Boiler Control Solution

Instruments and Solution for Automatic Boiler Control
Essential Equipments for Industries

Boilers are used in a broad range of industries such as electric power, pharmaceuticals, chemicals, ceramics, and paper and pulp. Amid the rising energy costs, tightening environmental regulations, and increasing awareness of safety as of late, the needs for high efficiency operation, low emission operation, and safe and stable operation of boilers are growing.

Increasing Efficiency and Lowering Emissions of Boilers

In order to ensure the air and fuel are combusted at an optimal ratio, the waste of fuel is eliminated, and the exhaust gas is cleaned, real-time monitoring of the oxygen concentration of combustion gases is required. Equipped with an oxygen sensor unit with a longer life span, the Zirconia Oxygen Analyzer ZR series are capable of measuring an oxygen concentration with high reliability. The Stack Gas Analyzer SG700 monitors exhaust gas components such as NOx, SO2, and CO2 in order to ensure low emission operation.

Safe and Stable Operation

A single-loop controller can be used to properly distribute control functionality. Offering the advantages of flexibility of building distributed control systems, simple maintenance, compatibility with conventional systems, and the like, the YS1000 Series of Single-loop Controllers are ideal for safe and stable operation at low costs.

Monitoring the drum level and steam flow rate in accurate at any conditions

In order to ensure highly efficient and safely operated boilers, it is also indispensable to accurately monitor the drum level and steam flow rate. The EJA and EJX Series of Differential Pressure Transmitters are capable of measuring the drum level with high stability even in actual applications at high temperatures and high pressures. The DY Series MV TYPE of Vortex Flowmeters with a simple construction employ a built-in sensor to measure the steam mass flow with high reliability.

Why Buy Yokogawa?

Yokogawa offers a wide variety of sensors and controllers that are used to monitor and operate boilers, and contributes to increasing the efficiency and environmental performance of boilers, as well as ensuring their safe and stable operation.

We want you to explore Yokogawa’s sensors and controllers in order to increase the efficiency and environmental performance of your boilers, and ensure their safe and stable operation.
**Steam Flow Measurement**

**Overview and Problems**
- Flow measurement for utility steam
- Conventional orifice flowmeter requires complicated, high cost installation and is not accurate

**Solution**
- Inline flowmeter
- Built-in temperature sensor, Digital YEFLO MV type
- Steam mass flow measurement without additional temperature sensor/transmitter and flow computer
- Accuracy 2 % of reading

**Benefits**
- Low installation and operational costs
- Safety operation to reduce leakage points
- Save energy by accurate measurement
## Combustion Control

### Overview and Problems
- O₂ control for optimum combustion
- Short sensor life by clogging

### Solution
- Long life sensor with molecular bonding and special coating
- Cell life prediction

### Benefits
- Fuel cost reduction
- Preventive maintenance
- Protect the environment, CO₂ reduction

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## Combustion Control

### Overview and Problems
- O₂ control for optimum combustion of large-sized combustion equipment
- High installation cost for multipoint measurement

### Solution
- Maximum 8 detectors can be connected to one AV550G converter
- O₂ measurement of multiple points, individual concentration and average values

### Benefits
- Accurate control by multipoint measurement
- Installation cost reduction

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## Exhaust Gas Analysis

### Overview and Problems
- Air pollution control by continuous emissions monitoring
- High maintenance frequency

### Solution
- Simultaneous measurement of up to five components, NOₓ, SO₂, CO, CO₂, O₂
- Sample conditioning system designed to reduce maintenance
- No moving parts in the sensor

### Benefits
- Stable, long-term measurement
- High accuracy to suit the environmental regulations
Technologies Commit Users’ Benefits

Our Goal

Our shared goal is customer satisfaction through operational excellence. Yokogawa has brought true innovations to industry. We are committed to ensuring accuracy, reliability, and safety of your production system throughout your business life cycle. Our comprehensive solutions and expertise help you achieve more results with less total costs of ownership. Below key technologies shall aim for your operational excellence.

EJA/EJX Silicone Resonant Sensor

By micro-machining the resonators directly within the single crystal silicon material we are able to derive the maximum benefits from the elasticity of the single crystal silicon material while enhancing sensitivity and repeatability. The properties of the resonators remain constant over time. This makes DPharp the ideal pressure sensor for harsh industrial automation environments. DPharp delivers stability, repeatability and reliability that you can rely on.

DY Key Technology

- **Spectral Signal Processing (SSP)** -

Spectral Signal Processing (SSP) technology is built into the powerful electronics of the digitalYEWFLO vortex flowmeter, enabling new functions. SSP analyses the fluid conditions inside the digitalYEWFLO vortex flowmeter and uses the data to automatically select the optimum adjustment for an application, providing features never seen before in vortex flowmeters.

YS1000 Dual CPU

With dual-CPU construction, manual control capability and display continues even if an abnormality occurs on one of the CPUs. If controller self-diagnostics detects a control circuit failure, the controller can suspend analog/digital output, switch to manual mode and allow manual control by operator.

Zirconia Oxygen Analyzers

- **Get a long service life and stable operation with a Zirconia sensor**
- **sensor replacement is easy**

- A molecular bonding method completes installation of platinum electrodes, and its inherent connection prevents separation of platinum from the Zirconia element.
- A lead-less electrode design eliminates electrical disconnection.
- Special coating protects the platinum and prevents the sensors from deteriorating.
- No special tool is required for cell replacement.
For Your Operational Excellence

Temperature Transmitter

YTA Series
- High resolution, high stability and high versatility
- Dual compartment housing for harsh environments
- SIL2 safety as standard feature
- Fieldbus communication capability

Direct In Situ Zirconia Oxygen Analyzers

ZR402/ZR202
- Measurement with probe directly inserted into furnace or boiler
- Integrated and separate types available.
- Also can be used as a high temperature humidity analyzer
- Fully field-repairable probe
- HART communication
- Explosion proof (FM, CSA, ATEX) (ZR22S, ZR202S)

Pressure Transmitter

DPHarp EJA/EJX Series
- Best installed performance
- Compact and rugged design
- Multi-Sensing digital sensor
- SIL2 as standard (EJX)
- Fieldbus communication capability

Averaging Converter

AV550G
- Capable of accepting inputs from up to 8 oxygen detectors and 8 individual outputs are available
- Averaging of multiple point oxygen measurements is ideally suited for combustion control

Digital YEWFLO Vortex Flowmeters

- Best-in-class accuracy
- Superior stability though the unique digital electronics SSP technology
- Complete range for temperature and pressure
- Multivariable availability with optional temperature sensor
- Fieldbus communication capability

Stack Gas Analyzing System

SG700
- A complete self standing cabinet including IR400 infra-red analyzer and the sample conditioning system
- Simultaneous measurement of up to five components, NOx, SO2, CO, CO2, O2

Single Loop Controller

YS1000 Series
- Two programming method
- High reliability
- Compact and light weight
- Expandable I/O
- Compatible with YS170 and SLPC

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VigilantPlant is Yokogawa’s automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.