



## Water Cooled Water Chiller

Shandong Vicot Air Conditioning Co., Ltd.



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### Introduction

Water cooled water chiller is one of the cooling system in central air conditioner, uses cooling tower to cool the water, and the cold water is cooling source. Water cooled water chiller has advantages of high efficient, low noise, reasonable structure, simple and stable operation, convenient installation and maintenance, which is comfortable central air conditioner that suitable for hotel, shopping mall, office building, exhibition mall, airport, gymnasium.

VWSA series water cooled water chiller is the stable product developed by VICOT with the using of new technologies of international and domestic air conditioning industry, which is designed and produced according to international standard, adopting world famous high quality compressor, system accessories and computerized controller, with the reasonable match and structure design, it's stable, high quality, low noise and no contamination to outdoor environment.

### Features

#### 1. Optimized design:

The strong and weak electricity systems installed separately to ensure safety.

Flexible high pressure system makes it lifetime longer.

#### 2. Quality components selection:

Compressors and refrigeration accessories (such as dry filter, thermal expansion valve, liquid supply solenoid, liquid level mirror, high/low pressure control devices) all chosen world-renowned brand products to ensure that the unit reached an excellent level of performance

Using the most advanced DAE / DAC efficient heat transfer pipe, heat transfer surface with internal ribbed tube makes the heat transfer coefficient substantially increased; the heat exchanger unique structural design, the best way of copper tube layout and precision of refrigerant control technology, greatly improved the efficiency of heat transfer.

#### 3. Simple and stable operation,

- Perfect control
  - 1) Computerized control with standby manual operation system, 2) Compressor operation timing,
  - 3) Compressor automatic start-up sequence, 4) Alarm signals, 5) Alarm reset, 6) Water temperature control, 7) Manual reset high pressure switch, Automatic reset low pressure switch
- Protections that ensure its safe and stable operation:
  - 1) Reverse phase, 2) lack phase, 3) high/low pressure, 4) gas discharge,
  - 5) Outlet water temp. too low (high), 6) water stopped, 7) antifreeze , 8)compressor overheat etc.
- High speed microprocessor is used.
- Reserved the terminal for SMS control
- Reserved the terminal for PC monitoring hardware
- With self diagnosis function, and automatically eliminate software problem, the capability of anti-interference is improved by the software uses redundancy and trap technology with WATCHDOG of hardware.  
Advanced touch screen is used, the lifetime of which is more than 1million times of consecutive touch.
- Digital display of:
  - 1) Entering and leaving water temperature, 2) Temperature and differential settings, 3) Alarm description
  - 4) Hour meters readout of operation and number of unit and compressor start-ups



### Nomenclature

VWSA

Vicot water cooled water chiller

1200

Nominal Capacity  
When less than 1000kW shows  
three numbers

### Optional Accessories/Function

- 1) PLC controller
  - 2) Stepless variable capacity adjust
  - 3) Soft starter
  - 4) Heat recovery
  - 5) Wooden box package
  - 6) Rectangular base frame
  - 7) Noise insulation box
  - 8) Anti-corrosion type
  - 9) Waterside 2.0 Mpa pressure bearing capacity
  - 10) R407C, R410A, R134A refrigerant
  - 11) Other optional accessories
- A: rubber absorber B: Spring absorber C: Remote control box.



### Specification

Model		VWSA400	VWSA430	VWSA480	VWSA560	VWSA660	VWSA760
Cooling capacity (R22)	kW	400	430	480	560	660	760
	BTU	1,365,000	1,468,000	1,638,000	1,911,000	2,252,000	2,594,000
Total power input (R22)	kW	83	88	97	113	135	154
Cooling capacity (R407C)	kW	381	410	457	533	629	724
	BTU	1,300,000	1,400,000	1,560,000	1,819,000	2,146,000	2,470,000
Total power input (R407C)	kW	86	92	101	118	140	160
Max. operating current	A	185	185	218	234	275	339
Energy control range		25%~100%					
Refrigerant circuit		1					
Compressor qty.		1					
Compressor type		Semi-hermetic Twin Screw Compressor					
Noise（standard）	dB(A)	71	71	73	73	74	76
Noise（Noise-proof）	dB(A)	61	61	65	65	66	68
Power		380V/3Ph/50Hz					
Refrigerant		R22/R407C					
Refrigerant Charge amount	kg	78	78	94	99	117	143
Cooled water inlet temp.	℃	12					
Cooled water outlet temp.	℃	7					
Cooled water flow	m³/h	69	74	83	96	114	131
Cooled waterside pressure drop	kPa	44					
Cooled water side connection pipe		DN100				DN125	
Cooling water inlet temp.	℃	30					
Cooling water outlet temp.	℃	35					
Cooling water flow	m³/h	83	88	99	114	135	157
Cooling water side pressure drop	kPa	44					
Cooling water side connection pipe		DN125					
Partial heat recovery capacity	KW	80	86	96	112	132	152
	BTU	273,000	294,000	328,000	382,000	451,000	519,000
Partial heat recovery water flow	m³/h	14	15	17	19	23	26
Partial heat recovery pressure drop	Kpa	30	32	32	33	34	34
Total heat recoverycapacity	KW	444	477	531	619	731	841
	BTU	1,515,000	1,515,000	1,812,000	2,112,000	2,494,000	2,870,000
Total heat recoverywater flow	m³/h	76	82	91	106	126	145
Total heat recoverypressure drop	Kpa	37	38	37	38	38	38
Length	mm	3,200	3,200	3,250	3,250	3,120	3,480
Width	mm	1,240	1,240	1,320	1,320	1,360	1,420
Height	mm	1,600	1,600	1,800	1,800	1,990	2,055
Operating Weight（Standard）	kg	2,500	2,550	3,150	3,450	3,600	3,800
Operating Weight（Noise-proof）	kg	2,620	2,670	3,300	3,580	3,740	3,950

. Note: Heat recovery is optional device, inlet water 40℃, outlet water 45℃.

Water side Max. bearing pressure: 1.0 MPa.



### Specification

Model		VWSA900	VWSA960	VWSA1120	VWSA1320	VWSA1520
Cooling capacity (R22)	kW	900	960	1120	1320	1520
	BTU	3,071,000	3,276,000	3,823,000	4,505,000	5,187,000
Total power input (R22)	kW	182	194	226	270	308
Cooling capacity (R407C)	kW	857	914	1,067	1,257	1,448
	BTU	2,9245,000	3,119,000	3,641,000	4,290,000	4,941,000
Total power input (R407C)	kW	189	202	235	281	320
Max. operating current	A	2*185	2*218	2*234	2*275	2*339
Energy control range	12.5%~100%					
Refrigerant circuit	2					
Compressor quantity	2					
Compressor type	Semi-Hermetic Twin Screw Compressor					
Noise (standard)	dB(A)	78	78	78	78	79
noise (noise-proof)	dB(A)	70	70	70	70	71
Supply Power	380V/3Ph/50Hz					
Refrigerant	R22/R407C					
Refrigerant charge amount	kg	2*78	2*94	2*99	2*117	2*143
Cooled water inlet temp.	℃	12				
Cooled water outlet temp.	℃	7				
Cooled water flow	m3/h	155	165	193	227	262
Cooled waterside pressure drop	kPa	44	44	45	45	45
Cooled water side connection pipe		DN150	DN150	DN150	DN200	DN200
Cooling water inlet temp.	℃	30				
Cooling water outlet temp.	℃	35				
Cooling water flow	m3/h	183	198	228	269	313
Cooling water side pressure drop	kPa	44	44	45	45	45
Cooling water side connection pipe		2*DN125	2*DN125	2*DN125	2*DN150	2*DN150
Partial heat recovery capacity	KW	180	192	224	264	304
	BTU	615,000	656,000	764,320	901,000	1,038,000
Partial heat recovery water flow	m3/h	31	33	39	45	52
Partial heat recovery pressure drop	Kpa	34	32	32	33	34
Total heat recovery capacity	KW	995	1,062	1,238	1,463	1,682
	BTU	3,395,000	3,624,000	4,225,000	4,992,000	5,740,000
Total heat recovery water flow	m3/h	171	183	213	252	289
Total heat recovery pressure drop	Kpa	39	37	39	39	38
Length	mm	4,090	4,045	4,045	4,435	4,690
Width	mm	1,465	1,460	1,460	1,420	1,440
Height	mm	1,965	2,010	2,010	2,075	2,215
Operating Weight (Standard)	kg	4,150	4,650	5,400	6,400	8,000
Operating Weight (Noise-proof)	kg	4,310	4,830	5,610	6,650	8,320

Note: Heat recovery is optional device, inlet water 40℃, outlet water 45℃.

Water side Max. bearing pressure:1.0 MPa.



### Specification

Model		VWSA1660	VWSA1800	VWSA1920	VWSA2080	VWSA2240	VWSA2480	VWSA2720	VWSA3100
Cooling capacity (R22)	kW	1,660	1,800	1,920	2,080	2,240	2,480	2,720	3,100
	BTU	5,664,000	6,142,000	6,552,000	7,098,000	7,643,000	8,462,000	9,281,000	10,578,000
Total power input (R22)	kW	336	362	388	420	459	498	548	624
Cooling capacity (R407C)	kW	1,581	1,714	1,829	1,981	2,133	2,362	2,590	2,952
	BTU	5,395,000	5,849,000	6,241,000	6,760,000	7,278,000	8,060,000	8,838,000	8,838,000
Total power input (R407C)	kW	349	376	404	437	477	518	570	649
Max. operating current	A	4*185	2*(185+218)	4*218	4*234	2*(234+275)	4*275	2*(275+339)	4*339
Energy control range		6.25%~100%							
Refrigerant circuit		4							
Compressor quantity		4							
Compressor type		Semi-Hermetic Twin Screw Compressor							
Noise (standard)	dB(A)	79	80	80	81	81	81	83	83
Noise (noise-proof)	dB(A)	71	72	72	73	73	73	75	75
Power supply		380V/3Ph/50Hz							
Refrigerant		R22 /R407C							
Refrigerant charge amount	kg	4*78	2*(78+94)	4*94	4*99	2*(99+117)	4*117	2*(117+143)	4*143
Cooled water inlet temp.	℃	12							
Cooled water outlet temp.	℃	7							
Cooled water flow	m <sup>3</sup> /h	286	310	331	358	386	427	468	534
Cooled waterside pressure drop	kPa	45	45	45	46	46	46	46	46
Cooled water side connection pipe		2*DN150	2*DN150	2*DN150	2*DN150	2*DN150	2*DN200	2*DN200	2*DN200
Cooling water inlet temp.	℃	30							
Cooling water outlet temp.	℃	35							
Cooling water flow	m <sup>3</sup> /h	342	372	397	428	462	511	562	637
Cooling water side pressure drop	kPa	46	46	46	46	46	46	46	46
Cooling water side connection pipe		2*DN150	2*DN200	2*DN200	2*DN200	2*DN200	2*DN200	2*DN200	2*DN200
Partial heat recovery capacity	KW	332	360	384	416	448	496	544	620
	BTU	1,133,000	1,229,000	1,311,000	1,420,000	1,529,000	1,693,000	1,856,000	2,116,000
Partial heat recovery water flow	m <sup>3</sup> /h	57	62	66	72	77	85	94	107
Partial heat recovery pressure drop	Kpa	35	35	35	35	35	35	35	35
Total heat recovery capacity	KW	1,836	1,989	2,123	2,300	2,483	2,740	3,007	3,426
Total heat recovery water flow	m <sup>3</sup> /h	316	342	365	396	427	471	517	589
Total heat recovery pressure drop	Kpa	39	39	39	39	39	39	39	39
Length	mm	4,320	4,600	4,500	4,650	4,650	5,000	4,750	4,850
Width	mm	2,290	2,290	2,350	2,350	2,400	2,500	2,450	2,600
Height	mm	2,210	2,315	2,355	2,365	2,495	2,465	2,555	2,575
Operating weight (standard)	kg	8,500	8,800	9,500	11,000	11,800	12,800	13,000	13,500
Operating weight (Noise-proof)	kg	8,750	9,060	9,780	11,280	12,100	13,130	13,330	13,850

Note: Heat recovery is optional device, inlet water 40℃, outlet water 45℃.

Water side Max. bearing pressure:1.0 MPa.

The data above is subject to change without prior notice.



**Capacities/power input in different conditions**

**VWSA Cooling Capacity Correction coefficient**

Outlet Cooled Water temp. °C	Cooling water inlet temp. °C												
	25	26	27	28	29	30	31	32	33	34	35	36	37
5°C	1.01	1.00	0.99	0.97	0.96	0.95	0.94	0.92	0.91	0.90	0.89	0.88	0.87
7°C	1.07	1.05	1.04	1.03	1.01	1.00	0.99	0.97	0.96	0.95	0.94	0.92	0.91
9°C	1.12	1.11	1.09	1.08	1.07	1.05	1.04	1.03	1.01	1.00	0.99	0.97	0.96
11°C	1.18	1.17	1.15	1.14	1.12	1.11	1.09	1.08	1.07	1.05	1.04	1.03	1.01
13°C	1.25	1.23	1.21	1.20	1.18	1.17	1.15	1.14	1.12	1.11	1.09	1.08	1.07
15°C	1.31	1.29	1.28	1.26	1.25	1.23	1.21	1.20	1.18	1.17	1.15	1.14	1.12

**VWSA Power input Correction coefficient**

Outlet Cooled Water temp. °C	Cooling water inlet temp. °C												
	25	26	27	28	29	30	31	32	33	34	35	36	37
5°C	0.863	0.886	0.910	0.934	0.959	0.985	1.011	1.037	1.064	1.092	1.120	1.149	1.179
7°C	0.877	0.900	0.924	0.949	0.974	1.000	1.026	1.053	1.080	1.108	1.137	1.166	1.197
9°C	0.890	0.913	0.938	0.963	0.989	1.015	1.041	1.068	1.096	1.125	1.154	1.184	1.215
11°C	0.903	0.927	0.952	0.977	1.003	1.030	1.057	1.084	1.113	1.142	1.171	1.202	1.233
13°C	0.917	0.941	0.966	0.992	1.018	1.046	1.073	1.101	1.129	1.159	1.189	1.220	1.251
15°C	0.930	0.955	0.981	1.007	1.034	1.061	1.089	1.117	1.146	1.176	1.207	1.238	1.270

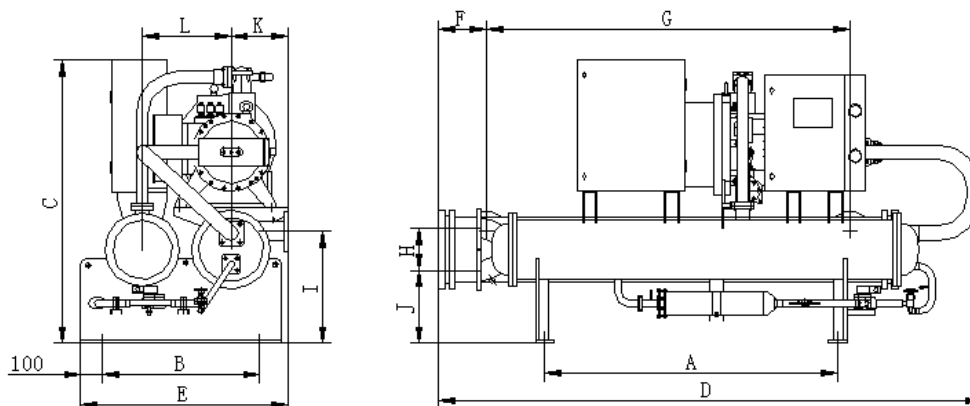




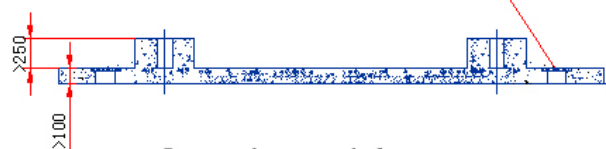
## Dimension

### 1. VWSA400~760

Unit dimension

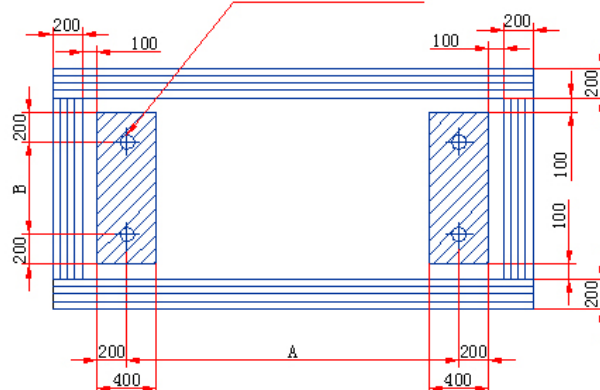


Drain cover



Reserved center hole 4- $\varnothing 80$

Foundation dimension



Model	VWSA400	VWSA430	VWSA480	VWSA560	VWSA660	VWSA760
<b>A</b>	1950	1950	2000	2000	1850	2050
<b>B</b>	850	850	920	920	1000	1100
<b>C</b>	1600	1600	1800	1800	1990	2055
<b>D</b>	3200	3200	3250	3250	3120	3480
<b>E</b>	1240	1240	1320	1320	1360	1420
<b>F</b>	212	212	224	224	219	219
<b>G</b>	2395	2395	2470	2470	2320	2640
<b>H</b>	264	264	269	269	330	312
<b>I</b>	649	649	830	830	877	918
<b>J</b>	368	368	465	465	452	506
<b>K</b>	350	350	350	350	350	400
<b>L</b>	435	435	525	525	524	574

Note: Cooling water below inlet and above outlet.

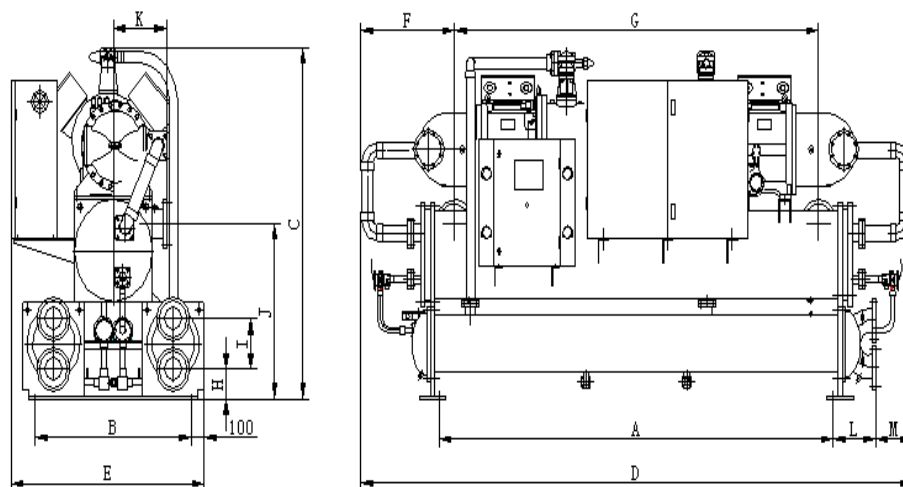
Cooled water inlet at right and outlet at left (facing to the control box)



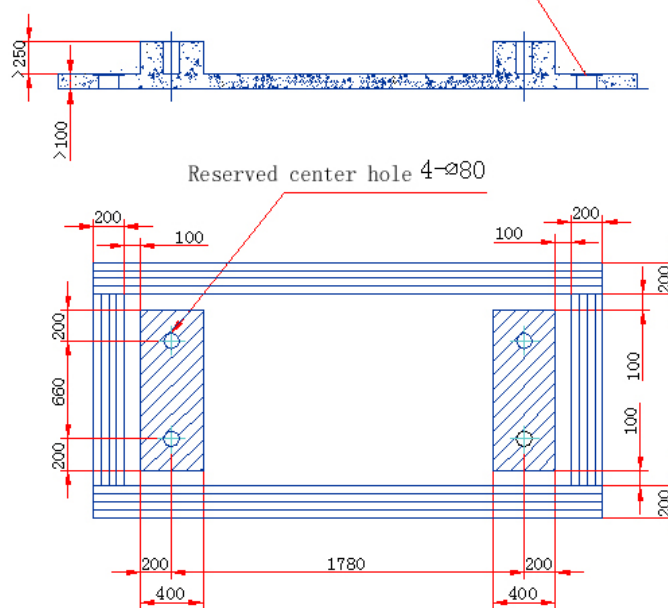
## Dimension

### 2. VWSA900-1520

Unit dimension



Drain cover



Foundation dimension

Mode	VWSA900	VWSA960	VWSA1120	VWSA1320	VWSA1520
A	2865	2865	2865	3265	3515
B	1121	1171	1171	1160	1160
C	1965	2010	2010	2075	2215
D	4090	4045	4045	4435	4690
E	1465	1460	1460	1420	1440
F	720	703	703	728	729
G	2643	2643	2643	2980	3230
H	171	171	171	192	192
I	288	288	288	304	304
J	982	1000	1000	993	1045
K	425	450	450	450	450
L	290	317	317	347	347
M	321	273	273	238	239

Note: Cooling water below inlet and above outlet.

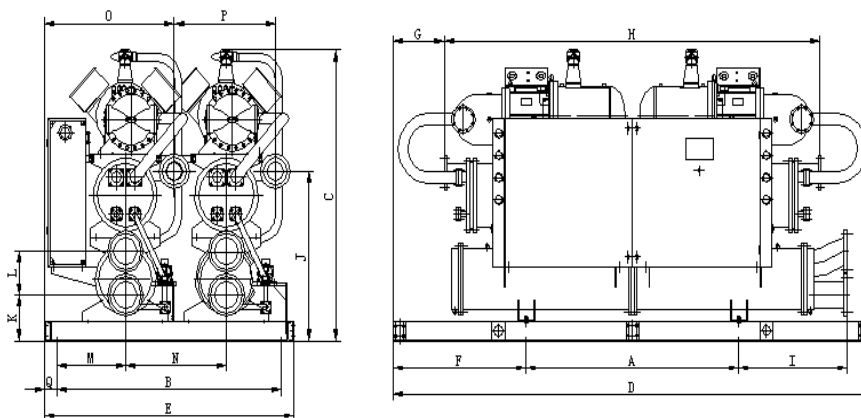
Cooled water inlet at right and outlet at left (facing to the control box)



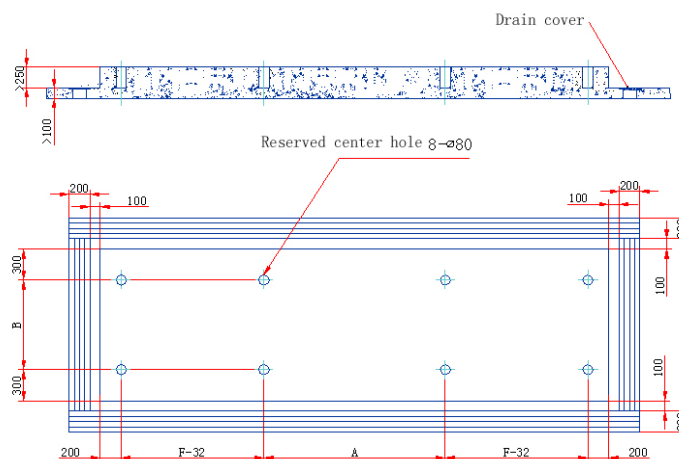
## Dimension

### 3. VWSA1660-3100

Unit dimension



Foundation dimension



Model	VWSA1660	VWSA1800	VWSA1920	VWSA2080	VWSA2240	VWSA2480	VWSA2720	VWSA3100
A	2000	2000	2000	2000	2000	2000	2000	2260
B	2050	2050	2110	2110	2160	2260	2210	2360
C	2210	2315	2355	2365	2495	2465	2555	2575
D	4320	4600	4500	4650	4650	5000	4750	4850
E	2290	2290	2350	2350	2400	2500	2450	2600
F	1160	1300	1250	1325	1325	1500	1375	1295
G	465	380	479	404	304	260	355	436
H	3390	3840	3540	3840	4040	4480	4040	3980
I	765	920	1015	1065	1090	970	1090	1060
J	1222	1340	1370	1390	1026	1350	1475	1465
K	350	348	372	373	350	344	350	350
L	305	355	350	350	390	350	390	390
M	647	647	642	642	672	677	662	787
N	900	900	950	950	950	980	1000	1050
O	1218	1208	1223	1223	1253	1307	1273	1337
P	900	900	950	950	950	980	1000	1050
Q	120	120	120	120	120	120	120	120

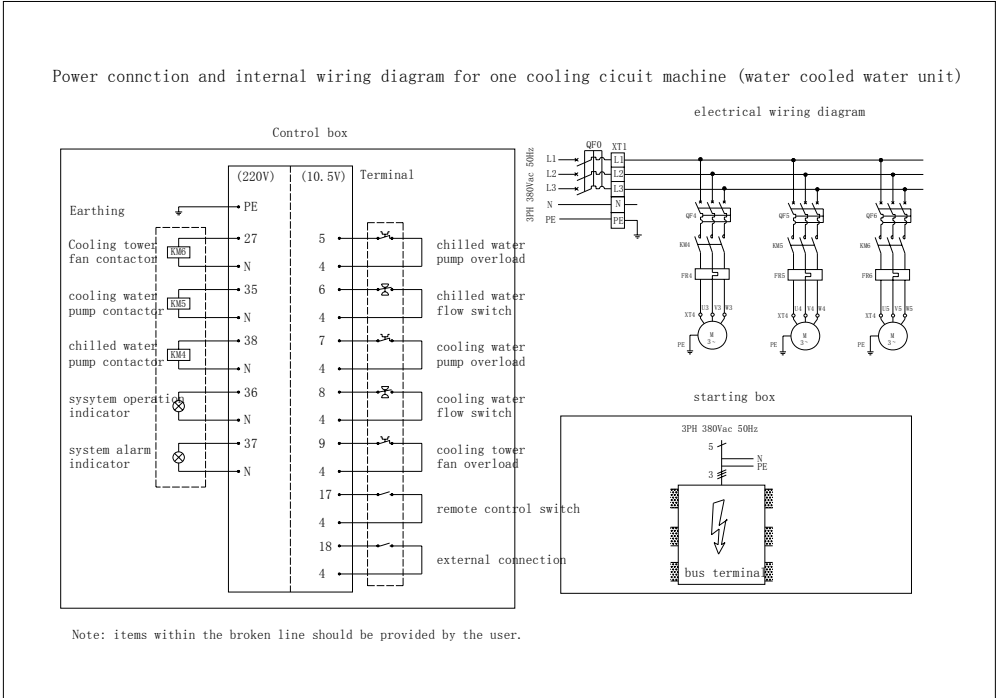
Note: Cooling water below inlet and above outlet.

Cooled water inlet at right and outlet at left (facing to the control box)

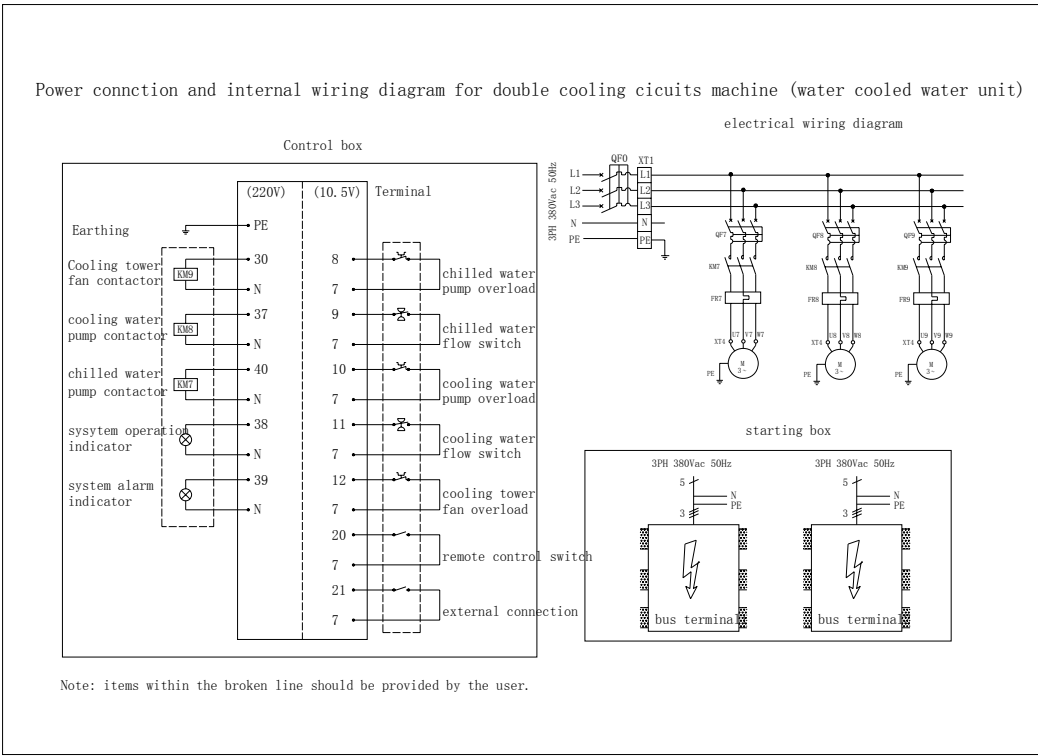


Wiring connection at site

1. Power supply connection and internal wiring for one cooling circuit machine



2. Power supply connection and internal wiring for twin cooling circuits machine





## Installation and Maintenance

### 1. Room requirements

- 1) For a convenient operation and maintenance, there should be at least leave 1-1.5m space in front of the operation side, and enough space allow easy movement of people in other sides.
- 2) Good ventilation environment should be ensured in the operation room, the room temp will be increased as the environment temp is lower than the temperature of compressor gas discharge end and gas discharge pipe, and the machine room temperature should not beyond 35°C.
- 3) The operation room should be sound insulated according to specific situation so as to avoid the operation noise disturbs environment surrounding. It is better that main machine and pump not installed in the same room.

### 2. Handling

Handle the machine carefully during lifting to avoid damage, especially no damage to compressor, control system, piping system etc.. Soft material should be used at the point of touching between the lifting rope and the unit. And to decrease the pressure on the unit, supporter bar between the rope and the unit is necessary for heavy unit. Crane can be applied during the handling, the lifting rope and the unit should be connected firmly, the unit should be horizontal without slope, and no rope touch on heat exchanger side, panel and the top of machine.

### 3. Installation

To guarantee sound quality and perfect performance, each unit has been strictly tested before leaving factory. Great care should be required during handling and installation, no any damage on control system or on pipes is allowed.

- 1) Before open the package, move the unit to the installation site as close as possible and pay attention on keeping the unit to be vertical.
- 2) During the installation, the sling bearing capacity should be 3 times of the unit's weight, and no people under the suspending unit are allowed. Please refer to rating label for unit weight.
- 3) Must have horizontal level calibration after the unit is on the foundation and the horizontal deviation should be within 0.02%.
- 4) The direction of the water pipe connected with the unit should be in line with the specification and the pipeline diameter should not be too small. Water flow switch should be equipped on the pipeline and connected with the compressor.
- 5) Temperature and pressure indicators should be equipped at both inlets and outlets of the chilled water pipe and cooling pipe for the convenient monitoring on the unit's operation condition.
- 6) Power capacity provided should be big enough, power supply voltage fluctuation should be within  $\pm 10\%$ , the earthing should be well done.

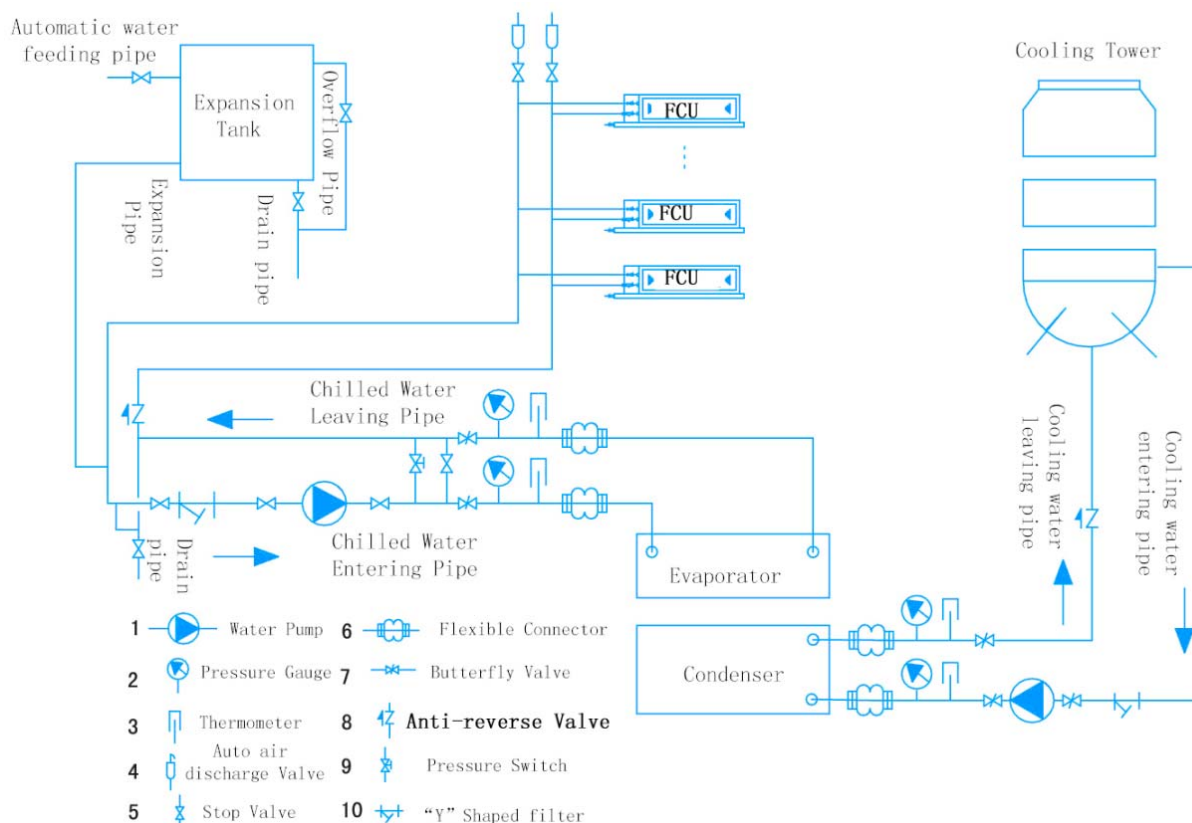
### 4. Water system and piping

- 1) The installation should in line with the national and local authorities' requirement.
- 2) Chilled water pipe must be insulated to avoid capacity loss and having condensed water.
- 3) For the sake of water quality, filter on input pipe is necessary.
- 4) Dimension of the joint of connection pipe should meet requirement (refer to Technical data)
- 5) For the sake of automatically discharge air, supply water indirectly and expanding or shrinking of chilled water system, expansion tank is required. And it should 1.5m higher than the highest point of the water system. No valve is allowed in the pipe between the expansion tank and return water system.
- 6) The air discharge valve should be fixed the highest point of the chilled water system. After connection of the chilled water system finished, and pressure testing is acceptable, open the air discharge valve to exhaust the air in chilled water and close the valve after completely air exhausted. If the water or the pipe inside is not clean, it needs to clean the filter after half an hour's pump operation.
- 7) Before the first running of the circulation water, close the input/output valve first, then open the bypass valve, run the water pump only to circulate the water in pipe to clean the pipe and clean the filter after that, then add clean water again to the system, then turn on the inlet/outlet valve and close the bypass valve for normal operation.



## Water Cooled Water Chiller

- 8) Water segregator, water collector and water pressure balance valve are required when several units to be parallelized.
- 9) Water drain valve should be fixed at the lowest point of the water system.
- 10) The design of water piping, please refer to the Air conditioning Design Manual, and the project operation and inspection refer to GB50243-1997 Ventilation & air conditioning project operation and inspection Norms.
- 11) Typical installation diagram of water system.



### 5. Power connection

- 1) Wire selection and connection should be carried out strictly according to requirement.
- 2) Should have earthing well done, no earthing to gas pipe, water pipe, telephone line, to avoid electric shock cause by bad earthing.
- 3) Ensure the phase sequence is correct, to avoid not running.

### 6. Maintenance

- 1) The qualified technician is required for the maintenance; all the protection devices and controller must be checked before restart.
- 2) Regular and correct maintenance is required for stability and good performance. Chilled and cooling water must be complete drained when long time no use to avoid possible freezing.

### 7. Notice

- 1) Antifreezer should be added in chilled water if water temp. set below zero or near zero.
- 2) Clean water system regularly.
- 3) Pay attention to antifreeze when ambient temp. is around 0°C in winter.
- 4) Antifreezer or other antifreeze measure must be used in bad ambient (under 0°C outdoor).