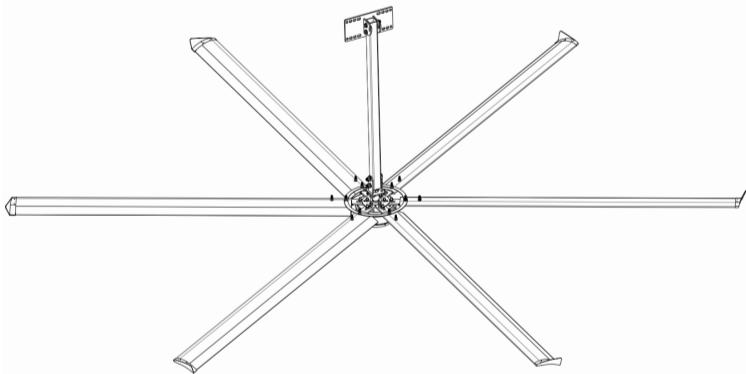


Quick Start Guide

Spectra Instruments Pte Ltd

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HVLS FAN



SPACEFANS DCM SERIES

Quick installation guide ➤

In order to safely use the product, please carefully read the operation instruction manual.

HVLS FAN

BEFORE YOU BEGIN

- ◆ In the installation, adjustment and the cleaning processes please don't bend the fan blades, or it will damage the equipment or affect using effects.
- ◆ Please make sure the fan's input voltage and supply voltage are the same before cut-in the power.
- ◆ Please don't proceed examine and repair works while power on so as to prevent electric shock.
- ◆ Please don't secretly alter the structure and installation site of the fan.
- ◆ Please don't open the electrical control box while power on so as to prevent electric shock.
- ◆ Please don't operate the damaged devices, or it will bring serious consequences of personal injury.
- ◆ Strictly prohibit the structural changes or parameter changes of the electrical control box, or it will cause equipment damage or personal injury and death accident duo to the improper set.
- ◆ In the electrical control box there includes high-voltage storage capacitor. When you operate the fan control device, please wait for 3 minutes to let the voltage release out (notes: the display blackness is not the mark that the voltage has reached the safety level) to prevent electric shock.
- ◆ Strictly prohibit the operation when the safety space of the fun is insufficient.
- ◆ Strictly prohibit the operation during the reverse back process of the fun's operating space, and make sure whether there are obstacles before starting.

CAUTION



- ◆ The installation and layout of the circuit wiring must be performed by our professional qualified staff.
- ◆ Please use the specified device component appointed by our company.
- ◆ While the fan is running, please don't cut off the power, otherwise it will cause damage to the fan. It should cut off the power when the fan is drop-dead halt.
- ◆ When the fan is in the corotation (inversion) state, please don't switch the button to the opposite direction directly or it will cause the mechanical failure.

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SAFETY & PRECAUTIONS

READ THE ENTIRE MANUAL BEFORE OPERATING THE FAN

Read and understand this manual before installing or operating a fan unit.

Installation, adjustment, repair or maintenance must be performed by qualified personnel.

Follow all safety practices and instructions during the installation, operation and servicing of the fan. Failure to apply these safety practices could result in death or serious

injury. If you do not understand the instructions, please call our Technical Department for guidance. Technical Department contact information can be found on last page.

All fan controls and incoming power should be installed only by qualified technicians.

Failure to follow these guidelines will void the manufacturer's warranty. All electrical controls are configured at the factory and are ready to use. No user adjustments are

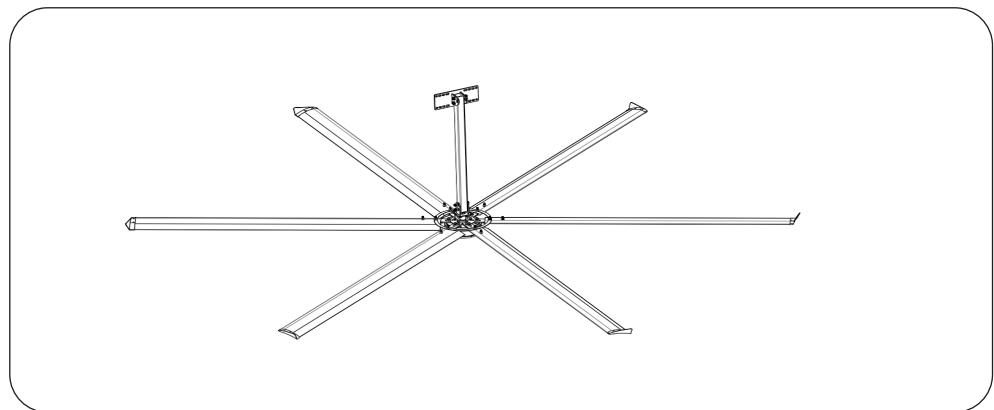
available. Follow the included installation instructions when installing this device to ensure proper operation. Do not make any changes to any part of the fan without first consulting SPACEFANS.

1. Product introduction

SF Series

The third generation PMSM HVLS(PMSM High Volume-Low Speed) large energy-saving ceiling fan named by FOREFANS is an application based on permanent-magnet brushless tech, acme industry design and intelligent control tech. The fans can circulate the airflow in the space efficiently, then improve the comfortable feeling greatly. The product combined a series of advanced technologies, such as aerodynamics, industry design, dynamics, vector control technology, mechanics, computer software, simulation technology.

The product is widely used in commercial space, industrial space, stadiums, airports, office space, auditorium, restaurant and other large & high occasions.

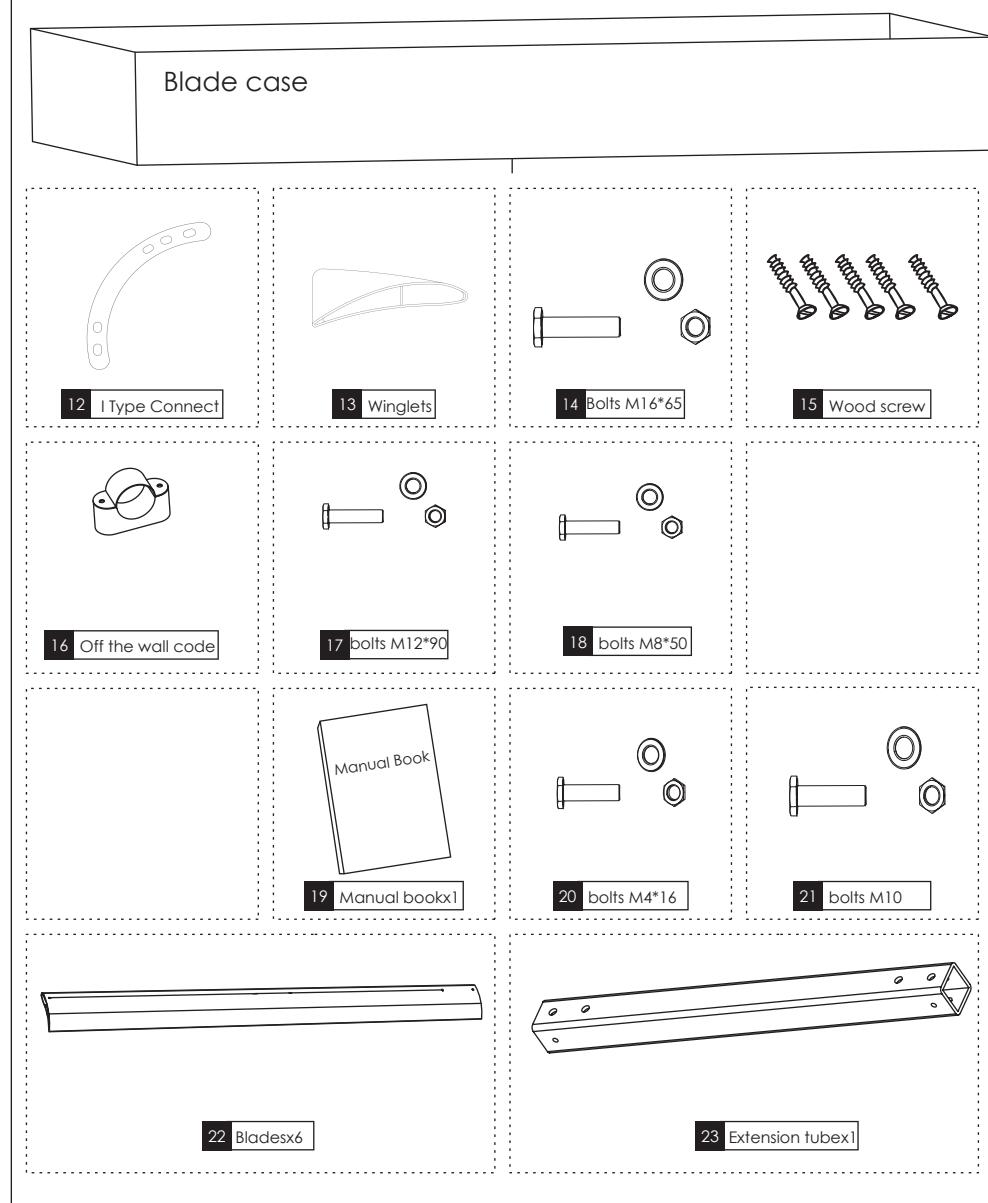
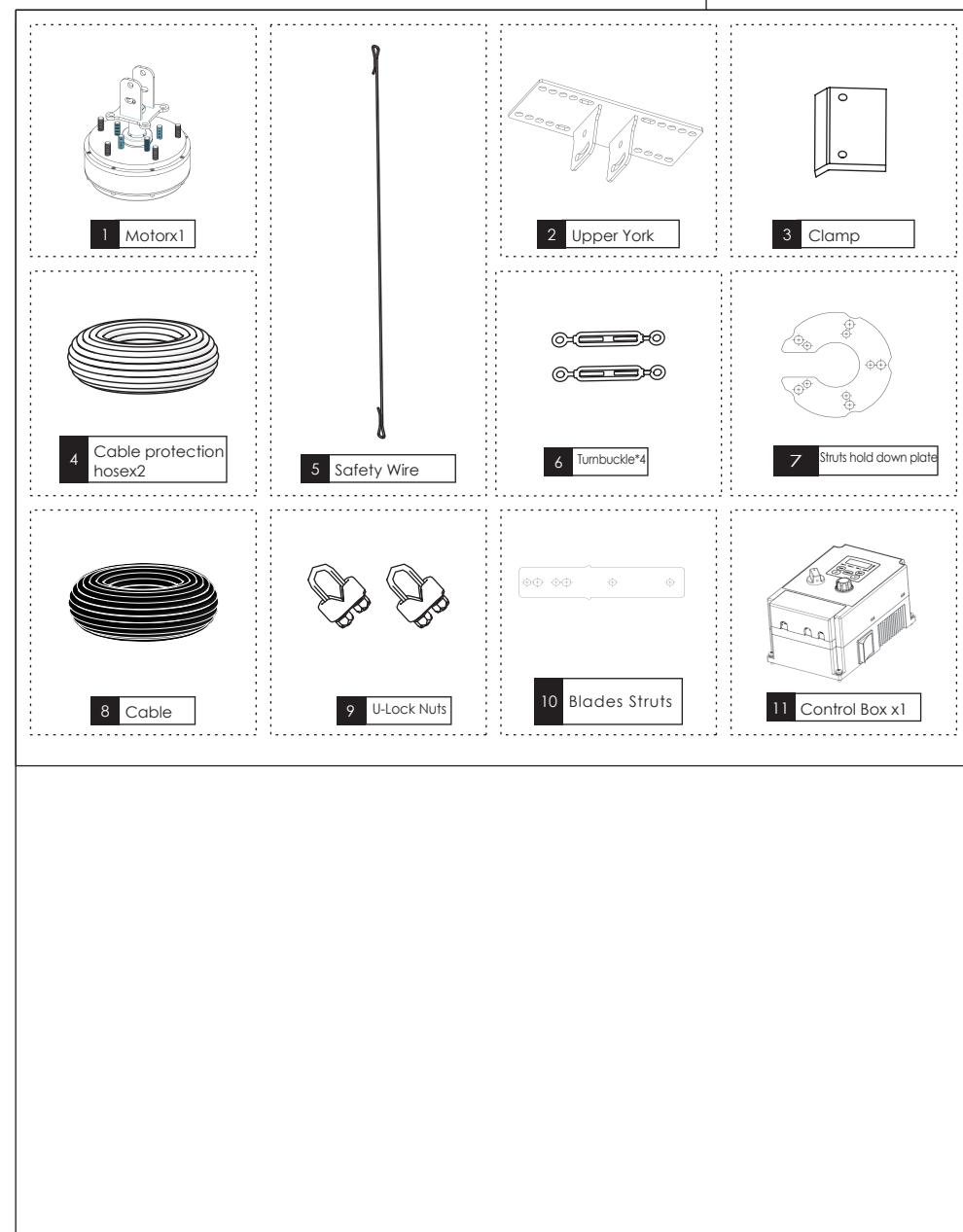


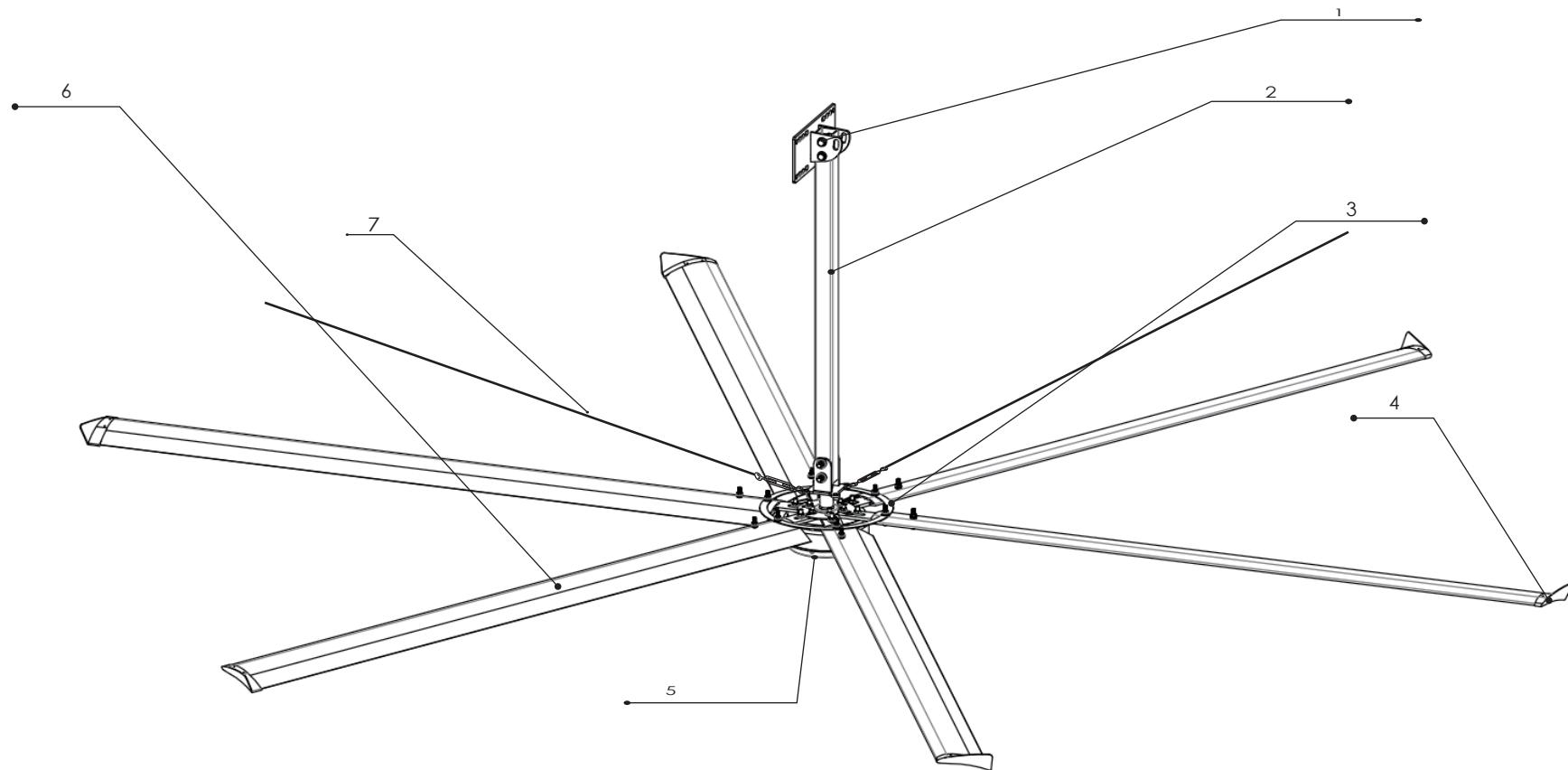
1.1 DCM 6 Blades ModeHVLS Fan Technical Specification

Diameter	8ft (2.4m)	10ft (3.0m)	12ft (3.6m)	14ft (4.2m)
Model	DCM-24	DCM-30	DCM-36	DCM-42
Max Air volume	4,800CMM	5,900CMM	6,800CMM	7,900CMM
Input Voltage	Single phase220V	Single phase220V	Single phase220V	Single phase220V
Max speed	110RPM	100RPM	90RPM	80RPM
Max Power	0.4KW	0.4KW	0.4KW	0.4kW
Max Current	2.0A	1.3A	1.5A	1.8A
Noise Level	39dBA	39dBA	35dBA	35dBA

Note:

- 1.Weight:the weight doesn't contain control box,top connection parts etc.
- 2.Size:the above-mentioned product size is standard,other size can be customized.
- 3.Noise:sound level measured a distance of 1m from the motor,electromagnetic noise is less than 38db(A).
- 4.Packing:Carton packing.
- 5.Input power:220V/1PH

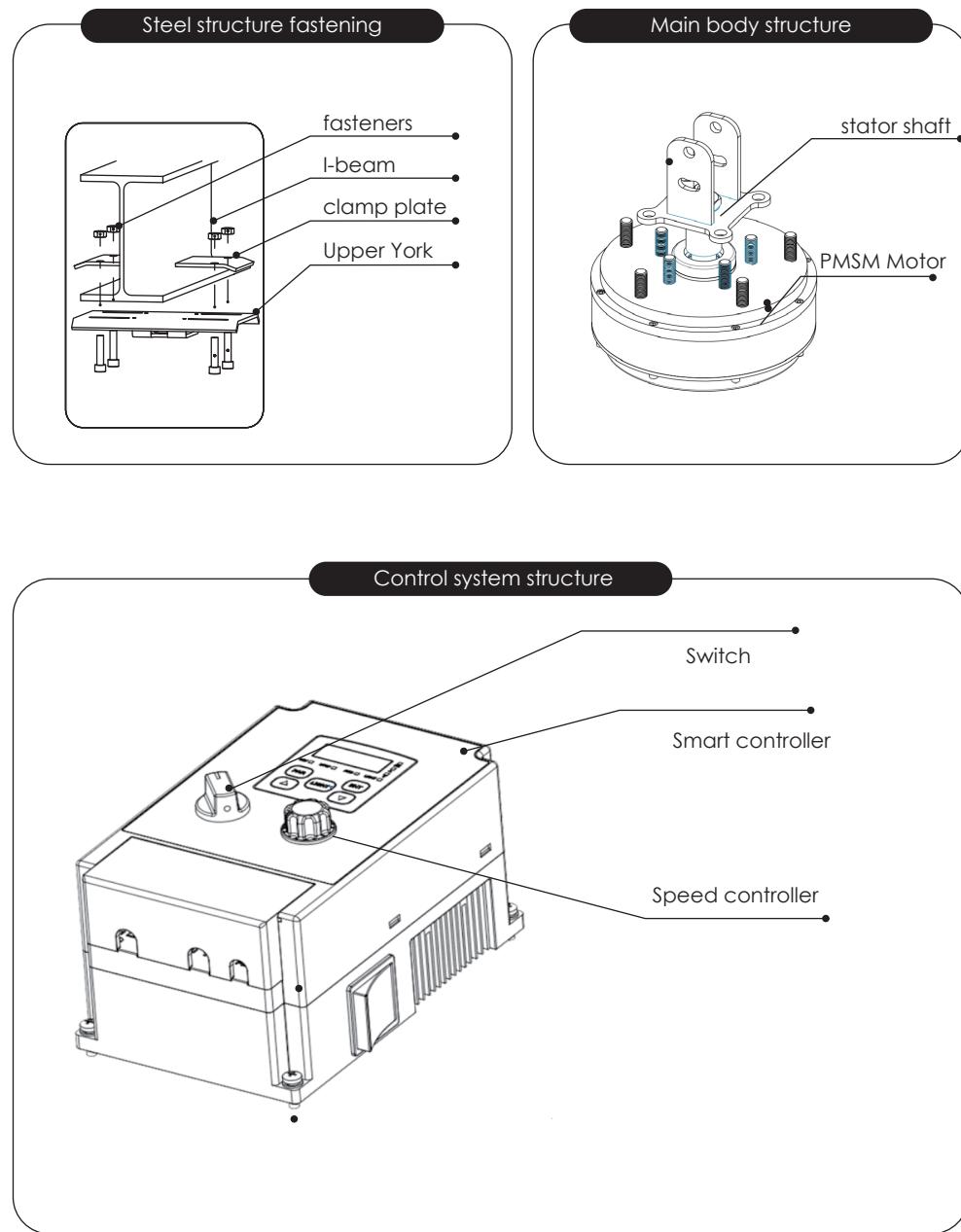
2.Packing list

3. Product drawing

- 1 Upper York
- 2 Drop Tube
- 3 Blades Retainers
- 4 Winglets
- 5 PMSM motor

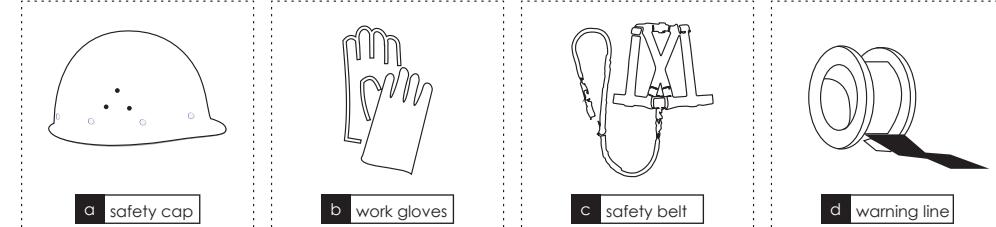
- 6 Blades
- 7 Steel Safety Rope

3.1 Standard part structure diagram

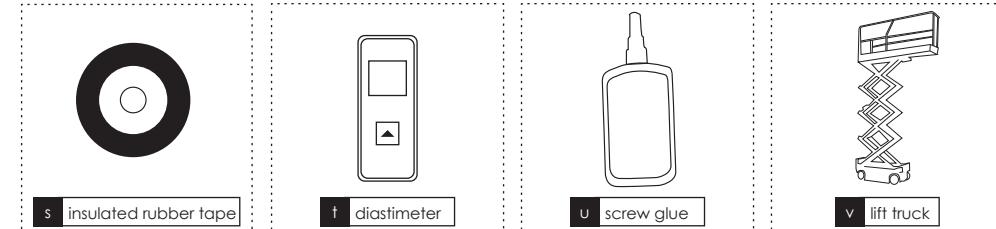
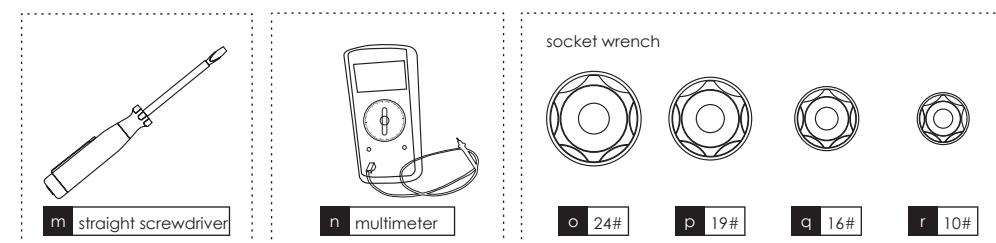
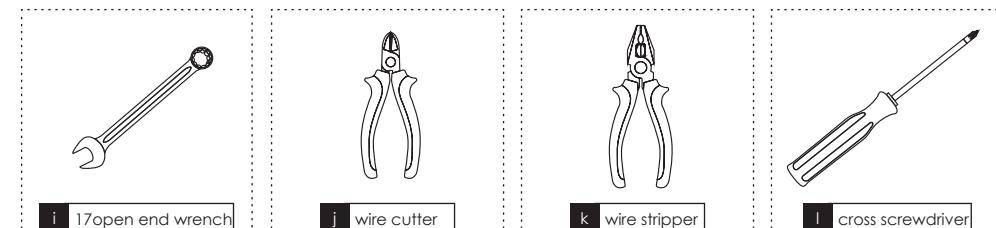
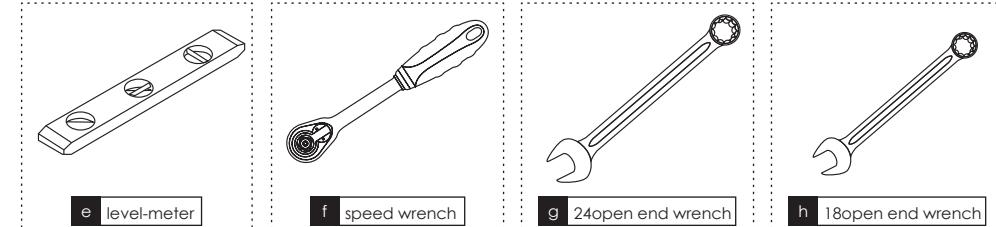


4. Preparation before installation

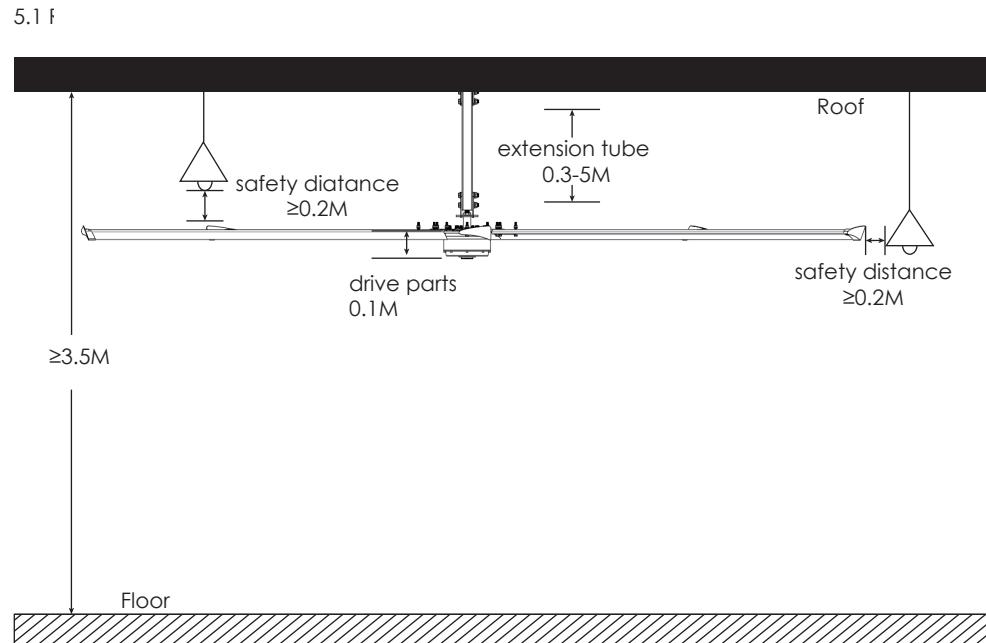
4.1 Security tool preparation



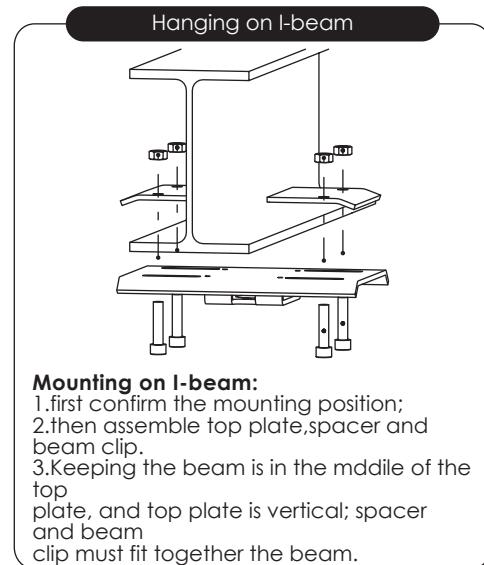
4.2 Installation tool preparation



5. Installation conditions and types



5.2 Brief introduction of different installation structure

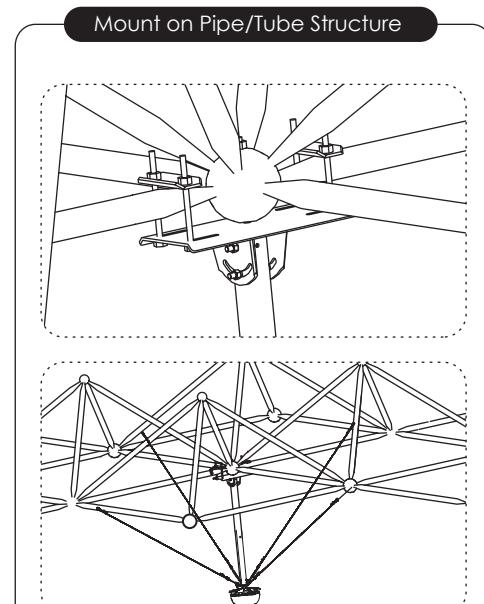
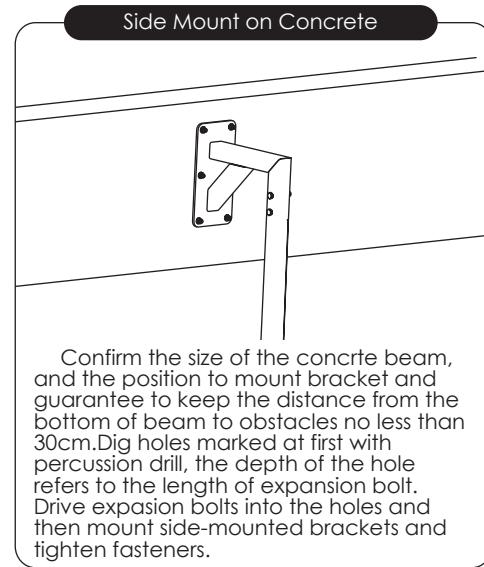
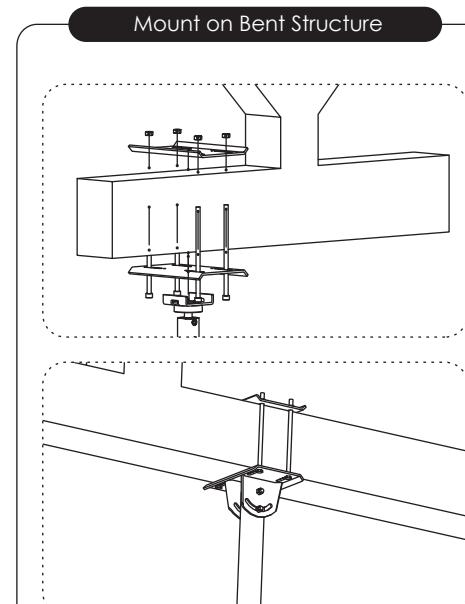
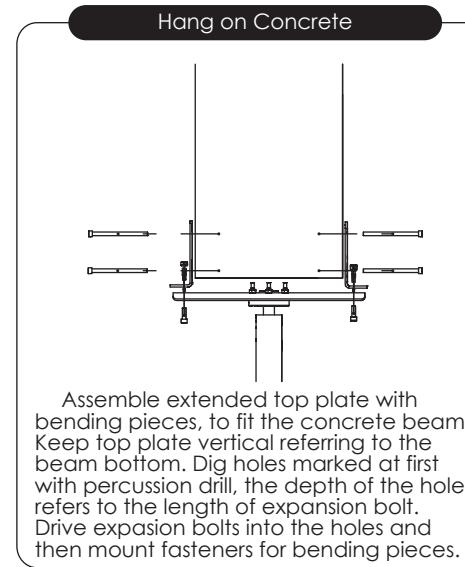


Mounting on I-beam:

1. first confirm the mounting position;
2. then assemble top plate, spacer and beam clip.
3. Keeping the beam is in the middle of the top plate, and top plate is vertical; spacer and beam clip must fit together the beam.

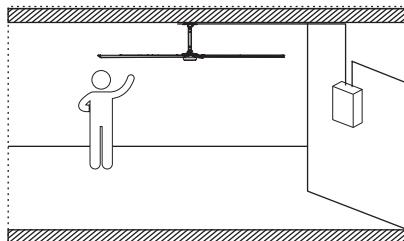
Side mount on I-beam:

confirm the size of the beam and the position to weld bracket and guarantee to keep the distance from the bottom of beam to fan blade no less than 30cm.
First paint off, then spot welding for brackets. full welding after confirming the balance of bracket. At last clean welding slag and paint as before.



6. Fan installation procedures

① Site survey confirmation

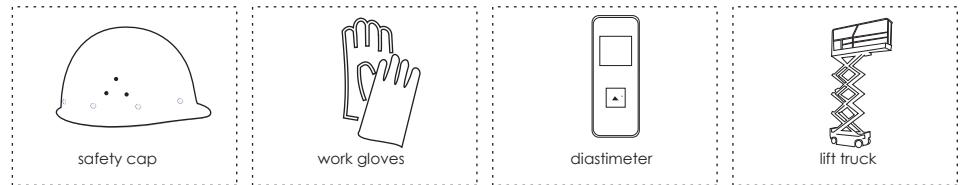


- ◆ Confirm installation position
- ◆ Measure the height to mount fan with diastimeter(t)
- ◆ Confirm any obstacle or not (crane, light, cables, fire protection equipment, camera etc)
- ◆ Confirm the position on beam to connect steel guy wire
- ◆ Confirm the position to mount control box

② Installation readiness check



Check all accessories. Prepare safety equipment(safety belt, safety cap etc), lift truck and installation tools.

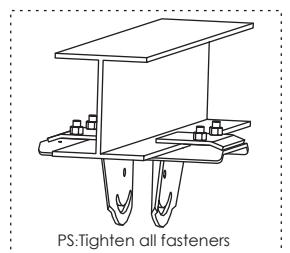
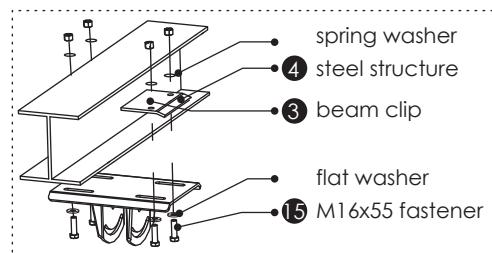


PS: Detailed installation tools please refer to P10

③ Installing roof



First confirm the mounting position, keeping the beam is in the middle of the top plate, and top plate is vertical; spacer and beam clip must fit together the beam. Use 24# open end wrench(g), speed wrench(f) and 24# socket wrench(o) to tighten M16x55mm fasteners. Other mounting brackets also required to install firmly.

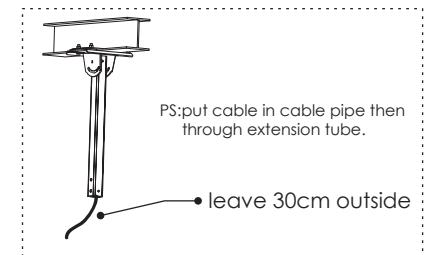
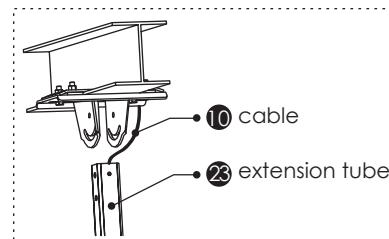


PS: Tighten all fasteners

④ Extension rod threading



put cable through the extension tube, leave 30cm outside to connect cables from motor.

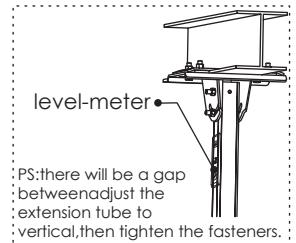
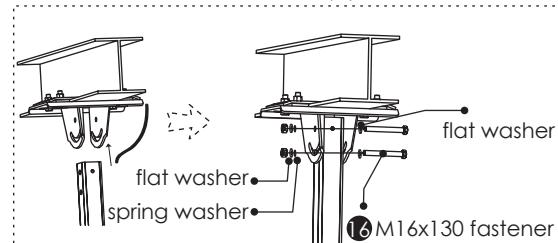


PS: put cable in cable pipe then through extension tube.

⑤ Install extension rod



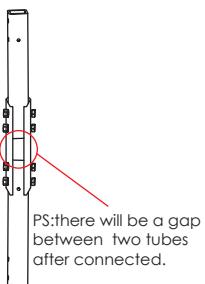
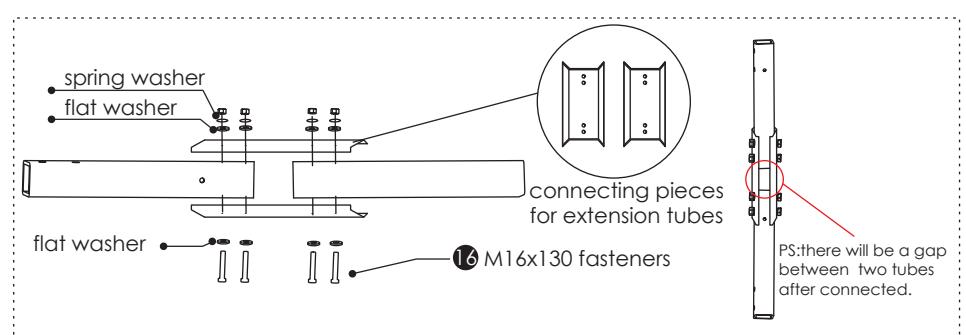
Put extension tube between the bending pieces, align to the holes with M16x130mm fasteners and pretighten them. Adjust the tube vertical with level-meter(e), then tighten fasteners with 24# open end wrench(g), speed wrench(f) and 24# socket wrench(o).



PS: there will be a gap between adjust the extension tube to vertical, then tighten the fasteners.



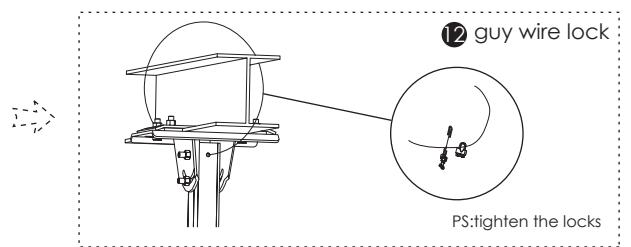
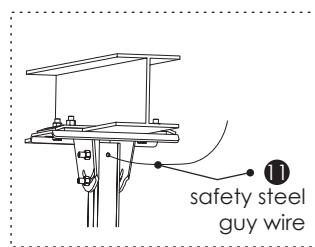
For some sites, one more extension tubes will be used, the method to connect two extension tubes as below:



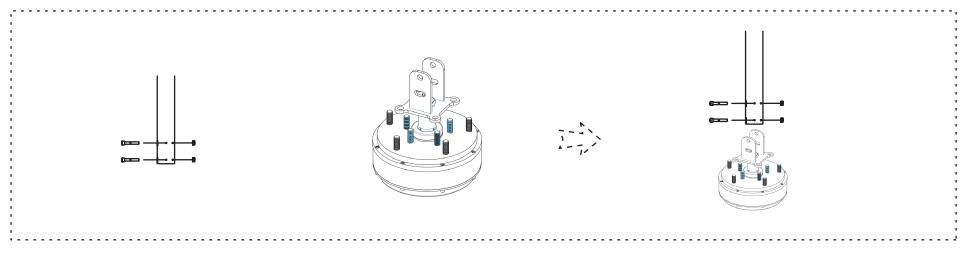
PS: there will be a gap between two tubes after connected.

6 Install safety rope

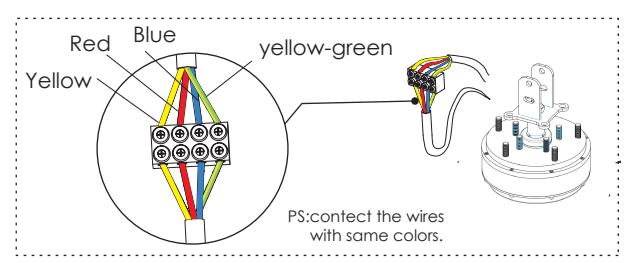
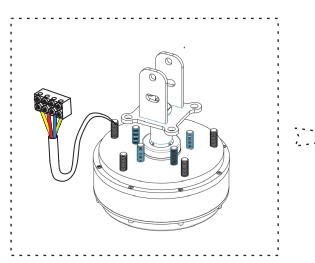
Put wire through a small hole on extension tube, and then twist the whole beam, adjust the safety wire and tighten the guy wire locks with speed wrench(f) and 10# socket wrench(r).

**7 Install host**

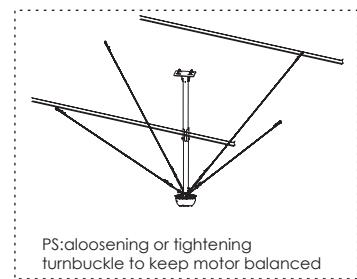
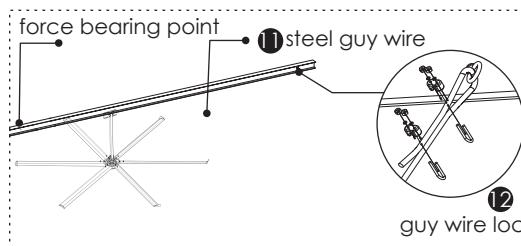
The motor shall be in horizontal, and the fasteners shall be tightened after the field is completed.

**8 Host wiring**

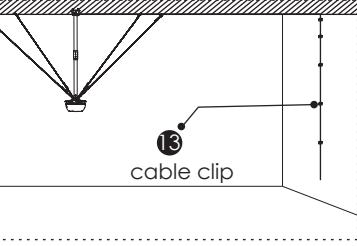
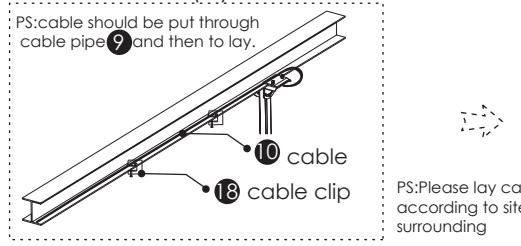
Strip the cable with wire stripper(k) and keep copper wire unbroken. Connect four lines with the same color, and fix the connector with cross screwdriver(l), then packed with insulated rubber tape to avoid sparks and improper contact.

**9 Installation of steel wire fastener**

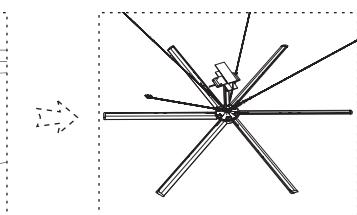
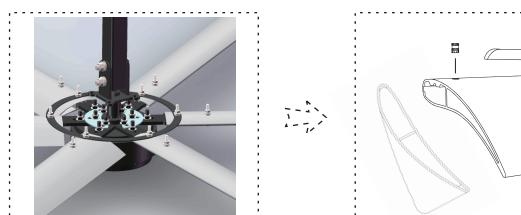
Please pre-judge the 4 points can bear the force or not, put the wire through the hole punched beforehand on the purlin. Connect turnbuckle with eyebolt on motor with guy wire, then loosen the turnbuckle at the most and put guy wire through lock and connect turnbuckle. Four safety wires must be isometric, symmetrical and even load. At last tighten all wire locks with speed wrench(f) and 10# socket wrench(r), and paint with screw glue on locks and turnbuckle.

**10 Layout power linea**

Cable routing should be neat and good-looking, every 1.5M with a cable clip while laying cable, and then tighten cable clips on beam and wall with straight screwdriver(m).

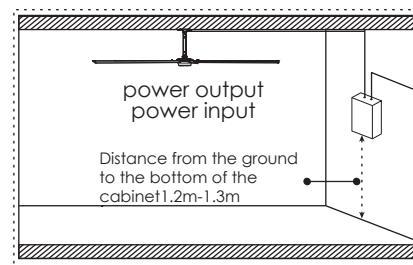
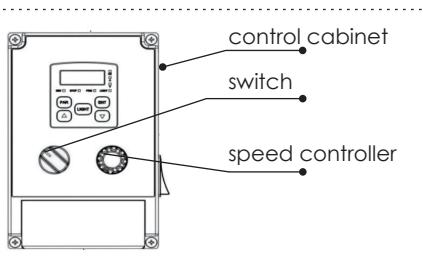
**11 Install fan blade**

Cable routing should be neat and good-looking, every 1.5M with a cable clip while laying cable, and then tighten cable clips on beam and wall with straight screwdriver(m).

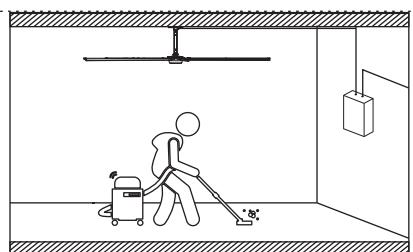


12 Installation control system

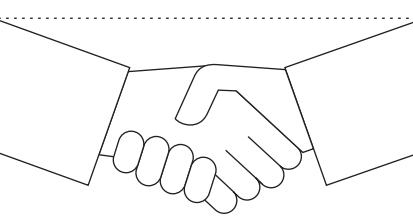
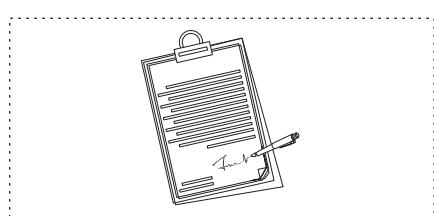
Fix control box to confirm mounted position, keep box balanced. Punch hole with electric tools and fix buckles into the holes with cross screwdriver(!). The box should be fixed at a height between 1.2m-1.3m from the ground.

**13 Clean up the scene**

Remove all things about installation, clean the site and return the scene.

**14 Customer signature**

Client's signature and acceptance.

**15 Installation is completed****7. The control panel and display system**

Function	Diameter
Output voltage	Volt(V)
Frequency	Hertz(Hz)
Power	Kilowatt(kW)
Current	Ampere(A)

1. After normal power-on, the display panel will self-test reset for a few seconds, and then display "off" when it is stable.

2. After starting the control box, 5 groups of data showed on display window will monitor the operation status quickly and show the current speed, output current, voltage, phase and temperature of controller.

8. Operating instructions**Control Switches**

Three gears control switches are the electrical devices that control STOP, RUN, and they are weak current control switches. They directly control the frequency converter.

RUN: Normal operation of fan
STOP: Fans stop running

Before operating the equipment, please read the product instruction and clear the obstacles in the fan revolve area to ensure there is enough safety space for the fan operation.
Warning: Please make sure to turn off the power supply first before doing any electrical and fan maintenance and did by professionals to avoid being wounded!

RUN

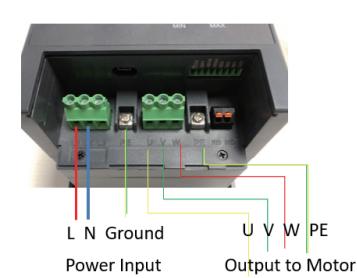
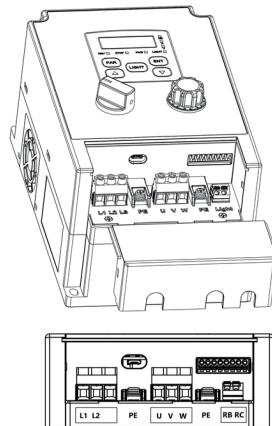
1. Confirm there is no obstruction and potential danger in the fan operation space ;
2. Confirm the input power supply is correct and meet the product's requirement;
3. Confirm the speed knob at the minimum position;
4. Turn on the fan, turn the control switch from STOP position to RUN position;
5. After the fan starts, adjust speed knob to get the appropriate speed and best effect.

STOP

1. STOP device, turn the control switch from RUN position to STOP;
2. Power outage is prohibited during the fan normal operation.

8.1 Control box wiring

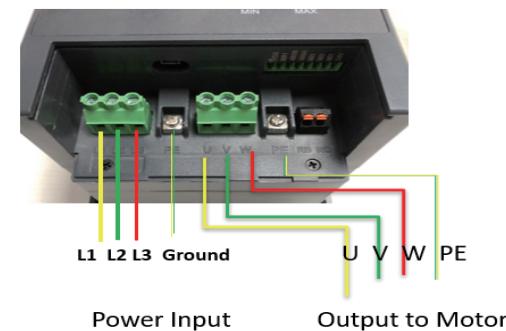
The cable at the output end of the motor is connected with the cable at the input end of the control box. The connection is fastened with a screwdriver. When connecting, it is necessary to ensure that the connected core wires are of the same color. Do not mistake or reverse the connection.



The wiring shown above is 220V Single-phase wiring.



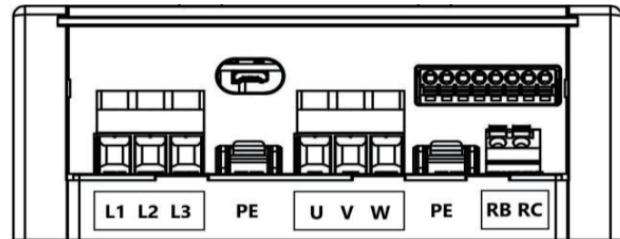
The following is a 380 V 3-phase connection.

**9. Troubleshooting****Common causes for the malfunctioning operation:**

- ◆ The external power supply of the control box is not valid;
- ◆ Open the master switch, and then turn on the three gears control switch, if the fan can still not work, please check whether the speed knob is of the MIN state. Otherwise, please contact Spectra Instruments Pte Ltd at +65-67478857/67475895;
- ◆ Non-professional staffs do not open the electrical control box! For repair or adjustment, Spectra Instruments Pte Ltd will send you our trained professionals or engineers;
- ◆ If you find the equipment is damaged or has abnormal sound, please stop running as soon as possible, cut off power supply, and contact our service department;
- ◆ Notes: Equipment damages due to the improper use are not covered by the warranty. Personal injuries and equipment damages for your failure to comply with the contents of this manual, the Company will not bear any responsibilities.

10. Specification of parameters for control system

◆ Wiring terminals



Terminal symbol	Terminal name	Function description
L1	Main circuit power input	The three-phase AC input terminal is connected to the grid.
L2		
L3		
U	Drive output	The three-phase AC output terminal is generally connected to the motor.
V		
W		
PE	Safety protection ground terminal	Each machine must be grounded.
RB/RC	Relay Contact Point	This relay controls the on-off of external devices

◆ Operation Panel Display



Button	Name	Function Description
	Parameters/exit key	Enter or exit the first level menu
	OK key	Step by step enter the menu screen, confirm the setting parameters
	Increase	Increment of data or function code
	Reduce	Decrement of data or function code
	Relay Control	Press once to turn on and again to turn off

LED indicator	Symbol content description
FWD	Forward direction: When the light is on, it means it is in the forward direction.
STOP	Stop: When the light is on, it means it is in a stopped state.
REV	Reverse direction: When the light is on, it means it is in reverse direction.
RPM	Speed unit
A	Current unit
V	Voltage unit
LIGHT	For external devices, the conduction light is on, and the disconnected light is off
7 LED displays	Parameter display: can display various monitoring data such as set frequency, output frequency, and alarm code

10.1 Explanation of error codes

The drive control all-in-one machine has multiple warning messages and protection functions. Once an abnormal fault occurs, the protection function will act and the drive will stop working. The drive fault relay contact action, and display the fault code on the drive display panel. Before seeking service, the user can perform self-examination according to the prompts in this section, analyze the cause of the failure, and find a solution. If you cannot find a solution, please seek technical support, contact the agent of the drive you purchased or contact our company directly.

Fault Name	Operation Panel Display	Fault Shooting	Fault Handling
Hardware overcurrent	OC(Hardware current detection overcurrent)	1. The output circuit of the drive is grounded or short-circuited 2. The acceleration and deceleration time is too short 3. The manual torque boost or V/F curve is inappropriate 4. The voltage is low 5. Start the rotating motor 6. Sudden acceleration during acceleration Load 7. Driver selection is too small	1. Eliminate peripheral faults 2. Check parameters by referring to the appendix Common parameter tables 3. Increase acceleration and deceleration time 4. Adjust manual boost torque or V/F curve 5. Adjust the voltage to the normal range 6. Select speed tracking start or wait for the motor to stop before starting 7. Cancel sudden increase Load 8. Choose a driver with a higher power level 9. Seek technical support
Software overcurrent	OC2(Software current detection overcurrent)	1. There is a grounding or short circuit in the output circuit of the drive 2. The acceleration and deceleration time is too short 3. The voltage is too low 4. The load is suddenly added during the deceleration process	1. Eliminate peripheral faults 2. Check parameters by referring to the appendix Common parameter tables 3. Increase acceleration and deceleration time 4. Adjust the voltage to the normal range 5. Cancel sudden load loading 6. Seek technical support
Hardware overvoltage	HU	1. The input voltage is too high 2. There is external force to drive the motor to run 3. The acceleration and deceleration time is too short	1. Adjust the voltage to the normal range 2. Cancel the external power or install a braking resistor 3. Increase the acceleration and deceleration time

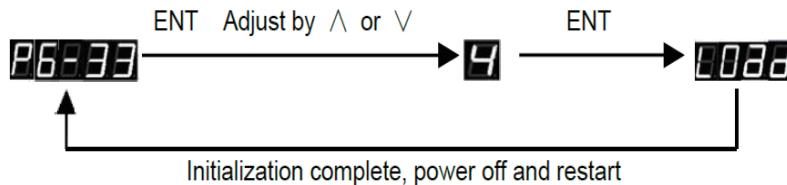
Undervoltage fault	LU	1. Instantaneous power failure 2. The input terminal voltage of the driver is not within the range required by the specification 3. The bus voltage is abnormal 4. The rectifier bridge	1. Reset the fault 2. Adjust the voltage to the normal range 3. Seek technical support 4. Seek technical support 5. Seek technical support 6. Seek technical support
		and buffer resistance are abnormal 5. The drive board is abnormal 6. The control board is abnormal	
Overload	OL	1. Whether the load is too large or the motor is blocked 2. The driver selection is too small	1. Reduce the load and check the motor and mechanical conditions 2. Choose a driver with a higher power level 3. Check parameters by referring to the appendix Common parameter tables
Module Overheated	OH	1. The ambient temperature is too high 2. The air duct is blocked 3. The fan is damaged 4. The module thermistor is damaged 5. The inverter module is damaged	1. Reduce the ambient temperature 2. Clean the air duct 3. Replace the fan 4. Seek technical support, replace the thermistor 5. Seek technical support, replace the inverter module
External device failure	-EIn	1. Input the external fault signal through the multi-function terminal MI	1. Check and troubleshoot external faults
Current sensor failure	EH	1. Current detection circuit components are damaged	1. Seek technical support 2. Check parameters by referring to the appendix Common parameter tables

Alarm Record Query

Refer to P6-13~P6-22 for the query of alarm records, which can query the content of the alarm and the operating status of the drive at the time of the last alarm.

Alarm record initialization

Clear the drive alarm record. The alarm detection record (alarm record) can be monitored through P6-13~P6-22, and the relevant parameters of P6-33 can be set to initialize the alarm record. The operation is as follows:

**11.Customer service**

After-sales service is very important for the stability of the equipment operation, because of this Forefans always offer customers high quality products and perfect after-sales service, at present, we had set up sales and after-sales service centers in five major areas across the country to ensure that we can provide users with thoughtful, fast, high quality and comprehensive after-sales service, make users feel relieved, without worry.

Product technical support

Combined with fan equipment installation, commission, and operation process, we provide users with free training about the product basic knowledge, use, maintenance technology and equipment related qualifications and certificates, to ensure long term stable operation of equipment.

Support can be got through the following ways:

- 1、Login in our website,browse to download the latest product technical specification.
- 2、Contact our company after-sales department at +86-15851682580 to get support.
- 3、Contact sales engineers
- 4、our company adhering to the customer first and provide the best service for you.

12.Fan working condition

In order to take full advantage of the product's performance and extend its life, the installation environment is of very important. Please install the fan in the environment as requested in the following table:

Environment	Conditions
Installation site	Indoors
Ambient temperature	-15~+55 C To improve the reliability, please don't use the product in the places where temperature changes rapidly. Avoid freezing the product.
Humidity	Below 95%RH
Surrounding	Places with no corrosive gas and flammable gas

12.Quality assurance

Details of the warranty of quality

Quality assurance is for the whole machine .The quality guarantee period is from the date of acceptance by customers. Failure occurs during the quality guarantee period, such as products, our company provide free consultation, maintenance services (including vulnerability free replacement of spare parts), quick response, professional troubleshooting.

The damages caused following reasons are not in warranty scope:

- ◆ Improper use, maintenance and safekeeping;
- ◆ Buyer and user themselves dismount or remove the product;
- ◆ Force majeure factors (lighting, earthquake, typhoon, etc.).

13.Warranty and maintenance

Our product design is maintenance-free, but in order to ensure the long life of the normal operation, the fans should also be maintained regularly, especially when applied in harsh environments. For any fan or inverter controller maintenance, please be sure that the fan stops running and cut off the controller power to protect the safety of personnel.

Interval	maintenance content
Test run	Check the operation of the fan, any abnormal sound or vibration
3000 hours	Clean the dust on the inverter Clean the dust on the blades
4000 hours	Check the mechanical fasteners to ensure that there's no looseness Check wire cable to ensure that there's no damage
9000 hours	Check the operation condition of power-driven device

If the fan is running with a serious abnormal noise or vibration, it indicates that there exists some damages to the mechanical parts somewhere, and you should immediately shut down the fan and do a comprehensive inspection.

14.Product Warranty

Product warranty period: 24 months for complete machine after delivery. For failures within the warranty period, please do not try to solve by your own, the company can send you a free onsite service professional. But the following occasions are the paid services:

- ◆ Failures caused by incorrect use.
- ◆ Failures caused by your transform of our products without our permission.
- ◆ Failures caused by natural disasters and fires.
- ◆ Over the warranty period
- ◆ Other failures caused by non-corporate responsibilities.

The abovementioned services are only available in Singapore, will not accept fault diagnosis in foreign countries . If customers wish to provide after-sales service abroad, it must be conclude and sign a Foreign Service contract.

Our products are manufactured under strict quality control, and each set of the products have passed the rigorous testing process before delivery.

When the product is used in the occasions that may cause major accident or loss due to the improper operation, please configure the relevant security measures.

Maintenance cycle						
Time	9 steps deep-clean (Whole fan)	18 steps safety inspections (whole fan)	Replacement of safety fastening system for fan blades	Replacement of Mechanical Safety Balanced Cable System	Replacement of radiator fans in control box	Replacement of Inverter
1st year	●	●	—	—	—	—
2st year	●	●	—	—	—	—
3st year	●	●	●	●	●	—
4st year	●	●	—	—	—	—
5st year	●	●	—	—	—	—
6st year	●	●	●	●	●	—
7st year	●	●	—	—	—	—
8st year	●	●	—	—	—	—
9st year	●	●	●	●	●	—
10st year	●	●	—	—	—	—

● Service item

— Non-service item

In order to meet your maintenance needs, Orbit is a full-service partner. Our maintenance service consists of three powerful components:

· Repair maintenance ·

· Preventive maintenance ·

· Improved maintenance ·

This manual focuses on preventive maintenance, which is the key to achieving optimal performance and long-term operational benefits.

Preventive maintenance can help you avoid unexpected interruptions, provide emergency on-site service, detect failures and unnecessary energy consumption, thereby reducing overall costs.

It protects and extends the life of your purchased product.

Items	18 Steps safety inspections (whole fan)	
1.Motor balance	7.Blade Strut	13.Operating current
2.Smooth operation	8.Blades	14.Circuit breaker
3.Safety rope	9.Fan tail	15.Switch
4.Fasteners	10.Line	16.Speed control
5.Wire lock	11.Wiring	17.Radiator fan
6.Safety ring	12.Inverter parameters	18.Other anomalies

Acceptance report of installation and commissioning

Customer: _____

Contract No.: _____

Principal of the customer: _____

Tel: _____ Fax: _____

1. Main installation and commissioning work for this project:

Installing Site information :

Field structure	Blade height from the ground	
Field Height	Blade tip distance from obstacle	Upper: Below: Winglets end:
Mounting point height	Extension tube length	
Motor Brand	VFD brand model	
Rated voltage(V)	Running current (A)	
Field voltage (V)	Running upper and lower limit frequencies (HZ)	Upper limit HZ Lower limit HZ

Product Type:

Products Info	Quantity	Product Number

Inspection Items:(Customer selection)

Has been received product manual (inverter/motor manual, Quality certificate, key, user manual).	Yes <input type="checkbox"/>	No <input type="checkbox"/>
All equipment works normally and smoothly (no vibration, abnormal sound, electric appliances no alarm)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Fan shape without defects	Yes <input type="checkbox"/>	No <input type="checkbox"/>
On-site training fan operation methods, precautions, and warning instructions (do not use the power switch to control fan operation)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Power on and commissioning operation (running time is 15 minutes)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Installation accordance: A. customer installation drawings B. Customer project leader site fixed installing position.	A <input type="checkbox"/>	B <input type="checkbox"/>

2. Time of installation and commissioning:

_____ to _____ (Month/ Date/Year)

3. Work attitude of the technician:

Good All right Not good enough

4. Quality of service

Good All right Not good enough

5. Final situation of the installation and commissioning:

Good All right Not good enough

6. Detail:

7. Conclusion of acceptance: : Qualified Unqualified

8. Customer's comment:

Signature and stamp of customer: