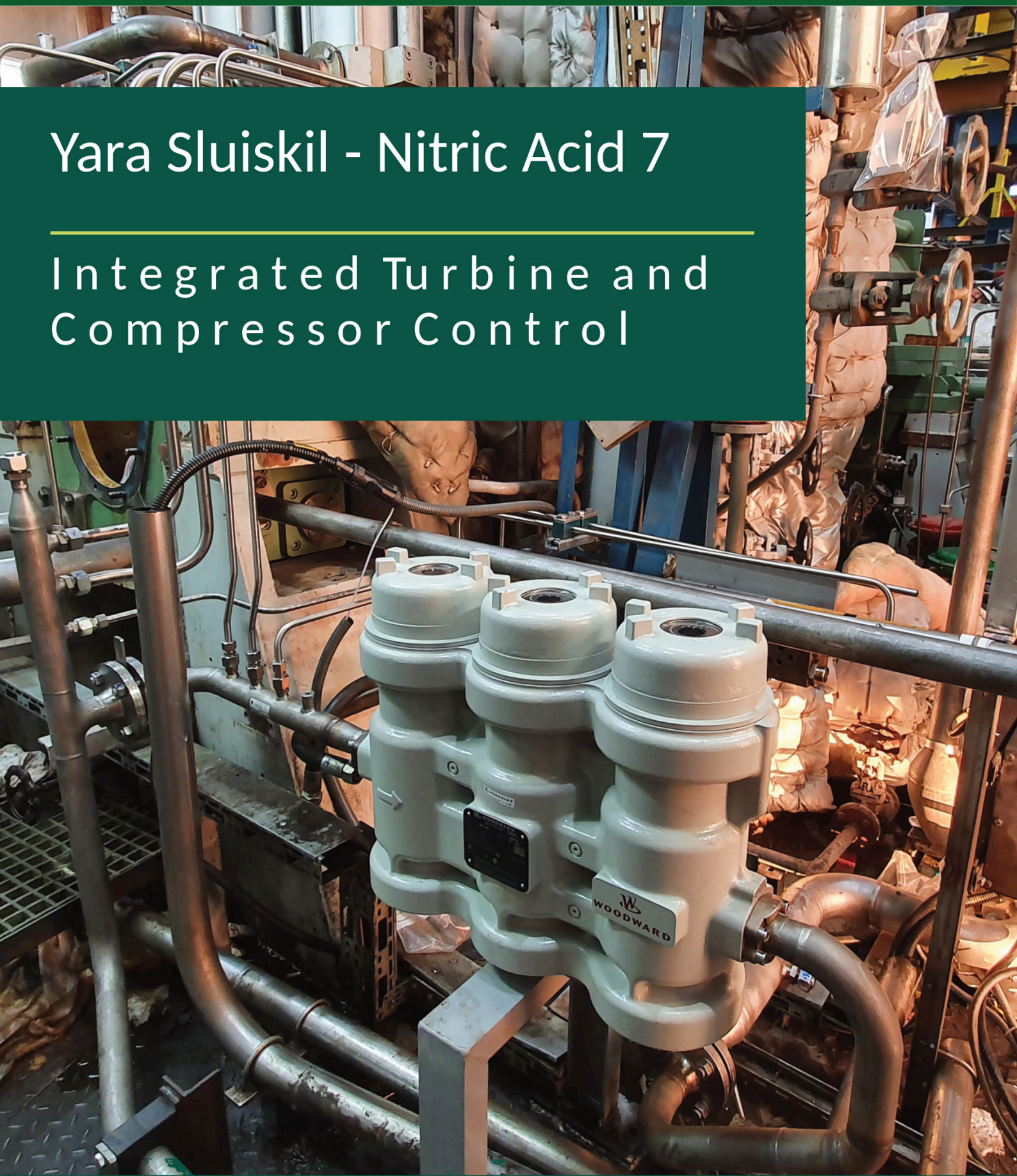
TURNER ENERGY CONTROL SOLUTIONS

WOODWARD Business Partner

December 2021

Yara Sluiskil - Nitric Acid 7

Integrated Turbine and Compressor Control



Introduction

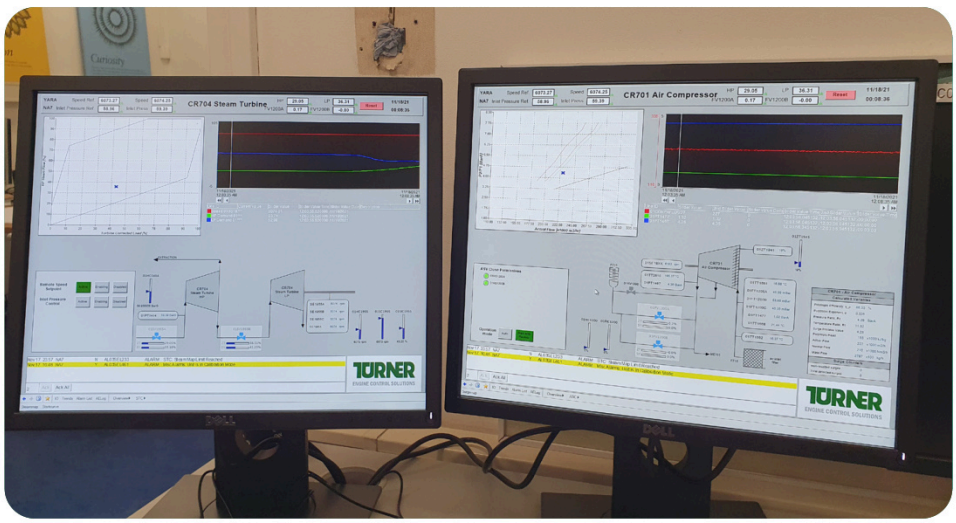
Based on a decade long relation following several steam turbine controller, actuator and trip system retrofits, Yara Sluiskil awarded Turner ECS the order to integrate and modernize the complete control of their Nitric Acid compressor train. Previously consisting of a separate steam turbine controller, compressor surge prevention controller and compressor surge detector, all functionality has now been integrated into a single control system based on Woodward's MicroNet Plus hardware platform with a dedicated HMI system. In addition to the control system Turner has also teamed up with Bobach to install Woodward's QuickTrip hydraulic trip block, Voith I/P converters and surge bottles. The installatin scope includes cabling, junction boxes and the prefabricated piping and pedestals required to hook up the new hydraulic equipment.

FEATURES

- Integrated turbine and compressor control
- CPU redundancy
- Power supply redundancy
- I/O redundancy
- 2-out-of-3 voted trip block
- Triple redundant surge detection

SOFTWARE

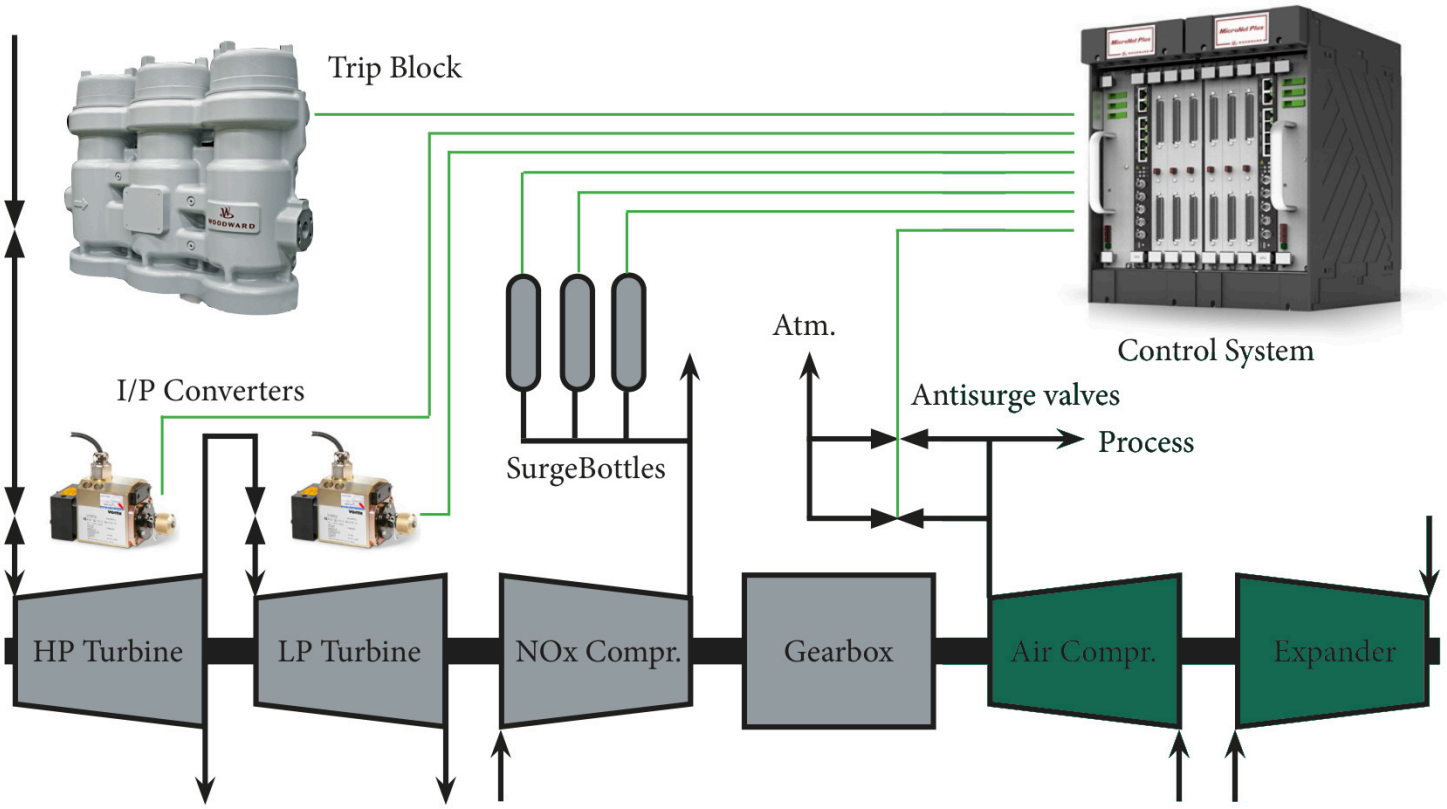
- Single extraction steam turbine control
- Anti-surge control and surge detection
- Anti-choke control and choke detection
- Compressor loading/ unloading
- Cause & Effect alarm and trip handling



FACT SHEET

Turbine:	MAN Turbo
Rated power:	8565 kW
Rated speed:	6405 rpm
Compressor:	NOx / air
Industry:	Fertilizer
End-User:	Yara
Location:	Sluiskil
Country:	Netherlands

System Overview



Trip Block

Woodward's QuickTrip is a 2-out-of-3 voted trip block that cuts the oil to the steam turbine's trip valve when at least two of its solenoids are de-energized. This means that field repair, testing and replacement is possible during operation. The QuickTrip uses high torque rotary spool valves that are able to close off the trip oil line regardless of the condition of the oil.

Surge Bottles

Three surge bottles with pressure difference transducers are used as triple redundant surge detectors. Each bottle delays the measurement of the discharge pressure using a needle valve and the bottle itself as buffer. This delayed measurement is compared to a direct measurement and the pressure difference indicates if a surge condition has occurred.

Control System

Woodward's MicroNet platform is an industry standard module-based control system for critical applications. The platform features CPU, power supply and I/O redundancy and executes its application software at pre-deterministic scan rates as fast as 200 times per second. The software used for this application is based on Turner ECS' own Total Train Solution.

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Turner Range of Services

LSTK Projects, Retrofits & Upgrades
Turner ECS delivers reliable retrofit solutions for a wide range of prime movers and other applications. This includes lump sum turnkey projects on turbines and compressors.

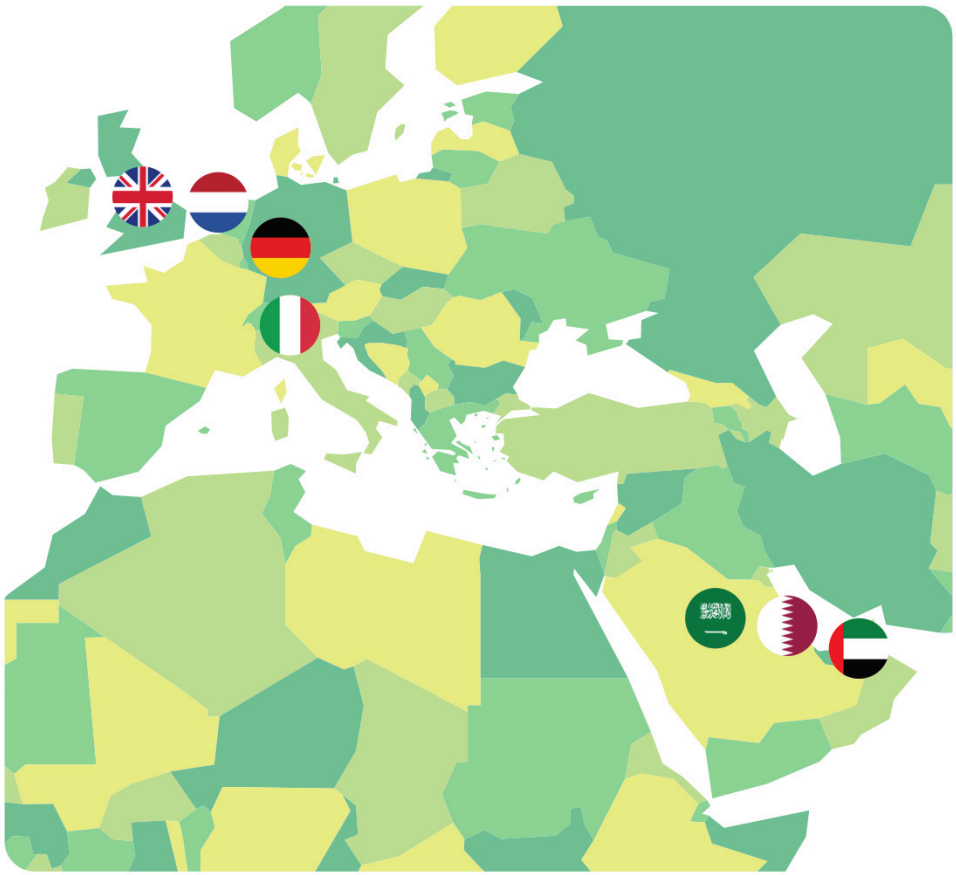
Genuine Parts & Service Exchange
Turner ECS has the largest stock of parts, service exchange governors and electronics in Europe and can provide a fast turnaround service.

Product Training
Turner ECS can provide official Woodward product training covering both theoretical and practical training on a wide range of Woodward products.

Electronic Repair & Mechanical Governor Overhaul Service
Turner ECS provides a comprehensive overhaul and repair service for electronic, mechanical and hydraulic governors.

World Wide Field Service
Turner ECS field service engineers and technicians provide comprehensive solutions for commissioning and on-site repair.

Service Contracts
Turner ECS provides long term service contracts to support users with Woodward governors and/or control products and electronic control systems.



ROTATING EQUIPMENT CONTROL SOLUTIONS DELIVERED ACROSS EUROPE & THE MIDDLE EAST

Turner ECS is an official Woodward Channel Partner with offices located in:

- The Netherlands
- England
- Germany
- Italy
- Abu Dhabi
- Qatar
- Saudi Arabia

Turner ECS also operates and manages an extensive network of official agents throughout Europe & the Middle East

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