

# AirBoost MAG

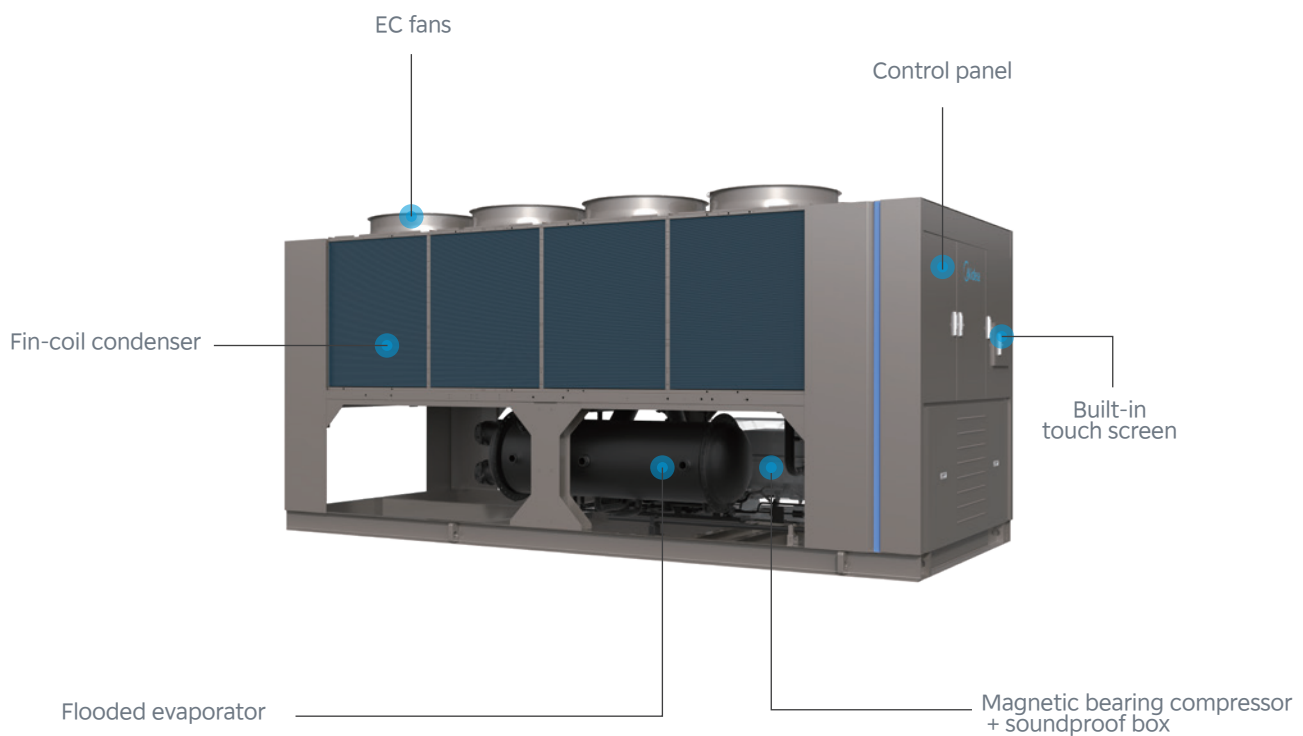
Air-Cooled Magnetic Bearing  
Centrifugal Chiller



2025

# OVERVIEW

Midea AirBoost MAG air-cooled magnetic bearing centrifugal chiller utilizes patented magnetic bearing technology. In addition to being highly efficient, stable and reliable, it features a wide operating range, quiet operation and less maintenance. The system incorporates an array of Midea core technologies including back-to-back two-stage compression, aerodynamic technology, magnetic bearing control, and high-efficiency permanent-magnet synchronous motors. It is your best choice in a variety of applications including commercial buildings, data centers, hospitals, shopping malls, airports, hotels and industrial buildings, providing customers with an efficient and energy-saving green building solution.



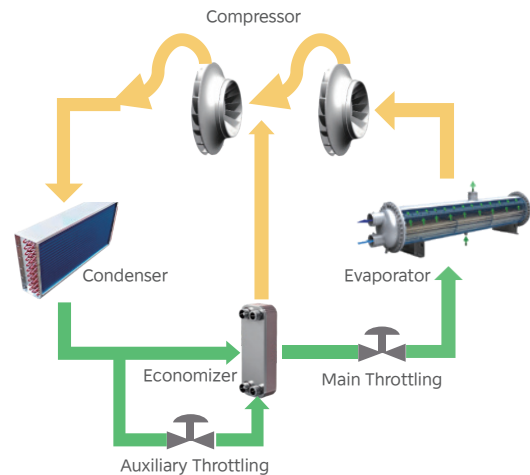
## Notes:

1. 70 RT to 120 RT (single-compressor) and 220 RT to 240 RT (dual-compressor) air-cooled magnetic bearing centrifugal chillers are available.
2. 140 RT to 200 RT (dual-compressor) units will be available in December, 2025.
3. Dual-unit combination for enhanced cooling capacity, the maximum cooling capacity reaches 480 RT.

# HIGH EFFICIENCY WITH SUPERIOR ENERGY SAVINGS

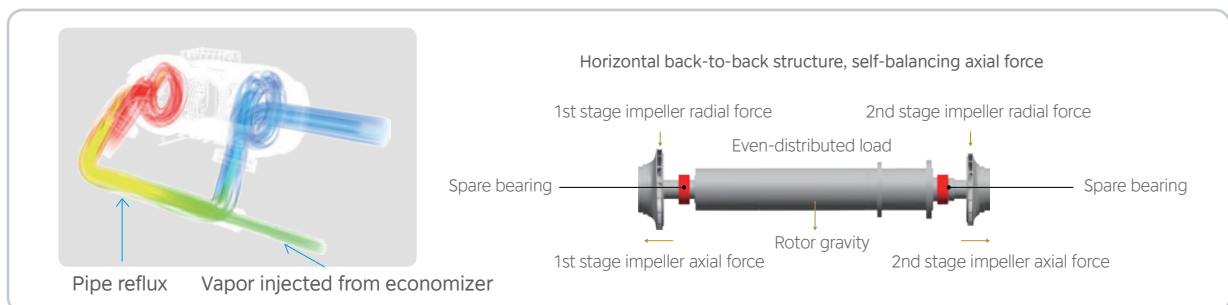
## Two-stage compression, enhanced vapor injection technology

Two-stage compression with enhanced vapor injection technology is 6% more efficient than single-stage compression.



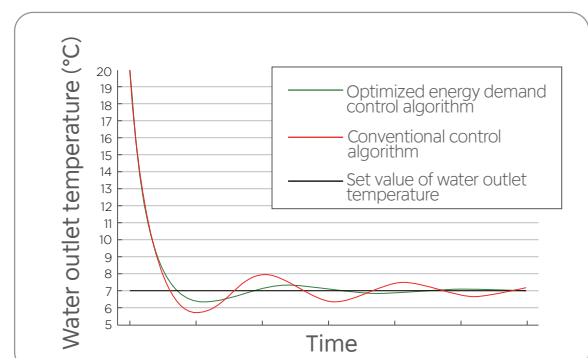
## Aerodynamic technology

- The three-dimensional enclosed impeller design ensures evenly distributed axial gas inflow into the second-stage impeller, with full flow field optimization for enhanced compressor efficiency.
- The pipe-type reflux device optimizes gasflow for smoother delivery, while the economizer enables more even gas distribution. This optimized flow field improves adaptability with smaller cooling capacities while increasing efficiency under partial loads.
- Innovative, industry-first back-to-back compression reduces axial force by 90%.



## Adaptive load management and efficiency enhancement technology

- Utilizing multi-dimensional cooperative control technology, the unit automatically responds to environmental and other factors to accurately control outlet water temperature fluctuation to under  $\pm 0.1^\circ\text{C}$ .
- Innovative technologies such as virtual load measurement and water-system capacity identification reduce the frequency of startups and stops, increasing efficiency under partial load conditions by 2% to 12%.

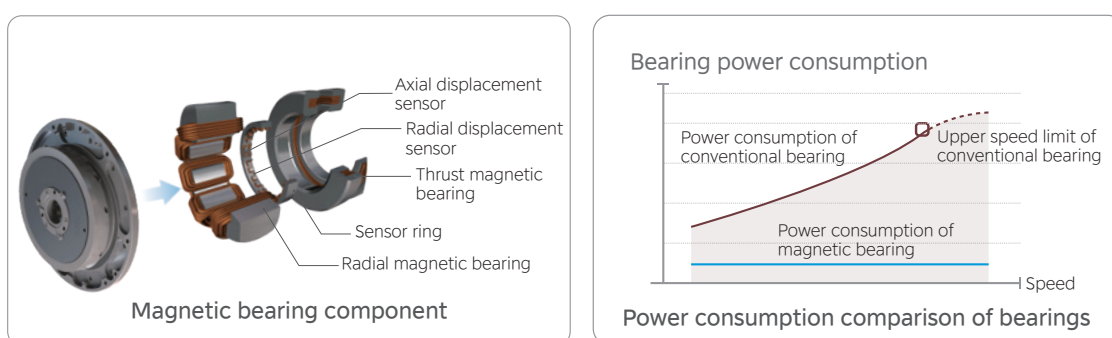




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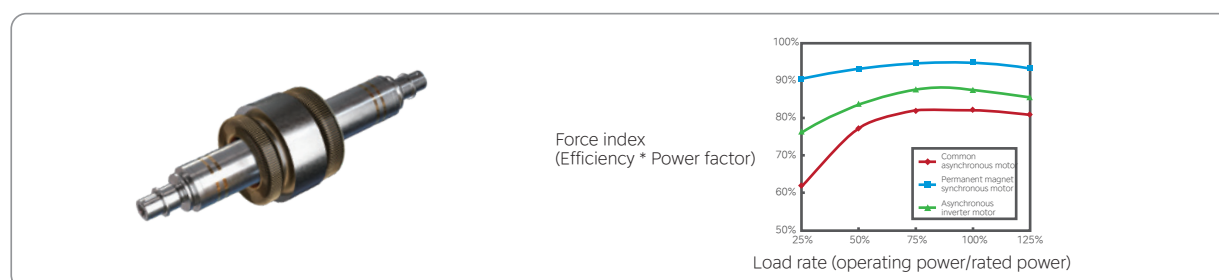
## Magnetic bearing technology

- Our industrial-grade magnetic bearing assembly is designed with radial and thrust magnetic bearings, along with position sensors. It features low power consumption, high bearing capacity, and exceptional reliability.
- Magnetic bearing power consumption is less than 0.25 kW, only 2%-10% of that of conventional oil bearings. Breaks through the upper speed limits of conventional oil bearings, significantly reducing power consumption at high speed: Unlike oil bearings, magnetic bearings become more efficient as speed increases.



## Permanent magnet synchronous motor technology

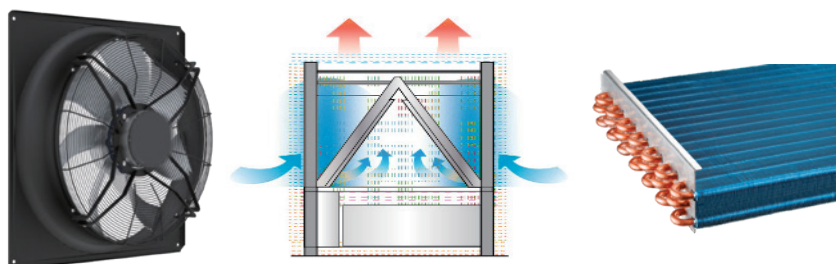
- Motor efficiency exceeds 96% in the full operating range, with highest efficiency of up to 97%.
- Space Vector Pulse Width Modulation (SVPWM) technology is employed for precise speed regulation and motor control, allowing the system to quickly adapt to changing operating conditions. This technology ensures low startup and operating current, leading to reduced electricity costs and distribution cost over the unit's lifespan. Additionally, an innovative vapor injection valve adaptively adjusts to optimize the vapor injection process for maximum efficiency.



# HIGH EFFICIENCY WITH SUPERIOR ENERGY SAVINGS

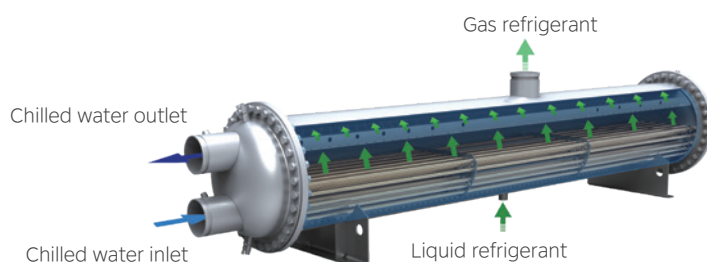
## High efficiency air side heat exchanger

- The main features of EC fans are compactness, low noise level and exceptional efficiency. The variable speed drive fans react continuously to load variations ensuring maximum efficiency especially at partial loads. Compared to conventional fans energy savings of 30% can be achieved.
- Inverted M-type air-side heat exchanger, the airflow is evenly distributed to achieve high efficiency heat exchange.
- High efficiency inner-threaded pipes and high quality arc-shaped window aluminum fins are closely combined by mechanical expansion pipe to improve heat transfer efficiency, reduce pressure loss and wind noise.
- Professional temperature field simulation, optimized design.



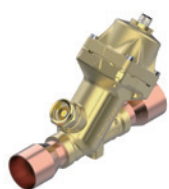
## High efficiency flooded evaporator

- A specialized refrigerant distributor ensures even distribution, optimizing the temperature field and raising the evaporation temperature, thereby increasing overall operating efficiency.
- Specially-designed baffle plate prevents liquid from being sucked inside the compressor, protecting it from potential damage while improving reliability.
- Water boxes at both ends can be disassembled for easy maintenance.



## High precision EXV

- Internationally renowned brands, stable and reliable quality.
- Responsive, no hysteresis, improve unit energy efficiency.
- PID high-precision adjustment to ensure that the whole situation is stable and efficient operation.



High precision EXV

VS



Traditional thermal expansion valve

# RELIABILITY & DURABILITY

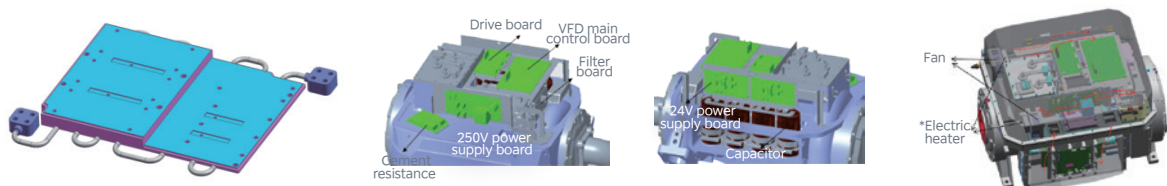
## Mechanical and electrical control integration

- The magnetic bearing compressor, motor, bearing control, and VFD are combined into a single, unified design, reducing the chiller system's overall size by 50% compared to conventional systems.
- The compressor features IP67 protection, ensuring it is safeguarded against water, fire, corrosion, and dust.



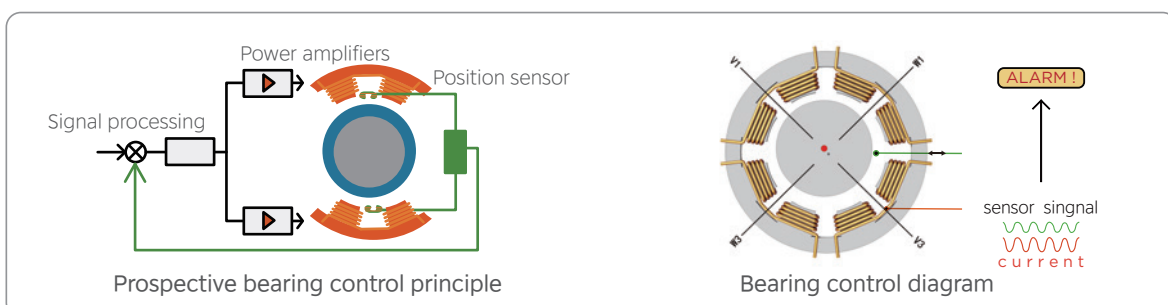
## Integrated thermal management system

- Integrated 3D ultra-efficient phase change liquid cooling technology, no power loss, high reliability.
- IC side board partition thermal management technology makes full use of the space in the cavity for distributed layout to avoid local hot spots. Capacitors and cement resistors use high thermal conductivity interface materials to conduct heat to the casing for effective dissipation. Compared to the industry split architecture, the cooling capacity is improved by 265%, and compared to the DFS integrated architecture, the cooling capacity is improved by 63%.
- Additionally, integrated circulation cooling/insulation technology is used for the VFD chamber and the compressor MBC chamber to address the challenges of high-temperature operation and low-temperature storage environments for air-cooled units. Conventional storage ambient temperature -25 °C to 70 °C (\*customizable -40 °C, the electric heater is required).



## High-precision magnetic bearing control technology

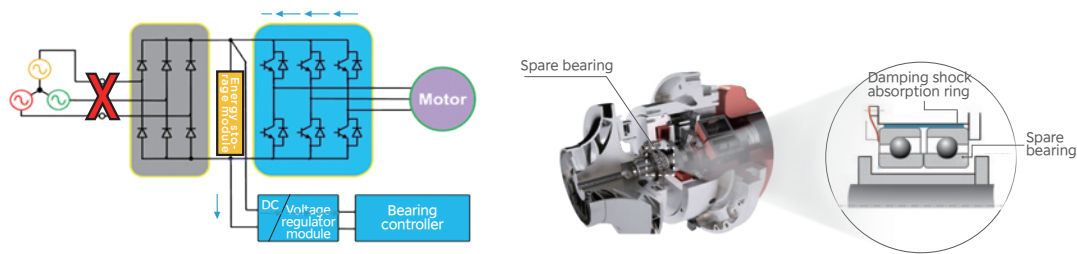
- The bearing control system adopts smart vibration compensation technology through high-frequency position detection and control, effectively reducing the impact of unbalance on shaft vibration.
- The high-efficiency magnetic bearing 5-degree-of-freedom position control technology can monitor and correct the levitation position of the bearing in real time. The position detection frequency is 400,000 times per second, and the position can be adjusted at 20 kHz.
- With a small bearing clearance of just 75  $\mu\text{m}$ , the rotor's displacement precision reaches 0.5  $\mu\text{m}$  in static levitation.



# RELIABILITY & DURABILITY

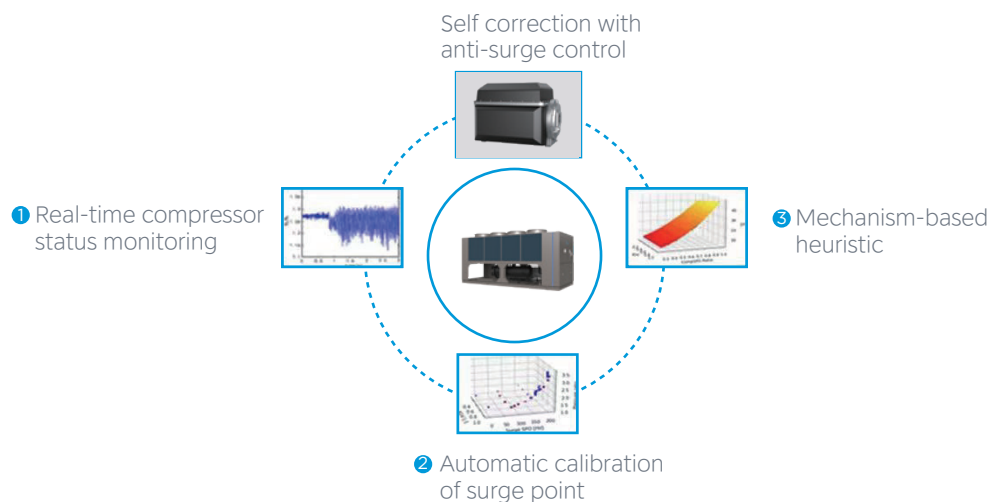
## Power-off dual protections

- Continuous self-generation mode: switches to generator mode, continuously supplying power to the magnetic bearings. This ensures the rotor lands smoothly, preventing damage.
- Ultra-long-life double-row spare bearing: the compressor can continue operating normally and stably, even after enduring over 300 consecutive hard drops of the rotor shaft from high speeds.



## Intelligent and super anti-surge technology

- The magnetic bearing system utilizes nonlinear model disturbance tracking control technology to prevent compressor damage.
- By reducing the current to the bearing controller by 90%, the system's control reliability is significantly improved.
- The super anti-surge protection allows the system to endure up to 500 continuous surges.

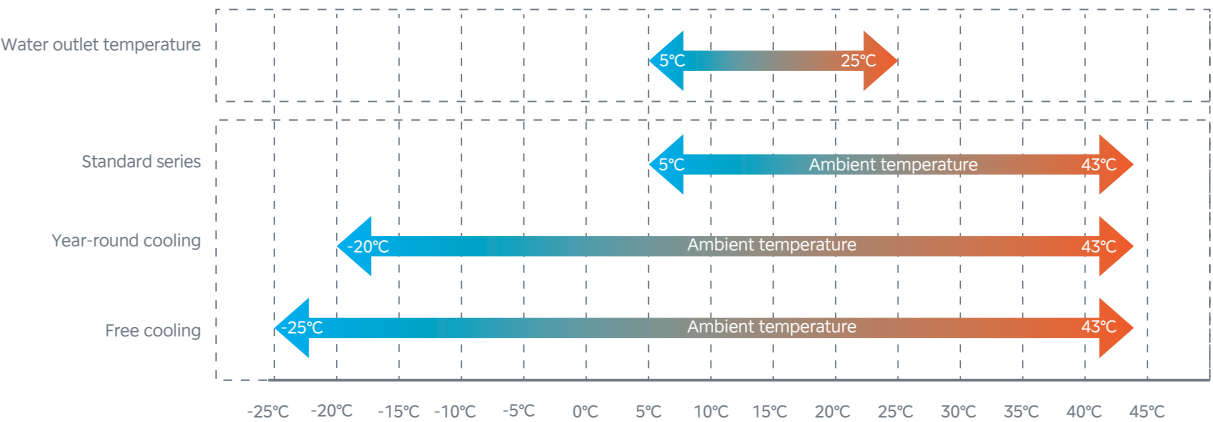




# WIDE OPERATION RANGE LESS MAINTENANCE AND LOWER COST

## WIDE OPERATION RANGE

The unit can operate stably under extreme conditions, ambient temperature ranging from -25 °C to 43 °C. Water outlet temperature ranging from 5 °C to 25 °C.



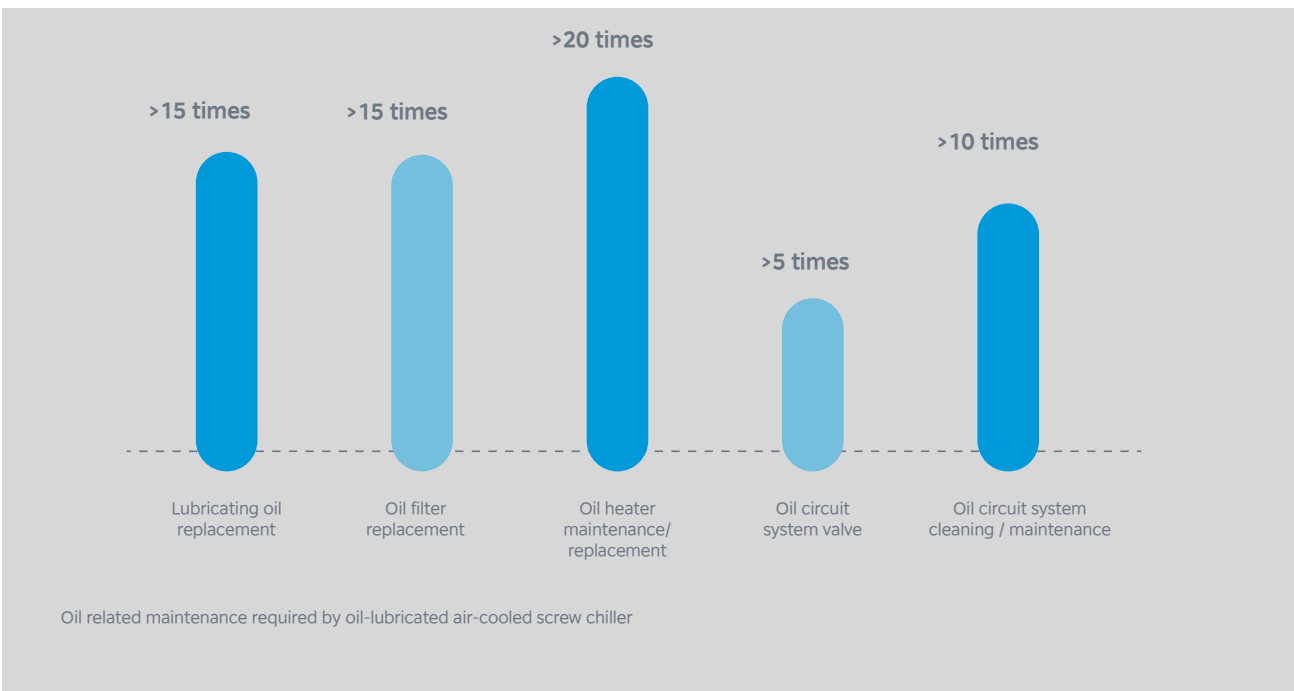
Notes:

Year-round cooling and Free cooling series need to be customized.

Standard water outlet temperature is 5 °C to 15 °C and higher temperature need to be customized.

## Less maintenance and lower cost

Oil-free operation, less maintenance items, and avoidance of energy efficiency degradation caused by oil in the system, reducing maintenance costs and operating expenses.

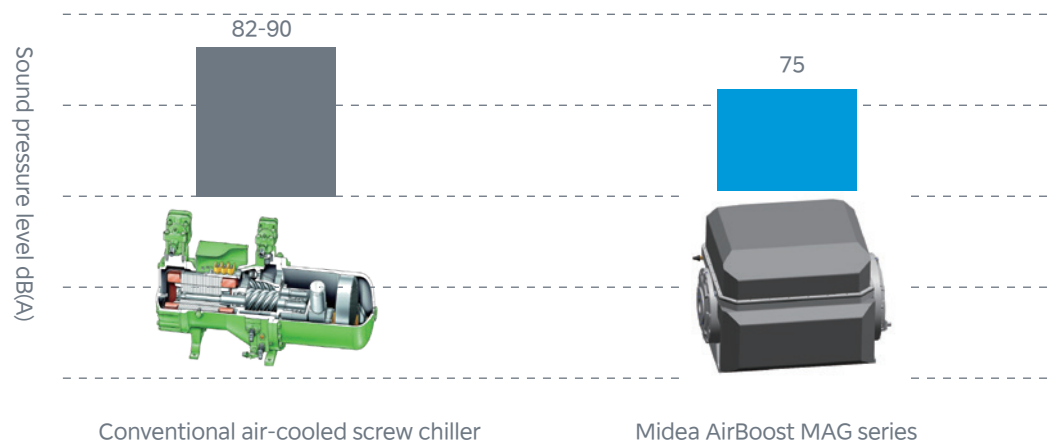




# ENVIRONMENTAL-FRIENDLY

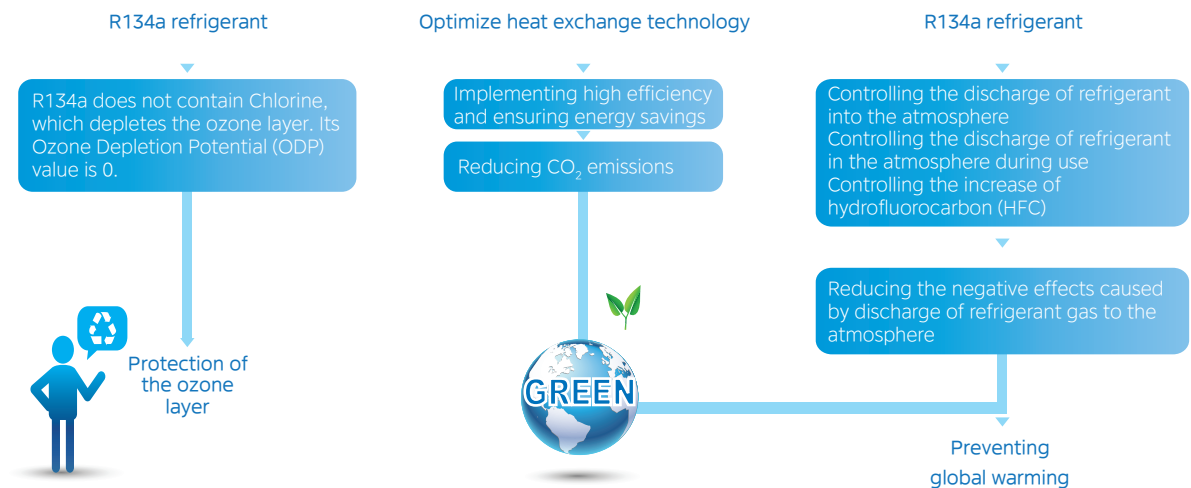
## Quiet Operation

Adopting multiple noise reduction measures, such as frictionless magnetic bearing, optimized aerodynamic design, standard EC fan, standard compressor soundproof box, the sound pressure level of the unit can be as low as 75 dB(A).



## Eco-friendly refrigerant

R134a eco-friendly refrigerant achieves high cooling efficiency, without depleting the ozone layer. This refrigerant complies with the Montreal Protocol.



# INTELLIGENT CONTROL HIGHLY CUSTOMIZABLE

## 7-inch Color Touch Screen

- 7-inch color touch screen.
- Real-time operating parameters display (temperature, pressure, etc.)
- Three-level password setting to prevent unauthorized operation.
- Detailed fault information recording.
- Power-off memory function.
- Timed ON/OFF.
- Master & Slave, Back-up, Duty cycling.
- Compatible with QuickView, M-Cloud, Midea Intelligent Chiller Plant Management (iCPM) and M-BMS.



## Options

- Free cooling
- Supports UPS and ATS functions
- Quick start
- Low harmonic, THDI<5%
- 16 °C to 25 °C water outlet temperature
- Large temperature difference and small flow rate, with a maximum temperature difference of 10 °C
- Year round cooling
- Single/dual pump hydraulic module
- Full range of single point electrical connection for dual-compressor units
- A full range of single water inlet/outlet (standard dual-unit combination can be customized)
- High concentration antifreeze (45%)
- Overall unit IP55
- PLC
- Heavy anti-corrosion treatment

Note: For options, please consult the factory according to the order requirements.

# Specifications

Model			CCAG70EV	CCAG80EV	CCAG90EV	CCAG100EV
Nominal parameter	Cooling capacity	kW	246.1	281.3	316.4	352.0
	Power input	kW	66.52	77.49	87.90	92.10
	Cooling COP	kW/kW	3.70	3.63	3.60	3.82
	IPLV.IP	kW/kW	6.10	6.15	6.05	6.37
Compressor	Type	/	Magnetic bearing centrifugal compressor			
	Quantity	/	1	1	1	1
Energy regulation mode		/	VFD+IGV			
Refrigerant	Type	/	R134a			
Power supply		/	380V 3~ 50H z			
Air side heat exchanger	Type	/	Fin-coil			
	No. of fans	/	6	6	6	8
	Motor power input	kW	1.9			1.8
Water side heat exchanger	Type	/	Shell and tube			
	Water flow	m³/h	42.3	48.4	54.4	60.5
	Water pipe connection	mm	DN150	DN150	DN150	DN150
	Max.working pressure	MPa	1.0			
Unit dimensions	Length	mm	4235	4235	4235	5240
	Width	mm	2300	2300	2300	2300
	Height	mm	2565	2565	2565	2565
Shipping weight		kg	3600	3600	3600	3800
Running weight		kg	3800	3800	3800	4000

Notes:

- Performance and efficiency are based on AHRI 551/591. Cooling: chilled water inlet/outlet=12°C(53.6°F)/7°C(44.6°F); fouling factor=0.018 m².°C/kW (0.000102h-ft²-°F/Btu), outdoor ambient temperature 35°C(95°F) DB.
- As a result of the continuous improvement of the product, the above parameters may change. Please refer to the product nameplate and in-kind.



# Specifications

Model			CCAG110EV	CCAG120EV	CCAG220EVD	CCAG240EVD
Nominal parameter	Cooling capacity	kW	390.0	422.0	774.0	844.0
	Power input	kW	105.4	117.2	211.0	234.0
	Cooling COP	kW/kW	3.70	3.60	3.66	3.60
	IPLV.IP	kW/kW	6.33	6.30	6.34	6.30
Compressor	Type	/	Magnetic bearing centrifugal compressor			
	Quantity	/	1	1	2	2
Energy regulation mode		/	VFD+IGV			
Refrigerant	Type	/	R134a			
Power supply		/	380V 3~ 50Hz			
Air side heat exchanger	Type	/	Fin-coil			
	No. of fans	/	8	8	16	16
	Motor power input	kW	1.8			
Water side heat exchanger	Type	/	Shell and tube			
	Water flow	m³/h	67.0	72.5	133.2	145.2
	Water pipe connection	mm	DN150	DN150	DN200	DN200
	Max.working pressure	MPa	1.0			
Unit dimensions	Length	mm	5240	5240	9420	9420
	Width	mm	2300	2300	2300	2300
	Height	mm	2565	2565	2565	2565
Shipping weight		kg	3800	3800	7640	7640
Running weight		kg	4000	4000	8140	8140

- Notes:
1. Performance and efficiency are based on AHRI 551/591. Cooling: chilled water inlet/outlet=12°C(53.6°F)/7°C(44.6°F); fouling factor=0.018 m².°C/kW (0.000102h-ft²-°F/Btu), outdoor ambient temperature 35°C(95°F) DB.
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