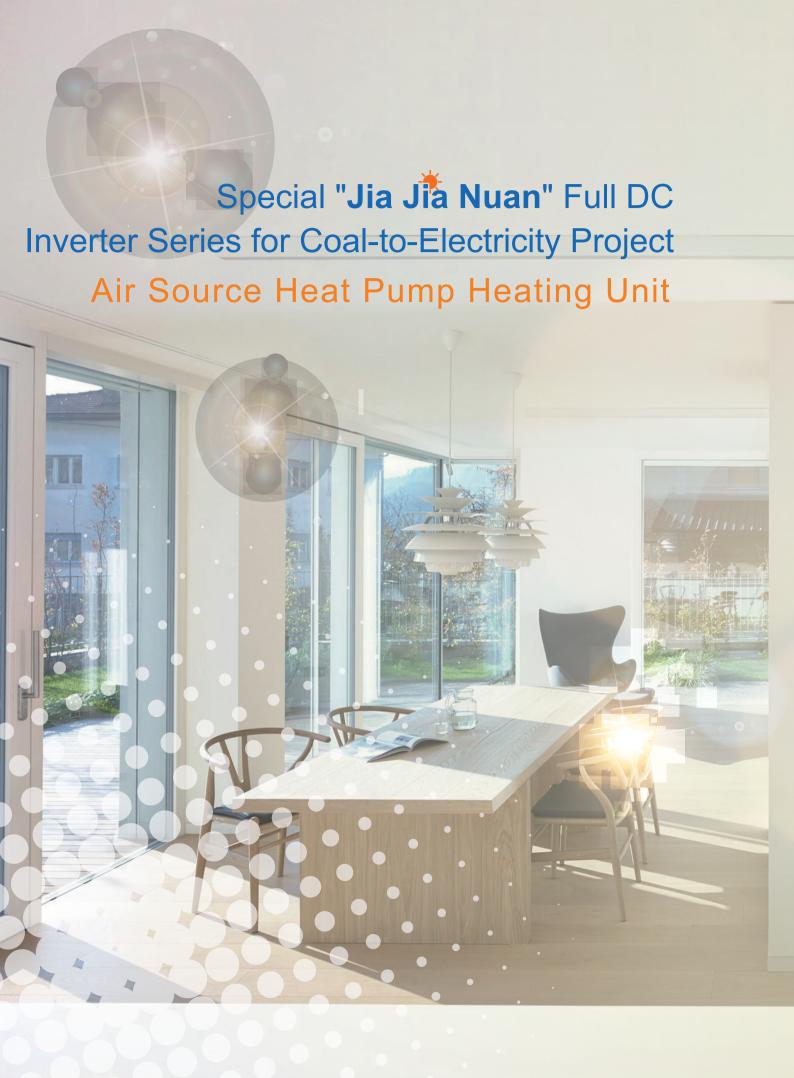
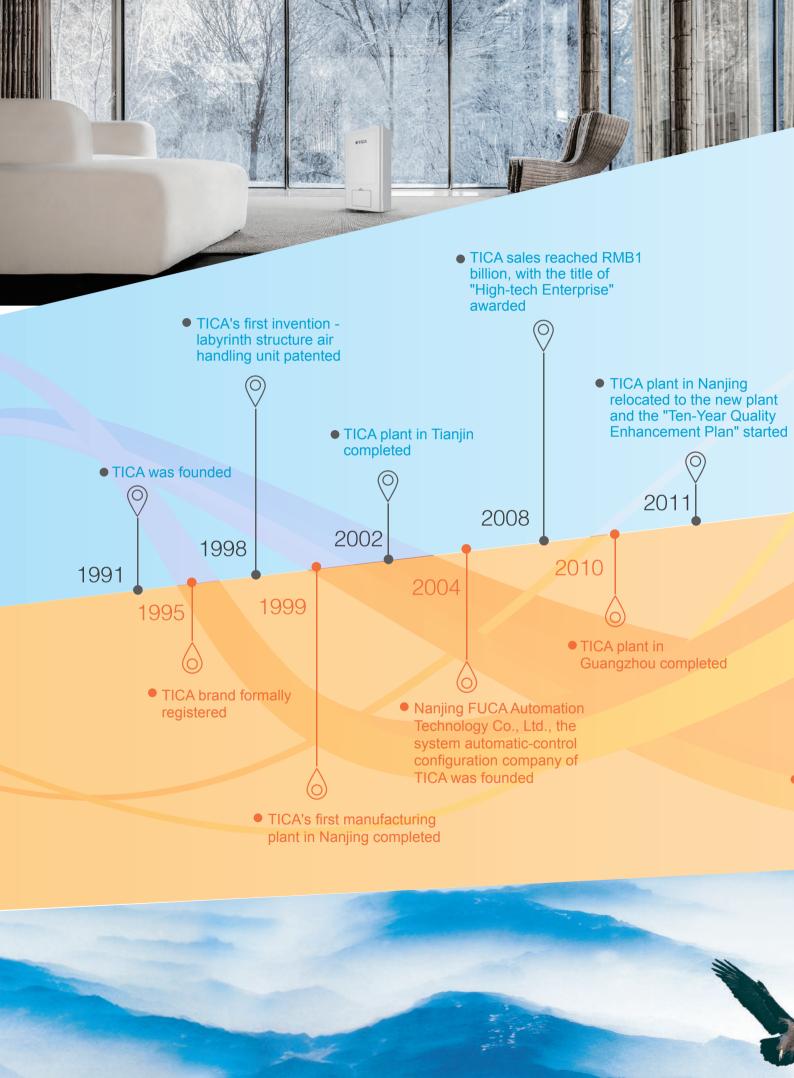


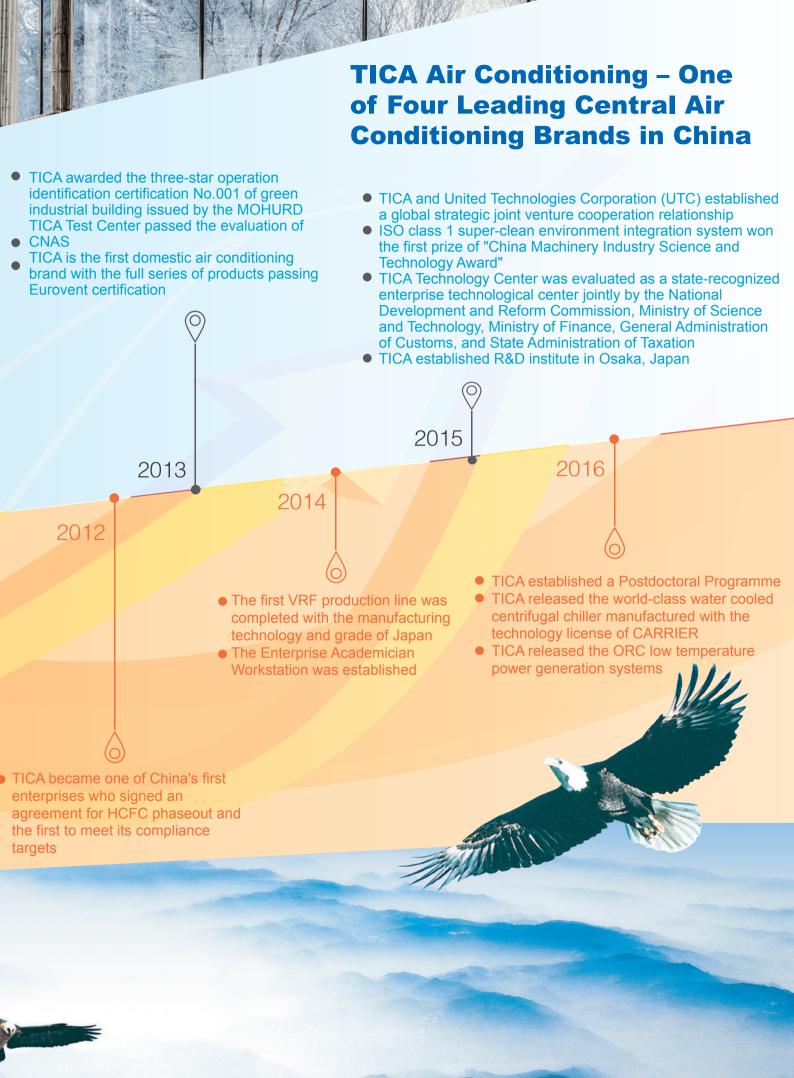
Special "Jia Jia Nuan" Full DC Inverter Series for Coal-to-Electricity Project Air Source Heat Pump Heating Unit











Development History and Industry Position

Founded in 1991, TICA is a professional central air conditioning equipment and heat energy utilization company integrating R&D, manufacturing, sales, and service.

TICA's brand positioning: A central air conditioning system integrator and service provider with international competitiveness. As a national high-tech enterprise, TICA has grown into one of four leading central air conditioning brands in China. TICA owns four plants in operation and two plants under construction, as well as over 70 branches and service outlets across the country.







Alliance between giants to open the road of internationalization

TICA established R&D institute in Osaka, Japan in 2015, which is the first professional institute constructed by a China central air conditioning brand in Japan and engaged in research into the relevant key technologies of heat pump water heater, heat pump chiller, VRF, cryogenic refrigerator, professional air purification unit, air purifier, etc.

TICA formally signed the legal agreement on global strategic joint venture cooperation with United Technologies Corporation on October 9, 2015. United Technologies Corporation will introduce the world's leading core technologies such as the advanced low temperature power generation systems (ORC), water cooled centrifugal chiller, and screw unit to TICA, enabling TICA's centrifugal chiller technologies to take a lead in the same trade of China by 20 years and low temperature power generation technology to take a lead by 30 years. Meanwhile, the two parties will integrate the global network to open up a new international market pattern.







TICA's Management System

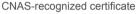
In 2011, TICA started the "Ten-Year Quality Enhancement Plan" and introduced the Japanese professional R&D and production management team to take charge of the full process covering R&D, process, manufacturing, and quality, with a view to bringing its product quality to meet and exceed the Japanese manufacturing standards.

TICA's products = Made in Japan

First-class Scientific Research Strength

TICA owns the largest CNAS Enthalpy Difference Laboratory in the central air-conditioning industry. At present, it has more than 20 sets of labs (experiment tables) advanced at home and abroad, covering an area of 10,000 m² and occupying fixed assets of RMB120 million, among which many sets are enthalpy difference labs meeting the test requirements at -25°C.







Low temperature lab testing certificate



TICA Academician Workstation

TICA established an Academician Workstation and invited two academicians, i.e., the leading authority Tao Wenquan and He Yaling in the heat transfer field, to realize deep integration of production, learning and research, providing a quick passage for industrialization of scientific research projects.



Academician Tao Wenguan



Academician He Yaling



TICA Postdoctoral Programme

TICA established a Postdoctoral Programme under approval by the Ministry of Human Resources and Social Security and the National Postdoctoral Management Committee to carry out the postdoctoral research work and cultivate postdoctoral talents, putting up a bridge for high-tech talents and enterprises of China.



Select "Jia Jia Nuan" Full DC Inverter

Air Source Heat Pump Heating Unit



Power saving and comfortable

The product adopts the full DC inverter technology to ensure small water temperature fluctuation, more comfortable environment and less power consumption.



Ultra low temperature heating

The minimum operating ambient temperature is -25°C, when 48°C hot water can be still provided, bringing a strong warm feeling to users in cold weather.



Excellent performance

The leading full DC inverter and EVI technologies of TICA improve the low temperature heating capacity by more than 45% and reduce the operation cost.

Six Major Reasons





Reliable operation

The -26°C ultra low temperature lab and long-term operation lab implement double verification and ensure quality; the split type design improves the anti-freezing effect and reliability of low temperature operation.



Five-star service

24/7 customer service hotline: 4008-601-601 More than 300 service outlets throughout the country bring users five-star customer service experience anytime.

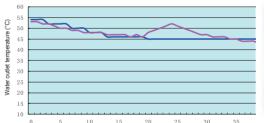
Convenient installation

The maximum water outlet temperature is 55°C. The user can select the radiator system, FCU system, or floor heating system freely.



Inverter technology •

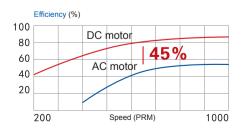
The unit uses the efficient DC inverter scroll compressor and adopts the advanced inverter drive technology to ensure operation stability of the compressor. The inverter compressor can implement the wide inverter control of 10~130 Hz. When the residential load demand is reduced, the ultra wide change range makes sure that the inverter compressor operates at the low frequency status automatically, saving both energy and money more efficiently. The compressor senses the outdoor ambient temperature and water supply/return temperature and automatically regulates the compressor frequency, ensuring small temperature fluctuation and making people feel more comfortable. The compressor can start up at a low voltage and features small impact on the power grid, stable operation and startup, and higher safety and reliability.





Full inverter technology •

TICA air source heat pump heating units not only adopt efficient inverter compressors, but also configure efficient DC inverter motors with low noises for fans. The fan motor implements stepless speed regulation and matches the air regulation with capacity regulation to realize more accurate operation and save more energy.





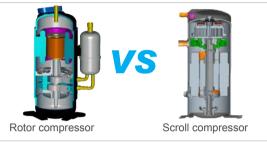
EVI technology •-

The EVI technology increases the refrigerant circulation quantity and enhances the heating capacity and energy efficiency at a low temperature. The capacity is improved by 45%, with no heat attenuation even at -20°C. Low temperature gaseous refrigerant is supplemented to prevent overheating of the compressor and increase the heating range. Strong heating can be implemented at -25°C. The unit is specially designed for the northern regions where heating is needed in winter.

No attenuation at -20°C TICA Others Outdoor ambient temperature

Scroll compressor technology -

The compliant scroll compressor technology features high volumetric efficiency, low attenuation at low temperature and flexible floating sealing, which substantially increase the liquid hammer resistance. Compared with rotor compressors, compliant scroll compressors are more efficient and have a longer service life.



Noise reduction technology •

The unit adopts the multi-noise reduction technology and inverter technology at the same time to effectively reduce the noises when the unit starts. When the ODU operates at a full load, the ODU noise is reduced to 60 dB, and the IDU noise is as low as 42 dB, creating a quiet and comfortable home environment for you.



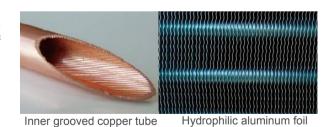
Smart defrosting technology •

TICA air source heat pump heating units intelligently judge whether defrosting is needed according to the outdoor ambient temperature and unit operating status, implement defrosting if there is frost but heating if there is no frost, and avoid defrosting by mistake, maximizing the heating capacity and energy efficiency. An ice melting line is set for heat exchanger, and the hydrocarbon material is adopted to ensure constant temperature and smooth drainage and avoid freezing at the ODU bottom. This function is designed specially for heating in the north.



High-efficiency heat exchanger technology •

TICA air source heat pump heating units employ the design of heating priority flow path and inner grooved copper tubes, and fins use hydrophilic corrugated sheets to ensure high heat exchange efficiency. Meanwhile, the units are characterized by the large fin spacing, small wind resistance, slow frosting, and smooth defrosting drainage.



The highest heating energy efficiency ratio in the field •

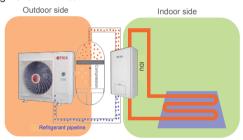
The heating energy efficiency ratio of units reaches 2.45 (the ambient temperature is -12/-14°C; the outlet water temperature is 41°C), which has been tested and recognized by the national authoritative testing institution and can save more money in use.

EER up to 2.45



Split structure to resist freezing •

TICA air source heat pump heating units adopt the split structure. The water system is installed indoors, and the IDU and ODU are connected using a copper tube to efficiently prevent the water pipe from being frozen in winter.



Inverter compressor •

The adopted compressor is the latest inverter EVI scroll compressor of Copeland, a top brand of the industry. Rapid braking is implemented using flexible liquid, and the independent oil pump system improves the compressor reliability significantly.



Eco-friendly refrigerant

The unit selects the internationally recognized R410A eco-friendly refrigerant, which showcases the advantages such as stabilization, non-toxicity and superior performance and does not harm the ozone layer, unlikely to be replaced. Meanwhile, it has a better heat exchange coefficient of unit volume and can improve the unit performance effectively.



Plate heat exchanger •

Danfoss plate heat exchanger is adopted to improve the heat exchange coefficient. The heat exchange efficiency is improved by about 15% as compared to the double-pipe heat interchanger.

Heat exchange efficiency improved by about 15% as compared to the double-pipe heat interchanger



Plate type

Double-pipe type

Imported electronic expansion valve with original packaging

The imported electronic expansion valve with original packaging is used to implement throttle control, match the cooling system dynamically, make reaction and movement faster, keep the unit operating at the optimal state all the time, enhance the energy efficiency of unit, and reduce the operating cost.



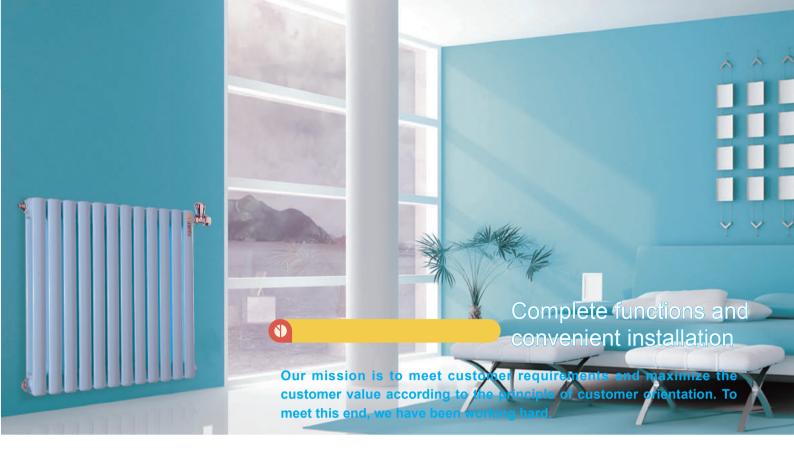
Electronic expansion valve

Thermostatic expansion valve

Excellent water pump •

The unit adopts the water pump of an international famous brand with a 8 m lift to provide stronger power to the water system.





High outlet water temperature

The maximum outlet water temperature of the unit is 55°C. The outlet water temperature can reach 50°C when the ambient temperature -20°C (the electric heater is not started). This can meet the needs of multi-heating forms such as floor heating, FCU, and radiator.



Integrated design makes installation more convenient •

The unit adopts the integrated design. The water system accessories (the expansion tank, water pump, automatic air discharge valve, and pressure gauge) are integrated in the IDU to reduce the field installation cycle and cost and improve reliability of the whole system at the same time.





Multi-safety protection •

The unit uses the temperature sensor and pressure switch to implement real-time monitoring on the parameters such as system pressure and temperature and all-around protection for the unit and system, improving the control accuracy and operation stability.

Multi-anti-freezing protection •

The unit implements anti-freezing protection for itself through multiple anti-freezing protection modes such as the water pump, compressor and electric heater according to the ambient temperature and water temperature and guarantees reliable operation of the water system for the unit.

LCD controller •

The unit is configured with a touch screen LCD controller to achieve full touch control and simple operations. As a result, the unit is controlled easily.

485 interface •

The unit is attached with a RS485 interface and can access the smart home and remote control system easily so that the operating status can be grasped in real time.



Super large LCD screen, with backlight HD

Set temperature and ambient temperature apparent to the eye

Touch buttons, preventing mechanical damage

O6/15 Tue 17:57
Set temperature: 50°C
Status: Healing mode
Environment: Power on at +18.7°C

Mode | Ox | Manual Outpy | Oncode

Security system

appliance system

Audio and video

entertainment

Air conditioning system

Household



Product Certification

(1)

The unit has passed the CCC conducted by the national authority and obtained the CCC certificate.



The unit has passed the sampling inspection conducted by the China Academy of Building Research and Hefei General Electromechanical Product Testing Institute, proving that all the performance parameters take a lead in the industry, and a testing report was also issued.



Perfect After-sales Service System



- More than 300 technical service centers across the country;
- 24H free service hotline: 4008-601-601;
- More than 70 sales branch companies follow up project supervision in the whole course;
- A warehouse logistics center was established in Tianjin to ensure timely supply of aftermarket accessories;
- TICA established an advanced digital center of after-sale service to bring end customers to the cloud times directly and implement real-time data monitoring, fault prediction and solving, customized maintenance, remote hosting management, etc.





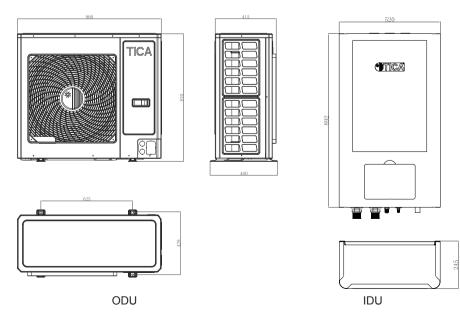
Specifications

Entire unit	TSCA/I60CRL TSCA60CRL TSCI60CRL 12.5 5.19 2.41
IDU TSCI30CRL Il heating capacity (kW) 8 ed input power (kW) 3.27 COP (W/W) 2.45 IPLV (H) 2.6	TSCI60CRL 12.5 5.19 2.41
I heating capacity (kW) 8	12.5 5.19 2.41
COP (W/W) 3.27 COP (W/W) 2.45 IPLV (H) 2.6	5.19 2.41
COP (W/W) 2.45 IPLV (H) 2.6	2.41
IPLV (H) 2.6	
. ,	
v (m³/h) 1.38	2.6
	2.15
range	
ODU 6	7
IDU	
ODU 29	34
IDU	
heating tube) (kW)	
erature (°C)	
1/ODU)	
es .	
eter (external thread)	
t pipe diameter d)	
ODU 85	95
IDU 43	43
heating tube) (kW) Perature (°C) I/ODU) Siss Eter (external thread) It pipe diameter d) ODU 85	

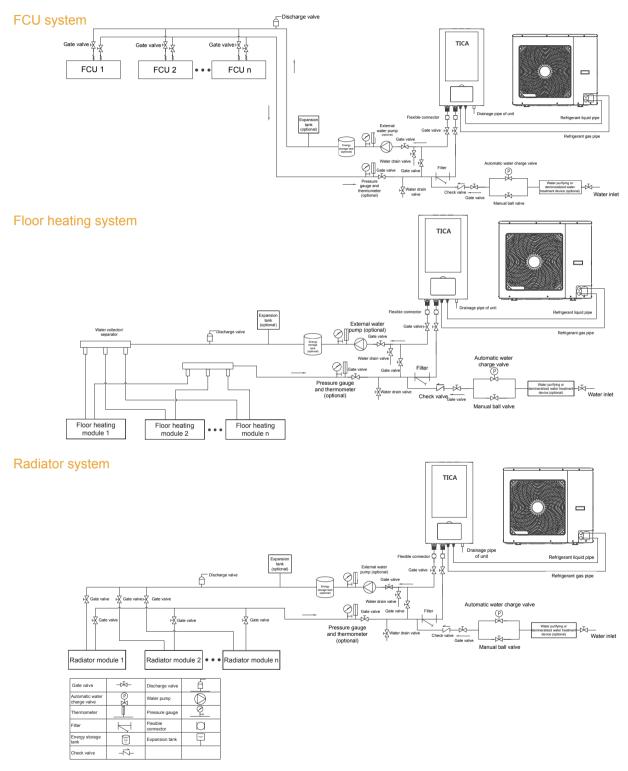
Remarks:

- 1. The unit compiles with the national standard GB/T25127-2010 Low Ambient Temperature Air Source Heat Pump (Water Chilling) Packages.
- 2. Nominal heating test conditions: The outlet water temperature is 41°C, the outdoor dry bulb temperature is -12°C, and the wet bulb temperature is -14°C.
- 3. If specifications are changed due to product improvement, the parameters indicated on the nameplate should prevail.

Dimensions



Installation Diagram



Notes: 1) The unit can be connected to the FCU, heating terminal and radiator terminal and used for heating, but two different heating terminals cannot coexist in one system.

- 2) Except the chillers (IDU and ODU), the user needs to prepare the heating terminals, connecting pipes and pipe fittings.
- 3) Decide whether the external water pump, Energy storage tank, expansion tank, pressure gauge, thermometer, and water purifying or demineralized water treatment device shown in the figures are needed according to the actual use conditions of the water system.
- 4) The discharge valve needs to be installed at the highest position of the water system; the water drain valve needs to be installed at the lowest position of the water system.
- 5) After the heating system is debugged, do not adjust the pipeline system valve without permission; otherwise the unit may fail to operate normally or be damaged.

Improved Test Verification

Now, TICA boasts more than 20 sets of labs (experiment tables) advanced at home and abroad, covering an area of 10,000 m², as well as several sets of enthalpy difference labs meeting the test requirements at -25°C, low temperature snowfall simulation lab, transportation simulation experiment table, long-term operation lab, rain lab, etc.

The units must undergo multiple tests according to the Japanese management process and test verification method before delivery for sales, so as to ensure stability and reliability of the delivered units.



Long-term operation test



Rain test



Low temperature test



Performance test



Transportation test



Noise test

Cases of Air Source Heat Pump Projects

Qingdao Licang District Theme Hotel
Hilton Hotel of Eastern International Center
Hancheng Xinyuan Hotel
Leping Overseas Chinese Hotel of Jingdezhen City
Central Capital Hotel - Kaifeng
Silk Road Leisure Hotel
AVIC Career Technical College in Guiyang
Henan College of Finance and Taxation
Huichuan No.1 Kindergarten at Fuzhou Road,

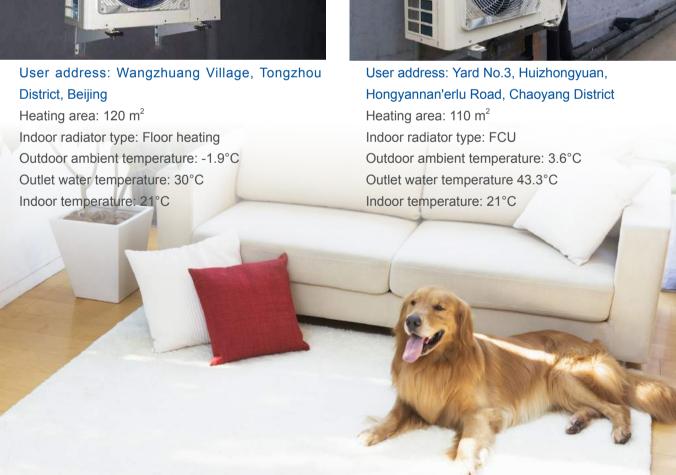
Huichuan District, Zunyi City
Shiyan Jingzhong Experimental School
The Second Hospital of Shanxi Medical
University
The First Affiliated Hospital of Nanchang
University
Saint Mary Hospital
LeeKwan Embroidery (Haining) Co., Ltd.

Xiaoyi Shuguang Coal Mine of Shanxi Province

Third Sports School at Luqiu Road, Huangcun, Beijing Shimen Village Liujiang River Hospital, Qinhuangdao City of Hebei Province Tongrentang Vinegar of Taiyuan City of Shanxi Province

Shizuishan Public Security Bureau of Ningxia Xinjiang Medical University at Urumqi of Xinjiang Ningxia Shouchuang Business Center





"Jia Jia Nuan" Full DC Inverter Series Air Source Heat Pump Heating Unit

4008-601-601

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Note: Due to the continuous improvement and innovation of TICA products, the product models, specifications, and parameters in this document are subject to changes without prior notice.