

HACE

Heating & Air Conditioning Ent.



Chilled Water Fan Coil Units

Tailor Your Atmosphere

About Us

Heating & Air Conditioning Enterprises have recently grouped the names of its divisions (HACE – Royal Temp – Golden Star) into (HACE), while preserving the company's good reputation and expertise acquired in the past 30 years for providing high quality HVAC products, supplies and services.

HACE took the advantage of the strongly increasing demand on its high quality products and launched numerous expansion plans to increase the production capacity by double, increase the working staff by 30%, provide totally new products with wider range of choice, release new HVAC products series with new specifications and develop the existing products and services. HACE is based on a production facility of 30'000 m² along with a storage area of 5'750 m². HACE team consists of more than 500 highly skillful technical and senior engineers.

In 1976 HACE started the manufacturing of HVAC products and supplies in the Kingdom of Saudi Arabia. In 1980, the primary manufacturing plant was built in the Second Industrial City in Riyadh and from that point, HACE started the manufacture of air conditioning equipment, air devices, heavy duty centrifugal blowers, and pre-insulated pipes under the trade name "Goldenstar". In 2004, the company trade name was changed to "Royal Temp" and to be used for all products. In 2012, the name HACE was chosen to replace the old trade names and declare a new milestone in the company's history.

In continuation of its growth pursuit, HACE is eagerly following the recent HVAC technologies and developments by providing its employees with the best training sessions coupled with its wide knowledge of HVAC sciences and products. HACE high quality equipment has acquired various international certifications like AHRI, ETL, UL, CE, and ISO 9001 along with many vendor approvals from the governmental sector, semi-governmental and leading private companies.

Today, HACE is producing a huge variety of HVAC products, supplies and services that will grant all of its customer's air comfort requirements to the least detail, "Tailor Your Atmosphere".

Our Vision

Become customer's first choice regionally and be recognized globally for providing high quality air comfort solutions.

Our Mission

Ensure total customer satisfaction for Air Comfort requirements by providing high quality, tailored, affordable, energy efficient and eco-friendly products and services.

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PRODUCT INTRODUCTION

HACE has combined advanced technology, sophisticated idea and quality component to develop a new range of fan coil unit product. This model range is ideal for commercial building, hospital, office, airport and etc. The small and slim compact design gives you an extra space saving. In addition to that, it provides high performance, low noise, easy for servicing and maintenance advantages; which is your ideal product.

* Air flow 340-4080m³/h; cooling capacity 1.81-22.5kW

* Horizontal concealed, horizontal exposed, vertical concealed, vertical exposed and with standard & high static for your selection.

SPECIAL FEATURES

*** STRUCTURE , TOUGH LASTING**

The unit casing is made of galvanized iron steel sheet. Condenser drain pan is die-pressed without any brazing joint and insulated with a layer of fire retardant thermal insulation. With an aesthetic outlook, the horizontal/ vertical exposed model can be installed in any room not only to provide optimum comfort but also to complement with any interior decoration. Horizontal/ vertical concealed model is suitable for project basis. It can be concealed and installed in designed conditioning spaces coupled together with air discharge grille making the interior rooms looks grand and comforting.

*** HIGH CAPACITY AND EXCELLENT PERFORMANCE**

The coil consists of staggered rows and seamless copper tube, expanded onto die formed aluminums fins coupled with low noise high air volume to ensure optimum heat exchange capability. The brass water distributor connections ensure a balanced distribution and reduce pressure drop losses, which further enhances the heat exchange efficiency.

*** QUIET OPERATION AND ENERGY SAVING**

Low noise permanent split capacitor motor and specially designed ABC centrifugal blower wheel combination that comes with a dynamically balancing inspection to ensure the unit high performance and silent run. Apart from providing high static pressure, ABS blower wheel also supply high air volume and operate under low noise condition.

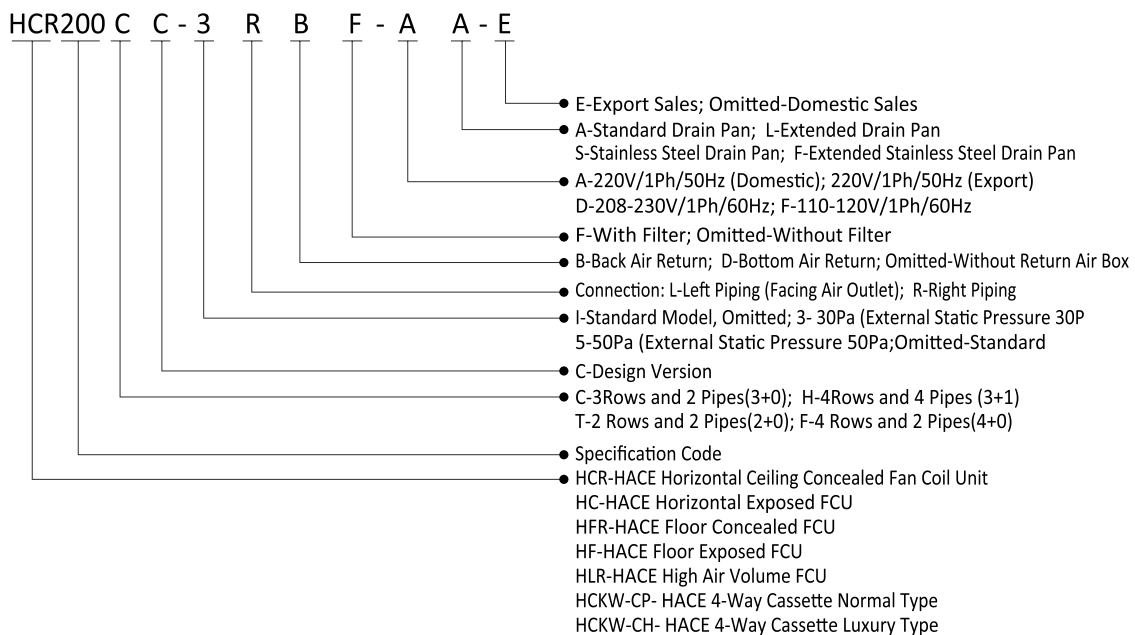
*** EASY ADJUSTMENT & MAINTENANCE**

Room air volume and cooling capacity are easily controlled using the 3 speeds operation switch. The unit assembly is designed for easy air filter removal. Fan motor shaft bearing uses alloy steel, surface nickel-coated with antirust treatment for longer life span and low maintenance cost.

*** HIGH FLEXIBILITY AND LOW INSTALLATION COST**

The unit assembly is light, with thickness of 23cm & 24.5cm. Drain pipe and wiring are easy to install. Left/right piping connections and return air can be flexibly changed from one direction to another to suit the environment requirement. The unit can be installed in any space compartment.

PRODUCT NOMENCLATURE



STRUCTURAL FEATURES



FAN COIL UNIT

Excellent heat transfer capability produced using high quality copper tubes with aluminium hydrophilic fins which are pressure bonded to the tubes through 12 MPa hydraulic expansions to ensure fully surface contact occurrence. Brass water distributor is used for improved water flow distribution, in order to provide better heat transfer effect.



CASING

An aesthetic outlook which comes with a rigid frame structure that is fabricated with zinc coated galvanized steel thus generates the rigidity of the unit making it hard to deform. For exposed type FCU, its cabinet is made of electro galvanized mild steel sheet through processes such as rinsing, treatment, ovening and electrostatic powder coating to ensure it is protected from corrosion and also enhances the unit beauty.



DRAIN PAN

No leakage die pressing surface has been coated with electrostatic powder treatment. 7mm PE thermal insulation foam is applied on the drain pan to prevent condensation and leakage from occurring. Furthermore the width and length of the drain pan has been specifically designed to accommodate the water drop from the water inlet/outlet and flow valve as a result of condensation.



FAN BLOWER

Low operating noise high performance centrifugal blower is made of fire retardant ABS, which is light weighted while statically and dynamically balanced. Galvanize wheel for option.



FAN MOTOR

High efficiency, low energy consumptions, innovative variable 3 speeds fan motor to provide various external static pressures. By rewiring the fan motor, HACE FCU can supply diverse speed and static pressure. High efficiency motor bearing and rubber isolator is being used to increase the motor life span while reducing noise level.



FUSE

Safety and reliability,exclusively standard equipped with fuse on the side of power supply wire in the field of centralise airconditioning,effectively protect the unit from being burnt because the installer connect multiple speed motor wire mistakenly. Motoris more safe and reliable. And received good feedback about its reliability.

PERFORMANCE PARAMETER (3-ROW COILS)

PERFORMANCE PARAMETER (3-ROW COILS)

Model			3 Rows Coil								
			HCR-200CC	HCR-300CC	HCR-400CC	HCR-500CC	HCR-600CC	HCR-800CC	HCR-1000CC	HCR-1200CC	HCR-1400CC
Air Volume	High Speed(H)	m ³ /h	340	510	680	850	1020	1360	1700	2040	2380
	Medium Speed (M)	m ³ /h	270	410	540	670	810	1080	1360	1630	1900
	Low Speed(L)	m ³ /h	200	310	400	510	610	810	1000	1220	1430
Operating Capacity	Cooling Capacity	W	2150	3260	4000	4850	5800	7320	9480	11500	12950
	Heating Capacity	W	3500	5000	6680	8030	9390	13000	15920	19000	20520
	Water Flowrate	LPM	6.2	9.3	11.5	13.9	16.6	21.0	27.2	33.0	37.1
	Water Pressure Drop	kPa	12	23	16	24	30	25	19	30	40
Air Flow Adjustment			Switch Control with 3 Different Air Volume								
Fan	Type	Double Inlet Forward-Curve Centrifugal Fan									
	Quantity	1	2				4				
Motor	Type	3 Speeds Permanent Split Capacitor Motor									
	Quantity	1					2				
	Power Supply	AC 1N-220V-50Hz-60Hz									
	Input Power(W)	Standard	31	45	57	74	89	132	150	187	228
30Pa Static Pressure		38	54	67	84	100	154	171	200	253	
50Pa Static Pressure		43	62	79	96	110	171	206	244	300	
Coil	Type	Purple Copper Tube/ Hydrophilic Aluminium Split Fin									
	Rows	3									
	Operating Pressure	1.6MPa									
	Face Area	m ²	0.089	0.114	0.136	0.152	0.175	0.230	0.268	0.293	0.325
Connection Pipe	Water Inlet	3/4"FPT Thread (DN20mm)									
	Water Drainage	3/4"MPT Thread (DN20mm)									
Net Weight	Without Plenum	kg	10	12.5	13.5	15	16	23.5	26	30	33
	With Plenum	kg	12.3	15	16.3	18	19.5	27.5	30.2	35.5	38.5

Notes:

- Cooling capacities are based on coil air temperature 27°C DB/ 19.5°C WB, entering water temperature 7°C, outlet water temperature 12°C.
- Heating capacities are based on coil temperature 21°C DB, entering water temperature 60°C, air flow volume, water same as in the cooling mode.
- MPT - Male Pipe Thread, FPT - Female Pipe Thread.
- LPM : Litre per minute, 1LPM = 0.06 m³/h.
- For KC and KF, the static pressure of air outlet is 0 Pa.
- HF, HFR without model 1400, and their performance parameter is same as HCR series.
- There will be no notice on changes of the above specification.

PERFORMANCE PARAMETER (2-ROW COILS)

Model			2 Rows Coil								
			HCR-200TC	HCR-300TC	HCR-400TC	HCR-500TC	HCR-600TC	HCR-800TC	HCR-1000TC	HCR-1200TC	HCR-1400TC
Air Volume	High Speed(H)	m ³ /h	360	540	720	880	1030	1500	1780	2170	2500
	Medium Speed (M)	m ³ /h	285	430	570	660	820	1150	1380	1620	1950
	Low Speed(L)	m ³ /h	210	310	420	510	590	870	1000	1250	1450
Operating Capacity	Cooling Capacity	W	1950	2830	3870	4550	5500	7580	8690	10400	11600
	Heating Capacity	W	3480	4700	6460	7750	9100	13580	15800	18000	19000
	Water Flowrate	LPM	5.6	8.1	11.1	13.0	15.8	21.7	24.9	29.8	33.3
	Water Pressure Drop	kPa	8	17	26	37	62	30	36	47	65
Air Flow Adjustment			Switch Control with 3 Different Air Volume								
Fan	Type	Double Inlet Forward-Curve Centrifugal Fan									
	Quantity	1	2				4				
Motor	Type	3 Speeds Permanent Split Capacitor Motor									
	Quantity	1					2				
	Power Supply	AC 1N-220V-50Hz-60Hz									
	Input Power(W)	Standard	31	51	58	75	90	126	152	189	228
		30Pa Static Pressure	40	57	71	86	106	156	174	208	253
50Pa Static Pressure		45	65	83	99	116	174	210	250	300	
Coil	Type	Purple Copper Tube/ Hydrophilic Aluminium Split Fin									
	Rows	2									
	Operating Pressure	1.6MPa									
	Face Area	m ²	0.089	0.114	0.136	0.152	0.175	0.268	0.293	0.325	0.366
Connection Pipe	Water Inlet	3/4"FPT Thread (DN20mm)									
	Water Drainage	3/4"MPT Thread (DN20mm)									
Net Weight	Without Plenum	kg	9.5	11	15	16	17.5	24	26.5	30	32.5
	With Plenum	kg	11.8	13.5	17.8	19	21	28	31.3	36.5	40

Notes:

1. Cooling capacities are based on coil air temperature 27°C DB/ 19.5°C WB, entering water temperature 7°C, outlet water temperature 21°C.
2. Heating capacities are based on coil temperature 21°C DB, entering water temperature 60°C, air flow volume, water flow rate same as in the cooling mode.
3. MPT - Male Pipe Thread, FPT - Female Pipe Thread.
4. LPM : Litre per minute, 1LPM = 0.06 m3/h.
5. There will be no notice on changes of the above specification.

PERFORMANCE PARAMETER (4-ROW COILS)

PERFORMANCE PARAMETER (4-ROW COILS)

Model			4 Rows Coil							
			HCR-200HC	HCR-300HC	HCR-400HC	HCR-500HC	HCR-600HC	HCR-800HC	HCR-1000HC	HCR-1200HC
Air Volume	High Speed(H)	m ³ /h	340	510	680	850	1020	1360	1700	2040
	Medium Speed (M)	m ³ /h	270	410	540	670	810	1080	1360	1630
	Low Speed(L)	m ³ /h	200	310	400	510	610	810	1000	1220
Operating Capacity	Cooling Capacity	W	2150	3150	3900	4850	5800	7350	9140	11660
	Heating Capacity	W	1880	2750	3570	4250	5410	6450	8620	10500
	Water Flowrate (Cooling)	LPM	6.2	9.0	11.2	13.9	16.6	21.1	26.2	33.4
	Water Pressure Drop (Cooling)	LPM	2.7	3.9	5.1	6.1	7.8	9.2	12.4	15.1
	Water Flowrate (Heating)	kPa	12	23	16	24	30	25	19	30
	Water Pressure Drop (Heating)	kPa	8	11	21	28	52	18	33	38
Air Flow Adjustment			Switch Control with 3 Different Air Volume							
Fan	Type		Double Inlet Forward-Curve Centrifugal Fan							
	Quantity		1	2				4		
Motor	Type		3 Speeds Permanent Split Capacitor Motor							
	Quantity		1				2			
	Power Supply		AC 1 φ -220V-50Hz-60Hz							
	Input Power(W)	Standard	36	52	65	83	95	140	165	194
30Pa Static Pressure		43	59	73	90	105	145	200	244	
Coil	Type		Purple Copper Tube/ Hydrophilic Aluminium Split Fin							
	Rows		3 + 1							
	Operating Pressure		1.6MPa							
	Face Area	m ²	0.089	0.114	0.136	0.152	0.175	0.230	0.268	0.293
Connection Pipe	Water Inlet		3/4"FPT Thread (DN20mm) + 1/2"FPT (Hot Water)							
	Water Drainage		3/4"FPT Thread (DN20mm) + 1/2"FPT (Hot Water)							
Net Weight	Without Plenum	kg	13.3	18.6	23.5	24.7	26.8	29.8	37.5	45.2
	With Plenum	kg	15.6	21.1	26.3	27.7	30.3	33.8	42.3	51.7

Notes:

- Cooling capacities are based on coil air temperature 27°C DB/ 19.5°C WB, entering water temperature 7°C, outlet water temperature 12°C.
- Heating capacities are based on coil temperature 21°C DB, entering water temperature 60°C, outlet water temperature 50°C.
- MPT - Male Pipe Thread, FPT - Female Pipe Thread.
- LPM : Litre per minute, 1LPM = 0.06 m³/h.
- There will be no notice on changes of the above specification.

HIGH AIR VOLUME HIGH STATIC PRESSURE FCU PERFORMANCE PARAMETER CHART

Item		Model		HLR-800	HLR-1000	HLR-1200	HLR-1400	HLR-1600	HLR-1800	HLR-2000	HLR-2400
Air Volume	High Speed(H)	m ³ /h	1360	1700	2040	2380	2720	3060	3400	4080	
	Medium Speed (M)	m ³ /h	1090	1360	1635	1900	2180	2450	2720	3260	
	Low Speed(L)	m ³ /h	815	1020	1225	1430	1630	1830	2040	2450	
Operating Capacity	Cooling Capacity	kW	7.8	10.2	11.2	13.8	15.5	17.8	18.5	22.5	
	Heating Capacity	kW	13.8	16.83	19.42	22.91	25.27	27.82	30.11	37.02	
	Water Flowrate	LPM	22.4	29.2	32.1	39.6	44.4	51	53	64.5	
	Water Pressure Drop	kPa	15.6	24.2	30.4	46.8	54.13	10.01	11.31	20.02	
Air Flow Adjustment		Switch Control with 3 Different Air Volume									
Fan	Type	Double Inlet Forward-Curve Centrifugal Fan									
	Quantity	1					2				
Motor	Type	3 Speeds Permanent Split Capacitor Motor									
	Quantity	1									
	Power Supply	AC 1 φ -220V-50Hz-60Hz									
	Input Power W	50Pa	280	380	480	615	680	775	900	1000	
120Pa		380	480	500	680	775	900	1000	1100		
Coil	Type	Purple Copper Tube/ Hydrophilic Aluminium Split Fin									
	Rows	4									
	Operating Pressure	1.6MPa									
	Face Area	m ²	0.256	0.285	0.334	0.402	0.494				
Connection Pipe	Water Inlet	3/4"FPT									
	Water Outlet	3/4"FPT									
	Water Drainage	3/4"MPT									
Outline Dimension	mm	1200×750×420	1260×750×420	1420×750×420	1610×750×420	1870×750×420					
Net Weight	kg	55	58	63	69	98					

Notes:

1. Cooling capacities are based on coil air temperature 27°C DB/ 19.5°C WB, entering water temperature 7°C, outlet water temperature 12°C.
2. Heating capacities are based on coil temperature 21°C DB, entering water temperature 60°C, air flow volume, water flow rate same as in the cooling mode.
3. The standard unit is equipped with plenum and filter net.
4. MPT - Male Pipe Thread, FPT - Female Pipe Thread.
5. LPM : Litre per minute, 1LPM = 0.06 m³/h.

HCKW CASSETTE TYPE FCU PERFORMANCE PARAMETER CHART

Model HCKW			200 CP(H)	300 CP(H)	400 CP(H)	500 CP(H)	600 CP(H)	800 CP(H)	1000 CP(H)	1200 CP(H)	1400 CP(H)	
Air Volume	High Speed(H)	m ³ /h	340	510	680	850	1020	1360	1700	2040	2380	
	Medium Speed (M)	m ³ /h	290	420	560	750	910	1100	1450	1850	2130	
	Low Speed(L)	m ³ /h	220	340	480	660	820	1050	1380	1600	1880	
Cooling Capacity	High Speed(H)	W	1900	2700	3600	4500	5500	7200	10000	11000	12600	
	Medium Speed (M)	W	1560	2300	3200	3900	5100	6400	9200	10200	11020	
	Low Speed(L)	W	1230	1850	2600	3300	4600	5900	8330	8850	10130	
Heating Capacity	High Speed(H)	W	3100	4400	5900	7500	9000	11600	16500	18200	19300	
	Medium Speed (M)	W	2720	3900	5500	6900	8250	10700	15400	17100	18100	
	Low Speed(L)	W	2400	3500	5200	6300	7100	9800	14600	16000	17300	
Water Flow		LPM	5.4	7.7	10.3	12.9	15.8	20.6	28.7	31.5	36.1	
Water Resistance		kPa	12	14	16	18	22	25	39.5	44	53	
Power Supply			220V/1PH/50Hz-60Hz									
Motor Power		W	34	46	60	75	93	128	150	188	215	
Control Ways			Normal type: terminal block; Luxury type: equipped with remote control (line control as option)									
Copper Tube of Cooling Coils		mm	Φ9.52									
Operating Pressure		MPa	1.6									
Dimension of Piping	Water Inlet	inch	ZG 3/4" (Internal Thread)									
	Water Outlet	inch	ZG 3/4" (Internal Thread)									
	Water Drainage	mm	Φ26									
Casing Dimension	Normal Type	mm	590 × 590 × 420			752 × 752 × 443		822 × 822 × 405		822 × 822 × 443		
	Luxury Type	mm	590 × 590 × 270			752 × 752 × 293		822 × 822 × 260		822 × 822 × 293		
Weight	Normal Type	kg	19		28	26		28		31		33
	Luxury Type	kg	19		20	23		25		28		30
Panel	Normal Type	mm	650 × 650 × 30			850 × 850 × 45		950 × 950 × 45				
	Luxury Type	kg	2.2			4.5		6				

Remarks:

- Above nominal air volume based on the 0Pa ESP
- Cooling capacity based on: air on 27°C DB/19.5°C WB, entering water temperature 7°C, outlet water temperature is 12°C.
- Heating capacity based on: air on 21°C DB, entering water temperature 60°C, water flow is same as the cooling mode.
- Normal cassette type FCU is not attached with water drainage pump(the last letter of the model is P), luxury type is attached with water drainage pump (the last letter of the model is H).

PERFORMANCE PARAMETER (COOLING)

Model	Entering Water Temperature °C	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition									
				24°CDB/17°CWB		25°CDB/18°CWB		26°CDB/19°CWB		27°CDB/19.5°CWB		28°CDB/21°CWB	
				SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
200	5	4	5.5	1298	1735	1342	1893	1383	2057	1451	2148	1458	2403
		6	11.3	1392	1950	1444	2137	1493	2331	1565	2435	1585	2740
		8	19.0	1448	2077	1506	2281	1560	2494	1635	2606	1662	2947
		10	28.4	1487	2162	1547	2379	1604	2604	1682	2723	1715	3084
	6	4	5.5	1243	1609	1287	1764	1329	1926	1398	2016	1408	2264
		6	11.3	1330	1806	1381	1989	1432	2181	1505	2284	1525	2585
		8	19.0	1381	1926	1439	2124	1494	2333	1571	2445	1598	2780
		10	28.4	1416	2003	1477	2215	1536	2438	1614	2554	1648	2910
	7	4	5.5	1186	1483	1233	1635	1276	1794	1346	1883	1356	2128
		6	11.3	1267	1663	1320	1843	1372	2029	1444	2135	1466	2428
		8	19.0	1314	1771	1373	1969	1428	2174	1505	2285	1535	2609
		10	28.4	1347	1846	1408	2051	1468	2268	1545	2384	1581	2734
	8	4	5.5	1131	1356	1178	1506	1223	1662	1292	1751	1306	1989
		6	11.3	1204	1520	1258	1696	1311	1879	1384	1981	1409	2268
		8	19.0	1247	1620	1307	1810	1363	2011	1440	2121	1471	2440
		10	28.4	1276	1685	1338	1888	1399	2101	1477	2216	1514	2555
	9	4	5.5	1075	1232	1124	1377	1170	1530	1238	1620	1255	1852
		6	11.3	1141	1379	1196	1550	1250	1728	1324	1829	1350	2111
		8	19.0	1180	1467	1240	1652	1299	1850	1374	1959	1408	2270
		10	28.4	1207	1525	1270	1723	1331	1930	1409	2044	1448	2377
10	4	5.5	1010	1131	1068	1250	1116	1399	1185	1488	1204	1714	
	6	11.3	1077	1238	1135	1403	1189	1578	1263	1680	1292	1952	
	8	19.0	1112	1315	1174	1495	1233	1687	1310	1796	1346	2098	
	10	28.4	1136	1367	1201	1558	1263	1761	1341	1875	1381	2198	
300	5	6	10.5	2046	2638	2116	2889	2180	3140	2285	3270	2285	3652
		8	17.5	2148	2867	2222	3140	2291	3423	2402	3576	2423	4012
		10	26.2	2211	3020	2296	3314	2370	3619	2486	3772	2518	4262
		12	36.4	2264	3129	2349	3434	2433	3761	2550	3924	2582	4437
	6	6	10.5	1957	2453	2031	2693	2095	2932	2201	3085	2211	3456
		8	17.5	2053	2660	2127	2922	2201	3194	2317	3347	2338	3728
		10	26.2	2116	2802	2201	3085	2275	3379	2391	3543	2423	4012
		12	36.4	2158	2900	2243	3205	2328	3510	2455	3685	2486	4186
	7	6	10.5	1873	2257	1947	2485	2010	2725	2116	2867	2137	3238
		8	17.5	1957	2442	2042	2703	2105	2976	2222	3129	2243	3554
		10	26.2	2021	2573	2105	2856	2180	3150	2296	3303	2328	3772
		12	36.4	2063	2671	2148	2965	2232	3270	2349	3445	2391	3924
	8	6	10.5	1788	2060	1862	2289	1926	2529	2037	2660	2053	4121
		8	17.5	1862	2235	1947	2485	2021	2758	2137	2911	2158	3325
		10	26.2	1915	2355	2000	2627	2084	2911	2201	3074	2232	3521
		12	36.4	1957	2442	2042	2725	2127	3031	2254	3194	2296	3674
	9	6	10.5	1703	1875	1777	2093	1852	2322	1957	2464	1979	2823
		8	17.5	1767	2028	1852	2267	1926	2529	2042	2682	2074	3085
		10	26.2	1820	2126	1904	2398	1989	2682	2116	2834	2148	3270
		12	36.4	1852	2202	1947	2485	2031	2780	2148	2943	2201	3412
10	6	10.5	1608	1679	1693	1897	1767	2126	1873	2267	1947	2605	
	8	17.5	1682	1820	1756	2060	1841	2311	1957	2464	1989	2856	
	10	26.2	1714	1908	1809	2169	1894	2442	2010	2594	2053	3031	
	12	36.4	1746	1973	1841	2246	1936	2540	2053	2703	2105	3150	

Remarks:

1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature

2. TH : Total Heat SH : Sensible Heat

3. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (COOLING)

PERFORMANCE PARAMETER (COOLING)

Model	Entering Water Temperature °C	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition									
				24°CDB/17°CWB		25°CDB/18°CWB		26°CDB/19°CWB		27°CDB/19.5°CWB		28°CDB/21°CWB	
				SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
400	5	8	8.3	2663	3401	2752	3717	2831	4052	2969	4230	2989	4732
		12	17.3	2831	3766	2930	4131	3029	4516	3177	4713	3217	5314
		16	29.0	2930	3973	2989	4368	3148	4782	3296	4999	3356	5649
		20	43.3	2989	4111	3108	4525	3227	4949	3375	5176	3445	5866
	6	8	8.3	2544	3155	2643	3461	2722	3786	2861	3963	2880	4466
		12	17.3	2702	3490	2811	3845	2910	4220	3059	4427	3098	5018
		16	29.0	2791	3678	2900	4072	3019	4476	3167	4693	3227	5334
		20	43.3	2851	3806	2969	4210	3088	4634	3237	4861	3306	5541
	7	8	8.3	2435	2899	2524	3204	2613	3530	2752	3707	2781	4190
		12	17.3	2574	3204	2682	3559	2781	3934	2940	4042	2979	4713
		16	29.0	2653	3382	2772	3766	2880	4161	3039	4378	3098	5009
		20	43.3	2712	3500	2831	3894	2950	4318	3098	4545	3177	5206
	8	8	8.3	2316	2652	2425	2958	2504	3263	2643	3441	2673	3924
		12	17.3	2445	2928	2554	3273	2663	3638	2811	3835	2861	4407
		16	29.0	2514	3086	2643	3461	2752	3855	2900	4062	2969	4683
		20	43.3	2564	3194	2692	3579	2811	3993	2969	4210	3039	4871
	9	8	8.3	2207	2406	2306	2692	2395	2997	2534	3185	2574	3648
		12	17.3	2316	2652	2435	2987	2544	3342	2692	3540	2742	4092
		16	29.0	2385	2800	2504	3155	2623	3540	2772	3756	2841	4358
		20	43.3	2425	2889	2554	3273	2673	3668	2831	3885	2910	4525
10	8	8.3	2089	2159	2188	2445	2287	2741	2425	2918	2465	3372	
	12	17.3	2197	2376	2306	2701	2415	3047	2564	3244	2623	3786	
	16	29.0	2247	2504	2376	2849	2494	3224	2643	3441	2712	4032	
	20	43.3	2287	2583	2415	2948	2544	3342	2702	3559	2772	4180	
500	5	8	8.9	3145	3830	3247	4172	3339	4525	3512	4717	3502	5261
		12	18.4	3369	4303	3492	4707	3594	5130	3778	5362	3798	6007
		16	30.9	3502	4586	3635	5029	3758	5483	3941	5735	3982	6460
		20	46.2	3594	4767	3727	5241	3860	5724	4043	5986	4105	6763
	6	8	8.9	3022	3548	3124	3890	3216	4233	3380	4434	3390	4959
		12	18.4	3227	3991	3339	4384	3461	4797	3635	5029	3666	5674
		16	30.9	3349	4253	3482	4686	3604	5140	3788	5382	3839	6087
		20	46.2	3431	4424	3564	4878	3696	5352	3890	5614	3941	6380
	7	8	8.9	2890	3275	2992	3608	3094	3941	3257	4142	3278	4656
		12	18.4	3084	3679	3206	4062	3318	4465	3492	4696	3533	5321
		16	30.9	3186	3910	3318	4334	3451	4777	3635	5019	3686	5724
		20	46.2	3257	4072	3400	4525	3543	4989	3727	5241	3798	5986
	8	8	8.9	2757	2993	2869	3326	2971	3658	3135	3850	3155	4364
		12	18.4	2930	3356	3053	3739	3175	4142	3349	4364	3400	4979
		16	30.9	3033	3578	3165	3991	3298	4424	3482	4666	3543	5341
		20	46.2	3104	3719	3237	4152	3380	4616	3564	4868	3635	5593
	9	8	8.9	2624	2721	2736	3044	2839	3366	3012	3568	3043	4062
		12	18.4	2787	3044	2910	3417	3033	3810	3216	4031	3257	4626
		16	30.9	2869	3235	3012	3638	3145	4072	3329	4313	3390	4979
		20	46.2	2930	3366	3084	3789	3227	4243	3410	4495	3482	5210
10	8	8.9	2491	2449	2553	2882	2716	3084	2890	3275	2920	3759	
	12	18.4	2634	2731	2767	3094	2890	3477	3073	3699	3124	4283	
	16	30.9	2716	2903	2859	3296	2992	3709	3175	3951	3247	4596	
	20	46.2	2767	3013	2920	3427	3063	3870	3247	4122	3329	4807	

Remarks:

1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature

2. TH : Total Heat SH : Sensible Heat

3. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (COOLING)

Model	Entering Water Temperature °C	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition									
				24°CDB/17°CWB		25°CDB/18°CWB		26°CDB/19°CWB		27°CDB/19.5°CWB		28°CDB/21°CWB	
				SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
600	5	10	12.0	3791	4657	3902	5085	4023	5513	4215	5762	4225	6429
		15	25.0	4033	5205	4174	5692	4315	6210	4527	6489	4567	7275
		20	42.0	4184	5513	4346	6051	4487	6608	4709	6897	4769	7782
		25	62.7	4285	5722	4446	6280	4709	6867	4830	7185	4900	8111
	6	10	12.0	3630	4319	3751	4737	3872	5165	4073	5404	4083	6061
		15	25.0	3862	4827	4003	5304	4144	5802	4356	6080	4396	6867
		20	42.0	3993	5115	4154	5633	4305	6180	4527	6479	4588	7334
		25	62.7	4083	5304	4255	5852	4416	6429	4638	6737	4709	7653
	7	10	12.0	3468	3981	3600	4389	3721	4807	3922	5055	3942	5692
		15	25.0	3680	4438	3831	4916	3973	5404	4184	5682	4235	6439
		20	42.0	3811	4707	3973	5215	4124	5752	4346	6051	4406	6887
		25	62.7	3882	4876	4053	5424	4225	5981	4446	6289	4527	7185
	8	10	12.0	3307	3642	3438	4040	3569	4458	3771	4697	3791	5324
		15	25.0	3509	4060	3660	4528	3801	5006	4013	5274	4073	6031
		20	42.0	3620	4299	3781	4807	3942	5324	4154	5623	4235	6449
		25	62.7	3690	4458	3862	4986	4023	5543	4255	5842	4346	6717
	9	10	12.0	3146	3314	3287	3702	3418	4100	3620	4349	3650	4956
		15	25.0	3327	3682	3479	4130	3630	4608	3842	4876	3902	5603
		20	42.0	3428	3891	3589	4389	3751	4896	3973	5185	4063	5991
		25	62.7	3489	4030	3670	4548	3842	5085	4063	5394	4154	6250
10	10	12.0	2974	3194	3126	3354	3267	3752	3458	3991	3509	4588	
	15	25.0	3146	3304	3307	3742	3458	4200	3670	4478	3741	5185	
	20	42.0	3237	3493	3408	3961	3569	4468	3791	4757	3882	5543	
	25	62.7	3297	3612	3468	4120	3650	4637	3872	4936	3973	5772	
800	5	15	13.6	4881	6107	5039	6656	5176	7224	5431	7534	5431	8392
		20	22.9	5127	6646	5294	7264	5461	7893	5726	8252	5746	9240
		25	34.2	5294	7015	5481	7683	5647	8372	5932	8751	5981	9819
		30	47.5	5412	7284	5608	7983	5795	8711	6080	9100	6148	10248
	6	15	13.6	4685	5658	4842	6197	4989	6755	5245	7075	5441	7923
		20	22.9	4901	6157	5078	6765	5245	7394	5520	7743	5549	8701
		25	34.2	5058	6506	5255	7155	5431	7833	5706	8202	5756	9260
		30	47.5	5176	6745	5372	7444	5559	8152	5844	8542	5922	9659
	7	15	13.6	4479	5219	4636	5748	4793	6296	5048	6616	5068	7444
		20	22.9	4685	5678	4862	6266	5039	6885	5304	7234	5343	8182
		25	34.2	4832	5987	5019	6626	5206	7294	5481	7663	5539	8691
		30	47.5	4931	6217	5137	6885	5333	7594	5608	7973	5697	9080
	8	15	13.6	4282	4780	4439	5299	4597	5837	4862	6147	4891	6955
		20	22.9	4469	5189	4646	5768	4822	6376	5097	6725	5147	7653
		25	34.2	4695	5468	4793	6097	4980	6745	5264	7115	5333	8132
		30	47.5	4685	5678	4891	6336	5088	7025	5382	7414	5471	8482
	9	15	13.6	4076	4341	4243	4840	4410	5368	4665	5688	4705	6476
		20	22.9	4243	4700	4430	5279	4616	5867	4891	6207	4950	7115
		25	34.2	4361	4959	4567	5568	4754	6207	5039	6576	5117	7564
		30	47.5	4439	5149	4655	5787	4862	6456	5147	6845	5245	7893
10	15	13.6	3850	3912	4047	4400	4214	4909	4479	5229	4528	5997	
	20	22.9	4027	4221	4223	4780	4400	5358	4675	5698	4744	6586	
	25	34.2	4125	4450	4331	5049	4538	5668	4813	6027	4901	6995	
	30	47.5	4204	4610	4420	5239	4626	5897	4911	6276	5019	7294	

Remarks:

1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature

2. TH : Total Heat SH : Sensible Heat

3. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (COOLING)

PERFORMANCE PARAMETER (COOLING)

Model	Entering Water Temperature °C	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition									
				24°CDB/17°CWB		25°CDB/18°CWB		26°CDB/19°CWB		27°CDB/19.5°CWB		28°CDB/21°CWB	
				SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
1000	5	20	10.9	6324	8083	6533	8811	6722	9578	7060	9993	7070	11155
		25	16.3	6553	8578	6781	9386	6990	10215	7338	10670	7368	11963
		30	22.7	6722	8962	6960	9811	7189	10690	7537	11165	7607	12539
		35	29.9	6851	9245	7099	10124	7338	11043	7696	11539	7776	12994
	6	20	10.9	6065	7487	6274	8214	6463	8962	6801	9386	6831	10528
		25	16.3	6274	7952	6503	8750	6712	9558	7060	10013	7119	11276
		30	22.7	6433	8295	6672	9134	6901	10003	7259	10478	7328	11832
		35	29.9	6543	8558	6801	9437	7040	10346	7398	10841	7487	12256
	7	20	10.9	5797	6901	6016	7608	6215	8346	6553	8760	6582	9892
		25	16.3	5996	7325	6224	8103	6443	8901	6791	9245	6851	10589
		30	22.7	6135	7638	6374	8467	6612	9306	6960	9791	7050	11114
		35	29.9	6244	7881	6503	8730	6742	9629	7109	10114	7199	11518
	8	20	10.9	5528	6315	5757	7012	5966	7729	6294	8154	6344	9255
		25	16.3	5707	6699	5946	7457	6175	8245	6523	8689	6592	9902
		30	22.7	5837	6982	6085	7790	6334	8619	6682	9083	6781	10387
		35	29.9	5936	7204	6195	8043	6453	8912	6811	9397	6920	10761
	9	20	10.9	5260	5739	5489	6416	5707	7123	6045	7537	6105	8608
		25	16.3	5419	6072	5668	6820	5896	7578	6244	8033	6334	9215
		30	22.7	5538	6335	5797	7113	6045	7931	6403	8396	6503	9659
		35	29.9	5628	6527	5896	7345	6155	8194	6513	8679	6632	10013
10	20	10.9	4991	5153	5230	5820	5807	6507	5787	6921	5857	7972	
	25	16.3	5131	5456	5389	6173	5628	6931	5976	7366	6075	8518	
	30	22.7	5240	5678	5509	6436	5757	7244	6105	7709	6224	8942	
	35	29.9	5320	5850	5598	6648	5857	7477	6215	7962	6354	9255	
1200	5	25	18.2	7769	9882	8022	10732	8264	11735	8667	12251	8698	13689
		30	25.3	7981	10358	8254	11319	8506	12332	8940	12879	8990	14802
		35	33.4	8153	10732	8435	11745	8708	12798	9142	13375	9222	15015
		40	42.4	8284	11016	8587	12069	8869	13162	9303	13749	9394	15471
	6	25	18.2	7436	9163	6791	10054	7941	10975	8355	11502	8395	12909
		30	25.3	7638	9598	7921	10560	8183	11532	8597	12089	8667	13608
		35	33.4	7789	9942	8092	10935	8365	11978	8788	12545	8879	14164
		40	42.4	7921	10206	8223	11249	8506	12322	8940	12909	9051	14590
	7	25	18.2	7113	8444	7376	9325	7638	10226	8042	10732	8092	12119
		30	25.3	7285	8849	7578	9770	7850	10742	8264	11289	8355	12777
		35	33.4	7436	9153	7729	10135	8022	11147	8445	11724	8546	13304
		40	42.4	7547	9406	7850	10408	8153	11471	8597	12048	8708	13719
	8	25	18.2	6770	6814	7053	8576	7315	9467	7719	9993	7800	11340
		30	25.3	6942	8090	7235	9001	7517	9953	7941	10489	8032	11957
		35	33.4	7073	8363	7376	9325	7678	10317	8102	10884	8223	12332
		40	42.4	7174	8596	7497	9578	7789	10621	8233	11208	8365	12818
	9	25	18.2	6437	7016	6730	7847	7002	8728	7416	9224	7406	10550
		30	25.3	6589	7340	6891	8221	7184	9153	7608	9699	7709	11127
		35	33.4	6710	7583	7023	8525	7325	9497	7759	10054	7880	11573
		40	42.4	6801	7786	7134	8748	7436	9760	7870	10347	8022	11927
10	25	18.2	6104	6298	6397	7118	6680	7978	7093	8474	7194	9770	
	30	25.3	6236	6591	6548	7462	6851	8373	7275	8900	7396	10297	
	35	33.4	6347	6814	6669	7715	6982	8616	7416	9224	7547	10712	
	40	42.4	6427	6976	6760	7928	7083	8920	7517	9497	7678	11026	

Remarks:

1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature

2. TH : Total Heat SH : Sensible Heat

3. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (COOLING)

Model	Entering Water Temperature °C	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition									
				24°CDB/17°CWB		25°CDB/18°CWB		26°CDB/19°CWB		27°CDB/19.5°CWB		28°CDB/21°CWB	
				SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
1400	5	30	27.3	8909	11273	9225	12308	9523	13393	9996	13991	10079	15685
		35	36.0	9117	11695	9449	12796	9764	13948	10245	14576	10370	16362
		40	45.8	9283	12047	9631	13190	9963	14381	10444	15030	10593	16898
		45	56.6	9416	12324	9781	13495	10129	14729	10618	15393	10776	17346
	6	30	27.3	8511	10458	8835	11477	9142	12549	9615	13137	9722	14782
		35	36.0	8702	10857	9042	11935	9374	13050	9855	13671	9980	15436
		40	45.8	8860	11164	9216	12289	9548	13469	10038	14103	10195	15948
		45	56.6	8984	11424	9349	12592	9706	13800	10195	14463	10370	16360
	7	30	27.3	8121	9645	8453	10643	8768	11692	9233	12287	9349	13899
		35	36.0	8296	10009	8644	11058	8976	12168	9457	12779	9598	14492
		40	45.8	8437	10292	8793	11516	9150	12538	9631	13186	9797	14987
		45	56.6	8553	10536	8926	11662	9283	12850	9781	13506	9955	15382
	8	30	27.3	7723	8833	8063	9808	8387	10838	8860	11421	8984	13002
		35	36.0	7889	9157	8238	10189	8578	11275	9059	11892	9216	13566
		40	45.8	8014	9419	8379	10501	8735	11618	9225	12253	9399	14007
		45	56.6	8121	9641	8495	10744	8860	11912	9357	12566	9557	14380
	9	30	27.3	7325	8020	7673	8984	8005	9976	8478	10571	8627	12105
		35	36.0	7474	8314	7831	9329	8179	10383	8669	10988	8835	12626
		40	45.8	7590	8557	7964	9605	8329	10696	8818	11328	9009	13039
		45	56.6	7682	8744	8072	9824	8445	10957	8934	11615	9142	13390
10	30	27.3	6927	7219	7284	8151	7624	9132	8097	9709	8262	11201	
	35	36.0	7060	7486	7433	8466	7790	9494	8271	10094	8453	11688	
	40	45.8	7167	7688	7549	8713	7914	9783	8403	10412	8611	12075	
	45	56.6	7250	7864	7640	8916	8022	10021	8520	10666	8744	12382	

Remarks:

- 1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature
- 2. TH : Total Heat SH : Sensible Heat

3. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (HEATING)

Model	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition 18°CDB							Air Inlet Condition 20°CDB						
			Water Inlet Temperature °C							Water Inlet Temperature °C						
			40	45	50	55	60	70	80	40	45	50	55	60	70	80
200	4	5.5	1902	2334	2766	3199	3631	4496	5360	1729	2161	2594	3026	3458	4323	5187
	6	11.3	2041	2505	2969	3433	3897	4824	5752	1856	2319	2783	3247	3711	4639	5567
	8	19.0	2116	2597	3078	3559	4040	5002	5965	1924	2405	2886	3367	3848	4810	5772
	10	28.4	2164	2655	3147	3639	4131	5114	6098	1967	2459	2951	3442	3934	4918	5901
300	6	10.5	2631	3229	3826	4424	5022	6218	7414	2393	2991	3590	4188	4786	5983	7180
	8	17.5	2765	3393	4021	4649	5278	6534	7791	2511	3139	3767	4394	5022	6278	7533
	10	26.2	2847	3494	4141	4788	5435	6729	8023	2590	3237	3885	4532	5180	6474	7769
	12	36.4	2904	3563	4223	4883	5543	6863	8183	2639	3299	3958	4618	5278	6597	7917
400	8	8.3	3581	4395	5209	6023	6837	8464	10092	3255	4068	4882	5696	6509	8137	9764
	12	17.3	3794	4657	5519	6381	7243	8968	10693	3448	4310	5172	6034	6896	8620	10344
	16	29.0	3903	4790	5678	6565	7452	9226	11000	3547	4434	5321	6208	7095	8868	10642
	20	43.3	3971	4873	5776	6678	7581	9386	11191	3607	4509	5410	6312	7214	9017	10821
500	8	8.9	4149	5092	6034	6977	7920	9806	11692	3771	4714	5657	6600	7543	9428	11314
	12	18.4	4453	5466	6478	7490	8502	10526	12551	4047	5059	6070	7082	8094	10117	12141
	16	30.9	4619	5669	6719	7769	8818	10918	13018	4195	5244	6292	7341	8390	10487	12585
	20	46.2	4721	5794	6866	7939	9012	11158	13304	4292	5365	6438	7511	8584	10730	12875
600	10	12.0	4914	6031	7148	8264	9381	11615	13849	4468	5585	6702	7819	8936	11170	13404
	15	25.0	5243	6434	7626	8817	10009	12392	14775	4767	5958	7150	8341	9533	11916	14300
	20	42.0	5418	6649	7880	9111	10343	12805	15268	4923	6154	7385	8616	9847	12308	14770
	25	62.7	5524	6779	8034	9290	10545	13056	15567	5020	6274	7529	8784	10039	12549	15059
800	15	13.6	6874	8436	9998	11560	13122	16247	19371	6252	7815	9377	10940	12503	15629	18755
	20	22.9	7232	8876	10519	12163	13807	17094	20381	6578	8222	9866	11511	13155	16444	19733
	25	34.2	7465	9162	10859	12556	14252	17646	21039	6784	8480	10176	11872	13568	16960	20352
	30	47.5	7625	9358	11091	12823	14556	18022	21488	6931	8663	10396	12128	13861	17326	20792
1000	20	10.9	8567	10514	12461	14408	16355	20249	24143	7787	9734	11680	13627	15574	19467	23361
	25	16.3	8885	10905	12924	14944	16963	21002	25041	8076	10095	12114	14133	16152	20190	24228
	30	22.7	9103	11172	13241	15310	17379	21517	25654	8279	10348	12418	14488	16557	20697	24836
	35	29.9	9268	11374	13480	15587	17693	21906	26118	8426	10532	12639	14745	16852	21064	25277
1200	25	18.2	10302	12643	14984	17325	19667	24349	29032	9362	11703	14043	16384	18724	23406	28087
	30	25.3	10588	12995	15401	17807	20214	25027	29840	9626	12032	14438	16845	19251	24064	28877
	35	33.4	10806	13262	15718	18173	20629	25541	30453	9823	12279	14735	17191	19646	24558	29470
	40	42.4	10970	13464	15957	18450	20943	25930	30916	9970	12463	14955	17448	19940	24925	29910
1400	30	27.3	11251	13808	16364	18921	21478	26592	31706	10228	12785	15342	17899	20456	25570	30683
	35	36.0	11496	14109	16721	19334	21947	27172	32397	10451	13063	15676	18289	20902	26127	31352
	40	45.8	11685	14341	16997	19653	22308	27620	32931	10623	13279	15935	18590	21246	26558	31869
	45	56.6	11836	14526	17216	19906	22596	27976	33356	10760	13450	16140	18830	21520	26900	32280

Remarks:

1. DB : Dry Bulb Temperature WB : Wet Bulb Temperature
2. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

PERFORMANCE PARAMETER (HEATING)

Model	Water Flowrate LPM	Water Pressure Drop kPa	Air Inlet Condition 21°CDB							Air Inlet Condition 22°CDB						
			Water Inlet Temperature °C							Water Inlet Temperature °C						
			40	45	50	55	60	70	80	40	45	50	55	60	70	80
200	4	5.5	1583	2000	2416	2833	3249	4082	4916	1500	1916	2333	2749	3166	3999	4832
	6	11.3	1699	2146	2593	3040	3487	4381	5275	1609	2056	2504	2951	3398	4292	5186
	8	19.0	1761	2225	2689	3152	3616	4543	5470	1669	2132	2596	3059	3523	4450	5377
	10	28.4	1801	2275	2749	3223	3697	4644	5592	1706	2180	2654	3128	3602	4550	5498
300	6	10.5	2274	2873	3471	4070	4668	5865	7063	2156	2754	3353	3952	4551	5748	6946
	8	17.5	2389	3018	3647	4276	4904	6162	7419	2263	2891	3520	4148	4777	6034	7291
	10	26.2	2461	3109	3756	4404	5052	6347	7642	2332	2980	3628	4276	4924	6220	7516
	12	36.4	2509	3169	3830	4490	5150	6471	7791	2379	3040	3701	4361	5022	6344	7666
400	8	8.3	3094	3908	4722	5536	6350	7979	9607	2928	3742	4555	5368	6182	7809	9435
	12	17.3	3277	4140	5002	5865	6727	8452	10177	3102	3964	4825	5687	6549	8272	9996
	16	29.0	3369	4256	5143	6029	6916	8689	10463	3191	4078	4964	5851	6737	8510	10283
	20	43.3	3427	4329	5231	6133	7035	8839	10643	3248	4150	5052	5954	6856	8661	10465
500	8	8.9	3580	4522	5464	6406	7349	9233	11117	3394	4337	5279	6222	7165	9050	10936
	12	18.4	3844	4855	5867	6878	7890	9913	11936	3645	4658	5670	6683	7696	9721	11746
	16	30.9	3988	5037	6087	7136	8186	10284	12383	3776	4825	5874	6922	7971	10069	12167
	20	46.2	4077	5150	6223	7296	8369	10515	12661	3863	4936	6009	7082	8155	10301	12447
600	10	12.0	4245	5362	6479	7596	8713	10948	13182	4027	5145	6264	7382	8501	10738	12975
	15	25.0	4526	5717	6908	8099	9290	11672	14054	4286	5476	6666	7857	9047	11428	13809
	20	42.0	4679	5910	7141	8373	9604	12066	14529	4410	5635	6860	8085	9310	11761	14211
	25	62.7	4777	6035	7292	8549	9806	12321	14835	4506	5758	7009	8261	9513	12016	14520
800	15	13.6	5938	7500	9063	10626	12188	15313	18439	5624	7186	8749	10311	11873	14998	18122
	20	22.9	6250	7895	9540	11184	12829	16119	19408	5917	7561	9205	10849	12492	15780	19067
	25	34.2	6446	8142	9838	11535	13231	16624	20016	6108	7804	9501	11198	12894	16288	19681
	30	47.5	6584	8316	10049	11781	13514	16979	20444	6242	7975	9709	11443	13177	16644	20112
1000	20	10.9	7400	9347	11294	13241	15189	19083	22978	7007	8954	10900	12847	14793	18686	22579
	25	16.3	7671	9690	11709	13728	15746	19784	23821	7267	9285	11304	13322	15341	19378	23415
	30	22.7	7864	9933	12003	14072	16142	20281	24420	7449	9518	11588	13657	15726	19864	24003
	35	29.9	8002	10108	12214	14320	16426	20637	24849	7584	9690	11797	13903	16010	20223	24436
1200	25	18.2	8895	11236	13577	15918	18258	22940	27622	8428	10769	13110	15451	17792	22474	27157
	30	25.3	9147	11554	13961	16368	18775	23589	28403	8663	11070	13476	15882	18289	23102	27914
	35	33.4	9329	11785	14240	16695	19150	24060	28971	8841	11296	13752	16208	18664	23575	28487
	40	42.4	9473	11965	14458	16951	19444	24429	29415	8975	11468	13961	16454	18947	23934	28920
1400	30	27.3	9716	12273	14830	17387	19944	25058	30172	9205	11762	14319	16876	19433	24547	29661
	35	36.0	9928	12541	15154	17766	20379	25604	30830	9406	12018	14631	17244	19856	25082	30307
	40	45.8	10092	12748	15403	18059	20715	26026	31338	9561	12216	14872	17528	20184	25495	30807
	45	56.6	10222	12912	15602	18292	20982	26362	31742	9684	12374	15064	17754	20444	25824	31204

Remarks:

1. DB : Dry Bulb Temperature.
2. The above technical data is based on the standard unit and high air volume & high static pressure unit. For other fan speeds or air volume units, its cooling capacity is the one that above data multiply correction factor F2 or F3 (Figure 1).

COIL PERFORMANCE

Application:

The cooling and heating capacity of various air volumes can be calculated from the performance characteristics chart (cooling and heating amodels) if the air on coil temperature, entering water temperature and water flow rate is maintained.

Examples,

From page 9, HCR 400 performance characteristics chart (cooling capacity), on coil temperature 27°C DB/19.5°C WB, entering water temperature 7°C, water flow rate 12LPM; sensible cooling capacity Qs1 and total cooling capacity Qt1 are:

$Q_{s1} = 2935 \text{ W}$ $Q_{t1} = 4116 \text{ W}$

From Page HCR 400 performance characteristics chart (heating capacity), on coil temperature 18 °C DB, water inlet temperature 50°C, water flow rate 12 LPM; heating capacity is :

$Q_{h1} = 5265 \text{ W}$

Explanations: From page 3, specifications chart (standard static)The HCR-400 air volume is 680m³/h and 540m³/h in high and medium speeds respectively.

The air volume ratio is:

$X = 540/680 * 100\% = 79\%$

From Figure 1,air volume factor (heating capacity)F1,air volume factor (sensible cooling)F2,air volume factor (total cooling) F3

$F1 = 0.87$; $F2 = 0.89$; $F3 = 0.92$

For medium fan speed, the total cooling capacity Qt2, sensible cooling capacity Qs2 and heating capacity Qh2 are:

$Q_{t2} = F3 \cdot Q_{t1} = 3719 \text{ W}$

$Q_{s2} = F2 \cdot Q_{s1} = 2617 \text{ W}$

$Q_{h2} = F1 \cdot Q_{h1} = 4802 \text{ W}$

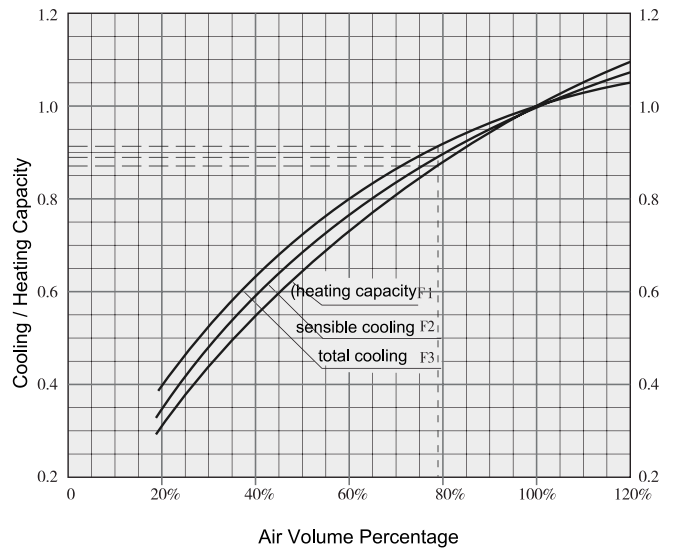


Figure 1: Different Air Flow Capacity Correction

AIR VOLUME AND AIR PRESSURE FEATURES

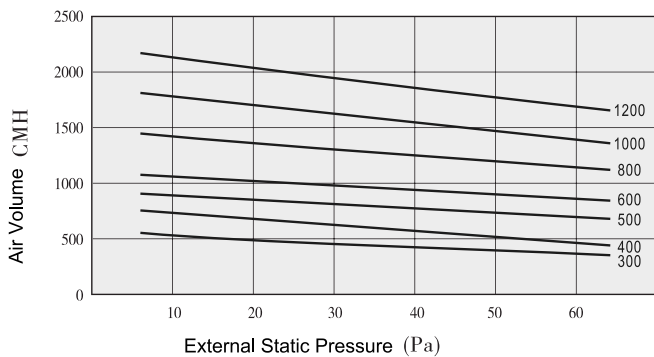


Figure2 Standard FCU External Static Pressure and Air Volume

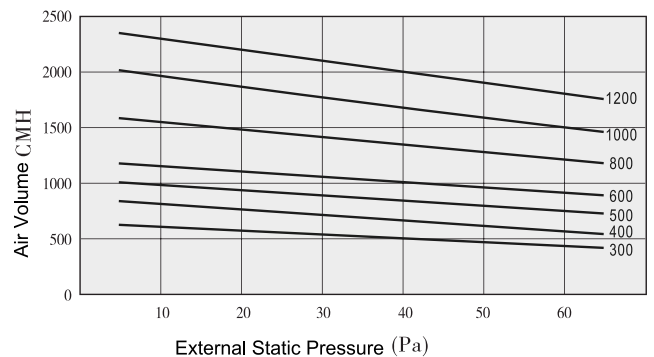


Figure3 High Static Pressure FCU External Static Pressure and Air Volume

Note:

Figure2 and Figure3 both refer to high speed performance on the condition of standard dry air without air filter and air return grill installed.

GUIDANCE OF MODEL SELECTION

To select the model in cooling mode, it is advised to meet the designed sensible capacity. Normally, the unit has sufficient potential capacity to suit the design requirement. The below example:

FOR HIGH SPEED FCU SELECTION (COOLING MODE)

Normally, FCU model is selected based on the fan high speed performance so that the optimum model unit can be chosen.

1. Condition Requirement

Known : Room sensible cooling 4130W

Room total cooling 5760W

Air inlet temperature 27°C DB, 19.5°C WB

Water entering temperature 7°C

Air Volume 1020 m³/h.

2. Model Selection

According to the cooling capacity performance on Page 10, during air inlet temperature 27°C DB, 19.5°C WB and entering water temperature 7°C, the unit capacity selected must be equal or more than the expecting value. Thus the unit sensible cooling is 4346 W while the total cooling is 6051W; and from the first line on the left, the model selected is 600. The new flow rate is 20LPM, water pressure drop is 42kPa. Different cooling capacity on different fan speed can be calculated by obtaining the F2 and F3 value from Figure 1.

FOR MEDIUM SPEED FCU SELECTION(COOLING MODE)

Normally, the FCU is operating under medium or low speed. If the unit is selected based on medium speed under average capacity, the unit can be operated in maximum capacity with high fan speed for higher capacity

1. Condition Requirement

Known: Average design room sensible cooling 3070 W

Average design room total cooling 3980W

Entering water temperature 7°C

Average design air volume 620m³/h

2. Select Model

From the specification chart, the medium fan speed is 670m/h, which is close to the needed value, and the model selected is 500.

3. From Figure 1, air volume factor F² and F³ was known

Sensible cooling air volume factor F²= 0.89

Total cooling air volume factor F³= 0.92

4. Correction sensible and total

Sensible correction cooling capacity = $3070/0.89 = 3449W$

Total correction cooling capacity = $3980/0.92 = 4326W$

5. Select confirm, water flow rate and pressure drop

Model 27°C DB / 19.5°C WB and 7°C water inlet temperature, sensible and total capacity of the selected unit in the performance chart must be equal or larger than the correction value. From the chart, the selected unit sensible capacity is 3492W and the total capacity is 4696W, and the model is 500 with water flow rate 12LPM and pressure drop 18.4kPa.

HEATING MODEL SELECTION

Normally, the model selected based on cooling capacity can provide sufficient heating capacity to meet the requirement. Heating capacity can be identified with providing the same water flow rate as cooling mode, and the hot water inlet temperature can be determined according to the required heating capacity.

1. Condition requirement

Known: Model selected (based on cooling) mode 600

Water flow rate 15LPM

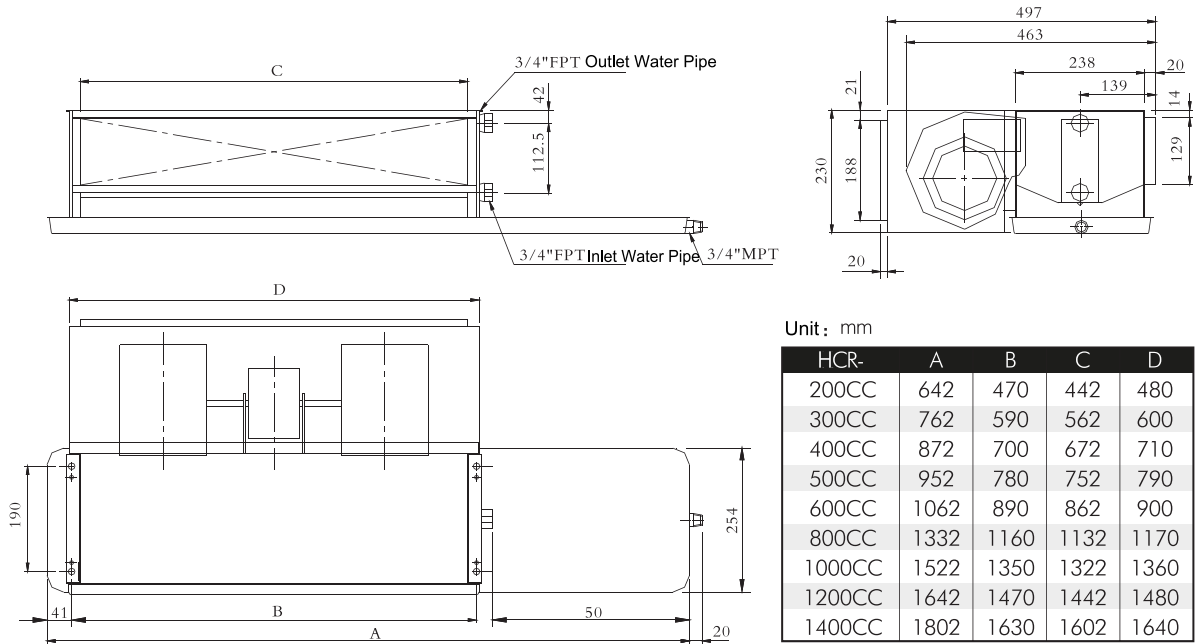
Room heating capacity 9020W

Air inlet temperature 21°C DB

2. Water inlet temperature

From the heating performance characteristics chart, when the unit is operating under high fan speed condition, the model 600 (under 15LPM) can provide a 9290W heating capacity at 60°C water inlet temperature.

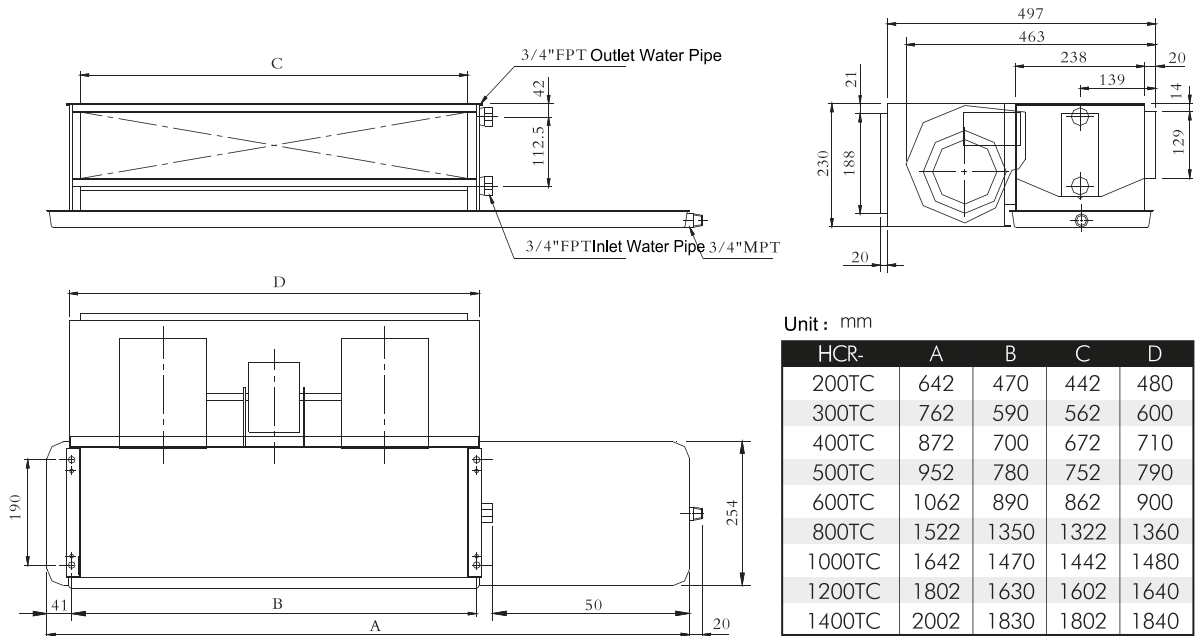
HCR-HORIZONTAL CONCEALED MODEL (3-ROW COILS)



Notes:

1. Piping connection is based on facing the air discharge, the figure above is the right side piping connection.
2. Wiring connection is in the same side as the piping connection.
3. Standard return air box faced bottom, but can be altered if required to.
4. No air filter is provided, removable air filter is an optional item (Installer or owner has to mention first)
5. Extended drain pan, the extended part's length is 300mm.

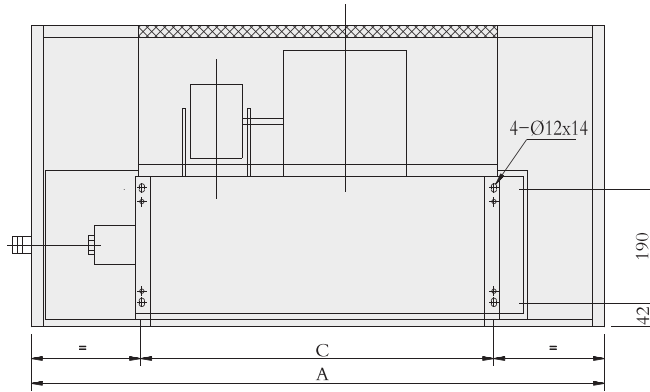
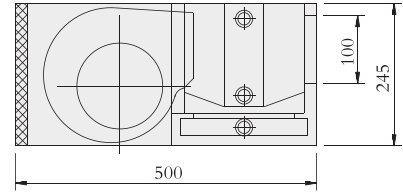
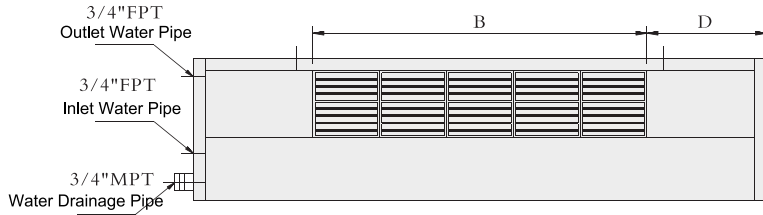
HCR-HORIZONTAL CONCEALED MODEL(2-ROW COILS)



Notes:

1. Piping connection is based on facing the air discharge, the figure above is the right side piping connection.
2. Wiring connection is in the same side as the piping connection.
3. Standard return air box faced bottom, but can be altered if required to.
4. No air filter is provided, removable air filter is an optional item (Installer or owner has to mention first)
5. Extended drain pan, the extended part's length is 300mm.

HC- HORIZONTAL EXPOSED MODEL

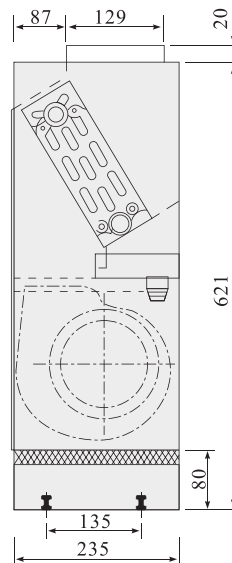
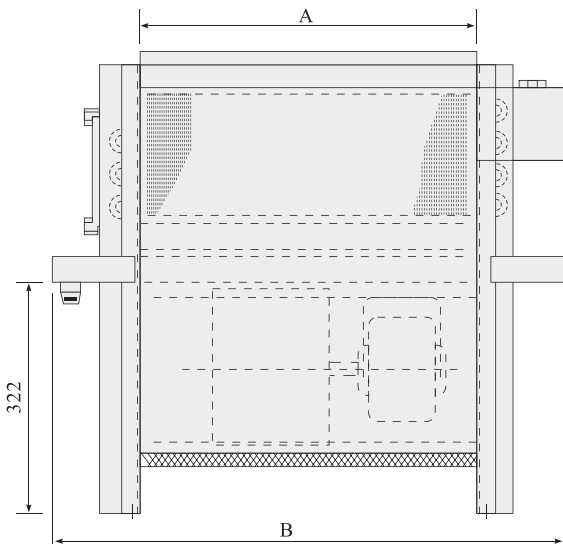


Unit : mm

HC-CC	A	B	C
200	830	400	470
300	940	600	590
400	1060	700	700
500	1100	800	780
600	1300	900	890
800	1490	1100	1160
1000	1640	1300	1350
1200	1800	1400	1470
1400	2000	1600	1630

* Left Piping Connection

HFR - VERTICAL CONCEALED MODEL

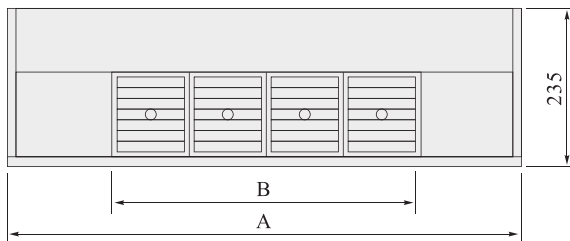
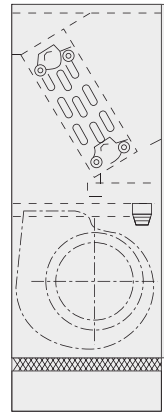
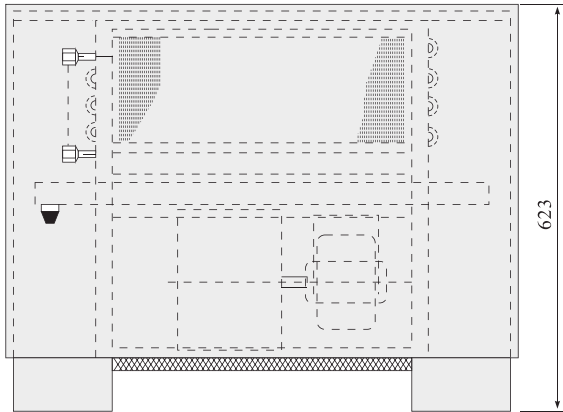


Unit : mm

HFR-CC	A	B
200CC	450	690
300CC	570	810
400CC	680	920
500CC	760	1000
600CC	870	1110
800CC	1140	1380
1000CC	1330	1570
1200CC	1450	1690

* Left Piping Connection

HF - VERTICAL EXPOSED MODEL

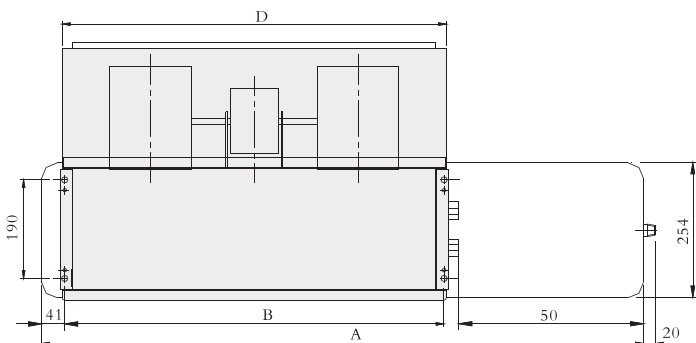
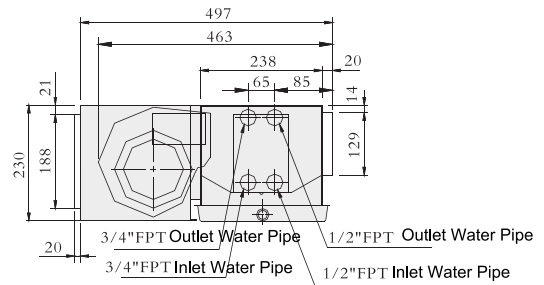
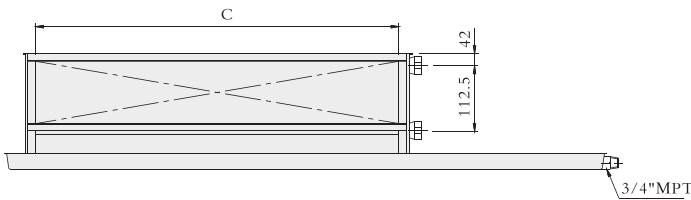


Unit : mm

HF-CC	A	B
200CC	880	400
300CC	1000	600
400CC	1110	700
500CC	1190	800
600CC	1300	900
800CC	1570	1100
1000CC	1760	1300
1200CC	1880	1400

* Left Piping Connection

HCR-4 PIPES SYSTEM FCU MODEL



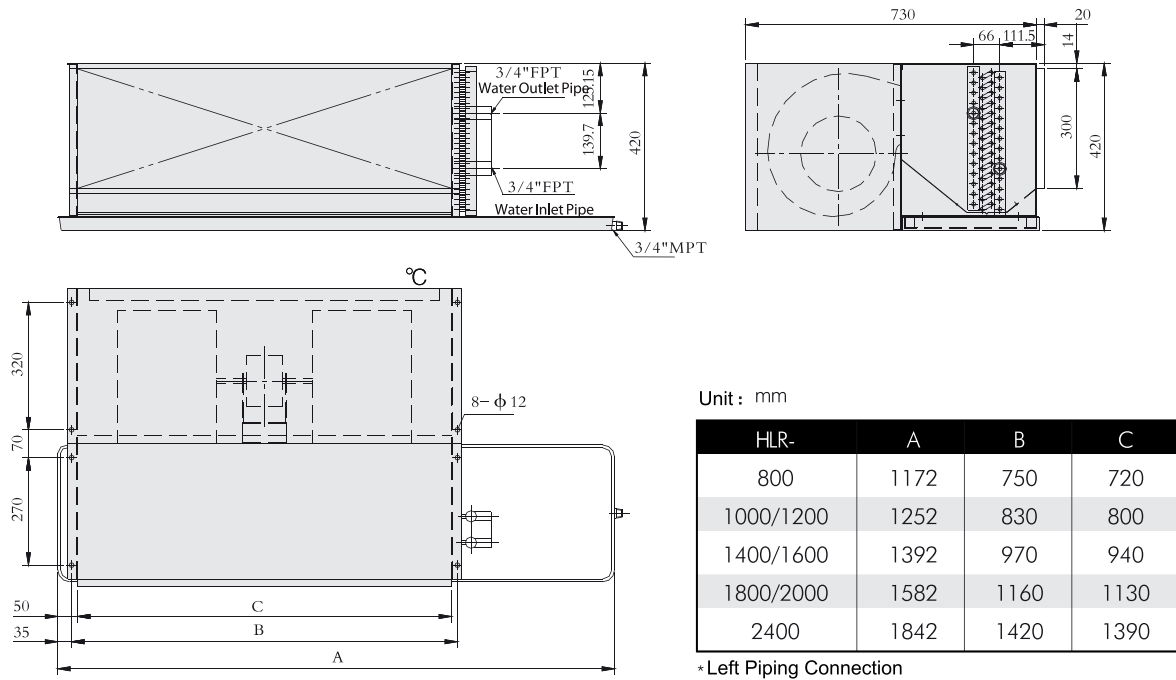
Unit : mm

HCR-	A	B	C	D
200HC	642	470	442	480
300HC	762	590	562	600
400HC	872	700	672	710
500HC	952	780	752	790
600HC	1062	890	862	900
800HC	1332	1160	1132	1170
1000HC	1522	1350	1322	1360
1200HC	1642	1470	1442	1480

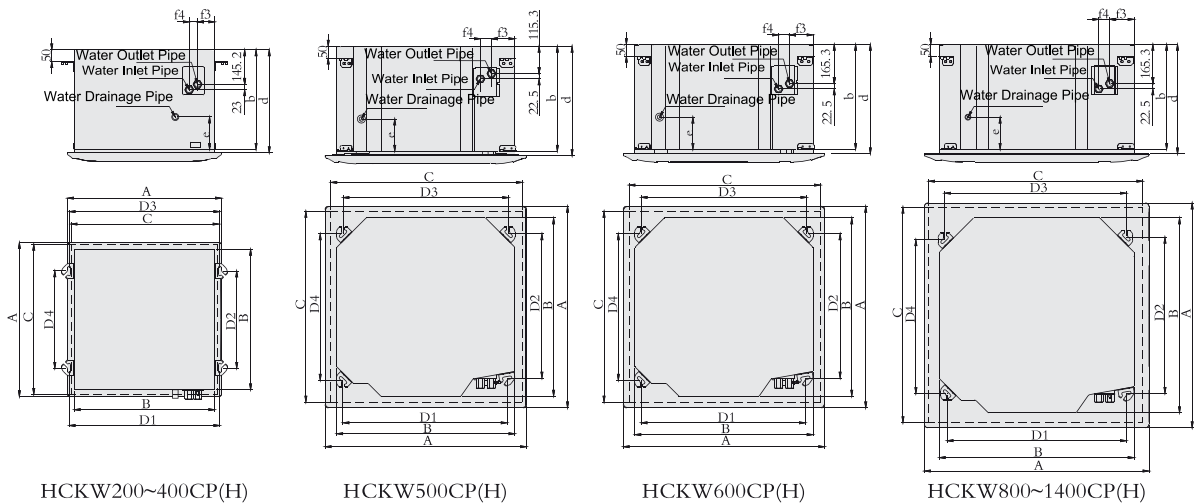
Notes:

1. Piping connection is based on facing the air discharge, the figure above is the right side piping connection.
2. Wiring connection is in the same side as the piping connection.
3. Standard return air box faced bottom, but can be altered if required to.
4. No air filter is provided, removable air filter is an optional item (Installer or owner has to mention first)
5. Extended drain pan, the extended part's length is 300mm.

HF - VERTICAL EXPOSED MODEL



HCR-4 PIPES SYSTEM FCU MODEL



Model	Mark	Unit	HCKW 200~400CP	HCKW500CP HCKW600CP	HCKW800CP	HCKW 1000~1400CP	HCKW 200~400CH	HCKW500CH HCKW600CH	HCKW800CH	HCKW 1000~1400CH
Unit Thickness	b	(mm)	420	443	405	443	270	293	260	293
Min.Ceiling Space	d	(mm)	440 ~ 445	463 ~ 468	423 ~ 428	463 ~ 468	290 ~ 295	313 ~ 318	278 ~ 283	313 ~ 318
Distance between Water Drainage outlet and Ceiling	e	(mm)	136	136	136	136	230	182	202	182
Panel Thickness	A	(mm)	650	850	950	950	650	850	950	950
Unit Width	B	(mm)	590	752	822	822	590	752	822	822
Ceiling Opening Dimension	C	(mm)	610 ~ 630	780 ~ 810	875 ~ 910	875 ~ 910	610 ~ 630	780 ~ 810	875 ~ 910	875 ~ 910
Hook Space1	D1	(mm)	635	693	757	757	635	693	757	757
Hook Space2	D2	(mm)	410	608	658	658	410	608	658	658
Hook Space3	D3	(mm)	635	699	767	767	635	699	767	767
Hook Space4	D4	(mm)	410	617	648	648	410	617	648	648
Relative Position between Pipes1	f3	(mm)	72.3	99	102.5	102.5	72.3	99	102.5	102.5
Relative Position between Pipes2	f4	(mm)	35	46.4	46.4	46.4	35	46.4	46.4	46.4

Remarks: Normal type without water drainage pump(the last letter of the model is P),luxury type with water drainage pump(the last letter of the model is H).

UNIT INSTALLATION AND MAINTENANCE

UNIT INSTALLATION Make sure the unit is under good condition, any moving / turning components would not be touching each other. During installation, ensure no foreign objects can be inserted into the blower wheel, fan motor and heat exchange coil. Another point to take into consideration is that one side of the drain pipe must be lowered at least 3-5 mm than the other side so that condenser water draining out will be smooth.

DUCTED CONNECTION return air grill must be installed with an air filter to prevent dirt or dust from blocking the fin coil so as not to impair the heat transfer effect. (See the detail in the duct diagram)

PIPING INSTALLATION water flow orientation of the unit where the lower positioned pipe is for inlet while the upper positioned pipe is for outlet. All pipes are being threaded for firm connection and the turning torque during the pipe connection must be less than 2.5 kgm in order to prevent the pipe from being dented on the inside. All pipes must be fully insulated. Drain pipe must be maintained in some slide angle and free from being bent or dented to achieve smooth flowing. (See detail in water piping diagram).

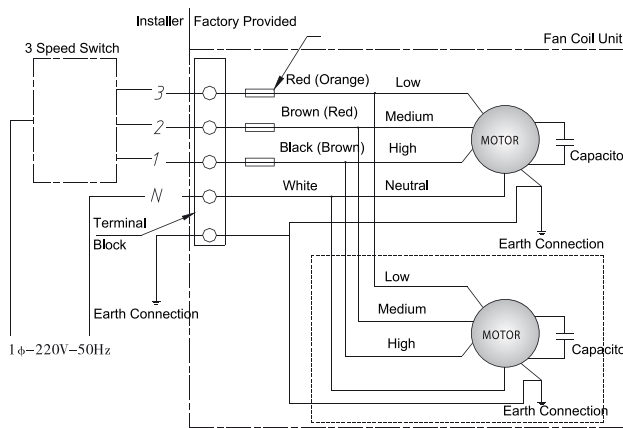
ELECTRICAL WIRING Unit must be grounded properly. All external wire must come with a terminal lug, and is screw tightened together to the terminal block provided in the unit. Study the indicator sticker and wiring color to connect correct wire for high, medium and low speed to the 3 fan speeds switch.

TEST RUN After the installation is completed, all the dirt and obstacle must be removed from the drain pan, blower casing and coil. Check the water pipe and wiring installation to make sure there is no mistake before operating the unit. Usually, it is advisable to start operating the unit from high to low speed.

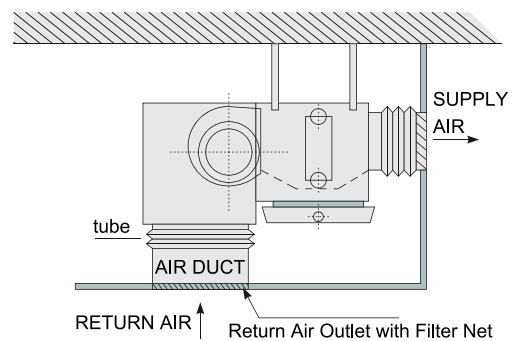
UNIT OPERATION To prevent air lock in the water system, air must be released thru the airvent. In summer, temperature for the chilled water must not be less than 5°C while the hot water not more than 65°C. The water in the system must be clean and soft.

MAINTENANCE Regular cleaning of the coil is required to maintain the efficiency of the heat transfer. Also the same must be done to the air filter for smooth and clean air flow. Make sure the water in the copper tube is full with no air inside to prevent corrosion from occurring. Antifreeze protection must also be applied during winter season to prevent pipe from cracking.

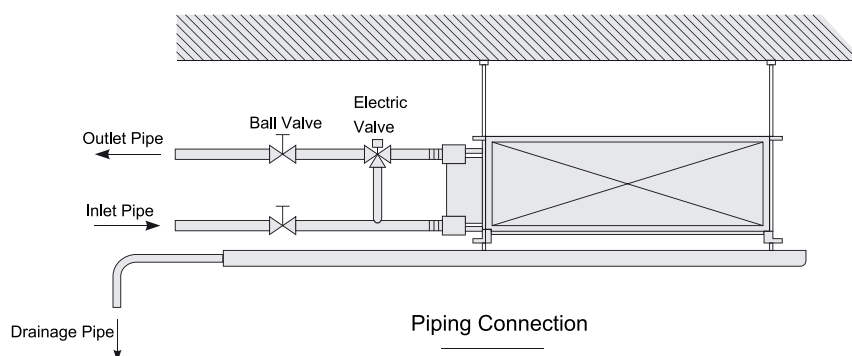
UNIT WIRING AND PIPING CONNECTION



Wiring Diagram



Duct Diagram



Piping Connection

Products Range



AIR COOLED WATER CHILLER 48 - 486 TR
Screw-Reciprocating



AIR HANDLING UNIT
(SINGLE & DOUBLE SKIN)
300 - 200,000 CFM



PACKAGED AIR CONDITIONING UNIT
2 - 100 TR



SLIM DUCTED CEILING
FAN COIL UNITS



HIGH PRESSURE FAN COIL UNIT



AIR COOLED CONDENSING UNITS
2 - 160 TR



FAN COIL UNITS
200 - 1,300 CFM



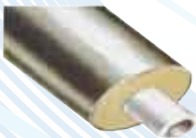
CASSETTE TYPE
AIR-CONDITIONER



MINI SPLIT UNIT
9,000 - 32,000 Btu/hr



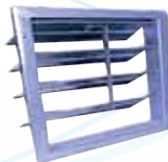
ROOM A/C UNITS
WINDOW SERIES



PRE-INSULATED PIPE



Ceiling/Side wall Diffusers



Back Draft Damper



Duct Heater
HF Series



Duct Heater
CHMS Series



Variable Air Volume (VAV)
MODEL S



Variable Air Volume (VAV)
MODEL SX



Variable Air Volume (VAV)
MODEL V



Variable Air Volume (VAV)
MODEL SR



AIRFOIL FANS
225 - 340,000 CFM



VANE AXIAL FAN
3,000 - 250,000 CFM



Sound Attenuator
Round Type



Sound Attenuator
Rectangular Type

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