



 **DEKON** WATER-COOLED CENTRIFUGAL CHILLER

Ningbo Dekon Refrigeration Equipment Co., Ltd, a large-scale industry and trade integrated company , is one of the leading manufacture and supplier for air conditioner products and ventilation systems in China. Products focus on air cooled or water cooled chiller; air handling units; water fan coil units; VRF air conditioner; light commercial air conditioner and special function industrial air conditioner.

Designing and manufacturing a wide range of A/C and ventilation products, we can supply models for use in residential apartments, houses, commercial buildings, hotels, shopping malls and public venues. Marketing all series under our proprietary brand "DEKON" , we can also complete ODM and OEM orders as per customers' requirements.

DEKON strives for better air in your home, hotel, shopping Center and office buildings. And our aim is to supply our air conditioner product to each corner of the world !



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## NOMENCLATURE



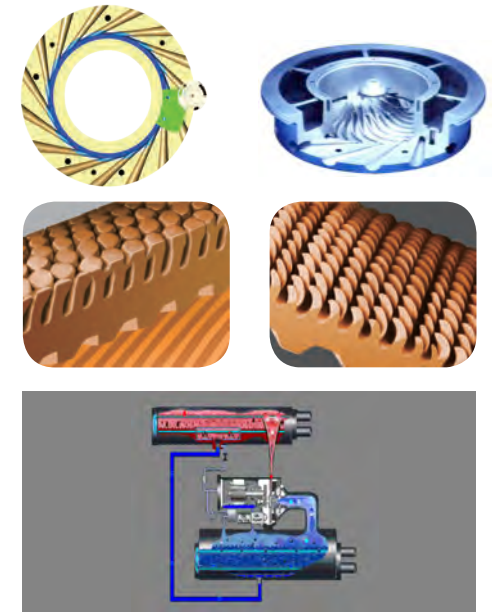
WCF 800 A C A

Power Supply:  
 A – 380V/50Hz/3ph  
 K – 10kV/50Hz/3ph  
 Type: C-Cooling only  
 Design Code: A, B,.....  
 Specification:800,900  
 Water-Cooled Centrifugal  
 Chiller

## FEATURES

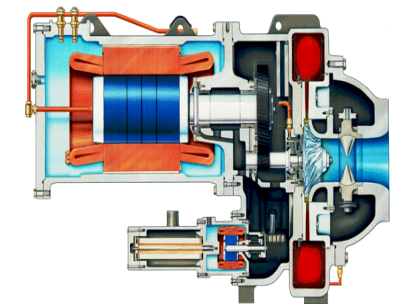
### 1 High Efficiency

- The keys components of the compressor are produced with cutting-edge technologies shared by **Carrier's** mother company UTC as used in its aerospace engine design.
- It applies a split ring diffuser (**SRD**) to enhance compressor efficiency. The inner ring of the SRD rotates as the workload changes to adjust the airflow area and direction, which greatly improves its IPLV and stability under part load.
- The adoption of the latest enhanced copper tubes increases heat exchange rate by minimizing thermal resistance; therefore, the design saves refrigerant charge and maintenance costs.
- The advanced linear floating valve system modulates the refrigerant flow passing through the throttle valves in accordance with working condition to build a natural liquid seal, which prevents the air from entering into the evaporator, thus ensures the performance under part load.



### 2 Stability and Reliability

- The semi-hermetic motor adopts liquid injection for motor cooling characterized by low operation temperature and high efficiency. The design not only limits the risk of refrigerant and lubricating oil leakage, but also reduce heat dissipation to the machine room, so the initial cost of cooling devices and operation control boxes is saved.
- Compared with multi-stage compression, efficient single-stage compression offers higher reliability, since it requires less moving parts.
- The unique grooved-tube-plate design effectively reduces leakage by better fitting between the copper tubes and the plate.



### 3 Advanced Design

- The unit adopts a compact positive pressure design, which, compared with a negative pressure design, saves floor space by more than 35% since no extra air separation devices are needed.
- Installation cost is reduced in that the lubricating oil is directly cooled by refrigerant in the oil cooler without additional cooling water pipes.
- When the chiller is equipped with isolation valves, the heat-exchanger can function as a liquid receiver, hence no need for a refrigerant recycle system, making maintenance easily.

- The reliability of the chiller is largely improved by the specially-designed remotely located starter in handling power supply fluctuations with its multiple protection features, such as a main breaker attached with a shunt tripping device, three-phase current phase-to-phase/ phase-to-ground imbalance protection and phase loss/ reversal/ imbalance protection.
- Soft Stop: The unit turns down the IGV structure after receiving shutting-down order, and the motor keeps functioning until the current drops to preset value, so the contactor is more durable in use.

#### 4 Easy Operation

- The pipe can be fitted with lathedogs or flanges, enabling easy installation.
- Big Screen Display: The new-generation microprocessor integrated control system (PICII ICVC), using Chinese LED display and menu management, realizes easy operation status check and convenient maintenance. Besides English, Japanese and Korean are also available.



- The unit can make an automatic control inspection before start up. The PICII ICVC system can be integrated with comfort control interface or other building control networks via communication protocol switch module. Standard protocols: BACnet/ Modbus/ Lonwork.

#### 5 Multiple Starting Options

- The standard configurations of WCF low-voltage (380V) starter is remote star-triangle, and solid-state soft starter as an option. The latter one is equipped with a main breaker attached with a shunt tripping device, three-phase current phase-to-phase/ phase-to-ground imbalance protection and a built-in bypass contactor, which can avoid harmonic interference when motor speeds up.
- The unit can also be equipped with a high-voltage starter to maintain efficient operation when the power supply is 10kV. The starter is configured with a shunt trip switch, a high-voltage fuse and an over-voltage absorber. Working together with a multiple-protection ISM starter control module, the starter is able to guarantee the safe start-up and operation of the HV motor.
- Shunt trip switch functions:
  - ★ Motor short circuit and overload protections.
  - ★ Working with starter protection module to better protect motor.
  - ★ To protect human and equipment when in overhaul period.

### MICROPROCESSOR CONTROL SYSTEM

The microprocessor is in charge of the auto control operation, protection, interlocked control and necessary information display of the unit. Programmed logic control ensures the proper startup, shutting down and recycling of the unit, as well as connection to a comfort control network.

The microprocessor is installed, wired and tested by the manufacturer to ensure safety and capacity control.

#### LED display

- Component test & diagnosis.
- Programmed recycling to keep operation under optimal workload and cut down operation cost.
- Menu display indicating working condition, control and system settings. Major/Minor info. Starting & stopping time.
- Record of the latest 25 alarms to assist problem diagnosis.
- PIC II control system can manage the integrated control of three units. The optional soft unloading function turns down the guide vanes until the unit shuts down to reduce motor current and protect electronic components.

#### Safety Stop

Bearing oil temperature high	Power loss	Refrigerant (subcooler) pressure high**
Lubricating oil low pressure drop	High voltage**	Refrigerant (evaporator) pressure low**
Oil pump voltage overload	Low voltage**	Compressor (refrigerant) discharge temperature high*
Prolonged motor acceleration	Motor overload+	Loss of water supply in evaporator and condenser
Compressor starter malfunction	Minor ground fault	Compressor surge protection*
Motor temperature high**	Low voltage-phase to phase and phase to ground	

#### Display

Working condition	Power supply	Pre-start diagnosis	Compressor motor current	Pre-alarm**
Remote alarm button	Alarm	Safe stopping info	Operation time	Input power

#### Capacity Control

Outlet water temperature control	Inlet water temperature control	Guide vane modulating device
Hot gas bypass	Demand control	Loading control through temperature or loading rate

#### Interlock Control

Manual/Autoremove start up	Starting/ stopping order	Pre-lubricating/After-lubricating
Water flow pre-flow/ after-flow	Compressor starter interlockedoperation	Low temperature water recycl
Examination of safety and warningdevices before start up		

#### ★ Notes

- A limit is set according to operation status and user's demand, exceeding which would trigger the alarm.
- + Protection privilege: 1. Restrict workload; 2. Trigger safety stopping if necessary.
- \*\* Automatic reset after power supply resumption, no need for manual reset or warning.
- ++ Indicate code only.

SPECIFICATIONS

WCF(R134a)Series Water-cooled Centrifugal Chiller ( 380V )

Model	WCF-ACA	300	350	400	450	500	550	599	600	649	650	699	
Cooling Capacity	Ton	300	350	400	450	500	550	600	600	650	650	700	
	10 <sup>4</sup> kcal/h	91	106	121	136	151	166	181	181	197	197	212	
	kW	1055	1231	1407	1583	1759	1934	2110	2110	2286	2286	2462	
Power Input	kW	202	229	266	294	320	335	401	361	409	382	451	
(AHRI)IPLV		5.58	5.85	5.82	5.98	6.00	6.40	5.85	6.31	6.15	6.52	5.95	
COP	W/W	5.24	5.38	5.29	5.38	5.49	5.78	5.26	5.85	5.59	5.99	5.46	
Running Current	A	354	392	461	515	555	580	702	631	712	671	777	
Starting Current	A	896	782	916	1119	1122	1122	1357	1357	1637	1521	1637	
Evaporator	Water Flow	m <sup>3</sup> /h	181	212	242	272	303	333	363	363	393	423	
	Water Pressure Drop	kPa	86	84	107	78	78	71	69	69	73	67	84
	Pipe DN	mm	200	200	200	200	200	200	200	200	200	200	
Condenser	Water Flow	m <sup>3</sup> /h	216	251	288	323	358	390	432	425	464	501	
	Water Pressure Drop	kPa	67	88	86	79	78	52	61	70	62	70	72
	Pipe DN	mm	200	200	200	200	200	250	250	250	250	250	
Dimension	Length	mm	4172	4172	4172	4365	4365	4460	4460	4460	4460	4460	
	Width	mm	1707	1707	1707	1908	1908	2054	2054	2054	2054	2054	
	Height	mm	2073	2073	2073	2153	2153	2137	2207	2207	2207	2207	
Refrigerant Charge	kg	371	396	396	483	508	609	493	493	510	524	510	
Operation Weight	kg	6555	6677	6805	7970	8212	9315	9719	9967	10239	10549	10239	
Transportation Weight	kg	5725	5791	5884	6678	6828	7612	8110	8393	8558	8864	8558	

Model	WCF-ACA	700	749	750	799	800	900	1000	1100	1200	1300	1400	1500	
Cooling Capacity	Ton	700	750	750	800	800	900	1000	1100	1200	1300	1400	1500	
	10 <sup>4</sup> kcal/h	212	227	227	242	242	272	302	333	363	393	423	454	
	kW	2462	2638	2638	2814	2814	3164	3517	3869	4220	4572	4924	5276	
Power Input	kW	414	467	438	487	456	516	573	646	717	754	822	865	
(AHRI)IPLV		6.50	6.06	6.61	6.28	6.71	6.67	6.78	6.50	6.40	6.59	6.48	6.78	
COP	W/W	5.95	5.65	6.02	5.78	6.17	6.13	6.13	5.99	5.88	6.06	5.99	6.10	
Running Current	A	716	817	769	850	799	896	976	1091	1222	1389	1396	1466	
Starting Current	A	1637	1794	1794	1794	1794	1794	1837	2362	3276	3276	3276	3276	
Evaporator	Water Flow	m <sup>3</sup> /h	423	454	454	484	484	544	605	665	726	786	847	907
	Water Pressure Drop	kPa	84	77	58	73	73	74	109	90	73	73	96	83
	Pipe DN	mm	200	250	250	250	250	300	300	300	350	350	350	350
Condenser	Water Flow	m <sup>3</sup> /h	495	534	529	568	562	633	704	777	849	916	988	1056
	Water Pressure Drop	kPa	71	80	64	73	79	80	97	86	78	90	104	85
	Pipe DN	mm	250	250	250	250	250	300	300	300	350	350	350	350
Dimension	Length	mm	4460	5000	4480	5000	5000	5156	5156	5156	5200	5200	5200	5200
	Width	mm	2054	2124	2124	2124	2124	2426	2426	2426	2711	2711	2711	2711
	Height	mm	2207	2261	2261	2261	2261	2750	2750	2985	3029	3029	3029	3029
Refrigerant Charge	kg	510	619	579	657	657	1020	1020	874	984	1028	984	1075	
Operation Weight	kg	10592	11797	11570	12259	12497	15575	16354	18165	20675	20982	20739	21965	
Transportation Weight	kg	8931	9735	9589	10029	10305	12787	13381	15121	16938	17125	17003	17754	

★ Notes

1. The parameters are based on following working condition: chilled water inlet/outlet temperature 12°C/7°C, cooling water inlet/outlet temperature 30°C/35°C.
2. For other working conditions or capacity parameters, please contact
3. The maximum starting current is the one from Y-Δ starting type.
4. Power supply as in the table: 380V~50Hz~3ph, voltage fluctuation limit ±10%.
5. Standard water pressure limit: 1.0MPa, optional water pressure limit: 1.6MPa, 2.0MPa.
6. Refrigerant weight is not included in the transportation weight.
7. There will be no further notice if the parameters changes due to product optimization.

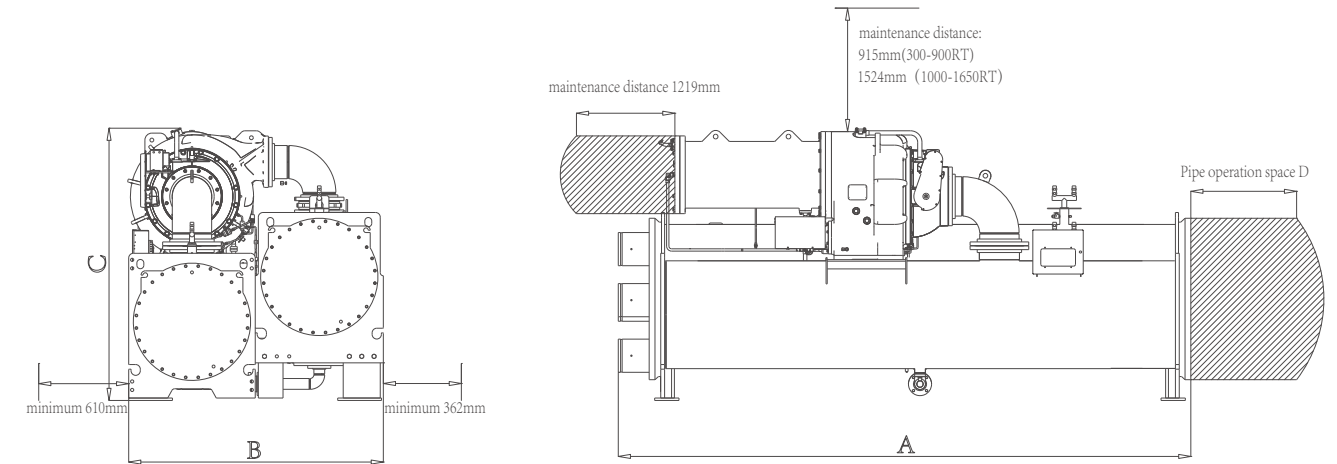
WCF(R134a) Series Water-Cooled Centrifugal Chiller(10kV )

Model	WCF-ACK	1000	1100	1200	1300	1400	1500	1650	
Cooling Capacity	Ton	1000	1100	1200	1300	1400	1501	1650	
	10 <sup>4</sup> kcal/h	302	333	363	393	423	454	499	
	kW	3517	3869	4220	4572	4924	5276	5803	
Power Input	kW	619	685	734	796	867	907	987	
(AHRI)IPLV		6.28	6.12	6.26	6.25	6.15	6.46	6.49	
COP	W/W	5.68	5.65	5.75	5.75	5.68	5.81	5.88	
Running Current	A	42	46	49	53	58	61	64	
Starting Current	A	200	231	244	244	244	244	299	
Evaporator	Water Flow	m <sup>3</sup> /h	605	665	726	786	847	907	998
	Water Pressure Drop	kPa	109	129	73	73	96	83	148
	Pipe DN	mm	300	300	350	350	350	350	350
Condenser	Water Flow	m <sup>3</sup> /h	711	783	852	923	996	1064	1168
	Water Pressure Drop	kPa	97	117	78	90	104	85	136
	Pipe DN	mm	300	300	350	350	350	350	350
Dimension	Length	mm	5156	5156	5200	5200	5200	5200	5810
	Width	mm	2426	2426	2711	2711	2711	2711	2711
	Height	mm	2750	2985	3029	3029	3029	3029	3029
Refrigerant Charge	kg	1020	1020	984	1028	984	1075	1420	
Operation Weight	kg	17084	18746	21113	21356	21113	22338	24551	
Transportation Weight	kg	14111	15767	17376	17498	17376	18127	19955	

★ Notes

1. The parameters are based on following working condition: chilled water inlet/outlet temperature 12°C/7°C, cooling water inlet/outlet temperature 30°C/35°C.
2. For other working conditions or capacity parameters, please contact
3. Power supply as in the table: 380V~50Hz~3ph, voltage fluctuation limit ±10%.
4. Standard water pressure limit: 1.0MPa, optional water pressure limit: 1.6MPa, 2.0MPa.
5. Refrigerant weight is not included in the transportation weight.
6. There will be no further notice if the parameters changes due to product optimization.

DIMENSIONS



Model WCF-ACA	Length A (2 pass) mm	Width B mm	Height C mm	Tube Removal Space D (Two ends) mm
300	4172	1707	2073	3747
350	4172	1707	2073	3747
400	4172	1707	2073	3747
450	4365	1908	2153	3747
500	4365	1908	2153	3747
550	4460	2054	2137	3747
599	4460	2054	2207	3747
600	4460	2054	2207	3747
649	4460	2054	2207	3747
650	4460	2054	2207	3747
699	4460	2054	2207	3747
700	4460	2054	2207	3747
749	5000	2124	2261	4343
750	4480	2124	2261	3747
799	5000	2124	2261	4343
800	5000	2124	2261	4343
900	5156	2426	2985	4267
1000	5156	2426	2985	4267
1100	5156	2426	2985	4267
1200	5200	2711	3029	4267
1300	5200	2711	3029	4267
1400	5200	2711	3029	4267
1500	5200	2711	3029	4267

Model WCF-ACK	Length A (2 pass) mm	Width B mm	Height C mm	Tube Removal Space D (Two ends) mm
1000	5156	2426	2985	4267
1100	5156	2426	2985	4267
1200	5200	2711	3029	4267
1300	5200	2711	3029	4267
1400	5200	2711	3029	4267
1500	5200	2711	3029	4267
1650	5810	2711	3029	4877

★ Notes

1. Flanges are included in Length A. The evaporator and condenser are composed with two passes, and the pipes are at the same side (the motor side in standard unit).
2. The above figures are based on water-side pressure 1.0MPa. Length A is subjected to changes according to water-side pressure increase.

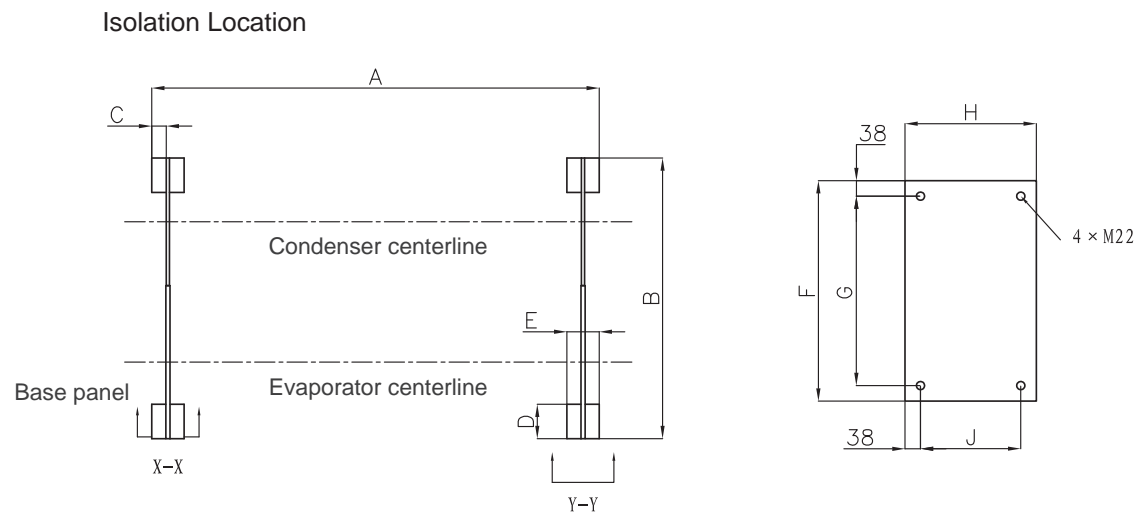
Starter Cabinet Dimension (Remote)

Voltage	Starter Type	Rated Current (A)	Width (mm)	Depth (mm)	Height (mm)
380V	Star Triangle	" < 740	800	600	2000
		740-1560"	1000	600	2000
380V	Solid State Starter	" < 1157	1200	800	2000
		1157-1550"	1600	800	2000
10KV	Direct on line starter Primary side reactance		1000	1660	2600
			2000	1660	2600

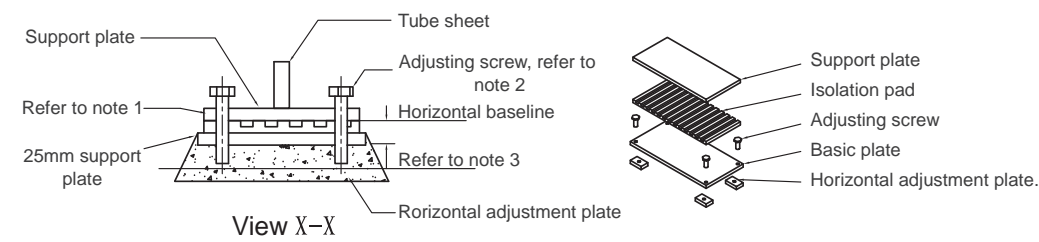
★ Notes

1. The wiring of the starter in 380V is top in top out.
2. The wiring of the starter in 10kV is top in top out.
3. For other wiring types, please contact
4. For dimensions of starters equipped with capacitance compensator, please contact local offices.
5. The entrance and exit openings of the starter should be water proof.

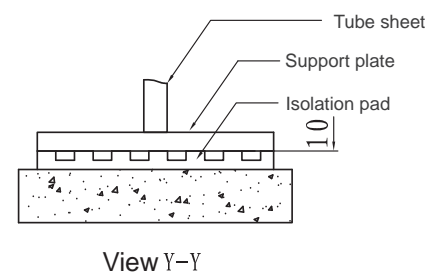
BASIC ISOLATION TYPES



Standard Isolation Types



Simple Isolation Types



WCF(R134a) Foundation Dimension Chart

Model WCF-ACA	A	B	C	D	E	F	G	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	3931	1632	92	387	229	540	464	254	178
350	3931	1632	92	387	229	540	464	254	178
400	3931	1632	92	387	229	540	464	254	178
450	3931	1829	92	387	229	540	464	254	178
500	3931	1829	92	387	229	540	464	254	178
550	3931	1969	92	387	229	540	464	254	178
599	3931	1969	92	387	229	540	464	254	178
600	3931	1969	92	387	229	540	464	254	178
649	3931	1969	92	387	229	540	464	254	178
650	3931	1969	92	387	229	540	464	254	178
699	3931	1969	92	387	229	540	464	254	178
700	3931	1969	92	387	229	540	464	254	178
749	4451	2070	92	387	229	540	464	254	178
750	3931	2070	92	387	229	540	464	254	178
799	4451	2070	92	387	229	540	464	254	178
800	4451	2070	92	387	229	540	464	254	178
900	4620	2400	176	559	406	711	635	432	356
1000	4620	2400	176	559	406	711	635	432	356
1100	4620	2400	176	559	406	711	635	432	356
1200	4620	2686	176	559	406	711	635	432	356
1300	4620	2686	176	559	406	711	635	432	356
1400	4620	2686	176	559	406	711	635	432	356
1500	4620	2686	176	559	406	711	635	432	356

Model WCF-ACK	A	B	C	D	E	F	G	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm
1000	4620	2400	176	559	406	711	635	432	356
1100	4620	2400	176	559	406	711	635	432	356
1200	4620	2686	176	559	406	711	635	432	356
1300	4620	2686	176	559	406	711	635	432	356
1400	4620	2686	176	559	406	711	635	432	356
1500	4620	2686	176	559	406	711	635	432	356
1650	5230	2686	176	559	406	711	635	432	356

★ Notes

1. Each unit requires 4 base plates, 16 adjusting screws and 16 horizontal adjustment plates.
2. The adjusting screws should be removed after concrete casting.
3. The depth of a second cement casting is determined by the user according to the need of horizontal adjustment.

## Daily Maintenance and Care

It is advised to record the daily operation data, and keep the unit maintained and cared periodically

- 1, The air-side units, and other parts of water system should be checked before put into use.
- 2, Maintenance and care should be done as advised below.

### Routine Examination Procedure

Examine operation status; record and analyze working condition;

Check the level and color of the lubricating oil in the compressor.

Check the pressure, pressure drop and temperature of supply oil and the operation of the oil cooling expansion valves. Add lubricating oil (provided by the user) if necessary.

Check the unit for abnormal noise or vibration.

Check the evaporating and condenser temperature as well as the temperature differences between inlet cooling water and outlet chilled water.

Check the real current of the motor against the power demand of the unit.

Check if guide vane modulating device is working properly.

If equipped, check the functioning of the diffuser modulating device.

Supply examination results on a periodical basis.

### Annual Maintenance Procedure

Change the oil filter and its seal.

Check the oil circuit and the oil-cooling system; change the oil return and injection filters.

Change compressor lubrication oil;

Examine the refrigerant cooling circuit; change the refrigerant filter.

Remove the condenser lid at the water side, and clean (mechanically) the heat transfer tube.

Test the pressure leak of the unit.

Vacuum the unit for dehumidifying and vacuum testing.

Recharge refrigerant as indicated in the nameplate.

Remove the safety valves of the evaporator and the condenser, and party A (the owner) submits them to the examination of designated national test facilities;

Test the insulation of compressor motor and oil pump motor;

Simulation tests to examine the function of the modulating devices of the guide vanes and the diffuser (if equipped).

Check the unit with ICVC module; analyze the alarm record and react.

Check and recalibrate the pressure sensor.

Provide annual maintenance report of the unit.

## Requirements of lubricating oil and filter replacement:

Lubrication replacement: lubricating oil should be replaced after the first 500 hours of operation. Afterwards, lubrication check is advised for every 2000 hours, and the oil should be changed annually.

Refrigerant filter: it needs change after the first 500 hours of service as well as every 2000 hours of use afterwards. The filter requires replacement as long as its pressure drop exceeds 2bar, at least once a year or more frequent if necessary.

Oil recovery filter: the oil recovery filter, located at the injector, compressor suction and discharge ports, needs substitution after the first 500 hours of service and examination every 2000 hours of use afterwards. The filter requires changing as long as its pressure drop exceeds 2bar, at least once a year or more frequently if necessary.

To change the oil recovery filter, one should shut down the oil recovery isolation valve, open the flare fitting slowly with a wrench and release the pressure.

Maintenance and care when the unit is left unused for a long time

①The water in the system, especially in the heat exchanger at the water side, should be emptied, and the power should be turned off if the unit will be left unattended for a long time or in the winter.

②Before restart, the system should be filled and cleansed with water, and the air in the water system should be discharged completely. Meanwhile, the power line (from the distribution box to the inlet unit) should be checked as intact. After that, the unit should be electrified and preheated for 24 hours before started up.

③The equipment can be treated according to pre-use maintenance procedure if necessary.

### ★ Notes:

1, Spare parts can be purchased

2, The maintenance suggestions are based on normal working condition. It is subjected to variations in unfavorable situations.





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