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LM2500 SAC

Gas Turbine Control Upgrade





Introduction

At a large oil refinery in Germany, two LM2500 SAC gas turbines drive the generators responsible for powering the refinery. When the original gas turbine control (Netcon 5000) installed in 1996 was in need of replacement, Turner ECS was chosen to program and assemble the new control panels based on Woodward's MicroNet Plus hardware, guaranteeing supportability for at least 20 years to come.

Control and Protection

Besides replacing the control system, introducing enhanced CPU power as well as CPU and power supply redundancy, several protection systems were replaced as well:

- The Jaquet overspeed system was replaced by Woodward's ProTech SX SIL-2 rated protection system
- The Vibrometer machine monitoring system was replaced by the industry standard Bently Nevada 3500.

RETROFIT PROJECT

PROJECT HIGHLIGHTS

- Software conversion
- Gas turbine simulation
- New panel design
- In-house panel assembly
- FAT at Turner ECS, NL
- Installation planning

INSTALLATION & COMMISSIONING

- Removal of old cabinet
- Installation of new cabinet
- Complete I/O checks
- Software configuration
- Calibration
- Start-up support



ProTech SX

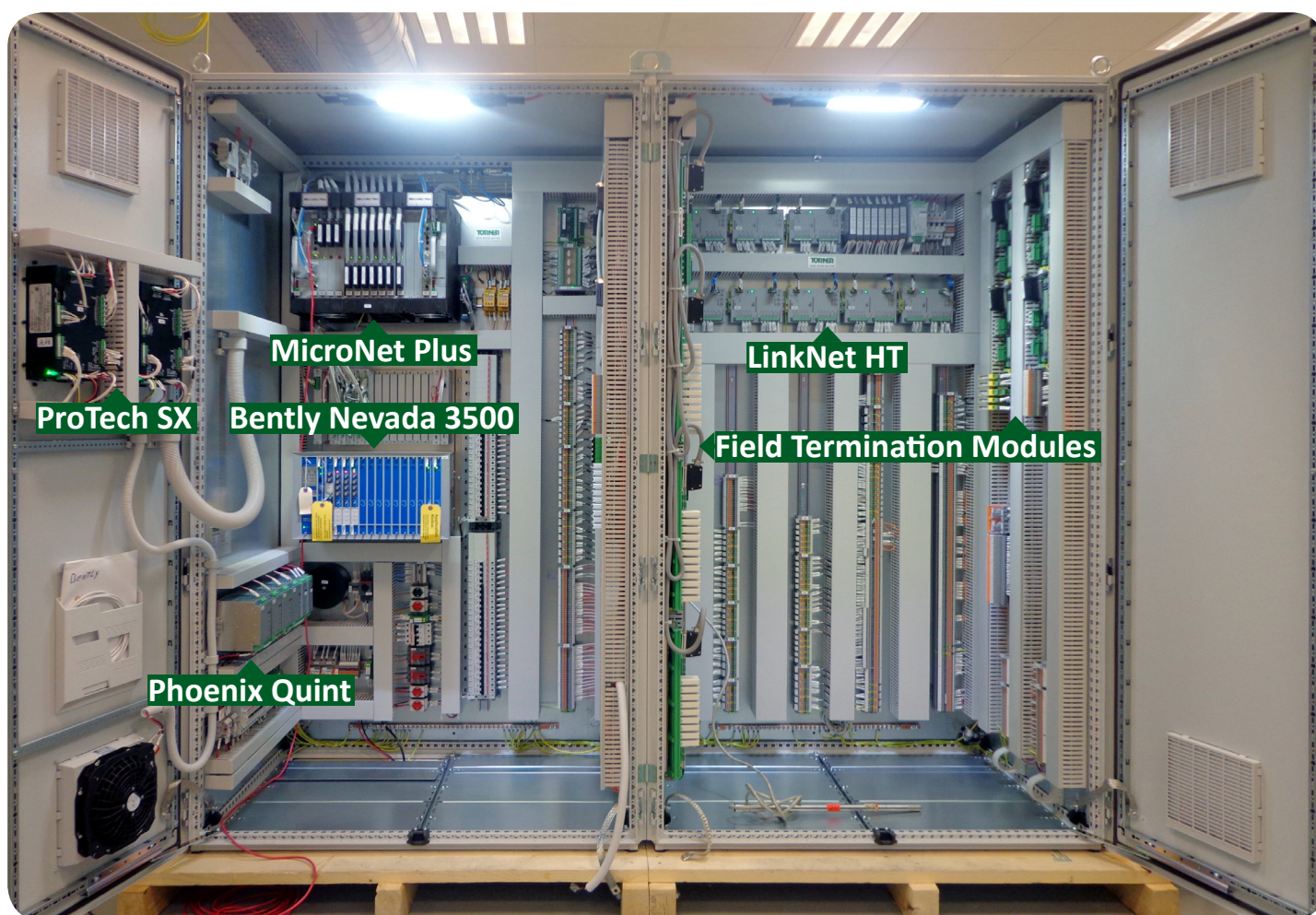
Panel mounted SIL-2 rated overspeed protection systems protect the gas turbine from break away of both the gas generator and the power turbine.

MicroNet Plus

At the heart of the system, this versatile redundant control system functions as core fuel controller, sequencer, auxiliaries controller and alarm system.

LinkNet HT

CANopen based distributed I/O network that functions as extension of the MicroNet Plus system, designed for use in high temperature and high vibration environments.



Phoenix Quint

24VDC power supplies provide redundant power to all auxiliary components by means of summing diodes.

Bently Nevada 3500

Machine monitoring system detecting and preventing both missed-trips and false-trips on the gas turbine.

Field Termination Modules

Hardwired to the MicroNet Plus control system, providing deterministic scan times as fast as 5 ms.

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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