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.

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.

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Operating Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling water inlet temperature</td>
<td>°C</td>
<td>18~45</td>
</tr>
<tr>
<td>Chilled water outlet temperature</td>
<td>°C</td>
<td>5~15</td>
</tr>
</tbody>
</table>

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

3 Scope of Application

Product Structure

- Microcomputer control
  - Providing auto-diagnosis, adjustment, security protection, remote control and other functions

- Electric control panel
  - Midea’s flexible sinking design has made a breakthrough in the single plane shape, featuring a lively and futuristic look

- 7-inch color display screen
  - Easy-to-read unit status; convenient to operate and maintain

- Condenser
  - This product features a double-sided reinforced high-efficiency condenser tube to further improve heat exchange efficiency

- Water inlet and outlet located on the same side
  - Easy installation, cleaning and maintenance

- Lifting hole
  - Lifting hole retained to make handling convenient

- Compressor
  - The compressor screw rotor adopts a new profile, and the air supply and enthalpy feature improved technology that greatly enhances efficiency

- Evaporator
  - Specially designed liquid equalization plate to optimize the temperature field and achieve optimal heat exchange efficiency

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  - The compressor screw rotor adopts a new profile, and the air supply and enthalpy feature improved technology that greatly enhances efficiency

- Evaporator
  - Specially designed liquid equalization plate to optimize the temperature field and achieve optimal heat exchange efficiency
The product has received testing certification, AHRI certification, from a third-party agency.

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.

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

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High energy efficiency

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.

Stop

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 slide valve position and motor speed, and first lowers the slide valve. Then, the slide valve assists in energy regulation.

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.

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)

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.: 20112013421.5)

Structural diagram of the full falling film evaporator

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.

Features
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.

- Built-in oil separator for the condenser
- Built-in three-stage oil separator for the compressor
- Advanced oil control system

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
- 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.

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.

![Energy Saving Chart](image-url)
Environmental 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, making it 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.

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
- Communication interface: Modbus RTU
- Protection measures: more than 20 protection measures help protect the power supply, compressor, environment, and atmosphere.
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

<table>
<thead>
<tr>
<th>Model</th>
<th>350kW</th>
<th>450kW</th>
<th>530kW</th>
<th>600kW</th>
<th>670kW</th>
<th>760kW</th>
<th>830kW</th>
<th>950kW</th>
<th>1050kW</th>
<th>1250kW</th>
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<tr>
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<td>Condenser water-side pressure drop</td>
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<tr>
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</tbody>
</table>

#### Note:
1. Nominal cooling capacities are based on the ANSI STANDARD 3595-1996 (IP)-2010.
2. Evaporator saturation: water 6.4°F, R22 30°F; Condenser conditions: water 6.3°F, R22 49°F.
3. The design fouling factor for evaporator is 0.17°F·min·h·in²×30°F•Btu; and for condenser is 0.4°F·min·h·in² ×30°F•Btu.
4. The working pressure of the water side for both the evaporator and condenser is 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

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCWE120HV</td>
<td>3500</td>
<td>1600</td>
<td>2291</td>
<td>2850</td>
<td>1500</td>
<td>411</td>
<td>671</td>
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<td>2291</td>
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<td>671</td>
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<td>1800</td>
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<td>696</td>
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<td>SCWE200HV</td>
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<td>1800</td>
<td>2391</td>
<td>2850</td>
<td>1700</td>
<td>436</td>
<td>696</td>
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<tr>
<td>SCWE230HV</td>
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<td>1800</td>
<td>2391</td>
<td>2850</td>
<td>1700</td>
<td>436</td>
<td>696</td>
<td>436</td>
<td>696</td>
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Outside View and Related Dimensions of the Dual Compressor Unit:

- SCWE270HV-SCWE450HV

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>468</td>
<td>818</td>
<td>468</td>
<td>818</td>
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</tbody>
</table>
## Installation

### Selecting an Installation Location

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>S/mm</th>
<th>T/mm</th>
<th>Z/mm</th>
<th>Y/mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCWE120-230HV</td>
<td></td>
<td>600</td>
<td>600</td>
<td>3200</td>
<td>1000</td>
</tr>
<tr>
<td>SCWE270-450HV</td>
<td></td>
<td>600</td>
<td>600</td>
<td>4200</td>
<td>1000</td>
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</tbody>
</table>

- **Base bolt mounting dimensions of each model**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Model</th>
<th>SCWE 120HV</th>
<th>SCWE 150HV</th>
<th>SCWE 180HV</th>
<th>SCWE 200HV</th>
<th>SCWE 230HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(mm)</td>
<td>2850</td>
<td>2850</td>
<td>2850</td>
<td>2850</td>
<td>2850</td>
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<tr>
<td>E(mm)</td>
<td>1500</td>
<td>1500</td>
<td>1700</td>
<td>1700</td>
<td>1700</td>
<td>1700</td>
</tr>
</tbody>
</table>

- **Field Wiring Diagram**

- **External dimension of support; additional allowance reserved for the base**

- **Square hole reserved for base: 100X100**

- **Front side of unit**

- **Embedded wire hole Φ100**
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 m²
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 m²

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 m²
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