

# Water Cooled Scroll Chiller



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Air Condition Co. LTD

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■ TOYO AIR CONDITION **Water cooled scroll chiller**

# Water cooled scroll chiller

## Maximum Efficiency with Enhanced Reliability

**C.O.P=5.45**



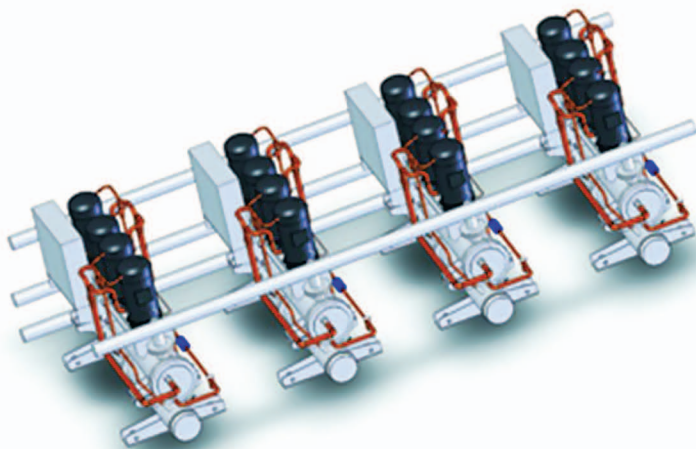
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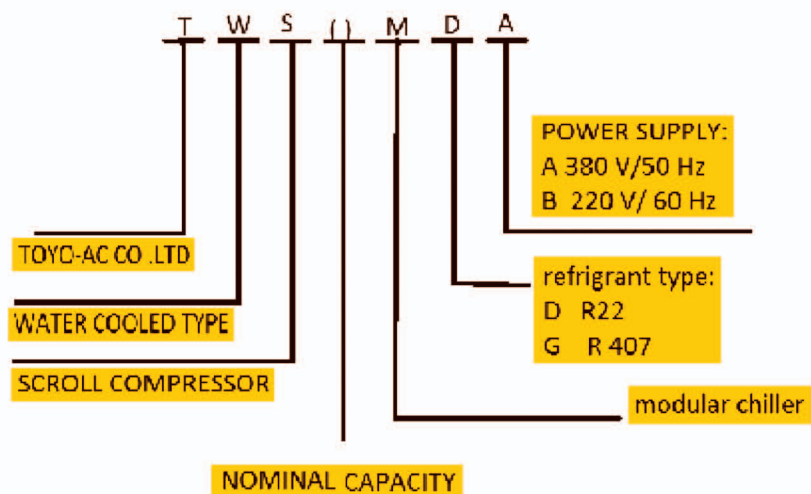
**Application**



# Modular water cooled scroll chiller



how to read ?







## Product Feature

- The master module can work independently or together with up to 8 slave modules, flexible design, stable performance, easy maintenance.
- Cooling capacity 25 RT to 315 RT
- R22 , R407 Refrigerant
- Micro-tech controller with PLC, optimize chiller operation for site conditions.
- Automatic operation dramatically reducing maintenance cost thanks to reliable microprocessor system.
- 3-phase scroll type compressor, with built-in thermal overload cut-out and crankcase heater, mounted on rubber vibration dampers.
- Panels and frame are made from galvanized steel protected with polyester powder painting to ensure total resistance to atmospheric agents.
- Shell and tube dry expansion type condenser, factory insulated with flexible close cell material.

## Maximum Efficiency with Scroll compressor

Most advanced and well known scroll compressor with better liquid handling , improved performance, and less moving parts which increases the system operating efficiency and reliability. Multiple scroll compressor used, so the system energy efficiency has been greatly improved at part load performance.





In a scroll compressor refrigerant is compressed by two offset spiral disks that are nested together. The upper disk is stationary while the lower disk moves in orbital fashion. The orbiting action of the lower disk inside the stationary disk creates sealed spaces of varying volume. Refrigerant is sucked in through inlet ports at the perimeter of the scroll.

A quantity of refrigerant becomes trapped in one of the sealed spaces. As the disk orbits the enclosed space containing the refrigerant is transferred toward the centre of the disk and its volume decreases. As the volume decreases, the refrigerant is compressed. The compressed refrigerant is discharged through a port at the centre of the upper disk.

Scroll compressors are quiet, smooth-operating units with the highest efficiency ratio of all compressor types. They are commonly used in automobile air conditioning systems and commercial chillers.

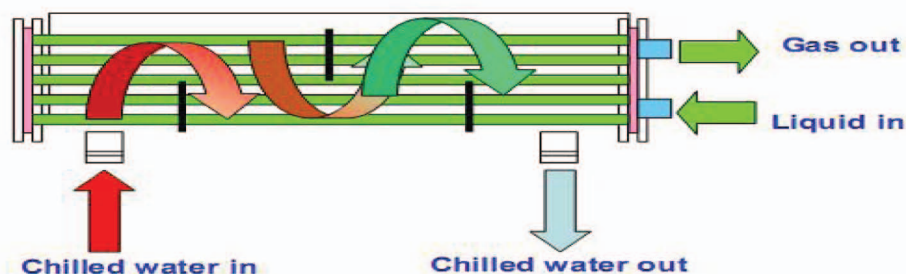
## ◆ Evaporator

Dry type evaporator scroll chiller is equipped with high efficiency shell and tube evaporator that are constructed by seamless steel tube with anti-corrosive treatment.

The evaporator is a direct expansion type with refrigerant inside the copper tubes and water on the outside. The copper tubes are roll expanded into carbon steel tube plates.

Constructed with seamless integrally finned copper, the water pipe system makes the evaporator attain optimal heat exchange efficient. Two return passages of water flow and the straight water pipe is easy for cleaning and maintenance.

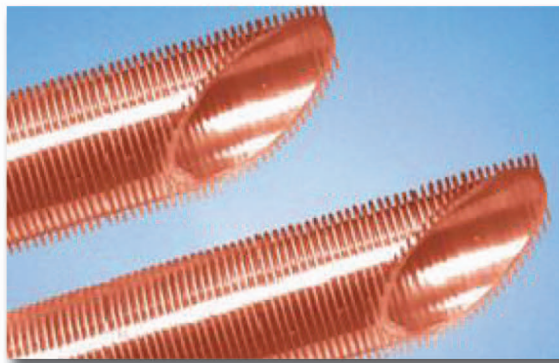
Both end covers are made of iron and attached with protection valve and snuffle valve. Also they are removable, which makes it available for altering water piping arrangement.





## High efficient tube;

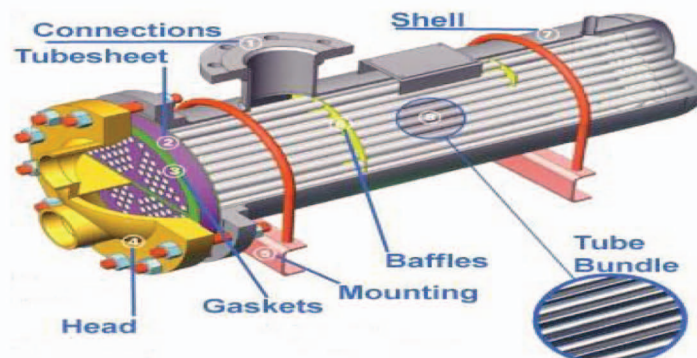
According to the heat exchange efficiency of refrigerant side and water side, calculate the numbers of tube and get the heat exchange efficiency; Use inside and outside strengthened heat exchanger tube to make the heat exchange efficiency reach to the best. Define the best liquid distribution type based on two phase flow principle. The refrigerant enters the evaporator evenly to ensure each heat exchange tube can transfer heat well.



## Condenser

Shell and tube heat exchanger with external still sheet shell and internal copper pipe bundled. The copper pipe are expanded in to terminal plates at the end. The head plates can be removed for maintenance procedures. The water connection can be used for operation with cooling tower.

It can be designed to suitable for different fouling factors. There is a reserved 15% heat exchange capacity design which can make the condenser provide enough capacity even the cooling water temperature reaches 32°C or there is fouling inside the water system.





## Electronic controller with BMS system:

The unit can connect to BMS system to realize remote control; RS-485 control connector, adopt international universal Modbus RTU protocol.

Customer can use configuration software or VB,VC software to realize equipment's monitoring, multiple equipment's central control and communication with third parties BMS.



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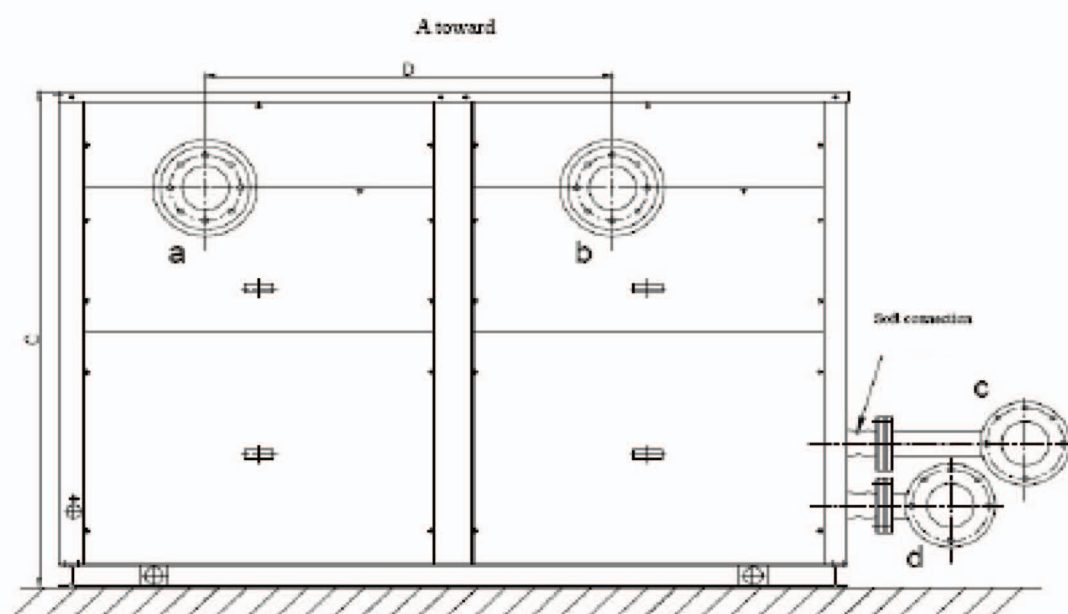
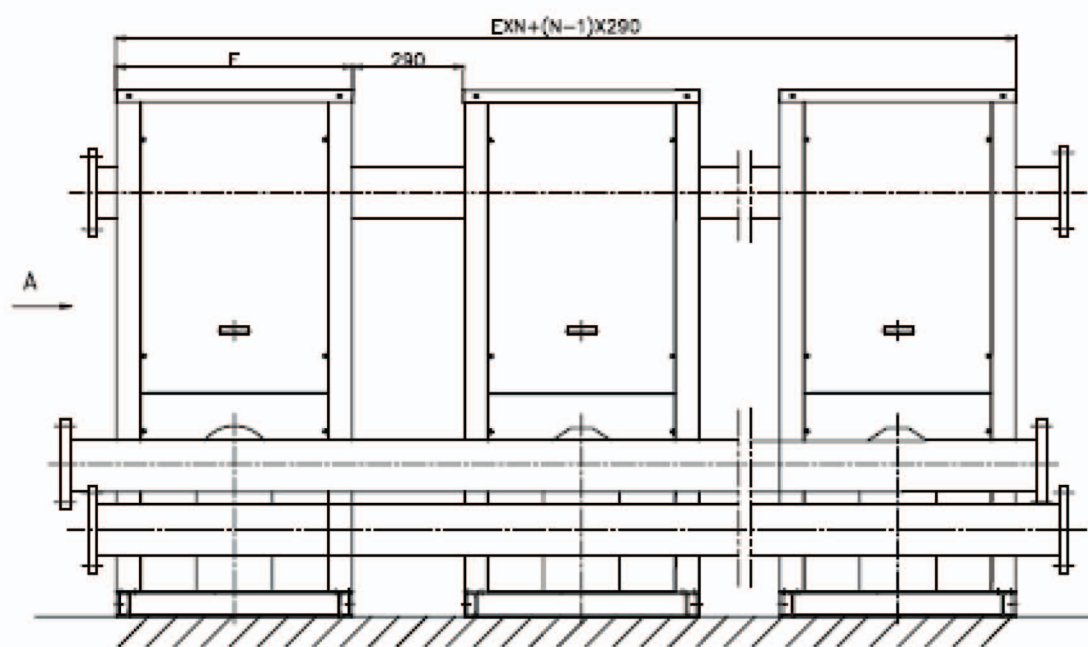
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## Modular Unit Without Cover Installation





## TWS (35 - 120) MDA

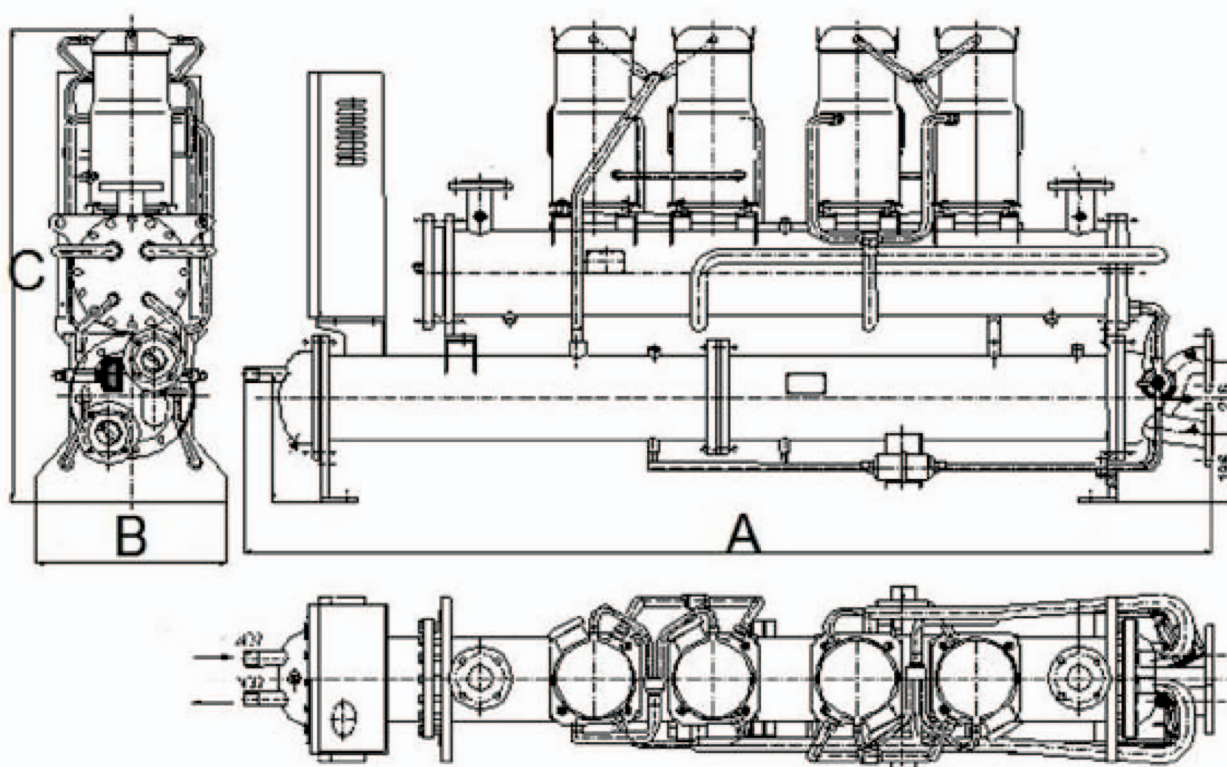
Model	TWS(35)MDA	TWS(40)MDA	TWS(50)MDA	TWS(60)MDA	TWS(100)MDA	TWS(120)MDA
cooling capacity	341,000	420,000	492,000	605,000	970,200	1,260,600
Power input	16	20	24	34	58	78
Compressor	High efficiency hermetically danfoss scroll					
quantity	2	3	4	4	4	4
Power supply	V/Ph/Hz					
Evaporator	Shell and tube type					
Water flow	15.5	18.3	22.4	27.5	44.1	57.3
Pressure drop	12	14	20	31	43	75
Connect pipe	mm					
Condenser	Shell and tube type					
Water flow	18.3	22	26	32	55.7	75.5
Pressure drop	23	25	40	56	75	85
Connect pipe	mm					
Refrigerant	R22					
Refrigerant charge	14	16	24	32	46	64
Sound level	57	61	62	63	65	66
Dimension	(L)mm	2200	2200	2735	3050	3200
	(W)mm	480	480	480	560	1200
	(H)mm	1380	1380	1380	1700	1700
Net weight	700	750	900	1050	1650	2150
Operation weight	750	820	980	1160	1870	2400

\* Performance values refer to the following conditions:

Cooling: condenser water inlet/outlet temperature: 28°C/33°C, evaporator water inlet/outlet temperature: 12°C/7°C.

\*\* The physical size and weight could be changed if it is other refrigerant or flooded type heat exchanger.

\*\*\* Noise level measured in free field condition at distance of 1 meter.



MODEL	TWS(35)MDA	TWS(40)MDA	TWS(50)MDA	TWS(60)MDA	TWS(100)MDA	TWS(120)MDA
A	2200	2200	2200	2735	3050	3200
B	480	480	480	560	560	1200
C	1380	1380	1380	1400	1700	1700



# Cooling Capacity Table

Evaporator water out TEMP(°C)	5		6		7		8		9		10		11		12		13		14		15	
Cooling Capacity/ Power Input	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
21	1.115	0.64	1.147	0.653	1.179	0.666	1.211	0.679	1.243	0.692	1.275	0.704	1.307	0.716	1.339	0.728	1.372	0.74	1.404	0.751	1.436	0.763
22	1.094	0.68	1.126	0.694	1.158	0.707	1.19	0.72	1.222	0.733	1.254	0.746	1.286	0.759	1.318	0.772	1.35	0.785	1.382	0.798	1.415	0.811
23	1.074	0.721	1.105	0.734	1.137	0.747	1.168	0.761	1.2	0.774	1.232	0.788	1.264	0.801	1.296	0.815	1.328	0.829	1.361	0.843	1.393	0.857
24	1.053	0.761	1.084	0.774	1.115	0.787	1.147	0.8	1.178	0.814	1.21	0.828	1.242	0.842	1.274	0.856	1.306	0.87	1.339	0.885	1.371	0.9
25	1.033	0.801	1.063	0.813	1.094	0.827	1.125	0.84	1.157	0.853	1.188	0.867	1.22	0.881	1.252	0.895	1.284	0.91	1.316	0.925	1.349	0.939
26	1.012	0.84	1.043	0.853	1.073	0.866	1.104	0.879	1.135	0.892	1.166	0.906	1.198	0.919	1.23	0.933	1.262	0.947	1.294	0.962	1.326	0.976
27	0.992	0.88	1.022	0.892	1.052	0.906	1.083	0.917	1.113	0.93	1.144	0.943	1.176	0.956	1.207	0.969	1.239	0.983	1.271	0.996	1.303	1.1
28	0.972	0.92	1.001	0.931	1.031	0.943	1.061	0.955	1.092	0.967	1.122	0.979	1.153	0.991	1.184	1.004	1.216	1.016	1.247	1.029	1.279	1.041
29	0.952	0.959	0.981	0.97	1.01	0.981	1.04	0.992	1.07	1.003	1.1	1.014	1.131	1.025	1.161	1.036	1.192	1.047	1.223	1.058	1.255	1.069
30	0.942	0.979	0.971	0.988	1	1	1.029	1.011	1.059	1.021	1.089	1.032	1.119	1.042	1.15	1.052	1.18	1.062	1.211	1.072	1.242	1.082
31	0.932	0.998	0.961	1.009	0.99	1.019	1.019	1.029	1.048	1.039	1.078	1.049	1.108	1.058	1.138	1.067	1.169	1.077	1.199	1.086	1.23	1.095
32	0.912	1.037	0.94	1.047	0.969	1.056	0.998	1.065	1.025	1.074	1.056	1.082	1.085	1.09	1.115	1.097	1.145	1.104	1.175	1.111	1.205	1.117
33	0.892	1.076	0.92	1.085	0.948	1.093	0.977	1.101	1.005	1.108	1.034	1.114	1.062	1.12	1.091	1.125	1.12	1.129	1.15	1.133	1.179	1.136
34	0.873	1.115	0.9	1.123	0.928	1.13	0.955	1.136	0.983	1.141	1.011	1.145	1.039	1.148	1.067	1.151	1.096	1.152	1.124	1.153	1.153	1.153
35	0.853	1.154	0.88	1.161	0.907	1.166	0.934	1.17	0.962	1.173	0.989	1.175	1.016	1.176	1.044	1.175	1.071	1.173	1.099	1.17	1.126	1.166
36	0.834	1.192	0.861	1.198	0.887	1.202	0.913	1.204	0.94	1.205	0.966	1.204	0.993	1.202	1.019	1.198	1.046	1.193	1.073	1.186	1.099	1.177
37	0.815	1.231	0.841	1.235	0.867	1.237	0.892	1.238	0.918	1.236	0.944	1.232	0.969	1.227	0.995	1.219	1.021	1.21	1.046	1.198	1.061	1.191
38	0.796	1.269	0.821	1.272	0.846	1.273	0.871	1.271	0.896	1.266	0.921	1.26	0.946	1.25	0.971	1.239	0.995	1.225	1.02	1.202	1.053	1.21

Condenser  
water in  
TEMP(°C)



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