

# FD-series wind turbine system

## (installation and instruction manual)



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### Warnings:

- Please excuse from specification alternations without notice;
- It is required to comply with the local law, regulations or the permission From local government before installing WTGS;
- Only under no wind weather should carry out the installation, maintenance And dismantling of WTGS;



- Please make sure the construction for WTGS mechanical and electronic facilities should be done by professionals;
- Color or figuration of pictures might be varied against physical goods;
- It is forbidden to leave the wind turbine generator working under unloaded state (such as without connecting with batteries).
- GLB50KW wind turbine system is dedicated to on-grid use, the capacity of the grid should be at least 10 times more than the capacity of the wind turbine system.
- Please contact with the agent or distributors if you have any questions.
- The safety signs involving the manual are as followed;
- WTG is shorted for Wind turbine generator;



**Danger**—Improper operation might lead to hurt people badly.



**Attention**—Improper operation might lead to damage products or hurt People.

## Content:

0 cautions.....	5
1 parameter.....	6
2 packing.....	7
2.1 packing details.....	7
2.2 transportation.....	7
2.3 loading location.....	7
3 installation.....	9
3.1 selection of the location.....	9
3.2 foundation and tower assembling.....	9
3.3 assembling generator with free standing tower.....	9
3.4 assembling generator with hydraulic tower.....	14
4 controller installation.....	16
4.1 sketch map .....	16
4.2 controller parameter.....	16
4.3 installation of ground controller box.....	17
4.4 connection.....	17
4.5 remote control.....	18
4.5.1 GPRS module.....	18
4.5.2 LAN module.....	21
5 phase-sequence confirmation.....	22
6 maintenance.....	23
6.1 maintenance schedule.....	23
6.2 spare parts list.....	24
7 disconnection and disassembling wind generator.....	25

7.1 free standing tower.....	25
7.2 hydraulic tower.....	25
8 notes.....	26



## 0 cautions



Yawing is forbidden before the tower erected



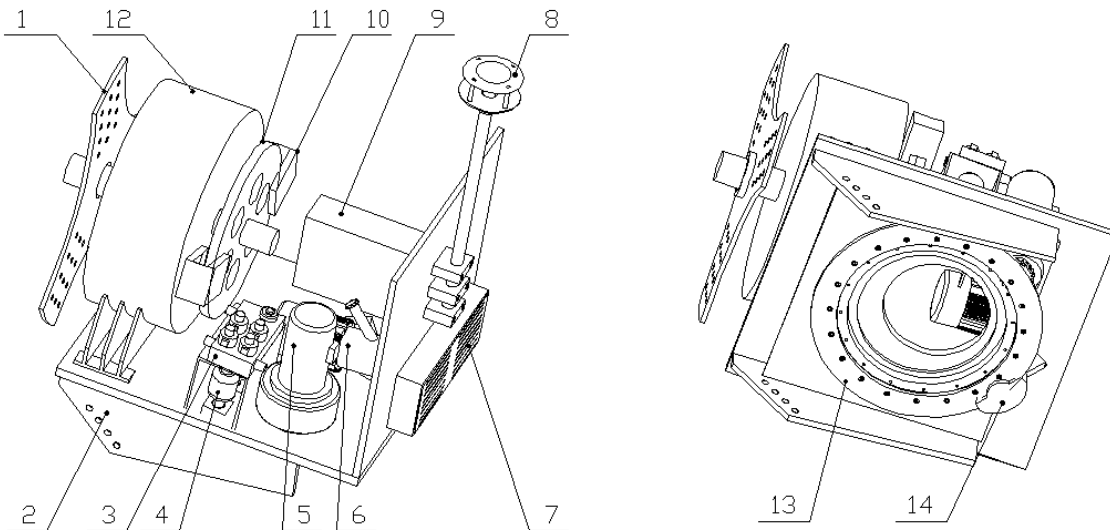
"manual-mode" is only available with technician, the turbine will lose protection in manual mode.

# 1 parameter for each model

the manual refer to the wind turbine system attached below

model	FD6. 4-5000	FD8. 0-10000	FD12. 0-20000	FD12. 0-30000
Rated power (W)	5000	10000	20000	30000
Rated voltage (V)	240	240	240	240
Rotor diameter (M)	6.4	8.0	10.0	12.0
Start-up wind speed (m/s)	2.5	2.5	2.5	2.5
Rated wind speed (m/s)	10	10	12	12.5
Security wind speed (m/s)	45	45	45	45
Rated RPM (r/m)	180	180	90	75
Blades material	GFRP	GFRP	GFRP	GFRP
Blades quantity	3	3	3	3
Noise level (dBa)	≤70	≤70	≤70	≤70

Generator composition:



No.	Description	No.	description
1	hub	8	Ultrasonic wind measuring device
2	Base plate	9	Control system
3	valve	10	Hydraulic brake
4	accumulator	11	Brake disc
5	Yaw motor	12	generator

<b>6</b>	Hydraulic motor and oil tank	<b>13</b>	Slewing bearing
<b>7</b>	Dump load	<b>14</b>	Yawing brake

## 2 packing

### 2.1 packing details

no.	Description	Quantity (set)	Packing form
1	Wind turbine ( including generator, hub and cables)	1	plastic film mulching
2	interface	1	Plywood case
3	blades	1	Plywood case
4	Nose cone and accessory	1	Plywood case

Notes:

Packing details of the tower refer to the tower manual

### 2.2 transportation

Except tower, anchors and location plate, all the other components are packed with plywood case.

All the packages can be transship and load by forklift.

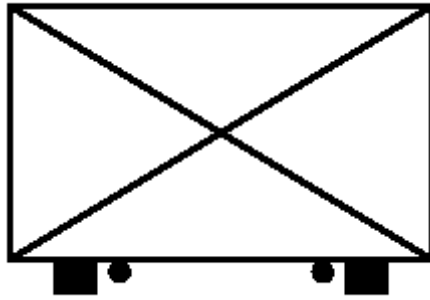
### 2.3 loading location

Please find the recommend loading location attached below marked with black point.

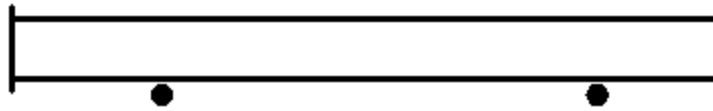
#### 1) generator

There is a loading U-bar installed under bottom plate of the generator, in case of the arm of the forklift would broken the oil tank and slewing bearing, making sure the arm of forklift hold the u-bar.

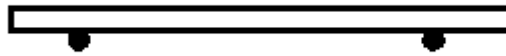
#### 2) Plywood case



1) tower



4) location flange



## 3.2 foundation and tower assembling

Refer to tower manual

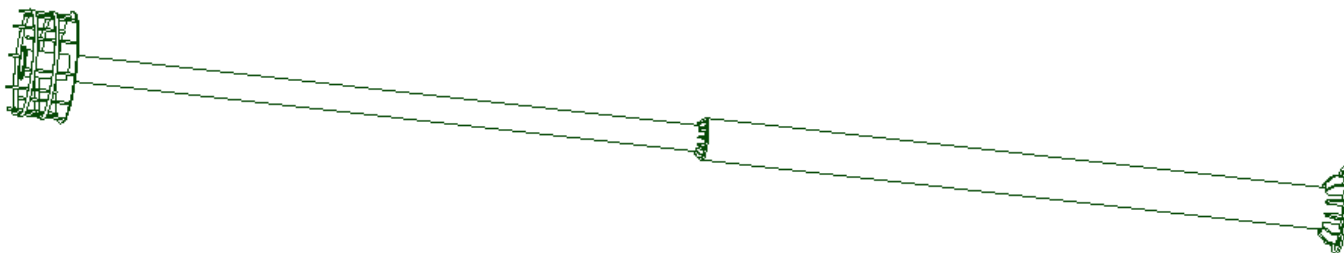
## 3.3 assembling generator with free standing tower

Forklift and 25T crane are required for the installation. Besides, two aloft working personnel are necessary during the installation.

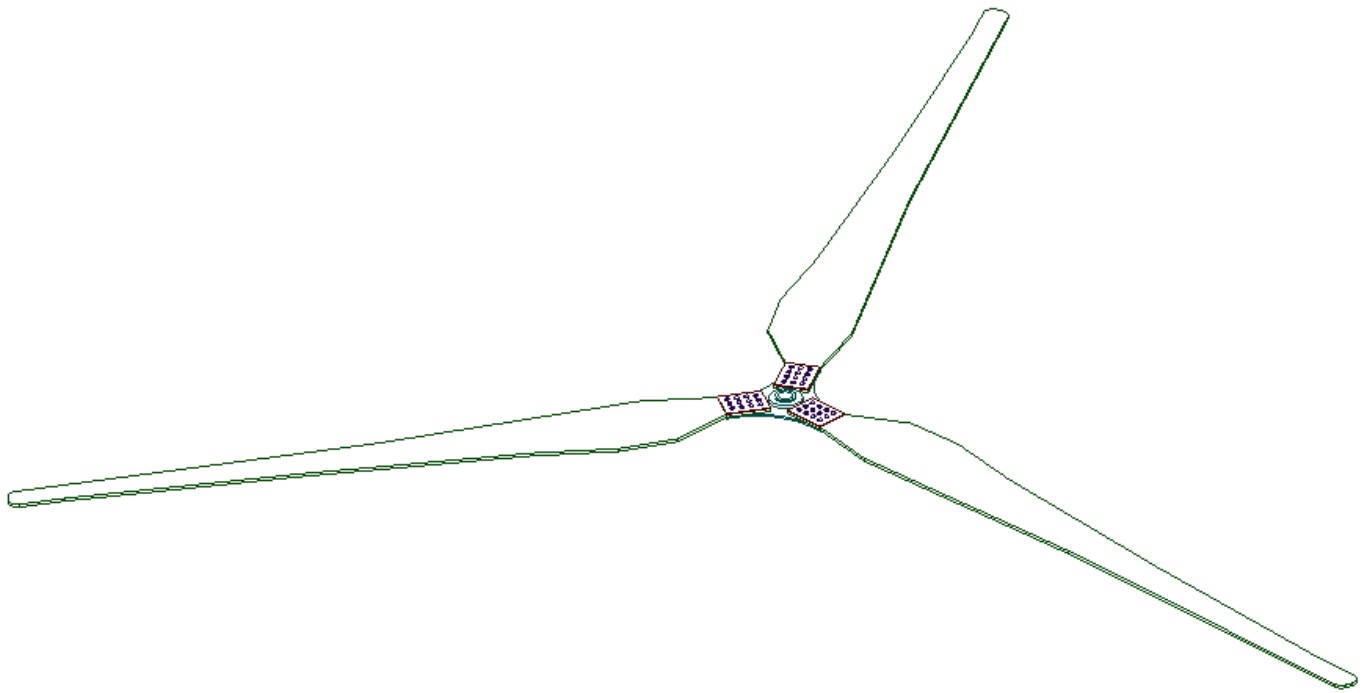


**Qualified commander is required during the hoisting**

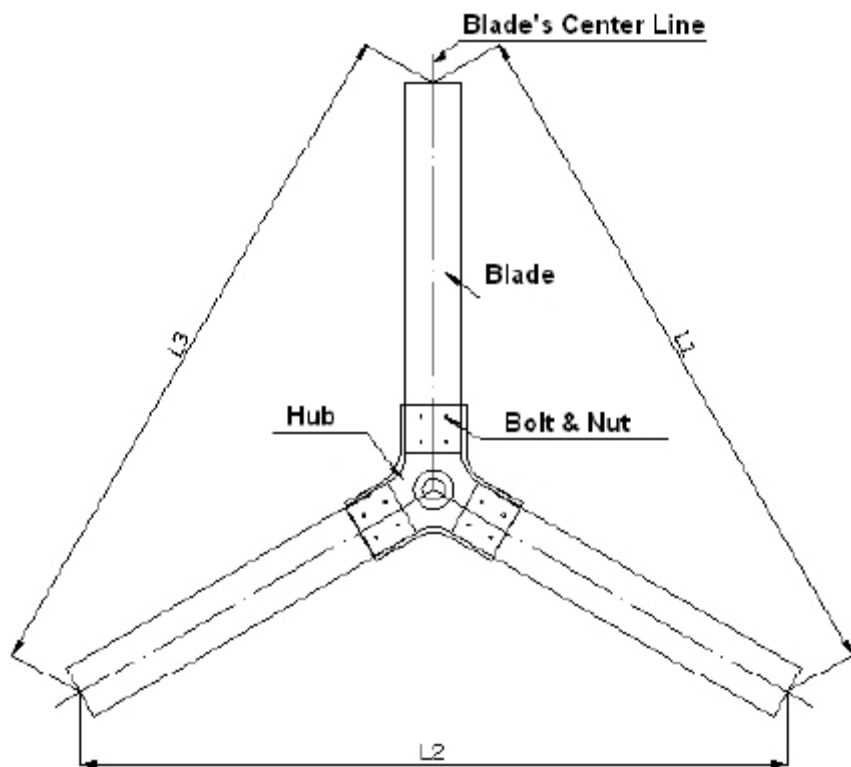
- 1) Connecting each section of the tower, extension the bolts according to diagonal sequence in proper order.
- 2) Connecting the working platform with tower after laying down the tower into a support



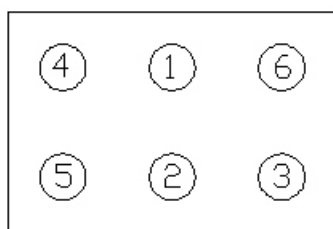
- 3) Lifting the top of the turbine with crane, putting the tower base into the prefabricated foundation, the foundation bolts should fit the holes on the tower base, fastening then nuts according to the sequence of the diagonal in proper order.
- 4) Checking if the hydraulic oil tank is full, if not, regarding to the maintenance schedule, filling the oil into the normal standard.
- 5) Taking off the hub from the shaft of the gear box: there are two expansion sleeves inside. First, loosening all the bolts from the outside expansion sleeve, then fastening the incidental M14\*30 bolts instead of the previous white bolts till the expansion sleeve starts to loose, taking off the loosening expansion sleeve from the shaft. Repeat the above steps to take off another expansion sleeve, then taking off the hub.
- 6) Assembling blades with the hub on the ground, the camber concave of the blades should face to the front, covering the clamping plate, fastening all the bolts, but not too tight. (seeing the picture attached below)



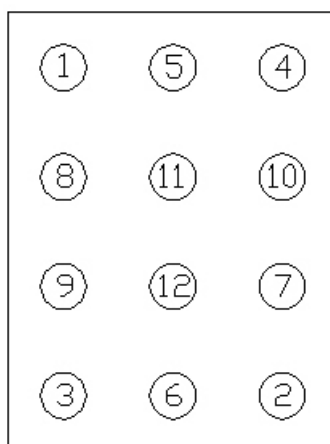
Adjusting the distance between each tip of the blades to equal, making sure  $L1=L2=L3$  (allowable difference  $\pm 5\text{mm}$ )



Fastening all the bolts according to the following sequence



**5kw,10kw**



**20kw,30kw**

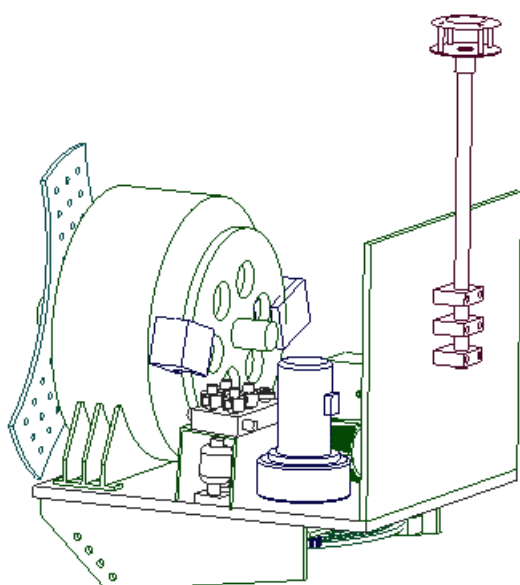
Fastening all the bolts according to the following sequence

model	torque (Nm)
5KW, 10KW	$50 \pm 1$
20KW, 30KW	$60 \pm 1$



Any improper installation would caused unbalance situation, even damage of the blades and the whole system.

- 1) Pull the cable for wind measuring device out of the support bar and connect with the wind measuring device, connect this device with the support bar, fix the support bar with the outboard of the back cover via a fixed black. (Notes: the Arrow mark N on the wind measuring device point to the back side of nacelle. See the picture attached below.)



- 2) Lifting the nacelle to the top of the tower with a crane, put down the cable inside tower to the ground.

- 3) Connecting nacelle and tower with bolts, fasten all the bolts with the diagonal sequence in proper order.
- 4) Lifting the assembled blades and hub, hub should be push to the deepest point, fasten all the bolts after installation
- 5) Install nose cone

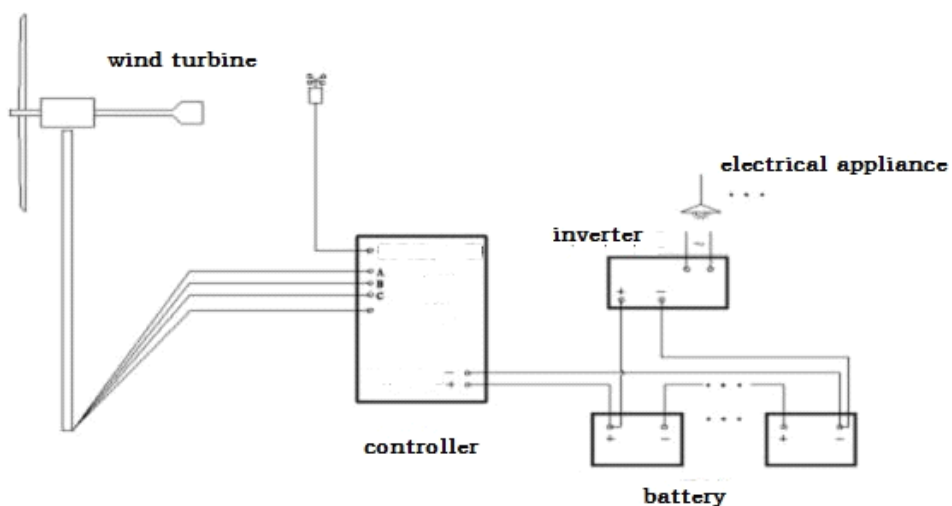
### **3.4 assembling generator with hydraulic tower**

Forklift and crane are required for the installation

- 1) Assembling the tower base and putting into the foundation bolts, fastening all the nuts with diagonal sequence
- 2) Lifting the top section of the tower, adjusting the direction of the tower and connecting it with bottom section of the tower, fastening all the bolts with diagonal sequence.
- 3) Putting a steel wire into the bottom section of tower and taking it out from the top section.
- 4) Lifting generator with forklift, filling up two sleepers under generator, then lifting the generator from the hanging ring.
- 5) Passing the hanging strip around hub, lifting the generator slowly via crane, changing the direction of the generator from horizontal into vertical with the help of forklift.
- 6) Moving the generator close to tower, taking the cables through out from generator and connecting with steel wire, pulling the steel wire go out of tower. Taking off the steel wire, pull the cables out of thread hole for standby.
- 7) Connecting tower with generator, fastening the bolts with diagonal sequence in proper order.
- 8) Filling up two sleepers under the tail of the generator
- 9) Installing of blades regarding to point 3.3
- 10) Installing of nose cone.
- 11) Erecting the tower refer to the hydraulic tower manual.

## 4 Wiring diagram

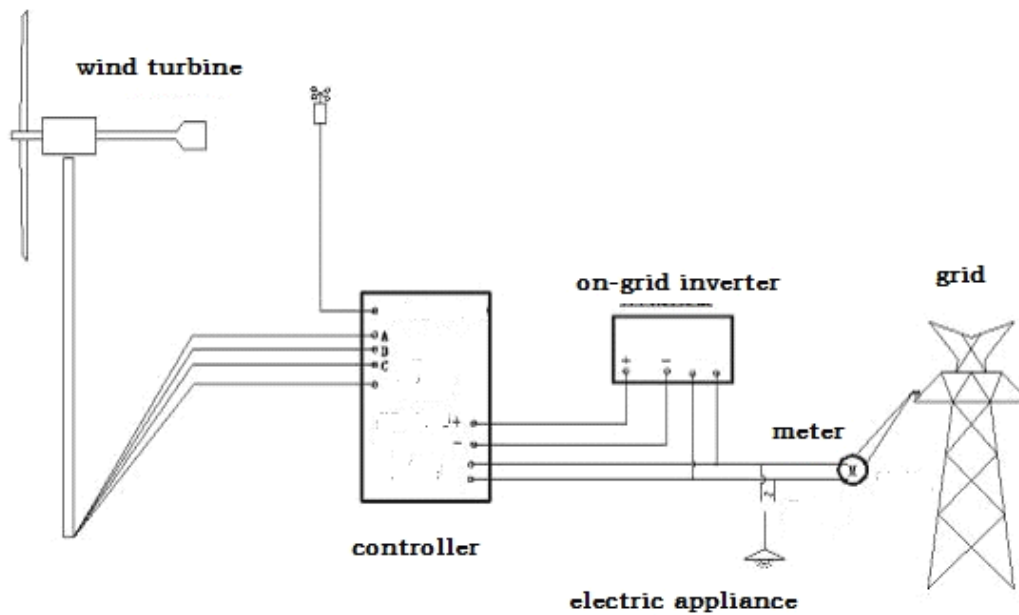
### 7.1 OFF GRID (Picture as below)



Please make sure that the output voltage, voltage of battery and the input voltage of battery should be same.

Do not misconnect the end of battery, which would burn the generator, battery and inverter out.

### 7.2 ON-GRID (Picture as below)



Every model of E-series could be applied for on-grid system with the permission of local government, and on-grid inverter and on-grid controller should be purchased by your own part. .



**Please turn off the main supply before connection.**

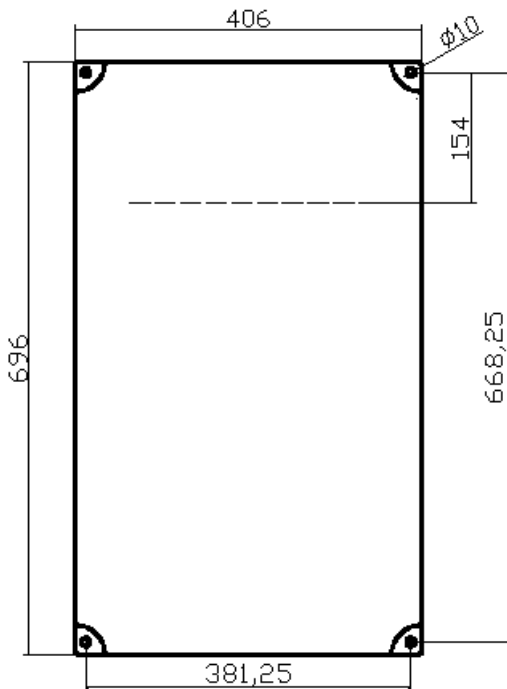
## 4.2 controller parameter

Environmental conditions	Temp. Between $-40^{\circ}$ --- $60^{\circ}$ , non-corrosiveness and combustible gas, not much of electrical conductivity dust
operation height	According to the standard JIS B 3502、IEC61131-2 (below 2000m)。
vibration strength	impact resistance according to standard JIS C 60068-2-27。
protection grade	IP54
contour dimension	696*406*172mm (lengh*width*height)
weight	10kg

interface	5.1ft touch screen.
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### 4.3 installation of ground controller box

The controller is wall built-up type, seeing the mounting holes in attached picture.



The mounting height is better to keep the sight straight to the power switch. (the location of the power switch marked with dotted line)

### 4.4 connection

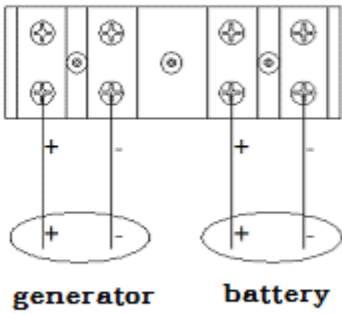


**Make sure the rated DC voltage of the output of generator, battery and input of the inverter is exactly the same. Pay attention to the positive and negative connection , any wrong connection would cause damage of the generator, battery or inverter.**

Opening the cover of controller box, put the cable inside controller box through water joint. Finish the connection according to the drawing below, fasten all the bolts after the connection.

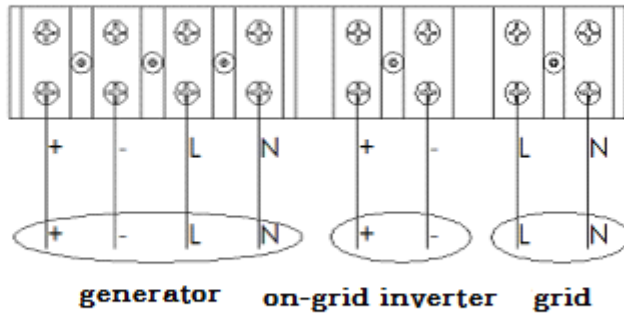
### off-grid system

#### line bank

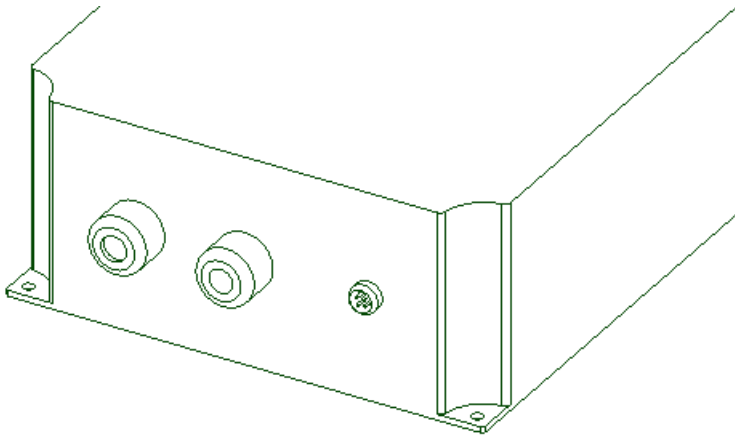


### on-grid system

#### line bank



Signal wire is a 4core wire, only need to connect to the bottom part of controller box ( see the picture attached below)



## 4.5 network

There are two options: GPRS module and LAN module. The default setting will be based on client's requirement.

## 4.5.1 GPRS

A local SIM card with internet function and modification of APN parameter will be required for the controller with GPRS module. Three frequency network: GSM900/1800/1900MHz are available for the default module. The installation of the SIM card required a sharp object to push the yellow button beside the groove in order to make the groove popping out. Putting SIM card inside the groove and pushing the groove back to the previous place.

※ Cutting off the power when proceed the Installation or taking off of SIM card, the voltage of the SIM card should be 3v or 1.5v




modify APN parameter:

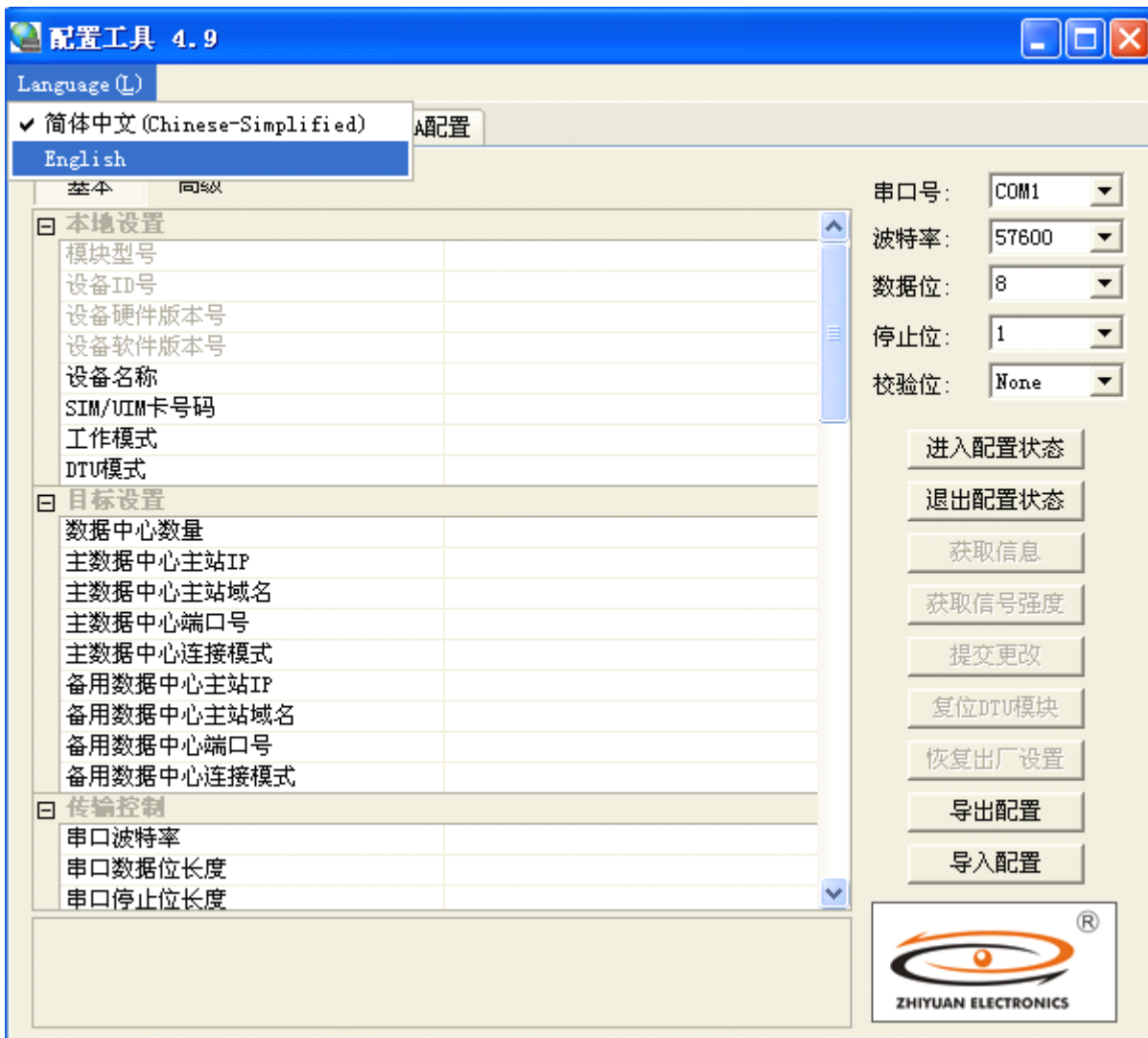
first, down load the configuration software, seeing web site attached below:

<http://asp.china-swtgs.com:800/publish/GLB50/DTUConfig.rar>, Uncompressing the software, pulling out the data cable from interface, which was connected between interface and GPRS module, and plugging the data cable with PC(the plug with red circle attached below should be connected with PC)



Operating the program , Choosing the serial port No. which connected PC with GPRS, keeping the default setting of other parameter, clicking "configuration" to connect PC with GPRS module.

Notes: if the baud rate 57600 failed, trying again with 9600.



Clicking "obtain information" to get the configuration of GPRS, then switching into advanced mode, dragging down to the screen to find the name of APN, changing the name into the one provided by SIM card supplier. If password needed, finding the reference from SIM card supplier and filling information in the corresponding place.

网络参数	
APN名称	
数据业务号码	
APN访问用户名/数据业务访问用户名	
APN访问密码/数据业务访问密码	

Clicking "submit" to modify the revised data, pulling out of the plug from interface, no need to change any data in case of the failure of internet. The time of configuration should be less than 1min, or the modification will be lose effect.

## 4.5.2 LAN module

Connecting the controller with module via serial port, connecting module with concentrator, switchboard via reticle or router. IP configuration is required, seeing the configurations attached below:

IP Information	
IP	192.168.0.178
Mask	255.255.255.0
Gateway	192.168.0.1
MAC	00:14:97:06:2F:70
IP Type	Static

The configuration of the module should be based of the network environment, if DHCP is available by the connected network equipment, choosing "Dynamic" for IP type.

If DHCP is unavailabe or client don't want to choose "Dynamic", the IP configuration should accord to the connected network equipment, Mask and Gateway, IP Type choosing "Static".

Finding the details refer to the separate module manual.

Recovering the cover of the controller after finishing the connection and configuration.

## 5 Battery configuration specification

Battery bank should be put in a building where is broad and ventilated with stable temperature and dry air. According to the output voltage of the battery to decide the number of battery and choose a way to connect them in series or in parallel, and then design the shelf to place batteries, controller and inverter. To connect batteries in parallel or series, according to the requested capability and voltage, and greased all the wire heads with butter or other anti-corrosion material. To avoid the interference of electro magnet, the lead between battery and controller should be less than 3 meters.

As the suggested battery capability of all models of wind turbine generator, please refer to the model and parameter table.

The means of linking battery in series: Connect the anode of one battery to the cathode of the other in consecutive. The graph as follow (the red position is the anode of the battery, and the blue position is the cathode of battery)



The means of linking battery in parallel: connect the anode of one battery to the anode of the other, and the cathode of one battery to the cathode of the other. The graph as follow (the red position is the anode of battery, and the blue position is the cathode of battery)



※As the notices and instructions of battery, please refer to the battery manual.

## 6.1 maintenance schedule

No.	items	After storm	Every half year	Every year	Every three years
1	Checking if there is any crack, unbalance or other abnormal situation. Those problem would reduce the efficiency of the blades. Exchanging is necessary refer to the above problem.	√			√
2	Greasing bearings.			√	
3	Fastening all the bolts and nuts. Changing the corrosion or missing bolts and nuts.	√			√
4	Checking if any crack, damage and poor connection of the cables , changing or re-connecting the faulty cables.	√	√		
5	Recover the painting if necessary.			√	
6	Checking the gearbox oil level via visual inspection. ( the oil level should be visible )		√		
7	Checking the hydraulic oil level, liquid level should be 45-50mm away from the entrance.		√		
8	exchanging the gearbox oil and			√	

	hydraulic oil when the temp. below -20°C				
9	checking if the control system works normally.		√		
10	Change brake pad.		√		

## 6.2 spare part list

no.	description	specification	Quantity
1	Principal axis brake pad		4pcs
2	Yawing brake pad		2pcs
3	Hydraulic oil	L-HM46	About 15L
4	blades	Refer to parameter table	3pcs

1)

## **7 disconnection and disassembling wind generator**

### **7.1 free standing tower**

- 1) Choosing windless weather to do the disconnection.
- 2) Switching the controller into "power off" mode.
- 3) Turning off the power switch of controller.
- 4) Disconnecting grid with controller.
- 5) Reversing the assembling instruction steps to do the disconnection with the help of crane.

### **7.2 hydraulic tower**

- 1) Choosing windless weather to do the disconnection.
- 2) Switching the controller into "manual "mode, brake the system and yaw the blades face back to the direction for tower laying down.
- 3) Turning off the power switch of controller.
- 4) Disconnecting grid with controller.
- 5) Laying down the tower with the help of hydraulic pump and cylinder

## 8 notes

Hydraulic oil grade:

- Environmental temp.:  $-20^{\circ}\text{C}\sim 80^{\circ}\text{C}$ : L-HM46
- Environmental temp.:  $<-20^{\circ}\text{C}$ : L-HS32

Torque for fastening expansion sleeve of the hub: 230NM