



Steam Turbine Control Upgrades

■ IMPROVED SYSTEMS

Every day a turbine is operated without an upgraded governing system is potentially another day of reduced efficiency and lost profits. Mechanical governors are sensitive to ambient conditions and have components that wear, experience fatigue and failure requiring service and excessive downtime and maintenance costs. To improve the process control stability or reduce plant operations and maintenance costs, upgrade your steam turbine governor with an electronic governing system. An electronic governor can provide precise speed control with fewer wearing parts than an equivalent mechanical governor. The electronic governor may also improve plant production from driven equipment through enhanced steam management while providing real-time data on turbine operating parameters. An electronic governing system can provide instantaneous data on the turbine's performance and speed while requiring minimal power and eliminating cumbersome mechanical attachments.

As the OEM, Elliott Group has the technical capabilities to define, scope, supply and install electronic governor upgrades on a wide variety of steam turbines operating in many different applications. Any customer looking to upgrade will have a governor system tailored to their specific needs to guarantee satisfaction, ensure a reliable installation process and maximize turbine control reliability. By deciding to make an upgrade now, Elliott can plan ahead to make changes during your next planned overhaul.

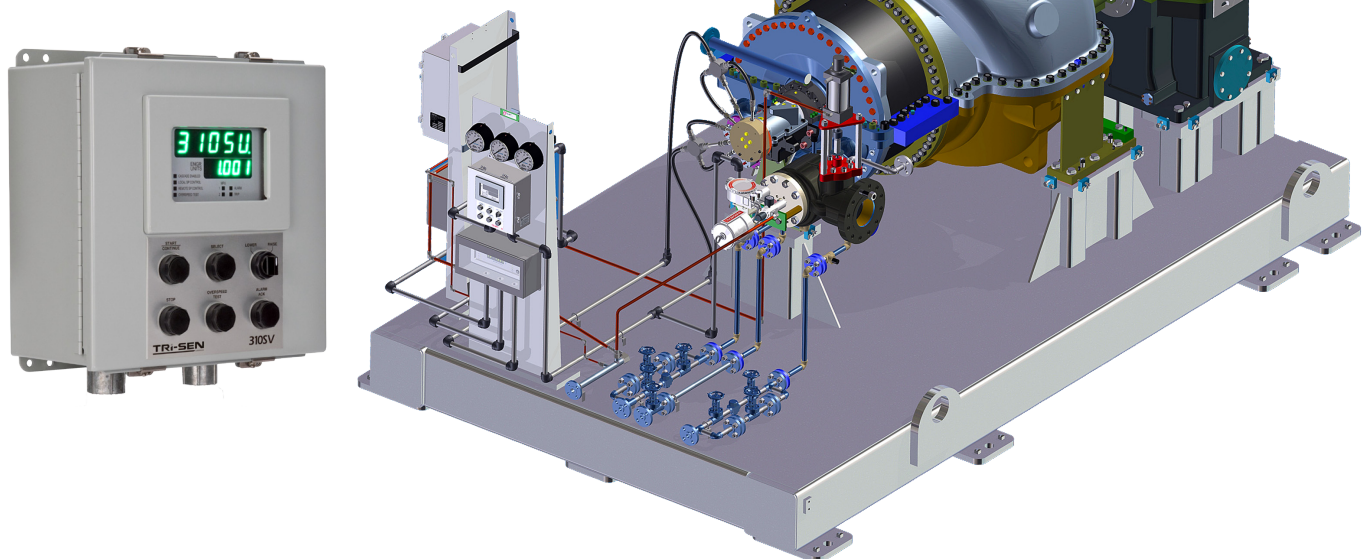
■ INTEGRATED PROCESS CONTROLS

Elliott customers gain a full scope of rotating machinery excellence integrated with advanced turbomachinery controls in one package. Elliott Group and Tri-Sen Systems strategic alliance provides Tri-Sen control systems as standard offerings with all Elliott compressors and turbines, in both new project and installed equipment. Customers benefit from a single-point of contact – no longer addressing software issues, turbomachinery component questions and retrofit applications separately. Additional benefits include Elliott Global Service's enhanced capability to upgrade and modify aging controls plus site evaluations that can provide anticipated efficiency gains as well as financial justification for a governor upgrade.

■ SINGLE-VALVE GOVERNOR – 310SV

This fully integrated and configurable controller is designed to handle start up and protect API-611 or noncritical API-612 single-valve mechanical drive steam turbines. In addition to speed control, the 310SV provides cascade control for regulating process variables such as suction/discharge pressure flow or inlet discharge steam pressure.

- ♦ 310SV Governor
- ♦ Pneumatic Direct-connected Trip
- ♦ Timing gear with 6 MPUs
- ♦ Valtek Logix 3200MD positioner
- ♦ Turbo-Sentry voting overspeed detection
- ♦ Redundant Control System (RCS) – controls pneumatic air supply for trip-system cylinder



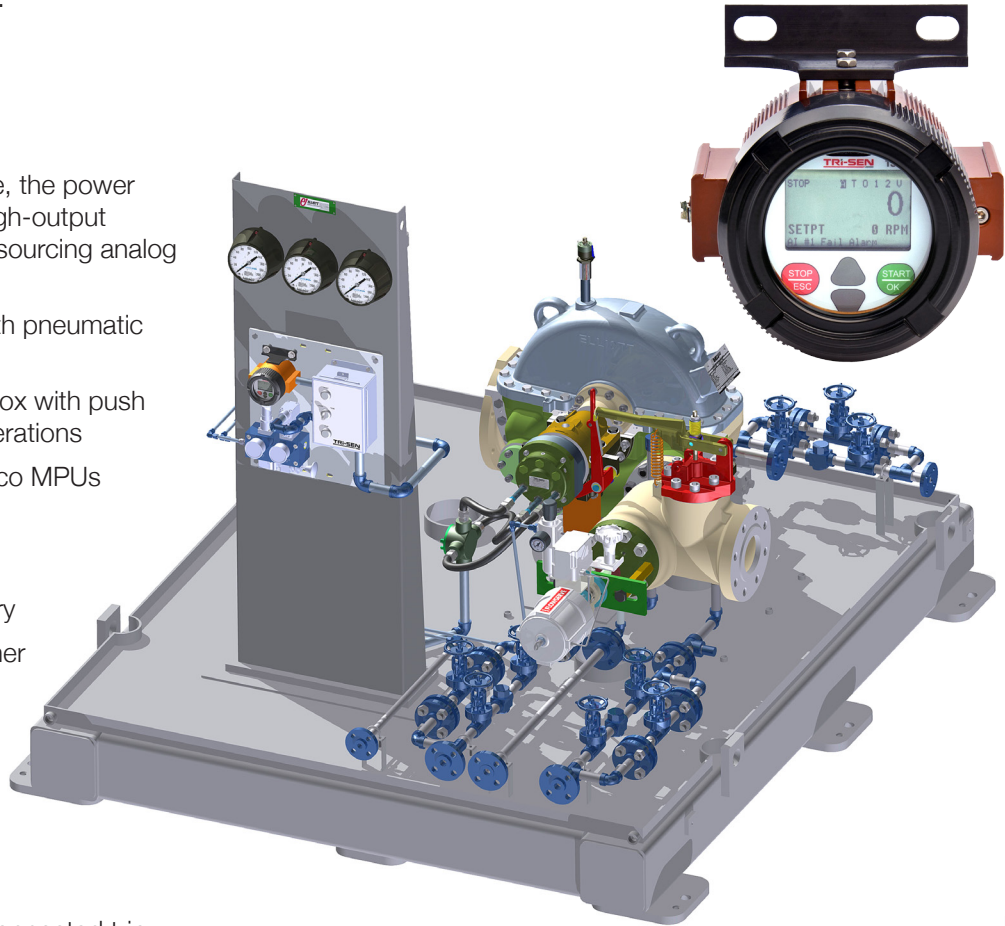
■ SELF-POWERED DIGITAL GOVERNOR – TS300

The TS300 is a compact, self-powered digital controller providing automatic startup and speed control for API-611 single-valve general-purpose steam turbines driving a mechanical load. Options include aluminum or stainless steel explosion-proof housing. The TS300 is available in either self-powered with a battery backup or external power mode.

No Electrical Power

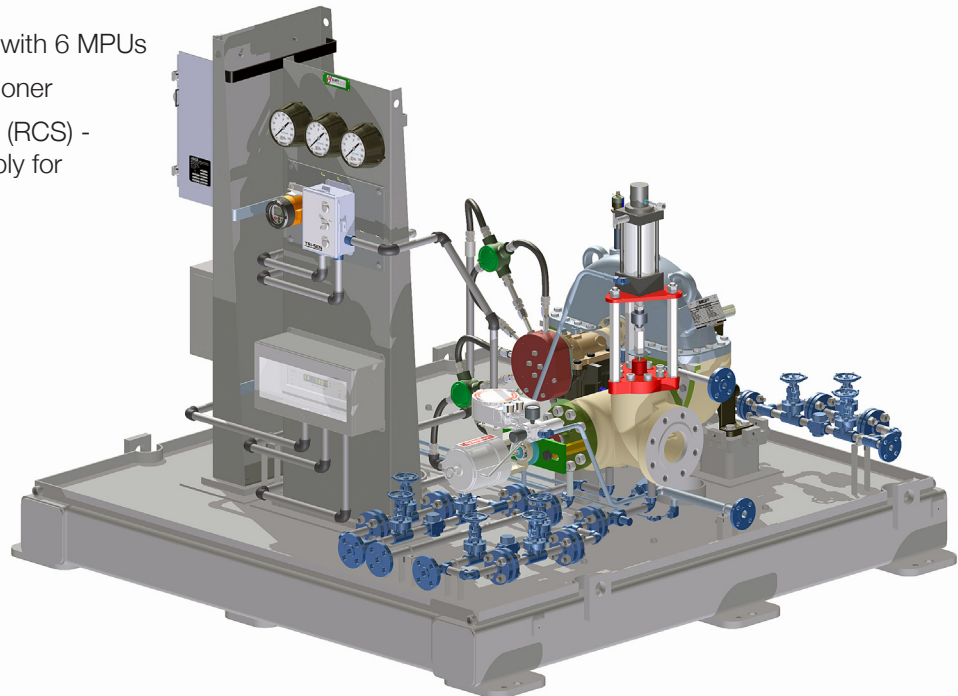
In self-powered mode, the power is derived from the high-output magnetic pickups or sourcing analog input.

- ◆ TS300 governor with pneumatic start-up assist
- ◆ Lockable junction box with push buttons for field operations
- ◆ MG10 with 3 Dynalco MPUs
- ◆ Mechanical trip
- ◆ Low-powered I/P
- ◆ 10-year LiON battery
- ◆ Valtek Beta Positioner



Electrical Power

- ◆ TS300 governor
- ◆ Pneumatic Direct-connected trip system
- ◆ Elliott standard timing gear with 6 MPUs
- ◆ Valtek Logix 3200MD positioner
- ◆ Redundant Control System (RCS) - controls pneumatic air supply for trip-system cylinder
- ◆ MG10





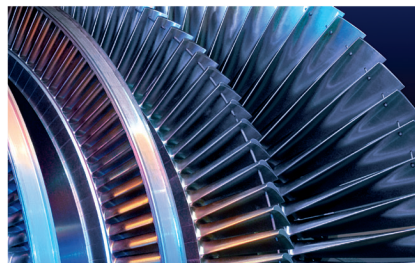
Elliott Group is a global leader in the design, manufacture and service of technically advanced centrifugal compressors, steam turbines, power recover expanders and axial compressors used in the petrochemical, refining, oil & gas and process industries, as well as in power applications. Elliott Group is a wholly owned subsidiary of Ebara Corporation, a major industrial conglomerate headquartered in Tokyo, Japan.



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