

FDO®: Fluorescence D.O. Measuring – What exactly does this mean?

The optical principle:

With the optical method a fluorescent dye is stimulated in the membrane of the FDO® 700 IQ by a short wave length lightsource. By falling back into the passive state, long wave light is emitted, which is recorded as a measurement signal. If oxygen contacts the dye by diffusing through the membrane the period of back scattering light is shortened according to the oxygen concentration of the sample. In principle the measurement of the fluorescent signal come back to a highly precise time measurement.

D.O. sensors of the first generation had a handful of technical issues to cope with.

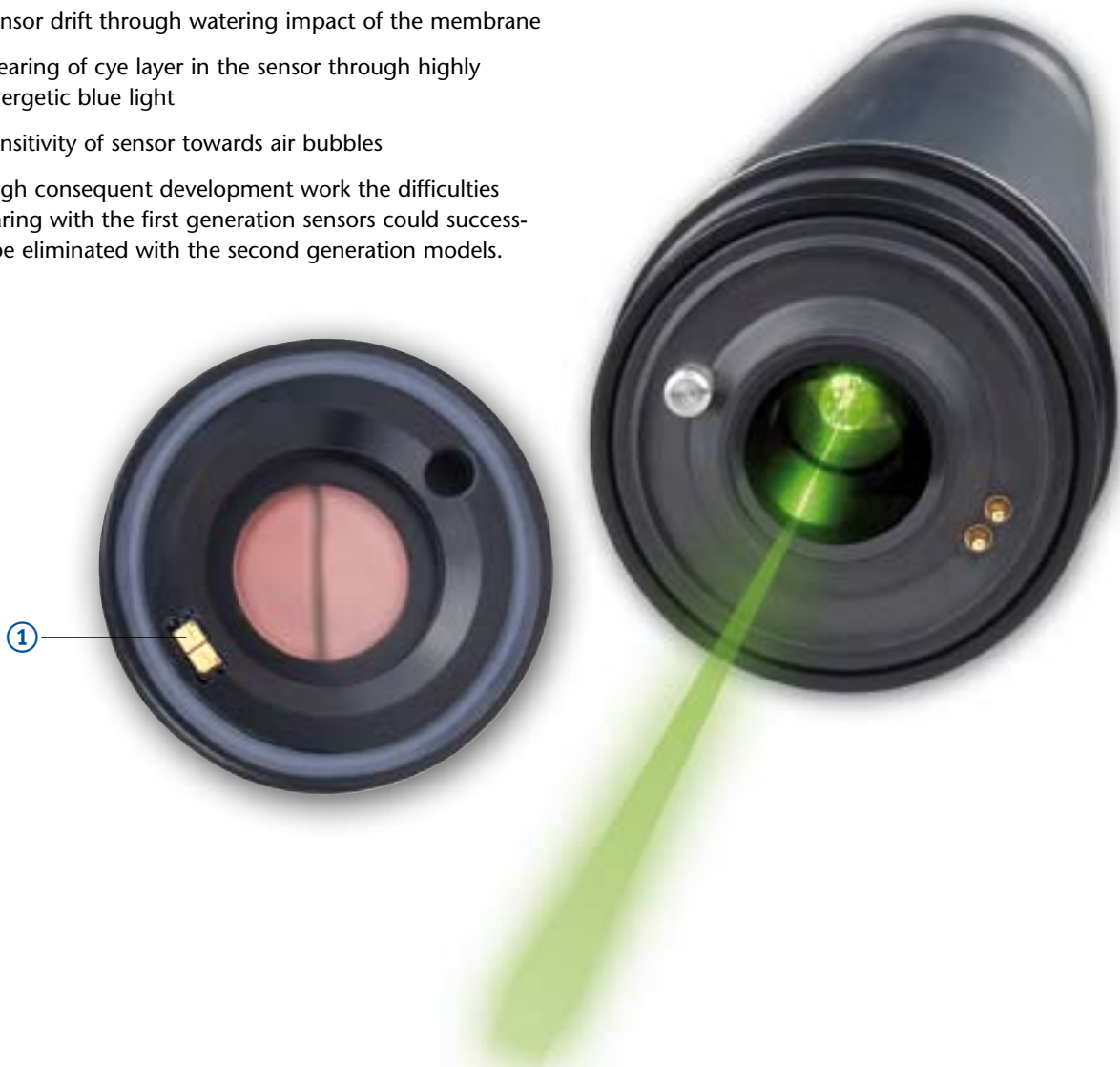
- Sensor drift through watering impact of the membrane
- Wearing of cye layer in the sensor through highly energetic blue light
- Sensitivity of sensor towards air bubbles

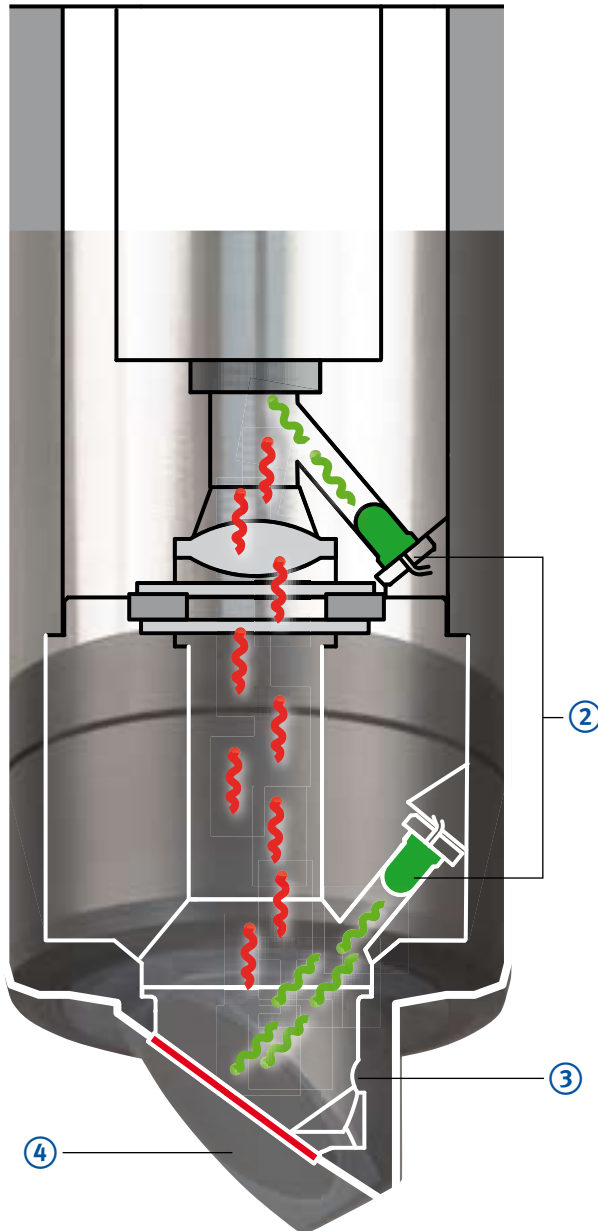
Through consequent development work the difficulties appearing with the first generation sensors could successfully be eliminated with the second generation models.

The following technologies are used:

① IQMC Technology

Each cap is individually factory calibrated. The calibration data are permanently stored on a chip which is installed in the membrane cap.





② EPRS = Equal Path Reference System

Measuring and reference path as well as optical components are identically designed with this sensor.

Natural aging processes of the optical components can therefore be compensated by the reference path and accordingly compensated in the measuring path. This causes a continuous high performance of the sensor.

③ GLT = Green-light Technology

By stimulating the fluorescent reaction in the membrane with low energetic green-light, a bleaching of the fluorescent dye in the sensor membrane is avoided. This leads to a membrane lifetime of min. 2 years.

④ 45° Technology

The membrane SC-FDO® has a horizontal slope of 45°. A congestion of air bubbles in front of the membrane, as experienced with the first-generation of optical D.O. sensors, is therefore avoided.

C² calibration:

The optical measuring technology is based on an attenuated fluorescent signal in a defined time frame. The D.O. measuring is more or less a highly precision time measurement. In order to process this time measurement as precise as possible, the sensor optics are calibrated to the speed of light. This natural constant "c" is defined as the time that a light beam needs to go from point A to point B – in short: the speed of light.

The sensor is precisely calibrated against a physical constant.

The interaction of these technologies makes the FDO® a non-calibration sensor.