

## Installation and the use of refrigerants not specified by Toshiba Carrier Corporation

Toshiba refrigeration and air-conditioning units are designed and manufactured on the assumption that the product is used with a specific refrigerant suitable for each unit.  
We have recently seen some cases where the type of refrigerant used is different from the one originally installed in the product. Such actions may cause mechanical defects, malfunctions, failures and in some cases result in a serious safety issue. Therefore do not install any refrigerant other than the one specified by Toshiba Carrier Corporation for its respective products.  
The type of the refrigerant used for each of our products is shown in the accompanying owners manual, or on the product label attached on the product itself.  
Toshiba Carrier Corporation shall not assume any liability for failures, malfunctions or safety in its products if the refrigerant used is different from the one specified.

### SAFETY PRECAUTIONS

Please see the Technical Document for details.

## UNIVERSAL SMART X Series *EDGE 2*



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A Carrier Company

 **Better Air Solutions**

**Made-in-Japan**  
**All-new innovative chiller system**

# UNIVERSAL SMART X Series EDGE 2

## 60HP model / 70HP model

Introducing the next-generation Universal Smart X Series EDGE 2 modular air-cooled chillers, a testament to the pursuit of efficiency, elevated compact design and expanded capacity. Designed to excel in every aspect, the series EDGE 2 offers exceptional efficiency, resulting in reduced operational costs and superior risk diversification capabilities. Experiencing quietness with their low noise levels, while enjoying ease of installation and maintenance.

Ideal for a diverse range of applications such as data centers, hospitals, clean rooms, offices, and manufacturing facilities, the Series EDGE 2 offers an all-encompassing solution. With the availability of both 60HP and 70HP models, our Series EDGE 2 chillers offer the combination up to 128 modules into a single system. Through its flexible design options and versatile system configurations, you can customize the chiller to precisely fit your specific application requirements.



## UNIVERSAL SMART X Series EDGE 2 line-up

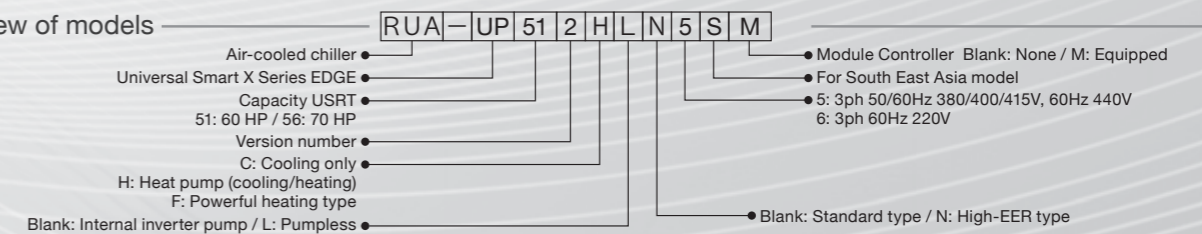
### Internal inverter pump

Model	Use	Type	Power supply	Page
60HP	Cooling-only	Standard	3-phase 3-wire 50/60Hz 380V / 400V / 415V	9
		High-EER		
	Heat pump	Standard	3-phase 3-wire 60Hz 440V 3-phase 3-wire 60Hz 220V	10
		High-EER		
70HP	Cooling-only	Standard	3-phase 3-wire 50/60Hz 380V / 400V / 415V	11
		High-EER		
	Heat pump	Standard	3-phase 3-wire 60Hz 440V 3-phase 3-wire 60Hz 220V	12
		High-EER		

### Pumpless

Model	Use	Type	Power supply	Page
60HP	Cooling-only	Standard	3-phase 3-wire 50/60Hz 380V / 400V / 415V	13
		High-EER		
	Heat pump	Standard	3-phase 3-wire 60Hz 440V 3-phase 3-wire 60Hz 220V	14
		High-EER		
70HP	Cooling-only	Standard	3-phase 3-wire 50/60Hz 380V / 400V / 415V	15
		High-EER		
	Heat pump	Standard	3-phase 3-wire 60Hz 440V 3-phase 3-wire 60Hz 220V	16
		High-EER		

### View of models





# UNIVERSAL SMART X Series **EDGE 2**

60HP model / 70HP model

## 7 Smart features

### 1 60HP model Top Class Energy Saving

#### Standard type

With optimum tuning of the compressor and adopting a highly-improved design of a heat exchanger and refrigerant cycle, the UNIVERSAL SMART X series EDGE 2 has achieved high efficiency **IPLV 6.4**\*1.

#### High-EER type

A higher efficiency **EER 4.72**\*2 has been achieved at full load with spraying water. By optimizing the design of water spray nozzle and position, water spray volume per cooling capacity (kW) has been reduced by 17% from the UNIVERSAL SMART X Series 3.

\*1 The indicated value for IPLV (cooling IPLV) is based on the AHRI550-590 'Water Chilling Unit'.

\*2 EER value is based on rated conditions.

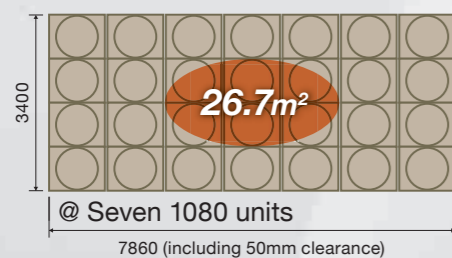
### 2 70HP model Highest capacity module

#### Space-saving installation

With maximum capacity up to 200kW for a single module, 70HP model is the perfect solution for limited installation space. Space saving and large capacity system now comes hand in hand.

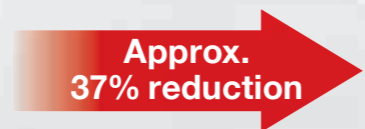
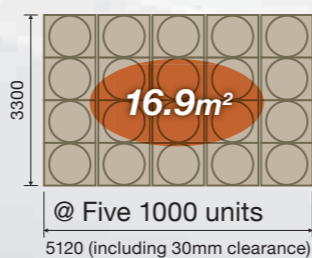
#### UNIVERSAL SMART X 50HP

Seven 150kW units = 1050kW



#### 70HP(56RT) model

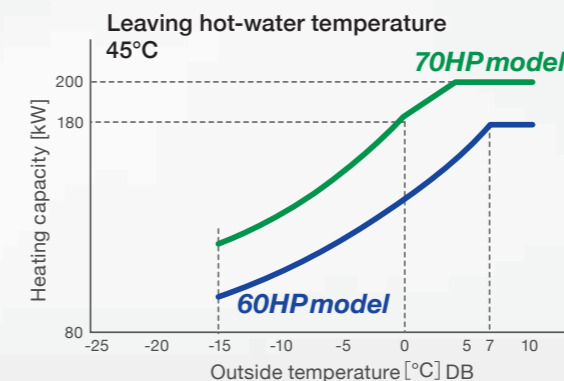
Five 200kW units = 1000kW



### 3 World's largest capacity\*2 DC inverter twin rotary compressor

Improving system performance with the installation of a newly-developed high-capacity DC-inverter rotary compressor—the largest in its class.

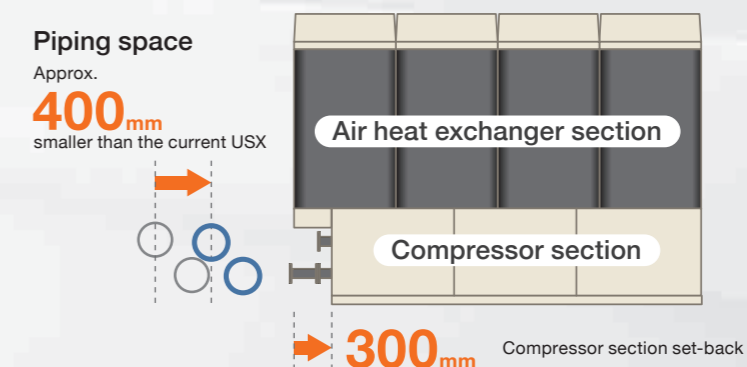
\*2 As of December 2016. According to a study by Toshiba Carrier on AC heat-source pumps (AC-style chiller).



### 4 Compact design with the EDGE shape

#### Installation friendly

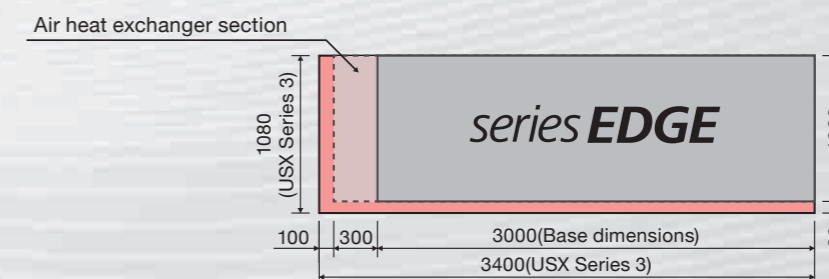
In addition to the X frame design, a unique EDGE shape has been adopted to reduce piping space which makes it more accessible.



#### Small footprint

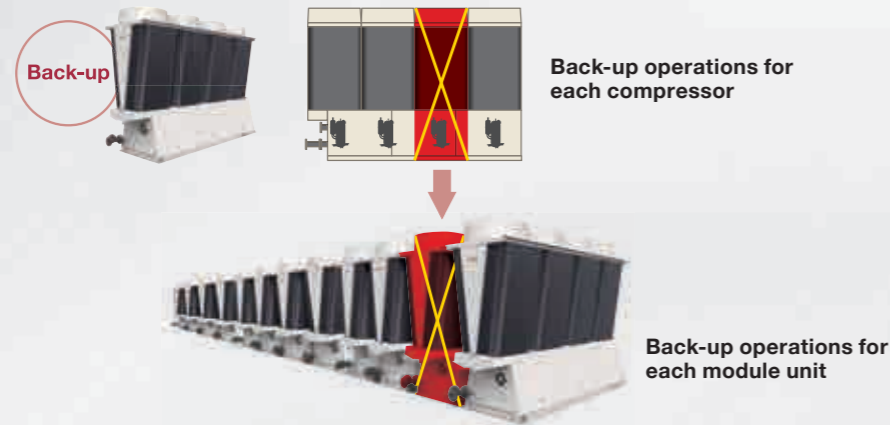
The Serise EDGE 2 with its compact design significantly improves the workability and serviceability around the chiller.

The foundation base area now has been reduced to 1000mm x 3000mm for a single module which is much more easier for maintenance than ever.



## 5 Highly-reliable module unit system

Each module unit has four independent refrigerant cycles, providing excellent risk diversification.



And also...

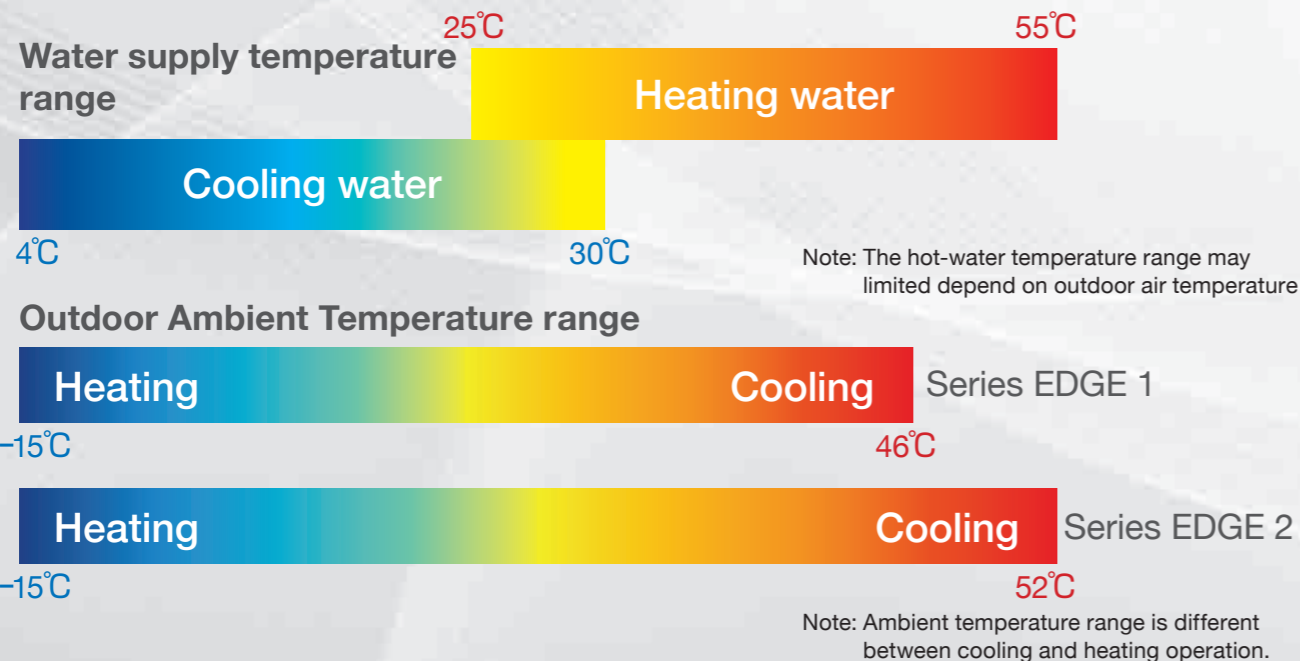
**Defrosting operation for a single module is performed by only one compressor at a time**

Utilizing the redundancy of four compressors to carry out distributed defrost operation in a module unit, the Universal Smart X series EDGE 2 could decrease the impact of leaving hot water temperature changes during defrost operation.



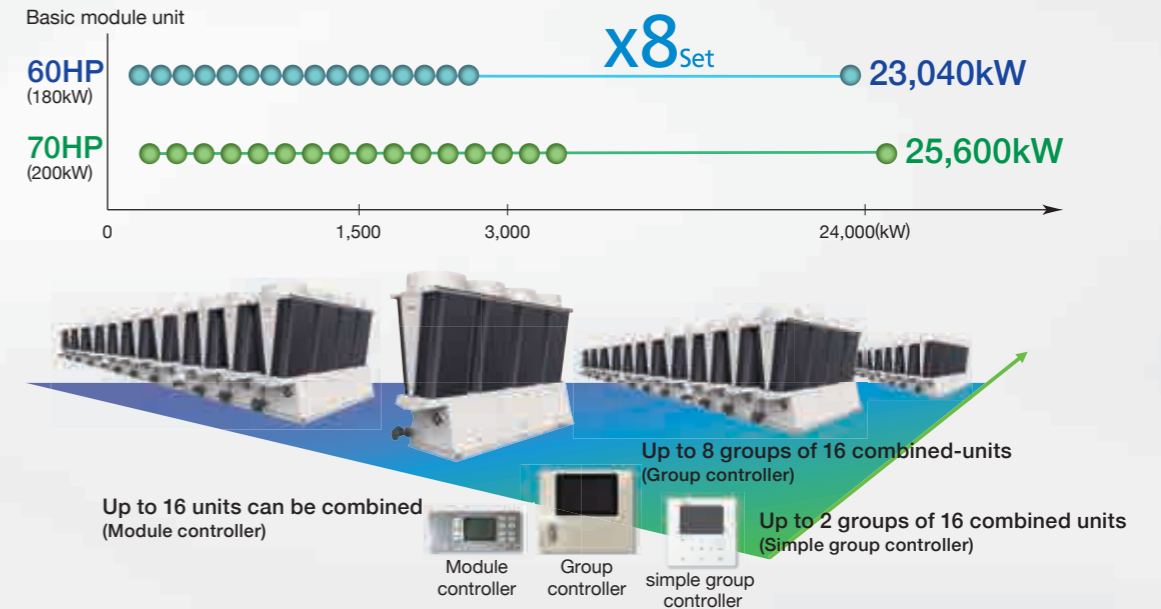
## 6 Wide operation range

The Universal Smart X Series EDGE 2 is now possible to operate at outdoor ambient temperature up to 52°C which improves its reliability at hot regions while keeping the same water supply temperature range as previous series.



## 7 Flexible control of up to 8960 horsepower

Up to 128 UNIVERSAL SMART X series EDGE 2 module units can be combined and operated together.



### Energy saving

#### Pursuit of system performance

(flow optimizer control/harmonic suppression functionality/power factor of 99%)

##### Variable water flow control

Internal inverter pump reduces power transmission loss with variable water flow and water pressure control, which adjusts water flow volume and water pressure according to the load. In addition, bypass flow 0 control is also available which reduces wasted water flow.

##### No harmonic filter / Power factor 99%

Our unique PWM (Pulse Width Modulation) Converter allows no Harmonic Filter treatment on site. Also, a power factor of 99% contributes to a reduction in the size of the power supply cable, circuit breaker, and the installation cost.

Specifications Internal inverter pump

**60HP model**

Cooling-only

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	60HP					60HP						
Model (A single module unit)	RUA-UP512C65(M)		RUA-UP512C55(M)			RUA-UP512CN65(M)		RUA-UP512CN55(M)				
Cooling capacity (Note 1) (kW)	180					180						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2)(mm)	1,000				1,000						
	Depth (Note 2)(mm)	3,300				3,300						
Shipping weight (kg)	1,286					1,298						
Operating weight (kg)	1,322					1,334						
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4-5) (A)	98											
Electrical data (Note 1-6)	Cooling	Nominal current (A)	150 (154)	86.9 (89.1)	82.5 (84.7)	79.5 (81.6)	75.0 (77.0)	101(105)	58.5 (60.6)	55.6 (57.6)	53.6 (55.5)	50.5 (52.3)
		Nominal input (kW)	56.6 (58.1)					38.1 (39.5)				
		EER	3.18 (3.10)					4.72 (4.56)				
		Power factor (Note 7) (%)	99					99				
IPLV (With a 5°C difference) (Note 8)	6.4					6.4						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	12.4 x 4				8.2 x 4						
	Type of start	Inverter starter				Inverter starter						
	Case heater (W)	37 x 4				37 x 4						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
	Water spray system (Note 9)	Water spray volume (L/min)	—				13.6 x 1					
Pump	Supply water pressure (Note 10)(MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
	Motor output (kW)	1.5				1.5						
	Type	Centrifugal pump				Centrifugal pump						
Refrigerant	Type	R410A				R410A						
	R410 charge (kg)	10.2 x 4				10.2 x 4						
	Control	Electric expansion valve				Electric expansion valve						
	Capacity control steps (Note 12) (%)	0 and 5 ~ 100				0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameters	Cold/Hot water inlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 13)	Control box side (dBA)	69.0				69.0						
	Coil side (dBA)	72.3				72.3						
	Water piping side (dBA)	68.5				68.5						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For heating: 12°C entering water (EWT), 7°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590.  
 Performance values do not include pump power consumption.

(Note 2) Dimensions do not include projections of water pipe connections.

(Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.

(Note 4) Output of the integrated pump can change depending on the outlet pump head required to comply with the indent. The power supply design at that time differs from those of a standard pump.

(Note 5) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.

(Note 6) Note that electrical data do not include internal pump.

(Note 7) Power factors may vary depending on site conditions.

(Note 8) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".

(Note 9) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)

(Note 10) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)

(Note 11) Working pressure : below 0.7 MPa.

(Note 12) Range of capacity control sometimes can vary depending on the unit's operating condition.

(Note 13) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications Internal inverter pump

**60HP model**

Heat pump

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	60HP					60HP						
Model (A single module unit)	RUA-UP512H65(M)		RUA-UP512H55(M)			RUA-UP512HN65(M)		RUA-UP512HN55(M)				
Cooling capacity (Note 1) (kW)	180					180						
Heating capacity (Note 1) (kW)	180					180						
Exterior Dimensions	Unit color	Silky shade (Munsell 1Y8.5/0.5)				Silky shade (Munsell 1Y8.5/0.5)						
	Height (mm)	2,350				2,350						
	Width (Note 2)(mm)	1,000				1,000						
Shipping weight (kg)	1,323				1,371							
	1,359				1,371							
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4-5) (A)	98											
Electrical data (Note 1-6)	Cooling	Nominal current (A)	150 (154)	86.9 (89.1)	82.5 (84.7)	79.5 (81.6)	75.0 (77.0)	101(105)	58.5 (60.6)	55.6 (57.6)	53.6 (55.5)	50.5 (52.3)
		Nominal input (kW)	56.6 (58.1)					38.1 (39.5)				
		EER	3.18 (3.10)					4.72 (4.56)				
		Power factor (Note 7) (%)	99					99				
Electrical data (Note 1-6)	Heating	Nominal current (A)	142 (144)	82.4 (83.5)	78.3 (79.3)	75.5 (76.4)	71.2 (72.1)	142 (144)	82.4 (83.5)	78.3 (79.3)	75.5 (76.4)	71.2 (72.1)
		Nominal input (kW)	53.7 (54.4)					53.7 (54.4)				
		COP	3.35 (3.31)					3.35 (3.31)				
		Power factor (Note 7) (%)	99					99				
IPLV (With a 5°C difference) (Note 8)	6.4					6.4						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	11.9 x 4				11.9 x 4						
	Type of start	Inverter starter				Inverter starter						
	Case heater (W)	37 x 4				37 x 4						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
	Water spray system (Note 9)	Water spray volume (L/min)	—				13.6 x 1					
Pump	Supply water pressure (Note 10)(MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
	Motor output (kW)	1.5				1.5						
	Type	Centrifugal pump				Centrifugal pump						
Refrigerant	Type	R410A				R410A						
	R410 charge (kg)	10.6 x 4				10.6 x 4						
	Control	Electric expansion valve				Electric expansion valve						
	Capacity control steps (Note 12) (%)	0 and 5 ~ 100				0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Defrost system	Distributed reverse cycle system											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, high water temp. cutout, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameters	Cold/Hot water inlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 13)	Control box side (dBA)	69.0				69.0						
	Coil side (dBA)	72.3				72.3						
	Water piping side (dBA)	68.5				68.5						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 For heating : 38°C entering water (EWT), 45°C leaving water (LWT), 7°CDB/6°CWD outdoor air (OAT)  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling: 12°C entering water (EWT), 7°C leaving water (LWT)  
 For heating: 40°C entering water (EWT), 45°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590.  
 Performance values do not include pump power consumption.

(Note 2) Dimensions do not include projections of water pipe connections.

(Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.

(Note 4) Output of the integrated pump can change depending on the outlet pump head required to comply with the indent. The power supply design at that time differs from those of a standard pump.

(Note 5) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.

(Note 6) Note that electrical data do not include internal pump.

(Note 7) Power factors may vary depending on site conditions.

(Note 8) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".

(Note 9) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)

(Note 10) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)

(Note 11) Working pressure : below 0.7 MPa.

(Note 12) Range of capacity control sometimes can vary depending on the unit's operating condition.

(Note 13) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications Internal inverter pump

**70HP model**

Cooling-only

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	70HP					70HP						
Model (A single module unit)	RUA-UP562C65(M)		RUA-UP562C55(M)			RUA-UP562CN65(M)		RUA-UP562CN55(M)				
Cooling capacity (Note 1) (kW)	200					200						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2)(mm)	1,000				1,000						
	Depth (Note 2)(mm)	3,300				3,300						
Shipping weight (kg)	1,295					1,307						
Operating weight (kg)	1,331					1,343						
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4-5) (A)	118											
Electrical data (Note 1-6)	Cooling	Nominal current (A)	187 (192)	109 (111)	103 (106)	99.3 (102)	93.7 (96.0)	124 (129)	72.0 (74.5)	68.4 (70.8)	66.0 (68.2)	62.2 (64.3)
		Nominal input (kW)	70.7 (72.5)					46.9 (48.5)				
		EER	2.83 (2.76)					4.26 (4.12)				
		Power factor (Note 7) (%)	99					99				
IPLV (With a 5°C difference) (Note 8)	6.0					6.1						
Compressor	Type	Hermetic rotary x 4					Hermetic rotary x 4					
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	15.4 x 4					10.7 x 4					
	Type of start	Inverter starter					Inverter starter					
Compressor oil	Type	RB74AF					RB74AF					
	Charge (L)	2.0 x 4					2.0 x 4					
Fan	Type	Propeller fan					Propeller fan					
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)					1,230 (maximum)					
	Type of start	Inverter starter					Inverter starter					
	Motor output x number of units (kW)	1.2 x 4					1.2 x 4					
Water spray system (Note 9)	Water spray volume (L/min)	—					13.6 x 1					
	Supply water pressure (Note 10)(MPa)	—					0.2					
Pump (Note 4)	Control	—					Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting					
	Motor output (kW)	2.2					2.2					
	Type	Centrifugal pump					Centrifugal pump					
	Flow control	Inverter					Inverter					
Cooler - water side (Note 11)	Type	R410A					R410A					
	R410 charge (kg)	10.2 x 4					10.2 x 4					
Refrigerant	Type	Electric expansion valve					Electric expansion valve					
	Control	—					—					
Capacity control steps (Note 12) (%)	0 and 5 ~ 100					0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameters	Cold/Hot water inlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 13)	Control box side (dBA)	70.5				70.5						
	Coil side (dBA)	74.9				74.9						
	Water piping side (dBA)	71.0				71.0						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling: 12°C entering water (EWT), 7°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHR1550-590.  
 Performance values do not include pump power consumption.

(Note 2) Dimensions do not include projections of water pipe connections.  
 (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.  
 (Note 4) Output of the integrated pump can change depending on the outlet pump head required to comply with the indent. The power supply design at that time differs from those of a standard pump.  
 (Note 5) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.  
 (Note 6) Note that electrical data do not include internal pump.  
 (Note 7) Power factors may vary depending on site conditions.  
 (Note 8) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHR1550-590 "Water Chilling Unit".  
 (Note 9) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)  
 (Note 10) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)  
 (Note 11) Working pressure : below 0.7 MPa.  
 (Note 12) Range of capacity control sometimes can vary depending on the unit's operating condition.  
 (Note 13) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications Internal inverter pump

**70HP model**

Heat pump

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	70HP					70HP						
Model (A single module unit)	RUA-UP562H65(M)		RUA-UP562H55(M)			RUA-UP562HN65(M)		RUA-UP562HN55(M)				
Cooling capacity (Note 1) (kW)	200					200						
Heating capacity (Note 1) (kW)	200					200						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2)(mm)	1,000				1,000						
	Depth (Note 2)(mm)	3,300				3,300						
Shipping weight (kg)	1,332					1,344						
Operating weight (kg)	1,368					1,380						
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4-5) (A)	118											
Electrical data (Note 1-6)	Cooling	Nominal current (A)	187 (192)	109 (111)	103 (106)	99.3 (102)	93.7 (96.0)	124 (129)	72.0 (74.5)	68.4 (70.8)	66.0 (68.2)	62.2 (64.3)
		Nominal input (kW)	70.7 (72.5)					46.9 (48.5)				
		EER	2.83 (2.76)					4.26 (4.12)				
		Power factor (Note 7) (%)	99					99				
Electrical data (Note 1-6)	Heating	Nominal current (A)	166 (168)	95.9 (97.1)	91.1 (92.3)	87.8 (88.8)	82.8 (83.9)	166 (168)	95.9 (97.1)	91.1 (92.3)	87.8 (88.9)	82.8 (83.9)
		Nominal input (kW)	62.5 (63.3)					62.5 (63.3)				
		COP	3.20 (3.16)					3.20 (3.16)				
		Power factor (Note 7) (%)	99					99				
IPLV (With a 5°C difference) (Note 8)	6.0					6.1						
Compressor	Type	Hermetic rotary x 4					Hermetic rotary x 4					
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	13.5 x 4					10.7 x 4					
	Type of start	Inverter starter					Inverter starter					
Compressor oil	Type	RB74AF					RB74AF					
	Charge (L)	2.0 x 4					2.0 x 4					
Fan	Type	Propeller fan					Propeller fan					
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)					1,230 (maximum)					
	Type of start	Inverter starter					Inverter starter					
	Motor output x number of units (kW)	1.2 x 4					1.2 x 4					
Water spray system (Note 9)	Water spray volume (L/min)	—					13.6 x 1					
	Supply water pressure (Note 10)(MPa)	—					0.2					
Pump (Note 4)	Control	—					Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting					
	Motor output (kW)	2.2					2.2					
	Type	Centrifugal pump					Centrifugal pump					
	Flow control	Inverter					Inverter					
Cooler - water side (Note 11)	Type	R410A					R410A					
	R410 charge (kg)	10.6 x 4					10.6 x 4					
Refrigerant	Type	Electric expansion valve					Electric expansion valve					
	Control	—					—					
Capacity control steps (Note 12) (%)	0 and 5 ~ 100					0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Defrost system	Distributed reverse cycle system											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, high water temp. cutout, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameters	Cold/Hot water inlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 13)	Control box side (dBA)	70.5				70.5						
	Coil side (dBA)	74.9				74.9						
	Water piping side (dBA)	71.0				71.0						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 For heating : 38°C entering water (EWT), 45°C leaving water (LWT), 7°CDB/6°CWD outdoor air (OAT)  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling: 12°C entering water (EWT), 7°C leaving water (LWT)  
 For heating: 40°C entering water (EWT), 45°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHR1550-590.

(Note 2) Dimensions do not include projections of water pipe connections.  
 (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.  
 (Note 4) Output of the integrated pump can change depending on the outlet pump head required to comply with the indent. The power supply design at that time differs from those of a standard pump.  
 (Note 5) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.  
 (Note 6) Note that electrical data do not include internal pump.  
 (Note 7) Power factors may vary depending on site conditions.  
 (Note 8) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHR1550-590 "Water Chilling Unit".  
 (Note 9) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)  
 (Note 10) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)  
 (Note 11) Working pressure : below 0.7 MPa.  
 (Note 12) Range of capacity control sometimes can vary depending on the unit's operating condition.  
 (Note 13) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications **Pumpless**

**60HP model**

Cooling-only

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	60HP					60HP						
Model (A single module unit)	RUA-UPS12CL6S(M)		RUA-UPS12CL5S(M)			RUA-UPS12HL6S(M)		RUA-UPS12HL5S(M)				
Cooling capacity (Note 1) (kW)	180					180						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2) (mm)	1,000				1,000						
	Depth (Note 2) (mm)	3,300				3,300						
Shipping weight (kg)	1,229					1,241						
Operating weight (kg)	1,265					1,277						
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4) (A)	95					95						
Electrical data (Note 1)	Cooling	Nominal current (A)	150 (154)	86.9 (89.1)	82.5 (84.7)	79.5 (81.6)	75.0 (77.0)	101 (105)	58.5 (60.6)	55.6 (57.6)	53.6 (55.5)	50.5 (52.3)
		Nominal input (kW)	56.6 (58.1)					38.1 (39.5)				
		EER	3.18 (3.10)					4.72 (4.56)				
		Power factor (Note 5) (%)	99					99				
IPLV (With a 5°C difference) (Note 6)	6.4					6.4						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	12.4 x 4				8.2 x 4						
	Type of start	Inverter starter				Inverter starter						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
Water spray system (Note 7)	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
	Water spray volume (L/min)	—				13.6 x 1						
Cooler - water side (Note 9)	Supply water pressure (Note 8) (MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
Refrigerant	Type	Braze plate heat exchanger (SUS316 equivalent)				Braze plate heat exchanger (SUS316 equivalent)						
	R410 charge (kg)	R410A				R410A						
	Control	10.2 x 4				10.2 x 4						
Capacity control steps (Note 10) (%)	Electric expansion valve				Electric expansion valve							
Operation control	0 and 5 ~ 100											
Protective device	Microprocessor control based on leaving water temperature and temperature difference											
Piping diameters (Sound level) (Note 11)	Cold/Hot water inlet (A)	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)				2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)		
	Cold/Hot water outlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)		
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1				PT1-1/2" External thread x 1		
	Control box side (dBA)	69.0				69.0				69.0		
Coil side (dBA)	72.3				72.3				72.3			
Water piping side (dBA)	68.5				68.5				68.5			

- (Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
For cooling: 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature. Numbers in parenthesis indicate values for a difference of 5°C.  
For heating: 12°C entering water (EWT), 7°C leaving water (LWT).  
Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590. Performance values do not include pump power consumption.
- (Note 2) Dimensions do not include projections of water pipe connections.
- (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.
- (Note 4) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.
- (Note 5) Power factors may vary depending on site conditions.
- (Note 6) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".
- (Note 7) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)
- (Note 8) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)
- (Note 9) Working pressure: below 0.98 MPa.
- (Note 10) Range of capacity control sometimes can vary depending on the unit's operating condition.
- (Note 11) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications **Pumpless**

**60HP model**

Heat pump

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
	60HP					60HP						
Model (A single module unit)	RUA-UPS12HL6S(M)		RUA-UPS12HL5S(M)			RUA-UPS12HL6S(M)		RUA-UPS12HL5S(M)				
Cooling capacity (Note 1) (kW)	180					180						
Heating capacity (Note 1) (kW)	180					180						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2) (mm)	1,000				1,000						
	Depth (Note 2) (mm)	3,300				3,300						
Shipping weight (kg)	1,265					1,278						
Operating weight (kg)	1,301					1,314						
Power supply (Note 1-3)	3 phase 3 wire 380V/400V/415V 50/60Hz, 440V 60Hz and 220V 60Hz											
Reference current for power supply design (Note 4) (A)	95					95						
Electrical data (Note 1)	Cooling	Nominal current (A)	150 (154)	86.9 (89.1)	82.5 (84.7)	79.5 (81.6)	75.0 (77.0)	101 (105)	58.5 (60.6)	55.6 (57.6)	53.6 (55.5)	50.5 (52.3)
		Nominal input (kW)	56.6 (58.1)					38.1 (39.5)				
		EER	3.18 (3.10)					4.72 (4.56)				
		Power factor (Note 5) (%)	99					99				
Electrical data (Note 1)	Heating	Nominal current (A)	142 (144)	82.4 (83.5)	78.3 (79.3)	75.5 (76.4)	71.2 (72.1)	142 (144)	82.4 (83.5)	78.3 (79.3)	75.5 (76.4)	71.2 (72.1)
		Nominal input (kW)	53.7 (54.4)					53.7 (54.4)				
		COP	3.35 (3.31)					3.35 (3.31)				
		Power factor (Note 5) (%)	99					99				
IPLV (With a 5°C difference) (Note 8)	6.4					6.4						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	12.4 x 4				11.9 x 4						
	Type of start	Inverter starter				Inverter starter						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
Water spray system (Note 7)	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
	Water spray volume (L/min)	—				13.6 x 1						
Cooler - water side (Note 9)	Supply water pressure (Note 8) (MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
Refrigerant	Type	Braze plate heat exchanger (SUS316 equivalent)				Braze plate heat exchanger (SUS316 equivalent)						
	R410 charge (kg)	R410A				R410A						
	Control	10.6 x 4				10.6 x 4						
Capacity control steps (Note 10) (%)	Electric expansion valve				Electric expansion valve							
Operation control	0 and 5 ~ 100											
Protective device	Microprocessor control based on leaving water temperature and temperature difference											
Piping diameters (Sound level) (Note 11)	Cold/Hot water inlet (A)	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)				2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)		
	Cold/Hot water outlet (A)	2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)				2-1/2" Flange x 1 (JIS10K)		
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1				PT1-1/2" External thread x 1		
	Control box side (dBA)	69.0				69.0				69.0		
Coil side (dBA)	72.3				72.3				72.3			
Water piping side (dBA)	68.5				68.5				68.5			

- (Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
For cooling: 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature.  
For heating: 38°C entering water (EWT), 45°C leaving water (LWT), 7°CDB/6°CWD outdoor air (OAT). Numbers in parenthesis indicate values for a difference of 5°C.  
For cooling: 12°C entering water (EWT), 7°C leaving water (LWT).  
For heating: 40°C entering water (EWT), 45°C leaving water (LWT).  
Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590. Performance values do not include pump power consumption.
- (Note 2) Dimensions do not include projections of water pipe connections.
- (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.
- (Note 4) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.
- (Note 5) Power factors may vary depending on site conditions.
- (Note 6) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".
- (Note 7) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)
- (Note 8) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)
- (Note 9) Working pressure: below 0.98 MPa.
- (Note 10) Range of capacity control sometimes can vary depending on the unit's operating condition.
- (Note 11) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications **Pumpless**

**70HP model**

Cooling-only

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
Model (A single module unit)	RUA-UP562CL65(M)					RUA-UP562CLN55(M)						
Cooling capacity (Note 1) (kW)	200					200						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2) (mm)	1,000				1,000						
	Depth (Note 2) (mm)	3,300				3,300						
Shipping weight (kg)	1,235					1,247						
Operating weight (kg)	1,271					1,283						
Power supply (Note 1-3)	3-phase 3-wire 50/60Hz 380V/400V/415V, 3-phase 3-wire 60Hz 440V											
Reference current for power supply design (Note 4) (A)	114					114						
Electrical data (Note 1)	Cooling	Nominal current (A)	187 (192)	109 (111)	103 (106)	99.3 (102)	93.7 (96.0)	124 (129)	72.0 (74.5)	68.4 (70.8)	66.0 (68.2)	62.2 (64.3)
		Nominal input (kW)	70.7 (72.5)					46.9 (48.5)				
		EER	2.83 (2.76)					4.26 (4.12)				
		Power factor (Note 5) (%)	99					99				
IPLV (With a 5°C difference) (Note 6)	6.0					6.1						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	15.4 x 4				10.7 x 4						
	Type of start	Inverter starter				Inverter starter						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
Water spray system (Note 7)	Water spray volume (L/min)	—				13.6 x 1						
	Supply water pressure (Note 8) (MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
Cooler - water side (Note 9)	Braze plate heat exchanger (SUS316 equivalent)					Braze plate heat exchanger (SUS316 equivalent)						
Refrigerant	Type	R410A				R410A						
	R410 charge (kg)	10.2 x 4				10.2 x 4						
	Control	Electric expansion valve				Electric expansion valve						
Capacity control steps (Note 10) (%)	0 and 5 ~ 100					0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameter (Sound level)	Cold/Hot water inlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 11)	Control box side (dBA)	70.5				70.5						
	Coil side (dBA)	74.9				74.9						
	Water piping side (dBA)	71.0				71.0						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling : 12°C entering water (EWT), 7°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590.

(Note 2) Dimensions do not include projections of water pipe connections.  
 (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.  
 (Note 4) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.  
 (Note 5) Power factors may vary depending on site conditions.  
 (Note 6) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".  
 (Note 7) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)  
 (Note 8) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)  
 (Note 9) Working pressure : below 0.98 MPa.  
 (Note 10) Range of capacity control sometimes can vary depending on the unit's operating condition.  
 (Note 11) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

Specifications **Pumpless**

**70HP model**

Heat pump

	Standard type					High-EER type						
	220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
Model (A single module unit)	RUA-UP562HL65(M)					RUA-UP562HLN55(M)						
Cooling capacity (Note 1) (kW)	200					200						
Heating capacity (Note 1) (kW)	200					200						
Unit color	Silky shade (Munsell 1Y8.5/0.5)					Silky shade (Munsell 1Y8.5/0.5)						
Exterior Dimensions	Height (mm)	2,350				2,350						
	Width (Note 2) (mm)	1,000				1,000						
	Depth (Note 2) (mm)	3,300				3,300						
Shipping weight (kg)	1,271					1,284						
Operating weight (kg)	1,307					1,320						
Power supply (Note 1-3)	3-phase 3-wire 50/60Hz 380V/400V/415V, 3-phase 3-wire 60Hz 440V											
Reference current for power supply design (Note 4) (A)	114					114						
Electrical data (Note 1)	Cooling	Nominal current (A)	187(192)	109 (111)	103 (106)	99.3 (102)	93.7 (96.0)	124(129)	72.0 (74.5)	68.4 (70.8)	66.0 (68.2)	62.2 (64.3)
		Nominal input (kW)	70.7 (72.5)					46.9 (48.5)				
		EER	2.83 (2.76)					4.26 (4.12)				
		Power factor (Note 5) (%)	99					99				
Electrical data (Note 1)	Heating	Nominal current (A)	166 (168)	95.9 (97.1)	91.1 (92.3)	87.8 (88.9)	82.8 (83.9)	166 (168)	95.9 (97.1)	91.1 (92.3)	87.8 (88.9)	82.8 (83.9)
		Nominal input (kW)	62.5 (63.3)					62.5 (63.3)				
		COP	3.20 (3.16)					3.20 (3.16)				
		Power factor (Note 5) (%)	99					99				
IPLV (With a 5°C difference) (Note 6)	6.0					6.1						
Compressor	Type	Hermetic rotary x 4				Hermetic rotary x 4						
	Model name	DA1000A4F-10UC1	RA1000A4F-10UC1			DA1000A4F-10UC1	RA1000A4F-10UC1					
	Motor output x number of units (kW)	15.4 x 4				10.7 x 4						
	Type of start	Inverter starter				Inverter starter						
Compressor oil	Type	RB74AF				RB74AF						
	Charge (L)	2.0 x 4				2.0 x 4						
Fan	Type	Propeller fan				Propeller fan						
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)				1,230 (maximum)						
	Type of start	Inverter starter				Inverter starter						
	Motor output x number of units (kW)	1.2 x 4				1.2 x 4						
Water spray system (Note 7)	Water spray volume (L/min)	—				13.6 x 1						
	Supply water pressure (Note 8) (MPa)	—				0.2						
	Control	—				Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting						
Cooler - water side (Note 9)	Braze plate heat exchanger (SUS316 equivalent)					Braze plate heat exchanger (SUS316 equivalent)						
Refrigerant	Type	R410A				R410A						
	R410 charge (kg)	10.6 x 4				10.6 x 4						
	Control	Electric expansion valve				Electric expansion valve						
Capacity control steps (Note 10) (%)	0 and 5 ~ 100					0 and 5 ~ 100						
Operation control	Microprocessor control based on leaving water temperature and temperature difference											
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)											
Piping diameter (Sound level)	Cold/Hot water inlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Cold/Hot water outlet (A)	3" Flange x 1 (JIS10K)				3" Flange x 1 (JIS10K)						
	Coil drain (A)	PT1-1/2" External thread x 1				PT1-1/2" External thread x 1						
Sound level (Note 11)	Control box side (dBA)	70.5				70.5						
	Coil side (dBA)	74.9				74.9						
	Water piping side (dBA)	71.0				71.0						

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 For heating : 38°C entering water (EWT), 45°C leaving water (LWT), 7°CDB/6°CWD outdoor air (OAT)  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling : 12°C entering water (EWT), 7°C leaving water (LWT)  
 For heating : 40°C entering water (EWT), 45°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590.

(Note 2) Dimensions do not include projections of water pipe connections.  
 (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.  
 (Note 4) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.  
 (Note 5) Power factors may vary depending on site conditions.  
 (Note 6) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".  
 (Note 7) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)  
 (Note 8) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)  
 (Note 9) Working pressure : below 0.98 MPa.  
 (Note 10) Range of capacity control sometimes can vary depending on the unit's operating condition.  
 (Note 11) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.



Perspective on of Set Specifications (Calculation Method)

Ex.) Internal inverter pump Air-cooled heat pump [High-EER type] 16 combined module units

		Ex.) 60HP x1(single unit)	Ex.) 60HP x16 units	Calculation method
Model		RUA-UP512HN5S(M)	RUA-UP512HN5S(M)	—
Cooling capacity (Note 1) (kW)		180	2,880	See General Charts or (single unit value) x (number of module units in set)
Heating capacity (Note 1) (kW)		180	2,880	—
Exterior	Unit color Silky shade (Munsell 1Y8.5/0.5)			
	Dimensions (Note 2)	Height (mm)	2,350	2,350
		Width (mm)	1,000	16,450
		Depth (mm)	3,300	3,300
Shipping weight (kg)		1,330	21,280	(Single unit value) x (number of module units in set)
Operating weight (kg)		1,366	21,856	(Single unit value) x (number of module units in set)
Power supply (Note 1-3)		3-phase 3-wire 380V 50/60Hz		
Reference current for power supply design (Note 4-5) (A)		196	196 x 16	(Single unit value) x (number of module units in set)
Electrical data (Note 6)	Cooling	Nominal current (A)	58.5 (60.6)	936 (970)
		Nominal input (kW)	38.1 (39.5)	610 (632)
		EER	4.72 (4.56)	4.72 (4.56)
	Heating	Nominal current (A)	82.4 (83.5)	1,318 (1,336)
		Nominal input (kW)	53.7 (54.4)	860 (871)
		COP	3.35 (3.31)	3.35 (3.31)
Power factor (Note 7) (%)		99	99	—
IPLV (With a 5°C difference) (Note 8)		6.4	6.4	—
Compressor	Type	Hermetic rotary		
	Model name	RA1000A4F-10UC1		
	Motor output x number of units (kW)	11.9 x 4	11.9 x 64	(Single unit value) x (number of module units in set)
	Type of start	Inverter starter		
Case heater (W)	37 x 4	37 x 64	(Single unit value) x (number of module units in set)	
Compressor oil	Type	RB74AF		
	Charge (L)	2.0 x 4	2.0 x 64	(Single unit value) x (number of module units in set)
Condenser coil - air side		Plate fin coil		
Fan	Type	Propeller fan		
	Air quantity (m <sup>3</sup> /min)	1,230 (maximum)	19,680 (maximum)	(Single unit value) x (number of module units in set)
	Type of start	Inverter starter		
	Motor output x number of units (kW)	1.2 x 4	1.2 x 64	(Single unit value) x (number of module units in set)
Water spray system (Note 9)	Water spray volume (L/min)	13.6 x 1	13.6 x 16	(Single unit value) x (number of module units in set)
	Supply water pressure (Note 10) (MPa)	0.2	0.2	—
	Control	Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setting		
Pump (Note 4)	Motor output (kW)	1.5	1.5 x 16	(Single unit value) x (number of module units in set)
	Type	Centrifugal pump		
	Flow control	Inverter		
	Maximum current (A)	6.1	6.1 x 16	(Single unit value) x (number of module units in set)
Maximum input (kW)	2.0	2.0 x 16	(Single unit value) x (number of module units in set)	
Cooler - water side (Note 11)		Braze plate heat exchanger (SUS316 equivalent)		
Refrigerant	Type	R410A		
	R410 charge (kg)	10.6 x 4	10.6 x 64	(Single unit value) x (number of module units in set)
	Control	Electric expansion valve		
Capacity control steps (Note 12) (%)	0.5 ~ 100			
Operation control	Microprocessor control based on leaving water temperature and temperature difference			
Defrost system	Distributed reverse cycle system			
Protective device	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, freeze protection, high water temp. cutout, low flow rate, discharge gas overheat protection, low pressure cutout, thermistor error, high water pressure error)			
Piping diameter	Cold/Hot water inlet (A)	2-1/2" flange (JIS10K)	2-1/2" flange (JIS10K)	(Single unit value) x (number of module units in set)
	Cold/Hot water outlet (A)	2-1/2" flange (JIS10K)	2-1/2" flange (JIS10K)	(Single unit value) x (number of module units in set)
	Coil drain (A)	PT1-1/2" External thread x 1	PT1-1/2" External thread x 1	*Each module unit has one connection port
Sound level (Note 13)	Control box side (dBA)	69	77.2	See General Charts
	Coil side (dBA)	72.3	75.2	
	Water piping side (dBA)	68.5	76.6	

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.  
 For cooling : 14°C entering water (EWT), 7°C leaving water (LWT), 35°CDB/24°CWD outdoor air (OAT) and 21°C feed-water temperature  
 For heating : 38°C entering water (EWT), 45°C leaving water (LWT), 7°CDB/6°CWD outdoor air (OAT)  
 Numbers in parenthesis indicate values for a difference of 5°C.  
 For cooling: 12°C entering water (EWT), 7°C leaving water (LWT)  
 For heating: 40°C entering water (EWT), 45°C leaving water (LWT)  
 Same capacities, outdoor air temperature, and supplied water temperature (only for High EER type) as indicated above.  
 Design water flow rate must be within the range of 5 to 10°C water temperature differences. Capacities and performance values are based on AHRI550-590.

(Note 2) Dimensions do not include projections of water pipe connections.  
 (Note 3) Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.  
 (Note 4) Output of the integrated pump can change depending on the outlet pump head required to comply with the indent. The power supply design at that time differs from those of a standard pump.  
 (Note 5) Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.  
 (Note 6) Note that electrical data do not include internal pump.  
 (Note 7) Power factors may vary depending on site conditions.  
 (Note 8) The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".  
 (Note 9) The supply water quality may cause scales and other matter to adhere to the coil surface. If necessary, install a water softener on the supply water side. (Provided locally)  
 (Note 10) Adjust the flow rate to become close to this supply water pressure with the manual flow adjustment valve on the water spray system inlet. If sufficient supply water pressure is not available, install a pressure pump. (Provided locally)  
 (Note 11) Working pressure : below 0.7 MPa.  
 (Note 12) Range of capacity control sometimes can vary depending on the unit's operating condition.  
 (Note 13) (Measurement position: Distance of 1.0m, height of 1.5m) The on-site sound level will be higher due to the affection of back noise and sound reflection.

General Charts for Combined module units : Capacity, Outside Dimensions, and Sound Level

**60HP model**

(Note 1)	Cooling capacity (kW)	Heating capacity (kW) (Note 2)	Dimensions (mm) H×W×D (Note 3)	Sound level (dBA) (Note 4)		
				Control box side	Air heat exchanger side	Water heat exchange side
RUA-UP512(H)(L)(N)#	180	180	2,350×1,000×3,300	69	72.3	68.5
RUA-UP512(H)(L)(N)# x 2 units	360	360	2,350×2,030×3,300	71.9	73.6	71.3
RUA-UP512(H)(L)(N)# x 3 units	540	540	2,350×3,060×3,300	73.4	74.2	72.8
RUA-UP512(H)(L)(N)# x 4 units	720	720	2,350×4,090×3,300	74.4	74.5	73.8
RUA-UP512(H)(L)(N)# x 5 units	900	900	2,350×5,120×3,300	75	74.7	74.5
RUA-UP512(H)(L)(N)# x 6 units	1,080	1,080	2,350×6,150×3,300	75.5	74.8	74.9
RUA-UP512(H)(L)(N)# x 7 units	1,260	1,260	2,350×7,180×3,300	75.9	74.9	75.3
RUA-UP512(H)(L)(N)# x 8 units	1,440	1,440	2,350×8,210×3,300	76.2	74.9	75.6
RUA-UP512(H)(L)(N)# x 9 units	1,620	1,620	2,350×9,240×3,300	76.4	75	75.8
RUA-UP512(H)(L)(N)# x 10 units	1,800	1,800	2,350×10,270×3,300	76.5	75	76
RUA-UP512(H)(L)(N)# x 11 units	1,980	1,980	2,350×11,300×3,300	76.7	75.1	76.1
RUA-UP512(H)(L)(N)# x 12 units	2,160	2,160	2,350×12,330×3,300	76.8	75.1	76.2
RUA-UP512(H)(L)(N)# x 13 units	2,340	2,340	2,350×13,360×3,300	76.9	75.1	76.3
RUA-UP512(H)(L)(N)# x 14 units	2,520	2,520	2,350×14,390×3,300	77	75.2	76.4
RUA-UP512(H)(L)(N)# x 15 units	2,700	2,700	2,350×15,420×3,300	77.1	75.2	76.5
RUA-UP512(H)(L)(N)# x 16 units	2,880	2,880	2,350×16,450×3,300	77.2	75.2	76.6

**70HP model**

(Note 1)	Cooling capacity (kW)	Heating capacity (kW) (Note 2)	Dimensions (mm) H×W×D (Note 3)	Sound level (dBA) (Note 4)		
				Control box side	Air heat exchanger side	Water heat exchange side
RUA-UP562(H)(L)(N)#	200	200	2,350×1,000×3,300	69	68.5	72.3
RUA-UP562(H)(L)(N)# x 2 units	400	400	2,350×2,030×3,300	71.9	71.3	73.6
RUA-UP562(H)(L)(N)# x 3 units	600	600	2,350×3,060×3,300	73.4	72.8	74.2
RUA-UP562(H)(L)(N)# x 4 units	800	800	2,350×4,090×3,300	74.4	73.8	74.5
RUA-UP562(H)(L)(N)# x 5 units	1,000	1,000	2,350×5,120×3,300	75	74.5	74.7
RUA-UP562(H)(L)(N)# x 6 units	1,200	1,200	2,350×6,150×3,300	75.5	74.9	74.8
RUA-UP562(H)(L)(N)# x 7 units	1,400	1,400	2,350×7,180×3,300	75.9	75.3	74.9
RUA-UP562(H)(L)(N)# x 8 units	1,600	1,600	2,350×8,210×3,300	76.2	75.6	74.9
RUA-UP562(H)(L)(N)# x 9 units	1,800	1,800	2,350×9,240×3,300	76.4	75.8	75
RUA-UP562(H)(L)(N)# x 10 units	2,000	2,000	2,350×10,270×3,300	76.5	6	75
RUA-UP562(H)(L)(N)# x 11 units	2,200	2,200	2,350×11,300×3,300	76.7	76.1	75.1
RUA-UP562(H)(L)(N)# x 12 units	2,400	2,400	2,350×12,330×3,300	76.8	76.2	75.1
RUA-UP562(H)(L)(N)# x 13 units	2,600	2,600	2,350×13,360×3,300	76.9	76.3	75.1
RUA-UP562(H)(L)(N)# x 14 units	2,800	2,800	2,350×14,390×3,300	77	76.4	75.2
RUA-UP562(H)(L)(N)# x 15 units	3,000	3,000	2,350×15,420×3,300	77.1	76.5	75.2
RUA-UP562(H)(L)(N)# x 16 units	3,200	3,200	2,350×16,450×3,300	77.2	76.6	75.2

Note 1: The power supply voltage specification (5: 380/400/415/ 440V, 6: 220V) can be replaced by "#".  
 Note 2: Only for heat pump types.  
 Note 3: Dimensions (width, depth) do not include projections of water pipe connections and power cable kit. (When installing optional parts)  
 Note 4: The on-site sound level will be higher due to the affection of back noise and sound reflection.

General Charts for Combined module units : Standard Water Flow Rate / Water Volume Range (Leaving (LVG) / Entering (ETG) water temperature difference = 7°C)

Internal inverter pump

60HP model

(Note 1)	Standard flow rate (L/min) (Note 2)	Flow rate range (L/min) (Note 3-6)	Minimum water loop volume (L) (Note 4-5-6)	In-unit water volume (L)
RUA-UP512(H)(N)#	369	150~600	860	36
RUA-UP512(H)(N)# x 2 units	737	150~1,200		72
RUA-UP512(H)(N)# x 3 units	1,106	150~1,800		108
RUA-UP512(H)(N)# x 4 units	1,474	150~2,400		144
RUA-UP512(H)(N)# x 5 units	1,843	150~3,000		180
RUA-UP512(H)(N)# x 6 units	2,211	150~3,600		216
RUA-UP512(H)(N)# x 7 units	2,580	150~4,200		252
RUA-UP512(H)(N)# x 8 units	2,949	150~4,800		288
RUA-UP512(H)(N)# x 9 units	3,317	150~5,400		324
RUA-UP512(H)(N)# x 10 units	3,686	150~6,000		360
RUA-UP512(H)(N)# x 11 units	4,054	150~6,600		396
RUA-UP512(H)(N)# x 12 units	4,423	150~7,200		432
RUA-UP512(H)(N)# x 13 units	4,791	150~7,800		468
RUA-UP512(H)(N)# x 14 units	5,160	150~8,400		504
RUA-UP512(H)(N)# x 15 units	5,529	150~9,000		540
RUA-UP512(H)(N)# x 16 units	5,897	150~9,600		570

Pumpless

60HP model

(Note 1)	Standard flow rate • Water pressure loss (Note 2)		Flow rate range (L/min) (Note 5)	Minimum water loop volume (L) (Note 3-4-5)	In-unit water volume (L)
	(L/min)	(kPa)			
RUA-UP512(H)(L)(N)#	369	42.1	150~600	860	36
RUA-UP512(H)(L)(N)# x 2 units	737		300~1,200	1,720	72
RUA-UP512(H)(L)(N)# x 3 units	1,106		450~1,800	2,580	108
RUA-UP512(H)(L)(N)# x 4 units	1,474		600~2,400	3,440	144
RUA-UP512(H)(L)(N)# x 5 units	1,843		750~3,000	4,301	180
RUA-UP512(H)(L)(N)# x 6 units	2,211		900~3,600	5,161	216
RUA-UP512(H)(L)(N)# x 7 units	2,580		1,050~4,200	6,021	252
RUA-UP512(H)(L)(N)# x 8 units	2,949		1,200~4,800	6,881	288
RUA-UP512(H)(L)(N)# x 9 units	3,317		1,350~5,400	7,741	324
RUA-UP512(H)(L)(N)# x 10 units	3,686		1,500~6,000	8,601	360
RUA-UP512(H)(L)(N)# x 11 units	4,054		1,650~6,600	9,461	396
RUA-UP512(H)(L)(N)# x 12 units	4,423		1,800~7,200	10,321	432
RUA-UP512(H)(L)(N)# x 13 units	4,791		1,950~7,800	11,181	468
RUA-UP512(H)(L)(N)# x 14 units	5,160		2,100~8,400	12,041	504
RUA-UP512(H)(L)(N)# x 15 units	5,529		2,250~9,000	12,902	540
RUA-UP512(H)(L)(N)# x 16 units	5,897		2,400~9,600	13,762	570

70HP model

(Note 1)	Standard flow rate (L/min) (Note 2)	Flow rate range (L/min) (Note 3-6)	Minimum water loop volume (L) (Note 4-5-6)	In-unit water volume (L)
RUA-UP562(H)(N)#	410	150~650	956	36
RUA-UP562(H)(N)# x 2 units	819	150~1,300		72
RUA-UP562(H)(N)# x 3 units	1,229	150~1,950		108
RUA-UP562(H)(N)# x 4 units	1,638	150~2,600		144
RUA-UP562(H)(N)# x 5 units	2,048	150~3,250		180
RUA-UP562(H)(N)# x 6 units	2,457	150~3,900		216
RUA-UP562(H)(N)# x 7 units	2,867	150~4,550		252
RUA-UP562(H)(N)# x 8 units	3,276	150~5,200		288
RUA-UP562(H)(N)# x 9 units	3,686	150~5,850		324
RUA-UP562(H)(N)# x 10 units	4,095	150~6,500		360
RUA-UP562(H)(N)# x 11 units	4,505	150~7,150		396
RUA-UP562(H)(N)# x 12 units	4,914	150~7,800		432
RUA-UP562(H)(N)# x 13 units	5,324	150~8,450		468
RUA-UP562(H)(N)# x 14 units	5,733	150~9,100		504
RUA-UP562(H)(N)# x 15 units	6,143	150~9,750		540
RUA-UP562(H)(N)# x 16 units	6,552	150~10,400		570

70HP model

(Note 1)	Standard flow rate • Water pressure loss (Note 2)		Flow rate range (L/min) (Note 5)	Minimum water loop volume (L) (Note 3-4-5)	In-unit water volume (L)
	(L/min)	(kPa)			
RUA-UP512(H)(L)(N)#	410	51.3	150~650	956	36
RUA-UP512(H)(L)(N)# x 2 units	819		300~1,300	1,911	72
RUA-UP512(H)(L)(N)# x 3 units	1,229		450~1,950	2,867	108
RUA-UP512(H)(L)(N)# x 4 units	1,638		600~2,600	3,823	144
RUA-UP512(H)(L)(N)# x 5 units	2,048		750~3,250	4,778	180
RUA-UP512(H)(L)(N)# x 6 units	2,457		900~3,900	5,734	216
RUA-UP512(H)(L)(N)# x 7 units	2,867		1,050~4,550	6,690	252
RUA-UP512(H)(L)(N)# x 8 units	3,276		1,200~5,200	7,645	288
RUA-UP512(H)(L)(N)# x 9 units	3,686		1,350~5,850	8,601	324
RUA-UP512(H)(L)(N)# x 10 units	4,095		1,500~6,500	9,557	360
RUA-UP512(H)(L)(N)# x 11 units	4,505		1,650~7,150	10,512	396
RUA-UP512(H)(L)(N)# x 12 units	4,914		1,800~7,800	11,468	432
RUA-UP512(H)(L)(N)# x 13 units	5,324		1,950~8,450	12,424	468
RUA-UP512(H)(L)(N)# x 14 units	5,733		2,100~9,100	13,379	504
RUA-UP512(H)(L)(N)# x 15 units	6,143		2,250~9,750	14,335	540
RUA-UP512(H)(L)(N)# x 16 units	6,552		2,400~10,400	15,291	570

Note 1: Note 1: The power supply voltage specification (5: 380/400/415/ 440V, 6: 220V) can be replaced by “#” in the table.  
 Note 2: For both at cooling/heating. Indicates the flow rate and water pressure loss when leaving/entering water temperature difference is 7°C at rated capacity. (water pressure loss is only for pumpless models)  
 Note 3: Within the indicate flow rate range, the flow rate automatically changes from the pump integrated into each module. (only for internal inverter pump models)  
 Note 4: Value indicated for retained water amount is with a standard flow amount. (Rated capacity, change in water outlet/inlet temperature difference = 7°C)  
 Note 5: Please make a separate inquiry if you would like to control the effect of a temperature reduction in the water supply due to the defrost operation.  
 Note 6: When operating at the rated flow capacity, even with internal inverter pump models, set the flow amount range and system retained water amount to the same value as the pumpless model.

Note 1: Note 1: The power supply voltage specification (5: 380/400/415/ 440V, 6: 220V) can be replaced by “#” in the table.  
 Note 2: For both at cooling/heating. Indicates the flow rate and water pressure loss when leaving/entering water temperature difference is 7°C at rated capacity. (water pressure loss is only for pumpless models)  
 Note 3: Within the indicate flow rate range, the flow rate automatically changes from the pump integrated into each module. (only for internal inverter pump models)  
 Note 4: Value indicated for retained water amount is with a standard flow amount. (Rated capacity, change in water outlet/inlet temperature difference = 7°C)  
 Note 5: Please make a separate inquiry if you would like to control the effect of a temperature reduction in the water supply due to the defrost operation.

Capacity Chart / Entering (ETG) water temperature difference = 7°C

### 60HP model

List of cooling capacities RUA-UP512(C) (L)  
Standard type

LVG cold-water temperature (°C)	Item	Outdoor air temperature (°C) (DB)								
		15	20	25	30	35	40	43	48	52
4	Cooling capacity (kW)	217	205	191	176	165	151	138	114	101
	Nominal input (kW)	37.9	41.9	45.9	50.0	54.6	60.4	59.0	52.3	51.0
	Water flow rate (L/min)	444	420	391	360	338	309	283	233	207
	Nominal current (A)	55.3	61.1	66.9	72.9	79.7	88.1	86.0	76.2	74.4
7	Cooling capacity (kW)	234	225	210	193	180	165	147	122	104
	Nominal input (kW)	39.5	43.2	47.5	51.9	56.6	62.5	59.0	52.1	48.8
	Water flow rate (L/min)	479	461	430	395	369	338	301	250	213
	Nominal current (A)	57.5	63.0	69.3	75.6	82.5	91.1	86.1	76.0	71.2
9	Cooling capacity (kW)	242	237	222	205	190	174	153	128	106
	Nominal input (kW)	40.4	44.1	48.5	53.0	57.9	63.5	59.1	52.2	47.3
	Water flow rate (L/min)	496	485	455	420	389	356	313	262	217
	Nominal current (A)	58.9	64.2	70.7	77.2	84.5	92.6	86.1	76.2	69.0
12	Cooling capacity (kW)	254	252	242	223	206	185	162	136	108
	Nominal input (kW)	42.8	45.6	50.0	54.7	59.7	63.8	59.1	52.3	45.0
	Water flow rate (L/min)	520	516	496	457	422	379	332	278	221
	Nominal current (A)	62.5	66.4	72.9	79.7	87.1	93.0	86.2	76.3	65.6
15	Cooling capacity (kW)	260	260	254	238	221	195	171	143	109
	Nominal input (kW)	44.8	46.3	50.8	56	61.2	63.9	59.2	52.2	43.3
	Water flow rate (L/min)	*516	*516	*516	487	453	399	350	293	223
	Nominal current (A)	65.2	67.5	74.1	81.6	89.3	93.2	86.3	76.1	63.1
20	Cooling capacity (kW)	261	261	256	242	228	201	176	147	110
	Nominal input (kW)	45.0	46.4	51.0	56.3	61.6	64.0	59.3	52.3	42.5
	Water flow rate (L/min)	*516	*516	*516	496	467	412	360	301	225
	Nominal current (A)	65.6	67.7	74.4	82.1	89.8	93.3	86.4	76.3	61.9
25	Cooling capacity (kW)	261	261	257	243	228	201	176	147	110
	Nominal input (kW)	45.0	46.4	51.0	56.4	61.8	64.0	59.3	52.3	42.5
	Water flow rate (L/min)	*516	*516	*516	498	467	412	360	301	225
	Nominal current (A)	65.6	67.7	74.3	82.2	90.1	93.3	86.4	76.3	61.9
30	Cooling capacity (kW)	261	261	257	243	228	201	176	147	110
	Nominal input (kW)	45	46.4	51.0	56.4	61.6	64.0	59.3	52.3	42.5
	Water flow rate (L/min)	*516	*516	*516	498	467	412	360	301	225
	Nominal current (A)	65.6	67.7	74.3	82.2	89.8	93.3	86.4	76.3	61.9

List of heating capacities RUA-UP512H(L) (N)  
Standard type/High EER type

LVG cold-water temperature (°C)	Item	Outdoor air temperature (°C) (DB)							
		-15	-10	-5	0	4	7	15	
25	Heating capacity (kW)	98.0	115	135	157	174	186	221	
	Nominal input (kW)	31.9	33.8	35.3	36.4	37.2	37.0	37.5	
	Water flow rate (L/min)	201	235	276	321	356	381	453	
	Nominal current (A)	47.5	49.8	52.1	53.7	54.8	53.9	54.6	
30	Heating capacity (kW)	97.5	115	134	156	173	185	220	
	Nominal input (kW)	34.0	36.2	38.0	39.5	40.5	40.6	41.7	
	Water flow rate (L/min)	200	235	274	319	354	379	450	
	Nominal current (A)	50.6	53.3	55.9	58.2	59.7	59.2	60.9	
35	Heating capacity (kW)	97.1	114	134	154	172	184	218	
	Nominal input (kW)	36.4	38.9	41.1	42.9	44.3	44.6	46.4	
	Water flow rate (L/min)	199	233	274	315	352	377	446	
	Nominal current (A)	54.1	57.3	60.5	63.2	64.6	65.0	67.6	
40	Heating capacity (kW)	96.5	113	132	153	170	182	216	
	Nominal input (kW)	39.1	42.0	44.6	46.8	48.4	48.9	51.3	
	Water flow rate (L/min)	198	231	270	313	348	373	442	
	Nominal current (A)	57.5	61.9	65.7	68.9	70.6	71.3	74.8	
45	Heating capacity (kW)	95.8	113	131	151	168	180	213	
	Nominal input (kW)	42.0	45.4	48.3	51.0	53.0	53.7	56.6	
	Water flow rate (L/min)	196	231	268	309	344	369	436	
	Nominal current (A)	61.9	66.8	71.2	74.4	77.3	78.3	82.6	
50	Heating capacity (kW)		112	130	150	167	178	210	
	Nominal input (kW)		48.9	52.4	55.6	57.8	58.7	62.1	
	Water flow rate (L/min)		229	266	307	342	364	430	
	Nominal current (A)		72.0	77.2	81.0	84.3	85.7	90.6	
55	Heating capacity (kW)			129	149	164	175	200	
	Nominal input (kW)			56.6	60.1	62.4	63.4	63.7	
	Water flow rate (L/min)			264	305	336	358	410	
	Nominal current (A)			82.5	87.6	90.9	92.4	92.9	

Note 1: The indicated cooling characteristics are when leaving/entering cold-water temperature difference is 7°C.  
Note 2: Performance shown for when machine operated on rated frequency.  
Note 3: \* mark indicates max. Flow rate due to flow rate limitation. For max/ flow rate, leaving/entering temperature difference is 7°C or more.  
Note 4: The indicated heating characteristics are when leaving/entering hot-water temperature difference is 7°C.  
Note 5:   The maximum output is displayed (however, this range does not go over the rated output). Other values indicates the performance when the machine is operating at its rated frequency.  
Note 6: The indicated heating characteristics indicate performance with a relative humidity difference of 85%.  
Note 7: The data is for 400V specification.

### 70HP model

List of cooling capacities RUA-UP562(C) (L)  
Standard type

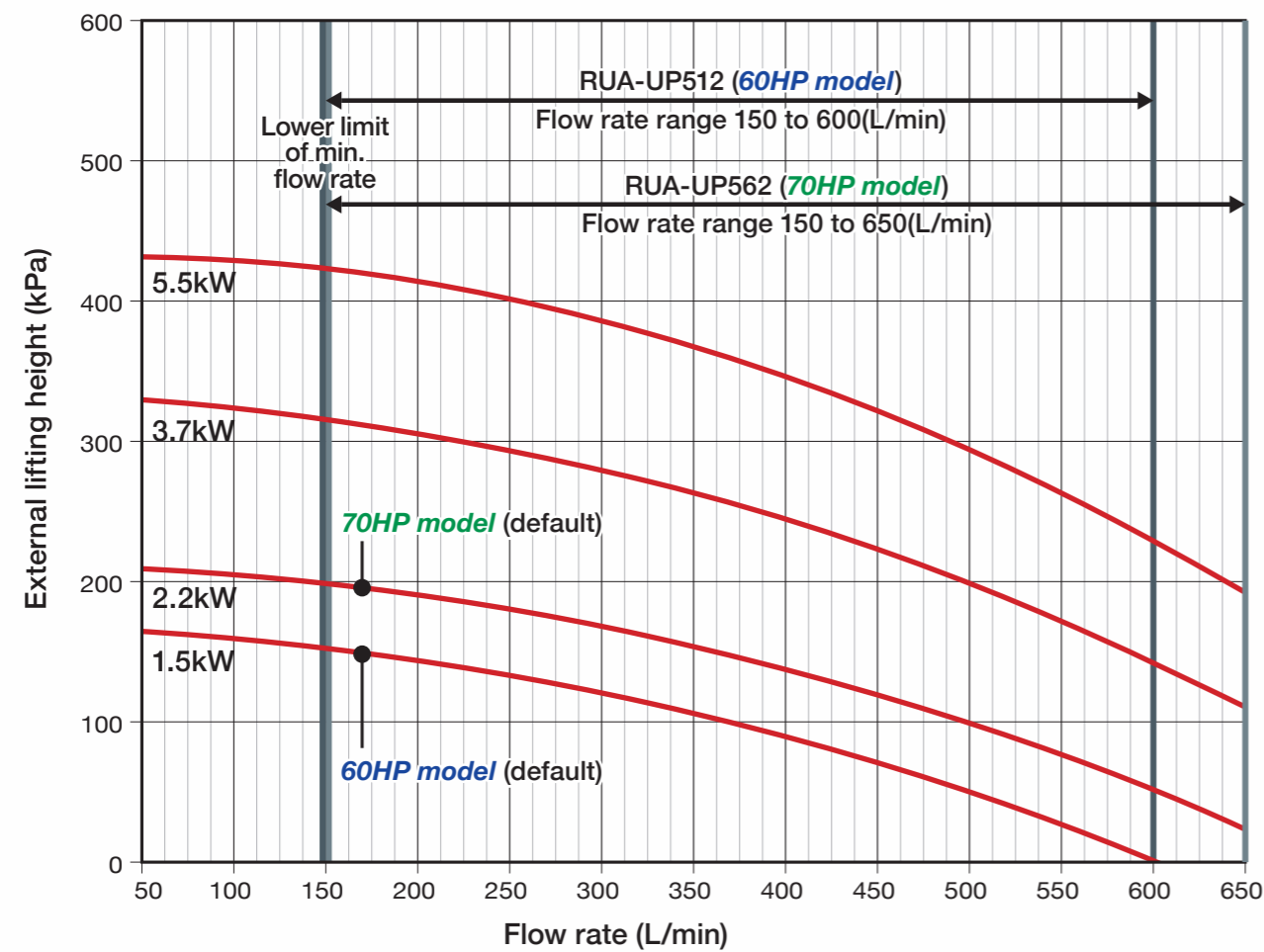
LVG cold-water temperature (°C)	Item	Outdoor air temperature (°C) (DB)								
		15	20	25	30	35	40	43	48	52
4	Cooling capacity (kW)	242	227	211	195	183	160	138	114	101
	Nominal input (kW)	48.5	53.0	57.5	62.3	67.8	65.3	59.0	52.3	51.0
	Water flow rate (L/min)	496	465	432	399	375	328	283	233	207
	Nominal current (A)	70.7	77.3	83.8	90.8	98.8	95.2	86.0	76.2	74.4
7	Cooling capacity (kW)	259	248	232	213	200	170	147	122	104
	Nominal input (kW)	49.7	54.9	59.9	64.9	70.7	65.4	59.0	52.1	48.6
	Water flow rate (L/min)	530	508	475	436	410	348	301	250	213
	Nominal current (A)	72.5	80.0	87.4	94.7	103.0	95.3	86.1	76.0	70.9
9	Cooling capacity (kW)	271	261	244	227	211	177	153	128	106
	Nominal input (kW)	51.0	55.9	61.3	66.6	72.0	65.6	59.1	52.2	47.3
	Water flow rate (L/min)	555	534	500	465	432	362	313	262	217
	Nominal current (A)	74.4	81.5	89.4	97.1	105.0	95.6	86.1	76.2	69.0
12	Cooling capacity (kW)	284	277	263	246	229	188	162	136	108
	Nominal input (kW)	53.1	57.1	63.1	68.9	74.4	65.7	59.1	52.3	45.0
	Water flow rate (L/min)	*573	567	539	504	469	385	332	278	221
	Nominal current (A)	77.4	83.3	92.0	100.5	108.4	95.8	86.2	76.3	65.6
15	Cooling capacity (kW)	287	284	273	257	242	199	171	143	110
	Nominal input (kW)	53.9	57.6	63.9	70.2	77.6	65.9	59.4	52.2	43.3
	Water flow rate (L/min)	*573	*573	559	526	496	407	350	293	225
	Nominal current (A)	78.7	84.0	93.2	102.4	113.1	96.1	86.6	76.1	63.1
20	Cooling capacity (kW)	287	284	273	259	245	205	176	147	110
	Nominal input (kW)	53.9	57.6	63.9	70.4	76.3	66.1	59.3	52.3	42.5
	Water flow rate (L/min)	*573	*573	559	530	502	420	360	301	225
	Nominal current (A)	78.7	84.0	93.2	102.6	111.3	96.4	86.4	76.3	61.9
25	Cooling capacity (kW)	287	284	273	259	245	205	176	147	110
	Nominal input (kW)	53.9	57.6	63.9	70.4	76.6	66.1	59.3	52.3	42.5
	Water flow rate (L/min)	*573	*573	559	530	502	420	360	301	225
	Nominal current (A)	78.7	84.0	93.2	102.6	111.6	96.4	86.4	76.3	61.9
30	Cooling capacity (kW)	287	285	273	259	245	205	175	147	110
	Nominal input (kW)	53.9	57.7	63.9	70.4	76.3	66.1	59.1	52.3	42.5
	Water flow rate (L/min)	*573	*573	559	530	502	420	358	301	225
	Nominal current (A)	78.7	84.1	93.2	102.6	111.3	96.4	86.2	76.3	61.9

List of heating capacities RUA-UP562H(L) (N)  
Standard type/High EER type

LVG hot-water temperature (°C)	Item	Outdoor air temperature (°C) (DB)							
		-15	-10	-5	0	4	7	15	
25	Heating capacity (kW)	119	140	164	190	211	207	244	
	Nominal input (kW)	43.8	46.1	48.1	49.9	51.1	43.3	44.2	
	Water flow rate (L/min)	244	287	336	389	432	424	500	
	Nominal current (A)	65.1	68.5	71.6	73.5	75.2	63.8	64.4	
30	Heating capacity (kW)	119	139	163	189	209	205	242	
	Nominal input (kW)	46.7	49.3	51.7	54.0	55.6	47.3	49.1	
	Water flow rate (L/min)	244	285	334	387	428	420	496	
	Nominal current (A)	69.4	73.3	76.2	79.5	81.9	69.0	71.6	
35	Heating capacity (kW)	119	139	163	187	207	203	240	
	Nominal input (kW)	50.2	53.1	56.0	58.6	60.5	51.9	54.3	
	Water flow rate (L/min)	244	285	334	383	424	416	491	
	Nominal current (A)	74.7	78.9	82.5	86.3	89.1	75.7	79.2	
40	Heating capacity (kW)	119	139	162	186	206	201	238	
	Nominal input (kW)	53.8	57.4	60.7	63.7	66.0	56.9	60.1	
	Water flow rate (L/min)	244	285	332	381	422	412	487	
	Nominal current (A)	80.1	85.5	89.4	93.8	97.2	83.0	87.6	
45	Heating capacity (kW)	119	138	160	184	204	200	236	
	Nominal input (kW)	57.8	61.9	65.6	69.2	72.1	62.5	66.1	
	Water flow rate (L/min)	244	283	328	377	418	410	483	
	Nominal current (A)	86.0	91.1	96.6	101.9	106.2	91.1	96.4	
50	Heating capacity (kW)		137	159	183				

Pump Characteristics / Internal Inverter Pump

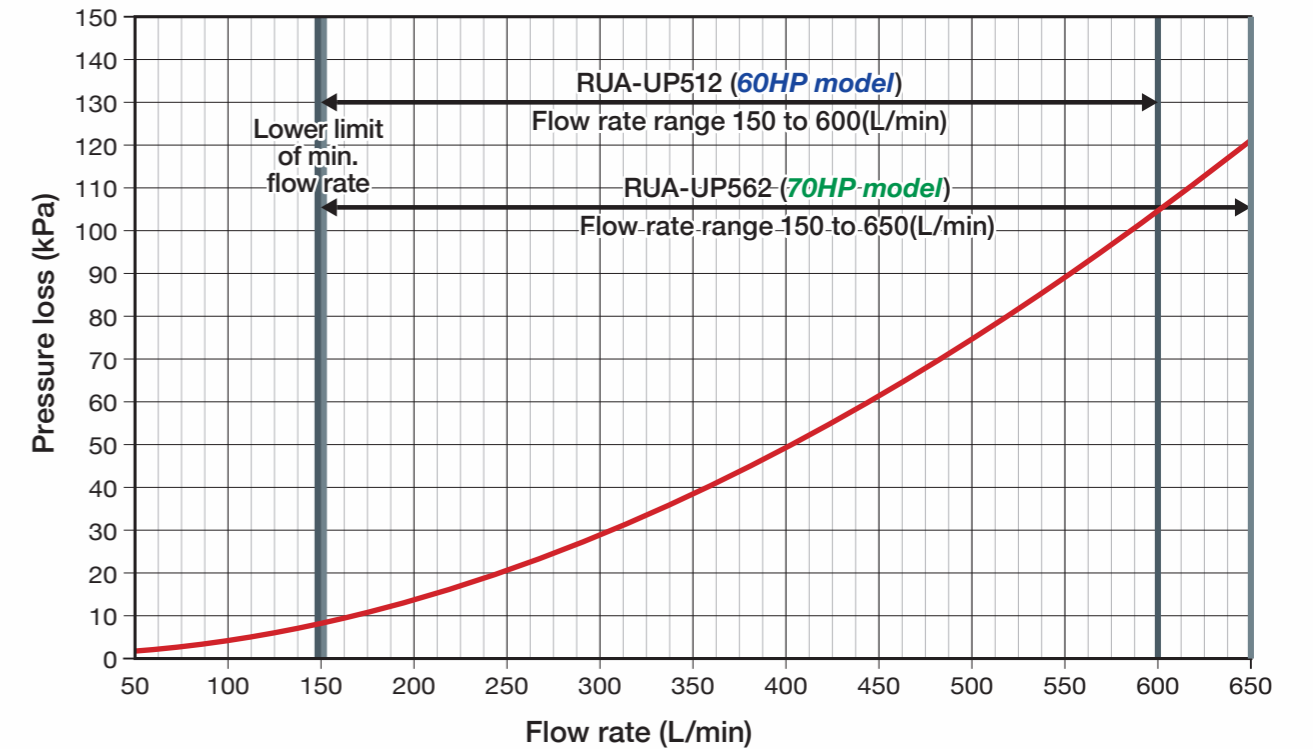
60HP model, 70HP model Internal pump 60HZ performance curve



Pump Characteristics / Internal Resistance Curve (For pumpless)

Internal resistance curve (For pumpless) 60HP model, 70HP model

Note: For a unit without a pump, select a pump outside of the heat pump unit considering internal resistance below



● Pump specification values

Pump output	60HP model				70HP model		
	1.5 (Standard)	2.2	3.7	5.5	2.2 (Standard)	3.7	5.5
Flow rate range <sup>(*)</sup> (L/min)	150~600						
External lifting height <sup>(**)</sup> (kPa)	43~151	92~198	190~315	284~422	64~198	158~315	247~422
Max. operation current <sup>(**)</sup> (A)	3.3	4.5	7.3	10.5	4.5	7.3	10.5
Max. power consumption <sup>(**)</sup> (kW)	2.0	2.8	4.5	6.4	2.8	4.5	6.4
Max. allowable boost pressure (MPa)	0.52	0.47	0.36	0.25	0.47	0.36	0.25
Max. suction head (water temp. 60°C or less) (kPa)	40	40	40	40	40	40	40

Note 1: Flow rate range (upper limit), max. current and max. power consumption in the table above are values for a pump. Multiply the number of pumps (modules) by these values depending on the unit size. When selecting anything other than rated output, you can also use values outside of the flow amount range shown in the graph. Use the formula below to find the flow amount range outside of the rated capacity.

Minimum flow rate=capacity x 860/60/10 (maximum temperature difference)  
 \*However, minimum flow amount must be at or above 75L/min  
 Maximum flow amount=capacity x 860/60/5 (minimum temperature difference)  
 \*However, maximum flow amount must be at or below 600L/min for the 60HP model, and at or below 650L/min for the 70HP model

- Note 2: Lifting height outside of the unit shown in the table is the value when the pump frequency is 60Hz at the flow rate range above. The pump lift outside of the machine is the value reached when subtracting the resistance inside the machine from the total pump lift.
- Note 3: Max. current and max. power consumption are the max. values when the pump operation frequency is 60Hz.
- Note 4: 60Hz pumps are commonly used in the 50Hz area.
- Note 5: Select a pump that can handle the needed lift and flow amount.
- Note 6: In case the nominal current is 380V.
- Note 7: Pump frequency shall be limited when ambient temperature is higher than 43°C due to pump inverter overheat protection.

## Operating Temperature Range

### 1. Operating ranges

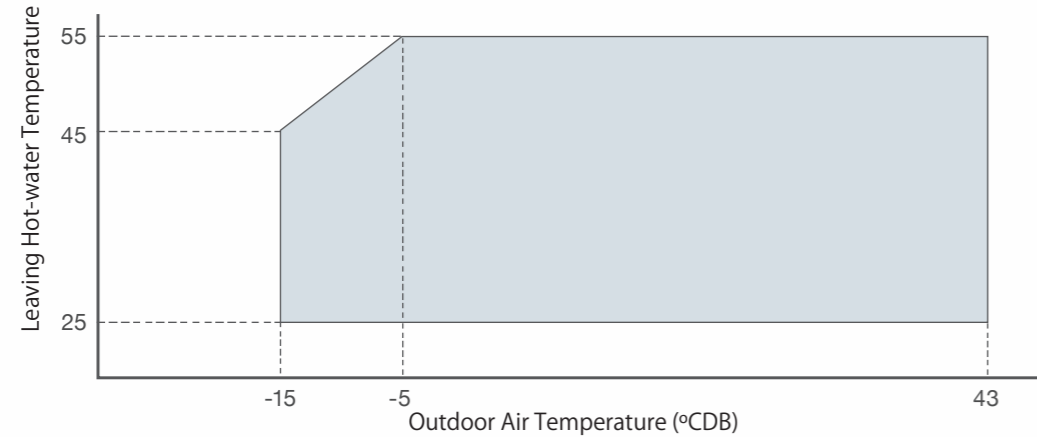
#### 60HPmodel 70HPmodel

Leaving water temperature (Note 1)	Cooling	°C	4~30
	Heating (Note 2) (Note 3)		25~55
	Temperature difference (inlet/outlet)		5~10
Outside air temperature	Cooling	°C	-15~52
	Heating (Note 2) (Note 3)		-15~43DB, 32WB

Note 1: LWT not higher than 35°C at cooling or not lower than 20°C at heating operation is allowable till 1 hour after starting up. After then, however, LWT must be within the operating range. Control it with bypass pipe if needed.  
 Note 2: For heat pump models only.  
 Note 3: Depend on the outdoor air temperature, leaving hot water temperature is limited as below.  
 Note 4: Only powerful heating type can operate at ambient temperature down to -20°C.

#### Leaving hot-water temperature range

#### 60HPmodel 70HPmodel



### 2. Operating range for water dispersing device

Water spray temperature range	°C	10~30
Outdoor temperature range as spray mode trigger	°C	20~40

Note 5: Water spray temperature changes do not add significant impact on performance values.

## Power Supply Design

Displayed below are the electrical power design specifications for each module unit.

※60HP model: Internal pump output for inverter units is 1.5kW (standard), and can be changed to 2.2, 3.7, and 5.5kW as special order.

70HP model: Internal pump output for inverter units is 2.2kW (standard), and can be changed to 3.7, and 5.5kW as special order.

### ● Power supply design (400V specifications) (Internal inverter pump/Pumpless) (Heat pump/Cooling-only) (Standard type and High-EER type in common)

		60HPmodel				70HPmodel				
		50/60Hz 400V				50/60Hz 400V				
Internal Pump	Power supply	Internal inverter pump				Internal inverter pump				
		Pumpless	Standard	For special order		Pumpless	Standard	For special order		
Motor Output (kW)			1.5	2.2	3.7	5.5		2.2	3.7	5.5
Type		—	Centrifugal pump			—	Centrifugal pump			
Type of start		—	Inverter start			—	Inverter start			
Control		—	Inverter			—	Inverter			
Max. Current (A)		—	3.1	4.3	6.9	10.0	—	4.3	6.9	10.0
Max. Input (kW)		—	2.0	2.8	4.5	6.4	—	2.8	4.5	6.4
No. of primary connecting part for power supply wiring		No. of power connection terminals inside each module(M10)				No. of power connection terminals inside each module(M10)				
Standard Current (A)		95	98	99	102	105	114	118	121	124
Power Source Capacity (kVA)		65.8	67.9	68.7	70.5	72.7	79.1	82.0	83.8	86.0
Power Supply Wiring (mm <sup>2</sup> )	IV: Power Supply ≤ 20m (mil)	38				60	60			
	IV: Power Supply ≤ 50m (mil)	38				60	60			
	CV: Power Supply ≤ 20m (mil)	38					38			
	CV: Power Supply ≤ 50m (mil)	38					38			
Ground (mil)		22			38	38				
Switch (A)		100			125	125				
Fuse (A)		100			125	125				
Earth Leakage Circuit Breaker (Capacity) (A)		100			125	125				
Earth Leakage Circuit Breaker (Sensibility) (mA)		100			200	200				

\*1. The internal pump can be selected with appropriate output according to the lifting height outside of the unit as a customized option. Since the power supply design is depending on the pump output, be sure to check the values in the corresponding field.

\*2. The pump operates at a maximum frequency of 60 Hz at a maximum flow rate (per module).

\*3. A leakage breaker must be installed. Use the one conformed to higher harmonic to prevent malfunction since this unit includes an inverter.

\*4. Standard Current is the value considering the unbalance of 2% between power supply voltages.

\*5. The power supply design above is for 400V only. For other voltages, make sure to calculate the current by interpolating from 400V data. Consult with Toshiba Carrier for more details.

Note.1: The thickness of the ground lead is the value for when using IV wire shown in the table for power supply wire. Refer to IEO60204-15.2 depending on the thickness of the wire used.

Table 1-Minimum cross-sectional area of the external protective copper conductor

Cross-sectional area of copper phase conductors supplying the equipment S mm <sup>2</sup>	Minimum cross-sectional area of the external protective copper conductor Sp mm <sup>2</sup>
S ≤ 16	5
16 < S ≤ 35	16
S > 35	S/2

● Fuse capacities in the tables are for B class fuses.

● Select a power supply transformer that can support values greater than those shown in the tables.

● Power supply line thickness values are for metal conduits with three or fewer wires inside a single conduit. (or six or fewer wires when two wires are used for one pole)

● Selected based on Japanese regulations. Select the appropriate unit based on the laws and regulations of the location where the unit is to be installed.

## Option List

Custom Option List
Pump output upgrade
Anti-corrosion & heavy anti corrosion models
Large ΔT specification (10~16 degree C)
Heat machine specification (heating only)
Stainless steel screw set
Stainless steel water strainer and check valve
Stainless steel pump specification
Fast start up specification
Automatic system recovery (MC, GC)
Standby Module Controller
Anti-corrosion & heavy anti corrosion connecting kit
Anti-corrosion & heavy anti corrosion flange kit
Module Controller with Modbus*
Group Controller with BACnet
Additional low level Input/Output points option

\*Please contact Toshiba Carrier for more details on above custom options and others.

\*Modbus\* is trademark registered by Schneider Electric USA, Inc.

\*BACnet is ASHRAE trademark

Accessory list	Remarks	Factory assembly
Connection bracket	Standard	×
SD card	Standard	×
Flash Air card	Sold separately	×
Module Controller	Standard	○
Simple group controller	Sold separately	×
Group controller	Sold separately	×
External sensors	Sold separately	×
Flow meter	Locally procured	×
dP sensor	Locally procured	×
Spring mount or Vibration stand	Locally procured	×
Protective screen kit	Sold separately	×
Flange kit for hood installation	Sold separately	×
Harmonic filter (if preferred)	Locally procured	×
Automatic Transfer Switch	Locally procured	×
Pressure gauge	Locally procured	×

Note 1: Accessories those are not assembled by factory will not be included in seller's work description.

Note 2: On-site support is not available after delivery of standard specification products.

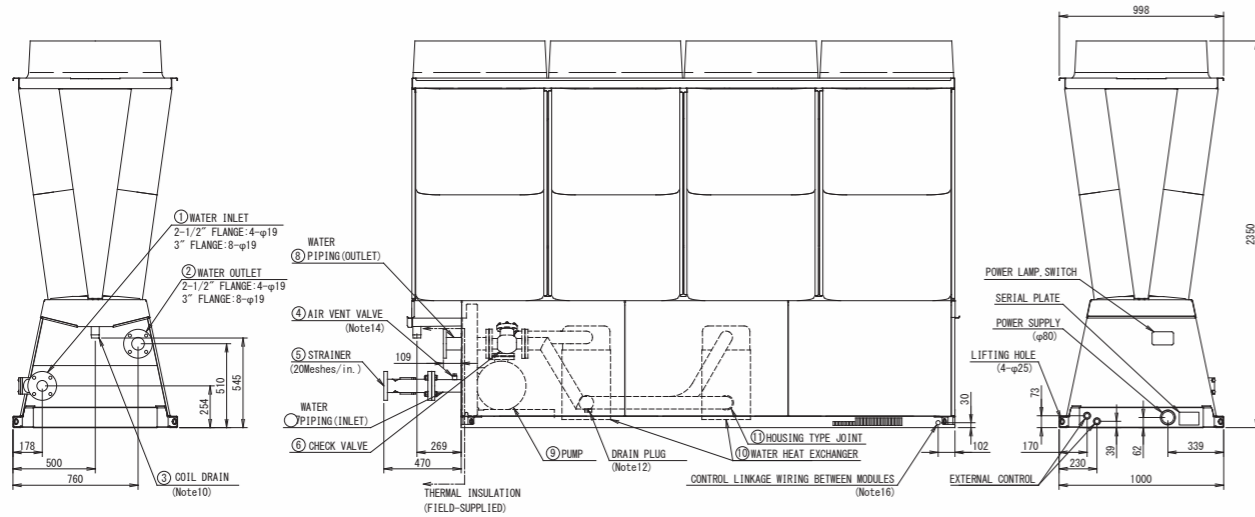
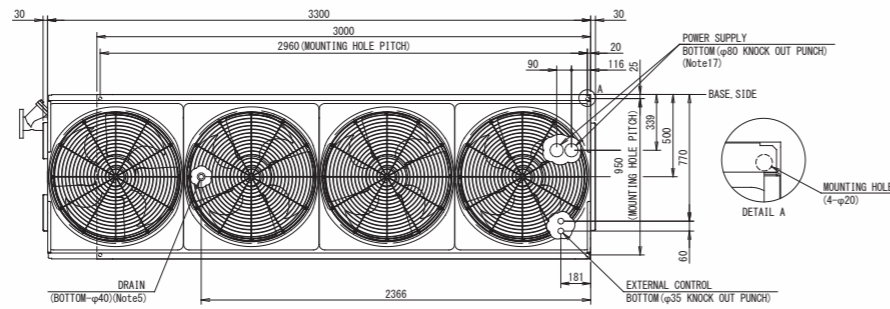
Note 3: Connection bracket is supplied by factory as standard to connect 2 modules at the top when 2 modules are placed no more than 50mm from each other.

Outline Drawing Internal inverter pump / Standard type

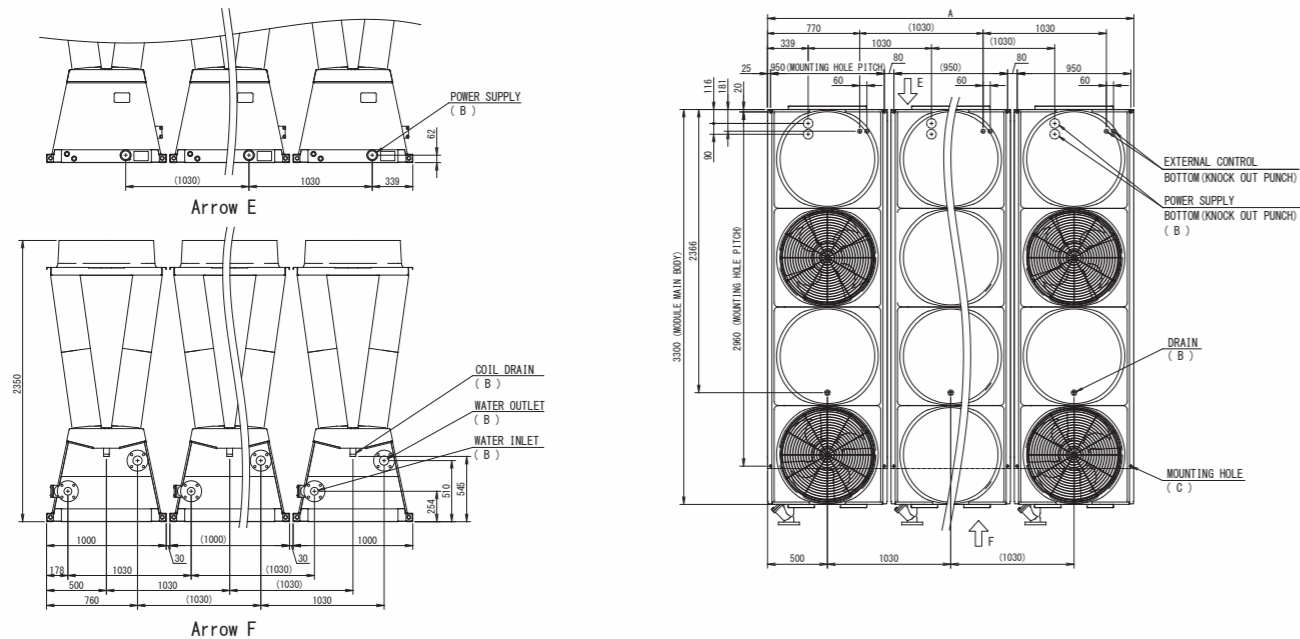
A single module unit

No.	NAME	Connection
1	WATER INLET	RUA-UP512 2-1/2" FLANGE
		RUA-UP562 3" FLANGE
2	WATER OUTLET	RUA-UP512 2-1/2" FLANGE
		RUA-UP562 3" FLANGE
3	COIL DRAIN	PT1-1/2" EXTERNAL THREAD
4	AIR VENT VALVE	PT1/2" INTERNAL THREAD
5	STRAINER	CASING: Equivalent to FC250
6	CHECK VALVE	CASING: Equivalent to FC200
7	WATER PIPING (INLET)	JIS10K FLANGE (Note.1) Equivalent to SUS304 PIPING Equivalent to SUS304
8	WATER PIPING (OUTLET)	JIS10K FLANGE (Note.1) Equivalent to SUS304 PIPING Equivalent to SUS304
9	PUMP	CASING: FC200
10	WATER HEAT EXCHANGER	PLATE, JOINT Equivalent to SUS316 SOLDER SOLDER PURE COPPER
11	HOUSING TYPE JOINT	GASKET (Note2) EPDM

Note1: ACCORDING TO JIS B 2220  
Note2: DESCRIPTION OF WETTED PART.



Combined installation



Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C
1	1000	1	4	5	5120	5	20	9	9240	9	36	13	13360	13	52
2	2030	2	8	6	6150	6	24	10	10270	10	40	14	14390	14	56
3	3060	3	12	7	7180	7	28	11	11300	11	44	15	15420	15	60
4	4090	4	16	8	8210	8	32	12	12330	12	48	16	16450	16	64

Note 1: Both 60HP,70HP has the same dimensional drawing except water inlet/outlet piping size.

Note 2: Number for A,B,C in the drawing.

Note 3: It is possible to install modules with a minimum space of 30mm between modules. However, this may not apply to all regions considering different request on servicing space.

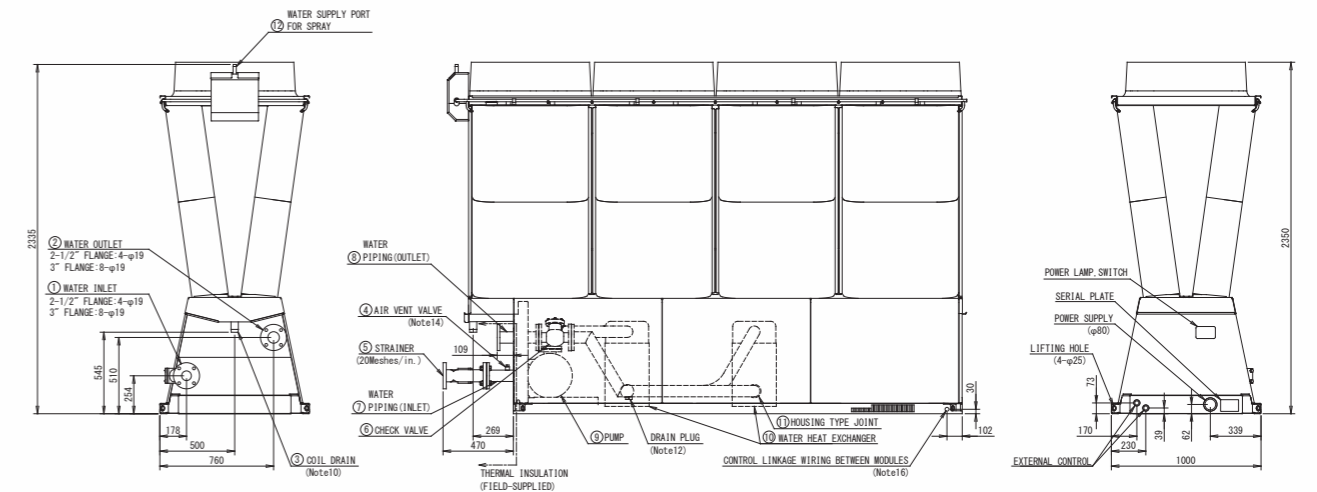
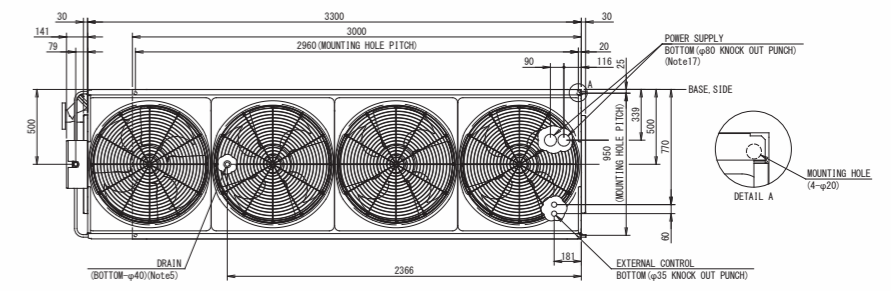
Note 4: Communication wiring between modules provided by factory is for 30mm module to module distance only. In case the distance is more than 30mm, please procure wiring locally. Check databook for wiring specification details.

Outline Drawing Internal inverter pump / High-EER type

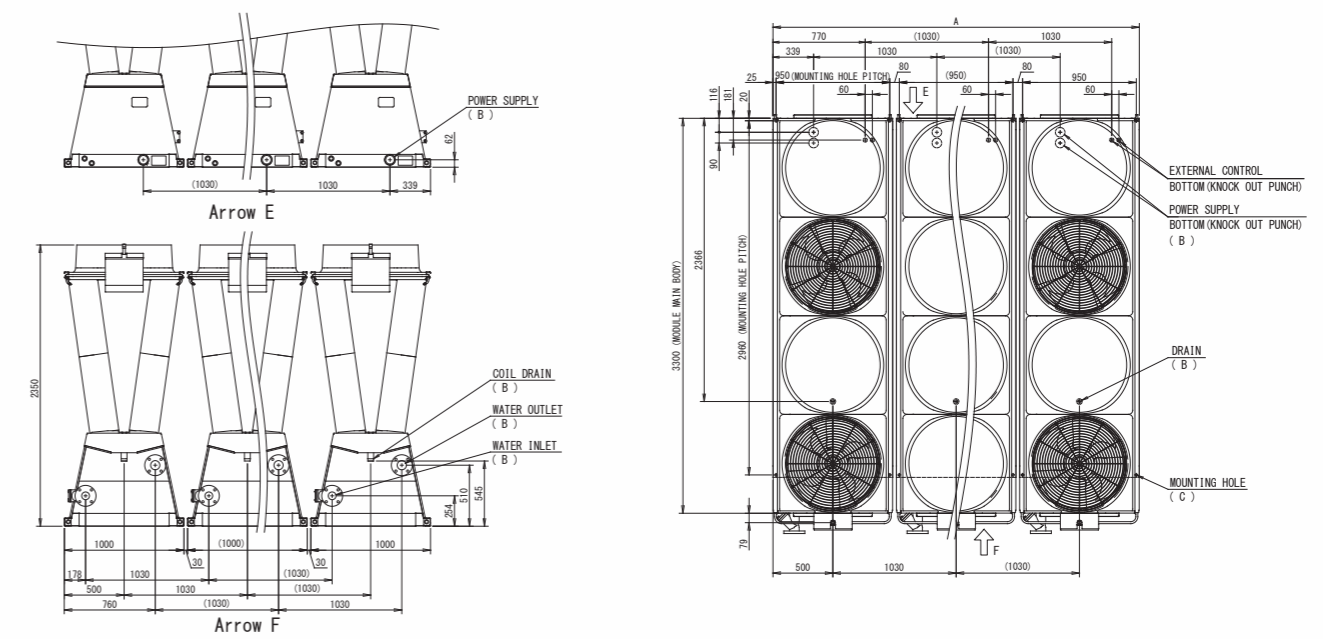
A single module unit

No.	NAME	Connection
1	WATER INLET	RUA-UP512 2-1/2" FLANGE
		RUA-UP562 3" FLANGE
2	WATER OUTLET	RUA-UP512 2-1/2" FLANGE
		RUA-UP562 3" FLANGE
3	COIL DRAIN	PT1-1/2" EXTERNAL THREAD
4	AIR VENT VALVE	PT1/2" INTERNAL THREAD
5	STRAINER	CASING: Equivalent to FC250
6	CHECK VALVE	CASING: Equivalent to FC200
7	WATER PIPING (INLET)	JIS10K FLANGE (Note.1) Equivalent to SUS304 PIPING Equivalent to SUS304
8	WATER PIPING (OUTLET)	JIS10K FLANGE (Note.1) Equivalent to SUS304 PIPING Equivalent to SUS304
9	PUMP	CASING: FC200
10	WATER HEAT EXCHANGER	PLATE, JOINT Equivalent to SUS316 SOLDER PURE COPPER
11	HOUSING TYPE JOINT	GASKET (Note2) EPDM
12	WATER SUPPLY PORT FOR SPRAY	PT1/2" EXTERNAL THREAD

Note1: ACCORDING TO JIS B 2220  
Note2: DESCRIPTION OF WETTED PART.



Combined installation



Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C
1	1000	1	4	5	5120	5	20	9	9240	9	36	13	13360	13	52
2	2030	2	8	6	6150	6	24	10	10270	10	40	14	14390	14	56
3	3060	3	12	7	7180	7	28	11	11300	11	44	15	15420	15	60
4	4090	4	16	8	8210	8	32	12	12330	12	48	16	16450	16	64

Note 1: Both 60HP,70HP has the same dimensional drawing except water inlet/outlet piping size.

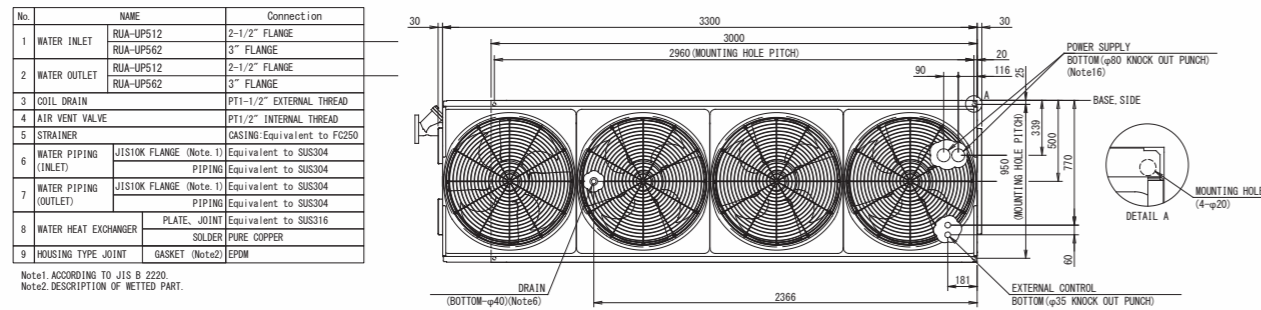
Note 2: Number for A,B,C in the drawing.

Note 3: It is possible to install modules with a minimum space of 30mm between modules. However, this may not apply to all regions considering different request on servicing space.

Note 4: Communication wiring between modules provided by factory is for 30mm module to module distance only. In case the distance is more than 30mm, please procure wiring locally. Check databook for wiring specification details.

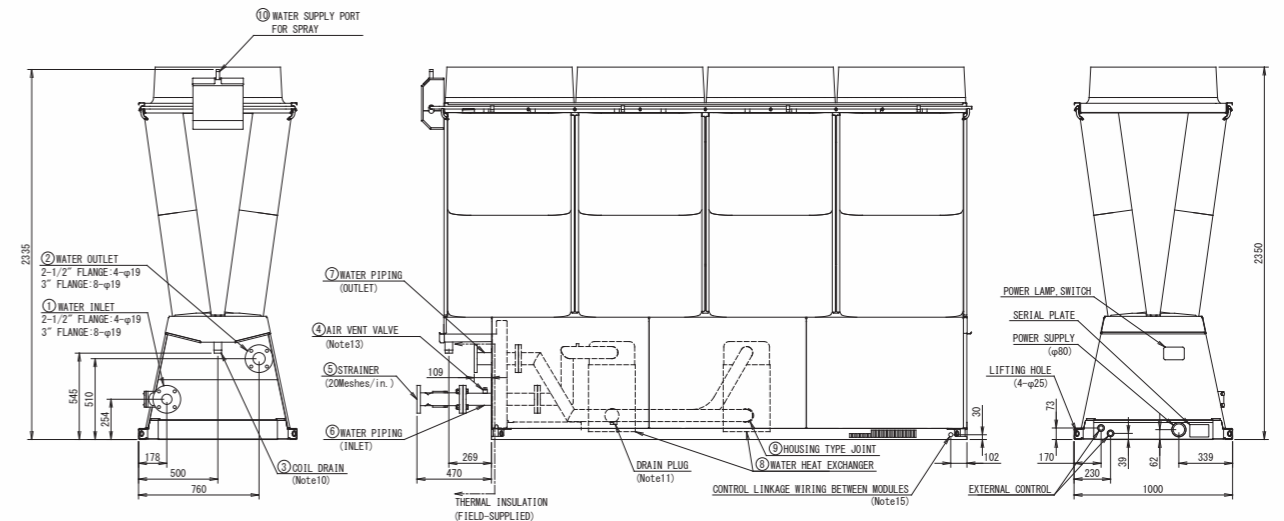
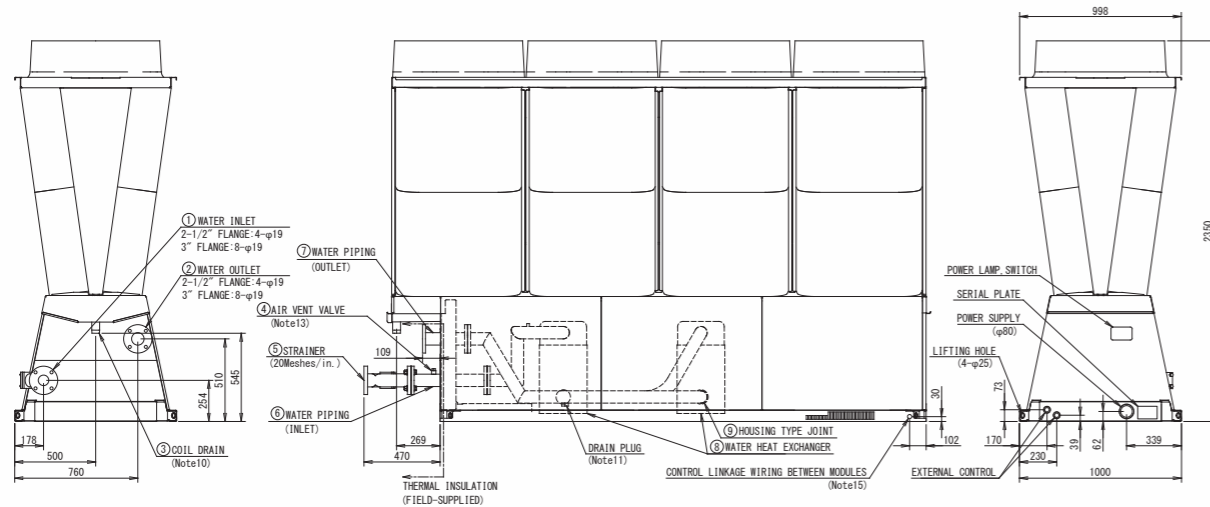
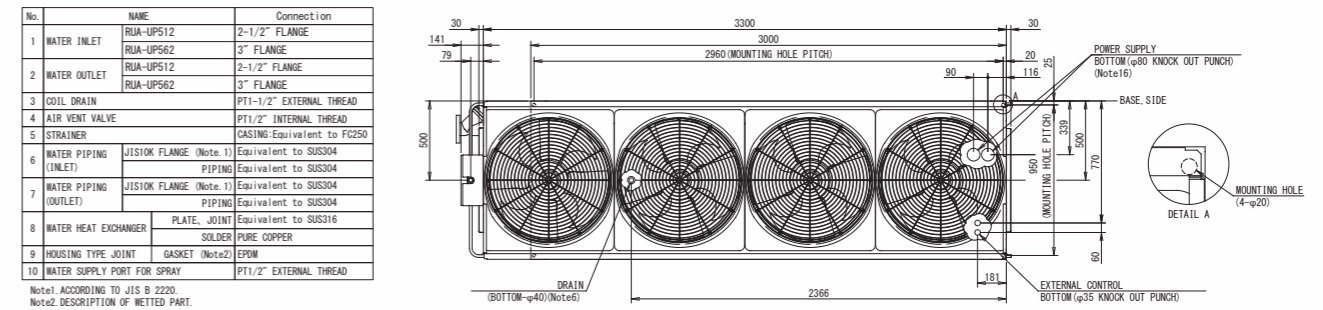
Outline Drawing Pumpless / Standard type

A single module unit

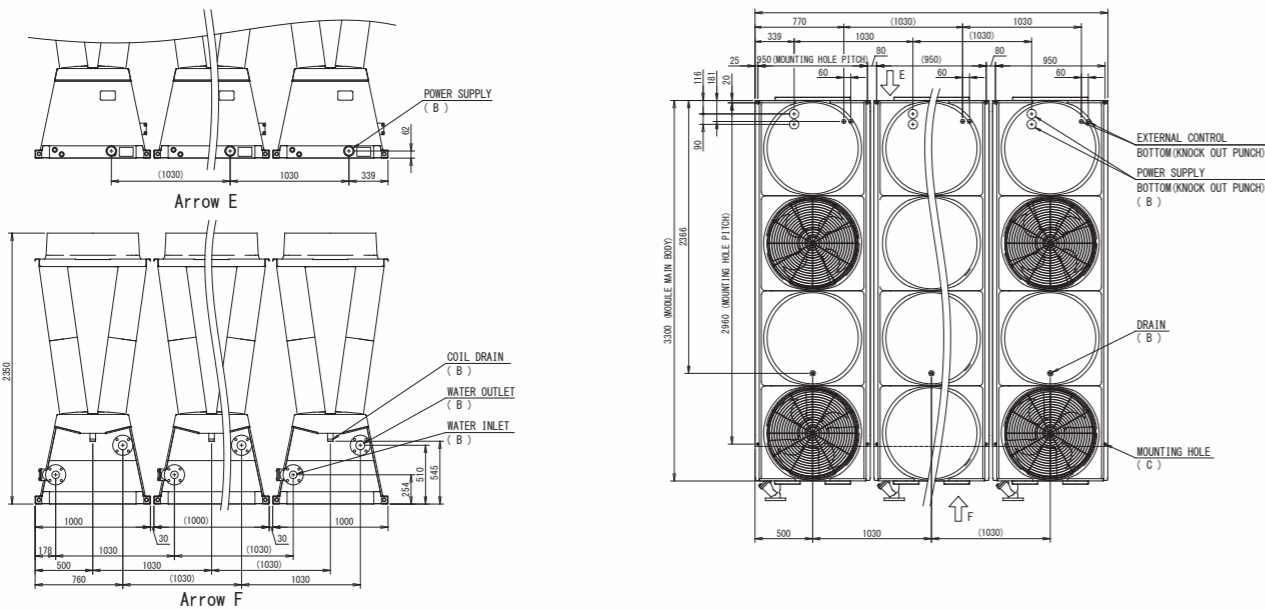


Outline Drawing Pumpless / High-EER type

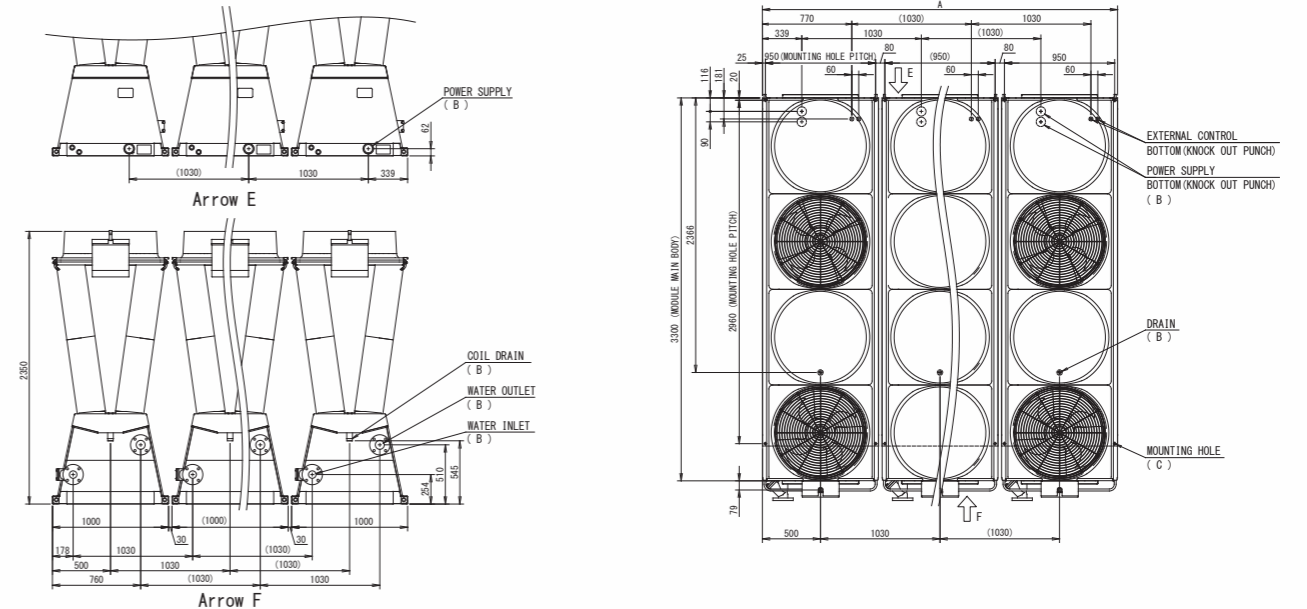
A single module unit



Combined installation



Combined installation



Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C
1	1000	1	4	5	5120	5	20	9	9240	9	36	13	13360	13	52
2	2030	2	8	6	6150	6	24	10	10270	10	40	14	14390	14	56
3	3060	3	12	7	7180	7	28	11	11300	11	44	15	15420	15	60
4	4090	4	16	8	8210	8	32	12	12330	12	48	16	16450	16	64

Note3. Number for A,B,C in the drawing.

Note4. When installing connected modules with a minimum space of 30mm between modules.

It is also possible to installing connected modules with a minimum space of 30mm between modules.

It is also possible to installing connected modules with a minimum space of 30mm between modules. cable (locally supplied) must be prepared in accordance with Table1. The accessory communication wire, supplied with the USX EDGE module, cannot be used to connect communication modules if the clearance is greater than 30mm.

If the clearance is larger, prepare long enough electric-wire and appropriate covering.

Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C	Number of Modules	A (Note6)	B	C
1	1000	1	4	5	5120	5	20	9	9240	9	36	13	13360	13	52
2	2030	2	8	6	6150	6	24	10	10270	10	40	14	14390	14	56
3	3060	3	12	7	7180	7	28	11	11300	11	44	15	15420	15	60
4	4090	4	16	8	8210	8	32	12	12330	12	48	16	16450	16	64

Note3. Number for A,B,C in the drawing.

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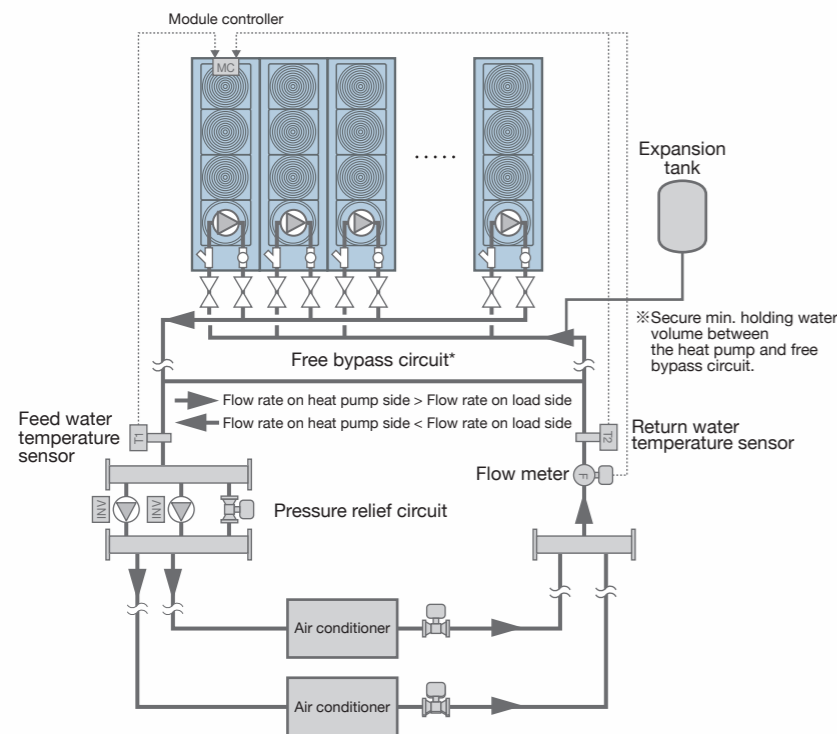
If the clearance is larger, prepare long enough electric-wire and appropriate covering.

## System Examples for Internal Inverter Pump Units

- When using a combination of several Heat Pumps, or combining with other heat pump units, a meeting about water provision must be held. Please contact us separately.
- As a cold (hot) water circulation pump is built in, test run adjustment which includes the whole piping system must be necessary. (Forced open/close of auto control valve in A/C is required.)
- The system detects the required flow rate on load side, and automatically fluctuates the number of internal cold (hot) water circulating pump and the operating frequency. Refer to "Pump Characteristics" and select an internal pump by considering the required max. flow rate and max. lifting for the system.
- Also consider construction on the suction side of internal pumps (boost pressure/pipe resistance). While internal pumps are stopped, ensure that the pressure on the suction side is not negative to prevent the air from entering the pumps from mechanical seals. Or ensure that the suction side main water pipes are higher than the heat pump cold (hot) water inlet piping to prevent the air from accumulating in the heat pump. Closer attention is required when an open-type tank is set up as an expansion tank on the heat pump inlet side.
- To improve energy saving abilities, we recommend that you make a variable flow system using 2 way valves on the secondary side etc.
- If the heat pump locates at the highest point in the system, install an automatic air vent valve (with a check valve function) at the inlet pipe for each module.
- Secure a sufficient holding water volume between the heat pump and the bypass circuit to ensure water temperature controllability. The water volume described in the specifications table is required to operate a module for two minutes, the minimum running time. The values in the table show the minimum holding water volume required to protect the unit. Ensure as much holding water volume as possible to minimize the variation of supply water temperature.
- Differential pressure regulating valves or flow meters may be required depending on the system. In that case, use different power supply from that of the heat pump. Follow instructions by the manufacturer for how to wire the valves or flow meters.
- For any system not listed below, please contact us.

### 1. Example of duplex pump system

(load side: variable flow, heat pump side: variable flow)



1. As there may be an unbalance in the load side pump flow rate and the heat pump flow rate, construct a normally open free bypass circuit.
2. LWT/EWT sensor in heat pump and water temperature sensor on feed/return water pipes detect the temperature balance inside system, and control the number of internal pump for cold/hot-water circulation and the frequency to minimize the unbalance between estimated load side flow rate and heat pump side flow rate. Mount the external sensors attached to the module controller on feedwater pipes and return water pipes, and connect the sensors to the module controller.
3. If there is a flow meter F (provided locally) in the system, connect its output to the module controller. This enables control which directly detects flow rate on the load side (mounting of external sensors on feed/return water pipes is required even when using a flow meter).
4. The module compressor which internal pump for cold/hot-water circulation controls the number of compressor and frequency so that the leaving water temperature approaches to the set temperature.

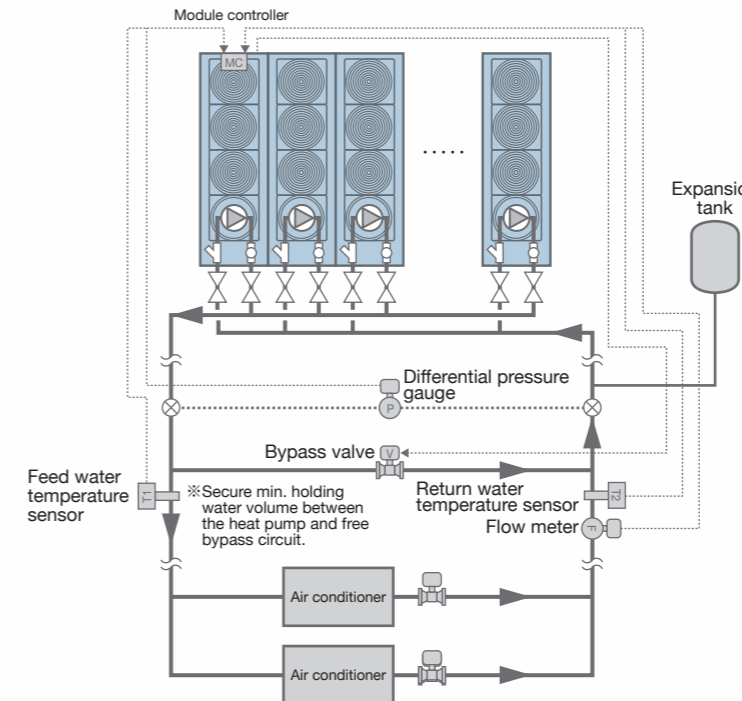
#### •List of equipment for control

Part name	Specification	Quantity	Provided locally	Constructed locally
Water temperature sensor (mandatory)	10kΩ external sensor	2	Attached to module controller	○
Flow meter	Able to measure instantaneous value Support voltage/current output*) (Able to adjust input range span: DC 0 to 5V)	1	○	○

\*) Attach 250Ω±1% metal film resistor (provided locally) when the signal has current 4-20mA. (In that case, input range span is DC 1 to 5 V)

### 2. Single Pump Example of standard system

(load side: variable flow, heat pump side: variable flow)



1. LWT/EWT sensor in heat pump and water temperature sensor on feed/return water pipes detect the temperature balance inside system, and control the number of internal pump for cold/hot-water circulation and the frequency to minimize the unbalance between estimated load side flow rate and heat pump side flow rate.
2. If there is a flow meter F (provided locally) in the system, connect its output to the module controller. This enables control which directly detects flow rate on the load side (mounting of external sensors on feed/return water pipes is required even when using a flow meter).
3. The module compressor which internal pump for cold/hot-water circulation controls the number of compressor and frequency so that the leaving water temperature approaches to the set temperature.
4. As there may be an unbalance in the load side required flow rate and the heat pump flow rate, construct a bypass valve V (provided locally) which is operated according to detection of differential pressure between feed/return water pipes. The bypass valve V is controlled by a module controller.
5. Even while the operation is stopped, freeze protection control may automatically operate the internal pump. The bypass valve may be forcibly opened to secure the flow path, and in this case water may not be supplied to equipment on load side (to feed water to the equipment on load side, be sure to open the 2-way valve on load side in accordance with freeze protection control of the heat pump, instead of configuring settings not to open the bypass valve.).

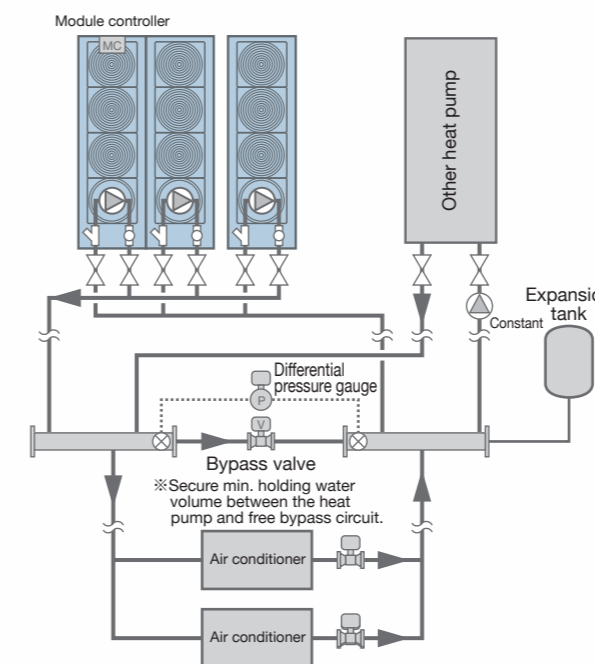
#### •List of equipment for control

Part name	Specification	Quantity	Provided locally	Constructed locally
Water temperature sensor (mandatory)	10kΩ external sensor	2	Attached to module controller	○
Flow meter	Able to measure instantaneous value Support voltage/current output*) (Able to adjust input range span: DC 0 to 5V)	1	○	○
Differential pressure gauge (mandatory)	pressure gauge (mandatory) Able to measure instantaneous value Support voltage/current output*) (Able to adjust input range span: DC 0 to 5V)	1	○	○
Bypass valve (mandatory)	Globe valve which can perform proportional control at current input DC 4 to 20mA (Able to adjust span)	1	○	○

\*) Attach 150Ω±1% metal film resistor (provided locally) when the signal has current 4-20mA. (In that case, input range span is DC 0.6 to 3 V)

### 3. Single Pump Example of other heat source dual-use system

(load side: variable flow, heat pump side:stepped variable flow (other heat pump: constant flow))



1. The internal pump for cold/hot-water circulation perform constant-control of the number of units (stepped variable flow) in accordance with the heat pump operation capacity.
2. The module compressor which internal pump for cold/hot-water circulation controls the number of compressor and frequency so that the leaving water temperature approaches to the set temperature.
3. As there may be an unbalance in the load side required flow rate and the heat pump flow rate, construct a bypass valve (provided locally) which is operated according to detection of differential pressure between feed/return water pipes.
4. Even while the operation is stopped, freeze protection control may automatically operate the internal pump. The bypass valve may be forcibly opened to secure the flow path to prevent, and in this case water may not be supplied to equipment on load side. (to feed water to the equipment on load side, be sure to open the 2-way valve on load side in accordance with freeze protection control of the internal chilled (warm) water circulation pump, instead of configuring settings not to open the bypass valve)