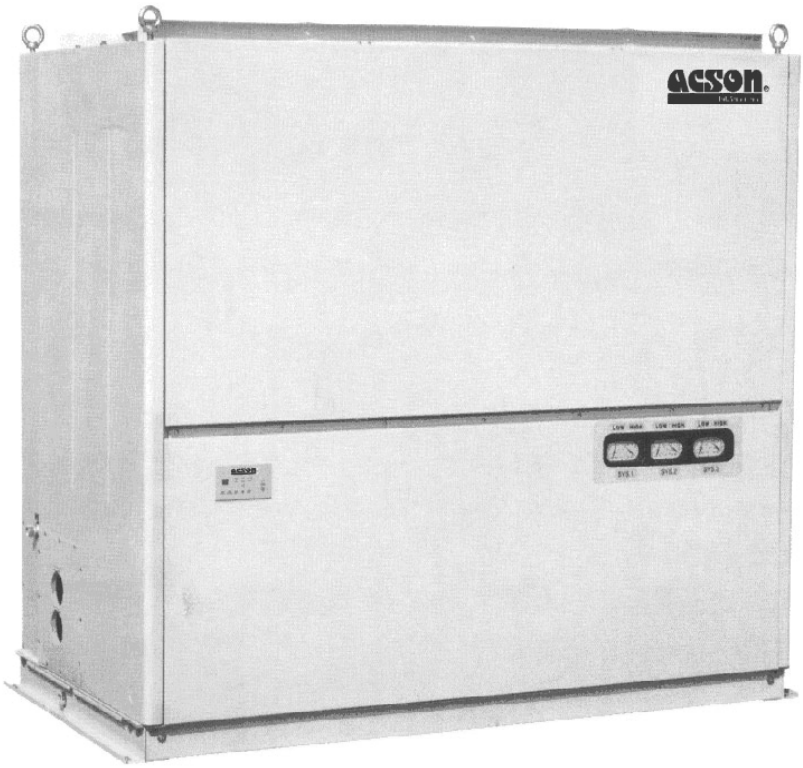
Installation, Operation & Maintenance Manual

Water Cooled Packaged Unit

AWCP120AE/ADE
AWCP160AE/ADE
AWCP220AE/ADE
AWCP250AE/ADE
AWCP280AE/ADE
AWCP320AE/ADE
AWCP380AE/ADE
AWCP420AE/ADE
AWCP460AE/ADE
AWCP480AE/ADE
AWCP520AE/ADE
AWCP620AE
AWCP680AE



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ACSON International

Please keep this manual properly
Before installation or use, please read this instruction manual carefully

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CONTENTS

1、SAFETY PRECAUTIONS

Before installing the unit, please read carefully

⚠ Warning: The wrong operation may cause death or major injury accident.

⚠ Caution: The precautions to be followed, in order to prevent damage to the unit and accidental injury

❗ stands for the important instructions to be followed.

🚫 stands for actions which shall not be tried.

■ Precautions of installation and use

To give play to the best performance of the equipment, please operate according to the following content. If the specifications are not followed, practical measures must be taken before starting.

⚠ Warning

■ **Confirm that the content in the instruction manual is followed for installation.**
Non-standard installation may cause damage to the unit, refrigerant leakage, electric shock, fire and other accidents. ❗

■ **During installation of the unit, please take windproof, shockproof and preventive measures according to the rules.**
Otherwise it may cause collapse, falling and other accident of the unit. ❗

■ **The maintenance should be only performed by professional maintenance personnel. Before touching the wiring devices, power supply must be cut off.** ❗

■ **Optional accessories shall be installed by professional staff.**
When optional accessories are used, the product recommended by the manufacturers shall be used. Improper selection is easy to cause electric shock, fire and other accidents. ❗

■ **In case of abnormal phenomenon of the unit, the power supply shall be immediately turned off.**
If you continue to use, it will damage the unit and may cause electric shock or fire accident. ❗

■ **The electrical parts must be moisture proof.**
Otherwise it will cause electric shock, fire and other accidents. ❗

■ **There shall be a private line for electrical installation, and the installation shall be completed by professional electrical personnel**
Electrical installation shall comply with electrical equipment engineering standard and indoor electrical wiring specification. The improper selection, of power line will lead to electric leakage or even fire. ❗

Warning

- **It is prohibited to use refrigerant or refrigerant oil with wrong type and model.**
  Otherwise it may lead to fire, explosion or other accidents.
- **The residual-current circuit breaker shall be properly set.**
  The residual-current circuit breaker shall be installed in accordance with the electrical specification. The wrong installation may cause electric shock.
- **The power line shall not be pulled too tightly.**
  Otherwise, the cable may break and generate heat, which can lead to fire or other accidents.
- **Correctly earthing of the unit.**
  Earthling wires can not be connected to gas pipes, water pipes, lightning conductor and telephone lines. Error earthing may cause electric shock
- **The air conditioner can only be cleaned after tne unit is stopped and the power has been turned off.**
  Otherwise it may cause electric shock or injury.
- **It is prohibited to use the power switch to directly control operation and stopping of the unit.**
  Such misoperation will cause electric shock or fire.
- **It is prohibited to change the set value of the safety protection device.**
  Otherwise it may lead to fire, explosion and other consequences.
- **It is prohibited to use the fuse above normal capacity.**
  Replacing the fuse with wire or other things will endanger the safety of equipment or cause fire.
- **It is prohibited to make the safety device short-circuit and force the unit to start.**
  This could lead to damage to the unit, fire, explosion and other consequences.
- **Protective equipment and installation tools shall be prepared.**
  Protective equipments, such as gloves and uniforms, can prevent accidental personal injury.
- **It is prohibited to install the unit in the place where there may be leakage of combustible gas.**
  If the combustible gas leaks and gathers around the unit, it may cause explosion, fire and other accidents.
- **Before maintenance the unit shall be shut down and the power shall be cut off.**
  Otherwise it may cause electric shock, accidental injury and other consequences
- **It is prohibited to operate the unit with wet hands.**
  Otherwise, it will cause electric shock.

Caution

- **Installation and maintenance engineering shall be entrusted to professional installation personnel of the supplier.**
  Installation and maintenance must be performed by specially trained professional staff with installation qualification.
- **Installation base of the unit must have enough carrying capacity.**
  The unit must be installed on the solid foundation to prevent sinking of the unit caused by insufficient strength or causing injuries.
- **Cold (Hot) water used by the unit shall comply with water quality standards.**
  Using water which does not meet the standard of water quality may affect the service life and performance of the unit or even cause water leakage. For water quality standard requirements, refer to Chapter 5 Requirement List of Water Quality of Circulating Water.
- **The fluctuation of voltage supply of the unit shall not be more than ±10% of the rated voltage. The power supply line must be separated from the welding transformer. The welding transformer may cause large voltage fluctuation.**
- **It is prohibited to touch the high temperature part of the compressor and refrigerant pipe.**
  Otherwise it will cause burns.
- **Do not touch the sharp edge or heat exchanger fin.**
  Sharp edge and the surface of the coil are harmful. Avoid touching them.
- **Installation position of the equipment shall ensure the smooth drainage system.**
  Unreasonable drainage system may lead to poor drainage and make the equipment affected by damp.
- **It is prohibited to touch the moving parts.**
  Otherwise it will cause accidental injury.
- **It is prohibited to install the unit in the bad environment.**
  It is prohibited to install the unit at the air outlet of toilet, at the air outlet of operating room in the hospital, near the sewage treatment equipment and in other similar places where there is much dirt, oil, salt and sulfide gas, which may cause corrosion of parts of the unit.
- **The product carrying must be very careful.**
  Forklift or drum is used for regular carrying. Do not force to drag. Before the unit is installed in place, the wood at the bottom of the unit shall not be removed. When the lifting equipment is used to raise or carry the unit, special equipment machinery shall assist to complete
- **It is prohibited to use for other purposes beyond the design scope of the unit.**
  This unit is not suitable for keeping food, animals and plants, precision instruments, fine art, etc. Otherwise it will reduce the quality of these items.
- **When the unit is not used for a long time, the residual water in the unit must be discharged.**
  When the unit is not used for a long time, the water pipe shall be filled with antifreezing agent or the water left in the pipe shall be discharged. Otherwise it may cause frost crack and leakage of the unit parts.
- **It is prohibited to place or hang any object above the unit.**
  It may cause accidental injury when the object topples or falls.
- **If the unit has unusual operation, please cut off the power immediately and contact with the seller.**
- **The compressors must be preheated for at least 24 hours if the system be restarted after long-term off. The crankcases of the compressors must maintain electrified in the interval of the system's short-term off.**

This manual includes the products produced by ACSON International and we reserve the right to make change in design and construction any time without notice.

2、PRODUCT INTRODUCTION

This series of water-cooled Packaged Unit has total of 24 models. Among them, in addition to the standard model (connected to the air duct), optional models with static pressure box is added for the special occasions without installing pipeline for air supply. This series of models have the following features:

1.This series adopt the latest design of vortex compressor with the incomparable advantages of piston compressor.

a. Stable operation. Noise 3~5dB(A) lower than that of the same kind of piston compressor. Very quiet.

b. Unique structure design, higher liquid impact resistance and higher reliability.

c. Higher energy efficiency ratio, power saving and lower operating cost.

2.Models above AWCP250AE/ADE adopt frame type double fan structure, which is convenient for hoisting. The operation is quieter.

3.Models above AWCP220AE/ADE adopt efficient shell and tube condenser, which can Reduce the pipeline jam, Convenient cleaning maintenance, Service life is longer.

4.Shell coated with pure polyethylene powder and arc design, beautiful and generous appearance, and strong rust-proof ability.

5. Electronic control realizes simple, stable and reliable operation.

This series models suit for family, shopping malls, hotels, schools, industrial sectors and so on.

3、TECHNICAL PARAMETERS

1. Specifications for AWCP-AE/ADE

Cooling Model			AWCP120AE	AWCP160AE	AWCP220AE	AWCP250AE	AWCP280AE
Cooling Capacity		Btu/h	109220	158700	226960	250850	279860
		kW	32	46.5	64	73.5	82
Capacity Steps		%	100,0	100,67,33,0	100,50,0	100,50,0	100,50,0
Rated Airflow Rate		m^3/h	5900	8100	10800	13600	14500
Noise Level		dB (A)	65	67	70	72	72
Net Weight		kg	280 (300)	455 (485)	610 (650)	720	800
Dimension	Length	mm	1278	1722	1922	2000	2000
	Width	mm	677	736	836	1060	1060
	Height	mm	1902 (2172)	1921 (2195)	2035 (2404)	1989	1989
Power Supply			380-415V/3N~/50Hz				
Rated Cooling Power Input		kW	7.8(7.8)	13.1(12.3)	16.2(15.2)	18.1	20.0
Compressor	Type		Fully enclosed vortex type				
	Quantity	unit	1	2	2	2	4
	Type of Refrigerant		R407C				
	Charge Quantity	kg	2.9	3.1+1.45	3.7+3.9	4.0x2	4.2x2
Condenser	Type		Tube In Tube		Shell & Tube		
	Water Flow	m^3/h	6.5	9.8	12.4	14.2	15.6
	Water Headloss	mH_2O	7.0	6.1	1.8	2.1	2.9
Refrigerant Control			Capillary tube				
Fan	Type		Low-noise Double Suction Multi-blade Centrifugal Type				
	Drive		V belt Drive				
Filter	Dimension	mm	1025×775	1466×725	1656×825	529x660	529x660
	Quantity	unit	1	1	1	6	6
Heat pump Model			AWCP120ADE	AWCP160ADE	AWCP220ADE	AWCP250ADE	AWCP280ADE
Rated Heating Capacity		kW	12	21	27	36	36
Rated Heating Power Input		kW	13.5(13.5)	23.2(23.2)	30.0(29.2)	39.0	40.0
Weight		kg	293(313)	473(503)	632(672)	760	840

Remarks:

a. The nominal cooling capacity is based on the following conditions: indoor dry-bulb temperature 27℃, wet-bulb temperature 19℃, entering cooling water temperature 30℃, the rated flow.

b. The parameters in the table above may change due to product improvement. Please refer to the parameters on the nameplate of the unit.

c. The parameters in the parentheses are applicable for the units with plenum box.

d. Heat pump Model built-in electric heating tube.

Cooling Model			AWCP320AE	AWCP380AE	AWCP420AE	AWCP460AE
Cooling Capacity		Btu/h	324230	375420	402730	450510
		kW	95	110	118	132
Capacity Steps		%	100,78,61,39,22,0	100,67,33,0	100,67,33,0	100,86,71,57,43,29,14,0
Rated Airflow Rate		m^3/h	17000	19800	22000	22000
Noise Level		dB (A)	74	75	75	76
Net Weight		kg	930	1010	1030	1225
Dimension	Length	mm	2000	2220	2220	2420
	Width	mm	1060	1243	1243	1243
	Height	mm	1989	2068	2068	2068
Power Supply			380-415V/3N~/50Hz			
Rated Cooling Power Input		kW	25.4	29.2	30.0	33.0
Compressor	Type		Scroll			
	Quantity	unit	3	3	3	4
	Type of Refrigerant		R407C			
	Charge Quantity	kg	7.3x2+2.7	4.7x3	4.8x3	3.9x4
Condenser	Type		Shell & Tube			
	Water Flow	m^3/h	19.8	22.9	23.4	28.0
	Water Headloss	mH_2O	1.7	2.9	2.0	2.9
Refrigerant Control			Capillary tube			
Fan	Type		Low-noise Double Suction Multi-blade Centrifugal Type			
	Drive		V belt Drive			
Filter	Dimension	mm	529x660	593x686	593x686	661x686
	Quantity	unit	6	6	6	6
Heat pump Model			AWCP320ADE	AWCP380ADE	AWCP420ADE	AWCP460ADE
Rated Heating Capacity		kW	42	48	48	48
Rated Heating Power Input		kW	46.0	53.5	55.5	55.5
Weight		kg	960	1060	1080	1255

Remarks:

a. The nominal cooling capacity is based on the following conditions: indoor dry-bulb temperature 27℃, wet-bulb temperature 19℃, entering cooling water temperature 30℃, the rated flow.

b. The parameters in the table above may change due to product improvement. Please refer to the parameters on the nameplate of the unit.

c. The parameters in the parentheses are applicable for the units with plenum box..

d. Heat pump Model built-in electric heating tube.

Cooling Model			AWCP480AE	AWCP520AE	AWCP620AE	AWCP680AE
Cooling Capacity		Btu/h	491460	525590	614330	679180
		kW	144	154	180	199
Capacity Steps		%	100,86,71,57,43,29,14,0	100,75,50,25,0	100,78,67,56,44,33,22,0	100,80,60,40,20,0
Rated Airflow Rate		m^3/h	24600	26400	28800	33000
Noise Level		dB (A)	77	77	78	79
Net Weight		kg	1235	1250	1350	1400
Dimension	Length	mm	2420	2420	2675	3002
	Width	mm	1243	1243	1243	1534
	Height	mm	2068	2068	2068	2083
Power Supply			380-415V/3N~/50Hz			
Rated Cooling Power Input		kW	34.4	39.0	42.0	49.4
Compressor	Type		Scroll			
	Quantity	unit	4	4	5	5
	Type of Refrigerant		R407C			
	Charge Quantity	kg	4.0x3+3.8	4.5x4	4.6x4+3.3	7.1x3+6.9x2
Condenser	Type		Shell & Tube			
	Water Flow	m^3/h	26.2	30.9	37.1	39.9
	Water Headloss	mH_2O	2.8	3.3	6.2	8.0
Refrigerant Control			Capillary tube			
Fan	Type		Low-noise Double Suction Multi-blade Centrifugal Type			
	Drive		V belt Drive			
Filter	Dimension	mm	661x686	661x686	686x744	629x673
	Quantity	unit	6	6	6	8
Heat pump Model			AWCP480ADE	AWCP520ADE	-	-
Rated Heating Capacity		kW	60	60	55(HD55A)	55(HD55A)
Rated Heating Power Input		KW	67.5	71.0	66.0	70.0
Weight		Kg	1265	1280	1430	1480

Remarks:

a. The nominal cooling capacity is based on the following conditions: indoor dry-bulb temperature 27℃, wet-bulb temperature 19℃, entering cooling water temperature 30℃, the rated flow.

b. The parameters in the table above may change due to product improvement. Please refer to the parameters on the nameplate of the unit.

c. The parameters in the parentheses are applicable for the units with plenum box.

d. Heat pump Model built-in electric heating tube.

e. For AWCP620/680AE electric heating function, additional electric heating box HD55A is needed.

2. Operating Range

2.1. Unit operating range

Power Supply		Condenser Water In	Evaporator Air In		Default Control Pressure (MPa)		
Compressor	Fan	Temperature range (℃)	Wet bulb temperature range (℃)	Dry bulb temperature range (℃)	Low pressure	High pressure	
						AWCP120-160	AWCP220-680
380-415V/3N~ /50Hz	380-415V/3N~ /50Hz	16~40	13 ~ 24	16 ~ 32	0.15	2.8	2.5

2.2. Unit Operation condition

Item	Content
Supply voltage	Rated voltage±10%
Power frequency	Rated frequency±1%
Imbalance between each phase	Rated voltage±2%
Air quality	Not contain solutes corroding copper, aluminum and iron
Cooling water flow	80%~130% of the rated flow
Cooling Water Pressure	AWCP120-160：Below 1.6Mpa (gauge pressure) AWCP220-680：Below 1.0Mpa (gauge pressure)
Cooling water quality	Not contain solutes corroding copper, iron and welding material (Refer to Chapter 5 “Requirements of Circulating Water Quality”)
Ambient temperature	Refer to above table (Unit operating range)
Relative humidity	Less than 90%

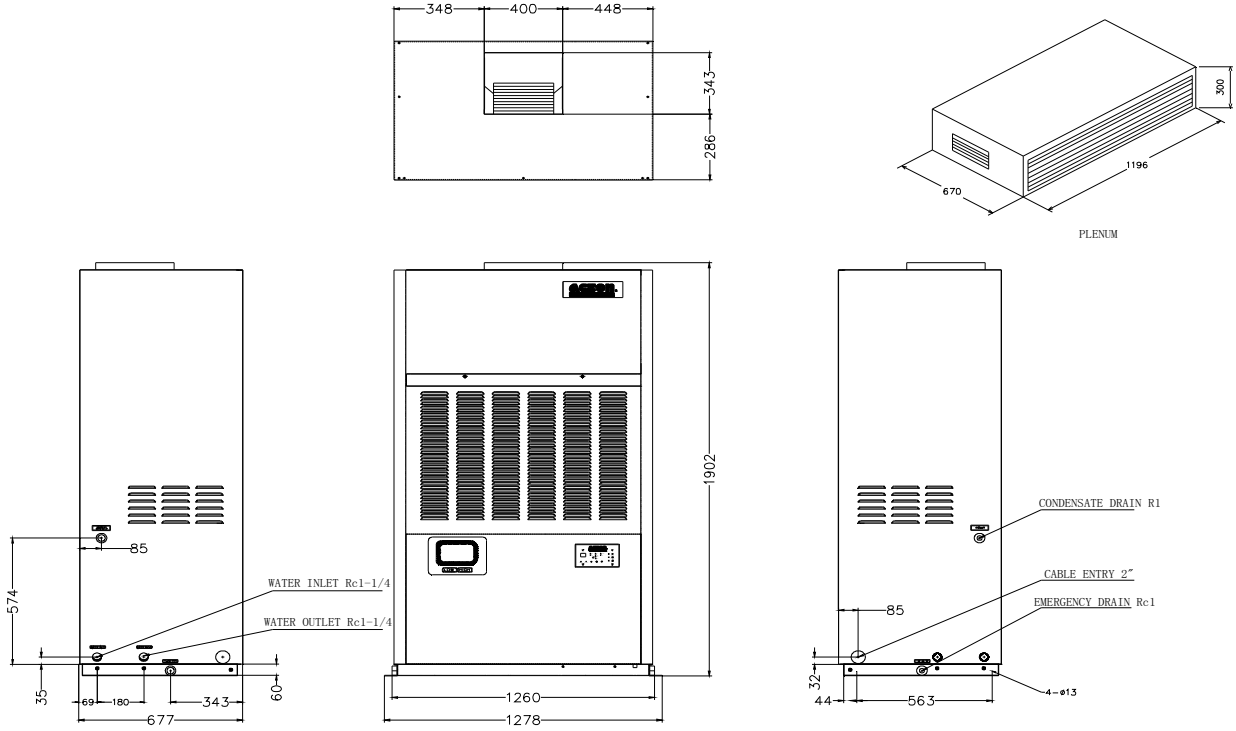
Remarks:

a. Every system of the unit has been strictly tested in the factory to ensure the unit operates safely within the operating range.

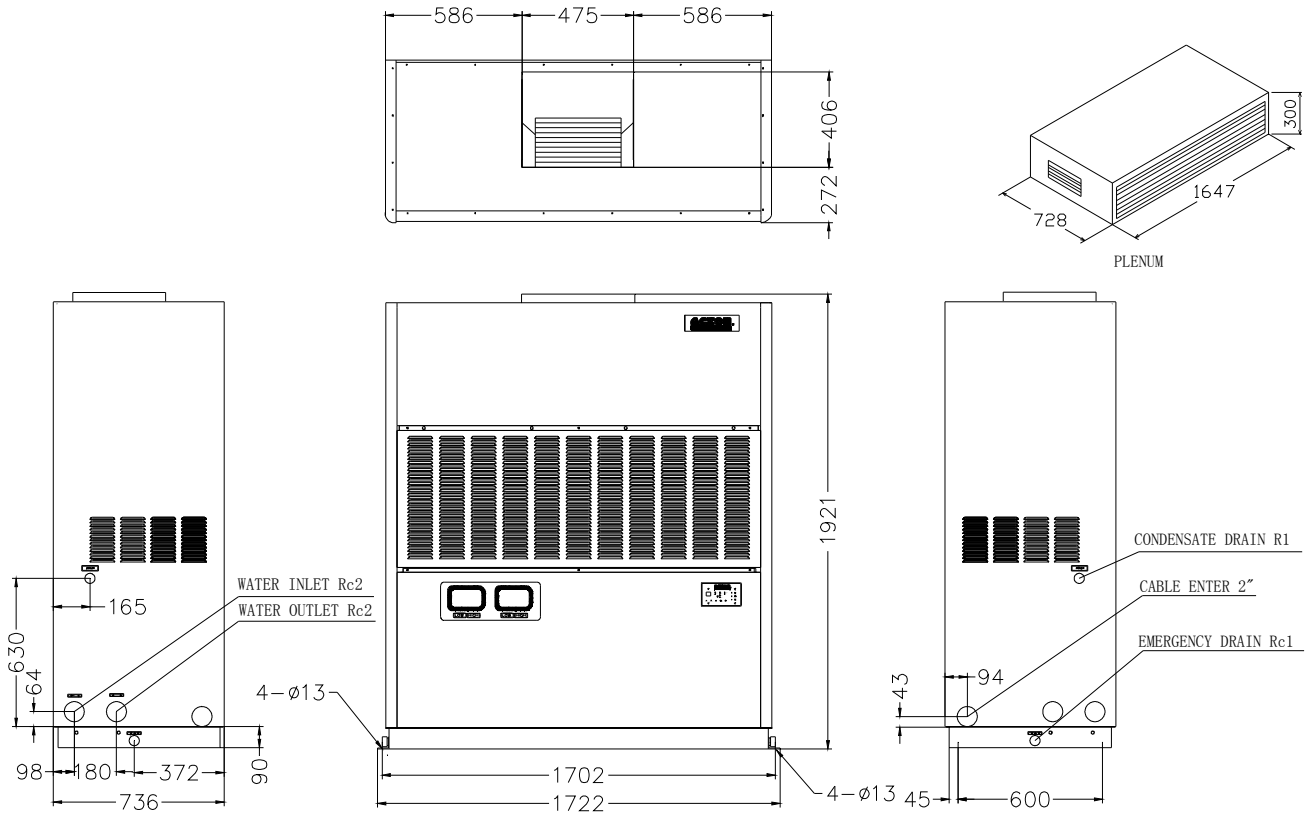
b. Above table shows normal operating range conditions of the unit. Beyond this range, the unit can only run for a short time. Otherwise there will be fault alarm.

4、 DIMENSIONS

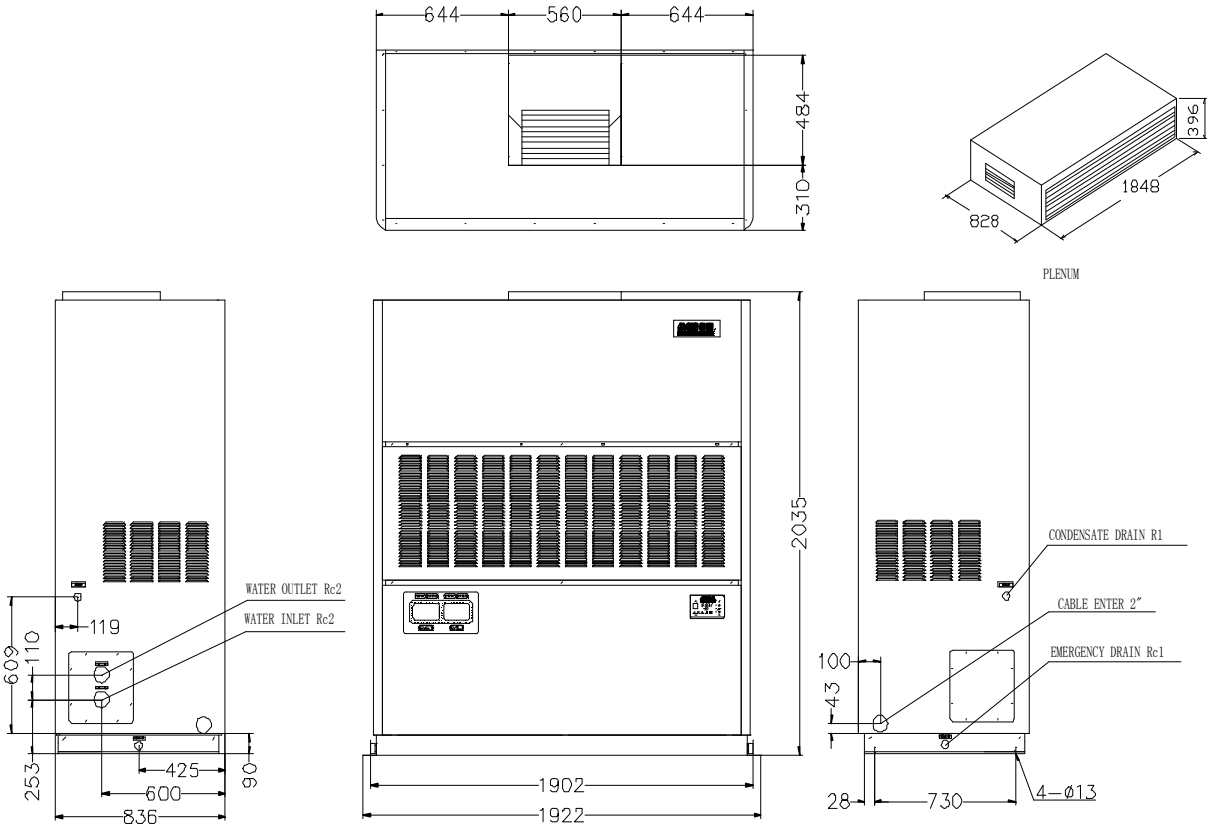
1. Model：AWCP120AE、AWCP120ADE



2. Model：AWCP160AE、AWCP160ADE

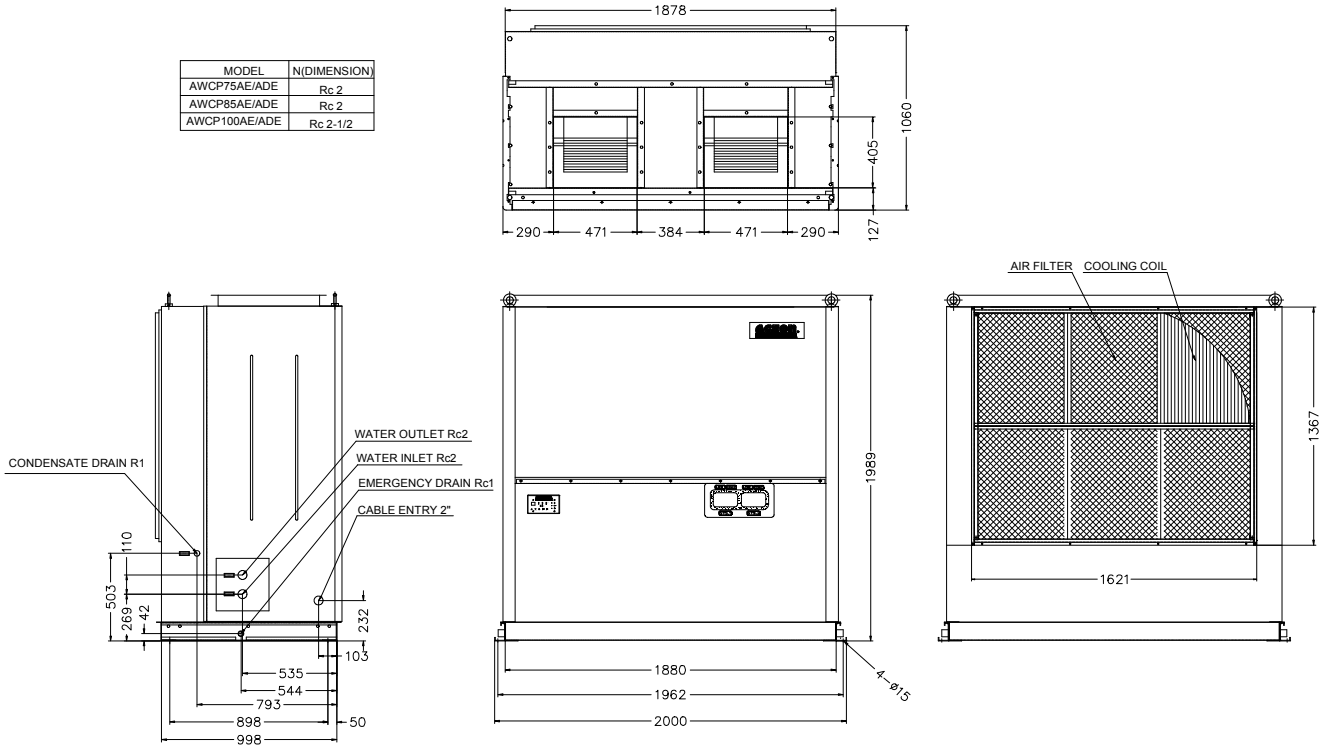


3. Model：AWCP220AE、AWCP220ADE



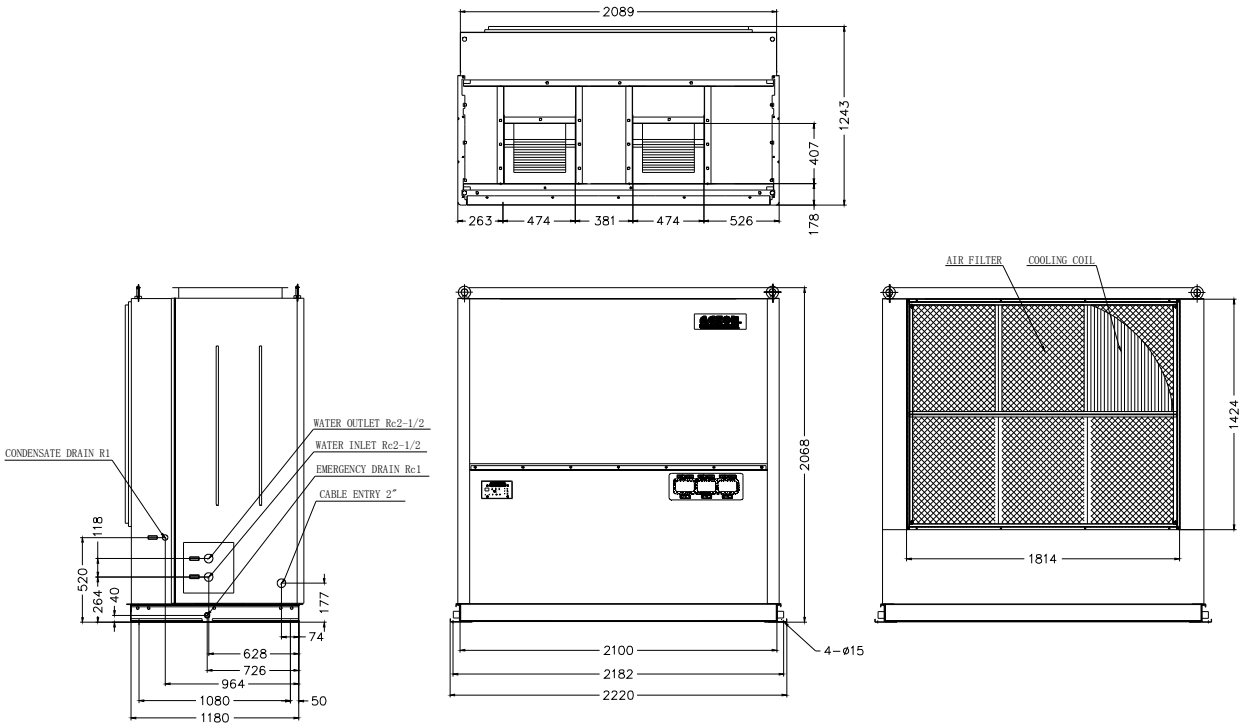
4. Model：AWCP250AE/280AE/320AE、AWCP250ADE/280ADE/320ADE

MODEL	N(DIMENSION)
AWCP75AE/ADE	Rc 2
AWCP85AE/ADE	Rc 2
AWCP100AE/ADE	Rc 2-1/2

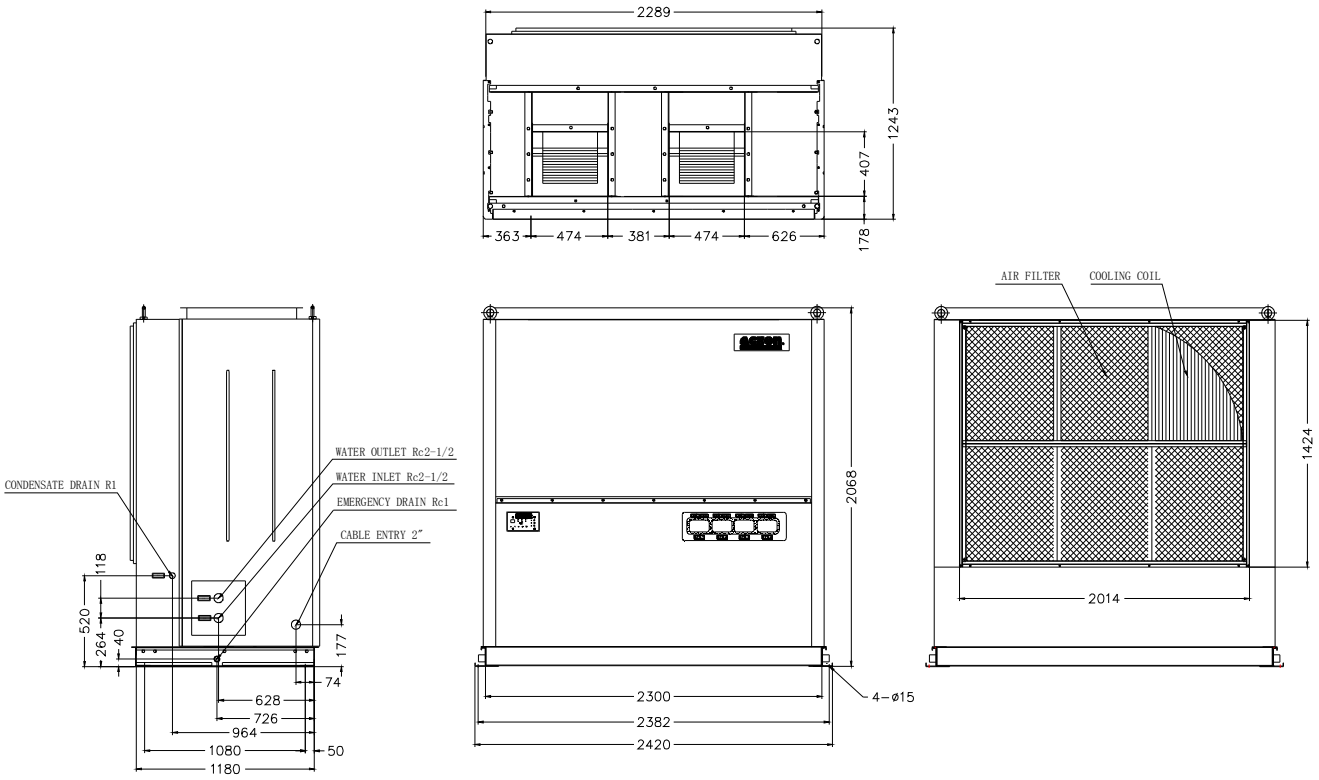


Remarks: AWCP250AE/ADE 、AWCP280AE/ADE coupled with two pressure gauge、AWCP320AE/ADE coupled with three pressure gauge.

5. Model: AWCP380AE/420AE、AWCP380ADE/420ADE

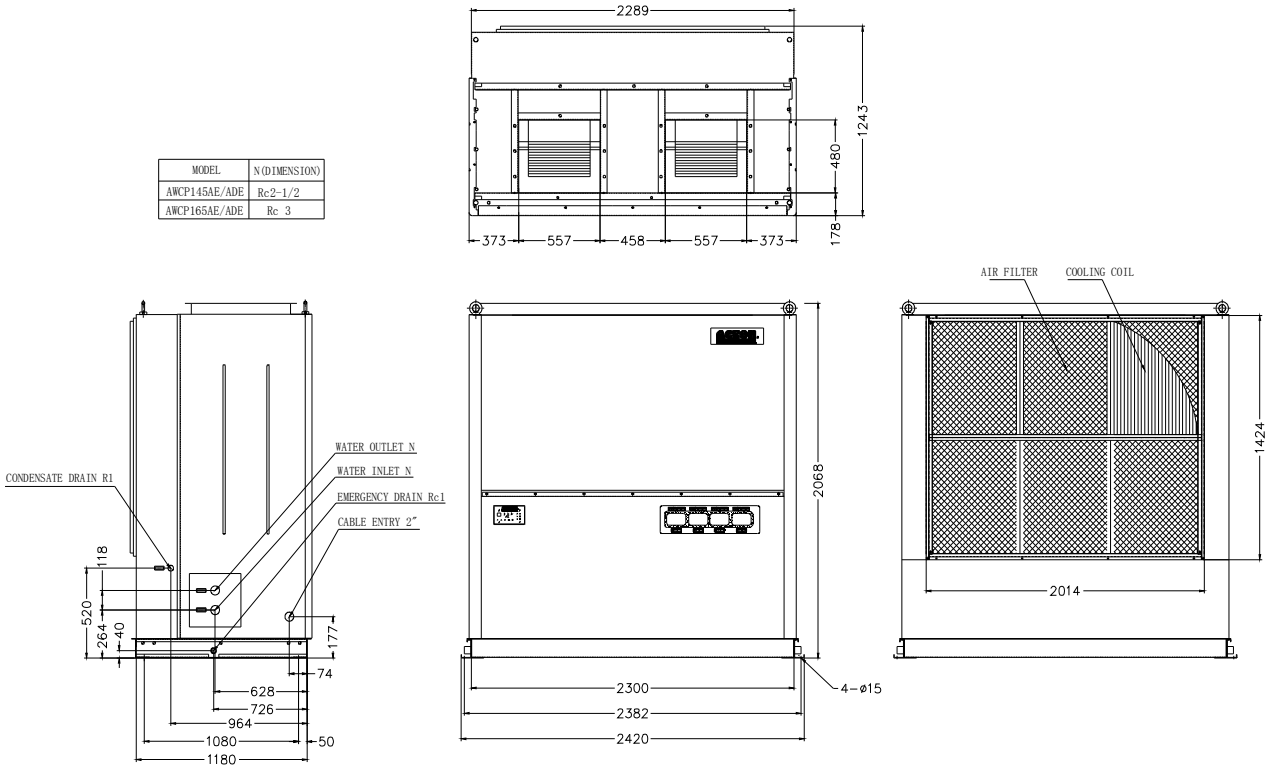


6. Model: AWCP460AE、AWCP460ADE

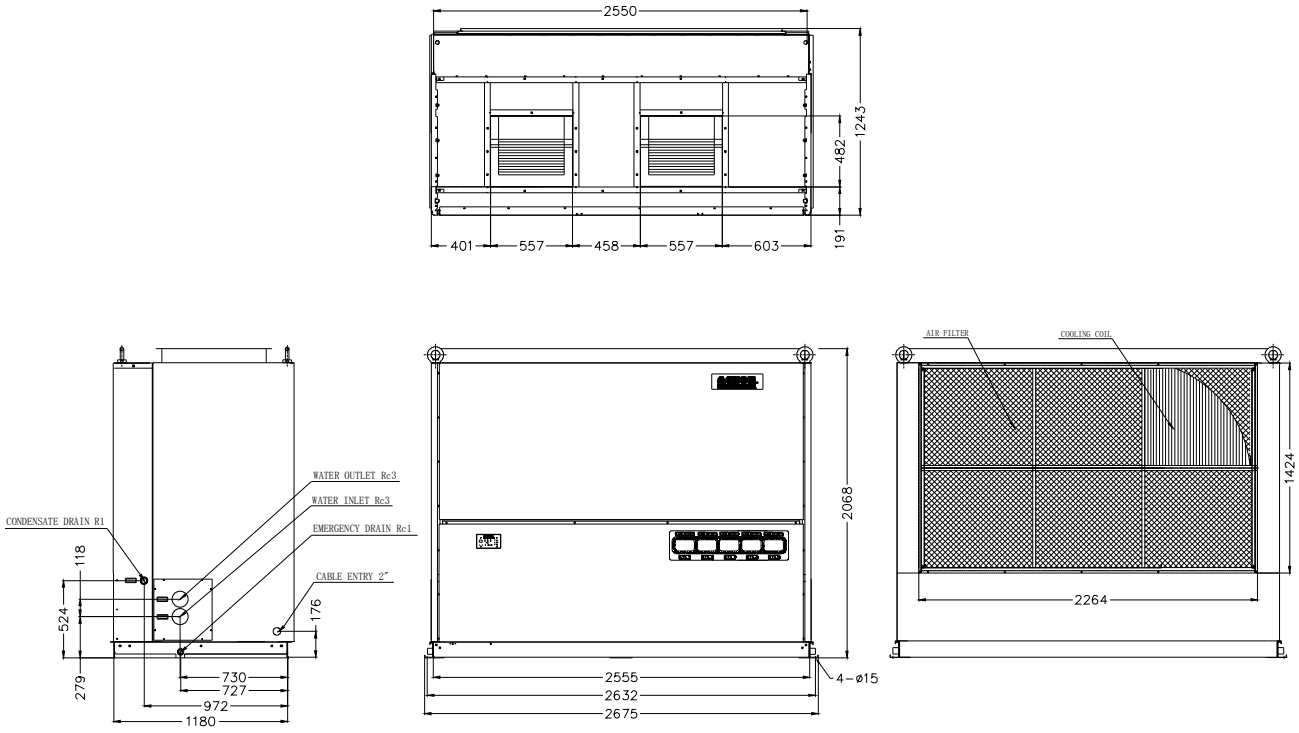


7. Model: AWCP480AE/520AE、AWCP480ADE/520ADE

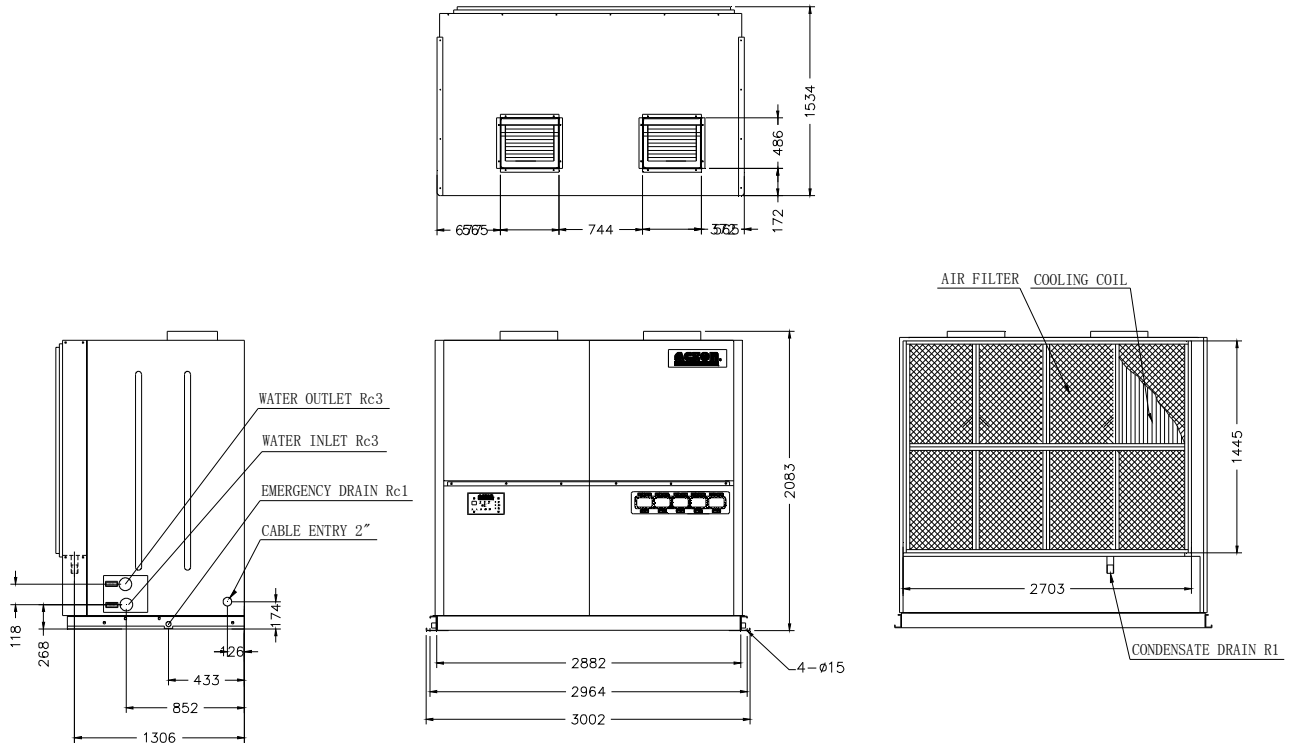
MODEL	N(DIMENSION)
AWCP145AE/ADE	Rc2-1/2
AWCP165AE/ADE	Rc 3



8. Model: AWCP620AE



9. Model: AWCP680AE



5、INSTALLATION

1. Check

When the unit is received, check the unit according to the following matters:

1.1. As soon as the unit is received, it should be inspected for any damage that may have occurred in transit. If damage is evident, it should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing at once.

1.2. Check shipment against the bill of lading to verify that all items were delivered. Any shortages should be noted on the delivery receipt, and a claim filed immediately.

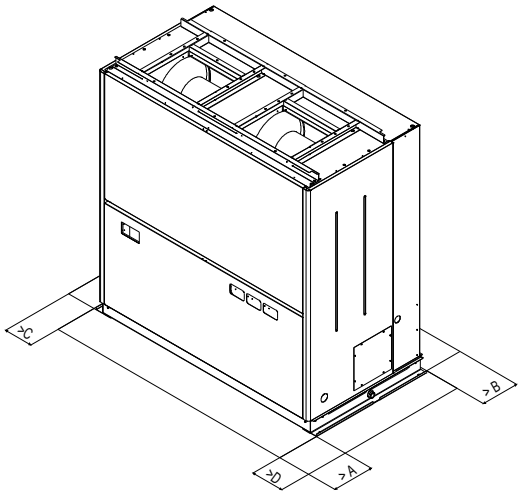
2. Installation space

2.1. Unit installation must be performed by service personnel of ACSON or experienced Technicians.

2.2. The installation must accord with the national and local laws, regulations, standards and product installation instructions on electric, architecture and environment.

2.3. There should be sufficient space for maintenance and repair around the unit. If the conditions allow, large maintenance space shall be reserved.

The image below shows the size of the minimum space for the unit.



Model	A（mm）	B（mm）	C（mm）	D（mm）
AWCP120/160/220	1500	900	900	900
AWCP250/280/320/380/420 /460/480/520/620/680	900	1500	900	900

3. Installation location

3.1. The unit is designed to install on a flat and level concrete foundation which can bear the unit operating weight. (Refer to specification parameters).

3.2. During installation, Place cushion between the concrete base and the unit vibration to avoid vibration and noise. The unit and piping should be separated with the wall and the ceiling.

3.3. Forbid installing the cooling tower in the polluted river, coast, electroplating factory, chemical factory and trunk road which is covered by harmful gases. The unit or cooling tower be installed exposed on low ambient conditions, freeze protection is the responsibility of others.

3.4. In order to prevent the noise from being transferred to the air conditioning room, it is suggested that to install the unit in the least sensitive place, such as near the stairwells, elevator or toilet, or use partition between the unit and the air conditioning room and seal the doors and windows; if necessary, the silencer also can be installed in the air duct.

4. Piping connections

All system piping should be installed in accordance with local codes ordinances. The piping should be designed with a minimum number of bends and changes in elevation to keep a minimum costs and maximum unit performance. A good installation should include the following:

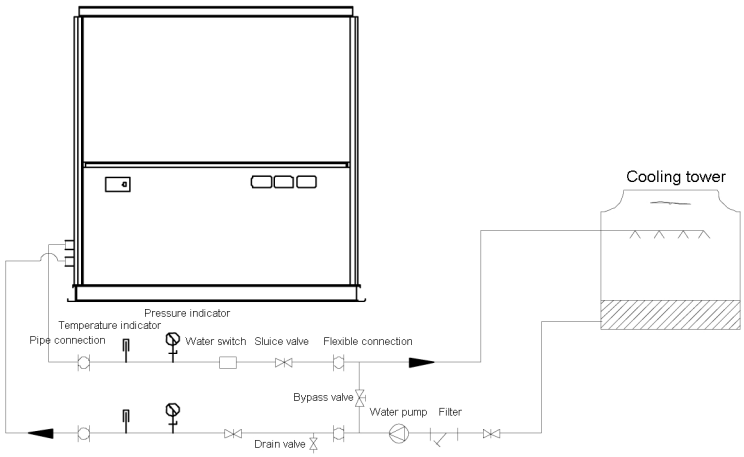
a、Vibration device to reduce vibration and noise transmit to the building;

b、Shut-off valves to isolate the unit and piping system during maintenance;

c、Install water pressure gauge and temperature indicators at the unit to aid in maintenance and repair;

d、Install a strainer in front of pump to remove foreign matter from the water.

The unit water system installation as shown in the figure below (schematic drawing)



4.1. Condenser water piping

Please connect the pipes according to mark of water inlet and water outlet of the unit. The reverse connection is prohibited. The left and right end cover of the condenser can be exchanged and connection direction of water inlet and water outlet of the unit can be changed on site. This work has to be guided by professional service personnel of our company on site.

4.2. Cooling tower piping

When the unit is connected with a cooling tower, a certain water pressure shall be ensured, AWCP120-160 model maximum pressure shall not exceed 1.6MPa (gauge pressure), AWCP220-680 model maximum pressure shall not exceed 1.0MPa (gauge pressure). At the same time, along with the change of outside temperature and humidity, the water flow entering the condenser shall be adjusted, in order to keep the condensing pressure and the condensing temperature constant. It is recommended to use a 3-way water regulating valve. The valve should be set to maintain minimum leaving condenser water temperature as 20℃or minimum entering condenser water temperature as 16℃.

In order to avoid the situation that the water temperature is too low, it is recommended to install a temperature switch (the suggested set value is around 27 ℃) to control the start-stop of fan of the cooling tower, so as to ensure that the water temperature is within the normal operation range.

4.3. Condensate drain pipe

There are two standard drain connection methods:

a. Connect from the drain pan that formed between the evaporator and the condenser.

b. Connect from the auxiliary drain pan which also called the unit base.

Place a small drainage pipe to prevent air from entering the evaporator and to facilitate the discharge of condensate. Drain pipe insulation must be used, otherwise it may cause condensate dripping.

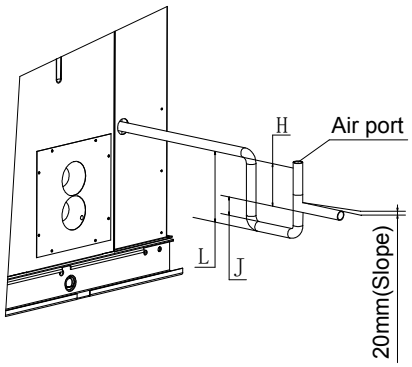
Vacuum condensate trap：

H = The maximum static pressure (Pa)/9.8 mmH_2O + 25.4 mmH_2O

J = H * 0.5

L = H + J + The condensate pipe diameter + The thickness of Insulation material

For the condensate drain piping connection, please refer to the figure below (schematic diagram)



4.4. Circulating water quality requirements

For equipments long-term high-efficiency operation in the system, the system must ensure the circulating water quality. The water must be preliminary softening treatment, aimed to protecting heat exchanger from scaling, which will influence heat exchange effect. In addition, the water unsoftened may be scaled in the pipeline, leading to water resistance increasing, impact the water flow and water pump.

Item			Reference value	Tendency	
				Corrosion	Fouling
Reference Item	pH value (25 ℃)		6.5～8.0	○	○
	Electric conductivity (25 ℃)	μS/cm	＜800	○	○
	Cl^-	$mg(Cl^-)/L$	＜200	○	
	SO_4^{2-}	$mg(SO_4^{2-})/L$	＜200	○	
	Acid consumption (pH=4.8)	$mg(CaCO_3)/L$	＜100		○
	Full hardness	$mg(CaCO_3)/L$	＜200		○
Reference Item	Fe	mg(Fe)/L	＜1.0	○	○
	S^{2-}	$mg(S^{2-})/L$	No containing	○	
	NH_4^+	$mg(NH_4^+)/L$	＜1.0	○	
	SiO_2	$mg(SiO_2)/L$	＜50		○
Note: ○ stands for factors of corrosion or fouling tendency					

If the water in the system can't accord with the requirement, the normal method is as below:

a. Adopt water-water plate heat ex-changer to separate the system water and cooling water, this special plate heat ex-changer should be anti-corrupt and easy washing.

b. Add water treatment equipment to circulating water system, such as water treatment device, vortex flow desander, etc.

5. Air duct connections

5.1. Air supply duct Connection

The air duct must be the same size with air outlet, and the air duct length of the straight pipe shall be more than 3 times of the diameter of the fan. Otherwise, it will cause additional loss of air pressure.

Minimum Straight Duct Length

MODEL	Impeller diameter（mm）	Minimum straight duct length（mm）	MODEL	Impeller diameter（mm）	Minimum straight duct length（mm）
AWCP120	300	900	AWCP380/420/460	380	1140
AWCP160	380	1140	AWCP480/520	460	1380
AWCP220	460	1380	AWCP620/680	460	1380
AWCP250/280/320	380	1140			

Note: The models with the plenum box can not be used to connect to the air duct. Otherwise, the unit may be damaged due to air volume insufficient.

5.2. Return air duct connection

AWCP units are designed for "free air return". The equipment room serves as the return air room. If the return air is ducted to the unit, a flex connection must be supplied.

5.3. Air duct insulation

The ductwork must be insulated. Insulation should include a vapor barrier to prevent absorption of moisture.

6. Electrical connections

Before electrical appliances are connected, the following safety rules and measures must be strictly followed.

Note: The power inlet shall have breaking device with enough capacity. The cut-off device shall have short circuit and grounding failure protection function. And the device shall have at least 3mm of contact separation.

6.1 Installation must be performed by service personnel of ACSON or experienced Technicians. The installation must accord with the national and local laws, regulations, standards and product installation instructions on electric, architecture and environment. The user shall not remove and add controllable parts. ACSON shall not be responsible for any damage to the unit or casualties caused by operation not according to the safety rules.

6.2. For the circuit connection, please refer to Wiring diagram and electrical parameters. Each machine is equipped with the wiring diagram, which is placed on the side panel of the unit.

6.3. Check whether the power supply meets the requirements before start-up.

MODEL	Minimum cross-sectional area of power cord (mm²)			Max. Current（A）	Max. Power Input（kW）
	Live Wire (R/S/T)	Neutral Wire	Earth Wire		
AWCP120AE	4	4	4	20.50	10.80
AWCP120AE(With plenum box)	4	4	4	20.50	10.80
AWCP120ADE	6	6	6	25.60	13.50
AWCP120ADE(With plenum box)	6	6	6	25.60	13.50
AWCP160AE	6	6	6	29.80	15.72
AWCP160AE(With plenum box)	6	6	6	29.80	15.72
AWCP160ADE	10	10	10	44.00	23.20
AWCP160ADE(With plenum box)	10	10	10	44.00	23.20
AWCP220AE	10	10	10	36.90	19.44
AWCP220AE(With plenum box)	10	10	10	36.90	19.44
AWCP220ADE	16	16	16	56.80	30.00
AWCP220ADE(With plenum box)	16	16	16	55.30	29.20
AWCP250AE	10	10	10	41.15	21.72

AWCP250ADE	25	16	16	73.90	39.00
AWCP280AE	10	10	10	45.47	24.00
AWCP280ADE	25	16	16	75.80	40.00
AWCP320AE	16	16	16	57.80	30.48
AWCP320ADE	35	25	16	87.20	46.00
AWCP380AE	25	16	16	66.39	35.04
AWCP380ADE	35	25	16	101.40	53.50
AWCP420AE	25	16	16	68.30	36.00
AWCP420ADE	35	25	16	105.20	55.50
AWCP460AE	25	16	16	70.00	39.60
AWCP460ADE	35	25	16	105.20	55.50
AWCP480AE	25	16	16	78.22	41.28
AWCP480ADE	50	35	25	127.90	67.50
AWCP520AE	35	25	16	88.70	46.80
AWCP520ADE	50	35	25	134.60	71.00
AWCP620AE	35	25	16	96.00	50.40
AWCP680AE	50	35	25	116.90	61.74

Remarks:

a. Data in the table above are electrical parameters of the unit.

b. All wire connection must be strong.

c. All wires shall not be in contact with refrigerant line, compressor, fan and other moving parts.

7. Operation

7.1. Cleaning water system before operation

Before debugging, the whole water system pipelines should be cleaned. During cleaning, close all the valves connected to the unit, and opened the discharge valve and by-pass valve. After washing, open the drain valve to discharge sewage and impurities. Repeat for 2-3 times like this until the water becomes clear. After washing of the pipeline, open all valves connected to the unit. Close all the by-pass valves and started the circulating pump and the cooling tower.

7.2.Items to be confirmed before operation

Note: Before commissioning of the unit, the following content must be carefully checked. Please read Safety Considerations once again, in order to ensure safety of the equipment.

a. During the first boot or restarting after stopping for a long time, the power must be switched on in advance. The crankcase must be heated for at least 24 hours to ensure compressor smooth starting.

b. Before water pump operation, open the water valve so that the pump is full of water. At the same time air in the system shall be discharged.

c. Before unit operation, the water system must be cleaned. Ensure that water system pipelines are clean and without any pollution.

d. Ensure that the operation range is obeyed to operation scope of the unit.

e. Circuit connection of the unit. Check the wire diameter and connection, and whether the ground wire has been firmly connected.

f. Whether the input voltage is too high or too low.

g. Whether the condensate drain pipe is clear.

h. Check the wire model and type is in line with local standards or requirements of the National Electrical Code.

i. Verify whether field wiring meets the requirements of the circuit diagram of the unit. Check the warning and the precautions on the unit.

j. Check whether the refrigerant loop has leakage.

k. Check the straightness of V belt wheel and the tightness of V belt.

l. Rotate V belt wheel of the fan by hand and check the position of fan propeller in the fan cover. If there is any friction, it shall be readjusted.

m. After the internal inspection of the unit, all the sheet metal parts aligned with the air port shall be installed.

n. Ensure that all pipes, such as cooling water pipe and drain pipe, have been installed and passed the test. The drain pipe shall be equipped with a U-shaped trap.

o. Ensure that functions of the water pump are normal and the flow setting is correct.

p. Equip pressure testing and thermometer tube on the inlet pipe and the outlet pipe for failure analysis.

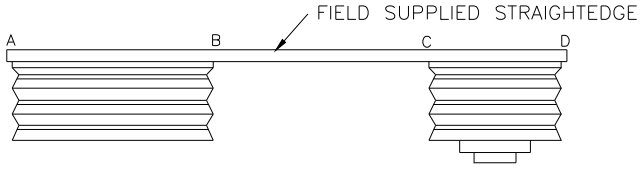
q. Ensure that cooling tower fan wiring and fan rotation direction are correct.

7.3. Air system Inspection before operation

Before the unit leaves the factory, V belt wheel and V belt have been adjusted. They should be checked before operation. After a week of operation, adjust the V belt tension to suitable. After a month of operation, adjust V belt tension again. After that, every three months a routine inspection shall be conducted. **The V belt too loose or too tight will damage to the system and produce noise.**

a. The V belt wheel straightness adjustment

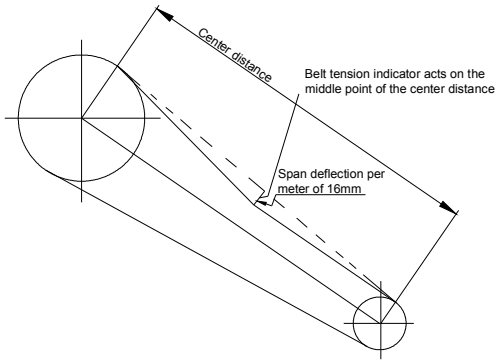
The straightness of V belt wheel can be checked and adjusted with four-point method on site with a ruler. (As shown in the figure below)



FOUR POINT METHOD

b. The V belt tightness adjustment

Inspection of V belt tightness is shown in the figure and table below:



V belt Model	Force required to make the V belt ban deflect 16mm per meter		
	Diameter of small V belt wheel (mm)	Newton (N)	Kilograms force (KGF)
SPZ	56-95	13-20	1.3-2.0
	100-140	20-25	2.0-2.5

SPA	80-132	25-35	2.5-3.6
	140-200	35-45	3.6-4.6
SPB	112-224	45-65	4.6-6.6
	236-315	65-85	6.6-8.7
A	80-140	10-15	1.0-1.5
B	125-200	20-30	2.0-3.1
C	200-400	40-60	4.1-6.1

7.4. Operation

Each system of the unit has been assembled in the factory and qualified in the adjustment of the operation. Each protection device has been well set. It is prohibited to change the set value of safety protection device. Otherwise, it will cause damage to the unit.

Protection measures include compressor overload protection, fan overload protection, high and low voltage protection system of the system, etc. These protection measures are to avoid damage to the compressor due to abnormal work of the system.

6、OPERATION INSTRUCTION

ACSON Water Cooled Packaged Unit provides you a set of high intelligent control system.

1. Module functions Introduction

1.1. Features:

a. There are four working modes (MODE): COOL/HEAT/FAN/COOL&HEAT, i.e. cooling/heating/air supply/automatic (cooling&heating). (The cooling only unit has cooling/air supply mode)

b. Temperature setting range (TEMP): 16℃~30℃.

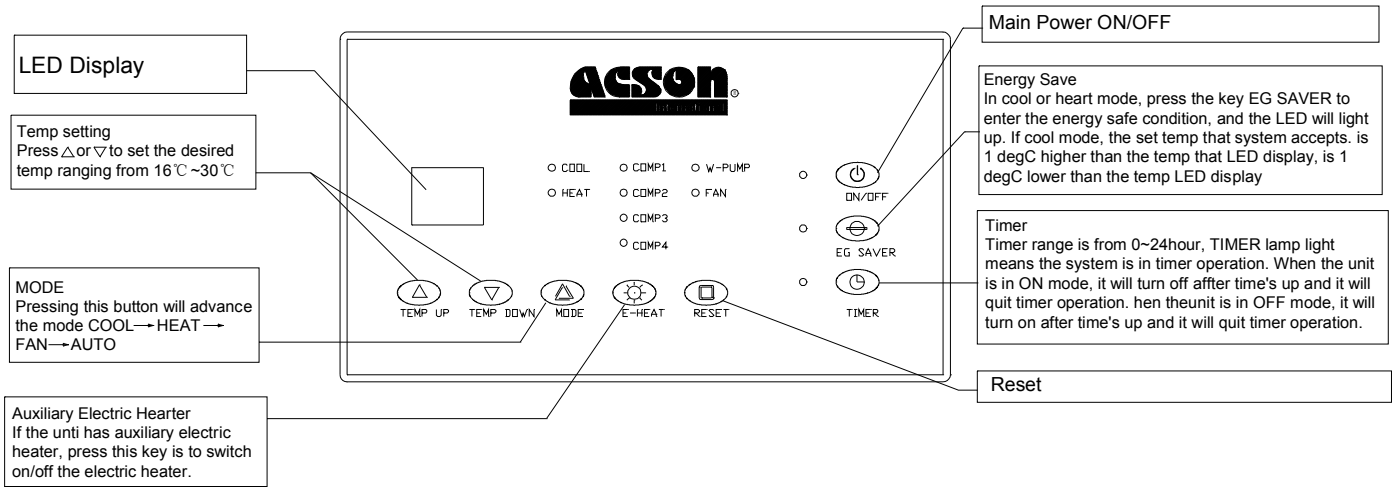
c. TIMER On/Off setting (TIMER): ranging from 1~24 hours. if the digital tube display 0,it means no timer function;

d. Energy saver function (EG-SAVER).

e. Fault alarm and judgment.

f. LED digital display can display the set temperature and timing time, as well as the alarm.

1.2. Control panel operation instruction：



2. Operation steps

2.1. Check all the items before start up to ensure normal power supply and water supply.

2.2. Press MODE button to select the operation mode. The MODE can be set when unit shutdown while forbidden in starting mode.

2.3. Press TIMER button to preset time if it is needed.

2.4. Press ON/OFF button to start up the unit. The startup sequence as follows:

a. Cooling Mode, Switch ON → Water pump on → 50s → Fan on → 10s →Compressor on→ 30s → Next compressor on → 30s → Next compressor on → 30s → Next compressor on

b. Fan Mode, Switch ON → Fan On.

2.5. When the unit runs, you can press TEMP button or EG-SAVER button, so that the unit runs under the required conditions.

2.6. In Cooling Mode, the shut off sequence is, Switch OFF→7s→Compressor OFF→2s→Next Compressor OFF→2s→Next Compressor OFF→2s→Next Compressor OFF→7s→Fan OFF→40s→ Water pump OFF

2.7. Error Code and Troubleshooting：

a. Error Code:

Error Code	Error Description	Error Code	Error Description
L1	Comp 1 Low pressure	H0	Fan motor overload
H1	Comp 1 High pressure	E7	Water pump overload
L2	Comp 2 Low pressure	L8	Shortage of water flow
H2	Comp 2 High pressure	H9	Pressure switch input
L3	Comp 3 Low pressure	E0	Return air sensor failure
H3	Comp 3 High pressure	E1	Coil 1 sensor failure
L4	Comp 4 Low pressure	E2	Coil 2 sensor failure
H4	Comp 4 High pressure	E3	Coil 3 sensor failure
H5	Comp 1 Overload	E4	Coil 4 sensor failure
H6	Comp 2 Overload	L0	No feedback signal
H7	Comp 3 Overload	E9	Communication failure
H8	Comp 4 Overload	E8	Memorizer failure

b. Once an alarm occurs, LED will display the error code, meanwhile, the alarm output switch will be close. When several errors occur, the LED will display their error codes one by one per second.

c. When the trouble is settled, the system still maintains the state of error. Only after pressing the key RESET, the system will resume to work.

d. When there is an Alarm, press key RESET to release the Alarm for service. Press the key RESET one more time, the system will check the Alarm signal again, if the trouble is still there, the system will alarm again, but temperature sensor failure and no feedback failure will reset automatically.

2.8. Cooling and Fan Mode can be selected before unit startup and related indicate lamp will light up. After unit startup, the lamp of ON/OFF will light up, and then, other indicates lamps will light up.

2.9. The system with networking can connect up to 32 units via RS-485 communication port. The unit address can be set via On or Off of KEY2.1—KEY2.5. Same unit address is not allowed in one networking system. Our factory can provide the open communication protocol, please contact the factory if needed.

Unit Address Table：

Key2.5	**Key2.4**	**Key2.3**	**Key2.2**	**Key2.1**	**Unit address**
OFF	OFF	OFF	OFF	OFF	00
OFF	OFF	OFF	OFF	ON	01
OFF	OFF	OFF	ON	OFF	02
OFF	OFF	OFF	ON	ON	03
OFF	OFF	ON	OFF	OFF	04
OFF	OFF	ON	OFF	ON	05
OFF	OFF	ON	ON	OFF	06
OFF	OFF	ON	ON	ON	07
OFF	ON	OFF	OFF	OFF	08
OFF	ON	OFF	OFF	ON	09
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	OFF	12
OFF	ON	ON	OFF	ON	13
OFF	ON	ON	ON	OFF	14
OFF	ON	ON	ON	ON	15
ON	OFF	OFF	OFF	OFF	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20
ON	OFF	ON	OFF	ON	21
ON	OFF	ON	ON	OFF	22
ON	OFF	ON	ON	ON	23

ON	ON	OFF	OFF	OFF	24
ON	ON	OFF	OFF	ON	25
ON	ON	OFF	ON	OFF	26
ON	ON	OFF	ON	ON	27
ON	ON	ON	OFF	OFF	28
ON	ON	ON	OFF	ON	29
ON	ON	ON	ON	OFF	30
ON	ON	ON	ON	ON	31

Note：

The Dip Switch KEY1.1, KEY1.2, KEY1.3 and KEY2.6 have been set ready before ex-factory, please do not change the setting, otherwise the unit may not running.

7、REPAIR AND MAINTENANCE

1. Repair

Note: Before repair and maintenance, confirm the relevant safety precautions again.

Note: Before delivery the units have been strictly tested and checked to ensure good work performance of the product after leaving factory. The user should regularly maintain.

Repair and maintenance of the unit shall be carried out by personnel who have accepted refrigeration training. Before restarting, safety control parts of the unit shall be checked one by one.

Common failures and troubleshooting methods

Failure phenomenon		Possible causes	Solution
Cooling capacity insufficient		Compressor failure or insufficient compression	Check the exhaust pressure of compressor, and maintain the compressor. If necessary, replace the compressor
		The temperature of air passing the evaporator is too high	Reduce the load to designed value
		The condenser copper pipe or the evaporator surface is stained	Check and clean the surface
		Refrigerant Insufficient	Check the leakage and add the refrigerant
		The air volume passing the evaporator is insufficient	Check the air volume, adjust the tension of V belt, and check and clean evaporator and strainer
		The control panel doesn't work properly	Check the control panel, and replace if necessary
compressor Control circuit stops due to protection action	Low voltage protection action	The air volume passing the evaporator reduces	Check and clean evaporator and strainer. Check the drive part of fan
		Refrigerant Insufficient	Check the leakage and add the refrigerant
		Refrigerant pipeline throttle	Identify the reasons for throttling and repair
	High pressure protection action	The entering water temperature is too high	Clean the cooling tower and adjust the water flow to a higher level
		There is air in the cooling system	Vacuum and fill the refrigerant
		Refrigerant is filled too much	Discharge excessive refrigerant
		Water flow is not enough	Increase the water flow to the required value
	compressor overload protector Action	Compressor over current (low voltage or default phase)	Check and repair the power supply, contactor and cables
		The exhaust pressure is too high	Refer to *High Pressure Protection Action*
		Compressor overheating due to insufficient refrigerant	Check the system pressure, check the leakage, and add refrigerant if necessary
		Short circuit of compressor coil	Replace the compressor
		Overload protector failure	Replace the overload protector
V belt is too long and it make noise when starting		V belt slip	Adjust tension of V belt

2. Maintenance

2.1. Routine inspection

In the appliance process, a certain routine inspection must be conducted to ensure the performance of the unit. This is the best way to avoid unnecessary downtime and other wastes. The inspection includes the following items:

Detailed items	Every month	Every quarter	Half a year	A year	As required
1. Compressor					
Performance evaluation. Whether there is abnormal sound	●				
Whether the connections are firm	●				
Whether the current is abnormal (within 10%)		▲			
Compressor exhaust temperature		▲			
Test the oil level					▲
Check the color of the lubricating oil					▲
2. Controller					
Check the parameter setting			▲		
Check the protection device			▲		
Phase sequence protector			▲		
High and low pressure switch					▲
Water flow switch					▲
Overload protector			▲		
3. Condenser					
Check the water quality	●				
Clean the condenser					▲
Seasonal protection measures (antifreeze in winter)					▲
4. Finned heat exchanger					
Wash the finned heat exchanger		▲			
5. Others					
Whether Y-shaped filter needs replacing or cleaning	●				
Whether the condensate drain is blocked	●				
Check whether fan and motor bearing need more lubrication		●			
Check whether the tension of V belt is appropriate	●				
Whether screws of the unit are loose		●			

Remarks:

1. The above maintenance plan is only for reference. The specific maintenance plan can be based on different usage in different areas.

2. Description: ● is the item checked by the users themselves; ▲ is the item checked by service personnel.

2.2. Maintenance at the beginning and ending using season

Beginning of the season

a. Check whether there is any obstacle on the return air inlet and outlet of the unit. If any, please remove the obstacles.

b. Check whether the grounding device is in good condition. The grounding device must be in good condition to ensure safe operation.

c. Repairing the unit and cleaning the strainer must be done by professional personnel.

End of the season

a. When it's sunny, air supply operation is required for half a day, so that inside of the unit becomes dry.
b. Shut off the power. Otherwise the unit will have power consumption.
c. Repairing the unit and cleaning the strainer must be done by professional personnel.

3. Condenser cleaning

The cleaning frequency of the condenser can be determined as required. Before cleaning condenser, power supply must be cut off. Shell and tube condenser shall be cleaned with mechanical method and chemical method. The casing condenser shall be cleaned with chemical method.

ACSON does not provide chemical agent required by cleaning with chemical method. During cleaning with chemical method, the followings shall be paid attention to.

a. Only cleaning agents with reliable source can be used.
b. When cleaning, the flow direction should be paid attention to.
c. During cleaning, the reagent dosage should be paid attention to. After cleaning, rinsing and neutralization treatment are required.

The proper operation of cooling tower can significantly extend the cleaning cycle. The overflow of the cooling tower should be often checked. If the cooling tower runs under the overflow insufficient condition, the concentration of the minerals in the water will increase. They will be quickly and seriously attached to the copper pipe wall of the condenser. This kind of situation will lead to frequent cleaning and serious corrosion.

The chemicals should be bought from reliable suppliers, and used correctly in strict accordance with specifications.

Note: The excessive water treatment will cause damage to the condenser, cooling tower, water pump, pipeline, etc. The following reasons should be excluded for poor refrigeration effect or high pressure failure of the unit, before confirming that the condenser shall be cleaned.

a. Too much refrigerant is filled;
b. In the system there are air and pressure gauge failures;
c. The setting of water regulating valve is wrong or there is failure;
d. Entering water temperature of the condenser is too high (check fan of the cooling tower and the system).

8、AFTER-SALES SERVICE AND WARRANTY

1. After-sales service

If you need after-sales service, please contact with the dealer. Professional staff will provide service to you.

Maintenance/Care

Improper maintenance or care may lead to leakage, electric shock or fire. Contact the dealer to arrange professional staff for maintenance and care.

Maintenance inspection

After a few seasons application,, the performance of the air conditioner will reduce due to the accumulation of dust in the machine. Please regularly maintain the air conditioner.

Our company also provides paid maintenance inspection service. Please contact with the dealer about details of the professional service.

Moving and reinstallation

Improper installation may lead to leakage, electric shock or fire. Please contact with the dealer to arrange professional staff to operate.

2. Warranty period

The warranty period of this product will be subject to the warranty application form

Within the warranty period specified, during normal use in accordance with the instructions and operational guidelines, if the unit operates failed, the user should contact with the dealer of the machine for warranty. When warranty is requested, please show your warranty application form. Except the circumstanced specially indicated in the warranty application form, warranty service will be provided for free.

For maintenance, the following information shall be provided.

a. Unit model (refer to warranty application form)

b. Manufacturing number and installation date (refer to warranty application form)

c. Detailed failure description

d. Your name and contact information

If repair is required after the warranty period, please contact with the seller. The service fee will be charged as appropriate.

Please carefully read the precautions in the warranty application form. And check the content of the warranty application form and properly keep.

9、Maintenance Records

The serial number	Failure description	Treatment measures	Treatment results	Recorder
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

【Note】Please fill in this form carefully and properly keep.

ACSON® International

While utmost care is taken in ensuring that all details in the publication are correct at the time of going to press, we are constantly striving for improvement and therefore reserve the right to alter model specifications and equipment without notice. Details of specifications and equipment are also subject to change to suit local conditions and requirements and not all models are available in every market.