

40 HQ Container

Plant Factory

Manual



HiTec
grow institute



MAXIMUS

Intro

Declaration

Due to product version upgrades or other reasons, the content of this manual may change, and we reserve the right to modify the content of this manual without any notice or prompt.

This manual is only used as a guide. We try our best to provide accurate information in this manual, but we do not ensure that the content of the manual is completely error-free. If you have any doubts about the scope of the manual, please call our company for inquiries.

Overview

Planting containers can overcome factors that are not conducive to plant growth such as different environments, different seasons, and various pests, and provide plants with an independent tidal hydroponic planting system that is suitable for temperature, humidity, light, carbon dioxide, nutrients, water and other necessary conditions. Green and pollution-free plants are efficiently grown in this relatively closed space.



Specifications

External Dimensions of the Container

Length Dimension: 12192mm, Width Dimension: 2438mm, Height Dimension: 2896mm

Internal Dimensions of the Container

Length Dimension: 11920mm, Width Dimension: 2230mm, Height Dimension: 2620mm

Container Weight

Total weight: 6 tons (container body 4.7 tons)

The container power inlet line is AC380V±10%, the frequency is 50HZ, and the total power of the equipment is 11.8KW; the power connection method adopts the aviation plug and the aviation socket to connect, and the aviation socket is installed in the left front of the container, and the aviation plug is connected to the power cable of the external power supply section.

Equipment	Frequency (w)	Quantity	Total Power (kW)
Air Conditioner Outdoor Unit	2300	2	4.6
Air Conditioner Room Unit	80	2	0.16
GrowLight	18	320	5.8
Fresh Air System Fan	200	1	0.2
Centrifugal	370	2	0.75
Fan	105	1	0.1
The Rest (Estimated)	200	1	0.2

The above is the maximum theoretical power value, and the actual power is related to the setting of season and planting parameters.



Installation Guide

Transportation

The bearing capacity of container structure in different transportation modes

Maritime

In the cabin slot: can withstand 7-storey stacking

On deck: Able to withstand 4 high stacks.

Highway

On a flatbed or container trailer: secure the container at the four foot pieces with twist locks or similar.

Railway

On flatbed or specialty container vehicles: secure the container at the four foot pieces with twist locks or similar.

Container Arrival

Hoisting

You need to contact the crane to slowly place the container horizontally to the destination.

Toward

According to the comprehensive consideration of the local sunset and sunrise orientation and the perennial wind orientation, the container entrance should be perpendicular to the direction of sunrise and sunset; the container door should be at the top of the perennial wind.

Air Conditioner Outlet Space

The rear of the container is the inlet and connection of water, electricity and network of the system. Please leave a certain space for maintenance and gas circulation at the outlet of the air conditioner.

Horizontal Placement

Before the container arrives, please ensure that the site is level and adjust the container to be horizontal, which is very important for the accuracy of the irrigation system and the drainage of the air conditioner.

Water/Electricity

Please prepare a 50Hz/380V 32A power cord in advance.

The inlet pipe interface is DN15.

Network

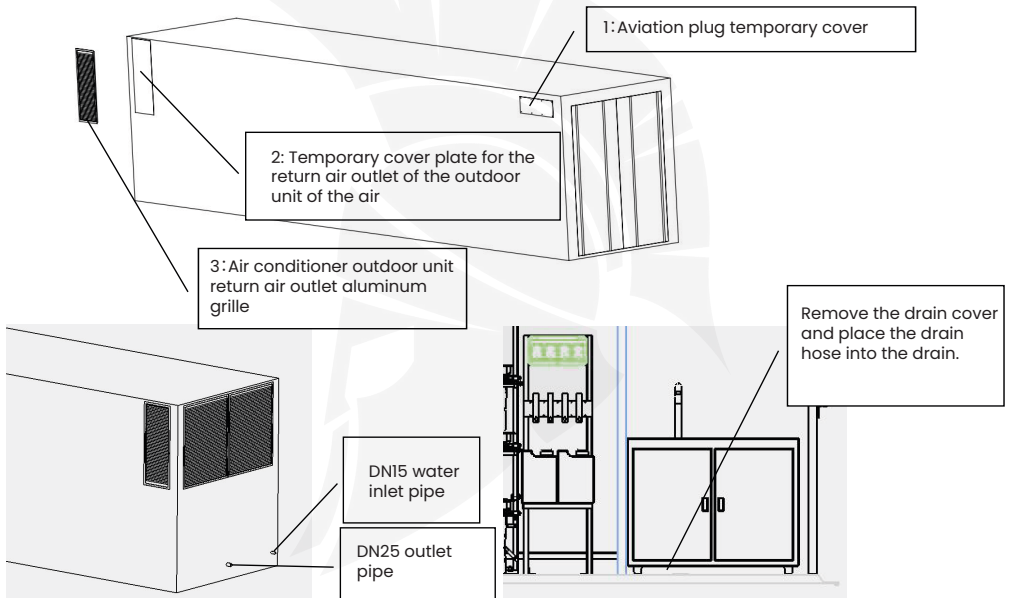
A network cable is required.

CO2 Tank

The customer needs to prepare CO2 bottled gas and a pressure reducer with a 220V solenoid valve on site.

Disassemble before use

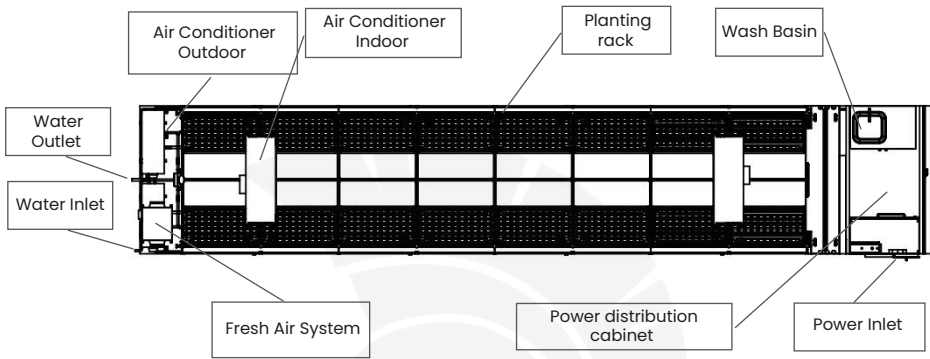
- Remove the temporary cover of the aviation plug
- Remove the left and right temporary covers of the return air outlet of the air conditioner outdoor unit
- Install the aluminum grilles of the left and right return air outlets of the air conditioner external unit
- Knock out the temporary cover of the drain under the sink, and then put the drain pipe into the drain



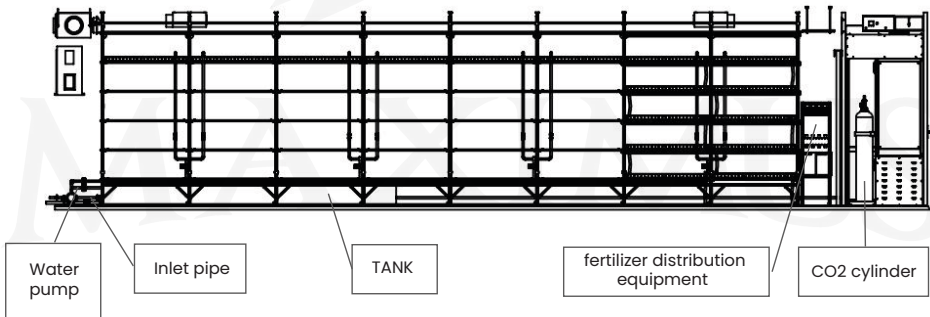
Structure Description



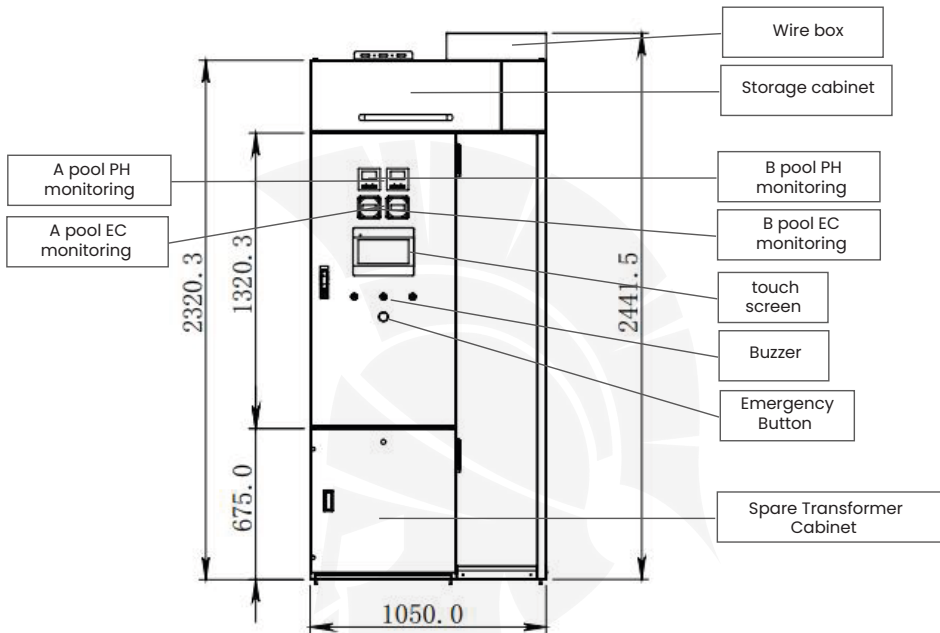
Top View



Side View



distribution cabinet



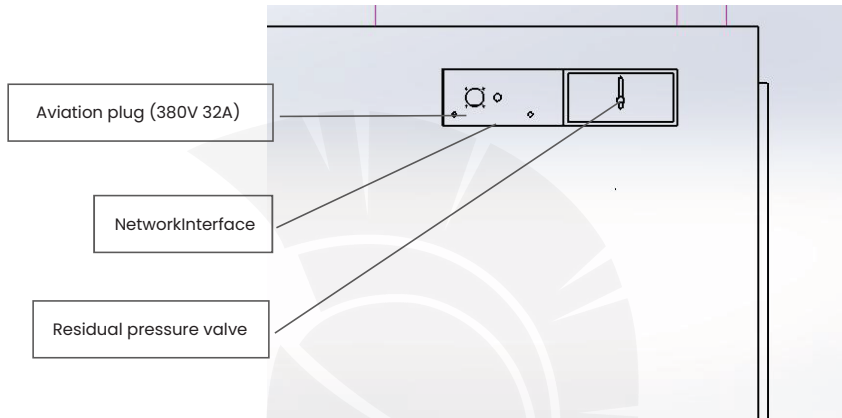
Insulation layer

The interior of the container is equipped with a rock wool insulation layer to achieve temperature isolation and buffering inside and outside the container, create the best growth environment for plants, and eliminate diseases; in order to improve the efficiency of air conditioning and refrigeration, save energy and reduce consumption, the following suggestions are recommended:

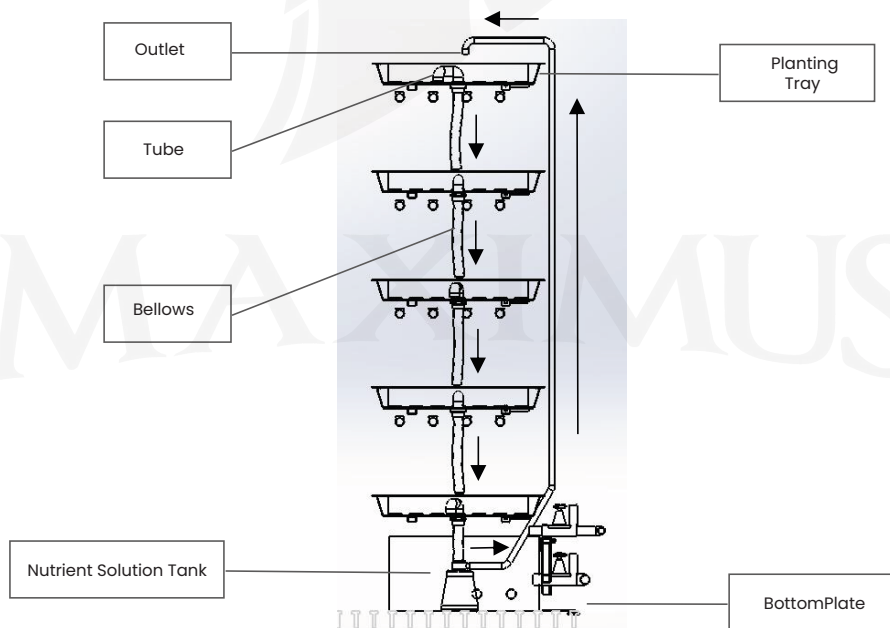
- Set up awning facilities above the container.
- The plant growth light is recommended to be turned on at night when the temperature is low.

Cable Port

The left front of the container provides power supply and network interface



Principles of ebb&flow



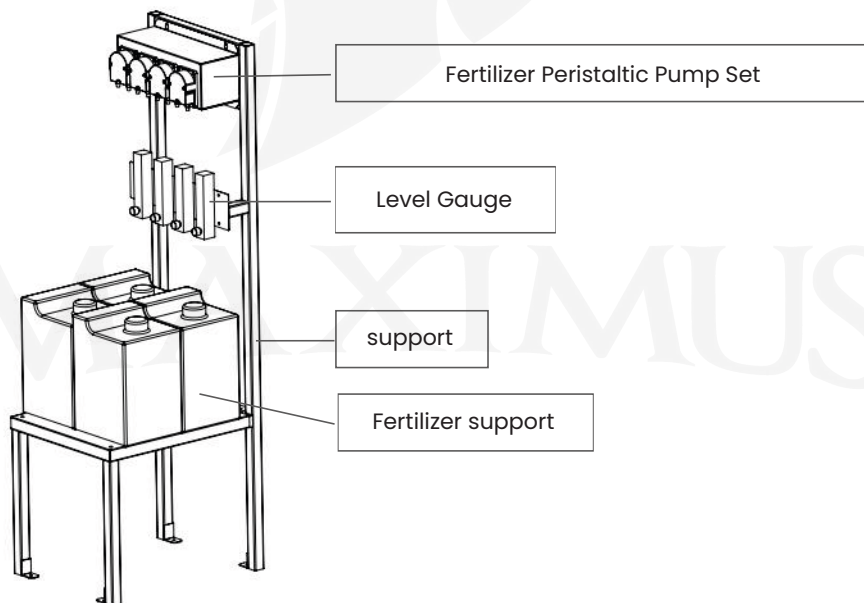
Carbon Dioxide

After the container is installed on site, it is supplied with 40L or 50L carbon dioxide steel cylinders and placed in the right area of the power distribution cabinet at the entrance. The high pressure outlet of the gas cylinder is connected to the European standard pressure reducer (purchased by the customer), and the low pressure output of the pressure reducer generally 0.15 ~ 0.2Mpa, connect the carbon dioxide gas hose (outer diameter $\Phi 6\text{mm}$, inner diameter $\Phi 4\text{mm}$), insert the solenoid valve power plug on the pressure reducer into the special controlled socket (220V) on the wall, the system will The data automatically provides carbon dioxide gas that is beneficial to plant photosynthesis for the planting area. Please set suitable carbon dioxide gas control parameters according to different planting varieties.



Fertilizer Distribution Equipment

The fertilizer distribution equipment is to suck the fertilizer solution into the water fertilizer tank and mix it with clean water according to a certain proportion after passing through the peristaltic pump, so as to provide the plants with the necessary water, fertilizer and acid-base environment for growth.

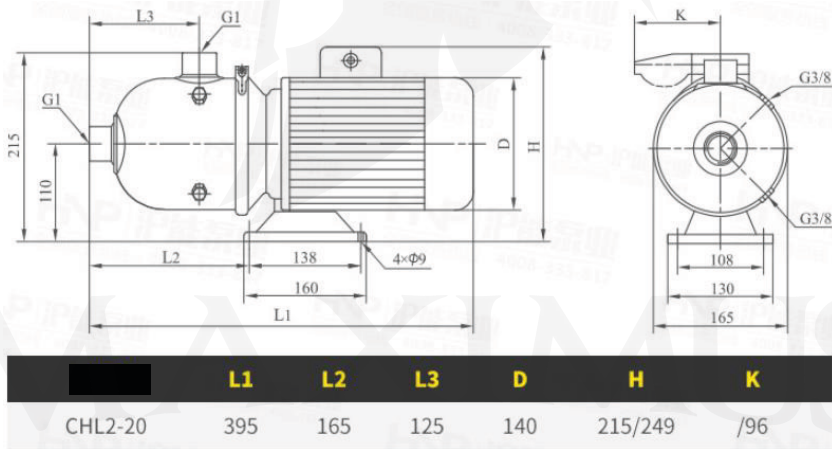


Horizontal Multistage Centrifugal Pump

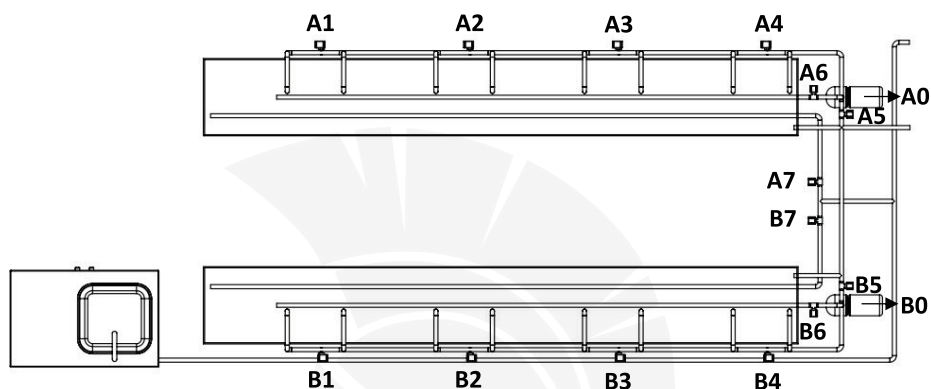
The purpose of the centrifugal pump is to fully mix the nutrient solution, acid-base solution and clear water in the water and fertilizer tank to meet the needs of plant production.

Device	Horizontal Multistage Centrifugal Pump
Model	CHL2-20
Lift	15m
Flow	2m ³ /h
Inlet/outlet Diameter	G1
Weight	10kg
Power Supply	220V/50Hz
Rated Power	0.37(kW)

Installation size



Valve Control



	Program	A1/B1 Irrigation Valve1	A2/B2 Irrigation Valve 2	A3/B3 Irrigation Valve 3	A4/B4 Napouštěcí ventil 4	A5/B5 Drain Valve	A6/B6 Return Valve	A7/B7 Inlet Valve	A8/B8 Centrifugal Pump
1	Clean water enters A/B water tank	Off	Off	Off	Off	Off	Off	ON	Off
2	Circulating mixing in the water tank	Off	Off	Off	Off	Off	ON	Off	ON
3	Irrigate A1/B1	ON	Off	Off	Off	Off	Off	Off	ON
4	Irrigate A2/B2	Off	ON	Off	Off	Off	Off	Off	ON
5	Irrigate A3/B3	Off	Off	ON	Off	Off	Off	Off	ON
6	Irrigate A4/B4	Off	Off	Off	ON	Off	Off	Off	ON
7	Drain	Off	Off	Off	Off	ON	Off	Off	ON

A/B are controlled independently, and water and fertilizer do not affect each other

LED Fill Light

Parameters:

GHXN02-12; Power:18W; PPE:2.0umol/J; AC85-265V50/60HZ



Temperate and Humidity /CO2/EC/PH Sensor



Temperature Accuracy	±0.5°C (25°C)
Humidity Accuracy	±3%RH (60% 25°C)
Temperature Range	-40°C~+80°C
Humidity Range	0%RH~100%RH
Temperature Resolution	0.1°C
Humidity Resolution	0.1%CRH
Power Consumption	≤0.1W
Working Temperature and Humidity	-40°C~+80°C 0%RH~95%RH (non-condensing)
DC power supply	DC 10-30V

Power Consumption	0.3W (24VDC)
Stability	<2% F-S
CO2 Accuracy	0~5000ppm: ± (50ppm+3%F.S) (25°C)
Working Environment	-10~+50°C, 0-80%RH
CO2 Measuring Range	0~5000ppm
Average Current	<85mA
Data Update Time	2s
Power Supply	10~30V DC



Measuring range	electrode:(2.00~2000)uS/cm, maximum20000uS/cm Temperature measurement range:(-10~130)°C
Temperature Compensation	Automatic Temperature Compensation/ Manual Temperature Compensation
Electronic Unit Basic Error	EC/TDS/ER: ±1%FS NTC10K: ±0.3°C
Current Output	(4~20)mA can be set to correspond to EC/TDS/E Rmeasurement range, maximum load 750Ω, output accuracy ±0.2%FS
Working Humidity	(10~85) %RH
Working Temperature	(0~60)°C
Power supply	AC:220VAC±10% 50Hz/60Hz DC:24VDC±20% Power ≥6W

pH Sensor



Measuring Range	pH: (0.00~14.00) pH ORP: (-1000~+1000) mV
Measurement Accuracy	pH: ± 0.02 pH; ORP: ± 1 mV
Input Resistance	$\geq 10^{12} \Omega$
Temperature Compensation	NTC10K: $(-10 \sim 60)^{\circ}\text{C} \pm 0.3^{\circ}\text{C}$ NTC10K: $(-10 \sim 60)^{\circ}\text{C}$ accuracy $\pm 0.3^{\circ}\text{C}$ $(60 \sim 130)^{\circ}\text{C} \pm 2^{\circ}\text{C}$ $(-10 \sim 130)^{\circ}\text{C}$ Range: $(-10 \sim 130)^{\circ}\text{C}$ manual/automatic
Transmission Output	(4~20) mA pH/ORP, 750Ω , $\pm 0.2^{\circ}\text{C}$ FS Isolated, (4~20) can be set to correspond to pH/ORP measurement range, maximum load Ω , output accuracy $\pm 0.2^{\circ}\text{C}$ F
Relative Humidity	(10~85) %
Working Temperature	(0~60) $^{\circ}\text{C}$
Alarm Function	2 AC250V/3A, 2 ch capacity AC250V/3A, normally open
Communication Output	RS485, Modbus-RTU

The water tank at the bottom of the planting frame is equipped with an ultraviolet lamp to inhibit the growth of algae and bacteria.

Seedling Cultivation and Transplantation

Seedling Cultivation

Please grow seedlings according to your own actual needs. Please purchase the corresponding LED lights and seedling trays, and place the treated seeds on the seedling trays at the bottom of the planting shelf.

If necessary, please purchase suitable blackout curtains to isolate the seedling area from light.

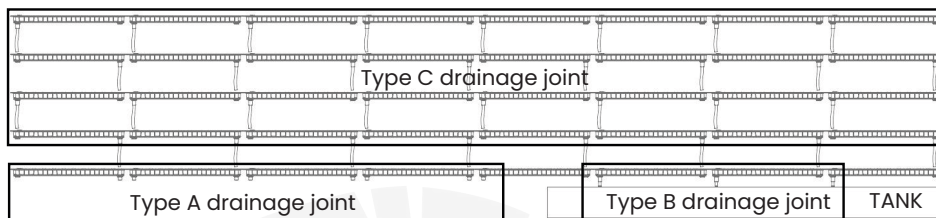
Transplantation

After the seedlings are raised, put the seedlings into a planting cup filled with water-absorbing medium and transfer them to the corresponding planting area. Please check the environment and irrigation settings in the planting plan.

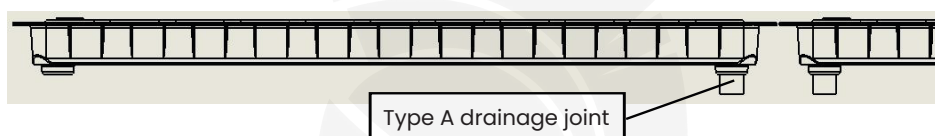
Setting

Set the appropriate PCL control logic to comprehensively control the lighting, temperature/humidity, EC/PH, and CO₂ concentration of the seedling/planting area.

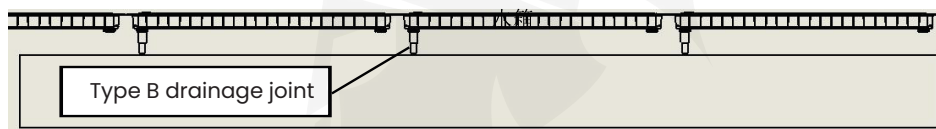
The type and Arrangement of the Drainage Port of the Planting Tray



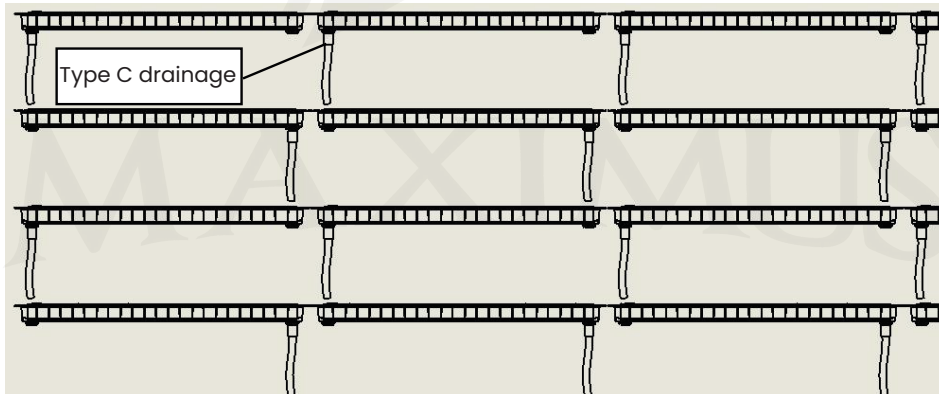
Type A drain fittings: placed at the bottom of the inlet side (5 on the left, 5right)



Type B Drain Connector: placed above the tank (3 left, 3right)



Type C Drain Connector: placed on floors 2-4 (32 on the left, 32 on the right)



Maintenance

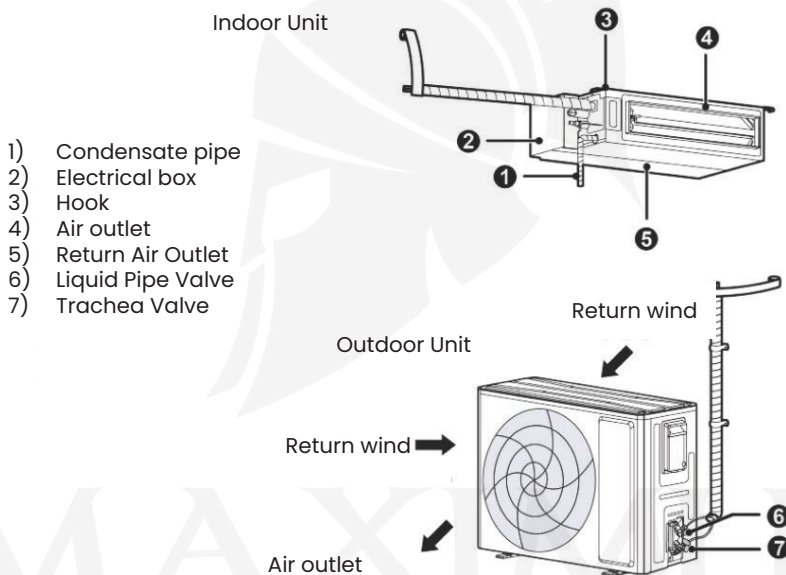
The power distribution cabinet includes switching power supply, circuit breaker, relay, PLC controller, etc.

Distribution Cabinet Circuit Diagram

The circuit diagram is in appendix 7.2
The plumbing diagram is in appendix 7.1

Air Conditioner Structure/Wiring

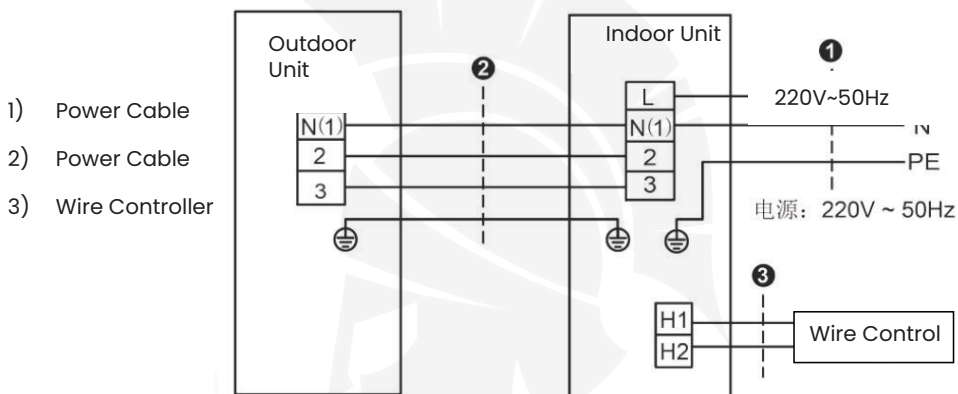
Structure Introduction



Allowable Range

Project	Outdoor Temperature	Indoor Temperature
Cooling Temperature Range	18°C~48°C	18°C~32°C
Heating temperature range	-15°C~24°C	10°C~27°C

Note: The parameters of this product (including noise value/external static pressure) may be adjusted, please refer to the parameters on the nameplate.



Air Conditioner Maintenance

Cleaning Filter

When cleaning, remove the air filter of the air inlet, and use a vacuum cleaner or rinse the filter with water. When the filter has heavy oil stains, it can be washed with warm water (below 45°C) dissolved in neutral detergent, and then put it in a cool place to dry.

When the air conditioner is used in a dusty environment, the air filter should be cleaned frequently (usually once every two weeks).

Drain Pipe

The drain pipe should be checked regularly for blockage to allow the condensate to drain smoothly.

Precautions Before Use

1. Check the air inlet and outlet of the indoor and outdoor units for blockage.
2. Check that the ground wire is intact.
3. Check whether the line connection is intact.
4. Check if there are words on the display screen of the wired controller after the power is turned on.

Precautions after use

1. Half-day air supply operation when the weather is fine, so that the unit is dry inside.
2. If the air conditioner will not be used for a long time, please turn off the power to save energy. After turning off the power, the text on the display screen of the wire controller will disappear.
3. Check whether the mounting frame of the outdoor unit is damaged, and contact the service center if there is any damage. If the outdoor unit is rusted, paint should be applied to the rusted area to prevent it from expanding under the condition of personal safety.
4. A special protective cover can be used to wrap the external unit of the air conditioner to prevent rainwater and dust from entering the air conditioner and corroding the unit.

Fresh Air System Maintenance

Four layers of filtration purify the air. After effectively intercepting suspended solids such as hair and flocs, the initial filter screen grades and filters the air thoroughly to ensure a continuous source of clean fresh air entering the room.

Activated carbon filter absorbs formaldehyde, benzene, TVOC and other harmful gases in the air, and HEPA high-efficiency filter has a filtering effect of up to 99.9%.

The medium-efficiency filter fully intervenes in the filtration, effectively improves the performance of the filter element, can fully filter PM10, fine debris, dust, etc., and can effectively pre-filter PM2.5 to improve the purification effect of the HEPA13 upper filter.

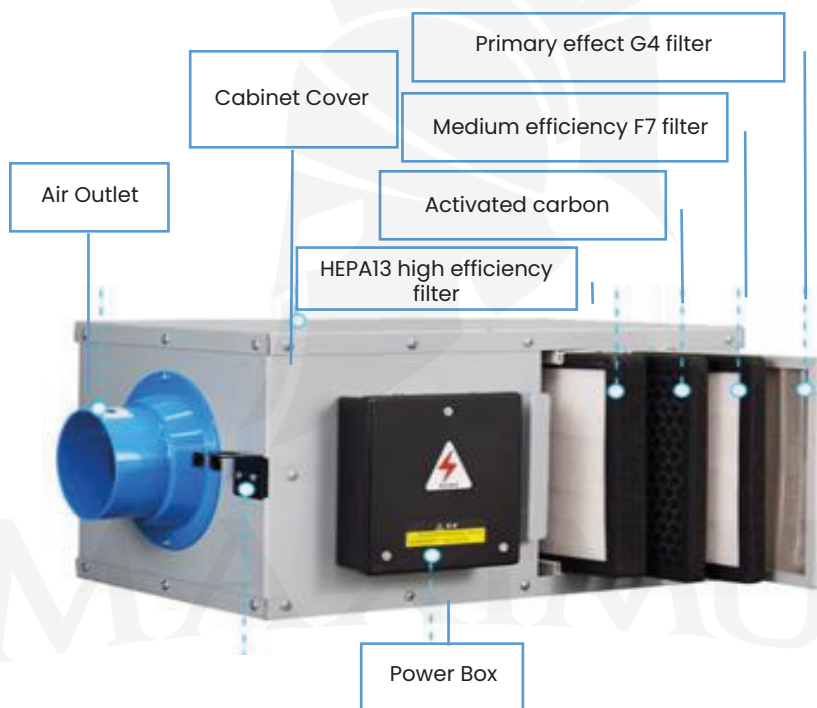
The folded peaks created with details, strong folds reduce wind resistance and allow air to pass through faster.

HEPA is the abbreviation of (high-efficiency air particulate filter), and the HEPA filter is composed of a stack of sub-glass fiber membranes folded back and forth continuously, forming a wavy gasket to place and support the filter medium.

The filtration efficiency of the HEPA high-efficiency particulate filter is proportional to its surface area. The HEPA high-efficiency particulate filter of the air purifier is folded in multiple layers. After unfolding, the area is about 14.5 times larger than when folded, and the filtration efficiency is very outstanding.

How to replace the filter element in the fresh air system: Disassemble the knob and maintain the filter element

	Filter	Maintenance Method	Cycle (month)
1	Primary effect G4 filter	Clean	1-3
2	Medium efficiency F7 filter	Replace	3-6
3	Activated carbon filter	sunbathing	3-6
4	HEPA13 high efficiency filter	Replace	3-6



Irrigation System Maintenance

Cleaning

Maintenance personnel should use a high-pressure water gun to flush the planting trays, nutrient solution tanks, and irrigation pipes every quarter, and finally use a submersible pump to discharge the sewage from the nutrient solution tank.

Disinfection

Use appropriate disinfectant, mix it in the nutrient solution tank according to the recommended proportion of the product, start the water circulation, disinfect the internal circulation system of the irrigation pipe, and spray disinfection and sterilization the planting space, add clean water in the water tank again for internal circulation cleaning and finally empty it 1 hour later.



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