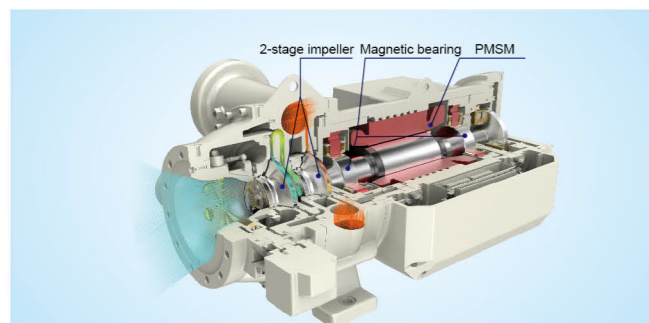


# Product Features

## Core Technology, High Efficiency

### PMSM Direct-Drive Impeller

Gree's magnetic bearing inverter centrifugal chiller adopts high-speed motor to directly drive the 2-stage impeller structure. We cancel speed-up wheelwork and 2 radial bearings to reduce mechanical loss and improve energy efficiency.



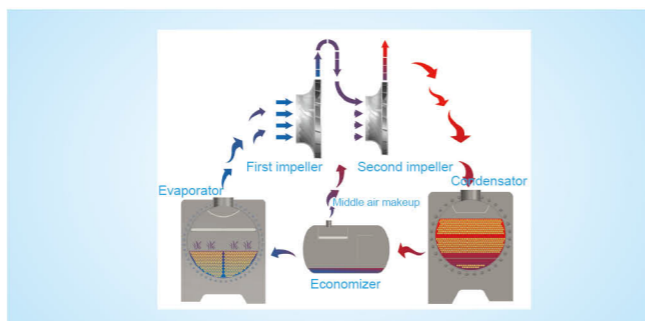
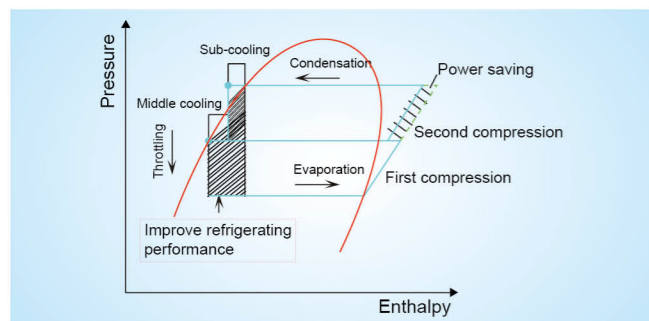
### Magnetic Bearing

The compressor adopts magnetic bearing so that rotor can be suspended during operation. Because compressor is running in oil-free condition, the refrigeration cycle doesn't have lubricating oil, which has avoided the heat exchange efficiency decrease caused by oil film coated on heat exchanging tubes. Heat exchange is more efficient and the product is more reliable during its entire service life.



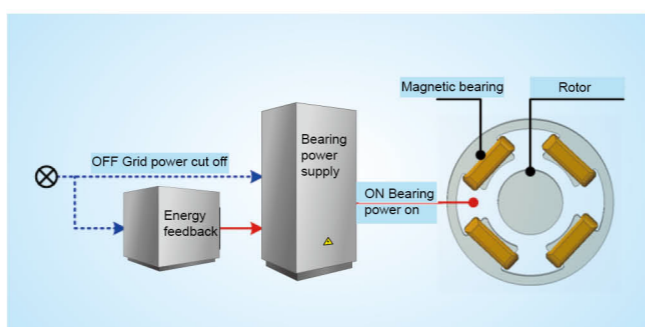
### Two-stage Compression Technology

Two-stage compression with air makeup is more efficient when compared to single-stage compression. The refrigerating efficiency is improved by 5~6%. In addition, two-stage compression enables large flow angle for impeller outlet, large surge margin and wider operating range.



### Power-off Energy Feedback

In case of power failure, motor will act as an electric generator to keep the bearing controller stably suspended through energy feedback until the motor stops running. Meanwhile, the backup radial bearing of compressor will support the compressor's rotor after power failure so as to prevent the rotor from touching any metal surface.

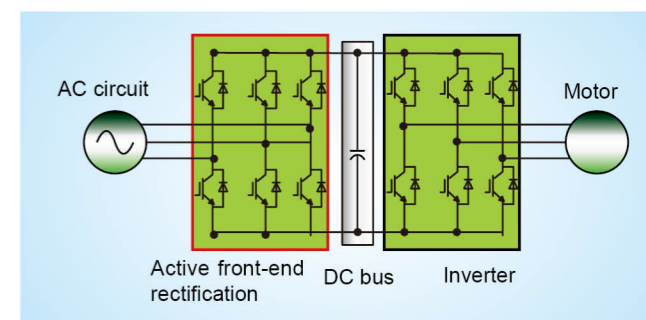


### 4-quadrant Inverter Technology

The chiller adopts 4-quadrant green inverter and IGBT transistor instead of diode for rectification. Power output time and method are both in better control and harmonic wave is well limited. It adopts closed-loop vector control without sensor to realize stable operation under high-speed running of the motor.

Because of PWM controllable rectification technology and the three-phase power factor correction technology, power factor and system efficiency are up to 0.995 and 97% respectively.

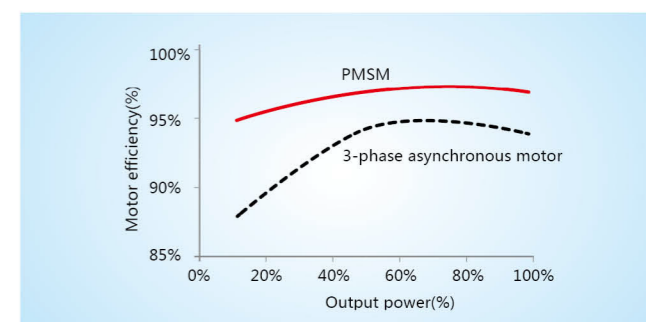
Total harmonic wave distortion factor is smaller than 5%. It is especially suitable to scientific research institutes, hospitals, factories and schools where low harmonic wave interference is necessary.



### Permanent Magnet Synchronous Motor

This chiller adopts permanent magnet synchronous motor. The motor's rotor has a permanent magnet, with little excitation loss. Motor efficiency is over 95% and the highest efficiency is up to 97.5%.

Since the power density is high, when compared to asynchronous motor with the same power, PMSM features small size and light weight. The weight of a 400kW PMSM is equal to a 75kW AC induction motor. The unit adopts spiral type refrigerant injection cooling technology to completely cool down the stator and rotor of motor and keep the motor's temperature field in balance. Motor's temperature can be controlled at 40°C.



## Core Components, Stable and Reliable

### Compact Structure

The compressor adopts high-speed motor to directly drive the 2-stage impeller. Speed-up wheelwork is cancelled and the entire refrigeration system has one moving part only—the impeller. With only one moving part, the unit is more reliable.

### Strict Tests

Components are strictly tested before entering the factory. Impellers are made of high-strength aluminum alloy, which is highly anti-corrosive. They must pass strict tests after manufacturing. Heat exchangers are designed in strict accordance with relevant codes of pressure vessels and tested in 1.5 times of working pressure. The machine will take complete performance tests and reliability tests before leaving the factory.

### Precise Control

It adopts high-precision magnetic bearing control technology. The precision is 2μm, thus accurate positioning and high reliability.

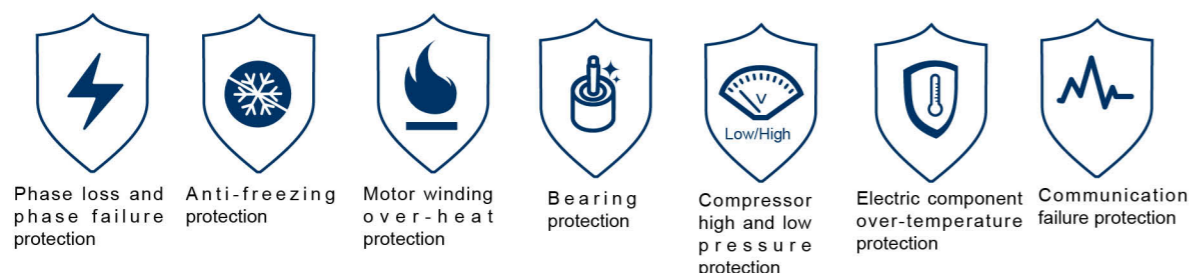


## No Need of Maintenance

The compressor adopts magnetic bearing to keep the rotor suspended so that there won't be mechanical friction during rotation. Because there is no structural surge, low running noise, the bearing doesn't need maintenance during service life. There is no need to manage and control the lubricant, which helps improve unit reliability.

## Multiple Protections

The unit is with bearing protection, motor winding overheat protection, surge protection, low pressure protection, high pressure protection, anti-freezing protection, water flow switch protection, phase loss and phase failure protection, electric component over-temperature protection, and different kinds of communication failure protection, etc.

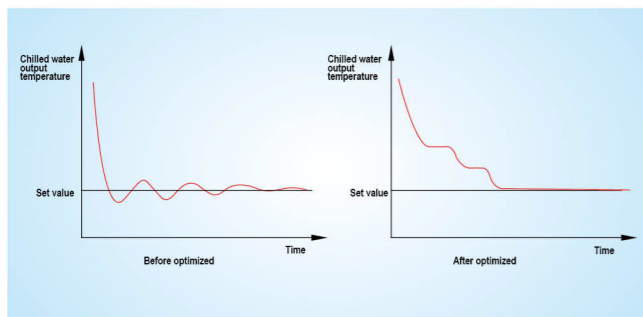


## Intelligent Control. Real-time Protection

### Self-adjusting Technology and Stable Operation

The control system can not only adjust load according to cold water leaving temperature but also predict and compensate the change of air conditioning load based on the change rate of cold water entering temperature. The unit can achieve faster load adjustment and stable water leaving temperature.

When the unit is under bad working condition, it will adjust the running parameters to keep itself running rather than frequently stop. The unit can operate stably and reliably to satisfy customers' refrigerating demand.



### Color Touch Screen Display Control Center

The touch screen display control center is a reliable micro-computer control system that provides users with a convenient, efficient and visualized operating screen, with real-time monitoring, data recording, safe protection, etc.

- 12" 1024 x 768 touch screen
- Chinese and English languages
- Clear display, easy to operate



## High-performance Digital Single Processing Platform

The control system adopts high-performance 32-bit CPU and DSP digital signal processor. The excellent data collection accuracy and data processing capability ensure timely and precise system control. The unit also adopts the intelligent Fuzzy-PID compound control algorithm, which is a control method comprising the intelligent technology, fuzzy technology and PID control algorithm, ensuring fast response and stable performance.

## Authority Classification with Passwords

Control center has access passwords for operators so that set values won't be changed without authorization. Access authority is classified to user access and manufacturer access. User password is used to start up unit and enter the interface of user parameter setting. It is managed and can be changed by the user. Manufacturer password is used to enter the interface of manufacture parameter setting. Any change of the manufacture parameters may affect unit's reliability; therefore it must be kept by professional engineering and debugging personnel.

## Soft Load-on and Soft Shut-down

Unit's control system can control the load-on gradually by capacity control and electric current limit so that unit won't be on and off frequently.

When unit is going to shut down, the control system will turn down the inlet guide vane (IGV) to a preset value and then disconnect power. This can effectively reduce impact on the unit and extend the starter's service life.