The Turbine Control Experts
Experts in Steam and Gas Turbine Control

For nearly five decades, Emerson Power & Water Solutions has been an industry leader in providing control solutions for every aspect of the power generation process, including steam and gas turbines. Today, as older machines operate beyond their original life expectancy, more precise and reliable control technology is a necessity.

Increasing competitive pressures in the power generation industry have driven dramatic changes in the operational needs of power plants. You face the ongoing need to enhance reliability, avoid unplanned outages, reduce maintenance costs and improve unit responsiveness not possible with your legacy turbine control technology.

Emerson is here to help you. Through years of experience and dedication to the power industry we understand the impact of efficient turbine control to achieving the maximum levels of reliability and availability.

Emerson’s Ovation™ technology uses the same hardware and software platform for turbine control as it uses for other plant controls such as boiler or HRSG controls, burner management systems, combustion controls, balance-of-plant, SCR controls, and more.

Our turbine control experts average over 15 years of experience in designing and implementing complete, steam and gas turbine control solutions. With Emerson’s fully integrated control, you achieve compatibility unit-wide, which reduces your time and costs to support and maintain the system. In addition, this solution:

• Improves unit stability, responsiveness, and thermal efficiencies
• Provides a concise view of key plant and turbine parameters
• Helps you gain tighter overall control of your plant operations
• Provides improved operational flexibility, increased plant performance and increased fuel efficiency
Our history of success is based on clear methodologies and low-risk project management strategies. We approach every project with a framework that involves specific tasks during the planning, design, implementation, testing, and commissioning phases.

During the planning phase we select a project team comprised of the right mix of individuals based on their technical knowledge, leadership abilities, and experience providing you a single point of contact for the life of the project. We develop a schedule using critical path tracking and key project milestones and conduct a project kick-off meeting to introduce our team. At that time we also review the project scope, identify training needs, and document your requirements.

The design phase involves control system engineering where we develop a turbine control strategy, and design control logic and graphics. We collaborate with you during project reviews to insure that the designs meet your control, protection, schedule and operational needs.

During project implementation we load and checkout the application software on the Ovation system that has been configured to meet your specific needs. You’re involved in the final testing and check out process, so that satisfaction is assured before the system ships to your site.

We provide highly experienced field service engineers at your site from installation through final tuning to assure successful commissioning and startup. Our team is with you every step of the way, working with you to ensure we meet your needs on time and on budget.
The basis of our turbine control solution is the Ovation control system. Ovation was developed to meet the unique needs of the power industry. It provides advanced process control, data analysis, operator interface, plant performance monitoring and more, on a rugged platform equipped with the specialized tools needed for industry-leading power generation operations.

With Ovation’s proven, reliable technology, we ensure safe, continuous control and monitoring of your turbine operations under any plant conditions. Multiple layers of built-in redundancies and safety logic provide you with the peace of mind that comes with safe, reliable operations. Unlike other systems, Ovation is designed to allow users to easily perform diagnostics and modify control strategies to better support long-term plant life cycle needs.

Ovation utilizes commercially available, off-the-shelf technology to provide a powerful and secure architecture while allowing your system to easily progress with rapidly advancing technology. You’ll get greater operational flexibility, long-term protection of your engineering investment, and a system that can evolve incrementally as your process grows or technology changes. And, better yet, you won’t have to depend on your turbine OEM for support of their proprietary control system. Ovation provides a clear window into your turbine control logic and lets you manage and optimize your own process rather than relying on the turbine OEM to ‘unlock the black box’.
Specially designed I/O cards ... for reduced project risk

We designed the Ovation Valve Positioner and Speed Detector I/O modules specifically for turbine control. This allows turbine control upgrades to be performed without changes to existing instrumentation.

Our turbine-specific I/O cards interface seamlessly to magnetic speed pickups, position feedback devices, and servo valve actuator coils. This eliminates the need for costly and time consuming field equipment replacements, thereby decreasing project risk and cycle time so that the unit can be more quickly returned to service.

With an Emerson turbine control solution, you have the following capabilities:

- Consistent use of hardware and software plant-wide
- Built-in redundancies and safety logic control design
- Two-out-of-three logic for tripping and overspeed protection
- Speed sensor and valve control cards integrated into the system
- Valve interface and calibration integrated into the system
- Automatic turbine startup
- Integrated vibration monitoring, prediction and protection
- Steam turbine rotor stress
- Auto synchronization
- Optimum valve point operation
Over the years we have supplied thousands of steam turbine control systems around the world including complete retrofits to General Electric, ABB, Westinghouse, Siemens, Allis Chalmers, Brown Bovari, Mitsubishi, Toshiba, Hitachi, KWU, and Skoda turbines as well as hundreds of Boiler Feedpump retrofits from various manufactures.

Our turbine control replacements include speed and load control, rotor stress and automatic turbine startup and sequencing, vibration monitoring, protection and prediction as well as complete mechanical and hydraulic system upgrades — all designed to provide increased reliability, reduced maintenance, improved diagnostics capabilities and more precise control.

**Robust, reliable mechanical/hydraulic replacements**

In addition to our Ovation control technology, we can also replace aging turbine mechanical and hydraulic systems. Replacing obsolete and unreliable hydraulic and mechanical systems with Emerson’s simplified design can result in significant reductions in mechanical parts and fewer hydraulic fluid circuits lessening the potential for component failure while reducing maintenance costs and enhancing unit availability and reliability. Emerson steam turbine mechanical/hydraulic replacements include:

- Speed wheel with brackets and probes
- Hydraulic Power Units
- Accumulator Assemblies
- Hydraulic Actuator Assemblies
- Filter Assemblies
- Pressure Status Manifolds
- Testable Dump Manifolds
- Turbine Trip Handles
Emerson has globally installed hundreds of gas turbine control systems including complete retrofits to General Electric, Westinghouse, ABB/Alstom, and Siemens gas turbines. With the recent addition of Innovative Control Systems, Inc. (ICS) to the Emerson family, our experience now includes ICS’ 20 years of proven success in control system modernizations for GE, ABB/Alstom, Pratt & Whitney, Rolls Royce and other gas turbine models.

All Emerson solutions are designed to provide increased reliability, reduced maintenance, improved diagnostic capabilities and more precise control. Emerson gas turbine control replacements include:

- Automatic turbine startup and sequencing
- Precise control of turbine acceleration and temperature
- Speed and load control
- Accurate spread monitoring of all exhaust temperatures
- Integrated vibration monitoring
- Integrated turbine protection and prediction
- Fuel system conversions
- Water injection systems
- Mechanical upgrades
- Electrical system refurbishments
- Control system upgrades based on specific OEM modification recommendations
With Ovation, you gain quick and efficient visual access to nearly twice the information available on older control panels. For example, you can now access data that indicates when turbine acceleration is passing through vibration criticality, view text prompts of critical time check milestones (such as time remaining during startup), and see all temperatures in a single graphic.

Ovation collects trends of important turbine information and stores that data over time to help you avoid unnecessary equipment failures. In addition, descriptive alarms visible through Ovation workstations allow your operators to monitor overall turbine activities and respond to problematic conditions including rotor stress and vibration monitoring information for enhanced equipment status and performance analysis.

Tighter startup control and safe turbine shutdown

Ovation provides tighter startup control of acceleration and pressure for quicker and more efficient operation. This allows your generating assets to consistently, effectively respond to changing load demands. In addition, our retrofit solution provides safe turbine shutdown or runback regardless of turbine supplier.

Ease of operation for fast troubleshooting… to prevent outages before they occur
Fully integrated Protection, Prediction, Monitoring and Control

The Emerson CSI 6500 Machinery Health™ Monitor is the ideal solution for plants looking to replace their existing protection system while also leveraging the benefits of predictive diagnostics and real-time monitoring. It builds on Emerson’s proven foundation of providing protection and prediction solutions for both steam and gas turbines.

Housed in a single chassis, the CSI 6500 delivers comprehensive real-time information that includes prediction, protection, and performance monitoring all fully integrated with the Ovation control architecture.

The CSI 6500 enables users to detect problems before they become critical issues. For real time decision-making the CSI 6500 provides a simple graphical view of process parameters, machinery protection parameters, machinery health information and machine performance information.
The success of your business relies on your ability to achieve the most out of your existing assets. At Emerson, our service, training and support programs allow you maximize your control system technology investment.

**Comprehensive training programs**
Our comprehensive training programs are designed to provide your operators, engineers, and technicians with the knowledge and skills they need to most effectively operate and maintain your Ovation system and assure that you gain the maximum benefits from your investment. Our training programs are conducted by highly skilled training engineers and can be held at our dedicated training facility or at your site.

**Realistic simulation capabilities**
Our Ovation Simulation capability gives you the ability to greatly enhance training effectiveness while also serving as a valuable engineering tool that has the same look, feel and operating characteristics as your actual Ovation system. Ovation Simulation incorporates the identical control logic, graphics and operating software as your Ovation system but in a compact, easy to maintain desktop PC package. Ovation Simulation has proven its effectiveness in operator training and qualification programs, procedure development, control logic testing and validation and as a test bed for plant process improvement programs.

**Customized service and support**
Whether you need resources to perform emergency on-site technical troubleshooting, upgrades, or routine system maintenance, our global service and support organization is available.

Our SureService™ Customer Support Program also allows you to design a customized service and support program that best suits your needs and resources. From 24-hour telephone support to remote systems diagnostics, scheduled on-site visits, component repair or replacement, or web-based software archiving, SureService allows you to select the coverage you want in order to structure a customized service and support program that best meets your needs.

**Keeping your system current**
With the rapid advances in computing technology, keeping your system current is a continuous challenge. That is why we developed the Ovation Evergreen program. Evergreen allows you to keep your Ovation system current through planned, incremental migration of system components to assure that your system will always have the latest functionality. With Evergreen, you avoid the disruption, expense and risk of periodic wholesale major system upgrades and replacements.