Application Note

Experion PKS Turbomachinery Control Solution

Extraction Steam Turbine Control

Introduction
Since 2002 Honeywell has been providing Turbomachinery controls to our customers on the Experion® PKS platform, meeting basic and advanced control requirements in the Refining, Pulp & Paper, Oil & Gas and the process industries. The control platform has since evolved whereby Experion® today is a powerful and attractive alternative to proprietary OEM and purpose-built Black Box turbine and compressor control solutions.

From the beginning the Experion® PKS Turbomachinery Control Solution was designed and built specifically to meet the unique and demanding requirements of Turbomachinery equipment. Experion® PKS Turbomachinery Control Solution can today be found on hydroelectric turbines, utility grade gas and steam turbines, and gas and steam turbine-driven centrifugal compressor sets. Not only is Experion® controlling the turbines, but it also handles all turbine, generator, and compressor auxiliaries as well as the balance of plant controls in a single easy to use, easy to maintain system. A few systems are even controlling turbines remotely from a central location.

Turbomachinery Control Solution
Experion® Turbomachinery Control Solution (TCS) has a dedicated controller and specialized I/O to handle the application-specific field devices found on turbines including speed probes, valve feedback from rotational or linear differential transformers, and outputs to servo valves. This specialized I/O is designed for signal conditioning requirements found only on Turbomachinery equipment. With the Experion® PKS Series C I/O, Speed Protection Module and Servo Valve Positioning Module these signals can be brought directly into the control system without the need and cost for separate signal converters and additional excitation power supplies.

Speed Protection Module
Experion® Speed Protection Module (SPM) performs high-speed processing of all the on-board I/O. Unlike the standard Experion Series C I/O, the SPM has a mix of analog inputs and outputs, digital inputs and outputs, and speed probe inputs. The SPM module includes (4) speed/pulse inputs, (8) analog inputs, (1) analog output, (8) digital inputs, and (5) digital outputs. The 4 on-board speed inputs can use both active and/or passive probes. This module also performs a 2oo3 voting logic of the speed inputs to protect the turbine from an over-speed event. Additional inputs and outputs are dedicated to equipment monitoring and interlocking. Wires are terminated on the Input / Output Termination Assembly (IOTA) which can handle redundant SPM modules for increased control availability and safety.

Servo Valve Positioning Module
Experion® Servo Valve Positioning Module (SVPM), like the SPM has high speed processing of the on-board I/O. This I/O includes (2) analog inputs, (2) digital inputs, (2) analog outputs, and (2) Linear/Rotational Variable Differential Transformer (LVDT/RVDT) inputs. Signals from the valve positioning LVDT/RVDT inputs and the servo valve outputs can be connected directly to the SVPM without the need for signal conditioners thus eliminating a point of failure. The SVPM on-board PID allows precise positioning of the turbine valves which in turn allows precise speed control of the turbine. Wires are terminated on the Input/Output Termination Assembly (IOTA) which handles redundant SVPM modules for increased control availability and safety.

Extraction Steam Turbine Control
This application of Experion® PKS utilizes the Turbomachinery Control Solution for the control of condensing or back-pressure extraction steam turbines driving either generators or mechanical loads such as fans, pumps, or compressors.. Whether your application is in a refinery, chemical plant, steel or a pulp & paper mill, Experion can handle your turbine application. No matter if your application is a single or multi-valve turbine configuration driving a generator with extractions for process
steam, Experion is the perfect fit. The totally integrated Experion PKS solution combines turbine speed control and load control into a single control system. Experion provides operators with all the information they need without having to log into another system to view data not available on the DCS or for the need of unreliable interfaces between the two dissimilar systems.

From start/stop commands to compressor curves, from steam valve calibration to testing of the trip systems, all the information operations and maintenance personnel need is available at the click of a button.

Turbine speed is important and prevention of an over-speed condition of the turbine is as vital to the application as is the prevention of centrifugal compressor surge. As process conditions change Experion provides real-time displays of the turbine, generator and compressor maps being able to view the turbine, generator, or compressor map from Experion makes operator decision making process easier and faster.

Experion PKS is a totally integrated control solution, providing fuel and generator control, compressor anti-surge control and performance control all in a single easy to use, easy to maintain system. Operators can readily access the information they need via Experion displays without the distraction of multiple control systems.

**Operator Stations and Local Operator Panel (LCP)**

Operational view to the process is an absolute must. With Experion® that view can come in a variety of configurations from Console Stations to Flex Stations to simple push buttons and indicators on a Local Control Panel (LCP).

Graphics on these stations can present a variety of information to the operator. From controller faceplates to trending of the process variables and gate position, all are available via Experion.

**Benefits**

Honeywell’s Experion PKS Turbomachinery Control Solution provides a totally integrated turbine and balance of plant controls solution on a single control system platform; benefits include:

- Integrated Turbine/Generator Control
- Automatic Turbine Start-up and Shut Down
- Better Coordination of various plant subsystems
- Common hardware/software platforms
- Common pool of maintenance spares
- Common engineering, diagnostic, and documentation tools
- Common operator interface for the entire plant
- Ease of operation and training
- Effective and consolidated data reporting and archiving
- Online Testing of valves and trip devices
- Over-speed Protection
- Turbine Interlocks

The Experion PKS Turbomachinery Control Solution facilitates the complete, effective and seamless integration of turbine and/or generator control functions and eliminates the need for proprietary “black box” solutions. The control performance and cost and efficiency improvements enabled by Experion result in enhanced Return on Investment for your operation.

**For More Information**

Learn more about how Honeywell’s Solutions visit our website [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell account manager.

**Honeywell Process Solutions**

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