

DATASHEET

DIGISENS RANGE

StacSense probe

UV Optical Technology for optimal measurements

- UV 254 spectral absorption without any reagents or consumables.
- Multi-parameter measurement: SAC₂₅₄, CODeq, TOCeq & BODeq, Turbidity eq
- **Modbus** RS-485 digital communication.
- Automatic Turbidity compensation.



Scope:

- Urban wastewater treatment: detecting organic load variations during input / treatment process / output.
- Treatment of industrial effluents
- Surface water monitoring
- Fish farming, aquaculture (freshwater)
- Drinking water: monitoring Organic matter in raw water, oxidation process, coagulation, activated carbon filtration.

The Spectral Absorption Coefficient (SAC) at 254 nm helps determine the Organic Content of a water sample but also the COD, TOC and BOD parameters by applying the appropriate correlation coefficients.

Measurement principle:

The StacSense probe uses UV absorption at 254 nm to measure organic compounds dissolved in water. This absorbance is correlated with the concentration of TOC, COD and BOD to provide a high-performance probe requiring no consumables.

A reference measurement at 530 nm is used to compensate for the presence of particles in the sample that also absorb UV light and to establish the Turbidity parameter.

The use of a state-of-the-art high-performance UV LED, combined with rigorous ignition management, offers an optimal variance of the signal.

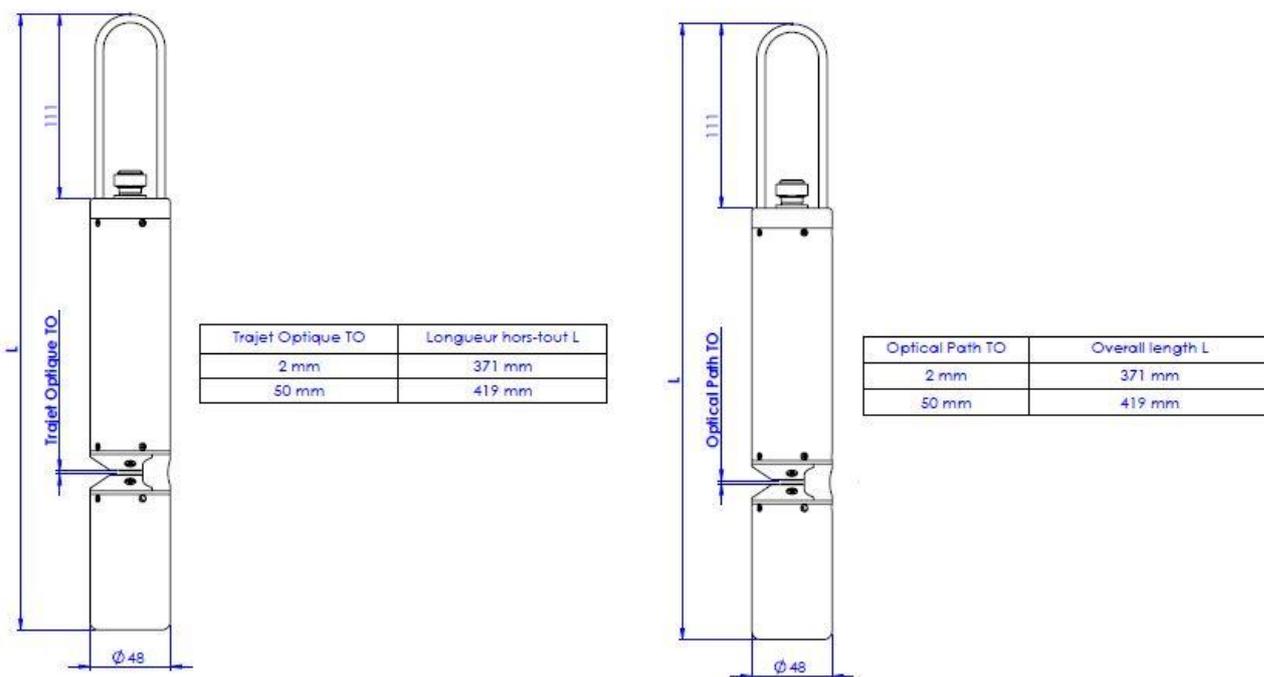
Digital Communication / Built-in Transmitter:

The StacSense sensor connects to any type of recorder, transmitter, remote management system or PLC using a **Modbus RS-485** input. As a result of sensor indexing, more than 200 sensors can be connected to a recorder.

Interference-proofing: pre-amplification built into the sensor and digital signal processing.

All calibration, history, user and measurement data are processed directly in the StacSense Probe and transmitted by a **Modbus RS-485** or SDI-12 link.

Mechanical perspective:



Technical Characteristics:

Measurements	
Measurement principle	UV 254 nm absorption
Compensation	Turbidity at 530 nm Internal temperature
Wave lengths	254 nm (turbidity correction at 530 nm)
Type of detector	Silicon Photodiode
Light sources	LED UV 254 +/- 5nm and 530 +/- 5 nm
Optical paths	2 and 50 mm
Measurement frequency	Maximum 1 measurement / 2s
Ingress Protection rating	IP68
Max. immersion depth	50 meters
Maximum pressure	5 bars
Operating temperature	0-40°C
Storage temperature	-10°C to +50°C
PH range	pH2 to pH12
Dimensions (D x L) (mm)	48x371 or 48x419 (see overall dimensions diagram)
Weight	1600 - 1800g depending on the optical path (cable not included)
Equipment	Body: Stainless steel 316 (1.4401) Optical windows: Fused Silicat (Corning 7980) Cable: Bare wire with polyurethane sheath Seals: Fluoroelastomer (FPM/FKM)
Cable	9 shielded conductors in 3, 7 and 15m. <i>Other lengths on request</i>
Signal interface	Modbus ¹ RTU (RS-485) / SDI12 ^{2,3} (TTL) ¹ Sensor mute in Modbus for up to 2s between the measurement request and the possibility to read the measurements or status ² Using SDI12, measurement result frame after up to 2s instead of the 850ms standard delay ^{1,2} The sensor responds in Modbus / SDI12 including when on Standby ³ The use and connexion of SDI12 bus may increase the standby power consumption* up to 40uA depending the level of the line (high or low). The consumption is not increased if the SDI12 line is disconnected or released to 0V (Modbus RTU only)
Sensor power supply	5.4 V ^{1,2} at 26 V ³ DC ¹ Absolute minimum 5.2 V with 1 m of cable ² Minimum voltage subject to cable length-related losses ³ 28.0 V absolute maximum
Typical consumption at 5.4 V	Automatic standby less than 10 µA* (54 µW) Maximum peak current: 600 mA (2 ms) Maximum current during the measurement: 100 mA (540 mW) Average current during the measurement: 70 mA (378 mW) Average current (1 measurement / 2s): 35 mA (189 mW) Energy for 1 measurement (1.5 s): 158 µWh
Typical consumption at 12 V	Automatic standby less than 10 µA* (120 µW) Maximum peak current: 400 mA (1.5 ms) Maximum current during the measurement: 70 mA (840 mW) Average current during the measurement: 60 mA (720 mW) Average current (1 measurement / 2s): 30 mA (360 mW) Energy for 1 measurement (1.5 s): 300 µWh
Typical consumption at 24 V	Automatic standby less than 10 µA* (240 µW) Maximum peak current: 300 mA (1 ms) Maximum current during the measurement: 65 mA (1560 mW) Average current during the measurement: 50 mA (1200 mW) Average current (1 measurement / 2s): 25 mA (600 mW) Energy for 1 measurement (1.5 s): 500 µWh

EMC compliance:	NF EN 61326-1: 2013-05 RS-485 Modbus RTU & SDI12
	¹ The sensor is qualified for standard use with a dedicated cable including power supply and communication lines specific to the sensor network. ² When connected to a DC power supply network separated from the RS485 communication lines; additional shielding must be used on the system to protect the sensors from shock waves from an impact.
Warranty	2 years

Measurement Ranges – Optical Path

Op.T	Parameters	Measurement range *	Units	Resolution	Detection limit	Quantification limit	Accuracy **	Application
2 mm	SEC ₂₅₄	0-750	Abs/m	0.01 to 0.01	1.7	5	1 or +/-3%	Wastewater
	COD _{eq}	0-1300	mg/L	0.01 to 1	3	9	2 or +/-3%	
	BOD _{eq}	0-350	mg/L	0.01 to 0.01	1	3	1 or +/-3%	
	TOC _{eq}	0-500	mg/L	0.01 to 0.01	1.5	4	1 or +/-3%	
	Turbidity eq	0-500	FAU	0.01 to 0.01	1.5	5	5 or +/-5%	
50 mm	SEC ₂₅₄	0-30	Abs/m	0.01	0.20	0.3	0.1 or +/-3%	Drinking Water
	COD _{eq}	0-50	mg/L	0.01	0.15	0.6	0.2 or +/-3%	
	BOD _{eq}	0-15	mg/L	0.01	0.10	0.2	0.1 or +/-3%	
	TOC _{eq}	0-20	mg/L	0.01	0.10	0.2	0.1 or +/-3%	
	Turbidity eq	0-40	FAU	0.01	0.40	1.2	1.0 or +/-7%	

Performance levels obtained under laboratory conditions (controlled temperature and stirring, aqueous solutions of KHP)

* Optical path 2 and 50mm, Linearity: > 0.99 on the given range.

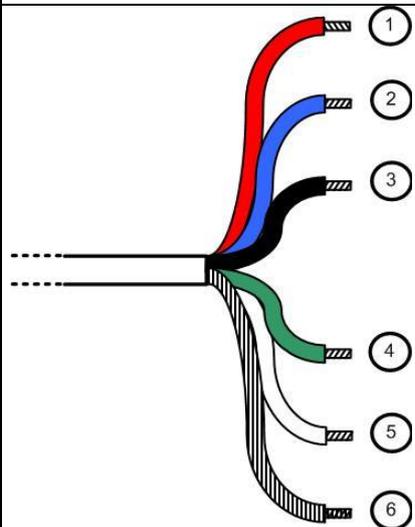
** Highest value

Never exceed a voltage of 10VDC (absolute maximum rating) on communication lines RS485, A or B, under penalty of irreversible destruction of the transceiver component RS 485.

SDI-12: respect the voltage value described in the associated standard (nominal: 5 VDC)

Always connect ground + shield first.

Electrical connections



Cable length from 15 to 100 m

RED YELLOW ORANGE PURPLE PINK	Power Supply, V+
2 - Blue	SDI-12
3 - Black	Weight
4 - Green	B "RS-485"
5 - White	A "RS-485"
6 - Green/yellow	Cable shielding

Connect wires 3 and 6 together

Cable length up to 15m

1 - Red	Power Supply, V+
2 - Blue	SDI-12
3 - Black	Weight
4 - Green	B "RS-485"
5 - White	A "RS-485"
6 - Green/yellow	Cable shielding

Connect wires 3 and 6 together