



# PPC 5000 Fuel/Air Ratio Controller



- Fuel/Air ratio control for single or multi-fuel burners
- Precise positioning of valves and dampers
- Controls up to 8x valve/damper servo motors
- 7x profiles
- Auto/Manual modulation
- Simple construction and installation
- Sequencing of up to 10 boilers
- 2 x PID controls: remote boiler setpoint/night setback
- 4 to 20mA, RTD and slidewire inputs
- Interfaces with most burner controllers: Fireeye, Honeywell, L&G and Satronic
- Tactile keyboard with full text vacuum fluorescent display
- Closed loop adaptive oxygen trim control with Fireeye "in-situ" zirconia probe
- Trim system has fast response and is quick to settle
- Displays efficiency, CO<sub>2</sub> and amount of trim being applied
- Displays hours run per fuel
- Interfaces for variable speed control (up to 4 per controller)
- Simultaneous firing of 3 fuels
- Communication software "Comfire" for local & remote PC connections - PC not required for commissioning
- RS485
- Assignable 4 to 20mA outputs
- Configurable digital and alarm outputs
- Self diagnostics
- Burner status indication
- Password protection
- Fully approved to meet US and European requirements

## BENEFITS

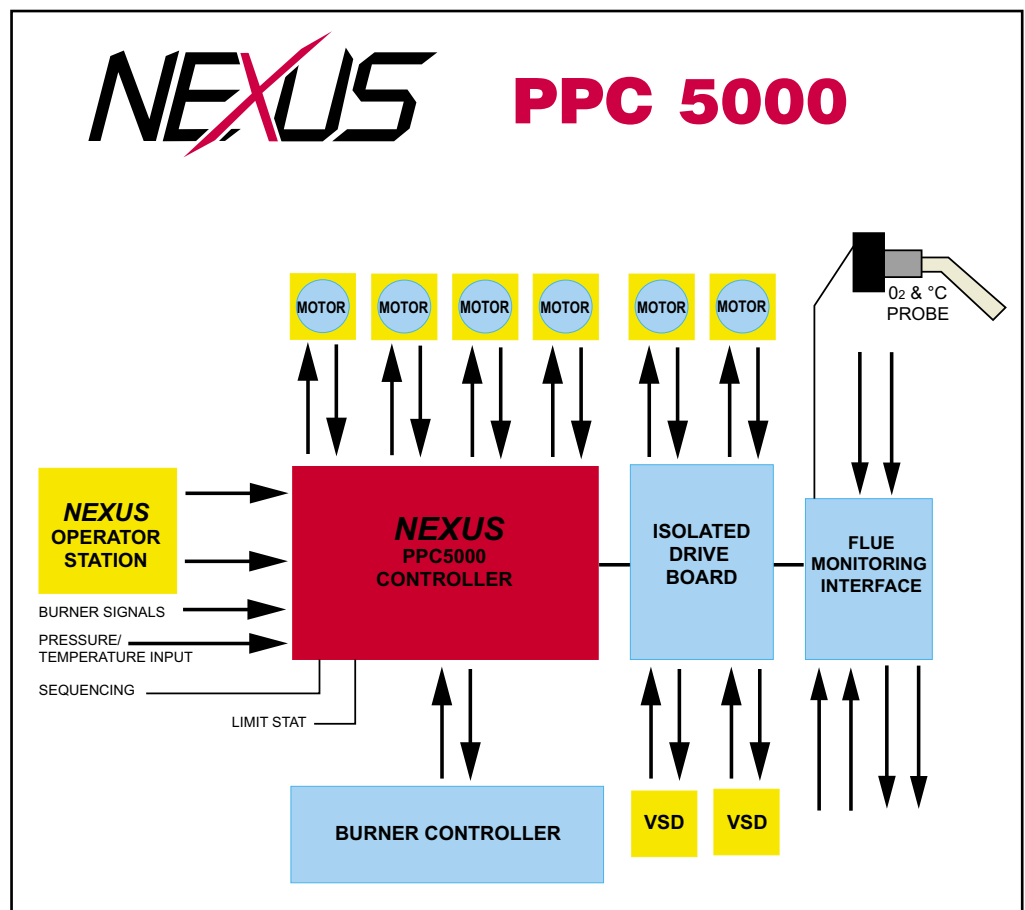
- Electronic control improves both reliability and performance
- Electronic fuel/air ratio controller replaces characterizing cam and also eliminates back-lash and hysteresis
- Second Boiler Setpoint saves energy during periods of low demand
- Variable speed control gives electrical energy savings and reduces noise in the boilerhouse
- Oxygen trim saves fuel, reduces emissions and extends the life of the boiler plant
- Waste becomes a source of energy when simultaneous firing software is installed

## DESCRIPTION

The PPC 5000 is an electronic fuel/air ratio controller for industrial burners firing gaseous and/or liquid fuels.

The basic unit controls four servo motors, positioning them to within 0.1 of an angular degree. Seven programmable profiles are available where each profile determines the positional relationship between all servo motors across the firing range of the burner. The unit has the capability to increase the number of motor drives from four to eight. These servo motors can operate burner fuel valves and air dampers.

Variable speed interfaces are available to control, via inverters, the burner fan motor speed and water feed pumps. Controlling the fuel/air ratio by adjustment of fan speed saves electrical energy and reduces noise. When the motor speed is halved an 80% electrical energy saving is achieved. Up to four variable speed interfaces can be added to a single PPC 5000.



Oxygen trim control is another option. Fireyes zirconia oxygen probe has earned an international reputation for reliability and longevity. Oxygen trim automatically and continuously compensates for all the variables that affect efficient combustion. This option will give typical fuel savings of 2% and will ensure safe and efficient combustion when firing fuels with varying calorific value.

## BENEFITS

Optional simultaneous firing software has been developed by Fireye which employs novel, dynamic setpoint technology. It ensures that the correct fuel/air ratio is maintained across the firing range when two fuels are being fired simultaneously and the ratio of one fuel to the other is varied. A single 4 to 20mA signal varies the mix of the two fuels being fired. Oxygen trim is needed for all simultaneous firing applications. Fuels or fuel combinations with differing and/or varying calorific values can be accommodated. Switching between various fuel combinations becomes a routine task.

"ComFire" communications software is an option available for the PPC 5000 electronic fuel/air ratio controller and the NEXUS electronic integrated burner controller. This powerful package gives connection to a local or remote personal computer via an RS485 connection. Information such as setpoints, profiles and engineers data is displayed in tabular and graphic form. A dynamic plant mimic shows the status of all burners on the site provided that they have PPC 5000 or NEXUS controls. Burner utilization curves can be displayed as chart recorder images and alarms with time and date stamp are also shown. "ComFire" provides non-safety critical analogue and digital control of the burner from the PC. It is possible to select "burner on", "trim on", "release to ignite", "release to modulate", "enable boiler sequencing", lead boiler for sequencing control and boiler setpoint. Modulation rate, boiler control setpoints and limits can also be varied from the PC.



Sequencing software for up to 10 boilers is also available allowing the operator to select any boiler as the lead boiler.

As the demand increases the burners progressively move to "high fire" leaving the last two boilers brought "online" to "modulate".

As the demand decreases boilers progressively move from "high fire" to "modulating" and then from "modulating" to "off-line".

Three pass code levels ensure that unauthorized personnel cannot service the burners nor change commissioning data.

The unit has extensive self diagnostics with primary and secondary level fault analysis. See your Fireye distributor for complete details on the PPC 5000 Controller.

- **COMFIRE** gives energy savings through better analysis and control and reduces commissioning time. Remote analysis of burner performance is especially useful during burner's warranty time period

- Sequencing saves energy by closely matching boiler output to demand and gives greater flexibility in boiler utilization planning

- Pass code protection prevents untrained or unauthorized personnel from changing the combustion set-up

- Full compatibility with other Fireye electronic fuel/air ratio controllers

# TECHNICAL SPECIFICATIONS

## BASIC UNIT

Basic Motor Drive Board/Burner Interface/PSU/Boiler Interface/CPU/  
Operator station/display

Supply voltage	110/120/ 220/240VAC
Power consumption (basic unit)	24VA
Supply frequency	50/60Hz +10% - 15%
Operating temperature range	0 to 60°C
Protection category electronics unit	IP0
Operator station/display	IP20
Dimensions:	
Electronics unit	146 x 135 x 220mm high
Operator station	141 x 188 x (28+4)mm deep
Weight (basic unit)	3.0Kg
Display:	
Motor positioning accuracy	0.1°
Response time to positioning error	15s for +-1.00; 1s for +5.0°

## SERVO MOTOR CONTROL

Type a.c. up/down with  
feedback potentiometer

Maximum quantity motors  
driven from basic unit 4  
(see Isolated Drive Board option for additional drives)

## SERVO MOTOR DRIVE RATINGS

Motor speed range	110V, 240V 150mA
Potentiometer feedback	10s/90° to 60s/90°
Potentiometer resistance	+5v or +15V
	1 k to 5k ohms at 5V;
	3k to 15k ohms at 15V

## BURNER INTERFACE INPUTS

Voltage range	110v to 250V
Maximum current	1.5mA

## BURNER INTERFACE OUTPUTS

Safety shutdown:	
Maximum voltage	110V/240VAC
Maximum current	2A

## ALARM

Contact	C/O
Maximum voltage	110V/240VAC
Maximum current	2A

## CONTROLLED SHUTDOWN

Maximum voltage	110V / 240VAC
Maximum current	500mA

## IGNITION & PURGE PROVE

Maximum voltage	110V / 250VAC
Maximum current	500mA

## BURNER INTERFACE DIGITAL OUTPUTS

Quantity	3
Voltage levels	0/12v
Maximum current sink	15mA

## PSU/BOILER INTERFACE

3 wire RTD	0 to 350°C
Modulation/Auxiliary input	4 to 20mA 0.5V
Load resistance (4 to 20mA)	220 ohms
Supply voltage	5v or 20V

## ISOLATED BOARD DRIVE

Maximum quantity	2
Fitted FMI maximum	1

## VARIABLE SPEED INTERFACE

Type	4 to 20mA current loop
Output load	750 ohms
Input load	250 ohms
Isolation voltage	50v

Outputs	2
Inputs	2
Extra servo motor controls	2



## FLUE MONITOR INTERFACE

Maximum quantity	1
Isolation channels	4
Isolation voltage	50V

## CHANNEL 1

Oxygen Trim option only compatible with Fireeye probe

## CHANNEL 2

Flue temperature thermocouple type K  
incorporated in Fireeye probe

## CHANNEL 3

Option	4 to 20mA
	300 ohm
Monitoring input 1	4 to 20mA
	300 ohm

## CHANNEL 4

Option	4 to 20mA
	300 ohm
Monitoring input 2	4 to 20mA
	300 ohm
and 2 x additional isolated 4 to 20mA outputs (not isolated from each other)	

## OPTIONS

Oxygen trim, flue gas monitoring, communications,  
sequencing, variable speed controls, simultaneous  
firing



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