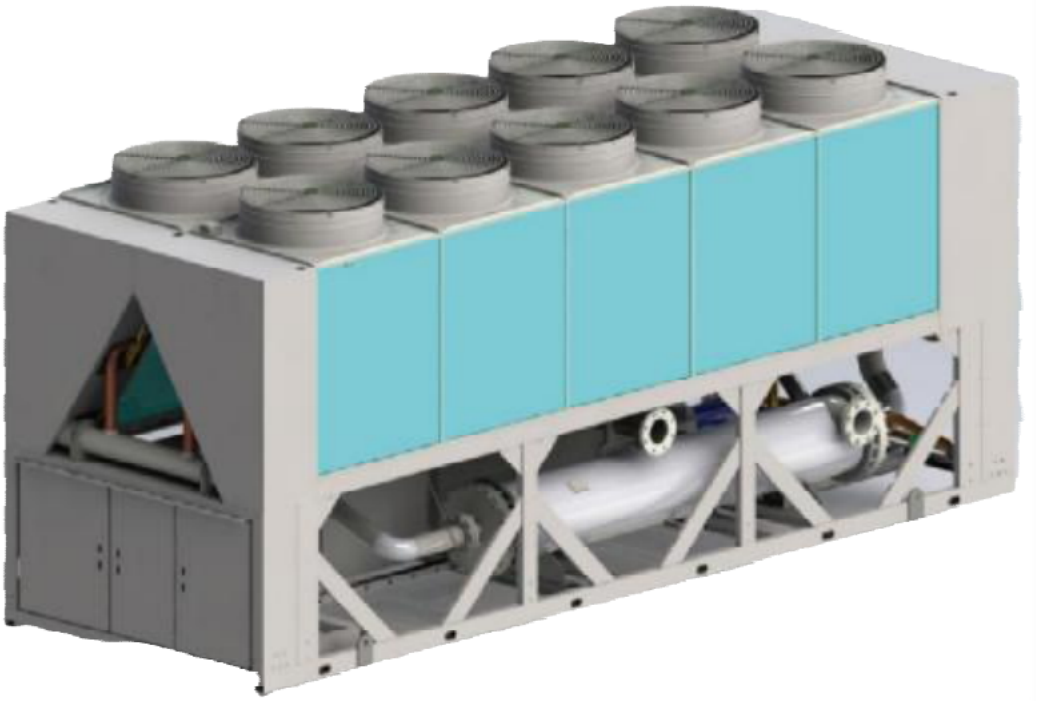
Air-Cooled Screw Chiller with Free Cooling



According to document готовый проет 07-02-2025) P18th, the picture shows the Dry Cooler (or closed cooler and chiller, three each, where the Dry Cooled Unit is installed on the roof and the chiller is arranged in the equipment room. Its cooling capacity is 1100Kw. The Dry Cooler Unit is connected to the chiller through a condensate pipe (including a water pump); The chiller main unit sends the chilled water generated by the chiller to the indoor unit air conditioning unit through a pump.

According to the standard load of 1100kw *3nos in the figure, DCS optimizes the selection, and selects DCS free cooling air-cooled chiller, model KCA2320B1CF, a total of 4 units, and the refrigeration capacity of a single unit is 1200kw; One of them is a standby machine, so as to prevent the system from running smoothly and balancedly if any of the hosts fails.

The operating principle of the free-cooling air-cooled chiller:

Summer (FreonSystem)

-- Compression stage: The compressor compresses the low-temperature and low-pressure refrigerant gas into high-temperature and high-pressure gas

-- Condensation and heat dissipation: The high-temperature

gaseous refrigerant is forced to exchange heat with air in an air-cooled condenser, dissipates heat through finned tubes and fans, and condenses into medium-temperature and high-pressure liquids

-- Throttle and depressurization: The liquid refrigerant is depressurized and cooled by the expansion valve to become a two-phase mixture of low temperature and low pressure

-- Evaporative endothermy: The refrigerant absorbs the heat of the chilled water in the evaporator and vaporizes completely, so that the chilled water temperature drops to a set value (e.g. 7°C)

Winter (Free Cooling)

--The temperature difference between outdoor low-temperature air and chilled water is used to directly produce low-temperature chilled water, and the compressor does not run, which reduces the energy consumption of the main engine;

Transition Season (Free Cooling &Freon System)

--The outdoor ambient temperature is lower than the return water temperature of the air conditioner, and the natural cooling operation will output part of the cooling capacity, and the insufficient part will be provided by the operation of the Freon system.

Air Cool Screw Chiller+Free cooling Performance

Unit Tag	Qty	DCS Model	Normal Cooling Cap. (KW)	Power Supply Volts -Ph-Hz	Refrigerant
Chiller 01	4	KCA2320B1FC	1200	380/3/50	R134a

Evaporator Data		Condenser Data		Performance Data	
EWT (°C)	15	Ambient Temp. Design (°C)	35	COP (w/w)	3.33
LWT (°C)	10	Altitude (m)	0	IPLV.IP (kW/kW)	-
Design Flow Rate (CMH)	244.0	Type	Fin / Tube	Noise dB(A)	About 84.1
Press. Drop (kPa)	80	**Compresso Data**		**Physical Data**	
Fluid	50% Ethylene Glycol	Brand	DCS	Rigging Wt. (kg)	13000
Fouling Factor (m^2K/kW)	0.018	Quanlity	2	Operating Wt. (kg)	14200
Type	Shell / Tube	Type	Semi-Hermetic Screw	Refrigerant Charge (kg)	About 260
Pipe Connection	DN125*2	Capavity Control	Stepless Control	Operating Pressure (MPa)	1.0

Electrical Data				Condenser Fan Data	
Total Rated Power (kW)@ 35 ℃	360.0	Start-up current (A)	1193	Fan Typw	Axial-flow
Unit Rated Current (A)	223.3+223.3	Capacity Adjust	12.5%~100%	Fan Qty	16
Recommended cable(mm)	185*2+185*2	Starter Type	Y-△	TotalPower (kW)	41.6

Free-cooling Paramet

Heat Exchanger	Copper Pipe & Alunum Fins	FLuid	50%ethylene glycol	Normal Capacity KW	1200
Water Pressure Drop (kPa)	175	Circle Type	Antifreezing	Water outlet /Operated At Ambient Temp ℃	10/15 , 0.5

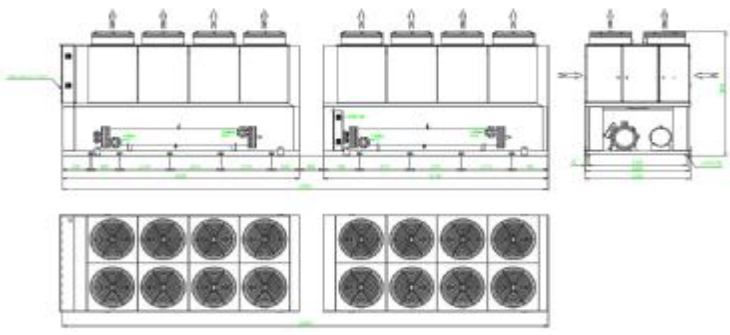
Control Protection Function (Device)

High and low pressure switch, Motor overheat protection, Anti-freezing switch, Temp. switch, Overload protector, Compressor oil heater, etc

Unit Dimensions		
L*W*H	**13720L×2235W×2500H (Unit size may change according to the actual situation)**	**mm**

Remark

1. Nominal cooling performance: 50% propylene glycol water water temp.10/15 °C, water flow 0.172m3 / (h·kW), inlet dry bulb temperature 35 °C;
2. The ambient temperature range of refrigeration operation is -30 °C ~ 46 °C;
3. The rated input power of the unit already includes the power of the condensing fan;
4. Considering high temperature and bad weather, please configure the wiring of the unit in accordance with the current configuration of the bad workingconditions;



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Summer

35℃

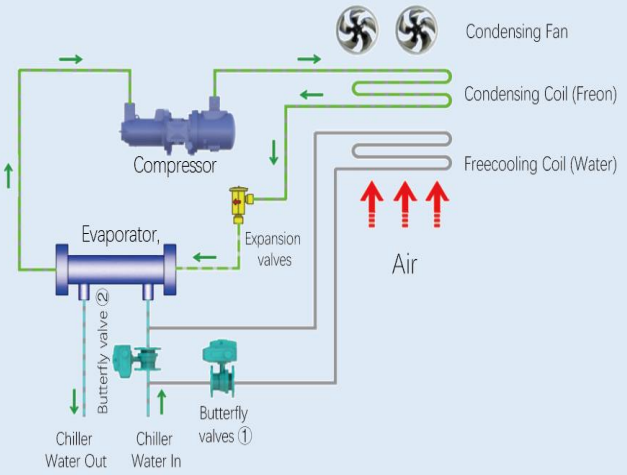
Summer operation：

★ Freecooling mode off.

★ Valve ① Off, Valve ② On

★ Chilled water flows directly through evaporator, Freecooling coil is not involved in cooling.

★ Compressor & fan are turned on ,Cooling output according to data room requirement.



Transition season

10℃

Runs during the transition season

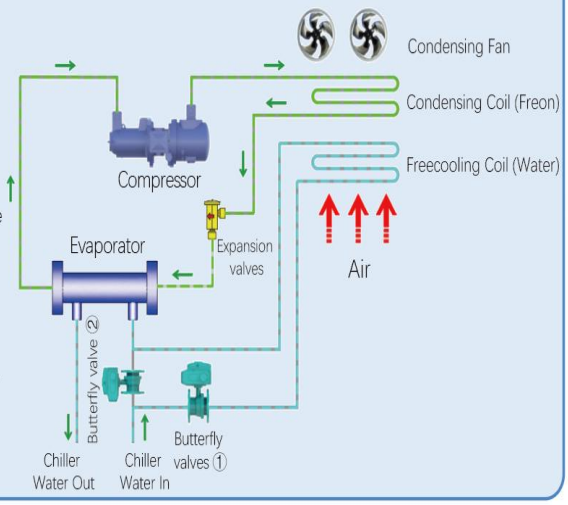
★ The outside temp. is lower than the return water temp. required, and the free cooling mode is on.

★ Valve ① On, Valve ② Off

★ Chilled water flows through freecooling coil and then through evaporator.

★ Free cooling outputs part of the cooling capacity, and the rest is provided by the freon system.

★ The lower the outside temp, the greater the free cooling capacity.



Winter

0℃

Winter operation:

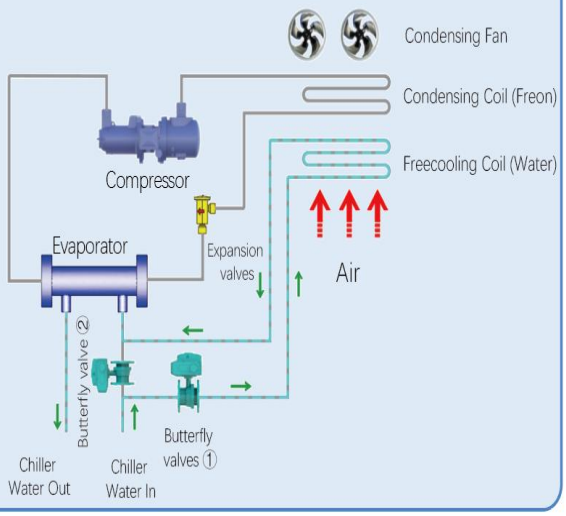
★ When ambient temp. can meet the indoor cooling load, the freecooling mode is turned on.

★ Valve ① On, Valve ② Off

★ The chilled water flows through the freecooling coil and then through the evaporator.

★ Compressor off and the chilled water is completely cooled by cold outside air.

★ The fan on and the water temp. is controlled by adjusting the fan.



Air Cooled Screw Chiller

Air Cool Screw Chiller Performance Report

Unit Tag	Qty	DCS Model	Normal Cooling /Heating Cap. (KW)	Power Supply Volts -Ph-Hz	Refrigerant
Chiller 01	**1**	**KCA1100B1**	**358/366**	**380/3/50**	**R134a**

Evaporator Data		Condenser Data		Performance Data	
EWT (°C)	12.0	Ambient Temp. Design (°C)	35	COP (w/w)	#VALUE!
LWT (°C)	7	Altitude (m)	0	IPLV.IP (kW/kW)	-
Design Flow Rate (CMH)	61.6	Type	Fin / Tube	Noise dB(A)	80.8
Total Press. Drop (kPa)	70	**Compresso Data**		**Physical Data**	
Fluid	Fresh Water	Brand	Hanbell	Rigging Wt. (kg)	4580
Fouling Factor (m^2K/kW)	0.018	Quanlity	1	Operating Wt. (kg)	4800
Type	Shell / Tube	Type	Semi-Hermetic Screw	Refrigerant Charge (kg)	105
Pipe Connection	DN100*2	Capavity Control	Stepless Control	Operating Pressure (MPa)	1.0

Air Cool Screw Chiller Performance Report

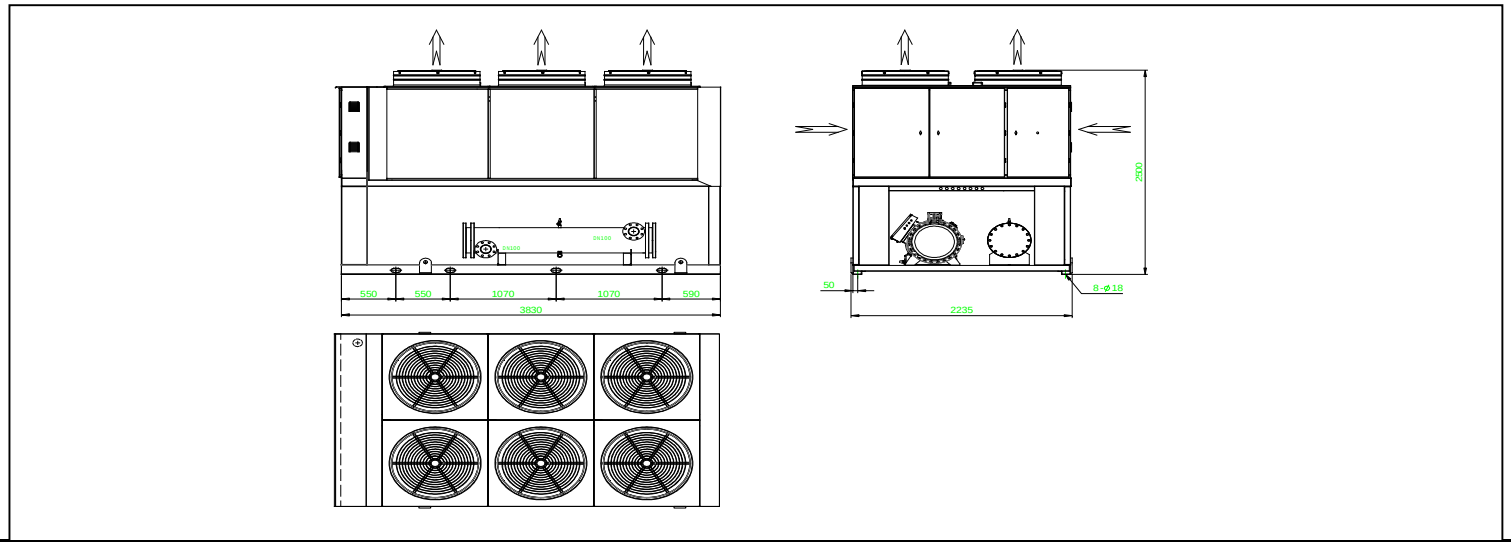
Electrical Data				Condenser Fan Data	
Total Rated Power (kW)@ 35 ℃	108.4	Start-up current (A)	546	Fan Typw	Axial-flow
Unit Rated Current (A)	193.8	Capacity Adjust	25%~100%	Fan Qty	6
Recommended cable(mm)	185	Starter Type	Y-△	TotalPower (kW)	10.8

Control Protection Function (Device)
High and low pressure switch, Motor overheat protection, Anti-freezing switch, Temp. switch, Overload protector, Compressor oil heater, etc

Unit Dimensions		
L*W*H	**3830L×2235W×2700H (Unit size may change according to the actual situation)**	**mm**

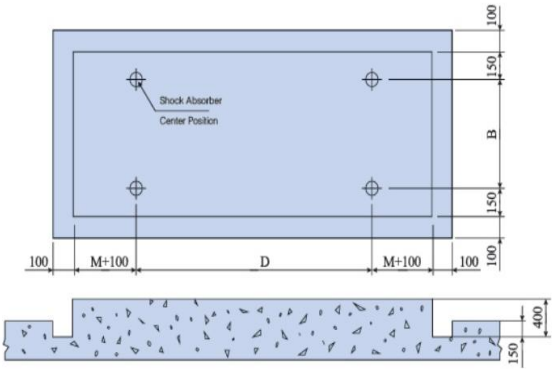
Remark

1. Nominal cooling performance: water temp.6.6/12.2 °C, water flow 0.172m3 / (h·kW), inlet dry bulb temperature 35 °C;
2. The ambient temperature range of refrigeration operation is 10 °C ~ 46 °C;
3. The rated input power of the unit already includes the power of the condensing fan;
4. Considering high temperature and bad weather, please configure the wiring of the unit in accordance with the current configuration of the bad working conditions;



Installation Foundation

- The unit is installed on a solid concrete or metal steel frame base, the installation platform must be strong enough to withstand the weight of the unit. If the intensity is insufficient, vibration and noise can easily occur.
- The surface of the concrete foundation platform is generally decorated with stucco and needs to be treated with water-repellent treatment. Drainage grooves shall be provided around the foundation platform, and the slope of the drainage groove shall be greater than 0.5%, and the slope shall face the drainage outlet.
- In order to make the equipment run quietly and avoid vibration and noise transmission affect the floors below , the unit base and foundation should be isolated by shock absorbers. When installing the unit, attention must be paid to install a shockproof base.
- In order to avoid possible displacements caused by earthquakes, typhoons or long-term operation of the equipment, which will cause the joints to be distorted and even broken, the crew should consider adopting appropriate fixed measures.
- Unit installation foundation and fixing method can refer to the following examples:



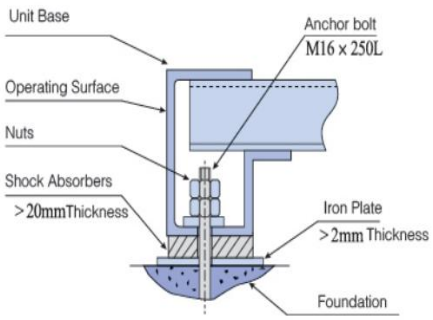


Figure 5

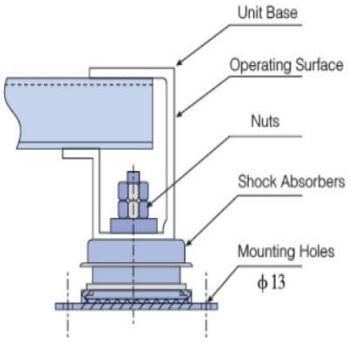


Figure 6

Note:

1, The dimensions of the mounting holes showed on figure 4, detail dimensions are shown in the dimension of each unit. D refers to the maximum distance of the mounting holes in the width direction. Special attention must be paid to the actual positions of the mounting holes in the width direction.

2. When using the fixing method shown in Figure 5, positioning the mounting hole according to Figure 4. Reserve anchor bolt mounting holes on the basis.

3, When adopting the fixing method of figure 6, the anchor bolt hole for shock absorbers must be reserved on the foundation. Kingair can provide corresponding shock absorbers (optional) .