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www.ticachina.com

TICA Central Air Conditioner

Air-cooled Scroll Chiller (Heat Pump)

CA-TAS-B11320G01

TAS

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TICA is a hi-tech enterprise specialized in R&D, manufacturing, sales and services of air-conditioning and refrigeration products. Established in 1991, it has developed into one of the top four Chinese air-conditioning brands, with factories in Nanjing, Tianjin and Guangzhou,and a network of over 70 sales and service filiales around the world.

TICA has invested up to RMB 600 million in the first phase to build the top notchcentral air-conditioning R&D and production base,credited as the state enterprise R&D center. Certified by CNAS, it serves as a national R&D public service platform.

TICA produces over 30 series of products,covering AHUs, VRFs, screw chillers and centrifugal chillers,diverse enough to meet various requirements with regards to comfort andmanufacturing processing application.

TICA is a strong competitor in chillers and commercial air conditioning products. It is the largest producer of AHUs in China for five consecutive years and covers over 40% of the market share as the supplier to such industries as micro-electronics, surgery operation room equipment and biopharmaceuticals.

TICA has established a global strategic joint venture with United Technologies Corporation (UTC) whose businesses include the world's most advanced Pratt & Whitney Aircraft Engines, the largest air-conditioning company Carrier and the biggest elevator company Otis.

The giant UTC transfers such global cutting-edge core technologies as large centrifugal chillers, screw chillers, and ORC systems to TICA, thrusting TICA 20 years ahead of its Chinese counterparts in terms of centrifuge technology and 30 years ahead in cryogenic power generation technology. Meanwhile, TICA and UTC will integrate global resources to create a brand-new international market pattern.

Meanwhile, the company has also provided energy-saving air-conditioning system integration solutions to both domestic and foreign users like Zhongnanhai, the Great Hall of the People, Beijing Bird's Nest stadium, the Water Cube, the Wukesong Indoor Stadium, Petro China, Sinopec, State Grid, Nanjing Panda, Hangzhou Xiaoshan Airport, Hainan Airlines Group, Shangri-La Hotel, Manila Ocean Park, Abu Dhabi Al Muneera, SM City in Philippines and Unilever, etc.

Nanjing Headquarter

Tianjin Base

Guangzhou Base

Chengdu Base

Air-cooled Scroll Chiller (Heat Pump)

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Air-cooled Scroll Chiller (Heat Pump)

Product Introduction

Air-cooled scroll chiller (heat pump) is a central air conditioning unit that uses air as cooling or heating source, and water as secondary refrigerant. It can be combined with multiple air side equipment, like fan coil and AHU, to form a centralized air conditioning system.

Air-cooled scroll chiller (heat pump) uses cooling parts and control components provided by world-famous manufacturers, together with the most cutting-edge intelligent control system, to make it highly efficient, energy conserving, stable and reliable. With a wide variety of specifications and functions, it supports the control over up to 8 units at the same time; it can also be connected to the building automation system (BAS) to easily meet various air-conditioning requirements in different places.

Without a cooling water system, air-cooled scroll chiller (heat pump) is simple in its pipeline network, easily installed, cost effective, and short in construction period and can be invested by stages. The system is widely applied to various situations for comfortableness and arts and crafts, such as villas, hotels, hospitals, office buildings, restaurants, supermarkets and theaters.

Air-cooled Scroll Chiller (Heat Pump)

Model Nomenclature

TAS 165 A H

- H — Feature code: C – Cooling only; H – Heat pump
- A — Design code: A, B…
- 165 — Specification code: 165, 260
- TAS — Air-cooled Scroll Chiller

Air-cooled Scroll Chiller (Heat Pump) Features

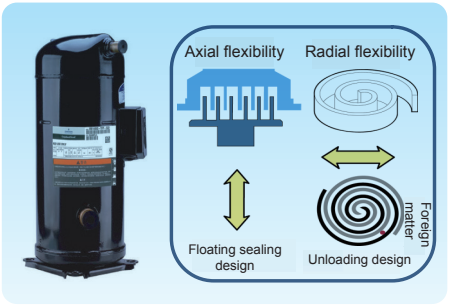
Environmental friendly

TICA air cooled scroll chiller (heat pump) uses eco-friendly refrigerant R410A. Such chlorine-free refrigerant does not harm the ozone layer (zero-ODP), and is stable and non-toxic. Therefore, it is environmental friendly and is unlikely to be replaced. In addition, it is good in heat exchanging, which could help boost the unit performance and lower energy consumption.

High-end configuration

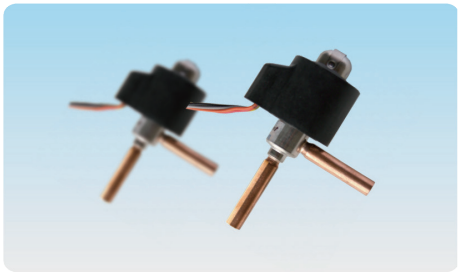
Efficient flexible scroll compressor

The unit uses the well-known hermetic efficient scroll compressor and the optimized scroll and sealing ring so that the refrigerant compressor features axial and radial flexibility. This not only effectively reduces refrigerant leakage, but also raises the volumetric efficiency of the compressor. Moreover, each compressor is equipped with a unidirectional discharge valve to avoid backflow of the refrigerant and ensure that the compressor can run stably in the full operating condition.



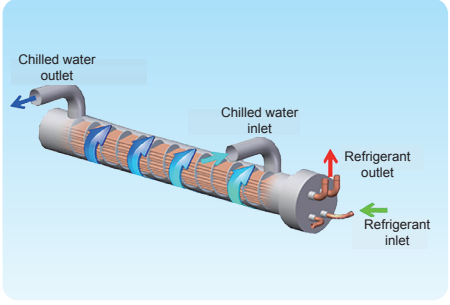
High-precision electronic expansion valve

The unit adopts the 480-step electronic expansion valve of premium brand (for total heat recovery: 500 steps) for precise adjustment of refrigerant flow. And with TICA's patented control technology, refrigerant in the system is dynamically adjusted to suit the load demands in a fast and accurate way, to greatly improve the unit energy efficiency.
(Patent No.: ZL 2013 2 0345187.X)



Efficient water-side shell-and-tube heat exchanger

The water-side heat exchanger employs the efficient shell-and-tube heat exchanger. Compared with the plate heat exchanger, the shell-and-tube heat exchanger provides wider water-side channels and produces less water resistance and scale, with less possibility of being blocked by impurity. Therefore, the shell-and-tube heat exchanger raises lower requirements for water quality and is equipped with more powerful anti-freezing capability.



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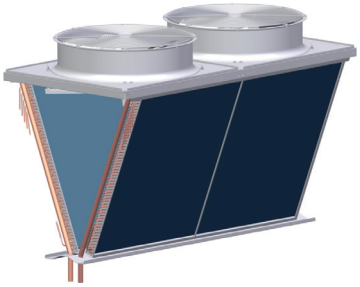
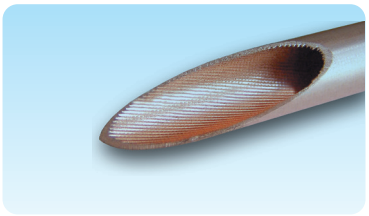
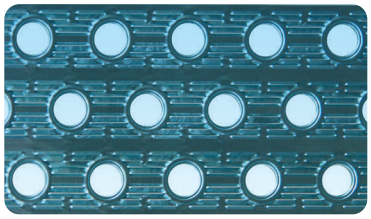






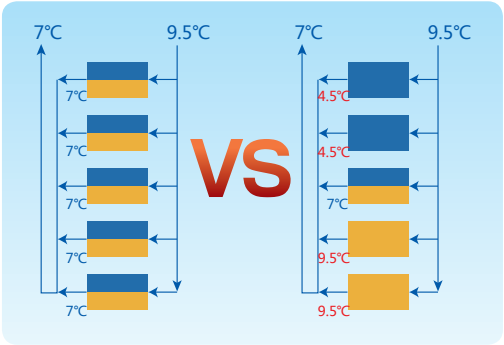
High-performance fan

The air cooled scroll chiller (heat pump) is installed with IP54-rated (or higher) fan motor, to ensure safe and reliable running in the most severe weather conditions..

Professional design

Unique energy regulation

When TICA air cooled scroll chiller (heat pump) is deployed in a modular system, the energy control part employs TICA's patented smart energy regulation technology, and based on which, the first system of each modular unit is loaded before loading the corresponding second system. In this way, the inlet and outlet water temperature difference of the modular unit at part load can be effectively balanced with less water temperature fluctuation, to raise the energy efficiency ratio of the modular unit at part load and enhance the anti-freezing capability of the water-side heat exchanger in winter, making the multi-modular unit a compact and easy-to-use system that features high efficiency and automatic energy regulation.
(Patent No.: ZL 2013 2 0344732.3)



Smart air flow regulation

With the common air system, the new-generation air cooled scroll chiller (heat pump) implements hierarchical control of fans. The unit with a single module can automatically adjust the number of active fans based on the ambient temperature so that the air flow change of the unit best matches the load change without frequently powering on or off fans. Therefore, the pressure of the system is stable with small water temperature fluctuation and the modular unit can run more reliably. Moreover, the common air system and hierarchical fan control design greatly increases the temperature ranges of the unit in cooling and heating modes.

High efficiency & energy saving

According to the national authoritative detection institute, the EER of TICA air cooled scroll chiller (heat pump) at full load is greater than 3.3, reaching and exceeding national grade 2 energy efficiency standard. TICA air cooled scroll chiller (heat pump) has achieved the Energy Conservation Certification issued by the authoritative detection institute certified by China National Accreditation Service for Conformity Assessment (CNAS), and has been included into the energy-saving product procurement list of China.
The whole unit adopts air-cooled mode without the need of large external equipment such as boiler and cooling tower, thereby reducing initial investment and OPEx of users. TICA air cooled chiller (heat pump) efficiently saves energy, having safe and eco-friendly characteristics.

Reliable running

Defrosting by heating, providing multiple guarantee

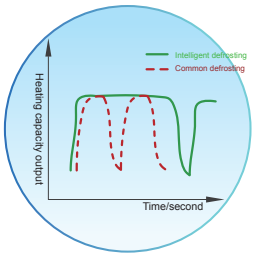
With three patented technologies resolving specific problems, the defrosting feature of air cooled scroll chiller (heat pump) is further improved to guarantee efficient defrosting in winter and excellent heating capacity of the unit.

First guarantee
With the patented defrosting technology, the system determines the defrosting conditions according to the ambient temperature, evaporation temperature, and running time in heating mode. Meanwhile, the patented defrosting technology ensures that the unit can be efficiently defrosted when there is frost, and stably supply heat when there is no frost. The running efficiency of the unit in heating mode is more than 90%. The EER in heating mode significantly increases.

Second guarantee
The patented unidirectional valve technology refers to deploying a unidirectional valve at the last refrigerant loop at the bottom of the heat exchanger to prevent the refrigerant at low temperature in heating mode from entering the last loop at the bottom, without blocking the flow of the refrigerant at high temperature during defrosting. This technology not only prevents frost, but also greatly reduces the risk of being frosted and frozen at the bottom.

Third guarantee
The suspended bottom design refers to reserving space between the bottom of the fin heat exchanger and the horizontal plate sheet without affecting water flow after defrosting. Therefore, water can more easily drain and the possibility of water accumulation and freezing is reduced.

1



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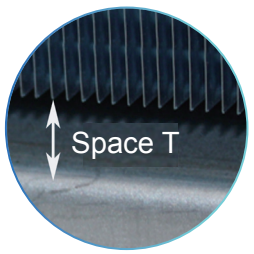


Improved protection functions

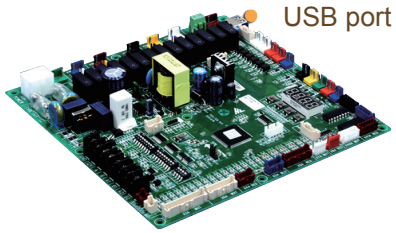
The unit programs have multiple protection functions to guarantee stable and reliable running. TICA air cooled scroll chiller (heat pump) is equipped with a water flow switch, which does not need to be installed and debugged during installation. This makes the unit running safer, simplifies the installation process, and reduces the costs, thus providing a cost-effective and convenient solution to customers.

Communication failure protection	Sensor fault protection
Protection of too high air discharge temperature	Frequent startup protection
Compressor high-current protection	Balancing wear during Balancing wear during hardware usage
Compressor low-current protection	High pressure protection
Protection of too low outlet water temperature	Low voltage protection
Protection of too high outlet water temperature	Fan overload protection
Phase sequence protection	Protection against insufficient water flow
Automatic anti-freezing protection	External interlocking protection

Intelligent control

Microcomputer control system

Air cooled scroll chiller (heat pump) employs the third-generation microcomputer control system and wired controllers that are upgraded. The third-generation microcomputer control panel integrates phase sequence detection and current detection features and provides more USB ports to facilitate subsequent maintenance and upgrade of TICA self-developed control program.
Moreover, the unit supports modular control, and up to 8 modules can be combined in parallel mode. When the unit is deployed in a modular system, the master and slave units can be set on demand. A faulty master unit can be easily replaced without affecting monitoring and running of the entire system.



Diversified control functions

Circulating water pump interlocking + Auxiliary electric heater interlocking + Fan coil interlocking

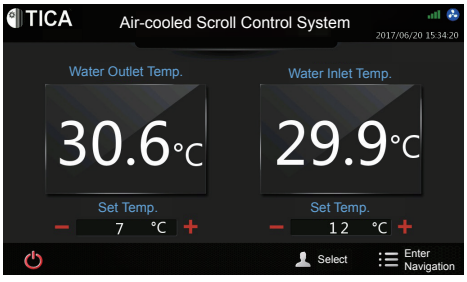
The control panel of the unit reserves the water pump interlocking control interface, auxiliary electric heater interlocking control interface, and the external interlocking interface. The unit supports interlocking control of the master water pump to prevent the unit from being damaged due to asynchronous startup of the water pump and unit. In winter, when the unit runs in heating mode, the switch of the auxiliary electric heater is controlled based on the load demand and the unit running status. The unit supports interlocking control of fan coil, controls unit power-on/power-off and loading/unloading according to the usage of the air side devices, thus enabling automatic running.

Remote power-on/power-off/mode switchover + Remote centralized control + Building automatic control

The control panel of the unit reserves the remote wired control switch/mode switchover interlocking interface. By adjusting the DIP switch, enable remote power-on/power-off/mode switchover. The reserved remote communication interface of the unit helps enable remote monitoring of the unit running and switch control. The unit is equipped with an RS485 communication interface that supports Modbus protocol. The unit supports building automatic control (BAS) system to enable centralized control and smart management of multiple modules.

User-friendly control

The unit is equipped with a perfect control program, providing the following functions: balanced running of the compressor, standby operation, smart anti-freezing running, manual defrosting, automatic fault judgment, automatic fault handling, and automatic alarm display. Additionally, the control part can use a multi-functional centralized controller (with keys/7" touch screen). The centralized controller can be customized to provide multiple functions, such as scheduled power-on/power-off, running on weekends/in holidays, memory upon power-off, and multi-level passwords.



Specifications

Model			TAS165AH	TAS260AH	TAS330AH	TAS440AH
Capacity	Cooling	kW	165	260	330	440
	Heating	kW	180	280	360	475
Power Input	Cooling	kW	53.2	83.8	106.4	141.9
	Heating	kW	56.2	87.4	112.5	148.4
Running Current	Cooling	A	100.8	158.7	184.5	245.6
	Heating	A	102.67	165.11	196.11	266.4
Power supply		V/N/HZ	380-3-50			
Maximum Input Power		kW	73.2	123.416	137.2	192
Maximum Input Current		A	135	220	240	330
Starting Current		A	203	274	319	417
Energy Regulation		%	0-25-50-75-100			
Water Side Heat Exchanger	Type	-	High efficient shell & Tube heat exchanger			
	Water flow	m^3/h	28.4	44.8	56.8	75.7
	Pressure drop	kPa	45	45	40	52
	Inlet/Outlet DN	DN	80	100	125	125
	Connection method	-	Victaulic connection			
Compressor	Brand	-	Danfoss		Copeland	
	Type	-	Scroll			
	Quantity	-	4	4	4	4
Fan	Type	-	Axial fan			
	Air flow	m^3/h	60000	112000	120000	172000
	Quantity	-	4	4	8	8
Refrigerant	Type	-	R410A			
Unit Dimensions (L*W*H)		mm	2200×1720×2000	2200×2400×2235	4440×2260×2460	4440×2260×2460
Packaging Dimensions (L*W*H)		mm	2260×1780×2000	2260×2460×2235	4440×2260×2460	4440×2260×2460
Net weight		kg	1460	2050	2930	3700
Running weight		kg	1590	2250	3380	4200
Sound Level		dB	72	75	74	74

★ Remarks:

1. The nominal cooling capacity and nominal cooling input power are tested at the rated water flow, water outlet temperature of 7°C, and outdoor dry-bulb temperature of 35°C.
   The nominal heating capacity is tested at the rated water flow, water outlet temperature of 45°C, outdoor dry-bulb temperature of 7°C or outdoor wet-bulb temperature of 6°C.
2. About 6% loss caused by system pipelines, water pumps, valves, and dirt after unit installation shall be considered for the cooling (heating) capacity in actual application.
3. The operating range is 5°C to 48°C for cooling and -15°C to 48°C for heating. If the unit needs to run in cooling mode at an ambient temperature lower than 5°C, please contact TICA factory.
4. The specifications are subject to change due to product improvement without a prior notice;
5. The specifications above are based on a single module. Multiple modules can be used in combination. A maximum of 8 modules can be combined.
6. As a separate item, control accessory box contains a wired controller, a wired controller communication cable, user manual, and temperature sensor. The configuration is subject to changes, so please refer to actual unit upon delivery.

Air-cooled Scroll Chiller (Heat Pump)

Specifications under Variable Operating Condition

Correction coefficient of cooling performance

Water outlet temperature °C	Ambient temperature °C																	
	5		10		15		20		25		30		35		40		48	
	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power	Cooling	Input power
5	1.06	0.72	1.08	0.73	1.09	0.71	1.09	0.78	1.04	0.84	0.99	0.90	0.93	0.97	0.87	1.01	0.80	1.08
7	1.14	0.75	1.16	0.76	1.17	0.74	1.16	0.81	1.11	0.87	1.06	0.93	1.00	1.00	0.94	1.04	0.87	1.11
9	1.21	0.78	1.23	0.79	1.24	0.77	1.23	0.84	1.18	0.90	1.13	0.96	1.07	1.03	1.01	1.07	0.94	1.14
12	1.28	0.81	1.30	0.82	1.31	0.80	1.30	0.87	1.25	0.93	1.20	0.99	1.14	1.06	1.08	1.10	1.01	1.17
15	1.35	0.84	1.37	0.85	1.38	0.83	1.37	0.90	1.32	0.96	1.27	1.02	1.21	1.09	1.15	1.13	1.08	1.20
20	1.40	0.88	1.43	0.89	1.44	0.87	1.42	0.94	1.38	1.00	1.32	1.06	1.26	1.13	1.20	1.17	1.13	1.24

Correction coefficient of heating performance

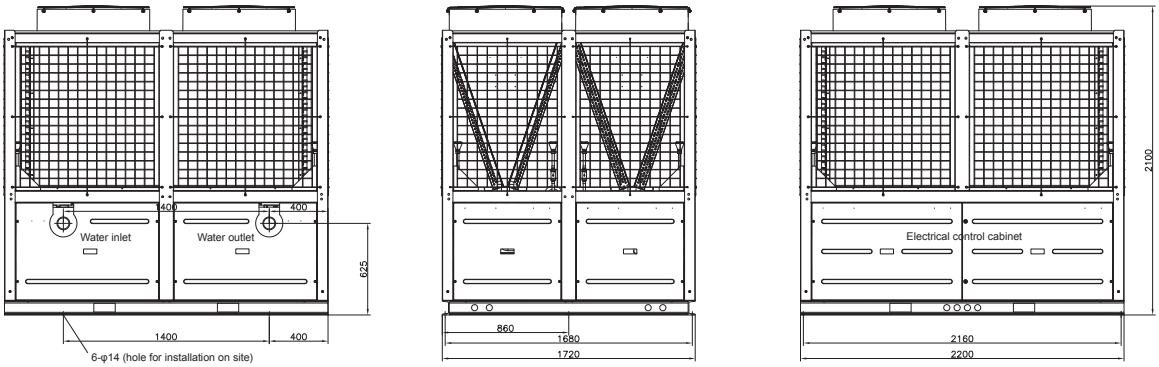
Water outlet temperature °C	Ambient temperature °C																	
	-15		-10		-5		0		7		10		15		20		25	
	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power	Heating	Input power
30	0.50	0.71	0.65	0.72	0.76	0.73	0.89	0.79	1.05	0.83	1.12	0.85	1.20	0.87	1.30	0.89	1.37	0.91
35	0.48	0.77	0.63	0.78	0.74	0.79	0.87	0.85	1.03	0.89	1.10	0.91	1.18	0.93	1.28	0.95	1.35	0.97
40	0.46	0.83	0.61	0.84	0.72	0.85	0.85	0.91	1.01	0.95	1.06	0.97	1.14	0.99	1.24	1.01	1.31	1.03
45	-	-	0.60	0.89	0.71	0.90	0.84	0.96	1.00	1.00	1.03	1.03	1.11	1.05	1.21	1.07	1.28	1.09
50	-	-	-	-	0.68	0.96	0.81	1.02	0.97	1.06	1.00	1.09	1.08	1.11	1.18	1.13	1.25	1.15

Operating range of units

Model			TAS165AH	TAS260AH	TAS330AH	TAS440AH
			Minimum/Maximum			
Cooling	Chilled water outlet temperature	°C	5/20			
	Ambient temperature	°C	5/48			
Heating	Hot water outlet temperature	°C	30/50			
	Ambient temperature	°C	-10/48			
Water flow		m^3/h	28.4	44.8	56.8	75.7
Water pressure drop		kPa	45	45	40	52
Maximum pressure on water side		Mpa	1			

Unit Dimensions

TAS165AH



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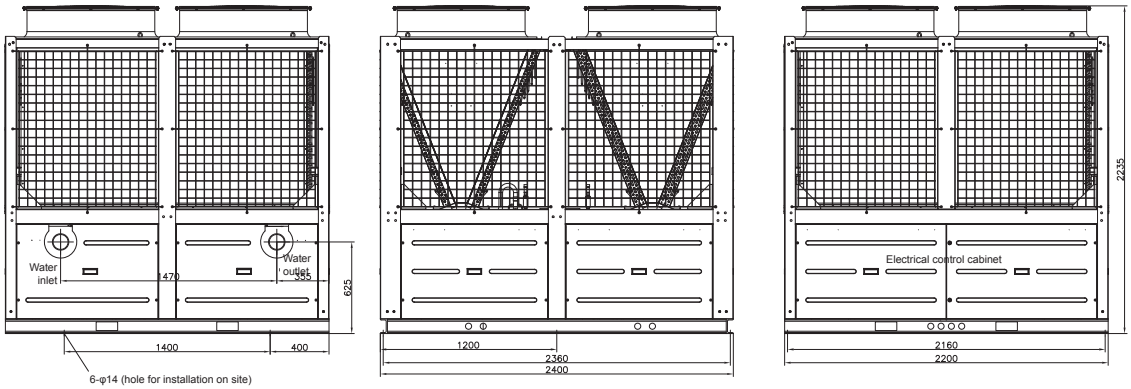
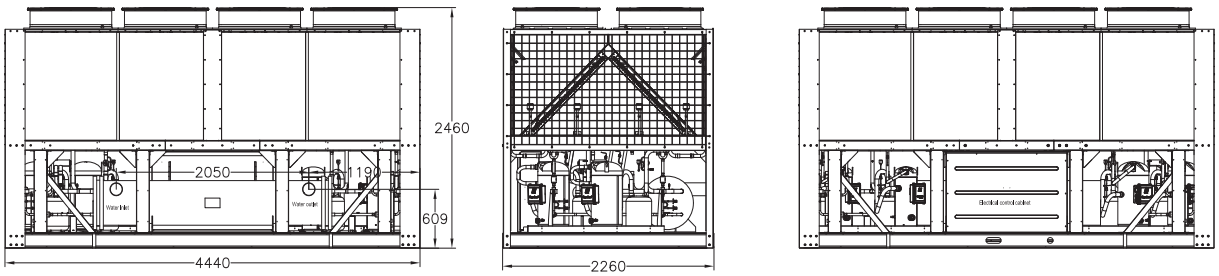


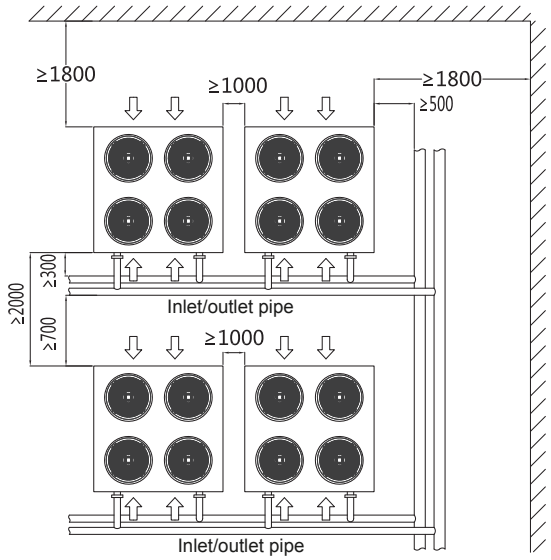
TAS430/330AH



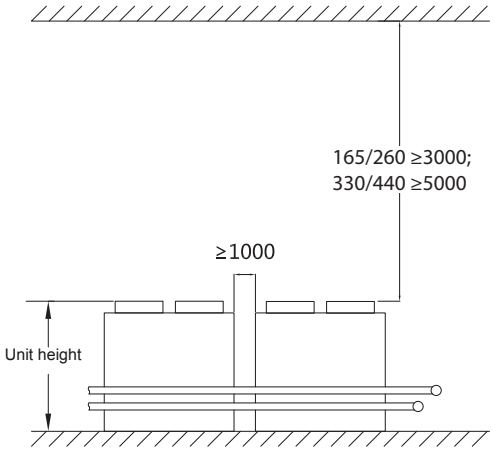
Air-cooled Scroll Chiller (Heat Pump)

Unit Installation Requirements

Installation space requirements



Top view



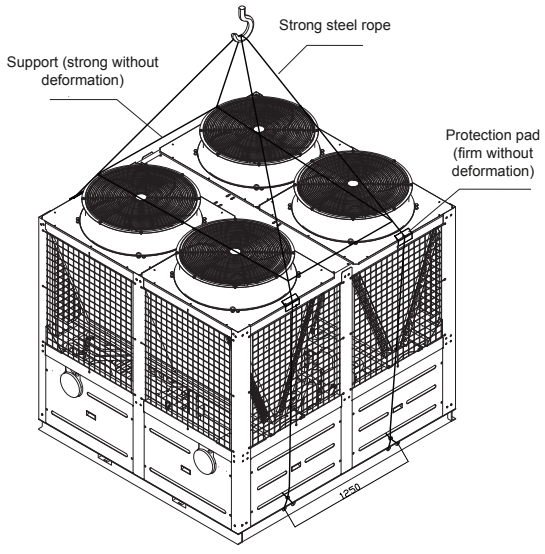
Side view

★ Notes:

1. For the unit with less than 80 tons of cooling capacity, recommend DN100 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.
2. For the unit with cooling capacity between 80 tons and 160 tons, recommend DN125 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.
3. For the unit with cooling capacity between 160 tons and 240 tons, recommend DN150 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.
4. For the unit with cooling capacity between 240 tons and 500 tons, recommend DN200 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.
5. The water outlet and inlet connection pipes of the unit: For the pipe connection dimensions of the unit, see the specifications table. The main water pipe is installed by the engineering personnel according to the actual situations.

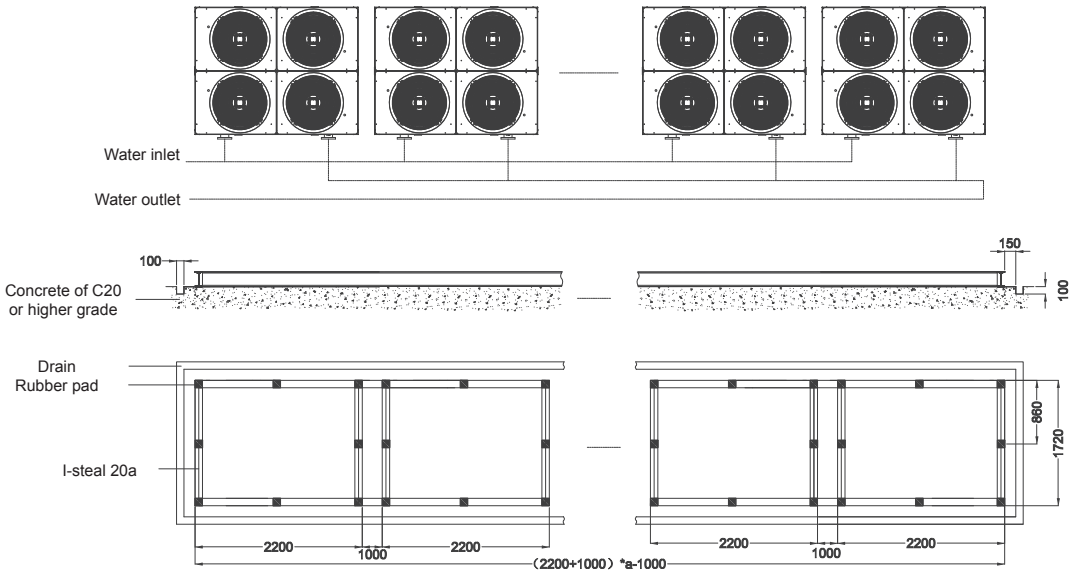
Installation notes of hoisting

- After a unit body is delivered from the factory to the installation site, keep the proper package before hoisting.
- Handle the unit body with care and keep the unit body upright.
- When hoisting the unit, avoid hitting the unit on other objects to prevent sliding. No person is allowed to stand below or near the unit for the sake of safety.
- Use protection pads in places where steel ropes contact the unit, to prevent scratches or unit deformation. In addition, use supports between ropes to prevent the tightened ropes from damaging the unit.
- For the reference weight for choosing the ceiling-mounted steel pipes, steel ropes, and locomotives for hoisting, see the unit specifications. During hoisting, protect the outlet and inlet water pipes against collision.

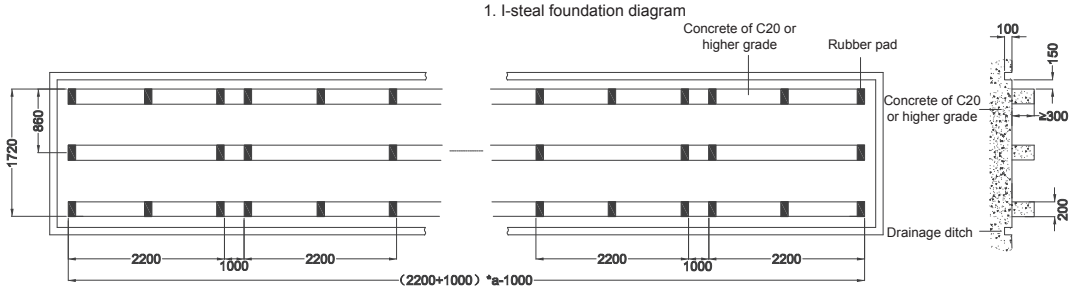


Unit Installation Foundation Diagram

TAS165AH

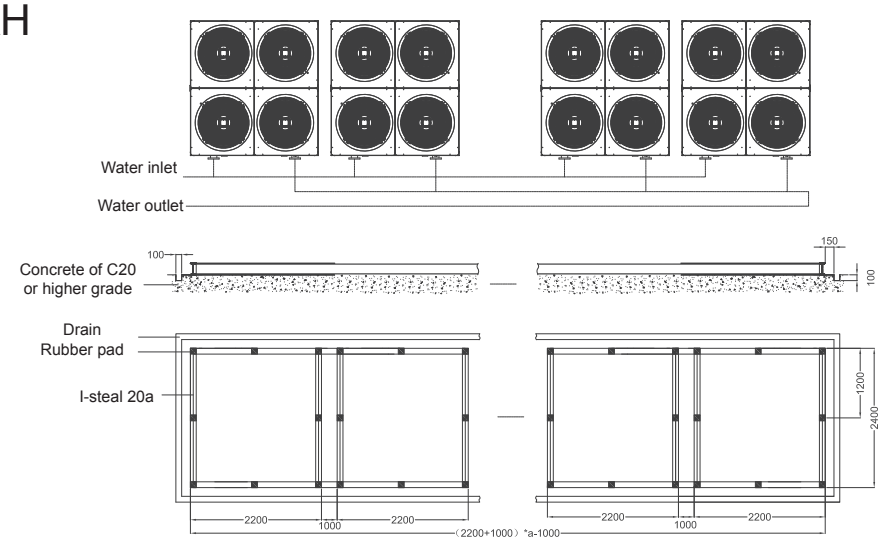


1. I-steal foundation diagram

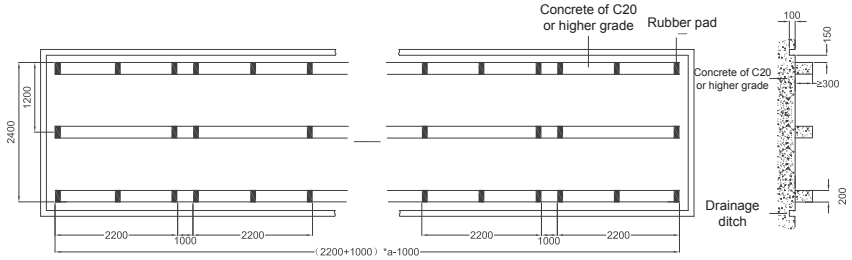


2. Concrete foundation diagram

TAS260AH

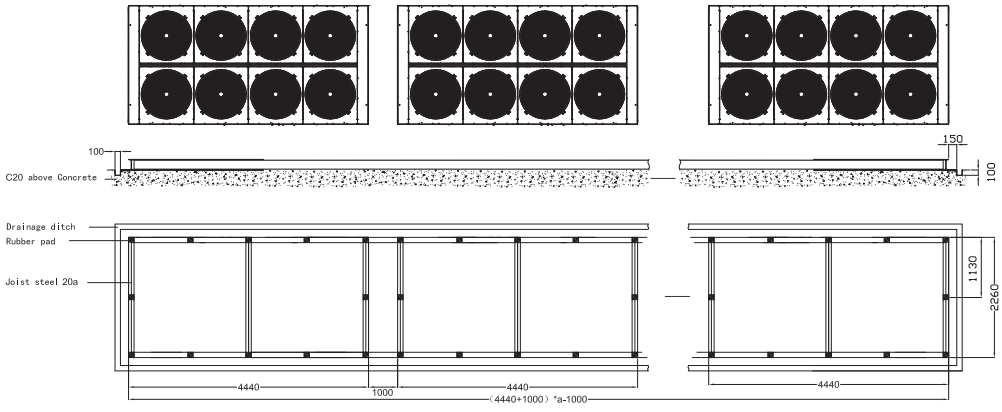


1. I-steal foundation diagram

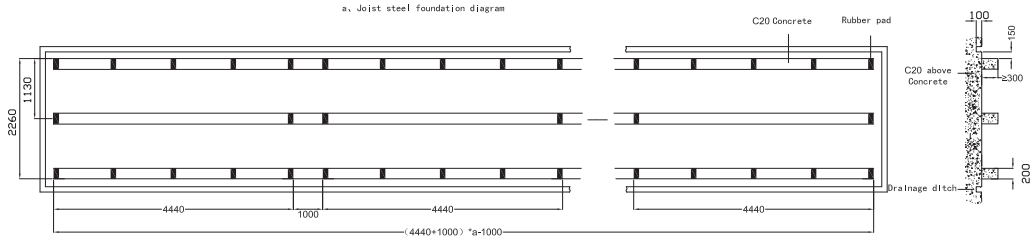


2. Concrete foundation diagram

TAS330, TAS440

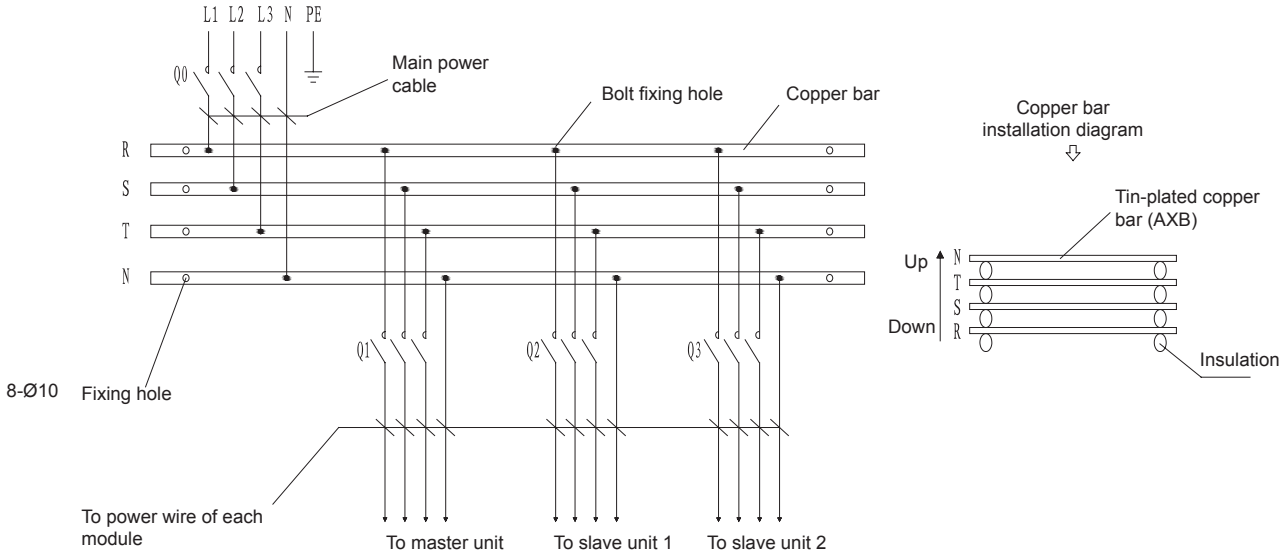


a、Joist steel foundation diagram



b. Concrete foundation diagram

On-site Unit Wiring Diagram



Model	Maximum operating current	Minimum cross-sectional area of power wire (mm^2)			Communication connecting wire	Copper bar size
	(A)	Phase line	Neutral line	GND	(RVVP)	(A x B)
TAS165AH	135	70	35	35	The wire for connecting the chiller and the remote controller is a 4-core communication wire and the standard length is 30 m. The wire for connecting units is a 2-core communication wire and the standard length is 5 m.	The cross-sectional area of the copper bar (M x B) shall not be smaller than the square of the main power wire.
TAS260AH	220	120	70	70		
TAS330AH	229.2	120	70	70		
TAS440AH	329.7	150	95	95		

★ Remarks:

1. The operating power supply of the unit is 380V 3N - 50Hz.
2. Q0 and Q1/Q2/Q3 are circuit breakers. Choose the circuit breakers of type D.
3. Select either Q0 or Q1/Q2/Q3. Q1/Q2/Q3 is conducive to the maintenance of a single unit.
4. Consider water pumps and other loads during installation, and select circuit breakers, power wires, and copper bars based on actual situation.
5. Copper bars are installed vertically. See the electric wiring diagram.
6. Copper bars are not required for less than two modules.
7. Only the power wiring terminals are reserved by default. In the diagram above, all the electric parts need to be configured by the customers themselves.
8. Customers shall provide the power cord of the unit on site. The power cord of the main power supply must comply with the national standard of electric construction.
9. The recommended specification of the power cord is the copper core cable used by the 70°C multi-core PVC insulated cable passing through sleeves and laid through the insulating wall at the ambient temperature of 30°C in the air and 20°C in the ground.

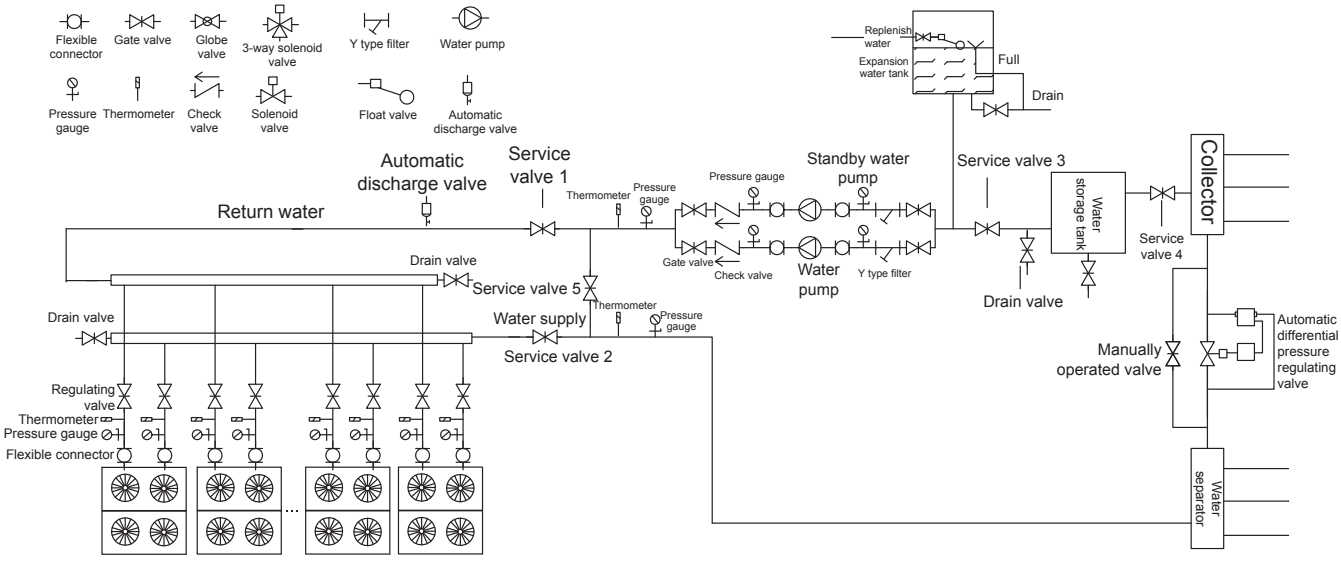
(See the IEC_60364-5-523 Wire and Cable Carrier Flow Standard). If the actual installation conditions on site have changed, select a proper model based on the layout conditions by referring to the conducting wire specifications and deployment conditions provided by the wire manufacturer.

10. The selection of power wires is closely related to the local climate, soil characteristics, cable length and layout mode. Such unit engineering projects are often designed by design institutes and the selection of power wires is subject to the design of the design institutes.
11. Shielded twisted pairs are recommended for communication wires. It is forbidden to lay out them with high voltage wires together.

Air-cooled Scroll Chiller (Heat Pump)

Water System Installation Diagram

Components of the water system



Notes:

- Water flow switches have been installed inside the unit and they do not need to be installed on site.
- When water systems of multiple systems are used in a large project, water supply is generally designed to be section-based. Overhauling or closing the water supply in a section may greatly change the load. In this case, turn off a unit at random to save energy.
- After the water systems of the unit are installed, close the overhaul valves 1 and 2, and open overhaul valve 5. Run the water pump, and then clean the water filter. After water systems are cleaned, ensure that the unit can run normally after the water pipe is connected to the master unit.
- Select a water pump according to flow and the required lift. The water pump can be installed on the main water inlet/outlet pipe. When the pressure at the entrance to the unit is greater than 1.0 MPa, recommend installing the water pump on the water outlet pipe. The water pump control must be interlocked with the unit.
- The automatic differential pressure regulator can make the entire system work more stably.
- Manifold is used to distribute water flow of branch pipes more properly.
- For shell-and-tube units, a Y-type water filter needs to be installed only on the main water inlet pipeline of the unit. (16-20 meshes/inch are commended.) After commissioning, clean the water filter.
- Install a water flow regulating valve on each water inlet branch pipe of the unit, to regulate the flow of water entering each unit to be consistent.
- If an auxiliary heat source such as an auxiliary electric heater is used, install it on the main water outlet pipe of the unit.
- To ensure water resistance balance, install water outlet/inlet pipes on the same side.
- Valves 1, 2, 3, and 4 are used as overhaul valves. Valve 5 is used when the system is commissioned for the first time and pipelines are cleaned or when water handling engineering is implemented at the air side products and pipelines. In this case, close valves 1 and 2 and open valves 3, 4, and 5, and enable the water pump.
- The diameters of the water inlet and outlet collection pipes of the unit must subject to the following conditions: 1) the water flow rate is lower than 1 m/s; 2) the diameters of the water inlet and outlet collection pipes of the unit are greater than the water pipe diameters of the water system loops connected to these water collection pipes.

Routine Maintenance

TICA recommends the user record the routine operating data of air-conditioning equipment and regularly carry out maintenance.

1. Before using the unit for the first time, check the functioning of the air side equipment and other parts of the water system.
2. (Recommended) Use the following service schedule to maintain the unit:

Daily inspection	1. Check whether the unit generates any alarm
	2. Check whether the air discharge and air suction pressures and oil pressure are normal
	3. Check whether the oil level is acceptable (check the oil sight glass to ensure proper amount of oil)
	4. Check for any abnormal compressor and fan noises
	5. Check for odors inside the starter and control cabinet
	6. Check whether the temperature sensor and temperature probe are securely fixed
	7. Check for any appearance damage of the unit. Check whether the heat exchanger or discharge fan is surrounded with obstacles
	8. Check whether the cooling tower, water pump, and valve are function. Check whether water leaks
	9. Check the appearance of water pipe for damages and leakage
Monthly inspection	1. Check the color of the test paper in the sight glass of liquid supply pipe (yellow indicates that the refrigerant has excessive water content)
	2. Check for leakage in the refrigerant loop (whether there is any greasy dirt or sound of leaks)
	3. Check whether the water system filter needs to be cleaned and whether the water flow switch and water differential pressure switch are function
	4. Verify that all the wires in the control cabinet are secured, wiring terminals are clean without dust and water leakage, and contacts act flexibly without being jammed

★ Remarks:

(1) Daily and monthly inspections are to be performed and recorded by the user.
(2) The replacement of consumable parts and materials is determined by the service life or operation duration of the unit. For units that operate all year around and those for the purpose of process, the operation duration should prevail; for units under normal operation and those for comfort, the service life should prevail.
(3) Recommend implementing the comprehensive maintenance when the unit is used every 3 years or runs for around 3000 hours.

Date	Topic

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