



AIR COOLED WATER CHILLER & HEAT PUMP

Modular Screw Series

WP Manufacturing (Pty) Ltd



Company Profile

WP Manufacturing (Pty) Ltd is one of South Africa's leading manufacturers and suppliers of all types of heating, ventilation air-conditioning and refrigeration equipment.

Products locally manufactured are an entire range of console and split type console air-conditioning units, capacities ranging from 2.6 kW to 7 kW. These units are manufactured from 304 stainless steel as well, which have been proven as high quality products in our range.

A comprehensive range of Westair direct expansion and water cooled units, self contained and split type is readily available from stock with capacities available from 2.6 kW to 255 kW, [High wall, cassette, under ceiling, hide a way and roof mount type configurations].

WP Manufacturing (Pty) Ltd have subsequently acquired the Rhoss agency for air and water cooled chillers, and related engineered system components operating with all the latest technical specifications, requirements and refrigerants. These engineered system products are available from our Westpoint principals globally as well, [U.S.A. Europe, Asia], chiller capacities range from 4.4 kW to 2050 kW. The smaller range chiller capacities are available from stock, [4.4 kW to 110 kW].

The state of the art manufacturing and test facility, warehouse, service and maintenance division with adjacent offices are located and logistically situated in Delville Germiston, with easy access to all major highway routes. Other branch offices are in Nelspruit, Mpumalanga, with two additional offices opening during 2008/09 in Kwa Zulu Natal and the Cape Province.

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Description

This unit is energy saving and convenient in use, which has the function of reverse cycle automatic defrosting, double steps automatic anti-freezing, built-in self-diagnosable system, and is controlled by microcomputer. Applicable to hotels, villas, hospitals, cinemas, stadiums, recreations, office blocks, factories and so on. It can also provide chilled water or moderate hot water for industria purpose.

The unit is suitable for installing in outspace such as roof, floor and porch, left off the boiler room and the special room, decreased the investment of building project. And no need of cooling tower and cooling water pump, this unit saves water greatly. And the unit is easy to install, manage and maintain.

Features



Unique design, less investment

Modular design suitable for bigger application area, automatic energy output adjustment as per actual load requirement.



Multi parallel connection, multi steps start by sequence, minimize starting current, good to electricity skid.



Fully-automatic control

The operation and management of this unit are controlled by microcomputer system. It is easy to operate so that the professional management personnel are unnecessary. The units turn on/off the compressor automatically according to the load, making the units operate on the point of the most economical, and energy saving. And there are complete protective functions such as error self-detecting system, balancing the compressor wear automatically, and anti-freezing automatically in winter.



Appearance

The “M” shaped air cooled condenser for modular screw type, which is ingenious, beautiful and compacting. This unit looks clear and refinement by means of designing the components and tubs reasonably.

The unit is well in anticorrosion, so that it can be placed in outdoor space without special room.



Intelligent defrosting

Each circuit is separate to the others at inner cooling system, and controls the operation of the system independently. So it is separating when booting up. According to the different climatic conditions (temperature and humidity) to set the parameters for automatic defrosting, defrost is thoroughly and energy-saving, increasing the heating efficiency. And the defrosting has no significant influence to the indoor air-conditioning temperature.



Intelligent anti-freezing

This unit adopts anti-freezing automatic dual-class protection, preventing the water system being damaged once the refrigerant freezing at winter. The anti-freezing protection can be quitted automatically when the water temperature is increased according to the operation of heating or pump.



Convenient operation

Each unit is strictly tested. And the protective parameters are set. So you will just connect the power and the water pipes at installation, and operate the computer controller when you use it.



No limit of pipe length

The piping length just have little impact one the capacity, only the change of water pump for longer piping.



Simple installation.

No on site refrigerant charge, light weight and compact size for easy handling.

Efficient shell & tube heat exchanger evaporator

1. High heat transfer efficiency, less weight, easy to clean.
2. Good anti corrosion property.
3. Long life time .
4. Precise temperature control.
5. Easy cleaning

Heating operation in low temperature down to -10°C .

Reliable screw compressor.



Standard Refcomp



Optional Bitzer

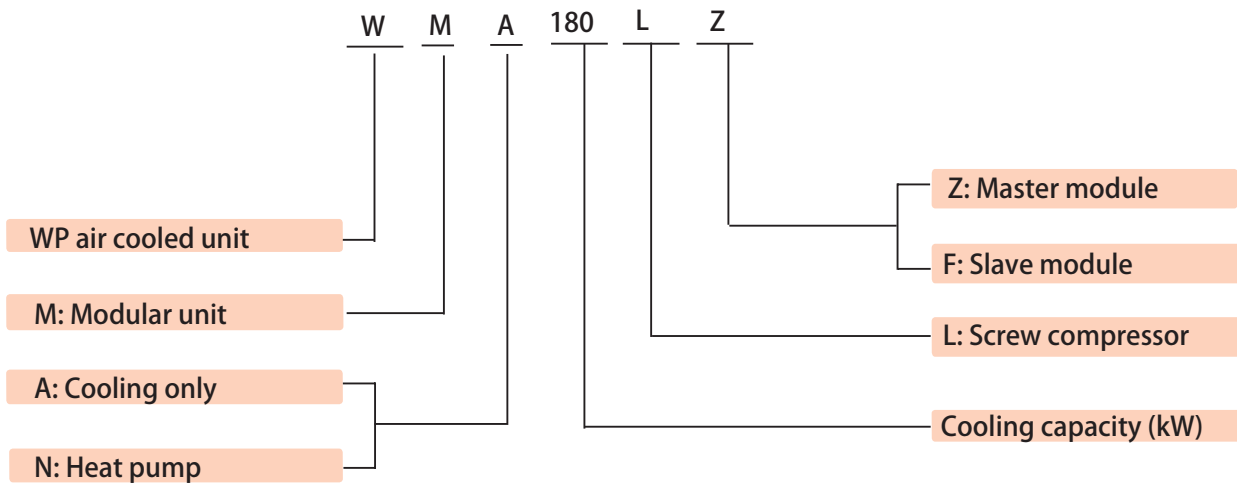
Touch screen controller



Optional PLC controller (interface in different languages available)



Nomenclature



Optional feature/accessories:

1. Heat recovery
2. Water flow switch
3. PLC controller
4. Remote control box
5. R407c refrigerant
6. R134A refrigerant

Specification

Air cooled water chiller (table 1)

Item		WMN(A)180L			WMN(A)250L			WMN(A)320L			WMN(A)380L			WMN(A)430L			
Refrigerant		R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	
Cooling Capacity	Kw	180	171	164	250	238	218	320	304	290	380	361	330	430	409	386	
	kW	198	188	-	275	261	-	350	333	-	430	409	-	480	456	-	
Heating Capacity	kW	198	188	-	275	261	-	350	333	-	430	409	-	480	456	-	
	kW	198	188	-	275	261	-	350	333	-	430	409	-	480	456	-	
Domestic Hot Water (Optional)	Capacity	Kw	54	51.3	49.2	75	71.4	65.4	96	91.2	87	114	108.3	99	129	122.7	115.8
	EWT	°C	50														
	LWT	°C	55														
	Flow rate	m3/h	9.4	9.0	8.6	13.1	12.5	11.4	16.8	15.9	15.2	19.9	18.9	17.3	22.5	21.4	20.2
Pipe size		DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50
Compressor	Type		Hermetic screw compressor														
	Input × Qty	kW	59.9×1	60.1×1	54×1	76.8×1	77×1	60.4×1	103.2×1	103.6×1	87.8×1	121.4×1	121.8×1	97.9×1	128.6×1	129×1	110.4×1
	Energy steps		25-50-75-100%														
Condensing fan	Type		Axial														
	Input × Qty	kW	1.8×4			1.8×6						1.8×8					
	Air flow rate	m3/h	92000			138000						184000					
Water side heat exchanger	Type		Shell & Tube														
	Flow rate	m3/h	31.5	29.9	28.7	43.7	41.6	38.1	55.9	53.1	50.7	66.4	63.1	57.7	75.1	71.5	67.5
	Pressure drop	kPa	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	Pipe size		DN80						DN100								
Refrigerant	Charge amount (kg)	60	60	60	80	80	80	110	110	110	125	125	125	135	135	135	
	Flow control device		Exterior balancing thermal expansion valve														
Noise	dB(A)	74	74	74	76	76	76	76	76	76	78	78	78	78	78	78	
Dimension	Length	mm	2290			3270			4020			4750			5250		
	Width	mm	2190														
	Height	mm	2480														
Power supply		3φ-380V-50HZ															
Total power input	kW	67.1	67.3	61.2	87.6	87.8	71.2	114	114.4	98.6	135.8	136.2	112.3	143	143.4	128.4	
Unit Weight	Kg	2050/2150			2750/2900			3200/3350			3650/3850			4000/4200			

Note:

- 1) For the above model, one master module can drive up to 7 slave modules.
- 2) Standard cooling work condition: Ambient temperature DB 35°C ,WB24°C; Chilled water inlet 12°C , outlet 7°C .
- 3) Standard heating work condition : Ambient temperature DB 7°C ,WB 6°C; Heating water inlet 40°C ,outlet 45°C .
- 4) The noise data is measured on the average of 1m far away from the unit.

Modular Screw Air Cooled Water Chiller & Heat Pump

Specification

Air cooled water chiller (table 2)

Item		WMN(A)500L			WMN(A)570L			WMN(A)640L			WMN(A)700L			
Refrigerant		R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	
Cooling Capacity	Kw	500	475	436	570	542	508	640	608	580	700	665	620	
Heating Capacity	kW	550	523	-	625	594	-	700	665	-	780	741	-	
Domestic Hot Water (Optional)	Capacity	Kw	150	142.5	130.8	171	162.6	152.4	192	182.4	174	210	199.5	186
	EWT	°C	50											
	LWT	°C	55											
	Flow rate	m3/h	26.2	24.9	22.9	29.9	28.4	26.6	33.6	31.9	30.4	36.7	34.9	32.5
Pipe size		DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80
Compressor	Type	Semi hermetic screw compressor												
	Input×Qty	kW	76.8×2	77×2	60.4×2	76.8+103.2	77+103.6	60.4+87.8	103.2×2	103.6×2	87.8×2	103.2+121.4	103.6+121.8	87.8+97.9
	Energy steps	12.5-25-37.5-50-62.5-75-87.5-100%												
Condensing fan	Type	Axial												
	Input×Qty	kW	1.8×12									1.8×14		
	Air flow rate	m3/h	184000			230000			276000			322000		
Water side heat exchanger	Type	Shell & Tube												
	Flow rate	m3/h	87.4	83.0	76.2	99.6	94.7	88.8	111.8	106.3	101.4	122.3	116.2	108.3
	Pressure drop	kPa	43	43	43	43	43	43	43	43	43	43	43	43
	Pipe size	DN125						DN150						
Refrigerant	Charge amount (kg)	160	160	160	190	190	190	220	220	220	235	235	235	
	Flow control device	Exterior balancing thermal expansion valve												
Noise	dB(A)	81	81	81	81	81	81	81	81	81	82	82	82	
Dimension	Length	mm	6530			7280			8030			8760		
	Width	mm	2190											
	Height	mm	2480											
Power supply		3φ-380V-50HZ												
Total power input	kW	175.2	175.6	142.4	201.6	202.2	169.8	228	228.8	197.2	249.8	250.6	210.9	
Unit Weight	Kg	5450/5750			5900/6200			6350/6650			6800/7150			

Note:

- 1) For the above model, one master module can drive up to 4 slave modules.
- 2) Standard cooling work condition: Ambient temperature DB 35°C ,WB24°C; Chilled water inlet 12°C , outlet 7°C .
- 3) Standard heating work condition : Ambient temperature DB 7°C ,WB 6°C; Heating water inlet 40°C ,outlet 45°C .
- 4) The noise data is measured on the average of 1m far away from the unit.

Specification

Air cooled water chiller (table 3)

Item		WMN(A)760L			WMN(A)810L			WMN(A)860L			
Refrigerant		R22	R407C	R134a	R22	R407C	R134a	R22	R407C	R134a	
Cooling Capacity	Kw	430	409	660	810	770	716	860	817	772	
Heating Capacity	kW	480	456	-	910	865	-	960	912	-	
Domestic Hot Water (Optional)	Capacity	Kw	129	122.7	198	243	231	214.8	258	245.1	231.6
	EWT	°C	50								
	LWT	°C	55								
	Flow rate	m3/h	22.5	21.4	34.6	42.5	40.4	37.5	45.1	42.8	40.5
Pipe size		DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	DN80	
Type		Semi hermetic screw compressor									
Compressor	Input ×Qty	kW	121.4×2	121.8×2	97.9×2	121.4+128.6	121.8+129	97.9+110.4	128.6×2	129×2	110.4×2
	Energy steps		12.5-25-37.5-50-62.5-75-87.5-100%								
Condensing fan	Type		Axial								
	Input ×Qty	kW	1.8×16								
	Air flow rate	m3/h	368000			414000			552000		
Type		Shell & Tube									
Water side heat exchanger	Flow rate	m3/h	75.1	71.5	115.3	141.6	134.6	125.1	150.3	142.8	134.9
	Pressure drop	kPa	44	44	44	44	44	44	44	44	44
	Pipe size		DN150						DN150		
Refrigerant	Charge amount (kg)	250	250	250	260	260	260	270	270	270	
	Flow control device		Exterior balancing thermal expansion valve								
Noise	dB(A)	83	83	83	84	84	84	85	85	85	
Dimension	Length	mm	9490			9990			10490		
	Width	mm	2190								
	Height	mm	2480								
Power supply		3φ-380V-50HZ									
Total power input	kW	271.6	272.4	224.6	278.8	279.6	237.1	286	286.8	249.6	
Unit Weight	Kg	7250/7650			7600/8000			7950/8350			

Note:

- 1) For the above model, one master module can drive up to 4 slave modules.
- 2) Standard cooling work condition: Ambient temperature DB 35°C ,WB24°C; Chilled water inlet 12°C , outlet 7°C .
- 3) Standard heating work condition : Ambient temperature DB 7°C ,WB 6°C; Heating water inlet 40°C ,outlet 45°C .
- 4) The noise data is measured on the average of 1m far away from the unit.

Performance

Cooling capacity correction coefficient

Entering Chilled water Temp. °C	Ambient temperature °C									
	27	29	31	33	35	37	39	41	43	45
10°C	1.008	0.993	0.979	0.964	0.950	0.933	0.916	0.900	0.883	0.868
12°C	1.061	1.046	1.030	1.015	1.000	0.982	0.964	0.947	0.930	0.913
14°C	1.114	1.098	1.082	1.066	1.050	1.031	1.013	0.994	0.976	0.959
16°C	1.170	1.153	1.136	1.119	1.103	1.083	1.063	1.044	1.025	1.007
18°C	1.229	1.211	1.193	1.175	1.158	1.137	1.116	1.096	1.076	1.057
20°C	1.290	1.271	1.252	1.234	1.216	1.194	1.172	1.151	1.130	1.110

Cooling power input correction coefficient

Entering Chilled water Temp. °C	Ambient temperature °C									
	27	29	31	33	35	37	39	41	43	45
10°C	0.872	0.899	0.927	0.955	0.985	1.015	1.045	1.076	1.109	1.142
12°C	0.885	0.913	0.941	0.970	1.000	1.030	1.061	1.093	1.126	1.159
14°C	0.899	0.926	0.955	0.985	1.015	1.045	1.077	1.109	1.142	1.177
16°C	0.912	0.940	0.969	0.999	1.030	1.061	1.093	1.126	1.160	1.194
18°C	0.926	0.954	0.984	1.014	1.046	1.077	1.109	1.143	1.177	1.212
20°C	0.940	0.969	0.999	1.030	1.061	1.093	1.126	1.160	1.195	1.230

Heating capacity correction coefficient

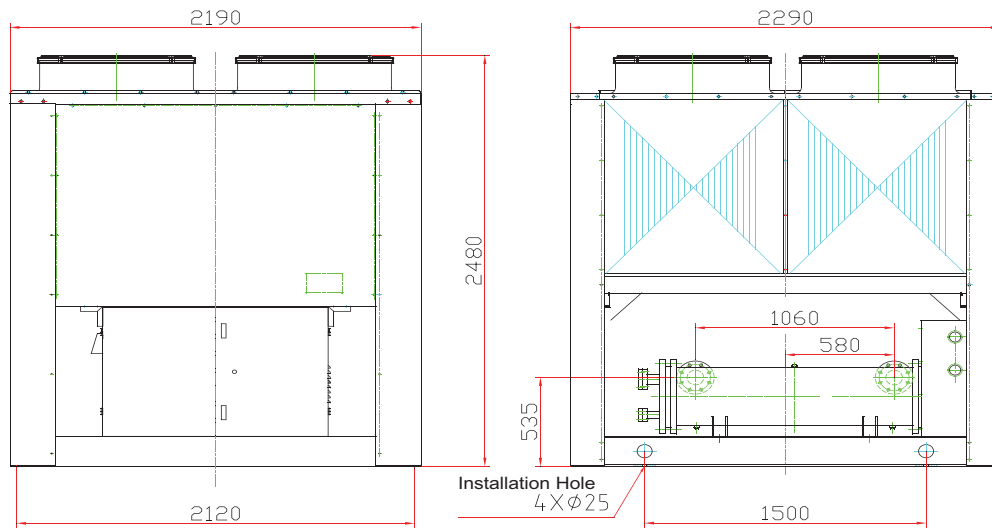
Entering Chilled water Temp. °C	Ambient temperature °C										
	-11	-9	-7	-5	-3	-1	1	3	5	7	9
34°C	0.689	0.725	0.763	0.803	0.846	0.890	0.937	0.986	1.038	1.093	1.142
36°C	0.669	0.704	0.741	0.780	0.821	0.864	0.910	0.957	1.008	1.061	1.109
38°C	0.649	0.683	0.719	0.757	0.797	0.839	0.883	0.930	0.979	1.030	1.076
40°C		0.663	0.698	0.735	0.774	0.815	0.857	0.903	0.950	1.000	1.045
42°C			0.677	0.713	0.751	0.790	0.832	0.875	0.922	0.970	1.014

Heating power input correction coefficient

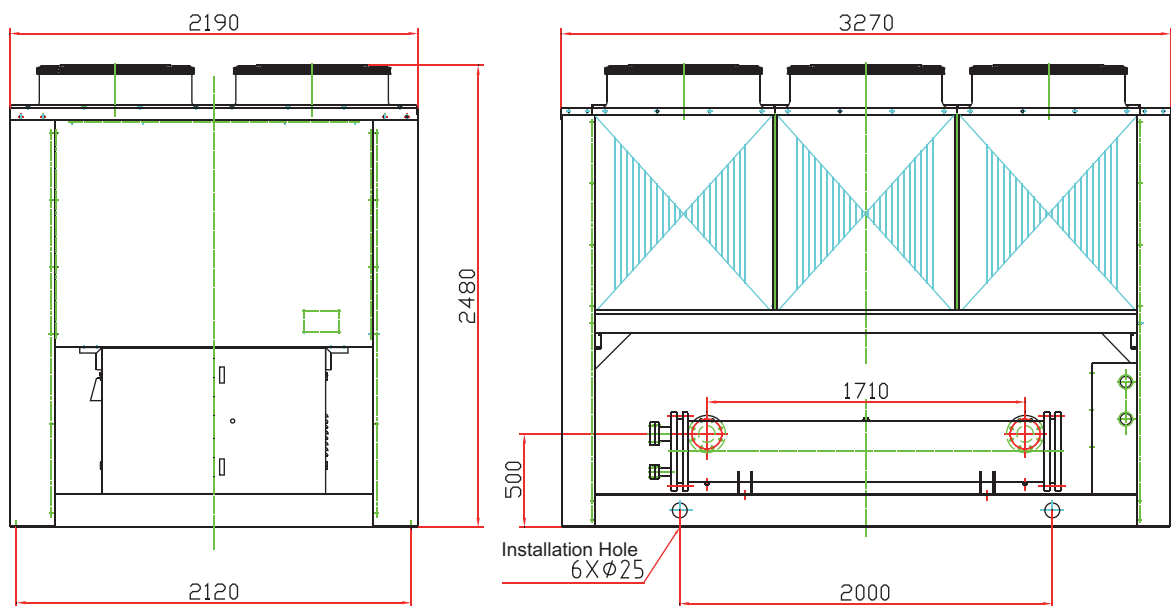
Entering Chilled water Temp. °C	Ambient temperature °C										
	-11	-9	-7	-5	-3	-1	1	3	5	7	9
34°C	0.808	0.816	0.825	0.833	0.841	0.850	0.858	0.867	0.876	0.885	0.894
36°C	0.842	0.850	0.859	0.868	0.876	0.885	0.894	0.903	0.912	0.922	0.931
38°C	0.877	0.886	0.895	0.904	0.913	0.922	0.931	0.941	0.950	0.960	0.970
40°C		0.923	0.932	0.941	0.951	0.961	0.970	0.980	0.990	1.000	1.010
42°C			0.969	0.979	0.989	0.999	1.009	1.019	1.030	1.040	1.050

Dimension

WMN(A)180L Unit: mm



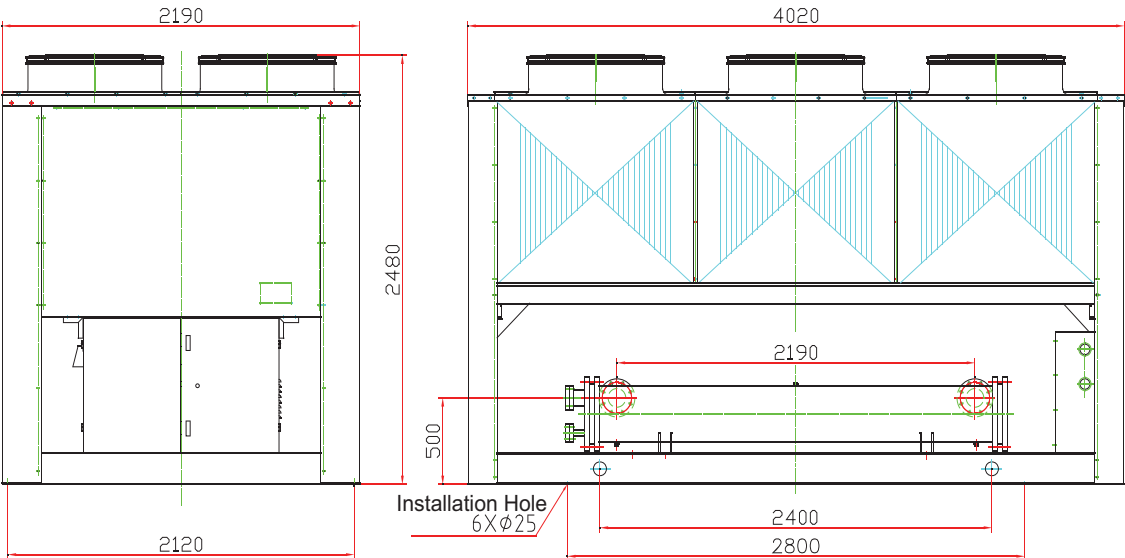
WMN(A)250L Unit: mm



Dimension

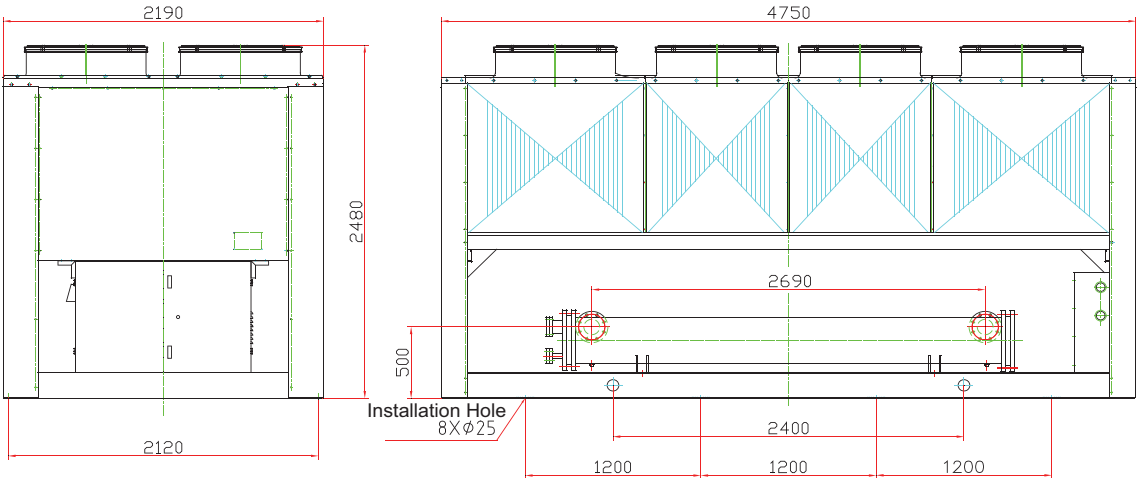
WMN(A)320L

Unit: mm



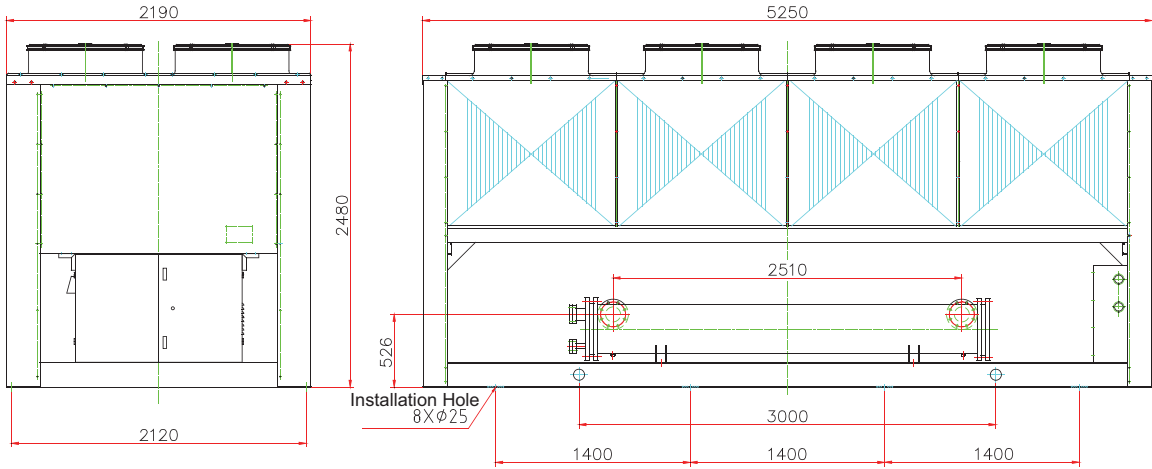
WMN(A)380L

Unit: mm

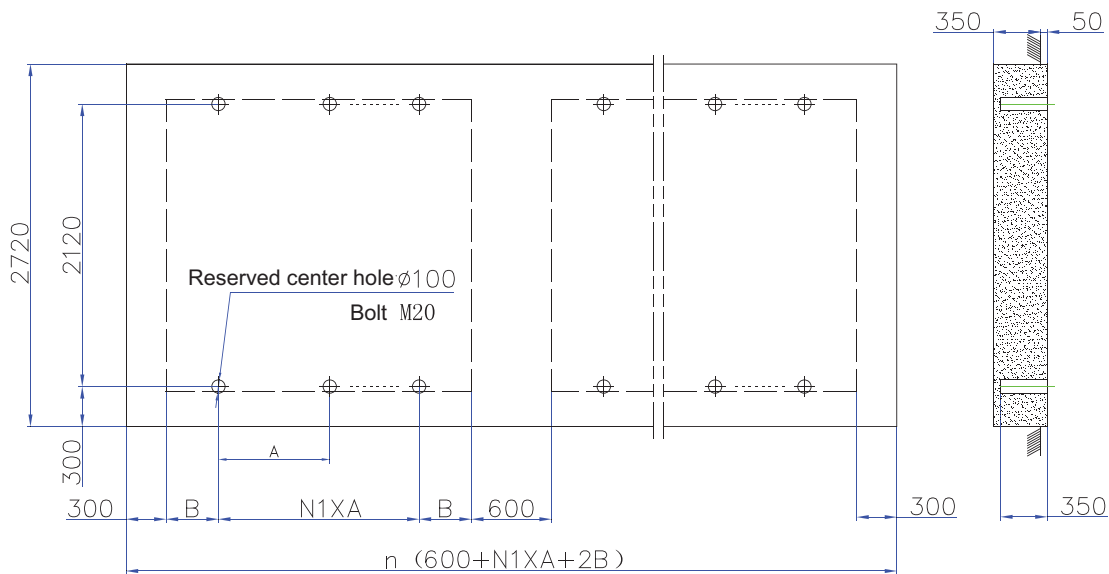


WMN(A)430L

Unit: mm



Foundation



Data \ Model	WMN(A)180L	WMN(A)250L	WMN(A)320L	WMN(A)380L	WMN(A)430L
A (mm)	1500	1000	1400	1200	1400
B(mm)	395	635	610	575	525
N1	1	2	2	3	3

"N" indicates the number of modules, foundation is same for chiller and heat pump.

Wiring at site

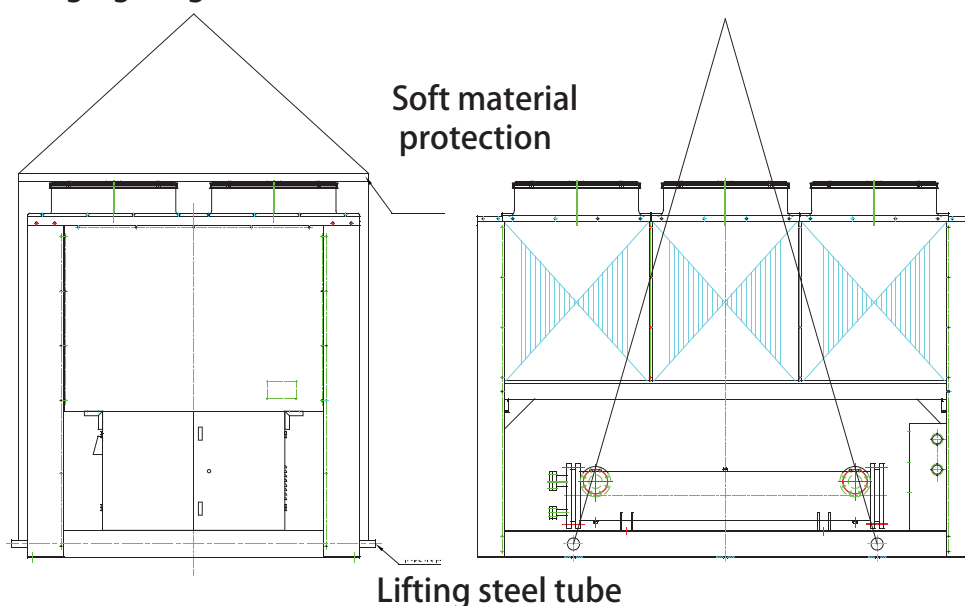
Please contact us for wiring diagram.

Installation

The preparation

- 1) After arriving the installation site, check all the items of the unit carefully according to the packing list if there are damage, lack of parts or damage during transport, notify the sales department.
- 2) The user must provide a rigid nondeforming foundation or concrete footings, based on the size of the unit four positioning hole; the foundation of the unit can also be framework structure, framework should be placed on main beam or column, and be capable of bearing the weight 150% heavier than the unit. The horizontal level should have no slope.

Unit Hanging Diagram



- 3) For easy handling, users should use the crane, the machine should properly protected by soft material(or the lifting protection plate) on the point of force applied, and also be in balanced status during handling to avoid possible damage.

4) Choose the Installation Place

Units can be installed indoor or outdoor , should consider the following factors:

- 1) Keep unit from the places where has easy accumulation of leaves, insects or other dirty thing to avoid blocking of heat exchanger.
- 2) Try to avoid as much as possible the direct sunshine on the machine when installs the machine.
- 3) Drain slot should be made in the surrounding of machine to drain the condensed water.
- 4) Should keep more than 1.6meter space surrounding the machine for the good air circulation and easy access of maintenance.
- 5) 3.0 to 3.5meters space should be kept above the machine to avoid return air.
- 6). 10 to 20mm rubber isolator should be fixed between the machine and the foundation.

Water quality standard

Items	Evaporator side water	Condenser side water
PH	6.5-8.5	6.0-8.0
Conductivity	≤ 200uv/cm (25°C)	≤ 200uv/cm (25°C)
chloride ion	≤ 50ppm	≤ 200ppm
sulfate ion	≤ 50ppm	≤ 200ppm
Total content of iron	≤ 0.3ppm	≤ 0.5ppm
Alkali ion	≤ 50ppm	≤ 100ppm
Total hardness of water	≤ 50ppm	≤ 100ppm
sulfide ion	No	No
ammonium ion	No	No
Sand	≤ 30ppm	≤ 50ppm
sodium ion	N/A	N/A

Power connection

- 1) Wire selection and connection should be carried out strictly according to requirement.
- 2) Should have earthing well done, no earthing to gas pipe, water pipe, telephone line, to avoid electric shock cause by improper earthing.
- 3) Ensure the phase sequence is correct, to avoid not running.

Maintenance

- 1) The qualified technician is required for the maintenance; all the protection devices and controller must be checked before restart.
- 2) Regular and correct maintenance is required for stability and good performance. Chilled and cooling water must be complete drained when long time no use to avoid possible freezing.

Notice

- 1) Antifreezer should be added in chilled water if water temp.set below zero or near zero.
- 2) Clean water system regularly.
- 3) Pay attention to antifreeze when ambient temp. is around 0°C in winter.
- 4) Antifreezer or other antifreeze measure must be used in bad ambient(under 0°C outdoor).

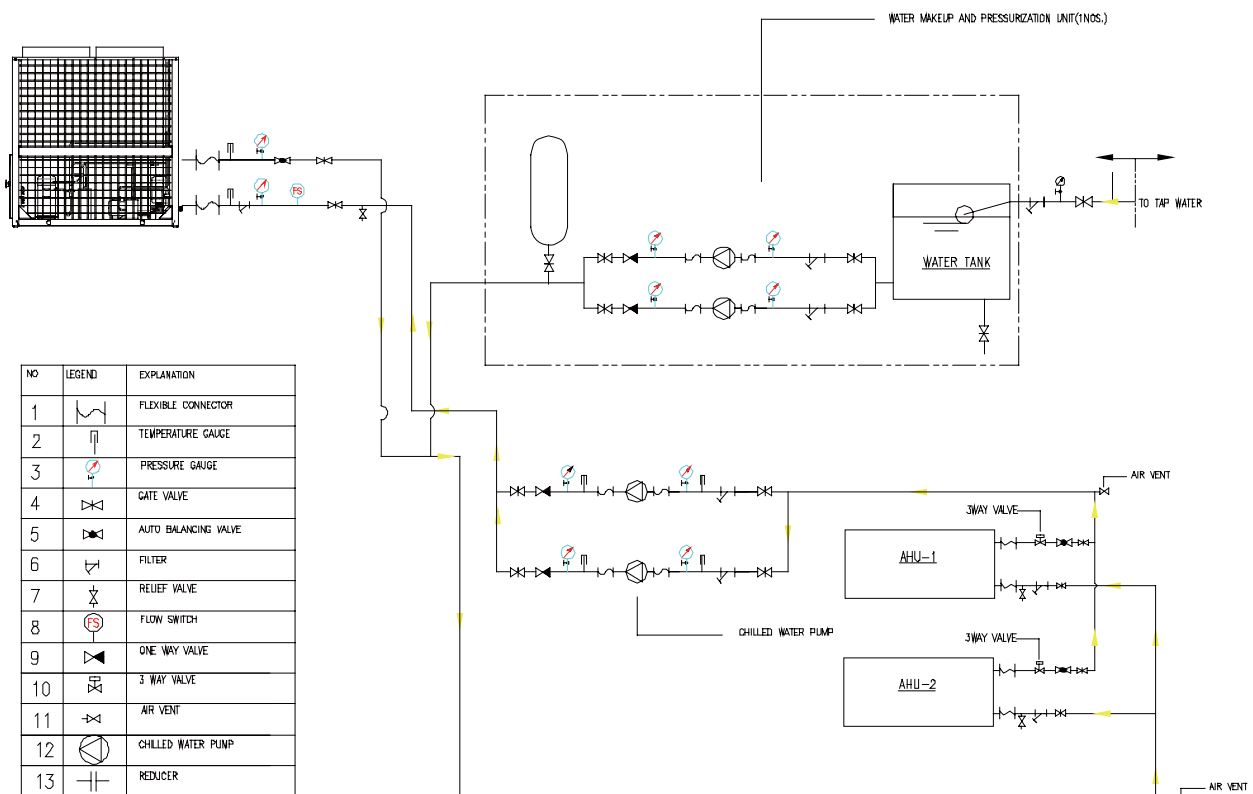
Modular Screw Air Cooled Water Chiller & Heat Pump

Installation Attention

The machine installation and piping system layout should be carried out by professional people according to national and local HVAC regulation. It should be carried out according to related technical specification and requirement and the building structure for piping system, in the process of installation, please pay attention to the followings:

- 1) Design the pipelines reasonably: avoid bending as much as possible, no piping in the shape of "U" or "Ω" to avoid discharging block and water resistance increase; keep slant in horizontal pipes in order to facilitate air discharge; fix air discharge valve in the highest point of water system;
- 2) Install water filter (≥ 40 mesh) in the front of water inlet pipe, to avoid pipe block and machine damage; the water piping must have leakage testing and cleaned when its finished, then the pipe can be connected with machine.
- 3) Water pipe must be well insulated to keep good cooling/heating performance and save energy.
- 4) Choose proper water flow pump for water supplying system to ensure the difference between actual water supply amount and unit acquiring water supply amount is less than 10%.
- 5) Adopting shock absorption flexible joint for chilled water inlet/outlet pipe and water pump connection to avoid shock transmission in operation. The pipe and water pump should have its own holder, to avoid force bearing on machine.
- 6) Install expansion tank on the water return pipe, for the water flow amount change due to ambient temperature change, the position of which should be 1 to 1.5meter higher than the highest point of the system, the volume of water tank should be 1/10 of that of total system, the chilled water pipe and water expansion tank should be insulated.
- 7) Install water flow switch on water out pipe (paddle flow meter), avoid of damage to unit due to lack of water. Discharge air inside to water system before operation to avoid damage of machine.
- 8) Install water discharge tap or valve in the lowest point of water system, so as to release all the water inside of water system and water side heat exchanger (refer to the water release mark on machine) when long time not in use in winter to avoid pipe damage caused icing.

Annex: 1. air cooled water chiller water system diagram:



WP Manufacturing (Pty) Ltd
11 Profab Crescent
Delville Business Park
Delville Ext 4
Germiston 1401
Tel: +27 (11) 827-3595
Fax: +27 (11) 827-3957
Email: sales@westair.co.za

Hennie Traut
Chief Executive Officer
Cell: +27 (82) 490 2069
Email: airtech@iafrica.com
