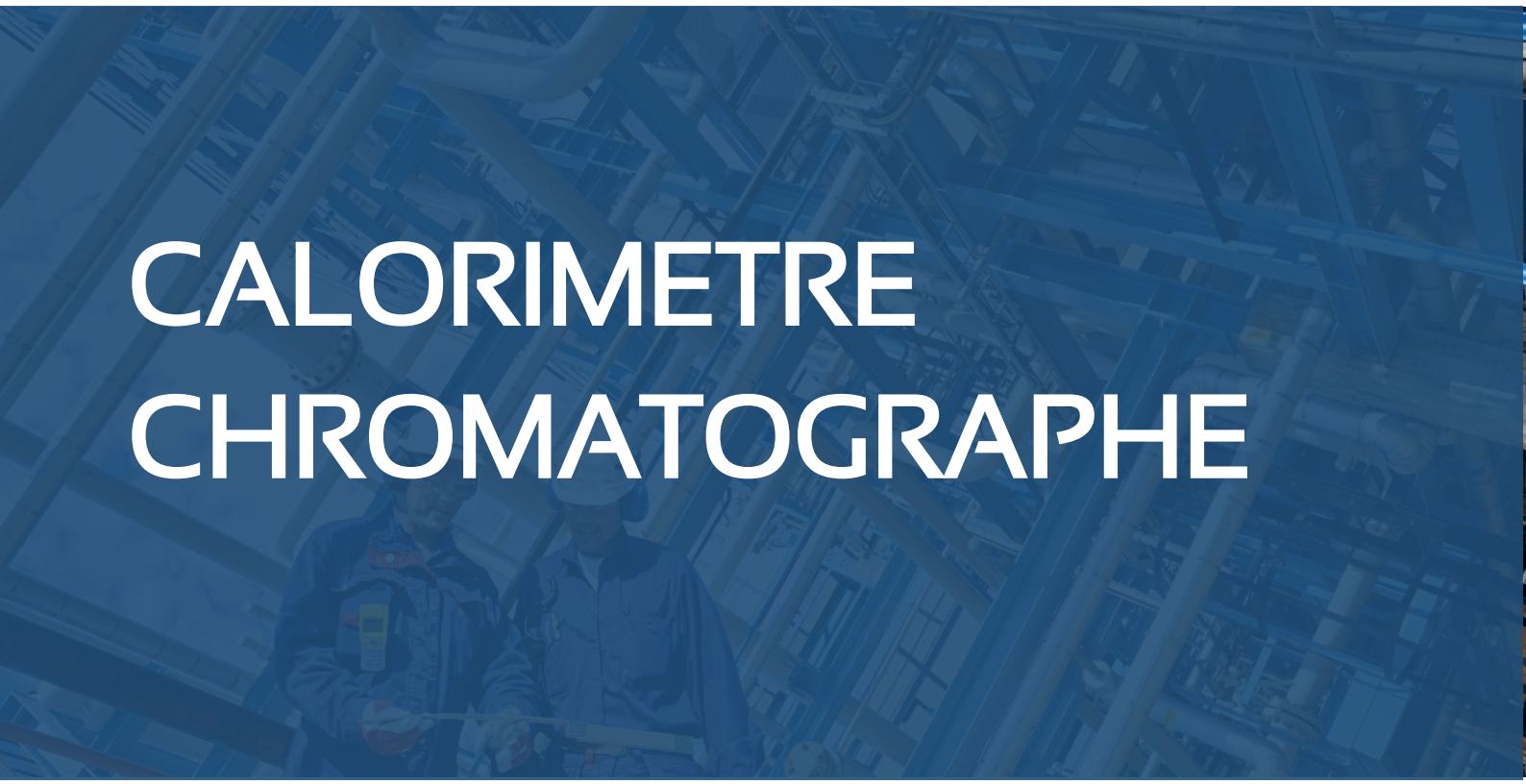
METRA
L'expérience qui compte



# CALORIMETRE CHROMATOGRAPHE

## ENCAL 3000

De plus en plus de projets visent à utiliser l'énergie issue des sources renouvelables (comme les éoliennes, l'hydroélectricité, etc.,) pour la convertir en hydrogène.
La première étape de ce process consiste en l'électrolyse de l'eau pour ensuite injecter l'hydrogène produit dans le réseau de gaz.
Il est par ailleurs également possible de produire du Méthane à partir d'Hydrogène et de $CO_2$.
Si la concentration max. d'hydrogène dans le gaz naturel est actuellement limité à 5% dans les applications de transaction commerciale, il est prévu de faire passer celle-ci jusqu'à 10%.
Cette application comme bien d'autres fait partie des applications pour lesquelles notre chromatographe de gaz Encal 3000 est parfaitement adaptée !

## GASLAB Q2

Les besoins énergétiques croissants, la mondialisation et la libéralisation du commerce du gaz stimulent la demande d'équipements de mesure / d'analyse de gaz fiable et précis.
Un grand nombre de procédés liés à l'utilisation de gaz, tels que les turbines à gaz, sont très sensibles à la variation des paramètres du gaz et doivent être ajustés ou régulés en conséquence.
Il est également possible de limiter la composition du gaz en mélangeant le gaz dans le réseau de transport.
Dans tous les cas, pour ces applications diverses, il est nécessaire de disposer d'un analyseur de gaz efficace et performant… tel que le GasLab Q2 !.

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# METRA SAS

## CRÉÉE EN 1952

… et intégrée dans le groupe MPH Energie en 2018, METRA est actuellement présente dans toutes les branches de l'industrie et s'affirme comme un spécialiste reconnu en matière de comptage, de débitmètrie, d'analyse, de mesure de niveau et de dispositifs de transfert de fluides.

**METRA déploie son activité sur plusieurs axes spécifiques et fait aujourd'hui référence dans le comptage gaz, liquide ou vapeur, la débitmètrie, la sécurité, la densimétrie et l'analyse.**

Pour répondre aux mieux à vos besoins, METRA dispose dans tous les cas de la solution adaptée à votre application / votre problème spécifique.

Notre longue expérience nous permet de vous offrir des produits de haute technologie pour de nombreuses applications dans les domaines les plus divers.

Nous sommes plus que jamais à votre disposition avec une large gamme de produits, un savoir-faire reconnu en systèmes clés en main, et des services compétents, efficaces et réactifs.

# ENCAL 3000 $H_2$

Accurate Hydrogen Measurement

## INTRODUCTION

**A new development in the natural gas industry is the injection of hydrogen in the natural gas pipeline system. The maximum hydrogen concentration for custody operation is currently 5 mol%, higher limits are under discussion.**

The basic idea is to utilize the excess energy of renewable sources, like wind turbines, hydroelectricity etc. by converting it into hydrogen. The first step in this process is the use of this energy to produce hydrogen by splitting water into its constituents. The second step is to feed the generated hydrogen in the gas grid. A possible intermediate step is the production of methane from hydrogen and carbon dioxide.
There are plans to increase the maximum concentration of hydrogen in natural gas to 10% so more hydrogen can be fed in to the grid. This adds a new application to the range of our EnCal 3000 gas chromatograph.

## COST SAVING

Online measurement of the hydrogen concentration obviously requires an initial investment. The EnCal 3000 however is able of measuring the hydrogen concentration in addition to the heatingvalue measurement. In many cases the heatingvalue measurement is required for billing purposes anyway. Assuming this is the case costly manual sampling, laboratory analysis or spot checkes can be saved with very limited additional costs.

## TECHNICAL APPLICATION

The EnCal 3000 is an online gas chromatograph using the latest MEMS (Micro Electro Mechanical Systems) technology. Because of the modular concept of the EnCal 3000 it is possible to offer various applications within the same system just by swapping out analytical channels. For the measurement of hydrogen there are two possible applications.

## HYDROGEN AS A SINGLE COMPONENT

In case heating value measurement is not required or already present it is possible to use an EnCal 3000 with a single analytical module. The measurement will be dedicated to the measurement of hydrogen only.

## HYDROGEN ADDED TO HEATING VALUE DETERMINATION

It is possible to measure hydrogen in addition to the components which are normally required for the calculation of the heatingvalue. In order to achieve this the first channel will need to be of another type and an additional carrier gas (Argon) must be added to the analyser. This has now become possible.

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# ENCAL 3000 $H_2$ TECHNICAL DATA

| | Natural gas + Hydrogen + Heating value | Hydrogen only |
|---|---|---|
| Analytical hardware | 2 parallel isothermal GC modules with narrow-bore capillary column technology in combination with MEMS based analytical components | 1 isothermal GC module with narrow-bore capillary column technology in combination with MEMS based analytical components |
| Analysis output | Full composition of any natural gas up to $C_{6+}$ or $C_{9+}$ (option) + Hydrogen concentration<br>Heating value, density, Wobbe index | Hydrogen concentration |
| Component range | $N_2$ : 0 – 20 %<br>$CH_4$ : 0 –100 %<br>$CO_2$ : 0 –20 %<br>$C_2$ : 0 –10 %<br>$C_3$ : 0 –10 %<br>$C_4$ : 0 – 10%<br>$H_2$ : 0 – 20%<br>néo-C5: incl. in nC4<br>$C_5$ : 0 –0.25 %<br>$C_6$ : 0 –0.10 %<br>$C_7$ : 0 –0.05 %<br>$C_8$ : 0 –0.05 %<br>$C_{9+}$ : 0 –0.05 %<br>Concentrations outside these ranges on request | Hydrogen : 0 - 100% |
| Performance Hydrogen analysis | | |
| Detection limit for $H_2$<br>Repeatability for $H_2$<br>Uncertainty<br>Analysis time | 5 ppm<br>0.3%RSD<br>0.6% of reading<br>5 minutes | 5 ppm<br>N/A<br>0.6% of reading<br>application dependant |
| Performance heating value measurement | | |
| Uncertainty<br>With multi level calibration<br>Repeatability | < 0.15 % for all calculated properties<br>< 0.10 % for all calculated properties<br>< 0.02 % for all calculated properties | N/A<br>N/A<br>N/A |
| Ambient conditions | Temperature: -20 °C to +55 °C (-4°F to 130 °F ) (provided heated version is used) | |
| Dimensions | Base Ø 37 cm x height 37 cm (Ø 14" x height 14") | |
| Weight | < 30 kg | |
| Approvals | ATEX / IECEx / INMETRO : Ex db IIC T6 Gb<br>KC MARK : Ex d IIC T6<br>FM : Class I / Div1 Group BCD T6<br>IP 66, Vibration and shock test in acc. with IEC 60068-2-31 and 64<br>EMC according to EN 61000-6-2 and EN 61000-6-4<br>PTB Metrological Certificate Reference No. PTB-3.31-4016861 | |
| Power supply | 24 V DC, 18 W nominal (50 W start-up peak) for non-heated version<br>24 V DC, 120 W nominal (170 W start-up peak) for heated version (ambient temp. < 0°C) | |
| Interfaces | Ethernet UTP 10 Base-T for ModBus TCP/IP and PC link<br>2 RS 232/485 ports for ModBus RTU or ASCII<br>3 analogue inputs for local sensors (4 – 20 mA or 0 – 10 V DC) | |
| Analyser | Complete stand-alone operation, including all calculations and generation of report formats, without need for operator intervention. Calculations in acc. with ISO 6976, GPA 2172 or GOST 22667. | |
| Data logging | History Log: local storage of last 35 days of all analytical data (analysis, events, alarms, averages, last chromatogram, calibration data) in accordance with API Report 21.1.<br>All data available on remote workstation in XML format | |
| Sample conditioning (integrated) | Integral part of analyser. Consists of pressure regulators for each stream, particle filters and double block and bleed stream selection for up to 5 streams and 1 calibration gas. The internal sample conditioning system also contains a programmable sample bypass 0-20 Nl/hr. (0.7 scf/hr) | |
| Sample conditioning (external) | Membrane filter required for sample gas. | |
| Carrier gas(ses) | Argon (for Hydrogen measurement) + Helium (in case of hydrogen + heatingvalue) Quality N5.0, supply pressure 5.5 barg, (80 psi) consumption ± 8 ml/min (0.4 scf/day)<br>Pressure regulator should contain a safety relief set at 6.5 barg. (95 psi) | |
| Calibration gas | Supply pressure 2 barg (28 psi) nominal. Consumption ± 600 ml/calibration (37 in³/calibration) (@ atm. Pressure)<br>Composition depending on application. | |

Application Note: EnCal 3000 $H_2$


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Honeywell

# ELSTER® GASLAB Q2

Real-time Natural Gas Analyser

## BRIEF INFORMATION

**Growing energy needs, globalization and the liberalization of the gas trade are driving demand for efficient and innovative gas measuring equipment, particularly equipment for analysing gas quality. One aspect of this trend is the global distribution of gases from various sources and in various qualities.**

A large number of processes relating to the use of gas, such as gas turbines, are very sensitive to varying gas parameters and must be adjusted or regulated accordingly. Alternatively the range of gas parameters can be limited by mixing gas in the transport network. Both cases require efficient process measuring equipment for gas quality.

While energy measurement in the distribution network is becoming more and more important, the need for simple and low maintenance analyzers is increasing. The billing to end customers needs to be made easy and more accurate. As opposed to the "classic" gas chromatograph solution, the Honeywell Elster® GasLab Q2 does not use carrier and mixed calibration gases or combustion air supply which means less cost of ownership for the user.

The Honeywell Elster® GasLab Q2 Gas Quality Analyzer determines the calorific value, Wobbe index and other parameters in natural gas. The applications of the device range from fiscal energy metering to measurement, control and regulation. One major application is control of the gas turbine of power plants to optimize efficiency, pollutant emissions and system load with fluctuating gas qualities. Another application is gas blending for managing the gas specifications in transportation.

The GasLab Q2 operates continuously and flameless in contrast to gas chromatographs or Wobbe-index analyzers. Therefore a safe, fast and continuous measurement is ensured. The measuring principle of the GasLab Q2 is based on the determination of the infrared absorption and the thermal conductivity of the measuring gas. This data is used in a correlative model to determine the gas quality.

The GasLab Q2 is designed to operate in many hazardous areas and wide ambient temperature ranges. This simplifies installation and allows the Analyzer to be placed close to the process supporting a short response time.

In measurement mode, the gas quality calculations are updated every second. To minimize gas transport delays between the sample tap and GasLab Q2, a bypass flow meter is integrated into the housing. Routine calibration is performed automatically at a user-programmed time and day, a simple binary mixture.

The analyzer has gas connections for sample gas, calibration gas, sensor vent and optional bypass outlet. Electrical connections for power and I/O communications are conveniently accessible in the top housing.

The measured values are communicated via Modbus protocol and analog outputs. Modbus is available through two serial ports and the Ethernet interface. Additionally it is possible to connect external signals to monitor contact closures, e.g. low pressure limit of calibration bottle or sampling system status.

*(cont. on next page)*

## MAIN FEATURES

- Determination of main gas parameters: calorific value/Wobbe index/density/ $CO_2$ concentration/methane number etc.
- Flameless, no air or carrier gas needed
- Fast, continuous measurement
- Easy operation
- Small footprint:
  Low investment and maintenance costs

## APPLICATIONS

- Fiscal metering
- Gas turbine control for power plants
- Feed forward burner control
- Biogas
- Gas blending

## BENEFITS

- Realtime update of gas parameters
- Installation, cost saving due to easy engineering and commissioning
- Less downtime for gas turbine installations
- More energy efficient turbine control because of quick response
- Less off-spec gas for blending stations
- Cleaner burner regulation
- Optimized emission of processes
- Better end product quality control

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*(cont. from previous page)*

The integrated display shows the measurement values and operating conditions of the analyzer. The analyzer can be operated via a touch panel connected to the device. ensuit for configuration, data display and recording.

The user-friendly Elster GasLab Q2 provides customers with fast, accurate gas quality measurements for a low capital investment and minimal ownership costs.

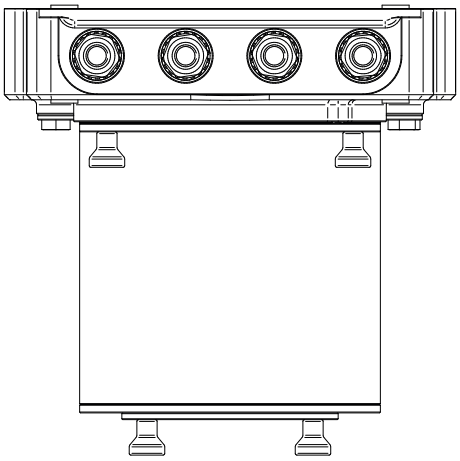
# ELSTER GASLAB Q2 TECHNICAL SPECIFICATIONS

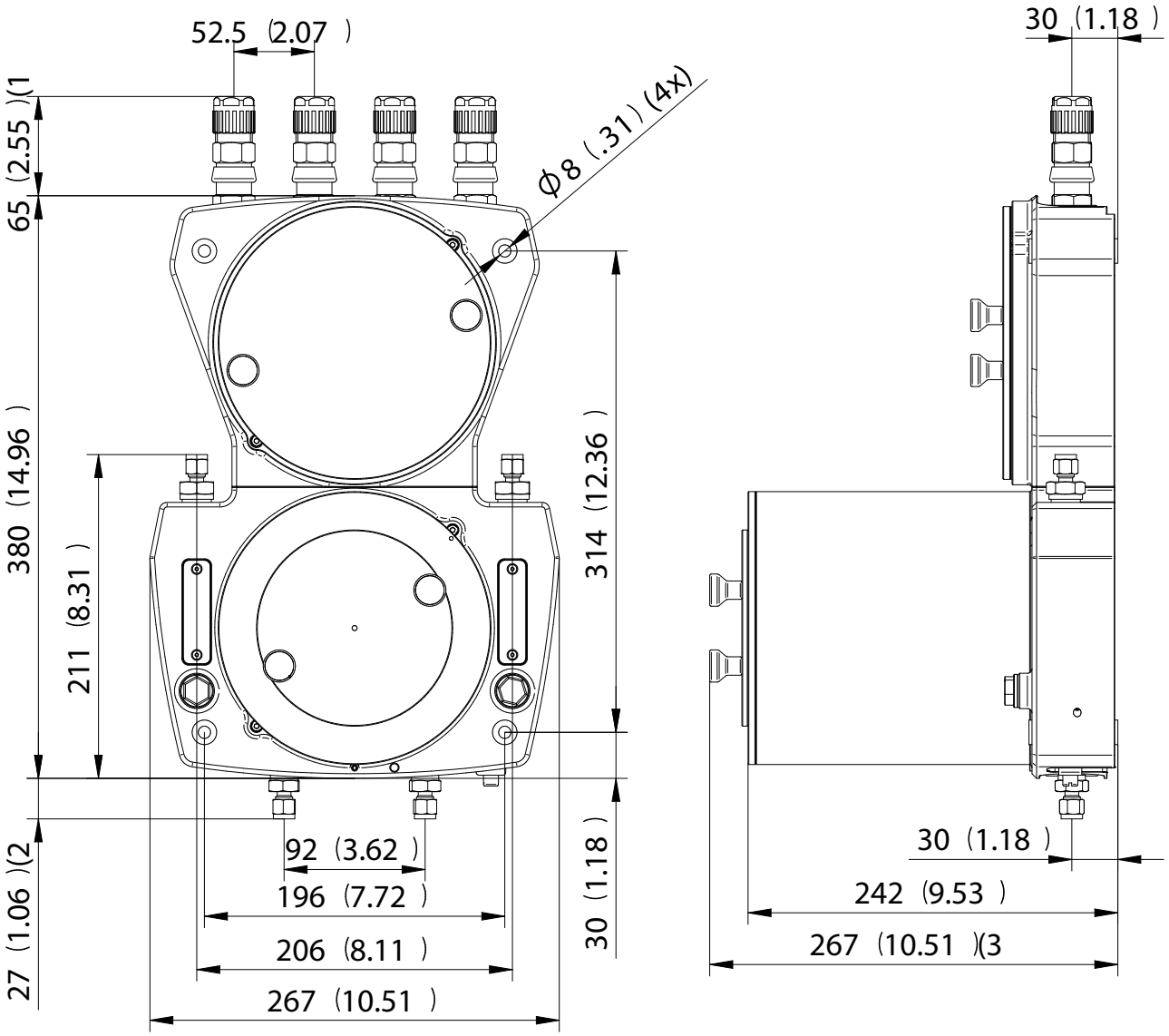
## TECHNICAL DATA

| | | | | Range | | | |
|---|---|---|---|---|---|---|---|
| Reported values (SI Units) | | Formula | Calculation standard | Normal | OIML R140 | Unit | Output available? |
| | Heating Value superior | Hs | ISO 6976-1995 | 27.9 - 48.5 | 29.9 - 45.6 | $MJ/m^3$ | Yes |
| | Wobbe index (superior) | WIs | ISO 6976-1995 | 33.8 - 58.0 | 36.0 - 55.3 | $MJ/m^3$ | Yes |
| | Density | ρ(rho) | ISO 6976-1995 | 0.7168 - 1.063 | 0.7175 - 1.005 | $kg/m^3$ | Yes |
| Reported values (Imperial Units) | Gross Heating Value | GHV / GCV | GPA 2172-2009 | 707.9 - 1237.3 | 707.9 - 1237.3 | $BTU/ft^3$ | Yes |
| | Wobbe index (superior) | WIs | GPA 2172-2009 | 859.4 - 1479.8 | 914.5 - 1403.9 | $BTU/ft^3$ | Yes |
| | Density | ρ(rho) | GPA 2172-2009 | 0.04232 - 0.06277 | 0.04236 - 0.05931 | $lbm/ft^3$ | Yes |
| Other reported values | Methanenumber | MN | Simplified method | | | - | Yes |
| | Wobbe index | WIs / WIi | Dry / Wet / Saturated | | | $MJ/m^3$ or $BTU/ft^3$ | Yes |
| | lower heating Value | LHV / NCV / Hi | | | | | Yes |
| | relative density or specific gravity | RD / SG | | | | - | Yes |
| | Calculated Model Gas Composition | $CH_4$...$C_8H_{18}$, $N_2$ | | | | % | Yes |
| Analytical performance | Uncertainty | Hs, Ws, ρ: ≤0.5%, $xCO_2$: ≤0.2mol% | | | | | |
| | repeatabilty | Hs, Ws, ρ: ≤0.1%, $xCO_2$: ≤0.1mol% | | | | | |
| List of suitable gases | Generic natural gases | | | | | | |
| | Methanenumber | $CH_4$ | | 70 - 100 | | mol% | Yes |
| | Ethane and higher alkanes | $C_2$+ | $C_2$>$C_3$>$C_4$>$C_5$>$C_6$ | 0 - 20 | 0 - 15 | mol% | Yes |
| | Carbon dioxide | $CO_2$ | | 0-20 | | mol% | Yes |
| | Nitrogen | $N_2$ | | 0-30 | 0-20 | mol% | Yes |
| | sum of Water, Oxygen, Hydrogen, Helium | $H_2O$ + $O_2$ + $H_2$ + He | < 0.1 | | | mol% | No |
| | Hydrogen Sulfide | $H_2S$ | 10 ppmV (or 14 $mg/m^3$ or 0.5 grains/100 scf) (higher amounts on request) | | | N/A | No |
| | Dust / liquids | technically free | | | | N/A | No |

| | |
|---|---|
| Calibration Gas | Binary mixture ($CH_4$/$CO_2$) with automatic calibration cycle |
| Gas Manifold | Integrated 2-channel double-block and bleed gas manifold for process and calibration gas |
| Operational Pressure/ Consumption | Inlet pressure 150 - 300 kPa gauge (22 to 43 psi) lower pressures possible with limitations, please contact your local Honeywell office.<br>Flow 20-300 l/h (0.7 to 1.1 scf/hr / total including adjustable bypass flow) |
| Dynamics | Analysis rate f=1 Hz, reaction time T90≤6s (90% step response / Tested @ NMi) |
| Power Supply | 24VDC±15% (Including mains fluctuations), max. 96W, 60W nominal power (ambient temperature dependant) |
| Environment | IP64, -25 to +55°C (-13 to +131°F), 0-95%RH (non-condensing) |
| Interfaces | 1x TCP/IP, 2x RS485 interface, 4 digital outputs, 2 digital inputs, 4 analog outputs Modbus via TCP/IP and serial |
| Data Logger | Integrated logging of measurements as mean values (e.g. on hourly basis) or current values. Integrated logging of measurement system status and external events |
| Operational Interface | 7-channel capacitive touch panel, PC software (enSuite) for configuration, data logging, display and archive retrieval |
| Safety Approvals | Zone 1: Ex II 2G Ex d IIC T4 Gb / Class I Div 2 Groups ABCD T4<br>KC Mark (Korea) & TS Mark (Taiwan) available TIIS (Japan) Pending |
| Metrological Approvals | NMi: OIML R140 Class A ($C_2$+ <15% & $N_2$ < 25%) |

all calculated values according :
- ISO 6976-1995 T1: 25°C; T2: 0°C; P1, P2: 1013.25 mbar
- GPA 2172-2009 : T1, T2: 60°F; P1, P2: 14.696 psi (using GPA 2145 - 2009 tables)






*(1 Depending on the type of cable connection and excluding cable clearance*

*(2 Excluding any clearance for tubing*

*(3 Including window dust cover*

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