

# *Water Cooled Centrifugal Chiller*

## *Lower Life Cycle Cost*



# 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.

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** 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.



Nanjing Plant



Guangzhou Plant



Tianjin Plant



Chengdu Plant



Kuala Lumpur Plant



Smartt HQ, Montreal



Energy Base

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# ***Magnetic Bearing Centrifugal Chiller***

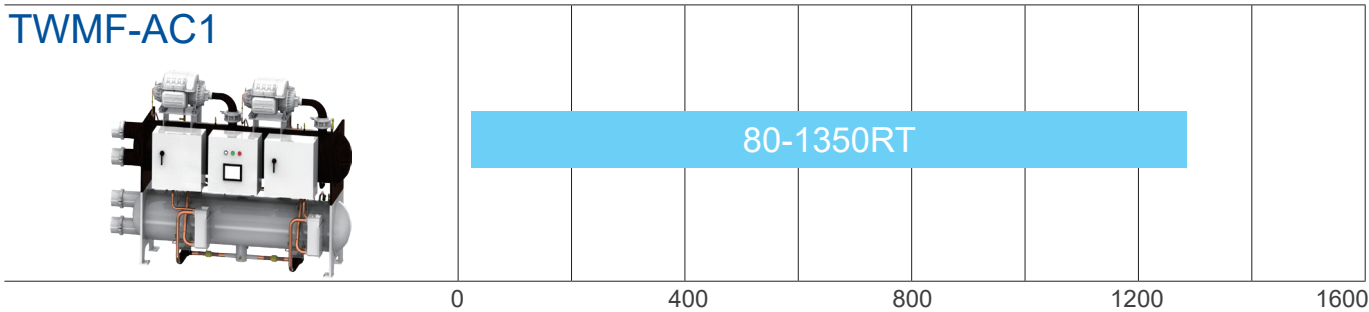




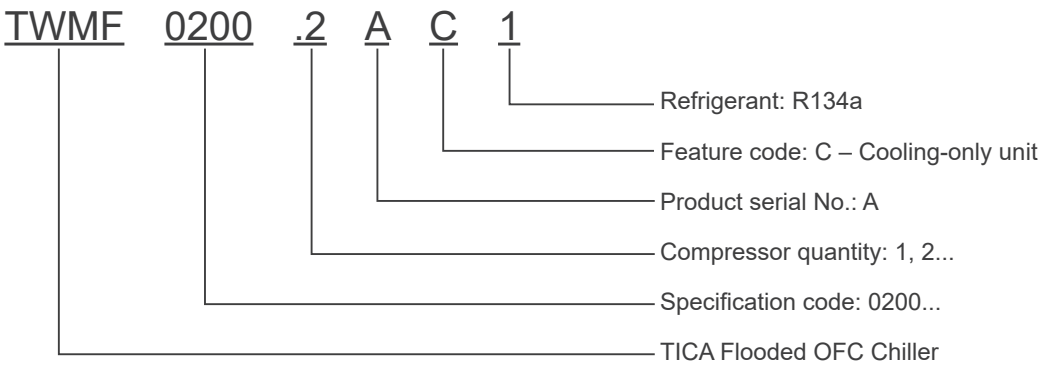


# Overview

## Product Lineup



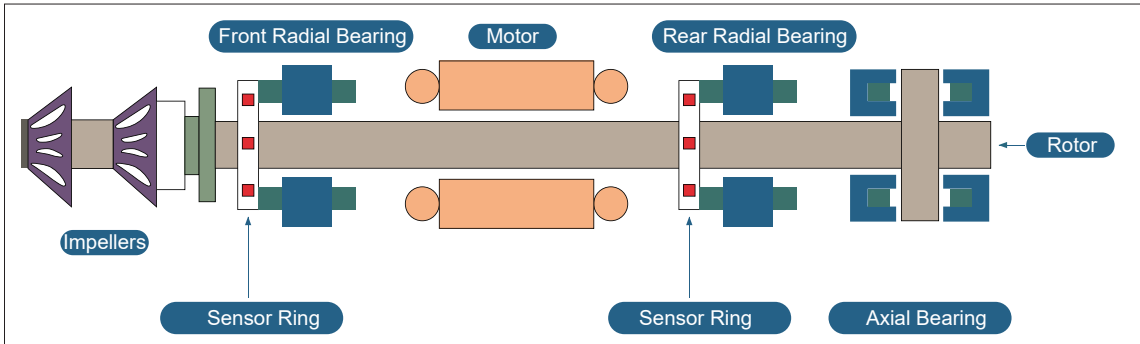
## Nomenclature



# Oil-free and High Efficiency

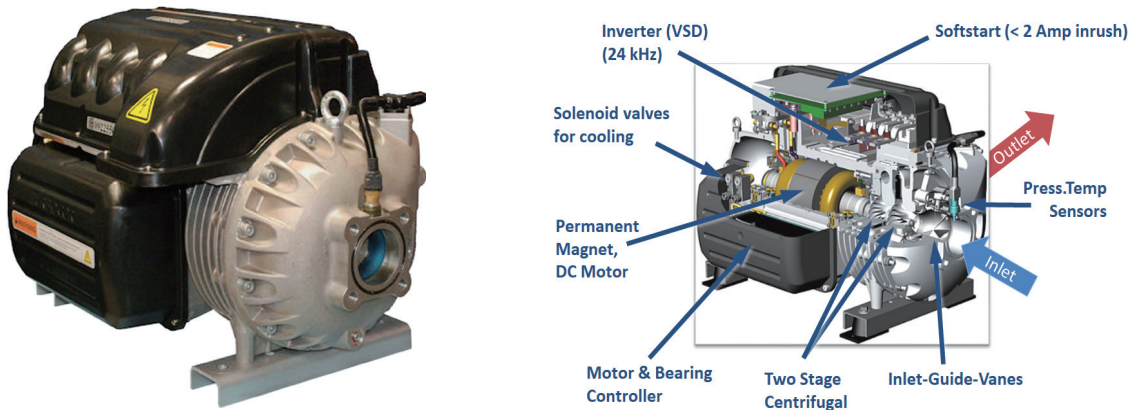
## Magnetic Bearing System

Magnetic bearing and orientation sensor: Two radial bearings and one axial bearing compose the digital magnetic bearing system. The movement parts are made of permanent magnet and electric magnet will suspend on the magnet and move.



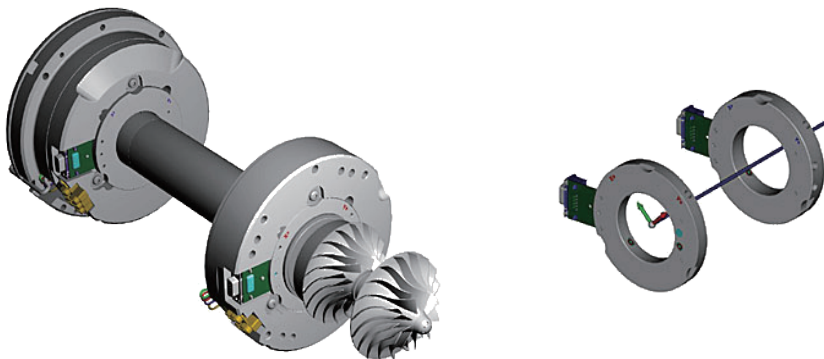
## Oil-free Centrifugal Compressor

TICA oil-free centrifugal compressors use magnetic bearings and a variable speed drive to deliver IPLV efficiencies that far surpass those of conventional oil-lubricated centrifugal, reciprocating, scroll and screw compressors.



## Magnetic Bearing

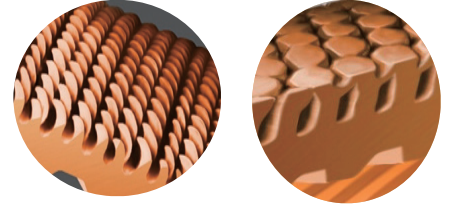
The magnetic bearings allowed the elimination of mechanical friction losses, increased the potential equipment life through eliminating wearing surfaces, and therefore eliminated the oil-related heat transfer losses in the system through removing the need for oil.



# Unique Heat-exchanging Technology

## High-Efficiency Heat Exchange Tube

- The teeth of the high-efficiency heat exchange tubes are optimized based on the difference between condensation and evaporation conditions, with the heat exchange area improved, the heat exchange environment inside and outside the tubes optimized, and the flow pressure loss of the refrigerating medium inside the tubes controlled to reduce the energy consumption of the water system.



## Evaporator

- The optimized tube layout of the evaporator reduces the impact on inter-tube heat transfer, improves the heat transfer performance of the tube bank, and optimizes the suction flow path to reduce the suction pressure loss and protect the compressor from operating with fluid.



## Condenser

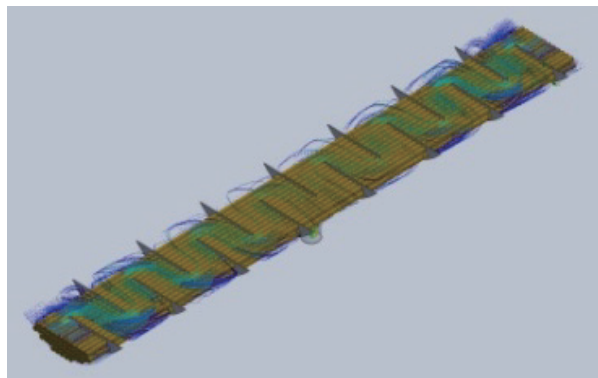
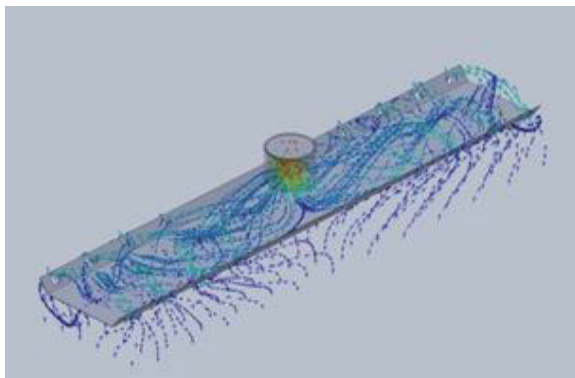
- The condenser designed with a supercooling chamber can fully cool the refrigerant down, improve the cooling capacity and energy efficiency of the unit, and improve the working environment of the throttle valve.



The heat exchanger is adequately tested and verified under a wide range of operating conditions based on simulation and calculation with emulation technology, which saves consumable materials and improves the performance and stability of the exchanger.

The unit is designed with multiple compressors connected in parallel. The design facilitates the utilization of the heat exchange area of the exchanger under some operating conditions, which maximizes the heat exchange effect when the unit is operating with partial load and improves the overall operation efficiency.

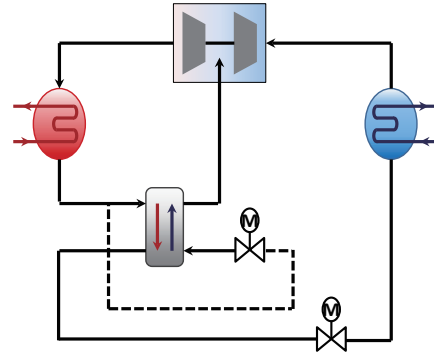
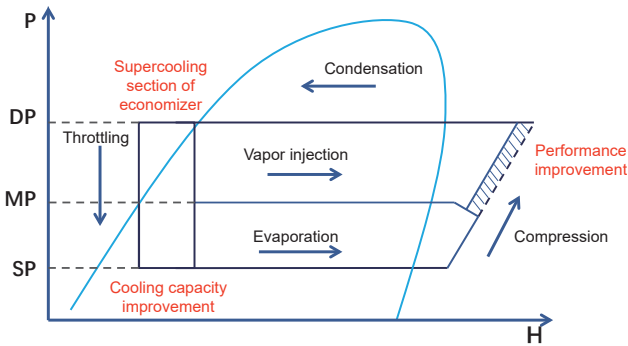
The oil-free refrigerant circulating system avoids the formation of a frozen oil film that may affect the performance of the heat exchange tube, simplifies the oil separator and oil return system, and makes the system stable and reliable.





# Economizer Circulation

The economizer is designed with a supercooling circulation feature. The design reduces the enthalpy value of the refrigerant that is not throttled and obtains the supercooling degree. The economizer circulation can effectively improve the cooling capacity and energy efficiency of the unit, especially when the unit is operating at a high condensing temperature.



# Precise EXV Control

Electronic expansion valves (EXV) are used for throttling, which feature high control accuracy, fast response, and wide control range.

A self-designed regulation solution is used, and adequately verified and optimized for the whole unit to adapt to the system operating under all kinds of conditions. The EXVs can respond quickly and adapt to the unit regardless of full load or partial load or even extreme operating conditions.

The opening of the EXVs is calculated in real time. The EXVs can be installed in any position to accurately match the operating state of the unit, thus improving the heat exchange performance, improving the energy efficiency of the unit, and ensuring the safety of the unit.



# Eco-friendly

The refrigerant is environmentally-friendly HFC-R134a, which does not contain chlorine atoms, is harmless to the atmospheric ozone layer, and has no ban period in the Montreal Agreement.

Such design improves the efficiency, and reduces the energy consumption and emission of CO<sub>2</sub>.

Dedicated to the development of green and environment-friendly products, TICA is among the first batch of demonstrative enterprises in China that manufacture air conditioners for industrial and commercial purposes and conclude agreements with the Ministry of Environmental Protection on abandoning HCHC.



# Wide Application

Operating range of the unit

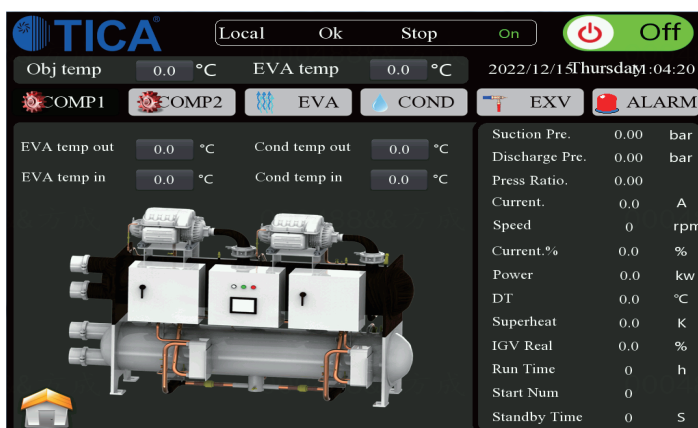
Item		Standard operating condition	Continuous operation area
Cooling Condition	Condenser inlet temperature °C	30	16~35
	Evaporator outlet temperature °C	7	5~15

Note: For operation under the extreme conditions, the user is advised to configure a three-way valve (used for the constant condensation pressure) for stepless regulation of the water flow.

# Intelligent Control

## Automatic Control System

- The patented dynamic optimization and control solution enables the unit to adapt to various operating conditions and obtain the optimal operating state to ensure that the unit can operate efficiently, stably, and safely in real time.
- The HD color LCD HMI can effectively distinguish daily operation, operation and maintenance, installation and commissioning, and maintenance management.
- Benefiting from the fuzzy control technology, the unit is able to adjust the water temperature based on outdoor air temperature and hence can improve efficiency to the greatest extent while meeting the needs.
- Multi-protections like open-phase protection, inverter temperature protection, condensing pressure protection, chilled water/cooling water cut-off protection, sensor fault protection and etc.
- The runtime of compressors of a multi-compressor unit is automatically adjusted to extended the service life of the unit.
- With RS485 interfaces and standard MODBUS RTU protocols, the unit can be connected to the building automation system (BAS), which implements centralized control and remote monitoring of the unit.



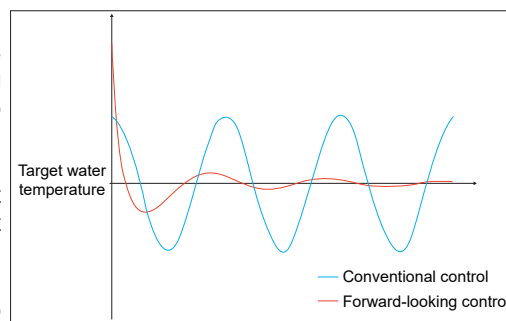
## Forward-looking Water Temperature Control

TICA OFC centrifugal chiller can adjust its capacity output in advance based on the water temperature, quickly match the required load, and effectively reduce the water temperature fluctuation.

The forward-looking stable control solution enables the unit to adapt to various operating conditions, to implement self-diagnose and adjustment by predicting the trend, and to avoid frequent changes in temperature and even shutdown, so that the unit can maintain efficient, stable and safe operation in real time.

The microcomputer control system predicts real-time load changes based on target values and load levels, and performs forward-looking corrections to unit loads, thus avoiding energy consumption increase or even shutdown of the unit due to frequent fluctuations in water temperature of the unit.

In addition, the powerful control logic can not only protect the reliable operation of the unit, but also expand the operation range of the unit, enabling the unit to adapt to various operating states.



# Specifications

## Technical Parameters of TWMF-AC1 (R134a) Series Flooded Water-cooled OFC Chiller

Model: TWMF-AC1		0080.1	0090.1	0100.1	0110.1	0125.1	0150.1	0180.1	0200.1	0250.2	0300.2	0350.2	0400.2	0450.3	0500.3	0550.3	
Cooling Capacity	RT	80	90	100	110	125	150	180	200	250	300	350	400	450	500	550	
	10 <sup>4</sup> kcal/h	24	27	30	33	38	45	54	60	76	91	106	121	136	151	166	
	kW	282	317	352	387	440	527	633	703	880	1055	1231	1406	1582	1758	1934	
Cooling Power Input	kW	48.4	55.2	61.1	65.3	73.4	86.5	102.6	111.4	148.3	173.0	197.9	222.8	259.5	284.4	309.3	
EER	/	5.83	5.74	5.76	5.93	5.99	6.10	6.17	6.31	5.94	6.10	6.22	6.31	6.10	6.18	6.25	
GB-IPLV	/	8.81	8.68	8.71	8.96	9.06	9.43	9.37	9.49	9.08	9.48	9.67	9.79	9.49	9.62	9.73	
AHRI-IPLV	/	10.05	9.91	9.94	10.23	10.34	10.75	10.69	10.82	10.37	10.89	11.10	11.23	10.89	11.04	11.16	
Running Current	A	88.0	99.0	109.0	115.0	127.8	137.3	168.9	185.4	256	274.6	322.7	370.8	411.9	460.0	508.1	
Motor Configuration Power	kW	134	134	134	134	134	109	132	132	2*134	2*109	109+132	2*132	3*109	2*109+132	2*132+109	
Maximum Running Current	A	210	210	210	210	210	170	206	206	2*210	2*170	170+206	2*206	3*170	2*170+206	2*206+170	
Power Supply	/	380V/3N/50Hz															
Refrigerant	/	R134a															
Energy Control	/	Stepless Control															
Compressor Quantity	EA	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	
Evaporator	Designed Water Pressure	Mpa	1.0														
	Water Flow (Cooling)	m <sup>3</sup> /h	49	55	61	67	76	91	109	121	151	181	212	242	272	302	333
	Water Pressure Drop (Cooling)	kPa	80	96	82	97	95	95	95	95	85	85	88	88	89	45	45
	Water Pipe Diameter	DN	150	150	150	150	150	150	150	150	200	200	200	200	200	250	250
Condenser	Designed Water Pressure	Mpa	1.0														
	Water Flow (Cooling)	m <sup>3</sup> /h	61	68	76	83	95	113	136	151	189	227	265	302	340	378	416
	Water Pressure Drop (Cooling)	kPa	73	90	80	92	88	88	90	90	72	71	66	65	70	46	46
	Water Pipe Diameter	DN	150	150	150	150	150	150	150	150	200	200	250	250	250	250	250
Unit Dimensions	Length	mm	2300	2300	2300	2300	2300	2300	2300	3500	3500	3500	3500	3500	4450	4450	
	Width	mm	1200	1200	1200	1200	1200	1200	1300	1300	1200	1200	1300	1300	2100	2300	2300
	Height	mm	2150	2150	2150	2150	2200	2200	2300	2300	2300	2300	2400	2400	2200	2300	2200
Unit Weight	Shipping Weight	kg	1950	1950	2000	2000	2200	2250	2750	2950	4500	4700	5300	5500	6600	7400	7500
	Operating Weight	kg	2100	2100	2150	2150	2380	2430	2950	3150	5000	5200	5900	6100	7400	8500	8600

### Notes:

1. Nominal cooling capacity condition: outlet chilled water temp: 7°C; inlet cooling water temp: 30°C.
2. For technical parameters under non-standard operating conditions, please contact branches of TICA.
3. Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
4. Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
5. Specification parameters are subject to change without prior notice, due to product improvement.





Model: TWMF-AC1		0600.3	0650.3	0700.4	0750.4	0800.4	0850.4	0900.4	1000.5	1100.5	1200.6	1300.6	1360.6	
Cooling Capacity	RT	600	650	700	750	800	850	904	1000	1100	1204	1300	1358	
	10 <sup>4</sup> kcal/h	181	197	212	227	242	257	273	302	333	364	393	411	
	kW	2109	2286	2461	2638	2813	2989	3179	3516	3868	4232	4571	4775	
Cooling Power Input	kW	334.2	362.1	395.8	422.0	445.6	487.6	515.8	576.5	613.1	666.0	726.0	753.9	
EER	/	6.31	6.31	6.22	6.25	6.31	6.13	6.16	6.10	6.31	6.35	6.30	6.33	
GB-IPLV	/	9.66	9.71	9.67	9.98	10.18	10.22	10.27	10.17	10.31	10.38	10.29	10.35	
AHRI-IPLV	/	11.08	11.13	11.10	11.05	11.27	11.31	11.37	11.25	11.41	11.49	11.39	11.45	
Running Current	A	556.2	601.2	645.4	694.6	741.6	793.6	824.0	959.7	1007.5	1097.4	1134.0	1176.0	
Motor Configuration Power	kW	3*132	3*132	2*109+2*132	2*109+2*132	4*132	4*132	4*132	5*132	5*132	4*132+2*109	6*132	6*132	
Maximum Running Current	A	3*206	3*206	2*170+2*206	2*170+2*206	4*206	4*206	4*206	5*206	5*206	4*206+2*170	6*206	6*206	
Power Supply	/	380V/3N/50Hz												
Refrigerant	/	R134a												
Energy Control	/	Stepless Control												
Compressor Quantity	EA	3	3	4	4	4	4	4	5	5	6	6	6	
Evaporator	Designed Water Pressure	Mpa	1.0											
	Water Flow (Cooling)	m <sup>3</sup> /h	363	393	423	454	484	514	547	605	665	728	786	821
	Water Pressure Drop (Cooling)	kPa	45	75	45	62	46	46	85	68	52	73	82	70
	Water Pipe Diameter	DN	250	250	300	300	300	350	350	350	350	350	350	350
Condenser	Designed Water Pressure	Mpa	1.0											
	Water Flow (Cooling)	m <sup>3</sup> /h	454	492	529	567	605	643	683	756	832	910	983	1027
	Water Pressure Drop (Cooling)	kPa	90	90	46	90	90	45	73	80	62	85	88	85
	Water Pipe Diameter	DN	250	250	300	300	300	300	300	300	350	350	350	400
Unit Dimensions	Length	mm	4450	4450	4550	4550	4550	4550	4550	5450	5450	6350	6350	6350
	Width	mm	2300	2300	2500	2500	2500	2700	2700	2900	2900	2900	2900	3000
	Height	mm	2200	2200	2400	2400	2400	2800	2800	2800	2800	2800	2800	2800
Unit Weight	Shipping Weight	kg	7700	7900	9000	9100	9200	10200	10400	15000	15400	16200	16500	17500
	Operating Weight	kg	8800	9000	10200	10300	10400	11500	11700	16500	16700	17500	17800	18800

# Centrifugal Chiller



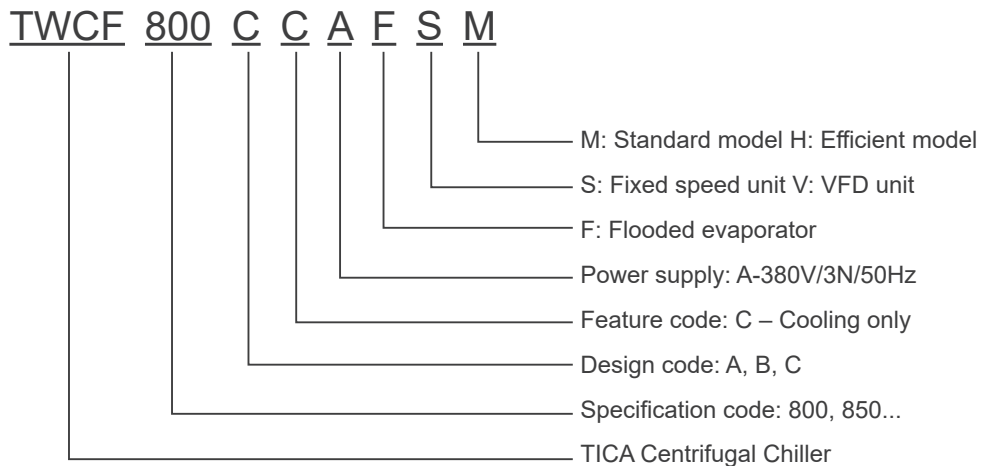
# Overview

## Product Lineup

<p>TWCF-C-S(fixed speed)</p> 								
<p>TWCF-C-V(inverter)</p> 								

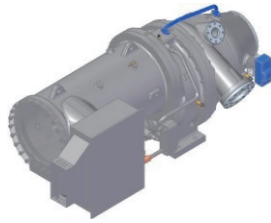
0                      400                      800                      1200                      1600

## Nomenclature





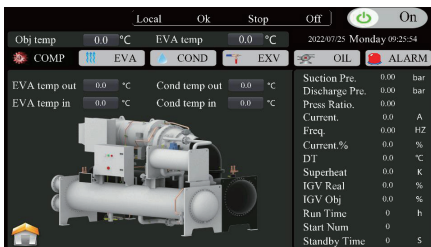
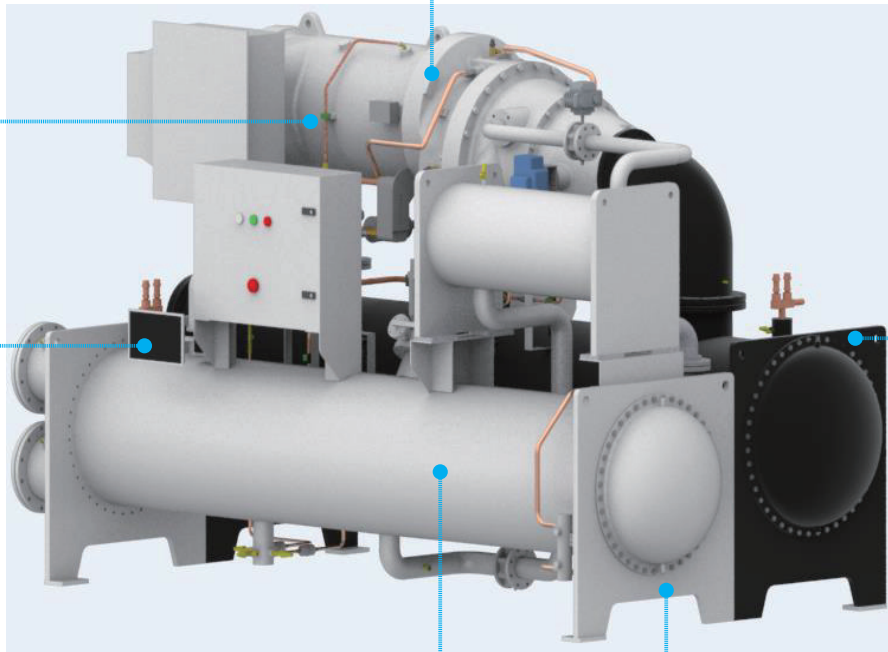
# Unit Member



High efficiency enclosed motor

Centrifugal compressor

Flooded type evaporator



'15 inches' colorful touch screen



Eco-friendly refrigerant



Condenser with integral sub-cooled

# High Efficiency

## High Efficiency Compressor

With centrifugal compressors and advanced technology in the field of aerospace engines, TICA and the team of foreign experts adopt professional software to pneumatically optimize the design of centrifugal compressors, and innovate the manufacturing technology of impellers, volutes and other key components, thus greatly improving the efficiency of the compressors, and effectively reducing the power consumption of the whole unit.

## High Efficiency Enclosed Motor

The efficient closed motor features a simple and compact structure, long service life, low noise, and high reliability.

The unit is cooled by refrigerant, and its operating temperature is not affected by the external environment.

High-quality silicon steel is used to reduce the loss of magnetic circuits. Meanwhile, low harmonic winding technology is applied to optimize the distribution of the electromagnetic field of the motor and reduce the additional stray loss. The efficiency of such motor is 0.5% higher than that of an ordinary AC asynchronous motor.



## Pre-rotation Guide Vane Technology

The air inlet of the compressor is equipped with high-efficiency airfoil pre-rotating guide vanes. The vanes generate winding flow under all kinds of loads, effectively expanding the operation range of the unit, realizing stepless adjustment of cooling capacity within the range of 10%-100%, and improving the efficiency under partial loads.



# High Efficiency

## 3D Flow Impeller

The newly designed high efficiency 3D flow alloy impeller is produced at a German GMD 5-axis machine center. It benefits from high machine precision and 30% reduced impeller thickness, thus reducing the axial force loss and separation loss.



## Suspension Volute Design

The optimized suspension volute is characterized by a compact structure and uniform internal flow, further improving the efficiency of the unit.

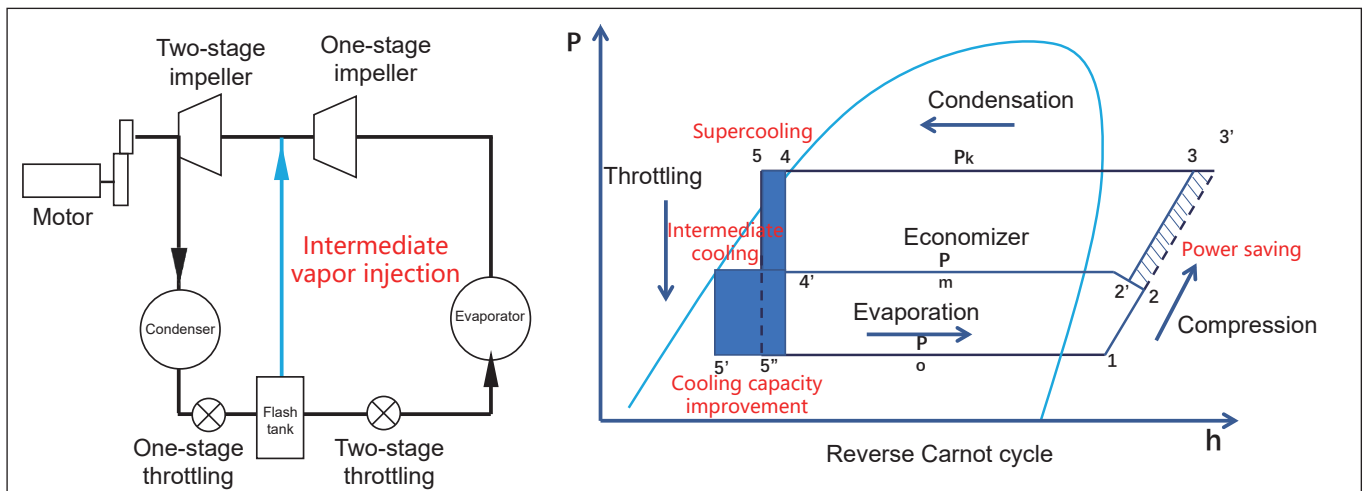


## Two-Stage EVI Compression Technology - Flash Tank Cycle

The two-stage EVI compression technology is designed with two-stage compression flash tanks that can reduce the enthalpy value of the refrigerant liquid subject to flash evaporation, enhance the heat absorption capacity of the refrigerant through flash tank cycles, and reduce the power consumption of the compressor, thus featuring a 6% increase in the unit's energy efficiency when compared with those equipped with single-stage compressors.

The unique three-stage separation economizer is simple and highly efficient.

The two-stage impeller can reduce the speed of the compressor and thus has higher reliability.

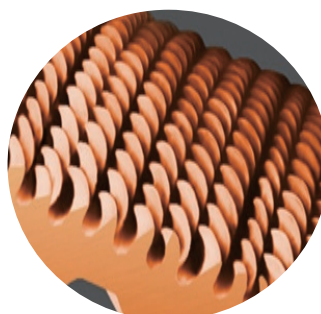




# Unique Heat-exchanging Technology

## High-efficiency Heat Exchange Tube

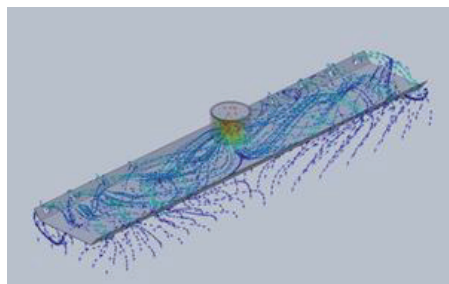
The heat exchanger adopts internally and externally enhanced heat exchange tubes with ultra high efficiency whose teeth are reinforced based on the heat transfer characteristics of the evaporator or condenser and those inside and outside the tubes to improve the heat transfer efficiency and control the flow pressure loss of the refrigerating medium inside the tube thus to reduce the energy consumption of the water system.



## Evaporator

The evaporator feature a unique efficient evaporation technology through airflow channels.

The evaporator calculates the flow field state through simulation, and effectively captures fluid and prevents it from entering the compressor under the optimal pressure drop, thus preventing suction with fluid, reducing the failure rate of the compressor, and improving the operating reliability of the compressor.

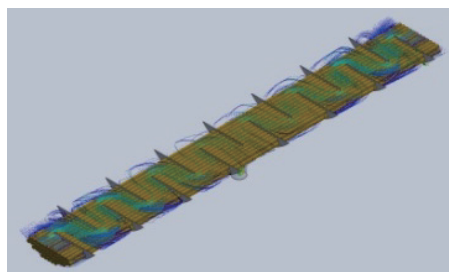
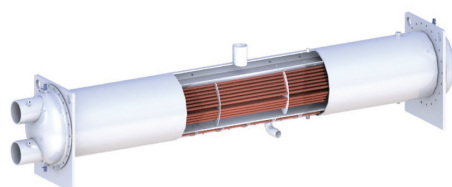


Simulation of fluid baffle

## Condenser

The condenser features an efficient condensing technology that can realize equalized airflow and forced supercooling.

The condenser is designed with a supercooling EVI chamber, and simulates and analyzes the heat transfer of the supercooling section through simulation technology to realize a supercooling degree of over 4°C, improve the cooling capacity of the unit and prevent air mixture in the container, thus improving the reliability of the unit.



Simulation of supercooling EVI chamber



## Precise Control

EXVs/electrically operated valves are used for throttling, which feature high control accuracy, fast response, and wide control range.

A self-designed regulation solution is used, and adequately verified and optimized for the whole unit to adapt to the system operating under all kinds of conditions. The EXVs/electrically operated valves can respond quickly and adapt to the unit regardless of full load or partial load or even extreme operating conditions.

The opening of the EXVs/electrically operated valves is calculated in real time. The valves can be installed in any position to accurately match the operating state of the unit, thus improving the heat exchange performance, improving the energy efficiency of the unit, and protecting the safety of the unit.



## Eco-friendly

The refrigerant is environmentally-friendly HFC-R134a, which does not contain chlorine atoms, is harmless to the atmospheric ozone layer, and has no ban period in the Montreal Agreement.

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# Wide Application


## Operating range of the unit


Item		Standard operating condition	Continuous operation area
Cooling Condition	Condenser inlet temperature °C	30	16~35
	Evaporator outlet temperature °C	7	5~15

Note: For operation under the extreme conditions, the user is advised to configure a three-way valve (used for the constant condensation pressure) for stepless regulation of the water flow.


## Wide Application

The compressor of the unit adopts the design of “wide range” variable pressure ratio, which is applicable to efficient operation under multiple working conditions. It can be used stably in various system energy-saving solutions such as those with a large temperature difference and a small flow rate, those with a primary pump variable flow rate, ice storage systems, and VFD systems.






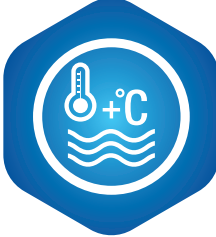
Primary pump  
variable flow rate  
system




Water-cooled chiller  
group control system



Ice storage system



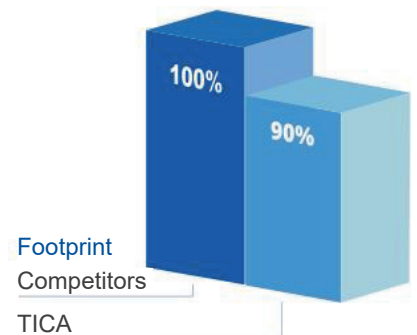
Large temperature difference  
and small flow rate system



Fixed/variable frequency  
system

## Convenience

- Both the evaporator and condenser are configured with flanges to make field installation convenient.
- The unit requires a small floor area due to its compact structure. Through various measures such as heat exchanger optimization, TICA centrifugal chillers can stabilize the performance and reduce the floor area and weight of the unit, so as to facilitate equipment transportation and installation.
- Sufficient refrigerant has been charged in the unit before the entire unit is delivered.
- The unit is configured with a compressor starter panel to facilitate on-site cable connection by the user.
- The unit is properly insulated.
- With minimal vibration, the unit usually does not need to be isolated.
- During installation on site, users only need to connect the water pipes of the evaporator and condenser and connect the power supply/communication lines.

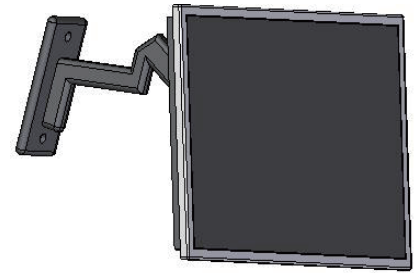
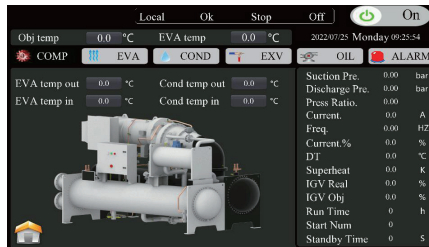
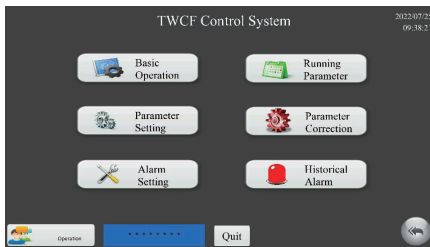




# Intelligent Control

## Automatic Control System

- The unit is equipped with industrial-grade micro controllers, and high-precision sensors to detect and feed back measured parameters in real time.
- The 15-inch rocker HD color LCD HMI can effectively distinguish daily operation, operation and maintenance, installation and commissioning, and maintenance management.
- Benefiting from the fuzzy control technology, the unit is able to adjust the water temperature based on outdoor air temperature and hence can improve efficiency to the greatest extent while meeting the needs.
- Multi-protections like open-phase protection, low oil pressure difference protection, condensing pressure protection, chilled water/cooling water cut-off protection, sensor fault protection and etc.
- The runtime of compressors of a multi-compressor unit is automatically adjusted to extended the service life of the unit.

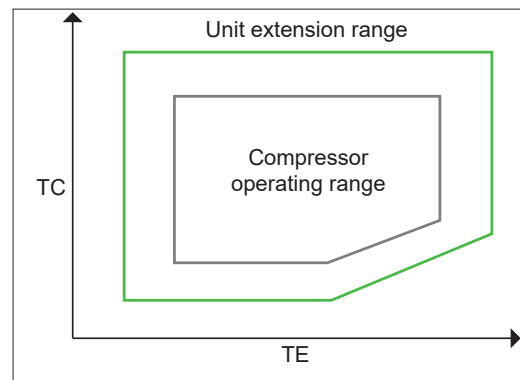
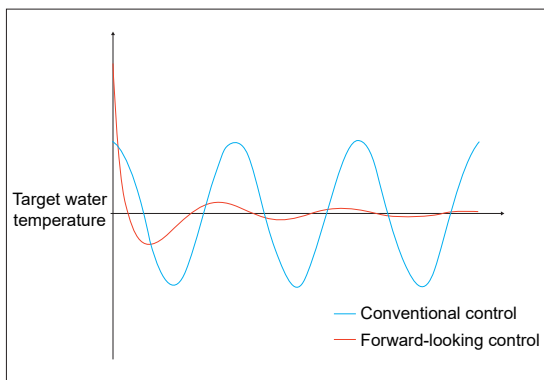


## Forward-looking Stable Control

TICA's unique forward-looking stable control solution enables the unit to adapt to various operating conditions, to implement self-diagnose and adjustment by predicting the trend, and to avoid frequent changes in temperature and even shutdown, so that the unit can maintain efficient, stable and safe operation in real time.

The microcomputer control system predicts real-time load changes based on target values and load levels, and performs forward-looking corrections to unit loads, so as to avoid system energy consumption or shutdown due to frequent fluctuations in water temperature of the unit.

In addition, the powerful control logic can not only protect the reliable operation of the unit, but also expand the operation range of the unit, enabling the unit to adapt to various operating states.

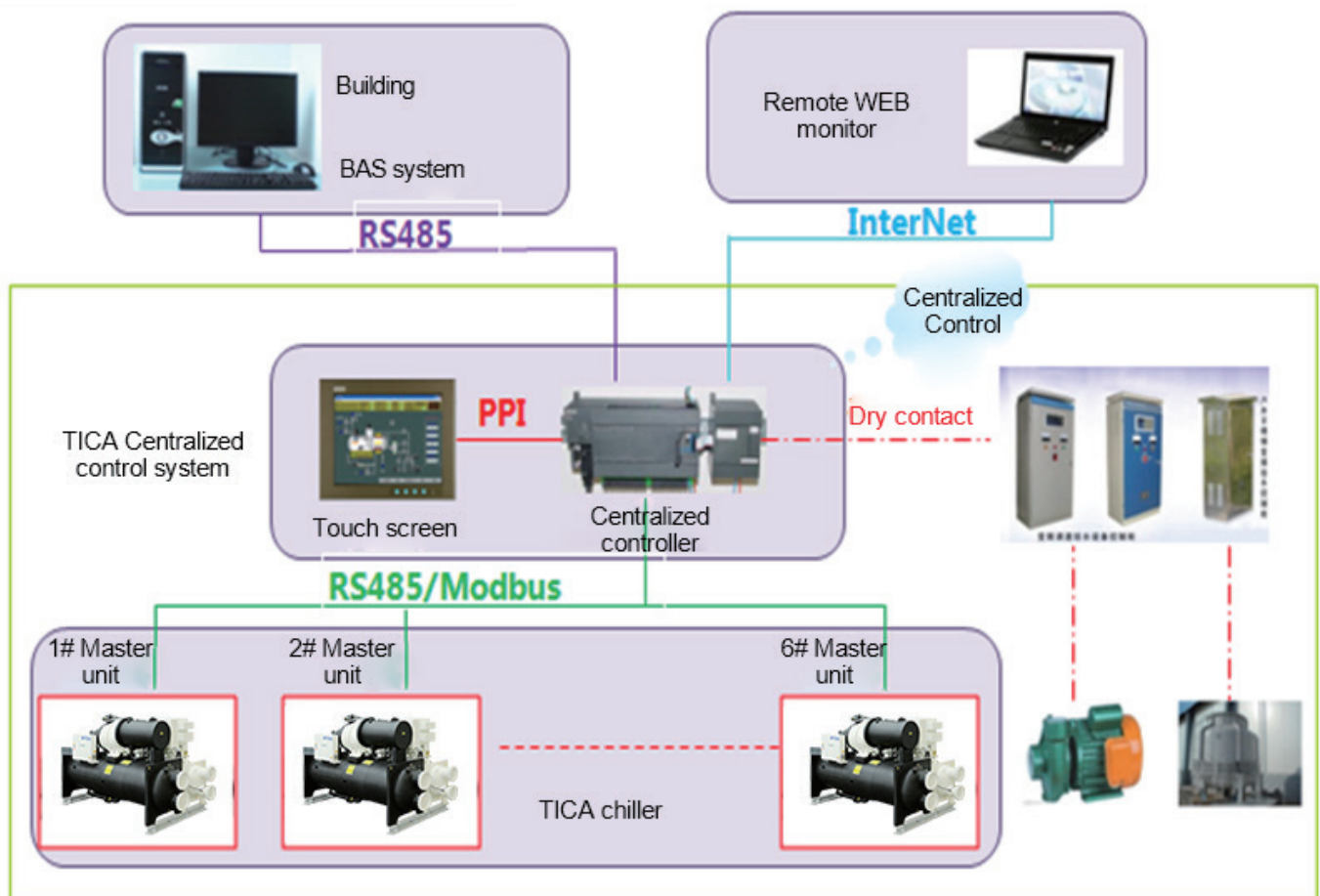




# TICA Group Control System (Optional)

With RS485 interfaces and standard MODBUS RTU protocols, the unit can be connected to the building automation system (BAS), which implements centralized control and remote monitoring of the unit. Based on the control requirements of the BAS, the unit is interlinked with other relevant devices and they are controlled in a centralized manner, thus saving energy and meeting the automation requirements.

- Implements multi-unit group control
- Implements equipment operation management with optimal energy consumption
- Reduces the workload of maintenance personnel
- Extends the service life of equipment
- Avoids unnecessary human negligence and errors
- Reduces energy costs
- Implements interlocked control of units, water pumps and cooling towers through decentralized and centralized management



# Specifications

## Fixed Speed (TWCF-C-S)

### H series under operating conditions specified by GB

Model	TWCF-CCAFSH	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	284.0	311.0	336.0	363.0	391.0	418.0	442.0	468.0	499.0	521.0	551.0	608.0	660.0	716.0	
Efficiency	kW/Ton	0.568	0.565	0.560	0.559	0.559	0.557	0.552	0.551	0.555	0.548	0.551	0.553	0.550	0.551	
COP	W/W	6.19	6.22	6.28	6.29	6.29	6.31	6.36	6.39	6.34	6.41	6.38	6.36	6.39	6.38	
IPLV	W/W	6.44	6.47	6.54	6.50	6.55	6.58	6.63	6.66	6.61	6.68	6.65	6.63	6.66	6.66	
Running Current	A	493.0	540.0	583.0	630.0	679.0	726.0	767.0	812.0	866.0	904.0	956.0	1055.0	1146.0	1243.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	557.1	611.0	656.9	706.8	764.1	816.0	862.2	922.0	971.8	1010.0	1068.0	1176.0	1280.0	1380.0	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	70	70	71	70	70	71	71	71	70	70	69	70	69	68
	Pipe Diameter DN		250	250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	351	386	421	455	491	525	560	595	630	664	700	770	839	909
	Water Pressure Drop	kPa	95	95	95	95	95	95	95	94	93	93	93	92	92	92
	Pipe Diameter DN		250	250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4800	4800
	Width	mm	2100	2100	2100	2100	2400	2400	2400	2400	2400	2650	2650	2650	2750	2750
	Height	mm	2750	2750	2750	2750	2800	2800	2800	2800	2800	2850	2850	2850	3000	3000
Shipping Weight	kg	11050	11100	11150	11200	11450	11550	11600	11650	11700	12850	12900	13000	13200	13350	
Operating Weight	kg	13100	13200	13300	13400	13700	13900	14000	14100	14200	15200	15500	15700	16000	16250	

Note:

- Nominal cooling capacity condition: outlet chilled water temp: 7°C; inlet cooling water temp: 30°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

## Fixed Speed (TWCF-C-S)

### M series under operating conditions specified by GB

Model	TWCF-CCAFSM	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	285.0	314.0	343.0	371.0	401.0	430.0	463.0	485.0	513.0	544.0	572.0	626.0	676.0	734.0	
Efficiency	kW/Ton	0.570	0.571	0.572	0.571	0.573	0.573	0.579	0.571	0.570	0.573	0.572	0.569	0.563	0.565	
COP	W/W	6.17	6.16	6.15	6.16	6.14	6.13	6.08	6.16	6.17	6.14	6.15	6.18	6.24	6.23	
IPLV	W/W	6.44	6.43	6.41	6.43	6.43	6.41	6.35	6.44	6.45	6.43	6.44	6.47	6.53	6.52	
Running Current	A	495.0	545.0	595.0	644.0	696.0	746.0	804.0	842.0	890.0	944.0	993.0	1087.0	1174.0	1274.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	561.1	619.0	673.9	724.6	784.1	839.1	891.1	953.6	993.9	1049.0	1103.0	1207.0	1313.0	1411.0	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	63	63	63	63	63	63	63	63	63	63	63	63	63	62
	Pipe Diameter DN			250	250	250	250	300	300	300	300	300	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	351	387	422	457	492	528	563	598	632	668	703	773	842	912
	Water Pressure Drop	kPa	56	56	55	55	54	53	53	53	53	52	52	52	52	51
	Pipe Diameter DN			250	250	250	250	300	300	300	300	300	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4700	
	Width	mm	2000	2000	2000	2000	2278	2278	2278	2278	2278	2650	2650	2650	2650	
	Height	mm	2700	2700	2700	2700	2750	2750	2750	2750	2750	2850	2850	2850	2850	
Shipping Weight	kg	10850	10900	10950	11000	11250	11350	11500	11550	11550	12750	12800	12900	13000	13350	
Operating Weight	kg	12900	13000	13100	13200	13500	13700	13800	13900	14000	15300	15400	15600	15800	16000	

Note:

- Nominal cooling capacity condition: outlet chilled water temp: 7°C; inlet cooling water temp: 30°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

## H series under operating conditions specified by GS

Model	TWCF-CCAFSH	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	304.0	333.0	360.0	389.0	419.0	448.0	474.0	501.0	535.0	559.0	591.0	652.0	708.0	768.0	
Efficiency	kW/Ton	0.608	0.605	0.600	0.599	0.599	0.597	0.592	0.589	0.595	0.588	0.591	0.593	0.590	0.591	
COP	W/W	5.78	5.81	5.86	5.87	5.87	5.89	5.93	5.97	5.91	5.97	5.95	5.93	5.96	5.95	
/	/	/														
Running Current	A	528.0	578.0	625.0	675.0	727.0	778.0	823.0	870.0	929.0	970.0	1026.0	1132.0	1229.0	1333.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	557.1	611.0	656.9	706.8	764.1	816.0	862.2	922.0	971.8	1010.0	1068.0	1176.0	1280.0	1380.0	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	70	70	71	70	70	71	71	71	70	70	69	70	69	68
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	355	390	425	460	495	531	565	600	636	671	706	777	847	918
	Water Pressure Drop	kPa	97	97	97	97	97	97	97	96	95	95	95	94	94	94
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4800	4800
	Width	mm	2100	2100	2100	2100	2400	2400	2400	2400	2400	2650	2650	2650	2750	2750
	Height	mm	2750	2750	2750	2750	2800	2800	2800	2800	2800	2850	2850	2850	3000	3000
Shipping Weight	kg	11050	11100	11150	11200	11450	11550	11600	11650	11700	12850	12900	13000	13200	13350	
Operating Weight	kg	13100	13200	13300	13400	13700	13900	14000	14100	14200	15200	15500	15700	16000	16250	

Note:

1. Nominal cooling capacity condition: inlet/outlet chilled water temp: 12/7°C; inlet cooling water temp: 32/37°C.
2. For technical parameters under non-standard operating conditions, please contact branches of TICA.
3. Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
4. Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
5. Specification parameters are subject to change without prior notice, due to product improvement.



## M series under operating conditions specified by GS

Model	TWCF-CCAFSM	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	306.0	337.0	368.0	399.0	431.0	462.0	498.0	522.0	551.0	584.0	615.0	673.0	727.0	789.0	
Efficiency	kW/Ton	0.612	0.613	0.613	0.614	0.616	0.616	0.622	0.614	0.612	0.615	0.615	0.612	0.606	0.607	
COP	W/W	5.75	5.74	5.73	5.73	5.71	5.71	5.65	5.73	5.74	5.72	5.72	5.75	5.80	5.79	
/	/	/														
Running Current	A	531.0	585.0	639.0	693.0	748.0	802.0	864.0	906.0	956.0	1014.0	1068.0	1168.0	1262.0	1370.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	561.1	619.0	673.9	724.6	784.1	839.1	891.1	953.6	993.9	1049.0	1103.0	1207.0	1313.0	1411.0	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	63	63	63	63	63	63	63	63	63	63	63	63	63	62
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	355	391	426	462	497	533	569	604	639	675	711	781	851	922
	Water Pressure Drop	kPa	57	57	56	56	55	54	54	54	54	53	53	53	53	52
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4700	
	Width	mm	2000	2000	2000	2000	2278	2278	2278	2278	2278	2650	2650	2650	2650	
	Height	mm	2700	2700	2700	2700	2750	2750	2750	2750	2750	2850	2850	2850	2850	
Shipping Weight	kg	10850	10900	10950	11000	11250	11350	11500	11550	11550	12750	12800	12900	13000	13350	
Operating Weight	kg	12900	13000	13100	13200	13500	13700	13800	13900	14000	15300	15400	15600	15800	16000	

**Note:**

- Nominal cooling capacity condition: inlet/outlet chilled water temp: 12/7°C; inlet cooling water temp: 32/37°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

## H series under operating conditions specified by GB

Model	TWCF-CCAFVH	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	281.0	310.0	337.0	365.0	393.0	420.0	444.0	477.0	501.0	530.0	560.0	616.0	667.0	727.0	
Efficiency	kW/Ton	0.562	0.564	0.562	0.562	0.561	0.560	0.555	0.561	0.557	0.558	0.560	0.560	0.556	0.559	
COP	W/W	6.26	6.24	6.26	6.26	6.26	6.28	6.34	6.27	6.32	6.30	6.28	6.28	6.33	6.29	
IPLV	W/W	8.38	8.36	8.42	8.41	8.41	8.44	8.52	8.43	8.50	8.49	8.44	8.46	8.52	8.48	
Running Current	A	459.0	506.0	550.0	596.0	642.0	686.0	725.0	779.0	818.0	865.0	915.0	1006.0	1090.0	1188.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	547.4	600.3	654.9	704.6	755.9	809.9	865.3	914.9	967.2	1024.6	1077.3	1180.2	1281.1	1381.4	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow (Cooling)	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop (Cooling)	kPa	70	70	71	70	70	71	71	71	70	70	69	70	69	68
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow (Cooling)	m <sup>3</sup> /h	351	386	421	456	491	526	560	596	630	666	701	771	840	911
	Water Pressure Drop (Cooling)	kPa	95	95	95	95	95	95	95	94	93	93	93	92	92	92
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4800	4800
	Width	mm	2100	2100	2100	2100	2400	2400	2400	2400	2400	2650	2650	2650	2750	2750
	Height	mm	2750	2750	2750	2750	2800	2800	2800	2800	2800	2850	2850	2850	3000	3000
Shipping Weight	kg	11450	11500	11550	11600	12150	12250	12300	12350	12400	13650	13700	13800	14000	14150	
Operating Weight	kg	13500	13600	13700	13800	14400	14600	14700	14800	14900	16200	16300	16500	16800	17000	

Note:

- Nominal cooling capacity condition: outlet chilled water temp: 7°C; inlet cooling water temp: 30°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

## M series under operating conditions specified by GB

Model	TWCF-CCAFVM	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	289.0	322.0	349.0	379.0	408.0	438.0	468.0	496.0	529.0	555.0	582.0	637.0	680.0	754.0	
Efficiency	kW/Ton	0.578	0.585	0.582	0.583	0.583	0.584	0.585	0.583	0.588	0.584	0.582	0.579	0.567	0.580	
COP	W/W	6.08	6.01	6.05	6.03	6.03	6.02	6.01	6.03	5.98	6.02	6.04	6.07	6.20	6.06	
IPLV	W/W	8.23	8.12	8.19	8.18	8.18	8.16	8.15	8.18	8.11	8.16	8.20	8.25	8.42	8.24	
Running Current	A	472.0	526.0	570.0	619.0	666.0	715.0	764.0	810.0	864.0	932.0	951.0	1041.0	1113.0	1231.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	558.5	609.6	665.1	720.2	777.0	832.5	889.5	940.5	994.2	1053.2	1107.4	1213.2	1316.9	1420.1	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow (Cooling)	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop (Cooling)	kPa	63	63	63	63	63	63	63	63	63	63	63	63	63	62
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow (Cooling)	m <sup>3</sup> /h	352	388	423	458	493	529	564	599	635	670	705	775	843	916
	Water Pressure Drop (Cooling)	kPa	56	56	55	55	54	53	53	53	53	52	52	52	52	51
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4700	
	Width	mm	2000	2000	2000	2000	2278	2278	2278	2278	2278	2650	2650	2650	2650	
	Height	mm	2700	2700	2700	2700	2750	2750	2750	2750	2750	2850	2850	2850	2850	
Shipping Weight	kg	11350	11400	11450	11500	11950	12050	12100	12150	12200	12750	12800	12900	13000	13150	
Operating Weight	kg	13400	13500	13600	13700	14200	14400	14500	14600	14700	15300	15400	15600	15800	16000	

**Note:**

- Nominal cooling capacity condition: outlet chilled water temp: 7°C; inlet cooling water temp: 30°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

## H series under operating conditions specified by GS

Model	TWCF-CCAFVH	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	304.0	335.0	364.0	394.0	425.0	454.0	480.0	515.0	541.0	572.0	605.0	665.0	720.0	785.0	
Efficiency	kW/Ton	0.608	0.609	0.607	0.606	0.607	0.605	0.600	0.606	0.601	0.602	0.605	0.604	0.600	0.604	
COP	W/W	5.78	5.77	5.80	5.80	5.79	5.81	5.86	5.80	5.85	5.84	5.81	5.82	5.86	5.82	
/	/	/														
Running Current	A	496.0	547.0	594.0	643.0	694.0	741.0	784.0	841.0	884.0	934.0	988.0	1086.0	1176.0	1283.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	547.4	600.3	654.9	704.6	755.9	809.9	865.3	914.9	967.2	1024.6	1077.3	1180.2	1281.1	1381.4	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	70	70	71	70	70	71	71	71	70	70	69	70	69	68
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	355	390	426	461	496	532	566	603	637	673	709	780	850	921
	Water Pressure Drop	kPa	97	97	97	97	97	97	97	96	95	95	95	94	94	94
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4800	4800
	Width	mm	2100	2100	2100	2100	2400	2400	2400	2400	2400	2650	2650	2650	2750	2750
	Height	mm	2750	2750	2750	2750	2800	2800	2800	2800	2800	2850	2850	2850	3000	3000
Shipping Weight	kg	11450	11500	11550	11600	12150	12250	12300	12350	12400	13650	13700	13800	14000	14150	
Operating Weight	kg	13500	13600	13700	13800	14400	14600	14700	14800	14900	16200	16300	16500	16800	17000	

Note:

- Nominal cooling capacity condition: inlet/outlet chilled water temp: 12/7°C; inlet cooling water temp: 32/37°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.



## M series under operating conditions specified by GS

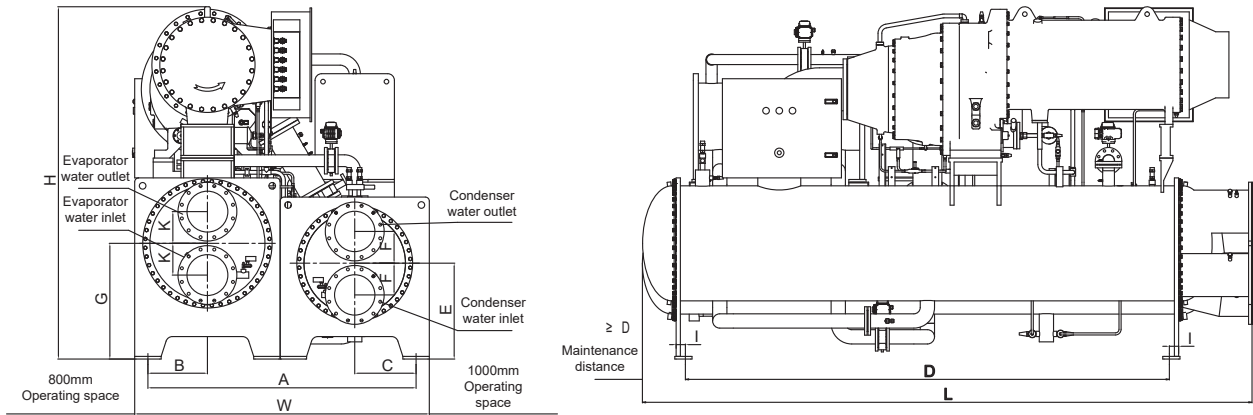
Model	TWCF-CCAFVM	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
Cooling Capacity	Ton	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	
	10 <sup>4</sup> kcal/h	151	166	181	196	212	227	242	257	272	287	302	333	363	393	
	kW	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219	4571	
Power Input	kW	311.0	347.0	376.0	408.0	439.0	472.0	505.0	534.0	570.0	598.0	627.0	686.0	732.0	811.0	
Efficiency	kW/Ton	0.622	0.631	0.627	0.628	0.627	0.629	0.631	0.628	0.633	0.630	0.627	0.624	0.610	0.624	
COP	W/W	5.65	5.57	5.61	5.60	5.61	5.59	5.57	5.60	5.55	5.59	5.61	5.64	5.76	5.64	
/	/	/														
Running Current	A	508.0	567.0	614.0	666.0	717.0	771.0	825.0	872.0	931.0	1004.0	1024.0	1121.0	1198.0	1324.0	
Locked-Rotor Current	A	4700	4700	4700	4700	4700	4700	5400	5400	6100	6100	6100	6800	7400	9200	
Maximum Running Current	A	558.5	609.6	665.1	720.2	777.0	832.5	889.5	940.5	994.2	1053.2	1107.4	1213.2	1316.9	1420.1	
Compressor Quantity	Set	1														
Power Supply	380V/3N/50Hz															
Refrigerant	R134a															
Energy Control	Stepless Control															
Evaporator	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	302	333	363	393	423	454	484	514	544	574	605	665	726	786
	Water Pressure Drop	kPa	63	63	63	63	63	63	63	63	63	63	63	63	63	62
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Condenser	Designed Water Pressure	MPa	1.0													
	Refrigerating Medium Type and Concentration	Water														
	Water Flow	m <sup>3</sup> /h	356	392	428	463	499	535	571	606	642	677	713	783	852	926
	Water Pressure Drop	kPa	57	57	56	56	55	54	54	54	54	53	53	53	53	52
	Pipe Diameter DN	250		250	250	250	300	300	300	300	300	350	350	350	350	350
Dimensions	Length	mm	4600	4600	4600	4600	4650	4650	4650	4650	4650	4700	4700	4700	4700	
	Width	mm	2000	2000	2000	2000	2278	2278	2278	2278	2278	2650	2650	2650	2650	
	Height	mm	2700	2700	2700	2700	2750	2750	2750	2750	2750	2850	2850	2850	2850	
Shipping Weight	kg	11350	11400	11450	11500	11950	12050	12100	12150	12200	12750	12800	12900	13000	13150	
Operating Weight	kg	13400	13500	13600	13700	14200	14400	14500	14600	14700	15300	15400	15600	15800	16000	

Note:

- Nominal cooling capacity condition: inlet/outlet chilled water temp: 12/7°C; inlet cooling water temp: 32/37°C.
- For technical parameters under non-standard operating conditions, please contact branches of TICA.
- Power supply: 380V 3N~ 50Hz; allowable voltage fluctuation: ±10%.
- Standard water chamber pressure: 1.0 MPa; optional water chamber pressure: 1.6 MPa.
- Specification parameters are subject to change without prior notice, due to product improvement.

# Dimensions

## Fixed Speed



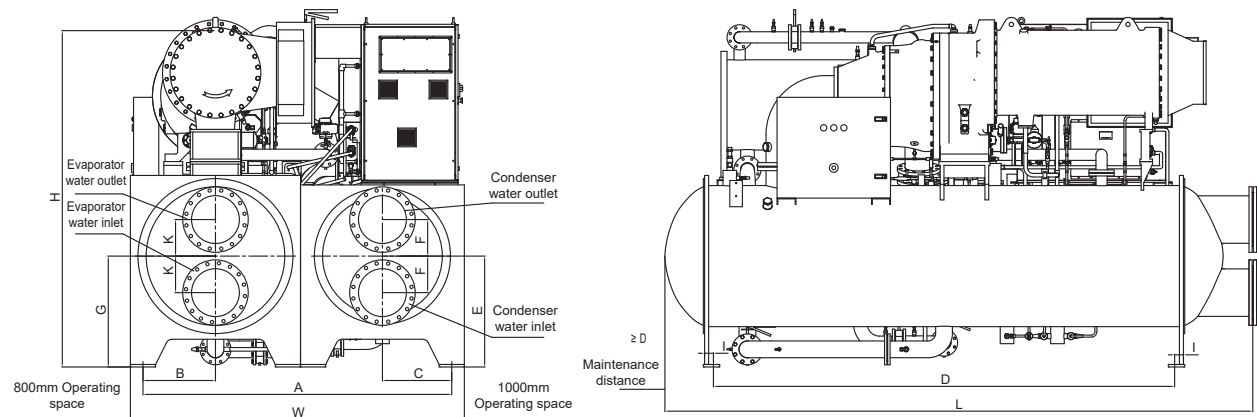
Model TWCF-CCAFSH	Evaporator Water Inlet/Outlet	Condenser Water Inlet/Outlet	A	B	C	D	E	F	G	L	W	H	K	I
500	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	70
550	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
600	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
650	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
700	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
750	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
800	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
850	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
900	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
950	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1000	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1100	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1200	350	350	2550	625	550	3660	880	290	930	4800	2750	3000	290	
1300	350	350	2550	625	550	3660	880	290	930	4800	2750	3000	290	

Model TWCF-CCAFSM	Evaporator Water Inlet/Outlet	Condenser Water Inlet/Outlet	A	B	C	D	E	F	G	L	W	H	K	I
500	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	70
550	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
600	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
650	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
700	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
750	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
800	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
850	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
900	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
950	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1000	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1100	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1200	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1300	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	

### Notes:

1. The water inlet and outlet pipes of the evaporator and condenser must be supported to avoid applying any external force to the unit.
2. The size of the equipment room area can guarantee repair and maintenance of the evaporator and condenser.

# Inverter



Model TWCF-CCAFVH	Evaporator Water Inlet/Outlet	Condenser Water Inlet/Outlet	A	B	C	D	E	F	G	L	W	H	K	I
500	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	70
550	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
600	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
650	250	250	1900	500	350	3660	820	215	820	4600	2100	2750	240	
700	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
750	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
800	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
850	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
900	300	300	2200	536	464	3660	725	240	900	4650	2400	2800	290	
950	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1000	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1100	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1200	350	350	2550	625	550	3660	880	290	930	4800	2750	3000	290	
1300	350	350	2550	625	550	3660	880	290	930	4800	2750	3000	290	

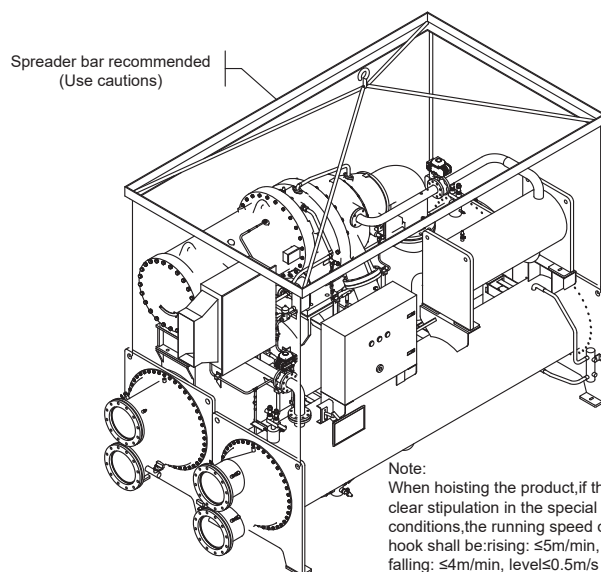
Model TWCF-CCAFVM	Evaporator Water Inlet/Outlet	Condenser Water Inlet/Outlet	A	B	C	D	E	F	G	L	W	H	K	I
500	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	70
550	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
600	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
650	250	250	1800	450	350	3660	820	215	820	4600	2000	2700	240	
700	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
750	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
800	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
850	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
900	300	300	2078	475	464	3660	725	240	900	4650	2278	2750	240	
950	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1000	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1100	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1200	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	
1300	350	350	2450	575	550	3660	880	290	880	4700	2650	2850	290	

**Notes:**

1. The water inlet and outlet pipes of the evaporator and condenser must be supported to avoid applying any external force to the unit.
2. The size of the equipment room area can guarantee repair and maintenance of the evaporator and condenser.

# Lifting&Foundation

## Lifting Diagram

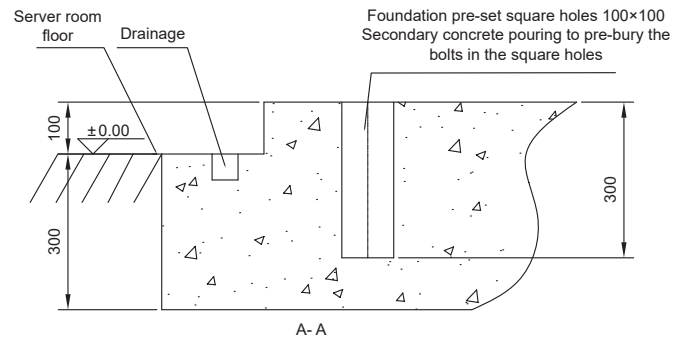
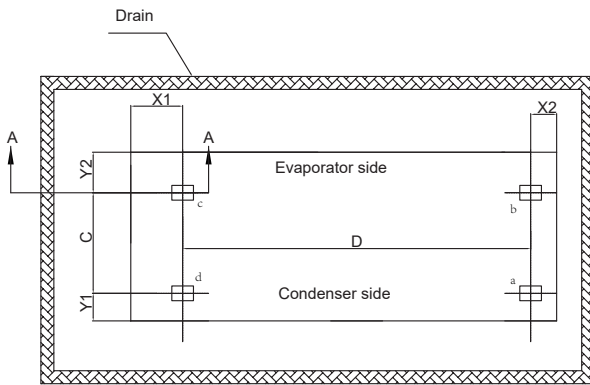


Model TWCF-CCAFSH	D	C	X1	X2	Y1	Y2
500	3660	1900	1000	800	1000	800
550	3660	1900	1000	800	1000	800
600	3660	1900	1000	800	1000	800
650	3660	1900	1000	800	1000	800
700	3660	2200	1000	800	1000	800
750	3660	2200	1000	800	1000	800
800	3660	2200	1000	800	1000	800
850	3660	2200	1000	800	1000	800
900	3660	2200	1000	800	1000	800
950	3660	2450	1000	800	1000	800
1000	3660	2450	1000	800	1000	800
1100	3660	2450	1000	800	1000	800
1200	3660	2550	1000	800	1000	800
1300	3660	2550	1000	800	1000	800

Model TWCF-CCAFSM	D	C	X1	X2	Y1	Y2
500	3660	1800	1000	800	1000	800
550	3660	1800	1000	800	1000	800
600	3660	1800	1000	800	1000	800
650	3660	1800	1000	800	1000	800
700	3660	2078	1000	800	1000	800
750	3660	2078	1000	800	1000	800
800	3660	2078	1000	800	1000	800
850	3660	2078	1000	800	1000	800
900	3660	2078	1000	800	1000	800
950	3660	2450	1000	800	1000	800
1000	3660	2450	1000	800	1000	800
1100	3660	2450	1000	800	1000	800
1200	3660	2450	1000	800	1000	800
1300	3660	2450	1000	800	1000	800



## Foundation Drawing



Model TWCF-CCAFVH	D	C	X1	X2	Y1	Y2
500	3660	1900	1000	800	1000	800
550	3660	1900	1000	800	1000	800
600	3660	1900	1000	800	1000	800
650	3660	1900	1000	800	1000	800
700	3660	2200	1000	800	1000	800
750	3660	2200	1000	800	1000	800
800	3660	2200	1000	800	1000	800
850	3660	2200	1000	800	1000	800
900	3660	2200	1000	800	1000	800
950	3660	2450	1000	800	1000	800
1000	3660	2450	1000	800	1000	800
1100	3660	2450	1000	800	1000	800
1200	3660	2550	1000	800	1000	800
1300	3660	2550	1000	800	1000	800

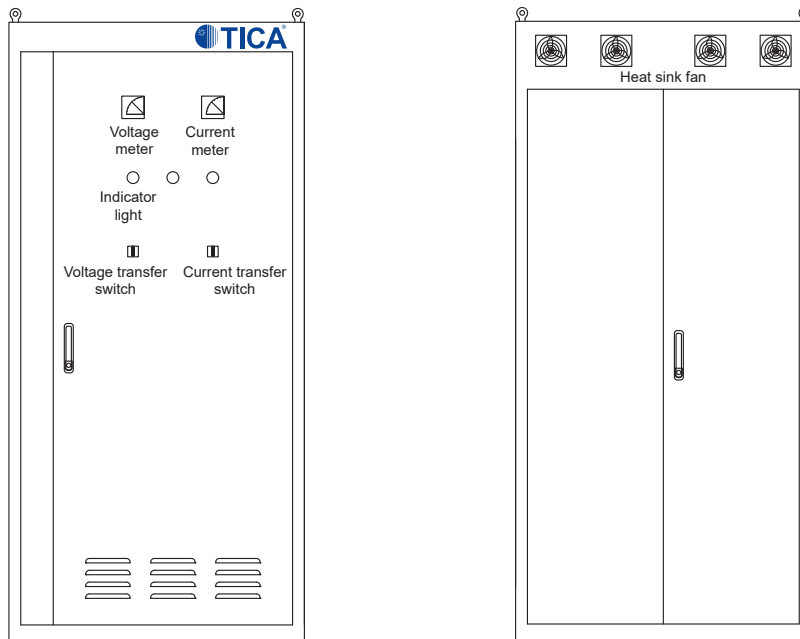
Model TWCF-CCAFVM	D	C	X1	X2	Y1	Y2
500	3660	1800	1000	800	1000	800
550	3660	1800	1000	800	1000	800
600	3660	1800	1000	800	1000	800
650	3660	1800	1000	800	1000	800
700	3660	2078	1000	800	1000	800
750	3660	2078	1000	800	1000	800
800	3660	2078	1000	800	1000	800
850	3660	2078	1000	800	1000	800
900	3660	2078	1000	800	1000	800
950	3660	2450	1000	800	1000	800
1000	3660	2450	1000	800	1000	800
1100	3660	2450	1000	800	1000	800
1200	3660	2450	1000	800	1000	800
1300	3660	2450	1000	800	1000	800

### Notes:

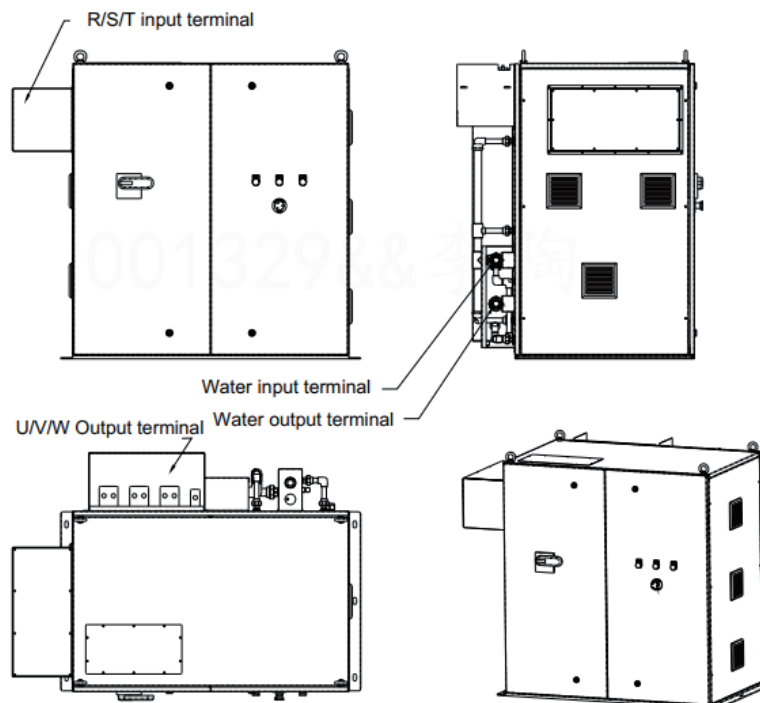
1. The vibration of the unit is very small, so it can be placed on a concrete ground directly.
2. If the customer needs to build a foundation and use foundation bolts or expansion bolts to fix the unit, refer to the above figure to complete the construction and installation.
3. If the equipment room is built on the floor, the floor should have enough strength and stiffness to bear the operating weight of the chiller.
4. When building a concrete foundation, build a drainage ditch around the foundation to facilitate drainage, and make sure that the foundation edge is smooth.
5. The foundation is applicable to the left-type units. For right-type units, please switch X1, X2 values shown in the table.

# Outline of Starter Panel

## Low-voltage closed star-delta starter panel



## Low-voltage variable-frequency starter panel



Starter panel type	Low-voltage closed star-delta starter panel	Low pressure VFD starter panel
Inlet-outlet line mode	Down inlet/up outlet	Side inlet/side outlet

Note: For other startup methods and requirements for other outlet directions, please contact the manufacturer's technical staff.

# Electrical Specifications

## Recommended Wiring

Recommended wiring for centrifugal chiller

Voltage	380V			
Startup mode	Closed star-delta starter panel		VFD starter panel	
Model	Inlet cable	Outlet cable	Inlet cable	Outlet cable
500	3*(2*BVR120)+BVR120+BVR16	6*(1*BVR185)+BVR150	3*(2*BVR150)+BVR150	3*(2*BVR150)+BVR150
550	3*(2*BVR150)+BVR150+BVR16	6*(1*BVR185)+BVR150	3*(2*BVR150)+BVR150	3*(2*BVR150)+BVR150
600	3*(2*BVR185)+BVR185+BVR16	6*(1*BVR240)+BVR185	3*(2*BVR185)+BVR185	3*(2*BVR185)+BVR185
650	3*(2*BVR185)+BVR185+BVR16	6*(1*BVR240)+BVR185	3*(2*BVR185)+BVR185	3*(2*BVR185)+BVR185
700	3*(2*BVR240)+BVR240+BVR16	6*(1*BVR240)+BVR240	3*(2*BVR240)+BVR240	3*(2*BVR240)+BVR240
750	3*(2*BVR240)+BVR240+BVR16	6*(2*BVR120)+BVR240	3*(2*BVR240)+BVR240	3*(2*BVR240)+BVR240
800	3*(2*BVR240)+BVR240+BVR16	6*(2*BVR120)+BVR240	3*(4*BVR120)+BVR240	3*(4*BVR120)+BVR240
850	3*(4*BVR120)+BVR240+BVR16	6*(2*BVR120)+BVR240	3*(4*BVR120)+BVR240	3*(4*BVR120)+BVR240
900	3*(4*BVR120)+BVR240+BVR16	6*(2*BVR120)+BVR240	3*(4*BVR120)+BVR240	3*(4*BVR120)+BVR240
950	3*(4*BVR120)+BVR240+BVR16	6*(2*BVR150)+BVR240	3*(4*BVR150)+BVR240	3*(4*BVR150)+BVR240
1000	3*(4*BVR120)+BVR240+BVR16	6*(2*BVR150)+BVR240	3*(4*BVR150)+BVR240	3*(4*BVR150)+BVR240
1100	3*(4*BVR150)+BVR240+BVR16	6*(2*BVR185)+BVR240	3*(4*BVR150)+BVR240	3*(4*BVR150)+BVR240
1200	3*(4*BVR150)+BVR240+BVR16	6*(2*BVR185)+BVR240	3*(4*BVR185)+BVR240	3*(4*BVR185)+BVR240
1300	3*(4*BVR185)+BVR240+BVR16	6*(2*BVR240)+BVR240	3*(4*BVR240)+BVR240	3*(4*BVR240)+BVR240
Remarks	<p>Notes:</p> <ol style="list-style-type: none"> <li>Under the ambient temperature of 40°C, the cables are single-core PVC copper core wires, and their cross-sectional area is in accordance with the GB/T 16895.6 Low-voltage Electrical Installations—Part 5- 52: Selection and Erection of. Wiring Systems concerning the recommendations for cable tray installation (flat, horizontal placement in contact with each other). For other routing methods that adopt multi-core cables which can resist high temperature, in case of line pressure loss of over 2% due to the distance factor, please re-select cables according to the maximum operating current of the unit. When using other types of cables, please pay attention to the size of the lug to ensure that the electrical clearance conforms to the standard.</li> <li>Cable writing method: Taking 3 * (2 * BVR150) + BVR150 + BVR16 as an example, it means that two BVR150 cables are used for each of the three phases, one BVR150 cable is used as the grounding line, and one BVR16 cable is used as the neutral line.</li> <li>The above recommended cables are the minimum wire diameter allowed for the unit, and the cables are prepared by the customer.</li> <li>When using multiple cables, cables with the same specifications must be equipped.</li> </ol> <p>Note 1: A fixed-frequency compressor has 6 terminals. Taking 6 * (2 * BVR120) + BVR240 as an example, it means that 6 sets of phase wires and 1 grounding line are needed to lead into the junction box of the compressor.</p> <p>Note 2: The terminal of the VFD compressor has been short-circuited. The customer only needs to lead 3 sets of phase wires and 1 grounding line to the junction box of the compressor.</p>			

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## **TICA PRO LLC**

141014, Russia, Moscow oblast, Mytishchi,  
Very Voloshinoy Ulitsa, office 705 and 805

Tel.: +7(495)822-29-00

E-mail: [info@tica.ru](mailto:info@tica.ru)

**[www.tica.ru](http://www.tica.ru)**

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