General Specifications

Model NTPC030
Exaquantum Power Performance Calcs

Exaquantum

GS 36J40D10-01EN

■ PROBLEM

Measuring efficiency in Coal Fired and Combined Cycle Power Plants is a difficult process and incorporates a number of departments including Management, Operations and Maintenance.

To better optimize plant performance, there are a number of complex and difficult calculations, estimates and measurements that need to be configured. Gathering all this data into a single and configurable interface is difficult and error-prone.

■ SOLUTION

Exaquantum Power Performance Calcs (Exaquantum/ PPC) is an American Society of Mechanical Engineers (ASME) compliant power performance calculation package suitable for power generation and process plants to determine the efficiency of plant equipment for Coal Fired and Combined Cycle Power Plants.

The performance calculations provided include the measurement and estimation of parameters for the derivation of plant efficiency and equipment heat rate calculations found in a typical power station.

The resulting information can be used as an indicator of the plant's operational efficiency and facilitates optimized plant operations.

■ BENEFITS

• The combination of Exaquantum/PPC embedded within an Exaquantum Plant Information Management System (PIMS) provides a powerful, integrated and cost-effective platform for collecting critical power plant information from various sources. The resulting performance information is made available across the business to users in operations, management and maintenance.

• The calculation summary can be provided to any user with access to the Exaquantum/PPC server. If a Yokogawa DCS is present, Exaquantum/PPC can be displayed on Yokogawa DCS HIS stations to provide operation personnel with the necessary information to take corrective actions to optimize efficiency.

• The Exaquantum/PPC 'What-If' tool allows different input scenarios to be tested to determine the viability of cost reduction and performance improvement initiatives.

■ KEY FEATURES

• Exaquantum/PPC processes real-time process data from a Process Control System(s) via an OPC DA interface. This open standard interface makes the gathering of process data easy to configure and maintain.

• Validation of tag (data point) names for erroneous entries and/or non-existent tags are clearly identified, enabling simple correction by the Exaquantum/PPC administrator.

• The acquired data is also subjected to tag quality checks (Good/Bad/Uncertain including IOP) enabling calculations where the source value quality check has failed to be clearly highlighted.

• Exaquantum/PPC includes a powerful expression equation builder to provide users with the ability to define and refine their calculations and/or constants. The expression builder syntax allows for both simple and comprehensive calculation definitions. For curves, such as ideal equipment performance curves, degradation curves, etc., 2D and 3D curves can be defined using Microsoft Excel and imported into a calculation.

• Users can access steam table routines from the Expression Builder. Steam data is in accordance with IAPWS-IF97.

• A user can manually enter process data, LIMS data, etc. for use by Exaquantum/PPC calculations.

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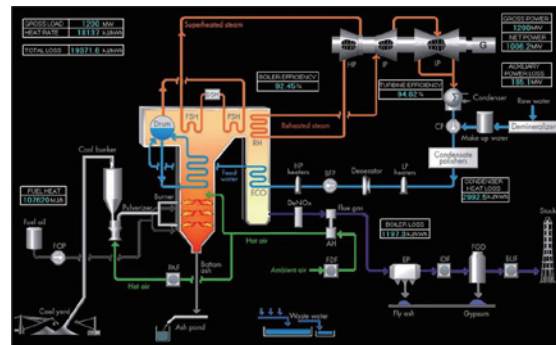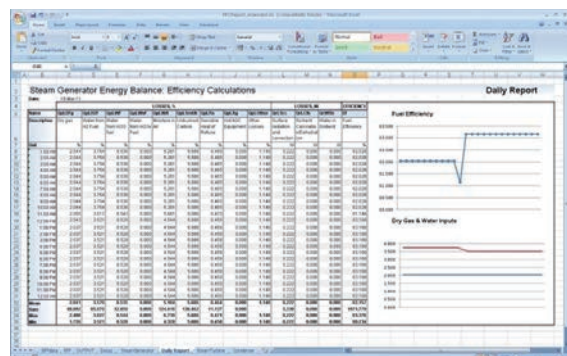
User Configurable Data

Users can use Microsoft Excel to add the following.

- Custom functions based on 2D or 3D curve data in order to represent, for instance, equipment performance curves, degradation curves, etc.
- Custom Units of Measure.

Once configured, the information is exported into Exaquantum/PPC using the supplied Microsoft Excel add-in.

What-If and Recalculation Capability

Users can manually change input values to view the derived results to simulate the effect on plant performance. This facility also allows for the correction of bad data in reports.

■ CALCULATIONS

Exaquantum/PPC supports Coal Fired and Combined Cycle Power Plants, and is adaptable to other power plant types by incorporating ASME compliant calculations, curves, etc. to vary with plant capacity, equipment characteristics and power plant type (thermal, combined cycle, etc.).

Templates are provided for all power performance calculations to simplify and reduce configuration time. These templates are constantly evolving and an up-to-date list can be supplied upon request.

Exaquantum/PPC uses aggregated process data to improve power calculations accuracy through all inputs being 'time coherent'.

The following calculation methods are employed.

Heat Loss Method Efficiency Estimation

The heating value of the fuel is estimated from the laboratory analysis allowing the losses in the steam generator to be estimated. The efficiency of the boiler is then calculated by deducting the sum of all the losses from the heating value.

Input/Output Method Efficiency Estimation

The heat supplied to working fluid and heat supplied to the steam generator is computed to estimate the following.

- Air heater performance
- Economizer performance
- Feed water heater performance
- Turbine performance
- Heat rate
- Condenser performance
- Steam generator performance
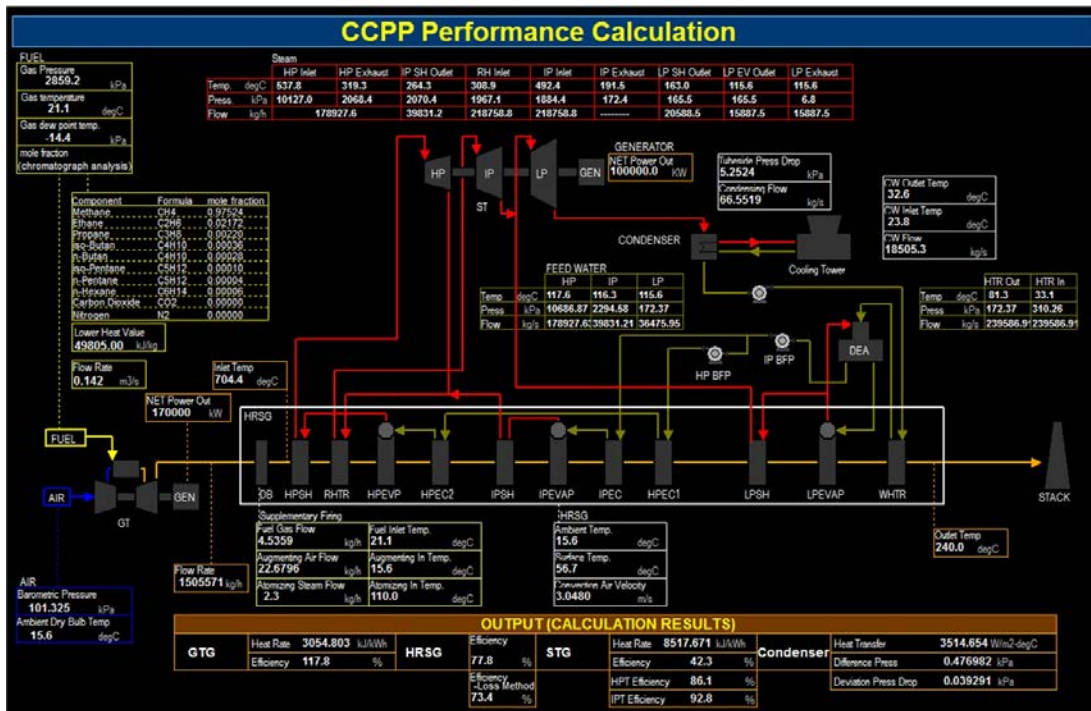
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■ HARDWARE AND SOFTWARE REQUIREMENTS

Minimum Hardware and Software Specifications

Component	Minimum Hardware and Software Specification
Exaquantum/PPC Server	Exaquantum/PPC must be installed on an Exaquantum server. For detailed specification information, refer to the following description in "Exaquantum GS (GS 36J04A10-01E)." Hardware: ● Hardware Operating Environment "Exaquantum Server" Software: ● Software Operating Environment "Exaquantum Server" For detailed supported revision, please refer to "GS 36J40W10-01EN."

If PPC will be installed on a different version of Exaquantum, please contact Yokogawa for assistance.

■ MODELS AND SUFFIX CODES

Exaquantum/PPC Product

		Description
Model	NTPC030	Exaquantum/PPC Product
Suffix Codes	-S	Basic Software License
	1	New Order (with Media)
	1	English version
	-SA1	Exaquantum/PPC Standalone Server License
	-UP1	Exaquantum/PPC Upgrade Server License
	-AD1	Exaquantum/PPC Add-on Server license

Maintenance Service for Exaquantum/PPC

		Description
Model	SV3NTMC030	Maintenance Service for Exaquantum/PPC
Suffix Codes	-S	Annual Contract
	1	Always 1
	1	Always 1
	-SA1	Exaquantum/PPC Standalone Sever AMC
	-UP1	Exaquantum/PPC Upgrade Server AMC
	-AD1	Exaquantum/PPC Add-on AMC
	-N	New
	-R	Renewal

■ ORDERING INFORMATION

Specify the model and suffix codes.

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