Instructions and installation manual

(GLB50KW wind turbine system)

CE

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

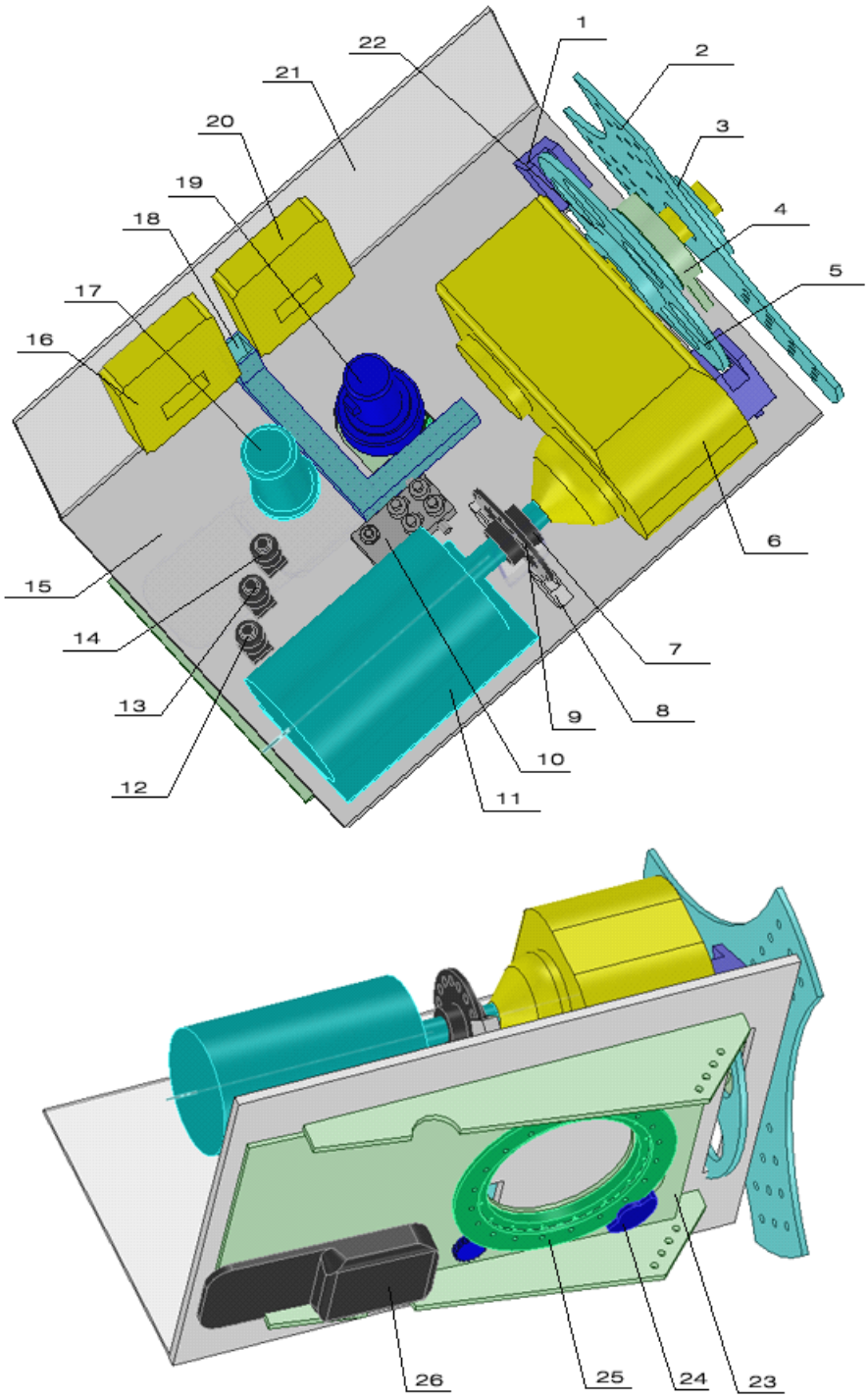
Yawing is forbidden before the tower erected

"manual-mode" is only available with technicist, the turbine will loose protection in manual mode.

Any changes of the phase-sequence should be double checked after the installation.

1 parameter

model	GLB50KW
Rated power(W)	50000
Phase no.	3
Rated voltage (V)	380~415
Rotor diameter(M)	6.8
Start up wind speed(m/s)	2.5
Rated wind speed（m/s）	12
Security wind speed(m/s)	45
Rated rpm（r/m）	59
Blades material	GFRP
Blades no.	3
Noise level(dBa)	≤70



1) low speed shaft brake system

2) hub

3) expansion sleeve for hub

4) support for principal axis

5) low speed shaft brake disc

6) gear box

7) coupling to connect high and low speed shaft brake

8) high speed shaft brake system

9) high speed shaft brake disc

10) valve

11) generator

12) accumulator of high speed shaft brabke

13) accumulator of yawing brake

14) accumulator of low speed shaft brake

15) base plate A

16) control box A

17) Hydraulic station

18) Trunking

19) Yawing motor

20) Control box B

21) Side plate

22) expansion sleeve of low speed shaft disc

23) Base plate B

24) Yawing brake

25) Slewing bearing

26) oil tank

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.

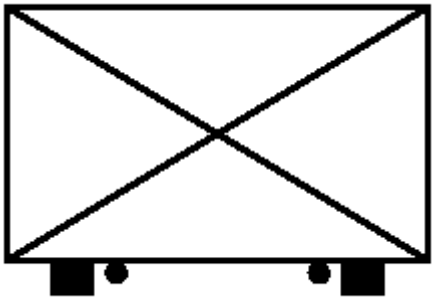
2.3 loading location

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

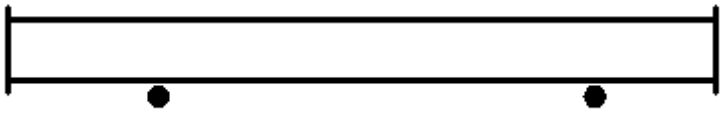
1） generator

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.

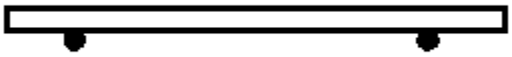
2） Plywood case



3） tower



4） Location plate



※The hanging ring of the gearbox and generator can be found after remove the top plate of the generator.

3 installation

3.1 selecting of the location

The installation side should be at least 200m away from the following area: house, crowd, overhead conductor, road and street. Meanwhile, in order to get good wind resource, the installation side should away from tall trees, high buildings or any other things which could obstruct the wind.

Those place are prohibited to be the installation side: Sand, uneven place, any place would suffer collapse,depression or the place easy to be effected by climate

requirement of the wind resource:

- annual average wind speed>5m/s (available)
- annual average wind speed>5m/s (good performance)

Meanwhile, the normal working noise is about 70dba, making sure the noise will not influent resident during the night.

the performance of the system can not be guaranteed in following conditions:

- elevation > 3000m
- temperature < -40 degree
- corrosive category >C5

3.2 foundation and tower assembling

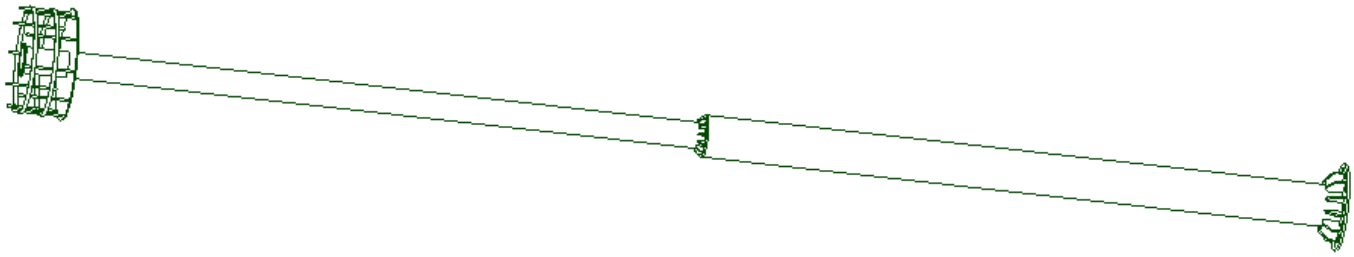
Refer to tower manual

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

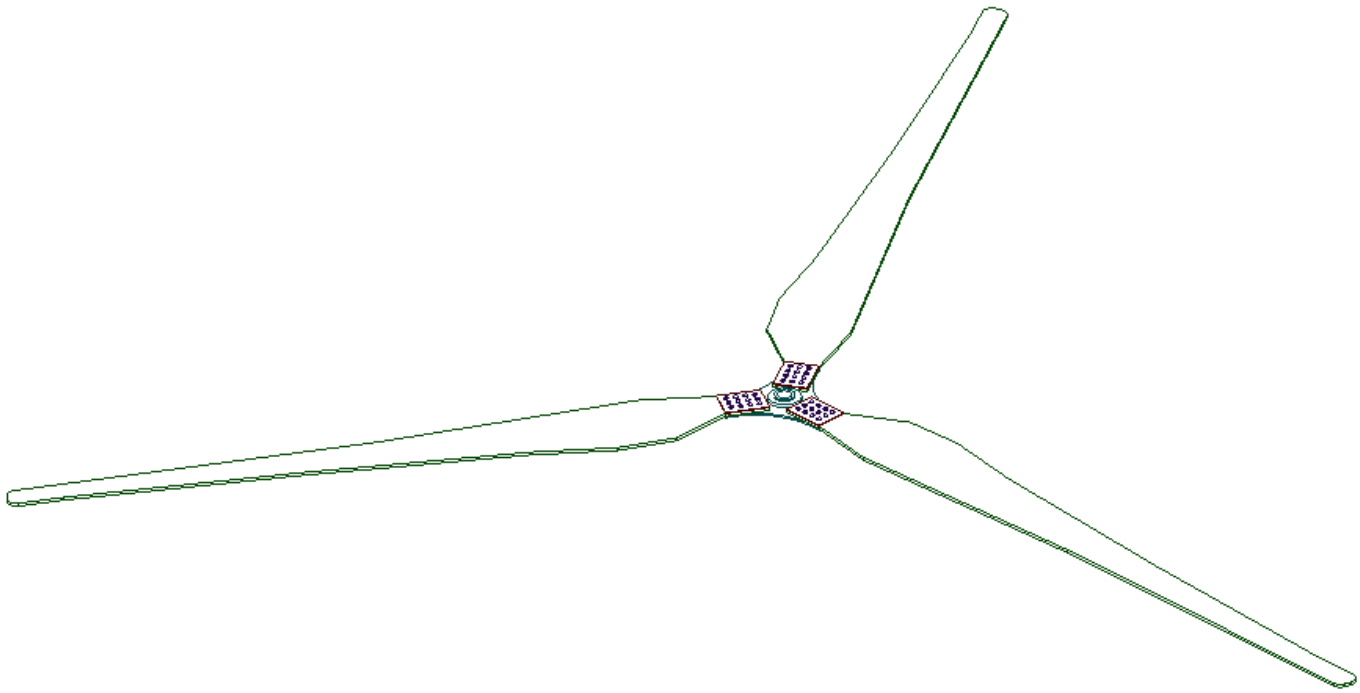


3) Lifting the top of the turbine with crane, putting the tower base into the prefabricated foundation, the foundation bolts should fit the holes on the tower base, fastening then nuts according to the sequence of the diagonal in proper order.

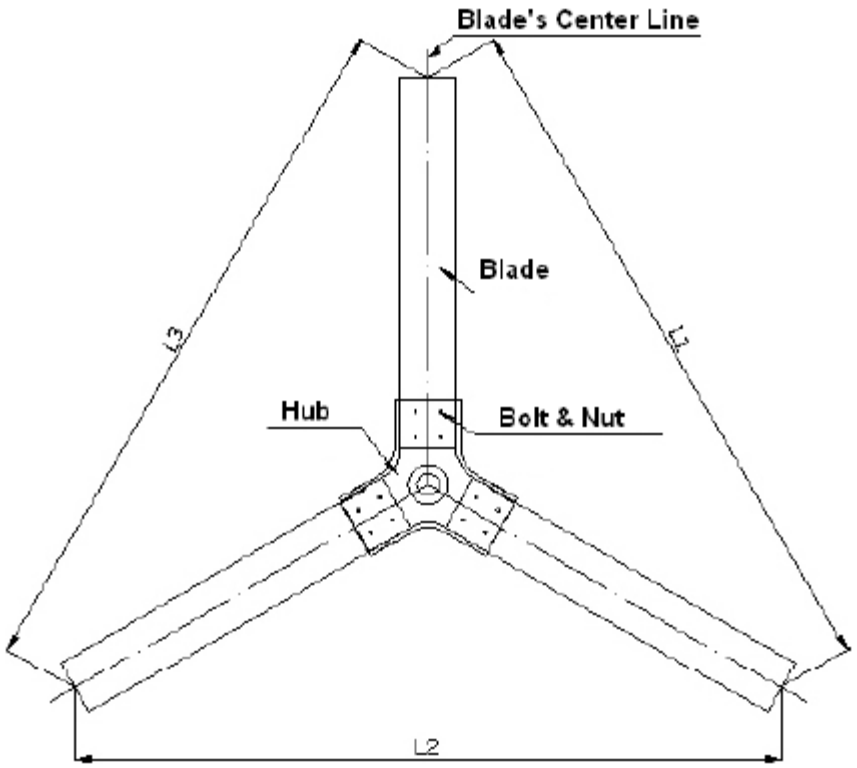
4) Checking if the hydraulic oil tank is full, if not, regarding to the maintenance schedule, filling the oil into the normal standard.

5) Taking off the hub from the shaft of the gear box:there are two expansion sleeves inside . First, loosing 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 loosing expansion sleeve from the shaft. Repeat the above steps to take off another expansion sleeve, then taking off the hub.

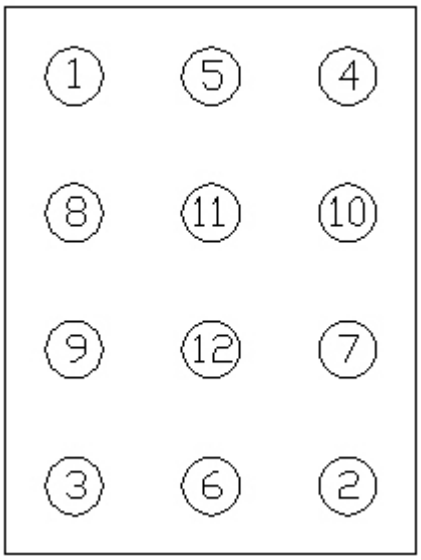
6) Assembling blades with the hub on the ground, the camber concave of the blades should face to the front, covering the clamping plate, fastening all the bolts, but not too tight.(seeing the picture attached below)



Adjusting the distance between each tip of the blades to equal, making sure LI=L2=L3(allowable difference ±5mm)



Fastening all the bolts according to the following sequence



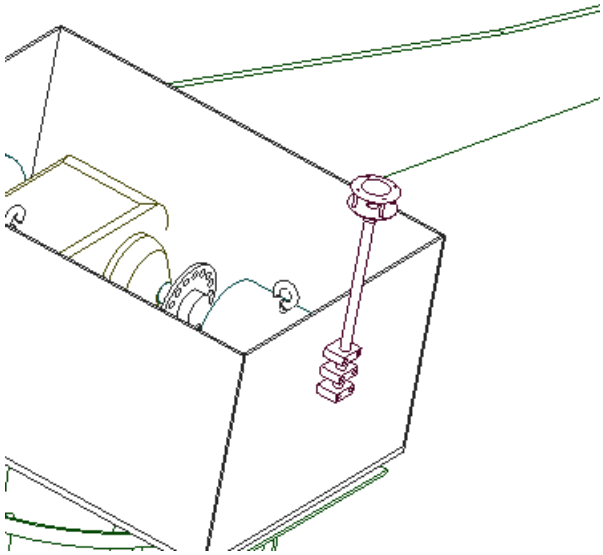
Torque spanner is required for fastening the bolts.(torque requirement: 60±2)

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

7) Opening the top cover of the nacelle.

8) Loosing the water joint of the wind measuring device which located in the back cover of the nacelle, pulling the cable of the wind measuring device out of the nacelle for 1m, taking off the fixed block for the support of the wind measuring device from inside of the back cover, putting the cable through the support, installing wind measuring device into the support and

fixing the support inside back cover with the fixed block.(seeing picture attached below)

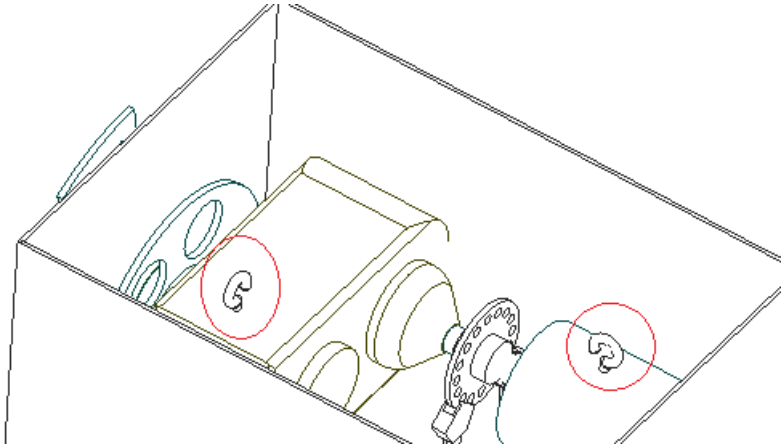


Finding the installation method of the wind measuring device refer to the wind measuring device manual.

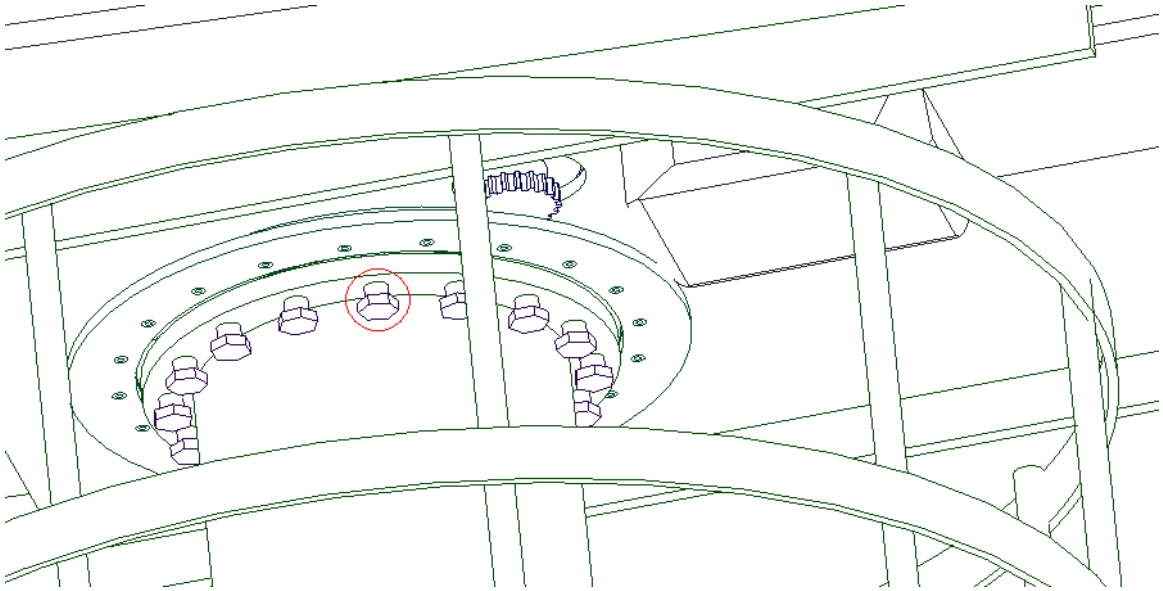
9) Transporting aloft working personnel to the working platform with basket, then returning the basket back to the ground.

10) Lifting the generator 1.2m higher from the ground with crane, removing the U-bar for transportation, installing the basket in the front of the generator

11) Assembling the generator with tower by crane, seeing the location of the lifting hook attached below with red mark.

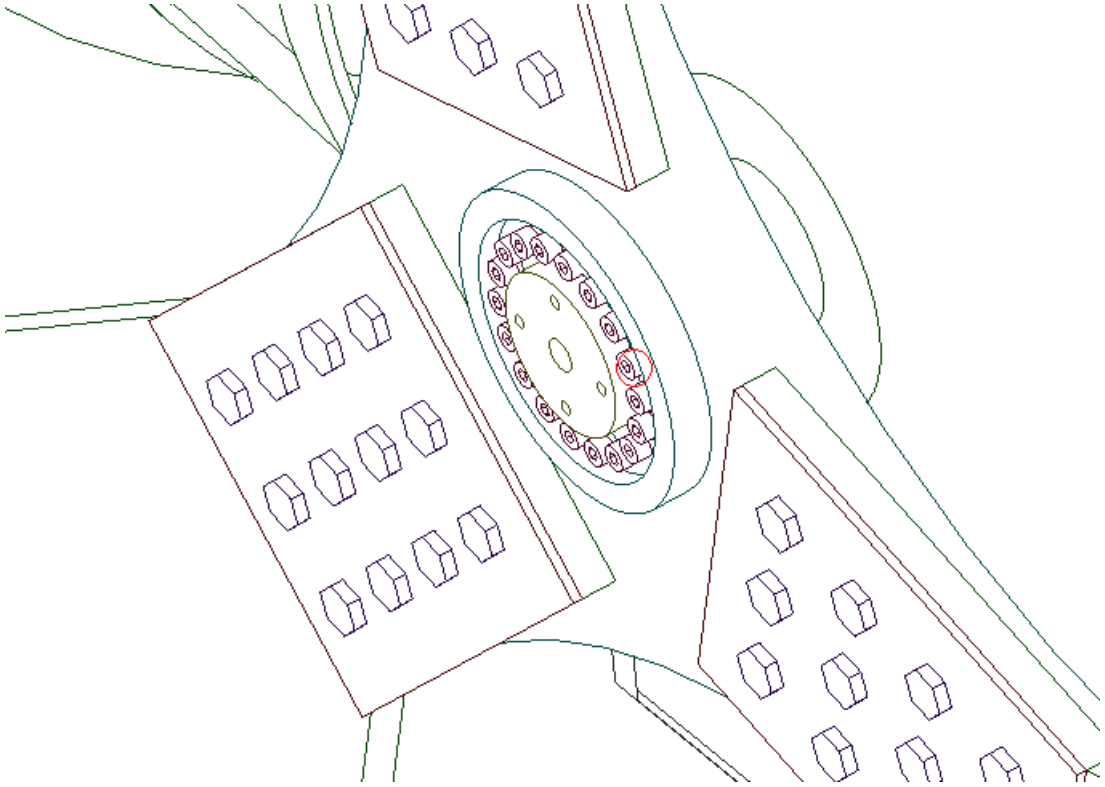


12) Fastening all the bolts to connect generator with tower regarding to diagonal sequence in proper order.(seeing picture attached below)



13) Putting the power cable and signal cable inside nacelle though the tower via the open pore of the nacelle, then recover the top plate.

14) Lifting the assembled blades and hub, meanwhile the aloft working personnel should stand inside basket. The outside flat of the hub should be abreast with the flat of input shaft of the gear box. Do not fasten the bolts to tight when install the inside expansion sleeve.Installing the incidental auxiliary flange inside the blade hub to fix it, then using the holes of the incidental auxiliary flange to fasten bolts of the expansion sleeve. Fastening the bolts according to the diagonal sequence in proper order(torque: 60 ± 2). Installing another expansion sleeve, fastening all the bolts according to the diagonal sequence in proper order(torque: 60±2).



15) Installing of the security cover plate of the hub.

16) Installing of nose cone.

17) Hooking up the basket with crane, taking off the basket from generator, returning the basket back to ground.

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) Loosing outside expansion sleeve from the hub, putting a auxiliary flange inside hub, fastening the bolts of the inside expansion sleeve with diagonal sequence.
4) Taking off the auxiliary flange, putting the outside expansion sleeve into the shaft, fastening all the bolts with diagonal sequence.
5) Installing ecurity cover plater of the hub.
6) Putting a steel wire into the bottom section of tower and taking it out from the top section.
7) Lifting generator with forklift, filling up two sleepers under generator, then lifting the generator from the hanging ring.

8) 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.

9) 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.

10) Connecting tower with generator, fastening the bolts with diagonal sequence in proper order.

11) Filling up two sleepers under the tail of the generator

12) Installing of blades regarding to point 3.3

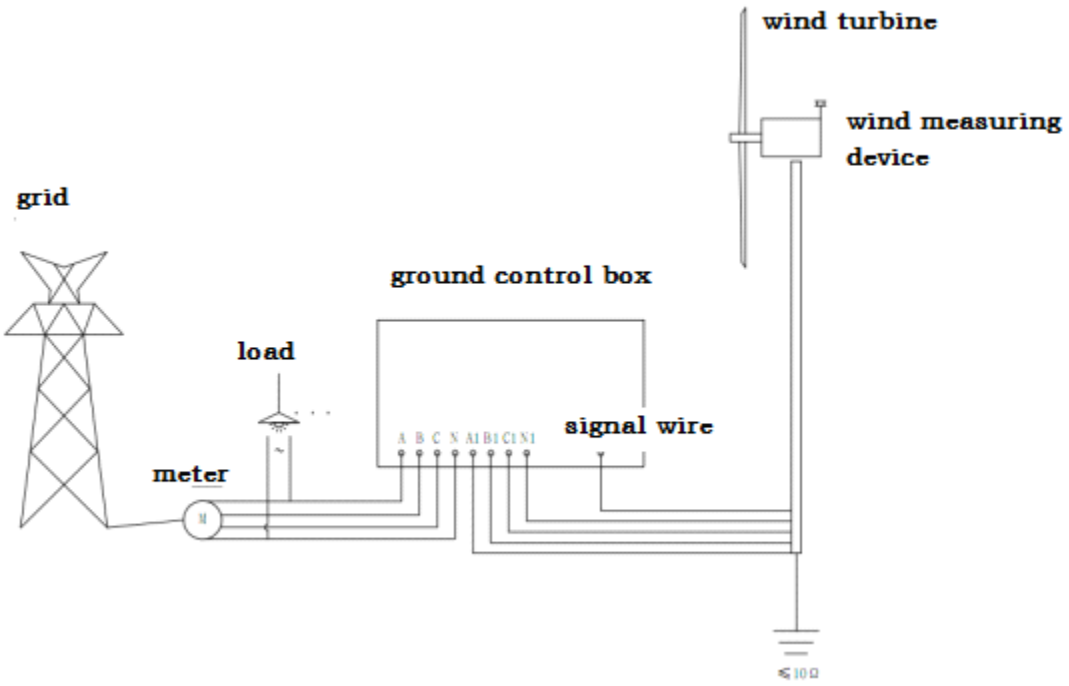
13) Installing of nose cone.

14) refer to control box manual to finish the connection, checking if the pressure of the yawing brake >= 40bar, if not, operating the yawing brake manually to increase the pressure >=40bar.(notes: in case of the nacelle creep down during the erection, the checking is necessary)

15) Erecting the tower refer to the hydraulic tower manual.

4 controller installation

4.1 sketch map



Grid parameter requirement: 380v 3-phase, 4 wires(with zero line), Mis-connection would lead to damage of the system or faulty of the grid .

Cutting of the grid before connection cables

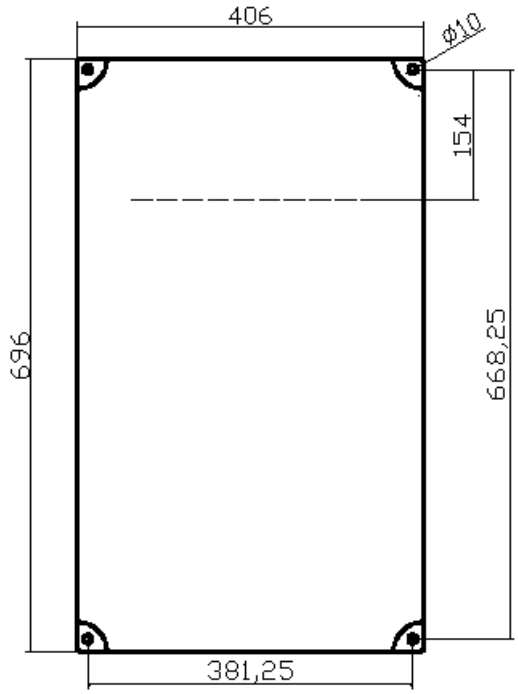
4.2 controller parameter

Environmental conditions	Temp. Between -40°---60°, non-corrosiveness and combustible gas, not much of electrical conductivity dust
operation heigh	According to the standard JIS B 3502、IEC61131-2（below 2000m）。

vibration strengh	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。

4.3 installation of ground controller box

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

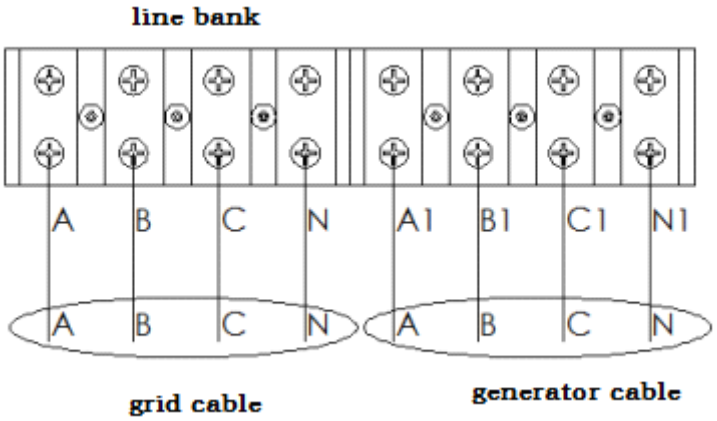


The mounting height is better to keep the sight straight to the power switch. (the location of the power switch marked with dotted line)

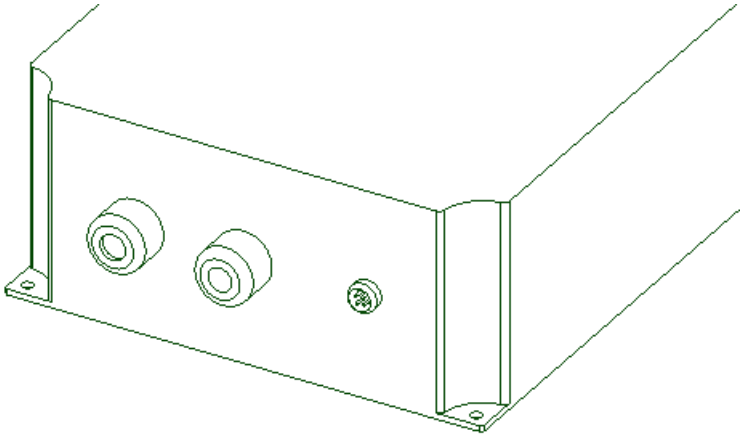
4. 4connection

Opening the cover plate of controller, putting the grid cable and generator cable through the water joint into controller, and connecting with the line bank as below, fastening all the bolts with socket spanner

※Diameter of grid cable (phase A, B , C) should be 16mm2, diameter of grid cable phase N should no less than 6mm2



Signal wire is a 4core wire with aviation socket, only need to connect with the plug located in the bottom part of controller.(seeing picture attached below)



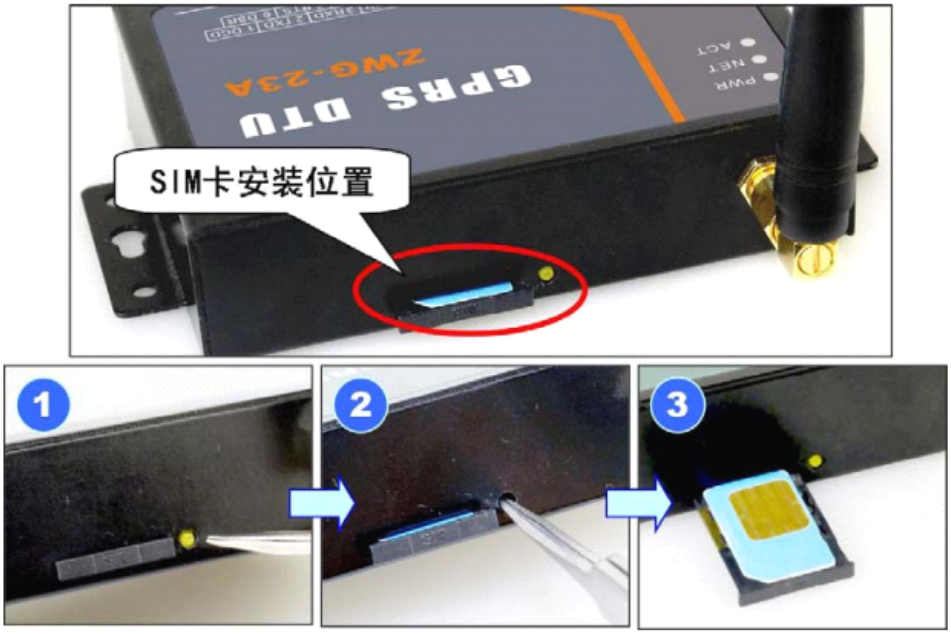
4. 5 network

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

4.5.1 GPRS 模块

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:

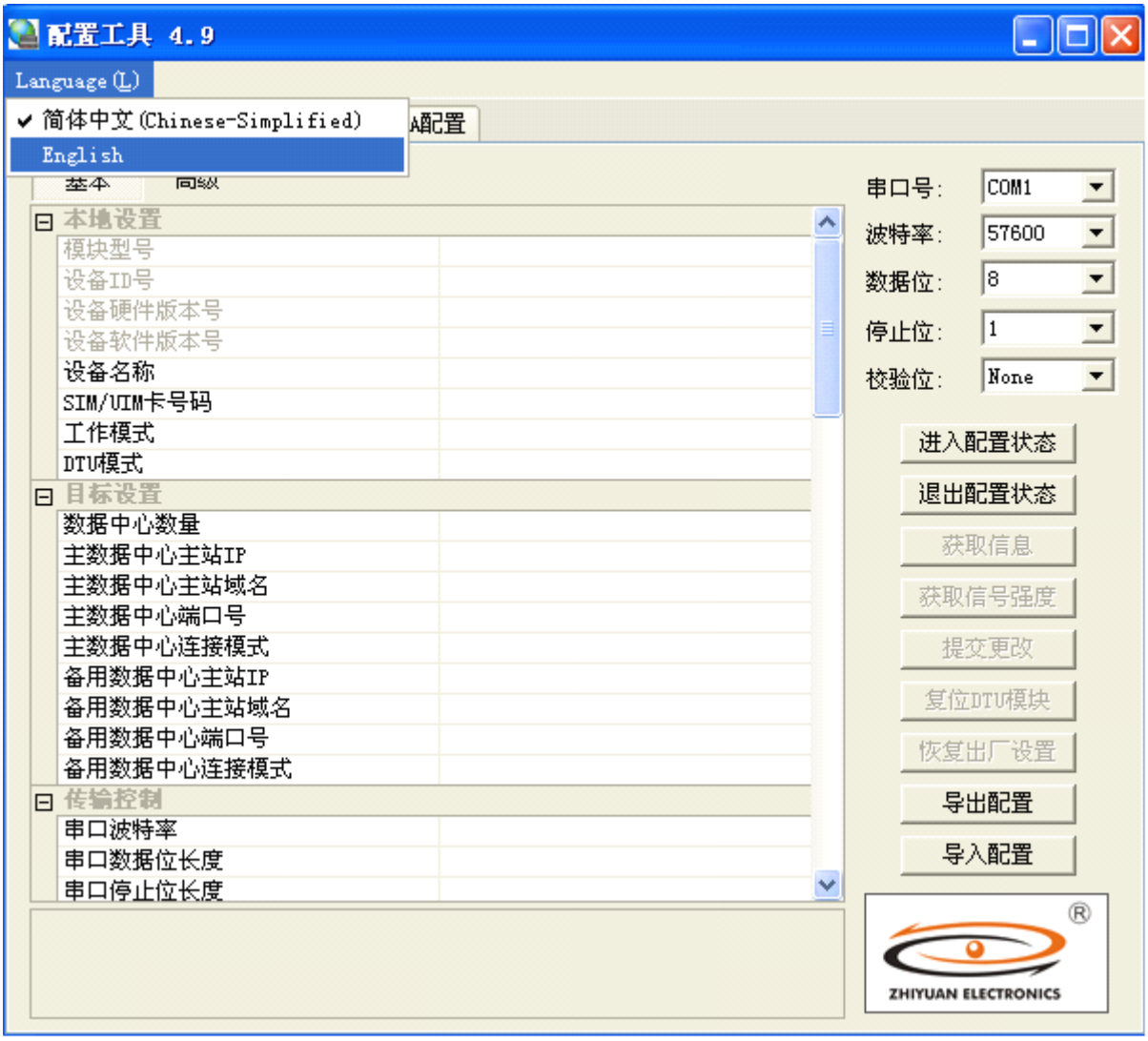
first, down load the configuration software, seeing web site attached below:

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 he 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.

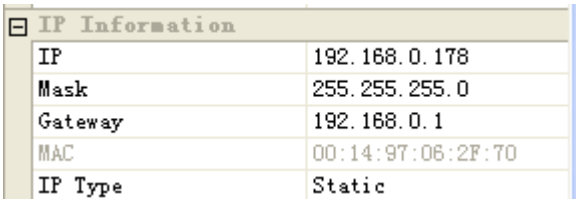


Clicking "abtain information" to get the configuration of GPRS, then switching into advanced mode, drugging down to the screen to find the name of APN , changing the name into the one provided by SIM card supplier. If password needed, finding the reference from SIM card supplier and filling information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

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:



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.

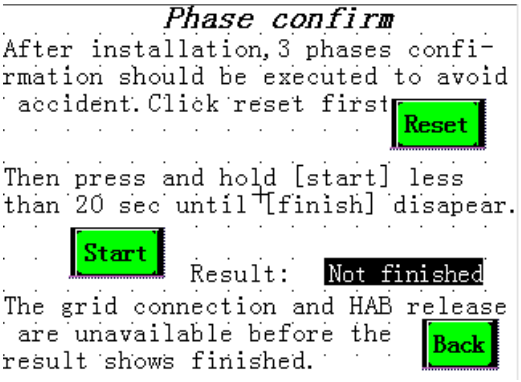
If DHCP is unavailabe or client don't want to choose "Dynamic" , the IP configuration should accord to the connected network equipment, Mask and Gateway，IP Type choosing "Static".

Finding the details refer to the separate module manual.

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

5 phase-sequence confirmation

After finishing the connection, entering into "setting" "phase sequence confirmation" in proper order to confirm the phase sequence , regarding to the software manual.



If the phase sequence can not be confirmed, exchanging the connecting sequence of cable A.B.C between grid and controller, then confirming again of the phase sequence.

The wind system can be came into use after confirming of the phase sequence.

6 maintenance

Working environment of the wind turbine system may very bad, the ssytem always working under the complex weather, in order to make sure the good performance of the system, regular checking and maintenance are required. Laying down the tower would be recommend before storm

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℃			√	
9	checking if the control system works normally.		√		
10	Change brake pad.		√		

6.2 spare part list

No.	Name	specification	random quantity	Spare part quantity
1	low speed shaft brake pad		4pcs	4pcs
2	high speed shaft brake pad		4pcs	4pcs
3	yawing brake pad		2pcs	2pcs
4	Gear box oil	L-CKD320	Around 100L	NO
5	Hydraulic oil	L-HM46	Around 21L	NO
6	blades	6.8m	3pcs	NO

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 assembleing 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

Gear box lubricating oil model:

- Environmental temp.: -20℃~80℃：L-CKD320
- Environmental temp.: <-20℃：L-CKT220，L-DRB/B32

Hydraulic oil grade:

- Environmental temp.: -20℃~80℃：L-HM46
- Environmental temp.: <-20℃：L-HS32

Torque for fastening expansion sleeve of the hub：230NM