

### Main Features

- Micro Modulation - Fuel/Air Ratio Control.
- UV Flame Safeguard.
- Burner Safety Control.
- Gas Valve Proving.
- Gas, Oil & Air Pressure Proving.
- Precise Target Setpoint Control.
- FGR Management.
- Lead Lag Control for both Steam and Hot Water
- 3 Parameter Trim,  $O_2$ ,  $CO_2$  &  $CO$ .
- Expansion PCB for Water Level Control, Flow Metering and First-Out Annunciation.

To ensure maximum efficiency in the operation of any boiler, two requirements are of paramount importance.

The first being that the air to fuel ratio is kept to the minimum to ensure complete combustion within the limitations of the combustion head design and that these settings, once arrived at, are infinitely repeatable to an incredibly high degree of accuracy.

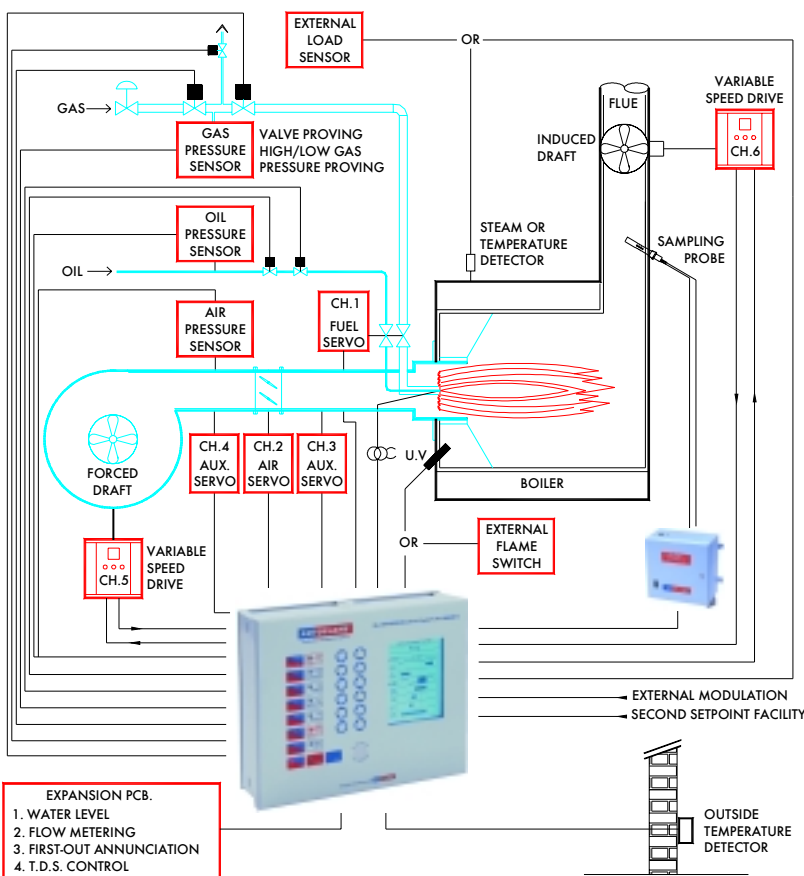
The second requirement should be that the target temperature or pressure of the boiler is monitored by the combustion system, and that at all times exactly the right amount of fuel and air is fired to achieve the target value.

The inherent hysteresis of all mechanical systems that have traditionally involved cams and linkages to characterise the fuel/air ratio have made this sort of accuracy impossible. The accuracy of response of fuel input to the monitored target temperature/pressure of the boiler has meant that the target set by the operator has at most times been exceeded or fallen short of. Autoflame Engineering were the first in the World to develop a system that overcomes all these problems by utilising the latest micro processor technology.

The Micro Modulation system provides an easily programmable and flexible means of optimising combustion quality throughout the load requirement range of the boiler/burner unit whilst ensuring the temperature is accurate to within  $1^\circ C$  ( $2^\circ F$ ) and pressure to within 1.5 p.s.i. The positioning accuracy of the direct drive motors controlling the air damper and fuel valve is 0.1 angular degrees at any position in the load range. At the heart of the system is the control module which contains the micro computer and power supply. The front panel of the control module features touch sensitive key pad entry data and a 1/4 VGA graphics display.



### MK 6 EVOLUTION BURNER MANAGEMENT SYSTEM



## Mk.6 EVOLUTION M.M. Features & Benefits

### Micro Modulation Fuel/Air Ratio Control

- Independently controlled fuel and air positioning motors with an accuracy of 0.1 of an angular degree.
- 4 separate fuel curves.
- 4 Dedicated Servo drives.
- 2 dedicated variable speed drives.
- Selectable trim channel (damper or vsd).
- ¼ VGA Display.
- Error diagnostic codes displayed.
- Single point change facility for commissioned fuel/air ratio.
- User definable optimum ignition position.
- FGR Management, delay from start-up to enable FGR until flue gas temp., boiler setpoint or time delay achieved.

### Exhaust Gas Analyser (separate module)

- CO<sub>2</sub>, O<sub>2</sub>, CO trim, NO, SO<sub>2</sub> continuous monitoring and display.
- User definable combustion limits on all CO<sub>2</sub>, O<sub>2</sub> & CO values.
- Exhaust, ambient temperature and ΔT displayed.
- Combustion efficiency calculation – net or gross displayed.

### Burner Control Box Functions

- Full flame supervision with UV self-check for continuous operation, patented self adaptive UV amplification.
- Burner Control Functions with user configurable timings.
- Gas Valve proving system with on-line pressure supervision.
- Oil pressure monitoring and display with limit checks.
- Air windbox pressure proving – display and supervision.
- Lockout history of last 16 incidents with date, time, function & reset.
- Burner Control Functions (Flame safeguard) selectable.

### Setpoint Control Features

- Internal 3 term PID control to required setpoint for both pressure and temperature.
- Software adjustable thermostat/pressure stat. facility.
- Second setpoint user adjustable.
- Time clock facility with normal operation, reduced setpoint and off modes.
- Outside temperature compensation of boiler set point, with night set back facility.
- Intelligent Boiler Sequencing for both steam & hot water.
- Intelligent Boiler Sequencing for low pressure steam.
- Fuel Flow Metering – instantaneous and totalised.
- Hand/Auto/Low flame hold facilities.
- 4-20 mA input for external load control.
- 4-20 mA output of firing rate.
- Twin burner control capability.

### User Features

- Password protection, user configurable options and parameters.
- IR coms port for upload/download of commissioned data and operating history.
- All systems data exports via gateway (Modbus).
- Internal calendar clock display and logging functions.
- Proximity Sensor Screen saver.

### Specifications

- 120/230V, 50/60 Hz switchable standard operation.
- IP65/NEMA 4 enclosure with panel facia mounting.
- All inputs and outputs fully self checked (continuous operation).



### Patents Applied For/Granted:

GB02138610, 1317356, 02169726,  
00195866, 09/234,391  
PCT/GB97/02010, 9715898.4,  
9715899.2, 9715900.8

### Peripherals:



Positioning Motors

Load Detectors

Flame Scanners

Pressure Sensors

Infrared Upload/Download

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