HY-OPTIMA™ 700B Series

General Use Inline Hydrogen Process Analyzer

Applications

The HY-OPTIMA™ 700B Series inline hydrogen process analyzer is ideal for gas streams where real-time, hydrogen-specific measurements can enhance process plant efficiencies, improve yields, and reduce maintenance costs:

Fuel Cells

H2 measurement on both anode and cathode side

Natural Gas

H2 in natural gas or biomethane

Industrial Gas Supply and Hydrogen Production

- Air separation
- Steam methane reforming
- Electrolysis process streams

Laboratory

- Research applications

Manufacturing

- Metals annealing
- Semiconductors
- Oil hydrogenation

Advantages

- Highly reliable
- Low life cycle cost
- Easy to install and operate
- Minimal maintenance required
- No cross sensitivity to combustible gases
- Real time, continuous hydrogen measurement
- Tolerant of many harsh background contaminants
- No reference or carrier gases required
- Non-consumable solid state technology
- Field-configurable settings

Doc # 90000145 R4

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The HY-OPTIMA™ 700B Series analyzer provides the most accurate, tolerant and affordable hydrogen process gas measurement solution for industrial markets. The general use analyzer uses a solid-state, non-consumable sensor for direct hydrogen measurement in process gas streams, with no cross sensitivity to other gases.

How it Works A thin film palladium-nickel alloy absorbs and desorbs hydrogen as it comes in contact with the sensor. The palladium catalyzes the hydrogen molecule into atomic hydrogen, which gets absorbed into the metal lattice and changes the bulk resistivity. This change in resistance is reported in real time as the partial pressure of the hydrogen in the process stream, which varies linearly with changes in pressure. The analyzer is hydrogen specific because even though palladium can catalyze several elements, only the reaction with hydrogen occurs at a rate that is meaningful to the measurement. As a result it is unaffected by any other gases. Proprietary coatings and special conditioning protect the sensor to enable continuous operation in environments with certain levels of CO and H2S present. Since it is a solid state device, the sensor does not degrade over time.

Ease of Use With no moving parts, the analyzer is extremely reliable and easy to use. Once installed and field calibrated, it typically only requires a quick calibration every three months, using readily available primary standard gases that span the expected operating range. No other maintenance is necessary. Communication with the unit is either via an analog 4-20mA output or serial communication using RS232 or RS422.

Performance and Safety The model 710B, 730B, and 740B analyzers are intended for use in dry gas streams where hydrogen is always present, and can be safely exposed to hydrogen continuously. The model 720B is for use in processes where hydrogen is only occasionally present in an air, oxygen or nitrogen background for short periods, as may occur if there is a leak or an upset condition. For optimal performance, it is recommended to ensure that the pressure at the analyzer stays constant, ideally between 0.95 to 1.1 atm absolute, and the flow rate is around 1 SLPM. The 700B series analyzers are UL and CE approved for safe general use operation.

HY-OPTIMA 700B Series Specifications

Performance

Operating Pressure at Analyzer:
Recommended: 0.95 – 1.1 atm absolute (14.0 – 16.1 psia)
Maximum: 2 atm absolute (29.4 psia)
Note: Analyzers are factory calibrated at 1 atm. For operation at higher pressure special factory calibration is required which may incur a nominal fee.

Process Gas Temperature: -20 to 60°C
Flow Rate: 0.1 to 10 slpm
Operating Humidity: < 95% RH (non-condensing)
Calibration Interval: 90 days

Output Signals

Analog: 4-20 mA
Serial: RS232 or RS422
Relays: 1A / 30 VDC SPDT
Two programmable relays with both NO and NC contacts, and one programmable relay with NC contact only

Power

Input Voltage
10 – 26 VDC

Input Power
10 W

Physical

Dimensions
9.3in (L) x 3.4in (W) x 1.4in (D)

Weight
0.8 lbs (0.4 kg)

Adapter Fitting: ½ in MNPT

Environmental

Operating temp: -20 to 55°C
Storage temp: -40 to 80°C

Safety Certifications

c UL US LISTED CE

Product Selection

MODEL	Hydrogen Range		Hydrogen MUST be present	CO Limit	H2S Limit	T90 Response Time (sec)	Accuracy		Drift/Week		Repeatability		Linearity		Calibration Background Gas
	Low	High					Low to 10% H2	10 to 100% H2	Low to 10% H2	10 to 100% H2	Low to 10% H2	10 to 100% H2	Low to 10% H2	10 to 100% H2	
710B	0.1%	10%	Yes	<100 ppm	<20 ppm	< 90	0.15%	N/A	0.15%	N/A	0.15%	N/A	0.15%	N/A	N2
730B	0.5%	100%	Yes	<100 ppm	<1000 ppm	< 60	0.3%	1.0%	0.2%	0.4%	0.2%	0.4%	0.2%	0.4%	N2
740B	0.5%	100%	Yes	20%	3%	< 90	0.3%	1.0%	0.2%	0.4%	0.2%	0.4%	0.2%	0.4%	N2
720B	0.4%	5%	No	0	0	< 60	0.3%	N/A	0.3%	N/A	0.3%	N/A	0.3%	N/A	O2, N2

Note: Sensor performance specifications are absolute and assume a dry process stream, an ambient temperature of 25°C, constant pressure, and are in addition to any errors in the calibration gases used.

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