COMMERCIAL AIR CONDITIONERS

Water Cooled Centrifugal Chiller

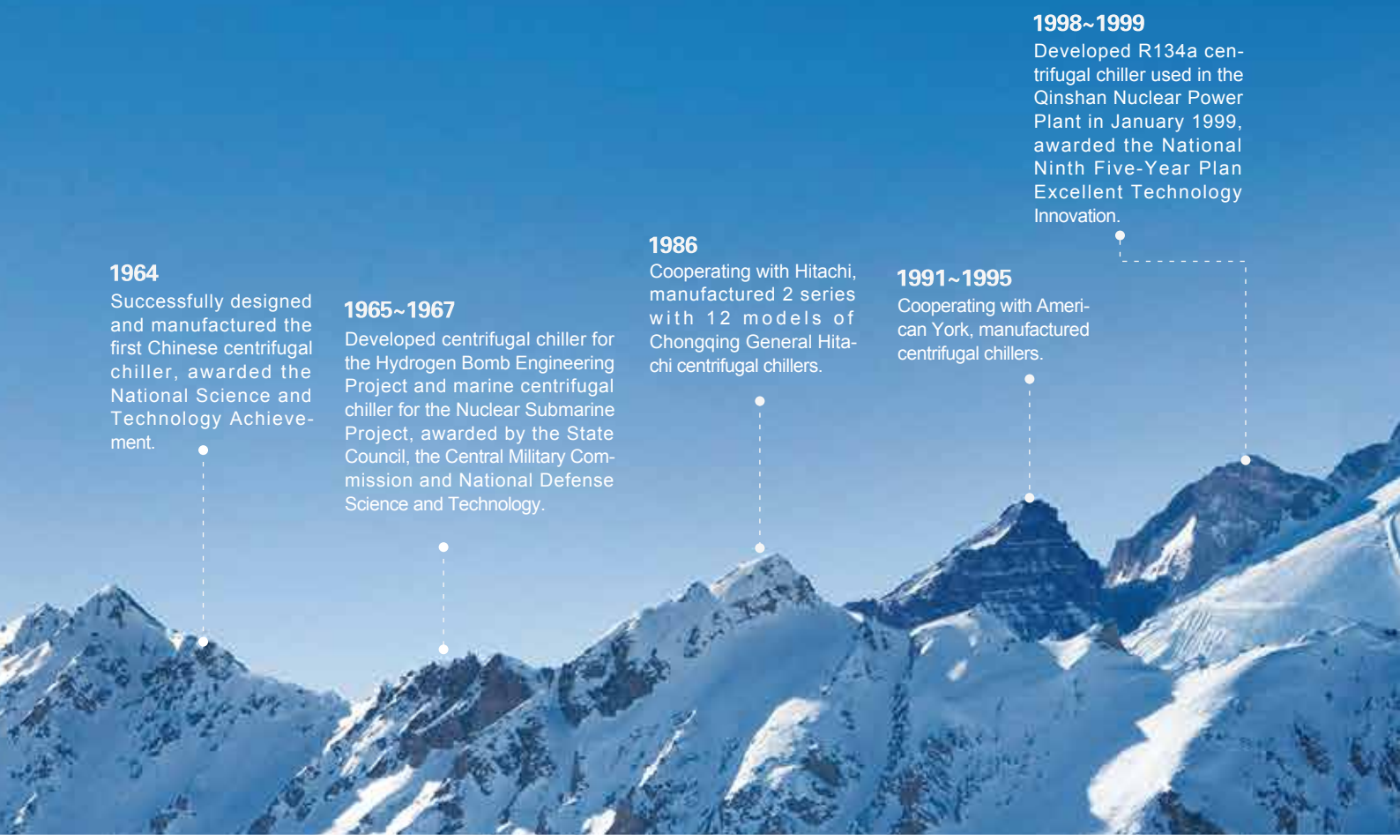
standard efficiency:450-2200Ton

High efficiency:650-2200Ton

R134a

Midea Central Air-conditioner

Entering into the 21st century, the energy has increasingly becomes as a global issue concerning the sustainable development of human-beings. In China, the construction power consumptions take 30% of the totals in the society. However, the power consumptions of air conditioners are 40%-50% of construction power consumptions. With progressive economy, various large-scale constructions are built up everywhere. Thus, building energy has become a common responsibility of the society and an obligation for every air-conditioner supplier



In the central air-conditioning industry, Midea Central Air-conditioner has been committed to the air-conditioning technology R & D and innovation. From the Chinese first centrifugal chiller to the first full falling-film dual stages centrifugal chiller, Midea has been trying for creating comfortable, energy-saving and environment friendly equipment to the world.

The ultra-efficient two-stage compression centrifugal chiller can be applied to a variety of energy-saving projects. It is the ideal choice for urban building and makes a significant contribution to the city building energy saving.

2001
The R134a (LC) series centrifugal chiller was named as the national key product.
2006
Launched the first Chinese VSD (Variable Speed Drive) centrifugal chiller unit.
2008
Developed the Smart Star new generation Semi-hermetic centrifugal chiller.
2010
Launched the centrifugal heat pump chiller units.
2013
Launched the first super efficient centrifugal chiller with dual stage compressor and full falling-film evaporator.

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With half century experience in chiller industry, Midea Chongqing chiller manufacturing base is becoming one of the largest chiller companies in China. It covers an area of 800 Mu (137 acre), with a registered capital of 12.5 million US $ and a total investment of over 0.85 billion US$. There are 6 product series and over 100 model products including centrifugal chillers, screw water chillers, scroll water chillers, water-cooled packaged units, and central air-conditioning indoor terminal devices(AHU/FCU). Five chiller manufacture plants with 14 flexible production lines lead a manufacturing capacity of 500 units centrifugal chillers 1,000 units of air cooled screw 2,000 units of water cooled screw and 200,000 units of AHU products.

Strong R&D and manufacturing capacity make Midea Chongqing general become the fastest developing company in chiller industry. The chiller testing lab which is certified by China National Refrigeration Equipment Inspection Center has become one of the largest refrigeration testing capacity in the world. The engineer team with 100 top engineers and international chiller experts who have been working many years in structure, electricity, and performance testing and software aspect make Midea the headship in chiller industry. In the year of 2011 Midea CAC invested another 150 million RMB for testing lab as ARI testing stand, big capacity air cooled screw life span testing room, 1,500kW compressor motor testing lab etc.

Concentrating on energy-saving and environment protection, Midea Chongqing chiller factory commits itself to the reliable and high efficiency products for the world. The chiller products are widely used in different countries and obtain good public praise from the clients. The solutions for the Beijing capital international airport, Jakarta international airport, China rapid transit station win good feedback and commendation. Continuing with the past and opening up the future, Midea chiller brand will go further and create an illustrious future.

Centrifugal chiller factory
Manufacturing capacity:
500 units/Year

Water cooled screw chiller factory
Manufacturing capacity:
2000 units/Year

Air cooled screw chiller factory
Manufacturing capacity:
1000 units/Year

8800kW water cooled chiller performance testing stand

The 8800kW water cooled chiller testing stand is one of the most advanced testing facilities in the world. It is able to simulate all the chiller running conditions like Chinese National standard condition (7/12°C,30/35°C). Chinese industry condition (7/12 °C, 32/37 °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 all the working condition for the actual situation. Provide the electrical correct factor for all the compresors. 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 facility in China.

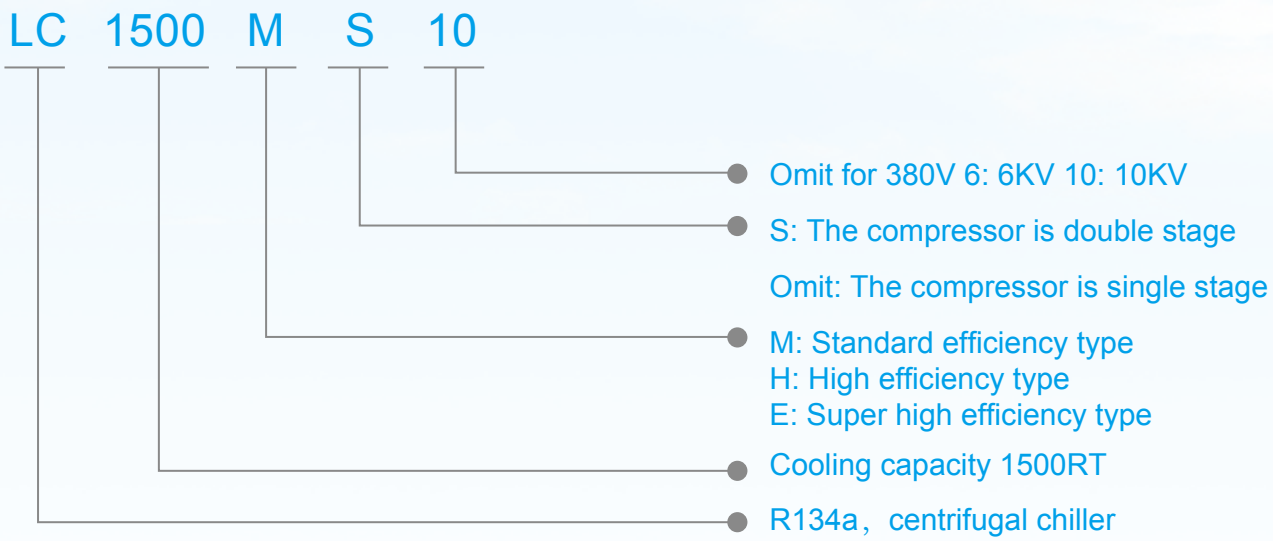
1200kW air cooled chiller performance testing lab

The 1200kW air cooled testing lab is one of the largest air cooled product testing labs. It can simulate all the actual ambient temperature range from -20 ° C to 56 °C.It ensures all the air cooled chiller products work reliably in all temperature condition. Witness testing service is optional for all the clients to ensure the product performance.The 1200kW air cooled testing lab was certified by AHRI.

AHRI CERTIFIED
www.ahridirectory.org

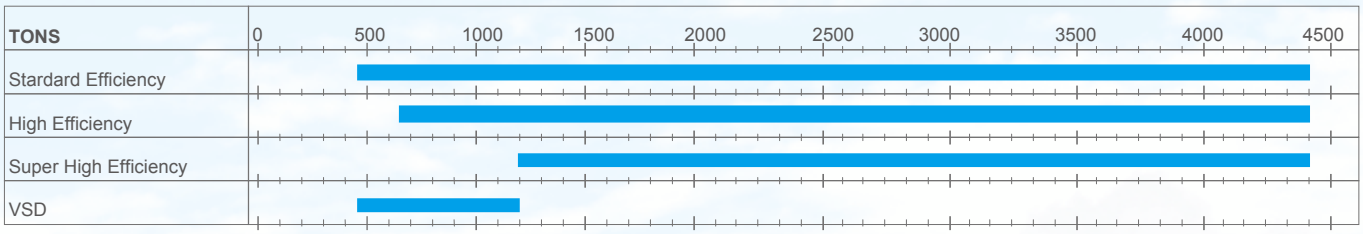
Product Information

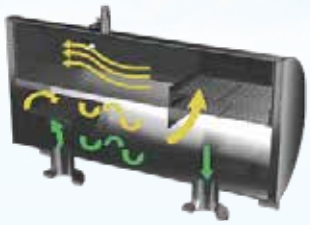
In 2013 Midea launched the third generation centrifugal chillers with higher efficiency and more compact size compared to the second generation. By using the advanced design platform the compressing efficiency and heat exchanging rate have been increased significantly. The full failing film heat exchange technology also be used to increase the efficiency and decrease the refrigerant charging volume up 40% less compared to the flooded type. It is a innovation to protect our environment and decrease the CO2 emission effectivly.



In order to cater to different efficiency requirement and consider the cost-effective for various investments Midea provides three class efficiency for the clients. Dual compressors can be customized for big capacity up to 4400Ton.

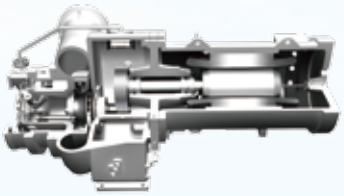
Type	Standard efficiency		High efficiency		Super high efficiency
Model	LC**M	LC**MS	LC**H	LC**HS	LC**ES
COP(W/W)	5.3~5.7		5.6~6.8		7 ~7.11
Compression stage	1	2	1	2	2
Capacity(Ton)	450-1200	1200-2200	650-1100	1200-2200	1200-2200
Evaporator type	Flooded type	Full falling film	Flooded type	Full falling film	Full falling film
Recommend power suply	380/400/415V	6kV/10kV	380V/6kV/10kV	6kV/10kV	6kV/10kV





Economizer in dual stages type

The ecomomizer is used in the dual stages compressing.Midea unique design economizer improves the efficiency from 5% to 8% compared with the single stage.

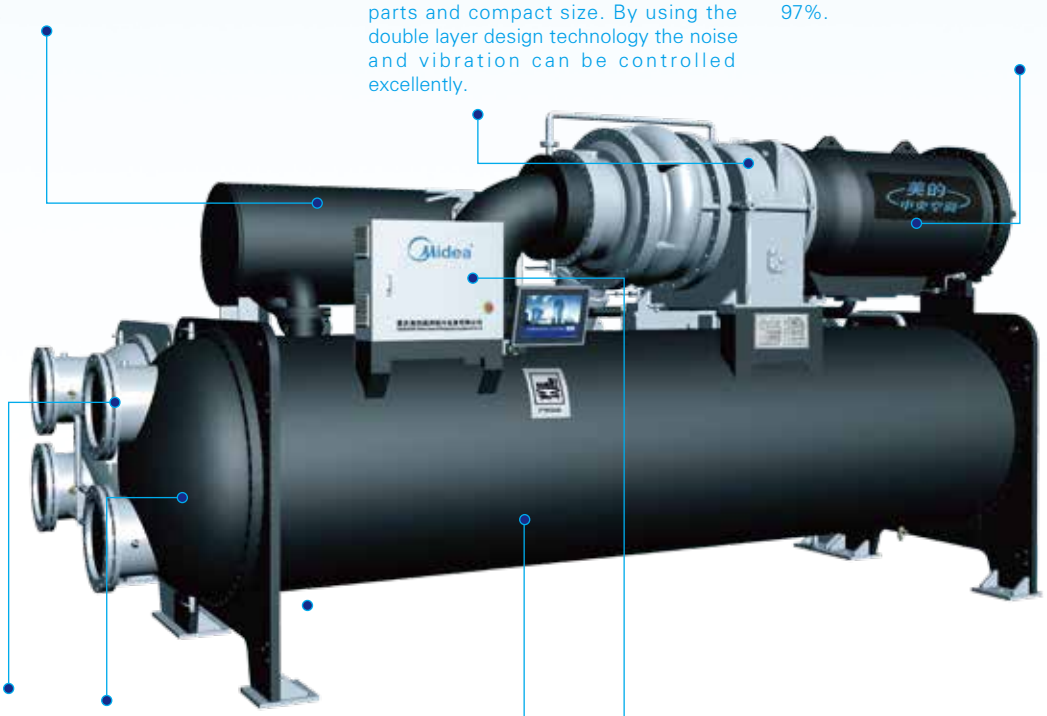


Semi-Hermetic centrifugal compressor

The compressor is designed on Midea advanced design platform, the impeller and chamber are matching perfectly. The compressor equipped with less moving parts and compact size. By using the double layer design technology the noise and vibration can be controlled excellently.

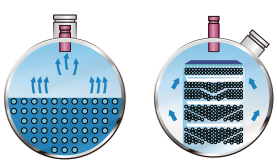
Gas cooled motor

The motor is cooled by refrigerant which ensures an excellent performance in various working condition and long life span. The motor is high efficiency type with higher power factor up to 97%.



Shell and tube condenser and flooded type evaporator

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



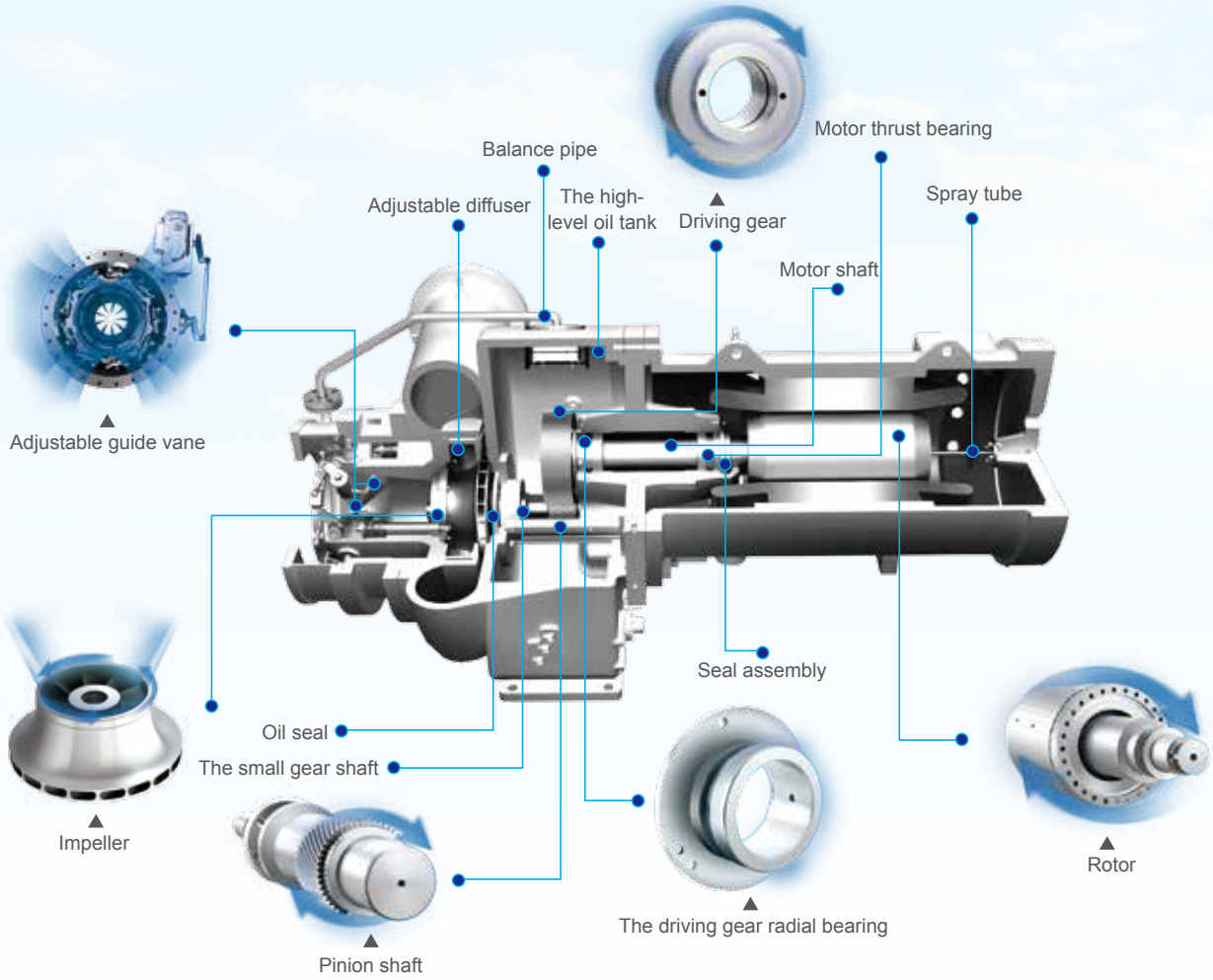
Environment friendly refrigeration

R134a is environment friendly gas with zero ODP (Ozone Depletion Potential) and very less GWP (Globle Warming Potential). The R134a refrigeration is no phase out gas and good choice for big chiller.

Advanced system control and user friendly screen

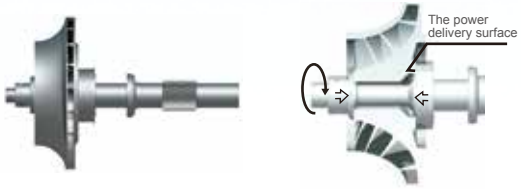
The system is control by industry type PLC with multiple function and good stability. It is open protocol of RS 485 which is compatible for BMS. The operation screen is user friendly with 10 inch colorful touchable screen.

Feature and Benefits



Keyless impeller coupling with high speed shaft
(PATENT NO.: ZL 01 2 56824.4)

The impeller is coupling with the shaft without any key to eliminate the stress to the shaft. Ensure the high speed shaft working stable and long life span.



Inlet guide vane (IGV) match with movable diffuser
(PATENT NO. : ZL01 2 56825.2)

The IGV matches with the moveable diffuser to ensure the compressor working stable in low partial load without any surge and stall. Capacity adjustment is from 10% to 100%.

Full falling film heat exchange technology
(PATENT NO: 20121041053.9 201220552298)

Unique spraying technology makes the liquid refrigerant film formed on the tube surface and then evaporation. By using this technology the heat exchange rate increase 3 to 8 % and refrigerant charge decrease 40%.

Six Core Technologies

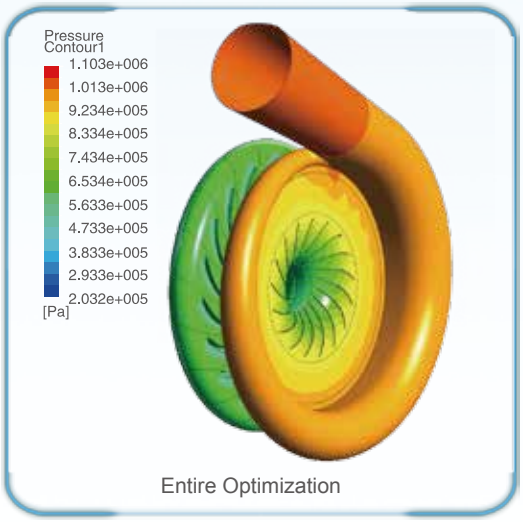
Explore the Frontier of Aerodynamic Technology

Full Flow Pass Optimization, further increases the efficiency

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

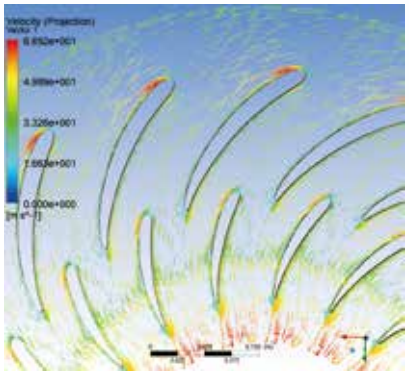
- Midea centrifugal compressor adopts the over-hung volute thus compacting the structure.

Volute Model



Entire Optimization

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



Turbulence Reducing Blade

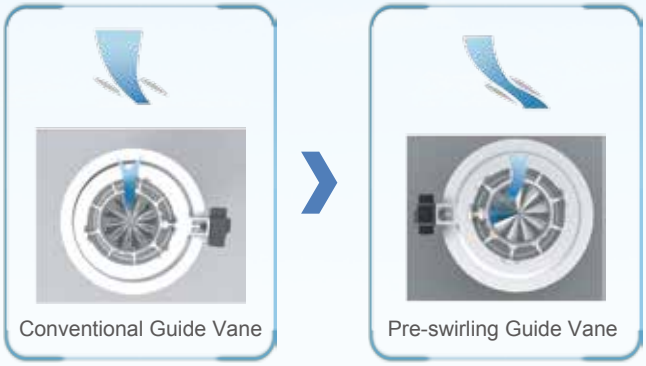
- Aerodynamic loss balance design reduces the aerodynamic noise

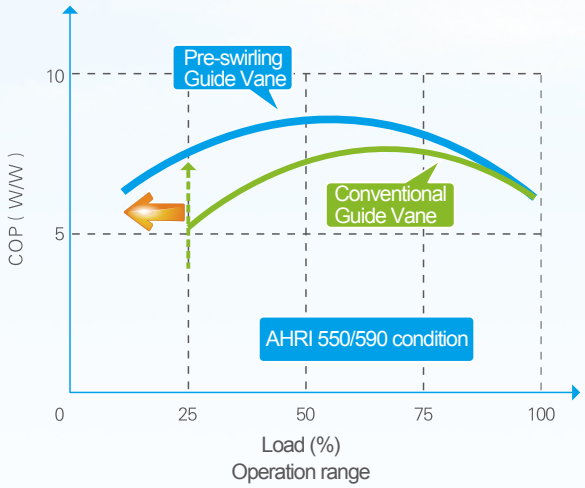
High Efficient Three-dimension Flow Impeller

- The newly designed high efficient three-dimension flow alloy impeller, produced in German GMD 5-aixs machine center, has high machining precision and reduces 30% of thickness for the impeller, thus reducing the axial force loss and separation loss.

Pre-swirling Guide Vane Technology

The compressor is equipped with airfoil shape pre-swirling guide vane, which will produce swirl under different load conditions, hence to extend the operation range and increase the part load efficiency.





Dual stage compression Technology

■ Unique designed dual stage compression technology enhances the heat absorption capacity of refrigerant, and lowers the power consumption, which increases 6% of efficiency over the single stage compressor.
■ Dual stage impeller is an equal ratio compression design, which helps to reduce the rotate speed and enhance the reliability.
■ Unique three-stage separation economizer simplifies the system design.

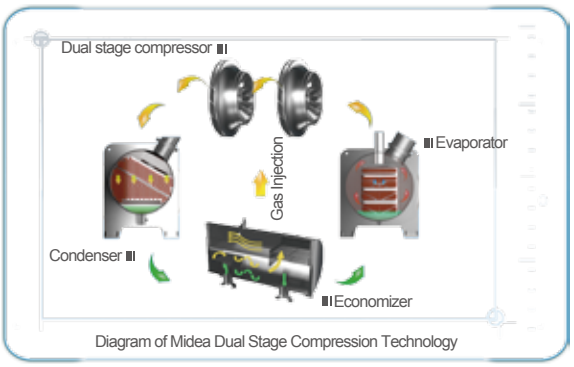
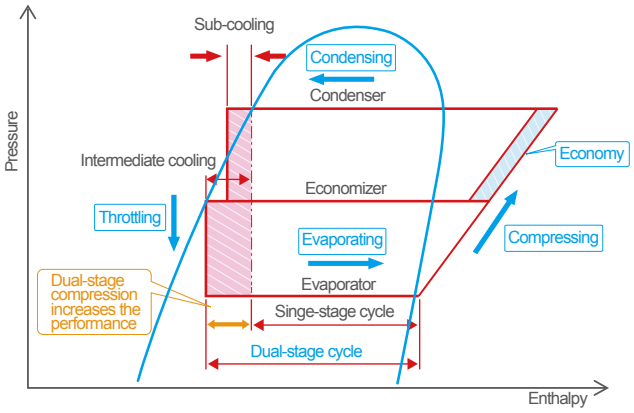


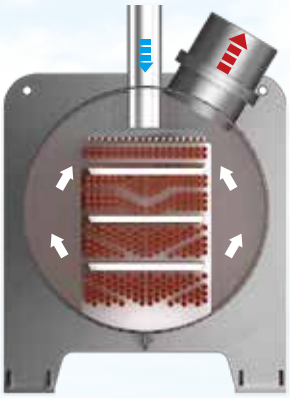
Diagram of Midea Dual Stage Compression Technology



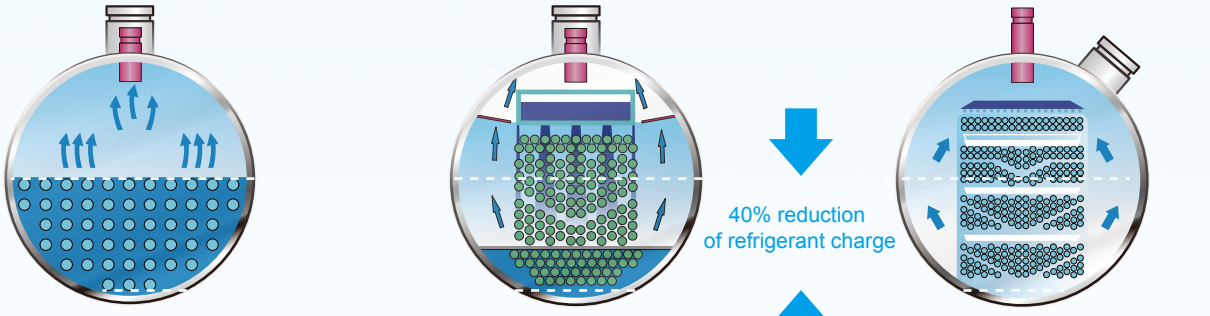
Creative Heat-exchanging Technology

Full falling-film Evaporating Technology

The unique full falling-film evaporating technology: spraying technology makes the liquid refrigerant form and evaporate on the surface of evaporating tubes, which significantly boosts the heat-exchanging efficiency and reduces 40% refrigerant charge. Midea adopts patented technologies to ensure refrigerant distributed evenly and avoid non liquid on part tubes, which extend the potential heat-exchanging capacity to the full and enhance the efficiency of the whole system.



Patent No: 201210414053.9； 201220552298.



Flooded type

Full falling film achieved
40% less refrigerant charge
than flooded type

Mixed falling film

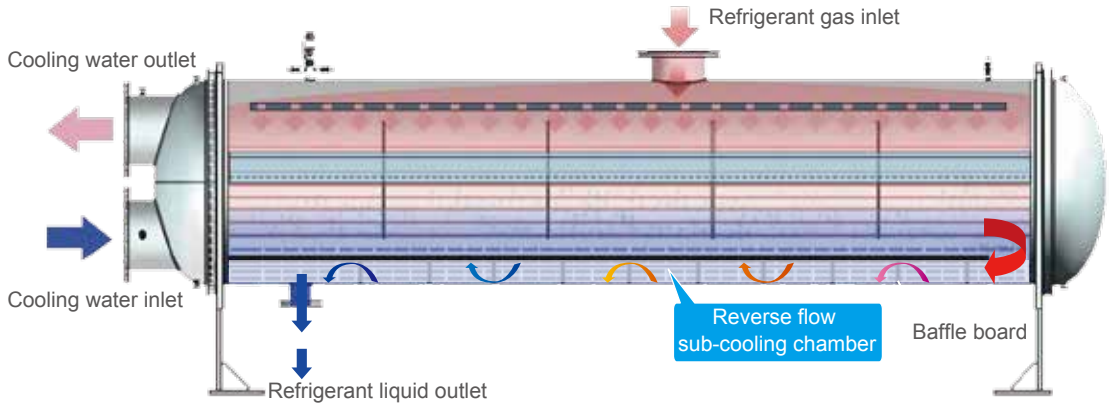
Full falling film achieved
25% less refrigerant charge
than the mixed flooded type

Full falling film

Almost zero percent liquid level

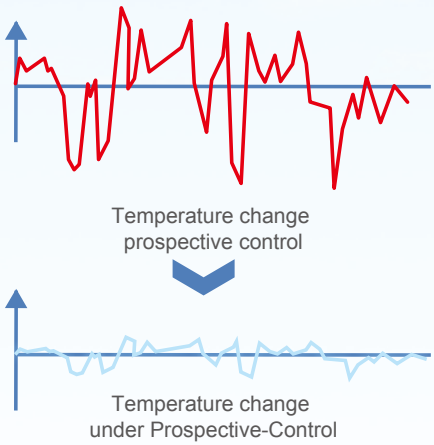
Condenser

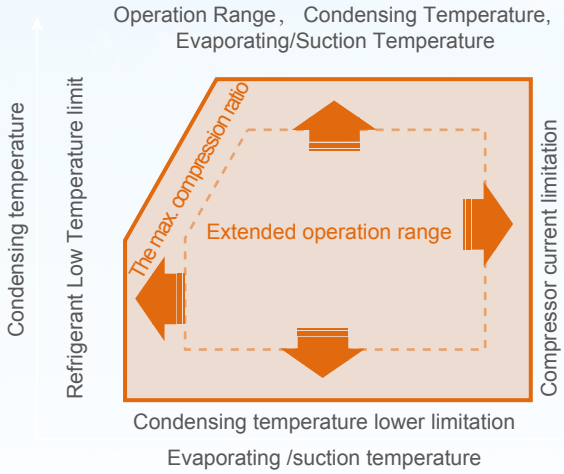
High efficient heat-exchanger and optimized structure enhance the heat exchanging performance. The design of reverse flow sub-cooling chamber with multiple turbulences increases the sub-cooling degree and improves the performance.



Prospective-Control Logic

The microcomputer control system has such as the trend prediction, self-diagnosis, self-adjustment and safety protection. capable to predict real load change according to the target values and historical load levels, prospectively modify the operation load and prevent energy waste





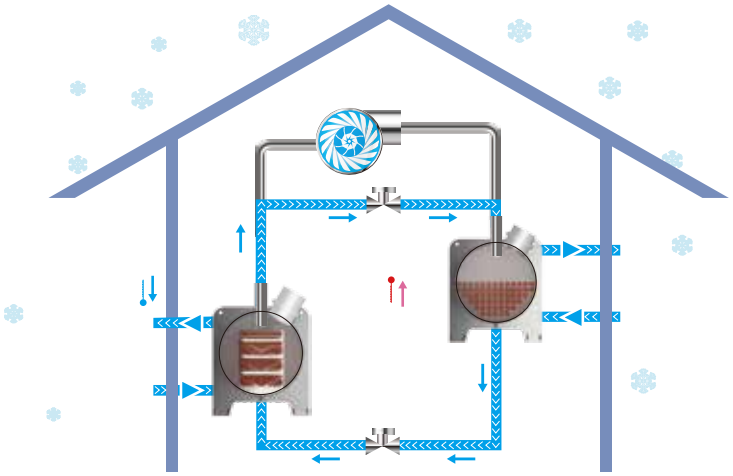
Free Cooling Technology-Refrigeration Migration

Midea 3G Centrifugal Chiller features the 'Free Cooling Technology'. When the outdoor temperature is low and large commercial buildings' interior spaces may need cooling, the main unit will work on 'Free Cooling' mode. Free cooling is the production of chilled water Without running compressor.

The relative warm, and the energy is carried directly to the low pressure condenser, where it is cooled and condensed by the water from the cooling tower. Then the low temperature liquid refrigerant flows to the evaporator driving by gravity, then naturally circulates.

The cost is saved due to the compressor's inactivity, 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 the transition season such as late fall, winter and early spring.



Compressor Reliability

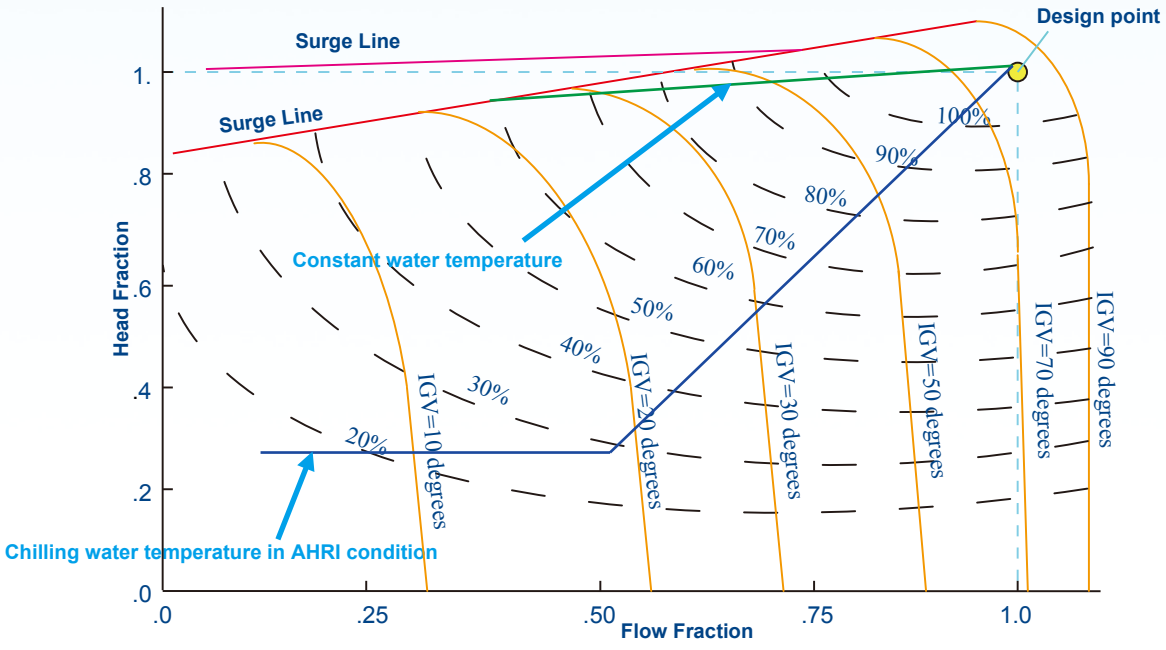
Centrifugal compressors are dynamic machines in which rotating impellers accelerate the gas. Main flow is radial. The velocity head is converted into pressure, partially in the rotating elements and partially in stationary diffusers.

Midea third generation “Smart Start” centrifugal compressors are carefully tested throughout the manufacturing process in order to guarantee a perfect match to their design criteria and to assure long lasting, continuous operation.All components were exclusively designed and tested for re-confirming it’s reliability. The following tests are typically carried out on components and assembled machines:

- Casing: hydraulic pressure test and hydraulic blasting testing
- Shaft: Ultrasonic testing and tensile testing
- Impellers: Ultrasonic and dynamically balanced testing
- Impeller/Rotor: Over speed testing
- Motor wiring: 3 phase resistance balance testing
- Other mechanical run test
- Performance testing for each chiller before delivery

Beside the mechanical testing the Thermodynamic Performance Test ensure the entire compressor working at any conditions.

Thermodynamic Performance Test



Note:AHRI condition testing example

Compressor Components

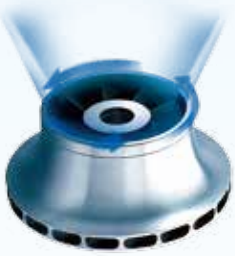
Advanced design platform improves the performance of impeller, volute and other key components of Midea centrifugal chiller, raising the isentropic efficiency of compressor up to 88.2%.Incrase the efficiency as well as the stability.

Hermetic Motor

The motors are hermetically sealed from the machineroom, cooling is accomplished by spraying liquid refrigerant on the motor windings and shaft. This highly efficient cooling method results in the use of smaller, cooler-running motors. As a result, hermetic motors require lower inrush current and are smaller,lighter and quieter than comparable air-cooled motors.

High Efficiency Impeller

The impeller features high strength aluminum-alloy backward curved vanes, refrigerant gas flows through the internal impeller passages without hydraulic interaction with the stationary casing walls. The impeller is designed for balanced thrust and is dynamically balanced and over speed tested.



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 of P.R.China. (Patent No.ZL 01 2 56825.2)

Precise Gearing

The specially engineered, single helical gear with crowned teeth keep more than one tooth 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 the gear contacting noise.

Bearings

Motor is suitable journal bearings to take care of the radial load, axial load and speed of the drive. The slide bearing base is 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

Special engineered gearing, double soundproof gearbox structure, optimized impeller and tunnel design ensure our chiller 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

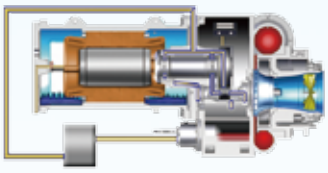
The baffle prevents direct impingement of high velocity compressor gas onto the condenser tubes. That eliminates the related vibration and wears of the tubes and distributes the refrigerant flow evenly over the length of the vessel for improved efficiency.

Advanced Capacity Adjustment

Inlet guide vanes work together with moveable diffuser lead to stepless capacity range from 10% to 100% and free of surge. The IGV openness is driven by one precision stepping motor which called actuator and be controlled by the PLC directly.And this technology was awarded by the State Intellectual Property Office of P.R.China. (Patent No.ZL01 2 56824.4).

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 supply oil to the gear surface for lubrication, prevent the gear from burnt if sudden power loss happens.



Oil Filter and Oil cooler

A plate type oil cooler is factory mounted aside the compressor. An external oil filter and oil cooler is easy to do maintenance and replacement. Change of the oil filter or oil cooler can be done after closed the isolation valve in the pipe line.

Unmatched Oil Reclaim System

During the running of chiller unit, a small amount of lube may interfuses into the refrigerant. Midea patented oil reclaim system designed to return the oil from the heat exchanger back to the oil tank. It will improve the refrigerant purity to increase the thermal exchange efficiency and provide sufficient oil to compressor.

Low Inrush Current

Standard starter for Midea 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 the 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 also available for various applications.

100% Factory Run-Tested

In Midea factory, after assembled, the unit will 100% go through 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 operation and performance-proven.

Specification

Standard efficiency

Model			LC450M	LC500M	LC550M	LC600M	LC650M	LC700M	LC750M	LC800M	LC850M	LC900M	LC950M	LC1000M	LC1100M	LC1200M
Cooling capacity	RT		450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200
	kW		1582	1758	1934	2110	2285	2461	2637	2813	2989	3164	3340	3516	3868	4219
	10^4kcal/h		136	151	166	181	197	212	227	242	257	272	287	302	333	363
Evaporator	Chilled water flow volume	m^3/h	272	302	333	363	393	423	454	484	514	544	575	605	665	726
	Chilled water pressure drop	kPa	64	63	62	65	72	70	74	75	78	80	82	85	83	84
	Pass	/	2													
	Chilled water inlet/outlet temperature	°C	12/7													
	Water pipe inlet/outlet diameter	/	DN200	DN250	DN250	DN250	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Cooling water flow volume	m^3/h	327	362	397	433	466	501	537	575	611	645	680	719	789	862
	Cooling water pressure drop	kPa	62	65	63	68	71	76	76	76	77	77	76	72	76	77
	Pass	/	2													
	Cooling water inlet/outlet temperature	°C	30/35													
	Water pipe inlet/outlet diameter	mm	DN200	DN250	DN250	DN250	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Compressor	Running power	kW	272	302	332	360	389	419	450	478	509	540	571	597	654	718
	Configured power	kW	385	385	385	445	490	490	560	560	630	630	695	695	760	840
	Power supply		380/10000V–3Ph-50Hz													
	Motor cooled by		Refrigerant													
Efficiency		kW/RT	0.605	0.603	0.604	0.600	0.598	0.599	0.600	0.598	0.599	0.600	0.601	0.597	0.595	0.598
Weight	Shipping weight	kg	7510	7650	7960	8146	10595	10670	10750	10835	10905	10974	11400	11547	11715	11860
	Running weight	kg	8702	8958	9390	9641	12382	12559	12700	12914	13062	13189	13882	14123	14458	14726
Dimension	Length(A)	mm	4671	4671	4671	4671	5020	5020	5020	5020	5020	5020	5085	5085	5085	5085
	Width(B)	mm	1850	1850	1850	1850	2100	2100	2100	2100	2100	2100	2210	2210	2210	2210
	Height(C)	mm	2054	2054	2054	2054	2510	2510	2510	2510	2510	2510	2610	2610	2610	2610

Notes:

1. Nominal Cooling capacities are based on following conditions:
   Chilled water inlet/outlet temperature 12°C/7°C(53.6°F/44.6°F);Cooling water inlet/outlet temperature 30°C/35°C(86°F/95°F).
2. The design fouling factor for both evaporator and condenser are 0.086m^2 ·°C/kW (0.0005ft2 ·°F·hr/Btu),otherwise can be customized.
3. The design working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

Model			LC1200 MS	LC1300 MS	LC1400 MS	LC1500 MS	LC1600 MS	LC1700 MS	LC1800 MS	LC1900 MS	LC2000 MS	LC2100 MS	LC2200 MS
Cooling capacity	RT		1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
	kW		4219	4571	4922	5274	5626	5977	6329	6680	7032	7384	7735
	10^4kcal/h		363	393	423	454	484	514	544	575	605	635	665
Evaporator	Chilled water flow volume	m³/h	726	786	847	907	968	1028	1089	1149	1210	1270	1331
	Chilled water pressure drop	kPa	83	85	84	81	83	87	89	90	88	89	90
	Pass	/	2										
	Chilled water inlet/outlet temperature	℃	12/7										
	Water pipe inlet/outlet diameter	/	DN350	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Condenser	Cooling water flow volume	m³/h	861	932	1004	1075	1147	1218	1289	1360	1431	1504	1576
	Cooling water pressure drop	kPa	86	83	84	87	88	90	89	92	94	95	96
	Pass	/	2										
	Cooling water inlet/outlet temperature	°C	30/35										
	Water pipe inlet/outlet diameter	mm	DN350	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Compressor	Running power	kW	724	785	841	898	950	1011	1064	1112	1168	1235	1309
	Configured power	kW	760	840	930	990	1100	1100	1100	1200	1320	1320	1450
	Power supply		10000V–3Ph-50Hz										
	Motor cooled by		Refrigerant										
Efficiency		kW/RT	0.603	0.604	0.601	0.599	0.594	0.595	0.591	0.585	0.584	0.588	0.595
Weight	Shipping weight	kg	18330	18760	19250	22410	22650	22920	23150	23360	23210	23910	24120
	Running weight	kg	22130	22370	22610	25340	25740	26210	26660	27110	27560	27780	28030
Dimension	Length(A)	mm	5490	5490	5490	5790	5790	5790	5790	5790	5790	5790	5790
	Width(B)	mm	2800	2800	2800	3150	3150	3150	3150	3150	3150	3150	3150
	Height(C)	mm	3010	3010	3010	3180	3180	3180	3180	3180	3180	3180	3180

Notes:

1. Nominal Cooling capacities are based on following conditions:
   Chilled water inlet/outlet temperature 12°C/7°C(53.6°F/44.6°F);Cooling water inlet/outlet temperature 30°C/35°C(86°F/95°F).
2. The design fouling factor for both evaporator and condenser are 0.086m² ·°C/kW (0.0005ft2 ·°F·hr/Btu),otherwise can be customized.
3. The design working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

High efficiency

Model			LC650H	LC700H	LC750H	LC800H	LC850H	LC900H	LC950H	LC1000H	LC1100H
Cooling capacity	RT		650	700	750	800	850	900	950	1000	1100
	kW		2285	2461	2637	2813	2989	3164	3340	3516	3868
	10^4kcal/h		197	212	227	242	257	272	287	302	333
Evaporator	Chilled water flow volume	m³/h	393	423	454	484	514	544	575	605	665
	Chilled water pressure drop	kPa	72	70	74	75	78	80	82	85	83
	Pass	/	2								
	Chilled water inlet/outlet temperature	°C	12/7								
	Water pipe inlet/outlet diameter	/	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Cooling water flow volume	m³/h	464	500	536	571	606	643	677	713	784
	Cooling water pressure drop	kPa	92	93	92	89	95	92	88	92	91
	Pass	/	2								
	Cooling water inlet/outlet temperature	°C	30/35								
	Water pipe inlet/outlet diameter	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Compressor	Running power	kW	373	403	429	458	484	515	539	564	622
	Configured power	kW	490	490	560	560	630	630	695	695	760
	Power supply		380/10000V–3Ph-50Hz								
	Motor cooled by		Refrigerant								
Efficiency		kW/RT	0.575	0.575	0.573	0.573	0.569	0.572	0.567	0.564	0.565
Weight	Shipping weight	kg	11002	11168	11284	11418	11514	11626	12077	12215	12459
	Running weight	kg	12789	13057	13234	13497	13671	13841	14558	14791	15201
Dimension	Length（A）	mm	5020	5020	5020	5020	5020	5020	5085	5085	5085
	Width（B）	mm	2100	2100	2100	2100	2100	2100	2210	2210	2210
	Height（C）	mm	2510	2510	2510	2510	2510	2510	2610	2610	2610

Notes:

1. Nominal Cooling capacities are based on following conditions:
   Chilled water inlet/outlet temperature 12°C/7°C(53.6°F/44.6°F);Cooling water inlet/outlet temperature 30°C/35°C(86°F/95°F).
2. The design fouling factor for both evaporator and condenser are 0.086m^2 ·°C/kW (0.0005ft2 ·°F·hr/Btu),otherwise can be customized.
3. The design working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

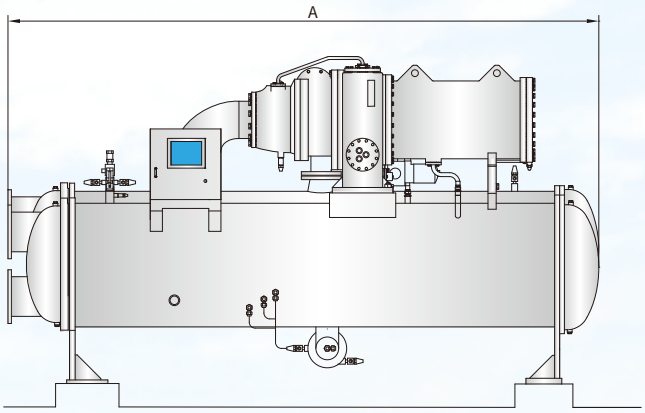
Model			LC1200 HS	LC1300 HS	LC1400 HS	LC1500 HS	LC1600 HS	LC1700 HS	LC1800 HS	LC1900 HS	LC2000 HS	LC2100 HS	LC2200 HS
Cooling capacity	RT		1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
	kW		4219	4571	4922	5274	5626	5977	6329	6680	7032	7384	7735
	10^4kcal/h		363	393	423	454	484	514	544	575	605	635	665
Evaporator	Chilled water flow volume	m³/h	726	786	847	907	968	1028	1089	1149	1210	1270	1331
	Chilled water pressure drop	kPa	80	82	81	78	80	84	86	87	85	86	89
	Pass	/	2										
	Chilled water inlet/outlet temperature	°C	12/7										
	Water pipe inlet/outlet diameter	/	DN350	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Condenser	Cooling water flow volume	m³/h	855	926	997	1067	1138	1209	1280	1350	1421	1493	1565
	Cooling water pressure drop	kPa	83	80	81	84	85	87	86	90	91	93	93
	Pass	/	2										
	Cooling water inlet/outlet temperature	°C	30/35										
	Water pipe inlet/outlet diameter	mm	DN350	DN350	DN350	DN400	DN400	DN400	DN400	DN400	DN400	DN400	DN400
Compressor	Running power	kW	675	733	785	838	892	949	1001	1054	1107	1168	1228
	Configured power	kW	760	840	930	990	1100	1100	1100	1200	1320	1320	1450
	Power supply		10000V–3Ph-50Hz										
	Motor cooled by		Refrigerant										
Efficiency		kW/RT	0.563	0.563	0.561	0.559	0.557	0.558	0.556	0.555	0.554	0.556	0.558
Weight	Shipping weight	kg	18530	18960	19450	22610	22850	23110	23360	23590	23870	24120	24350
	Running weight	kg	22330	22570	22810	25540	25940	26410	26860	27310	27760	27996	28230
Dimension	Length(A)	mm	5490	5490	5490	5790	5790	5790	5790	5790	5790	5790	5790
	Width(B)	mm	2800	2800	2800	3150	3150	3150	3150	3150	3150	3150	3150
	Height(C)	mm	3010	3010	3010	3180	3180	3180	3180	3180	3180	3180	3180

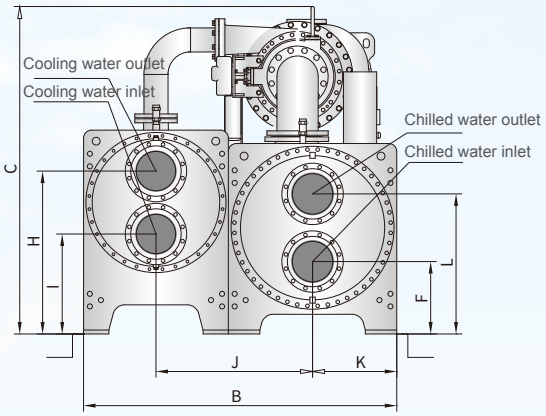
Notes:

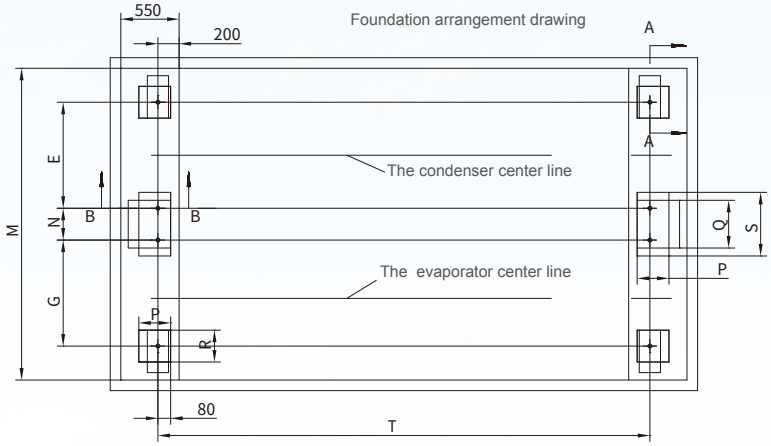
1. Nominal Cooling capacities are based on following conditions:
   Chilled water inlet/outlet temperature 12°C/7°C(53.6°F/44.6°F);Cooling water inlet/outlet temperature 30°C/35°C(86°F/95°F).
2. The design fouling factor for both evaporator and condenser are 0.086m² ·°C/kW (0.0005ft2 ·°F·hr/Btu),otherwise can be customized.
3. The design working pressure for both evaporator and condenser are 1.0MPa, higher pressure demand can be customized.

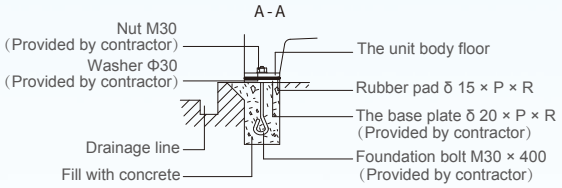
Dimension

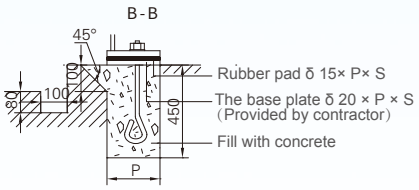
■ LC450M-LC750M







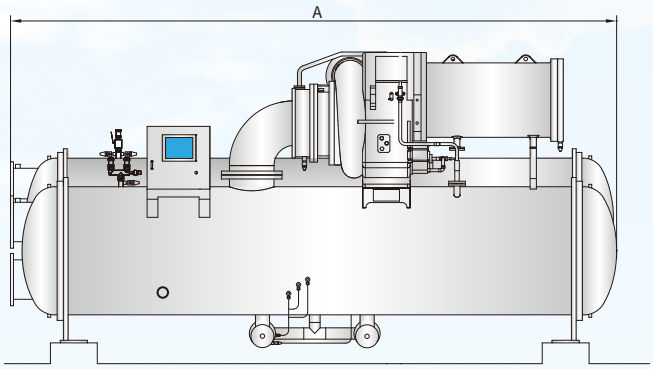


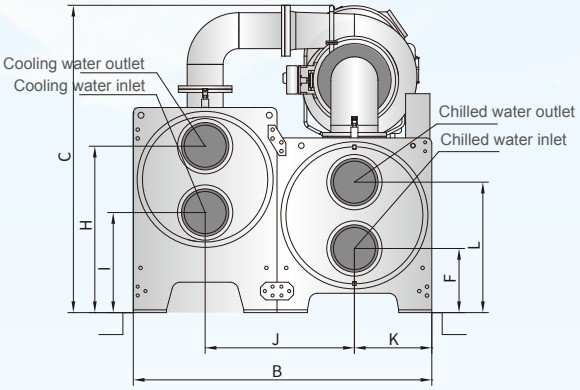


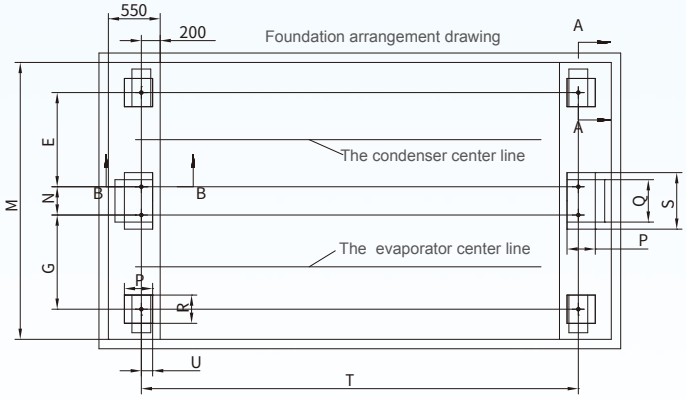
Model	Dimension			Unit Base									
	(A)	(B)	(C)	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
LC450M	4671	1850	2054	2150	780	670	200	240	200	350	400	80	3780
LC500M	4671	1850	2054	2150	780	670	200	240	200	350	400	80	3780
LC550M	4671	1850	2054	2150	780	670	200	240	200	350	400	80	3780
LC600M	4671	1850	2054	2150	780	670	200	240	200	350	400	80	3780
LC650M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC700M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC750M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080

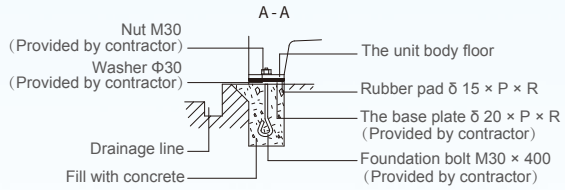
Model	Pipe Locate Position							
	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm		
LC450M	410	820	490	650	1020	925	DN200	DN200
LC500M	380	850	490	635	1035	925	DN250	DN250
LC550M	380	850	490	635	1035	925	DN250	DN250
LC600M	380	850	490	635	1035	925	DN250	DN250
LC650M	550	1020	550	875	1335	1050	DN300	DN300
LC700M	550	1020	550	875	1335	1050	DN300	DN300
LC750M	550	1020	550	875	1335	1050	DN300	DN300

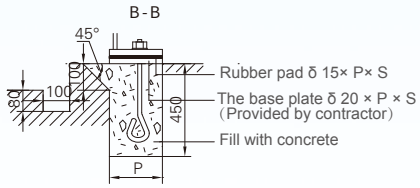
LC800M-LC1200M







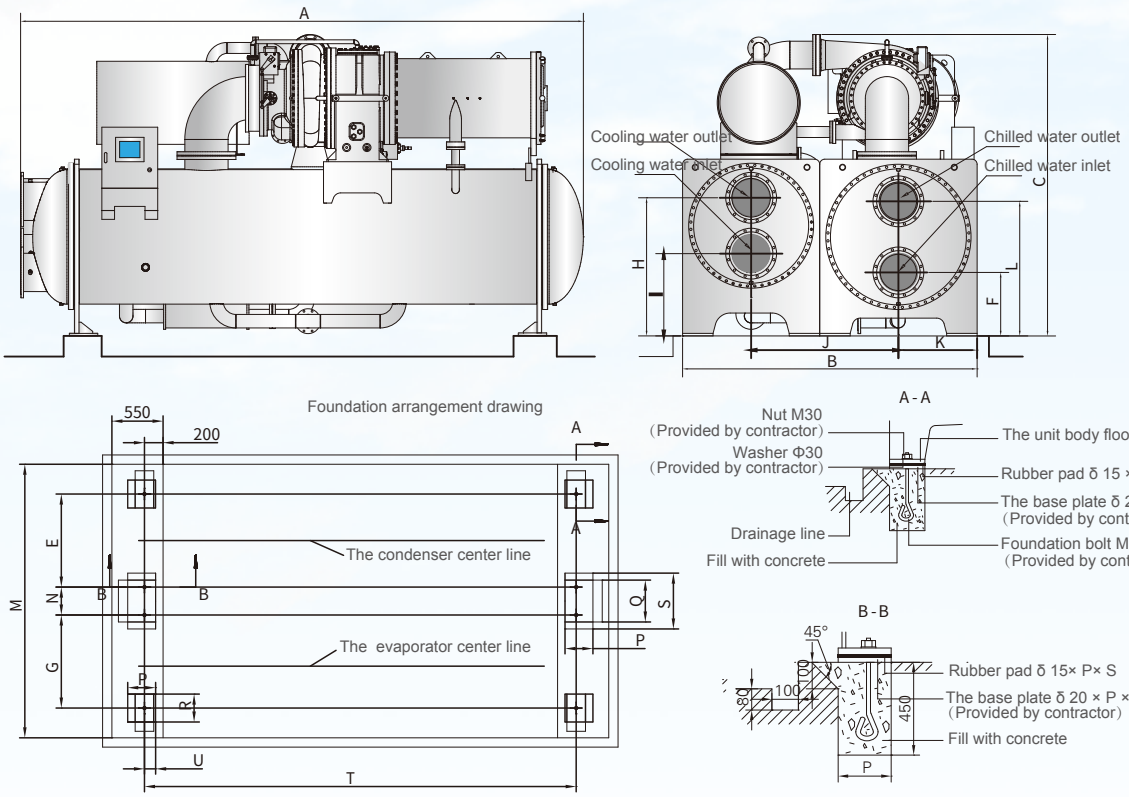




Model	Dimension			Unit Base									
	(A)	(B)	(C)	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
LC800M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC850M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC900M	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC950M	5085	2210	2610	2600	1000	900	200	240	200	350	400	80	4080
LC1000M	5085	2210	2610	2600	1000	900	200	240	200	350	400	80	4080
LC1100M	5085	2210	2610	2600	1000	900	200	240	200	350	400	80	4080
LC1200M	5085	2210	2610	2600	1000	900	200	240	200	350	400	80	4080

Model	Pipe Locate Position							
	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm		
LC800M	550	1020	550	875	1335	1050	DN300	DN300
LC850M	550	1020	550	875	1335	1050	DN300	DN300
LC900M	550	1020	550	875	1335	1050	DN300	DN300
LC950M	585	1085	600	920	1390	1150	DN300	DN300
LC1000M	585	1085	600	920	1390	1150	DN300	DN300
LC1100M	585	1085	600	920	1390	1150	DN300	DN300
LC1200M	585	1085	600	920	1390	1150	DN300	DN300

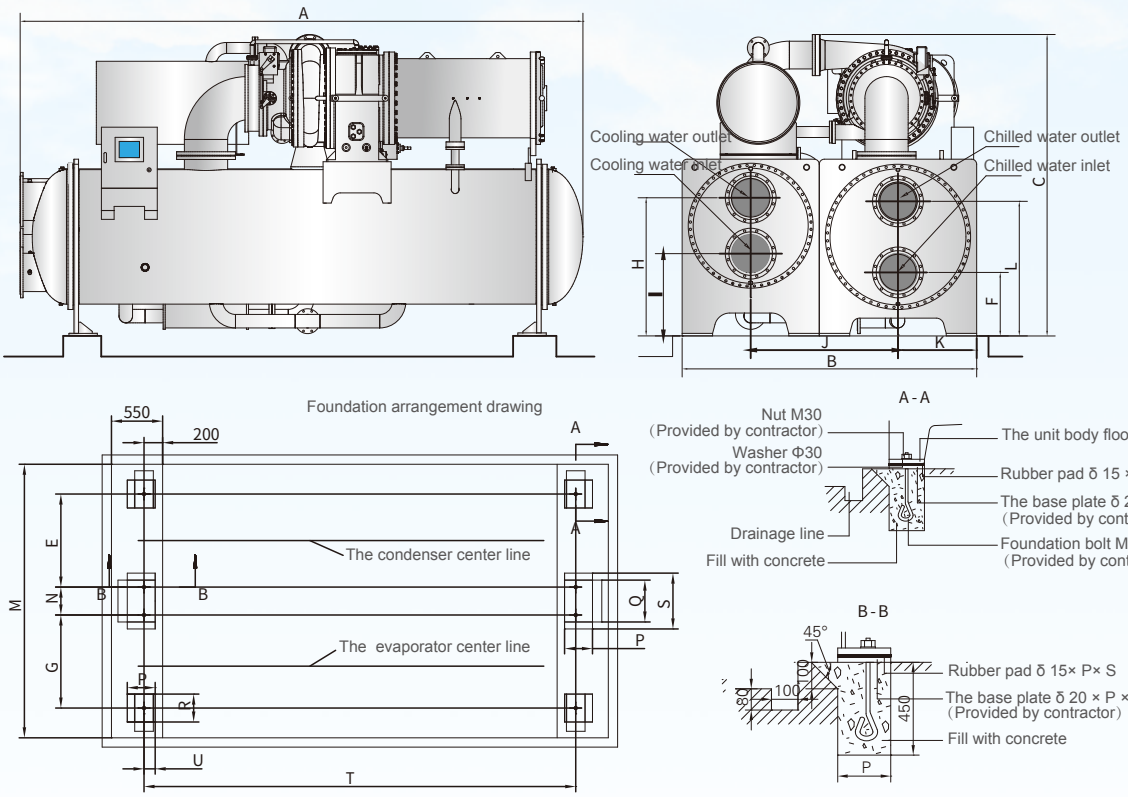
LC1200MS-LC1700MS



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
LC1200MS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1300MS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1400MS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1500MS	5790	2800	2920	3450	1380	1170	300	280	300	450	600	100	4540
LC1600MS	5790	2800	2920	3450	1380	1170	300	280	300	450	600	100	4540
LC1700MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540

Model	Pipe Locate Position							
	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm		
LC1200MS	765	1315	725	740	1360	1400	DN350	DN350
LC1300MS	765	1315	725	740	1360	1400	DN350	DN350
LC1400MS	765	1315	725	740	1360	1400	DN350	DN350
LC1500MS	740	1440	840	790	1410	1575	DN400	DN400
LC1600MS	740	1440	840	790	1410	1575	DN400	DN400
LC1700MS	740	1440	840	790	1410	1575	DN400	DN400

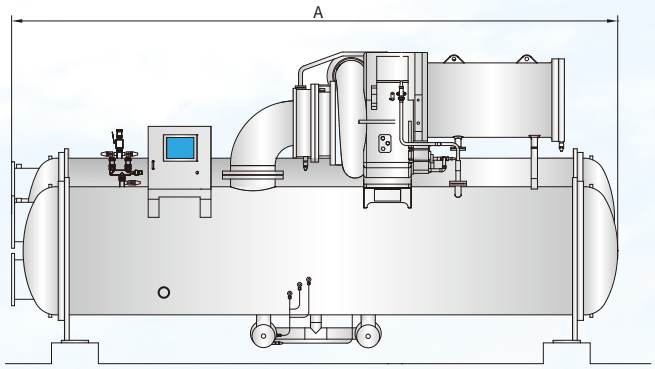
LC1800MS-LC2200MS

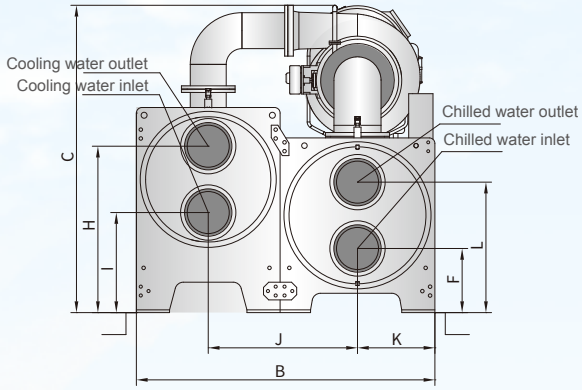


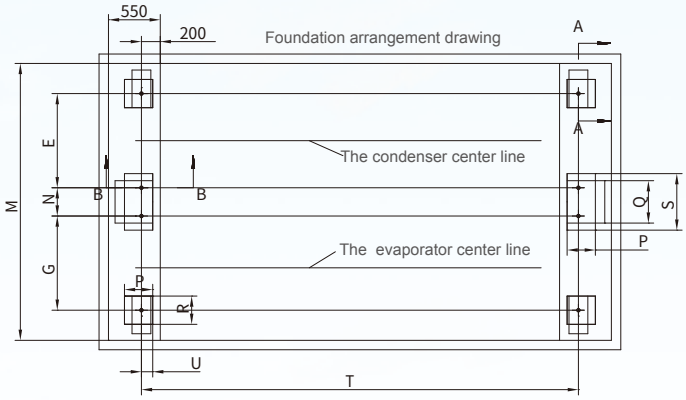
Model	Dimension			Unit Base									
	(A)	(B)	(C)	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
LC1800MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC1900MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2000MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2100MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2200MS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540

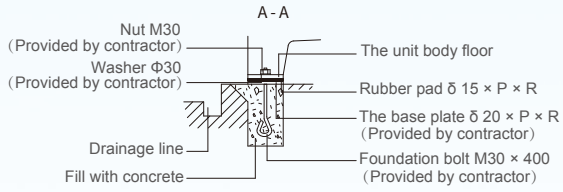
Model	Pipe Locate Position							
	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm		
LC1800MS	740	1440	840	790	1410	1575	DN400	DN400
LC1900MS	740	1440	840	790	1410	1575	DN400	DN400
LC2000MS	740	1440	840	790	1410	1575	DN400	DN400
LC2100MS	740	1440	840	790	1410	1575	DN400	DN400
LC2200MS	740	1440	840	790	1410	1575	DN400	DN400

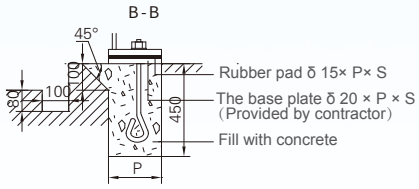
LC650H-LC1100H







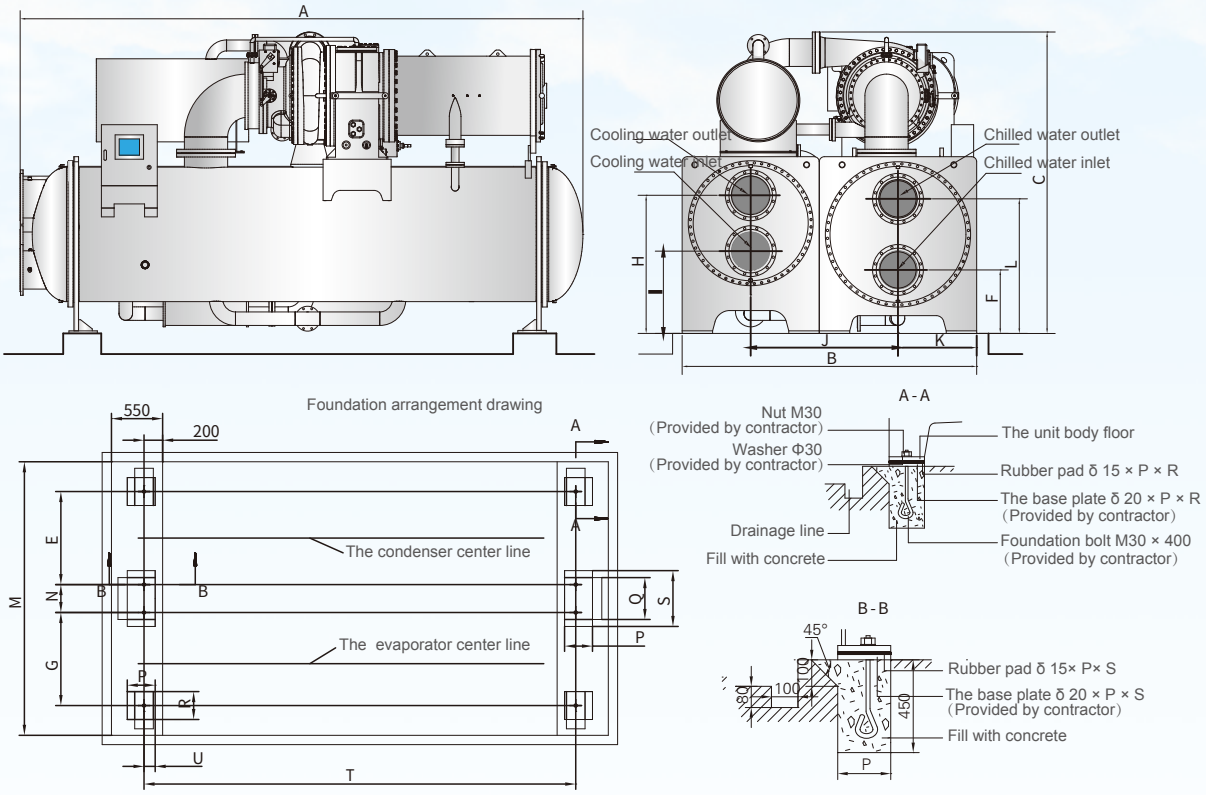




Model	Dimension			Unit Base									
	(A)	(B)	(C)	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
LC650H	5020	2100	2510	2400	900	800	200	240	200	350	400	80	4080
LC700H				2400	900	800	200	240	200	350	400	80	4080
LC750H				2400	900	800	200	240	200	350	400	80	4080
LC800H				2400	900	800	200	240	200	350	400	80	4080
LC850H				2400	900	800	200	240	200	350	400	80	4080
LC900H				2400	900	800	200	240	200	350	400	80	4080
LC950H	5085	2210	2610	2600	1000	900	200	240	200	350	400	80	4080
LC1000H				2600	1000	900	200	240	200	350	400	80	4080
LC1100H				2600	1000	900	200	240	200	350	400	80	4080

Model	Dimension			Pipe Locate Position							
	(A)	(B)	(C)	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm	mm	mm	mm		
LC650 H	5020	2100	2510	550	1020	550	875	1335	1050	DN300	DN300
LC700 H				550	1020	550	875	1335	1050	DN300	DN300
LC750 H				550	1020	550	875	1335	1050	DN300	DN300
LC800 H				550	1020	550	875	1335	1050	DN300	DN300
LC850 H				550	1020	550	875	1335	1050	DN300	DN300
LC900 H				550	1020	550	875	1335	1050	DN300	DN300
LC950 H	5085	2210	2610	585	1085	600	920	1390	1150	DN300	DN300
LC1000 H				585	1085	600	920	1390	1150	DN300	DN300
LC1100 H				585	1085	600	920	1390	1150	DN300	DN300

LC1200HS-LC2200HS

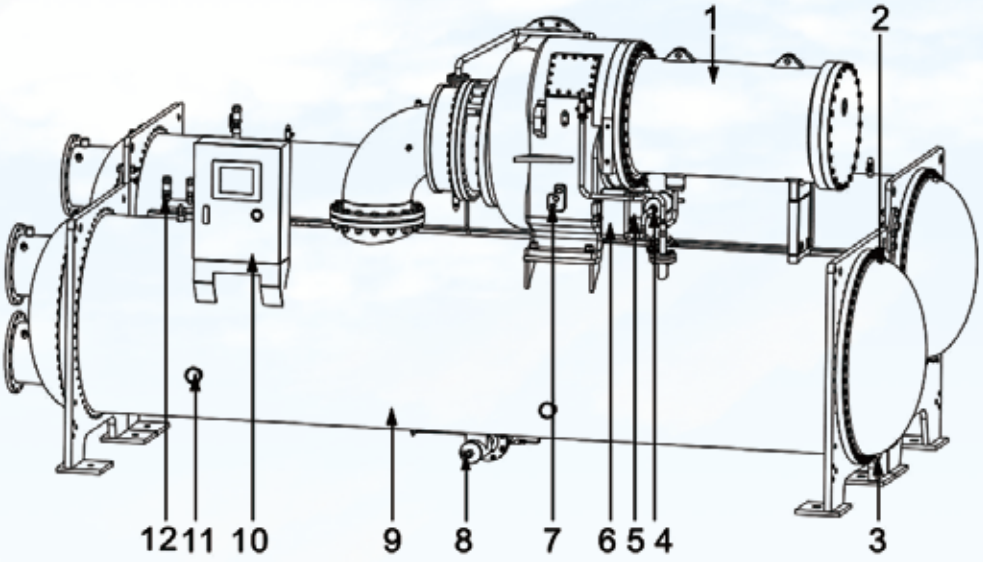


Model	Dimension			Unit Base									
	(A)	(B)	(C)	M	G	E	N	P	R	Q	S	U	T
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
LC1200HS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1300HS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1400HS	5490	2800	3010	3100	1150	1050	300	280	300	450	600	100	4340
LC1500HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC1600HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC1700HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC1800HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC1900HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2000HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2100HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540
LC2200HS	5790	3150	3180	3450	1380	1170	300	280	300	450	600	100	4540

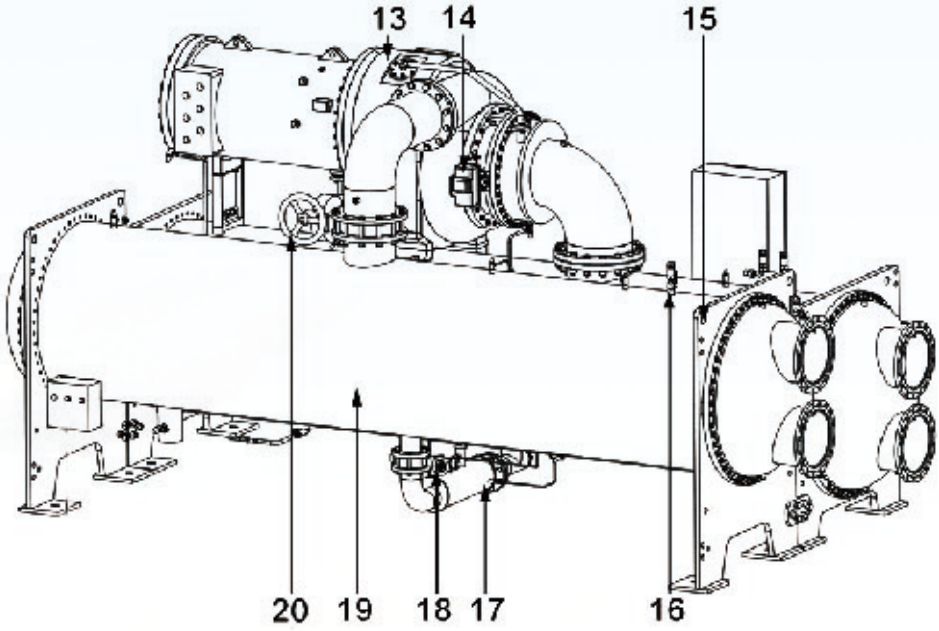
Model	Dimension			Pipe Locate Position							
	(A)	(B)	(C)	F	L	K	I	H	J	Evaporator	Condenser
	mm	mm	mm	mm	mm	mm	mm	mm	mm		
LC1200HS	5490	2800	3010	765	1315	725	740	1360	1400	DN350	DN350
LC1300HS	5490	2800	3010	765	1315	725	740	1360	1400	DN350	DN350
LC1400HS	5490	2800	3010	765	1315	725	740	1360	1400	DN350	DN350
LC1500HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC1600HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC1700HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC1800HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC1900HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC2000HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC2100HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400
LC2200HS	5790	3150	3180	740	1440	840	790	1410	1575	DN400	DN400

Construction

LC450M- LC1200M



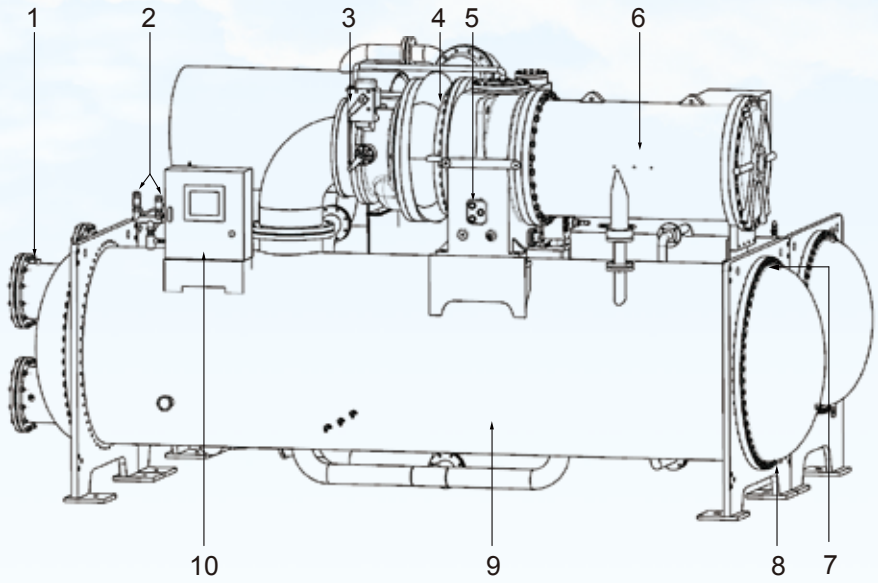
Front View



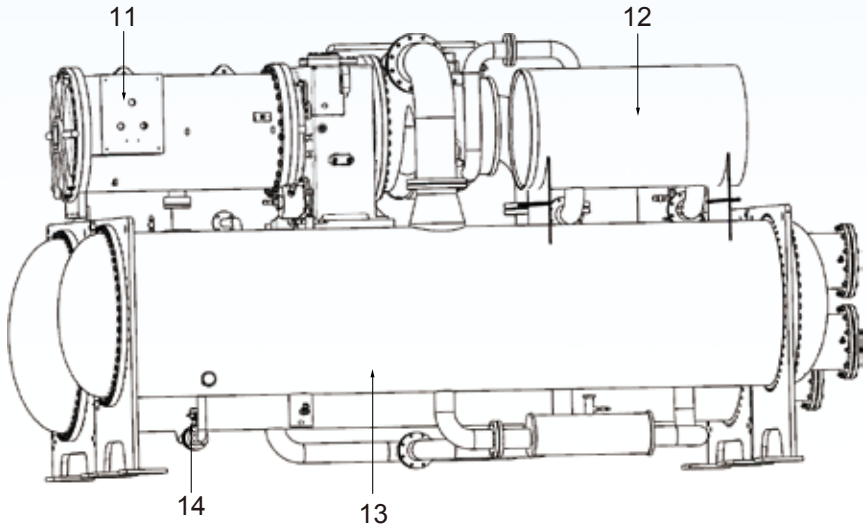
Rear View

1. Motor
2. Air Release Valve
3. Water Drainage Valve
4. Oil Filter
5. Oil pump
6. Oil Cooler
7. Oil Level Sight Glass
8. Refrigerant Charge valve
9. Evaporator
10. Control Panel
11. Refrigerant Level Sight Glass
12. Evaporator Security Valve
13. Compressor
14. Guide Vane Actuator
15. Lifting Points
16. Condenser Security Valve
17. Oil Reclaim Device
18. Liquid Line Butterfly Valve (Optional)
19. Condenser
20. Discharge Line Butterfly Valve (Optional)

LC12000MS- LC2200MS



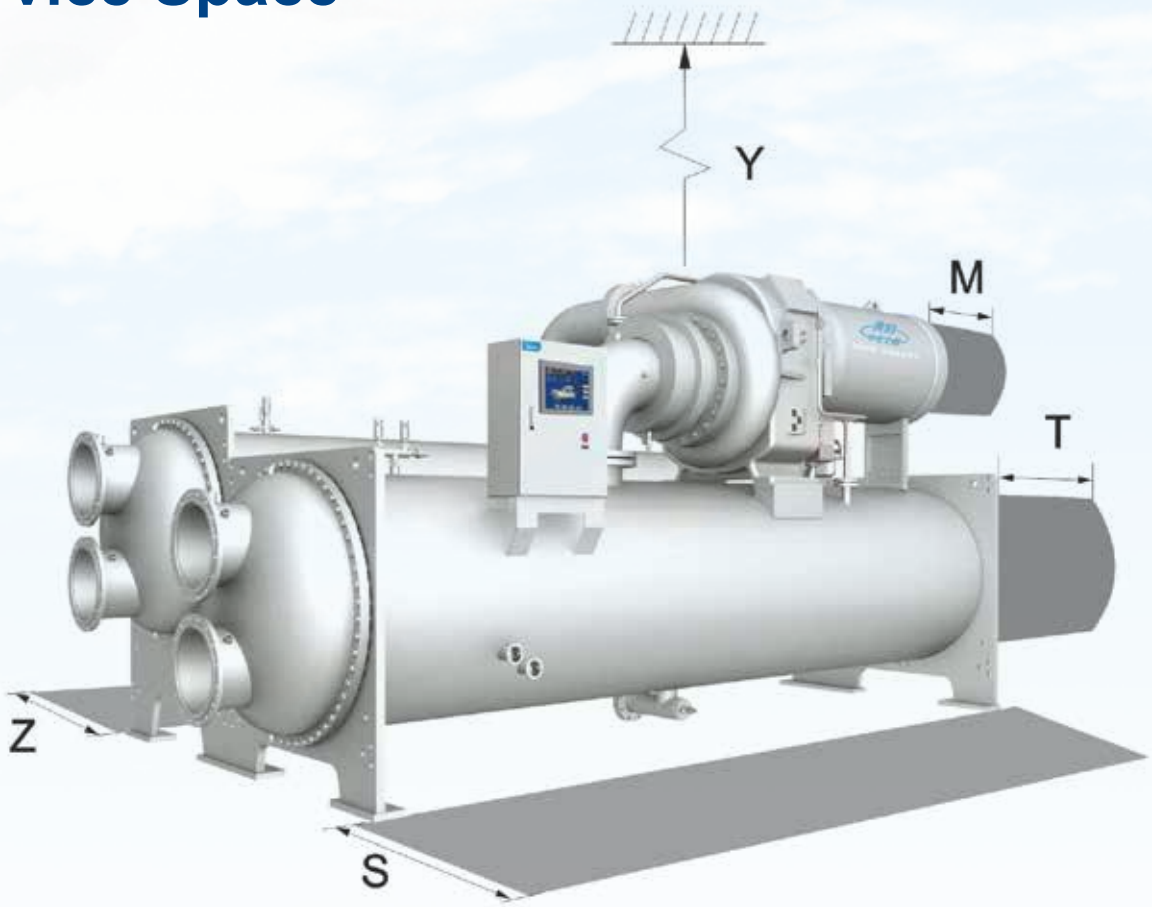
Front View



Rear View

1. Water outlet/inlet temperature sensor
2. Security Valve
3. Guide Vane Actuator
4. Compressor
5. Oil level Sight Glass
6. Motor
7. Air Release Valve
8. Water Drainage Valve
9. Evaporator
10. Control Panel
11. Motor Connection Box
12. Economizer
13. Condenser
14. Electric Valve

Service Space



Service space for stardard efficiency

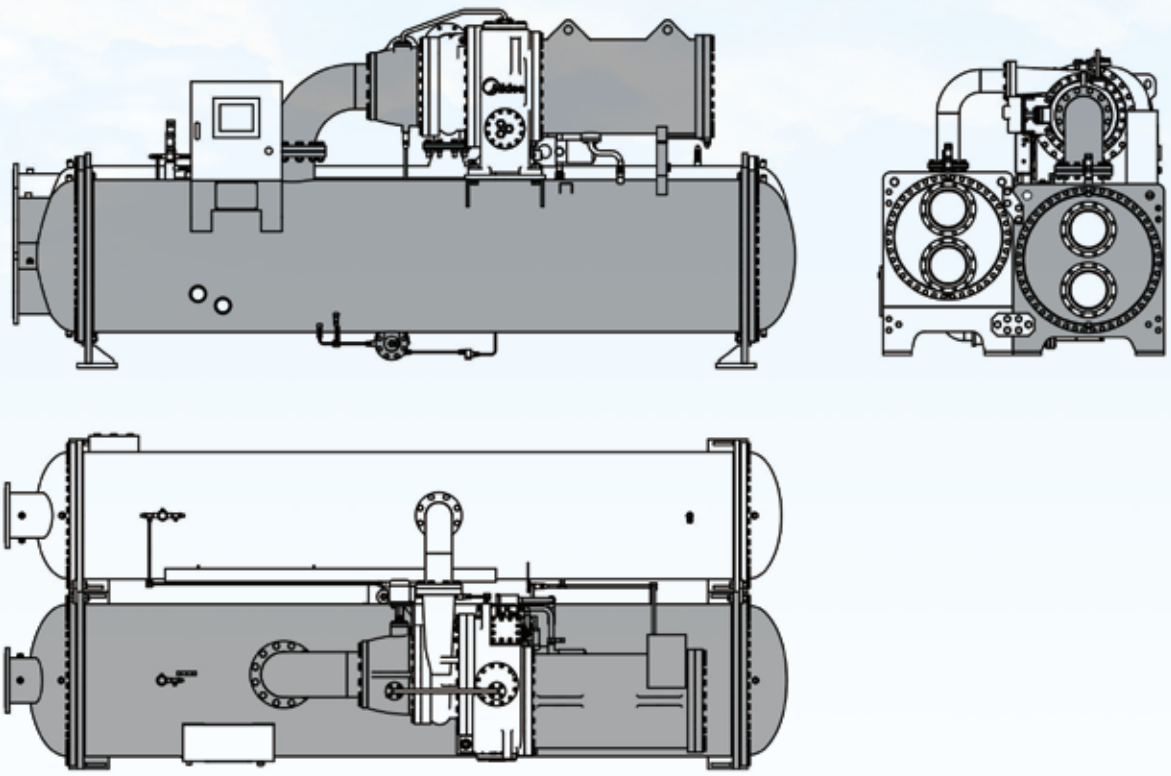
Model	Service Space(mm)				
	M	T	Y	S	Z
LC450M~LC750M	1100	4200	1200	1200	1000
LC800M~LC1200M	1500	4500	1300	1300	1000
LC1200MS~LC1800MS	1500	5300	1300	1300	1000
LC1900MS~LC2200MS	1500	5300	1300	1300	1000

Service space for high efficiency

Model	Service Space(mm)				
	M	T	Y	S	Z
LC650H~LC1100H	1500	4500	1300	1300	1000
LC1200HS~LC1400HS	1600	4800	1300	1800	1000
LC1700HS~LC2200HS	1600	5000	1300	1800	1000

Note:
The size "T" stands for the dimension to pull out the coper tube from the heat exchanger.It can be done from both sides.

Insulation



Note:
The gray area need to be insulated. Normally the chiller is insulated in the factory. If the chiller has to be insulated in the jobsite, it must ensure that:
• Moveable components and parts shouldn't be affected by insulation.
• Please don't leave connecting bolt in insulation.
• Please don't leave name plate in insulation.
• Please open water box cover when clean the evaporator tubes.

Insulation will be elastomeric foam of Class 'O' in accordance with BS 476 either factory or field-installed suitable to prevent sweating in environments with RH 85 % & dry bulb temperature ranging from 18 °C to 35°C.
The properties of the elastomeric foam shall be as follows:
CFC free closed cell nitrile rubber & noncombustible material.
Density: 65-75 kg/m3.
Thermal conductivity: Maximum 0.04 W/mK at a mean temperature of 20°C.
Maximum & minimum service temperature: 105°C & 0°C.
Water vapor permeability: 0.13 ugm/Nh.
Moisture absorption: Less than 2.5 percent by volume.

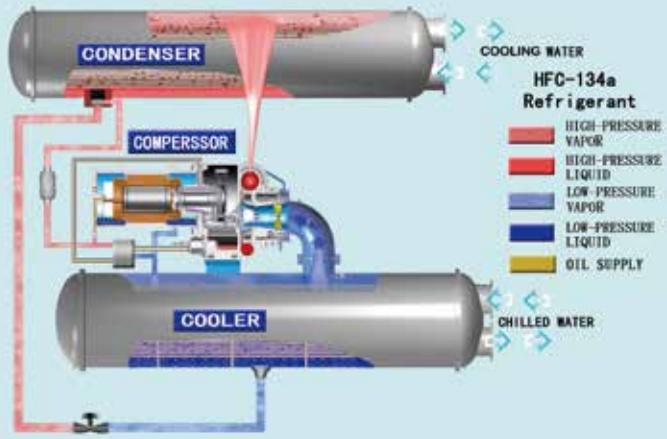
The insulation will cover all low temperature surfaces to include the evaporator, water boxes, oil return lines, chilled water flow switch piping, condenser bottom portion (if sweats during shutdown) and compressor suction line to the satisfaction of the Owner. Final color of the insulation shall match the chiller body not insulated to provide a homogenous color tone.

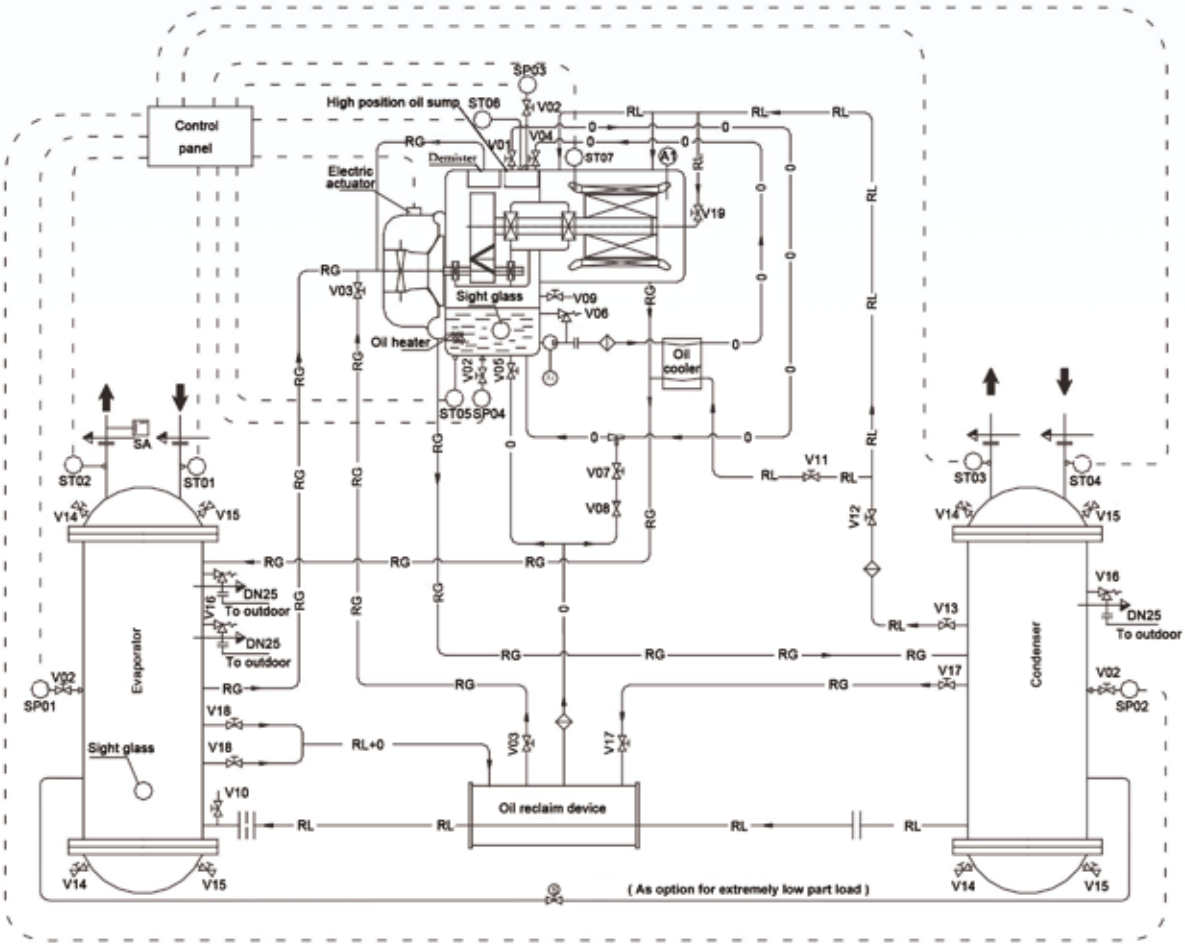
Refrigeration Cycle

Refrigeration system

Midea LC centrifugal chiller is the steam-compressing cycle type. The refrigerant will be imposed vertical energy by the high speed impeller to increase its temperature and pressure. The high pressure and temperature refrigerant gas will release its thermal energy to the cooling water in condenser, thus decrease its temperature. After throttled by the orifice its pressure will be decreased dramatically. In evaporator the low temperature and low pressure refrigerant will absorb the thermal energy from the chilled water to evaporating. The low temperature chilled water produced in this refrigeration circulation. One refrigeration circulation includes four indispensable processes: compressing, condensing, throttling and evaporating.

SP01: Evaporator pressure
SP02: Condenser pressure
SP03: Oil supply pressure
SP04: Oil sump pressure
ST01: Evaporator water inlet temperature
ST02: Evaporator water outlet temperature
ST03: Condenser water outlet temperature
ST04: Condenser water inlet temperature
ST05: Oil sump temperature
ST06: Oil supply temperature
ST07: Motor winding temperature
A1: Compressor motor current
A2: Oil pump current



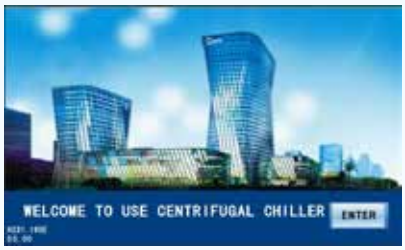


Microprocessor Control

User-friendly Interface

● The Microprocessor-based control system is equipped with an MODBUS-RTU port or other optional protocols that offers 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 the logical program such as pre-alarm, safety protection, interlock control etc., which ensures the system's proper start/start, normal operation and energy saving pause operation.

● The unit controller is factory mounted, wired and tested before shipment, to ensure machine operation in a proper condition.

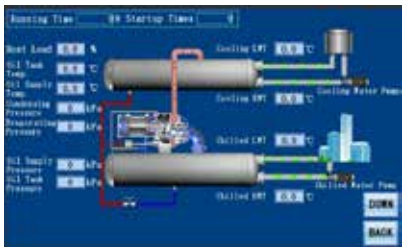


▲ Interface Display

- Graphical display
- Touch screen
- Operation status
- Operation Parameters
- Pre-alarm/alarm indication and record
- Enquiry function for historical data and trend curve

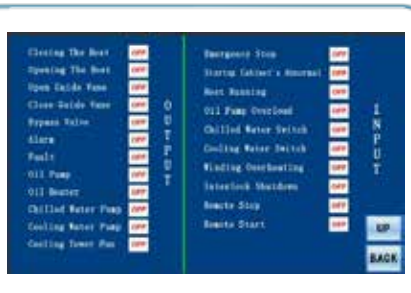
▲ Operation Control

- Set outlet temperature by users
- Automatically load or unload according to the chilled water temperature
- Pause function reduces the operation cost
- Independent start/stop control



▲ Safety Protection

- 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

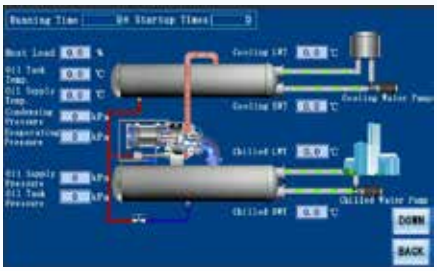


▲ Interlock Control

- 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

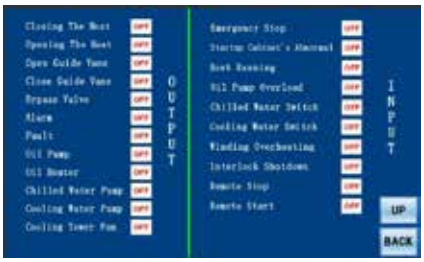
The all protection control, if necessary, shuts the chiller off or limits the open of inlet guide van to protect the chiller from possible damage.

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 voltage

User Settings

Restart temperature
Pause temperature
Current limit
Full load/rated load
Chilled water outlet temperature
Rated motor currency
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 is indication of oil flow and oil-pump operation. A significant drop in oil pressure difference indicates a failure of the oil pump, oil leakage, or other blockage in the oil-circuit. The differential pressure during compressor pre-lube mode should not fall below set point. A failure on meets this requirement leads to inhibit the start of the chiller. When the compressor is running, an alarm will be displayed if the differential pressure is below 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 increase to the maximum set point, the chiller will shut-down. The start of the compressor will be inhibited if the oil sump temperature is below the set point. The diagnostic will display at the user interface.

Oil Pump Current Overload Protection

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

High Condenser-Pressure Protection

The chiller controller's algorithm keeps the condenser pressure under a specified maximum pressure. The chiller can run up to 100 percent of this setpoint in a safe and reliable condition. If the condenser pressure exceeds the set point, the system will prohibit the open of the inlet guide vane to decrease the pressure or shut off the chiller immediately according to the different set point.

Low Evaporator-Pressure Protection

The chiller controller's algorithm keeps the evaporator pressure under a specified minimum pressure. The chiller can run up to 100 percent of this setpoint in a safe and reliable status.

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

Water Flow Protection

The water flow switches is required to install in the water piping system. The chiller controller has a digital input that will indicate the water flow. When this input does not prove flow within a fixed time during the starting, 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, avoids water freezing in the evaporator by immediately pause the chiller if the chilled water outlet temperature reaches its minimum allowable value. After the chilled water inlet temperature reach the restart set point, the chiller will start automatically. This protection may be due to the 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 line currents exceeds 110% of the rated current, the system will close the inlet guide vane automatically and check whether the current decrease to normal condition. And 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 ampere.

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 off if the temperature surpasses the maximum set point.

Start Time Limit Protection

When start the chiller, if the time from Wye connection change to Delta connection exceeds set point. The system will shut the chiller off immediately to protect the chiller from possible damage.

Power Supply Protection

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

Starter Failure Protection

The chiller will protect itself from a starter failure,that ensures the compressor motor disconnecting from the line when the motor reach the limits of its capabilities. The controller starts and stops the chiller through the starter. 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 off immediately.

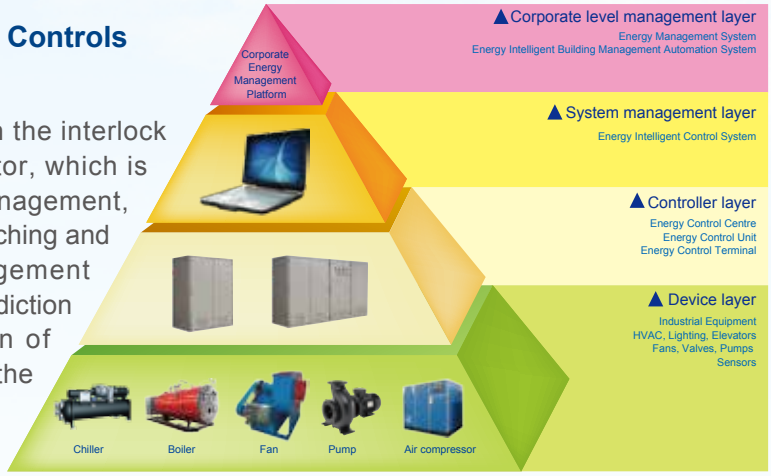
Centralized Control

■ Intelligent Control Logic Ensures System Reliability

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

■ Advanced Control Room & Centralized Controls

The conventional BMS system only focuses on the interlock control, operation status and parameter monitor, which is capable to achieve automation and energy management, but it neglects the optimization of equipment matching and controlling. Midea centralized energy management system attaches importance on building load prediction and control, and coordinates the operation of air-conditioner, fan and water pumps to realize the optimum energy management.



■ Centralized Control and Remote Management

▲ System Control Functions:

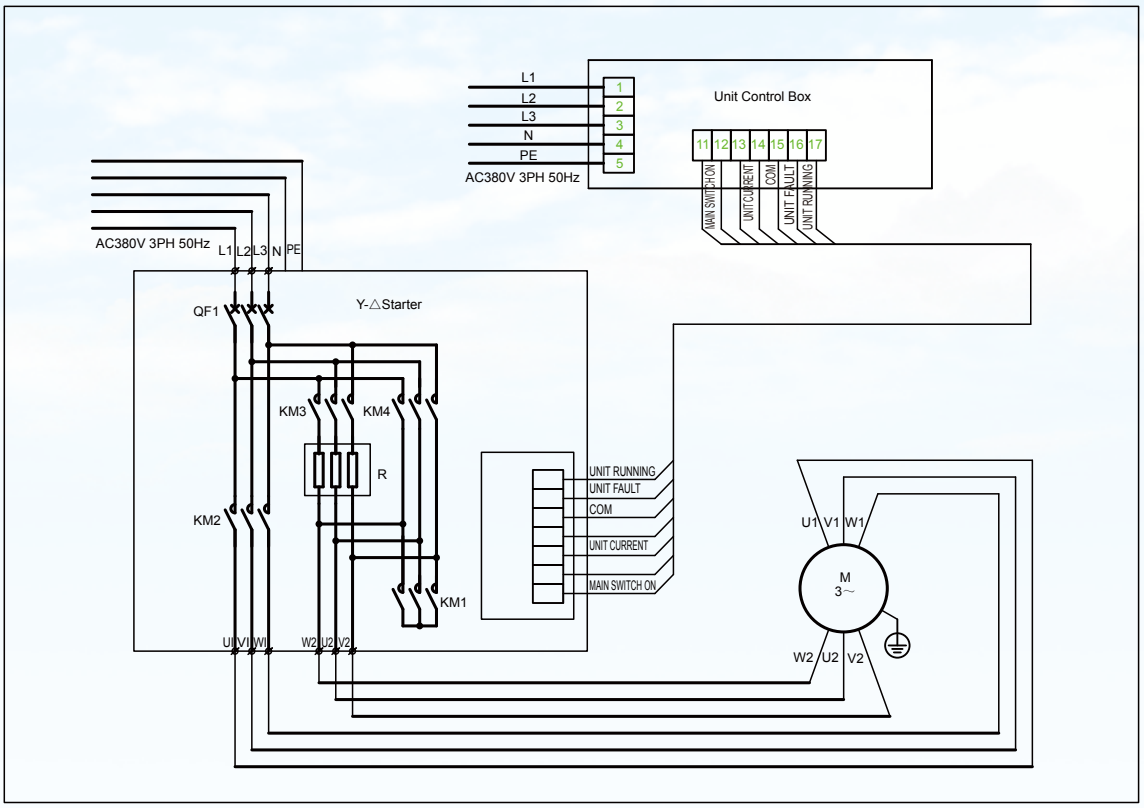
● Pragmatic Control Modes
Various and auto control, remote and local control, etc.
● Equalized operation time:
Automatically balance the operation time of each unit to extend the life-span and minimize the maintenance
● Optimum operation schedule:
Optimizes the operation schedule and qty. of water pumps, to minimize the total system power consumption.
● System data report:
It reports the operation capacity, power consumption and energy saving effect, as well the malfunction record and historical operation record.
● Strategies to address problems
System status indication and pre-alarm/alarm functions ensure the safety. Complete event management provides operator convenience to check historical records.

● Remote communication function
Adoption of the public open protocol enables the data exchange between the onsite energy management centre and the upper remote monitoring system and remote operation, maintenance and management.

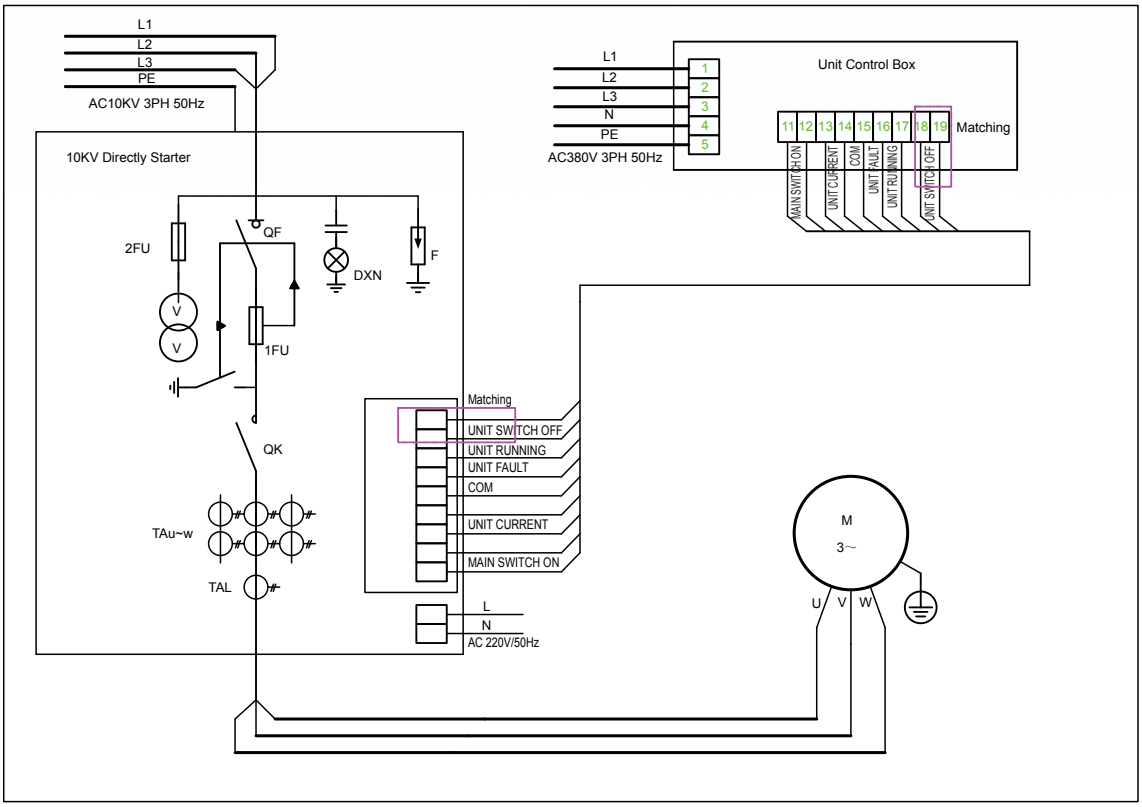
▲ Energy management:

● Climatic feedback control: Collect outdoor temperature and accordingly adjust the water volume when climate changes, thus reducing the 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 the frequency of startup and shutdown and minimizes the impact to the power grid, therefore extending the life span and reducing power consumption.

Typical Wiring Diagram



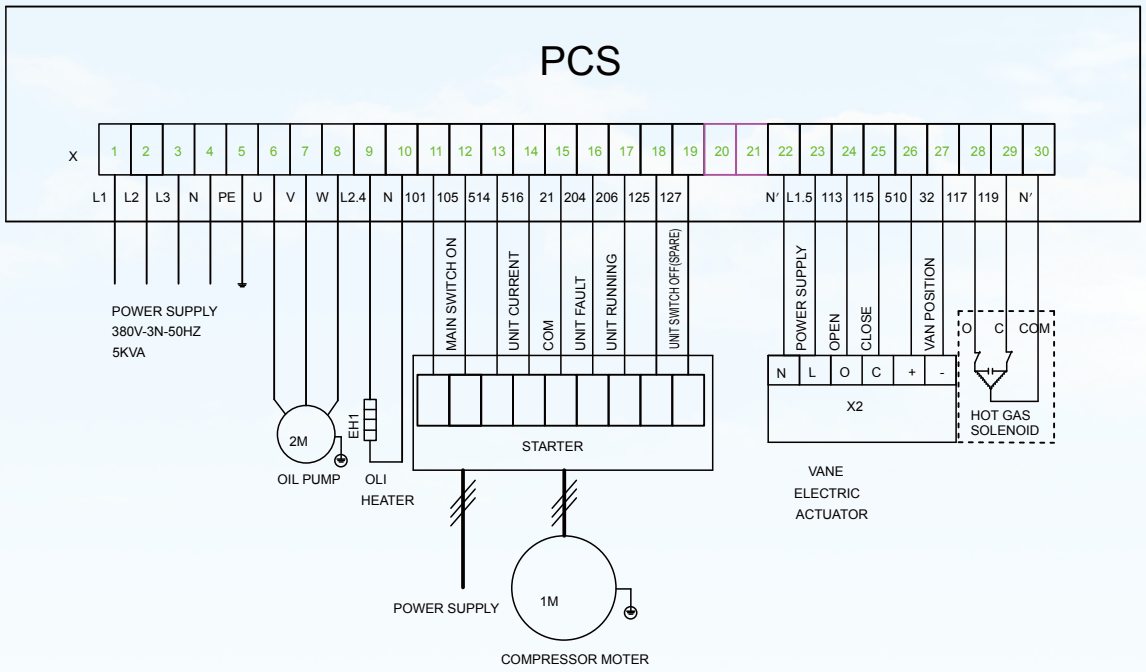
Low voltage (Closed star-delta connection)

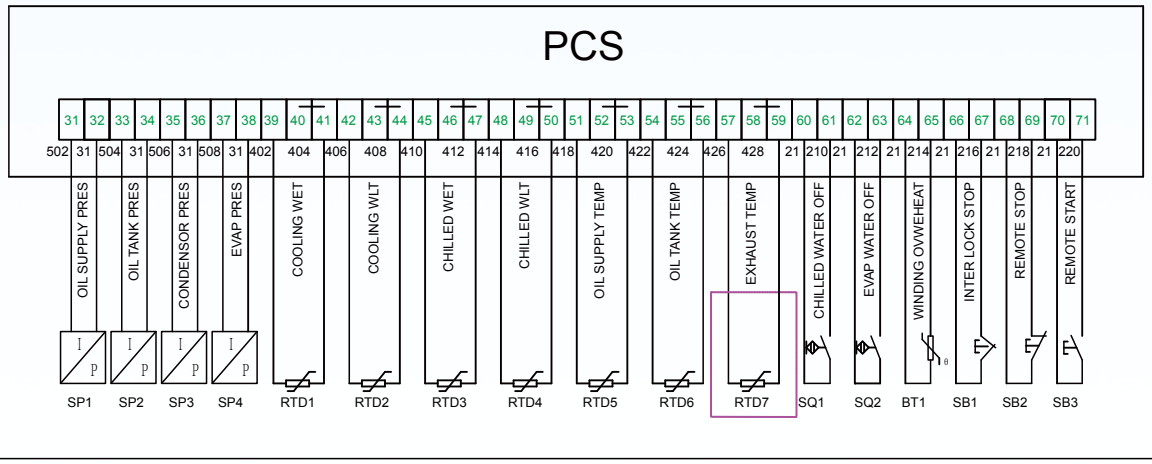


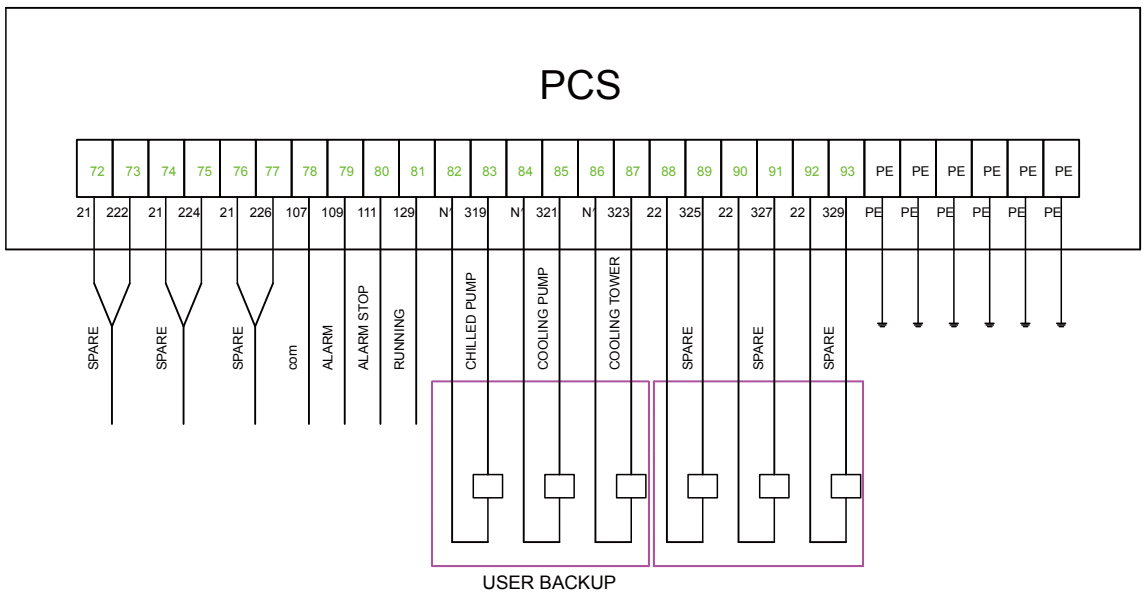
High voltage (Direct on line connection)

Note:The wiring diagram for reference only.

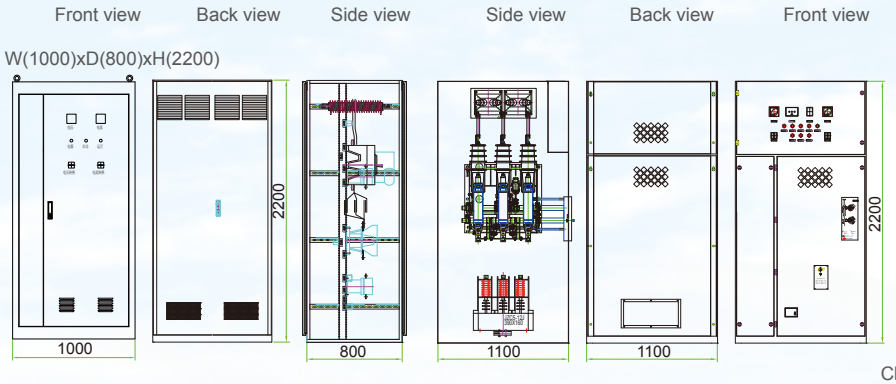
Electrical control panel wiring diagram





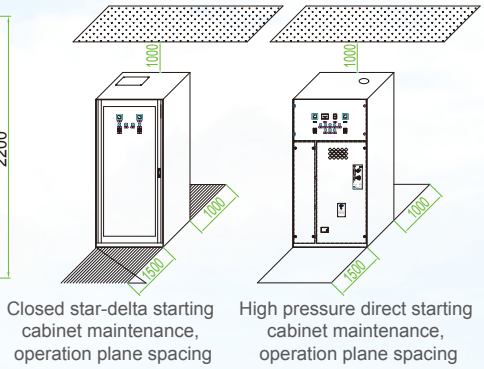


Starter Cabinet Dimensions



Closed star-delta starting cabinet

High voltage start cabinet



Closed star-delta starting cabinet maintenance, operation plane spacing

High pressure direct starting cabinet maintenance, operation plane spacing

Starting cabinet space layout

Recommended Copper Size

low voltage				
Model	Max Current	Y-△ Cable in	Y-△ Cable out	Auto-transformer in/out
LC450M	770	2xBVR240	BVR300	2xBVR240
LC500M	770	2xBVR240	BVR300	2xBVR240
LC550M	770	2xBVR240	BVR300	2xBVR240
LC600M	890	2xBVR300	2xBVR120	2xBVR300
LC650M（H）	974	2xBVR300	2xBVR150	2xBVR300
LC700M（H）	974	2xBVR300	2xBVR150	2xBVR300
LC750M（H）	1113	3xBVR240	2xBVR185	3xBVR240
LC800M（H）	1113	3xBVR240	2xBVR185	3xBVR240
LC850M（H）	1252	3xBVR240	2xBVR240	3xBVR240
LC900M（H）	1252	3xBVR240	2xBVR240	3xBVR240
LC950M（H）	1382	3xBVR300	2xBVR240	3xBVR300
LC1000M（H）	1382	3xBVR300	2xBVR240	3xBVR300
LC1100M（H）	1502	4xBVR240	2xBVR300	4xBVR240
LC1200M（H）	1670	4xBVR240	2xBVR300	4xBVR240
LC1300M（H）	1670	4xBVR240	2xBVR300	4xBVR240

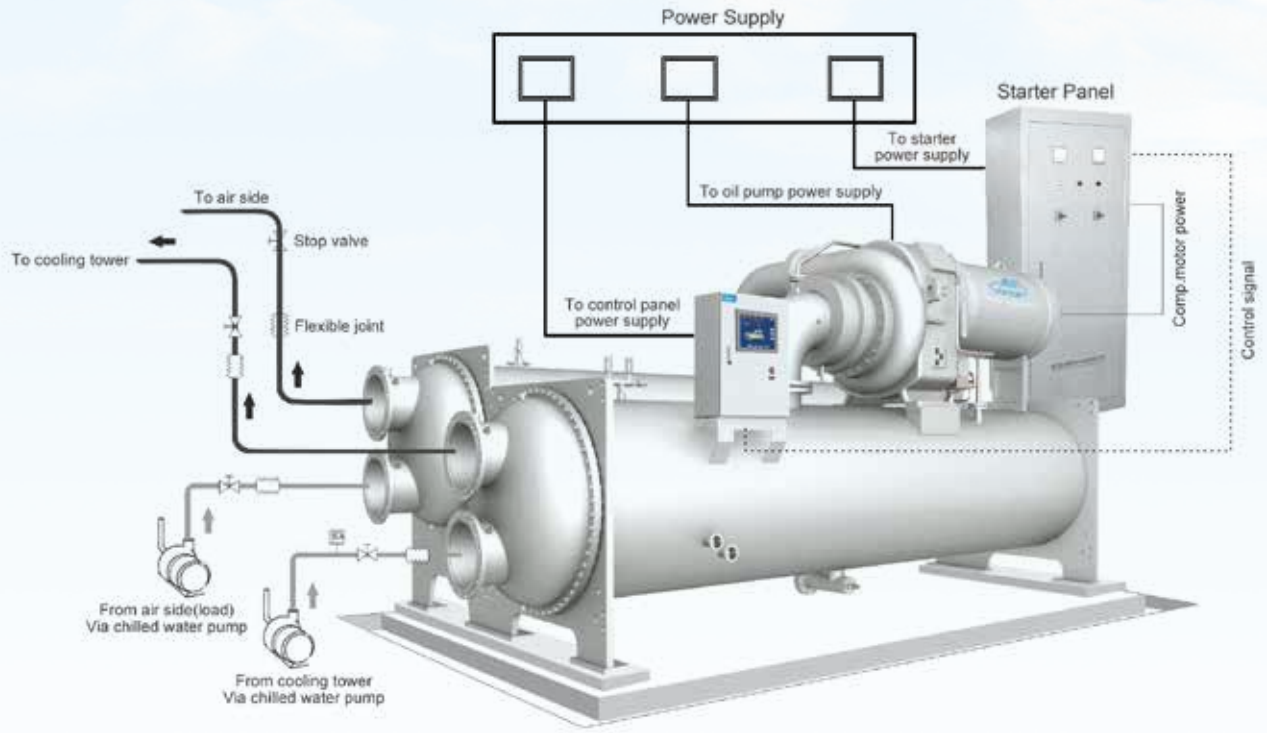
High voltage				
Model	Max Ampere (6000V)	6000V	Max Ampere (10000V)	10000V
LC650M（H）	61.3	YJV22-35	37.2	YJV22-25
LC700M（H）	61.3	YJV22-35	37.2	YJV22-25
LC750M（H）	70.1	YJV22-50	42.5	YJV22-35
LC800M（H）	70.1	YJV22-50	42.5	YJV22-35
LC850M（H）	78.8	YJV22-50	47.9	YJV22-35
LC900M（H）	78.8	YJV22-50	47.9	YJV22-35
LC950M（H）	87.0	YJV22-50	52.8	YJV22-35
LC1000M（H）	87.0	YJV22-50	52.8	YJV22-35
LC1100M（H）	95.1	YJV22-70	57.4	YJV22-50
LC1200M（H）	105.1	YJV22-70	63.8	YJV22-50
LC1300M（H）	105.1	YJV22-70	63.8	YJV22-50
LC1400M（H）	125.3	YJV22-70	75.2	YJV22-50
LC1500M（H）	125.3	YJV22-70	75.2	YJV22-50
LC1600M（H）	139.2	YJV22-95	83.5	YJV22-70
LC1700M（H）	139.2	YJV22-95	83.5	YJV22-70
LC1200M（H）S	105.1	YJV22-70	62.4	YJV22-50
LC1350M（H）S	109.5	YJV22-70	65.0	YJV22-50
LC1500M（H）S	121.4	YJV22-70	72.2	YJV22-50
LC1650M（H）S	133.9	YJV22-70	79.5	YJV22-50
LC1800M（H）S	146.4	YJV22-95	87.7	YJV22-70
LC1900M（H）S	155.6	YJV22-95	93.4	YJV22-70
LC2000M（H）S	161.4	YJV22-95	96.6	YJV22-70

Note:

The recommended copper cable size is suitable for the single phase from the same supplier and same standard.

It may be slightly change due to the ambient temperature and surroundings.

Typical Piping and Cable Layout



Choose the proper power supply cable size and tag clearly.

Filter must be used in the water system.

Thermometer and pressure meter must be installed in the water system.

Recommend to use a steel pipe to connect the security release valve to the outside.

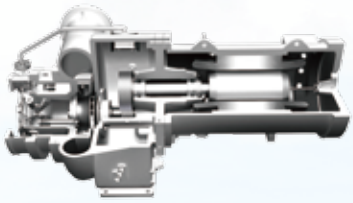
Recommend to use an oxygen density indicator that alarm automatically when the density lower than 19.5%.

Cable and pipe layout should be done based on local regulation.

Mechanical Specification

Compressor

The centrifugal compressor with high-strength aluminum alloy fully shrouded 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 minimize flow disruption for the most efficient part load performance.The movement of the inlet guide vane is controlled by a mounted electric actuator in response to refrigeration load on the evaporator. The rotor assembly consists of a heat-treated alloy steel drive shaft with a high strength, and the high speed shaft is forged with high strength and reliability.



Motor

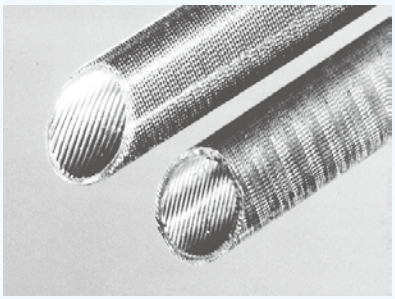
Midea centrifugal chiller use semi-hermetic two-pole motor and is cooled by the circular refrigerant, winding embedded sensors provide positive thermal protection to the motor. Asynchronism squirrel cage type motor can achieve higher operation performance and longer life span. Refrigerant cooled motor keeps motor heat out of the mechanical room, decrease vibration and shaft seal maintenance compare with open motors. Also refrigerant cooled motor have lower inrush currents and lower noise than open motor which cooled by air, there is no need to provide additional ventilation or air conditioning for the mechanical room than open motor design. The motor is bolt connected to the compressor gear housing and shaft labyrinth seal prevents refrigerant leakage from the motor to the gear box. Low voltage motor provides 6 terminals for reduce 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. A moveable steel sheet terminal box encloses the terminal board area to insulation.

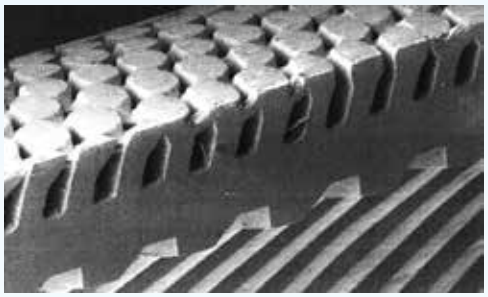
Impeller And Inlet Guide Vane

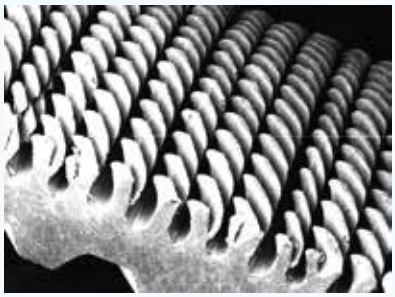
High strength aluminum-alloy compressor impellers feature backward-curved vanes for high efficiency Airfoil shaped inlet guide vane minimize flow disruption for the most efficient part load performance. Precisely positioned and tightly fitted, it allows the compressor to unload smoothly from 10% to 100% load output for excellent operation in real air conditioning application. The movement is controlled by a mounted electrical operator in response to refrigeration load on the evaporator. Impeller is made of high strength aluminum alloy which is tested at 125% design operating speed.

Heat Exchanger Tube

Heat exchanger tubes are high-efficiency, externally and internally enhanced type to provide optimum performance. Tubes in both the evaporator and condenser are 3/4" O.D. copper alloy providing an 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 material as a standard choice and 90/10 copper-nickel, 304stainless steel or titanium material can be customized.





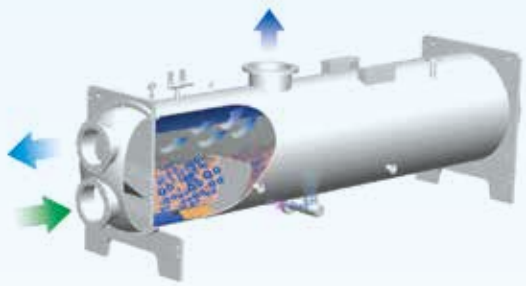


Evaporator

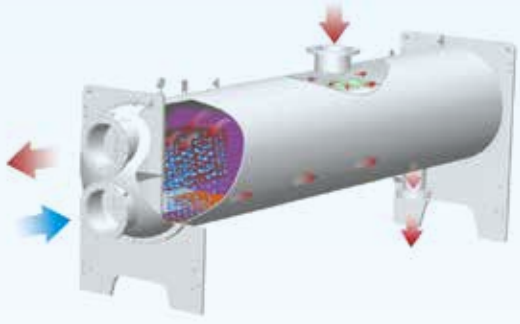
The evaporator is a shell and tube type heat exchanger. A flow equalizer provides uniform distribution of refrigerant over the entire tube length to yield optimum heat transfer. The evaporator shell contains a dual refrigerant relief valve arrangement set at 185 PSIG (1280 kPa) or single-relief valve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



Evaporator



Condenser

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 required pass arrangements. The nozzle connections are suitable for flanges and are capped when shipment. Plugged 3/4" drain and vent connections are provided in each water box.

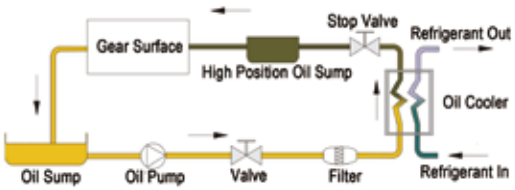
Orifice

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

Control Panel

Midea adopts the state-of-the-art microprocessor control system with 10.4 inch LCD touchable screen and high disturbance resistance. The LCD touchable screen with graphical display of chiller parameters, fast and easy to access makes the operation relatively simple. It also can communicate with the user's PC and carry out the remote control for start, operation and stop of the cooling system. More than 30 item protections and malfunctions used to make the chiller operation secure and reliable. The latest 10 items of failure information can be recorded for inquiry.

Lubrication System



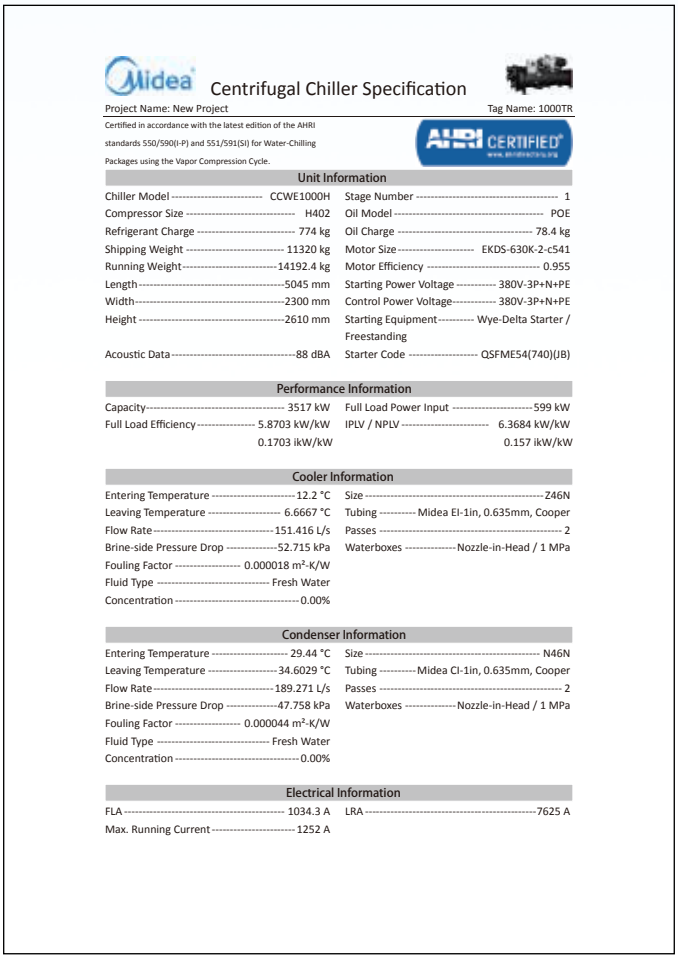
A separately driven electric oil pump assembly supplies lube to the compressor at proper temperature and pressure .After filtration the lube been pressed to the oil cooler to cooling it to certain temperature. And then adjust its pressure before transmitted to bearings. Special designed seals are installed at inner side of motor bearings at both ends to minimize the lube that leaked into the main motor and mixed into the R134a in evaporator. Besides, electric heater is used inside the oil tank to maintain the oil in proper temperature all the time. In this way, when the compressor shuts down, certain oil temperature can be maintained. Thus prevent the R134a gas from entering the oil to decrease the efficiency of lubrication. Therefore, while the compressor is shut down, it is necessary to keep oil heater on to make the oil temperature in certain temperature. If the compressor will out of service for a long time, it is required to run the oil heater to maintain the proper oil temperature.

Selection Software

For optimize the configuration and performance of Midea product, as well as to match the actual requirements of your HVAC system.This independent software can select the best components configuration according to the requirement of your HVAC system. After input the general parameters such as cooling capacity, fouling factor, pass number, power supply, etc. Nominal data and physical data for typical compressor-evaporator - condenser combinations are given by product list. Midea R&D fellow and software engineers will update the improvement information of the product online in time, and our customer can get the update information through the internet.

Selection interface

Selection report



Centrifugal Chiller Specification

Project Name: New Project Tag Name: 1000TR

Certified in accordance with the latest edition of the AHRI standards 550/590(I-P) and 551/591(SI) for Water-Chilling Packages using the Vapor Compression Cycle.

Unit Information

Chiller Model	CCWE1000H	Stage Number	1
Compressor Size	H402	Oil Model	POE
Refrigerant Charge	774 kg	Oil Charge	78.4 kg
Shipping Weight	11320 kg	Motor Size	EKDS-630K-2-c541
Running Weight	14192.4 kg	Motor Efficiency	0.955
Length	5045 mm	Starting Power Voltage	380V-3P+N+PE
Width	2300 mm	Control Power Voltage	380V-3P+N+PE
Height	2610 mm	Starting Equipment	Wye-Delta Starter / Freestanding
Acoustic Data	88 dBA	Starter Code	QSFME54(740)(JB)

Performance Information

Capacity	3517 kW	Full Load Power Input	599 kW
Full Load Efficiency	5.8703 kW/kW 0.1703 ikW/kW	IPLV / NPLV	6.3684 kW/kW 0.157 ikW/kW

Cooler Information

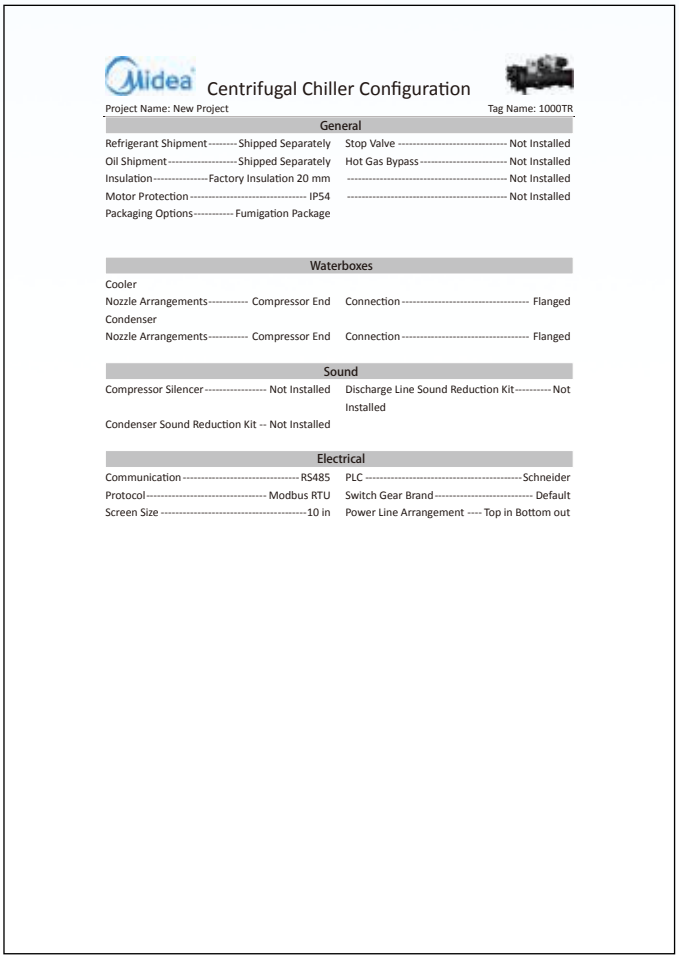
Entering Temperature	12.2 °C	Size	Z46N
Leaving Temperature	6.6667 °C	Tubing	Midea EI-1in, 0.635mm, Cooper
Flow Rate	151.416 L/s	Passes	2
Brine-side Pressure Drop	52.715 kPa	Waterboxes	Nozzle-in-Head / 1 MPa
Fouling Factor	0.000018 m^2-K/W		
Fluid Type	Fresh Water		
Concentration	0.00%		

Condenser Information

Entering Temperature	29.44 °C	Size	N46N
Leaving Temperature	34.6029 °C	Tubing	Midea CI-1in, 0.635mm, Cooper
Flow Rate	189.271 L/s	Passes	2
Brine-side Pressure Drop	47.758 kPa	Waterboxes	Nozzle-in-Head / 1 MPa
Fouling Factor	0.000044 m^2-K/W		
Fluid Type	Fresh Water		
Concentration	0.00%		

Electrical Information

FLA	1034.3 A	LRA	7625 A
Max. Running Current	1252 A		



Centrifugal Chiller Configuration

Project Name: New Project Tag Name: 1000TR

General

Refrigerant Shipment	Shipped Separately	Stop Valve	Not Installed
Oil Shipment	Shipped Separately	Hot Gas Bypass	Not Installed
Insulation	Factory Insulation 20 mm		Not Installed
Motor Protection	IP54		Not Installed
Packaging Options	Fumigation Package		

Waterboxes

Cooler

Nozzle Arrangements	Compressor End	Connection	Flanged

Condenser

Nozzle Arrangements	Compressor End	Connection	Flanged

Sound

Compressor Silencer	Not Installed	Discharge Line Sound Reduction Kit	Not Installed
Condenser Sound Reduction Kit	Not Installed		

Electrical

Communication	RS485	PLC	Schneider
Protocol	Modbus RTU	Switch Gear Brand	Default
Screen Size	10 in	Power Line Arrangement	Top in Bottom out

Optional items / Accessories

60Hz is optinal

50Hz is standard and 60Hz is also available.

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 remove without disturbing the water pipe connection.

Pass

The standard chiller is 2 passes. 1 pass or 3 passes are optional.

VSD (Variable speed drive)

Capacity less than 1300Ton product can be equipped with VSD for super high efficiency partial load.

Chiller starter

Delta star is a standard starter witch provided with the chiller. Auto transmit starter is another option for the low voltage chiller. Softer starter also can be provided to reduce the rush to the power supply net. 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 the multiple installations for control & monitor low side work.

Chiller vibration isolator

Spring isolator and rubber pad are the optional accessories from the factory

Dual compressor

Dual compressor system can be provided to the big capacity or strong back up for the chiller system.

Sectional transportation

The chiller can be part transport to the site and reassembling on the site under Midea engineer’s inspection.

Witness performance testing

Factory provide the witness testing service for the clients

Conversion table

■ Temperature: ℉—℃

Formulas: C = (F - 32) × 5 / 9, F = (C × 9 / 5) + 32							
Fahrenheit	Celsius		Fahrenheit	Celsius		Fahrenheit	Celsius
-20.2	-29.0		41.0	5.0		102.2	39.0
-18.4	-28.0		42.8	6.0		104.0	40.0
-16.6	-27.0		44.6	7.0		105.8	41.0
-14.8	-26.0		46.4	8.0		107.6	42.0
-13.0	-25.0		48.2	9.0		109.4	43.0
-11.2	-24.0		50.0	10.0		111.2	44.0
-9.4	-23.0		51.8	11.0		113.0	45.0
-7.6	-22.0		53.6	12.0		114.8	46.0
-5.8	-21.0		55.4	13.0		116.6	47.0
-4.0	-20.0		57.2	14.0		118.4	48.0
-2.2	-19.0		59.0	15.0		120.2	49.0
-0.4	-18.0		60.8	16.0		122.0	50.0
1.4	-17.0		62.6	17.0		123.8	51.0
3.2	-16.0		64.4	18.0		125.6	52.0
5.0	-15.0		66.2	19.0		127.4	53.0
6.8	-14.0		68.0	20.0		129.2	54.0
8.6	-13.0		69.8	21.0		131.0	55.0
10.4	-12.0		71.6	22.0		132.8	56.0
12.2	-11.0		73.4	23.0		134.6	57.0
14.0	-10.0		75.2	24.0		136.4	58.0
15.8	-9.0		77.0	25.0		138.2	59.0
17.6	-8.0		78.8	26.0		140.0	60.0
19.4	-7.0		80.6	27.0		141.8	61.0
21.2	-6.0		82.4	28.0		143.6	62.0
23.0	-5.0		84.2	29.0		145.4	63.0
24.8	-4.0		86.0	30.0		147.2	64.0
26.6	-3.0		87.8	31.0		149.0	65.0
28.4	-2.0		89.6	32.0		150.8	66.0
30.2	-1.0		91.4	33.0		152.6	67.0
32.0	0.0		93.2	34.0		154.4	68.0
33.8	1.0		95.0	35.0		156.2	69.0
35.6	2.0		96.8	36.0		158.0	70.0
37.4	3.0		98.6	37.0		159.8	71.0
39.2	4.0		100.4	38.0		161.6	72.0

Pressure: PSI—kPa—kg/m²

Formulas: 1psi≈6.894757 kpa 1psi≈0.070306958kg/m²

PSI	kPa	kg/m²	PSI	kPa	kg/m²	PSI	kPa	kg/m²	PSI	kPa	kg/m²
1.0	6.89	0.07	41.0	282.69	2.88	81.0	558.48	5.69	121.0	834.27	8.51
2.0	13.79	0.14	42.0	289.58	2.95	82.0	565.37	5.77	122.0	841.16	8.58
3.0	20.68	0.21	43.0	296.47	3.02	83.0	572.26	5.84	123.0	848.06	8.65
4.0	27.58	0.28	44.0	303.37	3.09	84.0	579.16	5.91	124.0	854.95	8.72
5.0	34.47	0.35	45.0	310.26	3.16	85.0	586.05	5.98	125.0	861.84	8.79
6.0	41.37	0.42	46.0	317.16	3.23	86.0	592.95	6.05	126.0	868.74	8.86
7.0	48.26	0.49	47.0	324.05	3.30	87.0	599.84	6.12	127.0	875.63	8.93
8.0	55.16	0.56	48.0	330.95	3.37	88.0	606.74	6.19	128.0	882.53	9.00
9.0	62.05	0.63	49.0	337.84	3.45	89.0	613.63	6.26	129.0	889.42	9.07
10.0	68.95	0.70	50.0	344.74	3.52	90.0	620.53	6.33	130.0	896.32	9.14
11.0	75.84	0.77	51.0	351.63	3.59	91.0	627.42	6.40	131.0	903.21	9.21
12.0	82.74	0.84	52.0	358.53	3.66	92.0	634.32	6.47	132.0	910.11	9.28
13.0	89.63	0.91	53.0	365.42	3.73	93.0	641.21	6.54	133.0	917.00	9.35
14.0	96.53	0.98	54.0	372.32	3.80	94.0	648.11	6.61	134.0	923.90	9.42
15.0	103.42	1.05	55.0	379.21	3.87	95.0	655.00	6.68	135.0	930.79	9.49
16.0	110.32	1.12	56.0	386.11	3.94	96.0	661.90	6.75	136.0	937.69	9.56
17.0	117.21	1.20	57.0	393.00	4.01	97.0	668.79	6.82	137.0	944.58	9.63
18.0	124.11	1.27	58.0	399.90	4.08	98.0	675.69	6.89	138.0	951.48	9.70
19.0	131.00	1.34	59.0	406.79	4.15	99.0	682.58	6.96	139.0	958.37	9.77
20.0	137.90	1.41	60.0	413.69	4.22	100.0	689.48	7.03	140.0	965.27	9.84
21.0	144.79	1.48	61.0	420.58	4.29	101.0	696.37	7.10	141.0	972.16	9.91
22.0	151.68	1.55	62.0	427.47	4.36	102.0	703.27	7.17	142.0	979.06	9.98
23.0	158.58	1.62	63.0	434.37	4.43	103.0	710.16	7.24	143.0	985.95	10.05
24.0	165.47	1.69	64.0	441.26	4.50	104.0	717.05	7.31	144.0	992.85	10.12
25.0	172.37	1.76	65.0	448.16	4.57	105.0	723.95	7.38	145.0	999.74	10.19
26.0	179.26	1.83	66.0	455.05	4.64	106.0	730.84	7.45	146.0	1006.63	10.26
27.0	186.16	1.90	67.0	461.95	4.71	107.0	737.74	7.52	147.0	1013.53	10.34
28.0	193.05	1.97	68.0	468.84	4.78	108.0	744.63	7.59	148.0	1020.42	10.41
29.0	199.95	2.04	69.0	475.74	4.85	109.0	751.53	7.66	149.0	1027.32	10.48
30.0	206.84	2.11	70.0	482.63	4.92	110.0	758.42	7.73	150.0	1034.21	10.55
31.0	213.74	2.18	71.0	489.53	4.99	111.0	765.32	7.80	151.0	1041.11	10.62
32.0	220.63	2.25	72.0	496.42	5.06	112.0	772.21	7.87	152.0	1048.00	10.69
33.0	227.53	2.32	73.0	503.32	5.13	113.0	779.11	7.94	153.0	1054.90	10.76
34.0	234.42	2.39	74.0	510.21	5.20	114.0	786.00	8.01	154.0	1061.79	10.83
35.0	241.32	2.46	75.0	517.11	5.27	115.0	792.90	8.09	155.0	1068.69	10.90
36.0	248.21	2.53	76.0	524.00	5.34	116.0	799.79	8.16	156.0	1075.58	10.97
37.0	255.11	2.60	77.0	530.90	5.41	117.0	806.69	8.23	157.0	1082.48	11.04
38.0	262.00	2.67	78.0	537.79	5.48	118.0	813.58	8.30	158.0	1089.37	11.11
39.0	268.90	2.74	79.0	544.69	5.55	119.0	820.48	8.37	159.0	1096.27	11.18
40.0	275.79	2.81	80.0	551.58	5.62	120.0	827.37	8.44	160.0	1103.16	11.25

We reserve the right to make change in design and construction at any time without notice.

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GD Midea Heating & Ventilating Equipment Co., Ltd.
Is certified under the ISO 14001 International standard
for environmental management.
Certificate No.15912E10020R0L

GD Midea Heating & Ventilating Equipment Co., Ltd.
Is certified under the ISO 9001 International standard
for quality assurance.
NO.01 100 019209

GD Midea Heating & Ventilating Equipment Co., Ltd.
Certificate of Occupational Health and Safety Management System
Certificate No. 15912S20006R0L-1.

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Note: The data in this book may be changed without notice for further improvement on quality and performance.

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