



reliability, efficiency, performance,
profits



Maximizing turbine availability, reliability and energy production

Modern wind turbines need to be reliable, efficient and most importantly, cost effective. They need to adapt to any wind conditions, operate in the harshest climates, and always be up and operating in the most remote locations.

Wind turbine OEMs must push the performance limits of their turbine to remain competitive and maximize wind park revenue potential. In response, through its Windtec Solutions, AMSC works to extract optimal energy from the wind by enhancing turbine performance, increasing component expectancy and improving power quality. Our smart control systems help lower the Levelized Cost of Electricity (LCOE), enable wind to compete more effectively with convectional power sources and allow customers to increase profits.

This need for smarter solutions is even greater in the offshore arena. Harsh climates and remote locations make turbine reliability and efficiency essential.

Increasingly, the industry is demanding a world-class power generation plant – guaranteeing high availability, enhanced durability, and precision quality and control – so that every possible kilowatt-hour can be extracted from the wind.

We are meeting this challenge.

Through its Windtec Solutions™, AMSC provides an array of turbine controls and systems.

Whether you want an entire wind turbine control system or just individual system components, we have what it takes to complete your turbine power electronics controls strategy.

Through its Windtec Solutions, AMSC provides customers with world-class solutions, expertise and experience for mechanical design and analysis, electrical controls, as well as a state-of-the-art, high-performance design for onshore, offshore, near shore – and all climate conditions. AMSC's ability to provide customers with this all-encompassing solution is unique to the industry.

Our wtECS Electrical Control Systems provide higher availability, reliability and optimized energy output from your wind turbine, wherever your operations, whatever the conditions.



Providing reliability under unreliable climate conditions. The proof is in the performance. Our integrated solutions maximize energy output while minimizing barriers to business.

Electrical pitch system for optimum performance

Located in the rotating hub, our pitch control system enables operators to gain optimal power from wind at below rated wind speed by adjusting the blade angle; controlling the speed of the wind turbine by holding a constant level at above rated wind speed; and minimizing mechanical loads due to variable speed operations.

Nacelle cabinet for ideal power distribution and turbine control

The nacelle cabinet is split into the power cabinet and the control cabinet. The nacelle cabinet collects all signals and controls all devices in the hub and nacelle, including that of the water- and oil-cooling system, heating system, brakes and fans, yaw system, pressures and temperatures, wind speeds, wind direction, and oil and monitoring signals.

Yaw controls

Yaw controls ensure that the turbine is constantly facing into the wind to maximize the effective rotor area and, as a result, power. Our unique expertise in all aspects of control systems means we can optimize the performance of the yaw controls so they are fully integrated into the turbine's entire control scheme.

Converter system for optimized connection to any grid frequency

The converter system coordinates variable speeds of the wind turbine with the fixed frequency of a grid, fulfilling worldwide grid codes and maintaining the capability for low voltage ride-through (LVRT) and for reactive power management. The converter system includes the AMSC PowerModule power converter, grid and generator choke, harmonic filter circuits and precharge unit, breakers, control parts and connections to the generator and grid. It supports integrated ground fault protection and has a temperature control system as well as a humidity monitoring system. It can be used for all types of generators.

Internal power supply cabinet

The internal power supply (IPS) cabinet is the distribution cabinet for auxiliaries of the entire wind turbine and provides access for

operation and maintenance work. The IPS cabinet contains power sockets as well as high power current sockets.

Tower base cabinet for full control

The tower base cabinet allows full control and operation of the wind turbine and provides information of all operated and measured signals. Through an integrated modem, it is the interface for communication from the wind turbine to the outside world.

Software for optimized wind turbine operation, monitoring and analysis

AMSC provides the entire software solution for the pitch-, converter-, yaw-, and condition monitoring system (including hardware), and SCADA that is required by the wind turbine for functionality. Data center and wind park controller software solutions are optional. The wind turbine operator needs only one single interface for the entire turbine operation, monitoring and control.

wtECS solution's field of functions

Electrical pitch system

- Pitch motor with integrated position sensors, thermistors and brake freewheel
- Backup system ensures pitch operation during short-term interruptions of the grid
- Built in safety features:
 - Unique turbine protection
 - Fail-safe mechanical system

Nacelle cabinet

- Control cooling and heating, brakes, fans, and yaw systems

Yaw controls

- Advanced yaw controls for maximum output
- Integrated pitch and yaw systems for better coordination and optimized turbine performance

Converter cabinet

- Torque control of the generator according to demand of the PLC
- Control of reactive power
- Rotational speed monitoring
- Minimization of drivetrain oscillation through active damping
- Fulfillment of worldwide grid codes



- **Single interface, with a maintenance- and service-friendly design**
- **Flexibility to pick and choose components based on turbine controls strategy**
- **Greater reliability and availability**
- **Maximized energy output from wind turbine**

Wind Turbine Controls and Systems

About AMSC's Windtec Solutions™

AMSC's Windtec Solutions enable manufacturers to launch best-in-class wind turbines quickly, effectively and profitably. We provide conceptual and detailed designs for complete wind turbines and advanced drivetrain systems. In addition, we provide a broad range of volume manufacturing support services, including supply chain development, localization and employee training. Our offerings also include advanced wind turbine electrical control systems that ensure highly reliable and efficient power flows. Whether you are a new entrant or a proven wind turbine manufacturer, our commitment is to provide you with the solution that delivers competitive advantage, lowers the cost of energy and enhances your return on investment.

We can do all of this for you; we are the partner you can turn to.

About AMSC®

AMSC (NASDAQ: AMSC) generates the ideas, technologies and solutions that meet the world's demand for smarter, cleaner ... better energy. Through its Windtec Solutions, AMSC enables manufacturers to launch best-in-class wind turbines quickly, effectively and profitably. Through its Gridtec Solutions, AMSC provides the engineering planning services and advanced grid systems that optimize network reliability, efficiency and performance. The company's solutions are now powering gigawatts of renewable energy globally and enhancing the performance and reliability of power networks in more than a dozen countries. Founded in 1987, AMSC is headquartered near Boston, Massachusetts with operations in Asia, Australia, Europe and North America.



Talk to us about

- Solving your most complex power challenges
- Enhancing competitive advantage
- Improving your system's performance, reliability and profitability

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Whether you wish to make new advances in renewable technology, optimize power generation or delivery, or simply gain a better understanding of the issues you face, please get in touch. We're here to help.



smarter, cleaner
... better energy

