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Measurement and Control Engineering Chemical Analysis Engineering Technical Support

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Ozone-Analyzer

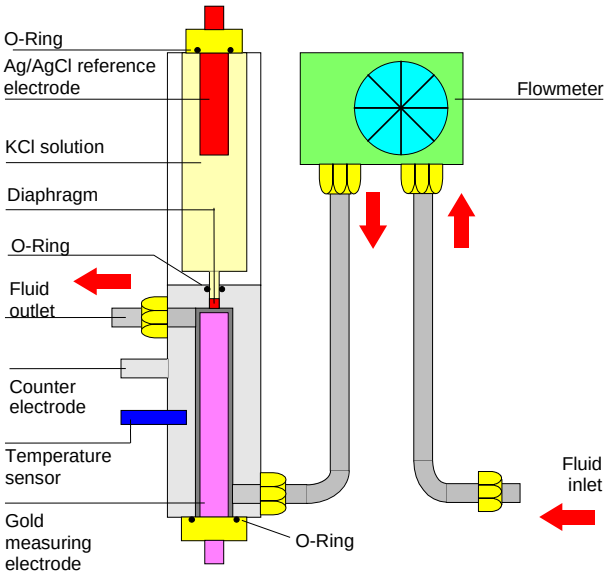
HYDROLYT LP 100

Applications

The ozone analyzer of the series HYDROLYT LP 100 is used for automatic, continuous measurement of the dissolved ozone O_3 in aqueous media. The analyzers are used for process monitoring and control, and gives alarm when limits are exceeded. Applications are, for example, drinking water treatment, in the beverage industry, or the control of the residual concentration O_3 of ozone-treated wastewater. It is important to note that the ozone concentration after treatment may not exceed the value of 0,05 mg/l O_3.

The benefit of the water treatment with ozone in compare to chlorine Cl_2 is a 600 to 3000 times more rapid killing of bacteria. The advantage of this disinfection or decontamination with ozone is also its environmental performance, because there are no by-products such as in the chlorine treatment (e. g. chloramines). At the end of the treatment process the harmless oxygen molecule O_2 remains. A too large residual concentration of ozone in the treated water can then be reduced by using an active carbon filter.

Important for the correct implementation of the disinfection process is an accurate, that means an exact stoichiometric dosage of the required ozone, as well as the measurement of an excess amount by measuring the presence of residual ozone.



Measuring cell

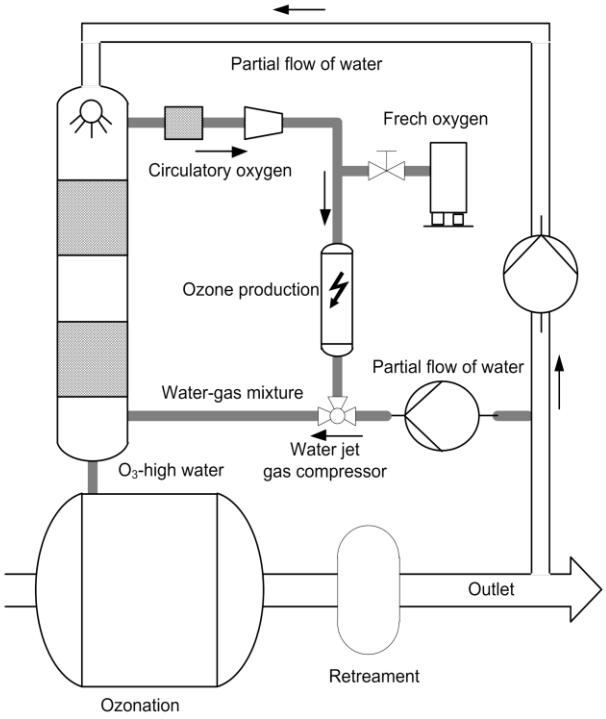


Diagram of a ionization plant

Description

During the measurement of the dissolved ozone (molecular O_3) the sample flows through a coaxial designed measurement cell by a gold measuring electrode. If the measuring electrode has a characteristic potential, in the boundary layer (interphase) the measurement reaction takes place. The electrochemical reaction may be represented qualitatively as (cathodic process):

$$O_3 + H_2O + 2e^- \Leftrightarrow 2OH^- + O_2$$

The electrochemical sensor functions in a potentiostatic mode with an open three-electrode system (no membrane). Consequently exact reliable measurements can be accomplished at pressures (up to 10 bar) and in areas where pressure spiking takes place. The ozone analyzer can measure ozone even if chloride is present in the medium (ozone concentration is measured selective).

The calibration of the sensor can be performed in two ways. Once by a parallel titration determination of the ozone concentration (classical laboratory method) or by a photometric determination and subsequent input of the current value into the instrument. Second, using a calibration solution of known concentration.

This sturdy and reliable measurement system makes possible to operate accurately even under harsh operating.

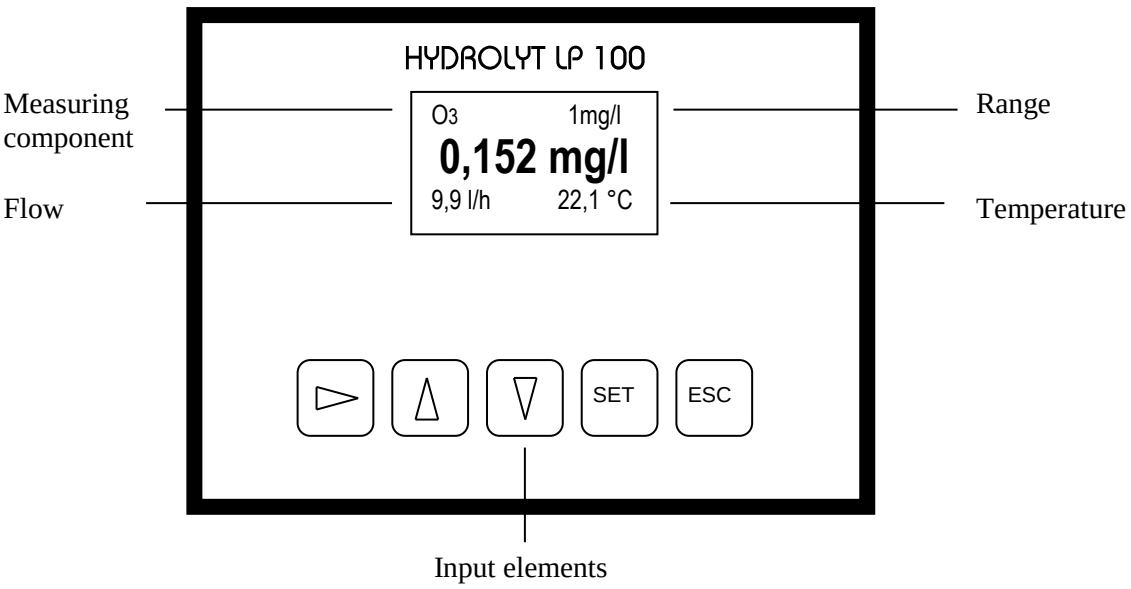
The sensitivity of the electrode can be restored easily by cleaning the electrode with a mild detergent.

HYDROLYT LP 100

Features

- Measurement range from the trace up to saturation levels
- Automatic compensation for flow and temperature effects; high degree of automation
- High resolution and quick response time (no membrane)
- On-line unit available as a either portable or wall mounted instrument
- No zero point adjustments needed; low maintenance
- Withstands pressure up to 10 bar (145 psi)
- Measurement data processing through modern micro processing; data logging function
- Analogue and digital interface; data logging function

Front view



Technical data

Measurement principle:..... microprocessor based, potentiostatic three electrode system

Calibration:..... build-in, single button operation and AutoCal

Auto-calibration:..... option

Measuring range:

Measuring group I:..... 0,0.....1000,0 µg/l

range selectable between 20....1000 µg/l

Measuring group II:..... 0,000.....10,000 mg/l

range selectable between 0,1....10 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:..... gold

Counter electrode:..... stainless steel 1.4571 (314)

Reference electrode:..... Ag/AgCl in saturated KCl-solution

Response time t_{90}:..... 30 sec

Probe conductivity:..... ≥10 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 (145 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