SEMITRONIK

OXYGEN % INDICATOR AND CONTROLLER
FOR BOILER

OXYGEN % INDICATOR AND CONTROLLER

Today no one can afford the luxury of wasting fuel. From the large power boilers used by the electrical utility companies to the small furnace operator or water heaters in cold countries, efficiency is the prime objective.

Combustion efficiency can be defined as the effectiveness of any combustion that operates in converting the internal energy contained in fuel into heat energy and making it available to the process.

In practice combustion efficiency is generally thought of as the total energy contained per unit of fuel-minus the energy carried away by hot flue gases exiting through the stacks expressed as a percentage.

Everyone knows of the three essential components of combustion :

❍ Fuel ❍ Air ❍ Heat

In fossil fuel there are really three elements of interest i.e. Carbon, Hydrogen and Sulphur. During combustion each reacts with Oxygen to release heat.

Pure Oxygen is rarely used for combustion. Air contains about 21 % Oxygen and 79 % Nitrogen by volume and available more readily than pure oxygen. If the burning is complete than the products generated will be nothing but Carbon Dioxide, Water and Nitrogen. This is known as stichiometric combustion. The heat released when the fuel burns completely is known as heat of combustion.

THE IMPORTANCE OF EXCESS AIR

In actual application it is impossible to achieve stichiometric combustion because burners cannot mix fuel and air perfectly. To ensure that all of the fuel is burned and that little or no combustibles appear in the flue gas, it is common practice to supply some amount of excess air. Not long ago it was not considered unusual to run a burner with large amount of excess air in order to avoid smoking stack. Today this is recognized as highly wasteful practice.

Too little excess air is inefficient because it permits unburned fuel in the form of combustibles to escape up the stack. But too much excess air is also inefficient because it enters the burner at ambient temperature and leaves the stack hot, thus stealing useful heat from the process. This leads to fundamental rule of combustion efficiency.

Maximum combustion efficiency is achieved when the correct amount of excess air is supplied so that sum of both unburned fuel loss and flue gas heat loss is minimized.

MAXIMIZING EFFICIENCY BY CONTROLLING EXCESS AIR

But how is the correct amount of excess air determined?

The most widely accepted practice for determining and maintaining correct amount of excess air is, flue gas analysis.

Development of Oxygen flue gas monitor has resulted in determining oxygen concentration in excess air leaving stack.

In recent years, the Zirconium Oxide cell has become the most prevalent Oxygen sensor for continuous monitoring of flue gases. The sensor has inherent ability to make Oxygen measurements in hot, dirty gases without sample conditioning which is quickly accepted by industrial users.

The cell has several significant advantages over the other Oxygen sensing methods. First, since the cell operates at high temperature there is no need to cool or dry flue gas before it is measured.

Most Zirconium Oxygen analysers make direct Oxygen measurements on the stack with nothing more than a filter to keep ash away from the cell.

The cell is also immune to vibration.

The advantage being the cell output increases with reduction of Oxygen.

The sensor consists of a Zirconium cell located at the end of stainless steel probe that is inserted directly into the flue gas system.

The voltage created by the Oxygen partial pressure different is carried down to the length of the probe and through our interconnecting cable to our electronics enclosure where it is conditioned into an output signal suitable for a control system. It is used for control of air for combustion input.

MODEL AVAILABLE

OXYGEN % INDICATOR AND CONTROLLER SYSTEM

MODEL 01C - 101

Electronic Unit

Complete electronics on plug-in type printed circuits board with power supply to operate on 220V + 10% 50 c/s with :

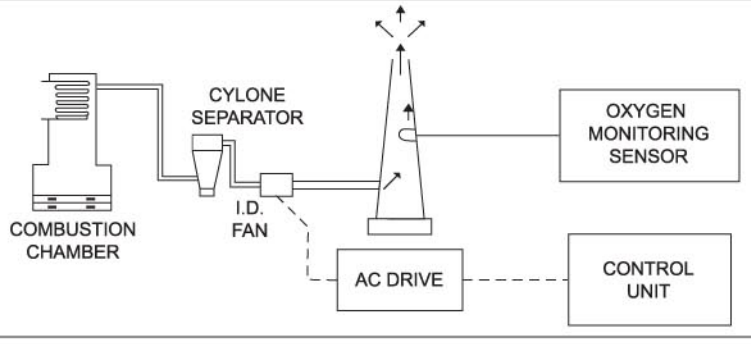
Display :
Digital to indicate % of Oxygen.

Control :
4-20 m or 0-10 V to either programmable logic controller or A.C. drives or two relay output for proportionate action or relays with changeover contacts rated with 1 Amp.

Sensor Assembly

Zirconium cell with due accessory and mounting connection arrangement housed in SS assembly.

THE COMBUSTION AIR CONTROL SYSTEM



For further details, contact

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Since our policy is of continuous development and improvement, we reserve the right to supply product which may differ from those illustrated & described in this publication.

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