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Measurement and Control Engineering Chemical Analysis Engineering Technical Support

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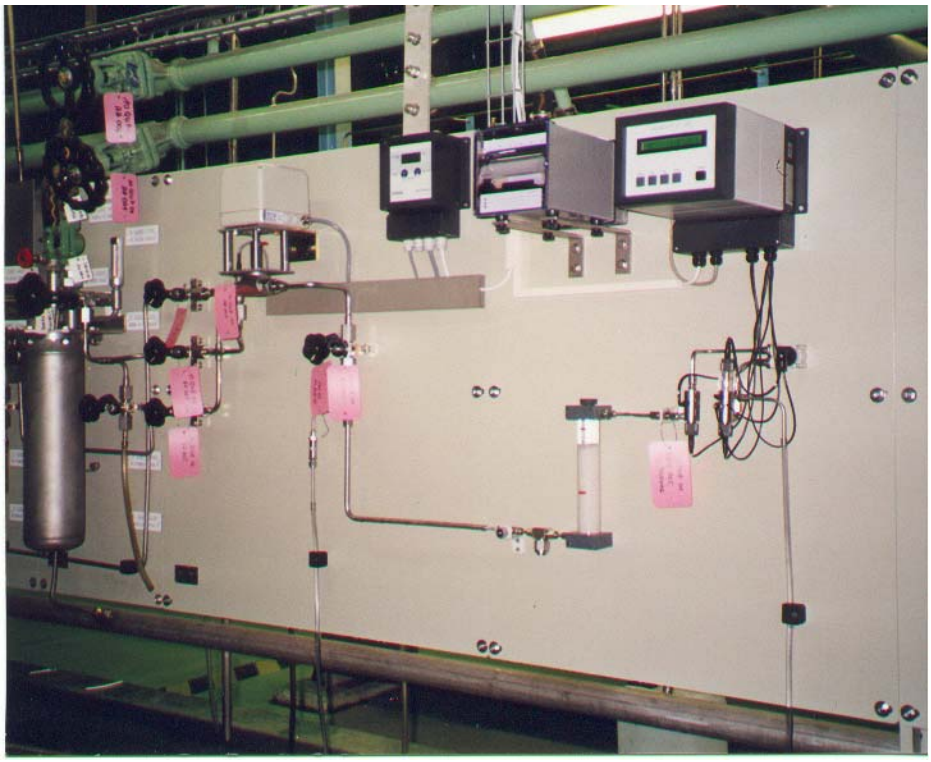
Oxygen analyzer

HYDROLYT LP 100



Applications

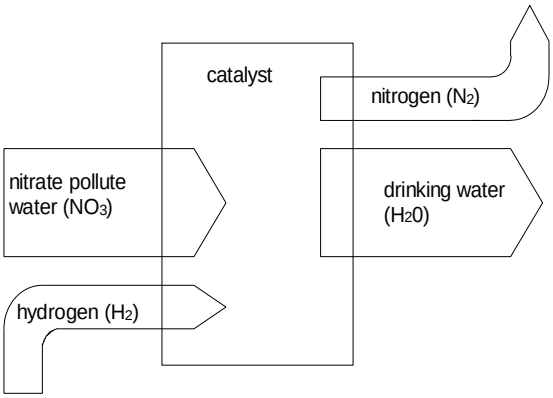
The HYDROLYT LP 100 oxygen analyzer is used for the automatic, continuous measurement and control of oxygen concentration in aqueous solution. For example, the determination of residue oxygen concentration in boiler feed-water in power plants, monitoring of oxygen concentration during the denitrification (removal nitrate NO^-_3) of drinking water, indication of oxygen concentration during catalytic reduction of oxygen on noble metal surfaces in water treatment plants etc. The measuring range is between some µg/l (trace areas) up to saturation levels.

The oxygen in a water-steam-loop of a power plant represent an important parameter between the interaction of iron and water or steam. According to the operation of the boiler a certain amount of oxygen must dose in the water system (oxygenated treatment). The oxygen concentration influence the rate of corrosion and therefore corresponds to the building or destruction of the protective layer in the pipes and boilers. The oxygen concentration ranges between a few µg/l (alkali water treatment) and approximate hundred µg/l if oxygenated treatment is using.

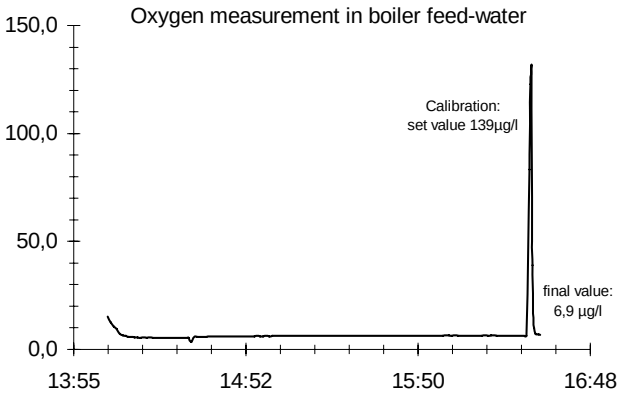
The denitrification is based on the process where by hydrogen is added to nitrate polluted water and then the water flows through a solid bed reactor filled with a noble metal catalyst. As a result water and nitrogen are produced.

The catalytic reduction of oxygen is based on the reaction between dissolved oxygen in water and hydrogen in the presence of a noble metal surface (bright-gas reaction). Typical applications for oxygen free water there are in breweries, beverage industry and in the preparation of boiler feedwater in power plants.

It is important for the correct operation of the process to dose the exact amount of hydrogen through measure the presence oxygen.



scheme for nitrate removing



Description

During the measurement of dissolved oxygen (molecular hydrogen O_2) the sample flows through a coaxial designed measurement cell by a silver measuring electrode. If the measurement electrode has a characteristical potential, in the boundary layer (interphase) the measurement reaction takes place. The electrochemical reaction may be represented qualitatively as:

$$O_2 + 2H_2O + 4e^- \Leftrightarrow 4OH^-$$

The electrochemical sensor functions in a potentiostatic mode with an open three electrode system (no membrane). Consequently exact and reliable measurements can be accomplished at low pressures (up to 8 bar) and also in areas where pressure spiking takes place.

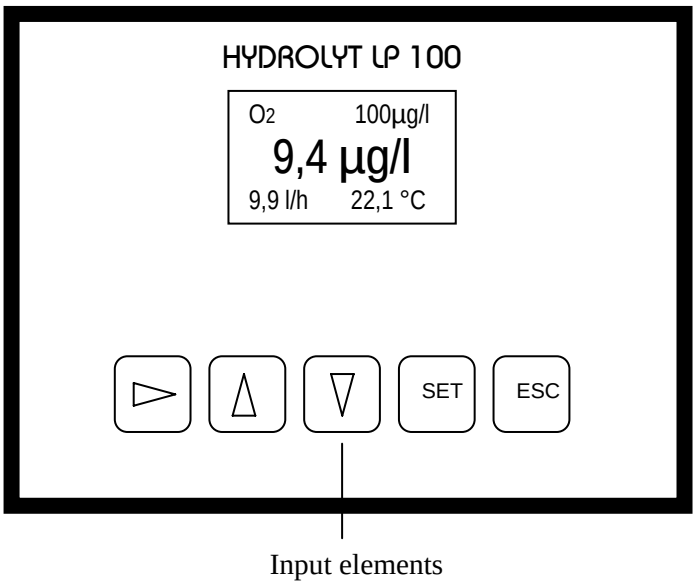
The analyzer has automatic in-line calibration. A stainless steel electrode is used in the calibration process. This electrode produces a certain amount of O_2 by electrolysis. The fully automatic calibration is activated at the push of a single button. As no other external calibration devices or procedures are required it is not necessary to shut down operation during calibration. This sturdy and reliable measurement system makes possible to operate very accurately even under extremely harsh operating conditions.
The measuring electrode is a solid cylindrical electrode. The sensitivity of the electrode can be restored easily by cleaning the electrode with a mild detergent.

HYDROLYT LP 100

Features

- measurement range from the traces area up to saturation levels
- high resolution and quick response time (no membrane)
- no zero point adjustment needed
- sturdy, durable and reliable measuring device (low maintenance)
- fully automatic in-line calibration; (no additional calibration equipment required)
- automatic compensation for effects of flow and temperature
- on-line unit available as a either portable instrument or wall mounted instrument
- withstands pressure up to 8 bar (116 psi)
- analogue and digital interface; data logging function
- measurement data processing through modern microprocessing; user friendly

Front view



Input elements

Technical data

Measurement principle:.....	microprocessor based, potentiostatic three electrode system
Calibration:.....	build-in, single button operation
Auto-calibration:.....	option
Measuring range:	
Measuring group I:.....	0,0.....1000,0 µg/l
	range selectable between 20....1000 µg/l
Measuring group II:.....	0,00.....20,00 mg/l
	range selectable between 4....20 mg/l
Analog output:.....	0(4).....20 mA; shunt max. 500 Ohm
Digital output:.....	serial interface RS 232
Data logging:.....	option
Limit:.....	power relay
Alarming:.....	power relay; Flow and Calibration
Measuring electrode:.....	silver
Counter electrode:.....	stainless steel 1.4571 (314)
Reference electrode:.....	Ag/AgCl in saturated KCl-solution
Calibration electrode:.....	stainless steel 1.4571 (314)
Response time t_{90}:.....	30 sec
Probe conductivity:.....	≥ 2 µS/cm; (if conductivity is less a salt cell is required)
Ambient temperature:.....	0.....+55 °C
Probe temperature:.....	0.....+60 °C
Probe pressure:.....	≤ 10 bar (147 psi)
Probe flow:.....	3 l/h .....18 l/h
Probe fittings:.....	tube fittings for tube ∅ 6 mm
Error limits:.....	± 3%
Protection class:.....	IP 54
Color:.....	basic parts RAL 7035; front and rear parts RAL 7024
Voltage:.....	100...240 VAC, 50/60 Hz
Power consumption:.....	10 VA

Technical subject to change without notice