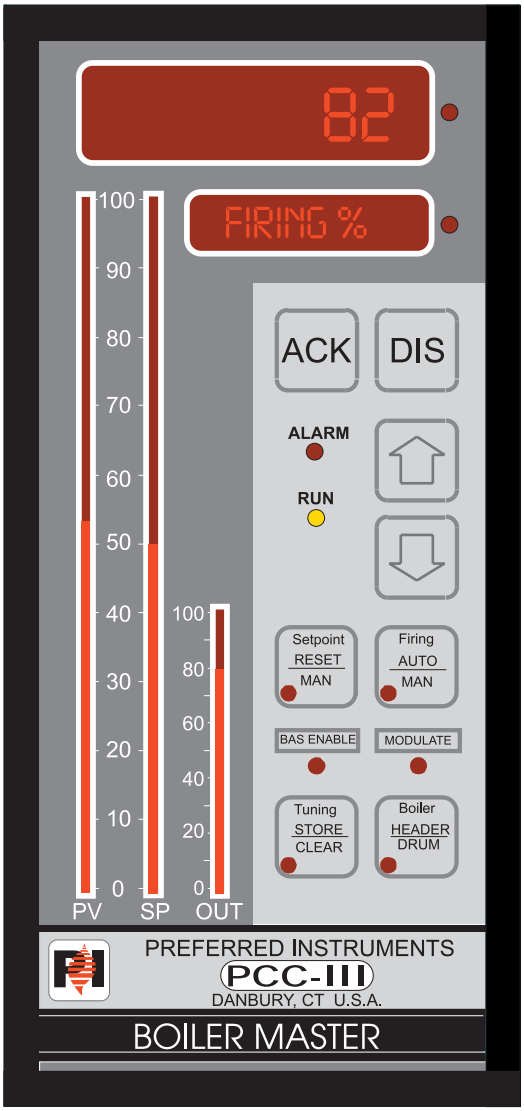
PREFERRED INSTRUMENTS

MiniSaver Burner Control

(Variable Speed Fan Combustion Air Flow Control)

- Precise fuel and air control for new or existing Jackshaft Burners.
- PID control provides efficient, accurate control by eliminating drum pressure (temperature) “offset” error.
- New or Existing Flame Safety System interface to permit automatic operation at a reduced cost of installation.
- Minimum Fan Power Usage - Fan speed control minimizes unnecessary damper pressure drop related fan power usage.
- Outdoor Reset - Heating Plant firing rate setpoint is adjusted based on outdoor temperature. Therefore, operating cost is reduced during warmer days.
- Automatic Sequencer - Coordinates 2,3 or 4 boiler “On-Off” operation to fulfill changing load conditions.



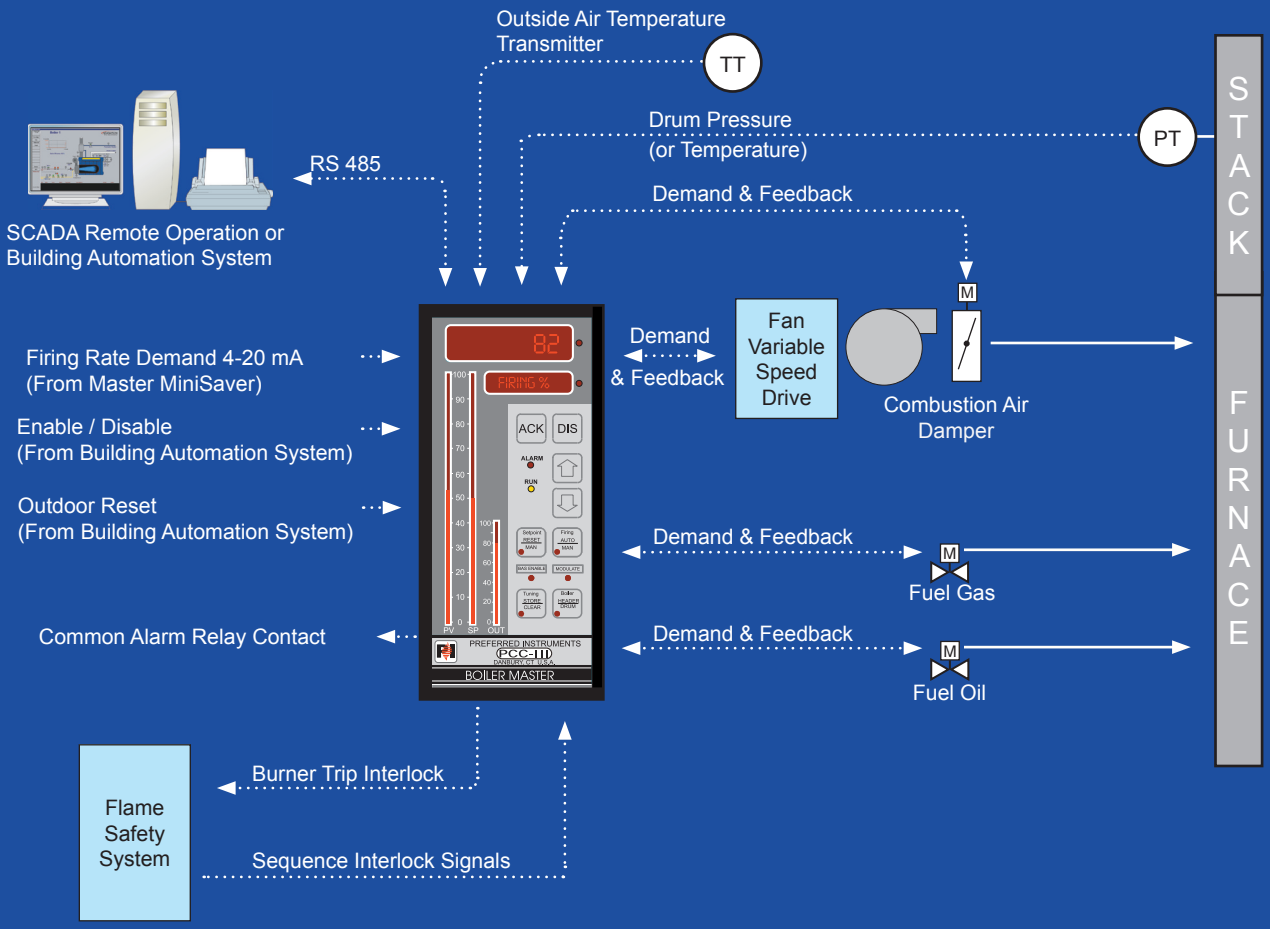
Description

The ***MiniSaver*** uses a single PCC-III Controller to provide state of the art burner control for boilers and hot water generators with firing rates as small as 1 million BTUs. The package includes fuel and air firing rate control with **variable speed fan** combustion air flow control.

The ***MiniSaver*** provides for independent control of the fuel valves, air damper, and Variable Speed Drive (VSD). This configuration saves fuel by avoiding “linkage” based control system errors while providing accurate electronic characterization of fuel-air ratio.

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

In the past, burner combustion air flow was varied by way of a damper. A damper reduces air flow by imposing a pressure drop, which consumes extra motor energy (kWh). By incorporating a VSD, the damper pressure drop is minimized, and kWh usage decreases dramatically in proportion to the cube of the flow ratio.



SIMPLIFIED BLOCK DIAGRAM
MiniSaver Burner Control

Functionality

- **Simple and Intuitive Operation** - Controller front panel keys allow the operator to select fully automatic operation or manually set the boiler to a specific firing rate. For heating plants, the operator can set the specific temperature setpoint or allow the setpoint to be adjusted by outside air temperature **(Outdoor Reset)**. Finally, the operator may select “Header Pressure” control and permit the boiler to fire according to a Plant Master input.

- **True PID Control** - In “Local”, the firing rate is determined by a pressure or temperature transmitter, the setpoint (determined by the operator), and a PID control block. PID control ensures that the required setpoint is reached without “offset”.

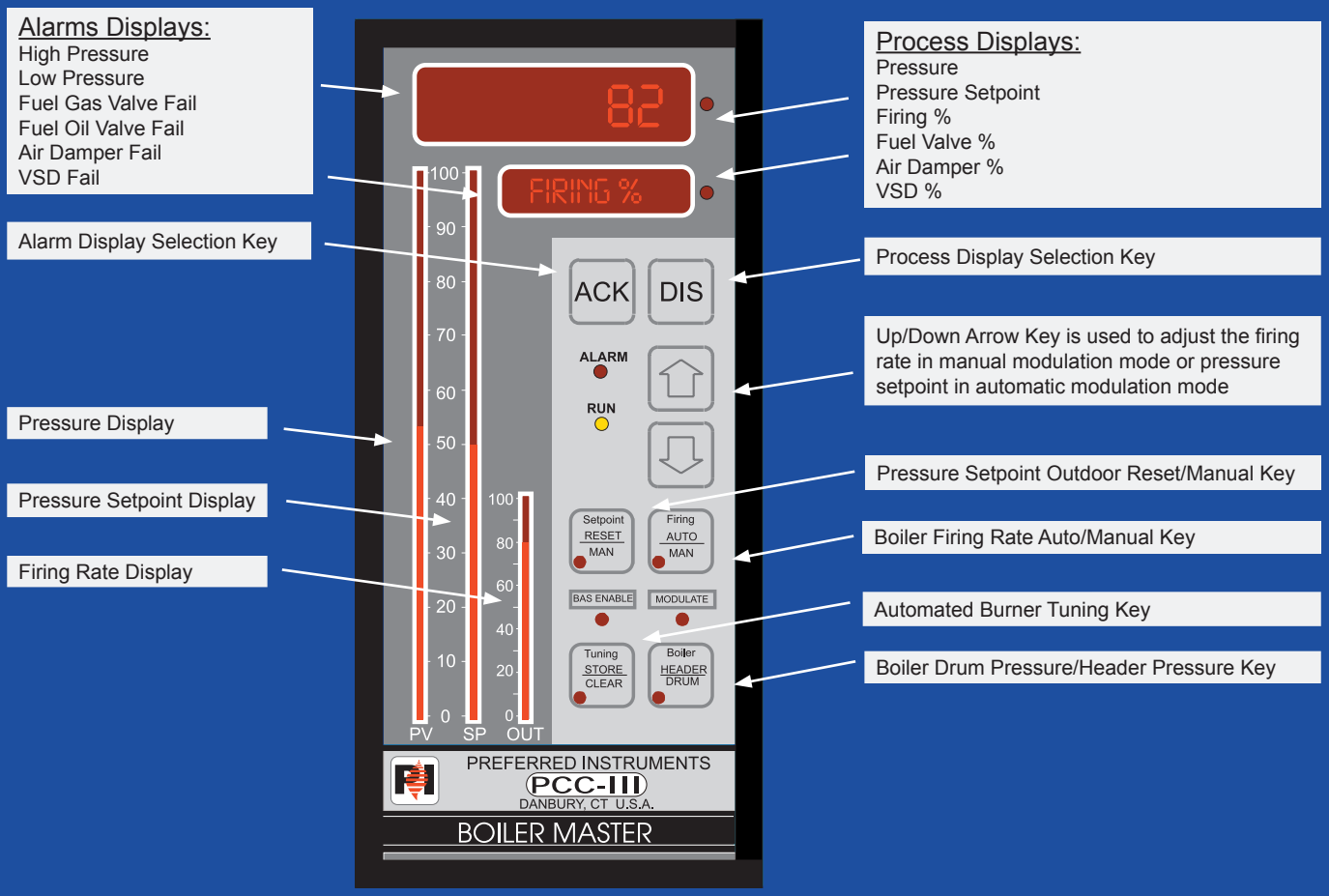
- **Directly Interfaces** - Optional interface to existing 135 ohm Boiler or Plant Master firing rate controllers.

- **Fuel-Air Lead/Lag with Cross Limiting -** Air increases first on load increase. Fuel decreases first on load decreases. 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 to minimize the possibility of flame instability.

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

- **Adjustable Start** - The light-off position is adjustable for wide turndown boilers.

Simple and Intuitive Operation . . .



Note: Steam Pressure Control Application shown, control is available for Steam or Hot Water Applications

- **Automated Purge & Light-Off** – The air and fuel automatically drive to "Purge", "Low-Fire" and "light-off" positions under flame safety system direction. VSD "Fan Running" contacts are included for burner "Purge", "Low-Fire" and "light-off" states.

- **Automatic Sequencing** - This control ensures the number of boilers in service meets the hot water or steam demand. The selected sequencing controller includes a lead boiler selection display and up to four (4) Auto Start/Stop discrete outputs. The selected lead boiler will fire on demand. If the lead boiler is unable to satisfy the load, the lag boiler(s) will be automatically brought on in numeric sequence as required by load conditions.

- **Full Boiler Modulation** – Multiple boiler firing rates are automatically adjusted to satisfy the overall plant hot water or steam demand.

- **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 possible and automatically selected.

- **Building Automation System (BAS)** – BAS interface includes a MODBUS interface, a contact input for boiler operation 'Enable/ Disable' and optional 4-20 mA 'Outdoor Reset' input signal.

MiniSaver Specifications

MINISAVER PANEL

Controller:	PCC-III-0GS0
Enclosure:	20" H x 20" W x 10" D
Environmental:	Weather Proof 32° to 122° F (0° to 50° C)
Input Power:	120 Vac (+/- 15%)
Transmitter Power:	24 Vdc @ 215 mA
Actuator Power:	24 Vac, 40 Va
Security:	4 password levels, Redundant memories
Communication:	
Protocol:	Modbus (ASCII or RTU mode)
Type:	RS-485, optically isolated
Operator Panel:	
Displays:	Up to 10
Alphanumeric:	16 character LED (0.2")
Numeric:	4.5 digit LED (0.43")
Bargraphs:	
PV & SP:	51 segment LED (5.1")
Output:	21 segment LED (2.1")
Alarm Annunciator:	10 point, first out
Status LED:	6 LED
Pushbuttons:	4 Membrane, tactile feedback
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.

FIRING RATE MODULATION

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

DAMPER AND VALVE MOTOR

Power:	250 Vac rms
Rotation:	90° in 60 seconds
Output Shaft:	Hardened Steel
Feedback Potentiometer:	+5Vdc for full range travel

VARIABLE SPEED DRIVE

Type:	Pulse Width Modulation (PWM)
Environmental:	Nema 12 32°-122° F avg., 131° F peak Derate above 104° F avg.
Efficiency:	95 - 97 %
Control Method:	"Soft Turn-On" IGBT PWM for dV/dt reduction
Input Line Protection:	External high speed fuses THD reduction choke

OUTDOOR AIR TEMPERATURE SENSOR

Sensor:	
Type:	RTD with Integral 4-20 mA Transmitter
Accuracy:	± 0.5% of span
Temperature Range:	-30 to +120 ºF

HEADER TEMPERATURE SENSOR

Sensor:	
Type:	RTD with Integral 4-20 mA Transmitter
Accuracy:	± 0.1% of span
Temperature Range:	0 to +300 °F
Thermowell:	
Insertion:	4.5"
Connection Size:	3/4" External and 1/2" Internal NPT Thread
Materials:	Stainless Steel

HEADER PRESSURE SENSOR

Sensor:	
Type:	4-20 mA
Accuracy (at 70 °F):	± 0.25% FS
Pressure Range:	0 - 25 psig, 0-200 psig or 0-500 psig
Pressure Fitting:	1/4" - 18 NPT external, Stainless Steel

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