

WMTC

High Efficiency Magnetic Bearing Two-stage Centrifugal Chiller

With Next Generation HFO Refrigerant,R-1233zd(E)



Cooling Capacity:400-600Tons





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Introduction

World-Class Design Leader

McQuay, as one of the largest air condition company in the world, has earned a worldwide reputation for providing high quality products and expertise to meet variable requirements from different customers. Our customers benefit from maximum energy savings, lower installation and operation costs, quiet operation, superior indoor air quality. WMTC chiller which applies advanced technology brings customers a new definition in magnetic chiller. McQuay has been dedicating to the ongoing commitment of products development and technology innovation and also offers industrial-leading and excellent performance products as always.

Technology Features

Superior Efficiency

As the global HVAC leader, McQuay has perfectly combined the most advanced technology with water cooled chillers to provide excellent performance.

- ▶ Magnetic bearing centrifugal chiller has been designed with oil free system, resulting in eliminating oil contamination in the refrigerant and heat transfer surfaces to provide outstanding operating efficiency without any performance penalty compared to conventional oil-system chiller.
- ▶ Our magnetic bearing centrifugal chiller also integrates VFD technology. It allows the compressor to unload smoothly from maximum to minimum load for superior part-load performance in comfort cooling applications.
- ▶ An additional flash tank economizer has contributed to efficiency improved by operating the two-stage compression system.

Environmental Friendly

A low global warming potential (GWP) refrigerant-**R1233zd(E)** is primarily considered for WMTC centrifugal chiller develops.

- ▶ R1233zd(E), one of next generation green HFO refrigerant with a very low global warming potential (GWP) value, is classified as an "A1" refrigerant according to ASHRAE Standard 34.
- ▶ This refrigerant selection is not just for today, also a green solution for future. This is a part of our social responsibilities to living environment to protect our planet through keeping carbon dioxide emission and any other environment impact at the minimal level.

HIGH EFFICIENCY MAGNETIC BEARING
TWO-STAGE CENTRIFUGAL CHILLER





Outstanding Reliability

McQuay, as an industrial leader on magnetic bearing technology applied in air conditioning, has been studying and manufacturing magnetic bearing centrifugal chillers for more than a decade.

- ▶ The advanced back-to-back compressor design well balanced the radial and axial thrust on the shaft.
- ▶ The design of magnetic bearing drive system does not need lubrication makes the chiller far more reliable than oil or refrigerant lubricated chillers.
- ▶ High accuracy sensors installed on WMTC compressor are utilized to keep detecting shaft position on a high frequency basis. Corrective move will be conducted to trim and maintain the shaft position if necessary.
- ▶ In an unlikely event of sudden power outage, WMTC compressor will be given full protection by running in generator mode which reversely provides power to controls and electronics until a completely stop.
- ▶ Extra backup bearings are additionally designed to catch and support shaft in off-time .

Magnetic Bearing Driveline

WMTC has chosen an integrated magnetic bearing drive system to offer exclusive efficiency and sustainable operating.

- ▶ The magnetic bearing system features the single moving shaft directly connected to motor eliminating any oil lubrication system or mechanical friction. This results in enhanced chiller efficiency, more sustainable performance and longer lifespan compared to conventional centrifugal chiller with oil lubrication or coupling system.
- ▶ Besides, magnetic bearing driveline benefits customer oil-free or frictionless feature at the lowest sound and vibration level, which is specifically an optimum solution for sound-sensitive or vibration critical application.

Lower Ownership Cost

Thanks to the low operating cost, WMTC gives customer a fast payback, which is one of decisive element in initial investment.

- ▶ To maximize value added to customer, WMTC has been designed with optimized operating efficiency to minimize energy cost by fully leveraging advantages of two-stage compressor , variable speed driveline and falling film evaporator.
- ▶ Owing to magnetic bearing technology, WMTC provides a low maintenance cost. Any oil-linked maintenance is unnecessarily required like oil charge, filter, oil heater, wear parts, etc.

AHRI Certification

The WMTC chiller performance is certified by the Air Conditioning, Heating and Refrigeration Institute (AHRI) following the latest issued AHRI Standard 550/590(I-P) and AHRI Standard 551/591(SI).

Control Features

McQuay employs microprocessor technology into the MicroTech V control system to provide the optimum chiller control. MicroTech controller incorporate microprocessor provides all monitor and control function for the efficient and safety operation. The control contains many energy-saving features to keep your chiller running efficiently day after day.



HIGH EFFICIENCY
MAGNETIC BEARING
TWO-STAGE
CENTRIFUGAL
CHILLER

User-friendly Operation

WMTC provides an easy operator interface, with key operating parameters on the screen. Operation Simplicity allows you to change the set points easily by pressing set button from any screen.

Alarm History For Easy Troubleshooting

Alarm history is easily accessed through intuitive touch-screen buttons. Operator can monitor all operating conditions by using the unit-mounted HMI. The occurred Alarms are retained in the controller's memory to aid in troubleshooting and fault analysis. Alarm history lists the alarms with the most current on top with date stamp, action taken and the cause of the alarm. You can download the chiller operating manual via USB.

Building Automation System

All MicroTech V controllers offer simple and inexpensive flexibility to use the Building Automation System. The exclusive control feature provides seamless integration and comprehensive monitoring, control, and two-way data exchange with industry standard protocols such as LONWORKS, Modbus or BACnet. The BAS communication module can be ordered factory mounted with your chiller. It is easy to integrate into your building automation system, providing comprehensive data exchange and point list for system integration, equipment monitoring and alarm notification.



Technical Data

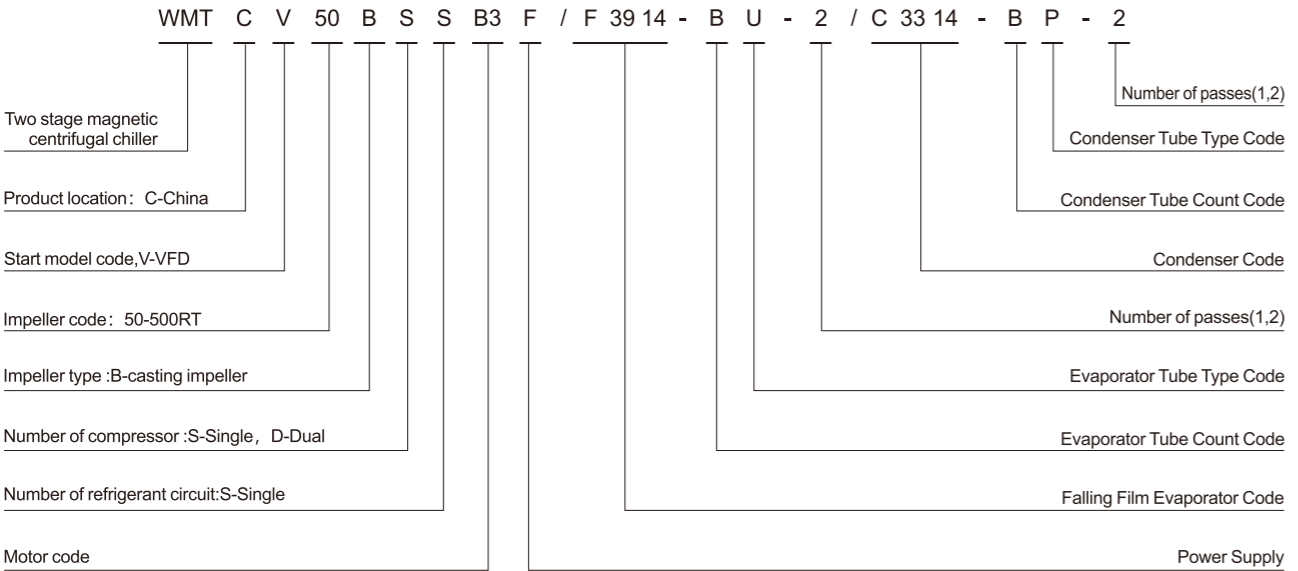
Model	Cooling capacity		Power Consumption	Efficiency		Evap.		Cond.		Rated Load	Chiller	Operation
	ton _r	kW	kW	kW/ton _r	COP	Flow Rate	Pressure Drop	Flow Rate	Pressure Drop	Amps	Weight	Weight
						L/s	kPa	L/s	kPa	A	kg	kg
WMTCV50BSSB3F/F3914-BU-2/C3314-BP-2	500.0	1758.0	244.4	0.4889	7.193	75.53	66.4	93.38	32.2	399	12291	14131

Notes:

- Above chiller cooling capacity is based on AHRI condition :
Evap: EEWT 12.22°C,ELWT 6.67°C; Fouling factor 0.0176 °C.m²/ kW;
Cond: CEWT 29.44°C, CLWT 34.61°C; Fouling factor0.0440 °C.m²/ kW;
- Above chiller is recommended, please contact local sales for other specific models;
- Standard:2 Pass evaporator and condenser;
- Above selection based on program WMT 1.02.

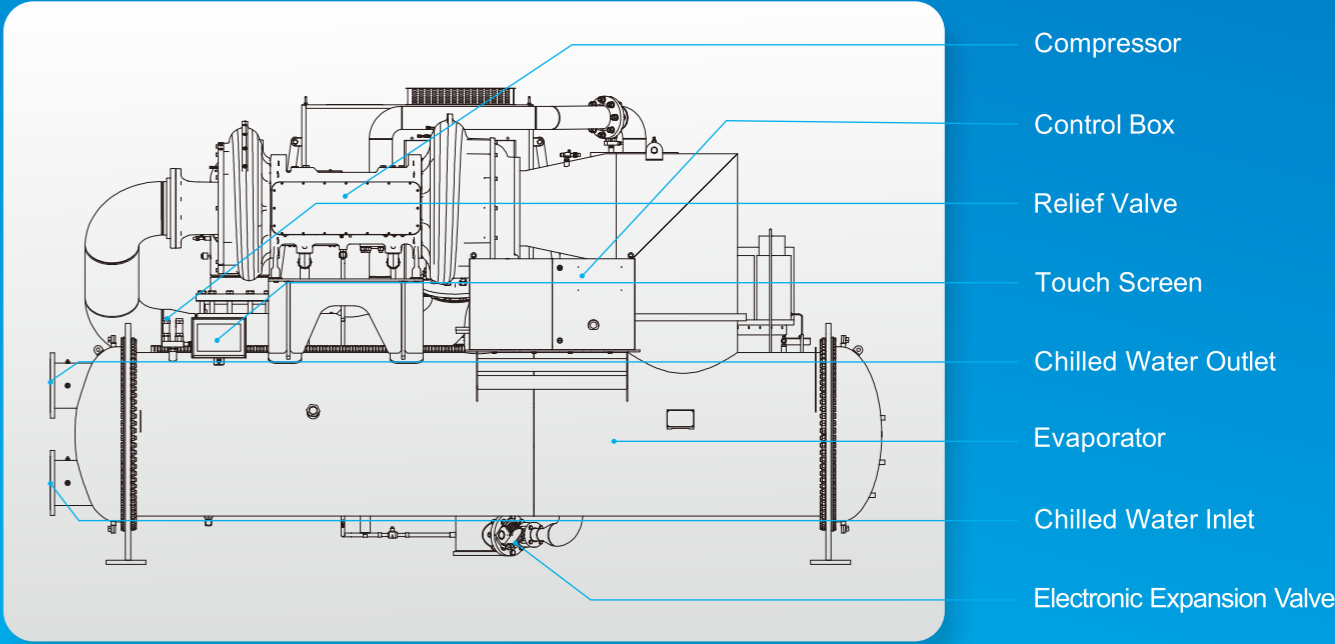
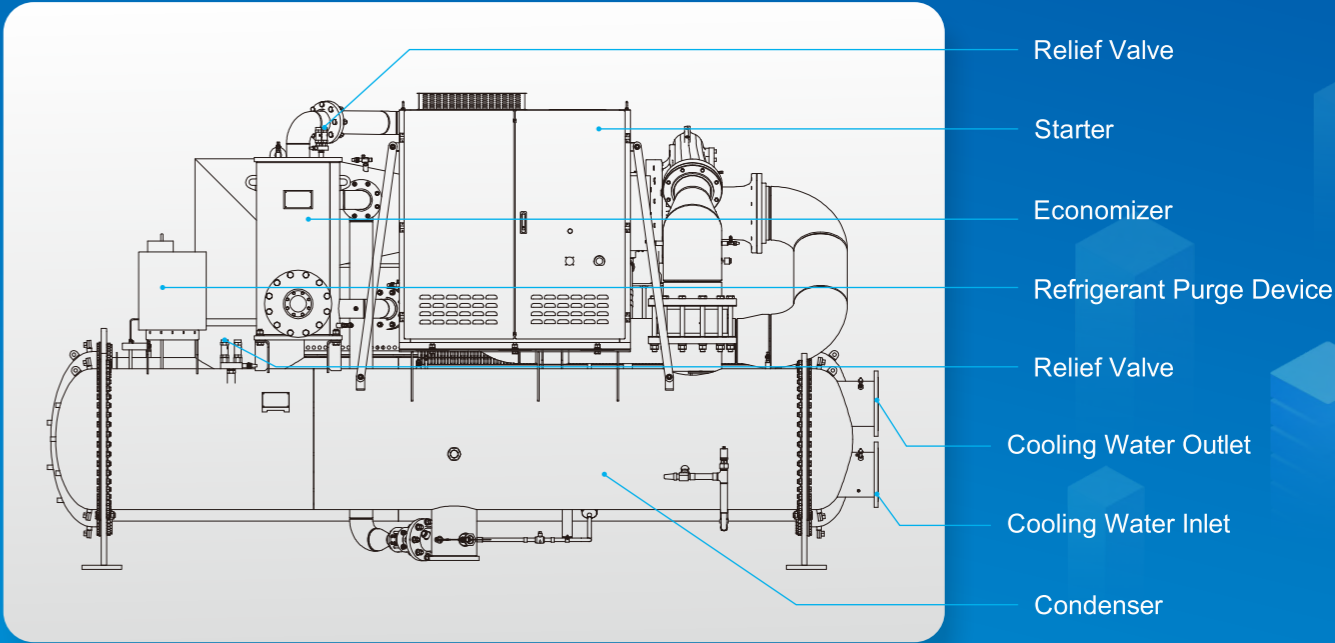


Nomenclature

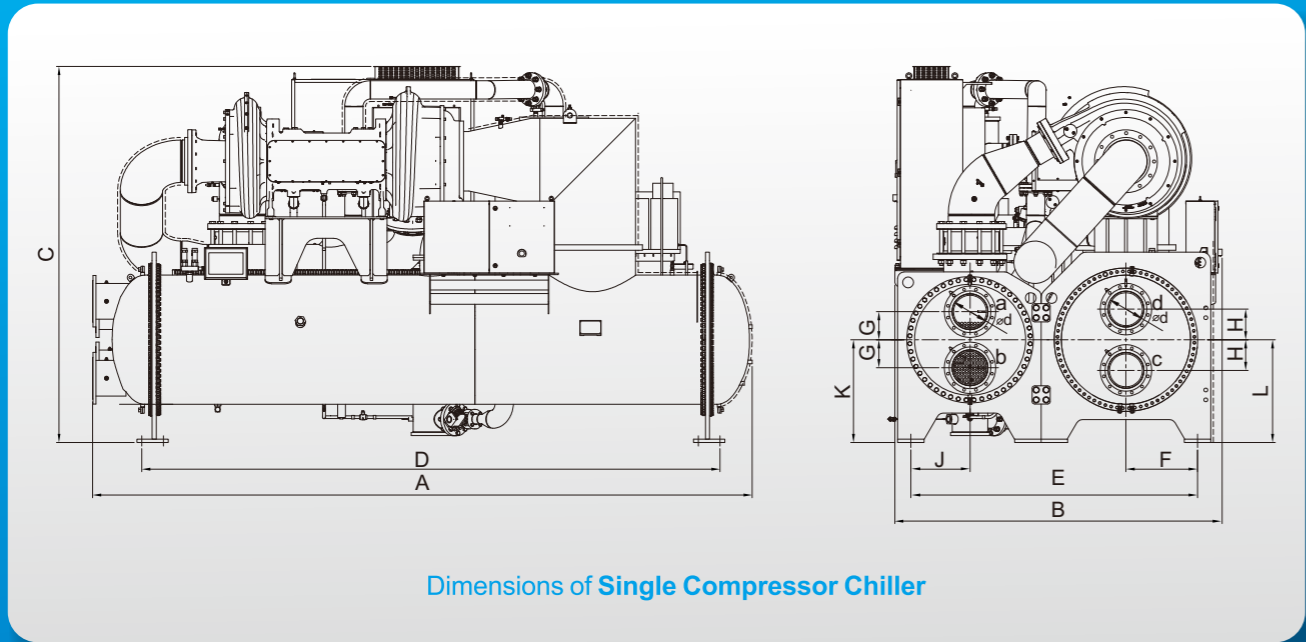


Note:
Power supply: F: 380V/50Hz/3ph, U: 380V/60Hz/3ph, G: 400V/50Hz/3ph, R: 460V/60Hz/3ph.

Major Components



Dimensions



Dimensions,Connection and Foundation Drawing Sizes													
Model	Dimensions(mm)					Locating Size of Evaporator Connection(mm)				Locating Size of Condenser Connection(mm)			
	A	B	C	D	E	F	L	H	OD	J	K	G	OD
WMTC*/F3914/C3314	5055	2533	2884	4432	2237	558	810	248	273	458	788	215	273
WMTC*/F4214/C3314	5055	2533	2884	4432	2237	558	810	295	273	458	788	215	273

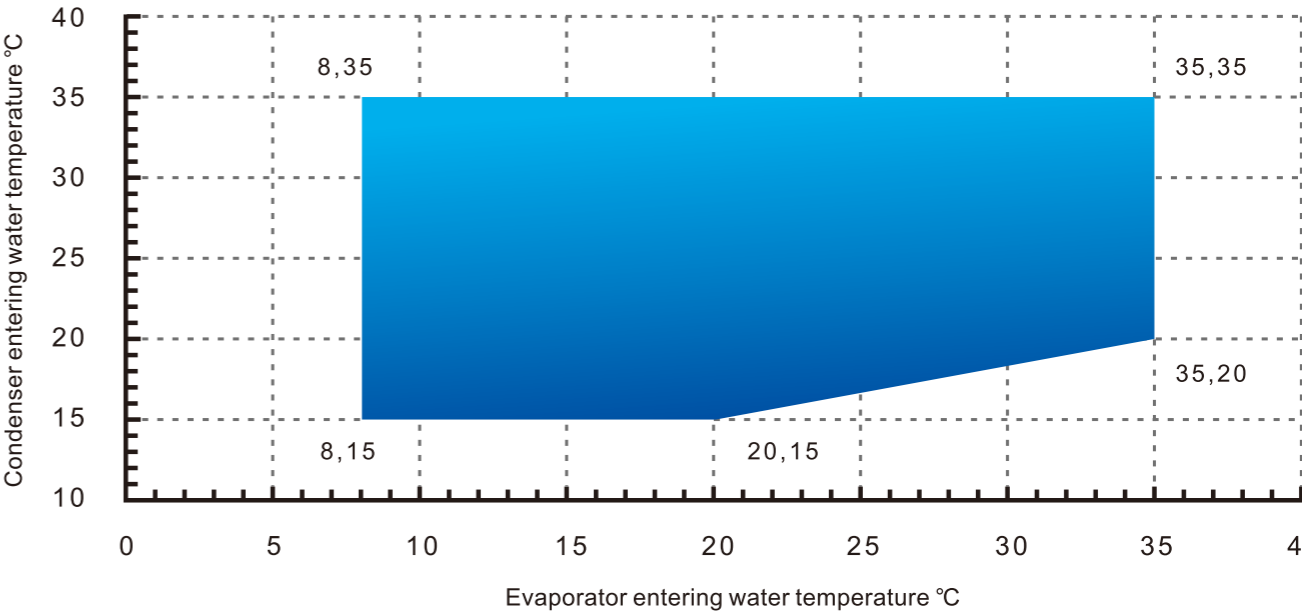
- Notes:
1. a: Condenser outlet; b: Condenser inlet; c: Evaporator inlet; d: Evaporator outlet; e: Relief valve NPT1;
 2. A、B、C dimension deviation ± 13mm ;
 3. Above dimension base on 2 pass water flow, Please contact your McQuay representative for other passes.
 4. The dimension include 20mm insulation for the evaporator.
 5. OD means the outside diameter of water connection pipe.

Options

Items	Standard	Options
Vessel Code	GB	ASME
Water Connection	Victaulic Groove	ANSI Flange
Water Box	Compact Water Cover (1.0MPa)	Marine Water Box
Insulation	20mm Insulation on Evaporator and Cold Surface①	40mm Insulation on Evaporator
Flow Switch	Thermal Flow Switch	Pressure Differential / Paddle Type
Anti-vibration	Rubber Cushion	Spring Isolator
Warranty Extension ④	None	1 to 10 Year
Test	Factory Test②	1-10 Point Witness Test/1-5 Point Certified Test
Harmonic Distortion Filter	None	Active Power Filter / Passive Filter③

- Notes:
- ① Insulation:
- a. Ambient temperature lower than 30℃ :
Humidity lower than 70%, use single layer insulation (20mm); humidity higher than 70%(include), use double layer insulation (40mm).
 - b. Ambient temperature higher than 30℃(include) :
Humidity lower than 65%, use single layer insulation (20mm); humidity higher than 65%(include), use double layer insulation (40mm).
 - c. Double layer of insulation (40mm) must be used when chiller leaving water temperature lower than 5℃ (include) .
 - d. 40mm Insulation on evaporator shell and 20mm on water head cap.
- ② Factory Testing :
To ensure provide safe and reliable products to costumers, all McQuay applied chillers are factory tested before shipment.
- Operating
and safety controls are checked for correct settings and operation. This testing helps reduce start-up issues and maintain critical construction schedules.
- ③ Active power filter is unit mounted. Passive filter is free standing.The standard harmonic distortion of WMTC chiller is less than 35%.
Harmonic distortion filter is an optional solution to lower the total harmonic distortion imposed on power grid.
- ④Options
'Extended Warranty' is valid only when the field service is provided by McQuay sales affiliates. Any third-party organization outside of McQuay is not recognized.

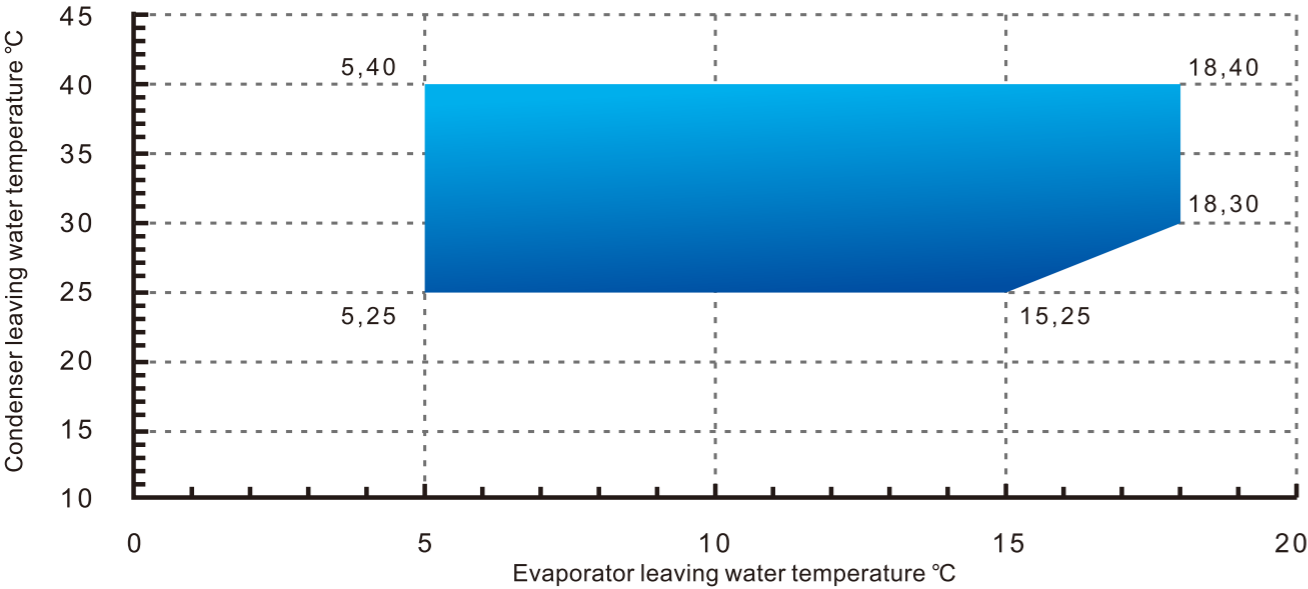
Startup Range



- Notes: After the chiller is started, condenser inlet water temperature must be higher than evaporator inlet water temperature within 5 minutes.
If not, please add a bypass valve in condenser inlet water pipe.



Operation Range



Note : Chiller operating range shall be subject to the latest selection software.

Application Standard

The standard running condition of the water chiller is as follows:

Supply Voltage	Rated voltage ± 10%
Phase Unbalance Rate	≤2%
Frequency	Rated frequency ± 2%Hz
Operating Temperature	3~40°C
Relative Humidity	1. 20 mm thick insulation will normally prevent condensation in environments with relative humidifies up to 70% and dry bulb temperatures ranging from 10 to 32°C. 2. 40 mm thick is also available for relative humidifies up to 80% and dry bulb temperatures ranging from 10 to 32°C. 3. If relative humidifies or dry bulb temperatures exceed the above scope, please contact factory to confirm the insulation thick.
Explosion-proof Grade	None
Atmospheric Corrosive Gas Contents	Sulfur dioxide ≤ 10 mg/m³
	Hydrogen fluoride ≤ 5 mg/m³
	Hydrogen sulfide ≤ 5 mg/m³
	Nitrogen oxide ≤ 5 mg/m³
	Nitrogen ≤ 1 mg/m³
	Hydrogen chloride ≤ 5 mg/m³
Installation	Indoor installation,no rain or direct sunlight(for installations of the outdoor,seaside,chemical plant,or place of high concentration of corrosive gas,please contact the local McQuay branch office and dealers)
Heat Exchange Tube Waterside Pressure	Standard chiller 1.0MPa (may be designed follow the customer's requirements)

Water Quality Management

During the unit running, the water quality of the cooling and chilled water will directly affect the machine's performance and lifetime, so it is necessary to survey the water quality beforehand and conduct water quality control as the unit runs. The following table contains some parameters of the water quality of open system:

Item	Unit	Reference Value	Item	
			Corrosion	Scaling
Base Items	PH (25°C)	—	<6.5~8.0	O
	Electrical Conductivity(25°C)	μs/cm	<800	O
	Chloridion Cl ⁻	mg(Cl ⁻)/L	<200	O
	Sulfateion SO ₄ ²⁻	mgSO ₄ ²⁻ /L	<200	O
	Acid Consumption (PH=4.8)	mg(CaCO ₃)/L	<100	O
	Full Hardness	mg(CaCO ₃)/L	<200	O
Reference Items	Iron Fe	mg(Fe)/L	<1.0	O
	Sulphion S ²⁻	mg(S ²⁻)/L	Not Detected	O
	Ammonium NH ₄ ⁺	mg(NH ₄ ⁺)/L	<1.0	O
	Silicon Oxide SiO ₂	mg(SiO ₂)/L	<50	O

Notes:

1. The “O” in the table indicates the relevant factors with corrosion or scaling.
2. We recommend you add water process device and contact McQuay professional servicer to deal with it.

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