

P5000 wind turbine controller technology and function criterion

5000 wind turbine controller is a Joint design product by this controller is designed for BRITGROUP 5000W wind turbine which will be use for As a core part of wind turbine system, the controller should control and adjust the power which is produced by the wind turbine, On one side the power supply from wind turbine to DC or AC priority is established , another side, the GRID power is used for charging the battery bank for auxiliary power.

When the power from wind turbine is not enough for the load, the controller will send the battery power to the load. After the battery bank is fully charged, the controller will ensure that the battery bank is not be over charged, when the battery bank power is discharged , the controller will also ensure that the battery bank is not discharged below safe limit of the battery to ensure long and good life for the battery bank.

It is a must to use a good controller for long, trouble free , service free life of system.



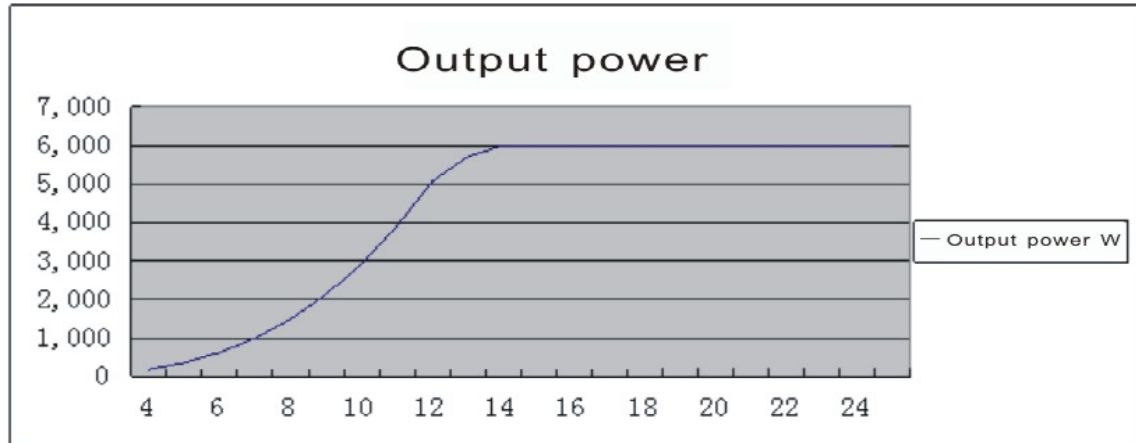
Controller Technology and characteristics :

I, WIND TURBINE :

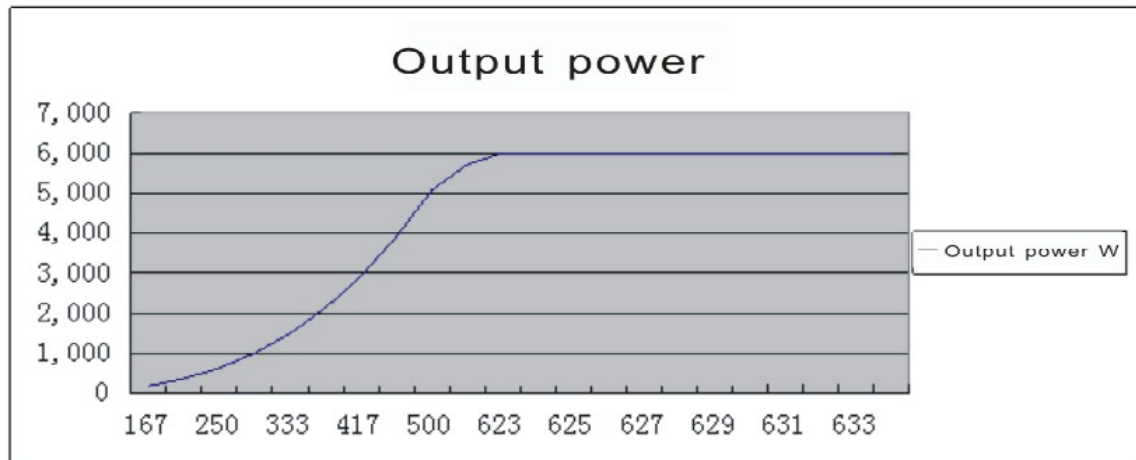
WIND TURBINE FEATURES :

- 1) Direct drive slow speed Generator
- 2) Rated output of 5000 Watts
- 3) Rated output voltage of 440 V AC
- 4) Output Voltage from 0 to 680V AC
- 5) Cut In / start up speed from 2- 2.5 mtrs. / sec
- 6) Rated power at 12 mtrs / sec wind speeds
- 7) Maximum safe speed upto 50 mtrs / sec
- 8) Aerodynamic speed governing
- 9) Electronic safe speed governing.

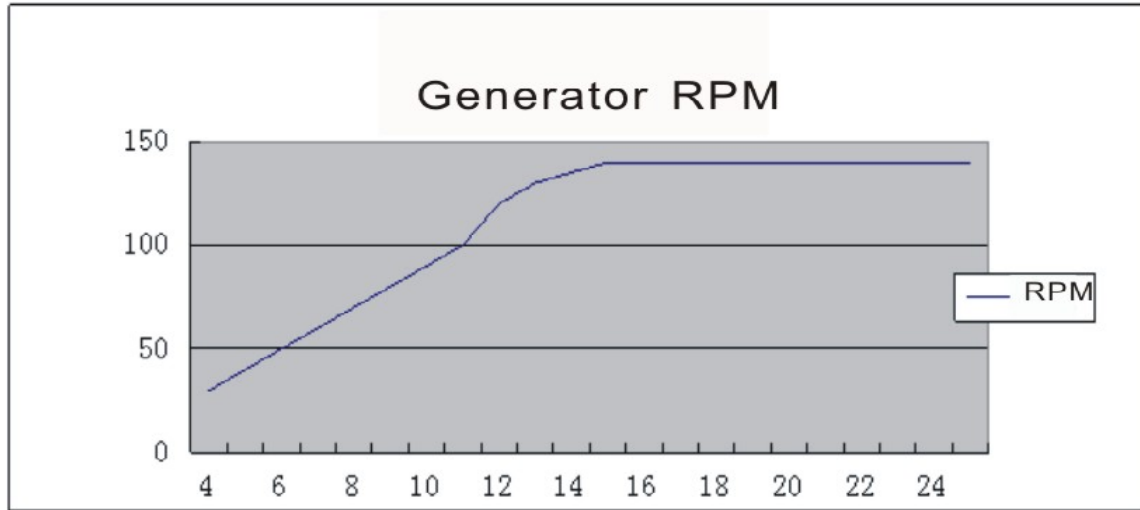
SYSTEM OPERATION and SPEED /POWER CURVES



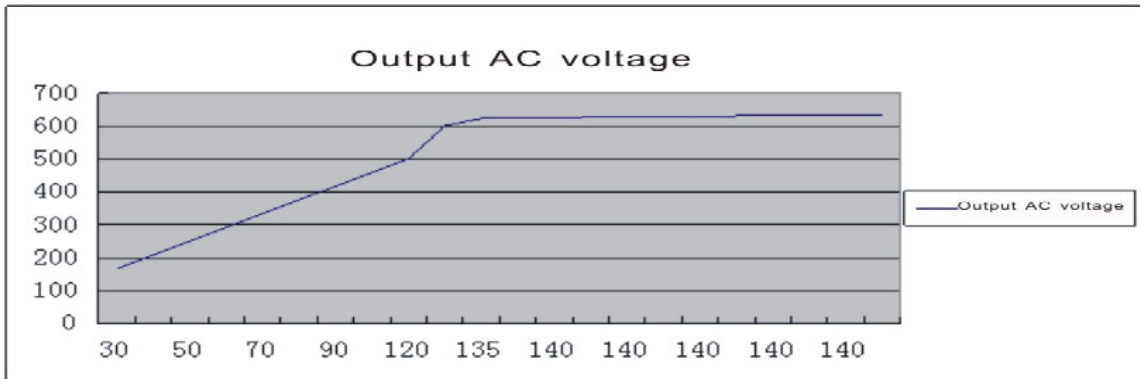
power and wind speed curve



voltage and power curve



wind speed and generator RPM curve



generator RPM and voltage curve

II, SCHEMATIC CIRCUIT DRAWINGS :

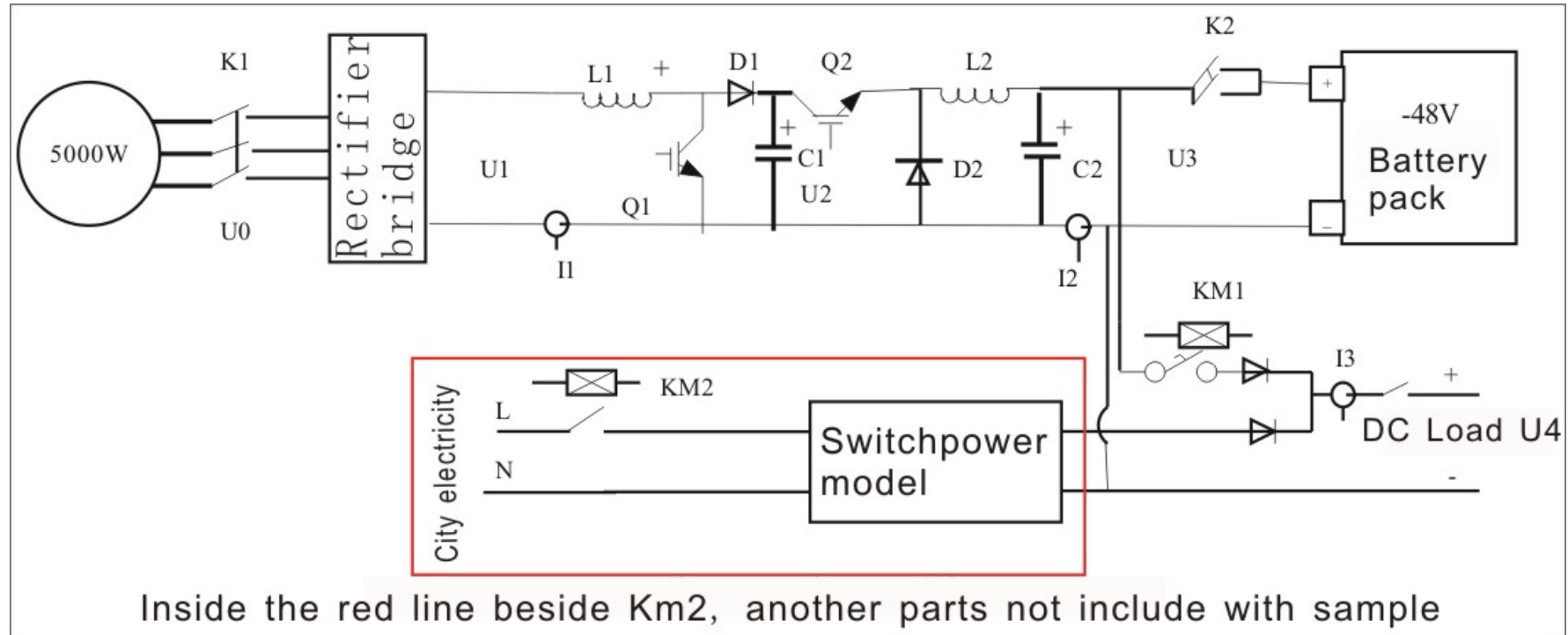


FIG-2 MAIN CONTROLLER

Fig 2 is the circuit drawing of the Model P 5000 wind turbine controller , this is one of the best designs currently now world wide using the ‘Boost/ Buck’ DC to DC conversion / charge technology. The main functions are as below;

A.

When the input voltage from wind turbine U0 is less than charge voltage, the BOOST circuit which are L1、 Q1、 D1、 C1 will increase the voltage, and charge the battery pack depending on U0&P curves and thereby Ensuring the blades are running at slow speeds for aesthetics.

B.

When the input voltage from wind turbine U0 is higher than the battery pack voltage, the BOOST which be constituent by L1、 Q1、 D1、 C1 will then turn to a cushion form basis power and adjust circuit, and L2、 Q2、 D2、 C2 which will then constitute a BUCK circuit, this circuit will follow wind turbine real time max power depending on U0&P curve, combine the battery pack voltage and its capacity and thereby charge the battery bank accordingly.

C.

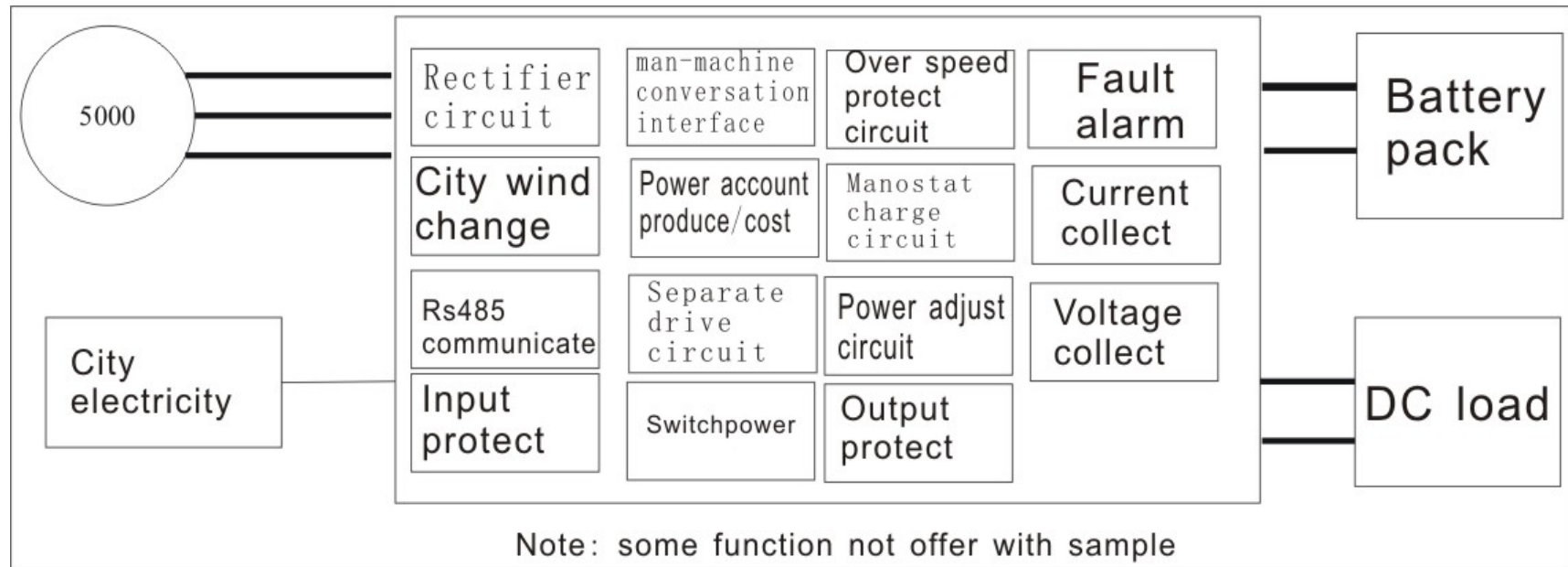
When the wind turbine is working at the over speed RPM / capacity or if $U1 \cdot I1$ higher than 120% rated power of the wind turbine, Q2 will open the charging circuit of the battery pack and wind turbine will be brought into safe running speeds. The wind turbine will be reconnected automatically after 10 minutes cut off time.

D.

When the battery pack is detected to be at fault due to Over voltage , discharged Voltage, or other adverse conditions then the MCU unit i.e. DSP from MICROCHIP will start KM2 in advance of 10 minutes (can be changed !) to supply Grid / City electricity supply to the load in a uninterrupted manner. After this the KM1 will be shut off after 10 minutes. After the adverse power condition is managed like under-voltage or other faults are managed, then power from KM1 will resume first, and then cut off KM2, this will ensure the load WILL never lose power, and the wind turbine power will always have priority.

E,

The controller will also ensure that BOOST / BUCK parameters are used to ensure that optimum battery capacity is maintained.



F, Some special features ;

capability characteristic

- use the DSP from MICROCHIP, in manage that each phase charge/discharge value is ensured , temperature compensation coefficient is met to suit for different requirements.
- the main circuit is insulated from the controller circuit, has special features for anti-jamming, has special simulation circuits for interpolating different load systems, provide true digital output by simulating dual control system.
- Customer can set the load status for Battery Overcharge and Battery Discharge voltages.
- Alarm provided to indicate ; battery pack over charge, battery pack discharge, diesel engine start control, load cut off, controller fault etc., and other alarm mode can be set by customer, like water flooding etc.

- Protection from lightning strike: up to 8/20 μ s, max current 40KA/line thunder strike.
- Block design, easy maintenance and service
- The max charger power is 1.5 times of the rated wind turbine power.
- Controller has built-in output short protect function, the is protection within 0.5s.
- Controller build-in input/ output polarity protect function.
- Controller has built-in current limit function, avoid sudden gusts of wind speed increases.
- The self power consumption of the controller is less than 3% of rated current of the wind turbine
- The controller has lightning protection and battery pack over discharge protection ensuring that battery is cut off at set discharge voltage.
- The controller build-in monitor function, build-in RS232/RS485 communicate interface and offer relevant communication protocols(**sample has NOT been included with this**)
- DC switchboard units(sample has only one unit included)

III, advanced and all parameter man-machine conversation interface(quantity production will include this function)

with quantity order, depends on customer' s require, we will offer following perfection man-machine conversation

- 240*168 LCD lattice module display, Chinese-English user menu, password enter, real time clock function.
- 4 touch keystoke operate.
- real time display battery pack voltage, load current, charge current, temperature of battery, add up AH value, add up load cost AH etc.

- history data stat display: times of over charge, times of over discharge, times of over load, times of short circuit, max can save more than 1000 piece fault message.
- programmable start and stop voltage, main and subordination load on and off voltage etc can be setup, customer can setup equal charge voltage, float charge voltage, charge voltage, start voltage, dynamic certain voltage coefficient, static state certain voltage coefficient, equal charge state time and suck state time etc.
- PC monitor software can test real time data, alarm information display, change controls parameter, read 30 days battery highest voltage, battery lowest voltage, everyday solar panel produce power add up and everyday load cost power etc.
- alarm: over voltage, lower voltage, over load and short protect etc.

IV, working condition

Suitable voltage arrange for DC communicate equipment station : -40VDC~-58VDC, the controller output voltage base is -48VDC.

Install system can be box model, hanging model, combine model, **the sample supplied is hanging model.**

Suitable working condition:

relative humidity: 90% (25℃);

suitable temperature arrange: -40℃~+45℃;

Can suit for high altitude low air pressure entironment.

height above sea level: 5000m.

V, current product picture, size and weight.

Output Rated Voltage	48Volts DC
Rated power	5000 Watt
Peak power	6000 Watt
Weight	15 Kg
Control	Max. Power Point Tracker, Wind Energy system
Protection	short circuit, overload with dummy load and so on
Operation temperature	-20°C to + 50°C
Dimensions	300mmX250mmX150mm

