



TICA PRO LLC
www.tica.pro



TICA Central Air Conditioner
Jenvin Series
JENVIN MODULAR AIR HANDLING UNIT

TBF

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. It has a national-recognized enterprise technology center, an enterprise academician workstation, and a post-doctoral research workstation. Its 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 is also the outstanding provider of central air conditioners for China's subway networks and has successfully served nearly 60 key subway lines in major cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Chengdu, Suzhou, Hangzhou and Tianjin. TICA is a professional supplier and service provider in China that specializes in system integration of clean environment. While for microelectronics, hospital operating rooms, biopharmaceutical industry and other professional purification areas, our market share has achieved over 40% in each.

TICA Quality For IAQ

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 **SMART**. TICA's excellent system integration capability and the **SMART** 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.

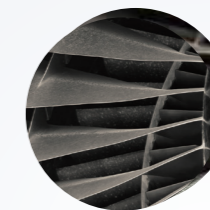
TICA aims to build itself into a world-leading system integration supplier and service provider that specializes in clean environment and thermal energy utilization.

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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.



Nanjing Headquarter



Tianjin Base



Guangzhou Base



Chengdu Base

Product Overview



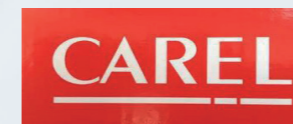
Reasons for Launching *Jenvin*

★ As the state authorities strengthen supervision on medical treatment, public health as well as food and drug safety, the requirements for the purifiers used in clean operating rooms and food and drug workshops constantly increase. On the basis of ensuring clean and hygienic air conditioning equipment, the concept of energy saving deepens.

★ Europe has established a perfect set of clean and hygienic standards for clean air-conditioning equipment used in the fields of medical treatment, public health, food and drugs. The air-conditioning systems for domestic high-end clean operating rooms, high-end purification workshops of pharmaceutical factories, and high-end food manufacturing workshops are designed by reference to Europe design standards, thus raising more specialized requirements for purification equipment.

★ Structures of Jenvin modular AHUs meet the requirements of EN1886 (a European standard), and VDI 6022-1 and DIN 1946-4 (Germany standards). Core parts are international well-known brands. They not only feature superior mechanical performance, but also apply to high-grade clean operating rooms, clean pharmaceutical manufacturing workshops, and clean factories in food industry, etc.

Jenvin Core Parts



Nomenclature

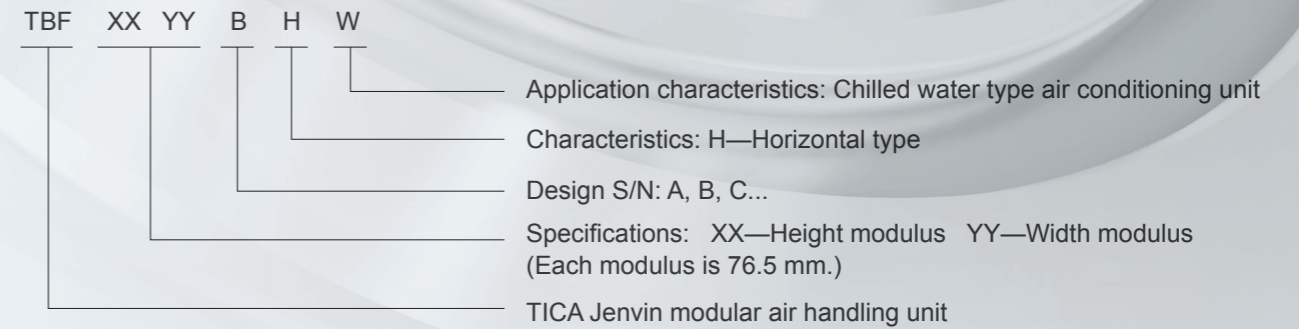
European Standard

The EUROVENT standard is well-known for its strict test methods and high requirements. Its authoritativeness is recognized throughout the world and is referred to as the class A air conditioner certification standard in Europe.

Mechanical Index of the Case	EN1886
Mechanical strength of the case	D1
Air leakage rate of the case	L1
Cold bridge factor	TB2
Cabinet heat transfer coefficient	T2



Nomenclature

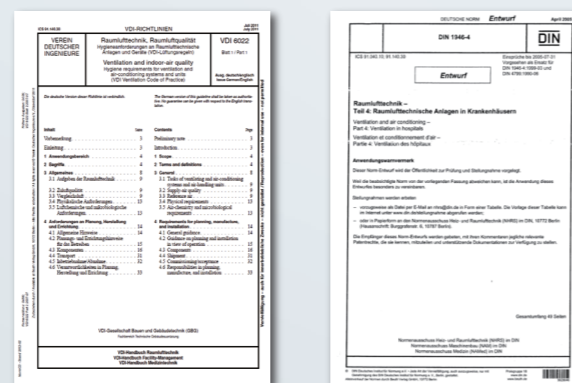


Example: TBF1216BHW

Box plate thickness 50 mm, 12 modulus for the height, 16 modulus for the width, horizontal, chilled water type air conditioning unit
 External height of unit = Height modulus*76.5 + 100 + Base height; External width = Width modulus*76.5 + 100.

German Standard

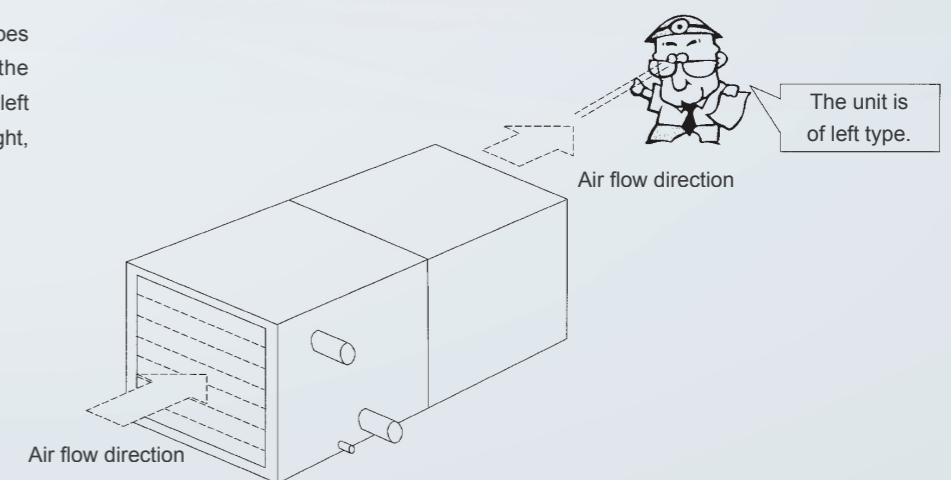
- ★ DIN refers to German Institute for Standardization, while VDI indicates Association of German Engineers with nearly 130,000 members of engineers and scientists.
- ★ The DIN 1946-4 standard is applicable to all medical buildings and departments, and provides demanding requirements for medical air conditioners. It emphasizes that components and materials of air conditioning system cannot contaminate the passing-by airflow.
- ★ VDI 6022 part1 describes the ideal sanitary state of the air conditioning system and raises complete sanitary requirements to prevent adverse effects on indoor air.



VDI 6022-1 Hygiene requirement for ventilation and air-conditioning systems and units
 DIN 1946-4 Ventilation in buildings and rooms of health care

Left/Right Judgment of the Unit

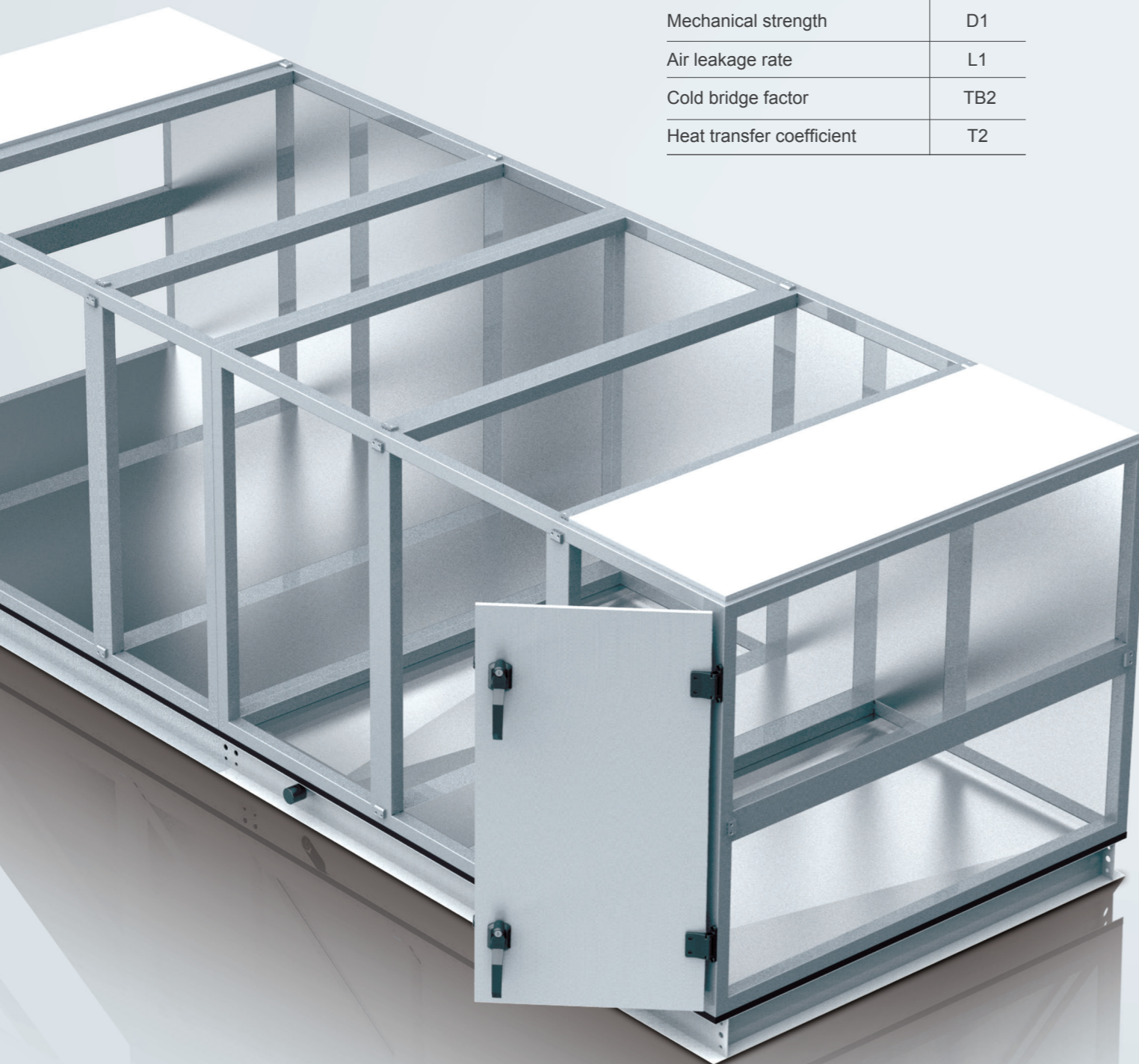
If the water inlet and outlet pipes are on the left when facing the air flow direction, the unit is of left type. If the pipes are on the right, the unit is of right type.



Mechanical Performance

Superior Mechanical Performance of the Unit

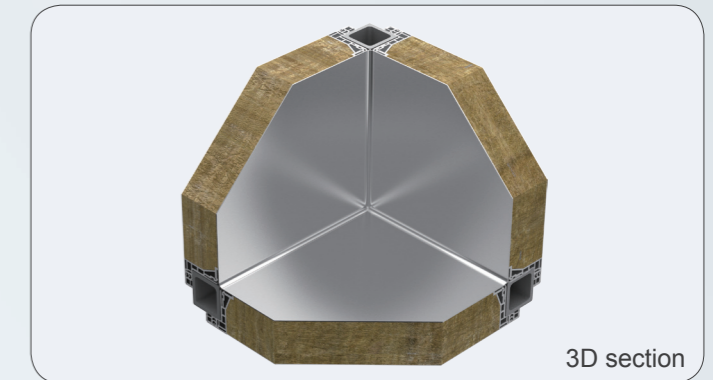
Mechanical Index of the Case	EN1886
Mechanical strength	D1
Air leakage rate	L1
Cold bridge factor	TB2
Heat transfer coefficient	T2



1. Mechanical performance

- | | |
|-------------------------------|---|
| Frame | Case plate |
| 1. Built-in steel square tube | 1. Thickness of internal and external metal plates is 1.0 mm. |
| 2. High strength GFK | 2. The thickness of the case plate is 50 mm. |

EN 1886	Jenvin Level
Mechanical strength	D1
Air leakage rate	L1
Cold bridge factor	TB2
Heat transfer coefficient	T2



2. Air leakage rate

- | | |
|----------------------------------|--|
| Case plate | Unit interior |
| 1. Integral free foaming sealant | 1. The case plate and frame are sealed with microbial inert high-density material. |

EN 1886	Jenvin Level
Mechanical strength	D1
Air leakage rate	L1
Cold bridge factor	TB2
Heat transfer coefficient	T2



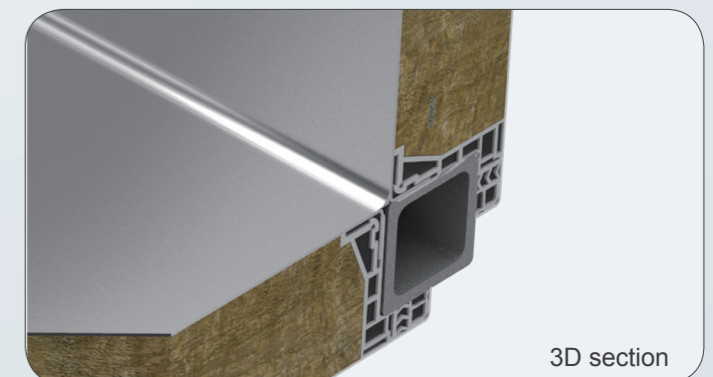
Sealing case plate

Flat interior

3. Cold bridge factor and heat transfer coefficient

- | | |
|--|---|
| Case plate | Stand column |
| 1. Add a profile that prevents cold bridge generation to the interior. | 2. Internal lining square steel for preventing cold bridge generation |

EN 1886	Jenvin Level
Mechanical strength	D1
Air leakage rate	L1
Cold bridge factor	TB2
Heat transfer coefficient	T2



Product Cleanliness Design

Cleanliness*Energy efficient*High fire protection grade

1. The design of the air valve complies with the hygiene standard.

DIN 1946-4 -- 6.5.1 General Requirements for Units

- ★ At least meet EN1751 leakage class 2.
- ★ Flexible connection of insulation materials.

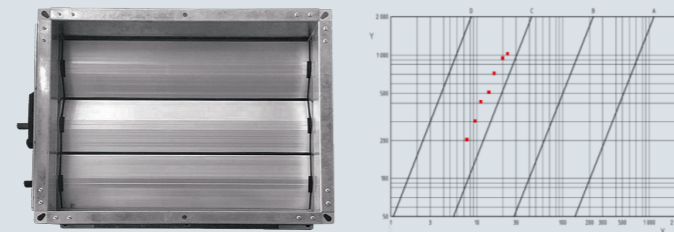
BS EN 1751:2014 classification standard $l/(s \cdot m^2)$

Class 1	740
Class 2	157
Class 3	30
Class 4	6

Jenvin Design

1

Actual measurement shows that the closed air valve complies with BS EN 1751:2014 Class 3.



2. The case complies with the hygiene standard design.

VDI6022-1 -- 4.3.5 Unit Case

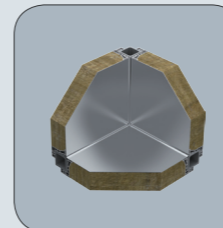
- ★ Porous sealing material without openings.
- ★ Fire protection measures comply with VDI 3803.
- ★ Easy for cleaning and checking smoothness of the inner surface.

DIN 1946-4 -- 6.5.1 General Requirements for Units

- ★ The sealing material does not breed bacteria.
- ★ Sheet metal has powder spraying coating of at least 60 μm thick, or uses corrosion-resistant stainless steel.
- ★ The inner surface is smooth for easy cleaning.

Jenvin Design

2



Fire protection class is A, meeting FM certification requirements.



Case plate meets IPX5 water-proof requirements. Avoid thermal insulation failure.



Unit's bottom frame is fully sprayed.



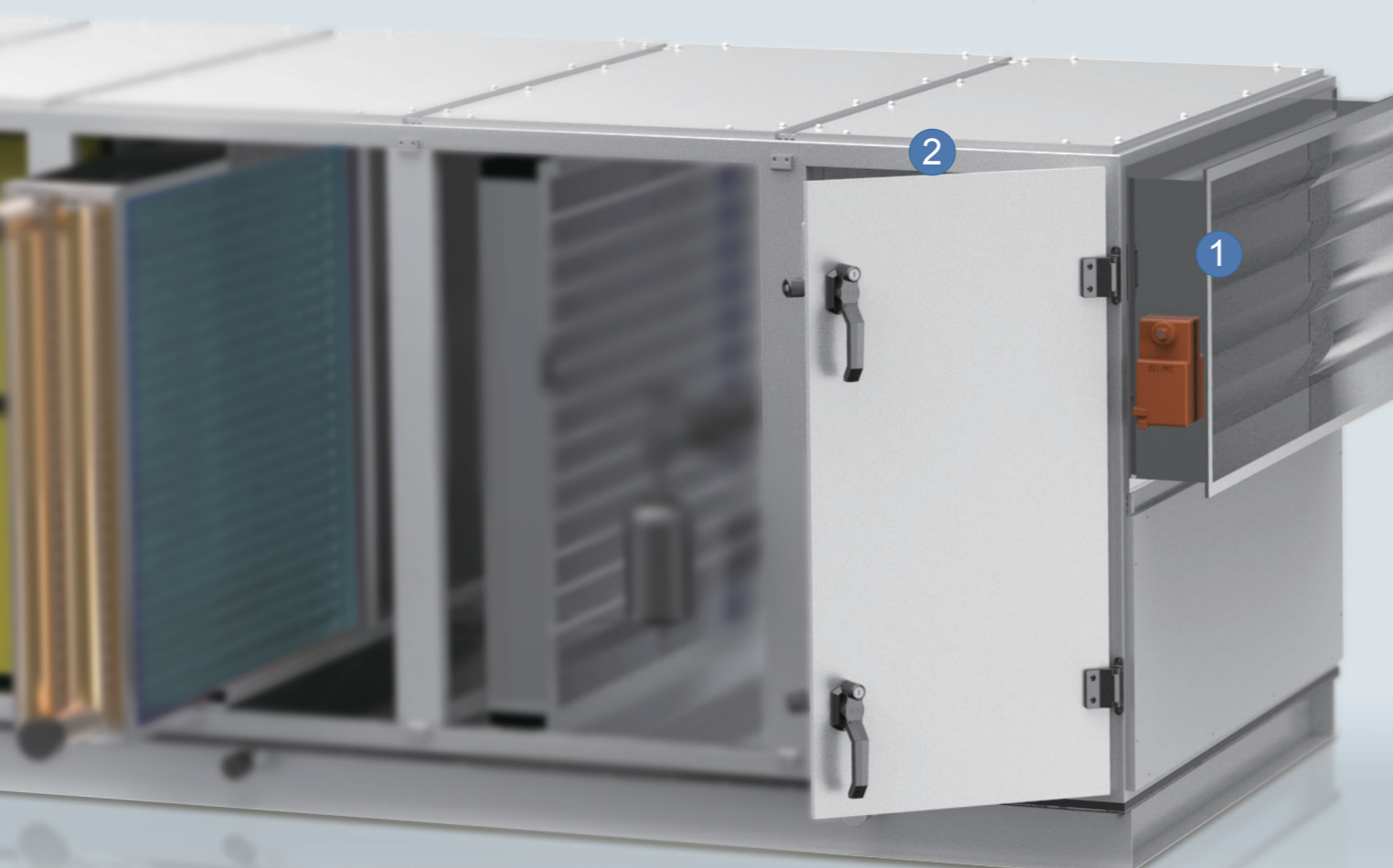
The interior is flat. Therefore, dust is not easy to accumulate and the interior is easily cleaned.



The high-density closed-hole microbial inert sealing material prevents bacteria breeding.



The external sheet metal is fully sprayed with electrostatic powder, and the coating thickness is 80 μm . The internal sheet metal is sprayed or uses stainless steel.



3. The fan motor section complies with the hygiene standard design.

VDI6022-1 -- 4.3.5 Unit Case

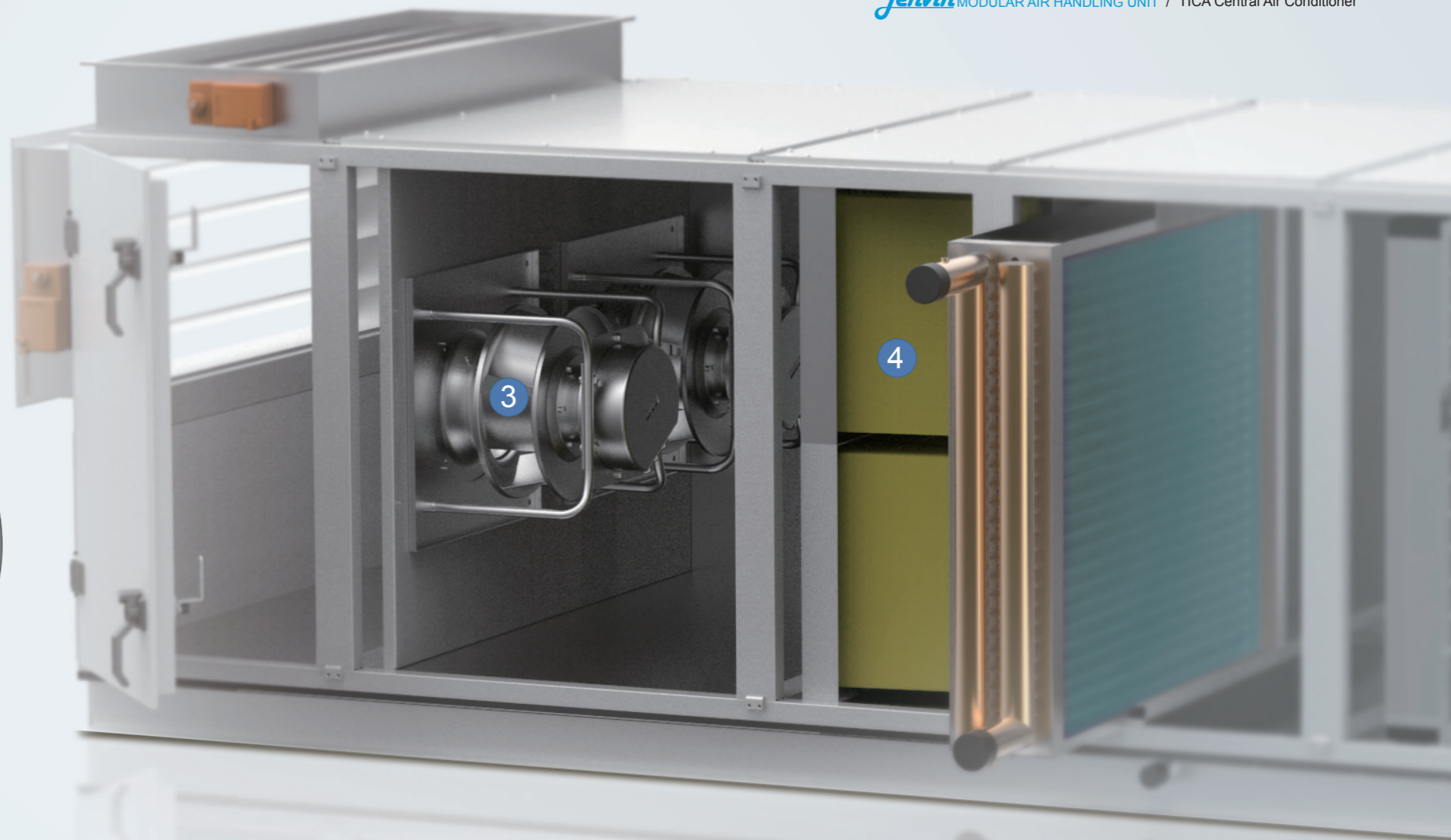
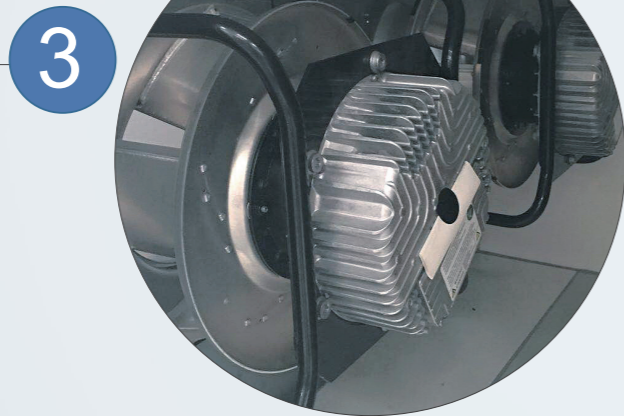
- ★ The fan or drive that will produce belt wear to reduce air quality does not exist.
- ★ Easy cleaning.

VDI6022-1 -- 4.3.5 Unit Case

- ★ The fan or drive that will produce belt wear to reduce air quality does not exist.
- ★ Easy cleaning.

Jenvin Design

- EC fan available without belt wear and dust
- Blade + motor shell, aluminum alloy
- Bracket spraying
- No volute, easy cleaning



4. The filter section complies with the hygiene standard design.

VDI6022-1 -- 4.3.5 Unit Case

- ★ Using a differential pressure gauge for detection
- ★ Closed-hole sealing material
- ★ Maintaining filter efficiency throughout the lifecycle

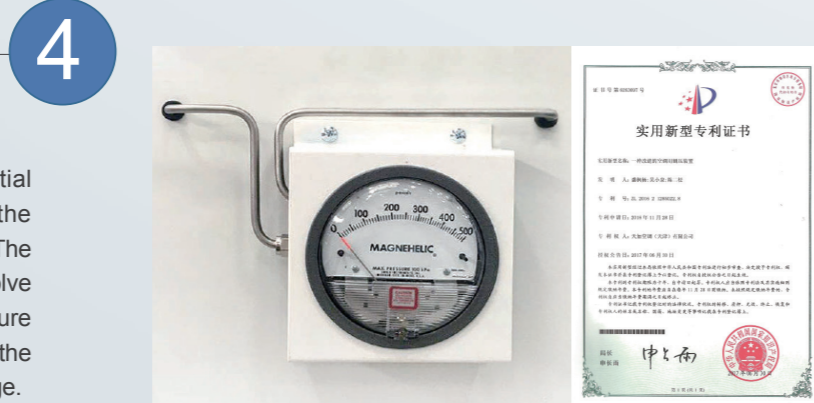
DIN 1946-4 -- 6.5.1 General Requirements for Units

- ★ Installing a differential pressure gauge in the filter section
- ★ Keeping the filtering level throughout the service period

Jenvin Design

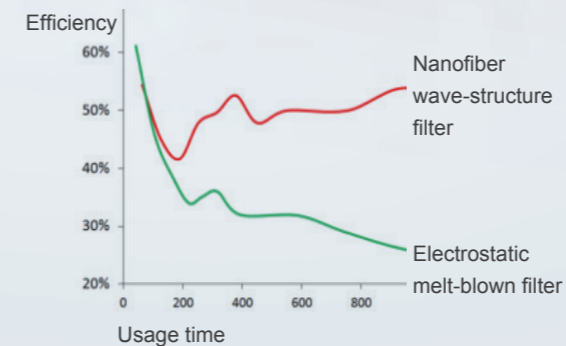
Professional Detail Design

TICA's installation and design of the differential pressure gauge is patented. TICA replaces the traditional plastic tube with stainless steel tube. The joint is sealed with a rubber seal to effectively solve the problem of air leakage and differential pressure pointer jitter caused by insufficient strength of the connecting pipe of the differential pressure gauge.

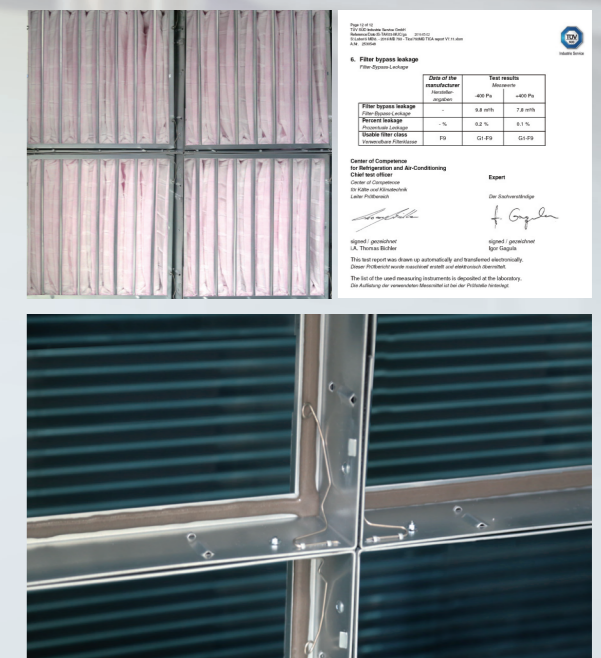


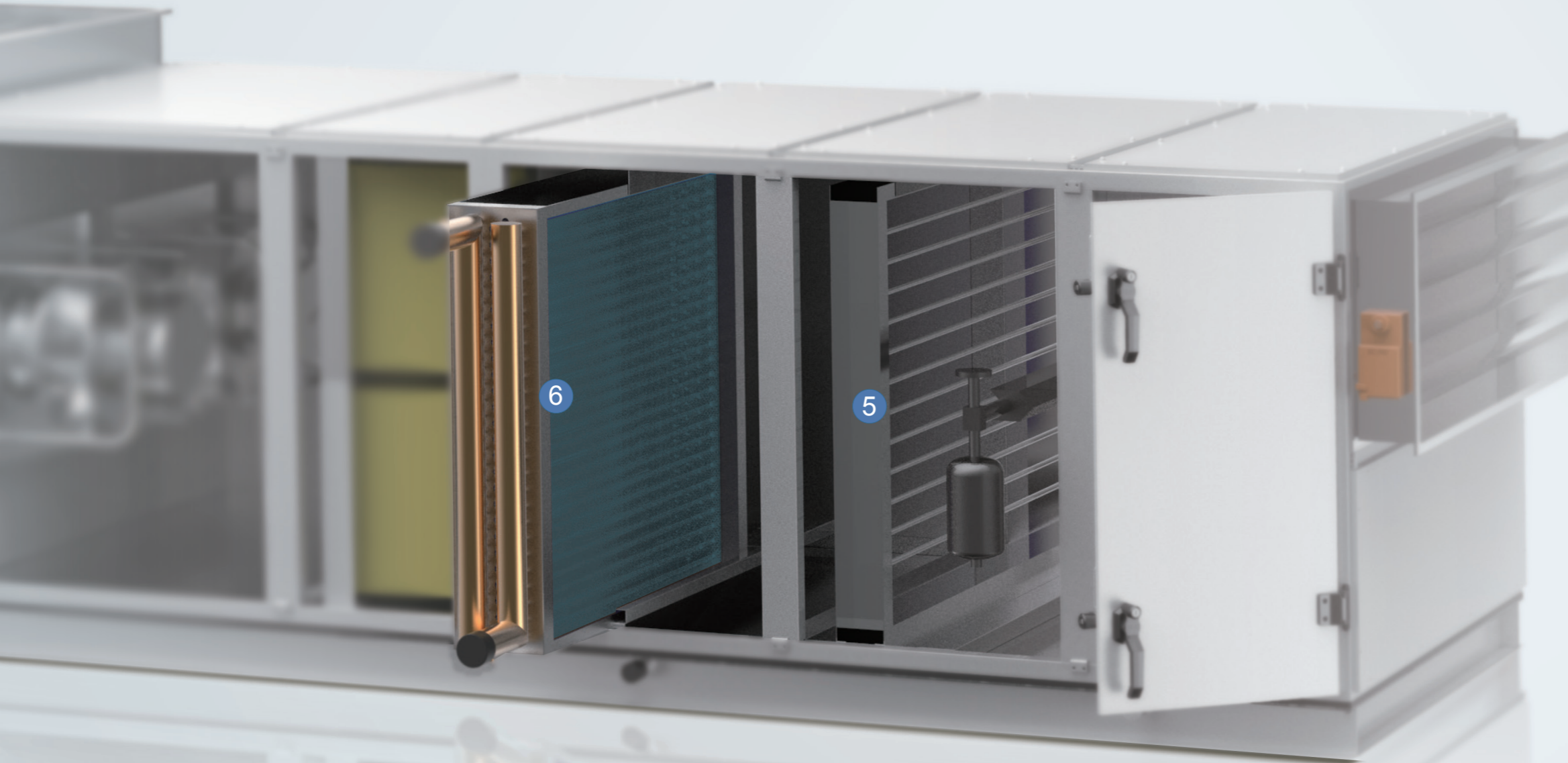
Highly-closed Filter Frame

The patented filter framework maximizes the performance of the filter section and achieves a filter bypass leak rate of up to EN1886 (F9).



Filter efficiency is not attenuated during use period when a nanofiber wave-structure filter is used.





5. The electric heating section complies with the hygiene standard design.

Jenvin Design

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Use a light-tube electric heater. Dust is not easily deposited on the surface of the electric heater.



6. The cooling coil section/water retaining section complies with the hygiene standard design.

VDI6022-1 -- 4.3.5 Unit Case

- ★ The heat exchanger is easily cleaned.
- ★ Anti-corrosion
- ★ The moisture eliminator is easily removed and cleaned.
- ★ The drain pan is corrosion-resistant and easily cleaned.

DIN 1946-4 -- 6.5.1 General Requirements for Units

- ★ Fin spacing is equal to or greater than 2 mm. Therefore, fins are easily cleaned.
- ★ The heat exchanger frame is resistant to corrosion.
- ★ The moisture eliminator is resistant to corrosion and easily cleaned.
- ★ The drain pan is resistant to corrosion. Water is drained timely and the drain pipe diameter should be at least 40 mm.

Jenvin Design

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- ★ The cooling coil frame is stainless steel and the pitch of fins is equal to or greater than 2 mm.
- ★ Use a professional software for model selection and an efficient heat exchanger. The heat exchanger is designed by using professional AHRI-certified models to ensure performance consistency between the selected model and real device. The coil is integrated with quality RoHS-certified copper tubes and unique corrugated aluminum fins through the advanced mechanical expansion tube process. The coil passes air tightness test before delivery to ensure no leakage.



Cooling coil/moisture eliminator can be pulled out from the side of the unit.



Stainless steel moisture eliminator



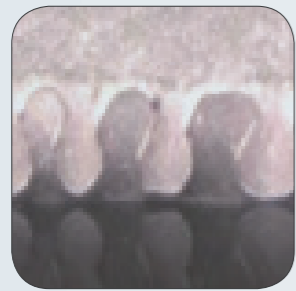
Material thickness of stainless steel drain pan ≥ 1.5 mm Slope design $\geq 3\%$



Unit Energy-saving Design

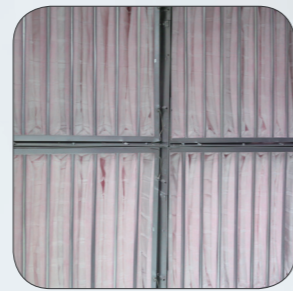
Jenvin Design

Energy-saving Design of Filter Section



Nanofiber wave-structure with relatively low windward fan speed and less resistance.

+



Filters are fully deployed in the air inlet section with low windward fan speed, thus further reducing resistance.



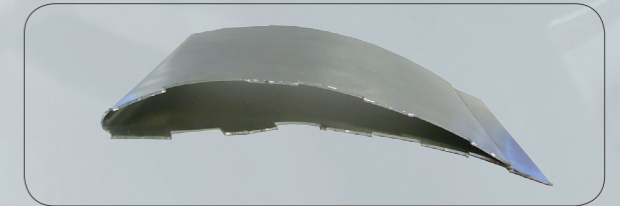
Compared with glass fiber, the primary and secondary filters help reduce resistance by 40%. Filter efficiency is guaranteed throughout the lifecycle.

Jenvin Design

Energy-saving Design in the Fan Section

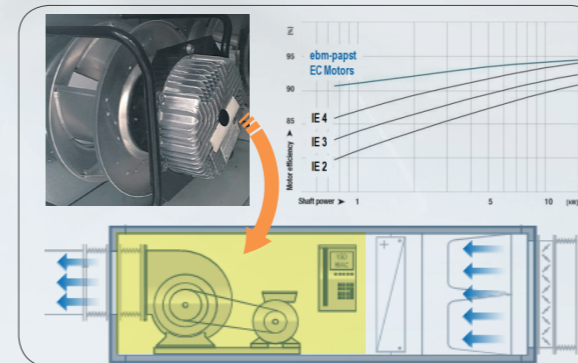
Airfoil blade

Low airflow loss + efficient operation + high stability

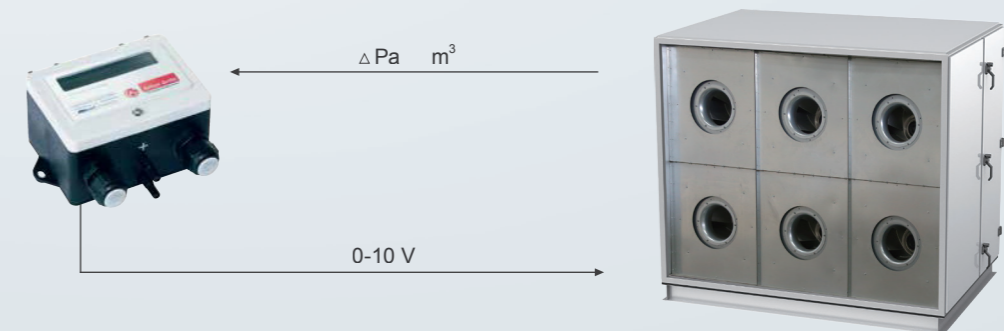


High motor efficiency

- No belt drive loss and belt replacement fee
- No inverter loss
- Uniform air flow and small resistance loss
- Smaller fan mounting space in the cabinet



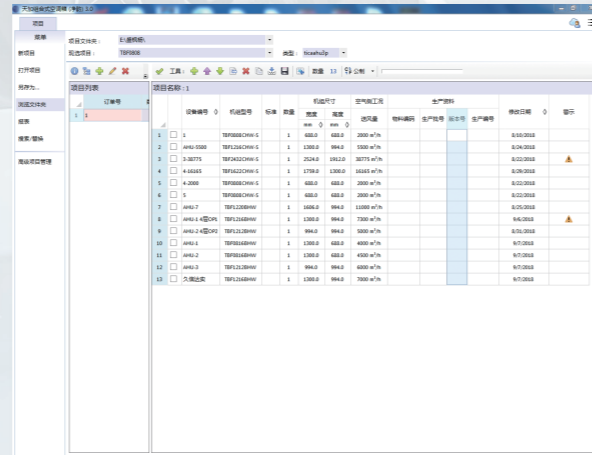
Multiple fans are used in parallel, with better adjustment capability. Based on differential pressure feedback, the controller can automatically adjust the fan speed according to the specified air flow to achieve constant air flow operation.



Professional Model Selection Software

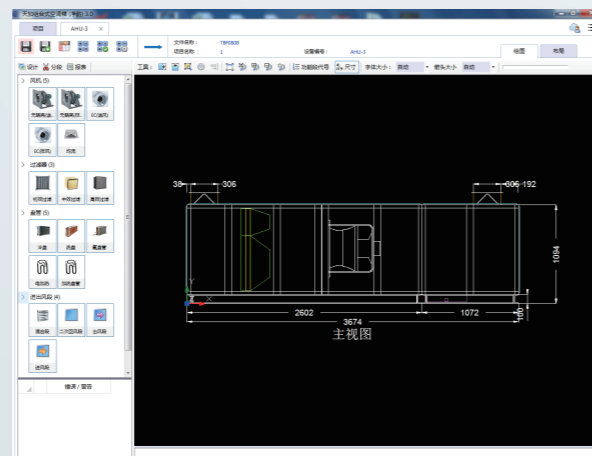
1. Personalized product customization and quick model selection

- ★ Specialized operating system, easy to use, automatic system association design, fast model selection and high accuracy.
- ★ Complete project management to listen to customers feedback on product design and give speedy answers.
- ★ Switch between languages.



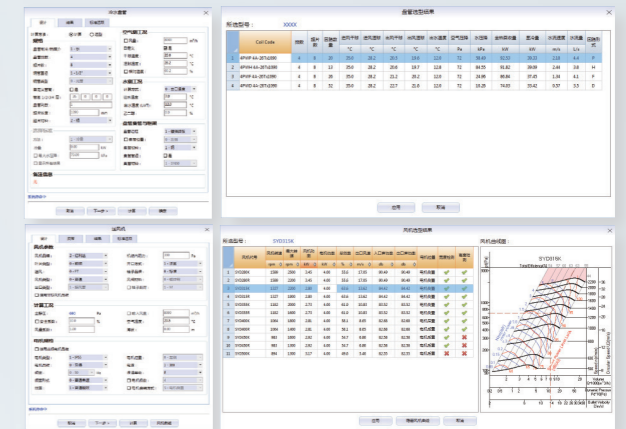
2. Powerful model selection function

- ★ Set a variety of modules based on the rich design experience of TICA modular AHUs. Directly fetch models during model selection, thus speeding up model selection.
- ★ The software is embedded with a variety of functional section configurations to meet customer requirements for different process designs. A large-capacity unit model database can meet the requirements of various locations for case sizes.



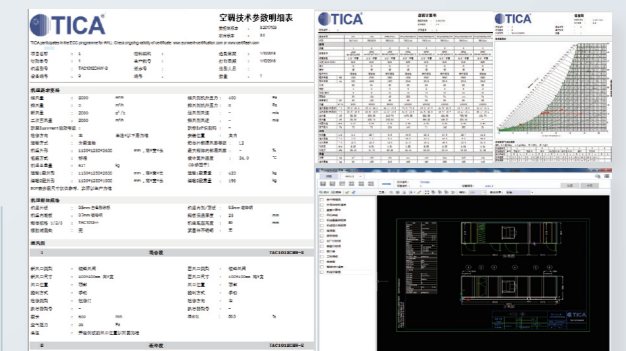
3. Professional model selection of core parts

- ★ TICA uses the professional heat exchanger selection software to provide a wide range of choices for coil rows, loops, and fins based on the operation conditions of the unit. The heat exchanger selection software passes U.S. AHRI certification.
- ★ Fan and motor selection can be determined automatically based on air flow and pressure requirements. Recommend the fan and motor combination at the best operating status point.



4. Output of a complete set of reports

- ★ The model selection results can be output through a complete set of reports, including the technical parameter detail list of each functional section of the unit, the coil model selection detail list, enthalpy/humidity chart, operating conditions, and unit size diagram.
- ★ The output report is professional, accurate and intuitive.



Air Flow Table

Unit: m³/h

Unit Specifications TBF		Windward Fan Speed of the Coil (m/s)					
Height	Width	2.00	2.25	2.50	2.80	3.00	3.50
08	08	1470	1650	1840	2060	2210	2570
08	12	2590	2910	3240	3630	3880	4530
08	16	3710	4170	4640	5190	5560	6490
12	12	4210	4730	5260	5890	6310	7360
12	16	6030	6780	7530	8440	9040	10550
12	20	7850	8830	9810	10980	11770	13730
16	16	8340	9390	10430	11680	12520	14600
16	20	10860	12220	13580	15210	16290	19010
16	24	13380	15050	16730	18730	20070	23420
20	20	13880	15620	17350	19430	20820	24290
20	24	17100	19240	21370	23940	25650	29920
20	28	20320	22860	25400	28440	30470	35550
24	24	20070	22580	25090	28100	30110	35130
24	28	23850	26830	29810	33390	35770	41740
24	32	27630	31080	34530	38680	41440	48350
28	28	27380	30810	34230	38340	41070	47920
28	32	31720	35680	39650	44410	47580	50000
28	37	36060	40560	45070	50000		
32	32	36840	41440	46040	50000		
32	37	41870	47110	50000			

Cooling Capacity Table

Unit Specifications TBF		Rated Air Flow (m ³ /h)	Fresh Air Condition						Return Air Condition					
			4 rows		6 rows		8 rows		4 rows		6 rows		8 rows	
			Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)	Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)	Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)	Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)	Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)	Sensible Cooling Capacity (kW)	Total Cooling Capacity (kW)
08	08	1840	12	27	13	31	14	33	6	7	7	9	8	10
08	12	3240	21	49	22	53	23	54	11	13	13	16	14	18
08	16	4640	26	60	33	78	33	78	18	22	19	23	19	24
12	12	5260	33	77	36	85	37	88	18	21	21	27	21	27
12	16	7530	41	97	52	123	53	125	29	34	30	37	30	38
12	20	9810	54	127	70	166	70	166	33	39	39	48	40	51
16	16	10430	57	132	71	169	72	172	40	48	41	51	41	52
16	20	13580	75	175	97	230	97	230	45	53	55	67	55	70
16	24	16730	90	211	118	281	120	287	55	63	68	84	67	84
20	20	17350	91	213	123	291	122	292	57	67	69	84	68	85
20	24	21370	111	259	141	334	154	366	69	80	87	105	85	107
20	28	25400	135	316	171	406	183	437	83	97	104	126	103	130
24	24	25090	132	308	167	397	180	430	82	95	102	123	100	127
24	28	29810	161	376	202	482	216	516	98	115	123	150	121	153
24	32	34530	188	442	237	564	253	603	108	128	143	175	142	180
28	28	34230	187	438	233	553	250	597	114	134	142	174	139	175
28	32	39650	219	514	272	647	290	692	126	149	166	204	164	209
28	37	45070	254	600	315	751	336	801	157	185	178	219	188	239
32	32	46040	254	597	316	752	337	804	154	182	192	235	189	240
32	37	50000	286	674	353	842	374	893	176	208	198	245	210	268

Remarks:

1. Fresh air conditions: The dry/wet bulb temperature of air inlet is 35°C/28°C.
2. Air return conditions: The dry/wet bulb temperature of air inlet is 24°C/17°C.
3. Chilled water inlet/outlet temperature: 7°C/12°C; windward fan speed of the coil: 2.5 m/s.

Heating Capacity Table

Unit Specifications TBF		Rated Air Flow (m ³ /h)	Fresh Air Condition (dry bulb temperature of air inlet: 7°C)				Return Air Condition (dry bulb temperature of air inlet: 15°C)			
			1 row	2 rows	3 rows	4 rows	1 row	2 rows	3 rows	4 rows
			Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)	Total Heating Capacity (kW)
08	08	1840	8	16	21	25	7	13	18	21
08	12	3240	16	30	39	45	13	24	32	38
08	16	4640	25	44	57	64	20	36	47	54
12	12	5260	26	47	62	72	21	39	52	60
12	16	7530	39	70	91	102	32	58	76	87
12	20	9810	53	92	106	133	43	77	88	112
16	16	10430	54	97	125	140	44	80	103	121
16	20	13580	73	128	147	185	59	105	122	153
16	24	16730	92	156	181	230	75	132	152	191
20	20	17350	90	161	185	233	75	133	153	193
20	24	21370	114	165	228	289	93	166	191	241
20	28	25400	137	198	264	345	112	164	227	287
24	24	25090	136	196	271	341	111	195	225	286
24	28	29810	163	235	314	410	135	196	270	340
24	32	34530	192	277	366	480	157	227	305	399
28	28	34230	190	274	366	471	155	225	310	395
28	32	39650	223	318	423	554	182	265	350	458
28	37	45070	260	367	469	636	212	307	409	522
32	32	46040	256	369	492	643	212	305	407	532
32	37	50000	288	415	548	699	239	346	453	591

Remarks:

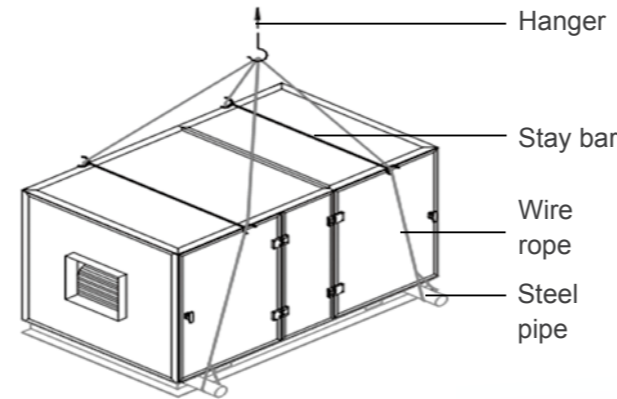
1. Hot water inlet and outlet temperature: 60°C/50°C; windward fan speed of the coil: 2.5 m/s.

Section Length Table

Unit: mm

No.	Height Modulus	Width Modulus	Air Inlet/Outlet Section	Plate Type	Bag Type	Dense-pleated	Cooling Coil Section				Moisture Eliminator Section	Heating	Humidification	Fan Section		Flow Equalization Section
							2 rows	4/6 rows	8 rows	10 rows				EBM 310	EBM 450	
1	8	8	536	153	459	383	459	536	612	689	77	306	459	842	1071	459
2	8	12	536	153	459	383	459	536	612	689		306	459			
3	8	16	536	153	459	383	459	536	612	689		306	459			
4	12	12	536	153	459	383	459	536	612	689		306	459			
5	12	16	536	153	459	383	459	536	612	689		306	459			
6	12	20	536	153	459	383	459	536	612	689		306	459			
7	16	16	612	153	459	383	459	536	612	689		306	459			
8	16	20	612	153	459	383	459	536	612	689		306	459			
9	16	24	612	153	459	383	459	536	612	689		306	459			
10	20	20	612	153	459	383	459	536	612	689		306	459			
11	20	24	612	153	459	383	459	536	612	689		306	459			
12	20	28	612	153	459	383	459	536	612	689		306	459			
13	24	24	689	153	459	383	689	765	842	918		306	459			
14	24	28	689	153	459	383	689	765	842	918		306	459			
15	24	32	689	153	459	383	689	765	842	918		306	459			
16	28	28	765	153	459	383	689	765	842	918		306	459			
17	28	32	765	153	459	383	689	765	842	918		306	459			
18	28	37	765	153	459	383	689	765	842	918		306	459			
19	32	32	842	153	459	383	689	765	842	918		306	459			
20	32	37	842	153	459	383	689	765	842	918		306	459			

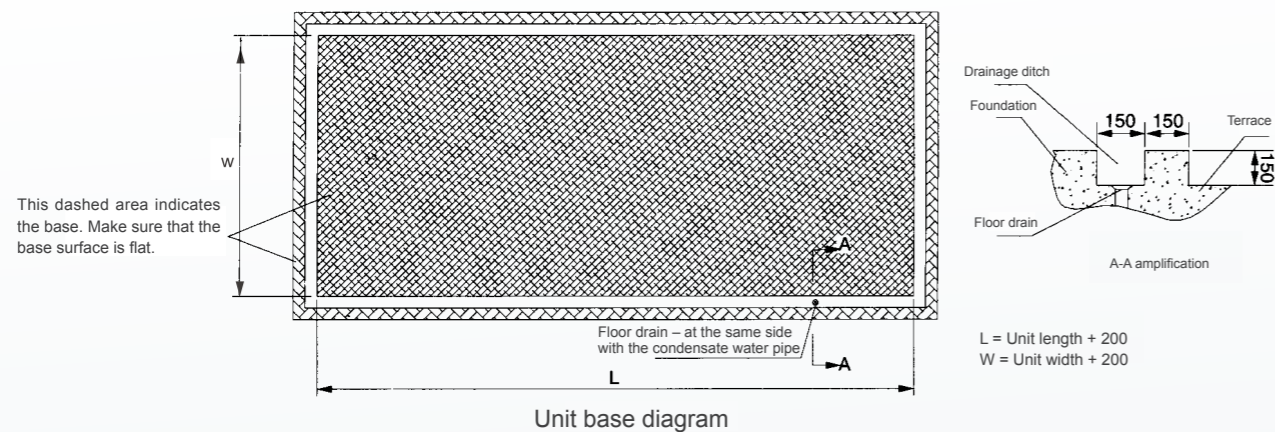
Lifting Diagram



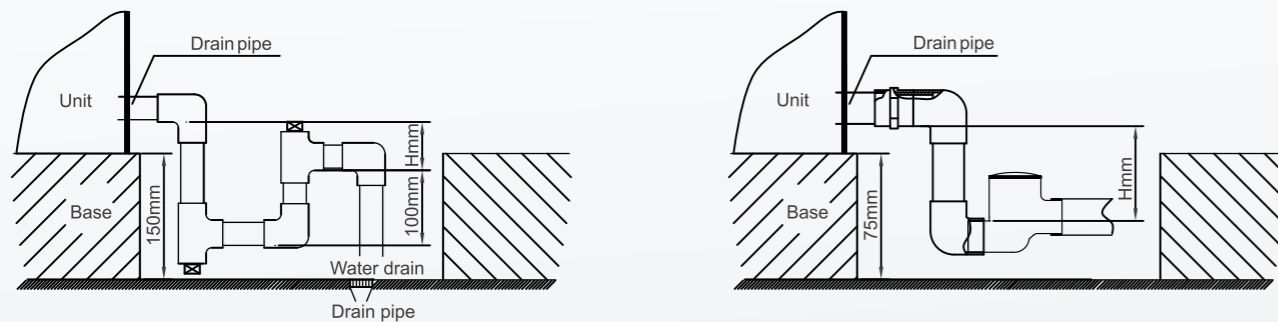
Notes

Lift the unit according to the schematic diagram for safety. Before lifting, insert materials such as cardboard at the position where the wire rope comes into contact with the housing, preventing the wire rope from scratching the unit.

Foundation Drawing



Unit Installation



$H = \text{Unit inside static pressure (mmH}_2\text{O)} + 20$
When the inside static pressure exceeds 750 Pa, increase the base height

U-shaped water seal installation diagram

$H = \text{Unit inside static pressure (mmH}_2\text{O)} + 20$
When the inside static pressure exceeds 750 Pa, increase the base height

Floating ball-type water seal installation diagram

- ◆ The air conditioning units of all structure types should be installed on a horizontal base.
- ◆ A sufficient space should be reserved around the unit, especially at the access door side of unit pipes, fan and motor, so as to facilitate routine unit inspection and regular maintenance.
- ◆ A U-shaped drain pipe must be first connected at the condensate water outlet or a floating ball-type water seal must be installed before connecting to the external pipe.
- ◆ Exert balanced force when connecting the water inlet and outlet pipes of coil. Excessive force may damage the coil.
- ◆ The motor of air conditioning unit should be connected to a power supply with overload protection, and provide with grounding protection.
- ◆ Flexible connection should be adopted between the air conditioning unit and the external air duct to avoid vibration transmission.

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 one to two months) to maintain excellent heat transfer effect and save energy.
3. Install the drainage pipe according to this manual. Ensure that water will drain smoothly. Take thermal insulation measures well. 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 dust 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 dirt from the cabinet and then let it air dry.
 - 8) When an 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. Air filter

Check the dust accumulation status on the unit filter screen regularly (twice per month recommended). If a differential pressure detection device is installed, the user needs to clean or replace the filter in time when the final resistance reaches the defined value. TICA recommends the following final resistance values:

Filtering efficiency specification	Recommended final resistance (Pa)
G3 (primary efficiency)	100-200
G4 (primary efficiency)	150-250
M5-M6 (medium efficiency)	250-300
F7-F8 (medium/high efficiency)	300-400
F9-E11 (sub-high efficiency)	400-450
High efficiency and ultrahigh efficiency	400-600

13. Heat exchanger

Make sure that the heat exchanger coil fins and copper pipes are free from scratches and dent. Keep the coil clean and brush the fins of the coil with 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. The outer surface of the coil shall be dust-free after cleaning, and the heat transfer effect of the inner surface shall reach its original heat transfer capability. 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. Drainage pipe

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. Make sure that the steam valve of the steam coil is closed before the fan stops. Make sure that the steam valve of the steam humidifier is closed before the fan stops.

19. If the customer provides a power control cabinet, start electric heating only after the fan starts. Turn off electric heating 5 minutes before the fan stops. The overheat protection switch of the electric heater needs to be connected to the electric heating protection loop.

MODULAR AHU - JENVIN SERIES

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