

# COMPRESSOR CONTROL AND PROTECTION

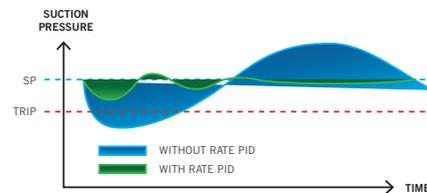
Field Proven Across the Globe



## REDUCE SYSTEM DEVELOPMENT AND COMMISSIONING TIME

For over 145 years, Woodward has been collaborating with OEMs and end users to provide the technology, application expertise and support that you've come to trust from a market leader. Our field-proven prime mover and compressor controls and protection technologies are safely operating some of the world's largest compression systems. And, many major compressor manufacturers incorporate Woodward systems into their equipment.

Our integrated turbine-compressor and motor-compressor control systems maximize availability and performance in up-stream, midstream and downstream oil and gas applications, helping owners run their compression systems and process at peak efficiencies. All of our systems meet industry standards for machinery control and safety, and are fully tested in a dynamic simulation environment—enabling you to reduce both system development and commissioning time.



## COMPRESSOR CONTROL

The MicroNet® Plus—simplex, dual redundant and the MicroNet® TMR—architecture and diagnostic coverage voted 2-out-of-3 combine to create a system with more than 99.99% availability and 99.999% reliability. The MicroNet ensures that correct and intelligent decisions are made, timely and precise responses are performed, and the prime mover and compressor always operate safely no matter the single point of failure.

## COMPRESSOR SAFETY

The new API670 standards require a total systems approach to meet the safety levels required in the industry. Woodward is a leader in delivering steam turbine and compressor safety systems to meet these new standards. From compressor surge detection, to lube oil, seal gas and suction scrubber level protection, our safety systems are powerful, reliable, easy to use, and flexible for your operating environment.

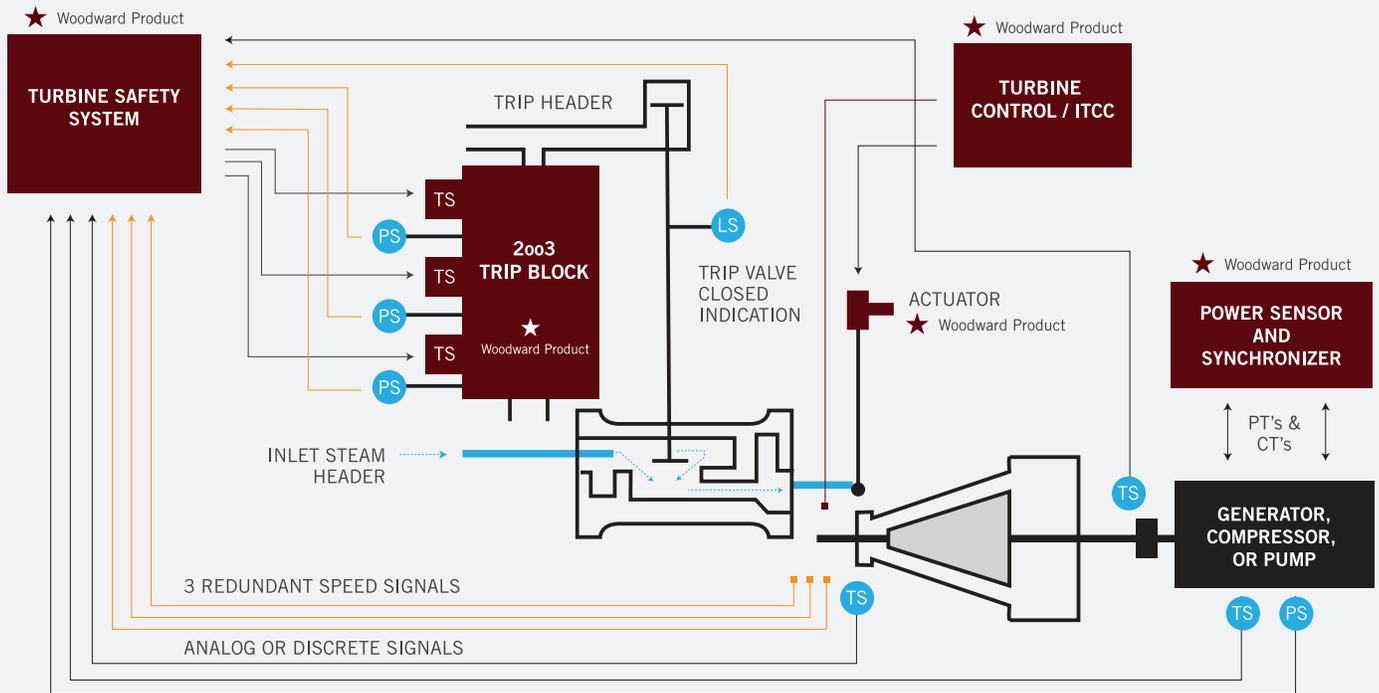
## ADVANCED TECHNOLOGIES

Woodward has developed surge preventive techniques that help compressor users achieve peak performance of their process and minimize process disturbances. All our solutions are modeled in our advanced dynamic simulation program (NetSim) before being implemented in the control systems. Woodward's patented rate PID algorithms provide anticipative opening of anti-surge valves during process upsets to minimize overshoots and allow safe operations with minimal safety margins. Compressor turndown is maximized and higher product yields are achieved.



TURBOMACHINERY CONTROL EXPERTS  
Turbines | Compressors | Safety | Actuation





## 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.

## 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.

## GLOBAL SUPPORT

### Colorado:

coloradofieldservice@woodward.com  
+1 970-498-3609  
turbinehelpdesk@woodward.com  
+1 970-482-5811, option 7

### Brazil:

vendas@woodward.com  
+55 19 3708-4800

### Europe:

fieldservice.europe@woodward.com  
+31-23-5661257  
helpdesk.europe@woodward.com  
+31-23-5661239

### China:

fieldservice.china@woodward.com  
+86 (512) 8818 5515  
helpdesk.china@woodward.com

### Japan:

fieldservice.japan@woodward.com  
+81-43-2132198  
helpdesk.japan@woodward.com

### India:

fieldservice.india@woodward.com  
+91 (129) 409 7100  
helpdesk.india@woodward.com  
+91 (124) 439 95330

### Middle East

fieldservice.middle-east@woodward.com  
+971 26267 929  
Saudi, +966 135 107 900

### Russia

fieldservice.russia@woodward.com  
+7 812 319 30 07