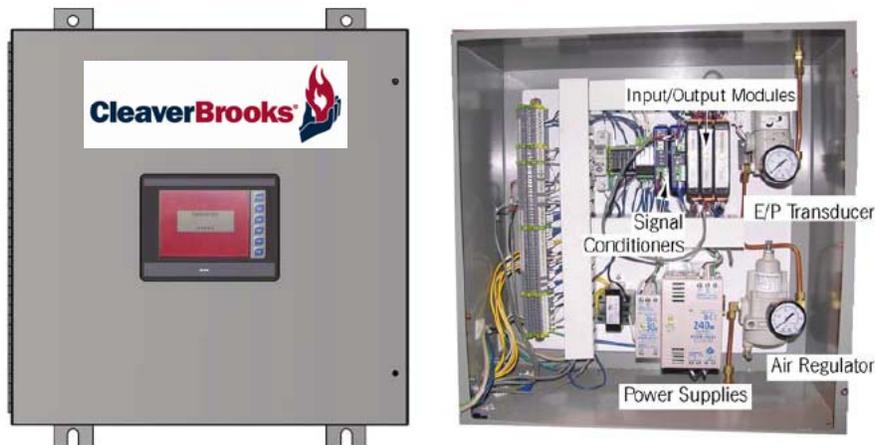


ACCU-TRIM O₂ TRIM SYSTEM

The C-B Accu-Trim O₂ Trim System is a stand-alone PLC-based control system designed to maintain the proper fuel-air ratio of a boiler/burner. The system will automatically compensate for changes in temperature, barometric pressure, or fuel characteristics, as well as correcting for normal hystereses. The system is intended for use on a Cleaver-Brooks boiler or burner with single point positioning, or jackshaft-type, combustion controls; however, it may be customized for special applications such as parallel positioning or alternate fuel firing. A complete system includes oxygen and firing rate sensors, a control panel which houses the PLC, and an actuator or VSD system which trims either the fuel or air flow.



FEATURES AND BENEFITS

- Single unit PLC / HMI with 6" color touchscreen
- Modular DIN rail mounted I/O - 8 analog inputs, 8 analog outputs, 4 digital inputs, 4 relay outputs
- Analog signals are 0-10 VDC, digital inputs are 24 VDC
- Modbus RTU communication
- Quick overview of O₂ setpoint and actual value
- Real time data trending for visual confirmation of system operation
- Displays stack temperature, variable speed drive output, excess air, and fuel selection
- Uses CB O₂ probe, Yokogawa probe, or any 4-20 mA probe
- Compatible with natural gas, propane, and #2 oil using the CB O₂ probe and with heavy oils using the Yokogawa probe
- Password protected operating parameter values
- 12-point setup for up to three fuel curves

- Independent PID loops for each trim device/fuel
- Ability to integrate with Base and Intermediate Hawk ICS packages
- Active and historical alarms
- Flash card available for data logging

PRODUCT OFFERING

Basic configurations:

The Accu-Trim system can be supplied for either fuel trim or air trim in the following configurations:

- Fuel trim - electric actuators only
- Fuel trim - pneumatic actuators only
- Fuel trim - electric and pneumatic actuators combined
- Air trim with VSD

Analyzer:

Yokogawa integrated type Zirconia oxygen analyzer

OR

Cleaver-Brooks model oxygen analyzer

Controller:

- Integrated PLC/touchscreen HMI
- Discrete input/output module
- Analog input module
- Analog output module

Actuators:

Electric, pneumatic, or combination

Options:

O₂ process value retransmission

ENGINEERING DATA

Electrical	120 VAC, 60 Hz, or 110 VAC 50 Hz 6 Amp 3-wire grounded system.
Environmental	Temperature: Control Panel 32-122 °F Firing Rate Sensor 0-180 °F
Air Supply (For pneumatic actuators only)	25-125 PSIG, 2 SCFM CLEAN, DRY instrument quality air Oil content 1 ppm maximum Dew point 35 °F or less at line pressure.



SAMPLE SPECIFICATIONS ACCU-TRIM

PART 1 GENERAL

1.1 GENERAL

- A. This specification covers the hardware and control of the C-B Accu-Trim O₂ Trim System. The system adjusts the fuel-to-air ratio in order to maintain maximum efficiency and features reliable monitoring and control of oxygen concentrations.
- B. The system shall be completely configured from factory, requiring only job-specific data to be entered (or modified) in the field. Controller/analyzer shall be shipped with “default” values and have a limit on the range of adjustments where applicable.
- C. Oil fuel trim available on integral head boiler applications only.

PART 2 PRODUCTS

2.1 HARDWARE

- A. Analyzer - choose one of the following:
Yokogawa integrated type Zirconia oxygen analyzer
OR
Clever-Brooks model oxygen analyzer
- B. Actuator – Siemens electric actuator for gas pressure, Controlair or Bellofram mounted on the oil pressure regulator (system without air trim via VSD).
- C. Controller
 - 1. Integrated PLC/HMI touchscreen (6" color screen standard)
 - 2. HMI shows bar graph and ‘moving pen’ data value indication
 - 3. Overview of O₂ setpoint and process value
 - 4. Display of stack temperature, VSD output, excess air, and fuel selection
 - 5. 8 Analog Inputs, 8 Analog Outputs
 - 6. 4 Digital Inputs and 4 Relay Outputs
 - 7. Modbus RTU
 - 8. Password protection of operating parameters.
 - 9. Active and historical alarms

Control algorithm shall be PID (Proportional, Integral, and Derivative) type. Proportional action shall be applied to the process variable and not to the deviation. PV (Process Variable) is oxygen concentration in flue gases. This is a 4-20 mA or 0-10 VDC signal from the oxygen analyzer. The O₂ input is scaled from 0 to 25% O₂. When analyzer is not measuring O₂ in flue gas (warm-up, calibration, fault) control output shall be at 50%. The

oxygen setpoint shall be based on the burner firing rate. Set point curve shall have 12 adjustable break points. The setpoint shall have independent settings for up to 3 fuels.

- Systems with Fuel Trim - Correction to the fuel air ratio is accomplished by changing fuel pressure. In the case of natural gas this is done via an electric or pneumatic actuator mounted on the gas pressure regulator. In the case of oil fuel, this is done by applying air pressure to the top side of the PRV diaphragm.
- Systems with Air Trim - Applying adjustment to the calculated combustion air blower speed performs the correction to the fuel-air ratio.

2.2 APPLICATION

This system is intended for use on a Cleaver-Brooks boiler or burner with single point positioning, or jackshaft-type, combustion controls; however, it may be customized for special applications such as parallel positioning or alternate fuel firing. System is compatible with natural gas, propane, and #2 oil using the CB O₂ probe and with heavy oils using the Yokogawa probe.