

Process Analyser EcaMon TE10

The continuous process analyser for waters, *EcaMon TE10*, enables the monitoring of tap water, see water, river waters, mineral waters, some waste waters and cleaned waste waters for metals such as As, Hg, Pb, Cu, Bi, Tl, Cd, Zn, Se, Mn, Fe, Ni, Cr down to the sub-mg/l concentration levels as well as for some non-metals (Cl⁻, Br⁻, I⁻, S²⁻, PO₄³⁻, NH₃, EDTA, ascorbic acid, bromates, chlorites).

Operational principle

EcaMon TE10 makes use of the electrochemical determination of metal species either after their preliminary enrichment on a long-living non-mercury electrode or through their direct electrochemical conversion. Most metals are determined by making use of the former procedure which facilitates the analyses in the mg/l down to sub-mg/l concentration range.



Technical description

The *EcaMonTE10* system built in a 19" construction consists of the following units:

Analytical Unit: Serves for the measurement of metals in the continuously delivered pre-treated sample solutions. It consists of the electronic control system, pumping system, flow-through electrochemical cell with a long-living working electrode, injection ports for the carrier electrolyte, reagent, standard, blank solutions. The analytical unit is controlled by a microprocessor, comprises a powerful potentiostat/galvanostat, fast A/D and D/A converters. The measurements and signal evaluation are controlled by the user program specially designed for the type of water being monitored.

One, two or three Analytical Units can be built into a single rack, enabling the measurement of one, two or three species simultaneously. Each unit operates independently, with its own



pace.

The system enables an automatic self-test and periodical checking of the operational functions by making use of the in-built self-calibration mode with a standard solution.

EcaMon TE10, 2 channel instrument



The reservoirs for the electrolytes and standard solution are placed in the lower part of the monitor.

Determined species

The following elements can be determined in an analytical unit:

Metals: As (Total or As(III)), Ni, Pb, Cu, Sn, Hg, Fe, Cr(VI), Ag, Sb, Cd, Mn, Bi, Zn

Non-metals: Bromate, chlorite, chloride, iodide, acids, bases, sulphides, sulphites, nitrates, orthophosphate, ascorbic acid, ammonia

The elaboration of the methodologies for the determination of other species may be *available on request*.

Metrological data

Detection limits are in the mg/l to several ug/l range for most of the above elements. The upper concentration limits are virtually unlimited.

The accuracy of the results is ensured by automatic standardisation by making use of the in-built calibration technique. The precision of the results is usually about 2-10 % depending on the concentration.

Sampling throughput

The average sampling and measurement rate is 4-20 measurements in an hour.

Operation duration and maintenance

The system operates unattendedly and automatically for at least one week not demanding any service. After this period, the working electrode, fine filter and reagent solutions should be replaced and refilled, respectively.

Advantages over other systems

Compared to other monitoring systems such as spectrophotometric and atomic spectrometric systems, the *EcaMonTE10* system exhibits the following advantages:

- Simple flow system with minimum possibilities for leakage, plugging.
- Minimum amount of reagent solutions
- Available and cheap reagents
- Environmentally compatible reagent solutions
- No environmentally harmful waste materials
- Extremely low maintenance costs
- Simple maintenance

Technical parameters

Cell: EcaCell 353c or 104 with three electrodes

Software: Programmable measuring and validation frequencies, automatic evaluation and archivation. Over 5000 measurements can be stored in the memory and can be downloaded

any time to a PC by making use of a simple software running under Windows XP/2000.

Manual mode: Filling of the system with solutions, calibration, electrode activation and regeneration.

Monitoring mode: fix measurement pace with pauses between measurements of 1, 5, 10, 20, 30, and 60 min, automatic calibration after a defined number of measurement, automatic electrode regeneration after a defined number of measurements, automatic check of the calibration coefficient

Keyboard for basic monitoring parameter input

Graphical display for displaying the calibration coefficient, actual result, time and date, error message

Digital IN/OUT interface (RS232) for data download and parameter upload from a PC

4-20 mA output (galvanically isolated)

Concentration alarm (dry contact)

Sample input: overflow with sample flow 0.1 - 1 l/min

Sample temperature: 10-50 °C

Sample pressure: 1 bar max.

Reservoirs: Carrier reagent, reagent, calibration solution, blank solution. Depending on the application, some of them (e.g. reagent and blank solutions) are not used.

Drain: solutions containing reagents, treated sample, standard and blank are lead to a separate drain tube for safe discharge

Weight: 40 - 80 kg, configuration dependent

Dimensions (WxDxH):

One channel system: 600x473x478 mm

Two channel system: 600x473x612 mm

Three channel system: 600x473x746 mm

Power: 230 V/50 Hz (other power input available on request)



The *EcaMon TE10* operates under the following conditions:

Temperature: 10 to 35 °C

Relative humidity: up to 90 % (not condensating)

The measuring cell

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