CombustionMaster Control Solutions
Unique Combustion Control for Gas and/or Oil-Fired Boilers
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The CombustionMaster™ system from Rockwell Automation is a programmable controller-based combustion control system for use with single or multi-burner gas and/or oil-fired boilers. Each unique CombustionMaster system is capable of controlling plant and boiler firing rate, fuel-to-air ratio, excess air trim, feed-water and balanced draft.

In addition to the CombustionMaster system, Rockwell Automation offers a variety of Combustion Control Solutions for boilers burning alternate fuels such as pulverized coal, lump coal or refuse-derived fuel (RDF). It can also incorporate process by-products such as liquids or gases, waste products and wood products.

Benefits
• Enhance boiler efficiency by using feed forward control techniques and excess air trim control strategies
• Improve operator understanding of the combustion process by use of a graphical HMI
• Reduce start-up time with the receipt of a fully assembled and programmed system designed for immediate field installation
• Confidence that your system is in compliance with all NFPA 85 codes and standards

Visualization Features
To provide your operator with seamless control of their system, the HMI display panel includes dynamic graphics for operator interaction:
• A boiler overview graphic depicting boiler operating status
• Control faceplate displays for PID and motor start/stop control
• Process variable indicator bars display analog value
• Alarm status and alarm history screens
• Tuning display

Compatibly Features
By combining CombustionMaster with BurnerMaster™ control systems, you can build a complete industrial boiler control system using affordable programmable logic controllers. The BurnMaster control system can be retrofit with the spare rack, multi-channel I/O modules, spare displays and excess processor. By incorporating the two solutions in one unit, your systems will have:
• A common hardware platform that will simplify troubleshooting, shorten maintenance and operator learning curve and reduce spare parts inventory costs
• Common programming software that will simplify future logic changes and reduce the number of software packages that must be supported by engineering
• Centralized HMI terminal for operator interaction that works with either system
• Overall reduction in training costs associated with any new controls retrofit
• All hardware will exist in same enclosure

If your facility has multiple boilers in addition to combustion controls, Rockwell Automation can provide a Floating Plant Master and/or Boiler Lead/Lag control.
**System Components**

Your plant is unique. An experienced Rockwell Automation solutions team will design, assemble and program a CombustionMaster system for your plant’s specific operational requirements. Several different hardware and programming options are available to ensure each solution is tailored to meet your needs. These include:

- Visualization and HMI
- Connected Enterprise
- Standard software packages
- Processors and I/O
- Power supplies and racks
- Industrial control hardware
- Non-Rockwell Automation hardware (e.g., enclosures)
- Documentation

**Integrated Architecture**

CombustionMaster is designed using Rockwell Automation’s ControlLogix® programmable logic controllers. These controllers can be din-rail mounted or placed within a 1756 I/O chassis. The input and output modules required to implement the selected control strategies are supplied with pre-fabricated cables connected to remote termination panels. Discrete and analog I/O modules are furnished as required with swing arms that are pre-wired to terminal blocks. Communication and data transfer of the system occurs over Ethernet. Each Ethernet Module in the system connects to a Stratix switch allowing for data transfer from multiple field and interfacing devices.

**The Connected Enterprise**

You can benefit from better collaboration, faster problem solving and improved innovation within your organization since the Connected Enterprise bridges operations, automation control and IT to access operational, business and transactional data. Each CombustionMaster system is connected via Ethernet allowing for high-speed communication, data transfer and process observation.

**Visualization (IS)**

A PanelView™ Plus operator terminal is also included in the CombustionMaster system which provides a graphical representation of the process information to the operator. From this terminal, the operator can change set points, monitor alarms, improve tuning parameters and select between automatic or manual control.

Visualization products by Allen-Bradley® provide windows into critical production and process information and enterprise data.
Standard Auxiliary Controls

In addition to the CombustionMaster core control strategies, standard auxiliary controls can be easily implemented in the CombustionMaster system. These control strategies are also available to accommodate dual fuel-fired boilers with or without automatic fuel transfer or simultaneous steady firing of fuel. These include:

**Drum Level Control**
- On/Off control
- Two element control
- Three element control

**Excess Air Trim**
- Oxygen trim
- Carbon monoxide trim

**Induced Draft Fan Control**
- Balanced draft control

Additional Auxiliary Controls
The CombustionMaster system can be easily expanded thanks to the spare processor and operator display capability included in the base system. Frequently, auxiliary boiler PID loops or discrete controls are included by using existing spare I/O channels, or by simply adding new I/O cards to the I/O chassis. System expansion can be accommodated without the need for additional panel board or rack room space.
A few of the most requested auxiliary control strategies and monitored parameters include:
- FD and ID motor start/stop
- Condensate additive pump control
- Condensate receiving tank level control
- Totalization of flow parameters
- Indication of flue gas exit temperature
- Boiler drum blowdown control
- Deaerator level control
- Steam temperature control

Alarms and System Protection
The CombustionMaster system is full of preventative features that ensure your system functions as it should. It is protected by an external watchdog which adds a layer of safety in the event of a system failure. The external watchdog removes power from the fuel valves forcing them to their closed fail-safe state. In addition to the external watchdog, several process checks are incorporated to monitor device failure, process conditions, fuel conditions, and other states of the system.

CombustionMaster Documentation
The operator can take complete system ownership as soon as the CombustionMaster system is delivered since it comes with a comprehensive documentation package for both hardware and software systems. The documentation package includes:
- A drawing list
- Logic Cabinet Schematic Wiring Drawings, including symbol identification
- Cabinet control power distribution and system elementary wiring
- Logic cabinet layout drawings, including I/O module assignment, cabinet general arrangement and subpanel equipment arrangement
- Field device schematic connection
- Program ladder listing and cross – reference report
- Product instruction documentation for major system components
For More Information

For more information on Rockwell Automation Industrial Combustion and Steam Generation solutions, please contact your local Rockwell Automation sales representative or your local Rockwell Automation Authorized Distributor.

Rockwell Automation's Industrial Combustion and Generation Solutions Team offers a full complement of burner management, combustion/temperature control and Balance of Plant solutions for all of your industrial boiler and non-boiler applications. The solutions cover all industrial fuel firing applications from single or multiple burners, single or multiple gaseous, liquid and/or solid fuels for single burner boilers and dryers through electrical utility boilers and multiple burner/multiple zone furnaces.