



OIL FREE CENTRIFUGAL CHILLER

| 07 Oil free Centrifugal Chiller

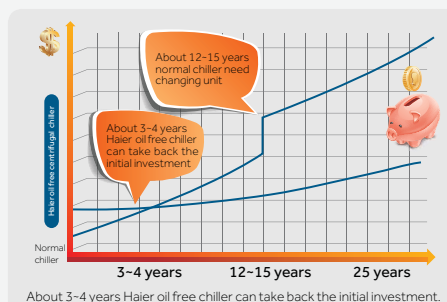


OIL FREE CENTRIFUGAL CHILLER

High Efficiency

Energy saving and high efficiency

The unit adopts the turbo inverter compressor technology and frictionless technology, which will enhance the energy efficiency greatly. Water cooled series IPLV(integrated part-load value AHRI standards) can be 11.98(Air-cooled series IPLV is 6.0). Comparing with normal centrifugal chiller, Haier centrifugal IPLV is 50% higher.



High efficient refrigeration cycle system design

High efficient environment friendly refrigerant R134a



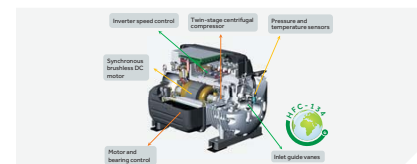
High efficient Compressor
Designed for HFC-134a
Oil free
DC conversion synchronous motor
Twin-stage centrifugal

Electronic expansion valve
It will control the liquid refrigerant spraying into the evaporator precisely control the compressor, evaporator and condenser running at the optimum efficiency

High efficient flooded evaporators
High efficiency heat transfer, convenient maintenance

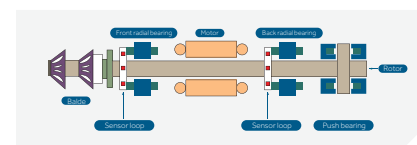
Turbocor compressor technology

The chillers either water-cooled or air-cooled, are designed to optimize the performance of the high efficient danfoss turbocor oil-free centrifugal compressor technology.



Magnetic bearing technology

Magnetic bearing and orientation sensor: Two radial bearings and one axial bearing compose the digital magnetic bearing system. The movement parts are made of permanent magnet and electric magnet will suspend on the magnet and move without friction. The orientation sensor will confirm the precise position of the rotor at max. 6,000,000 times per minute.



Permanent-magnet motor and Landing bearing

The compressor motor is magnetic permanently, which is supplied voltage by PWM (pulse width management) to realize variable speed running. The landing bearing will go upward before the unit starts up, which will keep a certain distance automatically and ensure no friction.

The radial bearing is to bear the axis after the compressor is powered down, to avoid the touch between the axis and the other metal surface.



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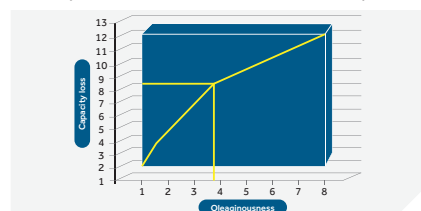
OIL FREE CENTRIFUGAL CHILLER

High Efficiency

Frictionless system

The movement parts of magnetic bearing system centrifugal compressor are composed of two radial magnetic bearings and one axial magnetic bearing. so the digital magnetic bearing system will be suspended when compressor is running. the movement parts do not need oil, which avoid that oil film in the heat exchanger lays on the pipe to reduce the heat exchanging efficiency. thus it will ensure the product has the consistent excellent performance in its operation period.

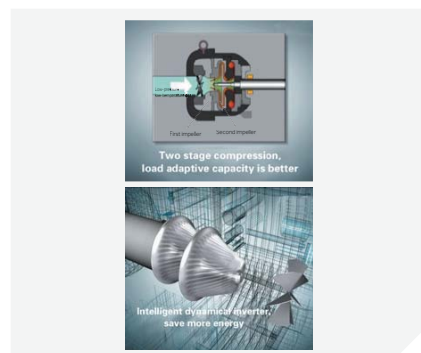
The oil content of old type chiller is 9% on average, which will reduce the efficiency up to 15% to 20%. Haier's magnetic bearing system inverter centrifugal chiller can enhance efficiency over 15% because of oil-free lubrication system.



Inverter driving

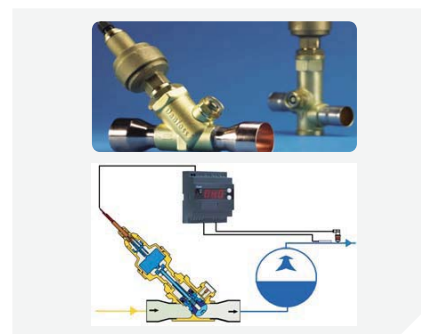
The inverter centrifugal compressor adopts the integrated driving module. on the condition of condensing temperature decreasing or load reducing, lower the compressor revolution, then optimum the compressor energy efficiency with 10%-100% of rated load.

Optional: digital load balancing valve, compressor even can work normally even when the load almost closes to 0.



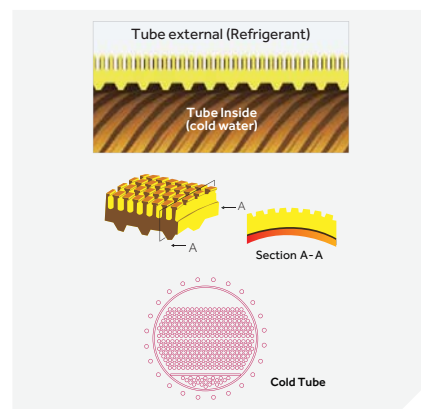
EEV (electronic expansion valve)

Adopt electronic expansion valve made by Danfoss. It will control the volume of liquid refrigerant spraying into the evaporator precisely. Adopt the special electronic expansion valve driving module, which will control the stepping motor operation due to the different load, adjust valve open angle, control refrigerant flow volume, and control the compressor, evaporator and condenser running at the optimum efficiency.



High efficiency heat exchange tube design technology

- The new design adopt high efficiency heat exchange tube.
- The tube adopt special layout make refrigerant flow improvement in the evaporator.



AHRI certificate

All models are qualified for AHRI certificate, so the products capacity and EER are guaranteed.

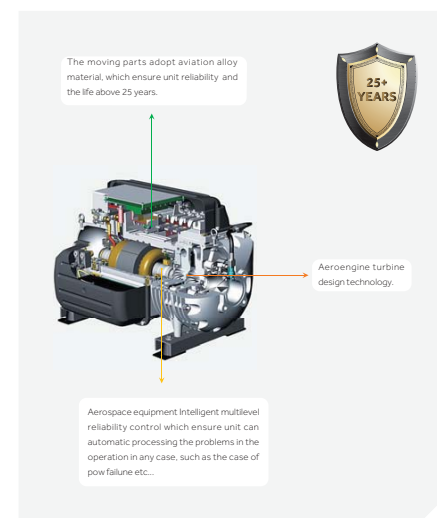


High Reliability

Long life

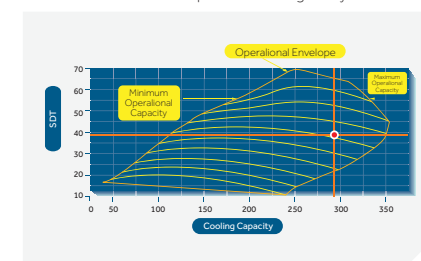
Compressor is made from the aerial class aluminum mold and the high strength thermal plastic electronic case, which can keep the compressor long-time and high efficient running.

Aerospace materials and technology, ensure 25 years reliable efficient operation.



Compressor safe operation

Compressor control module will supply the performance curves and according to the curves, adjust the running speed in time to ensure the compressor running safely.



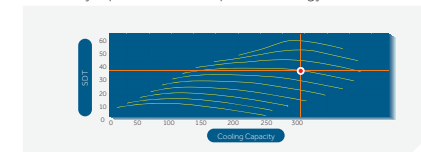
Safety operation

In the case of a power outage, the compressor is fully protected. Motor becomes a generator and charge capacitors. There is 60 seconds of power reserved in capacitors. Touchdown bearings are used as a back up bearing system for catastrophic failure.

Comfort

Flexible capacity adjustment

When condensing temperature goes down or the heat load is decrease, the compressor speed will reduce, the system control the refrigerant output from 2%-100% of the rated load freely, optimize the compressor energy.



Silence and less vibration, more comfortable

Fully frictionless operation. The device vibration is close to 0. Low running noise. Lower than *70dB(A), while the normal chiller's is higher than 85dB(A). Haier chiller doesn't need the anti-vibration parts.

* For water-cooled model [air-cooled model is 75dB(A)]

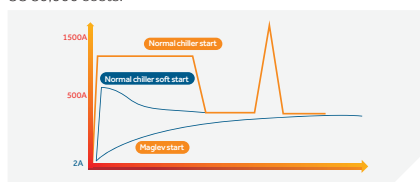
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Low Cost

Low installation and maintenance costs

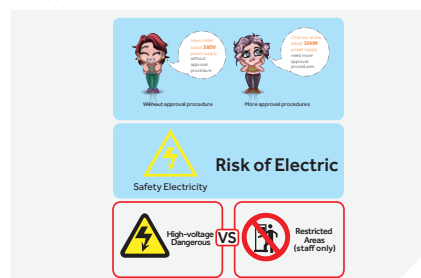
Low start current

Because the bearing adopt magnetic bearing system technology, when the system start up, only 2A current is necessary to suspend the axis, low starting torque, which results in low interference for electricity net. Only 2A start current for single compressor unit. The normal chiller start current can reach 1500A. Because the unit adopt Low start current, the installed don't need soft starter which will save US 80,000 costs.



High applicability and low installation costs

The unit adopts 380V power supply, then 10KV power supply is not required. It will be much safer since the examination and approval process are not required either.



Oil-free system, low maintenance costs

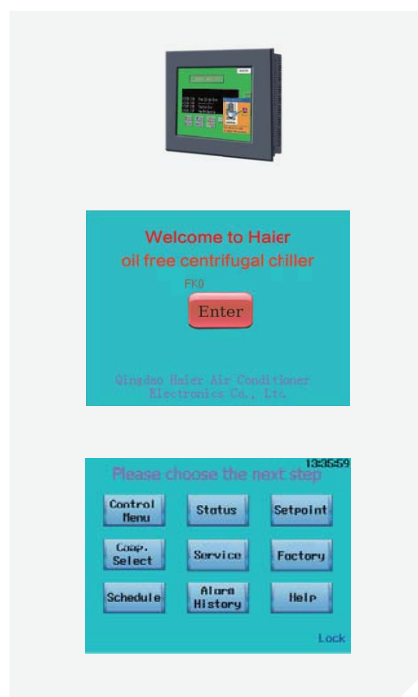
The unit adopts no oil in the chiller means no oil contamination over time, so design efficiency is maintained effortlessly. This design can save as much as US 60,000 maintenance costs during the life cycle.



Convenience

Advanced control system and convenient operation

Big LCD touch screen. Chinese and English are selectable
Calendar
Fault inquiries
Water system equipment interlocking
Remote control
Unit operation parameters quick inquiry



BMS function

The unit can realize BMS function; meanwhile, remote control function can be combined with interlock function and timer running function, to realize non-person control.

Easy Installation

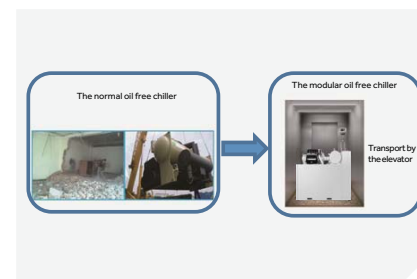
More compact and lighter

Compared with normal oil free centrifugal chiller, the modular chiller is lighter and smaller.



Easy to transport

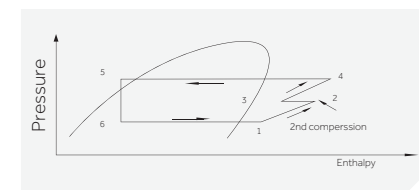
Because the modular oil free centrifugal chiller is compact, so it is easy to transport by the elevator.



Equipment Principle

Twin-stage compression

The high temperature and high pressure refrigerant will be discharged from the compressor (No.4), and enter the condenser, releasing the heat energy to the cooling water in pipe, then change into the med temperature and high pressure gas (No.5). after passing by the throttle valve, refrigerant turns into the low temperature and low pressure gas, next it enters the evaporator, turning into gas with low temperature and low pressure (No.1) by absorbing the energy from the chilled water (12/7°C) flowing by the pipe in evaporator. after that the gas will be compressed in compressor to turn to high temperature and high pressure liquid and be discharged again.

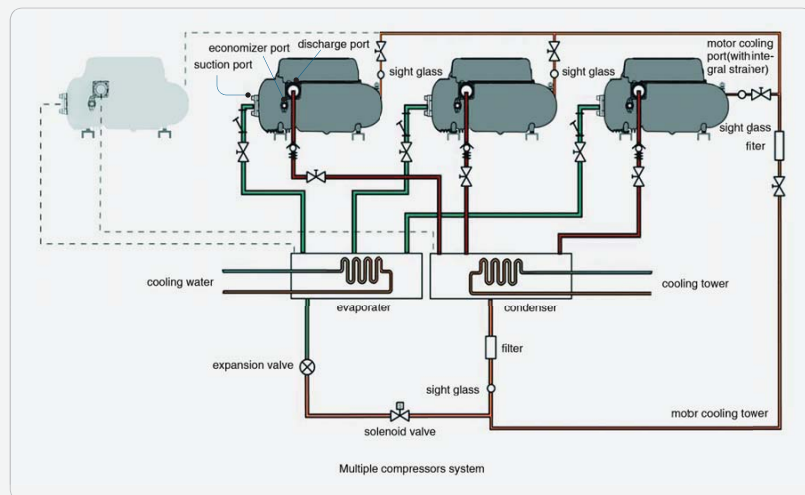
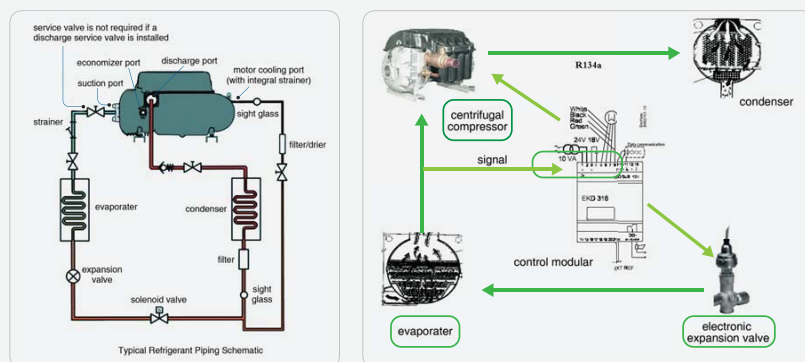


System control principle

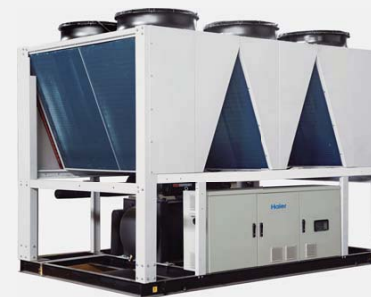
The unit will count the air return overheat state due to the air return temperature, then send signal to the control module. the control module will send directly to the centrifugal compressor and the electronic expansion valve. so the centrifugal compressor will adjust the revolution rate, and the electronic expansion valve will adjust the flowing volume. the load control can be adjusted at random, saving energy greatly.

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System circuit



AIR-COOLED OIL FREE CENTRIFUGAL CHILLER

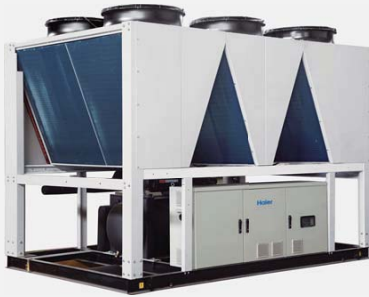


Model			CC0320PANI	CC0440PANI	CC0640PANI	CC0760PANI	CC0880PANI
Combination			A	B	2*A	A+B	2*B
Cooling capacity		kW	320	440	640	760	880
Total Power input		kW	93.3	125	181.8	214.7	246.5
EER			3.43	3.52	3.52	3.54	3.57
IPLV_AHRI		kW/kW	6.11	6.28	6.13	6.31	6.31
Starting current(Compressor)		A	2	2	2	2	2
Max. running current		A	180	280	360	460	560
Power supply		Ph/V/Hz	3/380/50				
Refrigerant throttle type			Electronic expansion valves				
Capacity control			2%-100%				
Safe protection			Overload protection, safe protection, water-lack delay protection,automatic antifreezing protection,fan motor overload protection,phase lack & sequence protection				
Compressor	Type		Magnetic bearing compressor				
	Quantity		1	1	2	2	2
Refrigerant	Type		R134a				
	Charge	kg	215	270	430	485	540
Air side heat exchanger	Type		High efficiency copper tube+hydroponic aluminum foil				
	Fan typ		Axial fan with low noise				
	Fan quantity		6	8	12	14	16
Water side heat exchanger	Type		Flood type shell & shell heat exchanger				
	Rated water flow	m³/h	60	75	118	135	150
	Inlet/outlet pipe	DN	150	150	150	150	150
	Water dirt coefficient	m².°C/kW	0.0172				
	Standard pressure	MPa	1				
	Water side resistance	KPa	60	70	60	70	80
External dimension	Unit length	mm	4060	5260	7690	8890	10090
	Unit width	mm	2600	2600	2600	2600	2600
	Unit height	mm	2660	2660	2660	2660	2660
Weight	Net weight	kg	2820	3320	5680	6180	6680
	Gross weight	kg	2900	3420	5880	6400	6920
	Operation weight	kg	3055	3700	6200	6835	7490

Note:

- 1. Nominal working condition (cooling water inlet temp: 12°C, water outlet temp: 7°C, ambient temp: 35°C). Water FOULING FACTOR dirt coefficient 0.172m²/h·kW.
- 2. Above parameters is based on the standard products (No special anticorrosive processing).
- 3. Above products standard pressure is 1.0 MPa (if pressure higher than 1.0 MPa, should contact with hailer technology engineer)
- 4. Operating ambient temperature range: 9~43°C.
- 5. Except CC0320PANI/CC0350PANI/CC0404PANI/CC0530PANI model, other is combination also separately transport.
- 6. Due to policy of innovation some specifications maybe changed without notification.

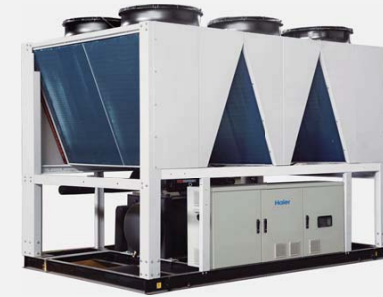
AIR-COOLED OIL FREE CENTRIFUGAL CHILLER



Model			CC0960PANI	CC1080PANI	CC1200PANI	CC1320PANI
Combination			3*A	2*A+B	A+2*B	3*B
Cooling capacity	kW		960	1080	1200	1320
Total Power input	kW		265.2	298.3	331.5	364.6
EER			3.62	3.62	3.62	3.62
IPLV_AHRI	kW/kW		6.30	6.29	6.30	6.30
Starting current(Compressor)	A		2	2	2	2
Max. running current	A		540	640	740	840
Power supply	Ph/V/Hz		3/380/50			
Refrigerant throttle type			Electronic expansion valves			
Capacity control			2%-100%			
Safe protection			Overload protection, safe protection, water-lack delay protection, automatic antifreezing protection, fan motor overload protection, phase lack & sequence protection			
Compressor	Type		Magnetic bearing compressor			
	Quantity		3	3	3	3
Refrigerant	Type		R134a			
	Charge	kg	645	700	755	810
Air side heat exchanger	Type		High efficiency copper tube+hydroponic alumininum foil			
	Fan typ		Axial fan with low noise			
	Fan quantity		18	20	22	24
Water side heat exchanger	Type		Flood type shell & shell heat exchanger			
	Rated water flow	m³/h	180	186	206	220
	Inlet/outlet pipe	DN	250	250	250	250
	Water dirt coefficient	m².°C/kW	0.0172			
	Standard pressure	MPa	1			
	Water side resistance	KPa	40	42	43	45
External dimension	Unit length	mm	11320	12520	13720	14920
	Unit width	mm	2600	2600	2600	2600
	Unit height	mm	2660	2660	2660	2660
Weight	Net weight	kg	8580	9080	9580	9960
	Gross weight	kg	8860	9380	9900	10380
	Operation weight	kg	9325	9970	10615	11280

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AIR-COOLED OIL FREE CENTRIFUGAL CHILLER



Model			CC1400PANI	CC1520PANI	CC1640PANI	CC1760PANI
Combination			3*A+B	2*A+2*B	A+3*B	4*B
Cooling capacity		kW	1400	1520	1640	1760
Total Power input		kW	387.8	419.9	449.3	482.2
EER			3.61	3.62	3.65	3.65
IPLV_AHRI		kW/kW	6.30	6.30	6.30	6.29
Starting current(Compressor)		A	2	2	2	2
Max. running current		A	820	920	1020	1120
Power supply		Ph/V/Hz	3/380/50			
Refrigerant throttle type			Electronic expansion valves			
Capacity control			2%-100%			
Safe protection			Overload protection, safe protection, water-lack delay protection, automatic antifreezing protection, fan motor overload protection, phase lack & sequence protection			
Compressor	Type		Magnetic bearing compressor			
	Quantity		4	4	4	4
Refrigerant	Type		R134a			
	Charge	kg	915	970	1025	1080
Air side heat exchanger	Type		High efficiency copper tube+hydroponic alumininum foil			
	Fan typ		Axial fan with low noise			
	Fan quantity		26	28	30	32
Water side heat exchanger	Type		Flood type shell & shell heat exchanger			
	Rated water flow	m³/h	241	270	282	300
	Inlet/outlet pipe	DN	250	250	250	250
	Water dirt coefficient	m².°C/kW	0.0172			
	Standard pressure	MPa	1			
	Water side resistance	KPa	52	55	62	70
External dimension	Unit length	mm	16150	17350	18550	19750
	Unit width	mm	2600	2600	2600	2600
	Unit height	mm	2660	2660	2660	2660
Weight	Net weight	kg	12080	12530	13000	13430
	Gross weight	kg	12360	12860	13360	13880
	Operation weight	kg	13225	13830	14465	15000

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