ACT

THE CHILLER EXPERT

ACT

ADVANCE COOL TECHNOLOGY CO.,LTD.

Modular Water-Cooled Chiller (Heat Pump)

Office
300/3 Soi Ladprao 107 Klongchan Bangkapi, 10240 Bangkok Thailand Website:www.advance-cool.com
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Factory
155 Moo 4, Suwan Sot Road, Wang Krachan, Muang Nakhon Nayok, Nakhon Nayok 26000

THE CHILLER EXPERT

www.advance-cool.com

We are specialized in Manufacturing Water Chiller Unit and Package Chiller range from Small Chiller to Large Chiller Plant using both Scroll compressor & Screw compressor as well as install Complete Cooling System including Machine Cooling System, Large Air Conditioning System

Our Air Cooled Chiller and Water Cooled Chiller are equiped with all high quality and well known components such as Copeland Compressor. With our experiences of more than 30 years we are capable of serving our customers' needs by providing High Quality Chillers as well as Outstanding Services.

Our service teams are highly experienced and well trained, we can ensure quality and fast service within 24hours. We do accept custom made chillers according to customer specific requirement.

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Directory

Designed for User

High effcient and energy saving

• The EER of machine unit can reach up to 4.78 and if with patial load, the EER will be higher , thus the users cost canbe lowered.

• Modularized operations and multi-stage starting make energy saving more significant.

Healthy and comfortable

• Our chiller adopts international well-known hermetic scroll compressor ,run in quietness and small vibration.

• Our chiller unit can rapidly and precisely meet all user' requirements by excellent control and performance of compressor.

Stable and reliable

• Our design adopts modularized operation and multi-stage starting mode, and has impact on grid.

• Machine unit itself has lots of protection function and runs in safety without defect.

• Long designed service life, one-time investment and long-term use.

Flexible and agility

• Client can make investment and installation step by step according to the project: the structure designing is compact, does not need special machine room and can be installed on the rooftop or balcony.

• Maintenance is convenient with modularization combination, and the maintenance of single module will not affect the running of other machine units.

• Centralized control can be achieved and is easy for daily management. Human friendly interface can meet diverse requirement of users.

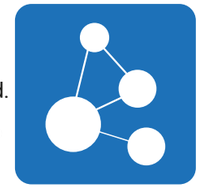
Green environment protection

• Refrigerant is green environment friendly HFC-410A, which has no damage to ozone layer of atmosphere and has no banned term, and gains great favor of the designers who advocate green environment protection.

• Chilling Performance is outstanding, save electric power consumption, and reduce CO2 emission

Convenient model selection

• There are total 5 basic unit modules of 20RT, 30RT, 40RT, 50RT, 60RT, arbitrary match of master and slave machines among 20RT, 30RT or 40RT, 50RT, 60RT can be made. And maximum 8 cooling modules can be combined. The interval between every 2 grades is 10RT from 20RT to 480RT. Heat pump unit have 20RT and 30RT, maximum 8 heat pump units can be combined which capacity can be from 20RT to 240RT



Easy transportation

• By modular design, transportation can be fulfiled by electric elevator or fork lift

• Require no professional lifting equipment, thus the lifting charge and labor cost are reduced.

Construction is convenient

• Machine unit can be transported separately and installed assembly.Multiple sets of machine units can make options and be installed with water circuit manifold. The installation construction is convenient and easy and the construction period is shortened.

Overview

ACT new series R410A modular water cooled chiller is an environment friendly, high efficient and energy saving.This machine unit employs advanced technologies and experience of industry, adopts reinforced heat transmission technology and improve the machine unit EER. Simultaneously considering the earthly environment and economic effect, central airconditioner is used as the preferred product for chilling supply or process cooling. It is a complete new generation of environment friendly high efficient scroll water chiller unit which ACT has devotedly developed, and it not only has broad scope of chilling volume and has low running cost, but also is very environment friendly.

This series of chiller units adopt advance entrie hermetic scroll type compressor and high effcient compact heat exchanger, combined with advanced electric circuit control technique and modularized chilling regulation technique, which makes the machine unit not only have advantages of high total EER and significant energy saving, stable and reliable system and others, but also make the users lower preliminary investment and save running cost.

This product has wide distribution of chilling capacity, smaller chilling load can select single modular operation, and bigger chilling load can select several modular (maximum 8) for combination operation.There are 2 combination series: 20,30 RT combination and 40,50,60 RT combination.

The installation is simple; the structure is concise and compact, with low noise and low maintenance cost, and small `land occupation. It can be widely used in luxury villas, hotels, hospitals, office buildings, entertainment places, restaurants, schools and industrial refrigerating fields, etc. R22 series can select maximum 4 modular for combination operation.

Model Description

TWS 20 M C C 4

- 4: Refrigerant: 2-R22 4-R410A
- C: Feature code: C-Cooling Only; W-Ground Water Type Heat Pump; G-Ground Tube Type Heat Pump
- C: Designing code: B. C….
- M: Modularized unit
- 20: Specification code: 20. 30, 40;……
- TWS: Modular water cooled chiller unit

Unit performance features

High efcient and energy saving

Compressor

Adopt international well-known brand scroll compressor, clearance volume is small,friction loss is small, running efficiency is high; combined with the application of tandam compressors technology, each modular unit employs 2-3 sets of scroll compressors for working, and can provide multi-stage volume capacity adjusting. The energy efficiency is excellent while working with partial load.

Condenser and evaporator

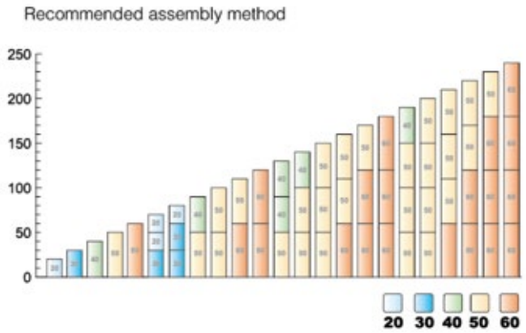
High efficient shell and tube type heat exchanger is adopted, and high efficient copper tubes improve heat exchanging capacity; heat exchanging area is enlarged, and heat transmission temperature difference is effective and machine unit COP value is improved; the bottom of condenser has subcool section which effectively raised refrigerant subcool degree; heat exchanger has undertaken strict flaw detecting test and pressure test, which is ensured to be safe and reliable.

Refrigerating fittings

Expansion valve, filters, and various kinds of safety protection control components all adopt international well-known brand products with reliable performance, and are ensured to be working high efficiency in long-term

Modularized combination style makes machine unit more energy-saving.

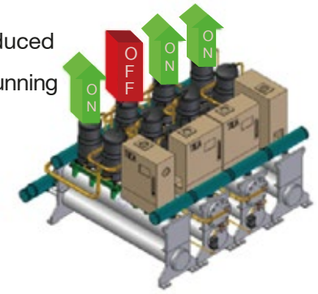
Every basic module have 2 or 3 stage capacity output. The system could achieve more stages by module combination, Keep the system running under high efficiency, avoid the weak point of low motor effciency under low load for single compressor model



Reliable performance

Reliable operation

Modularized structure and by stage starting of machine unit have reduced grid impact caused by starting current ; intelligently realized the equalhour running of compressor improved total service life of machine unit.



Multiple protection functions

The stability of equipment is important for industrial and commercial places. Multiple controls are provided within the machine unit to ensure the normal running.The service life is longer, and operation is safer.

- Phase sequential protection
- Avoid the frequent starting of compressor
- Compressor overloading protection
- Discharging temperature control protection
- High and low Pressure protection
- Anti-cutoff protection
- Automatic frozen proof function
- Automatic alarm and partial automatic fault resetting function
- Automatic increase/decrease loading function
- Powerful external interlock function

Running in low noise

The machine unit has excellent configuration and optimized structure design, which has made comparison, selection and improvement for the components and has made noise reducing for structure and pipelines; through precision noise room test, the mschine can run in low noise.

- High performance international well-known brand hermetic scroll compressor has little vibration;
- Compressor is installed with flexible base plate which can maximally lower the running vibration;
- Suction/discharge pipes have optimized designing which lowers the vibration transmitted to machine unit.

Intelligent control

The machine unit is provided with human friendly operation interface to meet diverse operational requirements of users.
The machine unit adopts micro computer monitoring to have multi-functions of temperature control, protection function, timing set, memory, state display, warning display, temperature set as group control, etc. Users can make use of the control switch of this machine unit itself to make control, and can realize remote control through connecting external switch.

Machine unit warning And protection function

- Many fault protection
- Press key lock
- Password protection parameter set

Parameter set function

- Real time set
- Timing power on/off set
- Refrigerating inlet water temperature set

Basic running operation

- Refrigerating working mode

Other functions

- Historic fault query
- remote control on/off
- Battery supported real time clock running

Intelligent control signal output function

- Cooling water pump control output
- Chilling water pump control output

Parameter display function

- Running condition query
- Compressor running display
- Chilling water temperature display
- Water pump running display
- Frozen proof display
- communication indication
- Polychrome backlight display
- Fault code display

Modular unit Performance data

General Data

Model TWS－MCC4	Cooling Capacity KW	Power Input KW	Compressor Qty	Energy control	Shell and Tube Evaporator				Shell and Tube Condenser			
					Water Pipe	Water Flow Rate m³/h	Water Pressure Drop KPa	Connection	Water Pipe	Water Flow Rate m³/h	Water Pressure Drop KPa	Connection
20	70.2	14.8	2	0－100% 2steps	DN65	12.1	19	Flexible Hoop	DN65	14.6	22	Flexible Hoop
30	107.2	22.6	3	0－100% 3steps	DN65	18.4	23		DN65	22.3	35	
40	146.4	30.6	2	0－100% 2steps	DN80	25.2	33		DN80	30.4	22	
50	186.7	39.2	2	0－100% 2steps	DN80	32.0	39		DN80	38.7	27	
60	230.0	48.3	2	0－100% 2steps	DN100	39.5	46		DN100	47.7	33	

Model TWS－MCC4	The Maximum Operating Current A	The Minimum Power KW	Dimension			Refrigerant				Lubricating oil	Weight	
			Length mm	Width mm	Height mm	Model	System	Control Method	Charge Mass kg		Shipping Weight kg	Operation Weight kg
20	60	21.9	1940	530	1490	R410A	1	Thermal expansion valve	14	POE	600	620
30	90	32.8	1940	550	1490		2		17	POE	780	810
40	106	42.8	2320	740	1720		2		22	PVE	1150	1190
50	132	54.5	2320	740	1720		2		28	PVE	1210	1250
60	162	67.7	2320	740	1720		2		36	PVE	1270	1320

Model TWS－MCC2	Cooling Capacity KW	Power Input KW	Compressor Qty	Energy control	Shell and Tube Evaporator				Shell and Tube Condenser			
					Water Pipe	Water Flow Rate m³/h	Water Pressure Drop KPa	Connection	Water Pipe	Water Flow Rate m³/h	Water Pressure Drop KPa	Connection
20	69.6	13.9	2	0－100% 2steps	DN65	12.0	13	Flexible Hoop	DN65	14.4	21	Flexible Hoop
30	107.1	21.5	3	0－100% 3steps	DN65	18.4	21		DN65	22.1	39	

Model TWS－MCC2	The Maximum Operating Current A	The Minimum Power KW	Dimension			Refrigerant				Lubricating oil	Weight	
			Length mm	Width mm	Height mm	Model	System	Control Method	Charge Mass kg		Shipping Weight kg	Operation Weight kg
20	54	20.0	1940	540	1550	R22	1	Thermal expansion valve	14	160P	545	565
30	81	31	1940	590	1550	R22	2		17	160P	700	720

Note:

1.Unit Nominal Condition : 12℃ entering and 7℃ leaving chilled water temperature , 30℃ entering and 35℃ leaving cooling water temperature

2.Power: 380V/50Hz,promised power fluctuate range : ± 10%

3.If there is special requirement please contact ACT representatives

4. ACT reserve the right to make changes to the above specifications without prior notice.

WATER-COOLED SCROLL CHILLER

Cooling Only

Model TWS-MCC4	Cooling Capacity kW	Power Input kW	Compressor Qty	Energy Control	Shell and Tube Evaporator				Shell and Tube Condenser			
					Water Pipe	Water Flow m³/h	WPD kPa	Connection	Water Pipe	Water Flow m³/h	WPD kPa	Connection
20	70.3	14.0	2	0-100% 2steps	DN65	12.1	19	Flexible Hoop	DN65	14.5	22	Flexible Hoop
30	105.1	20.9	3	0-100% 3steps	DN65	18.1	23		DN65	21.7	35	
40	150.2	29.9	2	0-100% 2steps	DN80	25.8	33		DN80	31.0	22	
50	181.2	35.9	2	0-100% 2steps	DN80	31.2	39		DN80	37.3	27	
60	229.0	45.5	3	0-100% 3steps	DN80	39.4	46		DN80	47.2	33	

Model TWS-MCC4	The Max. Operation Current A	Dimension			Cooling System				Lubricating Oil	Weight	
		L mm	W mm	H mm	Refrigerant	System	Control	Charge kg		Shipping Weight kg	Operation Weight kg
20	48	1940	530	1550	R410A	1	Thermal Expansion Valve	14	BVC32	640	670
30	72	1940	600	1550		2		17		840	875
40	106	2238	781	1770		2		22		1140	1180
50	119	2238	781	1770		2		28		1200	1245
60	159	2238	830	1770		3		33		1340	1390

Note：1、Nominal condition：Chilled water inlet/outlet 12/7℃，Cooling water inlet/outlet 30/35℃；

2、Power：380V 3N～ 50Hz，fluctuate range±10%；

Water Souce Heat-Pump(Ground Water)

Model TWS-MCW4	Cooling Capacity kW	Heating Capacity kW	Cooling Power Input kW	Heating Power Input kW	Compressor Qty	Energy Control	Hot-Cool Water Side				Gound Water Side			
							Water Pipe	Water Flow m³/h	WPD kPa	Connection	Water Pipe	Water Flow m³/h	WPD kPa	Connection
20	73.6	79.2	12.9	17.2	2	0-100% 2steps	DN65	12.7	20	Flexible Hoop	DN65	6.8	10	Flexible Hoop
30	110.5	118.9	19.4	25.8	3	0-100% 3steps	DN65	19.0	24		DN65	10.2	15	
40	157.5	170.7	27.6	37.2	2	0-100% 2steps	DN80	27.1	35		DN80	14.5	11	
50	189.6	202.3	33.1	44.1	2	0-100% 2steps	DN80	32.6	43		DN80	17.4	13	
60	243.2	256.1	42.4	55.8	3	0-100% 3steps	DN80	41.8	49		DN80	22.3	15	

Model TWS-MCC4	Compressor	Start Type	The Max. Operation Current A	Dimension			Cooling System				Lubricating Oil	Weight	
				L mm	W mm	H mm	Refrigerant	System	Control	Charge kg		Shipping Weight kg	Operation Weight kg
20	Totally Enclosed Scroll Compressor	Direct Start	48	1940	530	1550	R410A	1	Thermal Expansion Valve	14	BVC32	640	670
30			72	1940	600	1550		2		17		840	875
40			106	2238	781	1770		2		22		1140	1180
50			119	2238	781	1770		2		28		1200	1245
60			159	2238	830	1770		3		33		1340	1390

Note: 1、Nominal condition：For Cooling, Chilled water inlet/outlet 12/7℃，Ground water inlet/outlet 18/29℃；For Heating, Hot water outlet 45℃，Ground water inlet 15℃；

2、Power：380V 3N～ 50Hz，fluctuate range±10%；

Water Source Heat-Pump(Ground Pipes)

Model TWS-MCG4	Cooling Capacity kW	Heating Capacity kW	Cooling Power Input kW	Heating Power Input kW	Compressor Qty	Energy Control	Hot-Cool Water Side				Gound Pipe Side			
							Water Pipe	Water Flow m^3/h	WPD kPa	Connection	Water Pipe	Water Flow m^3/h	WPD kPa	Connection
20	72.7	74.8	13.2	17.1	2	0-100% 2steps	DN65	12.5	20	Flexible Hoop	DN65	14.8	23	Flexible Hoop
30	109.2	112.4	19.8	25.7	3	0-100% 3steps	DN65	18.8	24		DN65	22.2	37	
40	155.7	161.7	28.1	37.0	2	0-100%2steps	DN80	26.8	35		DN80	31.6	24	
50	187.4	191.6	33.8	43.9	2	0-100% 2steps	DN80	32.2	43		DN80	38.0	27	
60	236.4	242.5	42.6	55.6	3	0-100% 3steps	DN80	40.7	49		DN80	48.0	33	

Model TWS-MCG4	Compressor	Start Type	The Max. Operation Current A	Dimension			Cooling System				Lubricating Oil	Weight	
				L mm	W mm	H mm	Refrigerant	System	Control	Charge kg		Shipping Weight kg	Operation Weight kg
20	Totally Enclosed Scroll Compressor	Direct Start	48	1940	530	1550	R410A	1	Thermal Expansion Valve	14	BVC32	640	670
30			72	1940	600	1550		2		17		840	875
40			106	2238	781	1770		2		22		1140	1180
50			119	2238	781	1770		2		28		1200	1245
60			159	2238	830	1770		3		33		1340	1390

Note: 1、Nominal condition：For Cooling, Chilled water inlet/outlet 12/7℃，Ground Pipe inlet/outlet 25/30℃；For Heating, Hot water outlet 45℃，Ground Pipe inlet 10℃；
2、When Ground Pipe outlet below 3℃，need to add glycol liquid；
3、Power：380V 3N～ 50Hz，fluctuate range±10%；

Recommended density of glycol liquid

Leaving Water Temp ℃	3～0	0～- 5	-5 ～- 10
Recommended mass Concentration %	20	25	35

Correction Factor

Cooling Only Model Correction Factor

Model	Chilled Water Outlet Temp ℃	Chilled Water Inlet Temp ℃							
		20		25		30		35	
		Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input
TWS-MCC4	5	0.943	0.816	0.907	0.895	0.864	0.979	0.821	1.073
	6	1.048	0.833	1.006	0.92	0.962	0.993	0.916	1.089
	7	1.088	0.838	1.045	0.916	1	1	0.952	1.093
	8	1.126	0.843	1.084	0.921	1.037	1.005	0.988	1.099
	9	1.168	0.846	1.122	0.926	1.074	1.011	1.023	1.104
	10	1.206	0.84	1.16	0.931	1.12	1.017	1.06	1.12

Water Source Heat-Pump Model Cooling Mode Correction Factor(Ground Water)

Model	Chilled Water Outlet Temp ℃	Ground Water Inlet Temp℃											
		13		15		18		20		23		25	
		Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input
TWS-MCW4	5	0.947	0.900	0.938	0.935	0.925	0.987	0.916	1.026	0.903	1.083	0.892	1.104
	6	0.999	0.909	0.985	0.943	0.963	0.994	0.954	1.032	0.939	1.089	0.928	1.111
	7	1.037	0.914	1.022	0.948	1.000	1.000	0.990	1.038	0.974	1.095	0.962	1.117
	8	1.074	0.918	1.059	0.953	1.037	1.006	1.026	1.044	1.009	1.101	0.997	1.123
	9	1.112	0.923	1.097	0.958	1.073	1.011	1.062	1.050	1.044	1.107	1.032	1.129
	10	1.150	0.928	1.134	0.963	1.110	1.017	1.096	1.055	1.080	1.113	1.066	1.135

Water Source Heat-Pump Model Heating Mode Correction Factor(Ground Water)

Model	Hot Water Outlet Temp ℃	Ground Water Inlet Temp℃											
		13		14		15		16		17		18	
		Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input
TWS-MCW4	40	0.948	0.877	0.976	0.880	1.004	0.882	1.034	0.884	1.063	0.887	1.094	0.889
	43	0.947	0.934	0.974	0.937	1.002	0.939	1.031	0.941	1.060	0.944	1.090	0.946
	45	0.945	0.995	0.972	0.998	1.000	1.000	1.028	1.002	1.057	1.005	1.087	1.007
	48	0.945	1.038	0.971	1.040	0.999	1.043	1.026	1.045	1.055	1.048	1.084	1.050
	50	0.944	1.083	0.970	1.085	0.997	1.088	1.025	1.090	1.053	1.093	1.081	1.095
	55	0.942	1.204	0.967	1.206	0.993	1.209	1.020	1.212	1.047	1.214	1.075	1.217

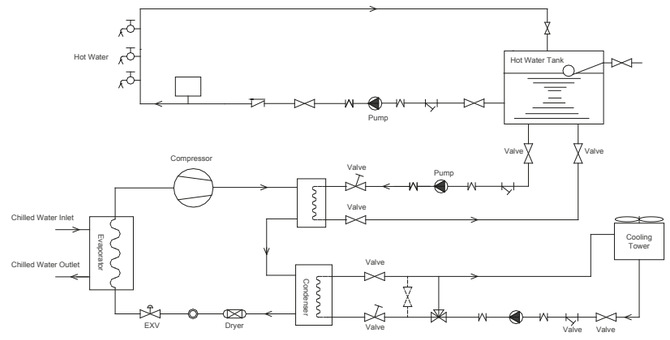
Water Source Heat-Pump Model Cooling Mode Correction Factor(Ground Pipe)

Model	Chilled Water Outlet Temp ℃	Ground Pipe Inlet Temp℃													
		10		15		20		25		30		35		40	
		Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input	Cooling Capacity	Power Input
TWS-MCG4	5	0.975	0.755	0.969	0.818	0.951	0.897	0.932	0.993	0.908	1.101	0.881	1.222	0.804	1.375
	6	1.011	0.758	1.005	0.821	0.986	0.900	0.966	0.997	0.941	1.105	0.912	1.226	0.834	1.379
	7	1.048	0.760	1.042	0.823	1.022	0.902	1.000	1.000	0.974	1.109	0.944	1.232	0.865	1.382
	8	1.085	0.763	1.078	0.826	1.058	0.905	1.035	1.003	1.009	1.112	0.978	1.236	0.896	1.386
	9	1.124	0.766	1.116	0.829	1.095	0.908	1.072	1.007	1.044	1.115	1.012	1.240	0.929	1.390
	10	1.163	0.769	1.155	0.832	1.133	0.911	1.109	1.010	1.081	1.119	1.047	1.243	0.962	1.394

Water Source Heat-Pump Model Heating Mode Correction Factor(Ground Pipe)

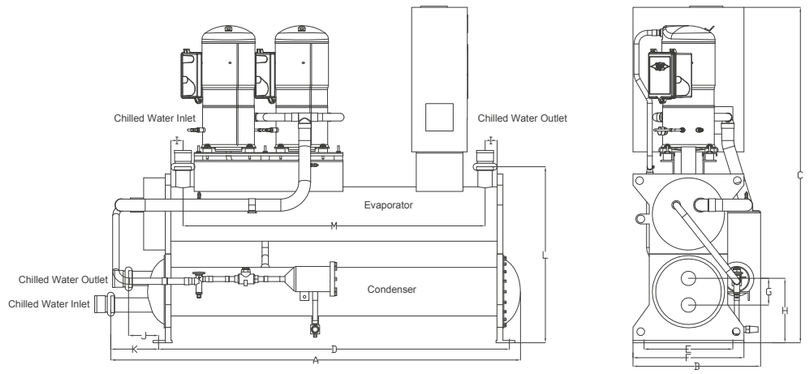
Model	Hot Water Outlet Temp ℃	Ground Pipe Inlet Temp℃													
		-5		0		5		10		15		20		25	
		Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input	Heating Capacity	Power Input
TWS-MCG4	40	0.640	0.863	0.759	0.876	0.879	0.888	1.016	0.900	1.173	0.912	1.319	1.082	1.465	1.090
	42	0.643	0.901	0.757	0.914	0.875	0.927	1.009	0.939	1.164	0.950	1.308	1.121	1.449	1.131
	45	0.646	0.963	0.754	0.976	0.869	0.988	1.000	1.000	1.153	1.012	1.297	1.183	1.431	1.197
	46	-	-	0.753	0.997	0.867	1.010	0.997	1.021	1.146	1.033	1.290	1.205	1.419	1.223
	48	-	-	0.752	1.042	0.863	1.054	0.991	1.066	1.137	1.077	1.281	1.248	1.403	1.267
	50	-	-	0.566	1.089	0.860	1.100	0.986	1.112	1.129	1.124	1.271	1.292	1.386	1.316
	55	-	-	-	-	0.850	1.180	0.976	1.190	1.120	1.202	1.259	1.351	1.359	1.380

Heat-Recovery Function(Optional)

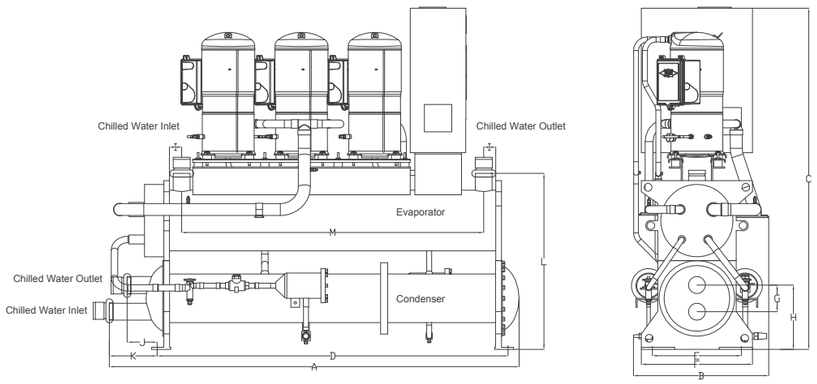


Modular Dimension

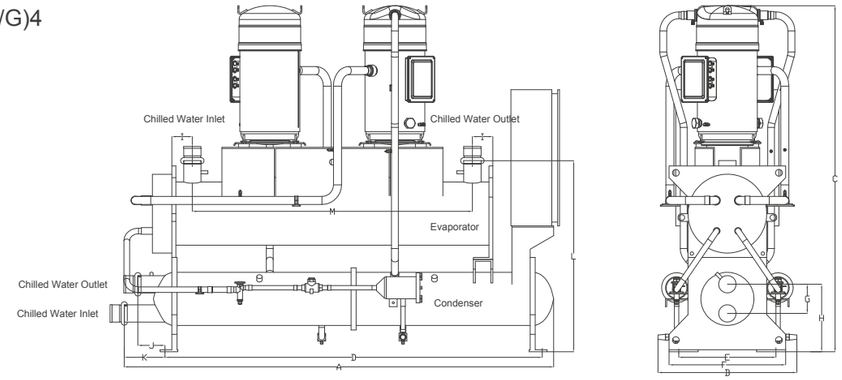
TWS20MCC(W/G)4



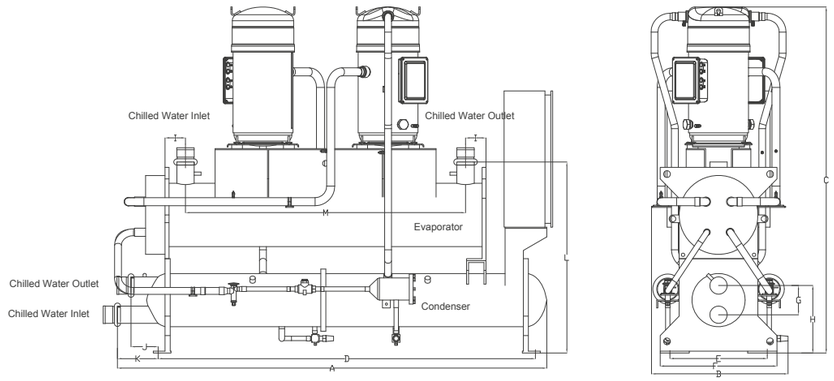
TWS30MCC(W/G)4



TWS40MCC(W/G)4



TWS50MCC(W/G)4



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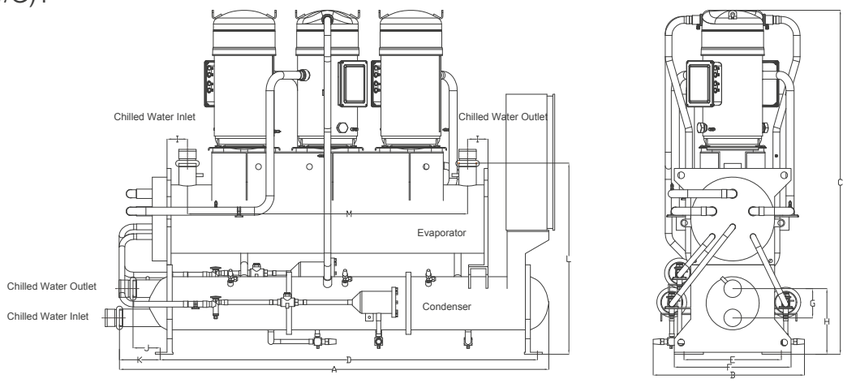
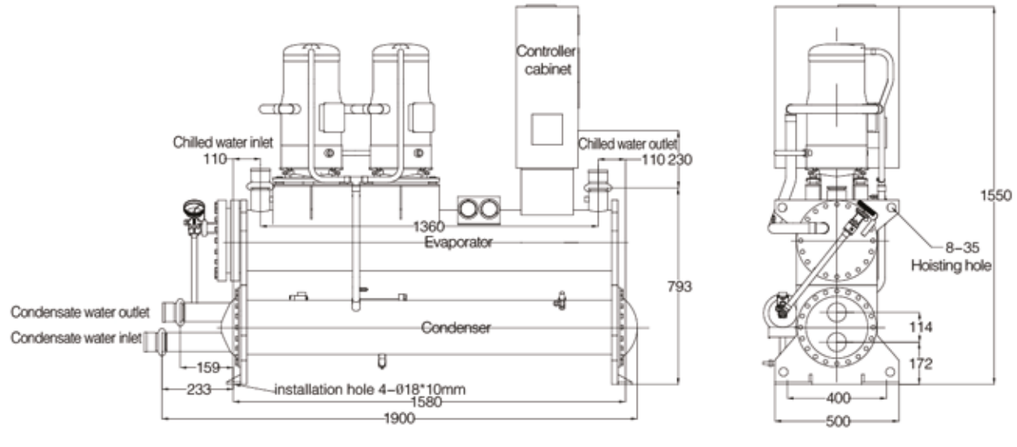
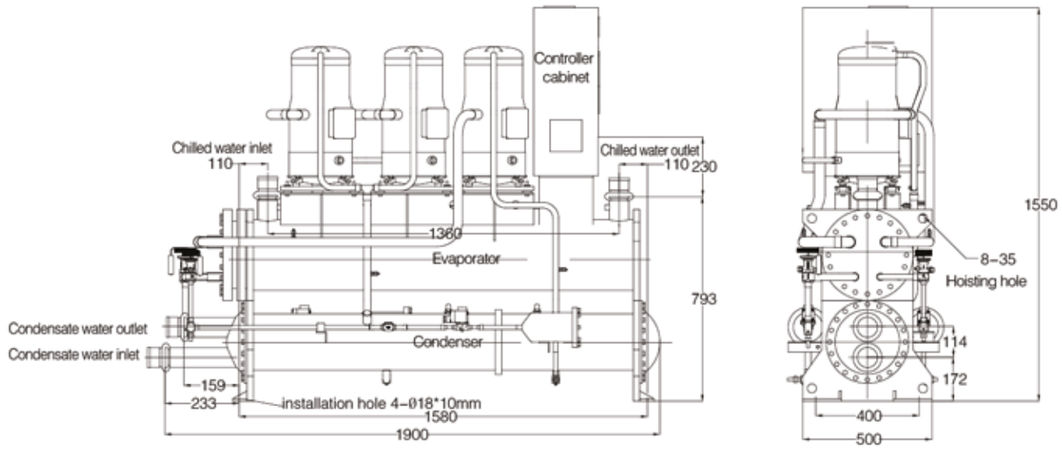


TWS20MCC(W/G)2



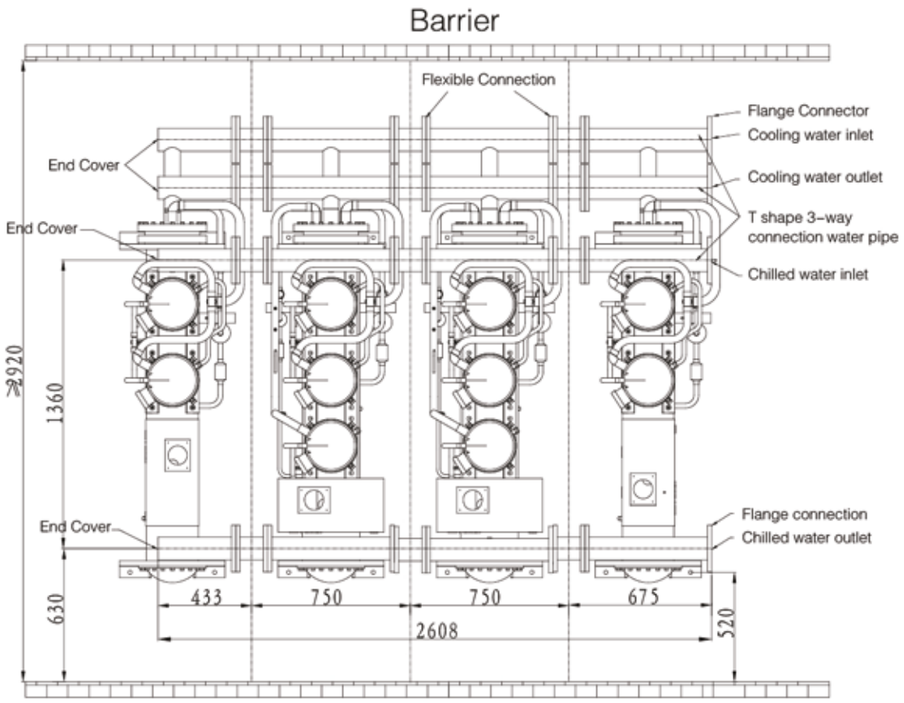
TWS30MCC(W/G)2



Note:The max. distance between chilled water inlet/outlet connection and controller cabinet door under part is 230mm.

Unit Assembly Sketch

TWS20/30MCC(W/G)



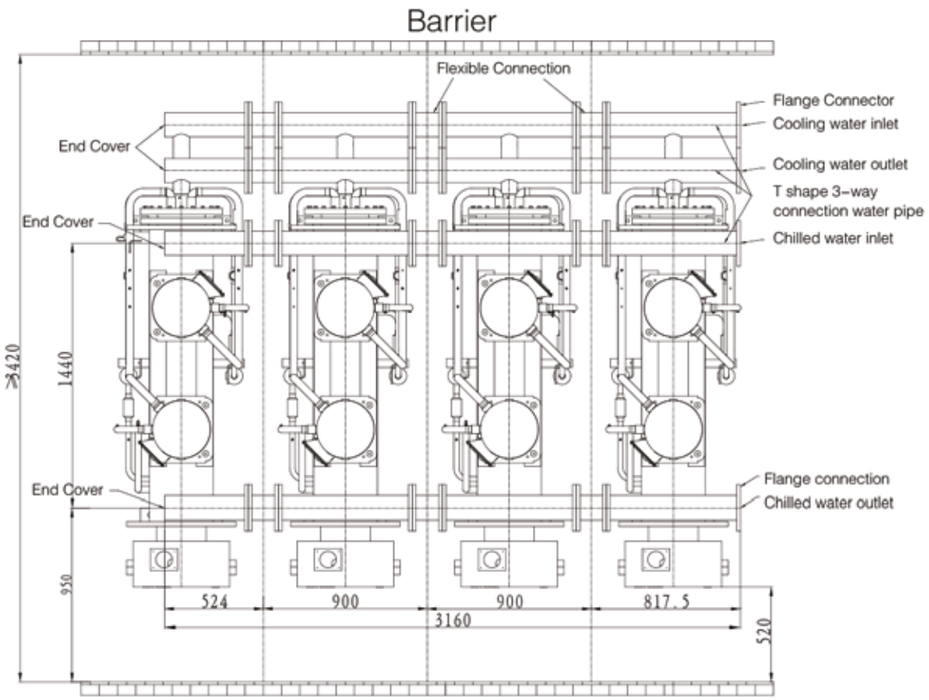
Note:

1.End Cover、units connection hoop and T shape water pipe are optional parts.

2.In actual application of the products, the water pipe can install at any sides ,but must promise the same location of cooling water inlet/outlet, chilled water inlet /outlet are as well .

3.The assembly method of other types refer to the sketch.

TWS40/50/60MCC(W/G)



Note:

1.End Cover、units connection hoop and T shape water pipe are optional parts.

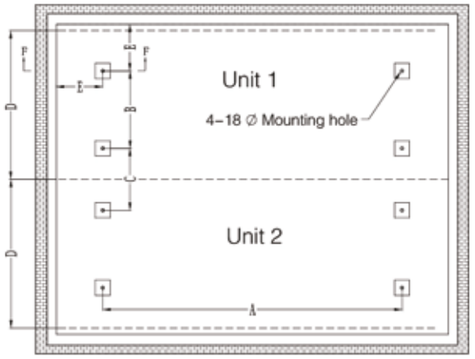
2.The water main pipe suggested to use DN125 for model between 70 to 160 cooling ton, and pipe connection can be reversed return system.

3.The water main pipe suggested to use DN150 for model between 160 to 240 cooling ton, and pipe connection can be reversed return system.

4.In actual application of the products, the water pipe can install at any sides ,but must promise the same location of cooling water inlet/outlet, chilled water inlet /outlet are as well.

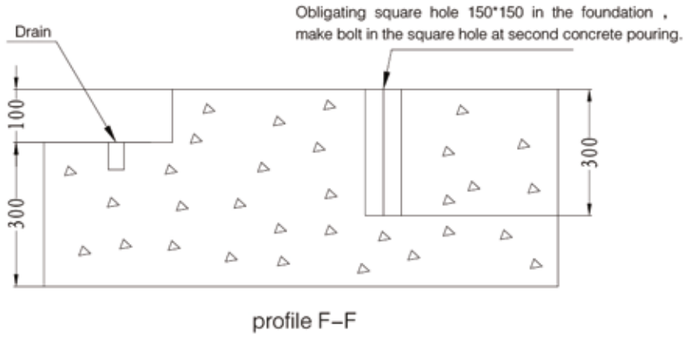
5.Please refer to the above sketch for the assembly method of other types .

Unit Mounting Location



Unit Mounting Location data

Model	A	B	C	D	E
TWS20/30	1580	400	350	750	200
TWS40/50/60	1932	500	400	900	300



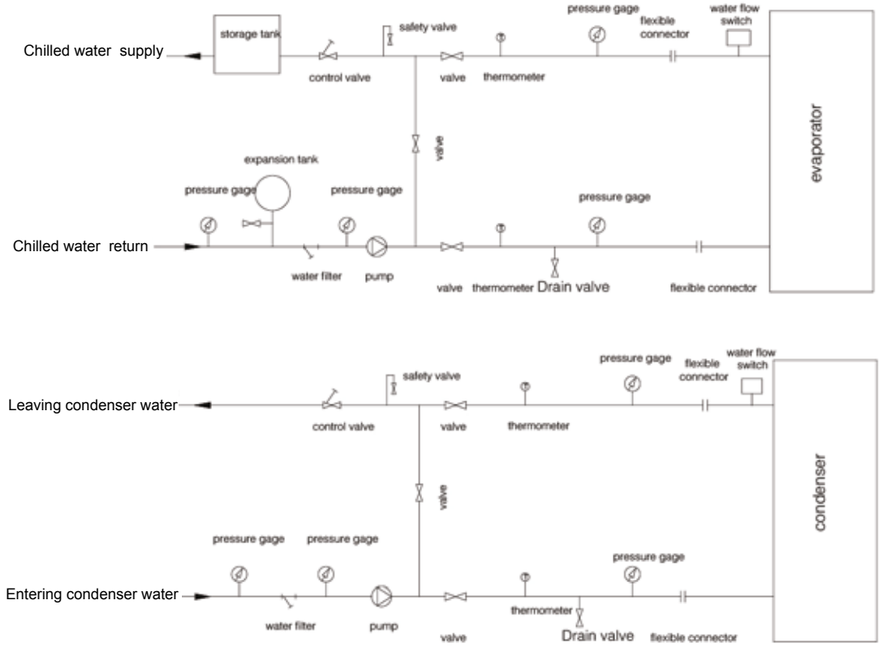
profile F–F

Note：unit/mm

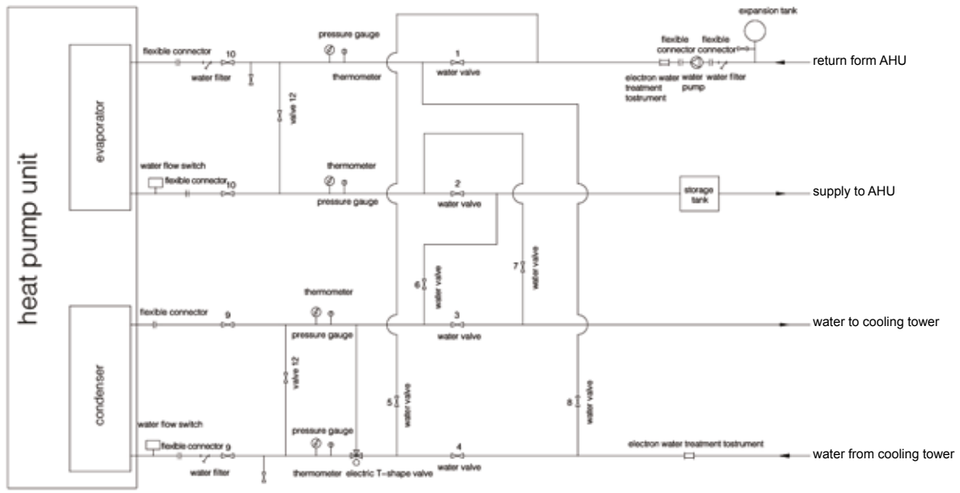
1.The Unit must be placed on a rigid and solid surface，e.g.concrete slab，at special situation，also installed on no deformation plinth（such as U-bar）

2.The foundation must be strong enough to support the unit's operating weight .

Schematic plot of the external water pipe of the unit



Hot & Cool Installation

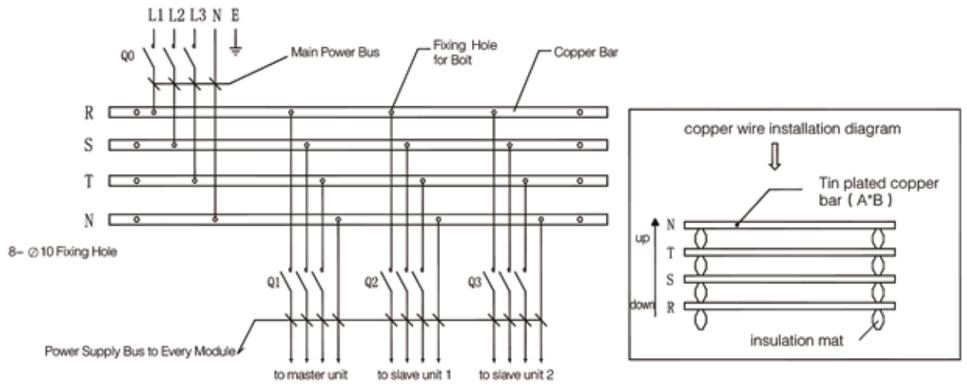


Cooling ：1、2、3、4、9、10valve opened；5、6、7、8valve closed
Heating：1、2、3、4valve closed；5、6、7、8、9、10valve opened

Description:

1. The water circulation designing should be concise as much as possible and avoid too many bends. The direct pipelines should be arranged on the same plane as much as possible.
2. Pay attention to the water inlet/outlet port of condenser and evaporator to avoid connection mistakes.
3. Manual or automatic air vent valve should be installed at all the highest points of water circulation system.
4. Expansion tank should use anti-corrosion material and should be mounted on the highest port of total pipelines system.
5. Temperature meter and pressure gauge should be installed on the chilling/cooling water inlet/outlet port.
6. All the pipe bends bottom should be provided with water discharge valve to ensure that the water of total system can be discharged.
7. The chilling/cooling water pipes connecting the machine unit heat exchanger with users water pipes should be provided with shutoff valve.
8. By pass valve should be installed between the heat exchanger inlet and outlet water pipes for the convenience of pipes repairing and swashing.
9. Flexible connectors should be provided to reduce the pipelines vibration.
10. Impurities in water system may lead to the scaling in heat exchange, so filter should be provided before water pump.
11. In order to improve chilling/heating effect and save energy, pipelines should be provided with strict heat insulations.
12. In order to prevent the frequent trips of machine unit in running due to large or small load, suggest the users to install energy accumulationg tank.

Electric wire connection plan



Only take TWS 130MCC4 as an example

Instructions for operation and use

1. The standard power supply is 380v/3P/50Hz, the allowed voltage fluctuation is ± 10%, and the automatic air switch should be used, at the same time power supply protection should be provided.
2. When the machine unit is used for the first time the machine unit compressor crank shaft heating box must be preheated for 12 hours prohibited to start and operate the machine immediately after turning on power supply;
3. Please do not turn on and off the host frequently, and should not be more than 6 times for one hour. The electric control system needs to prevent damp.
4. If the machine uint will be indle for a long time, the water inside the water system muse be drained thoroughly to avoid freezing and damaging the evaporator.
5. Water system should be provided with expansion tank, system circulation water must be clean, tand adequate water volume must be maintained, the water filter needs to be cleaned at regula intervals;
6. The system should maintain sufficient water volume to avoid the problems of frequent start and stop of machine unit and big temperature fluctuations as well as others. The water volume is usually designed according to 2.4 Gpm/ton.