



## TROLL® 9500 Multiparameter Instrument



The powerful, portable TROLL 9500 Water Quality Instrument is designed for groundwater and surface water monitoring. The unit houses up to nine water quality sensors, internal power, and optional data logger.

### Lower Total Cost of Ownership

- Save time and money with long-lasting internal power, automated low-flow sampling, remote access with telemetry, and more.
- Reduce maintenance and site visits—Field-proven sensors and antifouling system withstand harsh conditions.
- Deploy corrosion-resistant sonde in fresh, waste, and marine waters.

### Reliable, Accurate Operation

- Maintain and calibrate field-replaceable sensors quickly.
- Simplify data collection and management with Win-Situ® 4 Software.
- Get proven performance—Rigorous third-party testing shows that the TROLL 9500 delivers consistent results. Sensors are factory calibrated with NIST®-traceable standards (where applicable).

### Outstanding Customer Service

- Get free, 24/7 technical support.
- Receive guaranteed 7-day service for routine maintenance and sensor calibrations.

### Logging Models

- **LTS**—LTS stands for “Level, Temperature, and one additional Sensor,” such as conductivity, dissolved oxygen (DO), or pH.
- **Professional**—Offers the highest value for most applications. Allows for several sensors—conductivity/salinity, DO, ORP, pH, temperature, or depth.
- **Professional XP**—The most capable TROLL 9500 offers features available on the Professional and supports XP or “Extended Parameter” sensors—turbidity, ammonium, chloride, or nitrate.

### Non-Logging Models

- **Profiler**—Ideal for water quality sampling or profiling. Similar to the Professional, but does not include memory or logging capabilities. Data can be logged to a RuggedReader® Handheld PC or laptop.
- **Profiler XP**—Offers the same features as the Profiler with the option to use XP sensors.

## Applications

- Coastal deployments—estuaries and wetlands
- Environmental monitoring and spot checking
- Low-flow groundwater sampling
- Remediation and mine water monitoring
- Stormwater management
- Vertical profiling

# TROLL® 9500 Water Quality Sensors

## Customize Your TROLL 9500 Instrument



Choose from the following field-ready sensors. The selected sensor set will determine whether the TROLL 9500 has a sub-2" or sub-4" diameter.

- **Barometric pressure**—Use this sensor to compensate water level and DO values.
- **Conductivity**—Characterize water quality in actual conductivity, specific conductivity, salinity, TDS, or specific gravity.
- **DO**—Choose from the optical Rugged Dissolved Oxygen (RDO®) Sensor or Clark cell.
- **Level/Pressure**—Receive guaranteed accuracy. Non-vented and vented sensors are available for several ranges.
- **Nutrients**—Choose from ion-selective electrodes for ammonium, chloride, or nitrate.
- **pH or pH/ORP**—Extend field use with durable sensors. The re-buildable pH sensor outlasts traditional sensors.
- **Temperature**—Compensate conductivity, DO, pH, and nutrient data with this fast, accurate sensor.
- **Turbidity or Turbidity/Level**—Comply with ISO standards. The turbidity sensor uses ISO 7027 method. An optional wiper is available. Use at high-fouling sites or for lengthy deployments.

## RDO Optical DO Sensor—Now EPA-Approved

Breakthrough RDO technology surpasses Clark cell performance by eliminating hydration effects, membranes, electrolyte solution, and stirring requirements. After third-party testing, the EPA recommended approval to RDO methods under the Alternate Test Procedure process.

- **Rugged performance**—Wiper-free sensor excels in demanding environments. Abrasion-resistant foil withstands fouling, high sediment loads, and rapid flow rates. No photobleaching effects.
- **Automatic setup**—RDO Cap with pre-loaded calibration coefficients simplifies setup and eliminates programming errors.
- **Accurate results**—Operates with low drift over long-term deployments. Excels in hypoxic conditions. Responds quickly and maintains stable response.
- **Long-lasting calibration**—Deploys for several months if sensor fouling is minimal and if the foil is not damaged or removed.
- **Minimal interferences**—Sensor eliminates “poisoning” by sulfides, sulfates, and hydrogen sulfide. No cross-sensitivity to carbon dioxide, ammonia, pH, or chloride.
- **Fast response**—Ideal for vertical profiling and dynamically changing conditions. Withstands “thermal shocking.”



# TROLL® 9500 Accessories



## TROLL® Shield Antifouling System

Extend instrument deployments in coastal environments and at high-fouling sites with the TROLL Shield Guard. The guard combats biofouling and extends instrument deployments by up to six weeks.

## DO Field Bubbler Kit

Minimize calibration setup with the DO bubbler kit. With air-saturated water calibrations, you'll get accurate results.

## Calibration Solutions

From easy-to-use Quick Cal Check solution to NIST®-traceable standards, In-Situ supplies calibration solutions required to get accurate results. Call for details or visit [www.in-situ.com](http://www.in-situ.com).

## RuggedCable® Systems, Reels, & Well Accessories

RuggedCable Systems endure harsh environments and last for years. Titanium twist-lock connectors and Kellems® grip are included. Vented or non-vented cable is available in either Tefzel® or polyurethane. Order customized lengths up to 1,219 m (4,000 ft). Steel or plastic reels make deployment of long cables manageable. Ask about our well-docking accessories.





# Real-Time Monitoring for Remediation



## Conduct ISCO, ISCR, Biosparging, Air Sparging & More

The TROLL® 9500 Instrument supports real-time measurement of physical and chemical parameters, which allows for a dynamic work strategy per the EPA Triad Approach to site remediation. You can adapt to changing conditions as new data becomes available and complete projects more quickly and at a lower cost than when using traditional approaches. The TROLL 9500 Instrument:

- Monitors performance indicators in real-time
- Deploys in harsh conditions—Corrosion-resistant housing suitable for many remediation applications
- Reduces grab sampling and labor costs while improving safety when working with treatment chemicals
- Features sub-2" configuration for key parameters—DO with the RDO® Sensor, conductivity, pH/ORP, temperature, and barometric pressure
- Improves performance and reduces maintenance when deployed with the RDO Sensor
- Provides remote data access via the TROLL® Link Telemetry System



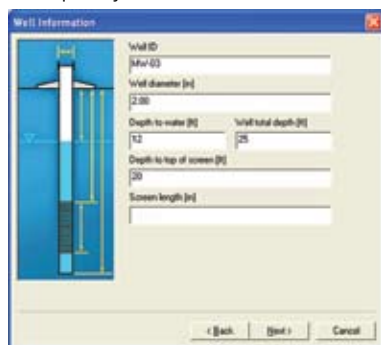
## TROLL® 9500 Low-Flow Sampling System

You can use the TROLL 9500 System with Flow-Sense Software to conduct low-flow purging and sampling. You will collect representative samples, minimize contaminant volatilization, and reduce hazardous waste disposal. The system:

- Automates collection of well and pumping information
- Monitors and records stabilization of key water quality parameters
- Automatically generates defensible calibration and sample reports that conform to federal and regional regulations
- Maximizes efficiency in the field
- Eliminates transcription time and errors

### Automate Test Setup

Flow-Sense Software retains all project information—well data, pump performance specifics, tubing details, pumping rate, stabilized drawdown, and parameter stabilization criteria. You can quickly access site information at subsequent sampling



events without re-entering data.

Win-Situ® Sync Software automatically copies well records and data between a computer and a RuggedReader® Handheld PC.



### Automate Data Collection

Stabilization criteria are set for each monitored parameter. Data collection intervals are defined by time or pumped volumes. During sampling, software calculates and displays variance and targets for each parameter. Data is

logged at pre-determined intervals and stabilization is achieved when readings meet variation criteria. In addition, you can view data numerically or graphically.



### Automate Test Report Generation

After stabilization, data is stored and can be exported into Excel® report templates, complete with your company's logo. Supporting calibration reports are generated and stored automatically.



# TROLL® 9500 Multiparameter Instrument

General					
Operating temp.	-5 to 50° C (23 to 122° F)				
Storage temp.	-40 to 65° C (-40 to 140° F)				
Dimensions & weight	4.7 cm (1.85 in) OD x 55.25 cm (21.75 in). With tist-lock hanger: 56.52 cm (22.25 in). Restrictor: 8.9 cm (3.5 in) OD x 21 cm (8.25 in) long; 1.9 kg (4.2 lbs)				
Wetted materials	PVC, 316L stainless steel, titanium, Acetal, Viton®, nylon. Cable: Tefzel® or polyurethane				
Water tightness rating	IP68 with all sensors and cable attached. Battery compartment: IP67 without the battery cover or cable attached				
Output options	RS485/RS232; SDI-12 (optional with SDI-12 adapter); ASCII streaming mode or binary command				
Power	External: 9-16 VDC (optional). Internal: 2 user-replaceable D batteries (use either alkaline or matched pair of lithium)				
Logging					
Data logging	16 programmable tests (defined, scheduled to run, or stored). Logging modes: Linear, Linear Average, Event				
Memory	4 MB (222,000 data records <sup>1</sup> )				
Standard Sensors	Accuracy	Range	Depth Rating	Response Time (T90)	Methodology
Barometric pressure	±0.3% FS	16.5 psia	Meets highest rating	<30 sec per 30 m (100 ft) of cable	Silicon strain gauge
Level, Depth, Pressure	±0.1% FS or better Sensor accuracy: -5 to 50° C	15, 30, 100, or 300 psi	<i>Non-vented</i> 30 psia: 10.90 m (35.76 ft) 100 psia: 60.11 m (197.2 ft) 300 psia: 200.7 m (658.6 ft) <i>Vented</i> 15 psig: 10.55 m (34.61 ft) 30 psig: 21.10 m (69.21 ft) 100 psig: 70.32 m (230.7 ft) 300 psig: 211.0 m (692.1 ft)	Instantaneous in thermal equilibrium	Silicon strain gauge (non-vented or vented)
Conductivity	Low: ±0.5% or 2 µS/cm High: ±0.5% + 2 µS/cm	Low: 5 to 20,000 µS/cm High <sup>2</sup> : 150 to 112,000 µS/cm	Low: Meets highest rating High: Meets highest rating	Low: Instantaneous High: Instantaneous	Std. Methods 2510, EPA 120.1 Std. Methods 2510, EPA 120.1
Dissolved oxygen RDO® sensor <sup>3</sup>	±0.1 mg/L ±0.2 mg/L 10% of reading	0 to 8 mg/L 8 to 20 mg/L 20 to 50 mg/L	Meets highest rating	T90: <45 sec. T95: <60 sec. T90: <45 sec. T95: <60 sec. T90: <45 sec. T95: <60 sec.	EPA-approved In-Situ Methods <sup>4</sup> 1002-8-2009, 1003-8-2009, 1004-8-2009
Clark cell electrode	±0.2 mg/L	0 to 20 mg/L; 0 to 200% saturation	246 m (807 ft)	1-mil membrane: 1-2 min @ 25° C 2-mil membrane: 90 sec to 3 min	Std. Methods 4500-O G, EPA 360.1
pH (single) or pH/ORP (combo)	pH: ±0.1 pH units ORP: ±5.0 mV	pH: 0 to 12 pH units ORP: ±1400 mV	pH: 246 m (807 ft) pH/ORP: 246 m (807 ft)	pH: <15 sec, pH 7 to pH 4 ORP: <15 sec	pH: Std. Methods 4500-H <sup>+</sup> , EPA 150.2 ORP: Std. Methods 2580
Temperature	±0.1° C	23 to 122° F (-5 to 50° C)	Meets highest rating	< 30 sec	EPA 170.1
Extended Parameter (XP) Sensors					
Ammonium (NH <sub>4</sub> <sup>+</sup> )	±10%	0.14 to 14,000 ppm N	14 m (46 ft)	T98: <60 sec, 1.4 to 14 ppm N	Std. Methods 4500-NH <sub>3</sub> D, EPA 350.3
Chloride (Cl <sup>-</sup> )	±15%	0.35 to 35,500 ppm Cl	70 m (231 ft)	T98: <60 sec, 3.54 to 35.45 ppm Cl	Std. Methods 4500-Cl <sup>-</sup> D
Nitrate (NO <sub>3</sub> <sup>-</sup> )	±10%	0.14 to 14,000 ppm N	14 m (46 ft)	T98: <60 sec, 1.4 to 14 ppm N	Std. Methods 4500-NO <sub>3</sub> D
Turbidity	±5% or 2 NTU/FNU	0 to 2,000 NTU/FNU	105 m (346 ft)	Instantaneous (5 sec for first reading)	ISO 7027
Warranty	TROLL 9500 and all sensors (excluding RDO & ISE sensors) come with a 1-year warranty. RDO Sensor: 3-year warranty. ISE sensors: 90-day warranty. RuggedCable® System: 2-year warranty.				
Notes	<sup>1</sup> A single data record includes time stamp, temperature, RDO, pH, and conductivity logged in Linear or Linear Average mode. <sup>2</sup> Full operating range: 70 to 200,000 µS/cm. <sup>3</sup> Full operating range: 0 to 50 mg/L. <sup>4</sup> EPA-approved under the Alternate Test Procedure process.				

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