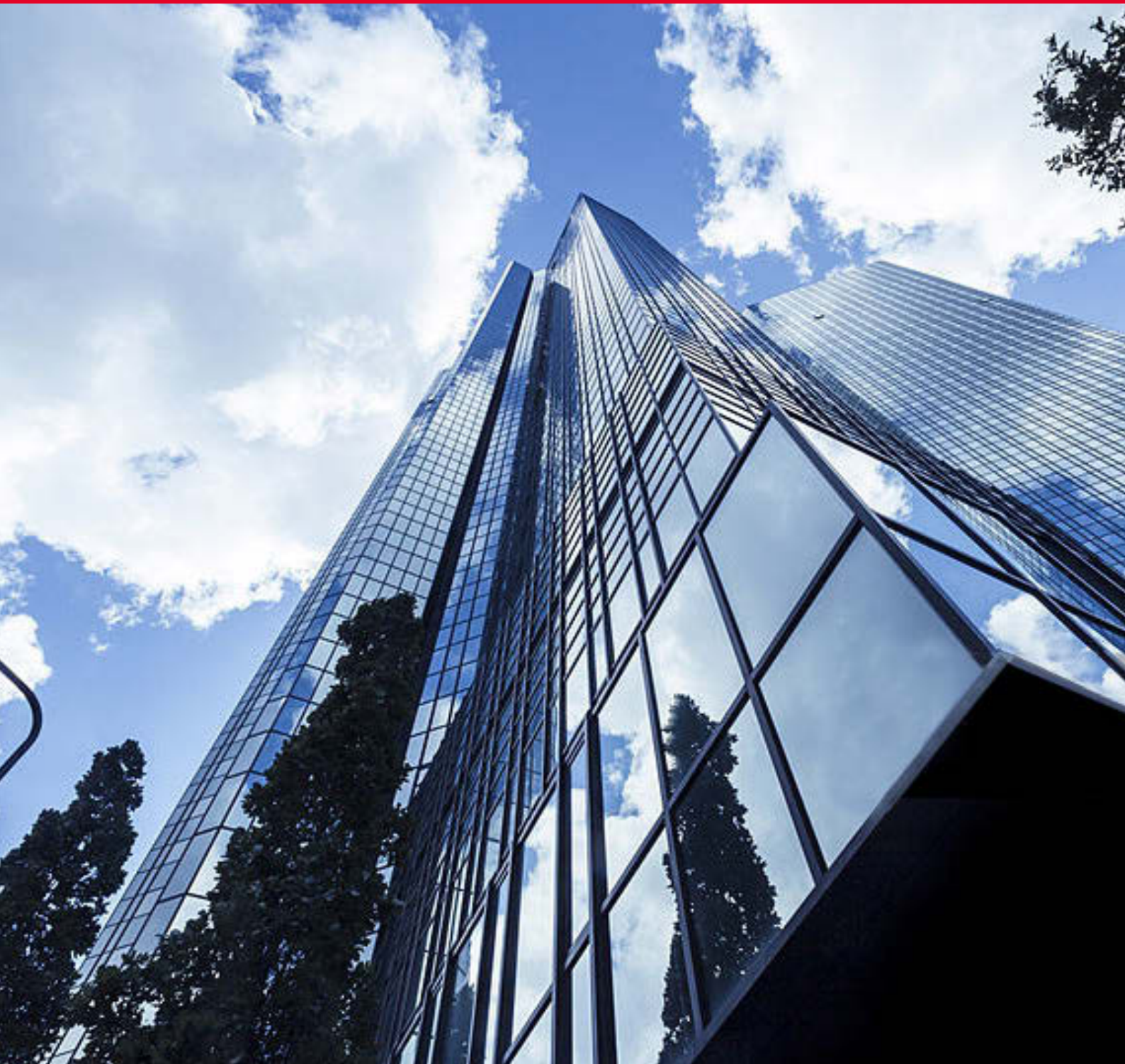


HITACHI

# Hitachi VRF Systems SET FREE $\Sigma$

HEAT PUMP type NS SERIES





A hand is holding a red brochure in the foreground, partially obscuring a white Hitachi VRF system in the background. The brochure features white text and a hand is visible at the bottom left corner holding it. The background is a dark wood surface.

# Enjoy a new chapter in Hitachi VRF history

Let us regale you,  
with the story of our new VRF system, SET FREE Σ.  
Leave behind the agonies caused by limitations or inclement weather.  
You will be captivated by the freedom and comfort that we offer.  
It's a new chapter in VRF history,  
where you can feel the future with air conditioning solutions by Hitachi.

HITACHI






# Hitachi VRF Systems SET FREE Σ

HEAT PUMP type NS SERIES

<b>Index</b>	03	What can Hitachi VRF offer ?	22	Specifications / Dimensions
	05	Line-up Overview		Service Space
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	13	Adaptability		
	16	High Efficiency		

# What can Hitachi VRF offer ?



 **Greater Performance**


An average of up to 39% energy savings for some applications compared to conventional HVAC systems.

- Higher efficiency ratio in APF, EER and COP
- Lower CO<sub>2</sub> emissions
- Lower power consumption

 **Greater Design Flexibility**

Meet any local requirements and constraints with a number of improvements of Outdoor unit (e.g. Larger capacity range or Smaller footprints).

- Larger capacity with smaller footprint
- Better piping limit
- Extended external static pressure

 **Easier Installation**

Overall cost/time reduction thanks to the lightweight and modular VRF systems.

- Overall lighter cabinet (16% lighter on average)
- Available for the lift transportation
- New package design to be craned more easily

 **Comfort**

Delivering precisely the correct amount of heating or cooling to each zone leads to the comfortability, and also quiet operation and defrosting are upgraded.

- Smart compressor control: keep indoor temperature more constant
- Lower noise operation
- New defrosting technology





**System Integration**

Delivering the ability of Integrating all management systems, from individual IDU to whole building, which leads to both time saving and cost saving.

- H-LINK solution
- Advanced individual and centralized control system
- Easy BMS connection



**Maintenance Ease**

Easier maintenance thanks to Both the elimination of any water treatment like pumps etc., and Design change in unit.

- All PCB visible and easily accessible
- Easy access to compressors and valves
- Smart refrigerant pump-down



**Better life-cycle costs**

VRF can operate for 20-30 years with whole easier maintenance, that leads to "Better Lifecycle Costs"!

- More Efficiency Operation thanks to DX system
- Maintenance Ease
- Higher Control capacity thanks to Advanced Individual/Centralized control system



**Aesthetics**

Let alone total line-up of Ceiling Concealed type of IDU, Ceiling Cassette type of IDU are also designed not to be the noise in space.

- Higher ESP ODU: the better visual aesthetics compared to outdoor installment
- Wide range of ceiling concealed type of IDU (Ducted type) will suit to your interior requirement
- Ceiling cassette type IDU are also designed to be clean and simple without any disturbance to indoor space.

# Line-up Overview

## NS SERIES

### Base Unit



8HP : RAS-8FSNS 190kg  
 10HP : RAS-10FSNS 190kg  
 12HP : RAS-12FSNS 210kg



14HP : RAS-14FSNS 268kg  
 16HP : RAS-16FSNS 310kg  
 18HP : RAS-18FSNS 311kg



20HP : RAS-20FSNS 350kg  
 22HP : RAS-22FSNS 364kg  
 24HP : RAS-24FSNS 365kg

### Combination of Base Units



26HP : RAS-26FSNS 478kg  
 28HP : RAS-28FSNS 520kg  
 30HP : RAS-30FSNS 521kg



32HP : RAS-32FSNS 579kg  
 34HP : RAS-34FSNS 621kg  
 36HP : RAS-36FSNS 622kg



38HP : RAS-38FSNS 633kg  
 40HP : RAS-40FSNS 675kg  
 42HP : RAS-42FSNS 676kg

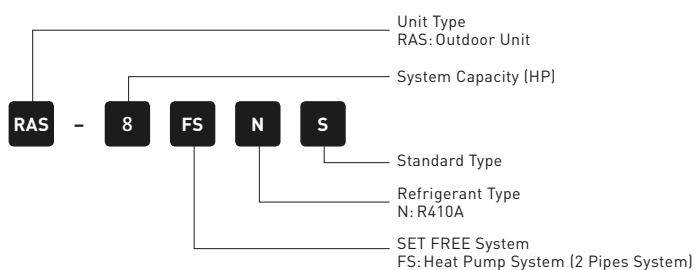


44HP : RAS-44FSNS 728kg  
 46HP : RAS-46FSNS 729kg  
 48HP : RAS-48FSNS 730kg



50HP : RAS-50FSNS 890kg  
 52HP : RAS-52FSNS 932kg  
 54HP : RAS-54FSNS 933kg

### Nomenclature





Summary Table

Item	Unit	Current Model (FSXN1)	NS Series
Capacity	HP	8-54	8-54
Nominal Cooling Capacity	KW	22.4 - 150.0	22.4-150.0
Nominal Heating Capacity	KW	25.0 - 165.0	25.0-165.0
Maximum Connectable Indoor Unit Quantity		64	64
Combination Capacity Ratio Between ODU and IDU	%	50-130	50-130
Total Piping Length	m (ft)	1000 (3281)	1000 (3281)
Maximum Piping Length Between ODU and IDU	m (ft)	165 (541)	165 (541)
Maximum Equivalent Piping Length Between ODU and IDU	m (ft)	190 (623)	190 (623)
Maximum Piping Length Between 1st Branch and IDU	m (ft)	90 (295)	90 (295)
Maximum Height Difference Between ODU and IDU * (when ODU is higher than IDU)	m (ft)	90 (295)	110 (361)↑
Maximum Height Difference Between ODU and IDU (when IDU is higher than ODU)	m (ft)	40 (131)	40 (131)
Maximum Height Difference Between IDU and IDU	m (ft)	30 (98)	30 (98)
Cooling Operation Range **	°C DB (°F)	-5 to 43 (23 to 109)	-5 to 48 (23 to 118)↑
Heating Operation Range **	°C WB (°F)	-20 to 15 (-4 to 59)	-20 to 15 (-4 to 59)

\* Please consult your distributor or dealer if the height different is over 50m.  
 \*\* For more details, please consult your distributors or dealer, or, refer to technical manuals.

Features and Benefits Overview

Design Flexibility ..... 9

- COMPACT
- EASY TRANSPORTATION
- IMPROVED EXTERNAL STATIC PRESSURE
- PIPING CONNECTION WORKABILITY
- OPERATION TEMPERATURE RANGE
- IDU COMBINATIONS RANGE

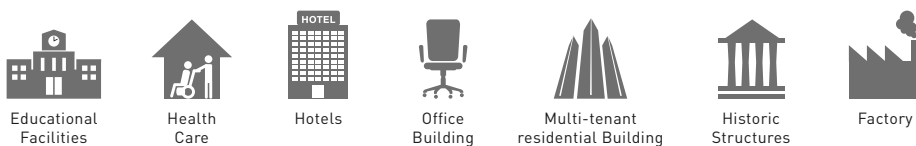
Adaptability ..... 13

- LOW NOISE OPERATION
- SILENT MODE
- IMPROVED STRENGTH
- DEFROSTING
- TO PREVENT FAILURE AND EMERGENCY OPERATION IN CASE OF FAILURE
- MAINTENANCE EASE

High Efficiency ..... 16

- EFFICIENCY RATIO
- 4 ADVANCED TECHNOLOGY
  - FAN
  - HEAT EXCHANGER
  - COMPRESSOR
  - COMPRESSOR CONTROL
- FOR BOTH YOU AND THE EARTH

Benefit to



# Features and Benefits Overview

FEATURES	ADVANTAGES	BENEFITS
Heat pump VRF systems	<ul style="list-style-type: none"> <li>Precisely heats or cools multiple zones</li> </ul>	<ul style="list-style-type: none"> <li>Provides extreme system design flexibility</li> </ul>
ODU Compact footprint	<ul style="list-style-type: none"> <li>Requires less indoor space than conventional systems</li> </ul>	<ul style="list-style-type: none"> <li>Expands options for positioning outdoor units</li> </ul>
Modular components ODU	<ul style="list-style-type: none"> <li>Provides flexibility to customize systems to each project's needs</li> </ul>	<ul style="list-style-type: none"> <li>Simplifies design process</li> <li>Allows easy updates as space is reconfigured or expanded</li> </ul>
Piping flexibility: with pipe runs up to 1000 meter	<ul style="list-style-type: none"> <li>Suitable for short or long runs; accommodates nearly all projects</li> </ul>	<ul style="list-style-type: none"> <li>Allows design freedom</li> </ul>
Higher ESP: up to 80 Pa	<ul style="list-style-type: none"> <li>Provides more options for outdoor units to be installed inside building by using ducts</li> </ul>	<ul style="list-style-type: none"> <li>Leads to both less piping length and lower installation cost</li> <li>Better efficiency</li> <li>Better visual aesthetics compared to outdoor installment</li> </ul>
Temperature Range	<ul style="list-style-type: none"> <li>Operates from -20°C to 48°C</li> </ul>	<ul style="list-style-type: none"> <li>Allows design freedom</li> </ul>
Silent Mode	<ul style="list-style-type: none"> <li>Lower sound power/sound pressure level by Three steps</li> </ul>	<ul style="list-style-type: none"> <li>Meet the local limitations to sound level</li> </ul>
Non-ducted systems	<ul style="list-style-type: none"> <li>Ultimate in design flexibility</li> <li>Reduces clearance between building floors</li> </ul>	<ul style="list-style-type: none"> <li>Reduces system costs</li> <li>Ideal for historic renovations</li> </ul>
Ducted systems	<ul style="list-style-type: none"> <li>Accommodates retrofits by making use of existing duct infrastructure</li> <li>Suits unique buildings that include ducted and non-ducted areas</li> </ul>	<ul style="list-style-type: none"> <li>Reduces overall construction costs</li> </ul>
Connectable IDU/ODU capacity ratio Up	<ul style="list-style-type: none"> <li>Up to 130% for Combination Capacity</li> </ul>	<ul style="list-style-type: none"> <li>Reduces system costs</li> </ul>
VRF Selection Software	<ul style="list-style-type: none"> <li>Intuitive functionality that simplifies and speeds designs</li> </ul>	<ul style="list-style-type: none"> <li>Allows confident selection and right-sizing of systems</li> </ul>
H-LINK: Hitachi original communication system to control multiple ODUs and IDUs from one control point.	<ul style="list-style-type: none"> <li>No connection boundary among RAC, PAC and VRF</li> <li>Flexible wiring routes</li> </ul>	<ul style="list-style-type: none"> <li>Allows design freedom</li> <li>Reduces system costs</li> </ul>



FEATURES	ADVANTAGES	BENEFITS
Compact footprint	<ul style="list-style-type: none"> <li>Requires less indoor space than conventional systems</li> </ul>	<ul style="list-style-type: none"> <li>Ease of transportation leads to time/cost saving in installation</li> </ul>
Lighter cabinet	<ul style="list-style-type: none"> <li>16 % lighter cabinet on average compared to Current Model (FSX N1)</li> </ul>	<ul style="list-style-type: none"> <li>Ease of transportation leads to time/cost saving in installation</li> </ul>
New Package of ODU	<ul style="list-style-type: none"> <li>Easy to understand for craning</li> </ul>	<ul style="list-style-type: none"> <li>Reduces installation time and cost</li> </ul>
Installation simplicity	<ul style="list-style-type: none"> <li>Outdoor unit piping can be connected from front, back or underneath.</li> <li>Small and light indoor units are easy to handle without heavy equipment</li> </ul>	<ul style="list-style-type: none"> <li>Reduces installation time and cost</li> </ul>
Comprehensive training	<ul style="list-style-type: none"> <li>Modules tailored to specific job functions</li> </ul>	<ul style="list-style-type: none"> <li>Enables professional, high-quality, timely installation</li> </ul>
Consistent, reliable product delivery	<ul style="list-style-type: none"> <li>Ensures correct components are delivered to job sites on time</li> </ul>	<ul style="list-style-type: none"> <li>Enhances installation efficiency</li> <li>Allows efficient labor scheduling</li> </ul>
Easy maintenance access	<ul style="list-style-type: none"> <li>The upper panel (on the side of an electric box) independently detached from the lower panel (on the compressor chamber side)</li> <li>All PCB visible and easily accessible including 7-segment display</li> <li>More Space in lower section, easy access to compressors and each valve</li> <li>Refrigerant evacuation: Enforced operation to open ODU EVO/EVB, IDU EVI, and Hi/Low pressure Bi-pass SVB</li> </ul>	<ul style="list-style-type: none"> <li>Speeds up time spent on maintenance, repair, and troubleshooting</li> </ul>
Improved Strength	<ul style="list-style-type: none"> <li>Rigidity ratio increased by 36.7%</li> </ul>	<ul style="list-style-type: none"> <li>Extends service life</li> </ul>
Technical Support Web	<ul style="list-style-type: none"> <li>All product information is available on TS-Web → <a href="http://www.jci-hitachi.com/support/technical">http://www.jci-hitachi.com/support/technical</a></li> </ul>	<ul style="list-style-type: none"> <li>Reduce time to check up the necessary resources</li> </ul>





	FEATURES	ADVANTAGES	BENEFITS
System	Rotational operation	<ul style="list-style-type: none"> <li>In multiple-unit applications at partial load, outdoor units operate alternately so that operating hours are shared equally.</li> </ul>	<ul style="list-style-type: none"> <li>Optimizes efficiency</li> <li>Extends service life</li> <li>Increases reliability</li> </ul>
	Backup operation function	<ul style="list-style-type: none"> <li>Allows one outdoor unit to be taken off-line for maintenance while remaining units keep operating.</li> </ul>	<ul style="list-style-type: none"> <li>Avoids system downtime</li> <li>Protects occupant comfort</li> </ul>
	Efficiency optimized for part-load operation	<ul style="list-style-type: none"> <li>APF cooling among industry's highest for VRF systems</li> </ul>	<ul style="list-style-type: none"> <li>Saves energy</li> </ul>
	Optimum individualized comfort	<ul style="list-style-type: none"> <li>Heat pump systems deliver simultaneous heating and cooling</li> </ul>	<ul style="list-style-type: none"> <li>Efficient heating/cooling</li> <li>Maximizes occupant comfort</li> </ul>
	Noise reduction preference mode	<ul style="list-style-type: none"> <li>Let users choose from three settings for a "not to exceed" sound level</li> </ul>	<ul style="list-style-type: none"> <li>Extremely quiet [24.5-28 dB for indoor units]</li> <li>Ideal where outdoor units are positioned on side of building or in locations where there are noise restrictions</li> </ul>
Compressor	DC inverter-driven scroll compressor	<ul style="list-style-type: none"> <li>Engineered to deliver the optimum efficiency at normal load conditions</li> </ul>	<ul style="list-style-type: none"> <li>Among industry's most efficient VRF systems:</li> <li>Highest EER</li> <li>Highest APF</li> <li>Highest COP in low and high heating modes</li> </ul>
	Newly introduced compressor shield cover	<ul style="list-style-type: none"> <li>New cover can shield up the compressor sound</li> </ul>	<ul style="list-style-type: none"> <li>Lower sound pressure level</li> </ul>
	Compressor modulation in 0.1 Hz increments	<ul style="list-style-type: none"> <li>Smoothly delivers only the exact amount of refrigerant needed for the load</li> </ul>	<ul style="list-style-type: none"> <li>Allows fine control for optimum comfort</li> <li>Saves energy</li> </ul>
Outdoor Units	Demand control	<ul style="list-style-type: none"> <li>Users can select from a wide variety of power settings from 100% to 60% and program "not to exceed" a given power level</li> </ul>	<ul style="list-style-type: none"> <li>Limits electric demand charges</li> <li>Limits equipment wear and tear</li> <li>Reduces noise</li> </ul>
	Smooth Drive: new compressor control operation system	<ul style="list-style-type: none"> <li>Controls compressor more efficiently</li> </ul>	<ul style="list-style-type: none"> <li>Saves energy</li> <li>Constant room temperature</li> </ul>
	Load shedding	<ul style="list-style-type: none"> <li>Allows programming to turn units on/off in rotation at 10- to 20-minute intervals</li> </ul>	<ul style="list-style-type: none"> <li>Saves energy</li> <li>Limits demand charges</li> </ul>
	Low noise operation	<ul style="list-style-type: none"> <li>Improved compressor cover</li> <li>Improved Fan + Fan-inlet structure</li> </ul>	<ul style="list-style-type: none"> <li>More quiet operation</li> </ul>
	New Heat Exchanger (which looks like Σ)	<ul style="list-style-type: none"> <li>Heat exchange are increased by more than 10 % [12HP]</li> </ul>	<ul style="list-style-type: none"> <li>Greater heat exchange rate</li> <li>More efficient operation</li> </ul>
	New long blade propeller fan	<ul style="list-style-type: none"> <li>Longer fan blades increase airflow quantity by 25%, resulting in higher static pressure</li> </ul>	<ul style="list-style-type: none"> <li>Operates more efficiently</li> <li>Extends motor life</li> </ul>
Indoor Units	As high as 200Pa static pressure in ducted systems	<ul style="list-style-type: none"> <li>Offers adjustable speeds to match the static pressure requirement</li> </ul>	<ul style="list-style-type: none"> <li>Flexibility to accommodate long or short ductwork runs</li> </ul>
	Widest range of line-up	<ul style="list-style-type: none"> <li>meets any of your indoor requirement</li> </ul>	<ul style="list-style-type: none"> <li>keeps aesthetic</li> </ul>
	Optional motion and radiant sensors	<ul style="list-style-type: none"> <li>Sets back temperature when space is unoccupied, increasing efficiency even further</li> </ul>	<ul style="list-style-type: none"> <li>Saves energy</li> </ul>
Controls	"H-LINK" Protocol	<ul style="list-style-type: none"> <li>Controls multiple indoor and outdoor units from one control point</li> <li>Adds versatility to connect various central control options</li> </ul>	<ul style="list-style-type: none"> <li>Maximizes indoor comfort</li> <li>Saves energy</li> <li>Improves system management</li> </ul>
	Temperature control	<ul style="list-style-type: none"> <li>Adjusts in 0.5/1 degree C increments</li> <li>Adjustable fan speeds</li> </ul>	<ul style="list-style-type: none"> <li>Auto-adjusts for daylight saving time</li> <li>Provides options to satisfy multiple projects/buildings</li> </ul>
	H-LINK BACnet adapter for integration into BMS	<ul style="list-style-type: none"> <li>Enables control of VRF systems by way of a building management system (e.g. Metasys®) for almost unlimited control in a building of campus enterprise.</li> </ul>	<ul style="list-style-type: none"> <li>Optimizes comfort</li> <li>Saves energy</li> <li>Unified interface for all HVAC systems</li> </ul>

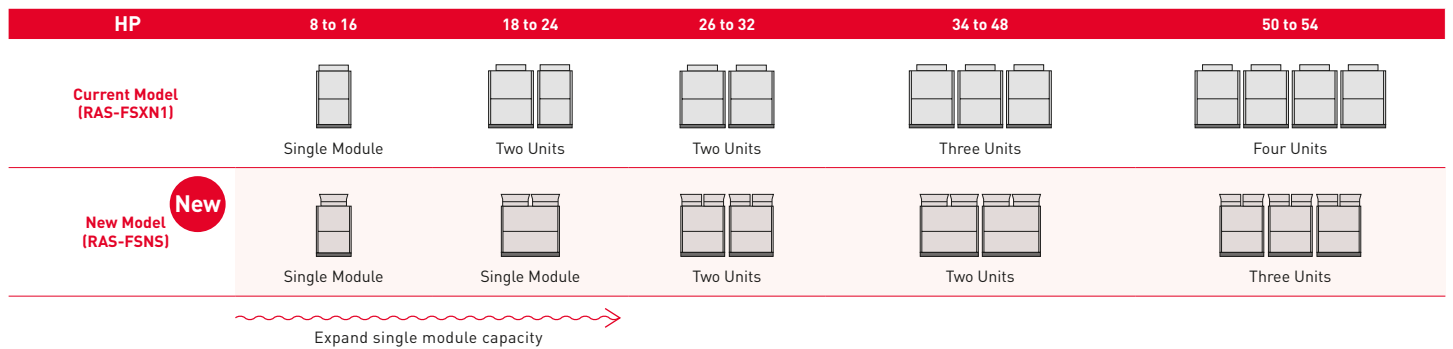


BUILDING OWNER

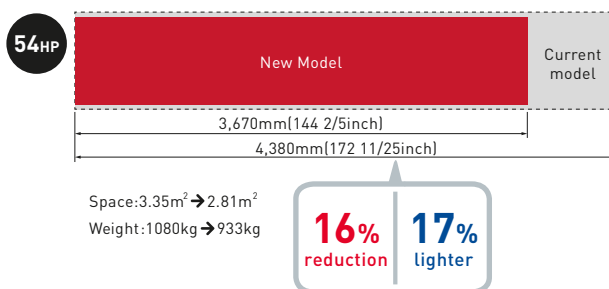
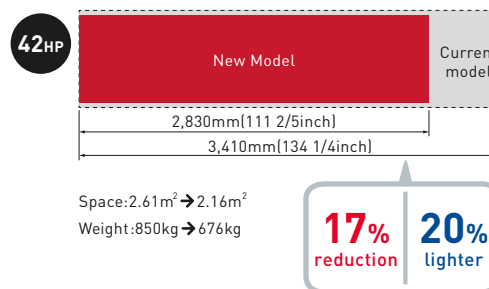
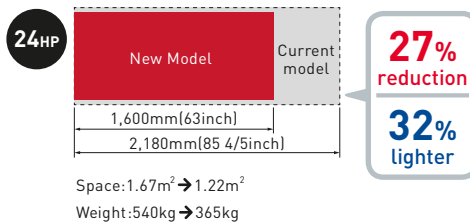
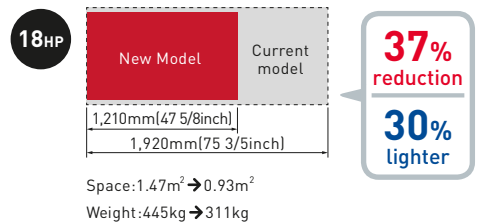
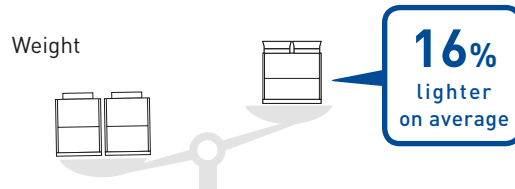
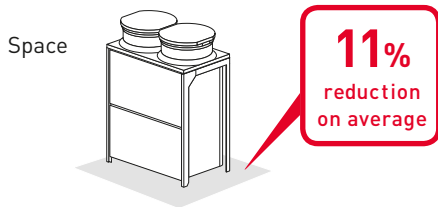
# Design Flexibility

## COMPACT

### Combination Comparison of Outdoor Unit



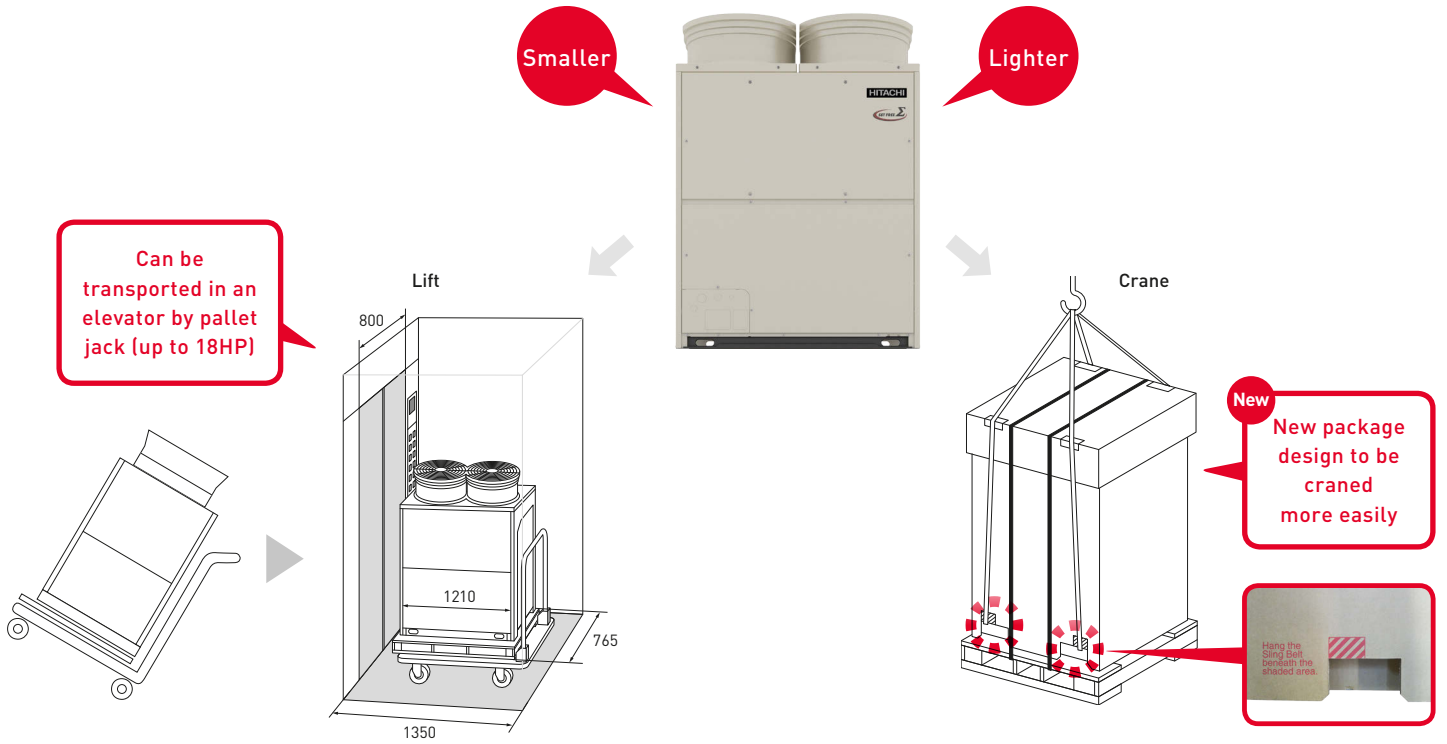
### More Compact Case (Compare to Current Model)







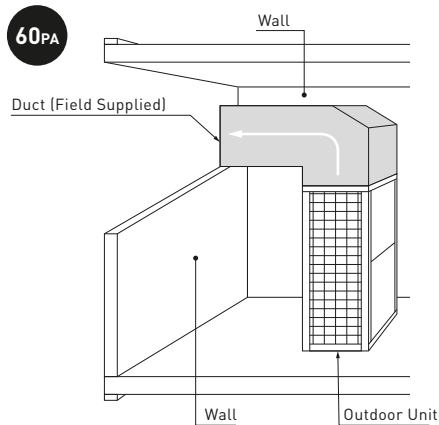
## EASY TRANSPORTATION



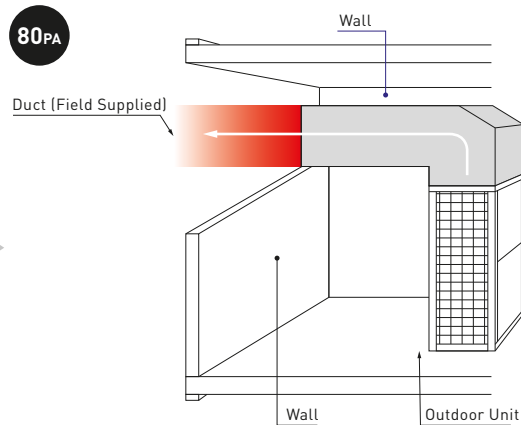
## IMPROVED EXTERNAL STATIC PRESSURE

High static pressure for outdoor units: can handle up to 80Pa

Current Model



New Model



**↑** offers more options for the indoor installation of the outdoor unit

- Less piping length
- Lower installation cost
- Visual aesthetics

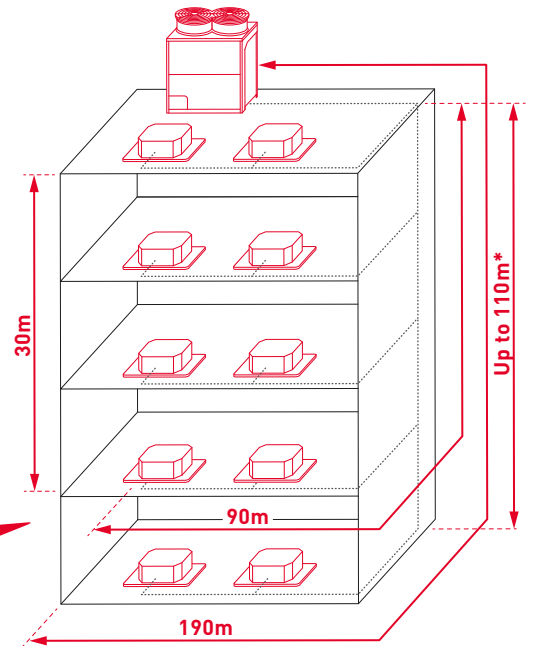
## PIPING CONNECTION WORKABILITY

### Improvement of restrictions on piping construction

<b>Total piping length</b>	1000m	
<b>Longest length actual (Equivalent)</b>	165m (190m)	
<b>Longest length after first branch</b>	90m	
<b>Level difference between ODU and IDU</b>	Higher ODU	Standard 50m Optional 110m(*)
	Lower ODU	40m
<b>Level difference between IDUs</b>	30m	

\* Please consult your distributor or dealer if the height difference is over 50m.

- Suitable for a high-rise building or complex facilities.
- Leads to cost/time saving for designers, with more efficient design.



### Piping Direction

The pipes can be installed in three directions (front, rear or bottom side) from the bottom base.

#### For Piping from Front cover

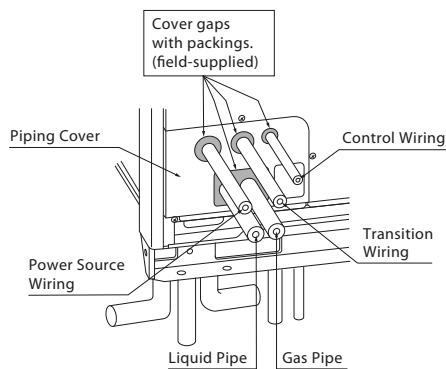


image: front

#### For Piping from Bottom base to Left, Right and Rear side

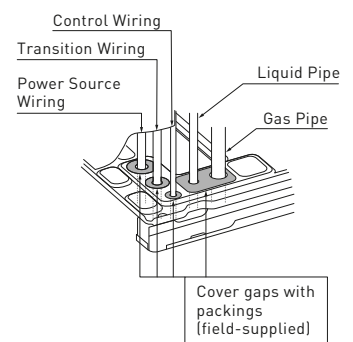


image: bottom

- For more service space in front.

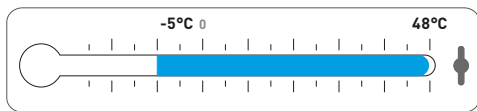


## OPERATION TEMPERATURE RANGE

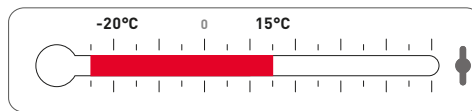
### Expansion of scope of outdoor operating temperature



<b>Cooling Capacity Range</b>	°C DB [°F]	-5 to 48 (23 to 118)
<b>Heating Capacity Range</b>	°C WB [°F]	-20 to 15 (-4 to 59)



Cooling mode



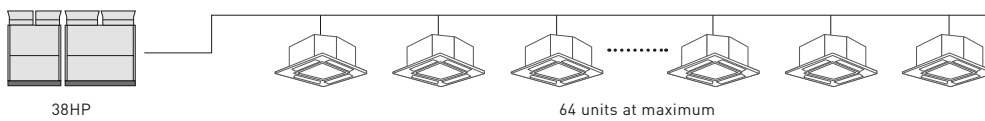
Heating mode

**NOTES:**

- Cooling operation at maximum 48°C DB (for standard type) and 52°C DB (for high efficiency type) should be available only if the outdoor air inlet temperature increase temporarily according to the installation condition.
- If install the units to the place where exceed ambient temperature 48°C continuously, the combination ratio must be lower 130% and not to operate all of the indoor unit simultaneously.
- The cooling capacity is deteriorated at high ambient temperature. Select the larger capacity outdoor unit than compatible building heat load.
- The appropriate amount (100%) of refrigerant must be charged. Excessive charging of refrigerant is forbidden.
- It must be avoided to install the units where affected by direct sunlight reflection and short circuit. There may be the possibility to activate protection control and alarm system if install the units to inappropriate place. Also the life time of the products and parts must be considerably shortened.
- Periodic maintenance (1/certain month) must be applied to the heat exchanger fin to avoid adhesion of dirt and clogging of sand to the outdoor unit heat exchanger.
- Refer to the technical catalog for the detail.

## IDU COMBINATIONS RANGE

### Expansion of number of connectable indoor units



<b>Outdoor Unit Capacity (HP)</b>	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38-54
<b>Range of combination capacity</b>	<b>Standard Type (FSNS) : 50 to 130% (In case the combination ratio exceed 130%)</b>															
<b>Maximum Connectable IDU Quantity</b>	13	16	19	23	26	26	33	36	40	43	47	50	53	56	59	64
<b>Recommended Connectable IDU Quantity</b>	8	10	10	16	16	16	18	20	26	26	32	32	32	32	32	38

**NOTES:**

- The connectable indoor unit capacity ratio can be calculated as follows.  
Connectable Indoor Unit Capacity Ratio = Total Indoor Unit Capacity / Total Outdoor Unit Capacity
- For the system under which all the indoor units are supposed to operate simultaneously, the total indoor unit capacity should be less than outdoor unit capacity. Otherwise, it may cause a decrease of operating performance and operating limit in overload operation.
- For the system under which all the indoor units are not supposed to operate simultaneously, the total indoor unit capacity is available up to 130% against the outdoor unit capacity.
- When operating the outdoor unit in cold areas with temperatures of -10°C, or under the high heating load conditions, the total indoor unit capacity should be less than 100% against the outdoor unit capacity and the total piping length should be less than 300m.
- The air flow volume for indoor units of 0.8 and 1.0HP is set higher than that for indoor units of 1.5HP or more. Make sure to select appropriate indoor units when installing indoor units where cold draft may occur during heating operation. If installing indoor units in such places, refer to the recommended number of connectable indoor units.
- If combination capacity of indoor units exceed 100% of outdoor unit capacity, there might be the possibility of insufficient capacity of 130% (standard) and 150% (high efficiency) combination ratio. Refer to the technical.



# Adaptability

## LOW NOISE OPERATION

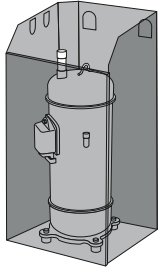
Thanks to below 2 Design Changes

Sound Power Level	dB(A)							
HP	8	10	12	14	16	20	22	24
Current Model	81.5	82.5	84	85.4	85.5	86	87	87
New Model	80	82	82	85	85	86	84	86

**-1.5 on Average !**  
 The performance capability has increased, but the running Sound Power Level (dB(A)) has decreased.

### Compressor:

The model is louder than conventional models due to the utilization of a compact high-speed compressor, but it can reduce the level of the sound pressure by up to 2dB(A) due to the utilization of new pressure covers.

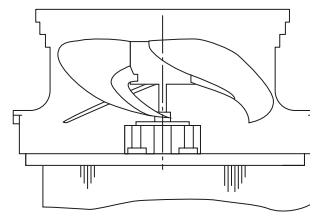


**New Cover**

New Cover

### Air blower:

The air blower has a new structure where it is placed above the heat exchanger, meaning that the noise on the reverse side can be suppressed.



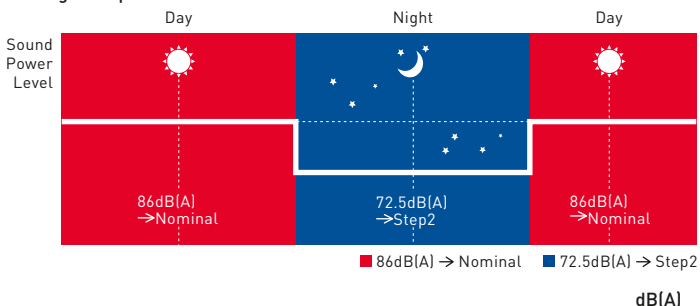
**New Model**

New Model

## SILENT MODE

The user can set a (three-step) nighttime low-noise schedule using the control unit remote controller. The user can set a schedule for operation that takes the ambient environment into account.

Setting example



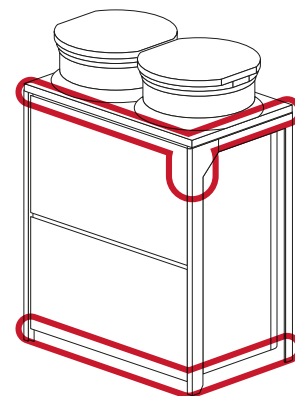
	18HP	42HP
Noise Reduction mode	Sound Power Level	Sound Power Level
Nominal	86	89
Step1	82.5	86
Step2	77.5	81
Step3	72.5	76

\*The range of performance and operation is limited, since the rotation frequency of the compressor and ODU fan are forcibly decreased.

## IMPROVED STRENGTH

Rigidity ratio (measured value) in the front and back direction : **increased by 36.7%**

**Rigidity improved !**



**Improved!**

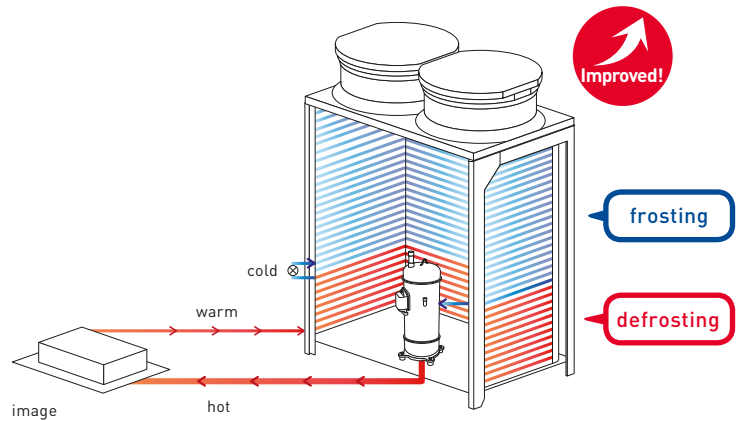
image



## DEFROSTING

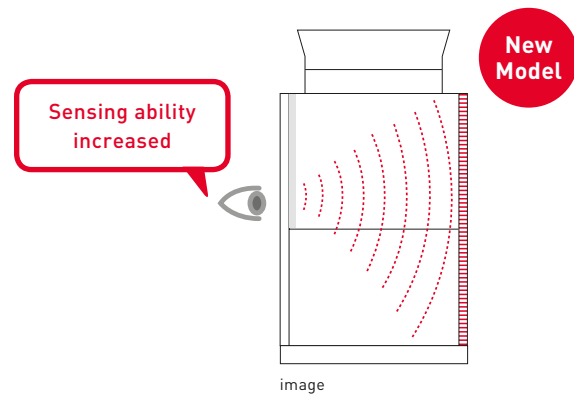
### Prevention

for defrosting prevention, the model controls frost and ice formation during heating operation by running mid-temperature coolant (5°C-20°C) before decreasing the pressure through a heat exchanger to control frost and ice formation on the lower part of the outdoor heat exchanger.



### Better Sensing

Even while defrosting, Hitachi's original sensing function has improved the system for detecting the frost amount.

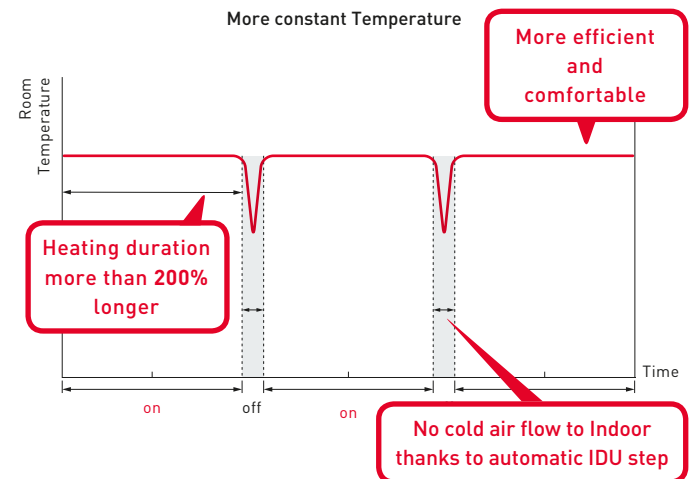
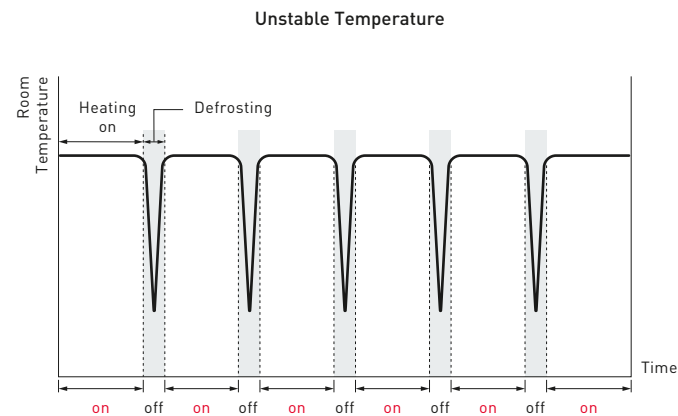


### More efficient defrosting

In addition, the defrosting interval has been increased by more than 200%, from 120 minutes to 250 minutes. Undertakes defrosting more efficiently, rather than unnecessary defrosting every two hours.

Current Model (image)

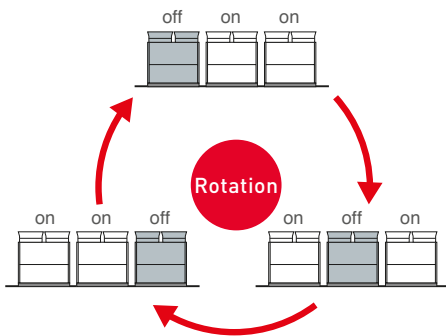
New Model (image)



## TO PREVENT FAILURE AND EMERGENCY OPERATION IN CASE OF FAILURE

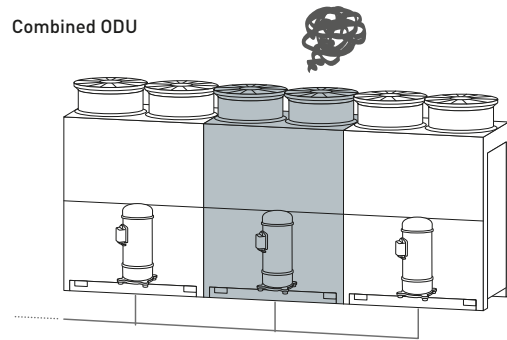
### To prevent failure

Standardize the running time of the individual outdoor units and distribute the load by rotating the order of operation of the compressors of the outdoor units.



### Back up function

Full introduction of backup operation function. If one outdoor unit should fail, the model can continue to operate using the remaining outdoor units, thereby preventing total system failure.



## MAINTENANCE EASE

### Total Structure Change

**New Structure:**

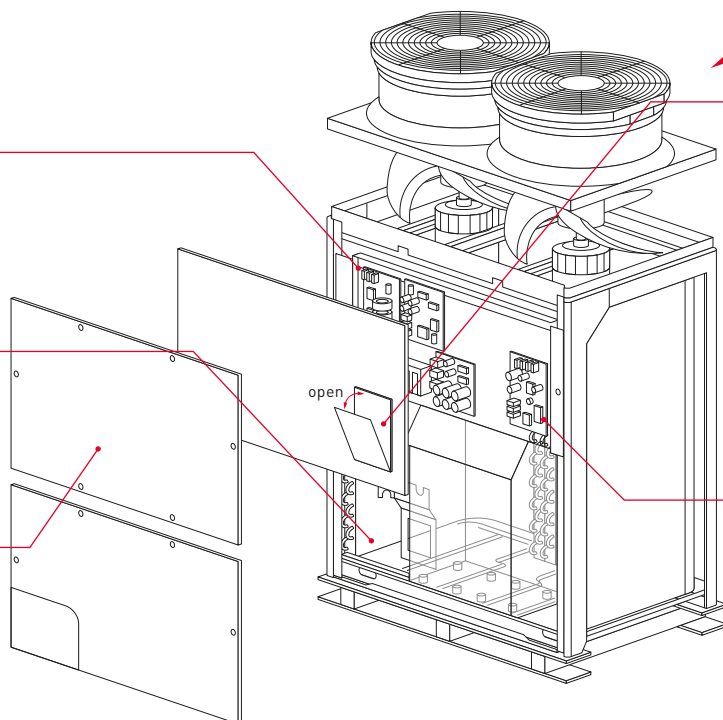
In upper section, all PCB visible and easily accessible

**New Structure:**

More Space in lower section, easy access to compressors or valves

**New Panel:**

The upper panel (on the side of an electric box) can be independently detached from the lower panel (on the compressor chamber side)



Totally New!

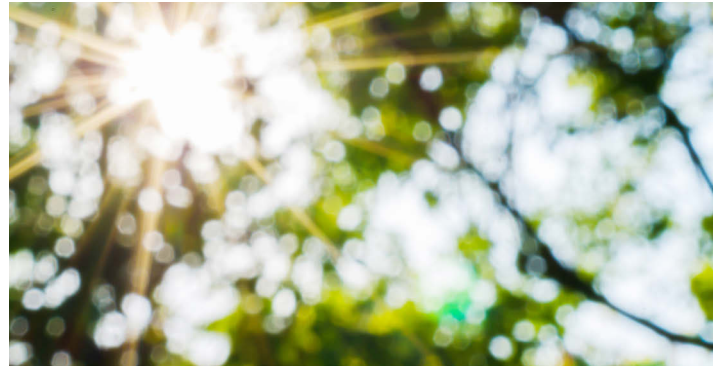
**Newly adopted window for 7-segment display:**  
Adopting access door to the electrical box in the upper panel, which leads to easy access to 7-segment display, PSW & DSW and so on.



**New DSW setting for Refrigerant pump-down:**  
Refrigerant evacuation: Enforced operation to open ODU EVO/EVB, IDU EVI, and Hi/Low pressure Bypass SVB

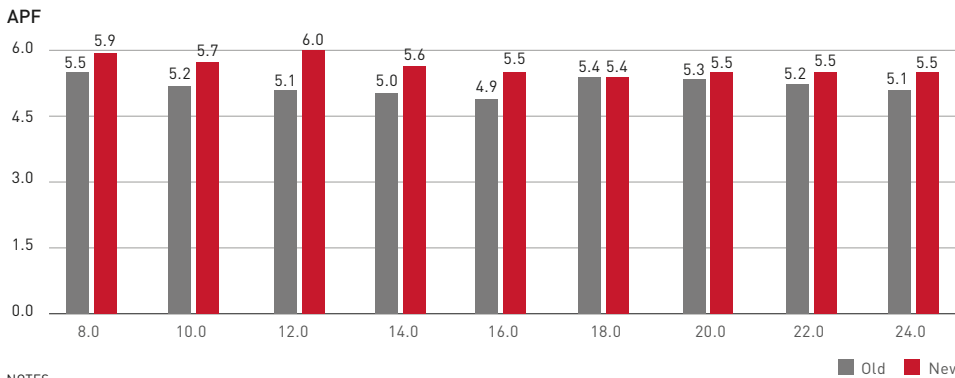


# High Efficiency



## EFFICIENCY RATIO

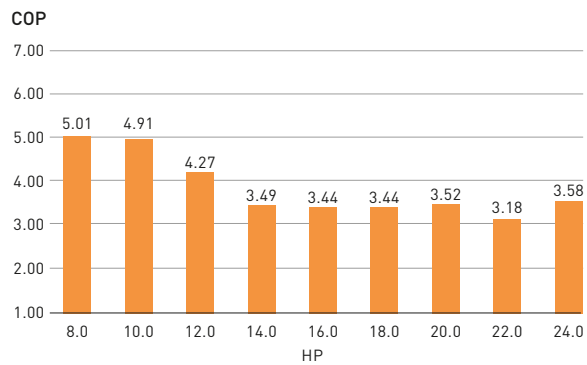
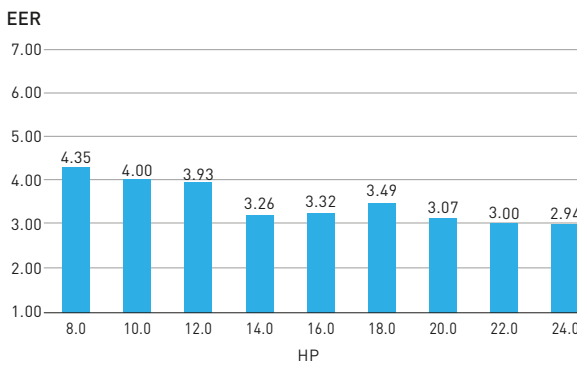
### APF: Annual Performance Factor



High Efficiency of Overall lineup, with APF improved by **7%** on average.

NOTES:  
 APF [As Reference in the Japanese seasonal performance benchmark for VRF]  
 APF is meant for cooling/heating capacity per 1kW of operating power consumption under certain conditions throughout the year.  
 APF = Accumulated cooling/heating loads (kWh) / Accumulated power input in cooling/heating (kWh)

### NS Type



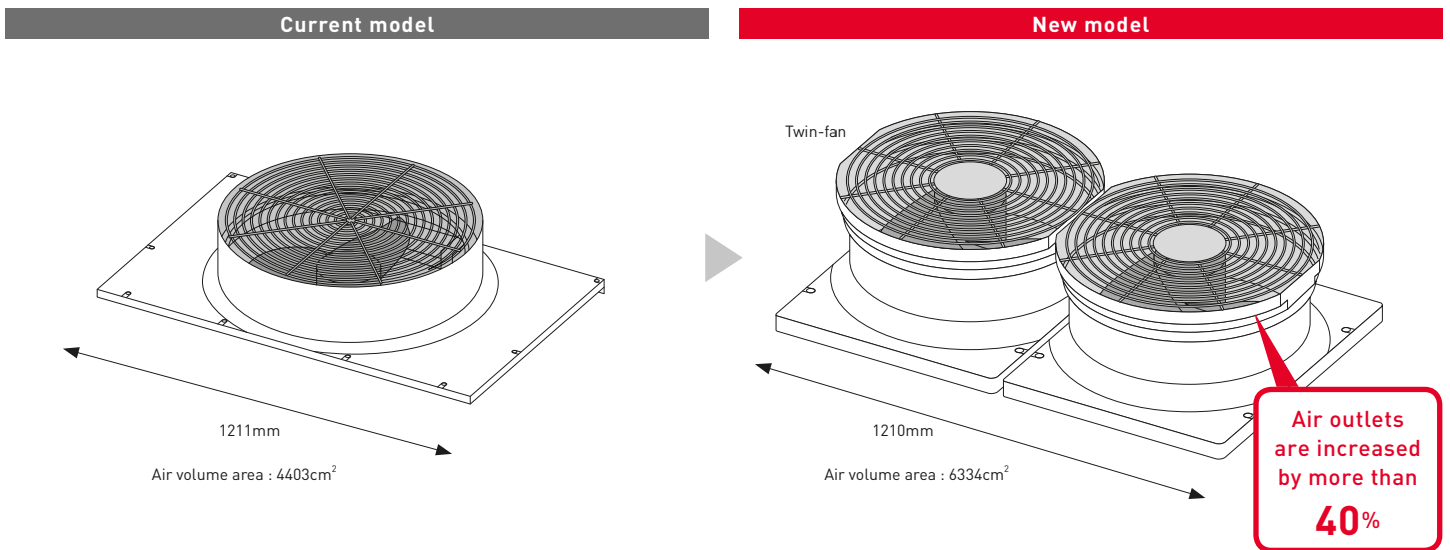
NOTES:  
 1. The graphs below show the EER/COP of single units for Oceania.  
 2. The above values indicate the EER/COP per outdoor unit when it is combined with specified indoor units.  
 3. The specification of EER/COP of each country is different according to the regulation. Please contact to the Sales person for more information.  
 4. EER = Energy efficiency ratio = Cooling capacity or Heating capacity ÷ Power consumption of an air conditioner  
 5. COP = Coefficient of performance of an air conditioner = Output KW (cooling capacity) ÷ Input KW (power consumption)

## WHAT'S IMPROVED?

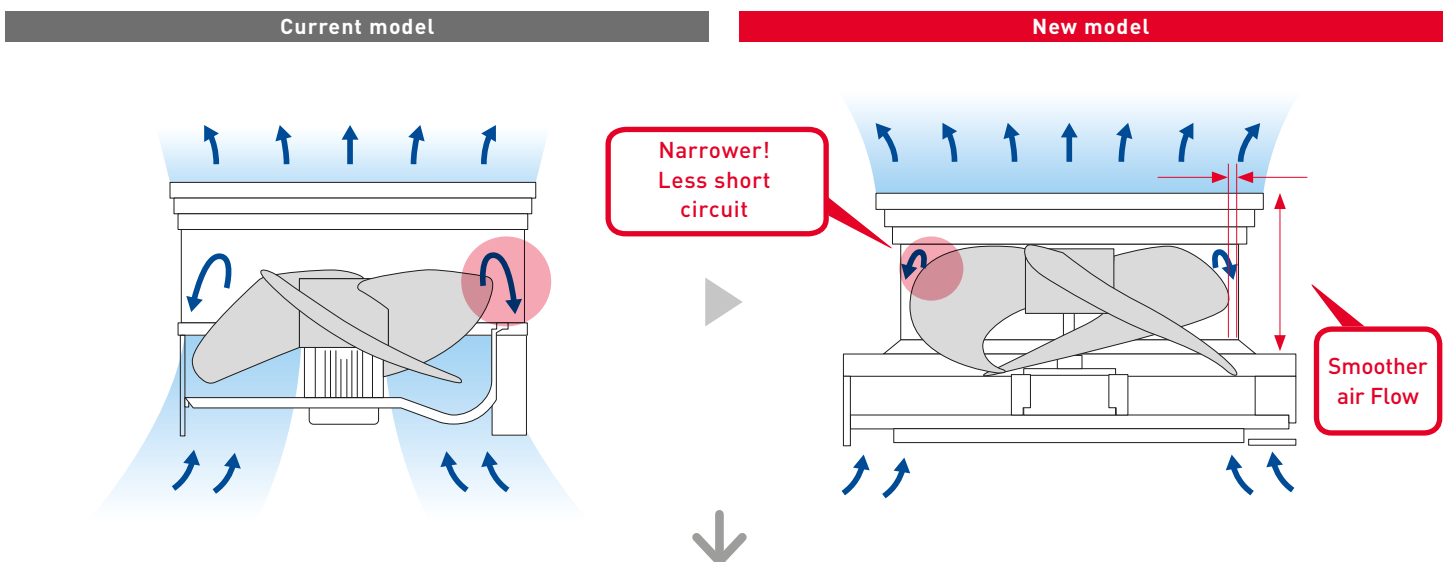
- 1) FAN
- 2) Heat Exchanger
- 3) Compressor
- 4) Compressor Control

## IMPROVED FAN POWER

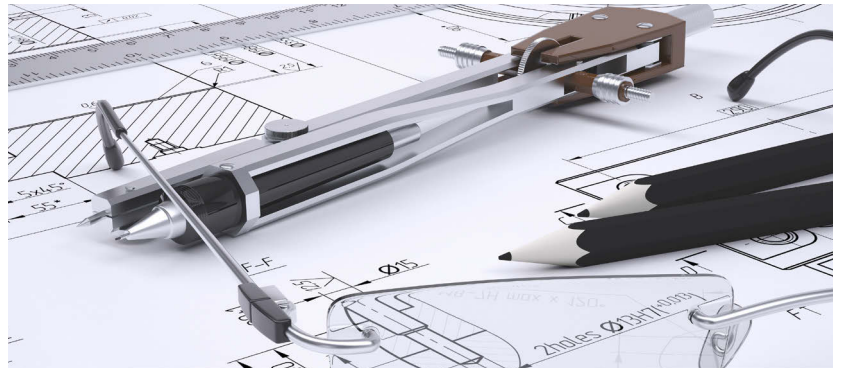
### Expansion of Air Outlets



### Improvement in bell-mouth



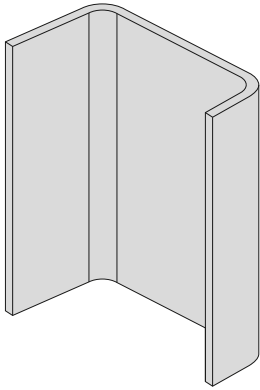
- Improvement of airflow volume by **23%** (12HP)
- Energy consumption in the driving shaft has decreased by **20%** on average



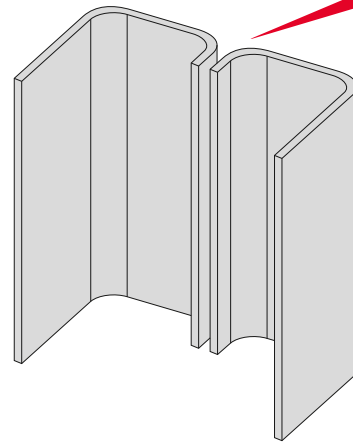
## IMPROVED HEAT EXCHANGER

### New shape

Current model (14,16HP)

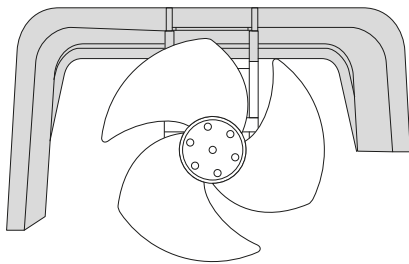


New model (14-24HP)

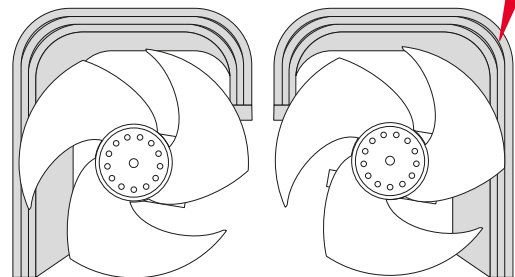


### New angle

Current model (14,16HP)



New model (14-24HP)



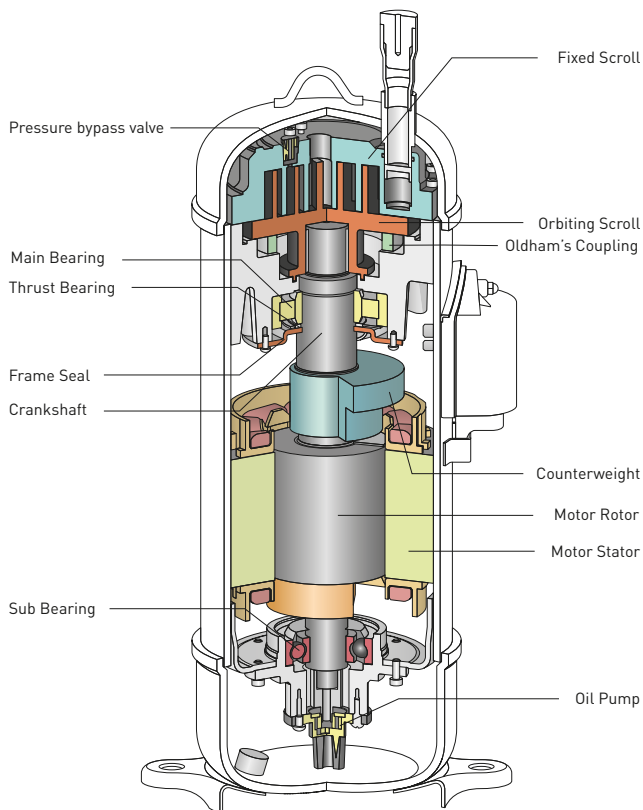
- The heat exchange area has been increased by more than **10%** (12HP)
- Gre-ater heat exchange efficiency



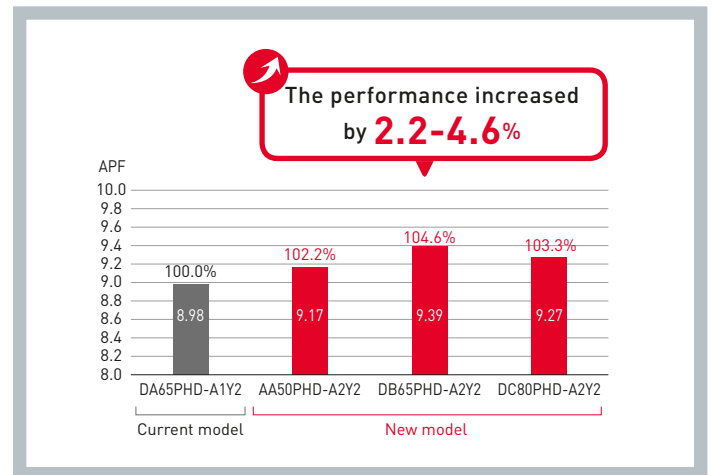
## IMPROVED COMPRESSOR

### New design compressor

**INVERTER**

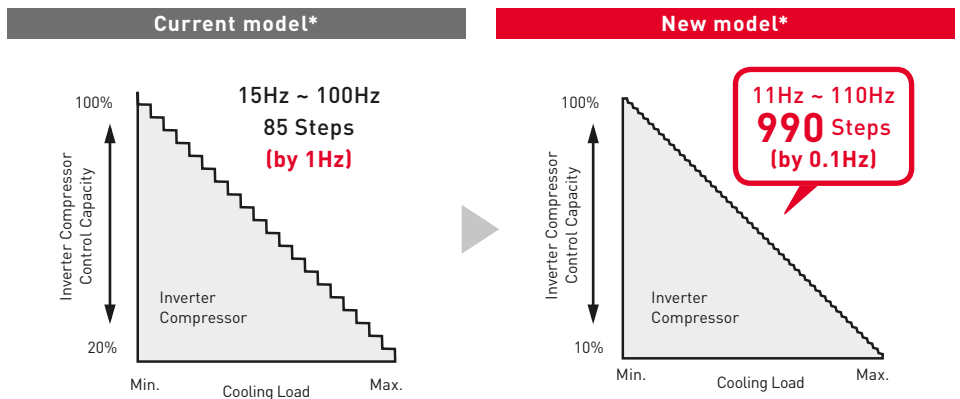


The **13** colored parts are new!



### Greater capacity control

The highly improved performance as well as greater energy saving is achieved by adopting newly developed high efficiency DC inverter compressor, with outstandingly precise control technology of 0.1Hz increments inverter frequency. Another feature is the dramatically extended working range, enabled by expanding the compressor's operating frequency band, both upwards and downwards.



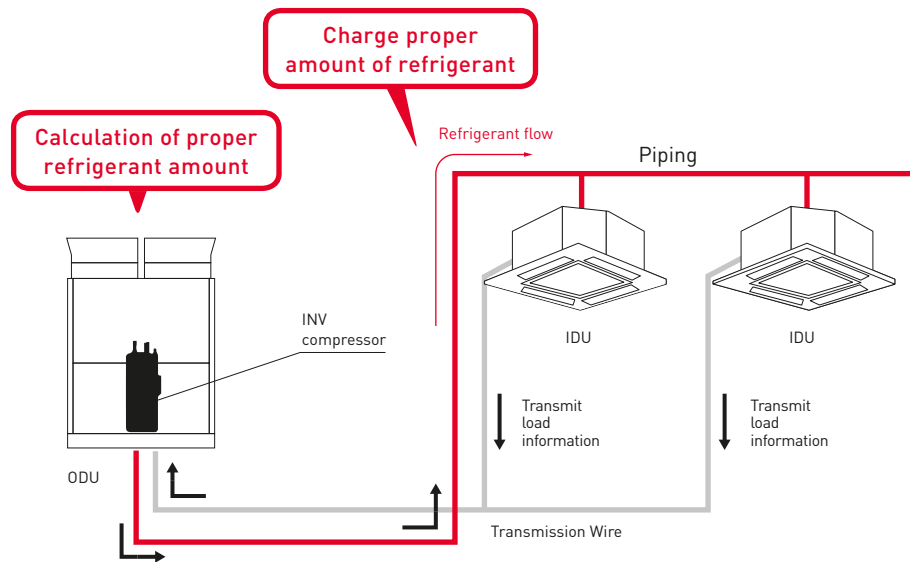
\*Example at 12HP



## IMPROVED COMPRESSOR CONTROL

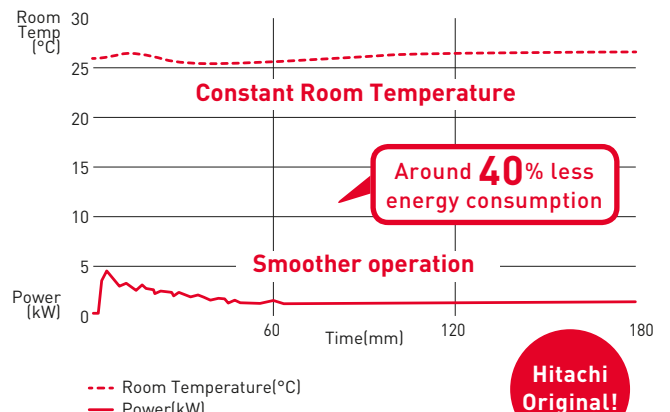
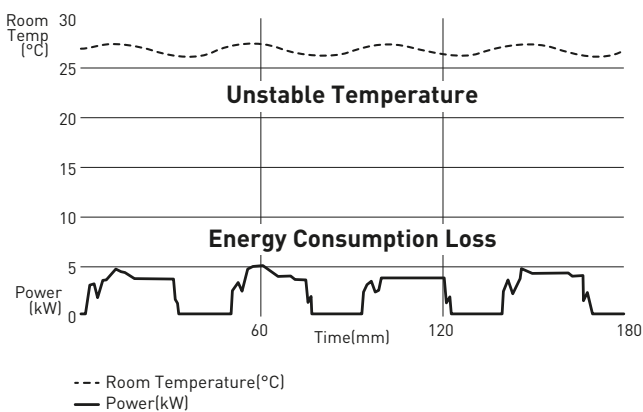
### Smooth Drive

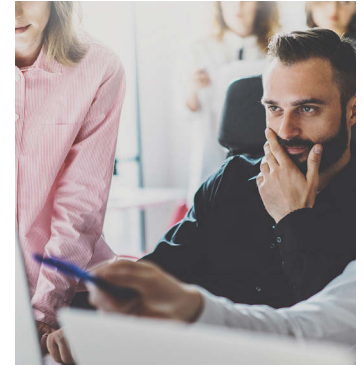
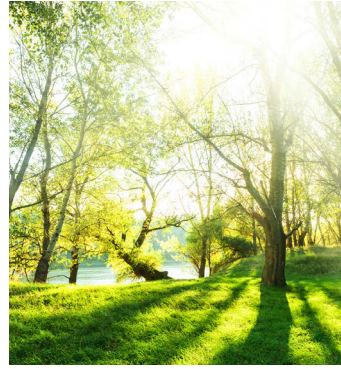
The model calculates the appropriate amount of coolant supplied by the outdoor units on the basis of information about the required load from the individual indoor units. The model employs smooth operation control to control the number of revolutions of the inverter compressor. The model supplies the appropriate amount of coolant to the indoor units according to the required load. The model increases energy-saving efficiency by operating smoothly while controlling the switching on and off of the compressor at low-load operation.



### Current model

### New model



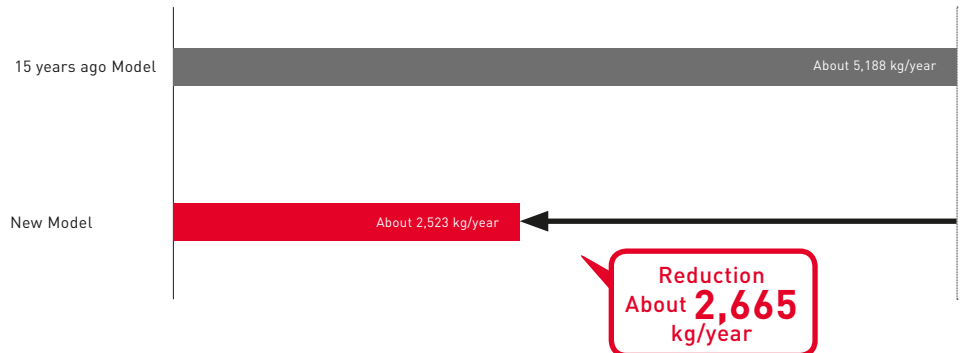


## FOR BOTH YOU AND THE EARTH

### Significant reduction of CO<sub>2</sub> emissions

By reducing power consumption, we have significantly reduced CO<sub>2</sub> emissions and reduced the environmental impact. (Reduction amount)

CO<sub>2</sub> EMISSIONS (FOR A 10HP EQUIVALENT SYSTEM)



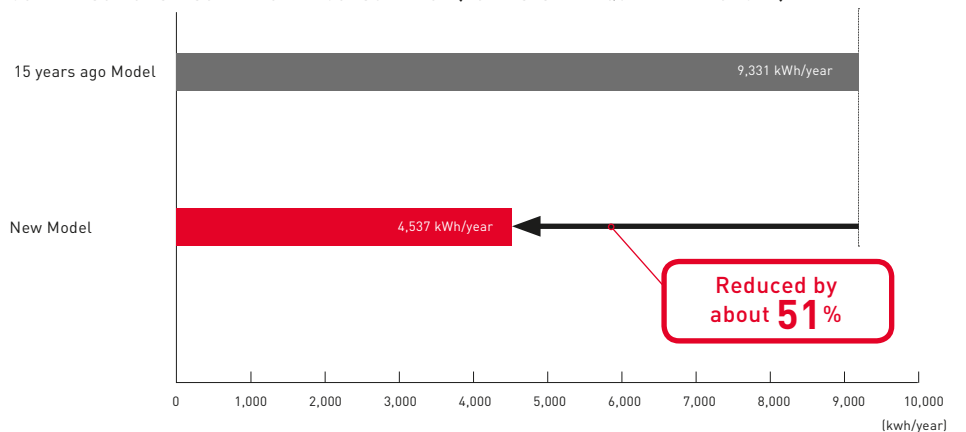
NOTE:

1. CO<sub>2</sub> emissions are a trial calculation value based on JIS B 8616: 2015 (Tokyo office). The CO<sub>2</sub> emissions coefficient is 0.534 kg-CO<sub>2</sub>/kWh.
2. Based on the end-use intensity of CO<sub>2</sub> emissions (actual emission coefficient in FY 2014) specified by the Federation of Electric Power Companies.
3. As reference in Japanese domestic model

### Significant reduction of power consumption

By increasing the performance of air blowers, heat exchangers and compressors and improving compressor control, we have significantly reduced annual power consumption. (Comparison of power consumption during a specific period)

COMPARISON OF SEASONAL POWER CONSUMPTION (FOR A SYSTEM EQUIVALENT TO 10HP)



NOTE:

1. Seasonal power consumption is a calculated value based on JIS B 8616: 2015 (Tokyo office), and it may vary depending on the area or usage conditions.
2. As reference in Japanese domestic model



# Specifications / Dimensions

## Service space














### NOTES:

The cooling and heating performances are the values when combined with our specified indoor units.

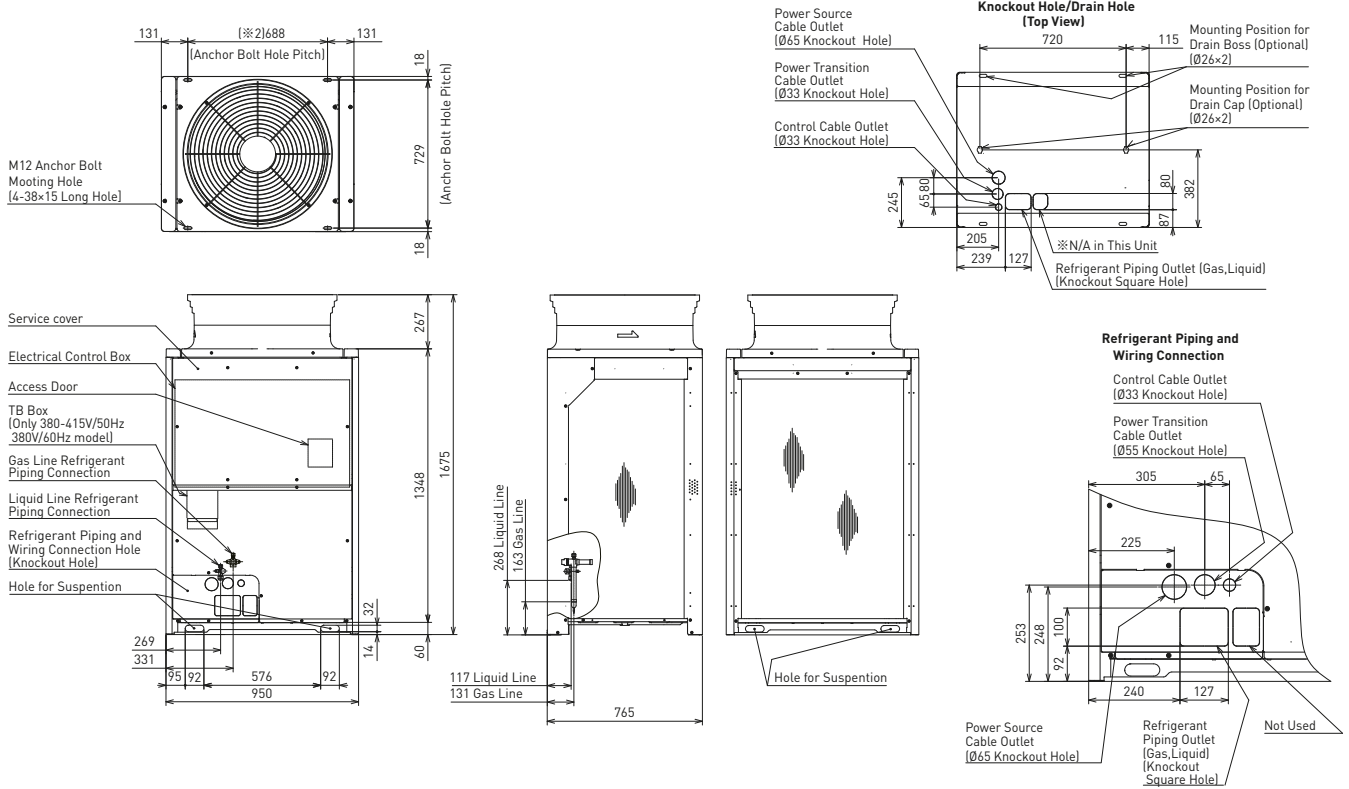
Cooling Operation Conditions	Heating Operation Conditions
Indoor Air Inlet Temperature: 27°C DB (80°F DB) / 19.0°C WB (66.2°F WB)	Indoor Air Inlet Temperature: 20°C DB (68°F DB)
Outdoor Air Inlet Temperature: 35°C DB (95°F DB)	Outdoor Air Inlet Temperature: 7°C DB (45°F DB) / 6°C WB (43°F WB)

Piping Length: 7.5 Meters  
Piping Lift: 0 Meter

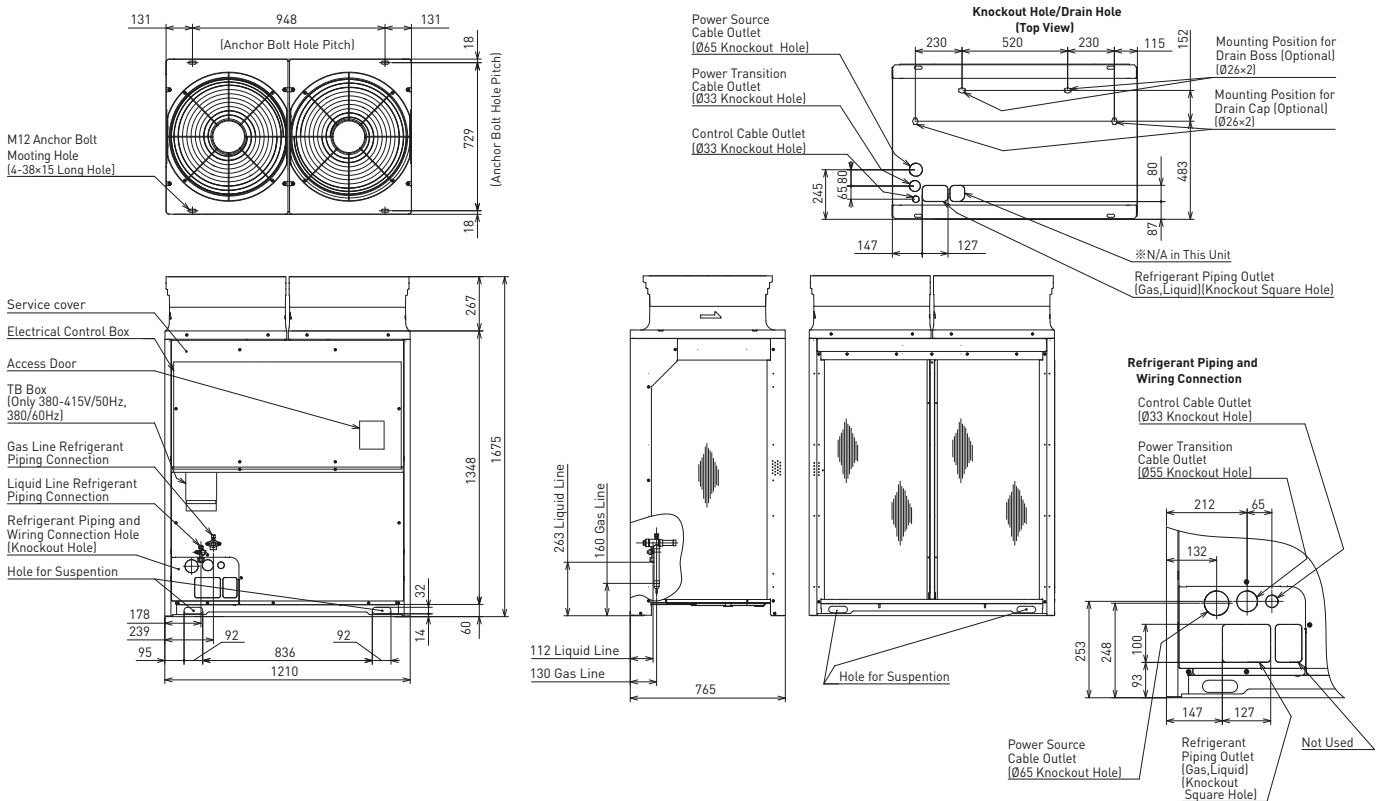
- 2 The sound pressure is based on the following conditions.  
The above data is based on the cooling mode. In case of heating mode, the sound pressure level increases by approximately 1-2 dB.  
The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.
- 3 Except for the specified combination in the table [26-54HP], there is no other combination of the base unit.
- 4 The width of outer dimension, it is the value when each distance between the base outdoor units is specified to 20mm.

										
Model				RAS-8FSNS	RAS-10FSNS	RAS-12FSNS	RAS-14FSNS	RAS-16FSNS	RAS-18FSNS	
Power Supply				AC 3φ, 380-415V/50Hz, 400V/50Hz, 380V/60Hz, 220V/60Hz						
Nominal Cooling Capacity			kW	22.4	28.0	33.5	40.0	45.0	50.0	
Nominal Heating Capacity			kW	25.0	31.5	37.5	45.0	50.0	56.0	
 Cabinet	Color	Munsell Code	Natural Gray (1.0Y 8.5/0.5)							
	Dimensions	H*W*D	mm	1,675 × 950 × 765			1,675 × 1,210 × 765			
	Footprint		m <sup>2</sup>	0.73			0.93			
 Weight	N/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	190	210	268	310	311		
		220V/60Hz	kg	185	205	263	305	306		
	G/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	206	226	286	328	329		
		220V/60Hz	kg	201	221	281	323	324		
 Refrigerant Gas	Type	R410A								
	Charged Amount	kg	5.0	7.2	8.9	9.9	10.7			
 Refrigeration Oil	Type	FVC68D								
	Charged Amount	L/Unit	6.0	6.9	7.9					
Flow Control				Micro-Computer Control Expansion Valve						
 Compressor	Type	Hermetic (Scroll)								
	Model	AA50PHD			DC80PHD		AA50PHD			
	Number per unit	1					2			
	Motor Output (Pole)	kW	3.3(6)	4.3(6)	5.4(6)	8.0(6)	4.5(6) × 2	5.0(6) × 2		
 Heat Exchanger	Type	Multi-Pass Cross-Finned Tube								
	Number of Coil per Unit	1			2					
	Maximum Operating Pressure	MPa	4.15							
	Total Face Area	m <sup>2</sup>	2.36			3.12				
	Tube	Material	Copper Tube							
		Diameter	φmm	7.0						
		Rows	2			3				
	Number of tubes	116			174					
Finn	Material	Aluminium								
	Pitch	mm	1.7							
 Condenser Fan	Type	Propeller Fan								
	Number per unit	1			2					
	Outer Diameter	mm	644	190	239	544 + 544				
	Nominal Air Flow Rate	m <sup>3</sup> /min.	165	170	256					
 Outdoor Fan Motor	Type	Drip-Proof Type Enclosure								
	Starting Method	DC Motor								
	Motor Output (Pole)	kW	0.26(8)	0.28(8)	0.42(8)	0.33(8) × 2	0.39(8) × 2			
	Number per unit	1			2					
	Insulation Class	E								
 Main Refrigerant Piping	Liquid Line	mm [in.]	φ9.52 [3/8]			φ12.7 [1/2]		φ15.88 [5/8]		
	Gas line	mm [in.]	φ19.05 [3/4]	φ22.2 [7/8]	φ25.4 (1)		φ28.58 [1-1/8]			
 Sound Level	Sound Power Level	dB(A)	80	82		85		86		
	Sound Pressure Level	dB(A)	58	60	59	63		65		
 Package	Dimensions	H*W*D	mm 1,800 × 1,030 × 810			1,800 × 1,290 × 810				
	Measurement	m <sup>3</sup>	1.5			1.9				

RAS-8FSNS, RAS-10FSNS AND RAS-12FSNS



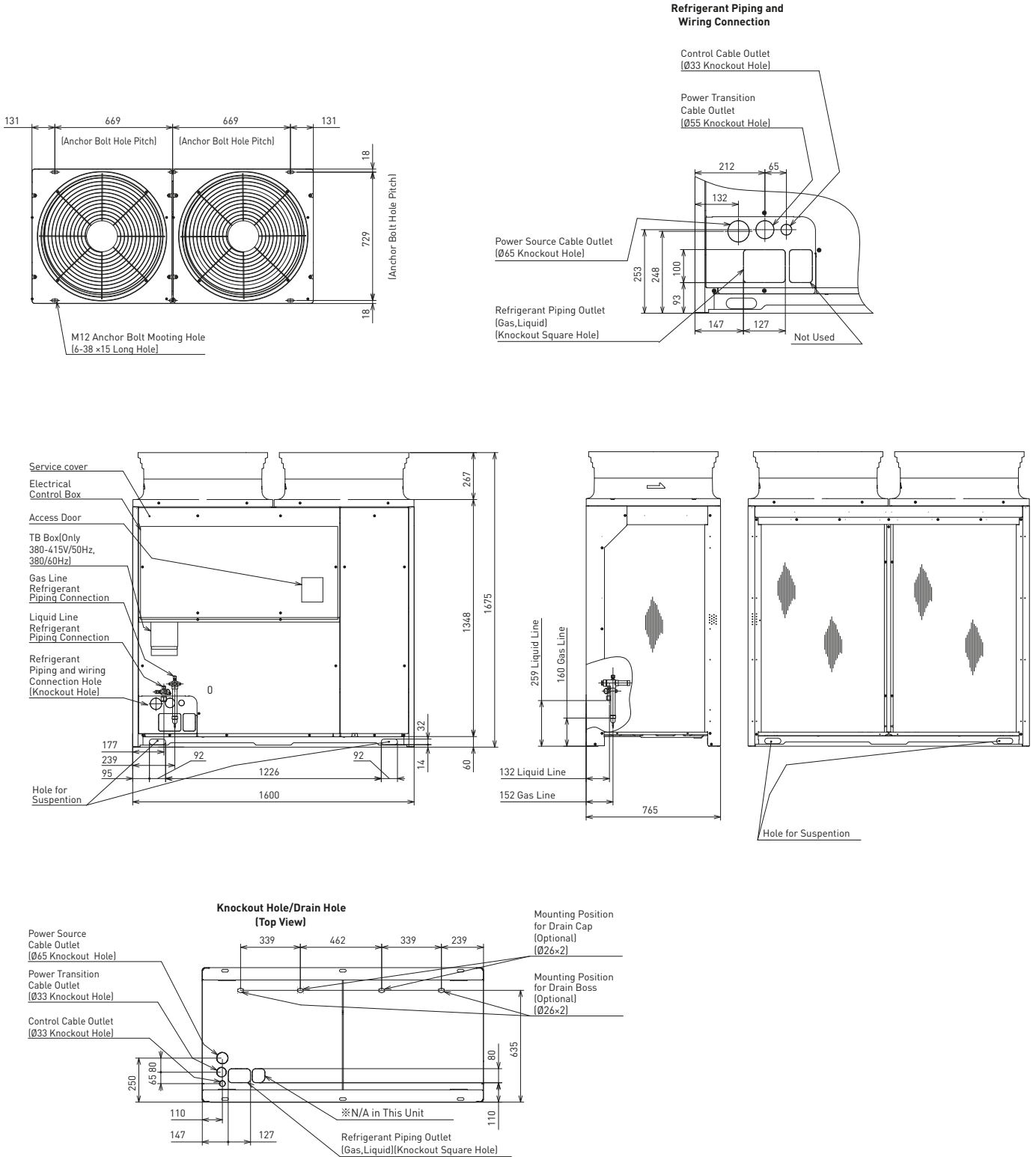
RAS-14FSNS, RAS-16FSNS AND RAS-18FSNS

















Model				RAS-20FSNS	RAS-22FSNS	RAS-24FSNS
Power Supply				AC 3φ, 380-415V/50Hz, 400V/50Hz, 380V/60Hz, 220V/60Hz		
Nominal Cooling Capacity			kW	56.0	61.5	67.0
Nominal Heating Capacity			kW	63.0	69.0	77.5
Cabinet	Color	Munsell Code		Natural Gray (1.0Y 8.5/0.5)		
	Dimensions	H*W*D	mm	1,675 × 1,600 × 765		
	Footprint		m <sup>2</sup>	1.22		
Weight	N/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	350	364	365
		220V/60Hz	kg	345	359	360
	G/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	370	384	385
		220V/60Hz	kg	365	379	380
Refrigerant Gas	Type			R410A		
	Charged Amount	kg		11.3		11.6
Refrigeration Oil	Type			FVC68D		
	Charged Amount	L/Unit		8.4		
Flow Control				Micro-Computer Control Expansion Valve		
Compressor	Type			Hermetic (Scroll)		
	Model			AA50PHD	DC80PHD	
				AA50PHD	DC80PHD	
	Number per unit			2		
	Motor Output (Pole)	kW		5.5(6) × 2	6.7(6) × 2	7.1(6) × 2
Heat Exchanger	Type			Multi-Pass Cross-Finned Tube		
	Number of Coil per Unit			2		
	Maximum Operating Pressure			MPa		
	Total Face Area			m <sup>2</sup>		
	Tube	Material		Copper Tube		
		Diameter	φmm	7.0		
		Rows		3		
		Number of tubes		174		
	Finn	Material		Aluminium		
Pitch		mm	1.7			
Condenser Fan	Type			Propeller Fan		
	Number per unit			2		
	Outer Diameter	mm	644 + 644			
	Nominal Air Flow Rate	m <sup>3</sup> /min.	329		348	
Outdoor Fan Motor	Type			Drip-Proof Type Enclosure		
	Starting Method			DC Motor		
	Motor Output (Pole)	kW		0.48(8) × 2	0.56(8) × 2	
	Number per unit			2		
	Insulation Class			E		
Main Refrigerant Piping	Liquid Line	mm (in.)	φ15.88 (5/8)			
	Gas Line	mm (in.)	φ28.58 (1-1/8)			
Sound Level	Sound Power Level	dB(A)	86	84	86	
	Sound Pressure Level	dB(A)	65	64	66	
Package	Dimensions	H*W*D	mm			
	Measurement		m <sup>3</sup>			
			1,800 × 1,680 × 810			
			2.4			

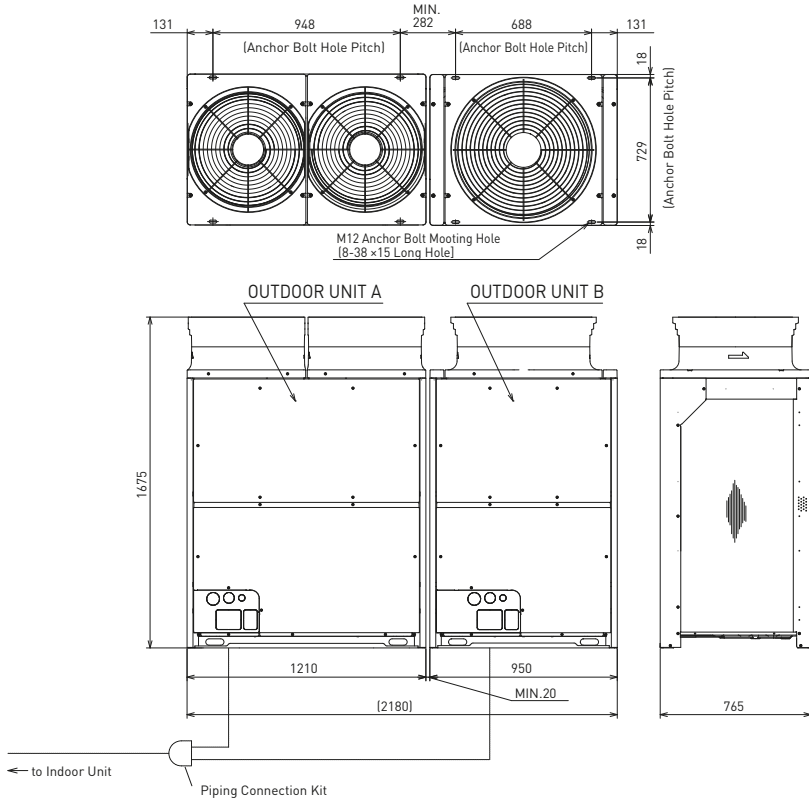
RAS-20FSNS, RAS-22FSNS AND RAS-24FSNS





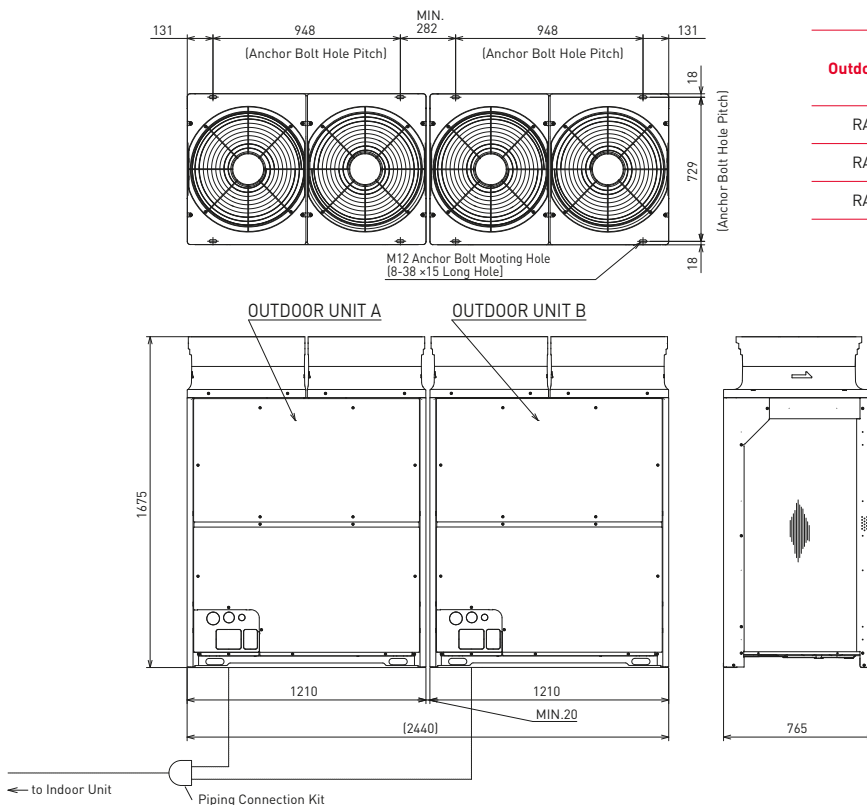
										
Model			RAS-26FSNS	RAS-28FSNS	RAS-30FSNS	RAS-32FSNS	RAS-34FSNS	RAS-36FSNS		
Combination of Base Unit			RAS-14FSNS	RAS-16FSNS	RAS-18FSNS	RAS-18FSNS	RAS-18FSNS	RAS-18FSNS		
			RAS-12FSNS	RAS-12FSNS	RAS-12FSNS	RAS-14FSNS	RAS-16FSNS	RAS-18FSNS		
Power Supply			AC 3φ, 380-415V/50Hz, 400V/50Hz, 380V/60Hz, 220V/60Hz							
Nominal Cooling Capacity			kW	73.0	77.5	85.0	90.0	95.0	100.0	
Nominal Heating Capacity			kW	82.5	90.0	95.0	100.0	106.0	112.0	
 Cabinet	Color	Munsell Code	Natural Gray (1.0Y 8.5/0.5)							
	Dimensions	H*W*D	mm	1,675 × 2,180 × 765			1,675 × 2,440 × 765			
	Footprint		m <sup>2</sup>	1.67			1.87			
 Weight	N/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	210 + 268	210 + 310	210 + 311	268 + 311	310 + 311	311 + 311	
		220V/60Hz	kg	205 + 263	205 + 305	205 + 306	263 + 306	305 + 306	306 + 306	
	G/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	226 + 286	226 + 328	226 + 329	286 + 329	328 + 329	329 + 329	
		220V/60Hz	kg	221 + 281	221 + 323	221 + 324	281 + 324	323 + 324	324 + 324	
 Refrigerant Gas	Type	R410A								
	Charged Amount	kg	16.1	17.1	17.9	19.6	20.6	21.4		
 Refrigeration Oil	Type	FVC68D								
	Charged Amount	L/Unit	12.9	13.9		14.8		15.8		
Flow Control			Micro-Computer Control Expansion Valve							
 Compressor	Type	Hermetic (Scroll)								
	Model		DC80PHD	DC80PHD	DC80PHD	DC80PHD	AA50PHD	AA50PHD		
			DC80PHD	AA50PHD	AA50PHD	AA50PHD	AA50PHD	AA50PHD		
				AA50PHD	AA50PHD	AA50PHD	AA50PHD	AA50PHD		
	Quantity		2	3			4			
Motor Output (Pole)	kW	5.4 (6) × 1 + 8.0 (6) × 1	5.4 (6) × 1 + 4.5 (6) × 2	5.4 (6) × 1 + 5.0 (6) × 2	8.0 (6) × 1 + 5.0 (6) × 2	4.5 (6) × 2 + 5.0 (6) × 2	5.0 (6) × 2 + 5.0 (6) × 2			
 Heat Exchanger	Type	Multi-Pass Cross-Finned Tube								
	Number of Coil per Unit		3			4				
	Maximum Operating Pressure	MPa	4.15							
	Total Face Area	m <sup>2</sup>	2.36 + 3.12			3.12 + 3.12				
	Tube	Material	Copper Tube							
		Diameter	φmm	7.0						
		Rows		3 + 3						
	Number of tubes	174 + 174								
Finn	Material	Aluminium								
	Pitch	mm	1.7							
 Condenser Fan	Type	Propeller Fan								
	Number per unit		3			4				
	Outer Diameter	mm	644 + 544 + 544			544 + 544 + 544 + 544				
	Nominal Air Flow Rate	m <sup>3</sup> /min.	190 + 239	190 + 256		239 + 256	256 + 256			
 Outdoor Fan Motor	Type	Drip-Proof Type Enclosure								
	Starting Method	DC Motor								
	Motor Output (Pole)	kW	0.42 (8) + 0.33 (8) × 2	0.42 (8) + 0.39 (8) × 2		0.33 (8) × 2 + 0.39 (8) × 2		0.39 (8) × 2 + 0.39 (8) × 2		
	Number per unit		3			4				
	Insulation Class		E + E							
 Main Refrigerant Piping	Liquid Line	mm (in.)	φ19.05 (3/4)							
	Gas Line	mm (in.)	φ31.75 (1-1/4)					φ38.1 (1-1/2)		
 Sound Level	Sound Power Level	dB(A)	87			89				
	Sound Pressure Level	dB(A)	64.5	66	67	68				

RAS-26FSNS, RAS-28FSNS AND RAS-30FSNS















Outdoor Unit Model	Combination of Base Unit Models	
	OUTDOOR UNIT A	OUTDOOR UNIT B
RAS-26FSNS	RAS-14FSNS	RAS-12FSNS
RAS-28FSNS	RAS-16FSNS	RAS-12FSNS
RAS-30FSNS	RAS-18FSNS	RAS-12FSNS

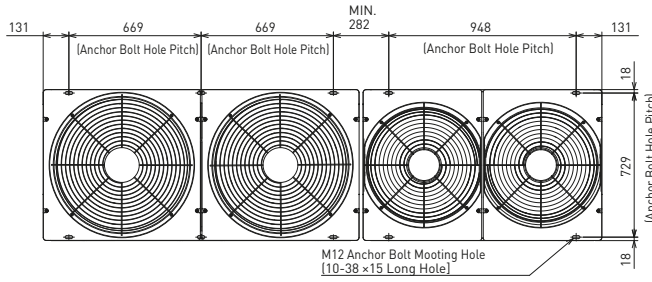
RAS-32FSNS, RAS-34FSNS AND RAS-36FSNS



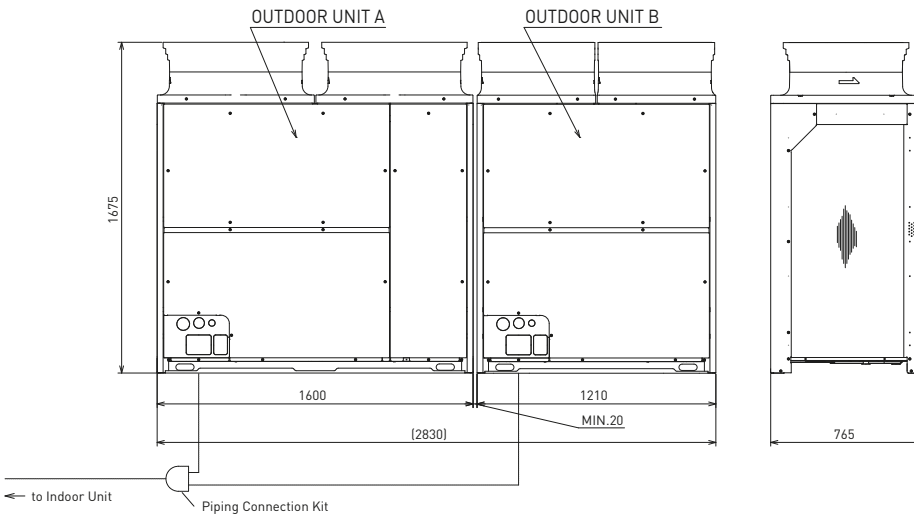
Outdoor Unit Model	Combination of Base Unit Models	
	OUTDOOR UNIT A	OUTDOOR UNIT B
RAS-32FSNS	RAS-18FSNS	RAS-14FSNS
RAS-34FSNS	RAS-18FSNS	RAS-16FSNS
RAS-36FSNS	RAS-18FSNS	RAS-18FSNS

											
Model				RAS-38FSNS	RAS-40FSNS	RAS-42FSNS	RAS-44FSNS	RAS-46FSNS	RAS-48FSNS		
Combination of Base Unit				RAS-24FSNS	RAS-22FSNS	RAS-24FSNS	RAS-22FSNS	RAS-24FSNS	RAS-24FSNS		
				RAS-14FSNS	RAS-18FSNS	RAS-18FSNS	RAS-22FSNS	RAS-22FSNS	RAS-24FSNS		
Power Supply				AC 3φ, 380-415V/50Hz, 400V/50Hz, 380V/60Hz, 220V/60Hz							
Nominal Cooling Capacity				kW	106.0	112.0	118.0	122.0	128.0	136.0	
Nominal Heating Capacity				kW	118.0	125.0	132.0	140.0	145.0	150.0	
 Cabinet	Color	Munsell Code		Natural Gray [1.0Y 8.5/0.5]							
	Dimensions	H*W*D	mm	1,675 × 2,830 × 765			1,675 × 3,220 × 765				
	Footprint		m <sup>2</sup>	2.16			2.46				
 Weight	N/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	268 + 365	311 + 364	311 + 365	364 + 364	364 + 365	365 + 365		
		220V/60Hz	kg	263 + 360	306 + 359	306 + 360	359 + 359	359 + 360	360 + 360		
	G/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz,	kg	286 + 385	329 + 384	329 + 385	384 + 384	384 + 385	385 + 385		
		220V/60Hz	kg	281 + 380	324 + 379	324 + 380	379 + 379	379 + 380	380 + 380		
 Refrigerant Gas	Type	R410A									
	Charged Amount	kg	20.5	22.0	22.3	22.6	22.9	23.2			
 Refrigeration Oil	Type	FVC68D									
	Charged Amount	L/Unit	15.3	16.3			16.8				
Flow Control				Micro-Computer Control Expansion Valve							
 Compressor	Type	Hermetic [Scroll]									
	Model			DC80PHD	AA50PHD	AA50PHD	DC80PHD	DC80PHD	DC80PHD		
				DC80PHD	AA50PHD	AA50PHD	DC80PHD	DC80PHD	DC80PHD		
				DC80PHD	DC80PHD	DC80PHD	DC80PHD	DC80PHD	DC80PHD		
				DC80PHD	DC80PHD	DC80PHD	DC80PHD	DC80PHD	DC80PHD		
Quantity			3			4					
Motor Output (Pole)	kW	8.0(6) × 1 + 7.1(6) × 2	5.0(6) × 2 + 6.7(6) × 2	5.0(6) × 2 + 7.1(6) × 2	6.7(6) × 2 + 6.7(6) × 2	6.7(6) × 2 + 7.1(6) × 2	7.1(6) × 2 + 7.1(6) × 2				
 Heat Exchanger	Type	Multi-Pass Cross-Finned Tube									
	Number of Coil per Unit	4									
	Maximum Operating Pressure	MPa	4.15								
	Total Face Area	m <sup>2</sup>	3.12 + 3.58			3.58 + 3.58					
	Tube	Material	Copper Tube								
		Diameter	φmm	7.0							
		Rows	3 + 3								
	Number of tubes	174 + 174									
Finn	Material	Aluminium									
	Pitch	mm	1.7								
 Condenser Fan	Type	Propeller Fan									
	Number per unit	4									
	Outer Diameter	mm	544 + 544 + 644 + 644			644 + 644 + 644 + 644					
	Nominal Air Flow Rate	m <sup>3</sup> /min.	239 + 348	256 + 329	256 + 348	329 + 329	329 + 348	348 + 348			
 Outdoor Fan Motor	Type	Drip-Proof Type Enclosure									
	Starting Method	DC Motor									
	Motor Output (Pole)	kW	0.33(8) × 2 + 0.56(8) × 2	0.39(8) × 2 + 0.48(8) × 2	0.39(8) × 2 + 0.56(8) × 2	0.48(8) × 2 + 0.48(8) × 2	0.48(8) × 2 + 0.56(8) × 2	0.56(8) × 2 + 0.56(8) × 2			
	Number per unit	4									
	Insulation Class	E + E									
 Main Refrigerant Piping	Liquid Line	mm (in.)	φ19.05 (3/4)								
	Gas Line	mm (in.)	φ38.1 (1-1/2)								
 Sound Level (2 Pipes)	Sound Power Level	dB(A)	89	88	89	87	88	89			
	Sound Pressure Level	dB(A)	68	67.5	68.5	67	68	69			

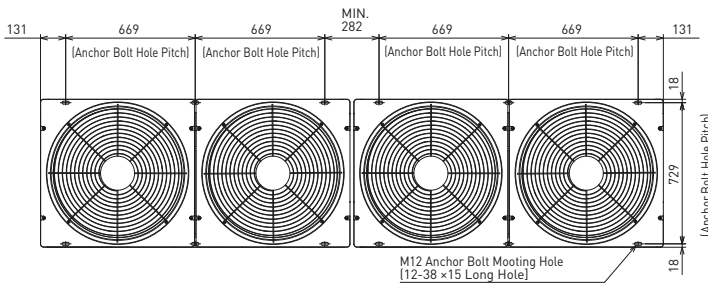
RAS-38FSNS, RAS-40FSNS AND RAS-42FSNS



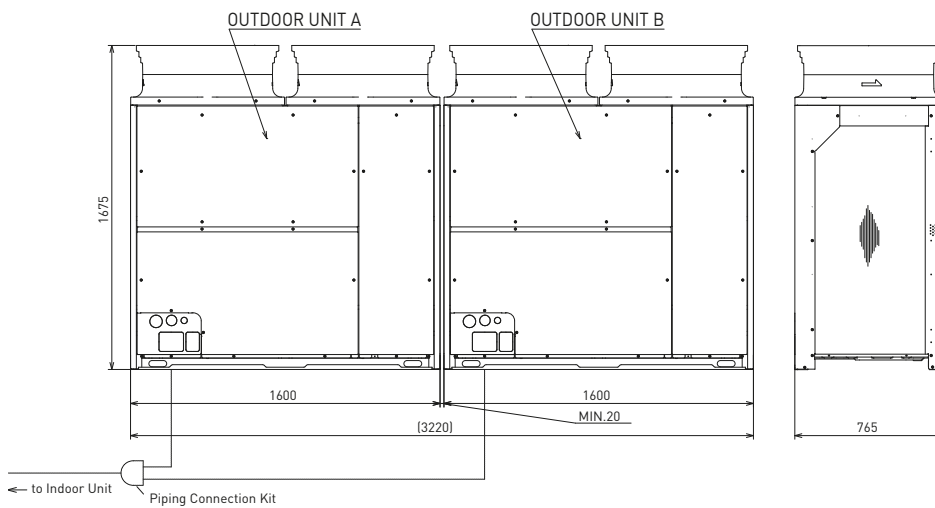
Outdoor Unit Model	Combination of Base Unit Models	
	OUTDOOR UNIT A	OUTDOOR UNIT B
RAS-38FSNS	RAS-24FSNS	RAS-14FSNS
RAS-40FSNS	RAS-22FSNS	RAS-18FSNS
RAS-42FSNS	RAS-24FSNS	RAS-18FSNS



RAS-44FSNS, RAS-46FSNS AND RAS-48FSNS



Outdoor Unit Model	Combination of Base Unit Models	
	OUTDOOR UNIT A	OUTDOOR UNIT B
RAS-44FSNS	RAS-22FSNS	RAS-22FSNS
RAS-46FSNS	RAS-24FSNS	RAS-22FSNS
RAS-48FSNS	RAS-24FSNS	RAS-24FSNS

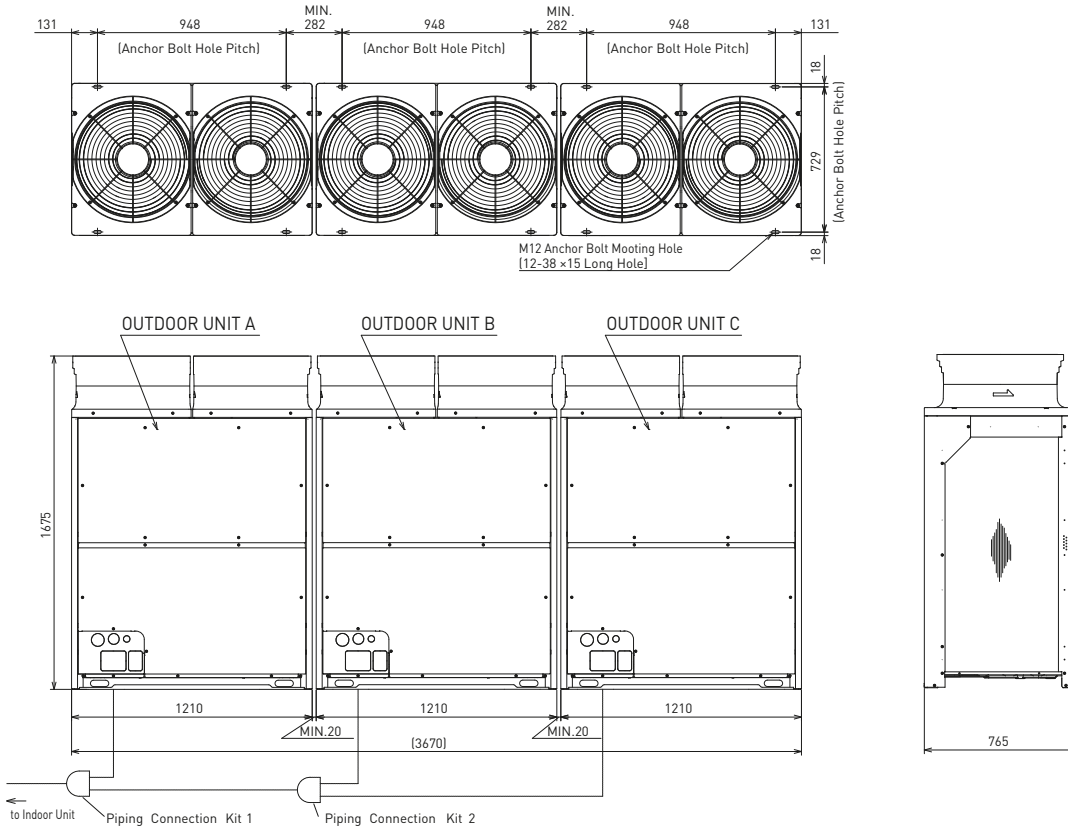




Model				RAS-50FSNS	RAS-52FSNS	RAS-54FSNS	
Combination of Base Unit				RAS-18FSNS	RAS-18FSNS	RAS-18FSNS	
				RAS-18FSNS	RAS-18FSNS	RAS-18FSNS	
				RAS-14FSNS	RAS-16FSNS	RAS-18FSNS	
Power Supply				AC 3Φ, 380-415V/50Hz, 400V/50Hz, 380V/60Hz, 220V/60Hz			
Nominal Cooling Capacity			kW	140.0	145.0	150.0	
Nominal Heating Capacity			kW	155.0	160.0	165.0	
Cabinet	Color	Munsell Code		Natural Gray [1.0Y 8.5/0.5]			
	Dimensions	H*W*D		1,675 × 3,670 × 765			
	Footprint			2.81			
Weight	N/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	268 + 311 + 311	310 + 311 + 311	311 + 311 + 311	
		220V/60Hz	kg	263 + 306 + 306	305 + 306 + 306	306 + 306 + 306	
	G/W	380-415V/50Hz, 400V/50Hz, 380V/60Hz	kg	286 + 329 + 329	328 + 329 + 329	329 + 329 + 329	
		220V/60Hz	kg	281 + 324 + 324	323 + 324 + 324	324 + 324 + 324	
Refrigerant Gas	Type			R410A			
	Charged Amount	kg		30.3	31.3	32.1	
Refrigeration Oil	Type			FVC68D			
	Charged Amount	L/Unit		22.7	23.7		
Flow Control				Micro-Computer Control Expansion Valve			
Compressor	Type			Hermetic (Scroll)			
	Model			DC80PHD	AA50PHD	AA50PHD	
				AA50PHD	AA50PHD	AA50PHD	
				AA50PHD	AA50PHD	AA50PHD	
				AA50PHD	AA50PHD	AA50PHD	
				AA50PHD	AA50PHD	AA50PHD	
Quantity			5	6			
Motor Output (Pole)			kW	8.0 (6) × 1 + 5.0 (6) × 2 + 5.0 (6) × 2	4.5 (6) × 2 + 5.0 (6) × 2 + 5.0 (6) × 2	5.0 (6) × 2 + 5.0 (6) × 2 + 5.0 (6) × 2	
Heat Exchanger	Type			Multi-Pass Cross-Finned Tube			
	Number of Coil per Unit			6			
	Maximum Operating Pressure			MPa		4.15	
	Total Face Area			m <sup>2</sup>		3.12 + 3.12 + 3.12	
	Tube	Material			Copper Tube		
		Diameter	φmm		7.0		
		Rows			3 + 3 + 3		
	Number of tubes			174 + 174 + 174			
Finn	Material			Aluminium			
	Pitch	mm		1.7			
Condenser Fan	Type			Propeller Fan			
	Number per unit			6			
	Outer Diameter			mm		544 + 544 + 544 + 544 + 544 + 544	
	Nominal Air Flow Rate			m <sup>3</sup> /min.	239 + 256 × 2	256 × 3	
Outdoor Fan Motor	Type			Drip-Proof Type Enclosure			
	Starting Method			DC Motor			
	Motor Output (Pole)			kW	0.33 (8) × 2 + 0.39 (8) × 2 + 0.39 (8) × 2	0.39 (8) × 2 + 0.39 (8) × 2 + 0.39 (8) × 2	
	Number per unit			6			
Insulation Class			E + E + E				
Main Refrigerant Piping	Liquid Line	mm (in.)		φ19.05 (3/4)			
	Gas Line	mm (in.)		φ38.1 (1-1/2)			
Sound Level	Sound Power Level		dB(A)		90	91	
	Sound Pressure Level		dB(A)		69	70	



RAS-50FSNS, RAS-52FSNS AND RAS-54FSNS



Outdoor Unit Model	Combination of Base Unit Models		
	OUTDOOR UNIT A	OUTDOOR UNIT B	OUTDOOR UNIT C
RAS-50FSNS	RAS-18FSNS	RAS-18FSNS	RAS-14FSNS
RAS-52FSNS	RAS-18FSNS	RAS-18FSNS	RAS-16FSNS
RAS-54FSNS	RAS-18FSNS	RAS-18FSNS	RAS-18FSNS

## SERVICE SPACE

Make the service space when outdoor unit is installed as follows.

If the service spaces for air inlet and outlet are insufficient, it may cause a performance degradation and some abnormalities due to insufficient air intake.

Additionally, the service space is required for facilitating the maintenance.

- In the case of no walls on the front side and the rear side, the service space is required as follows.

\* Front Side: Min. 500mm

\* Rear Side: Min. 300mm

\* Right and Left Sides: Min. 10mm (In the case that the field-supplied snow protection food or the air outlet duct is amounted to the unit, the spaces of min. 50mm are required.)

- If the wall on the front side is over 1,500mm high, the space of  $(500 + h2/2)$  mm for the front side is required.

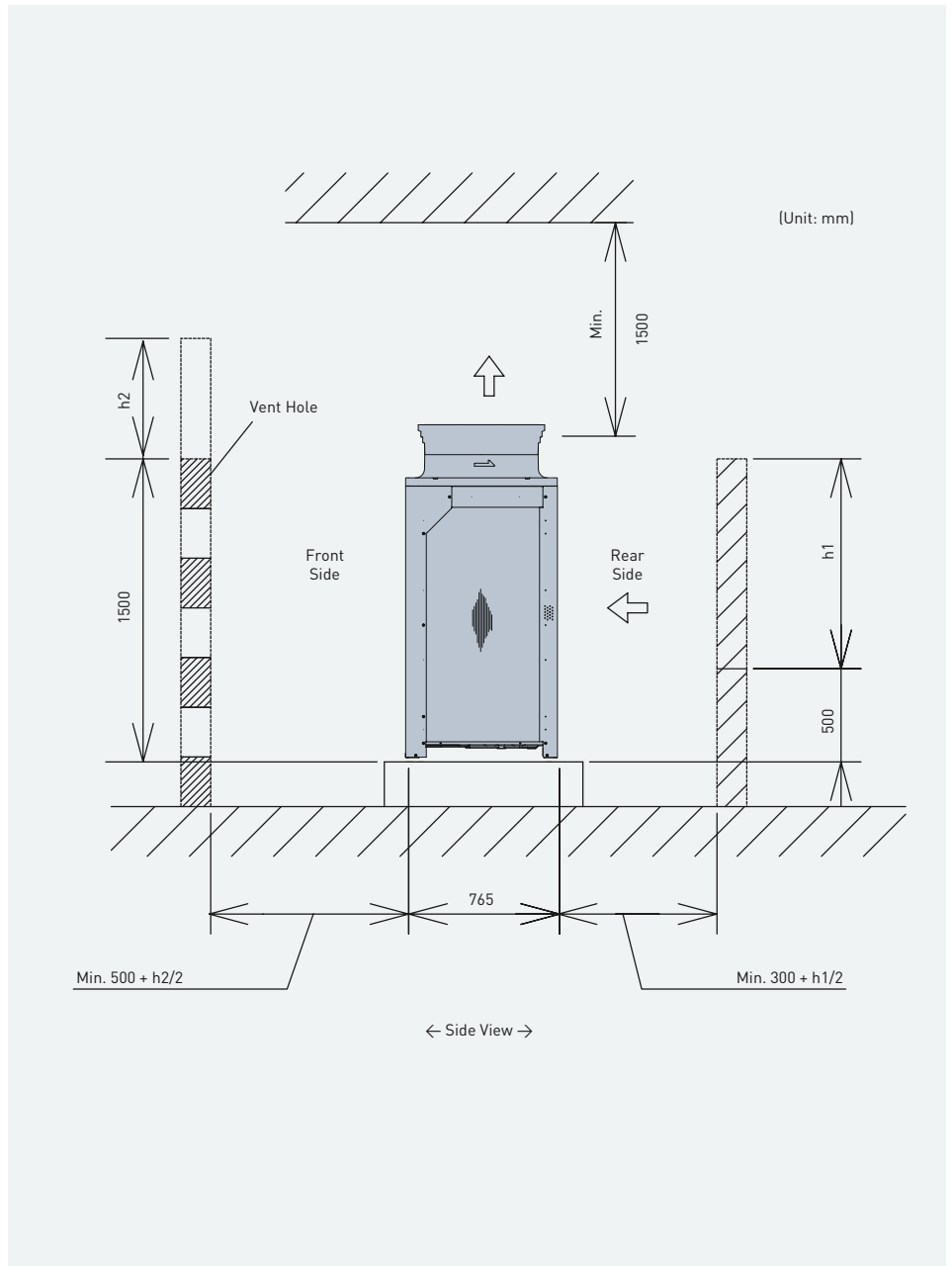
- If the wall on the rear side is over 500mm high, the space of  $(300 + h1/2)$  mm for the rear side is required.

- When the units are surrounded by walls on more than 2 sides, the space indicated in the figure above is required.

- For walls on more than 2 sides, secure the service space as shown in the following figures.

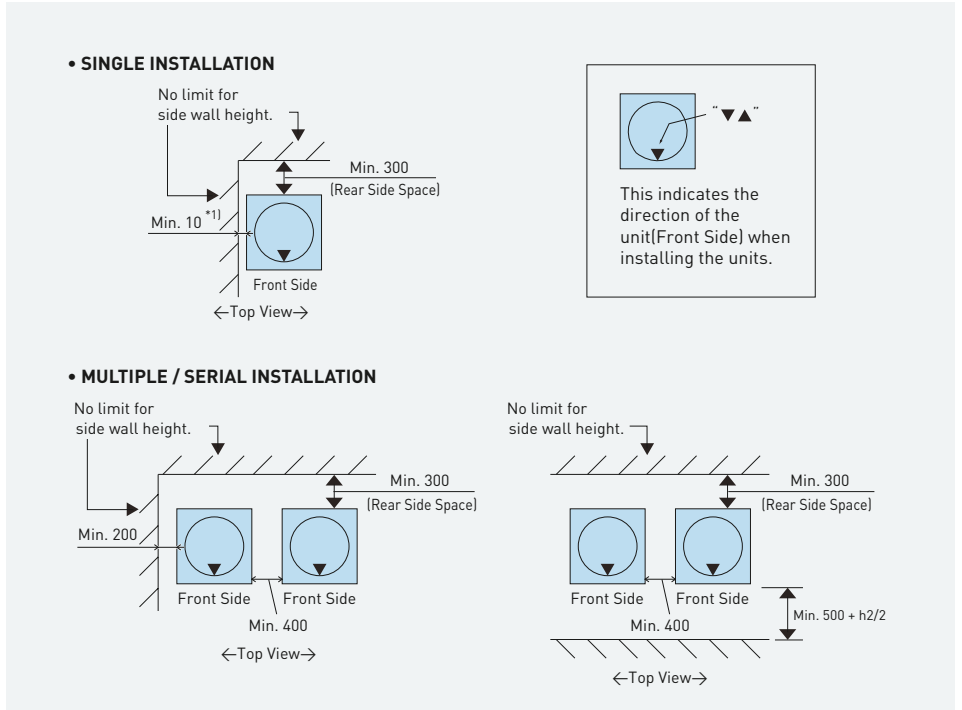
- If the space between the unit and an obstacle above the unit is less than 1,500mm or the space above the unit is closed, set up the duct at the air outlet side in order to prevent short circuit.

- When there are obstacles above the unit, the four (front, rear, right and left) sides of the unit shall be open in principle.

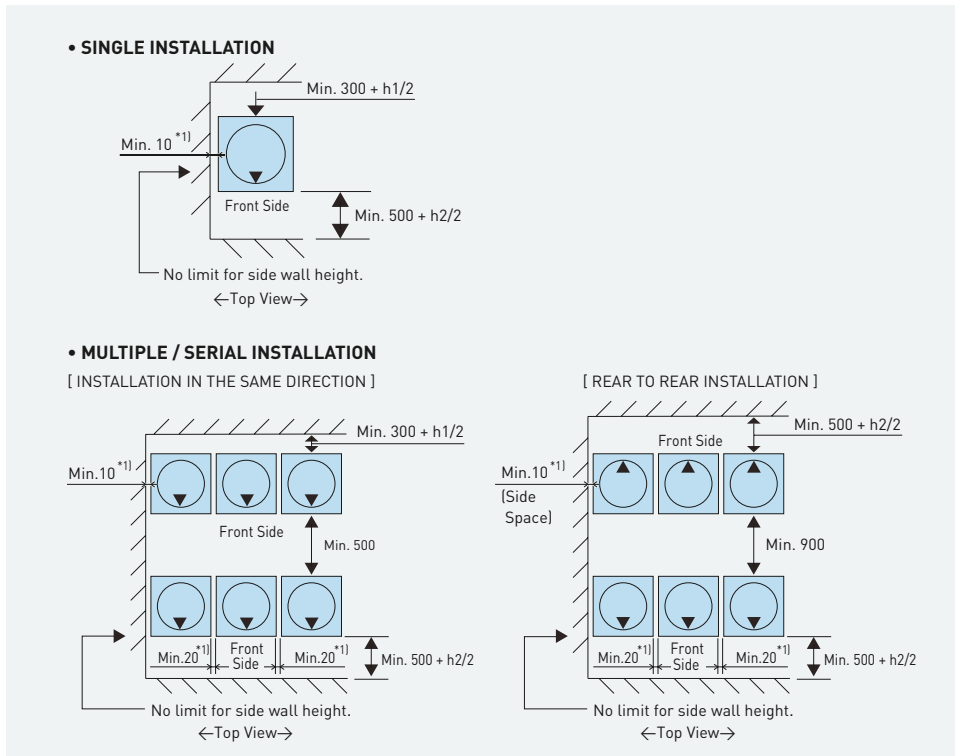


**1) Walls on 2 Sides**

In case that the units are installed adjacent to tall buildings and there are no walls on 2 sides, the minimum rear side space must be 300mm.



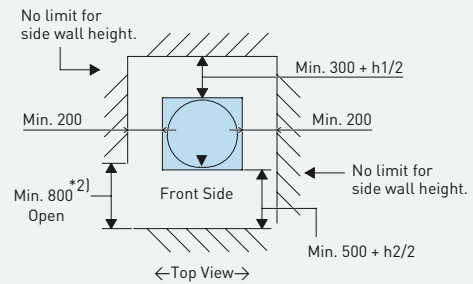
**2) Walls on 3 Sides**



\*1): In the case that the field-supplied snow protection hood or the air outlet duct is adopted, the space of minimum 50mm is required.

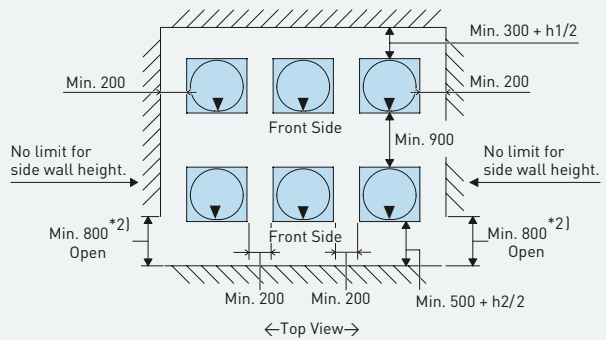
### 3) Walls on 4 Sides

#### • SINGLE INSTALLATION

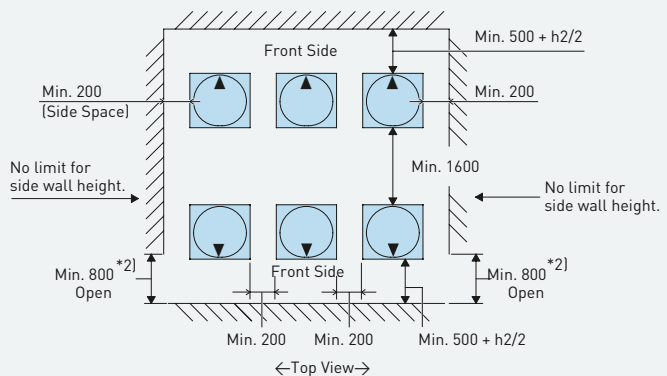


#### • MULTIPLE / SERIAL INSTALLATION

[ INSTALLATION IN THE SAME DIRECTION ]



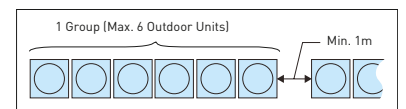
[ REAR TO REAR INSTALLATION ]



\*2]: Partly open a wall if the unit is surrounded by walls on four sides.

#### NOTES:

1. Keep the upper side open to prevent mutual interference of inlet and outlet air of each outdoor unit.
2. The figure dimensions indicate sufficient spaces around outdoor units for operation and maintenance at typical installation conditions as follows. [ Operation Mode: Cooling Operation, Outside Temp.: 35°C ] In case that the outdoor unit ambient temperature is higher and also the short circuit is likely to occur compared to the installation condition, find an appropriate dimension by calculating air flow current.
3. For the multiple installation, 1 group shall consist of 6 outdoor units (max.). Keep 1-meter interval between each unit group.



# Options





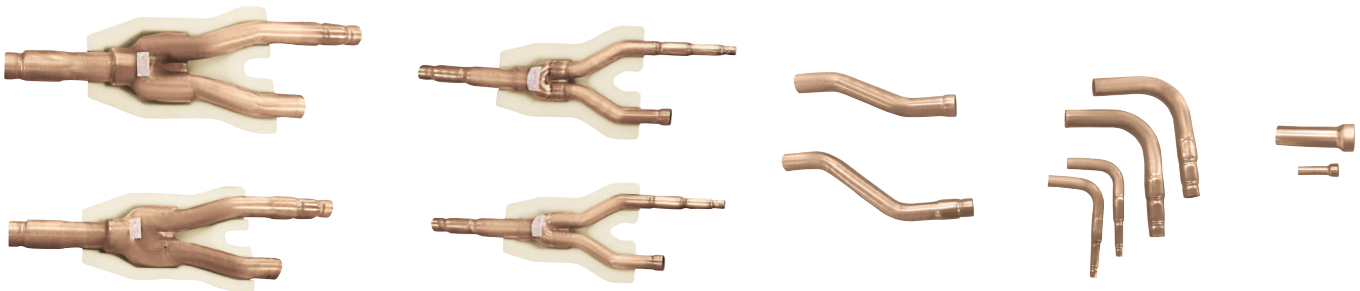
## 1. PIPING CONNECTION KIT

Piping Connection Kit for the divergence between outdoor units

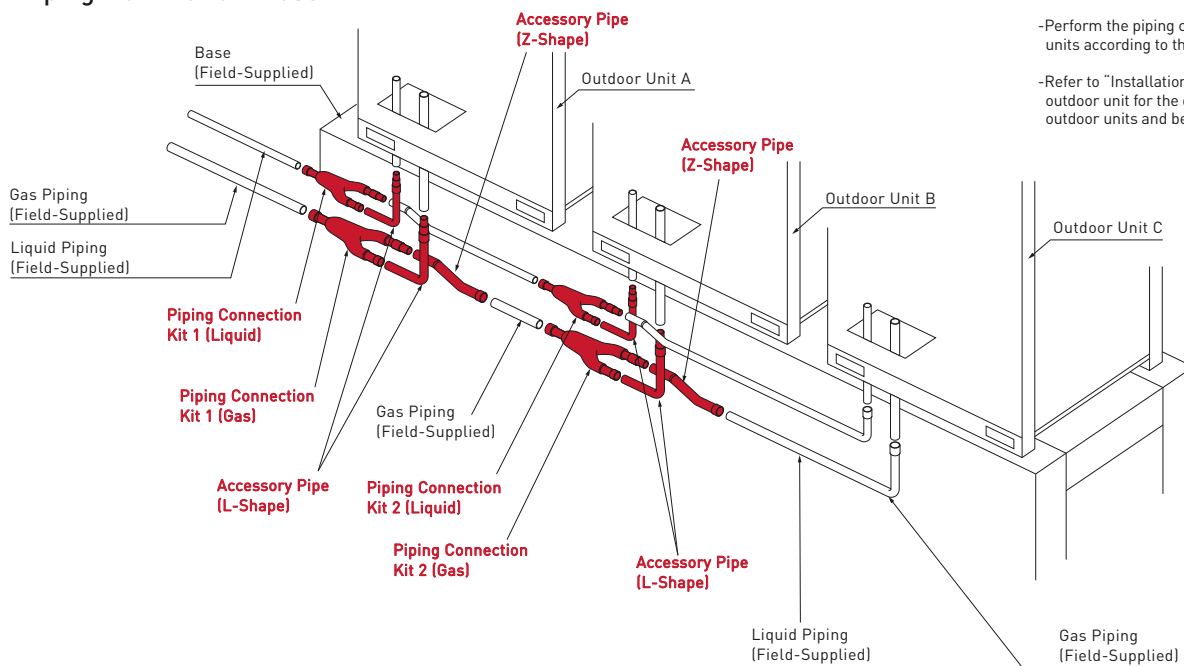
Item	Applicable Outdoor Unit		Model	Remarks
	HP	Connectivity Number		
Piping Connection Kit	26 - 48	2	MC-NP21SA	for Gas: 1 for Liquid: 1
	50 - 54	3	MC-NP30SA	for Gas: 2 for Liquid: 2

NOTE: The old model (MC-TTA1) is not available.

images:MC-NP30SA



### For Piping from Bottom Base



-Perform the piping connection between outdoor units according to this figure.

-Refer to "Installation & Maintenance Manual" of the outdoor unit for the dimension and distance between outdoor units and between piping connection kits.

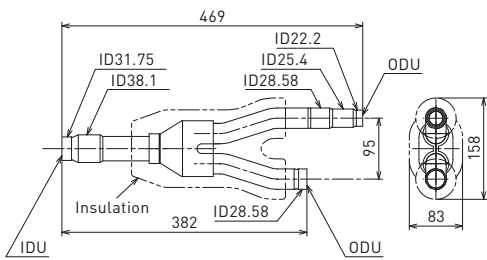
\*Perform the piping connection between outdoor units according to this figure.

\*Refer to the Installation & Maintenance Manual of the outdoor unit for the dimensions and distance between outdoor units and between piping connection kits.

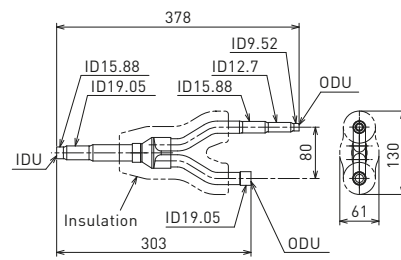
Dimensions

MC-NP21SA

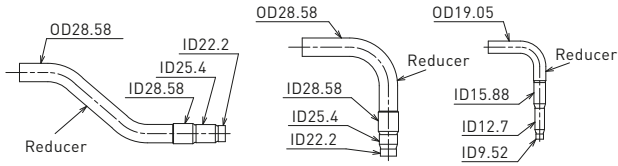
GAS Side



Liquid Side

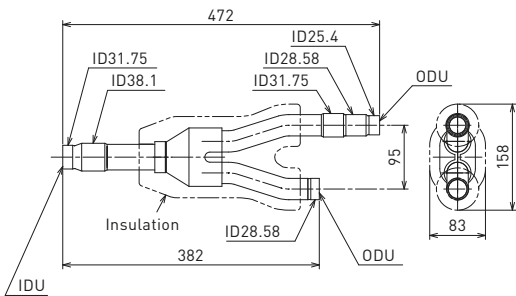


Reducer

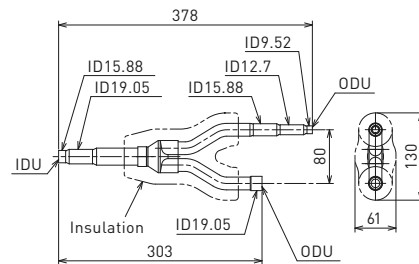


MC-NP30SA

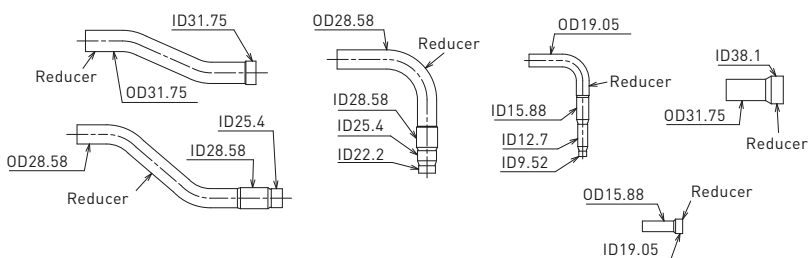
GAS Side



Liquid Side



Reducer



## 2. MULTI-KIT

Branching for indoor and outdoor connecting pipes

### Line Branch

#### First branching pipes

Outdoor Unit HP	Model
5 - 10	MW-NP282A3
12 - 16	MW-NP452A3
18 - 24	MW-NP692A3
26 - 54	MW-NP902A3

#### Pipe diameter after the first branch and multi-kit

Total Indoor Unit HP	Diameter (mm)		Model
	Gas Pipe	Liquid Pipe	
< 6	Φ 15.88	Φ 9.52	MW-NP282A3
6 - 8.99	Φ 19.05	Φ 9.52	
9 - 11.99	Φ 22.2	Φ 9.52	
12 - 15.99	Φ 25.4	Φ 12.7	MW-NP452A3
16 - 17.99	Φ 28.58	Φ 12.7	
18 - 25.99	Φ 28.58	Φ 15.88	MW-NP692A3
26 - 35.99	Φ 31.75	Φ 19.05	MW-NP902A3
≤ 36	Φ 38.1	Φ 19.05	

images:MW-NP282A3



### Header branch

Total Indoor Unit HP	No. of Header Branches	Model
5 - 8	4	MH-NP224A
5 - 10	8	MH-NP288A

images:MH-NP224A









### 3. DRAIN BOSS

The drain boss is for the drain pipe connection in order to use the bottom base of the outdoor unit as a drain pan.

#### Model Name

Name	Model
Drain Boss	DBS-TP10A

#### Quantity

Applicable Outdoor Unit HP	Q'ty
8 - 18	1
20 - 36	2
38 , 40	3
42 - 48	4
50 - 54	3
-	4
-	5
-	6

images:DBS-TP10A

Drain Boss + Rubber Cap

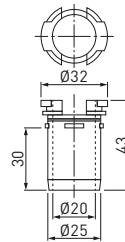


Drain Cap + Rubber Cap



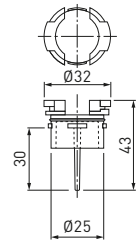
#### Dimensions

Drain Boss×2



Drain Cap×2

To close the drain hall



#### Drain Water Treatment

Drain water is discharged during heating and defrosting operation. (Rain water is also discharged.) Pay attention to the following.

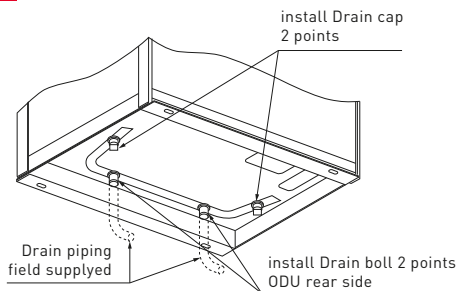
1. Choose a location where well drainage is available, or provide a drain ditch.
2. Do not install the unit over a walkway, as condensation water may drip onto people.

In the case of installing the unit in such a location, provide an additional drain pan.

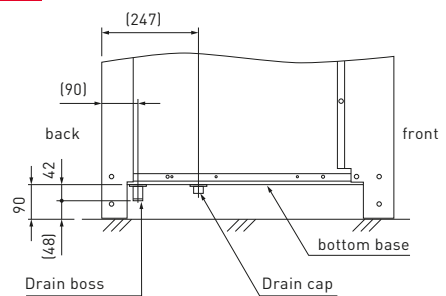
3. Do not use the drain boss in a cold area. The drain water in the drain pipe may freeze, and the drain pipe may crack.

#### How to use

Bottom view



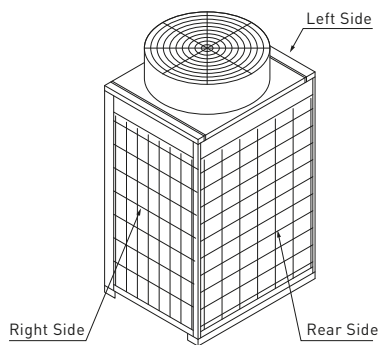
Side view



## 4. CABINET COVER

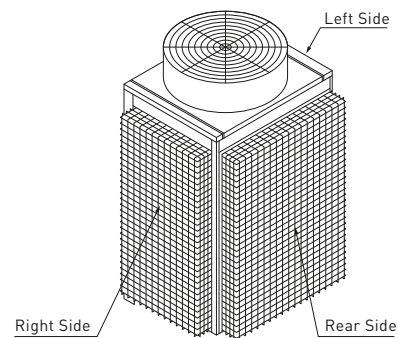
HP	Air Inlet Grille		
	Rear	Right	Left
8 - 12	PSN-TP20BA	PSN-TP20R	PSN-TP20L
14 - 18	PSN-TP20BB	PSN-TP20R × 2	
20 - 24	PSN-TP20BC	PSN-TP20R × 2	

image:Air Inlet Grille



HP	Protection Net		
	Rear	Right	Left
8 - 12	PN-TP20BA	PN-TP20R	PN-TP20L
14 - 18	PN-TP20BB	PN-TP20R × 2	
20 - 24	PN-TP20BC	PN-TP20R × 2	

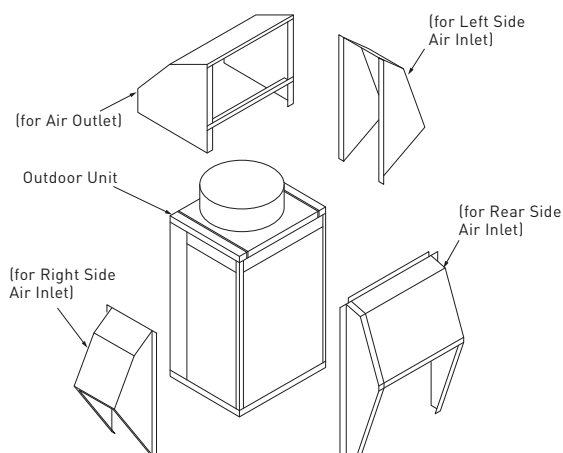
image:Protection Net



HP	Snow Protection Hood			
	Upper	Rear	Right	Left
<b>Zinc Coated Steel</b>				
8 - 12	ASG-TP50FA	ASG-TP50BA	ASG-TP50R	ASG-TP50L
14 - 18	ASG-TP50FB	ASG-TP50BB	ASG-TP50R × 2	
20 - 24	ASG-TP50FC	ASG-TP50BC	ASG-TP50R × 2	
<b>Stainless</b>				
8-12	ASG-TP50FAS	ASG-TP50BAS	ASG-TP50RS	ASG-TP50LS
14-18	ASG-TP50FBS	ASG-TP50BBS	ASG-TP50RS × 2	
20-24	ASG-TP50FS	ASG-TP50BCS	ASG-TP50RS × 2	

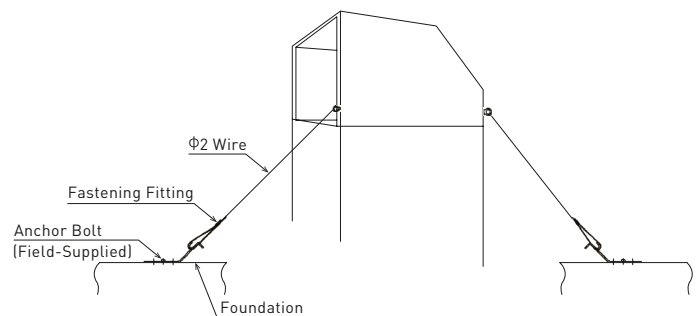
NOTE:Refer to the Technical Catalog for the Optional Parts selection.

image:Snow Protection Hood




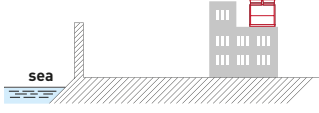
HP	Toppling Prevention Tool
8 - 24	ASG-SW20A

image:Toppling Prevention Tool



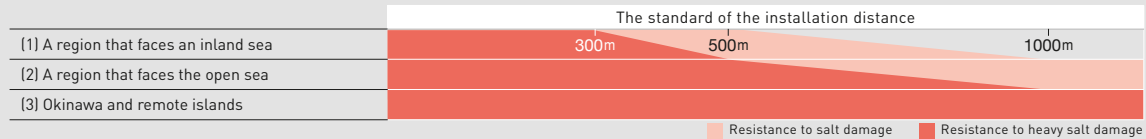
# Resistance to Salt Damage Specifications Products for Order

## About the installation location

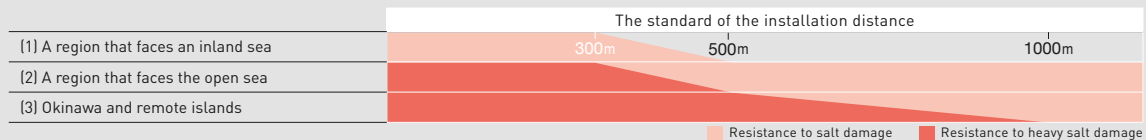
	Resistance to salt damage specifications	Resistance to heavy salt damage specifications
<b>Installation Location</b>	<p>A location that is not exposed to sea breezes, but that appears to be suitable for such an atmosphere</p> 	<p>A place that is susceptible to sea breezes (But the device is not directly exposed to water containing salt.)</p> 
<b>Requirements for installation location</b>	<ul style="list-style-type: none"> <li>- A location where the outdoor unit is rinsed by the rain</li> <li>- A location that is not exposed to sea breezes</li> <li>- A location where the distance from the installation location of the outdoor unit to the sea is between approximately 300 meters and one kilometer</li> <li>- A location where the outdoor unit is in the shelter of a building</li> </ul>	<ul style="list-style-type: none"> <li>- A location where the outdoor unit receives little rain</li> <li>- A location that is directly exposed to sea breezes</li> <li>- A location where the distance from the installation location of the outdoor unit to the sea is up to approximately 300 meters</li> <li>- A location where the outdoor unit is mounted on the front of a building (beach side)</li> <li>- A location where corrugated iron roofs and the steel parts of balconies near the installation location of the outdoor unit are often repainted</li> </ul>

## The standard of the installation distance from the beach (conditions vary according to the installation environment)

### 1 A location that receives direct sea breezes



### 2 A location that does not receive direct sea breezes



## Points to note for installation, maintenance and management

### • Points to note for installation (regarding maintenance and management)

The units of JRA specifications for resistance to salt damage and resistance to heavy salt damage are made with strengthened materials and paints, but they are not fully protected against corrosion.

It is therefore necessary to increase the anti-corrosion effects by carrying out the following installation plans and maintenance work.

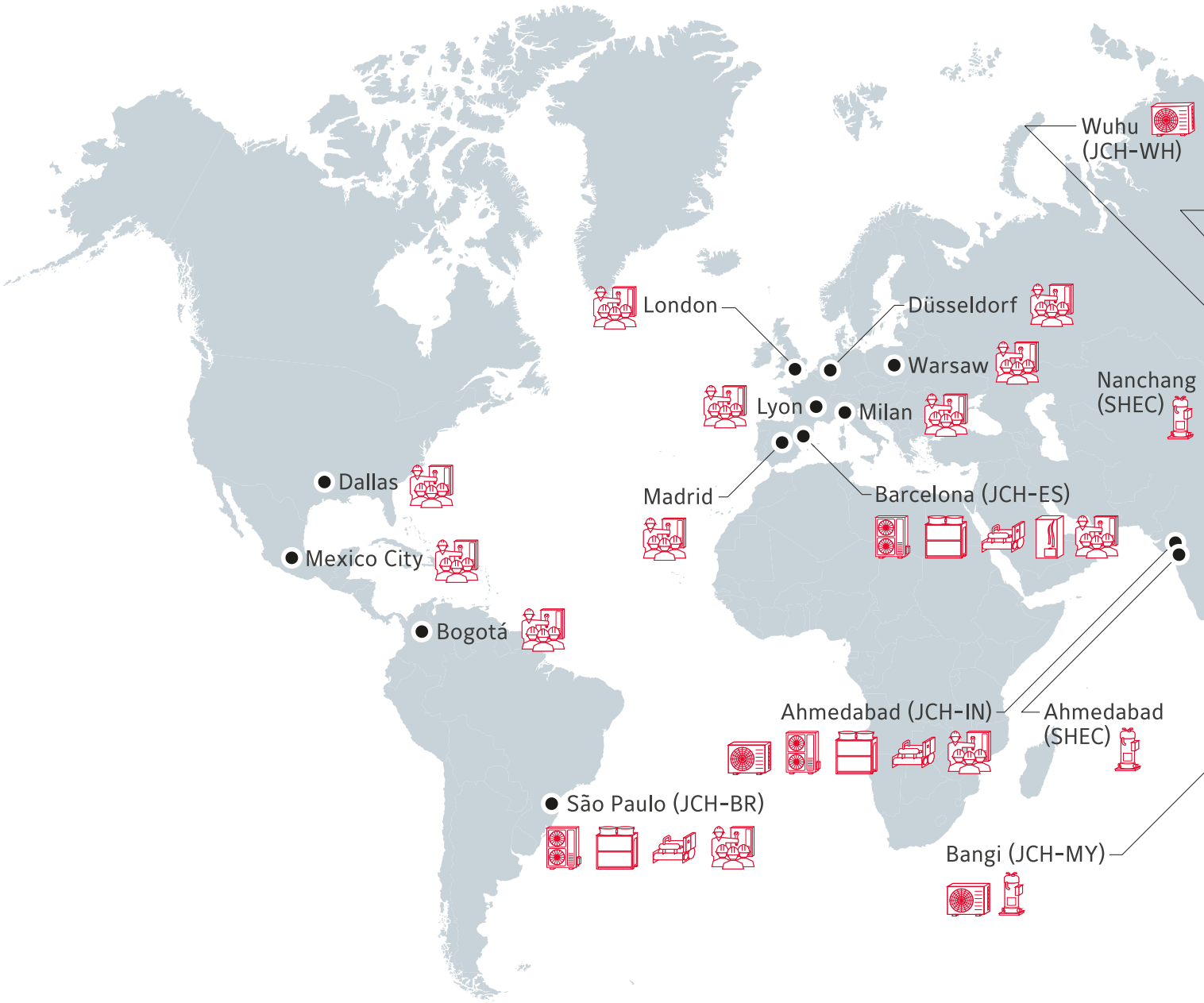
- (1) Please install the device in a location that avoids direct sea water splashes and sea breezes as much as possible.
  - Please install the device on the leeward side of a building.
  - If you have to install a device on the side of the beach, please avoid exposing it to direct sea breezes by erecting a wind-protective board.
  - Please be careful about the direction of installation. (The degree of corrosion differs depending on whether a device is installed parallel to the coastline or perpendicular to the coastline.)
- (2) Please ensure that any sea salt particles that adhere to the exterior panels will be washed away by the rain.
- (3) Because the pooling of water on the bottom base of the outdoor unit significantly boosts the corrosion effects, please be careful about the inclination so that the ability for water to run through the bottom base of an outdoor unit will not be affected.
- (4) For a device installed in a beach area, please rinse it with water on a regular basis to remove all salt adhering to the device.
- (5) Please install the device in a location where water drains away well. In particular, please secure the drainage of the foundation parts.
- (6) Please be sure to repair any scratches that are created during the installation and maintenance work.
- (7) Please inspect the conditions of the device on a regular basis. (If necessary, please apply anti-rust treatments or replace parts.)

### • Points to note for maintenance

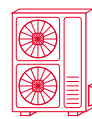
- Please carry out sufficient maintenance work on the device.
- If you stop using the device for a long time, such as during the off-season, please take measures such as putting a cover on the device.

\*If you install the device in a special atmosphere, you will need to undertake sufficient special consideration.  
Units that are resistant to salt damage are based on the "Standard of Testing Resistance to Salt Damage of Air Conditioning Devices JRA9002" of the Japan Refrigeration and Air Conditioning Industry Association (JRAIA).

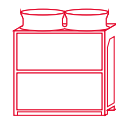
# Global Footprint



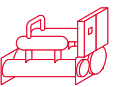
RAC



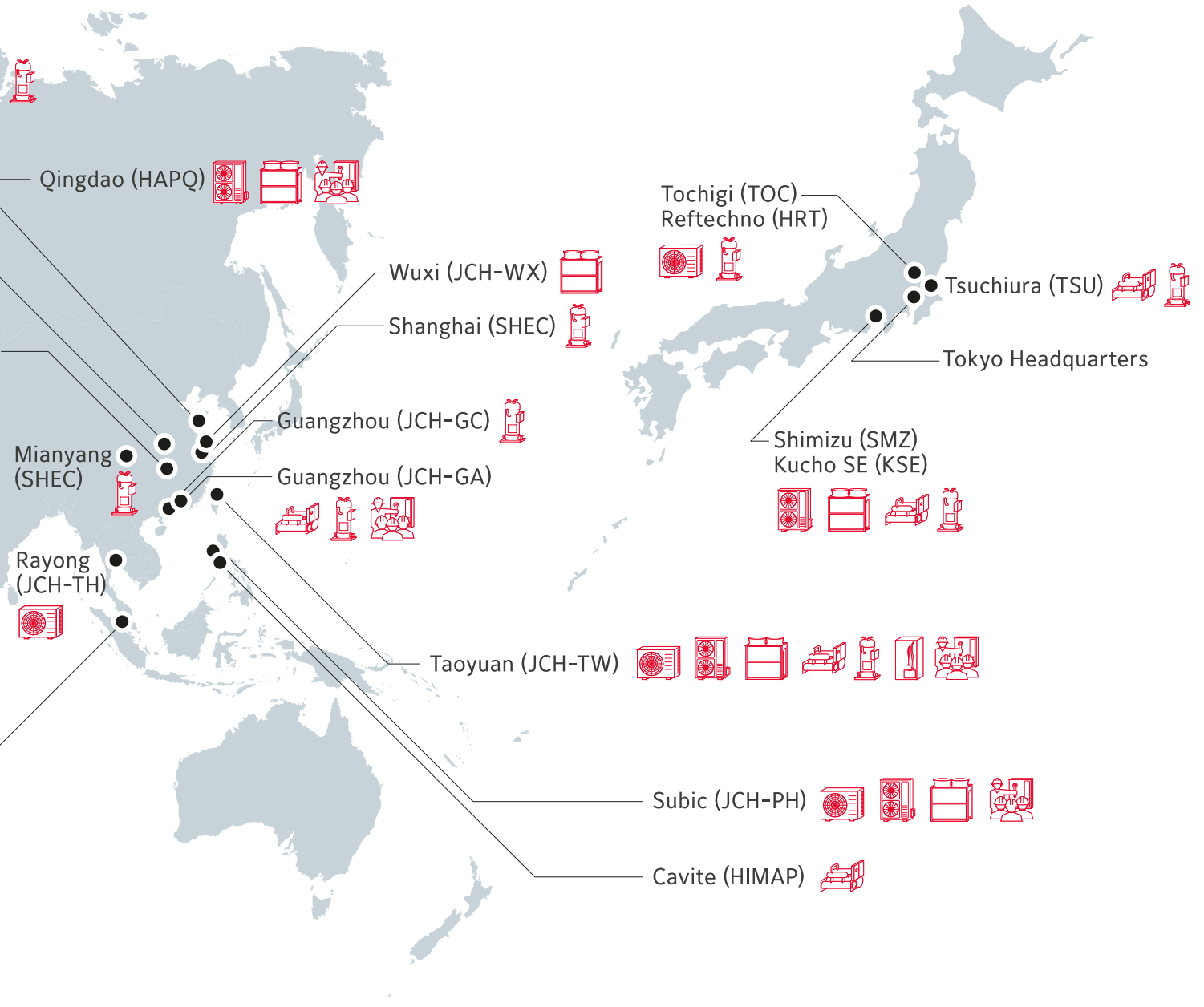
PAC



VRF



Chiller



 **Compressor**       **Air to Water**       **Training Center**

# Johnson Controls - Hitachi Air Conditioning

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## ISO 9000 series The quality of our design and manufacturing systems has been approved.



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Shimizu Air Conditioning Headquarters, Professional-Use Air Conditioning Business Division, Johnson Controls - Hitachi Air Conditioning  
JQA-1084 obtained in November 1995

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Shimizu Business Office, Johnson Controls - Hitachi Air Conditioning  
EC97J1107 obtained in October 1997