

1. Features

1.1 System Features

New DC Inverter UTOPIA Series for Single Power Source

HITACHI proudly introduces the New "DC Inverter UTOPIA" HVRNM2 series, the highly-efficient and reliable air conditioning system, for the Oceanian markets. Recently, increased numbers of buildings and shops are requiring "Intelligent" facilities - communication networks, office automation, including a comfortable environment. In addition to that, energy saving operation is needed.

Particularly, comfortable space is required all the day through the year in shops and office buildings.

This split air conditioner, "DC Inverter UTOPIA" can meet these requirements. The proven combination of the scroll compressor and the inverter provides the best air conditioning for shops and small office buildings.

New Line-up of Indoor and Outdoor Units

Type		Model Name
Indoor Unit	In-the-Ceiling (Duct)	RPI-3.0FSN2SQ
		RPI-4.0FSN2SQ
		RPI-5.0FSN2SQ
		RPI-6.0FSN2SQ
		RPI-7.0FSN2SQ
	4-Way Cassette	RCI-1.0FSN3
		RCI-1.5FSN3
		RCI-2.0FSN3
		RCI-2.5FSN3
		RCI-3.0FSN3
		RCI-4.0FSN3
		RCI-5.0FSN3
		RCI-6.0FSN3
Air Panel (Optional)	without Motion Sensor	P-AP160NA1
	with Motion Sensor	P-AP160NAE
Outdoor Unit		RAS-3HVRNM2
		RAS-4HVRNM2
		RAS-5HVRNM2
		RAS-6HVRNM2
		RAS-7HVRNM2

Standard Combination of Outdoor Unit and Indoor Unit

Outdoor Unit	Indoor Unit	Single Combination	Twin Combination	Triple Combination	Quad Combination
RAS-3HVRNM2	In-the-Ceiling Type (RPI-*FSN2SQ)	RPI-3.0FSN2SQ	-	-	-
	4-Way Cassette Type (RCI-*FSN3)	RCI-3.0FSN3	RCI-1.5FSN3 x 2	-	-
	In-the-Ceiling Type (RPI-*FSN2)	-	RPI-1.5FSN2 x 2	-	-
	2-Way Cassette Type (RCD-*FSN2)	-	RCD-1.5FSN2 x 2	-	-
	Ceiling Type (RPC-*FSN2)	-	-	-	-
	Wall Type (RPK-*FSNSM2)	-	RPK-1.5FSNSM2 x 2	-	-
RAS-4HVRNM2	In-the-Ceiling Type (RPI-*FSN2SQ)	RPI-4.0FSN2SQ	-	-	-
	4-Way Cassette Type (RCI-*FSN3)	RCI-4.0FSN3	RCI-2.0FSN3 x 2	RCI-1.5FSN3 x 3	RCI-1.0FSN3 x 4
	In-the-Ceiling Type (RPI-*FSN2)	-	RPI-2.0FSN2 x 2	RPI-1.5FSN2 x 3	RPI-1.0FSN2 x 4
	2-Way Cassette Type (RCD-*FSN2)	-	RCD-2.0FSN2 x 2	RCD-1.5FSN2 x 3	RCD-1.0FSN2 x 4
	Ceiling Type (RPC-*FSN2)	-	RPC-2.0FSN2 x 2	-	-
	Wall Type (RPK-*FSNSM2)	-	RPK-2.0FSNSM2 x 2	RPK-1.5FSNSM2 x 3	RPK-1.0FSNSM2 x 4
RAS-5HVRNM2	In-the-Ceiling Type (RPI-*FSN2SQ)	RPI-5.0FSN2SQ	-	-	-
	4-Way Cassette Type (RCI-*FSN3)	RCI-5.0FSN3	RCI-2.5FSN3 x 2	RCI-1.5FSN3 x 3	RCI-1.0FSN3 x 4
	In-the-Ceiling Type (RPI-*FSN2)	-	RPI-2.5FSN2 x 2	RPI-1.5FSN2 x 3	RPI-1.0FSN2 x 4
	2-Way Cassette Type (RCD-*FSN2)	-	RCD-2.5FSN2 x 2	RCD-1.5FSN2 x 3	RCD-1.0FSN2 x 4
	Ceiling Type (RPC-*FSN2)	-	RPC-2.5FSN2 x 2	-	-
	Wall Type (RPK-*FSNSM2)	-	RPK-2.5FSNSM2 x 2	RPK-1.5FSNSM2 x 3	RPK-1.0FSNSM2 x 4
RAS-6HVRNM2	In-the-Ceiling Type (RPI-*FSN2SQ)	RPI-6.0FSN2SQ	-	-	-
	4-Way Cassette Type (RCI-*FSN3)	-	RCI-3.0FSN3 x 2	RCI-2.0FSN3 x 3	RCI-1.5FSN3 x 4
	In-the-Ceiling Type (RPI-*FSN2)	-	RPI-3.0FSN2 x 2	RPI-2.0FSN2 x 3	RPI-1.5FSN2 x 4
	2-Way Cassette Type (RCD-*FSN2)	-	RCD-3.0FSN2 x 2	RCD-2.0FSN2 x 3	RCD-1.5FSN2 x 4
	Ceiling Type (RPC-*FSN2)	-	RPC-3.0FSN2 x 2	RPC-2.0FSN2 x 3	-
	Wall Type (RPK-*FSNSM2)	-	RPK-3.0FSNSM2 x 2	RPK-2.0FSNSM2 x 3	RPK-1.5FSNSM2 x 4
RAS-7HVRNM2	In-the-Ceiling Type (RPI-*FSN2SQ)	RPI-7.0FSN2SQ	-	-	-
	4-Way Cassette Type (RCI-*FSN3)	-	-	-	-
	In-the-Ceiling Type (RPI-*FSN2)	-	-	-	-
	2-Way Cassette Type (RCD-*FSN2)	-	-	-	-
	Ceiling Type (RPC-*FSN2)	-	-	-	-
	Wall Type (RPK-*FSNSM2)	-	-	-	-

- The single connection is subject to MEPS. Other connections are NOT acceptable.
- Refer to the Technical Catalog "TCI-08001" as to the information of indoor units RPI, RCD, RPC and RPK models.

Enhanced Combination of Outdoor Unit and Indoor Unit

- (1) The combination is available with the range of the following conditions. Less than the recommended number of indoor unit should be connected in order to prevent the cold draft during the heating operation with the system that all the indoor units are operated simultaneously.

Outdoor Unit Capacity		3HP	4HP	5HP	6HP	7HP
Recommended Number of Connectable Indoor Unit		≤ 2 Units	≤ 4 Units			1 Unit
Maximum Number of Connectable Indoor Unit		3 Units	5 Units	6 Units		1 Unit
Minimum Indoor Unit Capacity		1HP				7HP
Range of Combination Capacity of Indoor Unit (The case of exceeding the recommended number of connectable units)		50-120% (50-100%)				100%
Minimum Indoor Unit Capacity	In-the-Ceiling Type (RPI-*FSN2SQ)	Only 3HP	Only 4HP	Only 5HP	Only 6HP	Only 7HP
	4-Way Cassette Type (RCI-*FSN3)	1HP				-
	In-the-Ceiling Type (RPI-*FSN2)	0.8HP				-
	2-Way Cassette Type (RCD-*FSN2)	1HP				-
	Ceiling Type (RPC-*FSN2)	2HP				-
	Wall Type (RPK-*FSNSM2)	1HP				-

- (2) (Total Indoor Unit Capacity / Total Outdoor Unit Capacity) should be within the value as shown in the table above.
- (3) 1.0HP of the indoor unit is designed as the higher air flow volume than over 1.5HP of the indoor unit. Do not install a space where the cold draft may be felt (at heating).
- (4) If 4-Way Cassette Type or Ceiling Type indoor unit is connected to the outdoor unit, less than recommended number of the indoor unit should be connected. In addition, the range of the combination capacity of the indoor unit including these types should be within 100%. If the system is used in the cold area (outside temperature becomes -10°C) or under the high heating load conditions, the total indoor unit capacity should be less than 100% against the outdoor unit.
- (5) The minimum indoor unit capacity should be within the following table against the maximum indoor unit capacity in the same refrigerant cycle when multiple indoor units are connected.

Max. Indoor Unit Capacity	0.8HP	1.0HP	1.5HP	2.0HP	2.5HP	3.0HP	4.0HP	5.0HP
Min. Indoor Unit Capacity	≥ 0.8HP			≥ 1.0HP	≥ 1.5HP			≥ 2.0HP

2. General Data

2.1 Indoor Units

Indoor Unit Type		In-the-Ceiling (Duct) Type				
Model		RPI-3.0FSN2SQ	RPI-4.0FSN2SQ	RPI-5.0FSN2SQ	RPI-6.0FSN2SQ	RPI-7.0FSN2SQ
Indoor Unit Power Supply		AC 1 ϕ , 220-240V/50Hz, 220V/60Hz				AC 1 ϕ , 240V/50Hz
Sound Pressure Level (Overall A Scale) (Hi/Me/Lo)						
High Pressure Setting	dB	46/44/40	48/45/41	49/46/43	53/49/45	51/47/42
Standard Pressure Setting	dB	45/43/39	47/44/40	48/45/42	52/48/44	-
Outer Dimensions						
Height	mm (in.)	350 (13-3/4)	350 (13-3/4)	350 (13-3/4)	350 (13-3/4)	440 (17-5/16)
Width	mm (in.)	1,076 (42-3/8)	1,076 (42-3/8)	1,300 (51-3/16)	1,300 (51-3/16)	1,430 (56-5/16)
Depth	mm (in.)	800 (31-1/2)	800 (31-1/2)	800 (31-1/2)	800 (31-1/2)	550 (21-5/8)
Net Weight	kg (lbs.)	52 (115)	57 (126)	61 (135)	63 (139)	75 (165)
Refrigerant		R410A				
Indoor Fan						
Air Flow Rate (Hi/Me/Lo)						
High Pressure Setting	m ³ /min. (l/s)	29/26/20 (483/433/333)	36/33/25 (600/550/417)	47/43/34 (783/717/567)	56/50/40 (933/833/667)	65/57/46 (1,083/950/767)
Standard Pressure Setting	m ³ /min. (l/s)	29/26/20 (483/433/333)	36/29/25 (600/483/417)	47/39/36 (783/650/600)	56/48/42 (933/800/700)	-
External Pressure *1)	Pa	120 (70)	120 (70)	120 (70)	120 (70)	140
Motor Output	W	250	300	420	550	650
Connections		Flare-Nut Connection (with Flare Nuts)				
Refrigerant Piping						
Liquid Line	mm (in.)	ϕ 9.52 (3/8)	ϕ 9.52 (3/8)	ϕ 9.52 (3/8)	ϕ 9.52 (3/8)	ϕ 9.52 (3/8)
Gas Line	mm (in.)	ϕ 15.88 (5/8)	ϕ 15.88 (5/8)	ϕ 15.88 (5/8)	ϕ 15.88 (5/8)	ϕ 15.88 (5/8)
Condensate Drain		VP25	VP25	VP25	VP25	VP25
Approximate Packing Measurement	m ³	0.49	0.49	0.57	0.57	0.54

NOTES:

1. The above cooling and heating capacities show the maximum capacities when the outdoor and indoor temperature are below condition.

Cooling Operation Conditions

Indoor Air Inlet Temperature: 27°C DB (80°F DB)
19.0°C WB (66.2°F WB)
Outdoor Air Inlet Temperature: 35°C DB (95°F DB)

Heating Operation Conditions

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

Piping Length: 7.5 Meters Piping Lift: 0 Meter

2. The sound pressure level is based on following conditions.
1.5 Meters Beneath the Unit.

With Discharge Duct (2.0m) and Return Duct (1.0m).

Voltage of the power source for the indoor fan motor is 220V.

In case of the power source of 240V, the sound pressure level increases by about 1 or 2 dB.

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

3. The data for external pressure *1) indicates "High Pressure Setting (Standard Pressure Setting)" values when a filter is not used.
The sound pressure level is based on the Standard Pressure Setting.

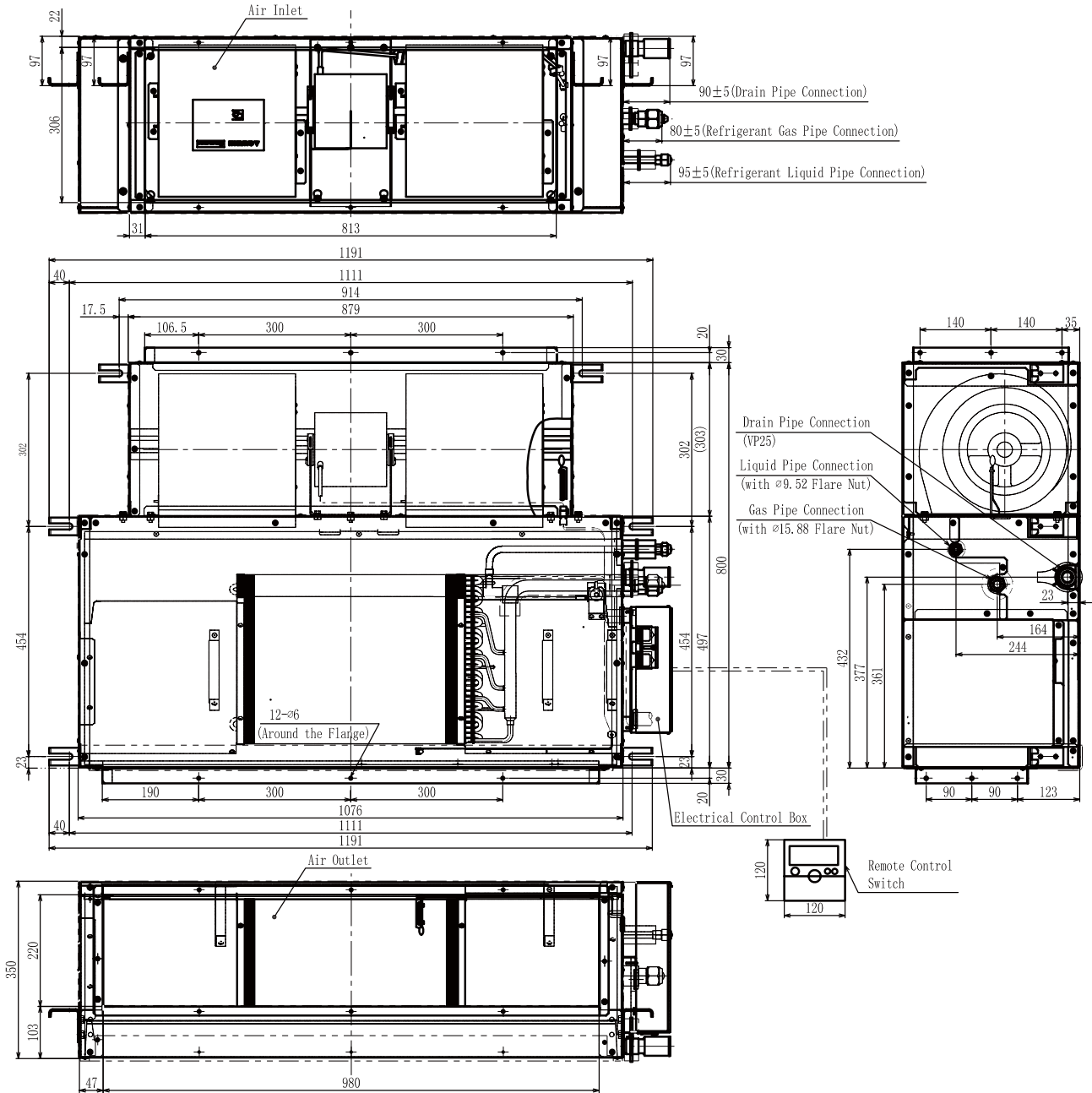
3. Dimensional Data

3.1 Indoor Units

< In-the-Ceiling (Duct) Type >

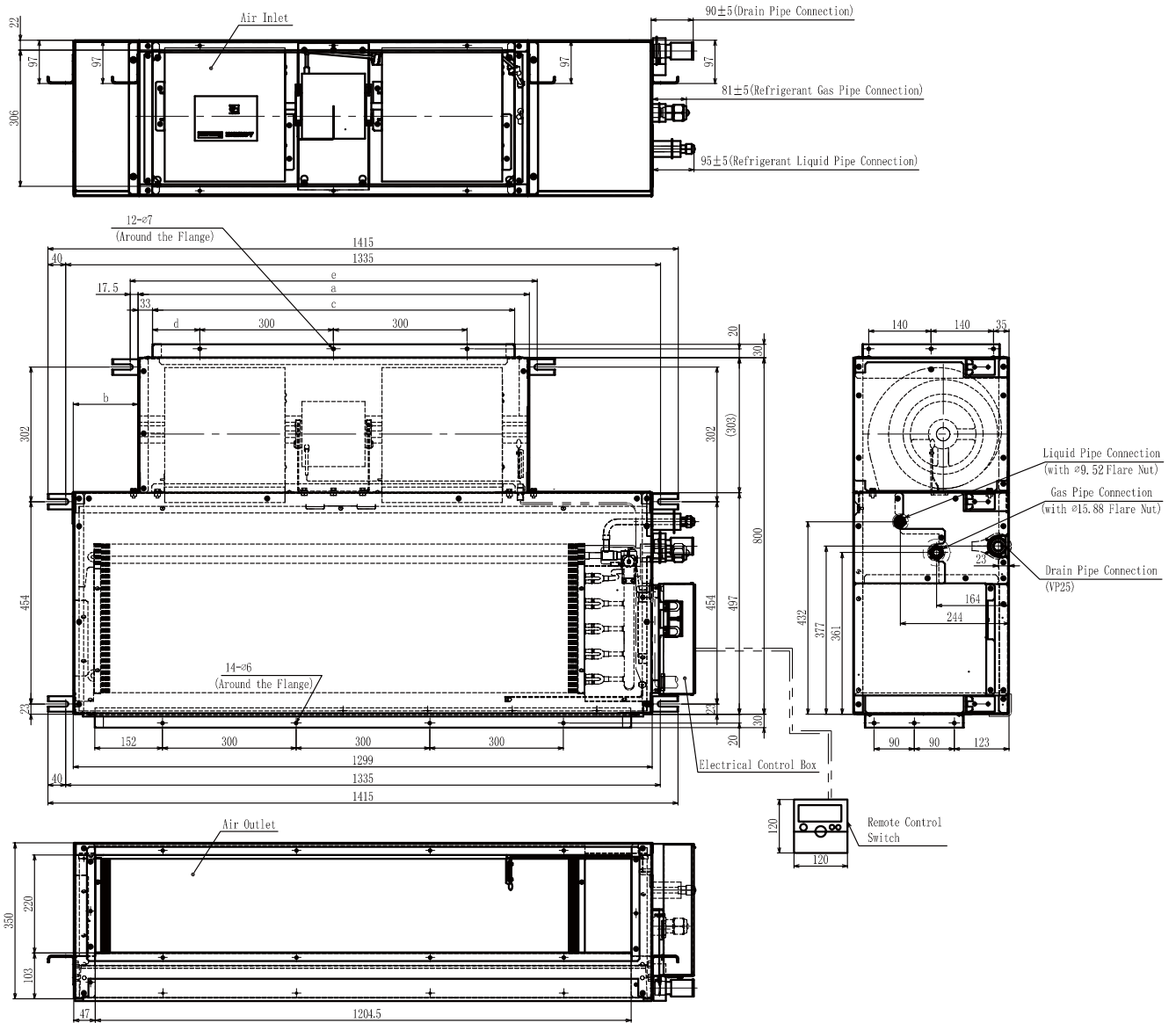
Models: RPI-3.0FSN2SQ and RPI-4.0FSN2SQ

Unit: mm



Models: RPI-5.0FSN2SQ and RPI-6.0FSN2SQ

Unit: mm

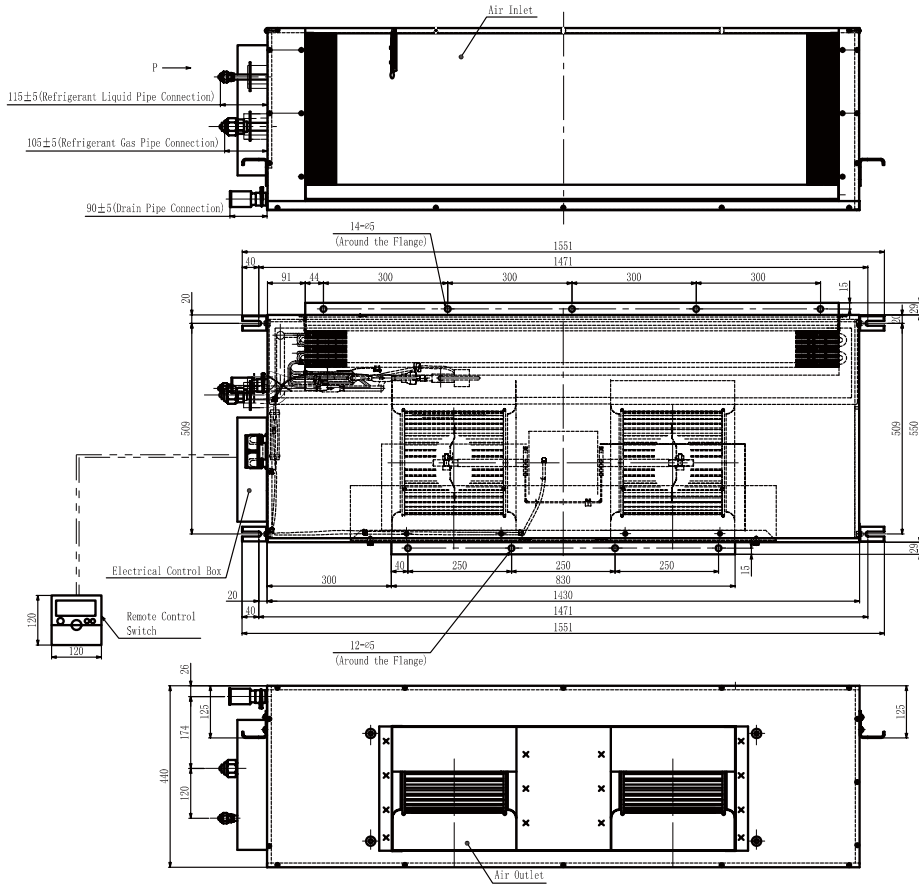


Model	a	b	c	d	e
RPI-5.0FSN2SQ	878.5	145	813	106.5	913.5
RPI-6.0FSN2SQ	1,000	85	934.5	167	1,035

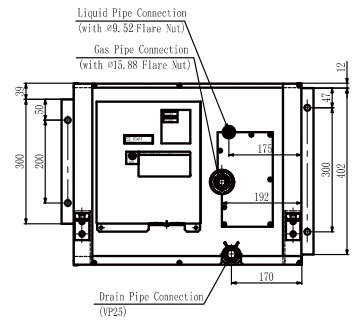
DIMENSIONAL DATA

Model: RPI-7.0FSN2SQ

Unit: mm



View from P

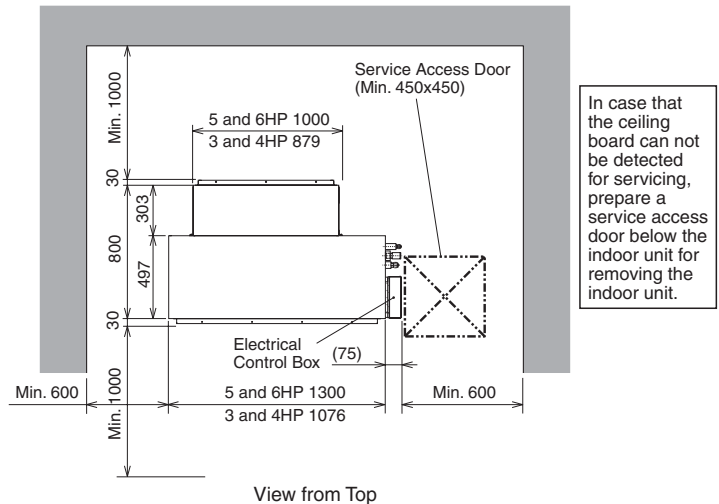


4. Selection Data

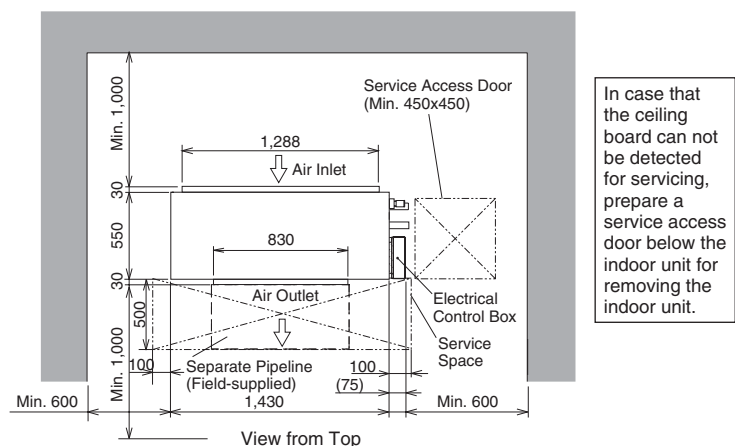
4.1 Operation Space

< In-the-Ceiling (Duct) Type >

Models: RPI-3.0FSN2SQ, RPI-4.0FSN2SQ, RPI-5.0FSN2SQ and RPI-6.0FSN2SQ



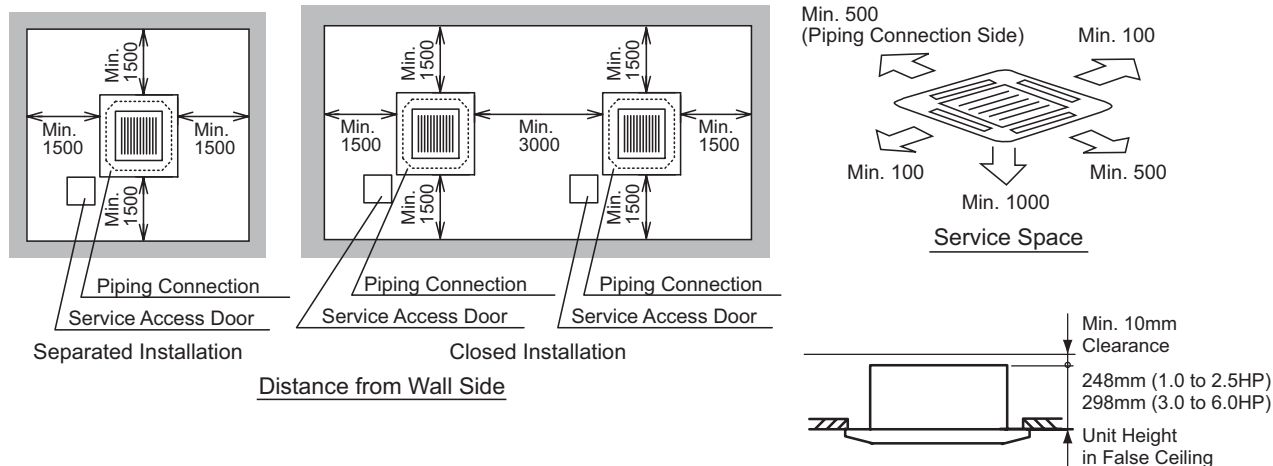
Model: RPI-7.0FSN2SQ



< 4-Way Cassette Type >

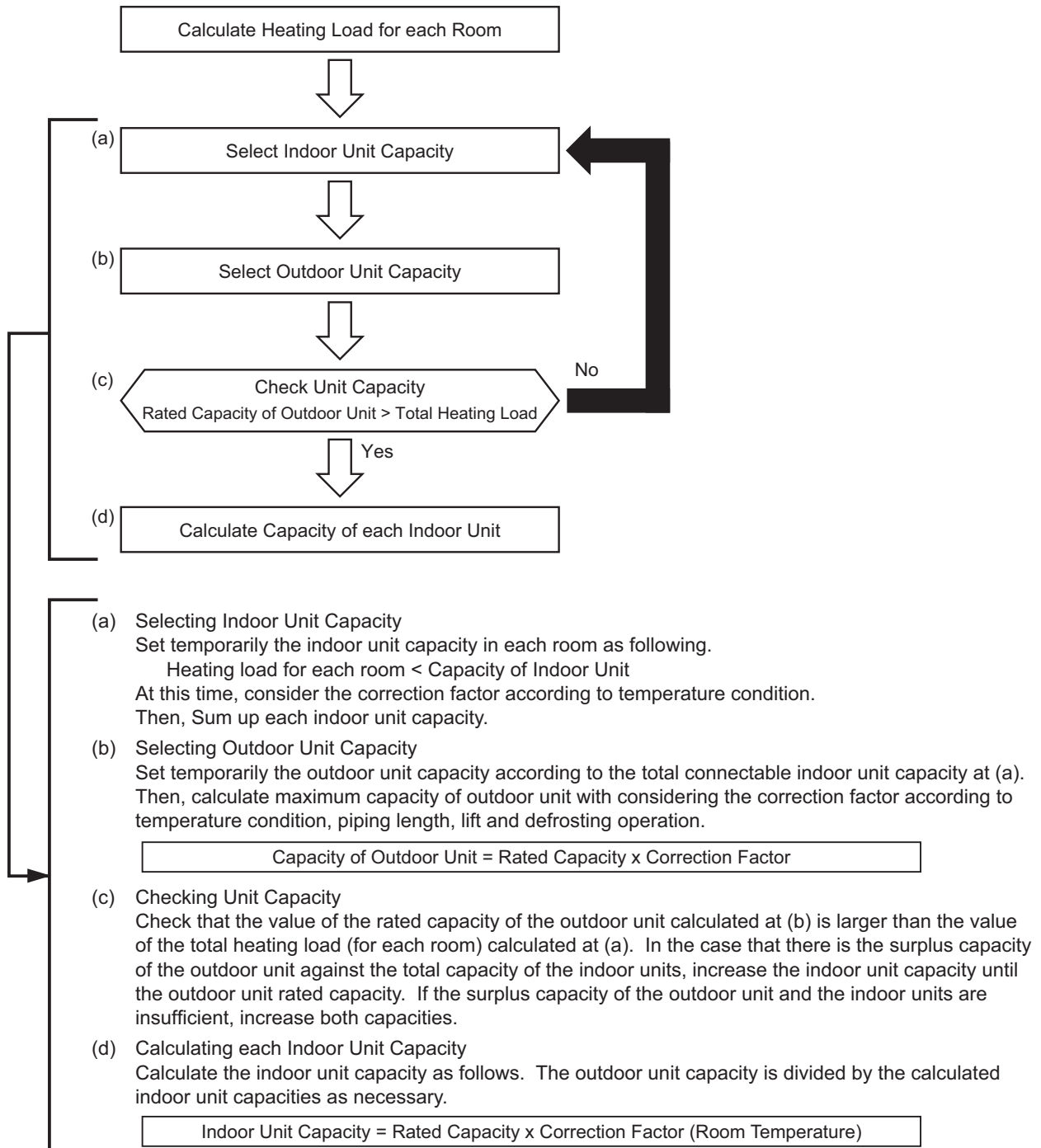
Models: RCI-1.0FSN3, RCI-1.5FSN3, RCI-2.0FSN3, RCI-2.5FSN3, RCI-3.0FSN3, RCI-4.0FSN3, RCI-5.0FSN3 and RCI-6.0FSN3

Unit: mm



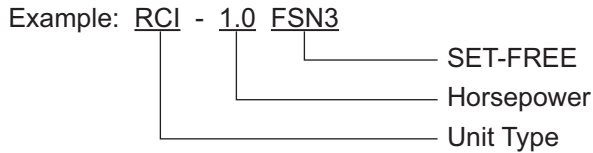
4.2 Selection Guide

The various indoor units can be combined with the HITACHI DC Inverter UTOPIA Series. Selection of Unit Model Capacity Procedure is shown below.



SELECTION DATA

(1) Meaning of Model Name for Indoor Unit



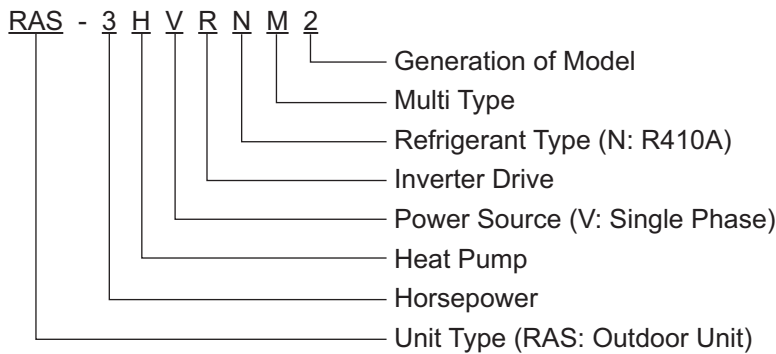
In-the-Ceiling Type	RPI
4-Way Cassette Type	RCI

NOTE:
Select the indoor units and outdoor unit so as the total indoor horsepower is near to the outdoor horsepower.

(2) Nominal Capacity of Indoor Unit

Horsepower (HP)		1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0
Cooling Capacity	kW	2.8	4.0	5.0	6.3	7.1	10.0	12.5	14.0	16.0
Heating Capacity	kW	3.2	4.8	5.6	7.5	8.0	11.2	14.0	16.0	18.0

(3) Meaning of Model Name for Outdoor Unit



(4) Nominal Capacity of Outdoor Unit

Model		RAS-3HVRNM2	RAS-4HVRNM2	RAS-5HVRNM2	RAS-6HVRNM2	RAS-7HVRNM2
Horsepower (HP)		3	4	5	6	7
Cooling Capacity	kW	7.1	10.0	12.5	14.0	16.0
Heating Capacity	kW	8.0	11.2	14.0	16.0	18.0

Nominal Capacity of Outdoor Unit is under the condition that the total indoor unit horsepower is same as outdoor unit horsepower.

(5) Given Condition (Example)

Total Load for Each Room

Item		Room (1)	Room (2)	Room (3)	(1) + (2) + (3)
Estimated Cooling Load	kW	2.92	3.86	4.88	11.66
Estimated Heating Load	kW	3.29	4.34	5.49	13.12

Temperature Condition

Cooling		Heating	
Outdoor Coil Air Inlet Dry Bulb: 30°C		Outdoor Coil Air Inlet Dry Bulb: 1°C	
Indoor Coil Air Inlet Dry Bulb: 27°C Wet Bulb: 19°C		Indoor Coil Air Inlet Wet Bulb: 0°C Dry Bulb: 20°C	

Equivalent Piping Length between Indoor Units and Outdoor Unit: 60m

Piping Lift: 20m

(6) Selecting Matching Indoor Units and Nominal Capacity

Select 4-Way Cassette Type Indoor Units (Example)

Item		Room (1)	Room (2)	Room (3)	(1) + (2) + (3)
Selected Model		RCI-1.5FSN3	RCI-2.0FSN3	RCI-2.5FSN3	-
Nominal Cooling Capacity	kW	4.0	5.0	7.1	16.1
Nominal Heating Capacity	kW	4.8	5.6	8.0	18.4

(7) Selecting Matching Outdoor Unit

Select Outdoor Unit (Example)

Item		Outdoor Unit
Selected Model		RAS-6HVRNM2
Nominal Cooling Capacity	kW	14.0
Nominal Heating Capacity	kW	16.0

SELECTION DATA

(8) Actual Capacity

In the case of the example, the total indoor horsepower is 6HP and outdoor horsepower is 6HP. Therefore, the outdoor unit capacity at the nominal temperature which is selected from the item 4.3 “Capacity Characteristic Curve” is 16.0kW at the cooling operation, 20.0kW at the heating operation under nominal conditions.

a) Actual Capacity of Outdoor Unit

Maximum Actual Capacity of Outdoor Unit

- = Outdoor Unit Capacity at Nominal Temperature selected from Total Indoor Unit Capacity
- × Correction Factor According to Piping Length and Lift *1)
- × Correction Factor According to Temperature Condition *2)
- × Correction Factor According to Defrosting Operation *3)

*1): Refer to the diagram in item 4.6 “Correction Factor According to Piping Length”.

Correction Factor of Cooling Capacity = 0.84
Correction Factor of Heating Capacity = 0.95

*2): Refer to the table in item 4.4 and 4.5 “Correction Factor According to Temperature Condition”.

Correction Factor of Cooling Capacity = 1.05
Correction Factor of Heating Capacity = 0.87

*3): Refer to the table in item 4.7 “Correction Factor According to Defrosting Operation”

Correction Factor = 0.85

Actual capacity of outdoor unit is

Cooling: $16.0\text{kW} \times 0.84 \times 1.05 = 14.11$
Heating: $20.0\text{kW} \times 0.95 \times 0.87 \times 0.85 = 14.05$

b) Actual Capacity of Each Indoor Unit

Actual Capacity of Each Indoor Unit

= Actual Capacity of Outdoor Unit

× (Each Indoor Unit's Horsepower ÷ Summation of Each Indoor Unit Horsepower)

ex.

< RCI-1.5FSN3 >

Cooling Capacity: $14.11 \times (1.5\text{HP}/6.0\text{HP}) = 3.53\text{kW}$

Heating Capacity: $14.05 \times (1.5\text{HP}/6.0\text{HP}) = 3.51\text{kW}$

< RCI-2.0FSN3 >

Cooling Capacity: $14.11 \times (2.0\text{HP}/6.0\text{HP}) = 4.70\text{kW}$

Heating Capacity: $14.05 \times (2.0\text{HP}/6.0\text{HP}) = 4.68\text{kW}$

< RCI-2.5FSN3 >

Cooling Capacity: $14.11 \times (2.5\text{HP}/6.0\text{HP}) = 5.88\text{kW}$

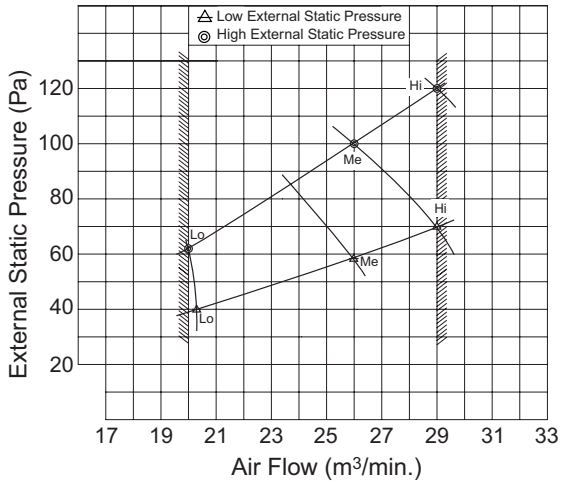
Heating Capacity: $14.05 \times (2.5\text{HP}/6.0\text{HP}) = 5.85\text{kW}$

< Result >

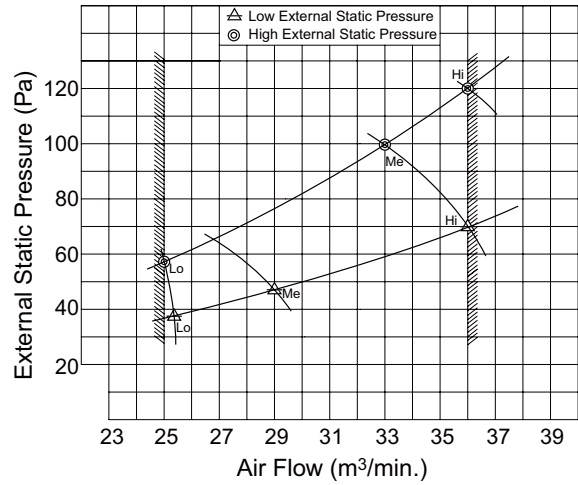
Item		Room (1)	Room (2)	Room (3)	(1)+(2)+(3)	
Selected Model		RCI-1.5FSN3	RCI-2.0FSN3	RCI-2.5FSN3	-	
Actual Capacity	Actual Maximum Cooling Capacity	kW	3.53	4.70	5.88	14.11
	Actual Maximum Heating Capacity	kW	3.51	4.68	5.85	14.05
Design Load	Estimated Cooling Load	kW	2.92	3.86	4.88	11.66
	Estimated Heating Load	kW	3.29	4.34	5.49	13.12

4.8 Fan Performance

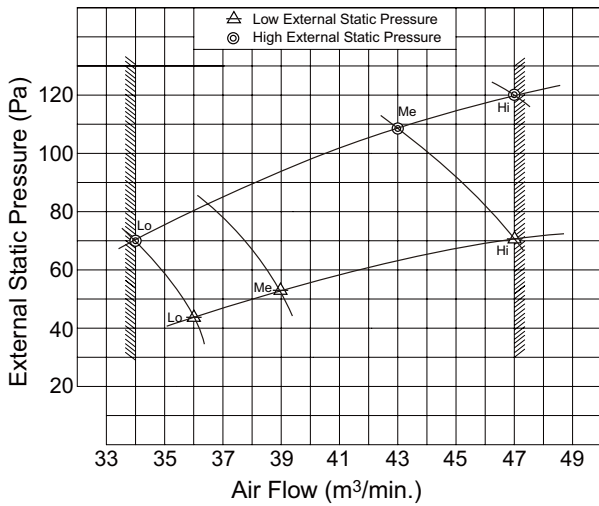
< RPI-3.0FSN2SQ >



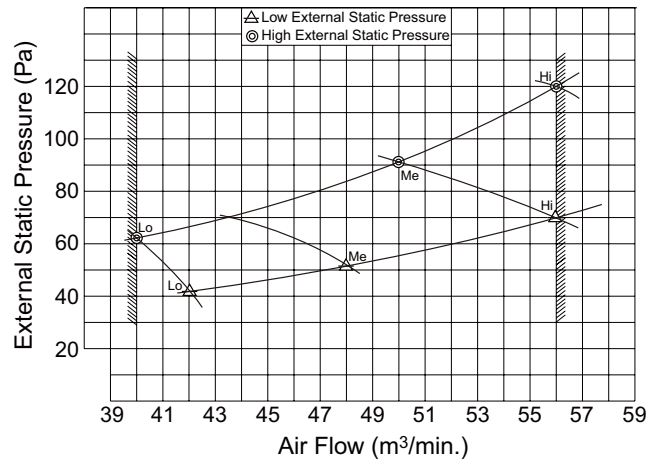
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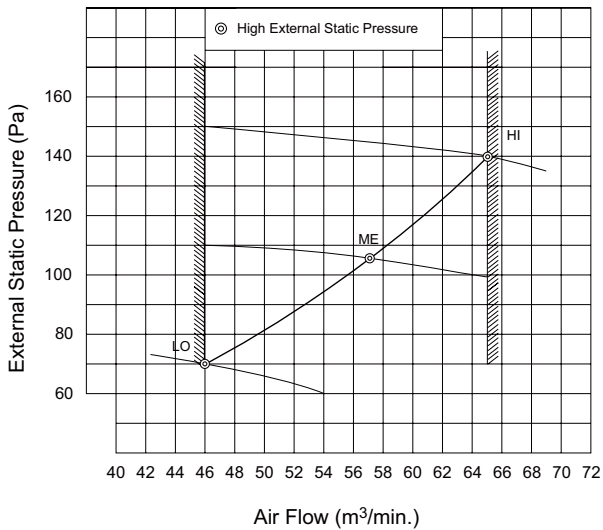
< RPI-5.0FSN2SQ >



< RPI-6.0FSN2SQ >



< RPI-7.0FSN2SQ >



5. Electrical Data

< Indoor Unit (220-240V/50Hz) >

Model		Unit Main Power			Applicable Voltage		Indoor Fan Motor		
		VOL	PH	HZ	Maximum	Minimum	PH	RNC	IPT
In-the-Ceiling (Duct) Type	RPI-3.0FSN2SQ	240	1	50	264	216	1	1.5	0.35
	RPI-4.0FSN2SQ							1.7	0.39
	RPI-5.0FSN2SQ							2.8	0.65
	RPI-6.0FSN2SQ							3.0	0.71
	RPI-7.0FSN2SQ							4.8	1.15
4-Way Cassette Type	RCI-1.0FSN3	220/240	1	50	264	198	1	0.2/0.2	0.04
	RCI-1.5FSN3							0.3/0.3	0.06
	RCI-2.0FSN3							0.4/0.4	0.08
	RCI-2.5FSN3							0.8/0.7	0.15
	RCI-3.0FSN3							0.8/0.7	0.15
	RCI-4.0FSN3							1.0/0.9	0.18
	RCI-5.0FSN3							1.1/1.0	0.20
	RCI-6.0FSN3							1.1/1.0	0.20

< Indoor Unit (220V/60Hz) >

Model		Unit Main Power			Applicable Voltage		Indoor Fan Motor		
		VOL	PH	HZ	Maximum	Minimum	PH	RNC	IPT
4-Way Cassette Type	RCI-1.0FSN3	220	1	60	242	198	1	0.2	0.04
	RCI-1.5FSN3							0.3	0.06
	RCI-2.0FSN3							0.4	0.08
	RCI-2.5FSN3							0.8	0.15
	RCI-3.0FSN3							0.8	0.15
	RCI-4.0FSN3							1.0	0.18
	RCI-5.0FSN3							1.1	0.20
	RCI-6.0FSN3							1.1	0.20

< Outdoor Unit (220-240V/50Hz, 220V/60Hz) >

Model	Unit Main Power			Applicable Voltage		Compressor Motor						Maximum Current		
	VOL	PH	HZ	Maximum	Minimum	PH	STC	Cooling Operation		Heating Operation				
								RNC	IPT	RNC	IPT		RNC	
RAS-3HVRNM2	220/240	1	50	264	198	3	-	7.9/7.3	1.69	7.4/6.8	1.58	23		
RAS-4HVRNM2							-	9.7/8.9	2.12	8.5/7.8	1.86	32		
RAS-5HVRNM2							-	13.8/12.6	3.00	11.0/10.1	2.40	32		
RAS-6HVRNM2							220	60	-	16.0/14.7	3.49	14.3/13.1	3.12	32
RAS-7HVRNM2							-	16.6/15.2	3.61	14.4/13.2	3.13	32		

VOL: Rated Unit Power Supply Voltage (Plated)(V)
 HZ: Frequency (Hz)
 STC: Starting Current (A)

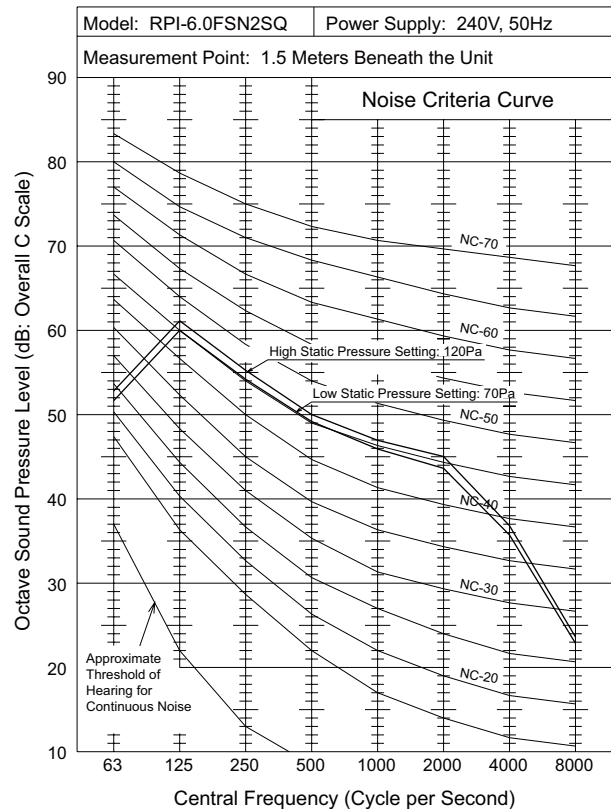
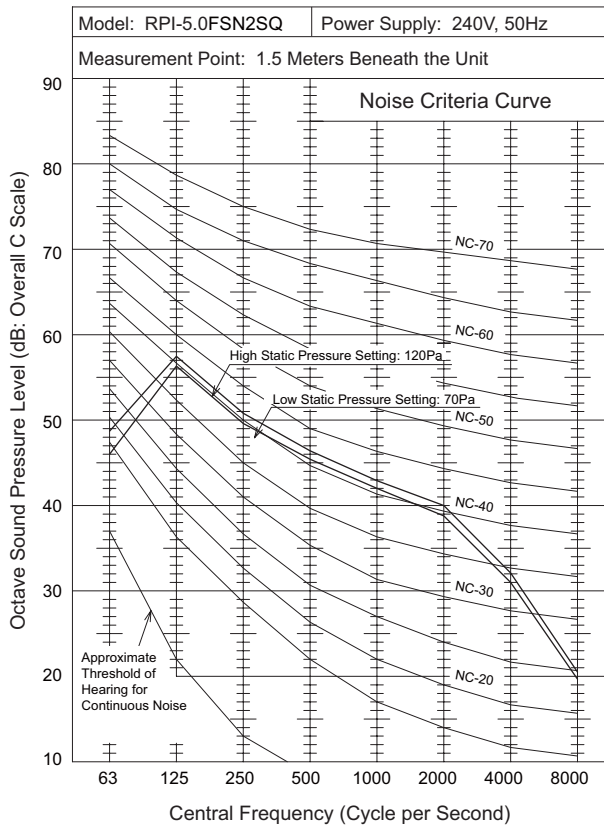
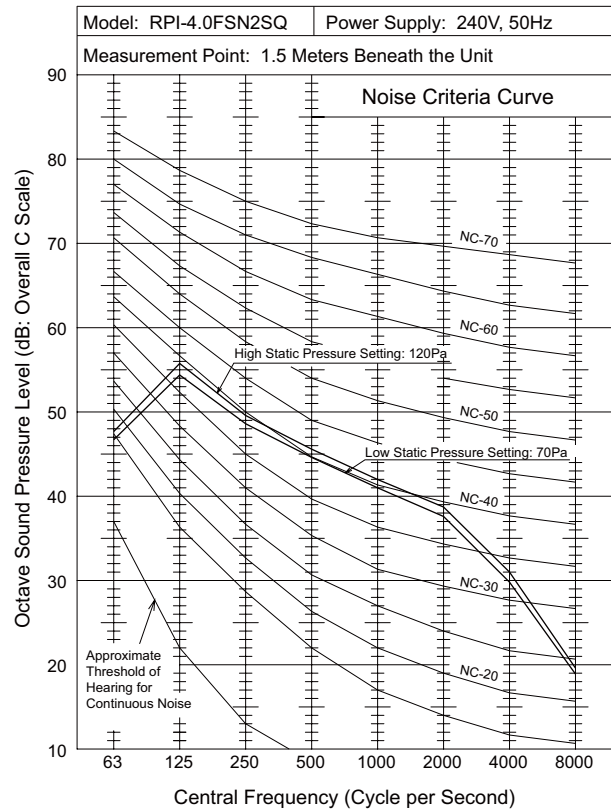
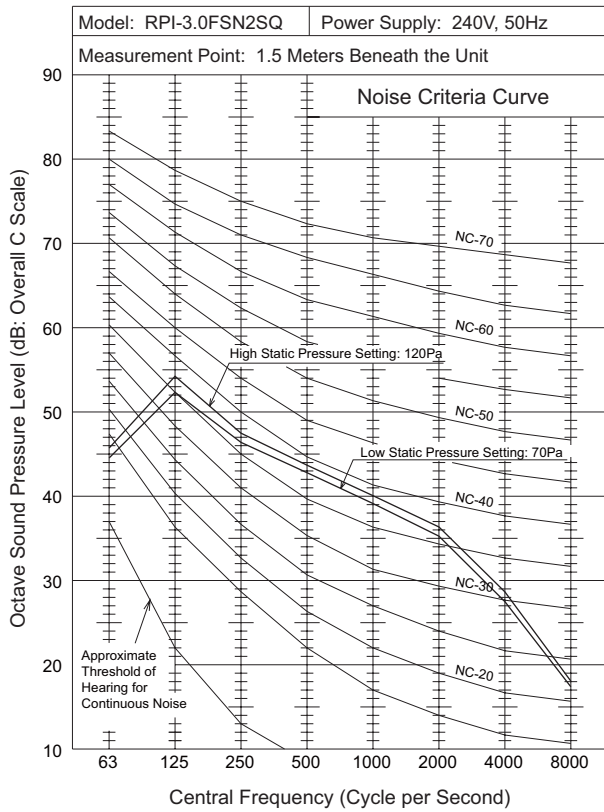
RNC: Running Current (A)
 PH: Phase (φ)
 IPT: Input (kW)

NOTES:

1. The above performance data is based on 7.5m equivalent piping length and 0m piping lift.
2. These data are based on the same conditions as the nominal heating and cooling capacities.
3. The compressor is started by an inverter, resulting in extremely low starting current.

6. Sound Data

< In-the-Ceiling (Duct) Type >



SOUND DATA

