



Introduction

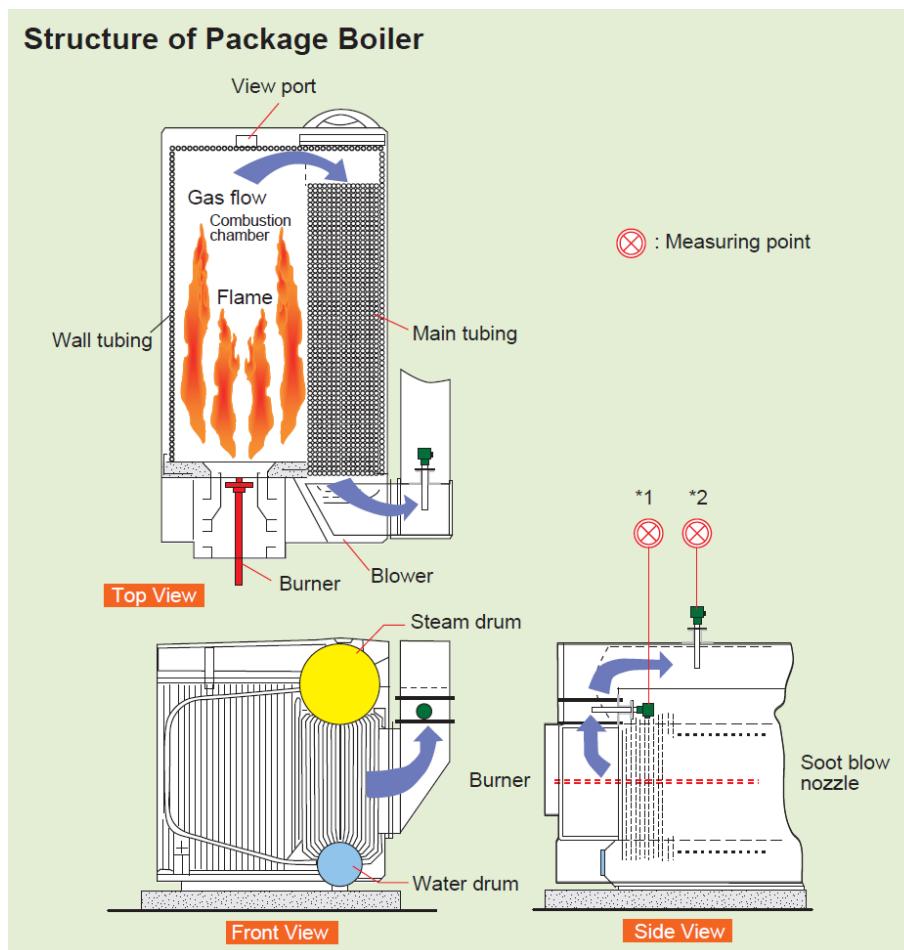
Package boilers require less fuel and electric power to operate and are widely used in the pharmaceutical, food, ceramic, and other industries. A package boiler operates more efficiently if the oxygen concentration in the flue gas is reduced. On the other hand, insufficient air intake causes incomplete combustion, resulting in increased smoke emission. Optimizing air intake for boiler operation requires continuous measurement of the oxygen concentration in the flue gas. The typical package boiler is a water tube boiler or flue and smoke tube boiler with a capacity of 5 to 20 t/h (average steam generation capacity). The most widely used fuels are heavy oil, light oil, kerosene, and gas.

The ZR22G/ZR802G zirconia oxygen analyzer is ideally suited for package boilers thanks to its long service life and low maintenance, and is an effective tool for the reduction of fuel and electric power consumption.

Expected Benefits

- Increases combustion efficiency of package boilers
- Stable, continuous measurement
- Reduces operating costs
- Keeps the initial cost of equipment replacement to a minimum

Process Overview



Measurement of Oxygen Concentration in Package Boiler Flue Gases

Solution Details

Process conditions

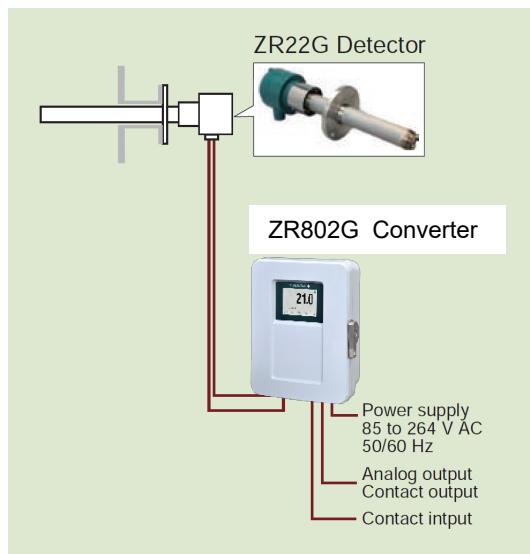
Measurement point: Boiler outlet, Economizer outlet
Temperature: 150 to 300 °C
Flow velocity: 15 m/s max.
Pressure: ±0.5 kPa
Dust: 1 g/Nm³ max.

Effectiveness in Saving Energy

A 1% reduction in excess oxygen of flue gas realizes a 0.8% saving in fuel.

Measurement system

Detector: ZR22G-□□□-S-□-□-□-E-A /□
Converter: ZR802G-□-□-N-N /□
Flow setting unit: ZA8F-□*C
Dust guard protector: K9471UC



Utilities

Rated voltage: 100 to 240 V AC
Rated frequency: 50/60 Hz
Power consumption: 330 VA (Max. 800 VA)
Instrument air: 300 to 700 kPa

Notes on Installation

- The detector should be mounted 2 to 3 m away from the boiler outlet.
- Typical good/bad installation examples are shown in Figure 1.

Special Notes

- The ZR22G/802G zirconia oxygen analyzer can also be used in bagasse- or bark-fired boilers under general conditions.
- Use of VVVF control can yield further reductions in fuel and electric power consumption. This can be done by combining the zirconia oxygen analyzer with a VVVF inverter and a programmable controller.

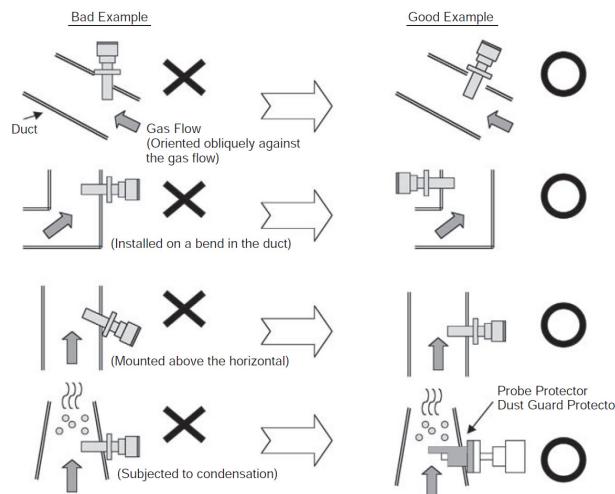


Figure 1 Instructions for installation

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