

UV500 IMO

Online Water Analyser



Specialist Of UV Spectroscopy

> UV500 IMO Online Water Analyser

- Fully compliant to MEPC 259 (68)
- Compact system
- User-friendly interface
- Multiplexing
- Robust design and sustainable
- Easy maintenance



In regards of the new regulations defined by IMO (International Maritime Organization) in 2020, ships must continuously control their emissions from fuel oil combustion.



Global sulphur content shall not exceed 0.5 % in ships' fuel oil unless an exhaust gas cleaning (EGC) system is provided. The wash water resulting from the cleaning of the scrubber used to reduce the amount of pollutants in the exhaust stream is also subjected to regulations as it is discharge into the open sea. Discharge water must be effectively monitored before returning to the sea in order to limit its impact on marine ecosystems or environment. The MEPC 259(68) standards give specific criteria for water quality parameters.

> UV500 IMO Measurement Principle

UV500 IMO manufactured by Tethys Instruments is a specific on-line water analyser which provides a simple and fast method to measure PAH (Polycyclic Aromatic Hydrocarbons), pH, turbidity, and temperature using different modules. This analyser is designed to monitor inlet or outlet washwater of exhaust gas cleaning system with good accuracy, stability, and low operating cost. UV500 IMO can also be easily applied for open-loop, closed-loop or hybrid scrubber. The analyser is fully compliant with the MEPC 259(68) discharge criteria.

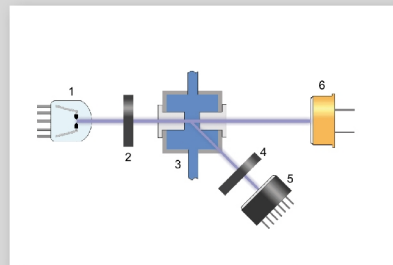
An UV-fluorescence module allows the measurement of PAH in terms of equivalent concentration of phenanthrene (PAHpheeq). Infra-red laser diode is used to monitor turbidity by nephelometry. Internal probes allow to monitor pH and temperature.

Thanks to its automatic cleaning system, the maintenance is roughly limited to a periodic refill of the inexpensive cleaning solution.

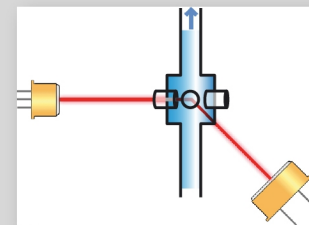
All the measurements are done within 5 seconds.

The UV source used for PAH measurement is a xenon flash lamp specified for 10^9 flashes that corresponds to more than 10 years of lifetime with one measurement every minute.

The infrared laser diode employed for turbidity complies with the ISO 7027:1999 standards.



UV fluorescence principle



Turbidity by laser diode principle

- 1: Xenon lamp,
- 2 : excitation filter,
- 3 : flow cell,
- 4 : emission filter,
- 5 : photomultiplier,
- 6 : reference photo detector.

Communication

The RS232 port supports the MODBUS protocol to transmit each measuring channel value to a SCADA system.

Additional parameters are available like status code, error code, calibration values and pumps run time.

Basic 4 – 20 mA output modules can be plugged on the main board for each measuring channel, in the limit of 12 modules. A USB port enables to download on any USB key the last 5000 recorded measurements as well as a diagnostic file containing the configuration and useful information for remote troubleshooting.

The recorded measurements file can be imported to Excel for graphs or other treatments.

The software of the analyser can be upgraded by connecting a USB key.

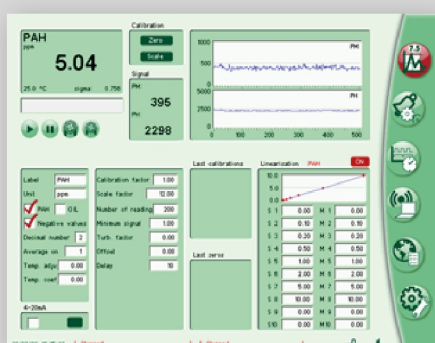


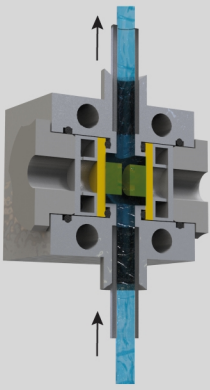
User-Friendly Interface

The large colour touch screen (10.4") and intuitive interface available in 9 different languages (Chinese, English, French, German, Hungarian, Italian, Portuguese, Spanish, Turkish) makes very easy to test or configure the analyser.

Many test functions allow to test and troubleshoot each element of the analysers (light signal, pump, solenoid valves, etc...) to set up quickly a maintenance diagnostic.

An acid resistant protection film on the screen assumes an efficient long-term protection.

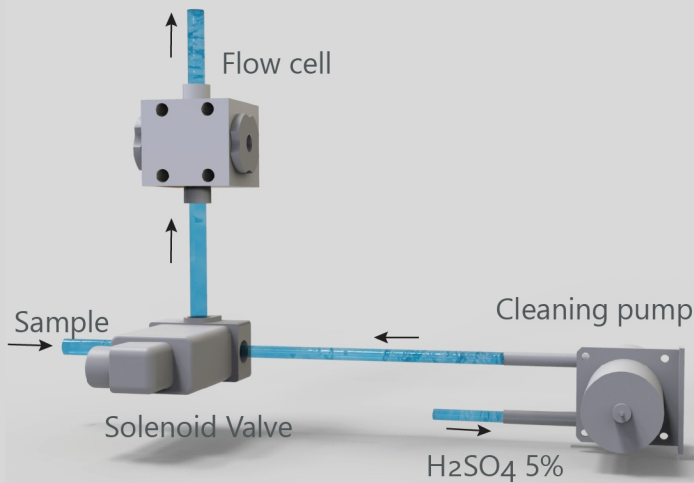




The patented flow cell allows to analyse very high level of suspended solids without clogging, making it suitable for industrial and municipal wastewater applications. The wetted parts of the flow cell make it also suitable for most corrosive samples. The design with two cylinders enables the water to go around them, avoiding suspended particles to agglomerate and interfere with the optical measurements.

Autocleaning

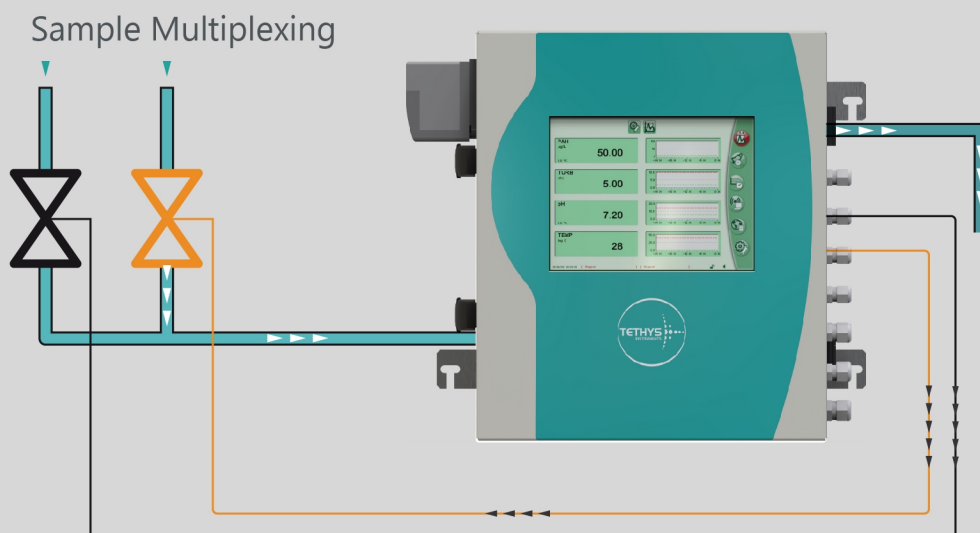
The analyser is designed to automatically clean itself including the pH probe with an adjustable time range, typically 24 hours, using sulfuric acid 5%. This autocleaning with sulfuric acid 5% proves to be more efficient than water or air autocleaning for dirty and oily samples. It prevents any clogging in the hydraulic circuit from heavily charged water samples. This autocleaning design enables uninterrupted measurements and low maintenance.



Autozeroing

Sulfuric acid has no absorbance in the UV-visible, making it an ideal component to measure the zero. At the end of each autocleaning cycle, the zero is performed on the sulfuric acid 5%. This frequency of zeroing is the key for successful measurements as it prevents any drift in the zero to occur.

Multiplexing System

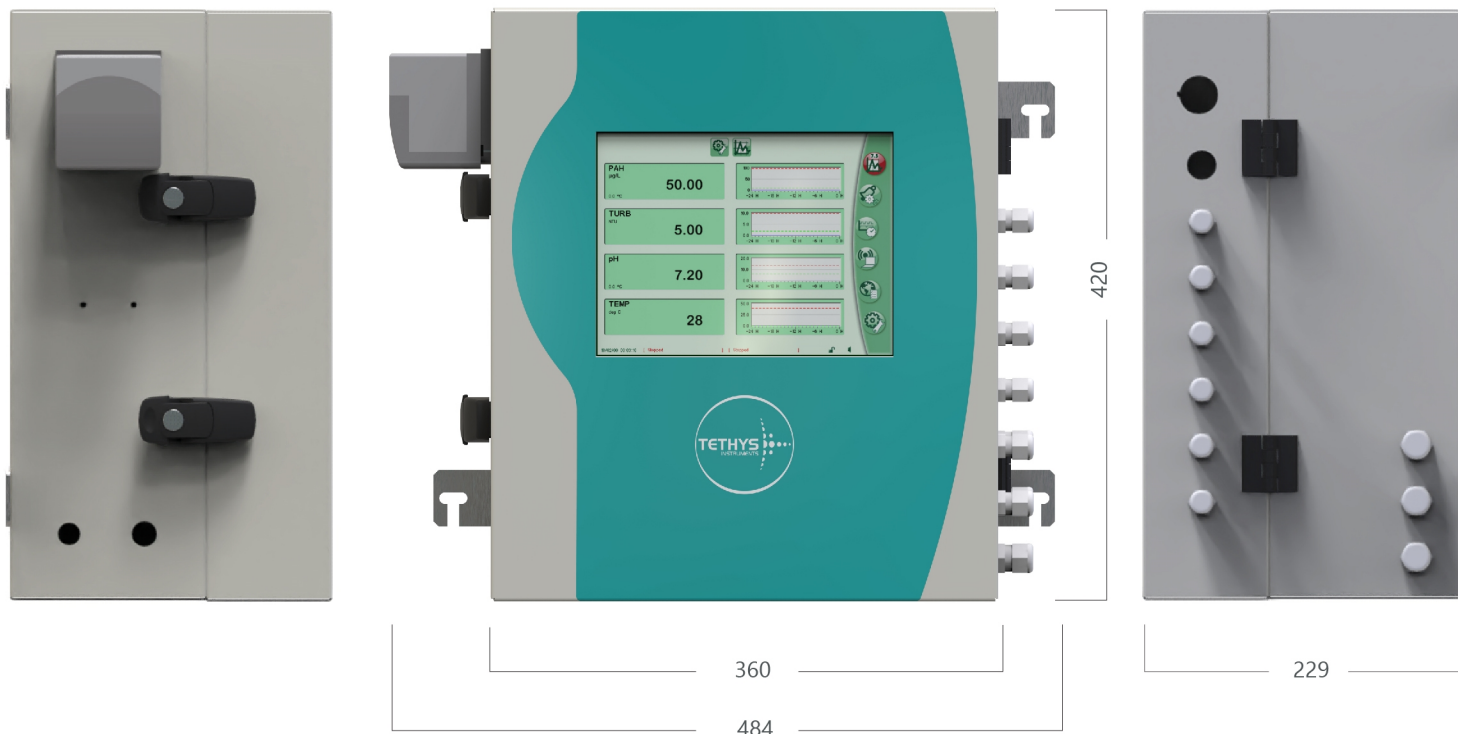


UV500 IMO can control two solenoid valves to select the inlet or the outlet of EGC system.

When different streams need to be analysed, an optional multiplexing system delivers relay contacts to control external electric-valves or external pumps.

The 8 parameters (PAH, Turbidity, Temperature, pH) for inlet and outlet water can be displayed at the same time on the screen.

> UV500 IMO Parameters Specifications



Parameter	Standard range Other ranges on request	Typical Repeatability	Accuracy On standard solution
PAH _{Pheeq}	0 - 1000 µg/L	± 15 µg/L For low values <10% FS ± 30 µg/L	± 3%
pH	0 - 14	± 0.01 pH	± 2%
Turbidity	0 - 100 NTU 0 - 1000 NTU	± 0.1 NTU ± 1 NTU	± 2% ± 2%
Temperature	0 - 80 °C	± 0.1 °C	± 2%

> UV500 IMO General Specifications

Sample flow	Recommended : 0 - 5 L/min
Sample pressure	0 – 4 bar (0-1 bar with sampling peristaltic pump)
Sample temperature	0 to 80 °C
Wet parts materials	Polypropylene, Polyethylene, PMMA, PEEK, FPM (Viton), Quartz, Compatible with sea water
Measuring time	5s
Measurement interval	1 min to 720 min
Memory	5000 lines of measurements (up to 16 channels) with date and time
Consumption	Cleaning solution (sulfuric acid 5%): 220 mL/day
Maintenance interval	Recommended : 6 months to 1 year (except for refilling)
Power supply	90 - 264 VAC / Maxi 100 VA / 50 – 60 Hz
Screen	10.4" Colour TFT LCD 640x480 pixels with LED backlight
Communication	RS232 with MODBUS protocol RS485 with MODBUS protocol USB
Certifications	CE, EN 61010-1, EN 61326
Enclosure	Stainless steel with epoxy coating, IP65, wall mounting brackets
Dimensions	360x420x229 mm (HxLxD)
Weight	23 kg
Marine type approval	DNV GL Statement of Compliance (Pending) Lloyd's Register (Pending) Bureau Veritas (Pending)

> UV500 IMO Parts references

Basic unit

UV500 IMO PAH (Poly-aromatic hydrocarbons)
Range: 0 – 1000 µg/L phenanthrene

Turbidity: Internal turbidity sensor
Low range: 0 - 100 NTU,
High range: 0 - 1000 NTU

pH: 0-14

Temperature: 0-80 °C

Color graphic display 640x480 pixels with touch screen
Built-in data logger, memory 5000 measurements for each parameter
12 sockets for input and output modules (not included, refer to options)
7 available glands for inputs / outputs
RS232 included (Sub-D 9 ways female connector) with 2 meters cable for PC
USB port integrated for USB key connection
Automatic cleaning system with 2-litres tank
Power supply 90-260 VAC 47-63 Hz with power cord 2 meters
Enclosure IP65/Nema3 360x420x229 mm (WxHxD) / 20 to 30 kg
Mounting lugs for wall

Sampling Pump

P Sampling peristaltic pump for unpressurized water
Built-it on the left side of the enclosure
flow of about 600 mL/min
discontinuing operating to increase tube lifetime

Output modules

OUT4-20-500 **4 – 20 mA output module**
Isolated 4 – 20 mA output
Active output, Max load 500 Ohm

RELAY500 **Relay module**
Contact rating: 2A / 220 V

Recommended consumables for 2 years :

P-ACI-HD1 : Head of cleaning pump (x1)
T-PHAR-1 : Tubing 6.4x9.6 mm for sampling pump
(x2 to x8 depending on sampling pump use)

Cleaning solution and reagents are not provided

Internal view of the analyser

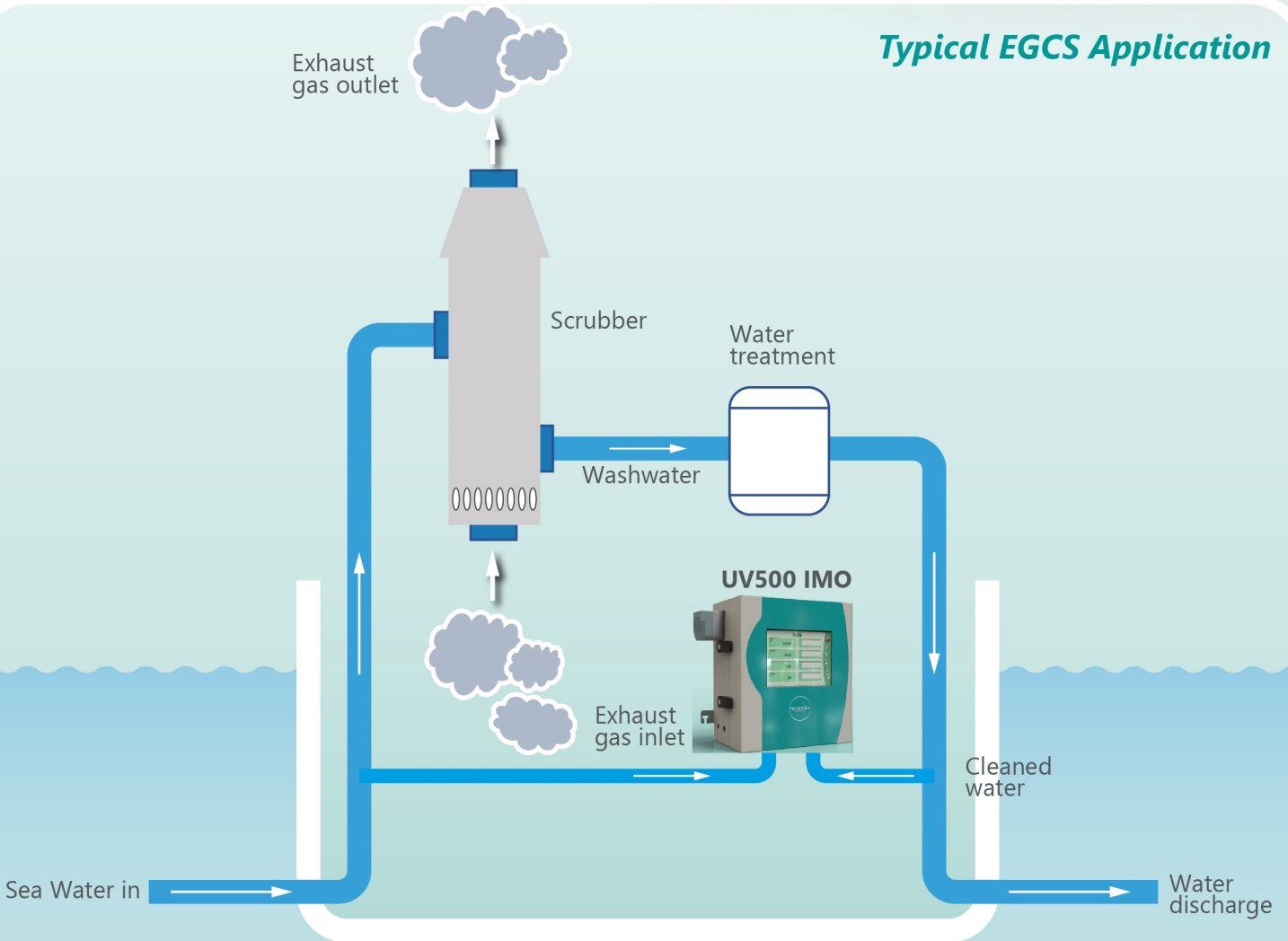
PAH Module

Turbidity Module

pH and Temperature Module



Typical EGCS Application



The manufacturer reserves the right to modify and/or change any specifications, dimensions, design or drawing at any time without prior notice

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Système de management
 ISO 9001:2015



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