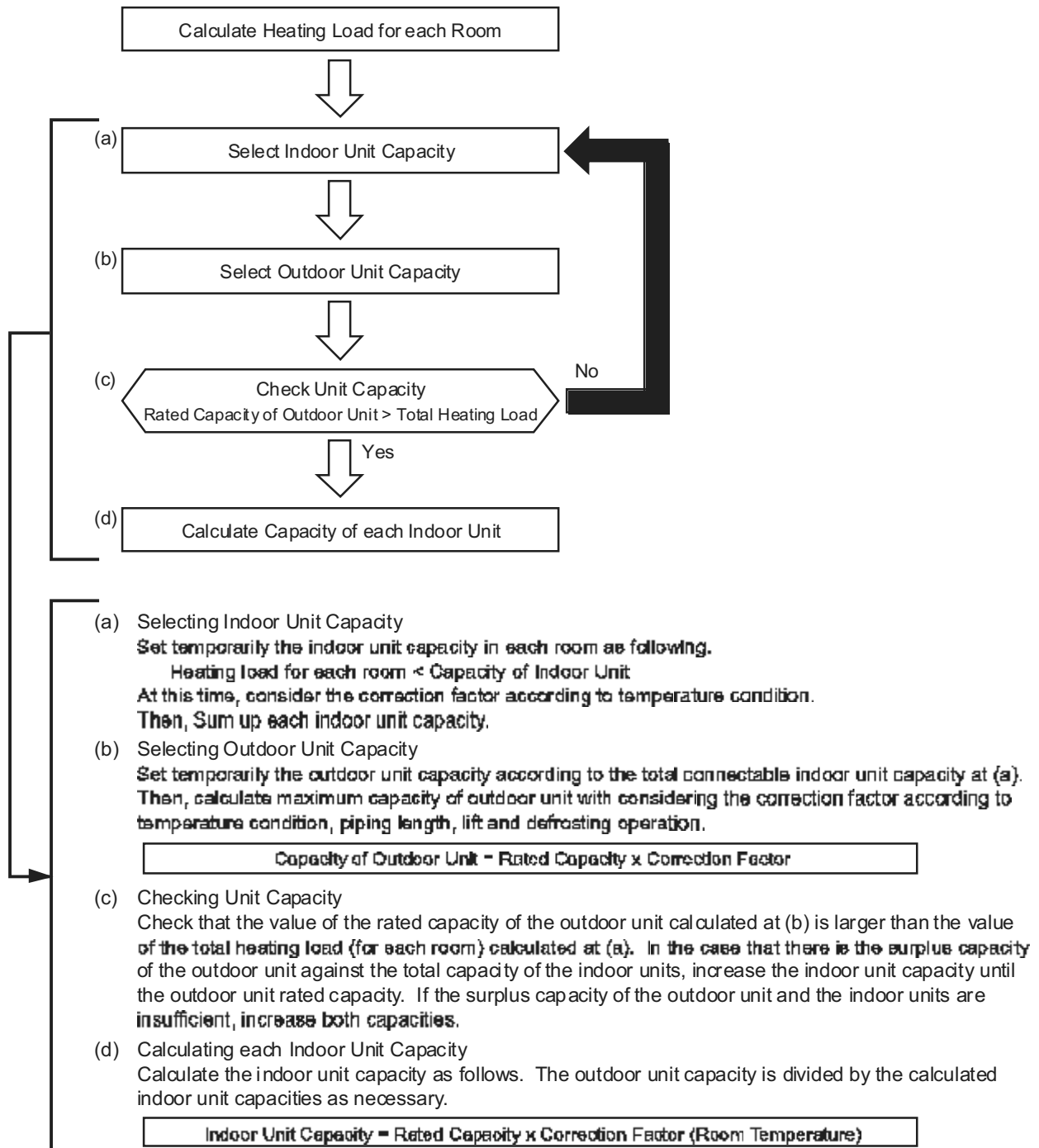


4.2 Selection Guide

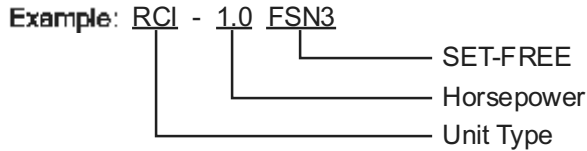
The various indoor units can be combined with the HITACHI DC Inverter UTOPIA Series.

Selection of Unit Model Capacity Procedure is shown below.



SELECTION DATA

(1) Meaning of Model Name for Indoor Unit



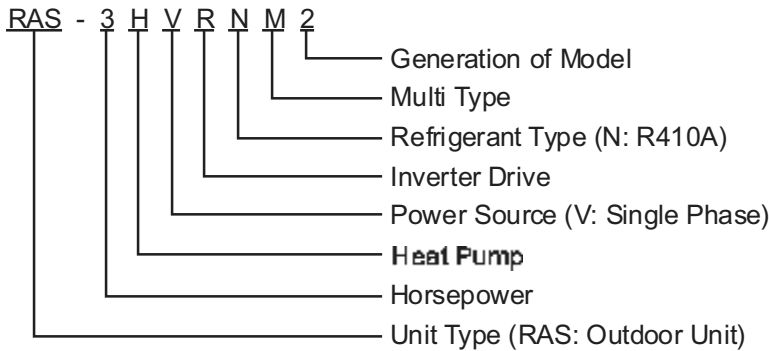
In-the-Ceiling Type	RPI
4-Way Cassette Type	RCI

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: 16.0kW × 0.84 × 1.05 = 14.11

Heating: 20.0kW × 0.95 × 0.87 × 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 × (1.5HP/6.0HP) = 3.53kW

Heating Capacity: 14.05 × (1.5HP/6.0HP) = 3.51kW

< RCI-2.0FSN3 >

Cooling Capacity: 14.11 × (2.0HP/6.0HP) = 4.70kW

Heating Capacity: 14.05 × (2.0HP/6.0HP) = 4.68kW

< RCI-2.5FSN3 >

Cooling Capacity: 14.11 × (2.5HP/6.0HP) = 5.88kW

Heating Capacity: 14.05 × (2.5HP/6.0HP) = 5.85kW

< 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

4.3 Capacity Characteristic Curve

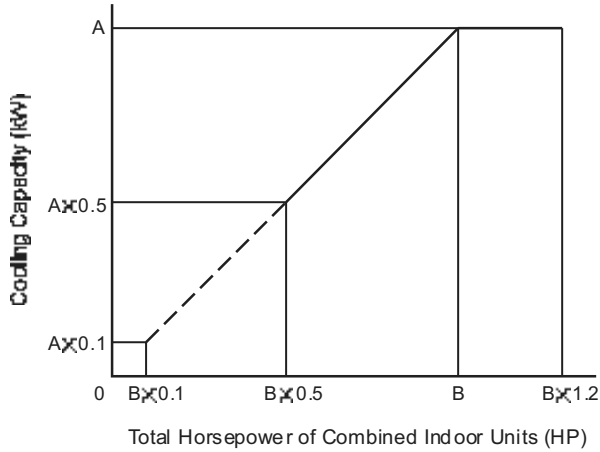
The following charts show the characteristics of outdoor unit capacity which corresponds with total horsepower of combined indoor unit, on standard condition with refrigerant piping of horizontal and 7.5m at length.

< Cooling Capacity >

- Condition

Indoor Air Inlet Temperature: 27.0°C DB (80.0°F DB), 19.0°C WB (66.2°F WB)

Outdoor Air Inlet Temperature: 35.0°C DB (95.0°F DB)



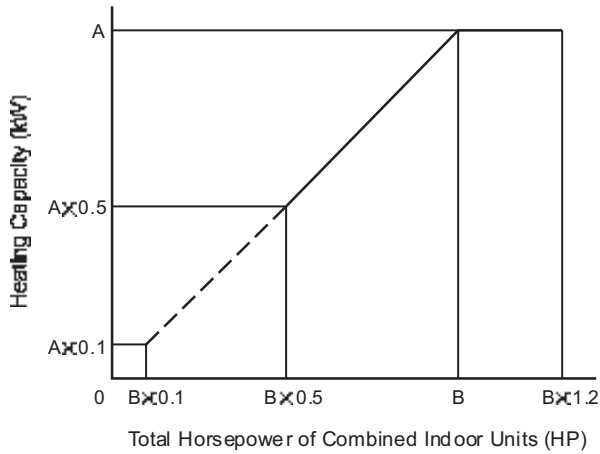
Model	A (kW)	B (HP)
RAS-3HVRNM2	8.0	3
RAS-4HVRNM2	11.2	4
RAS-5HVRNM2	14.0	5
RAS-6HVRNM2	16.0	6
RAS-7HVRNM2	18.0	7

< Heating Capacity >

- Condition

Indoor Air Inlet Temperature: 20.0°C DB (68.0°F DB)

Outdoor Air Inlet Temperature: 7.0°C DB (45.0°F DB), 6.0°C WB (43.0°F WB)



Model	A (kW)	B (HP)
RAS-3HVRNM2	10.6	3
RAS-4HVRNM2	14.0	4
RAS-5HVRNM2	18.0	5
RAS-6HVRNM2	20.0	6
RAS-7HVRNM2	20.0	7

SELECTION DATA

The following shows the examples of outdoor unit capacity which corresponds with total horsepower of combined indoor unit, according to the "Capacity Characteristic Curve" on the previous page.

Table 1. Outdoor Unit Capacity with Total Horsepower of Combined Indoor Unit

Indoor Unit Total (HP)	Outdoor Unit Capacity (kW)									
	RAS-3HVRNM2		RAS-4HVRNM2		RAS-5HVRNM2		RAS-6HVRNM2		RAS-7HVRNM2	
	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
1.5	4.0	5.3								
1.6	4.3	5.7								
1.7	4.5	6.0								
1.8	4.8	6.4								
1.9	5.1	6.7								
2.0	5.3	7.1	5.6	7.0						
2.1	5.6	7.4	5.9	7.4						
2.2	5.9	7.8	6.2	7.7						
2.3	6.1	8.1	6.4	8.1						
2.4	6.4	8.5	6.7	8.4						
2.5	6.7	8.8	7.0	8.8	7.0	9.0				
2.6	6.9	9.2	7.3	9.1	7.3	9.4				
2.7	7.2	9.5	7.6	9.5	7.6	9.7				
2.8	7.5	9.9	7.8	9.8	7.8	10.1				
2.9	7.7	10.2	8.1	10.2	8.1	10.4				
3.0	8.0	10.6	8.4	10.5	8.4	10.8	8.0	10.0		
3.1	8.0	10.6	8.7	10.9	8.7	11.2	8.3	10.3		
3.2	8.0	10.6	9.0	11.2	9.0	11.5	8.5	10.7		
3.3	8.0	10.6	9.2	11.6	9.2	11.9	8.8	11.0		
3.4	8.0	10.6	9.5	11.9	9.5	12.2	9.1	11.3		
3.5	8.0	10.6	9.8	12.3	9.8	12.6	9.3	11.7		
3.6	8.0	10.6	10.1	12.6	10.1	13.0	9.6	12.0		
3.7			10.4	13.0	10.4	13.3	9.9	12.3		
3.8			10.6	13.3	10.6	13.7	10.1	12.7		
3.9			10.9	13.7	10.9	14.0	10.4	13.0		
4.0			11.2	14.0	11.2	14.4	10.7	13.3		
4.1			11.2	14.0	11.5	14.8	10.9	13.7		
4.2			11.2	14.0	11.8	15.1	11.2	14.0		
4.3			11.2	14.0	12.0	15.5	11.5	14.3		
4.4			11.2	14.0	12.3	15.8	11.7	14.7		
4.5			11.2	14.0	12.6	16.2	12.0	15.0		
4.6			11.2	14.0	12.9	16.6	12.3	15.3		
4.7			11.2	14.0	13.2	16.9	12.5	15.7		
4.8			11.2	14.0	13.4	17.3	12.8	16.0		
4.9					13.7	17.6	13.1	16.3		
5.0					14.0	18.0	13.3	16.7		
5.1					14.0	18.0	13.6	17.0		
5.2					14.0	18.0	13.9	17.3		
5.3					14.0	18.0	14.1	17.7		
5.4					14.0	18.0	14.4	18.0		
5.5					14.0	18.0	14.7	18.3		
5.6					14.0	18.0	14.9	18.7		
5.7					14.0	18.0	15.2	19.0		
5.8					14.0	18.0	15.5	19.3		
5.9					14.0	18.0	15.7	19.7		
6.0					14.0	18.0	16.0	20.0		
6.1							16.0	20.0		
6.2							16.0	20.0		
6.3							16.0	20.0		
6.4							16.0	20.0		
6.5							16.0	20.0		
6.6							16.0	20.0		
6.7							16.0	20.0		
6.8							16.0	20.0		
6.9							16.0	20.0		
7.0							16.0	20.0	18.0	20.0
7.1							16.0	20.0		
7.2							16.0	20.0		

4.4 Correction Factor According to Temperature Condition (Cooling)

Correction Factor for RAS-3HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Dry Bulb (°C)	Indoor Air Inlet Wet Bulb (°C)					
	16.0	18.0	19.0	20.0	22.0	23.0
25.0	0.99	1.05	1.08	1.11	1.16	1.18
30.0	0.97	1.02	1.05	1.07	1.13	1.15
35.0	0.93	0.98	1.00	1.03	1.09	1.12
40.0	0.88	0.94	0.96	0.99	1.04	1.06

Correction Factor for RAS-4HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Dry Bulb (°C)	Indoor Air Inlet Wet Bulb (°C)					
	16.0	18.0	19.0	20.0	22.0	23.0
25.0	0.97	1.03	1.05	1.08	1.14	1.17
30.0	0.95	1.00	1.03	1.05	1.11	1.14
35.0	0.92	0.97	1.00	1.03	1.08	1.10
40.0	0.89	0.95	0.97	1.00	1.04	1.06

Correction Factor for RAS-5HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Dry Bulb (°C)	Indoor Air Inlet Wet Bulb (°C)					
	16.0	18.0	19.0	20.0	22.0	23.0
25.0	0.99	1.05	1.08	1.11	1.16	1.20
30.0	0.94	1.01	1.04	1.08	1.14	1.17
35.0	0.92	0.97	1.00	1.03	1.10	1.13
40.0	0.87	0.92	0.95	0.98	1.04	1.12

Correction Factor for RAS-6HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Dry Bulb (°C)	Indoor Air Inlet Wet Bulb (°C)					
	16.0	18.0	19.0	20.0	22.0	23.0
25.0	1.03	1.06	1.08	1.10	1.16	1.19
30.0	1.01	1.03	1.05	1.08	1.13	1.16
35.0	0.96	0.98	1.00	1.03	1.09	1.13
40.0	0.91	0.93	0.96	0.98	1.03	1.10

Correction Factor for RAS-7HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Dry Bulb (°C)	Indoor Air Inlet Wet Bulb (°C)					
	16.0	18.0	19.0	20.0	22.0	23.0
25.0	0.99	1.05	1.08	1.12	1.19	1.23
30.0	0.95	1.01	1.04	1.07	1.15	1.18
35.0	0.91	0.97	1.00	1.03	1.10	1.13
40.0	0.86	0.92	0.95	0.98	1.03	1.05

NOTE:

1. The table shows the normal value of cooling operation.
In some cases, the value may change due to the compressor protection control.
2. The cooling capacity on the table indicates the peak value, which does not include the capacity decrease caused by frost.
3. The value on the table shows when the system is operated under the following conditions.
The indoor unit total capacity: 100% of outdoor unit capacity, The total piping length: 7.5m,
The height difference: 0m

4.5 Correction Factor According to Temperature Condition (Heating)

Correction Factor for RAS-3HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet	Indoor Air Inlet Dry Bulb (°C)					
Wet Bulb (°C)	16.0	18.0	20.0	21.0	22.0	24.0
-20.0	0.51	0.51	0.51	0.51	0.50	0.50
-15.0	0.61	0.60	0.60	0.59	0.59	0.59
-10.0	0.71	0.70	0.70	0.69	0.69	0.68
-5.0	0.80	0.80	0.80	0.79	0.79	0.78
0.0	0.90	0.89	0.88	0.88	0.87	0.87
5.0	1.00	0.99	0.98	0.97	0.97	0.96
6.0	1.01	1.00	1.00	1.00	0.99	0.98
10.0	1.11	1.10	1.09	1.09	1.08	1.07
15.0	1.24	1.22	1.21	1.21	1.21	1.19

Correction Factor for RAS-4HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet	Indoor Air Inlet Dry Bulb (°C)					
Wet Bulb (°C)	16.0	18.0	20.0	21.0	22.0	24.0
-20.0	0.60	0.59	0.57	0.56	0.55	0.53
-15.0	0.68	0.67	0.65	0.65	0.64	0.63
-10.0	0.76	0.75	0.74	0.73	0.73	0.71
-5.0	0.84	0.83	0.82	0.81	0.80	0.79
0.0	0.92	0.91	0.90	0.90	0.89	0.87
5.0	1.00	0.99	0.98	0.98	0.97	0.96
6.0	1.01	1.00	1.00	0.99	0.99	0.98
10.0	1.10	1.10	1.10	1.09	1.09	1.07
15.0	1.21	1.21	1.21	1.21	1.21	1.19

Correction Factor for RAS-5HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet	Indoor Air Inlet Dry Bulb (°C)					
Wet Bulb (°C)	16.0	18.0	20.0	21.0	22.0	24.0
-20.0	0.60	0.60	0.59	0.58	0.58	0.57
-15.0	0.67	0.67	0.66	0.65	0.65	0.64
-10.0	0.75	0.74	0.73	0.73	0.72	0.71
-5.0	0.83	0.82	0.81	0.81	0.80	0.80
0.0	0.90	0.89	0.88	0.87	0.87	0.86
5.0	0.98	0.98	0.97	0.96	0.96	0.95
6.0	1.01	1.01	1.00	1.00	0.99	0.98
10.0	1.12	1.11	1.10	1.09	1.09	1.08
15.0	1.24	1.23	1.22	1.21	1.20	1.19

Correction Factor for RAS-6HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet	Indoor Air Inlet Dry Bulb (°C)					
Wet Bulb (°C)	16.0	18.0	20.0	21.0	22.0	24.0
-20.0	0.57	0.56	0.55	0.55	0.54	0.53
-15.0	0.64	0.63	0.63	0.62	0.62	0.61
-10.0	0.72	0.71	0.70	0.70	0.70	0.69
-5.0	0.81	0.80	0.80	0.79	0.79	0.78
0.0	0.88	0.88	0.87	0.86	0.86	0.86
5.0	0.97	0.97	0.96	0.96	0.96	0.96
6.0	1.00	1.00	1.00	1.00	1.00	0.99
10.0	1.09	1.07	1.07	1.06	1.05	1.03
15.0	1.17	1.16	1.15	1.12	1.09	1.03

Correction Factor for RAS-7HVRNM2 (Connected Indoor Unit: 100%)

Outdoor Air Inlet Wet Bulb (°C)	Indoor Air Inlet Dry Bulb (°C)					
	16.0	18.0	20.0	21.0	22.0	24.0
-20.0	0.49	0.48	0.48	0.48	0.47	0.47
-15.0	0.57	0.57	0.57	0.57	0.57	0.56
-10.0	0.67	0.66	0.66	0.65	0.65	0.65
-5.0	0.76	0.76	0.75	0.75	0.75	0.74
0.0	0.88	0.87	0.87	0.86	0.86	0.85
5.0	0.99	0.98	0.98	0.97	0.97	0.96
6.0	1.01	1.00	1.00	0.99	0.99	0.98
10.0	1.12	1.12	1.11	1.11	1.10	1.09
15.0	1.16	1.16	1.15	1.14	1.12	1.10

NOTE:

1. **The table shows the normal value of heating operation.**
In some cases, the value may change due to the compressor protection control.
2. The heating capacity on the table indicates the peak value, which does not include the capacity decrease caused by frost.
3. **The value on the table shows when the system is operated under the following conditions.**
The indoor unit total capacity: 100% of outdoor unit capacity, The total piping length: 7.5m,
The height difference: 0m

SELECTION DATA

4.6 Correction Factor According to Piping Length

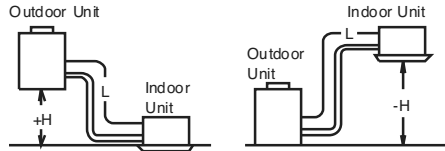
< Cooling Capacity >

Correction Factor for Cooling Capacity According to Piping Length

The correction factors are shown in the following figure.

Equivalent Piping Length for

- One 90° Elbow is 0.5m.
- One 180° Bend is 1.5m.
- One Multi-Kit is 0.5m.



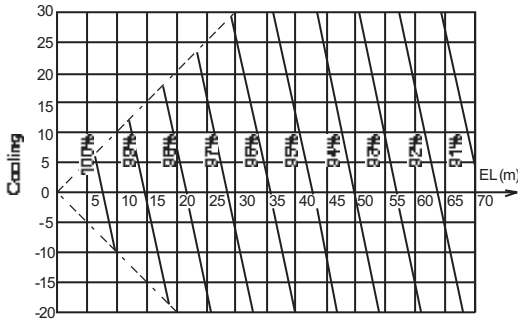
H: Vertical Distance Between Indoor Unit and Outdoor Unit in Meters

EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit in Meters (Equivalent One-Way Piping Length)

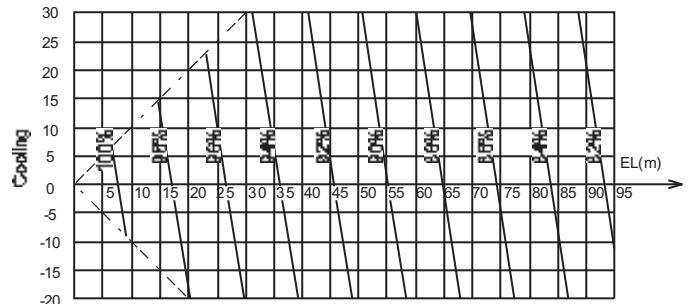
H > 0: Position of Outdoor Unit Higher Than Position of Indoor Unit

L: Actual One-Way Piping Length Between Indoor Unit and Outdoor Unit in Meters

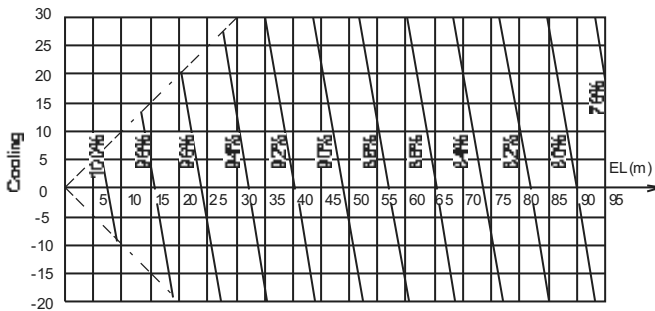
• RAS-3HVRNM2



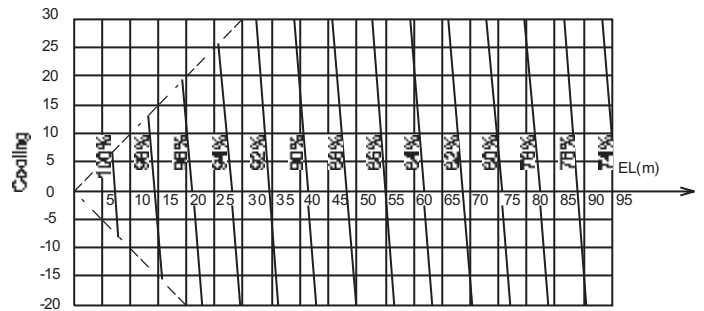
• RAS-4HVRNM2



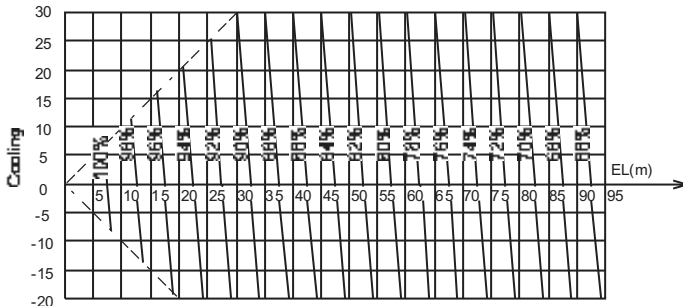
• RAS-5HVRNM2



• RAS-6HVRNM2



• RAS-7HVRNM2



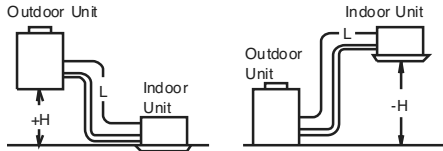
< Heating Capacity >

Correction Factor for Heating Capacity According to Piping Length

The correction factors are shown in the following figure.

Equivalent Piping Length for

- One 90° Elbow is 0.5m.
- One 180° Bend is 1.5m.
- One Multi-Kit is 0.5m.



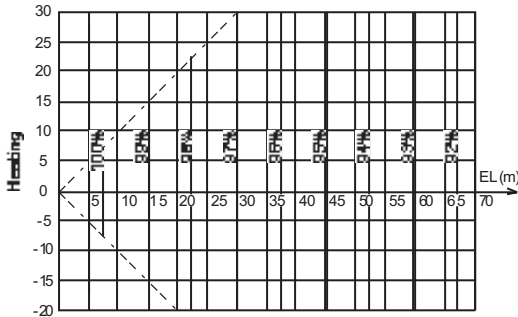
H: Vertical Distance Between Indoor Unit and Outdoor Unit in Meters

EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit in Meters (Equivalent One-Way Piping Length)

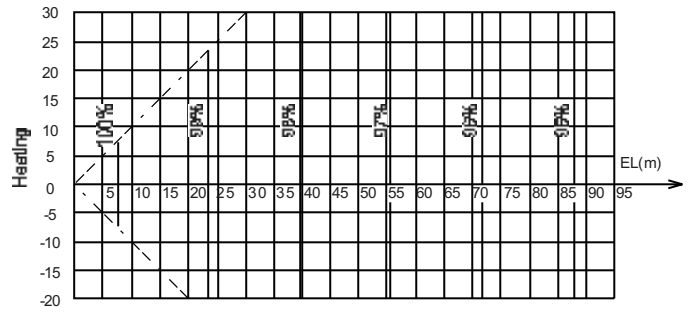
H > 0: Position of Outdoor Unit Higher Than Position of Indoor Unit

L: Actual One-Way Piping Length Between Indoor Unit and Outdoor Unit in Meters

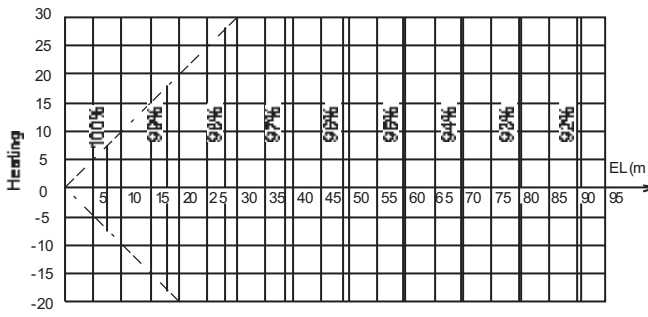
• RAS-3HVRNM2



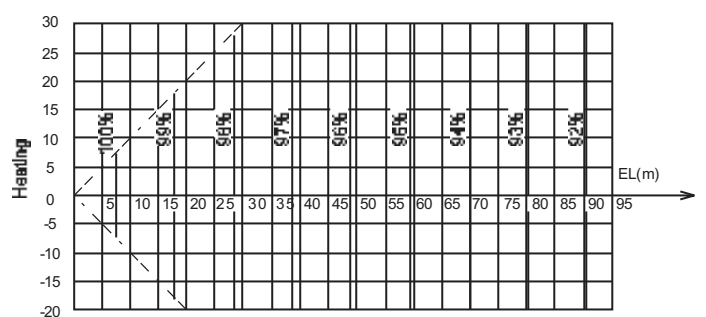
• RAS-4HVRNM2



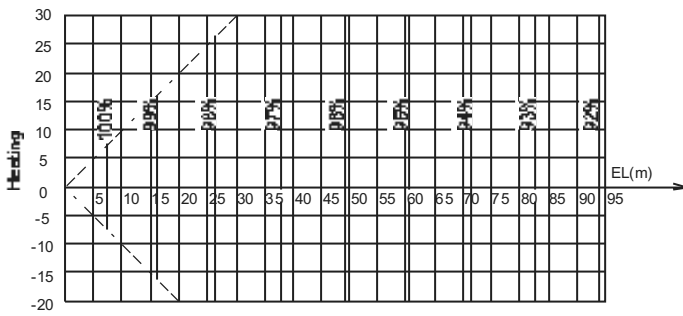
• RAS-5HVRNM2



• RAS-6HVRNM2



• RAS-7HVRNM2



SELECTION DATA

4.7 Correction Factor According to Defrosting Operation

The heating capacity in the preceding paragraph, 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.

$$\text{Corrected Heating Capacity} = \text{Correction Factor} \times \text{Heating Capacity}$$

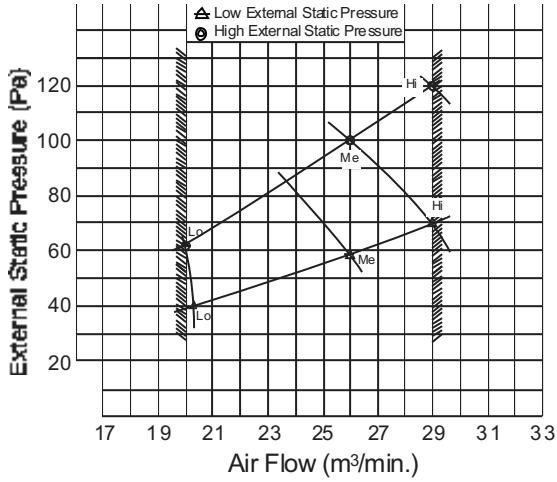
Outdoor Inlet Air Temp. (°C DB) (Humidity=85% RH)	-7	-5	-3	0	3	5	7
Correction Factor	0.95	0.93	0.88	0.85	0.87	0.90	1.0

NOTE:

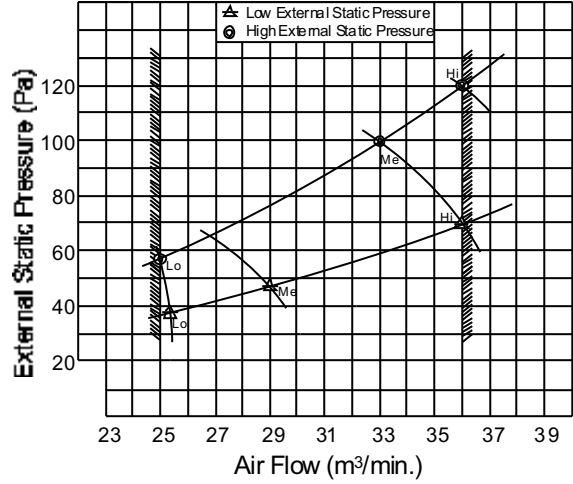
The correction factor is not available for the special condition like a snowfall or a operation in a transitional period.

4.8 Fan Performance

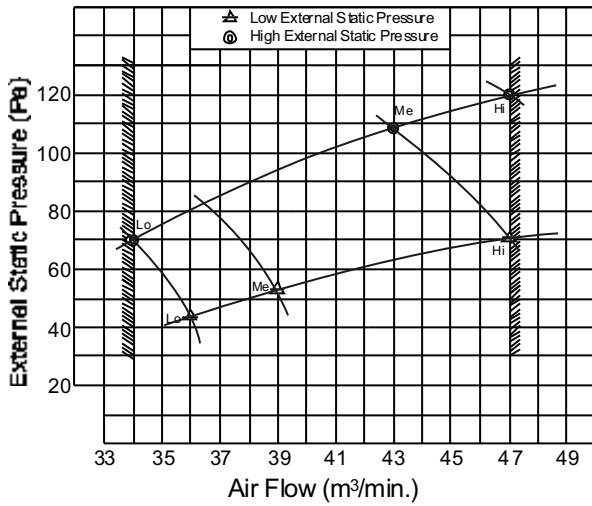
< RPI-3.0FSN2SQ >



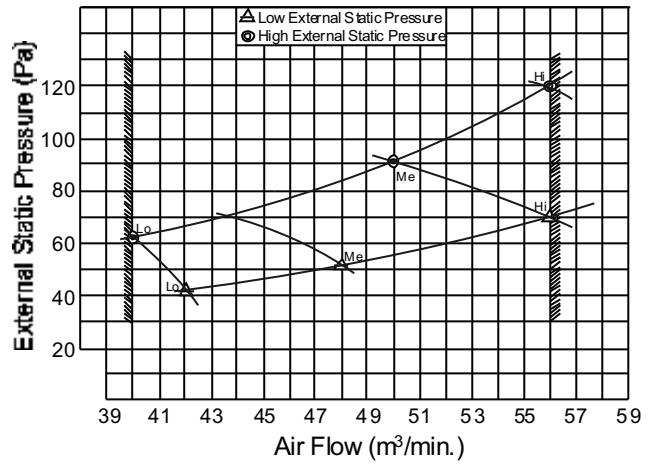
< RPI-4.0FSN2SQ >



< RPI-5.0FSN2SQ >



< RPI-6.0FSN2SQ >



< RPI-7.0FSN2SQ >

