



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Analysis in drinking and mineral water

excellent products, unique product basket



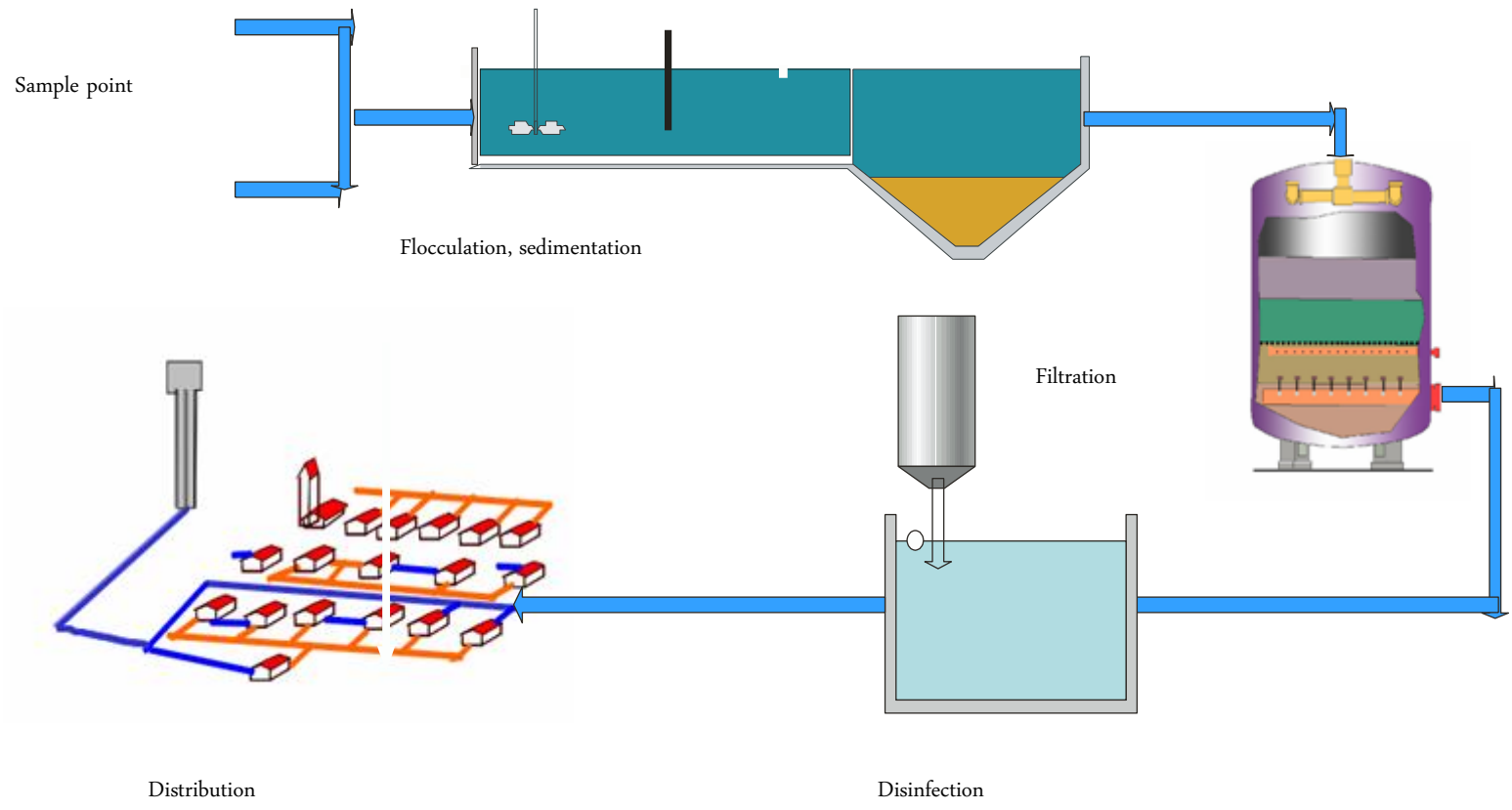
A full product basket for each application

E+H can offer a wide spread of different products and a full product basket in the drinking water industry for standard applications but also for special applications.

pH, ORP, chlorine, conductivity and turbidity for common applications like raw water intake, flocculation, sedimentation, disinfection and distribution.

Nitrate, Mangan, Iron, Aluminium and Ammonium for special measurements in raw water intake, flocculation, aeration, mixing and filtering.

Water treatment plant - general scheme



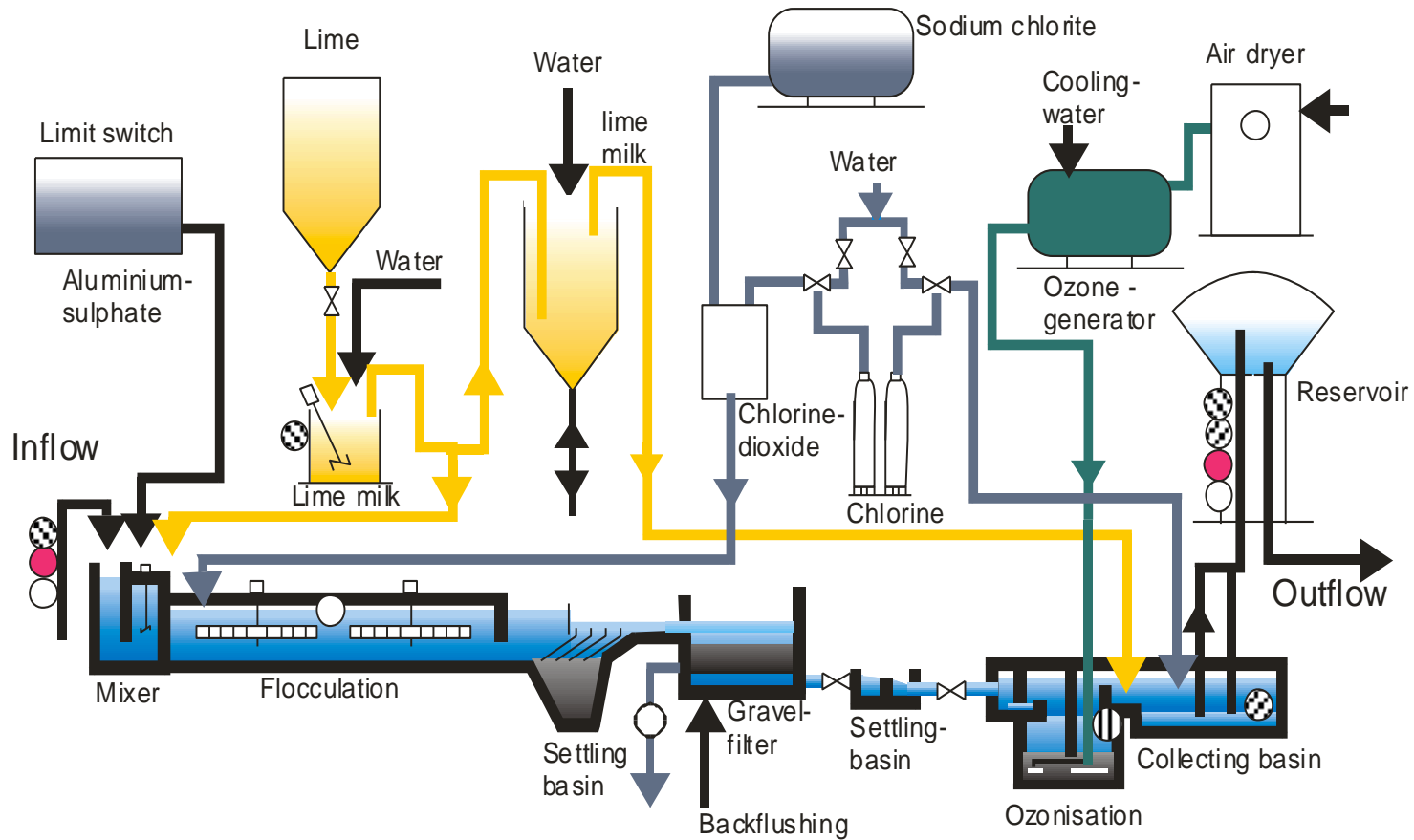
Requirements for drinking water

Limit values after drinking water regulation in Europe

- pH: $6,5 < \text{pH} < 9,5$
- turbidity: 1 FNU
- DO: 5 mg/l
- conductivity: 2,5 mS/cm at 20°C
- Ammonia: 0,2 mg/l $\text{NH}_4 \cong 0,17 \text{ mg/l } \text{NH}_4 \text{-N}$
- Nitrate: 50 mg/l $\text{NO}_3 \cong 11 \text{ mg/l } \text{NO}_3 \text{-N}$
- Nitrite: 0,1 mg/l $\text{NO}_2 \cong 0,03 \text{ mg/l } \text{NO}_2 \text{-N}$
- Fluoride: 1,5 mg/l F
- Iron: 0,2 mg/l Fe
- Aluminium: 0,2 mg/l Al
- Manganese: 0,05 mg/l Mn



Analytical measurements in a water work



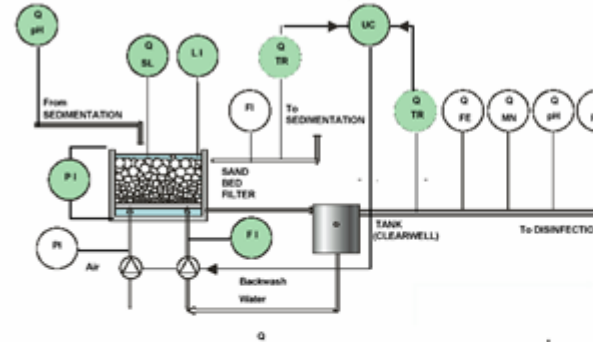
- pH
- Chlorine
- Chlorine dioxide
- Conductivity
- Turbidity
- Redox



Standard processes

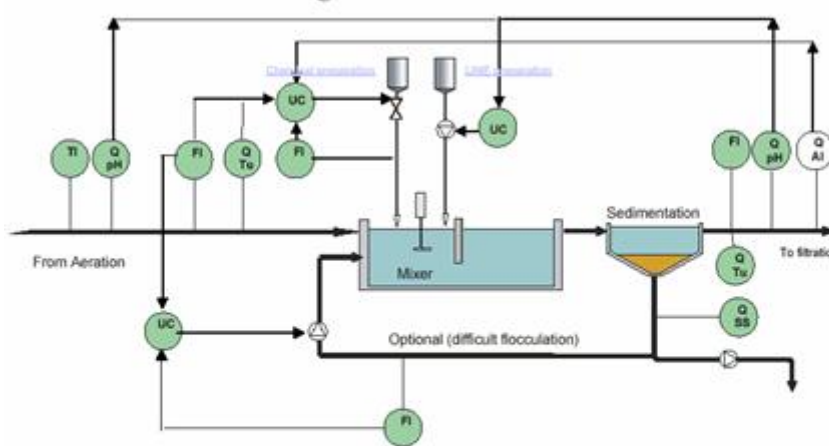
Tu, pH, Manganese, Iron

Filtration: Sand filter, Close filter



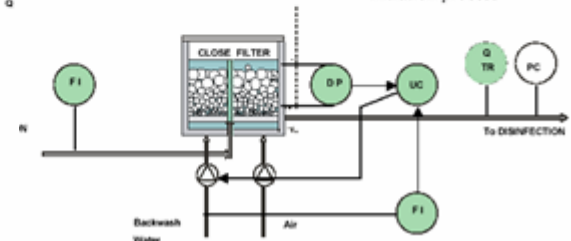
Description:
The filtration process removes the turbidity of water. This process can be done using sand filter bed or close filters. In both cases a backwash cycle has to be provided in order to maintain the efficiency of the filtration process

Treatment: Dosing, Flocculation and Sedimentation



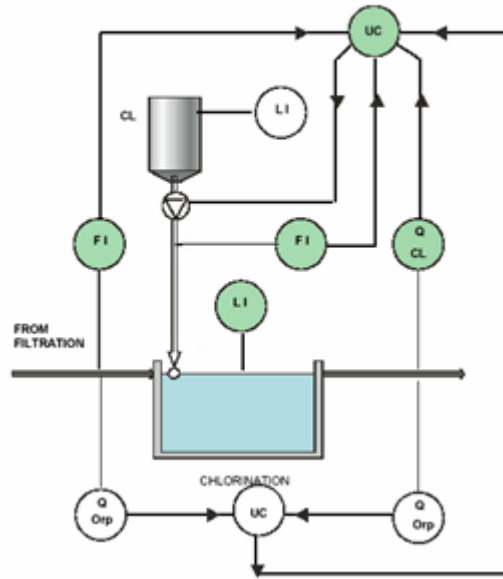
Description: Most of the suspended particles are so small (iron, manganese, ...) that a sedimentation step is insufficient for total removal. Because most of the particles have a negative load, they don't coagulate. With the aid of flocculant mixing carefully in the raw water the particles are enstabled and the flocculation process begin. With the flocculation it's possible to remove particles and dissolved matter. The particles, enclosed in bigger units, now can sedimentate and separate by filtration in a better way

Aluminium



Standard processes

Disinfection: Chlorine

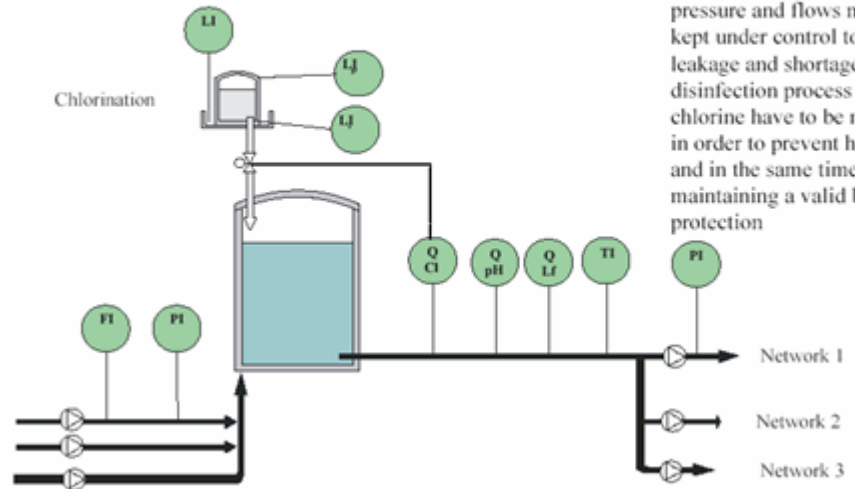


Description:

The disinfection process is used to kill bacteria and prevent the water contamination during the distribution process

Cl, cond

Distribution



Description:

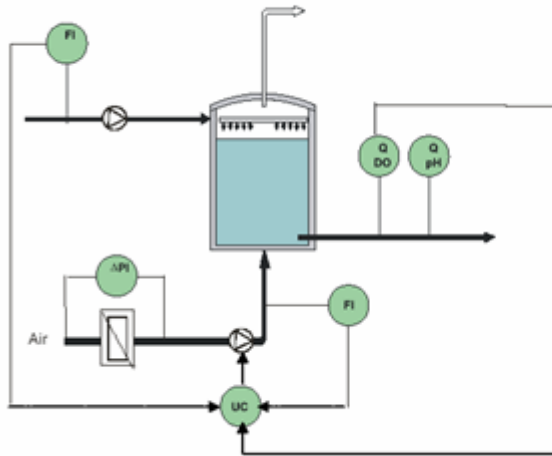
In the distribution process pressure and flows must be kept under control to avoid leakage and shortage. Even the disinfection process by chlorine have to be monitored in order to prevent high limit and in the same time maintaining a valid bacteria protection

Cond, pH, Cl

Specific processes



Treatment: Aeration



Description:

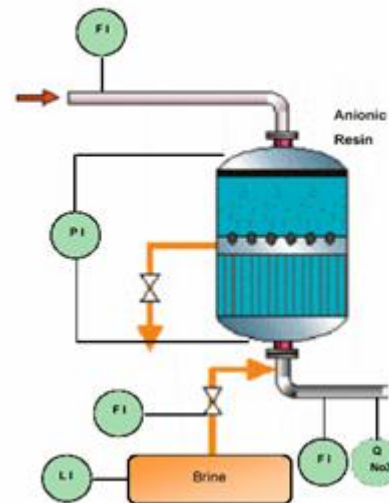
Partial removal of organic dissolved compound and ammonia derivatives. Control of oxygen is done as in the anaerobic principle.

Optionally these pre oxidation tanks are connected in cascade

Preoxidation is also used for removal of H₂S, CO₂, Iron and Manganese. Potassium permanganate is getting more used as oxidant. An overdose will give a pink or red color to the water; in this case color measurement has to be provided

DO, pH, Manganese, Iron

Nitrate removal: Ion exchange



Description:

Ion exchange is a process where undesirable ions are taken away from the contaminated water by exchanging them through a chemical reaction with desirable ion. Due to the limited capacity of the exchanger, it has to be washed with a regenerating solution to regain its function. Backwash, regeneration, rinsing and service are the standard steps of operation..

Nitrate

Panel for chlorine, pH and ORP measurement



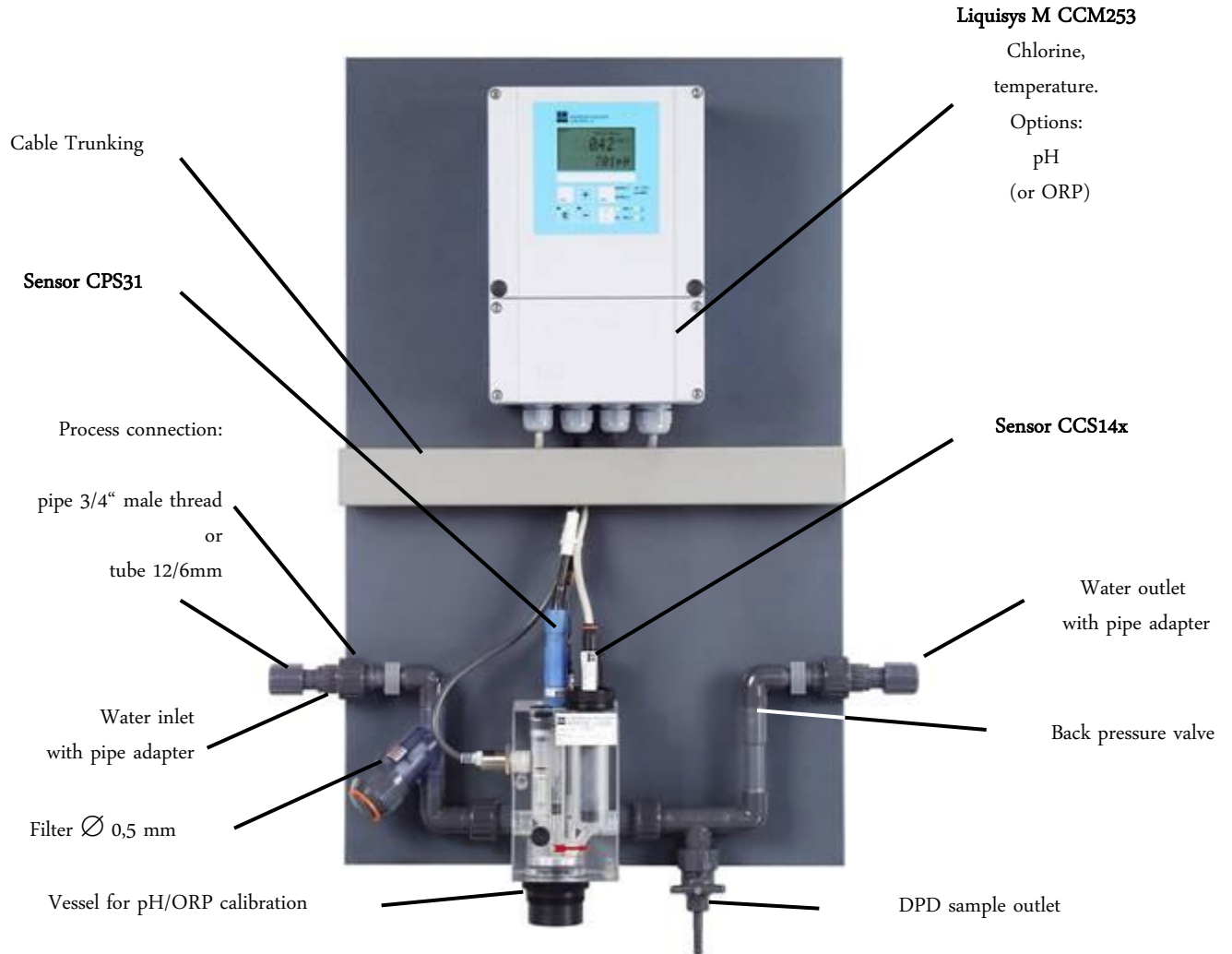
CCE1 for chlorine measurement, potable water

(pH in the range of 6 to 8 varying; pH compensation needed)

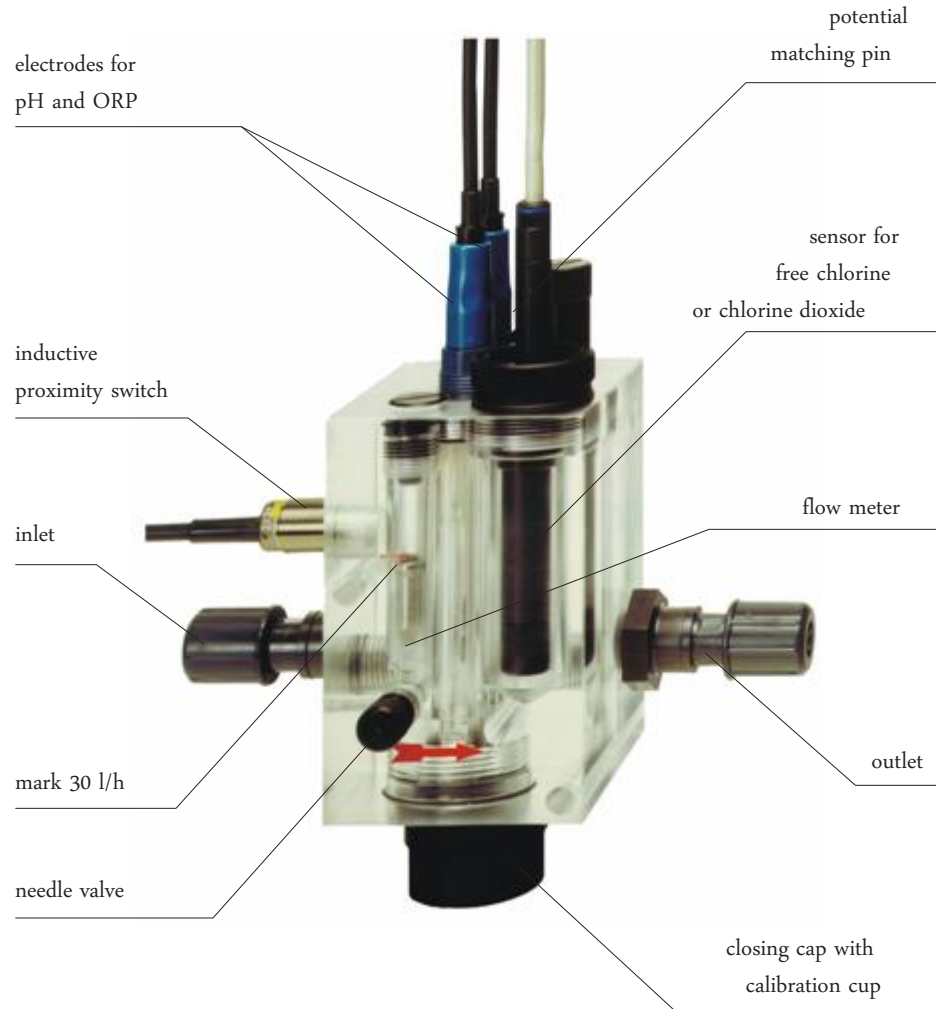
- CCM253EP transmitter version
- Sensor CCS141-N 0..5mg/l
- Sensor CPS31-1EC2ESA
- pH adapter-cable for CCE/CPS31: 51513423
- CCE1

pH adapter-cable 51513423: special designed cable for use with CCE-station (mechanically best adapted, TOP68-connector). Please use instead of CPK9 with CCE!

Panel CCE1 for chlorine and pH



Flow assembly CCA250



Sensor for Cl_2/ClO_2

CCS140	Cl_2	0,05-20mg	approx. 25nA at 1mg
CCS141	Cl_2	0,01-5mg	approx. 80nA at 1mg
CCS240	ClO_2	0,05-20mg	approx. 300nA at 1mg
CCS241	ClO_2	0,01-5mg	approx. 700nA at 1mg



Membrane cells CCS140/240/141/241



Measuring range:	0,05...20mg/l for CCS140/240 0,01...5mg/l for CCS141/241
Units:	mg Cl ₂ /l /mg ClO ₂ /l
Duration of Polarisation:	30min (CCS140/240) 45 min (CCS141/241)
Min. flow rate:	15 cm/s (30l/h for CCA250)
Temperature range:	2..45°C (CCS141)/ 10..45°C(CCS140)
Drift:	< 1,5% /month
pH Range:	4...8 (CCS140)/4...8,2(CCS141) No influence when measuring chlorine dioxide (CCS 240/241)
Max. pressure:	1bar

Liquisys M - modular Chlorine transmitter



CCM223



CCM253

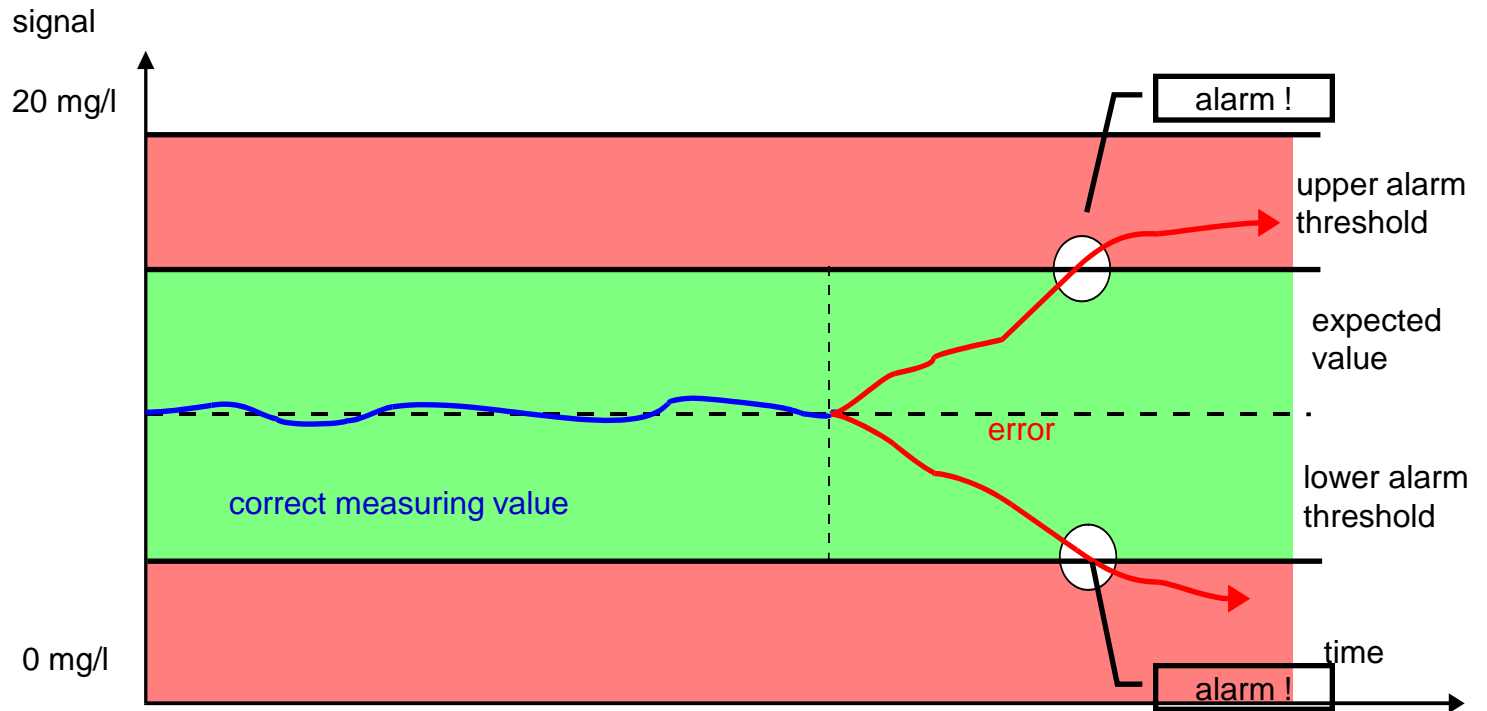
- High accuracy measurement
- User friendly
 - menu with clear text in 6 languages
 - programable alarm
 - cleaning trigger via alarm or limit contact
 - simple calibration procedures
- Safty first
 - like "live check", SCS , process check
 - plausibility check at calibration
 - overdosing plausibility check
- Service friendly
 - modular construction
 - no dismantling or rewiring
 - current output simulation
- Fit for all jobs
 - two circuit instrument with pH possible
 - dosing control, PID, feed-forward
 - limit contacts
 - P(ID) - controller
 - Chemoclean cleaning system
- Communication
 - profibus PA
 - HART
 - 1 or 2 Current outputs



Liquisys M Chlorine

version	parameter	area of application
EK	Cl ₂ ClO ₂	chlorine measurement with stable pH value chlorine dioxide meas. (pH value without influence)
ES	Cl ₂ ClO ₂	as EK, with added features: manual pH compensation for free chlorine, sensor and process check system, table for current output, alarm or limit contact as cleaning trigger
	Cl ₂ + pH chlorine dioxide measurement with pH measurement Cl ₂ + ORP ClO ₂ + ORP	as ES, with additional parameters: chlorine meas. with variable pH value with pH compens. EP ClO ₂ + pH chlorine meas. with stable pH and ORP as a monitoring measurement chlorine dioxide measurement with ORP as a monitoring measurement (pH value without influence)

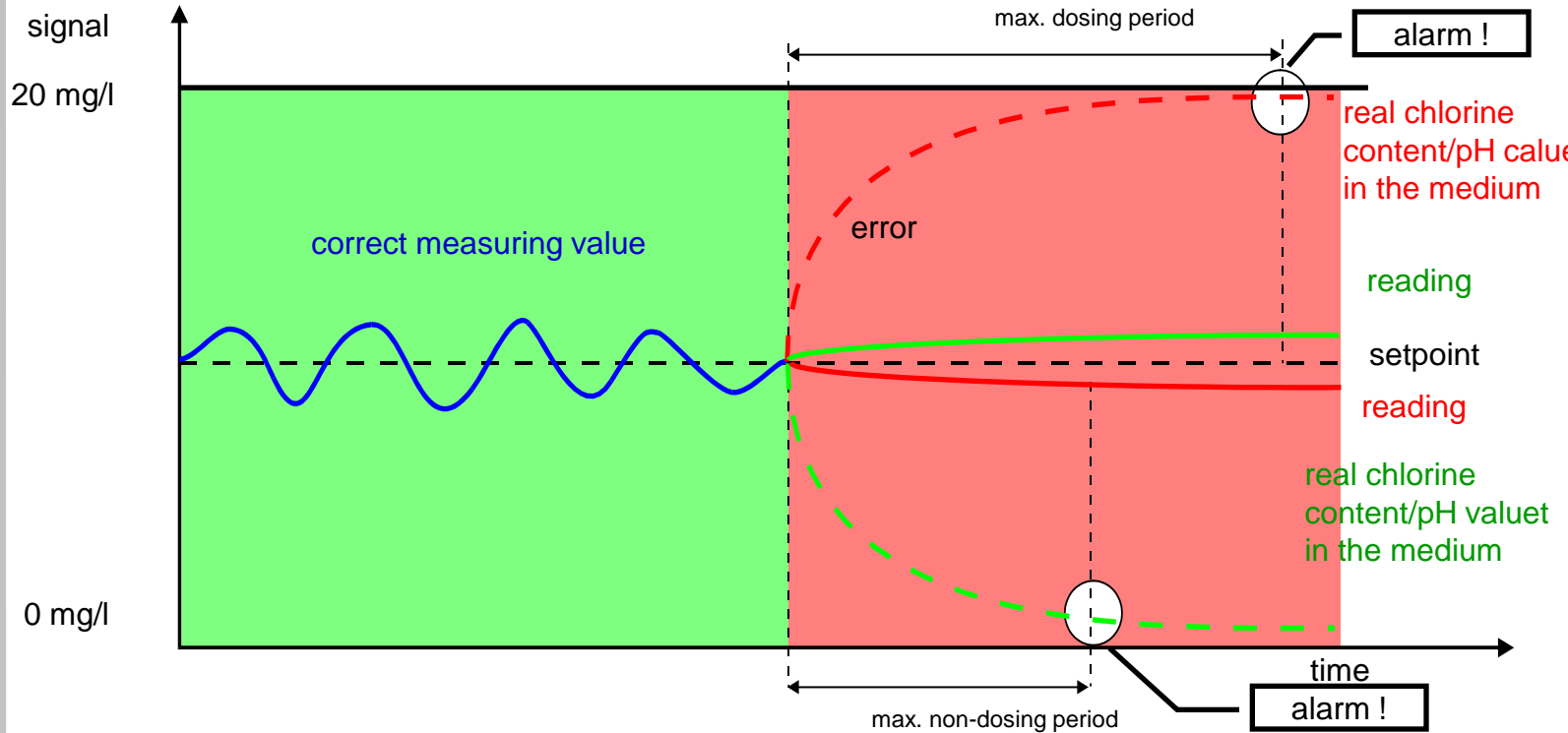
Process and Sensor monitoring



- Alarm threshold monitoring CCM2x3-ES/EP (Cl₂ / pH / ORP)
- free selectable (none, one, both) and adjustable
- detects signal drift due to sensor errors
- gives a safer measurement for applications with or without dosing of chemicals
- automatic dosing stop selectable



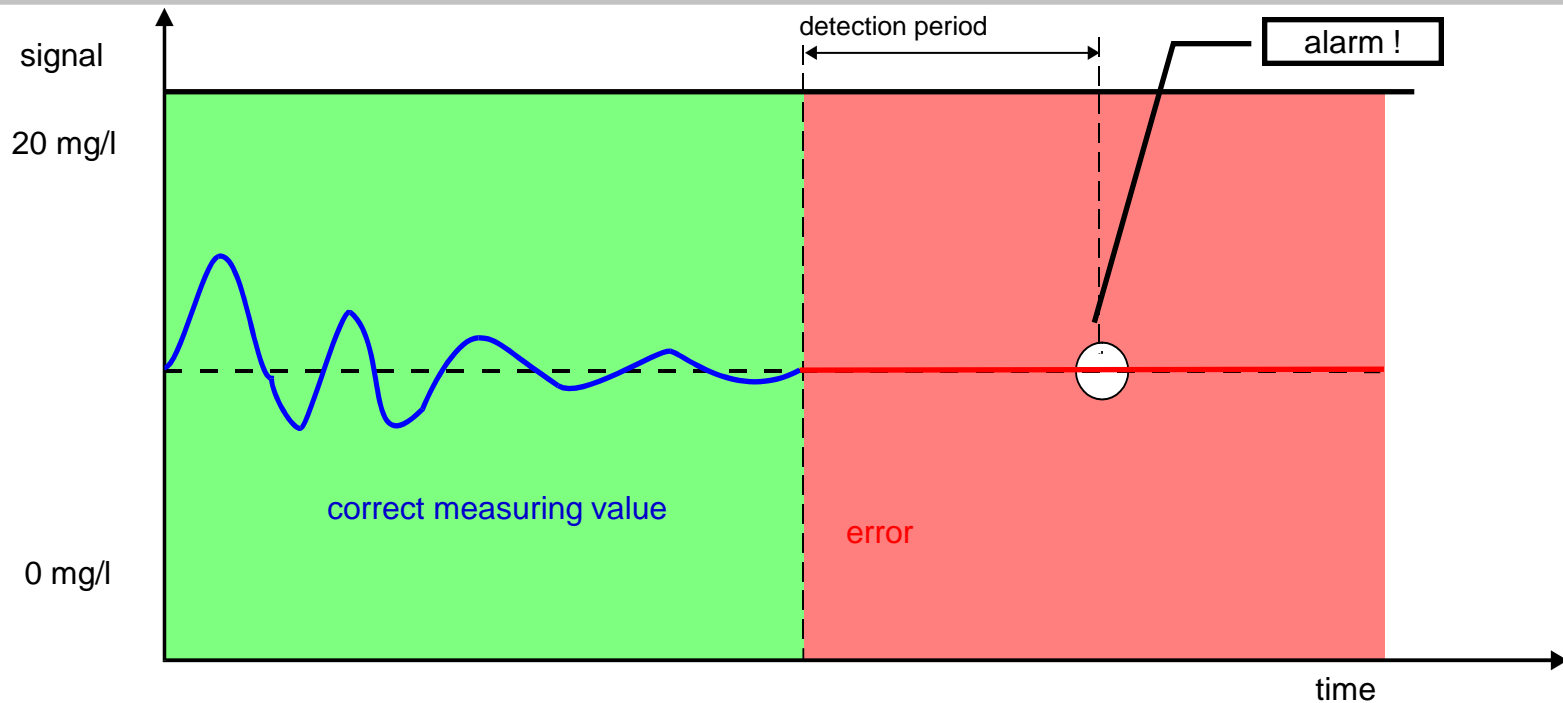
Process and Sensor monitoring



- Controller monitoring CCM2x3-ES/EP (Cl_2 / pH)
- free selectable (none, both) and adjustable
- detects deviation of process concentration due to sensor errors
- gives a safer measurement for controlled applications with dosing of chemicals
- automatic dosing stop selectable



Process and Sensor monitoring



- **Sensor activity monitoring CCM2x3-ES/EP (Cl₂ / pH / ORP)**
- free selectable (on, off)
- detects invariable signal due to sensor passivity
- gives a safer measurement for applications with or without dosing of chemicals
- automatic dosing stop selectable

Gel-filled pH electrode CPS31 or CPS71



CPS31



CPS71



- Gel-filled combination Electrode with low maintenance
- Waterproof, TOP68 plug-in head (IP 68)
- Ceramic diaphragm
- Pressure-tight without counterpressure
- Extended service time through long reference cartridge
- Long life time, low maintenance
- Also with Pt 100

Gel-filled ORP electrode CPS32 or CPS72

CPS32



CPS72



- Gel-filled combination Electrode with low maintenance
- Gold pin
- Waterproof TOP 68 plug-in head (IP 68)
- Ceramic diaphragm
- Pressure-tight up without counterpressure
- Extended service time through long reference cartridge
- Long life time, low maintenance

Liquisys M - modular pH/ORP transmitter



CPM223



CPM253

- High accuracy measurement
- User friendly
 - menu with clear text in 6 languages
 - programmable alarm
 - one bottom calibration
 - two point calibration
 - cleaning trigger via alarm or limit contact
- Safty first
 - "live check", SCS , process check
 - plausibility check at calibration (pH)
 - check of membrane and diaphragm
- Service friendly
 - modular construction
 - no dismantling or rewiring
 - current output simulation
- Fit for all jobs
 - limit contacts
 - P(ID), neutralisation - controller
 - Chemoclean cleaning system
- Communication
 - Profibus PA, HART
 - 1 or 2 Current outputs

CUS31 turbidity sensor

- Measurement according ISO7027/EN2702
- Digital signal processing and measurement
- Wide measurement range
- Measurement in FNU
- Plug and play
- Plausibility and self checks
- Factory calibration referenced to Formazine
- Rough, chemical resistant PVC housing
- Scratch-proof sapphire windows
- Check unit



Flow through assemblies CUS31-xxA/S



S-version

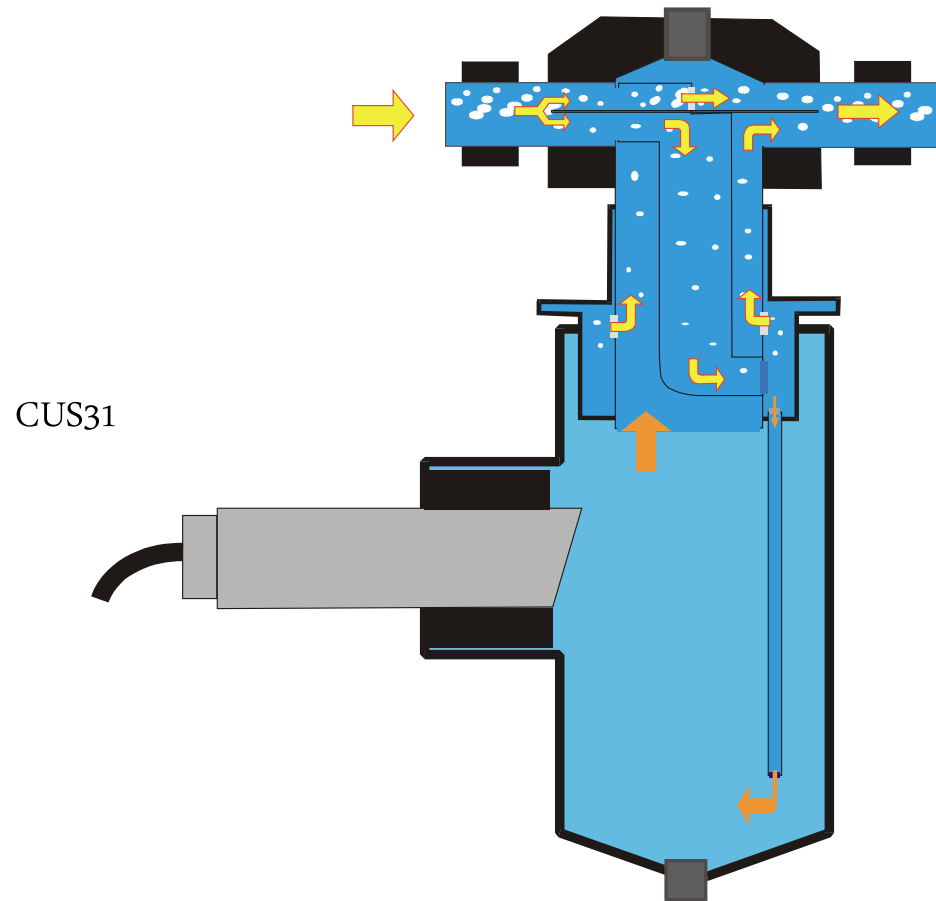


A-version

- Material: PVC
- Temperature up to 50 °C
- Pressure up to 6 bar
- For glueing on DN20 PVC pipes
- Optional mount wall support
- No initial calibration necessary due to factory calibration
- S-version with de-gasing system
- A-version for media without gas bubbles



Flow through assemblies with de-gasing



Liquisys M - modular turbidity transmitter



CUM223



CUM253

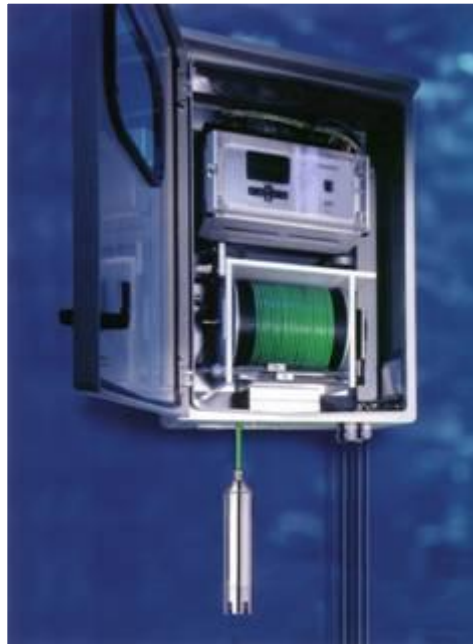
- High accuracy measurement
- User friendly
 - menu with clear text in 6 languages
 - indication in FNU
 - programmable alarm
 - cleaning trigger via alarm or limit contact
 - factory calibration
- Safty first
 - like "live check", SCS , process check
 - plausibility check at calibration
- Service friendly
 - modular construction
 - no dismantling or rewiring
 - current output simulation
- Fit for all jobs
 - limit contacts
 - P(ID) - controller
 - Chemoclean cleaning system
- Communication
 - profibus PA
 - HART
 - 1 or 2 current outputs

Ultrasonic system CUS70/CUM750

- Transmitter based on 32 bit processor for
 - high speed data processingfor optimum adaption of measuring parameters to the application
- for connection of up to 4 sensors
- No moving mechanical components
- Very low maintenance requirements
- Simple construction, easy to operate
- Up to 4 sensors can be attached to one transmitter, four 4-20 mA outputs and four status relays
- Multifunctional LCD display
- Option: automatic sensor washing by external pump
- Special Version:
 - High-Temperature Sensor up to 100°C
 - Sensor suitable for corrosive environment
- Very attractive price for multi channel version



Optical system CUC101



- Complete integrated system
- Reliable photometric measurement of sludge concentration
- Reliable sludge profiling along basin height
- Continuous and simultaneous calculation of sludge blanket level
- Automatic and manual height positioning of the sensors
- Signal transfer without interferences by highfrequency modulation of the signal within the sensor
- Optional software for special applications: flotation cells
- Automatic washing procedure of sensor
- Exchange of sensor without recalibration possible

Conductivity sensor CLS21



- Best multi-purpose conductive cell
- Very low polarization effects
- Titanium Graphite cells
- Fixed cable design
- Cell constant = 1.0
- Range 10 $\mu\text{S}/\text{cm}$ to 20 mS/CM
- Process connection 1" NPT
- Immersion or Inline mounting
- 2" Tri-Clamp
- 150°C, 16 bar

Liquisys M - modular conductivity transmitter



CLM223



CLM253

- High accuracy measurement
- User friendly
 - menu with clear text in 6 languages
 - programable alarm
 - cleaning trigger via alarm or limit contact
 - simple calibration procedures
- Safty first
 - like "live check“, SCS, process check
 - plausibility check at calibration
 - polarisation detection
 - temperature compensation
- Service friendly
 - modular construction
 - no dismantling or rewiring
 - current output simulation
- Fit for all jobs
 - limit contacts
 - P(ID) - controller
 - Chemoclean cleaning system
- Communication
 - Profibus PA
 - HART
 - 1 or 2 current outputs

Analyzer Stamolys CA71

Only producer of online Analyzer
for Iron and Manganese

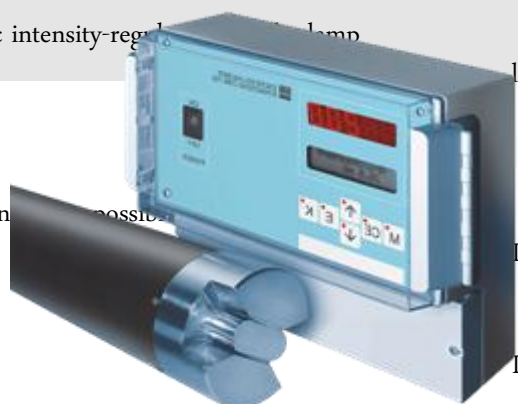


- For parameters Ammonium, Iron, Manganese, Hardness, Aluminium, Chlorine, Nitrite
- Two different housings
Polished stainless steel or GFK-housing
- Easy and quick exchange; low spare part stock
Modular structure
- Low reagent cost (quick re-invest)
Instrument with the lowest consumption of reagents
- Measuring according proved lab-methode
No discussion with lab-people from the WWTP
- Low maintenance cost
Long life tubing operating life double time than with CA 70
- Electronic module applicable in each Analyzer;
Low spare part stock; all calibration data for all parameters on one EPROM
- Self-monitoring function; high safety

Nitrate sensor CNS70/CNM750



Sensor for Nitrate concentration 214nm	→
no sample conditioning needed	
low maintenance, easy installation	
low cost of ownership	
Cleaning system by air	→
No wiper, no film on the optics	
Easy operation, no spares needed	
Tested sensor CNS	→
High quality, high reliability	
Automatic intensity-regulation lamp	→
longer life time, high security	
Installation possibilities	→
Low installation work	
Low installation cost	



Organic load SAK sensor CSS70/CSM750



Sensor for „Solved organic load“



no sample conditioning needed

254 nm

low maintenance, easy installation

low cost of ownership

Automatic intensity-regulation



longer life time, high security

Cleaning system by air



No wiper, no film on optics

Easy operation, no spares needed

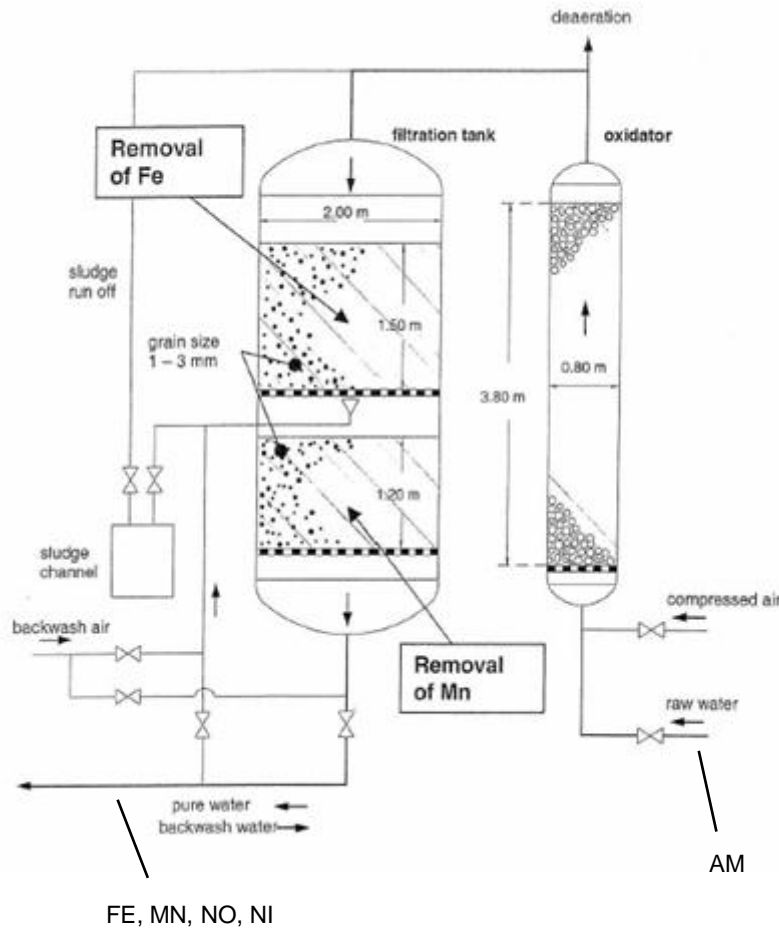
Tested sensor CNS



High quality, high reliability



Deironisation, demanganisation process in mineral



CA71FE and CA71MN are used in the outlet of the filter for monitoring as a quality control. The lowest measuring ranges of the CA71xx-A are accepted by these customers

If Nitrogen is in the water there is the danger that NO₂ Nitrite is generated in the filter. Nitrite is toxic, a measurement with CA71NO gives security. One customer had also asked for a lower detection limit, than in our lowest range. This is unfortunately at the moment not possible.

Sometimes producers prefer to monitor the Ammonium of the water in the inlet of the filter. Offer the CA71AM-A in this case

Success story for Manganese Analyzer



Monitoring of the efficiency of the demanganization in drinking water treatment and preparation

Example portable water treatment plant Sinsheim

- Two wells are subjected with oxygen
- Demanganization is done in the underground
- Analyser makes efficient well circuit and monitoring for the promotion quality possible



Success story for Iron Analyzer

Gerolsteiner Brunnen AG integrates CA71 Analyzer into their production processes



Gerolsteiner Brunnen AG is the biggest Mineral Water supplier in Germany. They have tested the CA71MN and the CA71FE Analyzer for two months.

They actually invest in new production lines (see the drivers for this in the following sheets).

The test was **very successful** and the Chief Technology Officer Dr. Arndt was positively surprised about reliability, precision at low concentrations and simplicity of our measurements.

He's decided to integrate our analyzer into their new production strategy.



Success story for Nitrite Analyzer

Selters Mineralquelle GmbH uses CA71NO for product quality control



Selters Mineralquelle GmbH is the most known mineral water brand in Germany.

They have a CA71NO for Nitrite measurement in just behind the Sandfilters, to control production.

The system detects Nitrite down to low ppb range (down to 9 ppb NO₂⁻)

The customer is satisfied with it since start up in Summer 2003 and saves now manual Nitrite determination in the laboratory

Actually nearly all big mineral water manufacturer in Germany are in close contact with us, due to analyzer portfolio





Mineral Water: New Legislations driving the market !!

From 2004 on mineral water producers will have to write on the bottles: „treated with Ozone“ if Ozone is used in their process. Most producers use Ozone for the Deironization and Demanganization. (Directive 2003/40/EC)

Producers do not want to write this „treated with Ozone“ and therefore invest in new processes where they use oxygen. This process is less stable and more difficult to control. Therefore

producers think to invest in measuring instruments for control.



Our competitive situation for the CA71NO, CA71MN and CA71FE is particularly good, since no competitor have this parameter at that price for such low costs of ownership!

Most of the producers are not aware that well priced online instruments for these parameters are available. Thus, they accept very well our offer.

Food Industry: New Legislations !!



From 2005 on all food and beverage should be completely traceable. The relevant norm is directive 2002/178/EC. This will be a general motivation for drinking water, mineral water and soft drink producers to introduce more measurements in their processes.

Especially for quality relevant measurements. In potable water these are among others:

Nitrate, Nitrite, Iron,
Manganese, Aluminium

On-Line Analyzer have got the big advantage for the customer to increase the number of analyses enormously, without hiring of Laboratory staff



Other applications in mineral and drinking water

- Nitrate CNS70/CNM750: measuring at the source (inlet of raw water) for spring and ground water, a higher concentration would mean that surface water comes in
- Chlor CA71CL: disinfection of bottles is mostly done by low chlorine concentrations at pH 10 - 11, only DPD can measure at high pH
- Aluminium CA71AL: control of flocculants (only allowed for drinking water, not in mineral water)
- Iron: often measured in the soft drink industry for taste and appearance reasons (ex. Iron in Coca Cola forms a precipitate)
- Rest: sometimes need of inline measurement of other minerals (Sulfides...)



Success story for Iron Analyzer



Quality control Coca Cola

- Water treatment
 - Every 2 hours, grab sample
- ROI: 1 year
continuous + reliable

Iron

Production of soft drink, drinking water plants

References:

Application soft drink: e.g. Coca Cola, CH-Bollingen

Drinking water plants: e.g.

CH-Zurich,

CH-St.Gallen,

CH-Frasnacht





Success Story for Aluminium Analyzer

Aluminum

Drinking water plants,
Industrial effluent

Applications:

CH-Geneva

CH-Neuenburg,

CH Vevey

CH-Frasnacht,

SC Singapore **15 units**





Water work Flacht/Germany





Solution - Water work Pforzheim/Germany





Solution - Water work Bühl/Germany



Solution - Water work Karlstadt/Germany

