



# Proteus P Portable Water Quality Monitor

*An industry-leading multi-parameter, real-time sensor platform (portable or permanent) that accurately and reliably measures multiple water quality parameters in pressurised pipes.*

The Proteus P is the world's first self-cleaning water quality sensor platform that can be installed almost anywhere without power. The Proteus P can measure a wide range of parameters including turbidity, temperature, conductivity, pH, ORP, dissolved oxygen, faecal coliforms and more. The Proteus P measures your choice of parameter, all in one package and can deliver data in the toughest field conditions. The Proteus has been designed for it's ease of use, reliable data and

**Easy integration:** The Proteus P can be effortlessly integrated with telemetry/SCADA systems and other datalogging devices with external RS232/Modbus/SDI12 or simply by using it's internal datalogger. The integrated datalogger can log 1,000,000 readings and it can be used with Tablets/Mobile Phones over Bluetooth or comms cable.

**Measure bacteria/coliforms:** The Proteus is the first instrument globally that has the potential to measure bacteria/coliforms in drinking water in real time.

## Parameters include:

- Faecal Coliforms
- Turbidity
- Pressure
- ORP / Redox
- EC / Salinity / TDS
- Dissolved Oxygen
- Chloride
- pH
- Temperature
- Optical Brighteners
- Tryptophan
- Refined Oils
- Ammonium
- Crude Oils CDOM

## Applications

The Proteus P can be used for a wide range of portable and permanent applications including:

- Background pipeline water quality monitoring
- Level of service monitoring
- Mains rehabilitation monitoring
- Pipeline flushing
- Faecal coliform ingress monitoring
- Groundwater water quality monitoring
- Survey tool combined with Bluetooth

**Improved process control:** Let the Proteus P monitor multiple process parameters 24/7.

**Self cleaning:** As it is essential that optical sensors have a cleaning mechanism, the Proteus P is also supplied with an integral wiper which cleans all of the Proteus' optical sensors before every measurement cycle.

**Virtually maintenance free:** The system is fully serviceable in the field and requires almost no maintenance. Logs and uploads data unattended minimizing manpower requirements and safety issues.

**Multiple power options:** Power can be provided by the internal lithium battery pack for unattended logging, or an external power source (battery, mains or solar).

Sensor Specifications					
Parameter		Range	Resolution	Accuracy	Comments
Coliform Counts	per 100ml <sup>1</sup>	>1 count/100ml <sup>1</sup>	1 count/100ml <sup>1</sup>	1 count/100ml <sup>1</sup>	
DOC (Dissolved Organic Carbon)	DOC mg/l	0 - 400 mg L <sup>-1</sup>	0.01 mg L <sup>-1</sup>	< 5 % of reading*	* providing adequate field calibration
Temperature	Water Temperature	-5 to 50 °C	0.01	0.1	never needs calibration
pH/ORP	pH	0 to 14 units	0.1	0.1 within 10 C of calibration, 0.2 otherwise	refillable reference electrode; corrected for temperature; typical sensor life > 4 years
	ORP	-999 to 999 mV	1	20 mV	platinum ORP sensor is combined with pH sensor
Turbidity	Turbidity	0 to 140 NTU	0.01 NTU	0.03 NTU	compensated for temperature; filtered for non-turbidity spikes; includes wiper to clean the optics
		0 to 1500 NTU		0.05 NTU	
	Transmissivity	0 to 100% transmission	4 digits	linearity of 0.99R <sup>2</sup>	WETLabs SeaStar; mounts alongside the Manta
Optical Dissolved Oxygen	Concentration	0 to 20 mg/l	0.01	0.1	compensated for temperature and salinity; EPA approved "lifetime" luminescence method; typical sensor cap life > 4 years
		20 to 30 mg/l	0.01	0.15	
		30 to 50 mg/l	0.1	5%	
	% saturation	0 to 500% saturation	0.1%	corresponds with the accuracy of the concentration reading	
Conductivity	specific conductance, µS/cm	0 to 5000 µS/cm	4 digits with maximum of one decimal	±0.5% of reading ±0.001	corrected for temperature; four easy-to-clean graphite electrodes; optional sensor provides ±0.5% of reading accuracy to 100 mS/cm.
	specific conductance, mS/cm	0 to 10 mS/cm		±1% of reading ±0.001	
		10 to 100 mS/cm		1% of reading	
		100 to 275 mS/cm		2% of reading	
	salinity	0 to 70 PSS	0.01	0.2	
total dissolved solids (TDS)	0 to 65 g/	0.1	5% of reading	calculated from specific conductance	
Pressure	Depth	0 to 25 m	0.01	0.05	compensated for temperature and salinity; 0.05 m out of 25 m is 2" out of 100 feet; 0.4 m out of 200 m is a football length out of two football fields
		0 to 200 m		0.4	
	Vented depth (level)	0 to 10 m	0.001	0.003m	compensated for temp, salinity, barometric pressure
	Pressure	0 to 20 bar	0.1	1.5	included with depth sensor
	Total dissolved gas (TDG)	400 to 1,400 mm Hg	0.1	1	compensated for temperature; maximum depth 15m
Fluorometers	chlorophyll a - blue	0 to 500 µg/l	6 digits with maximum of two decimals	linearity of 0.99R <sup>2</sup>	highest-quality Turner Designs fluorometric sensors; fluorometers often require non-trivial calibration; custom optics available upon request
	chlorophyll a - red	0 to 500 µg/l			
	rhodamine dye	0 to 1000 ppb			
	Phycocyanin (freshwater BGA)	0 to 40,000 ppb			
	Phycocerythrin (marine BGA)	0 to 750 ppb			
	CDOM/fDOM	0 to 1250 or 0 to 5000 ppb			
	CDOM/fDOM custom	0 to 1250 or 0 to 5000 ppb			
	optical brighteners	0 to 15,000 ppb			
	tryptophan	0 to 20,000 ppb			
	fuorescein dye	0 to 500 ppb			
	refined oil	0 to 10,000pb			
crude oil	0 to 1500 ppb				
Ion-selective electrodes (ISE's)	ammonium	0 to 100 mg/l as nitrogen	0.1	5% or 2 mg/l	corrected for ionic strength (via conductivity readings); the accuracy specification relies on non-trivial maintenance practice and frequent calibration near the temperature of measurement; ammonium and nitrate require tip replacement every 3 - 6 months
	nitrate	0 to 100 mg/l as nitrogen			
	chloride	0 to 18,000 mg/l			
	sodium	0 to 20,000 mg/l			
	calcium	0 to 40,000 mg/l			
	bromide	0 to 80,000 mg/l			
PAR	photometric PAR	10,000 µmol/sm <sup>2</sup>	4 digits	5% of reading	LiCor spherical sensor

General Specifications	Proteus 35	Proteus 40
Diameter	89 mm (3.5")	102 mm (4.00")
Length - w/o Battery Pack	483 mm (19")	483 mm (19")
Weight - with IBP	4.1 kg (9.0 lbs)	4.5 kg (10.0 lbs)
Number of sensors	Up to 7	Up to 9
Battery Pack	3 Lithium "C" cells	8 Lithium "C" cells

Internal Power Battery Life	1 to 24 month depending on sensors / logging rates	Sample Rate	1 Hz
External Power	5-15 vdc	Data Memory	>1,000,000 logged readings
Operating Temperature	-5 to 50 °C	Logging Rates	>1 second (1 min if using internal remote telemetry)
Depth Rating	200 m	Warranty	2 years* * All sensors included except ISE's (Ammonia/nitrate/chloride)
Communications	RS-232, SDI-12, USB or Bluetooth	© 2018 RS Hydro Ltd. E&OE. All rights reserved. Patent Pending.	