



TICA PRO LLC
www.tica.pro



STANDARD AIR HANDLING UNIT –CEILING TYPE TICA CENTRAL AIR-CONDITIONING

TFD

Established in 1991

TICA is a professional enterprise specialized in R&D, manufacturing, sales and services of environment cleaning and thermal energy utilization.

TICA is a national high-tech enterprise, a single leading enterprise cultivated by the Ministry of Industry and Information Technology, a national brand cultivation enterprise of the Ministry of Industry and Information Technology, and a vice chairman member of China Refrigeration and Air-conditioning Industry Association. We have a national-recognized enterprise technology center, an enterprise academician workstation, and a post-doctoral research workstation. Our projects cover Beijing Bird's Nest Stadium, Water Cube, Wukesong Indoor Stadium, PetroChina, Sinopec, State Grid, Nanjing Panda, Hangzhou Xiaoshan International Airport, Hainan Airlines Group, Shangri-La Hotel, Manila Ocean Park, Abu Dhabi Al Muneera, SM City in Philippines and Unilever, etc.

TICA focuses on indoor air quality (IAQ) in clean environments. Product lines include return air purifiers, heat recovery ventilators, fresh air purifiers, air purifiers, as well as the clean air handling units and digital variable-capacity air handling units used in the professional purification field. Regarding core technology, TICA established an ISO class 1 super-clean environment integration system and won the first prize of CMIST.

In the field of thermal energy utilization, TICA's product lines include modular chillers, VRF units, screw chillers, centrifugal chillers, and ORC low-temperature waste heat power generation systems. In 2015, TICA and United Technologies Corporation (UTC) established a global strategic joint venture cooperation relationship and acquired PureCycle, an ORC low-temperature power generation company owned by Pratt & Whitney under UTC. TICA obtained PureCycle trademarks and more than 100 patents and national copyrights. TICA's efficient centrifugal chillers, water-cooled screw chillers, and air-cooled screw chillers are manufactured with the technical license of Carrier under UTC.

TICA is characterized by excellent system integration capability. In the application of "Efficient Refrigeration System of Underground Railway Station", the integrated COP of the refrigeration room amounts to 6.0, and the research achievement reaches the international advanced level. In 2018, TICA merged and acquired an OFC central air conditioning enterprise **SMARTD**. TICA's excellent system integration capability and the **SMARTD** world-class OFC water chillers help increase the integrated COP of the efficient equipment room to 6.7 to 7.0.

TICA---We're striving.

TICA aims to build itself into a world-leading system integration supplier and service provider that specializes in clean environment and thermal energy utilization.



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TICA owns five production sites in Nanjing, Tianjin, Guangzhou, Chengdu and Kuala Lumpur, and a network of over 70 sales and service filiales around the world.

Its Nanjing HQ base received 3-star certification for national No. 001 green industrial construction.



Malaysia Base



Nanjing Headquarter



Tianjin Base



Guangzhou Base



Chengdu Base

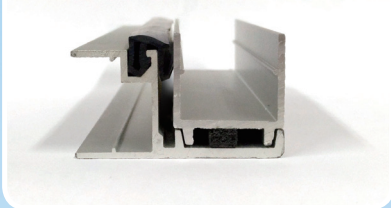
Features & Advantages

1

Labyrinth-type sealing structure

The cabinet panel adopting overall foam molding technology is surrounded by an aluminum alloy profile frame with concave and convex grooves. When installed, it forms a labyrinth sealing structure in tenon form, with the concave and convex modules interlocked. Fastened by bolts and embedded nuts, a labyrinth-type sealing cabinet with strong torsion resistance is formed. The mechanical strength rating of the cabinet can reach AHRI1350 CD4 and air leakage rating can reach AHRI1350 CL1.

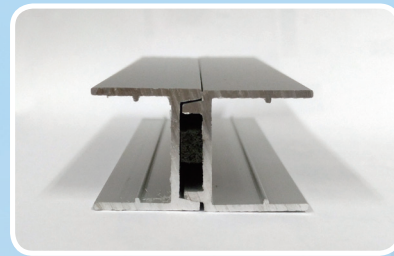
A labyrinth sealing structure, with the concave and convex modules interlocked



2

No cold bridge, no rust

The cabinet interior is isolated from the exterior via polyurethane foamed under high pressure and specially-designed rubber sealing strip to avoid cold bridge. Cold bridge factor can reach AHRI1350 CB2. The external metal plate of the cabinet is surrounded by the aluminum frame. Corners of the metal plate is isolated from wet air to avoid dust completely.



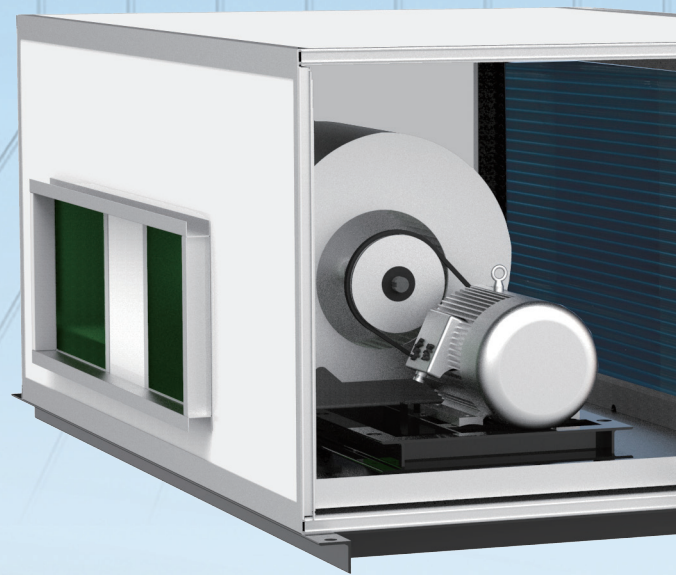
3

International professional certification

AHRI CERTIFIED®
www.ahridirectory.org

Central Station Air-Handling Unit Casings
AHRI Standard 1350

AHRI1350 Certification Performance Grade		
Cabinet strength		CD4
Air leakage rate		CL1
Heat transfer coefficient	Take air leakage rate into consideration	TC2
	Without taking air leakage rate into consideration	CT2
Cold bridge factor		CB2

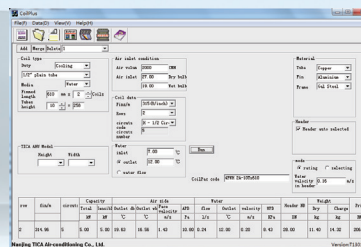


4

High-efficiency heat exchanger

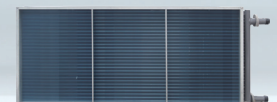
The heat exchanger is designed using the professional model selection software certified by AHRI to ensure that model parameters are consistent with performance of the actual heat exchanger and the heat exchanger can address model selection requirements of customers in different operating conditions.

The coil is integrated with quality RoHS-certified copper tubes and Hydrophilic aluminum fin through the advanced mechanical expansion tube process. The coil passes air tightness test before delivery to ensure no leakage.



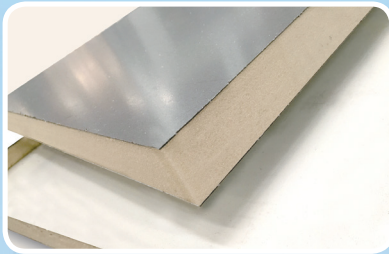
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Central Station Air-Handling Unit Casings
AHRI Standard 1350



5**Excellent thermal insulation**

Panels of the cabinet adopt one-time foam molding of polyurethane with low heat conductivity coefficient and external and internal metal plates. Foaming density is $\geq 50 \text{ kg/m}^3$. Therefore, panels feature good performance of heat preservation, thermal insulation, shock absorption, and noise reduction. Thermal insulation performance can reach AHRI1350 CT2.

**6****Clean & hygienic, quiet operation**

The unit is equipped with an integral drain pan. After being processed against corrosion using the technology of static spraying plastics, the entire drain pan can preserve heat. The drain pan covers on the bottom board of the cabinet. During installation, a water discharge slope will be established to ensure that condensate water can be discharged properly during unit operating, thus avoiding bacteria. Double-wall foaming boards form the envelop enclosure of the unit, which not only achieves good thermal insulation effects, but also reduces the unit operation noise.

**8****Intelligent integrated control**

Mechanical & electrical integration control enables integrated control of fan, motor, and water valve. The control system is composed of low-voltage apparatuses and temperature controllers from internationally well-known brands. If the unit is equipped with a temperature controller with communication function, the unit can access third-party control systems, such as a building automation and control system, to enable remote and network-based unit monitoring.

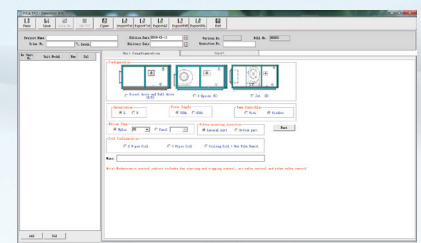
The control cabinet is equipped with multiple protection technologies, such as short circuit, power loss, and overloading to ensure that the unit operates stably. In addition, the unit reserves diversified external interlocking, such as control signals of fire valves, fresh air valves, and switching type water valves.

Integrated control can save energy of the chiller, while ensuring comfortable room temperature.

**9****Dedicated model selection and checking software**

TICA uses a professional model selection software to select a unit model. Featuring user-friendly interfaces, the software facilitates model selection.

The software can also address the needs of customers for model checking in non-standard operating conditions, deliver the best configuration solution, output a professional model selection report, and raise design efficiency.



Overview

TFD ceiling-type AHU is classified into three series of products: series B (direct drive), series D (belt drive), and series S (jet type). It uses 380V3N~50Hz three-phase AC power supply. The unit is mainly composed of filter, coil, and fan, and can meet requirements for different static pressures. The unit features compact structure, low weight, and excellent refrigeration performance. Hot water coil, electric controller, and other components can be provided as required by customers. The unit is applied to scenarios that need centralized air processing, for example, shopping malls, hotels, and office buildings.

The S series jet type AHU is the new type air handling unit that TICA developed for customers. The unit adopts the ceiling structure and high-performance spherical nozzle, and can implement remote direct air supply without the duct, which saves space, reduces layer height, and greatly lowers the one-time investment costs. The spherical air supply nozzle is adjustable in a certain range to ensure that the cold and hot air are sent to the specified location, thus creating a comfortable air-conditioning environment. This series of unit is applied to scenarios such as supermarkets, large-sized business buildings, factory workshops, stadiums, waiting halls, exhibition halls.

If the unit is installed near the sea shore, paper mill, steel mill, chemical plant, or other corrosive environment, please consult relevant plant(s) first in case that the corrosive environment may affect the operation stability of the unit.

Nomenclature

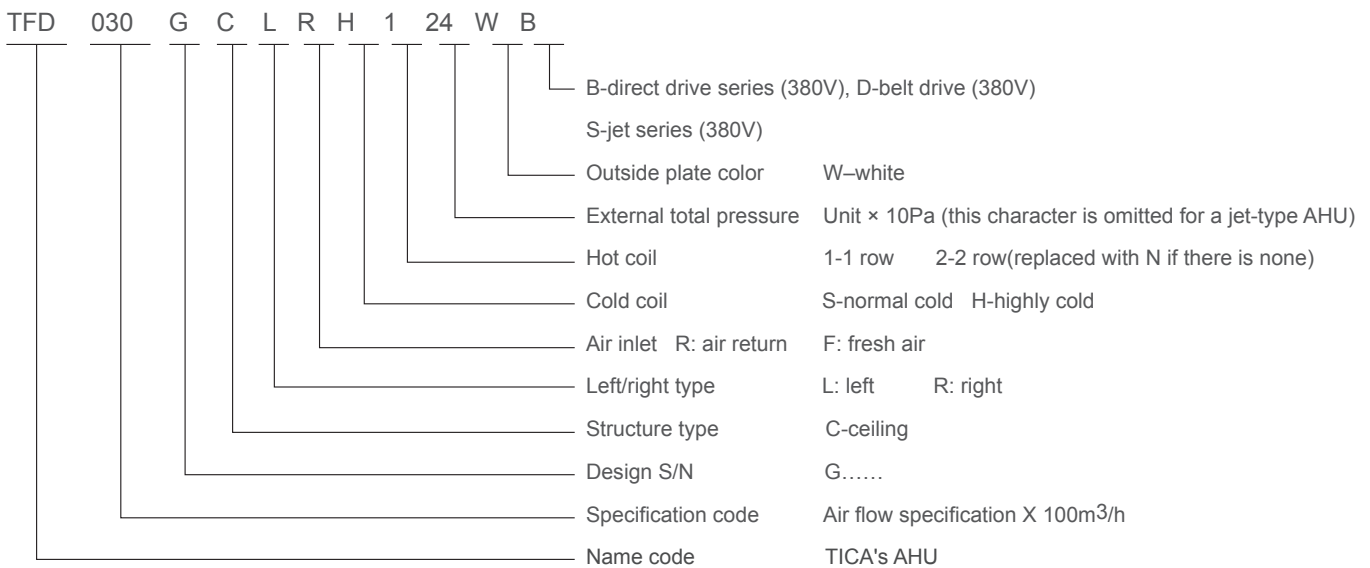
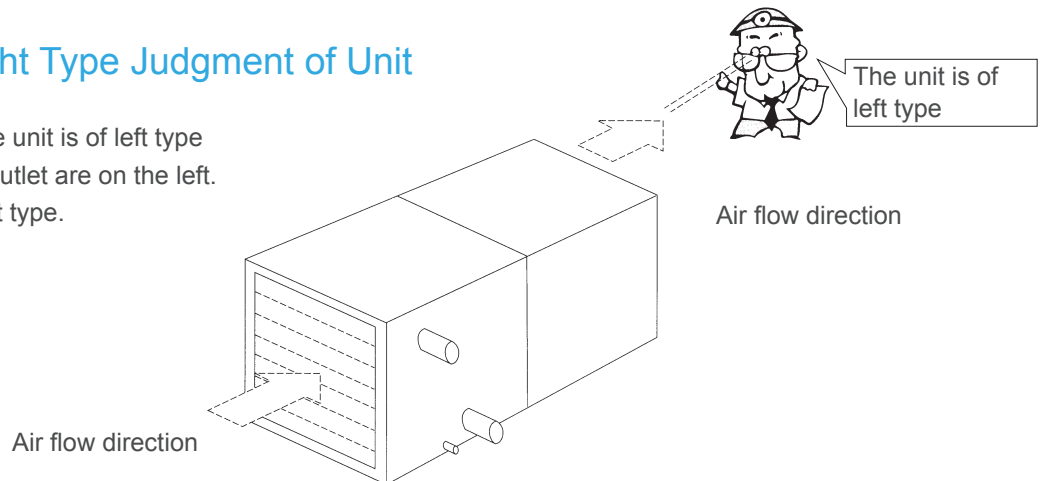


Diagram of Left/Right Type Judgment of Unit

Facing the air flow, the unit is of left type if the water inlet and outlet are on the left. Otherwise, it is of right type.





Specifications

Specifications (Direct Drive and Belt Drive Series)

Return Air Condition

Model	Air Flow	Normal Cold					Highly Cold					Condensate Water Pipe Diameter	Power Supply	Drive Type
		Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Chilled Water Pipe Diameter	Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Chilled Water Pipe Diameter			
TFD	m ³ /h	kW	kW	l/s	kPa	DN	kW	kW	l/s	kPa	DN	DN		
010	1000	5.1	10.2	0.24	20.8	32	7.2	12.4	0.34	25.0	32	25	380V 3 N - 50Hz	Direct drive
015	1500	8.3	15.2	0.40	62.7	32	11.0	18.5	0.52	74.8	32	25		
020	2000	11.5	21.2	0.55	59.2	32	14.9	25.3	0.71	84.9	32	25		
025	2500	14.4	26.0	0.69	41.4	32	18.2	30.8	0.87	71.3	32	25		
030	3000	17.5	32.0	0.83	63.8	32	22.0	37.3	1.05	76.2	32	25		
040	4000	23.4	41.5	1.13	89.7	32	30.1	49.1	1.43	87.1	32	25	380V 3 N - 50Hz	Belt drive
050	5000	28.3	51.4	1.37	76.2	32	35.2	61.8	1.68	47.3	40	25		
060	6000	34.5	61.7	1.64	86.4	32	43.7	73.9	2.08	76.0	40	25		
070	7000	40.3	71.3	1.92	81.0	32	49.4	85.3	2.35	70.6	40	25		
080	8000	46.2	83.1	2.20	81.2	32	57.6	98.3	2.74	89.9	40	25		
100	10000	59.9	108.1	2.85	88.9	40	75.1	135.3	3.58	55.8	50	25	380V 3 N - 50Hz	Belt drive
120	12000	69.3	131.7	3.30	89.8	40	85.8	161.1	4.09	76.9	50	25		
150	15000	85.3	162.8	4.06	89.8	50	108.5	189.7	5.17	77.5	50	32		

★ Note:

1. Cooling: The dry bulb temperature of inlet air is 27°C, the wet bulb temperature is 19.5°C, and the water inlet/outlet temperature is 7°C/12°C;
2. Heating: The dry bulb temperature of inlet air is 15°C, the hot water inlet/outlet temperature is 60°C/50°C.
3. The specifications are subject to change due to product improvement without prior notice.
4. The water volume in the above table indicates the cold water supply volume. Because the hot water supply volume is smaller than cold water supply volume, cold water supply volume is provided in the table for your reference to select the water pump.

Specifications (Direct Drive and Belt Drive Series)

Fresh Air Condition

Model	Air flow	Normal Cold					Highly Cold					Condensate Water Pipe Diameter	Power Supply	Drive Type
		Rated Cooling Capacity ¹	Rated Heating Capacity	Water Flow	Water Resistance	Chilled Water Pipe Diameter	Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Chilled Water Pipe Diameter			
TFD	m ³ /h	kW	kW	l/s	kPa	DN	kW	kW	l/s	kPa	DN	DN		
010	1000	13.9	13.2	0.66	85.6	32	15.8	15.6	0.75	79.2	32	25	380V 3 N - 50Hz	Direct drive
015	1500	18.7	18.4	0.93	82.3	32	24.5	23.7	1.17	84.8	32	25		
020	2000	27.0	27.5	1.29	84.8	32	31.2	31.3	1.49	64.6	32	25		
025	2500	30.8	31.8	1.47	76.2	32	40.3	39.3	1.92	83.9	32	25		
030	3000	39.9	40.9	1.90	87.0	32	45.8	45.1	2.18	80.5	32	25		
040	4000	49.7	51.1	2.37	79.9	32	63.8	61.8	3.04	66.3	40	25		
050	5000	64.5	64.0	3.07	84.0	32	75.4	70.3	3.59	81.6	40	25	Belt drive	
060	6000	72.7	75.5	3.46	38.5	50	92.6	91.9	4.41	80.5	40	25		
070	7000	84.1	87.1	4.00	61.0	50	105.6	104.8	5.03	70.6	50	25		
080	8000	99.0	101.7	4.71	87.7	50	120.7	119.7	5.75	85.7	50	25		
100	10000	133.1	133.3	6.34	50.6	65	160.2	157.9	7.63	60.2	65	25		
120	12000	149.4	155.1	7.12	69.1	65	185.2	180.4	8.20	82.1	65	25		
150	15000	184.2	200.2	8.77	69.1	65	244.7	237.1	10.65	82.1	65	32		

★ Note:

1. Cooling: The dry bulb temperature of inlet air is 35°C, the wet bulb temperature is 28°C, and the water inlet/outlet temperature is 7°C/12°C;
2. Heating: The dry bulb temperature of inlet air is 7°C, the hot water inlet/outlet temperature is 60°C/50°C.
3. The specifications are subject to change due to product improvement without prior notice.
4. The water volume in the above table indicates the cold water supply volume. Because the hot water supply volume is smaller than cold water supply volume, cold water supply volume is provided in the table for your reference to select the water pump.



Comparison Between Air Pressures and Motor Powers

Comparison Between Air Pressures and Motor Powers

Model TFD	Air Flow (m³/h)	Cooling Coil	External Total Pressure (Pa)								
			80	120	160	200	240	280	320	360	400
010	1000	N	0.18	0.18	0.25	0.32					
		H	0.18	0.25	0.32	0.32					
015	1500	N		0.32	0.32	0.32	0.37	0.45			
		H		0.32	0.32	0.37	0.45	0.45			
020	2000	N		0.32	0.32	0.37	0.37	0.45	0.45		
		H		0.32	0.37	0.37	0.45	0.45	0.55		
025	2500	N		0.45	0.55	0.55	0.75	0.75	0.75		
		H		0.55	0.55	0.75	0.75	0.75	0.75		
030	3000	N			0.55	0.75	0.75	0.75	0.75	1.1	1.1
		H			0.75	0.75	0.75	0.75	1.1	1.1	1.1
040	4000	N			1.1	1.1	1.1	1.1	1.1	1.1	1.5
		H			1.1	1.1	1.1	1.1	1.1	1.5	1.5
050	5000	N			1.1	1.1	1.1	1.1	1.5	1.5	1.5
		H			1.1	1.1	1.1	1.5	1.5	1.5	1.5
060	6000	N			1.1	1.1	1.5	1.5	1.5	1.5	2.2
		H			1.1	1.5	1.5	1.5	1.5	2.2	2.2
070	7000	N			1.5	1.5	2.2	2.2	2.2	2.2	2.2
		H			1.5	2.2	2.2	2.2	2.2	2.2	2.2
080	8000	N			2.2	2.2	2.2	2.2	2.2	3.0	3.0
		H			2.2	2.2	2.2	2.2	3.0	3.0	3.0
100	10000	N			2.2	3.0	3.0	3.0	3.0	3.0	3.0
		H			3.0	3.0	3.0	3.0	3.0	3.0	4.0
120	12000	N				3.0	3.0	3.0	4.0	4.0	4.0
		H				3.0	3.0	4.0	4.0	4.0	4.0
150	15000	N						4.0	4.0	5.5	5.5
		H						4.0	5.5	5.5	5.5

Specifications (Jet Type)

Return Air Condition

Model	Air Flow	Normal Cold						Highly Cold						Condensate Water Pipe Diameter	Power Supply	Drive Type
		Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Motor power	Chilled Water Pipe Diameter	Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Motor power	Chilled Water Pipe Diameter			
TFD	m ³ /h	kW	kW	l/s	kPa	kW	DN	kW	kW	l/s	kPa	kW	DN	DN		
010	1000	5.1	10.2	0.24	20.8	0.18	32	7.2	12.4	0.34	25.0	0.18	32	25	380V 3 N - 50Hz	Direct drive
020	2000	11.5	21.2	0.55	59.2	0.55	32	14.9	25.3	0.71	84.9	0.55	32	25		
030	3000	17.5	32.0	0.83	63.8	1.1	32	22.0	37.3	1.05	76.2	1.1	32	25		
040	4000	23.4	41.5	1.13	89.7	1.1	32	30.1	49.1	1.43	87.1	1.1	32	25		
050	5000	28.3	51.4	1.37	76.2	1.5	32	35.2	61.8	1.68	47.3	1.5	40	25		
060	6000	34.5	61.7	1.64	86.4	1.5	32	43.7	73.9	2.08	76.0	1.5	40	25		
070	7000	40.3	71.3	1.92	81.0	2.2	32	49.4	85.3	2.35	70.6	2.2	40	25		
080	8000	46.2	83.1	2.20	81.2	2.2	32	57.6	98.3	2.74	89.9	3.0	40	25		
100	10000	59.9	108.1	2.85	88.9	3.0	40	75.1	135.3	3.58	55.8	3.0	50	25		
120	12000	69.3	131.7	3.30	89.8	3.0	40	85.8	161.1	4.09	76.9	3.0	50	25		Belt drive

★ Note:

1. Cooling: The dry bulb temperature of inlet air is 27°C, the wet bulb temperature is 19.5°C, and the water inlet/outlet temperature is 7°C/12°C;
2. Heating: The dry bulb temperature of inlet air is 15°C, the hot water inlet/outlet temperature is 60°C/50°C.
3. The unit is not equipped with external static pressure. If a return air duct is required, please clarify the requirement when you make the order.
4. The specifications are subject to change due to product improvement without prior notice.
5. The water volume in the above table indicates the cold water supply volume. Because the hot water supply volume is smaller than cold water supply volume, cold water supply volume is provided in the table for your reference to select the water pump.

Fresh Air Condition

Model	Air Flow	Normal Cold						Highly Cold						Condensate Water Pipe Diameter	Power Supply	Drive Type
		Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Motor power	Chilled Water Pipe Diameter	Rated Cooling Capacity	Rated Heating Capacity	Water Flow	Water Resistance	Motor power	Chilled Water Pipe Diameter			
TFD	m ³ /h	kW	kW	l/s	kPa	kW	DN	kW	kW	l/s	kPa	kW	DN	DN		
010	1000	13.9	13.2	0.66	85.6	0.18	32	15.8	15.6	0.75	79.2	0.18	32	25	380V 3 N - 50Hz	Direct drive
020	2000	27.0	27.5	1.29	84.8	0.55	32	31.2	31.3	1.49	64.6	0.55	32	25		
030	3000	39.9	40.9	1.90	87.0	1.1	32	45.8	45.1	2.18	80.5	1.1	32	25		
040	4000	49.7	51.1	2.37	79.9	1.1	32	63.8	61.8	3.04	66.3	1.1	40	25		
050	5000	64.5	64.0	3.07	84.0	1.5	32	75.4	70.3	3.59	81.6	1.5	40	25		
060	6000	72.7	75.5	3.46	38.5	1.5	50	92.6	91.9	4.41	80.5	1.5	40	25		
070	7000	84.1	87.1	4.00	61.0	2.2	50	105.6	104.8	5.03	79.5	2.2	50	25		
080	8000	99.0	101.7	4.71	87.7	2.2	50	120.7	119.7	5.75	85.7	3.0	50	25		
100	10000	133.1	133.3	6.34	50.6	3.0	65	160.2	157.9	7.63	60.2	3.0	65	25		
120	12000	149.4	155.1	7.12	69.1	3.0	65	185.2	180.4	8.20	82.1	3.0	65	25		Belt drive

★ Note:

1. Cooling: The dry bulb temperature of inlet air is 35°C, the wet bulb temperature is 28°C, and the water inlet/outlet temperature is 7°C/12°C;
2. Heating: The dry bulb temperature of inlet air is 7°C, the hot water inlet/outlet temperature is 60°C/50°C.
3. The unit is not equipped with external static pressure. If a fresh air duct is required, please specify the requirement when you make the order.
4. The specifications are subject to change due to product improvement without prior notice.
5. The water volume in the above table indicates the cold water supply volume. Because the hot water supply volume is smaller than cold water supply volume, cold water supply volume is provided in the table for your reference to select the water pump.

Specifications

Return Air Condition (4-Pipe Heating Coil)

Model	Air Flow	1 Row				2 Rows			
		Rated Heating Capacity	Water Flow	Water Resistance	Water Pipe Diameter	Rated Heating Capacity	Water Flow	Water Resistance	Water Pipe Diameter
TFD	m ³ /h	kW	l/s	kPa	DN	kW	l/s	kPa	DN
010	1000	3.0	0.1	0.17	32	6.2	0.2	0.87	32
015	1500	4.3	0.1	0.19	32	9.9	0.3	2.1	32
020	2000	6.7	0.2	0.59	32	13.4	0.4	3.0	32
025	2500	8.2	0.2	0.63	32	16.4	0.4	3.3	32
030	3000	10.9	0.3	1.4	32	20.2	0.5	5.3	32
040	4000	14.8	0.4	1.5	32	27.7	0.7	6.5	32
050	5000	19.1	0.5	2.5	32	35.2	0.9	11.6	32
060	6000	23.2	0.6	3.0	32	43.0	1.1	14.2	32
070	7000	27.6	0.7	4.3	32	49.7	1.2	18.2	32
080	8000	31.5	0.8	4.0	32	57.3	1.4	18.2	32
100	10000	42.6	1.1	8.4	32	76.4	1.8	34.0	32
120	12000	49.4	1.3	9.9	32	87.3	2.4	38.8	32
150	15000	60.8	1.6	10.0	32	108.3	2.6	37.7	32

★ Note:

1. Heating: The dry bulb temperature of inlet air is 15°C, the hot water inlet/outlet temperature is 60°C/50°C.
2. The specifications are subject to change due to product improvement without prior notice.
3. The heating coil resistance is 20Pa/row. The external static pressure of a standard unit does not include the heating coil resistance. For example, the outlet static pressure of the unit with hot water coil is deducted 20Pa/row.

Fresh Air Condition (4-Pipe Heating Coil)

Model	Air Flow	1 Row				2 Rows			
		Rated Heating Capacity	Water Flow	Water Resistance	Water Pipe Diameter	Rated Heating Capacity	Water Flow	Water Resistance	Water Pipe Diameter
TFD	m ³ /h	kW	l/s	kPa	DN	kW	l/s	kPa	DN
010	1000	4.3	0.2	0.64	32	7.3	0.2	0.87	32
015	1500	6.3	0.2	0.69	32	11.6	0.3	2.1	32
020	2000	8.9	0.3	1.3	32	16.5	0.5	4.5	32
025	2500	10.9	0.3	1.4	32	20.2	0.5	4.9	32
030	3000	13.7	0.4	2.5	32	25.3	0.7	9.9	32
040	4000	18.3	0.5	2.3	32	33.7	0.9	10.3	32
050	5000	24.2	0.7	4.7	32	42.9	1.1	16.7	32
060	6000	29.1	0.8	5.1	32	51.4	1.3	19.2	32
070	7000	33.9	0.9	6.9	32	61.0	1.5	27.1	32
080	8000	39.3	1.1	7.2	32	69.7	1.7	25.7	32
100	10000	52.4	1.4	13.0	32	93.0	2.3	52.5	32
120	12000	60.7	1.6	14.5	32	106.2	2.6	56.7	32
150	15000	73.8	1.9	13.7	32	130.7	3.2	54.7	32

★ Note:

1. Heating: The dry bulb temperature of inlet air is 7°C, the hot water inlet/outlet temperature is 60°C/50°C.
2. The specifications are subject to change due to product improvement without prior notice.
3. The heating coil resistance is 20Pa/row. The external static pressure of a standard unit does not include the heating coil resistance. For example, the outlet static pressure of the unit with hot water coil is deducted 20Pa/row.

Jet Type Unit Design Selection

The thermal performance parameter calculation of the jet type air handling unit adopting the spherical nozzle is the same with that of the ordinary ceiling type unit. In design selection, mainly the air flow organization is calculated. For a specified project, the proper jet type air handling unit needs to be selected after the air supply distance, unit installation height, air supply temperature, and air supply volume are determined, and the cold and hot air flow supplied by the unit must meet the following requirements:

1. The cold and hot air are sent to the specified location.
2. The cold jet flow does not drop down during the supply process to avoid causing uncomfortable feelings to people.
3. The hot air can be sent to the required height and location.
4. The air side temperature difference meets the design requirement.

Design selection must consider the mutual impact of the multiple air supply nozzles of the unit. The spread of the jet flow is approximately 0.4 times wider than the jet range. An appropriate configuration is to make the unit deployment density slightly smaller than the diffusion width. If the unit is installed closely to the ceiling, the impact of adhesion should also be considered. The jet range of the attached air flow is 1.4 times larger than the common air flow.

Jet range recommendation

Based on the performances of the unit and the spherical nozzle, the recommended horizontal air supply range (unit: m) of various types of air handling units is as follows:

Model TFD	010	020	030	040	050	060	070	080	100	120
Jet range	14	21	21	21	25	22	28	30	28	31
Distance	20	27	27	27	31	28	34	36	34	37

★ Notes

The maximum spread width of the unit jet flow is about 40% of the jet range. Therefore, unit deployment should take into consideration the air flow spread angle, and the distance between units should not be too large.

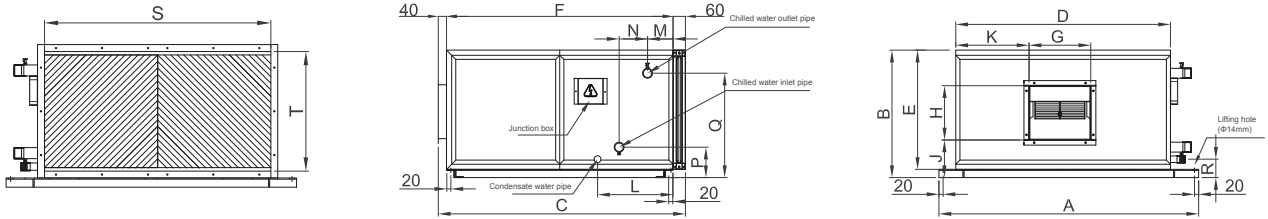
The units can be deployed on a single side or on opposite sides. If neither the deployment can meet the jet range, an induction fan can be adopted to continue the air supply. The induction fan is deployed by every 4 to 6 meters in vertical direction, and by every 6 to 10 meters in horizontal direction.

Range: distance when the air side air flow is 0.5m/s.

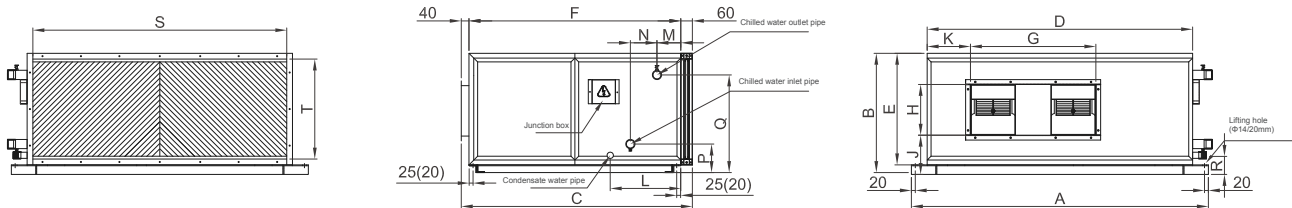
Distance: distance when the air side air flow is 0 m/s.

Standard Unit Dimensions

Direct Drive and Belt Drive Series



Model TFD	A	B	C	D	E	F	Air Outlet Flange		J	K	L	M		N		P	Q	R	Air Return Flange		Unit Weight	
							G	H				Normal Cold	Highly Cold	Normal Cold	Highly Cold				S	T	Normal Cold	Highly Cold
010	717	545	900	553	505	800	302	232	122	132	385	108	86	64	108	150	413	90	493	445	50	57
015	867	545	900	703	505	800	302	275	122	207	385	108	86	64	108	150	413	90	643	445	57	63
020	1007	545	900	843	505	800	302	275	122	277	385	108	86	64	108	150	413	90	783	445	71	81
025	1067	625	950	903	585	850	302	306	122	307	385	108	86	64	108	150	514	90	843	525	76	86
030	1167	625	950	1003	585	850	302	262	184	226	385	108	86	64	108	150	514	90	943	525	90	121
040	1387	625	950	1223	585	850	331	289	146	356	385	108	86	64	108	150	514	90	1163	525	99	129
050	1567	635	950	1403	585	850	331	289	156	446	385	108	86	64	108	150	514	90	1343	525	128	158

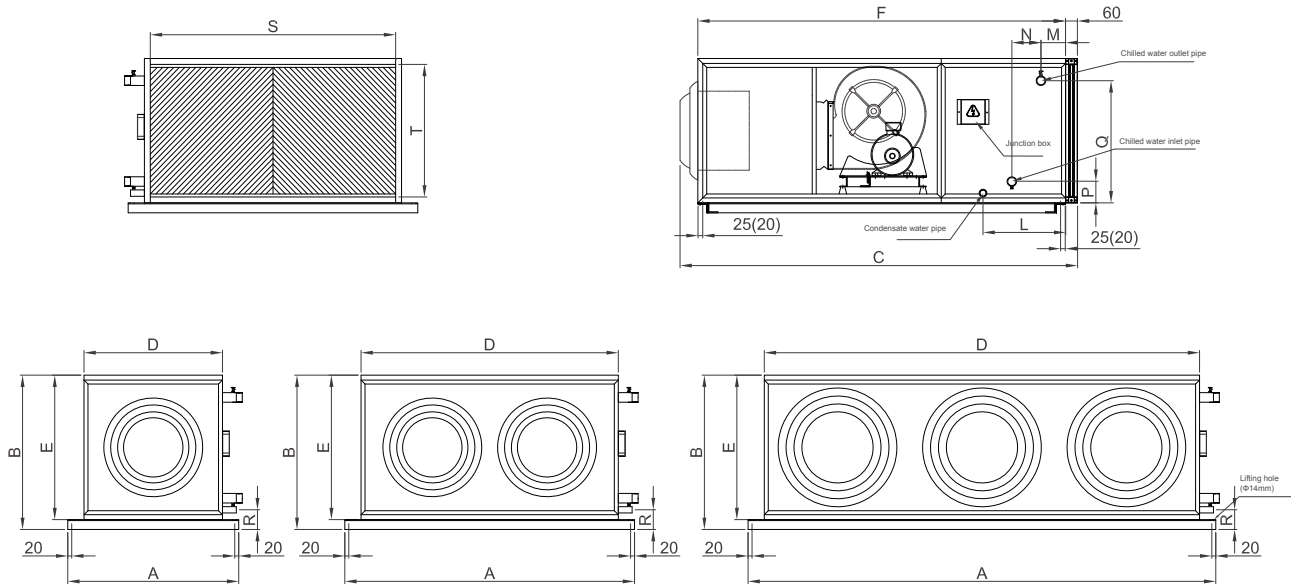


Model TFD	A	B	C	D	E	F	Air Outlet Flange		J	K	L	M		N		P	Q	R	Air Return Flange		Unit Weight		
							G	H				Normal Cold	Highly Cold	Normal Cold	Highly Cold				S	T	Normal Cold	Highly Cold	
																							S
060	1757	635	950	1593	585	850	840	262	215	226	385	108	86	64	94	108	150	514	90	1553	525	139	180
070	1997	635	950	1833	585	850	840	262	215	346	385	108	86	64	94	108	150	514	90	1793	525	192	222
080	2207	635	950	2043	585	850	840	262	215	451	385	108	86	64	94	108	150	514	90	2003	525	231	271
100	2287	790	1050	2123	740	950	862	341	215	483	385	108	86	64	108	108	155	667	90	2063	680	279	309
120	2477	790	1050	2313	740	950	1114	341	215	437	385	108	86	64	108	108	155	667	90	2253	680	287	311
150	2477	940	1150	2313	890	1050	1040	404	215	557	385	108	86	94	108	108	155	819	90	2253	830	372	414

★ Note:

1. The value 25(20) is the distance between the lifting hole and the outer edge of the unit base. It is 20 for 040 type and earlier type, and is 25 for types later than 040. The diameter of the lifting hole for 150 type is Ø20mm.
2. The above unit size does not contain the size of the heating coil. If the heating coil is required, the unit size F should be increased by 100 mm (for TFD010-025) or 200 mm (for TFD030-150).
3. The above weight and size do not include the built-in control cabinet.

Jet Type Unit



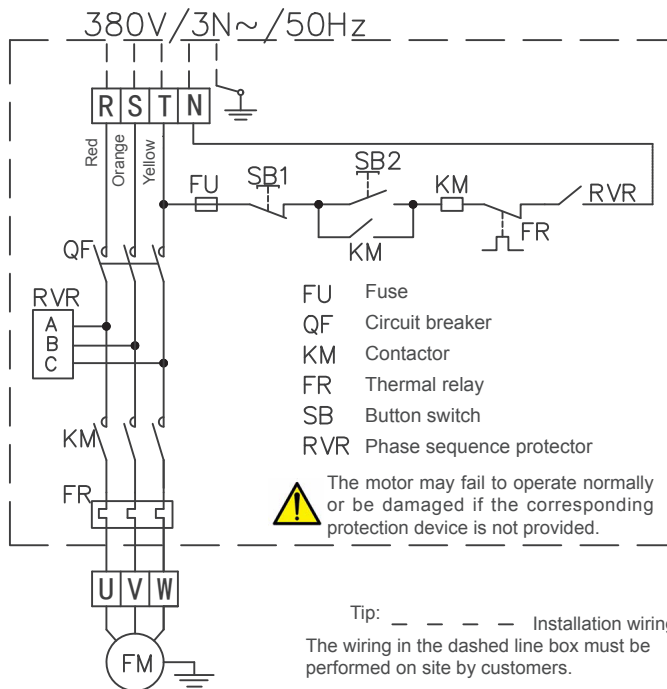
Model TFD	A	B	C	D	E	F	L	M		N		P	Q	R	Air Return Flange		Number of Air Outlets	Jet Air Outlet Size	Outer Diameter	Inner Diameter	Unit Weight		
								Normal Cold	Highly Cold	Normal Cold	Highly Cold				S	T					Normal Cold	Highly Cold	
010	717	545	1305	553	505	1200	385	108	86	64	64	108	150	413	90	493	445	1	Φ315	384	190	50	57
020	1007	545	1340	843	505	1200	385	108	86	64	64	108	150	413	90	783	445	1	Φ315	384	190	71	81
030	1167	625	1390	1003	585	1250	385	108	86	64	64	108	150	514	90	943	525	1	Φ400	467	230	90	121
040	1387	625	1390	1223	585	1250	385	108	86	64	64	108	150	514	90	1163	525	2	Φ400	467	230	99	129
050	1567	635	1390	1403	585	1250	385	108	86	64	64	108	150	514	90	1343	525	2	Φ400	467	230	128	158
060	1757	635	1390	1593	585	1250	385	108	86	64	94	108	150	514	90	1553	525	2	Φ400	467	230	139	180
070	1997	635	1390	1833	585	1250	385	108	86	64	94	108	150	514	90	1793	525	3	Φ400	467	230	192	222
080	2207	635	1390	2043	585	1250	385	108	86	64	94	108	150	514	90	2003	525	3	Φ400	467	230	231	271
100	2287	790	1500	2123	740	1350	385	108	86	64	108	108	155	667	90	2063	680	2	Φ500	600	275	279	309
120	2477	790	1500	2313	740	1350	385	108	86	64	108	108	155	667	90	2253	680	3	Φ500	600	275	287	311

★ Note:

1. The value 25(20) is the distance between the lifting hole and the outer edge of the unit base. It is 20 for 040 type and earlier type, and is 25 for types later than 040.
2. The above weight and size do not include the built-in control cabinet.

Electrical Wiring Diagram

Schematic Diagram

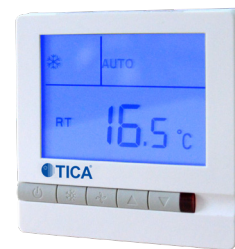


Note:

1. The dashed line indicates user installation wiring, which is not required for a standard unit. The wiring must be tightened.
2. The grounding terminal is inside the junction box. make sure to connect it firmly according to requirements.
3. If a control cabinet is required, clarify the requirement when placing an order.

Control Cabinet Description

The control cabinet is installed on the side of the TFD unit, when the control cabinet is delivered. The temperature controller is delivered together with the control cabinet. On site, the control cabinet is installed on the interior wall of the operation room to perform remote control. Field wiring includes the power cable of the control cabinet, and the signal cable between the temperature controller and control cabinet.

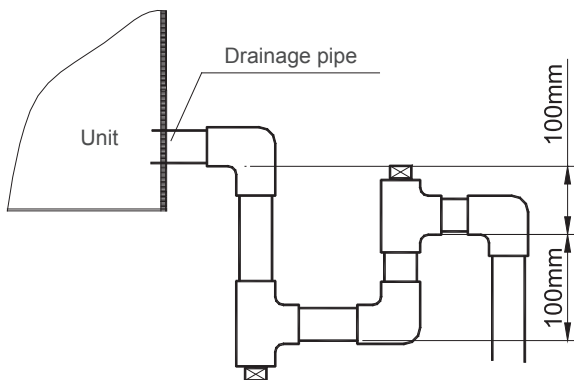
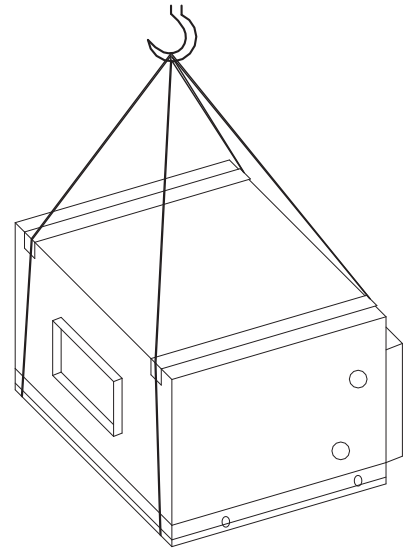


Other Notes

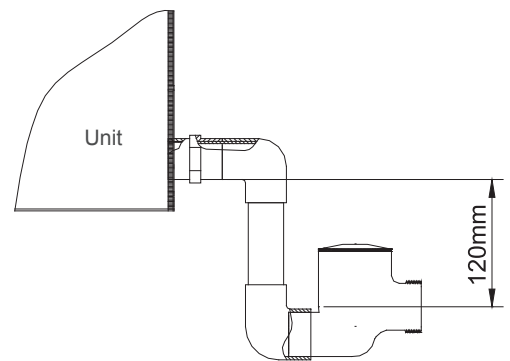
1. This control function is optional.
2. The water valve must be prepared by customers according to the pipe diameter. A 220V three-wire boolean valve is required.
3. In all fresh air scenarios, anti-freezing measures must be considered. Valves are not recommended.
4. The control system only controls valve on/off, and cannot adjust its opening degree.
5. The control system only controls fan motor on/off, and cannot adjust air volume.

Unit Installation

- Carefully check the unit for damage before unit installation. If any of the following cases occurs, contact the distributor as soon as possible for repairing or replacement: The unit is seriously bruised or deformed; The unit panel or shell has clearly visible scratches; The fan or motor gets loose.
- For safety reasons, a ceiling-mounted unit must be reliably installed. Be sure to lift the unit as shown in the right figure, or load, unload, and move the unit with a forklift. The mounting point must be firm and strong enough to bear the unit weight and keep the unit horizontal.
- Before wiring, ensure that the voltage, frequency, and phase amplitude of the power supply comply with those of the unit, and that the power voltage deviation does not exceed $\pm 10\%$ of the rated voltage. Before starting the fan, rotate the fan impeller manually in the fan cabinet to check whether there is any metal friction sound. If yes, eliminate the cause. Connect the power supply, start the fan, and check whether the impeller rotates in the right direction. If not, change the phase sequence of the power supply line.
- It is recommended that an air plenum be installed at the air inlet and outlet of the unit, an air flow regulating valve be set on the air pipe, and a fire valve be installed according to fire protection requirements. If an electric air flow regulating valve is installed, the air valve actuator should be opened before the fan, and closed after the fan.



U-shaped water seal installation diagram



Ball-type water seal installation diagram

- Before connecting a water pipe, remember to clean it. Connect pipes according to the cold (hot) water inlet and outlet directions marked on the unit, and be sure to install a valve and filter on the water inlet pipe of the unit to adjust the flow. Cut off the cold (hot) water source during maintenance, and prevent impurities from entering the heat exchanger and causing blockage. The water inlet and outlet pipes must be insulated with heat preservation pipes.
- When connecting a water inlet or outlet pipe, use a pipe wrench to fix the pipe to avoid torsion on the pipe. Use Teflon tape for sealing to avoid water leakage. Connect the condensate water generated in the unit at a certain water seal height, and discharge the water to the sewer with a drain pipe, as shown in the figures above.
- Do not place the weight of air pipes and water pipes on the unit.
- Be sure to ground the unit reliably. Ensure that the electrical circuit is in good condition and meets electrical safety requirements.
- Only professionals who are familiar with this product and understand related local regulations can install the unit. During installation, do not collide into, press or scratch the unit.



Installation Notes

1. Never run the unit where acid, alkali, salt spray and other corrosive gases are present, as it will damage the unit casing, pipeline or electrical components.
2. Keep the surroundings around the unit clean and dry and ensure smooth ventilation for the unit. Clean the air-side heat exchanger periodically (once every 1–2 months) to maintain excellent heat transfer effect and save energy.
3. Install the drainage pipe according to this manual. Ensure smooth drainage. Take thermal insulation measures and prevent generation of condensing water. Make sure to check the drainage pipe before the unit operates. If it is blocked, clear the foreign matter so that condensing water can be discharged smoothly.
4. Check whether wiring of the unit power supply and electrical system is secure, and whether electrical components work abnormally. If an exception occurs, repair or replace electrical components. Regularly check whether the unit is grounded reliably.
5. The minimum starting voltage of the unit must be kept above 90% of the rated voltage, the voltage must be within $\pm 10\%$ of the rated voltage range during operation, and the voltage difference between the phases should be within the range of $\pm 2\%$. An adverse impact will be caused to the unit when the voltage is too high or too low. Make sure that the power supply is stable. Otherwise, when the unit starts, it may generate excessive current, thus damaging the motor.
6. The unit can be maintained and repaired only when the unit is powered off and the power supply is cut off.
7. After the unit is faulty, find out the cause and remove the fault before restarting the unit. Do not restart the unit if the fault is not removed.
8. Never short circuit the protective device of the unit, as it may damage the unit.
9. Protect the internal cables of the unit to prevent the insulation layer from being damaged by sharp objects.
10. The wire and cable should be far away from the heat source. Do not move them frequently, and do not bend or twist them violently.
11. Control cabinet installation and usage:
 - 1) The control cabinet is embedded with AC strong power supply. Therefore, exercise caution during operation.
 - 2) The control line of the unit must be separated from the power cord of power supply to prevent interference.
 - 3) It is necessary to use the power supply that meets requirements. The use of a substandard power supply may damage the control cabinet.
 - 4) Do not place wires in the control cabinet or store long exposed wires inside the control cabinet. After the control cabinet door is repaired, install and reset it timely to prevent rainwater from entering.
 - 5) Be sure to control the running status of the air-conditioning unit through the control cabinet. It is forbidden to insert and remove the power plug to switch on/off the unit. Do not frequently shut down the unit by using the emergency stop switch.
 - 6) Do not use sharp objects when operating the controller's display. Do not impose excessive force, lest the controller panel may be damaged.
 - 7) Do not wipe the surface of the controller's display with solvent or strong chemicals. If there is slight dust, gently clear it with a clean soft cloth or cotton yarn. If the surface is seriously dirtied, use a clean soft cloth or cotton yarn to remove the dirt and then let it air dry.
 - 8) When a control cabinet alarm is reported or displayed, do not repair the cabinet yourself. Dial service hotline of TICA or contact your local service provider.
12. Periodically (recommended twice a month) check the dust accumulation on the filter of the unit. For units equipped with a differential pressure detection device, the user should clean or replace the filter in time when the final resistance reaches the specified value. TICA recommends that the final resistance value be:

Filtering efficiency specification	Recommended final resistance (Pa)
G3 (primary efficiency)	100-200
G4 (primary efficiency)	150-250
M5-M6 (medium efficiency)	250-300

13. Ensure that the heat exchanger coil fins and copper pipes are free of scratches or distortion. Keep the coil clean and brush the fins of the coil with a nylon brush. A vacuum cleaner must be used for cleaning before brushing. If compressed air is available, use a high pressure air pipe or a spray nozzle to clean the coil. After the coil is cleaned, the outer surface should be free of dust, and the heat exchange effect on the inner surface should reach the originally-designed heat exchange capacity. In addition to cleaning fins, after the coil has been used for 2-3 years, clear the water scale inside. If possible, use softened water to produce cold/hot water for the unit coil.
14. Make sure to check the drainage pipe before the unit operates. If it is blocked, clear the foreign matter so that condensing water can be discharged smoothly.
15. After the unit has operated for one week, readjust tightness of the belt. After that, perform routine check every three months.
16. After the unit has operated for a period of time, the wiring pile head of electric wire will get loose. Check and tighten the wiring pile head in three days after the unit is turned on for the first time.
17. The fan and motor bearings need to be checked regularly (three times per month recommended). Check the motor bearing sealing ring (e.g., V-sealing ring), and replace it when necessary; check whether the installed and connected parts get loose; check the bearing operating status by listening to abnormal noises, detecting vibration, and monitoring the oil consumption or bearing vibration measuring element. In case of any abnormality, stop the unit immediately, and locate and eliminate the cause in time. Take heating measures or use special tools to install, remove or replace bearings. Do not knock or pry bearings.
18. Fan bearing maintenance:

For the fan with an oil injection nozzle, charge lubricating grease that complies with specifications to the bearing regularly. If the user selects the grease of a brand for charging, the grease of this brand should be always used.

The validity period of lubricating grease depends on the grease type, bearing rotating speed, shaft diameter and operating environment. Normally, the lubricating grease should be replaced after the fan has operated for about 1500 hours; if the fan operates continuously for 24 hours, replace the lubricating grease every 500 to 700 hours of operation.

How to charge lubricating grease: Keep the shaft rotating when charging lubricating grease, stop charging when seeing one layer of fresh grease overflowing, and use a hand to rotate the wind wheel fast to discharge excess grease.

Five-Year Warranty

We offer a free five-year warranty for TICA standard products manufactured and sold by TICA. For things covered and not covered, please refer to the latest warranty policy we published. In the event of malfunctions or spare parts damages during the free warranty period of TICA products caused by product quality issues (excluding appearance, cleanness and other items subject to environment and climate conditions), the purchaser may obtain a free maintenance service or replacement of the parts (except for consumable parts and materials).

Warranty provider: Local service agency assigned by TICA air conditioning service center

TICA Hotline: 4008-601-601

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:

Item		Monthly	Quarterly	Year	Requirements	
Air-side cabinet	Air inlet section	Check whether the filter is dirty and clogged.	★	★	★	The final resistance of the unit reaches the requirements. (For the alarm values, see the technical manual.)
		Electronic dust removal filter	☆	☆	★	Check whether the filter is dirty and clogged.
	Coil Section	Cooling coil	☆	☆	★	Check whether the surface is full of dust, oil stain, impurities, etc.
		Steam coil	☆	☆	★	Check whether the steam gauge pressure of the gas supply pressure is between 0.02 Mpa and 0.4 Mpa. Check whether the steam trap is dirty and clogged.
		Condensate water drain pan and drainage pipe	☆	☆	☆	Check whether they are dirtied and clogged. Check whether water drainage is smooth.
		Wet film humidifier	☆	☆	☆	For all types of humidifiers, see the technical instructions.
	Fan section	Measure the belt tension.	☆	☆	☆	Check for cracks.
		Inspection of fan and motor bearing	★	★	★	Normally, the lubricating grease should be replaced after the fan has operated for about 1500 hours; if the fan operates continuously for 24 hours, replace the lubricating grease every 500 - 700 hours of operation.
Electrical control and electrical	Electrical control cabinet	Fuse	☆	☆	☆	Disconnection
		Contactors	☆	☆	☆	Serious contact electrocorrosion or noise during running.
		Sensor	☆	☆	☆	Measured value still varies from the actual value even after calibration.
		High pressure switch	☆	☆	☆	Controller false alarm.
		Check whether the wiring point is loose.	★	★	★	The contactor gets loose or can flexibly rotate when turning the connecting cable.
		Checking power supply	★	★	★	Rated voltage $\pm 10\%$, phase-to-phase unbalance $< 2\%$.
		Checking phase	☆	☆	☆	No phase loss or reverse phase

Notes: ① ★-----Required maintenance or replacement items; ☆----- Determine the maintenance items according to actual conditions.

② Daily and monthly inspections should be performed and recorded by the user.

③ 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.

④ It is recommended that the unit should be fully maintained every one year or every 1000 hours of machine operation. For clean units with purification requirements, shorten the maintenance time interval according to the user's cleaning requirements. For units with severe environmental conditions, they should be maintained monthly according to the inspection conditions.

3. The following maintenance methods are recommended when the equipment will not be used for a long term.

When the unit will not be used for a long term or will stop in winter, turn off the power supply, and drain water from the water system and steam coil of the unit.

If necessary, the maintenance methods before the equipment is put into use can be carried out.

Other Notes

During pipe connection, ensure the pressure of the cold water coil and hot water coil is 1.6Mpa.

For all fresh air unit, install a preheater at the fresh air inlet to prevent the inner coil freezing when the fresh air temperature is below 0°C.

When stopping a unit, drain all pipe water, blow out residual water, and add antifreezing solution in the pipe when the coil is at the freezing temperature.

Make sure to reserve sufficient space to facilitate daily maintenance.



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Note: Due to constant improvement and innovation of TICA's products, the product models, specifications and parameters contained in this document are subject to change without prior notice.