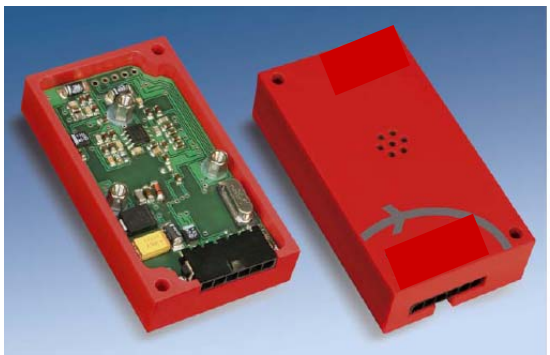
HYDROGEN H2
GAS MEASURING SYSTEM

1. THE TECHNOLOGY



H2 Measuring System – 1-4V transmitter including H2 SS sensor and PVC housing. Part no. 2112B0090

The Hydrogen H_2 gas measuring system contains a new type of solid electrolyte sensor to specifically determine volumes of between 0.01 and 4% volume of Hydrogen in ambient air.

In principle, the sensor works like an electrochemical cell. A solid electrolyte, however, takes the place of a liquid one. For this reason, the measuring system operates over a temperature range of -20° C to +80° C and a relative humidity of 10 to 90% RH.

At the three-phase boundary of the measuring electrode, the Hydrogen splits into protons and electrons. The resulting current flow is proportional to the Hydrogen concentration. Since this reaction takes place at room temperature, the heating systems for classic solid electrolyte sensors are not required. The power consumption of this compact detector (Length 65mm x Width 36mm x Height 16mm) is only 0.32 watts.

It contains no moving parts. Silicone, Halogen and sulphuric compounds do not impair its functioning. In addition, it is neither cross-sensitive to HC, H_2S, NO, NO_2, CO nor CO_2. The housing is plastic and is suitable for wall mounting.

The sensor has a fast response and a long service life of approximately 40,000 operating hours. The intelligent electronics process the measured values, output the measuring signal, monitor the functioning of the system and report any faults. The measured values are evaluated and further processed in a device arranged downstream according to the user's specifications (eg. Measuring instrument, display, PLC or limit monitor). The system has a 12V DC power supply.

The Hydrogen measuring system meets the highest of demands, such as those of the automobile industry.

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2. WHY A SPECIFIC MEASURING SYSTEM FOR H2?

Since Hydrogen is easy to store and transport, it is deemed the energy store of the future; electrolysers decompose water into Oxygen and Hydrogen using an electric current that has been generated in an environmentally friendly manner. The resulting Hydrogen stores the energy required to generate it and releases it again later in a reaction with Oxygen to make water, either in the form of electrical energy in a fuel cell or as heat or driving power in combustion.

One problem with this process is the highly explosive nature of Hydrogen. Whereas Methane forms an explosive mixture with air in a concentration of between 5 and 15% volume, in the case of Hydrogen concentrations, the corresponding range is between 4 and 75.6%. Since Hydrogen is extremely light and volatile, this problem is not critical in the open air but it certainly is in enclosed spaces such as cellars, garages and vehicle passenger compartments where even small leaks could lead to the formation of explosive mixtures. For this reason, it is essential to monitor Hydrogen concentration in such places at all times.

3. THE INNOVATION

Sensors previously available on the market have disadvantages. Semiconductor sensor and pellistors are cross-sensitive to flammable gases and vapours such as methane and benzene, while electrochemical liquid electrolyte sensors have limited service life and are susceptible to climate fluctuations.

The Hydrogen specific measuring system uses a new sensor which combines many advantages: it is specific for Hydrogen, has a long service life (more than five years) responds quickly (T90 time = 6 seconds), consumes very little power (approximately 0.32 watts) and has a linear measuring range.

4. DESIGN OF THE SYSTEM

The solid electrolyte sensor is mounted on a holder inside plastic housing and above a diffusion opening. The cable enters at the side by means of a plug connector. The housing also contains the transmitter with a signal amplifier and a 1.0 – 4V analogue output. The transmitter processes and transmits the measured signals. The device has a three-wire interface.

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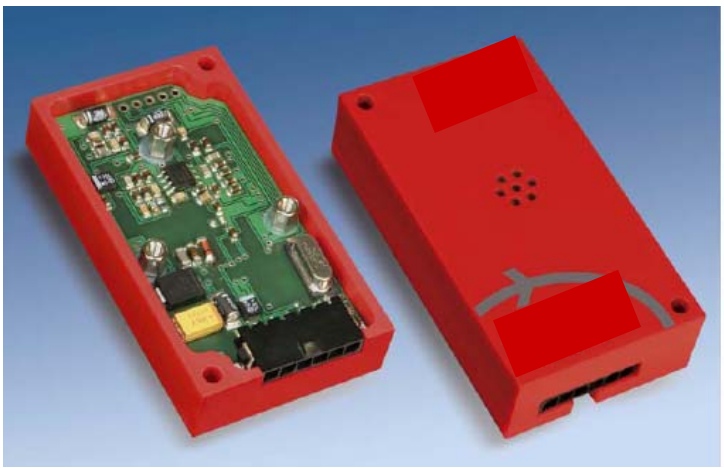

5. TECHNICAL DATA

Transmitter

Power supply:	Plug connector	Protection class IP 67
	Voltage:	12 V dc ±3 V
	Current:	20 – 40 mA
Connections:	Pin 1 (red)	12 V dc ±3 V
	Pin 2 (black)	0 V
	Pin 3 (green)	1.0 to 4.0 V
	Pin 4 (yellow0	Functional ground
Ambient temperature:	-20° C to +80° C	
Air pressure:	900 hPa to 1100 hPa	
Permissible humidity:	10-90% relative humidity, non-condensing	
Output:	1.0 – 4.0 V, corresponds to 0.01 to 2.0% volume	
Housing:	PVC, red	
Protection class of housing:	IP 53	
Housing weight:	Approx. 37 g	
Housing dimensions:	Approx. L65 x W36 x H16 mm	
Connecting cable:	3 x 0.5 ² Cu + functional ground, shielded cable	

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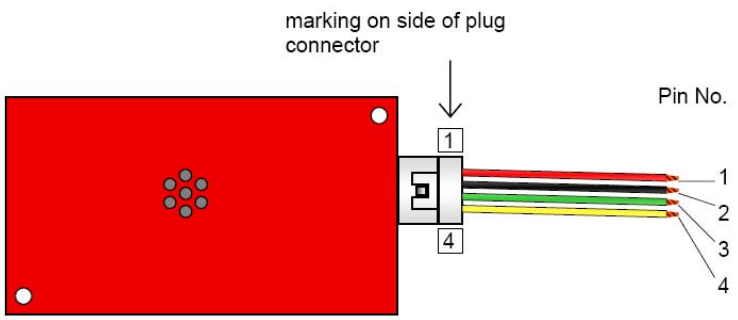
6. TECHNICAL DATA

Sensor

Gas access:	By diffusion
Measuring range:	Standard: 0.01 – 2% volume Hydrogen Optional on request: 0.01 – 4% volume Hydrogen
Expected operating life:	> 5 years in air
T_{90} response time:	6 seconds
Part number:	2112B0090

Connection Scheme

The gas measuring system must be connected to any downstream equipment by means of a three-core, shielded cable The system is connected to the electric circuit via Pin 1 and Pin 2 and the measured data is read via Pin 3. The functional earth must be connected to Pin 4.



7. ADDITIONAL INFORMATION

To date, we are unaware of any catalyst poisons.

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