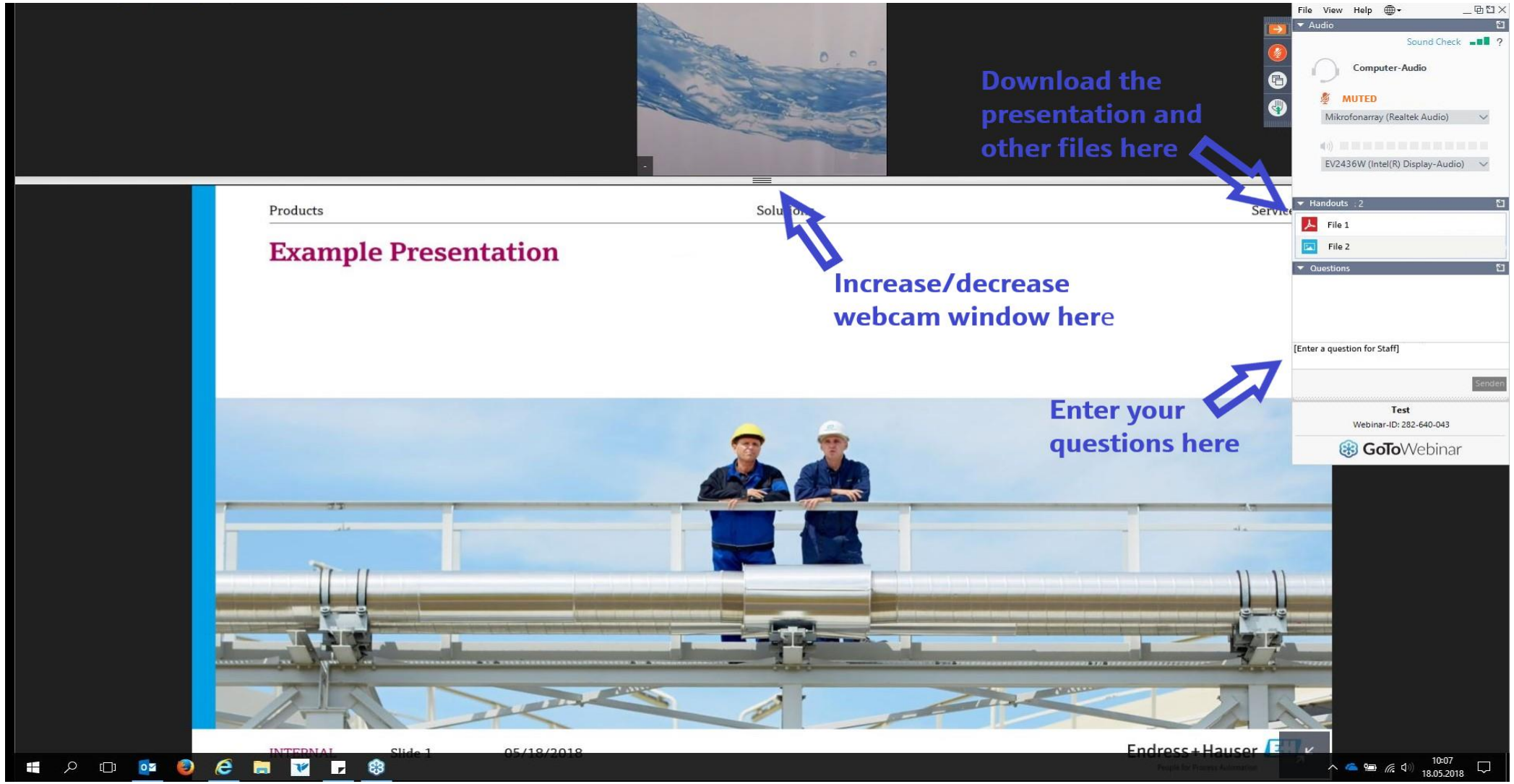
Get the most out of fully automated water samplers

Tuesday 15th March 2022, 3.30pm – 4.15pm AEDT

Endress+Hauser
People for Process Automation

GoToWebinar interface



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Presenters

Gustavo Queiroz
Industry Manager

Preeth John
Product Manager

Agenda

- What and why - sampling?
- Typical sampling applications
- Challenges in manual sampling
- Introduction to autosamplers
- Challenges in autosampler operations
- Benefits of E+H Autosamplers
- Q&A

What is sampling?

- Sampling is the first step of a lab or handheld analysis
- Major role in the consistency and accuracy of results

Techniques and resources used for appropriate sample collection and preservation for further analysis

Standards and Guidelines

- Australian and New Zealand water quality standards (AS/NZS 5667 series)
- Standard Methods for the Examination of Water and Wastewater
- Queensland's Water monitoring and sampling manual
- ISO 5667 International standard (First Edition 1980)
- DIN EN 25667 European standard (1991)
- DIN 4045 Terms for Wastewater (1985)
- DIN 38402 German standard (1985)
  - DIN 38402-11: (new 2007-03)
- NEN 6600 Netherlands standard
- ÖNORM Austrian standard
- Mcerts/E32 UK standard
- ...





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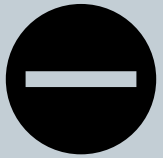
Why is sampling required?

Compliance with standards and regulations

- Standardisation of analysis and procedures
- GLP (Good laboratory practices)

Process instrumentation limitations

- Technology
- Return of investment for multiple online measurements

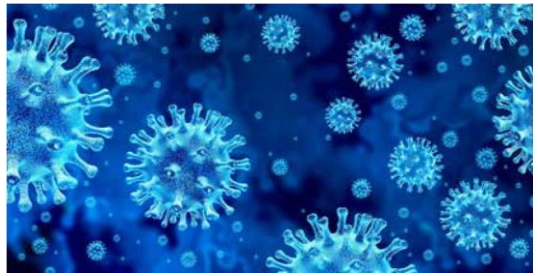


Analysis complexity

- Sample preparation and conditioning (e.g BOD5)
- Microbiological analysis (human interpretation)

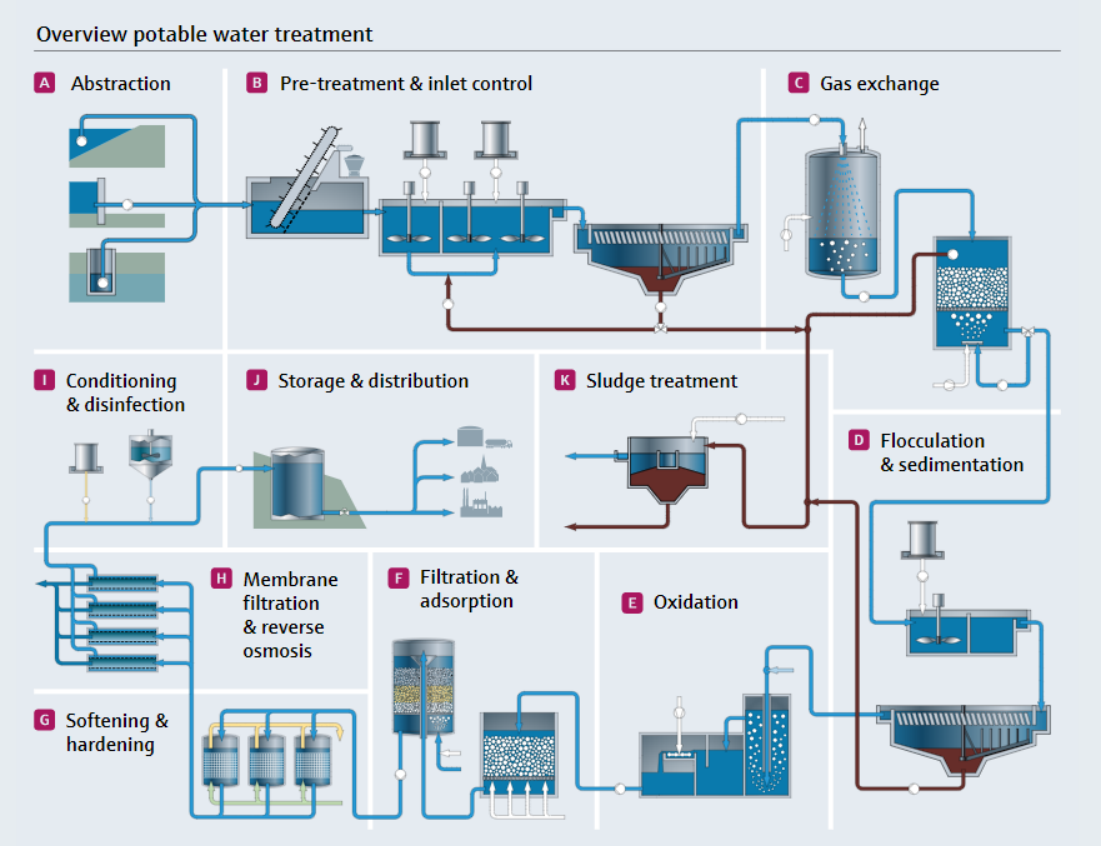
Typical applications

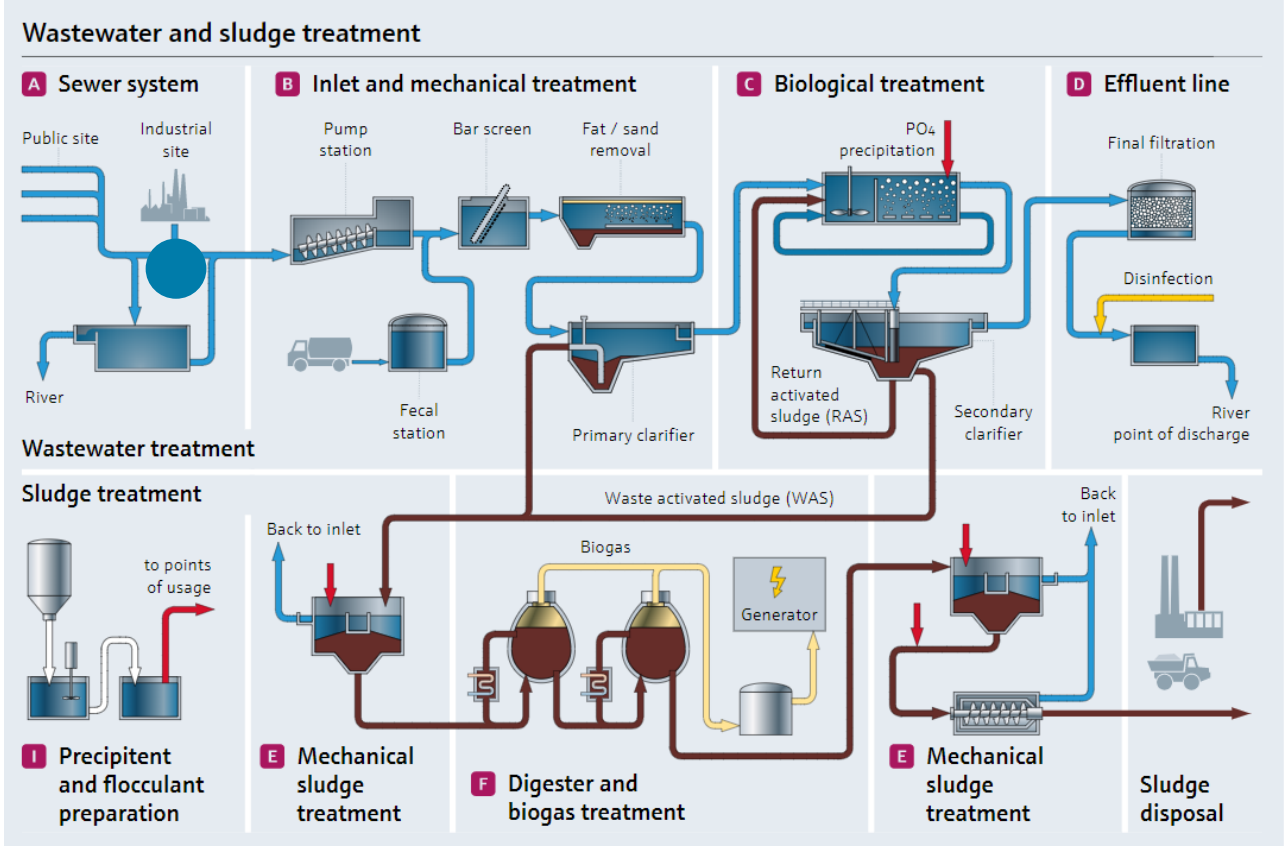
- Evaluation of water quality for discharge permits
- Monitoring of water bodies (e.g rivers, dams)
- Process monitoring
  - Water / wastewater treatment efficiency
  - Identification of product loss
  - Anomalies detection
- Outbreak detection (e.g. COVID-19)



Endress+Hauser Applicator

Scan me!





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Challenges in manual sampling

Challenges in manual sampling

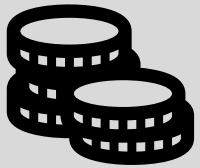
Safety

- Working close to water bodies
- Exposure to chemicals and biological hazards

Quality

- Risk of sampling non-conformities
  - Contamination
  - Not enough volume
  - Sample mixing
- Unstable variables (e.g free chlorine, pH, temperature)

Costs



- High wages
- Logistics time
- Personnel training

Manual sampling costs - Example

Scenario 1 – Grab sample

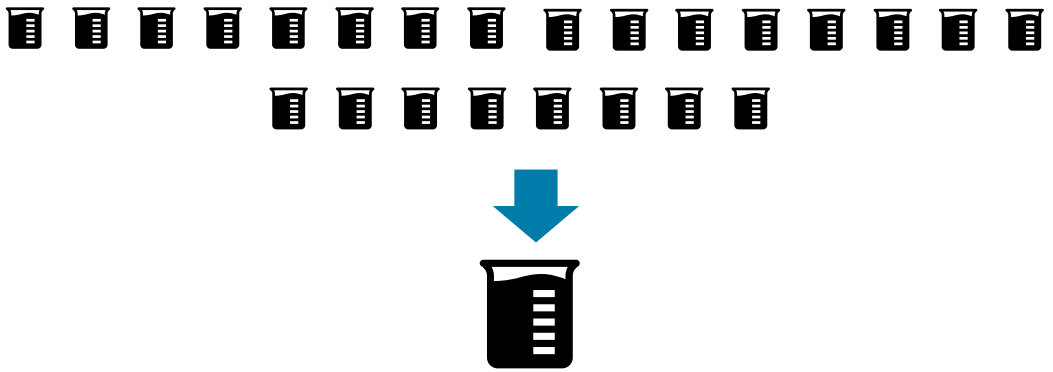
- **Cost per hour:** $ 35
- **Sampling time:** 3 minutes
- **Logistics time:** 10 minutes
- **Number of samples per day:** 5

Yearly costs: $ 13,838.60

Scenario 2 – Composite sample

- **Cost per hour:** $ 35
- **Sampling time:** 3 minutes
- **Logistics time:** 10 minutes
- **Number of samples per day:** 24

Yearly costs: $ 55,358.33



POLL – In your opinion, what is the main challenge in manual sampling?

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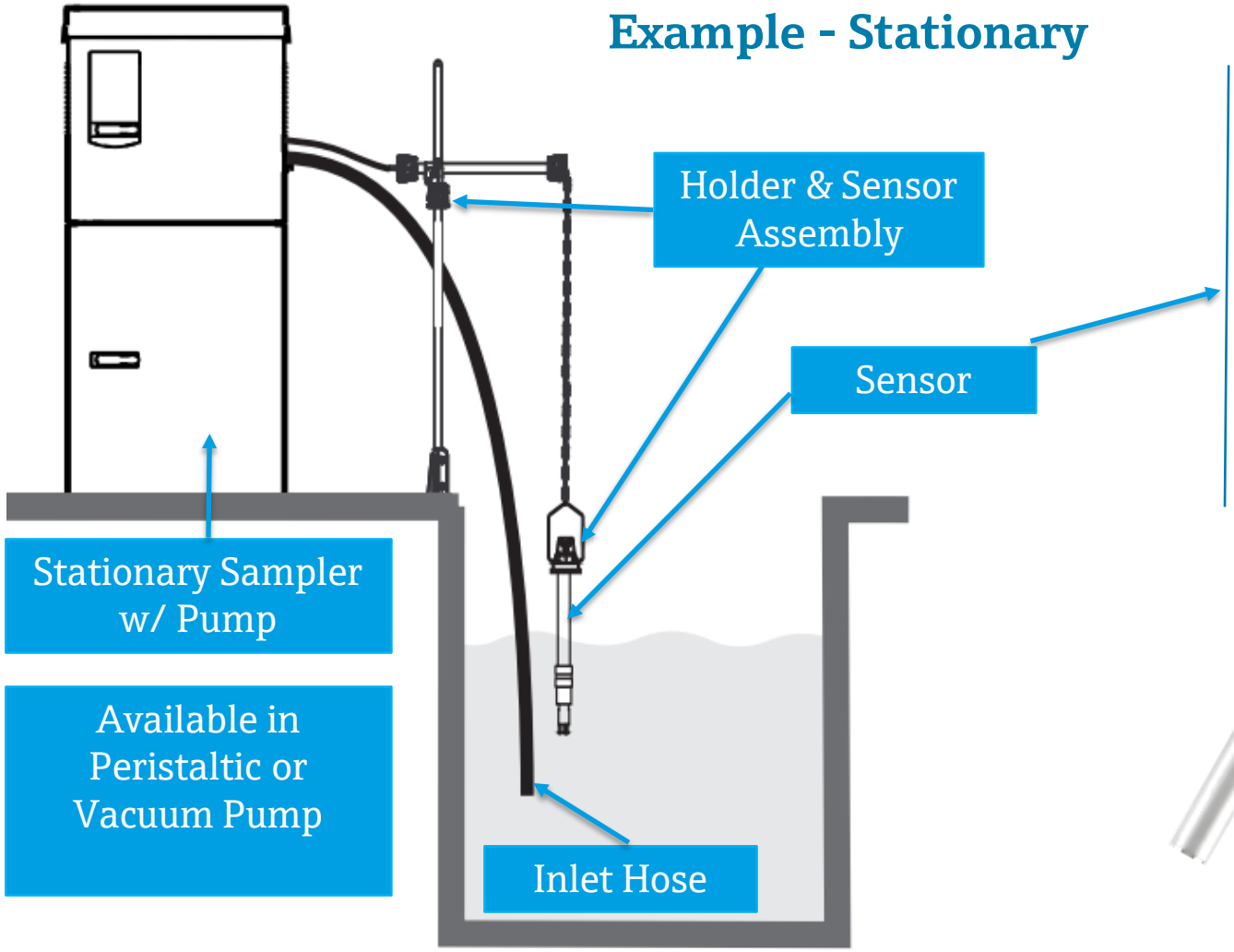
Introduction to autosamplers

Operation & Technology

Example - Stationary



- Nitrate/ SAC
- Turbidity
- ISE
- Conductivity Ind/Con.
- pH
- ORP
- Diss. oxygen amp.
- Chlorine

MEMOSENS

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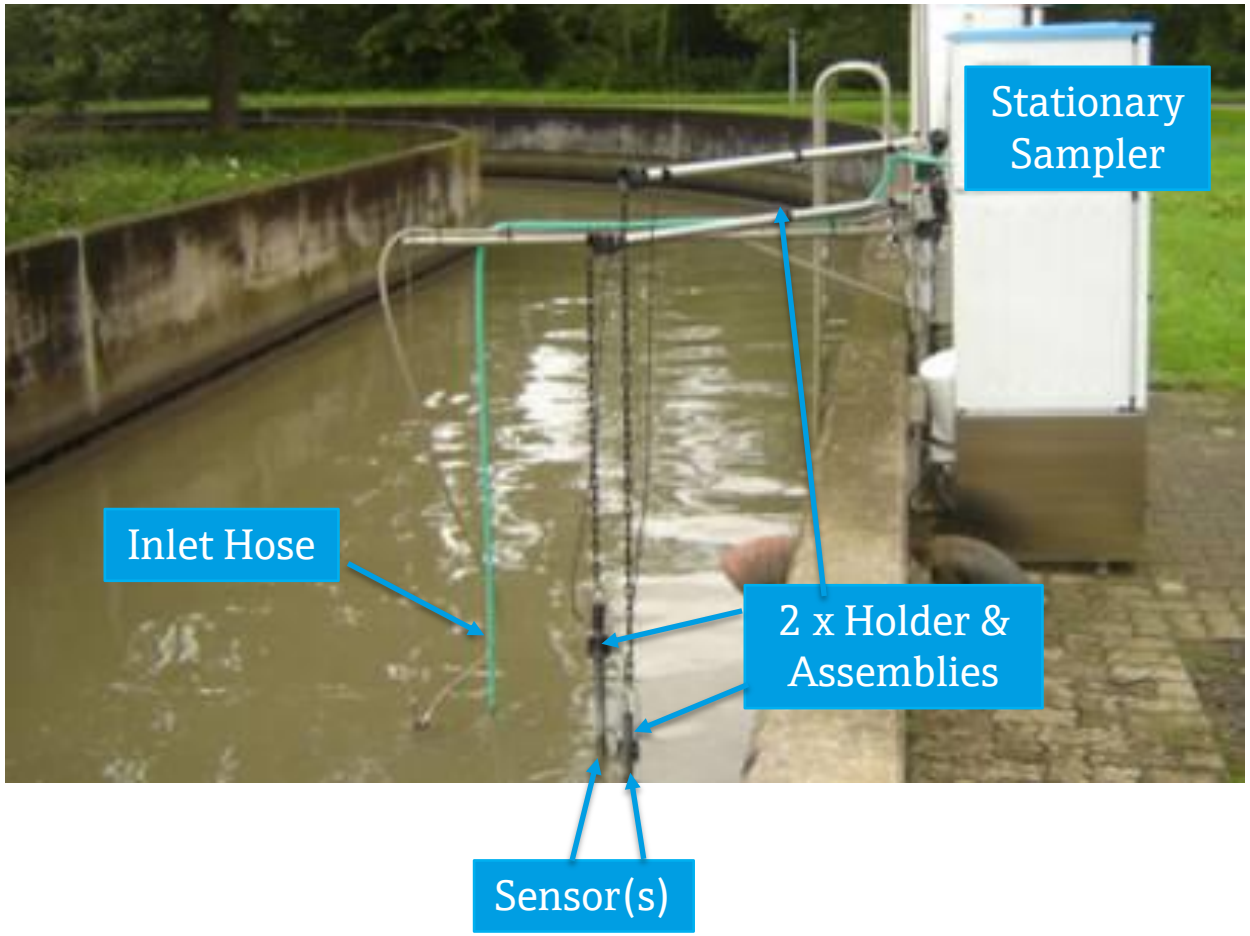
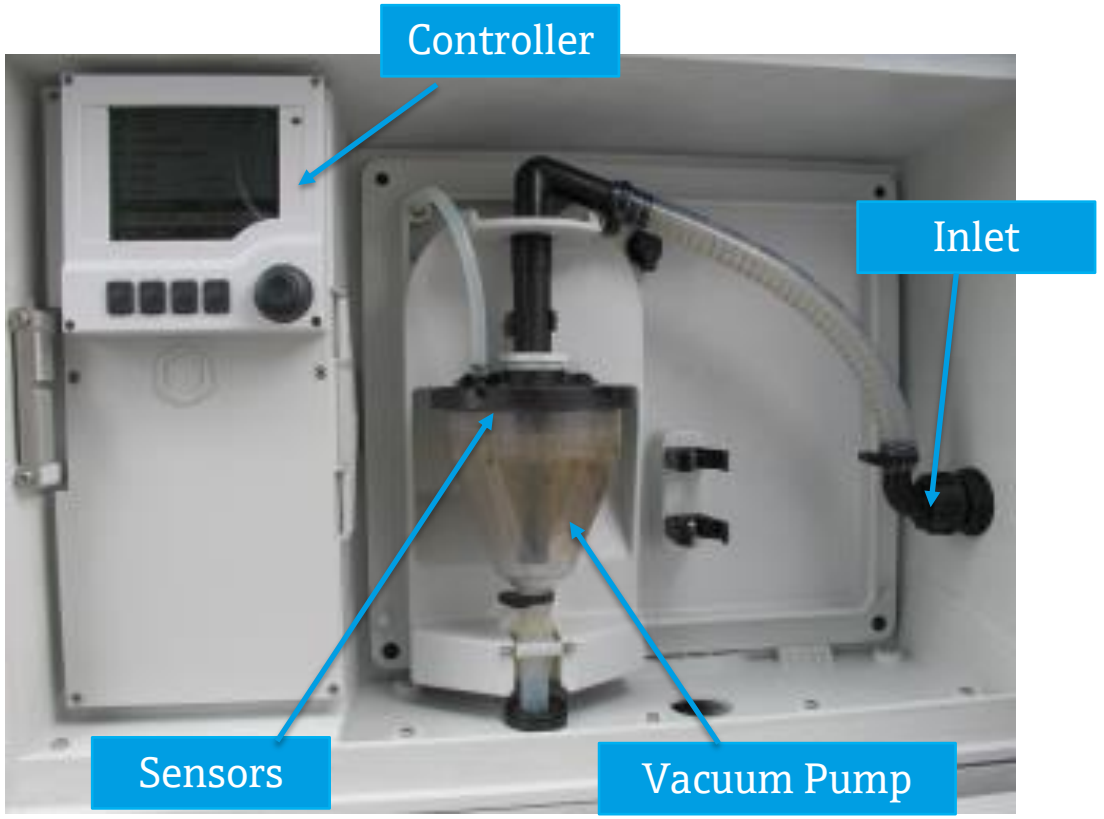
Operation & Technology

Stationary Samplers – with Pump





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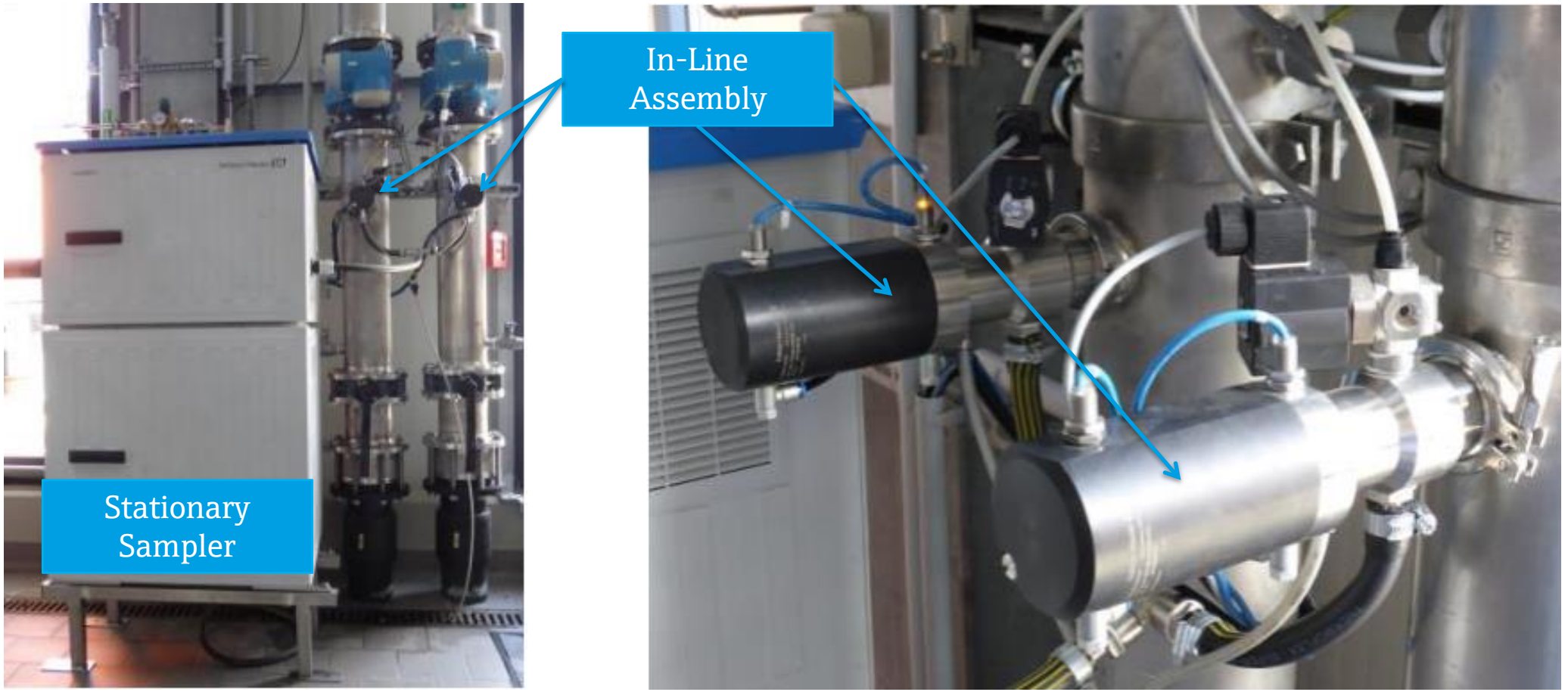
Operation & Technology

Stationary Samplers – with In-Line Assembly



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Operation & Technology

Portable Samplers – with Pump

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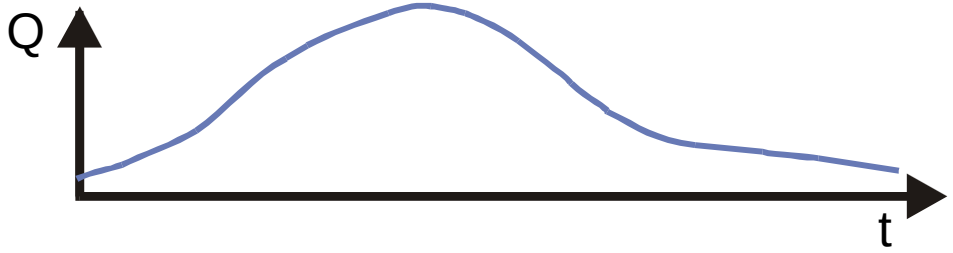
Operation Modes

An example of a system with Flow rate vs Time



Time Dependent:

- Equal time intervals, constant sample volume

Volume Dependent:

- Variable time intervals, constant sample volume

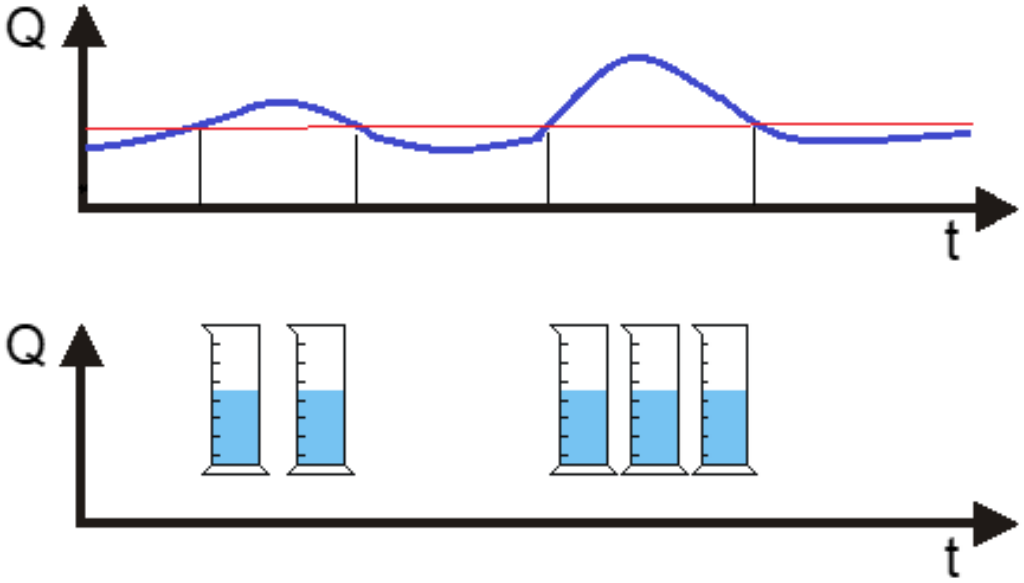
Flow Rate Dependent:

- Equal time intervals, variable sample volume

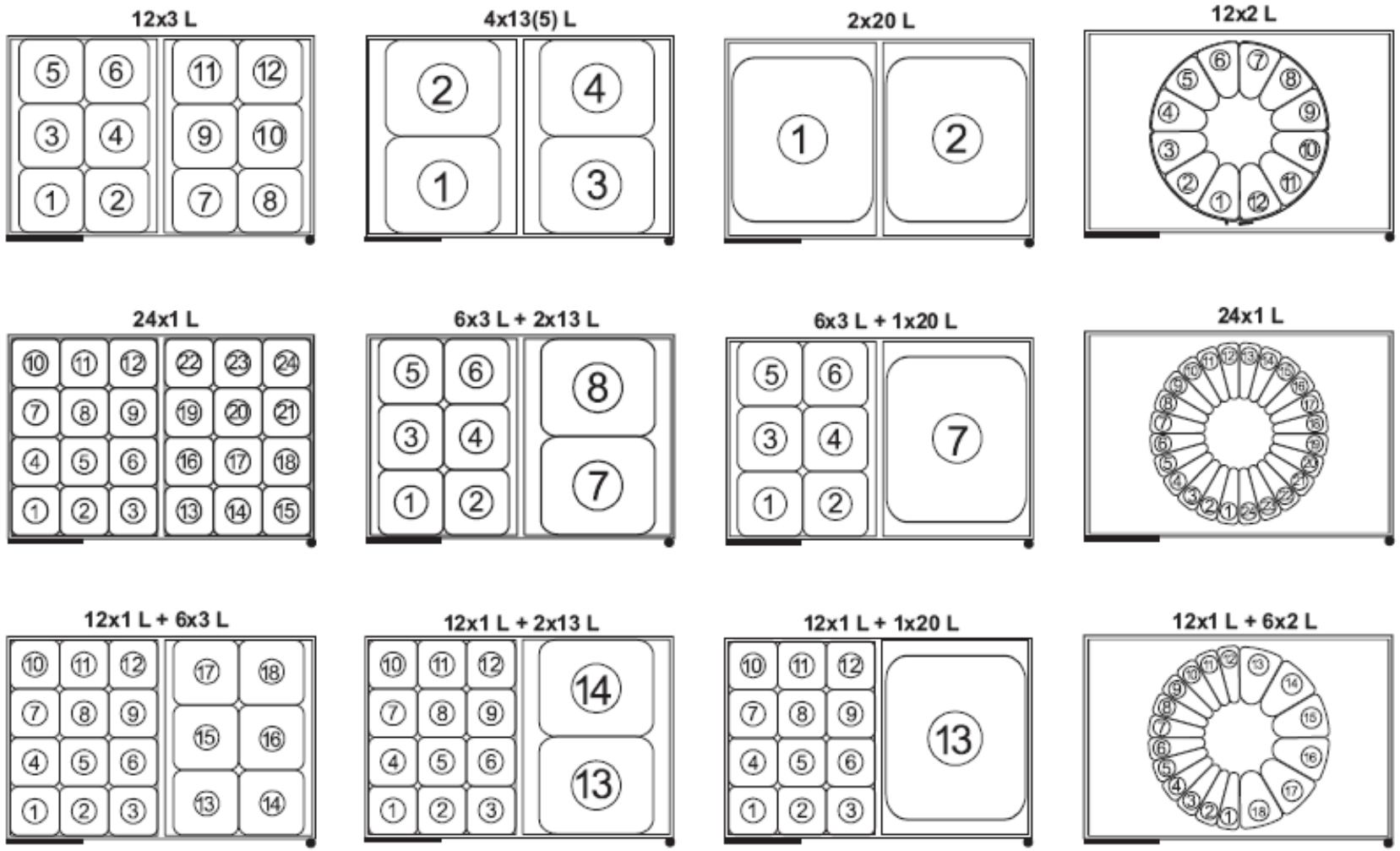
Operation Modes

Event Controlled:

- Alarm samples: The Sample is taken as soon as a certain value (eg: flow rate) is exceeded
- This mode makes monitoring and sampling possible with a single instrument only



Unique bottle Configurations



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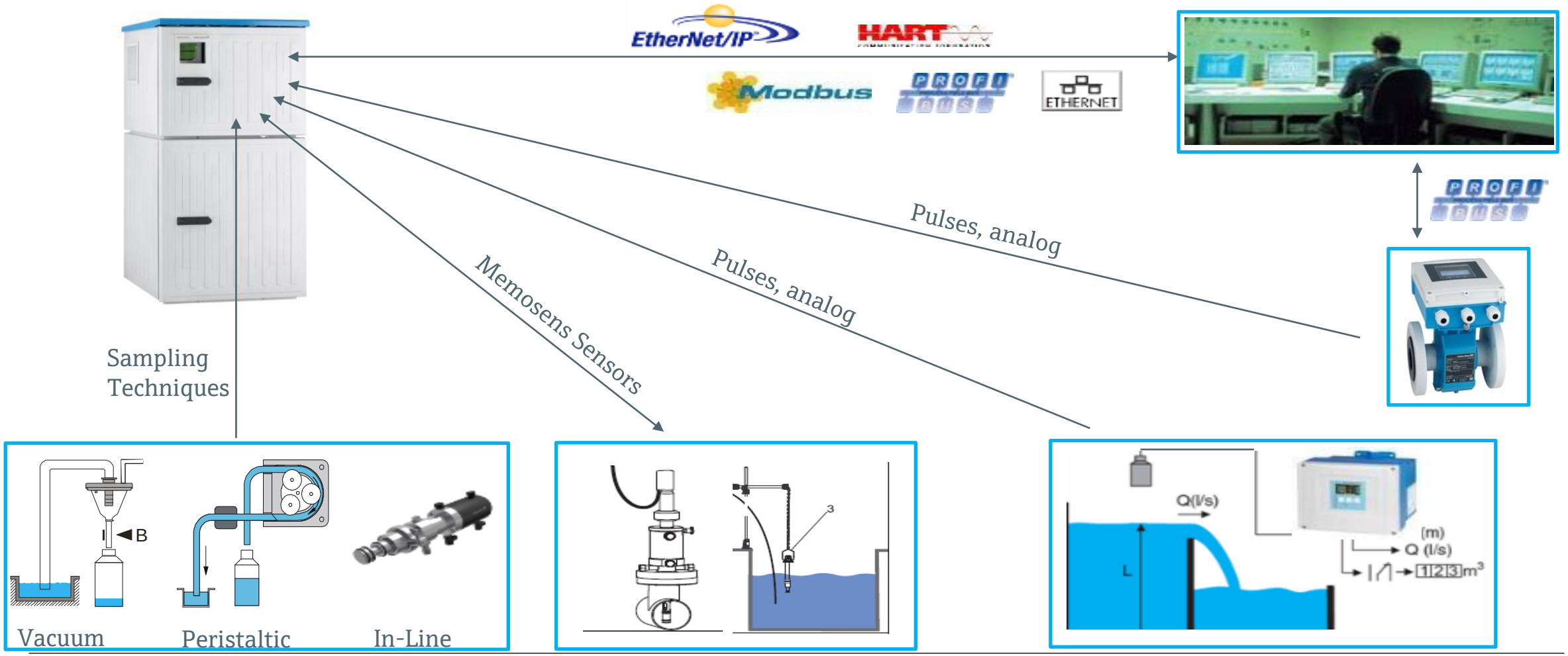
Autosampler Summary



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POLL – What is the aim of sampling in your process?

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Challenges in autosampler operations

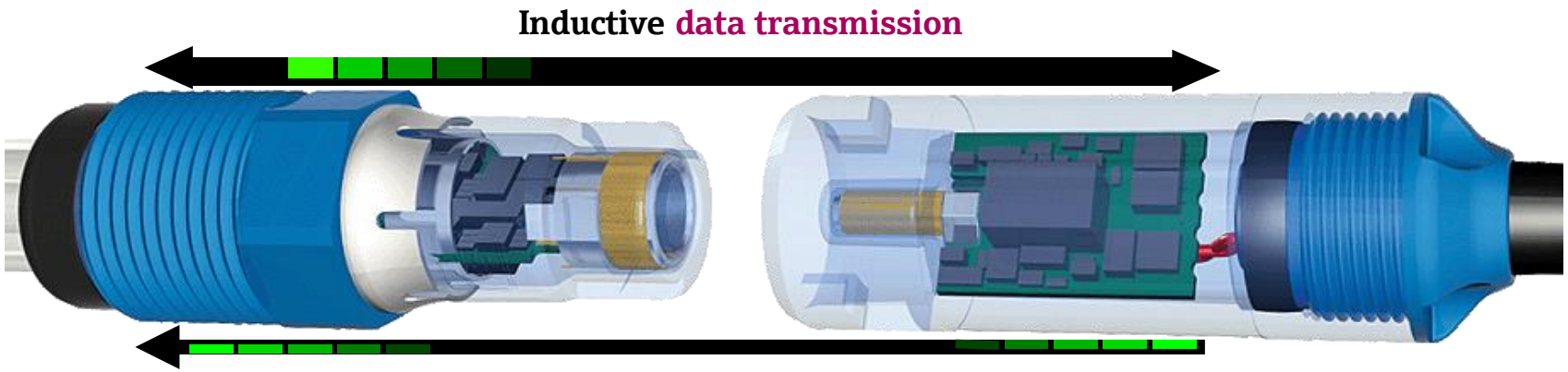
Challenges in Autosampler Operations

How do I measure unstable variables? e.g pH, temperature, dissolved oxygen, etc.

How do I know if my autosampler is fully operational?

How to plan the maintenance of my autosampler?

Memosens Technology



- Inductive coupling between cable and sensor, no open contacts Criticality of analogue systems is totally gone!
- Bidirectional data transmission between sensor and transmitter Transfer of energy to the sensor head by inductive principle
- Calibration data are stored in the sensor head directly, therefore allowing calibration in the laboratory
- While operating, the sensor stores a numerous amount of different operational data in the sensor head for assessment and evaluation

Challenges in Autosampler Operations

How do I measure unstable variables? e.g pH, temperature, dissolved oxygen, etc.

How do I know if my autosampler is fully operational?

How to plan the maintenance of my autosampler?

Heartbeat Technology

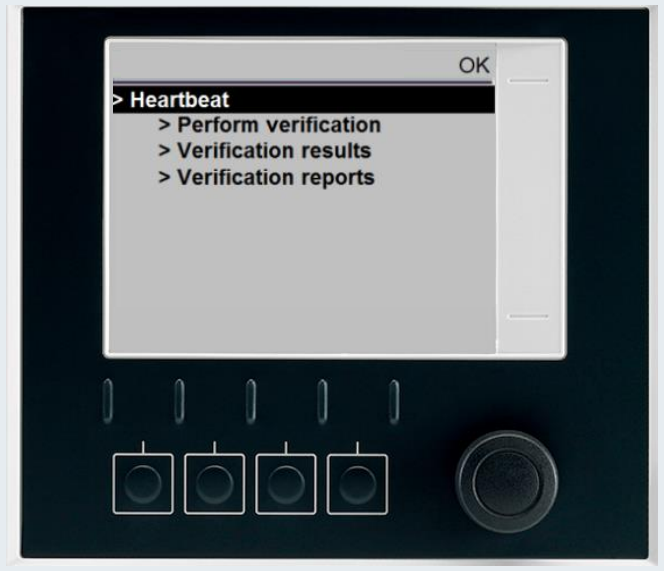
Heartbeat Technology

Heartbeat Diagnostics	Heartbeat Verification	Heartbeat Monitoring
		
Permanent process and device diagnostics	Documented in-situ verification	Information for predictive maintenance

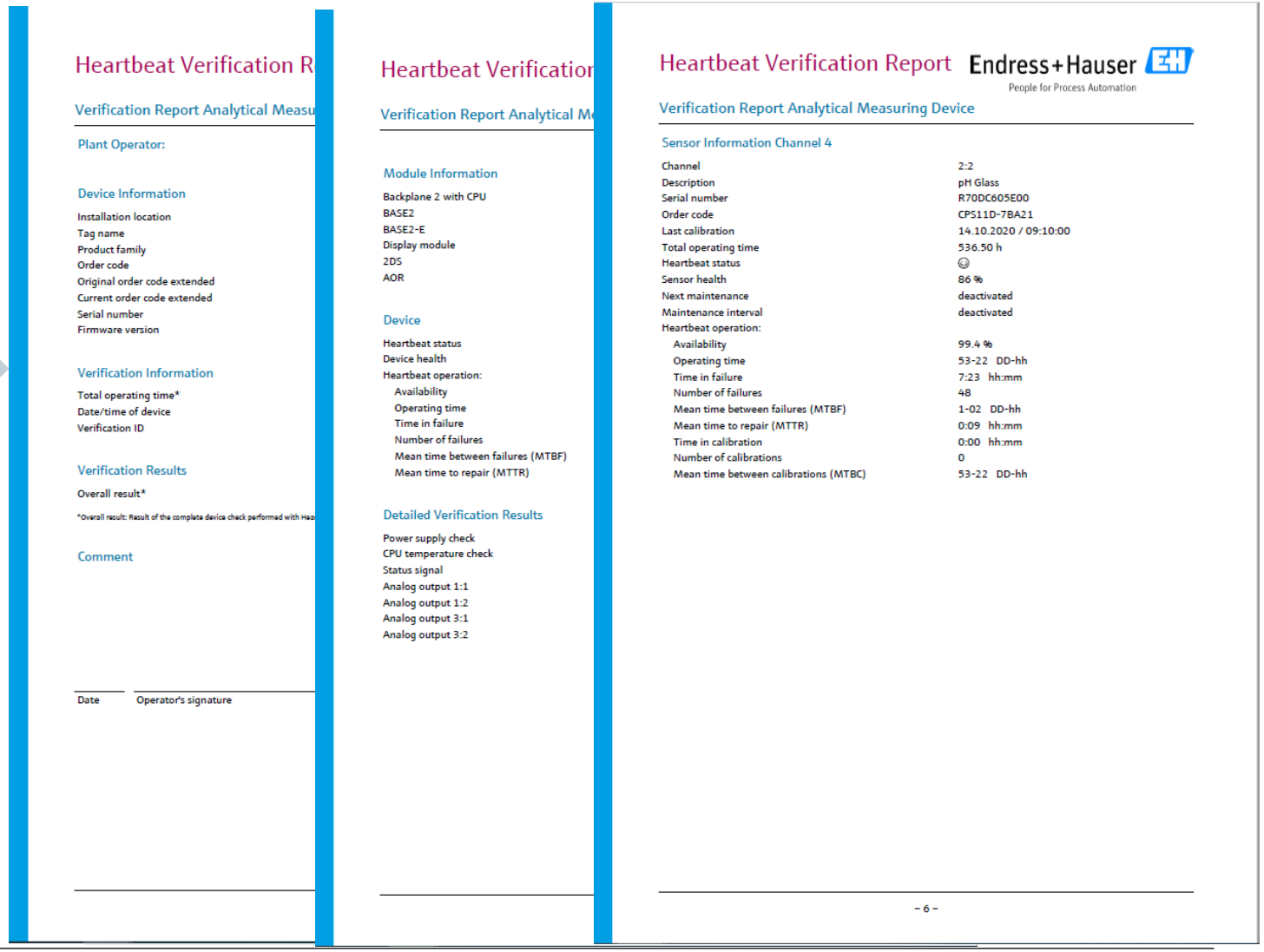
Increased plant availability and ...

... safe processes	... reduced verification effort	... optimization of process and maintenance strategy

Heartbeat Verification for liquid analysis



- One-click generation of verification reports in pdf
- Overview of passed/failed results
- Details of transmitter & sensor checks



Heartbeat Verification R

Verification Report Analytical Measu

Plant Operator:

Device Information

Installation location
Tag name
Product family
Order code
Original order code extended
Current order code extended
Serial number
Firmware version

Verification Information

Total operating time*
Date/time of device
Verification ID

Verification Results

Overall result*

*Overall result: Result of the complete device check performed with Hea

Comment

Date Operator's signature

Heartbeat Verificatior

Verification Report Analytical M

Module Information

Backplane 2 with CPU
BASE2
BASE2-E
Display module
2DS
AOR

Device

Heartbeat status
Device health
Heartbeat operation:
Availability
Operating time
Time in failure
Number of failures
Mean time between failures (MTBF)
Mean time to repair (MTTR)

Detailed Verification Results

Power supply check
CPU temperature check
Status signal
Analog output 1:1
Analog output 1:2
Analog output 3:1
Analog output 3:2

Heartbeat Verification Report Endress+Hauser
People for Process Automation

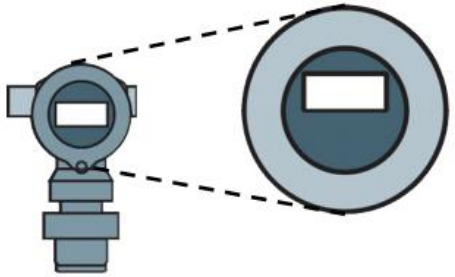
Verification Report Analytical Measuring Device

Sensor Information Channel 4

Channel	2:2
Description	pH Glass
Serial number	R70DC605E00
Order code	CPS11D-7BA21
Last calibration	14.10.2020 / 09:10:00
Total operating time	536.50 h
Heartbeat status	☺
Sensor health	86 %
Next maintenance	deactivated
Maintenance interval	deactivated
Heartbeat operation:	
Availability	99.4 %
Operating time	53-22 DD-hh
Time in failure	7:23 hh:mm
Number of failures	48
Mean time between failures (MTBF)	1-02 DD-hh
Mean time to repair (MTTR)	0:09 hh:mm
Time in calibration	0:00 hh:mm
Number of calibrations	0
Mean time between calibrations (MTBC)	53-22 DD-hh

- 6 -

How to run a Verification?

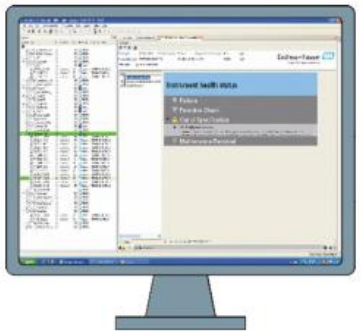


Device display

Web server

DeviceCare & Field Xpert

Smart Blue App**



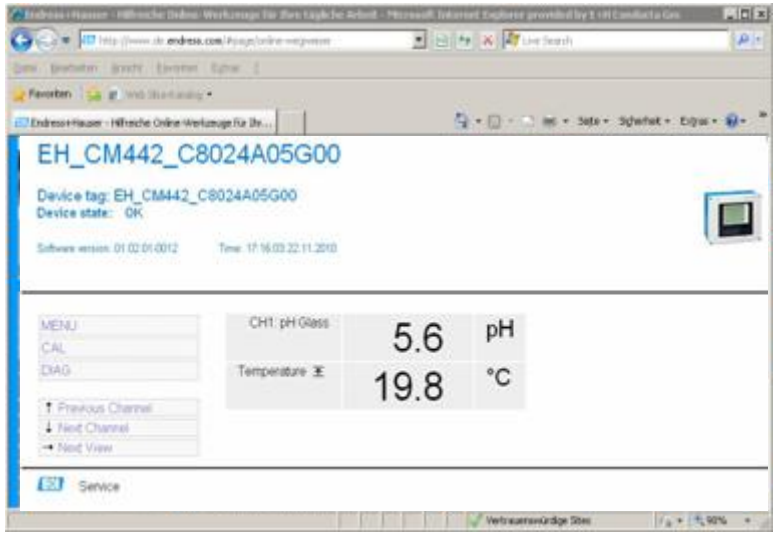
FieldCare

PLC/DCS
(engineering needed)

Application example for the web browser

Remote measurement values via a standard WiFi/WLAN router

http://192.168.105.150



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Maintaining as easy as ABC

Quick maintenance for both pump systems without any tools

Youtube Videos – Comissioning, maintenance and more!

Maintenance on the Liquistation CSF48 Peristaltic System - 1 - Preparation

839 views • 2 years ago

Endress+Hauser

This video shows how to perform a maintenance on the Liquistation CSF48 Peristaltic system. The carrier plate will be removed ..

Commissioning of the Liquistation CSF48 Vacuum System - 3 - Setup of the Program

1.3K views • 2 years ago

Endress+Hauser

This video shows how to perform a commissioning of the Liquistation CSF48 vacuum system. The settings of the sampler will be ...

Maintenance of Liquistation CSF48 samplers with vacuum system

723 views • 7 months ago

Endress+Hauser

This video shows how easy it is to perform the maintenance of Liquistation CSF48 with vacuum system. Maintenance of ...

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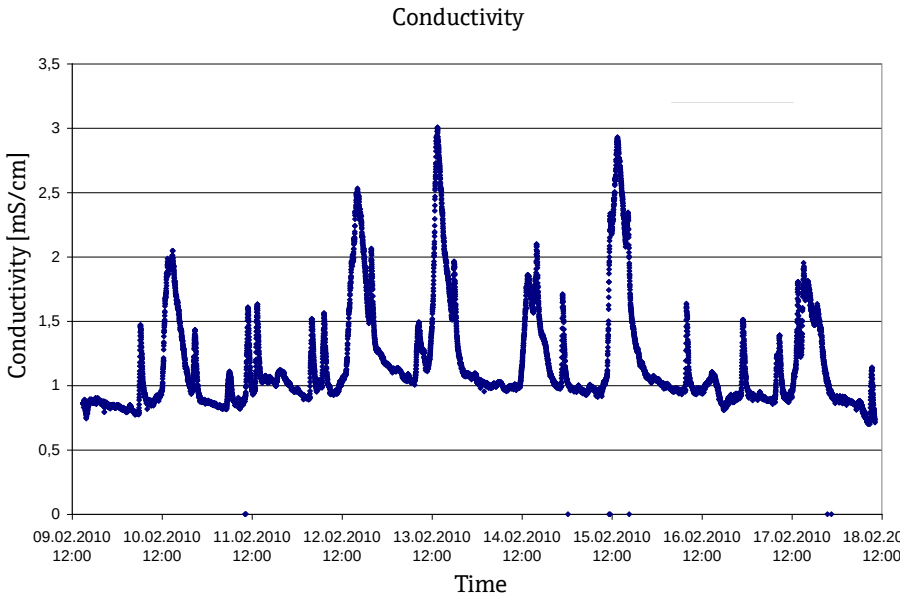
Application examples

Sampler – Daily Work

Sampling application: Municipal WWTP (Germany)
Sampling point: Inlet channel after screen

Application summary

- Sampling routine program activated with binary impulse
- Sampling Program: Advanced, 1x routine + 1x event
  - Sampling interval: 50m³, > 2mS/cm
  - Bottle change mode: 2h routine program
  - Setup: 12x 1 liter + 1x 20 liter
  - Sampling volume: 40ml, event programs multiplier 2x



conductivity inlet value by road deiceing (delay of sewer transport time)

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Sampler – Daily Work

Sampling application: Industrial WWTP
Sampling point: Inlet channel after screen

Application summary

- Sampling routine program activated by time
- Sampling Program: Basic, 1x routine
  - Sampling interval: 15 minutes
  - Setup: 1x 30 liter
  - Sampling volume: 100ml

Composite sample bottle

Sampler – Daily Work

Sampling application: Industrial WWTP
Sampling point: Effluent channel to sea

Application summary

- Sampling routine program activated by flow pulses
- Sampling Program: Basic, 1x routine

Sampling interval:	50 m³
Setup:	4x 13 liter
Sampling volume:	50ml
Bottle change:	24 h

Sampler – Daily Work

Sampling application: Municipal WWTP
Sampling point: WWTP Inlet

Application summary

COVID-19 Outbreak monitoring

- Sampling Program: Basic, 1x routine
  Sampling interval: 15 minutes
  Setup: 1x 30 liter
  Sampling volume: 100ml

analytikjena
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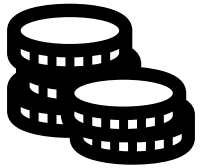
Benefits of E+H Autosamplers

- **Safety**
  - Reduction of human exposure to hazardous conditions and environments
  - No contact with samples
- **Cost Savings**
  - Reduce multiple sampling to one simple bottle replacement a day*
  - No re-sampling
- **Quality**
  - Real-time measurement of unstable variables
  - High reproducibility
  - Event-triggered operation
  - Data logging – Events, samplings



Questions?