#### 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

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.

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A Carrier Company

Printed Date: March 2024 USXE201901-Mi



CATALOG 2023-9

Air-cooled Inverter Modular Chiller for Diverse Customer Needs



## UNIVERSAL SMART X Series EDGE 2 60HPmodel / 70HPmodel

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

Model —	Use —	- Type ———	Power supply —	– Page –––
	Cooling-only	Standard	3-phase 3-wire 50/60Hz	9
60HP		High-EER	380V / 400V / 415V 3-phase 3-wire	9
OUTIF	Heat pump	Standard	60Hz 440V 3-phase 3-wire	10
	rieat pump	High-EER	60Hz 220V	10
	Cooling-only	Standard	3-phase 3-wire 50/60Hz	11
70HP		High-EER	380V / 400V / 415V 3-phase 3-wire 60Hz	"
7011	Heat pump	Standard	440V 3-phase 3-wire	10
	- Float pump	High-EER	60Hz 220V	12

Pumpiess				
Model —	Use	Type	Power supply —	— Page —
	Cooling-only	Standard	3-phase 3-wire 50/60Hz	13
60HP	Cooming only	High-EER	380V / 400V / 415V 3-phase 3-wire	13
OUHP	Heat pump	Standard	60Hz 440V 3-phase 3-wire	4.4
	rieat pump	High-EER	60Hz 220V	14
	Cooling-only	Standard	3-phase 3-wire 50/60Hz	15
70HP	Cooling Only	High-EER	380V / 400V / 415V 3-phase 3-wire	- 15
7UHP	Hoot numn	Standard	60Hz 440V 3-phase 3-wire	40
	Heat pump		60Hz	16

High-EER

■View of models — RUA – UP	51 2 H L N 5 S M
Air-cooled chiller Universal Smart X Series EDGE	Module Controller Blank: None / M: Equipped     For South East Asia model
Capacity USRT ◆ 51: 60 HP / 56: 70 HP	• 5: 3ph 50/60Hz 380/400/415V, 60Hz 440V 6: 3ph 60Hz 220V
Version number ● C: Cooling only ●	
H: Heat pump (cooling/heating) F: Powerful heating type	
Blank: Internal inverter pump / L: Pumpless	Blank: Standard type / N: High-EER type

# 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 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





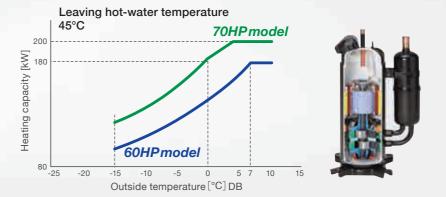
#### 70HP(56RT) model Five 200kW units = 1000kW



## World's largest capacity<sup>2</sup> 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.

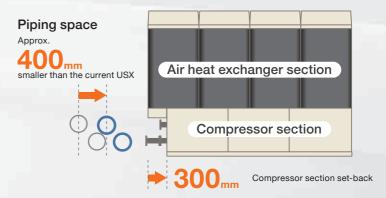
\*2 As of December 2016. According to a study by Toshiba Carrier on AC heat-source pumps (AC-style chiller).



## 4 Compact design with the EDGE shape

## Installation friendly

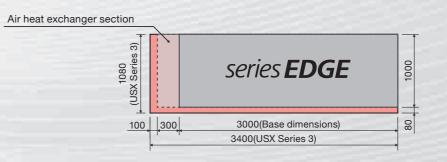
In addition to the X frame design, a unique EDGE shape has been adopted to reduce piping space which makes it more accessible.



## ■Small footprint

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

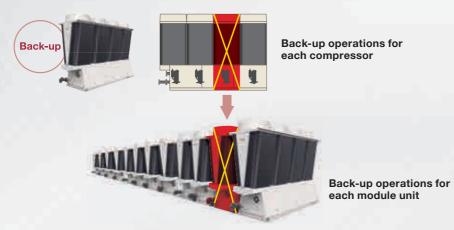
The foundation base area now has been reduced to 1000mm x 3000mm for a single module which is much more easier for maintenance than ever.



<sup>\*2</sup> EER value is based on rated conditions.

## 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

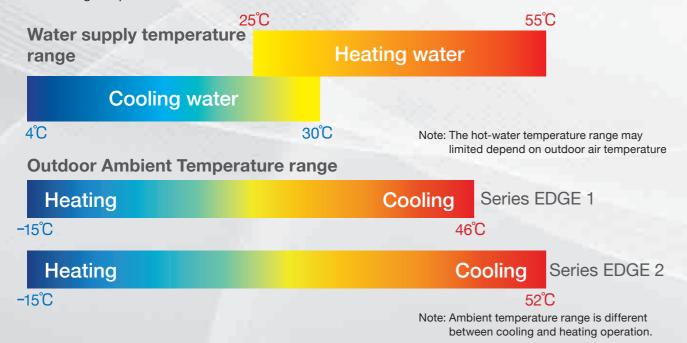
Utilizing the redundancy of four compressors to carry out distributed defrost operation in a module unit, the Universal Smart X series EDGE 2 could decrease the impact of leaving hot water temperature changes during defrost operation.





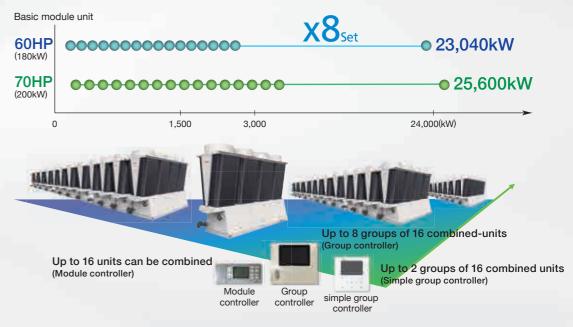
## 6 Wide operation range

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.



## 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)

## **60HPmodel** Cooling-only

				S	tandard typ	ре		High-EER type					
			220V	380V	400V	415V	440V	220V	380V	400V	415V	440V	
					60HP					60HP			
Mod	el (A single	module unit)	RUA-UP512C6S(M)		RUA-UP5	512C5S(M)		RUA-UP512CN6S(M)		RUA-UP51	2CN5S(M)		
Cool	ing capacit	y (Note 1) (kW)			180					180			
	Unit color			Silky sh	hade (Munsell 1)	Y8.5/0.5)			Silky sh	ade (Munsell 1Y	8.5/0.5)		
Exterior		Height (mm)			2,350					2,350			
erio	Dimensions	Width (Note 2)(mm)			1,000					1,000			
_ =		Depth (Note 2)(mm)			3,300					3,300			
Ship	ping weigh	t (kg)			1,286					1,298			
Oper	ating weig	ht (kg)			1,322			1,334					
Powe	er supply	(Note 1 • 3)	3 phase 3 wire 380V/400V/415V 50					0/60Hz, 440V 60	Hz and 220V 60	)Hz			
Refere	nce current fo	r power supply design (Note 4 • 5) (A)			98					98			
E		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)	
Electrical data	Cooling	Nominal input (kW)	minal input (kW) 56.6 (58.1)							38.1 (39.5)			
da	Cooming	EER			3.18 (3.10)					4.72 (4.56)			
ි (Note 1•6)		Power factor (Note 7) (%)			99					99			
IPLV	(With a 5℃ d	ifference) (Note 8)			6.4					6.4			
	Туре			H	Hermetic rotary	x 4			H	ermetic rotary >	4		
5	Model nan	ne	DA1000A4F-10UC1	F	RA1000A4F-10U	C1		DA1000A4F-10UC1	R	A1000A4F-10UC	1		
Compressor	Motor outp	ut×number of units (kW)			12.4 x 4			8.2 x 4					
esso	Type of sta	ırt	Inverter starter							Inverter starter			
=	Case heate	er (W)			37 x 4			37 x 4					
	.,	Туре			RB74AF					RB74AF			
Com	pressor oil	Charge (L)			2.0 x 4					2.0 x 4			
Cond	denser coil -	- air side			Plate fin coil					Plate fin coil			
	Туре				Propeller fan					Propeller fan			
Fan	Air quantit	y (m²/min)			1,230 (maximun	n)			1,	230 (maximum)	)		
5	Type of sta	ırt			Inverter starte	r		Inverter starter					
	Motor out	put x number of units (kW)			1.2 x 4			1.2 x 4					
Water spray 9 system	Water spra	y volume (L/min)			_					13.6 x 1			
m Spr	Supply wa	ter pressure (Note 10)(MPa)			_					0.2			
(Note 9)	Control				_			Continuous water spra	ying when outside ten	nperature exceeds settir	ig and compressor cap	acity exceeds setting	
	Motor out	put (kW)			1.5					1.5			
9	Туре			(	Centrifugal pum	пр			C	entrifugal pump	)		
Pump	Flow contr	ol			Inverter					Inverter			
(Note 4)	Maximum				3.1					3.1			
	Maximum				2.0					2.0			
	er - water si	de (Note 11)	ı	3razed plate h	heat exchanger (	SUS316 equiv	alent)	E	Brazed plate he	at exchanger (S	US316 equivale	ent)	
Refrigerant	Туре				R410A					R410A			
iger	R410 charg	ge (kg)			10.2 x 4					10.2 x 4			
	Control			Elec	ctric expansion v				Elect	ric expansion va	lve		
<u> </u>	city contro	•			0 and 5 ~ 100					0 and 5 ~ 100			
Opei	ration contr	rol	Microprocessor control based on leaving v										
Prote	ective devic	re	freeze protection, low flow rate, discharge gas overheat prote					an, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards tection, low pressure cutout, thermistor error, high water pressure error)				essor time guards,	
Pipin	Cold/Hot v	vater inlet (A)	2-1/2" Flange x 1 (JIS10K)					2-1/2" Flange x 1 (JIS10K)					
Piping diameters	Cold/Hot v	vater outlet (A)		2-1/2" Flange x 1 (JIS10K)					2-1/2" Flange x 1 (JIS10K)				
neters	Coil drain	(A)	PT1-1/2" External thread x 1					PT1-1/2" External thread x 1					
Soul	Control bo	x side (dBA)		69.0					69.0				
nd le	Example 2						72.3						
<u>№</u> (Note13)	Water pipi	ng 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 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.

Performance values do not include pump power consumption. Dimensions do not include projections of water pipe connections

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

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

Note that electrical data do not include internal pump.

Power factors may vary depending on site conditions.

(Note 5)

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

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)

## 60HPmodel Heat pump

				St	tandard typ	е			ı	High-EER ty	ре			
			220V	380V	400V	415V	440V	220V	380V	400V	415V	440V		
Mode	al (A single	module unit)	RUA-UP512H6S(M)		60HP RUA-UP51	12H5S/M)		RUA-UP512HN6S(M)		60HP	12HN5S(M)			
						121133(141)		NOA-OF 3121 INO3(IVI)			12111133(111)			
	ng capacit	•			180					180				
Heat	ing capacit	y (Note 1) (kV	V)	C:III	180	(0. F. (0. F.)		180 Silky shade (Munsell 1Y8.5/0.5)						
ш	Unit color	Ittairaha (aus	-)	SIIKY ST	nade (Munsell 1)	8.5/0.5)			SIIKY	2,350	18.5/0.5)			
Exterior	Dimaniana	Height (mr Width (Note 2) (mr			2,350 1,000			1,000						
ō.	Dimensions				3,300			3,300						
Chin	l oing weigh				1,323			1,335						
					1,359			The state of the s						
	ating weig er supply	(Note 1 • 3)	3 phase 3 wire 380V/400V/415V 5					1,371						
		r power supply design (Note 4 • 5) (	4)	98	50/60Hz, 440V 60Hz and 220V 60Hz 98									
nerere	nec current to		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		53.6 (55.5)	50.5 (52.3		
		Nominal input (kV		00.9 (09.1)	56.6 (58.1)	73.3 (01.0)	73.0 (77.0)	101(103)	30.3 (00.0	38.1 (39.5)	33.0 (33.3)	30.3 (32.3		
Еe	Cooling	EER	v)			4.72 (4.56)								
ctric		Power factor (Note 7) (9)	6)		3.18 (3.10) 99					99				
Electrical data		r orreinactor (/	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		75.5 (76.4)	71.2 (72.1)		
data		Nominal input (kV		0Z.T (03.3)	53.7 (54.4)	73.3 (70.4)	, 1.Z (/Z.1)	172 (177)	32.7 (03.3	53.7 (54.4)	73.3 (70.4)	/ 1.2 (/ 2.1		
Note 1•6)	Heating	COP	- /		3.35 (3.31)					3.35 (3.31)				
2)		Power factor (Note 7) (9)	6)		99				99					
PI V	l With a 5℃ d		0)		6.4					6.4				
	Туре	incrence)				Hermetic rotary	y 4							
Co	Model nan	ne	DA1000A4F-10UC1		lermetic rotary RA1000A4F-10U0		DA1000A4F-10UC1 RA1000A4F-10UC1							
Compressor		ut×number of units (kV			12.4 x 4	-1		DATOURAL TOOCT		11.9 x 4	CI			
ress	Type of sta		*/		Inverter starter					Inverter starte	r			
or Or	Case heate		(1)		37 x 4					37 x 4	ı			
	case ricate	Туре	*/	RB74AF						RB74AF				
Com	pressor oil		L)		2.0 x 4					2.0 x 4				
Conc	lenser coil -		Plate fin coil							Plate fin coil				
COIIC	Туре	all side				Propeller fan								
	Air quantit	ty (m³/n	in)	Propeller fan 1,230 (maximum)						1,230 (maximum)				
Fan	Type of sta	,			Inverter starter			Inverter starter						
		put x number of units (kV	v)		1.2 x 4					1.2 x 4				
S X	Water spra				- I.Z A T					13.6 x 1				
ater s stem		ter pressure (Note 10)(MF								0.2				
Water spray 9) system (Note 9)	Control	ter pressure(WII	u)					Continuous water spr	vina when outside	temperature exceeds set	ting and compressor ca	nacity eveneds setti		
(NOTE 3)	Motor out	put (kV	v)		1.5			continuous water spir	.,g *****CIT OUTSIDE	1.5	ang unu compicasoli ca	pacity cocceus sell		
	Type	, (N)		(	Centrifugal pum	n				Centrifugal pun	าต			
Pump	Flow contr	rol		,	Inverter	-				Inverter	r			
	Maximum		A)		3.1					3.1				
Note 4)	Maximum				2.0					2.0				
Cool	er - water si	<u> </u>		Brazed nlate h	eat exchanger (	SUS316 equiva	lent)	Ri	azed plate h	eat exchanger (S	US316 equivale	nt)		
				piace II	R410A		,		piace II	R410A		-/		
frige	Type R410 charg Control	ge (k	3)		10.6 x 4					10.6 x 4				
eran:	Control	,	97	Flec	tric expansion v	alve			FI	ectric expansion	valve			
	city contro	I steps (Note 12) (9	6)		0 and 5 ~ 100					0 and 5 ~ 100				
_	ation contr			0 and 5 ~ 100 Microprocessor control based on leaving wa										
_	ost system			Microprocessor control based on leaving war  Distributed reverse cycle system						outed reverse cyc	le system			
	ective device	re	Distributed reverse cycle system  High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pur freeze protection, high water temp. cutout, low flow rate, discharge gas overhe						er, Open-phase ¡	protection, Microproc	essor control (compr			
Pip	Cold/Hot v	water inlet (	A)	protection, low p		1/2" Flange x 1 (J								
ing di			ÿ 1 1											
Piping diameters	Coil drain		A) 2-1/2" Flange x 1 (JIS10K) A) PT1-1/2" External thread x 1					2-1/2" Flange x 1 (JIS10K)  PT1-1/2" External thread x 1						
oS Sus	Control bo							PT1-1/2" External thread x 1 69.0						
Soundlevel														
level	Coil side	(dB)						72.3						
	Water pipi	ng side (dB	4)		68.5					68.5				

#### Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.

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°C DB/24°CWD outdoor air (OAT) and 21°C feed-water temperature

For heating: 38°C entering water (EWT), 45°C leaving water (LWT), 7°C DB/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.

Dimensions do not include projections of water pipe connections.

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

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.

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

Note that electrical data do not include internal pump. 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 indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".

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)

## **70HPmodel** Cooling-only

		_			S	Standard ty	/ре			Hi	gh-EER ty	ре	
				220V	380V	400V	415V	440V	220V	380V	400V	415V	440V
						70HP					70HP		
Mod	el (A single	module unit)		RUA-UP562C6S(M)		RUA-UF	<sup>2</sup> 562C5S(M)		RUA-UP562CN6S(M)		RUA-UP5	62CN5S(M)	
Cool	ing capacit	у	(Note 1) (kW)			200					200		
	Unit color				Silkys	shade (Munsell	1Y8.5/0.5)			Silky sh	nade (Munsell 1	Y8.5/0.5)	
Ε×		Height	(mm)			2,350					2,350		
Exterior	Dimensions	Width	(Note 2)(mm)			1,000					1,000		
		Depth	(Note 2)(mm)			3,300					3,300		
_ ·	oing weigh		(kg)			1,295					1,307		
Ope	ating weig	ht	(kg)			1,331					1,343		
	er supply		(Note 1 • 3)				phase 3 wire 38	0V/400V/415V 50	0/60Hz, 440V 60	Hz and 220V 60			
	nce current for	power supply desig				118					118		
Electrical data		Nominal currer	. ,	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)
trical	Cooling	Nominal input	(kW)			70.7 (72.5)					46.9 (48.5)		
data		EER				2.83 (2.76)					4.26 (4.12)		
(Note 1-6		Power factor	(Note 7) (%)			99					99		
IPLV	With a 5°C d	ifference)	(Note 8)			6.0					6.1		
٥	Туре			DATOON AT TOUGH		Hermetic rotary			D4400044F40UG		ermetic rotary		
Compressor	Model nan		(114)	DA1000A4F-10UC1		RA1000A4F-10U	JC1		DA1000A4F-10UC1	l R.	A1000A4F-10U	LI	
ores		ut×number of uni	its (kW)			15.4 x 4					10.7 x 4		
sor	Type of sta Case heate		(W)			Inverter start	er		Inverter starter  37 x 4				
	Case neate		(VV)			37 x 4 RB74AF					37 X 4 RB74AF		
Com	pressor oil	Type Charge	(L)			2.0 x 4					2.0 x 4		
Con	lenser coil -		(L)			Plate fin coil			2.0 x 4  Plate fin coil				
COIN	Туре	an side				Propeller far					Propeller fan		
_	Air quantit	v	(m³/min)			1,230 (maximu				1	,230 (maximum	1)	
Fan	Type of sta	-	(11,1111)			Inverter start			Inverter starter				
		put x number of	funits (kW)			1.2 x 4	-				1.2 x 4		
sys	Water spra		(L/min)			_					13.6 x 1		
Water spray system	Supply wa	ter pressure	(Note 10)(MPa)			_					0.2		
(Note 9	Control					_			Continuous water spra	ying when outside ter	mperature exceeds sett	ing and compressor cap	pacity exceeds setting
	Motor out	put	(kW)			2.2					2.2		
٦	Туре					Centrifugal pu	mp			C	entrifugal pum	ıp	
Pump	Flow contr	ol				Inverter					Inverter		
(Note 4	Maximum	current	(A)			3.1					3.1		
	Maximum	·	(kW)			2.0					2.0		
	er - water si	ide	(Note 11)		Brazed plate		(SUS316 equiva	lent)	E	Brazed plate he		SUS316 equival	ent)
Refri	Туре					R410A					R410A		
Refrigerant	R410 charg	je	(kg)			10.2 x 4					10.2 x 4		
	Control			Electric expansion valve						Elect	ric expansion v		
_	city contro	<u> </u>	(Note 12) (%)			0 and 5 ~ 10					0 and 5 ~ 100		
Ope	ation contr	High proceure quitch Over current protection Inverter over							ter temperature			. 1/	
Prote	ctive device				free	eze protection, low f	low rate, discharge ga		n, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards, ection, low pressure cutout, thermistor error, high water pressure error)				essor time guards,
Piping	Cold/Hot v		(A)			B" Flange x 1 (JIS			3" Flange x 1 (JIS10K)				
iping diameters		vater outlet	(A)			B" Flange x 1 (JIS			3" Flange x 1 (JIS10K)				
	Coil drain							PT1-1/2" External thread x 1					
Soundleve	Control bo	x side	(dBA)			70.5					70.5		
dleve	Coil side		(dBA)		74.9					74.9			
(Note 13	Water pipi	ng side	(dBA)	71.0					71.0				

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.

Design water how fater miss the within the faringe of 3 to 10°C water temperature differences. Capacities and performance values do not include pump power consumption.

Dimensions do not include projections of water pipe connections.

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

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

Note that electrical data do not include internal pump. 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)
(Note 10)
The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".
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)

## 70HPmodel Heat pump

			Standard type		High-EER type					
			220V 380V 400V 415V	440V	220V 380V 400V 415V 440V					
			70HP		70HP					
Mode	el (A single	module unit)	RUA-UP562H6S(M) RUA-UP562H5S(M)	RI	RUA-UP562HN6S(M) RUA-UP562HN5S(M)					
Cooli	ng capacity	y (Note 1) (kW)	200		200					
Heati	ing capacity	y (Note 1) (kW)	200		200					
	Unit color		Silky shade (Munsell 1Y8.5/0.5)		Silky shade (Munsell 1Y8.5/0.5)					
Ext		Height (mm)	2,350		2,350					
Exterior	Dimensions	Width (Note 2)(mm)	1,000		1,000					
=		Depth (Note 2)(mm)	3,300		3,300					
Shipp	oing weight	t (kg)	1,332		1,344					
Opera	ating weigl	ht (kg)	1,368		1,380					
Powe	er supply	(Note 1 • 3)	3 phase 3 wire 380V/40	00V/415V 50/0	/60Hz, 440V 60Hz and 220V 60Hz					
Referer	nce current for	power supply design (Note 4 • 5) (A)	118		118					
		Nominal current (A)	187 (192) 109 (111) 103 (106) 99.3 (102) 93	3.7 (96.0)	124 (129) 72.0 (74.5) 68.4 (70.8) 66.0 (68.2) 62.2 (64.3					
_	c 1.	Nominal input (kW)	70.7 (72.5)		46.9 (48.5)					
Elec	Cooling	EER	2.83 (2.76)		4.26 (4.12)					
tric		Power factor (Note 7) (%)	99		99					
Electrical data		Nominal current (A)		2.8 (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)					
(Note 1•6)	Heating	COP	3.20 (3.16)		3.20 (3.16)					
		Power factor (Note 7) (%)	99		99					
IPI V (	With a 5℃ di	(1)	6.0		6.1					
	Туре	incrence)	Hermetic rotary x 4		Hermetic rotary x 4					
0	Model nan	20	DA1000A4F-10UC1 RA1000A4F-10UC1		DA1000A4F-10UC1 RA1000A4F-10UC1					
I 3 F		ut×number of units (kW)	15.4 x 4		13.5 x 4					
res			Inverter starter		Inverter starter					
sor	Type of sta Case heate									
	Case neate		37 x 4		37 x 4					
Comp	pressor oil	Type	RB74AF		RB74AF					
C I		Charge (L)	2.0 x 4		2.0 x 4					
	lenser coil -	· air side	Plate fin coil		Plate fin coil					
	Туре	(31 • )	Propeller fan		Propeller fan 1,230 (maximum)					
2	Air quantit	•	1,230 (maximum)	-						
	Type of sta		Inverter starter		Inverter starter					
		put x number of units (kW)	1.2 x 4	$\rightarrow$	1.2 x 4					
ਕਿ ਨ	Water spra	•	_		13.6 x 1					
spra		ter pressure (Note 10)(MPa)	_		0.2					
(Note 9)	Control		_		Continuous water spraying when outside temperature exceeds setting and compressor capacity exceeds setti					
l ŀ	Motor outp	put (kW)	2.2		2.2					
P	Туре		Centrifugal pump	$\longrightarrow$	Centrifugal pump					
1 おり	Flow contr		Inverter		Inverter					
(Note 4)	Maximum		3.1	$\longrightarrow$	3.1					
	Maximum		2.0		2.0					
	er - water si	de (Note 11)	Brazed plate heat exchanger (SUS316 equivalent)		Brazed plate heat exchanger (SUS316 equivalent)					
Refr	Туре		R410A		R410A					
iger.	R410 charg	ge (kg)	10.6 x 4		10.6 x 4					
ant	Type R410 charg Control		Electric expansion valve		Electric expansion valve					
	city contro	steps (Note 12) (%)	0 and 5 ∼ 100		0 and 5 $\sim$ 100					
Oper	ation contr	ol	Microprocessor control based on l	eaving water	r temperature and temperature difference					
Defro	st system		Distributed reverse cycle system		Distributed reverse cycle system					
Prote	ctive devic	re			p), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guard at protection, low pressure cutout, thermistor error, high water pressure error)					
Pipin	Cold/Hot v	vater inlet (A)	3" Flange x 1 (JIS10K)		3" Flange x 1 (JIS10K)					
ng dian	Cold/Hot v	vater 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					
	Control bo		70.5		70.5					
_	Coil side	(dBA)	74.9		74.9					
ᆲ			, 1		74.9					
8	Water pipi		71.0		71.0					

Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.

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°C DB/24°CWD outdoor air (OAT) and 21°C feed-water temperature

For heating: 38°C entering water (EWT), 45°C leaving water (LWT), 7°C DB/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.

Dimensions do not include projections of water pine connections.

Dimensions do not include projections of water pipe connections.

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

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.

Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction. Note that electrical data do not include internal pump.

(Note 6)

(Note 7)

Power factors may vary depending on site conditions.

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

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)
(Note 12)
(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)

## **60HPmodel** Cooling-only

					S	tandard typ	ре		High-EER type				
				220V	380V	400V	415V	440V	220V	380V	400V	415V	440V
						60HP					60HP		
Mod	el (A single	module unit)		RUA-UP512CL6S(M)		RUA-UP5	12CL5S(M)		RUA-UP512CLN6S(M)		RUA-UP5	12CL5S(M)	
Cool	ing capacit	у (г	Note 1) (kW)			180					180		
	Unit color				Silky sl	hade (Munsell 1)	(8.5/0.5)		Silky shade (Munsell 1Y8.5/0.5)				
Exterior		Height	(mm)			2,350			2,350				
erio	Dimensions		Note 2) (mm)			1,000					1,000		
		Depth (1	Note 2) (mm)			3,300					3,300		
Ship	ping weigh	t	(kg)			1,229					1,241		
Ope	ating weig		(kg)			1,265					1,277		
	er supply		Note 1 • 3)			3 p	hase 3 wire 380	V/400V/415V 50	0/60Hz, 440V 60H	Hz and 220V 60	)Hz		
	nce current for	r power supply design (				95			95				
Electrical data		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)
trica	Cooling	Nominal input	(kW)			56.6 (58.1)					38.1 (39.5)		
data	cooming	EER				3.18 (3.10)					4.72 (4.56)		
(Note 1)			Note 5) (%)			99					99		
IPLV	(With a 5℃ d	ifference) (1	Note 6)			6.4					6.4		
	Туре					Hermetic rotary			Hermetic rotary x 4				
Compressor	Model nar			DA1000A4F-10UC1		RA1000A4F-10U	21		DA1000A4F-10UC1 RA1000A4F-10UC1				
pre		ut×number of units	(kW)			12.4 x 4			8.2 x 4				
ssor	Type of sta					Inverter starter					Inverter starter		
	Case heate		(W)	37 x 4					37 x 4				
Com	pressor oil	Туре				RB74AF					RB74AF		
		Charge	(L)			2.0 x 4			2.0 x 4				
Cond	denser coil	- air side				Plate fin coil			Plate fin coil				
	Туре					Propeller fan					Propeller fan		
Fa	Air quantit		(m/min)			1,230 (maximum					230 (maximum		
_ =	Type of sta					Inverter starter				I	Inverter starter		
		put x number of ur				1.2 x 4					1.2 x 4		
Water spray 77 System (Note: 7)	Water spra		(L/min)			_					13.6 x 1		
m'spra		iter pressure	Note 8) (MPa)								0.2		
	Control					_			Continuous water spray		-		
	er - water s	ide (1	Note 9)		Brazed plate	heat exchanger	(SUS316 equiva	lent)		Brazed plate he		(SUS316 equiva	lent)
Refrigerant	Туре					R410A					R410A		
gera	R410 charg	ge	(kg)			10.2 x 4					10.2 x 4		
	Control				Elec	ctric expansion v	alve				ric expansion v	alve	
<u> </u>	city contro		Note 10) (%)			0 and 5 ~ 100					0 and 5 ~ 100		
	ration contr ective device			High-pressure sw		protection, Inverter of	verload protection	compressor, fan, pu	ter temperature a ump), Crankcase heate on, low pressure cutou	er, Open-phase prot	ection, Microproce		essor time guards,
Pip	Cold/Hot v	water inlet	(A)			2" Flange x 1 (JIS			protection, low pressure cutout, thermistor error, high water pressure error)  2-1/2" Flange x 1 (JIS10K)				
Piping diameters		water outlet	(A)			2" Flange x 1 (JIS			2-1/2 Flange x 1 (JIS10K)				
meter	Coil drain		(A)			1/2" External thre			PT1-1/2" External thread x 1				
	Control bo	ox side	(dBA)			69.0			69.0				
Sound level	Coil side		(dBA)			72.3			72.3				
evel 11	Water pipi	ing side	(dBA)			68.5			68.5				
(Note 11)	Trace pipi	ing side	(UDA)			00.5			I		00.5		

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°C DB/24°C WD 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.

Performance values do not include pump power consumption.

Dimensions do not include projections of water pipe connections.

Even when there is a fluctuation in supply voltage, do not exceed  $\pm 10\%$  and keep imbalances between the supply voltages within 2%. Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.

Power factors may vary depending on site conditions.

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

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)

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) (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)

## **60HPmodel** Heat pump

				S	tandard ty	ре		High-EER type				
			220V	380V	400V	415V	440V	220V	380V	400V	415V	440V
					60HP					60HP		
Mode	el (A single	module unit)	RUA-UP512HL6S(M)		RUA-UP51	2HL5S(M)		RUA-UP512HLN6S(M)		RUA-UP51	2HL5S(M)	
Cooli	ng capacit	y (Note 1) (kW)			180					180		
Heati	ing capacit	y (Note 1) (kW)			180					180		
	Unit color			Silky sl	hade (Munsell 1'	Y8.5/0.5)			Silky sha	de (Munsell 1Y	(8.5/0.5)	
Exterior		Height (mm)			2,350					2,350		
erio	Dimensions	Width (Note 2) (mm)			1,000			1,000				
		Depth (Note 2)(mm)			3,300			3,300				
Shipp	oing weigh	t (kg)			1,265			1,278				
	ating weig				1,301					1,314		
	er supply	(Note 1 • 3)	3 phase 3 wire 380V/400V/415V					0/60Hz, 440V 60	)Hz and 220V 60			
Refere	nce current fo	r power supply design (Note 4) (A)			95					95		
		Nominal current (A)	150 (154) 8	86.9 (89.1)	82.5 (84.7)	79.5 (81.6)	75.0 (77.0)					
_	Cooling	Nominal input (kW)			56.6 (58.1)					38.1 (39.5)		
Electrical data	cooming	EER			3.18 (3.10)					4.72 (4.56)		
rica		Power factor (Note 5) (%)			99					99		
l da		Nominal current (A)	142 (144) 8:	2.4 (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)
	Heating	Nominal input (kW)			53.7 (54.4)					53.7 (54.4)		
(Note 1)	пеанну	COP			3.35 (3.31)					3.35 (3.31)		
		Power factor (Note 5) (%)		99			99					
IPLV (	With a 5℃ d	ifference) (Note 8)		6.4					6.4			
	Туре			ŀ	Hermetic rotary	x 4			He	rmetic rotary	x 4	
0,	Model nar	ne	DA1000A4F-10UC1	F	RA1000A4F-10U	C1		DA1000A4F-10UC1	RA	1000A4F-10UC	1	
hpre	Motor outpo	ut×number of units (kW)			12.4 x 4					11.9 x 4		
Compressor	Type of sta	art		Inverter starte	r			li li	nverter starter			
~	Case heate	er (W)		37 x 4					37 x 4			
Comi	pressor oil	Туре			RB74AF			RB74AF				
Com	pressor on	Charge (L)			2.0 x 4			2.0 x 4				
Cond	lenser coil -	- air side			Plate fin coil					Plate fin coil		
	Туре				Propeller fan					Propeller fan		
Fan	Air quantit	ty (m³/min)			1,230 (maximun	1)			1,2	230 (maximum	)	
3	Type of sta	art			Inverter starte	r		Inverter starter				
	Motor out	put x number of units (kW)			1.2 x 4			1.2 x 4				
Water spray system	Water spra	y volume (L/min)			_					13.6 x 1		
an spr	Supply wa	ter pressure (Note 8) (MPa)			_					0.2		
(Note 7)	Control				_			Continuous water spr	aying when outside temp	perature exceeds setti	ng and compressor capa	city exceeds setting
	er - water s	ide (Note 9)	Braz	zed plate h	heat exchanger (	SUS316 equiv	valent)	Bi	razed plate heat	exchanger (SU	IS316 equivalent	t)
Refr	Туре				R410A					R410A		
Refrigerant	R410 char	ge (kg)			10.6 x 4					10.6 x 4		
ant	Control Electric expansion valve								Elect	ric expansion v	alve	
Capa	city contro	l steps (Note 10) (%)	(Note 10) (%) 0 and 5 ~ 100						(	0 and 5 $\sim$ 100		
Oper	ation conti	rol	Microprocessor control based on leaving w						and temperatu	re difference		
Defro	ost system				ributed reverse c					ed reverse cycl		
Prote	ctive devic	ce	High-pressure switch, Over current protection, Inverter overload protection (compressor, fan, pur freeze protection, high water temp. cutout, low flow rate, discharge gas overhe									sor time guards,
Pipin	Cold/Hot v	water inlet (A)		2-1	1/2" Flange x 1 (J	IS10K)		2-1/2" Flange x 1 (JIS10K)				
Piping diameters	Cold/Hot v	water outlet (A)		2-1	I/2" Flange x 1 (J	S10K)		2-1/2" Flange x 1 (JIS10K)				
neters	Coil drain	(A)		PT1-1/2" External thread x 1					PT1-1/2" External thread x 1			
So II	Control bo	x side (dBA)			69.0			69.0				
Sound level	Coil side	(dBA)					72.3					
(Note 11)	Water pipi	ng side (dBA)					68.5					

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. Dimensions do not include projections of water pipe connections.

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

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

Power factors may vary depending on site conditions.
The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit".
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.

(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)

## **70HPmodel** Cooling-only

				S	tandard typ	ре		High-EER type				
			220V	380V	400V	415V	440V	220V	380V	400V	415V	440V
					70HP					70HP		
Mod	el (A single	module unit)	RUA-UP562CL6S(M)		RUA-UP5	62CL5S(M)		RUA-UP562CLN6S(M)		RUA-UP56	2CLN5S(M)	
Cool	ing capacit	y (Note 1) (kW)	·		200					200		
	Unit color			Silky sl	hade (Munsell 1)	Y8.5/0.5)			Silky sh	ade (Munsell 1)	(8.5/0.5)	
Exterior		Height (mm)			2,350					2,350		
erio	Dimensions	Width (Note 2) (mm)			1,000					1,000		
		Depth (Note 2) (mm)			3,300			3,300				
Ship	ping weigh	t (kg)	1,235							1,247		
Oper	ating weig				1,271					1,283		
	er supply	(Note 1 • 3)				hase 3-wire 50	/60Hz 380V/400	)V/415V, 3-phase	3-wire 60Hz 44			
	ence current fo	r power supply design(Note 4) (A)			114					114	1	
Electrical data		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)
trical	Cooling	Nominal input (kW)			70.7 (72.5)					46.9 (48.5)		
data		EER			2.83 (2.76)					4.26 (4.12)		
(Note 1)		Power factor (Note 5) (%)			99					99		
IPLV	With a 5℃ d	ifference) (Note 6)			6.0					6.1		
	Туре				Hermetic rotary					ermetic rotary		
Compressor	Model nan		DA1000A4F-10UC1 RA1000A4F-10UC1					DA1000A4F-10UC1 RA1000A4F-10UC1				
pres		ut×number of units (kW)			15.4 x 4					10.7 x 4		
ssor	Type of sta		Inverter starter							Inverter starter		
	Case heate	, ,	51.11.1							37 x 4		
Com	pressor oil	Туре			RB74AF					RB74AF		
		Charge (L)			2.0 x 4					2.0 x 4		
Cond	denser coil -	air side			Plate fin coil			Plate fin coil				
	Type	(-3 (:-)			Propeller fan	`				Propeller fan	`	
Fan	Air quantit	·			1,230 (maximum					230 (maximum	)	
	/ '	put x number of units (kW)			1.2 x 4	1				1.2 x 4		
sy w	Water spra	, ,			1.2 X 4					13.6 x 1		
Water spray 7 System (Note Only)		ter pressure (Note 8) (MPa)								0.2		
pray.	Control	ter pressure with a			_			Continuous water spray	ving when outside tem		ng and compressor can	acity avegads satting
	er - water si	de (Note9)	F	Brazed nlate h	neat exchanger (	SUS316 equiva	lent)	Continuous water spra		neat exchanger		
	Type				R410A				2.uzeu piute i	R410A	,_ 555.5 cquive	
Refrigerant	R410 chard	ie (kg)			10.2 x 4					10.2 x 4		
rant	Control	, , , , , , , , , , , , , , , , , , , ,		Elec	ctric expansion v	/alve			Elect	ric expansion v	alve	
	city contro	steps (Note 10) (%)			0 and 5 ~ 100					0 and 5 ~ 100	-	
Oper	ation contr	rol	Microprocessor control b					ter temperature a	and temperatu	ire difference		
Prote	ective devic	freeze protection, low flow ra										essor time guards,
Pipin	Cold/Hot v	vater inlet (A)		3'	" Flange x 1 (JIS1	0K)		3" Flange x 1 (JIS10K)				
Piping diameters	Cold/Hot v	vater outlet (A)		3'	" Flange x 1 (JIS1	0K)		3" Flange x 1 (JIS10K)				
neters	Coil drain	(A)		PT1-1	1/2" External thre	ead x 1		PT1-1/2" External thread x 1				
				70.5					70.5			
Sound level	Coil side	(dBA)	*				74.9					
(Note 11)	Water pipi	ng side (dBA)			71.0			71.0				

Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.

For cooling:  $14^{\circ}C$  entering water (EWT),  $7^{\circ}C$  leaving water (LWT),  $35^{\circ}CDB/24^{\circ}CWD$  outdoor air (OAT) and  $21^{\circ}C$  feed-water temperature Numbers in parenthesis indicate values for a difference of  $5^{\circ}C$ .

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.
Dimensions do not include projections of water pipe connections.
Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.
Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction.
Power factors may vary depending on site conditions.
The indicated value for IRIV (Interacted Part Lead Value (or colling) is based on the AHRIS50-590 "Water Chilling Univ."

(Note 5)

The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRIS50-590 "Water Chilling Unit".

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)

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)

Working pressure pump. (Provided locally)

(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)

## 70HPmodel Heat pump

		_				Standard t	уре			H	ligh-EER ty	ре		
				220V	380V	400V	415V	440V	220V	380V	400V	415V	440V	
						70HP					70HP			
Model (A	A single	module unit)		RUA-UP562HL6S(M)		RUA-UP	2562HL5S(M)		RUA-UP562HLN6S(M)		RUA-UP56	2HLN5S(M)		
Cooling	capacity	/	(Note 1) (kW)			200					200			
Heating	capacity	y	(Note 1) (kW)			200			200					
	nit color				Silky	shade (Munsell	1Y8.5/0.5)			Silky s	hade (Munsell 1)	(8.5/0.5)		
Ext		Height	(mm)			2,350			2,350					
Exterior Dim	mensions		(Note 2) (mm)							1,000				
		Depth	(Note 2) (mm)			3,300					3,300			
	g weight		(kg)			1,271					1,284			
	ng weigl	nt	(kg)			1,307					1,320			
Power supply (Note 1 · 3)  Reference current for power supply design (Note 4)						3-phase 3-wire 50	00V/415V, 3-phase 3-wire 60Hz 440V							
Reference o	current for	,		10=(100)		114			101/100		114		100/110	
		Nominal current		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)	
<u>m</u>   Cc	ooling	Nominal input	(kW)			70.7 (72.5)				46.9 (48.5)				
Electrical data		EER Dawerfactor	(Note 5) (%)			2.83 (2.76)					4.26 (4.12)			
cal —		Power factor				99			1111111		99			
dat		Nominal current		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)	
	leating	Nominal input COP	(kW)			62.5 (63.3) 3.20 (3.16)					62.5 (63.3)			
			(Note 5) (%)			3.20 (3.16) 99			3.20 (3.16)					
DI V/varial	th a 5℃ di	Power factor	(Note 6)		6.0				99 6.1					
_		lierence)	(NOTE 0)				ny v A				Hermetic rotary	v 1		
O Mo	odel nan	20		DA1000A4F-10UC1		RA1000A4F-10			DA1000A4F-10UC1		RA1000A4F-10U			
3 <b>⊢</b>			(kW)	DA1000A4F-100C1		15.4 x 4	1001		DATOUGA4F-TOUCT		15.4 x 4	-1		
Motor output×number of units (kW) Type of start				Inverter starter							Inverter starter			
g like	se heate		(W)		37 x 4	tei			37 x 4					
Cus	3C Heate	Туре	(**)		RB74AF				RB74AF					
Compres	ssor oil	Charge	(L)			2.0 x 4					2.0 x 4			
ondens	ser coil -		(L)			Plate fin co	il		Plate fin coil					
Тур		u., 5,00				Propeller fa			Propeller fan					
Λ:-	r quantit	v	(m²/min)			1,230 (maximi					1,230 (maximum	1)		
a —	pe of sta		(,			Inverter star			Inverter starter					
		out x number of i	units (kW)			1.2 x 4			1.2 x 4					
		y volume	(L/min)			_			1.2 x 4 13.6 x 1					
ಹಹ ⊢—		ter pressure	(Note 8) (MPa)			_					0.2			
Note 7) Cor	ntrol					_			Continuous water spr	aying when outside t	emperature exceeds sett	ing and compressor car	pacity exceeds setti	
	water si	de	(Note 9)	E	Brazed plate	heat exchanger	r (SUS316 equiva	lent)	<del>-</del>	, ,	neat exchanger (			
ਲੂ Typ	pe					R410A					R410A			
R41	10 charg	e	(kg)			10.6 x 4					10.6 x 4			
rigerant Cor	ntrol				Ele	ectric expansion	n valve			Ele	ctric expansion	valve		
	y contro	steps	(Note 10) (%)			0 and 5 ~ 1	00				0 and 5 ~ 100			
Operatio	on contr	ol				Microproce	essor control bas	ed on leaving w	ater temperatur	e and temper	ature difference			
Defrost s	system			Distributed reverse cycle system						Distrib	uted reverse cyc	e system		
Protectiv	ve devic	e		High-pressure sw					fan, pump), Crankcase heater, Open-phase protection, Microprocessor control (compressor time guards soverheat protection, low pressure cutout, thermistor error, high water pressure error)					
골. Col	ld/Hot v	vater inlet	(A)			3" Flange x 1 (J	IS10K)		3" Flange x 1 (JIS10K)					
iping diameters	ld/Hot v	vater outlet	(A)		3" Flange x 1 (JIS10K)					3" Flange x 1 (JIS10K)				
Coi	il drain		(A)		PT	1-1/2" External t	thread x 1		PT1-1/2" External thread x 1					
	ntrol bo	x side	(dBA)	70.5					70.5					
Control box side (dBA)  Coil side (dBA)						74.9			74.9					
Water piping side (dBA)								71.0						
(Note 1) Pated conditions such as capacity electrical data, and standard flow rate are							llaura							

(Note 1) Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.

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°C DB/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.

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. Dimensions do not include projections of water pipe connections. Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%. Always install an earth leakage circuit breaker. This machine includes an inverter, so please use a high-frequency-compatible product to prevent malfunction. Power factors may vary depending on site conditions. The indicated value for IPLV (Integrated Part Load Value, cooling) is based on the AHRI550-590 "Water Chilling Unit". 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) 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 ressure nume. (Provided locally) (Note 8)

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		
Mod	el		RUA-UP512HN5S(M)	RUA-UP512HN5S(M)	_		
Cool	ing capacit	y (Note 1) (kW)	180	2,880	See General Charts or (single unit value) x (number of module units in set)		
Heat	ing capacit	y (Note 1) (kW)	180	2,880	-		
	Unit color		Silky shade (Mu	insell 1Y8.5/0.5)	-		
ΕX		Height (mm)	2,350	2,350			
Exterior	Dimensions	Width (Note 2)(mm)	1,000	16,450	See General Charts		
=	(Note 2)	Depth (Note 2)(mm)	3,300	3,300			
Ship	ping weigh	t (kg)	1,330	21.280	(Single unit value) x (number of module units in set)		
Ope	rating weig	ht (kg)	1,366	21,856	(Single unit value) x (number of module units in set)		
Pow	er supply	(Note 1 • 3)	3-phase 3-wire	380V 50/60Hz			
Refere	nce current for	r power supply design (Note 4 • 5) (A)	196	196 x 16	(Single unit value) x (number of module units in set)		
		Nominal current (A)	58.5 (60.6)	936 (970)	(Single unit value) x (number of module units in set)		
۱	Caalina	Nominal input (kW)	38.1 (39.5)	610 (632)	(Single unit value) x (number of module units in set)		
Electrical data	Cooling	EER	4.72 (4.56)	4.72 (4.56)	_		
TT.		Power factor (Note 7) (%)	99	99	_		
d d		Nominal current (A)	82.4 (83.5)	1,318 (1,336)	(Single unit value) x (number of module units in set)		
	I I a a stilla a	Nominal input (kW)	53.7 (54.4)	860 (871)	(Single unit value) x (number of module units in set)		
(Note 1•6)	Heating	COP	3.35 (3.31)	3.35 (3.31)	_		
		Power factor (Note 7) (%)	99	99	_		
IPLV	(With a 5℃ d	ifference) (Note 8)	6.4	6.4	_		
	Туре		Hermet	ic rotary	_		
S	Model nar	ne	RA1000A-	4F-10UC1	-		
Compressor	Motor outpu	ut×number of units (kW)	11.9 x 4	11.9 x 64	(Single unit value) x (number of module units in set)		
essc	Type of sta	art	Inverte	rstarter	-		
=	Case heate	er (W)	37 x 4	37 x 64	(Single unit value) x (number of module units in set)		
_	.,	Туре	RB7	4AF	_		
Com	pressor oil	Charge (L)	2.0 x 4	2.0 x 64	(Single unit value) x (number of module units in set)		
Cond	denser coil -	- air side	Plate f	în coil	_		
	Туре		Propel	ler fan	_		
771	Air quantit	ty (m²/min)	1,230 (maximum)	19,680 (maximum)	(Single unit value) x (number of module units in set)		
Fan	Type of sta	nrt	Inverte	rstarter	_		
	Motor out	put 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 9 system Note	Water spra	y volume (L/min)	13.6 x 1	13.6 x 16	(Single unit value) x (number of module units in set)		
m sp	Supply wa	ter pressure (Note 10) (MPa)	0.2	0.2	_		
(Note 9)	Control		Continuous water spraying when outside temperature e	xceeds setting and compressor capacity exceeds setting	-		
	Motor out	put (kW)	1.5	1.5 x 16	(Single unit value) x (number of module units in set)		
٦	Туре		Centrifug	gal pump	-		
Pump	Flow contr	rol	Inve	erter	_		
(Note 4)	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)		
	er - water si	ide (Note 11)	Brazed plate heat excha	inger (SUS316 equivalent)	_		
Ref	Туре		R41	0A	_		
Refrigerant	R410 charg	ge (kg)	10.6 x 4	10.6 x 64	(Single unit value) x (number of module units in set)		
ant	Control		Electric expa	ansion valve	_		
Capa	city contro	l steps (Note 12) (%)	0,5 ~	- 100	_		
Ope	ration contr	rol	Microprocessor control based on leaving wa	ter temperature and temperature difference	_		
Defr	ost system		Distributed reve	rse cycle system	_		
Prote	ective devic	re	Crankcase heater, Open-phase protection, Mic	erter overload protection (compressor, fan, pump), croprocessor control (compressor time guards, w flow rate, discharge gas overheat protection, error, high water pressure error)	_		
Pipin	Cold/Hot v	water inlet (A)	2-1/2" flange (JIS10K)	2-1/2" flange (JIS10K)	(Single unit value) y (number of module units in cet)		
Piping diameters Sound level	Cold/Hot v	wateroutlet (A)	2-1/2" flange (JIS10K)	(Single unit value) x (number of module units in set)			
neters	Coil drain	(A)	PT1-1/2" External thread x 1	*Each module unit has one connection port			
Soul	Control bo	x side (dBA)	69	77.2			
nd lev	Coil side	(dBA)	72.3	75.2	See General Charts		
(Note 13)	Water pipi	ng side (dBA)	68.5	76.6			

Rated conditions, such as capacity, electrical data, and standard flow rate are as follows.

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°CD8/24°CWD outdoor air (OAT) and 21°C feed-water temperature
For heating: 38°C entering water (EWT), 45°C leaving water (LWT), 7°CD8/6°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.
Dimensions do not include projections of water pipe connections.
Even when there is a fluctuation in supply voltage, do not exceed ±10% and keep imbalances between the supply voltages within 2%.
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 of

(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 7) Note that electrical data do not include internal pump.
 (Note 8) The indicated value for IPU (Integrated Part Load Value, cooling) is based on the AHRIS50-590 "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) Agits 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, in the low resource name. (Provided Install pressure name.)

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

## 60HPmodel

	Cooling capacity	Heating capacity	Dimensions (mm)		Sound level (dBA)	(Note 4)
(Note 1)	(kW)	(kW) (Note 2)	H×W×D (Note 3)	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

	Cooling capacity	Heating capacity	Dimensions (mm)		Sound level (dBA)	(Note 4)
(Note 1)	(kW)	(kW)	H×W×D (Note 3)	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 "#" in the table.

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

## 60HPmodel

(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		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	150~3,6009		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	860	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	512(H)(N)# x 15 units 5,529	150~9,000		540
RUA-UP512(H)(N)# x 16 units	5,897	150~9,600		570

## 70HPmodel

(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		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	956	288
RUA-UP562(H)(N)# x 9 units	3,686	150~5,850	930	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		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)

When calculating the retained water amount, calculate the greatest water loss in the piping flow channel, giving consideration to the bypass channel etc.

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.

## 60HPmodel

Pumpless

	Standard flow rate •	Water pressure loss (Note 2)	Flow rate range	Minimum water loop volume	In-unit water volume
(Note 1)	(L/min)	(kPa)	(L/min) (Note 5)	(L) (Note 3 • 4 • 5)	(L)
RUA-UP512(H)L(N)#	369		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	42.1	1,200~4,800	6,881	288
RUA-UP512(H)L(N)# x 9 units	3,317	42.1	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

	Standard flow rate •	Water pressure loss (Note 2)	Flow rate range	Minimum water loop volume	In-unit water volume
(Note 1)	(L/min)	(kPa)	(L/min) (Note 5)	(L) (Note 3 • 4 • 5)	(L)
RUA-UP512(H)L(N)#	410		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	51.3	1,200~5,200	7,645	288
RUA-UP512(H)L(N)# x 9 units	3,686	31.3	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)

When calculating the retained water amount, calculate the greatest water loss in the piping flow channel, giving consideration to the bypass channel etc.

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.

## 60HPmodel

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

LVG cold-water	le			Οι	utdoo	r air te	mper	ature	(°C) ([	OB)	
temperature (°C)	ltem		15	20	25	30	35	40	43	48	52
	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
4	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
	Cooling capacity	(kW)	234	225	210	193	180	165	147	122	104
7	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
	Cooling capacity	(kW)	242	237	222	205	190	174	153	128	106
9	Nominal input	(kW)	40.4	44.1	48.5	53.0	57.9	63.5	59.1	52.2	47.3
9	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
	Cooling capacity	(kW)	254	252	242	223	206	185	162	136	108
12	Nominal input	(kW)	42.8	45.6	50.0	54.7	59.7	63.8	59.1	52.3	45.0
12	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
	Cooling capacity	(kW)	260	260	254	238	221	195	171	143	109
15	Nominal input	(kW)	44.8	46.3	50.8	56	61.2	63.9	59.2	52.2	43.3
15	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
	Cooling capacity	(kW)	261	261	256	242	228	201	176	147	110
20	Nominal input	(kW)	45.0	46.4	51.0	56.3	61.6	64.0	59.3	52.3	42.5
20	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
	Cooling capacity	(kW)	261	261	257	243	228	201	176	147	110
25	Nominal input	(kW)	45.0	46.4	51.0	56.4	61.8	64.0	59.3	52.3	42.5
25	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
	Cooling capacity	(kW)	261	261	257	243	228	201	176	147	110
30	Nominal input	(kW)	45	46.4	51.0	56.4	61.6	64.0	59.3	52.3	42.5
30	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	ltem		Outdoor air temperature (°C) (DB)								
temperature (°C)	item		-15	-10	-5	0	4	7	15		
	Heating capacity	(kW)	98.0	115	135	157	174	186	221		
25	Nominal input	(kW)	31.9	33.8	35.3	36.4	37.2	37.0	37.5		
23	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		
	Heating capacity	(kW)	97.5	115	134	156	173	185	220		
30	Nominal input	(kW)	34.0	36.2	38.0	39.5	40.5	40.6	41.7		
30	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		
	Heating capacity	(kW)	97.1	114	134	154	172	184	218		
35	Nominal input	(kW)	36.4	38.9	41.1	42.9	44.3	44.6	46.4		
33	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		
	Heating capacity	(kW)	96.5	113	132	153	170	182	216		
40	Nominal input	(kW)	39.1	42.0	44.6	46.8	48.4	48.9	51.3		
40	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		
	Heating capacity	(kW)	95.8	113	131	151	168	180	213		
45	Nominal input	(kW)	42.0	45.4	48.3	51.0	53.0	53.7	56.6		
45	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		
	Heating capacity	(kW)		112	130	150	167	178	210		
50	Nominal input	(kW)		48.9	52.4	55.6	57.8	58.7	62.1		
30	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		
	Heating capacity	(kW)			129	149	164	175	200		
55	Nominal input	(kW)			56.6	60.1	62.4	63.4	63.7		
33	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

Note 3: "mark indicates max. Flow rate due to now rate limitation. For max/ now 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)

LVG cold-water	ltem		Outdoor air temperature (°C) (DB)									
emperature (°C)	item		15	20	25	30	35	40	43	48	52	
	Cooling capacity	(kW)	242	227	211	195	183	160	138	114	101	
4	Nominal input	(kW)	48.5	53.0	57.5	62.3	67.8	65.3	59.0	52.3	51.0	
4	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	
	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	
7	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	
	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	
9	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	
	Cooling capacity	(kW)	284	277	263	246	229	188	162	136	108	
12	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	
	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	
15	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	
	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	
20	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	
	Cooling capacity	(kW)	287	284	273	259	245	205	176	147	110	
25	Nominal input	(kW)	53.9	57.6	63.9	70.4	76.6	66.1	59.3	52.3	42.5	
25	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	
	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	
30	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	ltem			Outdoor air temperature (°C) (DB)							
temperature (°C)	item		-15	-10	-5	0	4	7	15		
	Heating capacity	(kW)	119	140	164	190	211	207	244		
25	Nominal input	(kW)	43.8	46.1	48.1	49.9	51.1	43.3	44.2		
25	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		
	Heating capacity	(kW)	119	139	163	189	209	205	242		
30	Nominal input	(kW)	46.7	49.3	51.7	54.0	55.6	47.3	49.1		
30	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		
	Heating capacity	(kW)	119	139	163	187	207	203	240		
35	Nominal input	(kW)	50.2	53.1	56.0	58.6	60.5	51.9	54.3		
33	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		
	Heating capacity	(kW)	119	139	162	186	206	201	238		
40	Nominal input	(kW)	53.8	57.4	60.7	63.7	66.0	56.9	60.1		
40	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		
	Heating capacity	(kW)	119	138	160	184	204	200	236		
45	Nominal input	(kW)	57.8	61.9	65.6	69.2	72.1	62.5	66.1		
43	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		
	Heating capacity	(kW)		137	159	183	202	198	234		
50	Nominal input	(kW)		66.5	71.0	75.3	77.1	68.3	72.7		
30	Water flow rate	(L/min)		281	326	375	414	405	479		
	Nominal current	(A)		98.0	105	111	112	100	106		
	Heating capacity	(kW)			159	179	192	197	228		
55	Nominal input	(kW)			76.4	78.2	78.0	74.3	77.0		
33	Water flow rate	(L/min)			326	367	393	403	467		
	Nominal current	(A)			113	114	114	108	112		

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.

Capacity Chart (LVG/ENG water temperature difference = 7°C)

## 60HP model

List of cooling capacities RUA-UP512 (C) (L) N High EER type

LVG cold-water	ltem —		0	utdoor a	ir temp	erature (	(°C) (DB)	
temperature (°C)			30	35	40	43	48	52
	Cooling capacity	(kW)	175	162	148	142	127	112
4	Nominal input	(kW)	33.7	37.5	42.4	45.8	47.4	47.5
4	Water flow rate	(L/min)	358	332	303	291	260	229
	Nominal current	(A)	49.2	54.7	61.8	66.8	69.1	69.2
	Cooling capacity	(kW)	194	180	164	156	137	121
7	Nominal input	(kW)	34.0	38.1	43.3	46.8	47.6	47.5
·	Water flow rate	(L/min)	397	369	336	319	281	248
	Nominal current	(A)	49.5	55.6	63.1	68.3	69.4	69.2
	Cooling capacity	(kW)	206	192	175	166	144	127
9	Nominal input	(kW)	34.3	38.4	43.8	47.3	47.5	47.4
,	Water flow rate	(L/min)	422	393	358	340	295	260
	Nominal current	(A)	50.0	56.0	63.8	69.0	69.3	69.1
	Cooling capacity	(kW)	225	209	191	181	154	135
12	Nominal input	(kW)	34.4	39.0	44.4	48.0	47.7	47.5
12	Water flow rate	(L/min)	461	428	391	371	315	276
	Nominal current	(A)	50.1	56.9	64.8	70.0	69.5	69.3
	Cooling capacity	(kW)	231	222	205	195	164	143
15	Nominal input	(kW)	35.3	39.1	45.1	48.6	47.7	47.5
15	Water flow rate	(L/min)	473	455	420	399	336	293
	Nominal current	(A)	51.5	57.0	65.7	70.9	69.5	69.3
	Cooling capacity	(kW)	233	227	212	203	169	147
20	Nominal input	(kW)	36.0	40.8	45.2	49.2	47.7	47.6
20	Water flow rate	(L/min)	477	465	434	416	346	301
	Nominal current	(A)	52.5	59.5	65.9	71.7	69.6	69.4
	Cooling capacity	(kW)	233	227	212	203	169	147
25	Nominal input	(kW)	36.0	40.8	45.2	49.2	47.7	47.6
23	Water flow rate	(L/min)	477	465	434	416	346	301
	Nominal current	(A)	52.5	59.5	65.9	71.7	69.6	69.4
	Cooling capacity	(kW)	233	227	212	203	169	147
30	Nominal input	(kW)	36.0	40.8	45.2	49.2	47.7	47.6
30	Water flow rate	(L/min)	477	465	434	416	346	301
	Nominal current	(A)	52.5	59.5	65.9	71.7	69.6	69.4

List of heating capacities RUA-UP512F (L) (N) Powerful Heating Type

LVG cold-water	Item		Outdoor air temperature (°C)							
emperature (°C)	item		-20	-15	-10	-5	0	4	7	15
	Heating capacity	(kW)	104	119	140	164	190	211	186	221
25	Nominal input	(kW)	41.8	44.2	46.5	48.5	50.3	51.1	37.0	37.5
25	Water flow rate	(L/min)	213	244	287	336	389	432	381	453
	Nominal current	(A)	62.7	65.8	69.2	72.2	74.1	75.2	53.9	54.6
	Heating capacity	(kW)	104	119	139	163	188	209	185	220
30	Nominal input	(kW)	44.4	47.0	49.8	52.2	54.5	55.6	40.6	41.7
30	Water flow rate	(L/min)	213	244	285	334	385	428	379	450
	Nominal current	(A)	66.9	70.1	74.0	76.9	80.2	81.9	59.2	60.9
	Heating capacity	(kW)	104	119	139	162	187	207	184	218
35	Nominal input	(kW)	47.7	50.6	53.5	56.4	59.0	60.5	44.6	46.4
33	Water flow rate	(L/min)	213	244	285	332	383	424	377	446
	Nominal current	(A)	71.8	75.4	79.6	83.2	87.0	89.1	65.0	67.6
	Heating capacity	(kW)	104	119	138	161	186	205	182	216
40	Nominal input	(kW)	51.0	54.3	57.7	61.0	64.1	65.9	48.9	51.3
40	Water flow rate	(L/min)	213	244	283	330	381	420	373	442
	Nominal current	(A)	76.6	80.8	85.9	89.8	94.5	97.1	71.3	74.8
	Heating capacity	(kW)	104	118	138	160	184	204	180	213
45	Nominal input	(kW)	54.7	58.4	62.4	66.1	69.7	71.6	53.7	56.6
45	Water flow rate	(L/min)	213	242	283	328	377	418	369	436
	Nominal current	(A)	81.3	86.7	91.8	97.2	102.5	104.4	78.3	82.6
	Heating capacity	(kW)		118	137	158	177	191	178	211
50	Nominal input	(kW)		62.4	66.8	70.2	71.4	70.7	58.7	62.4
30	Water flow rate	(L/min)		242	281	324	362	391	364	432
	Nominal current	(A)		92.1	98.6	104	105	103	85.7	91.0
	Heating capacity	(kW)				151	166	178	176	209
55	Nominal input	(kW)				70.9	70.6	70.1	64.0	68.5
33	Water flow rate	(L/min)				309	340	364	360	428
	Nominal current	(A)				105	103	102	93.3	99.9

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: Cooling properties are for an outside relative humidity of 40% and a water spray system water supply temperature of 21°C.

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.

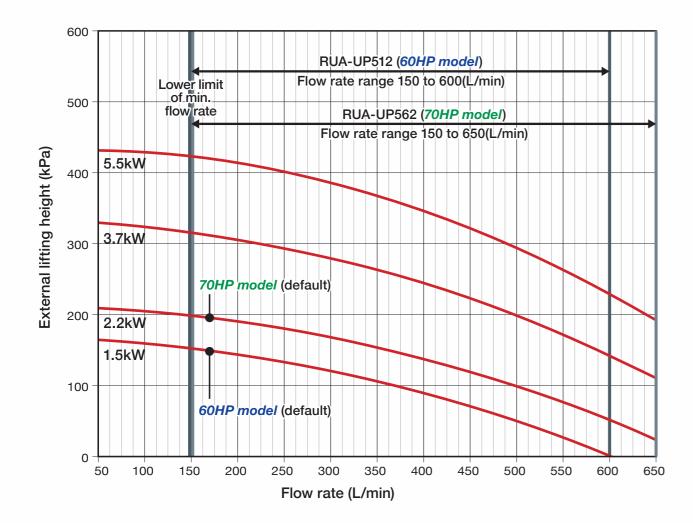
## 70HP model

List of cooling capacities RUA-UP562 (H) (L) N High EER type

LVG cold-water	Item		Outdoor air temperature (°C) (DB)								
temperature (°C)	iteiii		30	35	40	43	48	52			
	Cooling capacity	(kW)	195	180	167	161	127	112			
4	Nominal input	(kW)	41.6	45.8	50.5	53.5	47.6	47.5			
4	Water flow rate	(L/min)	399	369	342	330	260	229			
	Nominal current	(A)	60.6	66.8	73.6	78.0	69.4	69.2			
	Cooling capacity	(kW)	216	200	184	177	137	121			
7	Nominal input	(kW)	43.9	46.9	51.7	54.8	47.6	47.5			
,	Water flow rate	(L/min)	442	410	377	362	281	248			
	Nominal current	(A)	64.0	68.5	75.4	79.9	69.4	69.2			
	Cooling capacity	(kW)	229	214	196	188	144	127			
9	Nominal input	(kW)	44.2	49.2	52.5	55.3	47.5	47.4			
9	Water flow rate	(L/min)	469	438	401	385	295	260			
	Nominal current	(A)	64.5	71.7	76.6	80.6	69.3	69.1			
	Cooling capacity	(kW)	244	233	215	204	154	136			
12	Nominal input	(kW)	45.4	49.8	55.3	57	47.7	47.6			
12	Water flow rate	(L/min)	500	477	440	418	315	278			
	Nominal current	(A)	66.2	72.6	80.6	83.1	69.5	69.3			
	Cooling capacity	(kW)	253	247	231	221	164	143			
15	Nominal input	(kW)	44.9	51.8	55.8	58	47.7	47.5			
13	Water flow rate	(L/min)	518	506	473	453	336	293			
	Nominal current	(A)	65.4	75.5	81.4	84.6	69.5	69.3			
	Cooling capacity	(kW)	254	250	236	227	169	147			
20	Nominal input	(kW)	45.2	51.9	56.1	59.4	47.6	47.6			
20	Water flow rate	(L/min)	520	512	483	465	346	301			
	Nominal current	(A)	65.9	75.6	81.7	86.6	69.4	69.4			
	Cooling capacity	(kW)	254	250	235	227	169	147			
25	Nominal input	(kW)	45.2	51.9	56.1	59.3	47.7	47.6			
23	Water flow rate	(L/min)	520	512	481	465	346	301			
	Nominal current	(A)	65.9	75.6	81.8	86.4	69.6	69.4			
	Cooling capacity	(kW)	254	250	235	227	169	147			
30	Nominal input	(kW)	45.2	51.9	56.1	59.4	47.6	47.6			
30	Water flow rate	(L/min)	520	512	481	465	346	301			
	Nominal current	(A)	65.9	75.6	81.8	86.6	69.4	69.4			

#### Pump Characteristics / Internal Inverter Pump

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



#### Pump specification values

			60HP m	odel	70HP model					
Pump output		1.5 (Standard)	2.2	3.7	5.5	2.2 (Standard)	3.7	5.5		
Flow rate range (*1)	(L/min)		150	~600	150~650					
External lifting height (*2)	(kPa)	43~151	92~198	190~315	284~422	64~198	158~315	247~422		
Max. operation current (*3)	(A)	3.3	4.5	7.3	10.5	4.5	7.3	10.5		
Max. power consumption (*3)	(kW)	2.0	2.8	4.5	6.4	2.8	4.5	6.4		
Max. allowable boost pressure (		0.52	0.47	0.36	0.25	0.47	0.36	0.25		
Max. suction head (water temp. 60°C of	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)

 $\hbox{$^*$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.

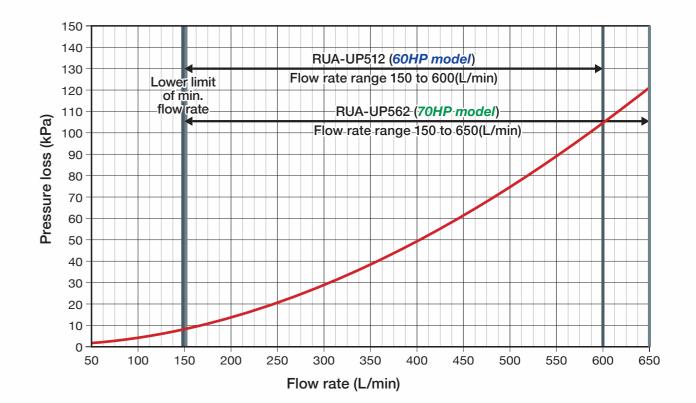
Note 5: Select a pump that can handle the needed lift and flow amount. Note 6: In case the nominal current is 380V.

Note 7: Pump frequency shall be limited when ambient temperature is higher than 43°C due to pump inverter overheat protection.

## 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



#### 1. Operating ranges

## 60HPmodel 70HPmodel

	Cooling			4~30
Leaving water temperature	Heating	(Note 2) (Note 3)		25~55
(loce ly	Temperature differen (inlet/outlet)	ce	℃	5~10
Outside air temperature	Cooling			-15~52
Outside all temperature	Heating	(Note 2) (Note 3)		-15∼43DB, 32WB

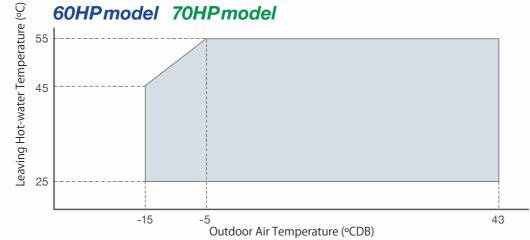
Note 1: LWT not higher than 35°C at cooling or not lower than 20°C at heating operation is allowable till 1 hour after starting up. After then, however, LWT must be within the operating range. Control it with bypass pipe if needed.

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



#### 2. Operating range for water dispersing device

Water spray temperature range	℃	10~30
Outdoor temperature range as spray mode trigger	℃	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)

					601	<b>HP</b> mo	del		70HPmodel						
	Power sup	pply				50/60Hz 400\	/		50/60Hz 400V						
						Internal inv	erter pump				Internal inverter p	ump			
٩				Pumpless	Standard	F	or special ord	er	Pumpless	Standard For special order					
Internal Pump	Motor Out	tput	(kW)		1.5	2.2	3.7	5.5		2.2	3.7	5.5			
na le	Туре			_		Centrifug	al pump		_	Centrifugal pump					
Je.	Type of sta	art		_		Inverte	r start		_		Inverter start				
-	Control			_		Inve	rter		_	Inverter					
	Max. Curre	rent (A)		_	3.1	4.3	6.9	10.0	_	4.3	6.9	10.0			
	Max. Inpu	t	(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 por	n terminals i	nside each m	odule(M10)	No. of pov	ver connectio	on terminals inside e	ach module(M10)				
	Standard (	Standard Current (A)			98	99	102	105	114	118	121	124			
	Power Sou	urce Capacity	(kVA)	65.8	67.9	68.7	70.5	72.7	79.1	82.0	83.8	86.0			
ig	Power	IV: Power Supply ≤ 20m	(mm)		3	8		60	60						
Power Supply Design	Supply	IV: Power Supply ≤ 50m	(mm)		3	8		60		60					
슬	Wiring	CV: Power Supply ≤ 20m	(mm)			38					38				
Sp	(mm²)	CV: Power Supply ≤ 50m	(mm)			38					38				
Ver	Ground		(mm)		2	2		38			38				
S S	Switch		(A)		100		12	25			125				
	Fuse		(A)		100		12	25			125				
	Earth Leak	age Circuit Breaker (Capacity)	(A)		100		12	25			125				
	Earth Leak	age Circuit Breaker (Sensibilit	y) (mA)		100		20	00			200				

<sup>\*1.</sup> 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	S
16 <s≤35< th=""><th>16</th></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
Pur	mp output upgrade
An	ti-corrosion & heavy anti corrosion models
Lar	ge ∆T specification (10~16 degree C)
He	at machine specification (heating only)
Sta	inless steel screw set
Sta	inless steel water strainer and check valve
Sta	inless steel pump specification
Fas	t start up specification
Au	tomatic system recovery (MC, GC)
Sta	ndby Module Controller
An	ti-corrosion & heavy anti corrosion connecting kit
An	ti-corrosion & heavy anti corrosion flange kit
Мо	dule Controller with Modbus®
Gro	oup Controller with BACnet
Ad	ditional low level Input/Output points option

<sup>\*</sup>Please contact Toshiba Carrier for more details on above custom options and others. 
\*Modbus\* is trademark registered by Schneider Electric USA, Inc.

Accessory list	Remarks	Factory assembly
Connection bracket	Standard	×
SD card	Standard	×
Flash Air card	Sold separately	×
Module Controller	Standard	0
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 prefered)	Locally procured	×
Automatic Transfer Switch	Locally procured	×
Pressure gauge	Locally procured	×

<sup>\*</sup>BACnet is ASHRAE trademark

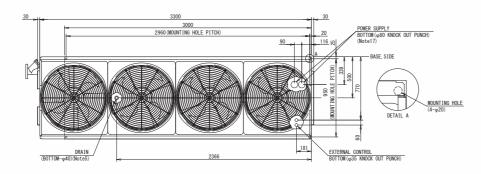
Note 1: Accessories those are not assembled by factory will not be included in seller's work description.

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

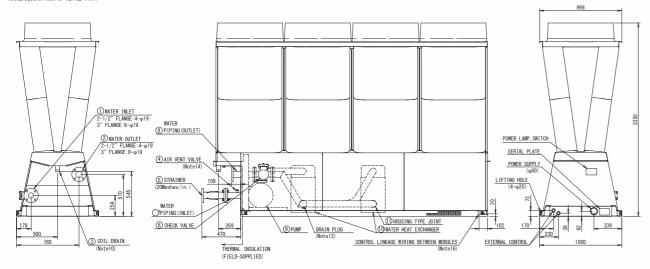
Note 3: Connection bracket is supplied by factory as standard to connect 2 modules at the top when 2 modules are placed no more than 50mm from each other.

#### A single module unit

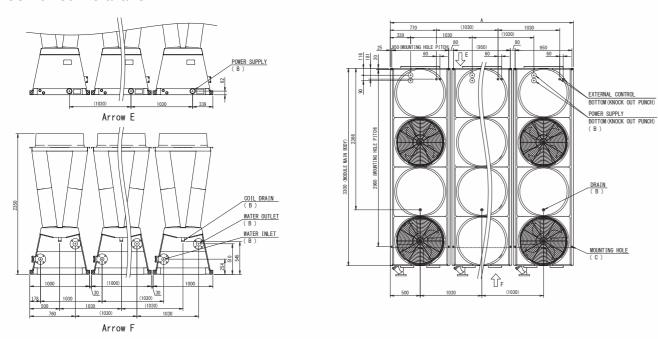
No.		NAN	ΛE		Connection					
1	WATER INLET	RUA-	UP51	12	2-1/2" FLANGE					
	WATER INCE!	RUA-	UP56	62	3" FLANGE					
2	WATER OUTLET	RUA-	UP51	12	2-1/2" FLANGE					
	WATER OUTLET	RUA-	UP56	62	3" FLANGE					
3	COIL DRAIN				PT1-1/2" EXTERNAL THREAD					
4	AIR VENT VALV	/E			PT1/2" INTERNAL THREAD					
5	STRAINER				CASING: Equivalent to FC250					
6	CHECK VALVE				CASING: Equivalent to FC200					
7	WATER PIPING	JI:	S10	K FLANGE (Note. 1)	Equivalent to SUS304					
/	(INLET)			PIPING	Equivalent to SUS304					
8	WATER PIPING	JI:	S10	K FLANGE (Note. 1)	Equivalent to SUS304					
٥	(OUTLET)			PIPING	Equivalent to SUS304					
9	PUMP				CASING:FC200					
10	WATER HEAT E)	CUANC	ירם	PLATE, JOINT	Equivalent to SUS316					
10	WATER REAL EX	CHANC	IER	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)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С
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.

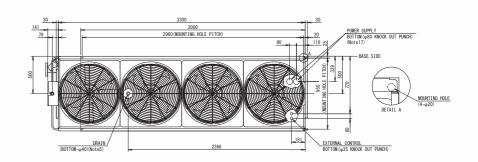
Note 4: Communication wiring between modules provided by factory is for 30mm module to module distance only. In case the distance is more than 30mm, please procure wiring locally. Check databook for wiring specification details.

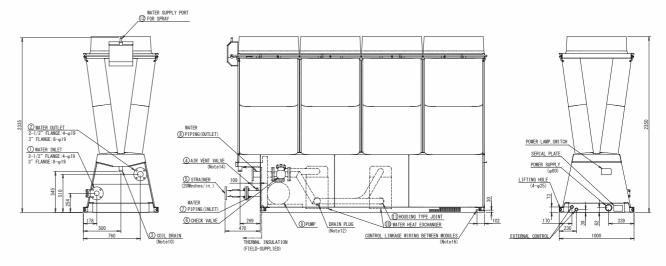
#### **Outline Drawing**

Internal inverter pump / High-EER type

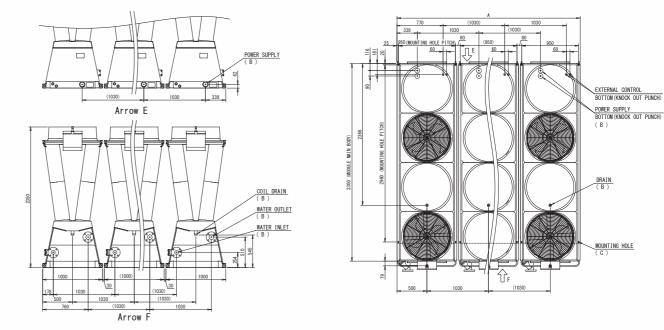
#### A single module unit

No.		NAME		Connection				
1	WATER IN ET	RUA-UF	512	2-1/2" FLANGE				
1	WATER INLET	RUA-UF	P562	3" FLANGE				
2	WATER OUTLET	RUA-UF	512	2-1/2" FLANGE				
-	MATER OUTLET	RUA-UF	P562	3" FLANGE				
3	COIL DRAIN			PT1-1/2" EXTERNAL THREAD				
4	AIR VENT VALVE			PT1/2" INTERNAL THREAD				
5	STRAINER			CASING: Equivalent to FC25				
6	CHECK VALVE			GASING: Equivalent to FC20				
7	WATER PIPING	JIS10	K FLANGE (Note. 1)	Equivalent to SUS304				
1	(INLET)		PIPING	Equivalent to SUS304				
8	WATER PIPING	JIS10	K FLANGE (Note. 1)	Equivalent to SUS304				
۰	(OUTLET)		PIPING	Equivalent to SUS304				
9	PUMP			CASING:FC200				
10	WATER HEAT EXC	NIAMOED.	PLATE, JOINT	Equivalent to SUS316				
10	MATER REAL EAU	MANUER	SOLDER	PURE COPPER				
11	HOUSING TYPE .	JOINT	GASKET (Note2)	EPDM				
12	WATER SUPPLY	PORT F	PT1/2" EXTERNAL THREAD					





#### Combined installation



Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С
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

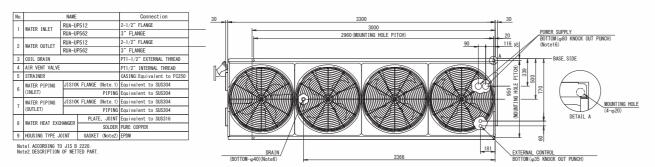
Note 1: Both 60HP,70HP has the same dimensional drawing except water inlet/outlet piping size.

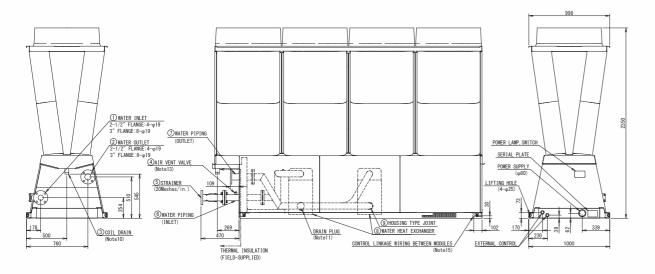
Note 2: Number for A,B,C in the drawing.

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.

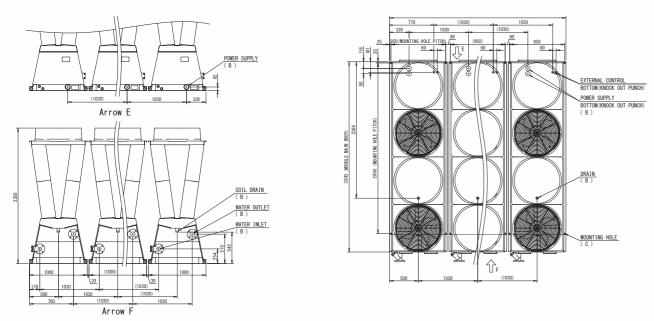
Note 4: Communication wiring between modules provided by factory is for 30mm module to module distance only. In case the distance is more than 30mm, please procure wiring locally. Check databook for wiring specification details.

#### A single module unit





#### Combined installation



Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С
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.

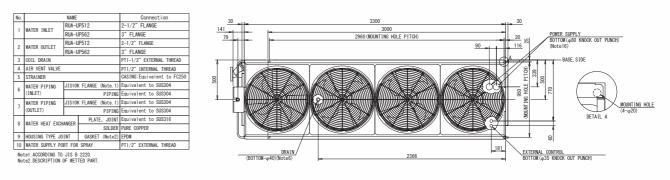
It is also possible to installing connected modules with a minimum space of 30mm between modules.

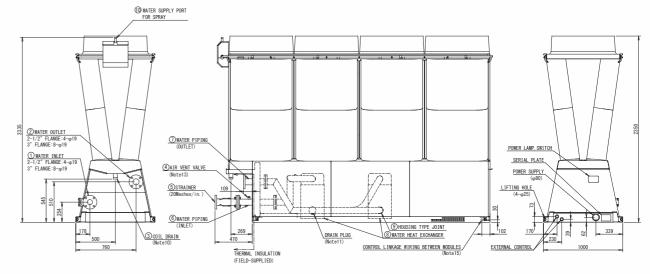
cable (locally supplied) must be prepared in accordance with Table1The accessory communication wire, supplied with the USX EDGE module, cannot be used to coa new communication en modules is greater than 30mm.

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

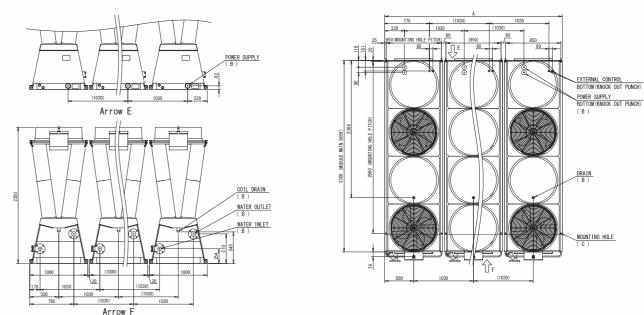
Outline Drawing Pumpless / High-EER type

#### A single module unit





#### Combined installation



[	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	С	Number of Modules	A (Note6)	В	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.

Note 4. 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.

cable (locally supplied) must be prepared in accordance with Table1The accessory communication wire, supplied with the USX EDGE module, cannot be used to coa new communication en modules is greater than 30mm.

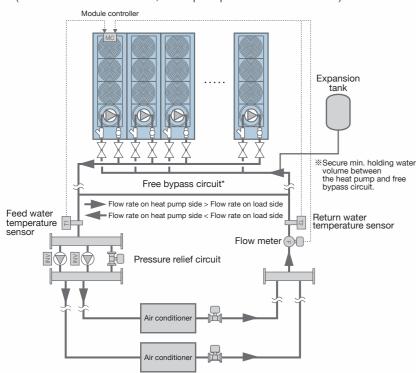
If the clearance is larger, prepare long enough electric-wire and appropriate covering.

## 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)



 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.

**UNIVERSAL SMART X Series EDGE 2** 

- 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.
- 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.

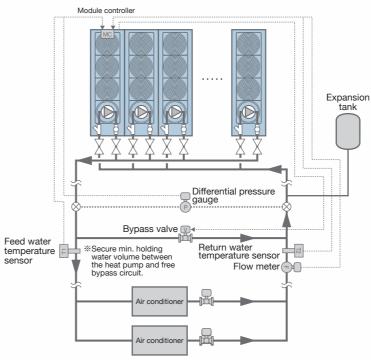
## List of equipment for control

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

<sup>\*)</sup> Attach  $250\Omega \pm 1\%$  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)



- 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.
- 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).
- 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.).

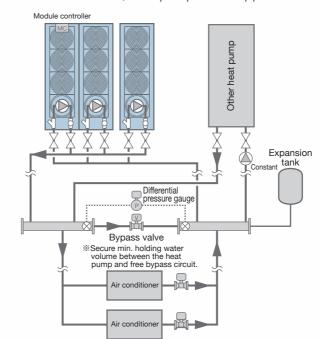
## List of equipment for control

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

<sup>\*)</sup> 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))



- 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.
- 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.
- 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)