

PROVEN STEAM TURBINE CONTROL SOLUTIONS: ANY SIZE, ANY APPLICATION

Simple | Reliable | Safe | Precise | Proven

TURBOMACHINERY CONTROL EXPERTS

Turbines | Compressors | Safety | Actuation

WOODWARD

CONTROL SOLUTIONS



SMALL MECHANICAL DRIVE TURBINE APPLICATION

Peak 200

- Large speed band
- Plant DCS interface
- First-out indication
- Integrated HMI
- Header pressure control

TG Governor

- Simple governor
- Overspeed test function





MEDIUM MECHANICAL/GENERATOR DRIVE TURBINE APPLICATION

505 / 505XT

- Auto-start sequence
- Header pressure control
- First-out indication
- Optional single extraction Control
- Integrated HMI
- OptiTune PID “auto-tune” technology

CRITICAL MEDIUM MECHANICAL/GENERATOR DRIVE TURBINE APPLICATION



5009FT

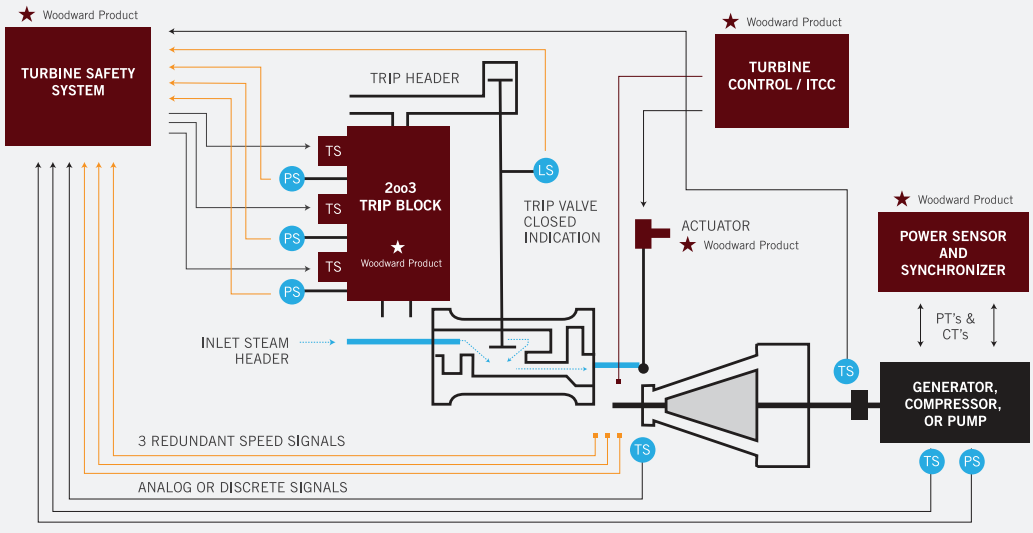
- Triple modular redundant (99.999% availability)
- Auto-start sequence
- Header pressure control
- First-out indication
- Optional single extraction control

MEDIUM-LARGE MECHANICAL/GENERATOR DRIVE TURBINE APPLICATION



Micronet Plus

- Custom site specific control logic
- Custom redundancy – architecture and I/O
- Custom number of inputs & outputs
- Custom user interfaces



INTEGRATED SYSTEM APPROACH

Woodward designs its line of steam turbine control products to be easily integrated together, simplifying system design and assuring unit-to-unit compatibility. This integrated approach reduces installation costs and allows customers to scale their system components to meet the requirements of small, medium, or large steam turbine applications.

FIELD PROVEN

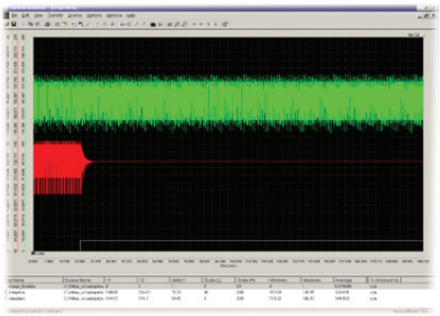
With over 40,000 steam turbine controllers installed worldwide, Woodward's control systems have been proven to stand up to harsh steam turbine environments, as well as meet the rigorous control requirements of steam turbine OEMs and users.

Robust product designs are leveraged to ensure long-term operation, no matter what the environment or application.

PRECISE

Purpose-built for steam turbines, Woodward's powerful controllers have the performance and accuracy required for today's steam turbine applications. Steam turbine OEMs utilize Woodward's turbine controllers to ensure their packages meet steady-state stability and fast transient responses required by petrochemical plant processes and utility grid regulatory commissions.

Low rotor inertias of smaller steam turbines pose controlling problems for general purpose PLCs (programmable logic controllers), but not for Woodward controllers. Their deterministic architecture and model-based algorithms were designed in collaboration with steam turbine manufacturers to ensure the required performance and stability at all levels of operation.



SIMPLE INTERFACING

As petrochemical and power plants continue to grow in size and complexity, steam turbine operators have found that they cannot be experts on every system, including the steam turbine controller. For this reason, Woodward has put extra focus on ensuring that our user interfaces are simple to understand and use.

Our goal is to make the controller's user interface start, stop, and troubleshoot their turbine without opening a product manual.

OEM QUALIFIED

OEM control system qualification is a stringent process in which details of the control system design, architecture and performance are carefully scrutinized and tested to ensure that OEM turbine performance requirements are met. Qualification includes verification of I/O signal processing accuracy, software algorithms, and control system execution that meet OEM requirements.

Control System Qualifications			
Ready State Stability	✓	Hazardous Location Rating	✓
Load Step Performance	✓	Competitive Cost	✓
Product Robustness	✓	Global Support	✓

CONTINUOUS INNOVATION

Woodward released its popular 505 steam turbine controller in 1985 which now has become the industry standard in steam turbine control. This standard off-the-shelf controller was purpose-built for small- to medium-size steam turbines driving generators, pumps or compressors.

The latest 505 controller models contain many new features that improve reliability and performance including:

- Integrated full color HMI for complete turbine visibility
- OptiTune "auto-tuning" PID for optimum performance
- Generator load rejection anticipation logic
- Three critical speed avoidance bands
- Auto-start routines based on turbine temperature
- Compressor "Performance Control" de-coupling logic
- Plant boiler loss protection control
- Dual-Redundant capability (2 Master/Slave based 505's)



Woodward 505 / 505XT

GLOBAL SUPPORT

Woodward's global support network and our turbomachinery OEM partners provide an extensive range of technical and after-sales support services. This global presence allows us to respond quickly to the needs of our customers anywhere in the world. In today's complex control world, customers have come to recognize our people's expertise beyond the control system and depend on our global teams as critical plant support assets.

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CONTENT

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