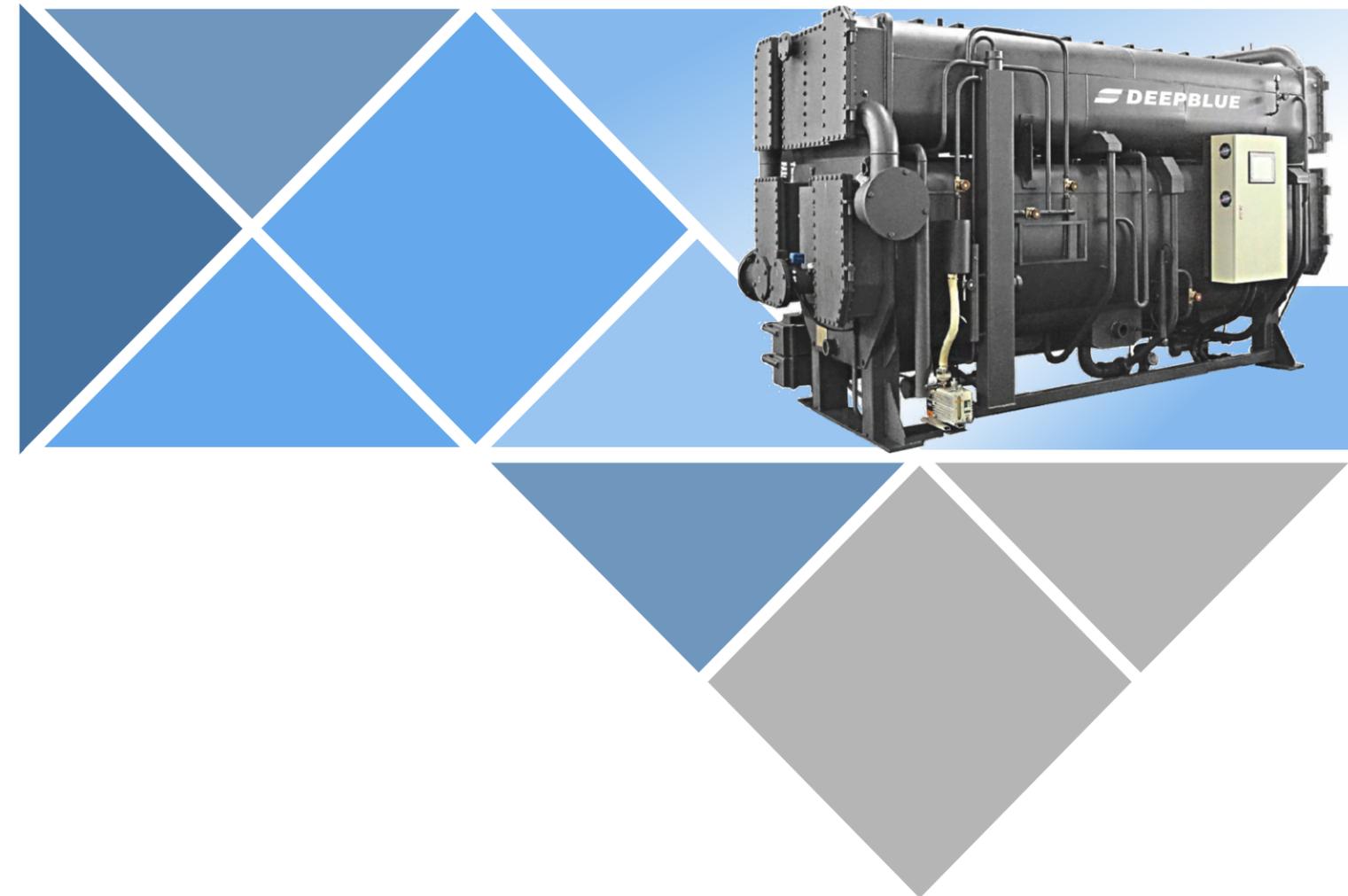


 **HOPE DEEPBLUE**

 **DEEPBLUE**

GREENER WORLD, BLUER SKY



 **Hope Deepblue**

**Continental Hope Group**

**Hope Deepblue Air Conditioning Manufacture Corp.,Ltd**

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NO. SL202104

**HOT WATER  
LiBr ABSORPTION CHILLER**



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## CONTINENTAL HOPE GROUP

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Dream Achieves Wonderfulness, Hope Creates Excellence!

Continental CHG (CHG) was founded in 1982. After years of steady development, CHG has now developed into a diversified comprehensive group focusing on four major industrial sections: Mechanical&Electronic, Energy&Chemical, Tourism&Real Estate, and Construction&Contract. The industry involves transmission control, HVAC&R, construction engineering, network engineering, sodium chlorate, hydroelectric development, sapphire, tourism, hotel, real estate, feed, food, financial investment and other fields.

The Mechanical&Electronic section takes energy conservation and environmental protection as its own responsibility. The Senlan Inverter and Deepblue HVAC&R equipment developed by our own intellectual property rights are widely used in the fields of transmission control, energy conservation, HVAC&R, waste heat utilization in China and abroad, which shows the Road of Chinese Brand. The Energy&Chemical sector builds a green circular economy industrial chain integrating "power generation, transmission, power distribution, salt chemicals, and new materials", transforming water conservancy and power resources into sodium chlorate chemical products, as well as gems. Hope Cultural and

Tourism sector devotes to creating an ideal life of living, travel and business, created China's Eight Luxury Real Estate. The Construction&Contract section has several special professional qualifications, using strength to build assured projects and build city dreams.

Hope Group takes high technology as the core, comprehensive utilization of resources as the link, and carries out industrial layout around "energy saving, environmental protection, circular economy, quality life, city music", and initially forms a close and three-dimensional upstream and downstream industries.

**Business philosophy**---- Excellence Beyond Boarder

**Vision**----Greener World Bluer Sky Better Life

**Mission**----Create higher value for customers with excellent products and services.

**Values**-----Sincere and trustworthy, achieving customers, contributing to the human.



**Based on China**  
Service all over the world

## HOPE DEEPBLUE AIR CONDITIONING MANUFACTURE CORP., LTD

Hope Deepblue Air Conditioning Manufacture Corp.,Ltd (Deepblue) was founded with an investment of 20 million USD by Continental Hope Group (CHG) in 1997 . It is located in national high-tech zone Chengdu, China, covering an area of 170 acres, which is the largest LiBr absorption equipment manufacture base in West China. Deepblue is engaged in the fields of refrigeration, heat pump, and industrial waste heat utilization product R&D, manufacture, sales, service, and providing one-stop energy system solutions to customers. Deepblue product includes LiBr absorption chiller, absorption heat pump, central vacuum hot water unit, which have been exported to many countries and regions. Deepblue has developed Deepblue Green Energy Center project (DGEC), which is the first CCHP project (Tri-generation) with independent intellectual property right in China. DGEC has been operating stably since 2003, which is known as the longest running time distributed energy project in China.

Thanks to strong technology and manufacture ability, Deepblue has established marketing and service network in China, involving in thousands projects and well known as expert of heat recovery in coking, textile, pharmaceutical, chemical, food, metallurgy, solar energy, rubber tires, power plants, petroleum, urban central heating and other industrial fields. Now Deepblue is paying more and more attention on developing oversea market and is open to cooperate with partners all over the world.

Deepblue products have obtained the National Industrial Product Production License, and have passed the ISO9001, ISO14001, OHSAS18001, CE , CRAA , CSC certification, etc. Deepblue won the Gold Award of China Science and Technology Expo, Gold Award of China Patent Technology Expo. Listed in the National Torch Plan Project, National Key New Product Project, Key Recommendation Unit for China Energy Conservation Project Construction, Top Ten Brands in China's HVAC and Refrigeration Industry, Top Ten Most Trusted Brands by Chinese Designers, China Model Enterprise for Building Energy Conservation and Emission Reduction, China Waste Heat leading company in the recycling field, Special Contribution Award for China's Building Environment and Equipment Industry, and the China Distributed Energy Outstanding Project Award etc.



## Certificates



Business License



National Industry Products Production License



High-tech Enterprise Certificate



Disinfection Product Hygienic License



Chinese Top 10 Trusted Brands



Chinese Construction Energy Conservation and Emission Reduction Enterprise



CE Certificate



ISO9001 Certificate



ISO14001 Certificate



18001 Certificate



Chinese Energy Conservation Product Certificate



National Torch Program Project Certificate



Chinese Best Patent Program Certificate



CRAA Certificate

## Manufacturing Equipment



CNC Processing Center



CNC Drilling Machine



Submerge-Arc Auto Welding Machine



CNC Cutting Machine



Auto Welding Robot



Sheet Metal Processing Center



Hydraulic Plate Shear



Painting Room



Hydraulic Cutting Machine

## Testing Equipment



Helium Leakage Detector



X-Ray Detector



Welding Seam Inspector



Flue Gas Analyzer



Electric Testing Device

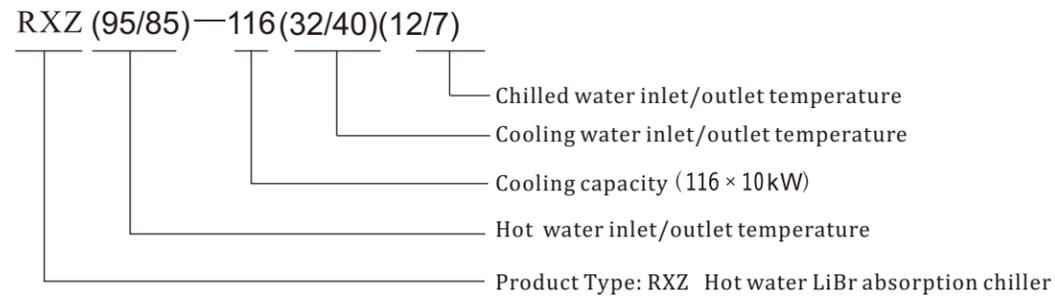


Whole Unit Performance Testing Center



Ultrasonic Pipe Flow Detector

## Products Model



## Hot Water LiBr Absorption Chiller Product Features

### Working principle

#### Hot Water Type Refrigeration Cycle

The hot water type LiBr absorption chiller is a hot water powered refrigeration unit. It adopts the aqueous solution of lithium bromide (LiBr) as a cycling working medium. The LiBr solution works as an absorbent and water as a refrigerant.

The chiller comprises primarily the generator, condenser, evaporator, absorber, heat exchanger, auto purge device, vacuum pump and canned pump.

**Working principle:** The refrigerant water in the evaporator evaporates away from the surface of the heat conducting tube. As heat in the chilled water is taken away from the tube, the water temperature drops and cooling is generated. The refrigerant vapor evaporated from the evaporator is absorbed by the concentrated solution in absorber and therefore the solution is diluted. The diluted solution in absorber is then delivered by the solution pump to the heat exchanger, where the solution is heated and the solution temperature rises. Then the diluted solution is delivered to the generator, where it is heated by hot water to produce refrigerant vapor. Then the solution becomes a concentrated solution. After releasing heat in the heat exchanger, the temperature of the concentrated solution drops. The concentrated solution then enters the absorber, where it absorbs the refrigerant vapor from the evaporator, becomes a diluted solution and enters the next cycle.

The refrigerant vapor generated by the generator is cooled in the condenser and become refrigerant water, which is further depressurized by throttle valve or U-type tube and delivered to the evaporator. After the evaporation&refrigeration process, the refrigerant vapor enters the next cycle.

The aforesaid cycle occurs repeatedly to form a continuous refrigeration process

#### Double Phase Hot Water Chiller Refrigeration Cycle

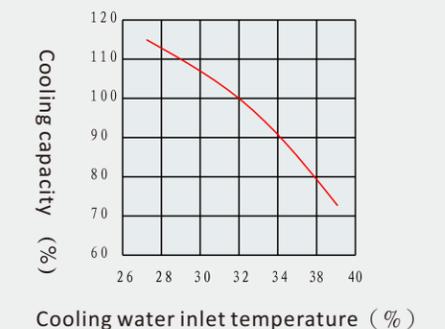
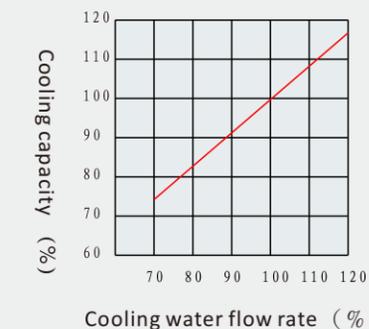
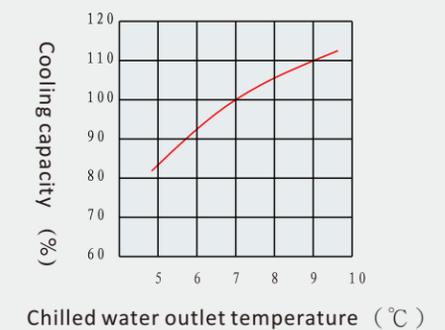
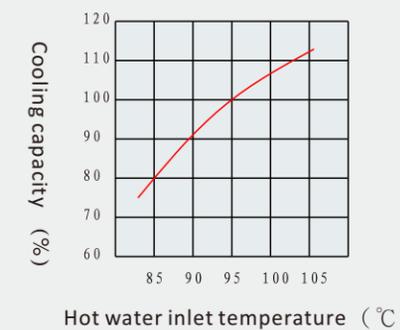
The refrigeration principle of double phase hot water LiBr absorption chiller is the same with general type, of which difference is that the double phase type unit make full use of the principle of ordered circulation, forming sufficient countercurrent heat exchange, which can reduce the outlet temperature of hot water to ensure the full use of hot water thermal energy.

The hot water double phase LiBr absorption unit consists of two evaporators, two absorbers, two generators, two condensers, two heat exchangers, two solution pumps, refrigerant pumps, automatic air extraction devices, etc.

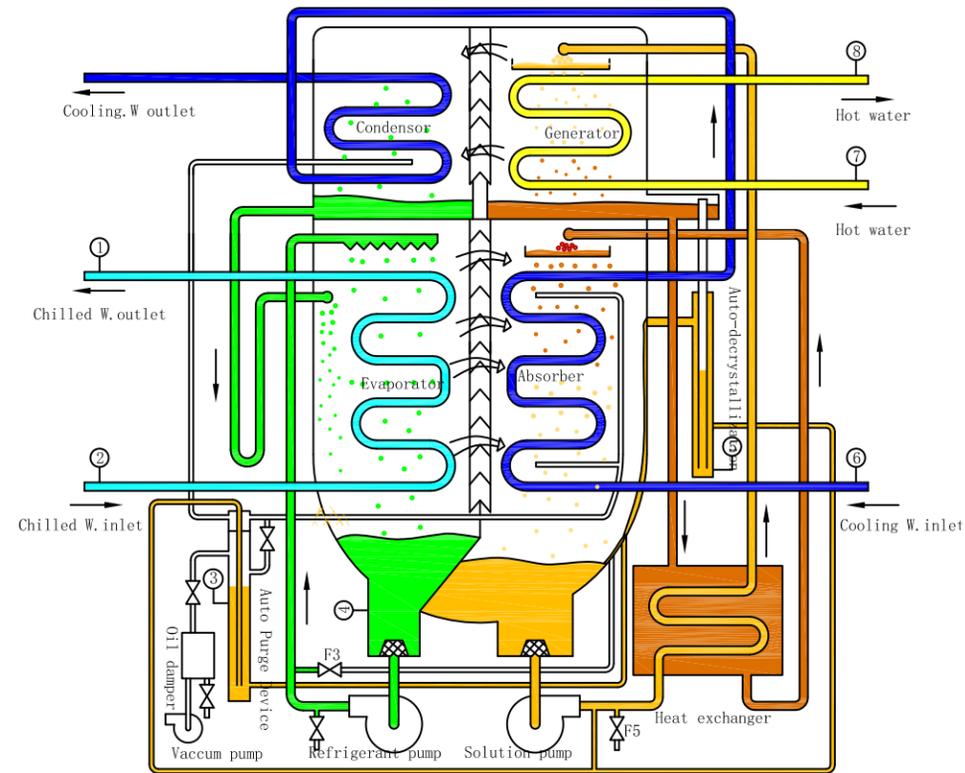
The first cycle is composed of low-temperature hot water (such as 86°C-68°C) and low-temperature cooling water. This refrigeration cycle can cool the relatively high-temperature air-conditioning water, such as from 12°C to 10° C.

The second cycle is composed of high- temperature hot water (such as 120°C-85°C) and high- temperature cooling water. This refrigeration cycle can cool the air conditioning water at a relatively low temperature, such as from 10°C to 7°C. Two cycles run in series to complete the refrigeration cycle.

## Performance Curve



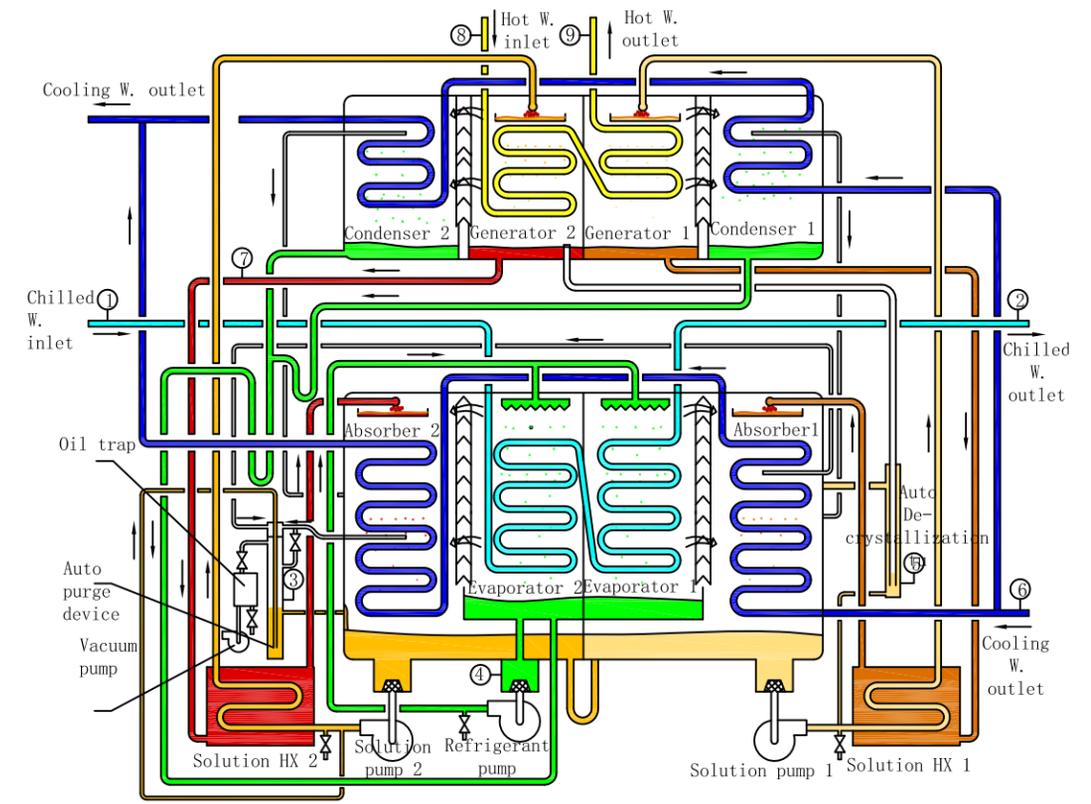
## Flow Diagram - Single Stage



- Concentrated solution
- Diluted solution
- Cooling water
- Chilled water
- Refrigerant water
- Hot water

- ① Chilled W. outlet temperature  
Chilled W. outlet target flow switch
- ② Chilled W. inlet temperature  
Chilled W. inlet target flow switch
- ③ Liquid level of auto purge device
- ④ Evaporator liquid level  
Evaporator temperature
- ⑤ Auto decrystallization tube temperature
- ⑥ Cooling W. inlet temperature  
Cooling W. inlet target flow switch
- ⑦ Hot W. inlet temperature
- ⑧ Hot W. outlet temperature

## Flow Diagram - Double Phase



- Concentrated solution 1
- Concentrated solution 2
- Diluted solution 1
- Diluted solution 2
- Chilled water
- Refrigerant water
- Hot water
- Cooling water

- ① Chilled W. outlet temperature  
Chilled W. outlet target flow switch
- ② Chilled W. inlet temperature  
Chilled W. inlet target flow switch
- ③ Liquid level of auto purge device
- ④ Evaporator liquid level  
Evaporator temperature
- ⑤ Auto decrystallization tube temperature
- ⑥ Cooling W. inlet temperature  
Cooling W. inlet target flow switch
- ⑦ Generator temperature
- ⑧ Hot W. inlet temperature
- ⑨ Hot W. outlet temperature

## 1. Interlock mechanical & electrical anti-freezing system: multi anti-freezing protection

The coordinated anti-freezing system features following merits: a lowered primary sprayer design for the evaporator, an interlock mechanism which links the secondary sprayer of evaporator with the supply of chilled water and cooling water, a pipe blockage prevention device, a two-hierarchy chilled water flow switch, an interlock mechanism designed for the chilled water pump and cooling water pump. Six levels anti-freezing design ensures timely detection of break, underflow, low temperature of chilled water, automatic actions will be taken to prevent tube freezing.

## 2. Auto purge system combining multi-ejector & fall-head technology: Speedy vacuum pumping and high vacuum degree maintenance

This is a new, high efficiency automatic air purge system. The ejector functions as a small air extraction pump. DEEPBLUE automatic air purge system adopts multiple ejectors to increase the air extraction and purge rate of unit. Water head design can help to evaluate vacuum limits and maintain a high vacuum degree. This design can provide a high vacuum degree for every part of unit at any time. Therefore, oxygen corrosion is precluded, service life time is prolonged and optimal operating status is maintained for unit.

## 3. Simple and reliable system pipe design: easy operation and reliable quality

Maintainable structure design: spray plate in absorber and spray nozzle in evaporator are replaceable. Ensure capacity will not drop in life span. No solution regulation valve, refrigerant spray valve and high pressure refrigerant valve, so the leakage points are less, and unit can keep stable operation without manual regulation.

## 4. Automatic anti-crystallization system combining level difference dilution and crystal dissolution: eliminate crystallization

A self-contained temperature & level difference detection system enables chiller to monitor excessively high concentration of the concentrated solution. On one hand upon detecting an overly high concentration the chiller automatically feeds refrigerant water to concentrated solution for dilution, on the other hand, the chiller utilizes HT LiBr solution in generator to heat concentrated solution to a higher temperature. In the event of a sudden power failure or abnormal shutdown, potential difference-based dilution system will start rapidly to dilute LiBr solution and to ensure rapid dilution after power supply recovers.

## 5. Tube broken alarm device

When the heat exchange tubes broke in chiller at abnormal condition, control system send out an alarm to remind operator to take actions, reduce damage.

## 6. Self-adaptive refrigerant storage unit: Improving part load performance and shortening startup/shutdown time

The refrigerant water storage capacity can be automatically adjusted according to external load changes, particularly when chiller works under partial load. The adoption of refrigerant storage device can shorten startup/shutdown time substantially and reduce idle work.

## 7. Economizer: Energy output boosting

Isooctanol with a conventional chemical structure as an energy boosting agent added to LiBr solution, is normally an insoluble chemical that has only a limited energy boosting effect. The economizer can prepare mixture of isooctanol and LiBr solution in a special way to guide isooctanol into generation and absorption process, therefore enhancing energy boosting effect, effectively reducing energy consumption and realizing energy efficiency.

## 8. Integral sintered sight glass: a powerful guarantee for high vacuum performance

The leakage rate of the whole unit is lower than  $2.03 \times 10^{-9} \text{ Pa} \cdot \text{m}^3 / \text{s}$ , which is 3 grade higher than national standard, can ensure unit's life span.

## 9. Unique surface treatment for heat exchange tubes: high performance in heat exchanging & less energy consumption

The evaporator and absorber have been hydrophilic treated to ensure even liquid film distribution on tube surface. This design can improve heat exchange effect and lower energy consumption.

## 10. $\text{Li}_2\text{MoO}_4$ Corrosion inhibitor: an environment-friendly corrosion inhibitor

Lithium Molybdate ( $\text{Li}_2\text{MoO}_4$ ), an environment-friendly corrosion inhibitor, is used to replace  $\text{Li}_2\text{CrO}_4$  (Containing heavy metals) during the preparation of LiBr solution.

## 11. Frequency control operation: An energy-saving technology

Chiller can adjust its operation automatically and maintain optimal working according to different cooling load.

## 12. Plate heat exchanger: Saving more than 10% energy

A stainless corrugated steel plate heat exchanger is adopted. This type of plate heat exchanger has a very sound effect, a high heat recovery rate and remarkable energy saving performance. Meanwhile, the stainless steel plate has a service life of over 20 years.

## 1. Fully-automatic control function

The control system (AI, V5.0) is featured by powerful and complete functions, such as one-key start up/ shutdown, timing on/off, mature safety protection system, multiple automatic adjustment, system interlock, expert system, human machine dialogue(multi languages), building automation interfaces, etc.

## 2. Complete chiller abnormality self-diagnosis and protection function

The control system (AI, V5.0) features 34 abnormality self-diagnosis & protection functions. Automatic steps will be taken by system according to level of an abnormality. This is intended to prevent accidents, minimize human labor and ensures a sustained, safe and stable operation of chiller.

## 3. Unique load adjustment function

The control system (AI, V5.0) has a unique load adjustment function, which enables automatic adjustment of chiller output according to actual load. This function not only helps to reduce startup/shutdown time and dilution time, but also contributes to less idle work and energy consumption.

## 4. Unique solution circulation volume control technology

The control system (AI, V5.0) employs an innovative ternary control technology to adjust circulated solution volume. Traditionally, only parameters of generator liquid level are used to control of solution volume. This new technology combines merits of concentration & temperature of concentrated solution and liquid level in generator. Meanwhile, an advanced frequency-variable control technology is applied to solution pump to enable chiller to achieve an optimal circulated solution volume. This technology improves operating efficiency and reduces startup time and energy consumption.

## 5. Cooling water temperature control technology

The control system (AI, V5.0) can control heat source input according to cooling water inlet temperature changes. By maintaining cooling water inlet temperature within 15-34 °C, chiller operate safely and efficiently.

## 6. Solution concentration control technology

The control system (AI, V5.0) uses a unique concentration control technology to enable real-time monitoring/control of concentration and volume of concentrated solution as well as heat source input. This system can maintain chiller under safe and stable at high-concentration condition, improve chiller operating efficiency and prevent crystallization.

## 7. Intelligent automatic air extraction function

The control system (AI, V5.0) can realize real-time monitoring of vacuum condition and purge out the non-condensable air automatically.

## 8. Unique dilution stop control

This control system (AI, V5.0) can control operation time of different pumps required for dilution operation, according to concentrated solution concentration, ambient temperature and remaining refrigerant water volume. Therefore, an optimal concentration can be maintained for the chiller after shutdown. Crystallization is precluded and chiller re-start time is shortened.

## 9. Working parameter management system.

Through interface of this control system (AI, V5.0), operator can perform any of following operations for 12 critical parameters relating to chiller performance: real-time display, correction, setting. Records can be kept for historical operation events.

## 10. Chiller fault management system

If any prompt of occasional fault is displayed on operation interface, this control system(AI, V5.0) can locate and detail fault, propose a solution or trouble shooting guidance. Classification and statistical analyses of historical faults can be conducted to facilitate maintenance service provided by operators.

## Remote Operation&Maintenance System

Deepblue Remote Monitoring Center collects the data of the units distributed around the world. Through the classification, statistics, and analysis of real-time data, it displays in the form of reports, curves, and histograms to achieve an overall overview of equipment operating status and fault information control. Through a series of collection, calculation, control, alarm, early warning, equipment ledger, equipment operation and maintenance information and other functions, as well as customized special analysis and display functions, the remote operation, maintenance, and management needs of the unit are finally realized. The authorized client can browse the WEB or APP, which is convenient and fast.



## Single Stage Hot Water Absorption Chiller Parameter

Model	RXZ(95/85)-	35	58	93	116	145	174	233	291	349	465	582	698	756	
Cooling capacity	kW	350	580	930	1160	1450	1740	2330	2910	3490	4650	5820	6980	7560	
	×10 <sup>4</sup> kcal/h	30	50	80	100	125	150	200	250	300	400	500	600	650	
	USRT	99	165	265	331	413	496	661	827	992	1323	1653	1984	2152	
Chilled water	Inlet/outlet temp	℃	12→7												
	Flow rate	m <sup>3</sup> /h	60	100	160	200	250	300	400	500	600	800	1000	1200	1300
	Pressure drop	kpa	70	80	80	90	90	80	80	80	60	60	70	80	80
	Joint connection	DN(mm)	100	125	150	150	200	250	250	250	250	300	350	400	400
Cooling water	Inlet/outlet temp	℃	30→36												
	Flow rate	m <sup>3</sup> /h	113	188	300	375	469	563	750	938	1125	1500	1875	2250	2438
	Pressure drop	kpa	65	70	70	75	75	80	80	80	70	70	80	80	80
	Joint connection	DN(mm)	125	150	200	250	250	300	350	350	350	400	450	500	500
Hot water	Inlet/outlet temp	℃	95→85												
	Flow rate	m <sup>3</sup> /h	38	63	100	125	156	188	250	313	375	500	625	750	813
	Pressure drop	kpa	76	90	90	90	90	95	95	95	75	75	90	90	90
	Joint connection	DN(mm)	80	100	125	150	150	200	250	250	250	300	300	300	300
Power demand	kW	2.8	3	3.8	4.2	4.4	5.4	6.4	7.4	7.7	8.7	12.2	14.2	15.2	
Dimension	Length	(mm)	3100	3100	4120	4860	4860	5860	5890	5920	6920	6920	7980	8980	8980
	Width	(mm)	1400	1450	1500	1580	1710	1710	1930	2080	2080	2850	2920	3350	3420
	Height	(mm)	2340	2450	2810	2980	3180	3180	3490	3690	3720	3850	3940	4050	4210
Operation weight	t	6.3	8.4	11.1	14	17	18.9	26.6	31.8	40	46.2	58.2	65	70.2	
Shipment weight	t	5.2	7.1	9.3	11.5	14.2	15.6	20.8	24.9	27.2	38.6	47.8	55.4	59.8	

- Cooling water inlet temp. range: 15℃-34℃, minimum chilled water outlet temp. -2℃.
- Cooling capacity regulation range 10%~100%.
- Chilled water, cooling water and hot water fouling factor: 0.086m<sup>2</sup>/kW.
- Chilled water, cooling water and hot water maximum working pressure: 0.8MPa.
- Power type: 3Ph/380V/50Hz (or customized).
- Chilled water flow adjustable range 60%-120%, cooling water flow adjustable range 50%-120%.
- Hope Deepblue reserves the right of interpretation, the parameters may be amended at final design.

## Double Phase Hot Water Absorption Chiller Parameter

Model	RXZ(120/68)-	35	58	93	116	145	174	233	291	349	465	582	698	756	
Cooling capacity	kW	350	580	930	1160	1450	1740	2330	2910	3490	4650	5820	6980	7560	
	×10 <sup>4</sup> kcal/h	30	50	80	100	125	150	200	250	300	400	500	600	650	
	USRT	99	165	265	331	413	496	661	827	992	1323	1653	1984	2152	
Chilled water	Inlet/outlet temp	℃	12→7												
	Flow rate	m <sup>3</sup> /h	60	100	160	200	250	300	400	500	600	800	1000	1200	1300
	Pressure drop	kpa	60	60	70	65	65	65	60	60	60	90	90	120	120
	Joint connection	DN(mm)	125	150	200	250	250	300	350	350	400	400	450	500	500
Cooling water	Inlet/outlet temp	℃	30→36												
	Flow rate	m <sup>3</sup> /h	113	188	300	375	469	563	750	938	1125	1500	1875	2250	2438
	Pressure drop	kpa	70	70	80	70	70	70	60	60	60	90	90	110	110
	Joint connection	DN(mm)	125	150	200	250	250	300	350	350	350	400	450	500	500
Hot water	Inlet/outlet temp	℃	120→68												
	Flow rate	m <sup>3</sup> /h	7	12	19	24	30	36	48	60	72	96	120	144	156
Power demand	kW	3.9	4.1	5	5.4	6	7	8.4	9.4	9.7	11.7	16.2	17.8	17.8	
Dimension	Length	(mm)	4105	4105	5110	5890	5890	6740	6740	6820	7400	7400	8720	9670	9690
	Width	(mm)	1775	1890	2180	2244	2370	2560	2610	2680	3220	3400	3510	3590	3680
	Height	(mm)	2290	2420	2940	3160	3180	3240	3280	3320	3480	3560	3610	3780	3820
Operation weight	t	7.4	9.7	15.2	18.4	21.2	23.8	29.1	38.6	44.2	52.8	69.2	80	85	
Shipment weight	t	6.8	8.8	13.8	16.1	18.6	21.2	25.8	34.6	39.2	46.2	58	67	71.2	

- Cooling water inlet temp. range: 15℃-34℃, minimum chilled water outlet temp. 5℃.
- Cooling capacity regulation range 10%~100%.
- Chilled water, cooling water and hot water fouling factor: 0.086m<sup>2</sup>/kW.
- Chilled water, cooling water and hot water maximum working pressure: 0.8MPa.
- Power type: 3Ph/380V/50Hz (or customized).
- Chilled water flow adjustable range 60%-120%, cooling water flow adjustable range 50%-120%.
- Hope Deepblue reserves the right of interpretation, the parameters may be amended at final design.

## Model Selection

### Chilled Water Outlet Temperature

Besides the specified chilled water outlet temperature of a standard chiller, other outlet temperature values (Min -2°C) may also be selected.

### Pressure Bearing Requirements

The design pressure bearing standard capacity of the chilled water/cooling water system of the chiller is 0.8MPa. If the actual pressure of the water system exceeds this standard value, a HP type chiller should be used.

### Unit QTY

If more than one unit are used, the unit's QTY should be determined by comprehensive consideration of max load, partial load, maintenance period as well as machine room's size.

### Control Mode

The hot water absorption chiller is supported by an AI (artificial intelligence) control system that enables automatic operation. Meanwhile, there are a number of options available for the customers, such as control interfaces for the chilled water pump, cooling water pump, cooling tower fan, building control, centralized control system and IoT access.



## Scope of Supply

Item	Qty	Remarks
Main body	1 set	Generator, condenser, evaporator, absorber, solution heat exchanger, auto purge device, etc.
Hot water regulating valve	1 set	
Canned pump	2/3 unit	
Vacuum pump	1 set	
LiBr solution	adequate	
Control system	1 kit	Including sensor & control elements (liquid level, pressure, flow rate and temperature), PLC and touchscreen
Frequency converter	1 set	
Commissioning tools	1 kit	Thermometer and common tools
Accompanying accessories	1 set	Refer to Packing List, which can meet the demand for 5 years maintenance.
Documents	1 set	Including Quality Certificate, Packing List, User Manual, Accessories' User Manual, etc.

## List of Models

### Hot Water Absorption Chiller

Item	Type	Features	Remarks
Heat source	Hot water	When placing an order, please specify requirements for the temperature /flow rate of hot water. If you desire a big hot water temperature difference, please specify in detail the expected temperature of the return hot water prior to placing an order.	
	HP type	When the Chilled water/cooling water system pressure is more than or equal to 0.8MPa, a HP water chamber may be adopted. The pressure bearing capacity may be 0.8-1.6MPa or 1.6-2.0MPa.	
Special order	Big Delta T	The standard chilled water inlet/outlet Delta T difference is 5-10°C, or bigger by special order.	When place an order, please specify the following details in the contract or annexes: QTY, parameters and any other requirements of a special order.
	LT type	The chilled water outlet temperature is as low as -2°C to meet the requirements of special processes.	
	Vessel-applied type	This type applies to occasions with slight wobbling. Seawater can be used as cooling water.	
	Split shipment type	Considering the dimension limitations of passages in the user's machine room, chiller unit can be separately transported and assembled at site.	

## Machine Room Design and Construction

### Scope of Delivery and Construction

Items	Description	Scope of Delivery and Construction		Remarks
		Deepblue	User	
Unit	Chiller and accessories	●		Please refer to Scope of Supply.
Performance test	Ex-factory performance test	●		
	Site commissioning	●		Depends on Sales Contract
Transportation to the site	From the factory to the worksite		●	Depends on Sales Contract
	From the worksite to the mounting		●	Depends on Sales Contract
	Installation in place		●	Depends on Sales Contract
	Chiller assembly (separate delivery)	●		The user must provide welding equipment, nitrogen and other necessary tools.
Electrical engineering	Sensors and meters	●		The user must be responsible for laying remote control cables.
	External electrical wiring engineering		●	The wires extend till the outlet of the wiring terminal of the control cabinet.
Other engineering	Foundation construction		●	
	External tubing engineering		●	
	Air extraction system		●	
	Tubing system anti-freezing measures		●	During winter shutdowns, please adopt anti-freezing measures for the water tubing.
	Cooling water quality management		●	Please set the cooling water discharge valve or other unit to enable proper water quality.
	Insulation engineering		●	Optional, depends on Sales Contract
Other	LiBr solution	●		
	Operation training & instructions	●		

## ◆ Site Selection of the Machine Room

The hot water absorption chiller can operate stably, safely and reliably with very little noise, so it may be installed in the basement or on the first floor, middle floors or rooftop or in independent machine rooms.

## ◆ Ambient Temperature in the Machine Room

The temperature should be controlled within the range of 5-43°C.

## ◆ Machine Room Ventilation

The machine room should have a good ventilation environment.

## ◆ Drainage

The machine room should be equipped with good drainage facilities:

- ★ Drains covered by cast iron grates should be available around the chiller. Water in the drains can flow out of the machine room without difficulty.
- ★ All the discharge pipes and signal pipes in the machine room should be installed at a visible place above the drains. They should not be installed in the drains.
- ★ Sump pits and submerged pumps should be available in a machine room located in the basement. Automatic control devices should be provided to enable automatic drainage.

## ◆ Machine Room Arrangement

The installation location of the machine room should ensure handy operation and adequate maintenance space. A 1-meter-wide operation space (minimum) should be left at the front of the electrical control cabinet, a 0.3m distance (minimum) should be reserved between the top of the chiller and the bottom of the beam of the machine room, a 1.2-meter-wide space (minimum) should be left for the other sides of the chiller. A space for drawing heat conducting tubes (length: no less than the tube length) should be reserved at any end of the lengthwise direction of the chiller. If this space can not be reserved, a window or door may be designed for tube drawing.

## ◆ Chiller Foundation

The unit's foundation may be designed on the basis of the dead load of the unit. The design should ensure stable, firm and unsinkable, otherwise the unit may suffer damage or a shortened service life.

## ◆ Tubing System

The tubing system should be designed and planned as a whole in compliance with the requirements of the applicable standards and regulations. The tubes should be arranged in an orderly and neat way. Try to adopt overhead installation. The tubes should be firmly supported. The gravity of external tubing must not be applied to the chiller.

## ◆ Water Supply System

Flexible joints must be fitted for chilled water/cooling water supply to the chiller. A filter must be fitted for the inlet end at a place easy for disassembly. If the hydrostatic pressure of the water supply system is more than 30mH<sub>2</sub>O, it is recommended that the water pump be installed on the outlet side so as to relieve unnecessary pressure load. Tubes at both inlet and outlet ends should be easy to uninstall. This is intended to facilitate the cleaning of heat conducting tubes by opening the watertight cover.

## ◆ Electric System

The design of the electrical system in the machine room must match the control system of the unit to achieve full automation.



### Delivery Status:

Delivery usually takes the form of whole-unit delivery.

Transportation suggestion: During the lifting process of the chiller, it should be carried out in accordance with the "Lifting Instruction" provided by Hope Deepblue. Lifting ropes and fastening devices can only be placed at the indicated marks on the chiller.

### Installation in Place:

A layer of steel plate and rubber sheet should be laid on the foundation of the chiller. After the chiller is in place, the length direction and width should be corrected with the small holes ( $\varphi 4$ ) on both sides as the reference point, and the levelness of the chiller should be controlled within 1/1000. There should be no gap between the bracket of the chiller and the foundation to ensure the uniform pressure.

During the lifting, installation and construction of the chiller, protective measures should be taken and strictly forbid to hit the chiller with heavy objects and to screw the valve to prevent it from being damaged.

### Water Quality Management

The cooling water evaporates continuously through the cooling tower, in which the salt is concentrated, and the water quality deteriorates, causing corrosion and fouling in the heat transfer tube of the chiller. The high temperature in summer causes algae to grow, dirt and scale increase the thermal resistance of the heat exchange tube, which greatly reduces the cooling capacity of the chiller.

### Refer to the following table for the water quality requirements on cooling water

Item	Unit	Makeup Water	Cooling Water Requirements	Tendency	
				Corrosion	Scaling
pH value(25°C)		6.5-8.0	6.5-8.0	△	△
Conductivity (25 °C)	$\mu S / cm$	<200	<800	△	
Chloride ion $Cl^-$	$mgCl^- / L$	<50	<200	△	
Sulfate ion $SO_4^{2-}$	$mgSO_4^{2-} / L$	<50	<200	△	
Acid consumption (pH:4.8)	$mgCaCO_3 / L$	<50	<100		△
Total hardness	$mgCaCO_3 / L$	<50	<200		△
Ferric ion (Fe)	$mgFe / L$	<0.3	<1.0	△	△
Sulfide ion $S^{2-}$	$mgS^{2-} / L$	Undetectable	Undetectable	△	
Ammonium ion $NH_4^+$	$mgNH_4^+ / L$	<0.3	<1.0	△	
Silicon dioxide $SiO_2$	$mgSiO_2 / L$	<30	<50		△

## Hope Deepblue LiBr Absorption Chiller Control System Support Multiple Protocols

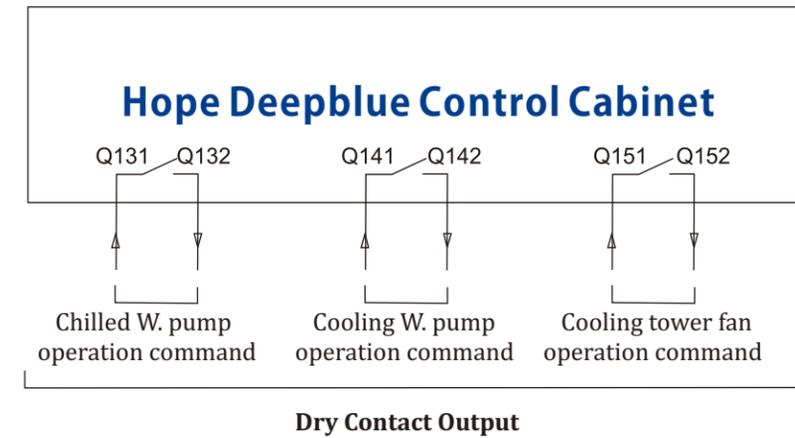
- Point to point interface----PPI protocol
- Multi-point --MPI protocol
- PROFIBUS ----PROFIBUS protocol
- Free interface-----User defined protocol

### Control System Site Construction Project

Item	Installation place & Requirement	Material source	Deepblue construction	User construction	
Power supply	In control cabinet	User	In-cabinet connection	Lay 5×6mm <sup>2</sup> cables (wires) under the control cabinet	
Ground connection	Ground resistance ≤10Ω	User	Connection	Lay the grounding grid and connect the wire to the bottom of the unit control cabinet	
IoT	Interface in control cabinet	Users provide Internet	In-cabinet plug-in line	Lay the network cable under the control cabinet	
PC Monitor < (1200m)	In user's monitoring room, in control cabinet	Deepblue (Optional accessories)	On-site installation	Lay the seven-core cable from the monitoring room to the bottom of the unit control cabinet	
Domestic hot water temperature probe base (three-purpose unit)	In user's mixing tank domestic hot water outlet, in control cabinet	Deepblue	Instructed installation	Welded the probe base, the 3 control wires are laid from the bottom of it to the bottom of the unit control cabinet	
Domestic hot water circulating pump start-stop control (three-purpose unit)	Domestic hot water circulating pump control panel, in control cabinet	User	Instructed installation	Lay the 4 control wires from the domestic hot water circulating pump control panel to the bottom of the unit control cabinet	
Oil level sensor (fuel type unit)	Daily fuel tank/ storage tank	Deepblue (Optional)	Instructed installation	Lay the 4 control wires and the oil pump control panel under the control cabinet of the unit	
Gas leak detector (Gas-fired unit)	Installed at poorly ventilated place and close to gas pipe line	User	In-cabinet connection	Install the detector, and lay the 2 control wires from the detector to the bottom of the unit control cabinet	
Fire detector	According to the requirements of Fire Dept	User	In-cabinet connection	Lay the 2 control wires from the detector to the bottom of the unit control cabinet	
Building interface	In control cabinet	Deepblue (Optional)	In-cabinet connection	Lay the control wires under the control cabinet of the unit	
Chilled/hot water pump	Frequency conversion linkage control	Inside or near the power distribution panel in the machine room	User	In-cabinet connection	Each motor has 2 control wires, and another 2 spare control wires, which are laid by the power distribution panel in the machine room to the lower part of the unit control cabinet.
Cooling water pump					
Cooling tower fan	Frequency conversion linkage control	In control cabinet	User	In-cabinet connection	
Domestic hot water circulating pump					

Note: The control wire is 0.75mm<sup>2</sup> multi-strand soft copper wire

### Interlock Control Diagram for User Water System



Note:

- The capacity of the output relays for the interlock control terminals of above water pumps is AC250V,5A (resistance load).
- Q131,Q132,Q141,Q142,Q151,Q152 are numbers of wirings inside the control cabinet.
- The chilled W. pump and cooling W. pump must be interlocked control during operation of the unit.

### Communication interface pins are assigned as follows

Pin ( 9 pin female connector)	PROFIBUS Name	System communication interface
1	RS-485 Signal A	RS-485 Signal A
2	RS-485 Signal B	RS-485 Signal B

Project Background				
Project Name				
Chiller Application		<input type="checkbox"/> Comfort A/C <input type="checkbox"/> Industrial process cooling/heating		
Chiller Installation Environment		<input type="checkbox"/> Safe <input type="checkbox"/> Combustible <input type="checkbox"/> Corrosive air <input type="checkbox"/> Dusty		
NOTE: Safe means the environment is not harmful to human being and chiller operation.				
Chiller				
Chiller Type		<input type="checkbox"/> Hot water <input type="checkbox"/> Steam <input type="checkbox"/> Direct fired <input type="checkbox"/> Multi-energy		
Unit Cooling(Capacity)		-----Kw		
Unit Heating(Capacity)		-----Kw		
QTY				
Heat Source	<input type="checkbox"/> Steam	Source	<input type="checkbox"/> Boiler <input type="checkbox"/> District heating <input type="checkbox"/> Others	
		Pressure	<input type="checkbox"/> 0.4Mpa <input type="checkbox"/> 0.6Mpa <input type="checkbox"/> 0.8Mpa <input type="checkbox"/> Others	
	<input type="checkbox"/> Direct fire	Type	<input type="checkbox"/> NG <input type="checkbox"/> Coal gas <input type="checkbox"/> LGP <input type="checkbox"/> Others	
		Species	Heat value      Kcal/Nm <sup>3</sup> Pressure      Mpa	
	<input type="checkbox"/> Fuel	Type	<input type="checkbox"/> Heavy Oil <input type="checkbox"/> Waste Oil	
	<input type="checkbox"/> Hot water	Viscosity	-----	
	<input type="checkbox"/> Exhaust	Inlet/Outlet	<input type="checkbox"/> 95-85°C <input type="checkbox"/> Other _____ °C	
		Pressure	_____ to _____ Mpa	
	Water Temp.	Chilled water	Inlet/Outlet	<input type="checkbox"/> 12-7°C <input type="checkbox"/> 23-16°C <input type="checkbox"/> Other _____ to _____ °C
			Pressure	<input type="checkbox"/> 0.8Mpa <input type="checkbox"/> 1.0Mpa <input type="checkbox"/> Other _____ Mpa
Domestic hot water		Inlet/Outlet	<input type="checkbox"/> 55.8-60°C <input type="checkbox"/> Other _____ to _____ °C	
		Pressure	<input type="checkbox"/> 0.8Mpa <input type="checkbox"/> 1.0Mpa <input type="checkbox"/> Other _____ Mpa	
Cooling water	Inlet/Outlet	<input type="checkbox"/> 30-36°C <input type="checkbox"/> 32-37°C <input type="checkbox"/> Other _____ to _____ °C		
	Pressure	<input type="checkbox"/> 0.8Mpa <input type="checkbox"/> 1.0Mpa <input type="checkbox"/> Other _____ Mpa		
Water Quality	Chilled water	<input type="checkbox"/> Standard <input type="checkbox"/> Special		
	Domestic hot water	<input type="checkbox"/> Standard <input type="checkbox"/> Special		
	Cooling water	<input type="checkbox"/> Standard <input type="checkbox"/> Special		
	Hot water	<input type="checkbox"/> Standard <input type="checkbox"/> Special		
Operation Condition	Operation Time/Day	<input type="checkbox"/> 24hours <input type="checkbox"/> 8-10hours <input type="checkbox"/> _____ hours		
	Operation Time/Year	<input type="checkbox"/> All Year <input type="checkbox"/> Summer <input type="checkbox"/> Winter <input type="checkbox"/> Other		
		Average Load	<input type="checkbox"/> >=90% <input type="checkbox"/> 75-90% <input type="checkbox"/> 60-75% <input type="checkbox"/> Other	
Lead Time	_____ days			
Other	_____			
NOTE:Please full fill as much as possible.				



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