

Emerson Ovation™ Control Solutions for Ansaldo Energia GT26 & GT36 Gas Turbines

Features

- Proven Ovation platform provides the foundation for Ansaldo Energia gas and steam turbine control
- Specifically designed to meet the operational needs of GT26 and GT36 units
- Powerful redundant controllers ensure the highest level of reliability required by demanding turbine control applications
- Open system design provides a state-of-the-art and user-friendly programming environment
- Single platform for control, protection and safety with common engineering tools, centralized alarming and historical archiving
- Flexible architecture allows for future expansion and integration with plant control system
- Cybersecurity solution options are available

Overview

For nearly five decades, Emerson has been a leader in power industry automation, providing solutions that range from turbine control to fully distributed plant control systems.

Over the years, we have installed turbine solutions across the globe for every major gas or steam turbine OEM and turbine type.

Our dedicated team includes power-focused engineers who understand the impact of reliable and flexible turbine control. Each solution, for new-build turbines or aftermarket retrofits, is delivered with the goal of achieving the highest levels of revenue and availability from your generating assets.



Emerson's comprehensive solution for the GT26 & GT36 fleet encompasses core turbine governor and sequencer control, project-specific applications, installation and commissioning as well as system lifecycle support and updates.

Ovation - Built for Power

The control solution for Ansaldo Energia GT26 & GT36 turbines is based on Emerson's Ovation™ technology which delivers sustainable performance improvements for power generation applications and helps users increase unit availability, reliability, safety and efficiency.



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The Ovation GT26 & GT36 turbine control solution provides the following benefits:

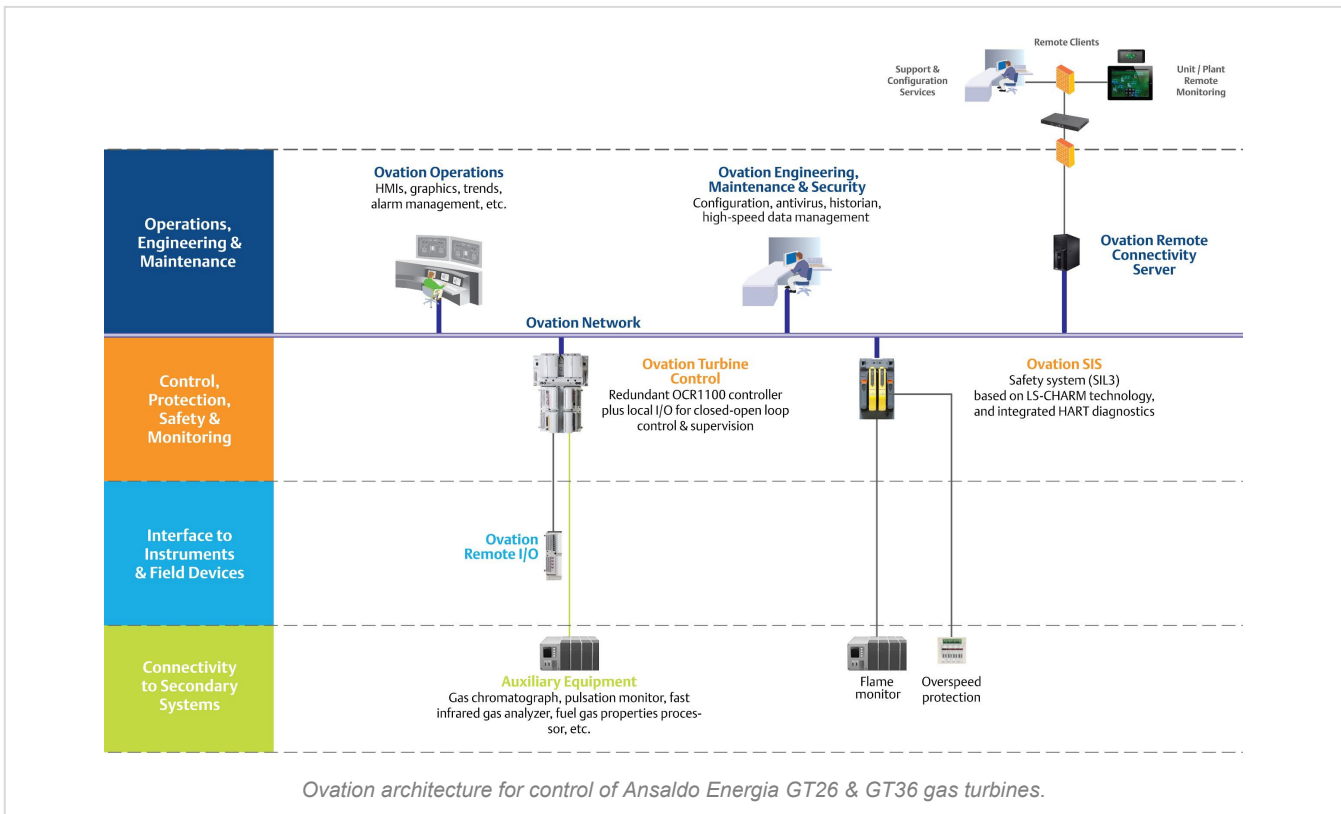
- **Eliminates obsolescence concerns** by working with a global company who has a long-standing commitment to the power industry. Emerson has thousands of installations world-wide supported well beyond installation by a network of control and industry experts.
- **Provides high-performance turbine control** using advanced diagnostics, pre-programmed governor control modules, high-speed data logging and best-in-class cybersecurity.
- **Secures operations** with standard features that address security concerns such as machine authentication, password management, workstation hardening and disabling prohibited activities.
- **Simplifies configuration and maintenance** with integrated user-friendly tools for programming, graphic creation, navigation, logic interrogation, historical functions and alarm management.

Architecture

The integrated and secure Ovation platform, with its non-client-server deterministic network design, ensures information is available in real-time and allows for seamless communication amongst all network nodes without loss, degradation or delay; even during unit upsets.

The open and flexible network design provides multi-tasking, data acquisition and control capabilities for reliable operation and efficient engineering and maintenance tasks, from both local and remote control locations.

The Ovation gas turbine control system includes native modules that seamlessly control turbomachinery instrumentation while eliminating problematic interposing devices. By incorporating the latest bus technology, the Ovation platform also enables quick and easy calibration, configuration and advanced diagnostics.



Operations, Engineering and Maintenance

Ovation operator workstations provide a dynamic view of all individual turbine functions with the stability, performance and flexibility needed to easily control GT26 & GT36 operating modes.

System configuration and maintenance is performed via an intuitive graphical interface on Ovation engineering workstations. Integrated engineering tools generate object-oriented graphics, the system database and control logic as well as define overall system security.

The remote desktop server provides secure access to Ovation operator and engineering functions on computers or mobile devices located outside of the Ovation control network.

Plant and corporate personnel can remotely configure and troubleshoot Ovation systems. Operator functions such as displaying graphics, trends and historical data are also available.

The Ovation process historian provides high-speed data management functions for in-depth troubleshooting and analysis.

Centralized & Remote Control, Safety, Protection and Monitoring

Ovation Network & Controllers

The backbone of the Ovation system is the robust, fault-tolerant Ovation communication network, tested at Ansaldo Energia for GT26 & GT36 applications.

Ovation I/O

The Ovation I/O subsystem uses both local (close to the process controllers) and remote (close to the field devices) I/O modules.

Remote I/O is rated 70C and connected to the Ovation controllers via redundant fiber optic cables.

Ovation Safety Instrumented Systems

Turbine protection is provided by Ovation's SIL3 capable Safety Instrumented System (SIS). SIS scalable modular architecture is based on the CHARacterization Modules (CHARMs) Smart Logic Solver (CSLS) and Emerson's easy-to-use electronic marshalling solution.

Each CSLS provides I/O processing and logic solving and diagnostics. CSLS supports individually configurable channels for flexibility when implementing safety-instrumented functions.

Ovation SIS is certified for SIL3 applications and meets IEC 6150 standards in accordance with IEC 61511. The GT26 & GT36 control system includes an independent SIL3 rated triple redundant overspeed protection system.

Connectivity to Instrumentation, Field Devices & Secondary Systems

Ovation offers a suite of connectivity products that integrate individual plant control systems, applications, instrumentation, third-party devices and corporate networks into a single unified platform to provide accurate process data when and where it is needed the most.

Ovation's connectivity platform options include:

- Controller and I/O modules such as the Ethernet link controller
- Workstations such as the Ovation SCADA server
- OPC connectivity
- Visualization and data analysis tools such as the enterprise data server (EDS)
- Wireless solutions

Secondary systems and field devices, such as gas chromatographs and pulsation monitoring, interface to the Ovation system at the I/O level via native modules using various supported communication protocols including Modbus and Profibus. The Ovation Profibus DP interface module used in the GT26 & GT36 solution has the capability to act as a Profibus master to two individual Profibus segments.

Turbine Control Applications

The Ovation gas turbine system fully controls and monitors GT26 & GT36 units, providing all sequencing control, protection and supervisory functions from Ovation HMIs via a single platform. Gas turbine startup and shutdown is fully automated and does not require operator intervention.

The startup sequence comprises:

- Starting gas turbine auxiliary systems
- HRSG purge
- Ignition and run-up to idle
- Synchronization and on-load operation

The shutdown sequence consists of:

- De-loading followed by de-synchronization
- Stopping fuel supply and opening compressor blow-off valves
- Spool down of rotor
- Cool-down in rotor barring operation

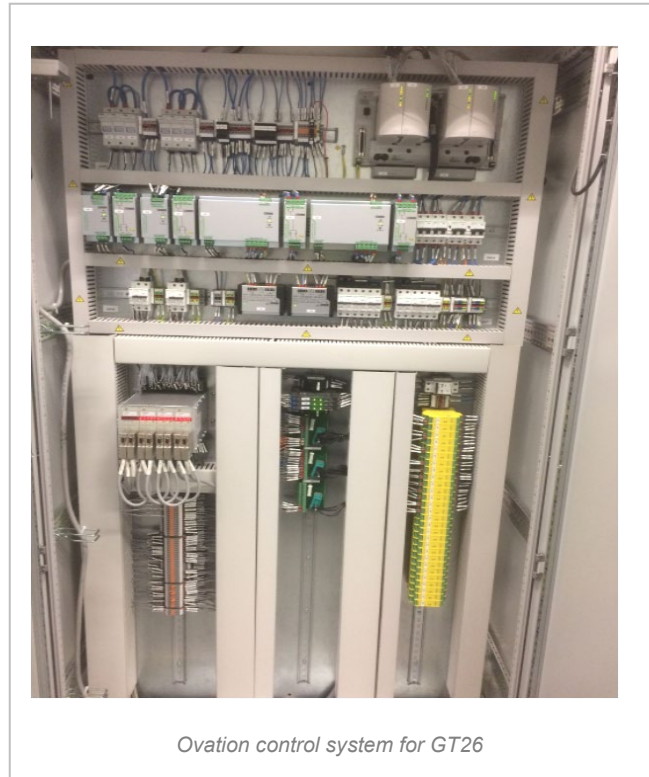
The Ovation control system provides all closed loop control functions, most prominently

- Startup and speed control
- Load and temperature control
- Primary and secondary frequency response

During operation, various features are available for maximum operation flexibility such as:

- Switch between gaseous and liquid fuels
- Performance optimized and maintenance cost optimized mode
- Power reserve control
- Low load operation
- Air inlet cooling
- Anti-icing and air preheating
- Compressor online washing

Additional functions are selectable off-line including fast cooling and compressor offline washing. To ensure plant safety, maximize availability and minimize lifetime consumption, the Ovation gas turbine



control system is designed to execute protective actions such as:

- Gas turbine trip
- SEV/SB emergency shut off
- Protective load shedding
- Protective unloading

Safety critical protective functions are implemented on the SIL-3 rated Ovation SIS integrated safety system. It controls and periodically tests the tripping system for secure shut-down in case of a gas turbine malfunction. Safety critical protective functions typically include

- Combustor flame monitoring
- SEV/SB inlet temperature supervision
- Lube oil pressure supervision
- Fire-fighting and gas detection

An independent SIL3-rated system is used for speed acquisition and overspeed protection.

Ovation's gas turbine control system open architecture allows seamless integration of external systems such as:

- Optical flame monitoring
- Combustor pulsation monitoring
- Gas quality analysis systems
- Emission monitoring systems
- Data acquisition systems

Emerson's library of turbine specific control function algorithms was developed based on years of turbine control implementation and are field-proven in thousands of turbine applications. Emerson maintains full version control to ensure a high degree of software standardization, ease of testing and full revision control history.

Lifecycle Services

An integral part of every Ovation solution is commitment to long-term product support and cost-effective migration paths that reduce lifecycle costs while keeping pace with technological advancements. Emerson's Lifecycle programs include maintenance, reliability and performance services such as:

- Installation & commissioning
- Customer support applications
- Ovation Evergreen system migration program
- Lifecycle management and maintenance programs
- Educational services

Cybersecurity Options

Emerson's Power and Water Cybersecurity suite is optionally available to manage cybersecurity risks and provide enhanced control system protection for secure, reliable, safe and efficient plant operation.

Our cybersecurity suite is supported by a team of certified industry experts specializing in cybersecurity, networking and industrial control systems. Cybersecurity assessments, fleet services, scheduled services, advanced services and custom services are available to create a program that best fits within the framework of existing programs.

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