# Burner Management System Solutions

Features

- Critical safety signals are wired as redundant I/O for maximum boiler safety
- An interlock sequence ensures correct completion of boiler air purge and satisfies safety permissives before fuel firing, preventing operator error
- Continued monitoring of boiler conditions actuates a safety shutdown trip if unsafe conditions develop
- Operator maintains control capabilities from the operator console or burner front pushbutton stations
- Detailed first-out indications for easier troubleshooting are provided for individual pieces of equipment including burners, pulverizers, igniters, and more
- Adheres to NFPA 85 requirements
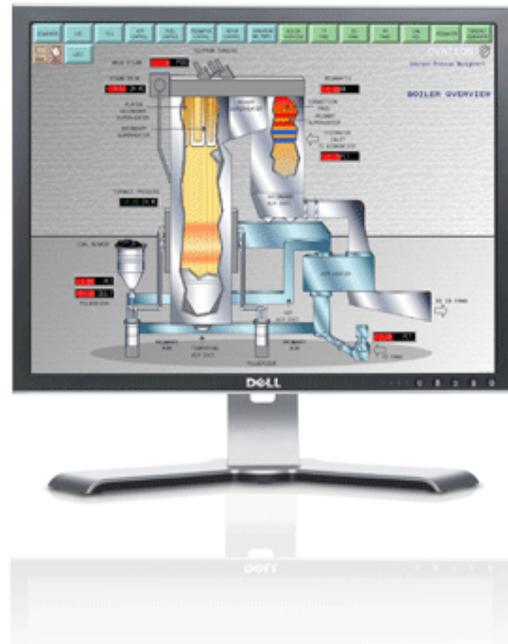
Overview

Since prevention of loss ranks high on the list of priorities for any plant, Emerson focuses on maintaining unit availability and stresses the importance of protecting our customers' employees and assets.

Safe operation of any boiler is dependent upon the proper design of a burner management system (BMS) including furnace purging, main burner ignition, scavenging of unburned fuel during a shutdown sequence, flame monitoring, and more. Emerson's burner management solution enhances the safe startup, operation and shutdown of a boiler by paying meticulous attention to design of these components in the system. By implementing our BMS solution, customers will be able to easily place burners and igniters in and out of service and monitor furnace conditions.

Emerson's BMS Solution

Emerson provides customized BMS logic that protects equipment investments and provides the ability to expand as future needs arise.

Our burner management solution can be implemented as a standalone system or coupled with other proved Emerson applications, such as boiler control, to form a tightly integrated system for higher levels of process control and plant performance.

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Process automation is immediately simplified, because every system we use lends itself to common hardware and software. This eliminates the need for proprietary part replacements.

We have provided burner management systems for all types of boilers including drum, once-through supercritical, ultra-supercritical, fluidized bed, cyclone, and heat recovery steam generators (HRSGs). Our BMS solutions have been implemented on some of the most common and complex boilers, including Alston/Combustion Engineering, Babcock & Wilcox, Foster Wheeler, Hitachi, IHI, Nooter-Erickson, and Vogt, just to name a few.

We maintain complete independence of the burner management functions from other boiler and auxiliary controls to provide maximum system integrity and assure that the safety functions are performed separately from all other control functions per NFPA 85 requirements. Using basic elements of a BMS such as common logic functions and sequential logic functions, our solution monitors overall boiler safety, controls fuel headers, and provides system diagnostics. It also controls individual burner, igniter and pulverizer functions, as well as:

- Boiler purge
- Flame monitoring
- Master fuel trip
- Master fuel trip relay
- First-out (cause of trip) annunciation
- Burner/pulverizer startup and shutdown sequences
- Safety interlocking
- Alarming of abnormal conditions

Emerson's BMS solution monitors the following components

- Fuel headers
- Igniters
- Burners
- Raw coal feeder
- Pulverizer
- Primary air fan/exhauster

- Pulverized coal/air transport lines

Pulverized coal-tripping interlocks are a key component of the burner management system. Emerson's BMS solution monitors combustion parameters including primary air flow, furnace pressure, flame loss, raw coal feeders, and reduces pulverizer trips.

Emerson's design includes detailed first-out indications of each piece of equipment associated with the combustion process including each fuel header, igniter, burner, pulverizer, and more. Unlike other systems, Emerson's BMS solution provides for efficient troubleshooting of issues when they arise. Standard engineering tools and operator graphics allow users to view logic diagrams and easily follow signals from input to output.

Intuitive system diagnostics quickly pinpoint the exact problem area, allowing fast resolution and avoiding any further potential damage to boiler and burner components. Built-in fault tolerance and diagnostics are readily available to the plant operator through illuminated colored status indicators on system components, an audible alarming system, and status graphics.

The Ovation™ Advantage

Emerson's BMS solution is part of our Ovation control system, a key component of the proven Emerson architecture. Ovation delivers sustainable performance improvements to the power generation industry by incorporating industry-specific applications designed to help users achieve higher levels of plant availability, reliability, safety, environmental compliance, and efficiency.

The Ovation control system is a product of Emerson's five decades of experience in process control for the power generation industry. Ovation utilizes commercially available, off-the-shelf technology to provide a powerful and secure architecture while allowing your system to easily progress with rapidly advancing computer technologies. Ovation provides a seamless interface with the most widely adopted bus and wireless standards allowing you to incorporate smart device technologies into your process. And

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Ovation's embedded advanced algorithms and proven industry-specific control routines assure that you can optimize your operations to maximize efficiency, productivity, and profitability.

Ovation Benefits for Burner Management

Operator Actions & Track Changes

Ovation supports mass storage and retrieval of process data, alarms, sequence of events (SOE), and operator actions. Additionally, the engineering audit trail feature tracks any changes that have been made to the system. This feature adds an automated mechanism to log engineering events and provide ready-to-use engineering information to help troubleshoot and quickly identify the root cause of any abnormal condition related to software changes.

Security

Unlike other burner management systems, every Ovation BMS solution includes basic standard security features that address NERC CIP requirements. These features address different types of security concerns such as machine authentication, stringent password management, workstation hardening (removal of unnecessary functions), disabling prohibited activities as well as more streamlined and formal user permissions.

An optional Power & Water Cybersecurity Suite can be added to the solution to enhance and manage the cybersecurity of the Ovation system without disrupting the controlled process. The security products included in the Suite were specifically selected to assist Ovation customers in reducing the cost of complying with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards by automating current manual procedures and for their

ability to be integrated with the real-time control system.

Alarms

Ovation's embedded alarm management strategy with alarms and signal conditioning as part of the database parameters comes standard with every solution. Ovation alarm management combines a best-in-class philosophy with the implementation of hardware and software to clearly convey potential problems to operators.

As an option, Emerson offers the alarm analysis tool that examines alarm data collected by the Ovation historian to help minimize unnecessary alarms and enable plant operators to more effectively address real, high-priority issues and focus on actionable items.

Project Management Strategy

The success of any control system project depends upon the technical expertise and project management for proper design, integration, and execution of the project. Our technical experts install burner management systems that can handle special and demanding requirements of new or retrofit installations. Our project engineer team:

- Integrates your existing equipment and operational requirements
- Provides innovative solutions to physical space limitations
- Performs pre-testing prior to installation to ensure minimal outage and seamless changeover to a new system

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Emerson BMS Solution Benefits
Enhanced safety and availability
Greater operational flexibility
Continuous safety monitoring
Consistent startup and operation
Full integration of all facets of the firing system
Improved plant availability
Reduced maintenance costs
Prevention of boiler explosion
NFPA 85 code compliance
Integrated security features
Easier troubleshooting
Embedded alarm management
Expandable solutions

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