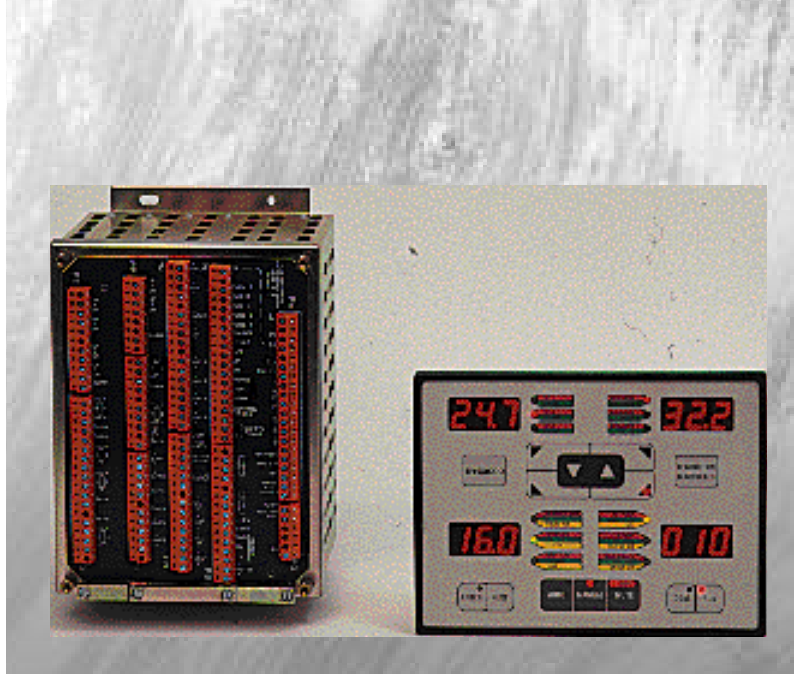


ETC 3000 Fuel/Air Ratio Controller



- Fuel/Air ratio control for single or multi-fuel burners
- Precise positioning of valves and dampers
- Controls up to 8 x valve/damper servo motors
- 7 x 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: Honeywell, L & G and Satronic
- Tactile keyboard with insertable legends for simple customer 'badging'
- Closed loop adaptive oxygen trim control with ETC 'in-situ' zirconia probe
- Trim system has fast response and is quick to settle
- Displays efficiency, CO₂, and amount of trim being applied
- Displays hours run per fuel
- Interfaces for variable speed control
- Simultaneous firing of 3 fuels
- Communications software 'ComView' for local and remote connection to a PC
- RS485
- Assignable 4 to 20mA outputs
- Configurable digital and alarm outputs
- Self diagnostics
- Burner status indication
- Pass code protection
- Fully approved to meet the directives on appliances burning gaseous fuels (90/396/EEC)

ETC

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Benefits

- **Electronic control improves reliability and performance.**
- **Electronic fuel/air ratio controller replaces characterising cam and 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 boiler-house.**
- **Oxygen trim saves fuel, reduces emissions and extends life of boiler plant.**
- **Waste becomes a source of energy when simultaneous firing software is installed.**
- **ComView gives energy savings through better analysis and control and reduces commissioning time. Remote analysis of burner performance is especially useful during the burner's warranty period.**
- **Sequencing saves energy, closely matches boiler output to demand and gives greater flexibility in boiler utilisation planning.**
- **Pass code protection prevents untrained/unauthorised personnel from changing combustion set-up.**
- **Full compatibility with other ETC electronic fuel/air ratio controllers.**

Description

The ETC3000 is an electronic fuel/air ratio controller for industrial burners firing gaseous and/or liquid fuels. It has full European approval under the gas directive 90/396/EEC.

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 facility to increase the number of motor drives from four to eight. These servo motors would operate 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 ETC3000.

Oxygen trim control is another option. ETC's zirconia oxygen probe has earned itself 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 3% and will ensure safe and efficient combustion when firing fuels with varying calorific value.

Optional simultaneous firing software has been developed by ETC 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 20 mA 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.

'ComView' communications software is an option available for the ETC3000 electronic fuel/air ratio controller and ETC1000 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 engineer's 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 ETC3000 or ETC1000 controls. Burner utilisation curves can be displayed as chart recorder images and alarms with time and date stamp are also shown. 'ComView' 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.

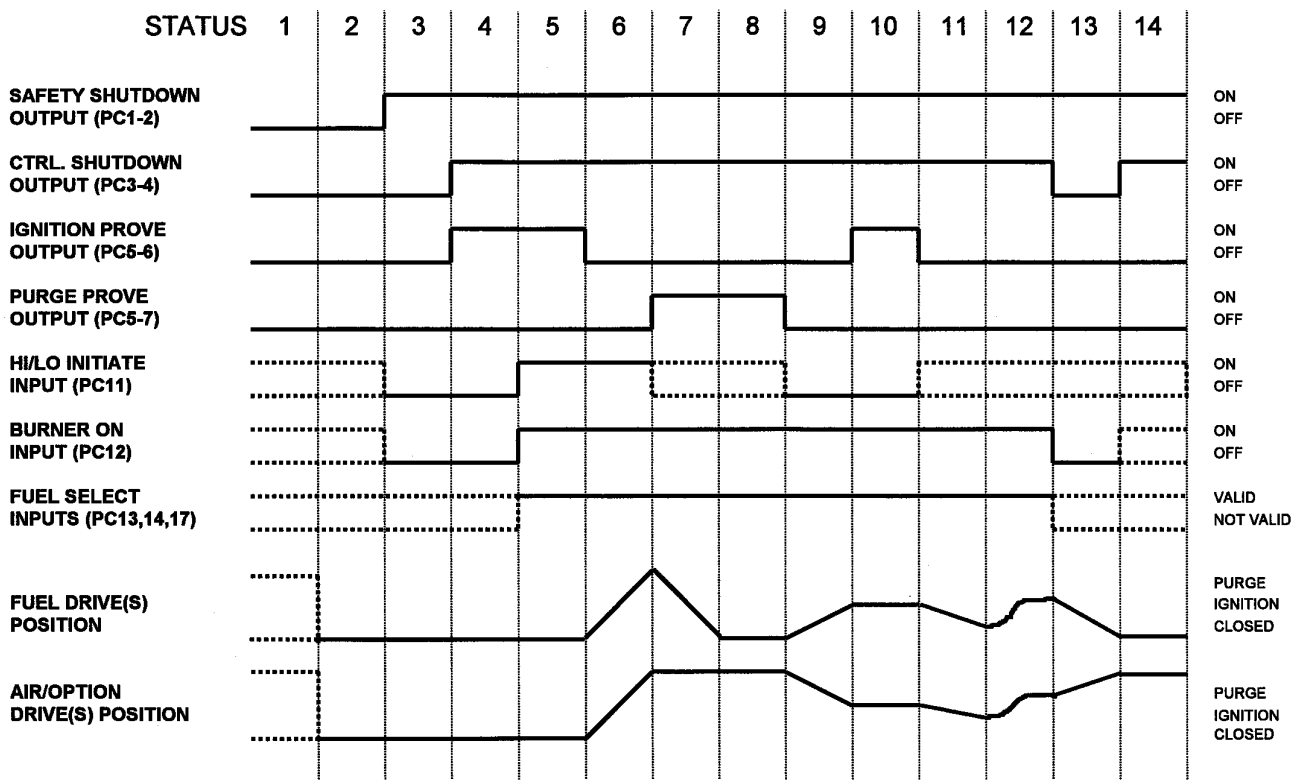
Sequencing software for up to 10 boilers is also available allowing the operator to select any boiler as the lead boiler. As the demand increases the burners progressively move to 'high fire' leaving the last two boilers brought 'on-line' to 'modulate'. As the demand decreases boilers progressively move from 'high fire' to 'modulating' and then from 'modulating' to 'off-line'.

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

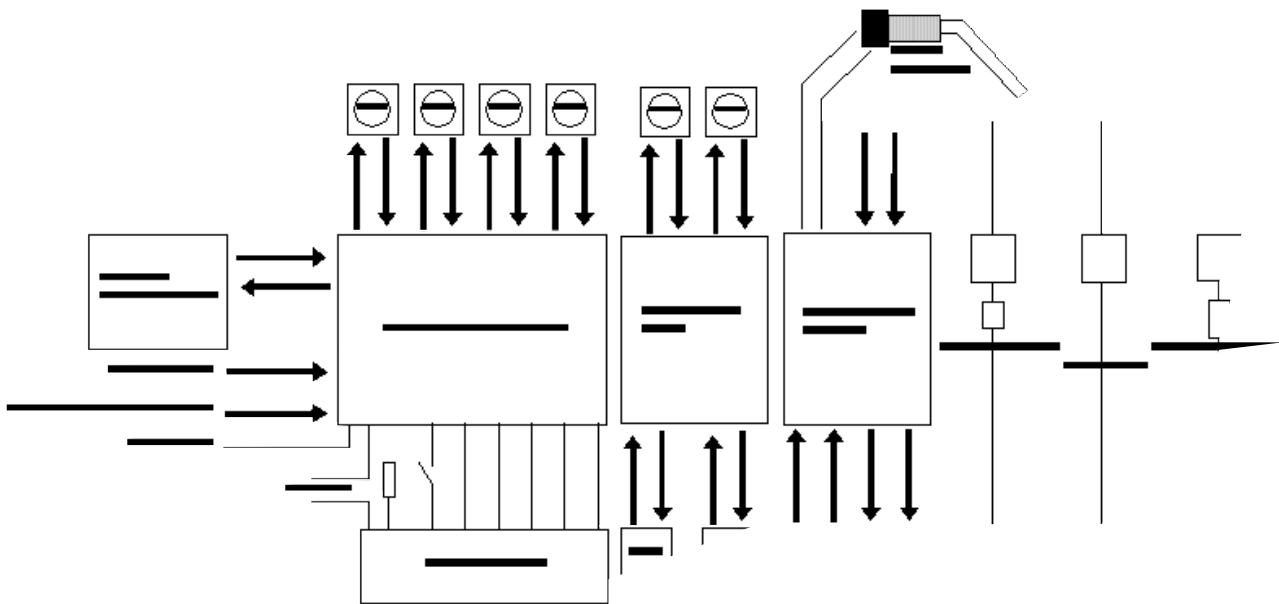
The unit has extensive self diagnostics with primary and secondary level fault analysis.

The above description does not identify all the features of the ETC3000 nor does it fully describe the features that have been mentioned.

• Burner start-up sequence timing diagram



• Schematic



Technical Specification

Isolated Drive Board (IDB)

Maximum quantity	2
if FMI is fitted maximum is	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 (FMI)

Maximum quantity	1
Isolation channels	4
Isolation voltage	50v

Channel 1

Oxygen Trim option	Only compatible with ETC probe
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Channel 2

Flue temperature thermocouple type K incorporated in ETC O₂ probe

Channel 3

Opacity sensor	4 to 20mA 300 ohm
Monitoring input 1	4 to 20mA 300 ohm

Channel 4

CO sensor	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)

Basic Unit

Basic motor drive board/Burner interface/PSU/Boiler interface/CPU/Operator station/display

Supply voltage	110/120/ 220/240v ac
Power consumption (Basic unit)	24VA
Supply frequency	50/60Hz +10% – 15%
Operating temperature range	0 to 60°C
Protection category Electronics unit	IPO
Operator station/Display	IP20
Dimensions Electronics unit	146 x 135 x 220 mm high
Operator station	141 x 188 x (28+4) mm deep
Weight (Basic Unit)	3.0Kg
Displays	6 x single colour, 6 x bi-colour, 6 x tri-colour LEDs 4 x (3 digit, 7 segment LED quadrant windows)
Motor positioning accuracy	0.1°
Response time to positioning error	15s for ±1.0°; 1s for ±5.0°

Servo motor control

Type	a.c. up/down with feedback potentiometer
Maximum quantity motors driven from basic unit (see Isolated Drive Board option for additional drives)	4

Servo motor drive ratings	240v 150mA; 50v 750mA; 240v 750mA (special)
Motor speed range	10s/90° to 60s/90°
Potentiometer feedback	+5v or +15v
Potentiometer resistance	1k 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	240vac
Maximum current	2A

Alarm

Contact	C/O
Maximum voltage	240vac
Maximum current	2A

Controlled shutdown

Maximum voltage	240vac
Maximum current	500mA

Ignition & purge prove

Maximum voltage	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

Options

Oxygen trim, Flue gas monitoring, Communications, Sequencing, Variable speed controls, Simultaneous Firing

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