HITACHI AIR-COOLED WATER CHILLERS
- SCREW TYPE -

HITACHI
Inspire the Next

Nominal Cooling Capacity Range

112	kW	to	1,080	kW	at 50Hz
32	USRT	to	307	USRT	at 50Hz
96,320	kcal/h	to	928,800	kcal/h	at 50Hz
382,000	Btu/h	to	3,685,000	Btu/h	at 50Hz

TROPICAL

Technical Catalog I
– Design Information –

Models:
For R407C
RCUP30ATU(Z)
RCUP38ATU(Z)
RCUP46ATU(Z)
RCUP51ATU(Z)
RCUP75ATU(Z)
RCUP90ATU(Z)
RCUP102ATU(Z)
RCUP135ATU(Z)
RCUP154ATU(Z)
RCUP179ATU(Z)
RCUP205ATU(Z)
RCUP256ATU(Z)
RCUP307ATU(Z)

Step Capacity Control Type:
RCUP-ATU
Continuous Capacity Control Type:
RCUP-ATUZ

New series! This series of HITACHI air-cooled water chillers up to 307 USRT at 50Hz has been developed for various requirements of air conditioning systems and industrial chilled water systems, where these equipment are operated under high ambient temperatures of 50°C.

Therefore, the units can be utilized under a wide temperature range.

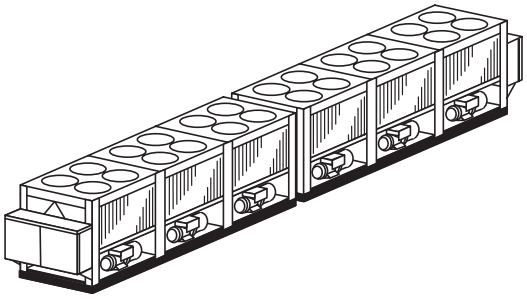
These water chillers are equipped with newly model-changed semi-hermetic HITACHI screw compressors, featuring high reliability, low noise and low vibration, and highly efficiency air-cooled condenser, resulting in compact design. The unit is composed of compressors, air-cooled condensers, plate type water coolers, and other auxiliary and control devices, compactly packaged in a weather-proof cabinet, and constructed of galvanized steel plates processed with specially baked resin paint.

SC1-U01, 2008

New HITACHI AIR-COOLED WATER CHILLER…
THAT'S THE ACHIEVEMENT OF TOTAL HITACHI TECHNOLOGY…

High Performance

The Unit COP has been greatly Increased.
*Example:
75RT Class (50Hz)
RCUP100ATX COP = 2.73 => RCUP75ATU **COP = 3.41**
(Series Average:
RCUP-ATX COP = 2.8 => RCUP-ATU **COP=3.2**)



The appropriate combination of the inversion M-shape air side heat exchangers with high performance SLIT fins, highly efficient new screw compressors, electronic expansion valves and plate type water side heat exchangers has achieved this high efficiency of operation.

Smaller Vibration and Lower Operation Sound

Due to the combination of the HITACHI semi-hermetic screw compressors and smooth-air-flow propeller fans for air side heat exchangers, smaller vibration and lower sound operation has been achieved, which was almost impractical in the current reciprocating compressor units. Therefore, in most cases, special vibration absorbing curbs are not required by utilizing factory-supplied rubber mats.

Designed to Reduce Impact on the Environment

* Ozone depletion potential (ODP) of R407C=0
* With a lower global warning coefficient than R22, R407C is a desirable alternative refrigerant.

(50Hz)

Item/Refrigerant		R22	R407C
Structure	wt%	HCFC22	HFC32/125/134a
Composition Ratio (wt%)	-	100	23/25/52
ODP (Ozone Depletion Potential)	-	0.055	0
GWP (Global Warning Potential)	-	1,700	1,530
Combustibility	-	Non-Flammable	Non-Flammable
Refrigerant Safety Degree (ASHRAE 34)	-	AI	AI/AI

Most Reliable Semi-Hermetic Screw Compressor

The HITACHI screw compressor, which is called, the heart of the unit, has been developed for higher efficiency by introducing new profile screw rotors and cyclonic oil separator, resulting in reliable and durable operation. Also, the compressor minimum load control has been expanded as follows by using new screw compressor.
25(33) to 100% => 15 to 100%

Capacity Control

Step Control Type

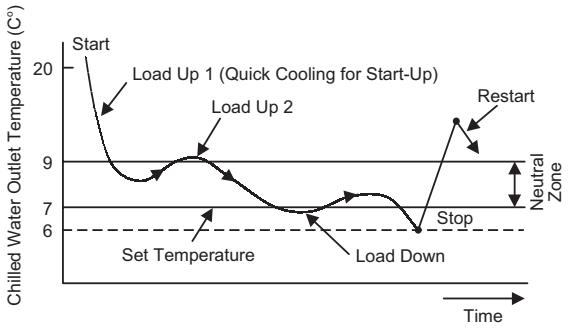
The new models are equipped with the following functions.

Adjustable Differential

- ON/OFF differential of the chilled water temperature can be set at 2, 3 and 4 degree C, in order to minimize the temperature band. (Standard set is 4 degree C)

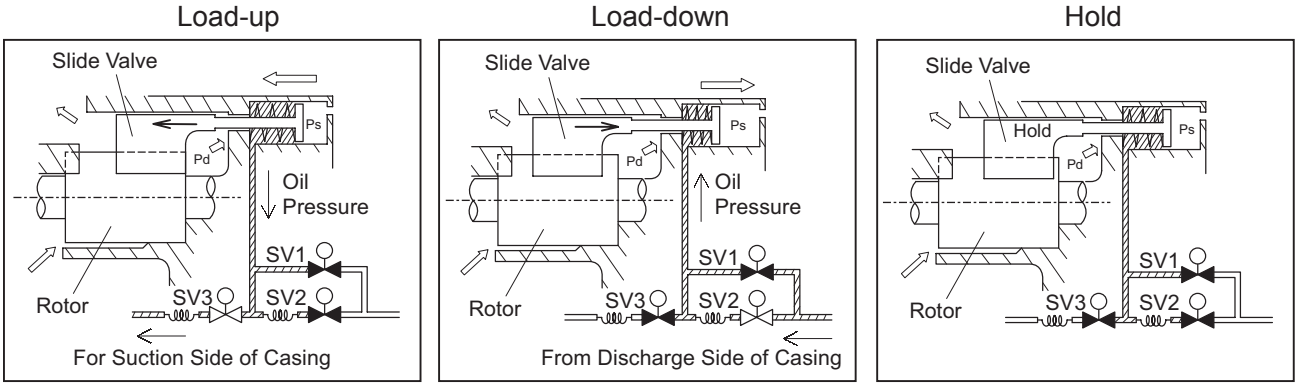
Continuous Capacity Control

- Chilled water outlet temperatures can be controlled precisely within $^{+2}_{0}$ °C of the setting temperature. This control is performed by applying a micro-computer to the continuous capacity control type screw compressor.
- This precise temperature control is suitable not only for air conditioning, but also for industrial use.



– Principle of Continuous Capacity Control –

Continuous capacity control is performed by adjusting the slide valve position as shown below. The slide valve position can be changed freely between 100% and 15% in accordance with cooling load.



Pd: Discharge Pressure, Ps: Suction Pressure, SV1,2,3: Solenoid Valve

Micro-Processor Control for Various Functions

A micro-processor has been applied to the new models for following various functions.

- Electronic Expansion Valve Control
- Alarm Indication for each cycle by 7-Segment
- Rotating Control of Compressor Starting Order
- Current Limitation Control
- Automatic Start after Instantaneous Power Failure

Easy Maintenance

Water coolers are Independent for each cycle so that service and maintenance are performed respectively.

Standard Accessory

(1) Vibration-Proof Mat
(2) Foundation Bolt, Nut, Washer and Bushing

Various Option

The following specifications are available on order basis. Please contact Hitachi if required.

(1) High External Static Pressure Type Fan
(2) Low Ambient Temperature (Up to 154ATU(Z))
(3) BMS: Please get in touch with Hitachi or Hitachi distributor if BMS is required.
(4) Water Strainer
(5) Anti-Corrosive Type Condenser Fin
(6) Pressure Gauge for Low and High Pressure

GENERAL DATA

Model	Step Control Type		RCUP30ATU	RCUP38ATU	RCUP46ATU	RCUP51ATU	RCUP75ATU	RCUP90ATU	RCUP102ATU
	Continuous Control Type		RCUP30ATUZ	RCUP38ATUZ	RCUP46ATUZ	RCUP51ATUZ	RCUP75ATUZ	RCUP90ATUZ	RCUP102ATUZ
Cooling Capacity	Nominal	kW *1	112	132	165	180	265	330	360
		USRT *1	31.9	37.5	46.9	51.2	75.4	93.9	102.4
		kcal/h *1	96,320	113,520	141,900	154,800	227,900	283,800	309,600
		Btu/h *1	382,000	450,000	563,000	614,000	904,000	1,126,000	1,228,000
	Effective	kW *1	86.9	102.4	128.1	139.7	205.7	256.1	279.4
		USRT *1	24.7	29.1	36.4	39.7	58.5	72.8	79.5
		kcal/h *1	74,734	88,064	110,166	120,142	176,902	220,246	240,284
		Btu/h *1	297,000	349,000	437,000	477,000	702,000	874,000	953,000
Capacity Control (%)	Step Control Type		100, 75, 50, 0				100, 75, 50, 25, 0		
	Continuous Control Type		100~15, 0				100~15, (5)*2, 0		
Dimension	Height	(mm)	2,150	2,150	2,150	2,150	2,150	2,150	2,150
	Width	(mm)	1,900	1,900	1,900	1,900	1,900	1,900	1,900
	Depth	(mm)	2,300	2,300	2,300	2,300	4,200	4,200	4,200
Refrigerant			R407C						
Flow Control			Electronic Expansion Valve						
Number of Circuits			1	1	1	1	2	2	2
Compressor Model			Semi-Hermetic Screw Type						
Step Control Type			30ASCP-H	40ASCP-H	50ASCP-H	60ASCP-H	40ASCP-H	50ASCP-H	60ASCP-H
Quantity			1	1	1	1	2	2	2
Continuous Control Type			30ASCP-Z	40ASCP-Z	50ASCP-Z	60ASCP-Z	40ASCP-Z	50ASCP-Z	60ASCP-Z
Quantity			1	1	1	1	2	2	2
Heat Exchanger									
Condenser			Multi-Pass Cross-Finned Type (Pre-Coated Fin: Standard)						
Condenser Fan			Direct Drive Propeller Fan						
	Motor	kW	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Quantity		4	4	4	4	8	8	8
Water Cooler			Plate Type						
Type of Control System			Micro-Processor Control						
Safety Device			Thermal Overcurrent Relay for Compressor (R, T Phase), Internal Thermostat for Compressor, Thermal Overcurrent Relay for Fan Motor, High Pressure Switch, Low Pressure Control, Oil Heater, Fusible Plug, Freeze Protection Control, Reverse Phase Protection Device, Discharge Gas Thermistor and Operation-Hour Meter						
Connections			Victaulic Type						
Chilled Water Inlet/Outlet			3B	3B	3B	3B	2×3B	2×3B	2×3B
Net Weight		kg	1,350	1,400	1,470	1,510	2,550	2,700	2,780
Approximately Shipping Dimensions									
Vinyl Packing	Height	(mm)	2,345	2,345	2,345	2,345	2,415	2,415	2,415
	Width	(mm)	2,100	2,100	2,100	2,100	2,150	2,150	2,150
	Depth	(mm)	2,400	2,400	2,400	2,400	4,300	4,300	4,300
Shipping Weight		kg	1,485	1,535	1,605	1,645	2,950	3,100	3,180
Approximately Shipping Dimensions									
Wooden Packing	Height	(mm)	2,460	2,460	2,460	2,460	2,490	2,490	2,490
	Width	(mm)	2,090	2,090	2,090	2,090	2,090	2,090	2,090
	Depth	(mm)	2,490	2,490	2,490	2,490	4,390	4,390	4,390
Shipping Weight		kg	1,750	1,800	1,870	1,910	3,150	3,300	3,380

NOTES:

1. The nominal cooling capacities are based on the following conditions. *1
   Chilled Water Inlet/Outlet Temperature: 12/7°C
   Condenser Air Inlet Temperature: 35°C (DB)
   The effective cooling capacities are based on the following conditions. *1
   Chilled Water Inlet/Outlet Temperature: 12/7°C
   Condenser Air Inlet Temperature: 46°C (DB)
2. Power Source : Main (AC 3Φ) 380/415V 50Hz
   : Control (AC 1Φ) 220/240V 50Hz
3. The units greater than 179ATU(Z) including 179ATU(Z) consist of two modules and are separately shipped.
4. The common chilled water piping (field-supplied) between each water cooler shall be directly connected at site.
   (The water coolers in the same unit shall be connected the same common piping.)
5. It is required to connect electrical control wires between No. 1 and No. 2 units for the unit greater than 179ATU(Z) including 179ATU(Z).
6. ( ) marked with *2 is available by selection switch.
7. Specifications in this sheet are subject to change without notice, in order that HITACHI may bring the latest innovations to their customers.

Working Range

Item	Standard	Option
Chilled Water Outlet Temperature	5 ~ 10°C	-
Condenser Air Inlet Temperature (DB)	5 ~ 50°C	-15 ~ 50°C

(up to 154ATU(Z))

Model			RCUP135ATU	RCUP154ATU	RCUP179ATU	RCUP205ATU	RCUP256ATU	RCUP307ATU
	Continuous Control Type		RCUP135ATUZ	RCUP154ATUZ	RCUP179ATUZ	RCUP205ATUZ	RCUP256ATUZ	RCUP307ATUZ
Cooling Capacity	Nominal	kW *1	495	540	660	720	900	1,080
		USRT *1	140.8	153.6	187.7	204.8	256.0	307.1
		kcal/h *1	425,700	464,400	567,600	619,200	774,000	928,800
		Btu/h *1	1,689,000	1,842,000	2,252,000	2,457,000	3,071,000	3,685,000
	Effective	kW *1	384.2	419.1	512.2	558.8	698.5	838.2
		USRT *1	109.3	119.2	145.7	158.9	198.6	238.4
		kcal/h *1	330,412	360,426	440,492	480,568	600,710	720,852
		Btu/h *1	1,311,000	1,430,000	1,748,000	1,907,000	2,383,000	2,860,000
Capacity Control (%)	Step Control Type		100, 66, 33, 17, 0		100, 75, 50, 38, 25, 13, 0		100,80,60,50,30,10,0	100,83,66,50,33,17,0
	Continuous Control Type		100~15, (5)*2, 0		100~15, (7.5)*2, 0		100~15, (6)*2, 0	100~15, (7.5)*2, 0
Dimension	Height	(mm)	2,150	2,150	2,150	2,150	2,150	2,150
	Width	(mm)	1,900	1,900	1,900	1,900	1,900	1,900
	Depth	(mm)	6,100	6,100	8,500 (min.)	8,500 (min.)	10,400 (min.)	10,400 (min.)
Refrigerant			R407C					
Flow Control			Electronic Expansion Valve					
Number of Circuits			3	3	2×2	2×2	3 + 2	3 + 3
Compressor Model			Semi-Hermetic Screw Type					
Step Control Type			50ASCP-H	60ASCP-H	50ASCP-H	60ASCP-H	60ASCP-H	60ASCP-H
Quantity			3	3	2×2	2×2	3 + 2	3 + 3
Continuous Control Type			50ASCP-Z	60ASCP-Z	50ASCP-Z	60ASCP-Z	60ASCP-Z	60ASCP-Z
Quantity			3	3	2×2	2×2	3 + 2	3 + 3
Heat Exchanger								
Condenser			Multi-Pass Cross-Finned Type (Pre-Coated Fin: Standard)					
Condenser Fan			Direct Drive Propeller Fan					
	Motor	kW	0.9	0.9	0.9	0.9	0.9	0.9
	Quantity		12	12	16	16	20	24
Water Cooler			Plate Type					
Type of Control System			Micro-Processor Control					
Safety Device			Thermal Overcurrent Relay for Compressor (R, T Phase), Internal Thermostat for Compressor, Thermal Overcurrent Relay for Fan Motor, High Pressure Switch, Low Pressure Control, Oil Heater, Fusible Plug, Freeze Protection Control, Reverse Phase Protection Device, Discharge Gas Thermistor and Operation-Hour Meter					
Connections			Victaulic Type					
Chilled Water Inlet/Outlet			3×3B	3×3B	4×3B	4×3B	5×3B	6×3B
Net Weight		kg	4,360	4,480	2×2,700	2×2,780	4,480+2,780	2×4,480
Approximately Shipping Dimensions								
Vinyl Packing	Height	(mm)	2,415	2,415	2×2,415	2×2,415	2,415+2,415	2×2,415
	Width	(mm)	2,150	2,150	2×2,150	2×2,150	2,150+2,150	2×2,150
	Depth	(mm)	6,200	6,200	2×4,300	2×4,300	6,200+4,300	2×6,200
Shipping Weight		kg	4,900	5,020	2×3,100	2×3,180	5,020+3,180	2×5,020
Approximately Shipping Dimensions								
Wooden Packing	Height	(mm)	2,510	2,510	2×2,490	2×2,490	2,490+2,490	2×2,510
	Width	(mm)	2,090	2,090	2×2,090	2×2,090	2,090+2,090	2×2,090
	Depth	(mm)	6,290	6,290	2×4,390	2×4,390	6,290+4,390	2×6,290
Shipping Weight		kg	5,210	5,330	2×3,300	2×3,380	5,330+3,380	2×5,330

NOTES:

1. The nominal cooling capacities are based on the following conditions. *1
   Chilled Water Inlet/Outlet Temperature: 12/7°C
   Condenser Air Inlet Temperature: 35°C (DB)
   The effective cooling capacities are based on the following conditions. *1
   Chilled Water Inlet/Outlet Temperature: 12/7°C
   Condenser Air Inlet Temperature: 46°C (DB)
2. Power Source : Main (AC 3Φ) 380/415V 50Hz
   : Control (AC 1Φ) 220/240V 50Hz
3. The units greater than 179ATU(Z) including 179ATU(Z) consist of two modules and are separately shipped.
4. The common chilled water piping (field-supplied) between each water cooler shall be directly connected at site.
   (The water coolers in the same unit shall be connected the same common piping.)
5. It is required to connect electrical control wires between No. 1 and No. 2 units for the unit greater than 179ATU(Z) including 179ATU(Z).
6. ( ) marked with *2 is available by selection switch.
7. Specifications in this sheet are subject to change without notice, in order that HITACHI may bring the latest innovations to their customers.

Working Range

Item	Standard	Option
Chilled Water Outlet Temperature	5 ~ 10°C	-
Condenser Air Inlet Temperature (DB)	5 ~ 50°C	-15 ~ 50°C

(up to 154ATU(Z))