

Applications:

- On-line monitoring for Calcium (and Magnesium) in boiler water
- On-line measurement of Calcium (and Magnesium) after a softening cycle
- On-line analysis of Calcium (and Magnesium) in cooling water (e.g. at power plants)
- Feedback control of Calcium (and Magnesium) in water (lower/upper set points) With "alarm" output



Specifications:

Input	:	high-impedance. $>5 \times 10^{12}$ Ohm, galvanically isolated
Temperature	:	Pt-100 input, 2-conductor. Range : -30.0... 140.0 ± 0.1 °C
Temp. compens	:	manual or automatic
Display	:	alphanumeric LCD, 2 lines, 16 characters
Analog output	:	0/4 ...20 mA, freely attributable, galvanically isolated, max. load 400 Ohm
Relay output	:	2 relay outputs, SPDT contacts 250 V, 6 A max 550 VA
Interface	:	optional RS 485
Ambient temp	:	operation 0...50 °C storage -20...65 °C
Humidity	:	max 90% at 40 °C non-condensing
Power required	:	230 or 130 or 24 VAC, -10 ...+6%, 40...60 Hz
Power consumption	:	10 VA
Electromagn. Comp	:	according to DIN EN 50081-1 50081-2 in Compliance with CE
Casing	:	Polystyrole, spring-loaded terminals
Protection class	:	IP 65 (NEMA X4)

DATA OF MEASURING UNIT & HOUSING CABINET:

Sensor	:	Combined Ca selective matrix membrane electrode with single junction Ag/AgCl reference half cell with 2 ceramic diaphragms
Temperature	:	Separated Pt-100
Display & range	:	-1 ...20 mg/l CaCO ₃ (-1 ...500 mg/l optional) for manual calibration 0.1-500.0 mg/l CaCO ₃ (for programmable automatic calibration version)
Precision	:	± 2 mg/l ($< + 6\%$ for 0 ...500 mg/l range) for manual calibration $\pm 6\%$ of measuring value or ± 0.5 mg/l whichever is greater (for programmable automatic calibration)
Response time	:	< 10 min.
Waste	:	Ca-/NaCl
Maximal pressure	:	< 1 bar on inlet/pressure-free at outlet of sampling vessel and waste outlet
Temperature range	:	0 ... 40°C
Optimal pH range	:	3 ...9
Reagent	:	Reference-cum-Ionic Strength Adjuster (RISA) dosing simultaneously over fixed-speed peristaltic pump
Sample flow rate	:	1-6 l/h
Working life	:	Sensor electrode : > 1 year
Cabinet	:	epoxy coated steel, front door, wall-mounted. IP 55 Class, dimensions (mm) 550 H 450 W 300 L
Warranty	:	1 year

Methodology:

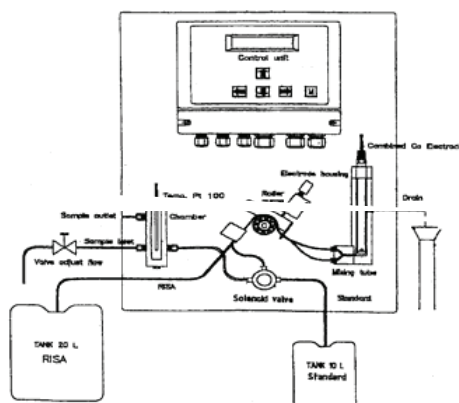
Measurement principle	:	Direct-potentiometry (Ca-Hardness Ion Selective Electrode) with ionic strength adjuster "RISA" and noise compensated evaluation of sensor data
Unit	:	"mg/l"
Measuring/control range	:	0 – 20 mg/l CaCO ₃ (0 – 500 mg/l CaCO ₃ optional) 0.0 – 500 .0 mg/l CaCO ₃ (for programmable automatic calibration version)
Detection limit	:	1 mg/l CaCO ₃ (0.1 mg/l programmable automatic calibration version)
Response time (T90)	:	< 10 min.
Programmable automatic calibration (option)		

Advantages:

- Commonly applied determination method in continuous flow analysis
- No sample preparation/filtration (if suspended particles < 1% and < 1 mm)
- Easy to set up, minimal maintenance
- Environmentally friendly (only non-toxic low-cost reagent NaCl, CaCl₂ needed)
- Robust full plastic PVC membrane Ca-selective sensor
- Analog outputs 0/4 – 20 mA e.g. for curve plotting
- Monthly only 1 reagent set (20 l RISA)

Operating principle:

Via bypass sample water flows through the OVERFLOW CHAMBER where temperature is measured. By action of a peristaltic pump a tiny sub-sample is extracted and mixed up with an equal volume of sample conditioner (RISA) in the MIXING TUBE. The sample/RISA mixture enters into the ELECTRODE HOUSING where the measurement is done; the mixture is finally wasted into a DRAIN. The temperature and potentiometric signals are transmitted to the controller unit and evaluated. According to the given set points (SP1, SP2) reset action/alarm will be triggered (with or without proportionality range).



SYSTEM CONFIGURATION:

WATER TEST Total/Ca-Hardness controller panel in cabinet mounted. Included: Overflow chamber, tubes, valve, peristaltic pump, electrode housing, reagent container RISA (20 l), combined Ca-electrode, Pt 100, controller unit K 100-TH