WATER QUALITY MONITORING / DATA SHEET

SS300-01

Multiparameter Water Quality Sonde

Modular online sonde for simultaneous multi-parameter water-quality monitoring with automatic digital-sensor recognition, RS485 / Modbus RTU and optional wiper.

6 + 1	IP68 / <10 m	RS485	12-24 VDC
Sensor positions + wiper	Ingress / max. depth	Modbus RTU interface	Power input

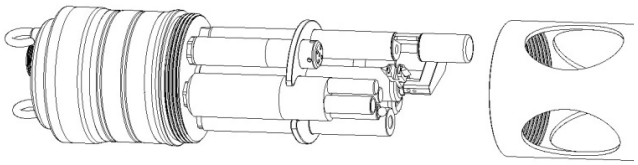
Introduction

The SpeSense SS300-01 is a second-generation online multiparameter water-quality sonde designed to collect data from multiple digital sensors in one platform. Up to six measurement sensors and one wiper can be installed at the same time. Each sensor uses optical, physical or electrochemical measurement principles and is automatically identified by the sonde.

Key Advantages

- Universal modular platform with uniform sensor connection
- Up to six digital sensors plus one wiper
- Automatic sensor recognition
- Sensor calibration parameters stored in each digital sensor
- RS485 and Modbus RTU communication
- Low-power operating mode
- Water-leakage alarm and port communication diagnostics
- Independent sensor architecture limits cross-impact from a failed sensor

Sonde Architecture



PERFORMANCE

Technical Specifications

Item	Specification
Interface	IP68 connector; RS485; Modbus RTU protocol
Operating Temperature	0-45 °C
Storage Temperature	-10-50 °C
Power	12-24 V DC
Power Consumption	20-120 mA @ 12 V depending on sensors/wiper; <3 mA @ 12 V in low-power mode
Leakage Alarm	Supported
Wiper	Supported
Warranty	1 year, except consumable parts
IP Rating	IP68; <10 m
Materials	316L stainless steel and POM
Dimensions	Ø106 × 376 mm
Flow Rate	< 3 m/s

Item	Specification
Accuracy / Range / Response Time	Refer to installed digital sensor specification; sensor response time 2-45 s
Lifetime*	Refer to installed digital sensor specification
Maintenance / Calibration Frequency*	Refer to installed digital sensor specification

Note: *Field life and calibration frequency depend on site conditions.

INTERFACE

Default Communication Settings

Setting	Default
Baud rate	9600, 8N1
Data format	32-bit IEEE 754 floating-point value, little-endian
Default Modbus address	0x01

DIGITAL INTERFACE

RS485	Modbus RTU	32-bit float
Physical interface	Communication protocol	IEEE 754 data

MODBUS

Register Map - System & Measurement Data

Address	Length	Type	Access	Description
0x0009	4	Char	R	SN number, e.g. V1603021
0x000E	1	UShort	R/W	MODBUS address; default 0x01
0x0012	1	UShort	R/W	Baud rate: 0-1200; 1-4800; 2-9600 (default); 3-19200; 4-38400; 5-115200
0x0014	1	UShort	R	Sonde alarm; low byte: leakage / supply voltage; high byte: node communication status
0x001A	1	UShort	R/W	Wiper interval, minutes; default 60
0x0605	1	UShort	R/W	Float format: 0-DCBA; 1-BADC; 2-CDAB; 3-ABCD (default, little-endian)
0x0030	2	Float	R	Temperature, °C
0x0032	2	Float	R	DO, mg/L
0x0034	2	Float	R	DO, % saturation; e.g. 0.72 = 72% Sat.
0x0036	2	Float	R	Turbidity, NTU
0x0038	2	Float	R	Conductivity, mS/cm
0x003A	2	Float	R	Chlorophyll a, µg/L
0x003C	2	Float	R	BGA, µg/L
0x003E	2	Float	R	CDOM, ppb or µg/L
0x0040	2	Float	R	Oil in water, ppb or mg/L (reserved)
0x0042	2	Float	R	COD, mg/L
0x0044	2	Float	R	TOC, mg/L (calculated from COD)
0x0046	2	Float	R	SAC, Abs/m
0x0048	2	Float	R	BOD, mg/L (calculated from COD)
0x004A	2	Float	R	pH
0x004C	2	Float	R	ORP, mV

MODBUS

Register Map - Additional Measurement Data

Address	Length	Type	Access	Description
0x004E	2	Float	R	NH4+, mg/L
0x0050	2	Float	R	K+, mg/L
0x0052	2	Float	R	NH4-N, mg/L; calculated from temperature, pH and NH4+
0x0054	2	Float	R	NH3, mg/L; calculated from temperature, pH and NH4+
0x0056	2	Float	R	Inside humidity; e.g. 77.8 = 77.8%
0x0058	2	Float	R	Salinity, ppt; calculated from conductivity

Address	Length	Type	Access	Description
0x005A	2	Float	R	Suspended solids, mg/L; calculated from turbidity
0x005C	2	Float	R	Transparency, cm; calculated from turbidity
0x005E	2	Float	R	Water depth, m; external air-pressure compensation is recommended
0x0060	2	Float	R	Pressure, kPa
0x0062	2	Float	R	NO3-N nitrate, ppm
0x0064	2	Float	R	Total nitrogen (TN), ppm
0x0082	1	Float	R	Sonde power voltage, V

CALIBRATION

User-Calibration Registers

Parameter	Register Pair	Function
DO	0x008C / 0x008E	Slope K / Offset B; default K=1.0, B=0
Turbidity	0x0090 / 0x0092	Slope K / Offset B; default K=1.0, B=0
Conductivity	0x0094 / 0x0096	Slope K / Offset B; default K=1.0, B=0
Chlorophyll a	0x0098 / 0x009A	Slope K / Offset B; default K=1.0, B=0
BGA	0x009C / 0x009E	Slope K / Offset B; default K=1.0, B=0
CDOM	0x00A0 / 0x00A2	Slope K / Offset B; default K=1.0, B=0
COD	0x00A8 / 0x00AA	Slope K / Offset B; default K=1.0, B=0
pH	0x00AC / 0x00AE	Slope K / Offset B; default K=1.0, B=0
ORP	0x00B0 / 0x00B2	Slope K / Offset B; default K=1.0, B=0
NH4+	0x00B4 / 0x00B6	Slope K / Offset B; default K=1.0, B=0
K+	0x00B8 / 0x00BA	Slope K / Offset B; default K=1.0, B=0
NH4-N	0x00BC / 0x00BE	Slope K / Offset B; default K=1.0, B=0
Depth	0x00C0 / 0x00C2	Slope K / Offset B; default K=1.0, B=0
Pressure	0x00C4 / 0x00C6	Slope K / Offset B; default K=1.0, B=0
NO3-N	0x00C8 / 0x00CA	Slope K / Offset B; default K=1.0, B=0
Total nitrogen (TN)	0x00CC / 0x00CE	Slope K / Offset B; default K=1.0, B=0

DIAGNOSTICS

Alarm Definitions

Code	Condition
0x02 (low byte)	Inside humidity above 50% - leakage alarm
0x80 (low byte)	Supply voltage outside 8-26 V
0x01-0x20 (high byte)	Communication failure on sensor ports 1-6
0x40 (high byte)	Wiper communication failure

INTEGRATION

Operating & Calibration Notes

- Do not access registers not listed in this document.
- Normal flow: power on → delay 50 ms → read SN (optional) → delay 2 s or longer → read sensor data. Do not combine discontinuous addresses in one frame.
- Read and write user-calibration data in ONE frame.
- User calibration follows Y = K × x + B, where x is raw data, K is calibration slope, B is offset and Y is the corrected reading.
- When K=1 and B=0, the corrected reading equals the raw reading.

CALIBRATION REFERENCE

Recommended Standards & Handling

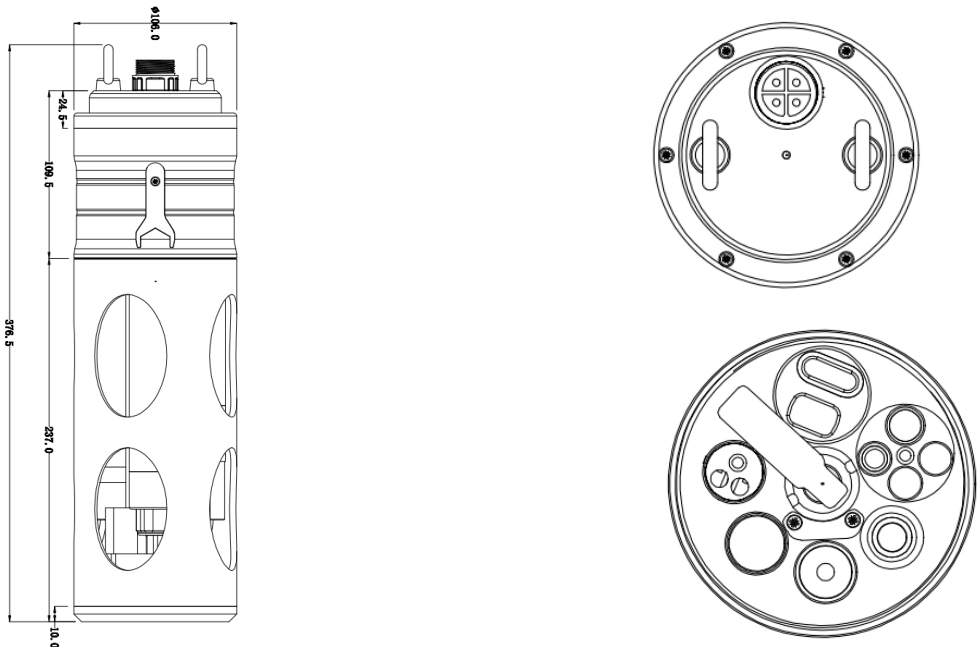
Parameter	Reference Guidance
Conductivity	Use standards above 1 mS/cm for best stability; 1.413 mS/cm or 12.88 mS/cm is recommended. Remove bubbles and allow temperature equilibration.
Dissolved Oxygen	Calibrate in saturated air or saturated water; zero-oxygen solution may be prepared with approximately 2 g/L sodium sulfite.
pH	Use appropriate buffers such as pH 4.0, 7.0 and 9.0. Keep the glass bulb immersed by at least 1 cm and remove bubbles.
Turbidity	Use the same type of standard at all calibration points; formazin is specified as the reference standard. Keep the optical window clean and remove bubbles.
Chlorophyll a	Use bubble-free DI water for zero. Rhodamine B is described as the reference solution in the source procedure; protect standards from light.
ISE - NH4 / NO3	Use ammonium chloride for ammonium and potassium nitrate for nitrate. Match sensor and

Parameter	Reference Guidance
	solution temperature and use gentle stirring.
COD	Use bubble-free DI water for zero and potassium hydrogen phthalate (KHP) as the reference standard.

MECHANICAL

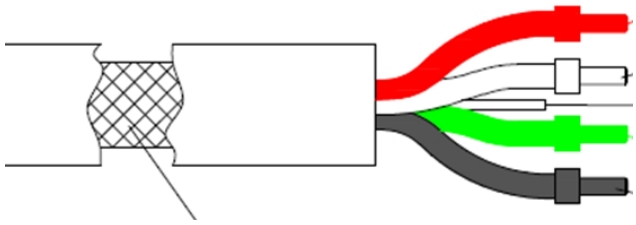
Outline Dimensions

Unit: mm | Tolerance: ±0.5 mm



INSTALLATION

Cable Wiring



Wire	Function
Red	VCC
White	RS485-B
Bare	Shielding
Green	RS485-A
Black	GND

DEPTH / PRESSURE

Depth Calculation Reference

The depth sensor uses an absolute, non-vented pressure sensor. Accurate depth calculation may require the measurement-point pressure together with surface atmospheric pressure, water temperature, salinity/conductivity and latitude.

Method 1: D = (X1 - X2) × 0.1019726, where X1 = sonde pressure (kPa) and X2 = external atmospheric pressure (kPa).

Method 2: D = X1 - (X2 - 101.31) × 0.1019726, where X1 = sonde water-depth reading (m) and X2 = external atmospheric pressure (kPa).

COMPATIBLE MODULES

Digital Water-Quality Sensors

Sensor / Parameters	Principle	Range	Accuracy	Resolution
pH / ORP / K+ / NH4-N / NO3-N / TN	Electrode	pH 0-14; ORP -999 to +999 mV; NH4-N 0.5-1000 mg/L; K+ 0.5-1000 mg/L; NO3-N 0.15-1000 ppm	pH 0.2; ORP ±20 mV; ISE 5% FS or 2 ppm*	pH 0.01; ORP 0.1 mV; ISE 0.01 mg/L
UV254 COD	UV absorption 254 / 550 nm	0.15-100 mg/L (KHP)	R^2 > 0.999; 5% FS	0.01 mg/L
Dissolved Oxygen / Temperature	Fluorescence	DO 0-20 mg/L or 0-200% Sat.; 0-45 °C	0.3 mg/L; 0.3 °C	0.01 mg/L; 0.1% Sat.; 0.01 °C
Conductivity / Temperature / Salinity / TDS	C22 + PEEK cell	1 µS/cm-100 mS/cm; salinity 0-70 ppt; temperature 0-50 °C	1% FS; 0.2 °C	0.0001 mS/cm; 0.01 °C
Turbidity / SS / Transparency	90° scattering	0.3-100 / 0.3-1000 / 1-4000 NTU;	3% FS	0.01 NTU

Sensor / Parameters	Principle	Range	Accuracy	Resolution
		SS 0-2000 mg/L; transparency 2-100 cm		
Chlorophyll a	Fluorescence	0.15-400 µg/L	$R^2 > 0.999$	0.01 µg/L
Blue-green Algae / Phycocyanin	Fluorescence	0.15-100 µg/L or 0-100 RFU	$R^2 > 0.999$	0.01 µg/L
CDOM / fDOM	Fluorescence, UV360 source	0.15-300 ppb QSU	$R^2 > 0.999$	0.01 ppb
pH / ORP	Electrode	pH 0-14; ORP -999 to +999 mV	pH 0.2; ORP ±20 mV	0.01 pH; 0.1 mV
Pressure / Depth	Non-vented 316L	0-10 m default; 0-100 m	0.5% FS	0.01 m

* w.i.g. = whichever is greater. Available ranges depend on the installed sensor module.

ORDERING REFERENCES

Sensor Part Numbers

Part Number	Sensor / Accessory
PN 620911	pH / ORP / K+ / NH4
PN 628010	pH / NH4+ / NO3-
PN 610813	UV254 COD
PN 610114 / 610115	Optical DO
PN 630314	Conductivity
PN 610211 / 610211-1 / 610211-2	Turbidity
PN 610511	Chlorophyll a
PN 610611	BGA
PN 611011	CDOM / fDOM
PN 620413-P / 620413-O	pH / ORP
PN 636910	Pressure / depth
PN 741621	Digital wiper

SERVICE

Maintenance Schedule

Sensor	Clean*	Clean**	Check humidity	Replace O-ring	Calibration	Consumable
Optical DO	1-4 days	4-8 weeks	6 months	12-24 months	6 months	24-36 months
Conductivity	4-8 weeks	4-8 weeks	6 months	12-24 months	6 months	No consumable part
Turbidity	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Chlorophyll a	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
BGA	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
NH4-N / NO3-N	0.5-3 days	4-8 weeks	6 months	12-24 months	2-3 weeks	3-6 months
pH	0.5-3 days	4-8 weeks	6 months	12-24 months	4-8 weeks	6-12 months
UV254 COD	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Oil in water	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
CDOM/fDOM	0.5-3 days	4-8 weeks	6 months	12-24 months	3 months	No consumable part
Wiper	4-8 weeks	4-8 weeks	NA	18 months	NA	18 months***

Maintenance Notes

- * Without wiper system.
- ** With wiper system.
- *** Dynamic sealing parts.
- The O-ring between sensor and wiper must be replaced every 12 months.
- Field life and calibration frequency depend on site conditions.

CONFIGURATION

Ordering Information

Part Number	Description
PN 941621	SS300-01 sonde body
PN 741621	Digital wiper
PN 810001-xx	PUR cable; xx = cable length in meters
Sensor modules	Refer to the compatible sensor part-number table in this data sheet

CONTACT / SUPPORT

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