HITACHI

Modular Air-cooled Inverter Scroll Chiller

RC(H)UA-AVSY Series

Cooling & Heating

Johnson Controls - Hitachi Air Conditioning

ADDRESS
New Pier Takeshiba South Tower
1-16-1, Kaigan Minato-ku, Tokyo 105-0022, JAPAN
Tel: +81-3-6721-5567
www.jci-hitachi.com

HITACHI. CERTIFIED QUALITY

Find the products Hitachi Cooling & Heating with the best service and conditions at your Hitachi Distributor.

AVSY-C-2012

Index

03 Overview

05 Product Features

11 Specifications

12 Dimensions

13 Foundation Drawings

15 Installation

Modular Design to Provide Optimized Building Solutions

Exceptional efficiency from a smaller footprint that permits flexible combinations

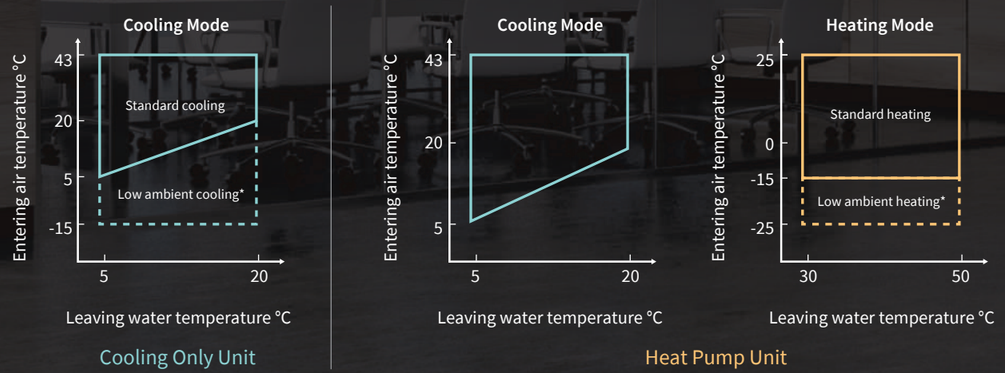
Footprint

-28%

RC(H)U	A	065	A	V	S	Y

- Y: Export Unit
- S: Smart Series
- V: Variable Speed Chiller
- A: Air-cooled Unit
- Cooling capacity
  065: 65kW
  130: 130kW
- A: R410A
- RCU: Cooling Only Unit
  RHU: Heat Pump Unit

Operating Range



Cooling Only Unit

Heat Pump Unit

* Contact Hitachi office for low ambient cooling and heating.

- **Smaller Footprint**

  Footprint reduced by 28% when compared with previous model*

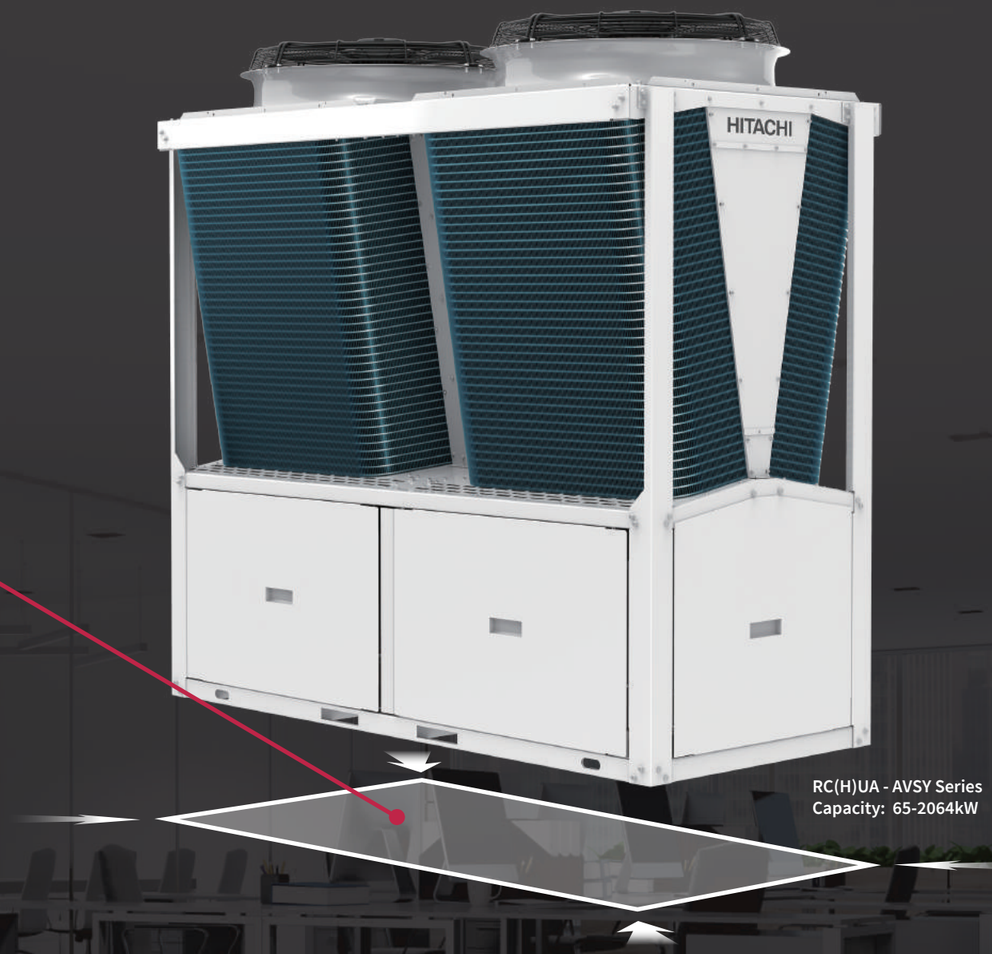
  * AVMY series

  Less space is required when combining several modular units

- **Quiet Operation**

  Runs quiet at both full load & partial load

  Ultra-quiet operation mode is available as an option



RC(H)UA - AVSY Series
Capacity: 65-2064kW

4 models. Can support up to 16 units per system.

Model	Cooling Capacity (kW)	Heating Capacity (kW)	Cooling COP	Heating COP	IPLV
RCUA065AVSY	64.5	-	3.0	-	6.06
RCUA130AVSY	129	-	3.0		
RHUA065AVSY	64.5	66	3.0	2.93	
RHUA130AVSY	129	132	3.0	2.93	

* RC(H)UA150AVSY will be launched later.
* Protection panel is standard. Protection grill is optional.

PRODUCT FEATURES

Superior Performance

COP up to 3.0
IPLV 6.06

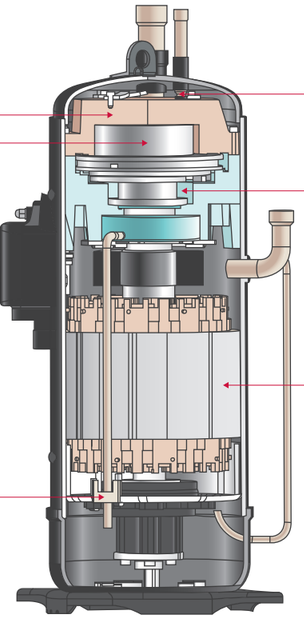
Precise Capacity Control

High-quality components makes AVSY series have high efficiency

- HITACHI DC Inverter Scroll Compressor
- “U Shape” Air Heater Exchanger
- Brazed Plate Heat Exchanger Water-side heat exchanger
- High Precision Electronic Expansion Valve
- Intelligent VFD Control logic
- High Efficiency Fan System
- Hydrophilic Fin

Hitachi DC Inverter Compressor

- 40 years of experience in scroll compressor design and production
- Features the latest technology for exceptional performance all year round
- Delivers stepless capacity control from 25% to 100%, allowing precise capacity matching for building loads and reducing the unit's power input



New Asymmetric Wrap
Optimized by reducing leakage and invalid suction superheat

Non-Contact Seal Design
Oil film seal formed by lubricating oil to diminish friction for higher efficiency and reliability

Internal Oil Circulation
Reduce over-heat losses and oil discharge rate to improve efficiency and reliability

Relieve Valve
More adaptive to variable pressure ration conditions, drive calibrated for higher partial load efficiency

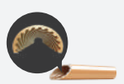
Mid-Pressure Server
Dynamically adjusts mid-pressure according to operation pressure, ensures axial flexibility and optimizes fixed scroll engagement for higher performance

Concentrated Motor
Concentrated winding offers lower height and less copper loss, be more adaptive to part load condition

Air-side Heat Exchanger

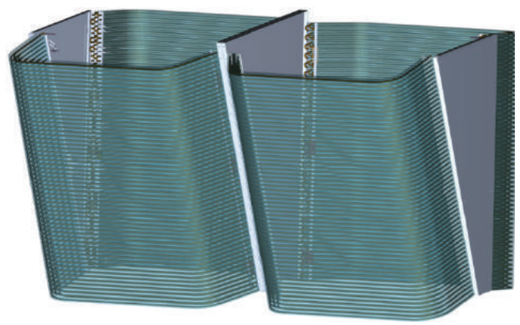
U Shape heat exchanger

- **Compact unit structure reducing the footprint further**
  The footprint is **28%** smaller than previous models*. (130kw).
  * AVMY series
- **Enhanced efficiency**
  Ensure enhanced heat transfer via multi-way air inlet design. Internal thread copper tube increases internal turbulence and heat transfer area.


Internal thread copper tube

VS


Normal copper tube


U shape Coil Design

- **Equipped with drain pan**
  A drain pan is set at the bottom of the heat exchanger to facilitate drainage.

PRODUCT FEATURES

Precise capacity control

- **Quick reaction and wider adjustment range**
- **Electronic Expansion Device**
  Precise 500 steps flow resolution
  Adjust the volume of refrigerant accurately and allow dynamic super heating exchange to ensure steady operation.

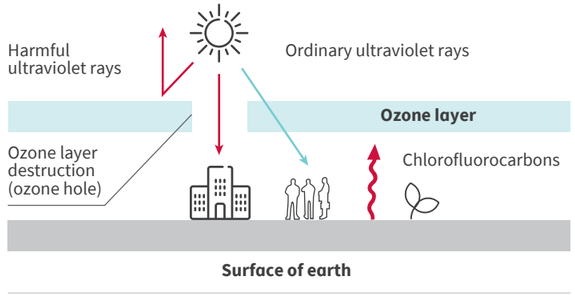
Control algorithm drives high part load efficiency

- 25%-100% Stepless Capacity Control by VFD technology
- Reduce power consumption by up to 30% compared to traditional fixed units
- Ensure stable water temperature, providing great comfort to users

Lower Environmental Impact

R410A refrigerant

- Stable, non-toxic, 0 ozone depletion potential
- Substitute for R22 refrigerant
- High-density refrigerant, less refrigerant is needed
- Energy conservation, emission reduction, environmental protection



Great Flexibility

Flexible combination

- Flexible model connection (65/130kW)
- Support up to 16 units per system ranging from 65-2064kw, easy for system capacity extension
- Easy to re-size system by adding or removing modules

Easy installation and maintenance

Simple A/C System

- Simple installation:
  no cooling tower, condensing pump or piping
- Saving installation space:
  no chiller plant room or condenser side piping

Easy to transport

- Small size / weight per module, easy to ship, lift and store
- Can be transported independently without large lifting equipment

Easy maintenance

- Non-stop service
  Failed unit could be disconnected without system operation interruption
- Standardized design
  Allow quick delivery and replacement of failed units

Robust Reliability and Operating Safety

Multiple system protection functions to ensure reliable operation

Modular provides excellent system redundancy

- Free switching master/slave unit to reduce failure of the unit.
- Function independently of each other. When a unit is down, another standby module will run as backup. While one unit is being serviced, the others still run as normal without impacting on operational capabilities.
- Modularized manufacturing and standardized components ensures easy replacement.

Smart defrost/Manual defrost

- Smart defrosting function according to the unit's conditions. Avoids unnecessary defrosting operation or inadequate defrosting.
- Manual defrosting to remove ice layer under harsh environmental condition.

Trouble-Free Start-up

- The compressor starts at low frequency and gradually increases to full speed
- Low start current helps extend the life of the motor

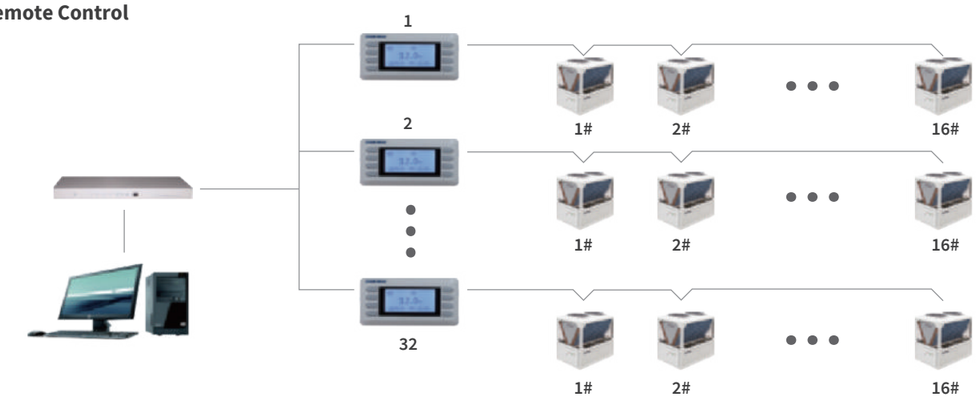
PRODUCT FEATURES

Intelligent Control

Central Controller (Optional)

- **4.3”** colorful touch screen with user-friendly interface
- Preset on-off function allows unmanned management
- Free switching master/slave units to reduce the risk of failure

Remote Control



- Standard RS-485 communication interface with built-in Modbus communication protocol

***Ordering notice**

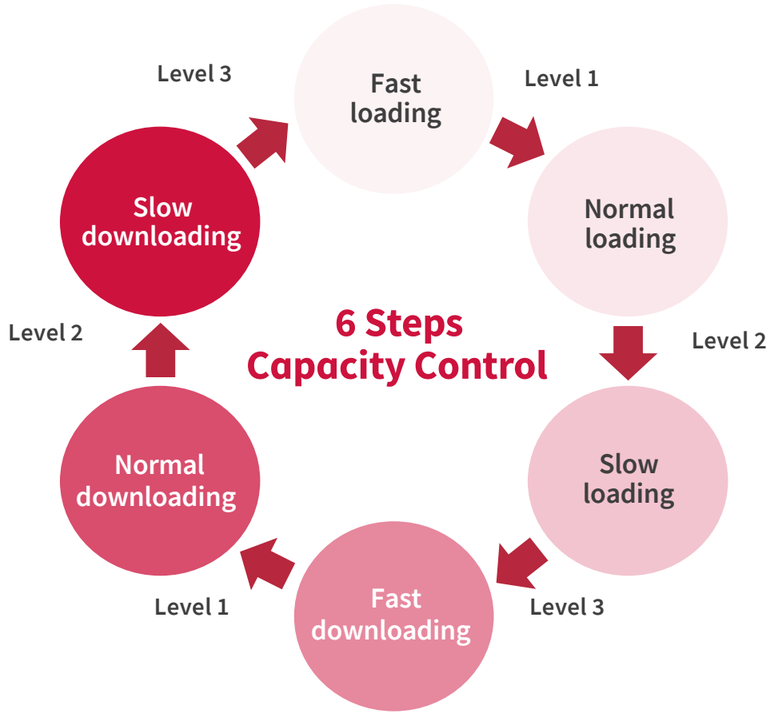
- Order controller separately per project needs
- One temperature sensor provided to customer (for data reading only)

Optimized Control Logic

- Automatically adjusts number of units operating as per operating frequency
- By optimizing operating frequency and controlling steps keeps units running under partial load conditions to improve efficiency
- Flexible operating frequency and control steps enable the unit working efficiently

1 Unit Level

6 Steps	Ensure precise capacity output matches the building load according to the difference between actual water temperature and targeted water temperature.
3 Speed	Ensures optimal response speed for the building's load change, delivering precise and stable water temperature. Minimum speed to start up the compressor. Maximum speed to defrost.
25-100% capacity range	Inverter compressor allows seamless speed control (Vs. 0-25%-50%-100% of fix speed)



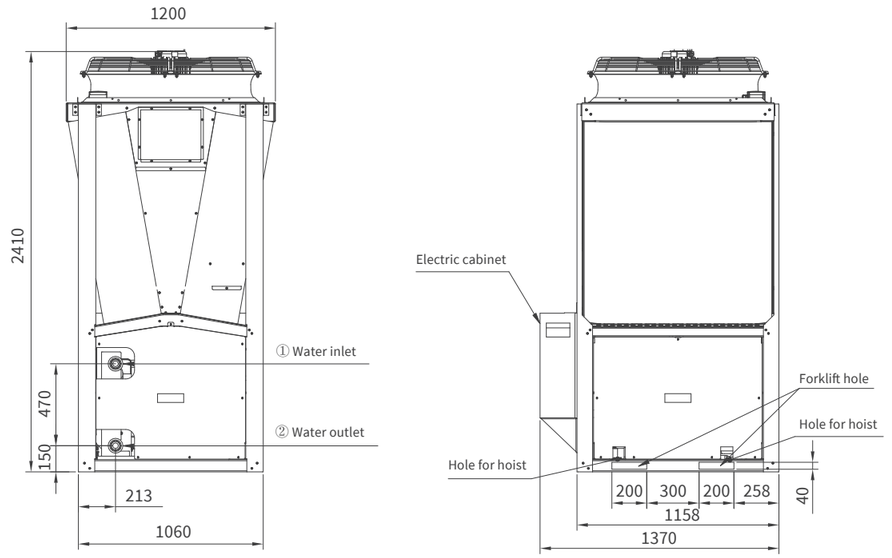
SPECIFICATIONS

Model			RCUA065AVSY	RCUA130AVSY	RHUA065AVSY	RHUA130AVSY
Nominal Cooling Capacity		kW	64.5	129	64.5	129
Power Input (cooling)		kW	21.5	43	21.5	43
COP (cooling)		kW/kW	3.0	3.0	3.0	3.0
Nominal Heating Capacity		kW	—	—	66	132
Power Input (heating)		kW	—	—	22.5	45
COP (cooling)		kW/kW	—	—	2.93	2.93
IPLV		kW/kW	6.06	6.06	6.06	6.06
Refrigerant		—	R410A			
Flow Control		—	Electronic expansion valve			
Circuit No.		—	1	2	1	2
Compressor Capacity Control		%	25~100	25~100	25~100	25~100
Noise		dB	68	71	68	71
Compressor	Type	—	Variable speed scroll compressor			
	Quantity	Set	2	4	2	4
Water-side heat exchanger	Type	—	Plate heat exchanger			
	Water flow rate (cooling)	m³/h	10.08	20.16	10.08	20.16
	Pressure Drop	kPa	44.7	32.5	44.7	32.5
	Water Connection	—	DN50 clamp	DN65 clamp	DN50 clamp	DN65 clamp
	Max. water-side operating pressure	Mpa	1.0	1.0	1.0	1.0
Air-side heat exchanger	Type	—	Grooved copper tubes and aluminum fins			
	Fan Power	kW	1.65	3.3	1.65	3.3
	Quantity	—	1	2	1	2
	Air flow rate	m³/h	21,500	43,000	21,500	43,000
Dimension	Length	mm	1,370	2,438	1,370	2,438
	Width	mm	1,200	1,200	1,200	1,200
	Height	mm	2,410	2,410	2,410	2,410
Net Weight		kg	485	910	545	1,030

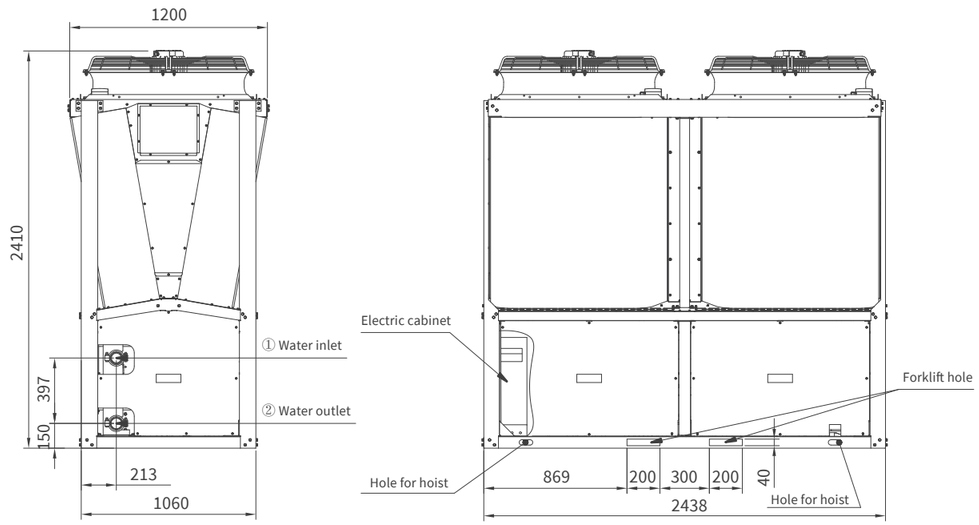
Notes:
1. Nominal cooling mode: water heat exchanger entering/leaving water temperature 12.2/6.7°C, outdoor air temperature 35°C.
2. Nominal heating mode: water heat exchanger entering/leaving water temperature 40/45°C, outdoor air temperature 7°C.
3. Water-side heat exchanger fouling factor 0.018m2K/kW.
4. Main power supply: 380V-3Ph-50Hz/415V-3Ph-50Hz/380V-3Ph-60Hz.

DIMENSIONS

RC(H)UA065AVSY

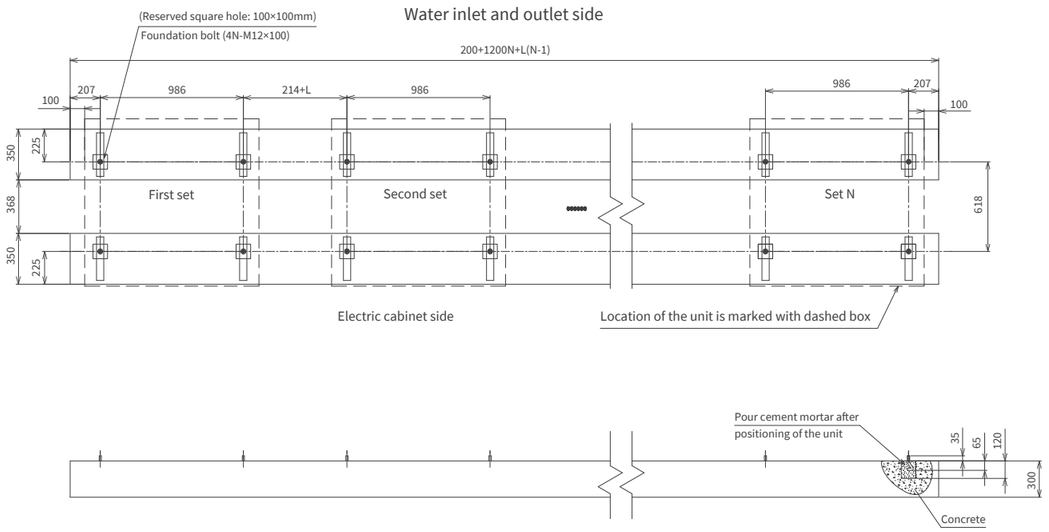


RC(H)UA130AVSY

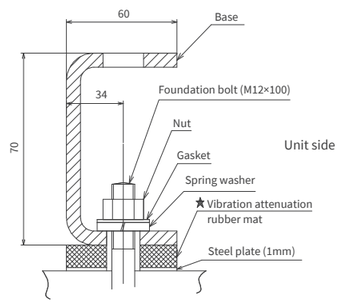


FOUNDATION DRAWINGS

RC(H)UA065AVSY

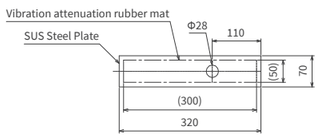


Foundation installation detail drawing (not to scale)



★: Parts from the manufacturer

Steel Plate Dimensional Drawing (Not to Scale)
Field Supplied

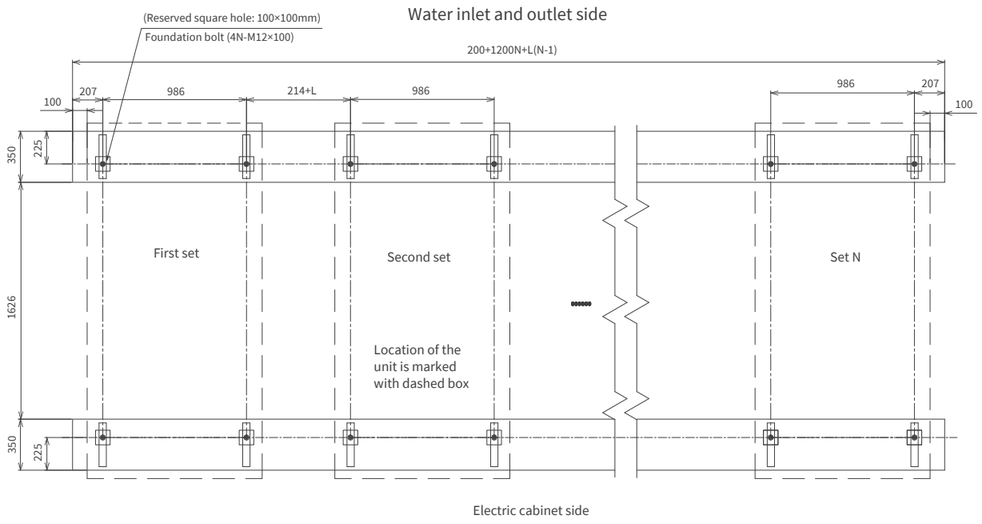


Applicable models

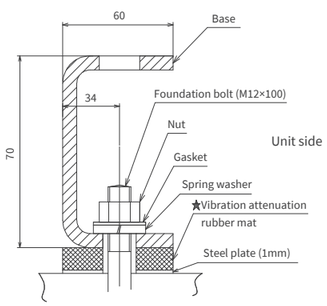
Heat Pump Unit	Water Chiller
RHUA065AVSY	RCUA065AVSY

Technical requirements:
1. The steel plate for foundation installation shall be provided by the user. For detailed specifications, please refer to the detailed size drawing of the steel plate.
2. Vibration attenuation rubber mats are provided with the machine and should be arranged in the manner as shown in the figure, i.e. 4 rubber mats for each unit.
3. N refers to the total number of modular units installed in the same line, and L is the minimum space between units installed, and L ≥500mm.
4. If the units are to be installed in multiple lines, the minimum space between two adjacent lines should be 1500mm.
5. The unit will generate low vibration. However, poor installation may result in vibration. Please install vibration isolation table or enhance the strength of the installation.
6. In principle, the foundation should form an integral part of the floor. Otherwise, in addition to caculation of the shock resistant degree of installation, it is also required to calculate the shock resistance of the unit + foundation so as to determine the strength during topping or movement.
7. In the case of rainfall or defrosting, water may accumulate, so the foundation should be flat and the floor should have drain holes to drain the water in time.
8. Use a hose when connecting the water pipe.

RC(H)UA130AVSY

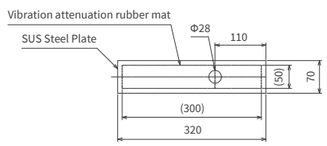


Foundation installation detail drawing (not to scale)



★: Parts from the manufacturer

Steel Plate Dimensional Drawing (Not to Scale)
Field Supplied



Applicable models

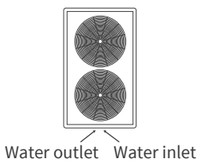
Heat Pump Unit	Water Chiller
RHUA130AVSY	RCUA130AVSY

Technical requirements:
1. The steel plate for foundation installation shall be provided by the user. For detailed specifications, please refer to the detailed size drawing of the steel plate.
2. Vibration attenuation rubber mats are provided with the machine and should be arranged in the manner as shown in the figure, i.e. 4 rubber mats for each unit.
3. N refers to the total number of modular units installed in the same line, and L is the minimum space between units installed, and L ≥500mm.
4. If the units are to be installed in multiple lines, the minimum space between two adjacent lines should be 1500mm.
5. The unit will generate low vibration. However, poor installation may result in vibration. Please install vibration isolation table or enhance the strength of the installation.
6. In principle, the foundation should form an integral part of the floor. Otherwise, in addition to caculation of the shock resistant degree of installation, it is also required to calculate the shock resistance of the unit + foundation so as to determine the strength during topping or movement.
7. In the case of rainfall or defrosting, water may accumulate, so the foundation should be flat and the floor should have drain holes to drain the water in time.
8. Use a hose when connecting the water pipe.

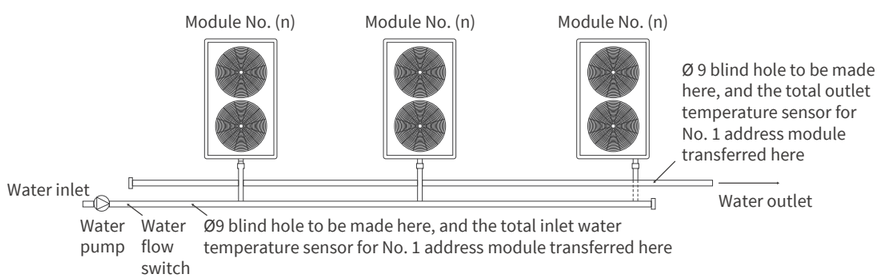
INSTALLATION

Pipe Connection Diagram

Single modular

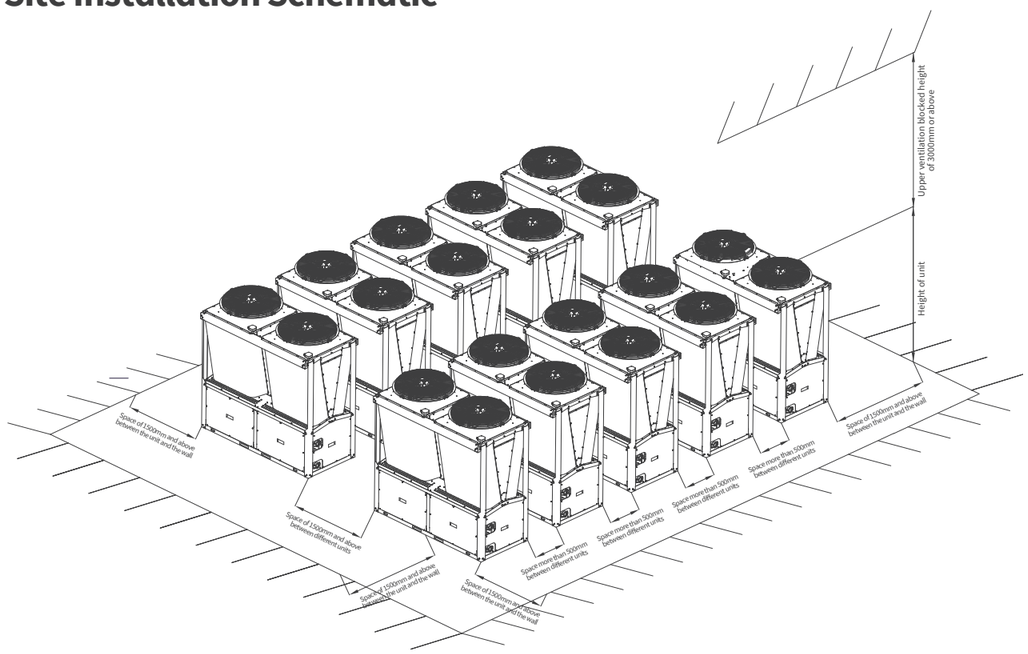


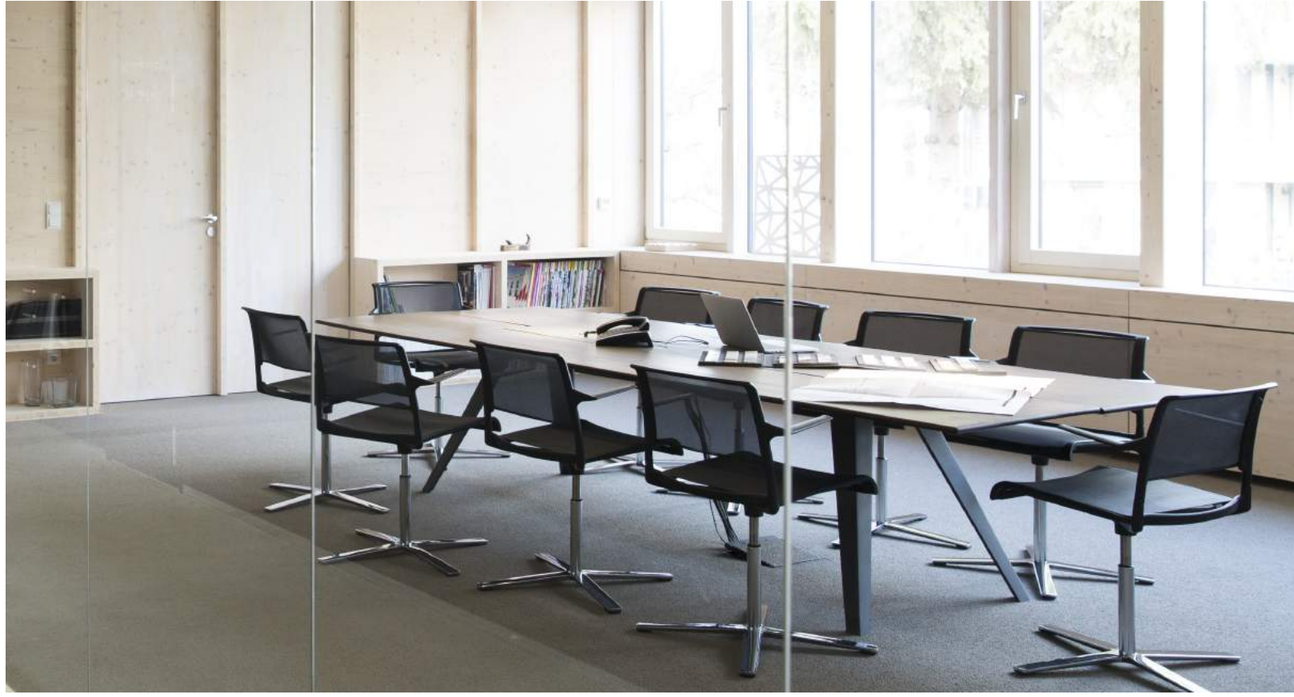
Multi-modulars combination (up to 16nos can combine freely)



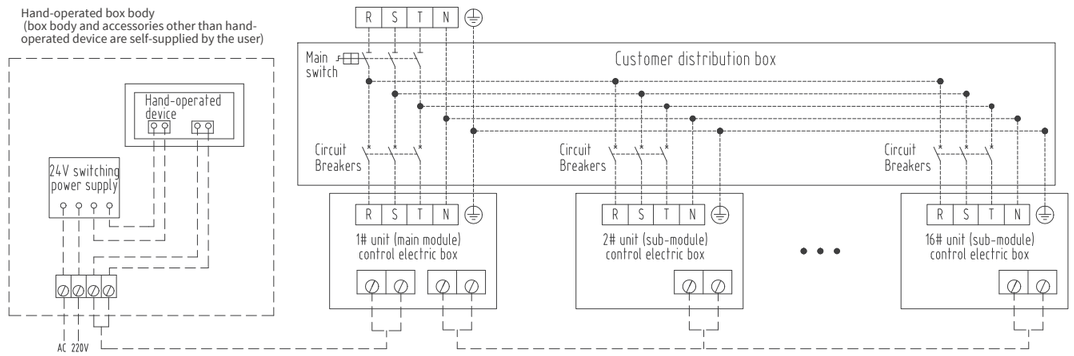
Note
1. The unit shall supply the water inlet and outlet temperature sensor, and the user shall arrange them according to the on-site condition.
2. The corresponding water flow switch is not supplied, and shall be provided by the user.

Site Installation Schematic





Wiring Diagram



Note:
1. Wires between chiller units should be prepared by the user.
2. Communication lines must use shielded twisted pairs that are forbidden to mix with strong electricity.
3. The hand-operated device is an optional item with a 3 m communication line, and the communication line between the host and the hand-operated device is provided by the user.
4. It is suggested that the hand-operated device is installed in the box body separately, and the box body, the termianl and the switch power supply are provided by the user.

Optional Attributes / Accessories

- Heat recovery / Partial heat recovery (≥15%)
- Low ambient cooling/ heating
- Low ambient heat pump (ambient air down to -25 ℃)
- Ultra-quiet operation model
- Protection grill of air-side heat exchanger
- Central controller