



EBARA REFRIGERATION EQUIPMENT & SYSTEMS CO., LTD.

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Two-Stage Compression Centrifugal Chiller

Model RTGC Series

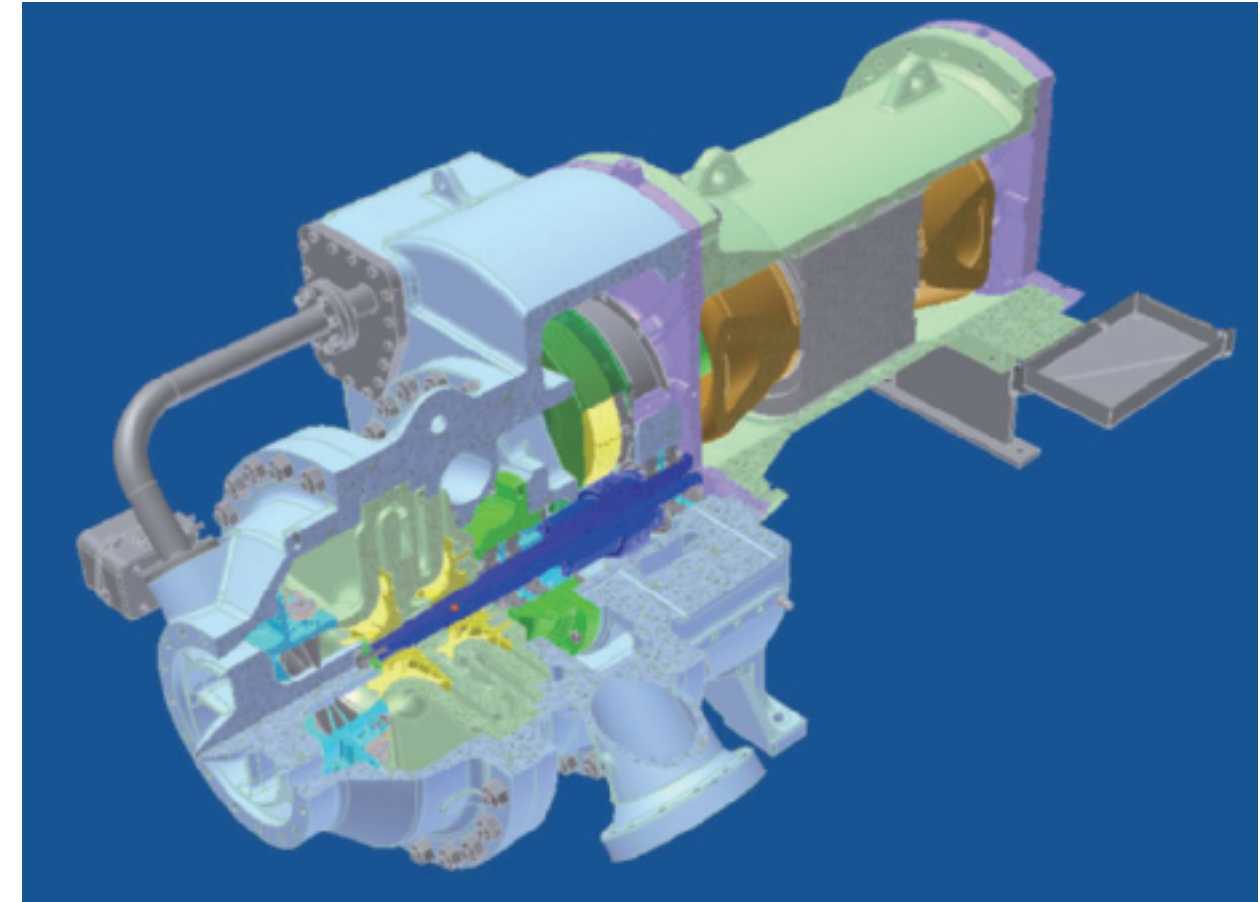
"Model ○○○ type series" in this catalogue is our model code.



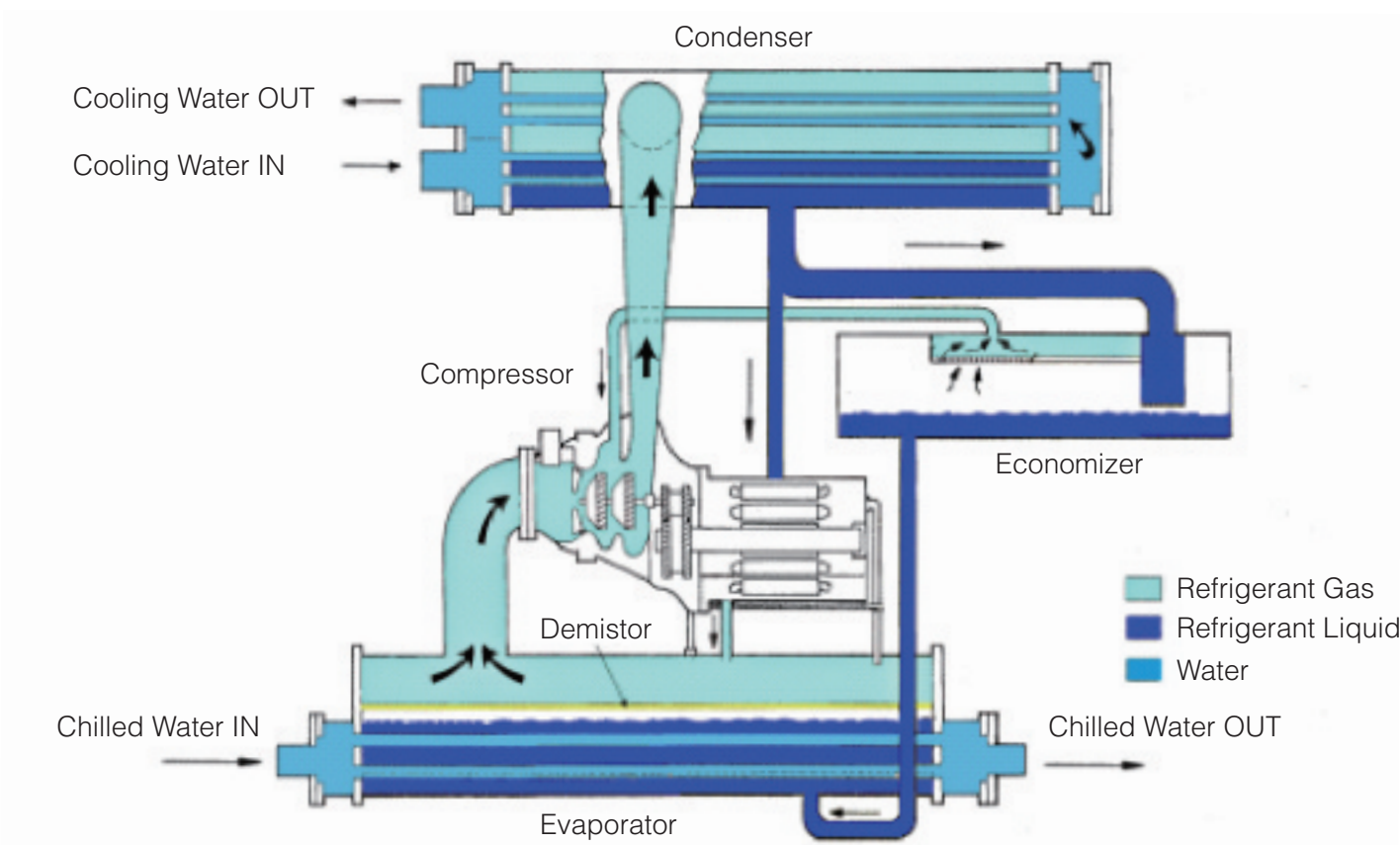
All specifications are subject to change without notice
"Model ○○○ type series" in this catalogue is our model code.

Features

- Compact and reliable design apply for high performance and long life semi hermetic type compressor.
- Motor is cooled directly by refrigerant liquid. Therefore motor can be designed compact and quiet operation.
- Eco-friendly refrigerant HFC 134a is applied to RTGC chiller.
- RTGC chiller adopts open type impeller and high speed revolution for compact design compressor.
- Compared with single-stage compression, RTGC chiller adopts economizer cycle for high efficiency and save energy.



Refrigeration Cycle



Inside Features

Compressor

Ball Bearing

Efficiency is increased by applying ball bearing which is minimized mechanical loss.

Volume Adjustment

Prompt adjustment of partial load by suction vane control.

High Efficient Two Impellers

Most suitable impeller design for high efficiency through fluid analysis.

Helical Gear, Gear Axis

Compact design by impeller high revolution with gear speed increase.

Motor

Motor temperature is low during the operation by cooling down with refrigerant.

Economizer

Liquid refrigerant sending evaporator is cooled by evaporated refrigerant from economizer increasing refrigeration effect. Evaporated refrigerant is induced by second impeller mixed with compressed refrigerant from first stage impeller.

Evaporator

- Apply high efficient heat transfer tube.
- No impeller erosion by demister avoiding refrigerant mist carry over.
- Adopt special refrigerant distribution system for high performance for evaporation.

Condenser

- Apply high efficient heat transfer tube
- Safety Valve is installed in condenser to protect over design pressure.
- To optimize heat transfer efficiency by optimized tube arrangement.



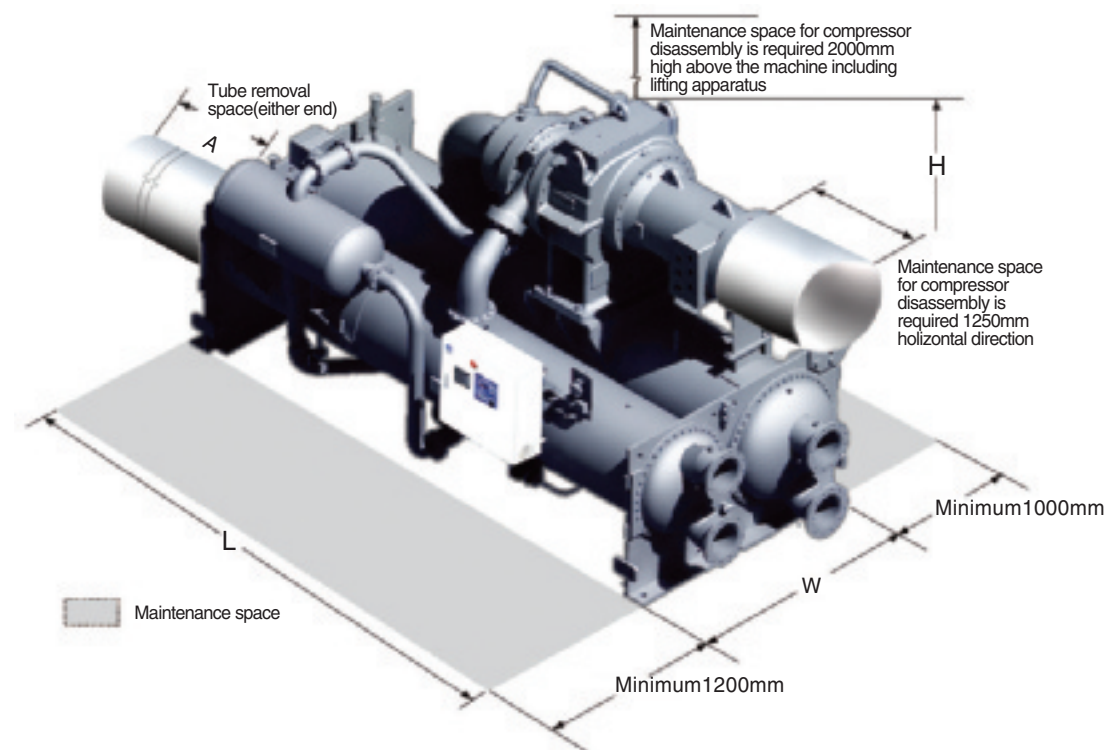
Specification

Condition : 7/32 °C Temperature Selection

Model		RTGC	055A	060A	065A	070A	075A	080A	085A	090A	095A	100A	110A	120A	130A	140A	150A	160A
Cooling Capacity	kW		1934	2110	2286	2462	2638	2814	2990	3165	3341	3517	3869	4221	4572	4924	5276	5627
	USRT		550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400	1500	1600
Motor Input		kW	349	379	411	444	480	506	537	568	602	636	712	757	820	884	954	1054
Chilled Water	Flow Rate	m ³ /h	331.9	362.1	392.3	422.4	452.6	482.8	513.5	543.1	573.3	603.5	663.8	724.2	784.5	844.9	905.2	965.6
	Pressure drop	kPa	98	98	99	100	112	98	99	99	99	100	118	126	127	128	129	161
	Nozzle size	A (mm)	250	250	250	250	250	300	300	300	300	300	300	350	350	350	350	350
	Pass number	—	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cooling Water	Flow Rate	m ³ /h	395.7	431.2	467.3	503.4	540.1	575.1	611.0	646.7	683.1	719.4	793.6	862.4	934.2	1006.3	1079.2	1157.6
	Pressure drop	kPa	83	84	85	85	97	83	84	84	85	86	102	101	101	102	103	131
	Nozzle size	A (mm)	250	250	250	250	250	300	300	300	300	300	300	400	400	400	400	400
	Pass number	—	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Approx. Dry Rigging Weight (380V/3.6,10KV)		t	11.4 / 12.1	11.6 / 12.2	11.7 / 12.4	11.9 / 12.5	11.9 / 12.6	15.0 / 15.3	15.2 / 15.5	15.3 / 15.6	15.5 / 15.6	15.6 / 15.9	15.7 / 16.0	21.4 / 21.5	— / 21.7	— / 22.0	— / 22.1	— / 22.3
Approx. Running Weight (380V/3.6,10KV)		t	13.2 / 13.9	13.5 / 14.1	13.7 / 14.4	14.0 / 14.7	14.0 / 14.8	17.6 / 17.9	17.9 / 18.1	18.1 / 18.3	18.3 / 18.4	18.5 / 18.9	18.6 / 19.0	25.6 / 25.7	— / 26.0	— / 26.3	— / 26.4	— / 26.7
Refrigerant Filler Content		kg	650	700	750	775	800	820	850	880	900	950	1000	1250	1320	1400	1450	1500
Maximum Length Dimension (L)		mm	5075	5075	5075	5075	5075	5100	5100	5100	5100	5100	5100	5500	5500	5500	5500	5500
Maximum Width Dimension (W)		mm	2550	2550	2550	2550	2550	2900	2900	2900	2900	2900	2900	3275	3275	3275	3275	3275
Maximum Height Dimension (H)		mm	2700	2700	2700	2700	2700	2850	2850	2850	2850	2850	2850	3285	3285	3285	3285	3285
Tube Removal Space (Either End) (A)		mm	4300	4300	4300	4300	4300	4300	4300	4300	4300	4300	4300	4600	4600	4600	4600	4600
Chilled Water Retain		ℓ	582	611	641	671	671	839	868	898	928	957	957	1230	1284	1341	1397	1397
Cooling Water Retain		ℓ	529	559	593	625	625	762	795	828	862	893	893	1129	1194	1259	1324	1324

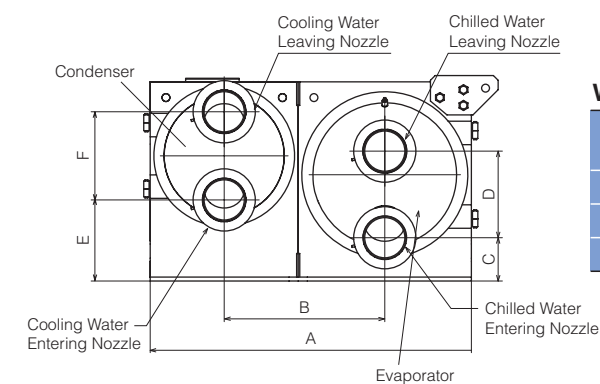
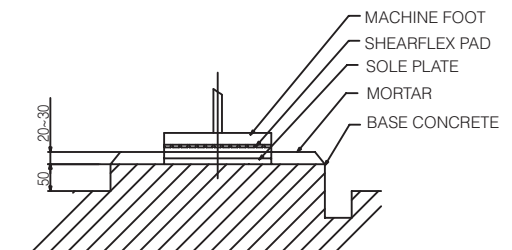
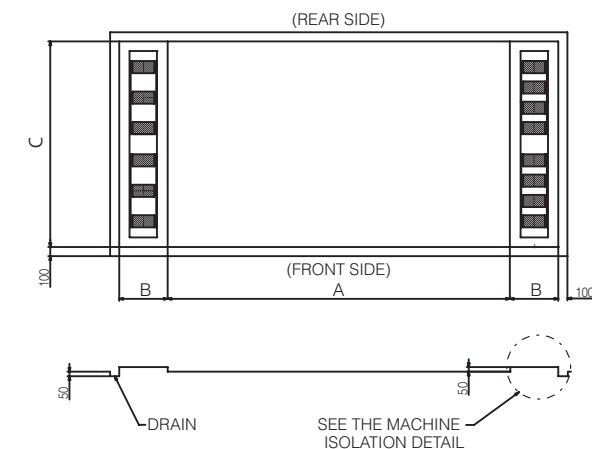
Notes:

- 1) Chilled Water Temperature (IN / OUT) 12/7 °C, Cooling Water Temperature (IN / OUT) 32/37 °C
- 2) Refrigerant R134a
- 3) Water Box Max Working Pressure 1MPa
- 4) Fouling Factor: Chilled Water; 0.018m²K/kW (0.21/10000m²h²°C/kcal) , Cooling Water; 0.044m²/Kw (0.51/10000m²h²°C/kcal)
- 5) Electric condition Frequency: 50, 60Hz, Voltage: 380V, 3kV, 6kV, 10kV Class



Machine Foundation Dimension

Model	RTGC	055A	060A	065A	070A	075A	080A	085A	090A	095A	100A	110A	120A	130A	140A	150A	160A
A		4805	4805	4805	4805	4805	4805	4805	4805	4805	4805	4805	5093	5093	5093	5093	5093
B		530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
C		2250	2250	2250	2250	2250	2500	2500	2500	2500	2500	2500	2810	2810	2810	2810	2810



Water Box Nozzle Dimension

Nozzle Dimensions	A	B	C	D	E	F
RTGC055A-075A	2040	1020	277	548	505	579
RTGC080A-110A	2290	1145	365	660	605	700
RTGC120A-160A	2600	1300	495	830	735	720

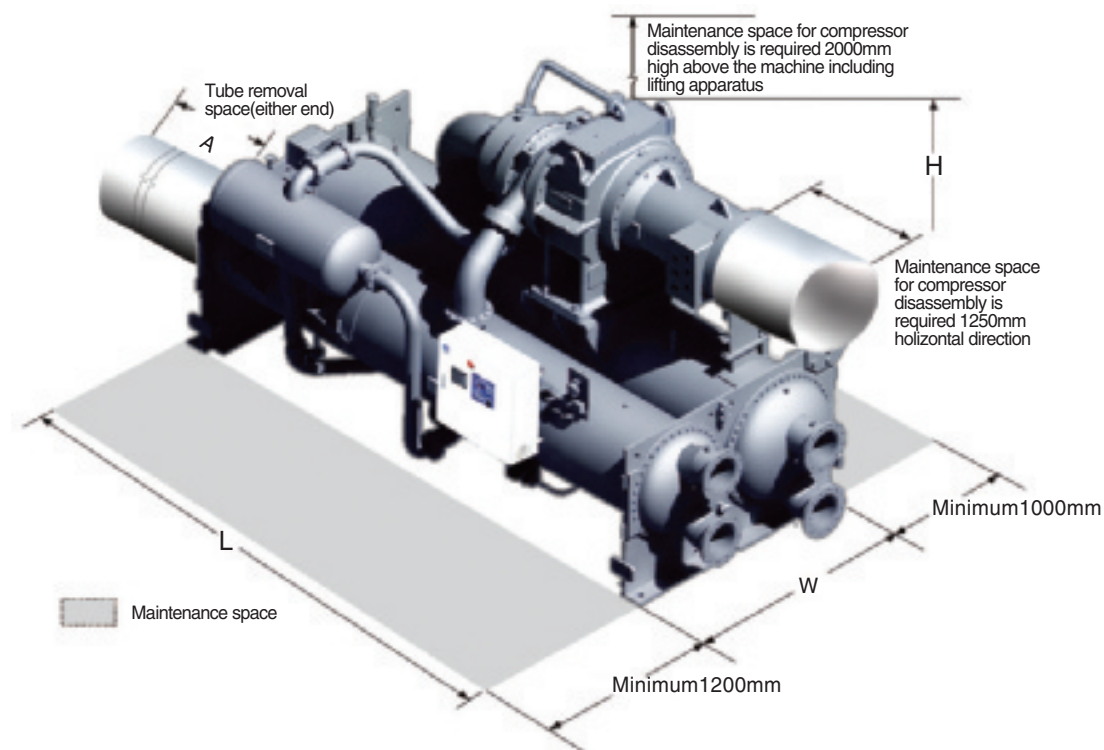
Specification

Condition : AHRI Temperature Selection

Model		RTGC	055A	060A	065A	070A	075A	080A	085A	090A	095A	100A	110A	120A	130A	140A	150A	160A
Cooling Capacity	kW		1934	2110	2286	2462	2638	2814	2990	3165	3341	3,517	3869	4221	4572	4924	5276	5627
	USRT		550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400	1500	1600
Motor Input		kW	326	354	383	411	445	467	495	524	554	585	657	701	758	818	881	967
Chilled Water	Flow Rate	m ³ /h	298.5	325.6	352.8	379.9	407.0	434.2	461.3	488.4	515.6	542.7	597.0	651.2	705.5	759.8	814.1	868.3
	Pressure drop	kPa	82	82	82	83	93	82	82	82	83	83	98	105	106	106	107	134
	Nozzle size	A (mm)	250	250	250	250	250	300	300	300	300	300	300	350	350	350	350	350
	Pass number	—	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Cooling Water	Flow Rate	m ³ /h	378.4	412.5	446.7	480.9	516.1	549.1	583.4	617.6	652.0	686.7	757.6	823.9	892.4	961.1	1030.6	1103.9
	Pressure drop	kPa	78	78	79	80	90	78	78	79	79	80	95	94	95	95	96	122
	Nozzle size	A (mm)	250	250	250	250	250	300	300	300	300	300	300	400	400	400	400	400
	Pass number	—	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Approx. Dry Rigging Weight (380V/3.6,10KV)		t	11.4 / 12.1	11.6 / 12.2	11.7 / 12.4	11.9 / 12.5	11.9 / 12.6	15.0 / 15.3	15.2 / 15.5	15.3 / 15.6	15.5 / 15.6	15.6 / 15.9	15.7 / 16.0	21.4 / 21.5	— / 21.7	— / 22.0	— / 22.1	— / 22.3
Approx. Running Weight (380V/3.6,10KV)		t	13.2 / 13.9	13.5 / 14.1	13.7 / 14.4	14.0 / 14.7	14.0 / 14.8	17.6 / 17.9	17.9 / 18.1	18.1 / 18.3	18.3 / 18.4	18.5 / 18.9	18.6 / 19.0	25.6 / 25.7	— / 26.0	— / 26.3	— / 26.4	— / 26.7
Refrigerant Filler Content		kg	650	700	750	775	800	820	850	880	900	950	1000	1250	1320	1400	1450	1500
Maximum Length Dimension (L)		mm	5075	5075	5075	5075	5075	5100	5100	5100	5100	5100	5100	5500	5500	5500	5500	5500
Maximum Width Dimension (W)		mm	2550	2550	2550	2550	2550	2900	2900	2900	2900	2900	2900	3275	3275	3275	3275	3275
Maximum Height Dimension (H)		mm	2700	2700	2700	2700	2700	2850	2850	2850	2850	2850	2850	3285	3285	3285	3285	3285
Tube Removal Space (Either End) (A)		mm	4300	4300	4300	4300	4300	4300	4300	4300	4300	4300	4300	4600	4600	4600	4600	4600
Chilled Water Retain		ℓ	582	611	641	671	671	839	868	898	928	957	957	1230	1284	1341	1397	1397
Cooling Water Retain		ℓ	529	559	593	625	625	762	795	828	862	893	893	1129	1194	1259	1324	1324

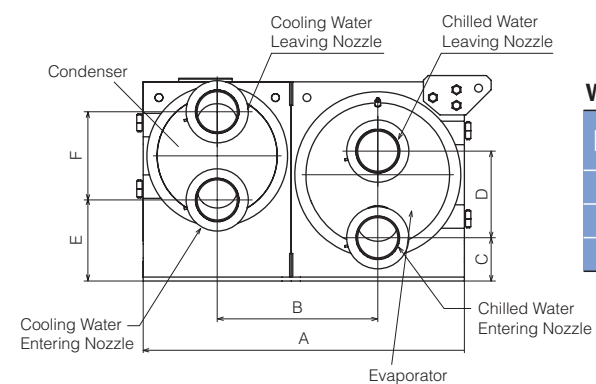
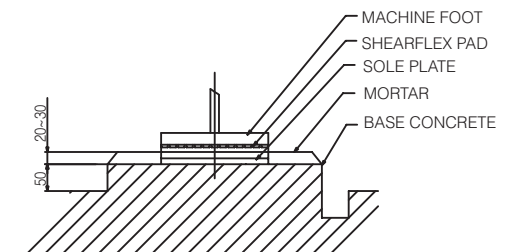
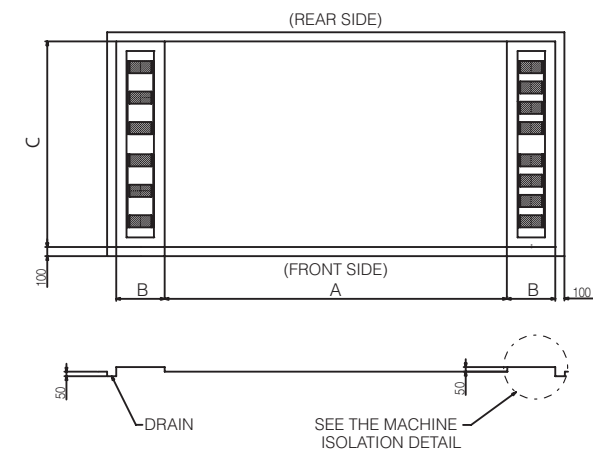
Notes:

- 1) Chilled Water Temperature (IN / OUT) 12.3/6.7℃, Cooling Water Temperature (IN / OUT) 29.4/34.6℃
- 2) Refrigerant R134a
- 3) Water Box Max Working Pressure 1MPa
- 4) Fouling Factor: Chilled Water; 0.018m²K/kW (0.21 / 10000m²h²℃/kcal), Cooling Water; 0.044m²/Kw (0.51 / 10000m²h²℃/kcal)
- 5) Electric condition Frequency: 50, 60Hz, Voltage: 380V, 3kV, 6kV, 10kV Class



Machine Foundation Dimension

Model	RTGC	055A	060A	065A	070A	075A	080A	085A	090A	095A	100A	110A	120A	130A	140A	150A	160A
A		4805	4805	4805	4805	4805	4805	4805	4805	4805	4805	4805	5093	5093	5093	5093	5093
B		530	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
C		2250	2250	2250	2250	2250	2500	2500	2500	2500	2500	2500	2810	2810	2810	2810	2810



Water Box Nozzle Dimension

Nozzle Dimensions	A	B	C	D	E	F
RTGC055A-075A	2040	1020	277	548	505	579
RTGC080A-110A	2290	1145	365	660	605	700
RTGC120A-160A	2600	1300	495	830	735	720



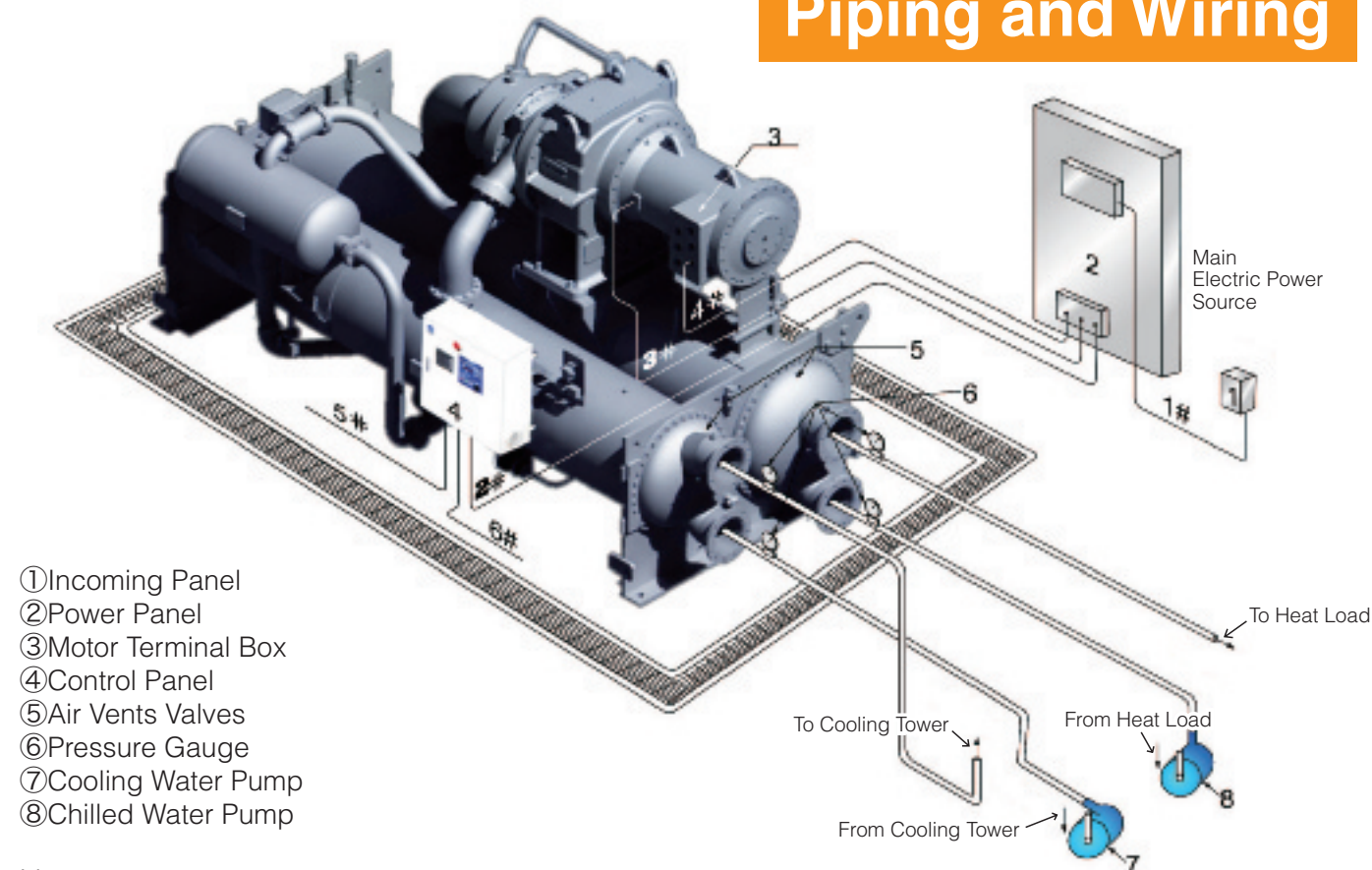
Motor Starting Method

Motor Output (kW)		370	440	520	610	720	760	910	1080
Applicable Model RTGC (Rating Condition)		055A 060A	065A 070A	075A 080A 085A	090A 095A 100A	110A	120A	130A 140A 150A	160A
Motor Voltage	AC380V	Y—△ Start (Standard), VFD Start (Option), Soft Start (Option)				Soft Start (Standard)		None	
	AC3kV AC6kV AC10kV	Direct Start (Standard), Reactor Start (Option), Korndorfer Start, Power Condenser (Option)							

Power Panel Outline Drawing

Voltage	Rated Output (kw)	W (mm)	D (mm)	H (mm)	Weight (kg)	Packing Weight (kg)	Start Method
380V	370	1100	600	2100	265	325	Star-Delta
	440				275		
	520				300	360	
	610				315	385	
	720	1000	1000	2200	320	385	Soft-Start
3,6,10kV	760						
	370						Direct Start
	440						
	520						
	610						
	720						
	760						
	910						
	1080						

Piping and Wiring

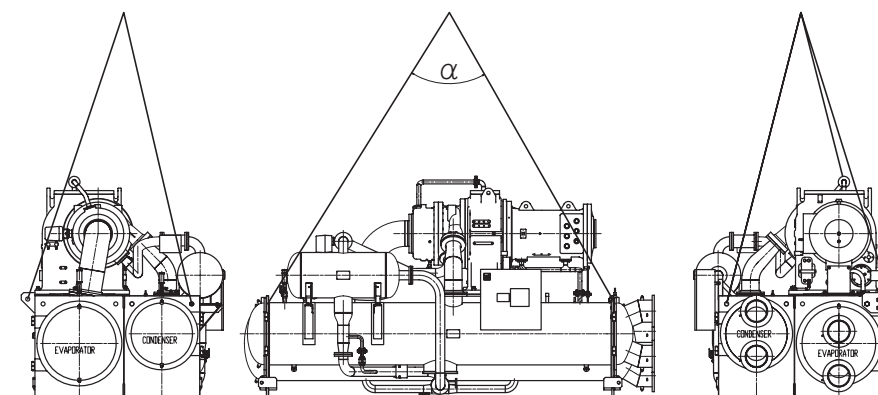


- ①Incoming Panel
- ②Power Panel
- ③Motor Terminal Box
- ④Control Panel
- ⑤Air Vents Valves
- ⑥Pressure Gauge
- ⑦Cooling Water Pump
- ⑧Chilled Water Pump

Line	Symbol	Usage	Description
1#		Power Supply Wire and Earth Wire	AC Power Source 3 Phase, Neutral Line 1Line,Earth Line 1Line
2#		From Power Panel to Control Panel	Operational Power Supply Wire and Power Panel Control Wire
3#		From Power Panel to Main Motor internal Thermistor Terminal Box	
4#		From Power Panel to Main Motor	Mechanical Power Wire and Earth Wire
5#		From Control Panel to Auxiliary Machine Panel	Pump and Cooling Tower start and stop signal Wire
6#		Communication Protocol Line	

Electric Wiring Construction Note:
Check safety with extra care when electric works are performed

Hoisting and Installation

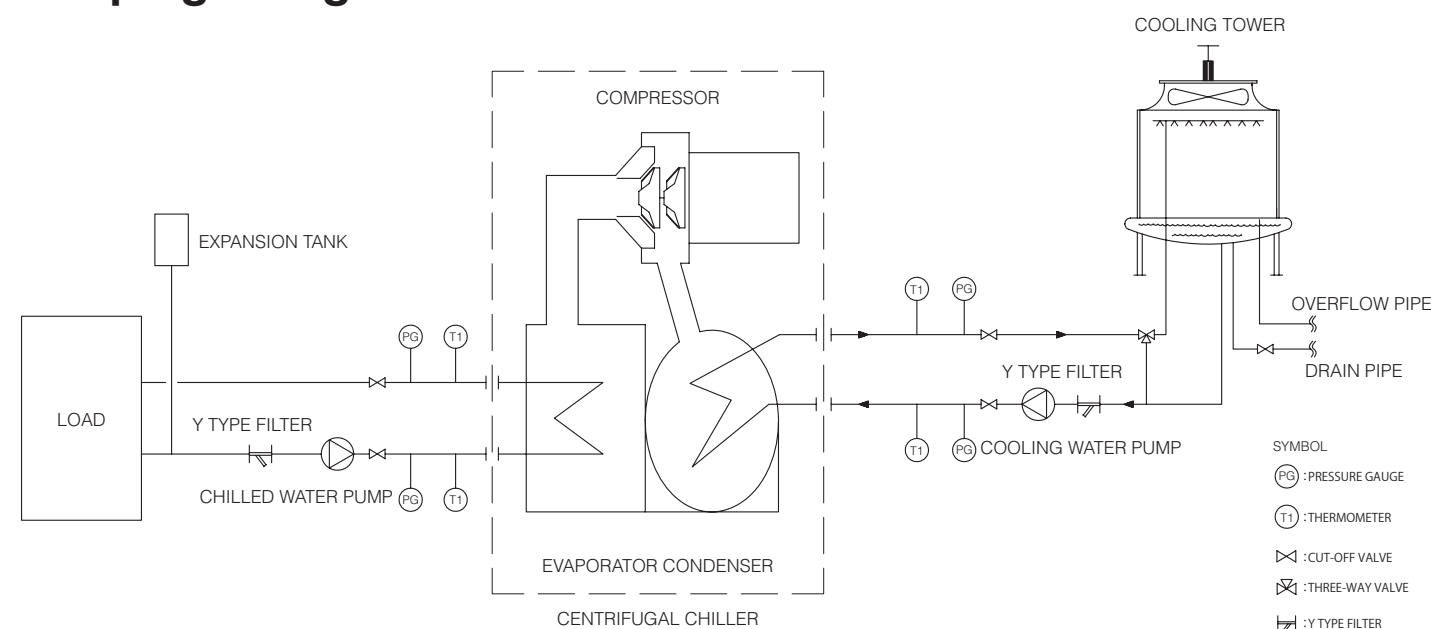


- Notes
- Concerning lifting equipment (lifting hook, lifting wire, and shackle), select equipment with suitable strength after checking the weight of a unit per the outline drawing of the unit.
 - α degrees angle $\leq 60^\circ$
 - Temporary plate for machine lifting is rigged when the machine is delivered. It will be removed after the machine is installed.

- Operating and maintenance space which is 1200mm or more wide around the machine is required. In particular, be careful to the motor, compressor, oil pump, oil filter, refrigerant dryer, filter and instrument apparatus.
- Perform construction for vibration isolating foundation and perform level adjustment on the upper part of the tube plate and on the compressor base plate with a level to be longer than 600mm. Place vibration-isolating material and plate at four positions as mentioned. Each of four plates with three different types of thickness is shipped. Select plates with thickness suitable to each position in order to adjust the level.
- Pipe supports are required to prevent piping mass, vibration application to the machine.
- The pressure test of evaporator and condenser water boxes must be conducted with hydrostatics.
- The strainer above 10 meshes is required on the entering piping of chilled water and cooling water to protect tube damages. If the strainer is equipped at the upper stream side of the entering piping of chilled water and cooling water, it's unnecessary.
- If the chilled water (brine) or cooling water has poor quality, scale will be deposited in the heat transmission tubes, affecting the chiller operation and causing trouble such as water leaks due to tube corrosion. Special care should be taken with regard to water quality.
- No person other than the specialists must not disassemble, repair, or modify the unit. Improper repair may cause the electrical shock or fire. If any accident occurs originated by those attempts, Ebara is not responsible for any of the damage, injury, or other losses.

Facilities Application

Piping Design Plan



1. [] shows the scope of supply.
2. In order to open the evaporator and condenser water box, please set the elbow pipe or single pipe.
3. To protect the heat transfer tube at the chilled water and cooling water entering nozzle, please set filter more than 10 mesh.
4. In order to decrease pipe weight load and vibration applied to the machine, please set the support and flexible hose.
5. In other than summer seasons, the cooling water entrance temperature may affect the machine, please use the three-way valve to control the cooling tower, the leaving temperature difference between cooling water and chilled water above 15°C.
6. Exhaust piping from the safety valve port; Install the piping provided with supports and vibration isolation pads, and lead it to the outdoor safety area. Also the closing area to the chiller on the pipe, flexible joint shall be required to prevent pipe loads to the safety valve.

After-Sales Services

Maintenance

To ensure the long-lasting use of chillers and chiller/heaters, daily operation checks and inspections are essential. After the completion of test runs of newly installed equipment, we offer our customers maintenance contracts, use of our overhaul service, and replacement to new models with higher energy efficiency.



Periodical Maintenance

A yearly maintenance contract is available, covering visiting inspections, as well as servicing and cooling/heating mode changeover before the start of cooling/heating season. Periodical inspections enable preventive and systematic maintenance, contributing to performance retention and cost reduction.

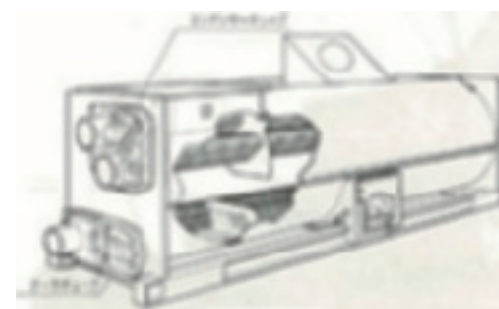
After-Sales Services



Overhaul Maintenance

Overhaul is a physical inspection that opens and disassembles hermetic parts not covered by regular maintenance. Overhaul is a practical preventive maintenance service to provide understanding of the current status of equipment and the appropriate action to ensure reliable operation from now.

Cleaning of Heat Exchanger Tubes



Cleaning evaporator (cooler) and condenser tubes

The adhesion of contaminants to the inner surface of heat exchanger tubes may lower the heat transfer efficiency, resulting in inefficient operation or tube corrosion. To keep the inner surface of the tubes clean, cleaning with a bristle brush is recommended.

By taking into consideration various circumstances, such as clean water passing through the tubes or water treatment to prevent contaminant adhesion or tube corrosion, the suitable timing of cleaning for each facility environment can be determined.

Water treatment for air conditioning use



Chemical control with this equipment contributes to prolonged service life of air conditioning systems as well as improved energy efficiency. Choosing genuine Ebara chemicals most suitable for your heat source system will also contribute to safe operation.