

揚帆

YANGFAN

# 變頻滿液式冰水機

## VFD FLOODED TYPE CHILLED UNIT (50HZ)

ISO 9001

BUREAU VERITAS  
Certification



榮獲國際品質管理系統驗證



Testing Laboratory 2232

國際認證基金會認證



冰水機管制委員會認證



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## 機組特點

中央系統冰水機組各國都訂定了能源效率的國家標準，但僅限於滿載運轉時需達到的標準，而在一年當中季節及早晚氣溫變化很大，所以冰水主機真正處在滿載運轉的時間僅佔 5%，依美國 ASHRAE 資料顯示：一般辦公大樓一年內空調負載在 50% 負載的約佔 4,500 小時，在 75% 負載約佔 4,000 小時，一整年總時數不過 8,760 小時，如果冰水主機的部份負載時間超過 8,000 小時，不去好好的節省耗電，是非常浪費的。

揚帆冷氣公司與國立台北科技大學能源與冷凍空調研究所共同開發了『變頻滿液式冰水機組』，它不但在滿載時完全符合國家定訂的能源效率標準，當部份負載 (Integrated Part Load Value【IPLV】) 時，其性能係數 (COP 值) 亦超過美國冷凍空調協會 (ASHRAE) 最新 2004 年標準。

茲介紹本系列機組主要機件及優點如下：

- **壓縮機**：專用變頻式冷媒壓縮機，可依負荷大小，由變頻器使電源自 30Hz~60Hz 作無段變能量，以減少耗電量。
- **變頻器**：穩定而可靠的交流馬達驅動變頻器，它接受負荷的增減，令電源頻率及電流增加或減少。
- **油氣分離器**：特殊結構的油氣分離器，能將壓縮機運轉時拋出之高壓氣體冷媒挾帶著冷凍油完全分離，使純淨的冷凍油返回壓縮機。讓壓縮機潤滑系統保持正常。
- **冷凝器**：採用管殼式，筒身及高效率多鰭麻繩式紫銅管，高溫冷媒在筒身內以雨淋方式噴灑在銅管外，冷卻水在銅管內擾流、滾動，使冷熱交換產生最佳效果。  
冷媒側試驗壓力為 25Kg/m<sup>2</sup>，水側試驗壓力為 10Kg/m<sup>2</sup>。
- **蒸發器**：採用管殼式，筒身及滿液式高效蒸發專用銅管，能使低壓冷媒在蒸發器內完全蒸發，加速產生製冷效果。  
冷媒側試驗壓力為 17Kg/m<sup>2</sup>，水側試驗壓力為 10Kg/m<sup>2</sup>。
- **冷媒流量控制**：採用電磁式電子膨脹閥，依負載或氣候變化，精準的控制冷媒流量，使冷媒始終保持在一定的液面，防止液體冷媒過與不及，不致造成壓縮機液壓縮而損壞。
- **人性化操控管理**：採用 PLC 可程式控制，具備自動啟動前檢查、警報記錄及自我診斷功能，精確控制蒸發器回水或出水之溫度。採觸控式液晶中文顯示之 LCD 人機介面、網路監控連線及數位化溫度、壓力、耗電量等感測。內建萬年曆及時間功能，可設定整年假日與非假日之開機/停機時間，並記錄運轉狀況、運轉時數與維修保養預警，有效提升系統管理。  
對溫度、壓力、過載，防止壓縮機頻繁啟動、逆向運轉等作最有效保護，當機組滿載或部份負載時，皆能保持高效率、安全及穩定之運轉。
- **可透過網路委託本公司控管系統作全年 24 小時連線**。我們專業的工程師隨時在關心您的空調機運轉狀況，並可提供適時的安全維護。
- **免除超負荷投資**：本系列機組因為有減頻和超頻能力，所以採用雙壓縮機者在 15% 負載下仍能運轉；採用單壓縮機者可允許在滿載情況下增加 25% 的冷房能力，免除超負荷規劃及減少投資費用。

## FEATURES OF THE CHILLER UNIT

For the central system chiller unit, each country has stipulated a national standard of energy source efficiency; however, this standard is limited to the working of the chiller at its full loading level. Practically, the temperature is greatly changed during the different seasons and the day or night time, so the actual full loading operation time occupies only 5% of the chiller operation time. According to the American ASHRAE data, in a general office building, the air conditioning operation time at 50% loading in the whole year is nearly 4,500 hours, and at 75% loading, 4,000 hours; the total operation time is under 8,760 hours in the whole year. In case the operation time at partial loading is over 8,000 hours cannot be put under the consideration of saving power consumption, it is an extraordinary waste.

YANGFAN Air-conditioning Company, together with the Department of Energy and Refrigeration Air-conditioning Engineering National Taipei University of Technology has mutually developed, namely, "VFD Flooded Type Chiller Unit". Not only this type of chiller is designed completely in accordance with the National Energy Source Efficiency Standard, but its Coefficient of Performance (COP) at the Integrated Partial Load Value (IPLV) is also over the ASHRAE standard issued in 2004.

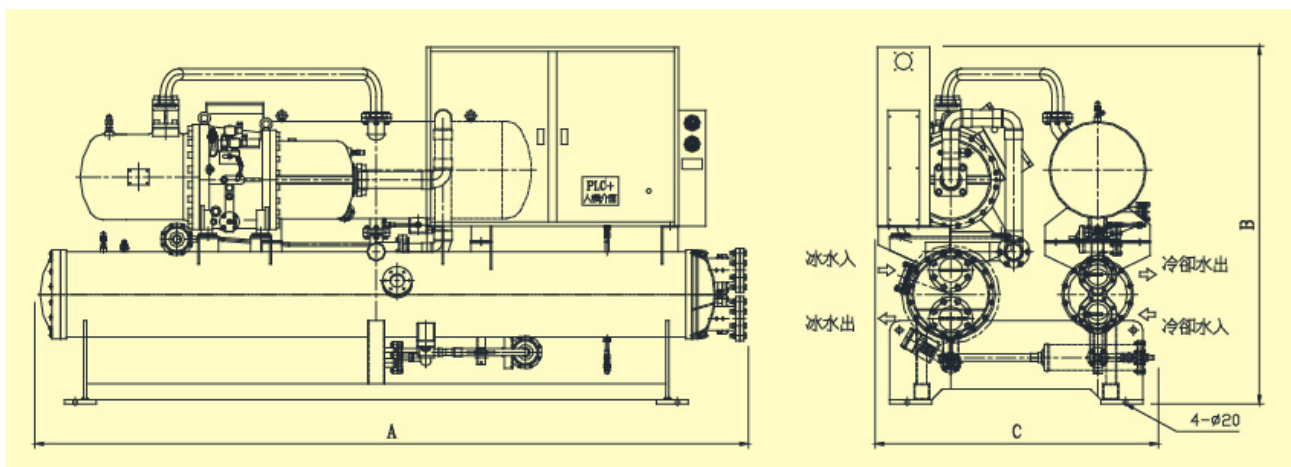
We introduce the main components of this series of chiller units and their advantage as follows,

- **Compressor:** Use VFD type refrigerant compressor according to the quantity of loading to non-stage vary the power source from 30Hz to 60Hz by VFD to minimize the power consumption.
- **VFD:** Stable and reliable AC motor driven VFD, which accepts the loading burden by increasing or decreasing to plus or minus the frequency of power source and electricity current.
- **Oil Separator:** Special structured oil separator, which separates the refrigeration oil completely from the high pressure gas refrigerant thrown out by the revolution of the refrigerant compressor, and carries the pure and clean refrigeration oil back to the compressor to maintain the compressor lubricating system always normal.
- **Condenser:** Use shell and tube type. The body of the condenser is made of premium steel tube with high efficient multi-finned spiral copper tubes inside. High temperature refrigerant in the body of the condenser uses the shower form spraying to the outside of the copper tube while the cooling water in the copper tubes is running in turbulence and rolling to ensure the best heat exchange effect. The test pressure is 25Kg/m<sup>2</sup> at refrigerant side, and 10 Kg/m<sup>2</sup> at water side.
- **Evaporator:** Use shell and tube type body and flood type high efficient special coppers for evaporating inside to make the low pressure refrigerant evaporated completely in the evaporator and speed the produced cooling effect. The test pressure is 17 Kg/m<sup>2</sup> at refrigerant side, and 10 Kg/m<sup>2</sup> at water side.
- **Refrigerant Flow Control:** Use the magnetic type electronic expansion valve and according to the variety of load or climate to precisely control the refrigerant discharge and keep the refrigerant always at a certain liquid level to prevent from too much or too little liquid refrigerant to avoid the occurring of liquid compression in the compressor and damage to the compressor.
- **Humanized Management Control:** Adopt PLC programming control intelligent unit to perform a series of pre-start checks, alarm recording and self-diagnosing and have the processing of the evaporator returning or leaving water temperature precisely controlled. Using touch control human-machine LCD interface displayed in English, network monitoring and digital temperature sensors, pressure sensor, power meter, etc. The in-built perpetual calendar and clock help you to set the time to start or stop the chiller unit on holidays or non-holidays, and help you to record the unit working status, running hours and notice the maintenance alarm to keep the system managed efficiently. The unit is protected from high temperature, high pressure, compressor frequently ON/OFF and compressor running in reverse so as to keep the operation safely and stable with high efficiency no matter running at full load or partial load.
- You are welcome to make good use of the convenience of the internet to entrust our company with maintenance service through connecting to our online controlling system 24 hours for all year round. With this, at any time, our engineers of the specialized field will be all attention to the running status of your air conditioner and provide with timely safe maintenance.
- **Eliminate Over Load Investment:** With capability in varied frequency, this series of chiller units will up or down frequency according to requirement, hence, to eliminate the program for overloading and minimize expenses. The unit will keep running at 15% unloading while it uses dual compressors, and the air conditioning capacity will increase by 25% at full loading when single compressor is used for the unit.

標準規範 Standard Specifications

單壓縮機系列 Single compressor series

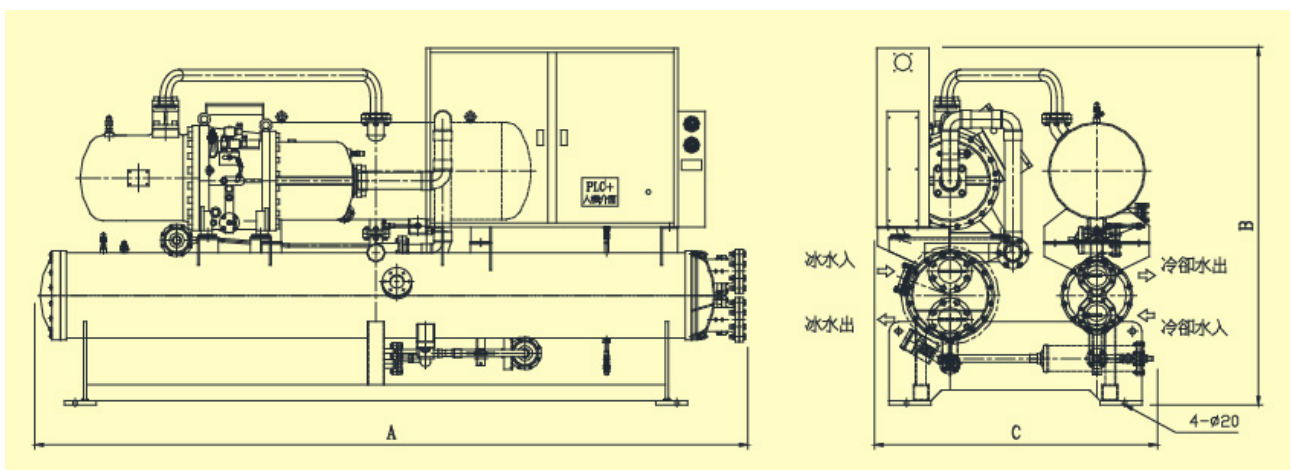
型號		單位		YVCHU					
MODEL		UNIT		030 S	040 S	045 S	050 S	055 S	060 S
冷房能力	H	Kcal/h	90,995	115,937	133,827	148,362	172,014	185,173	
	L	Kcal/h	45,498	57,969	66,913	74,181	86,007	92,586	
Cooling Capacity	H	KW	105.8	134.8	155.6	172.5	200.0	215.3	
	L	KW	52.9	67.4	77.8	86.3	100.0	107.7	
滿載性能系數 COP		KW/KW	4.85	5.01	4.94	5.08	4.98	5.23	
<b>壓縮機 COMPRESSOR</b>									
型式	Type 半密閉螺旋式 Semi-Hermetic Screw Type								
電源	Power Source 3φ-380V-50Hz								
輸入功率	H	KW	21.8	26.9	31.5	34.0	40.2	41.2	
	L	KW	10.9	13.5	15.8	17.0	20.1	20.6	
運轉電流	H	A	36.9	45.4	53.3	57.4	67.9	69.5	
	L	A	18.4	22.8	26.7	28.6	33.9	34.8	
起動方式	Starting Method 變頻器啟動 VFD Starting								
<b>冷凝器 Condenser</b>									
型式	Type 殼管式 Shell and Tube								
冷卻水量	L/min	366	464	536	592	689	735		
出入管徑	In	3	3	3	4	4	4		
<b>冰水器 Chiller</b>									
型式	Type 殼管滿液式 Shell and Tube Flooded Type								
冰水水量	L/min	303	386	446	495	573	617		
出入管徑	In	3	3	3	3	4	4		
<b>冷媒控制 Refrigerant Control</b>									
型式	Type 電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve								
冷媒	Refrigerant. R-134a								
冷凍油	lubricate FS-070R								
油充填量	L	16	16	18	18	18	18		
<b>外型尺寸 Dimension</b>									
A			2350	2350	2350	3050	3050	3050	
B	mm		1600	1600	1600	1600	1600	1600	
C			1250	1250	1250	1300	1300	1300	



標準規範 Standard Specifications

單壓縮機系列 Single compressor series

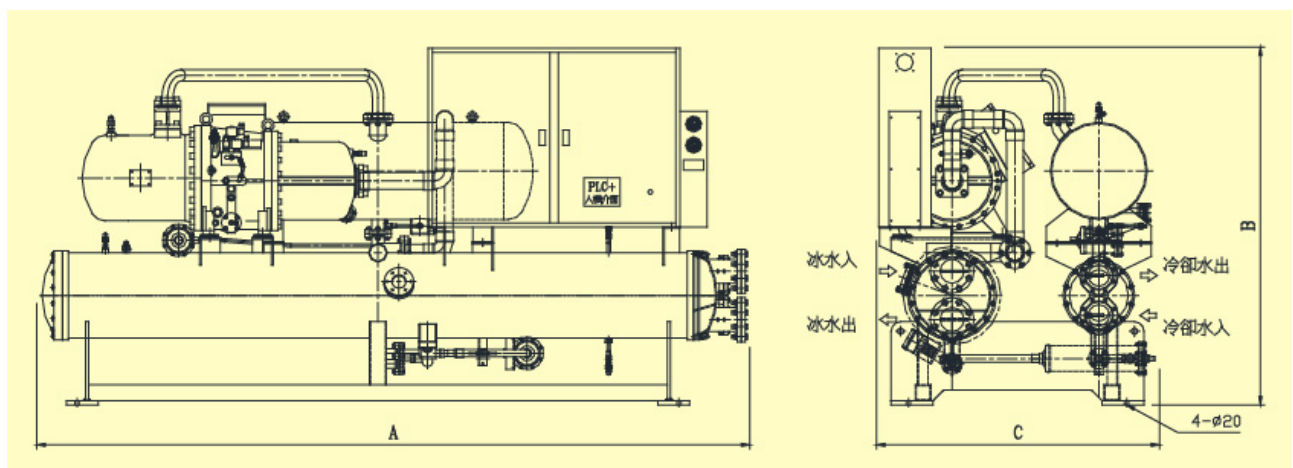
型號		單位		YVCHU					
MODEL		UNIT		070 S	080 S	090 S	100 S	110 S	120 S
冷房能力	H	Kcal/h		218,113	236,347	282,016	312,893	336,975	371,894
	L	Kcal/h		109,057	118,173	141,008	156,446	168,487	185,947
Cooling Capacity	H	KW		253.6	274.8	327.9	363.8	391.8	432.4
	L	KW		126.8	137.4	164.0	181.9	195.9	216.2
滿載性能系數 COP		KW/KW		5.27	5.27	5.29	5.30	5.34	5.16
<b>壓縮機 COMPRESSOR</b>									
型式	Type		半密閉螺旋式 Semi-Hermetic Screw Type						
電源	Power Source		3φ-380V-50Hz						
輸入功率	Power Input	H	KW	48.1	52.1	62.0	68.6	73.4	83.7
		L	KW	24.0	26.1	31.0	34.3	36.7	41.9
運轉電流	Operation Current	H	A	81.2	87.9	104.6	115.9	124.0	141.4
		L	A	40.6	44.0	52.3	58.0	62.0	70.7
起動方式	Starting Method		變頻器啟動 VFD Starting						
<b>冷凝器 Condenser</b>									
型式	Type		殼管式 Shell and Tube						
冷卻水量	Cooling Water Flow	L/min		865	937	1118	1240	1334	1480
出入管徑	Cooling Water Conn.	In		4	4	4	4	4	5
<b>冰水器 Chiller</b>									
型式	Type		殼管滿液式 Shell and Tube Flooded Type						
冰水水量	Chilled Water Flow	L/min		727	788	940	1043	1123	1240
出入管徑	Chilled Water Conn.	In		4	4	4	4	4	4
<b>冷媒控制 Refrigerant Control</b>									
型式	Type		電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve						
冷媒	Refrigerant.		R-134a						
冷凍油	lubricate		FS-070R						
油充填量	Oil Charge	L		18	22	22	22	22	26
<b>外型尺寸 Dimension</b>									
A				3,050	3,050	3,050	3,050	3,050	3,050
B		mm		1,600	1,650	1,650	1,750	1,750	1,750
C				1,500	1,550	1,550	1,550	1,550	1,550



標準規範 Standard Specifications

單壓縮機系列 Single compressor series

型號		單位		YVCHU					
MODEL		UNIT		135 S	150 S	175 S	190 S	215 S	235 S
冷房能力 Cooling Capacity	H	Kcal/h	410,339	456,524	525,158	573,149	647,115	714,029	
	L	Kcal/h	205,169	228,262	262,579	286,575	323,558	357,014	
	H	KW	477.1	530.8	610.6	666.4	752.4	830.2	
	L	KW	238.6	265.4	305.3	333.2	376.2	415.1	
滿載性能系數 COP		KW/KW	5.41	5.43	5.44	5.46	5.48	5.52	
<b>壓縮機 COMPRESSOR</b>									
型式	Type	半密閉螺旋式 Semi-Hermetic Screw Type							
電源	Power Source	3φ-380V-50Hz							
輸入功率	Power Input	H	KW	88.2	97.7	112.2	122.1	137.2	150.4
		L	KW	44.1	48.8	56.0	61.0	68.6	75.2
運轉電流	Operation Current	H	A	148.9	165.0	189.3	206.0	231.6	253.9
		L	A	74.5	82.5	94.7	103.0	115.8	126.9
起動方式	Starting Method	變頻器啟動 VFD Starting							
<b>冷凝器 Condenser</b>									
型式	Type	殼管式 Shell and Tube							
冷卻水量	Cooling Water Flow	L/min	1621	1802	2072	2260	2550	2811	
出入管徑	Cooling Water Conn.	In	4	5	5	6	6	6	
<b>冰水器 Chiller</b>									
型式	Type	殼管滿液式 Shell and Tube Flooded Type							
冰水水量	Chilled Water Flow	L/min	1368	1522	1751	1910	2157	2380	
出入管徑	Chilled Water Conn.	In	4	5	5	6	6	6	
<b>冷媒控制 Refrigerant Control</b>									
型式	Type	電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve							
冷媒	Refrigerant.	R-134a							
冷凍油	lubricate	FS-070R							
油充填量	Oil Charge	L	26	26	30	30	30	30	
<b>外型尺寸 Dimension</b>									
A				3,450	3,450	3,450	3,450	3,450	3,450
B		mm	1,750	1,800	1,800	1,800	1,950	1,950	
C				1,550	1,550	1,600	1,600	1,700	1,700



標準規範 Standard Specifications

雙壓縮機系列 Daul compressor series

型號		單位	YVCHU					
MODEL		UNIT	050 D	055 D	060 D	070 D	080 D	090 D
冷房能力 Cooling Capacity	H	Kcal/h	146,986	166,767	187,581	212,523	245,377	277,200
	L	Kcal/h	33,414	37,886	37,886	48,293	55,775	74,138
	H	KW	170.9	193.9	218.1	247.1	285.3	322.3
	L	KW	38.9	44.1	44.1	56.2	64.9	86.2
滿載性能系數 COP		KW/KW	4.88	4.98	5.01	5.08	5.00	4.85

**壓縮機 COMPRESSOR**

型式	Type	半密閉螺旋式 Semi-Hermetic Screw Type							
電源	Power Source	3φ-380V-50Hz							
輸入功率	Power Input	H	KW	35.0	38.9	43.6	48.6	57.1	66.4
		L	KW	9.7	10.9	10.9	13.5	15.8	17.0
運轉電流	Operation Current	H	A	61.8	68.1	74.8	47.2	96.7	112.9
		L	A	16.3	18.4	18.4	22.8	26.7	28.6
起動方式	Starting Method	變頻器啟動+Y-△啟動 VFD Starting + Y-△Starting							

**冷凝器 Condenser**

型式	Type	殼管式 Shell and Tube						
冷卻水量	Cooling Water Flow	L/min	590	668	750	848	982	1114
出入管徑	Cooling Water Conn.	In	3	4	4	4	4	4

**冰水器 Chiller**

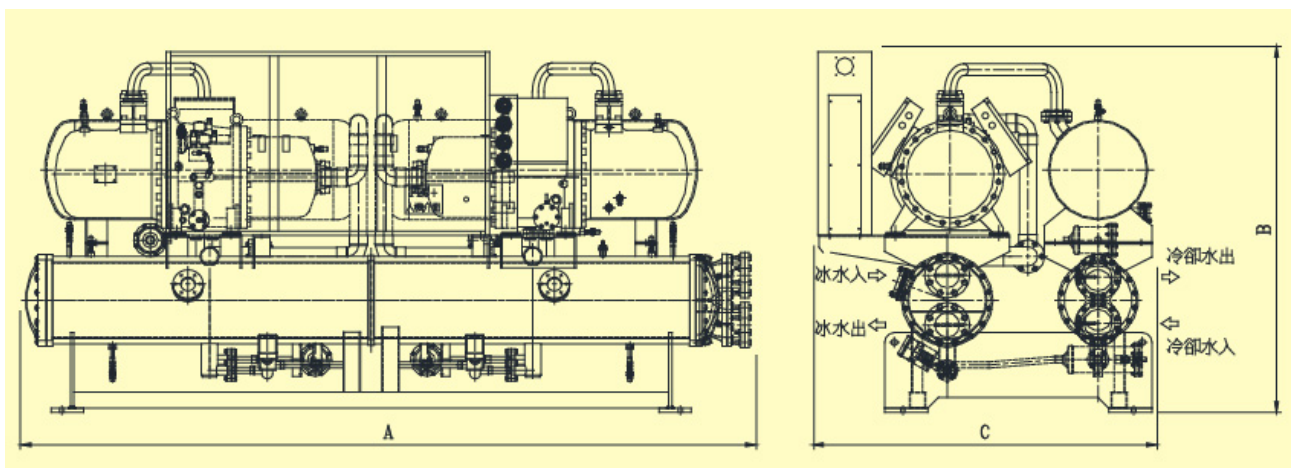
型式	Type	殼管滿液式 Shell and Tube Flooded Type						
冰水水量	Chilled Water Flow	L/min	490	556	625	708	818	924
出入管徑	Chilled Water Conn.	In	3	3	3	4	4	4

**冷媒控制 Refrigerant Control**

型式	Type	電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve						
冷媒	Refrigerant.	R-134a						
冷凍油	lubricate	FS-070R						
油充填量	Oil Charge	L	32	32	32	32	36	36

**外型尺寸 Dimension**

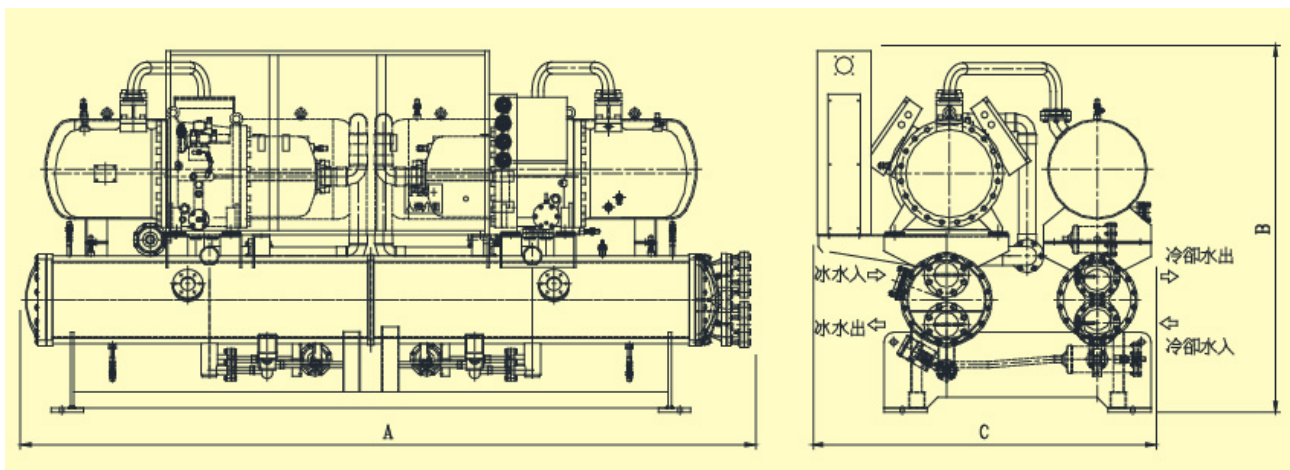
A		3,350	3,350	3,350	3,350	3,350	3,350
B	mm	1,650	1,650	1,650	1,650	1,650	1,650
C		1,500	1,500	1,500	1,550	1,550	1,550



標準規範 Standard Specifications

雙壓縮機系列 Daul compressor series

型號		單位		YVCHU					
MODEL		UNIT		110 D	120 D	135 D	155 D	180 D	200 D
冷房能力 Cooling Capacity	H	Kcal/h	326,310	366,991	415,069	471,403	542,703	593,705	
	L	Kcal/h	77,148	92,543	98,478	118,173	141,051	156,446	
	H	KW	379.4	426.7	482.6	548.1	631	690.3	
	L	KW	89.7	107.6	114.5	137.4	164	181.9	
滿載性能係數 COP		KW/KW	5.17	5.33	5.35	5.36	5.37	5.40	
<b>壓縮機 COMPRESSOR</b>									
型式	Type	半密閉螺旋式 Semi-Hermetic Screw Type							
電源	Power Source	3φ-380V-50Hz							
輸入功率	Power Input	H	KW	73.4	80.0	90.2	102.2	117.5	127.9
		L	KW	20.1	20.6	24.0	26.1	31.0	34.3
運轉電流	Operation Current	H	A	123.5	137.2	153.7	172.7	199.8	217.0
		L	A	33.9	34.8	38.3	44.0	52.3	58.0
起動方式	Starting Method	變頻器啟動+Y-△啟動 VFD Starting + Y-△Starting							
<b>冷凝器 Condenser</b>									
型式	Type	殼管式 Shell and Tube							
冷卻水量	Cooling Water Flow	L/min	1298	1453	1642	1864	2146	2346	
出入管徑	Cooling Water Conn.	In	5	5	5	5	6	6	
<b>冰水器 Chiller</b>									
型式	Type	殼管滿液式 Shell and Tube Flooded Type							
冰水水量	Chilled Water Flow	L/min	1088	1223	1384	1571	1809	1979	
出入管徑	Chilled Water Conn.	In	5	5	5	5	6	6	
<b>冷媒控制 Refrigerant Control</b>									
型式	Type	電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve							
冷媒	Refrigerant.	R-134a							
冷凍油	lubricate	FS-070R							
油充填量	Oil Charge	L	36	36	40	44	44	44	
<b>外型尺寸 Dimension</b>									
A		3,450							
B		mm	1,700	1,700	1,750	1,750	1,750	1,800	
C		1,650							

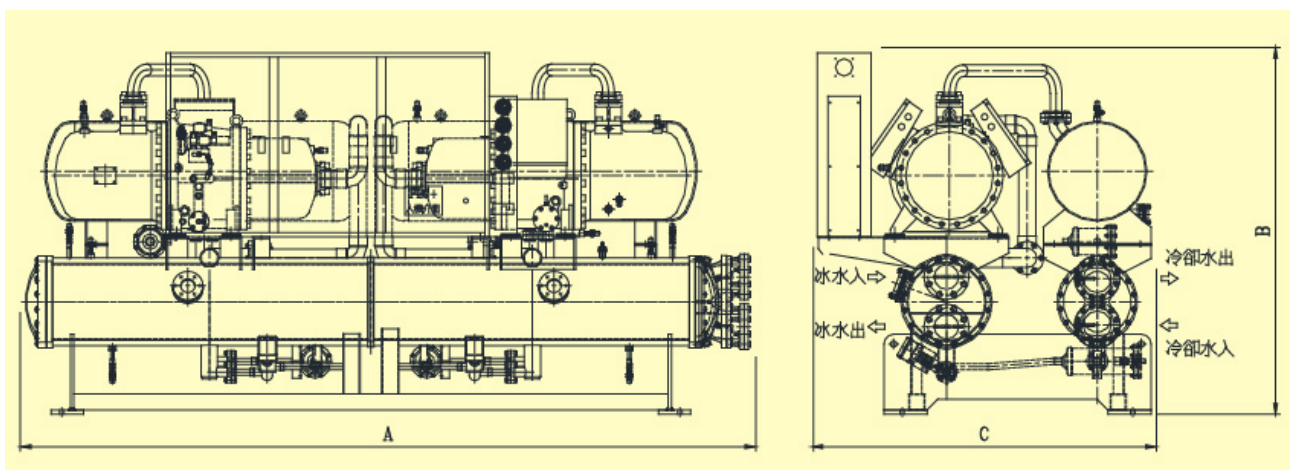




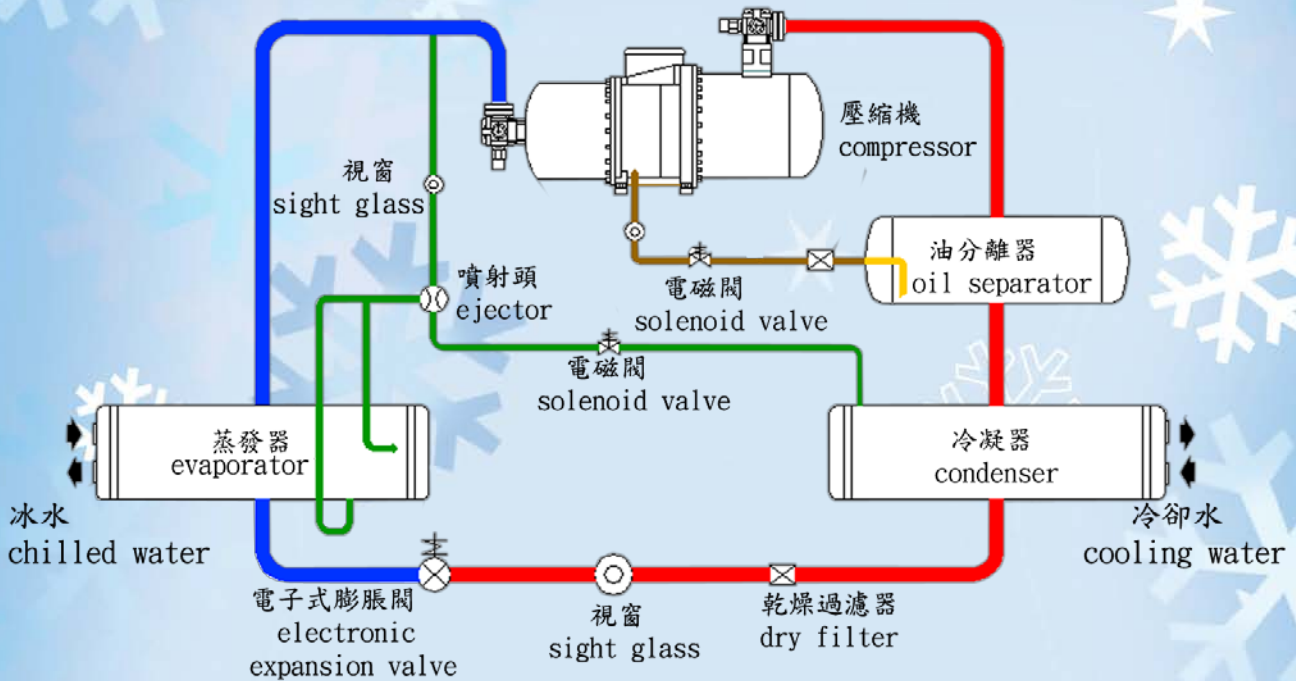
標準規範 Standard Specifications

雙壓縮機系列 Daul compressor series

型號		單位	YVCHU						
MODEL		UNIT	215 D	260 D	300 D	330 D	375 D	415 D	
冷房能力	H	Kcal/h	713,857	790,747	894,213	1,112,412	1,242,111	1,418,253	
	L	Kcal/h	185,947	205,212	228,262	286,661	323,558	357,014	
Cooling Capacity	H	KW	830	919.4	1039.7	1293.4	1444.2	1649	
	L	KW	216.2	238.6	265.4	333.3	376.2	415.1	
滿載性能系數 COP		KW/KW	5.35	5.50	5.52	5.55	5.58	5.62	
<b>壓縮機 COMPRESSOR</b>									
型式	Type	半密閉螺旋式 Semi-Hermetic Screw Type							
電源	Power Source	3φ-380V-50Hz							
輸入功率	Power Input	H	KW	155.0	167.2	188.3	233.0	258.7	293.4
		L	KW	41.9	44.1	48.8	61.0	68.6	75.2
運轉電流	Operation Current	H	A	70.7	285.6	323.4	400.8	438.5	497.9
		L	A	70.7	74.5	82.5	103.0	115.8	126.9
起動方式	Starting Method	變頻器啟動+Y-△啟動 VFD Starting + Y-△Starting							
<b>冷凝器 Condenser</b>									
型式	Type	殼管式 Shell and Tube							
冷卻水量	Cooling Water Flow	L/min	2824	3115	3521	4376	4882	5569	
出入管徑	Cooling Water Conn.	In	6	8	8	8	8	8	
<b>冰水器 Chiller</b>									
型式	Type	殼管滿液式 Shell and Tube Flooded Type							
冰水水量	Chilled Water Flow	L/min	2380	2636	2981	3708	4140	4728	
出入管徑	Chilled Water Conn.	In	6	6	8	8	8	8	
<b>冷媒控制 Refrigerant Control</b>									
型式	Type	電磁式電子膨脹閥 Electro-Magnetic Electronic Expansion Valve							
冷媒	Refrigerant.	R-134a							
冷凍油	lubricate	FS-070R							
油充填量	Oil Charge	L	52	52	56	60	60	65	
<b>外型尺寸 Dimension</b>									
A			4,050	4,050	4,050	4,100	4,550	4,550	
B		mm	1,850	1,900	1,900	1,950	21,00	21,00	
C			1,850	1,900	1,900	1,950	1,950	1,950	



## ◆冷媒系統流程圖



## ◆品質保證與創新

