

# DATA Sheet

## Portable Water Quality Analyzer Systems



### ROYCE Portable Features

- Rugged enclosures and sensors
- Completely waterproof (submersible)
- Microprocessor based electronics
- Continuous self-diagnostics (sensor and analyzer)
- Analog & Digital outputs standard (except 711)
- 9V battery power with automatic shutoff

### How many times have you had one of the following experiences while using a portable instrument?

Been caught in a downpour and instrument electronics became wet; dropped the instrument in the water and soaked the electronics; dropped the instrument on a hard surface and it became inoperable; got to the field only to find out that your batteries were too low to operate the instrument. These are just some of the experiences our customers told us about when they asked for a reliable portable instrument. Royce portable water quality analyzers have been designed with continual field use in mind. We have answered all of these problems and more.

When we say submersible we mean it - all our portables will work underwater. The enclosures are made of a glass-filled

nylon material that will not warp or dissolve when placed close to heat or chemicals. The instruments all use a standard 9V battery that can be purchased anywhere. Military components are used to guarantee quality and reliability.

You can count on the electronic sensor innovation that you expect from Royce Instrument Corporation, when purchasing one of our portables. All of them have rugged, long life sensors that will operate in the most negative environments you can find; and electronics that continually diagnose themselves and the sensors - alerting the operator when recalibration or maintenance is necessary.

**Royce portable instruments will give any operator correct data under any environmental condition!**

## Model 900 Portable PPM Dissolved Oxygen System



Model 900  
DO System



Some System  
Options

### Model 900 Specific Features

- Reads in PPM DO, temperature, % saturation
- Rugged enclosure and sensor
- Two choices of sensors
- Accessories for various field and lab applications

The Royce Model 900 Portable Dissolved Oxygen (DO) Measuring System is a rugged, waterproof instrument designed for the rigors of remote sampling. The System includes a choice of two rugged sensors - the Model 95 rechargeable sensor or the Model 99 disposable cartridge sensor.

Utilizing full microprocessor controlled electronics, the Model 900 is quickly programmed by the user for conditions (salinity, partial pressure, etc.) specific to his application. From that time on — all functions are single button actions.

Recalibration of either sensor is a single keystroke of the instrument and should not be required more than once per week. A complete recharge of the Model 95 sensor is no more than a 5 minute operation and should not be required sooner than every 3 to 6 months - if the system is used properly. The Model 99 sensor cartridge should last at least 1 year before replacement is necessary.

### Model 900 System Specifications

#### Ranges:

##### DO - Autoranging

0.00 to 9.99 PPM (mg/l) x 0.01 PPM to  
10.0 to 99.9 PPM (mg/l) x 0.1 PPM or  
1 to 99.9 % Saturation x 1% Sat.  
Accuracy  $\pm 0.1$  PPM or 1% Sat.

##### Temperature - Selectable

0 - 50°C x 1°C or  
32 - 122°F x 1°F  
Accuracy,  $\pm 0.2$ °C  
Compensation,  $\pm 1\%$  of reading

#### Display:

Harsh environment, 1/2" LCD digital display

#### Stability:

$\pm 0.1$  PPM DO

#### Repeatability:

$\pm 1\%$  (at constant temperature)

#### Sensor Response Time:

99% of actual in less than 30 seconds

#### Sample Flow Requirements:

Less than .15 ft/sec with 1 mil membrane

#### Outputs:

0-1 Volts DC, adjustable  
RS-232 Serial digital interface

#### Weight:

3.4 lbs., 1.55 kgm

### Supplied Standard with Model 900 System,

with Model 95 Sensor, **Part #59748**

with Model 99 Sensor, **Part #58132**

- Model 900 rugged DO/Temperature analyzer
- Sensor of choice will have a 15' cable and waterproof, military connector
- Membrane Protection Cap
- Flexible sensor storage cap
- Waterproof cap for Output connector
- Nylon "grip strap" which converts to handy belt holder
- One dozen 1 mil Teflon\* membranes in hard storage case (95 sensor only)
- 16 ounces of potassium chloride electrolyte (95 sensor only)
- 9V battery
- Detailed Instruction Manual

### Optional Accessories and Equipment

- Flexible, zippered waterproof nylon carry-bag with webbed nylon handle, separate protective pocket for manual, **Part #59381**
- Model 95 Sensor adaptor for 2" T flow cell mounting, **Part #59377**
- Model 95 Sensor collar adaptor kit for groundwater monitoring insertion assemblies, **Part #59378**
- Model 95 Epoxy flow cell with 1/4" stainless steel connections, **Part #54532**
- Output cable assembly with waterproof connector, **Part #59396**
- 24 - 2 mil Teflon\* membranes for Model 95 sensor, **Part #59252**
- 24 - 1 mil Teflon\* membranes for Model 95 sensor, **Part #59251**
- Model 99 replaceable cartridge, 1 mil membrane, **Part #59842**
- Model 99 replaceable cartridge, 2 mil membrane, **Part #59843**

# Model 711 Portable Suspended Solids/Interface Level Analyzer



Model 711 Portable  
MLSS/ILA System

## Model 711 Specific Features

- Two analyzers in one package
- Automatic ranging
- Simple, insitu calibration

The Royce Model 711 Portable Suspended Solids/ Interface Level Analyzer is a rugged, waterproof instrument designed for the rigors of remote sampling. The meter provides reliable operation in waste treatment plants, rivers, lakes, and other aqueous systems. The meter will read in either grams per liter when in the suspended solids mode or relative density percentage while in the interface level mode of operation.

The Model 711 stores the calibration values for suspended solids and interface level in two separate non-volatile memory locations allowing the user to switch between

operational modes without having to recalibrate. The net effect is two analyzers in one. Due to the full utilization of the microprocessor, calibration values are stored so that recalibration is not required on a daily basis. If the sensor is cleaned after use, monthly calibration is usually more than sufficient for proper operation in either mode of operation.

The Model 711 analyzer utilizes the Model 71 medium range sensor. The Model 71 is a rugged, reliable sensing element that has polymer optical grade lenses. It was designed specifically to meet the rigorous demands that are a requirement for a portable sensor.

## Model 711/71 Specifications

### Range:

0 -10 grams per liter (0 to 10,000 mg/l).

### Readout Device:

Harsh environment, 1/2" LCD digital display.

### Input Power:

Standard 9V battery.

### Enclosure:

Waterproof.

### Size:

7 inches long.  
3.2 inches wide.  
1.5 inches deep.

### Weight:

1.5 pounds (.68 kgms.).

### Type:

Single-gap, optical.

### Range:

0 -10 g/l.

### Operating Limits:

Temperature, 0-65°C.  
Pressure, 0-50 PSIG.

### Size:

4 inches long.  
2 inch diameter.

### Weight:

1 pound (.45 kgms.).

### Construction:

Poly-urethane body.  
Optical grade polymer lenses.

## Supplied Standard with Model 711 System

- Model 711 rugged Suspended Solids analyzer
- Model 71 rugged sensor with 8 meters or 25 feet of cable and waterproof, military connector. Cable is scaled in 1' increments.
- Velcro "grip strap" which can convert to handy "belt holder"
- 9V battery
- Detailed Instruction Manual

## Optional Accessories and Equipment

- Flexible, zippered waterproof nylon carry-bag with webbed nylon handle, separate protective pocket for manual, Part #59381

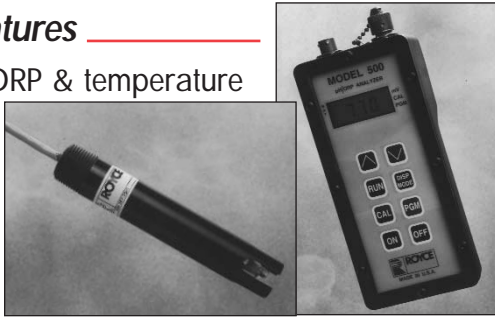
## Ordering Information

- Model 711 Analyzer with Model 71 Sensor on 8m cable, scaled in 1/4 m increments - #59760
- Model 711 Analyzer with Model 71 Sensor on 25 ft. cable, scaled in 1ft. increments - #59761

## Model 500 Portable pH/ORP System

### Specific Features

- Read pH, ORP & temperature
- Unique, rugged preamped sensor



The Royce Model 500 Portable pH/ORP Analyzer System is the only completely submersible pH/ORP instrument in industry. Designed specifically for the rigors of remote sampling, the Model 500 will become the constant companion to those that must make precision measurements in the field or over periods of days in a remote setting.

The Model 500 System utilizes a unique, rugged electrode arrangement which allows for a cable measuring up to several hundred meters. The cable itself is industrial grade 4-conductor twisted cable which can be any length. The System's preamplifier is located in the electrode body to insure interference-free operation in harsh environments. The electrode is supplied standard with a "reworked" hardened glass pH bulb, Hydrogel micro-frit double-reference junction, and a rugged temperature thermistor for automatic temperature compensation.

#### Measurement Ranges:

pH: 0 to +14 pH.  
ORP: -1999 to +1999 mV DC.

#### Temperature Measurement Range:

-17 to +150°C (0 to 302°F).

#### Displayed Resolution:

pH: 0.01.  
ORP: 1 mV.  
Temperature: 1° (C or F).

#### Accuracy (Includes linearity; sensor not included):

pH or ORP: ±.2% of full scale.  
Temperature: ±1%.

#### Repeatability:

±.2% of full scale.

#### Outputs:

0 to 1 V DC 10k ohms minimum load.  
RS-232 Serial digital port.

#### Power Source:

Standard 9 V Battery (Alkaline).

#### Temperature Compensation Accuracy:

±1% based on reference temperature compensator and reference compensation.

#### Enclosure:

Waterproof, rugged enclosure of nylon/glass construction.

#### Environmental:

-10 to 60°C Ambient Operating Range.  
-40 to 85°C Ambient Storage Range.

### Ordering Information

Model 500 Portable pH/ORP System, complete - #54514 pH  
- #54515 ORP

## Model 503 Portable CO<sub>2</sub>/pH System

### Specific Features

- Read pH, CO<sub>2</sub> & temperature
- Compensation for temperature, alkalinity and conductivity
- Unique, rugged sensor with preamp allows extra-long cable lengths



The Royce Model 503 Portable pH/CO<sub>2</sub> Analyzer is an intelligent, yet simple solution to the challenge of monitoring Dissolved Carbon Dioxide. In heavily-loaded or closed aquatic systems, carbon dioxide can have a dramatic effect on chemical and biological processes, especially where pure oxygen, rather than mechanical aeration is used to maintain dissolved oxygen. High levels of carbon dioxide severely restrict healthy respiration in fish and shellfish, and yet can be a beneficial addition to aquatic plant or algae culture. Excessive CO<sub>2</sub> can also adversely affect pH in various wastewater treatment processes. Applications include aquaculture, algae and aquatic plant culture, wastewater treatment, and environmental monitoring. Based upon the same rugged pH electrode used with the Model 500 Portable pH System, the Model 503 adds to its microprocessor the capability to calculate Dissolved Carbon Dioxide in real time. Compensating for temperature, and the known alkalinity & conductivity of the water being tested, the Model 503 displays the value of free CO<sub>2</sub> based on the current pH measurement. Switching between readings of CO<sub>2</sub>, pH, and temperature is a single-button operation. Housed in an extremely rugged, completely submersible enclosure, this instrument carries on the tradition of ROYCE high quality portable instrumentation designed for serious field use.

#### Measurement Ranges:

pH: 2 - 12  
CO<sub>2</sub>: 0.0 - 99.9 mg/l  
Temperature: -8 to 112°C

#### Displayed Resolution:

pH: 0.01  
CO<sub>2</sub>: 0.1  
Temperature: 1 °C

#### Accuracy and Repeatability:

pH: +/- .03  
CO<sub>2</sub>: 5% of reading  
Temperature: +/- 2 °C

#### Outputs:

0 to 1 VdC 10K Ohms minimum load  
RS - 232 serial digital port

#### Electrode:

Model 51A

#### Power Source:

Standard 9 volt alkaline battery

#### Enclosure:

Waterproof, rugged enclosure of nylon/glass composite construction

#### Environmental:

- 10 to 60°C ambient operating  
- 40 to 85°C ambient storage

### Ordering Information

Model 503 Portable pH/CO<sub>2</sub> System, complete - #59619



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