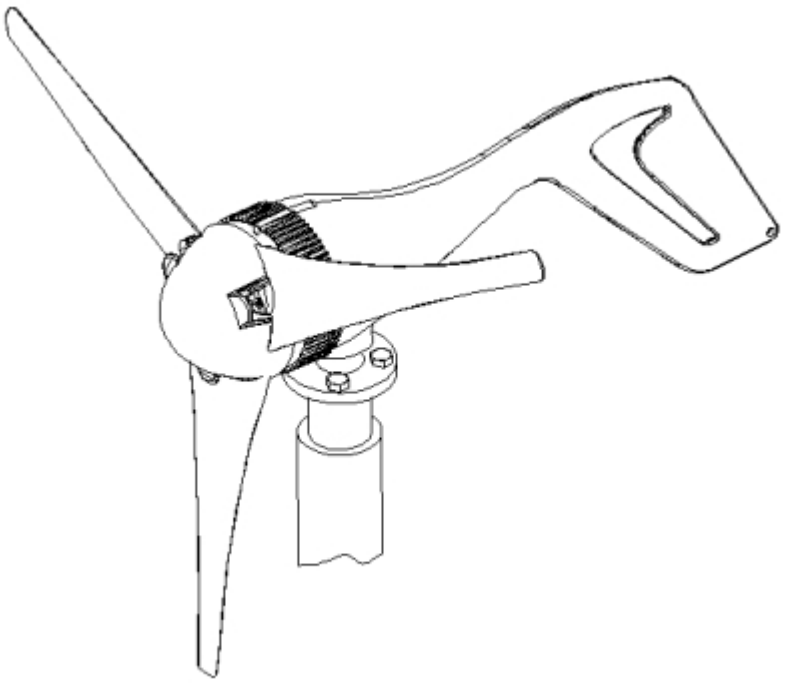
# Wind Turbine Generator



Model
FT-400

User's Manual

# Owner's Manual

Thank you for purchasing S series wind turbine. We are proud to offer a cost effective renewable energy technology as well as abundant resource, make sure you will enjoy it when you use it. Please read this manual carefully before installing and use the wind turbine. Always save this owner's manual.

**NOTICE:**

Failure to follow Safety Precautions will void wind turbine warranty and may result in death, personal injury or property damage.

- **Please try your best to tighten the main shaft nut until you can't move the nut. , or the hub will drop down.**

1. This information is believed to be reliable; however,we assumes no responsibility for inaccuracies or omissions.
2. All specifications are subject to update without notice.
3. Wind generators must be installed following the guidelines established by state and local regulations. Consult a local electrical contractor or the local planning and zoning office for details and regulations.
4. Please write the serial number of your wind turbine on the front of this manual for your convenience and protection. You will need this information in the event of a warranty claim. Thank you.

## 1. Safety Precautions

**NOTE:** Safety must be the primary concern as you plan the location, Installation and operation of the turbine. Please be aware of electrical, mechanical and rotor blade hazards.

### 1.1 Mechanical Hazards

Always connect the controller to the battery before you connect it to the wind turbine.

Only install the wind generator when the connections of the wind turbine system are disconnected and bypassed or the blades are tied to make sure you won't get hurt by the rotating blades.

Pay attention that system checks are best carried out in calm weather conditions. Avoid any unnecessary installation and/or maintenance during windy weather or rainy days. Be ware that internal voltages may cause damage.

Rotating blades present the most serious mechanical hazard. The blades of wind turbines are made of very strong thermoplastic. At the tip, the blades may be moving at velocities over 220 Km/hour. At this speed, the tip of a blade is nearly invisible and can cause serious injury or death. Never touch the rotating blades. Never try to stop it with your hands.

Check the tower condition regularly, if there are any loosen phenomenon, it should be tightened immediately, so as to prevent the falling down of the wind turbine.

When vibration or strange noise is found during working, please stop the wind turbine and check the reasons.

Keep the rotor balance, eliminate vibration

When the blades lost balance caused by outside damage and create strong vibration, the wind turbine must be stopped and checked, until the trouble is eliminated.

The batteries should be set on a place where far from fire resource and heat resource, the gas generated from charging and discharging process should be easy go out of the room.

**NOTE:** Please install the turbine only at locations where nobody has the possibility to touch it easily.

**CAUTION:** *DO NOT INSTALL THE TURBINE WHERE ANYONE CAN APPROACH THE PATH OF THE BLADES.*

### 1.2 Electrical Hazards

Please be careful when connecting this and other electrical devices. Use proper handling and methods.

Consult a qualified professional technician if you are not sure.

Pay attention the heat in wiring systems is often a result of too much current flowing through an undersized wire or through a bad connection when you extend the cable in your whole generator system. Don't use the cord which is smaller than 10 AWG when the length is shorter than the 75'. The 10 AWG or 8 AWG is strongly recommended for 100' or 150' extension distance.

**TIP：The smaller the gauge numbers of the wire, the greater the capacity of the cord. For example, an 8 gauge cord can carry a higher current than a 10 gauge cord.**

**CAUTION:** *SELECT THE CORRECT WIRE SIZE TO HELP AVOID THE RISK OF AN ELECTRICAL FIRE.*

Please twist three stripped wires of output cable end into on rope (ie: short circuit) to stop the wind turbine turning for safety during installation.

When disconnecting the electric line of the wind generating system, the three turbine cables must be firstly disconnected from the controller, then disconnect the two lines of the battery group from the controller & inverter box.

An open wire is very dangerous! Lay the wires securely in order to protect wires from mechanical damages.

Batteries can deliver a dangerous amount of current. A short-circuit of the battery cables and/or power lines can result in a fire. Please install a properly sized fuse or circuit breaker to the cable and as near as possible to the battery.

**CAUTION:** ***FUSE ALL CONNECTIONS****. SELECT THE CORRECT FUSE SIZE TO MINIMIZE THE RISK OF FIRE AND/OR AN ELECTRICAL FAILURE.*

### 1.3 System grounding:

Ground the system from the power control unit to avoid current leakage damage.

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# 1. Assembly requirements

1. Before the assembly of the wind generator or in the process of maintenance, please be sure to read the manual first.

2. Please don't install the wind turbines in rainy days or when the wind scale is at Level 4 or above.

3. After dismantling the package, you are proposed to short the three leads of the wind turbines （the exposed copper parts should be screwed together).

4. Before the installation of the wind turbine, lightning grounding must be prepared. You can arrange the facilities according to national standards, or you may your own idea to arrange them according to the local environment and soil condition. Table 1 is for reference.

5. When assembling the Wind turbine, all the parts should be fixed according to the parameters.

6. Before the connection between the wind turbine base and the bracket flange, please link the three leads of the wind turbine to the three leads of the bracket accordingly. When using the hinge method, every pair of wires should be no less than 30mm in length and be wrapped with Acetate cloth tape for three plies. Then please throw on glass paint tube. With this method, please connect the three pairs of wires (attention: the joint of the wires can't bear the weight of the tower leads directly, so it must be 100mm away from the joint and be fastened with rubber belt, and then stuffed into the supporting stand of the steel pipe. After that, it can be connected with the flange.)

7. Before hoisting the wind turbines, the end of the tower lead should be cut away the insulating layer for 10mm or so. Then screw the three exposed leads stubs (shot circuit) together.
8. During the installation, it is prohibited to revolve the rotor blades roughly (the ends of wind turbine leads or the tower leads are short-circuited at this moment). Only after all the installation and the examination is finished and the security of the erection crew is guaranteed, it is allowed to dismantle the terminal short circuit and be connected with the charger and battery to test the function.
·**If you don't follow the above instruction when assembling and installing the wind turbines, we are sorry that any problem or failure being generated here will not be covered.**

# 2. Product Description

1. Start with low speed; high wind energy utilization; beautiful appearance; low vibration on operation.
2. Being installed by human design and easy for installation, maintenance and repair.
3. Being molded through precise injection with new process, together with the optimized design of aerodynamic contour and structure, our wind turbine blades have such advantages: high utilization of wind energy which contributes to the annual energy output.
4. Our generators, adopting patented permanent magnet rotor alternator， with a special kind of stator design, efficiently decrease resistance torque of the generators. Meanwhile, it makes the wind turbines match the generators quite well and increase the reliability of their operation.

## 5. Technical parameters

| | |
|---|---|
| Rated Power | 400W |
| Rated AC Voltage | AC12V/24V |
| Number of blade | 3 PCS /5 PCS |
| Start-up wind speed | 2.5m/s |
| Cut-in wind speed | 3.5m/s |
| Cut-out wind speed | 17m/s |
| Rated wind speed | 12m/s |
| Engine | Three-<br>phase permanent magnet generator |
| Rotor diameter | 1200mm-1300mm |
| Blade material | Nylon fiber |
| Suggested Tower diameter | 48mm |
| Output line anti-<br>winding device | Overall three-phase commutator |
| Life span | 15years |
| Equipment surface protection | Aluminum oxide + plastic coating |
| Working temperature | -40°C to 70°C |

# 3.Tower and Accessories

**1.** In terms of this type of wind turbine in our company， its flange base is installed on the barrel-type tower whose the iron pipe OD is 48mm and wall thickness is 2.5 mm.

**2.** Being the main body of barrel-type tower, the iron pipe's length can be adjusted according to the wind and environment of the place where the user is going to install the wind turbines.

**3.** Tower accessories include (1) the production of the upper tower. (2) The cable group. (3) Tightening line device. (4) Anchor. (5) Line hook. (6) Base pier. (7) Anti-tarnish, anticorrosive, surface coating materials.

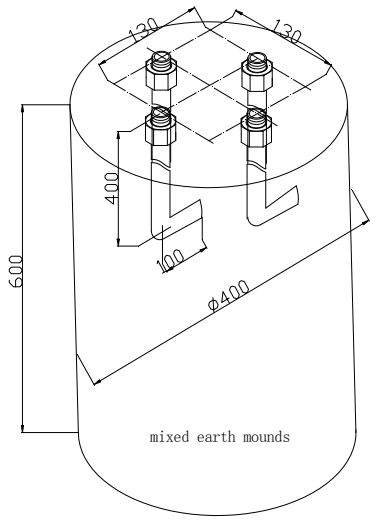



Figure1:manufacture of mixed earth mound

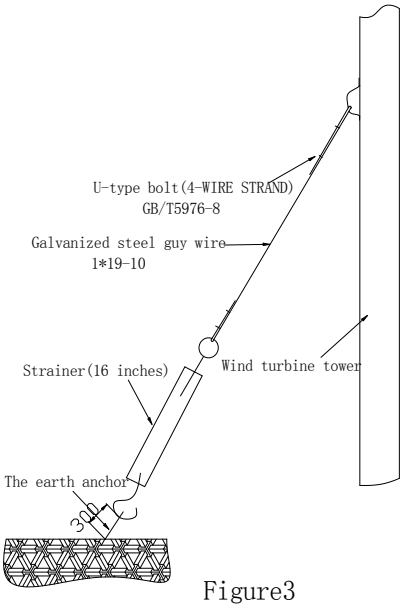



Figure3
The manufacture of guy cable

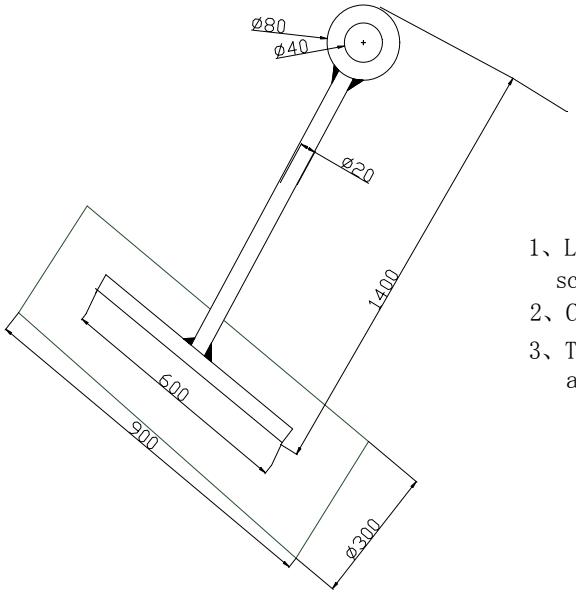


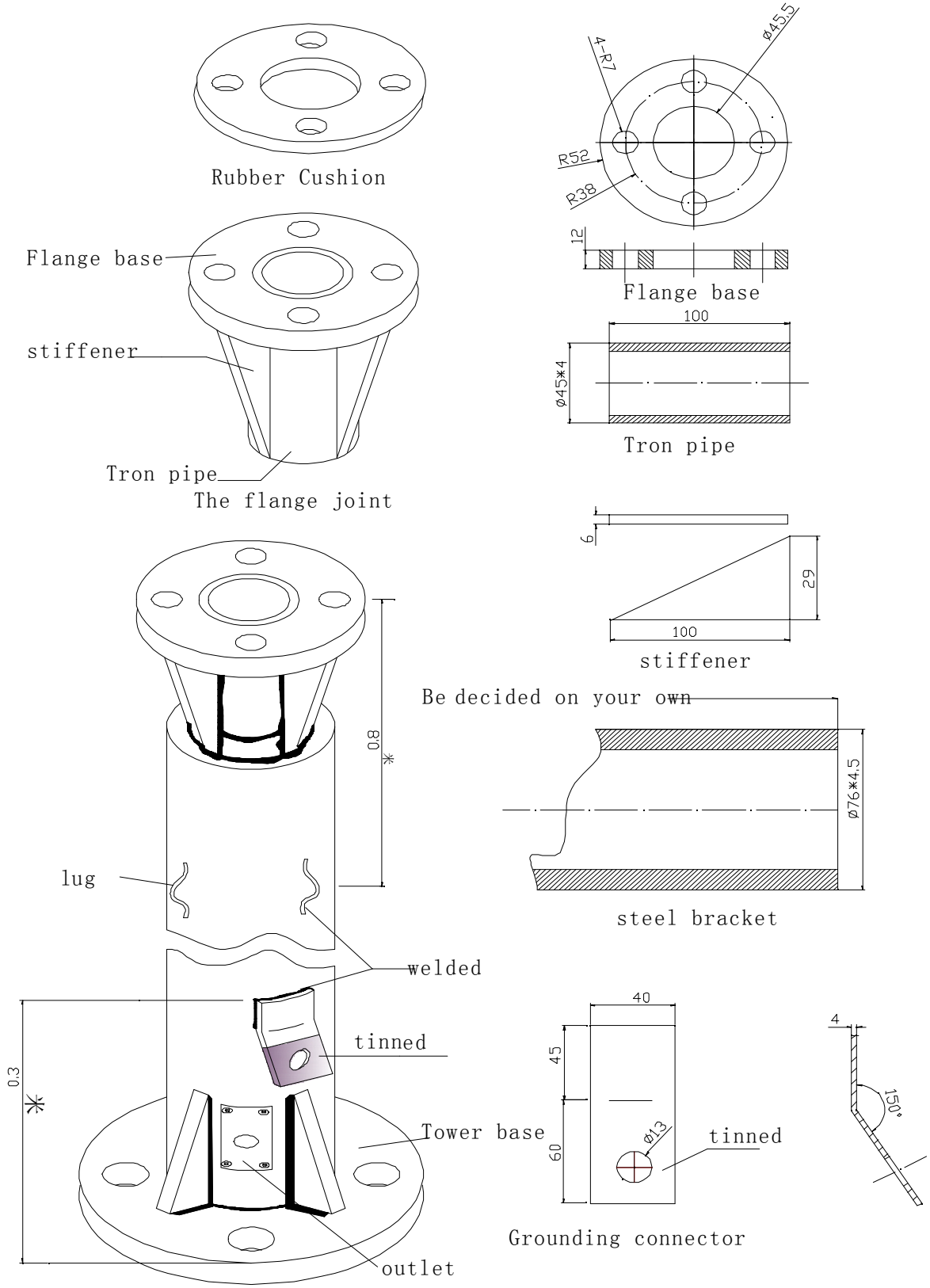

Figure2
The manufacture of earth anchor(3 sets)

## Technical requirement

1、L-type bolts for four galvanized wire strands; screws should be 60 higher from the mixed earth surface.
2、C25 motar can be used for mixed earth.
3、The metal parts should be under the threatment of anticorrosion and rust proofing.

**Table 1 the fabrication of anchor, lasso and guy cable**

5. The production style and size of the upper tower and size is shown in Figure II. Its requirement: solid welding; no leak at the weld zone; the earth lug must be welded 20cm away from the ground. It will be connected to the lightening grounding device.




6. **Figure 2 wind turbine flange docking in the upper tower**

**5.** The arrangement of the lightening protection earth resistance can refer to the national standard, the European standard, and American standard. You can also refer to the figure1 on the manual to help arrange.

**6.** We are able to provide the towers and accessories according to the special requirements of the users.

# 4. The Wind Turbine Installation Steps

· **It is prohibited to assemble and install wind turbines in rainy days.**

1**.** The current transmission and insulated wires: transmission lines are built in the bracket iron pipe. Their upper parts can be led out through the bore of the flange joint while the bottom ones are led out from the opening which is 30cm away from the ground. The section from the bore to the point which is 60cm away from the earth surface should be protected by iron pipes whose O.D should be 17mm to 21mm. The underground paths of the transmission lines can be combined together with an iron pipe or a plastic pipe, and then be connected to the place where the controller is located.

2**.** The installation sequence of the wind turbines can follow the steps as illustrated in figure3.

2-1. Place the steel bracket on the ground; block up the flange joint to 1.3m.

2-2. Remove the wind turbine flange base to the flange joint. According to the seventh article in the Safety Manual, please connect the leads and transmission lines respectively.

2-3. After the flange bolt (9) is mounted on the flap gasket (10), plug it in the correspondent jacks of the flange base with the bolt's head being up. Set the bolt silk into the elastic washer and then use a spanner to tighten the nut with the flange bolts silk. Similarly, plug other bolts, flat gasket, elastic washer and nuts in the corresponding jacks. Screw down four nuts. Please refer to table 2 about the efforts needed to tighten up them.

3**.** The installation of the wind wheel blades: install the diplopore of the wind wheel blades (6) onto the groove of the wind wheel hub (5). You shall match them perfectly. Otherwise, you can turn one blade back and then do the installation work. Please penetrate the stainless flange screw (13) into the pore from the front, then tighten up the anti-slack nut (14) (attention: the anti-slak nut is disposable, so it can only be screwed, but not be loosened). The operation on the other blades is similar. Please refer to table2 about the efforts needed on them.

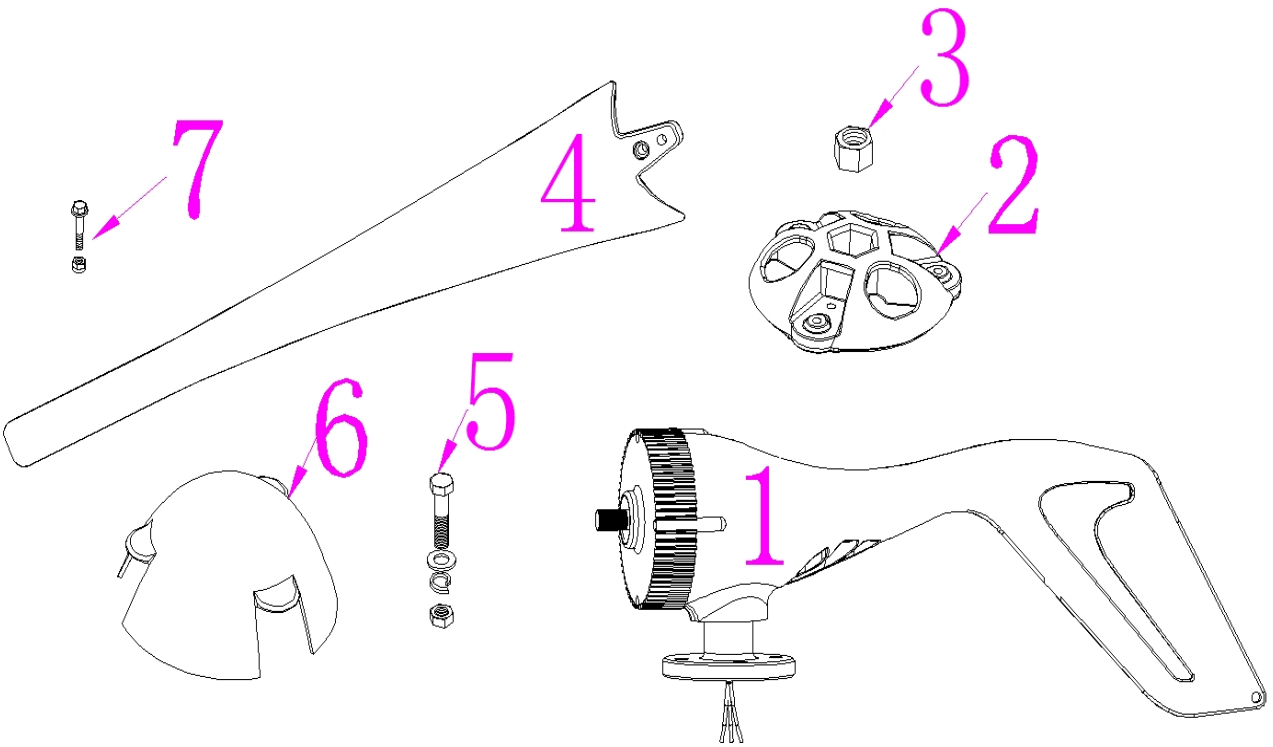
4**.** First put the big head end in the hexagonal hole of wind wheel hub and then put them into the thread spindle of the wind turbine. Press on the nut with your left hand while twist the wind wheel clockwise with your right hand. When the nut propels, use the extended hex wrench to lock the nut together with the dectral wind wheel blades.

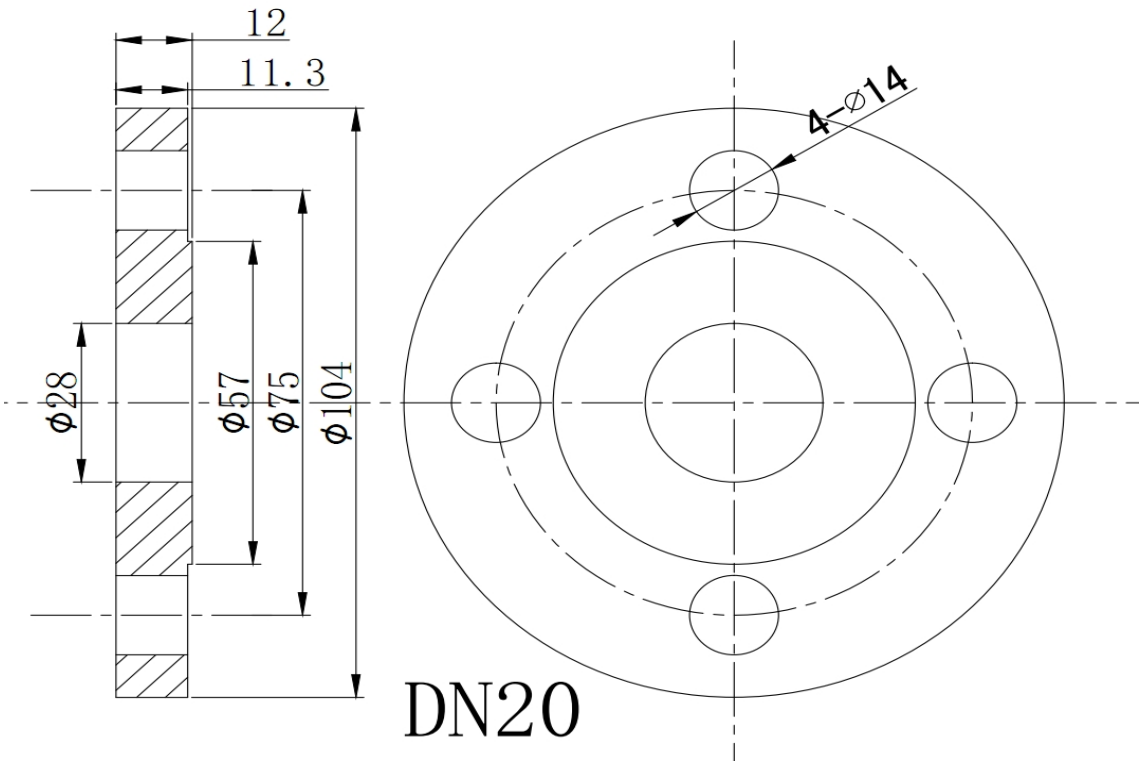
5. The installation of the fairing: the fit between the fairing (8) and the wind wheel hub (5) belongs to the clasp. The three gaps of the fairing are for the three blades, thus use your hands to clap the fairing pyramid so as to help them get into the seams of the wind wheel hub.

6. The lifting of the wind turbines and tower should be finished with the presence of skilled slingers and the security should be guaranteed. The tower's stance should be executed on the basis of the relevant requirement of permanent construction.

7. After the installation of the tower and the lightning protection, use a megger of 500W to measure the resistance between the transmission lines and the earth (the lightning protection line can represent the earth) in the case of not loosening the transmission short circuiting ends. The value should not be less than 5 MΩ. Otherwise, it may cause the insulating layer crushed or the joint being moist.

**Figure 3 wind turbine decomposition**



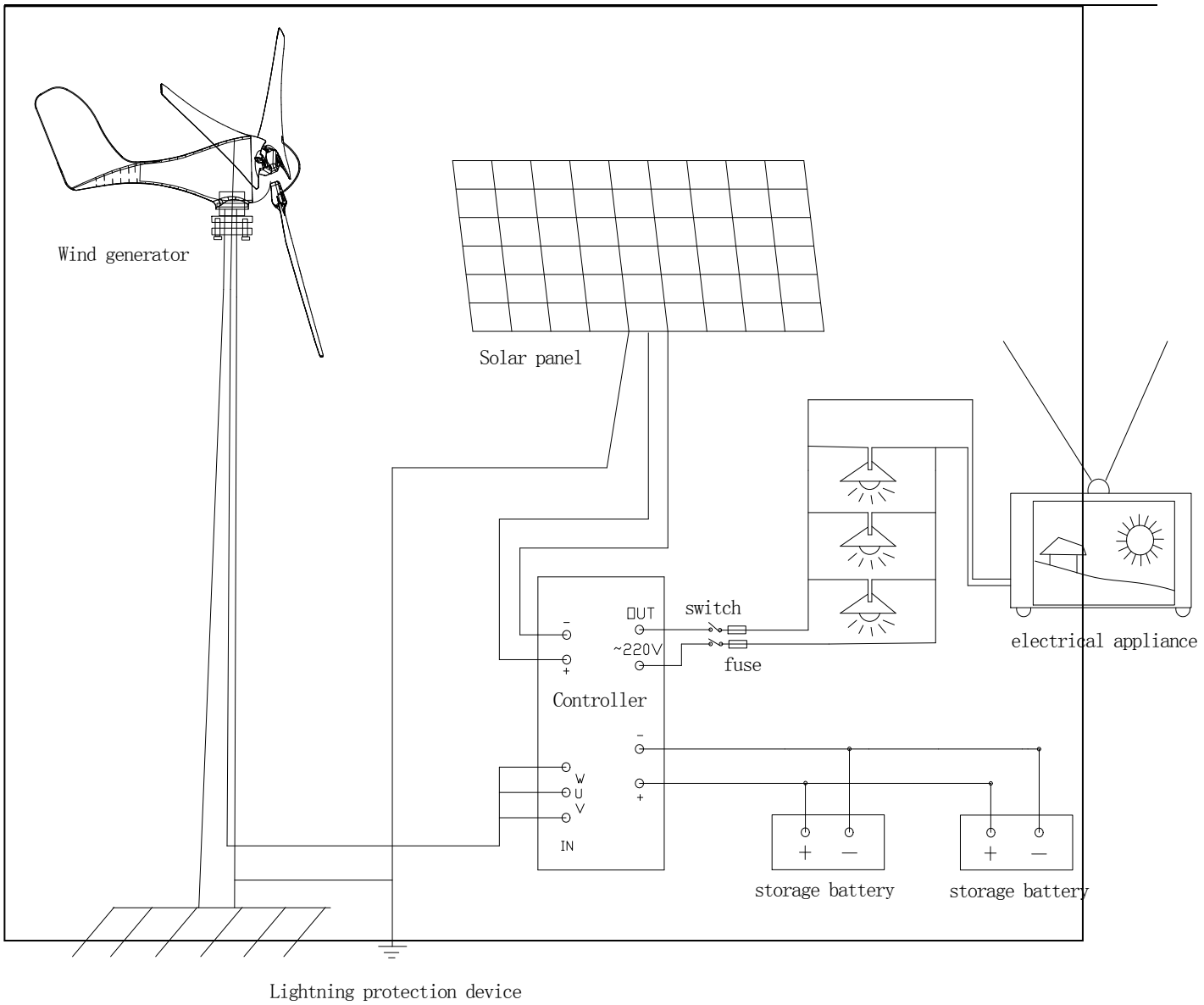



# 5、The Transmission Line Connecting With Inverter

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**Avoid heavy rain days for the first commissioning. Priority should be given to the days with gentle breeze of strong wind (wind speed: 5~13m/s).**

1. Please correctly connect the positive and negative poles of the storage battery to the ones of the binding posts (solar cell binding posts for spare use) on the controller (exclusive for wind turbines).
2. The load circuit is connected to the plug seat on the back of the controller through the fuse, switch and the plug.
3. The three transmission lines of wind turbine are connected to the three terminals (hole) on the back of the controller. As for the connection theory, you can refer to the relevant manual of the dedicated controller for wind generators, wind solar hybrid streetlight controller and the dedicated inverter for wind solar generators.
4. The D.C. voltmeter, being equipped with the inverter, indicates the storage battery's voltage while the charging current shows the storage battery's charging current. The alternating output voltmeter indicates the output voltage of the day. The red switch takes charge of the AV output. That is to say, the break of AC output will not influence the charging of the wind generator to storage battery. There are many indicating lamps with different colors on the central panel of the inverter's frontage. They indicate the working condition when the inverter has different functions and give warnings when the inverter deviates the normal operation condition.
5. Usually it is suggested to choose the fixed type lead-acid storage battery with cheap price. For instance, you can choose 100AH storage battery for the 200w wind generator, 400~600AH for 500w. The span of charging voltage is totally controlled by the inverter. The wind generators adopt the float-filling system to charge the storage battery. As for the float-filling current, it is related to the degree of depreciation, depth of discharge and maintenance. Usually, after the initial charge or the deep discharge, the beginning value will not be less than 8A per 100AH. With the time going, it may reduce to 3~1A. After it charges up, it can reach to 50~100MA or so.
6. The inverter should be put in dry and draughty places so as to resist the humid air and dust. Please make sure that the inverter's jacket is connected to the earth and over 1.5m away from the storage battery.
7. In order to maintain its charge and discharge capacity as well as the life expectancy, the storage battery should be installed in such places where they are dry, cool and ventilated in summer and warm in winter.




**Connection diagram of wind turbine, solar panel and electrical appliance**

# 6. Maintenance and Precautions

1. Wind generators often work at poor environment, thus please make sure you have time to check them with your sight and hearing; check whether the tower is swaying or whether the cable is loose (using a telescope is also a good idea).
2. Timely inspection should be made after a heavy storm. If there is any problem, please put down the tower slowly for maintenance. With regard to the wind turbines for streetlights, there should be electrician climbing the pole to check if there is any problem when the security protection measures are prepared.
3. The free maintenance batteries should be kept clear.
4. Do not disassemble the equipment by yourself. Please contact the specified maintenance department when the equipment is out of order.

# 7. Packing list

| number | name | Unit | quantity | Note |
|---|---|---|---|---|
| 1 | PMG | set | 1 | |
| 2 | hub | pcs | 1 | |
| 3 | blades | pcs | 3/5 | |
| 4 | stainless steel against pine nuts M16 | pcs | 1 | |
| 5 | flange connecting bolts（M12*55） | pcs | 4 | |
| 6 | nuts（M12） | pcs | 4 | |
| 7 | stainless steel blades bolts（M6*40） | pcs | 6 | |
| 8 | against pine nutsM6 | pcs | 6 | |
| 9 | flat washer | pcs | 8 | |
| 10 | spring washer | pcs | 4 | |
| 11 | stainless steel blades bolts（M6*40） | pcs | 1 | spare parts |
| 12 | against pine nutsM6 | pcs | 2 | spare parts |
| 13 | Controller/Inverter | set | 1 | A customer optional |
| 14 | Tower | set | 1 | A customer optional |
| Accessories: | | | | |

# 8. Quality Guarantee

**1.** To ensure quality, our products will go through strict examination before leaving the factory. Therefore we promise to customers that the generators are in excellent quality and complete.

**2**. Our products have 1 year's warranty since the day they are bought. In regard to the failure of the products because of one's repack or without authorization a year's guarantee， We don't keep the maintenance, occurred in the following situation: Dismantle and repair it by yourself or seriously violate

compasses operation (not according to instructions use)
3. The documents were as a product Warranty certificate, please properly preserved.

## User information table：

| | |
|---|---|
| Sales company： | Purchase company： |
| Purchase time： | Contact person： |
| SBBH： | Contact： |
| Model： | Zip code： |

## Maintenance records:

| Date | Maintenance species | Summary | SMT rework |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |