

STANDARD REFRIGERATION & ENGINEERING CO., LTD. 立德工程有限公司 (集團)有限公司 附屬機構

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ECOLITE 2018.04 V1



Air Cooled Oil-free Centrifugal Chiller











Ecolite Cooling Technologies Co., Ltd. was originally incorporated in Hong Kong as a consulting company providing energy savings solutions for efficient energy management. Now Ecolite has made a business breakthrough from green solutions to green products supplier. With world leading technology and guaranteed energy-saving policy, Ecolite Cooling provides incomparable energy-efficient and zero-emission HVAC&R products to the world market since its creation in 2016.

Ecolite Cooling is technically supported and authorized by Danfoss and has become the recognized OEM Partner of Turbocor Danfoss. We have production base in Guangzhou, China. All products supplied are made based on proven technologies from the U.S. and are AHRI Certified. Ecolite green HVAC&R products can be used in a wide range of applications in large high-rise commercial buildings, factories, plazas, metros and various industrial refrigeration fields.

OIL-free Centrifugal Compressor

Oil-free compressors are the state-of-the-art compressors utilizing magnetic bearings as core components based on the principle of magnetic repulsion. The inner and outer parts of the bearing are designed to be homo-polar to prevent physical contact with each other. Motor driveshaft and centrifugal impellors are held up by the magnetic bearing and levitated without any immediate contact and are mechanically frictionless. In practical operation, there will be only air friction between the shaft and bearings. Air friction loss is only 2% of mechanical friction loss, which greatly reduces friction and noise as well as associated efficiency loss, vibration, etc.



Speed of an oil-free compressor can reach 18,000 ~ 48,000 RPM, comparing to the 8,000 RPM of a traditional compressor. Impellors are smaller in radius, which is only 5~8cm due to the high speed of the rotating shaft and is space-saving that the compressor can fit into modular chiller to make up a modular system with a single compressor and a plate heat exchanger. This design reduces chiller footprint significantly. Additionally, the oil-free system runs without oil pumps and oil supply system and thus eliminates adverse effects of lubricating oil on heat transfer efficiency of the heat exchangers. In a conventional compressor, only 96.5% oil can be separated from the refrigerant. The remaining 3.5% will result in at least 8% capacity loss. To make things worse, 90% compressors burn-out are caused by oil failure. In comparison, the oil-free compressor comes with dedicated internal motor cooling circuit to prevent form motor burn-out for long running or any loss caused by high temperature.

Maglev Centrifugal Compressor





HIGH EFFICIENCY FLOODED SHELL-TUBE HEAT EXCHANGERS

- Evaporator and condenser are built in shell and tube structure with refrigerant flowing outside the tubes and water inside.
- Wieland copper tubes, which feature stable quality and easy maintenance, are utilized to offer high efficiency of heat transfer.
- High efficiency flooded shell-tube heat exchangers and wide adjustable range of water flow rates are ideal for IT rooms.

Water flow rate ranges from 30% to100%, perfectly matching the oil-free compressor.



HIGH PERFORMANCE PLATE HEAT EXCHANGER ECONOMIZER

- Stainless steel plates to ensure corrosion resistance
- High turbulence to slow down the formation of fouling
- Dedicated design for oil-free system to improve chiller efficiency High performance plate heat exchanger economizer that fits perfectly with the
- oil-free compressors is specially designed to increase sub-cooling and improve efficiency of the chiller.



CAREL ELECTRONIC EXPANSION VALVE (EXV)

- Accurate refrigerant metering based on compressor speed and load demand
- CAREL electronic expansion valve together with CAREL EVD series intelligent controller
- Accurate and stable EXV control perfectly fits with oil-free compressor.



HIGH PERFORMANCE & LOW NOISE FANS

- High efficiency EC fans with permanent magnet
- Fan motor speed is adjustable via internal controller
- Aluminum fan blades are designed to achieve rational noise control and excellent energy conservation.
- Total sound signature of 70 dB(A)

State-of-the-art EC fans deliver super quiet and ultra-efficient operation... the perfect complement to the oil-free centrifugal compressor



AIR SIDE RIFLED "V" CONFIGURATION CONDENSER

- and improve heat transfer efficiency
- The flat "V" configuration optimizes balanced air intake and improves heat transfer.
- High performance air side heat exchanger...the perfect complement to the oil-free centrifugal compressor

MART CONTROLS

A powerful intelligent control system is used. The heart of the controller is a dedicated HVAC programmable logic control panel pCO⁵⁺ with patented chip and ASIC technologies to ensure flexibility of the control system. LCD touch screen panel is designed to provide operator, technical personnel and servicemen with real-time running information of the chiller, faults, load history, run log, historical data, etc.

Temperature Control

The control system compares the entering and leaving water temperature with its setpoint value to compute the capacity required and determine the compressor load. Variable speed drive will adjust capacity of the chiller based on the calculated value to make sure water temperature is confined to setpoint.

Compressor Balance and ON/OFF Limitations

The control system accumulates running hours of each compressor and hence establishes a working sequence to ensure each compressor runs for similar hours.

Minimum non-running hours, minimum running hours, re-start times limit and other settings allow the control of the compressor start and stop frequency, which can improve its life span.

Safeties

Control system monitors system faults and compressor faults. In the event of a compressor fault, the controller will shut off the faulty compressor. In the case of a system fault, the controller will shut off all compressors of the chiller.

• Rifled copper tubes increase heat transfer surface and refrigerant turbulence

- Customizable anti-corrosive finned heat exchanger for seaside projects

Model Number Designation



- 1: Ecolite
- 2: Oil-free Compressor
- 3: Air-cooled
- 4: Module Nominal Capacity(RT)
- 5: Flooded Evaporator

Model

ECOA080F/ECOA090F/ECOA100F

ECOA120F/ECOA125F/ECOA160F

ECOA180F/ECOA200F/ ECOA240F

ECOA300F

Capacity: 75-360RT (263.8-1266KW)

echnical Data

Model		Unit	ECOA080F	ECOA090F	ECOA100F	ECOA120F	ECOA125F		
Nominal Cooling Capacity		kW	263.8	298.9	334.1	404.5	422		
Max Cooling Capacity		kW	301	320	416	439	457		
Nominal Power		kW	76.0	81.4	92.9	113	112.1		
СОР		w/w	3.47 3.67 3.60		3.58	3.76			
IPLV		w/w	6.10	6.10 6.44 6.14 6.32			6.46		
Control System			Alpha Lite						
Dimensions	Length	mm	2,600	3,900	3,900	5,200	6,500		
	Width	mm	2,200	2,200	2,200	2,200	2,200		
	Height	mm	2,500	2,500	2,500	2,500	2,500		
Estimated shipping weight		kg	2,500	2,800	2,900	3,500	4,700		
Estimated operating weight		kg	2,600	2,900	3,000	3,600	4,800		
Compressor Type			Magnetic levitation Oil-free Centrifugal						
Compressor Number		Set	1	1	1	1	1		
Сарас	Capacity Control		25~100	25~100	40 ~ 100	30 ~ 100	20 ~ 100		
Power Supply			380V-50Hz-3ph (Other Power for optional)						
Refrigerant Type			R134a						
Refrige	Refrigerant Charge		135 165 180 220 2						
	Туре		Flooded Shell and Tube						
Evaporator	CHW Flow Rate	m³/h	45.4	51.4	57.5	69.6	72.6		
	Water Pressure Drop	kPa	48.8	41.0	50.1	70.9	67.8		
	Fouling Factor	m²*K/kW	0.018	0.018	0.018	0.018	0.018		
	Max.Working Pressure (water side)	MPa	1	1	1	1	1		
	Passes		2	2	2	2	2		
	Connection Size		4"	5"	5"	5"	5"		
Condenser -	Туре		Fin-tube Coil						
	No. Of Fan		4	6	6	8	10		
	Fan Power	kW	6.86	10.29	10.29	13.72	17.15		
	RLA (Each)	A	2.65						

Notes:

1. The nominal capacity is based on the following conditions Leaving/Entering Temp. of Chilled Water: 7.0/12.0°C Ambient Temp. : 35.0°C

2. Specifications in this sheet are subject to change without notice.

echnical Data

	Model	Unit	ECOA160F	ECOA180F	ECOA200F	ECOA240F	ECOA300F		
Nomina	l Cooling Capacity	kW	545.1	615.5	685.8	826.5	1037.5		
Max C	Cooling Capacity	kW	602	639	843	898	1267		
No	minal Power	kW	159.1	176.7	189.1	227.6	286.1		
	СОР	w/w	3.43	3.48	3.63	3.63	3.63		
	IPLV	w/w	6.16	6.47	6.43	6.49	6.57		
Co	Control System		Alpha Lite						
	Length	mm	5,200	6,500	7,800	10,400	11,700		
Dimensions	Width	mm	2,200	2,200	2,200	2,200	2,200		
	Height	mm	2,500	2,500	2,500	2,500	2,500		
Estimate	ed shipping weight	kg	4,700	5,000	6,400	7,800	9,300		
Estimate	Estimated operating weight		4,800	5,100	6,500	8,000	9,500		
Compressor Type			Magnetic levitation Oil-free Centrifugal						
Comp	ressor Number	Set	2	2	2	2	3		
Cap	pacity Control	%	20 ~ 100	10~100	20~100	20 ~ 100	20 ~ 100		
Pc	ower Supply		380V-50Hz-3ph (Other Power for optional)						
Ref	rigerant Type		R134a						
Refri	gerant Charge	Kg	270	310	380	490	560		
	Туре		Flooded Shell and Tube						
	CHW Flow Rate	m³/h	93.7	105.8	117.9	142.1	178.4		
	Water Pressure Drop	kPa	51.7	56.5	68.7	74.4	72.1		
Evaporator	Fouling Factor	m²*K/kW	0.018	0.018	0.018	0.018	0.018		
	Max.Working Pressure (water side)	MPa	1	1	1	1	1		
	Passes		2	2	2	2	2		
	Connection Size		6"	6"	6"	6"	8"		
Condenser	Туре		Fin-tube Coil						
	No. Of Fan		8	10	12	16	18		
	Fan Power	kW	13.72	17.15	20.58	27.44	30.87		
	RLA (Each)	А	2.65						

Notes:

1. The nominal capacity is based on the following conditions

Leaving/Entering Temp. of Chilled Water: 7.0/12.0 $^{\circ}\mathrm{C}$

Ambient Temp. : 35.0°C

2. Specifications in this sheet are subject to change without notice.













Physical Dimensions



Physical Dimensions













Electrical Wiring



Notes:

- OPCHW:chilled water differential pressure switch, verifying water flows; CHWE1~2:#1-#2 chilled water pump fault signal; EXT: external remote start/stop input; Ell:external interlock signal; RL1~2:#1-#2 chilled water pump running signal output; RF:chiller fault status output;
- RUN:chiller running status output.

1. Electrical Performance Data

	Compressor (Each)			Fan (Each)		Chiller				
Model	R.L.A	F.L.A	M.O.P	R.L.A	M.O.P	No.of	No.of	M.O.P	F.L.A	
	(A)	(A)	(kW)	(A)	(kW)	Compressor	Fan	(kW)	(A)	
ECOA080F	118.3	135	84.9	2.65	3.2	1	4	97.7	155	
ECOA090F	130.5	135	84.9	2.65	3.2	1	6	104.1	165	
ECOA100F	155	210	123.3	2.65	3.2	1	6	142.5	240	
ECOA120F	190	210	123.3	2.65	3.2	1	8	148.9	250	
ECOA125F	192	210	123.3	2.65	3.2	1	10	155.3	260	
ECOA160F	118	135	84.9	2.65	3.2	2	8	195.4	310	
ECOA180F	130.8	135	84.9	2.65	3.2	2	10	201.8	320	
ECOA200F	151	210	123.3	2.65	3.2	2	12	285	480	
ECOA240F	184	210	123.3	2.65	3.2	2	16	297.8	500	
ECOA300F	151	210	123.3	2.65	3.2	3	18	427.5	720	

R.L.A: Rated Load Amperage M.O.P: Maximum Operating Power F.L.A: Full Load Amperage Power Supply: AC380V/50Hz/3Ph; Allowable Fluctuation Voltage: ±10%; 3-Phase Voltage Imbalance: 3%

- 2. When the chiller starts up, the compressor will start stage by stage. Chiller starting current is the sum of total current of operating compressors and starting current of the compressor(s) being actuated.
- 3. The selection of main cables should base on voltage, allowable voltage drop and local electrical codes. The cables to the chiller should be flexible copper cord.
- 4. In order to reduce harmonic interference, chiller should be equipped with special input line reactor to restrict the fluctuation of power grid or current surge in system operation. Spike in smooth supply voltage or phase missing resulted from commutation will prevent interference from the grid and reduce impacts on the grid caused by harmonic current of the rectifier unit.
- 5. Harmonic filter (optional) improves power transmission and utilization, further reducing local parallel harmonic or series resonant and noise created by electrical system, improving system capacity of the transformer, breaker and cables, etc. and ensuring normal functions of safeties and automatic devices. All these configurations comply with GB/T 14549. Total harmonic distortion (THD) is ≤5%. Automatic compensation power factor of the chiller is 0.95.

Notices For Installation And Operation

- 1. ECOLITE flooded air cooled oil-free centrifugal chillers can be installed in places with sufficient ventilation required between the induced drafts;
- 2. Distances between the flow switch and the upstream/downstream horizontal straight pipe should be at least 5 times pipe diameter to prevent damage on the chiller in the event of insufficient water flow. Flow switch is open when rated water flow ≤80%;
- 3. External pipes and valves shall have proper support so that their weights would not land on the chiller and guarantee good sealing of pipe connections.
- too much water pressure caused by partial blockage may damage the strainer.
- wells to protect temperature probes from being damaged by water accumulation inside the sensor well.
- 6. Prior to chiller operation, the whole piping system must be thoroughly cleaned and removed of mechanical impurities.
- 7. All piping components are to be supplied by the users.

and convenience for installation, such as rooftop, balcony or just on the ground, to keep good convection heat transfer. If two or more chillers are installed with induced drafts facing one another, minimum 3 meters spacing is

irreplaceable by differential pressure switch/transmitter on water headers; required setting of the flow switch:

4. Strainer should be installed in the inlet pipe. Strainer should be of stainless steel and sturdy enough in case that

5. After the temperature sensors are inserted to the sensor wells, grease lubricant should be applied into the sensor