

DATASHEET APPLICATION NOTE A007-CM04 - BURNERS - RATIO CONTROL

APPLICATION NOTE

Ratio control in Burner & Furnace applications

Processes involving burners, such as **welding, cutting** or even **furnace** applications, require efficient management of the gas supply. Gas flow control is the key to successful combustion in these areas. Recognising the demands of these processes, Bronkhorst has developed gas flow control solutions for burner applications.



Application requirements

For this type of process, it is essential that the oxidant/fuel mixture is reproducible. Also, it is essential to always supply a quantity of gas to avoid flame extinction or an increase in the amount of NO_x (Nitrogen oxides) produced during combustion. When using natural gas (network), it is necessary to minimise the pressure drop of the flow controller. In addition, burner or furnace manufacturers are looking for solutions that are adapted to their machines, that are robust, easy to install and commission, and that offer different communication modes.

Important topics

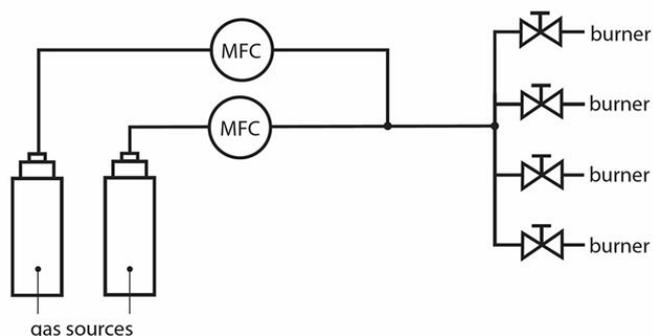
- Precise dosing of the delivered gases
- Stability
- Reproducibility
- Flexibility

Process solution

Management of the fuel/oxidant ratio

In combustion, two gases are often required: the fuel (methane, propane, or acetylene) and the oxidant (air or oxygen in case of oxy-fuel combustion).

To achieve ideal combustion and to maintain the dynamics of the burner, it is crucial to precisely control the ratio between the two gases. The stoichiometry of the reaction must be *controlled*, ensuring *complete combustion* of the air to avoid any safety problems. At the same time, to avoid excessive gas expenditure and to limit NO_x emissions, the air supply to the reaction can be minimised.



Flow scheme

The Bronkhorst "master/slave" solution presented can successfully provide a proportional gas flow with the necessary stability. As the combustion gas is supplied by one flow controller (Master), the oxidant gas is delivered accordingly in the correct proportion by another flow controller (Slave), thus ensuring constant mixing. The instruments have a fast response time which, combined with the stability of the flow controllers, guarantees a constant flame.

This solution has the advantage of avoiding issues related to pressure conditions such as a dirty burner. Indeed, if the burner back pressure increases. The combination of flow meter, valve and control loop will compensate for this back pressure by acting on the valve opening of the instruments, thus maintaining the stability of the process. This action on the valve can be followed on a data acquisition system and allows prevention and limitation of production stops.

Our MASS-STREAM flow controller instruments are a perfect fit for these applications.

Recommended Products



MASS-STREAM D-6370A & D-6470A MFM

Min. flow 4...200 l/min
 Max. flow 20...2000 l/min
 Pressure rating up to 20 bar
 Rugged sensor and housing (IP65)
 Optional integrated TFT display



MASS-STREAM D-6360A & D-6460A MFM

Min. flow 1...50 l/min
 Max. flow 5...500 l/min
 Pressure rating up to 20 bar
 Rugged sensor and housing (IP65)
 Optional integrated TFT display



MASS-STREAM D-6390 & D-6490 MFM

Min. flow 40...2000 l/min
 Max. 100...10000 l/min
 Pressure rating up to 20 bar
 Rugged sensor and housing (IP65)
 Optional integrated TFT display



MASS-STREAM D-6391/003BI & D-6491/003BI MFC

Min. flow 40...2000 l/min
 Max. flow 200...10000 l/min
 Pressure rating up to 20 bar
 Rugged sensor and housing (IP65)
 Optional integrated display