



GasPT - Gas Properties Transmitter

an instrument to provide fast and accurate measurement of the calorific value and relative density of natural gas

The GasPT system measures physical properties of the gas mixture, such as thermal conductivity and speed of sound, and from these properties infers an effective gas mixture comprising four components Methane, Propane, Nitrogen and Carbon Dioxide. From this effective gas mixture the system uses the standard ISO6976 to calculate the gas quality characteristics Calorific Value (CV), Wobbe Index (WI), Relative Density (RD) and Compression Factor (Z).

The GasPT system comprises two main elements:

The Probe

This performs the measurements on the sample gas and calculates the effective gas mixture and 'gas quality' parameters. It is likely that the probe will be in a hazardous area hence it works in partnership with:

The Safety Interface

This limits the voltage, current and power into the hazardous area. The safety interface also provides full galvanic isolation between the safe area equipment and the probe in the hazardous area.

These two items must be used together to ensure the safety of the final installation; they will always form a pair, for every probe there must be a corresponding safety interface. The safety interface requires an external 24 VDC power supply and communicates serially over a two wire RS485 interface. This two wire bus allows multiple systems to be connected to a single master that can read data from them all.

Communications

The GasPT system is MODBUS™ compatible slave and supports both ASCII and RTU protocols.



Features and Benefits

- Low initial cost
- Compact primary element; easy installation
- Non-combusting process
- Minimal operating costs
- No carrier or reference gases required
- High stability, infrequent calibration
- Flexible MODBUS™ communications interface
- Intrinsically safe primary element
- Wide range of gas compositions
- Fast, near real-time measurement
- Effective mixture CH₄, C₃H₈, N₂ and CO₂
- Utilises ISO6976 for CV, RD and WI calculation
- CV accuracy ± 0.5% of reading
- RD, WI and compression factor
- Easily configured to provide:-
 - SI or Imperial units
 - By mass or volume

The following gas quality data is available

Parameter	Parameter
Temperature	Effective Methane
Pressure (Absolute)	Effective Propane
Speed of Sound	Effective Carbon Dioxide
Speed of Sound Confidence	Effective Nitrogen
Calorific Value (superior)	Actual Density (gas)
Calorific Value (inferior)	Compression Factor
Relative Density	Motor Octane Number
Wobbe Index	Methane Number

Operational Range

Probe	
Ambient or Sample Gas	
Temperature Range	-10 to +50°C +14 to +122°F
Humidity	Non-condensing
Max pressure (absolute)	1300 mbara 18.82 psia, (4.3 psig)
Sample gas flow rate (typical)	0.7 to 2.0 l/min 1.5 to 4.1 ACFH
Hazardous Area Classification	⊕ II 1 G EEx ia IIB T4 (-40°C <T _a < 70°C) Suitable for natural gases in Zone 0
Safety Interface	
Ambient Temperature Range	0 to +50°C +32 to +122°F
Humidity	Non-condensing
Hazardous Area Classification	⊕ II(1)G [EEx ia] IIB (-20°C <T _a < 50°C) To be installed in a Non-Hazardous (Safe) Area
Power requirements	24 VDC @ 100 mA

Performance

Calorific Value (over normal range)	
- Accuracy	± 0.20 MJ/m ³ ± 5.4 Btu/SCF
- Repeatability	± 0.04 MJ/m ³ ± 1.1 Btu/SCF
- Drift	± 0.01 MJ/m ³ per month, ± 0.1 MJ/m ³ per year, ± 0.3 Btu/SCF per month, ± 2.7 Btu/SCF per year,
Relative Density	± 0.0016 (± 0.25% Error)
Sample Gas Temperature	± 0.30°C (± 0.54°F)
Sample Gas Pressure	± 2 mbar ± 0.03 psi
Sensor response to a change in gas composition at the inlet port (10% to 90% at 1l/min purge rate)	50 seconds
Gas property update time	2 to 20 seconds (default 8 seconds)
Gas property averaging time constant	2 to 255 seconds (default 20 seconds)

Please note: The GasPT is an inferential instrument which needs to be calibrated for the gases to which it will be exposed. The performance figures quoted above relate to the two principal calibrations. One of these is designed for UK mains gas and the other for LNG. Germanischer Lloyd (GL) would be happy to discuss new applications.

All figures are quoted to two standard deviations. Repeatability figures relate to a unit configured with the default averaging time constant.

GL Industrial Services

Holywell Park, Ashby Road, Loughborough
Leicestershire LE11 3GR, UK
Phone: +44 1509 282000
Fax: +44 1509 282525
oilandgas@gl-group.com · www.gl-group.com/oil-and-gas