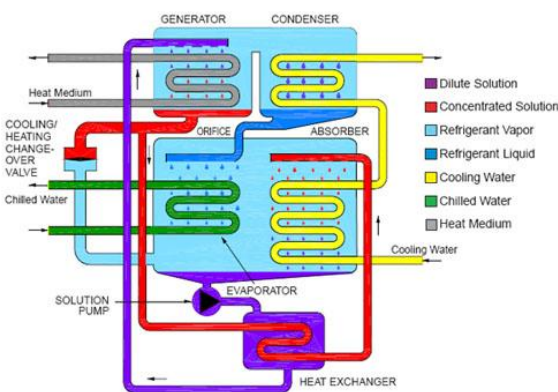


**Yazaki Solar Air Conditioning Absorption Chiller
WFC-S Series
10, 20 and 30 RT Cooling**

Yazaki Aroace solar-configured water fired chillers or chiller-heaters have cooling capacities of 10, 20 and 30 tons of refrigeration and produce chilled water for cooling or hot water for heating in comfort air conditioning applications. By using various Solar Panels Plus configurations, the systems can be de-rated by up to 50% or alternatively, can be over-driven by up to 25%.

The Yazaki absorption chiller or chiller-heater uses a solution of lithium bromide and water, under a vacuum, as the working fluid. Water is the refrigerant and lithium bromide, a nontoxic salt, is the absorbent. Refrigerant, liberated by heat from the solution, produces a refrigerating effect in the evaporator when cooling water is circulated through the condenser and absorber. The absorption cycle is driven by a thermal transfer fluid (hot water or glycol mixture) at 158° F to 203° F from solar thermal energy or other heat source and the condenser is cooled through a cooling tower.

COOLING CYCLE DIAGRAM



Generator

When the thermal transfer fluid inlet temperature exceeds 154.4° F, the solution pump moves dilute lithium bromide solution into the generator. The solution boils vigorously under a vacuum and droplets of concentrated solution are carried with refrigerant vapor to the primary separator. After separation, refrigerant vapor flows to the condenser and concentrated solution is pre-cooled in the heat exchanger before flowing to the absorber.

Condenser

In the condenser, refrigerant vapor is condensed on the surface of the cooling coil and latent heat, removed by the

cooling water, is rejected to a cooling tower. Refrigerant liquid accumulates in the condenser and then passes through an orifice into the evaporator.

Evaporator

In the evaporator, the refrigerant liquid is exposed to a substantially deeper vacuum than in the condenser due to the influence of the absorber. As refrigerant liquid flows over the surface of the evaporator coil it boils and removes heat, equivalent to the latent heat of the refrigerant, from the chilled water circuit. The recirculating chilled water is cooled to 44.6° F and the refrigerant vapor is attracted to the absorber.

HEATING CYCLE

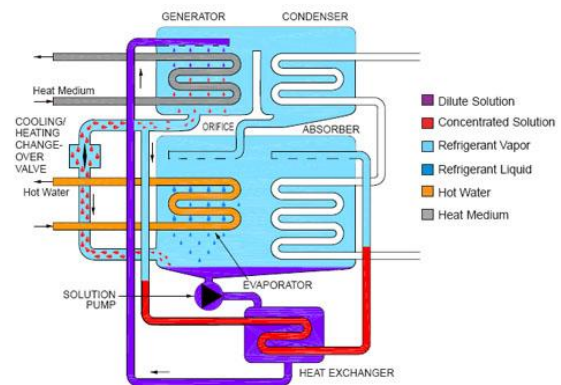
Generator

When the heat medium inlet temperature exceeds 154.4° F, the solution pump forces dilute lithium bromide solution into the generator. The solution boils vigorously under a vacuum to generate refrigerant vapor and droplets of concentrated solution. Since the changeover valve is open during heating operation, the mixture of refrigerant vapor and concentrated solution flows directly into the evaporator. Some refrigerant vapor flows through the condenser before reaching the evaporator.

Evaporator

Hot refrigerant vapor condenses on the surface of the evaporator coil and heat, equivalent to the latent heat of the refrigerant, is transferred to the hot water circuit. The recirculating water is heated to 131° F. Refrigerant liquid mixes with concentrated lithium bromide solution and the resulting dilute solution returns to the generator where the cycle is repeated.

HEATING CYCLE DIAGRAM

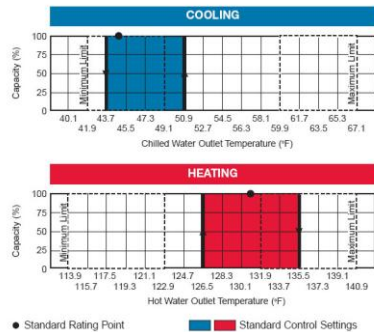


Yazaki Solar Air Conditioner Features

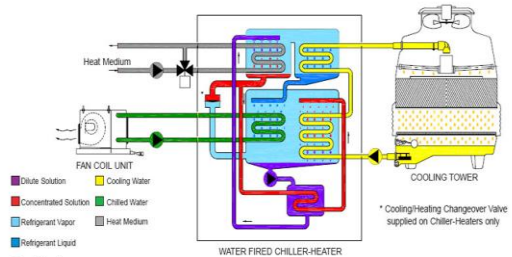
- **Absorption cycle energized by hot water** at 158° F to 203° F from process, cogeneration, solar or other waste heat sources.
- **Safe, odorless, non-toxic** working fluids of lithium bromide and water operate under a vacuum at all times.
- **Supplied as a chiller only or a chillerheater** for applications that require separation of heating water and heat medium circuits due to glycol, operating pressure, flow or piping limitations.
- **Crystallization prevented** in the generator by utilizing a solution pump and gravity drain-back system.
- **Single hermetic pump** controls solution flow.
- **Faster cold start-up time** than similar chillers with flooded generators.
- **Chilled water and hot water outlet temperatures** controlled by a built-in microprocessor with outputs to control a 3-way valve and/or heat medium pump (supplied by others).

- All chillers and chiller-heaters **supplied with a standard weatherproof cabinet** suitable for outdoor installation.
- **Built-in shutdown controls** for high heat medium temperature and abnormal cooling water conditions.
- **Cooling capacities increased** at 85° F cooling water and when energized by 203° F heat medium.
- **Ideal for a two pipe hydronic system** in which chilled or hot water is circulated to a central air handling unit or multiple fan-coil units.
- **Cooling or heating operation** on chiller-heaters can be selected from a remote or built-in switch.
- **Only 30 minute delay required for operation changeover.**
- **Transportation and lifting are simplified** because of modular construction.
- **Factory charged** and performance tested.
- **UL Listed for USA and Canada.**

Control Characteristics



Application (Water Fired Cooling & Heating System - Cooling Operation)



Specifications

Mode	WFC	SC10	SH10	SC20	SH20	SC30	SH30
Cooling	Capacity (Btu/hr x 1000)	120.0	240.0	360.0			
	Chilled Water Temp. (°F)	44.5 Outlet, 54.5 Inlet					
Heating	Capacity (Btu/hr x 1000)	—	166.3	—	332.6	—	498.9
	Hot Water Temp. (°F)		131.9 Outlet, 117.3 Inlet				
Chilled/Hot Water	Rated Water Flow (gpm)	24.2	48.4	72.6			
	Exp. Press. Drop (psi)	8.1	9.6	10.1			
	Water Retention Volume (gal)	4.5	12.4	19.3			
	Heat Rejection (Btu/hr x 1000)	291.4	582.8	874.2			
Cooling Water	Inlet Temperature (°F)	87.8 (Standard)					
	*Rated Water Flow (gpm)	80.8	161.7	242.5			
	Cond. Abs. Press. Drop (psi)	12.3	6.6	6.7			
	Water Retention Volume (gal)	17.4	33.0	51.3			
Heat Medium	Input (Btu/hr x 1000)	171.4	342.8	514.2			
	Inlet Temperature (°F)	190.4 (Standard)					
	Temperature Range 158 (min.) - 203 (max.)						
	Rated Water Flow (gpm)	38.0	76.1	114.1			
Electrical	Generator Press. Drop (psi)	13.1	6.7	8.8			
	Water Retention Volume (gal)	5.5	14.3	22.2			
	Power Supply	208V, 60Hz, 3 ph					
Capacity Control	Consumption (W)	210	260	310			
		On - Off					
Noise Level	Sound Pressure dB(A)	49	49	46			
	Chilled/Hot Water (in)	1-1/2 NPT	2 NPT	2 NPT			
Piping	Cooling Water (in)	2 NPT	2 NPT	2-1/2 NPT			
	Heat Medium (in)	1-1/2 NPT	2 NPT	2-1/2 NPT			
Weight	Dry (lb)	1,100	2,050	3,200			
	Operating (lb)	1,329	2,548	3,976			

* Minimum cooling water flow

NOTES:

- Specifications are based on water in all circuits and fouling factor of 0.0005 ft²hr/F/Btu.
- Do not exceed 85.3 psi operating pressure in any water circuit.
- If heat medium inlet temperature exceeds 203°F the chiller/chiller-heater will shutdown and require manual reset.
- Optional cooling water crossover piping with 3 in. type "L" copper connections available for WFC-SC20/SH20 and WFC-SC30/SH30.
- Sound pressure noise level measured in a free field at a point 79 in. behind the chiller/chiller-heater and 59 in. above the ground.