Fixed Hydrogen Sensor

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

21Senses

Resolution, Accuracy, and Repeatability

Patented Solid State Electrochemical Hydrogen Sensor 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: Detects hydrogen selectively, even in the presence of multiple background gases.

Sub-second Response Time: T20 to T90 in 0.5 seconds to 2.5 seconds.

Wide Operating Range: Options starting from ppm level to 10% H2 v/v.

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

Operating Life: 4-5 years.

Output Options: Analogue voltage, 4-20mA, CAN (29-bit), and RS485.

Energy Efficient: Operates at less than 30mA on 24VDC, showcasing low power consumption.

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

Industry Standard Power Supply: 24VDC or 5VDC Power supply. Customization possible.

Ultra-low Power Consumption: Consumes less than 30mA when operating at 24VDC.

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

Easy Calibration: Quick calibration through computer interface.

Enclosure: IP68 Powder Coated Aluminium Enclosure.

Seamless Integration: The product seamlessly interfaces with User's SCADA, PLC, DCS, and BMS systems, as well as our Control & Display Units. In automobile applications, it integrates effortlessly with on-board ECU and HSCU systems.

Product and Service Benefits

Enhanced Safety: User systems can proactively detect and address very low levels of leaks at their earliest stages for enhanced safety.

Critical Events Reliability: The sensor maintains reliable operation during catastrophic Hydrogen releases beyond the lower explosive limit ('LEL'), ensuring continuous alerts to users regarding the effectiveness of response actions.

Compact Design: Small, easy to handle, and deployable in tight, space-constrained locations.

Swift System Response: Positioned near the ceiling, the sensor significantly accelerates overall system response time by 4X, due to its compact size and efficient design.

Cost-Saving Operation: Eliminates unnecessary downtime with no false alarms, optimizing operational efficiency.

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 safety systems with our latest and best-in-class offerings

Tailored Solutions: In large-volume collaborations, our products can be customized to meet specific operating conditions, including extending sensing range, enhancing sensitivity, incorporating wireless communication, alternative power management, and meeting size and material construction requirements.

Small and easy to handle and deploy in small and space constrained locations.

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

Performance Parameters	Selectable Parameters		
Selectable Range	Range values are defined as H2 v/v in Background Gas		
	Range 1	Range 2	Range 3
Start	0 ppm	0%	0%
Span	5000 ppm	5%	10%
Resolution	10 ppm	0.005%	0.01%
Minimum Detection Limit	50 ppm	(50 ppm) 0.01%	(100 ppm) 0.01%
Accuracy (MV=Measured Value)	± (10 ppm + 3% of MV)	± (50 ppm + 2% of MV)	± (100 ppm + 2% of MV)

	Analogue Output			Digital Outputs	
Selectable Output Signal	V 0V to 5V (4-wire) ≤100 m	I 4-20mA (2-wire loop) ≤ 1000 m	C CAN Bus 29-Bit (4-wire) 40 ≤ 100 m	DM RS485 Modbus RTU (4-wire) ≤1,000 m	D RS485 Cont. (4-wire) ≤1,000 m

Selectable Background Gas	Air	Helium	Nitrogen	Argon	Combustibles	Oxygen	Vacuum

Selectable Compatible Interfaces	CAN*=	0-5V or RS485		4-20mA
	ECU, HSCU	SCADA, PLC, DCS, BMS	MNST CDU (Multi-C)	SCADA, PLC, DCS, BMS

Input Power Supply	24V DC (± 5%) from User's System| Maximum current consumption ≤ 30 mA; or.
	5V DC (± 5%) from MNST's CDU | Maximum current consumption ≤ 20 mA.
Input Power Supply	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
Response Time	T20 to T90 in 0.5 seconds to 2.5 seconds.
Cross Sensitivity	No cross sensitivity to other combustible and reducing gases.
Over-Exposure Impact	No damage on short term exposure to even 100% pure Hydrogen. 1. In-house lab tested for 15 second exposure to 100% pure Hydrogen. 2. In-house lab tested for 5 minutes exposure to 40% Hydrogen in Nitrogen. 3. In-house lab tested for 10 minutes exposure to 20% Hydrogen in Methane.
Operating Temperature	-20°C to +65°C
Storage Temperature	-20°C to +65°C
Operating Pressure	1 Bar to 1.2 Bar
Humidity	Up to 99% RH at 40°C (Non-condensing)
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 cup for enhanced diffusion sensitivity. Less than ~3.5 cm away from ceiling height, ensuring early exposure to diffused Hydrogen.
Ingress Protection	IP 68 as per IS/IEC 60529:2001 .
Gas Exposure Method	Diffusion. 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 6 months for high accuracy applications. Mandatory cycle: Once in every 12 months.
Calibration Procedure	The sensor can be calibrated easily using our Gas Calibration Setup. Detailed procedure shall be shared along with the product.

Product Ordering Nomenclature

*User can select from the options given in this catalogue

FIXaHY	H2	LD	XX*	
Product Series Name	Target Gas	Leak Detector	Output Signal V – Analogue Voltage Output I – 4-20mA Current Loop C – CAN Bus 29-Bit Extended Frame structure Output	DM - RS485 Modbus (Slave) 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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