

ETC6000

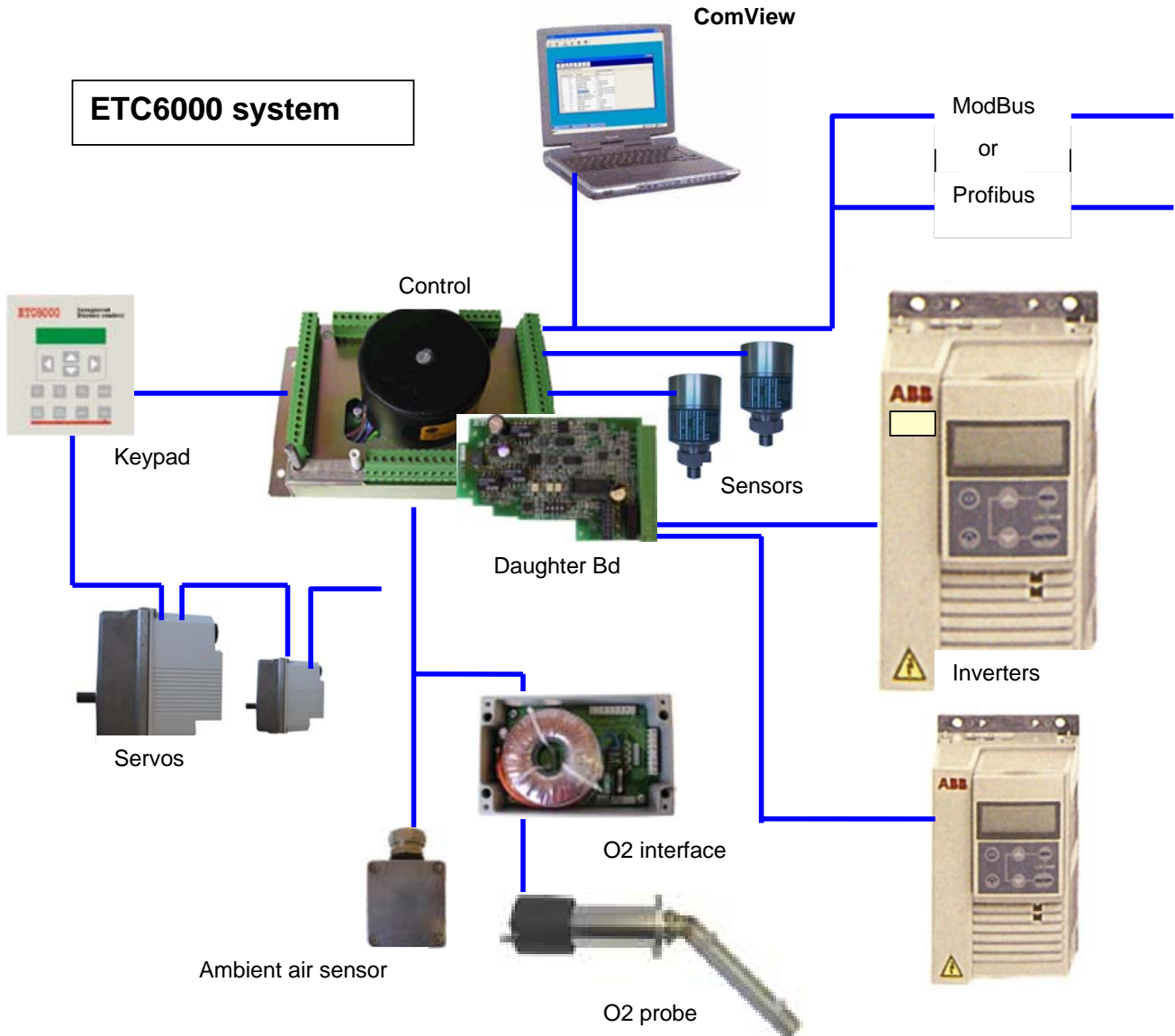
Series.....

Description

ETC6000 series is an integrated burner control incorporating fuel/air ratio control, all burner sequence timings, flame supervision, control of fuel safety valves, ignition, fan motor and modulation for single and dual fuel burners.

ETC6000 is suitable for many unique and unusual applications, for example:

- | | | |
|-----------------------------|---------------------------|--------------------------------|
| Temperature trim, | Twin firing combinations, | Complex boiler sequencing, |
| Water pump / valve control, | Draught control, | “Service due” indications etc. |





**Energy Technology &
Control Limited**

The burner sequence timing control function ensures safe operation of the burner during pre-purge, ignition, modulation and post purge. During this cycle, the unit controls the fan motor, the ignition circuit, fuel safety valves, fuel metering valves and the air damper. The unit also monitors combustion air pressure, gas pressure, flame presence and valve positions and performs necessary safety functions if faults are detected. Safety times can be varied to suit different applications.

UV, UV shuttered, Infra red, Ionisation probe and photocell flame sensors can be used independently or together. Permanent operation is possible with Infra red or shuttered UV.

For control of fuel/air ratio, the ETC6000 series uses profiling information stored in memory to position the servo motors on the burner; These motors directly control fuel valves and air dampers and remove the need for mechanical linkages. A high-resolution control algorithm is used to eliminate hysteresis and to give precise control of valve and damper positions. Commissioned set point positions give predictable control over all points from low to high fire. Interpolation methods give smooth and accurate transition between points. Ignition can be set below or above the low fire position providing for safe and reliable start-up and maximum turn-down ratio.

The basic unit will control up to 10 fuel / air control devices, supporting single or dual fuel burners for liquid or gaseous fuel firing. All servo channels can be non-monotonic making the control suitable for low Nox, flue gas re-circulation and firing of "exotic" fuels. Boiler modulation may be performed manually or, remotely using analogue or digital signals or, automatically from pressure or temperature sensors.

With such safety critical control applications, design is to a high standard with protection safeguards at every level. In line with this commitment to safety the ETC6000 series fully meets current and new European standards scheduled for introduction in September 2006.

The control is small and can be mounted on the burner or inside a traditional control panel. CanBus simplifies wiring and is used for communication between the control, its actuators, display and peripherals.

The multilingual full text display and its associated keypad, provide valuable information to the end user and commissioning engineer: burner status, set-points, commissioned data, motor positions, time and date stamped limit and fault events and O2 trim and VSD data.

Pass code protection ensures that unauthorised personnel cannot change commissioned data.

Although fuel selection and burner on/off have been integrated into the display's keypad functions they can be hard wired to traditional switches if required.

The control has extensive self diagnostics with primary and secondary fault analysis. Under specified conditions a control can be replaced without having to re-enter commissioned data.

ETC6000 series controls are complemented with a range of boiler sensors, servo motors

Optional features available through expansion components include variable speed fan control and adaptive oxygen trim.

Simple and complex boiler sequencing software are available as options.

The product's optional memory card the ETC6000's can perform simple or advanced data logging functions, typical applications are Emissions recording, Energy savings records, Utilisation, Trending etc.

"ComView" communications software is an option available for all ETC controls. This powerful package provides connection to a local or remote personal computer. Information such as set-points, profiles and engineer's data is displayed in tabular and graphic form. A dynamic plant mimic shows the status of boilers/burners and other ETC products. Burner utilisation curves can be displayed as chart recorder images and alarms with time and date stamp are available. "ComView" enables remote 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", selection of lead boiler for boiler sequencing (lead/lag) control and boiler set-point. Modulation rate, boiler control set-points and limits can also be viewed and varied from the PC. ComView includes a PC data logging option.

ETC have a range of protocol converters to convert from ETC protocol to ModBus and ProfiBus, which are commonly used to transmit data to Building Management Systems.

Benefits

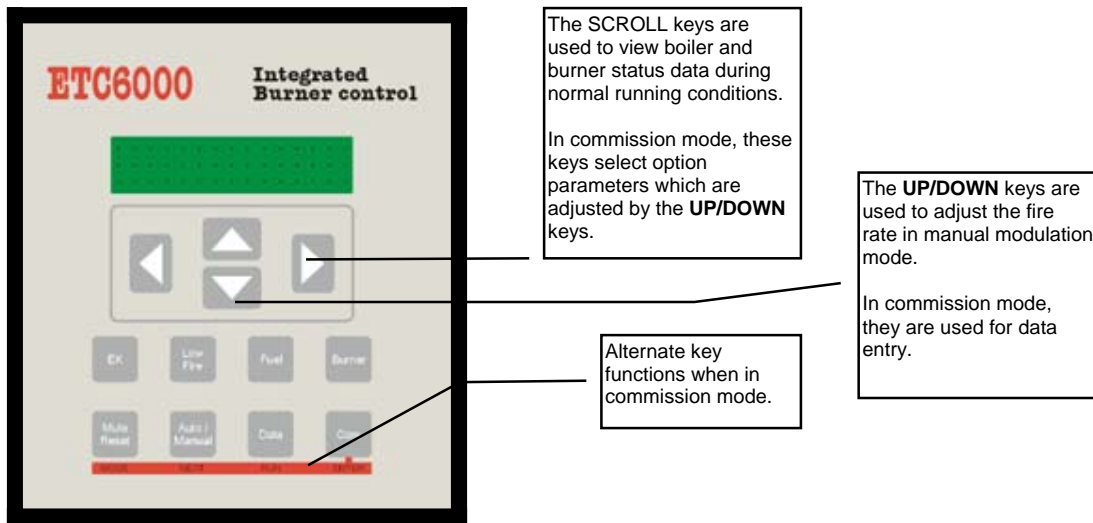
- ETC6000 series reduces boiler energy costs, minimises emissions and prolongs the life of the boiler.
- Improved turndown saves up to 5% on fuel costs.
- Electronic fuel/air ratio control replaces characterising cams and linkages and eliminates back-lash and hysteresis.
- The second boiler set-point saves energy during periods of low demand. Save up to 10%.
- Oxygen trim saves up to 3.5%.
- Energy savings and efficiency improvements result in reduced CO2 emissions
- Small size and a high degree of integration removes the need for large control panels.
- Functional integration of burner control, gas leak detection system, gas valve proving, flame supervision, PID modulation and fuel/air ratio control into a single unit simplifies wiring and interconnections and improves reliability.
- Pass code protection prevents untrained/unauthorised changes to combustion set-up.
- ComView provides data for better analysis and maintenance planning.

Functions/Features

- Sequence timing control for pre-purge, ignition and post-purge
- Self checking oil and gas flame supervision
- UV, UV Shuttered, IR and Photocell sensors can be used in combination
- Control of fuel safety valves, ignition circuit and fan motor
- Gas and oil valve proving and leakage detection
- Fuel/air ratio control with independent non monotonic control of each fuel valve and air damper
- Precise positioning of valves and dampers
- PID for control of modulation rate
- PID for remote boiler set-point and night / weekend set-back
- Fail safe digital inputs for alarm / shut-down / lockout
- Relay outputs can be used for water level alarms
- Primary and secondary air pressure monitoring
- Adjustable warming limit and period
- Burner status indication
- Self diagnostics and fault history
- Auto / manual modulation
- Small size 150 x 100mm x 90 suitable for mounting on burner
- Simple construction and installation
- Simple wiring requirements due to CanBus communication
- Optional O2 Trim
- Optional variable speed control
- Optional bespoke Boiler Sequencing
- Data Logging options for emissions recording, trending, utilisation , planning maintenance and monitoring energy savings and efficiency
- Optional ComView communications software for PC
- Optional Profibus, ModBus and Device Net interfaces for communication to Building and Energy Management systems
- Internationally Approved to today's standards and those due for introduction in Sept 2006.

The Display / Keypad

The display is a 2 line, 20 character per line, dot matrix vacuum fluorescent type allowing the use of plain text messages for most display parameters. The keypad is a membrane construction with tactile keys to give a positive feedback of the actuation.



Key actions in normal operation.

<u>Key</u>	<u>Function</u>
EK	Selects Engineers Key mode.
Low Fire	Press this key to forces the burner to Low fire. Press a second time to return to modulating mode.
Fuel	Changes Fuel / Profile. If the fuel / profile is changed whilst the burner is operating, then the control will turn the burner OFF then restart with the new profile settings
Burner	Sets the burner ON/OFF and local or remote operation.
MUTE / RESET	Press this key to mute (open) the alarm relays. Then hold the key down for approximately two seconds to remove any cleared faults and restart the burner.
Auto / Manual	Selects auto or manual burner modulation. In manual mode the UP/DOWN keys are used to alter the fire rate.
Data	Selects different data types on the display window.
Com	Changes operation to commission mode via a passcode.

Options to the display include Commissioning Data Backup, Additional Alarm outputs and Data Logging to a memory card (see Technical Specification).

ETC recognises that its customers need the flexibility in a control to cope with changing requirements of their business.

Technical specification

General		
Supply voltage		110/230Vac +10% -15%
CanBus supply (internal)		24V ac
Power consumption ETC6000 Series		65VA approx.
Supply frequency		50/60Hz \pm 5%
Ambient operating temperature range		0 to 60°C
Footprint		210mm x 125mm
Protection category		IP00
Display		2 x 20 full text VFD
Drives		12-key membrane keypad
		Maximum of 10
		2 fuel and up to 8 other functions
Combustion profiles (curve sets)		4
Flame sensors		
Sensors types:		Sensor and installation EN298 (7.4.2) & EN230 (5.2.2)
Flame sensitivity		UV, UV shuttered, IR or Photocell
Response to flame failure		2 levels – Pilot and Main flame
First Safety Time (Flame established)	1,2 or 3 seconds – as permitted by end product standards	Selectable, dependent on end product standards
Continuous operation		UV shuttered or, IR devices
Pilot and Main flame sensing	Different sensors of different technologies may be used for pilot and main flame monitoring	
Servo motor control		
Type		ETC CanBus
Positioning accuracy		\pm 0.1° ETC6000 SERIES
Relay (Digital) outputs		
Type		On/Off relay, de-energises for Off
maximum current		4A rms (fused at 4 A maximum)
maximum voltage		250Vac rms
Max total simultaneous current for Gas1+ Gas2 + pilot + Oil1 + Oil2 outputs		8A as a combination
High Voltage Digital inputs		
Type		(2 + Burner Select) OFF < 90Vac ON > 90Vac
Analogue inputs		
Types		2 x Universal – 0-5V or 4 to 20mA 4 x Voltage – 0-5V
Notes	Universal inputs are unavailable if used for gas pressure and boiler pressure / temperature	
Pressure/temperature input 0 to 5V		
Maximum current		<2mA
Input accuracy		\pm 1.0%
Pressure/temperature input 4 to 20mA		
Burden resistor		220 Ω
Input accuracy		\pm 1.2%

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Digital inputs	Type	Failsafe
Fuel and Profile select		Floating=Off, 0V=Level 1, +5V=Level 2.
Air flow and Auxiliary 1 –7		Low level = 1
Maximum current		< 25mA
Maximum Voltage		±20V absolute max
Communications interface	3-wire RS485, with termination resistor selectable via link.	

Display

Basic display	Type	2 lines of 20 Characters
		12 key (customisable) membrane keypad
	Language	Alternative language tables available for Run Mode
Standard display	Basic display +	3 programmable relay outputs (2 + 1 mixed voltage)
		Real-time clock and event logging (Fault History)
Logging Display	Standard display +	Memory for Data Logging (SD card)

Expansion Board

Basic Expansion		
Analogue outputs	Type	3 x 4 to 20mA
Analogue inputs	Type	2 x 4 to 20mA
Communications Interface	Type	Isolated RS485
VSD Expansion	Basic Expansion +	2 VSD control channels using 4 to 20mA I/O
Pulsed inputs	Type	3 x encoder / rotation sensor, 0-12V
Relay Outputs	Type	30V, 100mA. Typical Application – VSD RUN signal

Ancillary Components

Boiler Pressure/Temperature sensors ETC103x and ETC104x

Self-checking sensors

Gas Pressure sensor ETC102x series

Self-checking sensors

Can Oxygen Trim interface.

Connection layout

Main Control

