

Description

The 3C - Photometer is a compact three color extinction photometer for applications in ultra pure and chemical aggressive liquids. The extinction measurement at three wavelengths makes this sensor particularly suitable for in-line process monitoring and control of complex and high concentrated multi-phase systems, like submicron dispersions, micro-emulsions or polishing slurries. Besides extinction and color measurement the sensor can be excellently adapted for in-line measurement of concentration and particle size of submicron dispersions. The integrated evaluation unit with a LCD-display, the RS485 interface as well as the free programmable analogue output minimizes additional hardware requirements and guarantees an easy connectivity to a PC or PLC.



Applications

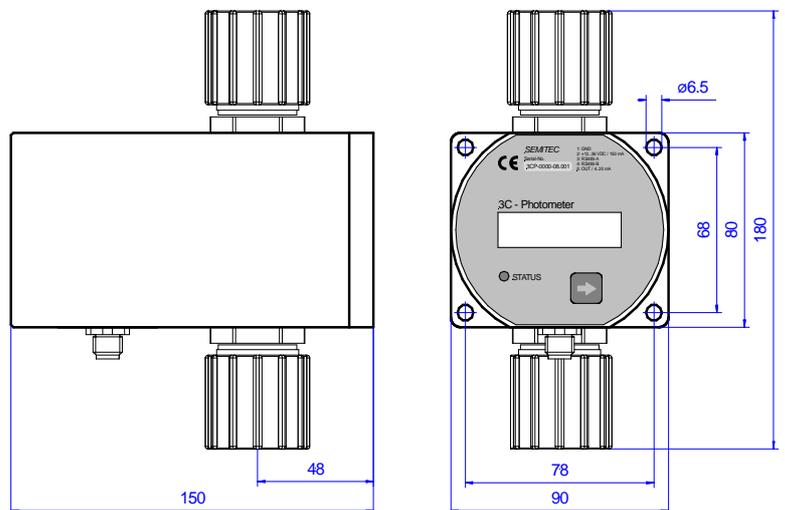
- ▶ High dynamic extinction measurement
- ▶ Concentration measurement
- ▶ Quality monitoring of CMP slurries
- ▶ Particle sizing of nanoscaled dispersions
- ▶ Color measurement
- ▶ Microemulsion in pharma and life science
- ▶ Ultra pure and chemical aggressive liquids

Specification

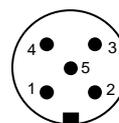
Extinction range	0...8
Wavelength	470, 630, 875 nm (3CP) 310, 390, 470 nm (3CPUV)
Measurement parameters	Extinction, Extinction ratio, Calibrated concentration
Extinction length	1, 4, 20 mm
Max. Pressure	8 bar
Degree of protection	IP54
Temperature range	-10 ... +60 °C

Dimensions	150 x 90 x 180 mm
Mounting	4 drill holes Ø 6,5 mm
Process interface	PFA-tube 1" (opt. 3/4")
Wetted materials	Housing: PTFE Sealing: Viton® Windows: Sapphire Tube Fittings: PFA

Fully plastic housing, no metallic parts



Power supply	24 V DC (18-36 V), 200 mA
Communication	RS485
Analogue Output	4 - 20 mA
Electrical connector	5 pin - M12 male connector



- 1: GND
- 2: +12..36 VDC / 150 mA
- 3: RS485-A
- 4: RS485-B
- 5: Analogue output (4..20 mA)

Software	Easy-to-use configuration, monitoring and measurement software (Windows®)
Communication protocol	Serial ASCII-protocol for the implementation into custom specific applications

Contact

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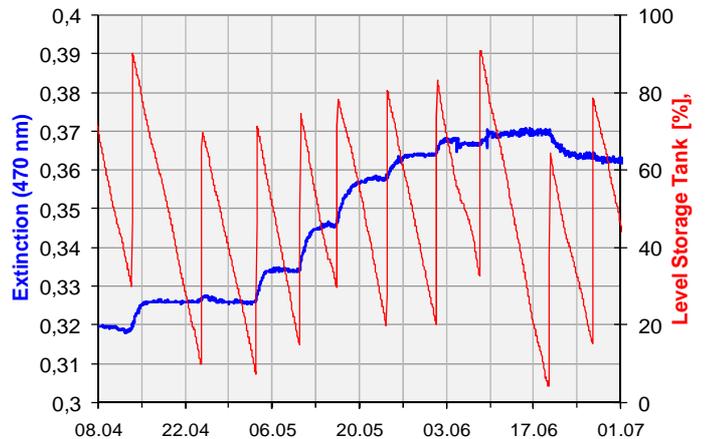
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Examples

Extinction measurement

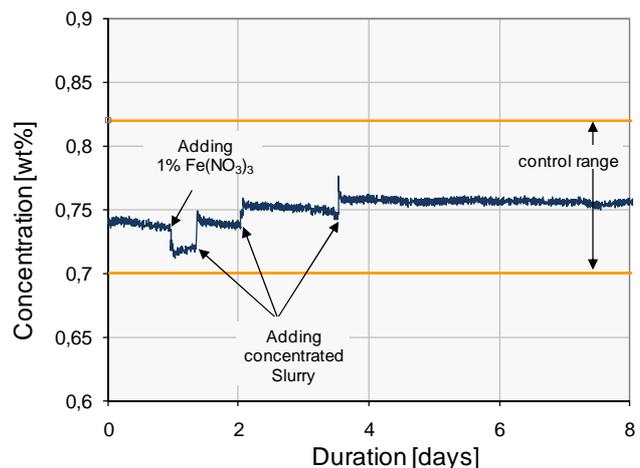
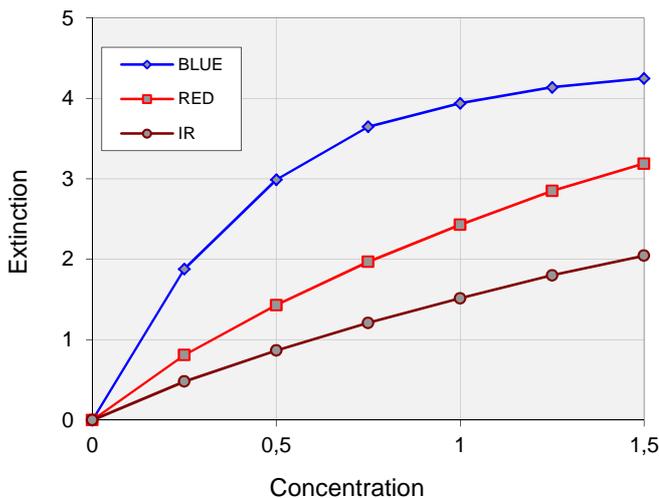
Extinction is a useful integral parameter for monitoring and controlling solutions and dispersions. A lot of parameters, like the concentration, the agglomeration state or the stability of dispersion, directly correlate with extinction. The use of three wavelengths enables additionally colorimetric measurements of liquids.

The graph shows the long term extinction course of a nanoscaled CMP slurry in a supply system. The sensor can excellently distinguish between different batches of slurry. The steps in the extinction curve are caused by filling the storage tank of the system with new slurry.



Concentration measurement

Calibrate the extinction on concentration enables quantitative measurements of this. The measurement at three wavelengths minimizes errors due to changes within the fluid system and makes the measurement very stable. Thereby the 3C - Photometer is very useful for applications in blending and mixing systems. The graphs show a typical calibration of a high concentrated colloidal dispersion and a typical concentration course in a mixing plant.



Particle Sizing

The extinction of dispersions depends on the size as well as on the concentration of particles.

In case of a known concentration the size of particles can be calculated directly from the extinction values. The use of three wavelengths enhances the stability and safeness of the measurement. The diagram shows the mean particle size of ceria slurry in dependence on the flow velocity. Due to high shear forces at high flows, larger particle agglomerates are destructed into smaller particles.

In case of submicron dispersions the extinction ratio is a very suitable concentration-independent indicator for the mean particle size, which can be excellently used for process control.

