Water Technologies

Wallace & Tiernan® Analytical Instrumentation

DEPOLOX® Basic for the measurement of free or total chlorine

SIEMENS

Introduction

The DEPOLOX® Basic measuring system is designed for monitoring the disinfection of potable and also process water. It is intended for applications where monitoring of free or total chlorine is sufficient - and no further control of the chlorine content in water by controllers or limit contacts is required. For measuring free chlorine the proven DEPOLOX® measuring cell, for measuring total chlorine a membrane sensor is used.

General

To check the chlorination of water, its content of free chlorine must be measured. Only the presence of certain chlorine residuals in treated water guarantees safe disinfection.

In the presence of ammonia or organic nitrogen compounds chloramines (combined chlorine) can form. The sum of free chlorine and chloramines is total chlorine. In particular when surface waters are treated, a major influx of ammonia into the raw water may occur. In such cases the total chlorine measurement is an important information in checking the water quality.

Design and function

Measurement of Free Chlorine
The free chlorine measuring cell consists of a 3-electrode system with external potentiostatic control. The working and the counter electrodes are made of a platinum alloy. A silver/silver-chloride electrode serves as reference electrode; the contact between reference electrode and sample water is established by two membranes. The reference electrode is mounted in PVC brackets and completely submerged in electrolyte.

The electrolyte container is transparent to enable a visual check to be made of the amount of electrolyte in the reservoir. Refilling of the electrolyte is simple. A membrane in the plug of the electrolyte reservoir provides the necessary equalisation of pressure.

Measurement of Total Chlorine
The patented sensor for total chlorine measurement consists of a membrane-covered potentiostatic 3-electrode system including a working electrode of gold, a counter electrode of stainless steel and a reference electrode of silver. An integral temperature sensor provides for temperature compensation in the range of +5...+45 °C (41...113°F). Zeropoint calibration is not required.The sensor has a very low dependence on pH-value, so it can be used in water with varying pH-value.

Benefits

- Continuous measurement of free or total chlorine
- No reagents needed
- Separate isolated signal inputs and outputs
- Freely selectable measuring ranges
- Long electrode lifetime
- Conforms to CE (89/336/EEC)

Supply of the water to be analysed to the electrode system is pressureless. The current generated in the sensor is directly proportional to the concentration of the oxidising agent in the sample water. This current is then transmitted to the microprocessor assisted electronic system for processing.

Display of Measured Values
The sensor – either for free or total chlorine – is connected to a digital amplifier that maintains by means of a potentiostatic control loop an adjustable DC voltage (Upot) between working and reference electrode.

Technical data

ELECTRONIC MODULE ® DEPOLOX® Basic
Chlorine Measuring Ranges:
1.0 / 2.00 / 5.00 / 10.0 / 20.0 mg/l
Display flashes if measuring range is exceeded or undershot

Measurement Input:
For chlorine sensor, isolated up to 50 V relative to earth Analogue Output (4...20 mA):
Output load ≤ 1000 Ω, accuracy + 0.1% FS,
isolated up to 50 V relative to earth

Mains Voltage: 115 / 230 V + 10 %, 50 – 60 Hz, 5 VA

Ambient Temperature: 0...50°C (32...122°F)

Housing:
Wall-mounted housing IP 66

Tests and Marks:
Conforming to CE (89/336/EEC)
EMC tests to EN 55011 and EN 50082, tested to IEC 801 parts 2, 3 and 4

Weight (including packing): 2.4 kg (5.3 lb)

Module Dimensions (W x H x D):
275 x 160 x 99 mm (incl. contact strip)
(10-7/8" x 6-5/16 x 3-15/16)

Flow block assemblies with sensor kits

	Flow Block Assembly with Free Chlorine Sensor Kit	Flow Block Assembly with Total Chlorine Sensor Kit
Measuring cell	Potentiostatic 3-electrode system DEPOLOX® 4	Potentiostatic 3-electrode system membrane-covered, TC1
Accuracy	0.01 mg/l ± 1 digit (2% FS)	0.05 mg/l ± 1 digit (6% FS)
Sensitivity	0.01 mg/l ± (1% FS)	0.01 mg/l ± (1% vFS)
Repeatability	0.01 mg/l ± 1 digit (2% FS)	0.02 mg/l ± 1 digit (3% FS)
Stability	± 2% FS for a period of one month under favourable conditions	± 5% FS for a period of one month under favourable conditions
Response time	90% of the change of the Cl_2 residual within 20 sec. after the entry of the sample water into the measuring cell	90% of the change of the Cl_2 residual within 5 min. after the entry of the sample water into the measuring cell
Overall dimensions of the complete Flow Block Assembly	260 x 350 x 160mm (W x H x D) (10-1/4" x 13-3/4" x 6-5/16")	110 x 345 x 104mm (W x H x D) (4-5/16" x 13-9/16" x 4-1/8")
Weight	3.8 kg (8.4 lb)	2.4 kg (5.3 lb)
Sample water temperature range	0 to 50°C (32 to 122°F) - No temperature compensation of the measuring signal	+5 °C bis +45°C (32 to 122°F)- measuring signal is independent of temperature by internal compensation
pH value	min. pH 4 up to max. pH9 measurement is based on stable pH values: pay attention to high HOCl/OCl-dependence max. pH-value variation 0.3 pH	min. pH 6 up to max. pH10 low pH-dependence: well suited for water with varying pH-values. Linear signal deviation of approx. -5% per pH unit
Conductivity	>250 µS/cm also suitable for salt water	10 µS/cm up to max. 2500 µS/cm not good for salt water
Inlet sample water pressure	0.15 to 4 bar g (2 to 58 psi)	0.15 to 4 bar g (2 to 58 psi)
Sample water outlet pressure	pressureless	pressureless
Recommended sample water flow	33 l/h ± 5 l (controlled)	6 to 35 l/h

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