

XINLEI COMPRESSOR CO.,LTD.

MAGNETIC LEVITATION VARIABLE FREQUENCY CENTRIFUGAL HEAT PUMP UNIT

XINLEI COMPRESSOR CO.,LTD.

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Please contact the sales person for more product information and service materials. Xinlei reserves the right of final interpretation of this catalog.

- High efficiency and energy saving
- Low noise and silence
- Intelligent control
- Low carbon and environmental protection



XINLEI GROUP SPECIALIZED MANUFACTURER OF INTELLIGENT HVAC EQUIPMENT

Xinlei was founded in Taizhou, Zhejiang Province. On January 19, 2023, Xinlei was listed on the main board of Shenzhen Stock Exchange. As a leading enterprise in the industry, Xinlei independent research and development production of air energy across the piston, screw, magnetic levitation centrifugal all-fluid plate.

Various types of products achieve high energy efficiency breakthroughs under the continuous innovation, access to more than 300 authorized patents. Xinlei has been recognized as a national "Specialized and New" little giant enterprise. Up to now, Xinlei has more than 800 distribution outlets in more than 100 countries and regions around the world. Our energy-saving equipment and smart solutions are widely recognized by the market and our customer partners.

Over the years, Xinlei has been striving to provide customers with a comfortable, energy-efficient, environmentally friendly and convenient indoor environment. With the service tenet of "Innovation reflects Value", we serve every customer with heart and soul. Xinlei has many experienced pre-sales, sales and after-sales service personnel. Our team has a strong technical ability, creating a new world of "energy saving, environmental protection and intelligence" in the field of aerodynamics.

1876

The world's first air conditioner was born in the United States

In the 20 years since the invention of air conditioning, it has always been machines, not people, that have enjoyed air conditioning

1996

Xinlei brand was founded in the era of the national "Ninth Five-Year Plan" economic take-off

2000

Xinlei's self-developed and self-produced aerodynamic products entered the European and American markets

2006

Faced the "EU anti-dumping" lawsuit and won the preliminary ruling

The daily output is 12,000 units, accounting for more than 56% of the customs export data

2017

Comprehensively layout the air/magnetic levitation centrifuge market and has made the first breakthrough

2020

It has increased production by 30% and saved energy by 50% for Sinopec, which has taken a major step on the road of "domestic substitution" of high-end air energy manufacturing

2022

Xinlei's first maglev inverter centrifugal chiller (heat pump) unit was launched, with an energy-saving rate of up to 50%, triggering a new revolutionary journey in the industry

2023

Xinlei was successfully listed
Stock code 301317

Xinlei heat pump has achieved a breakthrough in high energy efficiency in continuous innovation

The 300RT and 1000RT water-cooled chilled water (heat pump) unit test benches have passed the certification of the National Testing Center

XINLEI

It is a high-tech enterprise committed to providing high-tech products and smart HVAC solutions for demand industries, focusing on providing smart HVAC overall solutions and related products and services for various demand industries with the fundamental starting point of solving user needs.

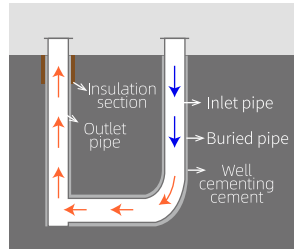
APPLICATION SCENE

Water and ground source heat pump units

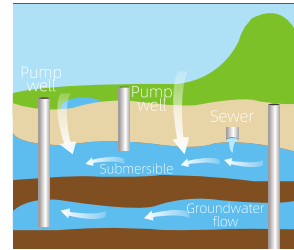
Heat source



Surface water source



land management water



underground water source



polluted water

5°C-20°C

Host equipment



High temperature water (ground)
source screw heat pump unit

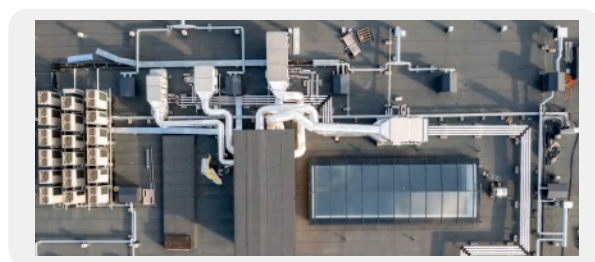
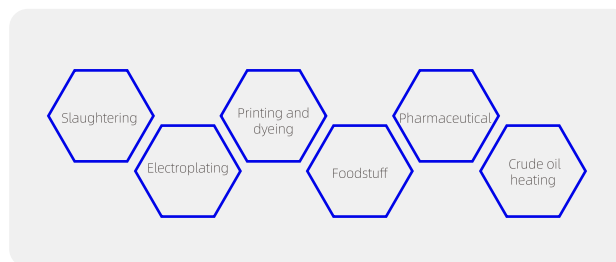
60°C-90°C



Magnetic levitation frequency
conversion centrifugal heat pump unit

40°C-65°C

Pipe network



40°C-65°C

Users



public buildings



commercial services



Aquaculture



agricultural insulation

Energy tower heat pump unit

Heat source



Low temperature environment

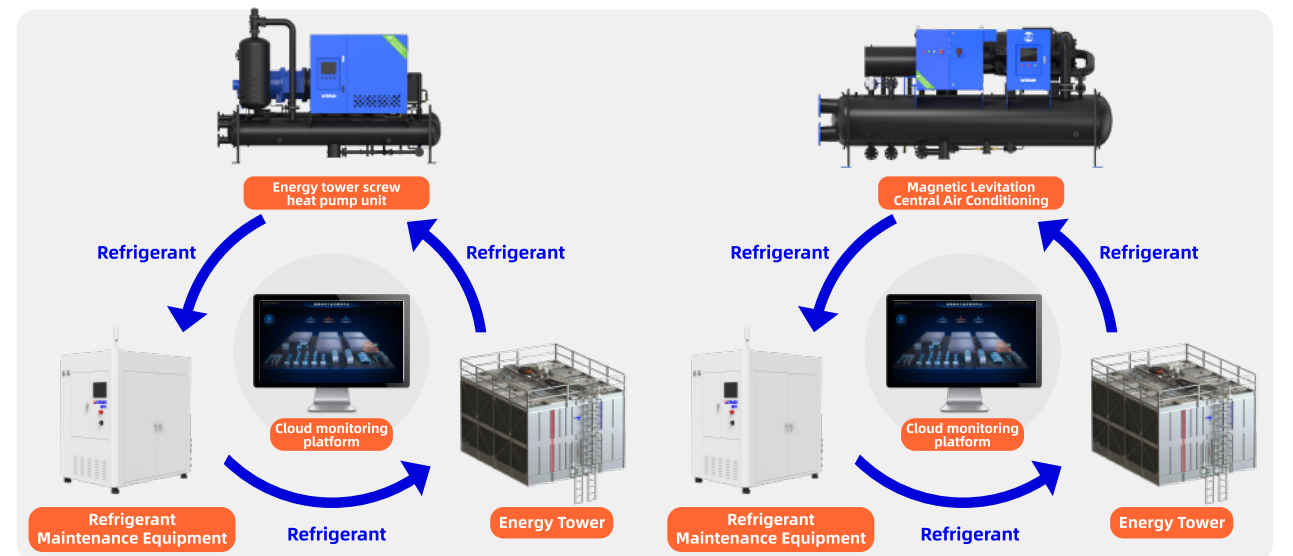
-25°C-43°C



Normal temperature environment

-2°C-43°C

Host equipment



Pipe network

40°C-65°C

secondary pipe network

Users



Industrial heating



residential buildings



commercial buildings

CREW COMPOSITION

■ Magnetic Levitation Variable Frequency Centrifugal Heat Pump Unit

It is mainly composed of magnetic levitation centrifugal compressor, evaporator, condenser, economizer, adjustable flow valve, airborne inverter and automatic control system. The compressor adopts magnetic bearing, no need for lubricating oil, **no need to worry about oil return limit**, "0" friction, high efficiency, stable and reliable.

■ Control cabinets

- PLC electronic control system, real-time monitoring of system operation data and trajectory, multiple **protection and early warning**;
- Internet of Things database management, the establishment of a background service platform, **and modular management of equipment energy efficiency**;



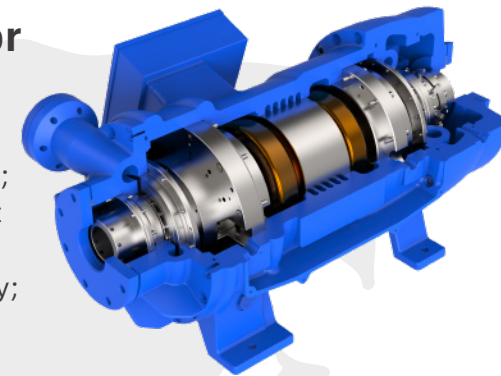
■ Intelligent operator panel

- Touch control screen, providing users with an intuitive interface, simple and convenient operation;
- Cloud remote monitoring, **automatic fault alarm**, easy to analyze the cause of failure;



■ Magnetic levitation centrifugal compressor

- Two-stage compression**, large surge margin, wider operating range;
- The impeller is horizontally opposed, and the axial force is small;
- Frequency conversion direct drive, low starting current, high unit efficiency;
- Magnetic bearing, running **0 friction**, no attenuation of efficiency;
- Stepper motor + guide vane mechanism is built-in, with accurate mechanical limit and high reliability.



■ Flash economizer

- The unit adopts two-stage compression and make-up gas enthalpy enhancement technology, which is **6%** more efficient than that of single-stage refrigeration circulation system.



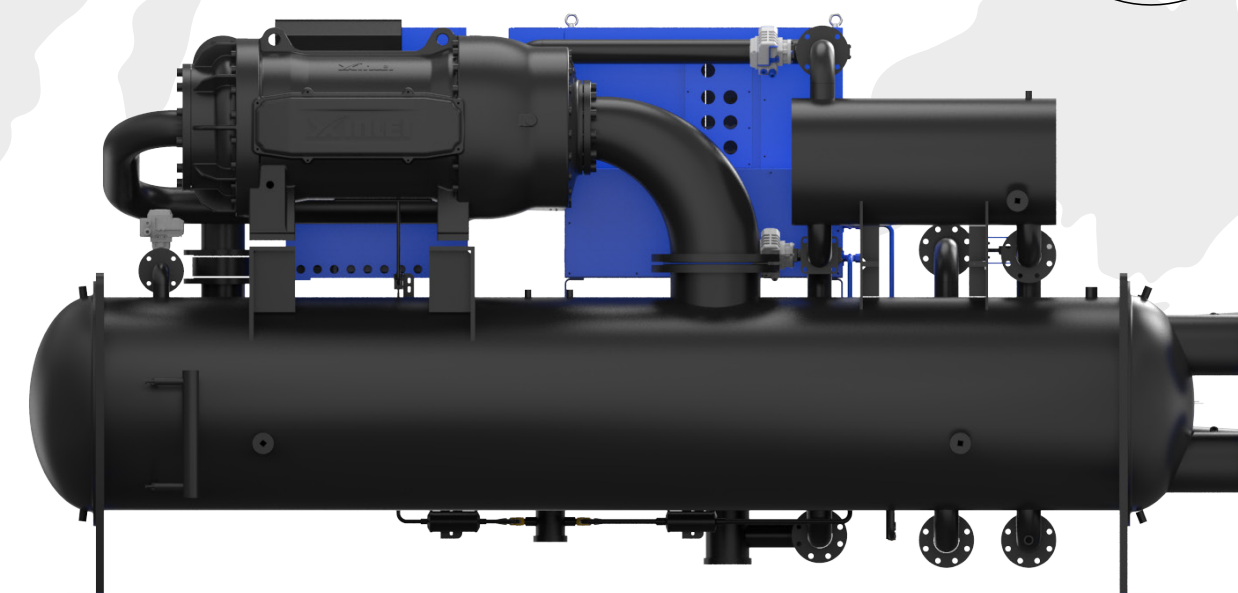
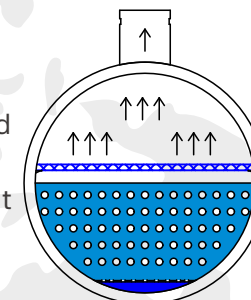
■ Electronic level gauge

- Real-time monitoring of the liquid level, automatic adjustment of the throttle valve opening, to ensure the stable and reliable operation of the system.



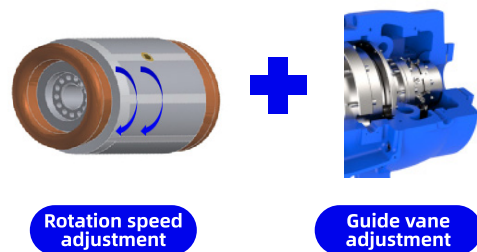
■ High-efficiency heat exchanger

- The heat exchanger adopts high-efficiency heat exchange tubes, and the inner and outer walls are strengthened for heat transfer to obtain excellent performance;
- Optimize the structure of the heat exchanger to effectively improve the heat exchange efficiency;

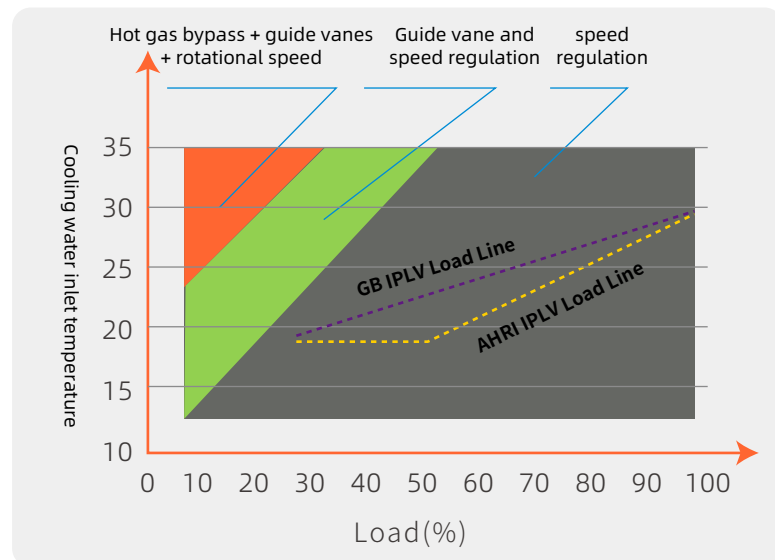


Product Technical Advantages

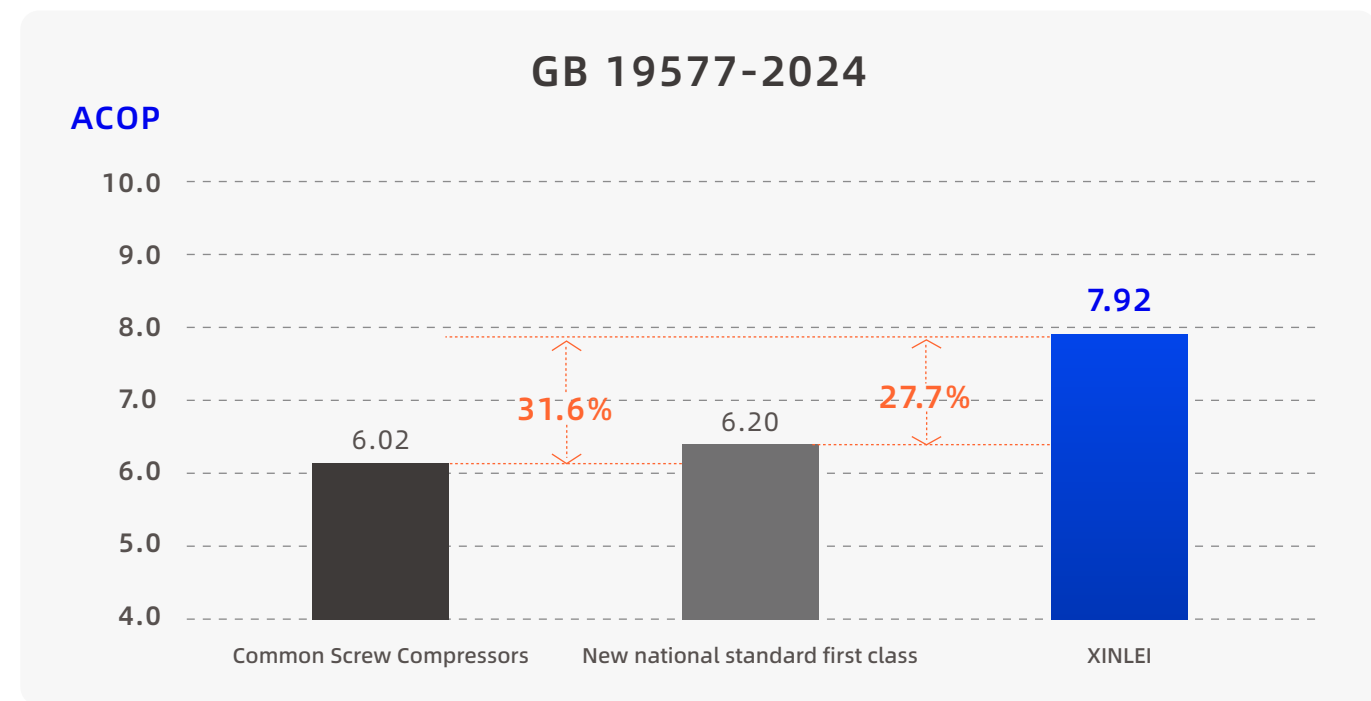
Wide-range, high-PR compressor for heat pumps



- The unit adopts frequency conversion speed control + imported guide vane (GV) to jointly regulate the cooling capacity, which can realize 10%~100% cooling capacity regulation for regular working conditions without hot gas bypass.
- MRC compressor adopts multi-condition design, mainly for air-conditioning conditions, taking into account the data center and water and ground source heat pump, heat recovery conditions.
- The MRC-H series compressor has a rated pressure ratio of 4.2 and a maximum pressure ratio of 6.0, and can be used in water and ground source high-temperature heat pumps, energy tower heat pumps, air-cooled heat pumps, ice storage and other scenarios.



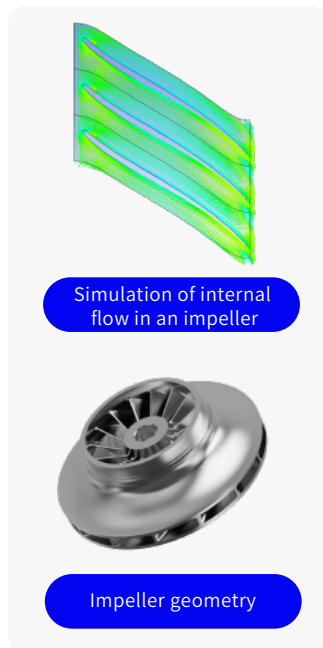
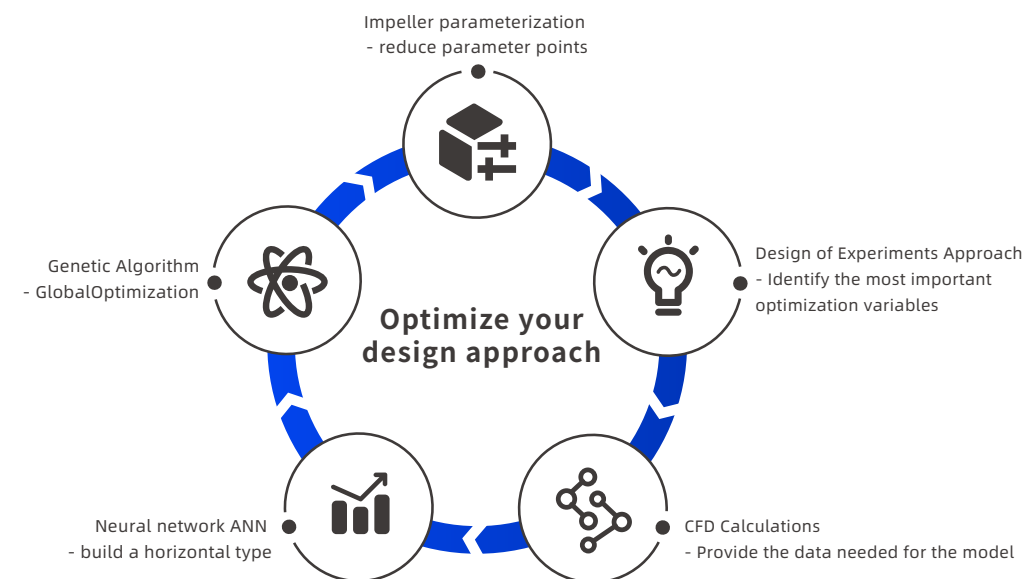
Full range of Class 1 energy efficiency



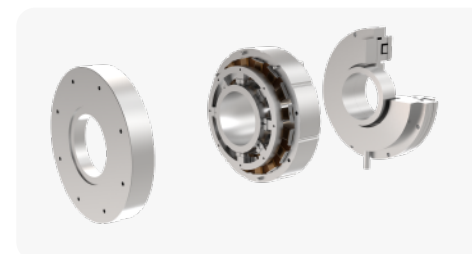
*The data in the above figure comes from the high-efficiency series units

Efficient, multi-condition pneumatic design

The impeller adopts the optimization technology of CFD calculation + neural network + genetic algorithm to optimize the parameters under a wide range of working conditions to achieve high efficiency of both rated and partial load.



Industrial-grade magnetic bearing technology

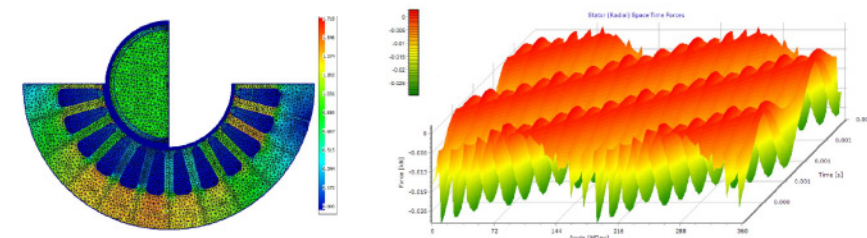


Xinlei magnetic bearings

- Radial and axial integrated modular design, compact structure and stable performance.
- No lubricating oil, zero friction, low power consumption, only 3~10% of conventional oil bearings, and the higher the speed, the more obvious the energy-saving effect.

Permanent magnet synchronous motor technology

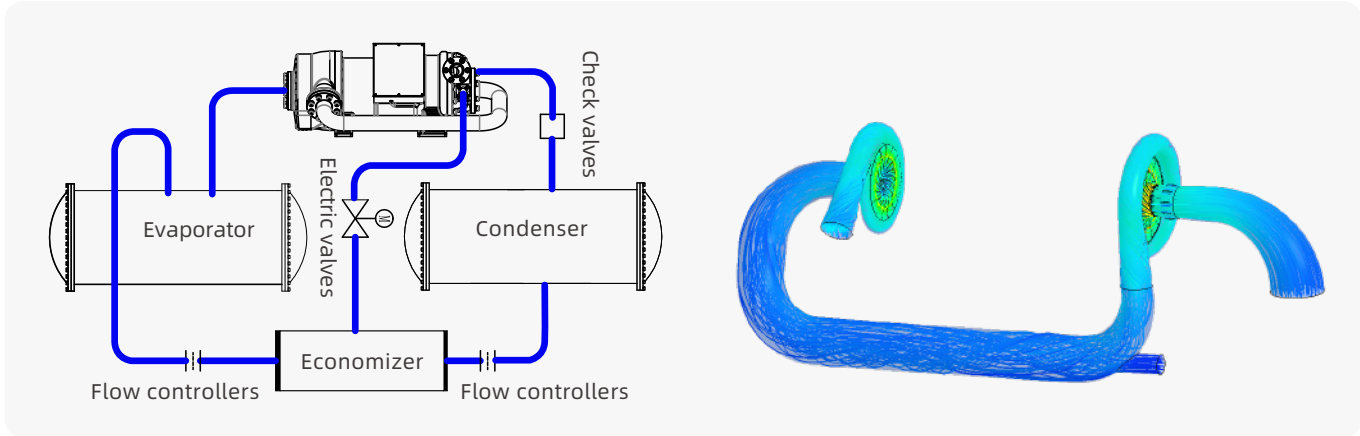
- The permanent magnet synchronous motor has a compact structure, and the motor efficiency is > 95% in all working conditions, and the maximum is 97.5%.
- The space vector pulse width modulation technology is used to achieve energy saving in the full load operating range.
- H-class insulation design, real-time monitoring of stator temperature, to achieve precise cooling of the motor, high reliability.



Electromagnetic finite element analysis of high-speed permanent magnet motors

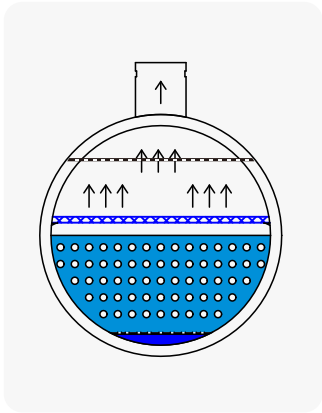
2D time-domain torque distribution of high-speed permanent magnet motors

■ Two-stage compression + gas enthalpy enhancement technology



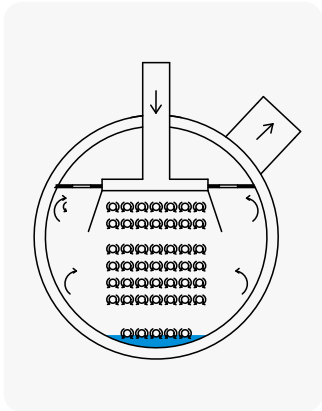
- CFD simulation and optimization of the whole flow field, high aerodynamic efficiency, innovative pipeline return design, uniform air supply, and small pressure loss.
- The two-stage compression and replenishment gas increase enthalpy, which is 6% higher than that of single-stage circulation.

■ High-efficiency evaporator



Flooded (standard)

- The liquid inlet of the evaporator adopts a homogenizing distributor to make the liquid refrigerant effectively and evenly distributed and improve the heat transfer efficiency.
- At the same time, the liquid blocking net on the upper part of the heat exchanger tube not only prevents the evaporator from carrying liquid, but also evenly distributes the refrigerant and pressure balance of the heat exchanger, avoids the appearance of dry pipes, and further improves the heat transfer efficiency of the heat exchanger.
- The heat exchange tube is equipped with a special high-efficiency full-liquid evaporation tube.
- Add an air baffle above the liquid baffle to prevent the evaporator from carrying liquid and improve the reliability of the flooded evaporator.



Falling film type (optional)

- With the design and manufacturing technology of falling film evaporator, falling film evaporator has high heat transfer efficiency and refrigerant charging, the advantage of a small amount of bets.

■ Condenser

- The air intake adopts a baffle and a homogenized exhaust structure, which effectively reduces the noise and vibration of the condenser, and evenly distributes the gas to the upper part of the heat exchange tube to flush the liquid film, making the heat transfer efficiency of the condenser higher.
- The special subcooler design technology makes the unit supercooled up to 5°C, effectively improving the energy efficiency of the unit.

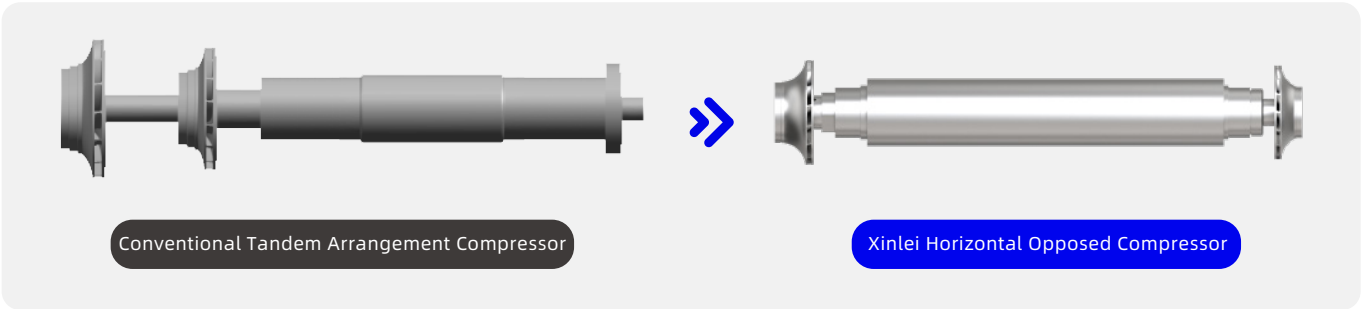


■ High-efficiency specialized breeding heat exchanger

- Adoption of new heat exchanger high-efficiency heat transfer technology.
- Application of anti-corrosion materials: according to the breeding water source and water quality requirements, heat exchanger tube material has copper (TP2) / stainless steel (S316L) / titanium tube (TA1) optional; tube plate and water chamber using carbon steel, stainless steel, titanium composite plate, etc., to achieve the requirements of corrosion prevention.

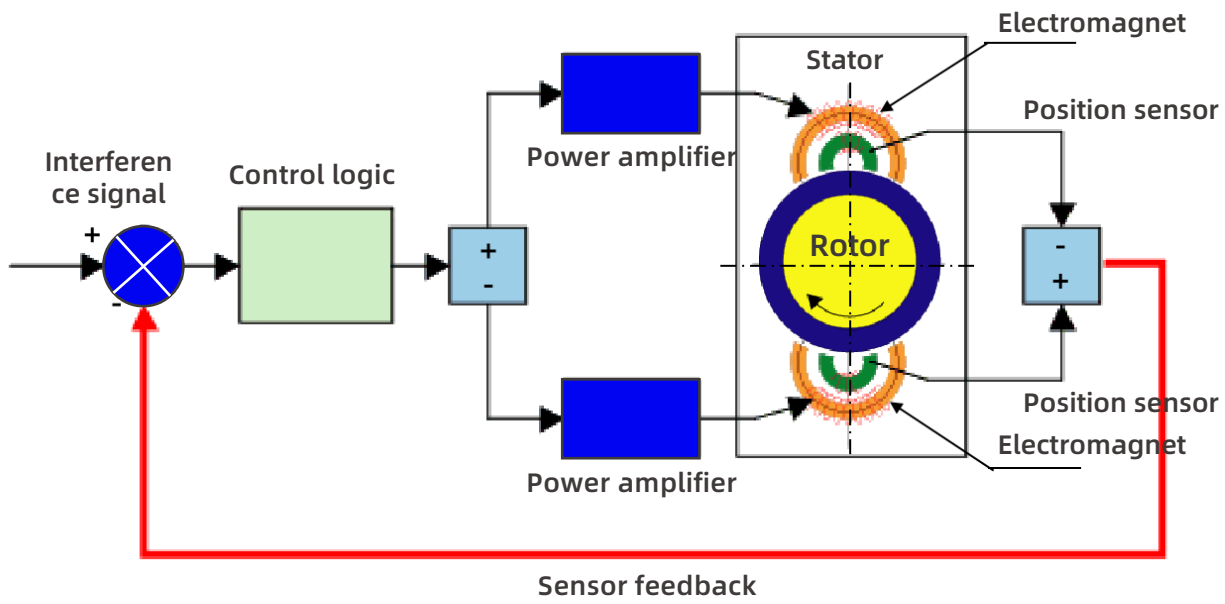


■ Direct drive + horizontally opposed technology



- Adopt direct drive, no transmission loss, 100% transmission efficiency.
- Impeller horizontally opposed, axial thrust offset each other more than 90%, has a good self-balancing, and the thrust bearing safety margin is greatly improved.
- Compared with tandem arrangement compressor, the vibration is smaller, the critical speed is higher, it is more suitable for large pressure ratio and high speed operation, and has higher reliability.

■ Active bearing control technology

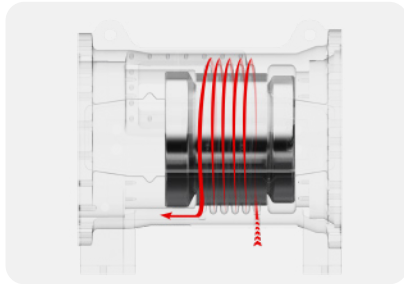


- The digital controller for magnetic bearings is equipped with 8 high-resolution position sensors to achieve superior vibration reduction control.
- Five-degree-of-freedom active bearing control, 10kHz position dynamic scanning and adjustment, μm -level control accuracy, and accurate shaft suspension.

■ Toroidal motor cooling technology

360° spiral toroidal cooling for high reliability

- CFD full flow field analysis and optimization design of motor cooling channel, 360° annular cooling, to achieve fast uniformity Cooling.
- The refrigerant is circulated for cooling, the cooling effect is better, and the motor can keep the temperature low under harsh working conditions, Longer service life.



■ Airborne refrigerant-cooled frequency converter



- The heat dissipation effect of refrigerant cooling is significantly better than that of air-cooled/water-cooled, cleaner than air-cooled inverters, and the service life of electrical components is longer. There is no dirty plugging problem of water-cooled inverter, which greatly reduces the probability of unexpected downtime.
- Full closed-loop temperature and humidity intelligent thermal management system, active and refined refrigerant control.
- Multi-objective PI is used to control the flow rate and temperature difference to achieve high-load heat dissipation and anti-condensation functions, Further improve product reliability and applicability.

¥ Save money

■ Comparison with conventional centrifuges (oil-free operation)

- Compared to traditional oil-lubricated centrifuges, the oil-free system significantly improves the reliability of the unit and does not have to worry about the oil return of the unit.
- There is no need for regular oil inspections, which makes maintenance easier and more convenient, and maintenance costs are lower.

Maintenance projects	Xinlei magnetic levitation centrifuge	Conventional oil centrifuges
Replace the lubricating oil and filters	No need	Once a year
Oil pump maintenance/replacement	No need	Once a season
Oil pump insulation check	No need	Triennial
Oil quality testing	No need	Once a week
Oil filter pressure drop detection	No need	Once a month
Oil pump insulation check	No need	Triennial

📶 Intelligent control

■ Internet of Things technology

Based on the network, it provides monitoring and digital scientific energy-saving management solutions for the operation and maintenance of central air-conditioning equipment and manufacturers.

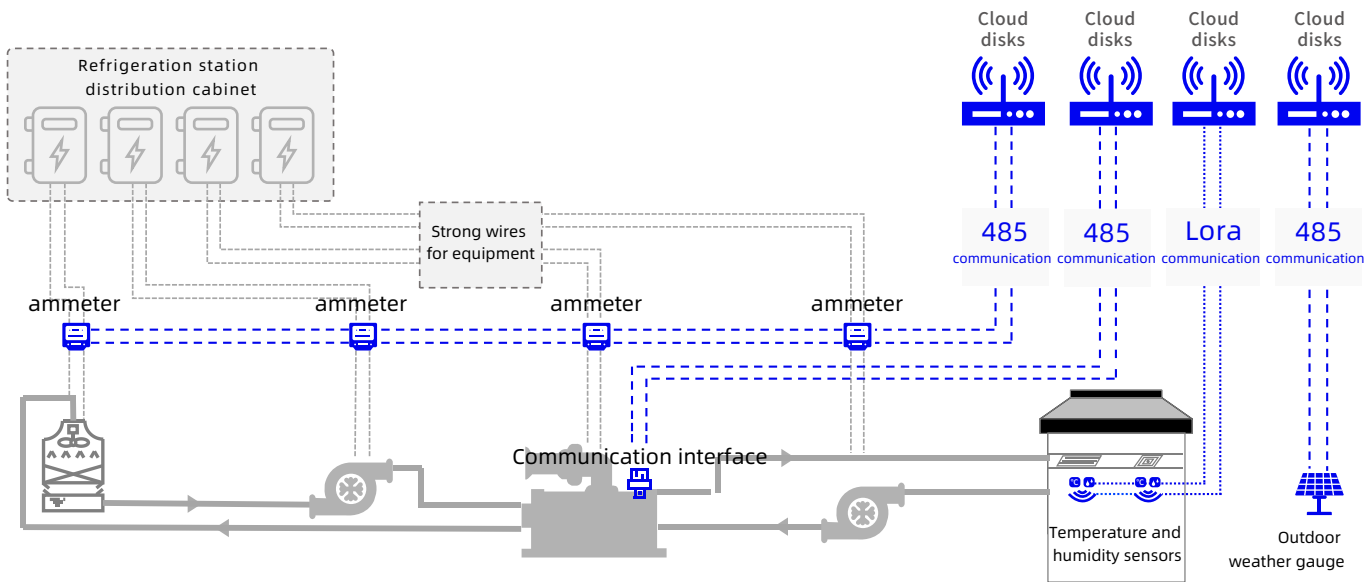
Product features

The cloud platform can record and provide the operation status and parameters of the central air conditioner that has been bound to the platform, as well as fault alarm and data recording and analysis. Users can log in to the platform to realize remote monitoring, energy-saving setting management, so that users can achieve real-time equipment management. At present, the IoT cloud platform provides Android, IOS, and PC clients, and opens the interface to realize the link with third-party software such as ERP, providing users with more possibilities.

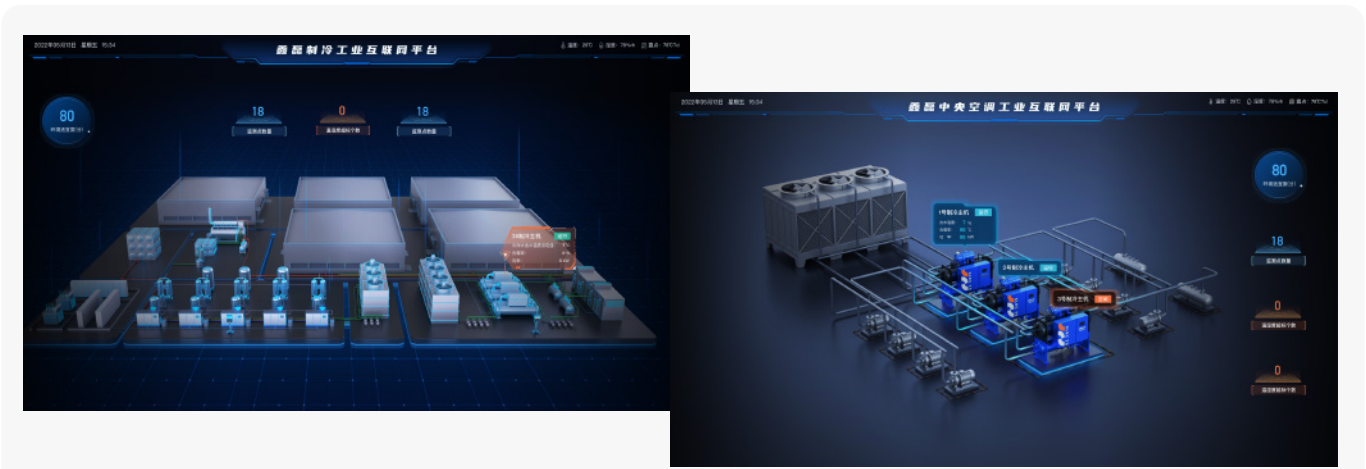
Core equipment

Communication interface | ammeter | central air conditioning | Outdoor weather gauge | Cloud disks | Temperature and humidity sensors

Schematic diagram of IoT technology



Data cockpit



- | | | | | |
|---------------------------------|---|---|---|---|
| Digital computer room | computer room configuration | <ul style="list-style-type: none">equipment operation status and alarm | Environmental monitoring | <ul style="list-style-type: none">real-time monitoring and data query |
| Intelligent control | Intelligent optimal control of water temperature | <ul style="list-style-type: none">on-demand cooling | Intelligent device start-stop optimization | <ul style="list-style-type: none">real-time dynamic optimization |
| Predictive maintenance | Fault diagnosis | <ul style="list-style-type: none">system failure, hidden fault, etc | Energy efficiency analysis | <ul style="list-style-type: none">statistics, diagnosis, evaluation |
| Systematic energy saving | Control energy saving | <ul style="list-style-type: none">intelligent optimization, energy saving and consumption reduction | Management energy saving | <ul style="list-style-type: none">save people and electricity |
| | | | Energy Saving Confirmation | <ul style="list-style-type: none">Cross-Contrast Method |

Case

Minghua Gear

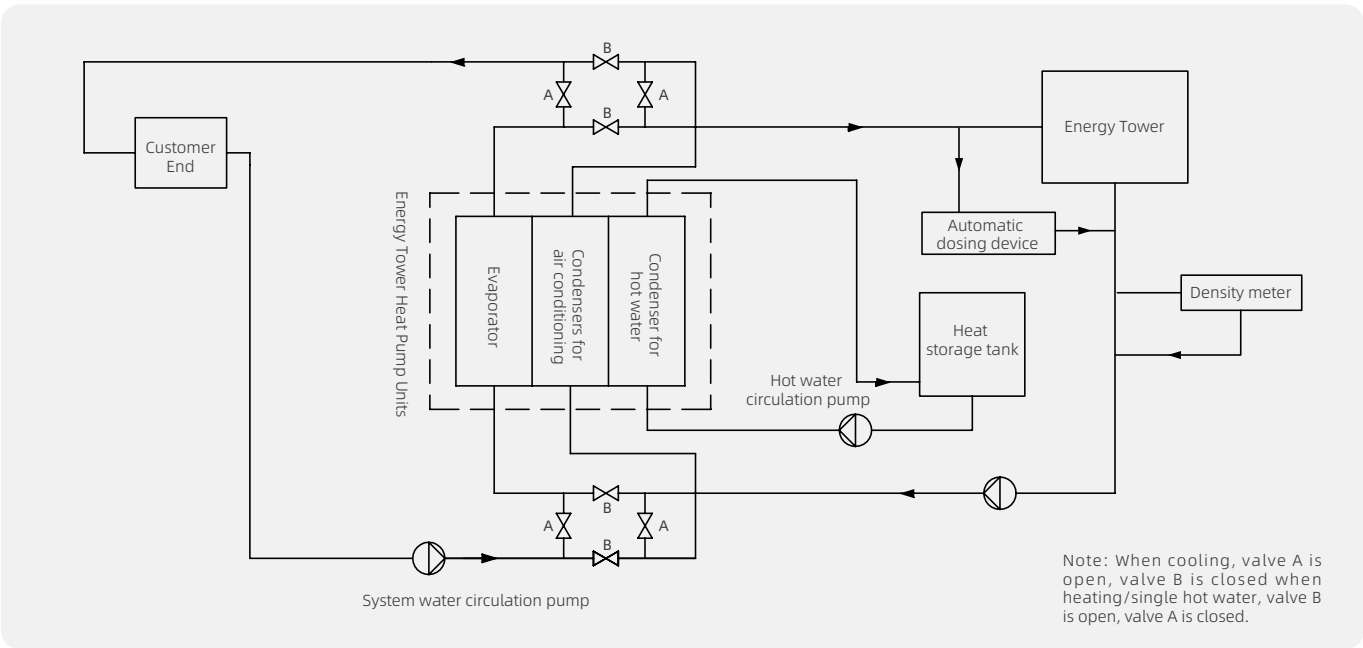


Project type:	summer cooling, winter heating	Cooling Capacity:	527kW	Heating Capacity:	600kW	Location:	Taizhou
Project area:	27000m ³	Chilled water:	12/7°C	Hot water:	40/45°C	Minimum ambient	
Quantity:	XLMC150x2 units	Cooling Water:	30/35°C	Heat Source:	Energy Tower	temperature in winter:	-4°C

Minghua Gear Co., Ltd, coastal area, relatively warm and humid, and precision instruments on the air temperature and humidity requirements are very high. The plant needs cooling in summer and heating in winter. The first phase of the project adopts two 150RT magnetic levitation heat pump units to replace 10 air-cooled modules in the original plant area, and the second phase adds one 350RT magnetic levitation heat pump unit to meet the cooling and heating needs of the expanded plant area.

First Phase Energy Saving Effect

150,000 yuan	80 tons/year	217 tons/year
Saving in operating costs	Saving standard coal	Reduce carbon emissions
680kg/year	117kg/year	
SO ₂ Emission reduction	NO _x Emission reduction	



■ Minhang Ecology Co.



Heat production capacity: 1700kW

Heat source: 10/5°C

Heat source water temperature range: 8~15°C

Hot water: 40/45°C

Hot water outlet temperature range: 20~45°C



Cooling capacity: 1934kW

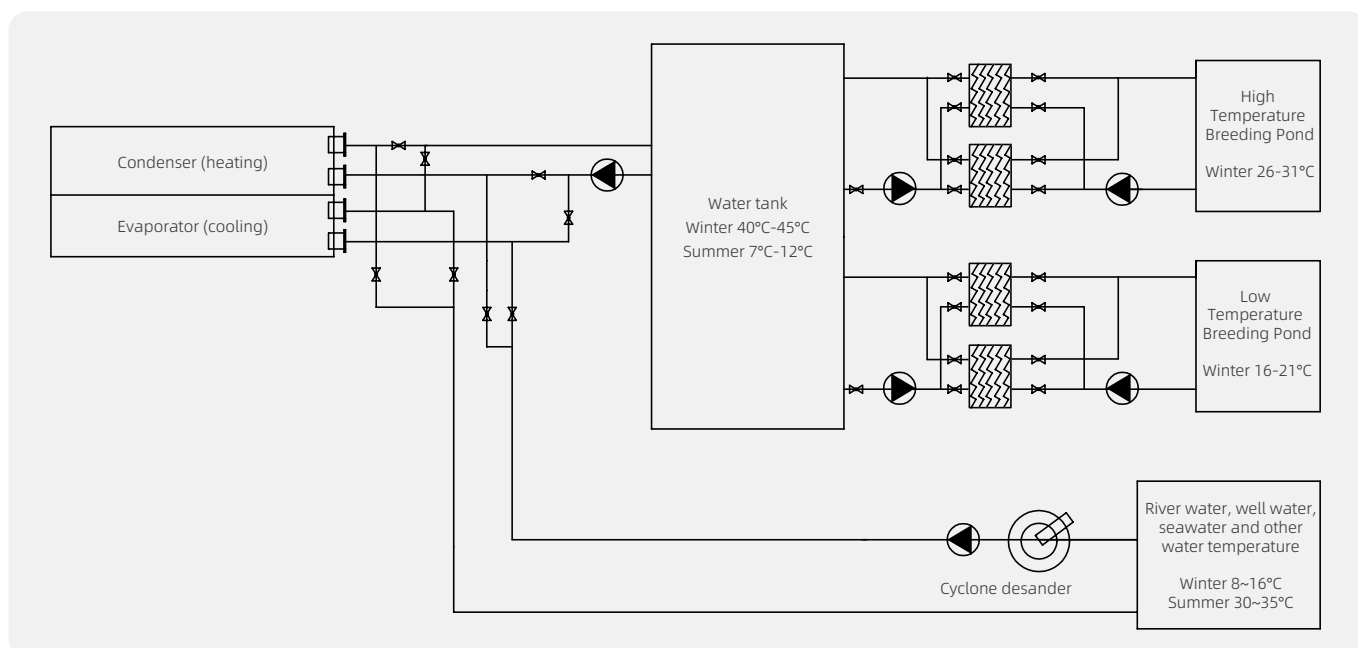
Chilled water: 30/23.6°C

Chilled water outlet temperature range: 19~30°C

Cooling water: 30/36.3°C

Cooling water inlet temperature range: 28~35°C

Minhang eel culture is an indirect water supply culture with intermediate plate exchange. The heat pump controls the temperature according to the season of fry/adult fish (winter: juvenile water temperature is controlled at 15~21°C/adult water temperature is controlled at 21~25°C; summer: water temperature is controlled at 25~31°C). In this project, river water (8-16°C) was used as the source of heat and cold. In order to meet the needs of fry and adult fish at the same time, the project set up an intermediate water tank. The intermediate water tank (40~45°C) + plate exchange is used for heating in winter and direct cooling in summer, and the COP of heating in winter is between 4.5~6.5 and COP of cooling in summer is between 8~13, which is highly efficient and energy-saving.



■ Xishui County Fu Nong Company



Heat production capacity: 1550kW

Heat source: 12/7°C

Heat source water temperature range: 8~15°C

Hot water: 10/16°C

Hot water outlet temperature range: 15~23°C



Cooling capacity: 1400kW

Chilled water: 30/24°C

Chilled water outlet temperature range: 19~30°C

Cooling water: 30/36°C

Cooling water inlet temperature range: 28~35°C

Funon eel culture is a direct water supply culture. The demand for aquaculture is divided into winter and summer, and according to the different fry and adult fish, different temperatures are required. The heat pump unit of this project is mainly used for fish fry culture, controlling the water temperature between 15~21°C in winter and 25~31°C in summer. The heat source of this project is mainly well water in winter, and the temperature is 8~16°C; in summer, when the water temperature of the fish pond exceeds 30°C, river water is used as the cold source, and the temperature is between 28~35°C. The project is a direct water supply project, i.e., hot water or cold water is taken directly from the fish pond and returned to the fish pond after heating or cooling. The heating COP in winter is between 8.5~15 and the cooling COP in summer is between 8~13, which achieves the purpose of high efficiency, energy saving and carbon reduction.

