

## Model: H8.0-10kW/ H9.0-20kW

Hummer 10kW /20kW wind turbines can be applied in both on-grid and off-grid systems.



Hummer in China (hydraulic tower)



Hummer in Italy (freestanding tower)

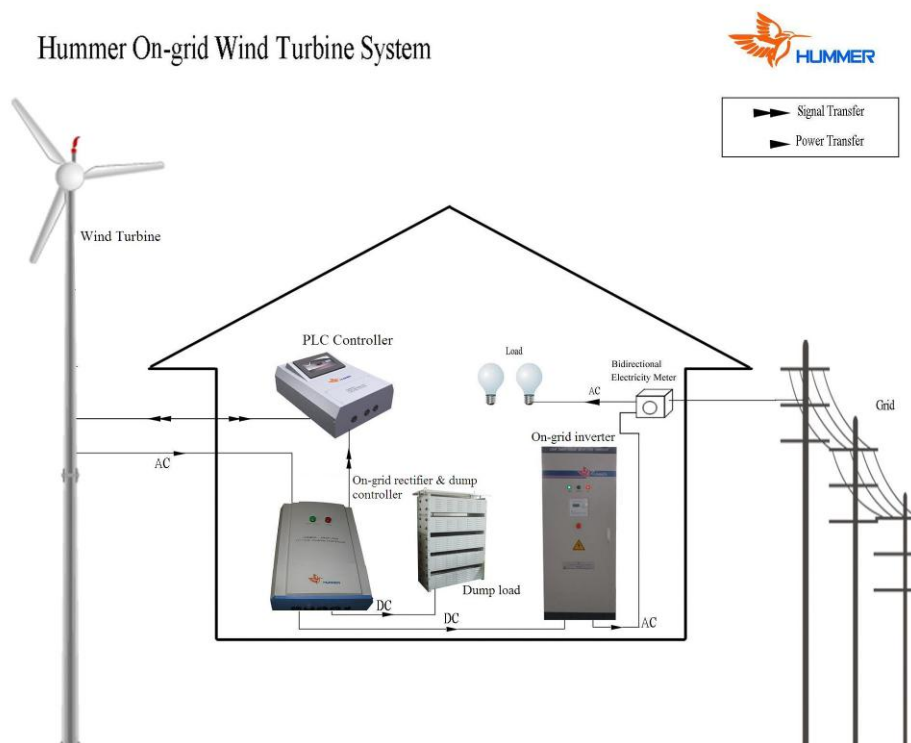
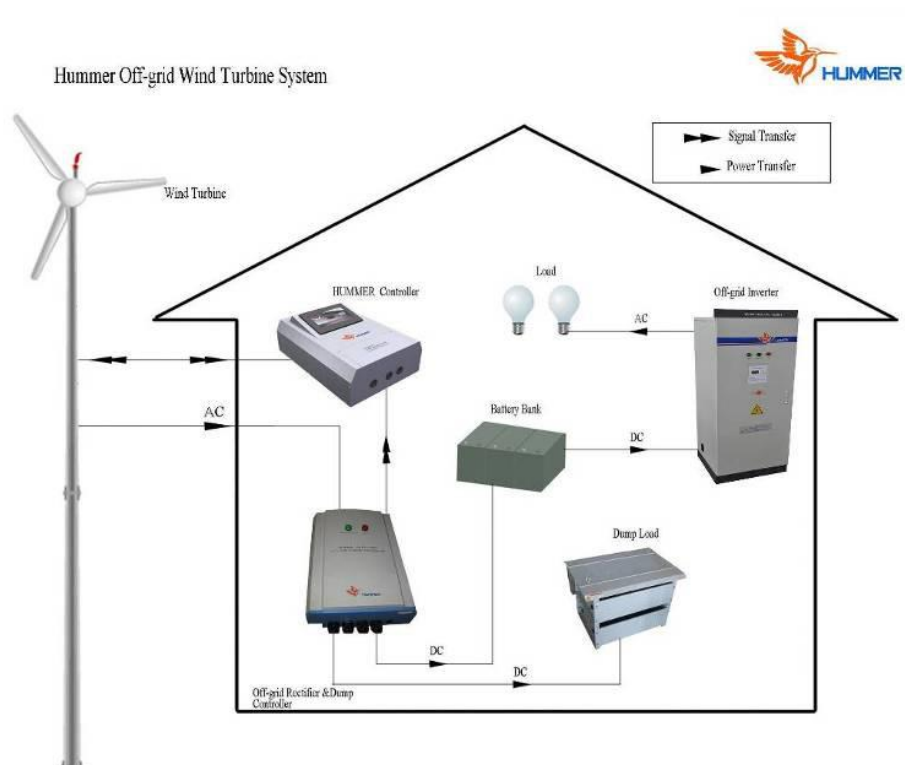


Hummer in Korea



Hummer in Somalia

## I. How Wind Turbine System Work



## II. Features:



### 1. SCF Supercritical generator

Hummer's wind generator adopts SCF supercritical technology which won a gold award in the 37th Salon Eureka in Brussels. This technology significantly reduces generator's weight and size down to 20% to 30% of the traditional one, and the production efficiency is 10% to 30% higher. This ensures that the generator functions perfectly in small wind condition.



### 2. SKF bearings

Hummer wind turbine adopts two SKF (Svenska Kullager Fabriken) bearings which are produced by the largest bearing manufacturer in the world, with the perfect internal geometric structure, known for its life-time endurance and reliable quality. Ordinary bearings need to be changed every two or three years, while SKF bearings can greatly reduce the maintenance costs on this matter.



### 3. PLC integrated with Siemens module

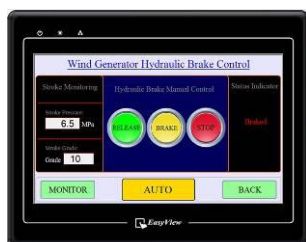
Hummer wind turbine's controlling system adopts the smart touch-screen PLC (Programmable Logic Controller) which is integrated with Siemens controlling unit. The PLC will alarm and adjust the abnormal running status of the wind turbine automatically both timely and efficiently. Siemens module offers high reliability to our PLC and its customers worldwide can testify for that.



### 4. Low noise

The design of the rotor blade of Hummer wind turbine absorbs the highlights of the small aircraft's airfoil, which is compliance with the aerodynamic standards. It provides a more aesthetic look and a higher efficiency and reduces the noise production as much as possible.

### 5. Triple braking protection

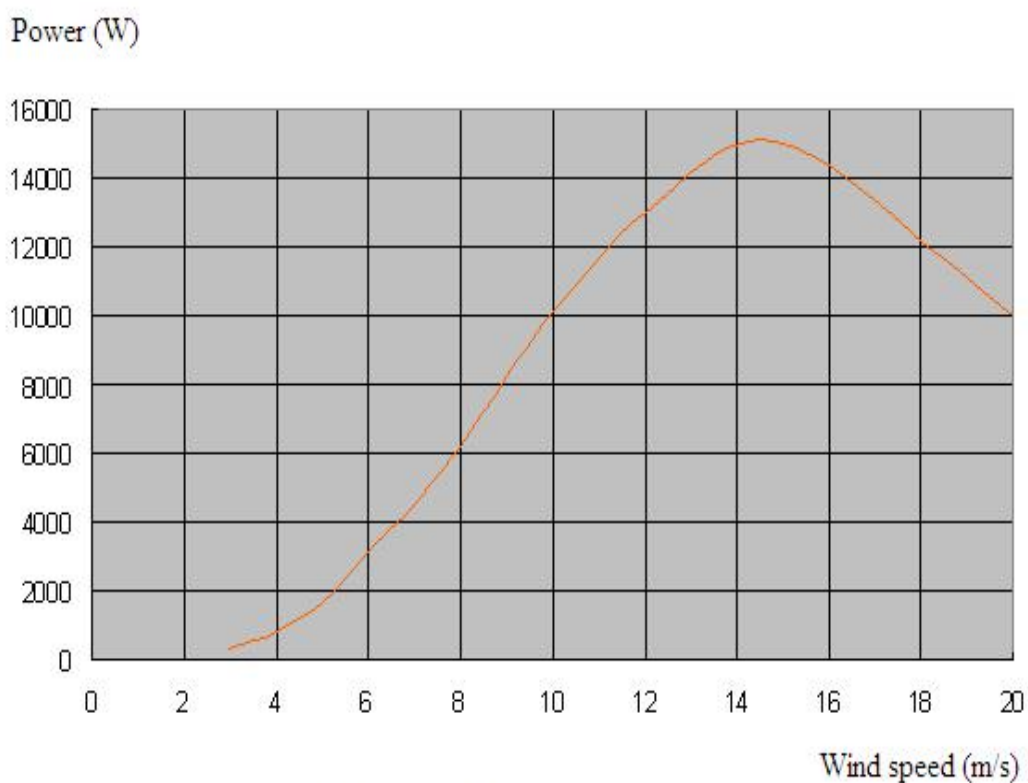


Hummer wind turbine generally adopts the yawing system and the electromagnetic braking system to regulate the rotation of the wind turbine. Besides, customer can order the hydraulic braking system as well as a third protection. It is easy and convenient to shut down the whole system both manually and automatically.

### III. Specifications and power curve:

#### 1. H8.0-10kW

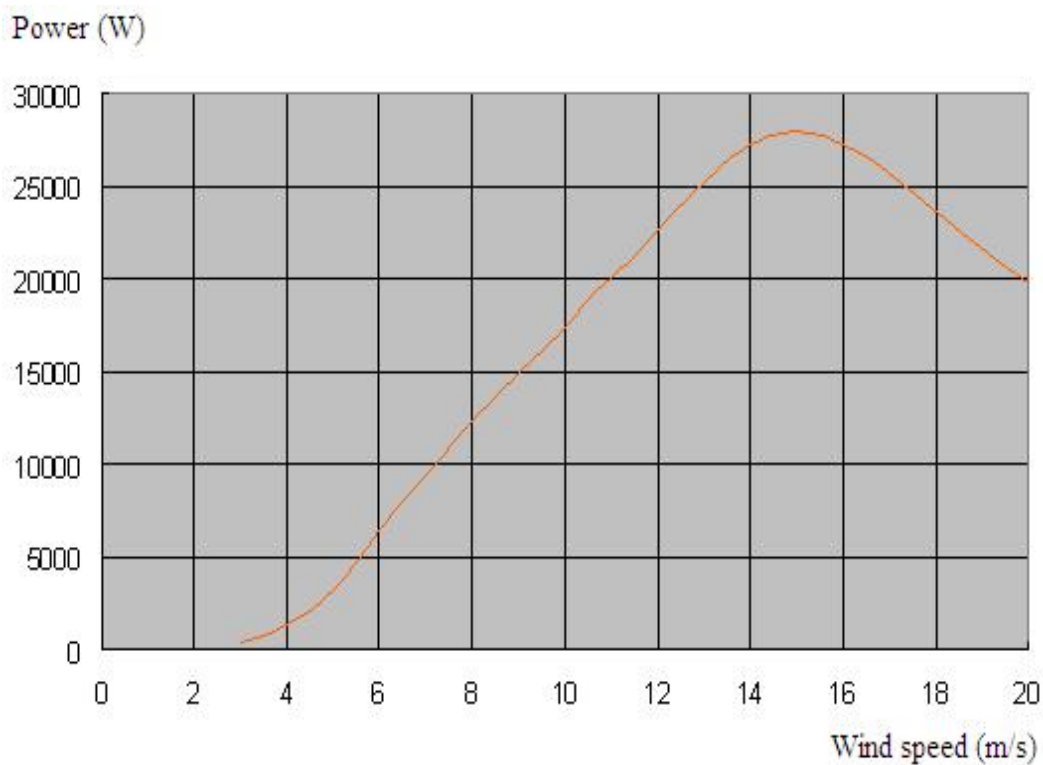
Rated power (W)	10000
Maximum output power (W)	15000
Cut-in wind speed (m/s)	3
Rated wind speed (m/s)	10
Working wind speed (m/s)	3-25
Survival wind speed (m/s)	50
Generator efficiency	>0.85
Wind energy utilizing ratio (Cp)	0.4
Generator type	Permanent Magnet Alternator
Generator weight (kg)	287
Blade material/quantity	GRP/3
Blade diameter (m)	Φ8.0
Over speed control	Yaw + Electromagnetic brake / Hydraulic brake (optional)
Shutting down method	Manual + Automatic



Hummer-10kW PMG Ouput Power Curve

## 2. H9.0-20kW

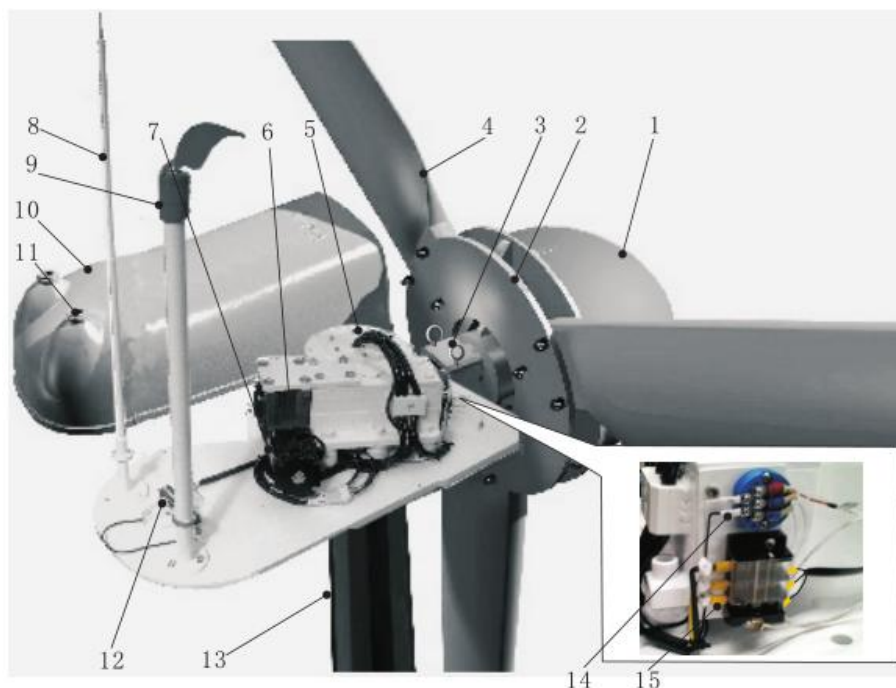
Rated power (W)	20000
Maximum output power (W)	28000
Cut-in wind speed (m/s)	3
Rated wind speed (m/s)	11.5
Working wind speed (m/s)	3-25
Survival wind speed (m/s)	50
Generator efficiency	>0.87
Wind energy utilizing ratio (Cp)	0.4
Generator type	Permanent Magnet Alternator
Generator weight (kg)	496
Blade material/quantity	GRP/3
Blade diameter (m)	Φ9.0
Over speed control	Yaw + Electromagnetic brake / Hydraulic brake (optional)
Shutting down method	Manual + Automatic



HUMMER-20kW Wind Generator



## IV. Structure and component parts:



NO.	Name	NO.	Name
1	Generator body	9	Dogvane
2	Blade pressing plate	10	Nacelle protection cover
3	Lifting ring( applicable for 5kW, 10kW,20kW)	11	Water-proof gland
4	Blades	12	Signal wire terminal block
5	Gearbox	13	Tower body
6	Speed reducer	14	Generator temperature transducer
7	Yaw servo motor	15	Wiring terminal for Generator output cable
8	Lightning rod(optional)		

### 1. Generator Part

It is composed of the patented SCF generator, the nose cone, and the protection cover. Hummer adopts the state-of-the-art SCF supercritical generator, which is installed in the hub, easy to radiate heat and reduce wind resistance. It is made of high-efficiency magnetic materials, special copper alloy, high-strength stainless steel and aeronautic aluminum alloys, which is extremely light in weight and small in size, but with higher power producing efficiency.



## 2. Nose Cone & Protection Cover

Both of them are made of the reinforced aluminum alloy. Nose cone is fixed in front of the rotor blades to reduce the wind resistance and radiate the heat produced by the generator. While the protection cover between the rotor blades and the nose cone to provide extra protection to the generator.



## 3. SKF Bearings

Two SKF bearings ensure the reliability the longevity of our generator. Wide temperature ranges: operation in the high temperature (150-350°C). Long life span, reach up to 60000-100000 hours. User may not change the bearing during the wind turbine using. It can greatly reduce the maintenance costs.



## 4. Flange & Blades

The flange is made of fine steel, used to fix the blades to the rotor. The blades are made of glass reinforced plastic; efficiently turn the wind energy into the mechanical energy. Every set of the three blades has passed the strict balance test before the shipping. It is important to fix the blades together which belongs to one set to the flange and never mix them up with other blades which belongs to another wind turbine.



## 5. Yaw Shaft

It is made of fine steel and used to connect the generator and the blades to the tower. Powered with a 24V motor and integrated with a gear box, which are able to regulate the direction of the generator.



## 6. Dogvane & Anemometer

They receive the signals of the wind direction and the wind speed.

The dogvane reads the average value of the wind direction every 120 seconds. If the angle between the dogvane and the wind generator axis surpasses  $10^\circ$ , the 24V motor will drive the yaw shaft to turn and follow the wind direction automatically.

The anemometer measures the real-time wind speed. If the wind blows non-stop over 3m/s during 20 seconds, the automatic wind tracking program will start to make the rotor blades surface face the wind correctly; if the wind speed drops below 3m/s, the tracking program will turn to stand-by.



## 7. Off-grid Inverter & On-grid Inverter

Hummer off-grid inverter adopts SPWM (Sinusoidal Pulse Width Modulation) technology, is able to invert DC with higher efficiency into AC with stable frequency and voltage, and filters the noise as well. It is used in the off-grid power system.

Hummer on-grid inverter adopts MPPT (Maximum Power Point Tracking) technology and IGBT (Insulated Gate Bipolar Transistor), is able to invert DC with a high power producing capacity and a wider AC voltage output range. It connects to the public grid and there is no need for any power storage device.





## 8. Siemens Module PLC

Hummer PLC (Programmable Logic Controller) adopts the Siemens controlling module and is equipped with a touch screen. It can alarm and adjust the abnormal running status of the wind turbine automatically. Siemens module offers high reliability to our PLC and its customers worldwide can testify for that. It is easy to control and operate your wind turbine via our PLC easily and efficiently.



## 9. Rectifier/Dump Load Controller & Dump Load Box

The controller controls the process of which the AC produced by wind turbine being rectified into DC and eventually charges the battery bank with DC. It also controls the switching on and off of the dump load to protect the system against the risk of being overloaded with too much power.

Metal box design of the dump load radiates the heat of the resistance inside quickly via the air convection. So there is no need for an extra fan.



Rectifier/Dump load controller



Dump load box

## 10. Guyed Mast (500W to 10kW)

Guyed mast is composed of several segments of steel tubes which are galvanized and spray painted. It is easy to be transported and assembled, especially suitable in the remote area where a crane is not available.



## 11. Freestanding (Self-supporting) Tower (500W to 100kW)

Freestanding tower is made of fine steel and it is strong enough to resist heavy wind. The surface of the tower is processed with the hot galvanization and spray paint, thus is able to protect the tower against corrosion and rust.



## 12. Hydraulic Tower System (2kW to 100kW)

Thanks to the hydraulic pump system at the foot of the tower, it is easy to set up or lay down the tower just by pressing buttons. It is a wise choice in the remote area where a crane is not available.



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