UV500
Online Water Analyser

Specialist Of UV Spectroscopy
It allows to monitor simultaneously many different parameters for waste water treatment plants or river monitoring stations with an excellent stability and low operating cost.

The same spectrograph can measure organic matter, nitrate, colour, turbidity, phosphate, ammonia and hydrogen sulphide. A complementary UV-visible fluorescence module allows the measurement of aromatics hydrocarbons (PAH). Nephelometric turbidity by visible or infra-red laser diode is also available.

The full UV-visible spectrum can also be used to monitor specific chemical process making the UV500 a ideal instrument for chemical plants. Different materials are available for the flow cell and hydraulic parts depending on the matrix chemical compatibility.

External probes can be added for physicochemical parameters like pH, ORP, dissolved oxygen, conductivity and turbidity.

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.
A 2048 pixels high resolution spectrograph scanning wavelengths from 180 nm to 750 nm is the master part of the UV500. Direct absorbance measurement for UV254, COD, BOD, TOC, NO3, Colour PO4 and Cr VI brings fast and stable measurements with a simple hydraulic circuit. Factory predefined or local multi-point calibration allows to get readings of COD, BOD and TOC under the UV alternative method for compatible applications. UV spectroscopy brings faster results than conventional methods like COD, BOD, TOC with much less maintenance once the correlation is determined.

An additional circuit allows the measurement of ammonia and hydrogen sulphide on the gas phase after a stripping step. This unique method allows measurements on extremely turbid or coloured samples like activated sludge as the gas phase is not affected. A fast Fourier transform (FFT) brings an exceptional selectivity and no interference has never been reported after years of operation on many different applications.

The patented flow cell allows very high level of suspended solid without clogging. The turbidity is automatically compensated by a dual-wavelength method.

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.

Physico-chemical measurements like pH, ORP, dissolved oxygen, conductivity can be added to the internal measurements by using external probes. The dissolved oxygen probe is based on fluorescence method for a lower maintenance and higher stability.

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.
When different streams need to be analysed, for example inlet and outlet of a plant, an optional multiplexing system delivers relay contacts to control external electric-valves or external pumps.

**Up to 6 different streams can be selected**

The measuring channels can be either duplicated (each one having its own 4-20mA output or MODBUS register), or measured sequentially to fit with the maximum of 16 measuring channels (a MODBUS register tells which stream is currently being measured).

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

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

**Sampling System**

*The UV500 can adapt to many different kind of sampling depending of the application: surface water, drinking water, process water or wastewater.*

If the water is already pressurized, the sample can be admitted directly inside the analyser with a maximal pressure of 4 bars. Otherwise an optional built-in peristaltic pump, synchronised with the measurement to extend the tubing life time, allows to take the sample directly from a tank located up to 6 meters below the analyser.

For demanding applications with long distances, another peristaltic pump in a separate enclosure is proposed as an option.

For some applications on river water or wastewater where two sampling pumps are necessary, the UV500 delivers a relay contact to synchronise the primary pump. The delay and running time of each pump can be adjusted easily in the parameters menu of the analyser.
## UV500 Parameters Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard range</th>
<th>Typical Repeatability</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Other ranges on request</td>
<td>for low values &lt;10% FS</td>
<td>On standard solution</td>
</tr>
<tr>
<td><strong>UV254</strong></td>
<td>0-200 Abs/m</td>
<td>+/- 0.05 Abs/m</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-600 Abs/m</td>
<td>+/- 0.15 Abs/m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-2000 Abs/m</td>
<td>+/- 0.5 Abs/m</td>
<td></td>
</tr>
<tr>
<td><strong>COD by UV correlation</strong></td>
<td>0-100 mg/l COD</td>
<td>+/- 0.05 mg/l COD</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-2000 mg/l COD</td>
<td>+/- 1 mg/l COD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-20000 mg/l COD</td>
<td>+/- 10 mg/l COD</td>
<td></td>
</tr>
<tr>
<td><strong>BOD by UV correlation</strong></td>
<td>0-100 mg/l BOD</td>
<td>+/- 0.05 mg/l BOD</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-1000 mg/l BOD</td>
<td>+/- 0.5 mg/l BOD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-10000 mg/l BOD</td>
<td>+/- 5 mg/l BOD</td>
<td></td>
</tr>
<tr>
<td><strong>TOC by UV correlation</strong></td>
<td>0-100 mg/l TOC</td>
<td>+/- 0.05 mg/l TOC</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-1000 mg/l TOC</td>
<td>+/- 0.5 mg/l TOC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-10000 mg/l TOC</td>
<td>+/- 5 mg/l TOC</td>
<td></td>
</tr>
<tr>
<td><strong>Ammonia</strong></td>
<td>0-100 mg/l NH4</td>
<td>+/- 0.2 mg/l NH4</td>
<td>+/- 5%</td>
</tr>
<tr>
<td><strong>Nitrate</strong></td>
<td>0-100 mg/l NO3</td>
<td>+/- 0.1 mg/l NO3</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>0-100 pt/Co</td>
<td>+/- 0.2 Pt-Co</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-1000 pt/Co</td>
<td>+/- 2 Pt-Co</td>
<td></td>
</tr>
<tr>
<td><strong>PAH (aromatics)</strong></td>
<td>0-10 mg/l C6H6</td>
<td>+/- 0.01 mg/l C6H6</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Oil in water</strong></td>
<td>0-100 ppm OIW</td>
<td>+/- 0.1 ppm OIW</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-1000 ppm OIW</td>
<td>+/- 1 ppm OIW</td>
<td></td>
</tr>
<tr>
<td><strong>Phosphate</strong></td>
<td>0-2 mg/l P-PO4</td>
<td>+/- 0.01 mg/l P-PO4</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-20 mg/l P-PO4</td>
<td>+/- 0.1 mg/l P-PO4</td>
<td></td>
</tr>
<tr>
<td><strong>Hydrogen sulphide</strong></td>
<td>0-20 mg/l H2S</td>
<td>+/- 1 mg/l H2S</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Chromium VI</strong></td>
<td>0-2 mg/l Cr VI</td>
<td>+/- 0.04 mg/l Cr VI</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Turbidity</strong></td>
<td>0-10 NTU</td>
<td>+/- 0.01 NTU</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-100 NTU</td>
<td>+/- 0.1 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-1000 NTU</td>
<td>+/- 1 NTU</td>
<td></td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>0-14</td>
<td>+/- 0.01 pH</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>ORP</strong></td>
<td>+/- 2000 mV</td>
<td>+/- 1 mV</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Dissolved oxygen</strong></td>
<td>0-25 mg/l O2</td>
<td>+/- 0.1 mg/l O2</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>Conductivity</strong></td>
<td>0-2000 μS</td>
<td>+/- 1 μS</td>
<td>+/- 2%</td>
</tr>
<tr>
<td><strong>External turbidity</strong></td>
<td>0-4 NTU</td>
<td>+/- 1% of reading or +/- 2 mg/l TSS</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-40 NTU</td>
<td>+/- 1% of reading or +/- 2 mg/l TSS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-400 NTU</td>
<td>+/- 1% of reading or +/- 2 mg/l TSS</td>
<td></td>
</tr>
<tr>
<td><strong>External TSS</strong></td>
<td>0-1500 mg/l TSS</td>
<td>+/- 1% of reading or +/- 2 mg/l TSS</td>
<td>+/- 2%</td>
</tr>
<tr>
<td></td>
<td>0-30000 mg/l TSS</td>
<td>+/- 1% of reading or +/- 2 mg/l TSS</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>0-80°C</td>
<td>+/- 0.1 °C</td>
<td>+/- 2%</td>
</tr>
</tbody>
</table>
### General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
</table>
| **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: 3 min)                                     |
| **Measurement interval**| 1 min to 720 min
Physicochemical parameters may be continuous                           |
| **Memory**             | 5000 lines of measurements (up to 16 channels) with date and time      |
| **Consumption**        | Cleaning solution (5% sulfuric acid): 220 ml/day
Reagent for PO4: 2 ml per measurement
NaOH 10% for NH4: 2 ml per measurement
HCl 10% for H2S: 2 ml per measurement                                    |
| **Maintenance interval**| Recommended: 6 months to 1 year (except for refilling)                  |
| **Power supply**       | 90 - 264 VAC 50/60 Hz 80 VA                                             |
| **Screen**             | Colour TFT LCD 640x480 pixels with LED backlight                        |
| **Communication**      | RS232 with MODBUS protocol
RS485 for external probes (DO, TSS)                                     |
|                        | USB
WI-FI (IEEE802.11B) optional
Ethernet (IEEE802.3) optional                                           |
| **Certifications**     | CE, EN 61010-1, EN 61326                                               |
| **Enclosure**          | Stainless steel with epoxy coating, IP65, wall mounting brackets        |
| **Dimensions**         | 525x345x260 mm                                                          |
| **Weight**             | 20 to 30 kg depending on the configuration                              |

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

**UV500**

*Basic unit (no measurement included)*
- Color graphic display 640x320 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 included for USB key connection
- Built-in data logger, memory 5000 measurements for each parameter
- Power supply 90-260 VAC 47-63 Hz with power cord 2 meters
- Enclosure IP65/Nema4x stainless steel 316 525x345x260 mm (HxWxD) / 20 to 30 kg
- Mounting lugs for wall

### 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

**P-EXT**

*External Peristaltic sampling pump for unpressurized water*
- Flow of about 940 ml/min
- Heavy duty brushless motor
- Discontinuous operating to increase tube lifetime

### Spectrograph

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

**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

(Require for PAH and OIW measurements)

**PAH-500**

*Poly-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

**PO4-L-500**

*Phosphate low range*
- Low range: 0 – 2 mg/l P (6 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

### 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-L-500**

*Internal turbidity sensor low range*
- Low range: 0 – 10 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)
### Measurements by optical method

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Range/Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DO-F</strong></td>
<td>Dissolved oxygen probe by fluorescence</td>
<td>Range: 0 - 25 mg/l O2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 meters of cable</td>
</tr>
<tr>
<td><strong>EXT-TURB-H</strong></td>
<td>Turbidity probes high range</td>
<td>High range: 0 – 30,000 mg/l TSS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 meters of cable</td>
</tr>
<tr>
<td><strong>EXT-TURB-L</strong></td>
<td>Turbidity probes low range</td>
<td>Low range: 0 – 1500 mg/l TSS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 meters of cable</td>
</tr>
</tbody>
</table>

### Measurement by UV absorption in gas phase

**WARNING:** 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
  - 5 meters of cable (10 meters in option)
  - Built-in ATC RTD 100 Ohm

#### ELPH
- pH on-line electrode
  - Range: 0 – 14
  - 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 an 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

#### LOGICS00
- 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

### Communications

#### WIFI500
- Wifi Interface
  - Connection to wireless WIFI network
  - Secured data transfer (WEP keys)

#### ETHER500
- Ethernet interface
  - Ethernet 10 base-T (IEEE 802.3)

#### MTI133
- Phone modem
  - Industrial modem 33,6 Kb/s V34+
  - DIN rail Mounting
  - Power supply 24V from the analyser

#### GSM
- GSM modem
  - Dual band (EGSM 900/1800 MHz)
  - Integral SIM card reader
  - R & TTE approved

### Recommended 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

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