

HY-OPTIMA™ 5000 Series

General Use Inline Hydrogen Process Analyzer

Applications

The new HY-OPTIMA™ 5000 Series inline hydrogen process analyzer featuring auto calibration is ideal for standalone use or OEM integration into existing analyzers, in gas streams where real-time, hydrogen-specific measurements can enhance process plant efficiencies, improve yields, reduce maintenance costs, and enable the green hydrogen economy.

Refining

- Catalytic reforming
- Hydrodesulphurization
- Tail gas treating units
- Flare monitoring
- Fuel gas

Natural Gas

- Wobbe Index or calorific value
- Blending and injection points
- Compressor stations

Hydrogen Economy

- Fuel cells and electrolyzers

Petrochemical

- Polymer feeds and flare gas process streams

Industrial Gas Supply and Hydrogen Production

- Air separation
- Steam methane reforming



Advantages

- Auto calibration self-corrects drift
- Highly reliable
- Low life cycle cost
- Easy to install and operate
- No maintenance required
- Compact package for easy OEM integration
- Real time, continuous hydrogen measurement
- Tolerant of many harsh background contaminants
- No reference or carrier gases required
- Non-consumable solid state technology

The HY-OPTIMA™ 5000 Series analyzer provides the most accurate, tolerant, and affordable hydrogen process gas measurement solution for industrial markets. The general purpose rated 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 rapidly 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, H2scan's patented auto calibration feature eliminates drift and the need for periodic calibrations. No other maintenance is necessary. Communication with the unit is via serial communication using Modbus RTU over RS485.

Performance and Safety

The model 5031, 5033, and 5034 analyzers are intended for use in dry gas streams where hydrogen is always present, and can be safely exposed to hydrogen continuously. The model 5032 is for use in processes where hydrogen is occasionally or intermittently present, 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 Gen 5 series analyzers are CE approved for safe general use operation. Hazardous location rated models will be available.

HY-OPTIMA™ 5000 Series Specifications

Performance

Operating Pressure at Analyzer:

Recommended: 0.95 – 1.1 atm absolute (14.0 – 16.1 psia)
Maximum: multiple atmospheres, max TBD

Note: Analyzers are factory calibrated at 1 atm abs.

Process Gas Temperature: -40 to 60°C

Flow Rate: 0.1 to 10 slpm (3/4" tube)

Operating Humidity: < 95% RH (non-condensing)

Calibration Interval: None (auto calibrating)

Output Signal

Digital: RS485, 2-wire; 19200 baud, 8 bit data, 2 stop bits, no parity; Modbus RTU Protocol

Analog: 4-20 mA available via optional accessory

Power

Input Voltage: 9 – 48 VDC

Input Power: 10 W

Physical

Dimensions: 5.9 in (L) x 1.6 in (W) x 1.6 in (D)
15.1 cm (L) x 4 cm (W) x 4 cm (D)

Weight: 0.8 lbs (0.4 kg)

Electrical Fitting: M12 4-wire

Sensor Fitting: 3/4"-14 MNPT

Environmental

Ingress Protection: IP68

Operating temp: -40 to 85°C

Storage temp: -40 to 105°C

Certifications

CE, FCC, RoHS, WEEE, Conflict Minerals
UL and hazardous locations (coming soon)

Product Selection

MODEL	Hydrogen Range		CO Limit	H ₂ S Limit	T90 Response Time (sec)	Accuracy		Drift/Week	Repeatability		Linearity	
	Low	High				Low to 10% H ₂	10 to 100% H ₂		Low to 10% H ₂	10 to 100% H ₂	Low to 10% H ₂	10 to 100% H ₂
5031	0.1%	10%	< 100 ppm	< 20 ppm	< 90	0.15%	N/A	None	0.15%	N/A	0.15%	N/A
5032	0.4%	5%	0	0	< 60	0.3%	N/A	None	0.3%	N/A	0.3%	N/A
5033	0.5%	100%	< 100 ppm	< 1000 ppm	< 60	0.3%	1.0%	None	0.2%	0.4%	0.2%	0.4%
5034	0.5%	100%	20%	3%	< 90	0.3%	1.0%	None	0.2%	0.4%	0.2%	0.4%

