



Commercial Air Conditioners **2018**



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Water Cooled Centrifugal Chiller

Standard efficiency:500-2200Ton

High efficiency:700-2200Ton

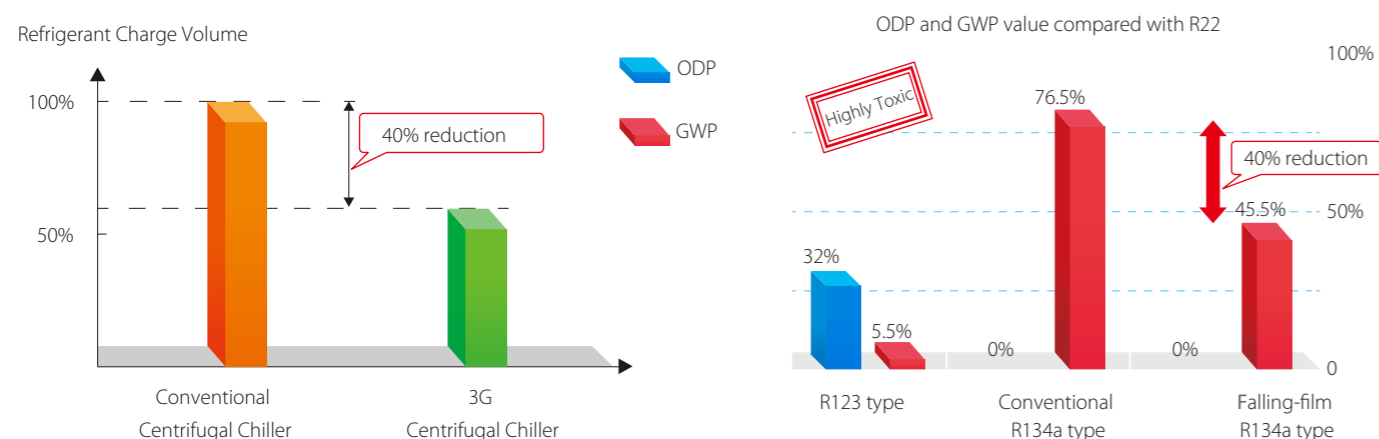
R134a



Features

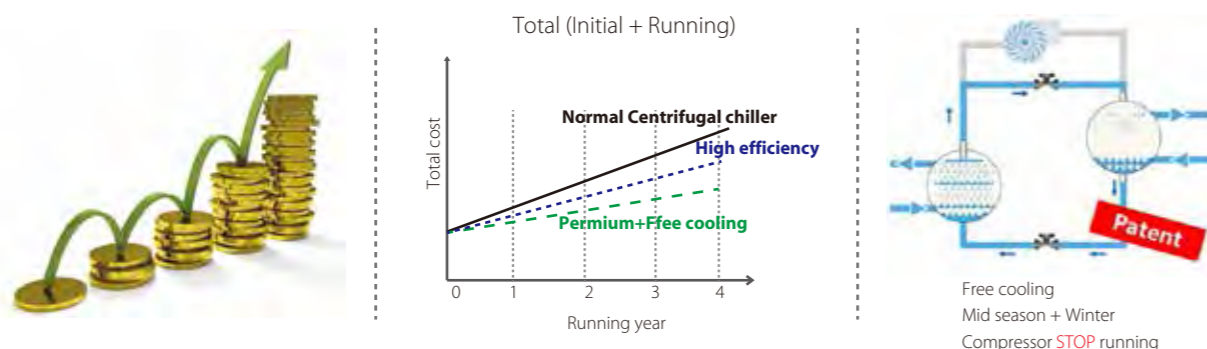
Environment friendly >>

R134a, an environmentally friendly refrigerant, has zero ozone depletion potential and completely meets the Montreal Protocol without any phase-out plan. The initially designed full falling-film evaporator significantly improves heat exchange efficiency and reduces refrigerant charge volume by more than 40%.



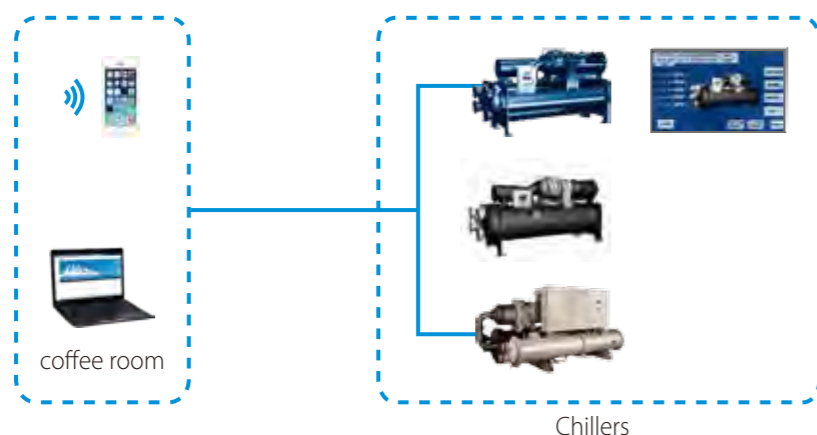
Low operation cost >>

Centrifugal chiller has a COP up to 6.3 in AHRI condition. Helped by "free cooling" technology during transition season, no power consumption. Both of these greatly reduce operation costs.



Simple & convenient operation >>

Control system, it doesn't have BMS, but need control and monitor chillers, Pre-alarm and fast trouble shooting (Big data analyse) and maintenance advise.



Reliable quality >>

100% run-tested in factory, large research investments and the strict requirements on product quality ensure the high reliability of the product.

❖ 8000 kW chiller performance testing center

The 8800kW water cooled chiller testing stand is one of the most advanced testing facilities in the world. It is able to simulate all chillers running conditions such as the standard testing condition of (7/12 °C, 30/35 °C), AHRI testing condition (6.7/12.2 °C, 29.4/35 °C). It provides all precise testing data for the IPLV and NPLV calculation. Witness testing service is optional for all the clients to ensure the product performance. Every chiller will be tested in the stand before shipping.



❖ 1500kW motor performance testing center

The 1500kW compressor motor testing lab used to simulate actual working conditions provides an adjusted electrical factor for all the compressors. The cooling capacity ranges from 1200kW to 8800kW. Evaporating temperature ranges from -20 °C to 40 °C and condensing temperature ranges from 25 °C to 80 °C. It is one of the most advanced testing facilities in China



❖ The independent clean room for compressor assembling

The centrifugal chiller compressor assembling room is a clean and constant temperature control space. The core components for compressor will be installed and tested here (Motor, gear, bearing, shaft, impeller etc). Dynamic testing for high speed rotation part will be done in the assemble room.



Wide application >>

3G centrifugal chiller with a "wide range" compression ratio design works efficiently in a variety of conditions. These include large temperature difference with low water flow rate systems, variable primary flow systems, standard water source or ground-water systems and ice storage systems. In large projects, it is possible to minimize the initial investment and floor space by using large-capacity chillers.

Long lifespan >>

Keyless impeller coupling and patent design, less mechanical loss, adopts well-known brand parts to ensure stable operation, better reliability, stability and long lifespan.

Six Core Technologies

Explore the Frontier of Aerodynamic Technology >>

Full Flow Pass Optimization, further increases efficiency

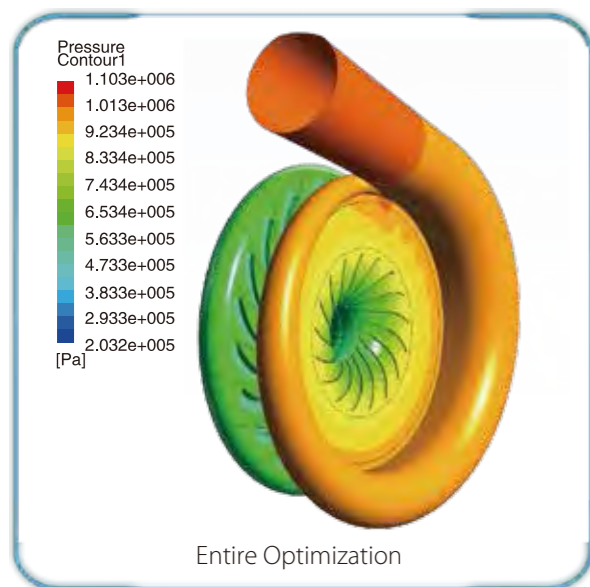
Newly designed three-dimensional flow impeller, coupled with the optimized volute, ensures the flow velocity and maximizes efficiency

Centrifugal compressor adopts the over-hung volute thus compacting the structure.

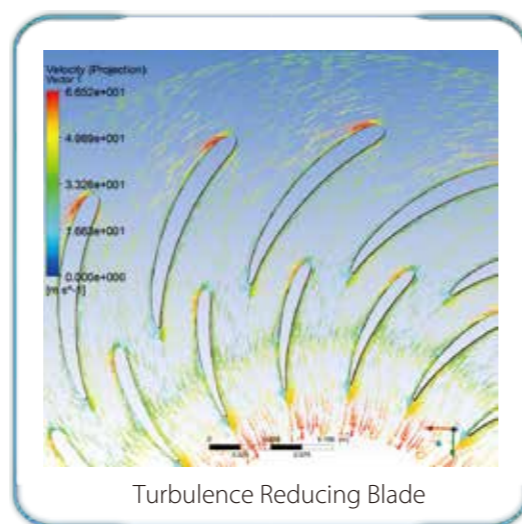


Volute Model

The gas flow perfectly matches the interior flow channel, hence the loss of impact reduced.



Aerodynamic loss balance design reduces the aerodynamic noise

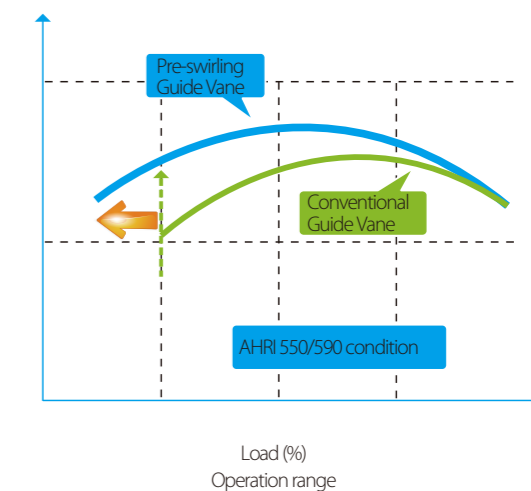
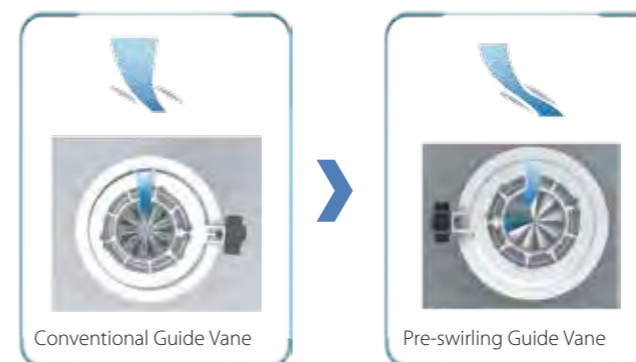


The newly designed high efficiency three-dimensional flow alloy impeller, produced in a German GMD 5-axis machine center, has highly machined precision and 30% reduced impeller thickness, thus reducing the axial force loss and separation loss.

High Efficient Three-dimension Flow Impeller

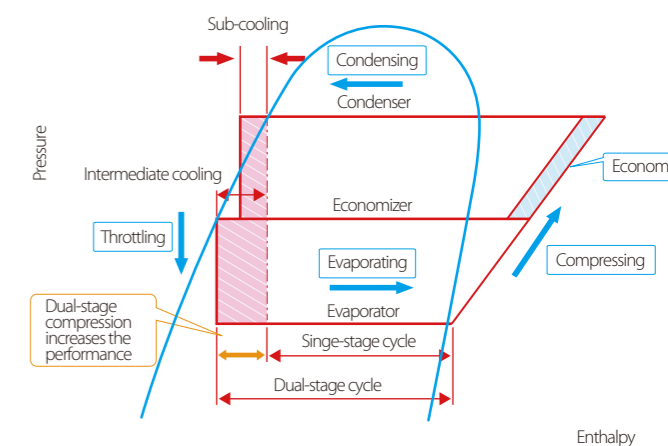
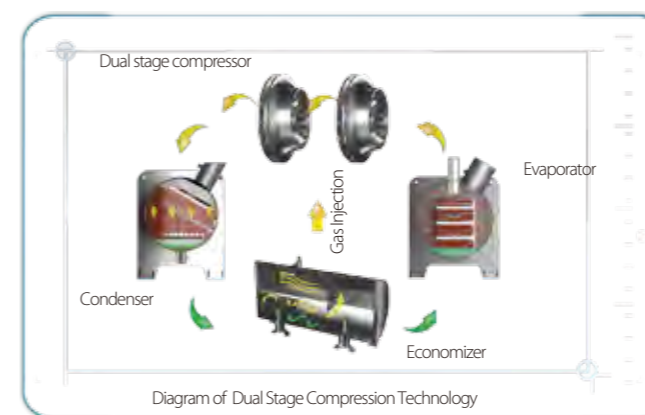
Pre-swirling Guide Vane Technology >>

The compressor is equipped with an airfoil shaped pre-swirling guide vane, which will produce swirl under different load conditions, thus extending the operation range and increasing the part load efficiency.



Dual stage compression Technology >>

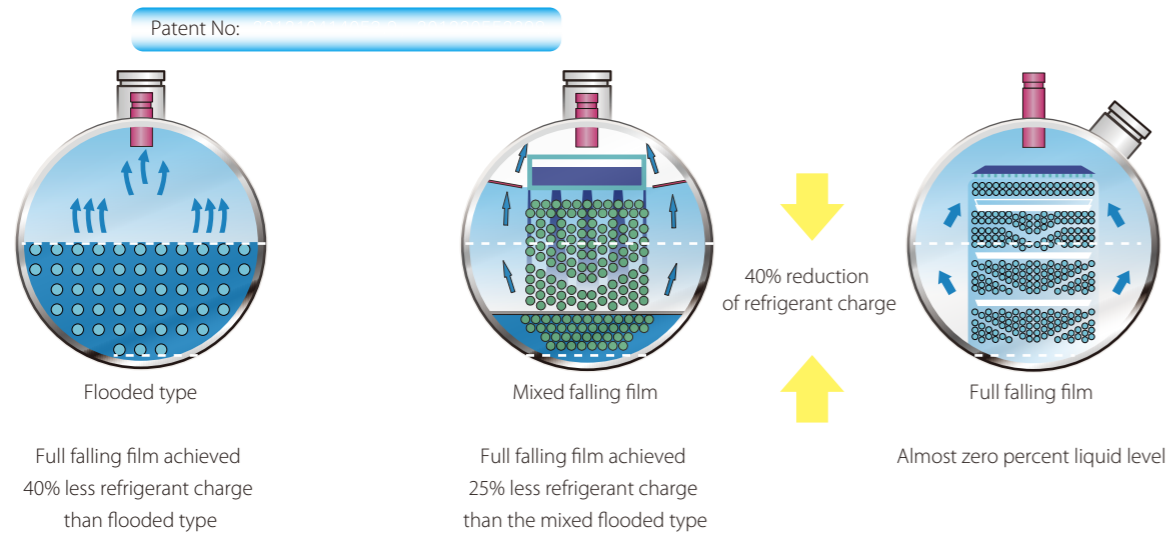
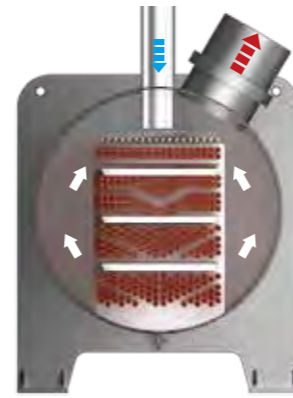
- ❖ Uniquely designed dual stage compression technology enhances the heat absorption capacity of refrigerant, and lowers power consumption, which increases energy efficiency by 6% when compared to single stage compressors.
- ❖ Dual stage impeller has an equal ratio compression design, which helps to reduce rotation speed and enhance reliability.
- ❖ Unique three-stage separation economizer simplifies the system design.



Creative Heat-exchanging Technology >>

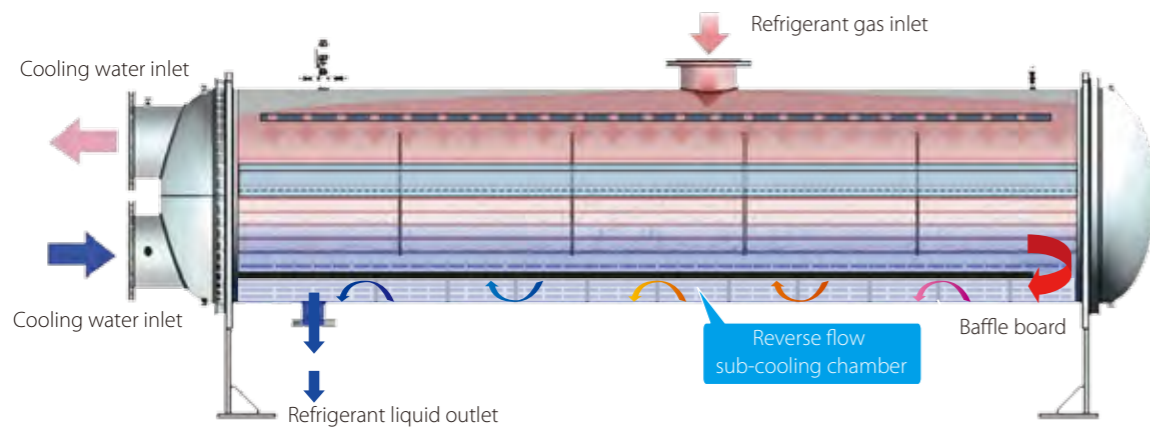
❖ Full falling-film Evaporating Technology

The unique full falling-film evaporating technology: spraying technology causes the liquid refrigerant form and evaporate on the surface of evaporating tubes, which significantly boosts heat-exchanging efficiency and reduces refrigerant charge by 40%. Adopts patented technologies to ensure refrigerant is distributed evenly and liquid does not form in the evaporator, which expands the potential heat-exchanging capacity to its full potential and enhances the efficiency of the whole system.



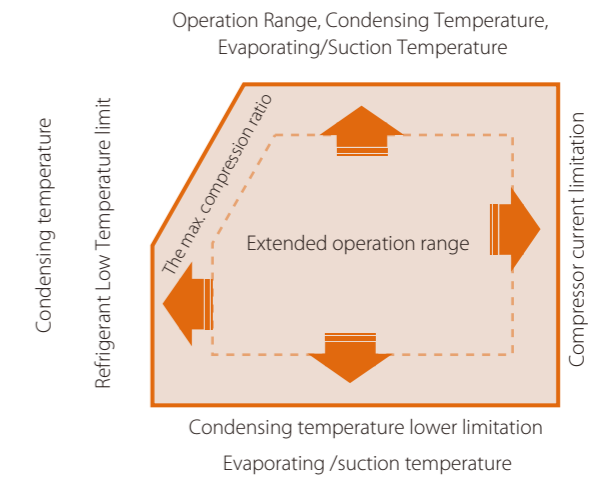
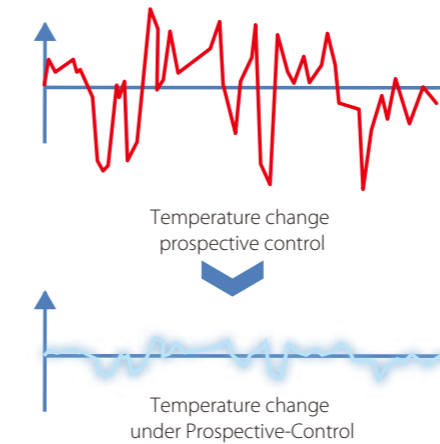
Condenser >>

High efficient heat-exchanger and optimized structure enhance heat exchanging performance. The design of a reverse flow sub-cooling chamber with multiple turbulences increases the sub-cooling level and improves the performance.



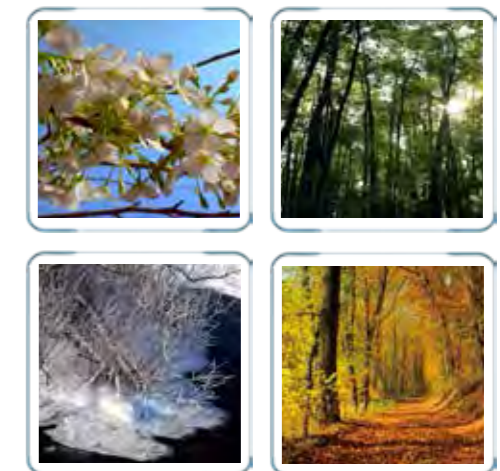
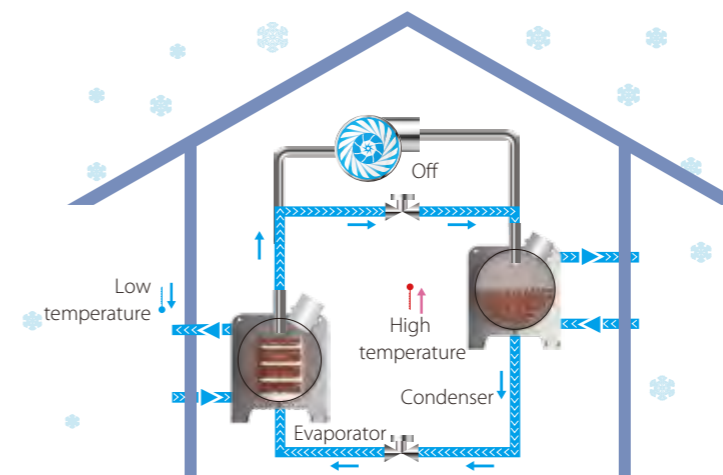
Prospective-Control Logic >>

The microcomputer control system has such features as trend prediction, self-diagnosis, self-adjustment and safety protection. Capable of predicting real load change according to target values and load level history, prospectively modifying the operation load and preventing energy waste.



Free Cooling Technology- Refrigeration Migration >>

Centrifugal Chillers feature 'Free Cooling Technology'. When outdoor temperatures are low and large commercial buildings' interior spaces need cooling, the main unit will work on 'Free Cooling' mode. Free cooling is the production of chilled water without running a compressor. The relative warm, and energy are carried directly to the low pressure condenser, where it is cooled and condensed by water from the cooling tower. Then the low temperature liquid refrigerant flows to the evaporator driven by gravity, then it naturally circulates. Costs are reduced due to the compressor's inactivity and zero power consumption of the main unit. The principle is that the refrigerant tends to move towards the coldest point in a refrigeration circuit. It can be used generally in transition seasons such as late fall, winter and early spring.

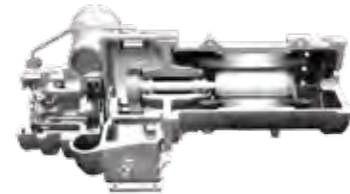


Mechanical Specification



Economizer in dual stages type

The economizer is used in the dual stage compressor. Uniquely designed economizer improves efficiency from 5% to 8% compared with the single stage compressor.



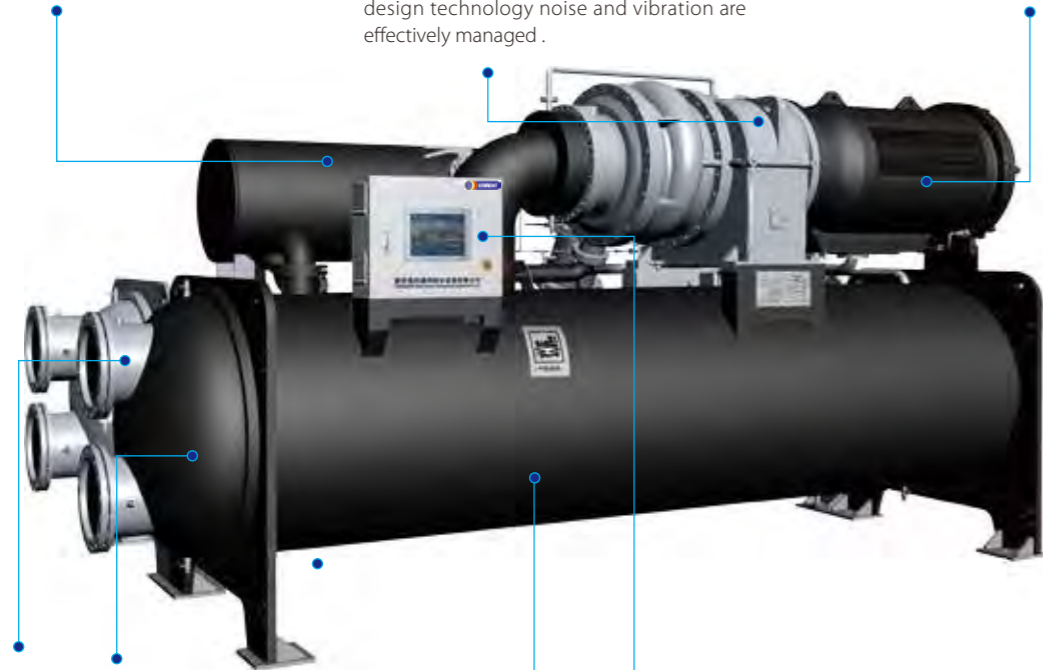
Semi-Hermetic centrifugal compressor

The compressor is designed on advanced design platform, the impeller and chamber are precisely aligned. The compressor is equipped with less moving parts and features a compact design. By using double layer design technology noise and vibration are effectively managed.



Gas cooled motor

The motor is cooled by refrigerant which ensures excellent performance in various working conditions and long life span. This high efficiency motor has a power factor of up to 97%.



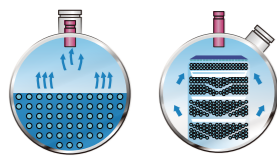
Shell and tube condenser and flooded type evaporator

The condenser is a shell and tube type for easy service. Flooded type evaporator used in the single stage product and full falling film evaporator used in dual stage chiller.



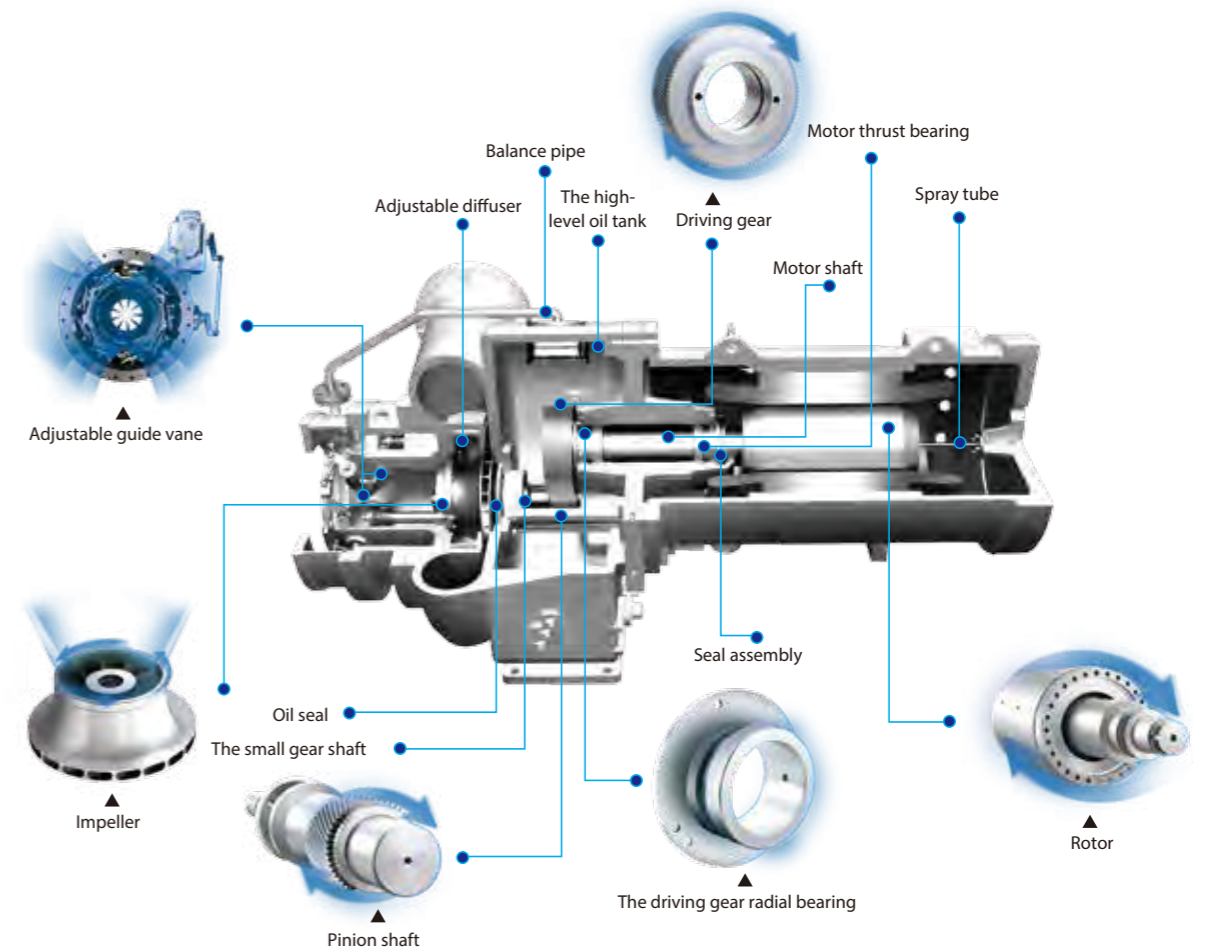
Advanced system control and user friendly screen

The system is controlled by industry type PLC with multiple functions and high stability. It is open protocol for RS 485 which is compatible for BMS. The operation screen is user friendly with a 10 inch colour touchscreen.

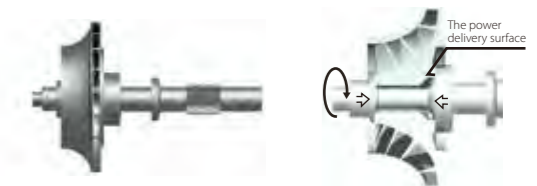


Environment friendly refrigeration

R134a is environmentally friendly gas with zero ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential). The R134a refrigeration is no phase out gas and good choice for large chiller.



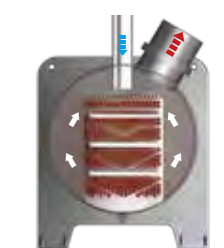
Keyless impeller coupling with high speed shaft (PATENT NO.: ZL 01 2 56824.4)
The impeller is coupled to the shaft without any key to eliminate any excess stress to the shaft. Ensures the high speed shaft operates stably and its life span.



Inlet guide vane (IGV) match with movable diffuser (PATENT NO.: ZL01 2 56825.2)
The IGV matches with the moveable diffuser ensure the compressor operates stably in low partial load without any surge or stall. Capacity adjustment is from 10% to 100%.



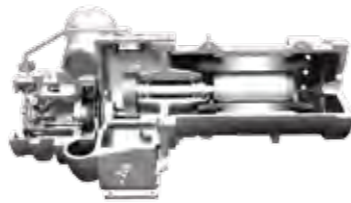
Full falling film heat exchange technology (PATENT NO.: 20121041053.9 201220552298)
Unique spraying technology causes the liquid refrigerant to form a film on the tube surface and then evaporate. By using this technology the heat exchange rate increase 3 to 8 % and refrigerant charge decrease 40%.



Advanced design platform improves the performance of impeller, volute and other key components of centrifugal chillers, raising the isentropic efficiency of compressors up to 88.2%. Increases the efficiency as well as the stability.

Compressor >>

The centrifugal compressor with high-strength fully shrouded aluminum alloy impellers and moveable inlet guide vane. The enclosed type impeller is designed for balanced thrust and is dynamically balanced and overspeed tested for smooth, vibration free operation. Airfoil shaped inlet guide vane minimizes flow disruption for efficient part load performance. The movement of the inlet guide vane is controlled by a mounted electric actuator that responds to refrigeration load on the evaporator. The rotor assembly consists of high strength heat-treated alloy steel drive shaft with a high strength, and the high speed shaft is forged to guarantee strength and reliability.



Motor >>

Centrifugal chiller uses a semi-hermetic two-pole motor and is cooled by circulating refrigerant, winding embedded sensors provide positive thermal protection to the motor. Asynchronism squirrel cage type motor can achieve high operation performance and long life span. A refrigerant cooled motor keeps motor heat out of the mechanical room, decreases vibrations and shaft seal maintenance compared with open motors. Also refrigerant cooled motors have lower inrush currents and lower operating noise than open motor which are air cooled, there is no need to provide additional ventilation. The motor is bolted to compressor gear housing and shaft labyrinth seal prevents refrigerant leakage from the motor to the gear box. Low voltage motor provides 6 terminals for reduced starting voltage (wye-delta or auto transformer start). High voltage motor provides three terminal posts for full voltage (across the line). Motor terminal pads are supplied. The terminal board is protected by a steel terminal box.



Impeller And Inlet Guide Vane >>

High strength aluminum-alloy compressor impellers feature reversed -curved vanes for high efficiency. Airfoil shaped inlet guide vanes minimize flow disruption for efficient part load performance. Precisely positioned and tightly fitted, it allows the compressor to unload smoothly from 10% to 100% load output guaranteeing smooth operation under real conditions. Movement is controlled by a mounted electrical operator that responds to refrigeration load on the evaporator. Impellers are made of high strength aluminum alloy which is tested at 125% of the designed operating speed.



Keyless Impeller Coupling >>

The impeller and the main shaft are coupled by keyless connection, it eliminates stress concentration on the power transmission surface and thus the life span of the impeller is greatly increased. Since there is no friction, the efficiency is higher than the traditional key coupling. This unmatched mechanical design was awarded by the State Intellectual Property Office



Precise Gearing >>

The specially engineered, single helical gear with crowned teeth keep multiple teeth in contact at all times to provide even distribution of compressor load and quiet operation. Gear tooth surfaces are case hardened and precision ground which can reach the class of 5. Gears are integrally assembled in the compressor rotor support and are oil film lubricated. Each gear is individually mounted in its own journal and thrust bearings to isolate it from impeller and motor forces. The double layer soundproof compressor design prevents gear contacting noise from escaping.



Bearings >>

Motor is suitable journal bearings to handle the radial load, axial load and drive speed. The slide bearing base has an embedded babbitt alloy covering which is softer than the main shaft and protect the shaft first when emergency happen. With high technology oil film lubrication design which keep the bearing and shaft only transitory contact and friction free when operation.



Lower Sound Levels and Vibration >>

Specially engineered gearing, double soundproof gearbox structure, optimized impeller and tunnel design ensure our chillers achieve lower sound levels. A gear-driven compressor runs at higher impeller rotational speeds but tends to have less vibration than the larger, much heavier, direct drive units.

Condenser Baffle >>

The baffle prevents direct impingement of high velocity compressor gas onto condenser tubes. Eliminates related vibration and wears on the tubes and distributes the refrigerant flow evenly over the length of the condenser for improved efficiency.

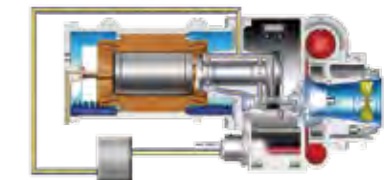
Advanced Capacity Adjustment >>

Inlet guide vanes work with moveable diffusers resulting in a stepless capacity range from 10% to 100% and free of surge. The Inlet Guide Vane (IGV) is controlled by an actuator that is directly run by the PLC. This technology was awarded a patent by the State Intellectual Property Office



Reliable Lubricant System >>

The lubrication system consists of an internal oil sump with oil heaters, positive displacement oil pump, brazed plate oil cooler, and oil return line. High position oil sump supplies oil to the gear surface for lubrication, prevents gear wear if sudden power loss occurs.



Oil Filter and Oil cooler >>

A plate type oil cooler is factory mounted on the side of the compressor. An external oil filter and oil cooler make maintenance and filter replacement easier. Replacement of the oil filter or oil cooler can be done after the isolation valve in the pipe line is closed.



Unmatched Oil Reclaim System >>

During the running of chiller unit, a small amount of lube may interfuse with the refrigerant. Patented oil reclaim system is designed to return the oil from the heat exchanger back to the oil tank. Improves the refrigerant purity therefore increasing the thermal exchange efficiency and providing sufficient oil to compressor.

Low Inrush Current >>

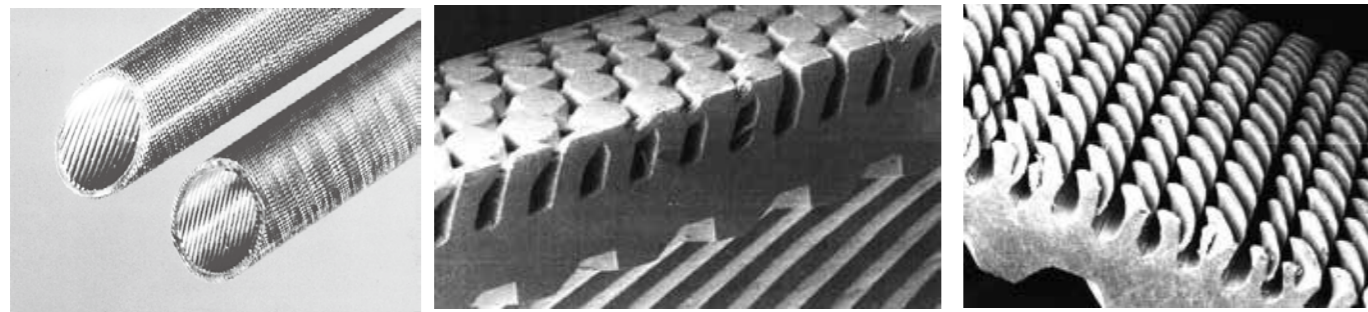
Standard starter for centrifugal chiller is a popular type for centrifugal chiller applications, that's wye-delta starter. The motor windings first connect in a "wye" configuration to reduce inrush current to 33.3% of locked rotor amps and producing 33.3% of normal starting torque. After a brief delay (transition time), the electrical load is momentarily transitioned to resistances while the motor windings are changed to the "delta" configuration. The resistances minimize the second inrush current when the delta configuration becomes active. The soft start and VSD are also available for various applications.

100% Factory Run-Tested >>

After assembly, the unit will go through a complete performance test in the test center. The benefits of a performance test include verification of performance, prevention of operational problems and assurance of a smooth start-up. A chiller that has been tested is operationally and performance-proven.

Heat Exchanger Tube >>

High-efficiency, externally and internally enhanced heat exchanger tubes provide optimum performance. Tubes in both the evaporator and condenser are 3/4" O.D. with a copper alloy internal and external surface. This provides extra wall thickness (up to twice as thick) and non-work hardened copper at the support location, extending the life span of the heat exchanger. Each tube is roller expanded into the tube sheets providing a leakproof seal, and is individually replaceable. Copper alloy comes standard and 90/10 copper-nickel, 304 stainless steel or titanium can be customized.

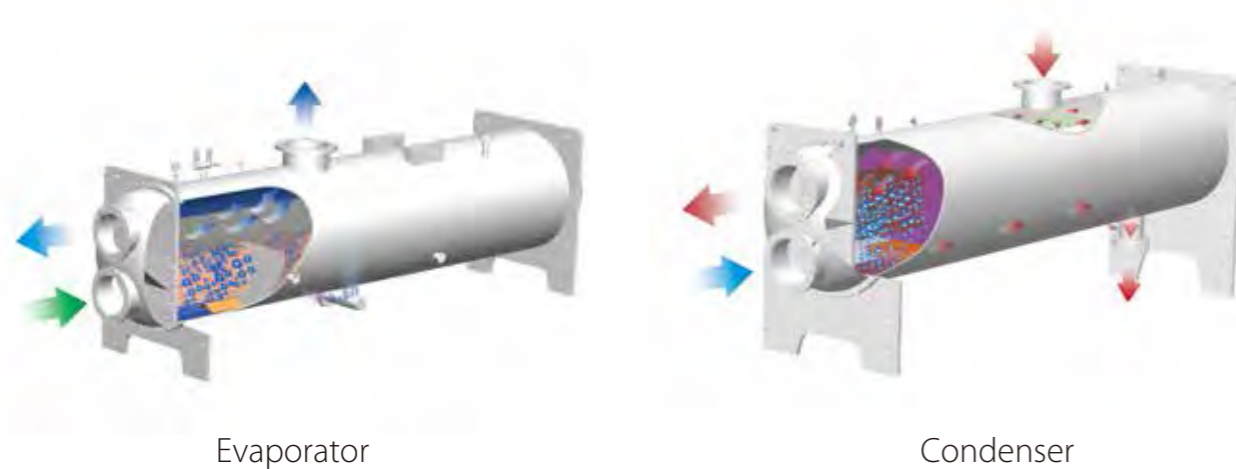


Evaporator >>

The evaporator is a shell and tube type heat exchanger. A flow equalizer provides uniform distribution of refrigerant over the entire tube length to yield optimum heat transfer. The evaporator shell contains a dual refrigerant relief valve arrangement set at 185 PSIG (1280 kPa) or a single-relief valve arrangement. Intermediate tube support sheets positioned along the shell axis prevent relative tube motion. The waterside is hydraulic tested at 1.5 times the maximum working pressure.

Condenser >>

The condenser is shell and tube type, with discharge gas baffle to prevent direct high velocity gas impingement on the tubes. The baffle is also used to distribute the refrigerant gas flow properly for most efficient heat transfer. An integral sub-cooler is located at the bottom of the condenser shell providing highly effective liquid refrigerant subcooling to provide the highest cycle efficiency. Regarding the dual-stage compressing, using the economizer can improve the efficiency by 5-8%. The condenser contains a refrigerant relief valve sets at 1.6 MPa. Standard maximum waterside working pressure is 1.0 MPa. The waterside is hydraulic tested at 1.5 times the maximum working pressure.



Water Box >>

The removable water boxes are fabricated of steel. The design working pressure is 150 PSIG (1034 kPa) and the boxes are tested at 225 PSIG (1551 kPa). Integral steel water baffles are located and welded within the water box to provide the integrity required to pass the test conditions. The nozzle connections are suitable for flanges and are capped when shipped. Plugged 3/4" drain and vent connections are provided in each water box.



Orifice >>

There are three refrigerant control devices used in the industry, expansion valves, fixed orifices, and float systems. Standard efficiency uses the fixed orifice without any moving part and increasing reliability. The high efficiency and super high efficiency type centrifugal chiller are equipped with the orifice as well as electronic ball valve plus liquid level control technology to improve the efficiency in the partial load. These matches ensure the chiller works stably in any working situation and improves the IPLV and NPLV significantly.

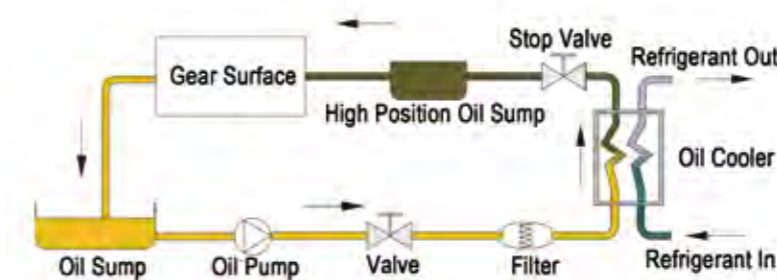
Control Panel >>

Adopts the state-of-the-art microprocessor control system with a durable 10.4 inch LCD touchscreen. The LCD touchable screen with graphical display of chiller parameters, fast and easy access make operation relatively simple. It also can communicate with the user's PC and remote control for start/stop and operation of the cooling system. More than 30 protection features are used to make chiller operation secure and reliable. The latest 10 failure reports can be recorded for inquiry.



Lubrication System >>

A separately driven electric oil pump assembly supplies lubricant to the compressor at proper temperature and pressure. After filtration the oil is sent to the oil cooler after adjusting. And then adjust its pressure it is transferred to bearings. Specially designed seals are installed on the inner side of motor bearings at both ends to minimize lubricant leakage into the main motor and prevent contamination of the R134a in the evaporator. An electric heater is used inside the oil tank to maintain in proper oil temperature all the time. Oil temperature is thus maintained in the event of a compressor shutdown, certain oil temperature can be maintained. Thus prevent the R134a gas from entering the oil and decreasing lubrication efficiency. Therefore, while the compressor is shut down, it is necessary to keep the oil heater on to maintain the oil at a certain temperature. If the compressor will out of service for an extended period of time, running the oil heater is still required.



Standard Series

Nomenclature >>

CWCF xxx SERIES



Specifications

Model (CWCFxxx)		500	550	600	650	700	750	
Cooling capacity	RT	500	550	600	650	700	750	
	kW	1758	1934	2110	2285	2461	2637	
	10 ⁴ kcal/h	151	166	181	197	212	227	
Efficiency	Running power (1)	kW	303	333	364	394	424	455
	COP (1)	kW/ kW	5.8	5.81	5.79	5.8	5.81	5.79
	Running power (2)	kW	313	345	376	406	437	470
	COP (2)	kW/ kW	5.62	5.61	5.61	5.63	5.63	5.61
Compressor	Configured power	kW	385	385	445	490	490	560
	Power supply		380V~3Ph~50Hz			380/10000V~3Ph~50Hz		
	Motor cooled by		Refrigerant					
Evaporator	Chilled water flow	m ³ /h	302	333	363	393	423	454
	Chilled water pressure drop	kPa	63	62	65	72	70	74
	Pass	/	2					
	Chilled water inlet/outlet temperature	°C	12/7					
	Connection type		Flange					
	Water pipe inlet/outlet diameter	/	DN250	DN250	DN250	DN300	DN300	DN300
Condenser	Cooling water flow	m ³ /h	362	397	433	466	501	537
	Cooling water pressure drop	kPa	65	63	68	71	76	76
	Pass	/	2					
	Cooling water inlet/outlet temperature	°C	30/35					
	Connection type		Flange					
	Water pipe inlet/outlet diameter	/	DN250	DN250	DN250	DN300	DN300	DN300
Weight	Shipping weight	kg	7650	7960	8146	10595	10670	10750
	Running weight	kg	8958	9390	9641	12382	12559	12700
Dimension	Unit length	mm	4650	4650	4650	5020	5020	5020
	Unit width	mm	1850	1850	1850	2100	2100	2100
	Unit height	mm	2054	2054	2054	2510	2510	2510
	Packing length	mm	4650	4650	4650	5020	5020	5020
	Packing width	mm	1850	1850	1850	2100	2100	2100
	Packing height	mm	2174	2174	2174	2630	2630	2630

Note:
 Nominal cooling capacities are based on the following conditions:
 Chilled water inlet/outlet temp.(1): 12°C/7°C; Cooling water inlet/outlet temperature 30/35°C.
 Chilled water inlet/outlet temp.(2): 12°C/7°C; Cooling water inlet/outlet temperature 32/37°C.
 The design fouling factor for both evaporator and condenser are 0.086 m²·°C/kW, otherwise can be customized.
 The design max. working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

Model (CWC _F xxx)		800	850	900	950	1000	1100	1200	
Cooling capacity	RT	800	850	900	950	1000	1100	1200	
	kW	2813	2989	3164	3340	3516	3868	4219	
	10 ⁴ kcal/h	242	257	272	287	302	333	363	
Efficiency	Running power (1)	kW	484	515	544	575	602	656	724
	COP (1)	kW/ kW	5.81	5.8	5.82	5.81	5.84	5.9	5.83
	Running power (2)	kW	500	532	563	595	623	679	750
	COP (2)	kW/ kW	5.63	5.62	5.62	5.61	5.64	5.7	5.63
Compressor	Configured power	kW	560	630	630	695	695	760	840
	Power supply	380/10000V~3Ph~50Hz							
	Motor cooled by	Refrigerant							
Evaporator	Chilled water flow	m ³ /h	484	514	544	575	605	665	726
	Chilled water pressure drop	kPa	75	78	80	82	85	83	84
	Pass	/	2						
	Chilled water inlet/outlet temperature	°C	12/7						
	Connection type	Flange							
	Water pipe inlet/outlet diameter	/	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Cooling water flow	m ³ /h	575	611	645	680	719	789	862
	Cooling water pressure drop	kPa	76	77	77	76	72	76	77
	Pass	/	2						
	Cooling water inlet/outlet temperature	°C	30/35						
	Connection type	Flange							
	Water pipe inlet/outlet diameter	/	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Weight	Shipping weight	kg	10835	10905	10974	11400	11547	11715	11860
	Running weight	kg	12914	13062	13189	13882	14123	14458	14726
Dimension	Unit length	mm	5020	5020	5020	5045	5045	5045	5045
	Unit width	mm	2100	2100	2100	2300	2300	2300	2300
	Unit height	mm	2510	2510	2510	2610	2610	2610	2610
	Packing length	mm	5020	5020	5020	5045	5045	5045	5045
	Packing width	mm	2100	2100	2100	2300	2300	2300	2300
	Packing height	mm	2630	2630	2630	2370	2370	2370	2370

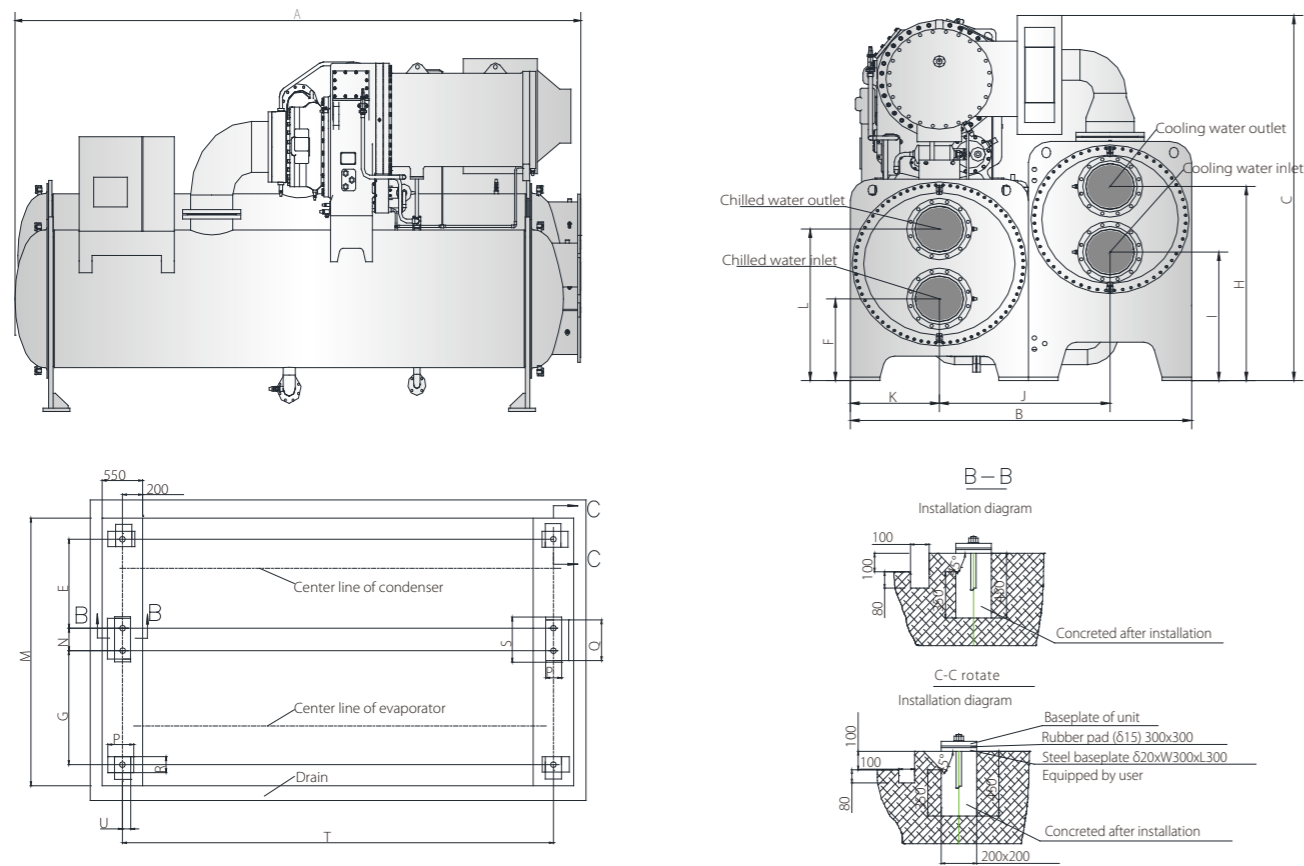
Note:
 Nominal cooling capacities are based on the following conditions:
 Chilled water inlet/outlet temp.(1): 12°C/7°C; Cooling water inlet/outlet temperature 30/35°C.
 Chilled water inlet/outlet temp.(2): 12°C/7°C; Cooling water inlet/outlet temperature 32/37°C.
 The design fouling factor for both evaporator and condenser are 0.086 m²/kW, otherwise can be customized.
 The design max. working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

Model (CWC _F xxx)		1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	
Cooling capacity	RT	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	
	kW	4571	4922	5274	5626	5977	6329	6680	7032	7384	7735	
	10 ⁴ kcal/h	393	423	454	484	514	544	575	605	635	665	
Efficiency	Running power (1)	kW	779	834	892	957	1016	1057	1127	1185	1252	1315
	COP (1)	kW/ kW	5.87	5.9	5.91	5.88	5.88	5.99	5.93	5.93	5.9	5.88
	Running power (2)	kW	803	862	918	980	1054	1095	1168	1229	1298	1364
	COP (2)	kW/ kW	5.69	5.71	5.75	5.74	5.67	5.78	5.72	5.72	5.69	5.67
Compressor	Configured power	kW	840	930	990	1100	1100	1100	1200	1320	1320	1450
	Power supply	10000V~3Ph~50Hz										
	Motor cooled by	Refrigerant										
Evaporator	Chilled water flow	m ³ /h	786	847	907	968	1028	1089	1149	1210	1270	1331
	Chilled water pressure drop	kPa	85	84	81	83	87	89	90	88	89	90
	Pass	/	2									
	Chilled water inlet/outlet temperature	°C	12/7									
	Connection type	Flange										
	Water pipe inlet/outlet diameter	/	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Condenser	Cooling water flow	m ³ /h	932	1004	1075	1147	1218	1289	1360	1431	1504	1576
	Cooling water pressure drop	kPa	83	84	87	88	90	89	92	94	95	96
	Pass	/	2									
	Cooling water inlet/outlet temperature	°C	30/35									
	Connection type	Flange										
	Water pipe inlet/outlet diameter	/	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Weight	Shipping weight	kg	18910	19400	20100	20800	21400	23310	23540	23820	24070	24300
	Running weight	kg	22490	22730	23430	24200	25100	26780	27230	27680	27916	28150
Dimension	Unit length	mm	5190	5190	5190	5190	5190	5290	5290	5290	5290	
	Unit width	mm	2700	2700	2700	2700	2700	3150	3150	3150	3150	
	Unit height	mm	3010	3010	3010	3010	3010	3180	3180	3180	3180	
	Packing length	mm	5490	5490	5490	5490	5490	5590	5590	5590	5590	
	Packing width	mm	2900	2900	2900	2900	2900	3350	3350	3350	3350	
	Packing height	mm	3310	3310	3310	3310	3310	3480	3480	3480	3480	

Note:
 Nominal cooling capacities are based on the following conditions:
 Chilled water inlet/outlet temp.(1): 12°C/7°C; Cooling water inlet/outlet temperature 30/35°C.
 Chilled water inlet/outlet temp.(2): 12°C/7°C; Cooling water inlet/outlet temperature 32/37°C.
 The design fouling factor for both evaporator and condenser are 0.086 m²/kW, otherwise can be customized.
 The design max. working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

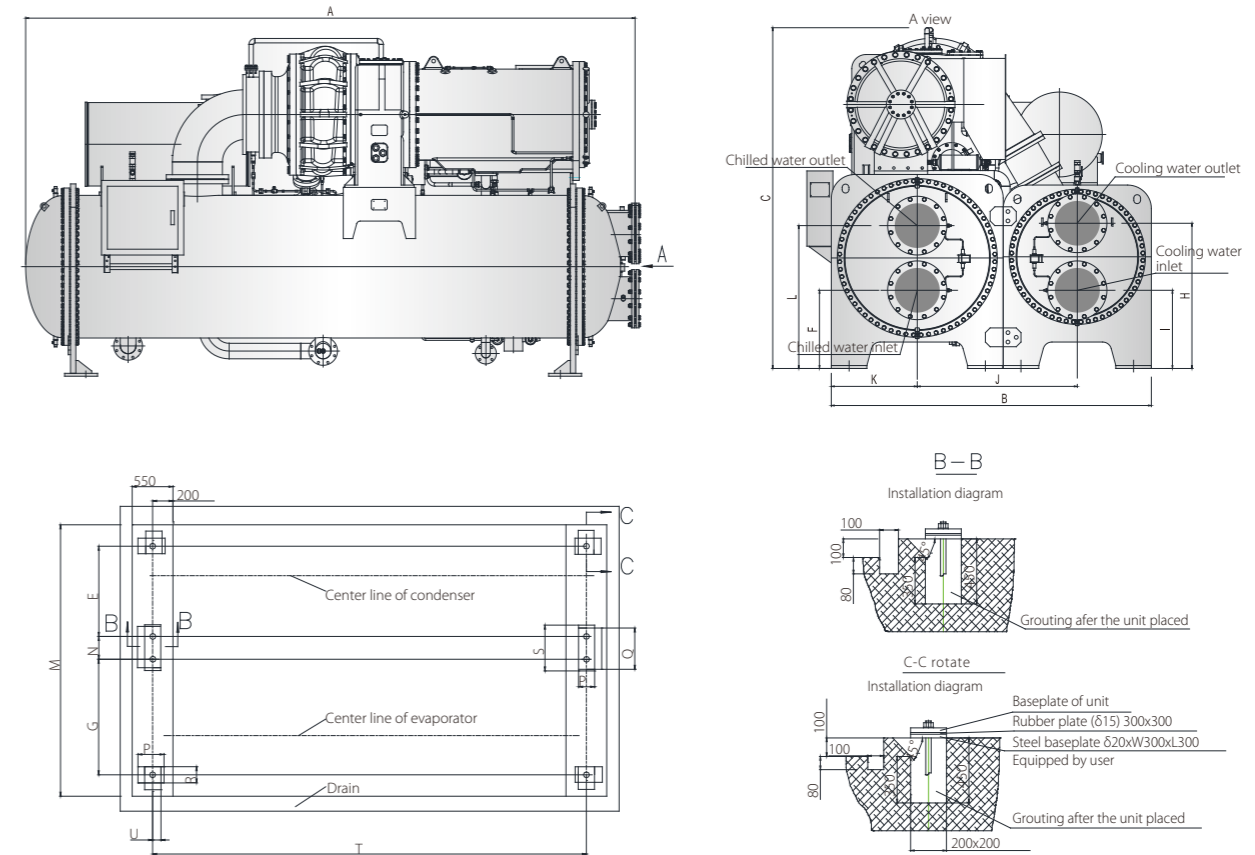
Dimensions >>

CWCF500-CWCF1200



Model	Dimension			Unit base									Pipe locate position						Evaporator Diameter	Condenser Diameter								
	A	B	C	M	G	E	N	P	R	Q	S	U	T	F	L	K	I	H			J							
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
CWCF500	4650	1850	2054	2150	780	670	200	240	200	350	400	80	3780	410	820	490	650	1020	925	DN200	DN200							
CWCF550	4650	1850	2054	2150	780	670	200	240	200	350	400	80	3780	380	850	490	635	1035	925	DN250	DN250							
CWCF600																												
CWCF650																												
CWCF700	5020	2100	2054	2150	780	800	200	240	200	350	400	80	4080	550	1020	550	875	1335	1050	DN800	DN800							
CWCF750																												
CWCF800																												
CWCF850	5020	2100	2054	2150	780	800	200	240	200	350	400	80	4080	550	1020	550	875	1335	1050	DN800	DN800							
CWCF900																												
CWCF950																												
CWCF1000	5045	2300	2510	2400	1000	900	200	240	200	350	400	80	4080	585	1085	600	920	1390	1150	DN800	DN800							
CWCF1100	5045	2300	2510	2600	1000	900	200	240	200	350	400	80	4080	585	1085	600	920	1390	1150	DN800	DN800							
CWCF1200																												

CWCF1300-CWCF2200



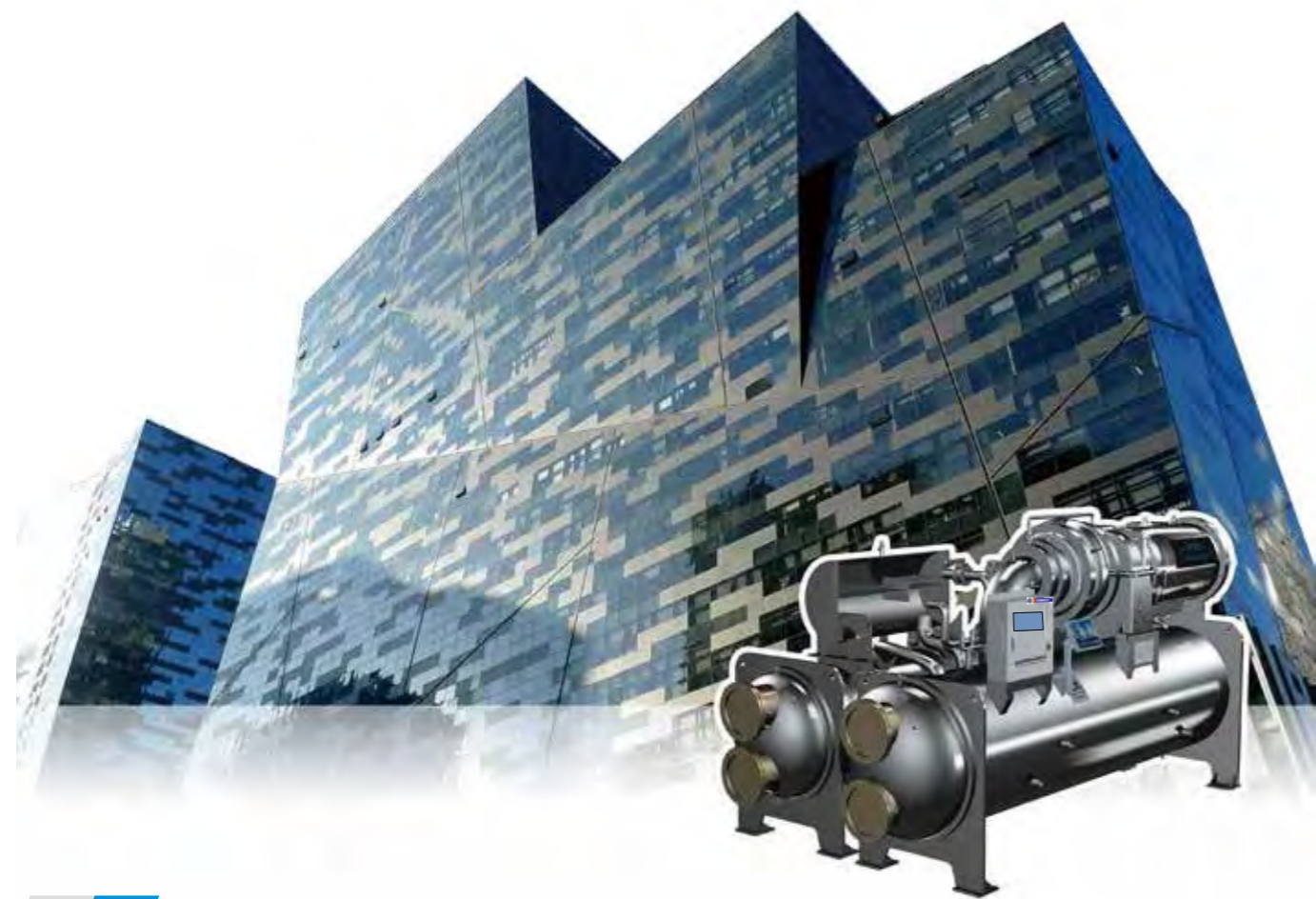
Model	Dimension							Unit base					
	A	B	C	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
CWCF1300	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCF1400													
CWCF1500	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCF1600													
CWCF1700													
CWCF1800													
CWCF1900													
CWCF2000	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
CWCF2100													
CWCF2200													

Model	Pipe locate position						Evaporator Diameter	Condenser Diameter
	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm
CWCF1300	665	1215	725	680	1220	1350	DN850	DN850
CWCF1400								
CWCF1500	640	1240	725	650	1250	1350	DN400	DN400
CWCF1600								
CWCF1700								
CWCF1800								
CWCF1900								
CWCF2000	740	1440	840	750	1370	1575	DN400	DN400
CWCF2100								
CWCF2200								

High Efficiency Series

Nomenclature >>

CWCH xxx SERIES



Specifications

Model(CWCH***)		700	750	800	850	900	950	1000	1100	1200		
Cooling capacity	RT	700	750	800	850	900	950	1000	1100	1200		
	kW	2461	2637	2813	2989	3164	3340	3516	3868	4219		
	10 ⁴ kcal/h	212	227	242	257	272	287	302	333	363		
Efficiency	Running power (1)	kW	403	432	460	489	515	543	572	628	683	
	COP(1)	kW/ kW	6.11	6.11	6.12	6.11	6.14	6.15	6.15	6.16	6.18	
	Running power (2)	kW	421	450	481	509	542	572	600	660	720	
	COP (2)	kW/ kW	5.85	5.86	5.85	5.87	5.84	5.84	5.86	5.86	5.86	
Compressor	Configured power	kW	490	490	560	560	630	630	630	695	760	
	Power supply	380/10000V-3Ph-50Hz										
	Motor cooled by	Refrigerant										
Evaporator	Chilled water flow	m ³ /h	423	454	484	514	544	575	605	665	726	
	Chilled water pressure drop	kPa	75	79	80	83	85	80	84	82	83	
	Pass	2										
	Chilled water inlet/outlet temperature	°C	12/7									
	Connection type	Flange										
	Water pipe inlet/outlet diameter	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	
Condenser	Cooling water flow	m ³ /h	504	540	576	611	648	684	719	791	863	
	Cooling water pressure drop	kPa	84	82	79	83	82	80	85	80	86	
	Pass	2					2					
	Cooling water inlet/outlet temperature	°C	30/35									
	Connection type	Flange										
	Water pipe inlet/outlet diameter	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	
Weight	Shipping weight	kg	11270	11350	11435	11505	11626	12077	12215	12459	12460	
	Running weight	kg	13209	13350	13564	13712	13841	14558	14791	15201	15376	
Dimension	Unit length	mm	5020	5020	5020	5020	5020	5045	5045	5045	5045	
	Unit width	mm	2100	2100	2100	2100	2100	2210	2210	2210	2260	
	Unit height	mm	2510	2510	2510	2510	2510	2610	2610	2610	2610	
	Packing length	mm	5020	5020	5020	5020	5020	5045	5045	5045	5045	
	Packing width	mm	2100	2100	2100	2100	2100	2260	2260	2260	2260	
	Packing height	mm	2630	2630	2630	2630	2630	2730	2730	2730	2730	

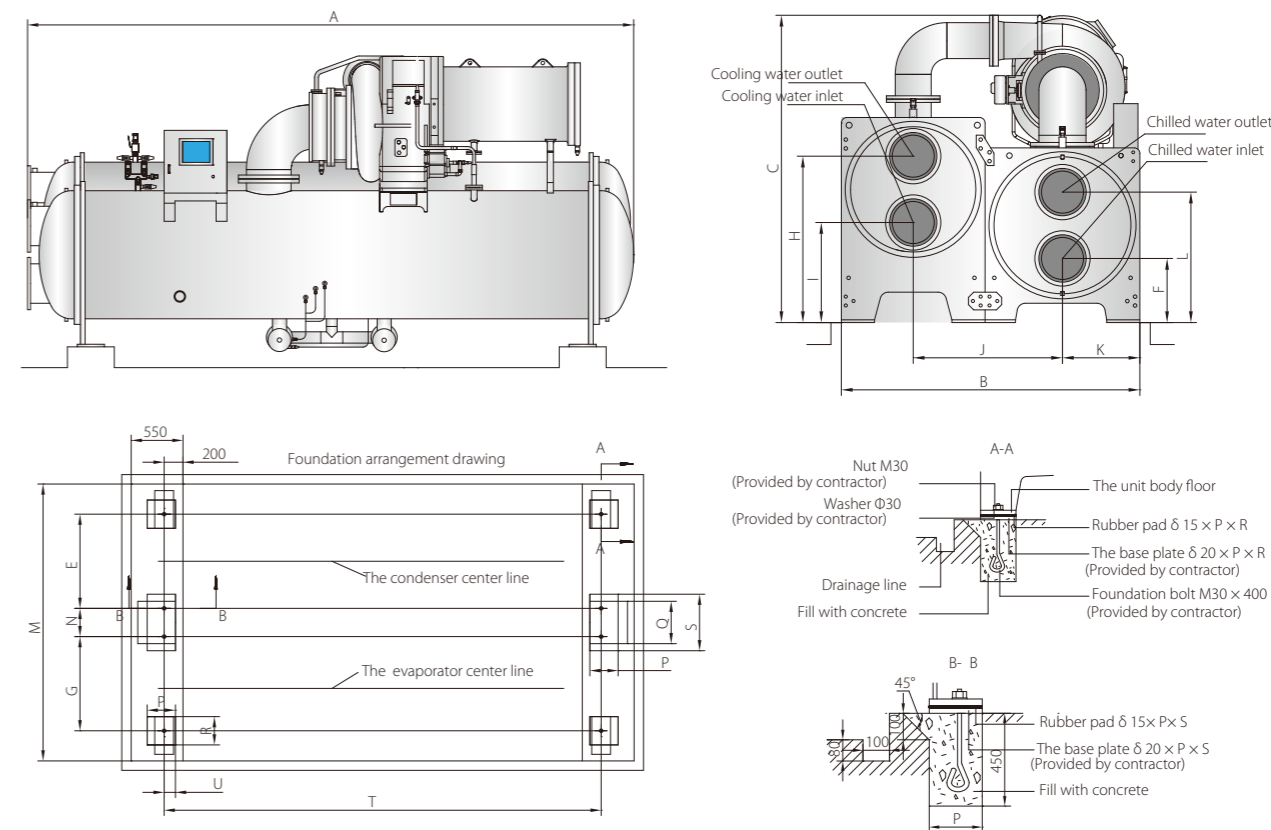
Note:
 Nominal cooling capacities are based on the following conditions:
 Chilled water inlet/outlet temp.(1): 12°C/7°C; Cooling water inlet/outlet temperature 30/35°C.
 Chilled water inlet/outlet temp.(2): 12°C/7°C; Cooling water inlet/outlet temperature 32/37°C.
 The design fouling factor for both evaporator and condenser are 0.086 m².°C/kW, otherwise can be customized.
 The design max. working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

Model(CWCH***)		1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	
Cooling Capacity	RT	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	
	kW	4571	4922	5274	5626	5977	6329	6680	7032	7384	7735	
	10 ⁴ kcal/h	393	423	454	484	514	544	575	605	635	665	
Efficiency	Running power (1)	kW	740	794	849	912	970	1015	1076	1132	1195	1256
	COP(1)	kW/ kW	6.18	6.2	6.21	6.17	6.16	6.23	6.21	6.21	6.18	6.16
	Running power (2)	kW	783	831	889	950	1010	1060	1123	1180	1241	1307
	COP (2)	kW/ kW	5.84	5.92	5.93	5.92	5.92	5.97	5.95	5.96	5.95	5.92
Compressor	Configured power	kW	840	930	990	990	1100	1100	1200	1320	1450	
	Power supply	10000V-3Ph-50Hz										
	Motor cooled by	Refrigerant										
Evaporator	Chilled water flow	m ³ /h	786	847	907	968	1028	1089	1149	1210	1270	1330
	Chilled water pressure drop	kPa	98	86	83	85	89	91	92	90	91	94
	Pass	2										
	Chilled water inlet/outlet temperature	°C	12/7									
	Connection type	Flange										
	Water pipe inlet/outlet diameter	mm	DN300	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Condenser	Cooling water flow	m ³ /h	929	999	1070	1141	1213	1283	1354	1425	1497	1570
	Cooling water pressure drop	kPa	92	84	87	88	90	89	93	94	96	96
	Pass	2										
	Cooling water inlet/outlet temperature	°C	30/35									
	Connection type	Flange										
Water pipe inlet/outlet diameter	mm	DN300	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400	
Weight	Shipping weight	kg	12560	19450	20150	20850	21450	23360	23590	23870	24120	24350
	Running weight	kg	15500	22790	23490	24260	25160	26840	27290	27740	27976	28210
Dimension	Unit length	mm	5045	5190	5190	5190	5190	5290	5290	5290	5290	5290
	Unit width	mm	2260	2700	2700	2700	2700	3150	3150	3150	3150	3150
	Unit height	mm	2610	3010	3010	3010	3010	3180	3180	3180	3180	3180
	Packing length	mm	5045	5490	5490	5490	5490	5590	5590	5590	5590	5590
	Packing width	mm	2260	2900	2900	2900	2900	3350	3350	3350	3350	3350
	Packing height	mm	2730	3310	3310	3310	3310	3480	3480	3480	3480	3480

Note:
 Nominal cooling capacities are based on the following conditions:
 Chilled water inlet/outlet temp.(1): 12°C/7°C; Cooling water inlet/outlet temperature 30/35°C.
 Chilled water inlet/outlet temp.(2): 12°C/7°C; Cooling water inlet/outlet temperature 32/37°C.
 The design fouling factor for both evaporator and condenser are 0.086 m²·°C/kW, otherwise can be customized.
 The design max. working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

Dimensions >>

CWCH700-CWCH1200

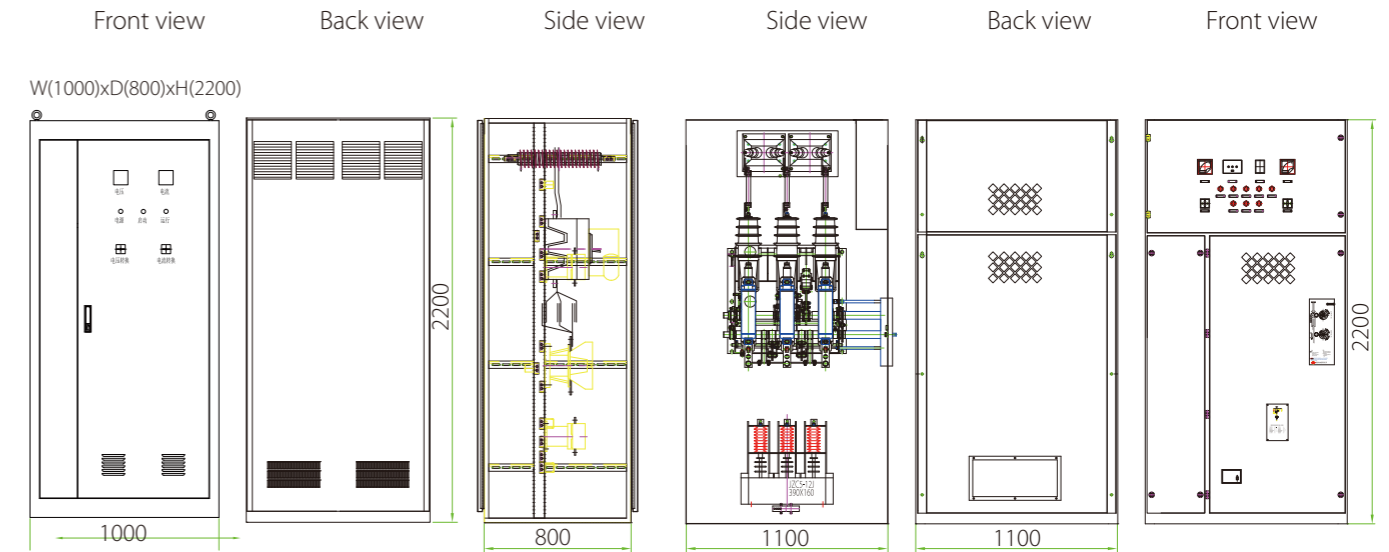
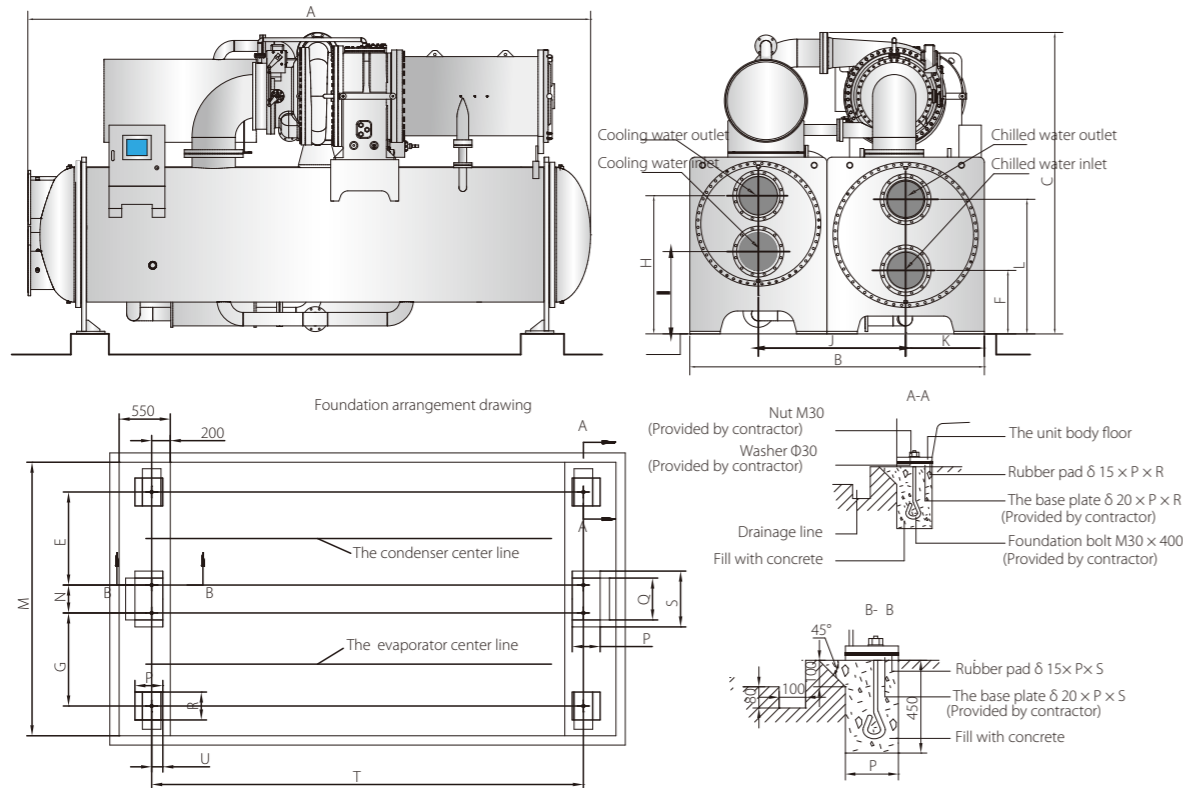


Model	Dimension			Unit base									
	A	B	C	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
CWCH700	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
CWCH750				2400	900	800	200	240	200	350	400	80	4080
CWCH800				2400	900	800	200	240	200	350	400	80	4080
CWCH850				2400	900	800	200	240	200	350	400	80	4080
CWCH900	5045	2260	2610	2400	900	800	200	240	200	350	400	80	4080
CWCH950				2510	985	875	200	240	200	350	400	80	4080
CWCH1000				2510	985	875	200	240	200	350	400	80	4080
CWCH1100				2510	985	875	200	240	200	350	400	80	4080
CWCH1200				2510	985	875	200	240	200	350	400	80	4080

Model	Pipe locate position							Evaporator	Condenser
	F	L	K	I	H	J	mm		
	mm	mm	mm	mm	mm	mm	mm		
CWCH700	550	1020	550	600	1060	1050		DN300	DN300
CWCH750	550	1020	550	600	1060	1050		DN300	DN300
CWCH800	550	1020	550	600	1060	1050		DN300	DN300
CWCH850	550	1020	550	600	1060	1050		DN300	DN300
CWCH900	550	1020	550	600	1060	1050		DN300	DN300
CWCH950	585	1085	592.5	650	1120	1130		DN300	DN300
CWCH1000	585	1085	592.5	650	1120	1130		DN300	DN300
CWCH1100	585	1085	592.5	650	1120	1130		DN300	DN300
CWCH1200	585	1085	592.5	650	1120	1130		DN300	DN300

CWCH1300-CWCH2200

Starter Cabinet Dimensions

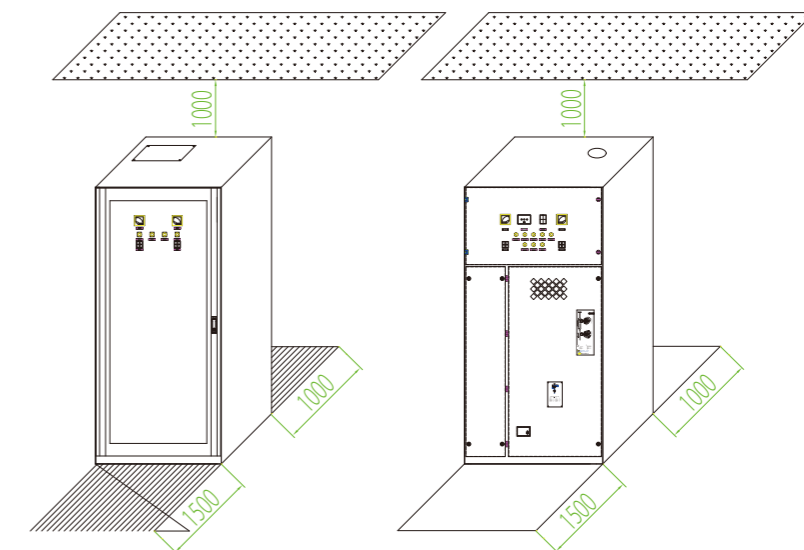


Closed star-delta starting cabinet

High voltage start cabinet

Model	Dimension						Unit base						
	A	B	C	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
CWCH1300	5045	2260	2610	2510	985	875	200	240	200	350	400	80	4080
CWCH1400	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCH1500	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCH1600	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCH1700	5190	2700	3010	3000	1150	950	300	280	300	450	600	100	4040
CWCH1800	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
CWCH1900	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
CWCH2000	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
CWCH2100	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
CWCH2200	5290	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540

Model	Pipe locate position						Evaporator	Condenser
	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm		
CWCH1300	585	1085	592.5	650	1120	1130	DN300	DN300
CWCH1400	640	1240	725	650	1250	1350	DN400	DN400
CWCH1500	640	1240	725	650	1250	1350	DN400	DN400
CWCH1600	640	1240	725	650	1250	1350	DN400	DN400
CWCH1700	640	1240	725	650	1250	1350	DN400	DN400
CWCH1800	740	1440	840	750	1370	1575	DN400	DN400
CWCH1900	740	1440	840	750	1370	1575	DN400	DN400
CWCH2000	740	1440	840	750	1370	1575	DN400	DN400
CWCH2100	740	1440	840	750	1370	1575	DN400	DN400
CWCH2200	740	1440	840	750	1370	1575	DN400	DN400



Closed star-delta starting cabinet maintenance, operation plane spacing

High pressure direct starting cabinet maintenance, operation plane spacing

Starting cabinet space layout

Optional Items / Accessories

Accessories	Optional items
Power supply	50Hz is standard, 60Hz is optional.
Water inlet/outlet connection	Flange type connection is the standard for the condenser and evaporator. Victaulic type connection is optional.
High pressure water box	Standard water box can sustain 1.0Mpa pressure .1.6Mpa or 2.0Mpa pressure is optional.
Marine water box	The condenser and evaporator can be provided with marine water box on the water connection side which provides easy access to the tube for inspection, clearing and removal without disturbing the water pipe connection.
Pass	The standard chiller is 2 passes. 1 pass or 3 passes are optional.
VSD (Variable speed drive)	Units with a capa city of less than 1300Tons can be equipped with VSD for super high efficiency partial load. Primary VSD design (30%, 50%~100%)
Chiller starter	Delta-star is the standard starter installed in the chiller. Auto transmit starter is another option for the low voltage chiller. Softer starter also can be provided to reduce shock to the power supply grid. Direct on line (DOL) is optional for the high voltage chiller (3000/11000V).
Chiller sequence management (Chiller Plant Manager)	Chiller plant manager can be provided to multiple installations for control & monitor low side work.
Chiller vibration isolator	Spring isolator and rubber pad are optional accessories from the factory
Dual compressor	Dual compressor systems provide more reliability and larger capacity.
Sectional transportation	The chiller can be transported in sections and assembled on site under Engineer's inspection.
Witness performance testing	Factory can arrange for customers to observe testing.
Heat recovery	Part heat recovery or full heat recovery (45°C to 60°C)
Bigger chilled water Delta T	Range from 5°C to 11°C
Centrifugal heat pump	Hot water temperature up to 60°C
Water storage or Ice storage	Water storage or Ice storage dual model chiller.

MIC(Intelligent Control)

User-friendly Interface >>

- ❖ The MIC control system is equipped with an MODBUS-RTU port or other optional protocols that offer multiple remote control, monitoring and diagnostic possibilities. It provides a platform to display the real time information and self-control the entire system. It also integrates programs such as pre-alarm, safety protection, interlock control etc., which ensures the system's proper start/start, normal operation and energy saving pause operation function smoothly.
- ❖ The unit controller is factory mounted, wired and tested before shipment, to ensure the unit is in proper running order.



▲ Interface Display

- Graphical display
- Touch screen
- Operation status

- Operation Parameters
- Pre-alarm/alarm indication and record
- Enquiry function for data history and trend curve



▲ Operation Control

- Set outlet temperature by user
- Automatically load or unload according to the chilled water temperature

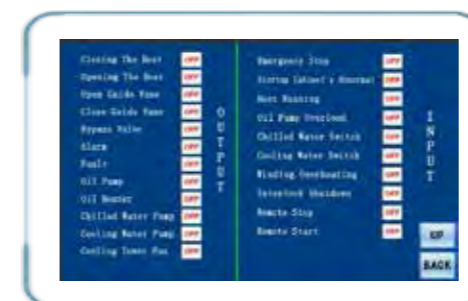
- Pause function reduces operation cost
- Independent start/stop control



▲ Safety Protocols

- Oil pressure difference low/too low
- Oil temp. High & too high
- Compressor motor ampere high & too high
- Compressor motor ampere too low
- Evaporator pressure low/too low(Evaporator)
- Refrigerant pressure high/too high (Condenser)

- Oil pump overload
- Starter fault
- Long time starting
- Water cut off in evaporator or condenser
- Anti-freezing protection



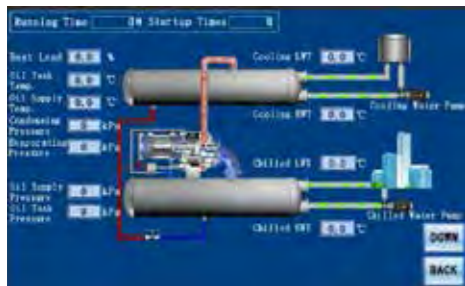
▲ Interlock Control

- Oil pump pre-lubrication/ post-lubrication
- Water pump pre-running/ post-running
- Starter interlock control
- Pause/Stop mode Inlet Guide Vane interlock

- Pause/stop mode inlet guide vane interlock
- Safety testing before start
- Pre-alarm interlock control

Basic Indication Items >>

Chilled water inlet temperature
 Chilled water outlet temperature
 Cooling water inlet temperature
 Cooling water outlet temperature
 Condensing pressure
 Evaporating pressure
 Oil supply temperature
 Oil supply pressure
 Oil sump temperature
 Oil sump pressure
 Oil supply pressure difference
 Inlet guide vane opening
 Running current (percentage)
 Total power on time
 Total running time
 Total start-up time



Safety Cutouts >>

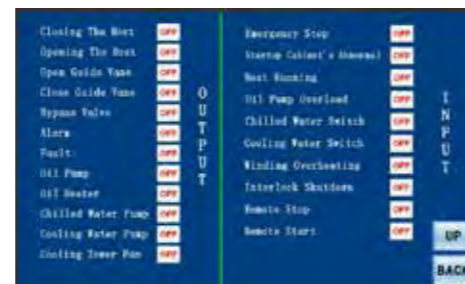
The protection control, if necessary, shuts the chiller down or limits the inlet opening guide vane to protect the chiller from possible damage.

Inadequate oil supply pressure difference.
 Excessive oil supply temperature
 Inadequate oil sump temperature
 Oil pump current overload
 Inadequate chilled water flow
 Low chilled water outlet temperature
 Compressor motor current overload
 Excessive main motor winding temperature
 Excessive Start time
 Inadequate evaporation pressure
 Excessive condensing pressure
 Temperature transmitter faults
 Pressure transmitter faults
 Starter faults
 Phase unbalance, phase loss, phase reversal
 Under voltage
 Over voltage31

User Settings >>

Restart temperature
 Pause temperature
 Current limit
 Full load/rated load
 Chilled water outlet temperature
 Rated motor current
 System control mode
 Low oil supply pressure difference (before start)
 Low oil supply pressure difference (after start)
 Minimum oil supply pressure difference.
 Minimum oil sump temperature
 High oil supply temperature
 Maximum oil supply temperature
 Low evaporation pressure
 Minimum evaporation pressure
 High condensing temperature
 Maximum condensing temperature
 Low chilled water outlet temperature
 Critical inlet guide vane opening
 Critical water temperature

Note:Setting values refer to user manual



Capacity Control >>

Minimum IGV opening control
 Maximum main motor current control
 Leaving chilled water temperature control
 Inlet guide vane actuator
 Manual mode option

Standard Protection

Low Supply Oil-pressure Difference Protection >>

Oil pressure tracks oil flow and oil-pump operation. A significant drop in oil pressure difference indicates oil pump failure, oil leakage, or blockage in the oil-circuit. During compressor pre-lube mode pressure should not fall below set point. Failure to meet this requirement leads to inhibits chiller start-up. When the compressor is running, an alarm will be displayed if the pressure is below the set point. And if this value decreases to the minimum set point the chiller will shut-down.

Oil-Temperature Protection >>

High oil temperature when the oil pump and/or compressor are running may be an indication of oil-cooler failure, overheating of the oil and the bearings, or oil filter blockage. If the oil temperature continuous to increase to the maximum set point, the chiller will shut-down. The start of the compressor will be affected if the oil sump temperature is below the set point. The diagnosis will display on the user interface.

Oil Pump Current Overload Protection >>

The oil pump control panel will monitor the oil pump current , and shut the chiller off when the oil pump current exceeds its maximum set point.

High Condenser-Pressure Protection >>

The chiller controller algorithm keeps the condenser pressure under a specified maximum pressure. The chiller can run up to 100 percent of this setpoint safely and reliably. If the condenser pressure exceeds the set point, the system will prohibit the opening of the inlet guide vane to decrease the pressure or shut off the chiller immediately according to the indicated set point.

Low Evaporator-Pressure Protection >>

The chiller controller algorithm keeps the evaporator pressure above a specified minimum pressure. The chiller can run up to 100 percent of this setpoint safely and reliably.

If the evaporator pressure decreases below the set point, the system will prohibit the opening of the inlet guide vane to increase the pressure or shut off the chiller immediately according to the indicated set point.

Water Flow Protection >>

Water flow switch installation is in the water piping system. The chiller controller has a digital input that will indicate the water flow. When this input does not show flow within a fixed time during start-up, the process will be terminated. If the flow is lost while the chiller is in running, the system will shut the chiller off to protect the chiller from possible damage.

Low Chilled Water Outlet Temperature Protection >>

Low chilled water outlet temperature protection, also known as anti-freeze protection, prevents water from freezing in the evaporator by immediately pausing the chiller if the chilled water outlet temperature reaches its minimum allowable value. After the chilled water inlet temperature reaches the restart set point, the chiller will start automatically. This may occur due to sensor fault, incorrect set point of chilled water outlet temperature or lack of chilled water flow.

Current Overload Protection >>

The control panel will monitor the current drawn by each line of the motor and if the highest of the three lines exceeds 110% of the rated current, the system will close the inlet guide vane automatically and monitor the current to ensure it returns to normal levels. The system will shut the chiller off if the highest of the three line currents exceeds 115% of the rated current. The current overload protection does not prohibit the chiller from reaching its full-load amperage.

High Motor-Winding Temperature Protection >>

This function monitors the motor temperature and terminates chiller operation when the temperature is excessive. The controller monitors the winding-temperature sensors any time the controller is energized. And immediately shut the chiller down if the temperature surpasses the maximum set point.

Start Time Limit Protection >>

During start-up, if the changeover from "WYE" connection to Delta connection exceeds a set time. The system will shut the chiller off immediately to protect the chiller from possible damage.

Power Supply Protection >>

Transformer or power supply protection module comes factory installed in the starter, if any overvoltage or undervoltage, phase-unbalance, phase-loss or phase reversal happens, the control system will detect it and shut the chiller down.

Starter Failure Protection >>

Starter failure protection ensures the compressor motor disconnects from the power supply if the motor reaches its limitations. The controller manages all start and stop operations. If the starter malfunctions and does not disconnect the compressor motor from the line in an emergency situation, the controller will recognize the fault and shut the chiller down immediately.



Centralized Control

Intelligent Control Logic Ensures System Reliability >>

By monitoring all the parameters such as chilled water outlet temp., setting temp., evaporating pressure, condensing pressure inlet guide vane opening degree, etc., the intelligent control logic decides the best load adjustment method and optimizes the motor frequency and the opening rate of the inlet guide vane to guarantee safe operation in various load conditions.

Advanced Control Room & Centralized Controls >>

The conventional BMS system only focuses on interlock control, operation status and parameter monitoring, which achieves automation and energy management, but fails to realize the benefits of equipment synchronization. Centralized energy management system attaches importance to building load prediction and control, and coordinates the operation of air-conditioners, fans and water pumps to realize optimum energy management.



Centralized Control and Remote Management

System Control Functions >>

- ❖ Pragmatic Control Modes: Various and auto control, remote and local control, etc.
- ❖ Equalized operation time: Automatically balance the operation time of each unit to extend life-span and minimize the maintenance
- ❖ Optimum operation schedule: Optimizes the operation schedule and qty. of water pumps, to minimize total system power consumption.
- ❖ System data report: Reports the operation capacity, power consumption and energy saving results, as well the mas operation and error history.
- ❖ Strategies to address problem: System status indication and pre-alarm/alarm functions ensure safety. Complete data history allows for easy access to all operating history.
- ❖ Remote communication function: Adoption of the public open protocol enables data exchange between the onsite energy management centre and the upper remote monitoring system and remote operation, maintenance and management.



Energy management >>

- ❖ Climatic feedback control: Collect outdoor temperature readings and adjust the water volume accordingly, thus reducing energy consumption.
- ❖ Cycle duty operation: Supply different capacity according to specific application in each building
- ❖ Load prediction control: Due to perspective control logic, it decreases startup and shutdown frequency and minimizes the impact on the power grid, therefore extending the life span of the unit and reducing power consumption.