JENA ENGINEERING

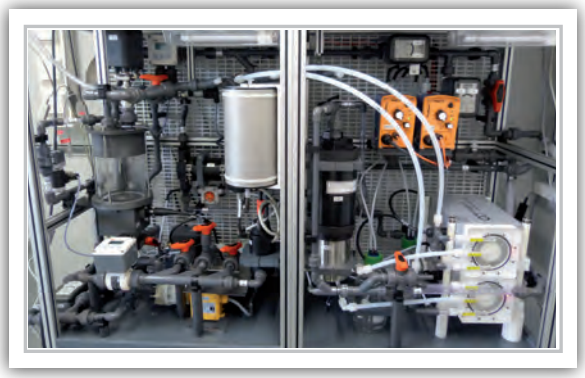
-4H-FerryBox

A VERSATILE SYSTEM FOR OPERATIONAL WATER MONITORING

Background - Why a FerryBox

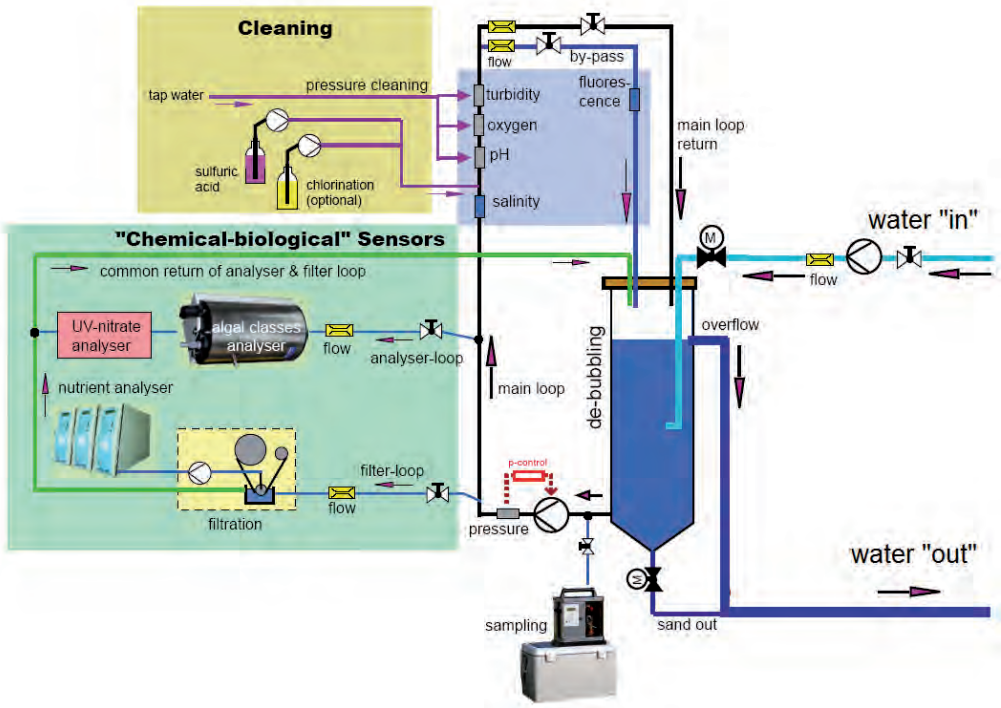
Operational monitoring of coastal waters and shelf seas is mainly carried out by manual sampling, buoys and analysis during ship cruises. These systems are strongly affected by biofouling and the operational and maintenance costs are high, mainly due to ship costs. In order to overcome these restrictions the **-4H- FerryBox** has been developed, which allows unattended automatic operation over long periods on ships, containers or costal/ riverine structures.

The **-4H- FerryBox** is an automatic, low- maintenance, flow-through system to measure water parameters continuously and unattended. It has been especially developed for permanent installation on ships and monitoring stations both onshore at harbors, rivers or lakes and offshore on research platforms and oil rigs. The special architecture allows the integration of various sensors of different manufactureres as well as the connection of external analysers and automatic samplers. The integrated automatic **cleaning** and **anti-fouling system** faciliates measurements in both highly productive water and water containing a high load of suspended matter, while maintenance is kept to a minimum. The intuitive software for control, data management and data visualization allows the operator to run and maintain the system easily. An implemented event control can start water samplers. The software is also able to send an e-mail or SMS to the operator. In conjunction with a corresponding communication module remote control, telemaintenance as well as geo-tagged measurements or even series of position-dependent measurements are possible.



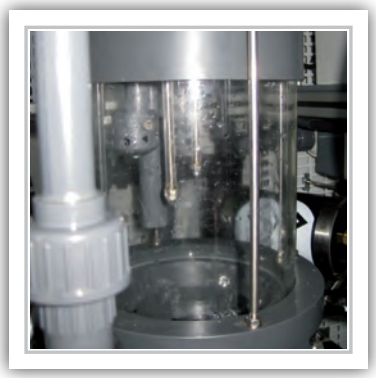
-4H- FerryBox concept

-4H- Flow through system for environmental monitoring



-4H- Antifouling concept for environmental monitoring

Especially in coastal waters biofouling on sensor surfaces is a major problem. The **-4H- FerryBox** antifouling concept prevents growth of algae, barnacles or microorganisms within the system to provide a sustainable basis for reliable measurements enabling long-term operation.



Fouling with a lot of barnacles (left/middle), no biofouling due to the -4H- Antifouling methodes (right)

FerryBox - Technical specifications

Basic parameters

	Range	Accuracy
Conductivity	0 … 70 mS/cm	0.003 mS/cm
Temperature	-3 … 35 °C	0.002 °C
Salinity	2 … 42 PSU	0.005 PSU
Oxygen conc.	0 … 500 µmol/l	8 µmol/l
Oxygen sat.	0 … 120%	0.4%
Total chlorophyll	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
green algae	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
cyanobacteria	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
diatoms	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
dinoflagelates	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
yellow substances	0 … 200 µg/l	0.01 µg/l
cryptophytes	0 … 200 µg Chl-a/l	0.01 µg Chl-a/l
Turbidity	0 … 750 NTU	0.2 NTU
pH	0 … 14	0.1
Intake temperature	-3 … 35 °C	0.001 °C

Accessories

Water sampler
Plankton sampler
Litter sampler
Inlet pump
Outlet tank and pump
GPS
Telemetry

Other parameters on request

Optional parameters

	Range	Accuracy
CH_4	0 … 50 µmol/l	3 %
pCO_2	0 … 3000 ppm	1 %
Crude oil	0 … 2700 ppb PTSA	30 ppb PTSA
Dissolved nutrients*		
NOx (nitrate + nitrite)	0 … 14 µmol/l up to 71 mmol/l	*depends on calibration range*
NO_2 (nitrite)	0 … 3.5 µmol/l up to 1.4 mmol/l	*depends on calibration range*
PO_4 (phosphate)	0 … 6.5 µmol/l up to 6.5 mmol/l	*depends on calibration range*
NH_4 (ammonium)	0 … 14 µmol/l up to 71 µmol/l	*depends on calibration range*
$Si(OH)_4$ (silicate)	0 … 3.3 µmol/l up to 3.3 mmol/l	*depends on calibration range*
Phycocyanin	0 … 150,000 cells/ml	500 cells/ml
Phycoerythrin	0 … 150,000 cells/ml	500 cells/ml
Fluorescein	0 … 500 ppb	5 ppb
Rhodamine	0 … 1000 ppb	10 ppb
CDOM/ FDOM	0 … 2500 ppb	25 ppb
Water level	0 … 10m	5 mm
COD eq	0 … 5000 mg/l	5 %
TOD eq.	0 … 500 mg/l	5 %
BOD eq.	0 … 5000 mg/l	5 %
Global radiation	0 … 2000W/m^2	0.012
Wind direction	0 … 360 deg	2 deg
Wind speed	0.7 … 50 m/s	1 m/s
Air temperature	-70 … 90 °C	0.1 °C
Air pressure	600 … 1100 hPa	10.5 hPa
Relative humidity	0 … 100%	2 %
Precipitation	0 … 4 ml/min	0.1 ml/min
Transmission	0 … 100%	1 %

*Calibration range will be adapted to user-specific optimum.

Dimensions

	FerryBox I	FerryBox II
Length	500 mm	500 mm
Height	1360 mm	900 mm
Width	450 mm	450 mm
Weight	~ 75 kg	~ 50 kg

Power supply:	110 VAC 230 VAC 400 VAC
Flow rate:	15 - 25 l/min
Freshwater:	should be present
Telemetry:	GSM, GPRS, UMTS, LTE & UHF/VHF

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