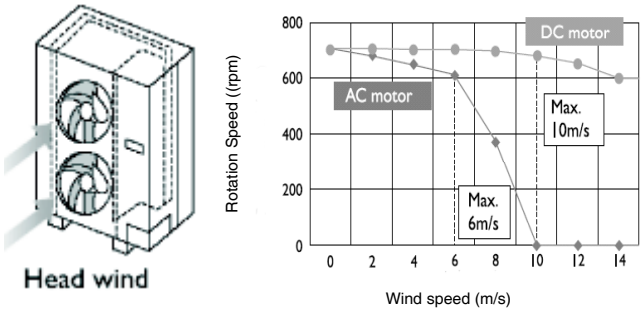


■ PWM (Pulse Width Modulation) Concept of Speed Control

Rotation speed is controlled by making the switching element (a power MOSFET) switch back and forth at a frequency of several tens of kHz, controlling the ON//OFF duty rate per cycle and thus changing the voltage applied to the fan motor.

■ Stable Operations against Strong Winds

A headwind of 6 m/s or faster will slow down the rotation speed sharply in conventional AC motors, but with a DC motor, the rotation speed will hardly change even for a headwind of up to 10 m/s.



■ Top Class Silence Operation

HITACHI uses the latest high technologies to efficiently obtain a lower sound output than their competitors. The applications of the following technologies allow HITACHI to achieve the results shown in the following example.

Outdoor Units Model	Heating Mode (dB-A)	Cooling Mode (dB-A)	Night Shift Mode (dB-A)
RAS-3HVRNE	45	43	39
RAS-4HVRNE	47	45	41
RAS-5HVRNE	49	47	43

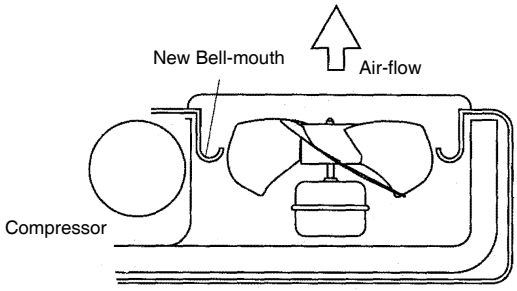
The following technologies allow to optimise sound levels:

■ SuperHigh Stream Fan

Delta shaped edges reduce fan size and noise.

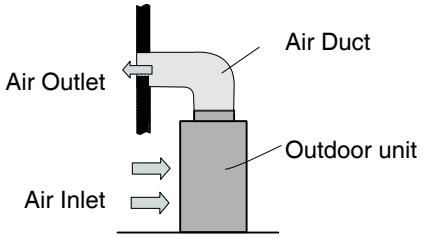
■ Bell-mouth

The bell-mouth minimises flow friction, resulting in smooth flow and low sound.



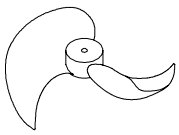
■ New-fan for 8~12HRNE

Hitachi uses a long bell mouth to achieve an increase static pressure of up to 60 Pa.

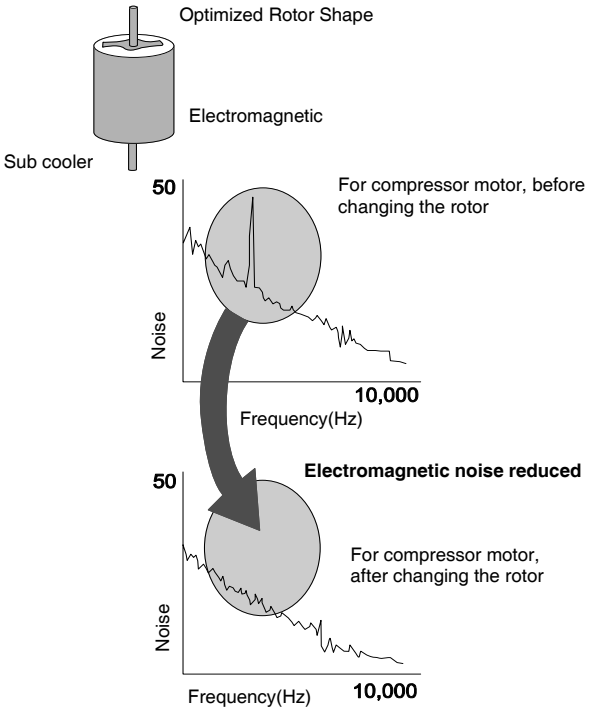


Low Sound

Hitachi uses high technology to achieve the lowest sound. The new two bladed propeller, rather then four bladed, achieves a reduction of 2 dB of noise level, increases air flow volume by up to 25%, and at the same time provides an important reduction of motor power input (approximately in 8%).



■ Reduce Electromagnetic Compressor Noise



1.2.6. COMBINABILITY

It is possible connect two, three or four indoor units in series to a single outdoor unit Utopia HN(V)E or H(V)RNE series. Indoor units may be of different types and even different capacities. See possible combinations in the following table:

Series		OUTDOOR UNIT	COMBINATION TYPE WITH INDOOR UNIT (HP)			
			TWIN	TRIPLE	QUAD	
Utopia N HN(V)E		RAS-3HN(V)E	1.5/1.5	-	-	
		RAS-4HN(V)E	2.0/2.0	-	-	
		RAS-5HNE	2.5/2.5 / 3.0/2.0	-	-	
Utopia DC-Inverter H(V)RNE		RAS-3H(V)RNE	1.5/1.5	-	-	
		RAS-4H(V)RNE	2.0/2.0	-	-	
		RAS-5H(V)RNE	2.5/2.5	-	-	
		RAS-6HRNE	3.0/3.0	2.0/2.0/2.0	-	
		RAS-8HRNE	4.0/4.0	2.5/2.5/3.0	2.0/2.0/2.0/2.0	
		RAS-10HRNE	5.0/5.0 / 6.0/4.0	3.0/3.0/4.0	2.5/2.5/2.5/2.5	
		RAS-12HRNE	6.0/6.0	4.0/4.0/4.0	2.5/2.5/ 3.0/4.0	3.0/3.0/ 3.0/3.0

NOTE:
For more information check the chapter 5.

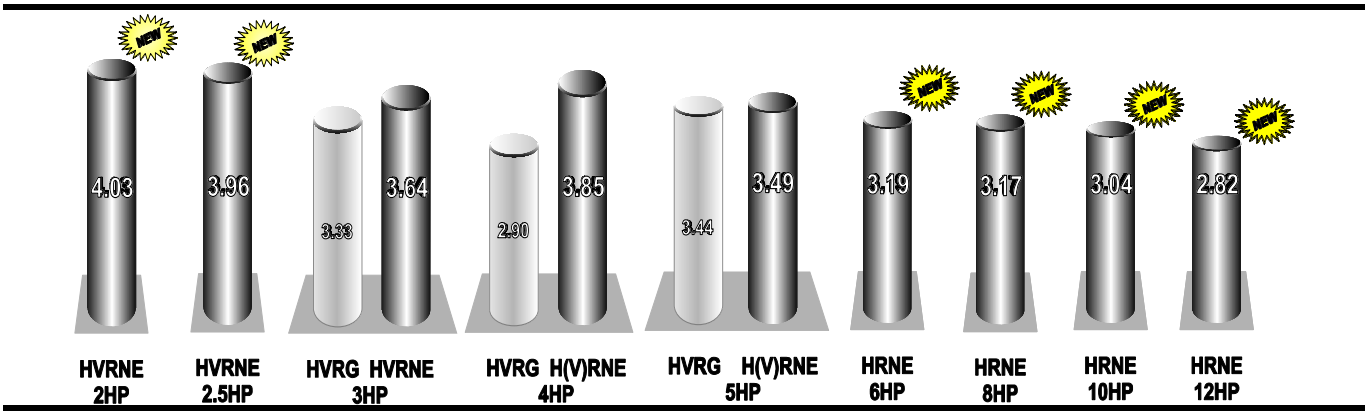
1.2.7. TOP CLASS COP EFFICIENCY

Capacities Comparative between series:

- EER: Energy Efficientcy Rate.
- COP: Capacity Operation Power.

■ **H(V)RNE Units**

EER:



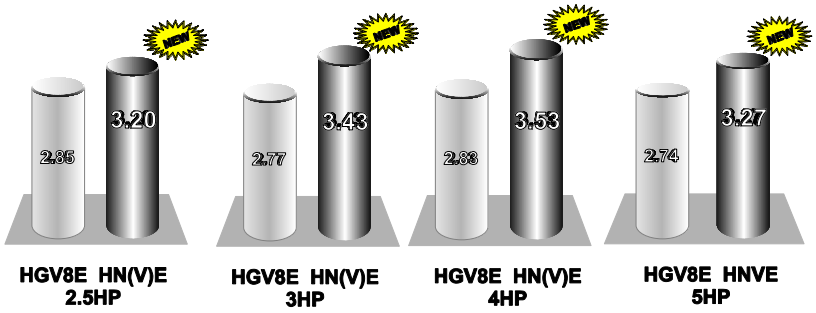
COP:

NOTE:
Indoor RCI single input is included.

■ HN(V)E Units

EER:

COP:



NOTE:
Indoor RCI single input is included.

1.3. INSTALLATION ADVANTAGES

This section describes the advantages from which you will benefit when installing the new Utopia series air-conditioning systems.

- Compact design and light weight
- Enhancements in the piping system
- Enhancements in the wiring system
- Easy servicing and commissioning.

1.3.1. COMPACT AND LIGHT

The units of the new Utopia series have been created to provide the lightest and most compact size systems on the market.
HITACHI's technology has again achieved large advantages in key points such as weight. size and noise.

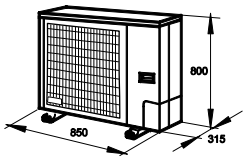
RAS-2HVRNE
Net Weight: 57 Kg
Installation Space: 0.33m²

RAS-2.5HVRNE
Net Weight: 60 Kg
Installation Space: 0.33m²

RAS-2.5 HN(V)E
Net Weight: 66 Kg
Installation Space: 0.33m²

RAS-3HVRNE
Net Weight: 60 Kg
Installation Space: 0.33m²

RAS-3HN(V)E
Net Weight: 69 Kg
Installation Space: 0.33m²



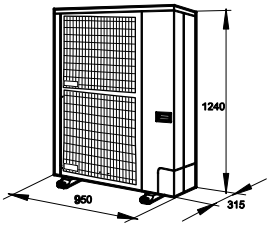
RAS-4H(V)RNE
Net Weight: 95~100 Kg
Installation Space: 0.37m²

RAS-4HN(V)E
Net Weight: 90 Kg
Installation Space: 0.37m²

RAS-5H(V)RNE
Net Weight: 97~102 Kg
Installation Space: 0.37m²

RAS-5HNE
Net Weight: 102 Kg
Installation Space: 0.37m²

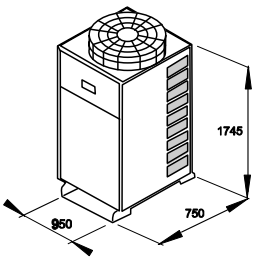
RAS-6HRNE
Net Weight: 102 Kg
Installation Space: 0.37m²



RAS-8HRNE
Net Weight: 260 Kg
Installation Space: 0.57m²

RAS-10HRNE
Net Weight: 270 Kg
Installation Space: 0.57m²

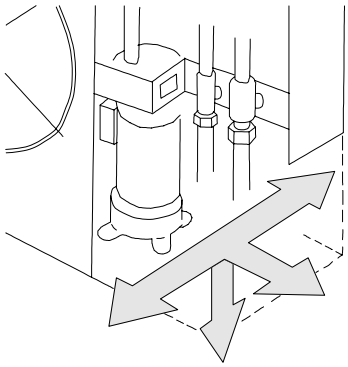
RAS-12HRNE
Net Weight: 270 Kg
Installation Space: 0.57m²



1.3.2. PIPING SYSTEM

■ Flexible Installation

Piping connectors pivot four-ways (front. rear. lateral. down) to permit much easier access positions of units. This greatly enhanced flexibility reduces problems at installation time and encourages the alignment of multiple outdoor units in more compact arrangements.



■ Pipe Size Reduction

– Reduced diameters compared to R407C systems.

HP	Liquid Pipe		Gas Pipe	
	R407C	R410A	R407C	R410A
2	∅6.35	∅6.35	∅15.88	∅15.88
2.5	∅9.53	∅9.53		
3				
4			∅19.05	
5				
6				
8	∅12.7		∅28.6	∅25.40
10	∅15.88	∅12.70		
12	-		-	∅28.40

Pipes can be reduced because refrigerant discharge is greatly reduced thus compression loss is small for the same capacity as R410A.

1.3.3. WIRING SYSTEM

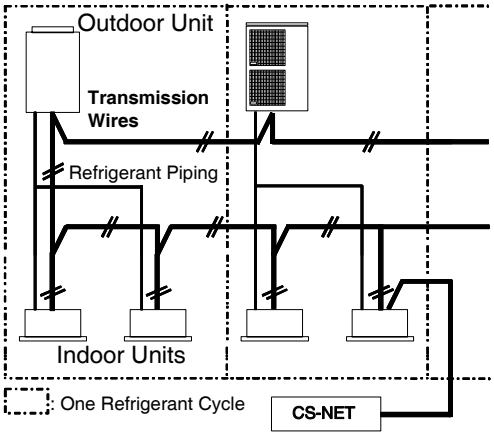
H-Link System

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

The system provides the following advantages:

- Easy and flexible installation.
- Non polarity.
- Freely Combinable.
- CS-Net Connection via Indoor or Outdoor Unit
- Maximum 64 Indoor Units
- Maximum length: 1000 m

Example of H-LINK System



NOTE:
To use the H-LINK system, the setting of DIP switches is required. If the DIP switches are not set or incorrectly set, an alarm may occur due to transmission failure.

The H-LINK system provides high flexibility in the design system. The installation is easy and the total costs are reduced. Furthermore, central control is possible by connecting CS-NET to anyware H-LINK wiring.

1.3.4. EASY SERVICING AND COMMISSIONING

To provide more efficient sevicing and comissioning the systems are equipped with on-board test, trial operation. and self-diagnosis functions.

■ Test Run

Automatic Test Run is available for commissioning through outdoor unit DIP switch or indoor unit remote control switch. Outdoor Unit 7-segment display gives all the necessary information to check the operation of the system.
Connected Outdoor Units Identification system. Using a Remote Control Switch. you can confirm to what series the operational Outdoor Units belong (ex: Single or Multi).
Automatic Address Coding system. With this you are able to automatically give a unit number to individual Indoor Units. (Units can also be allocated with a unit number manually. using their rotary type DIP switch).

■ Trial Operation and Self Diagnosis

A high quality control by the remote control switch has been developed. The self-diagnosis function, which enables quick checking of operation conditions in the Indoor Units and Outdoor Unit has been newly equipped. Furthermore, alarm data can be stored in a microcomputer memory when an abnormality occurs.

- Diagnosis through the Remote Control Switch

  Printed circuit boards (PCBs) can be checked using the optional LCD (Liquid Crystal Display) remote Control Switch. Therefore, diagnosis for PCBs at the site is quickly and accurately performed.

- Data Memory in the Remote Control Switch

  If an abnormality occurs, the LCD remote control switch shows an alarm code so that quick diagnosis is available at the site.

- Optional Function Setting by Remote Control Switch

  Cancellations of a four-degree shift in the heating mode or the fan speed increasing setting are set via Remote Control Switch. This way, multiple Indoor Units can be set at the same time.
  Also even after installation is completed, you can easily change the configuration.

- Diagnosis through the 7-Segment Display in the Outdoor Unit. (Only for H(V)RNE models).

The PCB in the Outdoor Unit is equipped with four 7-segment displays. This display indicates various operating modes such as:

- Outdoor Air Temperature
- Discharge Gas Temperature
- Evaporating Temperature during Heating Operation.
- Condensing Temperature
- Compressor Run Time

Therefore, quick and accurate diagnose is available at the site during the trial operation or normal operation.

■ Easy Operation for PCB Maintenance.

The PCB support is moving for using hinges on the PCB support.

■ Service Checker

A Service Checker to monitor installation conditions and operation status of air conditioning systems through a desktop or note-type computer is provided. You can also easily create test run records. (A service checker system consists of a special interface unit and a field-supplied desktop computer).

1.4. WIDE RANGE OF CONTROL SYSTEMS

A wide range of control systems is available. You can choose among individual remote control switches. timers. and centralized controls systems. One noteworthy innovation is the inclusion of CS-NET WEB, a new system developed by HITACHI to meet the user's control needs via the Internet.

1.4.1. INDIVIDUAL CONTROL

The individual controls available are the PC-P1HE Remote Control Switch, the PC-LH3A Wireless Remote Control Switch, and the PC-P5H Half Size Remote Control Switch.

■ **PC-P1HE**

Remote control switch

The Remote Control Switch contains:
- A large LCD
- Timer can be set at half-hour intervals up to 24
- When a problem occurs, an alarm code immediately shows the details of the error. A self-diagnosis function is incorporated.
- All the functions of the indoor unit can be selected through remote control switches.
- A remote control thermo function is provided

■ **PC-LH3A**

Wireless remote control switch

The wireless remote control switch removes the necessity of wiring and provides simple one-touch operation.
The remote control switch can simultaneously control two or more units.

■ **PC-P5H**

Half-size remote control switch

The main function of this easy-to-use remote control switch is temperature setting. It is ideal for facilities such as hotels, where different people use it.
Two remote control switches or a group control (for a maximum of 16 units) can be used, in a similar way to the standard remote control switch.
When a problem occurs, an alarm code immediately shows the details of the error.

1.4.2. TIMER

The PSC-5T is a seven-day programmable timer used to set operating schedules for air conditioners.

■ **PSC-5T**

Seven-day timer

- By using PSC-5S and PC-P1HE controllers, the air conditioners they control can be operated according to a schedule.
- The timer can be set at seven-day intervals, and operation/stop can be set three times daily.
- Remote Control can be prohibited during the OFF time (when used with PSC-5S and PC-P1HE).
- Two types of weekly schedule (A and B) can be set, and can easily be changed for summer and winter operation.
- Settings are all digitally displayed, allowing operations and settings to be easily checked.
- The power failure backup function prevents the timer from stopping because of a power failure (even if it lasts for weeks).

1.4.3. CENTRALIZED CONTROL SYSTEMS

The centralized control systems available are the PSC-5S Central Station, the HARC- Gateway Interface to LONG-WORKS BMS Systems, CS-NET Computer Controlled Network System, and the CS-NET WEB Remote Computer Network System.

■ PSC-5S

Central station

- A group of up to 16 remote control switches can be connected to an H-LINK to control up to 64 indoor units.
- Up to 8 units can be connected to an H-LINK
- In addition to the basic functions, the operation mode and temperature setting, air flow or auto louver can be set.
- When a problem occurs, an alarm code immediately shows the details of the error detected.
- An external input terminal is provided as standard.
- External signals control the following functions:
  - Central Operation/Stop
  - Demand Control Emergency Stop
  - Central Operation Output
  - Central Alarm Output

■ HARC-BXE

Gateway Interface to LONG-WORKS BMS Systems

Using the HARC-BX provides control of up to five setting points and remote monitoring up to nine values

- Connecting the HARC-BX to an H-LINK allows up to eight refrigerant cycles to be used and up to 64 indoor units can be controlled.
- Up to eight HARC-BX can be connected to the same H-Link.
- The HARC-BX can be connected to any point in the H-Link system

■ CS-NET

HITACHI Computer Controlled Network System (CS-NET)

The HITACHI CS-NET is an easy to use but powerful system for Hitachi System Free units.

CS-NET provides the following functions:

- Building Layout view enabling easy monitoring for the whole system
- Web connection enabling remote control and monitoring in any place of corporate LAN or even the Internet.
- Limits the setting temperature range
- Locking of the different setting points:
  - Setting temperature
  - Operation mode
  - Fan Speed
  - Run/Stop (only recommended for computer rooms)
- Up to 16 outdoor units to be controlled per H-LINK Board
- Up to 128 indoor units per H-LINK
- The CS-NET can be connected to any point in the H-Link System

■ CS-NET WEB (NEW)

HITACHI Remote Computer Controller Network System (CS-NET WEB)

The HITACHI CS-NET WEB is an easy to use standalone Centralised Controller for Set Free Multi Split Air Conditioner

CS-NET WEB connects an Hitachi System Free system to Local Area Network or even to the Internet. This connection enables setting of timer and allows system to be controlled without dedicated computer.

CS-NET WEB provides the following functions:

- Ethernet connection enabling easy remote control and monitoring in any place of corporate LAN or even the Internet.
- Limits the setting temperature range
- Locking of the different setting points:
  - Setting temperature
  - Operation mode
  - Fan Speed
  - Run/Stop (only recommended for computer rooms) (To be confirmed)
- Up to 16 outdoor units to be controlled per CS-NET WEB
- Up to 128 indoor units per CS-NET WEB
- The CS-NET can be connected to any point in the H-Link System

1.5. INDOOR UNITS

This section describes the various indoor units that can be used with the new series outdoor units.

1.5.1. EXPANSION VALVE

Indoor units are equipped with an electronic expansion valve to provide sophisticated control under any temperature condition.
The electronic expansion valve provides reduced electrical power consumption compared to the classic capillary tube expansion valve systems. It is also far more efficient than the capillary systems.

1.5.2. RCIM- FSN (NEW)

The RCIM – 4-way cassette type indoor unit benefits from Top class compact size, quiet operation, DC fan, uniform panel sizing, weight, ceiling operation, adjustable, reduced mounting size, compact size, and improved flexible piping.

■ Quiet operation

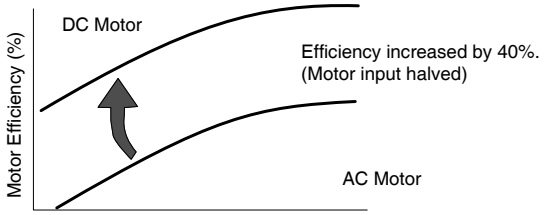
By employing DC motor the electromagnetic noise is reduced.

The following table lists air flow rates for RCIM.

Air flow rate / Model	Standard operation dB(A)		
	Hi	Me	Lo
RCIM-1.5FSN	38	35	33
RCIM-2.0FSN	42	39	37

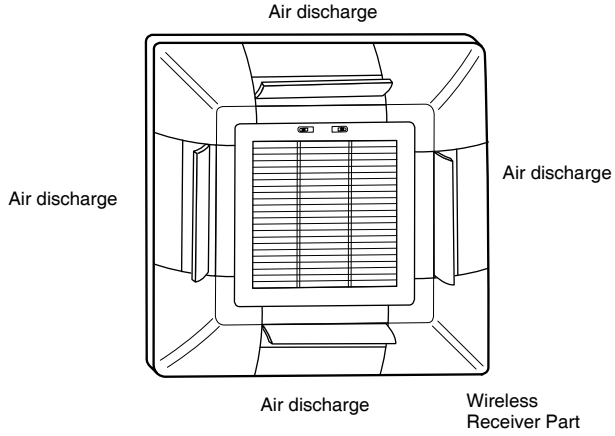
■ Fan motor input reduced by DC motor

The DC fan motor greatly improves efficiency compared to conventional products that use AC motors. In addition, air blasts are reduced by controlling the rotation speed of the fan.
The motor input is reduced by employing a ferrite magnetic surface-mounted rotor, centralized winding system and split core system. The motor efficiency is improved in all aspects, and is 50% smaller and lighter than conventional machines.



■ Uniform square panel size

Panel sizes are standardised to a 700mm square to facilitate the installation in grid ceiling. European standard module is 600mm.

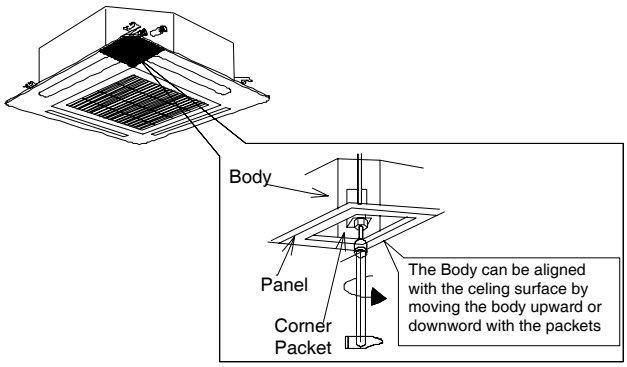


■ Equipped with drain up mechanism with high pump lift

A drain pump lift of up to 600mm from the ceiling surface is achieved by employing a drain-up mechanism with high pump lift (500mm in the previous model).

■ Body height easily adjustable in the corner pocket

A pocket is provided for each of the four panel corners. so that the body height can be easily adjusted without removing the panel.



■ Compact, thin and weight can be installed in a small space

The height of the units is just 295mm, and weight is 17Kg and so they can be installed in a reduced space inside a false ceiling.

■ High ceiling adaptability satisfies a wide variety of requirements

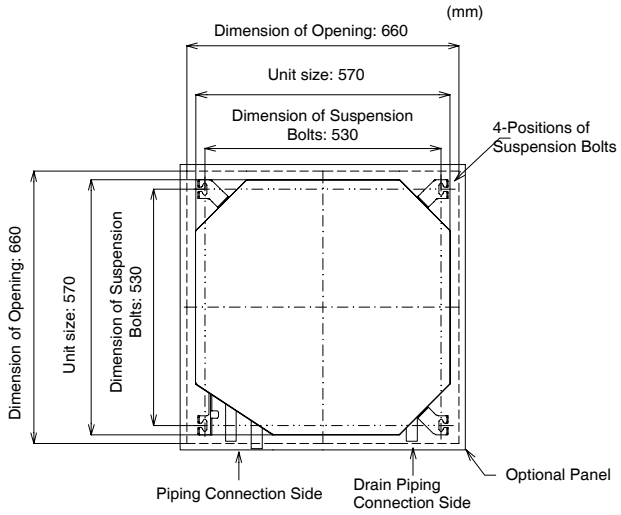
This model has been adapted for high ceiling (3.5m high) installations by incorporating speed-up taps. This feature provides comfortable air conditioning in suburban stores and showrooms.

(m)

High ceiling	Ceiling Height	
	1.5HP	2.0HP
Standard	Below 2.5	Below 2.7
Speed-up(1)	2.5 to 2.9	2.7 to 3.1
Speed-up(2)	2.9 to 3.9	3.1 to 3.5

■ Piping flexibility improved because the body-suspending positions are square-shaped

The suspending bolt pitch size is 530mm positioned at each corner of the square body. Thus, the direction of the body can be changed easily to match the pipe connection without changing the bolt positions. The layout is simple even for continuous installation.



■ Piping work improved

By setting the refrigerant pipe and drain pipe at separate corners, the working efficiency is improved.
The water level automatically activates the pump when the draining process is required.

1.5.3. RCI – FSN1E

The RCI – 4-way cassette type indoor unit benefits from quiet operation, improved efficiency DC fan, uniform panel sizing, high ceiling operation, adjustable body height, reduced mounting size, drain up mechanism, compact size, and improved flexible piping.

■ Quiet operation

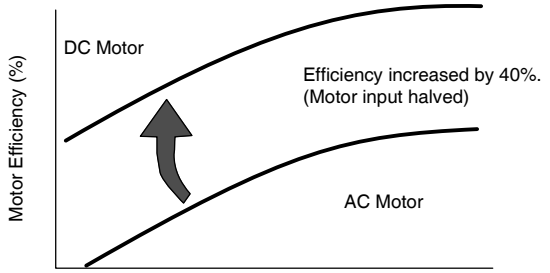
By employing a super-high-stream turbo fan (three-dimensional twisted wing with large bore and high efficiency), the wind flow efficiency has been improved by 20% (over conventional machines, patent pending). With the under damping slit mounted near the center of the revolving shaft, the electromagnetic noise is reduced. This electromagnetic noise is unique to DC motors and is caused by the number of magnetic poles and revolution speed of the motor.

The following table lists air flow rates for the new RCI:

Air flow rate / Model	Standard operation dB(A)		
	Hi	Me	Lo
RCI-1.5FSN1E	32	30	28
RCI-2.0FSN1E	32	30	28
RCI-2.5FSN1E	32	30	28
RCI-3.0FSN1E	34	32	30
RCI-4.0FSN1E	38	35	33
RCI-5.0FSN1E	39	37	35
RCI-6.0FSN1E	42	40	36

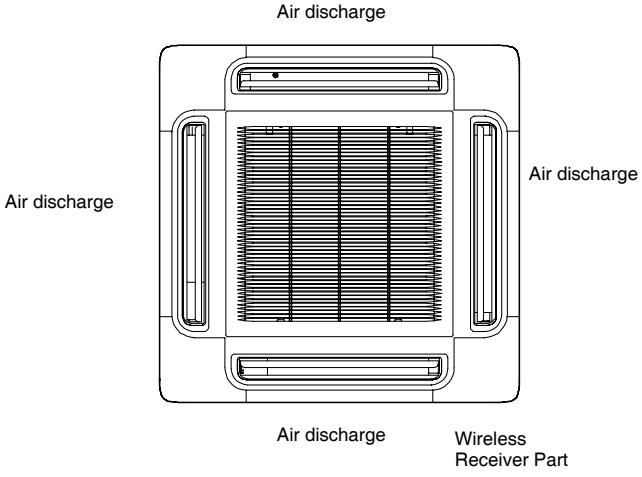
■ Fan motor input reduced by DC motor

The DC fan motor greatly improves efficiency compared to conventional products that use AC motors. In addition, air blasts are reduced by controlling the rotation speed of the fan.
The motor input is reduced by employing a ferrite magnetic surface-mounted rotor, centralized winding system and split core system. The motor efficiency is improved in all aspects, and is 50% smaller and lighter than conventional machines.



■ Uniform square panel size

Panel sizes are standardized to a 950mm square to facilitate the simple interchange of other models with different capacities.



■ High ceiling adaptability satisfies a wide variety of requirements

This model has been adapted for high ceiling (4.2m high) installations by incorporating speed-up taps. This feature provides comfortable air conditioning in suburban stores and showrooms.

(m)

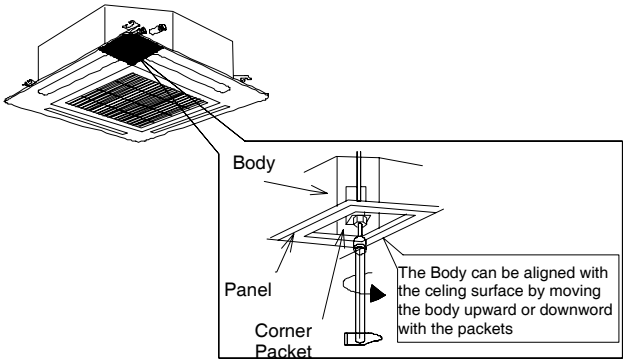
High ceiling	1.5/2.0/2.5 HP			3.0/3.5/4.0/5.0/6.0 HP		
	4-way	3-way	2-way	4-way	3-way	2-way
Standard	2.7	3.0	3.3	3.2	3.6	4.0
Speed-up(1)	3.0	3.3	3.5	3.6	4.0	4.2
Speed-up(2)	3.5	3.6	-	4.2	4.3	-

NOTE:

- *For setting two and three directions, the separately-sold 3-way outlet parts set is required.*
- *Speed-up (1) and Speed-up (2) can be selected with the remote control switch by using the C5 option.*

■ Body height easily adjustable in the corner pocket

A pocket is provided for each of the four panel corners. so that the body height can be easily adjusted without removing the panel.



■ Equipped with drain up mechanism with high pump lift

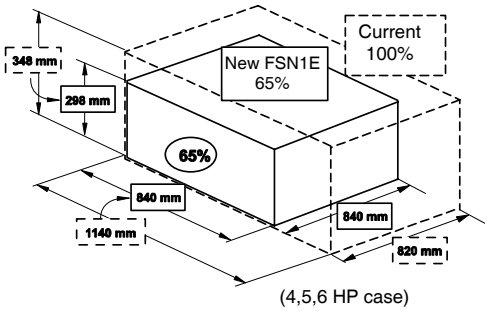
A drain pump lift of up to 850mm from the ceiling surface is achieved by employing a drain-up mechanism with high pump lift (500mm in the previous model).

■ Smaller celing opening for installation and renewall

The ceiling opening size has been changed from the conventional 910mm to a range between 860-910mm, so the ceiling panel cut-out will be smaller.

■ Compact, thin and can be installed in a small space

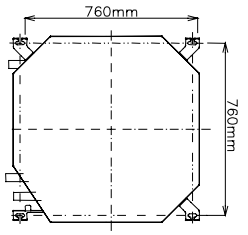
The height of the units is just 298mm. 50mm smaller than conventional models (RCI-HG7E/FSNE), and so they can be installed in a reduced space inside a false ceiling.



(4,5,6 HP case)

■ Piping flexibility improved because the body-suspending positions are square-shaped

The suspending bolt pitch size is 760mm, positioned at each corner of the square body. Thus, the direction of the body can be changed easily to match the pipe connection without changing the bolt positions. The layout is simple even for continuous installation.



■ Piping work improved

By setting the refrigerant pipe and drain pipe at separate corners, the working efficiency is improved.

The water level automatically activates the pump when the draining process is required.

1.5.4. RCD – FSN

The RCD – 2-way cassette type indoor unit provides quiet operation, new air panel, and a low profile design.

■ Quiet operation

By employing a super-high-stream turbo fan (three-dimensional twisted wing with large bore and high efficiency), the wind flow efficiency has been improved by 20% (over conventional machines. patent pending). With the under damping slit mounted near the center of the revolving shaft, the electromagnetic noise is reduced. This electromagnetic noise is unique to DC motors and is caused by the number of magnetic poles and revolution speed of the motor.
Unlike conventional units, the noise level has been reduced to an exceptionally low 30dB-A. It is ideal wherever quiet operation is important.

The following table lists air flow rates for the RCD.

Air flow rate / Model	Standard operation dB(A)		
	Hi	Me	Lo
RCD-1.5FSN	34	32	30
RCD-2.0FSN	35	32	30
RCD-2.5FSN	38	34	31
RCD-3.0FSN	40	36	33
RCD-4.0FSN	40	36	33
RCD-5.0FSN	43	40	36

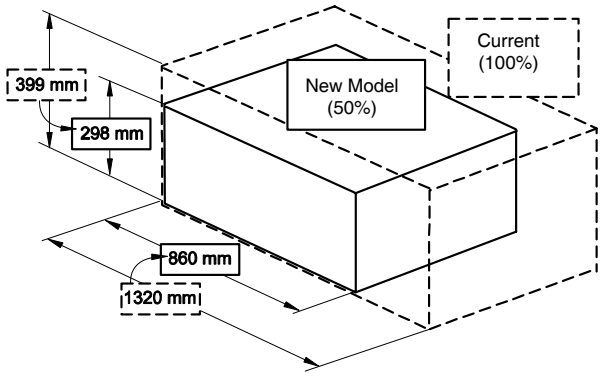
NOTE:
With a 240V power source, the sound pressure level increases by approximately 1 dB.

■ Air panel, perfect fit for any ceiling

This unit virtually merges with the ceiling, since it only protrudes 30 mm. The new air panel provides some space for customized paneling, allowing the unit to blend into any ceiling perfectly.

■ Low profile design

A compact turbo fan simplifies the structure and reduces the height of the unit to 298mm. The unit low profile design allows easy installation in confined space inside a ceiling.

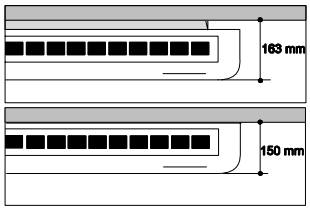


1.5.5. RPC – FSNE

The RPC – ceiling type indoor unit uses an elegant profile design and provides quiet operation, new air panel, versatile mounting, an automatic swing louver, and simple installation.

■ Profile design

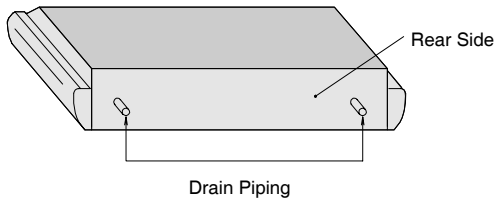
The RPC unit has been designed with an elegant appearance, more comfortable style and a new color. As usual the unit has fully adjustable mounting brackets allowing a flush fit with the ceiling to make installation possible even in the tightest places.



Concealed

■ Versatile mounting

To expand the installation and positioning options, HITACHI added a second drain pipe connector, one more than conventional units.



■ Automatic swing louver

This unit is equipped with an automatic swing louver to ensure even distribution of conditioned air to the entire room.

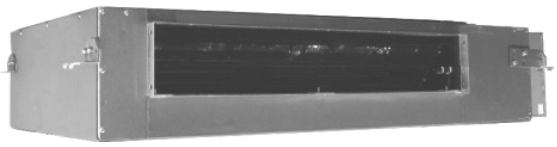
■ Simple and flexible installation

By enabling refrigeration piping to be tucked-in close to each indoor unit, piping layout and installation have been made much easier.

1.5.6. RPI – FSNE

The RPI – in-the-ceiling type indoor unit is designed especially for installation in false ceiling spaces.

- RPI-1.5HP



- RPI-2.0~6.0HP

- RPI-8~10HP

■ Solid structure and reduced dimensions

The RPI design gives a more solid, reinforced structure to the unit and improves rigidity when it is suspended.
The unit has reduced dimensions and thus requires less space for installation and has the lowest height in the market.

■ Fan unit with three static pressure levels

The unit is set at static pressure for normal operations as standard (STD SP), The High Static pressure (HSP) is available for long duct installations providing the possibility of accurately controlling the air flow distribution in the building.
It also provides the additional advantage of the new low static pressure (LSP) option for extra short ducting.
Actual noise levels in the field can be decreased by taking advantage of the static pressure availability, and all fan speed levels: high, medium and low.

■ Static pressure selection from the remote control switch

It is possible to select the static pressure through the remote control switch.

■ Quiet operation

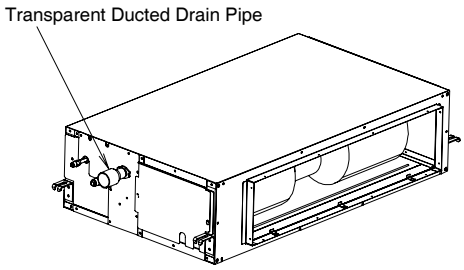
By selecting the most suitable static pressure (in function of length duct) it is possible to reduce the sound level and, this way, to obtain a quiet and efficient operation.
In the table below, you can see the noise reduction by selecting the suitable working pressure. These values are considered in the high fan speed.

Models	Sound level dB(A)		
	STD SP	HSP	LSP
RPI-1.5	38	-	-
RPI-2.0	39	40	35
RPI-2.5	40	41	36
RPI-3.0	40	42	37
RPI-4.0	42	44	41
RPI-5.0	45	47	44
RPI-6.0	46	48	45
RPI-8.0	54	54	51
RPI-10.0	55	55	52

■ Drain pump as standard (Only for 1.5~6.0 HP)

The whole range of units, from 1.5 HP to 6.0 HP are equipped with an internal drain pump, which removes the accumulated condensation from the drain pan even while the cooling operation is in progress.
This easy-to-service unit is equipped with a transparent ducted drain piping in order to improve the commissioning process.

Example: (2.0 HP to 6.0 HP)

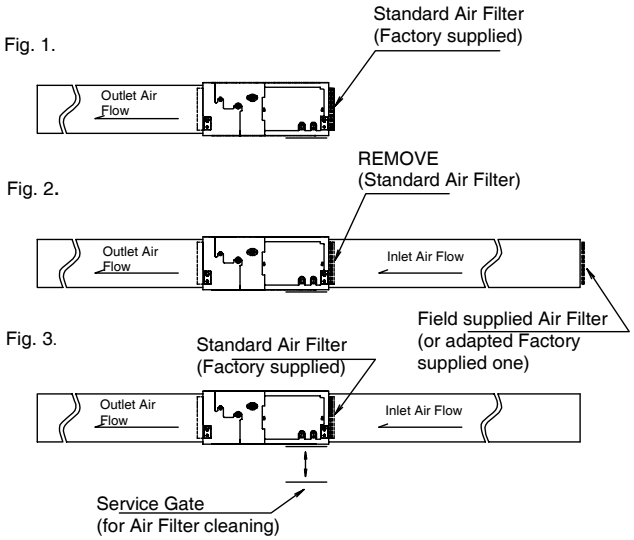


■ Float switch

The RPI units are equipped with the float switch sensor witch allows stop the unit in order to avoid water dropping.

■ Suction filter as STD accessory

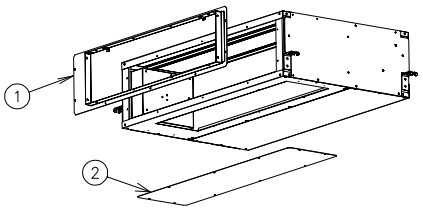
The RPI unit is equipped with a filter as a standard accessory. This can be used in cases where the suction unit is accessible because no suction duct is used or it is very short.

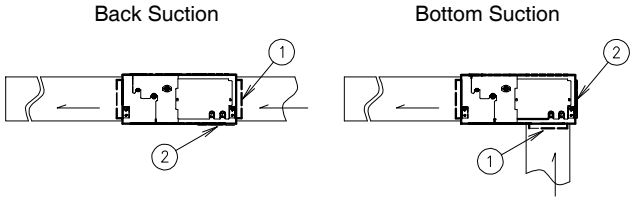


In situations where the suction duct is very long, the same filter can be installed in the suction false ceiling filter. This newly incorporated standard filter is giving more advantages and facilities for duct type installations.

■ Air suction direction change (Only for 2.0~6.0 HP)

Air suction direction can be modified by interchanging cover (2) and fan cover (1).

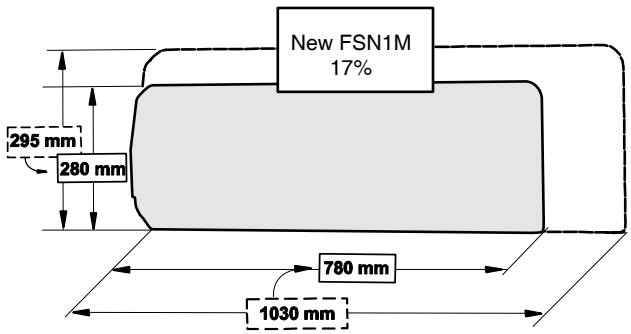




1.5.7. RPK – FSN1M

Hitachi has developed a new RPK FSN1M

■ Elegant and compact design



The width has been reduced by 17% compared with conventional model.
The compact size makes it easy to install.

■ Easy installation for PC-P1H(E)

It is possible to connect the PC-P1H(E) to the terminal board without an optional cable.

■ Easy troubleshooting

Alarm indication when using PC-LH3A has been improved the Filter and Timer LEDs show the alarm.

1.5.8. RPK- FSNM

HITACHI has developed a new RPK series, with a range that covers most of the applications that the markets request.

- RPK-1.5~2.0 HP

- RPK-2.5~4.0 HP

■ Elegant and compact design

With its elegant and timeless design, this unit will match any decor. Its compact size makes it easy to install because the weight has been reduced by 15%.

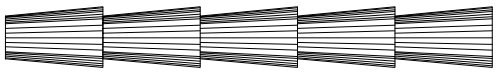
■ Quiet operation

Using trapezoidal blades allows cutting the air diagonally to reduce air flow resistance. Conical blade fans ensure a high air flow and low noise with slow rotation. It is the top level in the market.
This model creates a pleasant. quiet and comfortable environment.

Old Model FSG2M	
Model	**Noise Level (dB)**
1.5 HP	41-37-34
2.0/2.3 HP	42-38-36

New Model FSNM	
Model	**Noise Level (dB)**
1.5 HP	39-37-34
2.0 HP	40-38-36
2.5 Hp	43-40-37
3.0 HP	43-40-37
4.0 HP	49-46-43

Trapezoidal blades (1.5~2.0 HP)



■ Function. Swing Louver

The Swing Louver with three flaps at both sides has been adopted, in order to provide comfortable air to the entire room.

■ Wireless or wired control

The indoor unit is equipped with a wireless receiver kit inside as a standard accessory. The wired remote control switch. PC-P1HE is also applicable.

1.5.9. RPF – FSNE

■ Slim design of only 220 mm depth

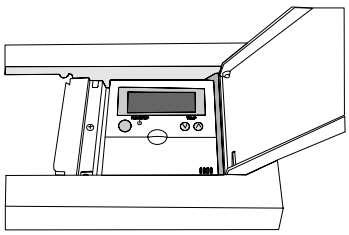
Due to its slim design, the indoor unit can be installed along the wall without wasting valuable floor space.

■ Low height of only 630 mm

The height of the indoor unit is only 630 mm so that this unit is ideal for perimeter zone air conditioning

■ Optional location for PC-P1HE (RPF)

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



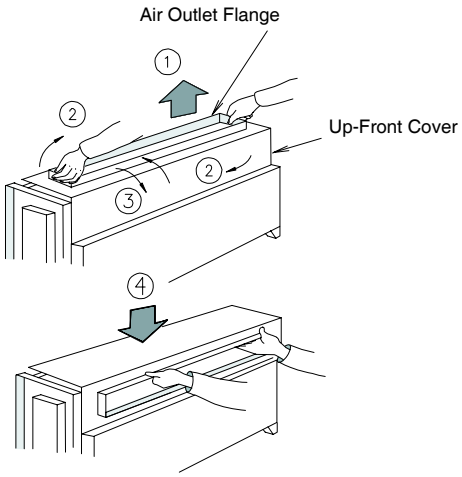
1.5.10. RPFI – FSNE

■ Compact design

This unit is normally installed inside walls under windows, without changing the interior. Due to its compact design, 620mm in height, 220mm in depth and 988mm for 1.5 and 1238mm for 2/2.5 in width, the unit can be installed in a limited space in most buildings.

■ Air discharge direction change

Air suction direction can be modified by changing the back cover.



1.6. COMPLEMENTARY SYSTEMS

The complementary systems, KPI and Econofresh, are available for Utopia DC-Inverter System.
For more information, refer to Technical Catalog and Service Manual for Set-Free System.

2 GENERAL DATA

This chapter provides you with a fast review of the most important features of Indoor and Outdoor Units of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

2.1. GENERAL DATA FOR INDOOR UNITS

2.1.1. RCI - 4-WAY-CASSETTE TYPE

MODEL RCI		Units	RCI-1.5 FSN1E	RCI-2.0 FSN1E	RCI-2.5 FSN1E	RCI-3.0 FSN1E	RCI-4.0 FSN1E	RCI-5.0 FSN1E	RCI-6.0 FSN1E
Nominal Cooling Capacity		kW	3.60	5.00	6.30	7.10	10.00	12.50	14.00
Nominal Heating Capacity		kW	4.00	5.60	7.00	8.00	11.20	14.00	16.00
Air Flow Rate (Hi/Me/Lo)		m^3/min	15/14/12	16/14/12	20/17/15	26/23/20	32/28/24	34/29/25	37/32/27
Fan Motor		W	56	56	56	56	108	108	108
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	32/30/28	32/30/28	32/30/28	34/32/30	38/35/33	39/37/35	42/40/36
Outer Dimensions	Height	mm	248	248	248	298	298	298	298
	Width	mm	840	840	840	840	840	840	840
	Depth	mm	840	840	840	840	840	840	840
Net Weight		kg	23	24	24	26	29	29	29
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)						
Connections Refrigerant Piping			Flare-nut Connection (With Flare-Nuts)						
Liquid Line		mm (in.)	∅6.35 (1/4)	∅6.35 (1/4)	∅9.53 (3/8)	∅9.53 (3/8)	∅9.53 (3/8)	∅9.53 (3/8)	∅9.53 (3/8)
Gas Line		mm (in.)	∅12.7 (1/2)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)
Condensate Drain		mm	∅32 OD	∅32 OD	∅32 OD	∅32 OD	∅32 OD	∅32 OD	∅32 OD
Packing Measurements		m^3	0.22	0.22	0.22	0.26	0.26	0.26	0.26
Adaptable Air Panel Model		-	P-G23WA2						
Color (Munsell Code)		-	Spring. White (4.1Y8.5 / 0.7)						
Outer Dimensions	Height	mm	37	37	37	37	37	37	37
	Width	mm	950	950	950	950	950	950	950
	Depth	mm	950	950	950	950	950	950	950
Net Weight		kg	6	6	6	6	6	6	6
Packing Measurements		m^3	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Remote Control Switch		-	PC-P1HE or PC-LH3A						

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		Cooling	Heating
Indoor Air Inlet Temperature	DB	27.0 °C	20.0 °C
	WB	19.0 °C	
Outdoor Air Inlet Temperature	DB	35.0 °C	7.0 °C
	WB		6.0 °C

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*
   - *1.5 meters beneath the Unit*
   - *Voltage of the power source for the indoor fan motor is 230V.*

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.
3. *Panel P-G23WA2 is equipped with an automatic swing louver system.*

RCI - 4-Way-Cassette Type

MODEL RCIM		**Units**	**RCIM-1.5FSN**	**RCIM-2.0FSN**
Nominal Cooling Capacity		kW	4.5	4.5
Nominal Heating Capacity		kW	5.0	6.3
Air Flow Rate (Hi/Me/Lo)		m^3/min	15/13.5/12	16/14/12
Fan Motor		W	52	52
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	38/35/33	42/39/37
Outer Dimensions	Height	mm	295	295
	Width	mm	570	570
	Depth	mm	570	570
Net Weight		kg	17	17
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)	
Connections			Flare-nut Connection (With Flare-Nuts)	
Refrigerant Piping				
Liquid Line		mm (in.)	∅6.35 (1/4)	∅6.35 (1/4)
Gas Line		mm (in.)	∅12.7 (1/2)	∅15.88 (5/8)
Condensate Drain		-	VP32 OD	VP32 OD
Packing Measurements		m^3	0.13	0.13
Adaptable Air Panel Model		-	P-N23WAM	
Color (Munsell Code)		-	Plaste. White (4.1Y8.5 / 0.7)	
Outer Dimensions	Height	mm	35	35
	Width	mm	700	700
	Depth	mm	700	700
Net Weight		kg	3.5	3.5
Packing Measurements		m^3	0.07	0.07
Remote Control Switch		-	PC-P1HE or PC-LH3A	

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*
   - *1.5 meters beneath the Unit*
   - *Voltage of the power source for the indoor fan motor is 230V.*

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.
3. *Panel P-N23WAM is equipped with an automatic swing louver system.*

2.1.2. RCD - 2-WAY-CASSETTE TYPE

MODEL RCD		Units	RCD-1.5FSN	RCD-2.0FSN	RCD-2.5FSN	RCD-3.0FSN	RCD-4.0FSN	RCD-5.0FSN
Nominal Cooling Capacity		kW	3.60	5.00	6.30	7.10	10.00	12.50
Nominal Heating Capacity		kW	4.00	5.60	7.00	8.00	11.20	14.00
Air Flow Rate (Hi/Me/Lo)		m^3/min	12/10/8.5	15/13/11	19/16/14	22/19/16	28/24/21	34/29/25
Fan Motor		W	35	35	55	55	35x2	35x2
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	35/32/30	35/32/30	38/34/31	40/36/33	40/36/33	43/40/36
Outer Dimensions	Height	mm	298	298	298	298	298	298
	Width	mm	860	860	860	860	1420	1420
	Depth	mm	620	620	620	620	620	620
Net Weight		kg	27	27	30	30	48	48
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)					
Connections Refrigerant Piping			Flare-nut Connection (With Flare-Nuts)					
Liquid Line		mm (in.)	∅6.35 (1/4)	∅6.35 (1/4)	∅9.53 (3/8)	∅9.53 (3/8)	∅9.53 (3/8)	∅9.53 (3/8)
Gas Line		mm (in.)	∅12.7 (1/2)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)	∅15.88 (5/8)
Condensate Drain		mm	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD
Packing Measurements		m^3	0.23	0.23	0.23	0.23	0.37	0.37
Standard accessories		-	-					
Adaptable Air Panel Model			P-G23DWA1			P-G46DWA1		
Color			Silky White					
Outer Dimensions	Height	mm	30+10	30+10	30+10	30+10	30+10	30+10
	Width	mm	1100	1100	1100	1100	1660	1660
	Depth	mm	710	710	710	710	710	710
Net Weight		kg	6	6	6	6	8	8
Packing Measurements		m^3	0.10	0.10	0.10	0.10	0.15	0.15
Remote Control Switch		-	PC-P1HE					

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151*

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*
   - *1.5 meters beneath the Unit*
   - *Voltage of the power source for the indoor fan motor is 230V.*

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.
3. *Panels P-G23DWA1 and P-G46WA1 are equipped with an automatic swing louver system.*

2.1.3. RPC - CEILING TYPE

MODEL RPC		Units	RPC-2.0 FSNE	RPC-2.5 FSNE	RPC-3.0 FSNE	RPC-4.0 FSNE	RPC-5.0 FSNE	RPC-6.0 FSNE
Nominal Cooling Capacity		kW	5.00	6.30	7.10	10.00	12.50	14.00
Nominal Heating Capacity		kW	5.60	7.00	8.00	11.20	14.00	16.00
Air Flow Rate (Hi/Me/Lo)		m3/min	15/13/10	18/16/12	21/17/15	30/24/19	35/28/21	37/32/27
Fan Motor		W	75	75	75	145	145	145
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	44/42/38	46/43/41	48/45/42	49/45/39	49/46/41	50/48/44
Outer Dimensions	Height	mm	163	163	163	225	225	225
	Width	mm	1094	1314	1 314	1314	1574	1574
	Depth	mm	625	625	625	625	625	625
Net Weight		kg	28	31	31	35	41	41
Color			Spring White (4.1Y 8.5 / 0.7)					
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)					
Connections Refrigerant Piping			Flare-nut Connection (With Flare-Nuts)					
Liquid Line		mm (in.)	Ø6.35 (1/4)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)
Gas Line		mm (in.)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Condensate Drain		mm	∅25 OD	∅25 OD	∅25 OD	∅25 OD	∅25 OD	∅25 OD
Packing Measurements		m3	0.24	0.29	0.29	0.36	0.43	0.43
Remote Control Switch		-	PC-P1HE					

ºOD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151..*

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*

-1 meter beneath the Unit

-1 meter from Discharge grille

-Voltage of the power source for the indoor fan motor is 230V.

The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.

2.1.4. RPI - IN THE_CEILING TYPE

MODEL RPI		Units	RPI-1.5 FSNE	RPI-2.0 FSNE	RPI-2.5 FSNE	RPI-3.0 FSNE	RPI-4.0 FSNE	RPI-5.0 FSNE	RPI-6.0 FSNE
Nominal Cooling Capacity		kW	3.60	5.00	6.30	7.10	10.00	12.50	14.00
Nominal Heating Capacity		kW	4.00	5.60	7.00	8.00	11.20	14.00	16.00
Air Flow Rate (Hi/Me/Lo)	HSP	- m3/min -	–	16/15/11	19/17/14	22/20/16	30/28/25	35/31/28	36/34/29
	STDSP		10/9/7	16/14/12	19/17/15	22/20/17	30/29/26	35/32/29	36/33/31
	LSP		–	16/16/13	19/19/15	22/22/18	30/30/28	35/35/31	36/36/33
Static Pressure (Hi/Me/Lo)	HSP	- mm -	–	12/10/6	12/10/6	12/10/6	12/10/8	12/10/8	12/10/8
	STDSP		5/5/5	8/6/5	8/6/5	8/6/5	8/7/6	8/7/6	8/7/6
	LSP		–	3/3/2	3/3/2	3/3/2	3/3/2	3/3/2	3/3/2
Fan Motor		W	55	80	225	225	350	350	350
Sound Pressure Level (Overall A Scale) /Hi/Me/Lo)	HSP	- dB (A) -	–	40/38/35	41/39/36	42/40/37	44/42/38	47/46/44	48/47/45
	STDSP		38/37/35	39/37/34	40/38/35	40/38/35	42/41/37	45/44/43	46/45/44
	LSP		–	35/35/31	36/36/32	37/37/33	41/41/35	44/44/42	45/45/43
Sound Power Level (Overall A Scale)	HSP	- dB (A) -	57	59	60	61	63	65	66
Outer Dimensions	Height	mm	197	274	274	274	274	274	274
	Width	mm	1020	1074	1074	1074	1464	1464	1464
	Depth	mm	574	643	643	643	643	643	643
Net Weight		kg	33.5	43	45	45	51	52	52
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)						
Connections Refrigerant Piping			Flare-Nut Connection (With Flare Nuts)						
Liquid Line		mm (in.)	Ø6.35 (1/4)	Ø6.35 (1/4)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø 9.53 (3/8)	Ø9.53 (3/8)
Gas Line		mm (in.)	Ø12.7 (1/2)	Ø15.88 (5/8)	PC-P1HE	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Condense Drain		mm	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD	Ø32 OD
Packing Measurements		m³	0.16	0.36	0.36	0.36	0.48	0.48	0.48
Remote Control Switch		-	PC-P1HE						

OD: Outer Diameter
HSP: High Static Pressure Connection
LSP: Low Static Pressure Connection
STDSP: Standard Static Pressure Connection

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*
   - *1.5 meter beneath the Unit (without ceiling under the unit), applying suction duct 1m. and discharge duct 2m.*
   - *Voltage of the power source for the indoor fan motor is 230V.*

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.

RPI - In The_Ceiling Type

MODEL RPI		**Units**	**RPI-8.0FSNE**	**RPI-10.0FSNE**
Nominal Cooling Capacity		kW	20.0	25.00
Nominal Heating Capacity		kW	22.4	28.00
Air Flow Rate (Hi/Me/Lo)		m^3/min	66	75
Fan Motor		W	1250	1250
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	(54/54/51)	(55/55/52)
Outer Dimensions	Height	mm	475	
	Width	mm	1580	
	Depth	mm	600	
Net Weight		kg	85	87
Refrigerant			R410A (Nitrogen Charged in Factory for Corrosion-Resistance)	
Connections Refrigerant Piping		-	Brazed Connection	
Liquid Line		mm (in.)	9.53 (3/8)	9.53 (3/8)
Gas Line		mm (in.)	19.05 (3/4)	22.2 (7/8)
Condensate Drain		-	Ø25 OD	Ø25 OD
Packing Measurements		m^3	0.5	0.5
Standard Accessories		-	Air Filter	
Remote Control Switch		-	PC-P1HE	

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*
   - *1.5 meter beneath the Unit (without ceiling under the unit), applying suction duct 1m. and discharge duct 2m.*
   - *Voltage of the power source for the indoor fan motor is 230V.*

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.

2.1.5. RPK - WALL TYPE

■ RPK FSN(1)M

MODEL RPK		Units	RPK-1.5 FSN1M	RPK-1.5 FSNM	RPK2.0 FSNM	RPK-2.5 FSNM	RPK3.0 FSNM	RPK4.0 FSNM
Nominal Cooling Capacity		kW	3.60	3.60	5.00	6.30	7.10	10.00
Nominal Heating Capacity		kW	4.00	4.00	5.60	7.00	8.00	11.20
Air Flow Rate (Hi/Me/Lo)		m³/min	11/10/9	13/11/9	14/12/10	22/18/15	22/18/15	26/24/20
Fan Motor		W	20	20	20	40	40	41
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)		dB (A)	40-38-36	39/37/34	40/38/36	43/40/37	43/40/37	49/46/43
Outer Dimensions	Height	mm	280	295	295	360	360	360
	Width	mm	780	1.030	1.030	1.390	1.390	1390
	Depth	mm	210	183	183	225	225	225
Net Weight		kg	10	12	12	21	21	22
Color		-	Pearl White					
Refrigerant		-	R410A (Nitrogen Charged in Factory for Corrosion-Resistance)					
Connections		-	Flare Nuts Connection (with Flare Nuts)					
Refrigerant Piping	Liquid Line	mm(in)	Ø 6.35 (1/4)	Ø6.35 (1/4)	Ø6.35 (1/4)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)
	Gas Line	mm(in)	Ø 12.7 (1/2)	Ø12.7 (1/2)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Condensate Drain			Ø 26 OD	Ø 26 OD	Ø26 OD	Ø26 OD	Ø26 OD	Ø26 OD
Packing Measurement		m³	0.07	0.07	0.11	0.20	0.20	0.20
Standard Accessories		-	Mounting Brackets					
Remote Control Switch		-	PC-P1HE or PC-LH3A					

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*

   -1 meter beneath the Unit.

   -1 meter from discharge grille.

   -Voltage of the power source for the indoor fan motor is 230V.

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.

2.1.6. RPF & RPFI - FLOOR & FLOOR CONCEALED TYPE

MODELS RPF & RPFI		Units	RPF-1.5FSNE	RPF-2.0FSNE	RPF-2.5FSNE	RPFI-1.5FSNE	RPFI-2.0FSNE	RPFI-2.5FSNE
Nominal Cooling Capacity		kW	3.60	5.00	6.30	3.60	5.00	6.30
Nominal Heating Capacity		kW	4.00	5.60	7.00	4.00	5.60	7.00
Air Flow Rate (Hi/Me/Lo)		m^3/min	12/10/9	16/14/11	16/14/11	12/10/9	16/14/11	16/14/11
Fan Motor		W	28	45	45	28	45	45
Sound Pressure Level (Overalll A Scale) (Hi/Me/Lo)		db (A)	38/35/31	39/36/32	42/38/34	38/35/31	39/36/32	42/38/34
Outer dimensions	Height	mm	630	630	630	620	620	620
	Width	mm	1170	1420	1420	988	1238	1238
	Depth	mm	220	220	220	220	220	220
Net Weight		kg	23	33	34	23	27	28
Color		-	Spring White (4.1Y 8.5 / 0.7)			---		
Refrigerant		-	R410A (Nitrogen Charged in Factory for Corrosion-Resistance)					
Connections			Flare Nuts Connection (with Flare Nuts)					
Refrigerant Piping	Liquid Line	mm (in)	Ø6.35 (1/4)	Ø6.35 (1/4)	Ø9.53 (3/8)	Ø6.35 (1/4)	Ø6.35 (1/4)	Ø9.53 (3/8)
	Gas Line	mm (in)	Ø12.7 (1/2)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø12.7 (1/2)	Ø15.88 (5/8)	Ø15.88 (5/8)
Condensate Drain		mm	Ø18.5 OD	Ø18.5 OD	Ø18.5 OD	Ø18.5 OD	Ø18.5 OD	Ø18.5 OD
Packing Measurements		m^3	0.24	0.29	0.29	0.23	0.25	0.25
Remote Control Switch		-	PC-P1HE					

OD: Outer Diameter

NOTE:

1. *The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.*

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. *The Sound Pressure Level is based on the following conditions:*

   -1 meter from the unit.

   -1 meter from floor level.

   -Voltage of the power source for the indoor fan motor is 230V.

   The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration when installing the unit.

2.2. GENERAL DATA FOR OUTDOOR UNITS

2.2.1. RAS - OUTDOOR UNITS HVRNE

MODEL RAS			RAS-2HVRNE	RAS-2.5HVRNE	RAS-3HVRNE	RAS-4HVRNE	RAS-5HVRNE
Power Supply			**AC 1ϕ, 220-240V, 50Hz**				
Nominal Cooling Capacity (Max/Nom/Min)		kW	5.6/**5.0**/2.0	7.1/**6.3**/2.7	8.00/**7.10**/3.90	11.20/**10.00**/4.90	14.00/**12.50**/6.70
Nominal Heating Capacity (Max/Nom/Min)		kW	7.1/**5.6**/2.1	8.0/**7.0**/3.1	10.00/**8.00**/4.00	14.00/**11.20**/5.70	18.00/**14.00**/7.00
Cabinet Color (MunsellCode)		-	Natural Grey (1.0Y8.570.5)				
Sound Pressure Level (Night Shift)		dB (A)	41/(38)	42/(38)	43/(39)	45/(41)	47/(43)
Outer Dimensions	Height	mm	800	800	800	1240	1240
	Width	mm	850	850	850	950	950
	Depth	mm	315	315	315	315	315
Net Weight		kg	57	60	60	95	97
Refrigerant		-	R410A				
Flow Control		-	Micro-Computer Control Expansion Valve				
Compressor			Hermetic (Rotary)	Hermetic (Rotary)	Hermetic (Rotary)	Hermetic (Scroll)	Hermetic (Scroll)
Model		-	2YC32GXD	2YC45BXD	2YC45BXD	E305AHD	E405AHD
Quantity		-	1	1	1	1	1
Motor Output (Pole)		kW	0.98 (4)	1.38 (4)	1.38 (4)	2.2 (4)	3.0 (4)
Heat Exchanger			Multi-Pass Cross-Finned Tube				
Condenser Fan		-	Propeller Fan				
Quantity		-	1	1	1	2	2
Air Flow Rate		m³/min	35	42	45	80	90
Motor Output (Pole)		W	50(8)	50(8)	50(8)	30(8)+50(8)	50(8)+70(8)
Connections			Flare-Nut Connection (Factory supplied)				
Refrigerant Piping	Liquid Line	mm (in.)	Ø6.35 (1/4)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)
	Gas Line	mm (in.)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Refrigerant Charge		kg	1.9	2.5	2.4	3.6	3.6
Wiring Holes	Power Supply	mm	Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5
	Control Circuit	mm	Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5
Connecting Wire between Indoor and Outdoor Unit		-	2	2	2	2	2
Packing Measurement		m³	0.34	0.34	0.34	0.55	0.55

OD: Outer Diameter

NOTE:

1. The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. The Sound Pressure Level is based on following conditions:

- *1 meter from the unit front surface.*
- *1.5 meter from floor level*
- *Voltage of the power source 400V*
- *The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration in the field.*

2.2.2. RAS - OUTDOOR UNITS HRNE

MODEL RAS			RAS-4HRNE	RAS-5HRNE	RAS-6HRNE	RAS-8HRNE	RAS-10HRNE	RAS-12HRNE
Power Supply			**AC 3ϕ, 380-415V, 50Hz**					
Nominal Cooling Capacity (Max/Nom/Min)		kW	4.9/**10.0**/11.2	6.7/**12.5**/14.0	6.9/**14.0**/16.0	22.4/**20.0**/9.0	28.0/**25.0**/11/2	33.5/**30.0**/13.5
Nominal Heating Capacity (Max/Nom/Min)		kW	5.7/**11.2**/14.0	7.0/**14.0**/18.0	8.1/**16.0**/19.4	28.0/**22.4**/8.3	35.0/**28.0**/10.5	37.5/**33.5**/12.6
Cabinet Color (MunsellCode)		-	Natural Gray (1.0Y8.5/0.5)					
Sound Pressure Level (Night Shif)t		dB (A)	45/(41)	47/(43)	48/(44)	56/(51)	58/(53)	62/(57)
Outer Dimensions	Height	mm	1240	1240	1240	1745	1745	1745
	Width	mm	950	950	950	950	950	950
	Depth	mm	315	315	315	750	750	750
Net Weight		kg	100	102	102	260	270	270
Refrigerant		-	R410A					
Flow Control		-	Micro-Computer Controlled Expansion Valve					
Compressor		-	Hermetic (Scroll)					
Model		-	E305AHD-27D4	E405HD-36D4	E405HD-36D4	E405AHD-36D2 E505DH-49D2Y	E405AHD-36D2 E605DH-59D2Y	E405AHD-36D2 E655DH-65D2Y
Quantity		-	1	1	1	1+1	1+1	1+1
Motor Output (Pole)		kW	2.2(4)	3.0(4)	3.0(4)	1.8(4)+3.7(2)	2.3(4)+4.4(2)	3.7(4)+4.4(2)
Heat Exchanger			Multi-Pass Cross-Finned Tube					
Condenser Fan		-	Propeller Fan					
Quantity		-	1	1	1	1	1	1
Air Flow Rate		m³/min	80	90	100	138	172	185
Motor Output (Pole)		W	30(8)+50(8)	50(8)+70(8)	50(8)+70(8)	380(8)	380(8)	380(8)
Connections			Flare-Nut and/or Flange Connection (Factory supplied)					
Refrigerant Piping	Liquid Line	mm (in.)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø12.7 (1/2)	Ø12.70 (1/2)
	Gas Line	mm (in.)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø25.4 (1)	Ø25.4 (1)	Ø25.4 (1)
Refrigerant Charge		kg	3.6	3.6	3.6	10.1	11.5	12.0
Wiring Holes	Power Supply	mm	Ø26.5	Ø26.5	Ø26.5	Ø56	Ø56	Ø56
	Control Circuit	mm	Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5
Connecting Wire between Indoor and Outdoor Unit		-	2	2	2	2	2	2
Packing Measurement		m³	0.55	0.55	0.55	1.44	1.44	1.44

OD: Outer Diameter

NOTE:

1. The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. The Sound Pressure Level is based on following conditions:

- *1 meter from the unit front surface.*
- *1.5 meter from floor level*
- *Voltage of the power source 400V*
- *The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration in the field.*

2.2.3. RAS - OUTDOOR UNITS HNVE

MODEL RAS			RAS-2.5HNVE	RAS-3HNVE	RAS-4HNVE
Power Supply			**AC 3ϕ, 380-415V, 50Hz**		
Nominal Cooling Capacity		kW	6.30	7.10	10.00
Nominal Heating Capacity		kW	7.00	8.00	11.20
Cabinet Color (MunsellCode)		-	Natural Gray (1.0Y8.5/0.5)		
Sound Pressure Level (Night Shif)t		dB (A)	47/(46)	47/(46)	47/(46)
Outer Dimensions	Height	mm	800	800	1240
	Width	mm	850	850	950
	Depth	mm	315	315	315
Net Weight		kg	66	69	90
Refrigerant		-	R410A		
Flow Control		-	Micro-Computer Controlled Expansion Valve		
Compressor		-	Hermetic (Rotary)		Hermetic (Scroll)
Model		-	5JS290	5JS330	ZP41K3E
Quantity		-	1	1	1
Motor Output (Pole)		kW	1.9 (2)	2.2 (2)	3.0 (2)
Heat Exchanger			Multi-Pass Cross-Finned Tube		
Condenser Fan		-	Propeller Fan		
Quantity		-	1	1	2
Air Flow Rate		m³/min	40	46	70
Motor Output (Pole)		W	70	70	70x2
Connections			Flare-Nut Connection (Factory supplied)		
Refrigerant Piping	Liquid Line	mm (in.)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)
	Gas Line	mm (in.)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Refrigerant Charge		kg	2.3	2.5	3.6
Wiring Holes	Power Supply	mm	Ø26.5	Ø26.5	Ø26.5
	Control Circuit	mm	Ø26.5	Ø26.5	Ø26.5
Connecting Wire between Indoor and Outdoor Unit		-	2	2	2
Packing Measurement		m³	0.34	0.34	0.55

OD: Outer Diameter

NOTE:

1. The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.

Operation Conditions		*Cooling*	*Heating*
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. The Sound Pressure Level is based on following conditions:

- *1 meter from the unit front surface.*
- *1.5 meter from floor level*
- *Voltage of the power source 400V*
- *The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration in the field.*

RAS - Outdoor Units HNE

MODEL RAS			**RAS-2.5HNE**	**RAS-3HNE**	**RAS-4HNE**	**RAS-5HNE**
Power Supply			**AC 3ϕ, 380-415V, 50Hz**			
Nominal Cooling Capacity		kW	6.30	7.10	10.0	12.5
Nominal Heating Capacity		kW	7.00	8.00	11.2	14.0
Cabinet Color (MunsellCode)		-	Natural Grey (1.0Y8.5/0.5)			
Sound Pressure Level (Night Shif)t		dB (A)	47/(46)	47/(46)	47/(46)	47/(46)
Outer Dimensions	Height	mm	800	800	1240	1240
	Width	mm	850	850	950	950
	Depth	mm	315	315	315	315
Net Weight		kg	66	69	90	102
Refrigerant		-	R410A			
Flow Control		-	Micro-Computer Controlled Expansion Valve			
Compressor		-	Hermetic (Rotary)		Hermetic (Scroll)	
Model		-	5JS290	5JS330	ZP41K3E	ZP57K3E
Quantity		-	1	1	1	1
Motor Output (Pole)		kW	1.9 (2)	2.2 (2)	3.0 (2)	3.75 (2)
Heat Exchanger			Multi-Pass Cross-Finned Tube			
Condenser Fan		-	Propeller Fan			
Quantity		-	1	1	2	2
Air Flow Rate		m³/min	40	46	70	103
Motor Output (Pole)		W	70	70	70x2	70x2
Connections			Flare-Nut Connection (with Flare Nuts)			
Refrigerant Piping	Liquid Line	mm (in.)	9.53 (3/8)	9.53 (3/8)	9.53 (3/8)	9.53 (3/8)
	Gas Line	mm (in.)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
Refrigerant Charge		kg	2.3	2.5	3.6	3.6
Wiring Holes	Power Supply	mm	Ø26.5	Ø26.5	Ø26.5	Ø26.5
	Control Circuit	mm	Ø26.5	Ø26.5	Ø26.5	Ø26.5
Connecting Wire between Indoor and Outdoor Unit		-	2	2	2	2
Packing Measurement		m³	0.34	0.34	0.55	0.55

OD: Outer Diameter

NOTE:

1. The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO 5151.

Operation Conditions		***Cooling***	***Heating***
Indoor Air Inlet Temperature	***DB***	*27.0 °C*	*20.0 °C*
	WB	*19.0 °C*	
Outdoor Air Inlet Temperature	***DB***	*35.0 °C*	*7.0 °C*
	WB		*6.0 °C*

***Piping Length**: 7.5 meters; **Piping Lift**: 0 meter*
***DB**: Dry Bulb; **WB**: Wet Bulb*

2. The Sound Pressure Level is based on following conditions:

- *1 meter from the unit front surface.*
- *1.5 meter from floor level*
- *Voltage of the power source 400V*
- *The above data was measured in an anaechoic chamber so that reflected sound should be taken into consideration in the field.*

2.3. COMPONENT DATA

The components data indicated are the following:

- Indoor Unit: Heat Exchanger and Fan unit:
- Outdoor Unit: Heat Exchanger, Fan unit and Compressor

2.3.1. RCI - 4-WAY CASSETTE TYPE

Model RCI				RCIM-1.5 FSN	RCIM-2.0 FSN	RCI-1.5 FSN1E	RCI-2.0 FSN1E	RCI-2.5 FSN1E	RCI-3.0 FSN1E	RCI-4.0 FSN1E	RCI-5.0 FSN1E	RCI-6.0 FSN1E
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube								
	Tube	Material	-	Copper Tube								
		Outer Diameter	Ø mm	7	7	7	7	7	7	7	7	7
		Rows	-	2	2	1	2	2	2	3	3	3
		Number of Tube/Coil	-	14	14	8	16	16	20	30	30	30
	Fin	Material	-	Aluminium								
		Pitch	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m^2	0.19	0.19	0.38	0.38	0.38	0.47	0.47	0.47	0.47
	Number of Coil/Unit		-	1	1	1	1	1	1	1	1	1
Fan Unit	Fan	Type		Multi-Blade Turbo Fan								
		Number/unit	-	1	1	1	1	1	1	1	1	1
		Outer Diameter	mm	2.98	2.98	490	490	490	490	490	490	490
		Nominal Air Flow (Hi/Me/Lo)	m^3/ min	15/13.5/12	16/14/12	15/14/12	16/14/12	20/17/15	26/23/20	32/28/24	34/29/25	37/32/27
	Fan Motor	Type	-	Drip-Proof Type Enclosure								
		Starting Method	-	DC Control								
		Nominal Output	W	52	52	56	56	56	56	108	108	108
		Quantity	-	1	1	1	1	1	1	1	1	1
		Insulation Class	-	E	E	E	E	E	E	E	E	E

2.3.2. RCD - 2-WAY CASSETTE TYPE

Model RCD				RCD-1.5FSN	RCD-2.0FSN	RCD-2.5FSN	RCD-3.0FSN	RCD-4.0FSN	RCD-5.0FSN
Heat Exchanger	Heat Exchanger Type			Multi-Pass Cross Finned Tube					
	Tube	Material		Copper Tube					
		Outer Diameter	Ø mm	7	7	7	7	7	7
		Rows		1	2	2	2	2	2
	Fin	Material		Aluminium					
		Pitch	mm	1.6	1.6	1.6	1.6	1.6	1.6
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m^2	0.36	0.36	0.36	0.36	0.63	0.63
	Number of Coil/Unit		-	1	1	1	1	1	1
Fan Unit	Fan	Type	-	Multi-Blade Turbo Fan					
		Number/unit	-	1	1	1	1	2	2
		Outer Diameter	mm	360	360	360	360	360	360
		Nominal Air Flow (Hi/Me/Lo)	m^3/min	12/10/8.5	15/13/11	19/16/4	22/19/16	30/26/23	32/29/25
	Fan Motor	Type	-	Drip-Proof Type Enclosure					
		Starting method	-	DC Control					
		Nominal Output	W	35	35	55	55	35x2	35x2
		Quantity	-	1	1	1	1	2	2
		Insulation Class	-	E	E	E	E	E	E

2.3.3. RPC - CEILING TYPE

Model RPC				RPC-2.0FSNE	RPC-2.5FSNE	RPC-3.0FSNE	RPC-4.0FSNE	RPC-5.0FSNE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube				
	Tube	Material	-	Copper Tube				
		Outer Diameter	Ø mm	9.53	9.53	9.53	9.53	9.53
		Rows	-	3	3	3	3	
		Number of Tube/Coil	-	20	20	20	32	32
	Fin	Material	-	Aluminium				
		Pitch	mm	2	2	2	2	
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m²	0.137	0.12	0.176	0.277	0.347
	Number of Coil/Unit		-	1	1	1	1	
Fan Unit	Fan	Type	-	Multi-Blade Centrifugal Fan				
		Number/unit	-	3	3	4	3	4
		Outer Diameter	Ø mm	101	101	101	136	136
		Nominal Air Flow (Hi/Me/Lo)	m^3/min	15/13/10	18/16/12	21/17/15	30/24/19	35/28/21
	Fan Motor	Type	-	Drip-Proof Type Enclosure				
		Starting method	-	Permanent Split Capacitor				
		Nominal Output	W	75	75	75	145	145
		Quantity	-	1	1	1	1	1
		Insulation Class	-	B	B	B	B	B

2.3.4. RPI - IN-THE-CEILING TYPE

Model RPI					RPI-1.5 FSNE	RPI-2.0 FSNE	RPI-2.5 FSNE	RPI-3.0 FSNE	RPI-4.0 FSNE	RPI-5.0 FSNE	RPI-6.0 FSNE	RPI-8.0 FSNE	RPI-10.0 FSNE
Heat Exchanger	Heat Exchanger Type			-	Multi-Pass Cross Finned Tube								
	Tube	Material		-	Copper Tube								
		Outer Diameter		Ø mm	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53
		Rows		-	3	2	3	3	3	3	3	3	4
		Number of Tube/Coil		-	20	20	30	30	30	30	30	20	20
	Fin	Material		-	Aluminium								
		Pitch		mm	2	2	2	2	2	2	2	12	12
	Maximum Operating Pressure			MPa	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area			m²	0.12	0.21	0.21	0.21	0.21	0.21	0.21	0.6	0.6
	Number of Coil/Unit			-	1	1	1	1	1	1	1	1	1
Fan Unit	Fan	Type		-	Multi-Blade Centrifugal Fan								
		Number/unit		-	2	2	2	2	2	2	2	2	2
		Outer Diameter		Ø mm	136	180	180	180	180	180	180	240	240
		Nominal Air Flow (Hi/Me/Lo)	HSP	m^3/min	–	16/15/11	19/17/14	22/20/16	30/28/25	35/31/28	36/34/29	66/63/54	75/72/60
			STD SP	m^3/min	10/9/7	16/14/12	19/17/15	22/20/17	30/29/26	35/32/29	36/33/31	65/63/55	75/68/61
			LSP	m^3/min	–	16/16/13	19/19/15	22/22/18	30/30/28	35/35/31	36/36/33	66/65/56	74/74/63
	Fan Motor	Type		-	Drip-Proof Type Enclosure								
		Starting method		-	Permanent Split Capacitor								
		Nominal Output		W	55	80	225	225	350	350	350	1250	1250
		Quantity			1	1	1	1	1	1	1	1	1
		Insulation Class			B	B	B	B	B	B	B	F	F

HSP: High Static Pressure Connection
LSP: Low Static Pressure Connection
STDSP: Standard Static Pressure Connection

2.3.5. RPK - WALL TYPE

Model RPK				RPK-1.5 FSN1M	RPK-1.5 FSNM	RPK-2.0 FSNM	RPK-2.5 FSNM	RPK-3.0 FSNM	RPK-3.5 FSNM	RPK-4.0 FSNM
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube						
	Tube	Material	-	Copper Tube						
		Outer Diameter	Ø mm	7	7	7	7	7	7	7
		Rows	-	2	2	2	2	2	2	2
	Fin	Material	-	Aluminium						
		Pitch	mm	1.3	1.2	1.2	1.4	1.4	1.4	1.4
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m²	0.2	0.26	0.26	0.35	0.35	0.35	0.35
	Number of Coil/Unit		-	1	1	1	1	1	1	1
Fan Unit	Fan	Type	-	Tangential Fan						
		Number/unit	-	1	1	1	1	1	1	1
		Outer Diameter	Ø mm	100	100	100	130	130	130	130
		Nominal Air Flow (Hi/Mme/Lo)	m^3/min	11/10/9	13/11/9	14/12/10	22/18/15	22/18/15	26/24/20	26/24/20
	Fan Motor	Type	-	Drip-Proof Type Enclosure						
		Starting method	-	DC-Control						
		Nominal Output	W	20	20	20	40	40	41	41
		Quantity	-	1	1	1	1	1	1	1
		Insulation Class	-	E	E	E	E	E	E	E

2.3.6. RPF - FLOOR TYPE AND RPFI – FLOOR CONCEALED TYPE

Model RPF and RPFI				RPF-1.5 FSNE	RPF-2.0 FSNE	RPF-2.5 FSNE	RPFI-1.5 FSNE	RPFI-2.0 FSNE	RPFI-2.5 FSNE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube					
	Tube	Material	-	Copper Tube					
		Outer Diameter	Ø mm	9.53	9.53	9.53	9.53	9.53	9.53
		Rows	-	2	2	3	2	2	3
		Number of Tube/Coil	-	18	18	24	18	18	24
	Fin	Material	-	Aluminium					
		Pitch	mm	2	2	2	2	2	2
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m²	0.15	0.21	0.21	0.15	0.21	0.21
	Number of Coil/Unit		-	1	1	1	1	1	1
Fan Unit	Fan	Type	-	Multi-Blade Centrifugal Fan					
		Number/unit	-	2	2	2	2	2	2
		Outer Diameter	Ø mm	136	136	136	136	136	136
		Nominal Air Flow (Hi/Me/Lo)	m^3/min	12/10/9	16/14/11	16/14/11	12/10/9	16/14/11	16/14/11
	Fan Motor	Type	-	Drip-Proof Type Enclosure					
		Starting method	-	Permanent Split Capacitor					
		Nominal Output	W	28	45	45	28	45	45
		Quantity	-	1	1	1	1	1	1
		Insulation Class	-	E	B	B	E	B	B

2.3.7. RAS - OUTDOOR TYPE

Model RAS				RAS-2HVRNE	RAS-2.5HVRNE	RAS-3HVRNE	RAS-4HVRNE	RAS-5HVRNE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube				
	Tube	Material	-	Copper Tube				
		Outer Diameter	Ø mm	7	7	7	7	7
		Rows	-	2	2	2	2	2
		Number of Tube/Coil	-	76	76	76	116	116
	Fin	Material	-	Aluminium				
		Pitch	mm	1.9	1.9	1.9	1.9	1.9
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m²	0.49	0.64	0.64	1.00	1.00
	Number of Coil / Unit		-	1	1	1	1	1
Fan Unit	Fan	Type	-	Multi-Blade Centrifugal Fan				
		Number/Unit	-	1	1	1	2	2
		Outer Diameter	mm	465	465	465	465	465
		Revolution	rpm	539	636	678	601/665	689/725
		Nominal Air Flow/Fan	m^3/min	35	42	45	80	90
	Fan Motor	Type	-	Drip-Proof Type Enclosure				
		Starting Method	-	Permanent Split Capacitor				
		Nominal Output	W	50	50	50	30+50	50+70
		Quantity	-	1	1	1	2	2
		Insulation Class	-	E	E	E	E	E

Model RAS				RAS-4HRNE	RAS-5HRNE	RAS-6HRNE	RAS-8HRNE	RAS-10HRNE	RAS-12HRNE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube					
	Tube	Material	-	Copper Tube					
		Outer Diameter	Ø mm	7	7	7	9.53	9.53	9.53
		Rows	-	2	2	2	2	2	2
		Number of Tube/Coil	-	116	116	116	112	112	112
	Fin	Material	-	Aluminium					
		Pitch	mm	1.9	1.9	1.9	2	2	2
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15	4.15	4.15
	Total Face Area		m²	1.00	1.00	1.00	1.65	2.03	2.03
	Number of Coil / Unit		-	1	1	1	1	1	1
Fan Unit	Fan	Type	-	Multi-Blade Centrifugal Fan					
		Number/Unit	-	2	2	2	1	1	1
		Outer Diameter	mm	465	465	465	644	644	644
		Revolution	rpm	601/665	689/725	721/787	690	750	950
		Nominal Air Flow/Fan	m^3/min	80	90	100	138	172	185
	Fan Motor	Type	-	Drip-Proof Type Enclosure					
		Starting Method	-	Permanent Split Capacitor					
		Nominal Output	W	30+50	50+70	50+70	380	380	380
		Quantity	-	2	2	2	1	1	1
		Insulation Class	-	E	E	E	E	E	E

Model RAS				RAS-2.5HNVE	RAS-3HNVE	RAS-4HNVE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube		
	Tube	Material	-	Copper Tube		
		Outer Diameter	Ø mm	7	7	7
		Rows	-	2	2	2
		Number of Tube/Coil	-	76	76	116
	Fin	Material	-	Aluminium		
		Pitch	mm	1.9	1.9	1.9
	Maximum Operating Pressure		MPa	4.15	4.15	4.15
	Total Face Area		m^2	0.64	0.64	1.0
	Number of Coil / Unit		-	1	1	1
Fan Unit	Fan	Type	-	Direct Drive Propeller Fan		
		Number/Unit	-	1	1	2
		Outer Diameter	mm	465	465	465
		Revolution	rpm	625	666	575/870
		Nominal Air Flow/Fan	m^3/min	40	43	75
	Fan Motor	Type	-	Drip-Proof Type Enclosure		
		Starting Method	-	Permanent Split Capacitor		
		Nominal Output	W	70	70	70
		Quantity	-	1	1	2
		Insulation Class	-	B	B	B

Model RAS				RAS-2.5HNE	RAS-3HNE	RAS-4HNE	RAS-5HNE
Heat Exchanger	Heat Exchanger Type		-	Multi-Pass Cross Finned Tube			
	Tube	Material	-	Copper Tube			
		Outer Diameter	Ø mm	7	7	7	7
		Rows	-	2	2	2	2
		Number of Tube/Coil	-	76	76	116	116
	Fin	Material	-	Aluminium			
		Pitch	mm	1.9	1.9	1.9	1.9
	Maximum Operating Pressure		MPa	4.15	4.15	4.15	4.15
	Total Face Area		m^2	0.64	0.64	1.0	1.0
	Number of Coil / Unit		-	1	1	1	1
Fan Unit	Fan	Type	-	Direct Drive Propeller Fan			
		Number/Unit	-	1	1	2	2
		Outer Diameter	mm	465	465	465	465
		Revolution	rpm	625	666	887/307	887/486
		Nominal Air Flow/Fan	m^3/min	40	43	75	85
	Fan Motor	Type	-	Drip-Proof Type Enclosure			
		Starting Method	-	Permanent Split Capacitor			
		Nominal Output	W	70	70	70	70
		Quantity	-	1	1	2	2
		Insulation Class	-	B	B	B	B

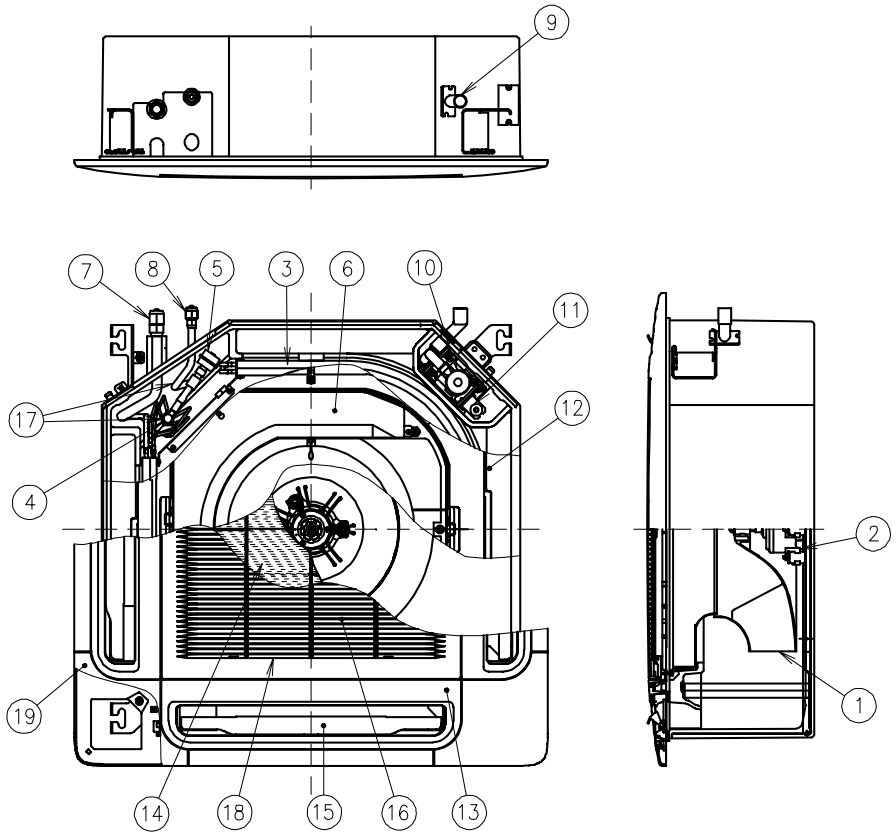
2.3.8. COMPRESSOR DATA

Compressor Model	Compressor Type	Air Tight Pressure		Motor Type			Oil Type
		Discharge (MPa)	Suction (MPa)	Starting Method	Poles	Insulation Class	
E305AHD-27D4	Hermetic Scroll	4.15	2.21	Inverter-Driven	4	E	FVC68D
E305AHD-36D4				Inverter-Driven	4		
E405AHD-36D2				Inverter-Driven	4		
E505DH-49D2Y				Direct-on-Line	2		
E655DH-65D2Y				Direct-on-Line	2		
2YC326XD	Hermetic Rotary			Inverter-Driven	4		FVC50K
2YC45BXD				Inverter-Driven	4		
5JS290				Direct-on-Line	2		FV50S
5JS330				Direct-on-Line	2		
ZP41K3E	Hermetic Scroll			Direct-on-Line	2		3MAW
ZP57K3E				Direct-on-Line	2		

2.4. NAME OF PARTS

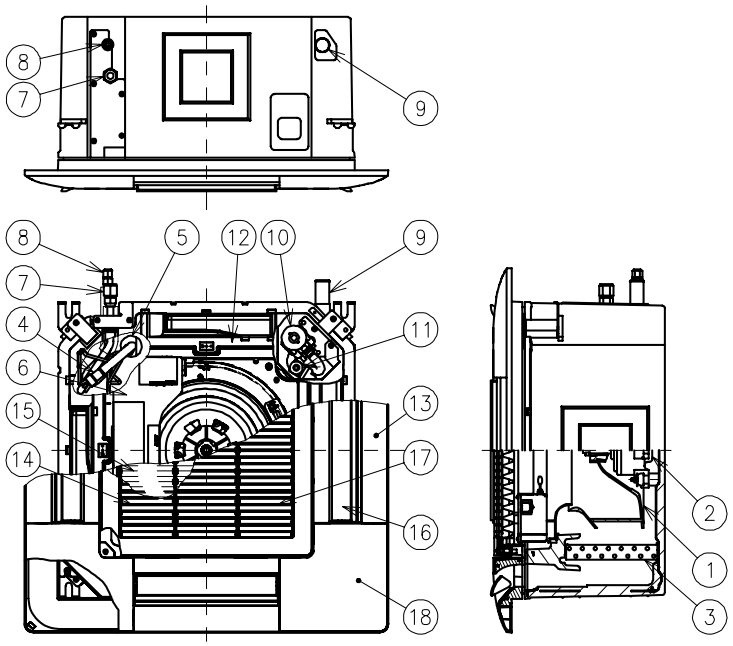
2.4.1. INDOOR UNITS

RCI – FSN1E (1.5 ~ 6.0 HP)



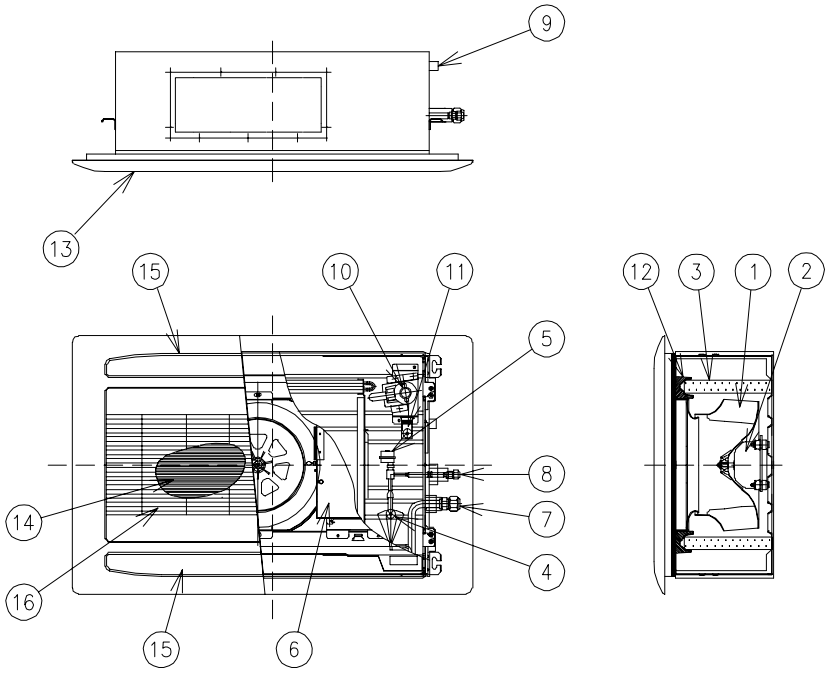
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electric Control Box
7	Gas Refrigerant Connection
8	Liquid Refrigerant Connection
9	Drain Pipe Connection
10	Motor for Drain Discharge Mechanism
11	Float Switch
12	Drain Pan
13	Panel
14	Air Filter
15	Air Outlet
16	Air Inlet
17	Strainer
18	Air Inlet Grille
19	Cover for Corner Pocket

RCIM– FSN (1.5 ~ 2.0 HP)



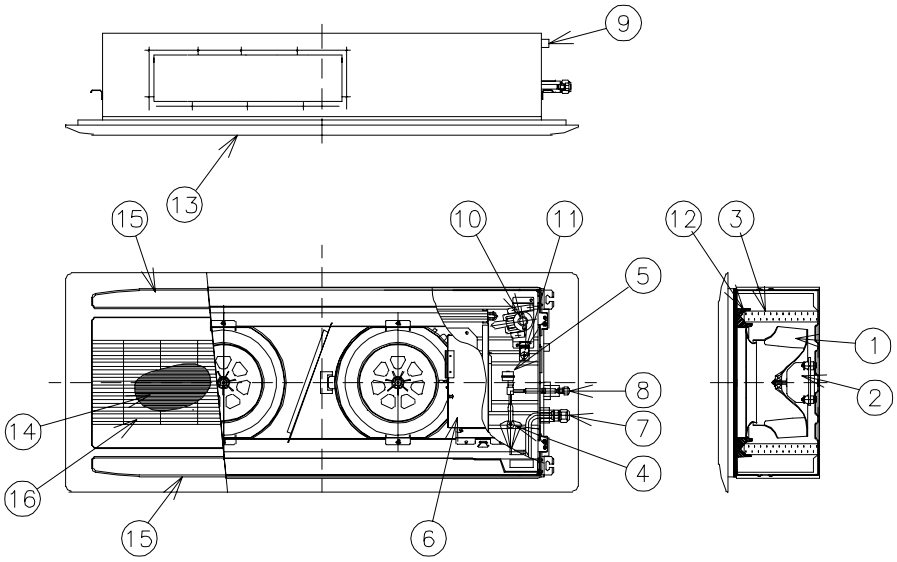
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electric Control Box
7	Gas Refrigerant Connection
8	Liquid Refrigerant Connection
9	Drain Pipe Connection
10	Motor for Drain Discharge Mechanism
11	Float Switch
12	Drain Pan
13	Panel P-N23WAM
14	Air Inlet Grille
15	Air Filter
16	Air Outlet
17	Air Inlet
18	Cover for Corner Pocket

RCD – FSN (1.5 ~ 3.0 HP)



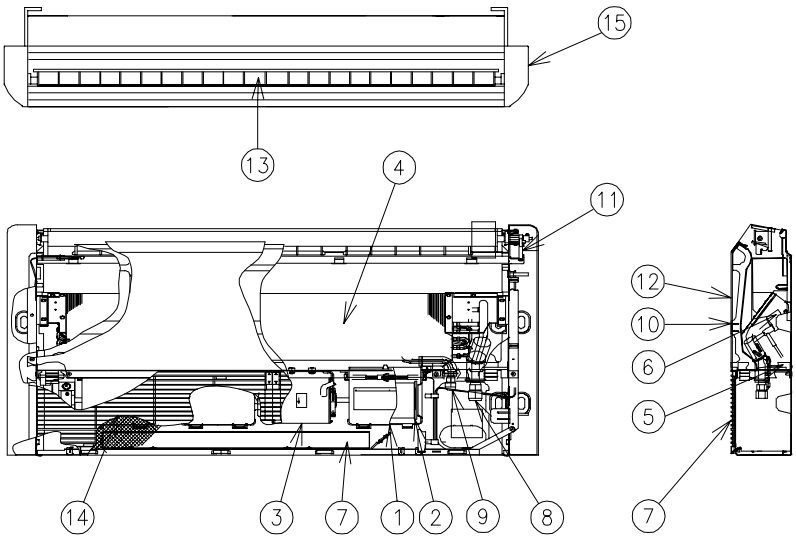
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electrical Control Box
7	Refrigerant Gas Pipe Connection
8	Refrigerant Liquid Pipe Connection
9	Drain Pipe Connection
10	Motor for Drain Discharge Mechanism
11	Float Switch
12	Drain Pan
13	Panel
14	Air Filter
15	Air Outlet
16	Air Inlet

RCD – FSN (4.0/5.0 HP)



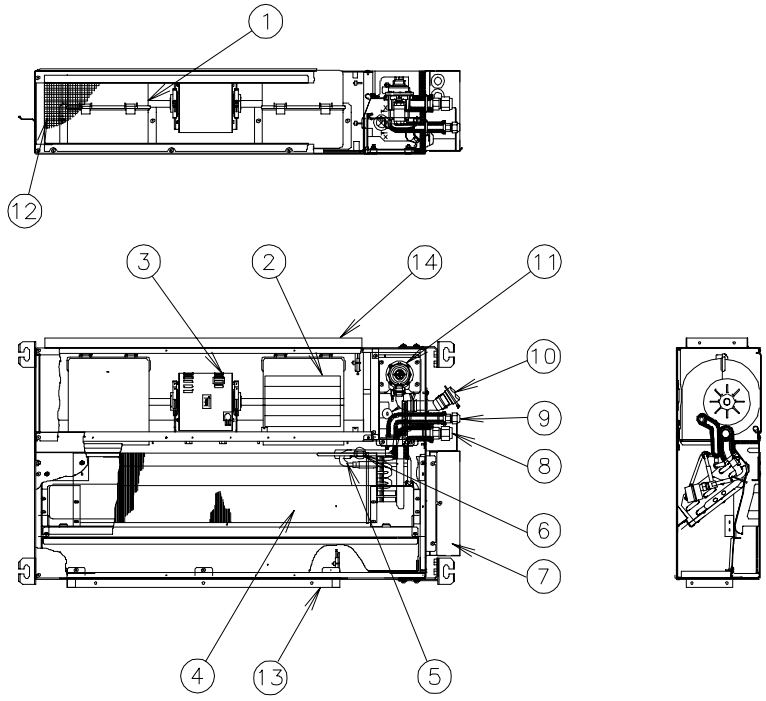
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electrical Control Box
7	Refrigerant Gas Pipe Connection
8	Refrigerant Liquid Pipe Connection
9	Drain Pipe Connection
10	Motor for Drain Discharge Mechanism
11	Float Switch
12	Drain Pan
13	Panel
14	Air Filter
15	Air Outlet
16	Air Inlet

RPC – FSNE (2.0 ~ 6.0 HP)



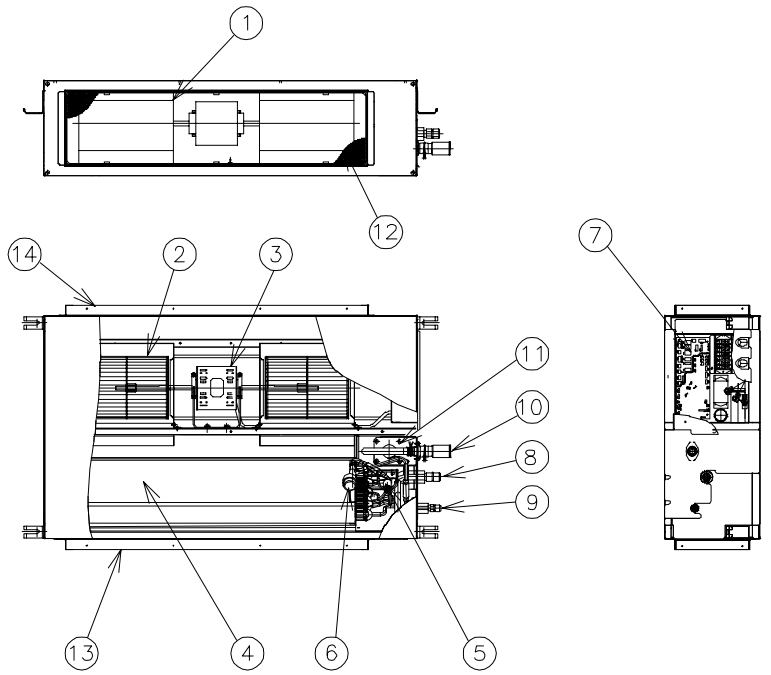
No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Distributor
6	Expansion Valve
7	Electrical Control Box
8	Refrigerant Gas Pipe Connection
9	Refrigerant Liquid Pipe Connection
10	Drain Pipe Connection
11	Motor for Auto-Swing Louver
12	Drain Pan
13	Air Outlet
14	Air Filter
15	Side Cover
16	Air Inlet

RPI – FSNE (1.5 HP)



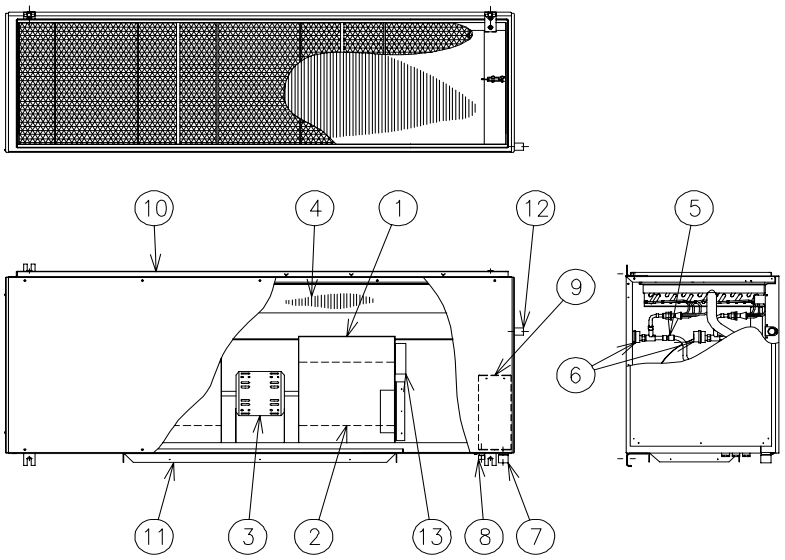
No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Distributor
6	Expansion Valve
7	Electrical Control Box
8	Refrigerant Gas Pipe Connection
9	Refrigerant Liquid Pipe Connection
10	Drain Pipe Connection
11	Drain Up Mechanism
12	Air Filter
13	Air Outlet
14	Air Inlet

RPI – FSNE (2.0 ~ 6.0 HP)



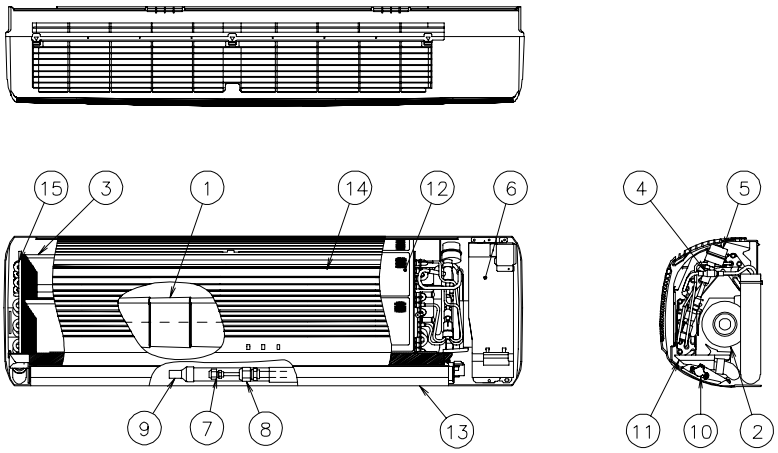
No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Distributor
6	Expansion Valve
7	Electrical Control Box
8	Refrigerant Gas Pipe Connection
9	Refrigerant Liquid Pipe Connection
10	Drain Pipe Connection
11	Drain Up Mechanism
12	Air Filter
13	Air Outlet
14	Air Inlet

RPI – FSNE (8.0/10.0 HP)



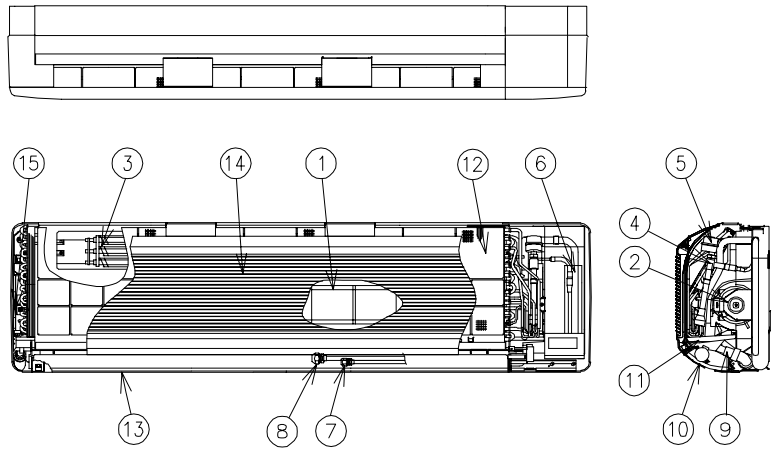
No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Strainer
6	Expansion Valve
7	Refrigerant Gas Pipe Connection
8	Refrigerant Liquid Pipe Connection
9	Electrical Control Box
10	Air Inlet
11	Air Outlet
12	Drain Pipe Connection
13	Capacitor

RPK - FSNM (1.5 / 2.0 HP)



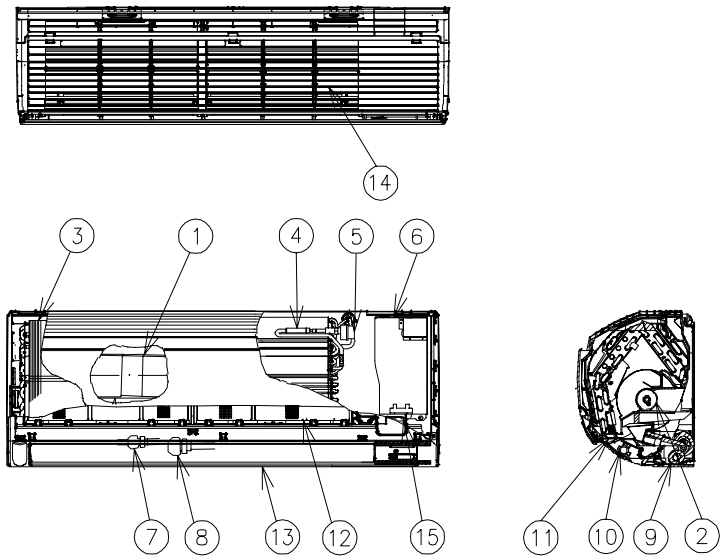
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electrical Control Box
7	Refrigerant Liquid Pipe Connection
8	Refrigerant Gas Pipe Connection
9	Drain Pipe Connection
10	Motor for Auto-Swing Louver
11	Drain Pan
12	Air Filter
13	Air Outlet
14	Air Inlet
15	Side Cover

RPK - FSNM (2.5 ~ 4.0 HP)



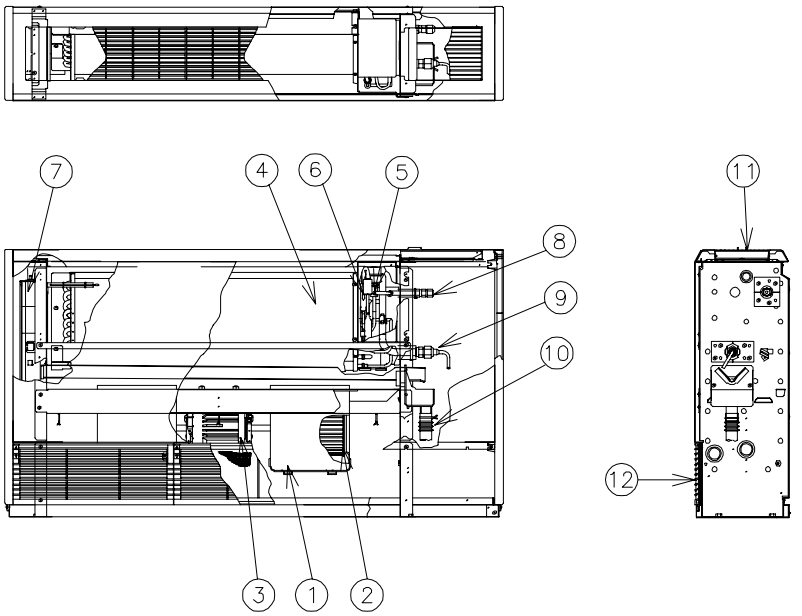
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Distributor
5	Expansion Valve
6	Electrical Control Box
7	Refrigerant Liquid Pipe Connection
8	Refrigerant Gas Pipe Connection
9	Drain Pipe Connection
10	Motor for Auto-Swing Louver
11	Drain Pan
12	Air Filter
13	Air Outlet
14	Air Inlet
15	Side Cover

RPK- FSN1M (1.5 HP)



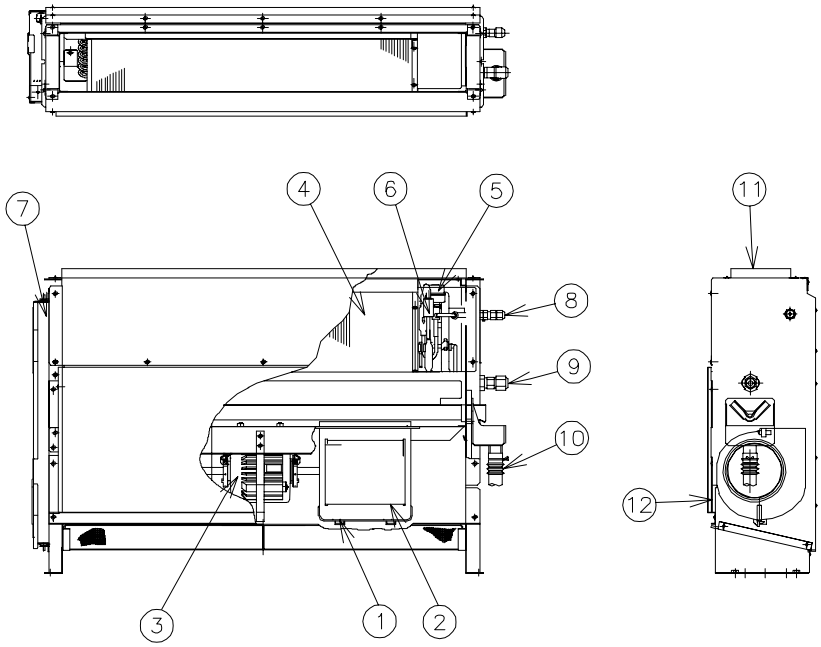
No.	Part Name
1	Fan
2	Fan Motor
3	Heat Exchanger
4	Strainer
5	Expansion Valve
6	Electrical Control Box
7	Refrigerant Liquid Pipe Connection
8	Refrigerant Gas Pipe Connection
9	Drain Pipe Connection
10	Motor for Auto-Swing Louver
11	Drain Pan
12	Air Filter
13	Air Outlet
14	Air Inlet
15	Wireless Receiver

RPF – FSNE (1.5 ~ 2.5 HP)



No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Distributor
6	Expansion Valve
7	Electrical Control Box
8	Refrigerant Liquid Pipe Connection
9	Refrigerant Gas Pipe Connection
10	Drain Pipe Connection
11	Air Outlet
12	Air Inlet

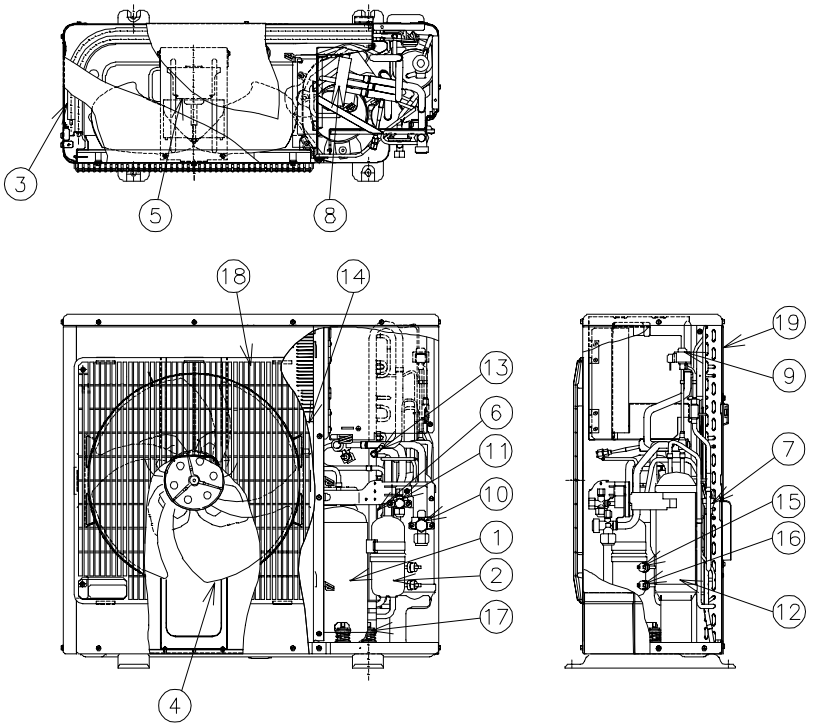
RPFI – FSNE (1.5 ~ 2.5 HP)



No.	Part Name
1	Fan Casing
2	Fan
3	Fan Motor
4	Heat Exchanger
5	Distributor
6	Expansion Valve
7	Electrical Control Box
8	Refrigerant Liquid Pipe Connection
9	Refrigerant Gas Pipe Connection
10	Drain Pipe Connection
11	Air Outlet
12	Air Inlet

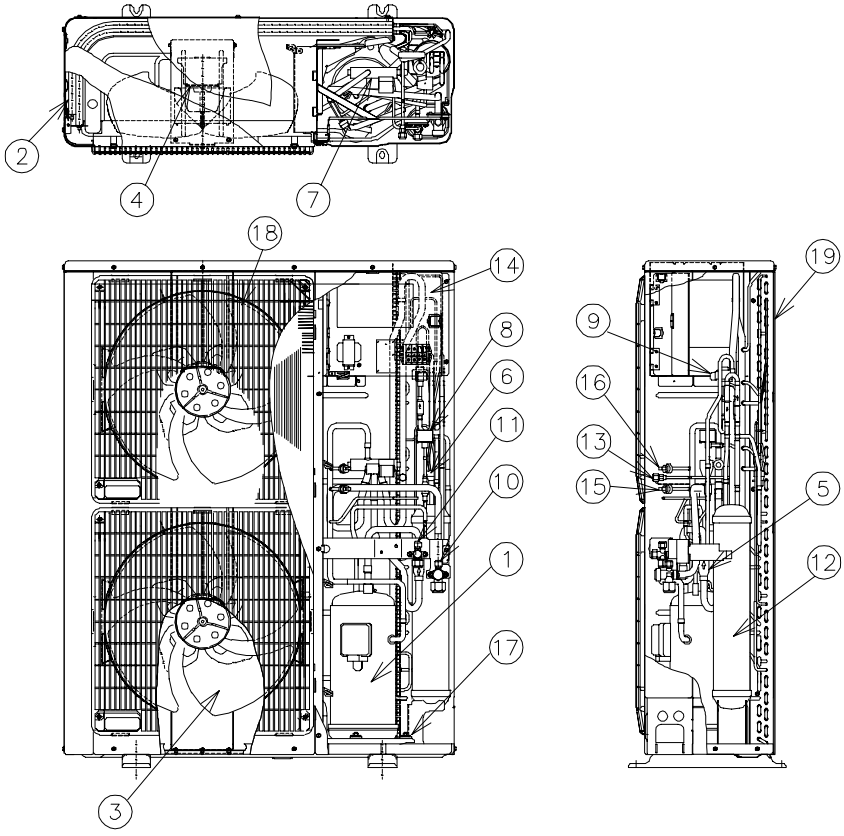
2.4.2. OUTDOOR UNITS

RAS – H(V)RNE (2~3 HP)



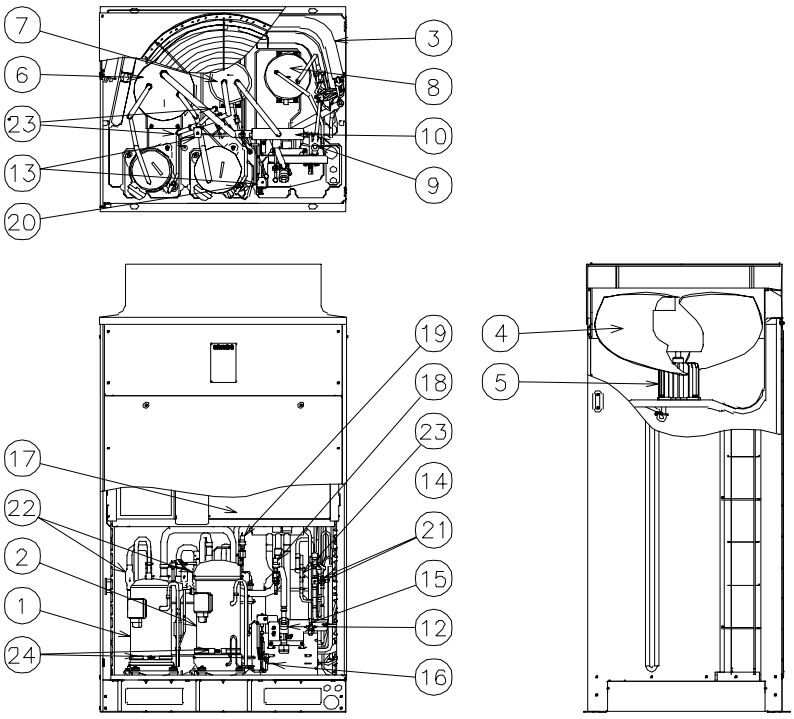
No.	Part Name
1	Compressor
2	Accumulator
3	Heat Exchanger
4	Fan
5	Fan Motor
6	Strainer
7	Distributor
8	Reversing Valve
9	Expansion Valve
10	Stop Valve for Gas Line
11	Stop Valve for Liquid Line
12	Receiver
13	Check Joint
14	Electrical Control Box
15	High-Pressure Switch
16	Pressure Switch
17	Vibration Isolation Rubber
18	Air Oulet
19	Air Inlet

RAS – H(V)RNE (4~6 HP)



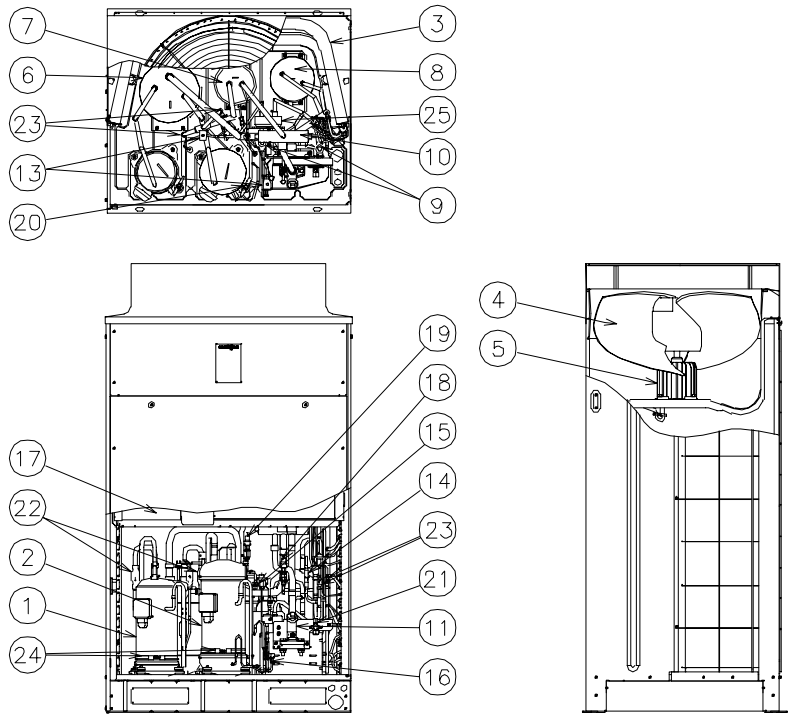
No.	Part Name
1	Compressor
2	Heat Exchanger
3	Fan
4	Fan Motor
5	Strainer
6	Distributor
7	Reversing Valve
8	Selenoid Valve
9	Expansion Valve
10	Stop Valve for Gas Line
11	Stop Valve for Liquid Line
12	Receiver
13	Check Joint
14	Electrical Control Box
15	High-Pressure Switch
16	Pressure Switch
17	Vibration Isolation Rubber
18	Air Oulet
19	Air Inlet

RAS – HRNE (8 HP)



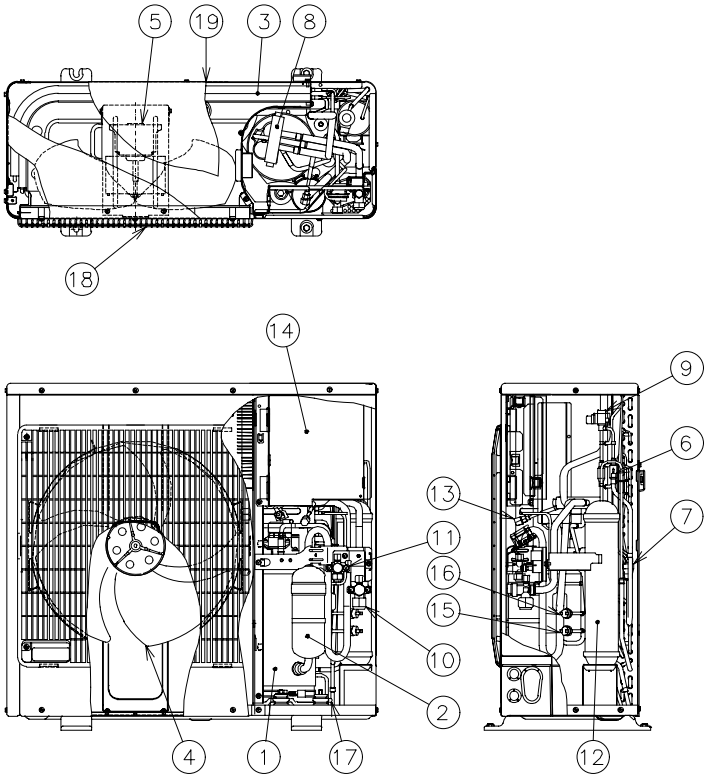
No.	Part Name
1	Compressor (Inverter)
2	Compressor Constant Speed
3	Heat Exchanger
4	Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Reversing Valve
9	Expansion Valve
10	Stop Valve Gas Line
11	Stop Valve Gas Line
12	Stop Valve Liquid Line
13	Reversing Valve
14	Check Joint Low
15	Check Joint High
16	Check Joint (for Oil Separator)
17	Electrical Control Box
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection
21	Strainer
22	Strainer
23	Sight Glass
24	Crankcase Heater

RAS – HRNE (10/12 HP)



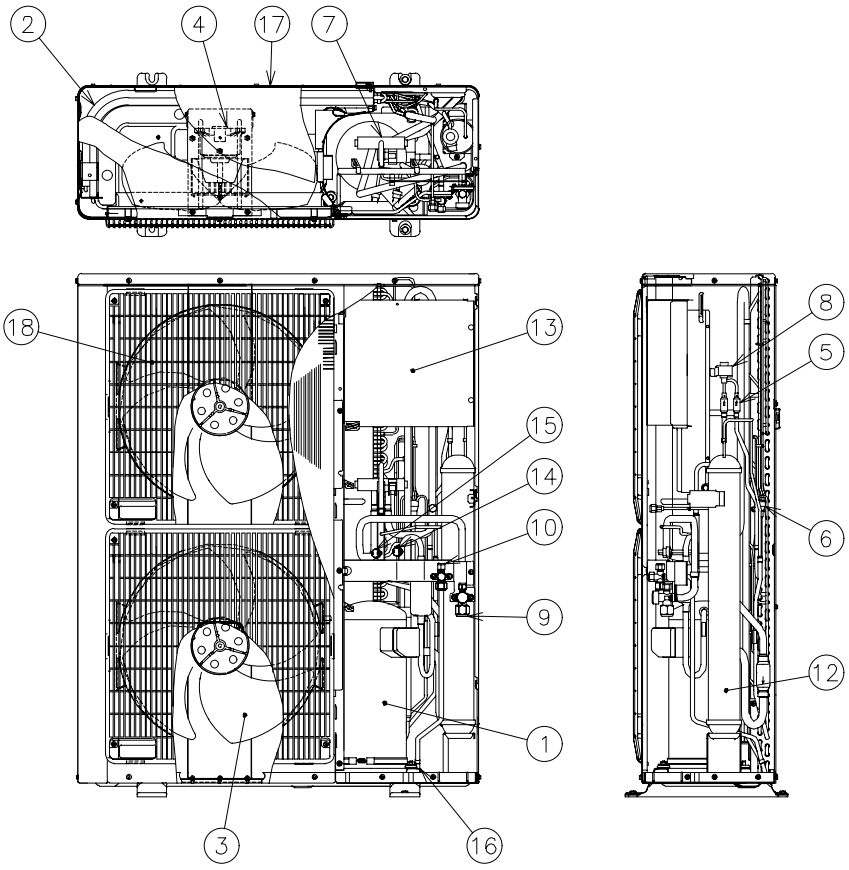
No.	Part Name
1	Compressor (Inverter)
2	Compressor Constant Speed
3	Heat Exchanger
4	Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Receiver
9	Expansion Valve
10	Reversing Valve
11	Stop Valve Gas Line
12	Stop Valve Liquid Line
13	Solenoid Valve
14	Check Joint Low
15	Check Joint High
16	Check Joint (for Oil Separator)
17	Electrical Control Box
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection
21	Strainer
22	Strainer
23	Reversing Valve
24	Crankcase Heater
25	Plate Heat Exchanger

RAS – HN(V)E (2.5/3 HP)



No.	Part Name
1	Compressor
2	Accumulator
3	Heat Exchanger
4	Fan
5	Fan Motor
6	Strainer
7	Distributor
8	Reversing Valve
9	Expansion Valve
10	Stop Valve for Gas Line
11	Stop Valve for Liquid Line
12	Receiver
13	Check Joint
14	Electrical Control Box
15	High-Pressure Switch
16	Pressure Switch
17	Vibration Isolation Rubber
18	Air Oulet
19	Air Inlet

RAS – HN(V)E (4/5 HP)



No.	Part Name
1	Compressor
2	Heat Exchanger
3	Fan
4	Fan Motor
5	Strainer
6	Distributor
7	Reversing Valve
8	Expansion Valve
9	Stop Valve for Gas Line
10	Stop Valve for Liquid Line
11	Receiver
12	Check Joint
13	Electrical Control Box
14	High-Pressure Switch
15	Pressure Switch
16	Vibration Isolation Rubber
17	Air Oulet
18	Air Inlet

3 DIMENSIONAL DATA

This chapter shows the physical features and the minimum service space required for each unit of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

3.1. INDOOR UNITS

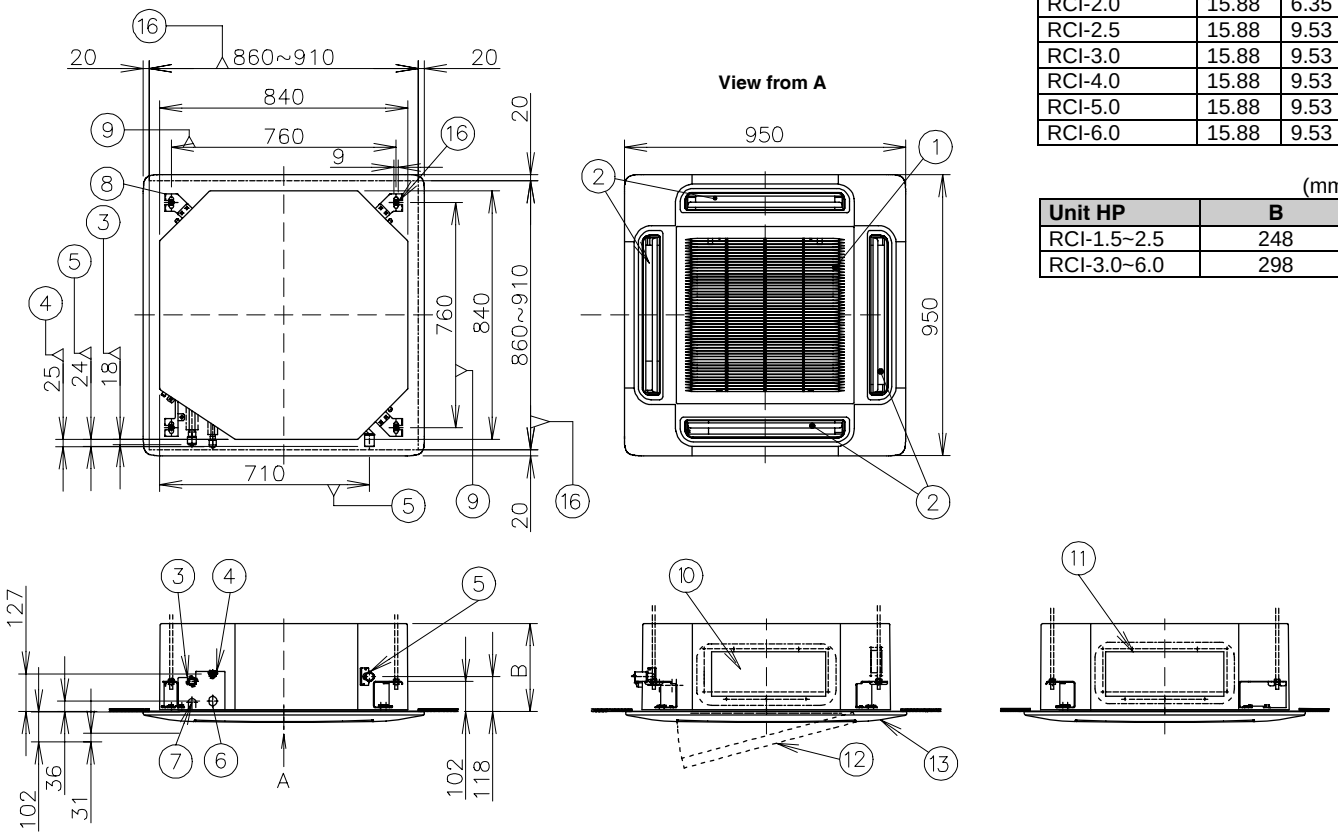
3.1.1. 4-WAY CASSETTE TYPE MODELS: RCI-1.5~6.0 WITH AIR PANEL P-G23WA2

Units: mm

Model / Pipe Size	a	b
RCI-1.5	12.7	6.35
RCI-2.0	15.88	6.35
RCI-2.5	15.88	9.53
RCI-3.0	15.88	9.53
RCI-4.0	15.88	9.53
RCI-5.0	15.88	9.53
RCI-6.0	15.88	9.53

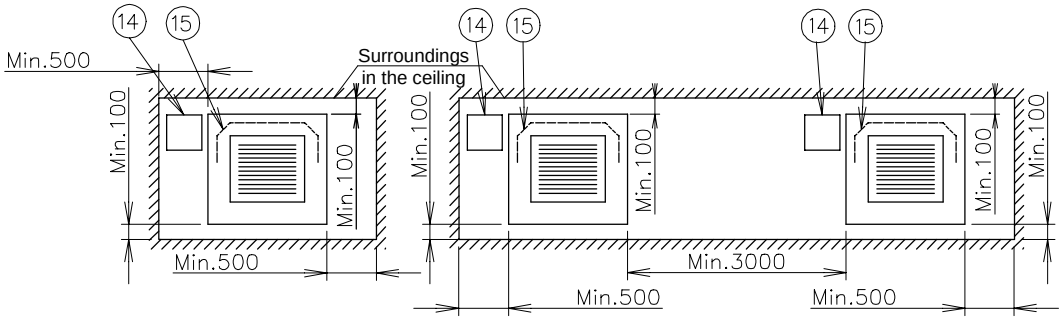
(mm)

Unit HP	B
RCI-1.5~2.5	248
RCI-3.0~6.0	298



Service Space
(Single Installation)

Service Space
(Multiple Installation)

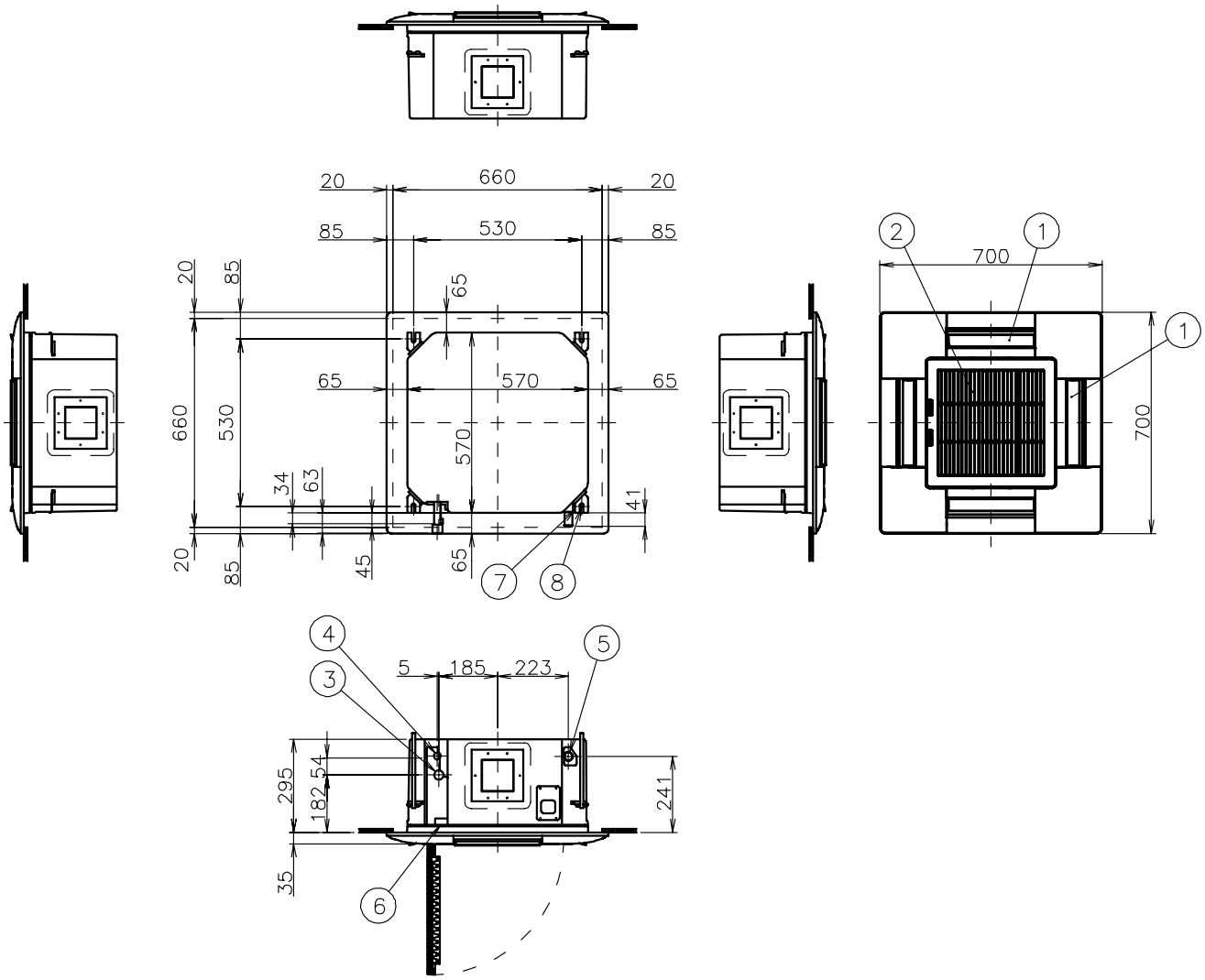


Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	4-way
3	Refrigerant Gas Line	Øa Flare Nut
4	Refrigerant Liquid Line	Øb Flare Nut
5	Drain Pipe	Ø32 Outer Diameter
6	Wiring Hole for conduit tube	Ø32.5 knockout hole
7	Wiring Hole	30x39 Hole
8	Suspension bracket	
9	Suspension Bolt	4-M10 or W3/8

Mark	Name	Remarks
10	Supply Duct Connection	150x385 knockout hole
11	Supply Duct Connection	150x400 knockout hole
12	Air grille	
13	Panel	
14	Service Access Panel	
15	Piping Connection	
16	Ceiling	Opening Hole

3.1.2. 4-WAY CASSETTE TYPE MODELS: RCIM-1.5/2.0 WITH AIR PANEL P-N23WAM

Units: mm



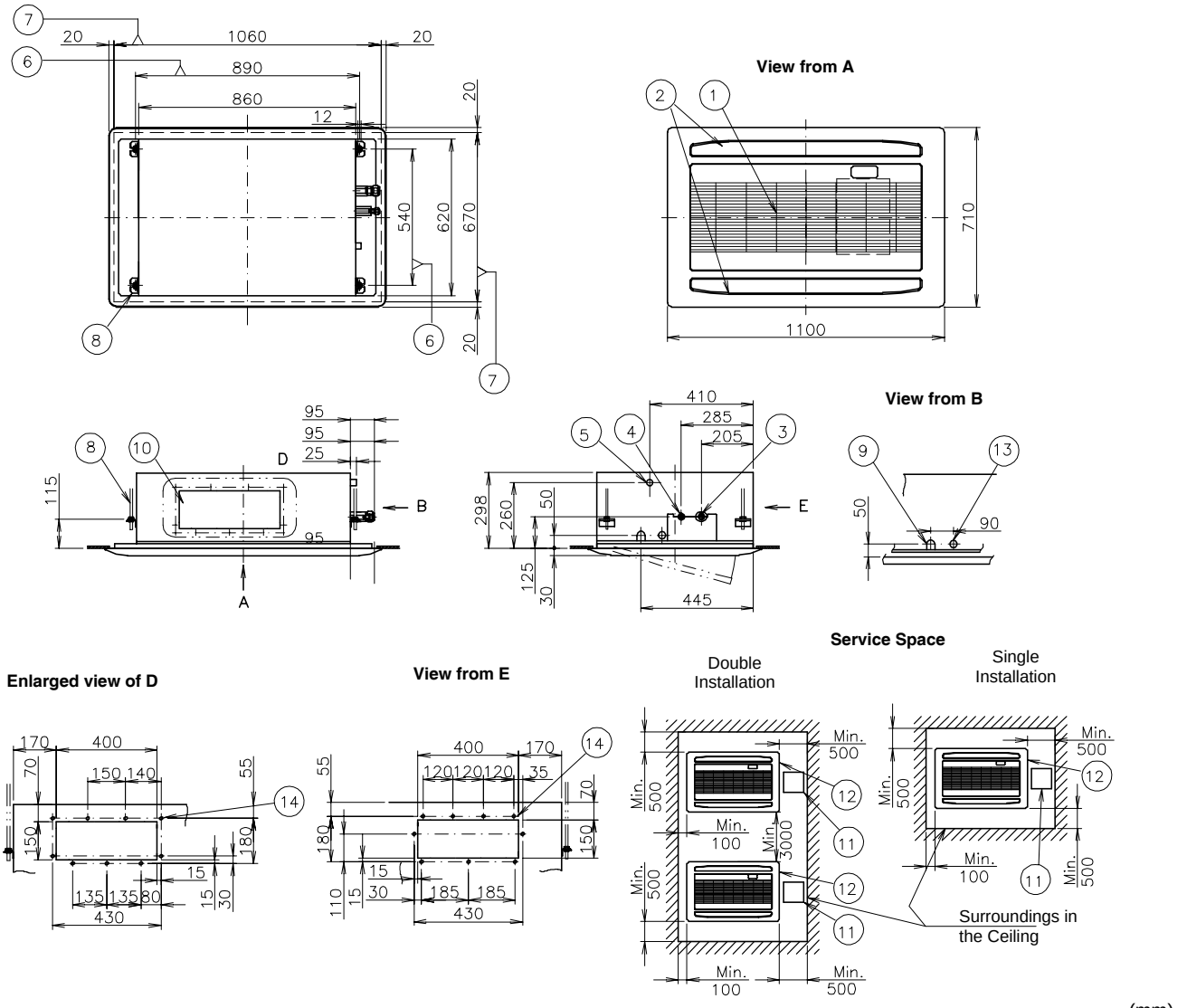
Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	4-way
3	Refrigerant Gas Line	Øa Flare Nut
4	Refrigerant Liquid Line	Øb Flare Nut
5	Drain Pipe	Ø32 Outder Diameter
6	Wiring Hole	
7	Suspension bracket	
8	Suspension Bolt	4-M10 or W3/8

(mm)

Model	a	b
RCIM-1.5	Ø12.7	Ø6.35
RCIM-2.0	Ø15.88	Ø6.35

3.1.3. 2-WAY CASSETTE TYPE MODELS: RCD-1.5~3.0 WITH AIR PANEL P-G23DWA1

Units: mm



(mm)

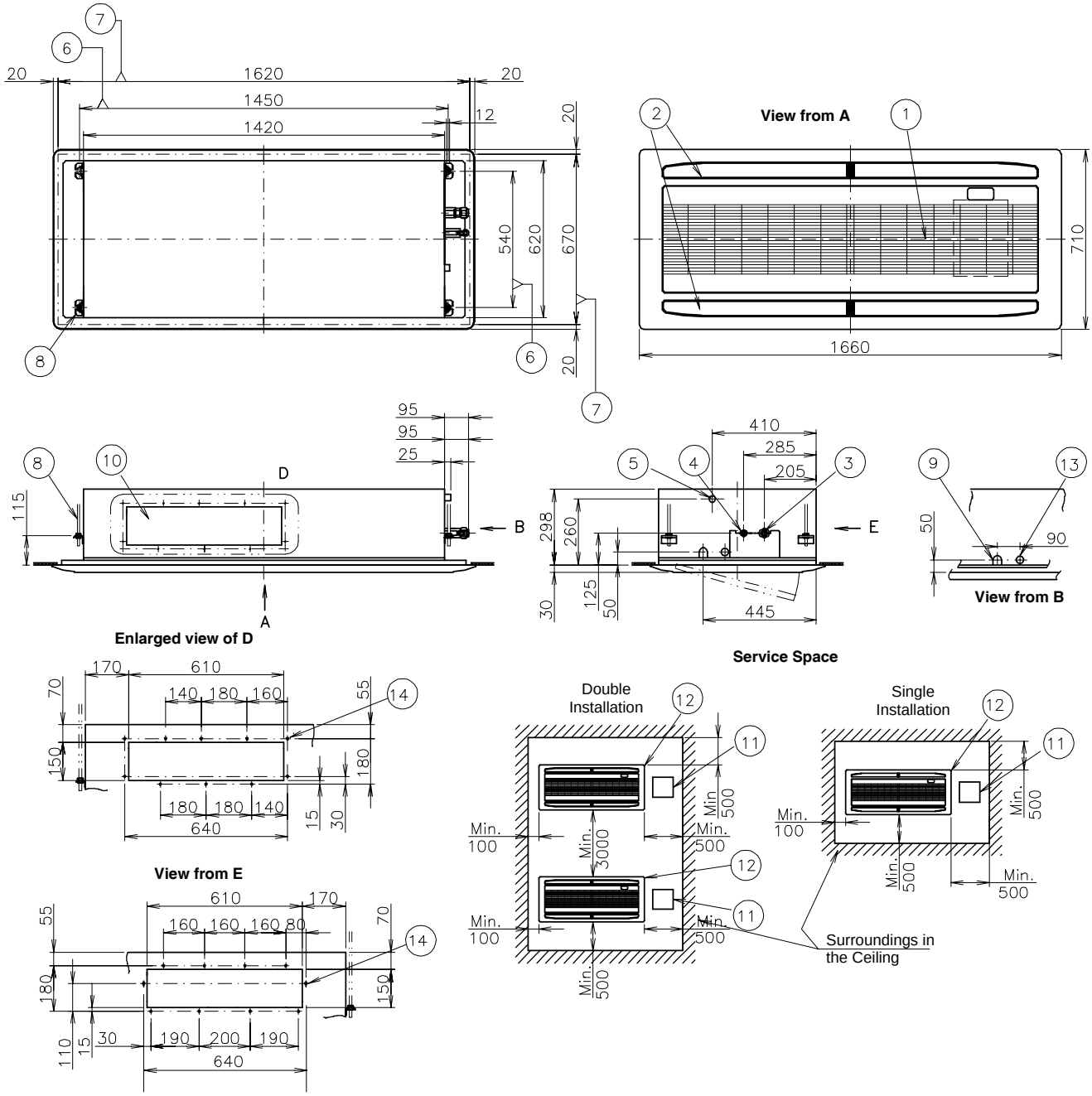
Model / Pipe Sizes	Øa	Øb
RCD-1.5	12.7	6.35
RCD-2.0	15.88	6.35
RCD-2.5	15.88	9.53
RCD-3.0	15.88	9.53

Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	2-way
3	Refrigerant Gas Line	Øa Flare Nut
4	Refrigerant Liquid Line	Øb Flare Nut
5	Drain Pipe	Ø32 Outer Diameter
6	Hole for Suspension Bolt	890 x 540

Mark	Name	Remarks
7	Ceiling Open Hole	1060 x 670
8	Suspension Bracket	
9	Wiring Hole	36 x 39mm
10	Supply Duct Connection	2 – 150 x 400
11	Service Access Panel	
12	Piping Connection	
13	Wiring Connection Cable	32.5mm
14	Self-Tapping Screw	9-M4 / 10 M4

3.1.4. 2-WAY CASSETTE TYPE MODELS: RCD-4.0/5.0 WITH AIR PANEL P-G46DWA1

Units: mm

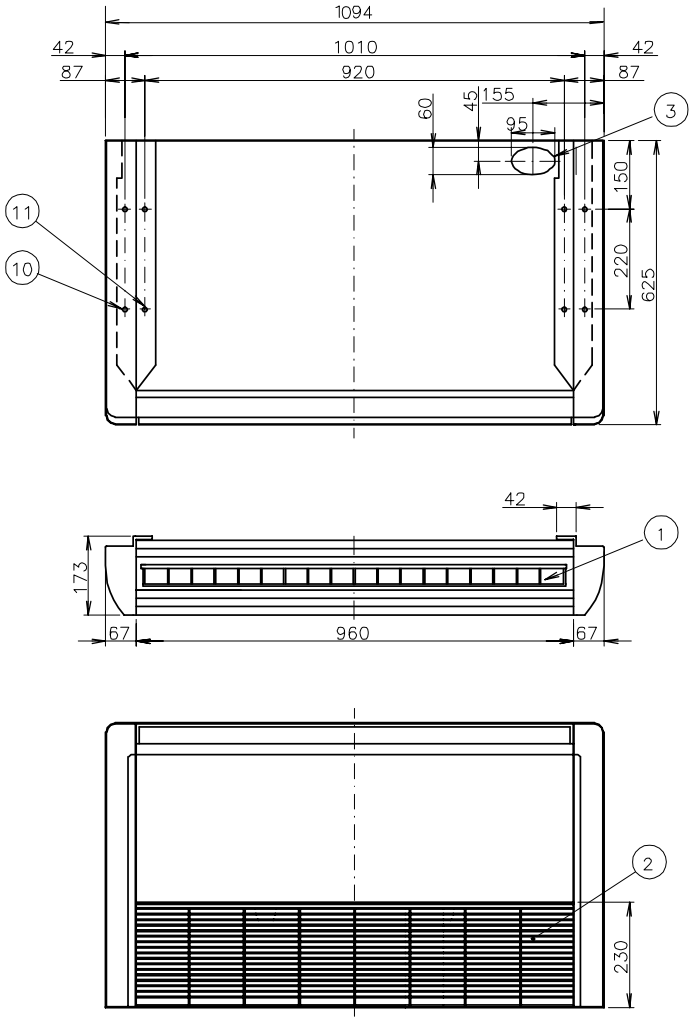


Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	2-way
3	Refrigerant Gas Line	Ø15.88 Flare Nut
4	Refrigerant Liquid Line	Ø9.53 Flare Nut
5	Drain Pipe	Ø32 Outer Diameter
6	Hole for Suspension Bolt	1450 x 540

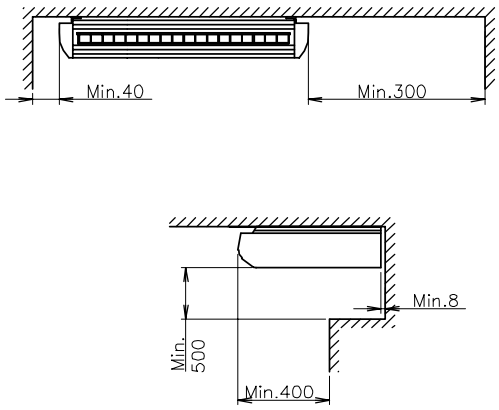
Mark	Name	Remarks
7	Ceiling Open Hole	1620 x 670
8	Suspension Bracket	
9	Wiring Hole	36 x 39mm
10	Supply Duct Connection	2 – 150 x 400
11	Service Access Panel	
12	Piping Connection	
13	Wiring Connection Cable	32.5mm
14	Self-Tapping Screw	9-M4/10 M4

3.1.5. CEILING TYPE MODELS: RPC-2.0

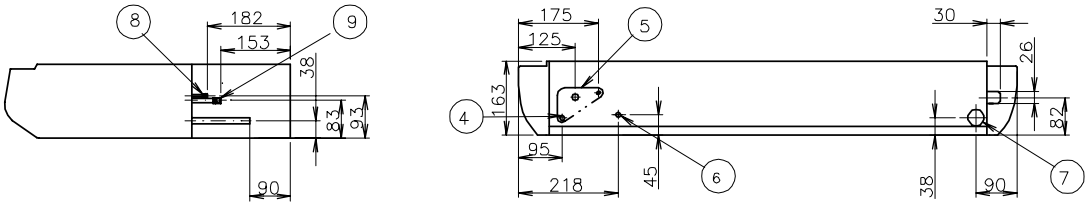
Units: mm



Service Space



Piping Connection Arrangement

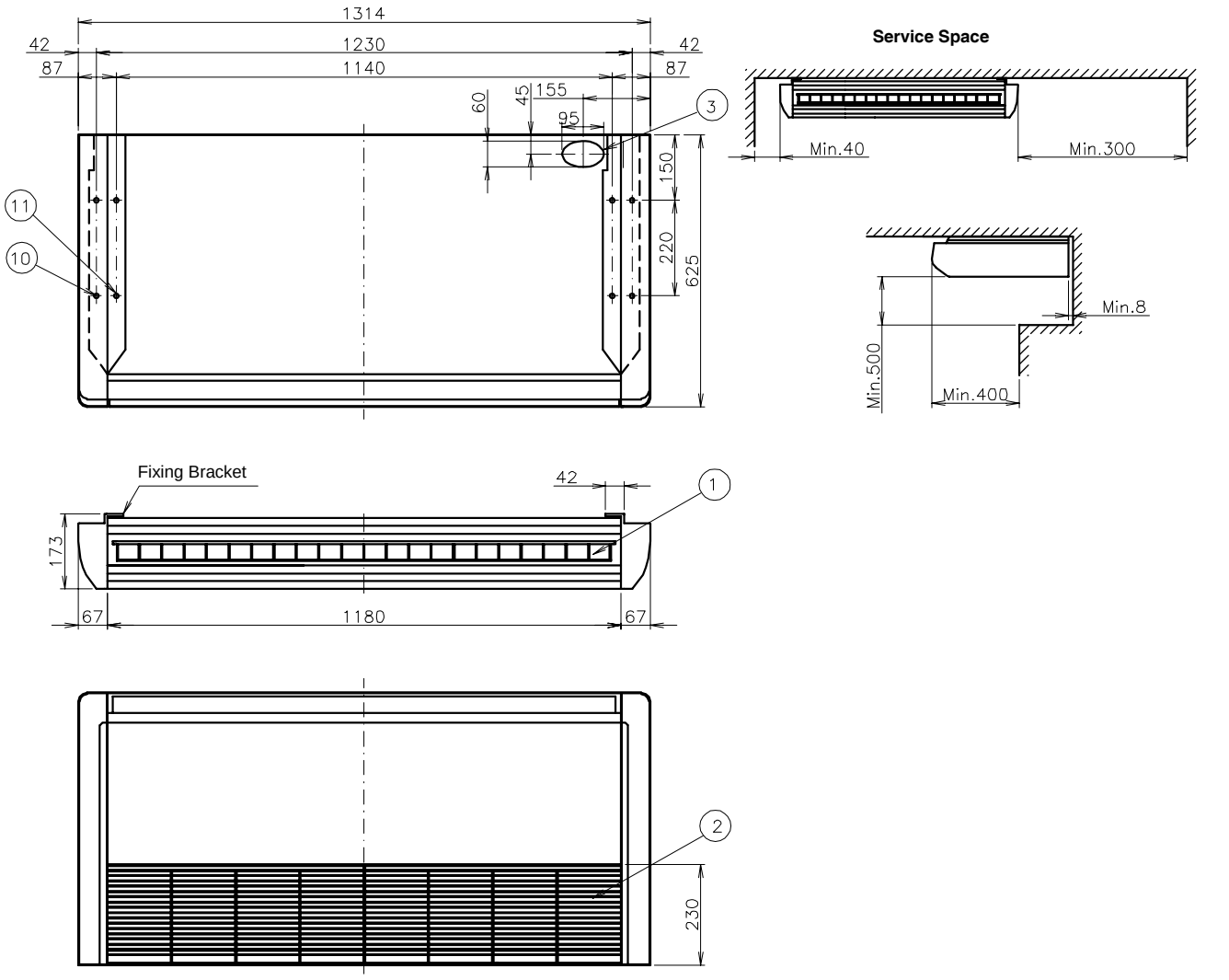


Mark	Name	Remarks
1	Air Discharge	
2	Air Inlet	
3	Hole for Refrigerant Piping	Knockout Hole for Top Side. Refrigerant Piping Arrangement
4	Condensate Drain Piping Connection	(for A Side) Ø25 Outer Diameter.
5	Hole for Refrigerant Piping	Knockout Hole
6	Hole for Conduit Tube	∅32.5 Knockout Hole

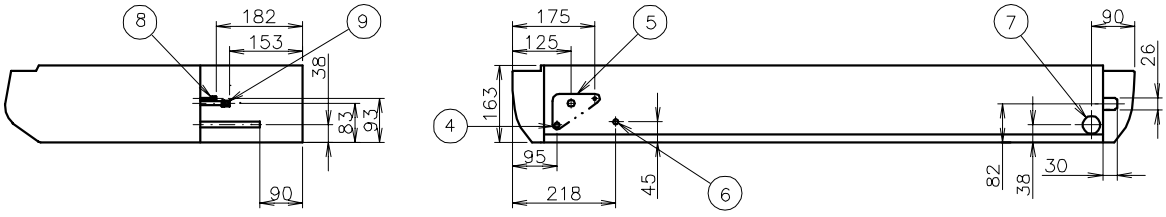
Mark	Name	Remarks
7	Condensate Drain Piping Connection	(for B Side) Ø25 O.D. Knockout Hole
8	Refrigerant Liquid Line	∅6.35 Flare Nut
9	Refrigerant Gas Line	∅15.88 Flare Nut
10	Hole for Suspension Bolt	∅12 Removable
11	Hole for Suspension Bolt	∅12 bracket can be attached to this position

3.1.6. CEILING TYPE MODELS: RPC-2.5/3.0

Units: mm



Piping Connection Arrangement

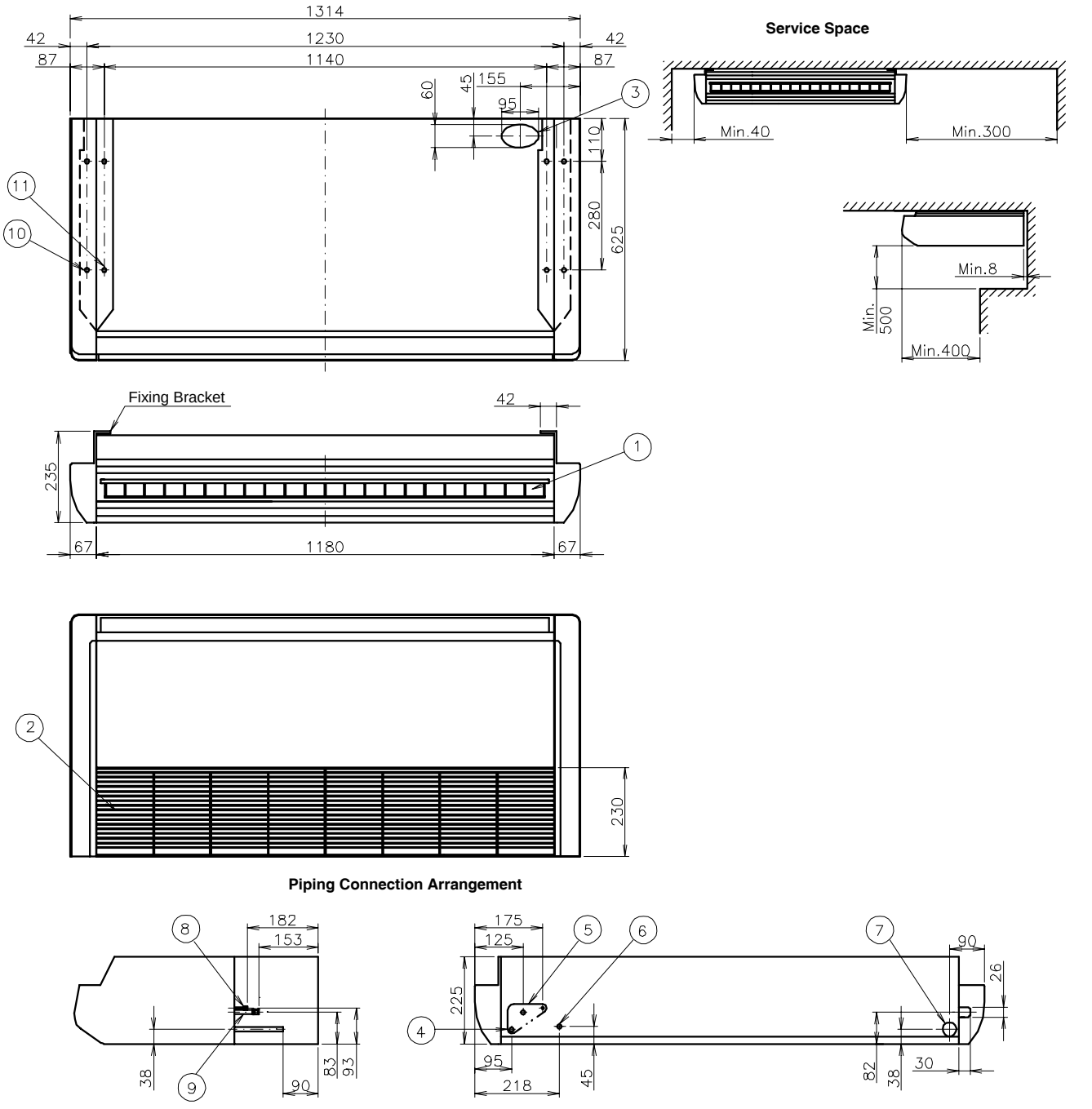


Mark	Name	Remarks
1	Air Discharge	
2	Air Inlet	
3	Hole for Refrigerant Piping	Knockout Hole for Top Side. Refrigerant Piping Arrangement
4	Condensate Drain Piping Connection	(for A Side) Ø25 Outer Diameter
5	Hole for Refrigerant Piping	Knockout Hole

Mark	Name	Remarks
6	Hole for Conduit Tube	∅32.5 Knockout Hole
7	Condensate Drain Piping Connection	(for B Side) Ø25 O.D. Knockout Hole
8	Refrigerant Liquid Line	∅9.53 Flare Nut
9	Refrigerant Gas Line	∅15.88 Flare Nut
10	Hole for Suspension Bolt	∅12 Removable
11	Hole for Suspension Bolt	∅12 bracket can be attached to this position

3.1.7. CEILING TYPE MODELS: RPC-4.0

Units: mm

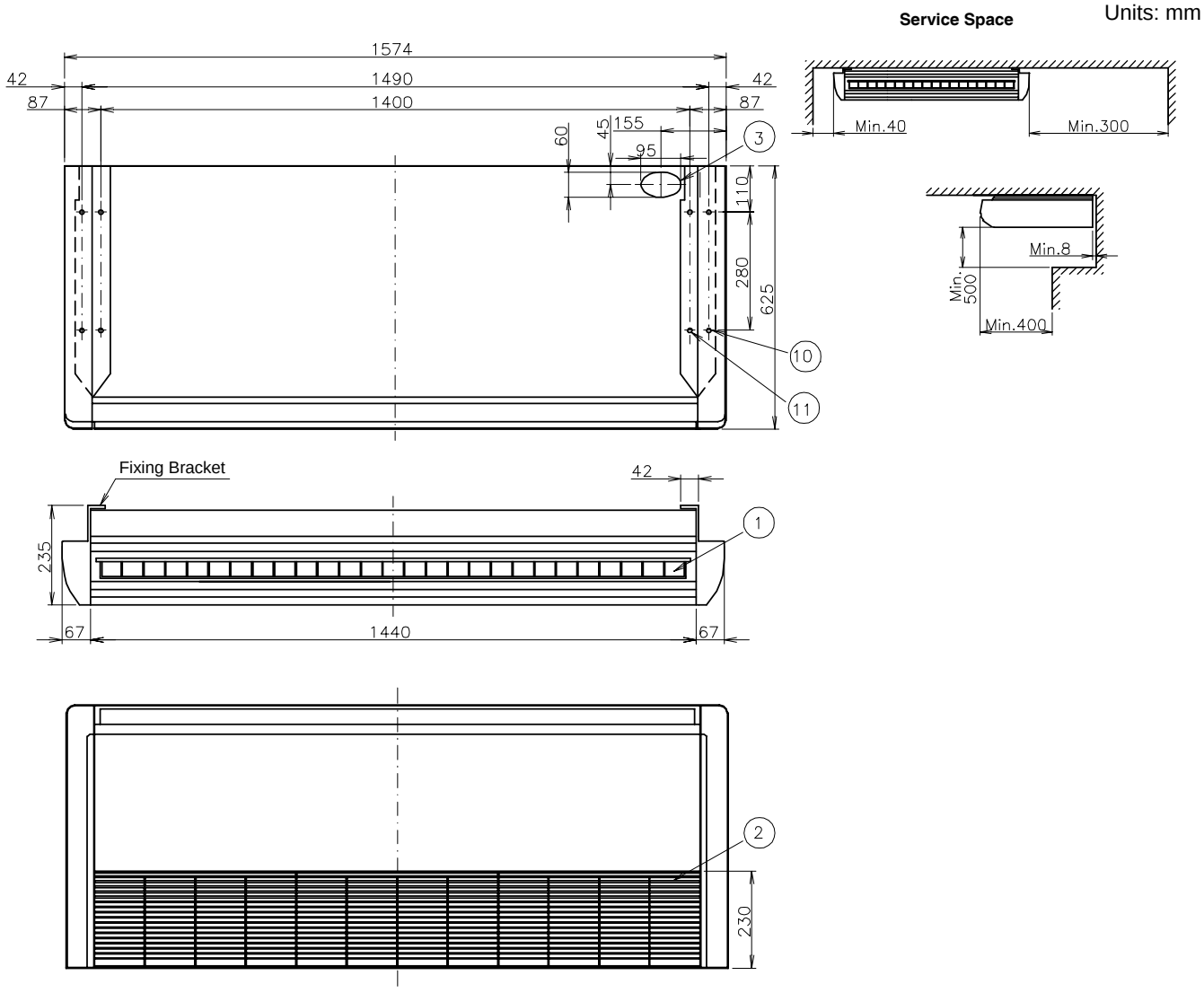


Mark	Name	Remarks
1	Air Discharge	
2	Air Inlet	
3	Hole for Refrigerant Piping	Knockout Hole for Top Side. Refrigerant Piping Arrangement
4	Condensate Drain Piping Connection	(for A Side) Ø25 Outer Diameter
5	Hole for Refrigerant Piping	Knockout Hole

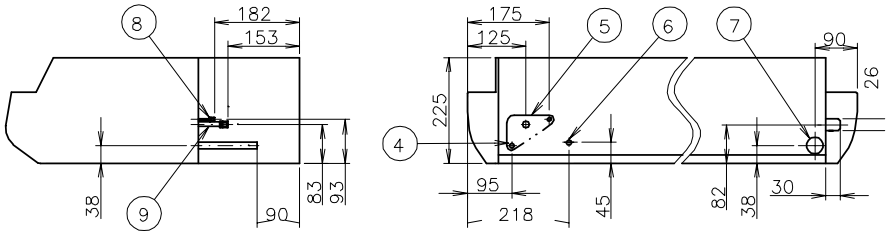
Mark	Name	Remarks
6	Hole for Conduit Tube	∅32.5 Knockout Hole
7	Condensate Drain Piping Connection	(for B Side) Ø25 O.D. Knockout Hole
8	Refrigerant Liquid Line	∅9.53 Flare Nut
9	Refrigerant Gas Line	∅15.88 Flare Nut
10	Hole for Suspension Bolt	∅12 Removable
11	Hole for Suspension Bolt	∅12 bracket can be attached to this position

3.1.8. CEILING TYPE MODELS: RPC-5.0/6.0

Units: mm



Piping Connection Arrangement

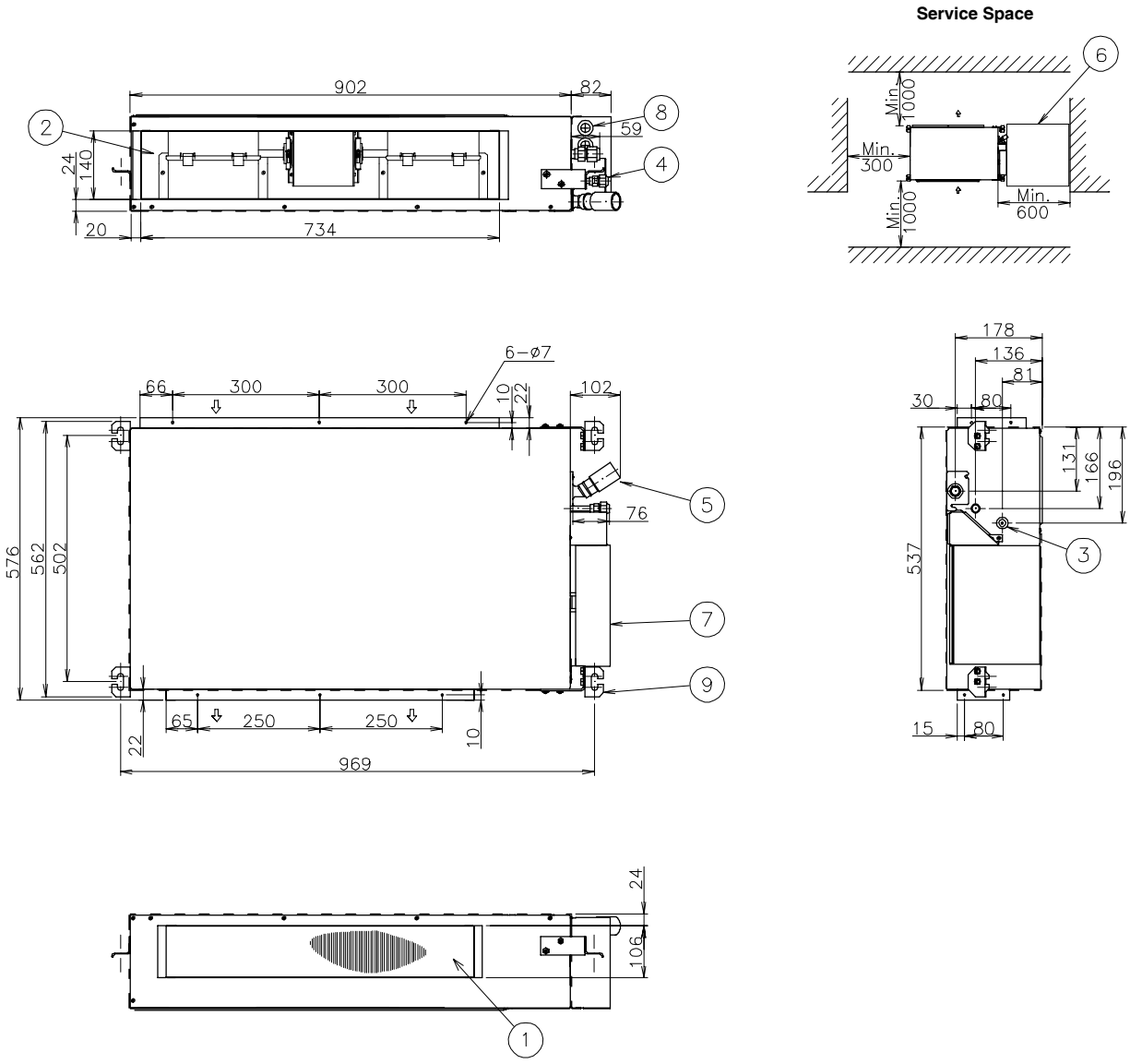


Mark	Name	Remarks
1	Air Discharge	
2	Air Inlet	
3	Hole for Refrigerant Piping	Knockout Hole for Top Side. Refrigerant Piping Arrangement
4	Condensate Drain Piping Connection	(for A Side) Ø25 Outer Diameter
5	Hole for Refrigerant Piping	Knockout Hole

Mark	Name	Remarks
6	Hole for Conduit Tube	∅32.5 Knockout Hole
7	Condensate Drain Piping Connection	(for B Side) Ø25 O.D. Knockout Hole
8	Refrigerant Liquid Line	∅9.53 Flare Nut
9	Refrigerant Gas Line	∅15.88 Flare Nut
10	Hole for Suspension Bolt	∅12 Removable
11	Hole for Suspension Bolt	∅12 bracket can be attached to this position

3.1.9. IN -THE-CEILING TYPE MODEL: RPI-1.5

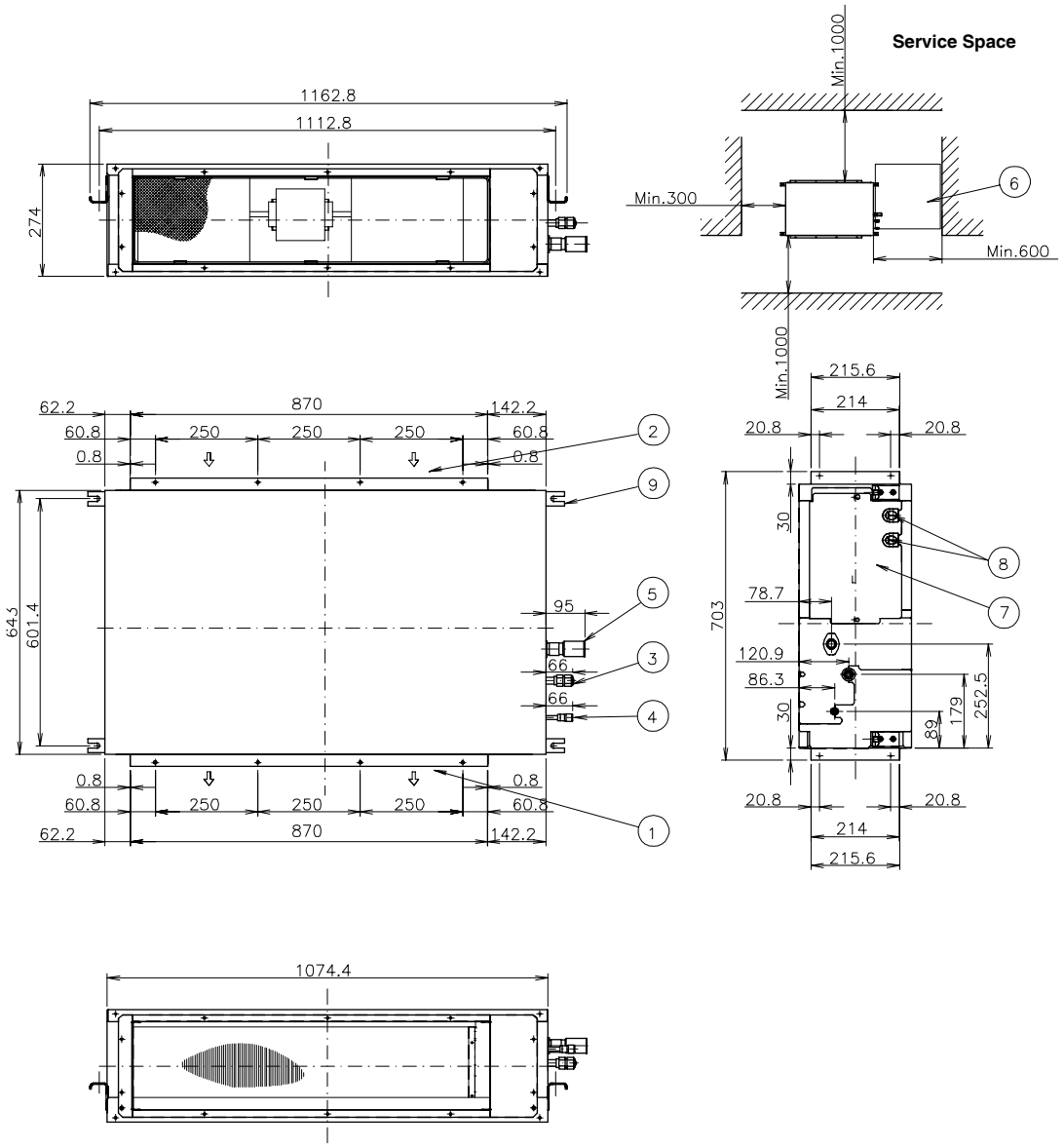
Units: mm



Mark	Name	Remarks
1	Air Discharge	
2	Air Intake	
3	Refrigerant Gas Line	Ø12.7 Flare Nut (Ø35 Hole)
4	Refrigerant Liquid Line	Ø6.35 Flare Nut (Ø30 Hole)
5	Condensate Drain	Ø32 Outer Diameter
6	Connection Hole for Power Supply	2-Ø20
7	Suspension Bracket	
8	Electrical Box	

3.1.10. IN-THE-CEILING TYPE MODELS: RPI-2.0/3.0

Units: mm



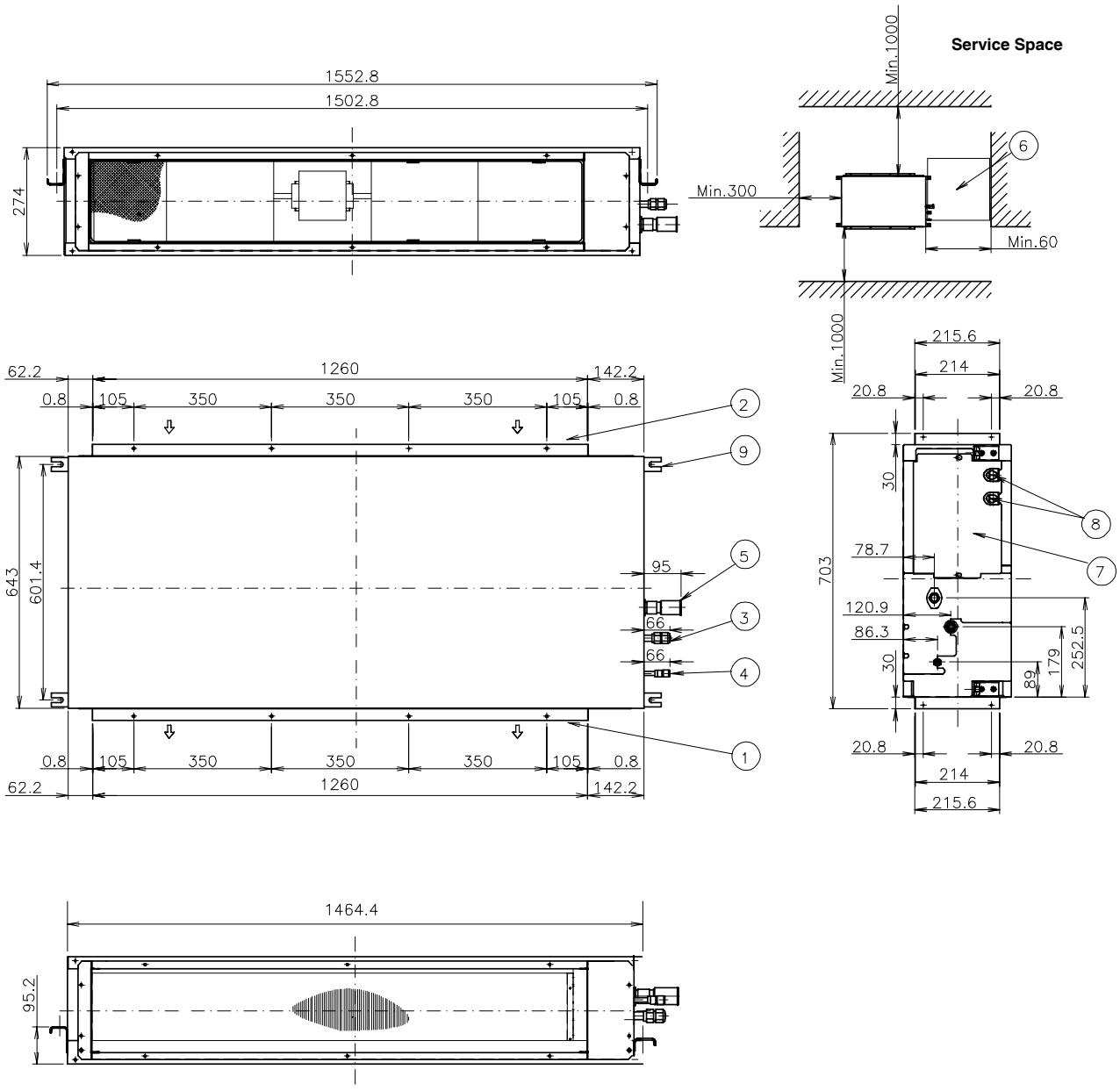
Mark	Name	Remarks
1	Air Discharge	
2	Air Inlet	
3	Refrigerant Gas Line	Øa Flare Nut (Ø 35 Hole)
4	Refrigerant Liquid Line	Øb Flare Nut (Ø 30 Hole)
5	Condensate Drain	Ø32 Outer Diameter.
6	Service Space Door	
7	Electrical Box	
8	Wiring Connection	
9	Suspension Brackets	

(mm)

Model / Pipe Sizes	Øa	Øb
RPI-2.0	15.88	6.35
RPI-2.5	15.88	9.53
RPI-3.0	15.88	9.53

3.1.11. IN-THE-CEILING TYPE MODELS: RPI-4.0/5.0/6.0

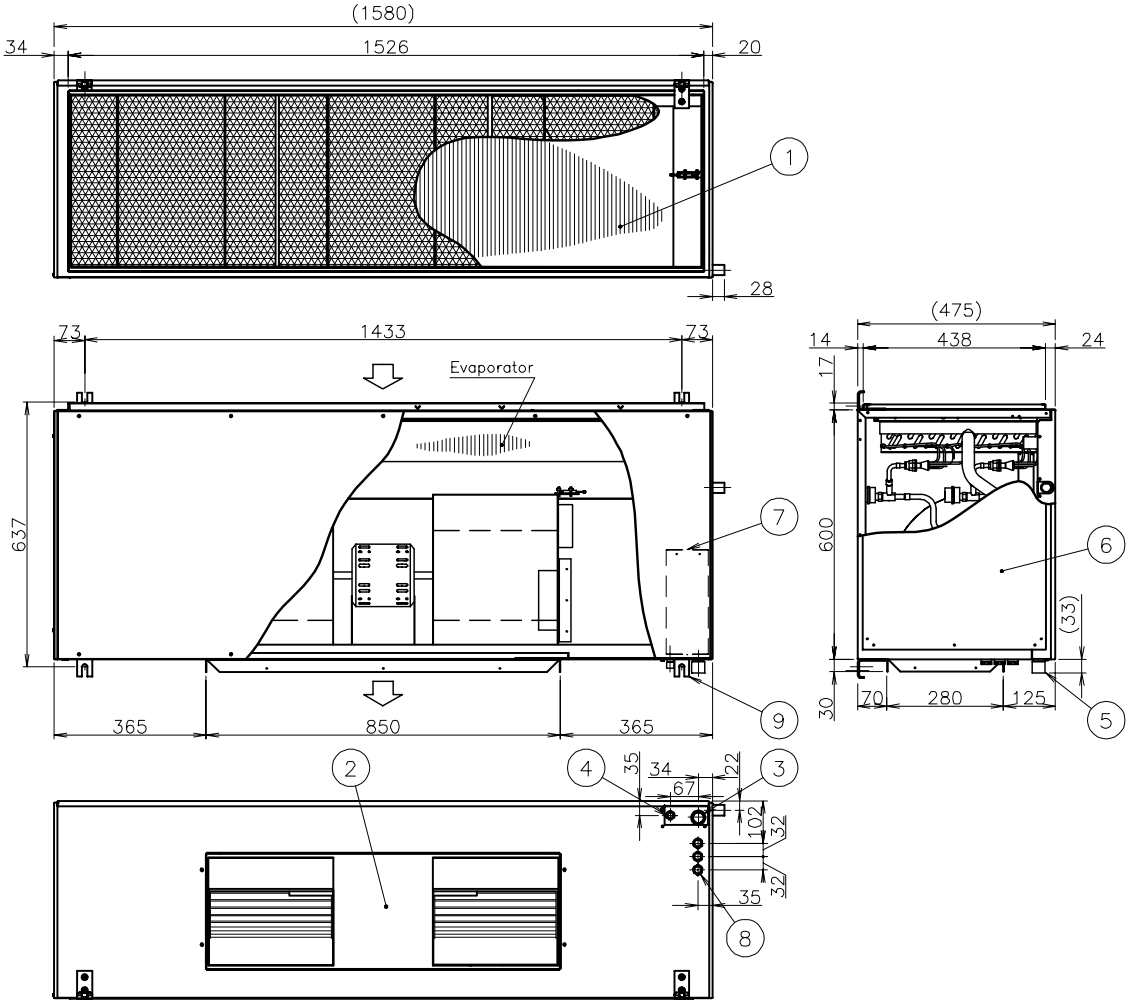
Units: mm



Mark	Name	Remarks
1	Air Discharge	
2	Air Intake	
3	Refrigerant Gas Line	Ø15.88 Flare Nut (Ø35 Hole)
4	Refrigerant Liquid Line	Ø9.53 Flare Nut (Ø30 Hole)
5	Condensate Drain	Ø32 Outer Diameter
6	Connection Hole for Power Supply	2-Ø20
7	Electrical Box	
8	Wiring Connection	
9	Suspension Brackets	

3.1.12. IN-THE-CEILING TYPE MODELS: RPI-8.0~10.0

Units: mm



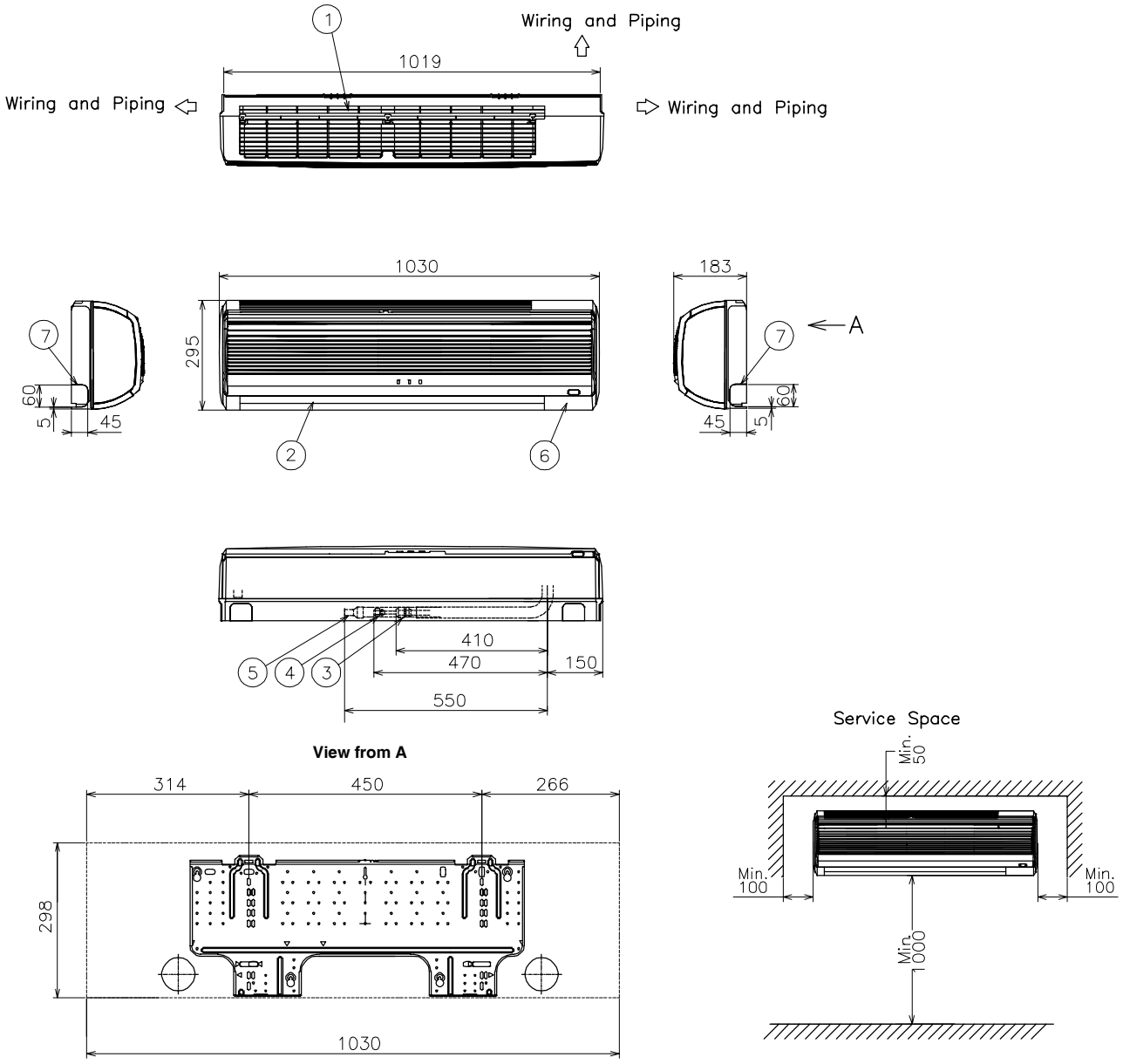
Mark	Name	Remarks
1	Air inlet	
2	Air Outlet	
3	Refrigerant Gas Line	Ø28.6 Flare Nut (Ø35 Hole)
4	Refrigerant Liquid Line	Øa Flare Nut (Ø30 Hole)
5	Condensate Drain	Ø25 Outer Diameter
6	Service Space Door	
7	Electrical Box	
8	Wiring Connection	
9	Suspension Brackets	

(mm)

Model	a
RPI-8.0	Ø12.7
RPI-10.0	Ø15.88

3.1.13. WALL TYPE MODELS: RPK-1.5/2.0 FSNM

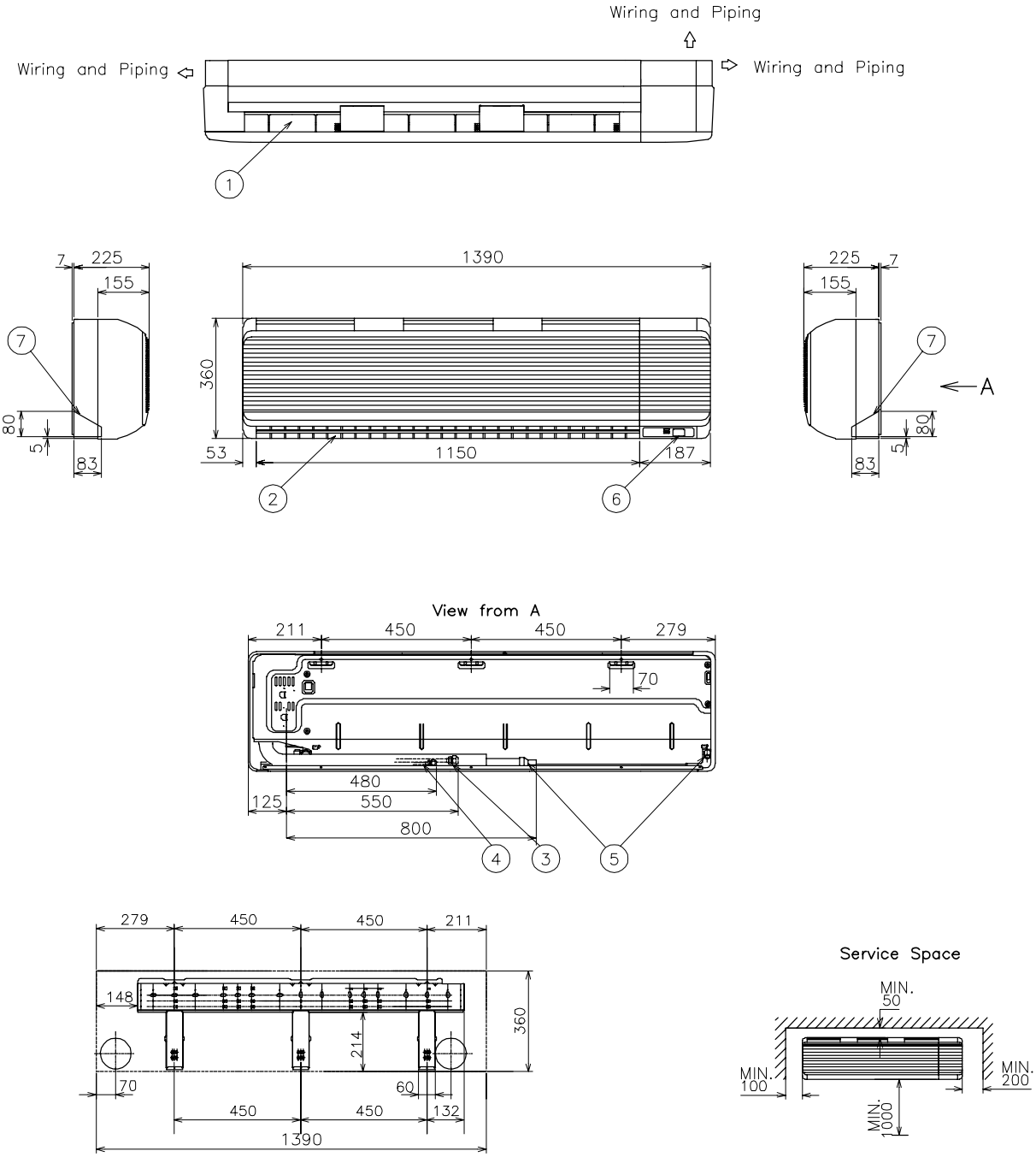
Units: mm



Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	
3	Refrigerant Gas Line	Ø 12.7 Flare Nut (RPK-1.5FSNM) Ø 15.88 Flare Nut (RPK-2.0FSNM)
4	Refrigerant Liquid Line	Ø 6.35 Flare Nut
5	Drain Pipe	Ø 26 Outer Diameter
6	Receiver Part	
7	Knockout Hole	

3.1.14. WALL TYPE MODELS: RPK-2.5~4.0 FSNM

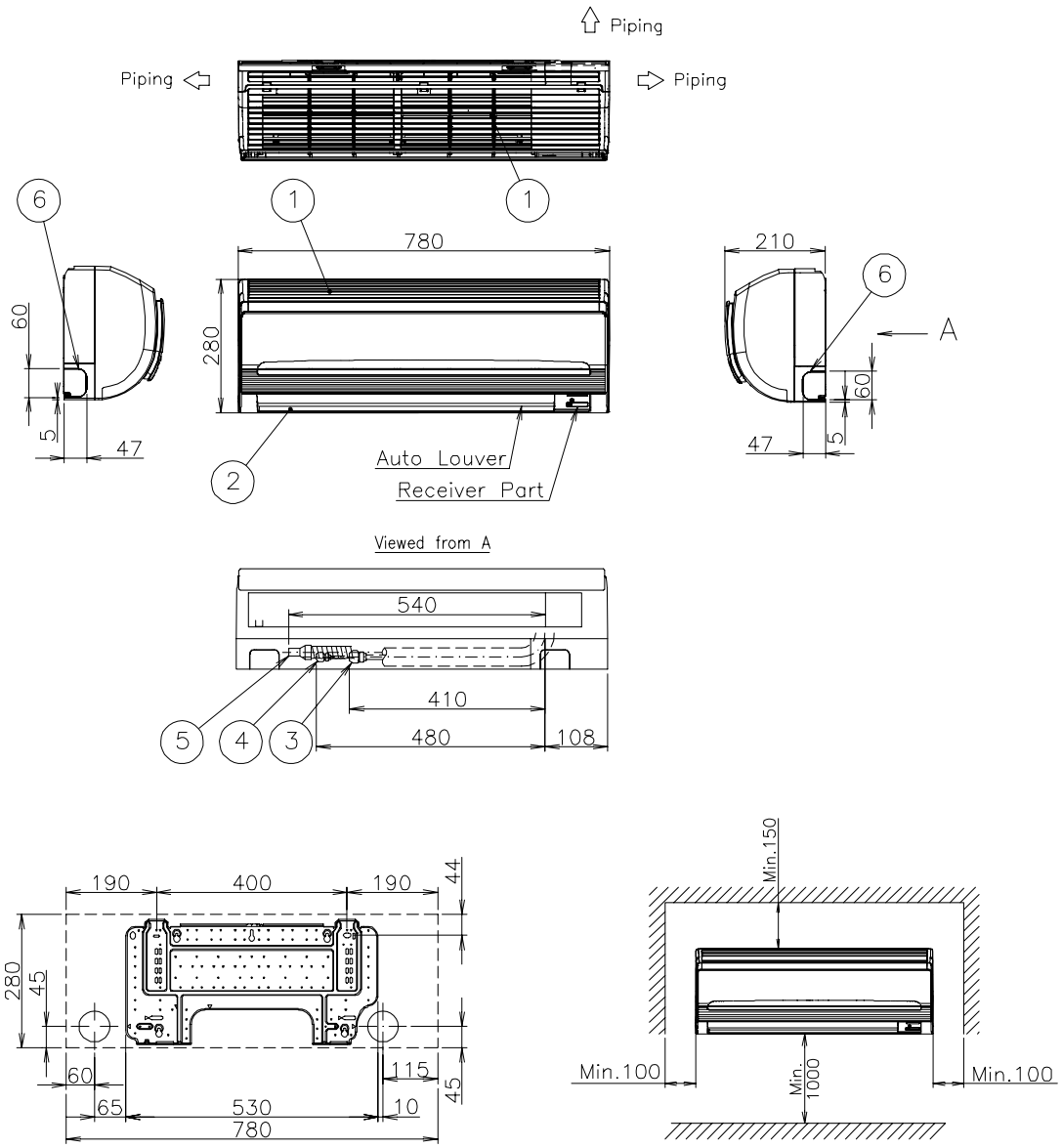
Units: mm



Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	
3	Refrigerant Gas Line	Ø 15.88 Flare Nut
4	Refrigerant Liquid Line	Ø 9.35 Flare Nut
5	Drain Pipe	Ø 26 Outer Diameter
6	Receiver Part	
7	Knockout Hole	

3.1.15. WALL TYPE MODELS: RPK-1.5FSN1M

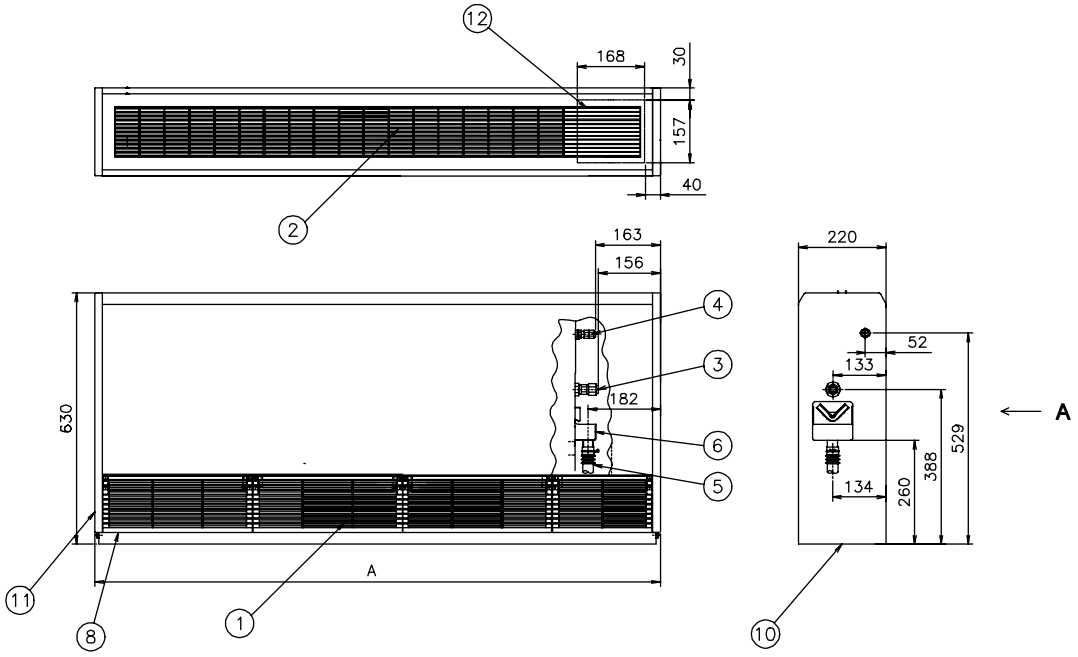
Units: mm



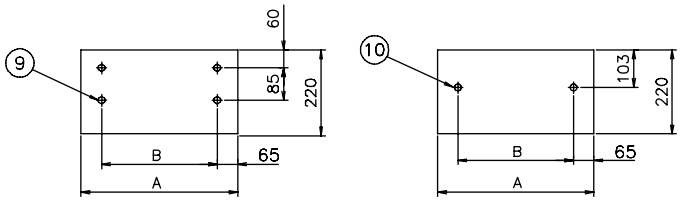
Mark	Name	Remarks
1	Air Inlet	
2	Air Outlet	
3	Refrigerant Gas Line	Ø 12.7 Flare Nut
4	Refrigerant Liquid Line	Ø 6.35 Flare Nut
5	Drain Pipe	Ø 26 Outer Diameter
6	Wiring and Piping Hole	Ø 65 Knockout Hole

3.1.16. FLOOR TYPE MODELS: RPF-1.5~2.5

Units: mm



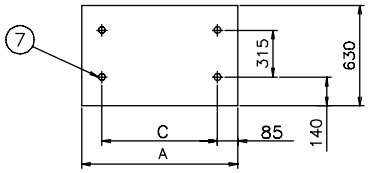
View from Bottom Side



Location of Fixing Holes on Floor for Wood Screws (4-M5)

Location of Fixing Holes on Floor for Bolts (2-M8)

View from A



Location of Fixing Holes on Wall

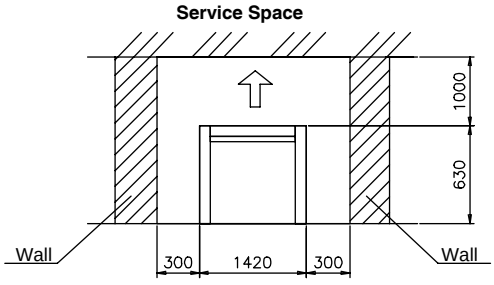
(mm)

Model	A	B	C
RPF-1.5	1170	879	857
RPF-2.0~2.5	1420	1129	1107

(mm)

Model	Ø c	Ø d
RPF-1.5	12.70	6.35
RPF-2.0	15.88	6.35
RPF-2.5	15.88	9.53

Service Space

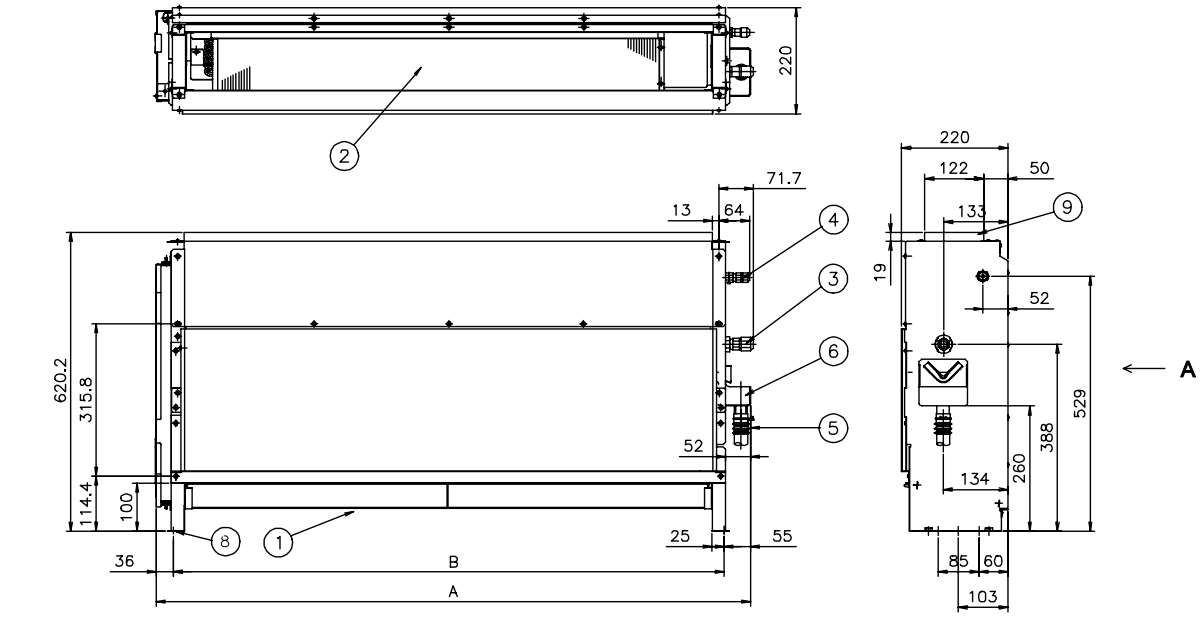


Mark	Name	Remarks
1	Air Inlet	-
2	Air Outlet	-
3	Refrigerant Gas Line	Ø c Flare Nut
4	Refrigerant Liquid Line	Ø d Flare Nut
5	Condensate Drain Hose	Ø18.5 Outer Diameter
6	Drain Pan	-

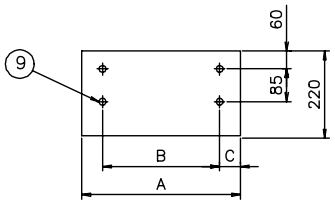
Mark	Name	Remarks
7	Fixing Hole on Wall	4-Ø14 mm(Rear)
8	Adjusting Screw	For Installation
9	Fixing Hole on Floor	4-Ø7 mm for Wood Screw (4-M5)
10	Fixing Hole on Floor	2-Ø12.5x18 mm for Bolts (2-M8)
11	Opening for wiring	Rear side
12	Space for Piping Connection On Floor	-

3.1.17. FLOOR TYPE MODELS: RPFI-1.5~2.5

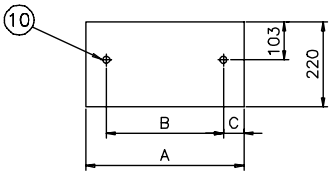
Units: mm



View from Bottom side

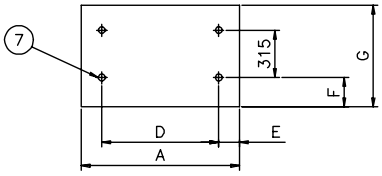


Location of Fixing Holes on Floor for Wood Screws (4-M5)



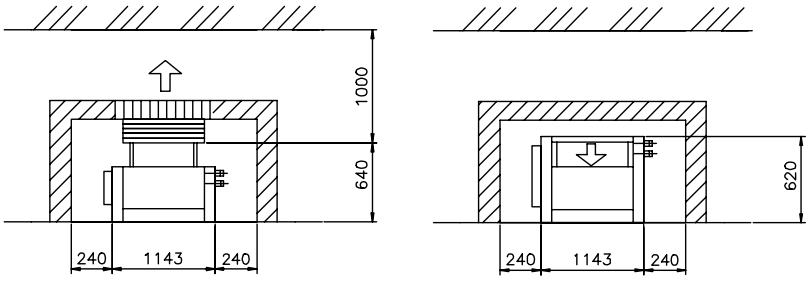
Location of Fixing Holes on Floor for Bolts (2-M8)

View from A



Location of Fixing Holes on Wall

Service Space



(mm)

Model	A	B	C	D	E	F	G
RPFI-1.5	973	879	36	857	50	139	620
RPFI-2.0~2.5	1223	1129	36	1107			

(mm)

Model	Ø h	Ø i
RPFI-1.5	12.70	6.35
RPFI-2.0	15.88	6.35
RPFI-2.5	15.88	9.53

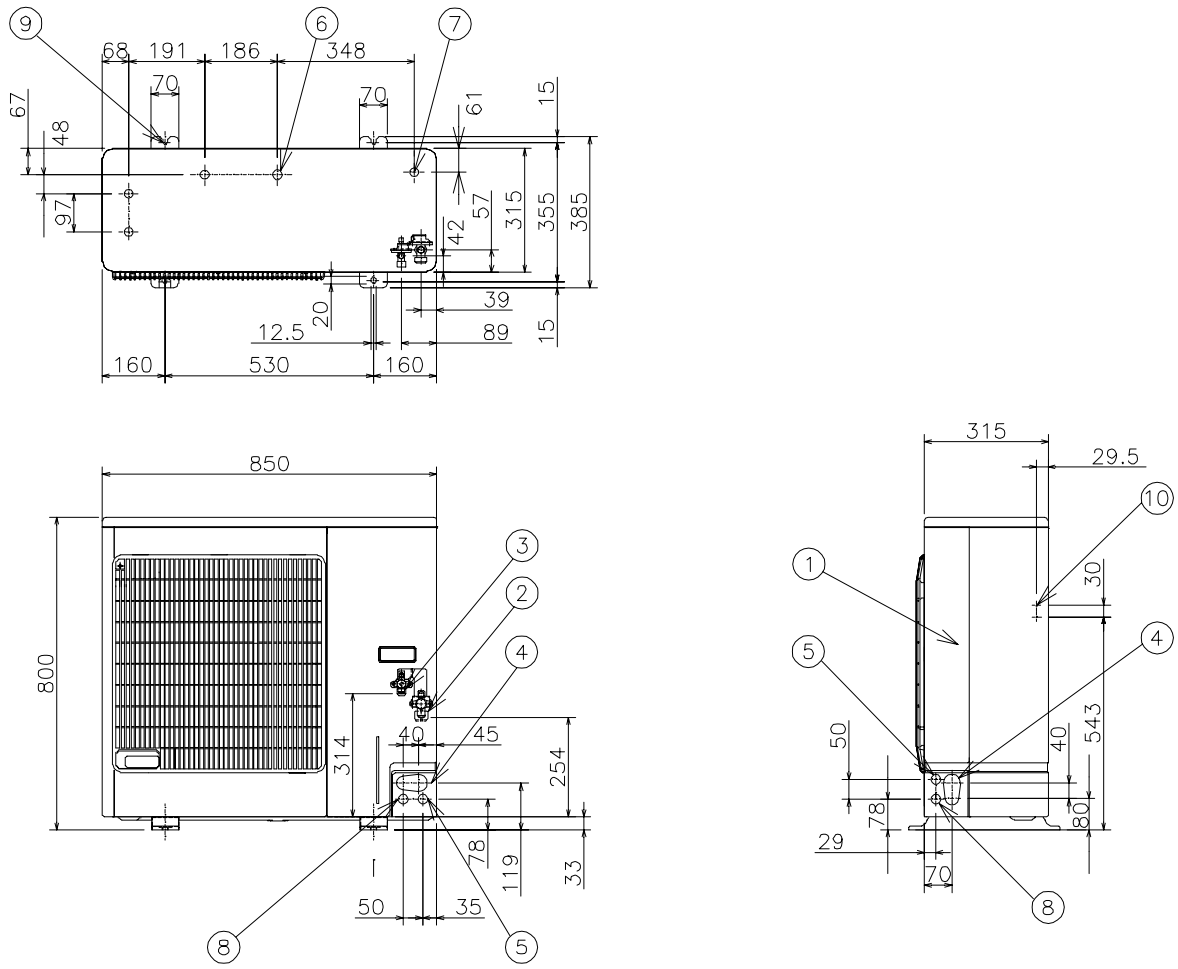
Mark	Name	Remarks
1	Air Inlet	-
2	Air Outlet	-
3	Refrigerant Gas Line	Ø h Flare Nut
4	Refrigerant Liquid Line	Ø i Flare Nut
5	Condensate Drain Hose	Ø18.5 Outer Diameter

Mark	Name	Remarks
6	Air Filter	-
7	Fixing Hole on Wall	4-Ø14 mm (Rear)
8	Adjusting Screw	For Installation
9	Fixing Hole on Floor	4-Ø7 mm for Wood Screw (4-M4)
10	Fixing Hole on Floor	2-Ø12.5x18 mm for Bolts (2-M8)

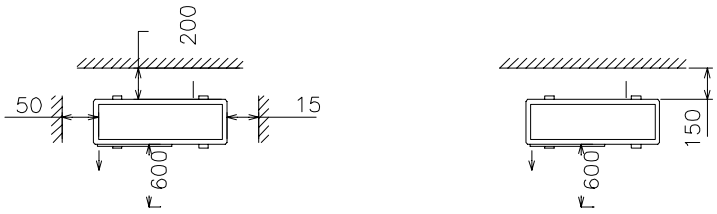
3.2. OUTDOOR UNITS MODELS

3.2.1. MODELS: RAS-(2~3)H(V)RNE / HN(V)E

Units: mm



Service Space



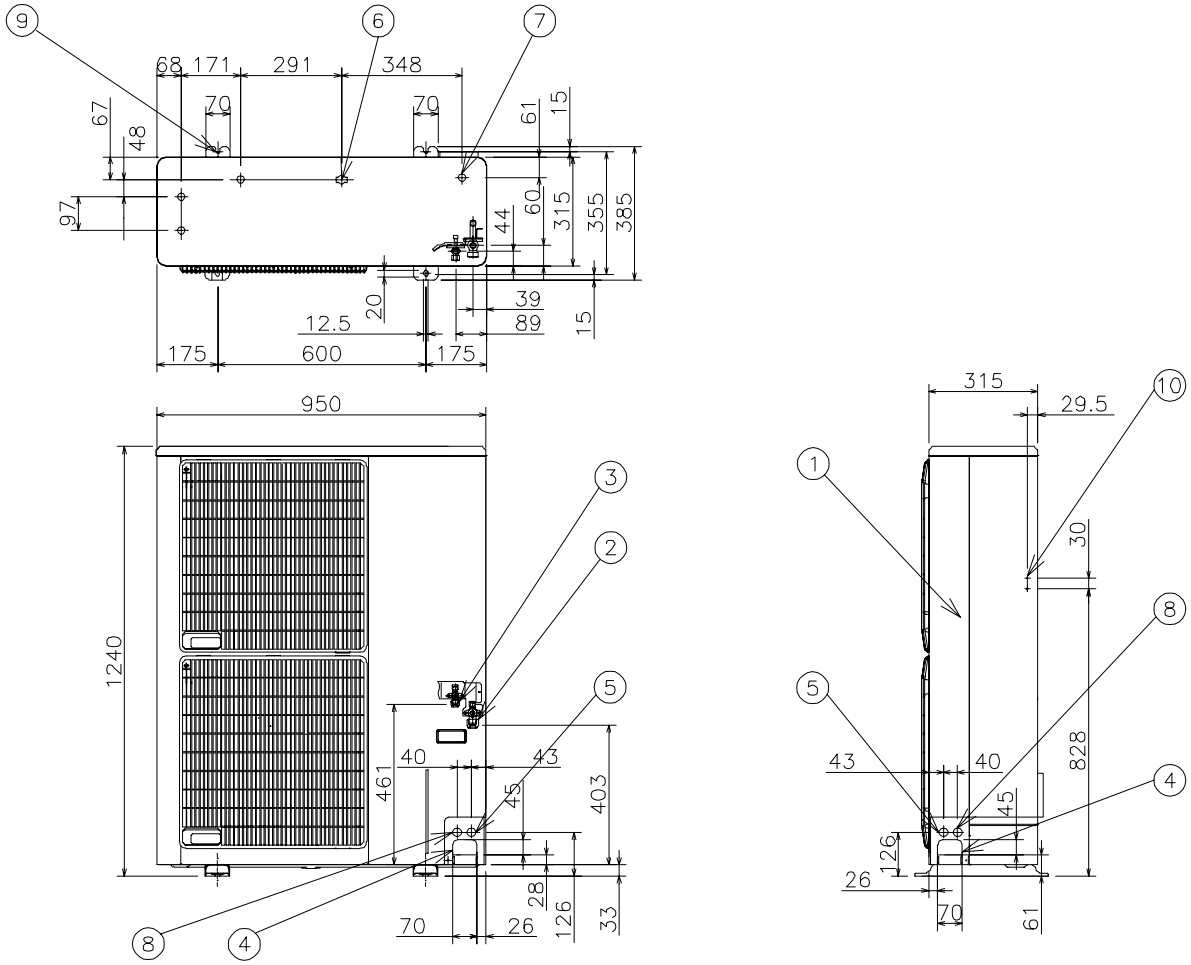
Mark	Name	Remarks
1	Service Cover	-
2	Refrigerant Gas Line	Piping Connection with Ø15.88 mm Flare Nut
3	Refrigerant Liquid Line	Piping Connection with Ø9.53 mm Flare Nut
4	Hole for Refrigerant Piping	(Knockout-Hole)
5	Hole for Control Line Wiring	Ø26.5 Knockout-Hole
6	Hole for Condensate Drain	(Ø26)
7	Hole for Condensate Drain	(4-Ø24)
8	Hole for Power Supply Wiring	Ø26.5 Knockout-Hole
9	2-U Cut Holes	-
10	4-Holes for fixing the unit to the wall (Both sides)	(M5 Tapping Screw)

NOTES:

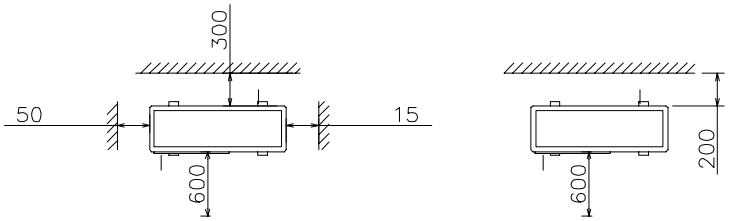
1. *If there are no walls in front or behind the unit, a service space of 600 mm for the front and 200 mm for the rear is still required.*
2. *If there are walls around the unit, then vent holes must be made through the wall.*
3. *When there are obstacles above the unit, the four surrounding sides must be kept open.*

3.2.2. MODELS: RAS-(4~6)H(V)RNE / HN(V)E

Units: mm



Service Space



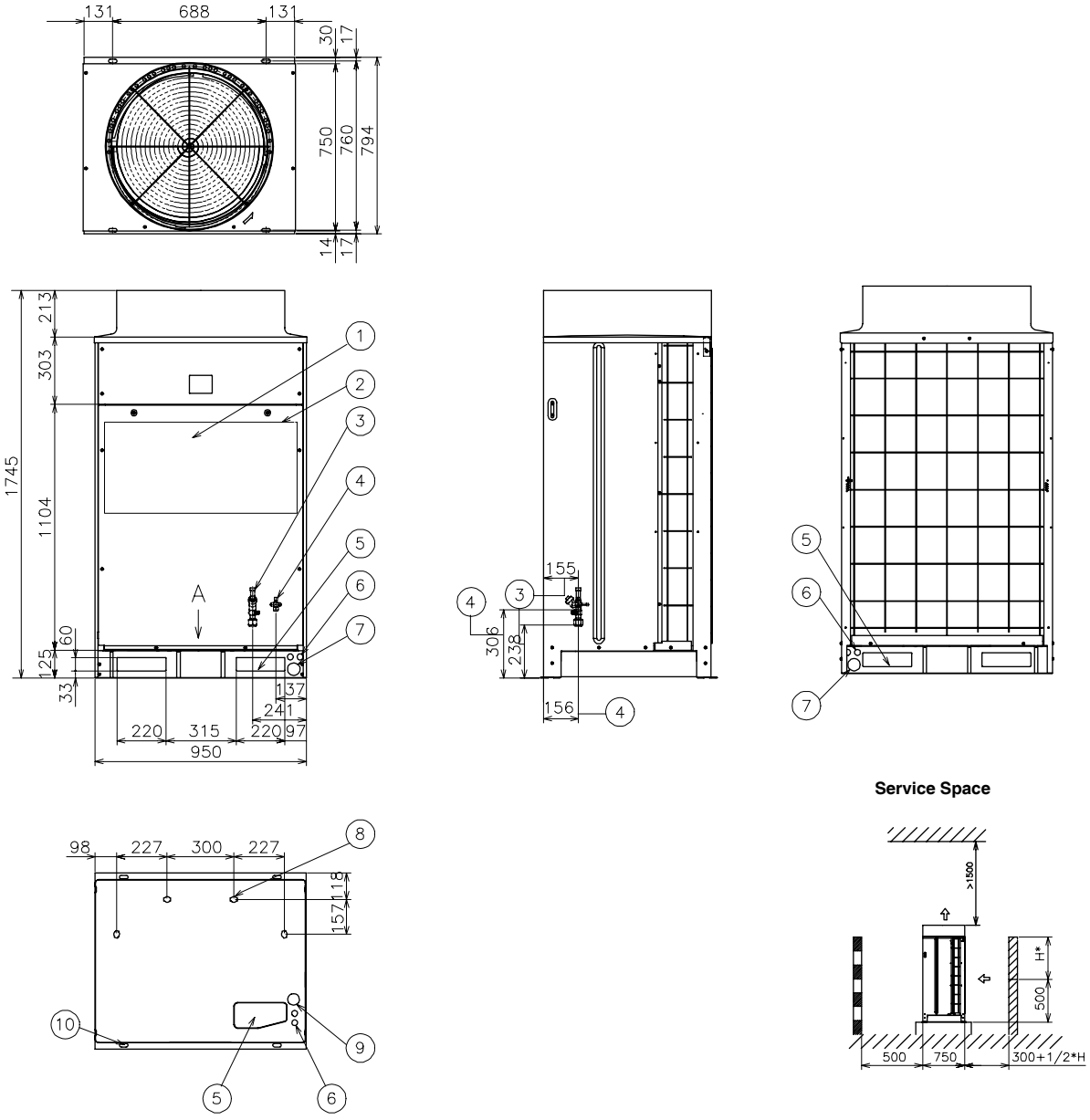
Mark	Name	Remarks
1	Service Cover	-
2	Refrigerant Gas Line	Piping Connection with Ø15.88 mm Flare Nut
3	Refrigerant Liquid Line	Piping Connection with Ø9.53 mm Flare Nut
4	Hole for Refrigerant Piping	(Knockout-Hole)
5	Hole for Control Line Wiring	Ø26.5 Knockout-Hole
6	Hole for Condensate Drain	(Ø26)
7	Hole for Condensate Drain	(4-Ø24)
8	Hole for Power Supply Wiring	Ø26.5 Knockout-Hole
9	2-U Cut Holes	-
10	4-Holes for fixing the unit to the wall (Both sides)	(M5 Tapping Screw)

NOTES:

1. *If there are no walls in front or behind the unit, a service space of 600 mm for the front and 300 mm for the rear is still required.*
2. *If there are walls around the unit, then vent holes must be made through the wall.*
3. *When there are obstacles above the unit, the four surrounding sides must be kept open.*

3.2.3. MODELS: RAS-(8~12)HRNE

Units: mm



Mark	Name	Remarks
1	Service Cover	
2	Electrical Control Box	
3	Refrigerant Gas Line	Piping Connection With 19.05 mm Flare Nut (8 HP) With 22.20 mm Brazing Flange (10 HP)
4	Refrigerant Liquid Line	Piping Connection with Ø9.53 mm Liquid Line
5	Holes for Refrigerant Piping	220×60 mm
6	Hole for Control Line Wiring	Ø26 x 2 mm
7	Hole for Power Supply Wiring	Ø56 mm
8	Hole for Condensate Drain	Ø26 x 4 mm
9	Hole for Power Supply Wiring	Ø52 mm
10	Holes for fixing to the floor	4

NOTES:

1. *If there is wall behind the unit higher than 500 mm, then the air intake space required at the rear of the unit is 300 + H/2 mm.*
2. *If there are no walls in front or behind the unit, a service space of 500 mm for the front and 300 mm for the rear is still required.*
3. *If there are walls around the unit, then vent holes must be made through the wall.*
4. *When there are obstacles above the unit, the four surrounding sides must be kept open.*

4 CAPACITIES AND SELECTION DATA

This chapter is a guide for selecting the most suitable units for your requirements and shows performance details of each unit of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

4.1. SYSTEM SELECTION PROCEDURE

This subchapter shows how to select a suitable model for certain requirements.

4.1.1. HOW TO USE THE DATA FROM THIS CHAPTER

When your requirements are defined (load, working temperatures and installation requirements) is necessary to select the most suitable units.

To calculate the suitable units use the following information:

From chapter 4:

- Combinability from subchapter 4.2
- Cooling capacity data from subchapter 4.4
- Heating capacity data from subchapter 4.5
- Piping length and lift correction factor from subchapter 4.6.1
- Defrost correction factor from subchapter from 4.6.3
- Sensible heat factor from subchapter 4.6.2
- If a duct type unit is selected subchapter 4.7
- Air flow distribution from subchapter 4.8
- Sound data from subchapter 4.9
- Operation space from subchapter 4.10

Use also the following data:

- General data from Chapter 2

If duct type unit is selected, the fan performance for duct calculation should be considered, as subchapter 4.7. shows. The units are designed with three possible static pressure ranges in order to adapt it to all installation necessities.

4.1.2. SELECTION EXAMPLE FOR COOLING LOAD

In order to show how to select the units characteristics', we define the following requirements:

☛ **Step 0: System requirements**

Cooling load:
Total maximum cooling load: 12.5 kW
Sensible heat load: 8.0 kW
Outdoor Air inlet Dry Bulb Temperature: 40 °C
Indoor Air inlet Dry Bulb Temperature: 26 °C
Indoor Air inlet Wet Bulb Temperature: 18 °C

Installation restrictions:
Power source: 230 V, 1~, 50 Hz.
Outdoor unit under indoor unit: 15.0 meters.
Total equivalent distance between Indoor Unit and Outdoor Unit: 20 meters

Indoor units type:
In this case Twin System with an RPK-FSNM and RPC-FSNE indoor units is required.

☛ **Step 1: Select outdoor unit capacity performance**

Pre-select an outdoor unit according to the required cooling load at defined temperatures (outdoor air inlet dry bulb and indoor air inlet wet bulb). Selected unit must have a bigger cooling capacity than the cooling capacity required.

Use cooling capacity data from subchapter 4.4.

	CR	Outdoor Air Inlet Temperature DB (°C)	Indoor air inlet temperature WB (°C) / (DB (°C))			
			14°(20°)	16°(23°)	18°(25°)	19°(27°)
			Capacity	Capacity	Capacity	Capacity
RAS-5HVRNE	0,61	10	14,24	15,12	16,01	16,38
		15	13,82	14,68	15,54	15,91
		21	13,42	14,26	15,09	15,46
		25	13,03	13,84	14,65	15,02
		30	12,59	13,40	14,21	14,58
		35	12,00	12,83	13,63	14,00
		40	11,29	12,10	12,91	13,26

Table 1 -Cooling Capacity Data (kW)

Apply a correction factor according to piping length and lift (subchapter 4.6.1) to the cooling capacity from table 1:

System cooling capacity = cooling capacity x correction factor = 12.91 x 0.94 = **12.14 kW**

We conclude that the most suitable Outdoor unit for the system requirements is **RAS-5HVRNE**.

Capacity Ratio

Selected Model		RPK-2.5	RPK2.5	Total
Nominal Cooling Capacity	kW	6.3	6.3	12.6
NominalhHeating Capacity	kW	7.0	7.0	14.0

Ratios for Cooling and Heating Capacity:

RPK-2.5

Cooling Ratio $\frac{6.3}{(6.3+6.3)} = 0.5$

RPC-2.5

Cooling Ratio $\frac{6.3}{(6.3+6.3)} = 0.5$

RPK-2.0 – 3.0

Cooling Ratio (2.0) $\frac{5}{(5+7.1)} = 0.41$

Cooling Ratio (3.0) $\frac{6.3}{(5+7.1)} = 0.58$

☛ Step 2: Indoor unit capacity performance

Select the indoor units according to your specific requirements. In this case Twin System using a RPK and RPC unit is required. See combinability from subchapter 4.2 for allowed indoor units.

In this case outdoor unit selected (step 1) is a **RAS-5HVRNE** (allows to be combined with RPK-2.5FSNM and RPC-2.5FSNE indoor units).

Once outdoor unit and indoor units have been selected is necessary to adjust the indoor unit nominal capacity to the system.

A. Outdoor unit fix the system cooling capacity.

B. To calculate indoor unit capacity apply the indoor unit distribution ratios to the system cooling capacity.

		RAS-5HVRNE	RPC-2.5FSNE	RPK-2.5FSNM
A	Cooling capacity	12.14		
B	Unit performance Capacity		=12.14x0.5	=12.14x0.5
			=6.07KW	=6.07KW
SYSTEM CAPACITY		**12.14 kW**	**6.07 KW**	**6.07 KW**

☛ Step 3: Sensible heat capacity (SHC)

System requirements specify a sensible heat load equal to 8kW. When unit performance capacity is defined is possible to calculate sensible heat capacity for each indoor unit.

From subchapter 4.6.2 get Sensible heat factor SHF for high fan speed.

Calculate sensible heat corrected factor for all indoor units using the formula:

SHC = unit performance capacity x SHF

$SHC_{RPC} = 6.07 \times 0.72 = 4.37$ *kW*
$SHC_{RPK} = 6.07 \times 0.72 = 4.37$ *kW*

Capacity data consider a 50% HR condition. Therefore 18°C WB air inlet temperature conditions has a 25°C DB temperature.

Difference between system required indoor air inlet dry bulb temperature (26°C) and cooling capacity data indoor air inlet dry bulb temperature (25°C) makes necessary to adjust the sensible heat corrected for each indoor unit. Use the following formula:

$SHC_c = SHC + CR \times (DB_r - DB)$

where
SHC_c *corrected sensible heat capacity (kW).*
SHC sensible heat capacity (kW).
CR correction ratio (from subchapter 4.4).
DB_r *evaporator dry bulb temp (°C).*
DB evaporator dry bulb temp (°C) or interpolated for each WB in the table.

For the example system:

$SHCc_{RPC} = 4.37 + 0.61x(26-25) = 4.98$ *kW*
$SHCc_{RPK} = 4.37 + 0.61x(26-25) = 4.98$ *kW*

System sensible heat capacity is:

$SHCc = SHCc_{RPC} + SHCc_{RPK} = 4.98 + 4.98 = 9.96$

4.1.3. SELECTION EXAMPLE FOR HEATING LOAD

In order to show how to select system units characteristics, we define the following requirements:

☛ Step 0: System requirements

Heating load:
Total heating load: 15.5 kW
Outdoor Air inlet Wet Bulb Temperature: 0°C
Indoor Air inlet Dry Bulb Temperature: 18°C

Installation restrictions:
Power source: 230 V, 1~, 50 Hz.
Outdoor unit under indoor unit: 15.0 metres.
Total equivalent distance between Indoor Unit and Outdoor Unit: 20 meters

Indoor units type:
In this case Twin System with an RPK-FSNM and RPC-FSNE indoor units is required.

☛ Step 1: Select outdoor unit capacity performance

Pre-select an outdoor unit according to the required heating load at defined temperatures (outdoor air inlet and indoor air inlet wet bulb). Selected unit must have a bigger heating capacity than the heating capacity required.

Use heating capacity data from subchapter 4.5

	Outdoor Air Inlet Temperature WB (°C)	Indoor Air Inlet Temperature DB (°C)			
		14°	16°	18°	20°
		CAPmax	CAPmax	CAPmax	CAPmax
RAS-5HVRNE	15°	21,15	21,08	21,00	20,91
	10°	19,57	19,49	19,41	19,32
	6°	18,24	18,16	18,08	18,00
	5°	17,99	17,90	17,82	17,73
	0°	16,52	16,45	16,37	16,29
	-5°	15,11	15,01	14,93	14,85
	-10°	13,66	13,58	13,49	13,40
	-15°	12,18	12,10	12,02	11,94

Table 2 -Heating Capacity data-

Apply a correction factor according to piping length and lift (subchapter 4.6.1) to the heating capacity from table 2.

System heating capacity = heating capacity x defrost correction factor x piping length correction factor =
= 16.37 x 0.81 x 0.99 = **13.13 kW**

We conclude that the most suitable Outdoor unit for the system requirements is **RAS-5HVRNE**.

☛ Step 2: Indoor unit performance capacity

Select the indoor units according to your specific requirements. In this case Twin System using a RPK and RPC unit is required. See combinability from subchapter 4.2 for allowed indoor units.

In this case outdoor unit selected (step 1) is a RAS-5HVRNE (allows to be combined with RPK-2.5FSNM and RPC-2.5FSNE indoor units).

Once outdoor unit and indoor units have been selected is necessary to adjust the indoor unit nominal capacity to the system.

A. Outdoor unit fix the system cooling capacity.
B. To calculate indoor unit capacity apply the indoor unit distribution ratios to the system cooling capacity.

		RAS-5HVRNE	RPC-2.0FSNE	RPK-3.0FSNM
A	Heating capacity	13.13 kW		
B	Unit performance capacity		=13.13x0.5 =6.57 kW	=13.13x0.5 =6.57 kW
SYSTEM CAPACITY		**13.13 kW**	**6.57 kW**	**6.57 kW**

4.2. COMBINABILITY

The new UTOPIA DC-INVERTER H(V)RNE series increase the flexibility of installation.

It allows the connection between different types of Indoor Units with the same Outdoor Units.

The different possible combinations are indicated in the table below.

UTOPIA DC-INVERTER H(V)RNE Series
Indoor Units possible Combinations

Model – Horse power–	Combinations	RCI-1.5 RCIM-1.5 RCD-1.5 RPI-1.5 RPK-1.5 RPF-1.5 RPFI-1.5	RCI-2.0 RCIM-2.0 RCD-2.0 RPC-2.0 RPI-2.0 RPK-2.0 RPF-2.0 RPFI-2.0	RCI-2.5 RCD-2.5 RPC-2.5 RPI-2.5 RPK-2.5 RPF-2.5 RPFI-2.5	RCI-3.0 RCD-3.0 RPC-3.0 RPI-3.0 RPK-3.0	RCI-4.0 RCD-4.0 RPC-4.0 RPI-4.0 RPK-4.0	RCI-5.0 RCD-5.0 RPC-5.0 RPI-5.0	RCI-6.0 RPC-6.0 RPI-6.0	RPI-8.0	RPI-10.0
RAS-2HVRNE	Single	-	1	-	-	-	-	-	-	-
RAS-2.5HVRNE	Single	-	-	1	-	-	-	-	-	-
RAS-3HVRNE	Single	-	-	-	1	-	-	-	-	-
	Twin	2	-	-	-	-	-	-	-	-
RAS-4H(V)RNE	Single	-	-	-	-	1	-	-	-	-
	Twin	-	2	-	-	-	-	-	-	-
RAS-5H(V)RNE	Single	-	-	-	-	-	1	-	-	-
	Twin	-	-	2	-	-	-	-	-	-
RAS-6HRNE	Single	-	-	-	-	-	-	1	-	-
	Twin	-	-	-	2	-	-	-	-	-
	Triple	-	3	-	-	-	-	-	-	-
RAS-8HRNE	Single	-	-		-		-	-	1	-
	Twin	-	-		-	4	-	-	-	-
	Triple	-	-	2	1	-	-	-	-	-
	Quad	-	4	-	-	-	-	-	-	-
RAS-10HRNE	Single	-	-	-	-	-	-	-	-	1
	Twin	-	-	-	-	-	2	-	-	-
		-	-	-	-	1	-	1	-	-
	Triple	-	-	-	2	1	-	-	-	-
	Quad	-	-	4	-	-	-	-	-	-
RAS-12HRNE	Twin	-	-	-	-	-	-	2	-	-
	Triple	-	-	-	-	3	-	-	-	-
	Quad	-	-	2	1	1	-	-	-	-
		-	-	-	4	-	-	-	-	-

UTOPIA H(V)NE Series
Indoor Units possible Combinations

Model – Horse power–	Combinations	RCI-1.5 RCIM-1.5 RCD-1.5 RPI-1.5 RPK-1.5 RPF-1.5 RPFI-1.5	RCI-2.0 RCIM-2.0 RCD-2.0 RPC-2.0 RPI-2.0 RPK-2.0 RPF-2.0 RPFI-2.0	RCI-2.5 RCD-2.5 RPC-2.5 RPI-2.5 RPK-2.5 RPF-2.5 RPFI-2.5	RCI-3.0 RCD-3.0 RPC-3.0 RPI-3.0 RPK-3.0	RCI-4.0 RCD-4.0 RPC-4.0 RPI-4.0 RPK-4.0	RCI-5.0 RCD-5.0 RPC-5.0 RPI-5.0	RCI-6.0 RPC-6.0 RPI-6.0	RPI-8.0	RPI-10.0
RAS-2.5HN(V)E	Single	-	-	1	-	-	-	-	-	-
RAS-3HN(V)E	Single	-	-	-	1	-	-	-	-	-
	Twin	2	-	-	-	-	-	-	-	-
RAS-4HN(V)E	Single	-	-	-	-	1	-	-	-	-
	Twin	-	2	-	-	-	-	-	-	-
RAS-5HNE	Single	-	-	-	-	-	1	-	-	-
	Twin	-	-	2	-	-	-	-	-	-

***NOTE**:*
RPF(I) can not be connected with another unit in a Twin, Triple or Quad combination due to lift restriction between Indoor Units.

4.3. STANDARD COOLING AND HEATING CAPACITY TABLES

■ Heat Pump combinations

HVRNE Units

Outdoor Unit	Type	Indoor Unit	Input Power [kW] (Cooling)	Cooling Capacity [kW]	EER	Cooling Performance	Input Power [kW] (Heat)	Heat Capacity [kW]	COP	Heating Performance
RAS-2HVRNE	Heat Pump	RCI-2.0FSN1E	1,24	5,00	4,03	A	1,41	5,60	3,96	A
		RCIM-2.0FSN	1,24	5,00	4,03	A	1,39	5,60	4,02	A
		RCD-2.0FSN	1,33	5,00	3,76	A	1,43	5,60	3,90	A
		RPC-2.0FSNE	1,33	5,00	3,76	A	1,43	5,60	3,90	A
		RPI-2.0FSNE	1,22	5,00	4,10	A	1,39	5,60	4,02	A
		RPK-2.0FSNM	1,28	5,00	3,91	A	1,45	5,60	3,85	A
		RPF(I)2.0FSNE	1,28	5,00	3,91	A	1,45	5,60	3,85	A
RAS-2.5HVRNE	Heat Pump	RCI-2.5FSN1E	1,59	6,30	3,96	A	1,62	7,00	4,32	A
		RCD-2.5FSN	1,68	6,30	3,75	A	1,71	7,00	4,09	A
		RPC-2.5FSNE	1,69	6,30	3,73	A	1,63	7,00	4,28	A
		RPI-2.5FSNE	1,63	6,30	3,86	A	1,66	7,00	4,22	A
		RPK-2.5FSNM	1,56	6,30	4,04	A	1,59	7,00	4,39	A
		RPF(I)2.5FSNE	1,62	6,30	3,89	A	1,65	7,00	4,23	A
RAS-3HVRNE	Heat Pump	RCI-3.0FSN1E	1.95	7.10	3.64	A	1.93	8.00	4.15	A
		RPC-3.0FSNE	2.03	7.10	3.50	A	2.01	8.00	3.98	A
		RPI-3.0FSNE	2.02	7.10	3.51	A	2.00	8.00	4.00	A
		RPK-3.0FSNM	1.95	7.10	3.64	A	1.93	8.00	4.15	A
		RCD-3.0FSN	1.98	7.10	3.58	A	1.96	8.00	4.09	A
		RCI-1.5FSN1E x2	1.96	7.10	3.62	A	1.94	8.00	4.13	A
		RCIM-1.5FSN x2	1.96	7.10	3.62	A	1.94	8.00	4.13	A
		RPI-1.5FSNE x2	2.01	7.10	3.54	A	1.98	8.00	4.03	A
		RPF(I)-1.5FSNE x2	1.94	7.10	3.66	A	1.92	8.00	4.17	A
		RPK-1.5FSNM x2	1.92	7.10	3.70	A	1.90	8.00	4.22	A
		RPK-1.5FSN1M x2	1.92	7.10	3.70	A	1.90	8.00	4.22	A
		RCD-1.5FSN x2	2.00	7.10	3.55	A	1.98	8.00	4.05	A
RAS-4HVRNE	Heat Pump	RCI-4.0FSN1E	2.60	10.00	3.85	A	2.55	11.20	4.39	A
		RPC-4.0FSNE	2.67	10.00	3.75	A	2.62	11.20	4.27	A
		RPI-4.0FSNE	2.62	10.00	3.82	A	2.57	11.20	4.36	A
		RCD-4.0FSN	2.62	10.00	3.82	A	2.57	11.20	4.36	A
		RPK-4.0FSNM	2.58	10.00	3.88	A	2.53	11.20	4.42	A
		RCI-2.0FSN1E x2	2.59	10.00	3.86	A	2.54	11.20	4.41	A
		RCIM-2.0FSN x2	2.59	10.00	3.86	A	2.54	11.20	4.41	A
		RPC-2.0FSNE x2	2.77	10.00	3.61	A	2.72	11.20	4.12	A
		RPI-2.0FSNE x2	2.77	10.00	3.61	A	2.72	11.20	4.12	A
		RPF(I)-2.0FSNE x2	2.67	10.00	3.75	A	2.62	11.20	4.27	A
		RPK-2.0FSNM x2	2.55	10.00	3.93	A	2.50	11.20	4.48	A
		RCD-2.0FSN x2	2.67	10.00	3.75	A	2.62	11.20	4.27	A
RAS-5HVRNE	Heat Pump	RCI-5.0FSN1E	3.58	12.50	3.49	-	3.40	14.00	4.12	-
		RPC-5.0FSNE	3.67	12.50	3.40	-	3.49	14.00	4.01	-
		RPI-5.0FSNE	3.67	12.50	3.41	-	3.49	14.00	4.01	-
		RCD-5.0FSN	3.63	12.50	3.44	-	3.45	14.00	4.06	-
		RCI-2.5FSN1E x2	3.56	12.50	3.51	-	3.38	14.00	4.14	-
		RPC-2.5FSNE x2	3.74	12.50	3.34	-	3.56	14.00	3.93	-
		RPI-2.5FSNE x2	3.76	12.50	3.33	-	3.57	14.00	3.92	-
		RPF(I)-2.5FSNE x2	3.62	12.50	3.45	-	3.44	14.00	4.07	-
		RPK-2.5FSNM x2	3.62	12.50	3.45	-	3.44	14.00	4.07	-
		RCD-2.5FSN x2	3.64	12.50	3.43	-	3.46	14.00	4.05	-

HRNE Units

Outdoor Unit	Type	Indoor Unit	Input Power [kW] (Cooling)	Cooling Capacity [kW]	EER	Cooling Performance	Input Power [kW] (Heat)	Heat Capacity [kW]	COP	Heating Performance
RAS-4HRNE	Heat Pump	RCI-4.0FSN1E	2.60	10.00	3.85	A	2.55	11.20	4.39	A
		RPC-4.0FSNE	2.67	10.00	3.75	A	2.62	11.20	4.27	A
		RPI-4.0FSNE	2.62	10.00	3.82	A	2.57	11.20	4.36	A
		RCD-4.0FSN	2.62	10.00	3.82	A	2.57	11.20	4.36	A
		RPK-4.0FSNM	2.58	10.00	3.88	A	2.53	11.20	4.42	A
		RCI-2.0FSN1E x2	2.59	10.00	3.86	A	2.54	11.20	4.41	A
		RCIM-2.0FSN.x2	2.59	10.00	3.86	A	2.54	11.20	4.41	A
		RPC-2.0FSNE x2	2.77	10.00	3.61	A	2.72	11.20	4.12	A
		RPI-2.0FSNE x2	2.77	10.00	3.61	A	2.72	11.20	4.12	A
		RPF(I)-2.0FSNE x2	2.67	10.00	3.75	A	2.62	11.20	4.27	A
		RPK-2.0FSNM x2	2.55	10.00	3.93	A	2.50	11.20	4.48	A
		RCD-2.0FSN x2	2.67	10.00	3.75	A	2.62	11.20	4.27	A
RAS-5HRNE	Heat Pump	RCI-5.0FSN1E	3.58	12.50	3.49	-	3.40	14.00	4.12	-
		RPC-5.0FSNE	3.67	12.50	3.40	-	3.49	14.00	4.01	-
		RPI-5.0FSNE	3.67	12.50	3.41	-	3.49	14.00	4.01	-
		RCD-5.0FSN	3.63	12.50	3.44	-	3.45	14.00	4.06	-
		RCI-2.5FSN1E x2	3.56	12.50	3.51	-	3.38	14.00	4.14	-
		RPC-2.5FSNE x2	3.74	12.50	3.34	-	3.56	14.00	3.93	-
		RPI-2.5FSNE x2	3.76	12.50	3.33	-	3.57	14.00	3.92	-
		RPF(I)-2.5FSNE x2	3.62	12.50	3.45	-	3.44	14.00	4.07	-
		RPK-2.5FSNM x2	3.62	12.50	3.45	-	3.44	14.00	4.07	-
		RCD-2.5FSN x2	3.64	12.50	3.43	-	3.46	14.00	4.05	-
RAS-6HRNE	Heat Pump	RCI-6.0FSN1E	4,39	14,00	3,19	-	4,23	16,00	3,78	-
		RPC-6.0FSNE	4,44	14,00	3,15	-	4,28	16,00	3,74	-
		RPI-6.0FSNE	4,43	14,00	3,16	-	4,28	16,00	3,74	-
		RCI-3.0FSN1E x2	4,39	14,00	3,19	-	4,23	16,00	3,78	-
		RPC-3.0FSNE x2	4,55	14,00	3,08	-	4,39	16,00	3,64	-
		RPI-3.0FSNE x2	4,54	14,00	3,08	-	4,38	16,00	3,65	-
		RPK-3.0FSNM x2	4,39	14,00	3,19	-	4,23	16,00	3,78	-
		RCD-3.0FSN x2	4,45	14,00	3,15	-	4,29	16,00	3,73	-
RAS-8HRNE	Heat Pump	RPI-8.0FSNE	6,42	20,00	3,11	-	6,53	22,40	3,43	-
		RCI-4-0FSN1E x2	6,31	20,00	3,17	-	6,42	22,40	3,49	-
		RPC-4.0SNE x2	6,48	20,00	3,09	-	6,59	22,40	3,40	-
		RPI-4.0FSNE x2	6,45	20,00	3,10	-	6,56	22,40	3,41	-
		RPK-4.0FSNM x2	6.27	20,00	3.24	-	6,38	22,40	3,51	-
		RCD-4.0FSN x2	6,35	20,00	3,15	-	6,46	22,40	3,47	-
RAS-10HRNE	Heat Pump	RPI-10.0FSNE	8,26	25,00	3,03	-	8,76	28,00	3,20	-
		RCI-5.0FSN1E x2	8,22	25,00	3,04	-	8,72	28,00	3,21	-
		RPC-5.0FSNE x2	8,55	25,00	2,92	-	9,05	28,00	3,09	-
		RPI-5.0FSNE x2	8,40	25,00	2,98	-	8,90	28,00	3,15	-
		RCD-5.0FSN x2	8,32	25,00	3,00	--	8,82	28,00	3,17	-
RAS-12HRNE	Heat Pump	RCI-6.0FSN1Ex2	10,64	30,00	2,82	-	11,13	33,50	3,01	-
		RPC-6.0FSNE x2	10,74	30,00	2,79	-	11,23	33,50	2,98	-
		RPI-6.0FSNE x2	10,88	30,00	2,76	-	11,37	33,50	2,95	-

HNVE Units

Outdoor Unit	Type	Indoor Unit	Input Power [kW] (Cooling)	Cooling Capacity [kW]	EER	Cooling Performance	Input Power [kW] (Heat)	Heat Capacity [kW]	COP	Heating Performance
RAS-2.5HNVE	Heat Pump	RCI-2.5FSN1E	6,3	2,2	2,86	C	7	2,19	3,2	D
		RPC-2.5FSNE	6,3	2,29	2,75	D	7	2,28	3,07	D
		RPI-2.5FSNE	6,3	2,38	2,65		7	2,37	2,95	
		RPF(I)-2.5FSNE	6,3	2,23	2,83	C	7	2,22	3,15	D
		RPK-2.5FSNM	6,3	2,23	2,83	C	7	2,22	3,15	D
		RCD-2.5FSN	6,3	2,34	2,69	D	7	2,23	3,14	D
RAS-3HNVE	Heat Pump	RCI-3.0FSN1E	7,1	2,4	2,96	C	8	2,33	3,43	B
		RPC-3.0FSNE	7,1	2,48	2,86	C	8	2,41	3,32	C
		RPI-3.0FSNE	7,1	2,55	2,78		8	2,48	3,23	
		RPK-3.0FSNM	7,1	2,4	2,96	C	8	2,33	3,43	B
		RCD-3.0FSN	7,1	2,43	2,92	C	8	2,36	3,39	C
RAS-4HNVE	Heat Pump	RCI-4.0FSN1E	10	3,18	3,14	B	11,2	3,17	3,53	B
		RPC-4.0FSNE	10	3,25	3,08	B	11,2	3,24	3,46	B
		RPI-4.0FSNE	10	3,33	3		11,2	3,32	3,37	
		RPK-4.0FSNM	10	3,19	3,13	B	11,2	3,19	3,51	B
		RCD-4.0FSN	10	3,16	3,16	B	11,2	3,15	3,56	B

HNE Units

Outdoor Unit	Type	Indoor Unit	Input Power [kW] (Cooling)	Cooling Capacity [kW]	EER	Cooling Performance	Input Power [kW] (Heat)	Heat Capacity [kW]	COP	Heating Performance
RAS-2.5HNE	Heat Pump	RCI-2.5FSN1E	6,3	2,2	2,86	C	7	2,19	3,2	D
		RPC-2.5FSNE	6,3	2,29	2,75	D	7	2,28	3,07	D
		RPI-2.5FSNE	6,3	2,38	2,65		7	2,37	2,95	
		RPF(I)-2.5FSNE	6,3	2,23	2,83	C	7	2,22	3,15	D
		RPK-.5FSNM	6,3	2,23	2,83	C	7	2,22	3,15	D
		RCD-2.5FSN	6,3	2,34	2,69	D	7	2,23	3,14	D
RAS-3HNE	Heat Pump	RCI-3.0FSN1E	7,1	2,4	2,96	C	8	2,33	3,43	B
		RPC-3.0FSNE	7,1	2,48	2,86	C	8	2,41	3,32	C
		RPI-3.0FSNE	7,1	2,55	2,78		8	2,48	3,23	
		RPK-3.0FSNM	7,1	2,4	2,96	C	8	2,33	3,43	B
		RCD-3.0FSN	7,1	2,43	2,92	C	8	2,36	3,39	C
RAS-4HNE	Heat Pump	RCI-4.0FSN1E	10	3,18	3,14	B	11,2	3,17	3,53	B
		RPC-4.0FSNE	10	3,25	3,08	B	11,2	3,24	3,46	B
		RPI-4.0FSNE	10	3,33	3		11,2	3,32	3,37	
		RPK-4.0FSNM	10	3,19	3,13	B	11,2	3,19	3,51	B
		RCD-4.0FSN	10	3,16	3,16	B	11,2	3,15	3,56	B
RAS-5HNE	Heat Pump	RCI-5.0FSN1E	12,5	4,21	2,97		14	4,28	3,27	
		RPC-5.0FSNE	12,5	4,3	2,91		14	4,38	3,2	
		RPI-5.0FSNE	12,5	4,45	2,81		14	4,52	3,1	
		RCD-5.0FSN	12,5	4,27	2,93		14	4,33	3,23	

NOTE:

Defrost factor is included

The nominal cooling and heating capacity is the combined capacity of the HITACHI standard split system, and are based on the ISO13253 for RPI Type and ISO 5151 for the rest of the models

Operation Conditions	Cooling	Heating
Indoor Air Inlet Temperature	27.0 °C DB	20.0 °C DB
	19.0 °C WB	
Outdoor Air Inlet Temperature	35.0 °C DB	7.0 °C DB
		6.0 °C WB

Piping Length: 7.5 meters **DB:** Dry Bulb; **WB:** Wet Bulb

Performance Class	Multi-split conditioner	
	Cooling	Heating
A	3.20 < EER	3.60 < COP
B	3.20 ≥ EER > 3.00	3.60 ≥ COP > 3.40
C	3.00 ≥ EER > 2.80	3.40 ≥ COP > 3.20
D	2.80 ≥ EER > 2.60	3.20 ≥ COP > 2.80
E	2.60 ≥ EER > 2.40	2.80 ≥ COP > 2.60
F	2.40 ≥ EER > 2.20	2.60 ≥ COP > 2.40
G	2.20 ≥ EER	2.40 ≥ COP

4.4. COOLING CAPACITY

HVRNE Units

Outdoor Unit	CR	Outdoor Air Inlet Temperature DB(°C)	Indoor Air Inlet Temperaure WET BULB (°C) / (DRY BULB (°C))						
			14°/(20°)	16°/(23°)	18°/(25°)	19°/(27°)	20°/(27°)	22°/(30°)	24°/(33°)
			Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
RAS-2HVRNE	0.24	10	5.82	6.20	6.57	6.73	6.91	7.20	7.40
		15	5.60	5.97	6.32	6.48	6.65	6.92	7.12
		20	5.38	5.74	6.08	6.23	6.39	6.65	6.84
		25	5.17	5.52	5.85	6.00	6.15	6.40	6.58
		30	4.94	5.28	5.60	5.78	5.91	6.16	6.34
		35	4.77	5.12	5.45	5.60	5.75	6.00	6.18
		40	4.58	4.92	5.25	5.41	5.55	5.80	5.99
RAS-2.5HVRNE	0.29	10	7.38	7.87	8.34	8.53	8.77	9.12	9.38
		15	7.09	7.56	8.02	8.21	8.43	8.77	9.02
		20	6.82	7.27	7.71	7.90	8.10	8.44	8.68
		25	6.56	6.99	7.41	7.61	7.79	8.11	8.34
		30	6.26	6.69	7.10	7.32	7.49	7.81	8.04
		35	6.05	6.49	6.90	7.10	7.29	7.61	7.84
		40	5.80	6.24	6.66	6.86	7.04	7.36	7.59
RAS-3HVRNE	0.37	10	8.31	8.86	9.39	9.61	9.88	10.28	10.57
		15	7.99	8.52	9.03	9.25	9.50	9.89	10.17
		20	7.69	8.20	8.68	8.90	9.13	9.51	9.78
		25	7.39	7.88	8.35	8.57	8.78	9.14	9.40
		30	7.05	7.54	8.00	8.25	8.44	8.80	9.06
		35	6.82	7.31	7.78	8.00	8.21	8.57	8.83
		40	6.54	7.03	7.50	7.73	7.93	8.29	8.55
RAS-4HVRNE	0.44	10	11.12	11.89	12.60	12.90	13.23	13.77	14.26
		15	10.80	11.54	12.23	12.53	12.85	13.37	13.84
		20	10.49	11.21	11.88	12.18	12.47	12.98	13.44
		25	10.18	10.88	11.53	11.83	12.11	12.60	13.05
		30	9.84	10.54	11.20	11.50	11.77	12.26	12.71
		35	9.55	10.25	10.89	11.20	11.48	11.97	12.42
		40	9.27	9.97	10.62	10.92	11.20	11.69	12.14
RAS-5HVRNE	0.61	10	14.24	15.12	16.01	16.38	16.76	17.32	17.81
		15	13.82	14.68	15.54	15.91	16.27	16.82	17.29
		20	13.42	14.26	15.09	15.46	15.80	16.33	16.79
		25	13.03	13.84	14.65	15.02	15.34	15.85	16.30
		30	12.59	13.40	14.21	14.58	14.91	15.41	15.86
		35	12.00	12.83	13.63	14.00	14.33	14.83	15.28
		40	11.29	12.10	12.91	13.26	13.61	14.11	14.56

HRNE Units

Outdoor Unit	CR	Outdoor Air Inlet Temperature DB(°C)	Indoor Air Inlet Temperaure WET BULB (°C) / (DRY BULB (°C))						
			14°/(20°)	16°/(23°)	18°/(25°)	19°/(27°)	20°/(27°)	22°/(30°)	24°/(33°)
			Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
RAS-4HRNE	0.44	10	11.12	11.89	12.60	12.90	13.23	13.77	14.26
		15	10.80	11.54	12.23	12.53	12.85	13.37	13.84
		20	10.49	11.21	11.88	12.18	12.47	12.98	13.44
		25	10.18	10.88	11.53	11.83	12.11	12.60	13.05
		30	9.84	10.54	11.20	11.50	11.77	12.26	12.71
		35	9.55	10.25	10.89	11.20	11.48	11.97	12.42
		40	9.27	9.97	10.62	10.92	11.20	11.69	12.14
RAS-5HRNE	0.61	10	14.24	15.12	16.01	16.38	16.76	17.32	17.81
		15	13.82	14.68	15.54	15.91	16.27	16.82	17.29
		20	13.42	14.26	15.09	15.46	15.80	16.33	16.79
		25	13.03	13.84	14.65	15.02	15.34	15.85	16.30
		30	12.59	13.40	14.21	14.58	14.91	15.41	15.86
		35	12.00	12.83	13.63	14.00	14.33	14.83	15.28
		40	11.29	12.10	12.91	13.26	13.61	14.11	14.56
RAS-6HRNE	0.66	10	17.80	18.90	20.01	20.48	20.95	21.65	22.26
		15	17.28	18.35	19.43	19.89	20.34	21.02	21.62
		20	16.78	17.82	18.86	19.33	19.75	20.41	20.99
		25	16.29	17.30	18.31	18.78	19.18	19.81	20.38
		30	15.74	16.75	17.76	18.23	18.64	19.26	19.83
		35	15.00	16.04	17.04	17.50	17.91	18.54	19.10
		40	14.11	15.13	16.14	16.58	17.01	17.64	18.20
RAS-8HRNE	0.45	10	20,32	21,62	22,91	23,55	24,66	26,83	29,01
		15	20,15	21,49	22,83	23,50	24,56	26,69	28,81
		20	19,94	21,30	22,66	23,34	24,34	26,34	28,34
		25	19,66	21,05	22,43	23,12	24,00	25,80	27,60
		30	19,33	20,72	22,10	22,80	23,54	25,07	26,58
		35	18,94	20,32	21,70	22,40	22,98	24,11	25,26
		40	18,50	19,86	21,25	21,92	22,27	22,98	23,66
RAS-10HRNE	0.61	10	25,40	27,03	28,64	29,44	30,83	33,54	36,26
		15	25,19	26,86	28,53	29,37	30,70	33,36	36,01
		20	24,93	26,63	28,33	29,18	30,43	32,93	35,43
		25	24,57	26,31	28,03	28,89	30,00	32,25	34,50
		30	24,16	25,90	27,63	28,50	29,43	31,34	33,23
		35	23,68	25,40	27,13	28,00	28,73	30,14	31,58
		40	23,13	24,83	26,56	27,40	27,84	28,73	29,58
RAS-12HRNE	0.66	10	30,39	32,33	34,26	35,22	36,88	40,13	43,39
		15	30,14	32,14	34,14	35,14	36,73	39,92	43,09
		20	29,82	31,85	33,89	34,91	36,40	39,39	42,38
		25	29,39	31,47	33,54	34,57	35,89	38,58	41,28
		30	28,91	30,99	33,05	34,10	35,20	37,49	39,75
		35	28,33	30,39	32,45	33,50	34,37	36,06	37,78
		40	27,67	29,70	31,78	32,78	33,31	34,37	35,38

Capacity: Capacity at compressor maximum frequency (KW)

HNVE Units

Outdoor Unit	CR	Outdoor Air Inlet Temperature DB(°C)	Indoor Air Inlet Temperaure WET BULB (°C) / (DRY BULB (°C))			
			16°/(23°)	18°/(25°)	20°/(27°)	22°/(30°)
			Capacity	Capacity	Capacity	Capacity
RAS-2.5HNVE	0,29	10	6,43	6,86	7,22	7,47
		15	6,25	6,67	7,02	7,28
		21	6,17	6,62	6,99	7,25
		25	6,11	6,49	6,87	7,12
		30	5,92	6,30	6,62	6,93
		35	5,73	6,11	6,49	6,74
		40	5,42	5,80	6,17	6,43
RAS-3HNVE	0,37	10	7,25	7,73	8,13	8,42
		15	7,04	7,51	7,91	8,20
		21	6,96	7,46	7,88	8,17
		25	6,89	7,31	7,74	8,02
		30	6,67	7,10	7,46	7,81
		35	6,46	2,48	7,31	7,60
		40	6,11	6,53	6,96	7,24
RAS-4HNVE	0,44	10	10,21	10,89	11,46	11,86
		15	9,92	10,58	11,14	11,55
		21	9,80	10,50	11,10	11,50
		25	9,70	10,30	10,90	11,30
		30	9,40	10,00	10,50	11,00
		35	9,10	9,70	10,30	10,70
		40	8,60	9,20	9,80	10,20

HNE Units

Outdoor Unit	CR	Outdoor Air Inlet Temperature DB(°C)	Indoor Air Inlet Temperaure WET BULB (°C) / (DRY BULB (°C))			
			16°/(23°)	18°/(25°)	20°/(27°)	22°/(30°)
			Capacity	Capacity	Capacity	Capacity
RAS-2.5HNE	0,29	10	6,43	6,86	7,22	7,47
		15	6,25	6,67	7,02	7,28
		21	6,17	6,62	6,99	7,25
		25	6,11	6,49	6,87	7,12
		30	5,92	6,30	6,62	6,93
		35	5,73	6,11	6,49	6,74
		40	5,42	5,80	6,17	6,43
RAS-3HNE	0,37	10	7,25	7,73	8,13	8,42
		15	7,04	7,51	7,91	8,20
		21	6,96	7,46	7,88	8,17
		25	6,89	7,31	7,74	8,02
		30	6,67	7,10	7,46	7,81
		35	6,46	2,48	7,31	7,60
		40	6,11	6,53	6,96	7,24
RAS-4HNE	0,44	10	10,21	10,89	11,46	11,86
		15	9,92	10,58	11,14	11,55
		21	9,80	10,50	11,10	11,50
		25	9,70	10,30	10,90	11,30
		30	9,40	10,00	10,50	11,00
		35	9,10	9,70	10,30	10,70
		40	8,60	9,20	9,80	10,20
RAS-5HNE	0,61	10	12,77	13,62	14,32	14,83
		15	12,40	13,23	13,93	14,44
		21	12,25	13,13	13,88	14,38
		25	12,13	12,88	13,63	14,13
		30	11,75	12,50	13,13	13,75
		35	11,38	12,13	12,88	13,38
		40	10,75	11,50	12,25	12,75

4.5. HEATING CAPACITY

H(V)RNE Units

Outdoor Unit	Outdoor Air Inlet Temperature WB (°C)	Indoor Air Inlet Temperature DB (°C)				
		16	18	20	22	24
		CAP max	CAP max	CAP max	CAP max	CAP max
RAS-2HVRNE	15	8,34	8,28	8,21	8,15	8,09
	10	7,75	7,68	7,63	7,56	7,50
	6	7,21	7,16	7,10	7,04	6,99
	5	7,11	7,05	6,99	6,94	6,89
	0	6,50	6,44	6,38	6,31	6,25
	-5	5,88	5,81	5,74	5,69	5,62
	-10	5,25	5,18	5,13	5,06	5,00
	-15	4,63	4,57	4,50	4,44	4,38
RAS-2.5HVRNE	15	9,40	9,33	9,26	9,18	9,11
	10	8,73	8,66	8,59	8,52	8,46
	6	8,13	8,06	8,00	7,94	7,87
	5	8,02	7,94	7,88	7,82	7,76
	0	7,33	7,26	7,18	7,11	7,04
	-5	6,62	6,55	6,47	6,41	6,34
	-10	5,92	5,84	5,78	5,70	5,63
	-15	5,22	5,14	5,07	5,00	4,94
RAS-3HVRNE	15	11.75	11.66	11.57	11.48	11.39
	10	10.91	10.82	10.74	10.65	10.57
	6	10.16	10.08	10.00	9.92	9.84
	5	10.02	9.93	9.85	9.78	9.70
	0	9.16	9.07	8.98	8.89	8.80
	-5	8.28	8.19	8.09	8.01	7.92
	-10	7.40	7.30	7.22	7.13	7.04
	-15	6.52	6.43	6.34	6.25	6.17
RAS-4H(V)RNE	15	16.49	16.41	16.32	16.24	16.16
	10	15.28	15.19	15.10	15.02	14.93
	6	14.18	14.09	14.00	13.91	13.82
	5	13.95	13.86	13.78	13.69	13.61
	0	12.79	12.71	12.63	12.55	12.46
	-5	11.65	11.56	11.48	11.39	11.31
	-10	10.52	10.43	10.33	10.23	10.13
	-15	9.37	9.28	9.18	9.08	8.98
RAS-5H(V)RNE	15	21.08	21.00	20.91	20.83	20.75
	10	19.49	19.41	19.32	19.24	19.16
	6	18.16	18.08	18.00	17.92	17.84
	5	17.90	17.82	17.73	17.65	17.57
	0	16.45	16.37	16.29	16.21	16.13
	-5	15.01	14.93	14.85	14.76	14.67
	-10	13.58	13.49	13.40	13.32	13.24
	-15	12.10	12.02	11.94	11.86	11.77

CAP max: Capacity at compressor maximum frequency (Kw)

NOTE:

The values are based on the following conditions:
Inverter Frequency: maximum.
Piping Length/Height Difference: 7.5m/0m.

The values are based on High speed of indoor fan.

The values does not include decreasing capacity by defrosting operation.

HRNE Units

Outdoor Unit	Outdoor Air Inlet Temperature WB (°C)	Indoor Air Inlet Temperature DB (°C)				
		16	18	20	22	24
		CAP max	CAP max	CAP max	CAP max	CAP max
RAS-4HRNE	15	16.49	16.41	16.32	16.24	16.16
	10	15.28	15.19	15.10	15.02	14.93
	6	14.18	14.09	14.00	13.91	13.82
	5	13.95	13.86	13.78	13.69	13.61
	0	12.79	12.71	12.63	12.55	12.46
	-5	11.65	11.56	11.48	11.39	11.31
	-10	10.52	10.43	10.33	10.23	10.13
	-15	9.37	9.28	9.18	9.08	8.98
RAS-5HRNE	15	21.08	21.00	20.91	20.83	20.75
	10	19.49	19.41	19.32	19.24	19.16
	6	18.16	18.08	18.00	17.92	17.84
	5	17.90	17.82	17.73	17.65	17.57
	0	16.45	16.37	16.29	16.21	16.13
	-5	15.01	14.93	14.85	14.76	14.67
	-10	13.58	13.49	13.40	13.32	13.24
	-15	12.10	12.02	11.94	11.86	11.77
RAS-6HRNE	15	22.72	22.63	22.54	22.45	22.36
	10	21.01	20.92	20.82	20.74	20.65
	6	19.57	19.49	19.40	19.31	19.23
	5	19.29	19.21	19.11	19.02	18.94
	0	17.73	17.64	17.56	17.47	17.38
	-5	16.18	16.09	16.01	15.91	15.81
	-10	14.64	14.54	14.44	14.36	14.27
	-15	13.04	12.95	12.87	12.78	12.69
RAS-8HRNE	15	36.68	36.56	36.46	36.44	36.42
	10	32.22	32.00	31.75	31.73	31.69
	6	31.68	29.84	28.00	27.94	27.92
	5	30.78	29.30	27.82	27.48	27.14
	0	26.32	26.32	25.20	25.20	23.80
	-5	22.40	22.40	22.40	22.40	22.40
	-10	19.79	19.78	19.77	19.90	20.01
	-15	17.34	17.32	17.32	17.38	17.46
RAS-10HRNE	15	45.85	45.70	45.57	45.56	45.53
	10	40.27	40.00	39.69	39.66	39.61
	6	39.61	37.30	35.00	34.93	34.90
	5	38.47	36.62	34.78	34.36	33.92
	0	32.90	32.90	31.50	31.50	29.75
	-5	28.00	28.00	28.00	28.00	28.00
	-10	24.74	24.72	24.71	24.87	25.01
	-15	21.67	21.64	21.64	21.73	21.83
RAS-12HRNE	15	49,13	48,96	48,83	48,81	48,78
	10	43,15	42,86	42,53	42,50	42,44
	6	42,44	39,96	37,50	37,43	37,40
	5	41,22	39,24	37,26	36,81	36,35
	0	35,25	35,25	33,75	33,75	31,88
	-5	30,00	30,00	30,00	30,00	30,00
	-10	26,51	26,49	26,48	26,65	26,80
	-15	23,22	23,19	23,19	23,28	23,39

CAP max: Capacity at compressor maximum frequency (Kw)

HN(V)E Units

Outdoor Unit	Outdoor Air Inlet Temperature WB (°C)	Indoor Air Inlet Temperature DB (°C)					
		16	18	20	22	24	26
		CAP max	CAP max	CAP max	CAP max	CAP max	CAP max
RAS-2.5HN(V)E	15	8,12	8,19	8,26	8,33	8,40	8,40
	10	7,35	7,42	7,49	7,56	7,63	7,70
	5	6,65	6,72	6,79	6,86	6,86	6,93
	0	5,88	5,95	6,02	6,09	6,16	6,23
	-5	5,18	5,25	5,32	5,39	5,39	5,46
	-8	3,98	4,06	4,02	4,09	4,13	4,16
RAS-3HN(V)E	15	9,28	9,36	9,44	9,52	9,60	9,60
	10	8,40	8,48	8,56	8,64	8,72	8,80
	5	7,60	7,68	7,76	7,84	7,84	7,92
	0	6,72	6,80	6,88	6,96	7,04	7,12
	-5	5,92	6,00	6,08	6,16	6,16	6,24
	-8	4,55	4,64	4,59	4,67	4,72	4,75
RAS-4HN(V)E	15	12,99	13,10	13,22	13,33	13,44	13,44
	10	11,76	11,87	11,98	12,10	12,21	12,32
	5	10,64	10,75	10,86	10,98	10,98	11,09
	0	9,41	9,52	9,63	9,74	9,86	9,97
	-5	8,29	8,40	8,51	8,62	8,62	8,74
	-8	6,37	6,49	6,42	6,54	6,61	6,66
RAS-5HNE	15	16,24	16,38	16,52	16,66	16,80	16,80
	10	14,70	14,84	14,98	15,12	15,26	15,40
	5	13,30	13,44	13,58	13,72	13,72	13,86
	0	11,76	11,90	12,04	12,18	12,32	12,46
	-5	10,36	10,50	10,64	10,78	10,78	10,92
	-8	7,96	8,11	8,03	8,18	8,27	8,32

CAP max: Capacity at compressor maximum frequency (Kw)

NOTE:

The values are based on the following conditions:
Inverter Frequency: maximum.
Piping Length/Height Difference: 7.5m/0m.

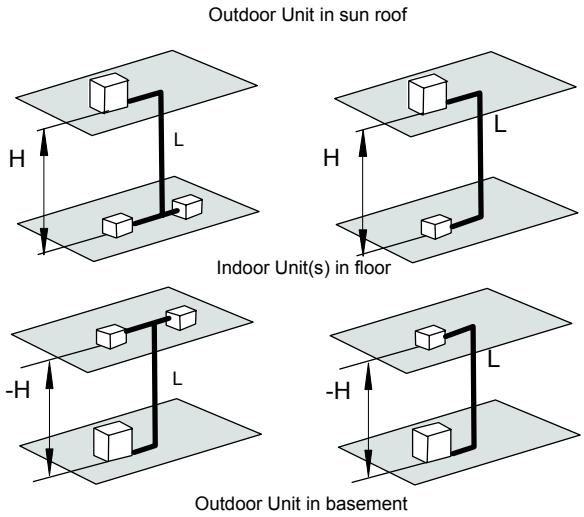
The values are based on High speed of indoor fan.

The values does not include decreasing capacity by defrosting operation.

4.6. CORRECTION FACTORS

4.6.1. PIPING LENGTH CORRECTION FACTOR

Correction Factor is based on the equivalent piping length in meters (EL) and the vertical distance between Indoor and Outdoor Unit in meters (H).



H: Vertical Distance between Indoor Unit and Outdoor Unit in meters (m).

NOTE:
H>0: Position of Outdoor Unit is higher than Position of Indoor Unit (m).
H<0: Position of Outdoor Unit is lower than Position of Indoor Unit (m).

EL: Equivalent Total Distance between Indoor Unit and Outdoor Unit in Meter (Equivalent one-way Piping Length L (m)).

NOTE:
A 90° elbow is equivalent to 0.5m.
A 180° bend is equivalent to 1.5m.
A distributor branch is equivalent to 0.5 m
For twin system:
L= the longest distance.

■ For Cooling Capacity

The cooling capacity should be corrected according the following formula:

TCA= TC x F

TCA: Actual Corrected Cooling Capacity (kW).
TC: Cooling Capacity from Cooling Capacity Table (kW).
F: Correction Factor based on the Equivalent Piping Length (in %).

■ For Heating Capacity

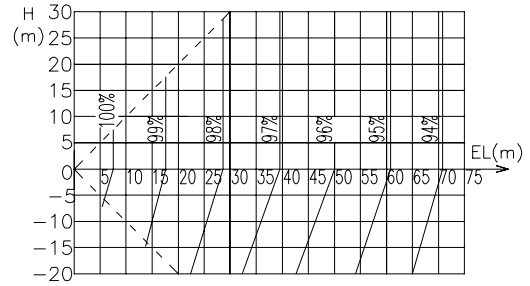
The heating capacity should be corrected according to the following formula:

THA= TH x F

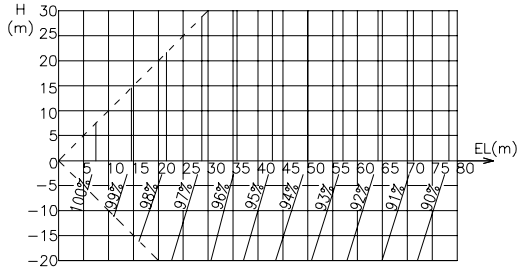
THA: Actual Corrected Heating Capacity (kW)
TH: Heating Capacity from Heating Capacity Table (kW).
F: Correction Factor Based on the equivalent Piping Length (in %).

Cooling

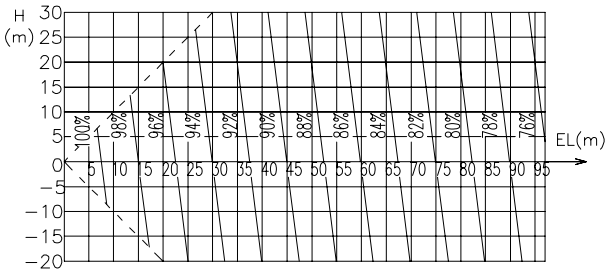
RAS-2HVRNE



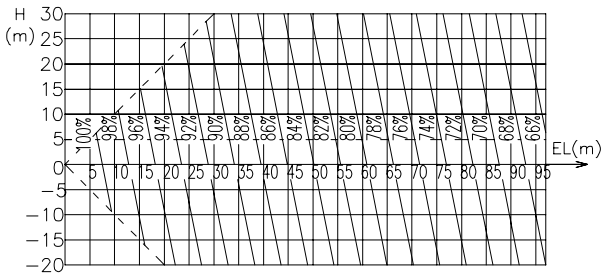
RAS-2.5/3HVRNE
RAS-2.5/3HN(V)E



RAS-4H(V)RNE
RAS-4HN(V)E

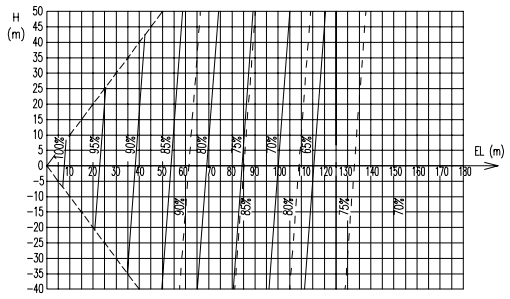


RAS-5/6H(V)RNE
RAS-5HNE

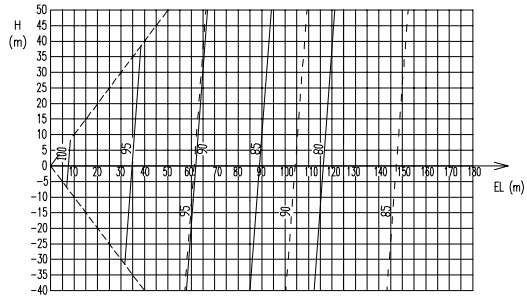


Cooling

RAS-8HRNE

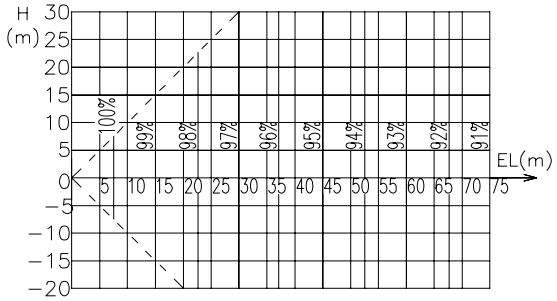


RAS-10/12HRNE

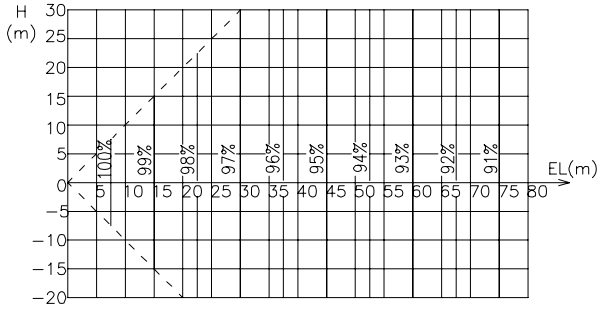


Heating

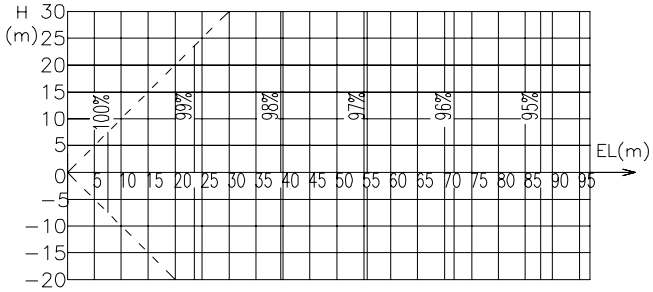
RAS-2HVRNE



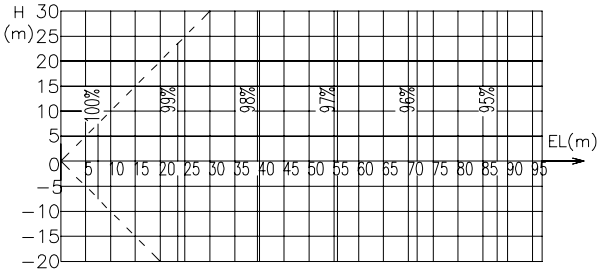
RAS-2.5/3HVRNE
RAS-2.5/3HN(V)E



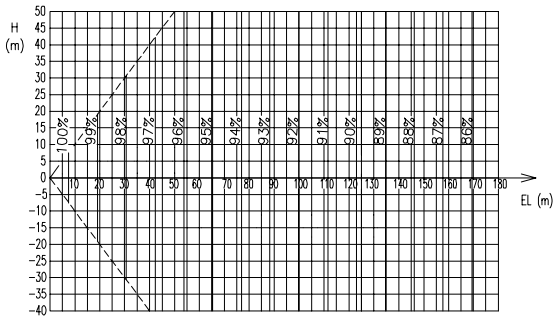
RAS-4H(V)RNE
RAS-4HN(V)E



RAS-5/6H(V)RNE
RAS-5HNE



RAS-8~12HRNE



4.6.2. SENSIBLE HEAT FACTOR (SHF)

The sensible heat factor of indoor units at each fan speed (Hi. Me. Lo) based on the JIS Standard B8616. is given in the table below.

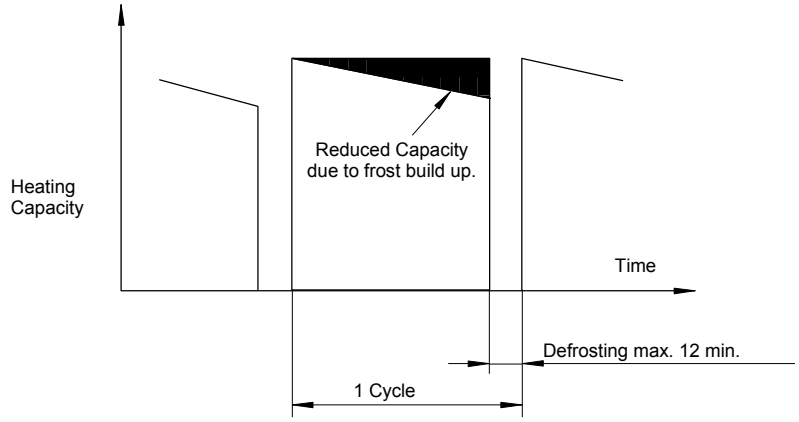
Indoor Unit Model	SHF		
	Hi	Me	Lo
RCI-1.5FSN1E	0.77	0.75	0.73
RCI-2.0FSN1E	0.78	0.76	0.75
RCI-2.5FSN1E	0.73	0.71	0.69
RCI-3.0FSN1E	0.79	0.76	0.72
RCI-4.0FSN1E	0.78	0.75	0.72
RCI-5.0FSN1E	0.74	0.70	0.68
RCI-6.0FSN1E	0.73	0.69	0.68
RCIM-1.5FSN	0.74	0.71	0.70
RCIM-2.0FSN	0.71	0.68	0.67
RCD-1.5FSN	0.73	0.69	0.66
RCD-2.0FSN	0.75	0.67	0.65
RCD-2.5FSN	0.74	0.67	0.65
RCD-3.0FSN	0.74	0.67	0.65
RCD-4.0FSN	0.73	0.67	0.65
RCD-5.0FSN	0.69	0.67	0.65
RPC-2.0FSNE	0.72	0.70	0.67
RPC-2.5FSNE	0.72	0.70	0.67
RPC-3.0FSNE	0.72	0.70	0.67
RPC-4.0FSNE	0.72	0.70	0.67
RPC-5.0FSNE	0.72	0.70	0.67
RPC-6.0FSNE	0.72	0.70	0.67
RPK-1.5FSN1M	0.73	0.72	0.70
RPK-1.5FSNM	0.73	0.72	0.70
RPK-2.0FSNM	0.72	0.72	0.70
RPK-2.5FSNM	0.72	0.72	0.70
RPK-3.0FSNM	0.71	0.72	0.70
RPK-4.0FSNM	0.71	0.72	0.70
RPI-1.5FSNE	0.73	0.69	0.65
RPI-2.0FSNE	0.76	0.75	0.74
RPI-2.5FSNE	0.76	0.74	0.72
RPI-3.0FSNE	0.75	0.71	0.67
RPI-4.0FSNE	0.73	0.71	0.65
RPI-5.0FSNE	0.72	0.68	0.64
RPI-6.0FSNE	0.72	0.69	0.67
RPI-8.0FSNE	0.70	0.68	0.63
RPI-10.0FSNE	0.71	0.68	0.64
RPF-1.5FSNE	0.73	0.69	0.65
RPF-2.0FSNE	0.73	0.69	0.65
RPF-2.5FSNE	0.73	0.69	0.65
RPFI-1.5FSNE	0.73	0.69	0.65
RPFI-2.0FSNE	0.73	0.69	0.65
RPFI-2.5FSNE	0.73	0.69	0.65

4.6.3. DEFROST CORRECTION FACTOR

The heating capacity excludes the condition of the frost or the defrosting operation period.
In consideration of the frost or the defrosting operation. the heating capacity is corrected by the equation below.

Corrected Heating Capacity = Defrost Correction Factor x Heating Capacity

Outdoor Inlet Air Temp. (°C DB) (Humidity=85% RH)	**-15**	**-10**	**-7**	**-5**	**-3**	**0**	**3**	**5**	**7**
Correction Factor	0.95	0.95	0.94	0.91	0.85	0.81	0.84	0.88	1.0

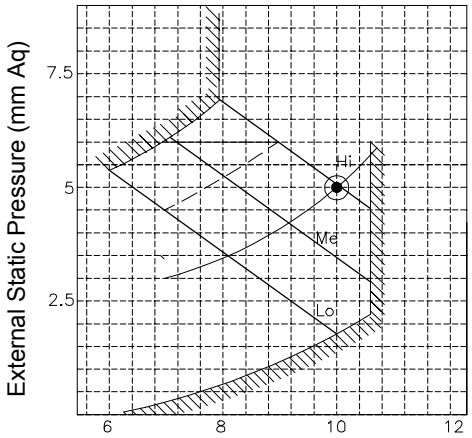


NOTE:
The correction factor is not valid for special condition like a snowfall or a operation in a transitional period.

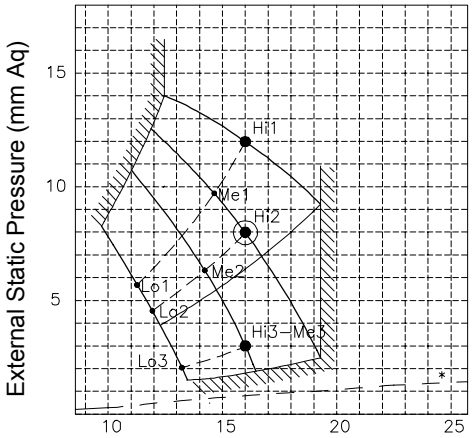
4.7. FAN PERFORMANCE

4.7.1. RPI - FAN PERFORMANCE

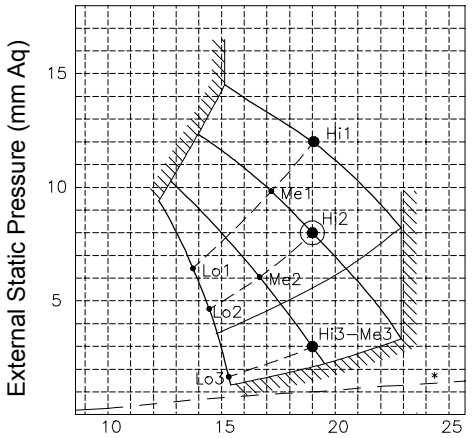
RPI-1.5



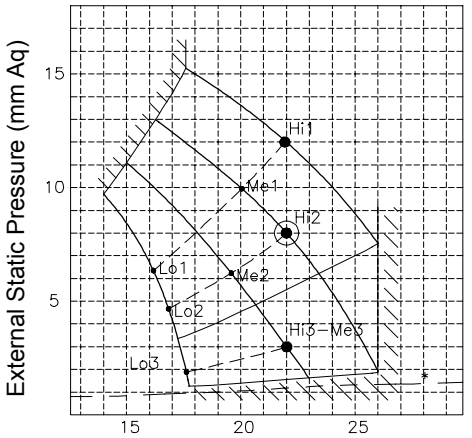
RPI-2.0



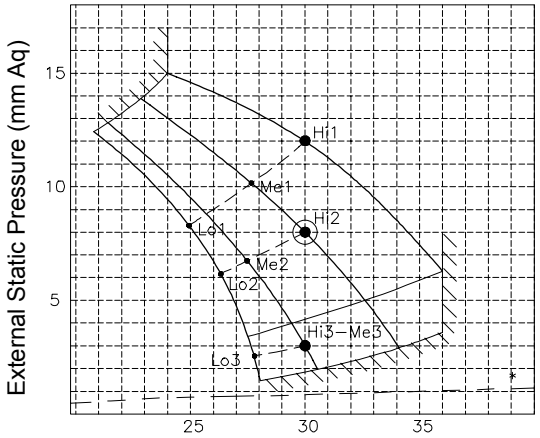
RPI-2.5



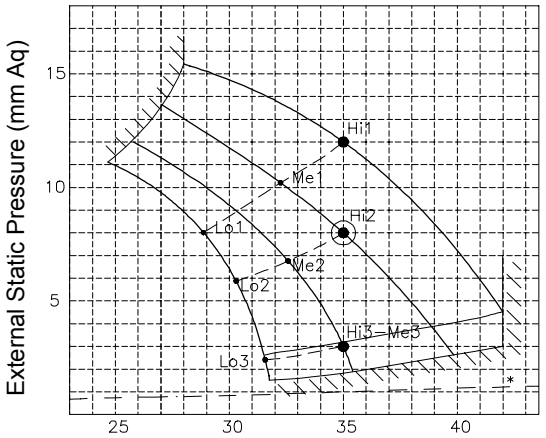
RPI-3.0



RPI-4.0

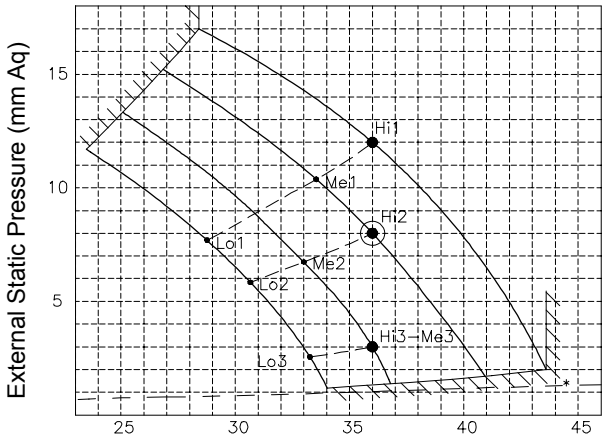


RPI-5.0



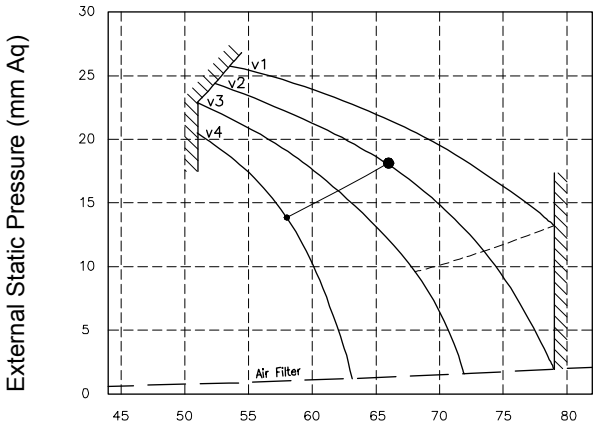
***** Filter resistance

RPI-6.0



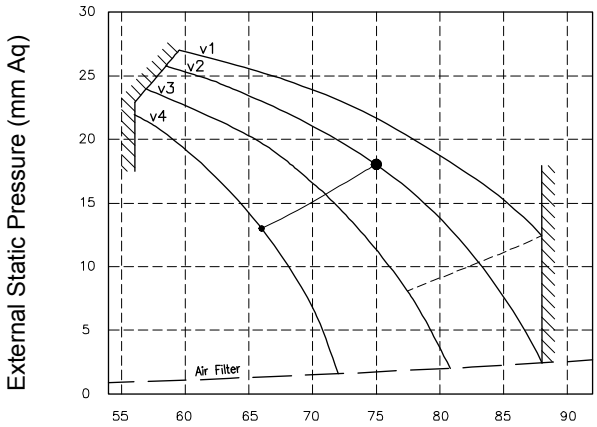
Air Flow (m³/min)

RPI-8.0



Air Flow (m³/min)

RPI-10.0



Air Flow (m³/min)

***** Filter resistance

NOTE: *(Only RPI-8/10)*

Std. Air Filter Pressure Loss (— - - —)

Rated Point (•)

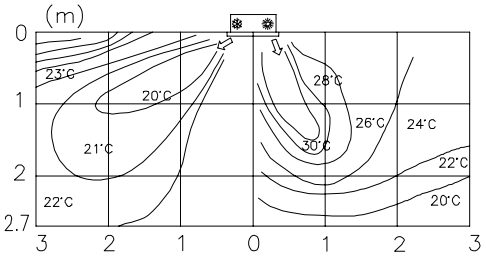
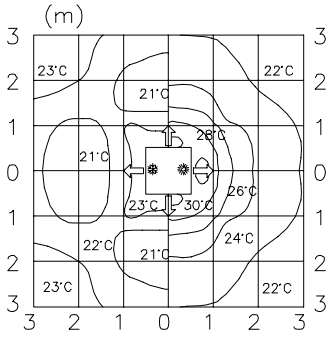
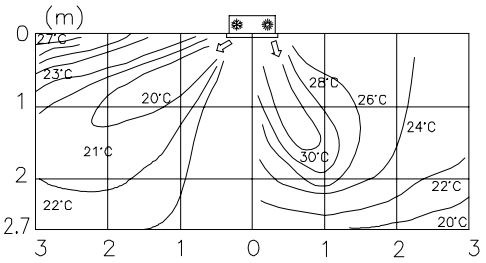
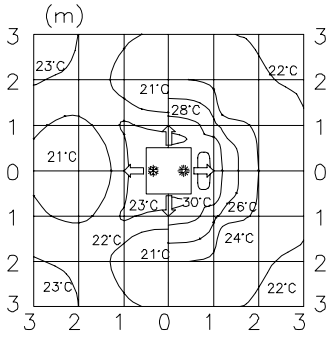
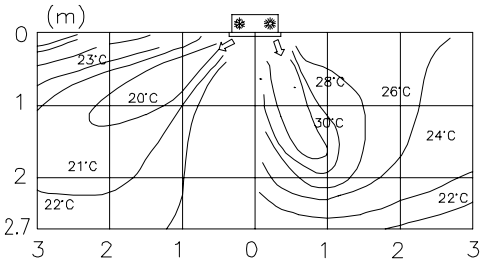
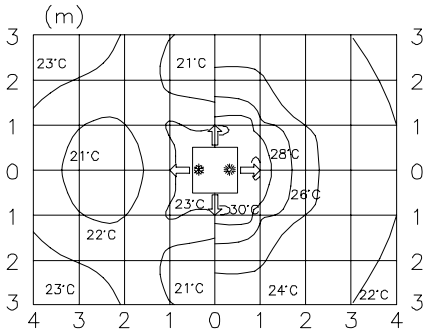
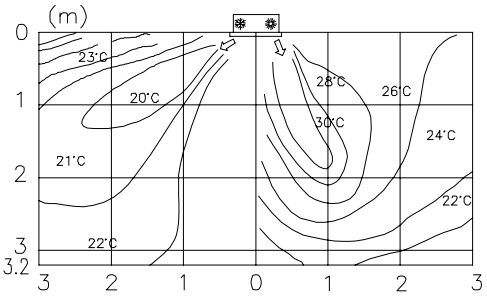
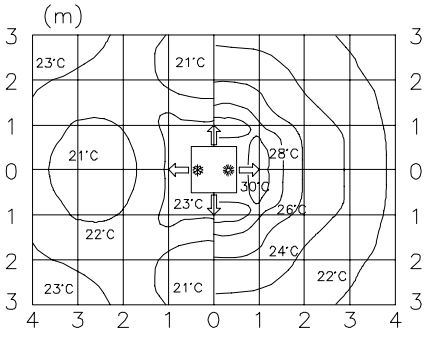
Fan Speed / Static Pressure	Hi	Med	Low
HSP	V1	V1	V3
LSP	V2	V2	V4

HSP: High Static Pressure
LSP: Low Static Pressure

CAUTION: *(Only RPI-8/10)*
In case of a very SHORT duct installation, make sure to select LOW STATIC PRESSURE connector.
Keep a minimum duct resistance as shown in the graphic.
Running the unit with a too short duct will make the unit run outside the accepted working range.

4.8. TEMPERATURE DISTRIBUTION DIAGRAMS

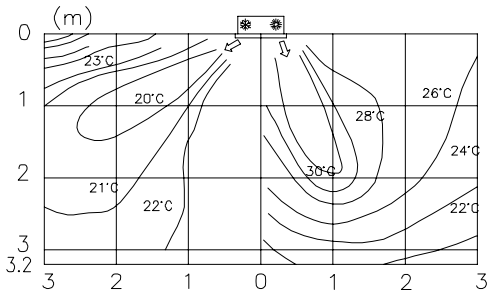
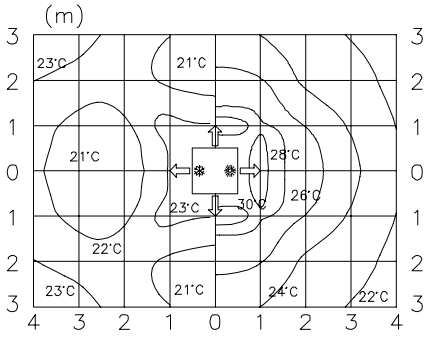
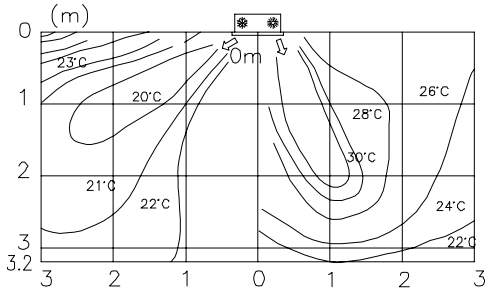
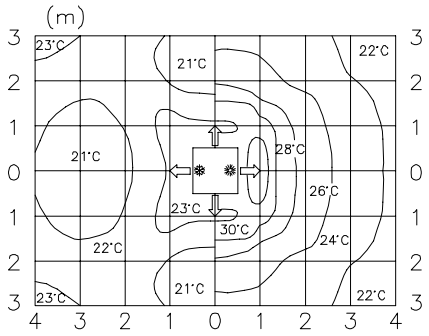
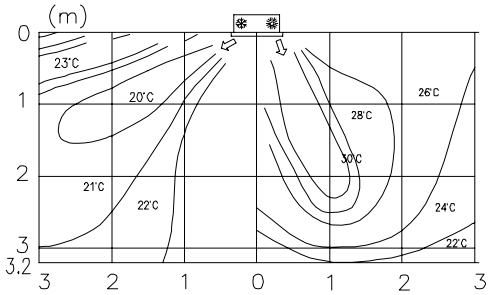
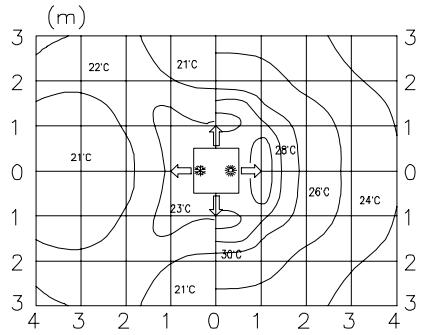
4.8.1. RCI 4-WAY CASSETTE TYPE

	Vertical Temperature distribution		Horizontal Temperature distribution (Height: 1.2m)	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB	Heating (Indoor Temperature: 20°C DB)	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)
Model: RCI-1.5FSN1E Air-Throw-Distance: 2.7m (When Air Velocity is: 0.3m/s)				
Model: RCI-2.0FSN1E Air-Throw-Distance: 2.7m (When Air Velocity is: 0.3m/s)				
Model: RCI-2.5 FSN1E Air-Throw-Distance: 2.7m (When Air Velocity is: 0.3m/s)				
Model: RCI-3.0FSN1E Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				

NOTE:

The Air is almost symmetrically discharged.

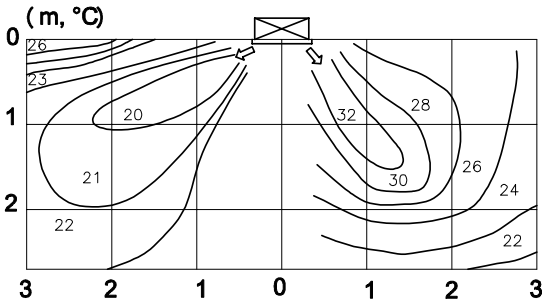
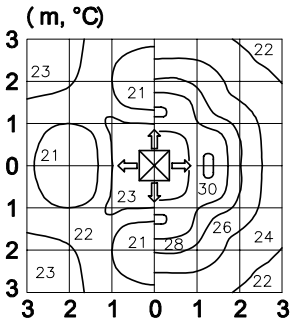
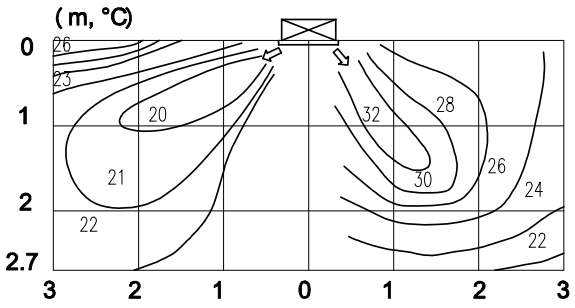
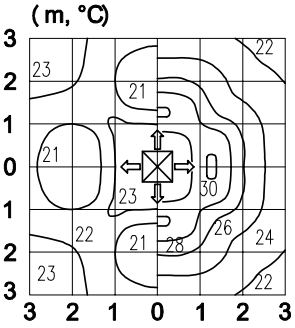
These figures show the distribution when no obstruction exists.

	Vertical Temperature distribution		Horizontal Temperature distribution (Height: 1.2m)	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB	Heating (Indoor Temperature: 20°C DB)	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)
Model: RCI-4.0 FSN1E Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				
Model: RCI-5.0 FSN1E Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				
Model: RCI-6.0 FSN1E Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				

NOTE:

The Air is almost symmetrically discharged.

These figures show the distribution when no obstruction exists

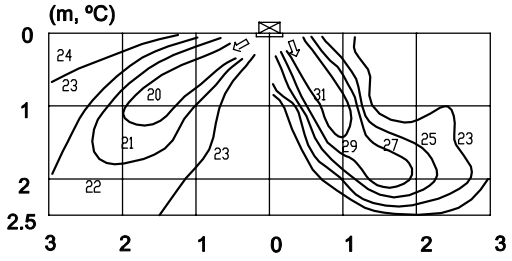
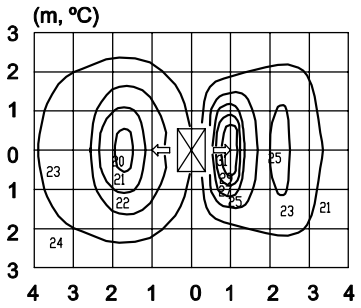
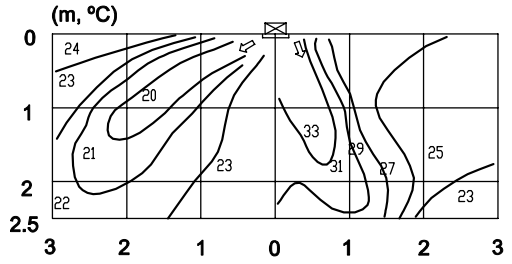
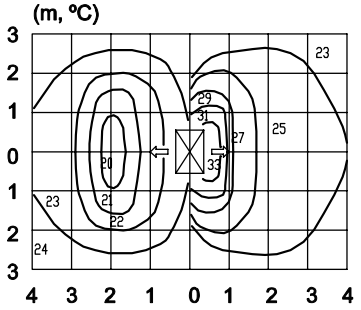
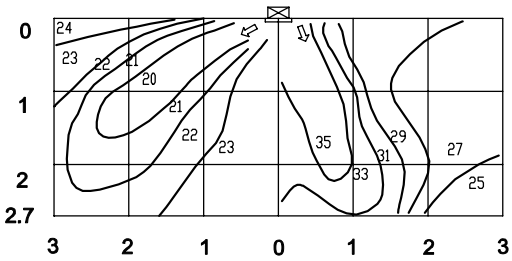
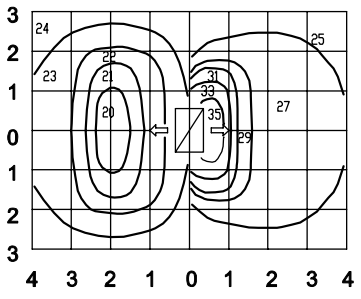
	Vertical Temperature distribution		Horizontal Temperature distribution (Height: 1.2m)	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB	Heating (Indoor Temperature: 20°C DB)	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)
Model: RCIM-1.5FSN Air-Throw-Distance: 2.7m (When Air Velocity is: 0.3m/s)				
Model: RCIM-2.0FSN Air-Throw-Distance: 2.7m (When Air Velocity is: 0.3m/s)				

NOTE:

The Air is almost symmetrically discharged.

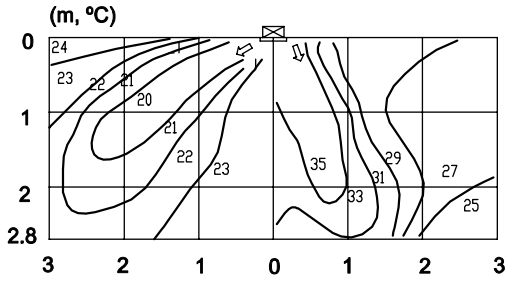
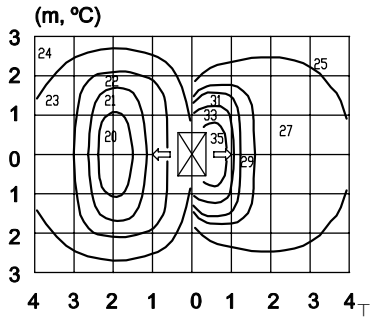
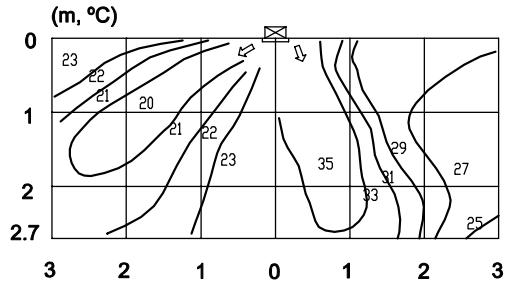
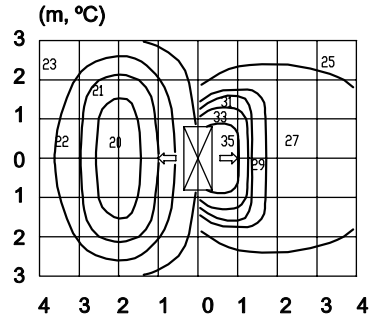
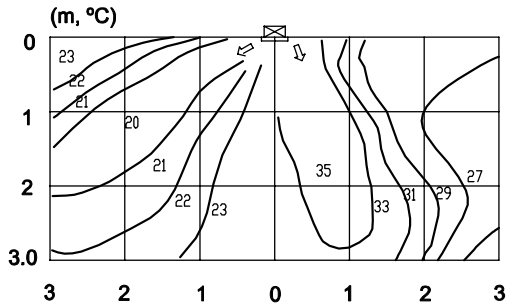
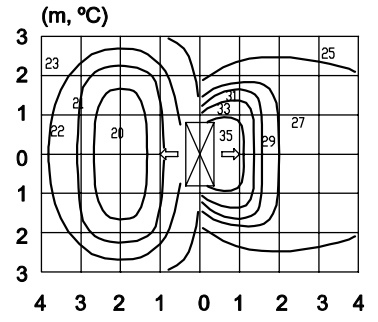
These figures show the distribution when no obstruction exists

4.8.2. RCD 2-WAY CASSETTE TYPE

	Vertical Temperature distribution		Horizontal Temperature distribution (Height: 1.2m)	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB	Heating (Indoor Temperature: 20°C DB)	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)
Model: RCD-1.5FSN Air-Throw-Distance: 2.8m (When Air Velocity is: 0.3m/s)				
Model: RCD-2.0FSN Air-Throw-Distance: 3.0m (When Air Velocity is: 0.3m/s)				
Model: RCD-2.5FSN Air-Throw-Distance: 3.0m (When Air Velocity is: 0.3m/s)				

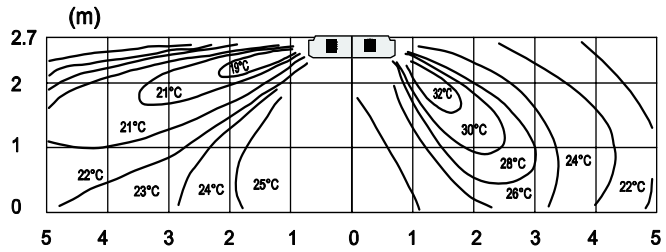
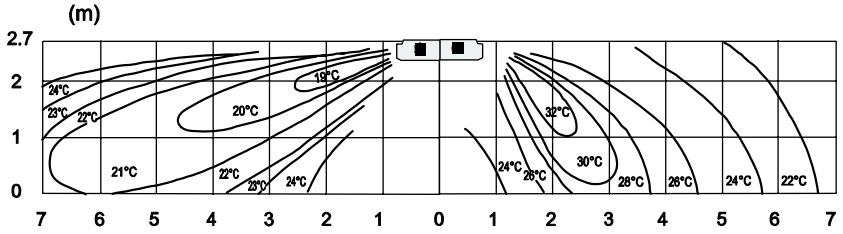
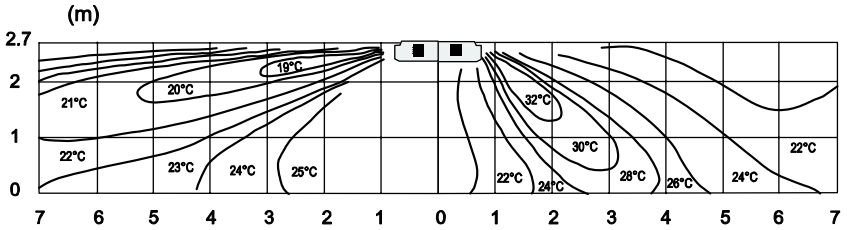
NOTE:

The Air is almost symmetrically discharged.
These figures show the distribution when no obstruction exists

	Vertical Temperature distribution		Horizontal Temperature distribution (Height: 1.2m)	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	Heating (Indoor Temperature: 20°C DB)
Model: RCD-3.0FSN Air-Throw-Distance: 3.1m (When Air Velocity is: 0.3m/s)				
Model: RCD-4.0FSN Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				
Model: RCD-5.0FSN Air-Throw-Distance: 3.3m (When Air Velocity is: 0.3m/s)				

NOTE:
The Air is almost symmetrically discharged.
These figures show the distribution when no obstruction exists

4.8.3. RPC-CEILING TYPE

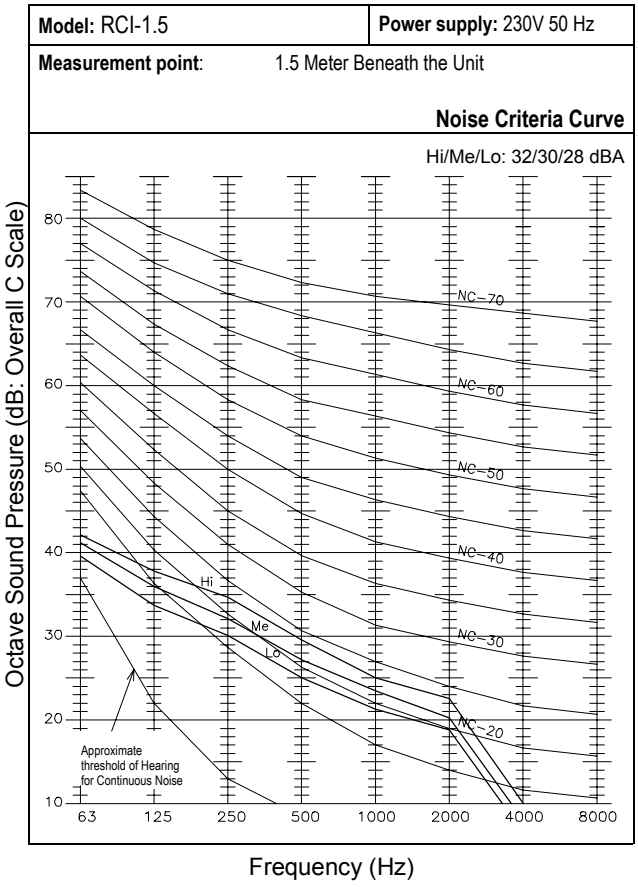
	Vertical Temperature distribution	
	Cooling (Indoor Temperature: 27°C DB / 19°C WB)	**Heating (Indoor Temperature: 20°C DB)**
Model: RPC-2.0/2.5FSNE Air-Throw-Distance: 4.9m (When Air Velocity is: 0.5m/s		
Model: RPC-3.0/4.0FSNE Air-Throw-Distance: 6.9m (When Air Velocity is: 0.3m/s		
Model: RPC-5.0/6.0FSNE Air-Throw-Distance: 7.5m (When Air Velocity is: 0.3m/s		

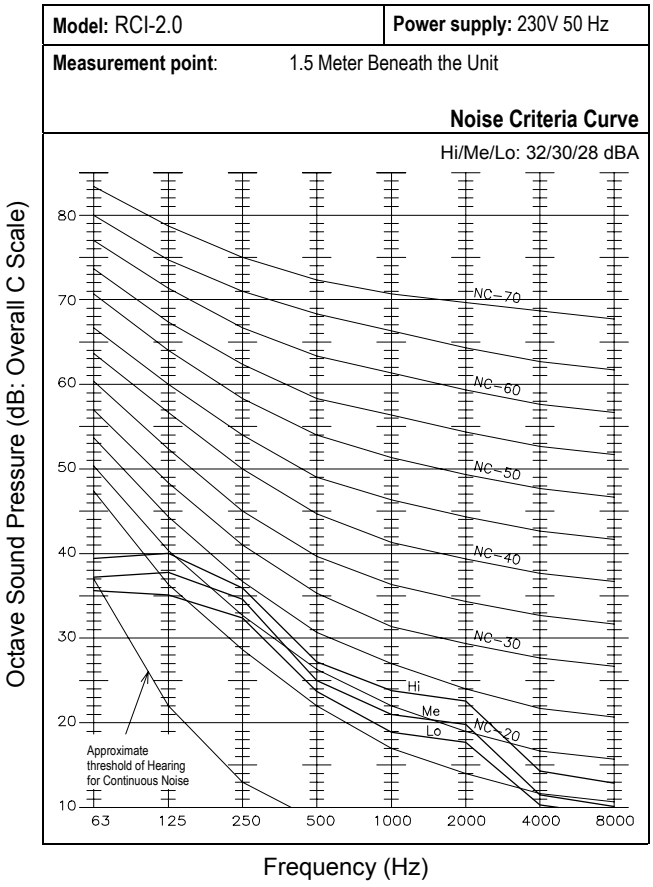
NOTE:

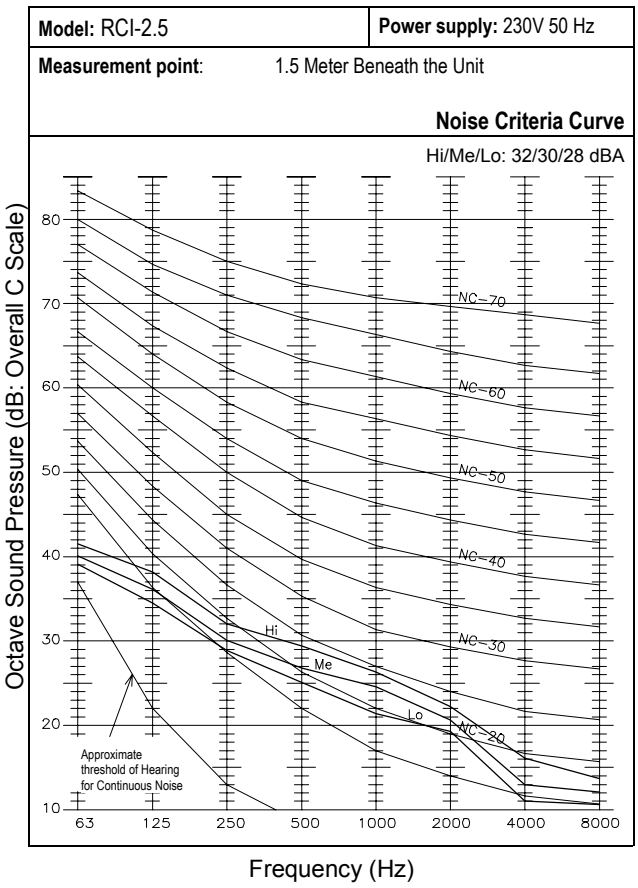
The Air is almost symmetrically discharged.
These figures show the distribution when no obstruction exists

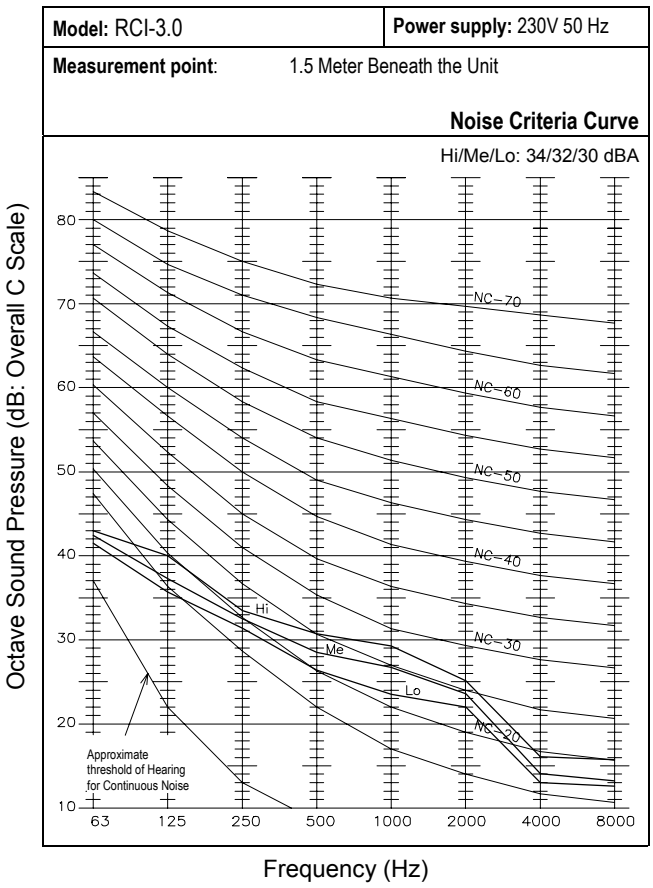
4.9. SOUND DATA

4.9.1. RCI - 4- WAY CASSETTE TYPE









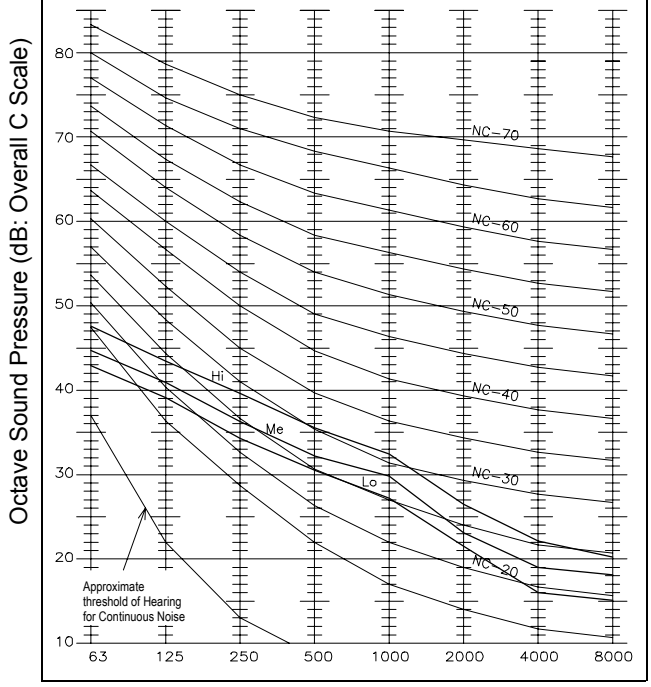
■ RCI - 4- Way Cassette Type (cont.)

Model: RCI-4.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo 38/35/33 dBA

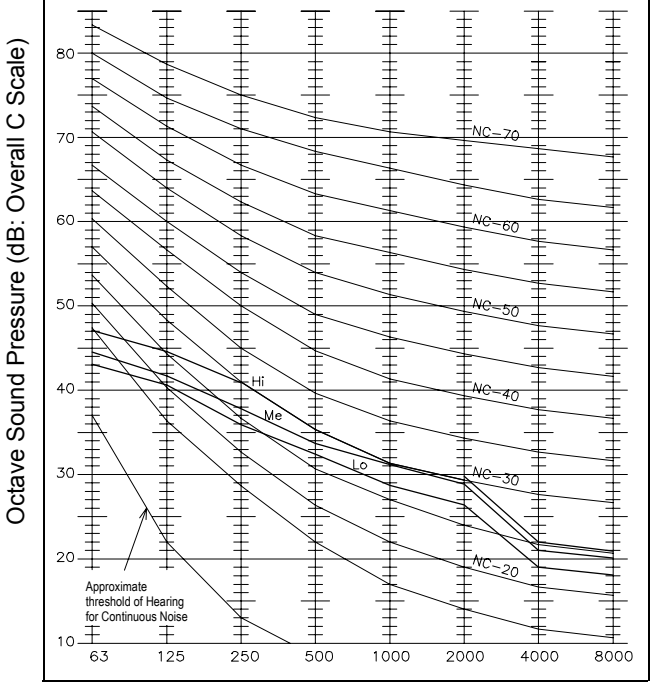


Model: RCI-5.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 39/37/35 dBA

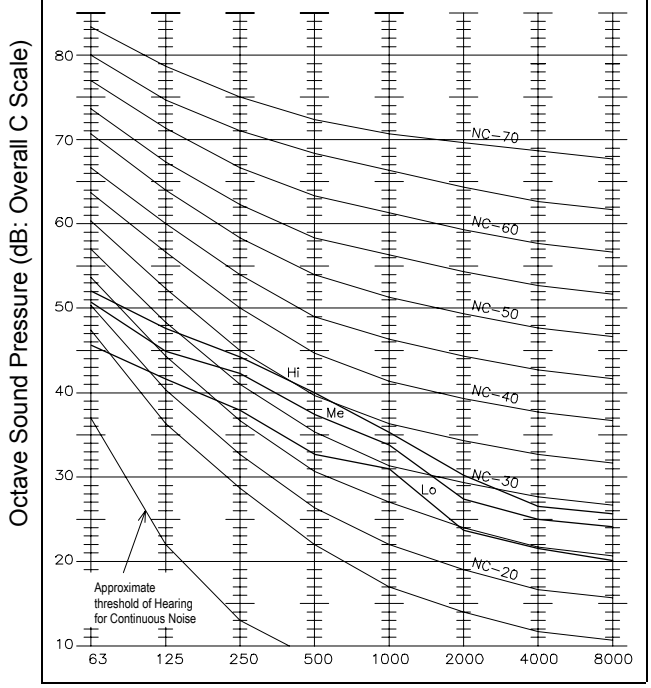


Model: RCI-6.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 42/40/36 dBA

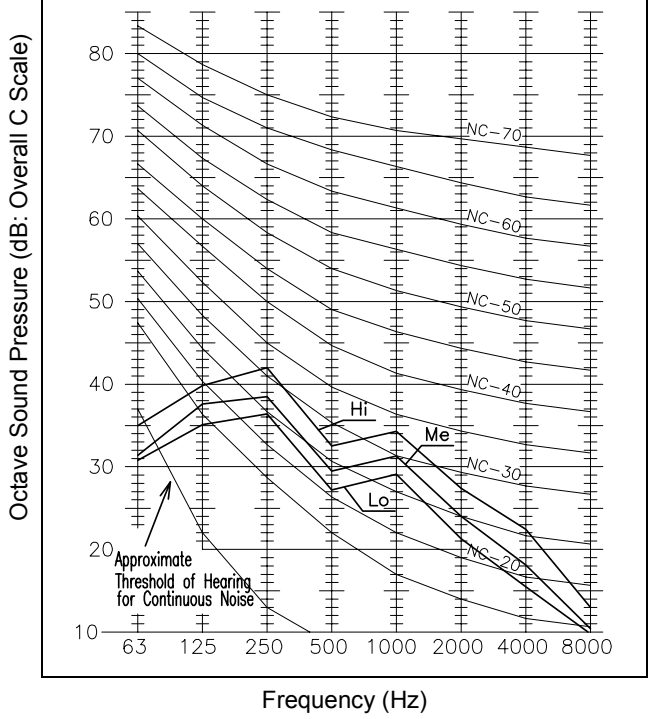


Model: RCIM-1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 38/35/33 dBA

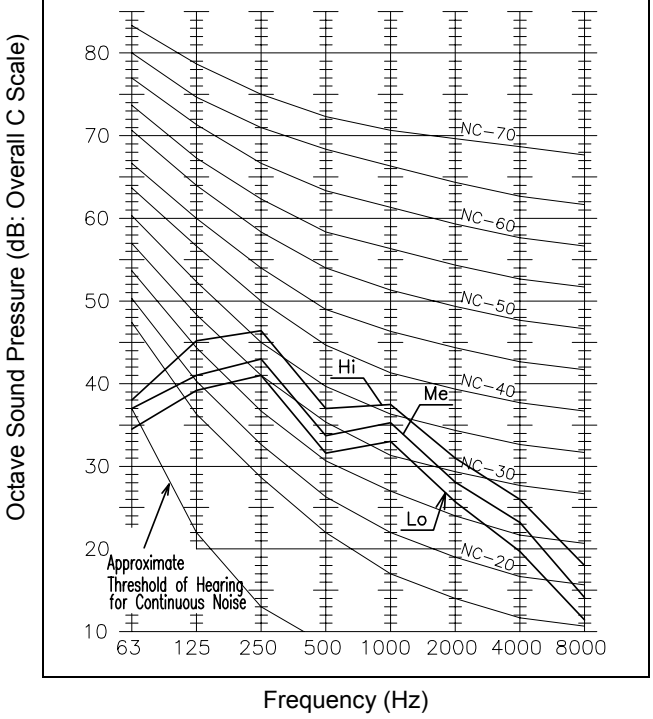


Model: RCIM-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 42/39/32 dBA



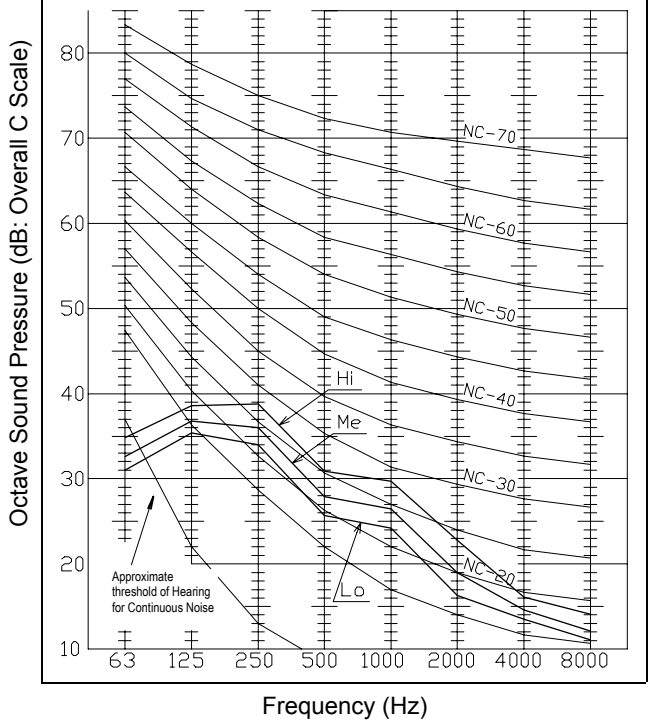
4.9.2. RCD - 2-WAY CASSETTE TYPE

Model: RCD-1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 35/32/30 dBA

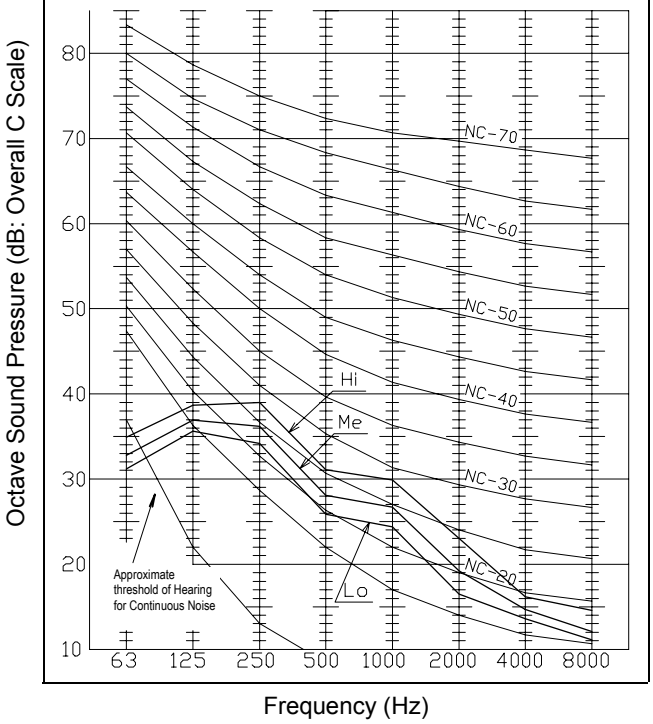


Model: RCD-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 35/32/30 dBA

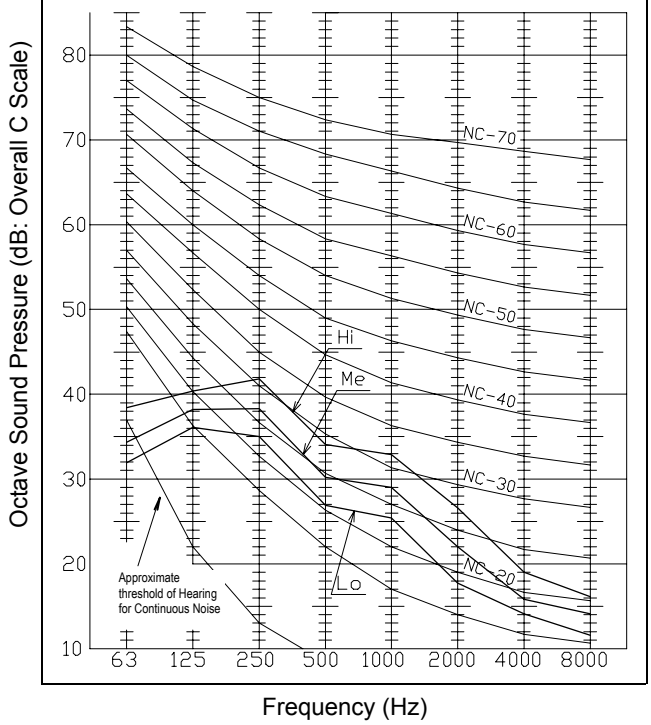


Model: RCD-2.5 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 38/34/31 dBA

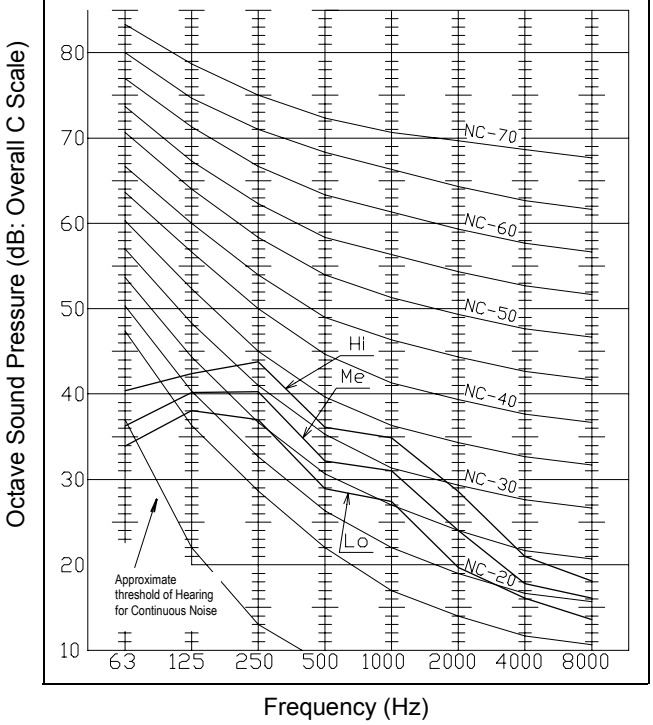


Model: RCD-3.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 40/36/33 dBA



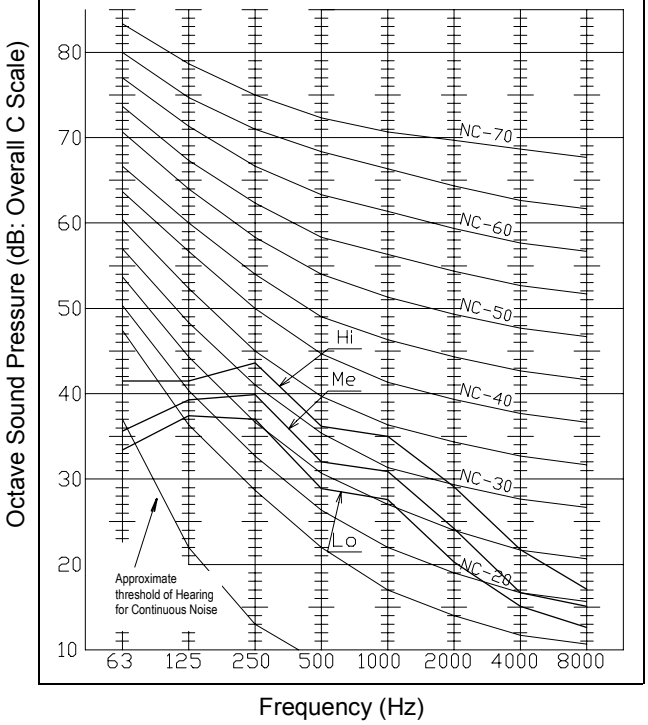
■ RCD - 2-Way Cassette Type (cont.)

Model: RCD-4.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 40/36/33 dBA

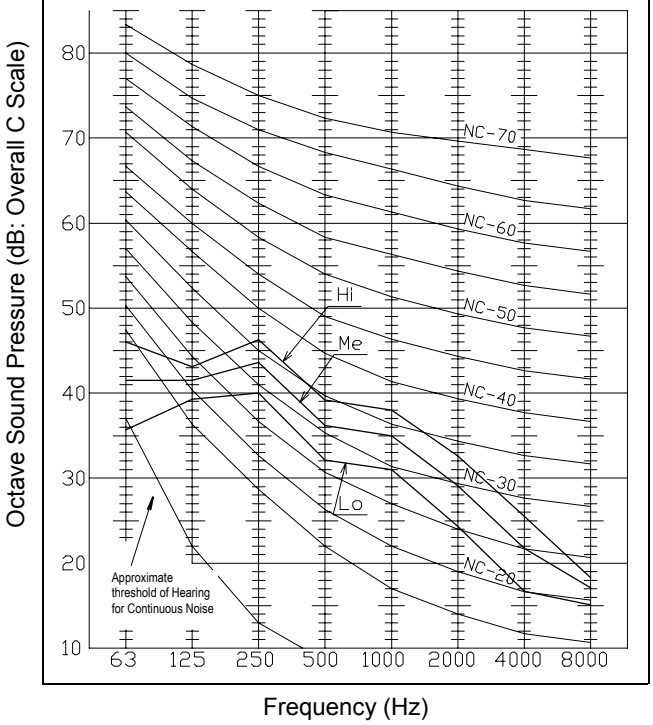


Model: RCD-5.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

Hi/Me/Lo: 43/40/36 dBA



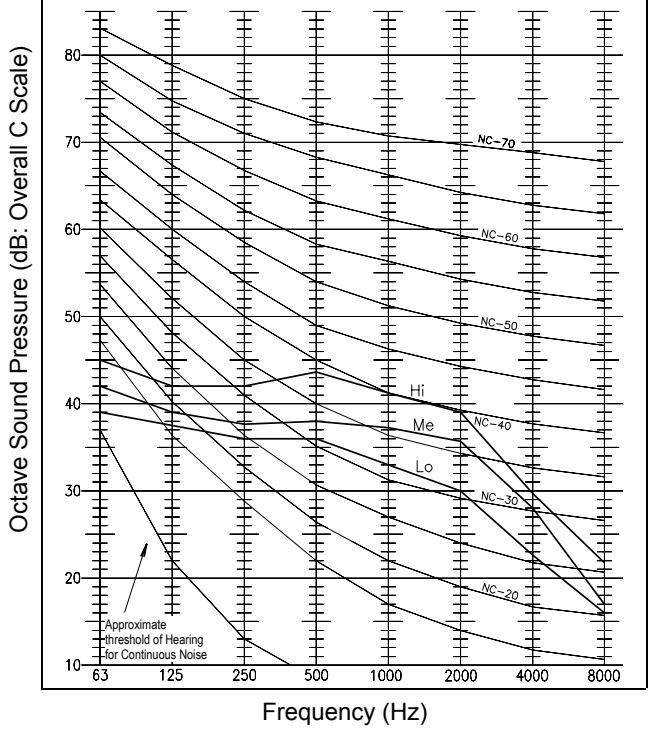
4.9.3. RPC - CEILING TYPE

Model: RPC-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 44/42/38 dBA

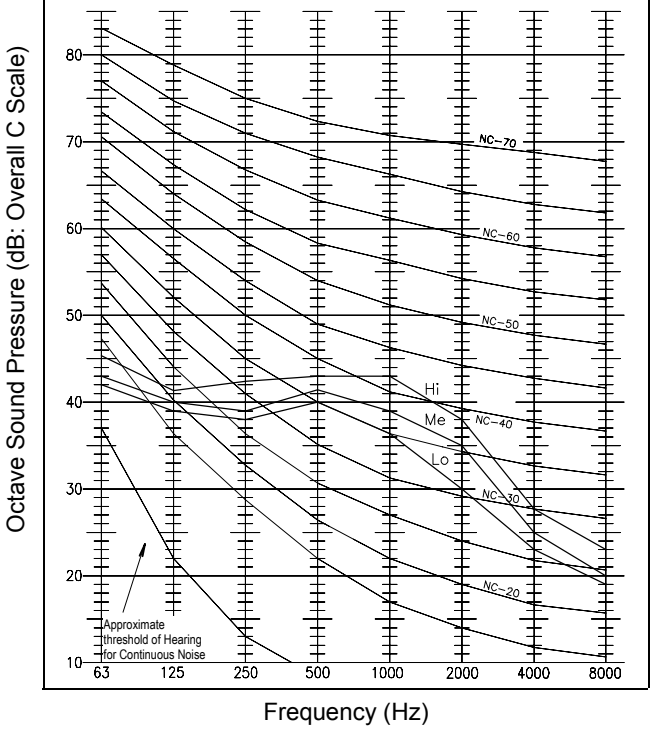


Model: RPC-2.5 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 46/43/41 dBA

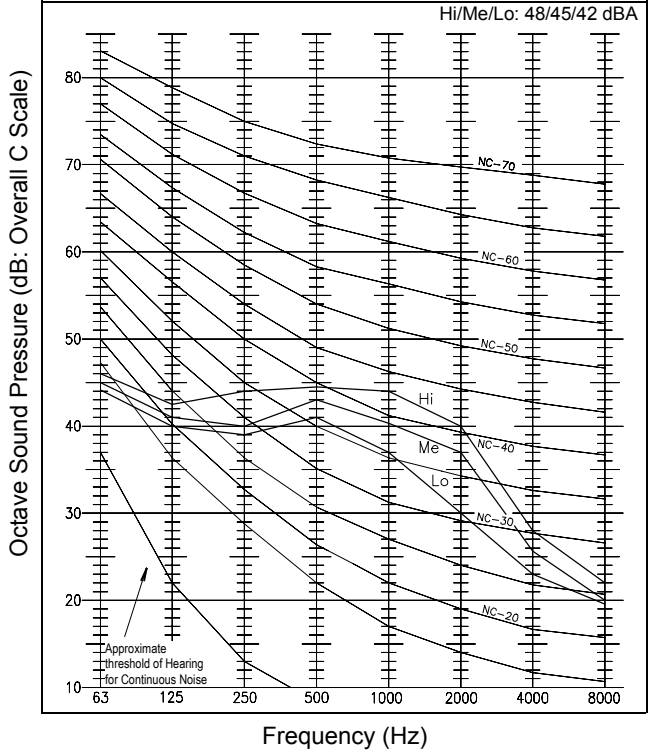


Model: RPC-3.0 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 48/45/42 dBA

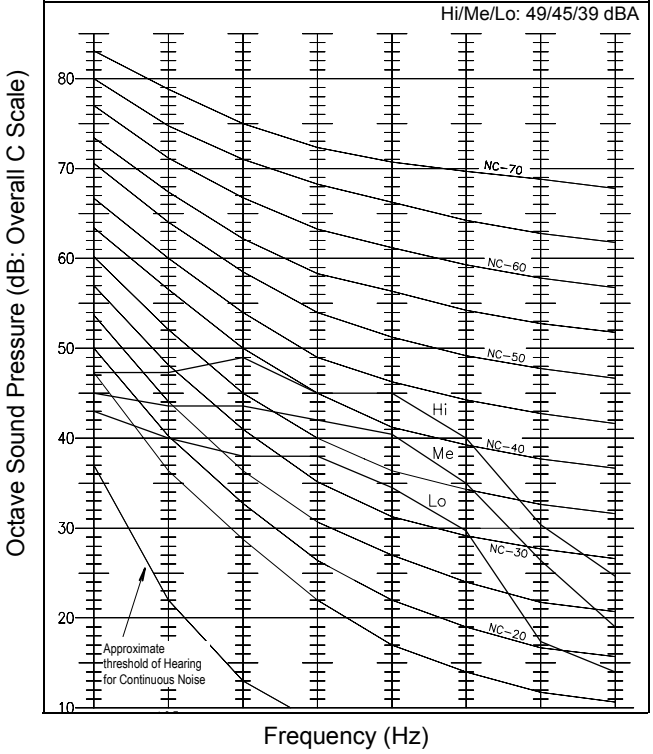


Model: RPC-4.0 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 49/45/39 dBA



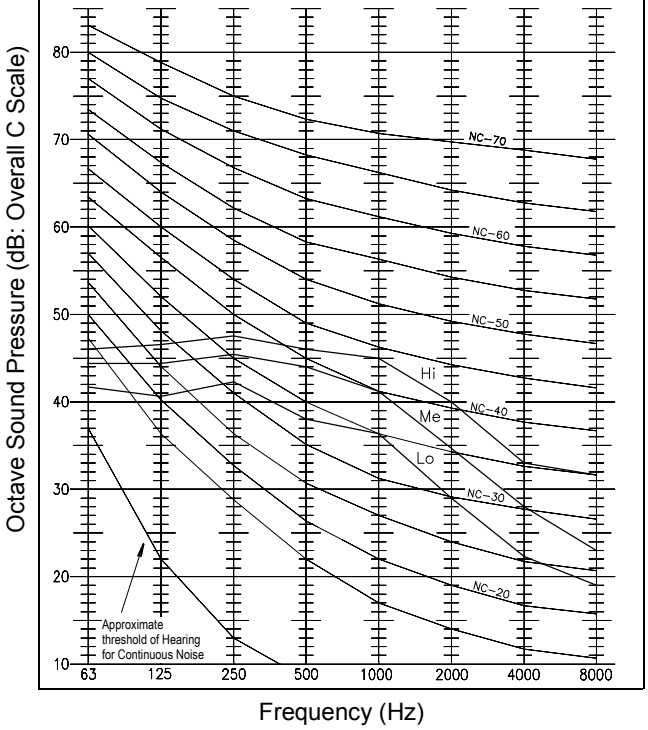
■ RPC - Ceiling Type (cont.)

Model: RPC-5.0 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 49/46/41 dBA

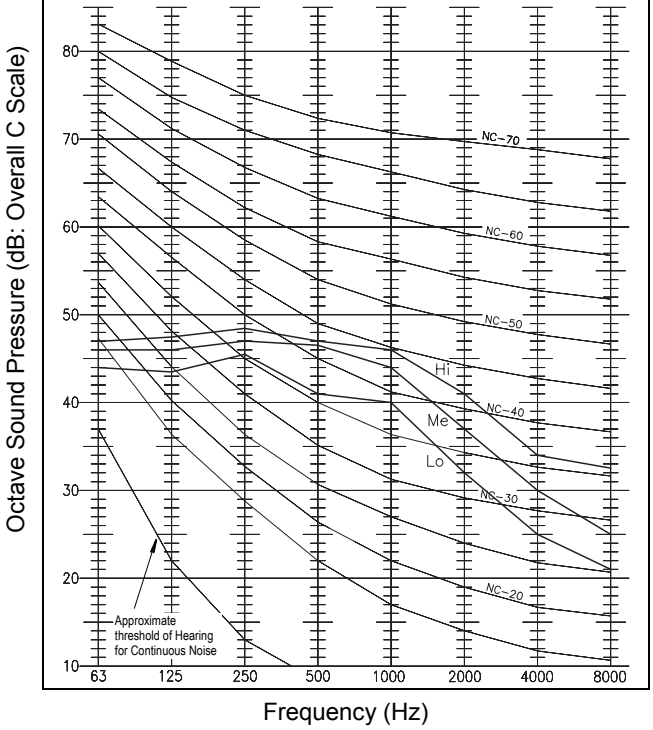


Model: RPC-6.0 | **Power supply:** 230V 50 Hz

Measurement point: 1Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 50/48/44 dBA



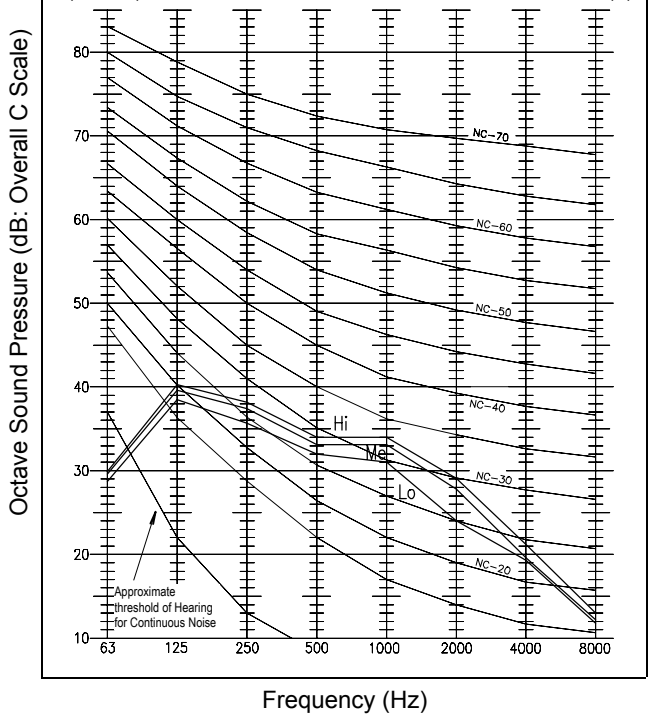
4.9.4. RPI - IN-THE-CEILING TYPE

Model: RPI--1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 38/37/35 dB(A)

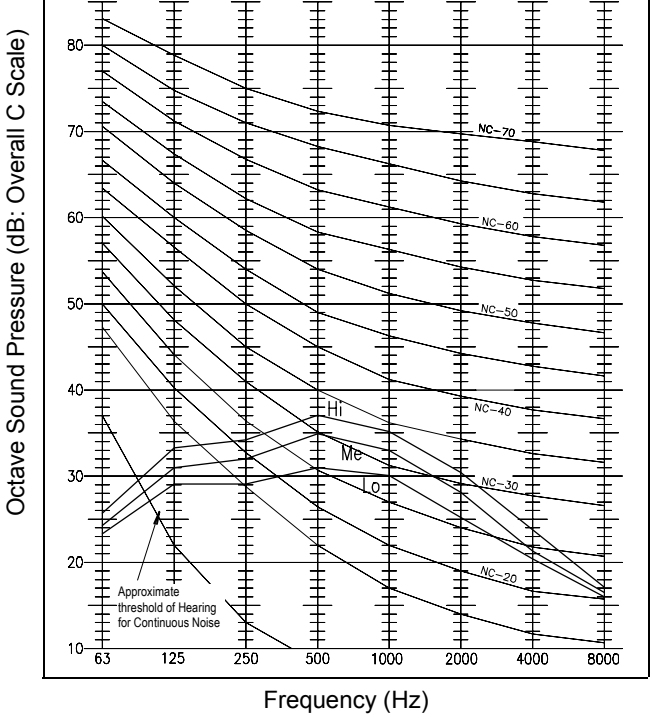


Model: RPI-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 39/37/34 dB(A)

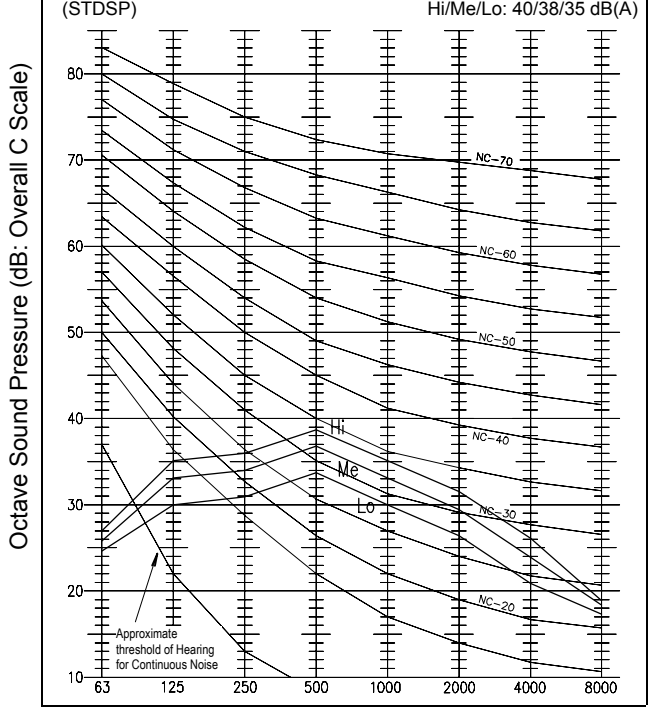


Model: RPI-2.5 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 40/38/35 dB(A)

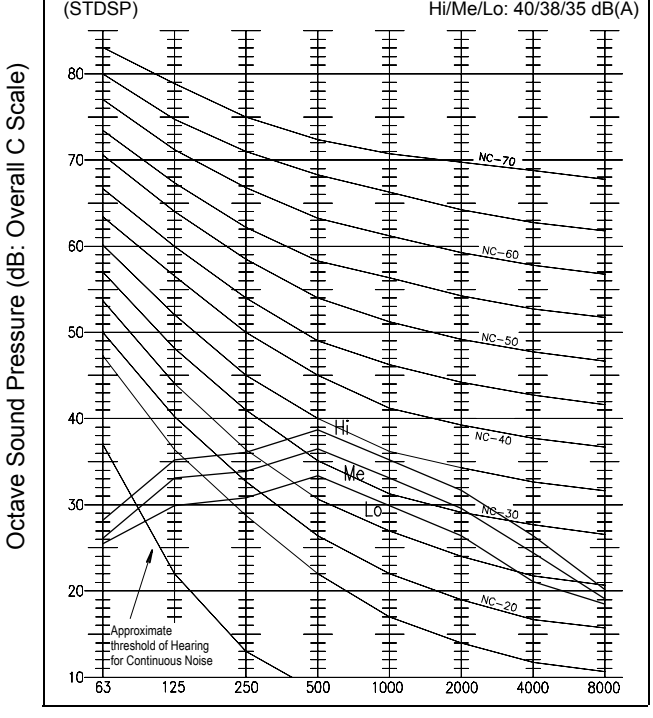


Model: RPI-3.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 40/38/35 dB(A)



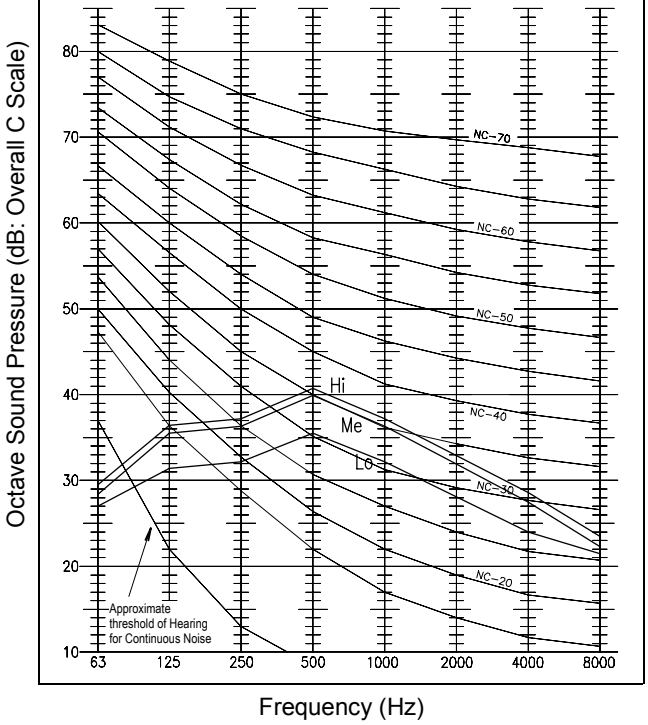
■ RPI - In-the-Ceiling Type (cont.)

Model: RPI-4.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 42/41/37 dB(A)

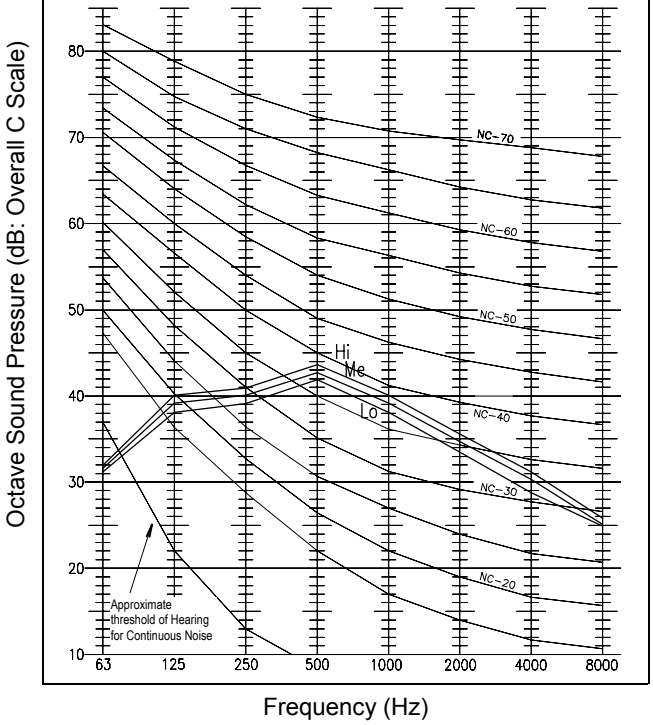


Model: RPI-5.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 45/44/43 dB(A)

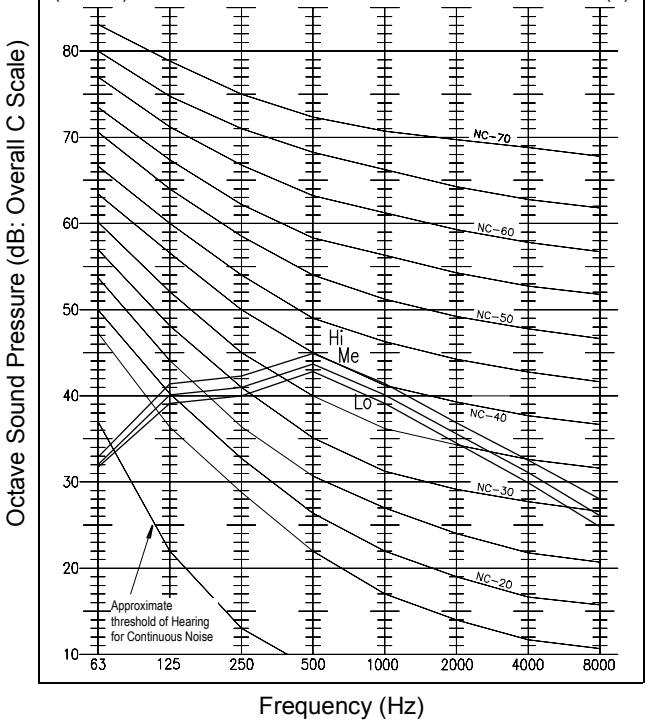


Model: RPI-6.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 46/45/44 dB(A)

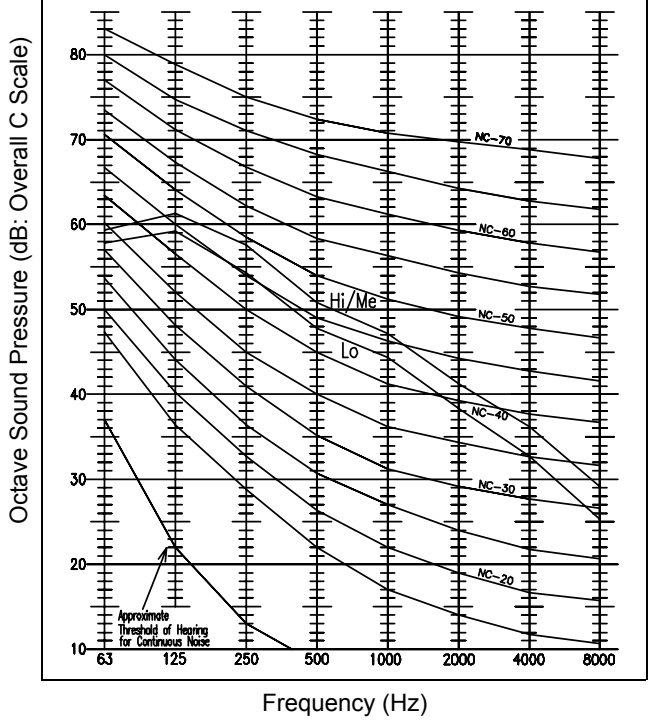


Model: RPI-8.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 54/54/51 dB(A)

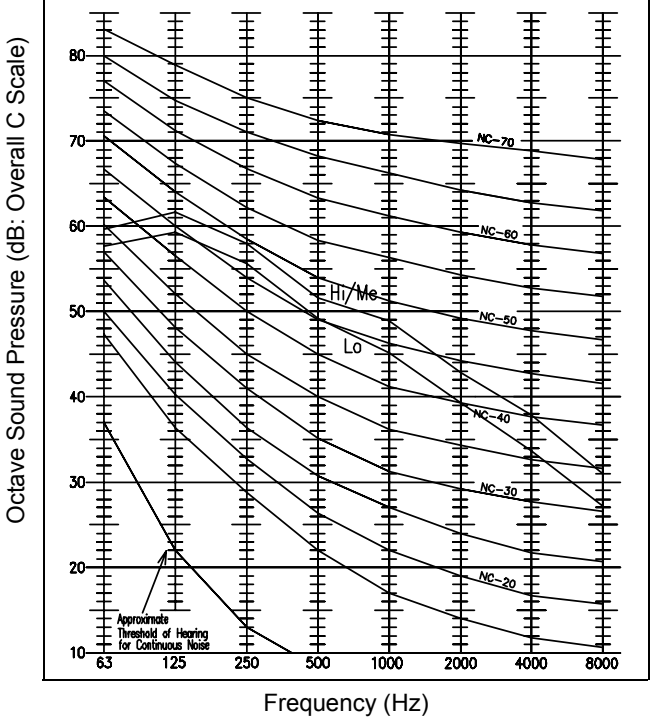


Model: RPI-10.0 | **Power supply:** 230V 50 Hz

Measurement point: 1.5 Meter Beneath the Unit

Noise Criteria Curve

(STDSP) Hi/Me/Lo: 55/55/52 dB(A)



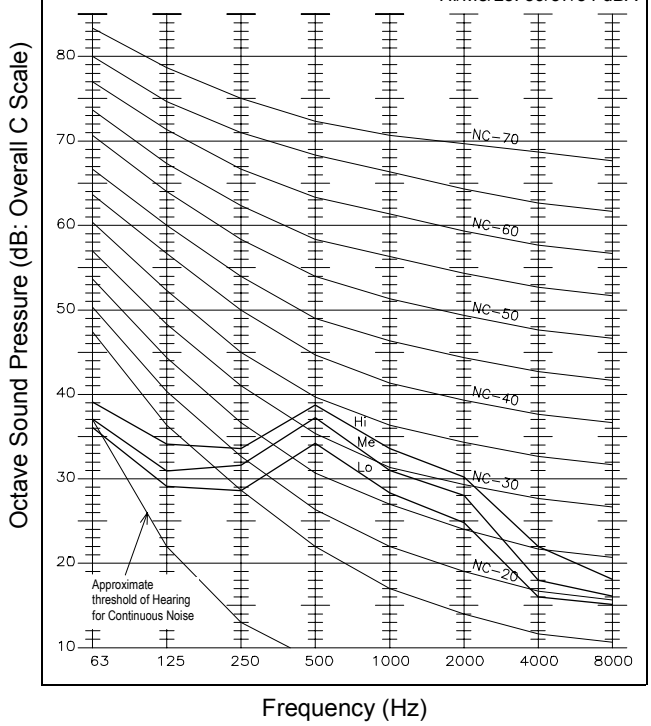
4.9.5. RPK - WALL TYPE

Model: RPK-1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 39/37/34 dBA

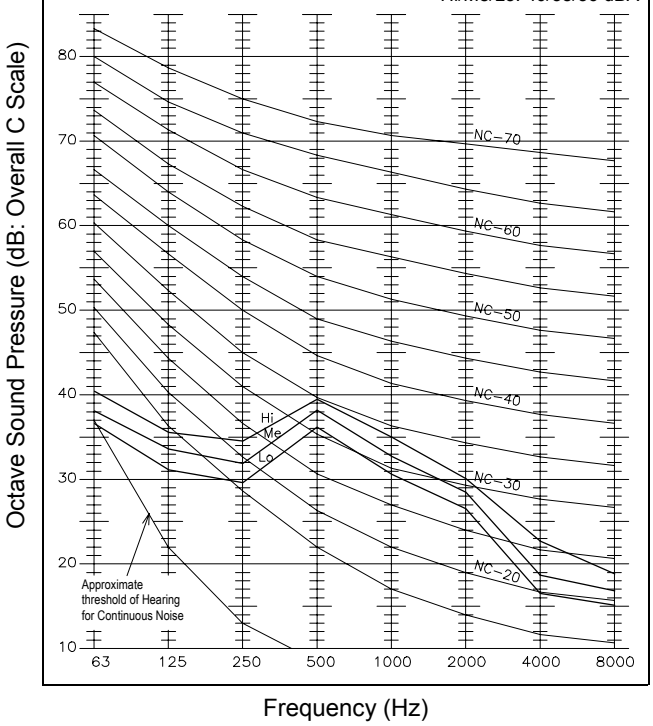


Model: RPK-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 40/38/36 dBA

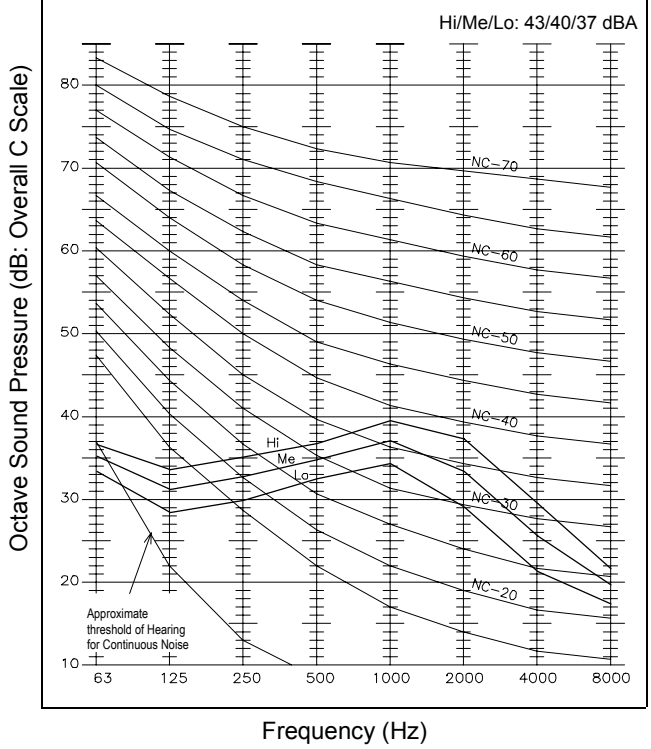


Model: RPK-2.5/3.0 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 43/40/37 dBA

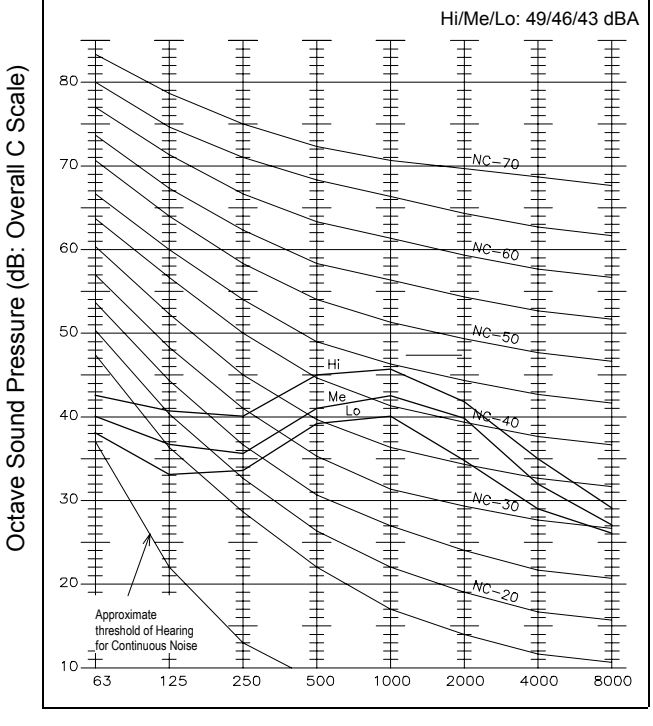


Model: RPK-4.0 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter Beneath the Unit
1 Meter from Discharge Grille

Noise Criteria Curve

Hi/Me/Lo: 49/46/43 dBA



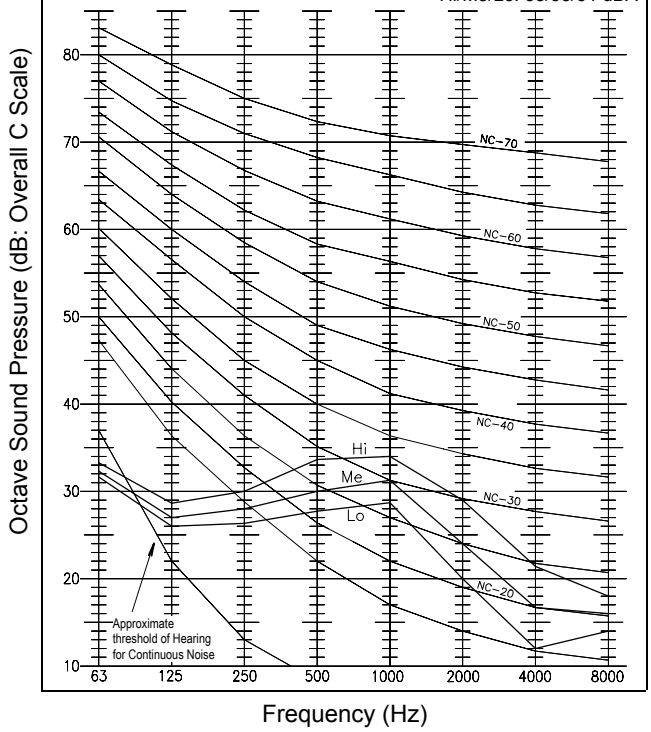
4.9.6. RPF - FLOOR TYPE

Model: RPF-1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 38/35/31 dBA

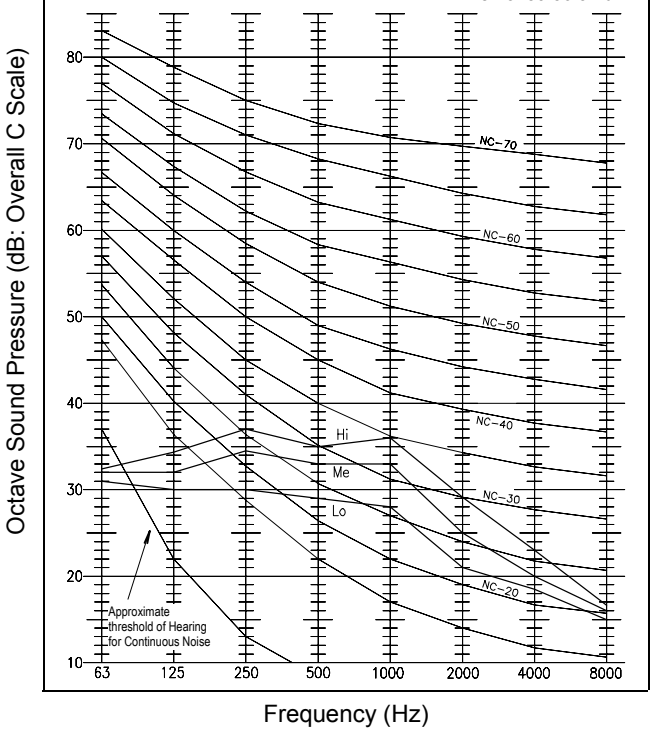


Model: RPF-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 39/36/32 dBA

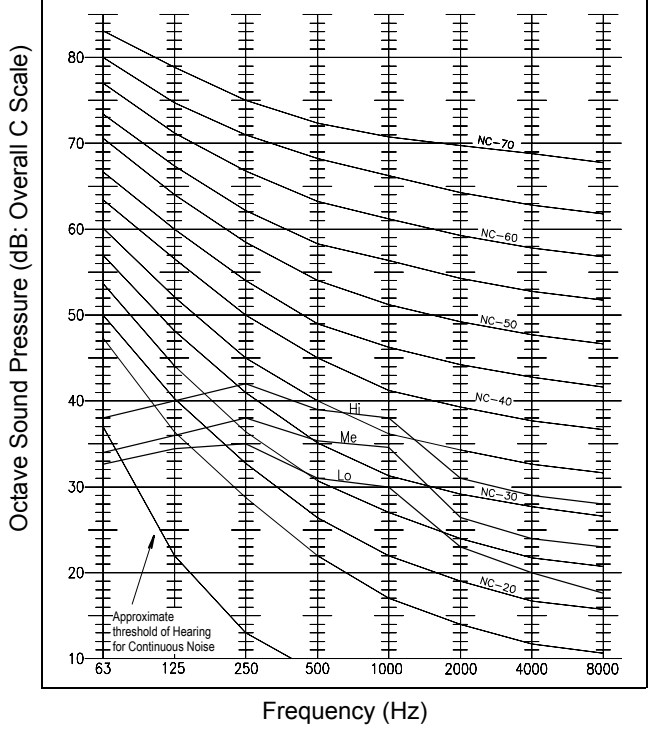


Model: RPF-2.5 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 42/38/34 dBA



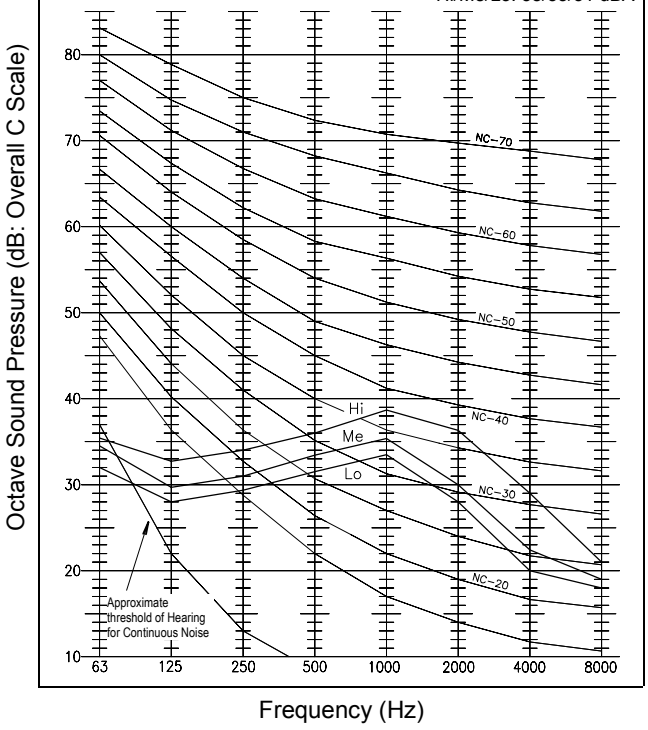
4.9.7. RPFI - FLOOR CONCEALED TYPE

Model: RPFI-1.5 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 38/35/31 dBA

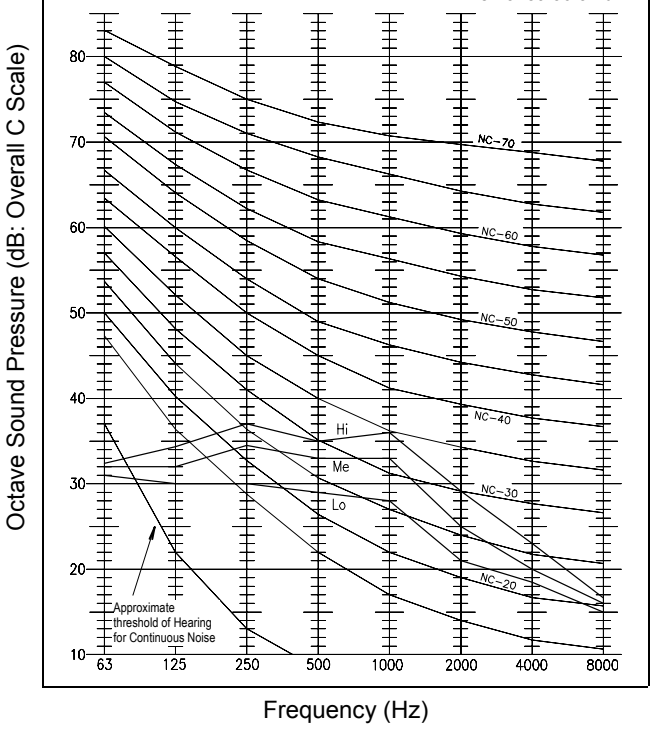


Model: RPFI-2.0 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 39/36/32 dBA

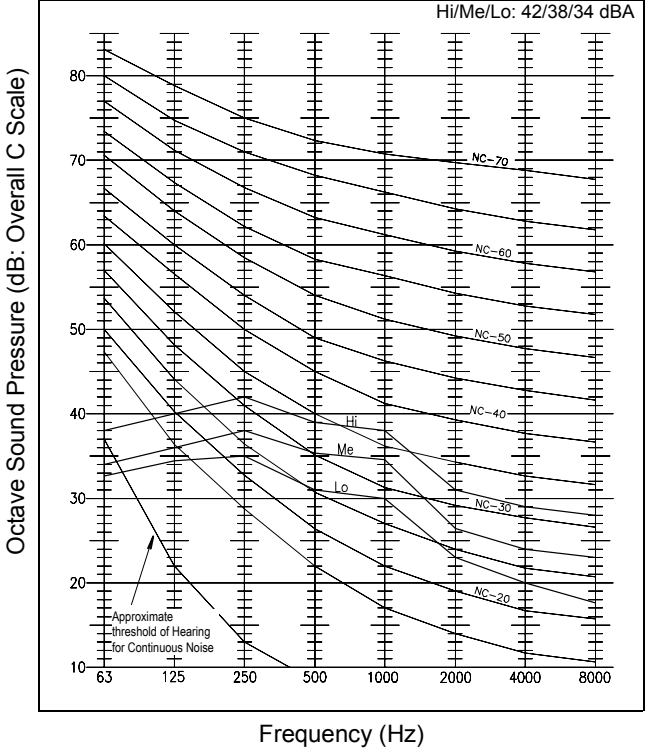


Model: RPFI-2.5 | **Power supply:** 230V 50 Hz

Measurement point: 1 Meter from the Unit
1 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 42/38/34 dBA



4.9.8. RAS - OUTDOOR UNITS H(V)RNE

Model: RAS-2HVRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 41/38 Dba

Octave Sound Pressure (dB: Overall C Scale)

To be informed later

Frequency (Hz)

Model: RAS-2.5HVRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 42/38 Dba

Octave Sound Pressure (dB: Overall C Scale)

To be informed later

Frequency (Hz)

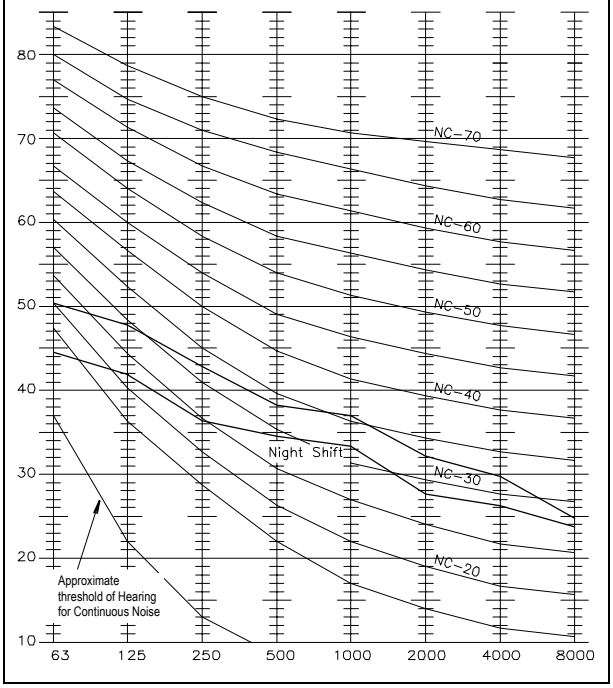
Model: RAS-3HVRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 43/39 Dba

Octave Sound Pressure (dB: Overall C Scale)



Frequency (Hz)

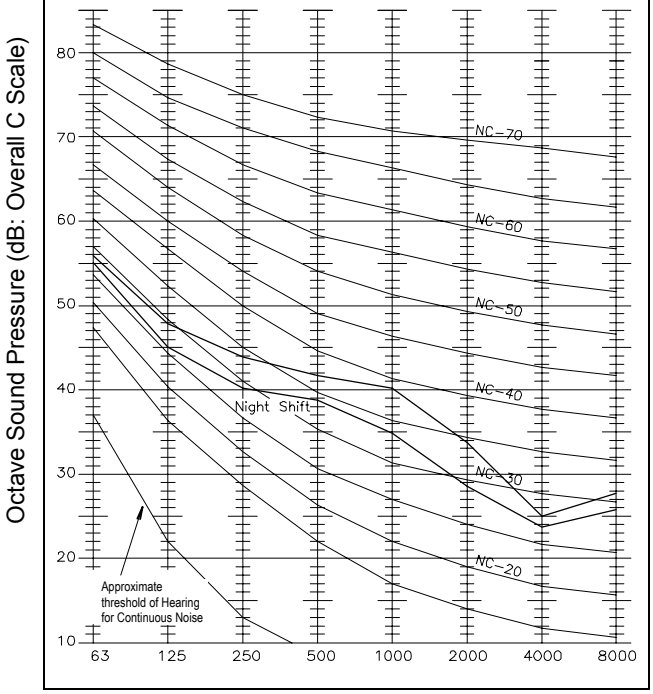
Model: RAS-4H(V)RNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 45/41 Dba

Octave Sound Pressure (dB: Overall C Scale)



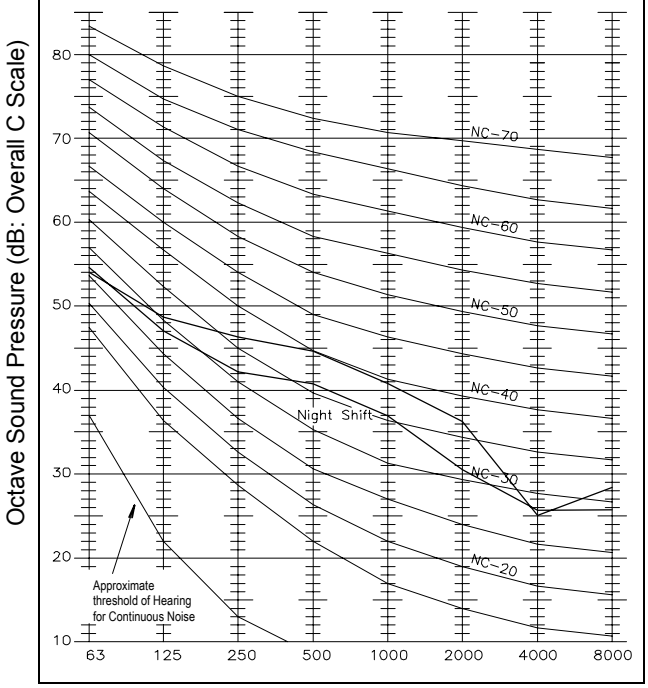
Frequency (Hz)

Model: RAS-5H(V)RNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 47/43 Dba



Model: RAS-6HRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 48/44 Dba

To be informed later

Octave Sound Pressure (dB: Overall C Scale)

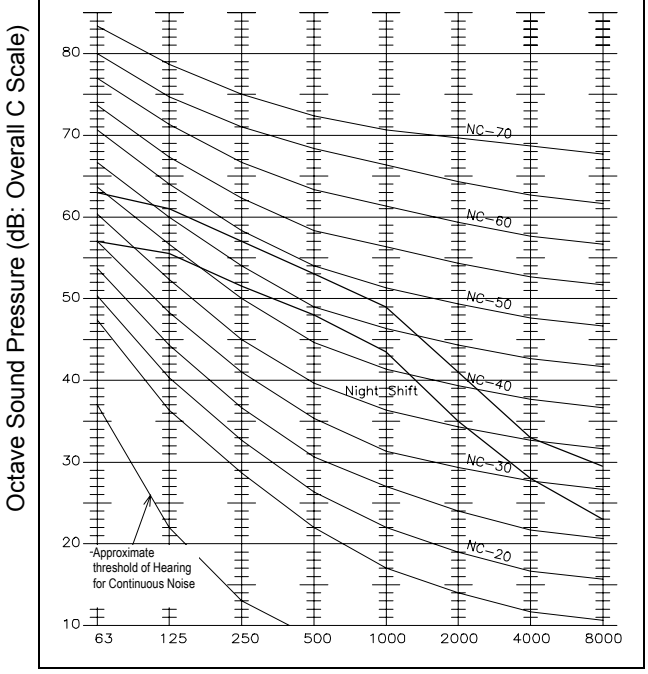
Frequency (Hz)

Model: Model: RAS-8HRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 56/51 Dba

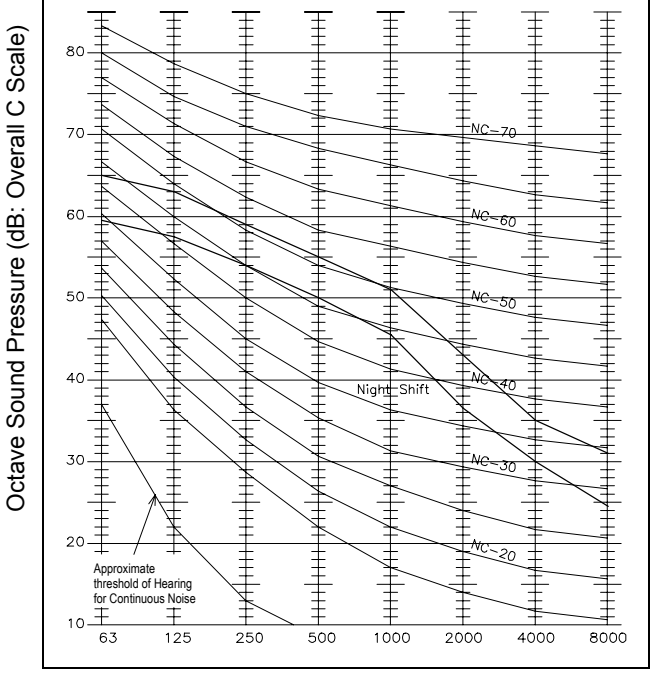


Model: RAS-10HRNE | **Power supply:** (V): 230V 50Hz

Measurement point: 1 Meter from the front surface
1.5 Meter from floor level

Noise Criteria Curve

Hi/Me/Lo: 58/53 Dba



Model: RAS-12HRNE	**Power supply:** (V): 230V 50Hz
Measurement point: 1 Meter from the front surface 1.5 Meter from floor level	
	Noise Criteria Curve
	Hi/Me/Lo: 62/57 Dba

Octave Sound Pressure (dB: Overall C Scale)

To be informed later

Frequency (Hz)

4.9.9. RAS - OUTDOOR UNITS HN(V)E

Model: RAS-2.5~5HN(V)E	**Power supply:** (V): 230V 50Hz
Measurement point: 1 Meter from the front surface 1.5 Meter from floor level	
	Noise Criteria Curve
	Hi/Me/Lo: 47/46 Dba

Octave Sound Pressure (dB: Overall C Scale)

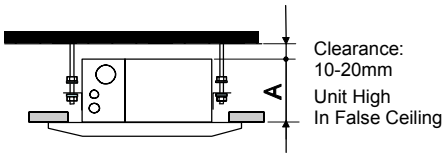
To be informed later

Frequency (Hz)

4.10. OPERATION SPACE

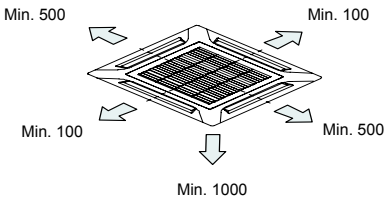
4.10.1. RCI 4-WAY CASSETTE TYPE

Models: RCI-1.5~6.0FSN1E



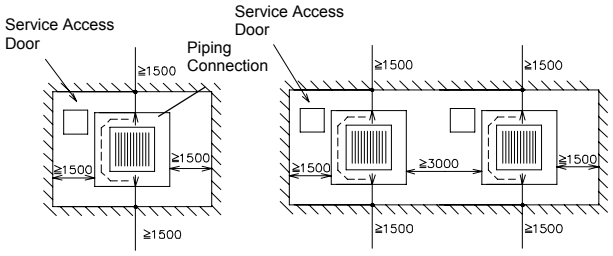
Unit HP	A(mm)
RCI-1.0 to 2.5HP	248
RCI-3.0 to 6.0HP	298

Service Space



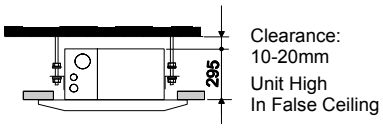
Distance from Wall Side

Single Installation Twin Installation

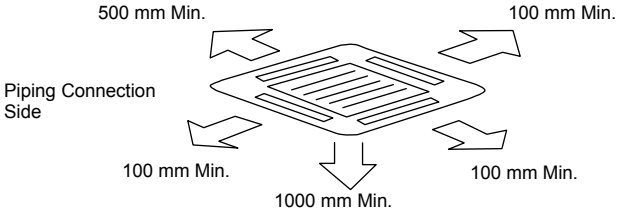


Space around Indoor Unit (mm)

Models: RCIM-1.0/1.5FSN

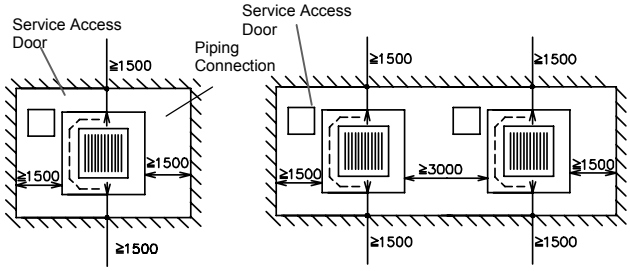


Service Space



Distance from Wall Side

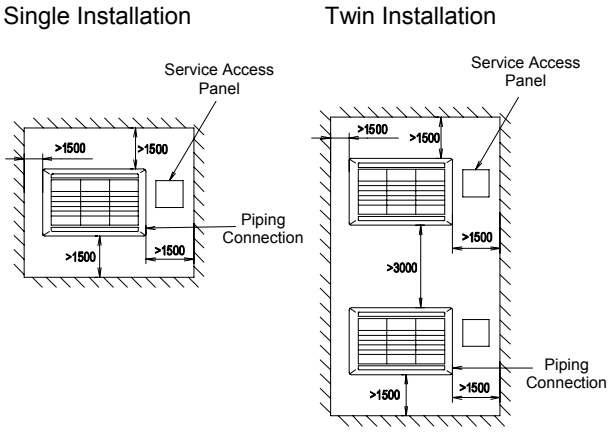
Single Installation Twin Installation



Space around Indoor Unit (mm)

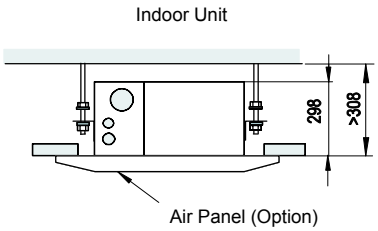
4.10.2. RCD 2-WAY CASSETTE TYPE

Models: RCD-1.5~5.0FSN



Space around Indoor Unit (mm)

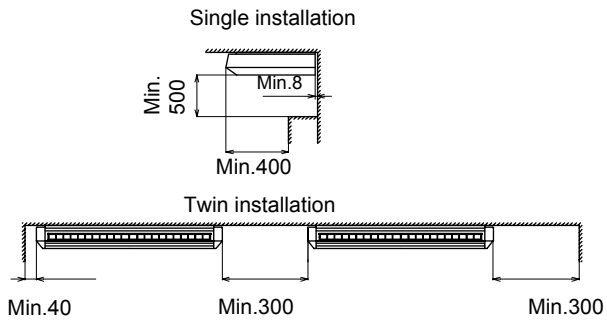
Distance from Wall Side



Unit height in false ceiling (mm)

4.10.3. RPC CEILING TYPE

Models: RPC-2.0~6.0FSNE

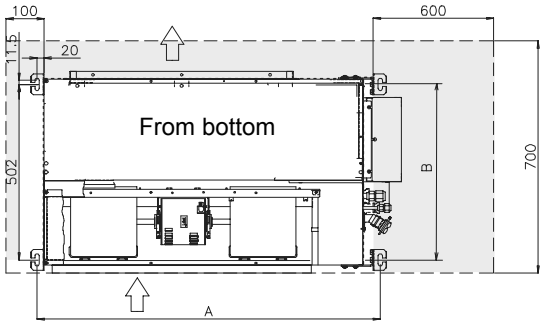


Space around Indoor Unit (mm)

4.10.4. RPI IN-THE-CEILING TYPE

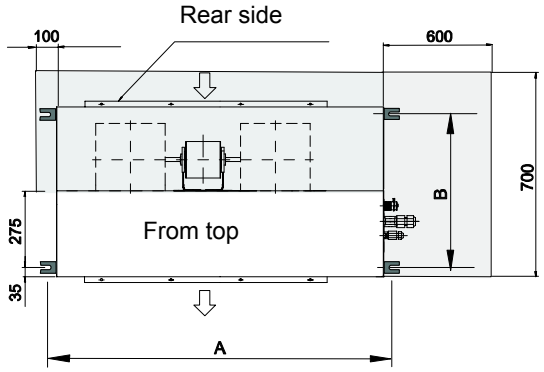
Models: RPI-1.5FSNE

Service space of false ceiling



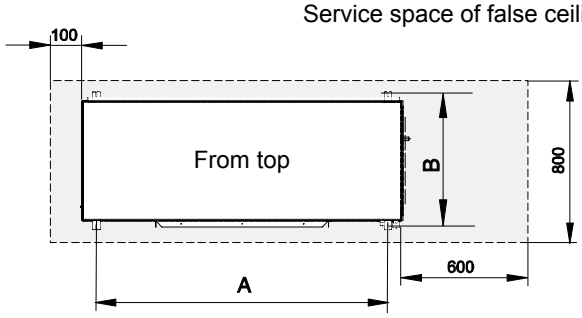
Models: RPI-2.0~6.0FSNE

Service space of false ceiling



Models: RPI-8.0~10.0FSNE

Service space of false ceiling

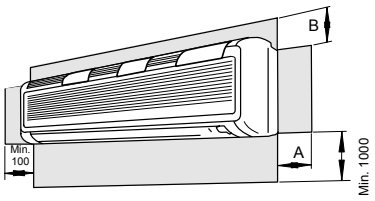


Distance between suspension brackets (A, B):

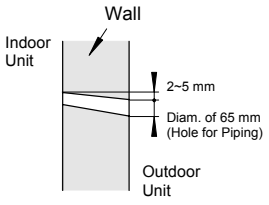
Models	**A** (mm)	**B** (mm)
RPI-1.5	969	1005
RPI-2.0~3.5	1113	601
RPI-4.0~6.0	1503	601
RPI-8~10	1433	637

4.10.5. RPK WALL TYPE

Models: RPK-1.5~4.0FSN(1)M



Operation and Installation Space



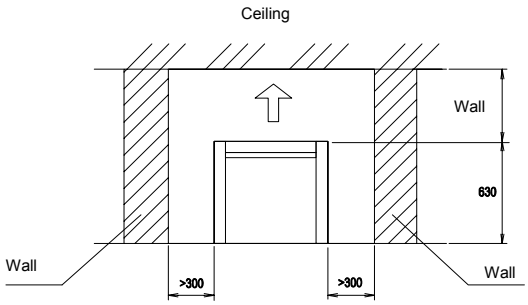
(Hole for Piping on the Wall)

Models FSNM	A (mm)	B (mm)
RPK-1.5 ~ 2.0	100	50
RPK-2.5 ~ 4.0	200	50

Models FSN1M	A (mm)	B (mm)
RPK-1.5	100	150

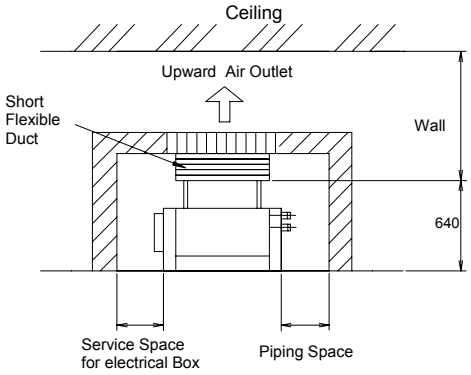
4.10.6. RPF FLOOR TYPE

Models: RPF-1.5~2.5FSNE

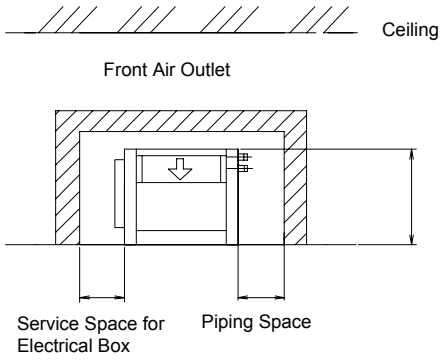


4.10.7. RPFI FLOOR CONCEALED TYPE

Models: RPFI-1.5~2.5FSNE

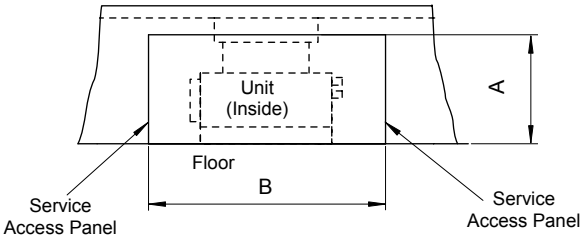


Provide a space so that air can flow smoothly



- Service Access Panel

  Provide a service access door or panel as shown below.

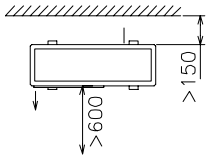


(Space around Indoor Unit)

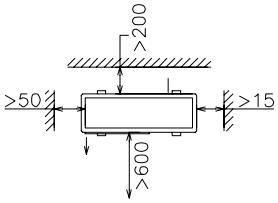
Model	Size	
	A (mm)	B (mm)
RPFI-1.5	620	1380
RPFI-2.0		1634
RPFI-2.5		

4.10.8. OUTDOOR UNITS

Models:: RAS (2~3)H(V)RNE / HN(V)E



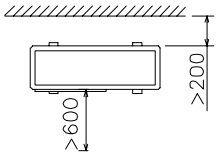
Only Rear Wall



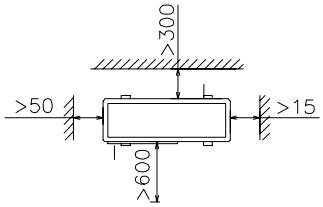
3 Surrounding Walls

Space around Indoor Unit (mm)

Models: RAS (4~6)H(V)RNE / HN(V)E



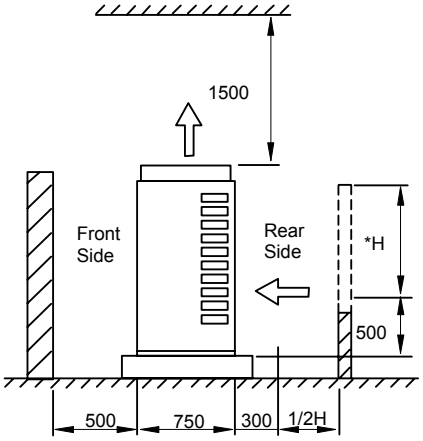
Only Rear Wall



3 Surrounding Walls

Space around Indoor Unit (mm)

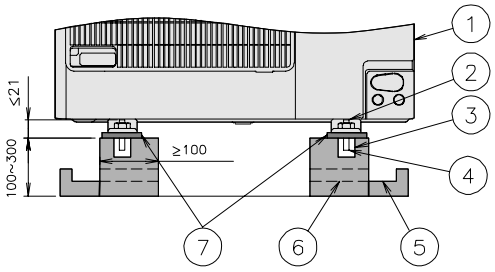
Models: RAS (8~12)HRNE

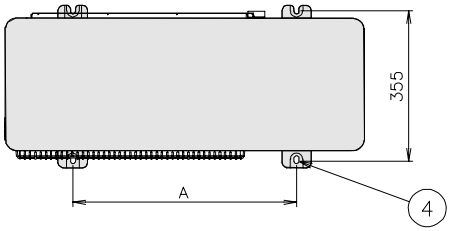


In case that the height of the rear side wall is higher than 500 mm (500+H), keep the distance between the unit and the rear side wall with (300+1/2H)mm.

4.11. FOUNDATION PROVISION

■ RAS-2~6 H(V)RNE – HN(V)E



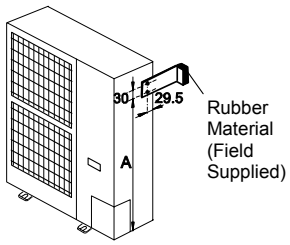


Nº	Description
①	Outdoor Unit
②	Cut this portion of bolt If not, it's difficult to remove Service Cover
③	Mortar Hole (Ø100xDepth 150)
④	Anchor Bolt M10
⑤	Drainage (Wide 100xDepth 150)
⑥	Drainage
⑦	Vibration-proof rubber

Mark	Dimension	
Model	2.5/3.0Hp	4.0/5.0Hp
A	530	600

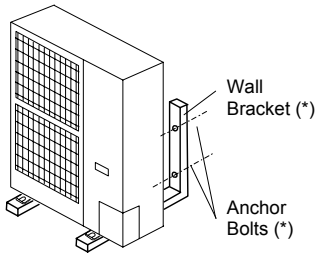
(mm)

Fix Unit to the wall



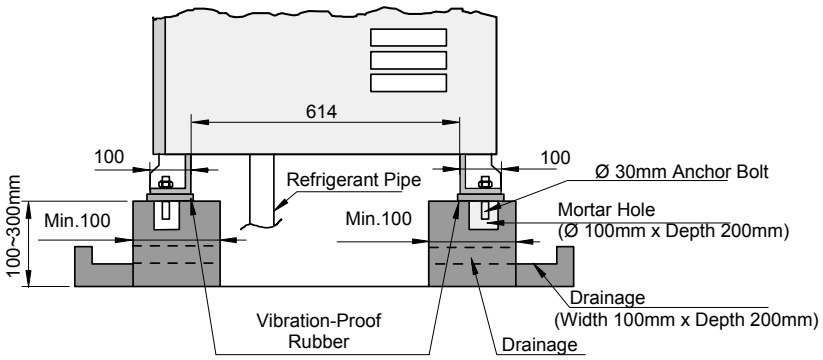
Mark	Dimension	
Model	2~3.0Hp	4.0~6.0Hp
A (mm)	511	796

Suspended unit

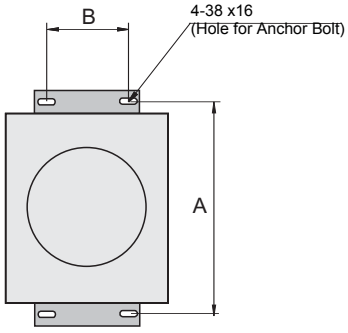


*) field supplied.

■ RAS-8~12 H(V)RNE



Position of Anchor Bolts

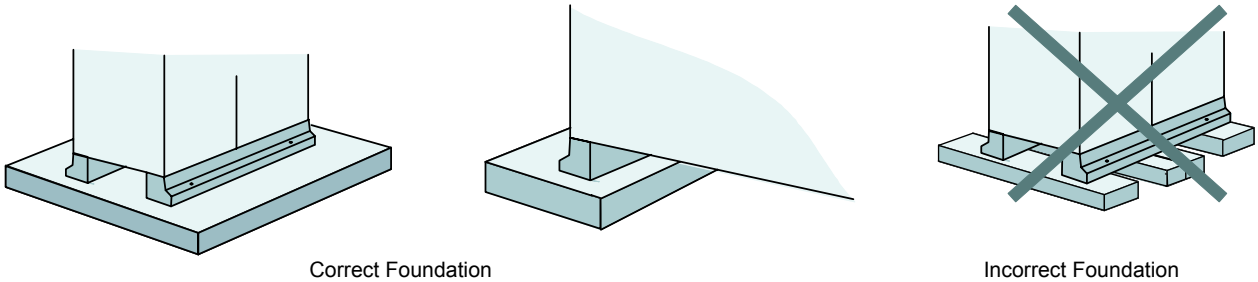


MODEL	A	B
RAS-8.0	760	368
RAS-10.0/12.0	760	688

(mm)

NOTE:

Design the foundation as show in the figure and confirm that the foundation carries all the feet of the unit.



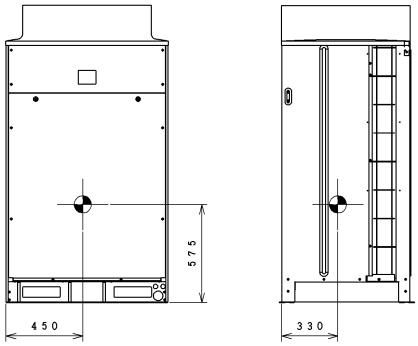
Correct Foundation

Incorrect Foundation

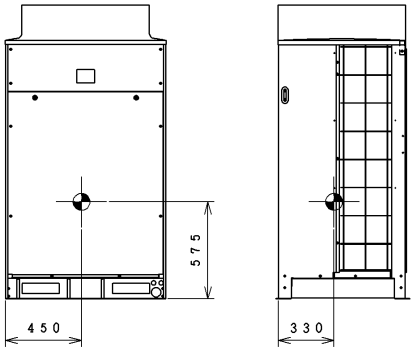
4.12. CENTER OF GRAVITY

■ **Center of gravity for RAS-8~12 (HP)**

Models: RAS-8



Models: RAS-10/12



5 WORKING RANGE

This chapter shows the working range of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

5.1. POWER SUPPLY

Working Voltage	90% to 110% of the Rated Voltage
Voltage Imbalance	Within a 3% Deviation from Each Voltage at the Main Terminal of Outdoor Unit
Starting Voltage	Higher than 85% of the Rated Voltage

Following the Council Directive 89/336/EEC and its amendments 92/31/EEC and 93/68/EEC, relating to electromagnetic compatibility, next table indicates maximum permissible system impedance Z_{max} at the interface point of the user's supply, in accordance with EN61000-3-11.

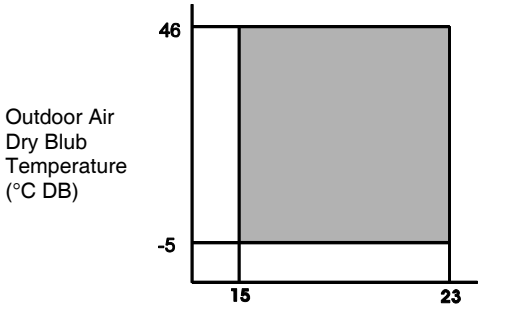
MODEL	Zmax (Ω)
RAS-2HVRNE	0.35
RAS-2.5HVRNE	0.35
RAS-3HVRNE	0.35
RAS-4HVRNE	0.27
RAS-5HVRNE	0.26
RAS-2.5HNVE	0.26
RAS-3HNVE	0.20
RAS-4HNVE	0.09

5.2. TEMPERATURE RANGE

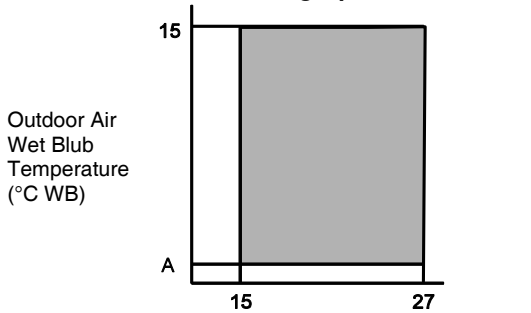
The temperature range is indicated in the following table.

		Cooling Operation	Haeting Operation
Indoor Temperature	Minimum	21 °C DB / 15 °CWB	15 °C DB
	Maximum	32 °C DB / 23 °C WB	27 °C DB
Outdoor temperature	Minimum	–5 °C DB	–20 °C WB
	Maximum	46 °C DB	15 °C WB

Cooling Operation



Heating Operation

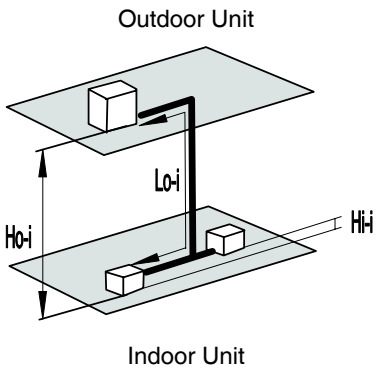


Model	Temperature (A)
RAS-2~3HVRNE	-15°C
RAS-4~12H(V)RNE	-20°C
RAS-2.5~5HN(V)E	-10°C

5.3. PIPING PROVISION

(m)

Unit Power	H(V)RNE				HN(V)E
	2HP	2.5/3HP	4/5/6HP	8/10/12HP	2.5/3/4/5HP
Maximum Piping Lenght Lo-i:					
Actual Length	55	60	77	120	50
Equivalent Length	75	80	99	150	70
Maximum Piping Lift Ho-i:					
Outdoor Unit is higher than Indoor Unit	30			30	30
Indoor Unit is higher than Outdoor Unit	20			20	20
Maximum Piping Lift Hi-i:	0.5			0.5	0.5



6 ELECTRICAL DATA

This chapter provides you the electrical requirements for each unit of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

6.1. INDOOR UNITS

■ All applicable Models:

Model		Unit Main Power		Applicable Voltage (V)			Indoor Fan Motor		
		U	PH	Hz	Max.	Min.	PH	RNC_I(A)	IPT_I(KW)
Cassette Type	RCIM-1.5 FSN	230	1	50	253	207	1	0.4	0.08
	RCIM-2.0 FSN							0.4	0.08
	RCI-1.5 FSN1E							0,2	0,05
	RCI-2.0 FSN1E							0,2	0,05
	RCI-2.5 FSN1E							0,3	0,06
	RCI-3.0 FSN1E							0,4	0,09
	RCI-4.0 FSN1E							0,7	0,11
	RCI-5.0 FSN1E							0,8	0,14
	RCI-6.0 FSN1E							1,0	0,18
2-Way Cassette Type	RCD-1.5 FSN	230	1	50	253	207	1	0,4	0,07
	RCD-2.0 FSN							0,4	0,09
	RCD-2.5 FSN							0,5	0,10
	RCD-3.0 FSN							0,6	0,12
	RCD-4.0 FSN							0,6	0,13
	RCD-5.0 FSN							0,9	0,19
Ceiling Type	RPC-2.0 FSNE	230	1	50	253	207	1	0,6	0,14
	RPC-2.5 FSNE							0,7	0,15
	RPC-3.0 FSNE							0,8	0,17
	RPC-4.0 FSNE							0,8	0,18
	RPC-5.0 FSNE							1,1	0,23
	RPC-6.0 FSNE							1,1	0,23
In-the-Ceiling Type	RPI-1.5 FSNE	230	1	50	253	207	1	0,6	0,10
	RPI-2.0 FSNE							0,9	0,21
	RPI-2.5 FSNE							1,1	0,24
	RPI-3.0 FSNE							1,2	0,26
	RPI-4.0 FSNE							1,2	0,26
	RPI-5.0 FSNE							1,8	0,38
	RPI-6.0 FSNE							1,8	0,38
	RPI-8.0 FSNE							4.7	1.01
	RPI-10.0 FSNE							5.2	1.15
Wall Type	RPK-1.5FSN1M	230	1	50	253	207	1	0,2	0,03
	RPK-1.5 FSNM							0,3	0,03
	RPK-2.0 FSNM							0,3	0,03
	RPK-2.5 FSNM							0,7	0,09
	RPK-3.0 FSNM							0,7	0,09
	RPK-4.0 FSNM							0,7	0,09
Floor Type	RPF-1.5 FSNE	230	1	50	253	207	1	0,2	0,04
	RPF-2.0 FSNE							0,4	0,09
	RPF-2.5 FSNE							0,4	0,09
Floor Concealed Type	RPFI-1.5 FSNE	230	1	50	253	207	1	0,2	0,04
	RPFI-2.0 FSNE							0,4	0,09
	RPFI-2.5 FSNE							0,4	0,09

U: Supply Voltage (V)
Hz: Frequency (Hz)
RNC: Running Current Fan (A)
IPT: Input Power Fan (kW)
PH: Phase (ϕ)

NOTE:
This data is based on the same conditions as the nominal capacity conditions. Refer to the notes of the Unit General data.

Specifications in these tables are subject to change without notice in order that HITACHI may bring the latest innovations to their customers.

6.2. OUTDOOR UNITS

■ RAS-2~6HP

Model	Unit Main Power			Applicable Voltage		Outdoor Unit (Including outdoor fan)						Maximum Current
								Cooling Operation		Heating Operation		
	U	PH	HZ	Maximum	Minimum	PH	STC	RNC	IPT	RNC	IPT	
RAS-2HVRNE	230	1	50	253	207	1	6	5.5	1.24	5.8	1.32	21
RAS-2.5HVRNE				253	207	1	7	7.1	1.56	7.2	1.62	21
RAS-3HVRNE				253	207	1	6.5	10.7	2.16	11.9	2.41	25
RAS-4HVRNE				253	207	1	10.5	15	3.07	15.3	3.13	32
RAS-5HVRNE				253	207	1	15	19.2	3.94	20	4.11	32
RAS-2.5HNVE				253	207	1	58	11.1	2.25	10.9	2.21	14
RAS-3HNVE				253	207	1	68	12.1	2.40	11.7	2.32	15.3
RAS-4HNVE				253	207	1	114	16.2	3.20	16.2	3.19	20
RAS-4HRNE	400	3	50	440	360	3	10.5	3.8	2.49	3.8	2.44	11
RAS-5HRNE				440	360	3	15	5.3	3.44	5	3.26	15
RAS-6HRNE				440	360	3	15	6.5	4.21	6.3	4.05	15
RAS-2.5HNE				440	360	3	27	4.9	2.25	4.9	2.21	5.7
RAS-3HNE				440	360	3	27	5.2	2.40	5	2.40	5.9
RAS-4HNE				440	360	3	48	6.9	3.20	6.9	3.20	7.4
RAS-5HNE				440	360	3	74	9.2	4.22	9.3	4.29	10.2

■ RAS-8~12HP

Model	Unit Main Power			Aplicable Voltage		Compressor Motor						Outdoor Fan Motor			Maximum Current
								Cooling Operation		Heating Operation		PH	RNC	IPT	
	U	PH	Hz	Max.	Min.	PH	STC	RNC	IPT	RNC	IPT				
RAS-8HRNE	400	3	50	440	360	3	77,3	10,3	6.50	8,9	5.70	1	1,2	0,26	14
RAS-10HRNE				440	360	3	80,8	12,5	7.90	12,4	7.80	1	2,2	0,5	17
RAS-12HRNE				440	360	3	88	12.5	10.64	13.2	11.13	1	2.2	0.5	17

U: Supply voltage (V)
Hz: Frequency (Hz)
STC: Starting Current (A)
RNC: Running Current (A)
IPT: Input Power (KW)
PH: Phase (ϕ)

NOTE:

This data is based on the same conditions as the nominal capacity conditions. Refer to the notes of the Unit General Data.
Specifications in these tables are subject to change without notice in order that HITACHI may bring the latest innovations to their customers.

NOTE:

1. *The above performance data is based on 5 m equivalent piping length and 0 m piping lift.*
2. *The models RAS-2~6H(V)RNE are equipped with one inverter-driven compressor.*
   The models RAS-2.5~5H(V)NE are equipped with one, ON/OFF controlled compressor.
   The models RAS-8~12HRNE are equipped with one inverter-driven compressor and one, ON/OFF controlled compressor.

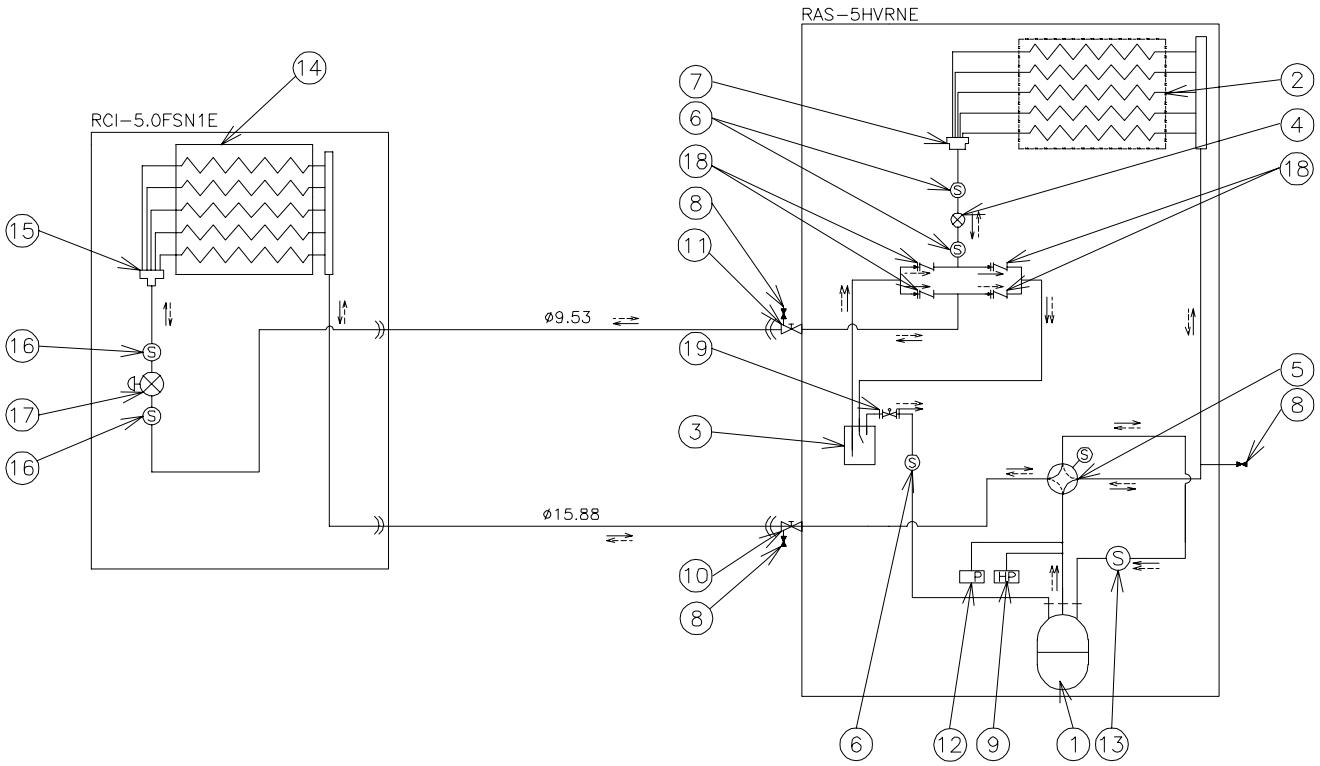
7 REFRIGERANT CYCLE

This chapter describes the Refrigerant Cycle and shows the main parts of the system for the possible configurations of the new Hitachi UTOPIA H(V)RNE / HN(V)E Series.

CONTENTS

7.1. OUTDOOR UNITS H(V)RNE

7.1.1. SINGLE SYSTEM EXAMPLE



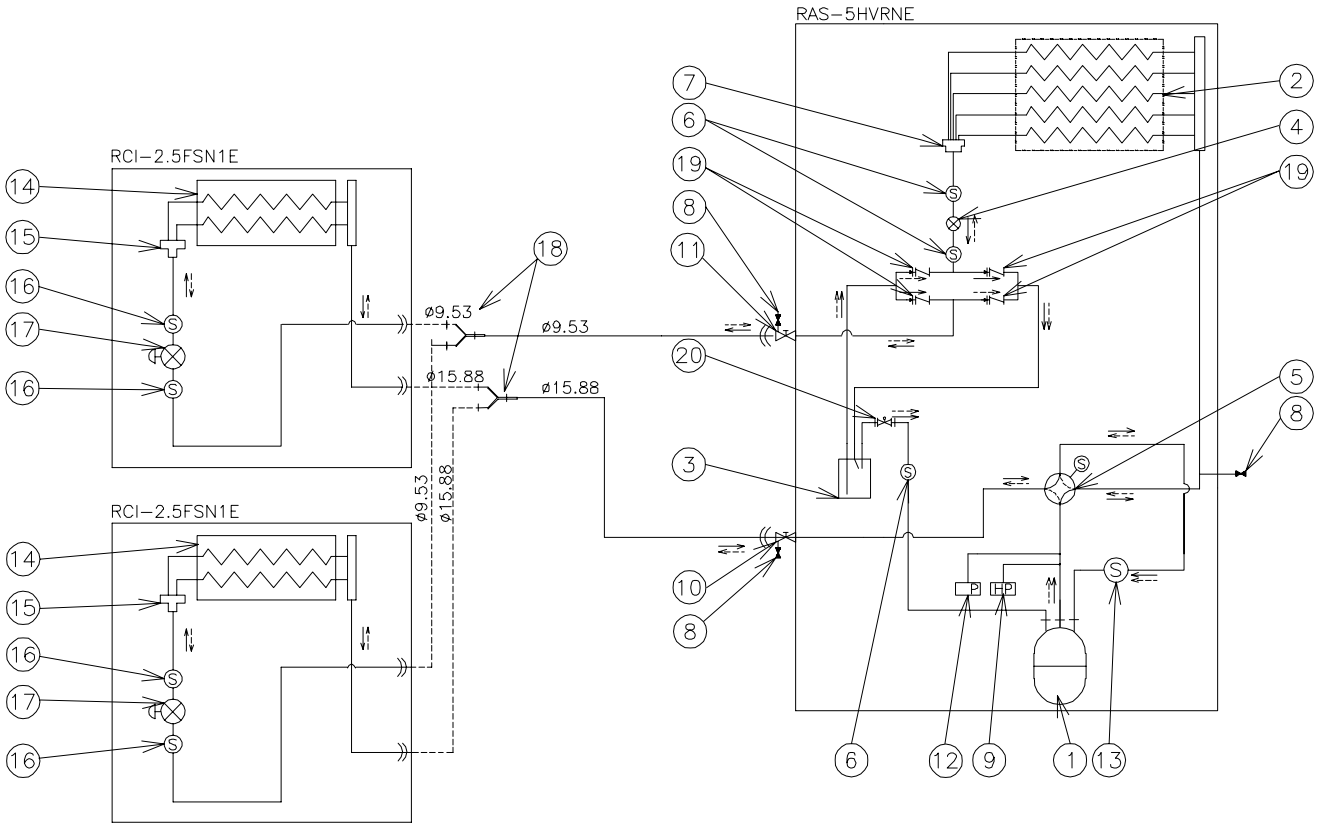
←: Refrigerant Flow for Cooling	←- -: Refrigerant Flow for Heating	– – –: Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant R410A	Airtight Test Pressure: 4.15 MPa

No.	Part Name
1	Compressor
2	Outdoor Heat Exchanger
3	Receiver
4	Micro Computer Control Expansion Valve
5	Reversing Valve
6	Strainer 3/8
7	Distributor

No.	Part Name
8	Check Joint
9	Pressure Switch
10	Stop Valve (Gas Line)
11	Stop Valve (Liquid Line)
12	Pressure Switch (Control)
13	Strainer 5/8
14	Indoor Heat Exchanger

No.	Part Name
15	Distributor
16	Strainer
17	Micro Computer Control Expansion Valve
18	Check Valve
19	Solenoid Valve

7.1.2. TWIN SYSTEM EXAMPLE



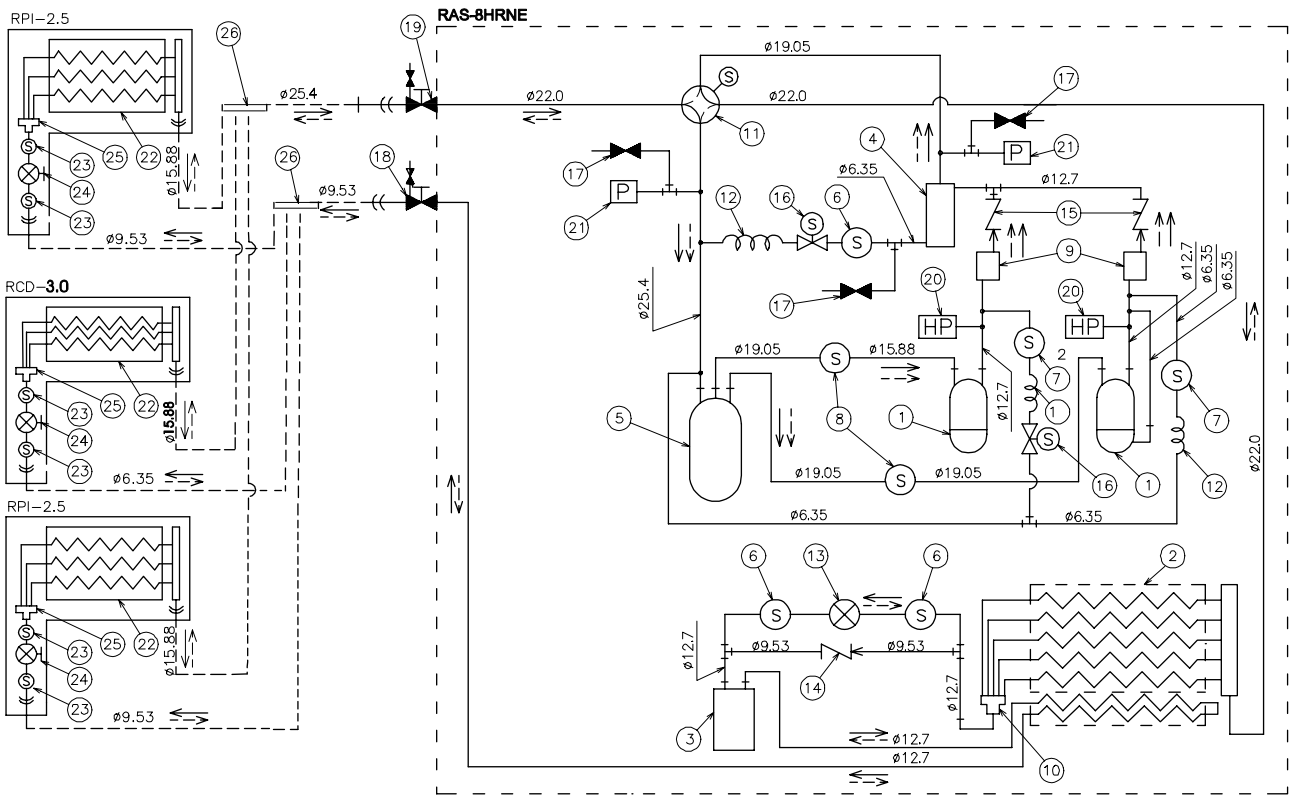
: Refrigerant Flow for Cooling	: Refrigerant Flow for Heating	: Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant: R410A	Airtight Test Pressure: 4.15 MPa

No.	Part Name
1	Compressor
2	Outdoor Heat Exchanger
3	Receiver
4	Micro Computer Control Expansion Valve
5	Reversing Valve
6	Strainer 3/8
7	Distributor

No.	Part Name
8	Check Joint
9	Pressure Switch
10	Stop Valve (Gas Line)
11	Stop Valve (Liquid Line)
12	Pressure Switch (Control)
13	Strainer 5/8
14	Indoor Heat Exchanger

No.	Part Name
15	Distributor
16	Strainer
17	Micro Computer Control Expansion Valve
18	Branch pipe (TE-56N)
19	Check Valve
20	Solenoid Valve

7.1.3. TRIPLE SYSTEM EXAMPLE



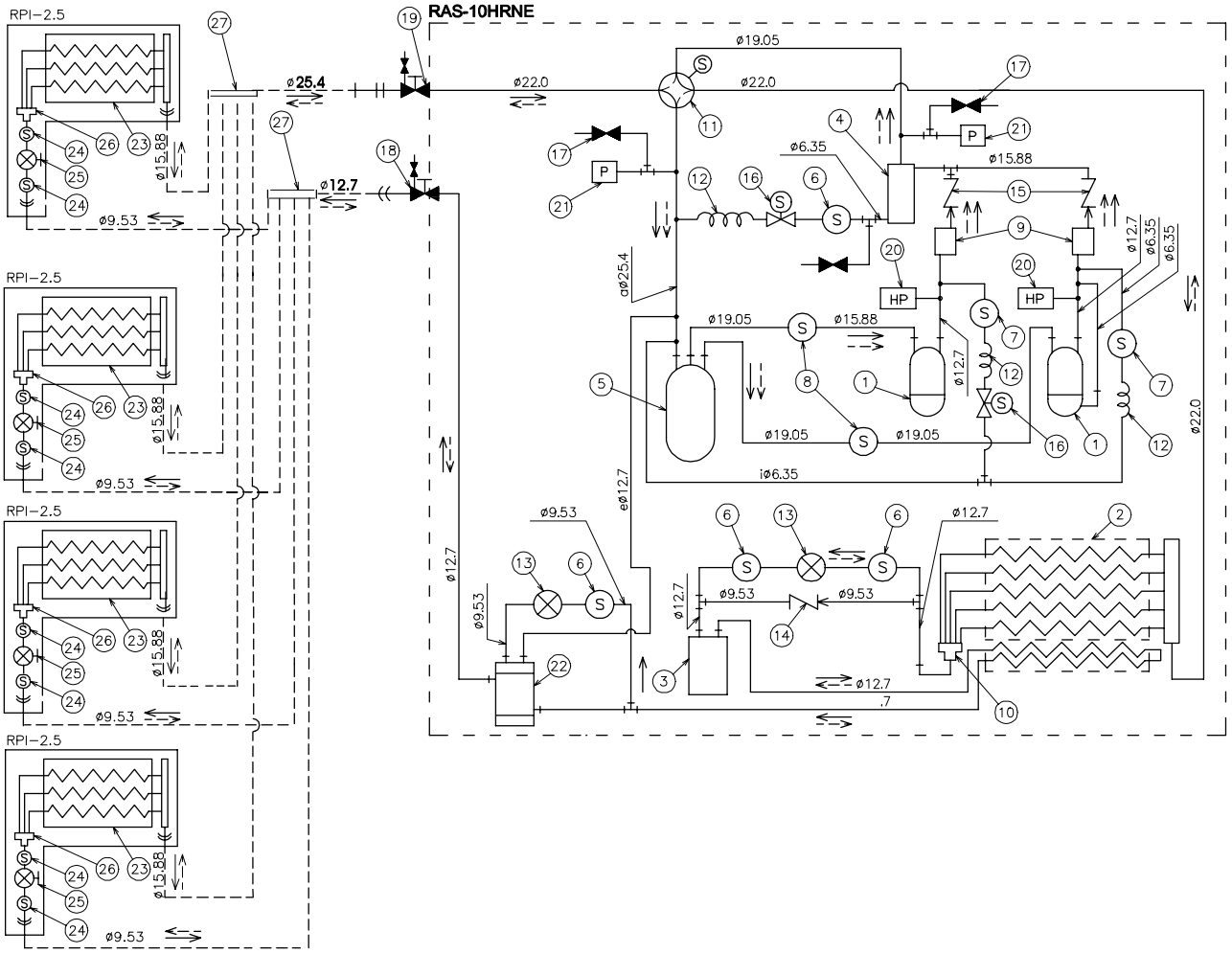
: Refrigerant Flow for Cooling	: Refrigerant Flow for Heating	: Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant: R410A	Airtight Test Pressure: 4.15 MPa

No.	Part Name
1	Compressor
2	Heat Exchanger
3	Receiver
4	Oil Separator
5	Accumulator
6	Strainer
7	Strainer
8	Strainer
9	Strainer

No.	Part Name
10	Distributor
11	Reversing Valve
12	Capillary Tube
13	Expansion valve
14	Check Valve
15	Check Valve
16	Solenoid Valve (Gas Bypass)
17	Check Joint
18	Stop Valve for Liquid Line

No.	Part Name
19	Stop Valve for gas Line
20	High Pressure Switch for Protection
21	Sensor for Refrigerant Pressure
22	Heat Exchanger Indoor
23	Strainer Indoor
24	Expansion Valve Indoor
25	Distributor Indoor
26	Branch Pipe TRE-810N

7.1.4. QUAD SYSTEM EXAMPLE



: Refrigerant Flow for Cooling	: Refrigerant Flow for Heating	: Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant: R410A	Airtight Test Pressure: 4.15 MPa

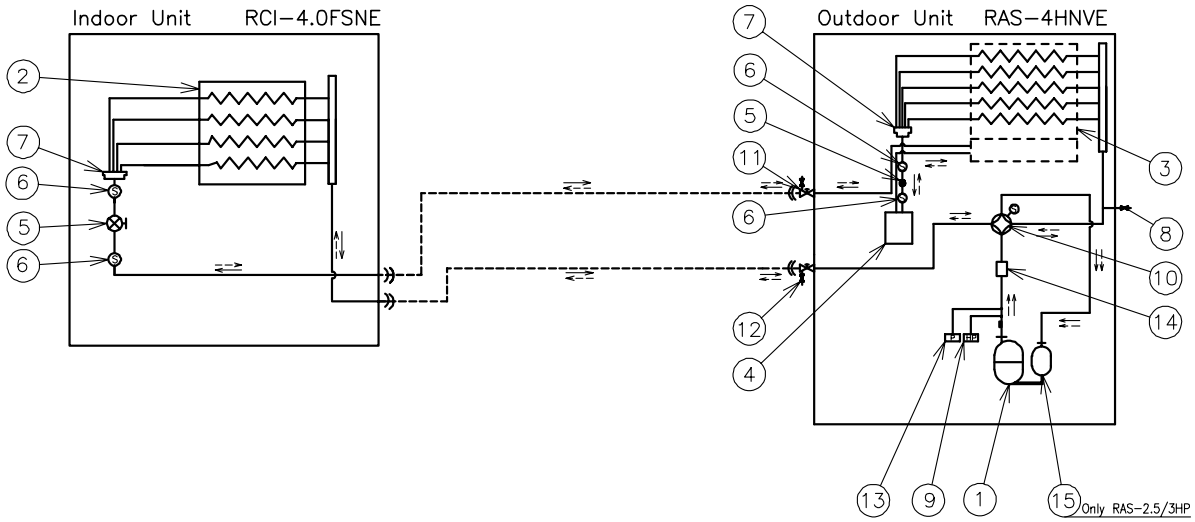
No.	Part Name
1	Compressor
2	Heat Exchanger
3	Receiver
4	Oil Separator
5	Accumulator
6	Strainer
7	Strainer
8	Strainer
9	Silenceer
10	Distributor

No.	Part Name
11	Reversing Valve
12	Capillary Tube
13	Expansion valve
14	Check Valve
15	Check Valve
16	Solenoid Valve (Gas Bypass)
17	Check Joint
18	Stop Valve for Liquid Line
19	Stop Valve for gas Line
20	High Pressure Switch for Protection

No.	Part Name
21	Sensor for Refrigerant Pressure
22	Plate Heat Exchanger
23	Heat Exchanger Indoor
24	Strainer Indoor
25	Expansion Valve Indoor
26	Distributor Indoor
27	Branch Pipe: QE-810N
28	Branch Pipe: QE-810N

7.2. OUTDOOR UNITS HN(V)E

7.2.1. SINGLE SYSTEM EXAMPLE



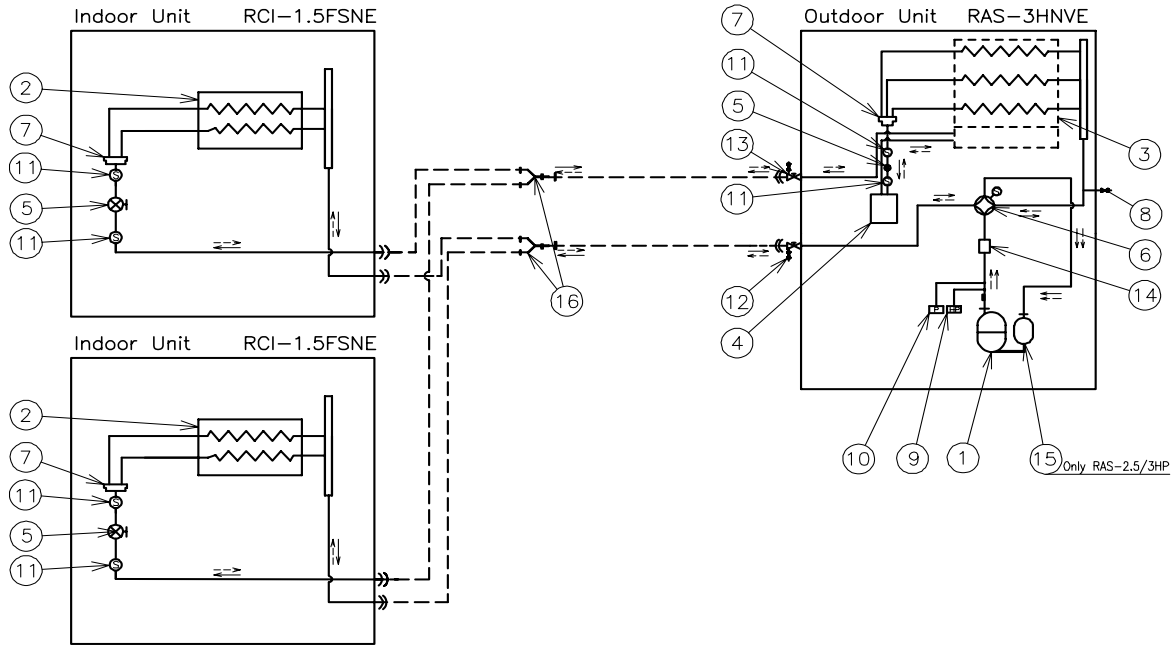
←: Refrigerant Flow for Cooling	←- - : Refrigerant Flow for Heating	– – – : Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant: R410A	Airtight Test Pressure: 4.15 MPa

(*) In case that the equivalent piping lenght is more than 100 m, see chapter 10.

No.	Part Name
1	Compressor
2	Indoor Heat Exchanger
3	Oudoor Heat Exchanger
4	Receiver
5	Expansion valve
6	Strainer
7	Distributor
8	Check Joint
9	High Pressure Switch for Protection
10	4-way Valve

No.	Part Name
11	Stop Valve for Liquid Line
12	Stop Valve for Gas Line
13	Pressure Switch (Gas by Pass)
14	Silencer
15	Accumulator

7.2.2. TWIN SYSTEM EXAMPLE



←: Refrigerant Flow for Cooling	←- - : Refrigerant Flow for Heating	– – – : Field Refrigerant Piping	: Flare Connection	: Flange Connection	: Brazing Connection	Refrigerant: R410A	Airtight Test Pressure: 4.15 MPa

(*) In case that the equivalent piping lenght is more than 100 m, see chapter 10.

No.	Part Name
1	Compressor
2	Indoor Heat Exchanger
3	Outdoor Heat Exchanger
4	Reciver
5	Expansion valve
6	Reverse Valve
7	Distributor
8	Check Joint
9	Pressure Switch (High)
10	Pressure Switch (Gas Bypass)

No.	Part Name
11	Strainer
12	Stop Valve (Gas Line)
13	Stop Valve (Liquid Line)
14	Silencer
15	Accumulator
16	Branch Pipe: TE-03N

8 REMOTE CONTROLLERS OPERATION

This chapter describes the operation procedures for the remote controllers of the new Hitachi Utopia H(V)RNE / HN(V)E Series.

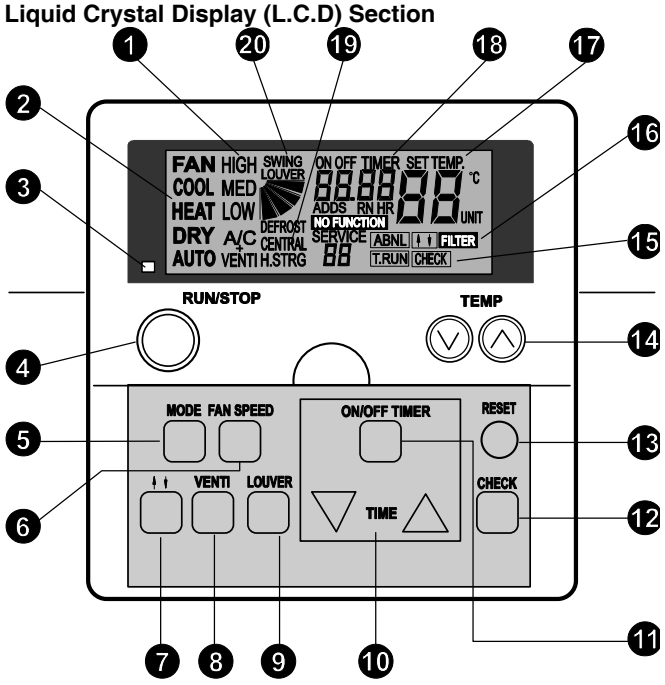
CONTENTS

HITACHI products have different optional Remote Controls. Therefore, the user may order the optional Remote Control as required. In the following pages, all possible functions and operations are explained. Please, refer to Chapter 15 to obtain information about installation and wiring connection.

⚠ ***CAUTION:***
Press switches only with fingers. Do not press switches by any other item, as it may damage the switches.

8.1. LIQUID CRYSTAL REMOTE CONTROL SWITCH (PC-P1HE)

Liquid Crystal Display (L.C.D) Section



Model: PC-P1HE

❶ **Fan Speed Indicator**
Ventilation Indicator
Indicates the fan speed you have selected: (High/Medium/Low)
It indicates if Total Heat exchanger has been selected.
A/C only air conditioning
VENTI only ventilation
A/C + VENTI when both have been selected

❷ **Operation Mode Indicator**
Indicates the operation mode selected:
Fan, Cool, Heat, Dry, Auto (Cool/Heat)

❸ **Run Indicator (Red Lamp)**

❹ **RUN/STOP Switch**

❺ **MODE (Operation Mode Selection) Switch**

❻ **FAN SPEED (Fan Speed Selection) Switch**

❼ **Up & Down Panel Operation Switch**

❽ **VENTI(Ventilator Operation) Switch**

❿ **TIME (Time Setting) Switch**
Increases and decreases the Set Time for timer operation

⓫ **ON/OFF TIMER Switch**
Used to activate or deactivate the timer operation

⓬ **CHECK Switch**

⓭ **RESET (Filter Reset Switch)**
After cleaning the air filter, press the RESET button. The filter indication will disappear and the next filter cleaning time is reset. It also stops the run procedure.

⓮ **TEMP (Temperature Setting) Switch**

⓯ **T.RUN (Test Run Indication)**
Check (Check Indication)
These Tests appears when TEST RUN or CHECK is being performed

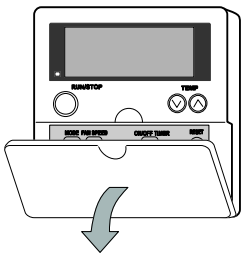
ABNML (Alarm) Indicator
FILTER Indicator

SET TEMP (Setting Temperature) Indicator

ON/OFF Timer (Timer Operation Indicator)
Alarm Code Indicator
NO FUNCTION Indicator

CENTRAL (Central Control Indicator Operation)
Indicates that central station or CS-Net is being performed

Swing Louver Indicator
DEFROST Indicator

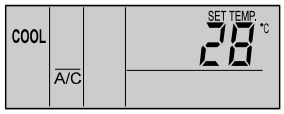
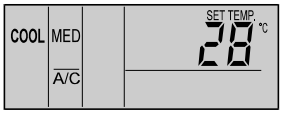
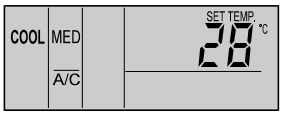


When opening the cover,
pull the cover toward the arrow direction

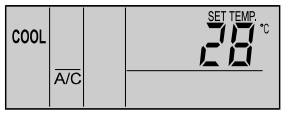
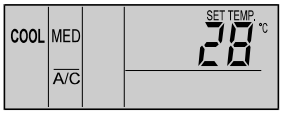
NOTE:

- *Do not use this system as constant temperature and constant humidity control equipment.*
- *In the case that the LOW fan speed is selected and outdoor temperature is higher than 21°C, excessive load is given to the compressor at heating operation. Therefore, set the fan speed at HIGH or MEDIUM, since safety devices may be activated.*
- *When the system is started after a shutdown longer than approximately 3 months, it is recommended that the system be checked by your service contractor.*
- *Turn OFF the main switch when the system is stopped for a long period of time. If the main switch is not turned OFF, electricity is consumed, because the oil heater is always energized during compressor stopping.*

8.1.1. OPERATION PROCEDURE FOR COOLING, HEATING, DRY AND FAN OPERATIONS

Before Operation Supply electrical power to the system for approximately 12 hours before start-up after long shutdown. Do not start the system immediately after power supply, it may cause a compressor failure, because the compressor is not heated well. Make sure that the outdoor unit is not covered with snow or ice. If covered, remove it by using hot water (less than 50°C). If the water temperature is higher than 50°C, it will cause damage to plastic parts.	⚠ ***CAUTION:***
– Turn ON the power supply. Three vertical lines appear on the liquid crystal display A/C or VENTI is indicated on the liquid crystal display. – Press the MODE switch. By repeatedly pressing the MODE switch, the indication is changed in order of COOL, HEAT, DRY and FAN (In case of Cooling Only model, COOL, DRY and FAN). (The figure shows when setting COOL mode is selected).	
– Press the RUN/STOP switch. The RUN indicator (Red) is ON. The system is automatically started. ⓘ ***NOTE:*** *Setting of Temperature, Fan Speed and Air Louver Direction* *The setting condition is memorized after setting once, therefore the daily setting is not required. In case that the setting is required to be changed, refer to operation procedure for Temperature, Fan Speed and Air Louver Direction Setting.*	
– Switch OFF (STOP) Press the RUN/STOP switch again. The RUN indicator (Red) is OFF. The system is automatically stopped. ⓘ ***NOTE:*** *There could be a case that the fan operation is performed for approximately 2 minutes after the heating operation is stopped.*	

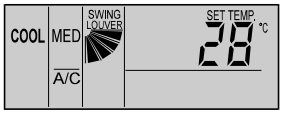
8.1.2. OPERATION PROCEDURE FOR TEMPERATURE, FAN SPEED AND AIR LOUVER DIRECTION SETTING

■ DO NOT touch the CHECK switch. – The CHECK switch is used only when servicing. – In case that the CHECK switch is pressed by mistake and the operation mode is changed to the check mode, press the CHECK switch again for approximately 3 seconds, and press the CHECK switch once again after 10 seconds, and the operation mode is changed to the normal condition.	⚠ ***ATTENTION:***
■ Setting of Temperature Adjust the temperature by pressing TEMP ⌃ or ⌄ switch. The temperature is increased by 1 °C by pressing ⌃ switch (Max. 30 °C). The temperature is decreased by 1 °C by pressing ⌄ switch (Min. 19 °C in case of COOL, DRY and FAN mode, Min. 17 °C in case of HEAT mode). (The figure shows when setting 28 °C).	
■ Setting of Fan Speed Press the FAN SPEED switch. By repeatedly pressing the FAN SPEED switch, the indication is changed in order of HIGH, MED and LOW. For standard operation, set the fan speed at HIGH. (The figure shows when setting MED speed). ⓘ ***NOTE:*** *In case of DRY mode, the fan speed is automatically changed to LOW, and can not be changed (However, the indication shows the present setting condition).*	

■ Setting of Swing Louver Direction

– Press the SWING LOUVER switch, the swing louver starts to swing. Press the SWING LOUVER switch again, the swing louver is fixed.
By repeatedly pressing the SWING LOUVER switch, the swing louver repeats to stop and swing.

- When Fixed
The indication shows the air flow direction.
- When Swinging Automatically
The indications move continuously corresponding to the louver swing.



NOTE:
In case of heating operation, the louver angle is automatically changed.

8.1.3. OPERATION PROCEDURE FOR TIMER OPERATION.

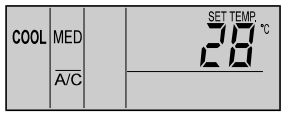
– Press the ON/OFF TIMER switch.
ON TIMER is indicated in case that the system is stopped.
OFF TIMER is indicated in case that the system is operated.
(The figure shows when setting ON TIMER)

– Press the TIME Δ or ∇ switch, and set your required time

- The set time is increased by 0.5 hours by pressing the Δ switch (Max. 24.0 hours) and decreased by 0.5 hours by pressing the ∇ switch (Min. 0.5 hours).
- In case that the required time is not set, the set time is automatically indicated at 8.0 hours.
(The figure shows when setting 8.5 hours for timer operation).

■ Cancel

– Press the ON/OFF TIMER switch again.



8.1.4. OPERATION PROCEDURE FOR VENTILATION

This function is available only when the total heat exchanger is connected.
When the procedures below are performed without the total heat exchanger connected, NO FUNCTION blinks for 5 seconds.

ATTENTION

■ Ventilation

– Press the VENTI switch
By repeatedly pressing the VENTI switch, the indication is changed in order of A/C, VENTI and A/C+VENTI.
(The figure shows when setting A/C + VENTI).

NOTE:
Contact your distributor or dealer of HITACHI for detailed information.
In case that the mode is changed to VENTI during individual operation of the air conditioner, the air conditioner is stopped.
In case that the mode is changed to A/C during individual operation of the total heat exchanger, the total heat exchanger is stopped.

8.1.5. OPERATION PROCEDURE FOR AUTOMATIC COOLING/HEATING OPERATION

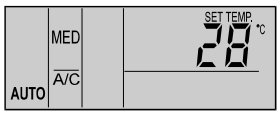
The automatic cooling/heating operation is required to be set by the optional function.
Contact your distributor or dealer of HITACHI for detailed information.
This function is to change operation mode, cooling or heating automatically according to the temperature difference between the set temperature and the suction air temperature.
In the case that the suction air temperature is higher than the set temperature by 3 °C, the operation is changed to COOL mode, and lower than the set temperature by 3 °C, the operation is changed to HEAT mode.

NOTE:

– *In case of heating operation at the LOW fan speed, the operation often stops by the operation of the protective devices. In such cases, set the fan speed at HIGH or MED.*

– *In case that the outdoor temperature is higher than approximately 21 °C, the heating operation is not available.*

– *The temperature difference between cooling and heating operation is quite big in case of using this function. Therefore, this function can not be used for the air conditioning of the room where requires accurate control of temperature and humidity.*



8.1.6. OPERATION PROCEDURE FOR SWING LOUVER ADJUSTMENT

Setting Swing Louver

1. When the SWING LOUVER switch is pressed, the swing louver starts its operation. The range of the swinging angle is approximately 70° from the horizontal position to the downward position. When mark is moving, it indicates the operation of the louver continuously.
2. 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 the mark .
3. Discharge air angle is fixed (at 20° for RCI series and 40° for RCD series) during start-up of heating operation and defrosting operation when thermostat is ON.When the outlet air temperature reaches higher than approximately 30 °C, swinging of louvers is started.

Fixing of Louver

1. In the case of cooling and dry operation, discharge air angle can be changed at 5 positions. In the case of heating operation, it can be changed at 7 positions
2. To fix the louver position, first press the SWING LOUVER switch to start the louver swinging, and then press the SWING LOUVER switch again when the louver reaches the required position.
3. Discharge air angle is fixed (at 20° for RCI series and 40° for RCD series) during start-up of heating operation and defrosting operation when thermostat is ON.When the outlet air temperature exceeds approxima-tely 30 °C, the swing louvers activate.
4. When the louvers are fixed at an angle 55° RCI, 65° RCD or 70° both during heating operation and the operation mode is changed to cooling operation, louvers will be automatically fixed at an angle 45° RCI, 60° RCD

NOTE:
There exists a time lag between the actual angle of the louver and the liquid crystal indication. When the SWING LOUVER switch is pressed, the louver will not stop immediately. The louver will move one extra swing.
If the louvers are moved due to cleaning or for any reason, setAuto Setting mode to take the four louvers in the same position.

RCI (4-Way Cassette Type)

Indication							
Louver Angle (approx.)	Approx. 20°	Approx. 25°	Approx. 30°	Approx. 35°	Approx. 45°	Approx. 55°	Approx. 70°
Cooling Dry	◄				►		
Heating	◄						►

Angle Range
Recommended Angle

RCD (2-Way Cassette Type)

Indication							
Louver Angle (approx.)	Approx. 40°	Approx. 45°	Approx. 50°	Approx. 55°	Approx. 60°	Approx. 65°	Approx. 70°
Cooling Dry	◄				►		
Heating	◄						►

Angle Range
Recommended Angle

RPK (Wall Type)

Indication							
Louver Angle (approx.)	Approx. 35°	Approx. 40°	Approx. 45°	Approx. 50°	Approx. 55°	Approx. 60°	Approx. 70°
Cooling Dry	◄				►		
Louver Angle (approx.)	Approx. 40°	Approx. 45°	Approx. 50°	Approx. 55°	Approx. 60°	Approx. 65°	Approx. 70°
Heating	◄						►

Angle Range
Recommended Angle

RPC (Ceiling Type)

Indication							
Louver Angle (approx.)	Horizontal	Approx. 15°	Approx. 30°	Approx. 40°	Approx. 50°	Approx. 60°	Approx. 80°
Cooling Dry	◄				►		
Heating	◄						►

Angle Range
Recommended Angle

CAUTION: *Do not turn the air louver by hand. If moved, the louver mechanism will be damaged! (In all units)*

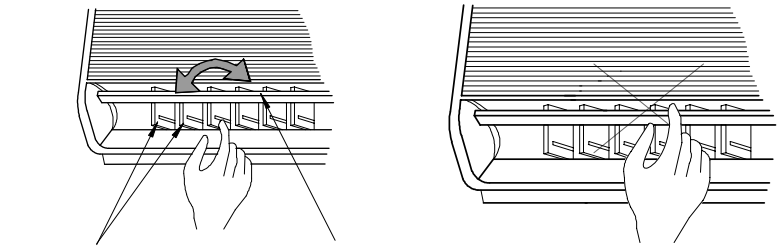
Wall Type (RPK):

Adjust the vertical deflectors by hand to discharge air in the required direction.

Do not swing 1 blade at left side and 2 blade at right side of the vertical deflection.

Automatic Setting of louver:

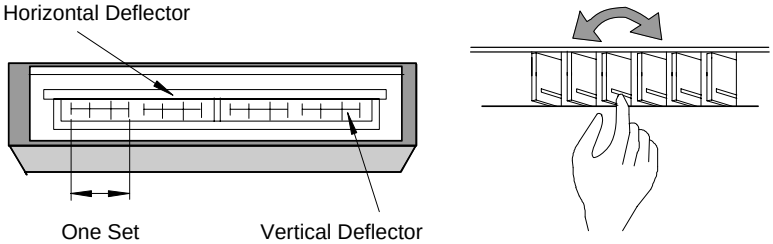
When the unit operation is stopped, two air louvers are stopped at closing position automatically.



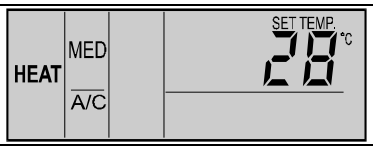
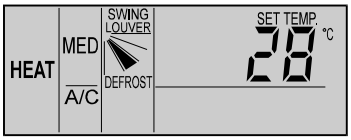
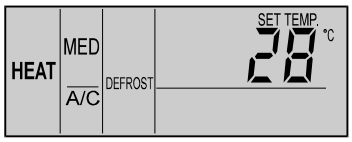
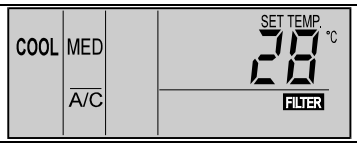
Ceiling Type (RPC):

The vertical deflector consists of four sets of deflectors. Adjust the vertical deflectors by hand to discharge air in the required direction.

NOTE:
For models without automatic swing louver the above indications are not available through R.C.S. The swing Louver should be adjusted by hand in this case.



8.1.7. INDICATION WHEN IN NORMAL CONDITION

■ **Thermo-controller** When the thermo-controller is operated, the fan speed is changed to LOW, and the indication is not changed. (Only in the heating operation)	
■ **Defrost** When the defrost operation is performed, DEFROST indication is ON. The indoor fan is slowed down or stopped (depends of selection) The louver is fixed at the horizontal or 35° position. However, the louver indication of LCD continues to activate. (The figure shows when setting DEFROST is ON).	
When the unit is stopped during defrost operation, the RUN indicator (Red) is OFF. However, the operation continues with DEFROST indication, and the unit is started after the defrost operation is finished.	
■ **Filter** Filter Clogging: FILTER indication is ON when the filter is clogged with dust, etc. Clean up the filter. Press the RESET switch after cleaning up the filter. The FILTER indication is OFF.	

8.1.8. INDICATIONS WHEN IN ABNORMAL CONDITION

■ **Abnormality**

The RUN indicator (Red) blinks.

ALARM is indicated on the liquid crystal display.

The indoor unit number, the alarm code and the model code are indicated on the liquid crystal display.

In the case that the plural indoor units are connected, the above items for each indoor unit are indicated one by one.

Check the contents of the indications and contact your service contractor of HITACHI.

■ **Power Failure**

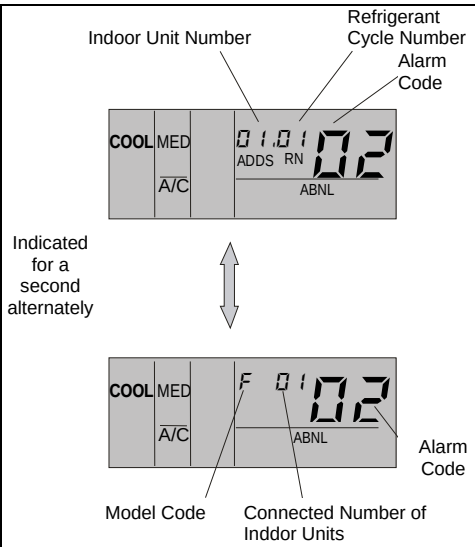
All the indications are OFF.
Once the unit is stopped by power failure, the unit will not be started again although the power recovers. Perform the starting procedures again.
In case of instantaneous power failure within 2 seconds, the unit will be started again automatically.

■ **Electric Noise**

There could be a case that all the indications are OFF and the unit is stopped. This is occurred by the activation of the micro computer for the unit protection from the electric noise.

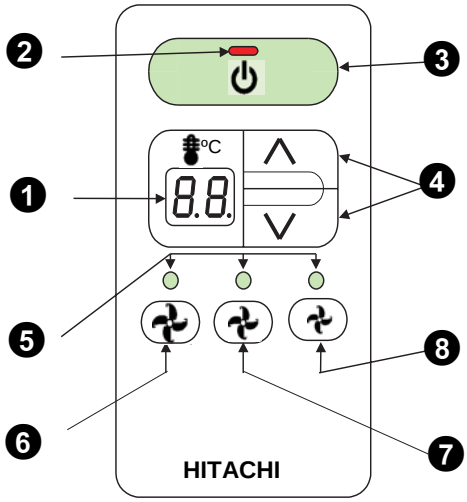
NOTE:

In case of using wireless, remote control switch for the wall type indoor unit, remove the connectors (CN25) connected to the indoor PCB. If not removed, the unit can not operated.
The memorized date can not be erased unless the remote control switch is initialized.



Model Code	
Indication	**Model**
H	Heat-Pump
P	Inverter
F	Multi
C	Cooling Only
E	Others

8.2. OPTIONAL REMOTE CONTROLLER (PC-P5H)

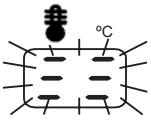


Model: PC-P5H

❶ Temperature Indication
❷ RUN LED (Red)
❸ RUN/STOP Switch
❹ Temperature Setting Switch
❺ FAN SPEED (Green)
❻ FAN SPEED Setting Switch-High
❼ FAN SPEED Setting Switch-Medium
❽ FAN SPEED Setting Switch-Low

■ To Start

1. When turning ON the indoor unit, initial process will start.



2. Set at your required temperature by pressing the ❹ switch. The set temperature is indicated on the ❶ display.
3. Select one of the fan speed by pressing the ❻, ❼, ❽ switches. The set fan speed is indicated by the green LED ❺.
4. Press the ❸ Switch. The red LED ❷ turns ON.

■ To Stop

1. Press the ❸ Switch. Air Conditioning is stopped and all the LEDs are turned OFF. In order to restart, press the ❸ switch.

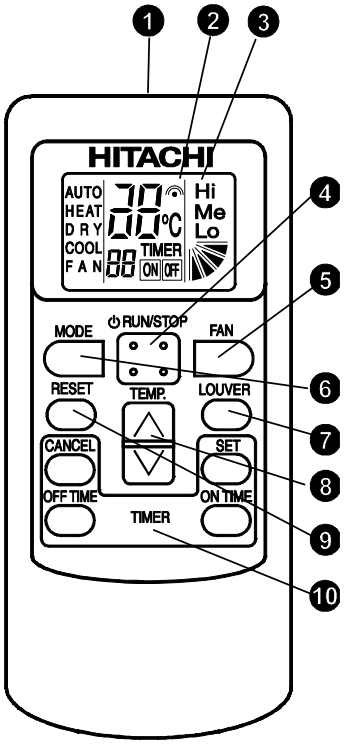
NOTE:

— *Swing Louver Setting is not available. Select by Central Station or other remote control switch.*

— *Default: Auto Swing*

— *In the case that the remote control switch not available mode is set by central station, setting is not available.*

8.3. OPTIONAL WIRELESS REMOTE CONTROL SWITCH, PC-LH3A



Model: PC-LH3A

This controller is used to send commands about operation mode, timer setting, etc. to the indoor unit. Face the transmitter of the controller toward the receiver of the indoor unit and press the switch of required operation so that commands (by infrared rays) are sent to the indoor unit. The distance for transmitting is approximately 6 meters as a maximum. (The capable distance for transmitting will get shorter in case that the transmitting angle is not vertical to the receiver or an electronic type light is used in the room, etc.).

❶Transmitter

Point the transmitter towards the receiver of the indoor unit when sending commands. The Transmitting indication on the liquid crystal display flashes when sending commands.

❷Transmitting Indication

❸Liquid Crystal Indication

The set temperature, timer operation, position of air louver, operation mode, air flow mode, etc.. are indicated.

The diagram of the display shown on the left is for explanation purposes only. The display will differ during actual operation.

❹Run/Stop Switch

Operation of the unit can be started or stopped by pressing this switch.

❺Fan Speed Switch

Press this switch to select the fan speed. By repeatedly pressing the button, the setting will change sequentially through HIGH, MED and LOW. (Fan speed is fixed at low for dry operation).

❻Mode selection switch

By repeatedly pressing the mode switch, the unit cycles through the different operating modes in the order of HEAT, DRY, COOL and FAN. To select auto operation, press the switch for more than 3 seconds. If the switch is pressed again, it will return to FAN mode.

❼Louver Angle Switch

The airflow angle and auto-louver operation can be set by this switch. When pressing the switch, the angle is changed in the following order. (In cool or dry operation modes, steps 1-5 and Auto swing are available).

❽Temp. Switch

The setting temperature con be adjusted using the switch.

❾Reset Switch

(1) Press RESET to turn off the filter indicator lamp after filter cleaning.

(2) If the unit is stopped abnormally due the protection devices etc... press the RESET switch to cancel the control stoppage after the cause of abnormality has been remove.

❿Timer Switches

Four switches control the timer operation.

The set time can be changed by pressing ON TIME or OFF TIME and is set by pressing the SET switch. Timer operation can be cancelled using CANCEL.

8.3.1. OPERATION PROCEDURE

When operating the controller, face the transmitter toward the receiver of the indoor unit and press the switch for the required operation as followings.

The operation commands are sent by pressing the required operation switch by facing the transmitter of the controller toward the receiver of the indoor unit.

When the commands are sent, the mark on the liquid crystal display of the controller blinks once.

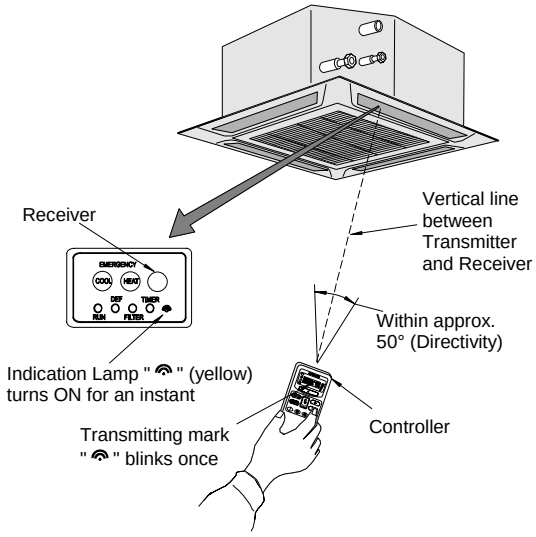
The indication lamp (yellow) on the receiver part of the indoor unit turns ON for an instant when the indoor unit receives the commands.

ATTENTION:

In case that the indication lamp (yellow) does not turn ON although the commands are sent, the commands are not received by the indoor unit. In such a case, send the commands again.

The transmitter of the controller has the vertical directivity to the receiver, and the permissible angle for transmitting is within 50°. However, the capable distance for transmitting gets half when the transmitting angle is 50°, and also get shorter in case that an electronic type light is used in the room.

In case that two indoor units are installed side by side, the commands from the controller may be received by both indoor units. The function to identify each indoor unit is not applicable.



8.3.2. RECEIVER KIT

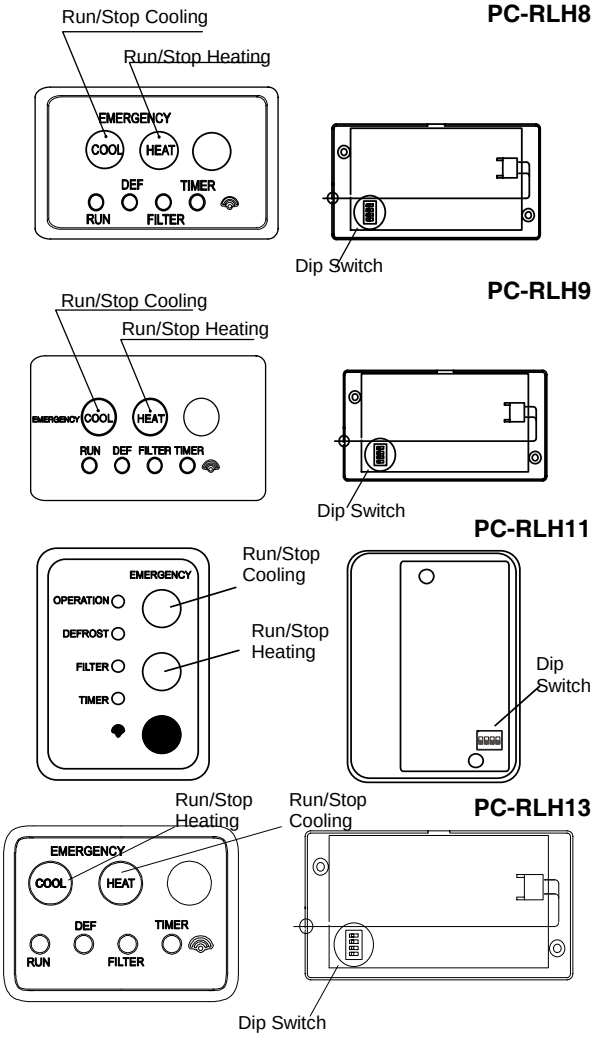
One of this receiver Kits is required for indoor units to receive the signal when using wireless remote control switch (PC-LH3A).

Applied Models:

Model	On the Wall	On the Panel
RCI-(1.5~6.0)	PC-RLH11	PC-RLH8
RCIM-1.5/2.0)	PC-RLH11	PC-RLH13
RCD-(1.5~5.0)	PC-RLH11	PC-RLH9
RPC-(2.0~6.0)	PC-RLH11	-
RPI-(1.5~10.0)	PC-RLH11	**-**
RPK-(1.5~4.0)	PC-RLH11	**-**
RPF(I)-(1.5~2.5)	PC-RLH11	**-**

NOTE:

In case of another Remote Controller is used together with PC-RLH8/9/11/13, one of them must be set as Sub, setting pin 1 of SW3 to ON (see next page)

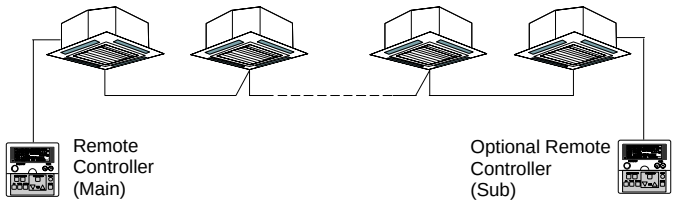


8.4. OPERATION FOR MULTIPLE INDOOR UNITS

■ **Installation of Control for Multiple Units**

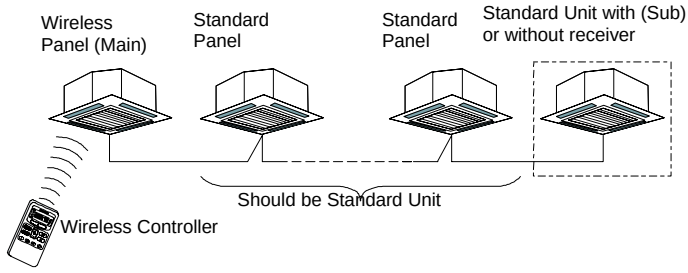
In case of operating multiple indoor units (Max. 16 units) simultaneously by a single control (wireless or remote), the receiver kit or the remote controller should be applied only to the unit for operation, and the other units should be without receiver kit or remote controller (for wired control). If plural receiver kits for control are required to be used, max. two receiver kits or remote controllers can be installed.

In case of using two controls, set Main and Sub for receiver kits or remote controllers by the following procedures.



NOTE:

- It is also possible to combine a remote controller and a Wireless Controller with the same group of Units.
- RPK units cannot be connected simultaneously with built-in Receiver. If multiple RPK wants to be used simultaneously by a single control, PC-RLH11 or another Remote Control should be installed.



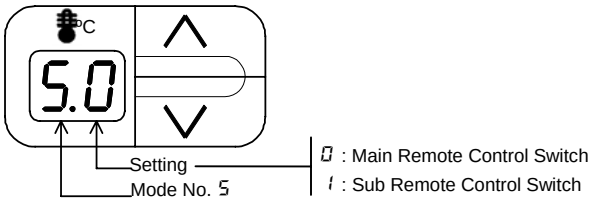
WARNING:

Turn OFF all the power source before the following procedures such as wiring, setting the rotary switch, etc.

■ **Setting of Sub receiver kit for Remote controllers**

PC-P5H:

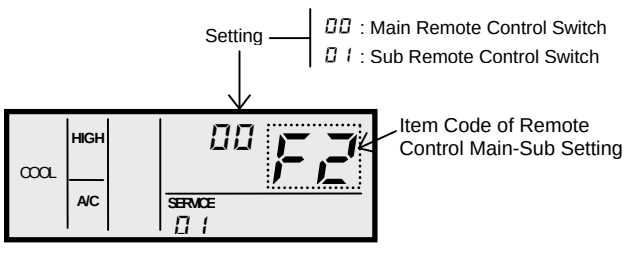
1. Press (🔧) (🔧) and (🔧) Switch simultaneously for more than 3 seconds.
2. Push three times (🔧) till Mode Number is 5.
3. Press the ⌃ ⌄ Switch to set the suitable number as showed in the picture beside (Sub or Main).



When this setting is changed, cut off the power supply of all indoor units after returning the normal mode

PC-P1HE

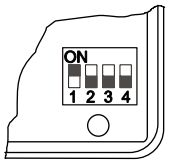
1. Press the CHECK switch and the RESET switch simultaneously more than 3 seconds to access the optional setting mode.
2. Press the ∨ or ∧ switch and set Service to 01.
3. Press the CHECK switch.
4. Select the item code F2 by pressing the TIME ∨ or ∧ switch.
5. Press the ⌃ ⌄ Switch to set the suitable number as showed in the picture beside (Sub or Main).



■ **Setting of Sub receiver kit for Wireless control**

PC-RLH8/9/11/13:

1. Remove rear cover
2. Set pin No. 1 of Dip Switch SW3 to ON



NOTE:

Refer to Service Manual (SMXX0032) for more information about setting of sub for controllers.

■ **Wiring Procedures between Indoor Units**

1. Perform the wiring work as follows.

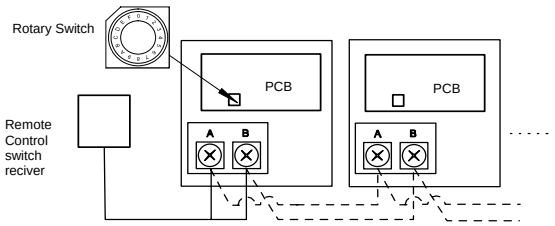
   The total length of the cable must be within 500 meters.

   Cable references are shown below:

PC-RLH8/9/11/13	PRC-10E1	PRC-15E1	PRC-20E1	PRC-30E1
Cable Length	10 m	15 m	20 m	30 m

2. Fix the connecting control cable between indoor units at certain points with bands not to run along the power supply cable inside of the indoor unit.

   The same wiring is required outside of the indoor unit; Keep a distance more than 30 cm between the control cable and the power supply cable, or ground one end of a conduit tube after inserting the control cable in the metal conduit tube.



3. Set the RSW switches on the printed circuit board in the electrical box of each indoor unit as shown in the next figure.
4. Check the number of Indoor Units Connected when test running

NOTE:
The 7-segment indication of the receiver part and the remote controller shows the number of the indoor units connected in case that the test running is performed by the controller. However, the number can not be indicated for some models. In such a case, check the number by the wired controller PC-P1HE.

WARNING:
Turn OFF all the power source before the following procedures such as wiring, setting the rotary switch, etc.
Rotary switch must start in 1.

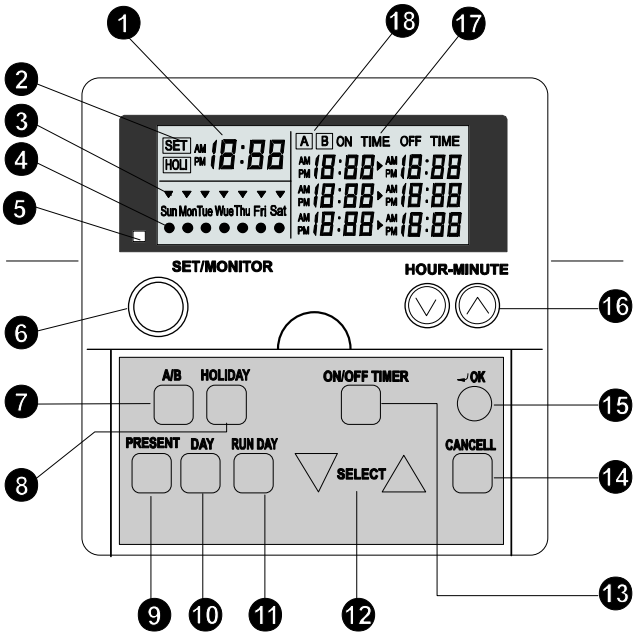
RSW Setting

1st unit	2nd unit	3rd unit	4th unit
			
5th unit	**6th unit**	**7th unit**	**8th unit**
			
9th unit	**10th unit**	**11th unit**	**12th unit**
			
13th unit	**14th unit**	**15th unit**	**16th unit**
			

8.5. OPTIONAL 7-DAY TIMER (PSC-5T)

Features:
By pluggin this timer to the optional remote control switch or central station, daily ON/OFF operation control throughout the week is available.

Functions:
1. ON/OFF setting time in a week
2. ON/OFF setting in available three (3) times a day
3. OFF setting for special Holiday day
4. Present time is indicated
5. Running time is indicated



Model: PSC-5T

❶ **Indication of Present Time**

❷ **Indication of Setting Time and Holiday Day**
This indicates the Operation Mode, SET or MONITOR, and the Holiday if it is selected.

❸ **Indication of Present Day of the week**

❹ **Indication of Running Day of the week**
Whenever the running day is set, this light is on.

❺ **Run Indicator (Red Lamp)**

❻ **Change Switch of Operation Mode (SET/MONITOR)**
By depressing this switch the control timer is changed to the setting mode, the SET indication is turned on and the ▼ mark is flickered. Depressing again the SET mode is turned off and the setting mode is changes to monitor mode.

❼ **Change Switch of Setting Pattern (A/B)**
There are two (2) patterns (A and B) set for the weekly schedule.
Each pattern can be set with three (3) times ON/OFF setting for each weekly day.
By depressing this switch the pattern activated (A or B) is selected.

❽ **Setting Switch of Holiday**
By depressing this switch when the SET indication is on, the HOLI indication is turned on and the selected day is set as Holiday. Depressing it again, the holiday setting is canceled.

❾ **Setting Switch of Present time**
By depressing this switch the SET indicator and ▼ mark are flickered and present time can be set.

❿ **Setting Switch of Day of a Week**
Day of week is selected by this switch when SET display is flickering or indicated.
Depressing this switch, the ▼ mark move in order of Sun > Mon > ... > Sat. Depressing the DAY after Sat, all the ▼ mark are selected. Depressing it again ▼ mark returns to Sun

⓫ **Setting Switch of Running Day (RUN DAY)**
By depressing the RUN DAY switch, the selected day is set as the running day and the ● mark is turned on. Depressing again it is turned off and the selected day is cancelled

⓬ **Change Switch of SELECT Setting**
By depressing the ▽ SELECT △ switch the 1, 2 or 3 of ON TIME and OFF TIME is selected.

⓭ **Change Switch of ON/OFF TIMER Setting**
When SET display is flickering, by depressing the ON/OFF TIMER the timer is changing to the ON/OFF time setting mode and the hour indication of ON TIME is flickering.

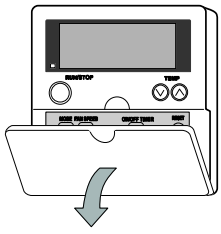
⓮ **CANCEL Switch of Setting Time**
Depressing this switch when timer is set, the indication of ON TIME or OF TIME is changed to -.--.

⓯ **OK Switch**
By depressing this switch the selection on setting process is accepted.

⓰ **Setting Switch of HOUR-MINUTE**
By depressing ⌃ or ⌄ the hour or minute is set when SET display is flickering or indicated.

⓱ **Indication of ON TIME and OFF TIME Setting**
It is indicating the setting conditions of the selected day

⓲ **Indication of Weekly Scheduled Pattern (A or B)**


When opening the cover,
pull the cover toward the arrow direction

NOTE:
The present time and the ON/OFF setting time are indicated by 12 hours units (AM 00:00-11:59, PM 00:00-11:59)

8.5.1. SETTING PRESENT DAY AND PRESENT TIME

(<Example> present Day: Friday, Present Time: 5:15 PM).

During the setting mode, the setting of the present time is not available when depressing the PRESENT switch more than 3 seconds.

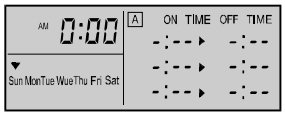
ATTENTION

1. Supply power to the unit.

ATTENTION:
Supply power the unit more than 12 hours before unit operation for compressor protection.

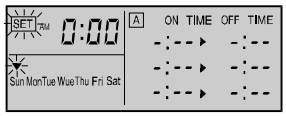
Do not cut off power during the term of using air conditioner.

The right figure shows the case of the present time at AM 0:00 on Sunday. (When the power is turned ON, the present time is not set.).



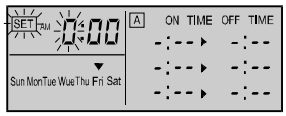
2. Depress the PRESENT switch for more than 3 seconds.

The display is changed to the present time setting mode, and the SET indicator and the ▼ mark are flickered.
The right figure shows the case that ON time and OFF time are not set.



3. Set the ▼ mark at the present day by depressing the DAY switch.

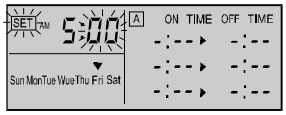
Depress the OK switch after setting the present day, the ▼ mark is turned on and hour indication is flickered.
The right figure shows the case of setting the day at Friday.



4. Set hour indication at the present hour by depressing the HOUR/MINUTE ⌃ or ⌄ switch.

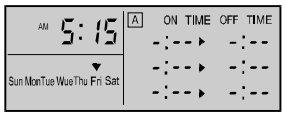
Depress the OK switch after setting the present hour, hour indication is turned on and minute indication is flickered.
The right figure shows the case of setting the hour at PM 5.

Note: AM 12:00 is displayed as PM 00:00



5. Set minute indication at the present minute by depressing the HOUR/MINUTE ⌃ or ⌄ switch.

Depress the OK switch after setting the present minute, the present day and the present time are fixed, and the present time setting mode is changed to the monitor mode. minute indication is turned on and the SET indication is turned off.
The right figure shows the case of setting the minute at 15.

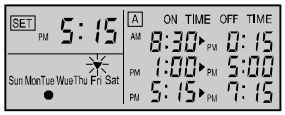


8.5.2. CHANGING WEEKLY SCHEDULE PATTERN (A OR B)

There are 2 (two) patterns (A or B) set for the weekly schedule.
Each pattern can be set with 3 (three) times ON/OFF settings for each weekly day.
<Function>
To select the pattern for setting and operating the schedule.
The schedule of A or B pattern can be set for each week and changed for a season.

1. Depress the SET/MONITOR switch.

The control timer is changed to the setting mode and the SET indication is turned on.



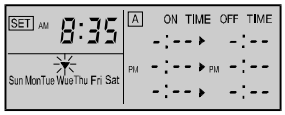
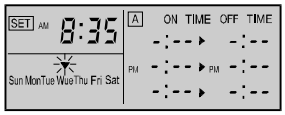
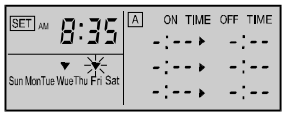
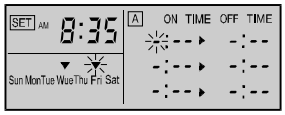
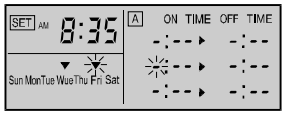
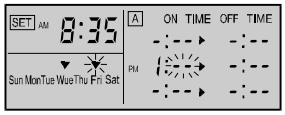
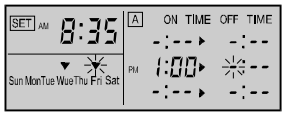
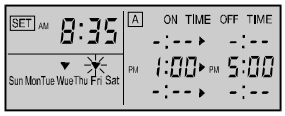
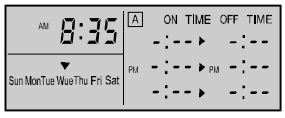
2. Depress the A/B switch.

The set pattern is changed (A to B) by depressing the A/B switch.
The right figure shows the case of selecting the set pattern B.

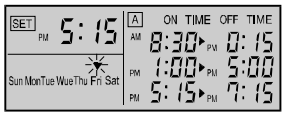
3. Depress the SET/MONITOR switch.

The SET mode is turned off and the setting mode is changed to the monitor mode.

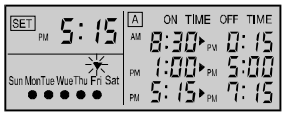
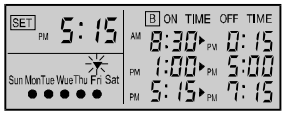
8.5.3. SETTING ON/OFF TIME

(<Example> A pattern, Friday, Setting 2, PM 1:00 (ON) / PM 5:00 (OFF)	
In case that the remote control switch (PC-2H2) is used together, both setting of ON TIME and OFF TIME are required for setting 1, 2 and 3. (The setting of ON TIME (or OFF TIME) only is not available). In case that the central station (PSC-5S or PC-P1H) is used together, the setting of ON TIME (or OFF TIME) only is available.	⚠ ***ATTENTION***
1. Depress the SET/MONITOR switch. The control timer is changed to the setting mode, the SET indication is turned on and the ▼ mark is flickered. The right figure shows the case of changing to the setting mode.	
2. Select A or B pattern by depressing the A/B switch. Refer to B. Changing weekly Schedule pattern A or B for changing the pattern	
3. Select the weekly day to set ON/OFF control by depressing the DAY switch By depressing the DAY switch, the flickering ▼ mark moves in order of Sun → Mon → ... → Sat. Depressing the DAY switch after Sat, all the ▼ marks (from Sun to Sat) are flickered. In this case, the setting is the same for all days of a week. Depressing the DAY switch once again, the flickering ▼ mark returns to the position of Sun	
4. Depress the ON/OFF TIME switch. The Timer is changed to the ON/OFF time setting mode and the hour indication of ON TIME is flickered. The right figure shows the case of changing to the ON/OFF time setting mode	
5. Select the setting 1,2 or 3 by depressing the △ SELECT ▽ switch. By depressing the △ SELECT ▽ switch, the hour indication moves flickering. The right figure shows the case of selecting the setting 2.	
6. Set the hour indication of ON TIME by depressing the HOUR/MINUTE ⌃ or ⌄ switch. After setting the hour indication, depress the OK switch and the minute indication of ON TIME to be set is flickered. The right figure shows the case of setting the hour PM 1:--	
7. Set the minute indication of ON TIME by depressing the HOUR/MINUTE ⌃ or ⌄ switch. After setting the minute indication, depress the OK switch and the hour indication of OFF TIME to be set is flickered. The right figure shows the case of setting the hour PM 1:00.	
8. Set the time of OFF TIME by the same procedure of setting the time of ON TIME After setting the time of OFF TIME, the flickering indication of OFF TIME is turned on and the ON/OFF time setting mode is changed to the setting mode. The right figure shows the case of setting the hour PM 5:00.	
9. Depress the SET/MONITOR switch The SET indication is turned off and the control timer is changed to the monitor mode. The right figure shows the case of indicating the setting condition of the present day.	
■ Depressing the CANCEL switch when setting ON time (procedure 6) or OFF time (procedure 8), the indication of ON TIME or OFF TIME is changed to -?--. Depressing the OK switch in this condition, the setting is canceled.	⚠ ***ATTENTION***

8.5.4. SETTING RUNNING DAY

<Function> To set the day for actual operation of the running schedule set before. (Though the ON time and OFF time are set, the schedule operation is not available unless the running day is set.) <Example> B pattern, Tuesday	
1. Depress the SET/MONITOR switch. The timer is changed to the setting mode, the SET indication is turned on and the ▼ mark are flickered.	
2. Select A or B pattern by depressing the A/B switch. The right figure shows the case of selecting the set pattern B	
3. Select the running day by depressing the DAY switch. Refer to 3. of Setting ON/OFF Time for the indication of the ▼ mark. The right figure shows the case of selecting the day Tuesday.	
4. Depress the RUN DAY switch, the selected day is set as the running day and the ● mark is turned on at the selected day. By depressing the RUN DAY switch again, the running day setting is canceled and the ● mark is turned off. The right figure shows the case of selecting the day Tuesday.	
5. Depress the SET/MONITOR The SET indication is turned off and the control timer is changed to the monitor mode.	

8.5.5. SETTING HOLIDAY

<Function> To cancel the running schedule temporarily. The schedule operation is canceled only once at the day set as holiday. After that, the schedule operation is available again. This function is used in case that there are any irregular holidays. (<Example> B pattern, Tuesday	
1. Depress the SET/MONITOR switch. The timer is changed to the setting mode, the SET indication is turned on and the ▼ mark are flickered.	
2. Select A or B pattern by depressing the A/B switch. The right figure shows the case of selecting the set pattern B	
3. Select the day to be set as holiday by depressing the DAY switch. Refer to 3. Setting ON/OFF Time for the indication of the ▼ mark. The right figure shows the case of selecting the day Tuesday.	
4. Depress the HOLIDAY switch, the HOLI indication is turned on and the selected day is set as holiday. In the case that the selected day is not set as running day the ● mark is turned off. The holiday setting is not available for the day. (In case that all days of a week are selected, only the running day is set as holiday). By depressing the HOLIDAY switch again, the holiday setting is canceled.	

8.5.6. CHECKING CONTENTS OF SETTING

1. Depress the DAY switch at the monitor mode (when the SET indication is turned off), the ▼ mark moves and the setting contents of the day with the ▼ mark is indicated. The right figure shows the case of selecting the day Tuesday.	

CAUTION:

The control timer has a built-in back-up battery and the clock function is available within 2 weeks in case of power failure.
If the power failure continues more than 2 weeks, set the present time again.

The RUN indicator is turned on at ON time and turned off at OFF time.
In case that the indoor unit operation is started or stopped by the remote control switch or the central station used together with the timer, the RUN indicator is not changed.

The flickering of the RUN indicator shows the abnormal condition of the Timer.
Check to ensure that the wiring connection and the setting of dip switches are correct.
In the case that the RUN indicator is still flickered after checking, contact your distributor or dealer of HITACHI.

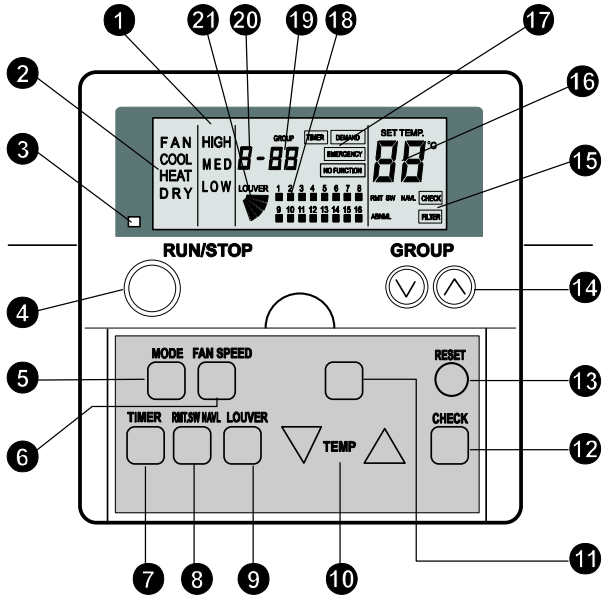
CAUTION:

It may take approximately 15 seconds to start (or stop) operation after ON time (or OFF time) according to the controller used together.

The operation can not be started or stopped during the setting mode condition.
After the completion of setting, set the Timer at the monitor mode. (After 3 minutes with leaving the Timer at the setting mode, the Timer is changed to the monitor mode automatically.)

In the case that the Timer is used with the central station (PSC-5S), the setting by the central station is required. Refer to next chapter 9.5 and chapter 4.3 in Service Manual (SMGB0032) of Installation of central Station for more details.

8.6. OPTIONAL CENTRAL STATION (PSC-5S)



Model: PSC-5S

❶ **Indication of Fan speed**
It indicates the fan speed selected to group shown: High/Medium/Low

❷ **Mode Indication**
It indicates the operation Mode selected to group shown: Fan, Cool, Heat and Dry.
Auto is available if this function is activated

❸ **Run indicator** (Red Lamp)

❹ **RUN/STOP Switch**
Operation Status of each unit is changed, ON/OFF

❺ **Operation mode Selection Switch**
FAN, COOL, HEAT, DRY

❻ **Fan Speed Selection Switch**
HIGH, MEDIUM, LOW

❼ **Timer Selection Switch**
By depressing this switch, the signal from the Control Timer (PSC-5T) schedule is available and the TIMER indication is turned on. Depressing again TIMER is turned off and schedule is not available.

❽ **RMT.SW AVL/NAVL Switch**
By depressing this switch, control by each Remote Control is prohibited or not.
When RMT.SW NAVAL is indicated Remote Control Switch is prohibited.

NOTE:
When monitoring mode is selected, the above mentioned operation modes and setting temperature are indicated.

❾ **LOUVER (Swing Louver Operation) Switch**
By depressing this switch the swing louver position or operation is selected

❿ **Temperature Setting Switch**

⓫ **This Switch is not used**

⓬ **Check Switch**
By depressing this switch, CHECK is indicated and Master or Slave unit can be set. See sub-chapter 16.3.5 for more details.

⓭ **RESET Switch**
By depressing this switch, the CHECK function is canceled. The FILTER indication can be turned off too.

⓮ **Group Selection Switch**
By depressing this switch, the group number to be controlled is changed from 01 to 16. After 16, AA is shown, and then all the units are controlled simultaneously. Depressing again 01 is shown and sequence is started

⓯ **CHECK, FILTER, RMT. SW NAVAL and ABNML indication**
CHECK is indicated when that Switch is depressed.
FILTER is indicated when one or more units of the same group have the filter clogging.
RMT.SW NAVAL is indicated when that switch is depressed.
ABNML is indicated when one or more units of the same group selected have an abnormal condition.

⓰ **TEMPERATURE indication**

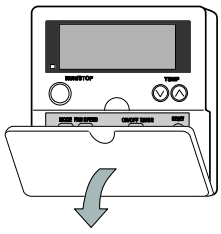
⓱ **TIMER, DEMAND, EMERGENCY and NO FUNCTION indication**
TIMER is indicated when that switch is depressed.
DEMAND is indicated when the demand input is set by the outside input function.
EMERGENCY is indicated when the emergency stop signal is input from the outside input function.
NO FUNCTION is indicated when switch depressed is not available

⓲ **Group Operation**
The ■ mark shows the operation conditions of each group.
OFF is Stop,
■ ON is Operation and Flickering is abnormality.

⓳ **Group Number Indication**

⓴ **Check Model Number indication**

㉑ **Swing Louver Indication**



When opening the cover,
pull the cover toward the arrow direction

8.6.1. GROUP SELECTION AND MONITORING UNIT OPERATION STATUS

The central station can control up to 16 groups by each group or simultaneously.
(The selected groups can be operated and the unit operation status of the groups can be monitored).

NOTE:
The group number is changed by depressing the GROUP switch. The group without setting is not indicated.

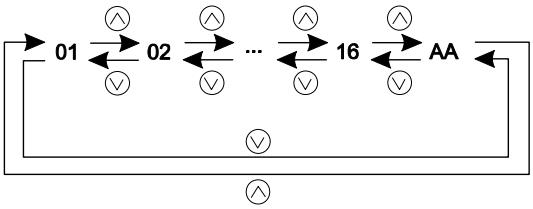
1. Supply power to the unit

ATTENTION
Supply power to the unit more than 12 hours before unit operation for compressor protection.

Do not cut off power during the term of using air conditioner

2. Depress the GROUP switch.

Every time the GROUP switch is depressed, the group number to be controlled is changed in the order as shown below. In case of AA, all the units are controlled simultaneously.

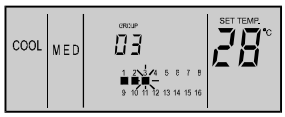


3. When selecting the group, the setting conditions of each group are indicated.

By operating by the remote control switch, the content of the setting is indicated.
1■~16 ■ Show the operating conditions of each group as follows;
Turned OFF ( ): Stop

Turned ON (■): Operation

Flickering (-■-): Abnormality



The Run indicator (Red Lamp) shows the following:
Turned OFF: All Groups Stop

Turned ON: More than 1 Group in Operation

Flickering: More than 1 Group in Abnormal Condition.

In case of group AA, the indications (operation mode, setting temperature, air flow, louver angle and RMT.SW NAVL are indicated only when all groups are in the same setting.

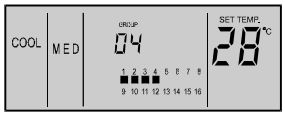
NOTE:
The indication of setting temperature -- shows no setting of temperature.

8.6.2. SETTING OF OPERATION MODE

<**FUNCTION**>
COOL Operation: To cool the room temperature by distributing the cooled air.
HEAT Operation: To heat the room temperature by distributing the heated air.
DRY Operation: To dehumidify more than standard cooling operation.
FAN Operation: To circulate the room air.

1. Depress the GROUP switch and select the group.

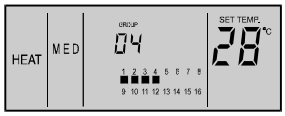
(Refer to item 2 of A. Group Selection and Monitoring Unit Operation Status in previous page.)
The right figure shows the case of selecting group 4



2. Depress the MODE switch.

The operation mode is changed in the followingn order.

FAN → COOL → HEAT → DRY



NOTE:

- *The above indications show the case of setting operation mode for group 4. The same setting procedure shall be performed for other groups. In case of the same setting for all groups, select the group number of AA.*
- *Some operation modes can not be set according to the unit model. Contact to HITACHI dealer or your distributor for details.*

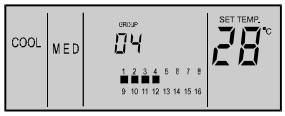
8.6.3. SETTING OF TEMPERATURE, FAN SPEED AND LOUVER ANGLE

NOTE:

- *Do not touch the CHECK switch. The CHECK switch is only for service use.*
- *When the CHECK switch is depressed by a mistake and the central station is changed to the check mode, depress the RESET switch to cancel.*

1. Depress the GROUP switch and select the group.

(Refer to item 2 of A. Group Selection and Monitoring Unit Operation Status in previous page)
The right figure shows the case of selecting group 4



<**TEMPERATURE**>

Set temperature by depressing TEMP switch.

Depressing △ switch, the temperature is increased by 1 °C (Maximum: 30 °C).

Depressing ▽ switch, the temperature is decreased by 1 °C (Minimum: 19 °C, for Cool, Dry and Fan mode, and 17 °C for Heat mode).

When depressing △ for 3 seconds at set temperature at 30 °C, or depressing ▽ for 3 seconds at the minimum temperature, the temperature is not set and the indication of setting temperature is --. In this case, depress △ or ▽**,** the indication of setting temperature returns to the minimum temperature or 30°C.

The right figure shows the case of setting 22 °C

NOTE:

The examples show the setting range for standard model. The setting range may be different according to the connected unit model.

<**FAN SPEED**>

Depress the FAN SPEED switch. By depressing the FAN SPEED switch, the indication is changed in the following order:

HIGH → MED → LOW →

The right figure shows the case of setting HIGH speed.

NOTE:

In case of dry operation, the fan speed is automatically changed and fixed at the LOW fan speed. In this case, the fan speed can not be changed (The indication remains at the setting condition).

<**LOUVER ANGLE**>

Depress the AUTO LOUVER switch.

Every time the AUTO LOUVER switch is depressed, the indication of the louver angle is changed.

Depress the AUTO LOUVER switch at the position of , the indication is changed to and this indication indicates the auto-swing. Depress the AUTO LOUVER switch again, the indication is turned to

The right figure shows the case of setting auto.swing

In the Case of 4-Way Cassette Type (Example)

NOTE:

- *The fixing angle of the louver shown beside is the case of 4-way cassette type Indoor Unit. The fixing angle is different according to unit model. Refer to the operation manual of each model for details.*
- *There exists a time lag between the indicated louver position on LCD and the actual louver angle in operation.*
  Therefore, when fixing the louver, set the angle according to the indicated louver angle on LCD.
- *When the AUTO LOUVER switch is depressed, the louver may not stop immediately.*

Indication							
Louver Angle (approx.)	Approx. 20°	Approx. 25°	Approx. 30°	Approx. 35°	Approx. 45°	Approx. 55°	Approx. 70°
Cooling / Dry	◄		Angle Range		►		
Heating	◄		Angle Range				►

■ :Recommended Angle

ATTENTION:

The louver angle is automatically changed during heating operation for unit control.

When heating operation is started When dry operation is started When temperature controller is activated	➡	The louver angle is automatically changed. ➡ When the discharged air temperature is increased over 30°C, the louver angle automatically return to the set position.

The LCD indication remains at the setting condition.

8.6.4. UNIT OPERATION

1. Depress the GROUP switch and select the group.

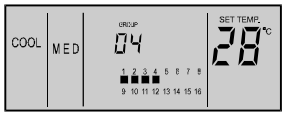
(Refer to item 2 of Group Selection and Monitoring Unit Operation Status in previous pages
The right figure shows the case of selecting group 4

2. Depress the RUN/STOP switch.

In case that the selected group is in operation, the group is stopped by depressing RUN/STOP switch.
In case that the selected group is not in operation, the group is started by depressing RUN/STOP switch.
In case of group AA, depress RUN/STOP switch, and;

a. All the groups are stopped. (When all the groups are stopped (RUN lamp is OFF))

b. All the groups are started operation. (When more than 1 group is in operation (RUN lamp is ON)).



NOTE:

- *The above indications show the case of setting operation mode for group 4.*
- *The same setting procedure shall be performed for other groups. In case of the simultaneous operation for all groups, select the group number AA.*

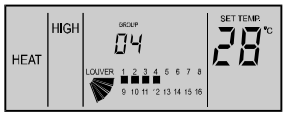
8.6.5. PROHIBITING OPERATION BY REMOTE CONTROL SWITCH

<**FUNCTION**>

To prohibit the operation by the remote control switch.
When this function is available, the CENTRAL indication appears on the LCD on the remote control switch and the operation by the remote control switch is not available.

1. Depress the GROUP switch and select the group.

(Refer to item 2 Group Selection and Monitoring Unit Operation Status in previous pages)
The right figure shows the case of selecting group 4



2. Depress the RNT.SW NAVL switch.

Every time the RMT. SW NAVL switch is depressed, the RMT. SW NAVL indication is turned ON and OFF alternately.

The above indications show the case of setting operation mode for group 4.

The same setting procedure shall be performed for other groups. In case of the same setting for all groups, select the group number of AA.

Although the RMT. SW NAVL function is set, in case of operation by the central station, the unit can be stopped by the remote control switch, and in this case, the unit can be started again by the remote control switch.

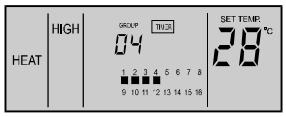
For the unit without remote control switch, the RMT. SW NAVL function shall be set.

In case of using together with other controllers, do not set the RMT. SW NAVL function. Additionally, do not set RMT. SW NAVL function by other controller or the malfunction may occur.

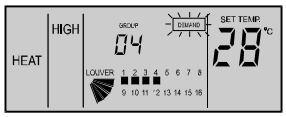
In case of no setting of temperature (--), the temperature can be set by the remote control switch during the RMT. SW NAVL function is available.

ATTENTION

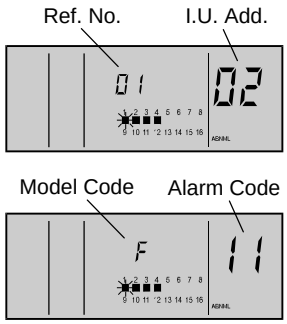
8.6.6. TIMER OPERATION

<**FUNCTION**> To set the schedule operation available or not available by the signal from the control timer in case of connection with the control timer (PSC-5T; Option). The schedule operation can be set available or not available individually for each unit, however, the operation schedule is all the same.	
1. Depress the GROUP switch and select the group. (Refer to item 2 of Group Selection and Monitoring Unit Operation Status in previous pages) The right figure shows the case of selecting group 4.	
2. Depress the TIMER switch. Every time the TIMER switch is depressed, the TIMER indication is turned ON and OFF alternately. The group with timer setting is operated according to setting by the signal from the control timer. The right figure shows the case of setting timer operation	
NOTE: - *The above indications show the case of setting operation mode for group 4.* - *The same setting procedure shall be performed for other groups. In case of the simultaneous operation for all groups, select the group number AA.*	

8.6.7. OTHER LDC INDICATIONS

<**EMERGENCY**> The EMERGENCY is indicated when the emergency stop signal is input by the outside input function. During the emergency stoppage, indoor units are stopped and the operation by the remote control switch is not available. Contact your distributor or dealer of HITACHI for details.	
<**DEMAND**> The DEMAND is indicated when the demand input is set by the outside input function. The indication is indicated for the group with demand setting and the DEMAND indication flickers when the demand signal is input. Contact your distributor or dealer of HITACHI for details.	 
<**FILTER**> Filter Clogging: When the FILTER indicator is indicated, it shows that the air filter of the indoor unit is clogged. Clean the air filter. After cleaning, depress the RESET switch and the FILTER indication is turned OFF.	

8.6.8. INDICATION IN ABNORMAL CONDITIONS

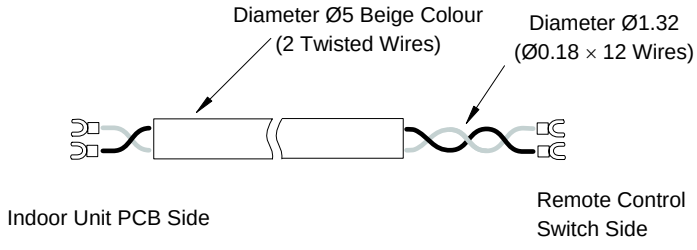
<**ABNORMAL**> The Run Lamp (Red Lamp) is flickered when there is a group in abnormal condition. The ALARM is indicated on the LCD. The ■ indication of the group in abnormal condition is flickered. Depress the GROUP switch and select the group with alarm, the indication of unit No. model code, alarm code and the normal indication is repeatedly indicated (There is a case that the model code may not be indicated according to the unit model). In case that multiple units are in abnormal conditions, the above indication is indicated by turns. Check the contents of LCD indication and contact your distributor or dealer of HITACHI for details.	
<**POWER FAILURE**> All the indications are disappeared. In case of unit stoppage due to the power failure, the unit is not started again after the power recovery. Perform the starting operation again. In case of instant power failure within 2 seconds, the unit is automatically started again.	
<**ELECTRICAL NOISE**> All the indications are disappeared, and the unit operation may be stopped for the device protection due to the electrical noise. Perform the starting operation again.	

8.7. OPTIONAL ACCESSORIES FOR RCS

8.7.1. REMOTE CONTROL CABLE (PRC-10E1~PRC-30E1)

For PC-P1HE, PSC-5S, PC-P5H and PC-RLH8/9/11

Connect a control twisted cable (0.75 mm² × 2 wires) in the field, with soldering, or use an optional extension remote control cable. For the details of the optional remote control cable, refer to the following table:

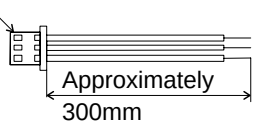
Model	Length (m)	Type of Cable	Specifications
PRC-10E1	10	TPC	
PRC-15E1	15	TPC	
PRC-20E1	20	TPC	
*PRC-30E1	30	TPC	

	A	B
Wire Colour	Black	White

*:Production is started after receipt of orders.
TPC: Twisted Pair Cable

8.7.2. 3P CONNECTOR CABLE

This connector is used when a remote ON/OFF device is connected or signals are taken out of the printed circuit boards of indoor and outdoor units.
One set contains five 3P connector cables.

Model	Application	Remarks	Specifications
PCC-1A	Optional functions of Outdoor Unit PCB	JST connector XARP-3 If long cord is needed, connect field supplied wires ($0.5mm^2$) with soldering.	Connector (“XARP-3” of JST) 

9 REFRIGERANT PIPING AND REFRIGERANT CHARGE

This chapter describes the way to connect and the way to change the refrigerant quantity in the system for the new Hitachi Utopia H(V)RNE / HN(V)E Series.

CONTENTS

9.1. REFRIGERANT PIPING WORK RANGE

The piping selection and distribution must be designed considering the following specifications:

WARNING:

The liquid piping and the gas piping must be the same piping length and run along the same route.

Install Multi-Kits (Optional Accessory as system parts) must be used for the branch pipe to the Indoor Unit.

Install Multi-Kits at the same horizontal level.

Oil trap every Ht of height difference for gas piping between Indoor Unit and Outdoor Unit is required when Outdoor Unit is located higher than the Indoor Units for 8~12HRNE

However, in case that the Outdoor Unit is located lower than Indoor Unit, it is not required to put oil trap in the suction gas piping, since the oil in the system can return to the compressor due to the oil return control system.

■ RAS-(2~6)H(V)RNE / HN(V)E

ITEM		Maximum Applicable Range H(V)RNE		
Description	Mark	2HP	2.5/3HP	4~6Hp
Total length from OU to all IU	-	55 m	60 m	77 m
Height difference (Hi-o) between OU to IU (*)	Hi-o	30 m		
Height difference (Hi-o) between IU to OU	Hi-o	20 m		
Height difference (Hi) between IUs	Hi	0.5 m		

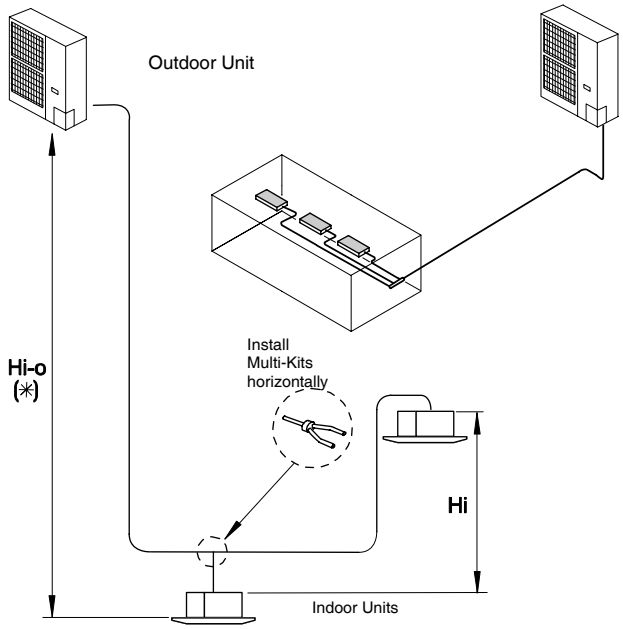
IU: Indoor Unit
OU: Outdoor Unit

ITEM		Maximum Applicable Range HN(V)E
Description	Mark	2.5~5 HP
Total length from OU to all IU	-	50 m
Height difference (Hi-o) between OU to IU (*)	Hi-o	30 m
Height difference (Hi-o) between IU to OU	Hi-o	20 m
Height difference (Hi) between IUs	Hi	0.5 m

IU: Indoor Unit
OU: Outdoor Unit

NOTE

After branch pipe the piping length should be shorter than 10 m
All branch pipe should be balanced, the difference between them can not bigger than 8 m or 6 m for a Triple case.



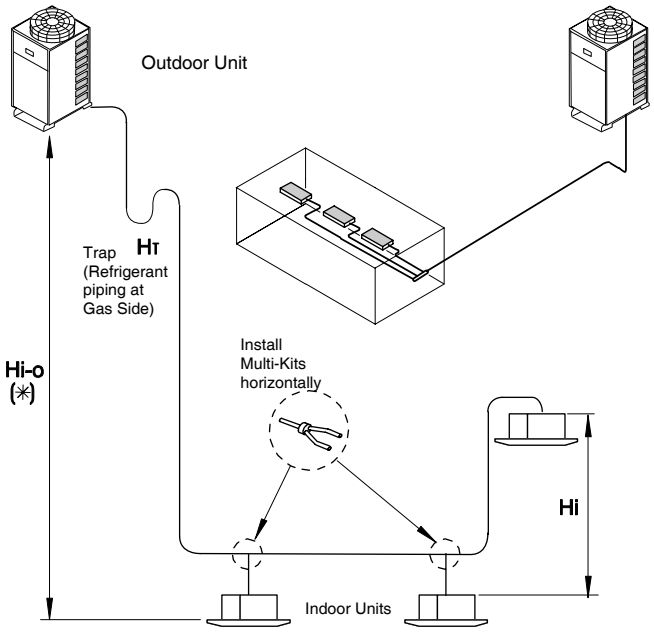
■ RAS-(8~12)HRNE

ITEM		Maximum Applicable Range HRNE
Description	Mark	8~12 HP
Total length from OU to all IU	-	120 m
Height difference (Hi-o) between OU to IU (*)	Hi-o	30 m
Height difference (Hi-o) between IU to OU	Hi-o	20 m
Height difference (Hi) between IUs	Hi	0.5 m
Oil Trap every (Ht) meters of height	Ht	10 m

IU: Indoor Unit
OU: Outdoor Unit

NOTE

After branch pipe the piping length should be shorter than 10 m
All branch pipe should be balanced, the difference between them can not bigger than 8 m or 6 m for a Triple case.
Make a Trap according to height difference (Ht) between Indoor Unit and Outdoor Unit. (See Table)



9.1.1. REFRIGERANT PIPING LENGTH

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

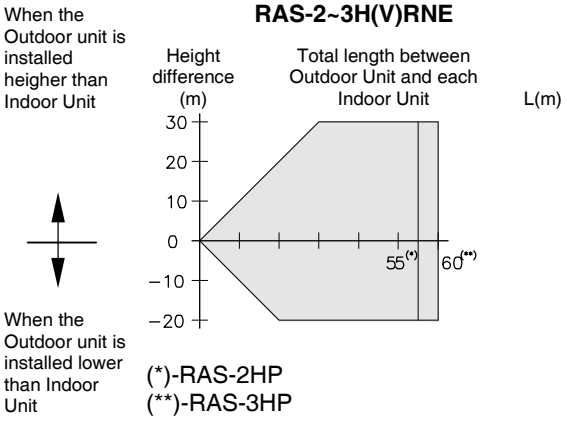
Keep the design point within the dark area of the chart, which is showing the applicable height difference according to piping length.
In case that a piping length is shorter than 5 meters, contact the Hitachi dealer.

NOTE *(Only RAS-8~12)*

1. DSW: Dip Switch on Outdoor Unit PCB.
(DSW3 must be set when the Outdoor Unit is installed higher than Indoor Unit).

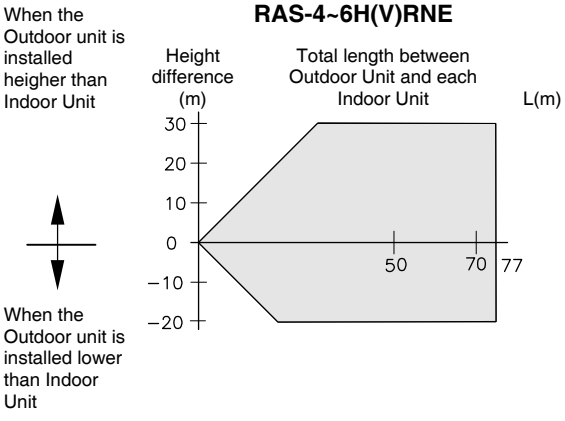
Piping Length specification:

RAS-2~3H(V)RNE

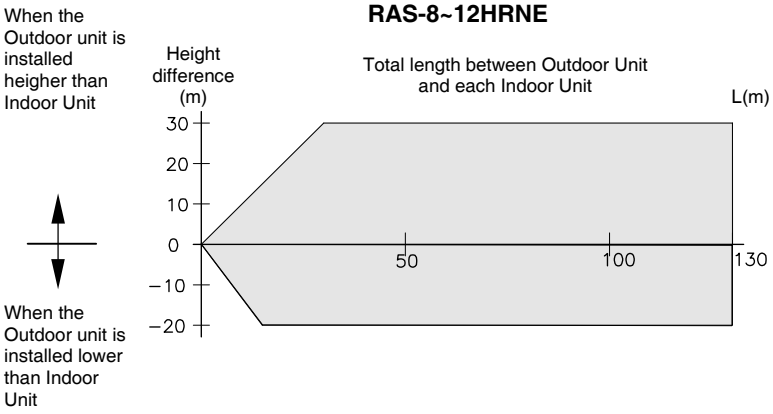


(*)-RAS-2HP
(**)-RAS-3HP

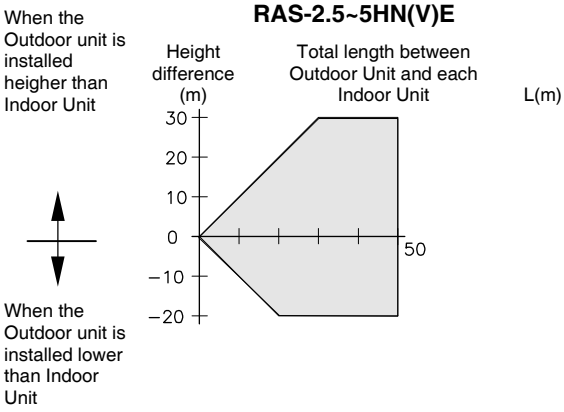
RAS-4~6H(V)RNE



RAS-8~12HRNE



RAS-2.5~5HN(V)E



9.1.2. 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

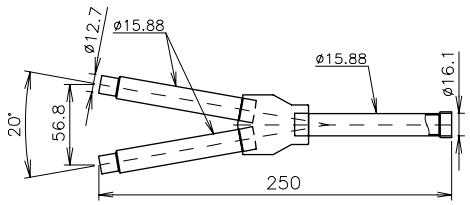
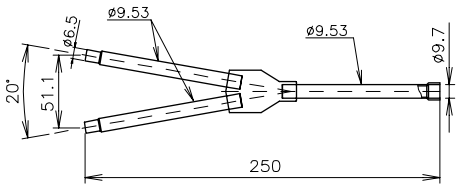
Outdoor Unit		Pipe Size		Branch Pipe		
Serie	(HP)	Gas Pipe	Liquid Pipe	Twin	Triple	Quad
H(V)RNE HN(V)E	2.0	15.88 (5/8)	9.53 (3/8)	-	-	-
	2.5	15.88 (5/8)	9.53 (3/8)	-	-	-
	3.0	15.88 (5/8)	9.53 (3/8)	TE-03N	-	-
	4.0	15.88 (5/8)	9.53 (3/8)	TE-04N	-	-
	5.0	15.88 (5/8)	9.53 (3/8)	TE-56N	-	-
	6.0	15.88 (5/8)	9.53 (3/8)	TE-56N	TRE-06N	-
	8.0	25.4 (1)	9.53 (3/8)	TE-08N	TRE-810N	QE-810N
	10.0	25.4 (1)	12.7 (1/2)	TE-10N	TRE-810N	QE-810N
	12.0	25.4 (1)	12.7 (1/2)	TE-10N	TRE-810N	QE-810N

9.2. DISTRIBUTOR LINE BRANCH AND HEADER BRANCH

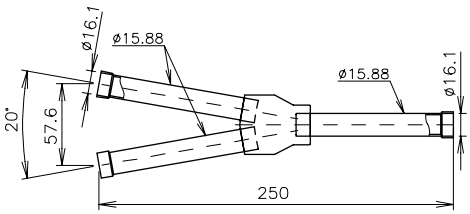
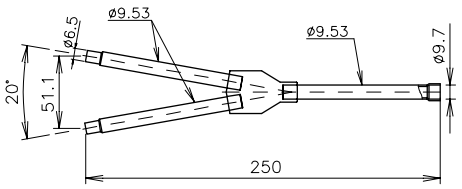
9.2.1. DIMENSIONAL DATA

■ **Line Branch**

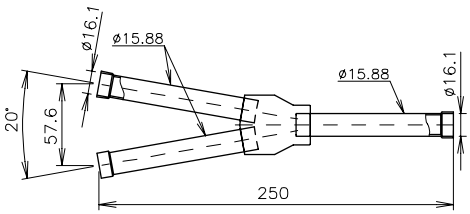
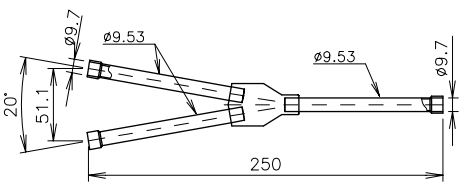
TE-03N

GAS LINE	LIQUID LINE
	

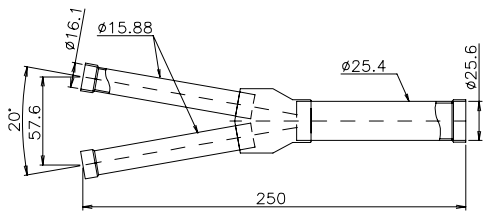
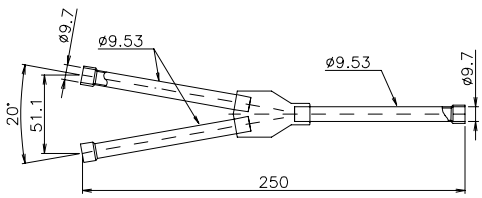
TE-04N

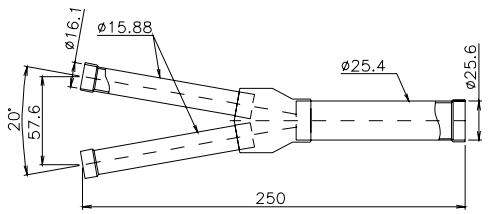
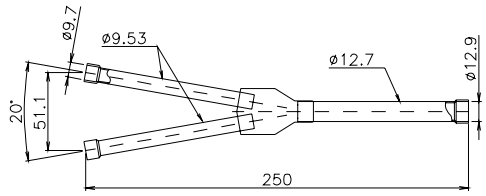
GAS LINE	LIQUID LINE
	

TE-56N

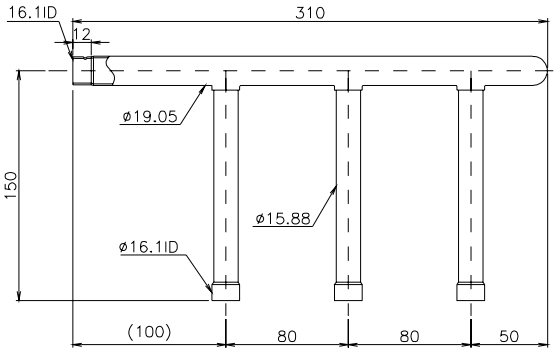
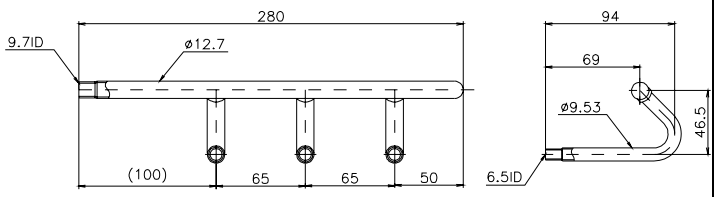
GAS LINE	LIQUID LINE
	

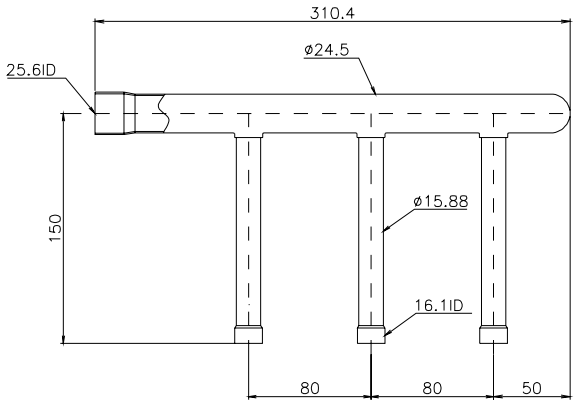
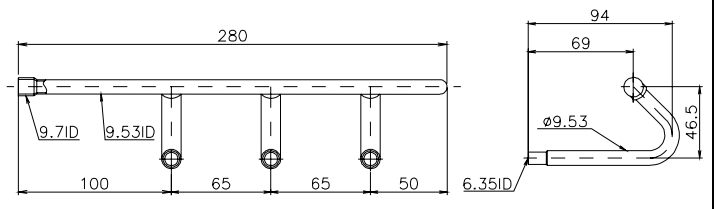
TE-08N

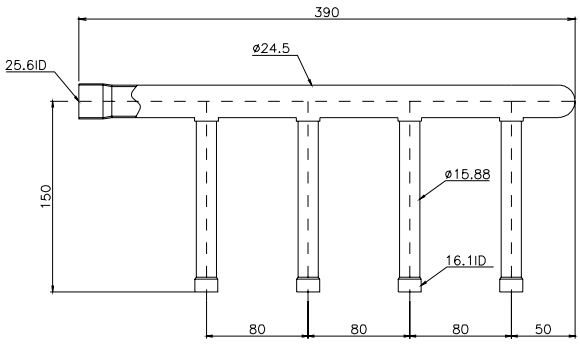
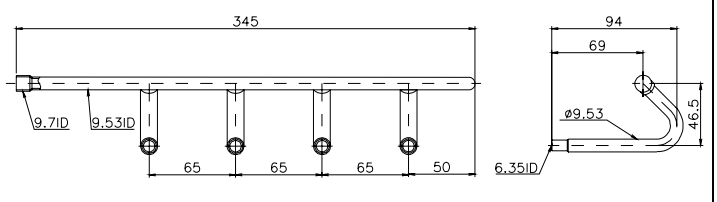
GAS LINE	LIQUID LINE
	

	GAS LINE	LIQUID LINE
TE-10N		

■ **Header Branch**

	GAS LINE	LIQUID LINE
TRE-06N		

	GAS LINE	LIQUID LINE
TRE-810N		

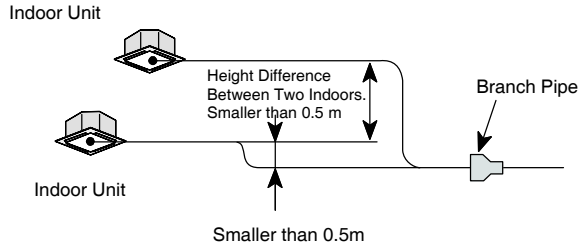
	GAS LINE	LIQUID LINE
QE-810N		

9.2.2. TWIN, TRIPLE AND QUAD SYSTEM INSTALLATION

■ **Height Difference Between Indoor Units and Branch Pipe**

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 0.5 meters. Install the branch pipe at the same height of indoor units or lower, but never higher.

Sample: Twin system

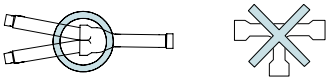


■ **Installing Branch Pipe**

1. Install the Branch Pipe supplied by HITACHI on request (not included in the delivery).

   A tee can not be installed instead of a Branch Pipe.

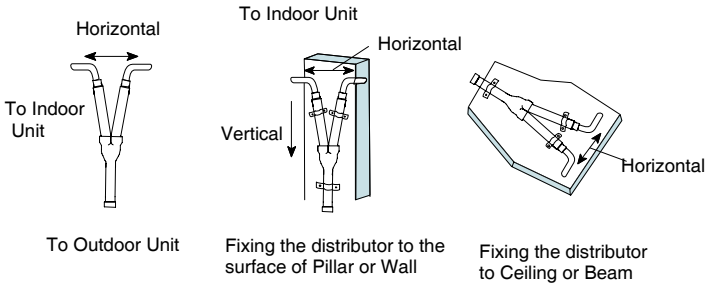
Sample: Twin System



2. Installing the Branch Pipe.

   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.

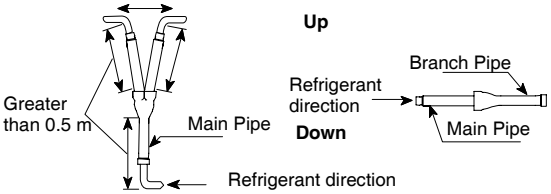
Sample: Twin System



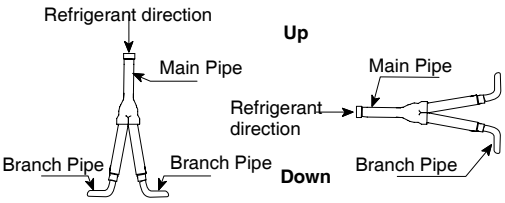
NOTE:
Fix the piping from outside of insulation or inserting absorber between the pipe and a fixing metal.

3. Correct position of Twin Branch Pipe

This is the correct position of twin Branch Pipe:



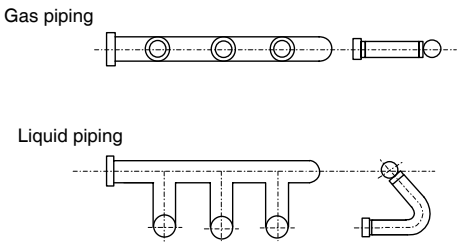
This is wrong position.



4. Correct position of Triple & Quad Branch Pipe.

This is the correct position:
Install the header horizontally

Sample: Triple Branch pipe



9.3. PIPING WORK CONNECTION CONSIDERATIONS

9.3.1. PIPING MATERIALS

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

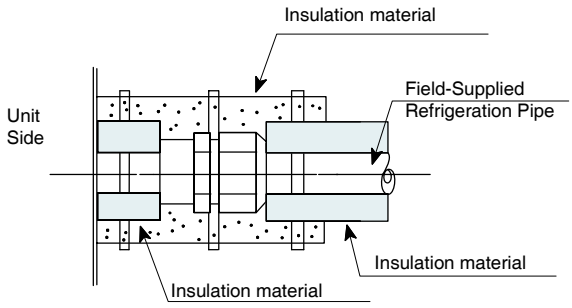
Nominal Diameter		Thickness (mm)	Cooper type
(mm)	(in)		
6.35	1/4	0.80	Roll
9.53	3/8	0.80	Roll
12.70	1/2	0.80	Pipe/Roll
15.88	5/8	1.00	Roll
19.05	3/4	1.00	Pipe/Roll
22.23	7/8	1.00	Pipe/Roll
25.40	1	1.00	Pipe

NOTE:

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

3. Select clean copper pipes. Make sure there is not dust and moisture inside. Blow the inside of the pipes with oxygen free nitrogen to remove any dust and foreign materials before connecting pipes.

4. After connecting the refrigerant piping, seal the open space between Knockout hole and refrigerant pipes by using insulation material as shown bellow:

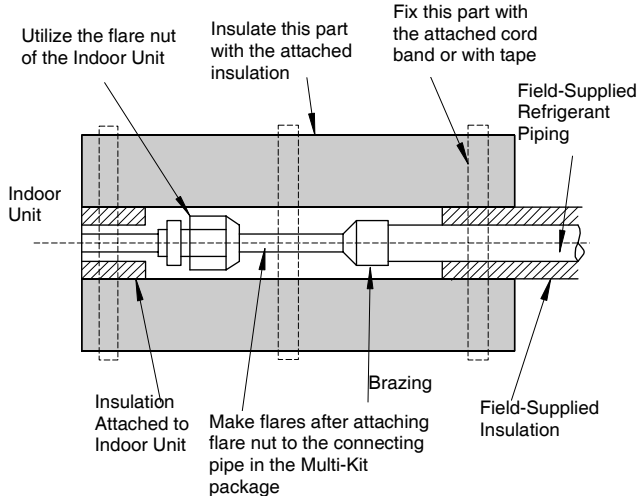


CAUTION:

- *Utilize clean copper pipes without any moisture or foreign material on the internal surface of pipes. When connecting refrigerant piping, cut copper pipes with a pipe cutter and blow the pipes with nitrogen.*
- *Do not use a saw and a grindstone or others which cause copper powder.*
- *When cutting pipes, secure the part for brazing as shown in subchapter 9.3.5.*
- *Refrigerant Pipes thickness are indicated in subchapter 9.3.4*

■ Piping Connection

Fix the connecting pipe as shown in the following figure. Utilize the insulation attached to the Indoor Unit.

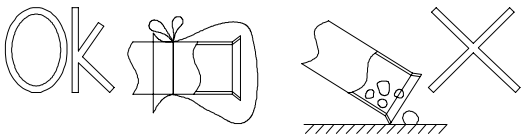


NOTE:

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

CAUTION:

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

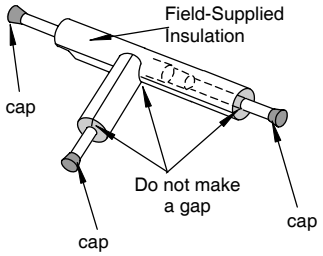


- *If piping installation is not completed until next day or over a longer period of time, braze off the ends of the piping and charge with oxygen free nitrogen through a Schrader valve type access fitting to prevent moisture and particle contamination.*
- *Do not use insulation material that contents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

■ Insulation

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

- For Line Branch



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

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

9.3.2. THREE PRINCIPLES ON REFRIGERANT PIPING WORK

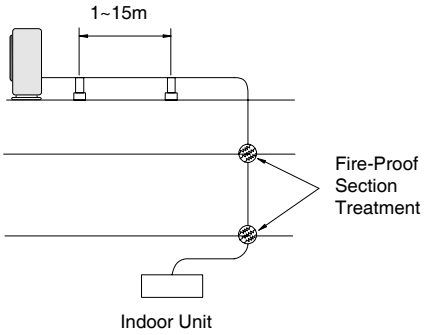
In case of the refrigeration cycle with refrigerant R410A, refrigeration oil should be of synthetic type. Therefore, the oil absorbs moisture quickly when compared with R407C systems and it will cause sludge and oxidation of the oil.

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

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

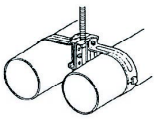
9.3.3. SUSPENSION OF REFRIGERANT PIPING

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

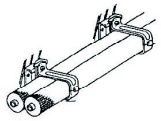


Do not fix the refrigerant piping directly with the metal fittings (The refrigerant piping may expand and contract).
Some examples for suspension method are shown below.

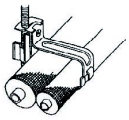
For Suspending Heavies



For Piping Along The Wall



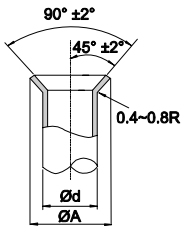
For Instant Installation Work



9.3.4. TIGHTENING TORQUE

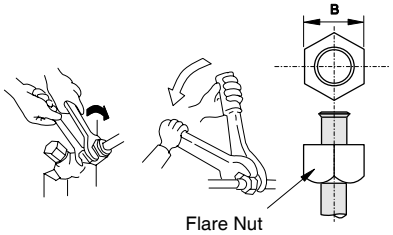
1. Flaring connections (smaller than a diameter of Ø19.05) are generally used. However, if incorrect flaring is performed, it will cause serious refrigerant leakage.
2. Shape after Flaring, it should be rectangular and flat, and no uneven thickness, cracks and scratches should exist.

Nominal diameter Ød		Dimension
(inches)	(mm)	$A^{+0.0}_{-0.4}$ (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
3/4	19.05	(*)



(*) It is impossible to perform the flaring work. In this case, use a joint selected from the table in next column.

When tightening the flare nuts, use two spanners, as shown in the figure.



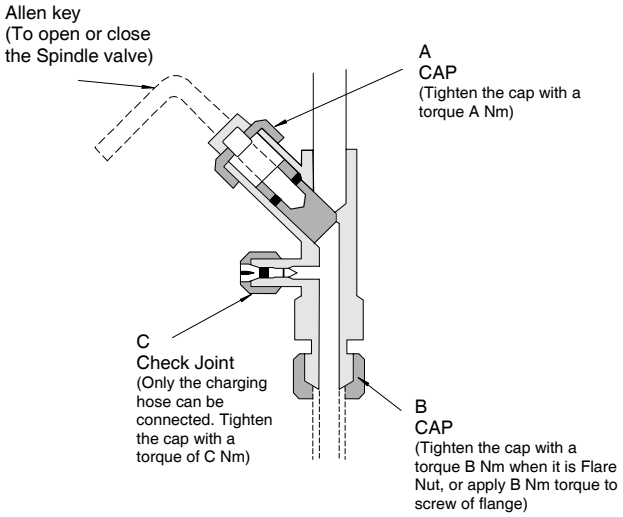
Pipe Diameter	Size B (R410A)
Ø6.35	17
Ø9.53	22
Ø12.70	26
Ø15.88	29
Ø19.05	36

The required tightening torque is as follows:

Pipe Size	Tightening Torque (Nm)
Ø 6.35 mm	20
Ø 9.53 mm	40
Ø 12.7 mm	60
Ø 15.88 mm	80
Ø 19.05 mm	100

8~12HRNE

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



RAS-8~12HRNE		A(N.m)	B (N.m)		C(N.m)
			Flare	Screw of Flange	
8HP	Liquid	16.5	40	-	9.8
	Gas	49	-	53 to 75	
10HP	Liquid	16.5	40		
	Gas	49.0	-		
12HP	Liquid	16.5	40		
	Gas	49.0	-		

Allen key Size (mm)

Model	Liquid Valve	Gas Valve
RAS-8HRNE	4	10
RAS-10HRNE		
RAS-12HRNE		

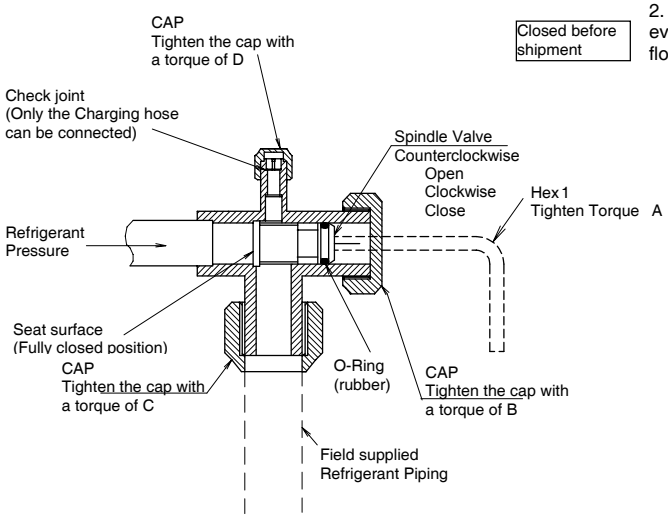
(As for wrenches of 5 mm and 10 mm, use field-supplied wrenches.)

CAUTION:

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

During the test run, fully open the spindle. If it is not fully opened, the devices will be damaged.

(2~6)H(V)RNE / HN(V)E



Stop Valve	Tighten torque (N·m)				Size (mm)
	A	B	C	D	Hex 1
Liquid (2~6HP)	7~9	33~42	33~42	14~18	4
Gas (2~6HP)	11~12	14~18	68~82	8~12	4

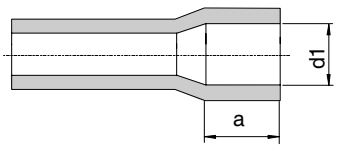
CAUTION:

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

During the test run, fully open the spindle. If it is not fully opened, the devices will be damaged.

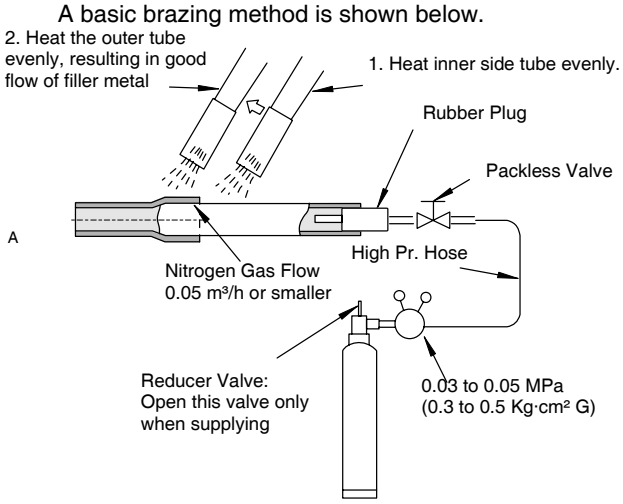
9.3.5. BRAZING WORK

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



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

A basic brazing method is shown below.

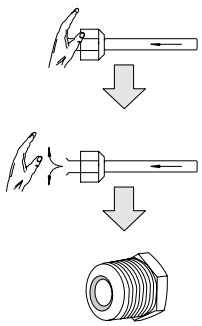


ATTENTION:

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

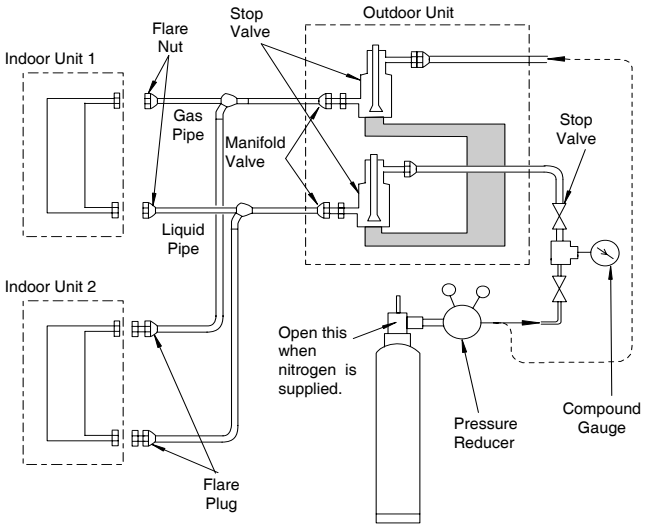
9.3.6. FLUSHING REFRIGERANT PIPES

It is required to remove Oxidation Film, Moisture or Dusts in case of insufficient Nitrogen Blow during Brazing, or Careless Handling of Tubes.



Release the pressure at a time after the hand can not close due to the pipe and pressure.

Attach a flare plug and close the end until flushing work is completely performed.



Open the stop valve of a nitrogen cylinder and increase the pressure up to 5 bar through a reducer valve.

Check to ensure that nitrogen gas is discharged from de service port in the outdoor unit.

FLUSHING: Perform flushing work for the pipes to the indoor units one by one

Close the outlet of the pipe by hand. Release the pressure at a time after the hand can not close the pipe end due to pressure. (first flushing).

Release the pressure at a time after the hand can not close the pipe end due to pressure. (second flushing).

Check the contents and quantity of dusts by applying cloth at the end of the pipe at flushing. If slight water is detected, perform a vacuum drying to remove moisture completely.

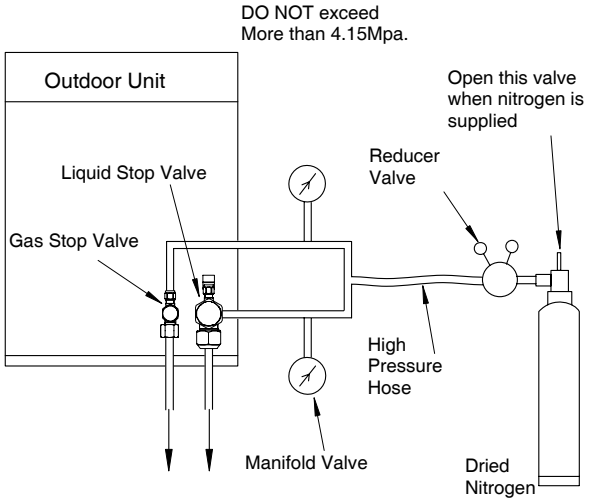
Perform the same work for gas piping after liquid piping.

9.3.7. AIR TIGHT PRESSURE TEST

After perform the piping work, brazing work and before to change new refrigerant R410A, it is required to check that brazing is completely performed without any leakage after refrigerant pipe brazing. In particular, the new refrigerant R410A, operates in a higher pressures than R407C. Therefore, it needs more careful brazing work.

1. Connect a manifold gauge to the check joint an the liquid side and gas side stop valves. Gradually increase the pressure step by step without opening the stop valves.

Step 1	0.5 MPa (~5 kg·cm²)	5 min or over	⇨	able to find small leakage
Step 2	1.5 MPa (~15 kg·cm²)	5 min or over		
⇩				
Step 3	4.15 MPa (~41.5 kg·cm²)	24 h or over	⇨	able to find fine leakage



⚠ ***CAUTION:***

- *Nitrogen gas should be used for an air tight test. If accidentally oxygen or acetylene or fluorocarbon gas is used, it will cause an explosion or poisonous gas.*

2. Perform an air tight test with a pressure of 4.15 MPa (= 41.5 kg·cm²) for R410A holding for 24 hours. If no pressure decrease is observed, it is judged that no leakage exist. If a pressure decrease is observed, check for leakage. However, in the case that there is ambient temperature difference between the pressure applying time and the final check time, perform the following temperature correction, since pressure are different according to an ambient temperature by approx. 0.01 MPa (=0.1 kg·cm²) per 1°C.

Correction:

Temp at Pressure Applying Time – (Temp. at Checking Time) x 0.01 MPa (or 0.1 kg·cm²)

Example:

	Pressure	Temperature
When pressure is applied	4.15 MPa (41.5 kg·cm²) R410A	28°C
After 24 hours	4.10 MPa (41.0 kg·cm²) R410A	23°C
Correction	(28-23) x { 0.01=0.05 MPa / 0.1=0.5 kg·cm²	5°C

3. If any leakage is detected locate it as follows:

Check by Listening: Listen to sound from a leakage portion
Check by touching: Check for a leakage portion by touching
Check by foaming agent: Apply foaming agent

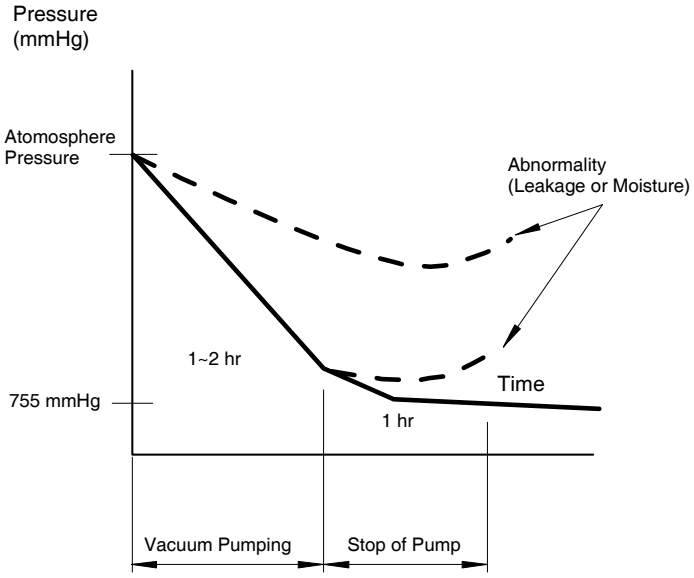
9.3.8. VACUUM DRYING

The purpose of vacuum drying is to dry inside of the refrigeration cycle by decreasing pressures, evaporating moisture and discharging moisture and air from the refrigeration cycle. It is requires to strictly perform vacuum pumping work, due to its characteristics of the refrigerant R410A and lubrication oil. If moisture remains inside of the refrigerating cycle, will cause hydration, resulting in abnormal pressure due to clogging in the refrigeration cycle, also oxidation reaction with synthetic oil will cause insulation deterioration of the compressor motor.

Perform vacuum pumping until an appropriate vacuum degree is obtained due to its high absorption.
Use a good vacuum pump, which provides a high vacuum degree performance
Use a new manifold valve and a charging hose only for the new refrigerant.
Perform vacuum pumping work according to the following procedures.

1. Check to ensure that the liquid and gas stop valves are completely closed.
2. Connect a manifold valve, a vacuum pump, a vacuum gauge for the new refrigerant to stop valves.
3. Operate the vacuum pump for more than 2 hours until.

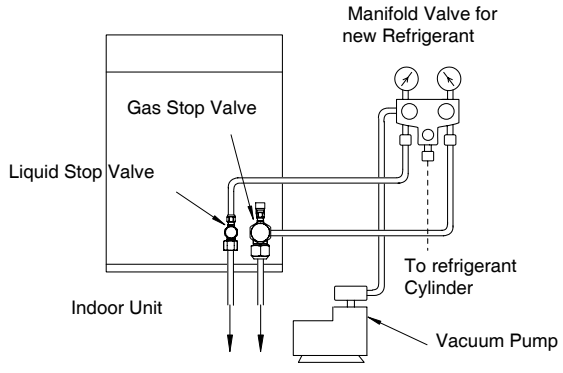
In the case that the vacuum degree of –755 mmHg is not available, check for any leakage, since a leakage or existence of moisture is suspected.
After the check, operate the vacuum pump more than one hour.



■ Evaporation of water

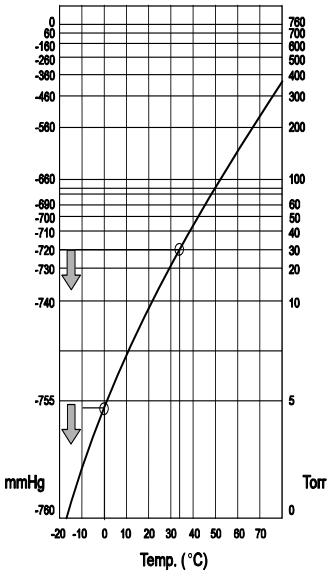
Water boiling temperature is 100 °C under atmosphere. However, boiling point decreases when vacuum degree is increased.
Therefore, the higher vacuum degree is, the higher vacuum drying is available.

In the case that dewing inside piping is suspected, it is not easy to obtain the high vacuum degree due to dew evaporation and it requires to control the degree strictly. It is preferable to obtain a vacuum degree of –755mmHg (5 to 2 Torr).



■ Check of vacuum degree

The vacuum degree should be checked by a vacuum gauge. However, vacuum degree reading is not available by the gauge connected to the manifold valve. It is recommended that a digital type vacuum gauge be used.



9.3.9. REFRIGERANT CHARGE PROCEDURE

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

1. The stop valves have been closed before shipment, however, ensure that the stop valves are closed completely.
2. Connect the indoor unit and the outdoor unit with field-supplied refrigerant tubes.
3. Connect the gauge manifold using charging hoses to a vacuum pump, a refrigerant charging cylinder and a nitrogen cylinder to the check joint of the liquid line stop valve.
4. Check for any gas leakage at the flare nut connection, by using oxygen free nitrogen gas to increase the pressure inside of the field-supplied tubes.
5. Operate the vacuum pump until the pressure decreases lower than a pressure of -756 mm Hg in vacuum.
6. Charge refrigerant (only if necessary according to data in chapter 13.12) by opening the gauge manifold valve. If the required quantity cannot be charged, follow procedures (7) to (9). Otherwise proceed step (10).

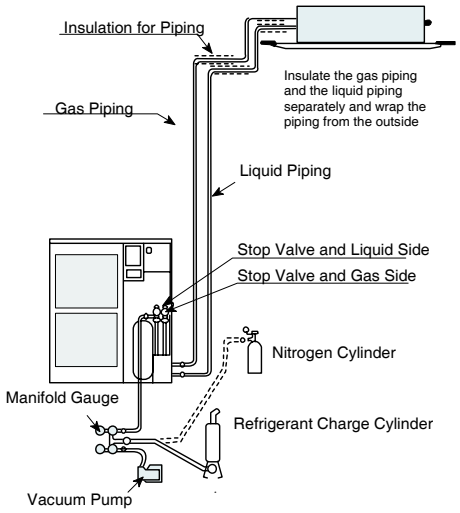
NOTE:

An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity as indicated in chapter 9.6.

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

⚠ ***CAUTION:***

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



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

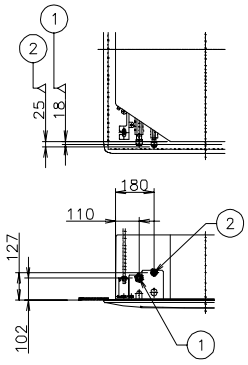
Insulation for Connection Parts:
The connection part must be insulated by the field supplied insulation materials.

Nitrogen:
For Leakage Test and Brazing

9.4. INDOOR UNIT PIPING WORK CONNECTION

9.4.1. RCI – 4 WAY CASSETTE TYPE

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



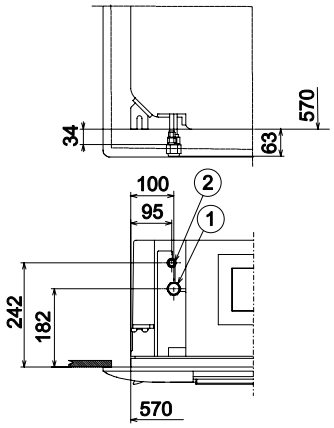
Piping size

mm (in)

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

9.4.2. RCIM-4WAY CASSETTE TYPE

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

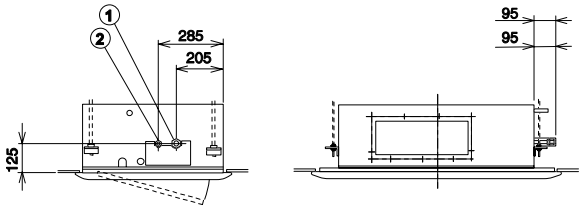


Piping size

(mm)(in)

	① Gas Piping	② Liquid Piping
RCI-1.5	Ø 12.70 (1/2)	∅ 6.35 (1/4)
RCI-2.0	∅ 15.88 (5/8)	

9.4.3. RCD – 2 WAY CASSETTE TYPE



Piping size

mm (in)

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

9.4.4. RPC – CEILING TYPE

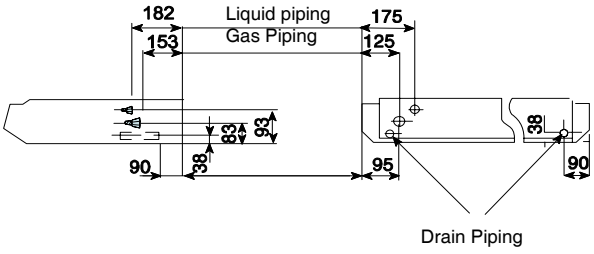
■ Piping Position

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

– The positions of piping are shown below

– Each direction has the prepared knockout hole as shown in piping work sub-chapter.

– Cut the knockout hole for the required direction.



Piping size

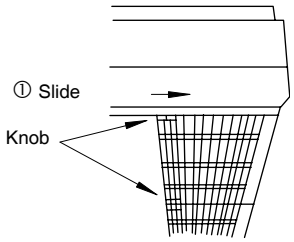
mm (in)

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

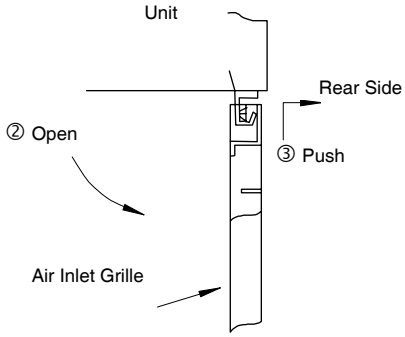
■ Piping Work Installation

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

1. Slide the Knobs to the rear side.



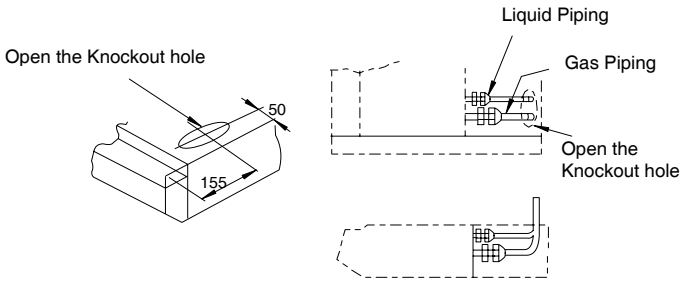
2. Open the air inlet grille, push up and slide the air inlet grilles to the rear side.



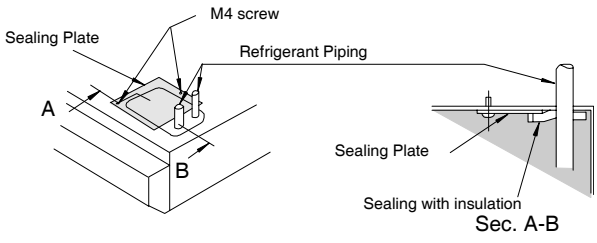
After select the piping direction proceeded to knockout selected hole, install pipes and seal the piping with the factory supplied insulation as indicated below:

■ Upper Side

1. Knockout hole

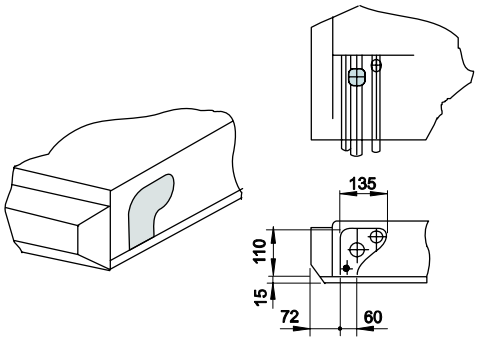


2. Seal piping

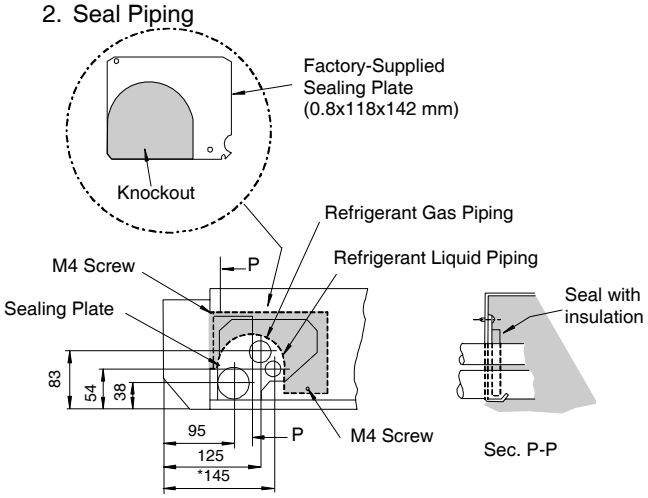


■ Rear Side

1. Knockout hole



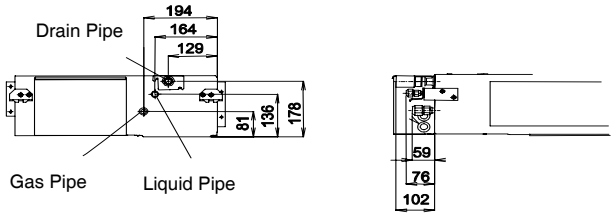
2. Seal Piping



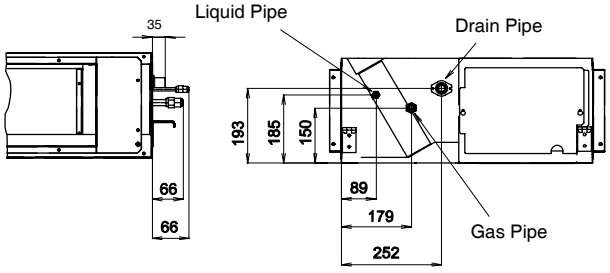
9.4.5. RPI – IN-THE-CEILING TYPE

Position of piping connection is the following:

■ RPI 1.5

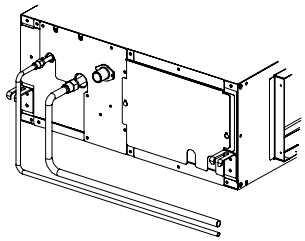


■ RPI 2.0~6.0

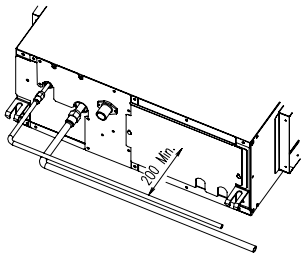


Keep electrical box and drain pipe access free of piping.

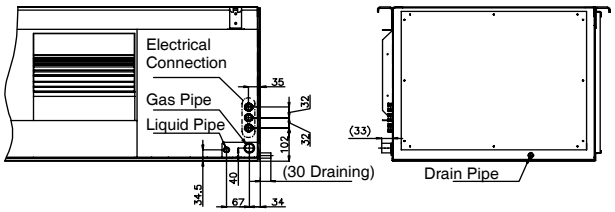
Option 1



Option 2



■ RPI (8.0 – 10.0)



Piping size

mm (in)

	Gas Piping	Liquid Piping
RPI-1.5	∅ 12.70 (1/2)	∅ 6.35 (1/4)
RPI-2.0	∅ 15.88 (5/8)	
RPI-2.5~6.0		∅ 9.53 (3/8)
RPI-8.0	∅ 25.4 (1)	∅ 9.53 (3/8)
RPI-10.0		∅ 12.70 (1/2)

Field supplier pipe reduction

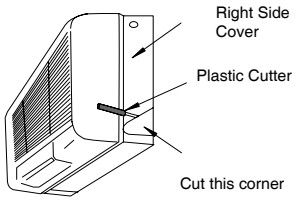
NOTE:
When installing pipes, make sure that enough space is provided for servicing the electrical box.

9.4.6. RPK – WALL TYPE

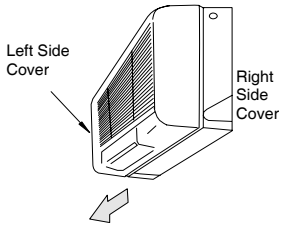
Piping Direction for the Indoor Unit:

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

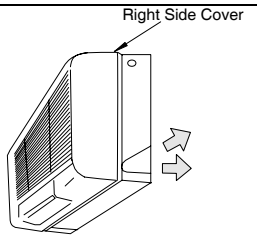
1. Right Side Piping
   Cut the corner using a plastic cutter as shown below and remove sharp edges completely.



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



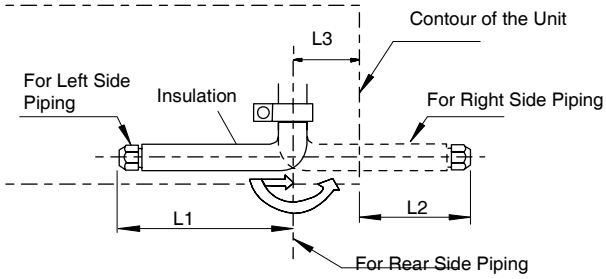
3. Rear Side Piping
   Make a hole by removing the knock-out plate at the rear side.



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

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

▪ RPK-1.5 ~ 4.0



mm

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

mm

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

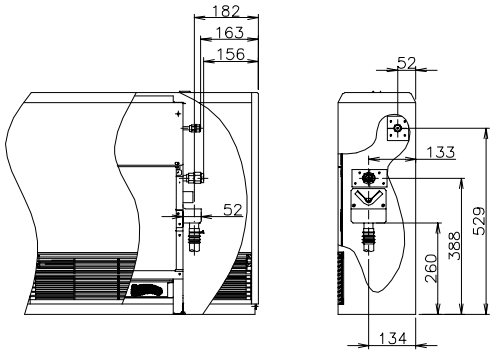
Piping size

mm (in)

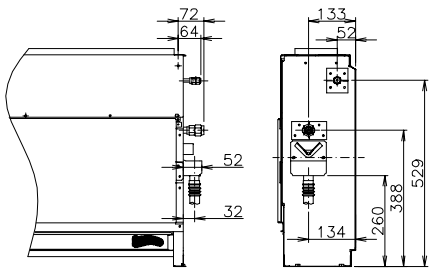
	Gas Piping	Liquid Piping
RPK-1.5	∅ 12.70 (1/2)	∅ 6.35 (1/4)
RPK2.0	∅ 15.88 (5/8)	
RPI-2.5~4.0		∅ 9.53 (3/8)

9.4.7. RPF & RPFI – FLOOR TYPE & FLOOR CONCEALED TYPE

(mm)



Piping Connection of RPF



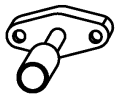
Piping Connection of RPFI

mm (in)

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

9.5. OUTDOOR UNIT PIPING WORK CONNECTION

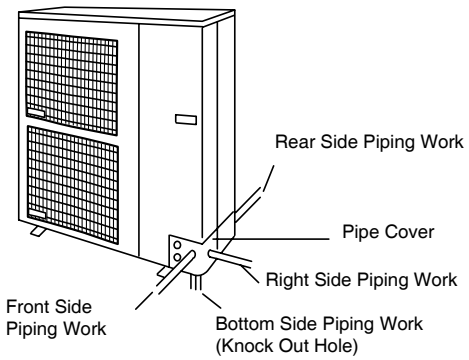
9.5.1. FACTORY SUPPLIED PIPE ACCESSORIES

Accessory		Quantity		
		RAS-8FHRNE	RAS-10HRNE	RAS-12HRNE
Compressed Sheet 		1	1	1
Pipe Flange of Refrigerant Gas Piping 		1	1	1
Rubber bush	For connection hole of power source wiring	1		
	For connection hole of operation wiring	4		
Screw	Spare	3		

9.5.2. POSITION OF PIPING CONNECTION

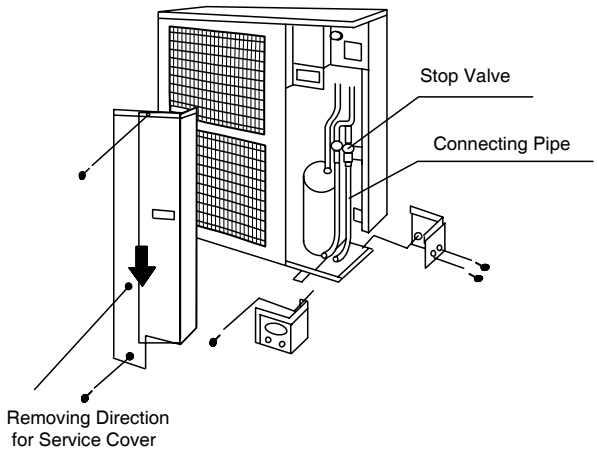
RAS-(2~6)H(V)RNE / HN(v)E

Pipes can be connected from four directions as shown. Make a hole at the front pipe cover or rear pipe cover to pass through the hole.



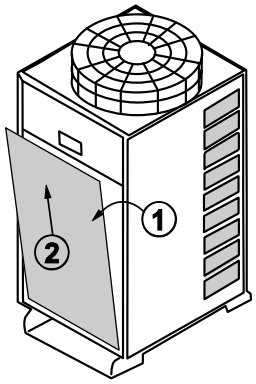
Remove the service cover as shown in fig. below before piping connection.

- Remove fixing screws.
- Slightly open the upper side and lift the service cover upward, then slowly pull it forward to the front side.



RAS-(8~12)HRNE

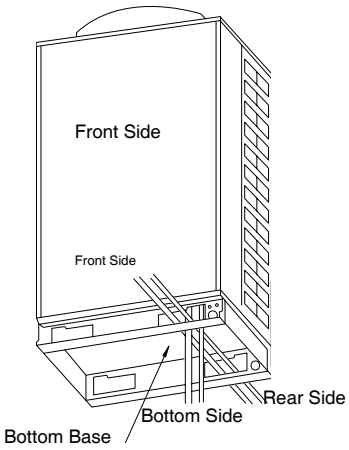
– Remove the service cover as shown in fig. below before piping connection.



– Remove fixing screws on the lower position (4 pieces) and the upper position (3 pieces).

– Slightly open the upper side and lift the service cover upward, then slowly pull it forward to the front side.

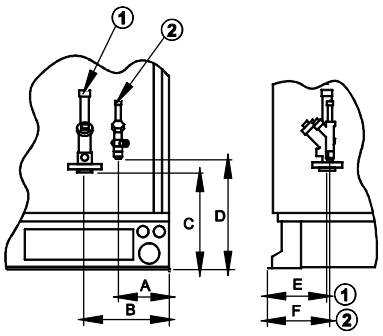
▪ Pipes can be connected from 3 directions



NOTE:
Do not install piping in front of the screw of the service panel. If not, the screw or the service panel can not be removed

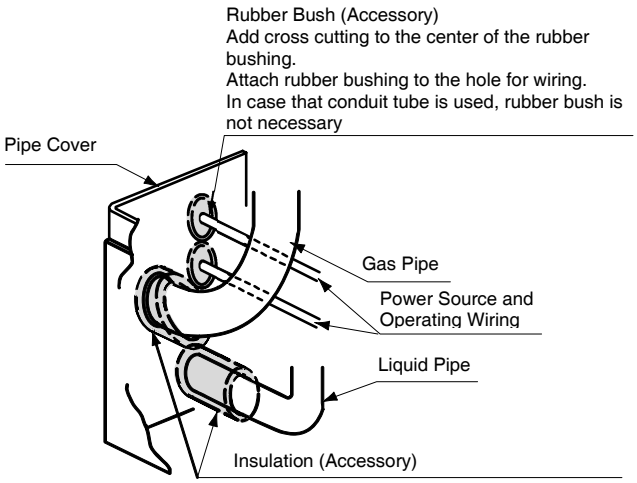
The position of the connecting pipes is the following for each Outdoor Unit type:

Model	① Refrigerant Gas Piping Connection Ø	② Refrigerant Liquid Piping Connection Ø	A	B	C	D	E	F
RAS-8HRNE	25.4 brazing	9.53 flare nut	137	241	238	306	155	156
RAS-10HRNE		12.70 flare nut		227	247	306	151	156
RAS-12HRNE				227	247	306	151	156

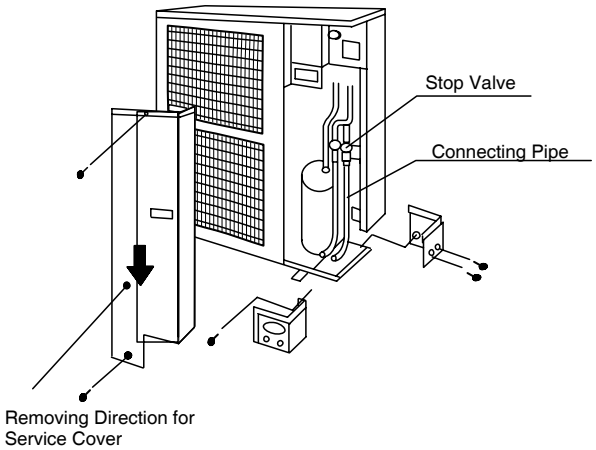


9.5.3. PIPING CONNECTION FOR RAS-(2~6)H(V)RNE / HN(V)E

- Select the most suitable piping direction.
- Remove the pipe cover and the service cover from the unit, cut off the part of the holes along the guideline (on the rear side of the pipe cover) and cut the edge of the holes.
- Attach the rubber bush (Factory-Supplied) and insulation before connecting the pipe in the flare nut. Later, it would be impossible to pass the insulation or the rubber bush through the pipe and it would remain an undesired gap for where water or animals could enter inside the unit.

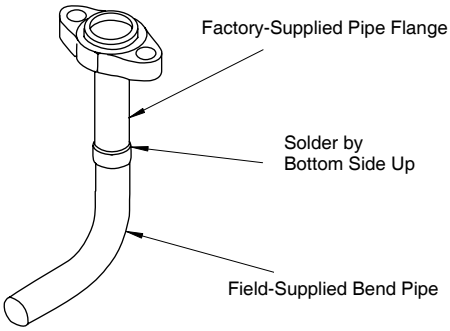


- Connect the Pipes and the Wiring to the unit.
- If the field-supplied piping is connected with stop valves directly, it is recommended to use a tube bender.
- Fix the Service Cover and the Pipe Cover.
- Finally, seal the open space between knockout hole and refrigerant pipes by using insulation material. If not, animals or water will enter inside the unit and electrical parts will be damaged.

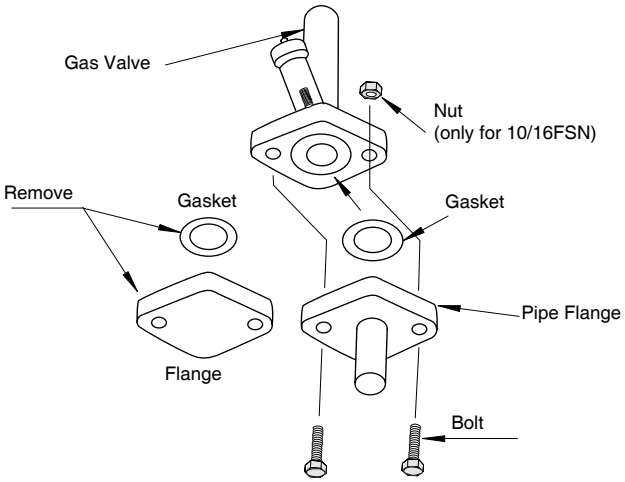


9.5.4. PIPING CONNECTION FOR RAS-8~12HRNE

- Confirm that the valve is closed
- Prepare a field-supplied bend pipe for liquid and gas line. Connect they to the liquid and gas valve by flare nut through the square hole of bottom base.
- Prepare a field-supplied bend pipe for gas line. Solder it and the factory-supplied pipe flange at the outside of the unit.



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



Solder the bend pipes and field piping.

9.6. REFRIGERANT CHARGING QUANTITY

Refrigerant has been charged into this unit for 30 m of length pipe. It is required that additional refrigerant be charged according the piping length if it is higher than 30 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

■ Outdoor Unit Factory Refrigerant charge (Wo Kg) is the next:

O/U MODEL	Wo/Kg
RAS-2HVRNE	1.7
RAS-2.5HVRNE / HN(V)E	2.3
RAS-3H(V)RNE	2.4
RAS-3HN(V)E	2.5
RAS-4HVRNE / HN(V)E	3.6
RAS-5HVRNE / HN(V)E	3.6
RAS-6HRNE	3.6
RAS-8HRNE	10.1
RAS-10HRNE	11.5
RAS-12HRNE	12.0

9.6.1. ADDITIONAL REFRIGERANT CHARGE CALCULATION FOR RAS-2~6HP

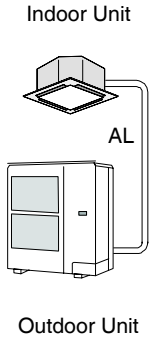
For RAS-2~6HP, determine the Total Additional Refrigerant Charge accoding to the Actual Piping length of the System.

■ **Single System**

RAS-(2~6)H(V)RNE / HN(V)E

O/U Model	Actual Piping Length: AL(m)				
	30<AL≤40	40<AL≤50	50<AL≤60	60<AL≤70	70<AL≤80
RAS-2HVRNE	0.4	0.8	1.0 (up to 55m)	-	-
RAS-2.5HVRNE	0.5	0.9	1.4	-	-
RAS-3HVRNE	0.6	1.2	1.8	-	-
RAS-4H(V)RNE	0.6	1.2	1.8	2.4	2.8
RAS-5H(V)RNE	0.6	1.2	1.8	2.4	2.8
RAS-6HRNE	0.6	1.2	1.8	2.4	2.8
RAS-2.5HN(V)E	0.5	0.9	-	-	-
RAS-3HN(V)E	0.6	1.2	-	-	-
RAS-4HN(V)E	0.6	1.2	-	-	-
RAS-5HN(V)E	0.6	1.2	-	-	-

(Unit: Kg)

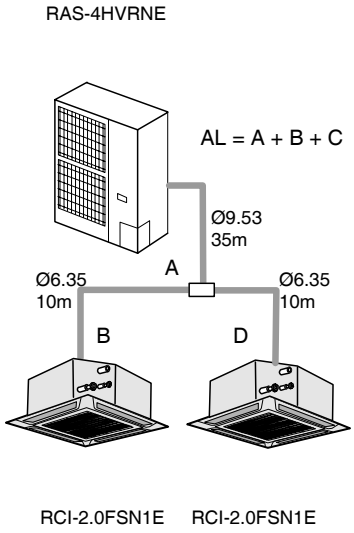


■ Twin System

RAS-(2.5~6)H(V)RNE / HN(V)E

O/U Model	Actual Piping Length: AL(m)					
	30<AL≤40	40<AL≤50	50<AL≤60	60<AL≤70	70<AL≤80	80<AL≤87
RAS-3HVRNE	0.4	0.8	1.3	-	-	-
RAS-4H(V)RNE	0.6	1.2	1.8	2.4	3.0	3.4
RAS-5H(V)RNE	0.6	1.2	1.8	2.4	3.0	3.4
RAS-6HRNE	0.6	1.2	1.8	2.4	3.0	3.4
RAS-3HN(V)E	0.6	1.2				
RAS-4HN(V)E	0.6	1.2				
RAS-5HN(V)E	0.6	1.2				

(Unit: Kg)



Sample of a RAS-4HVRNE Twin System:

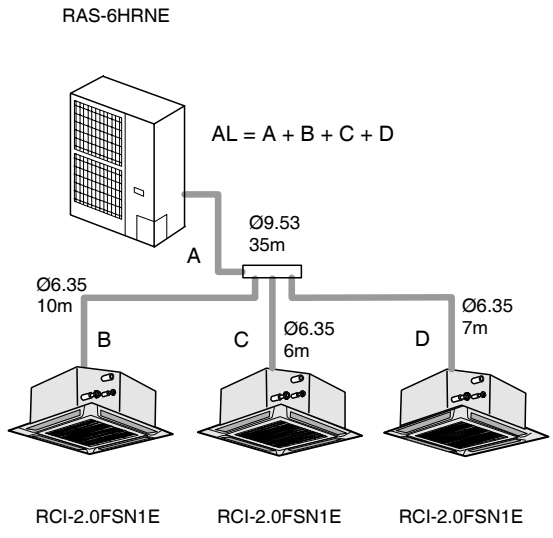
Total Piping length of the system (AL):	55 m
Total Additional Charge for (AL) is W1:	1.80 Kg
Outdoor Unit Factory Charge Wo :	3.60 Kg
Total Ref. Charge of this System:	5.40 Kg

■ Triple System

RAS-6HRNE

O/U Model	Actual Piping Length: AL(m)						
	30<AL≤40	40<AL≤50	50<AL≤60	60<AL≤70	70<AL≤80	80<AL≤87	90<al<99
RAS-6HRNE	0.9	1.5	2.3	2.7	3.3	3.9	4.5

(Unit: Kg)



Sample of a RAS-6HRNE Triple System:

Total Piping length of the system (AL):	48 m
Total Additional Charge for (AL) is W1:	1.5 Kg
Outdoor Unit Factory Charge Wo :	3.6 Kg
Total Ref. Charge of this System:	5.1 Kg

9.6.2. ADDITIONAL REFRIGERANT CHARGE CALCULATION FOR RAS-8~12HP

■ Single, Twin, Triple and Quad System

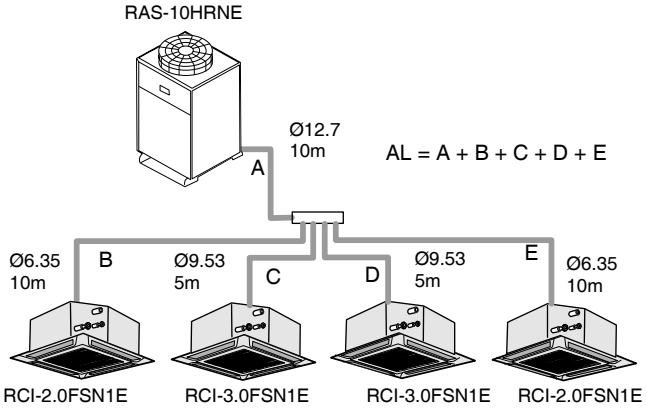
For RAS-8~12 Hp, determine the Total Additional Refrigerant Charge Amount following the formula bellow:

W = [W_1] + [W_2] - [P] = [Kg]

W_1 = Additional Charge according to the Liquid Piping diameter of the System.
W_2 = Quantity of indoor units which require additional refrigerant charge.
P= Correction Factor according to the Outdoor Unit (Hp).

■ Example of Calculation in a RAS-10HRNE Quad System:

- Diagram:



- Calculation of Additional Charge according to the Liquid Piping diameter of the System - (W_1).

Pipe Diameter	Total Piping Length	Additional Charge (kg)	
∅ 12.7	10	x 0.12	= 1.2
∅ 9.53	5+5	x 0.07	= 0.7
∅ 6.35	10+10	x 0.03	= 0.6
Actual system	Additional Charge W_1		= 2.5kg

- Determine the number of indoor units which require the additional refrigerant charge - (W_2).

Indoor Unit (HP)	Add. Charge (W_2)
1.5~6.0	0 Kg
8.0/10.0	1.0 Kg

- Correction Factor according to the Outdoor Unit - (P).

Outdoor Unit (HP)	Correction Factor (P)
RAS-8 Hp	1.6 Kg
RAS-10 Hp	2.0 Kg
RAS-12 Hp	2.0 Kg

ATTENTION:
Is not necessary to add or to extract refrigerant if calculation value is smaller than the standard refrigerant quantity (P).

- Calculation of Total Additional Charge Amount (W kg)

Total Q'ty of Additional Charge W = W1 + W2 – P

W= [2.5] + [0] - [2.0] = [0.5 Kg]

10 ELECTRICAL WIRING

This chapter describes the Electrical Wiring Connection and shows how to set the Dip Switches and the H-Link System of the new Hitachi UTOPIA H(V)RNE / HN(V)E series

CONTENTS

10.1 GENERAL CHECK

ATTENTION:

- *Turn OFF the main power switch to the indoor unit and the outdoor unit 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 or other small animals may gnaw at unprotected parts and at the worst, a fire will occur.*
- *Avoid the wires from touching the refrigerant pipes, plate edges and electrical parts inside the unit. Otherwise, the wires will be damaged and at the worst, a fire will occur.*

CAUTION:

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

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

NOTE:

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

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 electrical data given in this technical catalog. 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. If the power source capacity is too low, the system cannot be started 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.

10.2 SETTING OF DIP SWITCHES FOR OUTDOOR UNIT

- Quantity and Position of Dip Switches
  RAS-(2~6)H(V)RNE
  The PCB in the outdoor unit is operated with 5 types of dip switches and 3 types of push switch.
- RAS-(2.5~5)HN(V)E
  The PCB in the outdoor unit is operated with 4 types of dip switches and 1 type of push switch
- RAS-(8~12)HRNE
  The PCB in the outdoor unit is operated with 8 types of dip switches and 3 types of push switch.

NOTE:

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

Only for RAS-(8~12)HRNE

By using DSW4 and 5 the unit is started or stopped after 10 to 20 seconds after the switch is operated.

CAUTION:

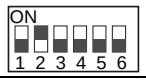
Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

■ RAS-(2~6)H(V)RNE

DSW1: Test run
Setting is required as indicated in chapter 3 Service Manual SMGB0036.

Setting Before shipment	

DSW2: Optional function setting
Setting is required as indicated in chapter 3 Service Manual 0036.

Setting before shipment	

DSW3: Capacity
Setting is required as indicated in chapter 3 Service Manual SMGB0036.

DSW4: Refrigerant cycle nº settings
Setting is required as indicated in chapter 3 Service Manual SMGB0036.

Cycle No. 0

Setting Before shipment	

DSW5: Transmitting setting
Setting is required for cancellation of end resistance and fuse protection as indicated in chapter 3 Service Manual 0030

Before shipment, No. 1 pin of DSW5 is set at ON side	

Push switch

Manual defrosting	PSW1
For Checking	PSW2 PSW3

■ RAS-(2.5~5)HN(V)E

DSW1: Test operation and options function settings
Setting is required as indicated in chapter 3 Service Manual SMGB0036.

Setting Before shipment	

DSW3: Capacity
.Setting is required as indicated in chapter 3 Service Manual SMGB0036.

DSW4: Refrigerant cycle nº settings
.Setting is required as indicated in chapter 3 Service Manual SMGB0036.

Cycle No. 0

Setting Before shipment	

DSW5: Transmitting setting
Setting is required for cancellation of end resistance and fuse protection as indicated in chapter 3 Service Manual 0036

Before shipment, No. 1 pin of DSW5 is set at ON side	

Push switch

Manual defrosting	PSW1

■ RAS-(8~12)HRNE

DSW1: Refrigerant cycle no. setting
Setting is required if H-Link is used. Setting position before shipment are all OFF (Refrigerant cycle No. 0). In the same Refrigerant Cycle set the same refrigerant cycle no. for the outdoor unit and for the indoor units as shown in chapter 3 Service Manual 0036.

Cycle No. 0

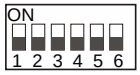
Setting Before shipment	

DSW2: Capacity settings
Not setting is required. Each outdoor unit is set before shipment as shown in chapter 3 Service Manual 0036.

DSW3: High difference
Setting is required as indicated in chapter 3 Service Manual 0036

Setting before shipment	

DSW4: Test Operation & Service Settings
Setting is required. This dip switch is utilized for servicing as indicated in chapter 3 Service Manual 0036.

Setting before shipment	

DSW5: Compressor Emergency Operation
Setting is not required. All compressor are running except compressor selected as indicated in chapter 3 Service Manual 0036.

Before shipment	

DSW6: Piping Length
Setting is required. Set the dip switch according to your requirements, as indicated in chapter 3 Service Manual 0036.

Before shipment and length < 25 m	

DSW7: Power Supply Setting
Setting is required. Set the dip switch according to your requirements, as indicated in chapter 3 Service Manual 0036.

Before shipment (380 V)	

DSW10: Transmitting Setting
Setting is required for cancellation of end resistance and fuse protection as indicated in chapter 3 Service Manual 0036

Before shipment, No. 1 pin of DSW10 is set at ON side	

Push switch

Manual defrosting	PSW1
For Check	PSW2 PSW3

10.3 SETTING OF DIP SWITCHES FOR INDOOR UNIT

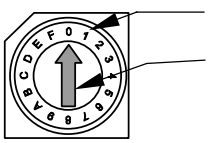
Quantity and Position of Dip Switches

The PCB in the indoor unit is operated with 5 types of dip and rotary switch.

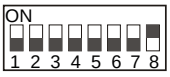
NOTE:
The mark "■" indicates position of dips switches. Figures show setting before shipment..

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.

RSW: Unit No. Setting
Setting is required. Set the unit No. of all indoor units respectively and serially, by following setting position shown in chapter 9. Numbering must start from "1" for every outdoor unit.



DSW2: Optional Functions Setting (Only RPK FSNM)
No setting is required. This switch is utilized for setting the optional functions as indicated in chapter 3 Service Manual 0036.

Setting before shipment	

DSW3: Capacity Code Setting
No setting is required, due to setting before shipment. This dip switch is utilized for setting the capacity code which corresponds to the Horse Power of the indoor unit as indicated in chapter 3 Service Manual 0036.

DSW5: Refrigerant Cycle No. Setting
Setting is required. Setting position before shipment are all OFF (Refrigerant cycle No. 0). In the same refrigerant cycle, set the same Ref. cycle number for the Outdoor Unit and for the Indoor Units as indicated in chapter 3 Service Manual 0036.

Setting before shipment	

DSW6: Unit Model Code Setting (Not available for RCI, RCIM and RPK)
No setting is required. This switch is utilized for setting the model code which corresponds to the indoor unit type as indicated in chapter 3 Service Manual 0036.

DSW7: Fuse Recover and Remote Control Selection
Setting required for fuse recover or PC-2H2 selection as indicated in chapter 3 Service Manual 0036.

Setting before shipment.	

Setting before shipment. (RPK-FSN1M)	

DSW8: Not used (RCI, RCIM only)

Setting before shipment.	

SSW: Remote Control System (except RPK, RCD)

	New	Old
PC-P1HE Before Shipment.	■	
PC2H2 (see DSW7)		■

10.4 COMMON WIRING

10.4.1 ELECTRICAL WIRING BETWEEN INDOR UNT AND OUTDOOR UNIT

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

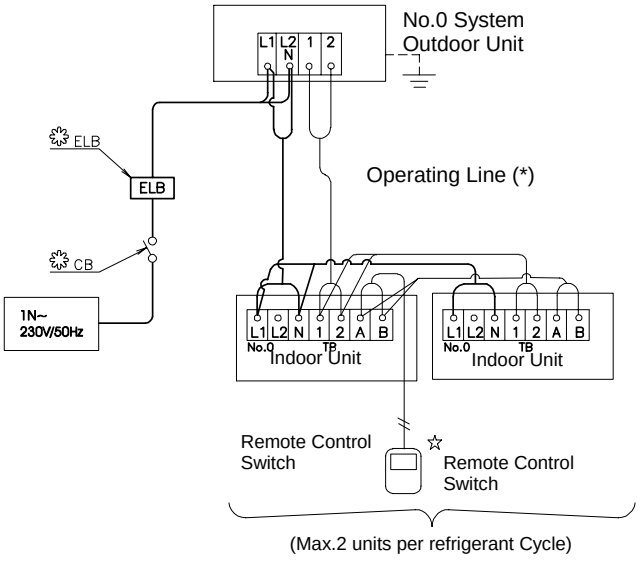
- Follow local codes and regulations when performing electrical wiring.
- If the refrigerant piping and the control wiring are connected to the units in the same refrigerant cycle.
- Use shielded twisted pair cable or twisted cable (more than 0.75 mm²) for operation wiring between outdoor unit and indoor unit, and operation wiring between indoor unit and indoor unit.
- Use 2-core wire for the operating line (Do not use wire with more than 3 cores).
- Use shielded wires for intermediate wiring to protect the units from noise obstacle at length of less than 300 m and size complied with local code.
- Open a hole near the connection hole of power source wiring when multiple outdoor units are connected from one power source line.
- The recommended breaker sizes are shown in Table of electrical data and recommended Wiring, Breaker Size/1 O.U.
- In the case that a conduit tube for field-wiring is not used, fix rubber bushes with adhesive on the panel.

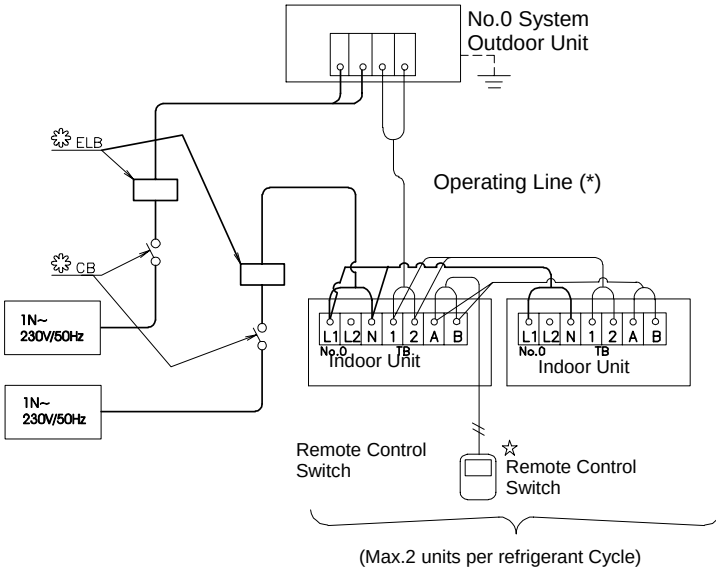
All the field wiring and equipment must comply with local and international codes.

ATTENTION:
Pay attention to the connection of the operating line. Incorrect connection may cause the failure of PCB

■ RAS-(2~5)HVRNE/HNVE

Models: RAS-2HVRNE
RAS-2.5HVRNE / HNVE
RAS-3HVRNE / HNVE
RAS-.4HVRNE / HNVE
RAS-5HVRNE / HNVE





TB : Terminal Board
PCB : Printed Circuit Board
—— : Field Wiring
- - - : Field Wiring
: Field-Supplied
☆ : Optional Accessory
ELB: Earth Leakage Breaker
CB: Circuit Breaker

Table for the connection of terminals

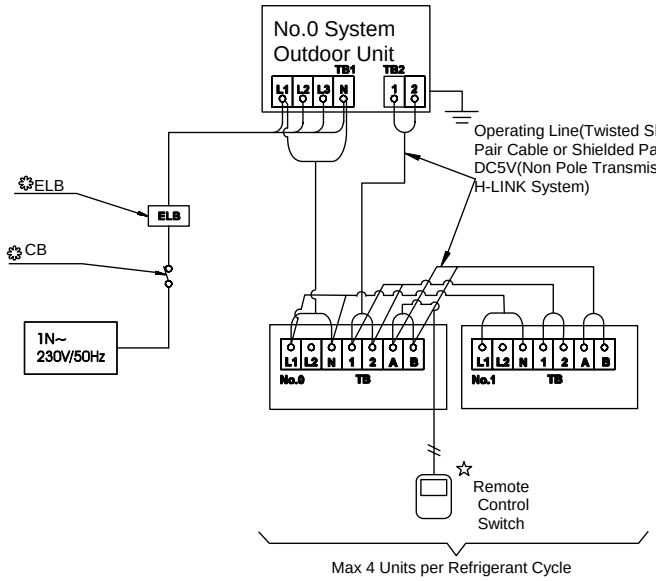
Wiring	[Connection (Connection of Terminals)]
Power Supply	[O.U.-O.U.(L1-L1, L2-L2, L3-L3, N-N)]
	[I.U.-I.U.(L1-L1, N-N)]
Operating	[O.U.-I.U., I.U.-I.U.(1-1, 2-2)]
Remote Control switch	R, CS-IV, IV-IV, A-A. B-B

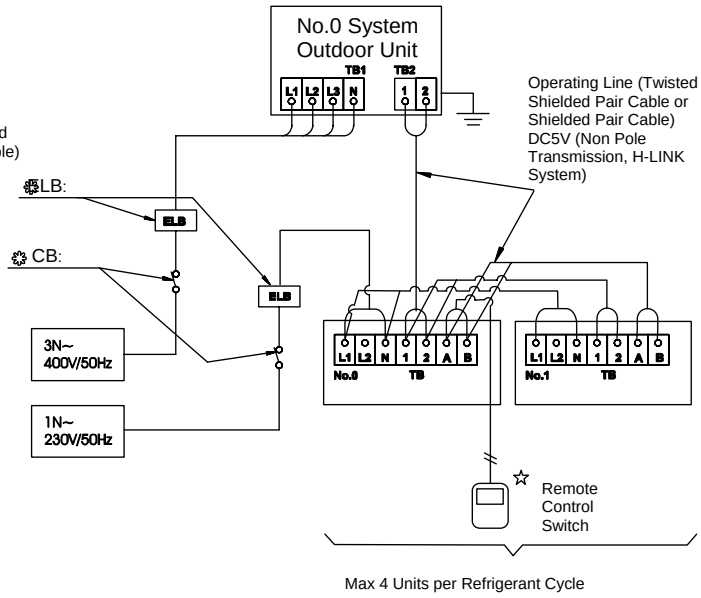
O.U.: Outdoor Unit, I.U.: Indoor unit

NOTE:
Make sure that the unit is grounded before connecting the power source.
If the unit is not grounded, the fan stops and the system issues alarm 02 after turning the main switch on.

■ RAS-(2.5~12)HRNE / HNE

Models: RAS-2.5HRNE / HNE
RAS-3HRNE /HNE
RAS-4HRNE / HNE
RAS-5HRNE / HNE
RAS-6HRNE
RAS-8HRNE
RAS-10HRNE
RAS-12HRNE





TB :Terminal Board
CB : Circuit Board
ELB : Field Wiring
—— : Field Wiring
—— : Field-Supplied
: Optional Accessory
☆ : Earth Leakage breaker

ELB: Earth Leakage Breaker
CB: Circuit Breaker

Table for Terminal Connection:

Wiring	[Connection (Connection of Terminals)]
Power Supply	[O.U.-O.U.(L1-L1, L2-L2, L3-L3, N-N)]
	[I.U.-I.U.(L1-L1, N-N)]
Operating	[O.U.-I.U., I.U.-I.U.(1-1, 2-2)]
Remote Controller	R, CS-IV, IV-IV, A-A. B-B

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

NOTE:

Make sure that the unit is grounded before connecting the power source.
If the unit is not grounded, the fan stops and the system issues alarm 02 after turning the main switch on.

10.4.2 WIRE SIZES

- Electrical Wiring Connection
  Field Minimum Wire Sizes for Power Source

INDOOR UNITS:

Model	Power Source	Max. Current	Power Source Cable Size		Transmission Cable Size	
			EN60 335-1 ❶	MLFC ❷	EN60 335-1 ❶	MLFC ❷
All indoor units (*)	230V/1ϕ/50Hz	5 A	0.75 mm²	0.5 mm²	0.75mm²	0.5mm²
RPI-8~10FSNE		10 A	1.5 mm²	0.75 mm²		

OUTDOOR UNITS:

Model	Power Source	Max. Current	Power Source Cable Size		Transmission Cable Size	
			EN60 335-1 ❶	MLFC ❷	EN60 335-1 ❶	MLFC ❷
RAS-2HVRNE	230V/1ϕ/50Hz	21 A	2.5 mm²	2.0 mm²	0.75mm²	0.5mm²
RAS-2.5HVRNE		21 A	2.5 mm²	2.0 mm²		
RAS-3HVRNE		21 A	2.5 mm²	2.0 mm²		
RAS-4HVRNE		28 A	4.0 mm²	3.5 mm²		
RAS-5HVRNE		29 A	4.0 mm²	3.5 mm²		
RAS-2.5HNVE		18 A	2.5 mm²	2.0 mm²		
RAS-3HNVE		21 A	2.5 mm²	2.0 mm²		
RAS-4HNVE		30 A	4.0 mm²	3.5 mm²		
RAS-4HRNE	400V/3ϕ/50Hz	11 A	2.5 mm²	2.0 mm²		
RAS-5HRNE		15 A	2.5 mm²	2.0 mm²		
RAS-6HRNE		15 A	2.5 mm²	2.0 mm²		
RAS-8HRNE		14 A	2.5 mm²	2.0 mm²		
RAS-10HRNE		17 A	2.5 mm²	2.0 mm²		
RAS-12HRNE		17 A	2.5 mm²	2.0 mm²		
RAS-2.5HNE		6 A	2.5 mm²	2.0 mm²		
RAS-3HNE		8 A	2.5 mm²	2.0 mm²		
RAS-4HNE		11 A	2.5 mm²	2.0 mm²		
RAS-5HNE		14 A	2.5 mm²	2.0 mm²		

The above wire sizes marked with ❶ are selected at the maximum current of the unit according to the European Standard, EN60 335-1.
The above wire sizes marked with ❷ are selected at the maximum current of the unit according to the wire, MLFC (Flame Retardant Polyflex Wire) manufactured by HITACHI Cable Ltd. Japan.

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

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

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

NOTE:
Follow local codes and regulations when selecting field wires, Circuit breakers and Earth Leakage breakers
Use wires that are not lighter than the ordinary polychloroprene sheathed flexible cord (code designation H05RN-F)
The earth cable size complied with local code: IEC 245, No. 571.

■ Main switches protection

Select the main switches according to the next table

INDOOR UNITS:

Model	Power Source	Max. Current	CB	ELB no. poles/A/mA
All indoor units	230V/1ϕ/50Hz	5 A	6 A	2/40/30
RPI-8~10FSNE		10 A	15 A	

ELB: Earth leakage breaker
CB: Circuit breaker

OUTDOOR UNITS:

Model	Power Source	Max. Current	CB	ELB no. poles/A/mA
RAS-2HVRNE	230V/1ϕ/50Hz	21 A	25 A	2/40/30
RAS-2.5HVRNE		21 A	25 A	
RAS-3HVRNE		21 A	25 A	
RAS-4HVRNE		28 A	32 A	
RAS-5HVRNE		29 A	32 A	
RAS-2.5HNVE		18 A	20 A	
RAS-3HNVE		21 A	25 A	
RAS-4HNVE		30 A	32 A	
RAS-4HRNE	400V/3ϕ/50Hz	11 A	16 A	4/40/30
RAS-5HRNE		15 A	20 A	
RAS-6HRNE		15 A	20 A	
RAS-8HRNE		14 A	16 A	
RAS-10HRNE		17 A	20 A	
RAS-12HRNE		17 A	20 A	
RAS-2.5HNE		6 A	10 A	
RAS-3HNE		8 A	10 A	
RAS-4HNE		11 A	16 A	
RAS-5HNE		14 A	16 A	

ELB: Earth leakage breaker
CB: Circuit breaker

10.5 H-LINK SYSTEM

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

1. Application

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

The CS-NET is a complementary software that provides a total centralized control over the system.

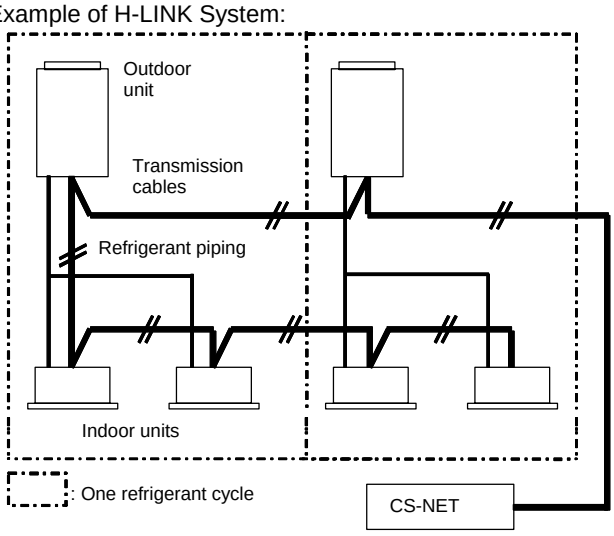
The H-LINK system can be applied to the following models.

Indoor unit	Outdoor unit
RCI RCIM RCD RPI RPK RPF RPFI RPC	RAS-H(V)RNE RAS-HN(V)E

2. Features

- The total wiring length is remarkably reduced.
- Only one (1) connection is required for the wiring between the indoor unit and outdoor unit.
- The wiring connection to the complementary central controllers devices is easy.

Example of H-LINK System:



3. Specifications:

- Transmission cable: 2-Wires.
- Polarity of Transmission cable: Non-Polar Wire.
- Maximum quantity of Outdoor Units that can be connected: 16 Units per H-LINK System.
- Maximum quantity of Indoor Units that can be connected: 4 Units per cycle and 64 Units per H-LINK System.
- Maximum wiring length: total 1000m (including CS-NET).
- It is possible to increase the maximum wiring length up to 5000 m by using up to four units PSC-5HR. (Refer to subchapter 10.6).
- Recommended cable: shielded twisted pair cable, over 0.75mm² (Equivalent to KPEV-S).
- Voltage: 5V DC.

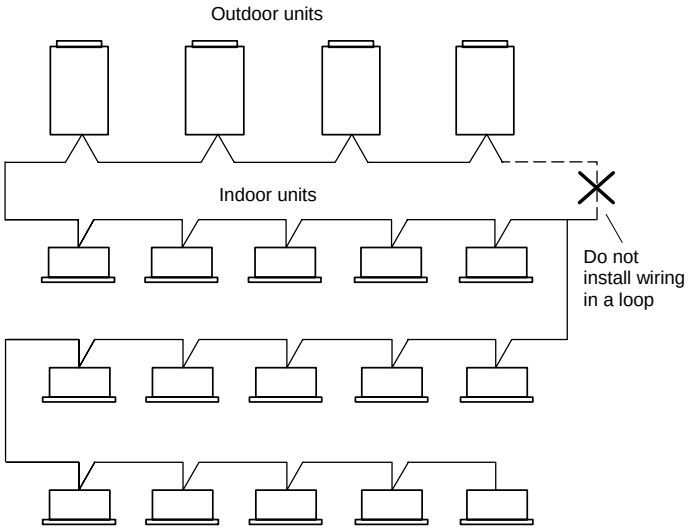
NOTE:
For the H-LINK System you must use Twisted Shielded Pair Cable or Shielded Pair Cable.

10.5.1 H-LINK CASES OF USINGS:

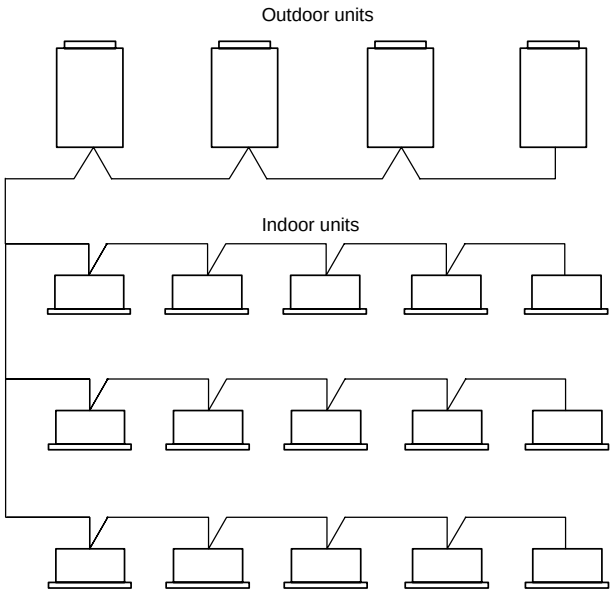
There are two typical cases of using H-LINK System:

(A) Using H-LINK System for the air conditioning systems without a central control device (CS-NET or PSC-5S).

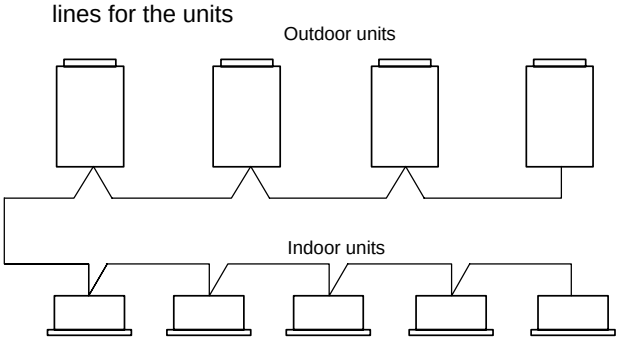
– Line Connection with all units (including Utopia and/or Set-Free, Mini Set-Free and DC Inverter)



- Line connection for each floor



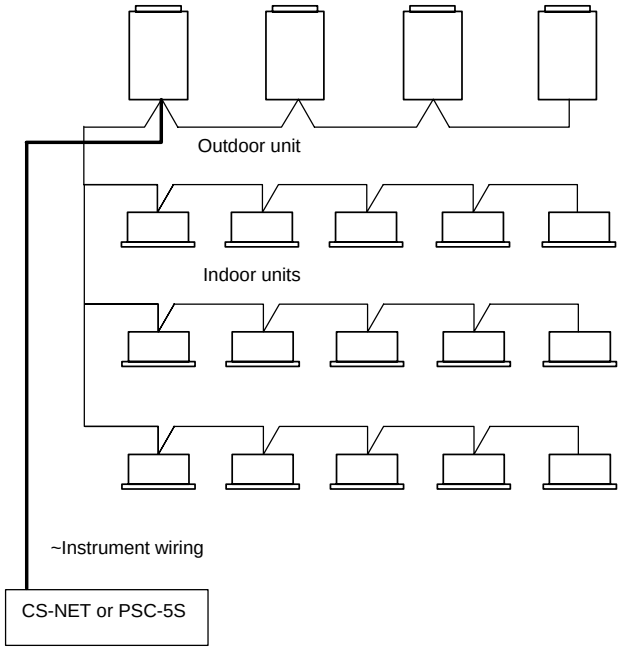
- Connection with one main line and with the branch lines for the units



(B) Using H-LINK System for the air conditioning systems with a central control device (CS-NET or PSC-5S).

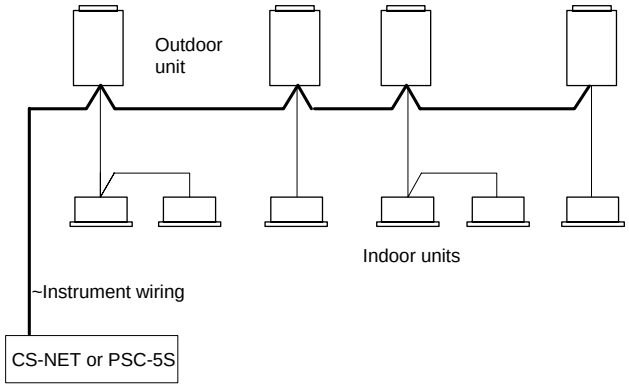
- In case that the central control device is applied when electrical wiring is performed:

  In this case, the CS-Net Wiring could be connected at any point of the H-Link wiring. In the example is connected to an Outdoor Unit.



- In case that the central control device is not applied when electrical wiring is performed.

  In this case, you must connect the H-Link Wiring to all the systems. Usually, to connect the Outdoor Units is the easiest implementation.



NOTE:

The maximum quantity of units to be connected is 16 outdoor units and 64 indoor units (including Utopia and/or Set-Free, Mini Set-Free and DC Inverter)

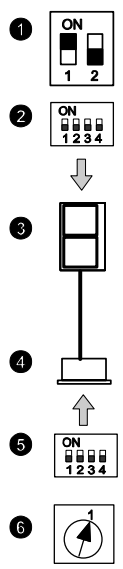
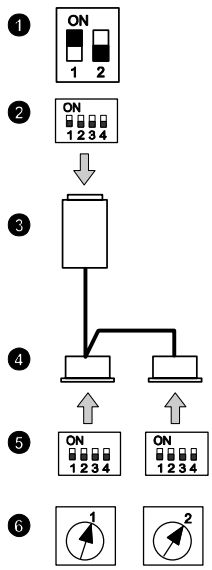
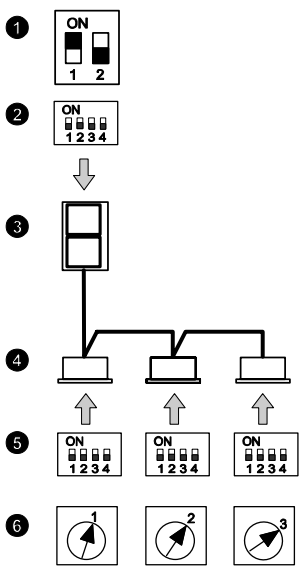
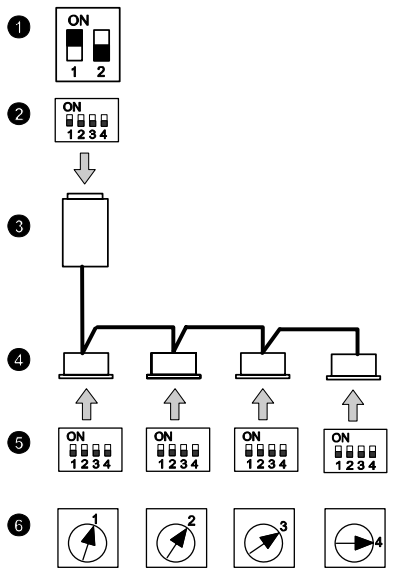
Do not make a wiring in a loop.

In the case that H-LINK is not applied when electrical wiring is performed, as shown above, H-LINK is applied after the instrument wiring is completed. Therefore, the dip switches are required to be set according to "Setting of Dip Switches on PCB".

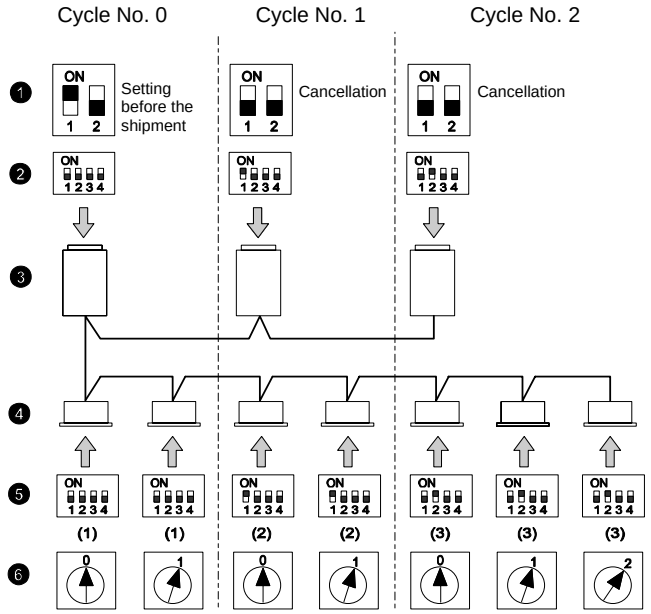
10.5.2 DIP SWITCH SETTING:

It is required to set Dip Switches of every indoor unit and outdoor unit

- 1. Dip Switch Setting when H-Link is not applied to the Indoor unit and Outdoor unit combination according to the system:

SINGLE	TWIN	TRIPLE	QUAD
			

- 2. Dip Switch Setting when H-Link is applied to the Indoor unit and Outdoor unit combination



Mark	Description
❶	DSW10 (end terminal resistance)
❷	DSW1 (refrigerant cycle)
❸	Outdoor unit
❹	Indoor units
❻	DSW5 (refrigerant cycle)
❼	RSW (address of indoor unit)

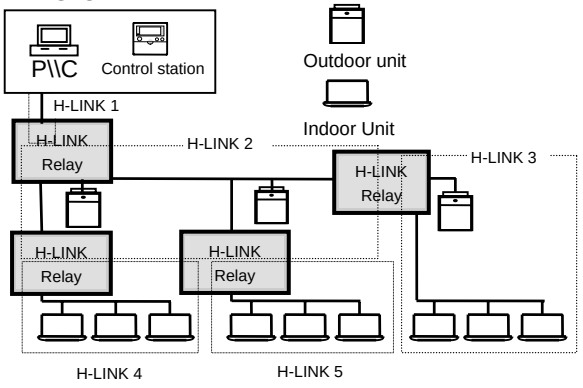
10.6 PSC-5HR

1. Installation of PSC-5HR

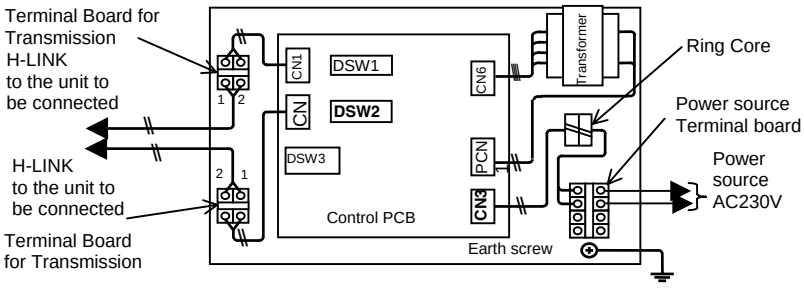
   Refer to "Installation & Operation Manual of PSC-5HR (PMML 0094A)" for details concerning the safety summary and the installation work.

2. Electrical wiring

■ SYSTEM



3. Internal layout



NOTE:

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

CAUTION:

- *Make sure that the power source voltage is correct.*
- *An incorrect wiring may cause a breakdown of the transformer PSC-5HR or the units*
- *Especially, DO NOT connect the power source to the terminal board for transmission.*
- *DO NOT install the H-LINK wires along the power supply wire, other signal wires, and others. If you install the H-LINK wires along those wires, there may be a malfunction due to the electrical noise. If you need to install the H-LINK wires near those wires, provide a distance of 15 cm or more. Or alternatively, insert the wires into the steel pipe and ground one end of the pipe.*

11 AVAILABLE OPTIONAL FUNCTIONS

This chapter gives a brief explanation of the available optional functions for the new Hitachi UTOPIA H(V)RNE / HN(V)E Series and Accessories.

CONTENTS

11.1. INDOOR UNITS AVAILABLE OPTIONAL FUNCTIONS

In the table bellow there is some information about the optional functions for UTOPIA H(V)RNE/HN(V)E Series, for more information check the Service Manual, code 0036 Chapter 6.

Optional function	Useful explanation	RCI	RCIM	RCD	RPC	RPI	RPK	RPF	RPFI
Remote Control ON/OFF Function	This function provides a control to stop and start 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.	O	O	O	O	O	O	O	O
Cancellation of Commands from Remote Control Switch After Forced Stoppage	This function stops the indoor unit and cancels the commands from the remote controller while it is activated.	O	O	O	O	O	O	O	O
Cooling or Heating Operation mode setting	This function provides a control to change the operation mode from a remote place.	O	O	O	O	O	O	O	O
Control By Field-Supplied Room Thermostat	This function allows take control to the unit by an external thermostat. This could reduce the problems due to stratification of indoor air.	O	O	O	O	O	O	O	O
Remote Temperature Sensor Control	Instead of using the Inlet Air Thermistor to control the unit, it is using the average between the Inlet Air Thermistor and the Remote Temperature sensor.	O	O	O	O	O	O	O	O
Pick Up Signals	This function allows to give up information about how is working the unit in order to activate the necessary devices.	O	O	O	O	O	O	O	O
Automatic Operation when Power Supply ON	This function retains the settings of the unit if power supply is interrupted. The unit will start when power is restored.	O	O	O	O	O	O	O	O
Restarting Function After Power Failure	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.	O	O	O	O	O	O	O	O

X Not available.
O Available.

11.2. OUTDOOR UNITS AVAILABLE OPTIONAL FUNCTIONS

Optional function	Useful explanation	RAS-(2~6) H(V)RNE	RAS-(2.5~5) HN(V)E	RAS-(8~12) HRNE
Fixing Operation Mode(Heating / Cooling)	This function fixes the operation mode, heating or cooling. If indoor unit is set on Heating (Cooling) mode when Cooling (Heating) mode is fixed, the indoor unit will be Thermo-OFF.	X	X	O
Demand	When this function is activated the compressor is stopped and the indoor units are put under Thermo-OFF condition.	O	O	O
Snow Sensor	This function operates all the outdoor fans at full speed during compressor stoppage if it detects the snow sensor is covered.	X	X	O
Enforced stoppage	This function produces and emergency stoppage, compressor and indoor fans do not operate.	X	X	O
Defrosting Condition Change Over	This function changes the defrosting operation conditions. It is specially interesting for cold areas.	O	O	O
Defrosting after stoppage	Even in case of heating stoppage, defrost will be performed	X	O	X
Defrosting signal output	This function gives output signal during defrost	O	O	X
Demand Current Control	This function regulates Outdoor running current, 60%, 70%, 80% or 100%, if demanded current is above set current the indoor unit capacity is reduced still thermo off if needs	X	X	O
Indoor Unit Fan Control During Thermo-OFF at Heating	This function activates the Indoor fans as a cycle (2 min ON, 6 min OFF) in order to reduce the unpleasent aspects of Indoor Thermo-OFF working conditions.	X	X	O
Cancellation of Outdoor Ambient Limit of Heating	This function allows to work in Heating Mode without top ambient temperatures restriction.	X	X	O
Cancellation of Outdoor Ambient Limit of Cooling	This function allows to work in Cooling Mode without low ambient temperatures restriction.	X	X	O
Night Shift (Low Sound) Operation	This function decreases the sound levels of the units, and the cooling capacity is also decreased.	O	X	O
Slow Defrost setting	When this function is activated the indoor fan speed at defrost mode is change to slow instead of stopped.	O	O	O
Cancellation of Outdoor Hot-Start Limit	This function allows to start the Outdoor unit without waiting the Temperature of compressor is bigger than 40ºC	X	X	O
Long piping Setting	This function indicates to the unit the distance between the Outdoor and the farthest indoor unit is bigger than 100 m.	X	X	O
R407C Piping	By using conventional R407C piping instead of R410A, piping pressure will be increased. To avoid pressure, this function will activate.	O	O	X
Low Noise Setting	This function reduces the maximum speed of the fan motor, consequently the noise level is reduced.	X	X	O
Pick Up Signals	This function allows to give up information about how is working the unit in order to activate the necessary devices	X	X	O
Energy saving operation	When tis function is activated the compressor is worked with low frequencies.	O (standard)	X	X
Release ambient temperature limit	This function allows to increase the limit outdoor temperature in cooling and heating mode	O	O	X
Simultaneous Defrost Prevention	This function avoids simultaneous Defrost in H-Link.	O	X	X

X Not available.
O Available.

11.3. REMOTE CONTROLLERS AVAILABLE OPTIONAL FUNCTIONS

■ PC-P1HE and PC-P5H

Items	Optional Functions	Setting Condition	Contents	Description
b1	Removal of Heating Temperature Calibration	00 01	Not Available Available	This function is used to eliminate the 4 ºC shift.
b2	Indoor fan control during thermo-off at heating	00 01	Not Available Available	This function is to avoid the stratification of air.
b3	Enforced 3 Minutes Minimum Operation Time of Compressor	00 01	Not Available Available	This function is used to guard the compressor when it frequently starts and stops
b4	Change of Filter Cleaning Time	00 01 02 03 04	Standard 100 hours 1200 hours 2500 hours Not Indication	With this function is possible to change the time when the remote controller advise about when is necessary to change the air filter.
b5	Fixing of Operation Mode	00 01	Not Available Available	This function eliminates the possibility of changing operation mode.
b6	Fixing of Setting Temperature	00 01	Not Available Available	This function eliminates the possibility of changing setting temperature.
b7	Fixing of Operation as Exclusive Cooling Unit	00 01	Not Available Available	This function eliminates Heating mode.
b8	Automatic COOL/HEAT Operation	00 01	Not Available Available	This function changes automatically from Cool to Heat operation
b9	Fixing of Air Volume	00 01	Not Available Available	This function eliminates the possibility of changing fan speed.
C1	Not prepared			
C2	Not prepared			
C3	Not prepared			
C4	Drain Pump in Heating	00 01	Not Available Available	This function is used to activate the drain pump in Heating mode.
C5	Static Pressure Selection	00 01 02	Medium Static Pressure (Factory Setting) Hi Static Pressure Low Static Pressure	This function is used to change the static pressure levels from the remote controller on the RPI units.
	Increasing Fan Speed (RCI, RCIM, RCD)	00 01 02	Normal Increasing speed 1 Increasing speed 2	This function is used to change the fan speed due to the high ceiling.
C6	Hi Speed at Heating Thermo-OFF	00 01	Not Available Available	This function is used to increase the fan speed when Thermo-OFF
C7	Cancelling of Enforced 3 Minutes Minimum Operation Time of Compressor	00 01	Not Available Available	This function is used to cancel the “Enforced 3 Minutes Minimum Operation Time of Compressor”
C8	Thermistor of Remote Control Switch	00 01 02	Control by Indoor Suction Thermistor Control by Thermistor of Remote Control Switch Control by Average value of Indoor Suction Thermistor and Thermistor of Remote Control Switch	This function is used to control the unit with the thermistor of remote control.
C9	Not prepared			
CA	Not prepared			
Cb	Selection of Forced Stoppage Logic	00 01	Forced Stoppage Input A Contact Forced Stoppage Input B Contact	With this function we select the forced stoppage logic.
CC	Not prepared			
d1	Power Supply ON/OFF 1	00 01	Not Available Available	This function retains the settings of the unit if power supply is interrupted. The unit will start when power is restored.
d2	Not prepared			
d3	Power Supply ON/OFF 2	00 01	Not Available Available	This function retains the settings of the unit if power supply is interrupted. The unit will restart when power is restored if the unit was ON before the power failure
F1	Automatic Setting for OFF Timer	00 01 02 23 24	No Function OFF Timer by 1 Hour OFF Timer by 2 Hour OFF Timer by 23 Hours OFF Timer by 24 Hours	This function is used to set the OFF timer function automatically when the unit is started by the remote control switch.
F2	Remote Control Main-Sub Setting	00 01	Main Sub	This function is used when to remote control are installed in one system.

■ PSC-5S

Items	Optional Functions	Setting Condition	Contents	Description
A	Fixing Operation Mode	Set *"Nothing showed"*	Available Not Available	This function eliminates the possibility of changing operation mode. Same Optional Function sould be selected by RCS This option affects on PSC-5S setting issues only.
b	Fixing Setting Temperature	Set *"Nothing showed*	Available Not Available	This function eliminates the possibility of changing setting temperature. Same Optional Function sould be selected by RCS This option affects on PSC-5S setting issues only.
c	Fixing Cooling Only	Set *"Nothing showed*	Available Not Available	Same Optional Function sould be selected by RCS This option affects on PSC-5S setting issues only.
d	Fixing Fan Speed	Set *"Nothing showed*	Available Not Available	Same Optional Function sould be selected by RCS This option affects on PSC-5S setting issues only.
E	Automatic COOL/HEAT Operation	Set *"Nothing showed*	Available Not Available	This function changes automatically from Cool to Heat operation. If not available from RCS this function will not work.

■ CS-NET

Items	Optional Functions	Setting Condition	Contents	Description
~	Historical Data	~	~	CS-Net generate a file with this information for a data consulting.
~	Power Consumtion	~	~	
~	Automatic COOL/HEAT Operation	~	~	This function changes automatically from Cool to Heat operation.
~	Fixing the Operation Mode	~	~	This function eliminates the possibility of changing operation mode in the Remote Controller.
~	Fixing Setting Temperature	~	~	This function eliminates the possibility of changing setting temperature in the Remote Controller.
~	Fixing of Air Volume	~	~	This function eliminates the possibility of changing fan speed in the Remote Controller.
~	Fixing the Run/Stop	~	~	This function eliminates the possibility of changing Run/Stop in the Remote Controller.
~	Fixing Setting Temperature Range	~	~	This function lets to limit the Temperature Range

"~ " Non Specific.

■ CS-NET WEB

Items	Optional Functions	Setting Condition	Contents	Description
~	Historical Data	~	~	CS-Net shows this information for a data consulting.
~	Power Consumtion	~	~	

"~ " Non Specific.

12 TROUBLESHOOTING

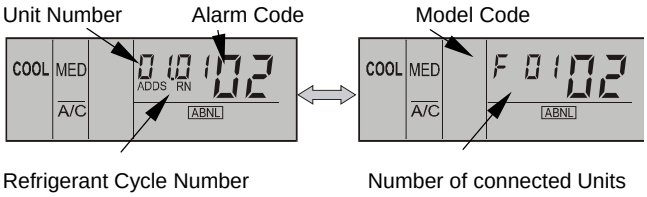
This chapter gives a concise description of the most common alarm codes of the new Hitachi UTOPIA H(V)RNE/HN(V)E Series.

CONTENTS

If RUN lamp flashes for 2 seconds, there is a failure in transmission between Indoor Unit and Remote Control Switch. Possible causes are:

Remote Cable broken
Contact Failure in Remote Control Cable
IC or Microcomputer defective
In any case, ask your contractor for service

If RUN lamp flashes 5 times (5 seconds) with unit number and alarm code displayed, note the alarm code (see table below) and ask your contractor for service.



12.1. ALARM CODES

Code No.	Category	Content of Abnormality	Leading Cause	RAS-(2~6) H(V)RNE	RAS-(2.5~5) HN(V)E	RAS-(8~12) HRNE
01	Indoor Unit	Tripping of Protection Device	Failure of Fan Motor, Drain Discharge, PCB, Relay.	O	O	O
02	Outdoor Unit	Tripping of Protection Device	Activation of PSH	O	O	O
03	Transmission	Abnormality between Indoor (or Outdoor) and Outdoor (or Indoor)	Incorrect Wiring. Failure of PCB. Tripping of Fuse. Power Supply OFF	O	O	O
04	Inverter	Abnormality between Inverter and Control PCB	Failure in transmission of fan controller	O	X	O
04.	Inverter.	Abnormality of Fan controller	Fan controller transmission failure	X	X	O
05	Transmission	Abnormality of Power Source Wiring	Reverse Phase Incorrect Wiring.	O	O	O
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.	O	X	O
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge. Expansion Valve Open Lock.	O	O	O
08		Increase in Discharge Gas Temperature	Insufficient Refrigerant. Ref. Leakage, Clogging or Expansion Valve Close Lock	O	O	O
09	Outdoor Unit	Tripping of Protection Device	Failure of Fan Motor.	X	X	O
11	Sensor on Indoor Unit	Inlet Air Thermistor	Failure of Thermistor, Sensor, Connection.	O	O	O
12		Outlet Air Thermistor		O	O	O
13		Freeze Protection Thermistor		O	O	O
14		Gas Piping Thermistor		O	O	O
19		Tripping of Protection Device for Fan Motor	Failure of Fan Motor	O	O	O
20	Sensor on Outdoor Unit	Top Compressor thermistor	Failure of Thermistor, Sensor, Connection	O	O	X
21		High Pressure Sensor		X	X	O
22		Outdoor Air Thermistor		O	O	O
23		Discharge Gas Thermistor on Comp.		X	X	O
24		Evaporating Thermistor		O	O	O
29		Low Pressure Sensor		X	X	O
31	System	Incorrect Setting of Outdoor and Indoor Unit	Incorrect Setting of Capacity Code.	O	O	O
32		Abnormal Transmission of Other Indoor Unit	Failure of Power Supply, PCB in other Indoor Unit. Failure of other Indoor Unit of the same Refrigerant Cycle	X	X	O
35		Incorrect Setting in Indoor Unit No.	Existence of the same Indoor Unit No. in the same Refrigerant Cycle	O	O	O
36		Incorrect Indoor unit Type	Indoor Unit is not for R407C, R410A	X	X	O
38		Abnormality of Protective Circuit in Outdoor Unit	Failure of Indoor Unit PCB. Incorrect wiring. Connection to PCB in Indoor Unit.	O	O	O
39		Abnormality of Running Current at Constant Compressor	Overcurrent, Blown Fuse of Failure of Current Sensor.	X	O	O

Code No.	Category	Content of Abnormality	Leading Cause	RAS-(2~6) H(V)RNE	RAS-(2.5~5) HN(V)E	RAS-(8~12) HRNE
41	Pressure	Overload Cooling (Possibility of high pressure)	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.	O	O	X
42		Overload Heating (Possibility of high pressure)	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.	O	O	X
43		Pressure Ratio Decrease Protection Activating	Failure of Compressor, Inverter	X	X	O
44		Low Pressure Increase Protection Activating	Overload to Indoor in Cooling. High Temperature of Outdoor Air In Heating Expansion Valve Open Lock	X	X	O
45		High Pressure Increase Protection Activating	Overload Operation. Excessive Refrigerant. Clogging of Heat Exchanger	X	X	O
46		High Pressure Decrease Protection Activating	Insufficient Refrigerant.	X	X	O
47		Low Pressure Decrease Protection Activating	Insufficient refrigerant .	O	X	O
51	Inverter	Abnormality of Current Sensor for Inverter	Failure of Sensor on Inverter PCB	O	X	O
52		Overcurrent Protection Activating	Failure of ISPM, Clogging of Heat Exchanger, Locked Compressor	O	X	O
53		ISPM Protection Activating	Automatic Stoppage of ISPM (Overcurrent, Low Voltage or Overheating).	O	X	O
54		Increase in Inverter Fin Temperature	Abnormal Inverter Fin Thermistor. Abnormal Outdoor Fan	O	X	O
55	ISPM	ISPM Abnormality	Failure of ISPM	O	X	X
56	Outdoor Fan	Abnormality of Detection for Fan Motor Position	Abnormal detection Circuit of Transmission	O	X	O
57		Fan Controller Protection Activating	Abnormal Fan Speed	O	X	O
58		Abnormality of Fan Controller	Overcurrent, Abnormal Fan Controller Fin	X	X	O
EE	Inverter	Compressor Protection	3 Time Occurrence of Alarm Giving Damage to Compressor within 6 hours	O	X	O

13 STANDARD SPECIFICATIONS

This chapter provides you with important requirements for the correct installation and use of the new Hitachi Utopia HN(V)E / H(V)RNE Series.

CONTENTS

UNIT - The unit shall be a multi-split system inverter-driven heat pump air conditioner for application with R410A refrigerant, and shall be composed of 4-way cassette type indoor units, or in-the-ceiling type indoor units, 2-way cassette type indoor units, ceiling type indoor units, wall type indoor units, floor type indoor units and an outdoor unit, with a distributed refrigeration cycle, electrical components and enclosing cabinets. Optional accessories shall also be provided upon customer request. The indoor unit shall be completely weather-proofed for outdoor installation. Both indoor unit and the outdoor unit shall be properly assembled, internally piped and wired, thoroughly tested, and charged with R410A refrigerant at the factory and shall comply with Japanese standardization statues.

CAPACITY - The total capacity of the multi-split system inverter-driven heat pump air conditioner shall be _____kcal/h or greater with _____ °C air inlet dry bulb, _____°C air inlet wet bulb, _____ °C outdoor air inlet temperature and _____ m^3/m. indoor air flow. The total compressor power inputs shall not exceed _____ kW. The total heating capacity of the split-type air conditioners shall be _____ kcal/h or greater, with _____ °C indoor heat exchanger inlet air dry bulb, _____ °C outdoor heat exchanger air inlet dry bulb, _____ °C outdoor heat exchanger air inlet wet bulb, and _____ m^3/min indoor air flow.
The total compressor power input shall not exceed _____kW.

INDOOR UNIT

CABINET - The cabinet shall be constructed of galvanized steel sheet or finished steel sheet, baked with synthetic resin-paint, with a plastic air panel assembly for cassette type unit, and be constructed of galvanized steel sheet for the in-the-ceiling duct type unit.

REFRIGERATION CYCLE - The refrigeration cycle shall be equipped with a heat exchanger, an electronic expansion valve, solenoid valves and flare connections.

INDOOR FAN AND FAN MOTOR - The indoor fan shall be the multi-blade centrifugal type, statically and dynamically balanced, and directly driven by a _____ W motor for model, _____ and a _____ W motor for model _____ . The fan motor bearing shall be permanently lubricated. The fan shall deliver _____ m^3/min air flow for model _____ and _____ m^3/min for model _____ at the nominal air flow. Three operating positions Hi, Me and Lo can be selected according to the required conditions.

INDOOR HEAT EXCHANGER - The heat exchanger shall be the multi-pass, cross-finned tube type. equipped with highly-efficient aluminum fins, mechanically bonded to seamless, oxygen-free copper tubes. The fins shall be spaced at no more than 12 fins per 25.4mm. The face area shall not be less than _____ m^2 for model _____ and _____ m^2 for model _____ . The coil shall be cleaned, dehydrated and tested for leakage at the factory.

OUTDOOR UNIT

CABINET - The cabinet shall be constructed of galvanized steel sheet, baked with synthetic resin-paint, The service panel shall be easily removable for service access to the electrical components and the compressor section.

REFRIGERATION CYCLE - Each refrigeration cycle shall be equipped with (a) scroll compressor (s), a solenoid valve, a heat exchanger, an accumulator, a 4-Way valve and flare connection parts.

COMPRESSOR PROTECTION - The compressor shall be protected against breakdown by a quick response overcurrent relay, a high pressure switch, a wrap-around type oil heater and a discharge gas thermistor.

OUTDOOR FAN AND FAN MOTOR - The outdoor fan(s) shall be the plastic propeller type, dynamically balanced, and the fan shall be directly driven by a _____ W motor for vertical-flow air discharge. The fan motor shall be permanently lubricated and be protected from ingress of water.

OUTDOOR HEAT EXCHANGER - The heat exchanger shall be the multi-pass, cross-finned tube type, equipped with highly-efficient aluminum fins, mechanically bonded to oxygen-free copper tubes. The coil shall be cleaned, dehydrated and tested for leakage at the factory.

CONTROL - All electrical control devices , shall be enclosed in the indoor and outdoor units.

In addition to the compressor protection devices , the indoor fan motor shall be equipped with an internal thermostat. The outdoor fan motor shall be protected by an internal thermostat. The indoor fan motor shall be directly supplied with the power source from the control circuit. The functions of these control devices shall compose an electrical sequence of manual starting and stopping, automatic continuous operation whenever the room thermostat requires, and the protection devices allow the operation.

CABINET - The cabinet shall be constructed of galvanized steel sheet.

REFRIGERATION CYCLE - The refrigeration cycle shall be equipped with solenoid valves and flare connections to changeover the cycle in mediating between outdoor unit and indoor unit

14 MISCELLANEOUS NOTES

This chapter gives you important details about the information given in the Technical Catalog of the new Hitachi Utopia HN(V)E / H(V)RNE Series.

CONTENTS

14.1 SPECIAL NOTES

1. Provide a service access door near the unit piping connection part on the false ceiling for the cassette type units.
2. 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. Cassette and Ceiling Types - Avoid unit installation in a room where the ceiling height (distance between the floor to the false ceiling) exceeds three meters. If the indoor unit is installed in a room with a ceiling higher than 3 meters, it is recommended to install an air circulation fan separately to obtain uniform air temperature in the room, especially during the heating operation.
3. Check to ensure that the ceiling slab is strong enough and that the false ceiling is flat and level.
4. Avoid obstacles which may restrict the air intake or the discharge flow.
5. Do not install the unit in a machinery shop or kitchen where vapor from oil or its mist can enter to the unit. The oil will deposit on the heat exchanger, thereby reducing the unit performance, and may deform, or in the worst case, break the plastic parts of the unit.
6. Pay attention to the following points when the unit is installed in a hospital or other facilities where electromagnetic wave is radiated from medical equipment.
   a. Do not install the unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
   b. Install the unit and its components as far as possible (at least three meters) from the electromagnetic wave radiator.
   c. Prepare a steel box and install the remote control switch in it. Prepare a steel conduit pipe and wire the remote control cable in it. Then, connect earth wire with the box and the pipe.
   d. Install a noise filter when the power supply emits harmful noise.
7. Do not install the units in an acid or alkaline environment due to the corrosive action on the heat exchanger. In the case that outdoor units are installed near the sea, it is recommended that optional corrosion-resistant type outdoor unit be used.
8. Do not install the units in an flammable environment due to the danger of an explosion.
9. Regarding cassette type indoor units, consider the direct and reflected sound level, when selecting the unit for spaces where extremely low sound is required.
10. During heating operation, the outdoor heat exchanger produces condensate dew or melting water from frost. Install the outdoor unit where drainage of such water is convenient, or provide a drain passage.
11. Heating Performance: The heating capacity normally decreases when outdoor temperatures decrease. Therefore, provide an auxiliary heating unit if outdoor temperatures are very low.
12. In the case that an outdoor temperature is low and humidity is high, the outdoor heat exchanger will covered with frost, resulting in lower heating capacity. In order to remove the frost, the unit is automatically changed to the defrosting mode. During this defrosting operation, the unit is stopped for approximately 3 to 10 minutes.
13. As this unit is of heat pump type by circulating hot air in the whole room space, it takes time to heat up the room temperature.
14. The operating sound data is based on an anechoic chamber. Therefore, the actual operating sound will be higher due to reflected sound from the floor and wall.
15. In the case that the unit is operated for a long time higher than the indoor temperature of 27°C DB or the humidity of 80%, dewing may occur on the cabinets resulting in dew drops. If dewing, it is required to add thermal insulator on the cabinets.
16. Provide snow-protection hoods to prevent the outdoor heat exchanger from snow clogging. If the unit is operated in an area where it snows heavily, provide a base under the outdoor unit which should be 50 cm higher than the presumable maximum snow height.
17. It is recommended to perform periodical service and maintenance by authorized service engineers before air conditioning seasons, in order to avoid performance decrease due to dust or dirt.
18. This heat pump air conditioner has been designed for normal air conditioning for people. Do not apply other purposes such as for food, animals, plants, high precision machines or work of art. Do not apply it either to vehicles or vessels. It will results in water leakage or electrical leakage.
19. It is recommended that authorized engineers perform the system installation.,If not, it may cause water leakage, electric shock or fire.
20. In a place where fibers or dust are floating, the air filter or heat exchangers or the drain pipe may be clogged, resulting in water leakage from the drain pan.

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