

Single Point Position (Jackshaft) Combustion Control Systems (CCS)

Introduction

Combustion control is a critical function for all utility, industrial and institutional customers for the following reasons:

- Safety of operating personnel is paramount
- Reliability of utility operations is essential
- Energy usage is a major cost of operations
- Value of boiler equipment must be protected.

For many years the engineers at MicroMod have developed and supplied automatic combustion control systems to safely, reliably and efficiently operate package boilers. This Application Data Sheet discusses control strategy as applied to automatic combustion control systems for single point position, single burner, dual fuel boilers.

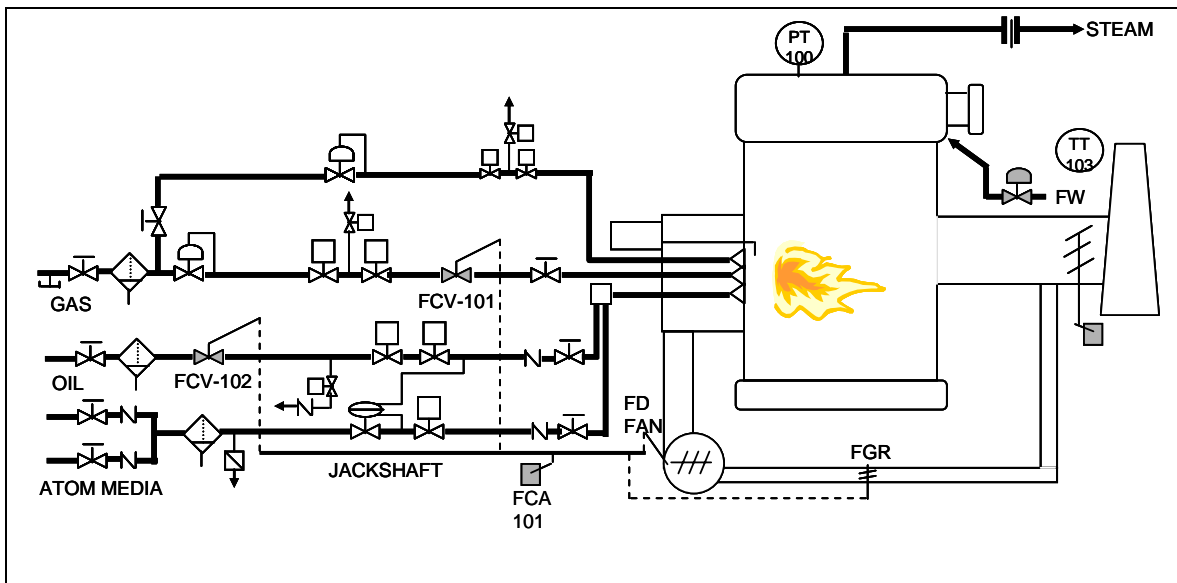


FIGURE 1: TYPICAL FIELD DEVICES FOR SINGLE POINT POSITION

APPLICATION DESCRIPTION

The automatic combustion control field hardware for a typical single burner, dual fuel package boiler is shown in Figure 1. The system shown is a single point position (jackshaft) system, i.e. the fuel and air are not measured and the fuel air ratio is mechanically set through cams on the fuel valves. This is the safest method boiler control, though it is less efficient than two-point positioning or full metering methods. Measurement of stack temperature is optionally provided for automatic alarming of low water conditions that cause high flue gas temperatures.

CONTROL STRATEGY

The control diagram for this combustion control strategy is shown in figure 2. The component descriptions are as follows:

Boiler Master

The boiler master controller receives the steam pressure signal from the steam pressure transmitter and compares it to the operator-entered setpoint. The difference is the pressure error. This error is acted upon by the proportional and integral action, which modulates the output in order to eliminate the error. The output is the boiler demand for steam and modulates the fuel and air by means of the jackshaft. The operator may adjust the setpoint in automatic or place the controller in Manual mode to fire the boiler manually. The control strategy rejects to Manual on bad signal quality (out-of-range or loss of signal). A high/low pressure alarm is shown. A logic interface to the BMS is provided where a contact closure will position the fuel / air actuator to a pre-programmed purge, or light off position.

Excess Flue Gas Temperature Option

The flue gas temperature is measured and compared to an adjustable high limit value. If it is too high a digital output is opened which can be used as a safety interlock to the BMS system.

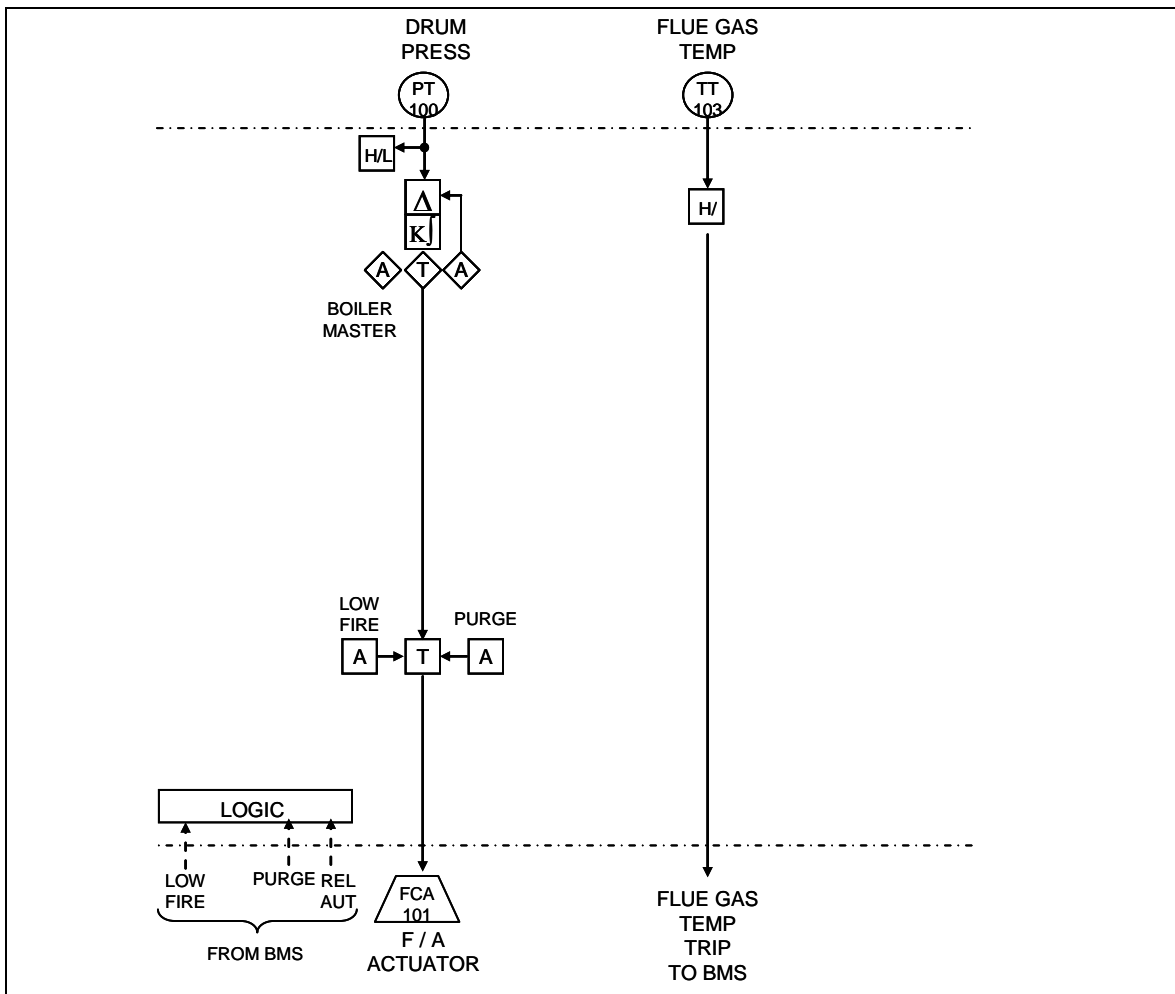


FIGURE 2: TYPICAL SINGLE POINT POSITION STRATEGY