UV500 ATEX

Online Water Analyser

TETHYS INSTRUMENTS

Specialist Of UV Spectroscopy

> UV500 ATEX Online Water Analyser

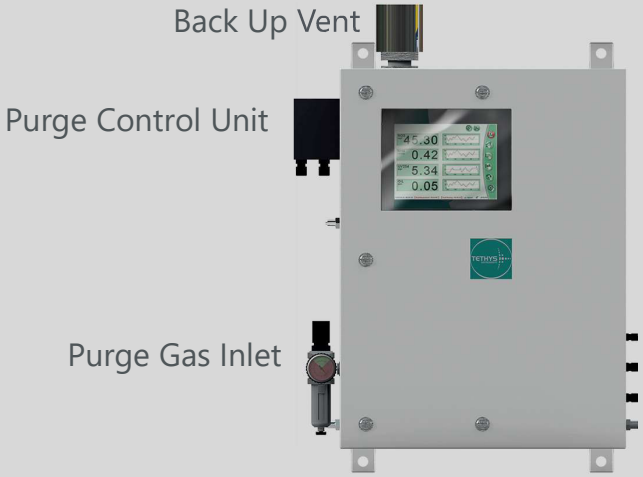
The UV500 ATEX, based on a modular concept, allows to monitor one or several parameters for process water, cooling water or waste water. The special enclosure and air purge system allows to use it on hazardous areas classified "Ex" like refineries and chemical plants.

Based on UV spectroscopy, well known for its stability and low operating cost, the UV500 ATEX can measure parameters like aromatics hydrocarbons (PAH), hydrogen sulphide, organic matter, ammonia. Each parameter corresponds to a specific optical module or software that can be selected by the user while ordering the analyser, depending on the application.

A colorimetric module allows the measurement of phosphate or chromium VI.
Probes can be added for physicochemical parameters like pH, ORP, dissolved oxygen and conductivity.

Thanks to its automatic cleaning system and its extremely long life time lamp, the maintenance is roughly limited to the periodic refill of the inexpensive cleaning solution and eventually reagents depending on the parameters.

TETHYS INSTRUMENTS



Ex pz protection according to ***EN94/9/EC***

The UV500 ATEX has a IP 65 stainless steel enclosure with an air purge system Ex pz to work on hazardous areas classified "zone 1 or Zone 2" where a risk of explosive atmosphere is present like refineries or chemical plants.
Two alarm contacts are provided if the pressure inside the enclosure drops below the adjustable setting points. This alarm can be used to switch off the power of the enclosure. The analyser is designed to work up to 60°C of ambient temperature to avoid the use of vortex cooler.
Depending on the certification needed a marking plate can be fixed on the enclosure with the marking below as an example :

II 3G Ex [pz] IIC T4

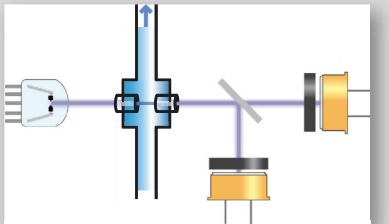
II : non-mining	3G : category 3 for Gaz	PZ : pressurised	IIA : propane	T1 : 450°C
	3D : category 3 for Dust		IIB : ethylene	T2 : 300°C
			IIC : Acetylene, hydrogen	T3 : 200°C
				T4 : 135°C
				T5 : 100°C
				T6 : 85°C

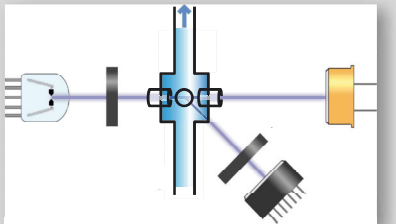
Note : IIC is more stringent than IIA or IIB
T4 is more stringent than T3

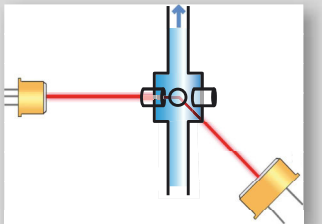
Main Method : ***UV-visible Spectroscopy***

- All the main measurements (PAH, H2S, UV254, NH4, PO4, Colour) are based on UV-VIS spectroscopy that brings fast and stable measurements with a simple hydraulic circuit for a high reliability.
- All the measurements are done within 5 seconds except H2S, NH4 and PO4 that require about 3 minutes.
- The UV source is a xenon flash lamp specified for 10^9 flashes that corresponds to more than 10 years of life time with one measurement every minute.

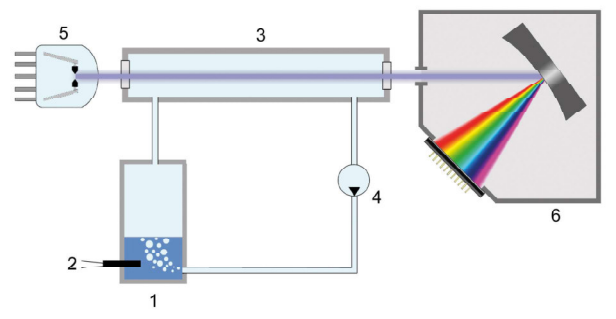

Patented clogging-free flow cell


UV double wavelength absorbance principle


UV fluorescence principle


Turbidity by laser diode principle

Hydrogen Sulphide and Ammonia : a ***UNIQUE method***



1: stripping pot, 2 : temperature probe, 3 : gas flow cell, 4 : gas pump, 5 : xenon flash lamp, 6 : spectrograph

The hydrogen sulphide and ammonia measurement are based on the UV absorption of the hydrogen sulphide gas or ammonia gas after a stripping phase.
Consequently, the turbidity or colour of the sample has absolutely no influence and measurements can even be carried on activated sludge.

The ammonia gas has a typical periodic absorption spectrum that is analysed using a fast Fourier transform (FFT) that brings an exceptional selectivity. No interference has never been reported after years of operation on many different applications.
A small quantity of hydrochloric acid is added to the sample for hydrogen sulphide, or NaOH solution for ammonia.

Low Maintenance *and* ***High Reliability***

The design has been specially oriented for low maintenance and high reliability on the measurements.

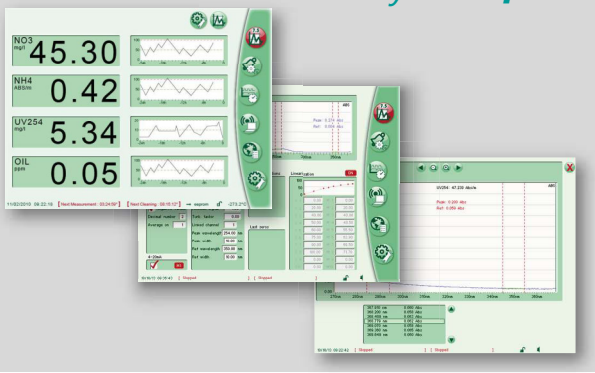
To avoid deposits on the optical windows and tubing, the UV500 ATEX has a built-in automatic cleaning system that injects a 5% sulphuric solution normally once day.
An auto-zero is performed at the same time to avoid any drift of the measurement.

The patented flow cell limit the risk of clogging inside the flow cell.

User-Friendly ***Interface***

The colour touch screen and intuitive interface available in 8 different languages (Chinese, English, French, German, Italian, Portuguese, Spanish, Turkish) makes very easy to test or configure the analyser.

Many test functions allows to test and troubleshoot each element of the analysers (light signal, pumps, solenoid valves, etc...) to setup quickly a maintenance diagnostic.



Communication

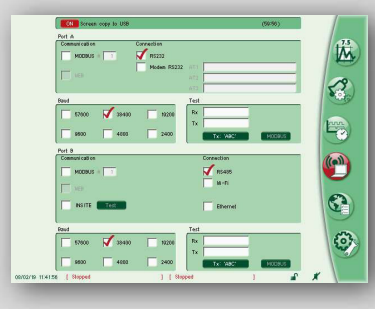
The RS232 port supports the MODBUS protocol to transmit each measuring channel value to a SCADA system.

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

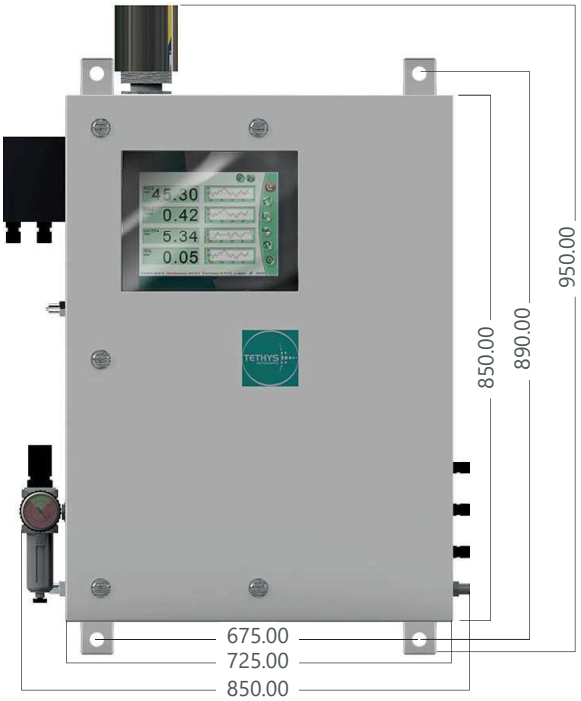
Basic 4-20 mA output modules can be plugged on the main board for each measuring channel, in the limit of 12 modules. A USB port enables to download on any USB key the last 5000 recorded measurements as well as a diagnostic file containing the configuration and useful information for remote troubleshooting.

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.



> UV500 ATEX Parameters Specifications



Parameter	Standard range Other ranges on request	Typical Repeatability for low values <10% FS	Accuracy On standard solution
UV254	0-200 Abs/m 0-600 Abs/m 0-2000 Abs/m	+/- 0.05 Abs/m +/- 0.15 Abs/m +/- 0.5 Abs/m	+/- 2%
COD by UV correlation	0-100 mg/l COD 0-2000 mg/l COD 0-20000 mg/l COD	+/- 0.05 mg/l COD +/- 1 mg/l COD +/- 10 mg/l COD	+/- 2%
BOD by UV correlation	0-100 mg/l BOD 0-1000 mg/l BOD 0-10000 mg/l BOD	+/- 0.05 mg/l BOD +/- 0.5 mg/l BOD +/- 5 mg/l BOD	+/- 2%
TOC by UV correlation	0-100 mg/l TOC 0-1000 mg/l TOC 0-10000 mg/l TOC	+/- 0.05 mg/l TOC +/- 0.5 mg/l TOC +/- 5 mg/l TOC	+/- 2%
Ammonia	0-100 mg/l NH4	+/- 0.2 mg/l NH4	+/- 5%
Nitrate	0-100 mg/l NO3	+/- 0.1 mg/l NO3	+/- 2%
Colour	0-100 pt/Co 0-1000 pt/Co	+/- 0.2 Pt-Co +/- 2 Pt-Co	+/- 2%
PAH (aromatics)	0-10 mg/l C6H6	+/- 0.01 mg/l C6H6	+/- 2%
Oil in water	0-100 ppm OIW 0-1000 ppm OIW	+/- 0.1 ppm OIW +/- 1 ppm OIW	+/- 2%
Phosphate	0-2 mg/l P-PO4 0-20 mg/l P-PO4	+/- 0.01 mg/l P-PO4 +/- 0.1 mg/l P-PO4	+/- 2%
Hydrogen sulphide	0-20 mg/l H2S	+/- 1 mg/l H2S	+/- 5%
Chromium VI	0-2 mg/l Cr VI	+/- 0.04 mg/l Cr VI	+/- 2%
Turbidity (TSS by correlation)	0-10 NTU 0-100 NTU 0-1000 NTU	+/- 0.01 NTU +/- 0.1 NTU +/- 1 NTU	+/- 2%
pH	0-14	+/- 0.01 pH	+/- 2%
ORP	+/- 2000 mV	+/- 1 mV	+/- 2%
Dissolved oxygen	0-25 mg/l O2	+/- 0.1 mg/l O2	+/- 2%
Conductivity	0-2000 µS	+/- 1 µS	+/- 2%
Temperatture	0-80°C	+/- 0.1 °C	+/- 2%

> UV500 ATEX General Specifications

Sample flow	Recommended : 0 - 5 l/min 0 - 0.5 l/min for NH4 or H2S
Sample pressure	0 - 4 Bar (0 - 1 Bar with sampling peristaltic pump) 0 - 0.5 Bar for NH4 or H2S
Sample temperature	0 - 80 °C 0 - 30 °C for NH4 or H2S
Wet parts materials	Quartz, Polypropylene, Polyethylene, FPM (viton), PMMA (+ pharmed and glass for NH4 or H2S)
Measuring time	5 sec (Except PO4, NH4, H2S, Cr(VI) : 3min)
Measurement interval	1 min to 720 min (Except PO4, NH4, H2S, Cr(VI) : 4min.)
Memory	5000 lines of measurements (up to 16 channels) with date and time
Consumption	Cleaning solution (5% sulfuric acid): 220 ml/day Reagent per measurement : 2 ml per measurement / NaOH 10% for NH4: 2 ml per measurement / HCl 10% for H2S: 2 ml per measurement / PO4 & Cr(VI) : 0.5ml per measurement
Maintenance interval	Recommended: 6 months to 1 year (except for refilling)
Power supply	100-240v AC 50/60 Hz 150 VA
Screen	Colour TFT LCD 640x480 pixels with LED backlight
Communication	RS232, Modbus RS485, Modbus USB
Certifications	CE, EN 61010-1, EN 61326
Enclosure	Stainless Steel IP65
Ambient Temperature	-20°C to 60°C
Dimensions	850 x 725 x 270 mm (HxLxD)
Weight	50 to 70 kg depending on the configuration

> UV500 ATEX Parts references

Basic unit

UV500 ATEX Basic unit (no measurement included)
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
RS485 included for communication with MODBUS protocol
USB port included 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/Nema4x stainless steel 316 850x725x270 mm (HxWxD) / 50 to 70 kg
Mounting lugs for wall
Type certification II 3G Ex [pz] IIC T4 (Consult us)

Sampling pump

P ***Sampling peristaltic pump for unpressurized water***
Built-in on the left side of the enclosure, Flow of about 600 ml/min
Discontinuous operating to increase tube lifetime

Spectrograph (required for UV254, COD, BOD, TOC, NO3, Colour, PO4, Cr VI, NH4 and H2S measurements)

SPECTRO500 ***UV-Visible spectrograph***
Range: 180 – 750 nm
Resolution 0.29 nm
2048 pixels

Absorbance flow cell and xenon lamp (required for UV254, COD, BOD, TOC, NO3, Colour, PO4, Cr VI measurements)

ABS500 ***Flow cell and xenon lamp for absorbance measurements***
Optical path: 1 or 3 or 10 mm
Lamp lifetime: 1 E 9 flashes
Wet materials: PMMA, Viton, Quartz

Configuration and calibration for measurements by absorbance (require SPECTRO500 and ABS500 modules)

COD-H-500 Organic matter high range
high range: 0 – 2,000 Abs/m
(equivalent to approx. 20,000 mg/l COD on municipal waste water)

COD-M-500 Organic matter Medium range
medium range: 0 – 600 Abs/m

COD-L-500 Organic matter low range
low range: 0 – 200 Abs/m
(equivalent to 100 mg/l COD on river water)

NO3-500 ***Nitrate***
Range: 0 – 100 mg/l NO3 (0 – 25 mg/l N of NO3)
Measurement possible until 250 mg/l NO3 (60 mg/l N-NO3)

CO-H-500 ***Colour high range***
Range: 0 – 1000 Pt-Co unit

CO-L-500 ***Colour low range***
Range: 0 – 100 Pt-Co unit

Measurement by UV fluorescence (required for PAH and OIW measurements)

PAH-500Poly-aromatic hydrocarbons
Range: 0 – 10 ppm phenol
Range: 0 – 100 ppm OIW
(equivalent to approx. 0 – 100 ppm oil with 10% aromatic ratio)

Measurement module by colorimetric method (require SPECTRO500 and ABS500 module)

PO4-H-500 Phosphate high range
High range: 0 – 20 mg/l P (60 mg/l PO4)
Sampling peristaltic pump included

CR6-500 Hexavalent chromium (VI)
Range: 0 – 2 mg/l Cr VI
Measurement possible until 5 mg/l Cr VI

PO4-L-500 ***Phosphate low range***
Low range: 0 – 2 mg/l P (6 mg/l PO4)
Sampling peristaltic pump included

Measurement by nephelometry

IRTURB-H-500 ***Internal turbidity sensor high range***
High range: 0 – 1,000 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

IRTURB-M-500 ***Internal turbidity sensor medium range***
Low range: 0 – 100 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

IRTURB-L-500 ***Internal turbidity sensor low range***
Low range: 0 – 10 NTU
Nephelometric method by laser diode at 650 nm (850 nm on request)

> UV500 ATEX Parts references

Measurements by optical method

DO-F — ***Dissolved oxygen probe by fluorescence***
Range: 0 - 25 mg/l O2
7 meters of cable

Measurement by UV absorption in gas phase

⚠ **The spectrograph option SPECTRO must be included**

STRIP500 — **Stripping system**
Include xenon lamp, flow cell, glassware, air pump, air filter and solenoid valve

NH4-500 — **Ammonia**
Range: 0 – 100 ppm NH4+

H2S-500 — **Hydrogen sulfide**
Range: 0 – 20 ppm H2S

Measurements by electrode (external)

PH500 — **pH/ORP module**
pH Range: 0 – 14
ATC input for platinum RTD 100 Ohm or 1000 Ohm
ORP Range: -2000 mV to +2000 mV

ELPH — **pH on-line electrode**
Range: 0 – 14
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

ELORP — **ORP on-line electrode**
Range: -2000 mV to +2000 mV
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

COND500 — **Conductivity module**
Range: 0 – 100 µS to 0 – 100 mS
ATC input for platinum RTD 100 Ohm

ELCOND — **Conductivity on-line electrode**
Range: 0 – 10 mS
Cell constant k=1.0 cm-1 (medium range)
5 meters of cable (10 meters in option)
Built-in ATC RTD 100 Ohm

ICOND — **Inductive conductivity online probe**
Range: 0 – 100 mS
3 meters of cable
Built-in temperature compensation at 2.2%/°C
Requires a IN4-20-500 module instead of COND500 module

Input modules

IN4-20-500 — **4-20 mA input module**
Isolated 4-20 mA input
Impedance: 100 Ohm

LOGIC500 — **Double logical inputs module**
Input no 1 : external pulse command for measurement
Input no 2 : measurements inhibition
Isolated 0 – 48 V DC inputs
Impedance: >10 Kohm

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/220V

Recommanded consumables for 2 years :

P-ACI-HD1 : Head of cleaning pump (x1)
P-RGT-HD1 : Head of reagent pump (x1) (only for NH4 or H2S)
T-PHAR-1 : Tubing 6.4x9.6 mm (if optional sampling pump) (x2 to x8 depending on sampling pump use)

Cleaning solution and reagents (if any) are not provided

TETHYS Instruments
57, Chemin du vieux Chêne, 38240 MEYLAN -France-

Tel : +33 4 76 41 86 39 - Fax : +33 4 76 41 92 27
Mail : sales@tethys-instruments.com
Web : www.tethys-instruments.com

IND#A - E.COM.21

CE RoHS