

Sakura Air Conditioner User-friendly, Earth-friendly



Direct-fired Double effect
Absorption Chiller & Heater

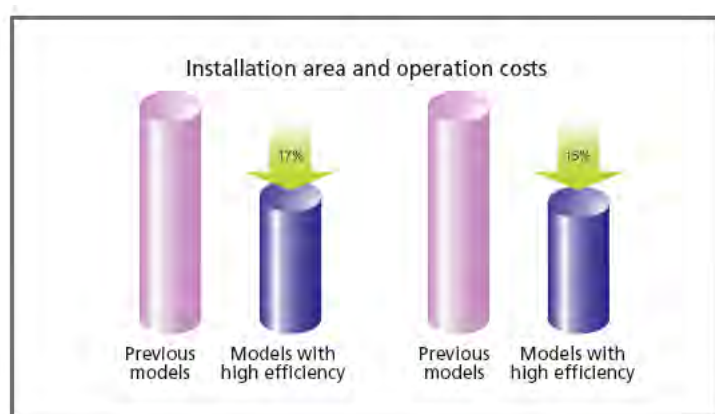
Direct-fired Double Effect Absorption Chiller & Heater

Features

Characteristics of the high efficiency two-stage Direct-fired Absorption Chiller

With the given benefits by the Heat Transfer Tube, the Optimized effect brought by the new Tube arrangement, the newly equipped Heat Exchanger having new Refrigerant Solution to improve the Solution flow, the Unit requires less Area of Installation (17% less), and less weight (10%) compared to the existing model available from the manufacturer. COP is now as high as 1.32 at the Higher Level Efficiency model, and 1.43, one at the world first class, at the Extra High Efficiency model.

1. Comparison of the Installation Area being required

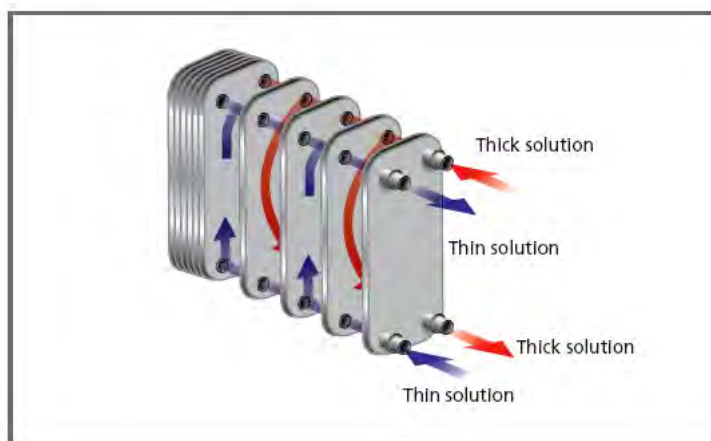


2. The design being adopted to enable such higher Heat Transfer Tube to optimize the function of such Heat Tubes

Specially high performance Heat Transfer Tubes are equipped for respective purpose to work as Absorber, Evaporator, Condenser and Low Temperature Generator of minimal size and the highest performance in each function.

3. High efficiency, high performance Heat Exchanger

The highly efficient, and of high performance as well, BPHE is adopted for both Low Temperature Heat Exchanger and the High Heat Exchanger to enhance the efficiency of the Chilling and Heating units for the respective purpose.



4. Solution flow is improved

To gain a higher efficiency of the unit, Flow of the Solution is much improved by using an Inverter type Solution Pump to increase the partial load factor efficiency.

5. Refrigerant Solution Heat Exchanger

The Refrigerant Solution Heat Exchanger is added to recover the heat from the Refrigerant Drain to reduce the wasting Calorie from the cooling water, thus, to improve the efficiency of the unit.

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High Performance Control Panel in practical use

1. Chilled water is now kept at a Stable Temperature

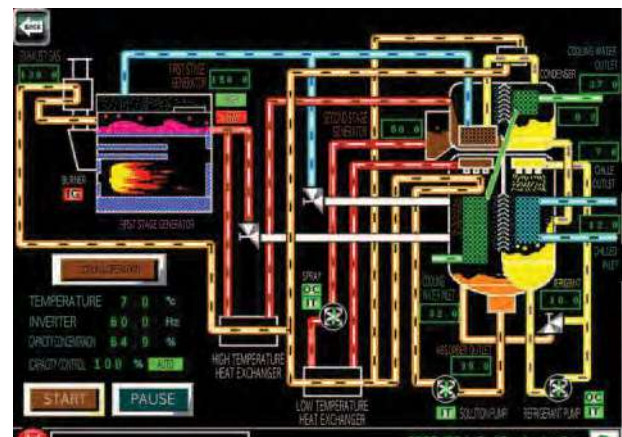
A supplementary system of Compensation-based Control is now added to the existing PI-based Control so as to increase the capacity in responding to the Loading variation to control the incineration volume promptly. The unit is, thus, now possible to respond to the demands of the Air-Conditioning system by maintaining the outlet temperature of the Chilled Water stable even when the load may be fluctuating frequently and severely.

2. The Display is of Colored Touch Screen

Large size Colored Touch Screen clearly indicates Operation Data, Temperature of the Chilled Water and the Cooling Water for much easier reading of the operation status. Any possible inconvenience may come out during the operation, the operator may check with the Operation Manual to actually start inspection to recover the expected normal operation of the unit in short.

3. To Predict and Diagnose troubles

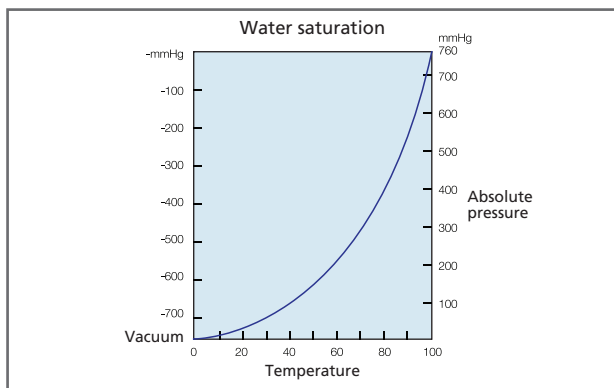
By the predictive function to avoid Over-freezing of the Chilled Water and Crystallization of the Cooling Water, operator may notice such situation before the unit may become critical conditions to keep running. The unit will, thus, indicate the required actions to be taken by the operator to recover from such critical conditions promptly.



Direct-fired Double Effect Absorption Chiller & Heater

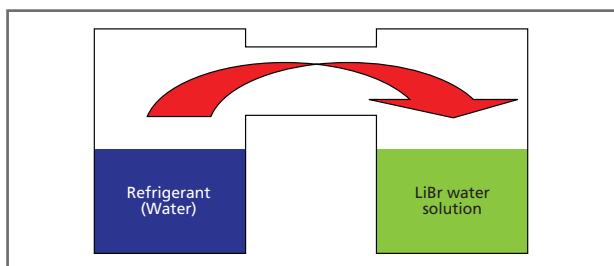
Feature Principle of high efficiency absorption chiller

Water (refrigerant) is vaporized in low temperatures in low pressures.



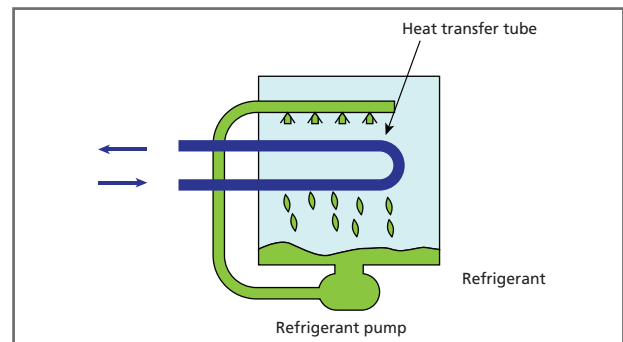
In higher mountains, water is vaporized in temperatures lower than 100°C. In other words, as the pressure of water decreases, water will be vaporized in lower temperatures. The absorption chiller is manufactured by using such principle.

LiBr water solution (the absorbing solution) has the absorption property similar to that of salt.



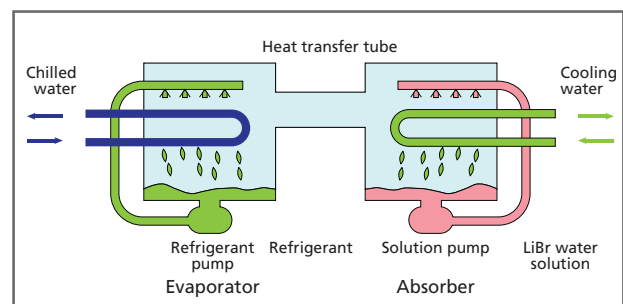
As shown in the picture, when the vessel containing the refrigerant and the vessel containing the LiBr water solution are connected with each other, the vaporized refrigerant is absorbed into the LiBr water solution, allowing the vessel containing the refrigerant to stay in a constant pressure.

1. Vaporization action of the evaporator



As shown in the above picture, the heat transfer tube is installed inside an air-tight container that contains the refrigerant (water), and the chilled water is allowed to flow through the tube and the inside of the container is kept at the vacuum level of 6.5mmHg, then, it is possible for the refrigerant to be vaporized in 5°C and, for the resultant vaporization heat to chill the chilled water inside the heat transfer tube.

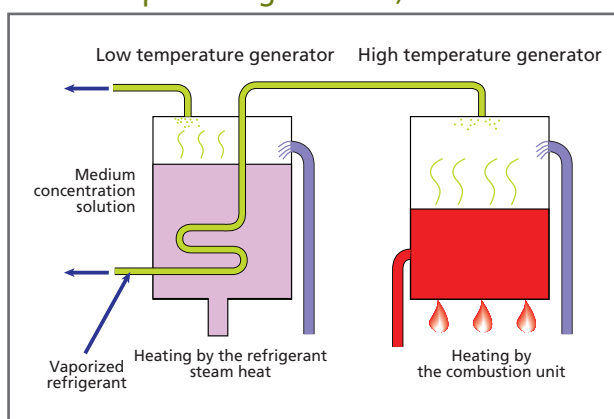
2. Absorption action of the absorber



When vaporization continues in the evaporator, the steam partial pressure goes up gradually, causing the vaporization temperature to increase also. When the container (the absorber) which contains the LiBr water solution is connected to the evaporator, the vaporized refrigerant is absorbed into the LiBr water solution, subsequently allowing the vaporization pressure and temperature to stay at a constant level. In order to remove the absorption heat generated during the absorption of the vaporized refrigerant, the heat transfer tube is installed inside the absorber to allow the cooling water to flow inside it.

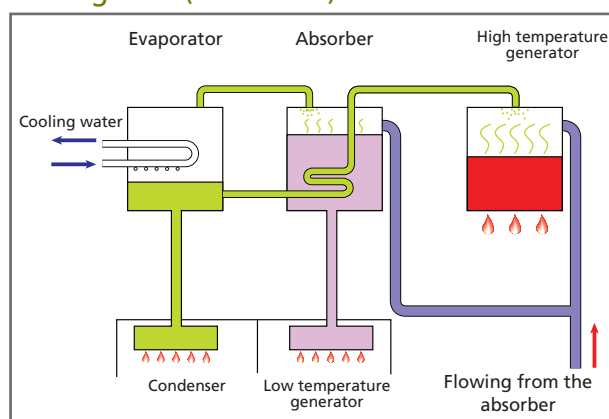
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3. Generation of the thin solution (High and low temperature generators)



When the absorption action continues, the concentration of the LiBr water solution becomes thinner and, subsequently, incapable of absorbing continuously any more. So, it needs to be concentrated as below. The thin solution of the absorber needs to be allowed to flow separately into the high temperature generator and the low temperature generator. The thin solution flowing into the high temperature generator is heated up by the combustion unit, and, as a result of it, generates the high temperature refrigerant steam, and gets concentrated. The high temperature refrigerant steam, generated in the high temperature generator, flows through the heat transfer tube, installed inside the low temperature generator, and heats up and condenses the thin solution that is sent into the low temperature generator. In other words, the low temperature generator plays the role of a condenser for the high temperature refrigerant steam generated in the high temperature generator, and is also heated up by the latent heat of condensation of the high temperature refrigerant steam. Thus concentrated thicker solution goes back to the absorber and continues its absorption action.

4. Condensation action of the vaporized refrigerant (Condenser)



Both the refrigerant steam generated in the low temperature generator and the refrigerant condensed inside the heat transfer tube of the low temperature generator flow into the condenser to be completely chilled and condensed due to the cooling water that flows through the heat transfer tube of the condenser, before going back to the evaporator. The refrigerant solution, thus recovered into the evaporator, is vaporized again to keep the chilling action going on.

Direct-fired Double Effect Absorption Chiller & Heater

Specification High Efficiency Standard

High Efficiency Standard (AR-F-Type)

MODEL(AR-F)		100GE1	120GE1	150GE1	180GE1	210GE1	240GE1	280GE1	320GE1	360GE1	
ITEM(UNIT)											
COOLING CAPACITY	USRT	100	120	150	180	210	240	280	320	360	
	Mcal/h	302	363	454	544	635	726	847	968	1,089	
	kW	352	422	527	633	738	844	985	1,125	1,266	
HEATING CAPACITY	kcal/h	267,000	319,000	400,000	479,000	559,000	639,000	745,000	852,000	958,000	
	kW	310	371	465	557	650	743	866	991	1,114	
COLD/ HOT WATER	INLET/OUTLET TEMPERATURE	℃	12→7 / 55.6→60								
	FLOW RATE	m³/h	60.5	72.6	90.7	109	127	145	169	194	218
	PRESSURE DROP	mAq	4.3	4.3	4.7	4.7	4.7	4.6	4.7	4.4	5.4
	CONNECTION SIZE	A	100				125		150		
COOLING WATER	INLET/OUTLET TEMPERATURE	℃	32→37.2								
	FLOW RATE	m³/h	100	120	150	180	210	240	280	320	360
	PRESSURE DROP	mAq	4.9	4.9	7.2	7.2	6.8	6.8	8.3	8.4	8.6
	CONNECTION SIZE	A	125				150		200		
ELECTRIC SPECIFIC ATIONS	POWER CAPACITY	kVA	11.0		12.0	13.0	14.0		14.5	16.0	19.0
	SOLUTION PUMP	kW	12+12	12+12	15+12	15+12	20+12	20+12	24+15	24+15	32+15
	REFRIGERANT PUMP	kW	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
	VACUUM PUMP	kW	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	BURNER FAN	kW	0.75	0.75	0.75	1.5	1.5	1.8	1.8	3.0	3.0
GAS	COOLING	Nm³/h	24.2	29.1	36.3	43.6	50.9	58.2	67.8	77.5	87.2
	HEATING	Nm³/h	29.8	35.7	44.7	53.6	62.5	71.4	83.3	95.3	107.1
	GASPRESSURE	mmAq	200～4,000						2,000～4,000		
CHIMNEY SIZE	mm	400 x 232		485x290		600 x 290			650 x 348		
EXTERNAL DIMENSION	LENGTH(L)	mm	2884		3844		3860		4881		4923
	WIDTH(W)	mm	2035		2135		2123		2123		2469
	HEIGHT(H)	mm	2,349		2,349		2,545		2,545		2,768
WEIGHT	RIGGING WEIGHT	Ton	4.8	5.1	5.3	6.3	8.1	8.3	9.5	10.1	12.7
	OPERATING WEIGHT	Ton	5.8	6.1	6.4	7.6	9.7	9.9	11.4	12.1	15.2

- NOTE
1. USRT:3024 kcal/h
 2. Fouling factors of chilled water, hot water and cooling water:0.0001m²h°C/kcal
 3. Maximum permissible pressure of water: 0.8mpa (8kg/cm²G)
 4. In cooling, capacity control range:100~25% with standard specification.
 5. Heating value:43.5MJ/Nm³(10,400 kcal/Nm³) high heating value standard
 6. 3 phase, 380V, 60hz is standard
 7. Specifications in this catalogue are subject to change without notice.

Direct-fired Double Effect Absorption Chiller & Heater

High Efficiency Standard (AR-F-Type)

MODEL(AR-F)		400GE1	450GE1	500GE1	560GE1	630GE1	700GE1	800GE1	900GE1	1000GE1	
ITEM(UNIT)											
COOLING CAPACITY	USRT	400	450	500	560	630	700	800	900	1,000	
	Mcal/h	1,210	1,361	1,512	1,693	1,905	2,117	2,419	2,722	3,024	
	kW	1,407	1,582	1,758	1,969	2,215	2,461	2,813	3,165	3,516	
HEATING CAPACITY	kcal/h	1,064,000	1,142,000	1,268,000	1,424,000	1,600,000	1,777,000	2,033,000	2,285,000	2,541,000	
	kW	1,237	1,328	1,474	1,656	1,860	2,066	2,364	2,657	2,955	
COLD/ HOT WATER	INLET/OUTLET TEMPERATURE	℃	12→7 / 55.8→60								
	FLOW RATE	m³/h	242	272	302	339	381	423	484	544	605
	PRESSURE DROP	mAq	5.1	7.0	7.3	4.6	5.5	7.2	4.3	5.6	7.1
	CONNECTION SIZE	A	150	200						250	
COOLING WATER	INLET/OUTLET TEMPERATURE	℃	32→37.2								
	FLOW RATE	m³/h	400	450	500	560	600	700	800	900	1,000
	PRESSURE DROP	mAq	8.7	10.1	10.2	6.4	7.8	9.8	6.0	7.8	9.8
	CONNECTION SIZE	A	200	250		300					350
	POWER CAPACITY	kVA	190	215		325		345			
ELECTRIC SPECIFIC ATIONS	SOLUTION PUMP	kW	32+15	37+15		37+20		55+20		55+22	
	REFRIGERANT PUMP	kW	0.4				1.5				
	VACUUM PUMP	kW	0.4								
	BURNER FAN	kW	30			5.5			7.5		
	GAS	COOLING	Nm³/h	969	109	121.2	135.7	152.7	169.6	193.8	218.1
HEATING		Nm³/h	119.0	127.7	141.8	159.2	178.9	198.6	227.3	255.5	284.1
GAS PRESSURE		mmAq	2,000~4,000								
CHIMNEY	SIZE	mm	650x348	670x406		780x406	820x406	930x406	780x464	820x464	930x464
EXTERNAL DIMENSION	LENGTH(L)	mm	4,923	4,995		6,288	6,813	7,313	6,588	7,088	7,588
	WIDTH(W)	mm	2,469	2,735		2,946			3,360		
	HEIGHT(H)	mm	2,768	2,977		2,940			3,381		
WEIGHT	RIGGING WEIGHT	Ton	131	149	161	221	252	27.6	31.5	35.7	39.2
	OPERATING WEIGHT	Ton	15.7	17.9	19.2	26.5	30.0	33.1	37.8	42.8	47.0

- NOTE
1. USRT:3024 kcal/h
 2. Fouling factors of chilled water, hot water and cooling water:0.0001m²h°C/kcal
 3. Maximum permissible pressure of water: 0.8mpa (8kg/cm²G)
 4. In cooling, capacity control range:100~25% with standard specification.
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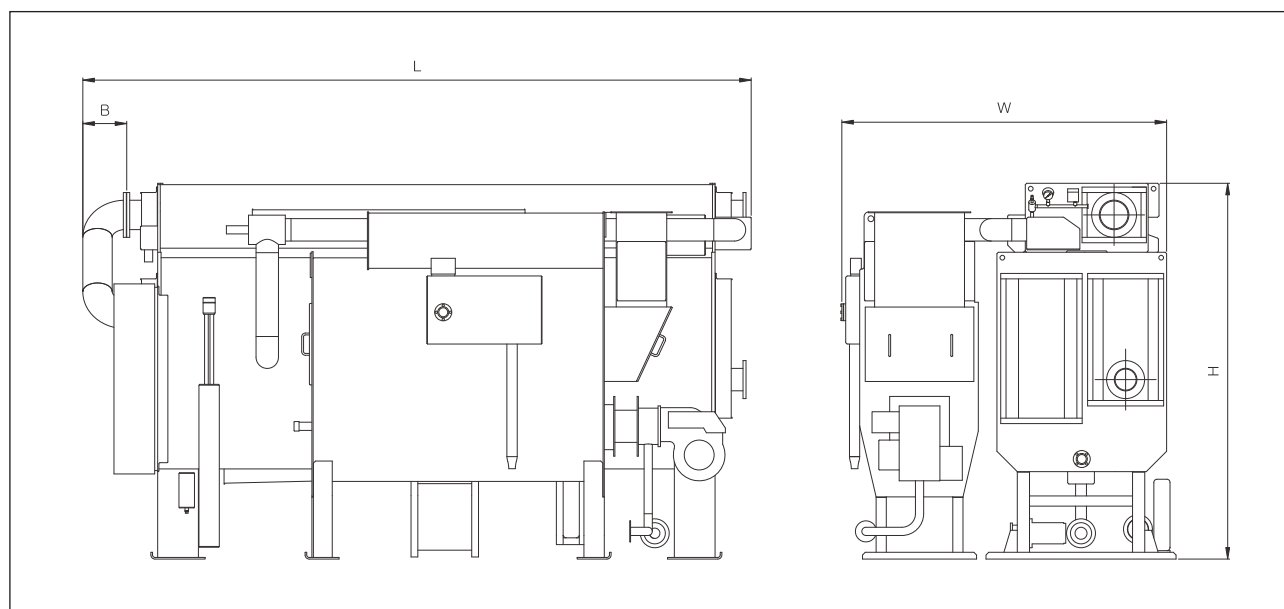
Direct-fired Double Effect Absorption Chiller & Heater

Specification High Efficiency Standard

High Efficiency Standard (AR-F Type) EXTERNAL DIMENSION

MODEL(AR-F)			100GE1	120GE1	150GE1	180GE1	210GE1	240GE1	280GE1	320GE1	360GE1
ITEM(UNIT)											
CONNECTION SIZE	COLD/HOT WATER	A	100				125		150		
	COOLING WATER	A	125				150		200		
	GAS(10,400)*	A	40								
	EXHAUST GAS	mm	400 x 232		485 x 290		600 x 290				650 x 348
EXTERNAL DIMENSION	LENGTH(L)	mm	2,637		3,635		3,613		4,557		4,600
	WIDTH(W)	mm	2,070		2,135		2,123		2,123		2,469
	HEIGHT(H)	mm	2,349		2,349		2,545		2,545		2,768
	BYPASS PIPE(R)	mm	247		209		247		324		323

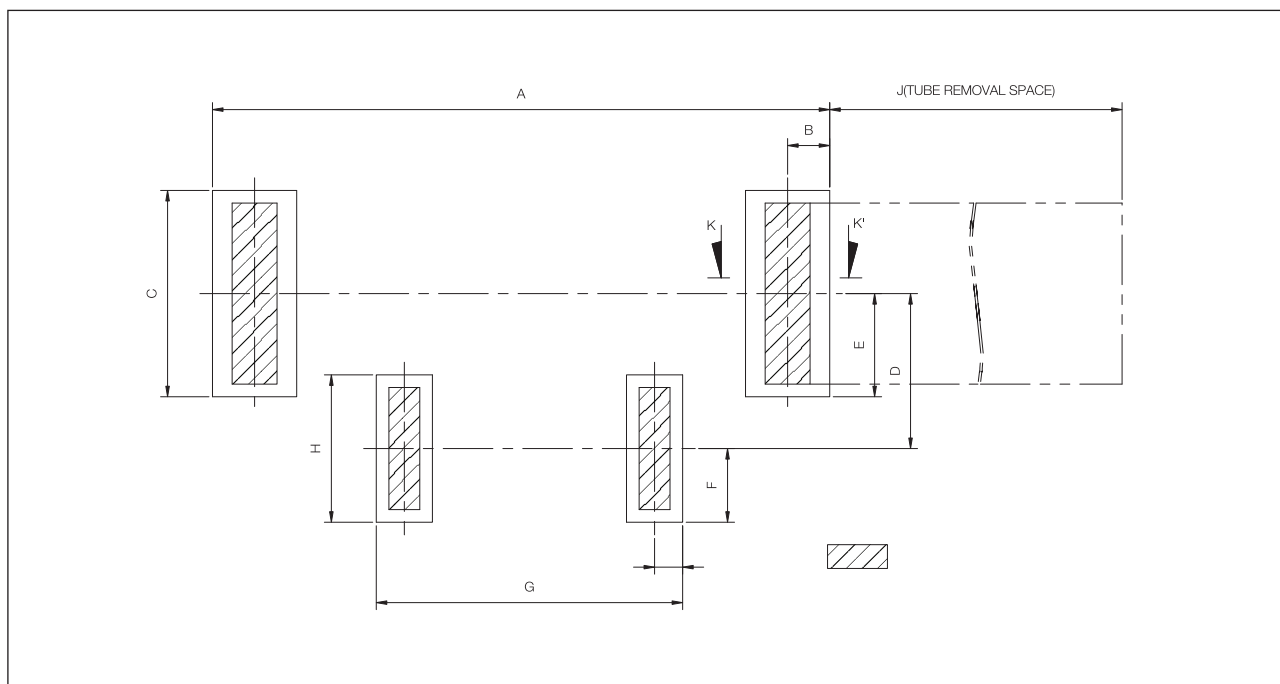
MODEL(AR-F)			400GE1	450GE1	500GE1	560GE1	630GE1	700GE1	800GE1	900GE1	1000GE1
ITEM(UNIT)											
CONNECTION SIZE	COLD/HOT WATER	A	150	200						250	
	COOLING WATER	A	200	250		300					
	GAS(10,400)*	A	40			50					
	EXHAUST GAS	mm	650 x 348	670 x 406		780 x 406	820 x 406	930 x 406	780 x 464	820 x 464	930 x 464
EXTERNAL DIMENSION	LENGTH(L)	mm	4,600	4,596		5,813	6,338	6,923	6,304	6,708	7,265
	WIDTH(W)	mm	2,469	2,735		2,946			3,260		
	HEIGHT(H)	mm	2,768	2,977		2,940			3,376		
	BYPASS PIPE(B)	mm	323	399		475		-	-	-	-



Direct-fired Double Effect Absorption Chiller & Heater

Dimension High Efficiency Standard

HIGH EFFICIENCY STANDARD (AR-F TYPE)

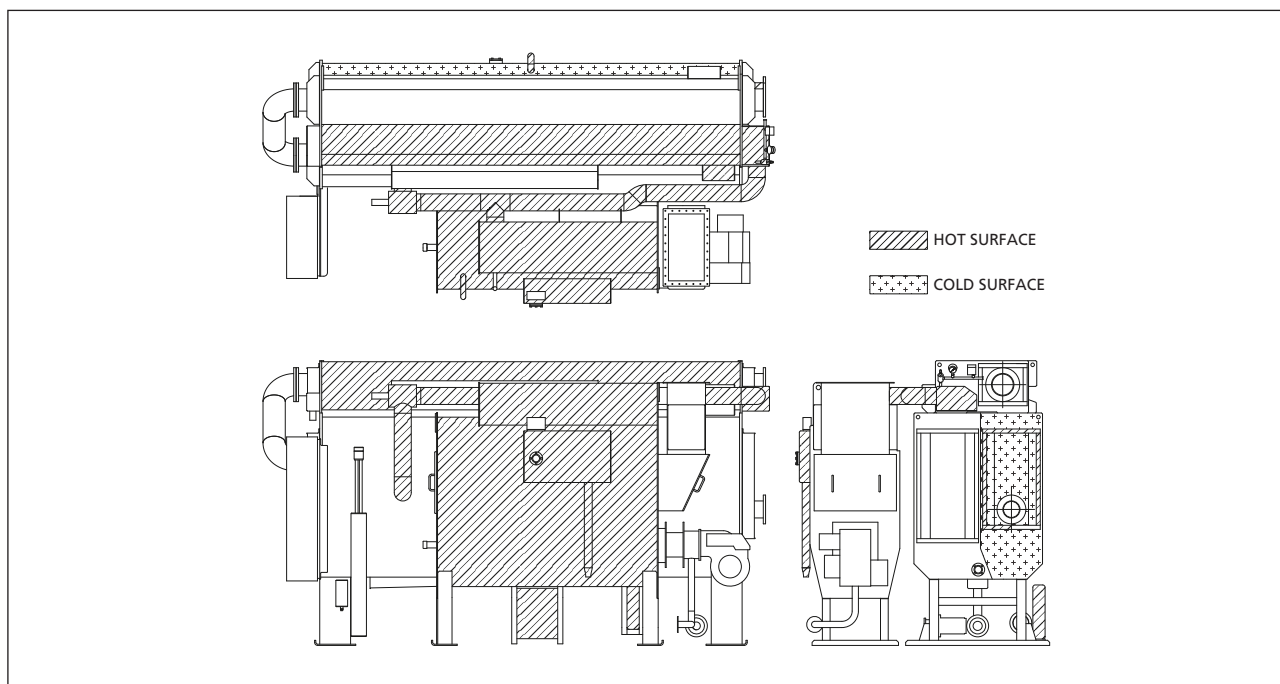


AR-F Type	A	B	C	D	E	F	G	H	I	J
100 GE1	2,366	250	1,340	990	670	450	1,300	900	225	2,200
120GE1	2,366	250	1,340	990	670	450	1,500	900	225	2,200
150GE1	3,386	250	1,340	990	670	450	1,554	900	225	3,200
180GE1	3,386	250	1,340	990	670	450	1,754	900	225	3,200
210GE1	3,386	300	1,420	1,030	710	450	1,804	900	225	3,200
240GE1	3,386	300	1,420	1,030	710	450	2,004	900	225	3,200
280GE1	4,406	300	1,420	1,030	710	450	2,304	900	225	4,100
320GE1	4,406	300	1,420	1,030	710	450	2,556	900	225	4,100
360GE1	4,406	300	1,600	1,104	800	520	2,254	1,040	225	4,100
400GE1	4,406	300	1,600	1,104	800	520	2,454	1,040	225	4,100
450GE1	4,406	300	1,760	1,309	880	600	2,654	1,200	250	4,100
500GE1	4,406	300	1,760	1,309	880	600	2,854	1,200	250	4,100
560GE1	5,446	300	1,840	1,420	920	670	2,514	1,340	250	5,200
630GE1	5,971	300	1,840	1,420	920	670	2,714	1,340	250	5,700
700GE1	6,471	300	1,840	1,420	920	670	2,914	1,340	250	6,200
800GE1	5,446	300	1,920	1,584	960	760	3,000	1,520	300	5,200
900GE1	5,971	300	1,920	1,584	960	760	3,200	1,520	300	5,700
1000GE1	6,471	300	1,920	1,584	960	760	3,400	1,520	300	6,200

Direct-fired Double Effect Absorption Chiller & Heater

Dimension High Efficiency Standard

HIGH EFFICIENCY STANDARD (AR-F TYPE)



1. Hot Surface: Fiberglass or equivalent (50mm)
2. Cold Surface: Fiberglass, polyethylene foam or equivalent (20mm)

REMARKS

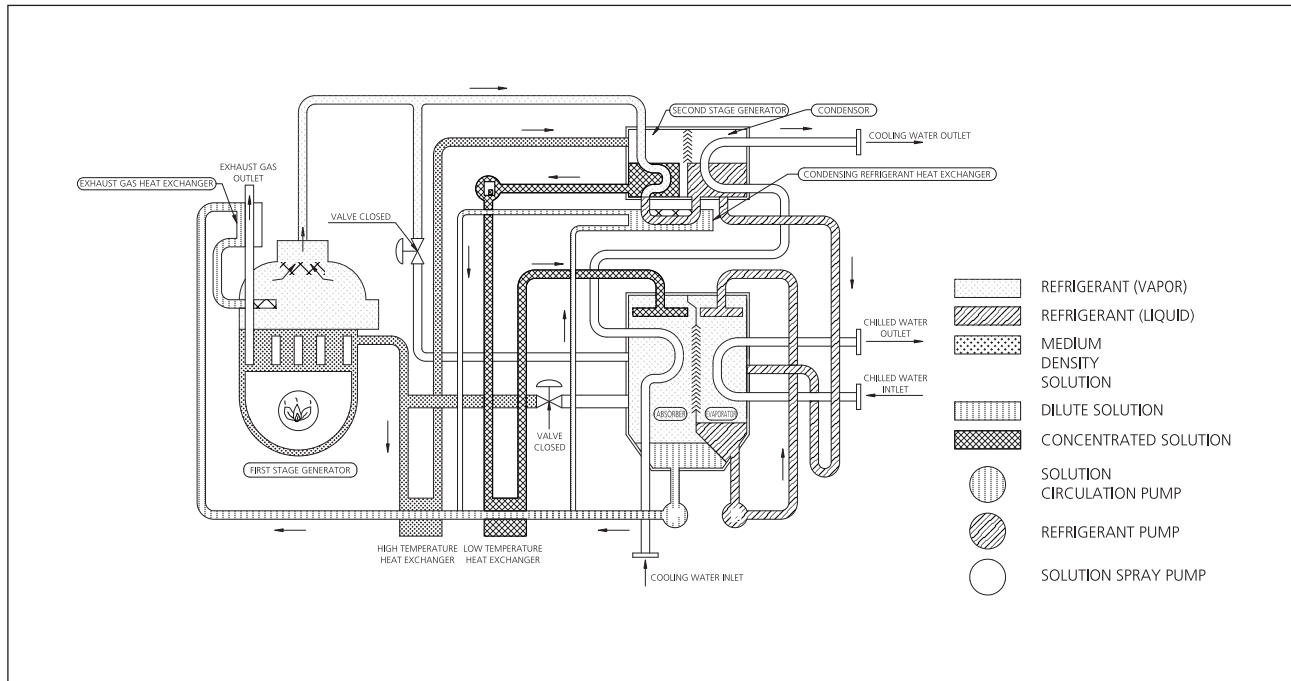
- 1) Do not embed the moving parts (valve handles) in insulation.
Valve handles must be free from insulation.
- 2) Do not embed the sight glass in insulation.
- 3) Do not embed the thermometer and manometer in insulation.
- 4) Do not embed the refrigerant pump motor in insulation.
- 5) When the water box is opened to clean the tubes, do not embed the clamping bolts of the water box.
- 6) Use fiber glass or polyethylene foam for cold insulation. Use fiber glass for hot insulation. (Do not use polyethylene foam for hot insulation)
- 7) Use a bonding agent, iron wires or bands to mount the insulation material. Do not use tapping(welding) and riveting
- 8) Insulation work will be done by others

MODEL	HOT SURFACE(m ²)	COLD SURFACE(m ²)
100GE1	13.6	5.3
120GE1	14.6	5.3
150GE1	16.2	6.7
180GE1	16.7	6.7
210GE1	18.1	7.3
240GE1	18.5	7.3
280GE1	21.9	8.9
320GE1	22.7	8.9
360GE1	23.8	10.4
400GE1	26.2	10.4
450GE1	29.4	11.8
500GE1	30.5	11.8
560GE1	36.4	15.6
630GE1	38.0	16.8
700GE1	41.2	18.0
800GE1	42.8	18.5
900GE1	46.2	20.7
100GE1	49.9	22.2

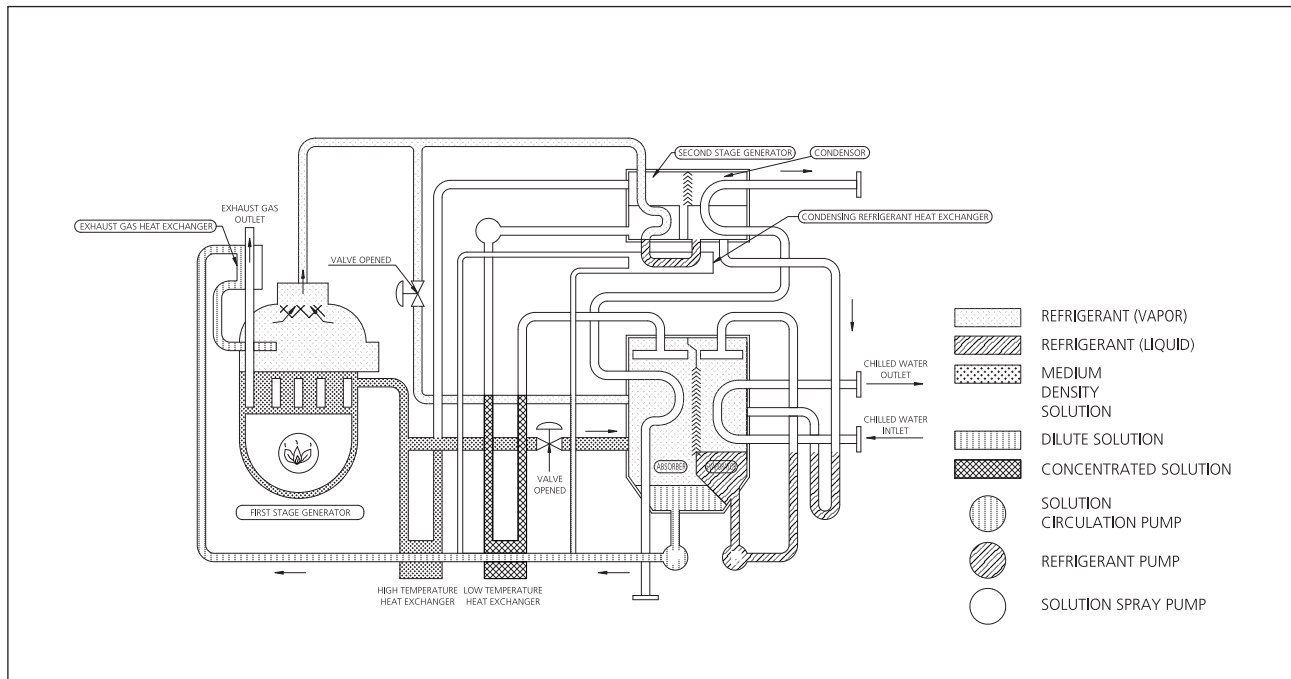
Direct-fired Double Effect Absorption Chiller & Heater

Cycle AR-F 100~1,000GE1

AIR CONDITIONING DISTRIBUTION DIAGRAM



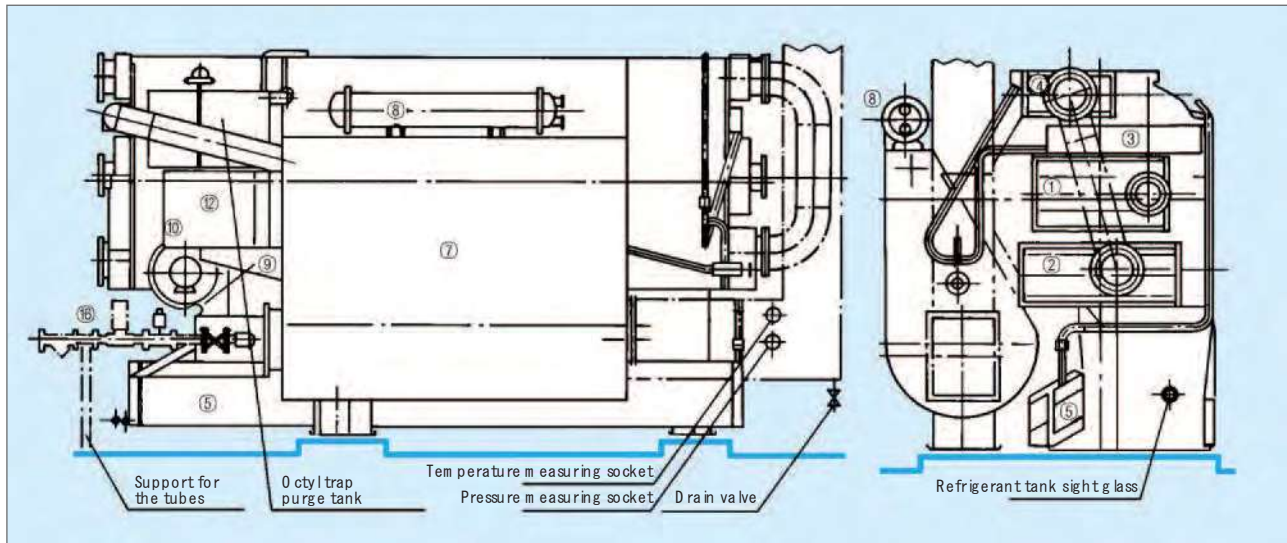
HEATING DISTRIBUTION DIAGRAM



Direct-fired Double Effect Absorption Chiller & Heater

Specifications

Components of the Absorption Chiller



1. Evaporator

Made up by the major components of Evaporator Heat Transfer Tube, Refrigerant Spray unit, Refrigerant Solution Tray, Eliminator and Support plate, the unit evaporates the Refrigerant Solution during its chilling process by taking away a heat from the chilled water flowing inside of the Heat Transfer Tube to provide chilling process. During a heating process, on the contrary, the unit concentrates to send the Refrigerant Steam being generated within the High Temperature Generator toward the Absorber to heat up the hot water inside by using potential heat created from its process of Condensation.

2. Absorber

Refrigerant Steam being generated in the Evaporator shall be absorbed to keep the pressure inside of the Evaporator at a certain level, and for the purpose to maintain the chilling capacity, make the Refrigerant inside of the Evaporator being evaporated satisfactory. The Absorber consists of Heat Transfer Unit, as a path for the water flow inside, Solution Spray unit and the Support Plate.

3. Low Temperature Generator

The unit consists of Heat Transfer Tube, as a path of the cooling water, Support Plate and the Channel for Solution passes. The Solution shall be heats up the Solution inside by using the potential heat of the High Pressure Refrigerant Steam being generated in the High Pressure Generator.

4. Condenser

The unit consists of Heat Transfer Unit, as a pass of Cooling Water, Refrigerant Solution Tray, an Eliminator and a Support Plate. The unit concentrates and sends the Refrigerant Steam being generated respectively either in high, or low, temperature Generator toward the Evaporator.

5. Heat Exchanger

The unit is a Shell and Tube type Heat Exchanger having a specially processed High Efficient Heat Transfer Tube and a Steel Plate for the purpose of High and Low Temperature Heat Exchangers. The unit works as a Heat Exchanger between the Low Temperature thin solution to effective to reduce the relative fuel consumption and to upgrade the efficiency of the Chiller.

6. Refrigerant and Solution Pumps

The unit keeps the Refrigerant and have Solution Pumps with an Airtight Rotor Pump with Low Suction Head. Having no Sealing Section on the Solution Pump, it is perfectly free from any Air Leak.

7. High Temperature Generator

As a Flow Tube plus Solution Tube type Heat Exchanger, the unit has a Cylindrical Outer Wall, a Flue Tube (the Combustion Chamber) and a specially processed Heat Exchanger inside. The unit propels the inside circulation of the Solution in a semi-forced manner to avoid overheating and concentration of such Solution inside.

8. Heat Exchanger for the high-temperature Water (Option)

As the Heat Exchanger can be installed separately, the unit outputs Hot Water (80 °C at the Outlet) using the potential heat of the Refrigerant Steam being generated in the High Temperature Generator .

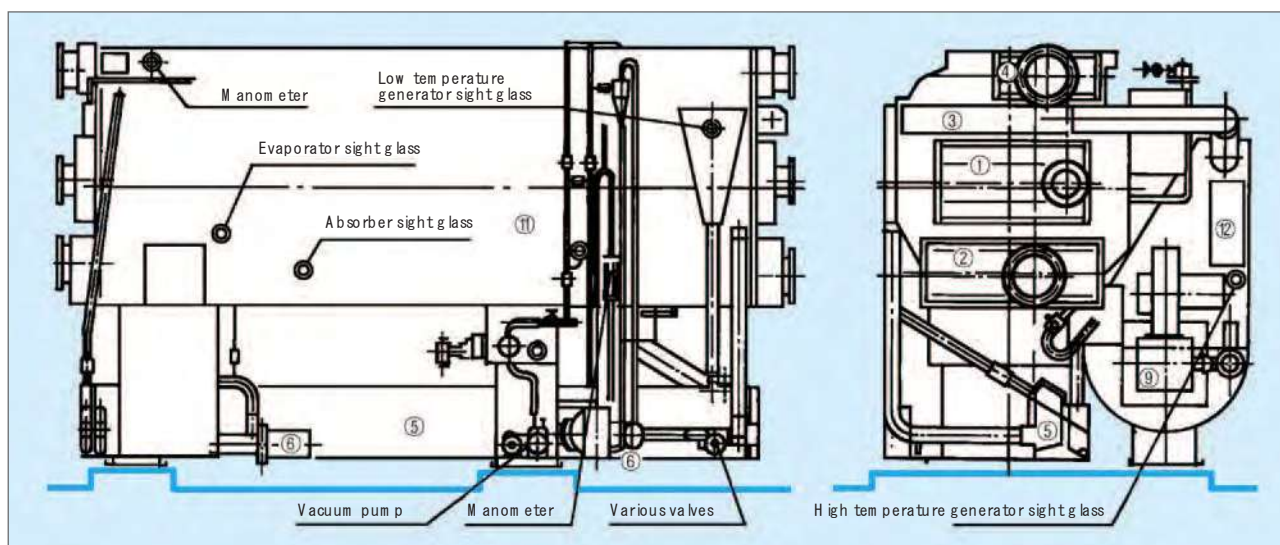
9. Combustion Unit

Having a capability of Heating-up, and Concentrating, the Solution inside the High Temperature Generator, consists of the combustion Blower, the Shut-off Valve, the Flame Detector and other Control Devices inside, the Unit keeps a capability of controlling the volume of Fuel and Combustion Air through the Temperature Controller by detecting a temperature of the Chilled Water at the outlet, during the Chilling Process, as well as the Hot Water at the outlet, during a Heating Process.

10. Automatic Volume Control Unit

The unit has an Electronic Fuel Control Valve, a Proportional Action Temperature Controller and a Thermostat for the purpose of keeping the temperature of Cool and Hot Water at a required level at the outlet.

Direct-fired Double Effect Absorption Chiller & Heater



11. Purging Unit

The unit has a Purge Tank, a Purge Pump, a Check Valve, a Manometer and an Oil Trap to discharge the Non-condensable Gases and Air, to outside so as to keep the inside of the unit vacuum.

12. Control Panel

To protect the unit from possible down time, the unit is equipped with a Control Panel to indicate an Alarm to stop the system for the delicate works both for Heating and Cooling functions. The system includes Display Unit of the Control Panel (indicates signals of start, stop, various pump operation modes), Indication Lamps, Alarm Devices, Protective Devices, Instruments and various Electronic Parts.

13. Protection units for High Temperature Generator

To protect the unit of the High Temperature Generator, the unit has several switches applicable for the purposes such as Solution Level Lowering, Solution Temperature Control and Pressure Control to detect such malfunctions as Level Lowering due to a raise of Solution Temperature and else to indicate an Alarm for protection purpose. When such Indication Light shall be lit, the operator has to take appropriate action to prevent any further accident like unnecessary Combustion.

14. Freezing –prevention Units for Chilled Water, and Refrigerant

The unit has a Sensor for Refrigerant temperature down, a Shut-off Switch for Chilled Water, a Sensor for Automatic Stop/Start. The unit, thus, automatically stop the Machine to start sounding Alarm and to turn on the Indication Lamp accordingly, in case a temperature of the Chilled Water goes down, or a temperature of the Refrigerant goes down.

15. Preventive unit for Solution Crystallization

In case a Solution Temperature, in the High Temperature Generator goes up above the set level, a switch shall be activated to prevent the Solution from being crystallized. Further, a Sensor to detect any dilution on the Solution occurs to activate the Solution Pump to carry out diluting till the Solution Temperature does down below the set value so that the Solution shall not be frozen being affected by the surrounding temperature.

16. Combustion Safety units

As the Flame Detector works to stop fueling, the burning in the Combustion Unit shall be stopped by closing the Safety Shut-off Valve and the Pilot Solenoid Valve. If the Fuel Pressure goes down (or up) an abnormal level, the Switch of either Pressure Lower, or Upper, Limit shall stop the Machine to run, to activate the Alarm and the Indication Lamp. In case the Discharge Pressure of the Wind Blower shall be lowered, the Wind Pressure Switch shall be activated to stop the Combustion inside, and control the operation of the Wind Blower to secure the level of safe Combustion by carrying out the Purging, before and after the Ignition, to enable to secure the Safe Combustion by the unit.

17. Other Safety Devices and Equipments of the Unit

- Temperature Switches for the Solution and Refrigerant Pump Motors
- Electric Over-current Relays for the Solution and Refrigerant Pump Motors
- Over-current Relays for the Wind Blower Motor
- Interlock Contacts for the Cool (Hot) Water and Refrigerant Pumps
- Oil Pressure Lowering Switch (to be attached only for Oil)
- Over-current Relays for the Fuel Spray Pump Motor (to be attached only for Oil)
- Protective Relay
- Sight Glass
- Manometer
- Inspection Window
- Temperature Gauge
- Various Valves
- Safety Valves

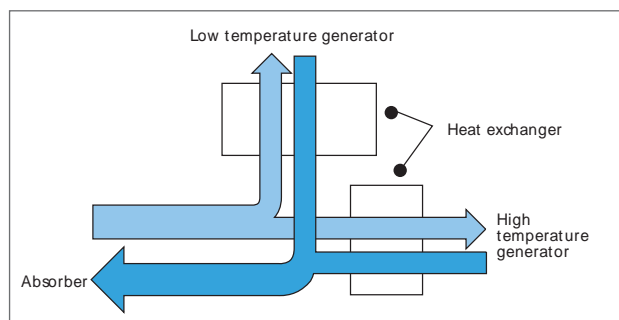
Direct-fired Double Effect Absorption Chiller & Heater

Features

Characteristics of the Absorption chiller

Sakura Chilling and Heating unit proudly has a Special Features of perfect protective function and an Automatic Volume Control on it.

1. Less fuel consumption

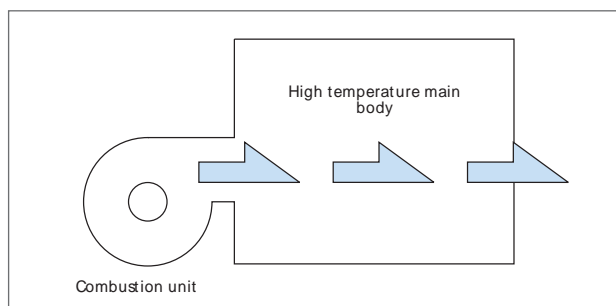


The parallel flow, per the above drawing, is for the highest Energy Saving and most effective to prevent Crystallization of the Solution.
By the patented Parallel Flow system, the Solution is divided, and sent, into two separated generators by pressure, is much effective to reduce the volume of the Solution, being kept in the Heat Exchanger, by almost 1/2, a considerable energy saving, and leave much space for other functions to design. In addition, it enables not to worry about its De-crystallization of it, as its possible Concentration of the Absorber at the inlet shall be much lower.

*Fuel consumption

Gas: 11,000Kcal/Nm³: 0.272Nm³/h•RT
12,000Kcal/Nm³: 0.249Nm³/h•RT
15,000Kcal/Nm³: 0.199Nm³/h•RT

2. Safe Structure of the High Temperature Generator



The High Temperature Generator is structured as a system of straight-lined wall chilling by the Solution. The unit, thus, requires no change in the direction of the Combustion Gas to avoid any possible damage to be caused by the non-combustion gas remaining inside of the unit during the operation.

3. Preventive Device for Crystallization of the Solution adopted

A preventive device for Crystallization of the Solution to be increased inside of the unit is adopted. To keep the Solution at lower risk of its Crystallization, a unique system being equipped inside of the unit shall start working automatically even at a lower temperature.

4. Various protective Devices to assure Safe Operation

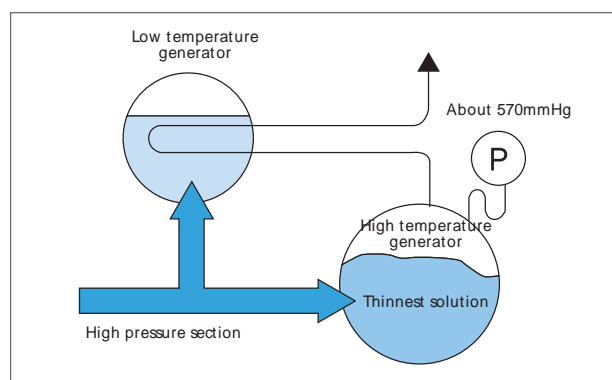
The unit is equipped with various protective devices, such as Shut-off Switch for the Chilled Water, Detective devices for Over-freezing of the Refrigerant, Solution heat-up, High Temperature Generator heat-up, too low level of the Solution, any error in the Dilution Control, Automatic Start and Stop, Combustion Safety, Fuel System and relative Pumps, to avoid any down time of the whole unit.

5. To be operated satisfactory in Wider Scope of condition

An Automatic Level Control device is equipped to run the unit satisfactory under a wider range of different temperature conditions. The device may cope with the lower level of the Refrigerant Solution volume, when its Concentration became thinner by a lowered temperature inside the unit, and lowered volume of the Refrigerant Solution to possibly cause cavitation in the Refrigerant Pump.

6. Easy to operate, requiring no qualification to run the unit

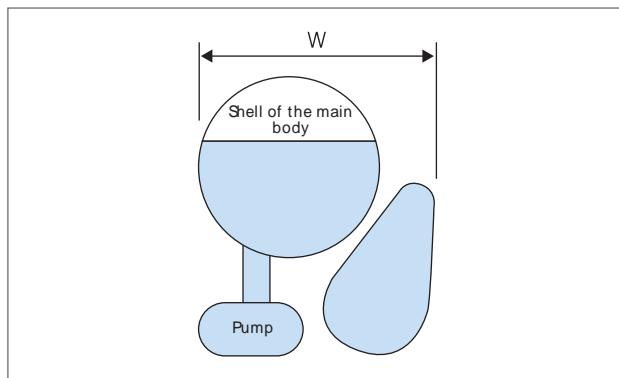
As the system is not classified to a Boiler, it is not required to be operated by any required person holding certificate (or a license) as the a pressure during the operation does not exceed the general atmospheric level, but as high as only 570mmHg. The pressure inside of the High Temperature Generator is determined by the Concentration degree of the Absorption Solution inside of the Low Temperature Generator. Based on the "Serial Flow" theory, the unit can be structured in a way to make the Pressure inside the High Temperature Generator lower than the Atmospheric Pressure, as the thinnest Solution is transferred to the Lower Temperature Generator. Based on such principle, this system is not handled as a Boiler so as not to require any qualification for the operator of the machine. Without any exception, thus, when the High Pressure Switch of the High Temperature Generator activated, everybody may operate the unit satisfactory.



Direct-fired Double Effect Absorption Chiller & Heater

7. Compact, Light-weight

Each unit is packed, when supplied, is securely air-tightened, none of air leak from the package should occur. The unit can, thus, be installed within a limited floor space. In the "Serial Flow" system, no need to arrange for the Solution from the Higher Temperature Generator toward the Lower Temperature Generator. The Higher Temperature Generator, thus, can be installed at the inclined bottom part on the Shell of the main body to require only narrower width for installation.



As the system shall be supplied within a single unit package, exactly in the same conditions as the Air-tightness Test performed in the factory before delivery, to require only small floor space is required to install at each location.

8. Shorter time for both Starting the unit, and Dilution as well

Thanks to the newly applied "Serial Flow" system, the volume of Solution, and the Thermal Capacity of the High Temperature Generator is small. The required Starting time, thus, has become shorter and the required time for Dilution is now shorter.

9. Wider range of operation

With the abundant Refrigerant volume, the system can be operated without reducing the volume of Solution Circulation responding to the respective loading conditions being required to each purpose of the operation. The unit, thus, can be flexibly operated by changing the Density and the Temperature of the Solution for each application.

10. Automatic Volume Control

By the Electronic Fuel Control Valve and the Proportional Temperature Controller equipped, the unit provides a significant control over the Cool and Hot Water at the outlet responding to the loading variation.

11. A Special Spray Nozzle is adopted

To prevent any possible Blockage in the Nozzle, and Corrosion in the Heat Transfer Tube, a Special Spray Nozzle is equipped so as to make it possible to spray the Refrigerant and the Solution evenly, without any leaning from the required specific direction.

12. The most updated Purge Unit

The Automatic Purging Unit will continuously keep the Internal Vacuum at the required level and strengthen the Chilling Efficiency

13. A Harmless Corrosion Inhibitor used

The unit provides only Lithium Nitrate as a Corrosion Inhibitor, absolutely harmless to the human body, to assure safe operation, as well as safe Repair Works, just in case it may be needed

14. Repair Valves are attached to all models

To enable the users may Disassemble, Inspect or Replace the pumps whenever required, without pouring out the Solution and the Refrigerant inside, Repair Valves are attached at the Inlets and Outlets of the Refrigerant and the Solution Pumps.

15. COM-control-based Automatic Control Panel, suitable for the Intelligent Buildings

The Control Panel, by DDC (Direct Digital Control) system using the 16-bit Micro Processor, is installed at the front of the Chiller. Whole operating, and controlling, status may be displayed in the back-light embedded LCD so that the operator may work by the sites. Through the Site Control Panel, DAK-007, the operator may recognize such data as the Temperature of the Chilled Water and Refrigerant, of the Solution Dilution, of the Chilled Water at the Outlet, the Status of the Valve Opening, the Operation Time, the Accumulated Count of Starts & Stops, the Status of Monitoring Contacts and the Status various Alarms, being displayed automatically one by one in a circular with a fixed intervals.

As the Control Unit communicates with the Computer for the parameters of respective Set Values, Schedules and so on to generate the warning (alarm) so as to enable the operator may alter such initial registration. Such diversified operative functions as to operate the unit by the Control Panel, or Remote Operation to allow an operator to do Remote Surveillance to control, and the Scheduled Operation by allowing an Automatic Operation per daily, weekly, or yearly (even up to some years). A Password to carry out the operation of the unit safely only by an Authorized Person to prevent any critical impact on the operation of the Chiller unit can be registered.

Direct-fired Double Effect Absorption Chiller & Heater

Specification Components of the Absorption chiller

AR-F 40~100G3 Type

ITEM(UNIT)		MODEL(AR-F)	40G3	50G3	60G3	70G3	80G3	90G3	100G3
COOLING CAPACITY		USRT	40	50	60	70	80	90	100
HEATING CAPACITY		kcal/h	110,400	138,000	165,600	193,200	220,800	248,400	276,000
CHILLED AND HOT WATER SYSTEM	CHILLED INLET/OUTLET TEMPERATURE	°C	INLET : 12°C, OUTLET : 7°C						
	HOT INLET/OUTLET TEMPERATURE	°C	INLET: 55.4°C, OUTLET : 60°C						
	FLOW RATE	m³/h	24	30	36	42	48	54	60
	PRESSURE DROP	mAq	6.0	6.5	7.9	4.9	4.1	7.3	5.8
	CONNECTION SIZE	A	65	65	65	80	80	100	100
COOLING WATER	INLET/OUTLET TEMPERATURE	°C	INLET : 32°C, OUTLET : 37°C						
	FLOW RATE	m³/h	45.6	57	68.4	79.8	91.2	102.6	114
	PRESSURE DROP	mAq	11.5	14	15	7.8	7.8	6.4	7.9
	CONNECTION SIZE	A	100	100	100	100	100	125	125
FUEL	REQUIRED GAS PRESSURE		200~4,000						
	GAS CONSUMPTION RATE	HIGH HEATING VALUE 11,000kcal/Nm³	Nm³/h	11.6	14.5	17.4	20.3	23.2	26.1
		HIGH HEATING VALUE 15,000kcal/Nm³	Nm³/h	8.5	10.6	12.8	14.9	17.0	19.1
	OIL CONSUMPTION RATE		kg/h	12.2	13.9	16.7	19.5	22.3	25.1
	GAS CONNECTION SIZE(OIL CONNECTION SIZE)		A	25(10)			40(10)		
	EXHAUST GAS CONNECTION SIZE		mm	394 × 420	394 × 420	394 × 420	470 × 520	470 × 520	470 × 520
ELECTRIC SPECIFICATIONS	POWER CAPACITY		kVA	4.9	4.9	4.9	7.5	7.5	7.5
	SOLUTION PUMP		kW	0.75	0.75	0.75	1.1+0.4	1.1+0.4	1.1+0.4
	REFRIGERANT PUMP		kW	0.2	0.2	0.2	0.4	0.4	0.4
	BURNER FAN		kW	0.4	0.4	0.4	0.75	0.75	0.75
	VACUUM PUMP		kW	0.4	0.4	0.4	0.4	0.4	0.4
	CONSUMPTION RATE		kW	3.3	3.3	3.3	5.5	5.5	5.5
CAPACITY CONTROL		-	FULLY AUTOMATIC, ON/OFF			FULLY AUTOMATIC, PROPORTIONAL CONTROL			
WEIGHT	OPERATING WEIGHT	Ton	3.1	3.2	3.4	4.6	4.7	4.7	4.7
	RIGGING WEIGHT	Ton	3.0	3.1	3.3	4.4	4.5	4.5	4.5
EXTERNAL DIMENSION	LENGTH(L)	mm	2,158	2,158	2,158	2,900	2,900	2,900	2,900
	WIDTH(W)	mm	1,592	1,592	1,592	1,835	1,835	1,835	1,835
	HEIGHT(H)	mm	1,872	1,872	1,872	2,046	2,046	2,046	2,046

- NOTE
1. USRT:3024kcal/h
 2. Maximum permissible pressure of water circuit(AR-F40~60G3):5kg/cm²G
Maximum permissible pressure of water circuit(AR-F70~100G3):8kg/cm²G
 3. Fouling factors of chilled water, Hot water and cooling water:0.0001m²h°C/kcal
 4. Oil data is based on kerosene with lower heating value of 10,400 kcal/kg
 5. Specifications in this catalogue are subject to change without notice
 6. 3phase, 380V, 60Hz or 220V 60Hz is standard, Different specifications could be satisfied at request.

Direct-fired Double Effect Absorption Chiller & Heater

AR-F 125~400G4 Type

ITEM(UNIT)		MODEL(AR-F)	125G4	150G4	180G4	210G4	240G4	280G4	320G4	360G4	400G4
COOLING CAPACITY		USRT	125	150	180	210	240	280	320	360	400
HEATING CAPACITY		kcal/h	378,000	453,600	544,320	653,040	725,760	846,720	967,680	1,088,640	1,209,600
COLD WATER	TEMPERATURE	°C	INLET:12 OUTLET:7								
	FLOW RATE	m³/h	75.6	90.7	108.9	127.0	145.2	169.3	193.5	217.7	241.9
	PRESSURE DROP	mAq	5.4	3.8	5.1	9.2	12.0	6.3	8.3	3.6	4.5
	CONNECTION SIZE	A	100	100	125	125	125	150	150	150	150
	NO. OF PASSES	-	EVEN	ODD	ODD	ODD	ODD	ODD	ODD	EVEN	EVEN
COOLING WATER	TEMPERATURE	°C	INLET:32 OUTLET:37.4								
	FLOW RATE	m³/h	130.0	156.0	187.2	218.4	249.6	291.2	332.8	374.4	416.0
	PRESSURE DROP	mAq	7.1	5.7	8.9	6.3	8.2	3.6	4.7	6.7	8.3
	CONNECTION SIZE	A	125	125	150	150	150	200	200	200	200
	NO. OF PASSES	-	ODD	EVEN	EVEN	ODD	ODD	ODD	ODD	ODD	ODD
HOT WATER	TEMPERATURE	°C	INLET:55 OUTLET:60								
	FLOW RATE	m³/h	75.6	90.7	108.9	127.0	145.2	169.3	193.5	217.7	241.9
	PRESSURE DROP	mAq	5.4	3.8	5.1	9.2	12.0	6.3	8.3	3.6	4.5
	CONNECTION SIZE	A	100	100	125	125	125	150	150	150	150
	NO. OF PASSES	-	EVEN	ODD	ODD	ODD	ODD	ODD	ODD	EVEN	EVEN
GAS POWER CAPACITY(3Ø380V,60Hz)		kVA	11.2	11.2	14.0	14.0	14.0	18.5	18.5	18.5	18.5
GAS AND OIL POWER CAPACITY(3Ø,380V,60Hz)		kVA	12.0	13.8	13.8	14.5	14.5	14.5	18.5	18.5	18.5
ELECTRICAL CAPACITY	SOLUTION PUMP	kW	2.2 + 1.5	2.2 + 1.5	3.7 + 1.5	3.7 + 1.5	3.7 + 1.5	4.5 + 2.2	4.5 + 2.2	4.5 + 2.2	4.5 + 2.2
	REFRIGERANT PUMP	kW	0.4	0.4	0.4	0.8	0.8	0.8	0.8	0.8	0.8
	BURNER FAN	kW	0.75	0.75	1.5	1.5	1.5	2.2	2.2	2.2	2.2
	VACUUM PUMP	kW	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	FUEL PUMP	kW	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
GAS	GAS CONSUMPTION RATE(Nm³/h)	COOL	-	36.3	43.6	52.3	61.1	69.8	81.4	93.0	104.7
		HOT	-	42.8	51.3	61.6	71.8	82.1	95.8	109.5	123.1
	CONNECTION SIZE	A	40	40	50	50	50	40	40	40	40
	GAS PRESSURE	mmAq	200~4,000						500~4,000		
	EXHAUST GAS CONNECTION	mm	470 ~ 520			480 ~ 530			600 ~ 600		
OIL	OPERATING WEIGHT	Ton	5.7	6.3	8.1	8.1	8.1	10.7	10.7	12.4	12.4
	COSUMPTION RATE	kg/h	32.5(37.8)	39(45.4)	46.8(54.4)	54.6(63.5)	62.4(72.6)	72.8(84.7)	83.2(96.8)	93.6(108.9)	104(121)
	DIESEL CONSUMPTION	kg/h	33.1(38.6)	39.7(46.3)	47.7(55.5)	55.6(64.8)	63.6(74)	74.1(86.4)	84.7(98.7)	95.3(111)	105.9(123.4)
	CONNECTION SIZE	A	10	10	15	15	15	15	15	15	15
	EXHAUST GAS CONNECTION	mm	470 × 520			480 × 530			600 × 600		
EXTERNAL DIMENSION	OPERATING WEIGHT	Ton	5.7	6.3	6.9	8.1	8.1	10.7	10.7	12.4	12.4
	LENGTH(L)	mm	3,039	3,121	3,484	3,946	3,946	4,071	4,071	4,641	4,641
	WIDTH(W)	mm	1,679	1,679	1,679	1,765	1,765	1,960	1,960	2,062	2,062
	HEIGHT(H)	mm	2,031	2,031	2,031	2,061	2,061	2,454	2,454	2,454	2,454
INSTALLMENT SIZE		m²	5.1	5.2	5.8	7.0	7.0	8.0	8.0	9.6	9.6
HEAT PIPE SIZE		mm	1,800	2,200	2,500	3,000	3,000	2,980	2,980	3,580	3,580

- NOTE
1. USRT:3024kcal/h
 2. Maximum permissible pressure of water circuit(AR-F40~60G30:5kg/cm²G)
Maximum permissible pressure of water circuit(AR-F70~100G³):8kg/cm²G
 3. Fouling factors of chilled water, Hot water and cooling water:0.0001m²h°C/kcal
 4. Oil data is based on kerosene with lower heating value of 10,400 kcal/kg
 5. Specifications in this catalogue are subject to change without notice
 6. 3phase, 380V, 60Hz or 220V 60Hz is standard. Different specifications could be satisfied at request.

Direct-fired Double Effect Absorption Chiller & Heater

Specification

AR-F 450~1500G5 Type

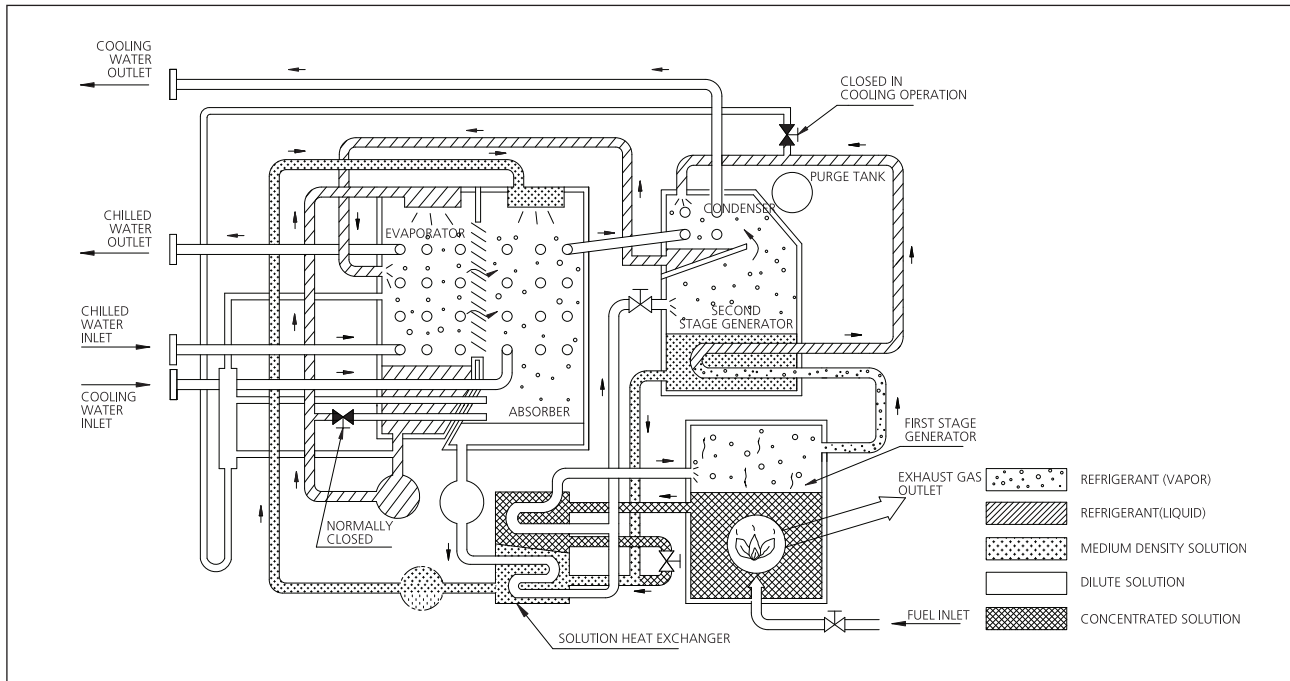
MODEL(AR-F)		ITEM(UNIT)	450G5	500G5	560G5	630G5	700G5	800G5	900G5	1000G5	1200G5	1500G5	
COOLING CAPACITY		USRT	450	500	560	630	700	800	900	1,000	1,200	1,500	
HEATING CAPACITY		kcal/h	1,138,500	1,265,000	1,416,800	1,593,900	1,771,000	2,032,800	2,284,800	2,541,000	3,049,200	3,809,400	
COLD WATER	TEMPERATURE	℃	INLET:12 OUTLET:7										
	FLOW RATE	m³/h	272	302	339	381	423	484	544	605	726	907	
	PRESSURE DROP	mAq	6.6	6.6	4.9	5.5	7.2	6.5	10.4	13.2	8.0	10.0	
	CONNECTION SIZE	A	200					250			300		
	NO. OF PASSES	-	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	
COOLING WATER	TEMPERATURE	℃	INLET:32 OUTLET:37.5										
	FLOW RATE	m³/h	450	500	560	630	700	800	900	1,000	1,200	1,500	
	PRESSURE DROP	mAq	8.1	8.7	4.9	6.8	9.1	13.4	17.0	21.0	12.0	15.0	
	CONNECTION SIZE	A	250		300			350			400		
	NO. OF PASSES	-	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	EVEN	EVEN	
HOT WATER	TEMPERATURE	℃	INLET:55.8 OUTLET:60										
	FLOW RATE	m³/h	272	302	339	381	423	484	544	605	726	907	
	PRESSURE DROP	mAq	6.6	6.6	4.9	5.5	7.2	6.5	10.4	13.2	8.0	10.0	
	CONNECTION SIZE	A	200					250			300		
	NO. OF PASSES	-	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	
GAS POWER CAPACITY(3Ø380V,60Hz)		kVA	21.6	21.6	29.9	29.9	29.9	29.9	29.9	35.1	46.5	52.6	
ELECTRICAL CAPACITY	SOLUTION PUMP	kVA	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	13.0	13.0	
	REFRIGERANT PUMP	kW	0.4	0.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
	BURNER FAN	kW	3.0	3.0	5.5	5.5	5.5	7.5	7.5	11.0	15	18.5	
	VACUUM PUMP	kW	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.75	0.75	
	GAS CONSUMPTION()		COOL	-	129.6	143.9	161.2	181.4	201.5	230.3	259.1	287.9	345.5
GAS	Nm³/h		HOT	-	129.6	143.9	161.2	181.4	201.5	230.3	259.1	287.9	345.5
	CONNECTION SIZE		A	40		50			65				
	GAS PRESSURE		mmAq	4,000									
	EXHAUST GAS CONNECTION		mm	315 x 416		350 x 506			402 x 626			900 x 400	
	EXTERNAL DIMENSION	LENGTH(L)		mm	4,993		5,895	5,735	6,544	6,660	6,729	7,139	7,150
WIDTH(W)		mm	2,440		2,940		2,912	3,330	3,449		4,380	4,690	
HEIGHT(H)		mm	2,926		3,122			3,437	3,437		3,750	3,800	
RIGGING WEIGHT		Ton	11.6	12.5	15.1	17.6	18.9	29.5	32.6	35.6	43.5	52.8	
OPERATING WEIGHT		Ton	14.7	15.6	20.8	24.5	26.1	36.5	37.5	39.6	48.5	59.0	
HEAT PIPE SIZE		mm	4,000		4,000	4,500	4,850	4,500	5,000	5,500	6,200	6,700	

- NOTE
1. USRT:3024kcal/h
 2. Maximum permissible pressure of water circuit(AR-F40~60G30):5kg/cm²G
Maximum permissible pressure of water circuit(AR-F70~100G3):8kg/cm²G
 3. Fouling factors of chilled water, Hot water and cooling water:0.0001m²h°C/kcal
 4. Oil data is based on kerosene with lower heating value of 10,400 kcal/kg
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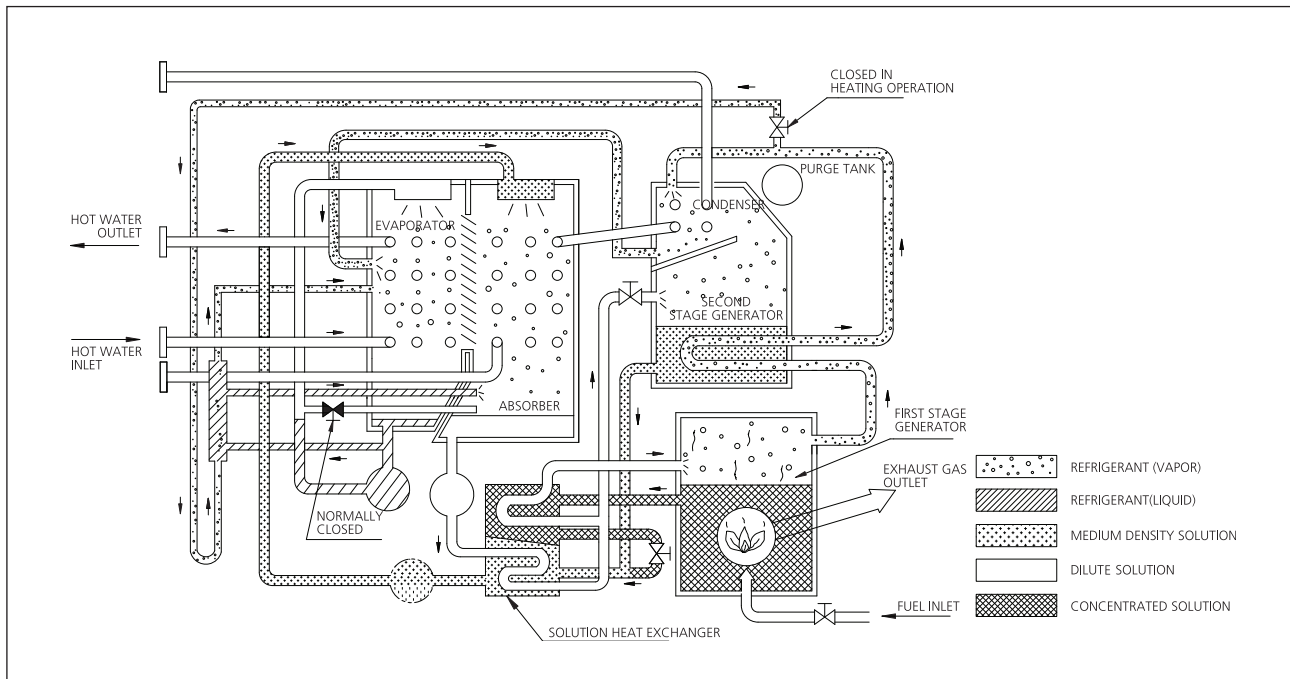
Direct-fired Double Effect Absorption Chiller & Heater

Cycle AR-F 40~100G3

AIR CONDITIONING DISTRIBUTION DIAGRAM



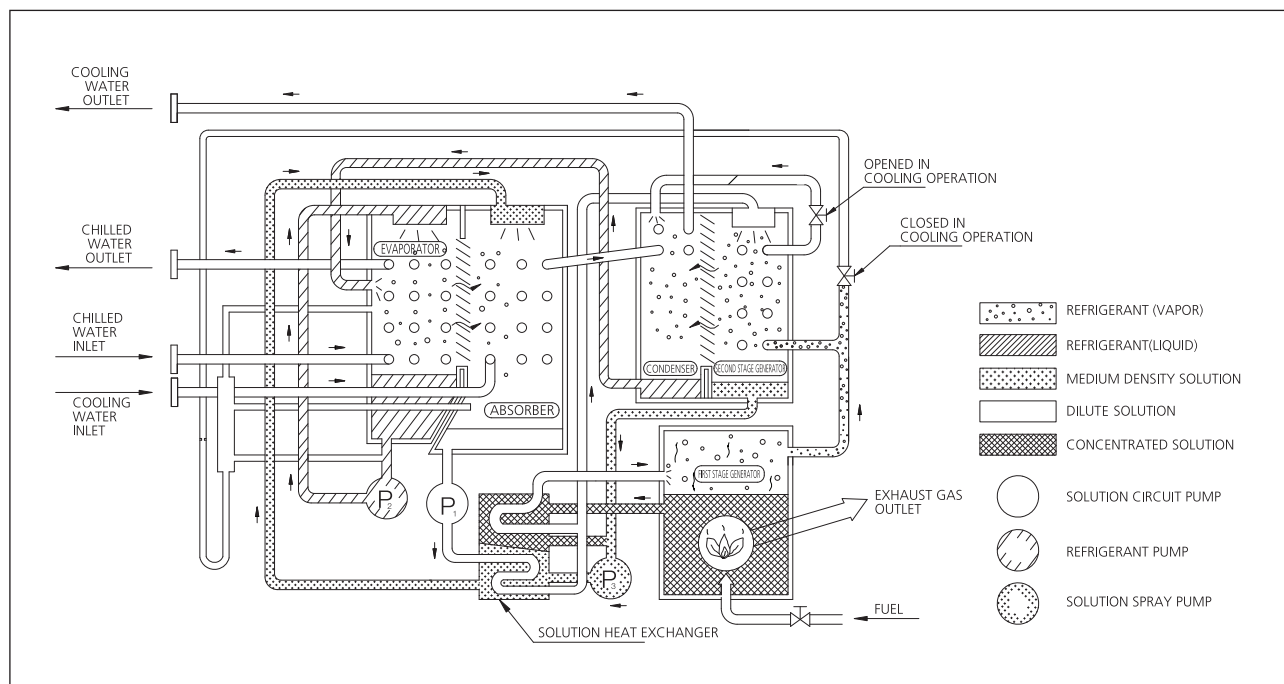
AIR CONDITIONING DISTRIBUTION DIAGRAM



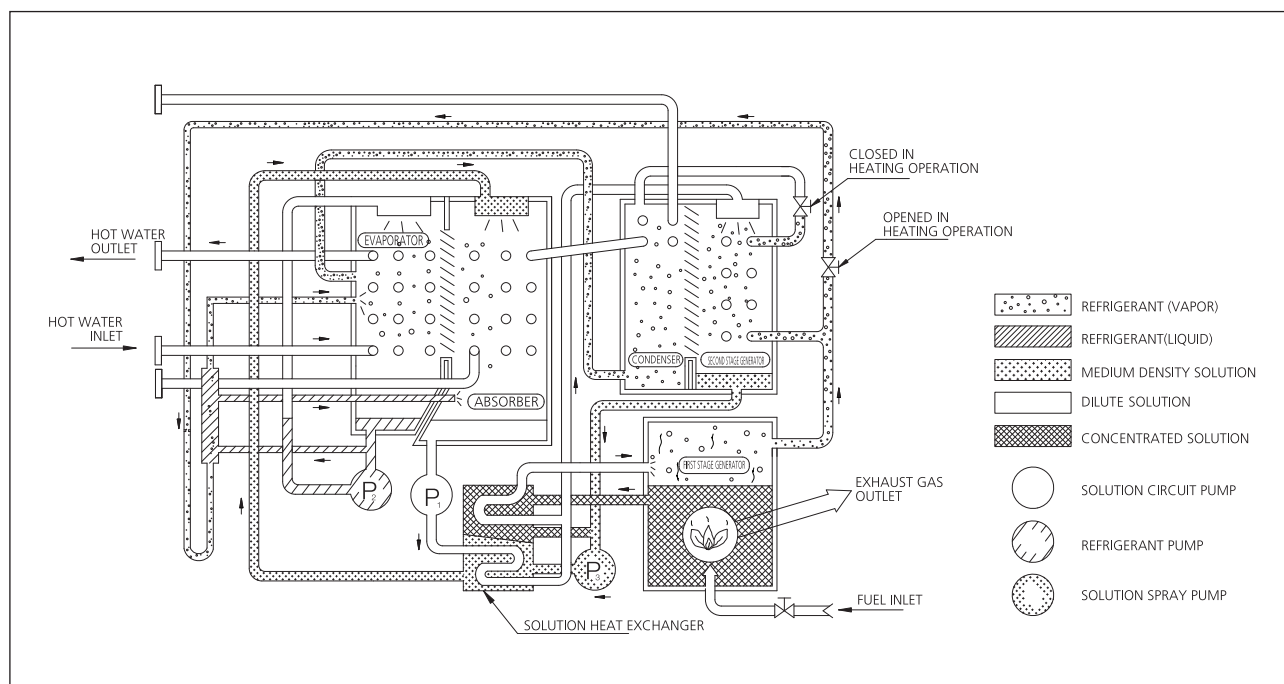
Direct-fired Double Effect Absorption Chiller & Heater

Cycle AR-F 125~400G4

AIR CONDITIONING DISTRIBUTION DIAGRAM



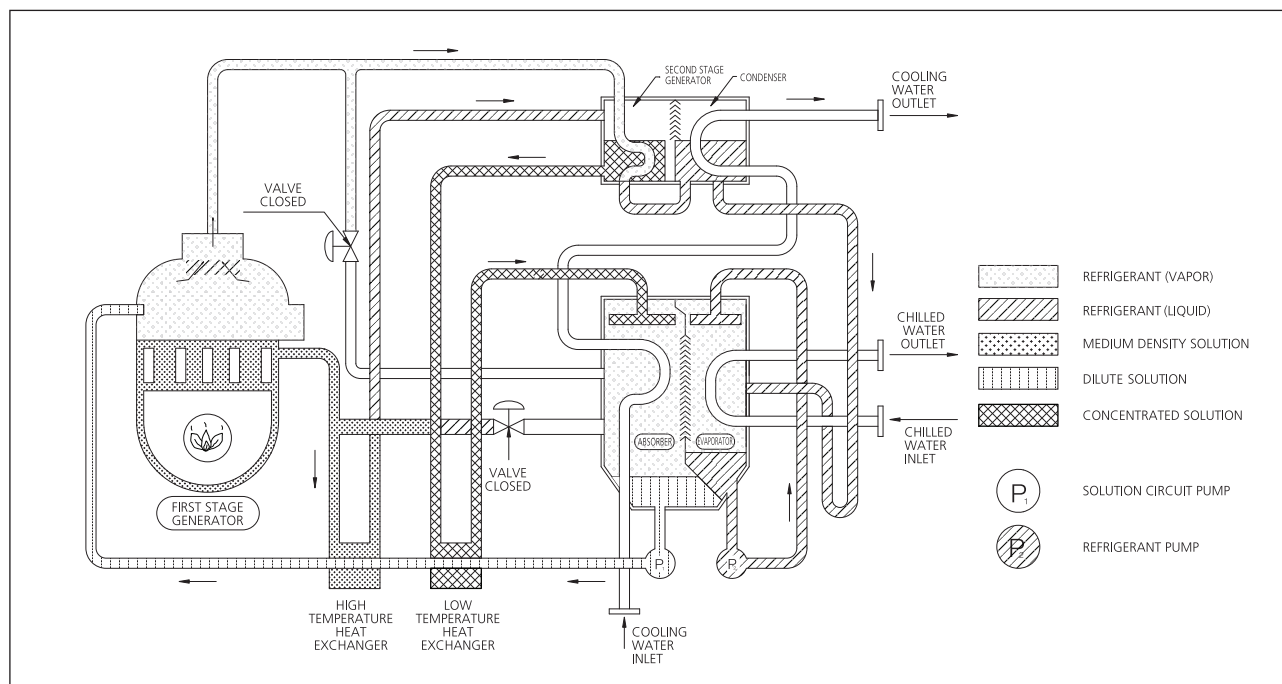
HEATING DISTRIBUTION DIAGRAM



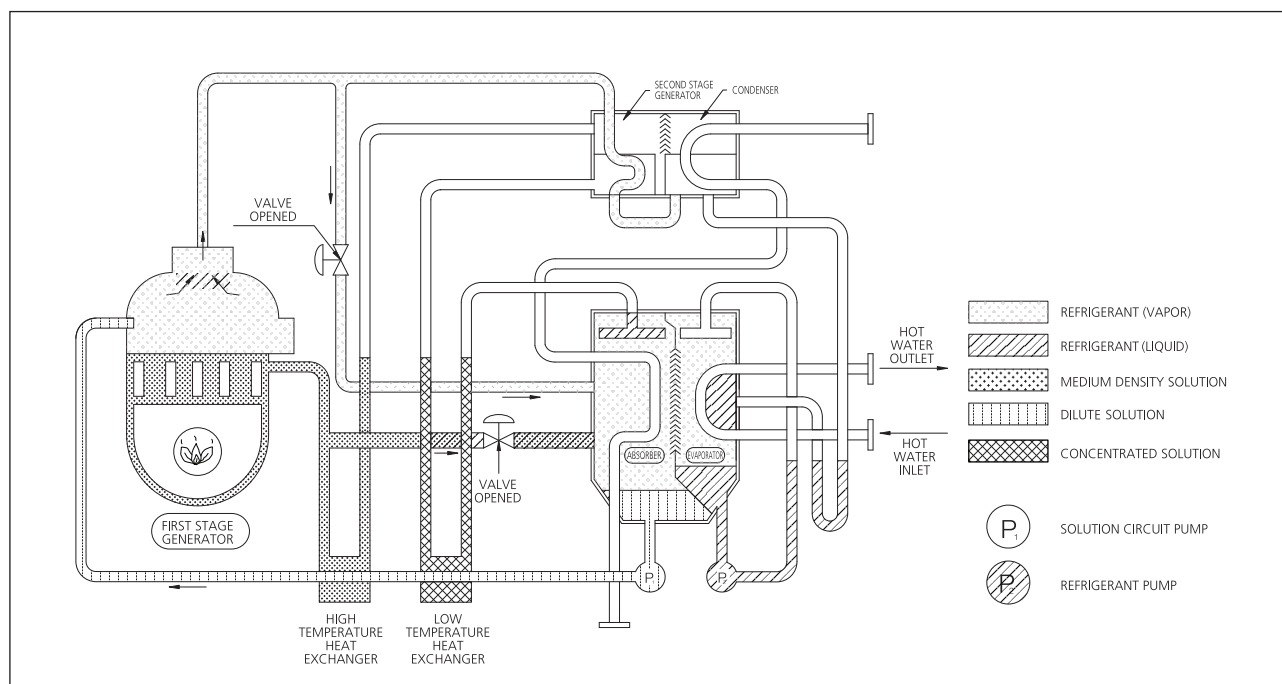
Direct-fired Double Effect Absorption Chiller & Heater

Cycle AR-F 450~1500G5

AIR CONDITIONING DISTRIBUTION DIAGRAM



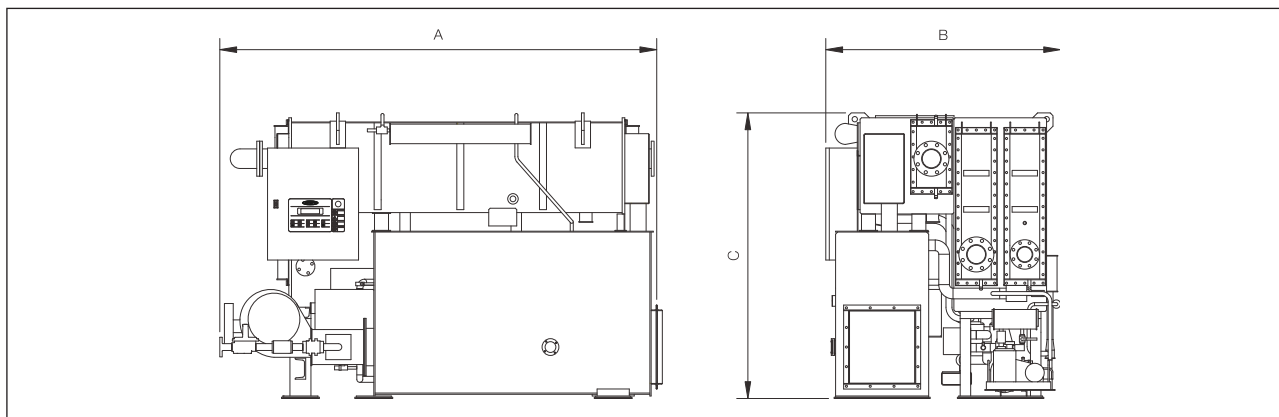
HEATING DISTRIBUTION DIAGRAM



Direct-fired Double Effect Absorption Chiller & Heater

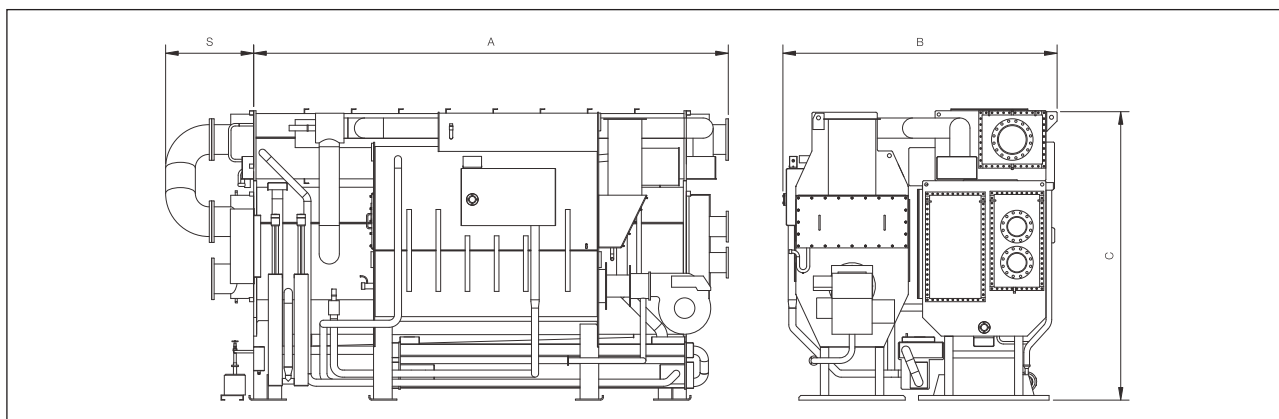
Dimension

AR-F 125~400G4 Type



MODEL(AR-F)	125G4	150G4	180G4	210G4	240G4	280G4	320G4	360G4	400G4
LENGTH(A)	3,039	3,121	3,483	3,944	3,944	4,071	4,071	4,641	4,641
WIDTH(B)	1,679	1,679	1,679	1,765	1,765	1,960	1,960	2,062	2,062
HEIGHT(C)	2,031	2,031	2,031	2,061	2,061	2,454	2,454	2,454	2,454
INSTALLMENT AREA(L)	1,800	2,200	2,500	3,000	3,000	2,980	2,980	3,580	3,580
WEIGHT (ton)	OIL	5.4	5.9	6.5	7.6	7.6	9.9	9.9	11.5
	GAS	5.4	5.9	6.5	7.6	7.6	9.9	9.9	11.5

AR-F 450~1000G5 Type

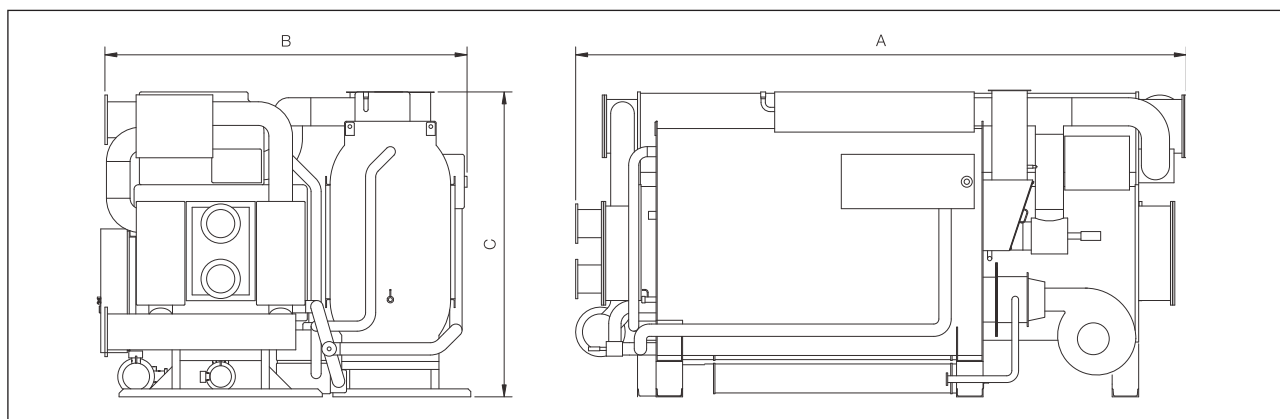


MODEL(AR-F)	450G5	500G5	560G5	630G5	700G5	800G5	900G5	100G5
LENGTH(A)	4,594		4,890	5,410	6,060	6,116	6,162	6,572
WIDTH(B)	2,440		2,940		2,912	3,300	3,449	
HEIGHT(C)	2,926		3,122				3,437	
CONNECTION PIPING(S)	399		485		484	544	567	
INSTALLMENT AREA(L)	4,100		4,000	4,500	4,850	4,300	5,100	6,200
WEIGHT(ton)	11.6	12.5	15.1	17.6	18.9	29.5	32.6	35.6

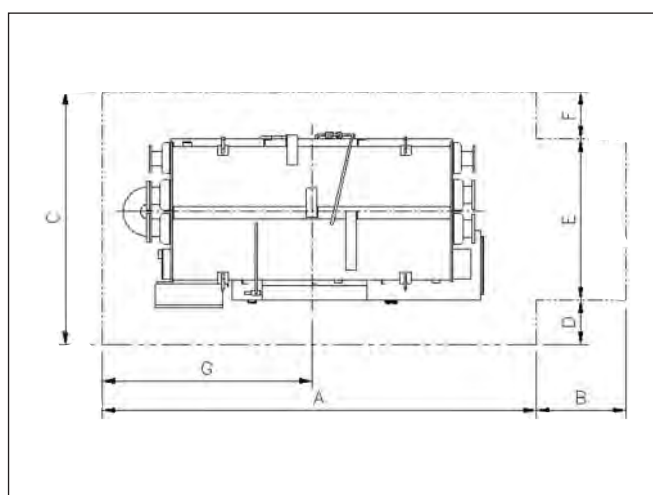
Direct-fired Double Effect Absorption Chiller & Heater

Dimension

AR-F 1200~1500G5 Type



MODEL(AR-F)	1200G5	1500G5
LENGTH(A)	7,150	7,550
WIDTH(B)	4,380	4,690
HEIGHT(C)	3,750	3,800
INSTALLMENT AREA(L)	6,200	6,700
WEIGHT(ton)	43.5	53

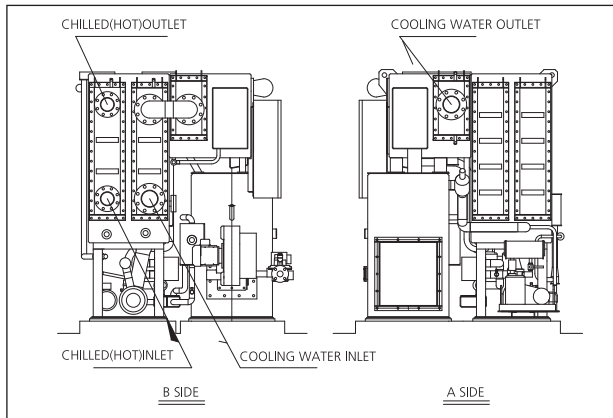


Installation & Application Data

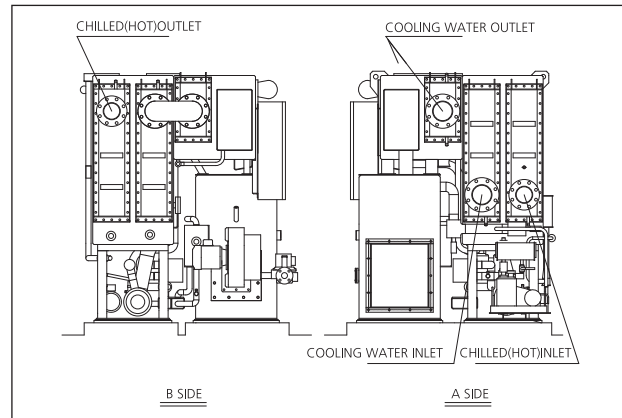
AR-F Type	A	B	C	D	E	F	G
125G4	4,800	430	3,750	1,100	1,650	1,000	2,200
150G4	4,900	1,140	3,650	1,100	1,550	1,000	2,450
180G4	5,300	1,400	3,650	1,100	1,550	1,000	2,560
210G4~240G4	5,800	1,900	3,750	1,100	1,650	1,000	2,850
280G4~320G4	5,800	1,900	3,850	1,100	1,750	1,000	2,850
360G4~400G4	6,400	2,500	4,100	1,100	2,000	1,000	3,150
450G5~500G5	7,556	2,600	4,400	1,000	2,440	1,000	3,778
560G5	7,910	2,500	4,930	1,000	2,930	1,000	3,955
630G5	8,410	3,000	4,930	1,000	2,930	1,000	4,205
700G5	8,910	3,350	4,930	1,000	2,930	1,000	4,455
800G5	8,530	3,000	5,330	1,000	3,450	1,000	4,265
900G5	9,120	3,590	5,330	1,000	3,450	1,000	4,560
1000G5	9,620	4,090	5,330	1,000	3,450	1,000	4,810
1200G5	13,350	6,200	6,480	1,000	4,380	1,100	3,575
1500G5	14,250	6,700	6,790	1,000	4,690	1,100	3,775

Direct-fired Double Effect Absorption Chiller & Heater

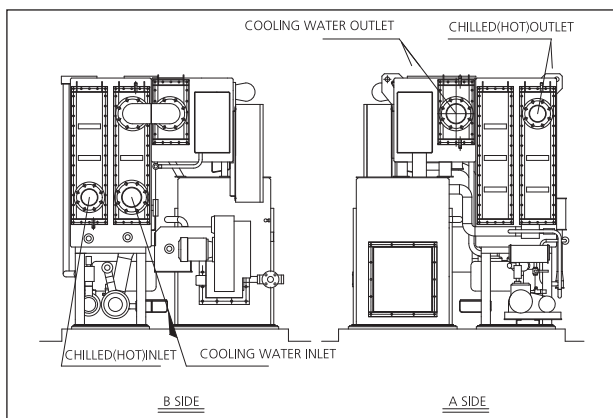
Installation & Application Data



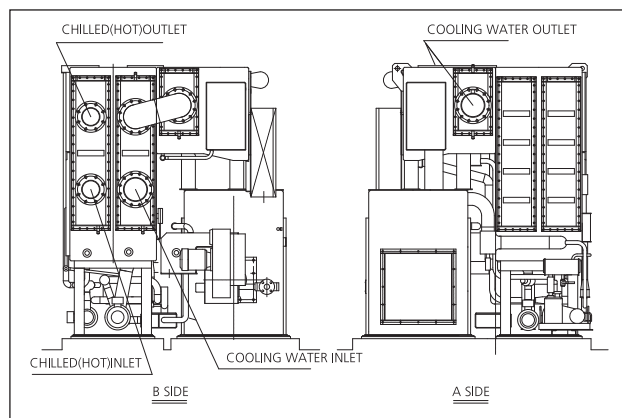
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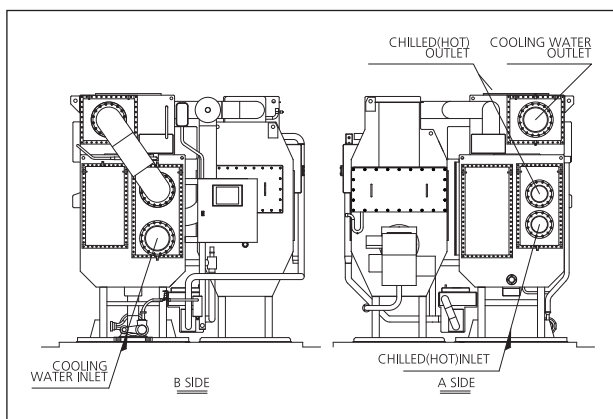
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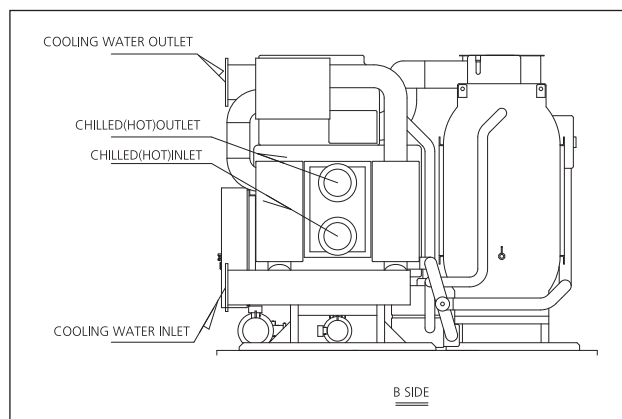
<AR-F 210~320G4>



<AR-F360~400G4>



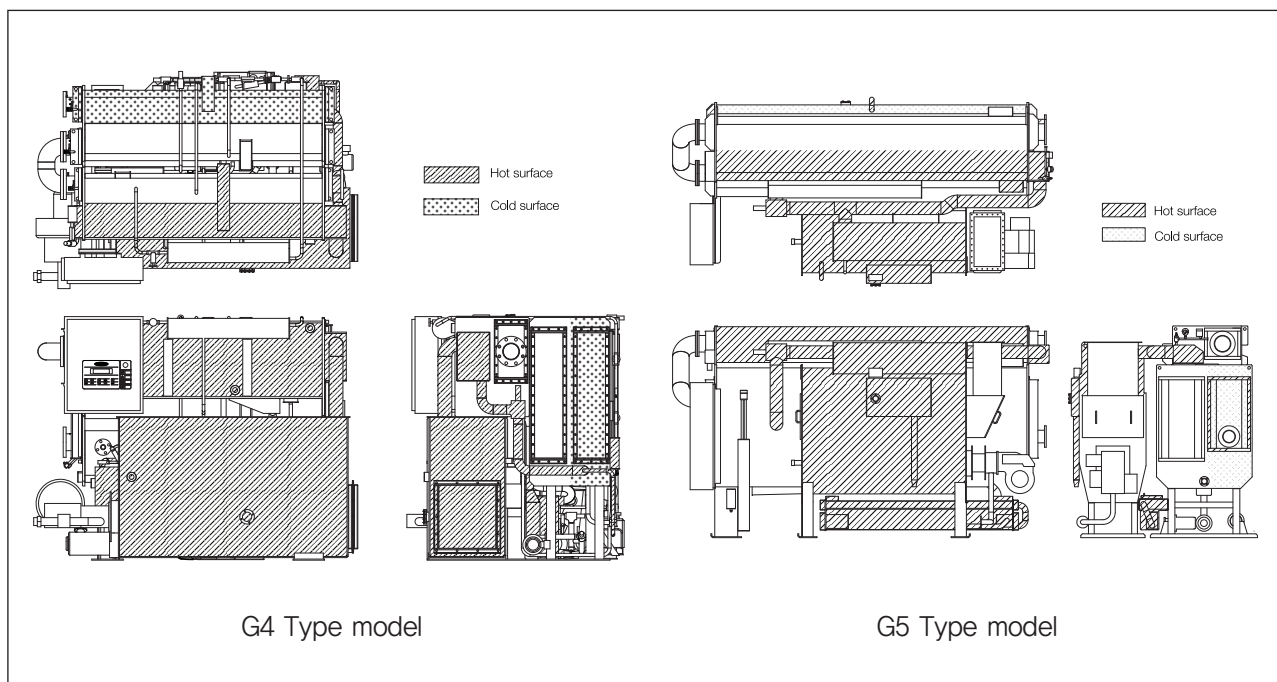
<AR-F450~1000G5>



<AR-F1200~1500G5>

Direct-fired Double Effect Absorption Chiller & Heater

Other Data



MODEL AR-F	40G3	50G3	60G3	70G3	80G3	90G3	100G3	125G4	150G4	180G4
Hot surface(m ²)	10	10	10	12	12	12	12	10	11	12
Cold surface(m ²)	7	7	7	7	7	7	7	6	6.6	7.6
MODEL AR-F	210G4	240G4	280G4	320G4	360G4	400G4	450G5	500G5	560G5	630G5
Hot surface(m ²)	14	14	16.4	16.4	19.1	19.1	31.4	32.0	33.8	36.8
Cold surface(m ²)	8.6	8.6	9.9	9.9	11.3	11.3	10.9	10.9	15.2	17.2
MODEL AR-F	700G5	800G5	900G5	1000G5	1200G5	1500G5				
Hot surface(m ²)	39.1	41.9	44.5	47.1	60	65				
Cold surface(m ²)	17.5	20.3	21.5	22.9	21	23				

1. Insulation material

Hot Surface: Fiberglass or equivalent

Cold Surface: Fiberglass, polyethylene foam or equivalent

2. Insulation Thickness

Hot surface: Appox. 50mm for first stage generator and approx. 25mm for others

Cold surface: Appox. 25 mm

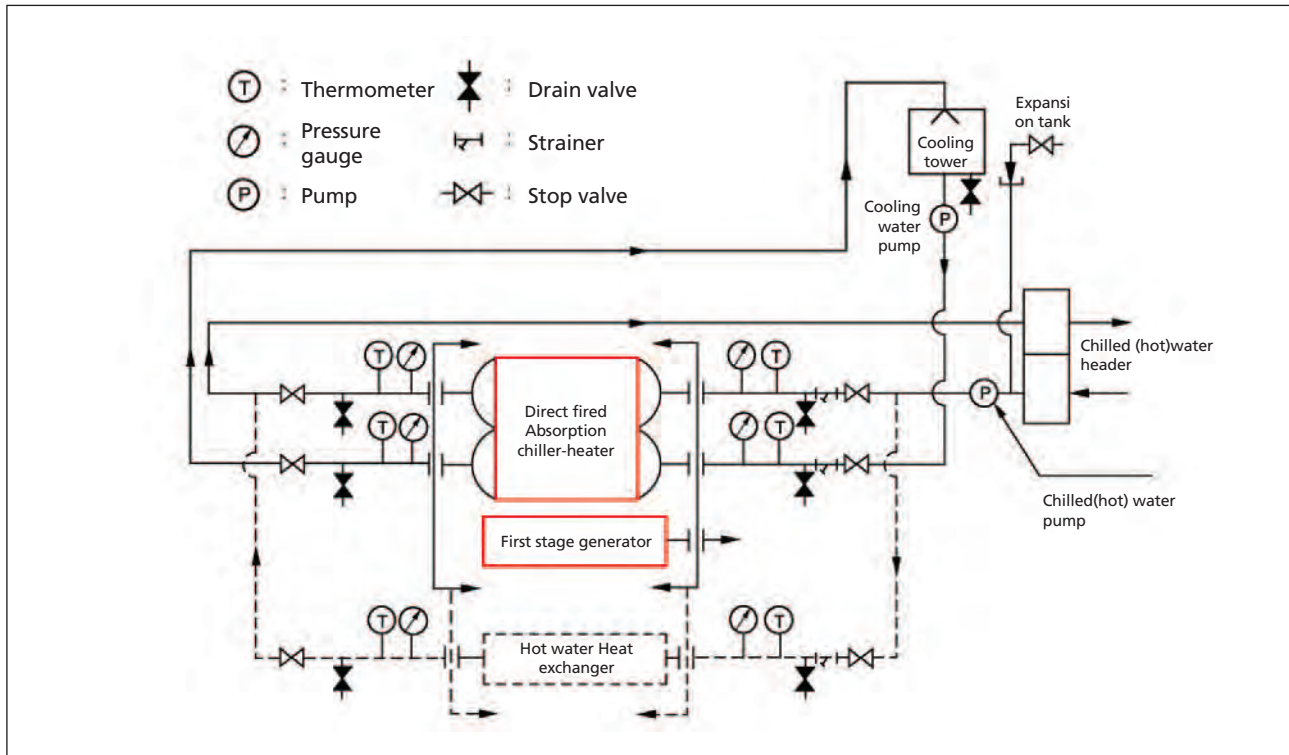
3. Remarks

- 1) Do not embed the moving parts (valve handles) in insulation. Valve handles must be free from insulation
- 2) Do not embed the sight glass in insulation
- 3) Do not embed the thermometer and manometer in insulation
- 4) Do not embed the refrigerant pump motor in insulation
- 5) When the water box is opened to clean the tubes, do not embed the clamping bolts of the water box
- 6) Use fiber glass or polyethylene foam for cold insulation use fiber glass for hot insulation (Do not use polyethylene foam for hot insulation)
- 7) Use a bonding agent, iron wires or bands to mount the insulation material. Do not use tapping(welding) and riveting
- 8) Insulation work will be done by others

Direct-fired Double Effect Absorption Chiller & Heater

Other Data

□ AR-F40-1500G3



1. Sakura scope of supply
2. To insure and correct flow from the chiller, balancing valves should be installed at the chilled (hot)water and cooling water outlets. Be sure to install pressure and temperature gauges referring to this schematics.
3. Be sure to install drain valves at the lowest part of the chilled water, hot water, cooling water pipings in order to be able to exhaust the water of the pipings, and connect drain valves with suitable drain discharge ditches.
4. Be sure to install air vent valves at the higher water and hot water pipings than water chambers of the machine.
5. Expansion tank must be installed in chilled water and hot water piping line if closed water cycle is adopted.
6. Be sure to install a 10 mesh strainer on the inlet side of the piping for chilled water, hot water and cooling water.
7. Effective supports are necessary for water and gas pipings not to put those weight on the machine.
8. Arrange the piping considering the space for extracting the tubes and for opening the water chamber
9. Cooling tower must be installed at the place where is free from pollutants in atmospheric air. (Such as sulfurous acid gas contained in sootysmoke from chimney, ammonia and hydrogen sulfide exhausted from ventilation fans of buildings, sewage treatment plants and chemical plant.)
10. Cooling water inlet temperature should be kept above 20°C by cooling tower fan capacity control or by providing bypass water line like as above piping schematics.
11. Maximum permissible pressure of water circuit AR-F40G3~60G3: 5kg/cm²g
AR-F70G3- 1500G3: 8kg/cm²G



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