Clivet-2003-3C2001

CLIVET SPA
Via Camp Lonc 25, Z.I. Villapaiera - 32032 Feltre (BL) - Italy
Tel. + 39 0439 3131 - Fax + 39 0439 313300 - info@clivet.it

CLIVET RUSSIA
Elektrozavodskaya st. 24, office 509 - 107023, Moscow, Russia
Tel. + 74956462009 - Fax + 74956462009 - info.ru@clivet.com

CLIVET MIDEAST FZCO
Dubai Silicon Oasis (DSO), High Bay Complex, Office No. 20, PO BOX 342009, Dubai, UAE
Tel. + 9714 3208499 - Fax + 9714 3208216 - info@clivet.ae

CLIVET AIRCONDITIONING SYSTEMS PRIVATE LIMITED
4BA, Gundecha Onclave, Kherani Road - Sakinaka, Andheri (East) - Mumbai 400 072 - India
Tel. +91 22 6193 7000 - Fax +91 22 6193 7001 - info.in@clivet.com

A Group Company of

www.clivet.com
www.clivetlive.com

CLIVET

Commercial Air Conditioners **2020**

Water Cooled Centrifugal Chiller

150~3000RT

Always ready for the Future

Clivet. Change things

40
agencies in Italy

630
employees in Italy and abroad

75
countries we export to

50.000 m²
of plants in Feltre, Belluno - Italy

6
branches: Great Britain, Germany, Spain, Russia, UAE, India

2015
Clivet Live is born

140
service centres

2016
A Group Company of Midea

FORTUNE GLOBAL 500
Midea Group #323 in 2018

39.5 $M
Midea turnover

For 30 years we have been offering solutions to ensure sustainable comfort and the well-being of people and the environment

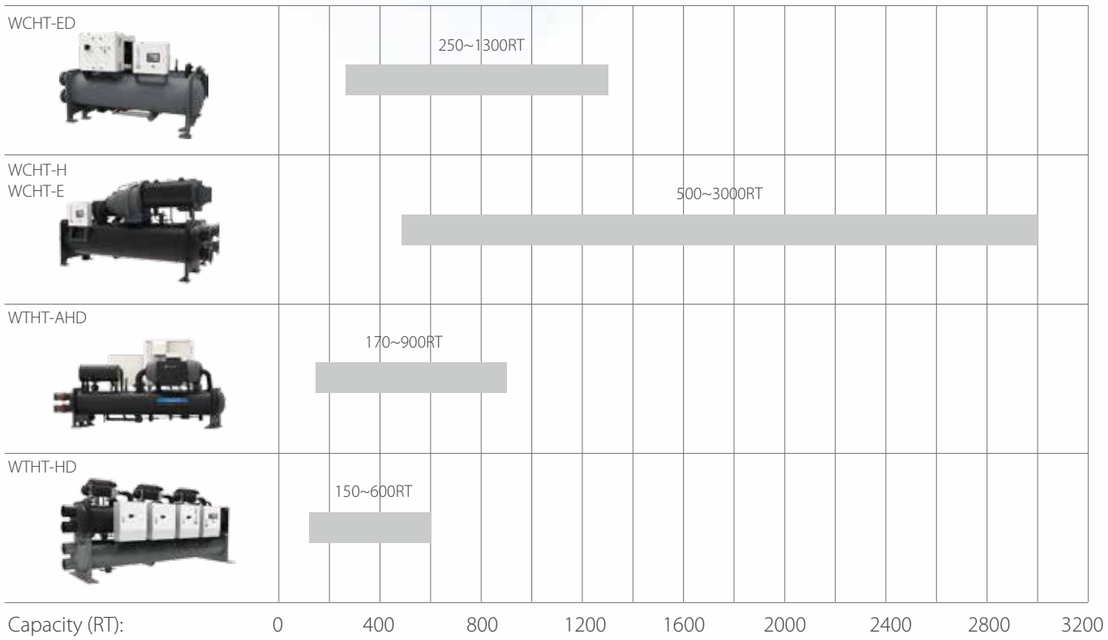
In 30 years of working on the design, manufacturing and distribution of air conditioning and handling systems, combining high efficiency with minimal environmental impact, Clivet has developed solutions to ensure sustainable comfort and the well-being of people and the environment.
Designing and developing year-round air conditioning solutions with innovative technologies are part of Clivet's DNA, which means the company has always been ready for the future.

Our values in the residential, commercial and industrial sectors

Increasing comfort, saving energy and providing customers with the best value for the entire life cycle of the system: these are the values that inspire our systems for the residential, services and industrial sectors.

Index

Product Lineup



Inverter Direct-drive Centrifugal Chiller

Overview

Unit Member

Features

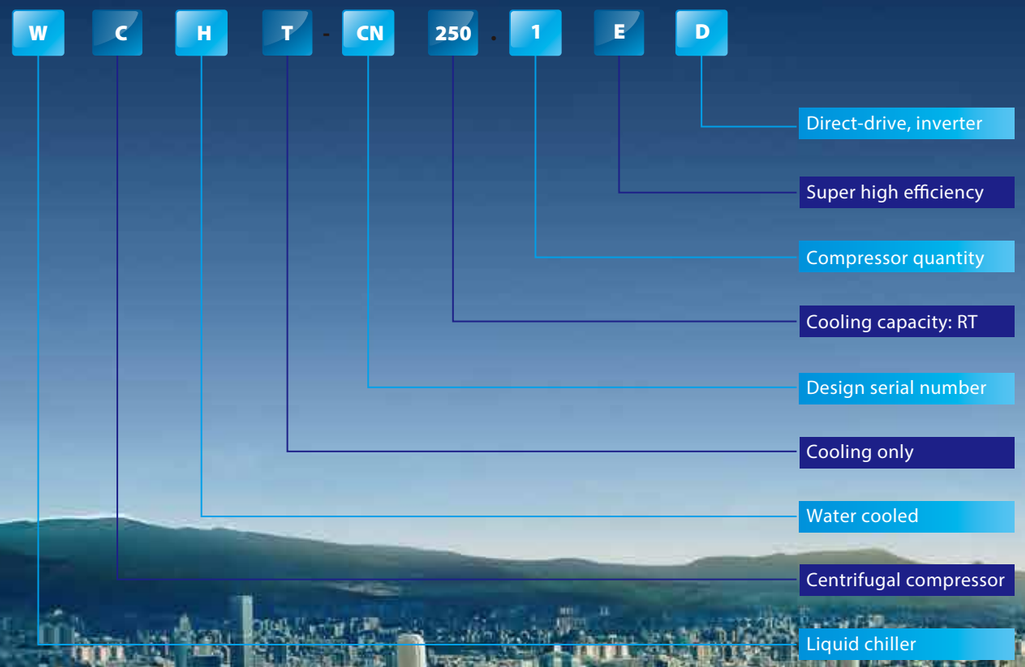
Specifications

Dimension

Options

Overview

Nomenclature



AHRI CERTIFIED
www.ahridirectory.org
Water-Cooled Water Chilling and Heat Pump Water-Heating Packages AHRI Standards 550/590 and 551/591

Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org

Clivet Commercial Air Conditioner stands on the frontier of intelligent and effective technological development on the path towards technology and product innovation. By building an internationalized R&D team, we have overcome various technical bottlenecks and first developed international-advanced core technologies such as the horizontally back-to-back uniaxial direct-drive centrifugal compression and full falling-film evaporation. The industry and users have responded positively to these technologies as applied to our new inverter direct-drive centrifugal chiller.

Benefits and Features:

Energy saving: COP up to 6.58, IPLV up to 10.69

Technology leading: more than 20 patents

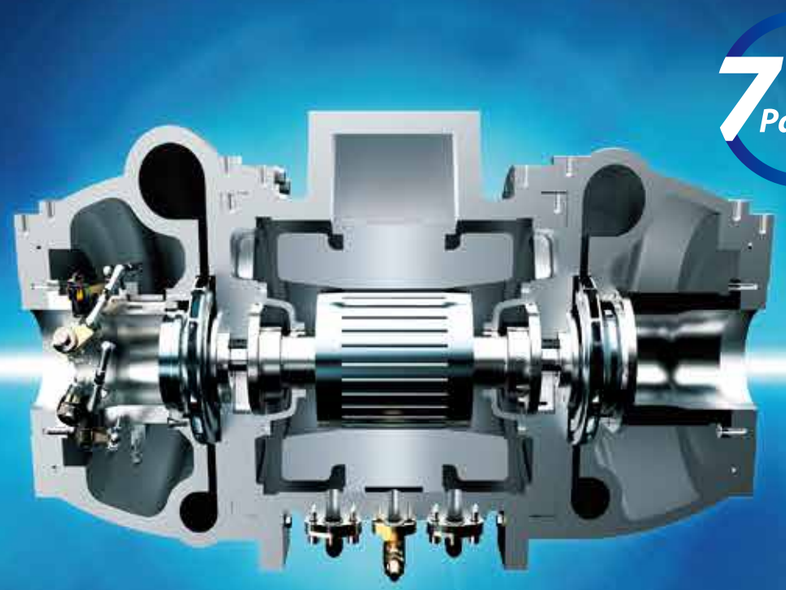
Environmentally friendly: less refrigerant charge and lower noise

Flexibility: wider operation range but compact size

Unit Member

Features

Horizontally back-to-back centrifugal compressor



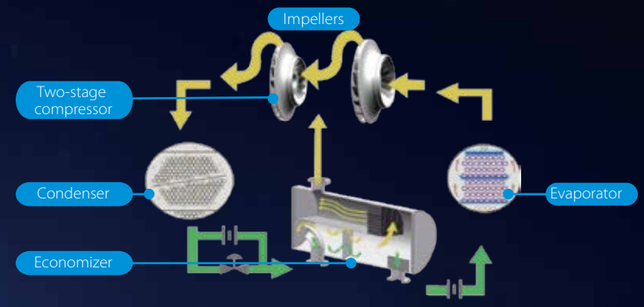
Clivet inverter direct-drive centrifugal compressor adopts the patented technologies as follow:

1) Horizontally back-to-back self-balanced impeller
2) Impeller profile joint and fastening technology
3) Inlet guide vane regulating mechanism with rolling element
4) Integration design of thrust plate and rotation axis
5) Wire leading device and motor equipped with wire leading
6) A centrifugal chiller inlet guide vane correcting algorithm
7) Gas-inlet regulation mechanism and centrifugal compressor with this mechanism

Energy Saving

Two-stage compressing

- 6% higher efficiency than single-stage compression.
- Lower speed and higher reliability.
- Unique three-stage separation economizer, reliable and effective.

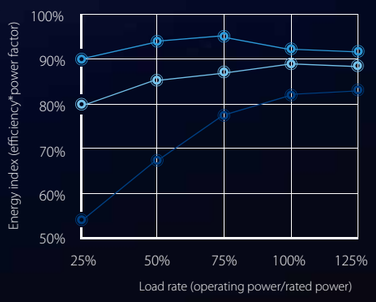


Aerodynamic compressor design

- With 3D-flow closed and strongly backward-bladed impeller design, impeller efficiency higher than 97%.
- Unique pipeline crossover, with large backflow radius to reduce flow losses and noise.
- The technology of two-stage compression with economizer fully demonstrates the advantage of aerodynamic design and brings higher efficiency to the system.

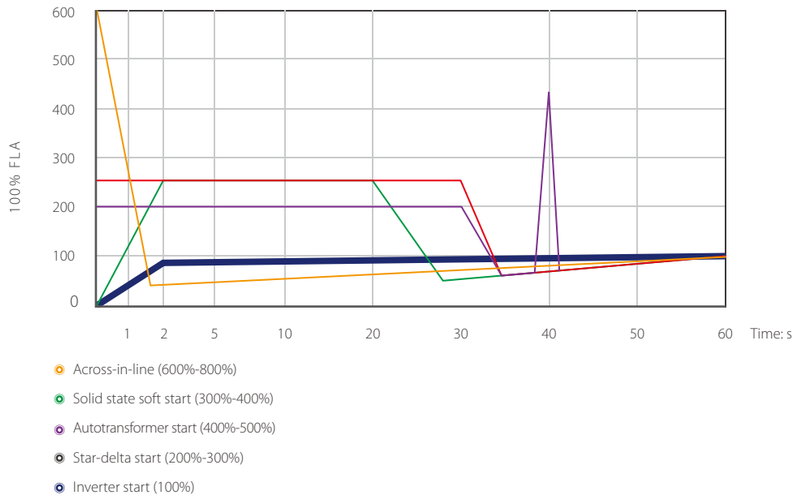
High efficiency inverter motor

- Motor efficiency as high as 95.5%, energy index (efficiency*power factor) over 2% higher than inverter asynchronous motor.
- High power density and small size, with size only 20% of AC inverter motor.
- Designed based on speed and high-frequency operation, with variable frequency range of 120~300Hz.



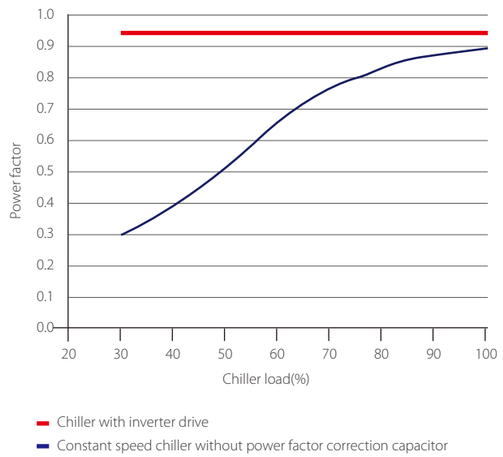
Zero in-rush current

- The unit adopts inverter starting mode, which produces zero in-rush current during the starting process and enables a stable operation from 0A to FLA.



0.95 power factor

- The high power factor eliminates the need for a power factor connection capacitor.



Technology Leading

Horizontally back-to-back compression technology

Clivet horizontally back-to-back impeller

- Clivet first developed the patented horizontally back-to-back compression technology with crossover pipe structure.
- Balance the thrust forces for longer life span and improved efficiency by less seal leakage and no gear loss.

Traditional serial impeller

- The traditional two-stage centrifugal impellers are arranged in serial to the same direction, and the axial forces on the two impellers are from the same direction and overlapped.
- More stress on thrust bearing, cause mechanical damage, and require higher reliability of bearing.

Patented IGV correcting algorithm

- Realized stable load regulating, energy saving and more comfort.
- High precision and high compatibility.
- Invented a centrifugal chiller load regulate method.

Guide vane opening correction model: B=a*sd1(t)2+b*sd1(t)+c

B: the 2nd guide vane opening

sd1(t): the 1st guide vane opening

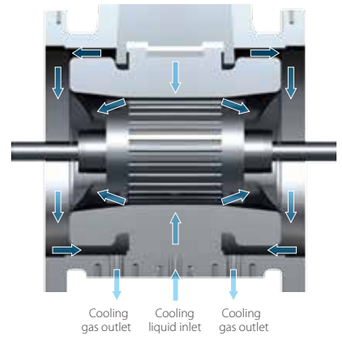
a: quadratic coefficient

b: monomial coefficient

c: constant

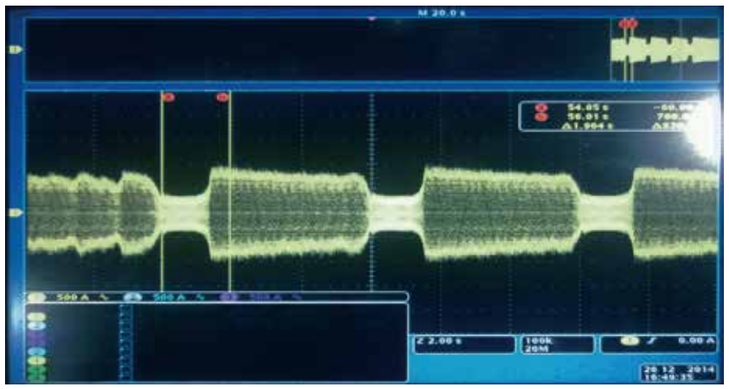
360° motor cooling technology

- The motor is cooled by the refrigerant, with liquid supply and gas return at the bottom, thus high efficiency.
- Cooling method eliminates the potential for shaft seal leaks and refrigerant/oil loss.
- The motor adopts F-level insulation design, with three PTC temperature switches preset in the winding to ensure constant safety.



Anti-surge technology

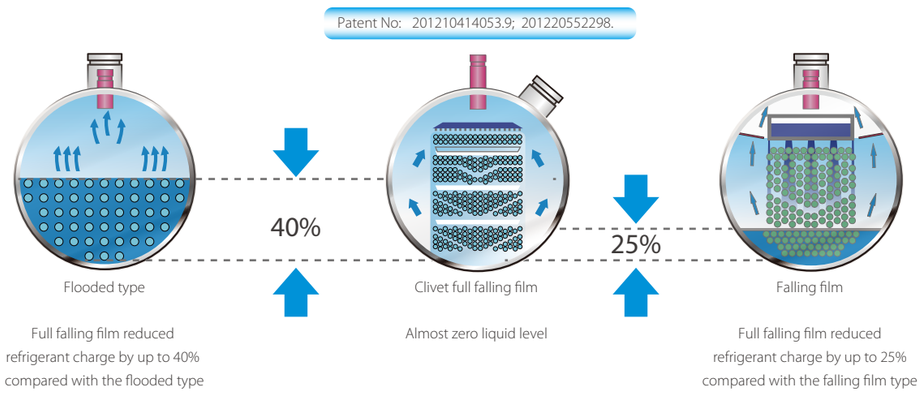
- Extend the surge curve: real-time to adjust the motor speed in different operation condition.
- Precise monitor and comparing: real-time to monitor running current and comparing running current curve to current data base in the controller.



Typical current waveform in surging condition

Full falling film evaporating technology

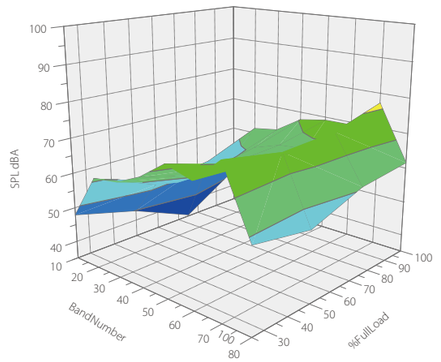
- First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge by up to 40%.
- The patented refrigerant distributor can improve the homogeneity of the liquid to avoid local drying, fully showcasing the performance of the heat exchange tube and increasing unit efficiency.



Environmentally Friendly

Quieter operation

Clivet inverter direct-drive centrifugal chiller is the quietest chiller in its size range with sound pressure ratings as low as 78dBA per AHRI Standard 575-2017. That makes it ideal for sound sensitive environments such as schools, performance halls, museums, condominiums and libraries.



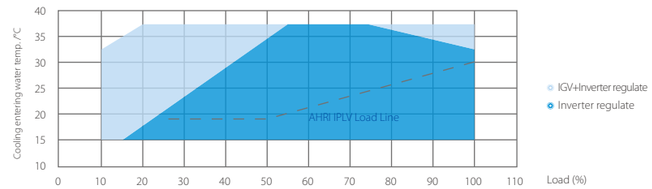
LEED

Zero-ozone depletion R134a refrigerant, green, and has no elimination cycle.
Full falling-film technology reduces refrigerant charge by up to 40%, which enables you to qualify for maximum Leadership in Energy and Environmental Design® (LEED) points for Enhanced Refrigerant Management. And with the chiller' s high efficiency, you can also earn additional points for credits from Optimized Energy Performance (EAc1).

Flexibility

Wider operation map

- Only inverter regulation on AHRI condition to save energy.
- Capacity load from 10%~100% and cooling EWT up to 37 °C are able to satisfy the application requirement of multiple operating conditions (load from 10%-20% need hot gas bypass).



Compact size

Compact size is ideal for retrofit as well as small installation space project. The space savings can add up as quickly as the energy savings.

Specifications

Model		WCHT-CN	250.1ED	300.1ED	350.1ED	400.1ED	450.1ED	500.1ED	550.1ED
Cooling capacity		RT	250.0	300.0	350.0	400.0	450.0	500.0	550.0
		kW	879.0	1055	1231	1406	1582	1758	1934
		10^4kcal/h	75.59	90.71	105.8	121.0	136.1	151.2	166.3
Power input		kW	141.2	165.2	193.0	223.9	247.3	276.6	310.1
COP		W/W	6.224	6.385	6.376	6.282	6.399	6.356	6.237
IPLV		W/W	9.341	9.591	9.737	10.46	10.61	10.59	10.69
Motor configuration power		kW	200.0	200.0	240.0	280.0	280.0	315.0	350.0
Rated current		A	230.7	269.9	315.3	365.7	403.9	451.9	506.6
Max. operating current		A	262.4	305.4	358.9	416.1	457.5	507.9	565.8
Locked-rotor current		A	1523	1523	1883	2603	2603	2985	3338
Evaporator	Water flow	m^3/h	135.8	163.0	190.1	217.3	244.4	271.6	298.8
	Pressure drop	kPa	43.3	43.2	43.6	42.9	43.2	42.4	44.1
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Water flow	m^3/h	169.7	202.9	236.8	271.1	304.2	338.3	373.1
	Pressure drop	kPa	44.7	45.7	45.9	44.8	44.6	46.5	46.8
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Unit dimension	Length	mm	3650	3650	3650	3650	3650	3650	3650
	Width	mm	1940	1940	1940	2000	2000	2000	2000
	Height	mm	2150	2150	2150	2150	2150	2150	2150
Shipping weight		kg	4650	4800	4950	5650	5800	5950	6100
Running weight		kg	5580	5780	5980	6730	6930	7130	7330

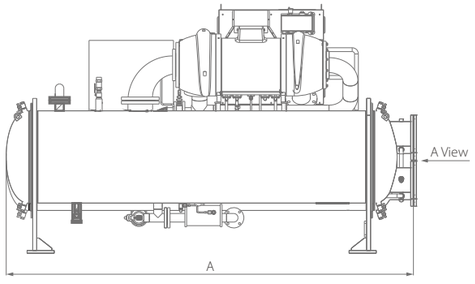
Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***ED#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

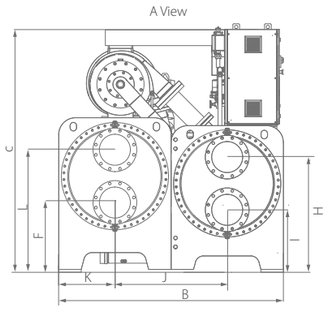
Model		WCHT-CN	600.1ED	650.1ED	700.1ED	750.1ED	800.1ED	850.1ED
Cooling capacity		RT	600.0	650.0	700.0	750.0	800.0	850.0
		kW	2110	2285	2461	2637	2813	2989
		10^4kcal/h	181.4	196.6	211.7	226.8	241.9	257.0
Power input		kW	331.3	357.2	378.0	407.5	442.1	460.7
COP		W/W	6.367	6.397	6.511	6.471	6.362	6.488
IPLV		W/W	9.315	9.628	9.991	10.16	10.19	10.15
Motor configuration power		kW	400	400	450	450	500	560
Rated current		A	541.3	583.6	617.6	665.7	722.3	752.6
Max. operating current		A	613.1	658.9	696.0	745.8	801.6	850.4
Locked-rotor current		A	3281	3281	3905	3905	4864	6495
Evaporator	Water flow	m^3/h	325.9	353.1	380.3	407.4	434.6	461.7
	Pressure drop	kPa	53.8	52.2	58.6	56.1	60.1	56.2
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	404.3	437.9	470.6	504.7	539.7	572.2
	Pressure drop	kPa	51.4	54.5	51.0	55.1	54.7	55.2
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimension	Length	mm	4700	4700	4700	4700	4700	4750
	Width	mm	1950	1950	1950	1950	1950	2150
	Height	mm	2750	2750	2750	2750	2750	2900
Shipping weight		kg	9060	9120	9330	9410	9490	10665
Running weight		kg	10700	10790	11080	11210	11330	12885

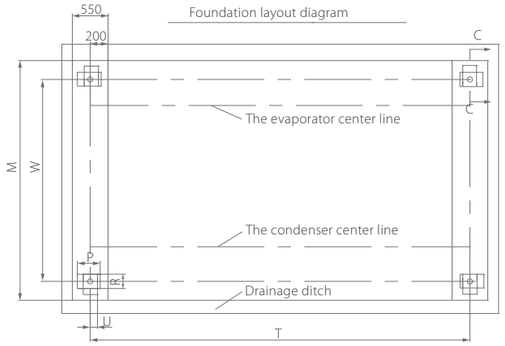
Model		WCHT-CN	900.1ED	950.1ED	1000.1ED	1100.1ED	1200.1ED	1300.1ED
Cooling capacity		RT	900.0	950.0	1000	1100	1200	1300
		kW	3164	3340	3516	3868	4219	4571
		10^4kcal/h	272.2	287.3	302.4	332.6	362.9	393.1
Power input		kW	482.2	513.3	538.8	591.8	641.7	698.0
COP		W/W	6.563	6.507	6.525	6.535	6.575	6.549
IPLV		W/W	10.37	10.39	10.55	10.35	10.57	10.69
Motor configuration power		kW	560	560	630	700	700	800
Rated current		A	787.7	838.6	880.3	966.9	1048	1140
Max. operating current		A	888.6	945.5	991.7	1089	1181	1282
Locked-rotor current		A	6495	6495	6246	6638	6638	6955
Evaporator	Water flow	m^3/h	488.9	516.1	543.2	597.5	651.9	706.2
	Pressure drop	kPa	62.4	54.5	58.4	57.0	57.0	56.0
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	605.2	639.8	673.3	740.7	807.5	875.1
	Pressure drop	kPa	58.9	53.4	55.6	52.6	53.4	58.0
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimension	Length	mm	4750	4750	4750	4800	4800	4800
	Width	mm	2150	2150	2150	2260	2260	2260
	Height	mm	2900	2900	2900	3050	3050	3050
Shipping weight		kg	10690	11050	11050	13320	13520	13650
Running weight		kg	12915	13450	13450	16180	16495	16710

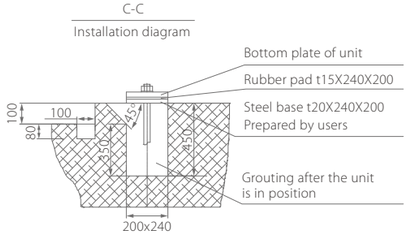
Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***ED#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Dimension

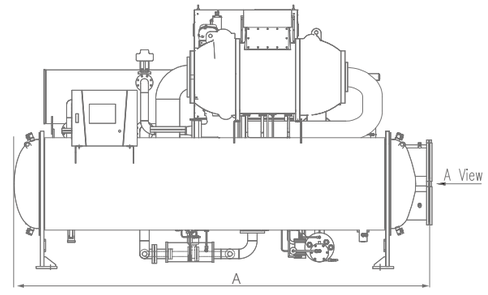


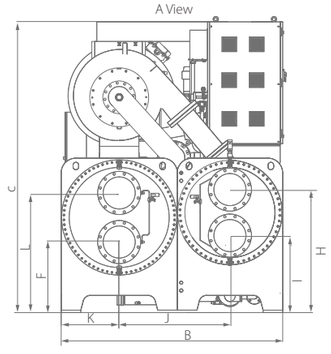


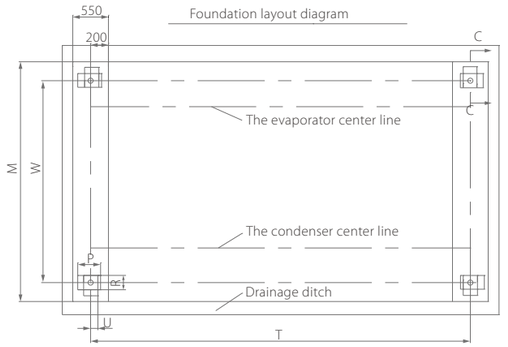


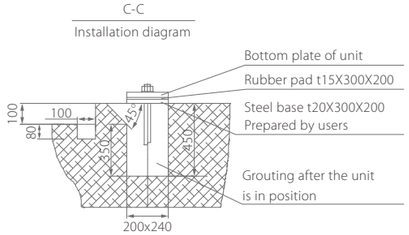


Model	Dimension			Support						Pipe locate position					
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
WCHT-CN250.1ED	3650	1940	2150	2240	1740	240	200	100	2780	670	1040	485	605	975	970
WCHT-CN300.1ED															
WCHT-CN350.1ED															
WCHT-CN400.1ED	3650	2000	2150	2300	1800	240	200	100	2780	620	1090	500	555	1025	1000
WCHT-CN450.1ED															
WCHT-CN500.1ED															
WCHT-CN550.1ED															









Model	Dimension			Support						Pipe locate position					
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
WCHT-CN600.1ED	4700	1950	2750	2550	1750	240	200	200	3780	635	1095	500	683	1143	975
WCHT-CN650.1ED															
WCHT-CN700.1ED															
WCHT-CN750.1ED															
WCHT-CN800.1ED															
WCHT-CN850.1ED	4750	2150	2900	2750	1950	240	200	200	3780	710	1180	550	765	1225	1075
WCHT-CN900.1ED															
WCHT-CN950.1ED															
WCHT-CN1000.1ED															
WCHT-CN1100.1ED	4800	2260	3050	2860	2060	240	200	200	3780	720	1220	593	785	1255	1130
WCHT-CN1200.1ED															
WCHT-CN1300.1ED															

Space layout

Model	Maintenance space (mm)			
	T	Y	S	Z
WCHT-CN250.1ED	1000	1200	1200	3200
WCHT-CN300.1ED				
WCHT-CN350.1ED				
WCHT-CN400.1ED				
WCHT-CN450.1ED				
WCHT-CN500.1ED				
WCHT-CN550.1ED				
WCHT-CN600.1ED	1000	1200	1200	4500
WCHT-CN650.1ED				
WCHT-CN700.1ED				
WCHT-CN750.1ED				
WCHT-CN800.1ED				
WCHT-CN850.1ED				
WCHT-CN900.1ED				
WCHT-CN950.1ED				
WCHT-CN1000.1ED				
WCHT-CN1100.1ED				
WCHT-CN1200.1ED				
WCHT-CN1300.1ED				

Note: Z is the tube removal space, and both ends can be selected.

Options

Items	Standard	Optional
Power supply	380V-3Ph-50Hz	380~460V, 50/60Hz
Water inlet/outlet connection type	Flange	×
High pressure water box	1.0MPa	1.6MPa, 2.0MPa
Marine water box	×	√
Anti-vibration	Rubber pad	Spring isolator
Vessel code	GB	ASME, PED
Heat recovery	×	√
Chilled water Delta T	5℃	6℃~11℃
Centrifugal heat pump	×	Hot water temperature up to 45℃
Water storage	×	√
Communication protocol	Modbus-RTU (RS485)	BACnet IP, BACnet MS/TP (RJ-45 port)
Hot gas bypass	×	√
Flow switch	Differential pressure	×
Knockdown shipment	×	√
Witness performance testing	×	√
Clivet Chiller Plant Control	×	√
Clivet Smart Cloud platform	×	√
QuickView	×	√
Tube automatic cleaning system	×	√
Low total harmonic current distortion rate (THDI)	≤35% (full load)	≤5% (full load)

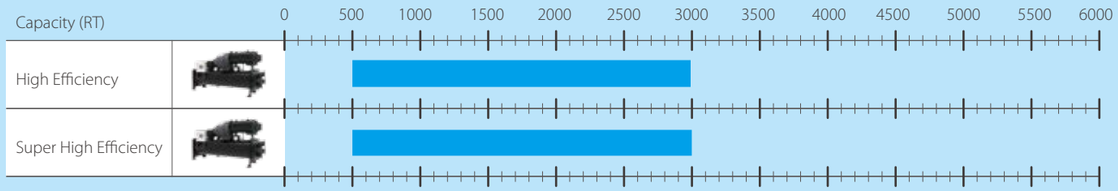
Note: For other options, please contact with our engineers.

High Efficiency & Super High Efficiency

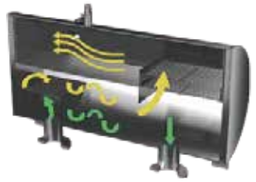
Centrifugal Chiller

Overview

Clivet Chiller has a complete product lineup and a wide application range to meet varied customer requirements. In 2013, Clivet launched the full falling film two-stage compression centrifugal chiller. In 2019, 2300~3000RT water cooled centrifugal chiller is specially designed for district cooling applications. The unit can be widely used in large temperature difference applications and large-scale public buildings, including factories, airports, exhibition halls and grand theaters, etc. 2300~3000RT units are one two-stage compressor centrifugal chillers. 4600-6000RT units are two two-stage compressor centrifugal chillers arranged in series counterflow. With patented heat exchange technology, the refrigerant charge amount is reduced by up to 40%. This innovation protects our environment and decreases CO_2 emissions significantly.

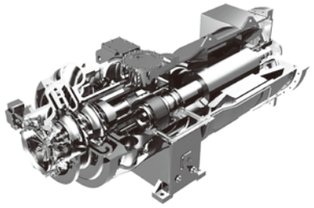


Mechanical Specification



Economizer

Unique three stage separation economizer, reliable and effective.

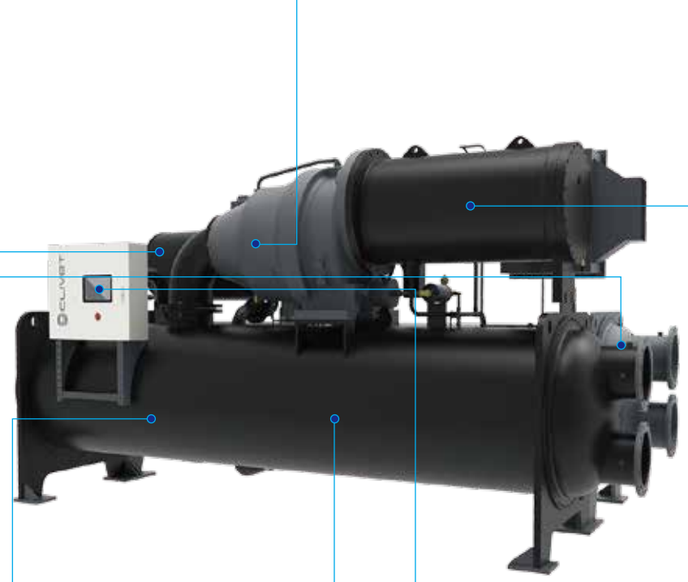


Semi-hermetic centrifugal compressor

Aerodynamic technology, higher efficiency.

Enclosed motor

Good cooling effect, no heat dissipation in the machine room, high reliability.



Condenser

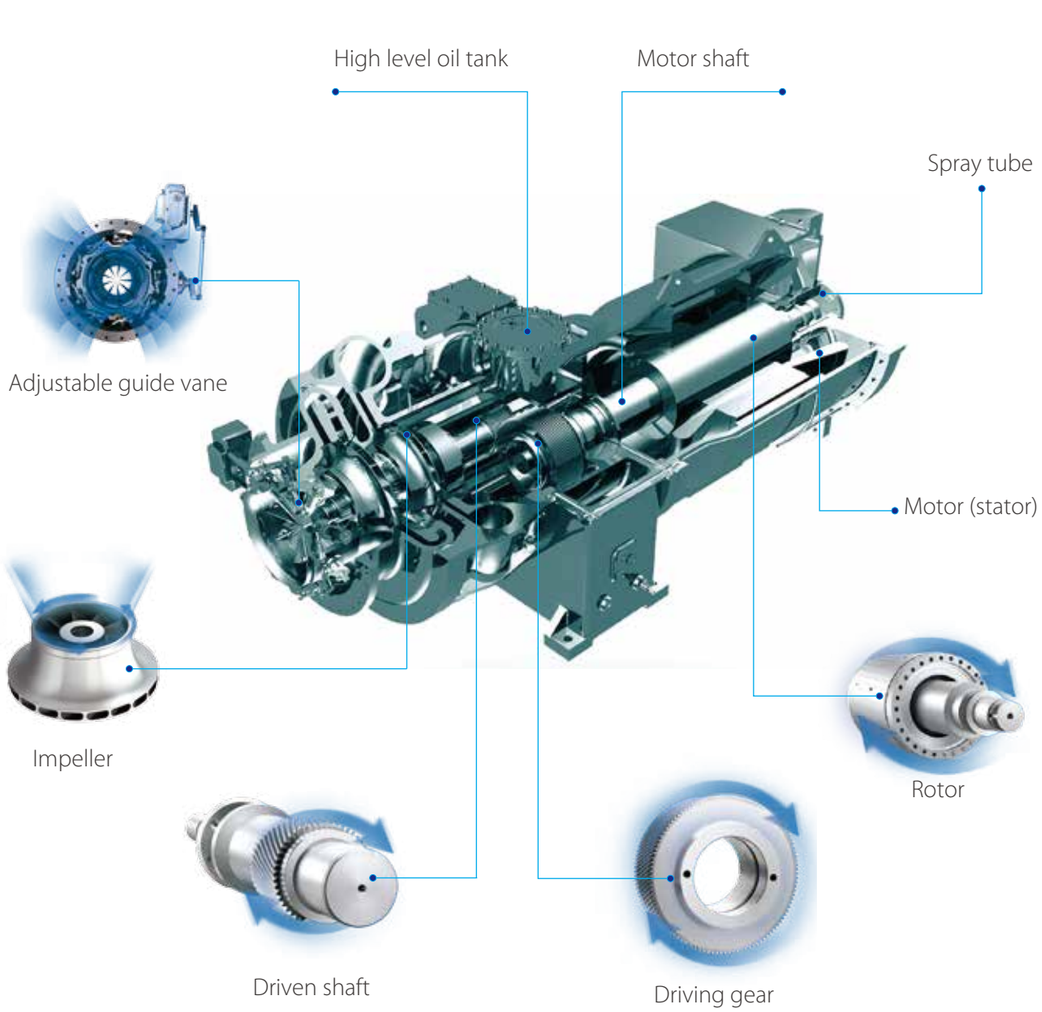
With integral sub-cooler.

Full falling film evaporator

Reduced refrigerant charge by up to 40%.

Environmentally friendly refrigerant

Color touch screen



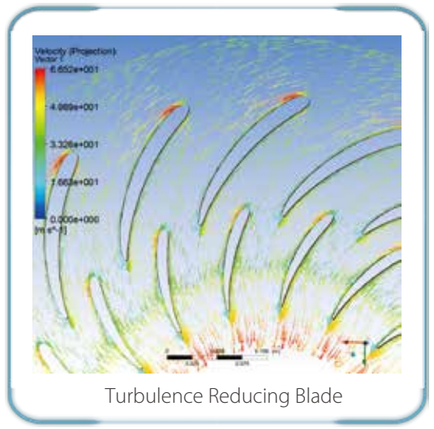
Features

Explore the Frontier of Aerodynamic Technology

Full Flow Pass Optimization increases efficiency.
The newly designed 3D flow impeller, coupled with the optimized volute, ensures flow velocity and maximizes efficiency.

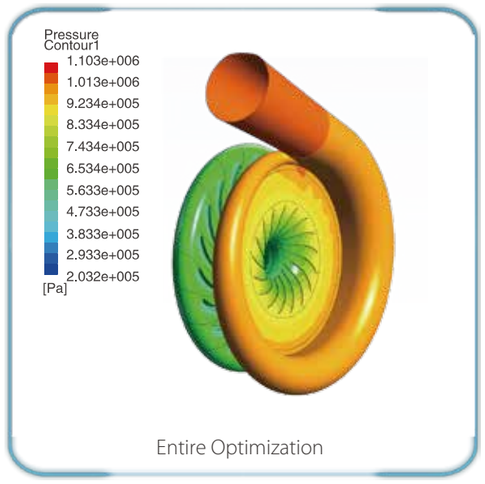
High Efficiency 3D Flow Impeller

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



Turbulence Reducing Blade

Aerodynamic loss balance design reduces the aerodynamic noise.



Entire Optimization

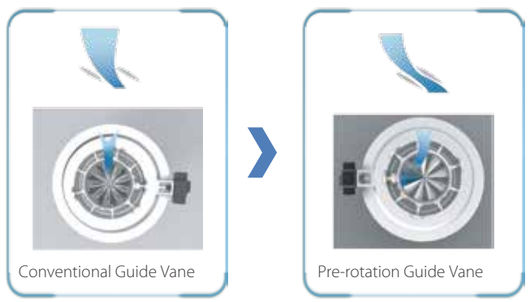
The gas flow perfectly matches the interior flow channel, reducing the loss of impact.

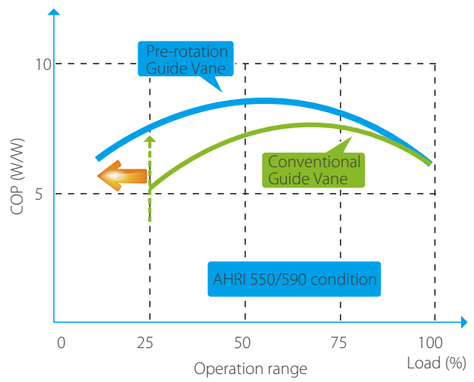
Volute

The volute is designed perfectly suitable to the impeller. The optimized flow pass can ensure the uniform distribution of flow velocity, contributes to higher efficiency.

Pre-rotation Guide Vane Technology

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





Two-stage Compression Technology

6% higher efficiency than single-stage compression.
Lower speed and higher reliability.
Unique three stage separation economizer, reliable and effective.

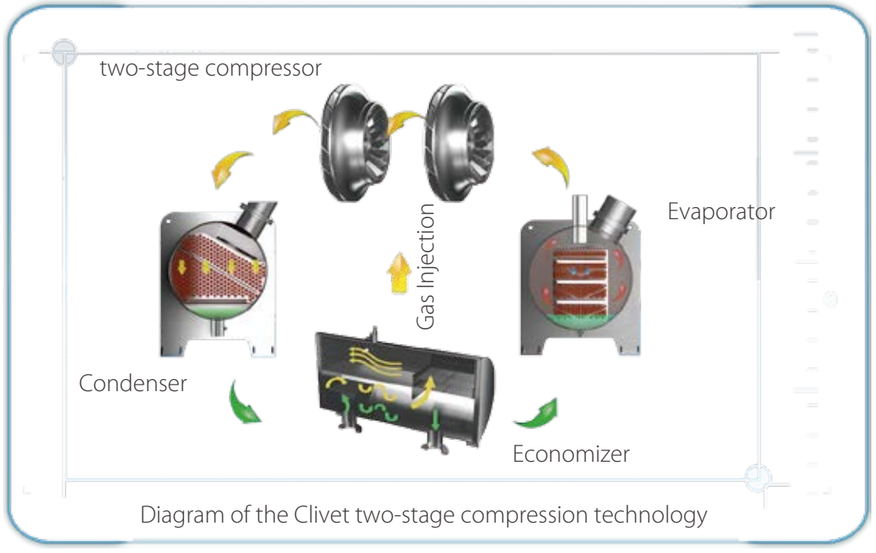
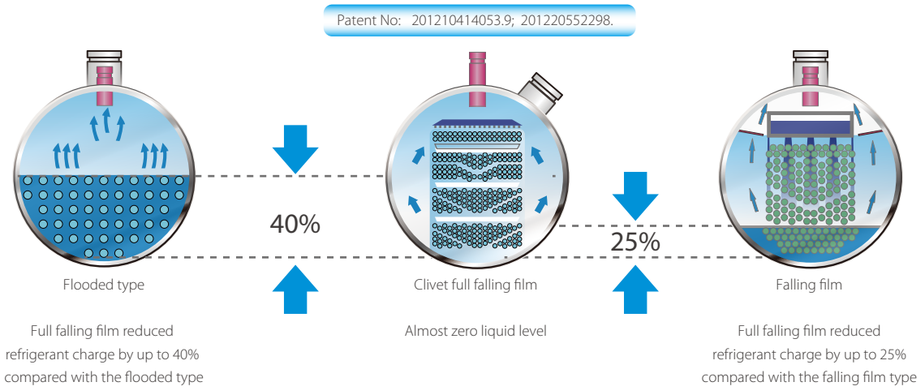


Diagram of the Clivet two-stage compression technology

Unique Heat-exchanging Technology

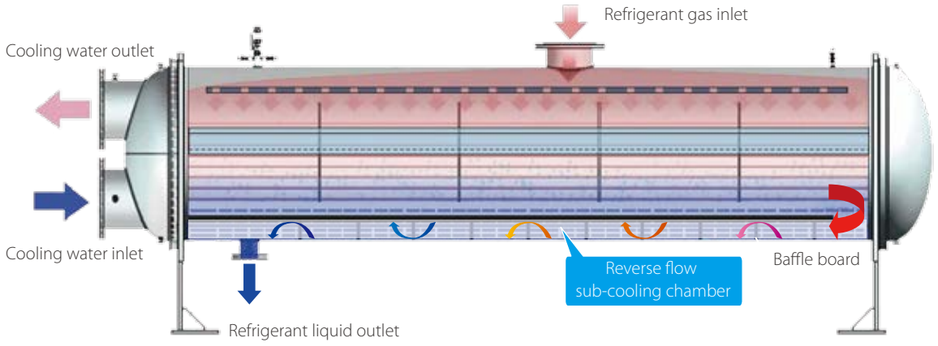
❖ Full falling film evaporator

First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge by up to 40%.
The patented refrigerant distributor can improve the homogeneity of the liquid to avoid local drying, fully showcasing the performance of the heat exchange tube and increasing unit efficiency.



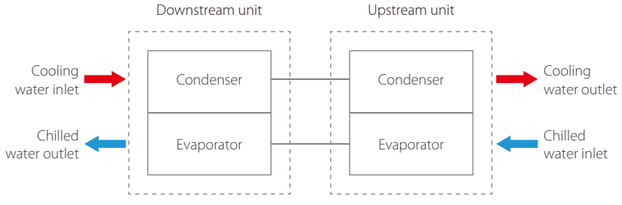
❖ Condenser

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



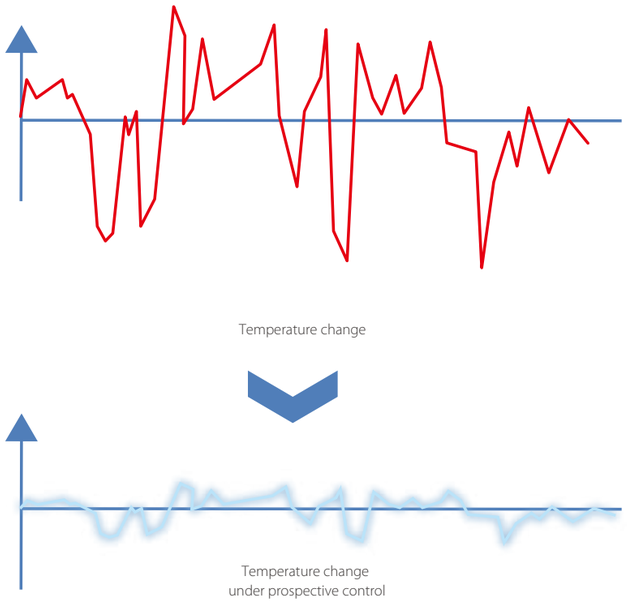
Series Counterflow

Series counterflow arrangement provides the advantage of having a compact size, without the need for extra components such as pipings, valves and pumps, etc. The result is lower installation cost and less space required.

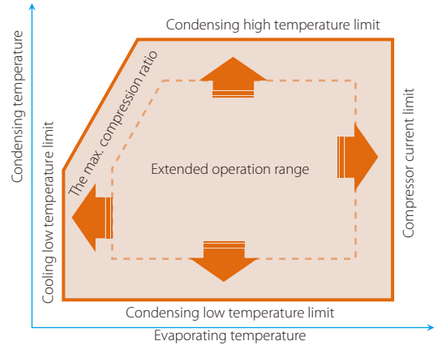


Prospective Control Logic

The microcomputer control system's features include trend prediction, self-diagnosis, self-adjustment and safety protection. Capable of predicting real load changes according to target values and load level history, the system can modify the operating load and prevent energy waste.



▼ Operating range



Environmentally Friendly

❖ Low noise and vibration

The unit is the quietest chiller in its size range with sound pressure ratings as low as 85dBA per AHRI Standard 575-2017. A coin can be balanced on the edge of the compressor-motor assembly. This demonstrates the extremely low vibrations generated by the unit.

❖ LEED

Zero-ozone depletion R134a refrigerant, green, and has no elimination cycle.
Full falling film technology reduces refrigerant charge by up to 40%, which enables you to qualify for maximum Leadership in Energy and Environmental Design®(LEED) points for Enhanced Refrigerant Management. And with the chiller' s high efficiency, you can also earn additional points for credits from Optimized Energy Performance (EAc1).

Reliable Quality

100% run-tested in the factory, high R&D investment and strict requirements on product quality ensure the high reliability of the product.

❖ 4000RT water cooled chiller performance testing lab

The 4000RT water cooled chiller performance testing lab is one of the most advanced testing facilities in the world. It can simulate all chiller running conditions such as the Chinese National standard testing condition of (7℃/12℃, 30℃/35℃), the typical of the Chinese industry testing condition of (7℃/12℃, 32℃/37℃), and the AHRI testing condition of (6.67℃/12.22℃, 29.44℃/34.61℃). Besides, it can cover the most worst testing condition in the Middle East region. The chilled water temperature range from 3℃ to 50℃ and cooling water temperature range from 10℃~60℃, which is far beyond the actual running conditions in the Middle East (13.33℃/4.44℃, 35℃/41.5℃). It provides precise testing data for the IPLV and NPLV calculation. The testing can cover all main kinds of power supply worldwide. Every chiller is tested with all kinds of necessary conditions before shipping.

The establishment of this lab further expands Clivet's testing capability of large tonnage chiller and further strengthens Clivet's international leading position in the whole industry.

❖ The independent room for compressor assembly

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

Wide application

The Clivet 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 groundwater 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

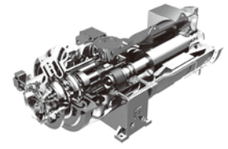
Keyless impeller coupling and patent design reduce mechanical losses. Well-known brand parts ensure stable operations and improve reliability, stability and service life.

Parts introduction

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

Compressor

The centrifugal compressor adopts high-strength fully shrouded aluminum alloy impellers and a moveable inlet guide vane. The enclosed type impeller is designed for balanced thrust. It is dynamically balanced and overspeed-tested for smooth, vibration free operations. The 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 the refrigeration load of the evaporator. The rotor assembly consists of a high-strength, heat-treated alloy steel drive shaft, guaranteeing strength and reliability.



Motor

The Clivet centrifugal chiller uses a semi-hermetic two-pole motor that is cooled by circulating refrigerant. Winding embedded sensors provide positive thermal protection for the motor. The asynchronism squirrel cage type motor achieves high operating performance and a long life span. The refrigerant cooled motor keeps motor heat out of the mechanical room and decreases vibrations and shaft seal maintenance compared with open motors. Refrigerant cooled motors have lower inrush currents and lower operating noise than the open motor, which is air cooled. Additional ventilation is not necessary. The motor is bolted to the compressor gear housing. The shaft labyrinth seal prevents refrigerant from leaking the motor to the gear box. The low-voltage motor provides six terminals for reducing the starting voltage (wye-delta or auto transformer start). The 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

The high-strength aluminum-alloy compressor impellers feature reversed -curved vanes for high efficiency. The 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 operations under real conditions. Movement is controlled by a mounted electrical operator that responds to refrigeration load on the evaporator. Impellers are made from high-strength aluminum alloy, which is tested at 125% of the designed operating speed.

Keyless Impeller Coupling

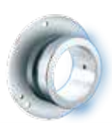
The impeller and main shaft are coupled by keyless connection. This eliminates stress concentration on the power transmission surface, greatly increasing the service life of the impeller. Since there is no friction, the efficiency is higher than the traditional key coupling. This unmatched mechanical design received an award from 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 multiple teeth in contact at all times to provide even distribution of the compressor load and quiet operation. Gear tooth surfaces are case hardened and precision ground, which can reach class 5. Gears are integrally assembled in the compressor rotor support and are lubricated with oil. Each gear is individually mounted on its own journal and thrust bearings to isolate gears from the impeller and motor forces. The double layer soundproof compressor design prevents gear contact noise from escaping.

Bearings

The motor is suitable for journal bearings to handle the radial load, axial load and drive speed. The slide bearing base has an embedded babbitt alloy covering that is softer than the main shaft, which protects the shaft if a fault occurs. The high-tech oil film lubrication design keeps the bearing and shaft minimizing contact, eliminating friction.



Lower Sound Levels and Vibration

The 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

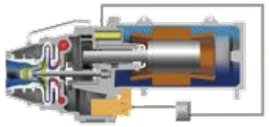
The baffle prevents direct impingement of high velocity compressor gas onto condenser tubes. This eliminates vibration and wears on the tubes, and distributes refrigerant flow evenly over the length of the condenser, thus increasing efficiency.

Advanced Capacity Adjustment

The inlet guide vanes work with moveable diffusers , resulting in a stepless capacity range from 10% to 100% and is free of surges. The Inlet Guide Vane (IGV) is controlled by an actuator, which is directly run by the PLC. This technology was awarded a patent 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. The high-position oil sump supplies oil to the gear surface for lubrication, preventing gear wear if a sudden power loss occurs.



Marvelous Oil Cooler

A plate-type oil cooler is mounted in the factory on the side of the compressor. An external oil filter and oil cooler simplifies maintenance and filter replacement. Replacing the oil filter or oil cooler can be completed after the isolation valve in the pipe line is closed.

Unmatched Oil Reclaim System

When the chiller unit is running, a small amount of lube may interfuse with the refrigerant. The Clivet patented oil reclaim system is designed to return the oil from the heat exchanger back to the oil tank. Improving the refrigerant purity, therefore increasing thermal exchange efficiency and supplying sufficient oil to compressor.

Low Inrush Current

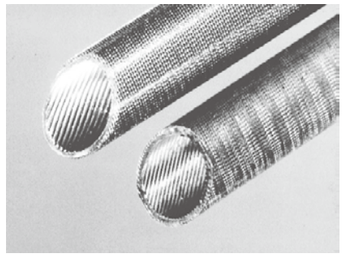
The standard starter for the Clivet centrifugal chiller is popular for centrifugal chiller applications; i.e., the wye-delta starter. The motor windings first connect in a “wye” configuration to reduce inrush current to 33.3% of locked rotor amps, producing 33.3% of the normal starting torque. After a brief delay (transition time), the electrical load is momentarily transitioned to resistance, while the motor windings are changed to the “delta” configuration. The resistance minimize the second inrush current when the delta configuration becomes active. The soft start and VFD are also available for various applications.

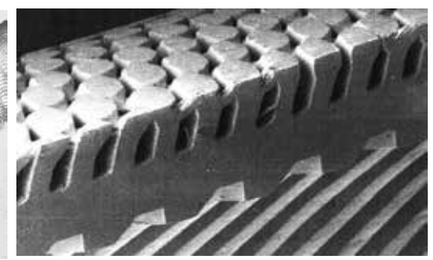
100% Factory Testing

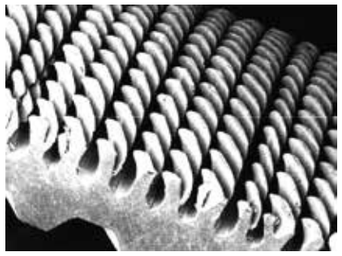
After assembly, the unit will go through a complete performance test in the test center. The benefits of performance testing include verifying performance, preventing operating problems and assurance of smooth start-up. A chiller that has been tested is operationally and performance-proven.

Heat Exchanger Tube

High-efficiency, externally and internally enhanced heat exchanger tubes provide optimum performance. Tubes in both the evaporator and condenser are 1" O.D. with an internal and external surface made from copper alloy. 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 expanded by roller into the tube sheets, providing a leakproof seal. The tubes are individually replaceable. Copper alloy comes as standard and is 90/10 copper-nickel. 304 stainless steel or titanium can be customized.





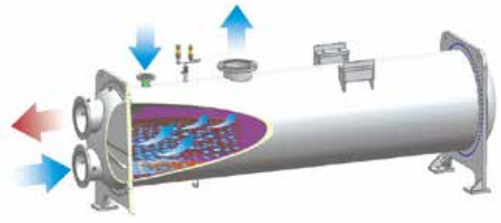


Evaporator

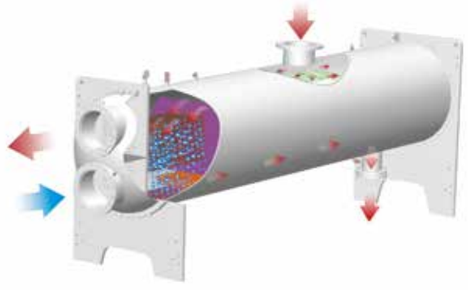
The evaporator is a shell and tube-type heat exchanger. A flow equalizer uniformly distributes refrigerant over the entire tube length to optimize heat transfer. The evaporator shell contains a dual refrigerant relief valve arrangement set at 185 PSIG (1280 kPa) or a single-relief valve arrangement. The intermediate tube support sheets positioned along the shell axis prevent relative tube motion. The waterside is hydraulic tested at 1.25 x the maximum working pressure.

Condenser

The condenser is the shell and tube type that includes a discharge gas baffle for preventing direct high velocity gas impingement on the tubes. The baffle is also used to distribute the refrigerant gas flow properly for the most efficient heat transfer. An integral sub-cooler is located on the bottom of the condenser shell, providing highly effective liquid refrigerant subcooling, giving the highest cycle efficiency. Two-stage compressing using the economizer can improve efficiency by 5% to 8%. The condenser contains a refrigerant relief valve sets at 1.6MPa. Standard maximum waterside working pressure is 1.0MPa. The waterside is hydraulic tested at 1.25 x the maximum working pressure.



Evaporator



Condenser

Water Box

The removable water boxes are fabricated from steel. The design working pressure is 150 PSIG (1034 kPa) and the boxes are tested at 187.5 PSIG (1292.5 kPa). Integral steel water baffles are located and welded within the water box to provide the integrity required to pass test conditions. The nozzle connections are suitable for flanges and are capped when shipped. Plugged 1" drain and vent connections are provided in each water box.

Orifice

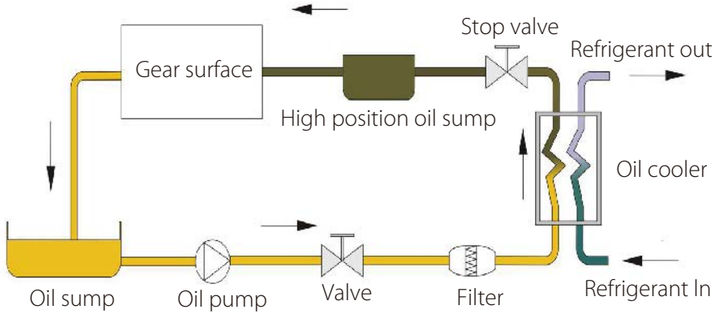
There are three refrigerant control devices used in the industry: electrical expansion valves, fixed orifices, and float systems. Clivet high efficiency series uses the fixed orifice without any moving parts, increasing reliability. The super high efficiency series is equipped with the orifice as well as liquid level control technology to improve the efficiency of partial loads. These matches ensure that the chiller works stably in any working situation and improves IPLV and NPLV significantly.

Control Panel

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

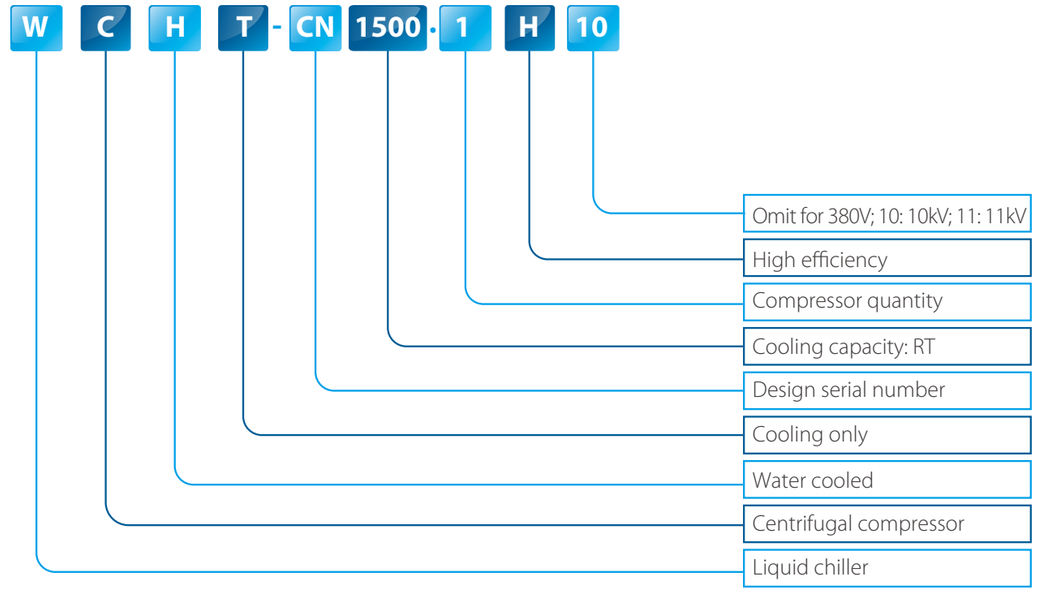
Lubrication System

A separately driven electric oil pump assembly supplies lubricant to the compressor at the correct temperature and pressure. After filtration the oil is sent to the oil cooler after adjusting. After adjusting its pressure, it is transferred to the bearings. Specially designed seals are installed on the inner side of motor bearings at both ends to minimize lubricant from leaking into the main motor and prevent contamination of the R134a in the evaporator. An electric heater is used inside the oil tank to maintain suitable oil temperature all the time. Oil temperature is thus maintained in the event of a compressor shutdown. This prevents R134a gas from entering the oil and decreasing lubrication efficiency. 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 falls out of service for an extended period of time, running the oil heater is still required.



High Efficiency Series

Nomenclature



Specifications

Model		WCHT-CN	500.1H	550.1H	600.1H	650.1H	700.1H	750.1H	800.1H
Cooling capacity		RT	500	550	600	650	700	750	800
		kW	1758	1934	2110	2285	2461	2637	2813
		10^4kcal/h	151.2	166.3	181.4	196.6	211.7	226.8	241.9
Power input		kW	286.2	314.8	343.6	372.0	401.7	430.0	458.7
COP		W/W	6.143	6.142	6.140	6.144	6.126	6.132	6.132
IPLV		W/W	6.718	6.698	6.706	6.739	6.813	7.153	7.092
Motor configuration power		kW	490.0	490.0	490.0	490.0	490.0	490.0	560.0
Rated current		A	496.9	546.7	596.6	645.9	697.6	746.7	796.4
Max. operating current		A	561.1	619.0	673.9	724.6	784.1	839.1	891.1
Locked-rotor current		A	4700	4700	4700	4700	4700	4700	5400
Evaporator	Water flow	m^3/h	271.6	298.8	325.9	353.1	380.3	407.4	434.6
	Pressure drop	kPa	35.8	42.5	39.1	44.7	54.0	55.8	55.9
	Water pipe connection	mm	DN250	DN250	DN250	DN250	DN300	DN300	DN300
Condenser	Water flow	m^3/h	337.5	371.5	405.4	439.2	473.2	507.0	541.0
	Pressure drop	kPa	52.6	62.6	55.4	64.1	66.2	65.4	64.9
	Water pipe connection	mm	DN250	DN250	DN250	DN250	DN300	DN300	DN300
Unit dimension	Length	mm	4690	4690	4690	4690	4690	4690	4690
	Width	mm	1800	1800	1800	1800	1950	1950	1950
	Height	mm	2410	2410	2410	2410	2410	2410	2410
Shipping weight		kg	10080	10080	10240	10240	11140	11270	11355
Running weight		kg	12020	12020	12180	12180	13159	13350	13564

Model		WCHT-CN	850.1H	900.1H	950.1H	1000.1H	1100.1H	1200.1H	1300.1H
Cooling capacity		RT	850	900	950	1000	1100	1200	1300
		kW	2989	3164	3340	3516	3868	4219	4571
		10^4kcal/h	257.0	272.1	287.3	302.4	332.6	362.9	393.1
Power input		kW	486.3	512.3	542.8	570.7	624.4	678.4	731.3
COP		W/W	6.145	6.177	6.153	6.161	6.194	6.220	6.251
IPLV		W/W	7.294	7.272	6.978	6.949	6.807	7.015	7.121
Motor configuration power		kW	560.0	630.0	630.0	630.0	695.0	760.0	840.0
Rated current		A	844.5	889.5	942.5	990.9	1084	1178	1270
Max. operating current		A	953.6	993.9	1048.5	1103	1207	1313	1411
Locked-rotor current		A	5400	6100	6100	6100	6800	7400	9200
Evaporator	Water flow	m^3/h	461.7	488.9	516.1	543.2	597.5	651.9	706.2
	Pressure drop	kPa	57.6	59.7	58.1	60.0	59.1	58.4	67.7
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	574.7	608.4	642.5	676.3	743.5	810.8	877.5
	Pressure drop	kPa	66.3	66.2	64.0	68.7	64.3	58.5	64.9
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimension	Length	mm	4690	4690	4745	4745	4745	4745	4745
	Width	mm	1950	1950	2260	2260	2260	2260	2260
	Height	mm	2410	2410	2610	2610	2610	2610	2610
Shipping weight		kg	11425	11494	11920	12067	12235	12380	12480
Running weight		kg	13712	13839	14532	14773	15108	15376	15500

Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***H#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Model		WCHT-CN	1400.1H10	1500.1H10	1600.1H10	1700.1H10	1800.1H10
Cooling capacity		RT	1400	1500	1600	1700	1800
		kW	4922	5274	5626	5977	6329
		10^4kcal/h	423.3	453.6	483.8	514.0	544.3
Power input		kW	793.4	848.5	909.4	965.4	1013
COP		W/W	6.205	6.216	6.186	6.191	6.250
IPLV		W/W	6.617	6.457	6.661	6.596	6.768
Motor configuration power		kW	930.0	990.0	1100	1100	1200
Rated current		A	52.60	56.30	60.30	64.10	67.20
Max. operating current		A	58.91	62.79	67.52	71.82	74.87
Locked-rotor current		A	380.0	405.0	450.0	450.0	490.0
Evaporator	Water flow	m3/h	760.5	814.8	869.1	923.5	977.8
	Pressure drop	kPa	63.6	60.9	59.3	66.8	70.8
	Water pipe connection	mm	DN400	DN400	DN400	DN400	DN400
Condenser	Water flow	m3/h	946.5	1014	1082	1150	1217
	Pressure drop	kPa	68.0	66.9	64.9	73.2	70.8
	Water pipe connection	mm	DN400	DN400	DN400	DN400	DN400
Unit dimension	Length	mm	5190	5190	5190	5190	5290
	Width	mm	2700	2700	2700	2700	3150
	Height	mm	3010	3010	3010	3010	3180
Shipping weight		kg	19370	20150	20850	20879	23360
Running weight		kg	22840	23490	24210	24289	27040

Model		WCHT-CN	1900.1H10	2000.1H10	2100.1H10	2200.1H10
Cooling capacity		RT	1900	2000	2100	2200
		kW	6680	7032	7384	7735
		10^4kcal/h	574.5	604.8	635.0	665.2
Power input		kW	1070	1131	1180	1251
COP		W/W	6.242	6.217	6.259	6.185
IPLV		W/W	6.737	6.681	6.783	6.697
Motor configuration power		kW	1200	1320	1320	1450
Rated current		A	71.00	75.10	78.30	83.00
Max. operating current		A	80.12	84.21	88.31	93.45
Locked-rotor current		A	490.0	540.0	540.0	590.0
Evaporator	Water flow	m3/h	1032	1086	1141	1195
	Pressure drop	kPa	66.0	67.5	67.0	67.1
	Water pipe connection	mm	DN400	DN400	DN400	DN400
Condenser	Water flow	m3/h	1284	1353	1419	1489
	Pressure drop	kPa	67.6	66.6	66.5	67.0
	Water pipe connection	mm	DN400	DN400	DN400	DN400
Unit dimension	Length	mm	5290	5290	5290	5290
	Width	mm	3150	3150	3150	3150
	Height	mm	3180	3180	3180	3180
Shipping weight		kg	23590	23870	24120	24350
Running weight		kg	27490	27840	28076	28310

Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software isWCHT-CN***H10#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Model		WCHT-CN	2300.1H10	2400.1H10	2500.1H10	2600.1H10	2700.1H10	2800.1H10	2900.1H10	3000.1H10
Cooling capacity		RT	2300	2400	2500	2600	2700	2800	2900	3000
		kW	8087	8438	8790	9142	9493	9845	10196	10548
		10^4kcal/h	695.5	725.8	756.0	786.2	816.5	846.7	877.0	907.2
Power input		kW	1246	1305	1357	1403	1454	1512	1574	1619
COP		W/W	6.492	6.468	6.480	6.517	6.529	6.512	6.477	6.515
IPLV		W/W	7.119	7.113	7.099	7.079	7.052	7.069	7.056	7.053
Motor configuration power		kW	1450	1600	1600	1600	1800	1800	1800	2000
Rated current		A	82.70	86.60	90.00	93.10	96.50	100.3	104.5	107.4
Max. operating current		A	94.29	97.86	102.5	105.9	109.9	114.1	117.0	121.2
Locked-rotor current		A	574.0	648.0	648.0	648.0	725.0	725.0	725.0	800.0
Evaporator	Water flow	m^3/h	1249	1304	1358	1412	1467	1521	1575	1630
	Pressure drop	kPa	75.5	74.8	74.8	74.4	74.2	74.2	73.9	72.9
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Condenser	Water flow	m^3/h	1547	1616	1683	1749	1816	1884	1952	2018
	Pressure drop	kPa	70.3	71.3	71.9	72.7	72.6	73.7	71.8	72.2
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Unit dimension	Length	mm	5900	5900	5900	5900	5900	5900	5900	5900
	Width	mm	3360	3360	3360	3360	3360	3360	3360	3360
	Height	mm	3650	3650	3650	3650	3650	3650	3650	3650
Refrigerant charge		kg	2150	2200	2250	2300	2350	2400	2450	2500
Shipping weight (non-marine water box)		kg	27015	27215	27415	27605	27845	28035	28225	28500
Running weight (non-marine water box)		kg	34210	34580	34950	35310	35720	36080	36485	36930

Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***H10#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Model		WCHT-CN	2300.1H11	2400.1H11	2500.1H11	2600.1H11	2700.1H11	2800.1H11	2900.1H11	3000.1H11
Cooling capacity		RT	2300	2400	2500	2600	2700	2800	2900	3000
		kW	8087	8438	8790	9142	9493	9845	10196	10548
		10^4kcal/h	695.5	725.8	756.0	786.2	816.5	846.7	877.0	907.2
Power input		kW	1537	1602	1671	1744	1804	1870	1926	1998
COP		W/W	5.263	5.267	5.260	5.241	5.262	5.264	5.294	5.279
Motor configuration power		kW	1800	1800	1800	2000	2000	2000	2150	2150
Rated current		A	92.70	96.70	100.8	105.2	108.8	112.8	116.2	120.5
Max. operating current		A	97.34	101.5	105.8	110.5	114.2	118.4	122.0	126.5
Locked-rotor current		A	690.0	690.0	690.0	790.0	790.0	790.0	791.0	791.0
Evaporator	Water flow	m^3/h	784.7	818.8	853.0	887.1	921.2	955.3	989.4	1024
	Pressure drop	kPa	32.5	32.2	32.2	32.0	31.9	31.9	31.7	31.3
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Condenser	Water flow	m^3/h	1649	1720	1792	1865	1935	2007	2077	2150
	Pressure drop	kPa	77.2	78.3	79.0	80.0	79.9	81.1	78.9	79.5
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Unit dimension (non-marine water box)	Length	mm	5900	5900	5900	5900	5900	5900	5900	5900
	Width	mm	3360	3360	3360	3360	3360	3360	3360	3360
	Height	mm	3650	3650	3650	3650	3650	3650	3650	3650
Shipping weight (non-marine water box)		kg	27015	27215	27415	27605	27845	28035	28225	28500
Running weight (non-marine water box)		kg	34210	34580	34950	35310	35720	36080	36485	36930

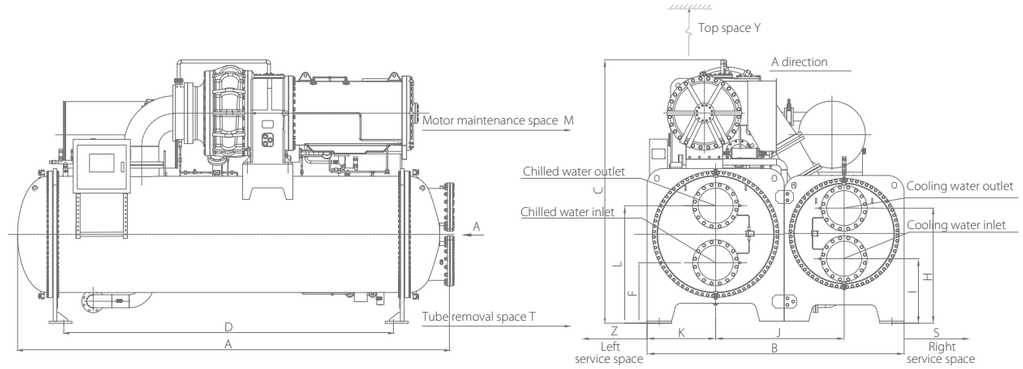
Note:
1. The parameters in the above table are given according to the working conditions in the Middle East: chilled water inlet/outlet temperature 14.40/5.55℃,
cooling water inlet/outlet temperature 34.40/39.40℃; the fouling factor on the chilled water side is 0.0176m²·℃/kW, and the fouling factor on the cooling water side is 0.0440m²·℃/kW.
Chilled water flow and cooling water flow are calculated based on operating conditions.
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***H11#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

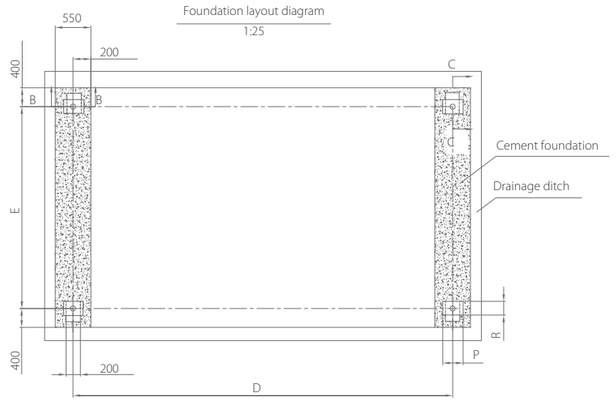
Model (series counterflow)		WCHT-CN	4600.2H11		4800.2H11		5000.2H11		5200.2H11	
Total cooling capacity		RT	4600		4800		5000		5200	
		/	Upstream unit	Downstream unit	Upstream unit	Downstream unit	Upstream unit	Downstream unit	Upstream unit	Downstream unit
Cooling capacity		RT	2415	2185	2520	2280	2625	2375	2730	2470
		kW	8491	7682	8860	8016	9230	8351	9599	8685
		10^4kcal/h	730.3	660.7	762.0	689.4	793.8	718.2	825.5	746.9
Power input		kW	1571.9	1475.4	1636.3	1529.3	1702.1	1597.4	1765.6	1652.6
COP		W/W	5.308		5.331		5.328		5.349	
Motor configuration power		kW	2000	2000	2000	2000	2000	2000	2000	2000
Rated current		A	94.80	89.00	98.70	92.30	102.7	96.40	106.5	99.70
Max. operating current		A	99.54	99.54	103.6	103.6	107.8	107.8	111.8	111.8
Locked-rotor current		A	790.0	790.0	790.0	790.0	790.0	790.0	790.0	790.0
Evaporator	Water flow	m^3/h	1563	1563	1631	1631	1699	1699	1767	1767
	Pressure drop	kPa	34.0	35.1	34.1	35.2	34.0	35.0	35.1	36.2
	Water pipe connection	mm	DN600	DN600	DN600	DN600	DN600	DN600	DN600	DN600
Condenser	Water flow	m^3/h	2530	2530	2639	2639	2748	2748	2857	2857
	Pressure drop	kPa	47.5	48.0	48.2	48.7	49.0	49.6	48.9	49.5
	Water pipe connection	mm	DN700	DN700	DN700	DN700	DN700	DN700	DN700	DN700
Unit dimension (non-marine water box)	Length	mm	6100	6100	6100	6100	6100	6100	6100	6100
	Width	mm	3360	3360	3360	3360	3360	3360	3360	3360
	Height	mm	3650	3650	3650	3650	3650	3650	3650	3650
Shipping weight (non-marine water box)		kg	27590	27590	27890	27890	27990	27990	28240	28240
Running weight (non-marine water box)		kg	35150	35150	35520	35520	35890	35890	36350	36350

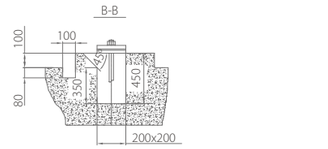
Model (series counterflow)		WCHT-CN	5400.2H11		5600.2H11		5800.2H11		6000.2H11	
Total cooling capacity		RT	5400		5600		5800		6000	
		/	Upstream unit	Downstream unit	Upstream unit	Downstream unit	Upstream unit	Downstream unit	Upstream unit	Downstream unit
Cooling capacity		RT	2835	2565	2940	2660	3045	2755	3150	2850
		kW	9968	9019	10337	9353	10706	9687	11075	10021
		10^4kcal/h	857.3	775.6	889.0	804.4	920.8	833.1	952.5	861.8
Power input		kW	1827.3	1703.5	1901.2	1764.9	1976.0	1826.6	2049.1	1899.5
COP		W/W	5.377		5.371		5.363		5.343	
Motor configuration power		kW	2150	2150	2150	2150	2150	2150	2150	2150
Rated current		A	110.2	102.8	114.7	106.5	119.2	110.2	123.6	114.6
Max. operating current		A	115.7	115.7	120.4	120.4	125.2	125.2	129.8	129.8
Locked-rotor current		A	791.0	791.0	791.0	791.0	791.0	791.0	791.0	791.0
Evaporator	Water flow	m^3/h	1835	1835	1903	1903	1971	1971	2039	2039
	Pressure drop	kPa	34.9	36.0	34.7	35.7	34.6	35.6	35.1	36.1
	Water pipe connection	mm	DN600	DN600	DN600	DN600	DN600	DN600	DN600	DN600
Condenser	Water flow	m^3/h	2967	2967	3078	3078	3189	3189	3300	3300
	Pressure drop	kPa	49.1	49.6	49.7	50.3	50.4	50.9	51.2	51.8
	Water pipe connection	mm	DN700	DN700	DN700	DN700	DN700	DN700	DN700	DN700
Unit dimension (non-marine water box)	Length	mm	6100	6100	6100	6100	6100	6100	6100	6100
	Width	mm	3360	3360	3360	3360	3360	3360	3360	3360
	Height	mm	3650	3650	3650	3650	3650	3650	3650	3650
Shipping weight (non-marine water box)		kg	28480	28480	28670	28670	28860	28860	29140	29140
Running weight (non-marine water box)		kg	36760	36760	37120	37120	37530	37530	37970	37970

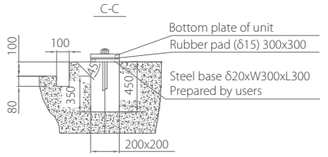
Note:
1. The parameters in the above table are given according to the working conditions in the Middle East: chilled water inlet/outlet temperature 13.30/4.44℃, cooling water inlet/outlet temperature 35/41.5℃; the fouling factor on the chilled water side is 0.0176m^2·℃/kW, and the fouling factor on the cooling water side is 0.0440m^2·℃/kW. Chilled water flow and cooling water flow are calculated based on operating conditions.
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***H11#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.
5. Cooling capacity lager than 3000RT is beyond the scope of AHRI certification.

Dimension







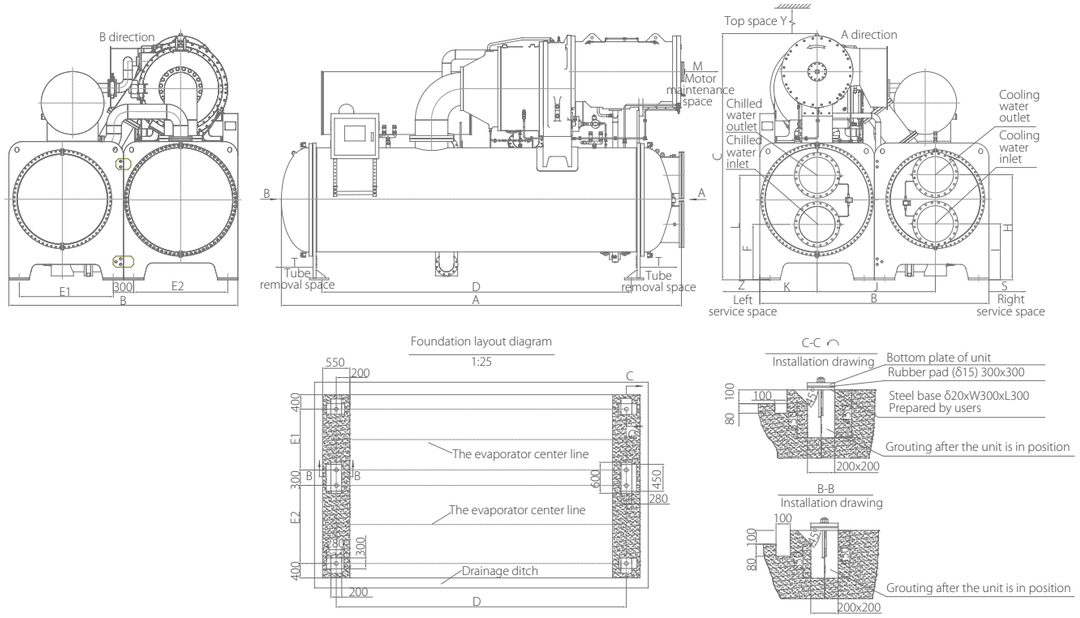


Model	Dimension			Support				Pipe locate position							
	Length (A)	Width (B)	Height (C)	D	E	P	R	F	L	K	I	H	J	Evaporator pipe diameter	Condenser pipe diameter
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN500.1H	4690	1800	2410	3780	1600	240	200	535	985	450	610	1030	900	DN250	DN250
WCHT-CN550.1H															
WCHT-CN600.1H															
WCHT-CN650.1H															
WCHT-CN700.1H	4690	1950	2410	3780	1750	240	200	530	990	500	580	1040	975	DN300	DN300
WCHT-CN750.1H															
WCHT-CN800.1H															
WCHT-CN850.1H															
WCHT-CN900.1H															
WCHT-CN950.1H	4745	2260	2610	3780	2060	240	200	585	1085	592.5	650	1120	1130	DN300	DN300
WCHT-CN1000.1H															
WCHT-CN1100.1H															
WCHT-CN1200.1H															
WCHT-CN1300.1H															
WCHT-CN1400.1H10	5190	2700	3010	4040	2400	280	300	640	1240	725	650	1250	1350	DN400	DN400
WCHT-CN1500.1H10															
WCHT-CN1600.1H10															
WCHT-CN1700.1H10															
WCHT-CN1800.1H10	5290	3150	3180	4040	2850	280	300	740	1440	840	790	1410	1575	DN400	DN400
WCHT-CN1900.1H10															
WCHT-CN2000.1H10															
WCHT-CN2100.1H10															
WCHT-CN2200.1H10															

Model	Maintenance space size (mm)				
	M	T	Y	Z	S
WCHT-CN500.1H~WCHT-CN1300.1H	1500	4200	1300	1300	1000
WCHT-CN1400.1H10~WCHT-CN2200.1H10	1600	4500	1300	1800	1000

T: Tube removal space for either end.

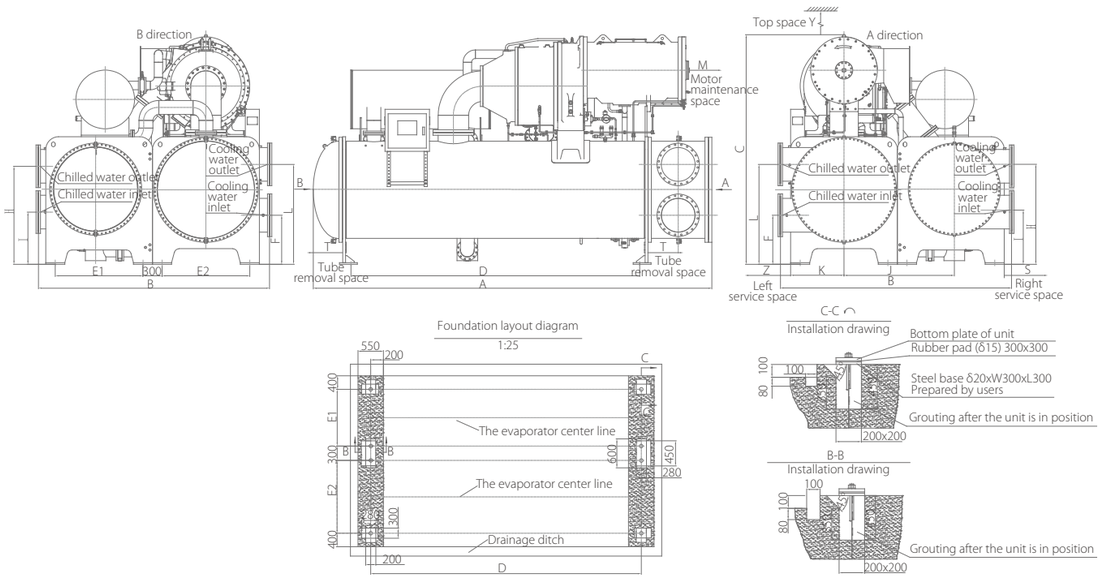
WCHT-CN2300.1H10~WCHT-CN3000.1H10 (non-marine water box)
WCHT-CN2300.1H11~WCHT-CN3000.1H11 (non-marine water box)



Model	Dimension			Support			Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	D	E1	E2	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN2300.1H10	5900	3360	3650	4540	1380	1380	810	1530	840	820	1540	1735	DN500	DN500
WCHT-CN2300.1H11														
WCHT-CN2400.1H10														
WCHT-CN2400.1H11														
WCHT-CN2500.1H10														
WCHT-CN2500.1H11														
WCHT-CN2600.1H10														
WCHT-CN2600.1H11														
WCHT-CN2700.1H10														
WCHT-CN2700.1H11														
WCHT-CN2800.1H10														
WCHT-CN2800.1H11														
WCHT-CN2900.1H10														
WCHT-CN2900.1H11														
WCHT-CN3000.1H10														
WCHT-CN3000.1H11														

Model	Maintenance space (mm)				
	M	T	Y	Z	S
WCHT-CN2300.1H10~WCHT-CN3000.1H10	2000	5000	1600	2000	1000
WCHT-CN2300.1H11~WCHT-CN3000.1H11					

T: Tube removal space for either end.

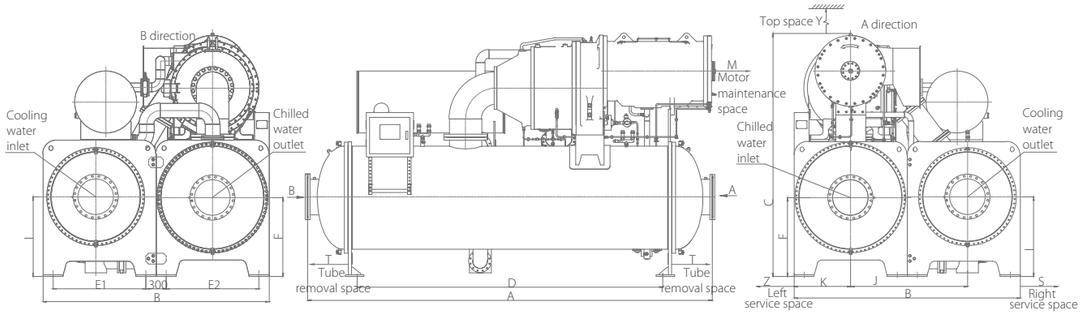


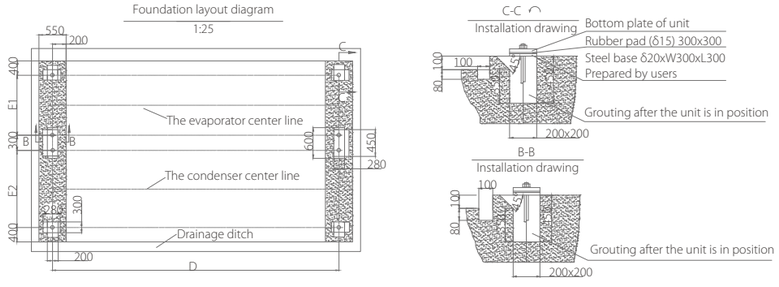
Model	Dimension			Support			Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	D	E1	E2	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN2300.1H11	6300	3650	3650	4540	1380	1380	810	1530	840	820	1540	1735	DN500	DN500
WCHT-CN2400.1H11														
WCHT-CN2500.1H11														
WCHT-CN2600.1H11														
WCHT-CN2700.1H11														
WCHT-CN2800.1H11														
WCHT-CN2900.1H11														
WCHT-CN3000.1H11														

Model	Maintenance space (mm)				
	M	T	Y	Z	S
WCHT-CN2300.1H11~WCHT-CN3000.1H11	2000	5000	1600	2000	1000

T: Tube removal space for either end.

Series counterflow (non-marine water box)



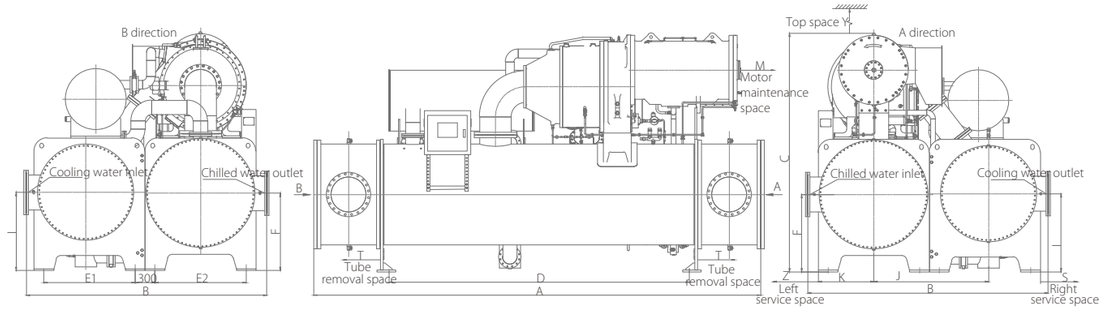


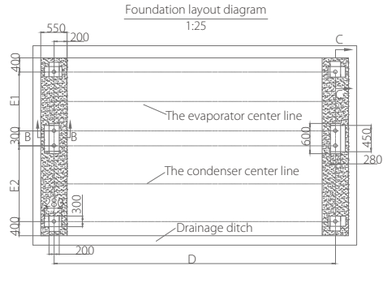
Model	Dimension			Support			Pipe locate position							
	Length (A)	Width (B)	Height (C)	D	E1	E2	F	L	K	I	H	J	Evaporator pipe diameter	Condenser pipe diameter
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN2300.1H11 Upstream unit/ Downstream unit	6100	3360	3650	4540	1380	1380	1170	/	840	1180	/	1735	DN600	DN700
WCHT-CN2400.1H11 Upstream unit/ Downstream unit														
WCHT-CN2500.1H11 Upstream unit/ Downstream unit														
WCHT-CN2600.1H11 Upstream unit/ Downstream unit														
WCHT-CN2700.1H11 Upstream unit/ Downstream unit														
WCHT-CN2800.1H11 Upstream unit/ Downstream unit														
WCHT-CN2900.1H11 Upstream unit/ Downstream unit														
WCHT-CN3000.1H11 Upstream unit/ Downstream unit														

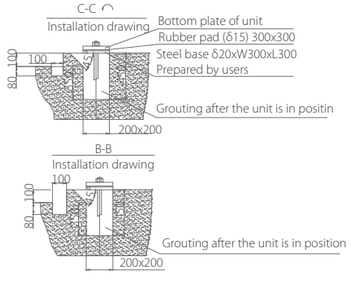
Model	Maintenance space(mm)				
	M	T	Y	Z	S
WCHT-CN2300.1H11~WCHT-CN3000.1H11 Upstream unit/ Downstream unit	2000	5000	1600	2000	1000

T: Tube removal space for either end.

Series counterflow (marine water box)







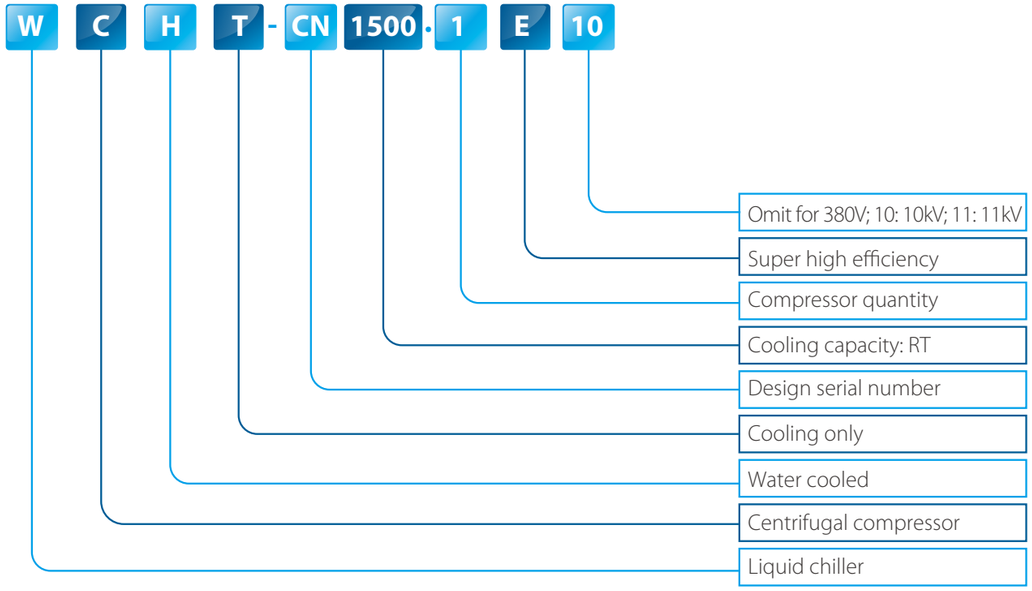
Model	Dimension			Support			Pipe locate position							
	Length (A)	Width (B)	Height (C)	D	E1	E2	F	L	K	I	H	J	Evaporator pipe diameter	Condenser pipe diameter
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN2300.1H11 Upstream unit/ Downstream unit	7000	3650	3650	4540	1380	1380	1170	/	840	1180	/	1735	DN600	DN700
WCHT-CN2400.1H11 Upstream unit/ Downstream unit														
WCHT-CN2500.1H11 Upstream unit/ Downstream unit														
WCHT-CN2600.1H11 Upstream unit/ Downstream unit														
WCHT-CN2700.1H11 Upstream unit/ Downstream unit														
WCHT-CN2800.1H11 Upstream unit/ Downstream unit														
WCHT-CN2900.1H11 Upstream unit/ Downstream unit														
WCHT-CN3000.1H11 Upstream unit/ Downstream unit														

Model	Maintenance space(mm)				
	M	T	Y	Z	S
WCHT-CN2300.1H11~WCHT-CN3000.1H11 Upstream unit/ Downstream unit	2000	5000	1600	2000	1000

T: Tube removal space for either end.

Super High Efficiency Series

Nomenclature



Specifications

Model		WCHT-CN	500.1E	550.1E	600.1E	650.1E	700.1E	750.1E	800.1E
Cooling capacity		RT	500.0	550.0	600.0	650.0	700.0	750.0	800.0
		kW	1758	1934	2110	2285	2461	2637	2813
		10^4kcal/h	151.2	166.3	181.4	196.5	211.7	226.8	241.9
Power input		kW	284.5	311.7	336.0	363.4	392.6	418.6	443.9
COP		W/W	6.178	6.205	6.279	6.288	6.269	6.300	6.337
IPLV		W/W	6.834	6.834	6.889	6.918	6.954	7.232	7.250
Motor configuration power		kW	490.0	490.0	490.0	490.0	490.0	490.0	560.0
Rated current		A	494.1	541.2	583.4	631.1	681.7	726.8	770.8
Max. operating current		A	557.2	611.0	656.9	706.8	764.1	816.0	862.2
Locked-rotor current		A	4700	4700	4700	4700	4700	4700	5400
Evaporator	Water flow	m^3/h	271.6	298.8	325.9	353.1	380.3	407.4	434.6
	Pressure drop	kPa	70.0	72.1	73.0	76.8	46.7	49.0	48.9
	Water pipe connection	mm	DN250	DN250	DN250	DN250	DN300	DN300	DN300
Condenser	Water flow	m^3/h	337.3	371.0	404.2	437.9	471.8	505.2	538.8
	Pressure drop	kPa	67.4	70.5	69.6	70.5	59.0	59.1	58.6
	Water pipe connection	mm	DN250	DN250	DN250	DN250	DN300	DN300	DN300
Unit dimension	Length	mm	5020	5020	5020	5020	5020	5020	5020
	Width	mm	1800	1800	1800	1800	2100	2100	2100
	Height	mm	2410	2410	2410	2410	2510	2510	2510
Shipping weight		kg	10400	10550	10700	10820	12260	12460	12580
Running weight		kg	12340	12490	12640	12760	14479	14740	14989

Model		WCHT-CN	850.1E	900.1E	950.1E	1000.1E	1100.1E	1200.1E	1300.1E
Cooling capacity		RT	850.0	900.0	950.0	1000	1100	1200	1300
		kW	2989	3164	3340	3516	3868	4219	4571
		10^4kcal/h	257.0	272.1	287.3	302.4	332.6	362.9	393.1
Power input		kW	470.9	501.0	522.8	552.0	608.3	661.1	715.1
COP		W/W	6.346	6.316	6.389	6.369	6.358	6.382	6.392
IPLV		W/W	7.293	7.361	7.148	7.165	7.110	7.182	7.181
Motor configuration power		kW	560.0	630.0	630.0	630.0	695.0	760.0	840.0
Rated current		A	817.7	870.0	907.9	958.5	1056	1148	1242
Max. operating current		A	922.0	971.8	1010.4	1068	1176	1280	1381
Locked-rotor current		A	5400	6100	6100	6100	6800	7400	9200
Evaporator	Water flow	m^3/h	461.7	488.9	516.1	543.2	597.5	651.9	706.2
	Pressure drop	kPa	51.2	52.6	50.4	52.1	52.3	52.1	60.1
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	572.3	606.7	639.5	673.4	741.1	808.1	875.0
	Pressure drop	kPa	55.7	61.9	57.4	61.5	57.3	55.0	63.5
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimension	Length	mm	5020	5020	5045	5045	5045	5045	5045
	Width	mm	2100	2100	2260	2260	2260	2260	2260
	Height	mm	2510	2510	2610	2610	2610	2610	2610
Shipping weight		kg	12720	12850	13560	13730	13950	14250	14250
Running weight		kg	15207	15395	16372	16636	17023	17446	17446

Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***E#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Model		WCHT-CN	1400.1E10	1500.1E10	1600.1E10	1700.1E10	1800.1E10
Cooling capacity		RT	1400	1500	1600	1700	1800
		kW	4922	5274	5626	5977	6329
		10^4kcal/h	423.3	453.6	483.8	514.0	544.3
Power input		kW	772.8	827.9	878.7	905.7	956.3
COP		W/W	6.369	6.370	6.402	6.599	6.618
IPLV		W/W	6.881	6.887	6.901	7.076	7.211
Motor configuration power		kW	930.0	990.0	1100.0	1100	1200
Rated current		A	51.30	54.90	58.30	60.10	63.50
Max. operating current		A	57.33	61.22	65.00	67.20	70.56
Locked-rotor current		A	380.0	405.0	450.0	450.0	490.0
Evaporator	Water flow	m^3/h	760.5	814.8	869.1	923.5	977.8
	Pressure drop	kPa	59.8	56.8	55.4	60.3	62.9
	Water pipe connection	mm	DN400	DN400	DN400	DN400	DN400
Condenser	Water flow	m^3/h	943.3	1011	1078	1141	1208
	Pressure drop	kPa	59.9	65.1	62.2	71.9	68.2
	Water pipe connection	mm	DN400	DN400	DN400	DN400	DN400
Unit dimension	Length	mm	5690	5690	5690	5690	5790
	Width	mm	2800	2800	2800	2800	3150
	Height	mm	3010	3010	3010	3010	3180
Shipping weight		kg	22324	22515	24030	24817	25312
Running weight		kg	25944	26055	27640	28727	28992

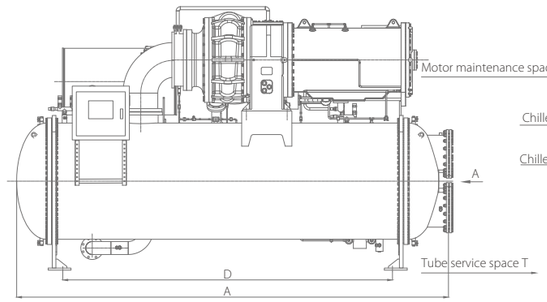
Model		WCHT-CN	1900.1E10	2000.1E10	2100.1E10	2200.1E10
Cooling capacity		RT	1900	2000	2100	2200
		kW	6680	7032	7384	7735
		10^4kcal/h	574.5	604.8	635.0	665.2
Power input		kW	1002	1073	1133	1205
COP		W/W	6.666	6.557	6.517	6.418
IPLV		W/W	7.266	7.221	7.222	7.003
Motor configuration power		kW	1200	1320	1320	1450
Rated current		A	66.50	71.20	75.20	80.00
Max. operating current		A	74.66	79.49	84.21	89.57
Locked-rotor current		A	490.0	540.0	540.0	590.0
Evaporator	Water flow	m^3/h	1032	1086	1141	1195
	Pressure drop	kPa	59.4	60.3	60.3	61.3
	Water pipe connection	mm	DN400	DN400	DN400	DN400
Condenser	Water flow	m^3/h	1274	1344	1412	1482
	Pressure drop	kPa	7.22665.8	58.8	59.4	64.9
	Water pipe connection	mm	DN400	DN400	DN400	DN400
Unit dimension	Length	mm	5790	5790	5790	5790
	Width	mm	3150	3150	3150	3150
	Height	mm	3180	3180	3180	3180
Shipping weight		kg	25543	25949	26250	26314
Running weight		kg	29443	30019	30306	30374

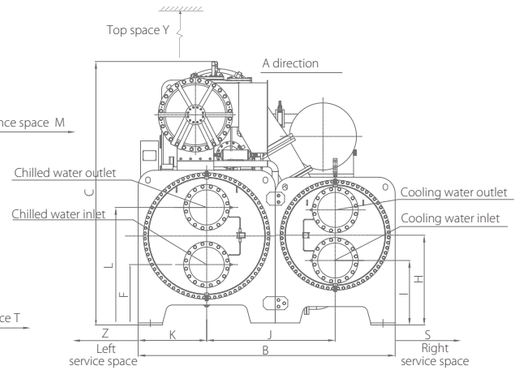
Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***E10# # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

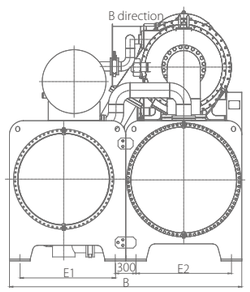
Model		WCHT-CN	2300.1E10	2400.1E10	2500.1E10	2600.1E10	2700.1E10	2800.1E10	2900.1E10	3000.1E10
Cooling capacity		RT	2300	2400	2500	2600	2700	2800	2900	3000
		kW	8087	8438	8790	9142	9493	9845	10196	10548
		10^4kcal/h	695.5	725.8	756.0	786.2	816.5	846.7	877.0	907.2
Power input		kW	1184.9	1244.7	1298.8	1347.3	1400.7	1458.8	1522.9	1568.5
COP		W/W	6.825	6.780	6.768	6.785	6.778	6.749	6.696	6.725
IPLV		W/W	7.172	7.163	7.146	7.123	7.094	7.109	7.095	7.090
Motor configuration power		kW	1450	1600	1600	1600	1800	1800	1800	2000
Rated current		A	78.60	82.60	86.20	89.40	93.00	96.80	101.1	104.1
Max. operating current		A	90.72	94.82	98.49	101.6	105.2	109.3	113.6	116.7
Locked-rotor current		A	574.0	648.0	648.0	648.0	725.0	725.0	725.0	800.0
Evaporator	Water flow	m^3/h	1249	1304	1358	1412	1467	1521	1575	1630
	Pressure drop	kPa	75.6	74.9	74.9	74.6	74.4	74.3	74.0	73.0
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Condenser	Water flow	m^3/h	1538	1606	1674	1740	1807	1875	1944	2010
	Pressure drop	kPa	70.8	71.8	72.5	73.3	73.3	74.4	72.6	72.9
	Water pipe connection	mm	DN500	DN500	DN500	DN500	DN500	DN500	DN500	DN500
Unit dimension	Length	mm	5900	5900	5900	5900	5900	5900	5900	5900
	Width	mm	3360	3360	3360	3360	3360	3360	3360	3360
	Height	mm	3650	3650	3650	3650	3650	3650	3650	3650
Refrigerant charge		kg	2150	2200	2250	2300	2350	2400	2450	2500
Shipping weight (non-marine water box)		kg	27590	27890	27990	28240	28480	28670	28860	29140
Running weight (non-marine water box)		kg	35150	35520	35890	36350	36760	37120	37530	37970

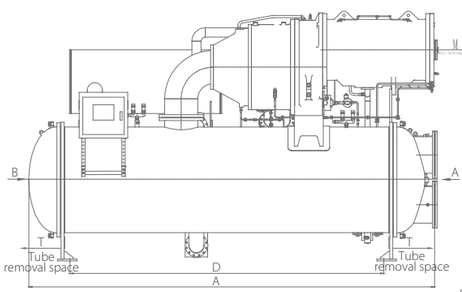
Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WCHT-CN***E10#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

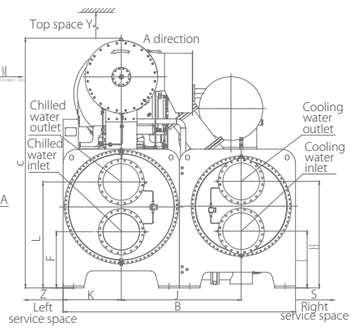
Dimension

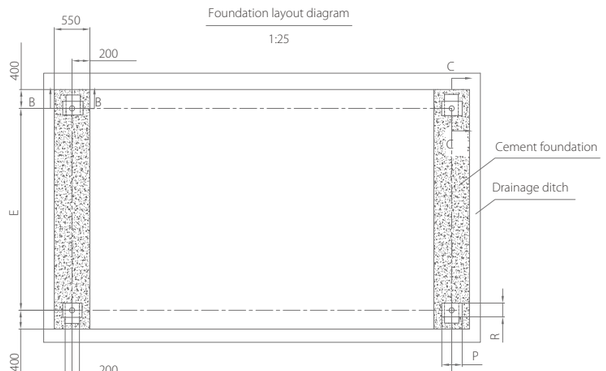


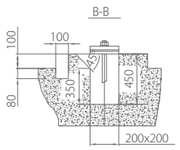


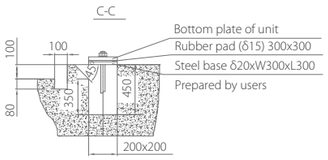


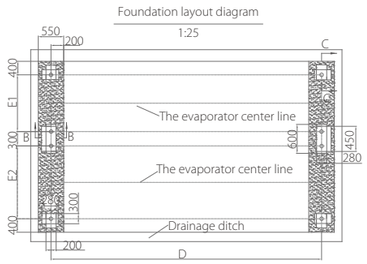


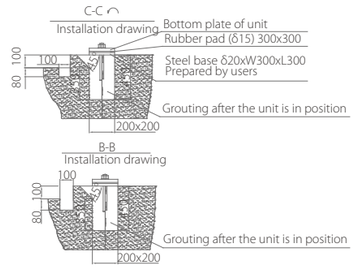












Model	Dimension			Support				Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	D	E	P	R	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN500.1E	5020	1800	2410	4080	1600	240	200	535	985	450	610	1030	900	DN250	DN250
WCHT-CN550.1E															
WCHT-CN600.1E															
WCHT-CN650.1E															
WCHT-CN700.1E	5020	2100	2510	4080	1900	240	200	550	1020	550	605	1065	1050	DN300	DN300
WCHT-CN750.1E															
WCHT-CN800.1E															
WCHT-CN850.1E															
WCHT-CN900.1E															
WCHT-CN950.1E	5045	2260	2610	4080	2060	240	200	585	1085	592.5	650	1120	1130	DN300	DN300
WCHT-CN1000.1E															
WCHT-CN1100.1E															
WCHT-CN1200.1E															
WCHT-CN1300.1E															
WCHT-CN1400.1E10	5690	2800	3010	4540	2400	280	300	640	1240	725	650	1250	1350	DN400	DN400
WCHT-CN1500.1E10															
WCHT-CN1600.1E10															
WCHT-CN1700.1E10															
WCHT-CN1800.1E10	5790	3150	3180	4540	2850	280	300	740	1440	840	790	1410	1575	DN400	DN400
WCHT-CN1900.1E10															
WCHT-CN2000.1E10															
WCHT-CN2100.1E10															
WCHT-CN2200.1E10															

Model	Maintenance space size (mm)				
	M	T	Y	Z	S
WCHT-CN500.1E~WCHT-CN1300.1E	1500	4200	1300	1300	1000
WCHT-CN1400.1E10~WCHT-CN2200.1E10	1600	4500	1300	1800	1000

T: Tube removal space for either end.

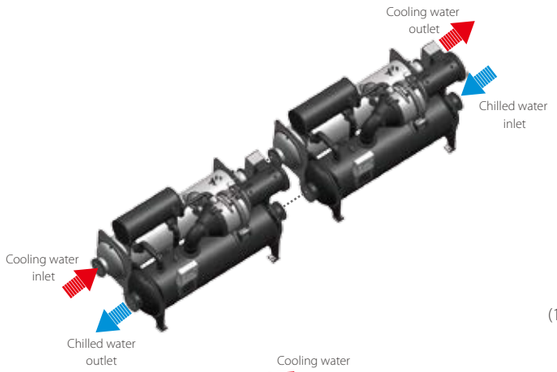
Model	Dimension			Support			Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	D	E1	E2	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WCHT-CN2300.1E10	5900	3360	3650	4540	1380	1380	810	1530	840	820	1540	1735	DN500	DN500
WCHT-CN2400.1E10														
WCHT-CN2500.1E10														
WCHT-CN2600.1E10														
WCHT-CN2700.1E10														
WCHT-CN2800.1E10														
WCHT-CN2900.1E10														
WCHT-CN3000.1E10														

Model	Maintenance space (mm)				
	M	T	Y	Z	S
WCHT-CN2300.1E10~WCHT-CN3000.1E10	2000	5000	1600	2000	1000

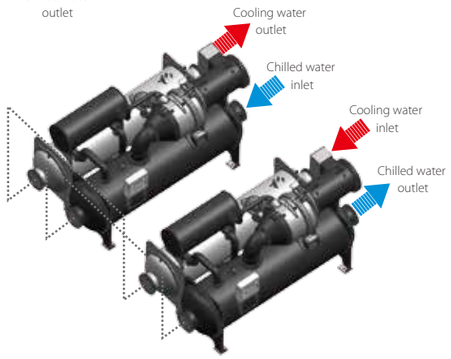
T: Tube removal space for either end.

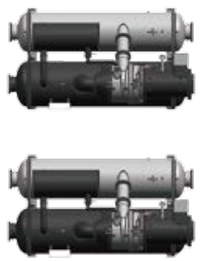
Series Counterflow Layout Diagram

Non-marine water box



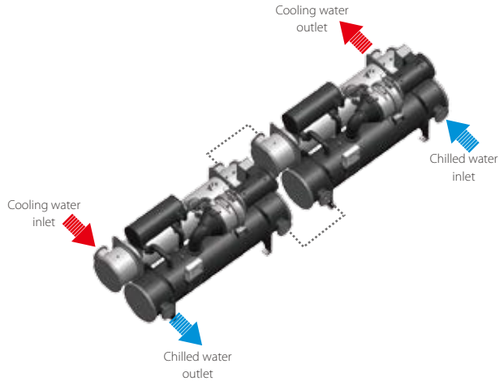
(1)



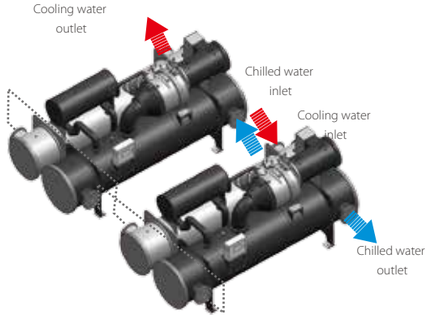


(2)

Marine water box

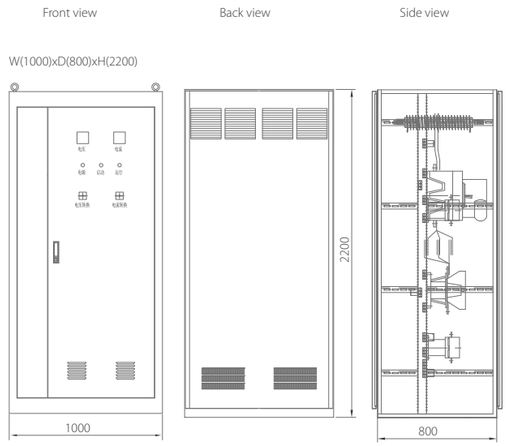


(1)

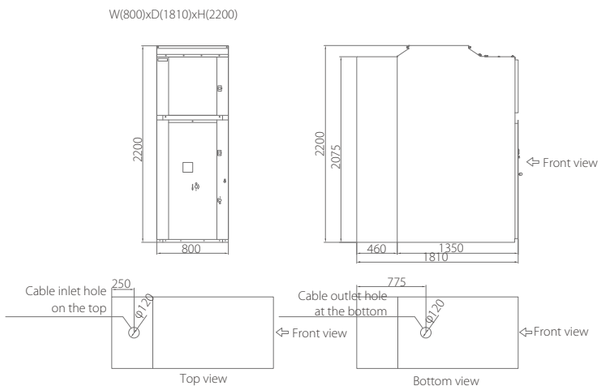


(2)

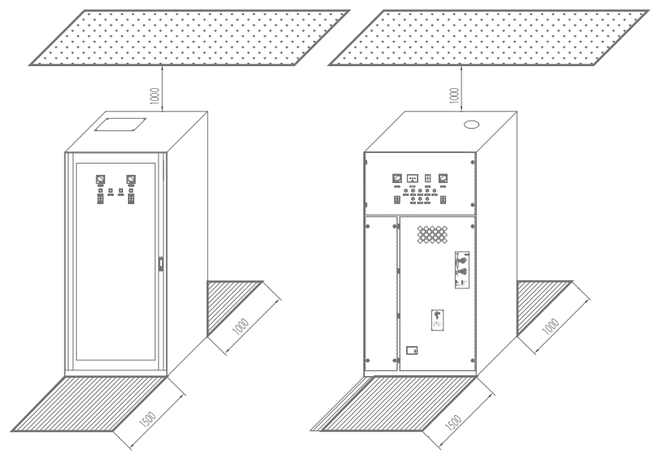
Starter Panel Dimension



Closed wye-delta starter panel



High voltage starter panel (direct-on-line)



Closed wye-delta starter panel

High voltage starter panel (direct-on-line)

Starter panel space layout

Options

Items	Standard	Optional
Power supply (600RT-1300RT)	380V-3Ph-50Hz	50Hz: 400V, 415V, 440V, 460V, 3kV, 3.3kV, 6kV, 6.6kV, 10kV, 11kV 60Hz: 380V, 400V, 415V, 440V, 460V, 3kV, 3.3kV, 6kV, 6.6kV, 10kV, 11kV
Power supply (1400RT-2200RT)	10kV-3Ph-50Hz	50Hz: 3kV, 3.3kV, 6kV, 6.6kV, 11kV
Power supply (2300-3000RT)	11kV-3Ph-50Hz	10kV-3Ph-50Hz
Chiller starter (600RT-1300RT)	Wye-delta	VFD, Solid soft starter, Direct-on-line (DOL) for high voltage (3kV-11kV)
Chiller starter (1400RT-3000RT)	Direct-on-line (DOL)	VFD, soft starter, auto transformer
High pressure water box	1.0MPa	1.6MPa, 2.0MPa
Marine water box	×	Marine
Insulation	20mm	40mm
Anti-vibration	Rubber pad	Spring isolator
Refrigerant isolation valve	×	√
Vessel code	GB	ASME, PED
Heat recovery	×	√
Chilled water Delta T	5℃	6℃-11℃
Centrifugal heat pump	×	Hot water temperature up to 45℃
Water storage or ice storage	×	√
Hot gas bypass	×	√
Communication protocol	Modbus-RTU (RS485 port)	BACnet IP, BACnet MS/TP (RJ-45 port)
Flow switch	Differential pressure	×
Knockdown shipment	×	√
Clivet Smart Cloud platform	×	√
QuickView	×	√
Clivet Chiller Plant Control	×	√
Tube automatic cleaning system	×	√
Witness performance testing	×	√

Note: For other options, please contact with our engineers.

Clivet Magnetic Bearing Centrifugal Chiller

Overview

Clivet magnetic bearing centrifugal chiller is the latest generation of oil-free centrifugal chillers with fully-independent intellectual property rights and featuring Clivet's core technologies. The series features oil-free, high efficiency, stability, reliability, wide-range operation, and low noise, and is environmentally-friendly and cost-saving. It adopts many of the core technologies that Clivet has spent years developing, such as the aerodynamic technology, magnetic bearing control, micro-channel refrigerant-cooled VFD, and high-efficiency permanent magnet synchronous motors. The series can be used in various buildings, including airports, rail transit, hotels, businesses, and new or reconstructed buildings, providing customers with efficient and energy-saving green building solutions.

Features

Oil-free and high efficiency

Aerodynamic design, making full-load operation more efficient; the magnetic bearing avoids friction, making partial load more efficient and providing the max. IPLV of 11.5; the full series have passed the AHRI certification.

Stable and reliable

Dual protection of self-generation control mode + spare bearing, ensuring safe operation under multiple harsh conditions.

Wide-range operation

Multi-technology joint adjustment widens the unit operation range while ensuring optimal efficiency; the cooling load of a single compressor can be as low as 10%.

Environmentally friendly

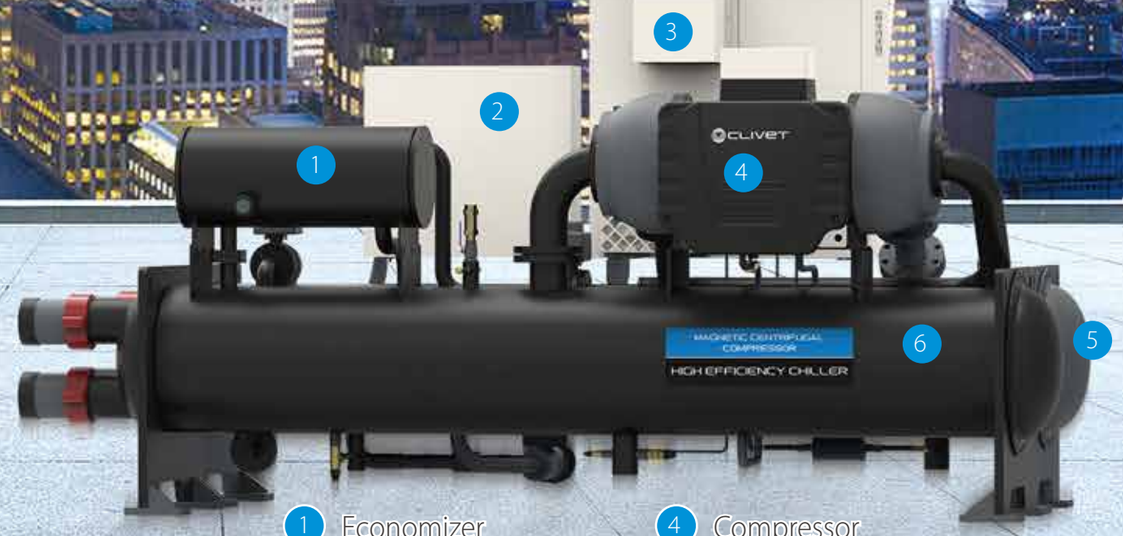
Horizontally back-to-back compression + noise reduction structure, minimizing the operating noise to 70dBA; full falling film evaporation technology reduces the refrigerant charge amount and better protects the environment.

Cost-saving

Oil-free throughout its entire life cycle, avoiding efficiency attenuation caused by oil film and saving more electricity; the maintenance costs are further reduced because it is unnecessary to replace the lubricating oil and filter.

AHRI CERTIFIED®
www.ahridirectory.org
Water-Cooled Water Chilling and Heat Pump Water-Heating Packages
AHRI Standards 550/590 and 551/591

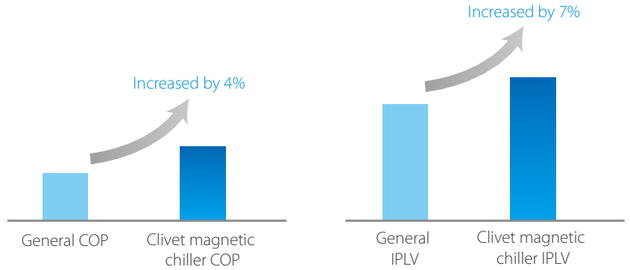
Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at: www.ahridirectory.org



1 Economizer
2 Control panel
3 VFD panel
4 Compressor
5 Condenser
6 Evaporator

Oil-free and High Efficiency

Clivet magnetic bearing centrifugal chiller boasts magnetic bearing technology, aerodynamic technology, a permanent magnet synchronous motor, and full falling film evaporation technology. It combines Clivet's unique horizontally back-to-back two-stage compression structure with higher energy efficiency as compared with the traditional magnetic bearing centrifugal chiller, improving the full-load energy efficiency by 4%*, and improving the part-load energy efficiency by 7%*.



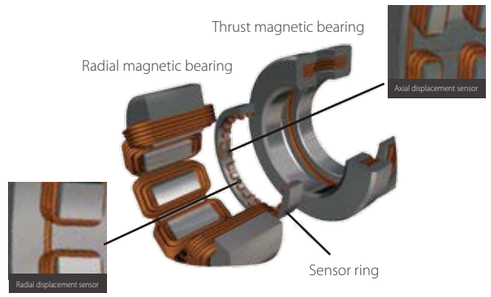
*The above data comes from the average energy efficiency comparison of Clivet's new and old magnetic chillers.

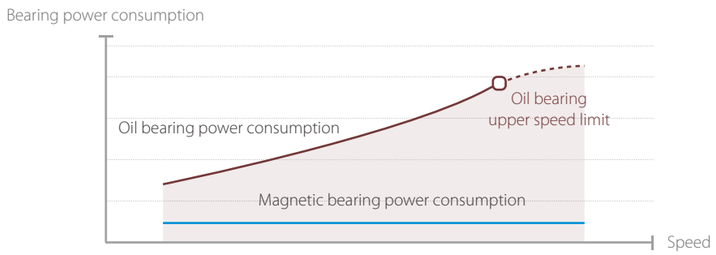
Magnetic bearing technology

Industrial-level magnetic bearing assembly including the radial magnetic bearing, thrust magnetic bearing and position sensor, and featuring low power consumption, high bearing capacity and high reliability.

- Power consumption less than 0.4kW, only 2% to 10% of that of conventional oil bearings.
- Breaks through the upper speed limits of conventional oil bearings, significantly reducing power consumption of the bearing at high speed: the higher the speed, the more energy efficient the magnetic bearing is compared to the oil bearing.

Magnetic bearing component

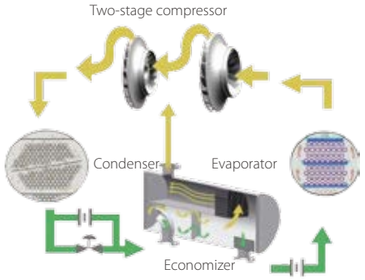


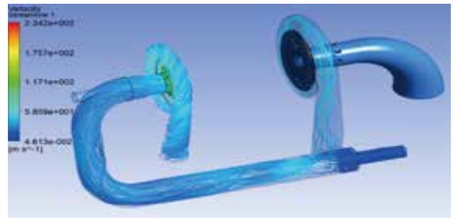


Bearing power consumption comparison

Aerodynamic technology

- Aerodynamic design optimizes the overall flow field efficiency and improves the compressor's isentropic efficiency.
- Unique horizontally back-to-back compression structure, balance the thrust forces for longer life span and improved efficiency.
- 6% higher efficiency than single-stage compression.



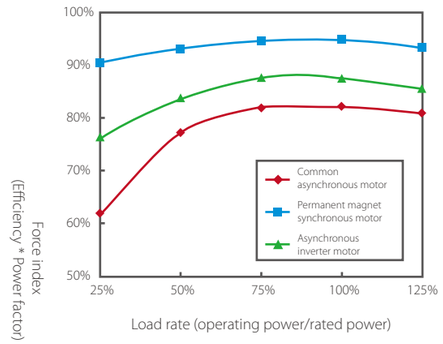


Horizontally back-to-back compression flow field analysis

Permanent magnet synchronous motor technology

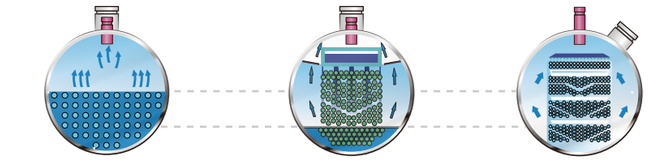
- Motor efficiency exceeds 96% in the full operating range, with the highest efficiency of up to 97%.
- The space vector pulse width modulation (SVPWM) technology is used for speed regulation and driving. Accurate and efficient operation is achieved according to changes in the operating conditions, the startup current is small, the operating current is low, and the operating electricity charge and distribution cost of the whole life cycle are low.
- The real-time monitoring system of stator temperature and rotor shaft elongation achieve precise, highly-reliable cooling of the motor.

Permanent magnet motor



Full falling film evaporating technology

- First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge by up to 40%.
- The patented refrigerant distributor can improve the homogeneity of the liquid to avoid local drying, fully showcasing the performance of the heat exchange tube and increasing unit efficiency.



Flooded type

Full falling film reduced refrigerant charge by up tp 40% compared with the flooded type

Falling film

Full falling film reduced refrigerant charge by up to 25% compared with the falling film type

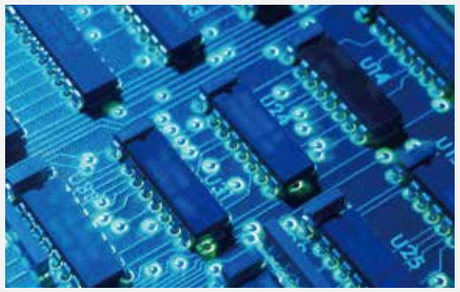
Clivet full falling film

Almost zero liquid level

Patent No: 201120134421.5

Stable and Reliable

- Clivet magnetic bearing centrifugal chiller is equipped with a self-generating mode after power failure, and features a long-life spare bearing, which can achieve accurate and safe control of the magnetic bearing and ensure the safety of the magnetic bearing to guarantee high efficiency.
- The micro-channel refrigerant-cooled VFD technology substantially improves the reliability and adaptability of the VFD.



How to ensure accurate position control of the magnetic bearing?

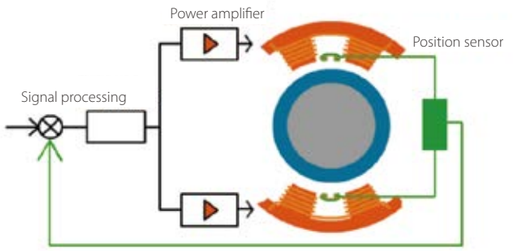
Accuracy: 20 kHz high frequency position monitoring, real-time correction output and position control precision at the μm level ensure accuracy of the shaft suspension position.

How does Clivet ensure the safety of the bearing without lubricating oil after an unexpected power failure?

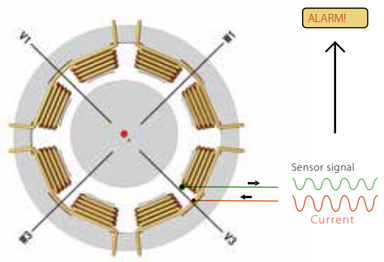
Safety: With dual protection of the self-generating mode and long-life spare bearing, a safe landing rate of spare bearing that is 10 times greater can be achieved when the compressor operates at max. speed; when the speed drops below 10%, normal landing is achieved.

Bearing control technology

- The bearing control system adopts prospective vibration compensation technology, which detects and controls the position at a high frequency to effectively reduce the impact of vibration on the rotating shaft by the amount of unbalance.
- 20 kHz dynamic position scanning and adjustment and position control precision at the μm level ensure the accuracy of the shaft levitation position.



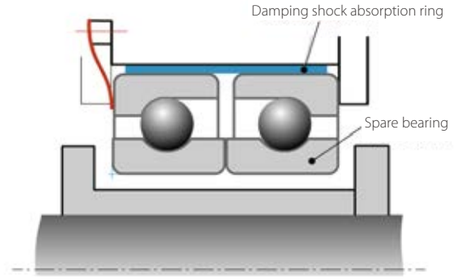
Prospective bearing control principle



Bearing control diagram

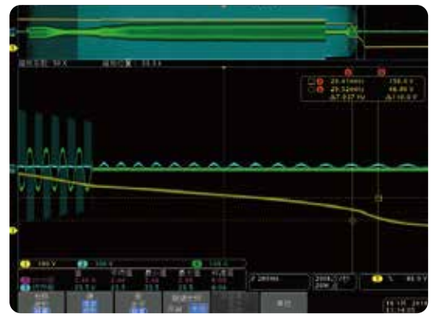
Long-life spare bearing

The spare bearing employs a set of high-strength rolling bearings and a damping shock absorption ring to effectively stop the rotor shaft during high-speed rotation if a magnetic bearing controller failure occurs, avoiding wear between the magnetic bearing, sensor and rotor and resulting in damage to the compressor.



Self-generation control technology

- Clivet's self-developed VFD control + permanent magnet motor technology can automatically switch the motor to the generator mode in the event of unexpected power failure to ensure the stability of the bus voltage, and the 40-750 V wide voltage adaptability of the bearing is combined to ensure the power supply safety of the magnetic bearing.
- The self-generating mode guarantees continuous power supply of above 15 Hz to the unit's magnetic bearing, ensuring the bearing remains levitating.



Micro-channel refrigerant-cooled VFD technology

Clivet's independently-developed high-power VFD employs micro-channel refrigerant-cooled technology to fix problems such as high heat flux density, poor heat dissipation effects, tendency of liquid-cooled heat dissipation to form condensation, high network-side harmonic current, poor reliability of an abnormal power grid product, high stray inductance which easily damages IGBT, high temperature lack of temperature-reducing capacity, heavy air-cooled VFD, and excessive noisiness of the high-power VFD, greatly improving reliability and adaptability of the VFD, enhancing the efficiency of the overall unit and greatly reducing noise.
Refrigerant-cooled: 170~250RT; Cooling water cooled: 400~900RT.

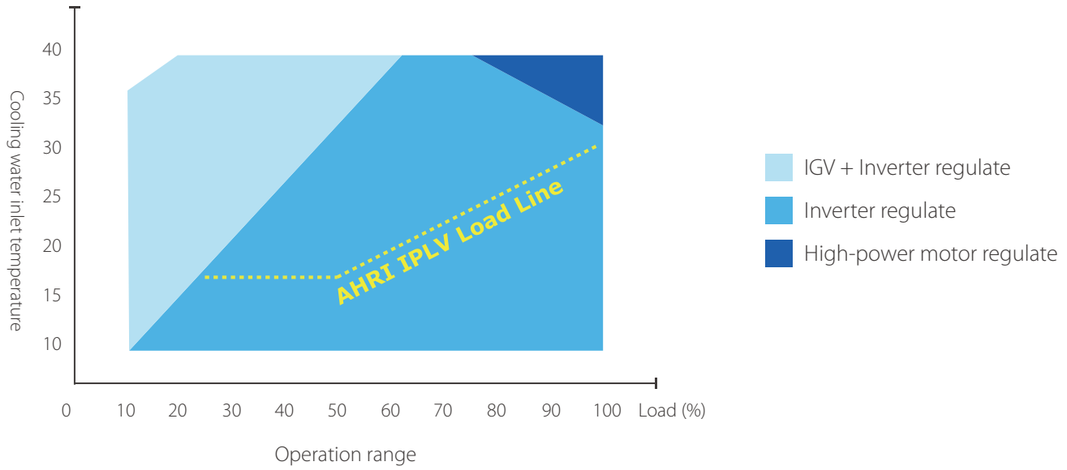
High reliability motor cooling design and monitoring

The whole flow field analysis and optimum design of the motor cooling channel is adopted to carry out real-time monitoring of the stator temperature and rotor elongation, and to ensure operation reliability of the motor.

Multi-baffle 360° cooling

Wide-range Operation

Multi-technology bearing joint adjustment widens the unit operation range while ensuring optimal efficiency. The cooling load of a single compressor can be as low as 10%, and the unit can operate normally when the cooling water drops to 12°C.



Joint regulation of multiple technologies

- Clivet magnetic bearing centrifugal chiller adopts the inverter and Inlet Guide Vane (IGV) to jointly regulate the cooling capacity. In extreme operating conditions, the guide vane opening starts to be reduced when the load becomes 50%.
- When the load is above 15% under normal operating conditions, the load is regulated solely by changing the speed, thus avoiding the additional flow loss caused by reduced opening of the IGV.

Low ambient temperature operation control technology

The low ambient temperature operation control technology ensures stable operation at a low cooling water temperature and provides a minimum cooling water temperature of 12°C.

Environmentally Friendly

With reference to AHRI standard 575-2017, sound pressure ratings are as low as 70dBA.

- No physical contact between moving metal parts, very quiet, and low vibration levels.
- The horizontally back-to-back impeller + external pipe-type reflux device structure of the compressor reduces the pneumatic noise of refrigerant while flowing.
- The specially-designed compressor body structure uses the solid-gas-solid interface to dissipate high-frequency noise and achieve ideal sound insulation and noise reduction effects.

Traditional screw chiller

Traditional two-stage centrifugal chiller

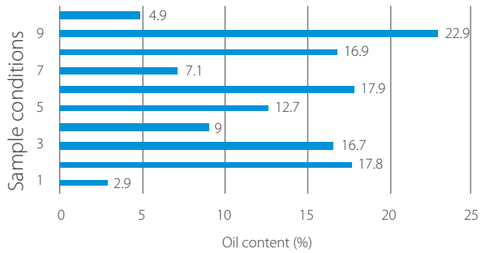
Clivet magnetic bearing centrifugal chiller

LEED

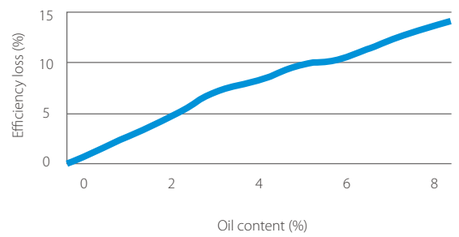
Zero-ozone depletion R134a refrigerant, green, and has no elimination cycle. Full falling-film technology reduces refrigerant charge by up to 40%, which enables you to qualify for maximum Leadership in Energy and Environmental Design®(LEED) points for Enhanced Refrigerant Management. And with the chiller's high efficiency, you can also earn additional points for credits from Optimized Energy Performance (EAc1).

Cost-saving

No friction between moving metal parts, better part-load performance and efficient operation under all operating conditions.
No oil system, no oil system fault and no need for regular maintenance.



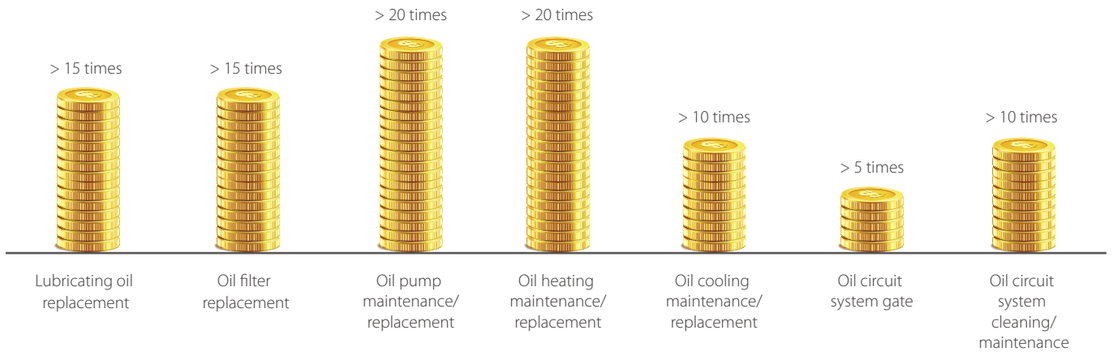
"The ASHRAE research report indicates that the oil content of most operating water chillers exceeds the standard" , ASHRAE Research Report 601



Studies have shown that, when the oil content of unit heat exchanger is 3.5%*, the energy efficiency of the entire unit will be reduced by 8%*

* Data comes from the ASHRAE Research Report 601.

Part of maintenance items of centrifugal chiller with oil



Taking the project of three 250RT centrifugal chillers as an example:
Maintenance: In the 20-year service cycle, the magnetic centrifugal chiller can reduce the costs related to the oil circuit system by about 1 million RMB compared with conventional fixed-speed centrifugal chiller with oil.
Operating costs: Supposing that the operation duration is 12 hours a day and 6 months a year, the magnetic chiller can save approximately 8 million RMB in operation cost throughout its life cycle.

Note: The above data are for reference purposes only, and accurate data are related to the actual application and management of each project. The magnetic centrifugal chiller also requires related maintenance items. The above description focuses on only some of the differences between units equipped with an oil system. Specific maintenance content is subject to the installation, operation and maintenance manual.

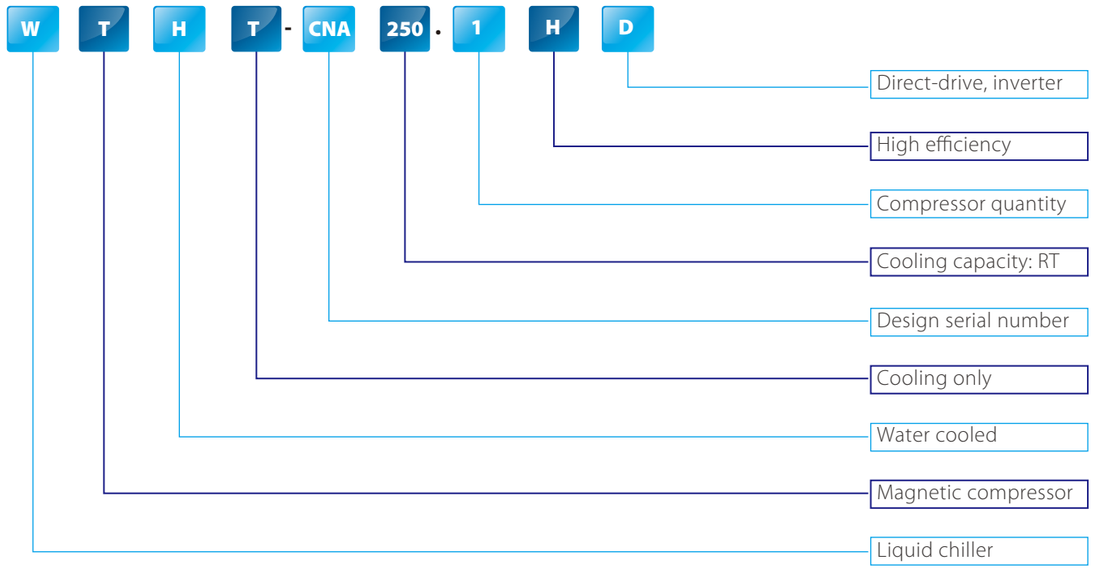
Options and Nomenclature

Optional applications

Items	Standard	Optional
Power supply	380V-3Ph-50Hz	380~460V, 50/60Hz
High pressure water box	1.0MPa	1.6MPa, 2.0MPa
Anti-vibration	Rubber pad	Spring isolator
Insulation	20mm	40mm
Refrigerant isolation valve	×	√
Flow switch	×	√
Knockdown shipment	×	√
Marine water box	×	√
Vessel code	GB	ASME, PED
Pressure vessel pass	2	1 or 3
Witness performance testing	×	√
Tube automatic cleaning system	×	√
Clivet Chiller Plant Control	×	√
Clivet Smart Cloud platform	×	√
QuickView	×	√
Low total harmonic current distortion rate (THDI)	≤35% (full load)	≤5% (full load)

Note: For other options, please contact with our engineers.

Nomenclature



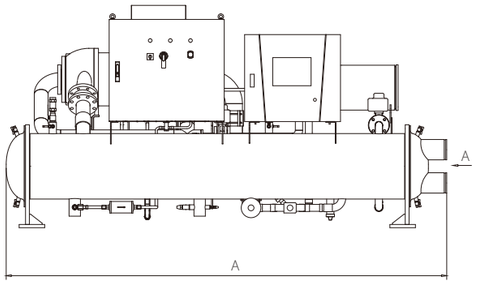
Specifications

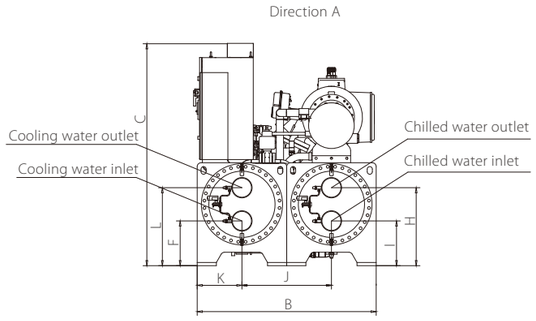
Model		WTHT-CNA	170.1HD	200.1HD	230.1HD	250.1HD
Cooling capacity		RT	170.0	200.0	230.0	250.0
		kW	597.7	703.2	808.7	879.0
		10^4kcal/h	51.41	60.48	69.55	75.60
Power input		kW	93.40	107.6	126.6	141.8
COP		W/W	6.398	6.532	6.388	6.200
IPLV		W/W	10.08	10.43	10.48	10.72
Motor configuration power		kW	165.0	165.0	165.0	165.0
Rated current		A	152.6	175.9	206.8	231.6
Max. operating current		A	181.7	207.8	243.3	272.3
Locked-rotor current		A	/	/	/	/
Evaporator	Water flow	m^3/h	92.35	108.6	124.9	135.8
	Pressure drop	kPa	31.4	41.9	46.6	54.0
	Water pipe connection	mm	DN150	DN150	DN150	DN150
Condenser	Water flow	m^3/h	115.1	135.1	155.8	171.0
	Pressure drop	kPa	26.8	35.8	38.3	44.8
	Water pipe connection	mm	DN150	DN150	DN150	DN150
Unit dimension	Length	mm	3500	3500	3500	3500
	Width	mm	1400	1400	1400	1400
	Height	mm	1800	1800	1800	1800
Shipping weight		kg	3110	3110	3225	3225
Running weight		kg	3660	3660	3735	3735

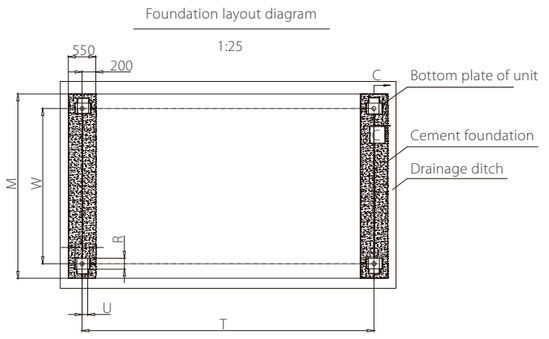
Model		WTHT-CNA	400.1HD	450.1HD	800.2HD	900.2HD
Cooling capacity		RT	400.0	450.0	800.0	900.0
		kW	1406	1582	2813	3164
		10^4kcal/h	121.0	136.1	241.9	272.2
Power input		kW	213.5	253.4	426.4	489.3
COP		W/W	6.588	6.243	6.596	6.467
IPLV		W/W	10.94	11.06	10.43	10.53
Motor configuration power		kW	300.0	300.0	2×300.0	2×300.0
Rated current		A	348.8	414.0	696.7	799.4
Max. operating current		A	417.1	470.8	836.8	944.6
Locked-rotor current		A	/	/	/	/
Evaporator	Water flow	m^3/h	217.3	244.4	434.6	488.9
	Pressure drop	kPa	49.6	50.0	66.2	66.8
	Water pipe connection	mm	DN200	DN200	DN300	DN300
Condenser	Water flow	m^3/h	269.6	305.2	537.1	605.0
	Pressure drop	kPa	65.8	66.3	49.2	49.3
	Water pipe connection	mm	DN250	DN250	DN300	DN300
Unit dimension	Length	mm	4570	4570	5500	5500
	Width	mm	2400	2400	2680	2680
	Height	mm	2600	2600	2650	2650
Shipping weight		kg	7000	7500	12500	13000
Running weight		kg	7700	8300	14500	15000

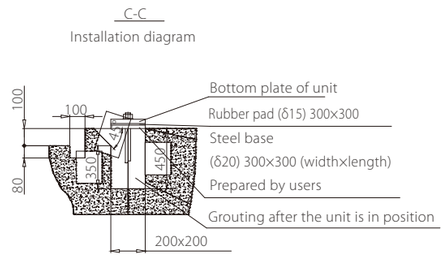
Note:
1. Performance and efficiency are based on AHRI 550/590-2018.
Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);
Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
3. The model in the selection software is WTHT-CNA***HD#. # is the production serial number and the actual product shall prevail.
4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Dimension

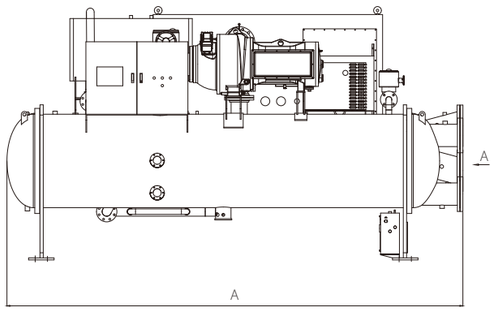


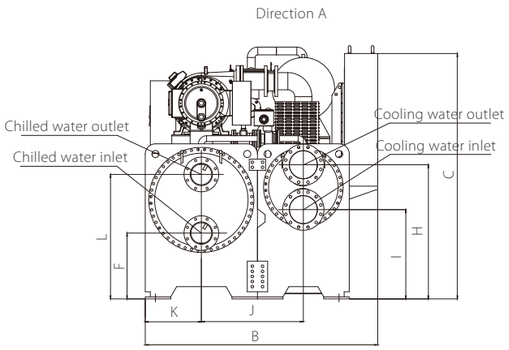






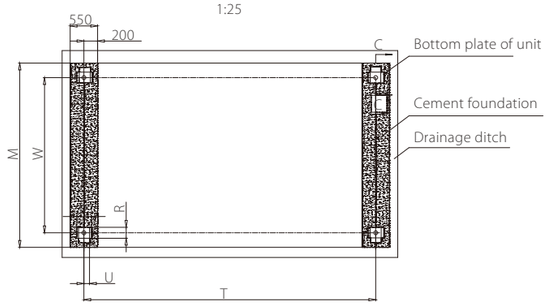
Model	Dimension			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CNA170.1HD	3500	1400	1800	1750	1250	240	200	100	2820	350	610	350	350	610	700	DN150	DN150
WTHT-CNA200.1HD																	
WTHT-CNA230.1HD																	
WTHT-CNA250.1HD																	





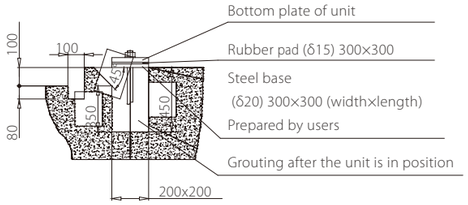
Foundation layout diagram

1:25

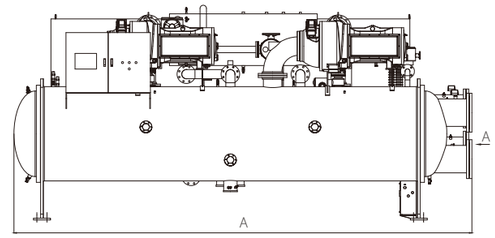


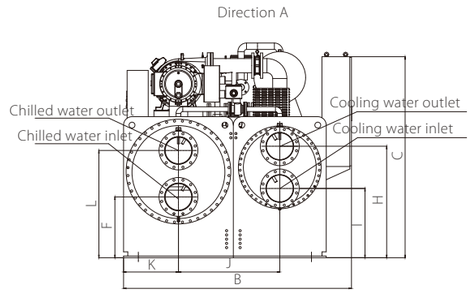
C-C

Installation diagram



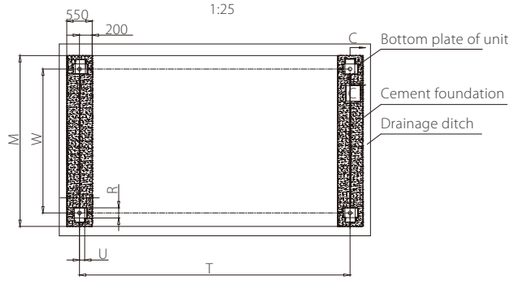
Model	Dimension			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CNA 400.1HD	4570	2400	2600	2400	1800	240	200	100	3446	645	1220	550	825	1265	1025	DN200	DN250
WTHT-CNA 450.1HD																	





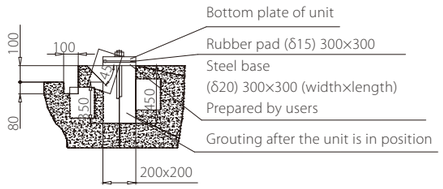
Foundation layout diagram

1:25



C-C

Installation diagram



Model	Dimension			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CNA 800.2HD	5500	2680	2650	2650	2050	240	200	100	4340	770	1320	600	820	1320	1150	DN300	DN300
WTHT-CNA 900.2HD																	

Space layout

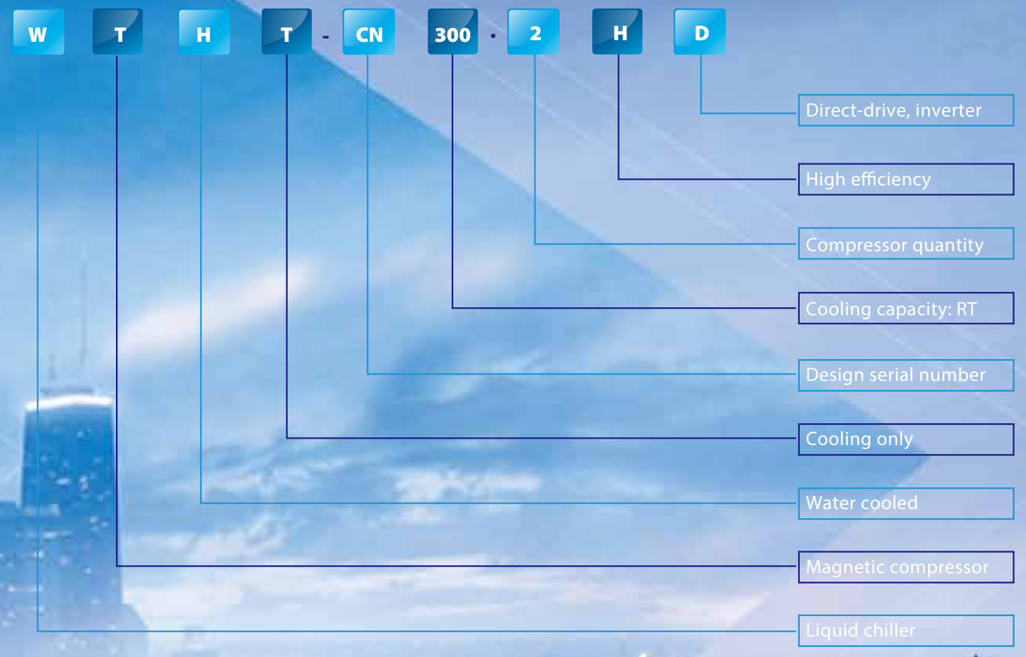
Model	Maintenance space (mm)			
	T	Y	S	Z
WTHT-CNA170.1HD	1000	1200	1200	3200
WTHT-CNA200.1HD				
WTHT-CNA230.1HD				
WTHT-CNA250.1HD				
WTHT-CNA400.1HD	1000	1200	1200	3800
WTHT-CNA450.1HD				
WTHT-CNA800.2HD	1000	1200	1200	4700
WTHT-CNA900.2HD				

Note: Z is the tube removal space, and both ends can be selected; 170 ~ 250 RT adopt a victaulic connection, and 400 ~ 900 RT adopt a flange connection.

Magnetic Bearing Centrifugal Chiller

Overview

Nomenclature



AHRI CERTIFIED
www.ahridirectory.org
Water-Cooled Water Chilling and Heat Pump Water-Heating Packages AHRI Standards 550/590 and 551/591

Certified in accordance with the AHRI Water-Cooled Water-Chilling a nd Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification program, which is based on AHRI Standard 550/590(I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org

Clivet Commercial Air Conditioner stands on the frontier of intelligent and effective technological development on the path to technology and product innovation. By building an internationalized R&D team, we have overcome various technical bottlenecks and integrated industry's top technologies, including magnetic bearings, permanent magnetic synchronous motors, oil-free and full falling film evaporation. The industry and users have responded positively to these technologies as applied to our new magnetic bearing centrifugal chiller.

Benefits and Features:

Energy saving: COP up to 6.115, IPLV up to 10.60.
Technology leading: magnetic compressor with VFD, PMSM, full falling-film evaporation, etc.
Less maintenance: less moving parts, oil-free and intelligent control.
Environmentally friendly: less refrigerant charge and lower noise.

Unit Member

Full falling film evaporator (patented)

Power panel

Magnetic bearing compressor with integral VFD

Condenser with integral sub-cooler

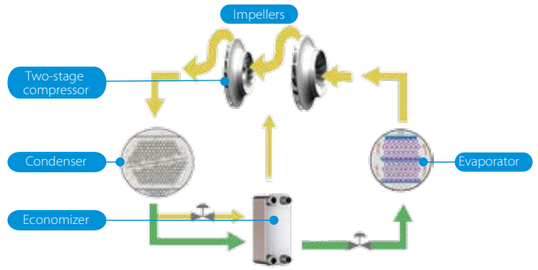
Control panel

Features

Energy Saving

Two-stage compressing

- 6% higher efficiency than single-stage compression.
- Lower speed and higher reliability.

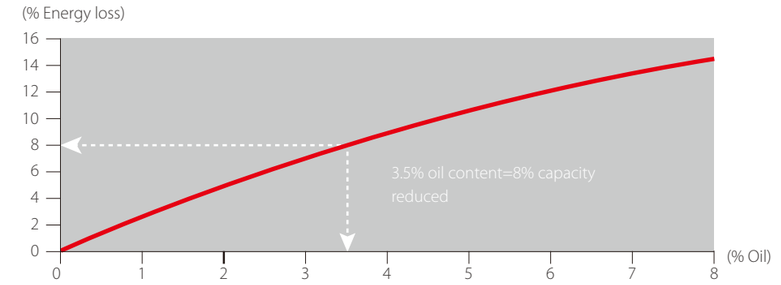


High-speed permanent magnet motor

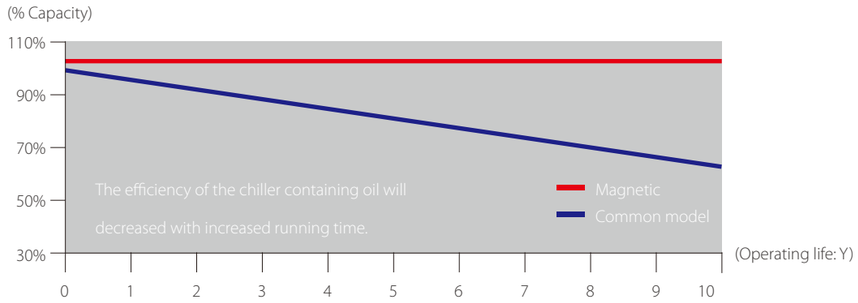
- Motor efficiency exceeds 95%, with the highest efficiency of up to 97%.
- High power density and compact size.
- The motor is cooled by refrigerant, high efficiency and long service life.

Heat transfer optimization through oil-free design

- Adopting magnetic bearing without the need for lubrication. The refrigerating system can realize 100% oil free operation to eliminate the heat transfer loss resulting from lubricating oil.



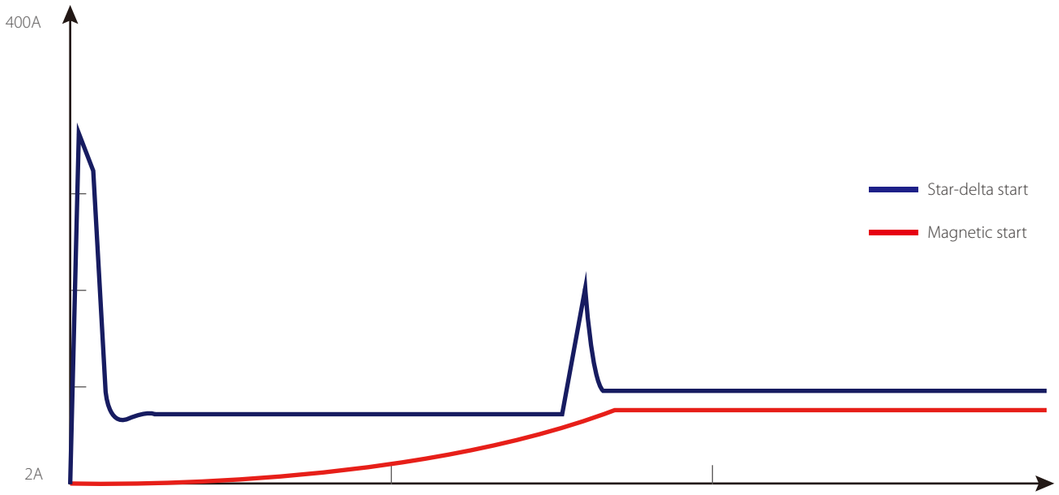
AHRI data indicates that when the lubricating oil amount of the centrifugal chiller evaporator reaches 3.5%, COP will reduce by more than 8%.



Year-by-year operation comparison between the Magnetic and common model.

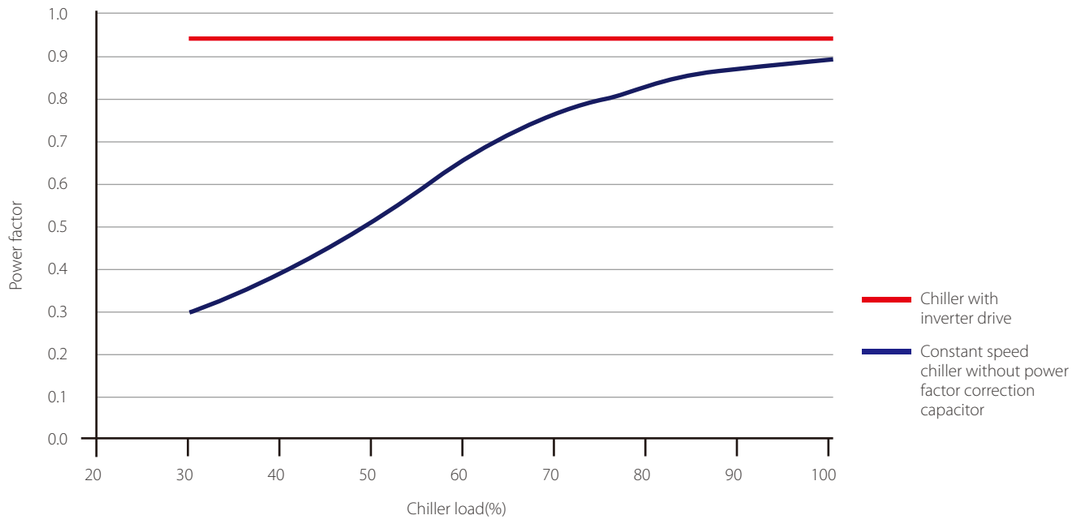
Zero in-rush current

- The rotor levitates in the non-contact magnetic bearing when the unit starts. The starting torque is small, a smooth starting process becomes possible in combination with the optimum control of soft start and VFD. The starting current of a single compressor is only 2A, which has no impact on the grid.



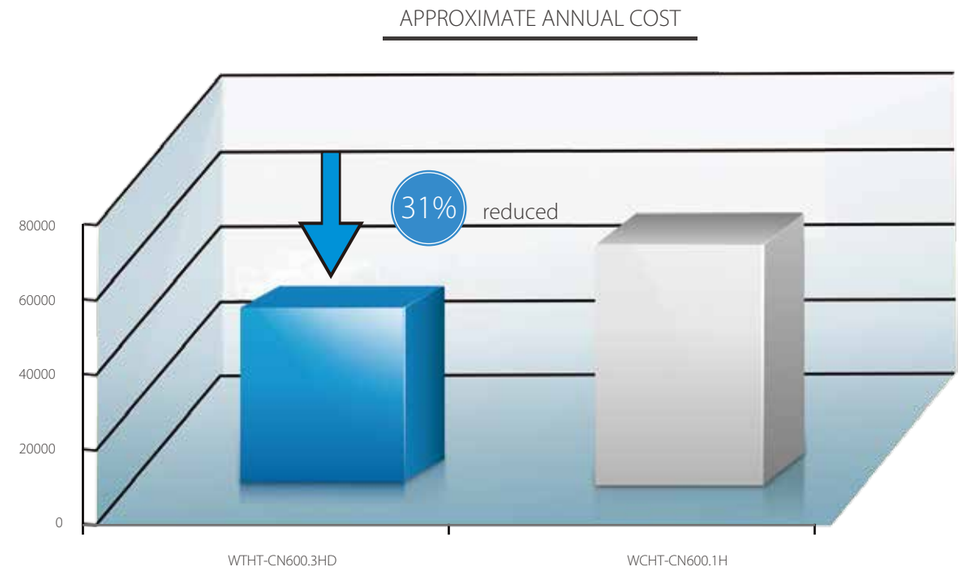
0.95 power factor

- The high power factor eliminates the need for a power factor connection capacitor.



Energy cost comparison

- Compare a 600RT magnetic bearing centrifugal chiller with a typical centrifugal chiller. The system can help customers save 33% per year. Given the system's service life, OPEX savings making investing in a magnetic bearing centrifugal chiller system worthwhile.



Input values

Based on	IPLV
Standard	AHRI
Capacity (RT)	600
Operating Hrs	4000
kW/h Rate ($)	0.0813

Model	ACL(AHRI)	IPLV	Operating Cost ($)
WTHT-CN600.3HD	348	9.786	40661
WCHT-CN600.1H	348	6.706	59336

Technology leading

Magnetic bearing compressor

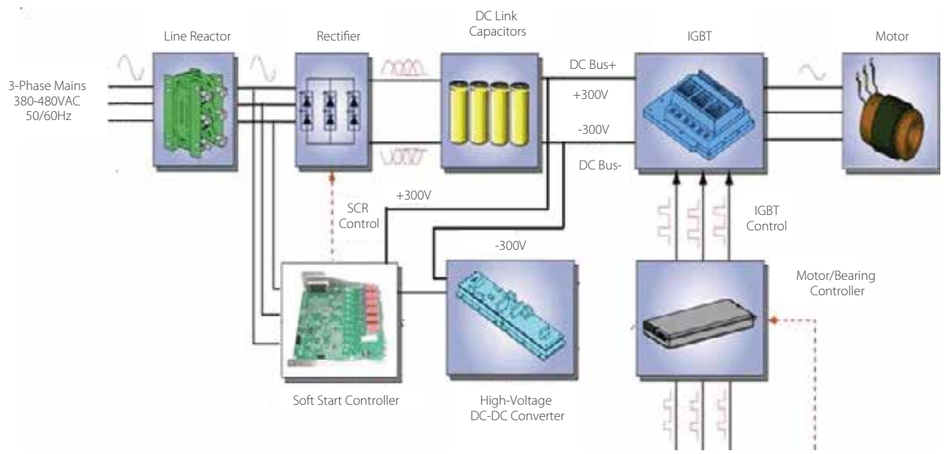
- Magnetic bearing compressor is a miniaturized, highly innovative compressor with magnetic bearing, VFD and permanent magnetic synchronous motor technologies.
- Realizes oil-free, effective and safe operations.

High efficiency direct-drive technology

- No acceleration gear and transmission loss, higher efficiency.
- Simpler transmission system, less moving parts, higher reliability.
- Magnetic technology is combined to significantly reduces the running noise.

Digital control

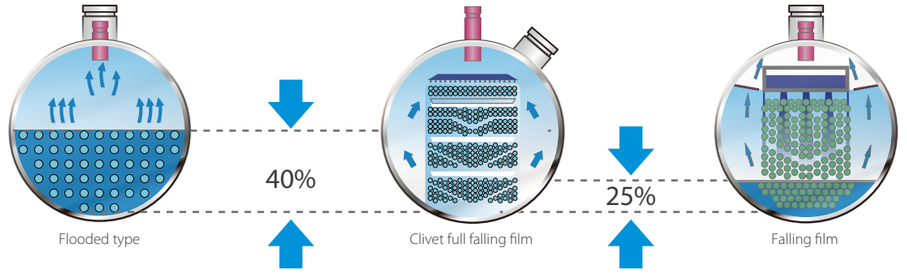
- The magnetic bearing compressor uses the integral variable frequency drive and soft starter.
- VFD+IGV regulation, chiller capacity range can be 10-100%.
- Lower in-rush current.
- Intelligent control to avoid surge and choke points.



Full falling film evaporating technology

- First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge by up to 40%.
- The patented refrigerant distributor can improve the homogeneity of the liquid to avoid drying, fully showcasing the performance of the heat exchange tube and increasing unit efficiency.

Patent No: 201210414053.9; 201220552298.



Full falling film reduced refrigerant charge by up to 40% compared with the flooded type

Almost zero liquid level

Full falling film reduced refrigerant charge by up to 25% compared with the falling film type

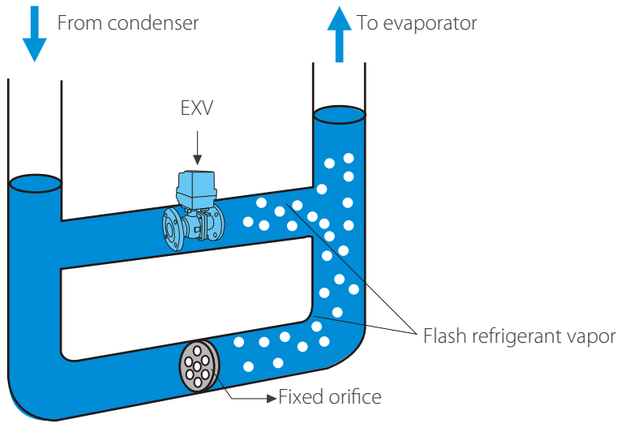
Advanced throttling technology

- Adopts the throttle method of Fixed orifice+EXV:

Precise liquid level control for the best performance of the condenser and evaporator.

Fast response, avoids hot gas bypass, and yields higher efficiency in part loads.

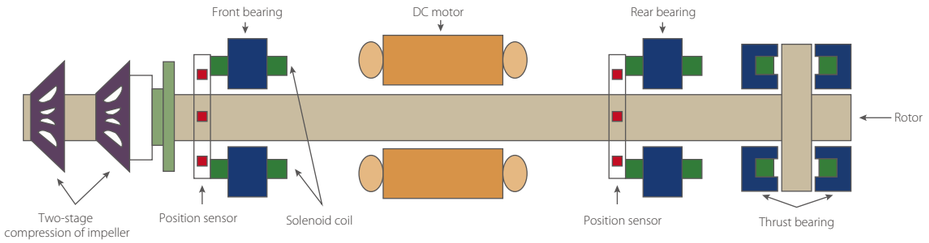
Energy saving and reliable.



Less Maintenance

Less moving parts

- Magnetic bearing guarantees total levitating of the rotor during operation. No contact between the bearing and rotor means no friction or structural vibtation.
- The motor directly drives the rotor. The compressor has one moving component and the system does not require an oil supply system or oil recovery system, greatly reducing unit parts, reducing fault points, and increasing reliability.



No gear drive

No mechanical bearing

No lubrication system

Intelligent surge control

- Real-time monitoring of the compressor's running status, adjusts the compressor speed and inlet guide vane opening to ensure safety and high efficiency.

Power outage protection

- Each compressor has four 8,000μF capacitors for energy storage and to filter DC voltage fluctuations. If a power failure occurs, the capacitors provide power continuity to the bearings to keep the shaft levitated, allowing the motor to turn into a generator and power itself down to a stop. Extended service life tests have confirmed the system's remarkable durability.

Less maintenance

- No oil system, no need for regular maintenance. Reduced maintenance procedures by 95%.
- Modular design of the compressor where all parts are universal, plug and play, and easy to maintain.

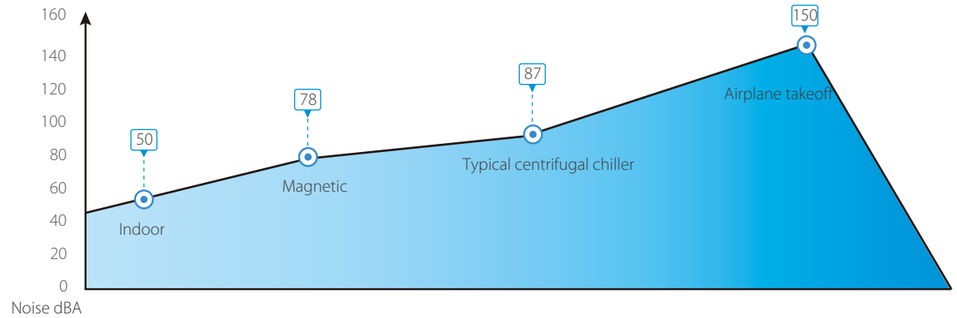
No.	Maintenance tasks	R123 chiller	R134a chiller	Magnetic centrifugal chiller (oil-free)
1	Oil change	Once a year	Once every three years	No
2	Oil filter change	Once a year	Once a year	No
3	Oil pump pressure detect	4 times a year	4 times a year	No
4	Oil quality check	Once a week	Once a week	No
5	Oil filter pressure drop detect	Once a month	Once a month	No
6	Compressor vibration test	Once a year	Once a year	No
7	Oil pump insulation check	Once every three years	Once every three years	No
8	Oil heater check	Once every three years	Once every three years	No
9	Motor winding check	Once a year	Once a year	No
10	Contactor and overload setting check	Once a year	Once a year	No
11	Refrigerant clearness check	Once a week	No	No
12	Refrigerant filter change	4 times a year	No	No

Comparison between various centrifugal chillers' maintenance tasks.

Environmentally Friendly

Quieter operation

- No physical contact between moving metal parts, very quiet, and low vibration levels.
- With reference to AHRI standard 575-2017, sound pressure ratings are as low as 78dBA. That makes it ideal for sound-sensitive environments such as schools, performance halls, museums, condos and libraries.



LEED

- Zero-ozone depletion R134a refrigerant, green, and has no elimination cycle.
- Full falling-film technology reduces refrigerant charge by up to 40%, which enables you to qualify for maximum Leadership in Energy and Environmental Design®(LEED) points for Enhanced Refrigerant Management. And with chiller' s high efficiency, you could also earn additional points for the Optimize Energy Performance (EAc1) credit.

Specifications

Model (WTHT-CN***HD)			150.1	200.1	250.2	300.2	350.2	400.2	450.3	500.3	550.3	600.3
Cooling capacity	RT		150.0	200.0	250.0	300.0	350.0	400.0	450.0	500.0	550.0	600.0
	kW		527.4	703.2	879.0	1055	1231	1406	1582	1758	1934	2110
	10^4kcal/h		45.36	60.48	75.60	90.72	105.8	121.0	136.1	151.2	166.3	181.4
Efficiency	Power input	kW	89.50	119.6	143.8	176.5	203.7	236.8	264.2	291.9	322.0	358.6
	COP	W/W	5.891	5.879	6.115	5.977	6.041	5.939	5.988	6.023	6.005	5.884
	IPLV	W/W	10.60	10.02	10.26	10.34	9.752	9.898	10.20	9.491	9.688	9.786
Compressor	Power supply		380V-3Ph-50Hz									
	Starting method		VFD									
Current	Starting current	A	2	2	4	4	4	4	6	6	6	6
	Max. operating current	A	180.0	220.0	320.0	360.0	420.0	440.0	540.0	620.0	640.0	660.0
Evaporator	Water flow	m^3/h	81.48	108.6	135.8	163.0	190.1	217.3	244.4	271.6	298.8	325.9
	Pressure drop	kPa	78.3	77.8	45.2	48.6	47.6	50.3	51.7	50.4	50.2	48.3
	Water pipe connection	mm	DN150	DN150	DN200	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Water flow	m^3/h	103.3	137.8	171.3	206.2	240.2	275.2	309.3	343.3	377.8	413.4
	Pressure drop	kPa	23.5	27.3	51.8	54.6	56.9	60.2	50.5	49.6	48.4	47.3
	Water pipe connection	mm	DN150	DN150	DN200	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Unit dimension	Length	mm	2485	2485	3510	3510	3510	3510	4560	4560	4560	4560
	Width	mm	1180	1180	1250	1250	1275	1275	1410	1410	1410	1410
	Height	mm	2135	2135	2210	2210	2260	2260	2350	2350	2350	2350
Shipping weight		kg	2085	2145	2830	2985	4120	4225	4980	5105	5210	5380
Running weight		kg	2565	2625	3450	3560	4755	4860	5940	6080	6205	6315

Note:

1. Performance and efficiency are based on AHRI 550/590-2018.

Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft²-°F/Btu (0.0176m². °C/kW);

Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft²-°F/Btu (0.0440m². °C/kW).

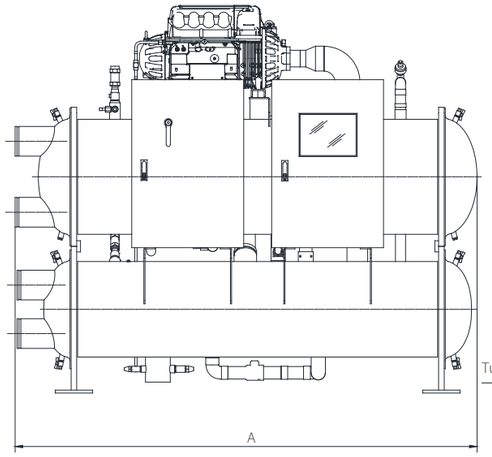
2. The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.

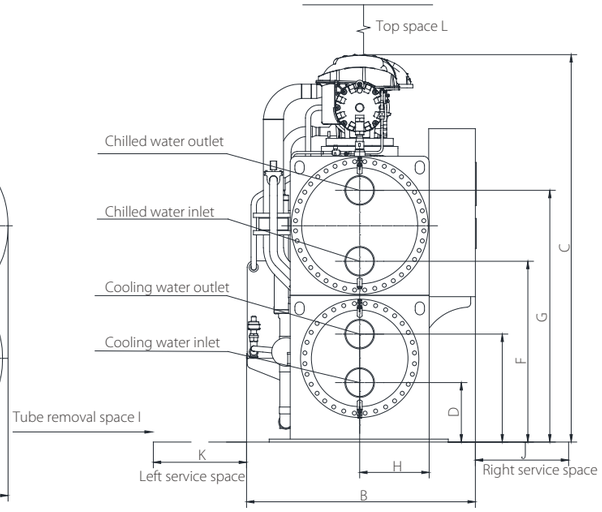
3. The model in the selection software is WTHT-CN***HD#. # is the production serial number and the actual product shall prevail.

4. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the software selection and the actual product.

Dimension

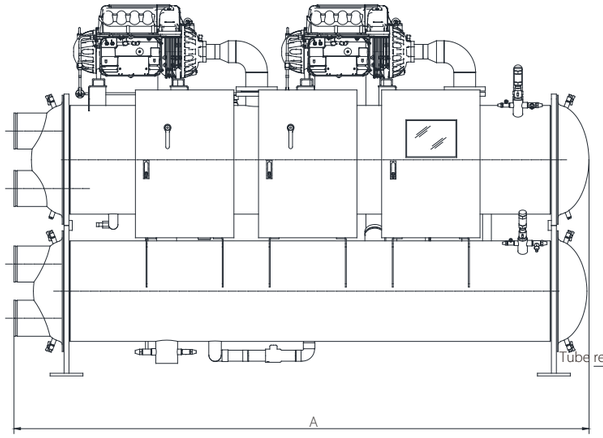
Single-compressor unit

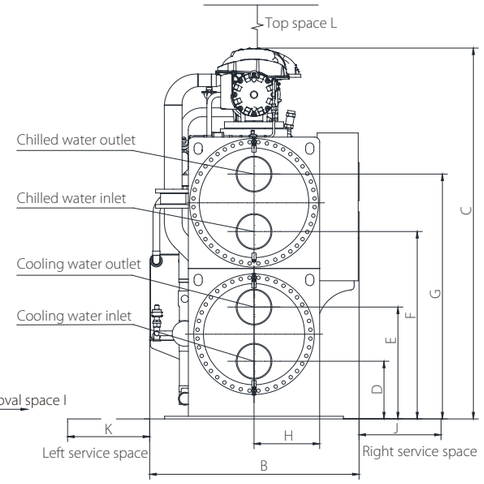




Model	Dimension			Pipe locate position					Maintenance space				Evaporator pipe diameter	Condenser pipe diameter
	Length(A)	Width(B)	Height(C)	D	E	F	G	H	I	J	K	L		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CN150.1HD	2485	1180	2135	320	580	970	1350	373	2500	1200	1200	1500	DN150	DN150
WTHT-CN200.1HD	2485	1180	2135	320	580	970	1350	373	2500	1200	1200	1500	DN150	DN150

Two-compressor unit

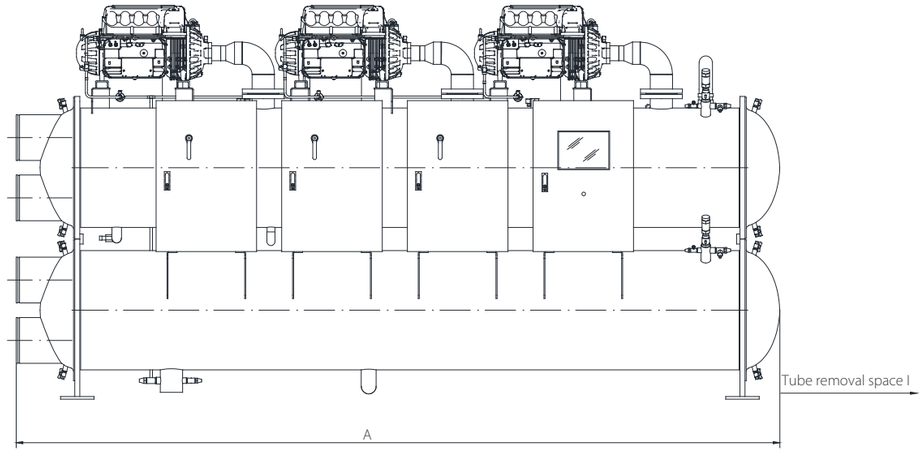


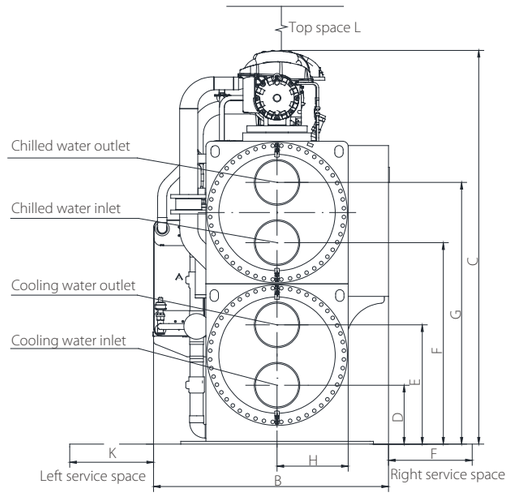


Model	Dimension			Pipe locate position					Maintenance space				Evaporator pipe diameter	Condenser pipe diameter
	Length(A)	Width(B)	Height(C)	D	E	F	G	H	I	J	K	L		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CN250.2HD	3510	1250	2210	335	635	1045	1395	368	3500	1200	1200	1500	DN200	DN200
WTHT-CN300.2HD	3510	1250	2210	335	635	1045	1395	368	3500	1200	1200	1500	DN200	DN200
WTHT-CN350.2HD	3510	1275	2260	350	680	1140	1490	400	3500	1200	1200	1500	DN200	DN200
WTHT-CN400.2HD	3510	1275	2260	350	680	1140	1490	400	3500	1200	1200	1500	DN200	DN200

I: Tube removal space for either end.

Three-compressor unit



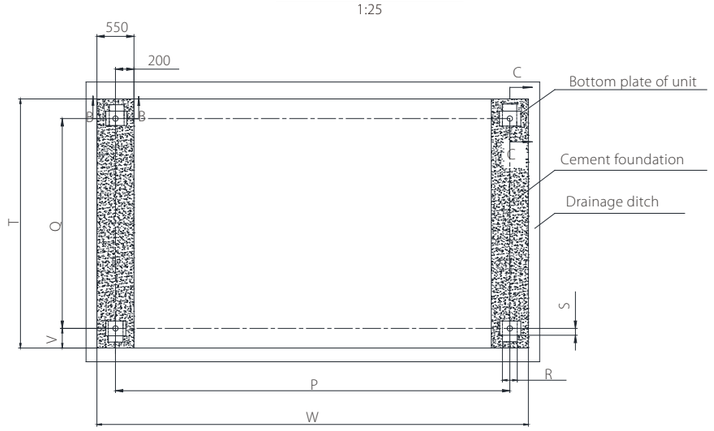


Model	Dimension			Pipe locate position					Maintenance space				Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	D	E	F	G	H	I	J	K	L		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
WTHT-CN450.3HD	4560	1410	2350	350	710	1200	1560	425	4500	1200	1200	1500	DN250	DN250
WTHT-CN500.3HD	4560	1410	2350	350	710	1200	1560	425	4500	1200	1200	1500	DN250	DN250
WTHT-CN550.3HD	4560	1410	2350	350	710	1200	1560	425	4500	1200	1200	1500	DN250	DN250
WTHT-CN600.3HD	4560	1410	2350	350	710	1200	1560	425	4500	1200	1200	1500	DN250	DN250

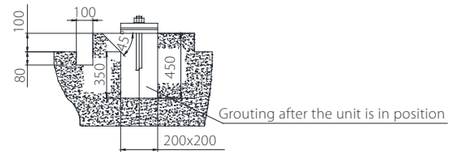
I: Tube removal space for either end.

Foundation Layout of Unit

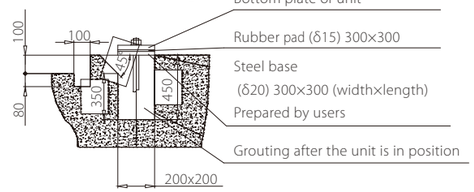
Foundation layout diagram
1:25



B-B
Installation diagram



C-C
Installation diagram



Model	Dimension						
	P	Q	R	S	T	W	V
	mm	mm	mm	mm	mm	mm	mm
WTHT-CN150.1HD	1970	860	200	50	1560	2670	350
WTHT-CN200.1HD	1970	860	200	50	1560	2670	350
WTHT-CN250.2HD	2970	860	200	50	1560	3670	350
WTHT-CN300.2HD	2970	860	200	50	1560	3670	350
WTHT-CN350.2HD	2970	990	200	50	1690	3670	350
WTHT-CN400.2HD	2970	990	200	50	1690	3670	350
WTHT-CN450.3HD	3970	1030	200	50	1730	4670	350
WTHT-CN500.3HD	3970	1030	200	50	1730	4670	350
WTHT-CN550.3HD	3970	1030	200	50	1730	4670	350
WTHT-CN600.3HD	3970	1030	200	50	1730	4670	350

Options

Accessories	Standard	Optional
Power supply	380V-3Ph-50Hz	50Hz: 400V 60Hz: 380V
Water inlet/outlet connection type	Victaulic	Flange
High pressure water boxes	1.0MPa	1.6MPa, 2.0MPa
Marine water box	×	√
Anti-vibration	Rubber pad	Spring isolator
Heat recovery	×	√
Chilled water Delta T	5℃	6℃~11℃
Centrifugal heat pump	×	Hot water temperature up to 45℃
Water storage	×	√
Communication protocol	Modbus-RTU (RS485)	BACnet IP, BACnet MS/TP (RJ-45 port)
Hot gas bypass	×	√
Flow switch	Differential pressure	×
Witness performance testing	×	√
Clivet Chiller Plant Control	×	√
Clivet Smart Cloud platform	×	√
QuickView	×	√
Tube automatic cleaning system	×	√
Low total harmonic current distortion rate (THDI)	≤35% (full load)	≤5% (full load)

Note: For other options, please contact with our engineers.

Operating and Control System

Intelligent color touch screen

The perfect operating and control system of centrifugal chiller integrates a series of control and monitoring functions including intelligent operations, safety protection and interlocking control to achieve reliable start, high efficiency operations and internal control of chiller.

Interface display

- 10-inch true color graphic display interface
- Full screen touch operation experience
- Visual display of unit operating status
- Multi-level password protection
- Unit operation data display
- Pre-alarm/alarm display and recording
- Operation log display

Operation control

- Freely select the inlet/outlet water control mode
- Target temperature settings
- Auto loading/unloading and soft loading
- Automatic optimization control function
- Quick start and startup after power restoration (optional)
- Independent start/stop function
- Remote and timed power-on/off functions
- Detailed unit status query

Interlocking control

- Frequency and guide vane control
- Water system bypass control
- Chilled water and cooling water pump interlocking control
- Cooling tower fan interlocking control
- Reserved upper computer interface control
- Reserved alarm interlocking control
- Pre-startup safety interlocking control

Safety protection

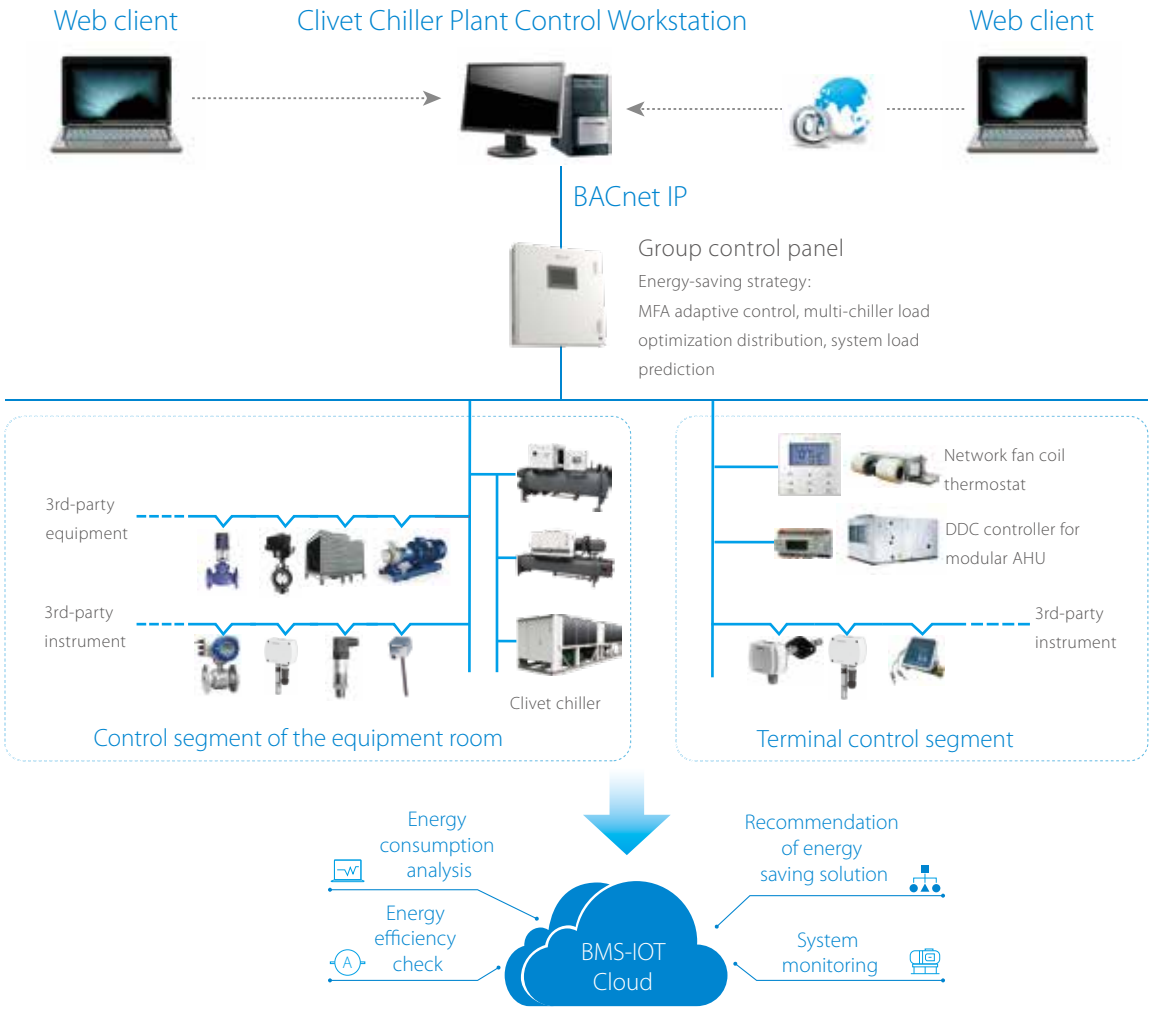
- Compressor current protection
- Anti-surge Protection
- Condensing pressure high/too high protection
- Evaporation pressure low/too low protection
- Water outage protection
- Operating anti-freeze protection
- VFD panel fault protection

Note:
The above is the reference for all series of centrifugal chiller, except for magnetic bearing centrifugal chiller with the model of WTHT-CN***HD.
The control interface and display content vary with each model. Please refer to the actual product.

Intelligent management

Clivet Chiller Plant Control

Clivet Chiller Plant Control is a group control system for commercial air conditioning that includes air conditioners, water pumps, cooling towers, terminals and related ancillary equipment (including valves, sensors etc.) as the underlying control objects. Based on a powerful control logic program and communication network, it establishes a 3-layer control framework that integrates the equipment, control and management layers. Clivet Chiller Plant Control contains a unique operation module from Clivet that is designed to save energy, so in addition to automated stable operations for the various devices, this product also improves and optimizes user management capabilities, reduces labour costs, boosts operational efficiency, and lowers the overall energy consumption for commercial air conditioning.

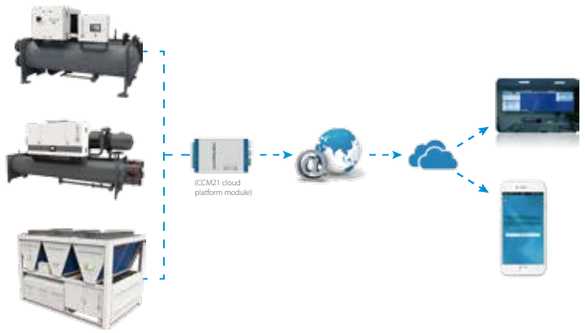


Main functions:

- Unattended equipment room
- Stable and reliable control system, protecting the customer's investment
- One-click system startup and shutdown
- System operation schedule setting
- System energy consumption monitoring
- Equipment maintenance reminders
- Provides ample control logic for HVAC system equipment rooms in various forms
- Balanced operation of devices in polling mode reduces the device failure rate
- Multiple practical control modes
- System energy-saving optimization control
- Automatic switching to a standby device if a device fails
- Uniform control of terminal air system devices

Clivet Smart Cloud platform

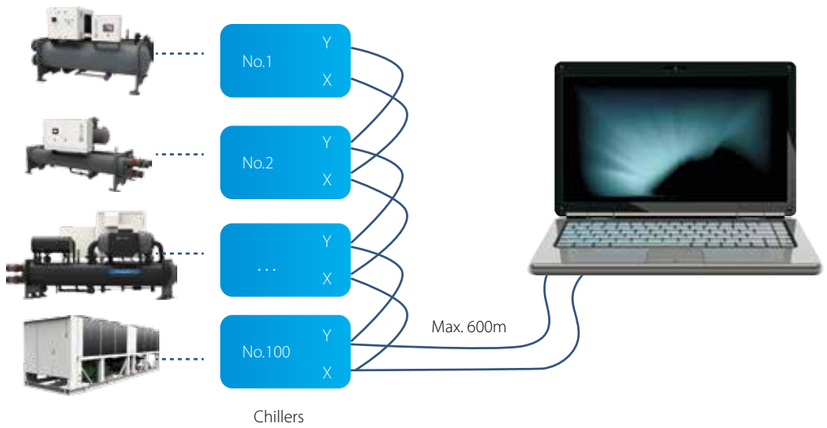
Clivet has built a flawless internet-based remote monitoring system, which provides customers with outstanding cloud service via advanced cloud service technologies and the internet. Customers can connect Clivet air conditioner to the global remote monitoring system through Clivet's IMU smart data acquisition terminal, so that professionals can help the customer to implement remote fault diagnosis and analysis, and receive early warning alarms for failures, ensuring the equipment's optimal operation. Customers authorized by Clivet can use a Web browser to view the real-time monitoring data of the air conditioning system.



1. "Clivet Smart Cloud" remote Internet monitoring service
2. Cloud data storage
3. Working condition data analysis
4. Quick fault diagnosis
5. Viewing monitoring data through the Web browser

QuickView

Clivet's QuickView smart software control system is a type of smart software specially developed by Clivet. It features high real-time efficiency, stability, reliability, a high degree of visualization, and strong scalability. It can implement a wide variety of scenarios, such as real-time data monitoring of units, unit equipment management, remote control, curve display, data storage, alarm query, fault diagnosis, uploading data to the cloud, and external data analysis, greatly improving the unit's operation management efficiency and reducing the human input and operation and maintenance costs.



Reference Projects

Guangzhou Baiyun International Airport T2 Terminal

- Country: China
- City: Guangzhou
- Outdoor Units: Centrifugal chiller
- Indoor Units: FCU & AHU
- Total Capacity: 35,680RT

Grand Mercure Hotel(Five Star)

- Country: Indonesia
- City: Jakarta
- Outdoor Units: Inverter direct-drive centrifugal chiller
- Total Capacity: 1,200RT
- Completion Year: 2016

Dalma Mall

- Country: UAE
- City: Abu Dhabi
- Outdoor Units: Centrifugal chiller
- Total Capacity: 10,000RT
- Completion Year: 2014

Hartono Lifestyle Mall

- Country: Indonesia
- City: Yogyakarta
- Outdoor Units: Centrifugal chiller
- Indoor Units: FCU & AHU
- Total Capacity: 5,000RT

Federal Security Service

- Country: Russia
- City: Moscow
- Outdoor Units: Centrifugal chiller
- Total Capacity: 5,000RT
- Completion Year: 2015

Harran University

- Country: Turkey
- City: Sanliurfa
- Outdoor Units: Centrifugal chiller
- Indoor Units: FCU & AHU
- Total Capacity: 3,000RT

Taipei City Government

- Country: China
- City: Taiwan
- Outdoor Units: Magnetic bearing centrifugal chiller
- Total Capacity: 500RT
- Completion Year: 2017

MENARA KPJ Healthcare

- Country: Malaysia
- City: Kuala Lumpur
- Outdoor Units: Magnetic bearing centrifugal chiller
- Total Capacity: 800RT
- Completion Year: 2018