



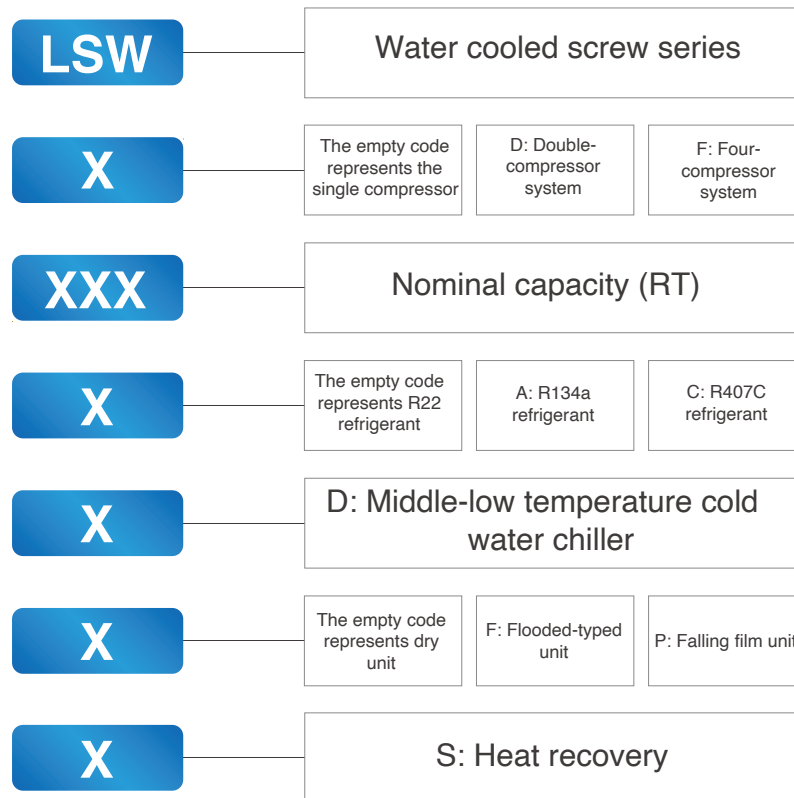
WATER COOLED SCREW CHILLER

Water cooled screw chiller

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I. Naming Rules for Water Cooled Screw Chiller



II. Introduction of Water Cooled Screw Chiller

The water-cooled screw chiller adopts the semi-closed double screw compressor, and uses the single circuit or multi-circuit design.

The protection and control facilities are placed in the control cabinet and the running state of the host is displayed on the computer monitor. All units are assembled in the factory and leave the factory after being operated and debugged.

The application scope of this series of the units includes various commercial and civilian building facilities, such as shopping malls, office buildings, commercial buildings, factory workshops, hotels, hospitals and so on.

The design, manufacturing and inspection of Dryer water cooled screw chillers shall be in accordance with the GB/ T18430.

1-2007 Water Chilling (Heat Pump) Packages Use the Vapor Compression Cycle—Part 1: Water Chilling (Heat Pump) Packages for Industrial & Commercial and Similar Application.

Compressor

The compressor adopts the positive displacement double helix design. The compress part is composed of two inter-meshing spiral rotors, among which, the male rotor drives the female one.

The positive displacement of the double torsion forms a pure rotational movement, resulting in the minimal vibration and wide operating range. The process from suction and compression to exhaust owns the characteristics of high efficient and smooth airflow. The lubrication and air tightness of the compressor adopt the differential pressure oil supply mode, so no lubricating oil pump is required.

The efficient oil separator is placed in the compressor, so the oil separator and compressor are combined into one. Therefore, the shape of the compressor is the smallest and the circular flow of refrigerant is simplified. For the flooded type unit, the secondary oil separator is placed between the exhaust port and condenser to make less refrigeration oil into system and improve the heat exchange efficiency.

The sliding valve driven by the solenoid valve and hydraulic pressure system constitutes the floating type capacity adjustment system, which can facilitate partial load operation and allow 25%-100% segmented regulation for the compressor. The control mode of fuzzy control theory can also be adopted to achieve step-less energy regulation and fully match the building load.



Compared with the piston compressor, the semi-closed screwcompressor has the following advantages

A few operating parts (about 1/3-1/4 of that in a piston compressor), simple structure, a few wearing parts, high reliability and long service life.

Even and continuous suction and exhaust, no pulsation, low exhaust temperature, small operating vibration, insensitive to wet compression and strong anti-liquid slugging capacity.

Shell and tube evaporator

The Shell

The Shell adopts the special high-quality steel plate for pressure vessel, and its manufacturing and test conform to the provisions of NB/T47012-2010 Pressure Vessels for Refrigerant Equipment. Its outer surface adopts the flame-retardant and waterproof thermal-insulation materials. The deflector baffle of the evaporator adopts the PVC engineering plastics, which owns the advantages of strong corrosion resistance and tight sealing, so the chilled water can circuitously flow up and down along the baffle to increase disturbed flow effect and improve the heat exchange capacity of the evaporator. The equalizing equipment is specially set at the refrigerant inlet to evenly distribute the refrigerant in each heat exchange copper tube and improve the heat exchanger efficiency of the whole unit.

The high efficiency heat exchanger tube

The high efficiency heat exchanger tube adopts the efficient heat exchange copper tube, which greatly strengthen the refrigerant side heat exchange capacity and improve the heat transfer coefficient, thus ensuring good cooling and heating effect of the unit.

It adopts the efficient heat transfer tubes to increase the energy efficiency and save the installation space.



Expansion valve

The electronic expansion valve control system with the 6386 steps of control accuracy can accurately control refrigerant volume in accordance with the suction gas superheat and electronic control system compared with the saturation pressure, which always keep the unit in the best operating state and maximize the capacity of the unit.

Power distribution control cabinet

It includes compressor starting device, surge protector and microcomputer controller. It adopts broad temperature series electrical components of well-known brand.

The microcomputer controller can run steadily and reliably at an ambient temperature from -15°C to 65°C. It owns perfect automatic control function and standard communication interface of RS-232 and RS-485 equipment. Moreover, it can achieve the remote control.



Features of microcomputer control

- Setting and display of cold water temperature.
- Automatic energy control and start and stop function.
- Touch-screen operation mode.
- Display the current amount (options and accessories) and its set value, the operating state, the alarm condition, and the running hours of compressor.
- Receive the remote start and stop signal.
- When the outside line is power failure, the unit can be automatically returned to operation after the power is restored.
- And it owns the password setting protection function.

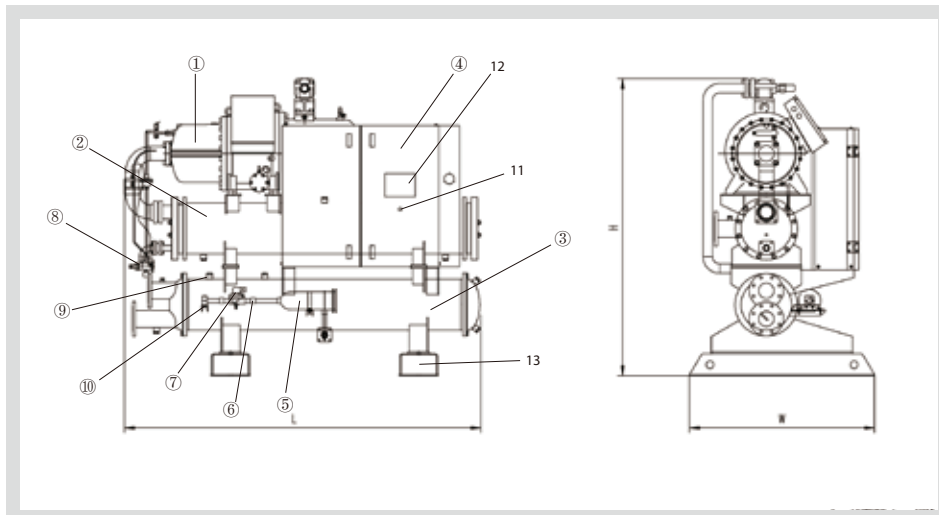
Safety equipment

- **High-low voltage switch:** Refers to a device that protects the compressor from the damage when the high voltage is too high, or the low voltage is too low.
- **Anti-freezing temperature control:** Refers to a device that protects the evaporator from the damage caused by the freezing of cold water when the water system is fault.
- **Oil heater:** Each compressor is equipped with an oil heater, which is a device that can heat the oil when the compressor is stop and protect the system from dilution caused by the mixing of refrigerant with the oil when it is started for the next time.
- **Emergency stop switch:** In case of emergency, it can stop the machine urgently by hand with this switch.
- **Overload protector:** When the load current of the motor exceeds the rated value, this protector can stop the motor to protect it from burning.
- **Surge protector:** Refers to a protective device that prevents the compressor from reverse phase running and under phase running when the voltage is too high or too low.
- **Refrigerant injection device:** Refers to a device that injects liquid to the compressor for cooling to prevent the exhaust temperature from being too high.

Special purpose

The water-cooled screw chiller can be used for ice storage. For the detailed information, please contact with Grad Company.

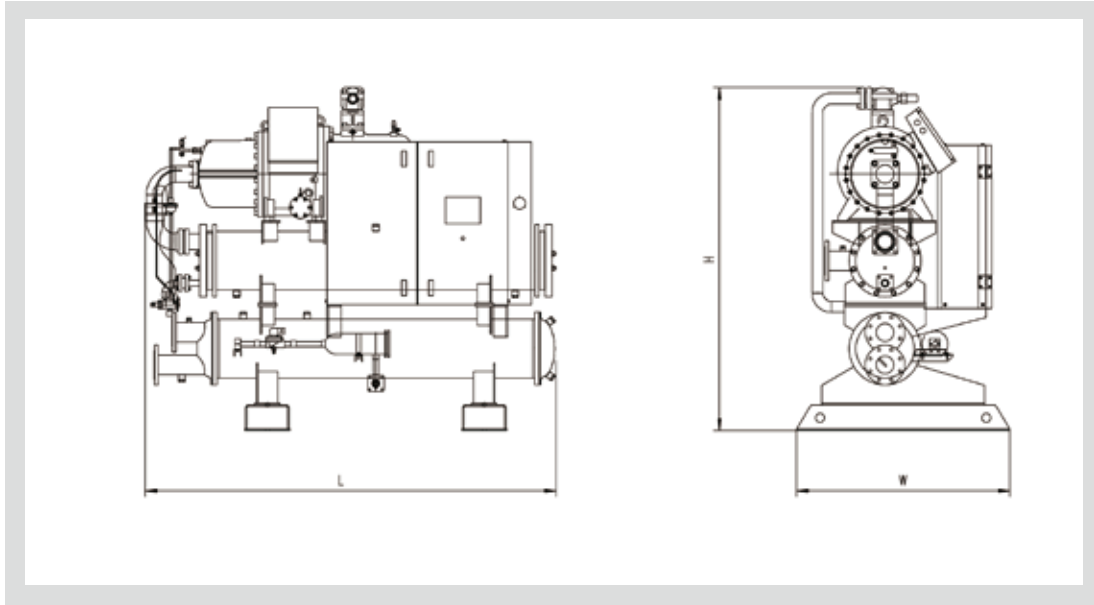
III. Structure Diagram of Water Cooled Screw Chiller



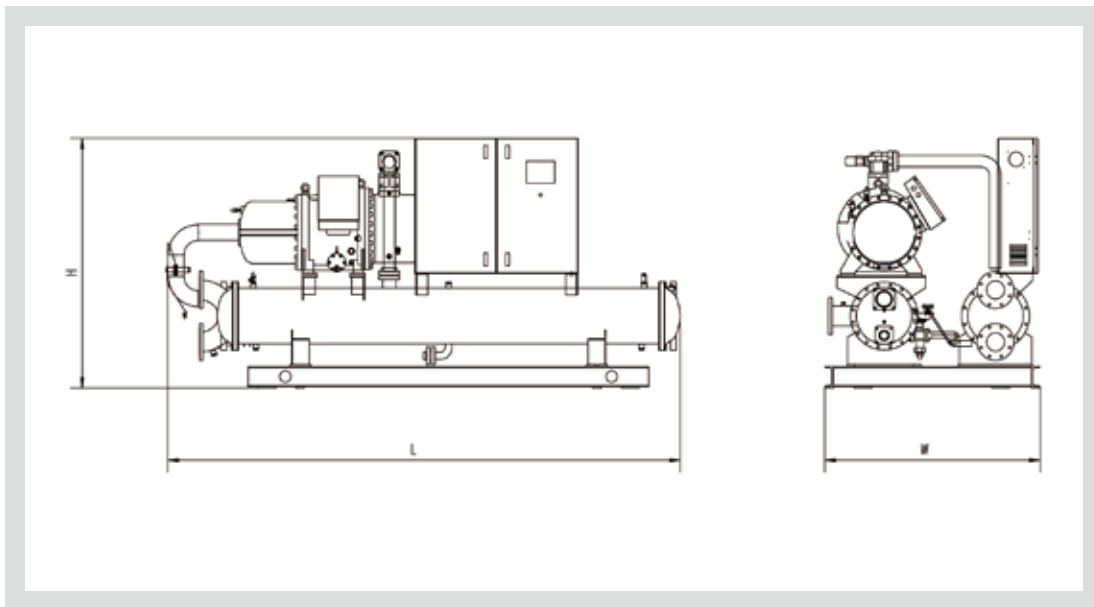
No.	Name	No.	Name
1	Compressor	8	Expansion valve
2	Evaporator	9	Safety valve
3	Condenser	10	Exhaust valve
4	Electric cabinet	11	Emergency stop button
5	Dry filter	12	Touch screen
6	Sight glass	13	Unit base
7	Solenoid valve		

IV. Profile Diagram of Water Cooled Screw Chiller

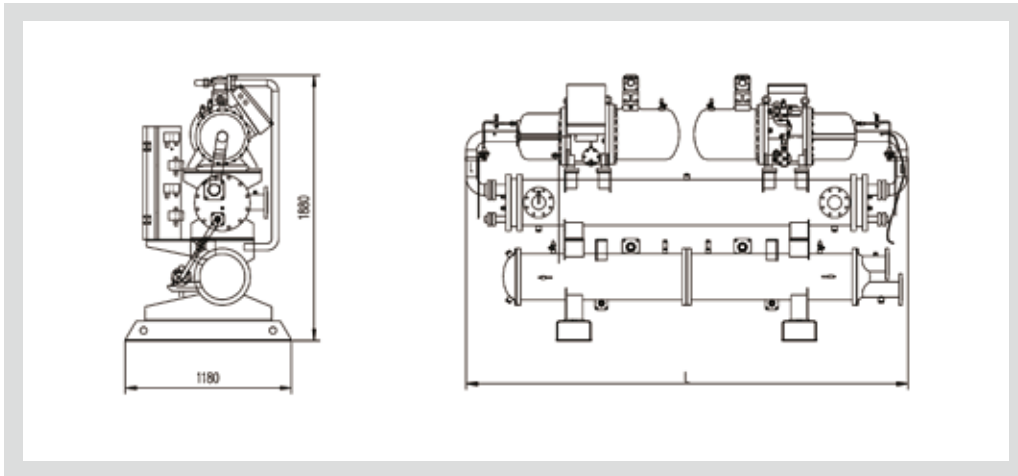
Profile diagram of dry type unit



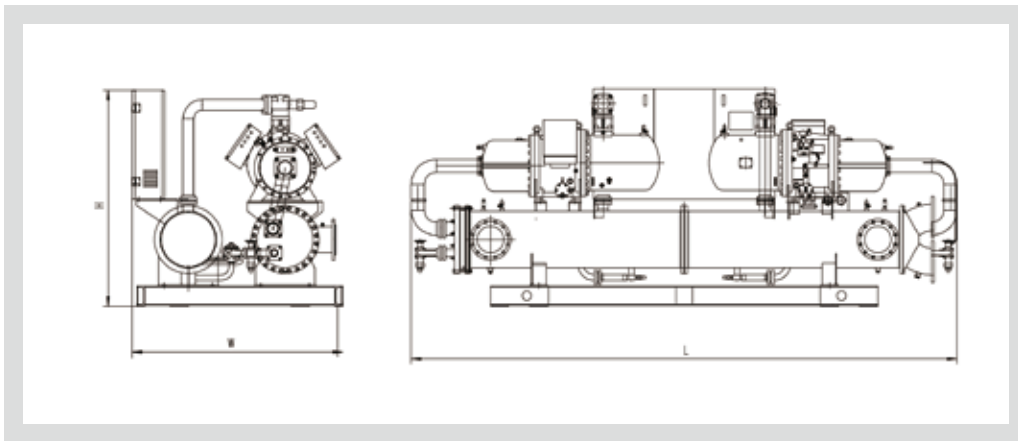
LSW70-LSW140 LSW50A-LSW100A



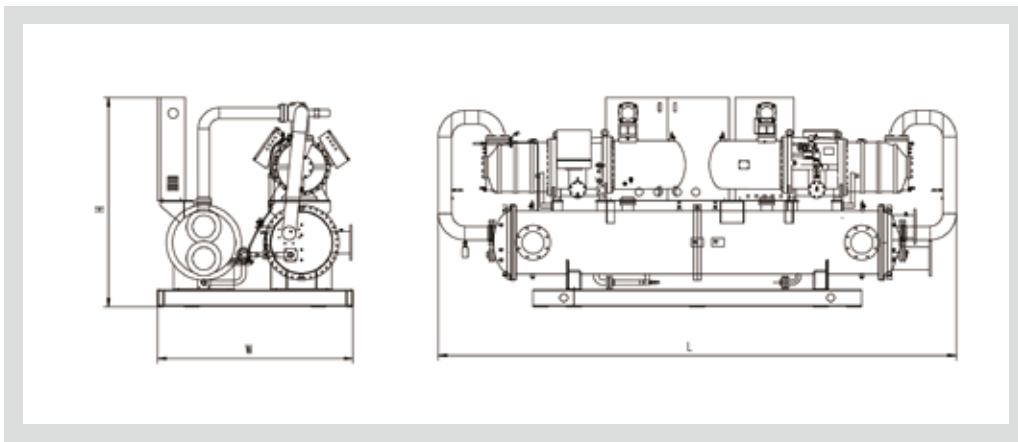
LSW160-LSW240 LSW110A-LSW200A



LSWD110-LSWD270 LSWD70A-LSWD200A

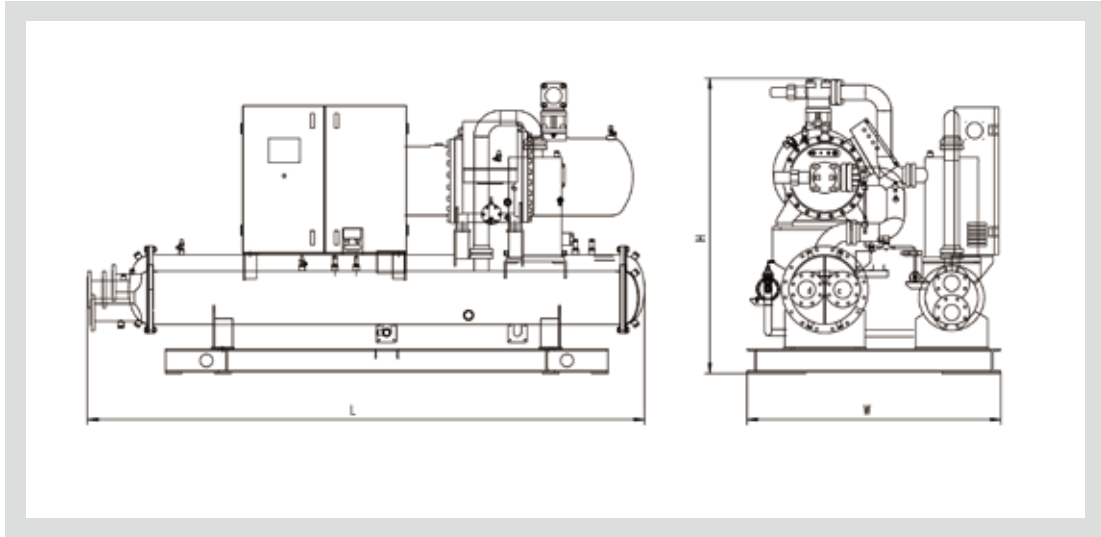


LSWD300-LSWD480 LSWD220A-LSWD360A

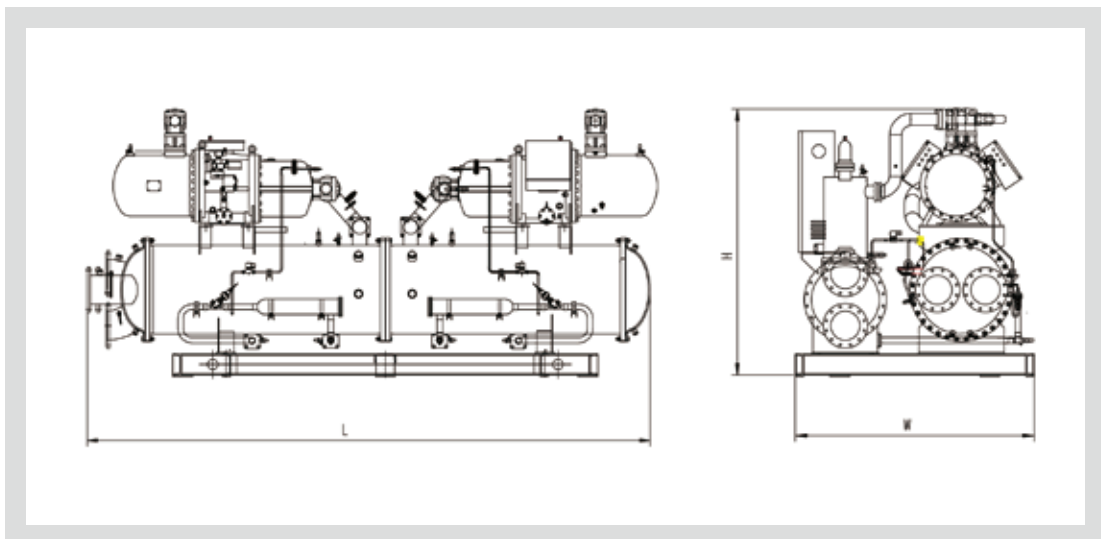


LSWF540-LSWF960 LSWF360A-LSWF720A

Profile diagram of flooded type unit



LSW100F-LSW540F LSW70AF-LSW220AF



LSWD360F-LSWD600F

R134a

Technical parameters of water cooled screw chiller - I

Unit model		LSW050A	LSW060A	LSW070A	LSW080A	LSW100A	LSW110A
Refrigerating capacity	kW	176	211	246	281	352	387
Power supply		3N~50Hz 380V					
Energy control		25%~100%					
Starting mode		Y-△ or shunt winding					

Refrigerant	Filling quantity R134a	kg	35	42	50	63	77	84
	Type		Semi-closed screw compressor					
Compressor	Number of compressors	Set	1	1	1	1	1	1
	Input power of refrigerating	kW	36.3	43.5	50.7	57.9	71.1	78.2

Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40-80					
	Connecting pipe specification	mm	80	100	100	100	100	100
	Water flow	m ³ /h	30.3	36.3	42.3	48.3	60.5	66.6

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Condenser	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40-80					
	Connecting pipe specification	mm	80	100	100	100	150	150
	Water flow	m ³ /h	37.8	45.4	52.9	60.4	75.6	83.2
Partial heat recovery	Part of heat recovery quantity	kW	44.0	52.8	61.5	70.3	88.0	96.8
	Water side resistance	kPa	40-80					
	Connecting pipe specification	DN	50	50	50	50	65	65
	Water flow	m ³ /h	7.3	8.8	10.2	11.7	14.7	16
Profile, weight and model standards	Length	mm	2315	2925	2925	2980	3000	3430
	Width	mm	1180	1180	1180	1180	1180	1400
	Height	mm	1915	1915	1955	2045	2100	1650
	Shipping weight	kg	1650	1750	1820	2400	3000	3150
Profile and weight of partial heat recovery model	Length	mm	2565	3175	3175	3230	3250	3680
	Width	mm	1330	1330	1330	1330	1330	1550
	Height	mm	2065	2065	2105	2195	2250	1800
	Shipping weight	kg	1750	1880	1900	2550	3200	3260

- Notes:
1. The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 2. The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 3. The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 4. The specification listed in this table is subject to change without notice.

Unit model		LSW120A	LSW130A	LSW150A	LSW160A	LSW180A	LSW200A	
Refrigerating capacity	kW	422	464	528	563	633	703	
Power supply		3N~50Hz 380V						
Energy control		25%~100%						
Starting mode		Y-△ or shunt winding						
Refrigerant	Filling quantity (R134a)	kg	84	98	105	112	126	140
Compressor	Type		Semi-closed screw compressor					
	Number of compressors	Set	1	1	1	1	1	1
	Cooling input power		85.3	91.4	105.6	112.4	126.6	140.6
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	100	125	125	150	150	150
	Water flow	m ³ /h	72.6	79.8	90.8	96.8	108.9	120.9
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	100	125	125	150	150	150
	Water flow	m ³ /h	90.7	99.8	113.5	121.0	136.1	151.1
Partial heat recovery	Partial heat recovery quantity	kW	105.5	114.3	132.0	140.5	158.3	175.8
	Water side resistance	kPa	40~80					
	Connecting pipe specification	DN	65	65	65	80	80	80
	Water flow	m ³ /h	15.6	16.9	19.5	20.8	23.4	26.0
Shape, weight, model standards	Length	mm	3450	3500	3500	3600	3600	3600
	Width	mm	1400	1450	1450	1450	1450	1450
	Height	mm	1620	1670	1760	1760	1760	1760
	Shipping weight	kg	3150	3300	3500	4200	4500	4900
Model, shape and weight of partial heat recovery unit	Length	mm	3700	3750	3750	3850	3850	3850
	Width	mm	1550	3150	3150	3150	3150	3150
	Height	mm	1770	1820	1910	1910	1910	1910
	Shipping weight	kg	3400	3600	3800	4550	4900	5300

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

R134a Technical parameters of water cooled screw chiller - III

Unit model		LSWD070A	LSWD100A	LSWD120A	LSWD140A	LSWD160A	LSWD200A	
Refrigerating capacity	kW	246	352	422	492	563	704	
Power supply		3N~50Hz 380V						
Energy control		25%~100%						
Starting mode		Y-△ or shunt winding						
Refrigerant	Filling quantity (R134a)	kg	49	70	84	98	112	140
Compressor	Type		Semi-closed screw compressor					
	Number of compressors	Set	2	2	2	2	2	2
	Cooling input power		50.7	72.6	87	101.4	115.8	142.2
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	100	100	125	125	150	150
	Water flow	m ³ /h	42.3	60.5	72.6	84.6	96.8	121.1
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	100	100	125	125	150	150
	Water flow	m ³ /h	52.9	75.7	90.7	105.8	121.0	151.4
Partial heat recovery	Partial heat recovery quantity	kW	61.5	88	105.5	123	140.7	176
	Water side resistance	kPa	40-80					
	Connecting pipe specification	DN	50	65	65	65	80	80
	Water flow	m ³ /h	10.6	15.1	18.1	21.2	24.2	30.3
Shape, weight, model standards	Length	mm	3130	3200	3700	3700	3810	3810
	Width	mm	1180	1180	1300	1300	1300	1300
	Height	mm	1840	1985	2040	2040	2170	2220
	Shipping weight	kg	2500	3000	3150	4200	4550	4690
Model, shape and weight of partial heat recovery unit	Length	mm	3380	3450	3950	3950	4060	4060
	Width	mm	1330	1330	1450	1450	1450	1450
	Height	mm	1990	2135	2190	2190	2320	2370
	Shipping weight	kg	2600	3200	3400	4500	4800	4900

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

R143a Technical parameters of water cooled screw chiller - IV

Unit model		LSWD220A	LSWD240A	LSWD260A	LSWD300A	LSWD320A	LSWD360A	
Refrigerating capacity	kW	774	844	914	1055	1125	1266	
Power supply		3N~50Hz 380V						
Energy control		12.5%~100%						
Starting mode		Y-△ or shunt winding						
Refrigerant	Filling quantity (R143a)	kg	154	168	182	210	224	252
Compressor	Type		Semi-closed screw compressor					
	Number of compressors	Set	2	2	2	2	2	2
	Cooling input power	kW	156.4	170.6	182.8	211.2	224.8	253.2
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	150	150	150	200	200	200
	Water flow	m ³ /h	133.1	145.2	157.2	181.5	193.5	217.8
Evaporator	Type		Shell and tube heat exchanger					
	Water side resistance	kPa	40~80					
	Connecting pipe specification	mm	150	150	150	200	200	200
	Water flow	m ³ /h	166.4	181.5	196.5	226.8	241.9	272.2
Partial heat recovery	Partial heat recovery quantity	kW	193.5	211	228.5	263.75	281.25	316.5
	Water side resistance	kPa	40-80					
	Connecting pipe specification	DN	80	80	100	100	100	100
	Water flow	m ³ /h	33.3	36.3	39.3	45.4	48.4	54.4
Shape, weight, model standards	Length	mm	4500	4500	4800	4600	4700	4700
	Width	mm	1600	1600	1600	1750	1700	1700
	Height	mm	1750	1750	1825	1920	1920	1920
	Shipping weight	kg	5400	5900	6300	6750	7100	7500
Model, shape and weight of partial heat recovery unit	Length	mm	4750	4750	5050	4850	4950	4950
	Width	mm	1750	1750	1750	1900	1850	1850
	Height	mm	1900	1900	1975	2070	2070	2070
	Shipping weight	kg	5700	6200	6600	7050	7400	7900

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

R143a Technical parameters of water cooled screw chiller - V

Unit model		LSWF400A	LSWF440A	LSWF480A	LSWF520A	LSWF600A	LSWF640A	LSWF720A	
Refrigerating capacity	kW	1407	1548	1688	1828	2110	2251	2532	
Power supply		3N~50Hz 380V							
Energy control		6.25%~100%							
Starting mode		Y-△ or shunt winding							
Refrigerant	Filling quantity (R143a)	kg	280	308	336	364	420	448	504
Compressor	Type		Semi-closed screw compressor						
	Number of compressors	Set	4	4	4	4	4	4	4
	Cooling input power	kW	284.4	312.8	341.2	365.6	422.4	449.6	506.4
Evaporator	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	200	200	200	200	250	250	250
	Water flow	m ³ /h	242.0	266.3	290.3	314.4	362.9	387.2	435.5
Evaporator	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	150x2	150x2	150x2	150x2	200x2	200x2	200x2
	Water flow	m ³ /h	302.5	332.8	362.9	393.0	453.7	484.0	544.4
Partial heat recovery	Partial heat recovery quantity	kW	351.8	387.0	422.0	457.0	527.5	562.8	633.0
	Water side resistance	kPa	40-80						
	Connecting pipe specification	DN	100	125	125	125	125	125	125
	Water flow	m ³ /h	52.0	57.2	62.4	67.6	78.0	83.2	93.6
Shape, weight, model standards	Length	mm	3900	3900	4600	4600	4600	4600	4600
	Width	mm	2600	2600	2700	2700	2700	2700	2700
	Height	mm	2500	2500	2600	2600	2700	2700	2700
	Shipping weight	kg	8700	9200	10800	11800	12600	13500	14200
Model, shape and weight of partial heat recovery unit	Length	mm	4150	4150	4850	4850	4850	4850	4850
	Width	mm	2750	2750	2850	2850	2850	2850	2850
	Height	mm	2650	2650	2750	2750	2850	2850	2850
	Shipping weight	kg	9000	9400	11000	12000	12900	13800	14500

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

R143a Technical parameters of water cooled screw chiller | Flooded type - I

Unit model		LSW070AF	LSW090AF	LSW120AF	LSW130AF	LSW140AF	LSW180AF	LSW190AF	
Refrigerating capacity	kW	246	317	422	457	492	633	668	
Power supply		3N~50Hz 380V							
Energy control		25%~100%							
Starting mode		Y-△ or shunt winding							
Refrigerant	Filling quantity (R134a)	kg	135	175	213	251	271	329	368
Compressor	Type		Semi-closed screw compressor						
	Number of compressors	Set	1	1	1	1	1	1	1
	Cooling input power	kW	46.4	59.8	79.6	85.4	91.1	118.3	123.7
Evaporator	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	100	100	100	100	100	125	150
	Water flow	m ³ /h	42.3	54.5	72.6	78.6	84.6	108.9	114.9
Condenser	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	100	100	100	100	100	125	150
	Water flow	m ³ /h	52.9	68.2	90.7	98.3	105.8	136.1	143.6
Partial heat recovery	Partial heat recovery quantity	kW	61.5	79.3	105.5	114.3	123.0	158.3	167.0
	Water side resistance	kPa	40~80						
	Connecting pipe specification	DN	50	65	65	65	65	80	80
	Water flow	m ³ /h	10.6	13.6	18.1	19.7	21.2	27.2	28.7
Shape, weight, model standards	Length	mm	3400	3400	3500	3400	3500	3400	3600
	Width	mm	1500	1700	1600	1700	1700	1700	1800
	Height	mm	1800	1800	1900	1950	1900	1950	2000
	Shipping weight	kg	2300	2550	2900	3180	3400	4150	4320
Model, shape and weight of partial heat recovery unit	Length	mm	3650	3650	3750	3650	3750	3650	3650
	Width	mm	1650	1850	1750	1850	1850	1850	1950
	Height	mm	1950	1950	2050	2100	2050	2100	2150
	Shipping weight	kg	2400	2700	3100	3380	3600	4400	4600

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

R143a Technical parameters of water cooled screw chiller | Flooded type - II

Unit model		LSW220AF	LSWD180AF	LSWD240AF	LSWD260AF	LSWD280AF	LSWD360AF	LSWD380AF	
Refrigerating capacity	kW	774	633	844	914	985	1266	1336	
Power supply		3N~50Hz 380V							
Energy control		25%~100%	12.5%~100%						
Starting mode		Y-△ or shunt winding							
Refrigerant	Filling quantity (R134a)	kg	425	348	445	503	542	658	735
Compressor	Type		Semi-closed screw compressor						
	Number of compressors	Set	1	2	2	2	2	2	2
	Cooling input power	kW	142	92.8	159.2	170.8	182.2	236.6	247.4
Evaporator	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	150	150	150	150	150	200	200
	Water flow	m ³ /h	133.1	108.9	145.2	157.2	169.4	217.8	229.8
Condenser	Type		Shell and tube heat exchanger						
	Water side resistance	kPa	40~80						
	Connecting pipe specification	mm	150	150	150	150	150	200	200
	Water flow	m ³ /h	166.4	136.1	181.5	196.5	211.8	272.2	287.2
Partial heat recovery	Partial heat recovery quantity	kW	193.5	158.3	211.0	228.5	246.3	316.5	334.0
	Water side resistance	kPa	40-80						
	Connecting pipe specification	DN	80	80	80	80	100	100	100
	Water flow	m ³ /h	33.3	27.2	36.3	39.3	42.4	54.4	57.4
Shape, weight, model standards	Length	mm	3600	4400	4400	4300	4500	4900	4900
	Width	mm	1900	1900	1900	2000	1900	2000	1900
	Height	mm	2000	2000	2000	2100	2000	2200	2100
	Shipping weight	kg	4500	4800	5800	6200	6510	7980	8320
Model, shape and weight of partial heat recovery unit	Length	mm	3850	4650	4650	4550	4750	5150	5150
	Width	mm	2050	2050	2050	2150	2050	2150	2050
	Height	mm	2150	2150	2150	2250	2150	2350	2250
	Shipping weight	kg	4800	5000	6100	6500	6800	8200	8500

- Notes:
- The standard working conditions for the refrigerating capacity of the unit and the power consumption of the compressor are as follows.
The water inlet/outlet temperature of the condenser is 30/35°C, while that of the evaporator is 12/7°C.
 - The standard working conditions for partial heat recovery of the unit are as follows.
The water inlet temperature of the condenser is 40°C, while that of the evaporator is 12°C
 - The standard pressure bearing capacity of the condenser, evaporator, and heat collector waterway is 1.0MPa.
And the fouling factor of the evaporator is 0.018m² °C/ KW, while that of the condenser is 0.044m² °C/ KW.
 - The specification listed in this table is subject to change without notice.

VI. Handling and Installation Considerations

Considerations before installation

Delivery and reception

Reception

After the equipment arrives at the site, it's necessary to check whether the goods consistent with the order, whether accessories are lost, and whether damages caused by transportation exist. If there are discrepancies with the order, lack of accessories or damage, contact the delivery person or our company immediately.

Handling

Transportation: Fewer unit handling times, fewer opportunities of damage. The accessories on equipment (such as electric cabinet, pipeline, pipeline accessories, etc.) cannot be used for lifting machine or trodden. During lifting, it's supposed to use forklift or crane to load and unload.

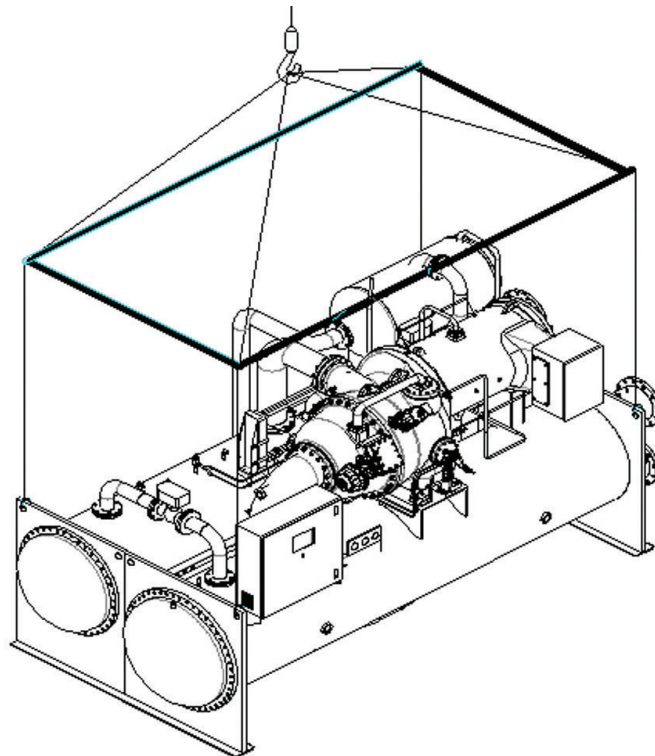
When used, the crane can hang the hanging hole in the backing board and use lifting support for lifting. At the same time, notice that the electric control box, pipe fittings and insulation materials cannot be damaged.

Lifting

During the unit lifting, it is necessary to avoid the surface scratching or deformation, and the contact surface between cable and machine must be placed protective cushion.

During the lifting, it's supposed to maintain the unit vertical, the gradient shall be less than 30° and the bumping and sliding shall be avoided.

Pay attention to slightly handle and put down.



Installation

The installation site must be clean and dry, with no sundries stacked and having good lighting, so as to facilitate both control instrument check and operation and maintenance.

Pay attention to whether enough space is available for unit access at installation site.

Irrespective of the unit type, reserve sufficient maintenance space on each side. In addition, reserve sufficient space at both ends of the unit for cleaning and repairing of condenser and evaporator copper pipes afterwards.

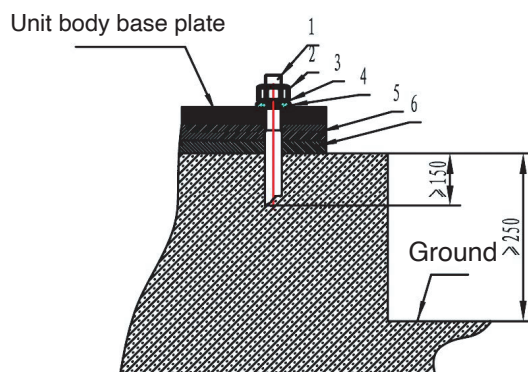
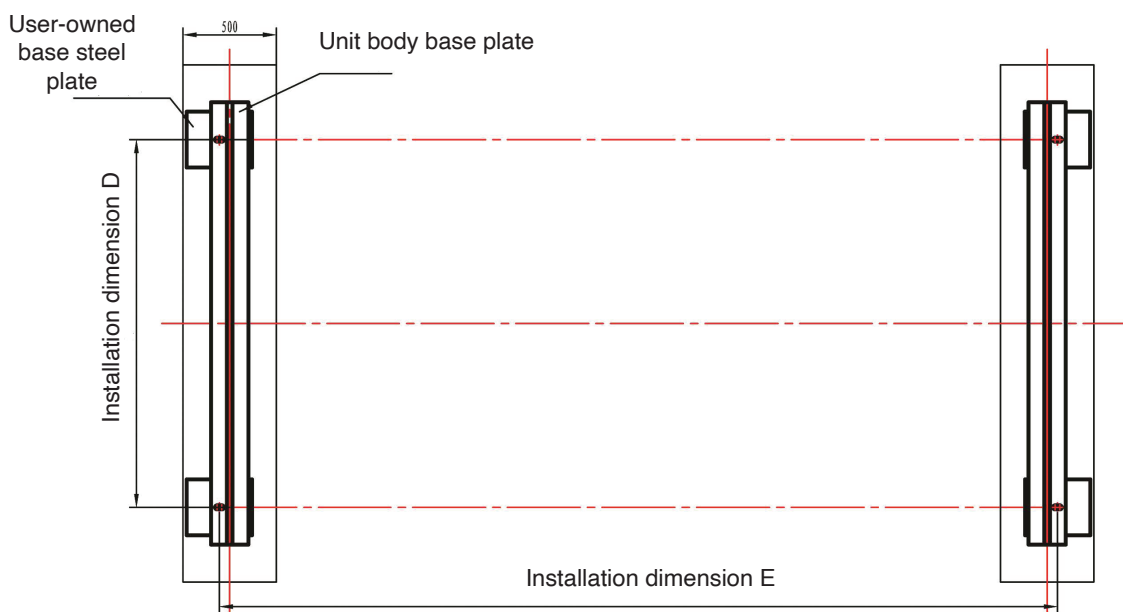
The indoor machine room should have adequate ventilation, which is beneficial to the safe running and operation of machinery equipment.

For normal operation of electrical components, do not put the unit in places of dust and dirt, corrosive fumes and high humidity; otherwise, please correct it .

Foundation

The foundation can be made of cement or steel plate, which shall be able to fully withstand the operating weight of the unit and the levelness shall be within 3/1000.

In order to facilitate unit maintenance and inspection, the foundation height should be 250mm above the ground.



No.	Name
1	Foundation bolt
2	Nut
3	Spring washer
4	Flat washer
5	User-owned steel plate
6	Rubber shock pad

Shockproof

- The foundation of the unit must be solid so as to minimize vibration transmission.
- The unit should be added with shock absorber to prevent noise and vibration from spreading to the floor and reducing the vibration to unit.

Space demand

The installation shall leave enough space for the access of unit.
No matter what kind the model is, each side of it needs to reserve enough maintenance space.

In addition, notice that both ends of the unit can reserve enough space for cleaning and repairing the condenser and evaporator copper tubes.

Ventilation

The equipment room must be well ventilated. Although there are no relevant regulations in many areas, it would be better to install ventilation equipment at the poorly ventilated place to facilitate the safety running and operation of machine equipment.

Drainage

When setting the foundation, the drainage pipe shall be pre-installed around to facilitate to discharge the water stored in equipment during repair.

Water proof

The unit cannot be installed under the water pipes that has condensation or water leakage or the places that maybe splashed by water.

Water pipeline of condenser and evaporator

- The equipment shall be corrected on horizontal position before the assembly of water pipes. The automatic exhaust valve shall be installed on the highest position of pipeline. The pipeline of the evaporator water pipe shall be insulated to prevent the condensation. While the pipeline of the condenser water pipe shall be handled according to local conditions and laws and it shall be insulated if necessary.
- Install the pipeline of inlet & outlet water pipe connecting the chiller condenser and evaporator according to unit identification and mis-connection is forbidden.
- The thermometer and pressure gauge shall be installed on the inlet & outlet water pipe of the condenser and evaporator to master the operating conditions of the unit.
- The inlet side of cold water pump needs to be installed with the filter. Because in the construction of water pipeline, there may be debris left in the water pipe that cannot be cleaned, these debris may enter the pump, condenser and evaporator when the machine is running causing blockage or damage to the heat pipe.
- The stop valve shall be installed on the pipeline of the inlet & outlet water pipe of the condenser and evaporator, so the water valve shall be shut off to discharge the water in the condenser and evaporator when maintenance.
- The flexible shockproof hose shall be installed at the pipeline of the inlet & outlet water pipe of the condenser and evaporator to reduce the transmission of vibration and protect the unit from bearing the weight of the pipeline.
- The flow control valve shall be installed at the pipeline of the inlet & outlet water pipe of condenser to keep the unit condensing pressure in proper condition.
- The flow switch shall be installed at the outlet of the condenser and evaporator to ensure the normal amount of water when the unit runs. If it is not installed, the unit may be damaged seriously.
- The circulating water pump shall be installed on the inlet of the condenser and evaporator, while it shall also be installed on the outlet if it is limited by space.
- The expansion tank shall be installed on the top position of air conditioning equipment to keep the exhaust function and possess the expansion and shrinkage of water supply and cold water system.
- At the highest position of the protruding distribution pipe, automatic exhaust device should be equipped. Confirm that air in the water pipeline has been ruled out before starting the chiller unit to avoid damage caused by water-free operation.

Principles and requirements of water system

Water quality: The water shall be clean, or the water has been processed and meets the engineering requirements.

Water temperature: The temperature of water source shall be proper.

Water volume: The volume of water source shall be enough to meet the user's demands of heating or cooling load.

Power distribution

- The power engineering must meet relevant regulations.
- The specifications of the wire size, electromagnetic switch, and no-fuse switch, etc. shall comply with relevant laws and regulations.
- The phase sequence of the power supply shall comply with the steering of compressor.
- All wiring terminals shall be crimped uniformly, properly, and the screws shall be screwed firmly.
- After the wiring connection is completed, the mark shall be made for future maintenance

Control circuit

- It is necessary to complete the connection of contact of the exterior interlock circuit of control circuit to prevent the compressor starting before the water pump is not started.
- When the oil heater is off, please do not cut off power supply. If the power supply is cut off, it's supposed to confirm that oil heater has heated for 8 hours or oil temperature has reached above 23°C before starting.

VII. Correction Factor Table

Correction factor table for unit cooling condition

		Water inlet temperature of cooling water °C									
		28		29		30		31		32	
		Refrigeration capacity	Power input	Refrigeration capacity	Power input	Refrigeration capacity	Power input	Refrigeration capacity	Power input	Refrigeration capacity	Power input
Water outlet temperature of chilled water °C	5	0.950	0.948	0.941	0.967	0.932	0.986	0.923	1.006	0.914	1.025
	6	0.984	0.955	0.975	0.974	0.965	0.993	0.956	1.012	0.947	1.032
	7	1.019	0.961	1.009	0.981	1.000	1.000	0.991	1.019	0.981	1.040
	8	1.054	0.968	1.045	0.987	1.035	1.009	1.027	1.027	1.016	1.046
	9	1.091	0.974	1.082	0.994	1.072	1.013	1.033	1.033	1.052	1.054
	10	1.129	0.980	1.119	0.999	1.109	1.019	1.040	1.040	1.088	1.061

VIII. Schedule

Relational table of copper wire cross-sectional area and the safe current

Rated current (A)	6	8	10	12	16	20	25	32	40	63	80	100	125	160	200	250	315	
Wire cross-sectional area (mm ²)	Max.	1	1.5	1.5	1.5	2.5	2.5	4	6	10	10	18	25	35	50	75	95	120
	Min.	1.5	2.5	2.5	2.5	4	6	6	10	16	25	35	50	70	95	120	150	240

Example: When the operating current is 32A, the minimum cross-sectional area of the wire selected should be 6mm², while the maximum cross-sectional area should be 10mm².
When the operating current is 160A, the minimum cross-sectional area of the wire selected should be 50mm², while the maximum cross-sectional area should be 70mm².

Notes: The standard is that the above cross-sectional area of wire selected should meet the national standard of copper wire.

Grading	Serial No.	Category	Cooling consumption in summer		Cooling consumption in winter	
			W/m ²	Kcal/ m ² .h	W/m ²	Kcal/ m ² .h
Comprehensive indicators calculated by building area	1	General hotel	115-140	100-120	93-115	80-100
	2	Hotel below three stars	140-175	120-150	115-140	100-120
	3	Office building	115-140	100-120	93-115	80-100
	4	Complex building	128-162	110-140	110-128	95-110
	5	Commercial building	200-350	172-300	160-260	138-224
	6	General store	150-175	130-150	120-140	105-130
	7	Hospital	115-140	100-120	115-140	100-120
	8	Gymnasium	180-470	155-405	120-180	103-155
	9	Computer room	175-290	150-250	110-128	95-110
	10	Comprehensive cinema	290-384	250-330	120-180	103-155
	11	Airport	150-210	130-180	140-180	120-155
Classification Index	1	Standard room	140-175	120-150	115-140	100-120
	2	General office	116-175	100-150	105-128	90-110
	3	General meeting room	174-290	150-250	115-140	100-120
	4	Chinese restaurant	300-400	258-344	140-170	120-150
	5	Western restaurant, bar	230-350	200-300	140-170	120-150
	6	Hair salon and beauty salon	230-350	200-300	140-170	120-150
	7	Bottom shopping mall	279-314	240-270	223-251	192-216
	8	Market above second floor	186-233	160-200	149-186	128-160
	9	Large business hall	200-290	170-250	149-186	128-160
	10	Lobby	150-200	129-172	150-200	175-215
	11	Corridor	70	60	70	60
	12	General hospital ward	140-175	120-150	115-140	100-120
	13	Operating room	230-350	200-300	140-200	120-172

Notes: The above values are estimates, and it is more accurate to successively calculate the air conditioning room.
a) The above values have included the cooling (heating) consumption of fresh air (factor or permeation).
b) When selecting outdoor unit, it's supposed to specially pay attention to simultaneous using factor of airconditioning rooms in the building. This factor shall be <1.

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