

XINLEI
COMPRESSOR
CO.,LTD.

MAGNETIC LEVITATION VARIABLE FREQUENCY CENTRIFUGAL CHILLER

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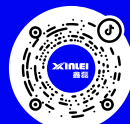
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Xinlei official website



Xinlei Wechat subscription



Xinlei Tik Tok enterprise

- High efficiency and energy saving
- low noise and silence
- intelligent control
- low carbon and environmental protection



Xinlei Group is a professional manufacturer of intelligent HVAC equipment

The company was established in Taizhou, Zhejiang, and was listed on the main board of the Shenzhen Stock Exchange on January 19, 2023. As a leading enterprise in the industry, Xinlei's independent research and development and production products span the piston, screw magnetic levitation centrifugal all-fluid sector.

All kinds of magnetic levitation central air conditioning, air energy central heat pump and other air energy products in continuous innovation to achieve high energy efficiency breakthroughs, access to more than 300 authorized patents, was named the national "specialized, special and new" small-giant enterprises, 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 intelligent solutions have been widely recognized by the market and customer partners.

Over the years, the company has been providing customers with a comfortable, energy-saving, environmentally friendly and convenient indoor environment, with the service tenet of "innovation reflects value", and serves every customer attentively. The company has many experienced pre-sales, in-sales, after-sales service personnel, and strong team technical capabilities, creating a new world of "energy saving, environmental protection and intelligence" in the aerodynamic city.

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.

CREW COMPOSITION

■ Magnetic levitation inverter centrifugal chiller (heat pump) unit

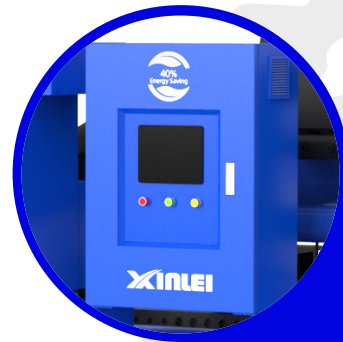
It is mainly composed of magnetic levitation centrifugal compressor, evaporator, condenser, economizer, adjustable flow valve, airborne inverter and automatic control system. The compressor adopts magnetic bearing, no need for lubricating oil, **no need to worry about oil return limit**, "0" friction,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

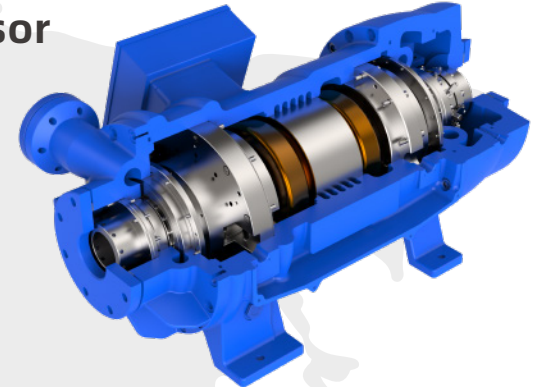
■ Intelligent operator panel

- 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.



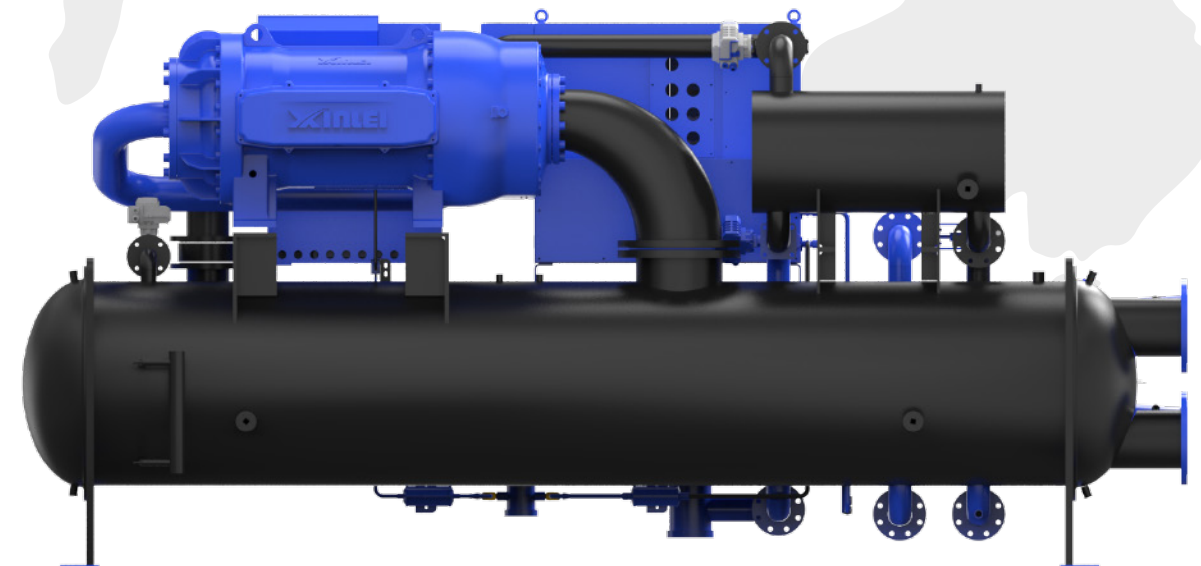
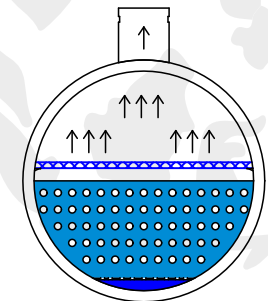
■ Electronic level gauge

- 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;



Maglev+

Central air conditioning solutions



Energy efficient



Stable and reliable



Low noise and silence



Wide-area operation



Intelligent control



Save money



Scan the code to watch the video

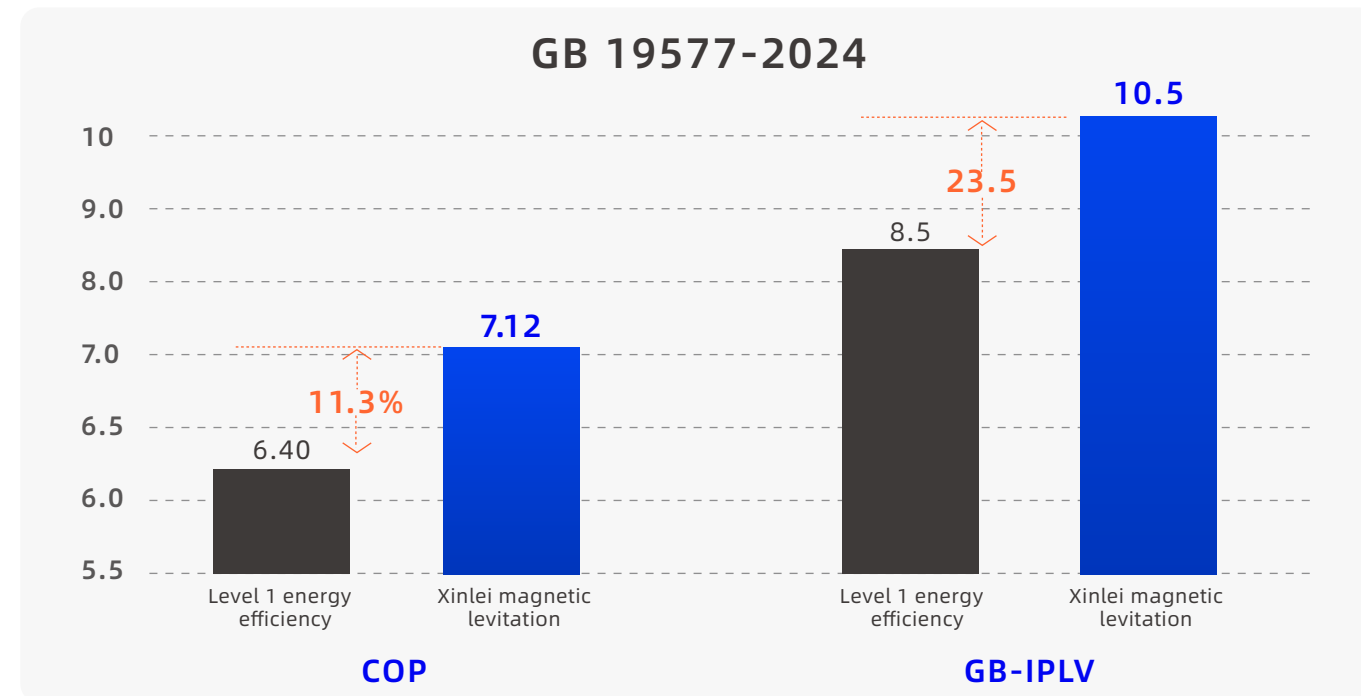
Magnetic levitation technology

Five-degree-of-freedom magnetic bearing, equipped with 8-channel sensors, accurately controls the rotor shaft with a signal processing frequency of 10,000 times per second. The center position ensures safe, efficient and stable operation at high speed.



Energy-efficient

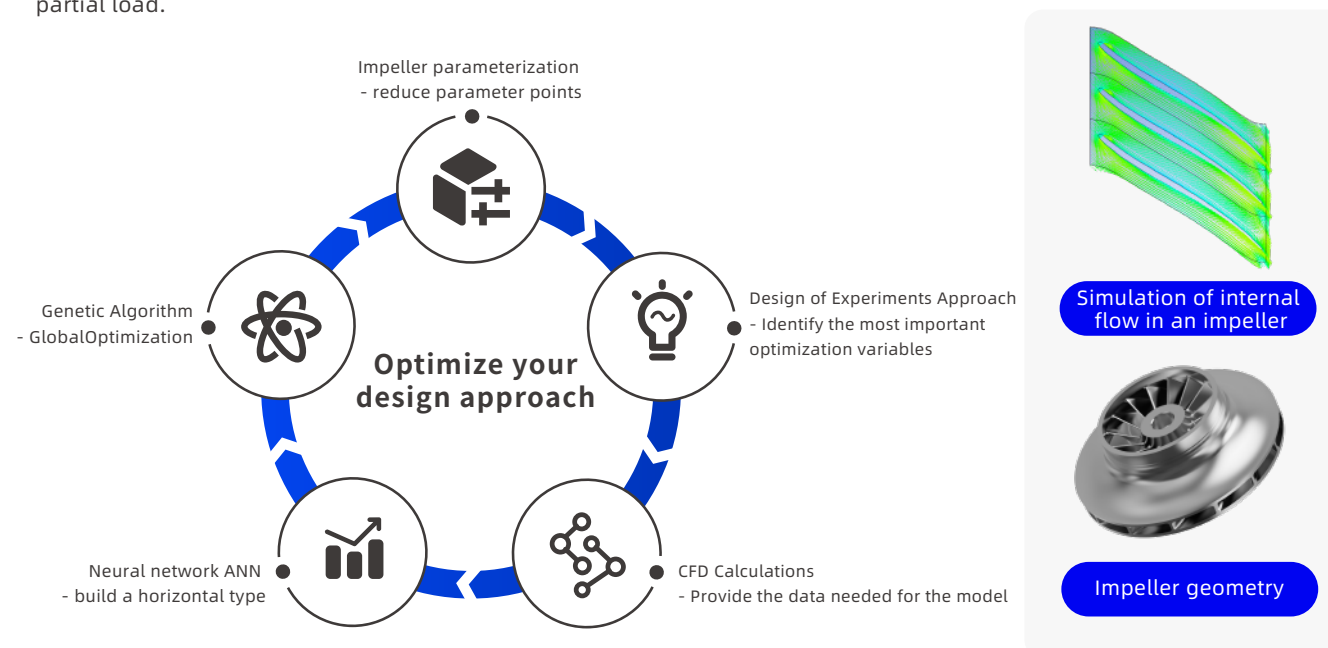
A full range of dual-level energy efficiency



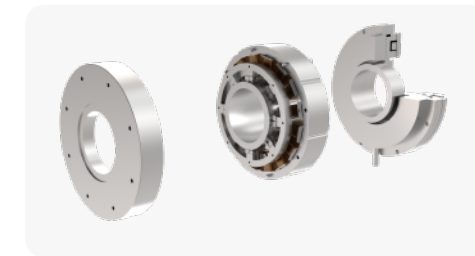
*The data in the above figure comes from the high-efficiency series units

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.



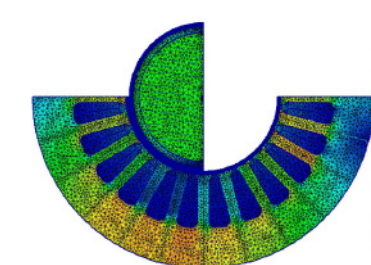
Industrial-grade magnetic bearing technology



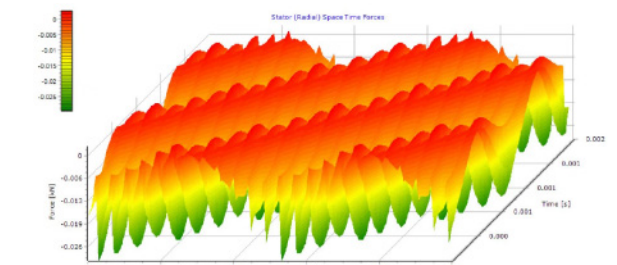
Xinlei magnetic bearings

- 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



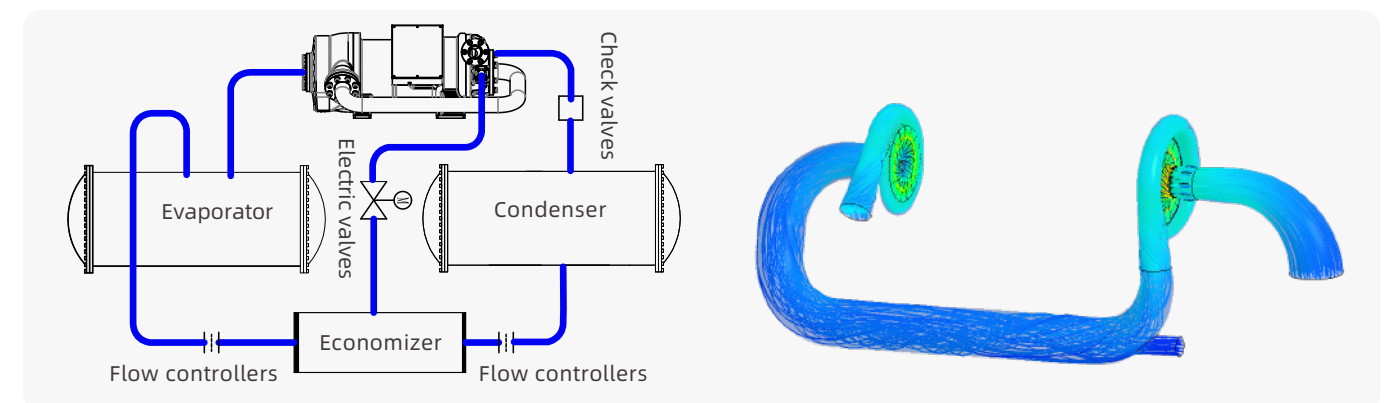
Electromagnetic finite element analysis of high-speed permanent magnet motors



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

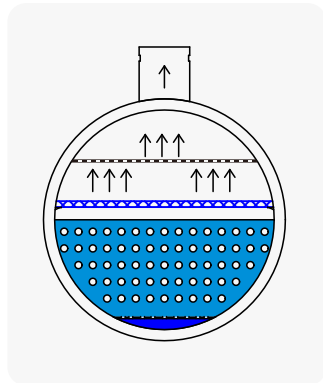
- The permanent magnet synchronous motor has a compact structure, and the motor efficiency is > 95% in all working conditions, and the maximum is 97.5%
- The space vector pulse width modulation technology is used to achieve energy saving in the full load operating range.
- **H-class** insulation design,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

Two-stage compression + gas enthalpy enhancement technology, the unit has higher energy efficiency



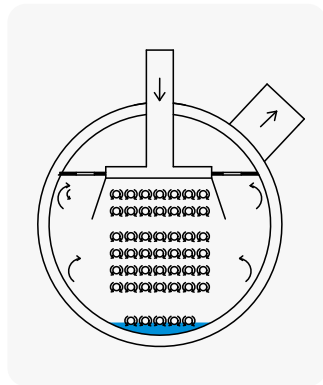
- CFD simulation and optimization of the whole flow field, high aerodynamic efficiency, innovative pipeline return design, uniform air supply, and small pressure loss.
- The two-stage compression and replenishment gas increase enthalpy, which is **6%** higher than that of single-stage circulation.

■ 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.



Stable and reliable

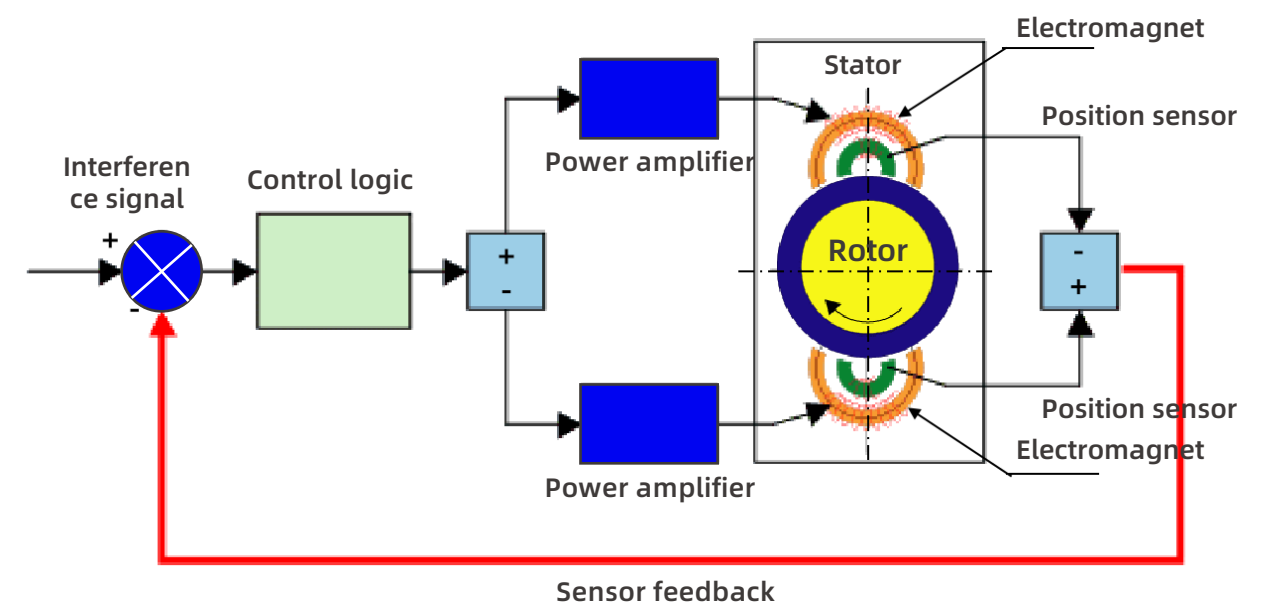
■ Direct drive + horizontally opposed technology



Horizontally opposed impeller

- Direct drive, no transmission loss, **100% efficiency**;
- The impeller is horizontally opposed, the axial thrust cancels each other by more than **90%**, the self-balance is good, and the safety margin of the thrust bearing is greatly increased; Compared with the series arrangement compressor, the vibration is small, the critical speed is high, and it is more suitable for the operation of large pressure ratio and high speed, and the reliability is higher.

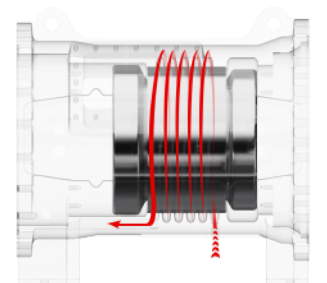
■ Active bearing control technology



- 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.

■ Multiple baffles 360° annular cooling

- 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 down-time**.
- 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.

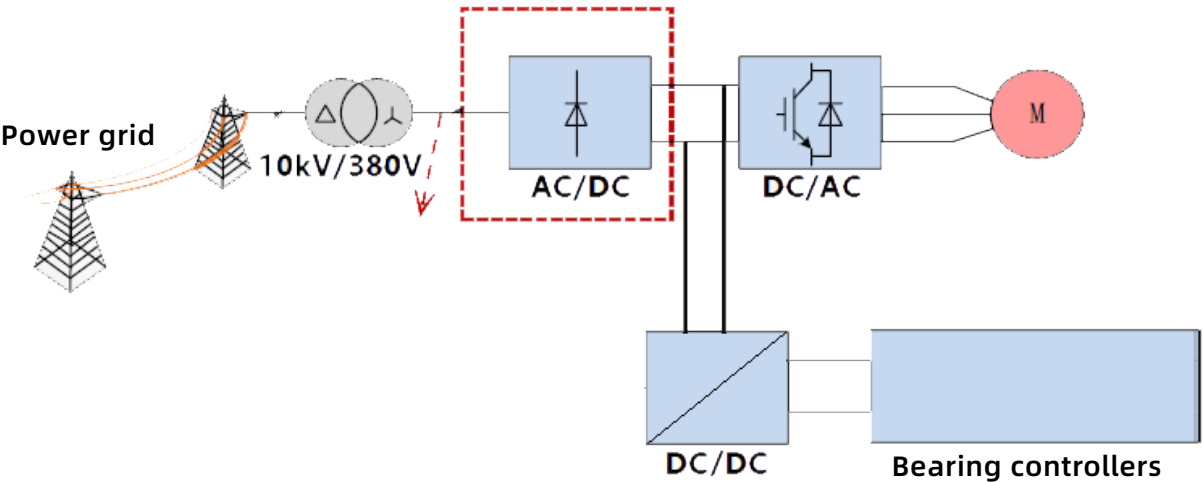
■ Bearings are powered

UPS (optional)

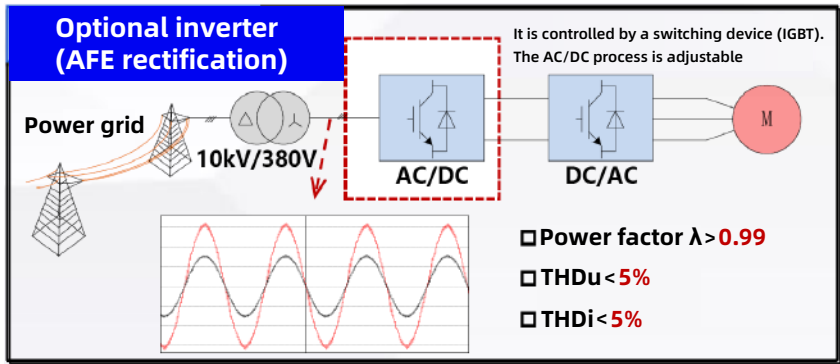
- **All-in-one** integrated power module design, including UPS, AC/DC DC power supply, heat dissipation air duct design based on CFD analysis, **protection level $\geq$ IP54**;
- Ensure that the motor rotor continues to suspend during rotation until it is **lower than 0rpm of the "absolutely safe alternate speed"**, and smoothly descends to the alternate bearing, fully protecting the bearing from damage;
- UPS uses lead-acid batteries, which are mature in technology, low in cost, high in safety and easy to maintain.

Reverse power generation (standard)

- When the power is suddenly cut off, the "permanent magnet motor + inverter" automatically switches to the **generator mode**, converts the inertia parking kinetic energy of the permanent magnet motor into electrical energy, and the bearing power supply is taken from the inverter bus, and the **200-800V wide working voltage** design is adopted to ensure the continuous and stable operation of the bearing.
- Ensure that the motor rotor continues to suspend during rotation until it is **lower than the "safe alternate speed" of 900rpm**, and smoothly descends to the alternate bearing to protect the bearing from damage.



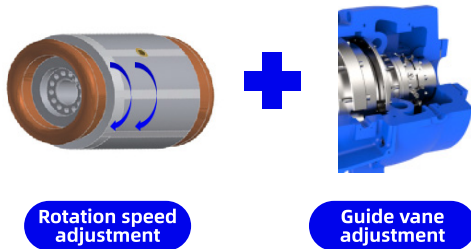
■ Professional Harmonic Control (Optional)



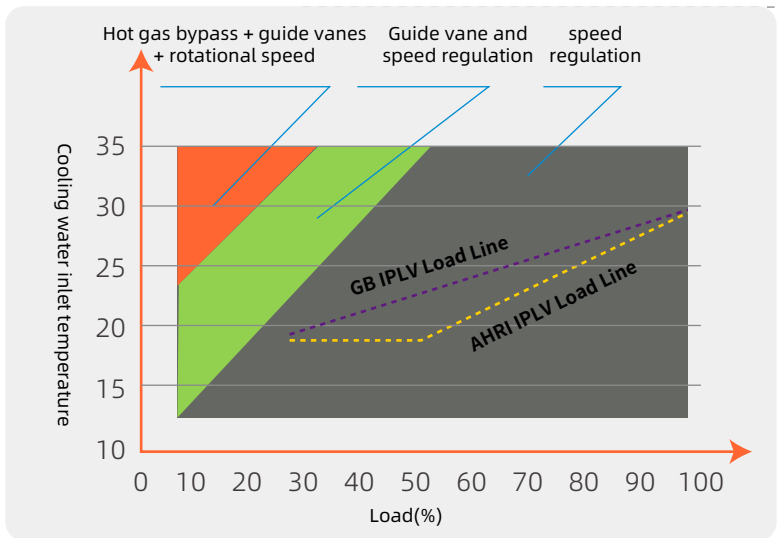
- Automatic Power Factor Correction: 0.99;
- Professional harmonic control scheme (APF or four-quadrant);
- The total harmonic distortion rate is <5%, and
- the harmonic interference is extremely low.

Wide-area operation

■ Joint adjustment + multi-condition design

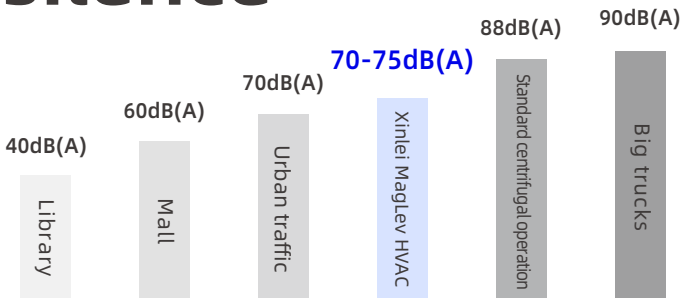


- The unit adopts frequency conversion speed control + imported guide vane (GV) to jointly regulate the cooling capacity, which can realize 10%~100% cooling capacity regulation for regular working conditions without hot gas bypass.
- MRC compressor adopts multi-condition design, mainly for air-conditioning 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.



Low noise and silence

- Operating noise as low as **70dB(A)**;
- No oil and no friction, reduce the transmission noise of mechanical parts;
- The structure of compressor horizontally opposed impeller + external pipeline reflux reduces the aerodynamic noise of the refrigerant during the flow process.



¥ 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.

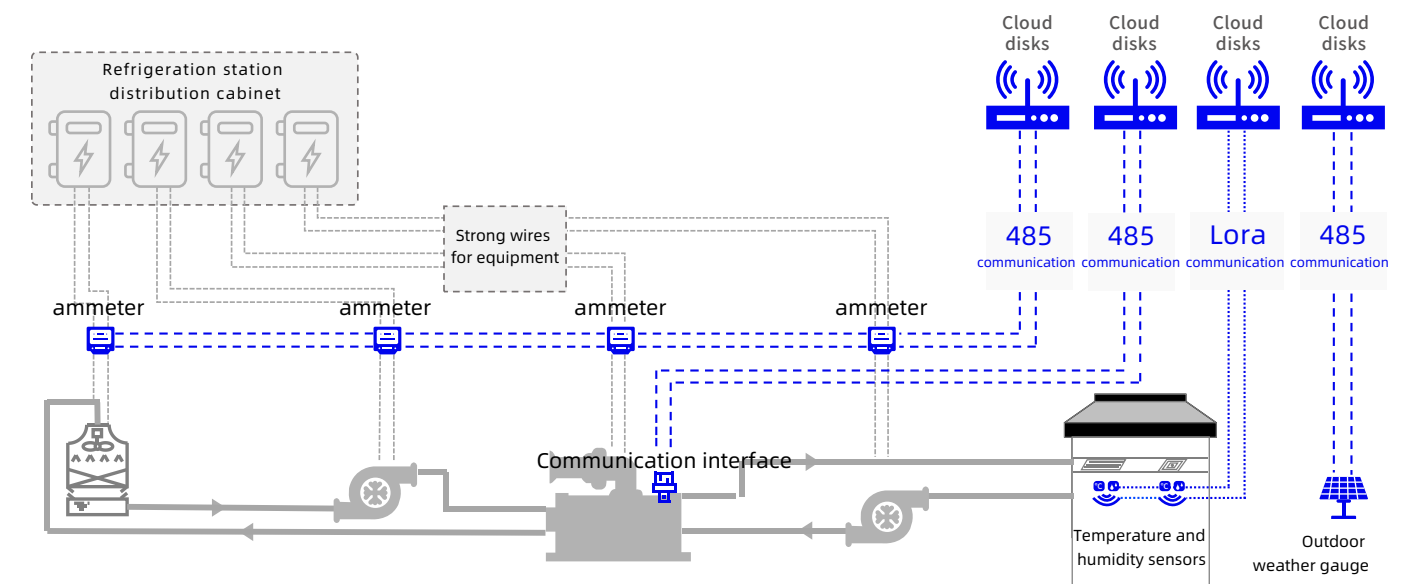
Product features

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.

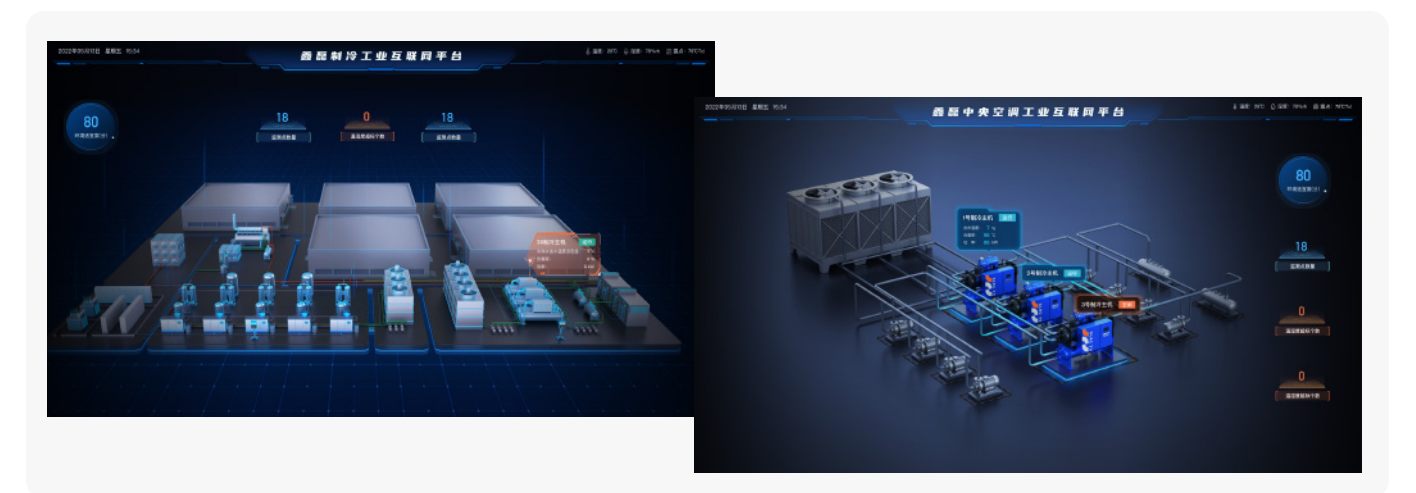
Core equipment

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

- equipment operation status and alarm

Intelligent control

Intelligent optimal control of water temperature

- on-demand cooling

Predictive maintenance

Fault diagnosis

- system failure, hidden fault, etc

Systematic energy saving

Control energy saving

- intelligent optimization, energy saving and consumption reduction

Environmental monitoring

- real-time monitoring and data query

Intelligent device start-stop optimization

- real-time dynamic optimization

Energy efficiency analysis

- statistics, diagnosis, evaluation

Management energy saving

- save people and electricity

Energy Saving Confirmation

- Cross-Contrast Method

Typical case



Project Introduction

Zhejiang Energy Bearing Technology Co., Ltd. (formerly Taizhou Ruili Bearing Co., Ltd.) is a modern enterprise specializing in the production of various medium and small metric and inch tapered roller bearings, and gradually extends the development and production of short cylindrical bearings, construction machinery, agricultural machinery, and bushings for automobile transmissions. The company is located in Taizhou, the beautiful mountain and sea city of "Holy Land and Manufacturing Capital". It is warm and humid all the year round, so the temperature and dehumidification capacity of the air conditioning system are more demanding. After a lot of investigations and comparisons, they chose two 150RT Xinlei Magnetic Suspension Central Air Conditioning, just to meet its three layers (each layer 50*70*6m) machining workshop.

Project Highlights

The project has been in operation for more than 8,000 hours without any anomalies. Xinlei's machines have show excellent reliability and stability, to adapt the harsh production environment of energy bearings, with overall energy efficiency of 6.4. Xinlei Magnetic Suspension Central Air Conditioning, introduced magnetic suspension technology, the application of industrial magnetic bearings, no lubricating oil, zero friction, low power consumption, reducing the company's energy consumption and maintenance costs. The overall energy efficient design reduces the impact on the environment, in line with the company's environmental philosophy. At the same time, the system is equipped with an intelligent control system, which enables flexible temperature and humidity regulation, increasing comfort and energy efficiency.



Typical case



Project Introduction

WENLING JIULONG INTERNATIONAL HOTEL is a five-star standard building with a construction area of 42,000 square meters and nine floors of guest rooms. In order to improve energy efficiency, reduce operating costs and improve environmental comfort, the hotel decided to use magnetic levitation frequency centrifugal chiller to replace the original Miura steam boiler and Ebara double-effect steam chiller. The retrofit was designed to improve energy efficiency and operational efficiency of the traditional equipment, which had high energy consumption and complex operation, with an original annual energy cost of approximately 5.5 million to 6 million.

Project Highlights

The hotel adopts Xinlei magnetic levitation inverter centrifugal chiller, which saves more than 60% energy compared with the original lithium bromide unit, improves energy efficiency and reduces operation cost. The magnetic levitation unit is easy to operate and has a high degree of automation, which reduces maintenance requirements and improves operational stability. The remodeling brings economic benefits and reflects the hotel's efforts to save energy and protect the environment, supporting sustainable development.

