



# Air-cooled scroll chiller (heat pump) unit

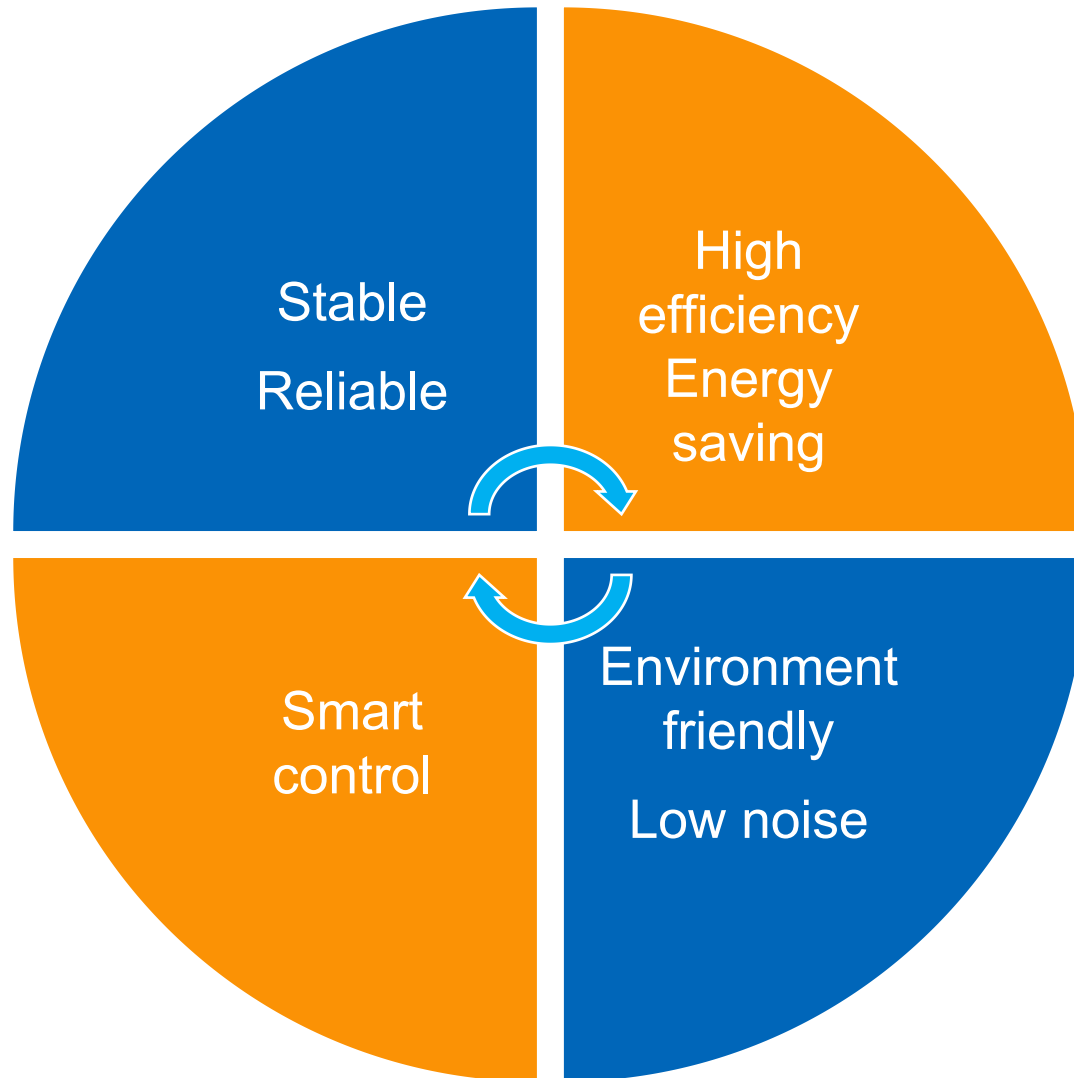
By @TECKA  
2020/2/22

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Professional & Focus | All life service



# | TECKA air-cooled scroll chiller (heat pump) unit design concept





# Stable & Reliable

TECKA air-cooled scroll chiller (heat pump) unit design concept

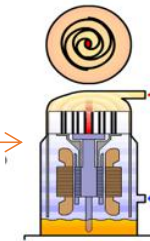
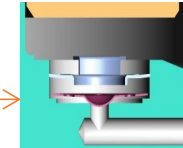
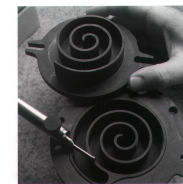
# | Stable & Reliable: imported fully enclosed scroll compressor

## Dedicated enlarged motor

- The dedicated compressor for the unit adopts an enlarged motor, which can adapt to the working condition of low ambient temperature and high outlet temperature.

## Flexible design of dynamic and static scrolls

- The patented axial and radial flexible design, no gas pulsation, stable operation, and provides excellent resistance to liquid shock and impurities.



## ASTP intelligent temperature protection

- Install the temperature-sensitive fast moving disc inside the compressor. When the abnormal exhaust temperature is too high, the dynamic and static scrolls are quickly separated to stop the compressor from sucking and exhausting.

## Suction cooling technology

- The airlet is at a lower position, which can make the low-temperature refrigerant gas cool the motor better and ensure that the motor is always in a safe operating environment.

# | Stable & Reliable: shell and tube heat exchanger with “U” tube

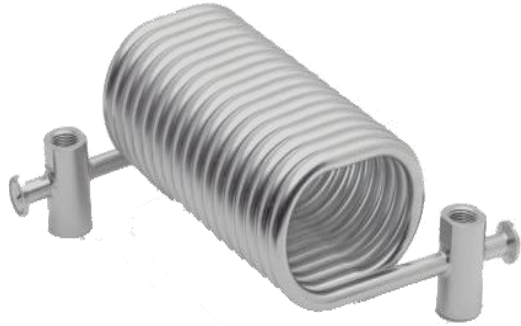


- “U” type heat exchange tube can avoid internal stress and leakage hazards caused by different expansion coefficients of steel and copper materials.



- Compared with the plate heat exchanger, the pressure loss of the shell and tube heat exchanger is less, and it is not easy to block ice and dirt.

# Stable & Reliable: “U” type shell and tube heat exchanger



## Double-tube heat exchanger

- Low heat exchange efficiency, high energy consumption.
- Difficult for maintenance, cleaning and disassembly, the connection is easy to leak.
- The water channel is narrow, which is easy to block ice and dirty.

## Plate heat exchanger

- Poor sealing, easy to leak.
- Fluid channel is narrow, easy to block, and the resistance is higher than shell and tube heat exchanger.
- Uneven refrigerant distribution, the heat exchange area cannot be fully utilized.

# | Stable & Reliable: perfect system configuration

## Thermal expansion valve

- Adopt mechanical thermal expansion valve, simple structure, stable and reliable.
- Bidirectional flow design reduces system resistance and improves system stability.



## Refrigerant balance system

- The refrigerant balance system effectively adjusts the refrigerant circulation when the unit is in different working states, ensuring the cooling (heating) effect and greatly extending the life of the compressor.



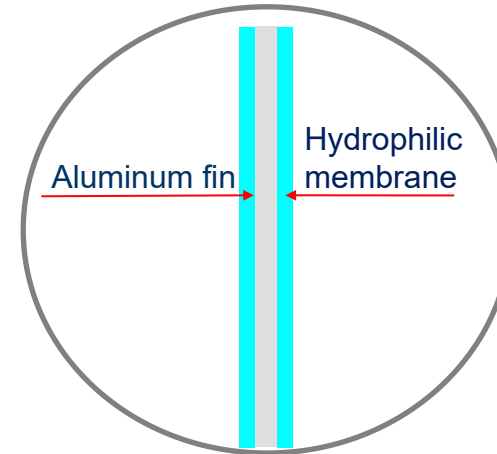
## Thickened dual anti-corrosion frame

- The thickened galvanized plate frame has good anti-corrosion performance after being sprayed on the surface.
- The support plate of the air side heat exchanger is supported by aluminum plate, which is similar to the hardness of the copper tube, reducing the possibility of leakage caused by wear.



# | Stable & Reliable: hydrophilic membrane aluminum fin

- The aluminum fins of the air side heat exchanger are coated with a hydrophilic film, which can effectively inhibit the corrosion of the fins, delay the aging of the fins, and extend the service life of the unit.





# | Stable & Reliable: world famous brands low-voltage electrical components

- The unit adopts world famous brand low-voltage electrical components with high safety level to ensure more efficient and reliable operation of the unit.



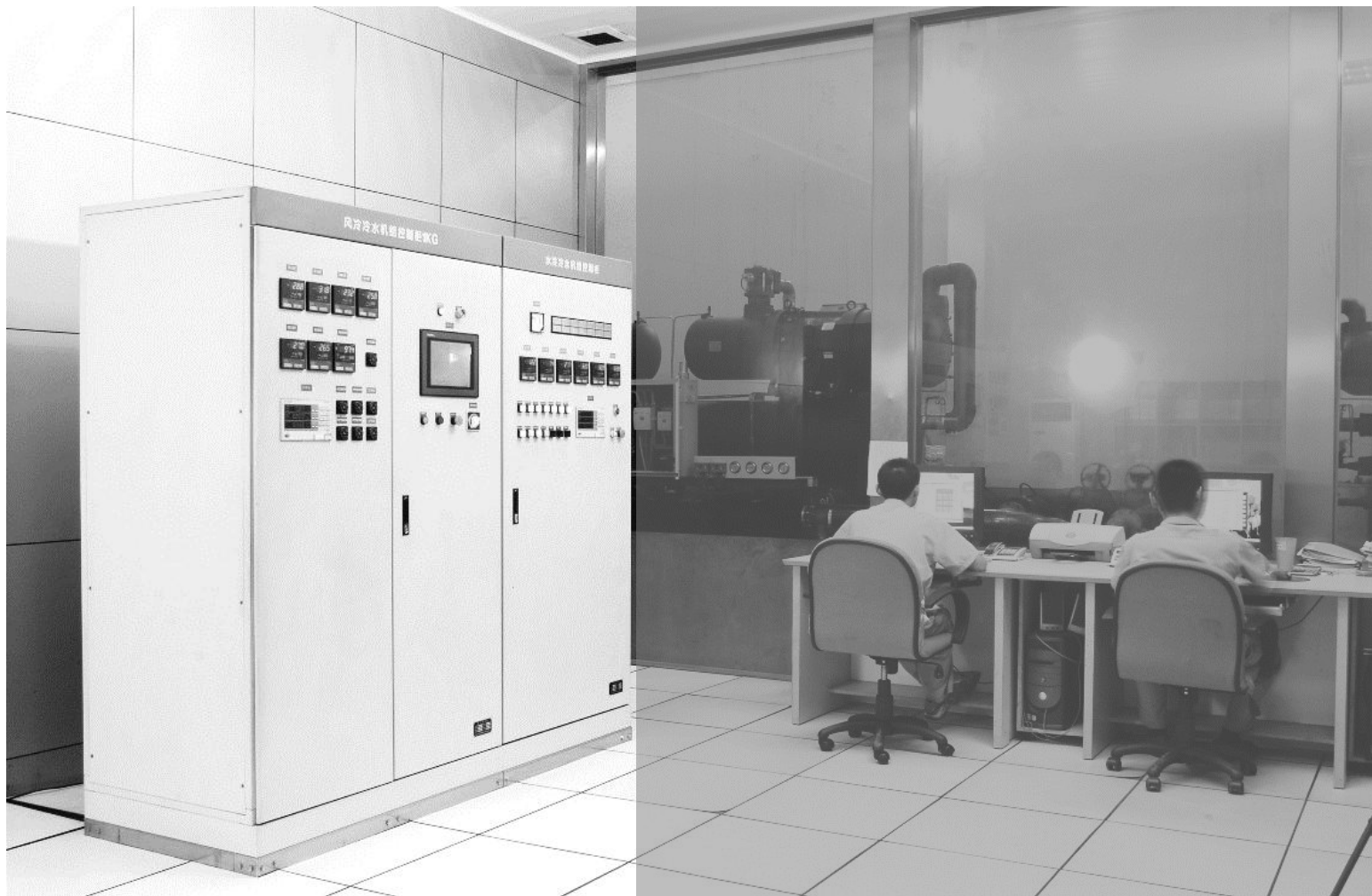
# | Stable & Reliable: perfect security protection function

- System high pressure protection
- System low pressure protection
- Unit power protection
- Compressor overload protection
- Compressor protection against frequent start
- Sensor failure protection

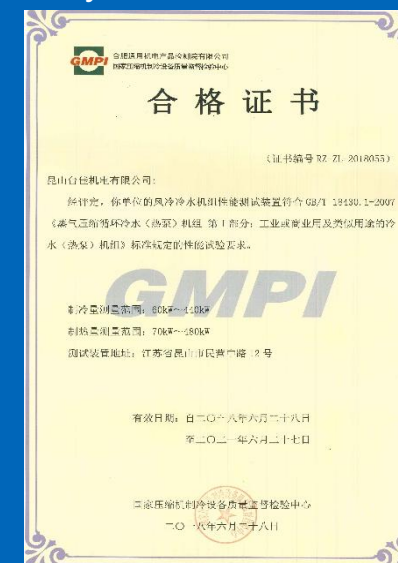


- Chilled water flow protection
- Unit antifreeze chain protection
- Unit outlet water temperature protection
- Fan overload protection
- High compressor discharge temperature protection
- .....

# Stable & Reliable: TECKA test center was certified by national institution



- TECKA Air-cooled Chiller Test Center was certified by National Compressor Refrigeration Equipment Quality Supervision and Inspection Center, which can accurately simulate the working conditions.
- The products were 100% fully inspected to ensure the 100% top quality for all units before delivery.

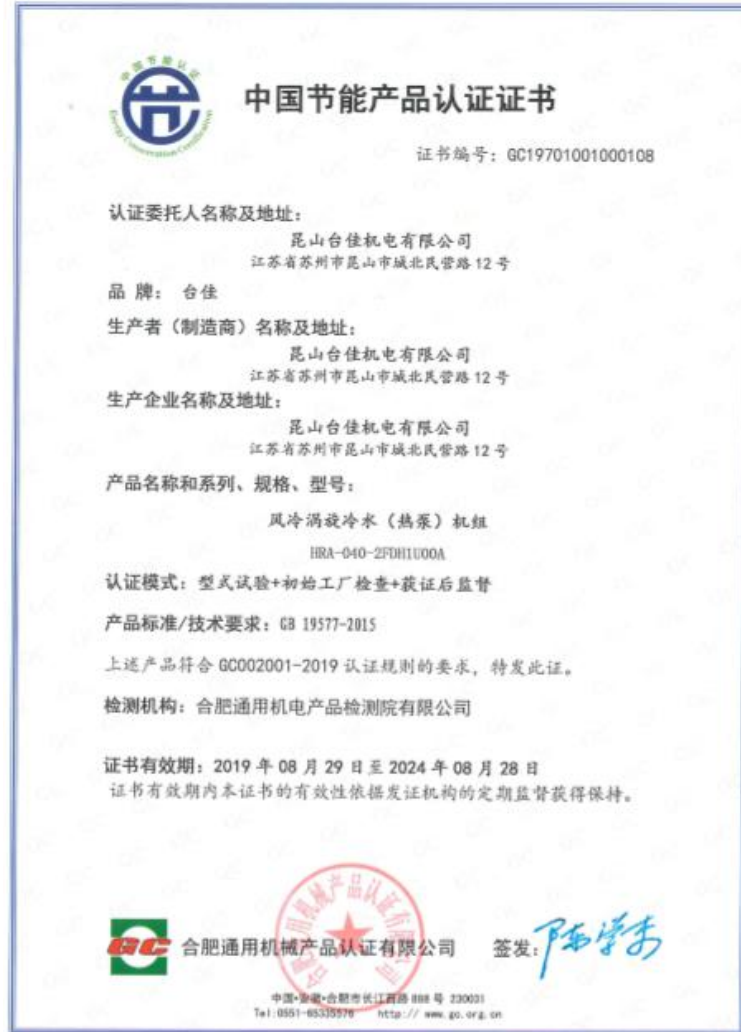




# High efficiency Energy saving

TECKA air-cooled scroll chiller (heat pump) unit design concept

# High efficiency & Energy saving: energy-saving product certificate



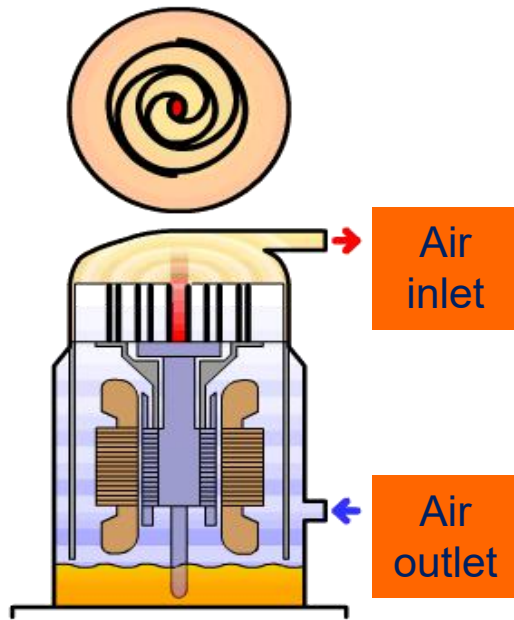
GB 19577-2015

Energy Efficiency Index

| Type                                  | Nominal Cooling capacity<br>(CC)<br>kW | Energy efficiency class |              |              |               |
|---------------------------------------|--|-------------------------|--------------|--------------|---------------|
|                                       |  | 1                       | 2            | 3            |               |
|                                       |  | (COP)<br>W/W            | (COP)<br>W/W | (COP)<br>W/W | (IPLV)<br>W/W |
| Air-cooled or evaporation cooled type | CC ≤ 50                                | 3,20                    | 3,00         | 2,50         | 2,80          |
|                                       | CC > 50                                | 3,40                    | 3,20         | 2,70         | 2,90          |
| Water-cooled type                     | CC ≤ 528                               | 5,60                    | 5,30         | 4,20         | 5,00          |
|                                       | 528 < CC ≤ 1 163                       | 6,00                    | 5,60         | 4,70         | 5,50          |
|                                       | CC > 1 163                             | 6,30                    | 5,80         | 5,20         | 5,90          |

| Basic models | COP  |
|--------------|------|
| HRA-20       | 3.30 |
| HRA-40       | 3.32 |

# | High efficiency & Energy saving: world famous scroll compressor



- Adopt dedicated fully enclosed scroll compressor, with small pressure difference between adjacent crescent-shaped spaces and low leakage.



- No air inlet and outlet valve, low resistance and high efficiency.



- The inner cavity of the compressor shell is the exhaust chamber, which reduces the air inlet preheating and improves the volumetric efficiency of the compressor.

# | High efficiency & Energy saving: optimization design of air side heat exchanger



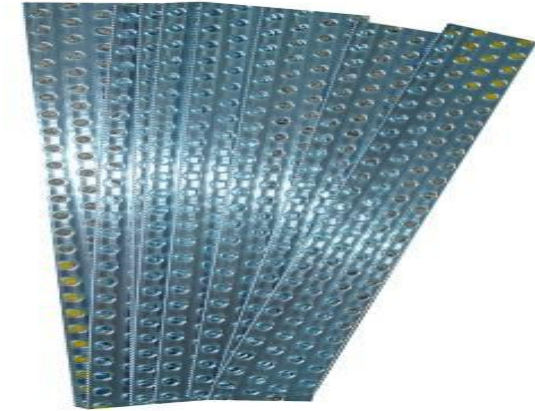
## "V" heat exchanger

Optimized design of the installation angle of the fin heat exchanger, which is the best design of efficiency, mute, and external dimensions. The air flow is more evenly distributed, and the heat exchange between air and refrigerant is more sufficient.



## Internal thread copper tube

The heat exchange copper tube is an internally threaded heat exchange copper tube, which strengthens the refrigerant flow disturbance, strengthens the refrigerant side heat exchange performance, and improves the unit's energy efficiency.

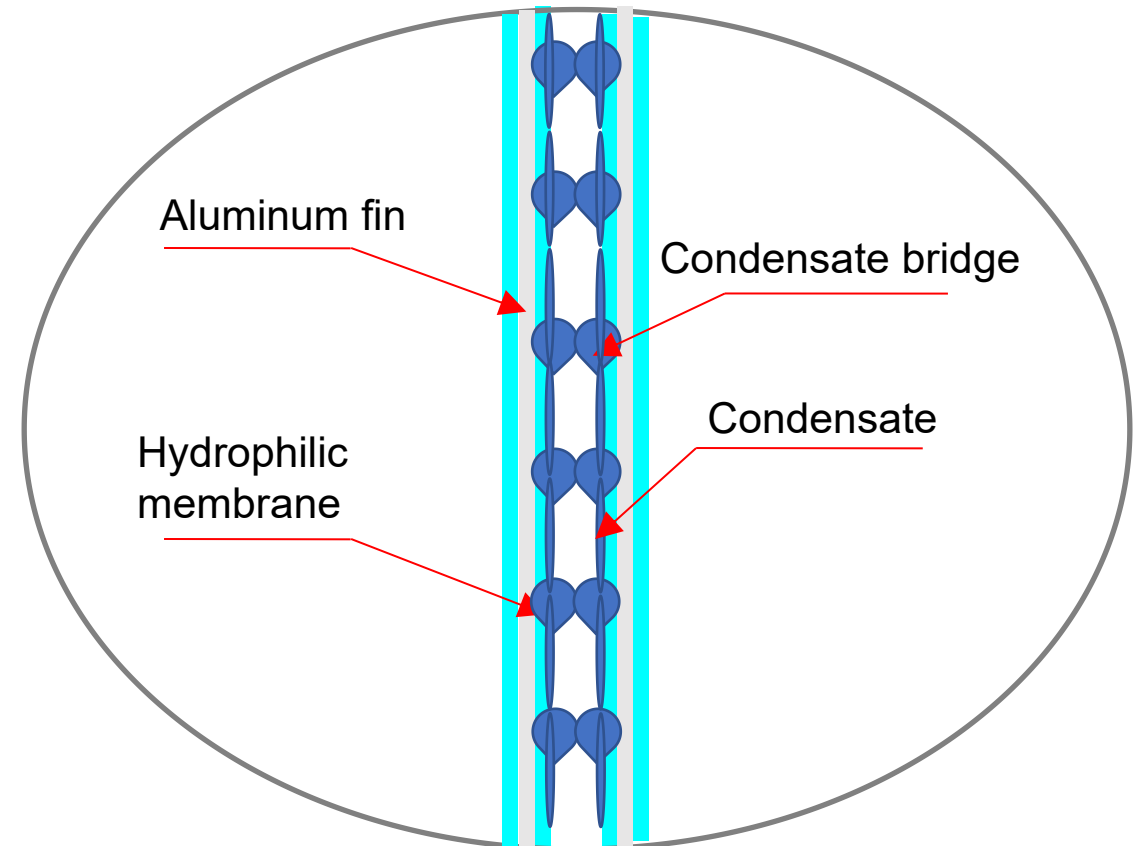


## Hydrophilic membrane aluminum fins

The surface of the fin is coated with a hydrophilic film to ensure that the condensate drains smoothly during heating in the winter and the air circulation is smoother, which is conducive to the heat exchange between air and refrigerant.

# High efficiency & Energy saving: hydrophilic membrane aluminum fin

- The aluminum fins of the air side heat exchanger are coated with a hydrophilic membrane to make the condensate evenly distributed on the fins and quickly slide down, to avoid the "bridging" of the condensate and reduce the air capacity of the unit and the heat exchange efficiency.





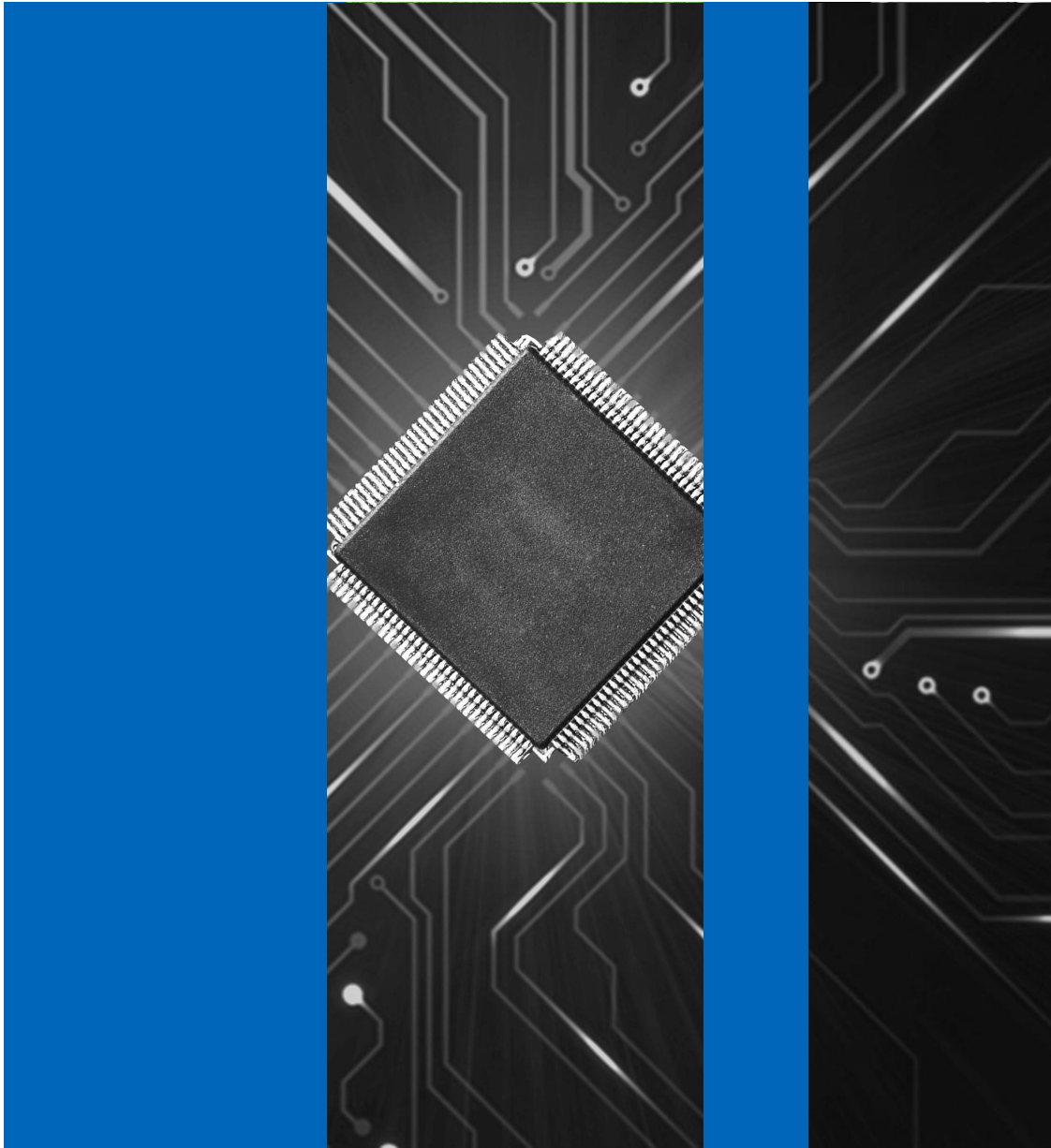
# High efficiency & Energy saving: "U" type shell and tube heat exchanger



- Baffle adopts spiral design with high heat exchange efficiency.



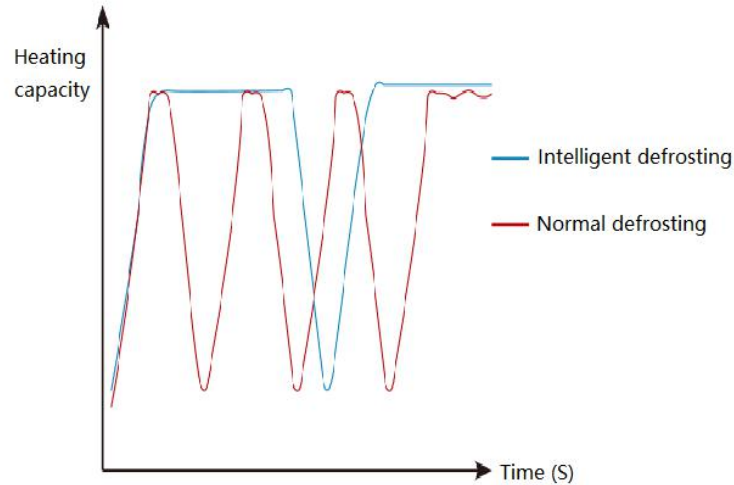
- TECKA patented internal distributor is installed at the liquid inlet to effectively atomize the refrigerant liquid, greatly improving the heat exchange efficiency of the evaporator.



# Smart control

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# Smart control: intelligent asynchronous defrosting technology



01

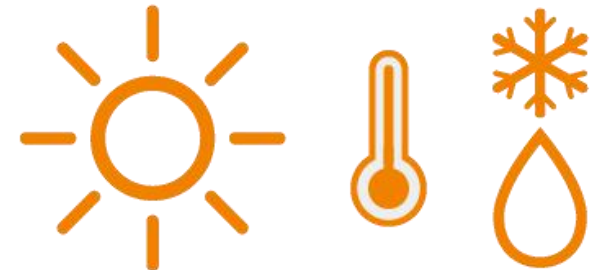
## Intelligent asynchronous defrosting

- The controller monitors the ambient temperature and fin temperature in real time through the sensor. When the defrosting condition is reached, the defrosting starts. When the unit pressure reaches the set value or the defrosting time is reached, it turns to the drying mode. After the condensate on the fan was removed, the chiller start the heating mode. Shorten the defrosting process, reduce the duration of defrosting, ensure that the defrosting is fast and no residue.

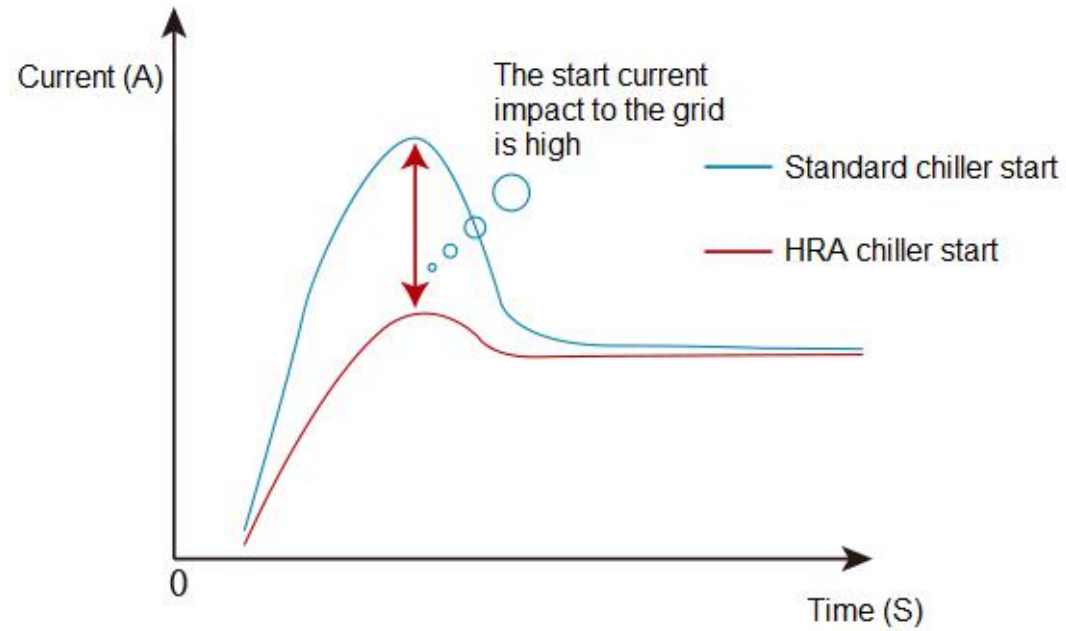
02

## The hot water outlet temperature is stable

- When the unit is heating in winter, the asynchronous defrost mode is used. When one module enters the defrosting mode, the other modules are still in the normal heating mode, which ensures that the outlet water temperature of the whole water system is stable and improves the comfort of the air conditioning in winter.



# Smart control: multi-module start in turn

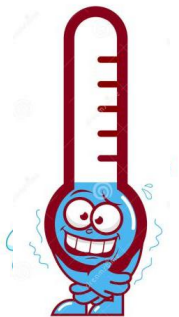


## Multi-module start in turn

Multi-module chillers in the system are started in sequence as required, running smoothly and reducing the impact on the grid during startup.

# Smart control: adaptive energy regulation

- When the system is composed of multiple modules, the controller performs partial load calculation according to the unit outlet water temperature, and adjusts the number of operating units and compressor partial load operation automatically.



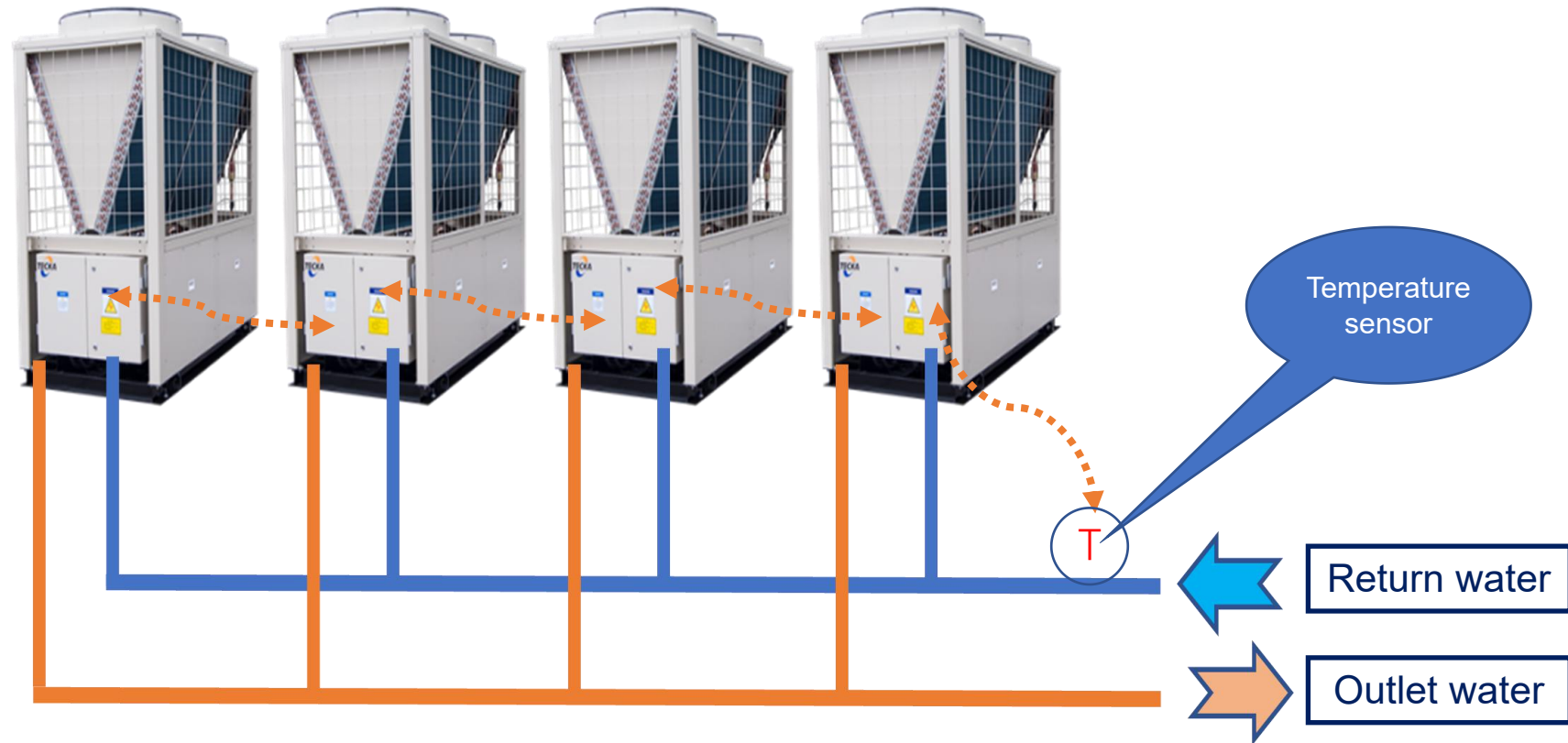
# Smart control: balanced control for working time

- When the system is composed of multiple modules, the controller will adjust the balance according to the load change and the working time of the compressor to avoid the over-operation of some compressors.



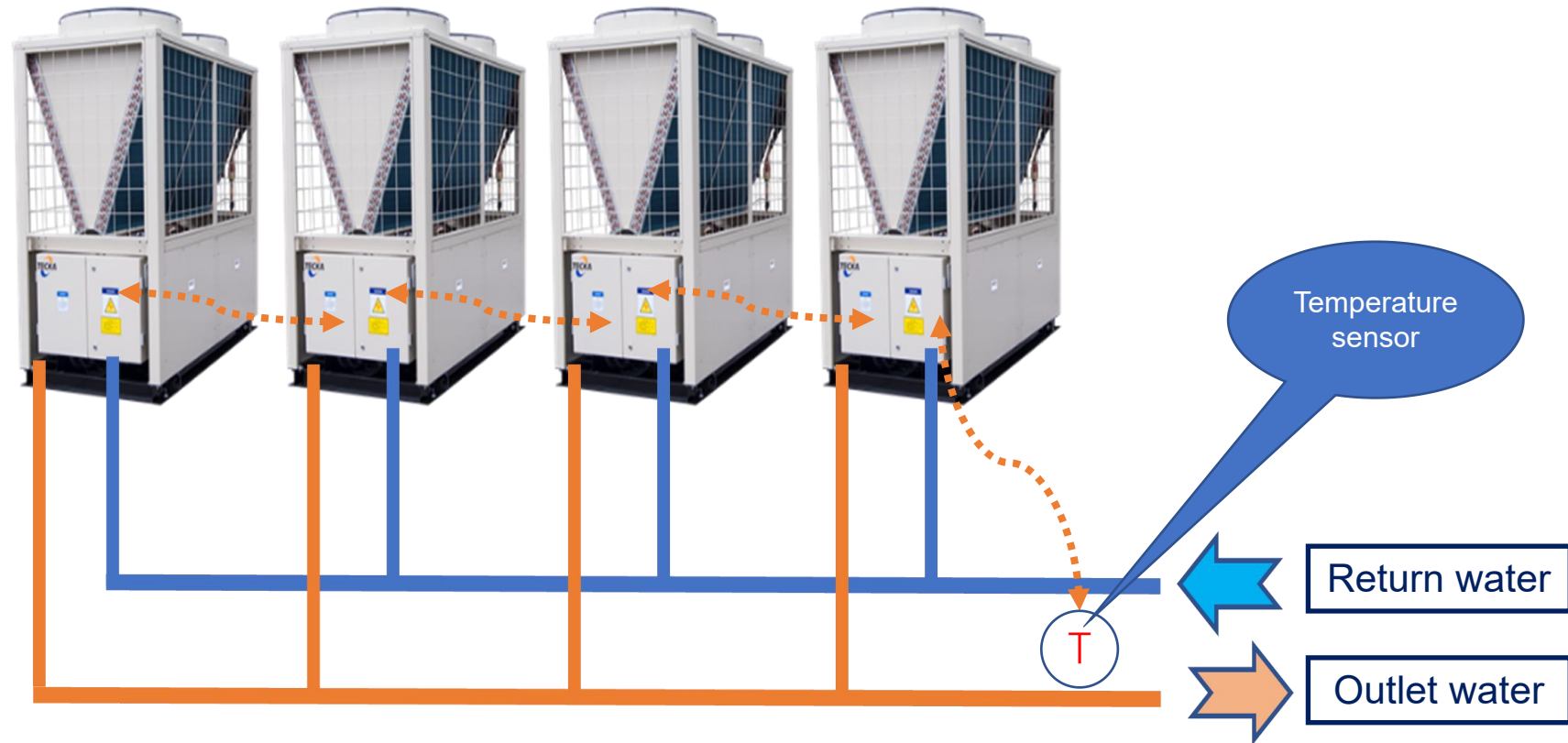
# Smart control: optional control of outlet or return water temperature

- Customers can select the outlet water temperature or return water temperature according to the number of system modules, pipeline layout and load conditions.



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# Smart control: intelligent controller



## Outdoor type

- Adopt outdoor dedicated color display controller, with the features of friendly HMI, high temperature and low temperature resistance, high humidity resistance, anti-electromagnetic interference, high control accuracy, etc.,. Comprehensive fault diagnosis and alarm function, reduce the failure rate.

## Modular control

- The unit can realize modular control, and up to 12 modules can be connected in parallel. When combining multiple modules, set the main chiller and and sub-chiller as required, and the main chiller and and sub-chiller can be changed as required.

## RS485

- Configure RS485 standard communication interface, and open communication protocol, which can realize remote monitoring function and access to building automatic control system through network wiring.



# Environment friendly Low noise

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# Environment friendly & Low noise



## Low noise axial fan

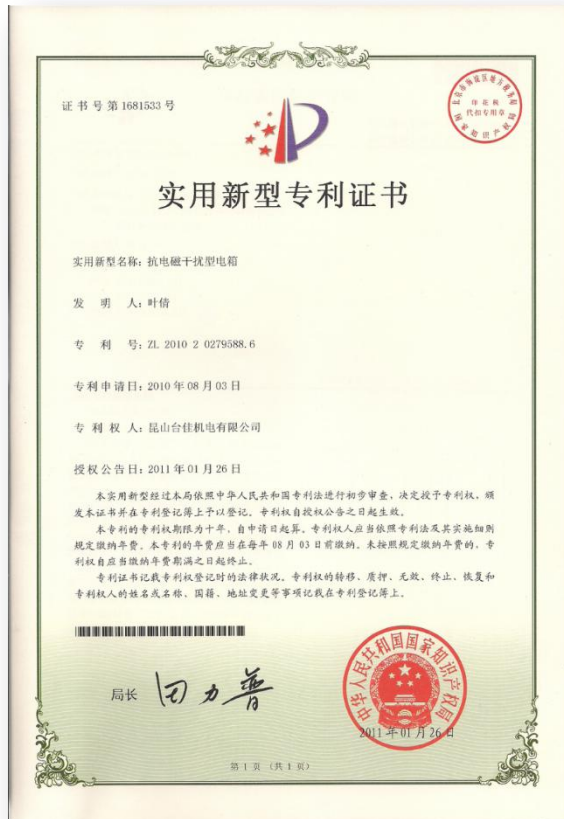
- The large-diameter low-noise axial fan is adopted to ensure the excellent work in normal working conditions and harsh working conditions to further improve the efficiency of the unit, reduce noise and reduce frost.



## Low noise compressor

- Adopt CFD and FEA technology to optimize the design of the refrigerant channel, it effectively improve the separation effect of the compressor refrigeration oil and greatly reduce the aerodynamic noise of the unit.

# Environment friendly & Low noise: no electromagnetic harmonic interference



- The The unit adopts TECKA patented anti-electromagnetic interference type electric box, which passed the EMC test and can effectively avoid external electromagnetic interference. The unit has no electromagnetic harmonic interference to the outside, and will not cause electromagnetic interference to other equipment in the air-conditioned place.

# Thank you

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