

# HY-OPTIMA™ 1700 Series

## Intrinsically Safe Inline Hydrogen Process Analyzer

### Applications

The HY-OPTIMA™ 1700 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:

#### Refinery

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

#### Natural Gas

H<sub>2</sub> in natural gas or biomethane

#### Industrial Gas Supply

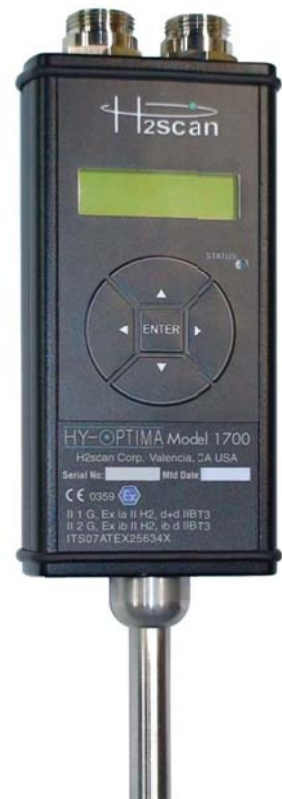
- Air separation
- Steam methane reforming
- Electrolysis process streams

#### Petrochemical

H<sub>2</sub> measurement in polymer feeds and flare gas process streams

#### 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

The HY-OPTIMA™ 1700 Series analyzer provides the most accurate, tolerant and affordable hydrogen process gas measurement solution for industrial markets. The intrinsically safe 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 calculated very accurately and reported in real time. The analyzer is hydrogen specific because even though palladium can catalyze several elements, only hydrogen can penetrate the lattice structure at a rate that is meaningful to the measurement. As a result it is unaffected by any other gases. Proprietary coatings protect the sensor to enable continuous operation in environments with high levels of CO and H<sub>2</sub>S. Since it is a solid state device, the sensor does not degrade over time. The output reports the partial pressure of the hydrogen in the process stream, which varies linearly with changes in pressure.

**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 is either via an analog 4-20mA output or serial communication using RS422.

**Performance and Safety** The model 1730 and 1740 analyzers are intended for use in dry gas streams where hydrogen is always present, and can be safely exposed to hydrogen continuously. The model 1720 is designed for processes where hydrogen is only occasionally present for short periods, as may occur if there is a leak or an upset condition. For optimal performance, a conditioning system is available from H2scan and strongly recommended to ensure that the pressure at the analyzer is between 0.95 to 1.1 atm and the gas temperature does not exceed 60°C. The intrinsically safe 1700 series analyzers are ATEX certified with a dual zone rating for safe operation with the probe tip in a Category 1 (Zone 0) hazardous environment.

## HY-OPTIMA 1700 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 may be required.*

#### 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: RS422

Relays: Optional IS barrier with two programmable SPST relays

### Power

#### Input Voltage (Power Barrier)

20 – 28 VDC, 24 VDC nominal

#### Input Voltage (Analyzer)

5 – 28 VDC, 10 VDC nominal

Input Power: 10W

### Physical

#### Dimensions

10.3in (L) x 3.4in (W) x 1.4in (D)

#### Weight

1.0 lbs (0.45 kg)

Adapter Fitting: ½ in MNPT

### Environmental

Operating temp: -20 to 40°C

Storage temp: -40 to 50°C

### Safety Certifications



Probe Tip: Ex II 1 G, Ex ia II H<sub>2</sub>, d+d IIB T3 Ga

Analyzer Body: Ex II 2 G, Ex ib II H<sub>2</sub>, ib d IIB T3 Gb

Certificate Number: ITS07ATEX25634X

## Product Selection

MODEL	Hydrogen Range		Hydrogen MUST be present	CO Limit	H <sub>2</sub> S Limit	T90 Response Time (sec)	Accuracy		Drift/Week		Repeatability		Linearity		Calibration Background Gas
	Low	High					Low to 10% H <sub>2</sub>	10 to 100% H <sub>2</sub>	Low to 10% H <sub>2</sub>	10 to 100% H <sub>2</sub>	Low to 10% H <sub>2</sub>	10 to 100% H <sub>2</sub>	Low to 10% H <sub>2</sub>	10 to 100% H <sub>2</sub>	
1730	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%	N <sub>2</sub>
1740	0.5%	100%	Yes	20%	3%	< 90	0.3%	1.0%	0.2%	0.4%	0.2%	0.4%	0.2%	0.4%	N <sub>2</sub>
1720	0.4%	5%	No	0	0	< 60	0.3%	N/A	0.3%	N/A	0.3%	N/A	0.3%	N/A	O <sub>2</sub> , N <sub>2</sub>

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.

