

LP-4000 Hi-Speed Calorimeter

DESCRIPTION

The LP-4000 Hi-Speed Calorimeter is used in a broad range of gas applications requiring feed forward or feed-back control in processing units - ovens, reformers, heaters, boilers, reactors, as well as for blending gas to a uniform quality. When the fuel gas composition varies, the heating characteristics also vary. The LP-4000 is a necessary tool to efficiently control the heating value of the fuel gas.

APPLICATIONS

Rapid response and reliability make the LP-4000 the best choice in:

- *Mixing and blending of gas streams.*
- *Monitoring gas quality.*
- *Calorific Value measurement.*
- *Wobbe Index Measurement.*
- *Controlling LPG/Air mixing systems.*
- *Controlling enrichment of low BTU gas.*

STANDARD FEATURES

The fast response, reliable operation, and ease of maintenance and calibration have made the LP-4000 the world leader in Calorific Value calorimeters. ASDI instruments are used in high speed gas blending operations where continuous measurement of the gas heating value is



required. The LP-4000 series is an example of SDI's high quality products.

- *Fast response of Calorific value measurements for precise control.*
- *Digital display for easy readout.*
- *High reliability ensures accurate and durable use.*
- *Continuous output for precision control applications.*
- *Optional auto calibration enhances accuracy and reduces maintenance.*
- *Flame safety automatic interlock for secure operation.*
- *Low maintenance saves on operating cost.*
- *Wobbe Index or Calorific Value measurement.*

O P E R A T I O N

PRINCIPLE OF OPERATION

Quantities of sample gas and combustion air are accurately metered and burned under closely controlled conditions. The resulting exhaust gas temperature is measured by a precise sensing system. A narrow proportional band controller regulates changes in the quantity of combustion and cooling air to the burner. This serves to maintain the exhaust gas at a constant temperature while the heating value of the sample gas is changing. The change in flow rate of the air is sensed and is proportional to the measured value within the calibrated range of the instrument. A transducer inputs the measured value to a microprocessor which provides a digital display, a 4-20mA continuous output (corrected for zero shift), and provisions for auto-calibration.

An arrangement of sensors provide a means to automatically ignite the burner if the flame becomes extinguished due to shortage of sample gas, combustion air, mechanical failure, or electrical supply failure. A solenoid valve serves to shut off the sample gas supply until all monitored parameters are reinstated within acceptable limits. When satisfactory conditions are established the burner will be re-ignited.

MODES OF OPERATION

Wobbe Index-

A meaningful measure of the actual heating characteristics of a fuel gas, which is derived from the basic heat flow equation and is defined as:

$$\text{Wobbe Index} = \frac{\text{Calorific Value}}{\sqrt{\text{Specific Gravity}}}$$

The Wobbe Index measures the combined effects of fuel gas composition changes (i.e. calorific value and specific gravity) and therefore provides a useful signal for monitoring and/or control. Wobbe Index mode is applied in LPG/Air mixing systems such as the SDI **BLENDAIRE**[®].

Calorific Value-

The heat value at standard conditions. Calorific Value mode is applied in fuel enrichment applications and gas mixing.

Gross Heating Value-

The theoretical heat value of the gas at standard conditions.

Net Heating Value-

The actual available heat value of the gas at standard conditions, which is frequently used in calculations to infer the heat potential for the gas.

S P E C I F I C A T I O N S

MODES OF OPERATION

Calorific Value:	Expressed in BTU/SCF (KCAL/Nm ³)
Wobbe Index:	Defined As $\frac{\text{Calorific Value}}{\sqrt{\text{Specific Gravity}}}$
Range:	Standard up to 3000 BTU/SCF (30,000 Kcal/Nm ³) where the upper value is twice the lower value.
Accuracy:	+/-1.0% of upper range value +/-0.5% of upper range value with Auto-Cal
Repeatability:	+/-0.3% of upper range value
Linearity:	+/-0.2% of upper range value
Response:	6-8 seconds plus sample transport lag time
Output Signal:	4-20mA DC 1200 Ohm impedance (4-wire isolated)
Ambient Temperature Limits:	Should be in protected area where temperature variations are within +/-15°F (+/-8°C) to maintain accuracy. Suitable enclosures are available as options to accommodate various ambient conditions.

SAMPLE CONDITIONS

Flow Rate:	400-2500 cc/min (depending on gas heating value)
Pressure:	1-60 psig (7-414 kPa)(Standard) Consult factory for other conditions.

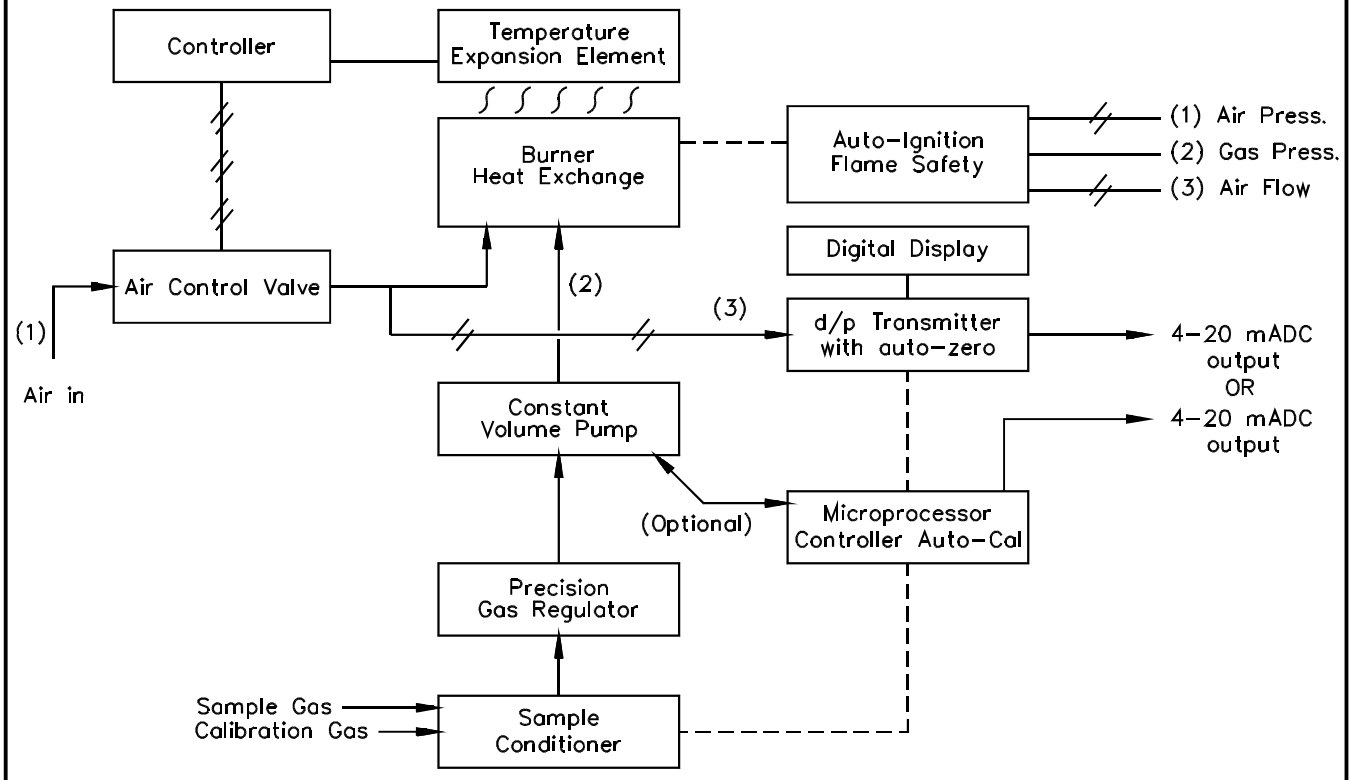
UTILITIES

Power:	115VAC +/-10% 50/60 Hz (5 amps Maximum) 220 VAC +/- 10% 50/60 Hz
Air Supply:	Instrument air, 60-125 psig (414 to 862 kPa) 2.5 to 6.0 SCFM (71 to 170 l/m depending on gas heating value) dry, oil free. Optional air blower available.

ARRANGEMENTS

Electrical Area Classification:	General Purpose. Consult factory for hazardous area.
Mounting:	Wall mounting Enclosure (standard)
Shipping Weights and Dimensions:	200 lbs. (68 kg.) 44"H X 24"W X 16"D (1.07m X 0.56m X 0.37m)
Optional Features:	Constant Volume Gas Pump for Calorific Valve Measurements.
	Auto-Calibration with Auto switching sampling system,
	Gas enrichment system for expanded range operation or low burning quality gas.
	Auxiliary gas injection system for hard to ignite gases.
	Air blower (used when instrument air is not available).
	Sample conditioning systems.
	Free standing rack, Free standing enclosure, Free standing temperature controlled enclosures.

LP-4000 SCHEMATIC



...Innovative liquid vaporizing and gas mixing solutions

Represented By:

Power Equipment Company
 2011 Williamsburg Road
 Richmond, VA 23231 USA

Tel: 804-236-3800
 Fax: 804-236-3882

e-mail: sales@peconet.com
 internet: www.peconet.com



Form: LP1199