Hydrogen Analyzer

Sensitivity, Selectivity, and with Peak Precision
and Shortest Response Time.

21Senses

High Precision, Responsivnes and Selective to Hydrogen

Our Hydrogen Analyzer is powered by patented Solid State Electrochemical Sensor Technology with Solid Electrolyte and Novel Reference Electrode.

Product Features:

Technology: Patented Solid State Electrochemical Hydrogen Sensor with Solid Electrolyte and Novel Reference Electrode

Extremely Compact Design: 98mm x 64mm x 34mm, weighing less than 350gms.

Selective and Specific: to Hydrogen in multiple background gases.

Rapid Response Time: Initiates response in 0.5 seconds, achieving T60 response in 3 seconds and T90 response in 10 seconds.

Wide Operating Range: Options from ppm level to 25% H2 v/v.

Damage Resistant: Withstands over-exposure to hydrogen and high humidity.

Operates in Oxygen Free Environment: The sensor can operate continuously in Oxygen free environment.

Operating Life: 4-5 years

Output Options: 4-20mA (2-wire loop), Analogue voltage, and RS485 (Continuous Transmission).

Advanced Performance: Delivers high sensitivity, resolution, accuracy, and repeatability with fast recovery.

Core Sensor Configuration: Tailored Internal Construction: Depending on the specific use case, the core sensor can be configured to either sit flush against the enclosure surface or protrude with a threaded interface for optimal functionality.

Industry Standard Power Supply: 24VDC Power Supply. Customization is possible.

Ultra-low Power Consumption: Consumes less than 50mA when operating at 24VDC.

Connector Options: Streamlined pigtail connector arrangement for user-friendly selection of mating connectors.

Easy Calibration: Quick calibration through computer interface, while applying a certified calibration gas mixture using our calibration kit.

Precise Fine Calibration: For an elevated level of analytical-grade accuracy, a rapid fine calibration routine can be executed before each test, ensuring calibration conditions closely match the test conditions on any given day.

Enclosure: IP68 Powder Coated Aluminium Enclosure

Seamless Integration: The product can be interfaced with User's SCADA, PLC and DCS systems or our Control & Display Units.

Product and Service Benefits

Low-Cost Real-Time Analysis: Obtain high-quality real-time Hydrogen concentration information, eliminating the need for sample checks via cumbersome GC analysis

Complex Background Mixtures: Unlike other binary gas mixture TCD analyzers, our instrument selectively measures Hydrogen in inert and combustible gas background mixtures.

Purge Line Monitoring: Detect the presence of Hydrogen at very low concentrations in inert purge lines.

Design advantage: Small, easy to handle, and deployable in small and space-constrained locations.

System response: Enables the design of faster-responding closed-loop systems.

Comprehensive AMC: Ensures periodic calibration and hassle-free product replacement, extending beyond the warranty period at no additional cost.

Future-Ready Upgrades: Explore buyback options for upgrading your analyzer systems with our latest and best-in-class offerings.

Customization: For large-volume collaborations, customize products based on operating conditions, extending sensing range, offering higher sensitivity, adding wireless communication, implementing alternate power management, and meeting specific size and material construction requirements.

Ensures periodic calibration and hassle-free product replacement, extending beyond the warranty period at no additional cost.

Technical Specification

Hydrogen Concentration Terminology Conversion Table for Ease of Reference
Hydrogen Lower Explosive Limit ('LEL') – 4% H2 v/v in Air

250% H2 LEL = 10% H2 v/v in Air = 1,00,000 ppm H2 v/v
125% H2 LEL = 5% H2 v/v in Air = 50,000 ppm H2 v/v
100% H2 LEL = 4% H2 v/v in Air = 40,000 ppm H2 v/v
50% H2 LEL = 2% H2 v/v in Air = 20,000 ppm H2 v/v
25% H2 LEL = 1% H2 v/v in Air = 10,000 ppm H2 v/v
1% H2 LEL = 0.04% H2 v/v in Air = 400 ppm H2 v/v

	Selectable Parameters				
Selectable Range	**Range values are defined as H2 v/v in Background Gas**				
	Range 1	**Range 2**	**Range 3**	**Range 4**	**Range 5**
Start	0 ppm	0%	0%	0%	0%
Span	5000 ppm	2%	10%	15%	25%
Resolution	5 ppm	0.002% (20 ppm)	0.01% (100 ppm)	0.01% (100 ppm)	0.01% (100 ppm)
Minimum Detection Limit (MDL) of Hydrogen in different Background Gases					
For Oxygen Free Gas Mix (Dry to 70% RH)	10 ppm	0.002%	0.01%	0.01%	0.01%
For Oxygen Free Gas Mix (70% to 99% RH)	30 to 50 ppm	0.002% to 0.01%	0.01% to 0.02%	0.01% to 0.02%	0.01% to 0.02%
For Air and O2 Background (Dry to 20% RH)	20 ppm	0.01%	NA	NA	NA
For Air and O2 Background (20% to 99% RH)	20 to 100 ppm	0.01% to 0.02%	NA	NA	NA
Accuracy (MV=Measured Value)	± (50 ppm + 3% of MV)	± (0.01% + 3% of MV)	± (0.02% + 3% of MV)	± (0.05% + 3% of MV)	± (0.1% + 3% of MV)
Accuracy Note	Higher accuracy can be achieved through in-line fine calibration for critical applications using a 3-way switching valve arrangement with one line for appropriate calibration gas mixture and another line for sample process gas. **See Note 1.**				

Selectable Output Signal	**Analogue Output**		**Digital Output**
	V 0V to 5V (4-wire) ≤100 m	**I** 4-20mA (2-wire loop) (2-wire) ≤ 1,000 m	**D** RS485 Cont. (4-wire) ≤1,000 m

Selectable Background Gas	**Helium** All Ranges **See Note 2**	**Nitrogen** All Ranges **See Note 2**	**Argon** All Ranges **See Note 2**	**Combustible** All Ranges **See Note 2**	**Oxygen** Only Range 1 & Range 2	**Air** Only Range 1 & Range 2

Selectable Compatible Interfaces	**V or D**		**I**
	☐	☐	☐
	SCADA, PLC, DCS, BMS	MNST CDU (Multi-C	SCADA, PLC, DCS, BMS

Input Power Supply	24VDC (± 5%) from User's System| Maximum current consumption ≤ 50 mA; or
	5VDC or 24VDC (± 5%) from MNST's CDU | Maximum current consumption ≤ 50 mA
Selectable Connector Option	Signal and calibration cable terminated internally through an IP 68 cable gland (10cm). Option for standard/ user defined crimped connector at Pig tail end.

Common Features	Specifications
Start-Up Time	5 seconds.
Response Time	Initiates response in 0.5 seconds, achieves T60 response in 3 seconds, and T90 response in 10 seconds. (Response time calculated from the moment when the test gas/sample gas is fully available at the sensing surface.)
Cross Sensitivity	No cross sensitivity to other combustible and reducing gases
Over-Exposure Impact	No damage on exposure to even 100% pure Hydrogen
Operating Temperature	-20° to +65° (Calibration is dependant on the operating temperature of the gas sample. This can be updated in the calibration logic during local gas calibration)
Storage Temperature	-20° to +65°
Operating Pressure	1 Bar to 1.2 Bar (Calibration is dependent on the operating pressure of the gas sample. This can be updated in the calibration logic during local gas calibration)
Operating Humidity	The analyser can operate in different humidity levels starting from dry gas up to 99% RH at 40° (Non-condensing). The minimum detection limits (MDL) are described above for different levels of operating humidity. The analyser can be calibrated with better precision if humidity variations are limited to a narrow band of ±5% RH. Our team can help you calibrate the analyser to obtain the optimal performance according to the actual process conditions.
Area of Deployment	Safe Area/ Non-Hazardous Area.
Enclosure	Rugged and sleek enclosure for tough outdoor as well as indoor applications.
Dimensions	98mm x 64mm x 34mm.
Material of Construction	Powder Coated Die Cast Aluminium.
Weight	< 350 grams
Sensing Surface Position	Flush against gas exposure hole, within a small threaded cup for enhanced diffusion sensitivity or contained in a protruding threaded interface. Both arrangements have threads for interface with a flow-through chamber, for continuous operation.
Ingress Protection	IP 68 as per IS/IEC 60529:2001
Gas Exposure Method	Flow through system. Gas exposure aperture Ø 3mm.
Mounting Flanges	SS/ MS straight flanges/ Z-type flanges
Calibration Interface	RS485 Modbus based digital calibration, via computer GUI.
Calibration Periodicity	Recommended cycle: Once in every 3 months. Mandatory cycle: Once in every 6 months. High accuracy applications: As frequently as required. See Note 1. If the analyser, meant for operation in Oxygen free process gas, is exposed to air or oxygen more than defined limits, local gas calibration must be performed before the analyser is used again.
Calibration Procedure	The sensor can be calibrated within 15 to 20 minutes using our Gas Calibration Kit. Detailed procedure shall be shared along with the product.

Note 1: For high-accuracy demanding applications, the calibration routine can be flexibly executed as frequently as needed using a straightforward 3-way manual selection valve. One inlet is connected to a certified calibration gas mixture, while the other inlet is linked to the process gas sample..

Note 2: For Nitrogen, Helium, Argon, and Combustible Gases Background:

- Ensure the sample gas contains only trace levels of Oxygen. Calibration may be affected if the analyzer, designed for operation in an Oxygen-free environment, is exposed to Oxygen/Air beyond specified limits herein.
- The impact of Oxygen exposure is more significant when measuring low concentrations of Hydrogen (less than 1,000ppm) at over 40% RH. A local gas calibration is required to counter the effects of Oxygen exposure before the instrument can be used again.

Product Ordering Nomenclature

*User can select from the options given in this catalogue

FIXaHY	H2	AZ	XX*	
Product Series Name	Target Gas	Analyzer	Output Signal V - Analogue Voltage Output	I - 4-20mA D - RS485 (Continuous Transmission)

Exciting developments are on the horizon!

Use Cases

Industries:
Oil & Gas, Power Generation & Transmission, Petrochemicals, Fertilizers, Pharmaceuticals, Chemicals, Nuclear Research, and Steel.

Electrolysers:
PEM, Alkaline, SOEC and other burgeoning technologies

Fuel Cells: PEM and SOFC

Hydrogen Supply Chain:
Transport Pipelines, Containers, Storage Sites, Tankers, and Fuelling Pumps

Battery Rooms:
Flooded or VRLA Lead Acid and Nickel cadmium battery banks in industries and Datacentres, Submarines, Ships, Forklifts and Heavy Equipment.

Strategic Sectors:
Space Exploration, Nuclear Research, Defence, and R&D

New Age Applications:
Ships, Aircrafts, Backup Generators, Biomass to H2, H2-PNG Blending, Other Green Hydrogen Production Techniques

21Senses

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Please Note:
We have made every effort to accurately represent the information about our product. However, please note that some details may be subject to change without prior notice.