1803-14C1812

Commercial Air Conditioners **2019/2020**

Inverter Water Cooled Screw Chiller

Full falling film type 120~450RT(R134a)

AHRI CERTIFIED™
www.ahridirectory.org

Commercial Air Conditioner Division

Midea Group

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Quality Assurance ISO 9001 · Environmental Management ISO 14001 · Occupational Health and Safety Assessment OHSAS 18001

Note: Product specifications change from time to time as product improvements and developments are released and may vary from those in this document.

Midea CAC

Midea CAC is a key division of the Midea Group, a leading producer of consumer appliances and provider of heating, ventilation and air conditioning solutions. Midea CAC has continued with the tradition of innovation upon which it was founded, and emerged as a global leader in the HVAC industry. A strong drive for advancement has created a groundbreaking R&D department that has placed Midea CAC at the forefront of a competitive field. Through these independent efforts and joint cooperation with other global enterprises, Midea has supplied thousands of innovative solutions to customers worldwide.

We have three production bases: Shunde, Chongqing and Hefei.

MCAC Shunde: 38 product lines focusing on VRF, Split Products, Heat Pump Water Heaters, and AHU/FCU.

MCAC Chongqing: 14 product lines focusing on Water Cooled Centrifugal/Screw/Scroll Chillers, Air Cooled Screw/Scroll Chillers.

MCAC Hefei: 11 product lines focusing on VRF, Chillers, and Heat Pump Water Heaters.

MIDEA GROUP
FORTUNE GLOBAL
FORTUNE
500

2017 » Developed the large capacity air cooled scroll chiller.

2016 » Acquire an 80% stake in Clivet.

2015 » Launched the inverter direct-drive centrifugal chiller and magnetic chiller.
An international strategic Platform has brought Midea Group, Carrier Corporation and Chongqing General Industry Group together in the chiller business.

2013 » Launched the super high efficiency centrifugal chiller with dual-stage compressor and full falling film evaporator.

2008 » Developed the Smart Star new-generation Semi-hermetic centrifugal chiller.

2007 » Won the first Midea centrifugal chiller project overseas.

2006 » Launched the first VFD (Variable Frequency Drive) centrifugal chiller.

2004 » Acquired MGRE entered the chiller industry.

2001 » The R134a (LC) series centrifugal chiller was named as a key national product.

1999 » Entered the CAC field.

Making Technological Breakthroughs

and Establishing New Industry Benchmarks

In the 21st century, saving energy and reducing emissions is increasingly important and has become a global drive for sustainable development. The state is paying closer attention to each unit's the Integrated Part Load Value (IPLV) and advocating high-efficiency, energy-saving products. Midea's efficient falling film inverter screw unit adopts several industry-leading technologies, and offers four main advantages, including its high energy efficiency, low environmental impact, stability and reliability, and intelligent controls.

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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

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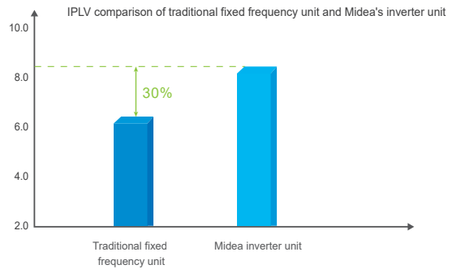
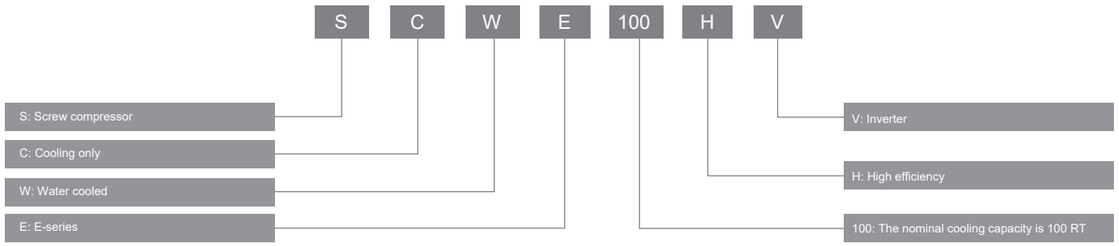
Overview

Midea's MC efficient inverter full falling film water cooled screw chiller adopts the volume ratio optimization control technology of Midea's independently-developed inverter twin screw along with our environmentally friendly R134a refrigerant and full falling film evaporation technology to achieve a higher partial load efficiency. Compared with traditional fixed-frequency screw units, this newer unit is more efficient, more stable (a 30% improvement) and has lower operating costs. Our product also employs a number of patented technologies and operates reliably, safely and stably. It applies to projects with large system air conditioning load fluctuation and longer partial load running times (for example, in medium and large public buildings and civil buildings like hotels, office buildings, hospitals, factories and shopping malls).

The cooling capacity range of Midea's MC efficient inverter full falling film water cooled screw chiller is 120 RT to 450 RT. It has been awarded AHRI and energy-efficient product certifications, and made vast contributions to saving energy and reducing emissions in green city construction, proving to be an ideal choice for air conditioning in green buildings.



1 Nomenclature



2 Operating Range

Item	Unit	Operating Range
Cooling water inlet temperature	°C	18~45
Chilled water outlet temperature	°C	5~15

Note: Normal use of the unit will be adversely affected if the above parameter exceeds the operating range.

3 Scope of Application


Rail transport

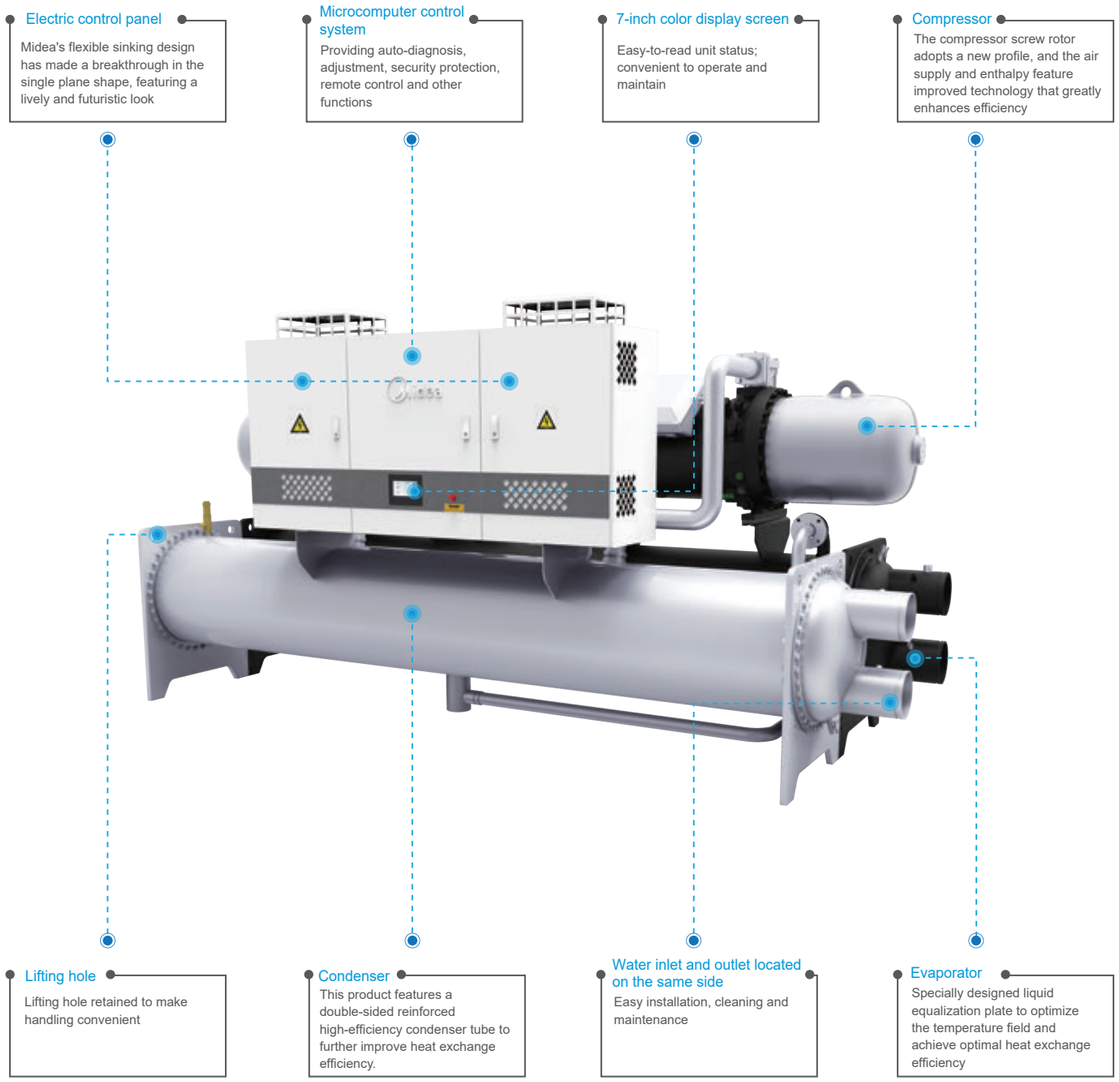

Star hotel


Hospital


Factory


Shopping mall

4 Product Structure



Features

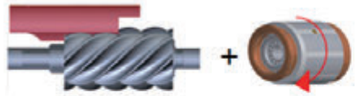
High energy efficiency

1 The product has received testing certification, AHRI certification, from a third-party agency.

AHRI certification

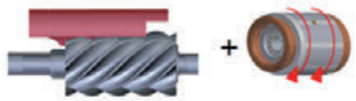
2 Vi optimizing inverter technology of Midea's independently-developed inverter twin screw

Midea's independently-developed volume ratio optimization control technology integrates the characteristic curves of a compressor, inverter and motor, and maximizes the performance and reliability of the inverter screw compressor. The maximum isentropic efficiency is 76%, far higher than other adjustment methods.



Start

When the motor starts at a low speed, the slide valve rapidly rises to a middle position, and the unit does not operate at the low slide valve position.

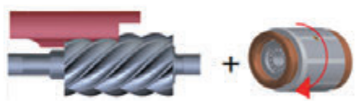


Loading

The motor speed increases, and the slide valve looks for the best Vi position. The built-in algorithm then analyzes the operating parameters online, optimizes to adjust the slide valve position and motor speed, and first lifts the slide valve. Then, the motor speed matches the load accurately.

Load reduction

The motor slows, and the slide valve looks for the best Vi position. The built-in algorithm then analyzes the operating parameters online, optimizes to adjust the position of the slide valve and motor speed, and first lowers the slide valve. Then the slide valve assists in energy regulation.

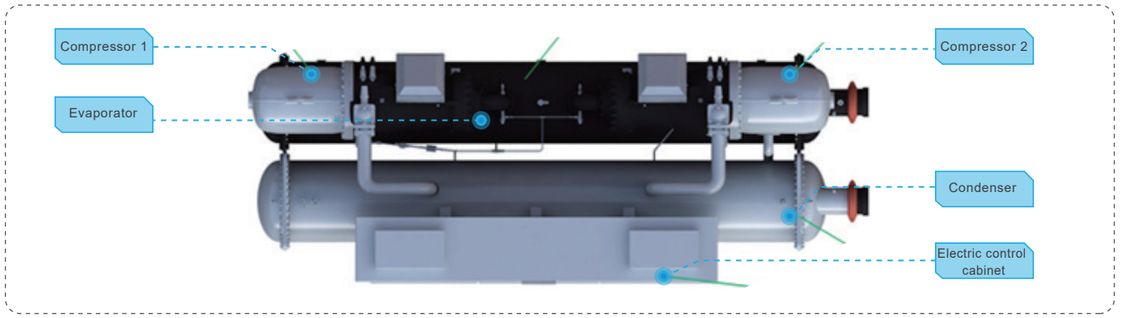


Stop

The motor slows and the slide valve drops to the lowest position. The motor stops after its speed reaches the minimum setting value.

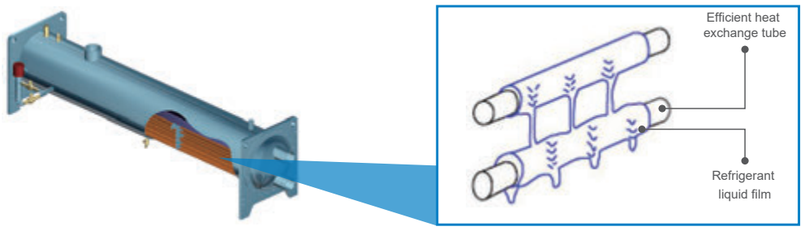
3 Parallel dual compressor design

The dual-head unit is designed with the parallel system of double compressors, and the total heat exchange area is used to greatly improve the operation efficiency when the single compressor operates. (Customization of non-parallel system accepted)



4 Full falling film evaporation technology

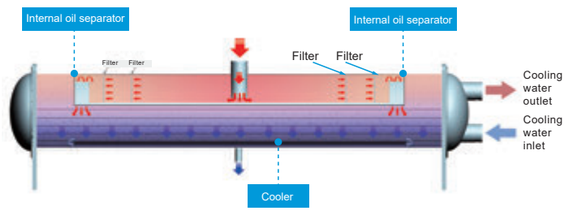
- The pioneering full falling film evaporator reduces the volume of refrigerant required.
- Spray falling film technology allows the refrigerant to form a liquid film on the surface of the efficient heat exchange tube to implement film state evaporation and greatly improve the heat exchange efficiency of the evaporator.
- The refrigerant distributor is specially designed to avoid uneven liquid distribution and prevent local pipe dryness. (Patent No.: 201120134421.5)



▲ Structural diagram of the full falling film evaporator

5 New Condenser

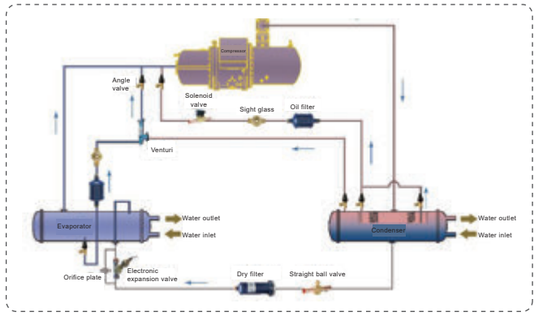
- It adopts the double-side reinforced condenser tube to optimize the tube bundle arrangement design in the condenser.
- The unique design of the built-in oil separator helps address the problem of lubricating oil separation.
- The product optimizes the subcooler design, improves the supercooling temperature, and reduces the pressure loss of subcooler, improving heat exchange performance efficiency.
- This product implements uniform gas transmission without any heat transmission blind spots.



Stable and Reliable

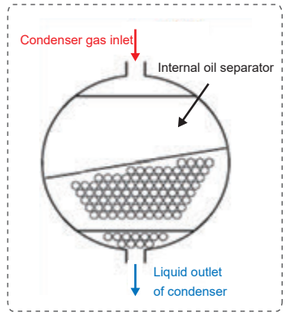
1 Reliable Oil System

Midea's MC efficient inverter full falling film water cooled screw chiller has an oil circuit control system that adopts leading technology, which ensures stable operation of the unit.



▲ Advanced oil control system

▲ Built-in three-stage oil separator for the compressor



▲ Built-in oil separator for the condenser

Oil supply

This system features a differential pressure-type oil supply. All the moving parts in the compressor can stay well lubricated without an external oil pump.

Oil return

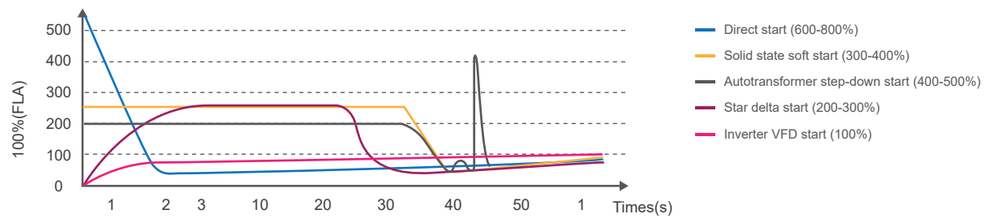
The first oil separation: The compressor is provided with a three-stage oil separator to ensure low oil content.

The second oil separation: The built-in high efficiency oil separator for the condenser controls the oil separation efficiency to a value above 99.99%, enabling the system to realize normal oil return under both partial load and full load,ensuring reliable and stable operation of the system and increasing the unit operating range.

Double oil return system: This system adopts oil return through oil separation and Venturi injection. Oil return is implemented through the Venturi tube injection of high pressure gas, and oil is not stored in the evaporator. An oil heater is set in the unit. The control system preheats the lubricating oil according to the unit's status to maintain optimal viscosity, optimizing the lubrication function. The external oil filter can be replaced easily.

2 No Impact of the Power Grid

This product utilizes inverter startup with a smooth starting current of less than 50% of the star-delta startup current, without any current impact, which prolongs the service life of motor.



3 Multiple Guarantees

Intelligent control of unit safety

The system monitors the unit parameter's changing trends and progressively adjusts the operating status of the unit to ensure safe operation.

Powerful protection function for improved safety

The unit is provided with powerful protection measures to improve operation safety and reliability.

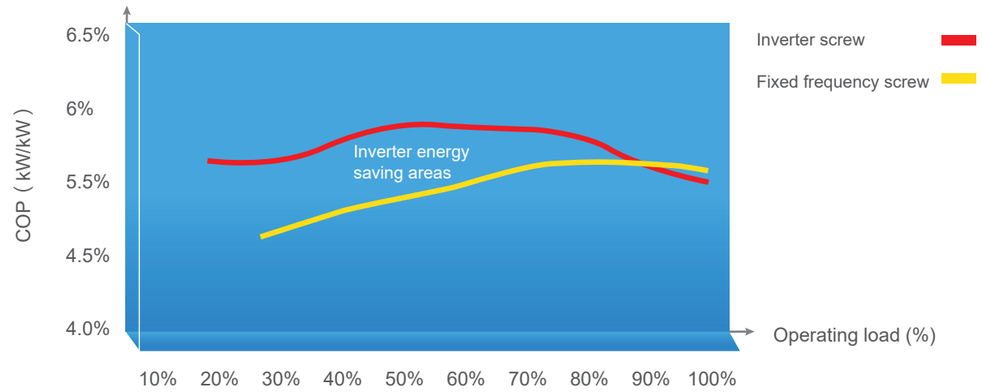
Strict factory test

All the units have undergone strict testing before delivery. Only the water pipe and power supply need to be connected during installation.

Accurate Capacity Adjust

1 Energy Saving Principle of Inverter Adjust

The inverter screw unit regulates the cooling capacity by reducing the frequency. The COP of the partial load is better than the fixed frequency unit, which greatly enhances the energy efficiency.

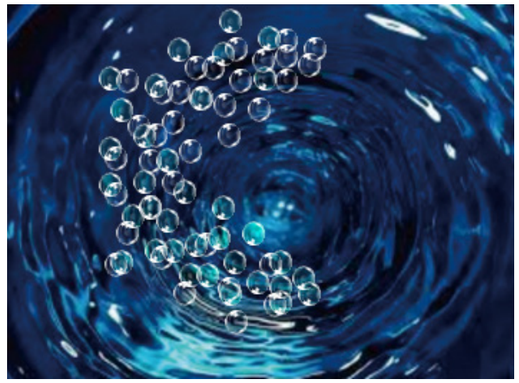


Note: Let's use 7/32°C operating conditions as an example.

2 Accurate Control

Innovative swirl orifice plate throttling technology:

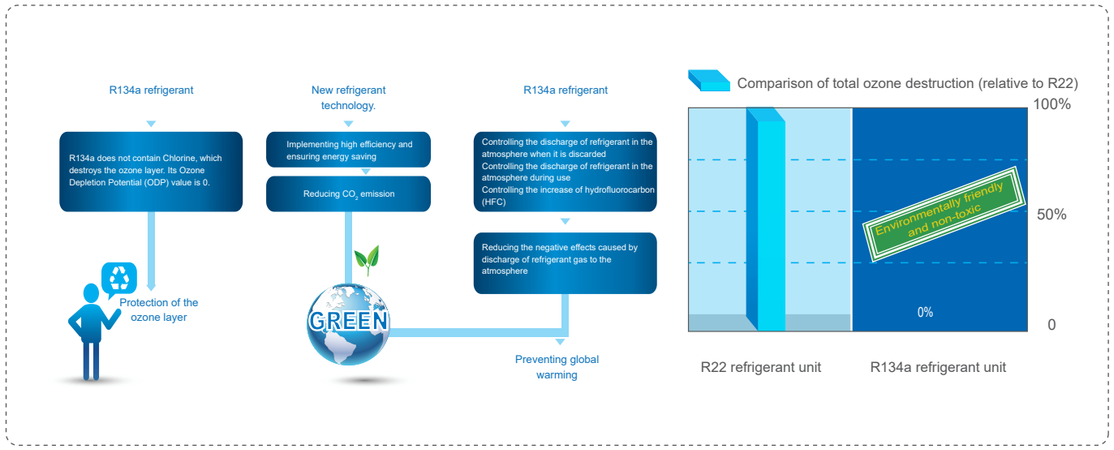
- The flow resistance increases when the gas content of refrigerant is high before the orifice plate, which greatly improves the cooling capacity attenuation caused by hot gas bypass under the partial load;
- When the condensation pressure is low and the refrigerant in front of the orifice plate is liquid, the liquid flow rate can be accelerated to increase the liquid supply;
- The single head unit utilizes an orifice plate for throttling, and the dual head unit features an orifice plate + electronic expansion valve for throttling. This resolves issues such as performance attenuation, low pressure protection, air suction with liquid, and frozen pipes caused by relying solely on electronic expansion valve control.



Environmentally Friendly

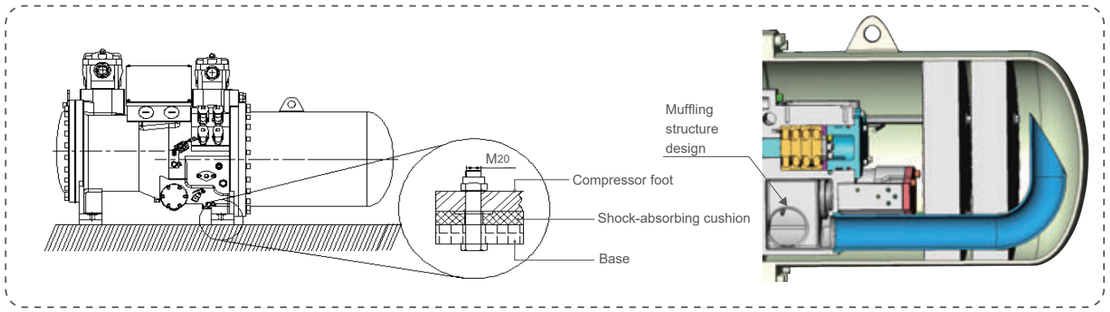
1 Environmental protection refrigerant

- R134a environmentally friendly refrigerant achieves high cooling efficiency,without destroying the ozone layer. The refrigerant complies with the Montreal Protocol.
- Full falling film evaporation technology greatly improves heat exchange efficiency and reduces the refrigerant charge at the same time,more environmentally friendly.



2 Quiet Operation

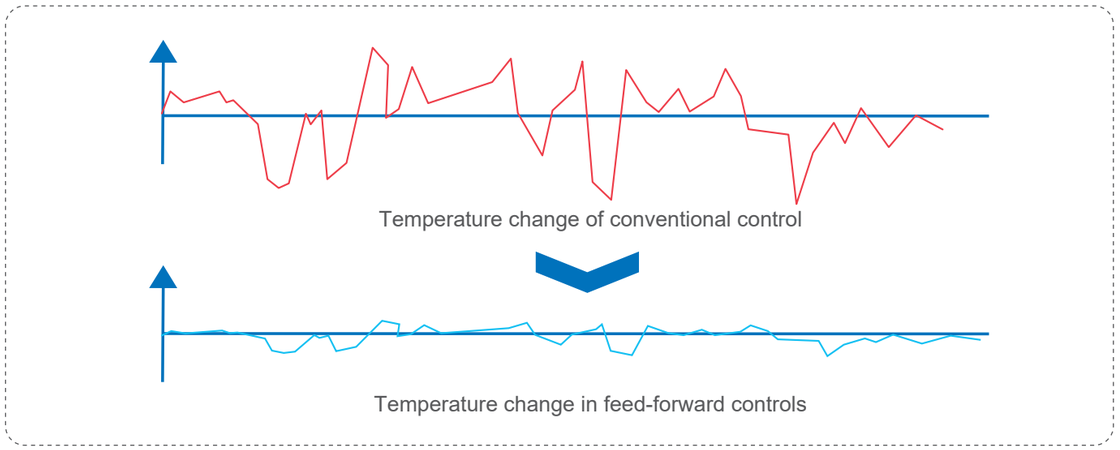
- The sound level is as low as 65 dB(A) when the unit operates with a partial load.
- A standard shock-absorbing cushion is configured between the compressor foot and the metal support, achieving a good damping effect.
- The built-in discharge muffler for the compressor cuts off transmission from the sound source.



▲ Shock-absorbing cushion installation diagram

▲ Built-in discharge muffler design for compressor

Intelligent Control



- **Intelligent load control:** Real-time load changes are predicted according to historical data, and the real-time load is prospectively revised to avoid frequent fluctuations in the unit water temperature.
- **Safe and intelligent unit control:** The system monitors the trends of change in the unit's parameters and adjusts the operating status of the unit as necessary to ensure safe operation.
- **Intelligent failure response:** When the unit fails, in addition to executing the corresponding protective measures, the fault parameters are recorded for manual inspection and troubleshooting.

Interface display

Control mode: Midea special controller

Interface display: 7-inch touch screen

Communication interface: RS485

Communication protocol: ModBus- RTU

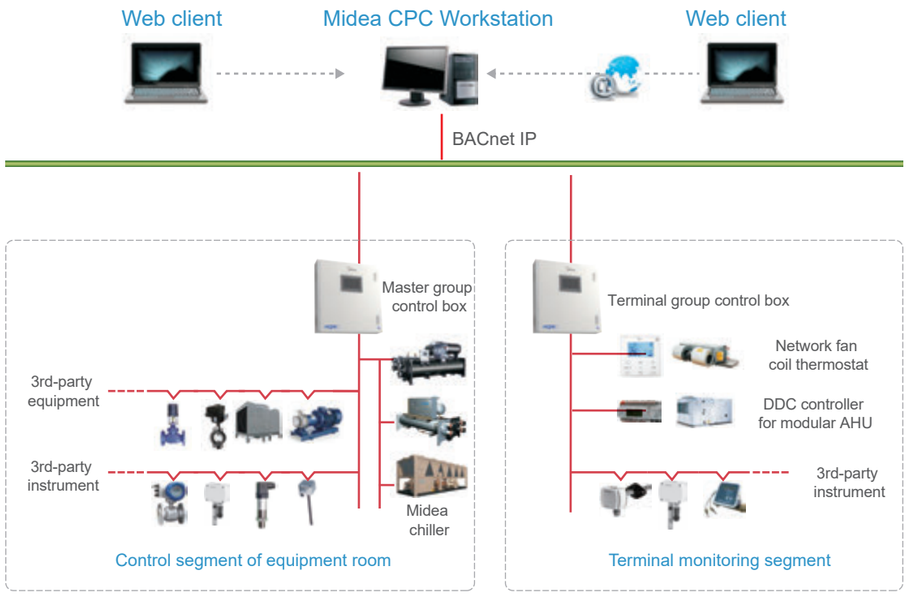
Protection measures: more than 20 protection measures help protect the power supply, compressor, pressure, and temperature.

Intelligent Management

CPC Group Control System

MIDEA CPC

The intelligent group control system of Midea's Chiller Plant Control system (CPC) regards air conditioning devices as bottom control objects, and uses the powerful control logic program and communication network to construct a three-level control framework at the equipment, control, and management layers. By independently developing and manufacturing the master units, Midea organically and seamlessly integrates the internal control logic and performance parameters of the master unit into the group control system. In addition to implementing automated and stable operations between devices, Midea's CPC intelligent group control system also uses the unique Midea energy-saving operation module to enhance and optimize the user management level and reduce overall energy consumption by the central air conditioning unit.



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 reminder
- 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
- Automatic switching to a standby device if a device fails
- System energy saving optimization control
- Uniform control of terminal air system devices

Specifications

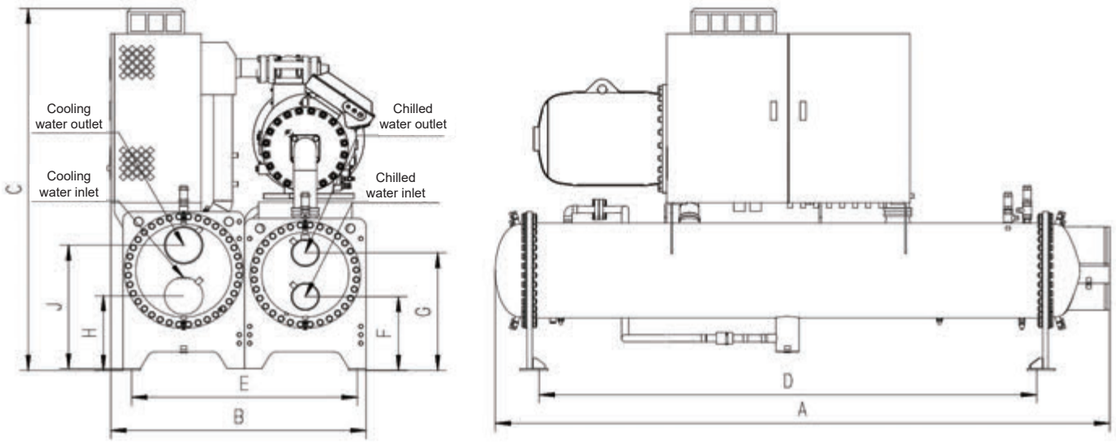
Model		SCWE	120HV	150HV	180HV	200HV	230HV	270HV	300HV	330HV	360HV	390HV	430HV	450HV
Cooling capacity		RT	116.9	150.7	179.2	192.4	223.1	264.1	301.8	326.7	354.0	389.7	426.0	444.0
		kW	411.1	530.0	630.2	676.7	784.6	928.8	1061	1149	1245	1371	1498	1562
Power input		kW	76.41	91.06	112.8	120.8	140.3	164.6	181.3	203.5	226.8	241.7	260.0	279.4
Cooling COP		W/W	5.38	5.819	5.586	5.601	5.592	5.642	5.854	5.645	5.488	5.670	5.761	5.588
Cooling IPLV		W/W	8.56	9.163	8.556	8.798	8.919	8.630	8.944	8.915	8.907	9.110	9.153	9.074
Energy efficiency grade			Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
Compressor		Qty	1	1	1	1	1	2	2	2	2	2	2	2
		Form	Semi-hermetic screw compressor											
		Startup mode	Single head inverter startup/dual head inverter startup or inverter + fixed frequency startup											
Energy regulation range			Single unit 15%-100%, dual units 8%-100%											
Refrigerant	Name	/	R134a											
	Charge quantity	kg	130	160	175	180	210	280	300	300	310	330	335	340
Power			380V-3N-50Hz											
Rated electrical current		A	128.4	157.2	193.1	211.4	223.1	282.9	311.6	347.7	366.1	411.3	435.9	472.4
Maximum running current		A	167.1	207.0	254.3	278.4	308.6	370.0	409.9	457.2	481.3	539.3	569.6	617.3
Startup current		A	< 167.1	< 207.0	< 254.3	< 278.4	< 308.6	< 370.0	<409.9	<457.2	<481.3	<539.3	<569.6	< 617.3
Evaporator	Water flow	m^3/h	63.72	82.15	97.67	104.9	121.6	143.9	164.5	178.1	193.0	212.4	232.2	242.0
	Water-side pressure drop	kPa	58.9	58.9	60.5	60.2	61.2	55.9	54.4	56.1	55.1	55.1	55.3	55.7
	Connection pipe diameter	mm	DN150	DN150	DN150	DN150	DN150	DN200	DN200	DN200	DN200	DN200	DN200	DN200
Condenser	Water flow	m^3/h	79.67	102.7	122.1	131.1	152.0	179.9	205.7	222.6	241.2	265.5	290.3	302.5
	Water-side pressure drop	kPa	53.1	56.3	54.1	53.6	53.5	63.8	67.2	63.6	63.1	66.8	66.1	65.8
	Connection pipe diameter	mm	DN150	DN150	DN200	DN200	DN200	DN200	DN200	DN200	DN200	DN200	DN200	DN200
Dimensions	Length	mm	3500	3500	3500	3500	3500	4600	4600	4600	4600	4650	4650	4650
	Width	mm	1600	1600	1800	1800	1800	1850	1850	1800	1800	1900	1900	1900
	Height	mm	2291	2291	2391	2391	2391	2438	2288	2288	2288	2343	2393	2393
Shipping weight		kg	2763	3289	3595	3629	3802	5562	5914	5989	6060	6431	6622	6665
Operating weight		kg	2943	3501	3870	3919	4122	6036	6435	6544	6655	7100	7340	7406

Note:
1. Nominal cooling capacities are based on the AHRI STANDARD 550/590 (I-P)-2018;
2. Evaporator condition: water inlet=54°F, water outlet=44°F; Condenser conditions: water inlet=85°F, water outlet=94.3°F;
3. The design fouling factor for evaporator is 0.0176m2-°C/kW(0.0001h-ft2-°F/Btu) ; and for condenser is 0.044m2-°C/kW(0.00025h-ft2-°F/Btu);
4. The working pressure of the water side for both the evaporator and condenser are 1.0MPa, 1.6Mpa,2.0Mpa can be customized;
5. As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the product nameplate parameters and in-kind.

Dimensions

External view and related dimensions of the single compressor unit:

• SCWE120HV-SCWE230HV

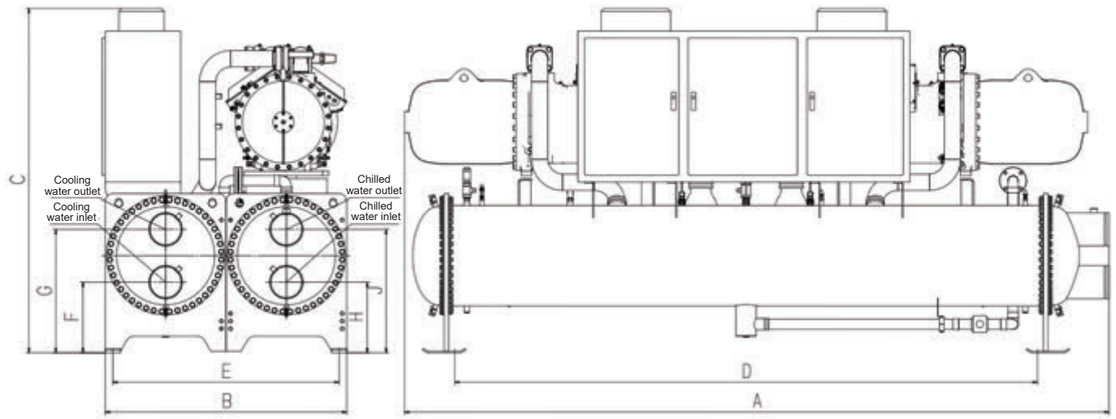


• Single Compressor Unit Specifications

Model	A	B	C	D	E	F	G	H	J
SCWE120HV	3500	1600	2291	2850	1500	411	671	411	671
SCWE150HV	3500	1600	2291	2850	1500	411	671	411	671
SCWE180HV	3500	1800	2391	2850	1700	436	696	436	696
SCWE200HV	3500	1800	2391	2850	1700	436	696	436	696
SCWE230HV	3500	1800	2391	2850	1700	436	696	436	696

Outside View and Related Dimensions of the Dual Compressor Unit:

• SCWE270HV-SCWE450HV

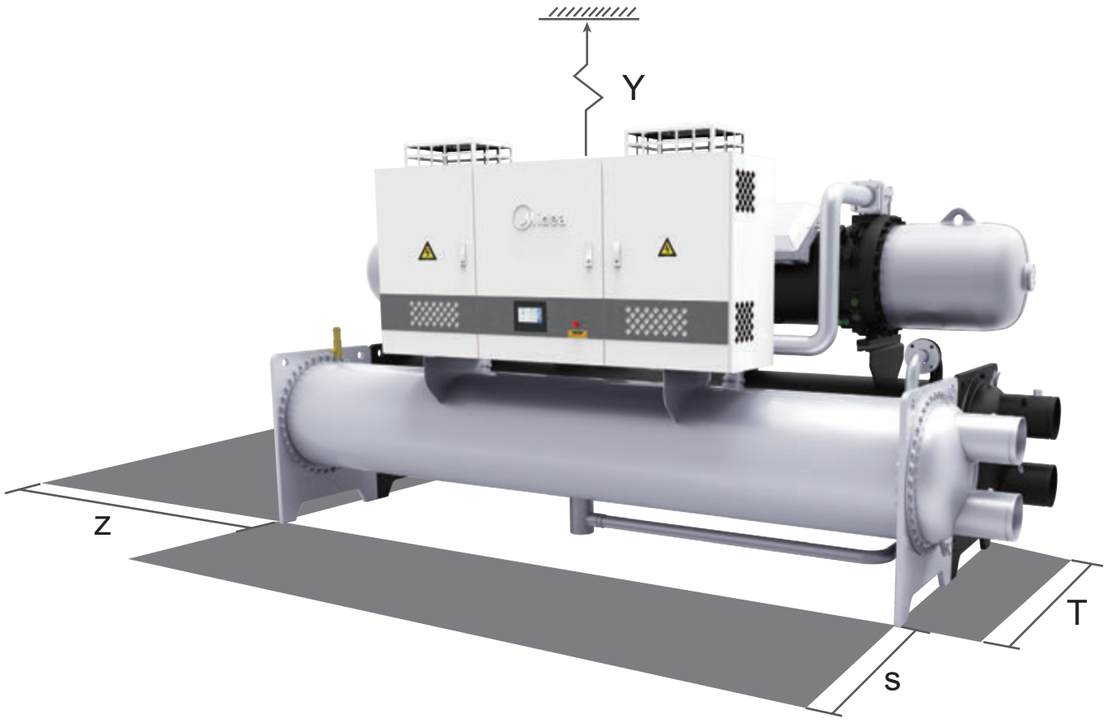


• Dual Compressor Unit Specifications

Model	A	B	C	D	E	F	G	H	J
SCWE270HV	4600	1800	2438	3860	1700	618	793	618	793
SCWE300HV	4600	1800	2288	3860	1700	618	793	618	793
SCWE330HV	4600	1800	2288	3860	1700	618	793	618	793
SCWE360HV	4600	1800	2288	3860	1700	618	793	618	793
SCWE390HV	4650	1900	2343	3860	1800	468	818	468	818
SCWE430HV	4650	1900	2393	3860	1800	468	818	468	818
SCWE450HV	4650	1900	2393	3860	1800	468	818	468	818

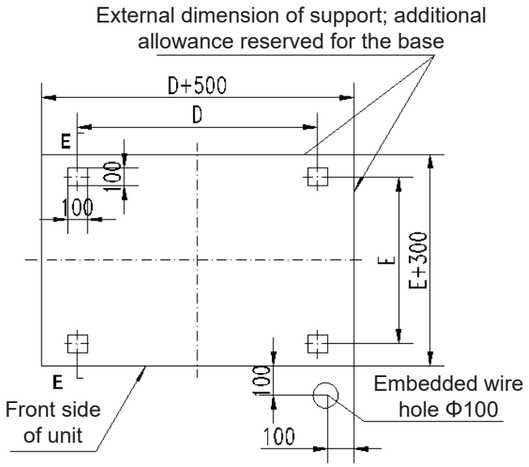
Installation

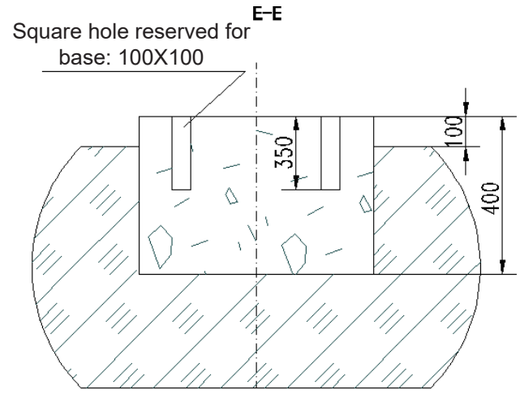
Selecting an Installation Location



Dimensions / Model	S/mm	T/mm	Z/mm	Y/mm
SCWE120- 230HV	600	600	3200	1000
SCWE270- 450HV	600	600	4200	1000

Installation Location



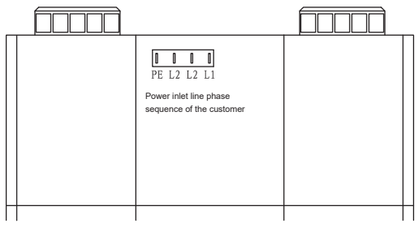


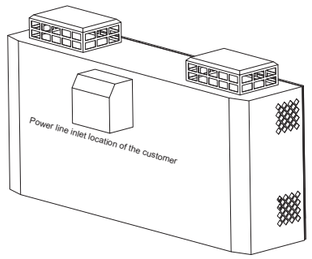
- Base bolt mounting dimensions of each model

Dimensions / Model	SCWE 120HV	SCWE 150HV	SCWE 180HV	SCWE 200HV	SCWE 230HV
D(mm)	2850	2850	2850	2850	2850
E(mm)	1500	1500	1700	1700	1700

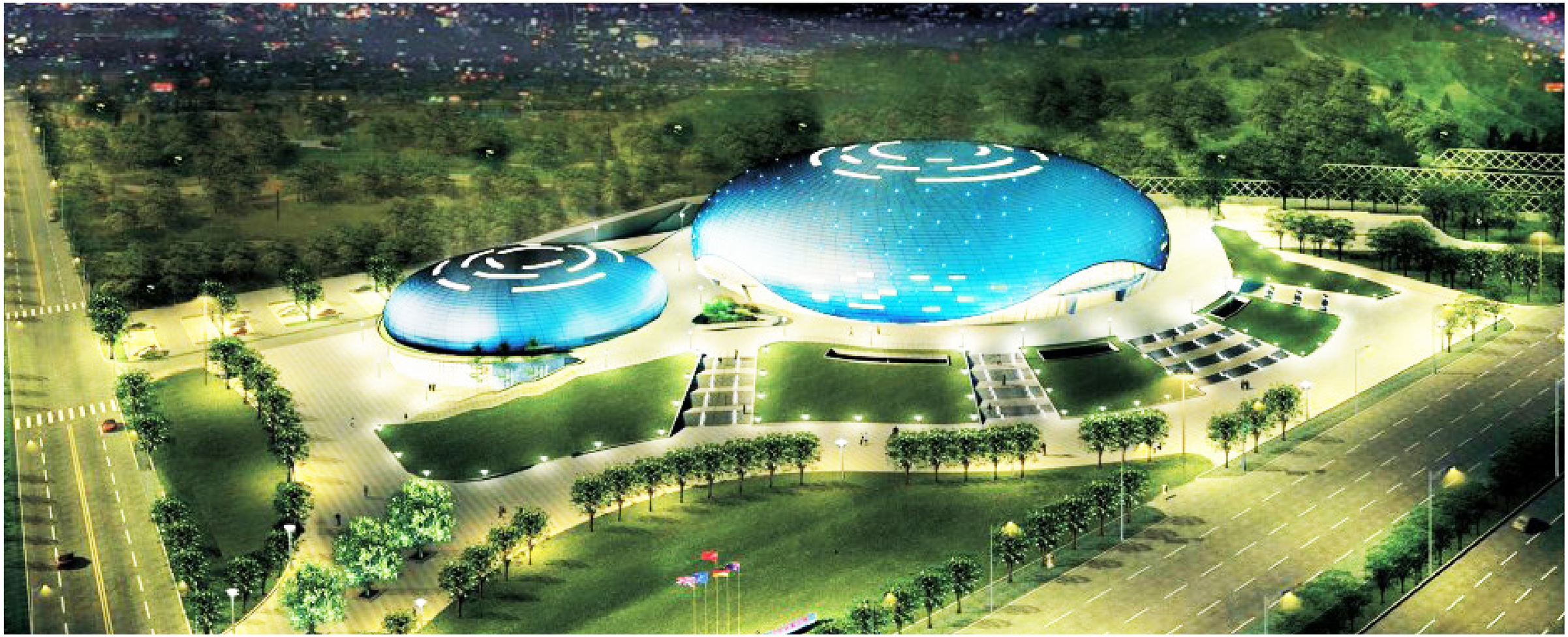
Dimensions / Model	SCWE 270HV	SCWE 300HV	SCWE 330HV	SCWE 360HV	SCWE 390HV	SCWE 430HV	SCWE 450HV
D(mm)	3860	3860	3860	3860	3860	3860	3860
E(mm)	1700	1700	1700	1700	1800	1800	1800

- Field Wiring Diagram



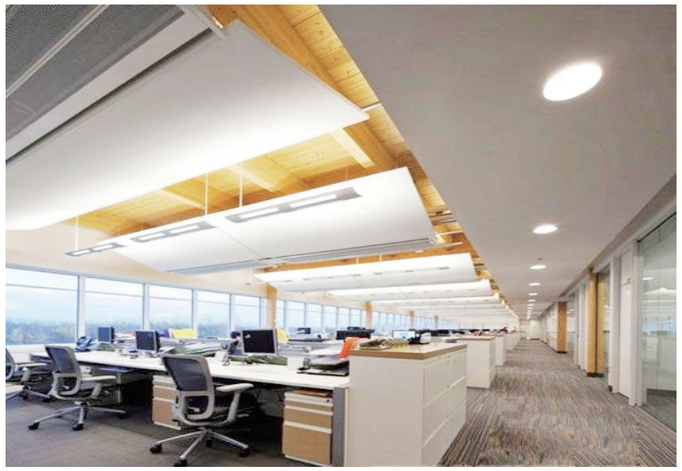


Reference Projects



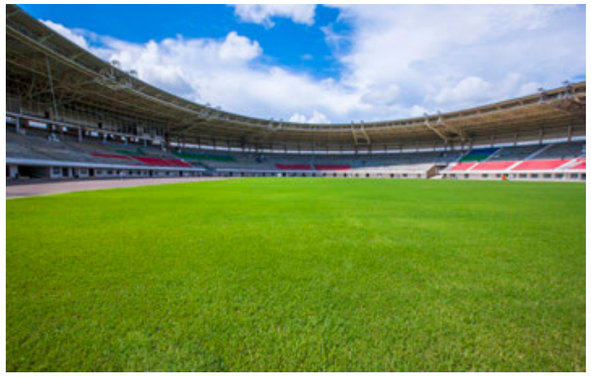
Guangzhou Huadu Asian Games Stadium

Country:	China
City:	Guangzhou
Outdoor Unit:	Water-cooled screw chiller
Indoor Unit:	AHU
Total capacity:	3,650 kW



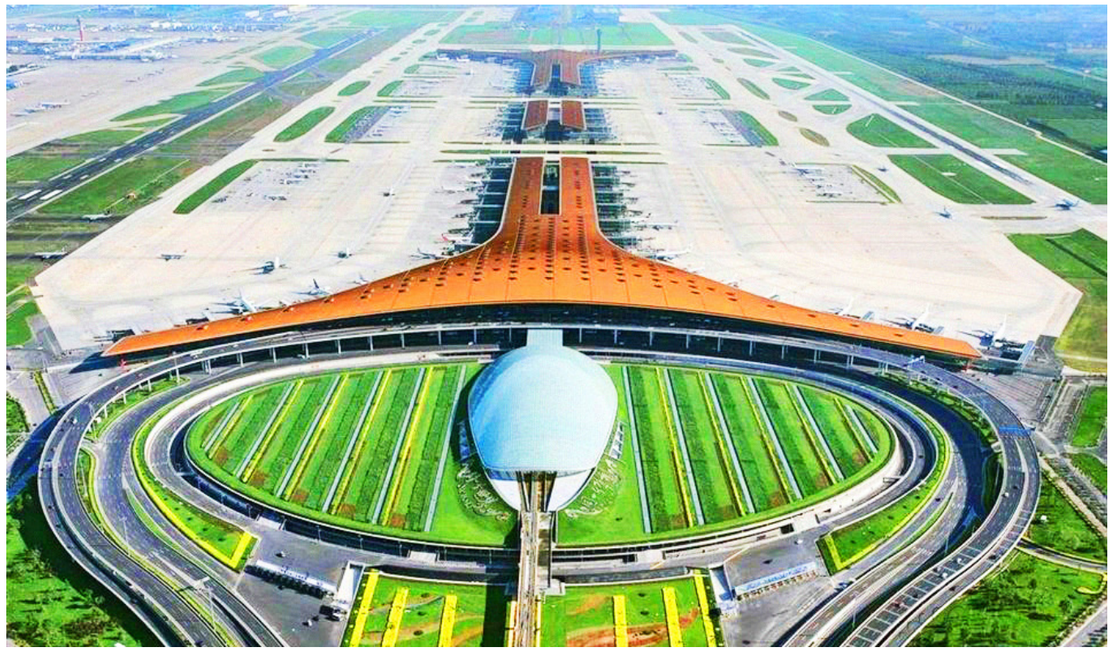
Midea Headquarter Building

Country:	China
City:	Shunde
Total Capacity:	3,700 RT
Outdoor Unit:	Centrifugal chiller & Water-cooled screw chiller & Air-cooled scroll chiller & DC Inverter VRF
Indoor Unit:	AHU & Cassette & Wall Mounted & Duct
Control System:	BMS
Completion Year:	2010



The 27th Southeast Asian Games Stadium

Country:	Myanmar
City:	Nay Pyi Taw
Total Capacity:	4100RT
Outdoor Unit:	Water-cooled screw chiller (Heat Recovery)
Indoor Unit:	MAHU
Completion Year:	2012
Total Floor Area:	40,000 m^2



Beijing Airport T3 Terminal

Country:	China
City:	Beijing
Total Capacity:	9556RT
Outdoor Unit:	Centrifugal Chiller & Water-cooled screw chiller
Indoor Unit:	FCU
Control System:	BMS
Completion Year:	2007
Total Floor Area:	900,000 m^2

Hilton Hotel in Foshan (Five Star)

Country:	China
City:	Foshan
Total Capacity:	3,700 RT
Outdoor Unit:	Centrifugal chiller & Water-cooled screw chiller
Indoor Unit:	AHU & FCU
Control System:	BMS
Completion Year:	2013
Total Floor Area:	90,000 m^2

Salarieh Trade Center

Country:	Iran
City:	Qom
Capacity:	800Ton
Outdoor Unit:	Water screw chiller
Indoor Unit:	FCU
Completion Year:	2013

The Prime Minister Office Building

Country:	Tajikistan
City:	Dushanbe
Total Capacity:	2880kW
Outdoor Unit:	Water-cooled screw chiller
Indoor Unit:	Cassette & Duct FCU
Control System:	Wired Control & Remote Control
Completion Year:	2015

The Ministry of Foreign Affairs Building

Country:	Tajikistan
City:	Dushanbe
Total Capacity:	1480kW
Outdoor Unit:	Water-cooled screw chiller
Indoor Unit:	Cassette & Floor standing FCU
Control System:	Wired Control & Remote Control
Completion Year:	2012