Clipper Windpower, a United Technologies Corp. company, is engaged in wind energy technology, turbine manufacturing and wind project development. Clipper designs advanced wind turbines, manufactures the 2.5 MW Liberty wind turbine, and develops wind power generating projects in the Americas and Europe. The company is headquartered in California with manufacturing and assembly facilities in Cedar Rapids, Iowa. Clipper's website is at www.clipperwind.com.

United Technologies Corp., based in Hartford, Connecticut, is a diversified Fortune 50 company that provides high technology products and services to the global building systems and aerospace industries. The UTC website is www.utc.com.

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LIBERTY® 2.5 MW WINDTURBINE

FACTS & SPECIFICATONS

LIBERTY

WIND TURBINE DESIGN

The Liberty 2.5 MW wind turbine brings the wind industry's most valued design standards together with Clipper's purpose-engineered technologies to tackle the industry's most critical technology challenges – namely, the recognized drivers of unscheduled maintenance expense: downtime associated with gearbox and generator stresses; large component change-outs; and crane call-outs.

Beginning with a horizontal-axis, 3-blade, upwind, pitch-regulated, variable-speed architecture, Clipper integrated its Quantum Drive® distributed drive train, a two-stage, helical load-splitting gearbox, four separate MegaFlux® permanent magnet synchronous generators, and controls optimized for variable-speed operation with full power conversion.

A number of innovative features were also added to increase worker safety, and provide ease of machine serviceability.

The Liberty turbine was designed by Clipper in partnership with the U.S. Department of Energy (DOE) and its National Renewable Energy Laboratory (NREL), which provided funding for development as well as facilities and support for extensive drivetrain and blade testing. As a result, an 'Outstanding Research and Development Partnership Award' was issued to Clipper by DOE in 2007, highlighting Clipper's "outstanding contribution toward industry advancements", and recognizing "the Liberty wind turbine, which attained unparalleled levels of efficiency and reliability and reduced cost of energy."

An independent due diligence review of the Liberty wind turbine technology conducted by Garrad Hassan America, Inc. (GH) on behalf of Clipper concluded: "Overall, GH considers the Clipper turbine design to be reasonable though novel, and the technology to be sound."

With the first Liberty prototype installation in 2005, and first serially produced units installed in 2007, the Liberty fleet expanded to over 1 Gigawatt of installed turbines with about 4 million operating hours, spread over 16 projects by year-end 2009.

2009 U.S. market share (according to American Wind Energy Association) for wind turbines in the 2.5 MW and greater sized class is approximately 60 percent.

LIBERTY

KEY FEATURES

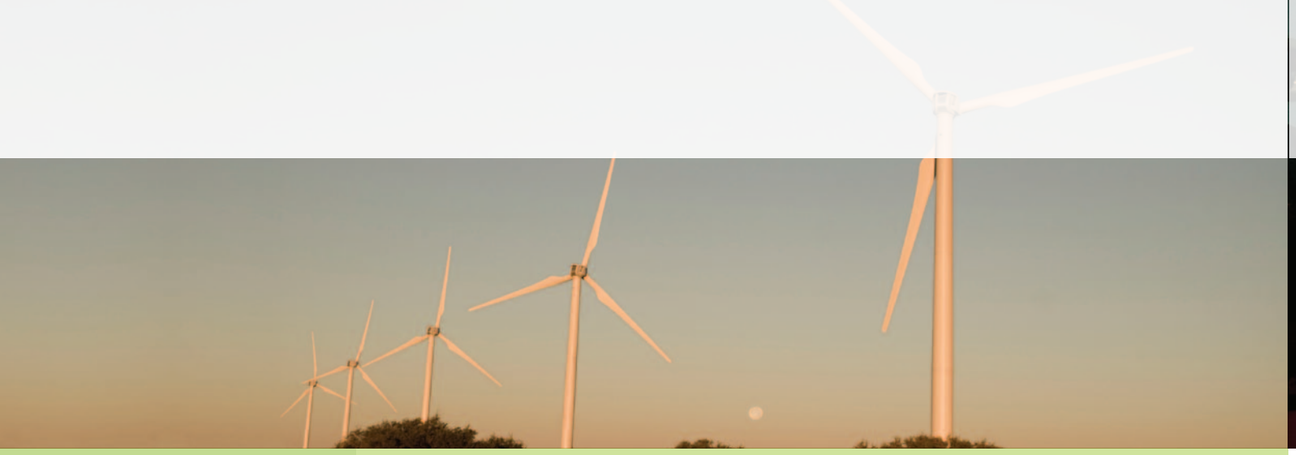
LIBERTY 2.5 MW WIND TURBINE – KEY FEATURES	Reduced Cost of Unscheduled Maintenance	Greater Efficiency, Increased Production	Improved Ownership Return	Ease of Maintenance	Grid Friendliness	Lifetime Cost	Versatility
Quantum Drive® distributed powertrain	•	•	•	•	•	•	•
Four MegaFlux® permanent magnet generators	•	•	•	•	•	•	•
Variable speed technology	•	•	•	•		•	•
IEEE 519 power quality, exceeds standards	•	•	•	•			•
Extended low voltage and zero voltage ride-through capability	•	•	•		•		•
Design architecture accommodates 50 or 60 Hz					•		•
SCADA monitoring & control system	•	•	•	•	•	•	•
CBMS predictive maintenance system	•	•	•	•	•	•	•
Multiple gear inspection ports in powertrain	•	•	•	•	•	•	
Two-person service lift	•	•	•	•	•	•	•
Service platform with safe and spacious work area	•	•	•	•	•	•	•
Internal 2-ton hoist	•	•	•	•	•	•	•
Hub accessibility from inside the nacelle	•	•	•	•	•	•	•
Comprehensive lightning protection	•	•	•	•	•	•	•
Crane size requirement for installation similar to 1.5 MW unit	•				•	•	
GL certified cold weather capability	•	•	•	•	•		•
Rotor diameter choices for optimized power generation		•	•			•	•
Full Power Conversion	•	•	•	•	•	•	•
Generator cooling: Water-to-air or air-to-air configurations	•		•	•		•	•
Patented Single Blade Change Out Process	•		•	•		•	•

"GH notes that even some established gearbox manufacturers have struggled to meet the stringent design and manufacturing quality standards required for wind turbine applications. GH takes comfort in the fact Clipper is subjecting 100% of its production gearboxes to full load testing."

Liberty 2.5MW wind turbines are operating in nearly every climate and weather condition

FEATURE	DETAIL	BENEFIT
Quantum Drive® Distributed Powertrain	Liberty utilizes a purpose designed, two-stage helical, distributed load path powertrain.	Increased reliability and durability. Higher efficiency in comparison to three-stage powertrain designs
	Four smaller high speed shafts distribute the output to four generators, reducing the potential for premature bearing failure and decreasing time and cost associated with generator service and repair.	Increased reliability and productivity.
	Two pre-loaded, low-speed taper-roller main bearings absorb thrust loads and mitigate problematic axial motion and mainshaft misalignment associated with low speed bearing failures.	Increased reliability, reduced downtime and extended turbine life.
	High-speed gear sets are in "cartridge" form. Replacement is conducted by way of an onboard hoist without removal of the gearbox, eliminating the need for expensive crane mobilization.	Reduced downtime, increased energy production, and substantially reduced long-term operating costs.
	Multiple inspection ports facilitate simple access for visual observation of the gears, enabling a more rigorous operations and maintenance protocol and earlier detection of abnormal wear.	Reduced unscheduled maintenance cost and increased energy production.
MegaFlux® Permanent Magnet Generators	Permanent magnet generators offer advantages over induction generators in terms of increased power density, increased efficiencies at lower wind speeds, improved low-voltage ride-through capability when combined with full power conversion, and simplicity of design.	Nearly maintenance-free operation with higher efficiency, increased energy production, and a lower VAR requirement.
	Does not utilize slip rings or brushes. Historically, slip rings have been a maintenance issue requiring replacement more frequently than anticipated.	Higher efficiency.
	Stray current-induced pitting and bearing failures inherent in doubly-fed generators is eliminated, substantially extending bearing life.	Reduced unscheduled maintenance cost.
	There are no moving parts on the rotor in the rotating frame, thus the need for complex replacements of brushes, rotating rectifiers and exciters typical of doubly-fed generators is eliminated.	Reduced maintenance cost, increased reliability.
	Low short-circuit current reduces torque overload on the drivetrain due to electrical short circuit.	Extended gearbox life.
	Effective generator cooling design maintains temperature at less than Class F rise under all conditions. Form-wound Class H stator winding insulation.	Lower operating temperature provides for increased reliability, and longer life due to greater thermal margin.

FEATURE	DETAIL	BENEFIT
	The four-generator configuration and control capability can enable continued wind turbine operation with one or more generators removed until replacement is performed.	Reduced downtime, and greater productivity.
	Small, compact generators enable removal and replacement utilizing the onboard hoist, eliminating the need for expensive large crane mobilization.	Reduced downtime and long-term operating costs.
	Two IP54 configurations: "water-to-air" and "air-to-air" cooling configurations offer solutions for both mild and harsh operating environments.	Increased reliability and productivity and decreased downtime.
Variable Speed System	System is based on larger capacity IGBT's and proprietary permanent magnet generator technology which provides simpler, more reliable, more cost effective variable speed operation.	Higher energy capture. Increased productivity.
Full Power Conversion	Grid Isolation. Clipper's variable speed generator and inverter system completely decouples the generator from the grid, eliminating grid induced drivetrain torque excursions.	Improved gearbox reliability.
	Power Factor Control. Enables the operation with selectable power factor to near unity and as low as five percent which minimizes or eliminates the need for VAR correction.	Reduced overall system cost.
	Passive Rectifier. Conversion of the generator alternating current output to direct current for the input to the variable speed inverter offers a simpler variable speed system compared to other wind turbine designs.	Higher reliability and less downtime
	Unidirectional Power Flow. Clipper's variable speed inverter system is simpler, utilizes fewer parts, and delivers power exclusively from the generator's stator. In contrast, doubly-fed generator systems require power flow to and from the generator's rotor requiring high-power slip rings and brushes.	Lower operating and maintenance costs.
	Meets or exceeds IEEE 519 high quality power requirements worldwide now common in all major electricity power markets.	Siting versatility. Increased productivity.
Low Voltage Ride-Through	The Clipper system stays online, helping to stabilize weak grid systems. The system provides low voltage ride-through capability of up to 3 seconds down to 10% of nominal voltage and for 150 msec down to zero percent, exceeding all low voltage ride-through requirements. Clipper's system exceeds the most stringent of grid requirements now in planning, enabling integration into the strictest regulatory environments.	Provides siting versatility and enables greater wind penetration on a given grid system.



Liberty gearbox assembly and testing at Clipper's facility in Cedar Rapids, Iowa.

FEATURE	DETAIL	BENEFIT
Blades	Rotor sizes available for all wind regimes, including 89m, 93m, 96m and 99m.	Provides siting optimization benefits.
Blade Pitch System	Each blade has an independent electromechanical pitch system with battery back-up for power control and primary braking.	Increased reliability, higher availability.
Lightning Protection	Blade tip lightning receptors connect through brushes on the blade pitch bearings and main shaft, transmitting lightning strike current down the tower to ground. A steel mesh Faraday Cage is embedded within the structure of the nacelle providing an added lightning protection for service crews and machine safety, and immunity to radio frequency interference.	Reduced downtime, reduced cost, and greater productivity.
Advanced Cold Weather Package	Operates at temperatures down to -30 degrees Centigrade, survives to -40 degrees.	Greater energy capture and reduced downtime.
Installation Requirements	Crane size and duration requirements for the installation of the Liberty turbine are similar to that of a typical 1.5 MW machine.	Improved installation value on a cost-per-megawatt basis.
Service Lift	A two-person service lift facilitates timely and efficient service calls enabling crews to service more turbines per day. In addition, experienced service personnel can extend their careers without the limitation of stringent climbing requirements.	Higher turbine operating availability. Increased worker safety.
Interior Work Platform	Provides full stand-up workspace for several technicians as well as near obstacle-free walkways, facilitating ergonomic comfort, safety and ease of service for organized, efficient work performance.	Ease of maintenance. Increased worker safety.
EHS Equipment	Personnel evacuation equipment, including a self-rescue system.	Provides greater safety levels for service technicians. Increased worker safety.
Containment Deck	The nacelle includes a 125-gallon containment deck below the powertrain, preventing tower contamination and providing increased service crew safety.	Reduced downtime associated with spills. Increased worker safety.
Hub Access	The hub can be accessed through three entry ports from inside the nacelle, eliminating the need to exit to the nacelle topside to enter the hub, facilitating quick, simple and safe hub access, particularly in extreme weather conditions.	Decreased downtime associated with performing hub maintenance in severe weather. Increased worker safety.
	Hub components, including pitch drives, can be lowered to the ground with a small, portable 500-pound hoist that attaches to lifting eyes inside the hub.	Reduced downtime for component change out. Ease of replacement and maintenance of components in the hub.

CLIPPER PROCESSES

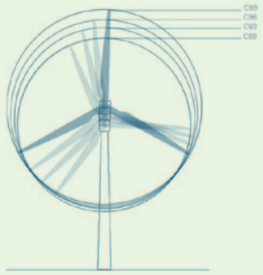
MANUFACTURING	BENEFIT
Quality	Clipper operates with 6 Sigma quality assurance practices, including tools and training for manufacturing practices, personnel training and quality assurance of suppliers. Clipper's ISO 9001:2000 compliant Quality Management System "QMS" manages the full life cycle of the product from design through ongoing operation and maintenance. Our fleet of professional QC staff is on-site at Clipper's Iowa facility as well as at the plants of our key component suppliers to ensure production to the highest standards. This proactive hands-on approach includes mandatory hold and inspection points within all of our production processes.
In-House Manufacturing Cedar Rapids, Iowa	Located in the middle of North America near major road, rail and river barge services. Clipper has invested significantly to ensure state-of-the-art operations. Affording over 330,000 square feet of manufacturing and assembly space, Clipper's facility includes full-scale wind turbine machine base, hub and gearbox assembly lines for the highest level of quality control and supply surety.
In-House Testing	In-house Testing: All Clipper gearboxes and generators undergo rigorous fatigue testing prior to sign-off and shipment via the use of two specialized, fully-rated gearbox test stands and one robust generator test stand located on-site at Clipper's factory.
Custom-Engineered Component Manufacturing	Outsourced to select, reliable, well-established companies with specialized industrial expertise, Clipper's sub-components are manufactured to Clipper's strict specifications for precise functionality and high quality assurance.
Safety	At Clipper, we're dedicated to the safe operation of our facilities and to the protection of our employees, the public and the environment. Our experienced staff includes a ratio of full-time EHS officers to employees that is among the highest in the wind energy industry. Our practices meet or exceed local, state and federal agency standards.
Operation, Maintenance & Remote Monitoring	Clipper provides service support, covering both scheduled and unscheduled maintenance, and maintains a 24/7 Remote Monitoring and Diagnostics Center (RMDC) at its Cedar Rapids plant. The RMDC interfaces with project sites to shut down and bring on-line turbines that are going into or coming out of a maintenance cycle. The RMDC is also active throughout the turbine commissioning process. Clipper's Fleet Service team Is among the wind industry's most skilled, with decades of experience providing a highly qualified professional base.
Warranty	Warranties are available to suit our customer's needs similar to other industry standard packages.
Our People	Clipper's team represents one of the broadest and deepest levels of experienced wind industry professionals. The global staff includes a strong ratio of professionals with 10 to 20 years of proven wind energy expertise throughout the full range of key staffing roles – experience gained through prior employment within the Industry's top wind energy companies.

TECHNICAL SPECIFICATIONS - LIBERTY 2.5 MW WIND TURBINE

Power Output	2500 kW
Operation	Variable Speed: 9.6 - 15.5 rpm

Model	**C89**	**C93**	**C96**	**C99**
Wind Class	Ia*	IIa	IIb	S
Rotor Diameter	89m	93m	96m	99m
Swept Area	6221m2	6793m2	7238m2	7698m2
Blades	43.2m	45.2m	46.7m	48.2m

*Class Ia - All parameters same as IEC Class Ia except 50-year return gust value is 64.5 m/s instead of 70 m/s

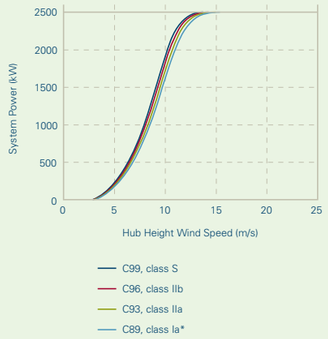


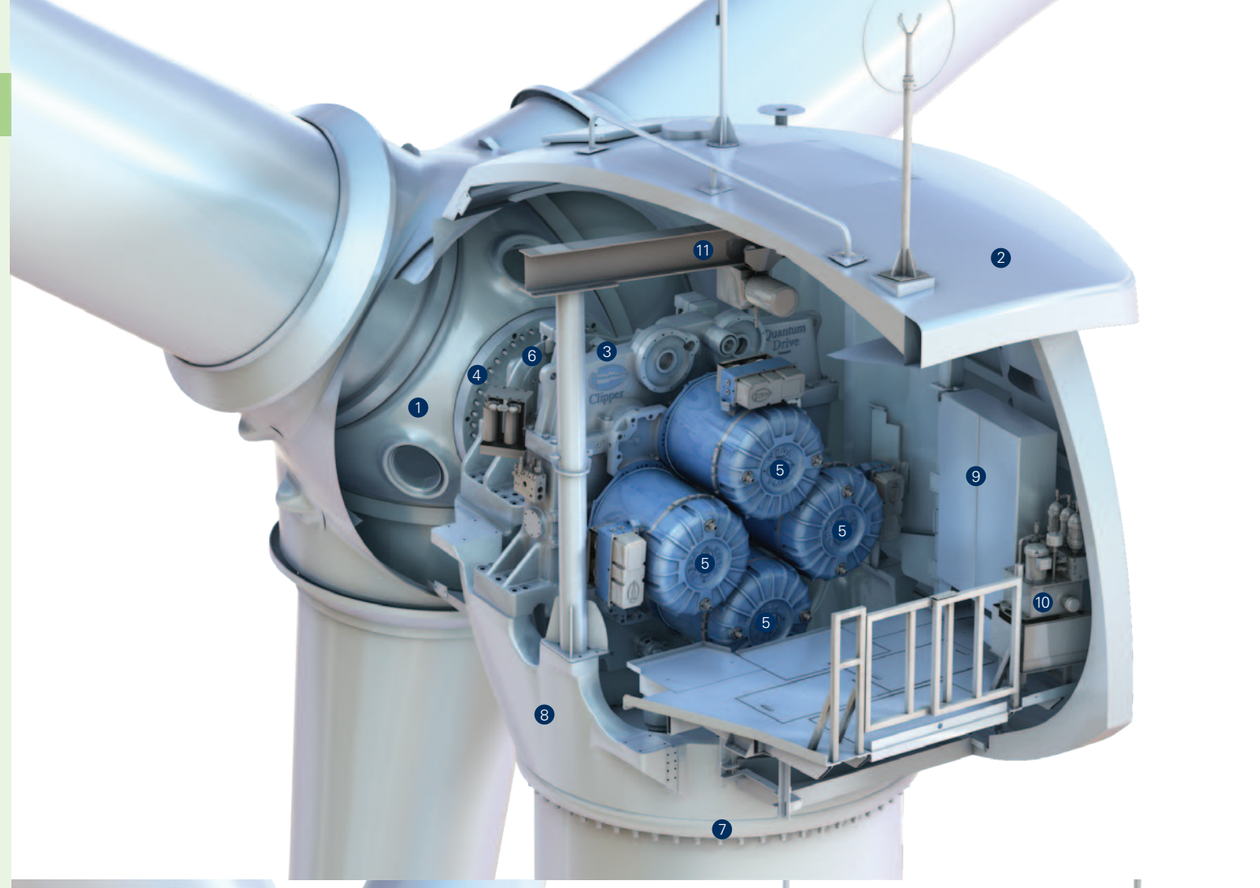
Cut-in Wind Velocity	3.5 m/s - 10 min. Average
Cut-out Wind Velocity	25 m/s - 10 min. Average
Pitch System	3X AC Electric-Mechanical Gear-motor, Servo Drives and Batteries
Generator	
Type	Synchronous Permanent Magnet
Rated Power Each	660 kW at 1133 rpm
Number of Units	4
Voltage	1325 VDC at Rated Power
Controller	
Type	Patent Pending, Purpose Designed, Automotive style Embedded Power PC
Voltage	3 Phase 480 VAC and 24 VDC
Back-Up	Patent Pending, Super Capacitor Energy Storage System for Extend Ride Through Operations
Power Converter	
Type	4X, Voltage Sourced, IGBT Based 6 Pulse, Inverters
Voltage	690 VAC, 50Hz or 60Hz ± 3Hz
Grid Compatibility	
Frequency	50Hz or 60Hz ± 3Hz continuous

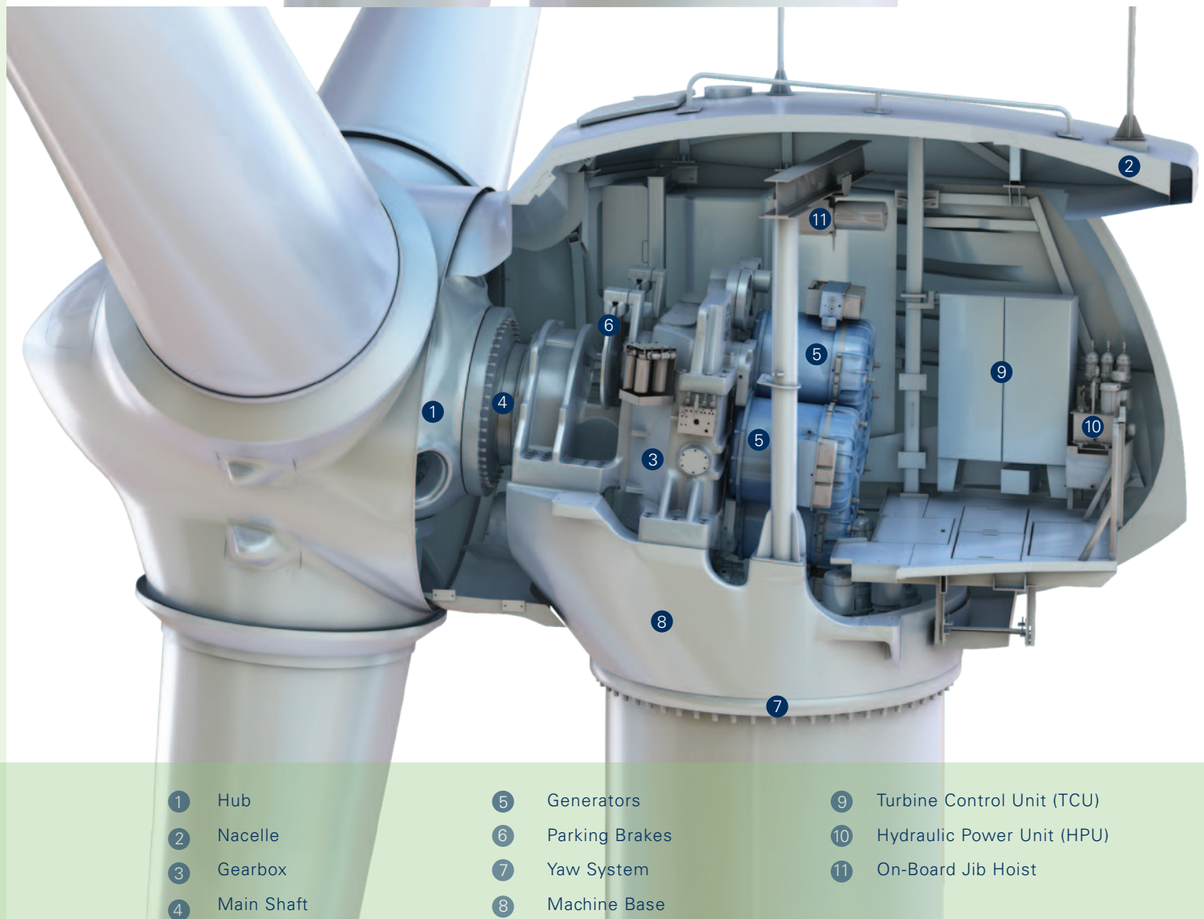
Grid Compatability	Frequency – Continuous	47 to 53 Hz / 57 to 63Hz
	Nominal Line Voltage (RMS):	690VAC
	Line Voltage (% of nom RMS)	90% < v ≤ 110% - Continuous Operation
	Line Voltage (% of nom RMS)	110% < v ≤ 120% - 5 second Operation
	Line Voltage (% of nom RMS)	120% < v ≤ 130% - 500ms Operation
	Line Voltage (% of nom RMS)	10% ≤ v < 90% - 3 second Operation
	Line Voltage (% of nom RMS)	0% ≤ v < 10% - 150 ms Operation
	Power Quality	IEEE 519 and IEC-61400-21 Compliant
	Reactive Power	Supported

Line Phase Imbalance	Rated Power ± 5%, Cut-in ± 10%
Yaw System	6 Electro-Mechanical Motors with Planetary Drives
Yaw Bearing	Internal Gear, Ball Bearing
Yaw Brake System	Disc, 5 Active Hydraulic Brake Calipers
Parking Brake System	Dual Disc with Active Hydraulic Brake Calipers
Parking Brake Location	Intermediate Stage of Gearbox
Tower	Partial Conical - Tubular Steel, 4 Steel Plate Sections
Hub Height	80m Standard / Other Options Available
Service Hoist	On-Board, 2 Metric-ton Hoist
Maintenance	
Post Commissioning	Once at 700 Hours, Every 6 Months Thereafter

Power Curve







1 Hub
2 Nacelle
3 Gearbox
4 Main Shaft
5 Generators
6 Parking Brakes
7 Yaw System
8 Machine Base
9 Turbine Control Unit (TCU)
10 Hydraulic Power Unit (HPU)
11 On-Board Jib Hoist