AMT Analysenmesstechnik GmbH

Joachim-Jungius-Strasse 9
D-18059 Rostock, Germany
Telephone: +49 (0) 381 40 59 380
Fax: +49 (0) 381 40 59 383
e-Mail: amt-gmbh@t-online.de
www.amt-gmbh.com

H_2 Measuring Instrument with Amperometric Micro-sensor

Very fast determination of dissolved hydrogen without streaming the sensor membrane, display of hydrogen in mg/l and temperature in °C

The microprocessor-operated measuring instrument has been developed for the fast and accurate in-situ determination of dissolved hydrogen without any sampling. The instrument is useful for the laboratory and for simple and fast measurements in the field (e.g. power plants, chemical industry). The instrument is equipped with an amperometric, membrane covered H_2-micro-sensor, which has not to be streamed and with a temperature-sensor. The display shows the concentration of the measured dissolved hydrogen in mg/l and the temperature of the sample.

The battery-operated measuring instrument can be equipped with a power supply unit and with a RS 232 interface. By means of exchanging the H_2-sensor tip to a galvanic oxygen micro-sensor tip, the measuring instrument could be changed simply into a high performance oxygen measuring instrument.

Furthermore the instrument is useful to store the calibration coefficients of up to 10 different chemical micro-sensors and to calculate the concentration units by means of the measured raw data. This allows also the fast and simple exchange of sensors and measuring ranges, if required. Apart from the already mentioned micro-sensors for the determination of H_2 and oxygen, there are also micro-sensors available for the determination of dissolved hydrogen and ozone. All these sensors can be interfaced very simply to the measuring instrument. Instead the temperature sensor could be used also an combined pH/temperature sensor if this is required.

The measuring system is equipped with a functional leather case for the whole system with shoulder strap and with belly carrier bag function for easy handling and with a quiver for the sensors. The operation of the measuring device is possible without removing the instrument from the bag. This ensures a simple and and protected handling also during field measurements under difficult conditions.

Advantages of the Hydrogen Measuring Instrument with amperometric Micro-sensor

Compared with the other commercially available so called macro-sensors for the amperometric determination of dissolved hydrogen and compared with the very expensive instrumentation systems like gas chromatography, the new measuring instrument has the following advantages:

1. No streaming of the sensor membrane necessary, very low analyte consumption
2. Membrane or electrolyte exchange is not necessary
3. Very fast response times of the sensor (only some seconds for $t_{90\%}$)
4. Determination is possible without sampling and without adding any chemicals
5. Very low detection limit of 0,2 µg/l
6. High accuracy
7. High economic efficiency (no consumption of chemicals)
8. Measurements also in turbid, coloured, muddy and salt containing samples
9. Online measurement (not only average values of a big volume)
10. High local resolution of the measurement (µm-steps)
11. Immediate display of the hydrogen concentration (mg/l)

Fig..: Amperometric H_2-Micro-sensor, complete with titanium housing, integrated electronics and exchangeable sensor tip

Technical Data of the Amperometric Micro-sensor:

- ☞ Measuring principle: amperometric, membrane covered sensor with redox catalyst
- ☞ 3 sensor electrodes
- ☞ Ready for measurements after polarisation time of 20...45 minutes
- ☞ Polarisation is managed by the integrated electronics
- ☞ No streaming of the membrane, no stirring of the analyte, very low analyte consumption
- ☞ Concentration ranges: depends on customers request
  standard: 0,2...500 (1000) µg/l and others on request
- ☞ Accuracy of the sensor: better than 2% of the measuring value
- ☞ Measurements within a range of 0°C to 30°C
- ☞ Response time: $t_{90\%}$: 2 seconds
- ☞ Average life time: approx. 6...10 months
- ☞ No signal interferences caused by salt concentrations up to 40 g/l
- ☞ Cross sensitivities: H_2S (leads to errors and/or reduced life time)
- ☞ Unsuitable for measurements in strong alkaline solutions (c>0,02 mol/l OH^-) and for measurements in strong acid solutions (c>0,5 mol/l H^+)