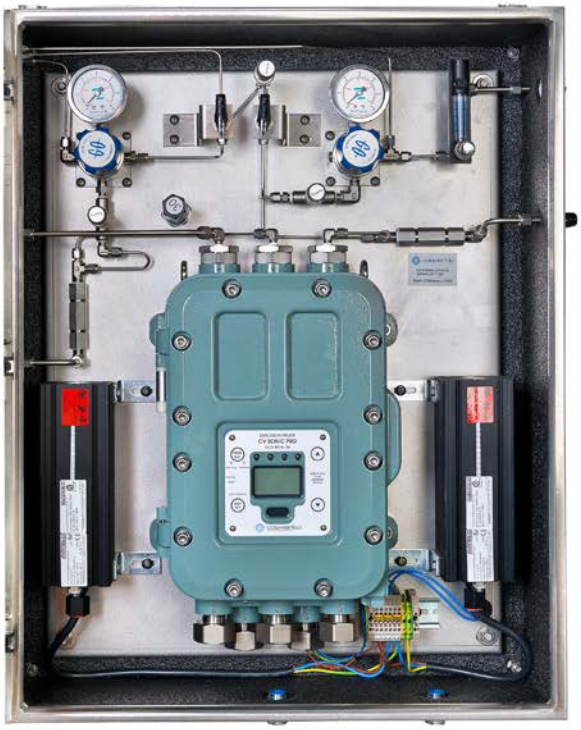
cosa+xentaur

Natural Gas Applications:

- ☑ Gas Turbine Fuel Gas Optimizing
- ☑ Gas Boiler Optimizing
- ☑ Appliance Performance
- ☑ Natural Gas Custody Transfer
- ☑ City Gas Energy Accounting



CV PRO™ Features:

- ➔ 5 Second Response Time
- ➔ No Carrier Gases
- ➔ Small Form Factor
- ➔ Calibrates With Air

CV SonicPRO

Calorific Value Measurement

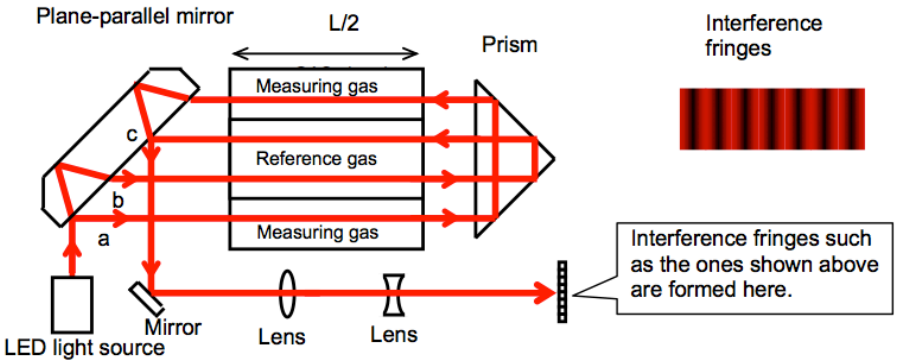
BTU/cf • **kcal**/m^3 • **MJ**/m^3 • **Wobbe**

Relative Density Measurement

Methodology

Two measurement methodologies are utilized to determine the Calorific Value and Relative Density.

OPTICAL SENSOR SECTION



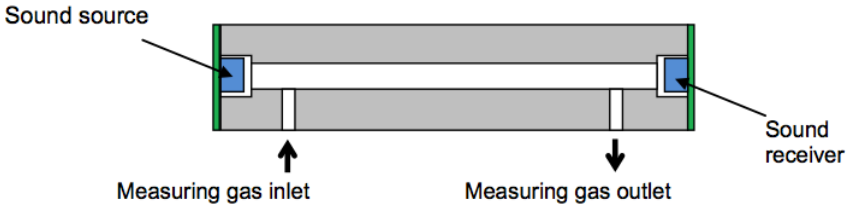
A schematic diagram of the interferometer used in the optical sensor is shown above. This interferometer forms "interference fringes" that move in proportion to the "differences of refractive index" between the measuring and reference gases. The movement distance of interference fringes Δθ can be expressed as the following formula:

$$\Delta\theta \frac{2\pi L(nGAS - nREF)}{\lambda}$$

L: Chamber length
nGAS: Refractive index of measuring gas
nREF: Refractive index of reference gas
λ: Light source wavelength

The light source wavelength and chamber length are physically quite stable. Therefore, the refractive index of measuring gas *nGAS* can be accurately obtained by measuring the movement distance of interference fringes.

ACOUSTIC SENSOR SECTION



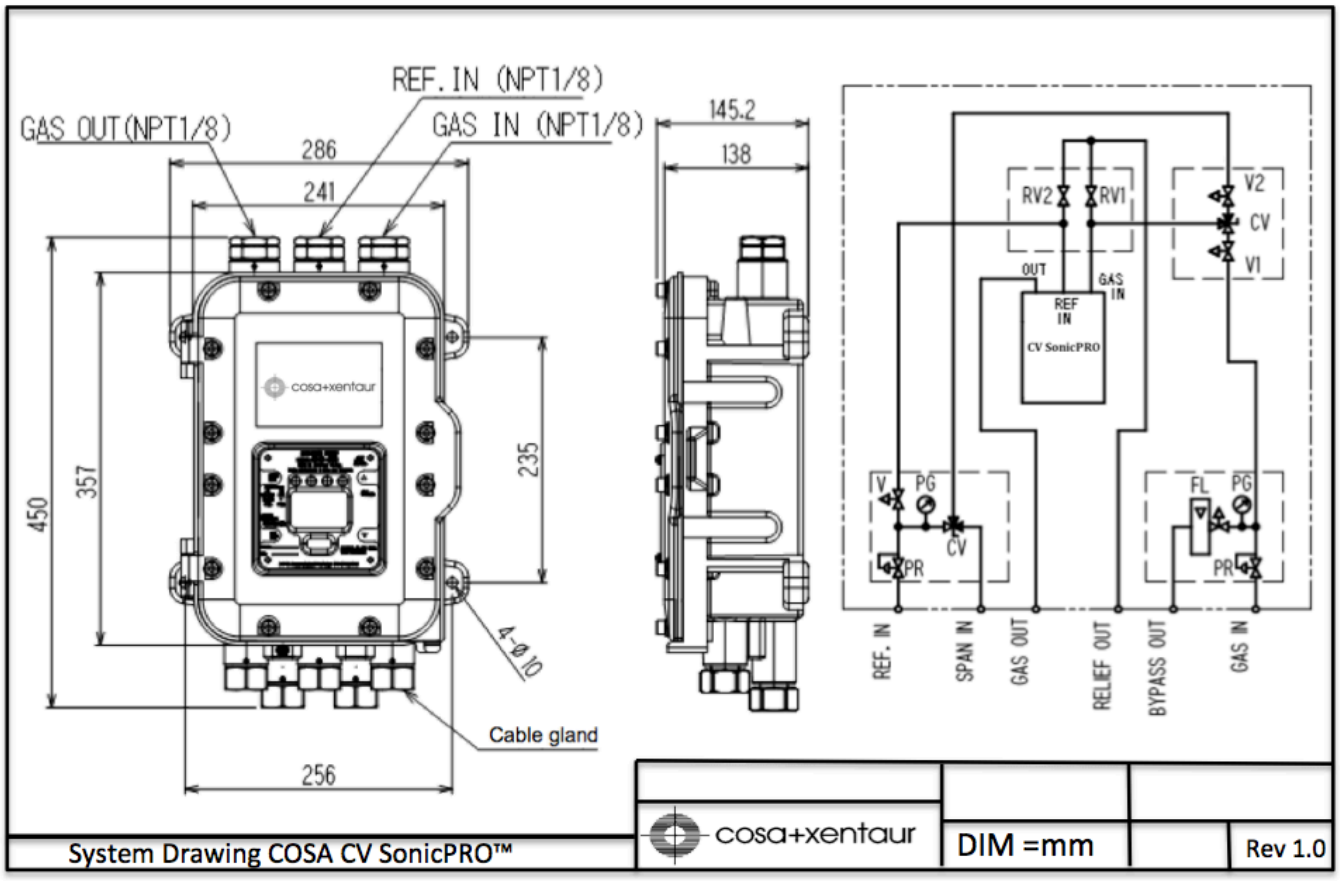
A schematic diagram of the sonic sensor is shown above. This sensor emits a sound from the sound source into a tube in which a measuring gas flows and then measures the time τ in which the sound travels through the measuring gas and arrives at the sound receiver. T
of sound that travels through the measuring gas v_{GAS} can be expressed as the following formula:

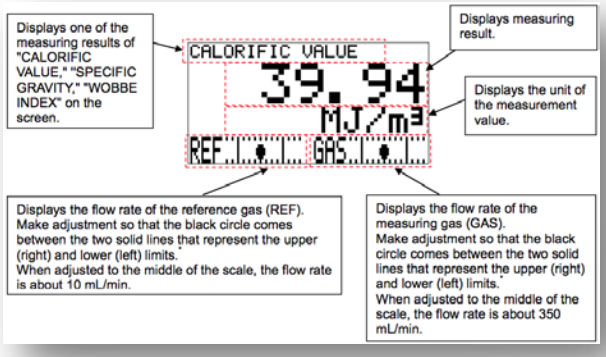
$$vGAS = \frac{L}{\tau}$$

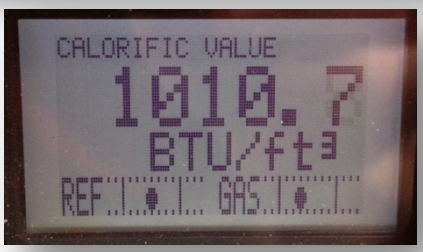
L: Distance from the sound wave source to the sound receiver
τ: Time in which a sound from the sound source arrives at the sound receiver

The distance from the sound source to the sound receiver *L* is physically quite stable. Therefore, the speed at which a sound travels through the measuring gas v_{GAS} can be accurately obtained by measuring the sound travel time τ.

System Overview

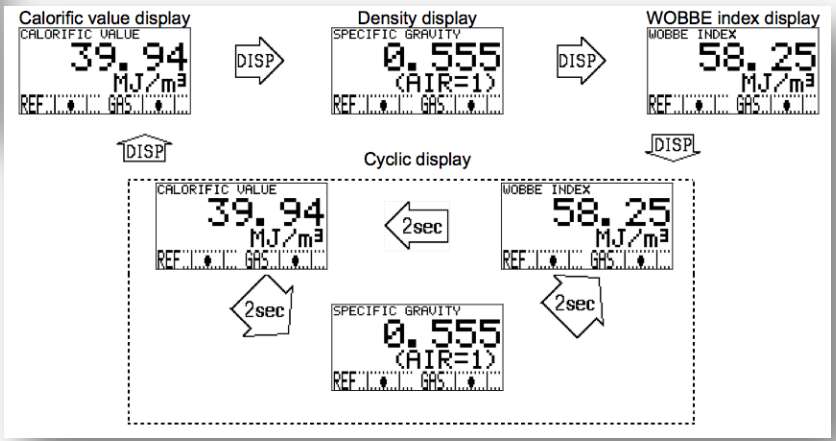






Backlit LCD Display

Easily seen and understood screens that cycle through the Calorific and Density measurements or will hold on one unit of measurement for continuous display



SPECIFICATIONS

Model	CV SonicPRO™
Detection principle	Interferometry + Acoustic using Speed of Sound
Measuring gas	C1-C6 Blends 10-100% Interference Gases: AR, N2 & CO2<70% combined H2: 0-40%
Measuring Parameters	Calorific Value gross/Net, Wobbe Index, Specific Gravity/Relative Density, Methane Number
Measurement range	CV: 25-50 MJ/Nm^3 (670 BTU/ft^3 - 1341 BTU/ft^3) RD: 0.500 – 1.500 (Air=1.000) Methane Number: 45-110 MN
Accuracy:	CV:±0.4% Relative RD:±0.4% Relative MN± 1 MN
Repeatability	CV: ±0.02 MJ/Nm^3 (0.5 BTU/cf) RD: ±0.002 MN ± .1 MN
Drifting	CV: 0.1 MJ/Nm^3 (0.3 BTU/cf) max temp fluctuation of 20°C in 24hrs
Response time	≤5 sec Time to 90% response
Flow Rates	Sample Gas: (GAS INLET) 3 L/min (Natural Gas or NG + LPG) Reference Gas: (REF INLET) 0.5 L/min (Instrument Air)
Inlet Pressures	3000psig on sample system inlet 11.60psia to 15.95psia on instrument
Gas Temperature	-20 to +57°C
Ambient Temperature	-20 to +57°C, 95%RH (non-condensing)
Outputs - Analog	4-20mA (source current) maximum load resistance of 300 Ω
Outputs - Digital	RS-485 Modbus
Outputs - Optical	Proprietary interface IrDA communication output for maintenance
Outputs - Electrical	2ea. System Condition Relays 2 A, 30 VDC (resistance load) 1ea. Maintenance Relay 20 W, 240 VAC (resistance load)
Area Classifications	ATEX ZONE 1
Power	100 - 240 VAC ±10%, 50/60 Hz, max. 18 VA or 24 VDC ±10%, max. 5W
Dimensions & weight	Approx. 286 (W) x 450 (H) x 145 (D) mm, approximately 21kg

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