• **Energy Efficient** fuel and air control for new or existing Jackshaft Burners.

• **Faster Payback** by combining oxygen trim fuel savings and combustion air fan speed control electrical savings.

• **Minimum Fan Power Usage** - Fan speed control minimizes damper pressure drop related fan power usage.

• **Minimum Fuel Usage** - Flue gas oxygen is used to continuously adjust (trim) the air / fuel ratio.

• **Safe and Dependable Boiler Control** - Flue gas temperature and oxygen are monitored. Warning alarms and burner safety shutdown interlocks are available.

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**Description**

The *UtilitySaver* uses a single PCC-III Controller to provide state of the art burner control. The package includes fuel and air firing rate control with both oxygen trim and variable speed fan combustion air flow control.

Flue gas oxygen is measured and compared against setpoint to continuously adjust (trim) the air / fuel ratio. Oxygen trim saves fuel by fine tuning the burner to operate safely and reliably at reduced excess air levels throughout the burner firing range.

Variable speed fan control is a proven electrical energy savings technique that has been applied to thousands of HVAC installations.

In the past, burners typically varied air flow with a damper. A damper reduces air flow by adding pressure drop, which consumes extra motor energy (kWhs). By incorporating a Variable Speed Drive, the damper pressure drop is minimized, and kWh usage decreases rapidly in proportion to the cube of flow.

*UtilitySaver* control logic provides maximum fuel and electrical savings without reducing burner turndown.

Installed on new or existing Jackshaft burners, *UtilitySaver* fuel and electrical savings can pay for the installed system in two years or less.
**Digital Displays**

- Demand % or (Pressure/Temperature)¹
- Setpoint (Pressure/Temperature)¹
- Firing Rate %
- Oxygen
- Oxygen Setpoint
- Oxygen Trim
- VFD Speed
- Fuel Valve Position
- Air Damper Position
- Boiler Efficiency

**Alarms**

- Low Flue Gas Oxygen
- Low-Low Flue Gas Oxygen
- Low Efficiency⁴
- High Flue Gas Temperature⁴
- Oxygen Sensor Fault
- Fuel Control Valve Fail
- Variable Frequency Drive Fail
- Air Damper Fail

**Notes**

1. **Directly interfaces** with 135 ohm or 4-20 mA Boiler or Plant Master firing rate controllers. Optional transmitter adds local PID firing rate control.

2. **Fuel-Air Lead-Lag with Cross-Limiting** - Air increases first on load increase. Fuel decreases first on load decrease. Controls to minimum excess air levels during normal firing, and increases excess air during a load change for safety. Excessive air is prevented during load changes for flame stability.

3. **Independent Fuel-Air Ratio curves for Gas and Oil** - The F(x) characterizer curves allow for optimum Fuel-Air ratio for each fuel over the entire modulating range. PCC-III “Learn” mode provides rapid, error free burner fuel-air ratio curve setup, with easy “Store” pushbutton operation.

4. **Real time boiler efficiency is calculated** - This function allows the boiler operator to instantly identify inefficiencies and potential operational problems. (Requires flue gas temperature thermocouple).
**Site Data:**
- 600 Bhp Boiler - 20 hp fan, 120 psi boiler, natural gas fired, operating 365 days / year & 24 hours / day
- Electrical Cost - 7.5 cents /kWh, Fuel Cost - $4.5 / 1000 ft3, Flue Gas Oxygen Reduction - 1.5% Wet

**Return on Investment . . .**

**Total Savings $13,700/year**

**Typical Energy Savings Chart**

**Functionality**

- **Availability** - Full Speed Bypass - "Flip-a-Switch" to change over from variable speed to constant speed control with pre-set full speed air damper curves.
- **Safety** - Low flue gas oxygen trips the burner after an adjustable time delay. VFD speed and actuator position are continuously monitored and the burner trips if either are out of position.
- **Lightoff Position** is adjustable for wide turndown
- **Automated Purge & Light-Off** - The air and fuel automatically drive to purge and light-off positions under flame safeguard system direction. VFD "at speed" contacts are included for burner purge and light-off limits.
- **Oxygen Analyzer Diagnostics** - Specific diagnostic codes for rapid trouble shooting. Continuous cell impedance checking for cell health prediction.
- **Oxygen Trim Is Delayed** for a period after light-off (adjustable) to allow stack oxygen to stabilize.
- **Manual Air Trim Capability**
- **Easy Commissioning Using “Learn Mode”** - F(x) Characterizer curves are set by manually positioning fuel and air for safe and reliable operation and optimum oxygen level and then pressing the "STORE" button. Air and oxygen setpoint curves are simultaneously setup. The process can be repeated for a maximum of 11 load points. Independent curves for each fuel are automatically selected.

**Larger Size boilers provide even greater payback**
UtilitySaver Specifications

UtilitySaver Panel

Controller: PCC-III-ZG00
Enclosure: 16" H x 14" W x 10" D
Environmental: Nema 12
32° to 122° F (0° to 50° C)
Input Power: 120 Vac (+/- 15%)
Transmitter Power: 24 Vdc @ 215 mA
I/O:
- 8 Analog Inputs
- 2 T/C Inputs
- 5 Digital Inputs
- 2 Analog Outputs
- 2 Relay Outputs
- 2 Pair Triac Outputs
Control Logic: Blockware, 62 functions, 160 Blocks
Security: 4 password levels, Redundant memories
Communication:
- Protocol: Modbus (ASCII or RTU mode)
- Type: RS-485, optically isolated
Operator Panel:
- Process Displays: Up to 10, (see page 2)
- Alarm Messages: Up to 10, (see page 2)
Commissioning:
- Faceplate: Fully front face configurable
  4 dedicated EDIT keys located under hinged cover
- Laptop (optional): PC3-Edit™ spread sheet
  based editor or PC3-Draw™
  graphical, object-oriented editor
Tools: “Quick Menus” for rapid editing of tuning constants, alarm setpoints, and key parameters,
“Examine”, "Block Force" and "Learn" modes to facilitate commissioning.

Boiler Efficiency Kit

Sensor: Type J flue gas thermocouple assembly
Construction: Nema 12
Mounting: Mounting flange provided
Calculation: Based on ASME "by losses"

Model ZP Oxygen Sensor

Sensor: In-situ zirconia oxide cell, ceramic heater
Construction: Nema 12
Input Power: 120 Vac, 70 W
Application: Gas & Liquid Fuel standard
Solid Fuels optional
Probe Lengths: 20, 30, 45, 65 or 90 inches
Mounting: 3", 125 lb, flat faced flange
Instrument: "Z" option board in remote
PCC-III Controller

PWM Variable Frequency Drive

Environmental: Nema 12
32°-122° F avg., 131° F peak
Efficiency: 95 - 97 %
Control Method: "Soft Turn-On" IGBT PWM for dV/dt reduction
Input Line Protection: External high speed fuses
THD reduction choke
Optional Bypass Package: Full Speed / Variable Speed, 3 Phase Transfer Switch, Nema 12 enclosure

Actuators (Jackshaft and Damper)

Standard: DM-1E, 150 in-lb, electric
Optional:
- R-AL, 600 in-lb, electric
- 1710, 1000 in-lb, electric
- UP10, 1080 in-lb, pneumatic

Firing Rate Modulation

Standard: Re-use existing 135 ohm or 4-20 mA firing rate signal
Optional: PID firing rate control with pressure or temperature

For Suggested Specification
See Bulletin CS-PCC-III-13103SP

For complete information on the UtilitySaver System and the operating cost savings you can expect, see your nearest PREFERRED INSTRUMENT Representative, or contact us direct.