

Centrifugal Chiller



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Note:

Gree is committed to continuously improving its products to ensure the highest quality and reliability standards, and to meet local regulations and market requirements.

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GC-1809-02



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GREE
ELECTRIC APPLIANCES, INC. OF ZHUHAI

Gree Electric Appliances, Inc. of Zhuhai, founded in 1991, is a diversified international industrial group, whose business covers residential air conditioners, central air conditioners, intelligent equipments, home appliances, air source water heaters, smart phones, refrigerators, etc.

- Since 2005, Gree has topped No.1 in production and sales volume of residential air conditioners for 13 consecutive years.
- 2015, Gree's sales revenue exceeded 15.08 billion USD.
- 2016, sales revenue exceeded 16.51 billion USD.
- 2017, sales revenue exceeded 22.21 billion USD.
- 2018, Gree entered into the list of Forbes Global 2000 again and ranked No. 294, moving up 70 places compared with the previous year.

Gree has paid some 14.26 billion USD in total tax, being the No.1 in terms of tax payment in the Chinese home appliances industry for 16 consecutive years.

Thanks to 300 million users' choices, Gree products are widely sold in more than 200 countries and regions. Today Gree's annual production capacity of RAC and CAC is more than 60 million and 5.5 million sets respectively.

Action makes the future and innovation makes achievement. Looking forward, Gree will press ahead with its business philosophy of passion, innovation and realization. We aim to build an air conditioning enterprise of some hundred year's standing, to create a better life for humankind.



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ACHIEVEMENT

After 20 years of development, Gree has successively achieved 24 cutting-edge technologies that are identified as world-leading by authorized experts, including the ultra-low temperature digital VRF units, high-efficiency centrifugal chiller, 1Hz control technology, high-efficiency fixed-speed compressor, R290 eco-friendly refrigerant air conditioner, multi-functional floor heating household central air conditioner, permanent magnet synchronous inverter centrifugal chiller, rare-earth free reluctance inverter compressor, two-stage inverter compressor, PV direct-drive inverter centrifugal chiller, magnetic bearing inverter centrifugal refrigerating compressor and chiller, high-efficiency permanent magnet synchronous inverter centrifugal ice-storage and refrigerating unit, cooling technology at -40°C, high-efficiency residential VRF unit based on different volume switching compressor technology, and the research and application of CAN+ communication technology for VRF units.

SERVICE

Gree provides service for you before, during and after sales. Every little thing that matters to you also matters to Gree. We have 35,000 outlets, 5,000 professional service centers and 50,000 professional service staffs around the globe. We aim to provide our customers with the best service with standard management and unified standards.



STRENGTH

R&D Investment

Gree is a professional HVAC company that is committed to independent research and development. We have no limit on the R&D investment. We invest based on needs. Every year, we input more than 5 billion RMB to R&D.

R&D Team

Gree has over 10,000 technicians and engineers with expertise in various fields. They constitute a strong support for our technical innovation and development.

R&D Strength

Gree has been authorized to build the State Key Laboratory for Energy Conservation of Air Conditioning Equipment and System, 2 national research centers (National Engineering Research Center on Green Refrigeration Equipment, and National Certified Enterprise Technology Center), 1 national industrial design center, 12 research institutes (respectively on refrigerating technology, motor technology, home appliances technology, intelligent equipment technology, new energy and environmental technology, health technology and communication technology, etc.), 1 R&D center on robot engineering technology, 72 research institutions and 727 advanced laboratories.

TECHNOLOGY

Technical Results

In 1991, Gree started to independently develop central air conditioners. After 20 years of development, Gree developed the high-efficiency centrifugal chiller, permanent magnet synchronous inverter centrifugal chiller, PV direct-drive inverter centrifugal chiller, the first magnetic bearing inverter centrifugal chiller that was independently developed in China, and the high-efficiency permanent magnet synchronous inverter centrifugal ice-storage and refrigerating unit.

The company was listed in the National Key Energy-saving Technology Promotion Catalogue (the 5th plan), awarded the title of national key new product, the first prize of Guangdong Municipal S&T Award, the first prize of the National S&T Progress Award, China Patent Award of Excellence, the Golden Prize of Guangdong Patent Award, the Outstanding Achievement Award of AHRI Certification, and the UK RAC Cooling Industry Award.

Gree centrifugal chillers are the company's technical innovation. They are used in many large projects, such as the Great Hall of the People, the Skyscraper China Zun, and China's third generation nuclear power station.



PROCESS

Production Strength

Gree has 12 test and experiment rigs for centrifugal chillers and centrifugal compressors, which are in strict accordance with AHRI 550/559 and China national standard GB/T 18430.1. The largest testing capacity is 3,000RT. These experiment facilities can conduct tests simultaneously for units with different refrigerating capacity. They can be used for centrifugal chillers, ice-storage refrigeration, heat pump, etc. To ensure product reliability, every product must pass complete and strict tests before ex-factory.



Production Process

- **Advanced simulation and design tools**

We use the advanced software from the US Company Concepts NREC to design and build the centrifugal compressors, sharing the technology used for aerospace design.

- **Sophisticated processing equipment**

Two centrifugal chiller production and experimental bases in Zhuhai and Hefei are equipped with more than 50 sets of high-precision digital processing equipment, including the German DMG five-axis machining center, HM3UB Schenck dynamic balancing machine and the large-scale horizontal boring and milling machining center from Toshiba.

- **Scientific and strict quality control**

Impellers are made of high-strength aluminum alloy, which is very strong and highly anti-corrosive. They must pass strict inspection, dynamic balance test, over-speed test and other strict tests after manufacturing.



CVE Series Permanent Magnet Synchronous Inverter Centrifugal Chiller

This unit was identified by Chinese Academy of Science, Tsinghua University, Xi'an Jiaotong University, Chinese Association of Refrigeration and China Refrigeration and Air-Conditioning Industry Association as: the world's first high-speed and high-power permanent magnet synchronous inverter centrifugal chiller that has reached world leading level.

This chiller integrates the advanced air conditioning technologies of Gree. It has 100% independent intellectual property rights. When compared to common centrifugal chillers, its annual comprehensive energy efficiency is 65% higher, with 40% power saving.

It is exceptionally energy-saving, reliable and adaptive and can be widely applied in large buildings, hospitals, schools, supermarkets and factories or used to reconstruct the current air conditioning system for energy conservation.

Nomenclature

CVE	510	PIE	KIE	-	-	-	-
1	2	3	4	5	6	7	8

1	Model	CVE- Permanent magnet synchronous inverter centrifugal chiller
2	Compressor code	—
3	Evaporator code	—
4	Condenser code	—
5	Special functions	R- Partial heat recovery; Q- Total heat recovery; Absence- No special function
6	Type of startup cabinet	D- Diode inverter startup; Absence- Inverter; 4-quardant inverter startup
7	Number of compressors	2 – double; Absence – single
8	Power spec.	G-10000V; Absence – 380V;



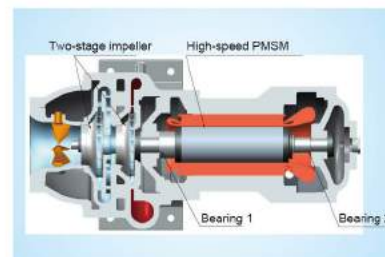
Product Features

Core Technology, High Efficiency

High-speed Direct-drive Two-stage Impeller

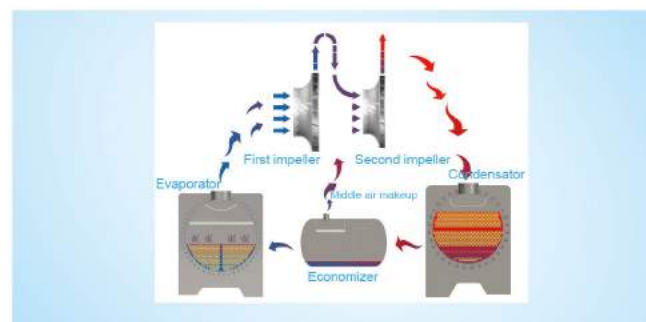
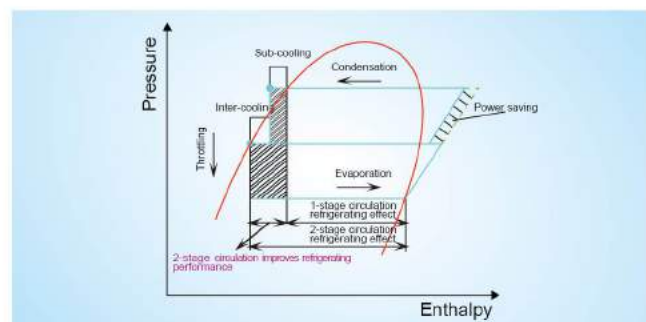
Gree's magnetic bearing inverter centrifugal chiller adopts high-speed motor to directly drive the 2-stage impeller structure. We cancel speed-up wheelwork and 2 radial bearings to reduce mechanical loss and improve energy efficiency. Compressor is compact and reliable. Volume and weight of the compressor is only 40% of the same capacity conventional compressor.

Speed-up wheelwork is canceled. Without the high-frequency noise of wheelwork, compressor's operating sound is much lower. That is 8dBA lower than that of a conventional unit.



Two-stage Compression Technology

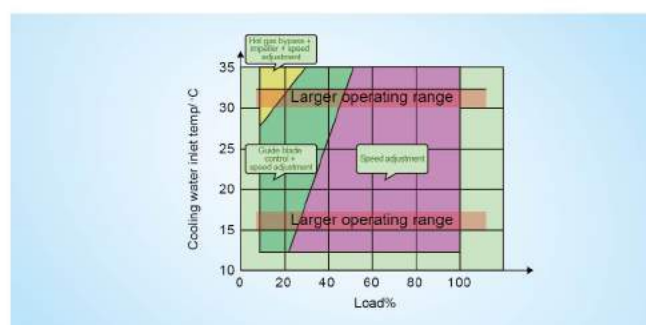
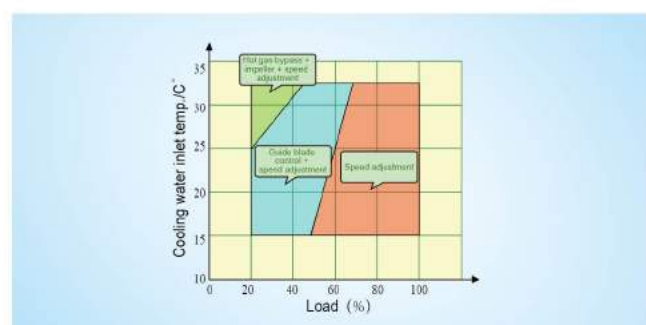
Two-stage compression with air makeup is more efficient when compared to single-stage compression. The refrigerating efficiency is improved by 5~6%. It has lower running speed, higher reliability, and longer service life. In addition, two-stage compression enables large flow angle for impeller outlet, large surge margin and wider operating range.



Wide Operating Range

Two-stage compression and the patent diffuser technology have greatly expanded the unit's operating range. It can operate stably when entering cooling water temperature is 12~35°C. It can realize stepless regulation at 10~100% load.

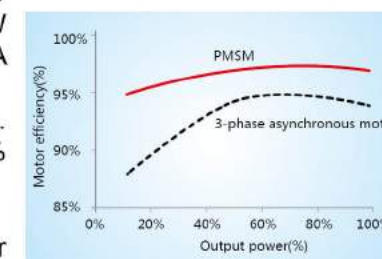
Conventional inverter centrifugal chiller adopts variable rotation speed + guide vane to adjust cooling capacity and will begin to turn down the guide vane at 50~60% load, which is not energy-efficient. In comparison, Gree permanent magnet synchronous inverter centrifugal chiller can adjust its rotation speed at 25~100% load, which can reduce the throttling loss of guide vane and improve energy efficiency.



Core Components, Stable and Reliable

High-speed Permanent Magnet Synchronous Inverter Motor (PMSM)

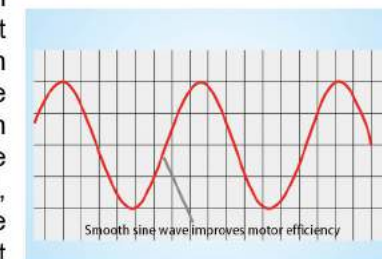
It's the world's first high-power and high-speed PMSM that is dedicated for refrigerating centrifugal compressor. The power of motor is more than 400 kW and the rotational speed is above 18000 rpm. It is compact and lightweight. A 400kW high-speed PMSM weighs the same as a 75kW AC induction motor. The motor has low startup current, only 1/5 of the star-delta startup current. Within the operating range, motor efficiency is above 96% all the time and 97.5% to the maximum.



By adopting spiral refrigerant injection cooling technology to cool down motor stator and rotor, motor's temperature can be controlled at around 40°C, ensuring efficient operation. Under partial load, motor generates little heat. It can work efficiently when the entering cooling water temperature is 12°C.

On-board Sine-wave Inverter

Sine-wave inverter is built with the unit. To satisfy the requirement of a closed compressor system, the inverter adopts high-speed permanent magnet with no position sensor. It can detect the position of motor rotor without probe. It is directly installed on the unit, which will save floor space for customers. In addition, the inverter adopts refrigerant cooling and the copper piping is simple and reliable. With PWM controllable rectification technology, the inverter can output smooth sine wave to improve motor efficiency, which allows the unit to be reliably used for data processing rooms, hospitals, scientific research institutes, factories or special areas that are sensitive to electromagnetic interference. The diode inverter has high power density, which makes it economic and reliable. It has complete protection and voltage harmonic THD is less than 5%. It can be widely applied in large office buildings, schools, hotels, shopping malls, etc.



Low Viscosity Vane Diffuser

Unique low viscosity vane diffuser design and airfoil guide vane can effectively turn high-speed gas into high static pressure gas so as to realize high-efficiency pressure recover. In partial load, vane diversion reduces backflow loss, which has improved the partial load performance and expanded the unit's operating range. The unit's partial load performance is improved by more than 8%.



Control Center with Colorful Touch Screen Display

The following technology is limited to CVE310LG1HG1D-CVE410MH1JH1D.

CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.



Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model		CVE210HG4GG4	CVE210HG3GG3	CVE220HG2GG2	CVE220HG1GG1	CVE310LG1HG1	CVE320MH4HH2
Cooling capacity	kW	879	967	1055	1231	1406	1582
	RT	250	275	300	350	400	450
EER	W/W	6.17	6.09	6.46	6.36	6.47	6.59
IPLV	W/W	10.06	10.31	10.37	10.77	10.95	10.70
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	142.5	158.8	163.3	193.5	217.4	240.1
RLA	A	218.6	243.7	250.6	296.9	333.6	368.5
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	350	375	400	425	450	550
Refrigeration oil	Type	No.68 synthetic fatty oil					
	Charge volume	L	30	30	30	40	40
Evaporator	Type	Flooded					
	Fouling factor	$m^2 \cdot ^\circ C / kW$	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	37.89	41.88	45.47	53.05	60.62
		GPM	600.6	660.7	720.8	840.9	1081.0
	Pressure drop	kPa	58.3	58.4	58.4	62.6	57.3
		ft.WG	19.1	19.2	19.2	20.5	18.8
Condenser	Connection pipe	mm	DN200	DN200	DN200	DN200	DN250
	Type	Shell and tube					
	Fouling factor	$m^2 \cdot ^\circ C / kW$	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	47.27	52.09	56.37	65.90	75.14
		GPM	749.3	825.7	893.5	1045.0	1191.0
	Pressure drop	kPa	54.2	54.4	53.6	58.0	53.1
Sound pressure level(Max.)		dB(A)	80	80	80	82	82
Dimension	Outline(WxDxH)	mm	3770x1590x1850	3770x1590x1850	3770x1590x1850	3770x1590x1850	4300x1850x2150
	Package(WxDxH)	mm	3900x1750x2050	3900x1750x2050	3900x1750x2050	3900x1750x2050	4450x1950x2350
Net/Gross/Operating weight	kg		5150/5450/5700	5240/5540/5800	5500/5800/6050	5700/6000/6600	6100/6450/6400
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Model		CVE320MH3HH1	CVE410MH2JH2	CVE410MH1JH1	CVE510PIEKIE	CVE510PIDKID	CVE520PICKIC
Cooling capacity	kW	1758	1934	2110	2285	2461	2637
	RT	500	550	600	650	700	750
EER	W/W	6.48	6.67	6.58	6.66	6.57	6.73
IPLV	W/W	10.96	10.88	11.12	10.94	11.14	10.90
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	271.3	289.9	320.6	343.2	374.6	391.3
RLA	A	416.4	444.9	492.0	526.6	574.9	600.4
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	575	600	625	650	675	700
Refrigeration oil	Type	No.68 synthetic fatty oil					
	Charge volume	L	40	40	40	40	40
Evaporator	Type	Flooded					
	Fouling factor	$m^2 \cdot ^\circ C / kW$	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	75.78	83.36	90.93	98.51	106.10
		GPM	1201.0	1321.0	1442.0	1562.0	1682.0
	Pressure drop	kPa	62.5	68.2	67.9	62.0	60.3
		ft.WG	20.5	22.4	22.3	20.3	19.8
Condenser	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250
	Type	Shell and tube					
	Fouling factor	$m^2 \cdot ^\circ C / kW$	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	93.90	102.90	112.50	121.67	131.20
		GPM	1489.0	1631.0	1783.0	1928.0	2080.0
	Pressure drop	kPa	65.6	63.3	62.8	56.7	56.8
Sound pressure level(Max.)		dB(A)	85	85	85	88	88
Dimension	Outline(WxDxH)	mm	4300x1850x2150	4250x1910x2210	4250x1910x2210	4550x2010x2300	4550x2010x2300
	Package(WxDxH)	mm	4450x1950x2350	4400x2100x2450	4400x2100x2450	4700x2100x2500	4700x2100x2500
Net/Gross/Operating weight	kg	6680/7280/7750	7710/8160/8600	7820/8270/8750	8880/9360/9900	8970/9470/10050	9270/9770/10400
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Product Specification

Model		CVE520PIBKIB	CVE520PIAKIA	CVE610QJCMJD	CVE610QJBMJC	CVE620QJAMJB	CVE620RJAMJA
Cooling capacity	KW	2813	2989	3164	3340	3516	3668
	RT	800	850	900	950	1000	1100
EER	W/W	6.72	6.63	6.83	6.75	6.84	6.75
IPLV	W/W	11.10	11.24	11.30	11.45	11.16	11.44
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	KW	418.6	450.8	463.3	494.8	514	573
RLA	A	642.4	691.8	711.0	758.3	788.9	879.3
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	-	1	1	1	1	1
Refrigerant charge volume	kg	725	730	900	925	950	975
Refrigeration oil	Type	No.68 synthetic fatty oil					
	Charge volume	L	40	40	50	50	50
Evaporator	Type	Flooded					
	Fouling factor	m ² · °C /KW	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	121.10	128.80	136.40	144.00	166.70
		GPM	1922.0	2042.0	2162.0	2282.0	2643.0
	Pressure drop	kPa	60.2	61.8	60.2	59.2	60.1
		ft.WG	19.8	20.3	19.7	19.4	19.7
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300
Condenser	Type	Shell and tube					
	Fouling factor	m ² · °C /KW	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	149.50	159.20	167.90	177.40	205.50
		GPM	2370.0	2523.0	2661.0	2813.0	3257.0
	Pressure drop	kPa	58.1	59.9	65.4	66.2	67.4
		ft.WG	19.1	19.7	21.5	21.7	22.1
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300
Sound pressure level(Max.)	dB(A)	88	88	88	88	88	88
Dimension	Outline(WxDxH)	mm	4550x2010x2300	4550x2010x2300	4980x2210x2500	4980x2210x2500	4980x2310x2600
	Package(WxDxH)	mm	4700x2100x2500	4700x2100x2500	5100x2370x2750	5100x2370x2750	5100x2600x2850
Net/Gross/Operating weight	kg		9370/9870/10500	9480/9980/10600	10730/11230/12150	10860/11360/12250	11010/11510/12500
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Notes:

- Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7℃ and entering cooling water temperature is 29.4℃.
- Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
- Scale factors of chilled water and cooling water are 0.018 m² · °C /kW and 0.044 m² · °C /kW respectively.
- Above water flow is indicated according to ARI 550/590-2015; IPLV is the test value obtained based on the working condition specified in ARI 550/590-2015.
- For compressor using inverter starter, starting current < rated current; power factor is 0.99; cooling capacity: 250~800RT. The diode inverter startup cabinet (type code: D) is the standard part for the unit, while the four-quadrant inverter startup cabinet (type code: null) is the optional one.
- The unit's performance parameters may be changed without prior notice due to product improvement. For the specific parameters, please refer to product nameplate.
- The product models are not for EU.

Operation Range

Chilled water		Cooling water	
Outlet temperature(℃)	Temperature difference between inlet and outlet (℃)	Inlet temperature (℃)	Temperature difference between inlet and outlet (℃)
5~15	2.5~8	12~35	3.5~8

If customer requires higher temperature difference, please consult the manufacturer.

Product Installation

Installation Environment and Foundation

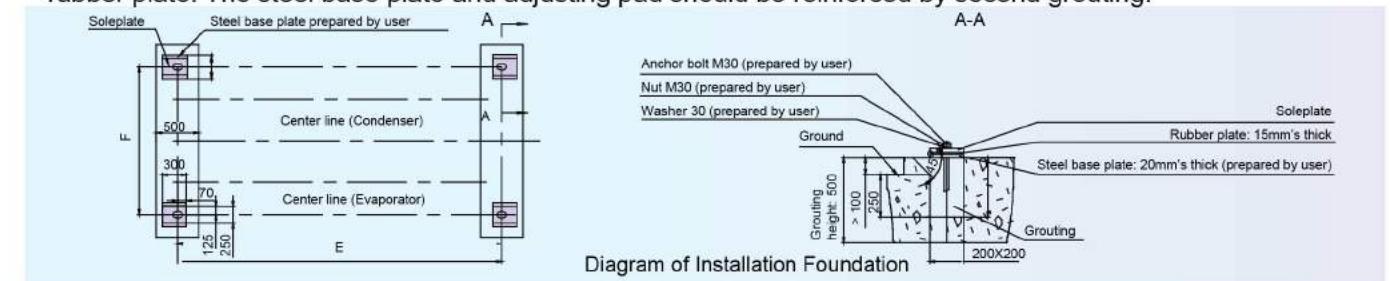
Installation Environment

- The unit should not be installed in a place with corrosive or inflammable or explosive substances or oil mist. Otherwise, the unit will not function normally or will have shorter service life. What's worse, it may cause fire hazard or severe injury. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- Select a location where ambient temperature is below 40℃ and is drafty (High temperature will cause malfunction and accelerate corrosion). When ambient temperature is 40℃, relative humidity should be below 90%. It is not allowed to install or store the unit outside or in the open air.
- Select a location that is with little dust.
- The location should be bright for the convenience of maintenance and inspection.
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space of the corresponding unit for the specific dimensions).
- For the ease of lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- The surrounding of the unit and the whole machine room should be able to be drained completely.
- If the unit is installed outdoors or at the seaside, a chemical plant, iron and steel plant, paper mill, tannery or printing and dyeing mill or a place where there is high concentration of corrosive gas or salty mist, special design is needed for the unit because corrosive substances may enter the unit's tubes through the cooling water tower. Please contact the local sales office. The location of cooling water tower should be away from waste discharge outlet.

Installation Foundation

The rotor of centrifugal compressor has passed strict static balance and dynamic balance tests, so its dynamic load against the foundation is very small. Please see table "Foundation Dimensions". To prevent unit's footings from being corroded, please be sure that there is good drainage around the unit and the unit's steel base plate is flat and smooth. Specifically:

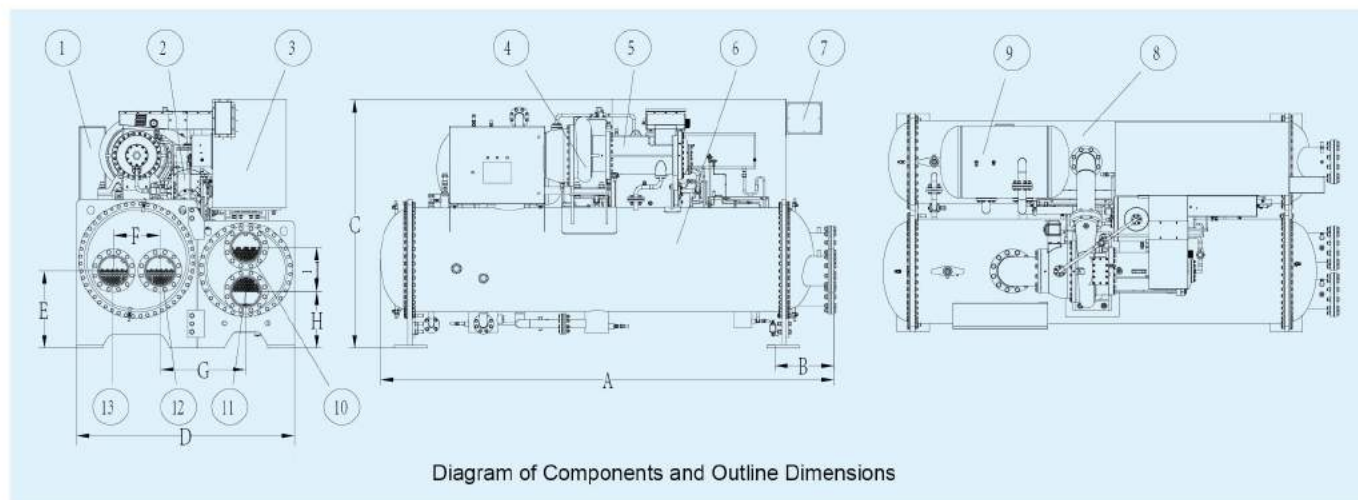
- The maximum drop difference (level difference) between each foundation surface should be less than 3mm.
- For the convenience of maintenance and inspection, the foundation should be 100mm higher than the ground.
- Drain ditch should be set around the unit.
- There should be no gap between the steel base plate and the unit's soleplate. Insert adjusting pad between the steel base plate and the concrete foundation. Adjust the steel base plate to level (Their height difference should be 0.5mm per meter.)
- Lift up the unit and place a rubber plate on the steel base plate to reduce vibration. And then place the unit on the rubber plate. The steel base plate and adjusting pad should be reinforced by second grouting.



Unit Foundation Dimension(mm)

Model and dimension	E	F	Model and dimension	E	F
CVE210HG4GG4D	2990	1335	CVE510PIEKIE	3590	1760
CVE210HG3GG3D	2990	1335	CVE510PIDKID	3590	1760
CVE220HG2GG2D	2990	1335	CVE520PICKIC	3590	1760
CVE220HG1GG1D	2990	1335	CVE520PIBKIB	3590	1760
CVE310LG1HG1D	2990	1560	CVE520PIAKIA	3590	1760
CVE320MH4HH2D	3290	1595	CVE610QJCMJD	3990	1960
CVE320MH3HH1D	3290	1595	CVE610QJBMJC	3990	1960
CVE410MH2JH2D	3290	1655	CVE620QJAMJB	3990	1960
CVE410MH1JH1D	3290	1655	CVE620RJAMJA	3990	2060

Diagram of Components



No.	Name	No.	Name
1	Electric control cabinet	8	Condenser
2	Oil tank	9	Flash type evaporator
3	Converter	10	Leaving cooling water
4	Compressor	11	Entering cooling water
5	Motor	12	Entering chilled water
6	Evaporator	13	Leaving chilled water
7	Owner's Wiring Terminal		

Dimensions of centrifugal chiller

Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
CVE210HG4GG4D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
CVE210HG3GG3D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
CVE220HG2GG2D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
CVE220HG1GG1D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
CVE310LG1HG1D	3850	520	2220	1810	675	420	735	450	350	DN200	DN200
CVE320MH4HH2D	4300	570	2150	1850	765	430	740	370	405	DN250	DN250
CVE320MH3HH1D	4300	570	2150	1850	765	430	740	370	405	DN250	DN250
CVE410MH2JH2D	4250	570	2210	1910	765	430	770	430	415	DN250	DN250
CVE410MH1JH1D	4250	570	2210	1910	765	430	770	430	415	DN250	DN250
CVE510PIEKIE	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
CVE510PIDKID	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
CVE520PICKIC	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
CVE520PIBKIB	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
CVE520PIAKIA	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
CVE610QJCMJD	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
CVE610QJBMJC	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
CVE620QJAMJB	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
CVE620RJAMJA	4980	590	2700	2310	1015	580	895	550	470	DN300	DN300

Dimension of Installation and Maintenance Space

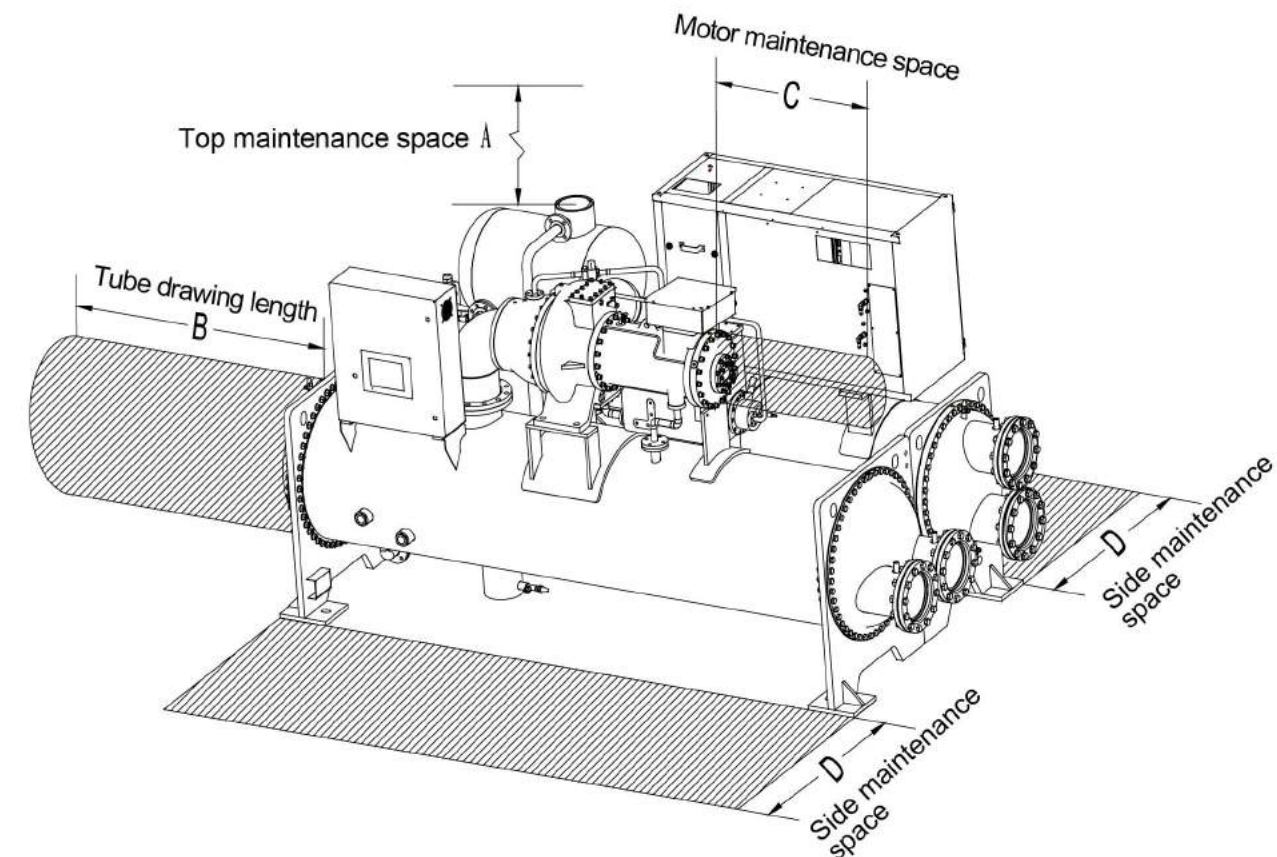


Diagram of Maintenance Space

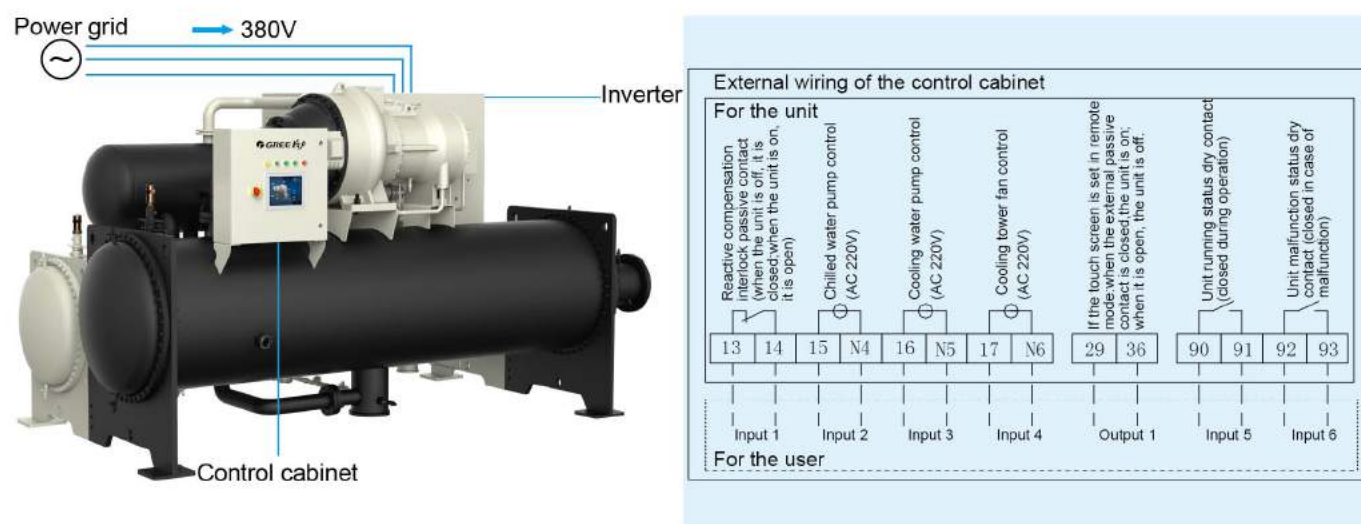
Dimension of Installation and Maintenance Space

Model	A	B	C	D
CVE210HG4GG4D	1500	3500	1500	1220
CVE210HG3GG3D	1500	3500	1500	1220
CVE220HG2GG2D	1500	3500	1500	1220
CVE220HG1GG1D	1500	3500	1500	1220
CVE310LG1HG1D	1500	3500	1500	1220
CVE320MH4HH2D	1500	3500	1500	1220
CVE320MH3HH1D	1500	3500	1500	1220
CVE410MH2JH2D	1500	3500	1500	1220
CVE410MH1JH1D	1500	3500	1500	1220
CVE510PIEKIE	1500	3800	1500	1220
CVE510PIDKID	1500	3800	1500	1220
CVE520PICKIC	1500	3800	1500	1220
CVE520PIBKIB	1500	3800	1500	1220
CVE520PIAKIA	1500	3800	1500	1220
CVE610QJCMJD	1500	4200	1650	1320
CVE610QJBMJC	1500	4200	1650	1320
CVE620QJAMJB	1500	4200	1650	1320
CVE620RJAMJA	1500	4200	1650	1320

Electrical Installation

Electrical Installation of 4-quadrant Inverter

Diagram of External Wiring for the Unit (Low Voltage)

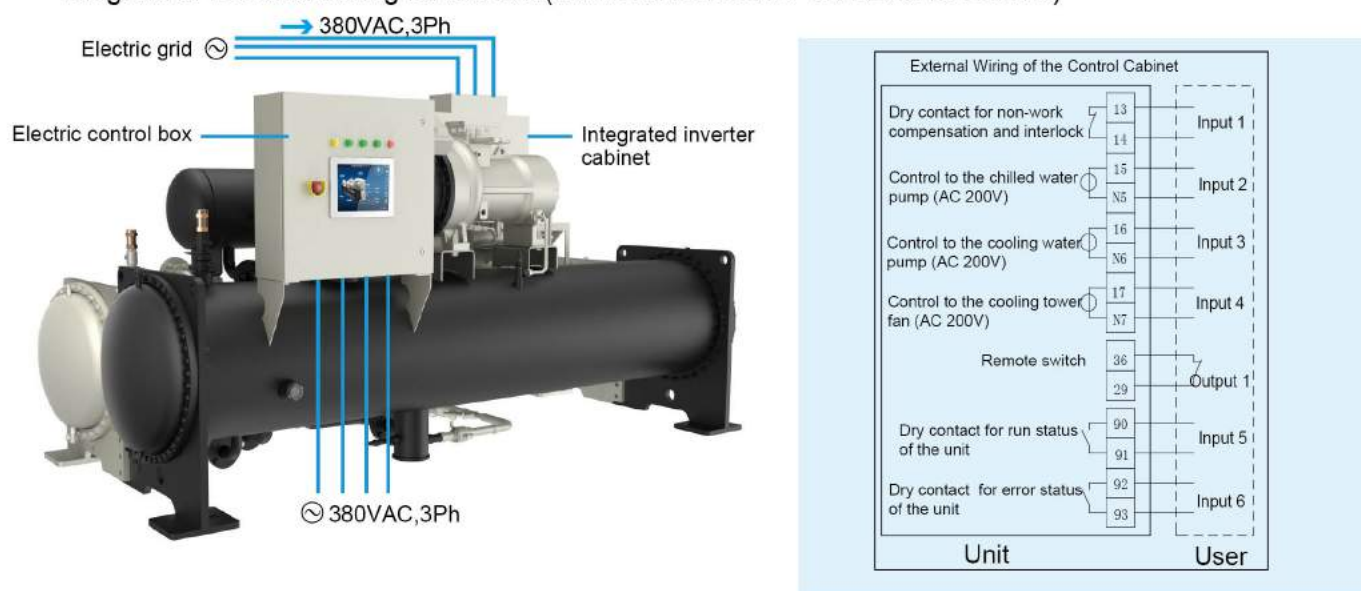


Wiring instructions:

- (1) For 380V unit, the power cable from the customer's power distribution cabinet to the on-board inverter startup cabinet should use power of 380V 3 ~ 50Hz. See the above diagram for the wiring. The power cable should enter from the side or bottom of the inverter startup cabinet and the cable size varies as per the change of unit power.
- (2) It is the signal control line from the main control cabinet of the chiller to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
- (3) The unit adopts PWM controllable rectification 4-quadrant inverter technology. Harmonic distortion rate < 5%, so there's no need to add additional harmonic handling device.
- (4) Power factor > 0.99, so there's no need to do reactive compensation. For the reactive compensation of design system, calculate separately; otherwise the unit may not function normally due to over-compensation.

Electrical Installation of Diode Inverter

Diagram of External Wiring for the Unit (CVE210HG4GG4D~CVE220HG1GG1D)



Wiring instructions:

- (1) For 380V unit, the power cable from the customer's power distribution cabinet to the on-board inverter should use power of 380V 3 ~ 50Hz. See the above diagram for the wiring. The power cable should enter from the top of the on-board inverter and the cable size varies as per the change of unit power.
 - (2) Power for the electric control box: 380V, 3N~, 50Hz, 4kW;
 - (3) It is the signal control line from the main control cabinet of the chiller to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
- Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

Electrical Installation of Diode Inverter

Diagram of External Wiring for the Unit (CVE310LG1HG1D~CVE410MH1JH1D)



Wiring instructions:

- (1) For 380V unit, the power cable from the customer's power distribution cabinet to the on-board inverter should use power of 380V 3 ~ 50Hz. See the above diagram for the wiring. The power cable should enter from the top of the on-board inverter and the cable size varies as per the change of unit power.
 - (2) It is the signal control line from the on-board inverter to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
- Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

Scope of Supply

S= Standard Supply; O= Owner's Supply; P= Purchased Supply

Item	QTY	Spec.	Type
Main unit	1	Set	S
Refrigerant	See Table of Spec.	R134a	S
Lubricating oil	Check with manufacturer for more details	68# synthesis lipid lubricating oil	S
Inverter startup cabinet	1	Set	S
Oil filter	1	PC	P

Note: If long-distance monitoring or other functions are needed, please purchase related accessories.



CC Series Magnetic Bearing Inverter Centrifugal Chiller

Gree CC Series Magnetic Bearing Inverter Centrifugal Chiller was independently developed by Gree. It is a permanent magnet synchronous inverter centrifugal chiller that adopts magnetic bearing technology. Its cooling capacity is 100RT-1100RT. The application of permanent magnet synchronous motor (PMSM), 2-stage compression, motor direct-drive impeller, and 4-quadrant inverter has greatly improved the chiller's energy-saving performance. Meanwhile, magnetic bearing is adopted for oil-free operation. The reliable microcomputer control system, group control technology and building communication interfaces have also contributed to the fine operation quality. It is applicable for hotels, office buildings, business clubs, etc.



World Leading – Gree Magnetic Bearing Inverter Centrifugal Chiller

Mar 7, 2014, through independent research and technical innovation, Gree successfully developed the magnetic bearing inverter centrifugal chiller that could realize 1,000RT (3516kW) refrigerating capacity with a single compressor. It was unanimously identified as World Leading by experts. The essential part of the chiller is the magnetic bearing centrifugal compressor that consists of impeller, motor, magnetic bearing, displacement sensor, bearing controller and motor driver. It utilizes magnetic field to keep the rotor suspended so that there won't be mechanical friction during rotation. By using magnetic bearing, lubricating system is no longer necessary in a refrigerating compressor. Thus, central air conditioners are more energy-efficient.



Nomenclature

CC	220	FE4	EE4	-	-
1	2	3	4	5	6

1	Model	CC- Magnetic bearing centrifugal chiller
2	Compressor code	—
3	Evaporator code	—
4	Condenser code	—
5	Number of compressors	Absence – single; 2 - double
6	Power spec.	Absence – 380V; G-10kV

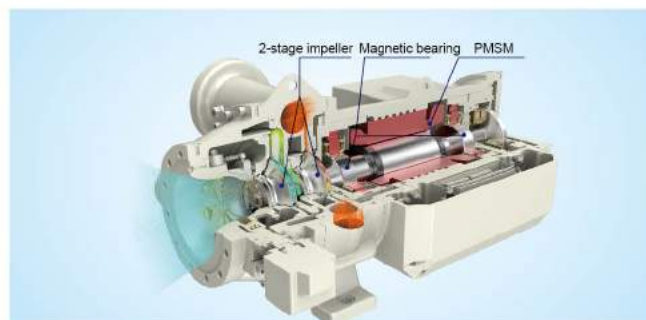


Product Features

Core Technology, High Efficiency

PMSM Direct-Drive Impeller

Gree's magnetic bearing inverter centrifugal chiller adopts high-speed motor to directly drive the 2-stage impeller structure. We cancel speed-up wheelwork and 2 radial bearings to reduce mechanical loss and improve energy efficiency.



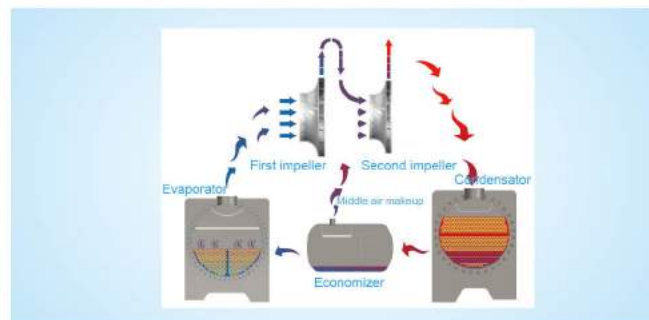
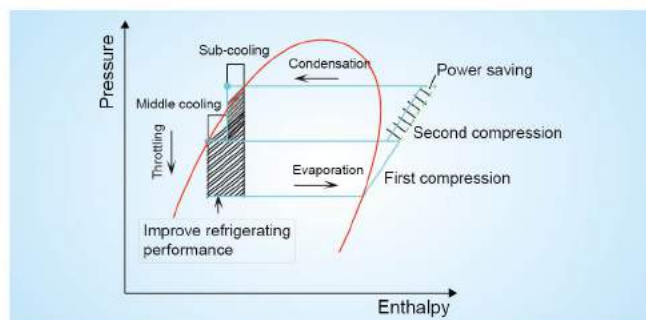
Magnetic Bearing

The compressor adopts magnetic bearing so that rotor can be suspended during operation. Because compressor is running in oil-free condition, the refrigeration cycle doesn't have lubricating oil, which has avoided the heat exchange efficiency decrease caused by oil film coated on heat exchanging tubes. Heat exchange is more efficient and the product is more reliable during its entire service life.



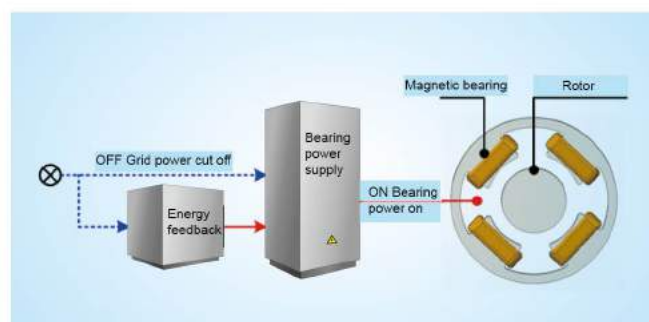
Two-stage Compression Technology

Two-stage compression with air makeup is more efficient when compared to single-stage compression. The refrigerating efficiency is improved by 5~6%. In addition, two-stage compression enables large flow angle for impeller outlet, large surge margin and wider operating range.



Power-off Energy Feedback

In case of power failure, motor will act as an electric generator to keep the bearing controller stably suspended through energy feedback until the motor stops running. Meanwhile, the backup radial bearing of compressor will support the compressor's rotor after power failure so as to prevent the rotor from touching any metal surface.

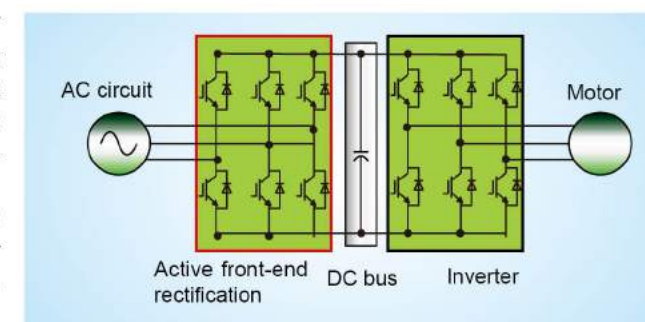


4-quadrant Inverter Technology

The chiller adopts 4-quadrant green inverter and IGBT transistor instead of diode for rectification. Power output time and method are both in better control and harmonic wave is well limited. It adopts closed-loop vector control without sensor to realize stable operation under high-speed running of the motor.

Because of PWM controllable rectification technology and the three-phase power factor correction technology, power factor and system efficiency are up to 0.995 and 97% respectively.

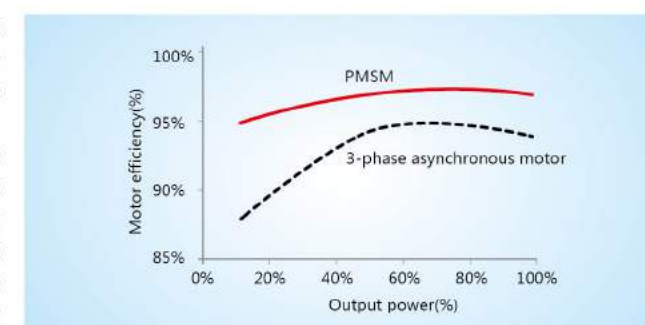
Total harmonic wave distortion factor is smaller than 5%. It is especially suitable to scientific research institutes, hospitals, factories and schools where low harmonic wave interference is necessary.



Permanent Magnet Synchronous Motor

This chiller adopts permanent magnet synchronous motor. The motor's rotor has a permanent magnet, with little excitation loss. Motor efficiency is over 95% and the highest efficiency is up to 97.5%.

Since the power density is high, when compared to asynchronous motor with the same power, PMSM features small size and light weight. The weight of a 400kW PMSM is equal to a 75kW AC induction motor. The unit adopts spiral type refrigerant injection cooling technology to completely cool down the stator and rotor of motor and keep the motor's temperature field in balance. Motor's temperature can be controlled at 40°C.



Core Components, Stable and Reliable

Compact Structure

The compressor adopts high-speed motor to directly drive the 2-stage impeller. Speed-up wheelwork is cancelled and the entire refrigeration system has one moving part only—the impeller. With only one moving part, the unit is more reliable.

Strict Tests

Components are strictly tested before entering the factory. Impellers are made of high-strength aluminum alloy, which is highly anti-corrosive. They must pass strict tests after manufacturing. Heat exchangers are designed in strict accordance with relevant codes of pressure vessels and tested in 1.5 times of working pressure. The machine will take complete performance tests and reliability tests before leaving the factory.

Precise Control

It adopts high-precision magnetic bearing control technology. The precision is 2μm, thus accurate positioning and high reliability.



No Need of Maintenance

The compressor adopts magnetic bearing to keep the rotor suspended so that there won't be mechanical friction during rotation. Because there is no structural surge, low running noise, the bearing doesn't need maintenance during service life. There is no need to manage and control the lubricant, which helps improve unit reliability.

Multiple Protections

The unit is with bearing protection, motor winding over-heat protection, surge protection, low pressure protection, high pressure protection, anti-freezing protection, water flow switch protection, phase loss and phase failure protection, electric component over-temperature protection, and different kinds of communication failure protection, etc.

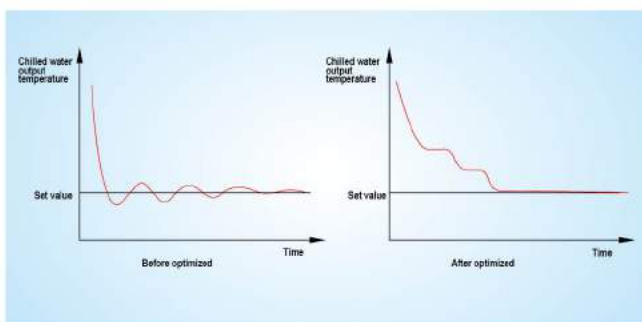


Intelligent Control. Real-time Protection

Self-adjusting Technology and Stable Operation

The control system can not only adjust load according to cold water leaving temperature but also predict and compensate the change of air conditioning load based on the change rate of cold water entering temperature. The unit can achieve faster load adjustment and stable water leaving temperature.

When the unit is under bad working condition, it will adjust the running parameters to keep itself running rather than frequently stop. The unit can operate stably and reliably to satisfy customers' refrigerating demand.



Color Touch Screen Display Control Center

The touch screen display control center is a reliable micro-computer control system that provides users with a convenient, efficient and visualized operating screen, with real-time monitoring, data recording, safe protection, etc.

- 12" 1024 x 768 touch screen
- Chinese and English languages
- Clear display, easy to operate



High-performance Digital Single Processing Platform

The control system adopts high-performance 32-bit CPU and DSP digital signal processor. The excellent data collection accuracy and data processing capability ensure timely and precise system control. The unit also adopts the intelligent Fuzzy-PID compound control algorithm, which is a control method comprising the intelligent technology, fuzzy technology and PID control algorithm, ensuring fast response and stable performance.

Authority Classification with Passwords

Control center has access passwords for operators so that set values won't be changed without authorization. Access authority is classified to user access and manufacturer access. User password is used to start up unit and enter the interface of user parameter setting. It is managed and can be changed by the user. Manufacturer password is used to enter the interface of manufacture parameter setting. Any change of the manufacture parameters may affect unit's reliability; therefore it must be kept by professional engineering and debugging personnel.

Soft Load-on and Soft Shut-down

Unit's control system can control the load-on gradually by capacity control and electric current limit so that unit won't be on and off frequently.

When unit is going to shut down, the control system will turn down the inlet guide vane (IGV) to a preset value and then disconnect power. This can effectively reduce impact on the unit and extend the starter's service life.

Control Center with Colorful Touch Screen Display

The following technology is limited to CVE310LG1H61D-CVE410MH1JH1D.

CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.



Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model		CC210FE5EE5	CC220FE4EE4	CC220FE3EE3	CC230GE2FE2	CC230GE1FE1	CC310HG5GG5
Cooling capacity	kW	352	457	527	633	703	791
	RT	100	130	150	180	200	225
EER	W/W	5.81	5.87	5.76	6.16	6.04	6.12
IPLV	W/W	9.84	9.41	9.70	9.98	10.24	9.72
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	60.52	77.87	91.56	102.7	116.4	129.3
RLA	A	92.9	119.5	140.5	157.7	178.7	198.4
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	210	235	250	280	300	320
Evaporator	Type	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	15.16	19.7	22.73	27.28	30.31
		GPM	240.3	312.3	360.4	432.5	480.5
	Pressure drop	kPa	30.5	31.4	31.2	31.9	31.5
		ft.WG	10	10.3	10.2	10.5	10.3
Condenser	Connection pipe	mm	DN150	DN150	DN150	DN150	DN200
	Type	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	19.07	24.75	28.64	34.04	37.93
		GPM	302.3	392.4	454.0	539.6	601.2
	Pressure drop	kPa	35.5	36.2	34.9	33.9	33.9
Sound pressure level(Max.)		dB(A)	78	78	78	78	78
Dimension	Outline(WxDxH)	mm	3320x1140x1900	3320x1140x1900	3320x1140x1900	3330x1180x1900	3330x1180x1900
	Package(WxDxH)	mm	3500x1360x2100	3500x1360x2100	3500x1360x2100	3500x1400x2100	3500x1400x2100
Net/Gross/Operating weight	kg	2695/2995/3050	3329/3629/3700	3500/3800/3900	3738/4038/4200	3905/4205/4350	4796/5196/5300
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Model		CC310HG4GG4	CC310HG3GG3	CC320HG2GG2	CC320HG1GG1	CC410MH4HH2	CC410MH3HH1
Cooling capacity	kW	879	967	1055	1231	1406	1582
	RT	250	275	300	350	400	450
EER	W/W	6.16	6.06	6.34	6.24	6.42	6.48
IPLV	W/W	10.03	10.27	10.16	10.58	10.16	10.50
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	142.7	159.6	166.4	197.2	219.1	244.2
RLA	A	219.0	244.9	255.3	302.7	336.2	374.7
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	350	375	400	425	450	550
Evaporator	Type	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	37.89	41.88	45.47	53.05	60.62
		GPM	600.6	660.7	720.8	840.9	961.0
	Pressure drop	kPa	57.0	56.8	56.8	57.0	50.8
		ft.WG	18.7	18.6	18.6	18.7	17
Condenser	Connection pipe	mm	DN200	DN200	DN200	DN200	DN250
	Type	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	47.28	52.13	56.51	66.07	75.22
		GPM	749.4	826.3	895.8	1047.0	1240.0
	Pressure drop	kPa	53.6	53.9	53.3	53.6	54.7
Sound pressure level(Max.)		dB(A)	78	78	78	78	80
Dimension	Outline(WxDxH)	mm	3770x1590x1950	3770x1590x1950	3770x1590x1950	3770x1590x1950	4300x1850x2330
	Package(WxDxH)	mm	3900x1750x2050	3900x1750x2050	3900x1750x2050	3900x1750x2050	4450x1950x2350
Net/Gross/Operating weight	kg	4833/5233/5350	4941/5341/5450	5008/5408/5600	5146/5646/5700	6335/6835/7150	6410/6910/7250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Model		CC410MH1HH1	CC510MH2JH2	CC510MH1JH1	CC520PIEKIE	CC520PIDKID	CC610PICKIC
Cooling capacity	kW	1758	1934	2110	2285	2461	2637
	RT	500	550	600	650	700	750
EER	W/W	6.37	6.64	6.55	6.67	6.58	6.78
IPLV	W/W	10.78	10.84	11.08	10.84	11.08	10.95
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	276.1	291.2	322.1	342.6	374	389.9
RLA	A	423.5	447.0	494.3	447.0	494.3	598.7
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	575	600	625	650	675	700
Evaporator	Type	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	75.78	83.36	90.93	90.93	113.70
	GPM		1201.0	1321.0	1442.0	1562.0	1802.0
	Pressure drop	kPa	49.3	88.2	67.9	68.2	61.8
	ft.WG		16.2	22.4	22.3	20.3	20.3
Condenser	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250
	Type	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	94.12	103.00	112.50	103.00	140.10
	GPM		1492.0	1632.0	1784.0	1628.0	2220.0
	Pressure drop	kPa	65.9	63.3	62.8	62.8	57.7
Sound pressure level(Max.)	dB(A)	80	80	80	82	82	82
	mm	4250x1850x2330	4250x1910x2210	4250x1910x2210	4550x2010x2300	4550x2010x2300	4550x2010x2300
Dimension	Package(WxDxH)	mm	4450x1950x2350	4400x2100x2450	4400x2100x2450	4700x2100x2500	4700x2100x2500
Net/Gross/Operating weight	kg	6400/6900/7250	7604/8104/8550	7720/8220/8650	8754/9254/9800	8883/9363/9900	9164/9664/10250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Model		CC610PIBKIB	CC610PIAKIA	CC630QJCMJD	CC620QJBMJC	CC710QJAMJB	CC710RJAMJA
Cooling capacity	kW	2813	2989	3164	3340	3516	3688
	RT	800	850	900	950	1000	1100
EER	W/W	6.75	6.66	6.72	6.94	6.95	6.85
IPLV	W/W	11.15	11.28	11.56	11.71	11.33	11.61
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW	406.6	448.8	470.8	481.3	505.9	564.6
RLA	A	639.5	688.7	721.6	770.9	776.4	866.5
Compressor	Type	Centrifugal					
	Starting mode	Variable frequency drives					
	Quantity	1	1	1	1	1	1
Refrigerant charge volume	kg	725	730	900	925	950	975
Evaporator	Type	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	121.20	128.80	136.40	144.00	151.60
	GPM		1922.0	2042.0	2162.0	2282.0	2403.0
	Pressure drop	kPa	60.8	63.1	60.2	59.2	59.3
	ft.WG		20	20.7	19.7	19.4	19.7
Condenser	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300
	Type	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	149.40	159.10	168.20	186.10	205.10
	GPM		2369.0	2521.0	2660.0	2950.0	3251.0
	Pressure drop	kPa	58.1	59.9	65.7	66.5	67.1
Sound pressure level(Max.)	dB(A)	82	82	82	84	84	84
	mm	4550x2010x2300	4550x2010x2300	4980x2210x2500	4980x2210x2500	4980x2210x2500	4980x2310x2600
Dimension	Package(WxDxH)	mm	4700x2100x2500	4700x2100x2500	5100x2370x2750	5100x2370x2750	5100x2600x2850
Net/Gross/Operating weight	kg	9284/9874/10400	9374/9874/10500	10591/11091/12000	10719/11219/12150	10850/11350/12300	11506/12006/13050
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1

Note:

- Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7°C and entering cooling water temperature is 29.4°C.
- Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
- Scale factors of chilled water and cooling water are 0.018 m² · °C /kW and 0.044 m² · °C /kW respectively.
- Above water flow is indicated according to ARI 550/590-2015; IPLV is the test value obtained based on the working condition specified in ARI 550/590-2015.
- For compressor using inverter starter, starting current < rated current, power factor is 0.995.
- The unit's performance parameters may be changed without prior notice due to product improvement. For the specific parameters, please refer to product nameplate.
- The product models are not for EU.

Operation Range

Operating condition of nominal cooling (water temperature)				Operating range (water temperature)			
Chilled water		Cooling water		Chilled water		Cooling water	
Inlet(°C)	Outlet(°C)	Inlet(°C)	Outlet(°C)	Outlet(°C)	I/O difference(°C)	Inlet(°C)	I/O difference(°C)
12.2	6.7	29.4	34.9	5~15	2.5~8	12~35	3.5~8

Product Installation

In order to guarantee normal operation and prevent any malfunction, the installation work must be done by professional technicians who are familiar with air conditioning knowledge and have rich experience in air conditioning installation. Before installation, please read carefully the installation manual.

Installation Environment and Foundation

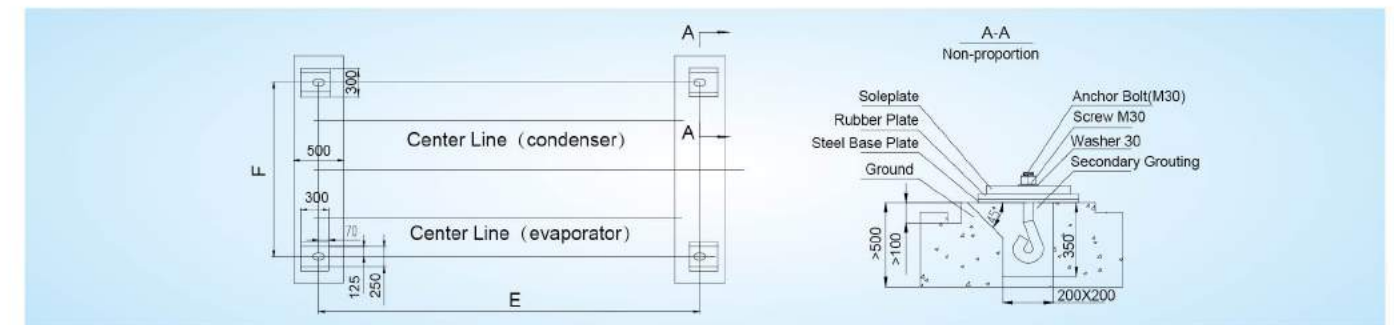
Installation Environment

- Select a location where ambient temperature is within the range of 0~40°C and relative humidity is below 90%.
- Install the unit indoors with ventilation facilities. Avoid rains and sunlight.
- The unit should be kept away from fire and inflammables. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- The location should be bright for the convenience of maintenance and inspection.
- Select a location that is with little dust. (Dust will lead to electric malfunction)
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space for the specific dimensions).
- For easy lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- If the unit is installed outdoors or at the seaside or a chemical plant where there is high concentration of corrosive gas, special design is needed for the unit. Please contact the local sales office.

Installation Foundation

The foundation of the unit must be made of cement or steel and should be able to bear the unit's operating weight. Its upper surface must be level. It's better to set drain ditch for the foundation. Please refer to the diagram of installation foundation. The unit should be placed on the foundation.

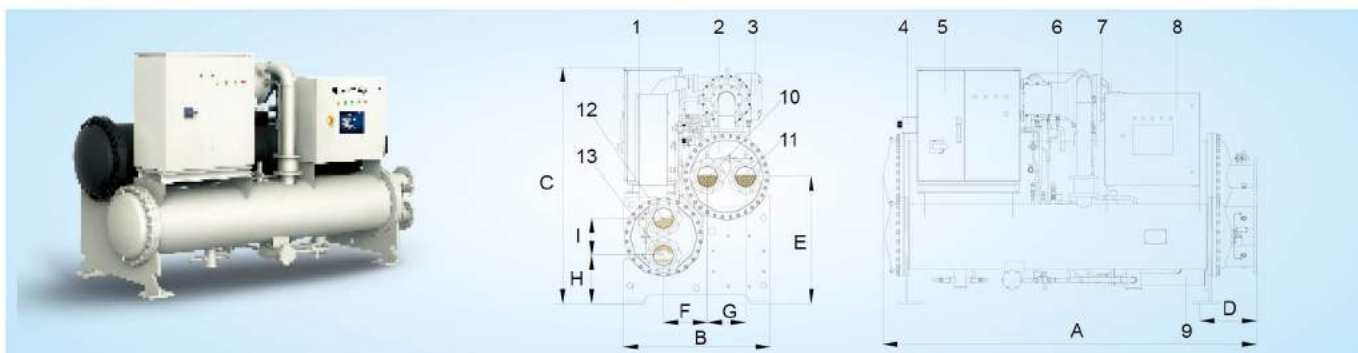
The steel base plate and damping rubber plate should be reinforced by second grouting after the chiller is installed with anchor bolts. Anchor bolts should be about 100mm above the installation surface.



Unit Foundation Dimension(mm)

Model	E	F	Model	E	F
CC210FE5EE5	2617	980	CC410MH3HH1	3290	1595
CC220FE4EE4	2617	980	CC420MH2JH2	3290	1655
CC220FE3EE3	2617	980	CC420MH1JH1	3290	1655
CC230GE2FE2	2617	1020	CC510PIEKIE	3590	1760
CC230GE1FE1	2617	1020	CC510PIDKID	3590	1760
CC310HG5GG5	2990	1335	CC520PICKIC	3590	1760
CC310HG4GG4	2990	1335	CC520PIBKIB	3590	1760
CC310HG3GG3	2990	1335	CC520PIAKIA	3590	1760
CC320HG2GG2	2990	1335	CC530QJCMJD	3990	1960
CC320HG1GG1	2990	1335	CC610QJBMJC	3990	1960
CC410LG1HG1	2990	1560	CC610QJAMJB	3990	1960
CC410MH4HH2	3290	1595	CC610RJAMJA	3990	2060

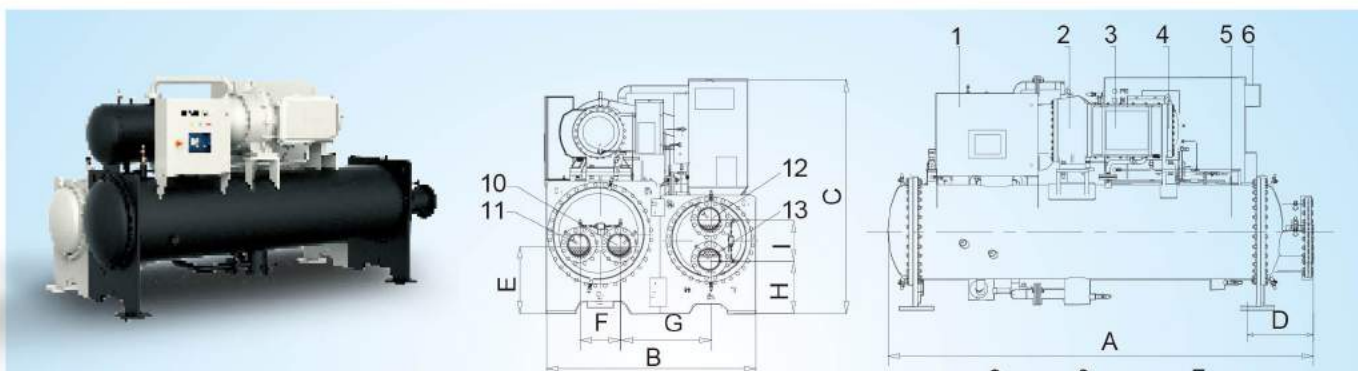
Diagram of Components



No.	Name	No.	Name
1	Condenser	8	Electric control box
2	Evaporator	9	Flash evaporator
3	Bearing controller	10	Leaving chilled water
4	Customer wiring terminal	11	Entering chilled water
5	Inverter	12	Leaving cooling water
6	Motor	13	Entering cooling water
7	Compressor		

Dimensions of centrifugal chiller

Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
CC210FE5EE5	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
CC220FE4EE4	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
CC220FE3EE3	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
CC230GE2FE2	3350	1180	1900	450	990	345	300	375	290	DN150	DN150
CC230GE1FE1	3350	1180	1900	450	990	345	300	375	290	DN150	DN150

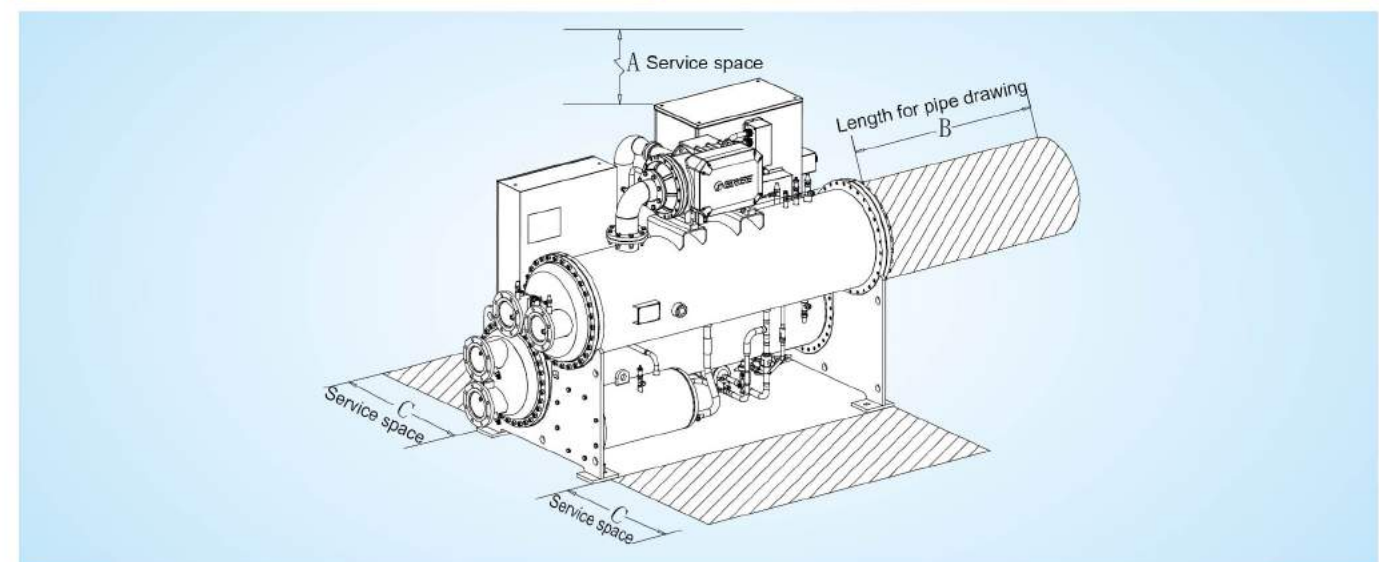


No.	Name	No.	Name
1	Electric control box	8	Condenser
2	Compressor	9	Flash evaporator
3	Bearing controller	10	Entering chilled water
4	Motor	11	Leaving chilled water
5	Evaporator	12	Leaving cooling water
6	Customer wiring terminal	13	Entering cooling water
7	Inverter		

Dimensions of centrifugal chiller

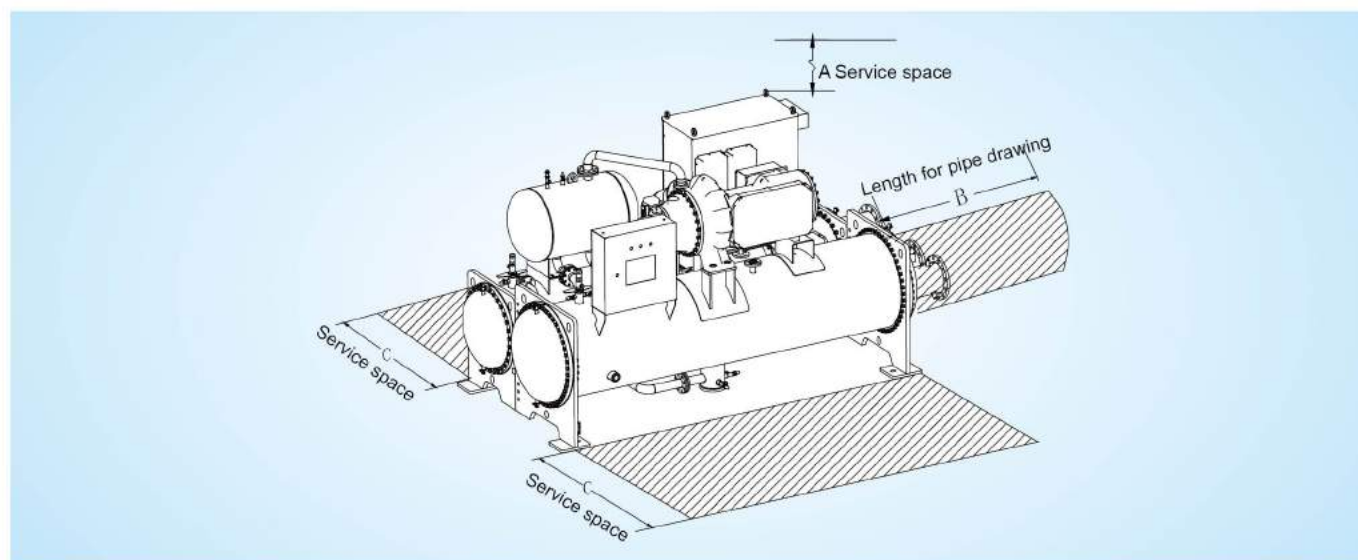
Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
CC310HG5GG5	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
CC310HG4GG4	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
CC310HG3GG3	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
CC320HG2GG2	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
CC320HG1GG1	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
CC410LG1HG1	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
CC410MH4HH2	4300	1850	2150	570	765	430	740	370	405	DN250	DN250
CC410MH3HH1	4300	1850	2150	570	765	430	740	370	405	DN250	DN250
CC420MH2JH2	4250	1910	2210	570	765	430	770	430	415	DN250	DN250
CC420MH1JH1	4250	1910	2210	570	765	430	770	430	415	DN250	DN250
CC510PIEKIE	4550	2010	2300	570	815	480	770	510	430	DN250	DN250
CC510PIDKID	4550	2010	2300	570	815	480	770	510	430	DN250	DN250

Dimension of Installation and Maintenance Space



Dimension of Installation and Maintenance Space

Model	A	B	C	D
CC210FE5EE5	500	2800	600	1000
CC220FE4EE4	500	2800	600	1000
CC220FE3EE3	500	2800	600	1000
CC230GE2FE2	500	2800	600	1000
CC230GE1FE1	500	2800	600	1000

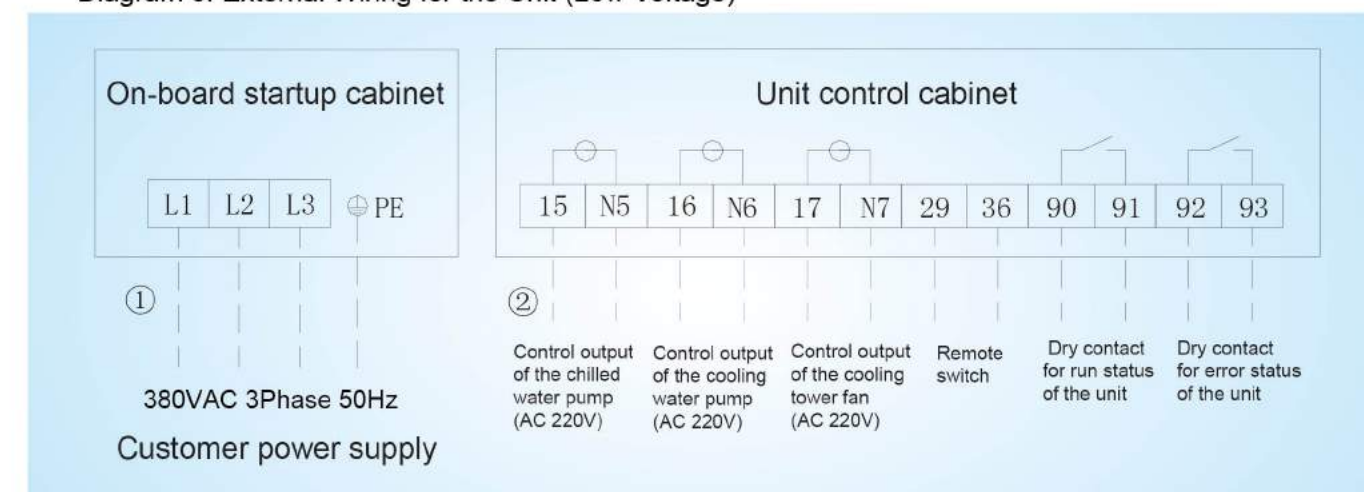


Dimension of Installation and Maintenance Space

Model	A	B	C	D
CC310HG5GG5	600	3200	700	1000
CC310HG4GG4	600	3200	700	1000
CC310HG3GG3	600	3200	700	1000
CC320HG2GG2	600	3200	700	1000
CC320HG1GG1	600	3200	700	1000
CC410LG1HG1	1500	3500	1500	1220
CC410MH4HH2	1500	3500	1500	1220
CC410MH3HH1	1500	3500	1500	1220
CC420MH2JH2	1500	3500	1500	1220
CC420MH1JH1	1500	3500	1500	1220
CC510PIEKIE	1500	3800	1500	1220
CC510PIDKID	1500	3800	1500	1220

Electrical Installation

Electrical Installation of 4-quadrant Inverter Diagram of External Wiring for the Unit (Low Voltage)



Wiring instructions:

(1) Line 1 represents the power cable between customer's power distribution cabinet and chiller's inverter startup cabinet. The required power supply is 380V 3~ 50Hz. The power cable shall enter from the side or bottom of the inverter startup cabinet and the cable size varies as per the change of unit power.

(2) Line 2 represents the signal control line from the chiller's main control cabinet to the water pump control cabinet and remote switch, unit running status and unit malfunction status. The cable size should be equal to or above 1.5mm².

Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.





CE Series Centrifugal Chiller

Gree CE Series Centrifugal Chiller adopts R134a eco-friendly refrigerant, and is equipped with features like high energy efficiency, safe, reliable and stable operation, wide adjustment range, long service life, simple operation and maintenance, and low noise. This series has passed AHRI certification and can be widely applied in large office buildings, hospitals, schools, shopping malls, industrial processing, or refrigerating places that demand high-temperature cooling water or low-temperature chilled water.



Nomenclature

C	V	E	510	PIE	KIE	-	-	-	-
1	2	3	4	5	6	7	8	9	10

No.	Code meaning	Options
1	Model	C- Centrifugal chiller
2		C- Magnetic bearing; V- Permanent magnet inverter; Absence-Fixed frequency
3		E- Cooling only (absence for magnetic bearing); P- Heat pump H- Heating only; I- Ice making; S- PV power; T- High temperature
4	Compressor	--
5	Evaporator	--
6	Condenser	--
7	Special functions	R- Partial heat recovery; Q- Total heat recovery; Absence- no special function
8	Type of startup cabinet	D- Diode inverter startup; Re- Reactor startup; S- Soft startup; T- Autotransformer startup; Absence- Inverter; 4-quadrant inverter startup
9	Number of compressors	Fixed-frequency: star-delta startup (380V), direct startup (6kV/10kV)
10	Power	2- Double compressors; Absence- Single compressor
		G- 10000V; Absence- 380V



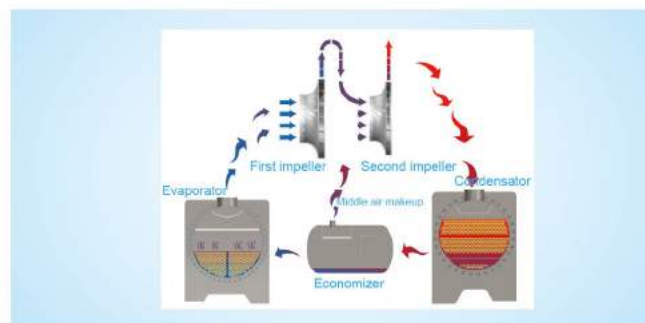
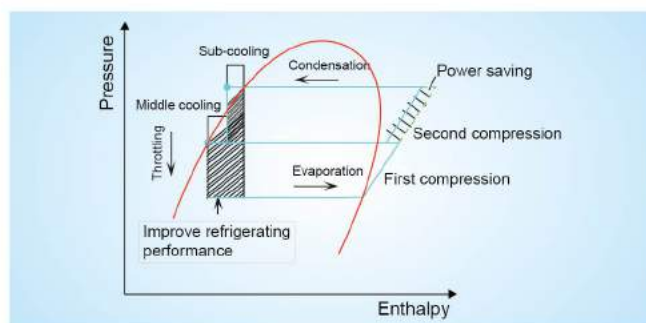
Product Features

Core Technology, High Efficiency

Two-stage Compression Technology

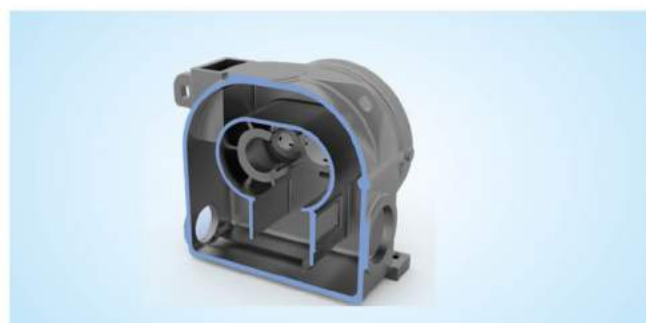
When compared to single-stage compression, two-stage compression technology has the following advantages:

- (1) 5~6% higher efficiency in refrigeration;
- (2) Lower running speed, higher reliability, and longer service life for compressor;
- (3) Large flow angle for impeller outlet, large surge margin and wider operating range;



Multiple Noise Reduction Technologies

The high-strength gear case to reduce vibration; 4-grade precision wheelwork to diminish mechanical friction; double-layer soundproof component; injection noise reduction design; different measures are taken to reduce the operating noise.



Double Independent Systems

For units with large cooling capacity, double compressors are adopted. The entire system is equal to the combination of two centrifugal chillers. Two systems are independent from one another; refrigerant of one side won't affect the refrigerant of the other side, thus high reliability; two compressors work independently, which will greatly improve the unit's partial load capacity and compressors' overall performance. In addition, the heat exchanger countercurrent single-flow shell and tube design lowers the water pressure, which can satisfy the demand of small water flow system.



System Positive Pressure Design

System maintains positive pressure so that non-condensable gas will not enter the system during operation. The system is cleaner without the need to add an air extractor. Compared to negative pressure design, the unit is more compact and space saving.

Core Components, Stable and Reliable

Semi-hermetic Motor

This is an efficient closed type motor that adopts injection cooling with liquefied refrigerant. It will not only lower the risk of refrigerant and lubricant leakage but also restrain heat dissipation, saving the cost for cooling devices in the machine room.



High-efficiency Heat Exchanger

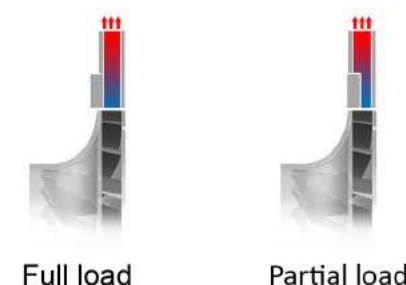
Heat exchangers are especially design for centrifugal chillers. They can keep refrigerant distribution in balance, maintain a proper temperature field, and improve heat exchange efficiency. They are highly efficient, not only lowering the heat transfer resistance but also increasing the cooling capacity and energy efficiency ratio.

To ensure the reliability, both the evaporator and the condenser adopt 3V-grooved tube plate design. The bottom of condenser is made with sub-cooler, which uses high-efficiency sub-cooling tubes. Maximum sub-cooling can be 5°C.



Variable Section Diffuser

The rear side of the impeller is designed with variable section diffuser. Under partial load, its axial movement is used to change the width of the airflow passage, so that the flow area of the diffuser is reduced, thereby improving the airflow velocity and stability, reducing airflow backflow, effectively improving the surge point of the unit, expanding the unit's operating range, reducing noise and vibration of the unit at full load and partial load.



On-board Startup Cabinet

Wiring is completed before ex-factory. User just needs to provide the power line, which has simplified the wiring procedure at user side. The startup cabinet is directly built on the unit, which is space-saving and making the structure more compact.



Control Center with Colorful Touch Screen Display

The following technology is limited to CVE310LG1HG1D-CVE410MH1JH1D.

CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.



Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model			CE310LG2HG2	CE311LG1HG1	CE320MH4HH2	CE321MH3HH1	CE330MH2JH2	CE331MH1JH1
Cooling capacity	kW		1231	1406	1582	1758	1934	2110
	RT		350	400	450	500	550	600
EER	W/W		6.10	6.09	6.38	6.42	6.54	6.55
IPLV	W/W		6.64	6.63	6.69	6.97	6.91	7.11
Power supply	V/Ph/Hz		380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	kW		201.7	230.9	248.0	273.8	295.7	322.1
RLA	A		344.40	394.20	423.40	467.50	504.80	549.80
Compressor	Type	-	Centrifugal					
	Starting mode	-	Y-△					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge volume	kg		425	450	550	575	600	625
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	50	50	50	50	50	50
Evaporator	Type	-	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	53.05	60.82	68.2	75.78	83.36	90.93
		GPM	840.9	961	1081	1201.0	1321.0	1442.0
	Pressure drop	kPa	54.2	57.3	62.4	62.5	68.2	67.9
		ft.WG	17.6	18.8	20.5	20.5	22.4	22.3
	Connection pipe	mm	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	66.28	75.77	84.69	94.02	103.20	112.50
		GPM	1051	1201	1343	1490.0	1635.0	1784.0
	Pressure drop	kPa	62.7	62.8	63.1	65.8	63.5	62.8
		ft.WG	20.6	20.6	20.7	21.6	20.8	20.6
	Connection pipe	mm	DN200	DN200	DN250	DN250	DN250	DN250
Sound pressure level(Max.)	dB(A)		82	82	82	82	82	82
Dimension	Outline(WxDxH)	mm	3850x1810x2220	3850x1810x2220	4300x1850x2310	4300x1850x2310	4250x1910x2370	4250x1910x2370
	Package(WxDxH)	mm	3950x1950x2450	3950x1950x2450	4400x1900x2550	4400x1900x2550	4400x2000x2600	4400x2000x2601
Net/Gross/Operating weight	kg		6800/7100/7450	7100/7400/7750	7300/7800/8200	7500/8000/8400	7850/8350/8800	8100/8600/9100
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model		CE410PIEKIE	CE411PIDKID	CE420PICKIC	CE421PIBKIB	CE510PIAKIA	CE511QJCMJD	
Cooling capacity	kW	2285	2461	2637	2813	2989	3164	
	RT	650	700	750	800	850	900	
EER	W/W	6.40	6.44	6.50	6.53	6.50	6.52	
IPLV	W/W	6.82	7.02	6.94	7.12	7.09	6.98	
Power supply	V/Ph/Hz	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	
Power input	kW	357.1	382.2	405.7	430.8	459.8	485.3	
RLA	A	609.60	652.40	692.60	735.30	784.90	828.50	
Compressor	Type	Centrifugal						
	Starting mode	Y- Δ						
	Quantity	1	1	1	1	1	1	
Refrigerant charge volume	kg	650	675	750	775	800	900	
Refrigeration oil	Type	No.68 synthetic fatty oil						
	Charge volume	L	60	60	60	60	80	80
Evaporator	Type	Flooded						
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	98.51	106.1	113.7	121.2	128.8	136.4
		GPM	1562.0	1682.0	1802.0	1922.0	2042.0	2162.0
	Pressure drop	kPa	63.3	61.5	64.9	60.2	61.8	60.2
		ft.WG	20.8	20.2	21.3	19.8	20.3	19.7
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN300
Condenser	Type	Shell and tube						
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	122.30	131.60	140.80	150.10	159.60	168.90
		GPM	1938.0	2086.0	2232.0	2379.0	2526.0	2677.0
	Pressure drop	kPa	57.2	57	58.2	58.5	60.2	66.1
		ft.WG	18.8	18.7	19.1	19.2	19.7	21.7
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN300
Sound pressure level(Max.)	dB(A)	83	83	83	83	84	84	
Dimension	Outline(WxDxH)	mm	4550x2010x2390	4550x2010x2390	4550x2010x2390	4550x2010x2390	4980x2210x2610	
	Package(WxDxH)	mm	4700x2100x2600	4700x2100x2600	4700x2100x2600	4700x2100x2600	5100x2300x2850	
Net/Gross/Operating weight	kg	9600/10100/10700	9850/10350/10950	10100/10600/11300	10350/10950/11550	10800/11300/12050	12000/12600/13450	
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	

Model			CE512QJBMJC	CE520QJAMJB	CE521RJAMJA	CE522RJAMJA	CE610SKNQKN	CE611SKMQKM
Cooling capacity	KW		3340	3516	3692	3868	4219	4571
	RT		950	1000	1050	1100	1200	1300
EER	W/W		6.54	6.55	6.60	6.60	6.54	6.57
IPLV	W/W		7.12	6.93	7.07	7.19	6.95	7.18
Power supply	V/Ph/Hz		380/3/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Power input	KW		510.7	536.8	559.4	586.0	645.1	695.7
RLA	A		871.90	918.40	954.90	1000.00	1101.30	1187.70
Compressor	Type	-	Centrifugal					
	Starting mode	-	Y- Δ				soft starting	
	Quantity	-	1	1	1	1	1	1
Refrigerant charge volume	kg		925	950	950	975	1250	1300
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	80	80	80	80	100	100
Evaporator	Type	-	Flooded					
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	144.00	151.60	159.10	166.70	181.90	197.00
		GPM	2282.0	2403.0	2523.0	2643.0	2883.0	3123.0
	Pressure drop	kPa	59.2	59.3	55.4	60.1	56	55.9
		ft.WG	19.4	19.4	18.2	19.7	18.4	18.4
	Connection pipe	mm	DN300	DN300	DN300	DN300	DN350	DN350
Condenser	Type	-	Shell and tube					
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	178.20	187.50	196.70	206.10	225.10	243.70
		GPM	2825.0	2973.0	3118.0	3267.0	3568.0	3863.0
	Pressure drop	kPa	86.7	86.9	82.4	67.7	62	41.4
		ft.WG	21.9	21.9	20.5	22.2	13.8	13.6
	Connection pipe	mm	DN300	DN300	DN300	DN300	DN350	DN350
Sound pressure level(Max.)	dB(A)		84	84	84	84	85	85
Dimension	Outline(WxDxH)	mm	4980x2210x2610	4980x2210x2610	4980x2310x2710	4980x2310x2710	5250x2530x2880	5250x2530x2880
	Package(WxDxH)	mm	5100x2300x2850	5100x2300x2850	5100x2300x2950	5100x2300x2950	5600x2900x3100	5600x2900x3100
Net/Gross/Operating weight	kg		12250/12850/13750	12500/13100/14000	13156/13756/14750	13429/14029/15050	16600/17200/18700	17000/17600/19150
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			CE620SKLQKL	CE621TKNRKNG	CE630TKMRKM-G	CE631TKLRKL-G	CE710TLNRL-LG	CE711TLMSP-LG	CE720TLRLQ-LG
Cooling capacity	KW		4922	5274	5626	5977	6329	6680	7032
	RT		1400	1500	1600	1700	1800	1900	2000
EER	W/W		6.52	6.55	6.62	6.65	6.66	6.68	6.66
IPLV	W/W		6.95	7.13	7.08	7.24	7.12	7.27	7.13
Power supply	V/Ph/Hz		380/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50
Power input	KW		755.0	755.0	849.8	898.8	950.3	1000.0	1056.0
RLA	A		1288.80	52.20	55.10	58.30	61.60	64.90	68.50
Compressor	Type	-	Centrifugal						
	Starting mode	-	Soft starting	Direct starting					
	Quantity	-	1	1	1	1	1	1	1
Refrigerant charge volume	kg		1350	1400	1450	1500	1600	1650	1800
Refrigeration oil	Type	-	No.68 synthetic fatty oil						
	Charge volume	L	100	100	100	100	120	120	120
Evaporator	Type	-	Flooded						
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	212.20	227.30	242.50	257.60	272.80	288.00	303.10
		GPM	3364.0	3604.0	3844.0	4084.0	4325.0	4565.0	4805.0
	Pressure drop	kPa	56.9	54.4	45.5	45.5	56.9	56.1	56.9
		ft.WG	18.7	17.8	14.9	14.9	18.7	18.4	18.7
	Connection pipe	mm	DN350	DN350	DN350	DN350	DN400	DN400	DN400
Condenser	Type	-	Shell and tube						
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	262.70	281.30	299.60	318.20	336.80	355.40	374.30
		GPM	4165.0	4459.0	4750.0	5044.0	5339.0	5634.0	5933.0
	Pressure drop	kPa	44.2	42.9	44.4	44.4	63.7	62.6	60.9
		ft.WG	14.5	14.1	14.6	14.6	20.9	20.5	20
	Connection pipe	mm	DN350	DN400	DN400	DN400	DN450	DN450	DN450
Sound pressure level(Max.)	dB(A)		85	85	85	85	86	86	86
Dimension	Outline(WxDxH)	mm	5250x2530x2880	5400x2750x3000	5400x2750x3000	5400x2750x3000	5800x2750x3100	5800x2750x3100	5800x2750x3100
	Package(WxDxH)	mm	5600x2900x3100	5800x3200x3200	5800x3200x3200	5800x3200x3200	6400x3100x3300	6400x3100x3300	6400x3100x3300
Net/Gross/Operating weight	kg		17400/18000/19600	18600/19400/21250	19000/19800/21500	19500/20300/22050	23500/24300/26150	24000/24800/26800	24500/25300/27450
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1	1

Model			CE721ULNSLN-G	CE730ULMSLM-G	CE731ULLSLL-G	CE610UN4SN4-2-G	CE611UN3SN3-2-G	CE620UN2SN2-2-G	CE621UN1SN1-2-G
Cooling capacity	KW		7384	7735	8087	8438	9142	9845	10550
	RT		2100	2200	2300	2400	2600	2800	3000
EER	W/W		6.68	6.70	6.71	6.68	6.67	6.68	6.72
IPLV	W/W		7.27	7.17	7.30	8.19	8.18	8.20	8.24
Power supply	V/Ph/Hz		10000/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50	10000/3/50
Power input	KW		1105.0	1155.0	1205.0	1263.0	1371.0	1474.0	1570.0
RLA	A		71.70	74.90	78.20	81.90	88.90	95.60	101.80
Compressor	Type	-	Centrifugal						
	Starting mode	-	Direct starting						
	Quantity	-	1	1	1	2	2	2	2
Refrigerant charge volume	kg		2000	2100	2200	2300	2500	2700	2800
Refrigeration oil	Type	-	No.68 synthetic fatty oil						
	Charge volume	L	120	120	120	200	200	200	200
Evaporator	Type	-	Flooded						
	Fouling factor	m ² · °C /kW	0.018	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	318.30	333.40	348.60	363.70	394.10	424.40	454.70
		GPM	5045.0	5286.0	5526.0	5766.0	6247.0	6727.0	7208.0
	Pressure drop	kPa	58.2	58.0	58.0	43.7	43.9	43.5	43.2
		ft.WG	19.1	19	19	14.3	14.4	14.3	14.2
	Connection pipe	mm	DN400	DN400	DN400	DN500	DN500	DN500	DN500
Condenser	Type	-	Shell and tube						
	Fouling factor	m ² · °C /kW	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	362.80	411.40	430.00	448.90	486.40	523.80	560.70
		GPM	6227.0	6521.0	6816.0	7116.0	7711.0	8303.0	8889.0
	Pressure drop	kPa	59.8	59.2	60.8	40.1	39.9	39.7	39.7
		ft.WG	19.6	19.4	20.0	13.2	13.1	13.0	13.0
	Connection pipe	mm	DN450	DN450	DN450	DN500	DN500	DN500	DN500
Sound pressure level(Max.)	dB(A)		86	86	86	88	88	88	88
Dimension	Outline(WxDxH)	mm	5800x3000x3300	5800x3000x3300	5800x3000x3300	7600x2460x2850	7600x2460x2850	7600x2660x2950	7600x2660x2950
	Package(WxDxH)	mm	6400x3350x3350	6400x3350x3350	6400x3350x3350	8000x3360x3360	8000x3360x3360	8000x3360x3360	8000x3360x3360
Net/Gross/Operating weight	kg		26000/26800/29300	26600/27400/30000	26900/27700/30400	32000/33000/35750	33000/34000/36950	34000/35000/38150	35000/36000/39250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1	1

Notes:

1. Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7℃ and entering cooling water temperature is 29.4℃.
2. CE610UN4SN4-2-G~CE621UN1SN1-2-G adopt independent dual-system structure.
3. Above water flow is indicated according to ARI 550/590-2015; IPLV is the test value obtained based on the working condition specified in ARI 550/590-2015.
4. Scale factors of chilled water and cooling water are 0.018 m²/°C /kW and 0.044m²/°C /kW respectively.
5. For special working condition, please contact Gree's local sales agent.
6. Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
7. The unit's performance parameters may be changed without prior notice due to product improvement. For the specific parameters, please refer to product nameplate.
8. The product models are not for EU.

Operation Range

Chilled water		Cooling water	
Outlet temperature(℃)	Temperature difference between inlet and outlet (℃)	Inlet temperature (℃)	Temperature difference between inlet and outlet (℃)
5~15	2.5~8	12~35	3.5~8

If customer requires higher temperature difference, please consult the manufacturer.

Product Installation

Installation Environment and Foundation

Installation Environment

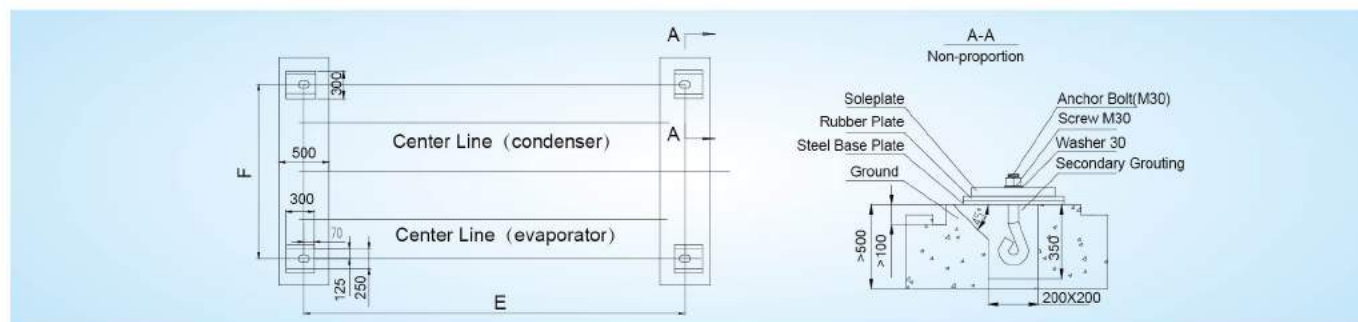
- The refrigerating unit should be kept away from fire and inflammables. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- Select a location where ambient temperature is below 40°C and is drafty (High temperature will cause malfunction and accelerate corrosion). When ambient temperature is 40°C, relative humidity should be below 90%. It is not allowed to install or store the unit outside or in the open air.
- Select a location that is with little dust. (Dust will lead to electric malfunction)
- The location should be bright for the convenience of maintenance and inspection.
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space for the specific dimensions).
- For easy lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- The surrounding of the unit and the whole machine room should be able to be drained completely.
- Avoid direct sunlight.

Note: Please contact the manufacturer if the unit is to be installed 1000m or more above sea level.

Installation Foundation

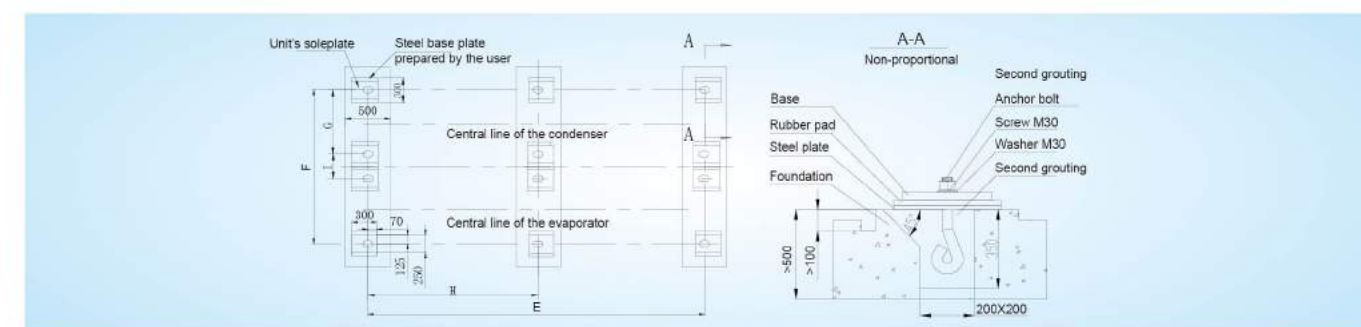
The rotor of the centrifugal refrigerating compressor has undergone strict static balance and dynamic balance tests, so the dynamic load of compressor on the foundation is very small. For dimensions of the foundation, please refer to "Dimensions of the Foundation". In order to prevent the footing of the unit from being corroded, please ensure smooth drainage around the unit. The surface of the foundation must be smooth and flat. See the following requirements:

- The maximum drop difference (level difference) between each foundation surface should be less than 3mm.
- For the convenience of maintenance and inspection, the foundation should be 100 higher than the ground.
- Drain ditch should be set around the unit.
- There should be no gap between the steel base plate and the unit's soleplate. Insert adjusting pad between the steel base plate and the concrete foundation. Adjust the steel base plate to level (Their height difference should be 0.5mm per meter.)
- Lift up the unit and place a rubber plate on the steel base plate to reduce vibration. And then place the unit on the rubber plate.
- The steel base plate and adjusting pad should be reinforced by second grouting.



Unit Foundation Dimension(mm)

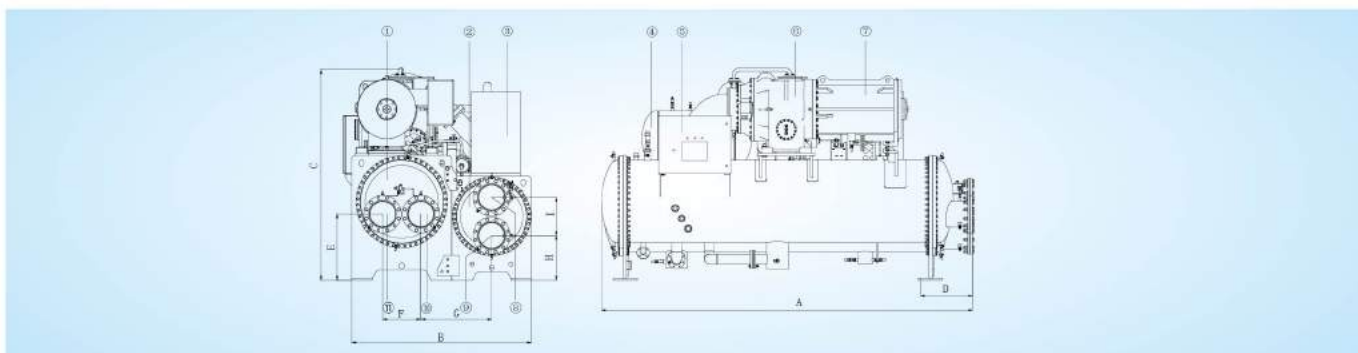
Model	E	F	Model	E	F
CE310LG2HG2	2990	1560	CE521RJAMJA	3990	2060
CE311LG1HG1	2990	1560	CE522RJAMJA	3990	2060
CE320MH4HH2	3590	1595	CE610SKNQKN	4190	2280
CE321MH3HH1	3590	1595	CE611SKMQKM	4190	2280
CE330MH2JH2	3590	1655	CE620SKLQKL	4190	2280
CE331MH1JH1	3590	1655	CE621TKNRKN-G	4190	2500
CE410PIEKIE	3590	1760	CE630TKMRKM-G	4190	2500
CE411PIDKID	3590	1760	CE631TKLRKL-G	4190	2500
CE420PICKIC	3590	1760	CE710TLNRL-G	4590	2500
CE421PIBKIB	3590	1760	CE711TLMRLP-G	4590	2500
CE510PIAKIA	3590	1760	CE720TLLRLO-G	4590	2500
CE511QJCMJD	3990	1960	CE721ULNSLN-G	4590	2750
CE512QJBMJC	3990	1960	CE730ULMSLM-G	4590	2750
CE520QJAMJB	3990	1960	CE731ULLSLL-G	4590	2750



Unit Foundation Dimension(mm)

Model	E	F	G	H	I
CE610UN4SN4-2-G	6290	2710	1120	3060	250
CE611UN3SN3-2-G	6290	2710	1120	3060	250
CE620UN2SN2-2-G	6290	2710	1120	3060	250
CE621UN1SN1-2-G	6290	2710	1120	3060	250

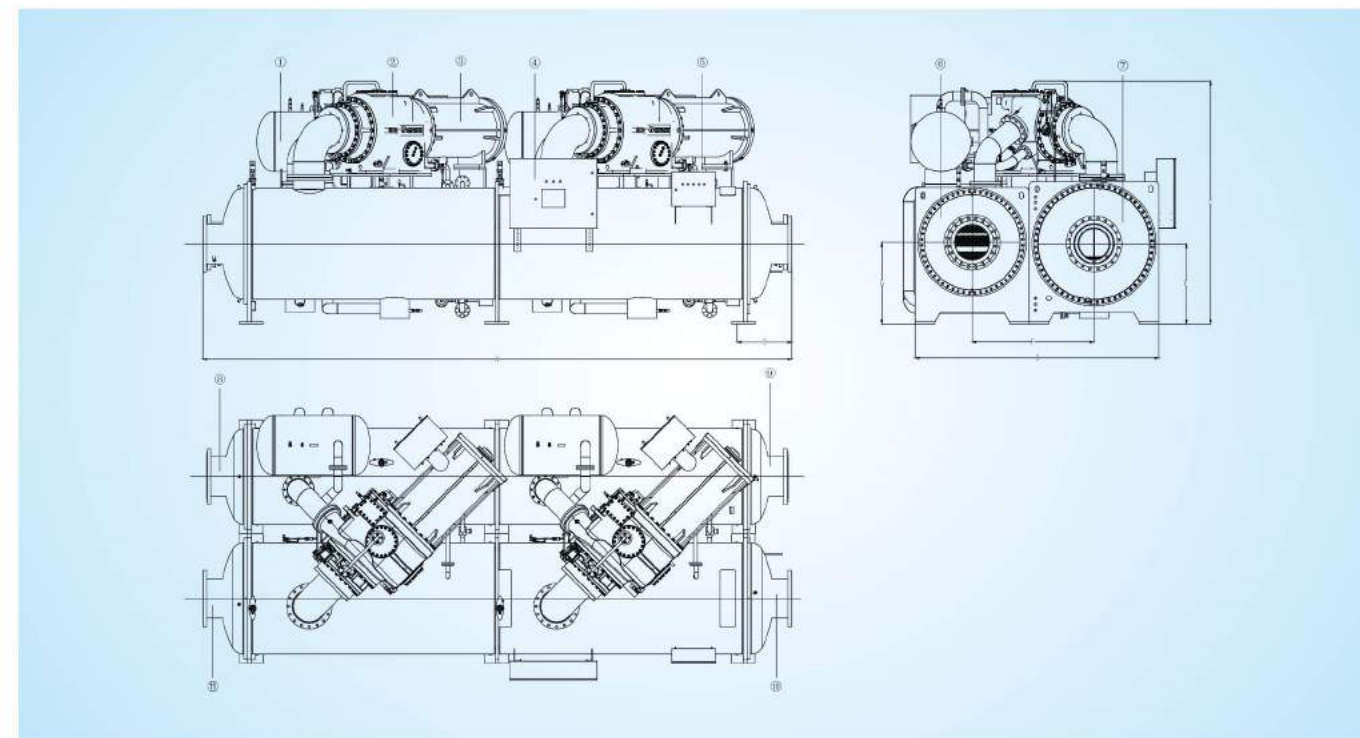
Diagram of Components



No.	Name	No.	Name
1	Evaporator	7	Motor
2	Condenser	8	Leaving cooling water
3	Startup cabinet	9	Entering cooling water
4	Flash evaporator	10	Entering chilled water
5	Electric control cabinet	11	Leaving chilled water
6	Compressor		

Dimensions of centrifugal chiller

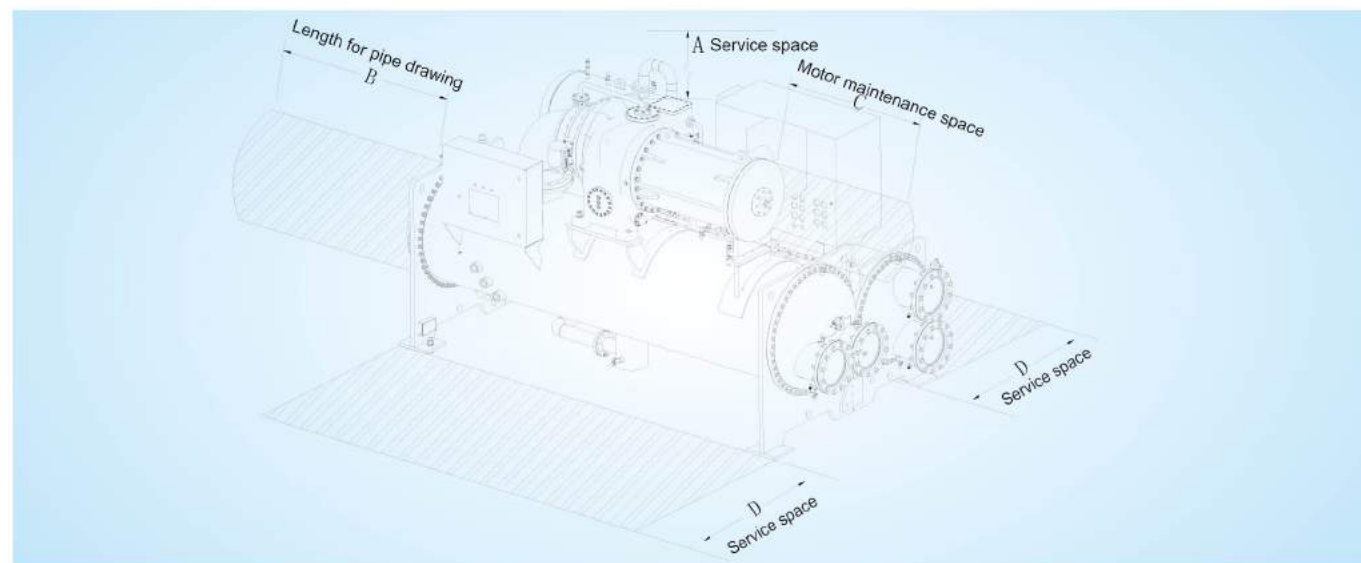
Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
CE310LG2HG2	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
CE311LG1HG1	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
CE320MH4HH2	4300	1850	2310	570	765	430	740	370	405	DN250	DN250
CE321MH3HH1	4300	1850	2310	570	765	430	740	370	405	DN250	DN250
CE330MH2JH2	4250	1910	2370	570	765	430	770	430	415	DN250	DN250
CE331MH1JH1	4250	1910	2370	570	765	430	770	430	415	DN250	DN250
CE410PIEKIE	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
CE411PIDKID	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
CE420PICKIC	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
CE421PIBKIB	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
CE510PIAKIA	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
CE511QJCMJD	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
CE512QJBMJC	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
CE520QJAMJB	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
CE521RJAMJA	4980	2310	2710	590	1015	580	895	550	470	DN300	DN300
CE522RJAMJA	4980	2310	2710	590	1015	580	895	550	470	DN300	DN300
CE610SKNQKN	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
CE611SKMQKM	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
CE620SKLQKL	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
CE621TKNRKN-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
CE630TKMRKM-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
CE631TKLRKL-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
CE710TLNRL-L-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
CE711TLMRLP-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
CE720TLRLRLO-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
CE721ULNSLN-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450
CE730ULMSLM-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450
CE731ULLSLL-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450



No.	Name	No.	Name
1	Flash Evaporator	8	Evaporator
2	Compressor	9	Entering cooling water
3	Motor	10	Leaving cooling water
4	Main control cabinet	11	Entering chilled water
5	Oil pump control cabinet	12	Leaving chilled water
6	Condenser		

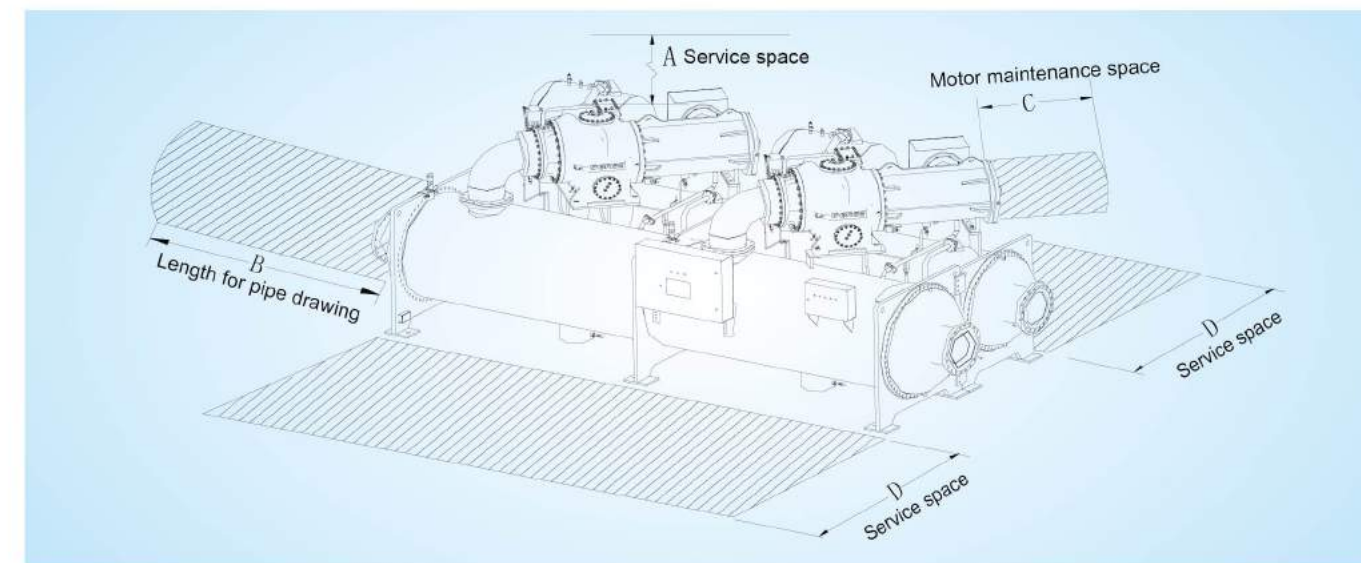
Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
CE610RN2QN2-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN200	DN200
CE611RN1QN1-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN200	DN200
CE612SN2RN2-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN250	DN250
CE620SN1RN1-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN250	DN250

Dimension of Installation and Maintenance Space



Dimension of Installation and Maintenance Space

Model	A	B	C	D
CE310LG2HG2	1500	3500	1500	1220
CE311LG1HG1	1500	3500	1500	1220
CE320MH4HH2	1500	3500	1500	1220
CE321MH3HH1	1500	3500	1500	1220
CE330MH2JH2	1500	3500	1500	1220
CE331MH1JH1	1500	3500	1500	1220
CE410PIEKIE	1500	3800	1500	1220
CE411PIDKID	1500	3800	1500	1220
CE420PICKIC	1500	3800	1500	1220
CE421PIBKIB	1500	3800	1500	1220
CE510PIAKIA	1500	3800	1500	1220
CE511QJCMJD	1500	4200	1650	1220
CE512QJBMJC	1500	4200	1650	1220
CE520QJAMJB	1500	4200	1650	1220
CE521RJAMJA	1500	4200	1650	1220
CE522RJAMJA	1500	4200	1650	1220
CE610SKNQKN	1500	4400	1800	1320
CE611SKMQKM	1500	4400	1800	1320
CE620SKLQKL	1500	4400	1800	1320
CE621TKNRKN-G	1500	4400	1800	1320
CE630TKMRKM-G	1500	4400	1800	1320
CE631TKLRKL-G	1500	4400	1800	1320
CE710TLNRLL-G	1500	4800	1800	1520
CE711TLMRLP-G	1500	4800	1800	1520
CE720TLRLO-G	1500	4800	1800	1520
CE721ULNSLN-G	1500	4800	1800	1520
CE730ULMSLM-G	1500	4800	1800	1520
CE731ULLSLL-G	1500	4800	1800	1520

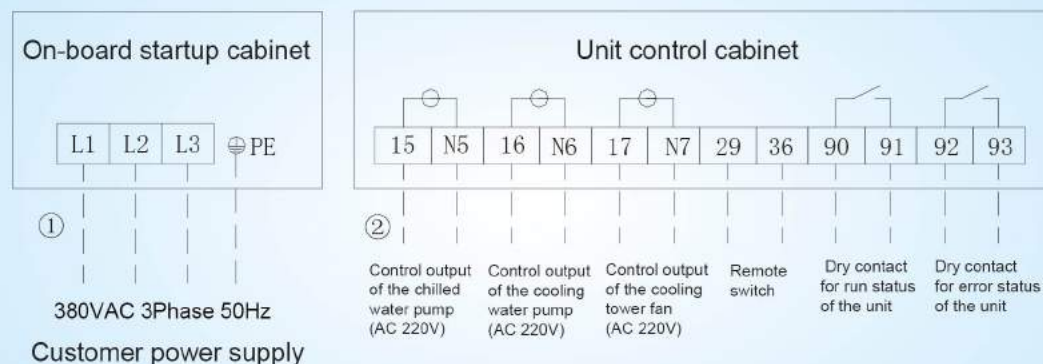


Dimension of Installation and Maintenance Space

Model	A	B	C	D
CE610UN4SN4-2-G	1500	6500	1800	1320
CE611UN3SN3-2-G	1500	6500	1800	1320
CE620UN2SN2-2-G	1500	6500	1800	1320
CE621UN1SN1-2-G	1500	6500	1800	1320

Electrical Installation

Diagram of Engineering Wiring for Low Voltage Centrifugal Chiller



Wiring Diagram for Low Voltage Centrifugal Chiller

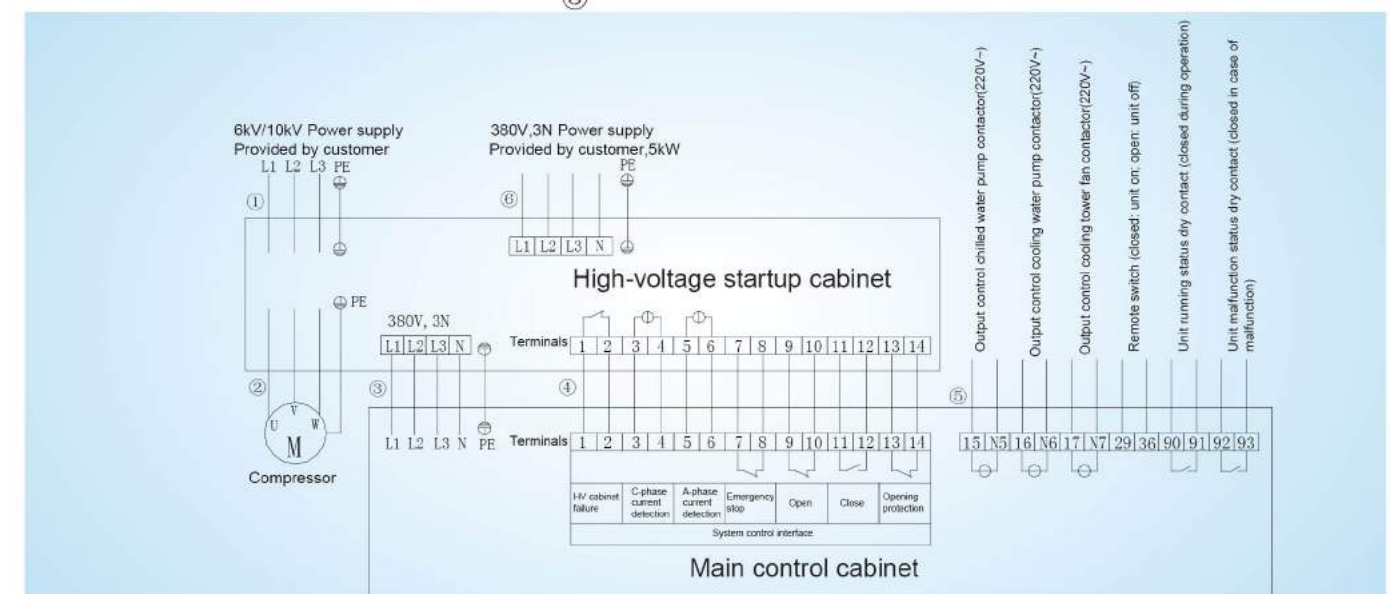
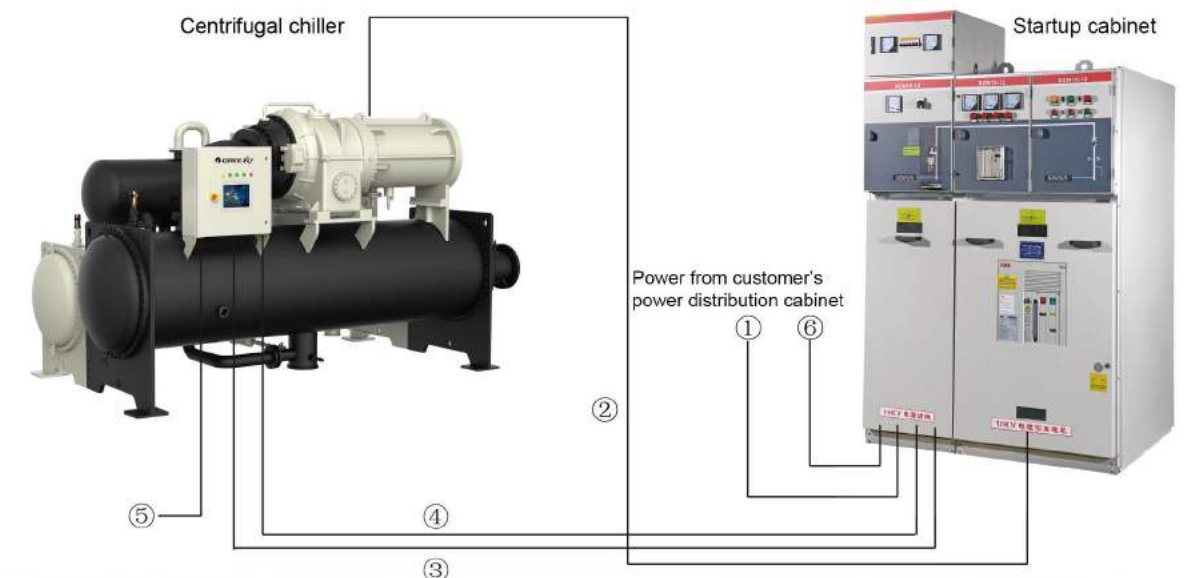
Wiring instructions:

(1) Line 1 represents the power cable between customer's power distribution cabinet and chiller's startup cabinet (3-phase, with ground wire). The required power supply is 380V 3~ 50Hz. The power cable shall enter from the top or bottom of the startup cabinet and the cable size varies as per the change of unit power.

(2) Line 2 represents the signal control line from the chiller's main control cabinet to the water pump control cabinet and remote switch. The cable size should be 1.0mm^2 .

Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

Wiring Diagram for High Voltage Centrifugal Chiller



Wiring instructions:

(1) Line 1 represents the power cable between the power distribution cabinet and the startup cabinet (3 phase with ground wire). The required power supply is 10kV, 3~50Hz. The way of power cable entering the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.

(2) Line 2 represents the power cable between the startup cabinet and the main motor of centrifugal chiller. The cable should leave from the bottom of startup cabinet and the cable size varies as per the change of unit power.

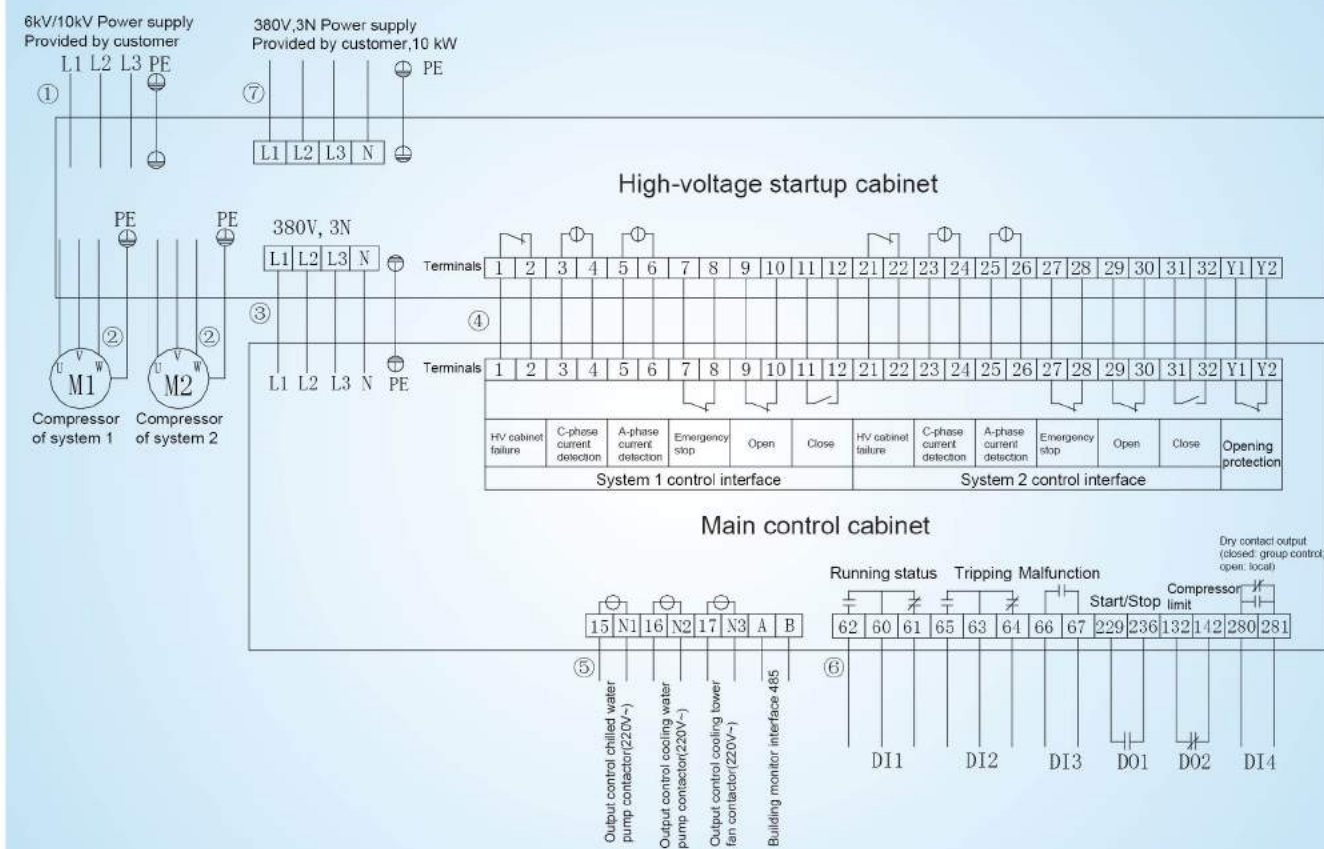
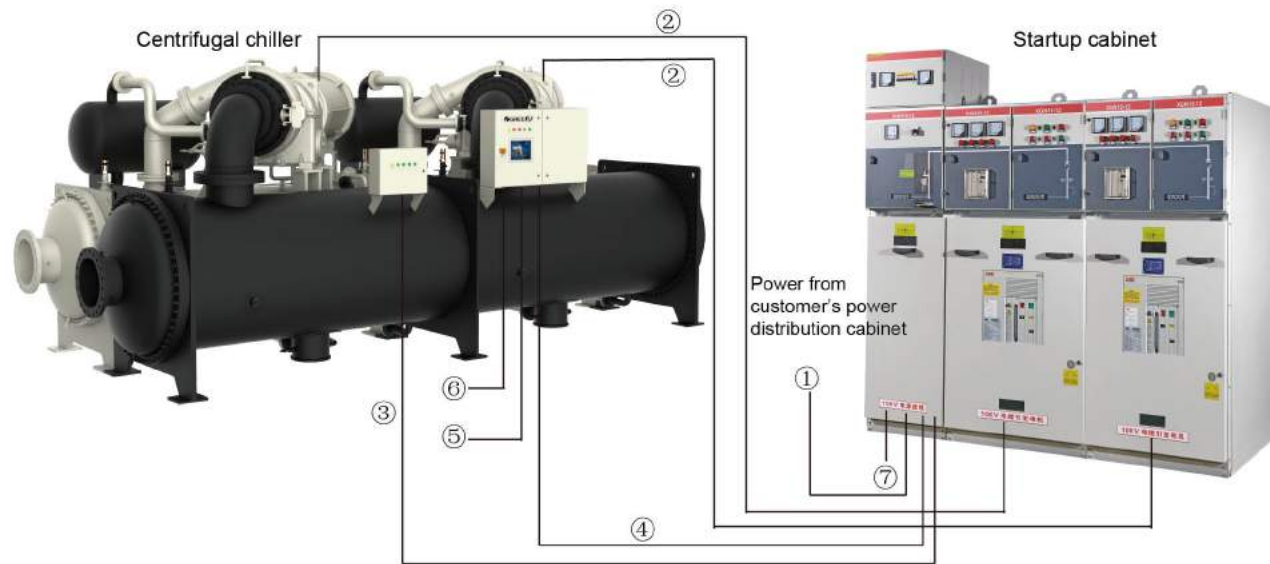
(3) Line 3 represents the power cable between the high-voltage cabinet (380V) and the control cabinet of the chiller (3 phase with neutral wire and ground wire). The cable size should be equal to or more than 2.5mm^2 . Power specification is 380V 3N~50Hz.

(4) Line 4 represents the signal control line between the startup cabinet and the main control cabinet. The size of the cables connecting terminals "3", "4", "5", "6" should be 2.5mm^2 . For other cables, the size should be equal to or more than 1.5mm^2 . (If the cable is more than 50m's long, use a thicker power cable.)

(5) Line 5 represents the signal control line from the main control cabinet to the water pump control cabinet and remote switch. The cable size should be equal to or more than 1.5mm^2 . (Note: water pump control cabinet is provided by the user.)

(6) Line 6 represents the low-voltage control power line from customer's low-voltage power distribution cabinet to the high-voltage startup cabinet. The size of the cables should be equal to or more than 2.5mm^2 .

Wiring Diagram for Dual-system Centrifugal Chiller



Wiring instructions:

- (1) Line 1 represents the power cable between customer's power distribution cabinet and the startup cabinet (3 phase with ground wire). The required power supply is 10kV, 3~50Hz. The way of power cable entering the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.
- (2) Line 2 represents the power cable between the startup cabinet and the main motor of centrifugal chiller. The way of power cable leaving the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.
- (3) Line 3 represents the power cable between the high-voltage cabinet (380V) and the oil pump control cabinet of the chiller (3 phase with neutral wire and ground wire). The cable size should be 4.0mm². Power specification is 380V 3N~50Hz. If heat dissipation of the environment is not good, we recommend using power cable of 6.0mm².
- (4) Line 4 represents the signal control line between the startup cabinet and the main control cabinet (see the diagram). The size of the cables connecting terminals "3", "4", "5", "6" and "23", "24", "25", "26" should be 2.5mm². For other cables, the size should be equal to or more than 1.5mm².
- (5) Line 5 represents the signal control line from the main control cabinet to the water pump control cabinet and remote monitor (see the diagram). The cable size should be equal to or more than 1.5mm². (Note: water pump control cabinet is provided by the user.)
- (6) Line 6 is from the main control cabinet to the interface of customer instrument control system.
- (7) Line 7 represents the low-voltage control power line from customer's low-voltage power distribution cabinet to the high-voltage startup cabinet. The size of the cables should be equal to or more than 4.0mm². If heat dissipation of the environment is not good, we recommend using power cable of 6.0mm².

Scope of Supply

S= Standard Supply; O= Owner's Supply; P= Purchased Supply

Item	QTY	Spec.	Type	Applicable scope
Main unit	1	Set	S	
Refrigerant	See Table of Spec.	R134a	S	
Lubricating oil	Check with manufacturer for more details	Number 68 synthesis lipid lubricating oil	S	
Low-voltage startup cabinet	1	Set	S	Applicable to 380V unit
High-voltage startup cabinet	1	Set	P	Applicable to 6kV or 10kV unit
Oil filter	1	PC	P	

Note

Award and Certification

