

Westair
Industries, Inc.



**FLOODED TYPE WATER
COOLED SCREW CHILLER**
WKCWF Series

Contents

- Introduction02
- Product Features02
- Application02
- Unit Features03
- Characteristics & Advantages06
- Unit Components06
- Model Nomenclature06
- PLC Control System07
- Single Compressor Unit Specification (R22)08
- Double Compressor Unit Specification (R22)09
- Single Compressor Unit Performance (R22)11
- Double Compressor Unit Performance (R22)13
- Single Compressor Unit Specification (R134a)15
- Double Compressor Unit Specification (R134a)16
- Single Compressor Unit Performance (R134a)18
- Double Compressor Unit Performance (R134a)20
- R22 Single Compressor Unit Dimension22
- R22 Double Compressor Unit Dimension23
- R134a Single Compressor Unit Dimension24
- R134a Double Compressor Unit Dimension25
- Unit Shifting & Lifting Installation26
- Water Flow Switch Installation27
- Wiring28
- Water Quality Treatment29

Our Dream Product

High Performance Chiller

Nowadays, most screw chiller manufacturers only emphasize the equipment cost and neglect the unit performance. In the present shortage material world, Westair never stops fulfill the customers' requirements and based on the future world environmental and enhanced the energy consumption efficiency responsibility, we have provided a new generation high performance and reliable flooded type water cooled screw chiller by combining Westair 40 years HVAC technology and manufacturing skill. With the super high 5.4 COP, westair has been ranked with this product range in advanced international standard.



Introduction

This product range is mainly constructed by electrical driven screw compressor, high efficiency heat exchanger and advanced throttle device etc. , used to provide cooling capacity for the centralize air conditioning system and industrial application.

Product Features

Westair flooded type water screw chiller applies reliable screw compressor and new advance heat exchanger, its COP 5.4 reduces the operation cost effectively. It also contributes the friendly environmental and great energy saving. This chiller model's screw compressor design is not only with high efficiency, low noise level and less wear and tear components.

The screw compressor normally does not perform the imbalance inertia force phenomenon (normally happen in reciprocating compressor) and also without unit surging (low load) & low operating efficiency problem (found in centrifugal compressor). Thus, the unit model can be used to perform in wide range of heating load.

Application

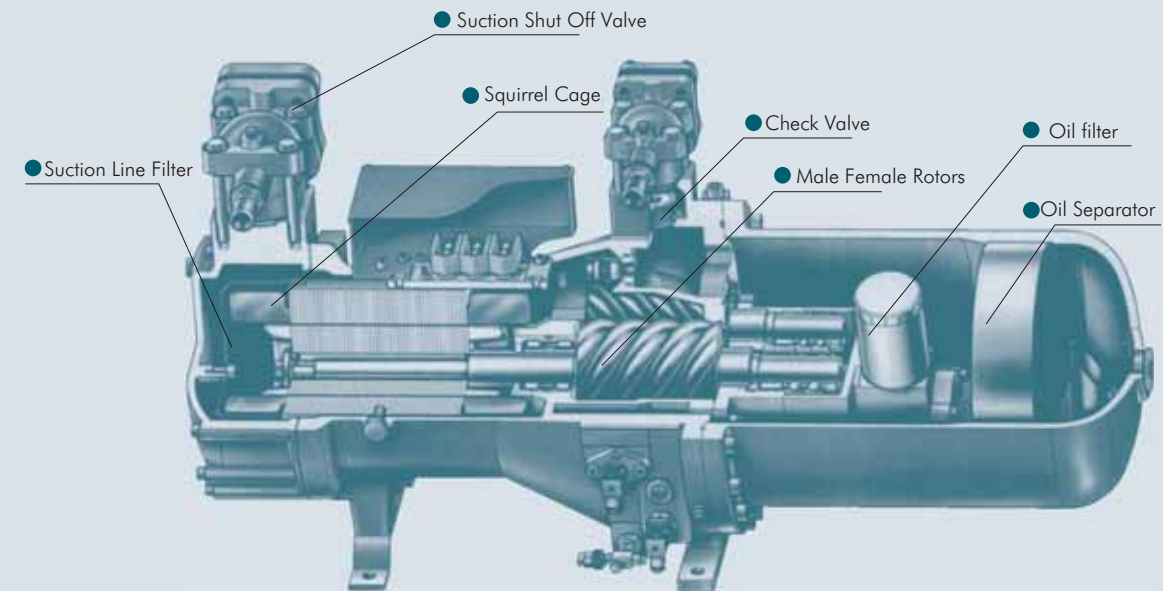
Westair screw water chiller not only have a strong bonding combination structure but also provide environment energy saving and intelligent control advantages. It is also widely used for hostel, restaurant, school, theater, commercial center, office block, condominium, hospital etc. And more importantly, It can be applied for use nuclear plant station, plastic injection molding, and precision tooling etc process cooling.

Thus, with the higher and higher standard of nation building energy saving regulation, Westair chiller will be more well accepted in the market.



Unit Features

Flooded Type Screw Compressor



- Male female rotors are manufactured and precisely machined to provide minimum clearance. They have a high volumetric efficiency, low noise and vibration and also reliable operating features.
- Special internal volumetric ratio design in flooded type evaporating condition has been applied to provide high compression ratio.
- Utilization of branded fluorine endurance motor in the compressor resulted in high efficiency and reliable. Motor is cooled down by the low temperature refrigerant, good thermal release and no leakage.
- Motor is direct driven with less moving components and wear tear. The mechanical drive efficiency is high.
- Oil supply is actuated by the differential pressure without the oil pump provided.
- A slide valve provides fully modulating capacity control to ensure smooth adaptation for the changes of heat load.

Flooded Type Evaporator Design

- The optimization design refrigerant distributor spreads out the heat exchanger temperature evenly and smaller refrigerant pressure drop. Evaporator tubes immerse entirely in the boiling refrigerant liquid. Thus, the total heat transfer rate is three time above the conventional evaporator, effectively enhanced the unit's cooling capability and efficiency.
- Low fin (FPI) evaporator tube surface is dense with many ring type gaps that forms the vapor nucleus for nuclearboiling creation, directly increase the tube outer heat exchange rate.
- Tube internal's reinforced heat transfer fin increase the water side turbulence heat exchange and reduce the fouling
- Chilled water flows inside the heat transfer tube, easy for fouling cleaning.
- Saturated suction vapor gas can increase the compressor compression rate and mass flow effectively.

Unit Features

Easy Flexible Installation & Commissioning

- Piping connection direction can be changed according to the customer requirement.
- To save the customer wiring cost, our unit control box is provided.
- Refrigerant and lubrication oil are provided to the unit in the factory. Only piping connection and power supply connection are required on the site.
- Each part with active connection, easy for maintenance.

Advanced Throttle device

- Apply sophisticated control logic and reliable throttle device; unit will determine precisely the heat load to automatically regulate the evaporator liquid volume.
- Expansion valve can rapid regulate the refrigerant flow precisely, to maintain the evaporator liquid level.
- During unloading operation, it has higher 'effective heat exchange surface area rate', so the integrated part load performance is higher.

Perfect Control System

- It applies world class branded PLC controller and user-friendly operation screen.
- It is equipped with multiple protection function, including high/low pressure, oil temperature, oil level, anti-frozen, overload and water flow switch etc. to ensure unit safe and reliable operating.
- It has condition display, parameter setting, capacity fuzzy logic control, faulty information etc. multi-control function.
- Unit capacity can be stepless regulated in wider range, to match with the actual heat load and directly enhance the integrated part load performance.

Unit Features

Reliable System Protection

- Compressor has applied multiple protection devices in order to avoid rotor jam and motor overheated.
- High low pressure, discharge temperature and operating current, water temperature monitoring control are ensuring the unit safe operating
- All the water flow switch, antifreeze protection, low pressure switch and water temperature control devices can eliminate the freezing crack possibility of the evaporator tube.

Twin Compressors Optimize Design

- Provide wider cooling capacity range.
- Consistent and reliable.
- Better integrated part load performance.
- Better unit structural combination.
- Longer lifespan for switching over two compressors during partial loads.

Reliable Oil Treatment System

- Oil supply is actuated by differential pressure, no need for oil pump.
- Compressor internal comes with high efficiency oil separator.
- Unique evaporator leads the concentrated oil returns.
- External mechanical and assemble with high efficiency oil separator.

Aesthetics Outlook Structure

- Unit assemble setup is tidy and tight combination with smaller unit volume.
- Aesthetic outlook with unique structure.

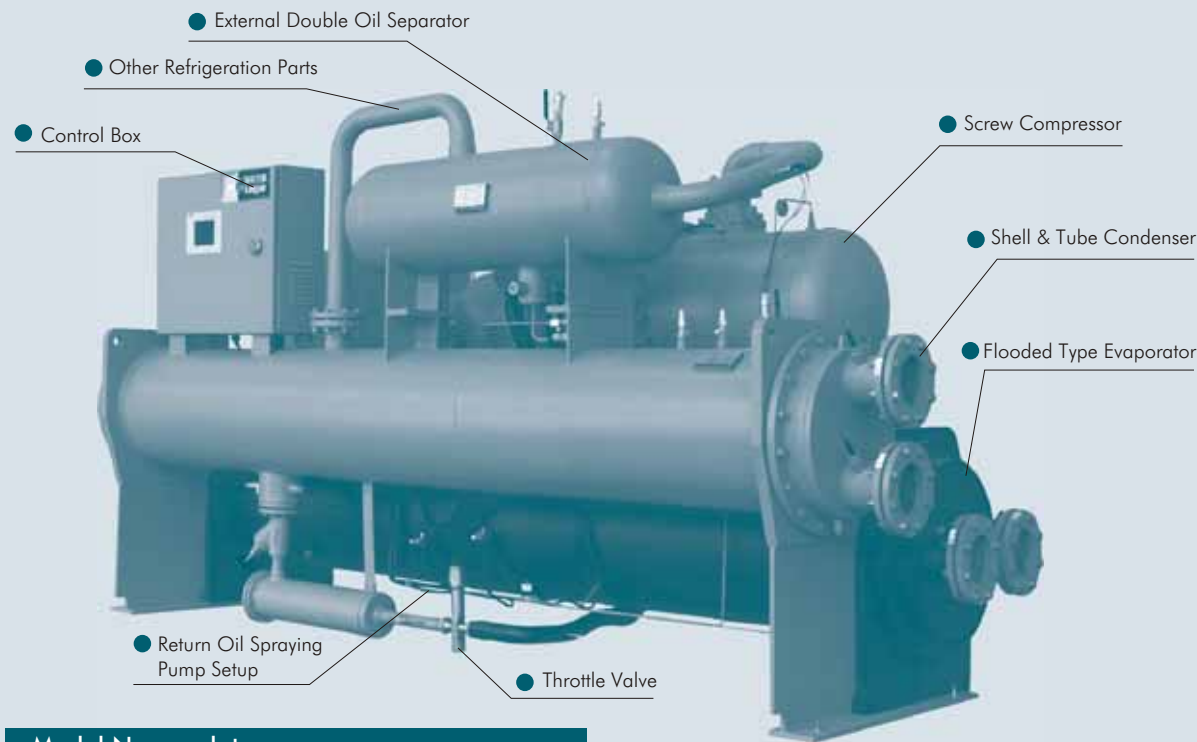
Friendly User Setting

- The customer can set the parameters according to the real operation condition hence achieving the best operation performance.
- The setting method is easy and direct.
- Provide several methods for water temperature control.

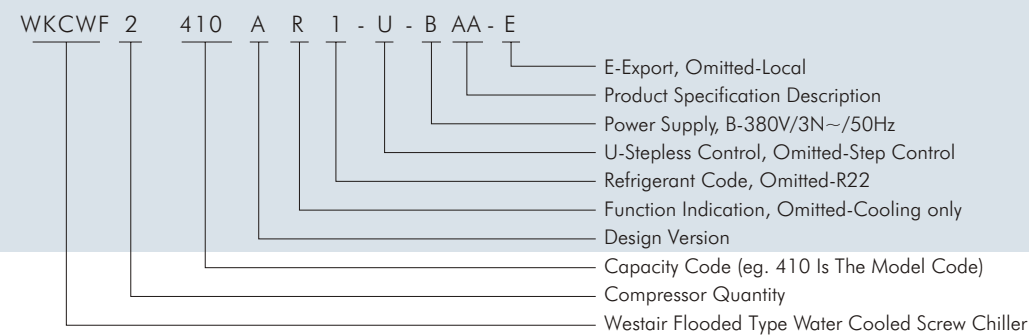
Characteristics & Advantages

- The flooded type evaporator design will increase the COP by 15%, with significant energy saving.
- Less moving part in screw compressor will provide better operation reliability, low noise and longer lifespan.
- The screw compressor normally doesn't perform imbalance inertia force and no liquid sugging problem, thus unit can consistence operates in long working hour.
- Flexible working condition range of the screw compressor can steady operate with 25%~100% capacity range without the effect of discharge pressure.
- Without the unit surging problem which happen in centrifugal compressor, the screw compressor can deliver higher integrated part load performance (IPLV=5.9).

Unit Components



Model Nomenclature



Note:

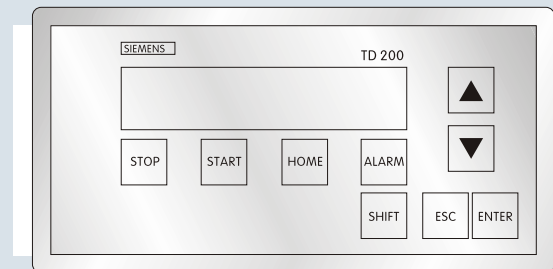
- WKCWF1080ARBAA - Westair Flooded Type Water Screw Chiller, Single Screw Compressor, R22 Refrigerant, Step Control With Model Code: 80
- WKCWF2410ARBAA - Westair Flooded Type Water Screw Chiller, Double Screw Compressors, R22 refrigerant, Step Control With Model Code: 410

PCL Control System

The unit is applying Siemens SIMATIC S7-200 range PLC controller that can utilize logic programming software, used for setting unit control logic and set parameters. The operation condition, control temperature, refrigeration pressure and other parameters can be monitored through display panel. Also, it can maximize the operation performance and reliability and automatic balance between the compressors working hours in order to extend the unit lifespan. Not only that, the controller is also playing role for individual operation or couple with other equipments to form a networking complex control system. By having the high reliability and strong communication capability, it can provide better functions in the group or district automatic control system.

Control panel is applying SIEMENS TD200 display panel (shown at right figure), the control functions consist of:

- 2 rows of LCD displays, each row can display 20 characters;
- Dismountable remote control keyboard.
- Cut off memory function;
- Faulty alarm, 35 history records displays;
- 3 levels password protection for parameter setting and editing;
- Unit operation time and condition displays.



The main functions of controller:

1. Faulty Self-diagnosis and Protection

When the compressor occurs the faulty such as high low pressure trips, compressor overloaded and internal protection, no water, oil temperature and too high or low voltage etc abnormal faulty, the unit control function will stop automatically the individual unit operation. Alarm will be activated and records the faulty content. The system based on the faulty effect to the unit operation, and the faulty will divide it into two categories: standard fault and serious fault. If the unit is operating, and the same standard faulty is repeated within 12 hours, the faulty will be considered as a serious faulty. And then, it can't automatically reset to operate again, unless it is manually reset.

2. Operation and Capacity Management Function

Every 24 hours, the system will calculate the accumulated operating time for every single unit. Priority to start operation is given to the unit with lowest accumulated operating time. However, the single unit unloads (download) will be the unit that have highest operating time. Directly, the two compressors operating time will be make equivalent and extend the overall unit lifespan. The unit will determine the heat load according to the value and the changes rate of the water temperature. It also applies fuzzy logic control theory for compressor stepless capacity control in order to reduce the power consumption and economically enhances the operation.

3. Display and Triple Password

Parameters editing can be divided into three levels: user level, maintenance level and manufacturer level. The user can set up the unit start stop, holiday operating timer and water inlet outlet temperature etc.

4. Remote Control

The unit is standard equipped with 2 RS-485 communication ports, can be directly connected to BAS. Available for PPI & MODBUS protocol, PROFIBUS for option.

Single Compressor Unit Specification (R22)

Model WKCWF		1080B	1100B	1120B	1150B	1180B	1200B	1220B	1255B	1270B	1310B	
Cooling Capacity	KW	253	318	382	483	580	625	706	820	880	1007	
	Kcal/h	217580	273480	328520	415380	498800	537500	607160	705200	756800	866020	
Total Input Power	KW	52.5	63.5	77.4	96	115.9	124	138	157.6	172.8	193.4	
Rated Current	A	96	118	138	171	208	217	252	279	305	340	
Power Supply	380V/3N~/50Hz											
Capacity Regulating	25%-100% Stepless or 4 stage unloading											
Compressor	Type	Semi-hermetic screw compressor										
	Starts Up	Y-Δ										
	Qty	1	1	1	1	1	1	1	1	1	1	1
	Oil Heater	W	300									
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger										
	Water Flow Rate	m ³ /h	44	55	66	83	100	108	121	141	151	173
	Pressure Drop	kPa	45	45	45	48	78	78	81	78	77	77
	Connection	DN	100	100	100	125	125	125	150	150	150	150
Condenser	Type	Shell and Tube Heat Exchanger										
	Water Flow Rate	m ³ /h	54	68	82	104	125	134	152	176	189	217
	Pressure Drop	kPa	45	47	46	52	75	75	75	77	78	77
	Connection	DN	100	100	125	125	150	150	150	150	150	200
Refrigerant	Type	R22										
	Charge	Kg	90	100	100	110	140	140	150	165	165	205
Outline Dimension	Length	mm	3010	3010	3010	3010	3510	3510	3400	3400	3400	3510
	Width	mm	1120	1120	1260	1260	1350	1350	1400	1500	1500	1400
	Height	mm	1700	1700	1800	1850	1950	1950	2000	2050	2050	2050
Weight	Transportation Weight	Kg	2400	2550	2800	3100	3500	3550	3600	4000	4000	4350
	Operation Weight	Kg	2550	2700	3000	3300	3750	3800	3850	4300	4300	4700

Note:
 1.Design,manufacture and test comply with GB/T18430.1-2007 criterion.
 2.Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C.

Double Compressor Unit Specification (R22)

Model WKCWF		2160B	2200B	2240B	2270B	2300B	2330B	2360B	2390B	
Cooling Capacity	KW	506	635	765	874	966	1067	1160	1250	
	Kcal/h	435160	546100	657900	751640	830760	917620	997600	1075000	
Total Input Power	KW	113.2	121	128.2	137	145.2	153	161.2	172	
Rated Current	A	192.2	205	217.6	232	246.4	260	273.6	292	
Power Supply	380V/3N~/50Hz									
Capacity Regulating	12.5%~100% Stepless or 8 stage unloading									
Compressor	Type	Semi-hermetic screw compressor								
	Starts Up	Y-Δ								
	Qty	2	2	2	2	2	2	2	2	2
	Oil Heater	W	300×2							
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger								
	Water Flow Rate	m ³ /h	87	109	132	150	166	184	200	215
	Pressure Drop	kPa	62	63	62	62	63	60	66	60
	Connection	DN	125	125	150	150	150	200	200	200
Condenser	Type	Shell and Tube Heat Exchanger								
	Water Flow Rate	m ³ /h	109	137	164	188	208	229	249	269
	Pressure Drop	kPa	50	50	52	52	52	55	55	55
	Connection	DN	125	150	150	150	200	200	200	200
Refrigerant	Type	R22								
	Amount	Kg	160	220	220	260	300	285	285	430
Outline Dimension	Length	mm	4400	4520	4400	4400	4520	4660	4660	4660
	Width	mm	1450	1500	1600	1650	1600	1650	1650	1700
	Height	mm	1900	1900	1950	1950	2000	2150	2150	2150
Weight	Transportation Weight	Kg	4000	4400	4800	5400	5800	6400	6500	7100
	Operation Weight	Kg	4350	4750	5200	5800	6200	6950	7050	7650

Note:
 1.Design,manufacture and test comply with GB/T18430.1-2007 criterion.
 2.Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C.

Double Compressor Unit Specification (R22)

Model WKCWF		2410B	2440B	2470B	2510B	2530B	2550B	2620B	
Cooling Capacity	KW	1332	1402	1522	1640	1711	1760	2015	
	Kcal/h	1145520	1205720	1308920	1410400	1471460	1513600	1732900	
Total Input Power	KW	183	192	201.2	212	223.2	236	248.2	
Rated Current	A	310.6	326	341.8	360	378.8	400	421.2	
Power Supply		380V/3N~/50Hz							
Capacity Regulating		12.5%~100% Stepless or 8 stage unloading							
Compressor	Type	Semi-hermetic screw compressor							
	Starts Up	Y-Δ							
	Qty	2	2	2	2	2	2	2	
	Oil Heater	W	300×2						
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger							
	Water Flow Rate	m ³ /h	229	241	262	282	294	303	347
	Pressure Drop	kPa	66	72	67	63	67	72	65
	Connection	DN	200	200	200	200	200	200	250
Condenser	Type	Shell and Tube Heat Exchanger							
	Water Flow Rate	m ³ /h	286	301	327	353	368	378	433
	Pressure Drop	kPa	52	57	56	51	55	58	52
	Connection	DN	200	200	200	250	250	250	250
Refrigerant	Type	R22							
	Amount	Kg	430	430	420	450	450	450	470
Outline Dimension	Length	mm	4550	4550	4660	4750	4750	4750	4450
	Width	mm	1800	1800	1800	1800	1800	1800	1950
	Height	mm	2250	2250	2250	2300	2300	2300	2300
Weight	Transportation Weight	Kg	7150	7150	7700	8380	8380	8380	8800
	Operation Weight	Kg	7780	7780	8350	9150	9150	9150	9740

Note:
 1. Design, manufacture and test comply with GB/T18430.1-2007 criterion.
 2. Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C.

Single Compressor Unit Performance (R22)

Model WKCWF	Cooling Water Entering Temperature	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
1080B	28°C	239	259	279	300	50.3	51	51.7	52.5
	30°C	234	253	273	293	51.7	52.5	53.2	54.0
	32°C	229	247	267	287	53.3	54.1	54.9	55.7
	34°C	223	241	260	280	55.1	56.0	56.7	57.6
1100B	28°C	301	325	351	377	60.8	61.7	62.6	63.5
	30°C	294	318	343	369	62.5	63.5	64.4	65.3
	32°C	287	311	336	360	64.5	65.5	66.4	67.4
	34°C	280	303	327	352	66.7	67.7	68.6	69.7
1120B	28°C	361	390	422	453	74.1	75.2	76.3	77.4
	30°C	353	382	413	443	76.2	77.4	78.5	79.6
	32°C	345	373	403	433	78.6	79.8	80.9	82.1
1150B	28°C	457	494	533	573	91.9	93.3	94.6	96.0
	30°C	447	483	522	560	94.6	96.0	97.3	98.8
	32°C	436	472	510	547	97.5	99.0	100.4	101.8
	34°C	426	460	497	534	100.8	102.3	103.8	105.3
1180B	28°C	548	593	640	688	111.0	112.7	114.2	115.9
	30°C	537	580	626	673	114.2	115.9	117.5	119.3
	32°C	524	567	612	657	117.7	119.5	121.2	123.0
	34°C	511	553	597	641	121.7	123.5	125.3	127.1

Single Compressor Unit Performance (R22)

Model WKCWF	Cooling Water Entering Tempertu	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
1200B	28°C	591	639	690	741	118.7	120.5	122.2	124.0
	30°C	578	625	675	725	122.1	124.0	125.7	127.6
	32°C	565	611	659	708	125.9	127.8	129.6	131.6
	34°C	551	596	643	691	130.2	132.2	134.0	136.0
1220B	28°C	667	722	779	837	132.1	134.1	136.0	138.0
	30°C	653	706	762	819	135.9	138.0	139.9	142.0
	32°C	638	690	745	800	140.1	142.3	144.3	146.4
	34°C	622	673	727	780	144.9	147.1	149.2	151.4
1255B	28°C	775	838	905	972	150.9	153.2	155.3	157.6
	30°C	759	820	886	951	155.2	157.6	159.8	162.2
	32°C	741	801	865	929	160.0	162.5	164.8	167.2
	34°C	723	781	844	906	165.5	168.0	170.4	172.9
1270B	28°C	832	899	971	1043	165.4	168.0	170.3	172.8
	30°C	814	880	950	1021	170.2	172.8	175.2	177.8
	32°C	795	860	929	997	175.5	178.2	180.7	183.3
	34°C	776	839	906	973	181.4	184.2	186.8	189.5
1310B	28°C	952	1029	1111	1194	185.2	188.0	190.6	193.4
	30°C	931	1007	1088	1168	190.5	193.4	196.1	199.0
	32°C	910	984	1063	1141	196.4	199.4	202.2	205.2
	34°C	888	960	1036	1113	203.1	206.2	209.1	212.1

Double Compressor Unit Performance (R22)

Model WKCWF	Cooling Water Entering Tempertu	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
2160B	28°C	478	517	559	600	100.5	102.1	103.5	105.0
	30°C	468	506	546	587	103.4	105.0	106.5	108.0
	32°C	457	494	534	573	106.6	108.3	109.8	111.4
	34°C	446	482	521	559	110.3	111.9	113.5	115.2
2200B	28°C	600	649	701	753	121.6	123.4	125.2	127.0
	30°C	587	635	686	737	125.1	127.0	128.8	130.7
	32°C	574	620	670	720	129.0	130.9	132.8	134.7
	34°C	560	605	654	702	133.4	135.4	137.3	139.3
2240B	28°C	723	782	844	907	148.2	150.5	152.6	154.8
	30°C	708	765	826	887	152.5	154.8	157.0	159.3
	32°C	691	747	807	867	157.2	159.6	161.8	164.2
	34°C	674	729	787	846	162.5	165.0	167.3	169.8
2270B	28°C	826	893	965	1036	169.9	172.5	174.9	177.5
	30°C	808	874	944	1014	174.8	177.5	180.0	182.6
	32°C	790	854	922	991	180.3	183.0	185.6	188.3
	34°C	770	833	900	966	186.4	189.2	191.9	194.7
2300B	28°C	913	987	1066	1145	183.8	186.6	189.2	192.0
	30°C	894	966	1043	1121	189.1	192.0	194.7	197.6
	32°C	873	944	1019	1095	195.0	198.0	200.7	203.7
	34°C	852	921	994	1068	201.6	204.7	207.5	210.6
2330B	28°C	1009	1090	1178	1265	204.9	208.0	210.9	214.0
	30°C	987	1067	1152	1238	210.8	214.0	217.0	220.2
	32°C	964	1042	1126	1209	217.3	220.6	223.7	227.0
	34°C	941	1017	1098	1180	224.7	228.1	231.3	234.7
2360B	28°C	1097	1186	1280	1375	221.9	225.3	228.5	231.8
	30°C	1073	1160	1253	1346	228.3	231.8	235.0	238.5
	32°C	1048	1133	1224	1315	235.4	239.0	242.3	245.9
	34°C	1023	1105	1194	1282	243.4	247.1	250.6	254.3
2390B	28°C	1182	1278	1380	1482	237.4	241.1	244.4	248.0
	30°C	1156	1250	1350	1450	244.3	248.0	251.5	255.2
	32°C	1130	1221	1319	1417	251.9	255.7	259.3	263.1
	34°C	1102	1191	1287	1382	260.4	264.4	268.1	272.0

Double Compressor Unit Performance (R22)

Model KCWF	Cooling Water Entering Tempertu	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
2410B	28°C	1259	1361	1470	1579	250.8	254.7	258.2	262.0
	30°C	1232	1332	1439	1545	258.1	262.0	265.7	269.6
	32°C	1204	1301	1405	1510	266.1	270.1	273.9	278.0
	34°C	1174	1269	1371	1472	275.1	279.3	283.2	287.4
2440B	28°C	1325	1433	1547	1662	264.2	268.3	272.0	276.1
	30°C	1297	1402	1514	1626	271.9	276.0	279.9	284.0
	32°C	1267	1370	1479	1589	280.3	284.6	288.5	292.8
	34°C	1236	1336	1443	1550	289.8	294.2	298.3	302.7
2470B	28°C	1439	1555	1680	1804	283.0	287.3	291.3	295.7
	30°C	1408	1522	1644	1766	291.2	295.6	299.7	304.2
	32°C	1375	1487	1606	1725	300.2	304.8	309.0	313.6
	34°C	1342	1450	1567	1683	310.4	315.1	319.5	324.2
2510B	28°C	1550	1676	1810	1944	301.8	306.4	310.7	315.3
	30°C	1517	1640	1771	1902	310.5	315.2	319.6	324.3
	32°C	1482	1602	1730	1859	320.1	325.0	329.5	334.4
	34°C	1446	1563	1688	1813	331.0	336.0	340.7	345.7
2530B	28°C	1617	1749	1889	2028	316.3	321.1	325.6	330.5
	30°C	1583	1711	1848	1985	325.4	330.4	335.0	340.0
	32°C	1546	1672	1805	1939	335.5	340.6	345.4	350.5
	34°C	1508	1631	1761	1891	346.9	352.2	357.1	362.4
2550B	28°C	1664	1799	1943	2087	330.9	335.9	340.6	345.7
	30°C	1628	1760	1901	2042	340.4	345.6	350.4	355.6
	32°C	1591	1720	1857	1995	351.0	356.3	361.3	366.6
	34°C	1551	1677	1811	1946	362.9	368.4	373.6	379.1
2620B	28°C	1905	2059	2224	2389	370.3	376.0	381.2	386.9
	30°C	1864	2015	2176	2337	381.0	386.8	392.2	398.0
	32°C	1821	1969	2126	2284	392.8	398.8	404.4	410.4
	34°C	1776	1920	2074	2228	406.1	412.3	418.1	424.3

Operation Range

Nominal Cooling Condition	Chilled Water		Cooling Water	
	Entering Temperature(°C)	Leaving Temperature(°C)	Entering Temperature(°C)	Leaving Temperature(°C)
	-	7	30	-
Safety Operation Range	Leaving Temperature(°C)	Temperature Difference(°C)	Entering Temperature(°C)	Temperature Difference(°C)
	5 ~ 15	2.5 ~ 8	19~35	3.5~8

Single Compressor Unit Specification (R134a)

Model KCWF		1070A1	1080A1	1090A1	1105A1	1120A1	1135A1	1150A1	1165A1	1185A1	1210A1	
Cooling Capacity	KW	224	265	294	335	384	430	488	538	600	670	
	Kcal/h	192640	227900	252840	288100	330240	369800	419680	462680	516000	576200	
Total Input Power	KW	43.4	51.2	56.6	64.1	72.6	80.6	91.5	100.6	111.6	124.1	
Rated Current	A	73.7	86.7	96.1	108.8	123.2	136.8	155.3	170.9	189.4	210.6	
Power Supply	380V/3N~/50Hz											
Capacity Regulating	25%-100% Stepless or 4 stage unloading											
Compressor	Type	Semi-hermetic screw compressor										
	Starts Up	Y-Δ										
	Qty	1	1	1	1	1	1	1	1	1	1	
Oil Heater	W	300										
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger										
	Water Flow Rate	m³/h	39	46	51	58	66	74	84	93	103	115
	Pressure Drop	kPa	45	44	45	45	44	44	79	78	80	80
	Connection	DN	100	100	100	100	125	125	125	125	125	125
Condenser	Type	Shell and Tube Heat Exchanger										
	Water Flow Rate	m³/h	48	57	63	72	83	92	105	116	129	144
	Pressure Drop	kPa	40	43	41	41	45	41	71	67	72	73
	Connection	DN	100	100	100	100	125	125	125	125	150	150
Refrigerant	Type	R134a										
	Charge	Kg	100	100	100	100	100	100	110	140	150	165
Outline Dimension	Length	mm	3100	3100	3100	3100	3100	2950	3450	3450	3600	3600
	Width	mm	1100	1100	1100	1100	1150	1250	1300	1300	1300	1300
	Height	mm	1750	1750	1750	1800	1800	1850	2000	2000	2000	2000
Weight	Transportation Weight	Kg	2600	2700	2800	3000	3100	3300	3600	3700	3800	4200
	Operation Weight	Kg	2700	2800	2950	3150	3250	3500	3800	3900	4000	4450

Note:

- 1.Design, manufacture and test comply with GB/T18430.1-2007 criterion.
- 2.Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C.

Double Compressor Unit Specification (R1 34a)

Model WKCWF		2180A1	2195A1	2210A1	2225A1	2240A1	2255A1	2270A1	2285A1	
Cooling Capacity	KW	588	629	670	719	768	814	860	918	
	Kcal/h	505680	540940	576200	618340	660480	700040	739600	789480	
Total Input Power	KW	113.2	121	128.2	137	145.2	153	161.2	172	
Rated Current	A	192.2	205	217.6	232	246.4	260	273.6	292	
Power Supply	380V/3N~/50Hz									
Capacity Regulating	12.5%~100% Stepless or 8 stage unloading									
Compressor	Type	Semi-hermetic screw compressor								
	Starts Up	Y-△								
	Qty	2	2	2	2	2	2	2	2	
	Oil Heater	W	300×2							
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger								
	Water Flow Rate	m ³ /h	101	108	115	124	132	140	148	158
	Pressure Drop	kPa	66	61	70	60	68	61	69	60
	Connection	DN	150	150	150	150	150	150	150	150
Condenser	Type	Shell and Tube Heat Exchanger								
	Water Flow Rate	m ³ /h	126	135	144	155	165	175	185	197
	Pressure Drop	kPa	47	48	54	44	50	44	48	45
	Connection	DN	150	150	150	150	150	150	150	200
Refrigerant	Type	R134a								
	Amount	Kg	210	210	210	235	235	260	260	290
Outline Dimension	Length	mm	4650	4650	4650	4500	4500	4500	4500	4650
	Width	mm	1450	1450	1450	1500	1500	1550	1550	1750
	Height	mm	1900	1900	1900	1950	1950	1950	1950	2150
Weight	Transportation Weight	Kg	4850	4950	5000	5300	5350	5650	5700	6200
	Operation Weight	Kg	5000	5100	5150	5500	5550	5850	5900	6450

Note:
 1.Design,manufacture and test comply with GB/T18430.1-2007 criterion.
 2.Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C。

Double Compressor Unit Specification (R1 34a)

Model WKCWF		2300A1	2315A1	2330A1	2350A1	2370A1	2390A1	2410A1	
Cooling Capacity	KW	976	1026	1076	1138	1200	1270	1340	
	Kcal/h	839360	882360	925360	978680	1032000	1092200	1152400	
Total Input Power	KW	183	192	201.2	212	223.2	236	248.2	
Rated Current	A	310.6	326	341.8	360	378.8	400	421.2	
Power Supply	380V/3N~/50Hz								
Capacity Regulating	12.5%~100% Stepless or 8 stage unloading								
Compressor	Type	Semi-hermetic screw compressor							
	Starts Up	Y-△							
	Qty	2	2	2	2	2	2	2	
	Oil Heater	W	300×2						
Evaporator	Type	Flooded Type Shell and Tube Heat Exchanger							
	Water Flow Rate	m ³ /h	168	176	185	196	206	218	230
	Pressure Drop	kPa	68	68	68	68	68	68	68
	Connection	DN	200	200	200	200	200	200	200
Condenser	Type	Shell and Tube Heat Exchanger							
	Water Flow Rate	m ³ /h	210	221	231	245	258	273	288
	Pressure Drop	kPa	51	44	48	46	51	43	51
	Connection	DN	200	200	200	200	200	200	200
Refrigerant	Type	R134a							
	Amount	Kg	290	305	305	330	330	370	370
Outline Dimension	Length	mm	4650	4650	4650	4650	4650	4500	4500
	Width	mm	1750	1750	1750	1850	1850	1900	1900
	Height	mm	2150	2150	2150	2150	2150	2250	2250
Weight	Transportation Weight	Kg	6250	6450	6500	7000	7100	7400	7500
	Operation Weight	Kg	6500	6700	6750	7300	7400	7700	7800

Note:
 1.Design,manufacture and test comply with GB/T18430.1-2007 criterion.
 2.Above capacity based on chilled water leaving temperature 7°C, cooling water entering temperature 30°C。

Single Compressor Unit Performance (R134a)

Model WKCWF	Cooling Water Entering Temp.	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
1070A1	28°C	212	229	247	266	41.6	42	42.8	43.4
	30°C	207	224	242	260	42.7	43.4	44.0	44.7
	32°C	202	219	236	254	44.1	44.7	45.4	46.0
	34°C	197	213	231	248	45.6	46.3	46.9	47.6
1080A1	28°C	251	271	292	314	49.0	49.8	50.5	51.2
	30°C	245	265	286	307	50.4	51.2	51.9	52.7
	32°C	239	259	280	300	52.0	52.8	53.5	54.3
	34°C	234	253	273	293	53.8	54.6	55.3	56.2
1090A1	28°C	278	300	325	349	54.2	55.0	55.8	56.6
	30°C	272	294	318	341	55.8	56.6	57.4	58.2
	32°C	266	287	310	333	57.5	58.4	59.2	60.0
	34°C	259	280	303	325	59.4	60.3	61.2	62.1
1105A1	28°C	317	342	370	397	61.4	62.3	63.2	64.1
	30°C	310	335	362	389	63.1	64.1	65.0	66.0
	32°C	303	327	353	380	65.1	66.1	67.0	68.0
	34°C	295	319	345	370	67.3	68.3	69.3	70.3
1120A1	28°C	363	392	424	455	69.5	70.6	71.6	72.6
	30°C	355	384	415	445	71.5	72.6	73.6	74.7
	32°C	347	375	405	435	73.7	74.9	75.9	77.0
	34°C	339	366	395	425	76.2	77.4	78.5	79.6

Single Compressor Unit Performance (R134a)

Model WKCWF	Cooling Water Entering Temp.	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
1135A1	28°C	407	439	475	510	77.2	78.3	79.4	80.6
	30°C	398	430	464	499	79.4	80.6	81.7	82.9
	32°C	389	420	454	487	81.9	83.1	84.3	85.5
	34°C	379	410	443	475	84.6	85.9	87.1	88.4
1150A1	28°C	461	499	539	579	87.6	88.9	90.2	91.5
	30°C	451	488	527	566	90.1	91.5	92.8	94.2
	32°C	441	477	515	553	92.9	94.3	95.7	97.1
	34°C	430	465	502	539	96.1	97.5	98.9	100.4
1165A1	28°C	509	550	594	638	96.3	97.8	99.2	100.6
	30°C	498	538	581	624	99.1	100.6	102.0	103.5
	32°C	486	526	568	610	102.2	103.7	105.2	106.7
	34°C	474	513	554	595	105.6	107.2	108.7	110.3
1185A1	28°C	567	613	662	711	106.8	108.5	110.0	111.6
	30°C	555	600	648	696	109.9	111.6	113.2	114.8
	32°C	542	586	633	680	113.3	115.1	116.7	118.4
	34°C	529	572	618	663	117.2	119.0	120.6	122.4
1210A1	28°C	633	685	740	794	118.8	120.6	122.3	124.1
	30°C	620	670	724	777	122.2	124.1	125.8	127.7
	32°C	605	655	707	759	126.0	127.9	129.7	131.7
	34°C	591	639	690	741	130.3	132.3	134.1	136.1

Double Compressor Unit Performance (R134a)

Model WKCWF	Cooling Water Entering Temp	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
2180A1	28°C	556	601	649	697	108.4	110.0	111.6	113.2
	30°C	544	588	635	682	111.5	113.2	114.8	116.5
	32°C	531	574	620	666	115.0	116.7	118.3	120.1
	34°C	518	560	605	650	118.9	120.7	122.4	124.2
2200A1	28°C	595	643	694	746	115.8	117.6	119.3	121.0
	30°C	582	629	679	730	119.2	121.0	122.7	124.5
	32°C	568	615	664	713	122.9	124.8	126.5	128.4
	34°C	554	599	647	695	127.1	129.0	130.8	132.7
2210A1	28°C	633	685	740	794	122.7	124.6	126.4	128.2
	30°C	620	670	724	777	126.3	128.2	130.0	131.9
	32°C	605	655	707	759	130.2	132.2	134.0	136.0
	34°C	591	639	690	741	134.6	136.7	138.6	140.6
2225A1	28°C	680	735	794	852	131.2	133.2	135.0	137.0
	30°C	665	719	777	834	134.9	137.0	138.9	141.0
	32°C	650	702	759	815	139.1	141.2	143.2	145.3
	34°C	634	685	740	795	143.9	146.0	148.1	150.3
2240A1	28°C	726	785	848	910	139.0	141.1	143.1	145.2
	30°C	710	768	829	891	143.0	145.2	147.2	149.4
	32°C	694	750	810	870	147.5	149.7	151.8	154.0
	34°C	677	732	790	849	152.5	154.8	157.0	159.3
2255A1	28°C	770	832	898	965	146.5	148.7	150.8	153.0
	30°C	753	814	879	944	150.7	153.0	155.1	157.4
	32°C	736	795	859	923	155.4	157.7	160.0	162.3
	34°C	718	776	838	900	160.7	163.1	165.4	167.8
2270A1	28°C	813	879	949	1020	154.3	156.7	158.9	161.2
	30°C	796	860	929	998	158.8	161.2	163.5	165.9
	32°C	777	840	907	975	163.7	166.2	168.5	171.0
	34°C	758	820	885	951	169.3	171.8	174.2	176.8
2285A1	28°C	868	938	1013	1088	164.7	167.2	169.5	172.0
	30°C	849	918	991	1065	169.4	172.0	174.4	177.0
	32°C	830	897	969	1040	174.7	177.3	179.8	182.5
	34°C	809	875	945	1015	180.6	183.4	185.9	188.7

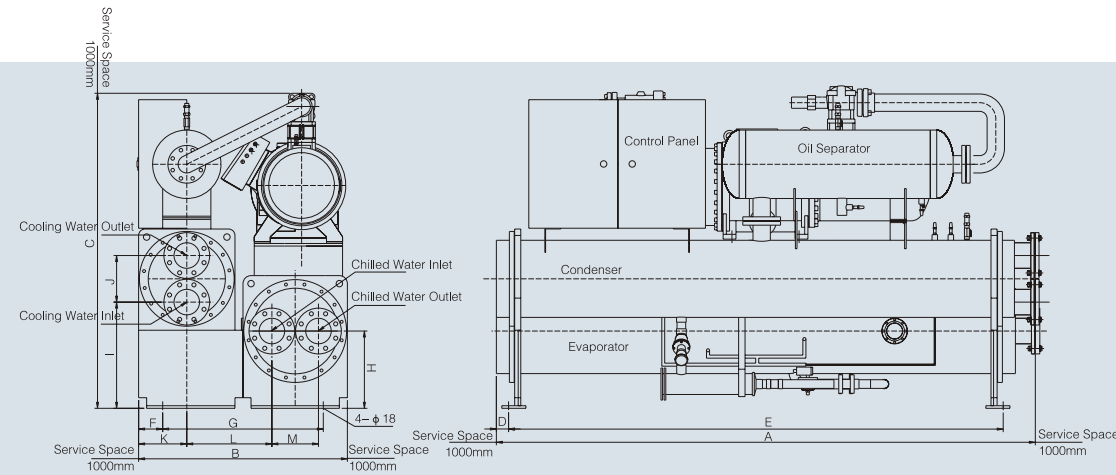
Double Compressor Unit Performance (R134a)

Model WKCWF	Cooling Water Entering Temp	Cooling Capacity (KW)				Total Input Power (KW)			
		Chilled Water Leaving Temperature				Chilled Water Leaving Temperature			
		5°C	7°C	9°C	11°C	5°C	7°C	9°C	11°C
2300A1	28°C	923	997	1077	1157	175.2	177.9	180.4	183.0
	30°C	903	976	1054	1132	180.3	183.0	185.6	188.3
	32°C	882	954	1030	1106	185.8	188.7	191.3	194.1
	34°C	860	930	1005	1079	192.2	195.1	197.8	200.7
2315A1	28°C	970	1049	1132	1216	183.8	186.6	189.2	192.0
	30°C	949	1026	1108	1190	189.1	192.0	194.7	197.6
	32°C	927	1002	1083	1163	195.0	198.0	200.7	203.7
	34°C	904	978	1056	1134	201.6	204.7	207.5	210.6
2330A1	28°C	1017	1100	1188	1276	192.6	195.6	198.3	201.2
	30°C	995	1076	1162	1248	198.2	201.2	204.0	207.0
	32°C	972	1051	1135	1219	204.3	207.4	210.3	213.5
	34°C	949	1025	1107	1189	211.3	214.5	217.5	220.7
2350A1	28°C	1076	1163	1256	1349	203.0	206.1	208.9	212.0
	30°C	1053	1138	1229	1320	208.8	212.0	215.0	218.1
	32°C	1028	1112	1201	1290	215.3	218.6	221.6	224.9
	34°C	1003	1085	1171	1258	222.6	226.0	229.2	232.5
2370A1	28°C	1134	1226	1325	1423	213.7	217.0	220.0	223.2
	30°C	1110	1200	1296	1392	219.9	223.2	226.3	229.7
	32°C	1084	1172	1266	1360	226.7	230.1	233.3	236.8
	34°C	1058	1144	1235	1327	234.4	237.9	241.3	244.8
2390A1	28°C	1201	1298	1402	1506	226.0	229.4	232.6	236.0
	30°C	1175	1270	1372	1473	232.5	236.0	239.3	242.8
	32°C	1148	1241	1340	1439	239.7	243.3	246.7	250.4
	34°C	1120	1210	1307	1404	247.8	251.6	255.1	258.9
2410A1	28°C	1267	1369	1479	1589	237.6	241.3	244.6	248.2
	30°C	1240	1340	1447	1554	244.5	248.2	251.7	255.4
	32°C	1211	1309	1414	1519	252.1	255.9	259.5	263.3
	34°C	1181	1277	1379	1481	260.6	264.6	268.3	272.3

Operation Range

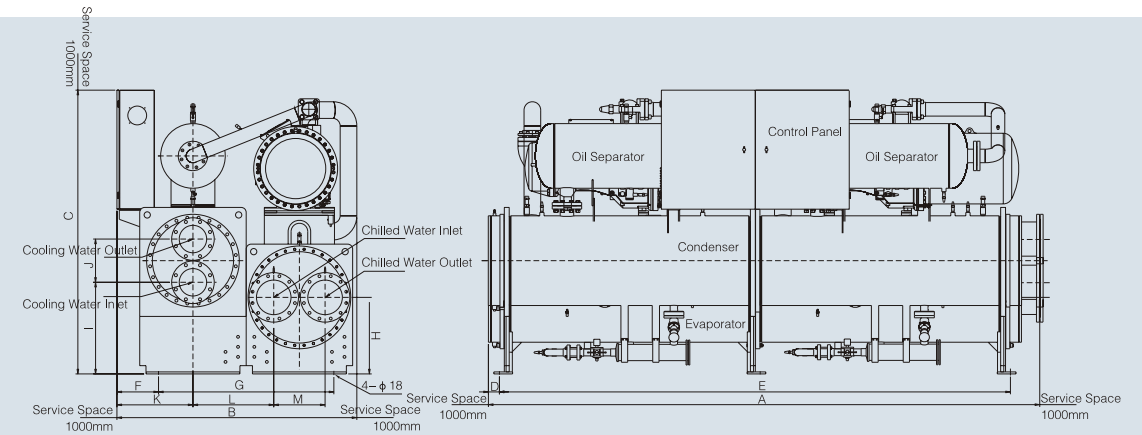
Nominal Cooling Condition	Chilled Water		Cooling Water	
	Entering Temperature(°C)	Leaving Temperature(°C)	Entering Temperature(°C)	Leaving Temperature(°C)
	-	7	30	-
Safe Operation Range	Leaving Temperature(°C)		Temperature Difference(°C)	
	5 ~ 15	2.5 ~ 8	19 ~ 35	3.5 ~ 8

R22 Single Compressor Unit Dimension



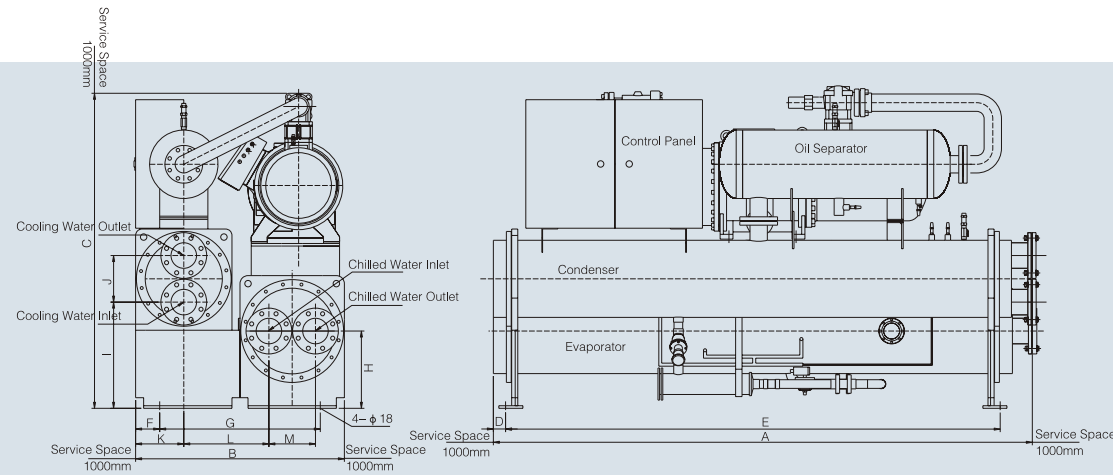
Model	Dimension mm													Connection	
	A	B	C	D	E	F	G	H	I	J	K	L	M	Condenser	Evaporator
1080B	3010	1260	1800	80	2580	150	820	466	588.5	180	225	492.5	265	DN100	DN100
1100B	3010	1120	1700	80	2580	150	820	466	588.5	180	225	492.5	265	DN100	DN100
1120B	3010	1260	1800	80	2580	150	900	466	594.5	220	240	557.5	265	DN100	DN125
1150B	3010	1260	1850	80	2580	150	900	466	596.5	265	270	557.5	265	DN125	DN125
1180B	3510	1350	1950	80	3080	150	950	496	636.5	245	270	530	300	DN125	DN150
1200B	3510	1350	1950	80	3080	150	950	496	636.5	245	270	530	300	DN125	DN150
1220B	3400	1400	2000	80	3080	150	1000	496	639	300	300	550	300	DN150	DN150
1255B	3400	1500	2050	80	3080	150	1150	531	639	300	300	655	300	DN150	DN150
1270B	3400	1500	2050	80	3080	150	1150	531	639	300	300	655	300	DN150	DN150
1310B	3510	1400	2050	80	3080	150	1080	531	671.5	305	345	537.5	305	DN150	DN200

R22 Double Compressor Unit Dimension



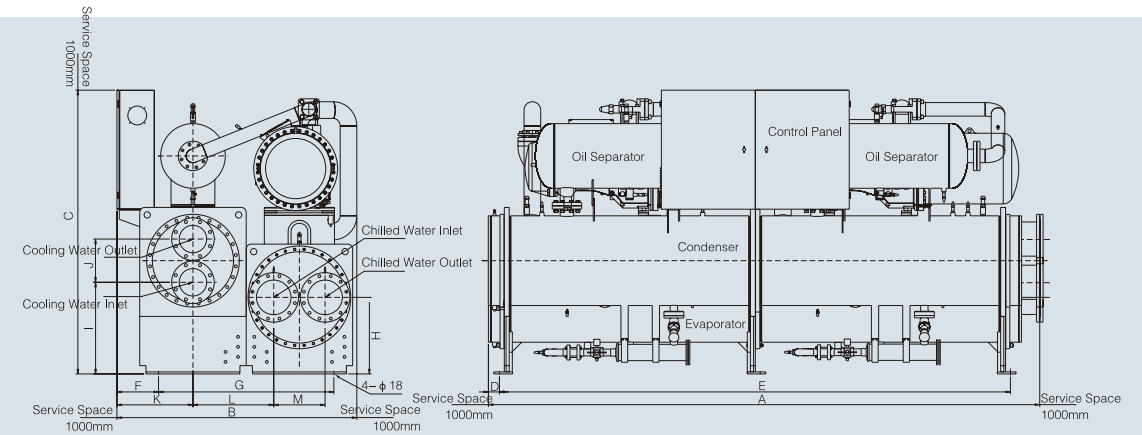
Model	Dimension mm													Connection	
	A	B	C	D	E	F	G	H	I	J	K	L	M	Condenser	Evaporator
2180B	4400	1450	1900	81	4080	403	860	466	596.5	265	523	487.5	265	DN125	DN125
2200B	4520	1500	1900	81	4080	403	920	496	606.5	245	523	517.5	265	DN125	DN150
2240B	4400	1600	1950	81	4080	372	1000	496	609	300	523	550	300	DN150	DN150
2270B	4400	1650	1950	81	4080	372	1080	531	609	300	523	585	300	DN150	DN150
2300B	4520	1600	2000	81	4080	328	1080	531	641.5	305	523	540	300	DN150	DN200
2330B	4660	1650	2150	200	4080	368	1080	531	671.5	305	563	537.5	305	DN200	DN200
2360B	4660	1650	2150	200	4080	368	1080	531	671.5	305	563	537.5	305	DN200	DN200
2390B	4660	1700	2150	233	4080	368	1160	571	671.5	305	563	552.5	355	DN200	DN200
2410B	4550	1800	2250	233	4080	328	1280	571	686.5	355	563	632.5	355	DN200	DN200
2440B	4550	1800	2250	233	4080	328	1280	571	686.5	355	563	632.5	355	DN200	DN200
2470B	4660	1800	2250	233	4080	328	1280	571	686.5	355	563	632.5	355	DN200	DN200
2510B	4750	1800	2300	310	4080	328	1320	611	686.5	355	563	605	410	DN200	DN250
2530B	4750	1800	2300	310	4080	328	1320	611	686.5	355	563	605	410	DN200	DN250
2550B	4750	1800	2300	310	4080	328	1320	611	686.5	355	563	605	410	DN200	DN250
2620B	4450	1950	2300	88	4080	333	1400	611	699	410	608	605	410	DN250	DN250

R134a Single Compressor Unit Dimension



Model	Dimension mm													Connection	
	A	B	C	D	E	F	G	H	I	J	K	L	M	Condenser	Evaporator
WKCWF1070A1	3100	1100	1750	80	2580	150	750	466	588.5	180	225	422.5	265	DN100	DN100
WKCWF1080A1	3100	1100	1750	80	2580	150	750	466	588.5	180	225	422.5	265	DN100	DN100
WKCWF1090A1	3100	1100	1750	80	2580	150	750	466	588.5	180	225	422.5	265	DN100	DN100
WKCWF1105A1	3100	1100	1800	80	2580	150	750	466	594.5	220	240	407.5	265	DN100	DN125
WKCWF1120A1	3100	1150	1800	80	2580	150	750	466	594.5	220	240	407.5	265	DN125	DN125
WKCWF1135A1	2950	1250	1850	80	2580	150	850	466	596.5	265	270	477.5	265	DN125	DN125
WKCWF1150A1	3450	1300	2000	80	3080	150	950	496	626.5	265	270	530	300	DN125	DN125
WKCWF1165A1	3450	1300	2000	80	3080	150	950	496	626.5	265	270	530	300	DN125	DN125
WKCWF1185A1	3600	1300	2000	80	3080	150	950	496	636.5	245	270	530	300	DN125	DN150
WKCWF1210A1	3600	1300	2000	80	3080	150	950	496	639	300	300	500	300	DN125	DN150

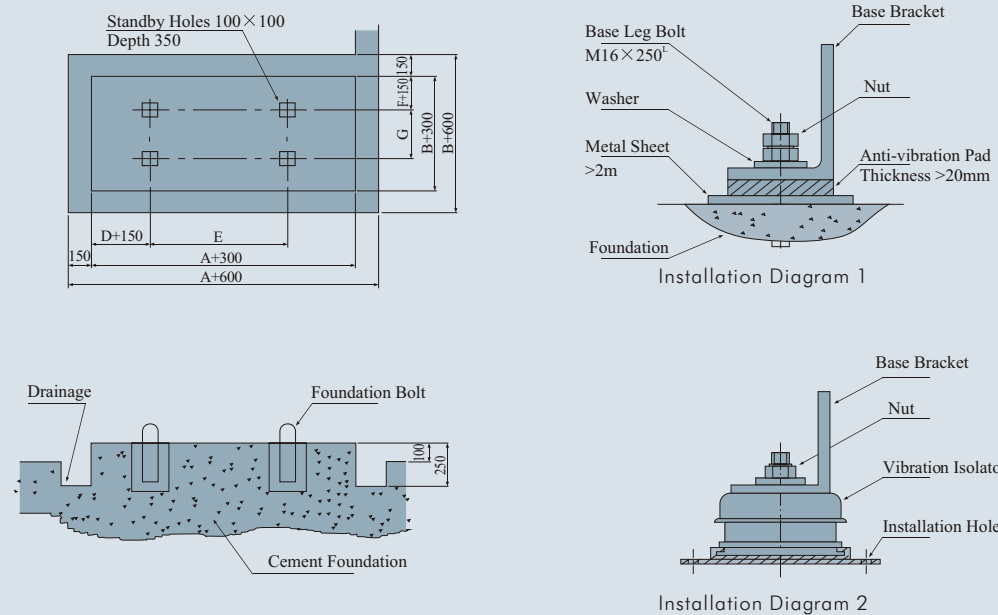
R134a Double Compressor Unit Dimension



Model	Dimension mm													Connection	
	A	B	C	D	E	F	G	H	I	J	K	L	M	Condenser	Evaporator
WKCWF2180A1	4650	1450	1900	81	4080	403	840	496	606.5	245	523	420	300	DN150	DN150
WKCWF2200A1	4650	1450	1900	81	4080	403	840	496	606.5	245	523	420	300	DN150	DN150
WKCWF2210A1	4650	1450	1900	81	4080	403	840	496	606.5	245	523	420	300	DN150	DN150
WKCWF2225A1	4500	1500	1950	81	4080	372	900	496	609	300	523	450	300	DN150	DN150
WKCWF2240A1	4500	1500	1950	81	4080	372	900	496	609	300	523	450	300	DN150	DN150
WKCWF2255A1	4500	1550	1950	81	4080	372	990	531	609	300	523	492.5	305	DN150	DN150
WKCWF2270A1	4500	1550	1950	81	4080	372	990	531	609	300	523	492.5	305	DN150	DN150
WKCWF2285A1	4650	1750	2150	81	4080	368	1080	531	671.5	305	563	537.5	305	DN150	DN200
WKCWF2300A1	4650	1750	2150	81	4080	368	1080	531	671.5	305	563	537.5	305	DN200	DN200
WKCWF2315A1	4650	1750	2150	81	4080	368	1080	531	671.5	305	563	537.5	305	DN200	DN200
WKCWF2330A1	4650	1750	2150	81	4080	368	1080	531	671.5	305	563	537.5	305	DN200	DN200
WKCWF2350A1	4650	1850	2150	81	4080	368	1160	571	671.5	305	563	552.5	355	DN200	DN200
WKCWF2370A1	4650	1850	2150	81	4080	368	1160	571	671.5	305	563	552.5	355	DN200	DN200
WKCWF2390A1	4500	1900	2250	81	4080	328	1240	571	686.5	355	563	592.5	355	DN200	DN200
WKCWF2410A1	4500	1900	2250	81	4080	328	1240	571	686.5	355	563	592.5	355	DN200	DN200

Unit Shifting & Lifting Installation

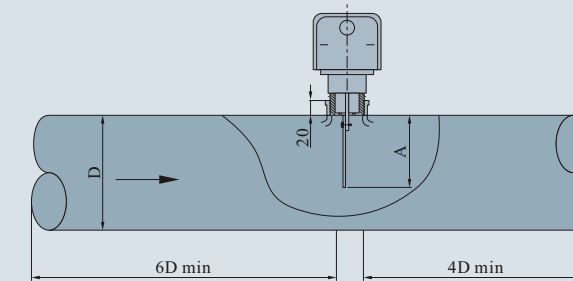
- During unit shifting, please avoid unit from being crushed onto the floor and direct impact on the unit.
- Avoid refrigerant pipe, insulation and control box from being dented during unit shifting & lifting.
- Provide sufficient space in the equipment room for easy installation & maintenance purposes. Allow an extra space equivalent to the length of the unit for future heat exchanger replacement.
- Installation Foundation
 - 1) Additional consideration must be taken for the unit installation foundation, especially the intermediate floor or rooftop of the unit. Extra attention must also be taken for strength of the floor slab and noise pollution created. Please refer to the architect first before the unit installation.
 - 2) The foundation must come with drainage for condensing water and chilled water to drain out.
 - 3) Unit installation and fixing methods can refer to figure below.



Note: 1) If the fixing method in Installation Diagram 1 is used, the foundation must reserve the base leg bolt installation holes according to the installation diagram.
 2) If the fixing method in Installation Diagram 2 is being used, the foundation must prepare the vibration isolator installation bolt holes.

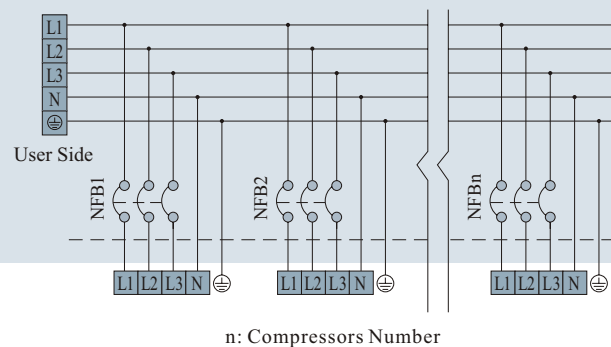
Water Flow Switch Installation

- Flow rate switch should be balance installed horizontally on top at water inlet tube or water outlet tube section;
- When forced to install on a vertical water pipe, flow rate switch must be installed on the up stream of the water pipe (Avoid installing on the down stream);
- Flow rate switch flow-in direction piping length section should have a minimum of 6 times that of the piping diameter; flow rate switch flow-out direction piping length section should have a minimum of 4 times that of the piping diameter; Should not installed it near a pipe bend, orifice and valve port;
- The flow switch's blade end should $\pm 1/3 D$ distanced away from the pipe centerline ($1/3D < A < 2/3D$). It would ensure the flexi movement of the blade; the switch's arrow direction must be same with the water flow direction in the water pipe;
- In order to avoid flow rate switch surging, should purge all the air in the water system.
- Adjust flow rate switch until when water flow rate is lower than minimum flow rate (Minimum flow rate is 60% of the design flow rate), it is in open condition. When the water flow rate meet requirement, water flow rate switch should maintain in closed contact condition.



Wiring

- The power supply voltage must be constant during the chiller operates time. Any voltage drop factors should be under consideration. The working voltage should maintain in the nominal range $\pm 10\%$ range. Too high or too low voltage will affect the performance of the unit.
- Ensure that the differential for the phase's voltage must be less than $\pm 2\%$ of nominal value. The maximum and minimum different must be less than 3% of the nominal voltage. This will prevent the compressor from being overload.
- The power supply frequency should be maintained within $\pm 2\%$ of thàe nominal frequency.
- The minimum starting voltage should be maintained at 85% above the nominal voltage.
- Using extreme cable length will not start up the compressor. Thus, the cable length used must ensure that the two cable terminal voltage differential is less than 2% of the nominal voltage. If the cable length can not be reduced, then bigger size cable diameter should be selected.
- The input power supply wiring connected to the chiller unit must strictly comply with the electrical standard. All wiring and connection must have good electricity insulation. The connection terminals with the unit must be tested with a 500V high resistance meter to check for any current leakage. The minimum resistance is $5M\Omega$.
- For safety purposes, excellent earth protection setup must follow the electrical standard to avoid current leakage.
- Only allow copper strain cable and 5 cables for wiring connection.
- All wiring and electrical components setup must be executed by the qualified wireman.
- Not allow the put the low voltage control cables (<30V) and high voltage cables (>30V) in the same cable trucking casing.
- All connection of wires must be tightened to avoid overheated, electric shock and fire incident. Do not apply exceed force for terminal tightening. Insulated the cable to avoid the insulation and related components loosen.
- To reduce electricity short circuit of electrical wiring, to avoid transformer and electrical wiring equipment damages, and to have a separate control of the module compressors, every compressor wiring must be coupled with a non fuse breaker (NFB), as shown below:
- All compressors should apply star-delta start-up (according to the customer requirement for soft starter option)
- For site wiring current (FHA) selection, should fulfill: $FHA \geq 1.8 RLA$ (nominal current)
- For circuit breaker (FHA) selection, should fulfill: $FHA \geq 1.8 RLA$ (nominal current)



Water Quality T treatment

- Poor chilled water and condenser water quality inside the heat exchanger tube will cause fouling. Not only result in reduced heat transfer efficiency and unit performance, but also causes corrosion (scaling) in the heat exchanger tube which result in unit serious problem. Customer should strictly follow GB50050-1995 《Industrial Cycle Cooling Water Treatment Design Specification》 standard to carry out water quality treatment. For closed loop chilled water system, it is recommended to use soft water. During unit operating cycle, perform a sample analysis on cooling water (include open type system cooling water). Water quality must satisfy the below requirement:
- If the requirement is not met, should perform water quality treatment. Water quality that is not treated or poorly treated can result in inner tube scaling, friction, corrosion, scaling and growth of mud and algae. If problem is serious, it can result in copper tube cracking. It is recommended to let professional water treatment personnel to carry out treatment. Westair will not be held responsible for problem as a result of poor treatment or untreated cooling water and chilled water usage. And also the same thing for salt water usage.
- In addition, during winter if unit is idle for a long time, water should be drained out. This is in order to avoid heat exchanger tube from freeze cracking and this damaging the unit.

	ITEM	UNIT	SUPPLY WATER	CONDENSING (CHILLED)WATER	SCALING	FOULING
BASIC ITEM	PH Value (25C)		6.5~8.0	6.5~8.0	0	0
	Conductivity (25C)	$\mu S/cm$	<200	<800	0	0
	Ion Chlorine Cl^-	$mg Cl^-/L$	<50	<200	0	
	Ion Sulphuric Acid SO_4^{-2}	$mg SO_4^{-2}$	<50	<200	0	
	Calcium Carbonate (PH4.8)	$mg CaCO_3/L$	<50	<100		0
	Total Hardness	$mg CaCO_3/L$	<50	<200		0
REFERENCE ITEM	Iron Fe	$mg Fe/L$	<0.3	<1.0	0	0
	Ion Sulphate S^{2-}	$mg S^{2-}/L$	Not Available	Not Available	0	
	Ion Ammonia NH_4^+	$mg NH_4^+/L$	<0.2	<1.0	0	
	Silica Dioxide SiO_2	$mg SiO_2/L$	<0.3	<50		0

rience in global HVAC industry to produce and make available one of the high quality wide range of air conditioning equipment for worldwide client's satisfaction.