

WESTAIR INDUSTRIES, INC., incorporated in Texas, USA applies latest technology and sound experience in global HVAC industry to produce and make available one of the high quality wide range of air conditioning equipment for worldwide client's satisfaction.



Modular Air Cooled Heat Pump Chiller

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In line with continues products improvement and specifications upgrading; Westair reserves the right to make changes in specifications and design without prior notice.

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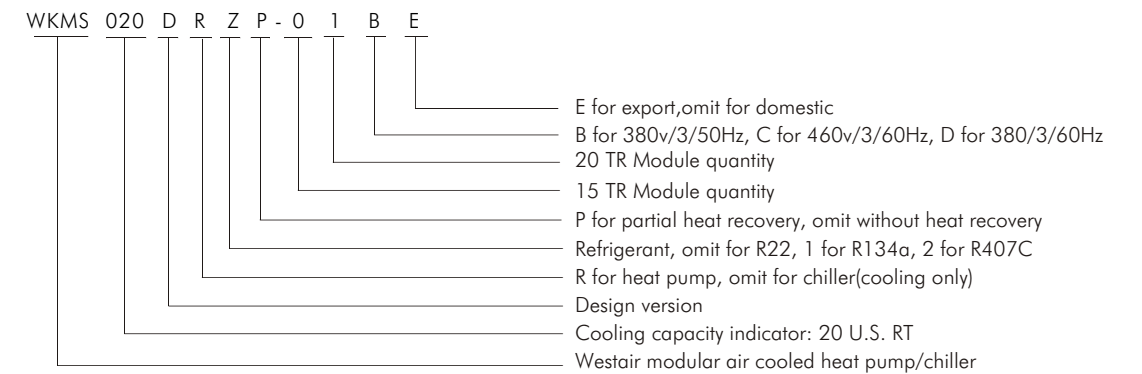
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Product Introduction

WKMS series modular type air cooled heat pump/chiller unit is one of the energy saving products launched under the combined foundation of Westair many years of experience in manufacturing and design. The designed concept of the unit is of modular design and each single unit can be assembled together and controlled by the microprocessor. Every single unit in the unit assemble can be started or stopped flexibly to provide sufficient capacity for the various heat load which directly improve the efficiency of the energy saving. Unit assemble still operates (heating mode) above -10° C ambient temperature and the efficiency is 3 times higher than the electrical heater normally. The units assemble are widely applied for area that are low ambient temperature (winter), without burner or any other heater element available.

The flexibility of combining modular unit increases the sensibility of the system capacity, energy saving and smaller installation space. Thus, the Westair modular heat pump/chiller becomes one of the popular choices for HVAC centralize air conditioning application.

Product Nomenclature



Product Features

1) Flexible Combination System, Easy Installation

- The modular heat pump/chiller can consists of several units put together or only single unit depending on the capacity required. Every modular/chiller unit is independent of each other as it has its own individual frame structure, refrigeration circuit and control protection system. Each unit will start to operate step by step in order to achieve the capacity needed. If one of them breaks down, it will not affect the other unit s' performance in the system.
- Modular unit quantity in the unit assemble can be increased for future expansion.
- Every modular unit can be installed closely or by a separate distance, in order to suit the application and space of installation.
- No discrete room is required and low installation cost. The procedure of the unit installation and operation only require:
 - a)Connecting water piping
 - b)Ensure good water quality
 - c)Pump-in the clean water to the water system
 - d)Start commissioning

2) Intelligent Control System, Efficiency Energy Saving

- Due to the modular system design, the maximum starting ampere for the whole system is decreased to the minimum (lower voltage surge) by starting the modular unit separately. This directly will save for the system energy generally.
- The microprocessor can detect and determine the required capacity automatically. It will randomly start the separate modular units until the sufficient capacity for the space heat load is supplied in order to achieve the best energy saving for the system.
- All modular units use the new hermetic scroll compressor that is of low noise, low vibration and high efficiency.
- Evaporator and condenser coil are manufactured with inner groove copper tube where for cooling and heating mode condition, the heat transfer rate is 32% higher than the normal heat exchanger rate.
- Antirust hydrophilic aluminums fin which can be applied in the worst ambient condition; it reduces the frost thickness and forming rate during heating cycle and also increases the heat exchanger rate of the coil.

3) Excellent Quality and High Reliability

- All main components in the refrigeration system are of branded quality products from US, Europe and Japan. Electrical parts for the units are provided by Siemens, Omron which is well-known for its quality.
- Microprocessor controller have functions such as intelligent defrost, diagnosis capacity management, antifreeze control, modular operating and etc.
- The unit is protected by high-low pressure switch, air vent, water temperature control and other safety devices which assure that the unit is safe during operation.

4) Quiet, Comfort, Easy Maintenance

- Utilization of high efficiency, low noise propeller fans & scroll compressor are the major factors in reducing the noise level of the unit assemble.

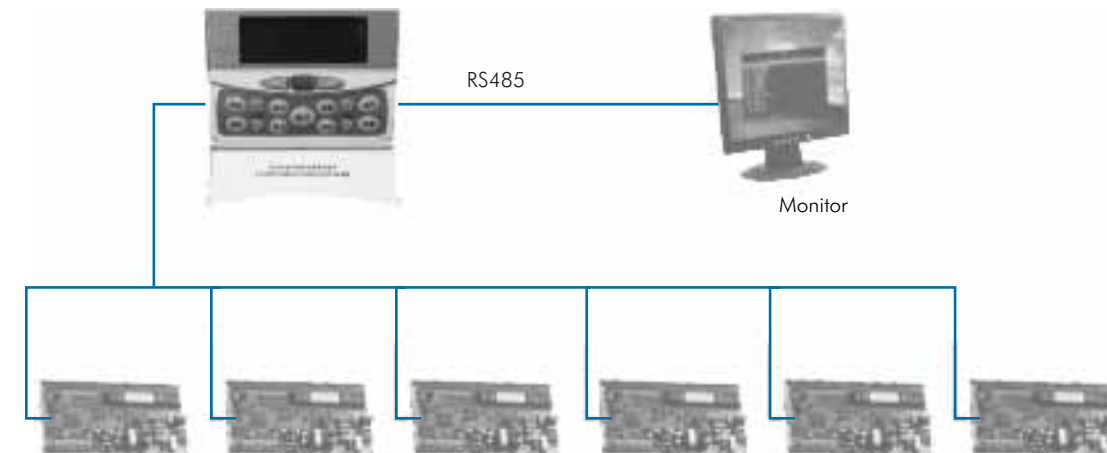
- For carrying out unit servicing and maintenance, just dismantle the protection grille.

5) Free Hot Water , Energy Saving and Environment-Friendly (Option)

- Under heat recovery mode, the unit's COP can be 5% higher, with low operation cost.
- Recover the super heat during the cooling circle, and may supply 65°C sanitation hot water, no need extra energy.
- Using release heat from condenser, reduce waste heat to environment, and safe hot water system from electricity consumption.

Microprocessor Controller

1. Control System Diagram



2. Controller Display Function

Real timer display (24hrs)	Every modular unit output parameter display
Operation mode : cool, heat , automatic & manual	Compressor cut in display
Unit temperature setting and indicator display	Compressors accumulate running duration display
Unit ON/OFF display	Compressors accumulate starting number display
Information status display	Water pump accumulate operating duration display
Every modular unit input parameter display	Diagnosis display, alarm display, unit components location, failure starting time ,failure end time

3.Controller Control Function

Compressor wear & tear balancing	Remote control terminal
Cooling, heating, automatic, manual and other mode function	Failure alarm dialing function (optional)
Multiple ON/OFF timer function	Remote control function (dry contact control)
Self-diagnosis and protection function	Remote operation, alarm function (relay output contact)
Random capacity adjustment control	Automatic antifreeze protection (winter)
Water outlet antifreeze protection	Multi module controller
Water outlet overheat protection	Intelligent defrost control
Temperature, pressure transducer short circuit, cut off protection	Only allow one unit defrosts at one time
Power failure last memory function	Manual defrost
Unit setting control quantity function	Delay on timer after unit off
Compressor overtime operation alarm function	Secondary heater control
Multiple ON/OFF operation mode/method	Compressor oil heat-up control

4.Safety Alarm Function

High pressure protection	External interlocking protection
Low pressure protection	Information failure alarm
Compressor overload, crankcase heater protection	Overload operation alarm
Wrong phase or short of 1 phase, high or low voltage protection (3 phase protection)	Transducer failure alarm
Air vent protection (high temperature)	Minimum / maximum water outlet temperature alarm.
Minimum water flow rate protection	100 Failure memory record (only for deluxe model, optional)

R22 Unit Specification

Specification		Model	WKMS				
Item			015DR-10	020DR-01	030DR-20	040DR-02	050DR-21
Cooling Capacity	kW		50.5	61	101	122	162
Heating Capacity (Heat Pump)	kW		55	68	110	136	178
Heat Recovery Capacity	kW		12.5	15	25	30	40
Module Quantity	Nos.		1	1	2	2	3
Electric Data	Power Supply		380V/3Ph/50Hz				
	Total Power Input	kW	15.3	19.3	30.6	38.6	49.9
	Total Operating Current	A	27.6	35.5	55.2	71	90.7
Compressor	Type		hermetic scroll compressor				
	Qty	Unit	2	2	4	4	6
	Input Power	kW	14	18	28	36	46
Condenser Type			Inner groove copper tube/ blue aluminum fin				
Condenser Fan	Type		Water proof,weather proof,low noise high efficiency propeller fan				
	Qty	Unit	2	2	4	4	6
	Motor	kW	1.3	1.3	1.3×2	1.3×2	1.3×3
A/C Water Heat Exchanger	Type		Shell and tube heat exchanger				
	Water Flow Rate	m ³ /h	8.7	10.5	17.4	21	27.9
	Water Pressure Drop	kPa	30	32	32	34	35
	Connection	DN	50	50	50	50	50
	Water Operating Pressure	MPa	1.0				
A/C Water Collecting Pipe Recommend Connection	mm	DN50	DN50	DN65	DN65	DN80	
Heat Recovery Water Heat Exchanger	Type		Tube in Tube				
	Water Flow Rate	m ³ /h	2.2	2.6	4.3	5.2	6.9
	Water Pressure Drop	kPa	21	22	24	24	26
	Connection	in	G1	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0				
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN25	DN32	DN32	DN40	DN40	
Outline Dimension	Width	mm	1080	1080	2190	2190	3300
	Depth	mm	2130	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000	2000
Refrigerant	Type		R22				
	Charge	kg	19	21	38	42	59
Operating Weight	kg	750	800	1500	1600	2300	
Sound Level	dB(A)	67	68	69	69	69.5	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

R22 Unit Specification

Specification		Model	WKMS			
Item			060DR-03	070DR-22	080DR-04	090DR-23
Cooling Capacity	kW		183	223	244	284
Heating Capacity (Heat Pump)	kW		204	246	272	314
Heat Recovery Capacity	kW		45	55	60	70
Module Quantity	Nos.		3	4	4	5
Electric Data	Power Supply		380V/3Ph/50Hz			
	Total Power Input	kW	57.9	69.2	77.2	88.5
	Total Operating Current	A	106.5	126.2	142	161.7
Compressor	Type		hermetic scroll compressor			
	Qty	Unit	6	8	8	10
	Input Power	kW	54	64	72	82
Condenser Type			Inner groove copper tube/ blue aluminum fin			
Condenser Fan	Type		Water proof,weather proof,low noise high efficiency propeller fan			
	Qty	Unit	6	8	8	10
	Motor	kW	1.3×3	1.3×4	1.3×4	1.3×5
A/C Water Heat Exchanger	Type		Shell and tube heat exchanger			
	Water Flow Rate	m ³ /h	31.5	38.4	42	48.9
	Water Pressure Drop	kPa	36	38	39	42
	Connection	DN	50	50	50	50
	Water Operating Pressure	MPa	1.0			
A/C Water Collecting Pipe Recommend Connection	mm	DN80	DN100	DN100	DN100	
Heat Recovery Water Heat Exchanger	Type		Tube in Tube			
	Water Flow Rate	m ³ /h	7.7	9.5	10.3	12
	Water Pressure Drop	kPa	26	28	28	30
	Connection	in	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0			
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN40	DN50	DN50	DN50	
Outline Dimension	Width	mm	3300	4410	4410	5520
	Depth	mm	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000
Refrigerant	Type		R22			
	Charge	kg	63	80	84	101
Operating Weight	kg	2400	3100	3200	3900	
Sound Level	dB(A)	69.5	70	70	70.5	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

R22 Unit Specification

Specification		Model	WKMS			
Item			100DR-05	120DR-06	140DR-07	160DR-08
Cooling Capacity	kW		305	366	427	488
Heating Capacity (Heat Pump)	kW		340	408	476	544
Heat Recovery Capacity	kW		75	90	105	120
Module Quantity	Nos.		5	6	7	8
Electric Data	Power Supply		380V/3Ph/50Hz			
	Total Power Input	kW	96.5	115.8	135.1	154.4
	Total Operating Current	A	177.5	213	248.5	284
Compressor	Type		hermetic scroll compressor			
	Qty	Unit	10	12	14	16
	Input Power	kW	90	108	126	144
Condenser Type			Inner groove copper tube/ blue aluminum fin			
Condenser Fan	Type		Water proof,weather proof,low noise high efficiency propeller fan			
	Qty	Unit	10	12	14	16
	Motor	kW	1.3 × 5	1.3 × 6	1.3 × 7	1.3 × 8
A/C Water Heat Exchanger	Type		Shell and tube heat exchanger			
	Water Flow Rate	m ³ /h	52.5	63	73.5	84
	Water Pressure Drop	kPa	43	47	51	55
	Connection	DN	50	50	50	50
	Water Operating Pressure	MPa	1.0			
A/C Water Collecting Pipe Recommend Connection	mm	DN100	DN125	DN125	DN125	
Heat Recovery Water Heat Exchanger	Type		Tube in Tube			
	Water Flow Rate	m ³ /h	12.9	15.5	18.1	20.6
	Water Pressure Drop	kPa	30	32	34	36
	Connection	in	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0			
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN65	DN65	DN65	DN65	
Outline Dimension	Width	mm	5520	6630	7740	8850
	Depth	mm	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000
Refrigerant	Type		R22			
	Charge	kg	105	126	147	168
Operating Weight	kg	4000	4800	5600	6400	
Sound Level	dB(A)	70.5	71	71.5	72	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

R22 Unit Specification

Specification		Model	WKMS			
Item			180DR-09	200DR-0A	220DR-0B	240DR-0C
Cooling Capacity	kW		549	610	671	732
Heating Capacity (Heat Pump)	kW		612	680	748	816
Heat Recovery Capacity	kW		135	150	165	180
Module Quantity	Nos.		9	10	11	12
Electric Data	Power Supply		380V/3Ph/50Hz			
	Total Power Input	kW	173.7	193	212.3	231.6
	Total Operating Current	A	319.5	355	390.5	426
Compressor	Type		hermetic scroll compressor			
	Qty	Unit	18	20	22	24
	Input Power	kW	162	180	198	216
Condenser Type			Inner groove copper tube/ blue aluminum fin			
Condenser Fan	Type		Water proof,weather proof,low noise high efficiency propeller fan			
	Qty	Unit	18	20	22	24
	Motor	kW	1.3 × 9	1.3 × 10	1.3 × 11	1.3 × 12
A/C Water Heat Exchanger	Type		Shell and tube heat exchanger			
	Water Flow Rate	m ³ /h	94.4	104.9	115.4	125.9
	Water Pressure Drop	kPa	59	63	67	71
	Connection	DN	50	50	50	50
	Water Operating Pressure	MPa	1.0			
A/C Water Collecting Pipe Recommend Connection	mm	DN150	DN150	DN150	DN200	
Heat Recovery Water Heat Exchanger	Type		Tube in Tube			
	Water Flow Rate	m ³ /h	23.2	25.8	28.4	30.95
	Water Pressure Drop	kPa	38	40	42	44
	Connection	in	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0			
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN80	DN80	DN80	DN80	
Outline Dimension	Width	mm	9960	11070	12180	13290
	Depth	mm	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000
Refrigerant	Type		R22			
	Charge	kg	189	210	231	252
Operating Weight	kg	7200	8000	8800	9600	
Sound Level	dB(A)	72.5	73	73.5	74	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

R407C Unit Specification

Specification	Model	WKMS						
		020DR2	040DR2	060DR2	080DR2	100DR2	120DR2	
Cooling Capacity	kW	57	114	171	228	285	342	
Heating Capacity (Heat Pump)	kW	63	126	189	252	315	378	
Heat Recovery Capacity	kW	14	28	42	56	70	84	
Module Quantity	Nos.	1	2	3	4	5	6	
Electric Data	Power Supply	380V/3Ph/50Hz						
	Total Power Input	kW	19.5	39	58.5	78	97.5	117
	Total Operating Current	A	35.8	71.6	107.4	143.2	179	214.8
Compressor	Type	hermetic scroll compressor						
	Qty	Unit	2	4	6	8	10	12
	Input Power	kW	18.2	36.4	54.6	72.8	91	109.2
Condenser Type	Inner groove copper tube/ blue aluminum fin							
Condenser Fan	Type	Water proof,weather proof,low noise high efficiency propeller fan						
	Qty	Unit	2	4	6	8	10	12
	Motor	kW	1.3	2.6	3.9	5.2	6.5	7.8
A/C Water Heat Exchanger	Type	Shell and tube heat exchanger						
	Water Flow Rate	m ³ /h	9.8	19.6	29.4	39.2	49	58.8
	Water Pressure Drop	kPa	32	34	36	39	43	47
	Connection	DN	DN50	DN50	DN50	DN50	DN50	DN50
	Water Operating Pressure	MPa	1.0					
A/C Water Collecting Pipe Recommend Connection	mm	DN50	DN65	DN80	DN80	DN100	DN100	
Heat Recovery Water Heat Exchanger	Type	Tube in Tube						
	Water Flow Rate	m ³ /h	2.4	4.8	7.2	9.6	12	14.4
	Water Pressure Drop	kPa	22	24	26	28	30	32
	Connection	in	G1	G1	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0					
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN32	DN40	DN50	DN50	DN65	DN65	
Outline Dimension	Width	mm	1080	2190	3300	4410	5520	6630
	Depth	mm	2130	2130	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000	2000	2000
Refrigerant	Type	R407C						
	Charge	kg	20	40	60	80	100	120
Operating Weight	kg	800	1600	2400	3200	4000	4800	
Sound Level	dB(A)	68	68.5	69	69.5	70	70.5	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

R407C Unit Specification

Specification	Model	WKMS						
		140DR2	160DR2	180DR2	200DR2	220DR2	240DR2	
Cooling Capacity	kW	399	456	513	570	627	684	
Heating Capacity (Heat Pump)	kW	441	504	567	630	693	756	
Heat Recovery Capacity	kW	98	112	126	140	154	168	
Module Quantity	Nos.	7	8	9	10	11	12	
Electric Data	Power Supply	380V/3Ph/50Hz						
	Total Power Input	kW	136.5	156	175.5	195	214.5	234
	Total Operating Current	A	250.6	286.4	322.2	358	393.8	429.6
Compressor	Type	hermetic scroll compressor						
	Qty	Unit	2	16	18	20	22	24
	Input Power	kW	127.4	145.6	163.8	182	200.2	218.4
Condenser Type	Inner groove copper tube/ blue aluminum fin							
Condenser Fan	Type	Water proof,weather proof,low noise high efficiency propeller fan						
	Qty	Unit	14	16	18	20	22	24
	Motor	kW	9.1	10.4	11.7	13	14.3	15.6
A/C Water Heat Exchanger	Type	Shell and tube heat exchanger						
	Water Flow Rate	m ³ /h	68.6	78.4	88.2	98	107.8	117.6
	Water Pressure Drop	kPa	51	55	59	63	67	71
	Connection	DN	DN50	DN50	DN50	DN50	DN50	DN50
	Water Operating Pressure	MPa	1.0					
A/C Water Collecting Pipe Recommend Connection	mm	DN125	DN125	DN125	DN125	DN150	DN150	
Heat Recovery Water Heat Exchanger	Type	Tube in Tube						
	Water Flow Rate	m ³ /h	16.9	19.3	21.7	24.1	26.5	28.9
	Water Pressure Drop	kPa	34	36	38	40	42	44
	Connection	in	G1	G1	G1	G1	G1	G1
	Water Operating Pressure	MPa	1.0					
Heat Recovery Water Collecting Pipe Recommend Connection	mm	DN65	DN65	DN65	DN80	DN80	DN80	
Outline Dimension	Width	mm	7740	8850	9960	11070	12180	13290
	Depth	mm	2130	2130	2130	2130	2130	2130
	Height	mm	2000	2000	2000	2000	2000	2000
Refrigerant	Type	R407C						
	Charge	kg	140	160	180	200	220	240
Operating Weight	kg	5600	6400	7200	8000	8800	9600	
Sound Level	dB(A)	71	71.5	72	72.5	73.5	74	

Note:

Above data based on:

1. Cooling mode: leaving temperature 7°C, ambient temperature 35°C; heat recovery water entering 40°C, leaving 45°C;
2. Heatin mode: leaving water temperature 45°C, ambient temperature DB 7°C/WB 6°C;
3. Working ambient temperature range: cooling 16~48°C, heating -10~21°C, heat recovery only under cooling mode;

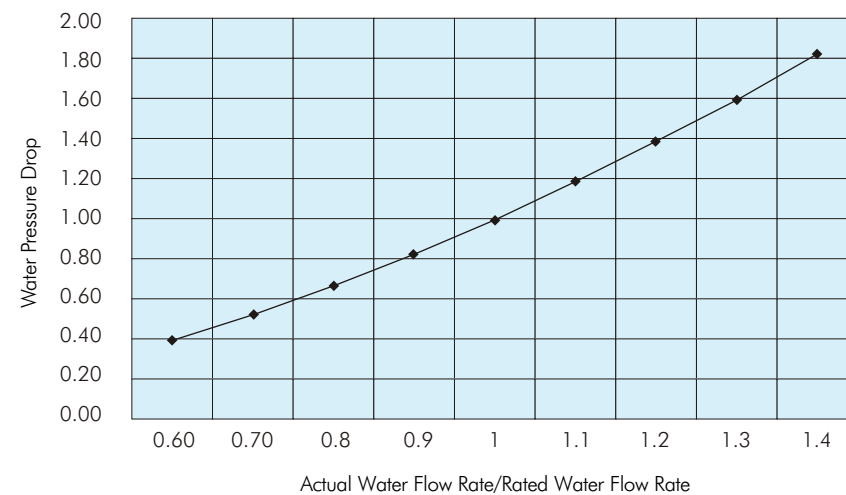
Cooling Capacity Correction Factor

Ambient Temperature °C	Cooling Capacity				Input Power			
	Leaving Water Temperature °C				Leaving Water Temperature °C			
	5	7	9	11	5	7	9	11
28	1.03	1.08	1.13	1.18	0.88	0.89	0.91	0.94
32	0.99	1.04	1.09	1.14	0.94	0.95	0.97	1.00
35	0.95	1.00	1.06	1.10	0.97	1.00	1.03	1.05
38	0.92	0.97	1.02	1.06	1.03	1.05	1.08	1.08
40	0.90	0.94	0.99	1.04	1.06	1.08	1.11	1.11
46	0.84	0.88	0.92	0.97	1.15	1.16	1.19	1.19

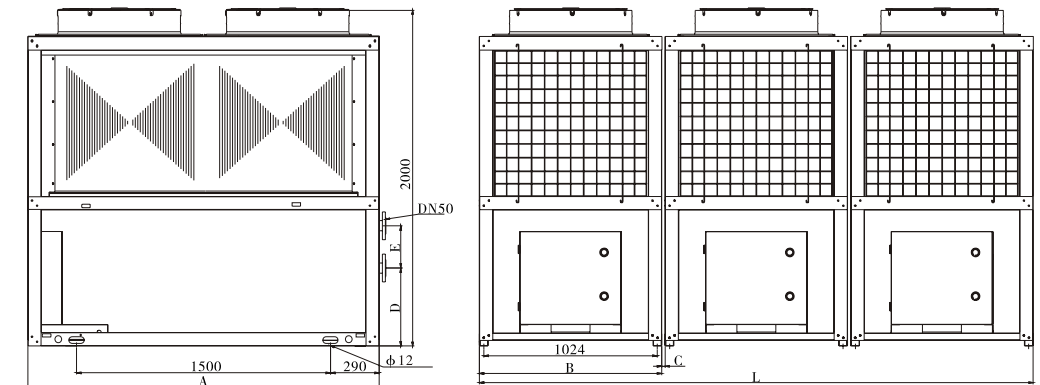
Heating Capacity Correction Factor

Ambient Temperature °C	Heating Capacity					Input Power				
	Leaving Water Temperature °C					Leaving Water Temperature °C				
	39	42	45	48	50	39	42	45	48	50
13	1.23	1.21	1.19	1.15	1.13	0.96	1.00	1.05	1.10	1.14
10	1.15	1.13	1.11	1.08	1.05	0.94	0.98	1.02	1.07	1.11
7	1.06	1.03	1.00	0.98	0.95	0.92	0.96	1.00	1.05	1.09
2	0.92	0.89	0.86	0.83	0.80	0.90	0.94	0.98	1.02	1.05
-2	0.80	0.77	0.74	0.71	0.69	0.87	0.91	0.96	1.00	1.04
-6	0.68	0.65	0.61	-	-	0.82	0.86	0.91	-	-
-10	0.57	0.55	-	-	-	0.78	0.81	-	-	-

Water Pressure Drop Correction Factor

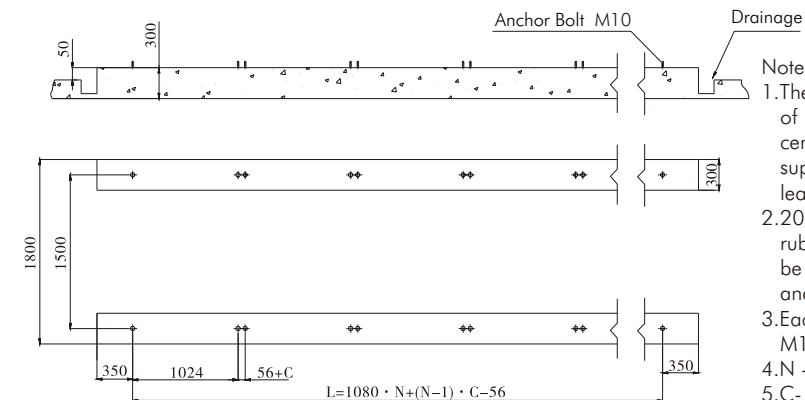


Units Dimension



Total Unit's Length $L=1080 \times N + (N-1) \times C$; $A=2080$; $B=1080$; $C \geq 30$; L may be larger according to actual installation space, $D=461$; $E=250$; N : module nos, $N \leq 12$;
Customer may arrange the module at will, distance between module should not lower than 30mm, if the space allow, distance may as long as possible.

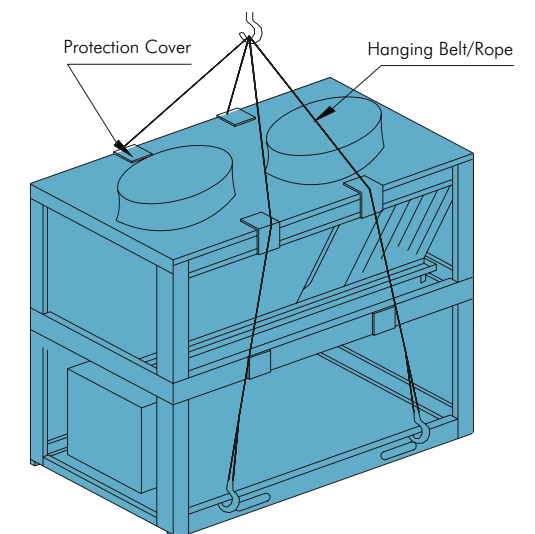
Unit Installation Foundation Diagram



- Note:
1. The base foundation must consist of either reinforced concrete cement or strong steel structure support that is able to support at least up to 400kg/m² load.
 2. 20mm thickness anti-vibration rubber grommet or isolator must be placed between the unit base and foundation.
 3. Each module unit is secure with 4 M16 bolts to the ground
 4. N - module quantity
 5. C - distance between modules

Unit Lifting

1. Pallet truck and forklift are being used for the unit shifting or lifting by inserting the fork into the unit base pan.
2. Extra attention must be taken during unit lifting by crane. Flat belt or steel ropes are required to go through the unit base for safety lifting. The contact point between the rope and the unit must be applied with a protection cover to prevent unit from being dented. Steel rope should be tightened around the hook to avoid any sliding from occurring during weight imbalance.

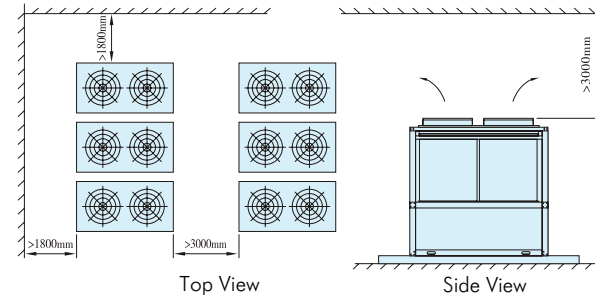


Units Orientation

1. These products can be installed on the roof, balcony and garden. The installation space must have good ventilation, clean and bright. Avoid places that are oily, steamy and with other heating element. The location must also be provided with a good water drainage system, low noise and is easy for pipe connection installation.

2. To ensure there is sufficient space for maintenance and ventilation, installer must follow the space distance indicated in the right side diagram. No obstacles are allowed in the space distance and the height of the ceiling must be more than 3m from the unit top panel to avoid ventilation short circuit.

3. Unit assemble air intake should not be parallel with monsoon wind blowing direction.(winter)



Water System Installation

1. All piping and valve must be heat insulated. Extra protection cover is needed to prevent capacity loss, condensation problem and water freezing in the piping(during winter).

2. Water flow switch must be installed in the water system to avoid water freezing from occurring. Insufficient water in the system will lead to water freezing, low suction pressure and insufficient compressor oil return(during cooling cycle); and high pressure during heating cycle, damage the compressor and shorten the compressor life spans.

3. If the water system is a close circuit system, to avoid expansion(during heating cycle) or contraction(during cooling cycle), an expansion tank should be installed 1 meter higher than the water piping system's highest point. Do not apply check valve in the outlet of the expansion tank to avoid leakage or pipe cracking.

4. Water pump should be installed in the return water line. If any secondary electric heater is being used, the water pump should be located before the heater. If the pump water pressure is higher than the unit's limit, the pump should be placed after the water outlet.

5. No air lock is allowed. Auto air vent should be installed in the highest possible location in the piping. For horizontal installation pipe, a 1/250 slide angle should be considered. To maintain the purity of the water in the system, a water filter(40 μ icron) must be installed to block the dirty and rusting element.

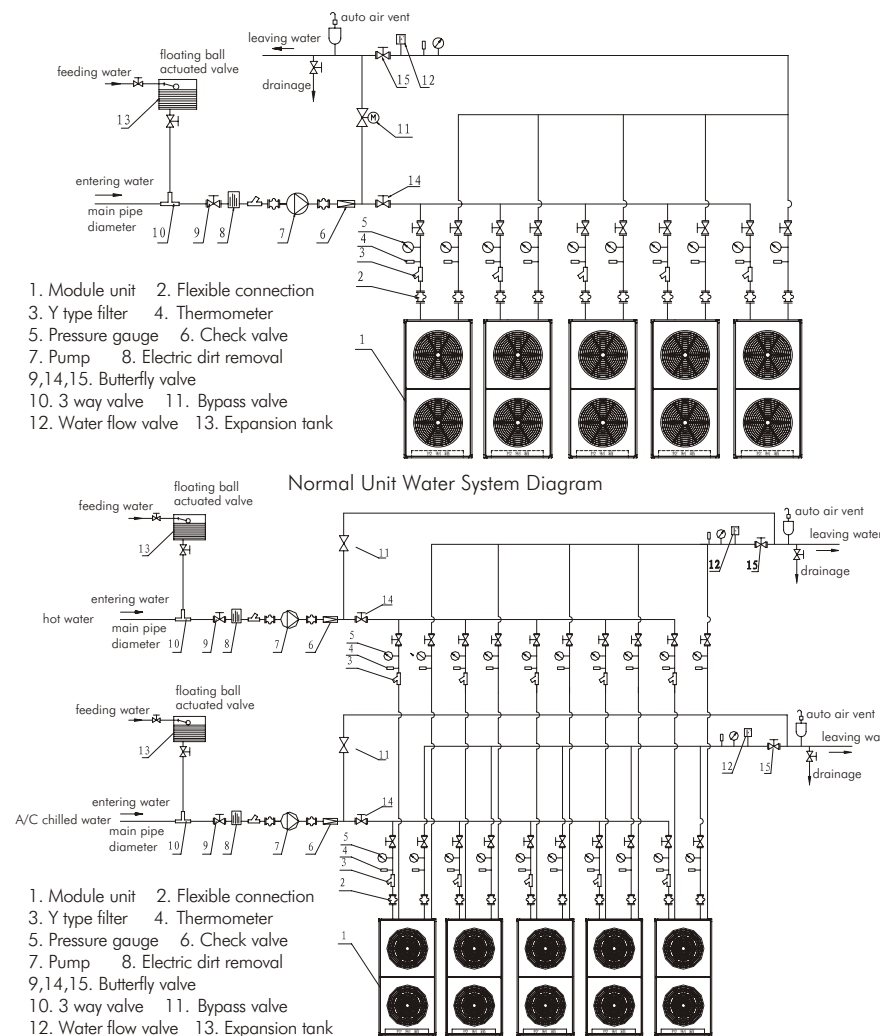
6. Water piping line's weight should not be beared by unit. Flexible connection should be applied between pump and unit to isolate the vibration.

7. For checking and recording purpose, the unit should set up with thermometer and pressure gauge at the water inlet/outlet.

8. Neight underground water,hard water nor dirty water is allowed in the water system. The PH value of the water system is 6.8~8.0. The hardness is not more than 70. Regular inspection of the water quality should be carried out in order to maintain the efficiency of the heat transfer.

9. The same piping distance should be utilized in two or more modules units.

10. The diagram on the right side is for reference. Consultant or specialist is needed for the design of system installation.



1. Module unit
2. Flexible connection
3. Y type filter
4. Thermometer
5. Pressure gauge
6. Check valve
7. Pump
8. Electric dirt removal
- 9,14,15. Butterfly valve
10. 3 way valve
11. Bypass valve
12. Water flow valve
13. Expansion tank

Partial Heat Recovery Unit Water System Diagram

Wiring

1. The supply voltage must be maintained around $\pm 10\%$ and the frequency is $\pm 2\%$.

2. The phase differential between 2 phase must not more than $\pm 2\%$, current differential between the highest and the lowest lower should lower than 3% to avoid compressor from overheat.

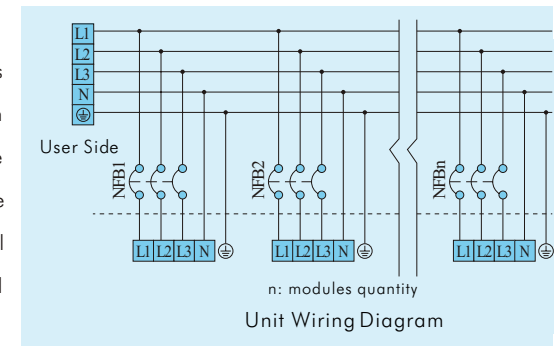
3. The minimum starting voltage of the unit should be larger than 85% of the rate value.

4. All wiring connection must follow the electric standard, and unit with terminal must use 500V resistance meter for checking the current leakage. The minimum resistance is $3M\Omega$.

5. Every module unit must install a three phase non fuse breaker(NFB) as to reduce the risk of having electricity short circuit, avoid transformer and wiring damage, and to have a separate control of the module compressors. Wiring as shown on right diagram:

6. For safety purpose, earthing protection installation must follow the electrical standard to avoid electric shock.

7. In the specification chart, all the operating current and input power is stated under standard testing condition. In real case, the operating condition might be different in term of capacity load and mambient temperature. If the ambient temperature is higher, then the capacity load will increase, and the operating current and input power will increase subsequently. As a result, all the electrical controlling elements(transformer, contactor, cable lug and wiring size) must be selected based on 1.8 times of the standard value.



Model	Total Rated Current	Main Power Wire mm ²	Each Module Wire mm ²
	A	BVR	
WKMS015D(R)(P)	27.6	10	10
WKMS020D(R)(2)(P)	35.5	16	16
WKMS030D(R)(P)	55.2	16	16
WKMS040D(R)(2)(P)	71	25	16
WKMS050D(R)(P)	80.7	35	16
WKMS060D(R)(2)(P)	106.5	35	16
WKMS070D(R)(P)	126.2	50	16
WKMS080D(R)(2)(P)	142	50	16
WKMS090D(R)(P)	161.7	50	16
WKMS100D(R)(2)(P)	177.5	70	16
WKMS120D(R)(2)(P)	213	95	16
WKMS140D(R)(2)(P)	248.5	95	16
WKMS160D(R)(2)(P)	284	120	16
WKMS180D(R)(2)(P)	319.5	150	16
WKMS200D(R)(2)(P)	355	185	16
WKMS220D(R)(2)(P)	390.5	240	16
WKMS240D(R)(2)(P)	426	300	16