

HY Small Wind Turbine Special Features

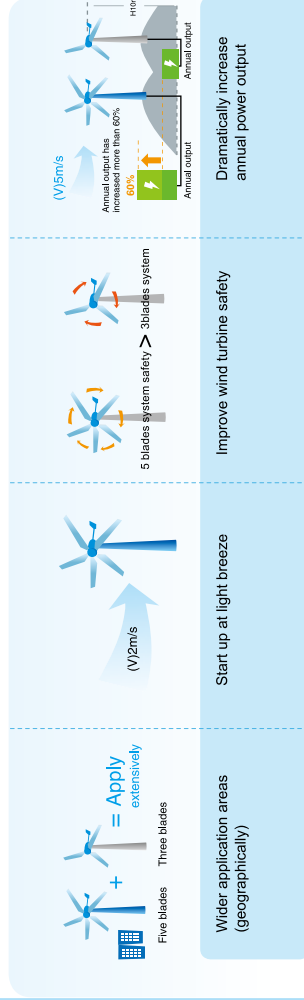
Patented Blade Design

Patented aerofoil 5 blade design with true symmetrical and twisted aerodynamic design which ensures rotor capture maximum power from wind ($C_p > 0.35$ in low wind) and operates in amazingly low noise and minimal vibration.



Blade side view

- True symmetrical and balanced aerofoil blade ensure rotor matching with generator perfectly
- Large ratio of tip section chord to root section chord and variable chord airfoil blade ensures rotor start-up easily and running smoothly with high torque & RPM at lower wind condition
- Aerodynamic blades designed with over-speed braking system to make sure generator well protected in higher wind.
- Reinforced nylon glass-fiber using advanced thermoplastic engineering and precision injection molding technology for higher strength, flexibility and reliability.
- $C_p > 0.35$ at low wind



Over-speed Control System

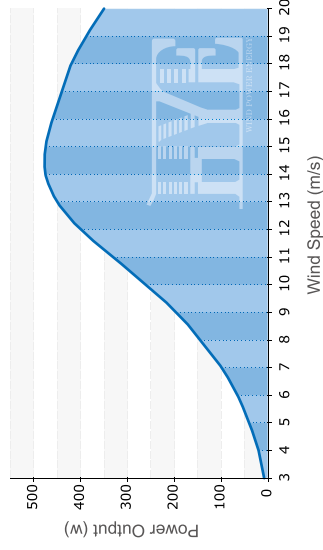
Smart Blade Aerodynamics Braking and Electromagnetic Speed Limitation



Abandoned the traditional failure-prone mechanical furling system, the blade itself is designed with over-speed braking system which will generate a reverse reluctant torque to lower the blade rotation speed so that the blades and generator can be well-protected in higher wind, it solved safety and reliability problems facing by most small wind turbines.

Combination of Electromagnetic braking and aerodynamic braking maximizes energy capture by extending turbine's operating speed range into higher and lower wind speed which are missed by the old style wind turbines.

HY-400 Wind Turbine Power Curve



This power curve generated by wind tunnel testing indicated that the blade aerodynamics braking system starts to take effect from 14-15m/s wind speed, the rotor RPM is always limited within wind turbine rated maximum RPM at even higher wind.

Minimal Vibration and Low Noise Operation

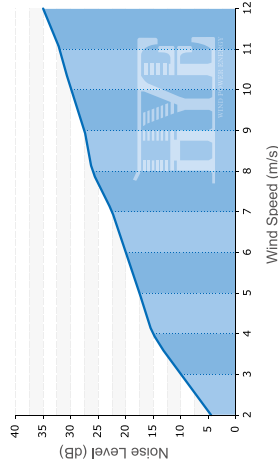


Wind turbine with minimal vibration and low noise could be mounted on rooftop safely and its operation won't affect resident.

- The blades have exceptional consistency and aerodynamic outline with a mass distribution which ensures the rotor operate with minimal vibration and very low noise.
- Perfectly matched rotor and generator cause much less resonance of wind turbine and tower.
- Blade Aerodynamics Braking limits blade to rotate at rated RPM which could avoid higher noise and vibration caused by extreme wind.

Everything with moving parts will make some noise and vibration, and wind turbines are no exception, most noise and vibration are caused by turbine blades rotation in the wind and generator resonates with rotor and tower, HY Energy well designed wind turbine could works quietly in both low and high wind.

HY-1000 Wind Turbine Noise Level Testing Result



Maintenance Free Design



Innovative two-moving-part system

Typical wind turbine has three moving parts(rotor, head yawing and mechanical furling), HY Energy replaced mechanical furling by using advanced electromagnetic and blade aerodynamics braking and take only two moving parts, which improves generator reliability dramatically as it has less mechanical failure.



Innovative slip ring design

Wind turbines with typical slip ring design often twists and tangles the connection cable from generator to controller, which made the system has to be maintained every few month. HY Energy patented slip ring design solved this problem completely and made HY wind turbine with higher reliability and real maintenance free.

Best Material and Workmanship

Rotor and housing

Patented rotor is made of high quality stainless steel rotor shaft attached with permanent neodymium magnet, the unique winding and multi pole design reduces the start-up torque of alternator which assures generator would produce more power at lower wind condition than other system.



Generator housing is made of precisely casted aluminum alloy with minimal tolerance and sealed with high quality sealant, this is why HY wind turbine could work normally under various working conditions, and this is why HY wind generator features class B insulation and IP56 class protection. Besides, HY generator system is designed with a sufficient buffer of overload to ensure overall wind turbine reliability.



Blade

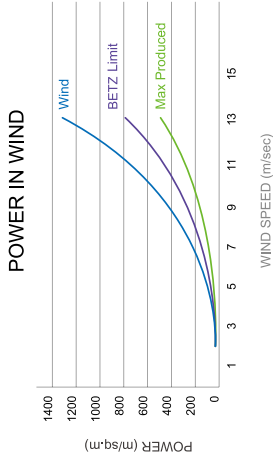
Blades are made from reinforced nylon glass-fiber by using advanced thermoplastic engineering and precision injection molding technology for higher strength, flexibility and reliability.



HY Wind Turbine Structure and Special Features

HY High Efficiency Wind Turbines

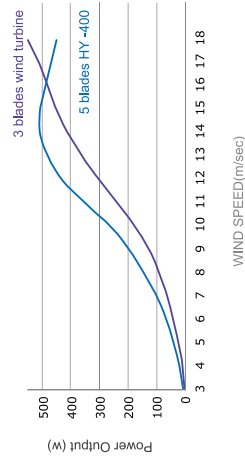
With HY R&D team efforts and years of technology accumulation and fine workmanship, HY wind 6th generation wind turbines proved an excellent performance, durability and reliability, following generator efficiency testing result shows what HY turbine is capable of and we expect you could start to test our wind turbine yourself. Results speak themselves!



Wind – shows power in the wind watt per square meter
BETZ limit – shows the theoretical maximum power could be captured from wind
 Max produced – shows maximum power a wind generator could generate from wind

Power output chart

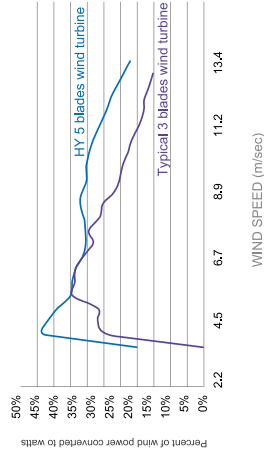
5 BLADES & 3 BLADES WIND TURBINE POWER OUTPUT COMPARISON



5 blades HY-400 power curve shows excellent power output performance at lower wind speed, and the blades aerodynamics braking system starts to protect wind turbine from 14-15m/s wind speed

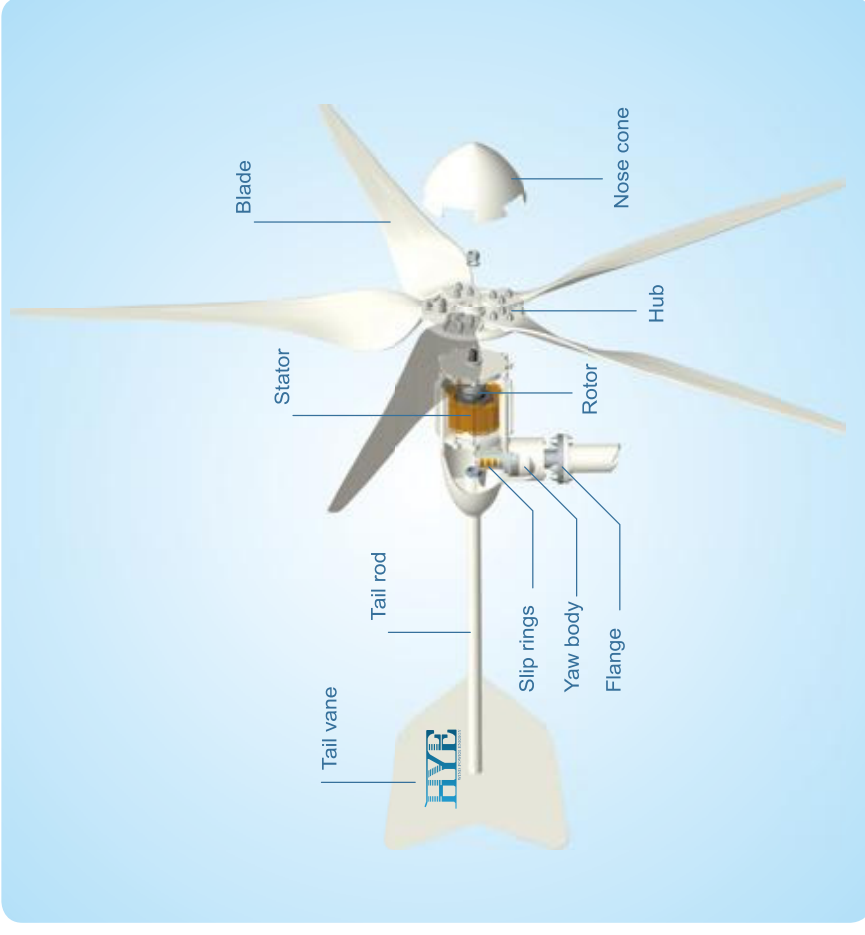
Typical 3 blades wind turbine generates lower power at low wind speed and no protection for wind turbine at higher wind speed, wind turbine may break down if dump loader doesn't work properly.

5 BLADES & 3 BLADES WIND TURBINE EFFICIENCY COMPARISON



HY 5 blades wind turbine shows excellent wind power utilizing efficiency at lower wind (more than 40%), and also good performance at higher wind because smart blade aerodynamic braking could limit rotor speed within its rated RPM to keep generating power in higher wind.

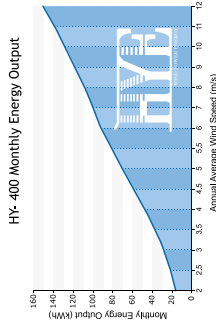
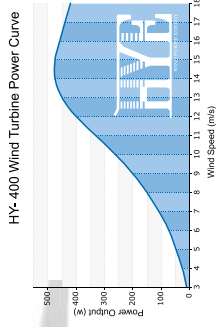
Typical 3 blades wind turbine captures much less power from wind at lower wind speed, and wind power efficiency drops in higher wind because dump loader or mechanical furling braking system intermittently limits rotor speed in constantly changing wind, which results in average efficiency drop.



Product Special Features

- High Efficiency
- Light Breeze Start Up
- Long Lifetime, Free of Maintenance
- Light Weight, Easy Installation
- Heavy Wind Self-protection
- Minimal Vibration and Low Noise Operation
- Anti-rust & Anticorrosion
- Damp-proof & Sand-Proof

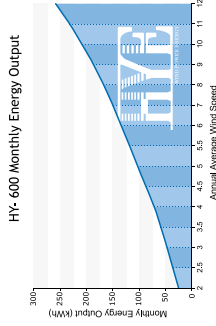
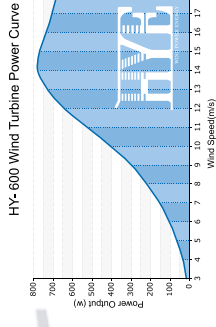
HY-400 Technical Specifications



Technical Specifications:

Model	HY-400
Rated Output	400W
Peak Output	500W
Rated Voltage(V)	DC12/24
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	33.3/16.7
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg. V=5.5m/s)	82
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.55
Swept Area (m ²)	1.89
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase with permanent Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	22KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	MPPT or PWM
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	7
Certificate	ISO9001:2008, CE, RoHS, ETL

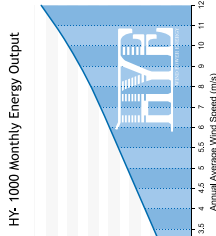
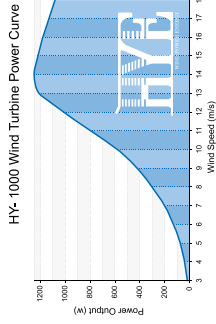
HY-600 Technical Specifications



Technical Specifications:

Model	HY-600
Rated Output	600W
Peak Output	750W
Rated Voltage(V)	DC24/48
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	25/12.5
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg. V=5.5m/s)	91
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.75
Swept Area (m ²)	2.4
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	25KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	MPPT or PWM
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	6
Certificate	ISO9001:2008, CE, RoHS, ETL

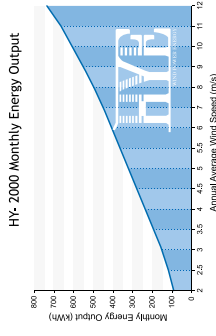
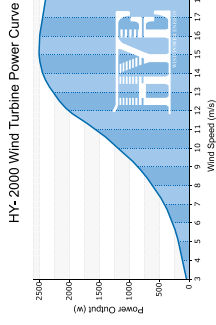
HY-1000 Technical Specifications



Technical Specifications:

Model	HY-1000
Rated Output	1000W
Peak Output	1200W
Rated Voltage(V)	DC24/48
Start-up Speed	2.5m/s or 5.6mph
Cut-in Speed	3m/s or 6.7mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	41.7/20.8
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg. V=5.5m/s)	175
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.96
Swept Area (m ²)	3
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	28KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	MPPT or PWM
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	4
Certificate	ISO9001:2008, CE, RoHS, ETL

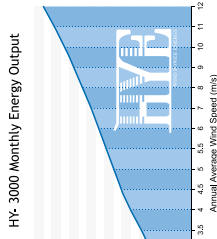
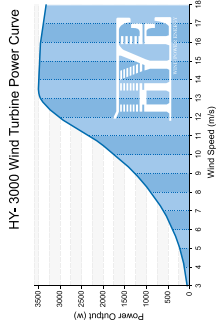
HY-2000 Technical Specifications



Technical Specifications:

Model	HY-2000
Rated Output	2000W
Peak Output	2500W
Rated Voltage(V)	Grid-off DC48/110 or Grid-on AC110/220
Start-up Speed	2.5m/s or 5.6mph
Cut-in Speed	3m/s or 6.7mph
Rated Rotor Speed (RPM)	650
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	DC41.7/20.8 or AC18.7/9.0
Noise Level	<30dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg. V=5.5m/s)	354
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	2.8
Swept Area (m ²)	6.15
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	68KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	MPPT or PWM
Applications	stand alone, solar & wind hybrid system,grid-tie system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	4
Certificate	ISO9001:2008, CE, RoHS, ETL

HY-3000 Technical Specifications



Technical Specifications:

Model	HY-3000
Rated Output	3000W
Peak Output	3500W
Rated Voltage(V)	Grid-off DC48/110 or Grid-on AC110/220
Start-up Speed	2.5m/s or 5.6mph
Cut-in Speed	3m/s or 6.7mph
Rated Rotor Speed (RPM)	700
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	DC62.5/27.3 or AC27.2/13.6
Noise Level	<30dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg. V=5.5m/s)	495
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	60m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	3.05
Swept Area (m ²)	7.3
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	70KG
Tower Connection	Flange connection or reducing joint
Controller Type	MPPT or PWM
Applications	Stand alone, solar & wind hybrid system, grid-tie system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	4
Certificate	ISO9001:2008, CE, RoHS, ETL

HY ENERGY WIND TURBINE APPLICATION SYSTEM

