OTT ecoN – new generation of UV Nitrate sensors

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Applications

- Nitrate water monitoring Instruments for:
  - Lake and reservoir baseline info
  - River and stream surveys
  - Groundwater studies
  - Wetland management
  - Academic research
  - Regulatory monitoring
  - Nitrate Loading and Reduction studies
  - Aquaculture protection
  - HAB monitoring
  - Effluent discharge regulation
  - Agricultural run-off
  - Ecosystem assessment programs
  - Nutrient trading programs
  - Quantify diurnal changes/impacts

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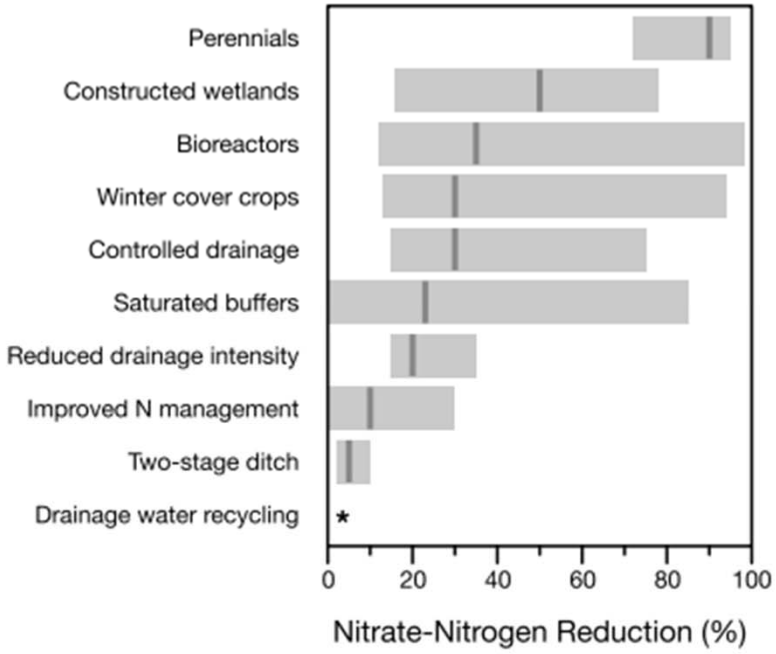
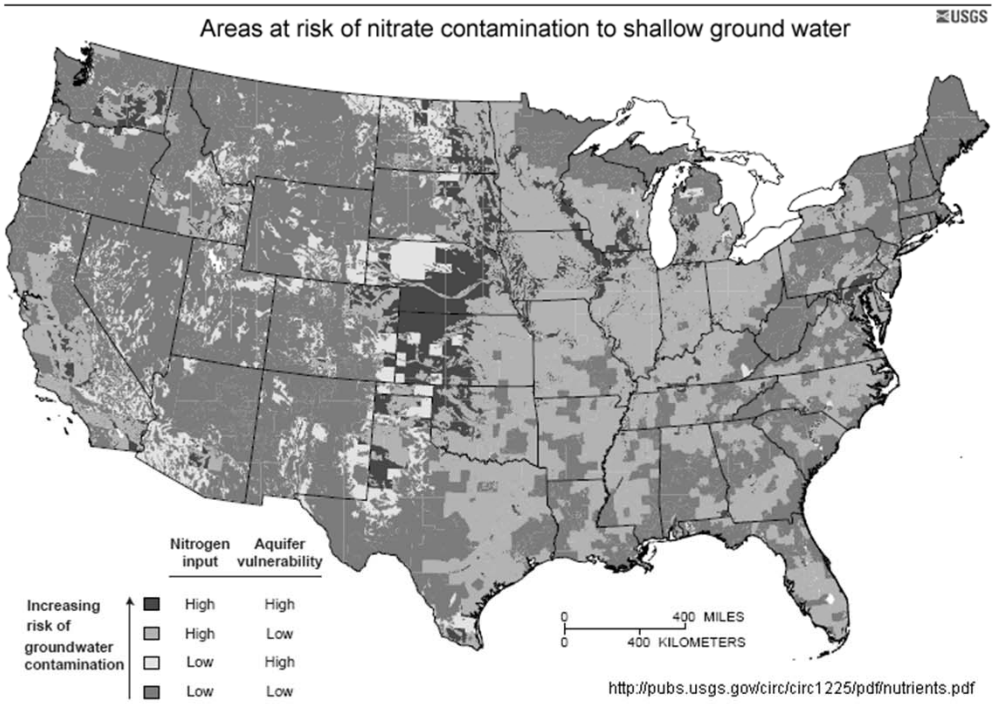
Nitrate Loading and Reduction





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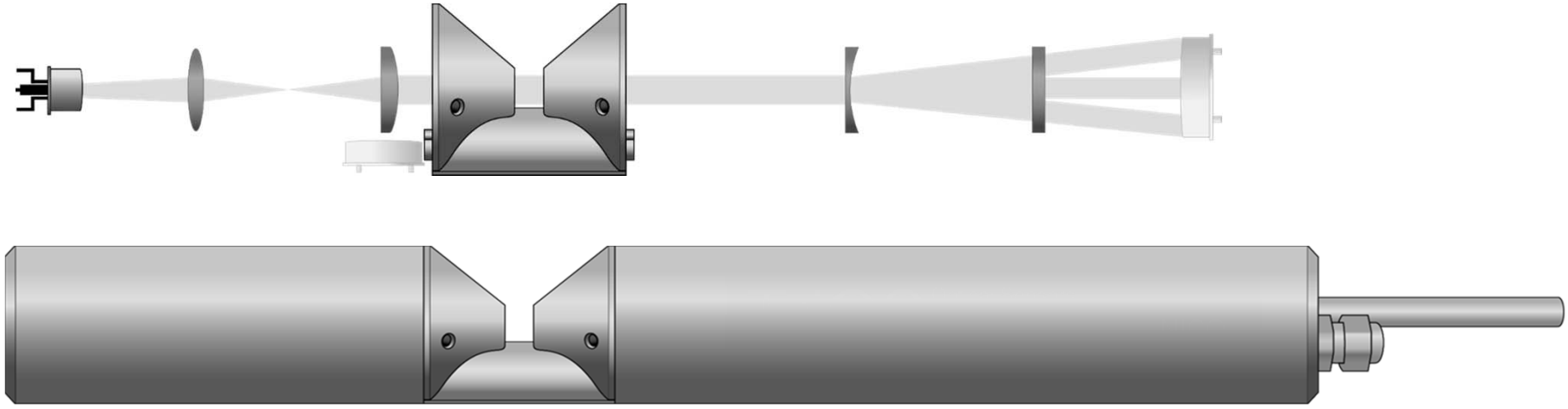
Our partner…TriOS

The light source

Reference diode

Filters

Photo diode



Xenon flash lamp emits light

A reference diode measures the emitted light before it passes the medium

The light passes through the optical path

The filter only lets the light with 212 nm, 254 nm and 360 nm pass and excludes all other wavelengths.

The photo diode can then perform a differentiated measurement of the remaining light in the relevant wavelengths.

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NEW ! OTT ecoN UV Nitrate sensor

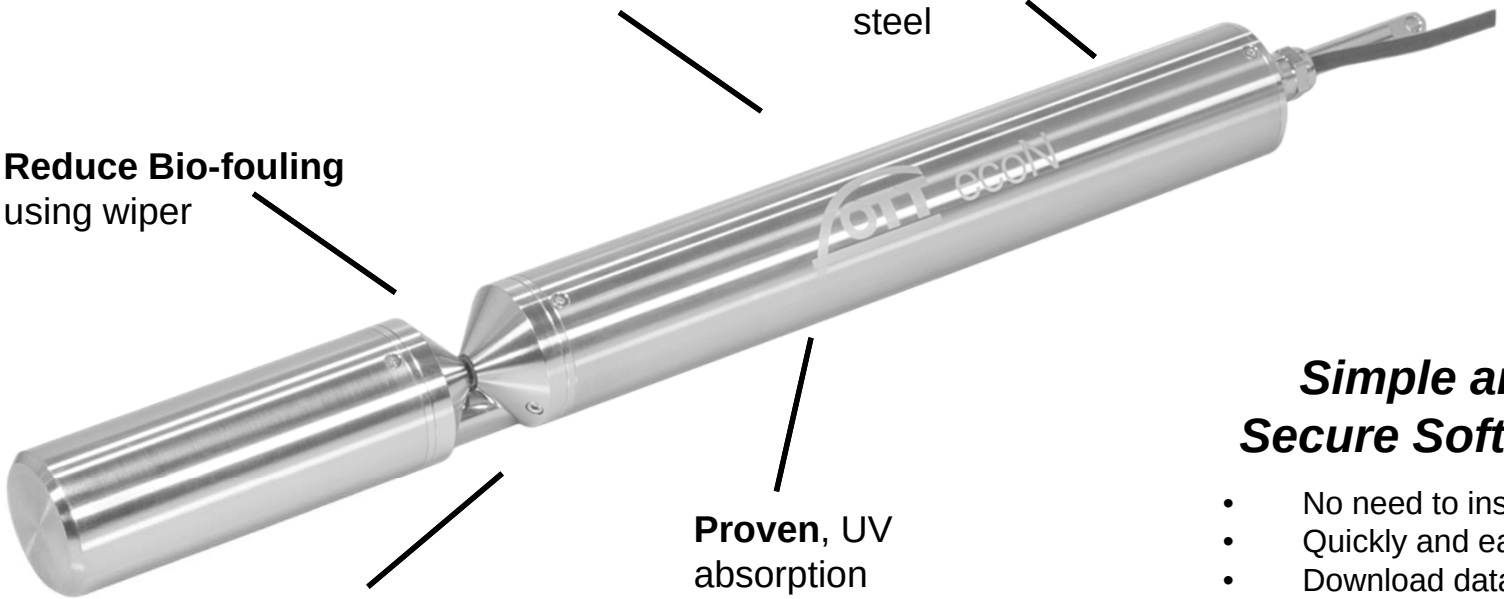
Advancing the legacy of industry-leading nutrient sensors , the OTT ecoN UV Nitrate sensor combines durability and exceptional performance on a user friendly, lower operational cost, future ready platform

Use with external dataloggers via **SDI-12**** or **Modbus**

Factory Calibration with ultra pure water

High Quality precision stainless steel

Reduce Bio-fouling using wiper



Adaptable path lengths *

Proven, UV absorption technology with 4 diode detectors

Simple and Secure Software

- No need to install software
- Quickly and easily setup
- Download data
- Verify optical performance

* Training required

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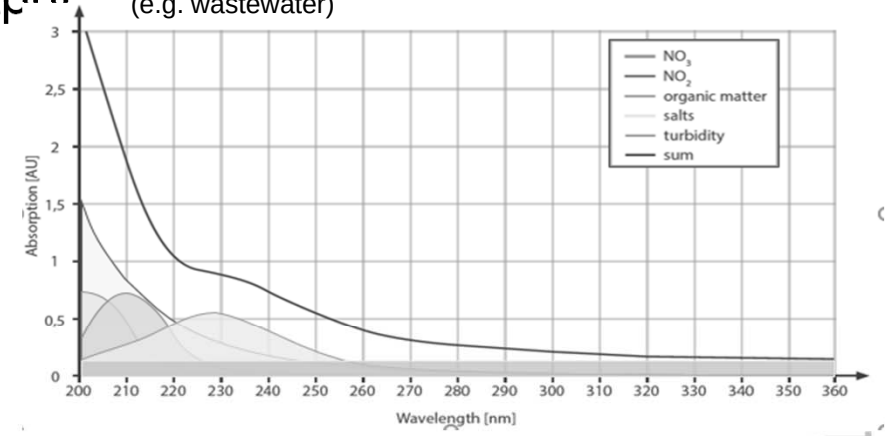
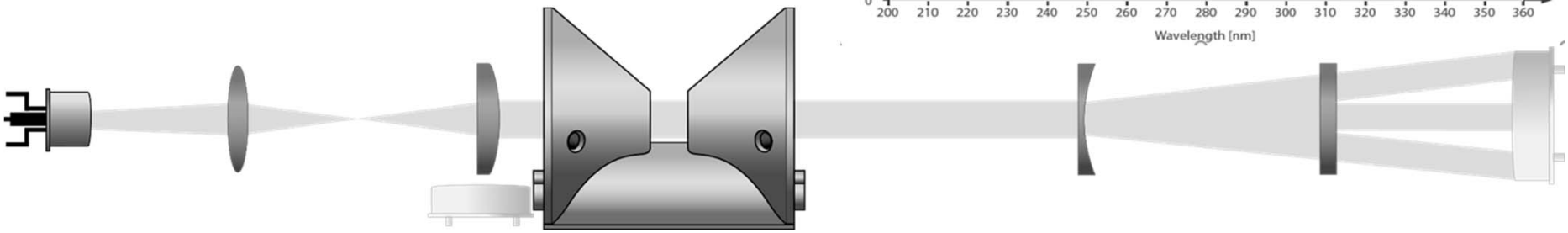
OTT ecoN – Precise optical technology

- Reference signal provides greater accuracy
- Reference signal to minimize drift and eliminate bias
- Self corrects for variation to lamp output
- Help ensure data quality

A typical absorption spectrum looks like this:
(e.g. wastewater)





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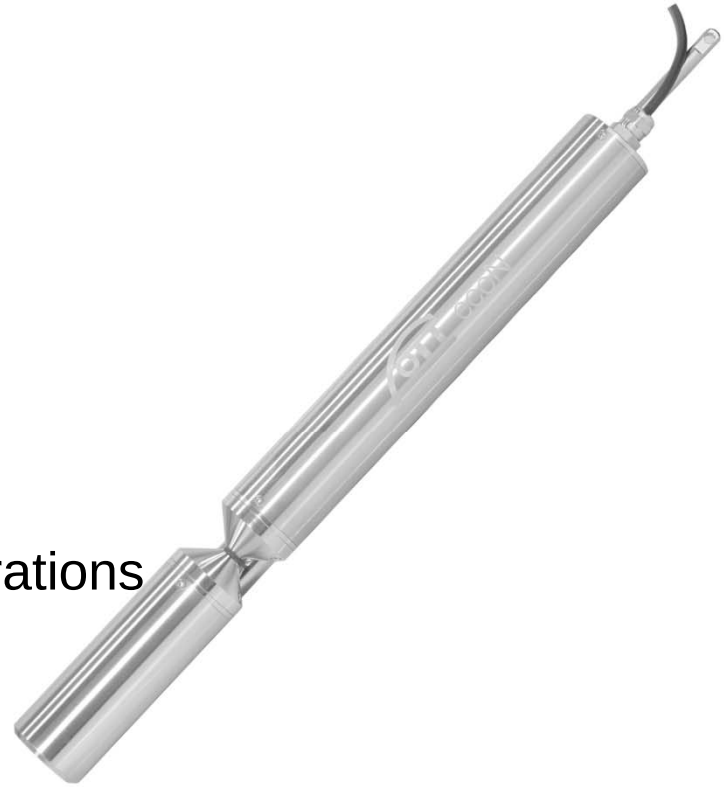
OTT ecoN – high quality



Stainless Steel Housing

- Robust and Corrosion resistant
- Easy to clean
- Increased likelihood of excellent calibrations

Compact design

- Suitable for discrete installation due to compact design
- Easier to install and minimizes the size of physical protection required

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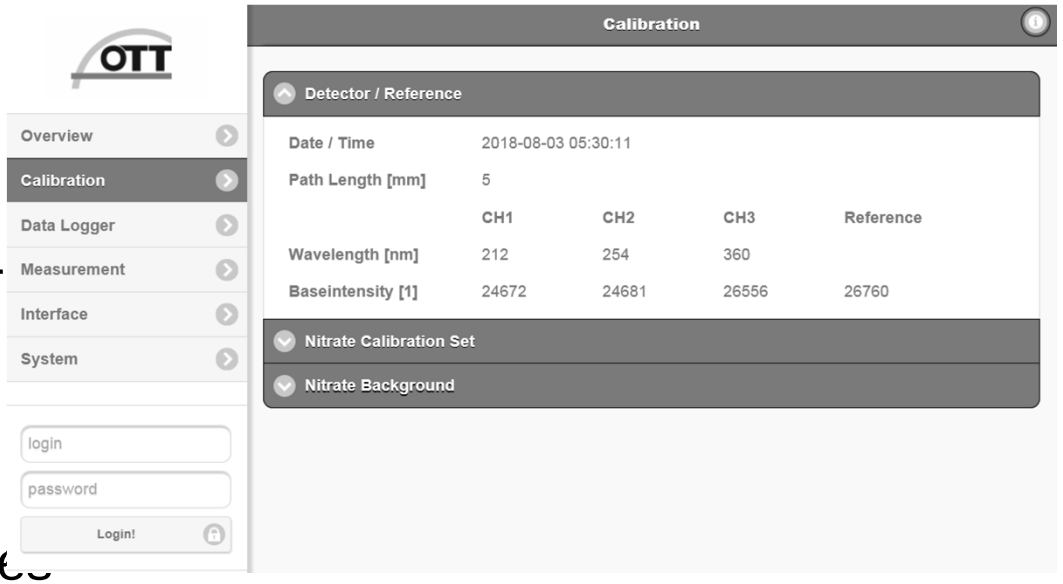
OTT ecoN - Usability

- No need to install software
- Browser only http://192.168.77.1
- Minimizes IT security concer
- Different OS can be used
- Eliminates compatibility issue



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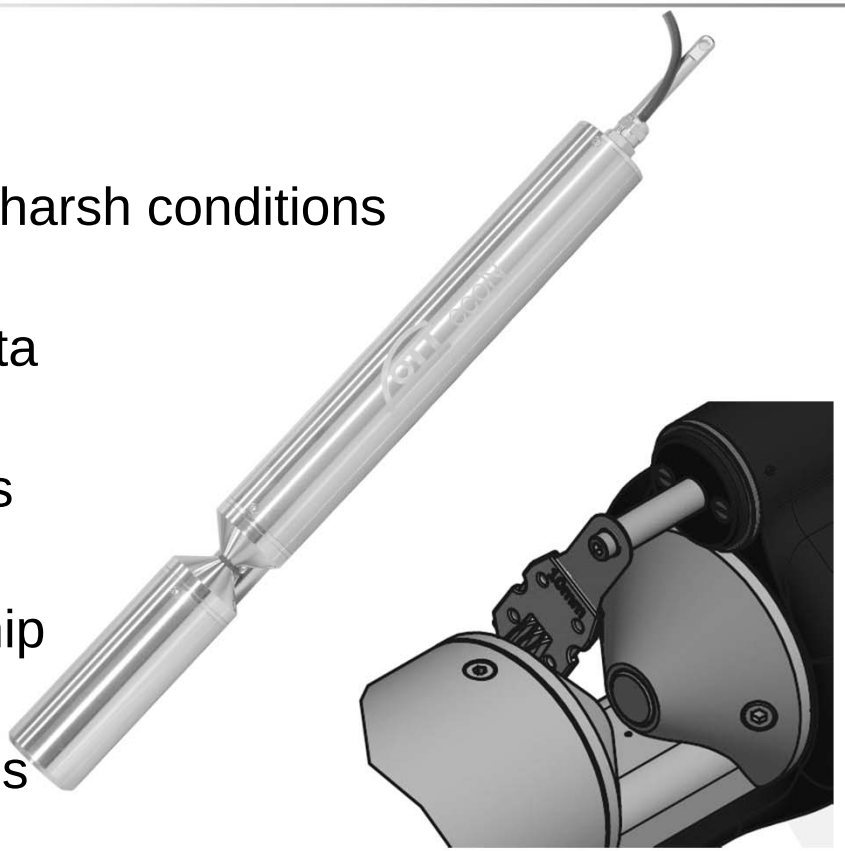
OTT ecoN – antifouling

- Increases deployment length in harsh conditions
- Minimizes likelihood of noisy data
- Decreases number of sites visits
- Decreases total cost of ownership
- Simple to exchange wiper blades



- Nano coating also Reduces biofouling and prolongs life of the lens

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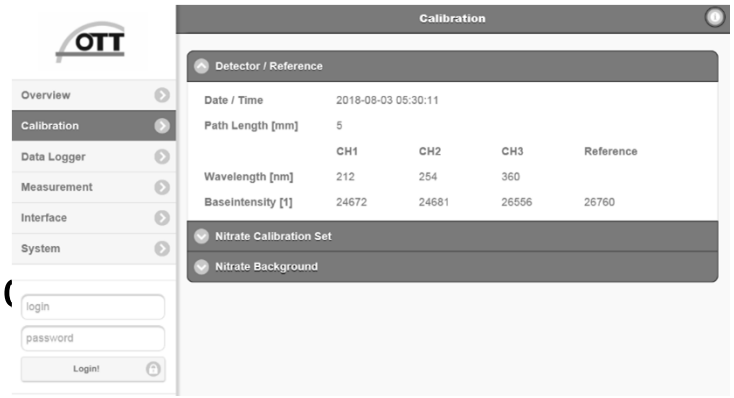
OTT ecoN - Calibration

- No need to send equipment to factory for annual calibration – training requi
- Lower annual maintenance costs
- Less downtime - More uptime
- Use chemical standards to verify performanc
- Browser based software can be used
- Ability to enter a custom compensation adjustment based on laboratory resu



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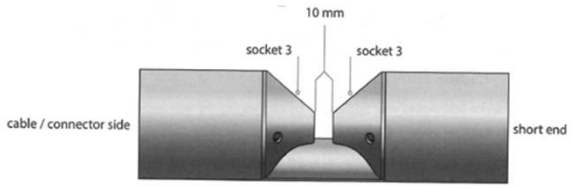
OTT ecoN – Calibration – adaptable lens

***Lens changing/calibration training required

- Use the same sensor for different sites/ studies- changing conditions
- Less restrictions in instrument selection and usage
- Expands the possibility that sensor can be used a shared resources
- OTT ecoN improves the cost of ownership for real time UV Nitrate sensors
- Reduced cost of ownership of rental stock and capital investment – USGS
- More flexibility to meet rental demands - USGS



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OTT ecoN - Guidelines

Shorter Path Lengths

- Limited sensitivity at low-level concentrations
- Greater Nitrate detection range
- Better at minimizing the impacts of turbidity

Longer Path Lengths

- Greater sensitivity at low-level concentrations
- Reduced Nitrate detection range
- Increase impacts from interferences such as Turbidity

Pathlength [mm]	Parameter	Unit	Range	LOD	LOQ	Precision	Accuracy*
1	Nitrate NO3-N	mg/L	0…60	0.5	1.5	0.15	± (5% + 1)
	Nitrate NO3	mg/L	0…266	2.2	6.6	0.66	± (5% + 4.4)
2	Nitrate NO3-N	mg/L	0…30	0.25	0.75	0.075	± (5% + 0.5)
	Nitrate NO3	mg/L	0…133	1.1	3.3	0.33	± (5% + 2.2)
5	Nitrate NO3-N	mg/L	0…12	0.1	0.3	0.03	± (5% + 0.2)
	Nitrate NO3	mg/L	0…53	0.44	1.32	0.132	± (5% + 0.88)
10	Nitrate NO3-N	mg/L	0…6	0.05	0.15	0.015	± (5% + 0.1)
	Nitrate NO3	mg/L	0…26.6	0.22	0.66	0.066	± (5% + 0.44)

*In Nitrate standard solution

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OTT ecoN – AOB

Questions / Comments

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OTT ecoN – other Guidelines

- Criteria for a suitable optical path length

  Check through absorption: service mode

Abs210	0.2…2.5	2.5…3	≥ 3
Abs360	≤ 0.5	0.5…0.8	≥ 0.8

- Reference Channel - indicators
  - Ideal – ultra pure water ~26,000
  - Attention required – ultra pure water < 16,000

- SQI – Signal Quality Indicator
  - Scale 0 to 1
  - < 0.8 typically will provide good data

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OTT ecoN – AOB

Integration Status

- Sutron integration
  - Python script – as used on USGS test sites
  - Wiper function
  - Log file saved on ecoN

- SDI-12 - Development commitment for end2018

- Conversions
  - Nitrate as Nitrogen(NO3-N) to Nitrate(NO3)
    - NO3-N x 4.42
  - Freshwater applications typically express NO3-N

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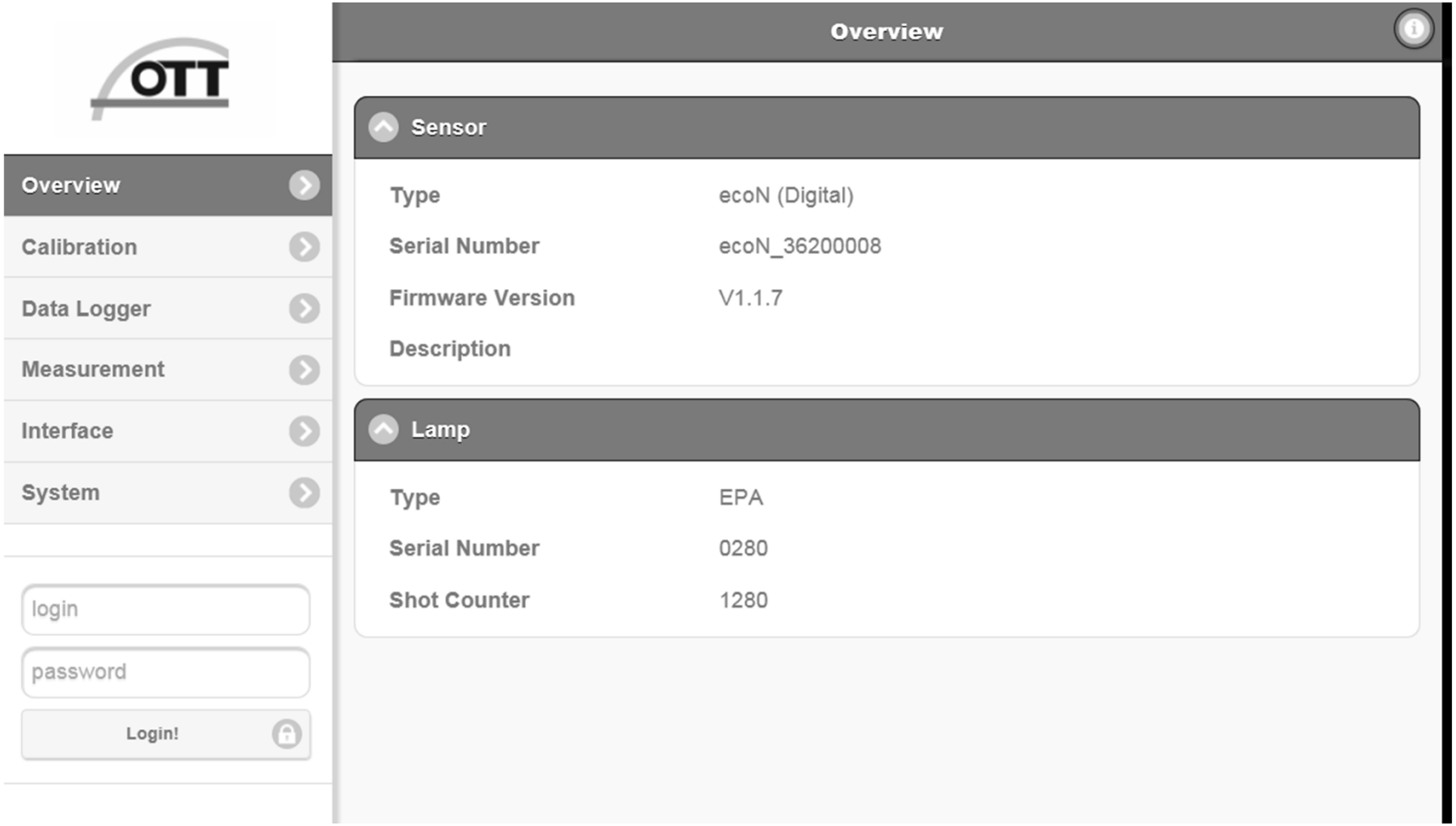
OTT ecoN – UI Overview



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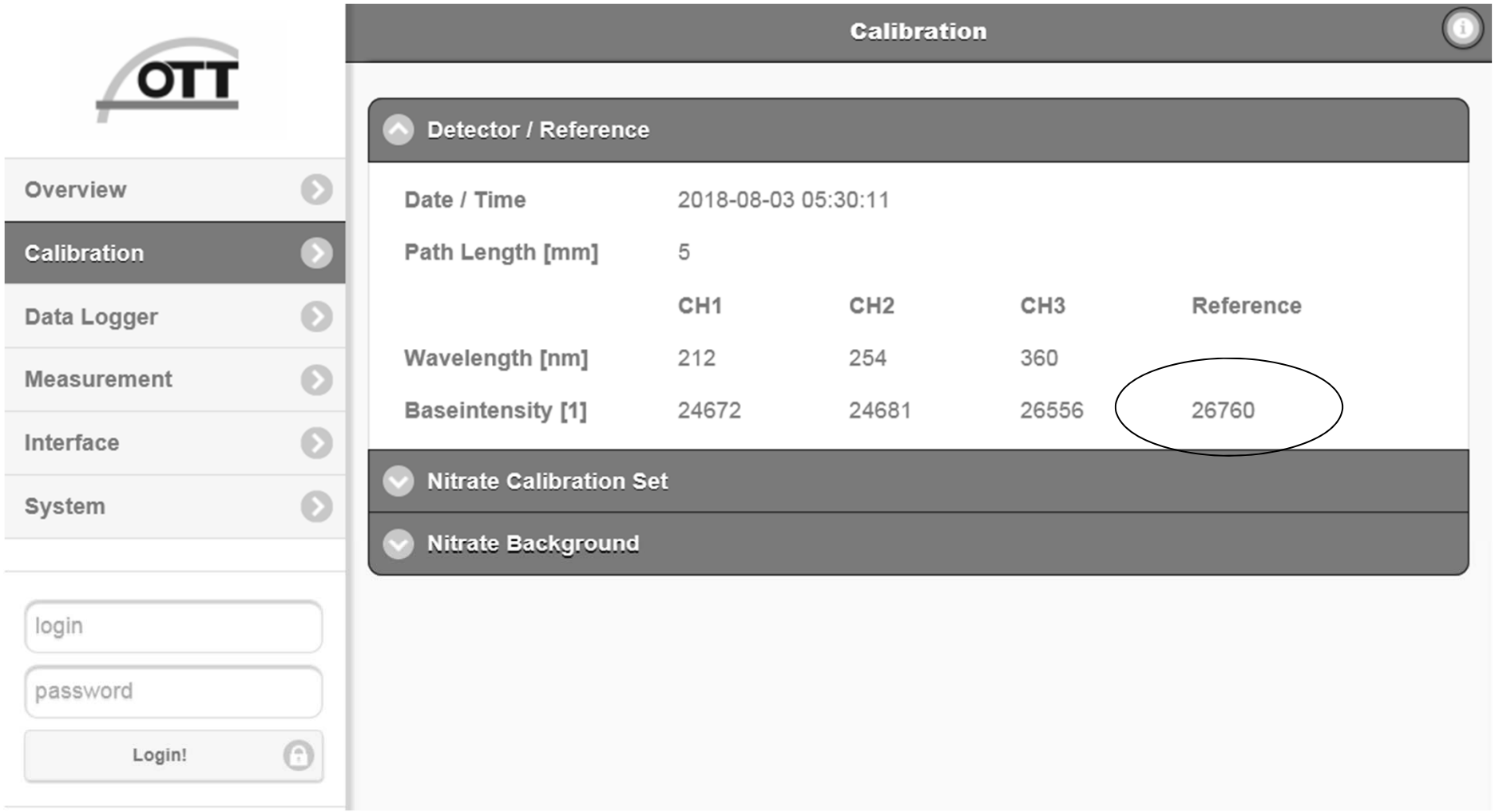
OTT ecoN – UI Calibration



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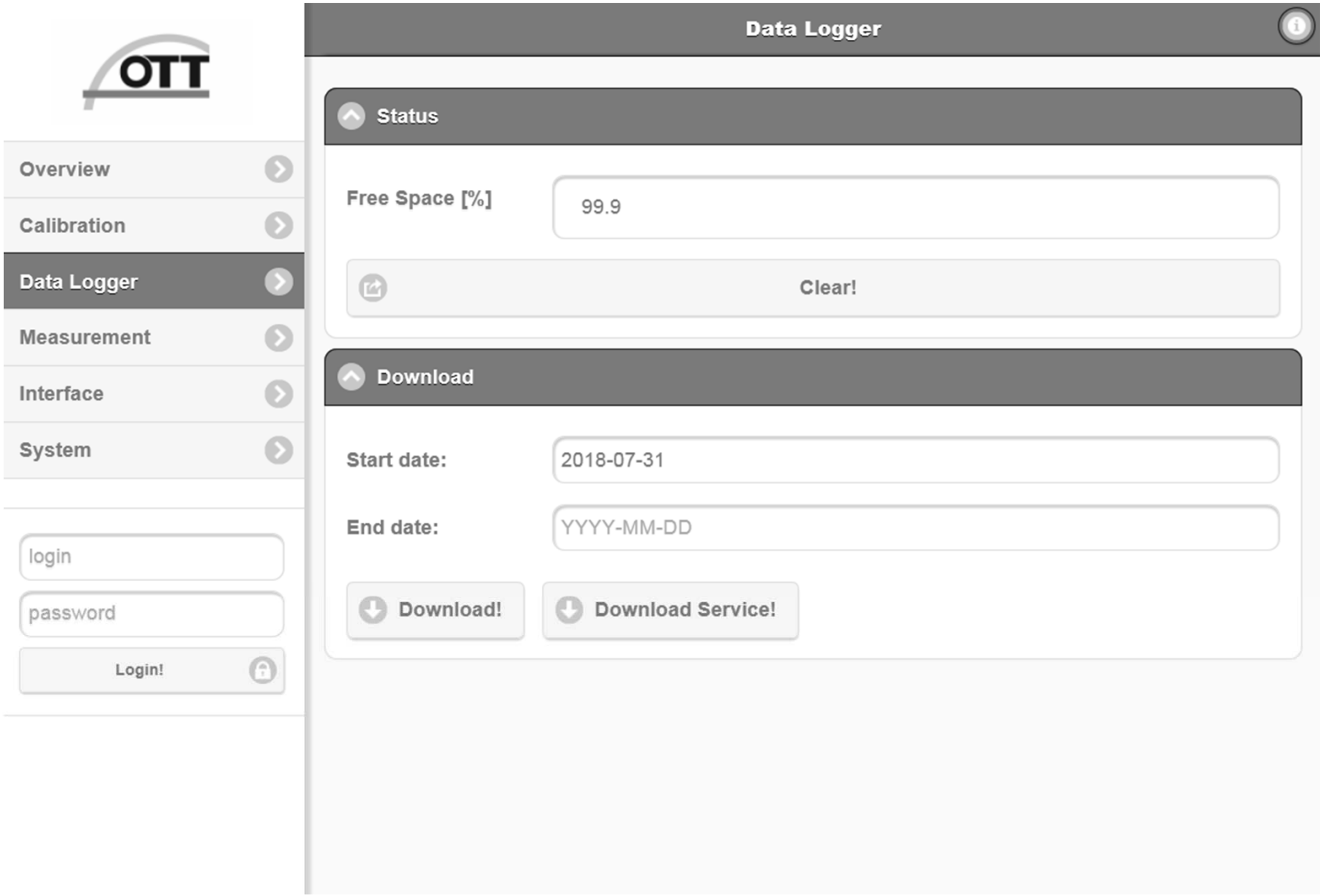
OTT ecoN – UI Data Logger



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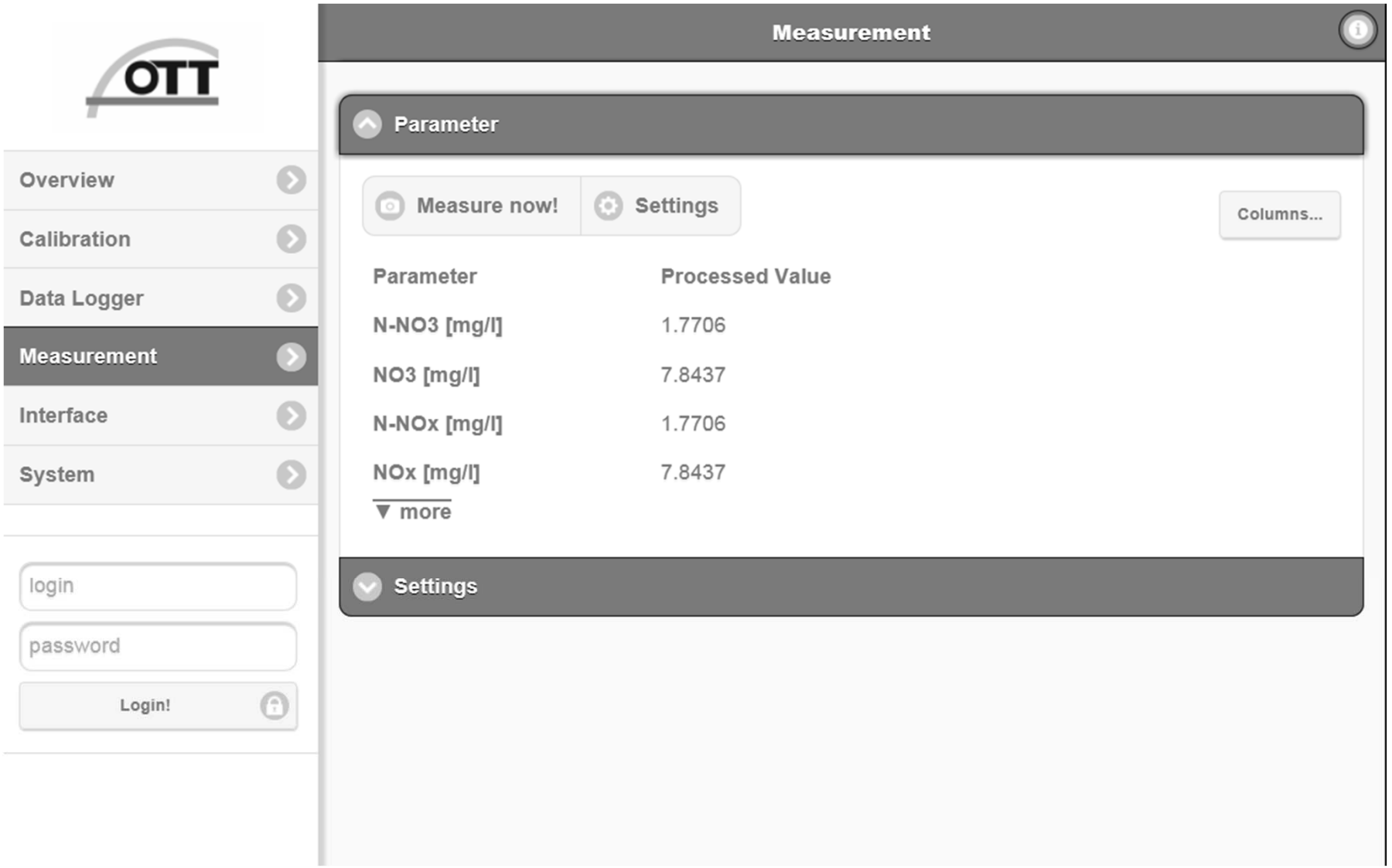
OTT ecoN – UI Measurments



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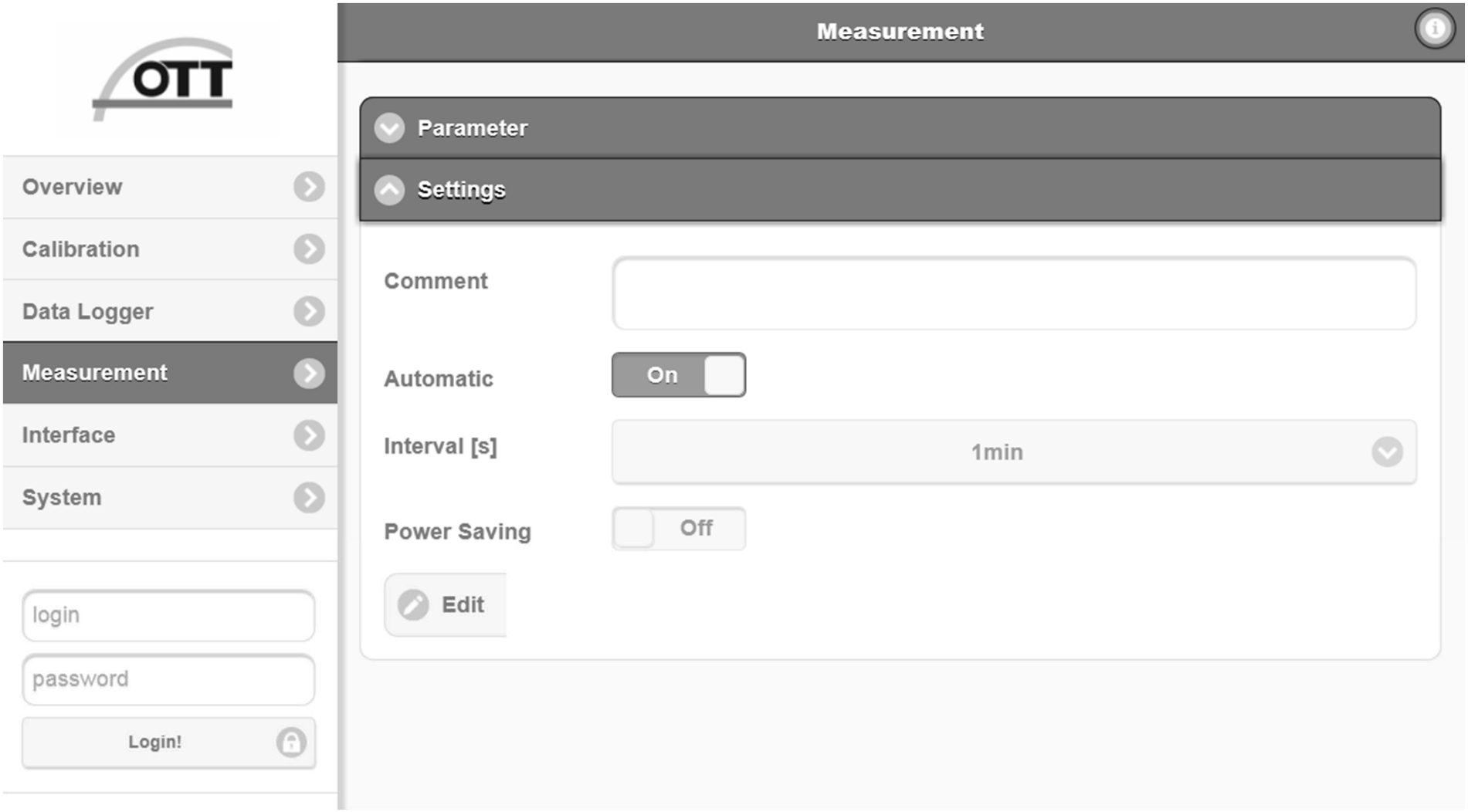
OTT ecoN – UI Autolog



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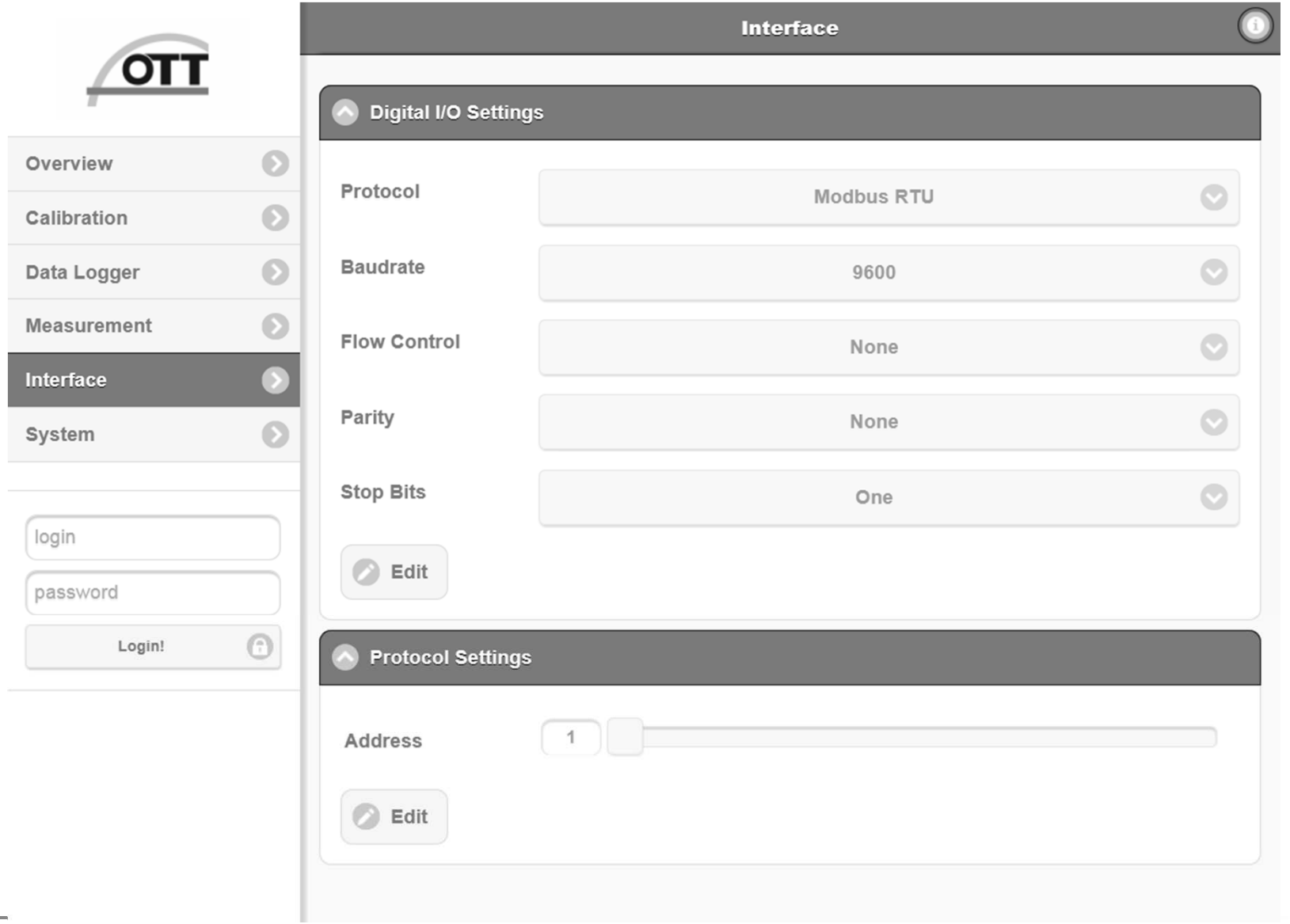
OTT ecoN – UI Communications



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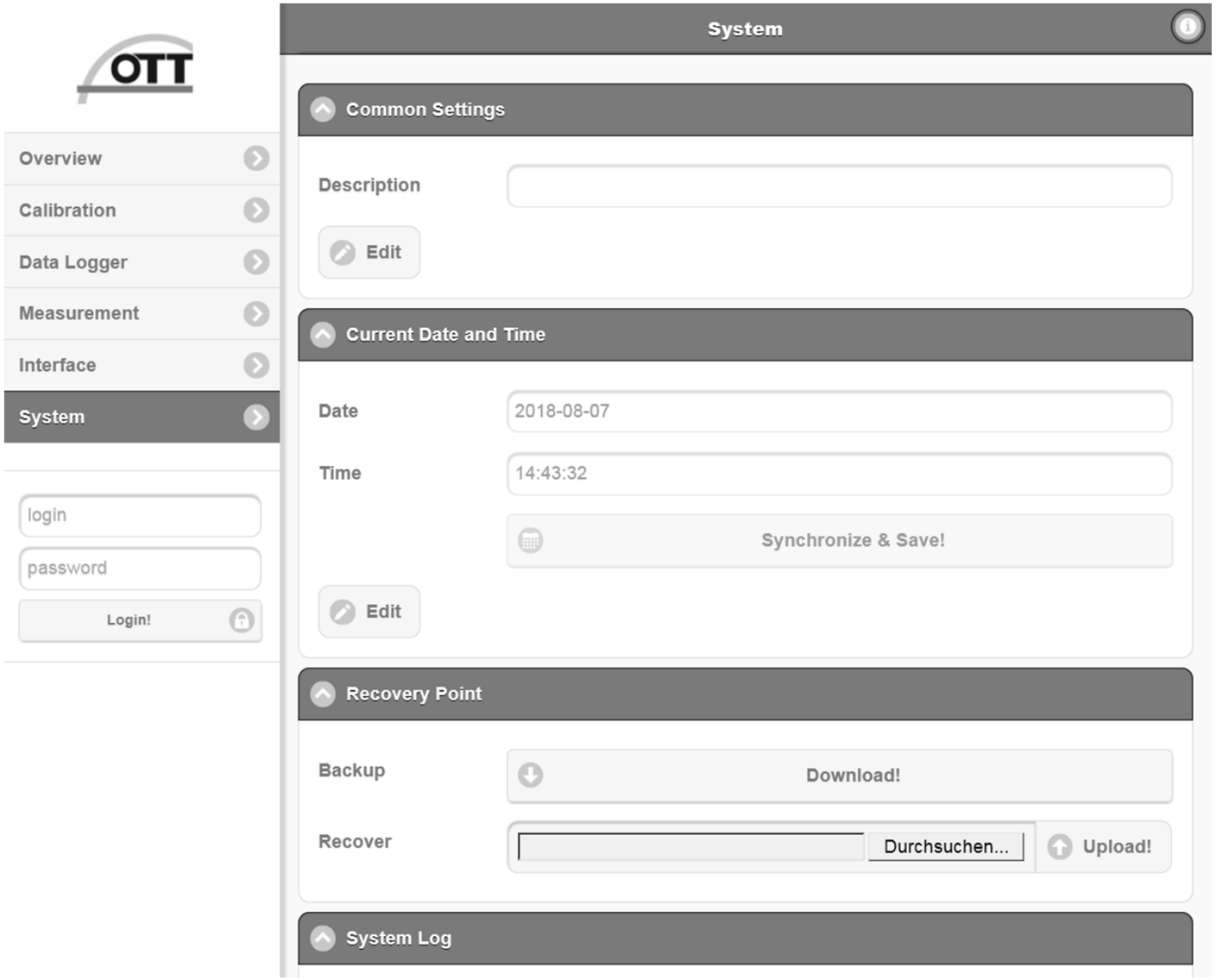
OTT ecoN – UI Settings



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OTT ecoN - Guidelines

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