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H₂S/Sulphide Measuring Instrument with Micro-sensor

In-situ Determination of Dissolved H₂S/Total Sulphide, pH, temperature with parallel Display of the Concentrations of all Parameters



The microprocessor-operated measuring instrument has been developed for the fast and accurate in-situ determination of dissolved H₂S and total sulphide without any sampling. The instrument is useful for the laboratory and for simple and fast measurements in the field (e.g. sewage analytics). The instrument is equipped with an amperometric, membrane covered H₂S-micro-sensor, which has not to be streamed and with a combined pH/temperature-sensor. The display shows the concentration of the measured total sulphide in mg/l (on request only the H₂S-concentration), the pH-value 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 H₂S-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 H₂S/total sulphide 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.

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 protected handling also during field measurements under difficult conditions.

Advantages of the H₂S/Sulphide Measuring Instruments with amperometric Micro-sensor

Compared with all the other commercially available methods/instruments for the quantitative determination like e.g. the chemical analysis by means of methylene blue (German standard) or by means of ionsensitive electrodes, the new measuring instrument has the following 10 advantages:

1. Determination without sampling or adding chemicals within the pH-range 0-8,5
2. Very low detection limit down to 2 µg/l H₂S
3. High accuracy
4. High economic efficiency (no consumption of chemicals)
5. Fast putting into operation (after polarisation of the sensor, approx.5-10 minutes)
6. Measurements also in turbid, coloured, muddy and salt containing samples
7. No cross sensitivities against tensids, heavy metals, sulphur-oxygen-compounds
8. Online measurement (not only average values of a big volume)
9. High local resolution of the measurement (µm-steps)
10. Alternatively analysis of dissolved H₂S or dissolved total sulphide (heavy metal sulphides are not detected)



Fig.: Amperometric H₂S-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
- ☞ 3 sensor electrodes
- ☞ ready for measurements after polarisation time of 5...15 minutes
- ☞ no streaming of the membrane, no stirring of the analyte, very low analyte consumption
- ☞ concentration ranges: - type I: 0,05 - 10 mg/l H₂S
- type II: 0,5 - 50 mg/l H₂S
- type III: 0,01 - 3 mg/l H₂S
and others on request
- ☞ accuracy of the sensors: better than 2% of the measuring value
- ☞ measurements between 0°C and 30°C and within a range of pH 0 to 8,5
- ☞ Response time: t_{90%}: down to some hundred milliseconds
- ☞ average life time: depends on H₂S-stress and on sample matrix: 5...9 months
- ☞ no cross sensitivities against:
Carbon dioxide (to 25,38 vol.%), methane (to 5,78 vol.%), hydrogen (to 0,544 vol.%), ammonia (to 1000 ppm(v)), carbon monoxide (to 92 ppm(v)), carbon bisulphide (to 5 vol.%), organic solvents (max. 20 Vol.%), acetic acid (to 1 mol/l), dimethyl sulphide, HCN
- ☞ low cross sensitivities against SO₂ (at pH<4): 100 pip SO₂ = 1 ppm H₂S
and against Chlorine: 50 ppm Cl₂ = 1 ppm H₂S
- ☞ no signal interferences caused by salt concentrations up to 40 g/l