



**Automatic**

**Concentration  
Measurement**

# ZESTRON® EYE Application Area

The ZESTRON® EYE is a digital monitoring system that enables the precise measurement and control of cleaning bath concentration for electronics cleaning processes in real time and irrespective of flux loading. It is easily integrated within commonly used cleaning machine types and manufacturers.

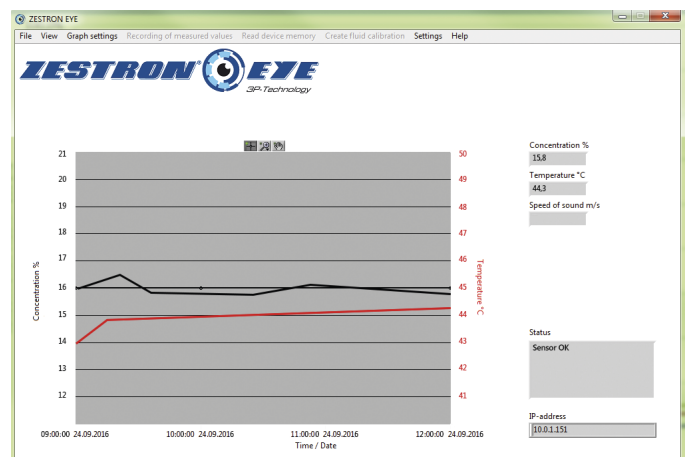
Cleaning bath concentration fluctuates over time for a variety of reasons including drag-out and evaporation. Unchecked, this will result in dilution of the cleaning agent and compromise cleaning results. Thus, continuous concentration monitoring is essential to ensure the stability and reliability of the cleaning process, thereby guaranteeing the high quality cleaning results expected.

Manual measurement methods, such as the ZESTRON® Bath Analyzer, are inexpensive alternatives. However, the ZESTRON® EYE offers automated process control including data management and storage for quality assurance.



## ZESTRON® EYE is specifically designed for ZESTRON cleaning agents and provides:

- ✓ Precise and automatic concentration measurement for fresh and loaded cleaning baths
- ✓ Real time cleaner concentration management to quickly react to changes of the cleaner concentration in the running process
- ✓ Touch screen interface for ease of use
- ✓ Ability to integrate with the cleaning equipment PLC and automated dosing system
- ✓ Reduced operator workload due to automated measurements
- ✓ With the ZESTRON® EYE Basic Software, you can connect the ZESTRON® EYE to your PC or Laptop. The software allows the user the opportunity to read and save the data onto the controller (e.g. for ISO audits), conduct a ZESTRON® EYE functional test or update the controller software



Home screen ZESTRON® EYE Basic Viewer Software

# Advantages compared to conventional measuring methods

Conventional ultrasonic or optical liquid concentration measurement systems typically rely on a single variable to determine concentration. However, the ZESTRON® EYE incorporates 3P-Technology that simultaneously assesses three distinct parameters to characterize the liquid flow and resulting concentration. The sender and receiver are external to the sensor eliminating the possibility of erratic readings due to changes in the liquid flow rate or surface contamination.

Due to the specific positioning of the signal converter on the outside of the ZESTRON® EYE sensor, the system is able to analyze the cleaning agent flowing through without being affected by any signal disturbing parts, such as forked sensors in the pipes, which are common in conventional ultrasonic measuring systems.

Concentration Measurement Method Comparison:			
	ZESTRON® EYE 3P-Technology	Conventional Optical Measurement, i.e. nD	Conventional Ultrasonic Measurement
Measurement accuracy	++	- Not suitable for running/operating cleaning processes	+
Signal stability (contamination load)	++ Very stable against contamination (i.e. flux load)	- Very sensitive to contamination	+
Process disturbance	++ None, as sensor does not contain any flow disturbing parts	- System installation influences the laminar flow and thus leads to pressure drops	- Sensor positioned in the middle of the cleaning agent flow → pressure drops and turbulence
Required space	++	+	-
Integration/Installation	++ No adapter necessary, standard external thread, can be connected via Ethernet or analog output with PLC and dosing system	- Adapter required for integration into the cleaning agent cycle of the machine	- Adapter required for integration into the cleaning agent cycle of the machine
Investment cost	++	+	-

++ excellent/ low

+ good/ medium

- poor/ high

The sensor is manufactured of stainless steel and is void of moving parts, thereby ensuring long and maintenance-free product life.

100 % compliance with EU guidelines (RoHS 1, 2 & 3 WEEE, CE)

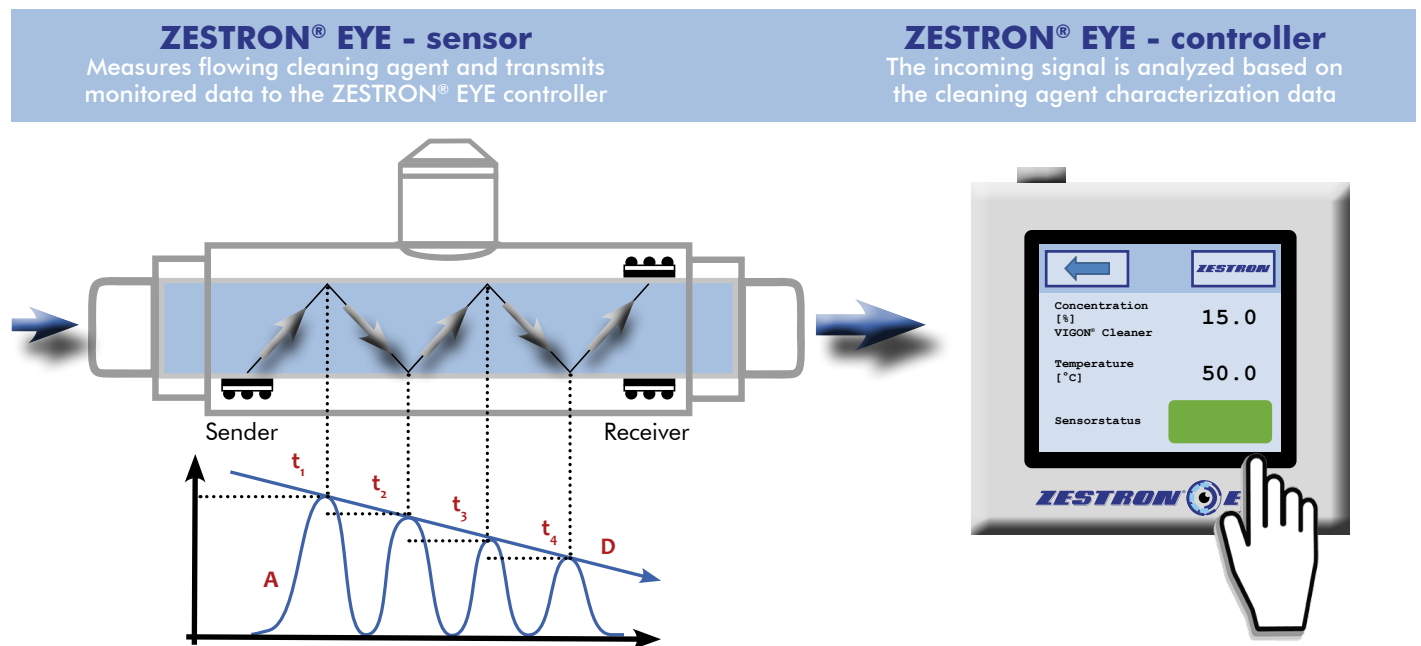


# Powered by 3P-Technology

ZESTRON® EYE is state of the art technology featuring automated, digital real-time concentration measurement for electronics cleaning processes. It is based on 3P-Technology, an innovative acoustic measuring method. This technology enables liquid concentration determination with extraordinary accuracy without impeding liquid flow. The sensor design is compact for ease of installation in commonly used cleaning machines.

Unlike conventional acoustic methods that rely on measuring a single parameter, such as signal frequency, the 3P-Technology simultaneously monitors three parameters in order to characterize and analyze the cleaning agent concentration. The 3P-Technology parameters are:

1. Signal time period ( $t$ ): Time interval between signal waves
2. Signal amplitude ( $A$ ): Strength of the signal waves
3. Signal dampening ( $D$ ): reduction of the signal amplitude ( $A$ ) over time



## Operating principle:

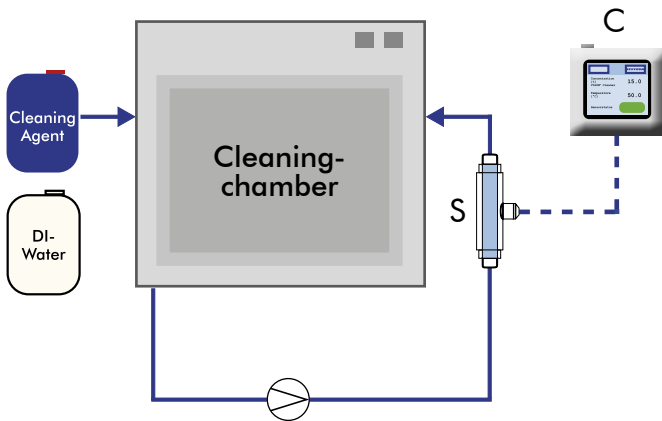
1. The ZESTRON® EYE sensor, integrated within the wash pipe system of the cleaning equipment, continuously analyses the cleaning agent as it is pumped through the cleaning cycle.
2. The 3P-Technology simultaneously records three parameters: Signal time periode ( $t$ ), Signal amplitude ( $A$ ), and Signal dampening ( $D$ ). This multiparameter characterization ensures accurate and reliable measurement.
3. Zestron cleaning agents are characterized by their unique acoustic fingerprint. Using this data, the ZESTRON® EYE controller is calibrated for accurate concentration measurement.

# Integration Options

The ZESTRON® EYE can be integrated into the cleaning equipment in several ways and provide either manual or automatic process control.

## ZESTRON® EYE - Manual Dosage

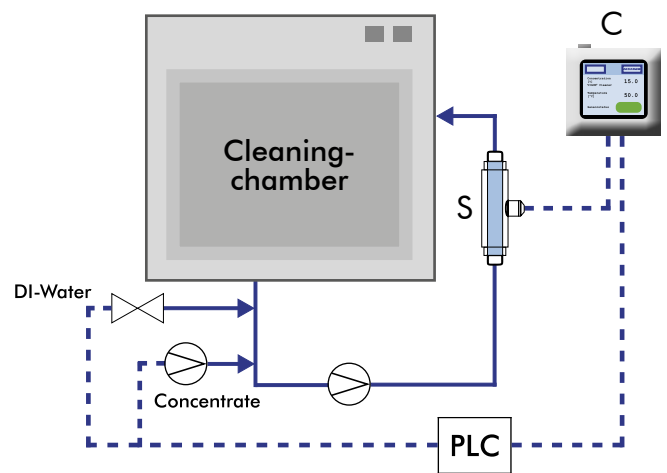
The sensor is installed directly into the high pressure side of the wash pipe line or via a bypass. The concentration measurement is visible on the ZESTRON® EYE controller.



C = Controller  
S = Sensor  
PLC = Programmable Logic Controller

## ZESTRON® EYE - Automatic Control

The sensor is installed directly into the high pressure side of the wash pipeline. The controller output signal is connected with the cleaning equipment PLC for the automated control and dosage of the concentrate and DI-water as required. In this case, the necessary PLC program upgrade is provided by the specific cleaning equipment manufacturer.



## ZESTRON® EYE Mobile

This mobile version of the ZESTRON® EYE can monitor the cleaning agent concentration of several pcb and stencil cleaning machines with only one device. The battery life lasts for several working days. Moreover, the device is capable of recommending the appropriate cleaning agent or DI-water addition to obtain optimum concentration within the wash tank.

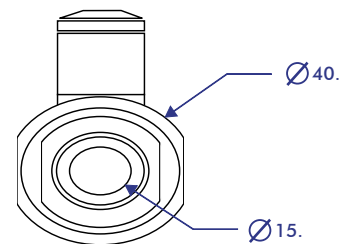
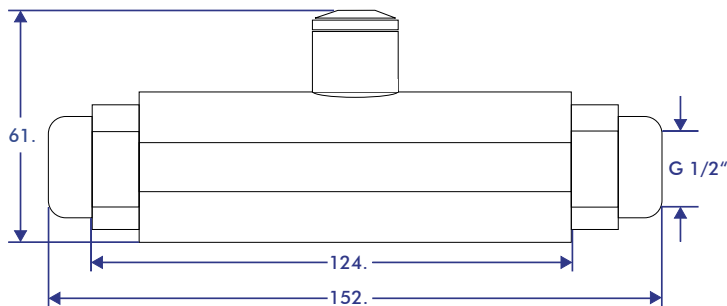


# Technical Information

## ZESTRON® EYE sensor

The ZESTRON® EYE sensor is available in three sizes and can be easily integrated into your cleaning machine. The sensor is made of stainless steel and polished on the inside. The extremely smooth surface prevents the deposit of residue particles inside the sensor and thus guarantees a long and maintenance-free product life.

Measuring Technology	ZESTRON® EYE	3P-Technology		
Measuring Resolution	%	± 0.01		
Measuring Frequency	sec. / min. / h.	Customer selected (minimum interval = 1 second)		
Concentration Window	%	Cleaning agent dependent		
Material	Stainless Steel	1.4404 / AISI 316L (V4A)		
Application Temperature	°C / °F	0 - 100 / 32 - 212		
Process Connections	External thread	1/4"	1/2"	1"
Thread specification	DIN EN ISO 228-1			
Diameter $\varnothing$	Optional	DN 8	DN 15	DN 25
Length (l)	mm	130	152	210
Height (h)	mm	55,5	61	75



Version: DN 15

## ZESTRON® EYE controller

The ZESTRON® EYE controller is touch screen operated. The intuitive menu control allows the operator to individually program the measuring frequency and the way the concentration graph is presented. The controller can further be connected to the PLC of your cleaning machine to control a dosing system.

Digital Interface		Ethernet/ Modbus
Analog Interface	mA / V	4 - 20 mA / 0 - 10 V (switching contact: relay max. 50 V / 2 A)
Power Supply	V DC	24
Operating Temperature Range	°C / °F	0 - 70 / 32 - 158
Cable Length	Optional	2m, 5m, 10m
Data Capacity	GB	2 (2 million measurements possible → measurements up to 2 years)

