



**ITT**

**Water & Wastewater**

# Royce Total Suspended Solids Systems



*Engineered for life*

# Portable and Continuous TSS Systems

## MODEL 711 PORTABLE MLSS/ILA SYSTEM

### FEATURES

- Two complete analyzers in one package (TSS & Interface Level)
- Microprocessor based
- Automatic ranging
- Simple, insitu calibration
- Electronic self-diagnostics
- Nine volt battery with automatic shutoff
- Waterproof, rugged housing

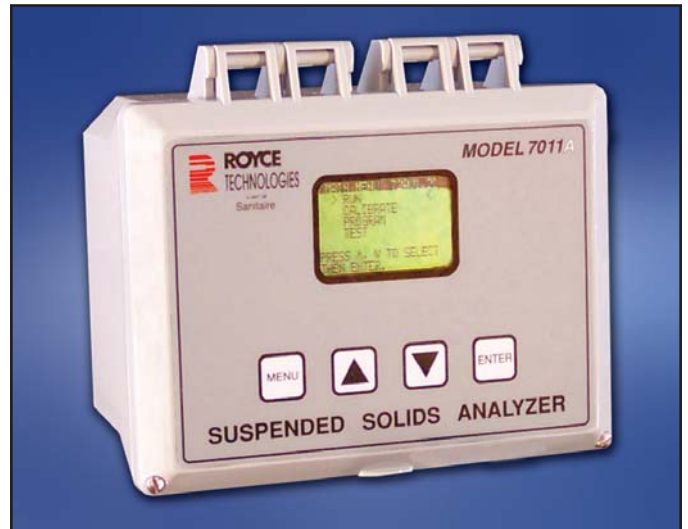


MODEL 711 PORTABLE MLSS/ILA SYSTEM

## MODELS 7110/7120 SERIES CONTINUOUS SYSTEM

### FEATURES

- Automatic ranging
- Simple to use insitu calibration
- Menu driven text help screens
- Electronic self diagnostics
- Digital communications with isolation and surge protection
- Isolated current or voltage outputs
- Up to 2 set-point relays per channel
- User selectable calibration curves
- Backlit display (7110/7120)
- Menu driven text help screens
- Phased array source for automatic color compensation (Model 73B/73P Sensor)
- Automatic ambient light compensation on all sensors
- NEMA 4X (IP65) enclosure



MODEL 7011A SINGLE CHANNEL ANALYZER



MODEL 7110/7120 SINGLE/DUAL CHANNEL ANALYZER

## CONTINUOUS MONITORING AND CONTROL SOLIDS ANALYZERS

The Model 7011A Total Suspended Solids (TSS) Analyzer is the tried and true performer that has buttressed the Royce line of solids analyzers for years. Still the most used TSS analyzer in the industry, the Model 7011A is the primary single channel offer in the Royce line of analyzers.

### SPECIFICATIONS

#### Range:

100 – 10,000 up to 800 – 80,000 mg/l (Sensor Dependent)

#### Standard Outputs:

4 – 20 mA or 0 – 1 VDC (Isolated)  
RS-485 serial port (isolated and surge protected)

#### Standard Setpoints:

Two programmable setpoint relays  
All relays are form C rated 250 VAC, 7 Amps resistive

#### Readout Device:

Harsh environment, 2.2" x 1.5" LCD digital display

#### Input Power:

Switch selectable 115/230 VAC, 60/50 Hz

#### Enclosure:

NEMA 4X (IP65) Fiberglass

#### Instrument Ambient Conditions:

Temperature: -10 to 50°C  
With Heater: -40 to 50°C  
Humidity: 0 to 100%

#### Analyzer Options:

NEMA 4X enclosure with quick disconnect for sensor  
Rear Rail mounting kit  
JB-93 junction box with quick disconnect for sensor

#### Weight:

5.5 Lbs (2.5 kgms)

## MODELS 7110/7120 ANALYZERS

The Series 7110/7120 Water Process Analyzer is a single or dual channel solids monitoring system that offers the latest in digital communication while utilizing one or two Royce TSS sensors. Sensors do not have to be the same model. The Series 8000 Water Process Analyzer can be made up to a 4-channel system that will incorporate up to any two TSS sensors plus two Dissolved oxygen sensors. While it can be purchased as a dual channel, 3-channel or 4-channel system, the sensor combinations are almost unlimited.

### SPECIFICATIONS

#### Instrument Ambient Conditions:

Temperature: -10 to 50°C  
Humidity: 0 to 100%

#### Input Power:

80 – 260 VAC, 60/50 Hz or 12 VDC

#### Outputs:

Four isolated 4 – 20 mA per analyzer 600 ohms maximum  
Four Relays with programmable hysteresis  
10A resistive @ 250 VAC  
RS-485 & Modbus (Standard)  
Profibus DP (Optional)

#### Readout Device:

Harsh environment, four line, 20 Character backlit  
LCD digital display

#### Calibration:

Push-button for In-Situ calibration to a known value for TSS

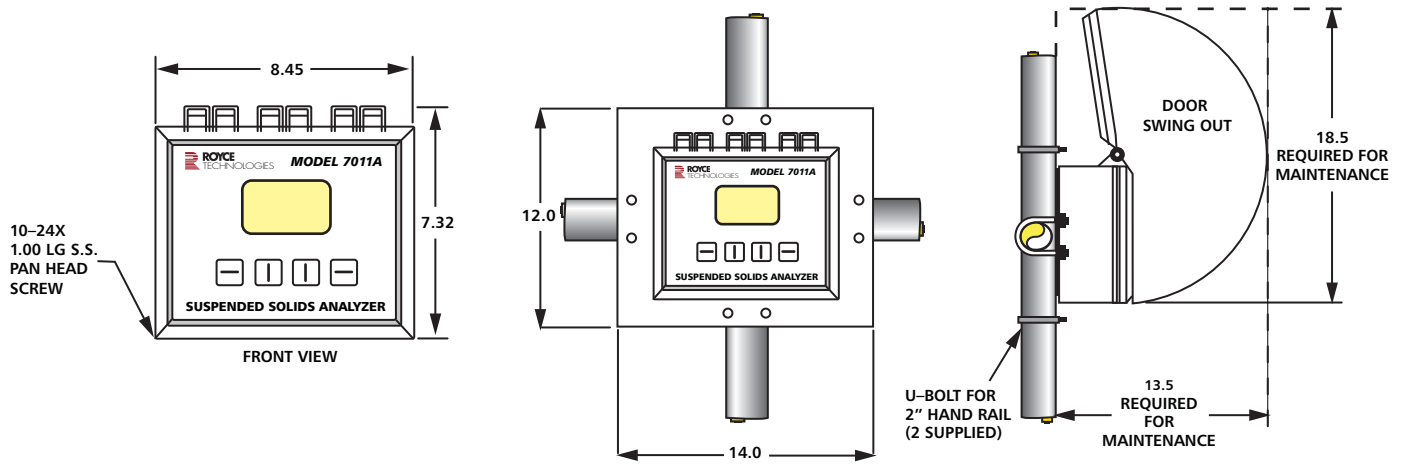
#### Enclosure:

NEMA 4X (IP65) Fiberglass

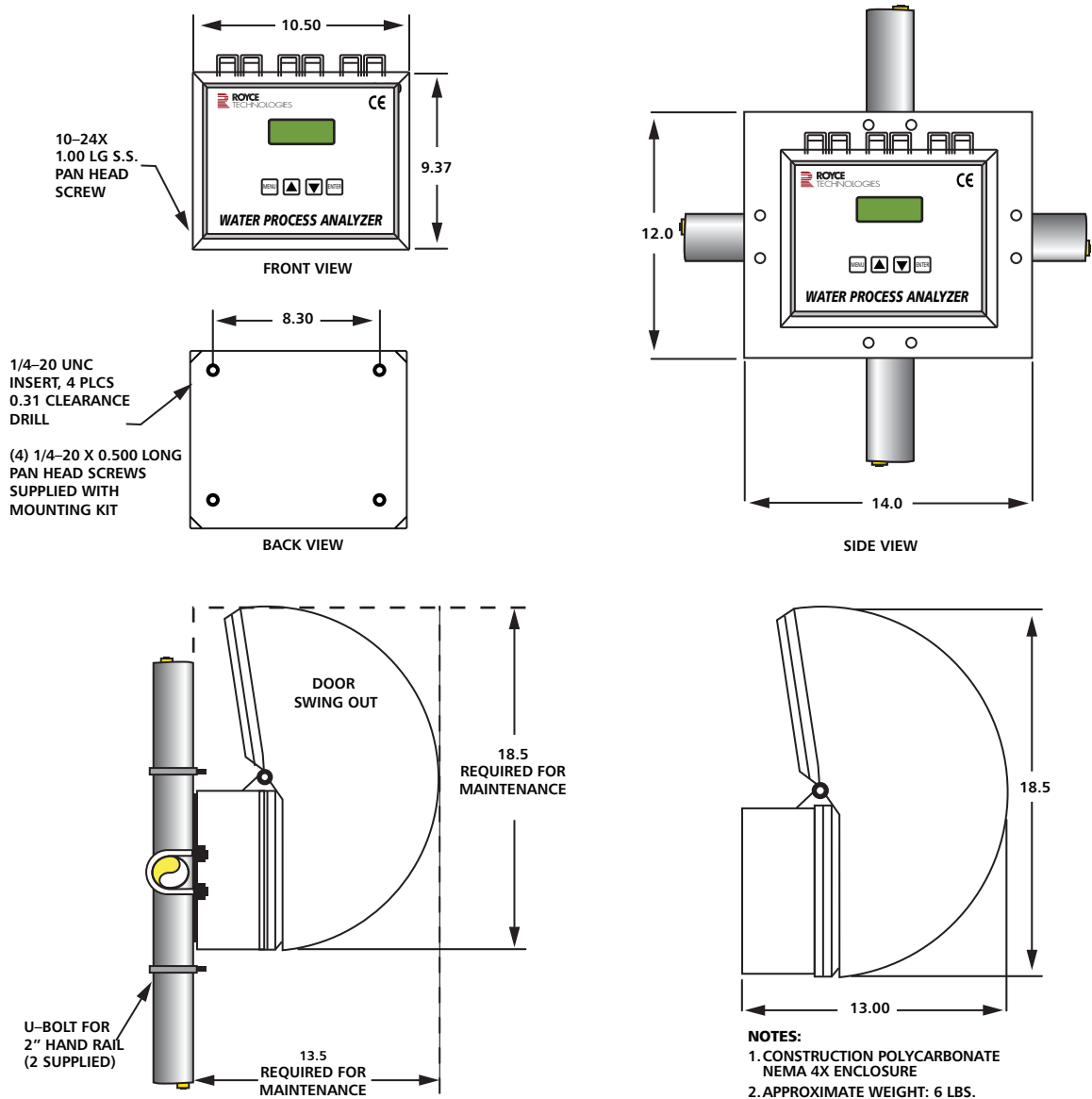
#### Weight:

5.5 Lbs (2.5 kgms)

## MODEL 7011A ANALYZER DIMENSIONS, RAIL KIT OUTLINE AND MOUNTING



## SERIES 7110/7120 ANALYZERS



## MODEL 72A LOW RANGE TSS SENSOR

The Model 72A is for low ranges commonly experienced in effluent streams (10 – 1500 mg/l). It incorporates a unique automatic ambient light compensating technology that allows for clean water monitoring insitu, without requiring sample intake lines for reflection chambers. Automatic self cleaning is available.

### SPECIFICATIONS

#### Type:

Single Gap Optical

#### Range:

10 – 1500 mg/l

#### Resolution:

1 mg/l

#### Accuracy:

± 5% of reading or ± 5 mg/l, whichever is greater

#### Repeatability:

± 1% of reading or ± 2 mg/l, whichever is greater

#### Operating Limits:

Temperature: 0 – 50°C  
Pressure: 0 – 50 PSIG

#### Size:

4.5 inches square

#### Weight:

5.5 Lbs (2.5 kgms)

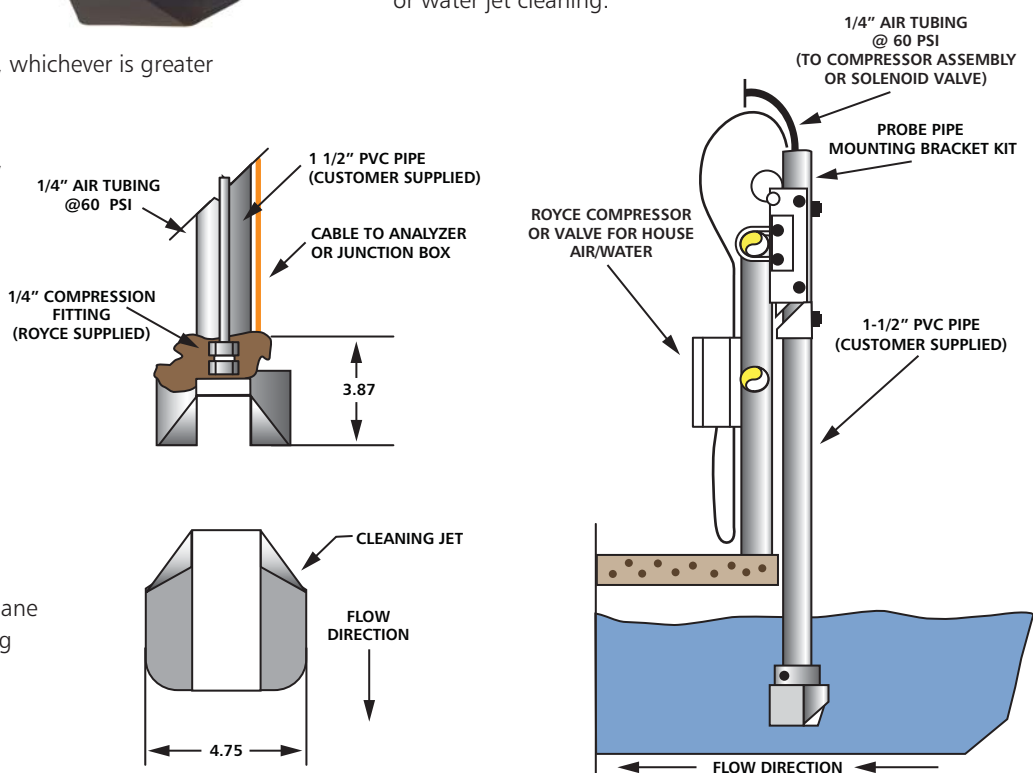
#### Construction:

Chemically resistant polyurethane optics in polyurethane housing



### SENSOR MOUNTING

- The sensor cable is a 5 conductor shielded 22 AWG. It is available in 25 and 50 foot lengths as standard.
- A connector for quick disconnect to the monitor is provided as standard on the sensor and analyzer. The connector on the sensor is required when used with the JB-93 junction box.
- All Royce suspended solids sensors are equipped for an air or water jet cleaning.



## MODEL 72P FLOW THROUGH LOW RANGE TSS SENSOR

The Model 72P is a low range, flow through version of the popular Model 72A. Commonly used in outfall plumbing of packaged WWTP's, portable potable water systems, backwash filter lines and other process water lines for the measurement of low level suspended solids.



### SPECIFICATIONS

#### Range:

10 – 1500 mg/l,

#### Construction:

Molded Epoxy/PVC

#### Limits:

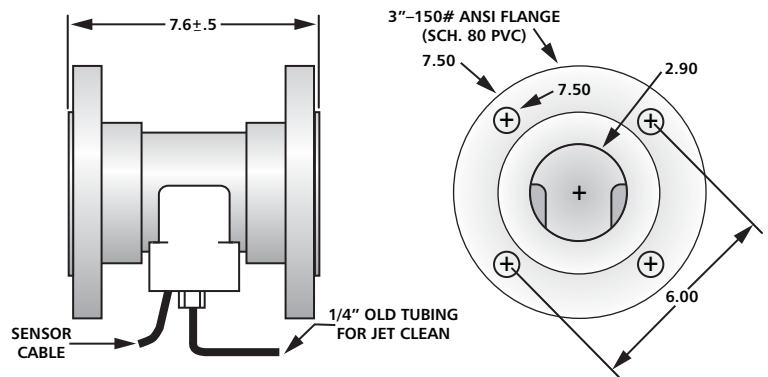
Temp. 0 – 50°C  
Pressure: 0 – 20 PSIG

#### Optical:

3" Flanged Spool Mounted; Air or Water Jet Self-Cleaning

## MODEL 72P SENSOR MOUNTING

- The sensor cable is a 5 conductor shielded 22 AWG. It is available in 25 and 50 foot lengths as standard.
- A connector for quick disconnect to the monitor is provided on the sensor and analyzer. The connector on the sensor is required when used with the JB-93 junction box.
- All Royce suspended solids sensors are equipped for an air or water jet cleaning.



## MODEL 73B SUBMERSIBLE MLSS SENSOR

The Model 73B submersible sensor is designed for mixed liquor suspended solids or MLSS typically found in aeration basins. This sensor uses phased array color compensation to correlate light absorption with suspended solids.

### SPECIFICATIONS

#### Type:

Single Gap, Optical; self cleaning. Model 73B has phased array emitter/receptor combination for automatic color compensation

#### Range:

300 – 3,000 up to 300 – 30,000 mg/l  
0 – 3%

#### Accuracy:

± 5% of reading or ± 100 mg/l, whichever is greater

#### Repeatability:

± 1% of reading or ± 20 mg/l, whichever is greater

#### Operating Limits:

Temperature: 0 – 50°C  
Pressure: 0 – 50 PSIG

#### Size:

2.5" D x 3.3" L

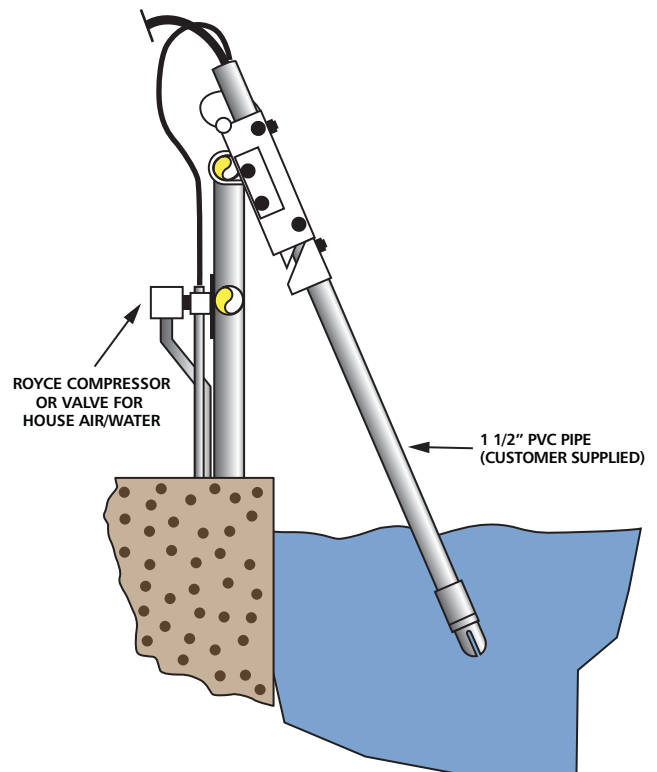
#### Weight:

12 ounces (.34 kgms)

#### Construction:

Chemically resistant polyurethane optics  
Molded polymer housing

- The sensor cable is a 8 conductor shielded 22 AWG. It is available in 25 and 50 foot lengths as standard.
- A connector for quick disconnect to the monitor is provided on the sensor and analyzer. The connector on the sensor is required when used with the JB-93 junction box.
- All Royce suspended solids sensors are equipped for an air or water jet cleaning.



## MODEL 73P FLOW THROUGH MLSS SENSORS

The Model 73P in-line MLSS sensor is common for use with in-line mixed liquor applications, septic waste influent applications, and packaged WWTP RAS, WAS MLSS and influent lines.

### Mid-Range:

Color Compensated; Pipe insertion; Air or Water Jet Self Cleaning

### Range:

300 – 3,000 up to 300 – 30,000 mg/l, 0 – 3%

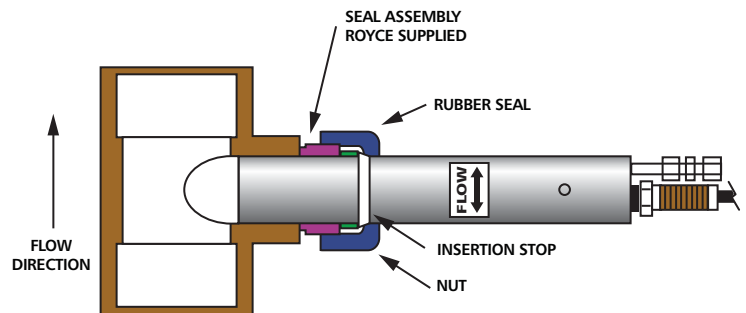
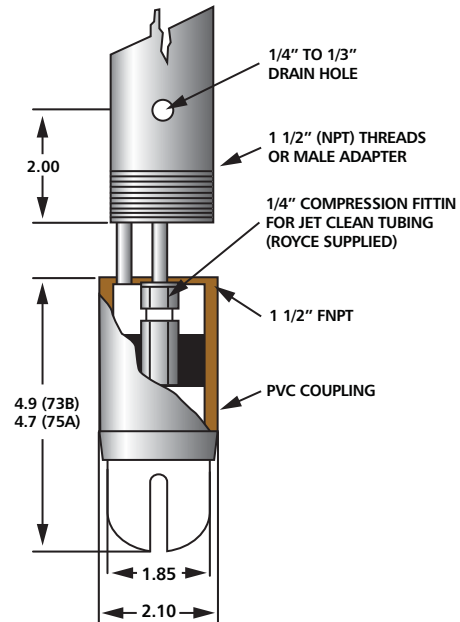
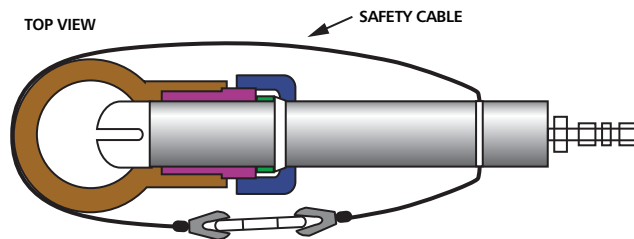
### Construction:

Molded Epoxy/PVC  
Limits: Temp. 0 – 50° C  
Pressure: 0 – 20 PSIG



## MODELS 73P SENSOR MOUNTING

- The sensor cable is a 8 conductor shielded 22 AWG. It is available in 25 and 50 foot lengths as standard.
- A connector for quick disconnect to the monitor is provided on the sensor and analyzer. The connector on the sensor is required when used with the JB-93 junction box.
- All Royce suspended solids sensors are equipped for an air or water jet cleaning.



## MODEL 74A AND 76A HIGH DENSITY PIPE INSERTION SENSORS

The Model 74A and 76A in-line sensors are used in WAS (Waste Activated Sludge) and RAS (Return Activated Sludge) line applications. These sensors offer automatic water Jet cleaning of the sensor optics by house supplied water.

### SPECIFICATIONS

#### Type:

Single Gap, Optical; self cleaning water jet

#### 74A Range:

800 – 8,000 up to 800 – 80,000 mg/l, 0 - 8%

#### 76A Range:

300 – 3,000 up to 300 – 30,000 mg/l, 0 - 3%

#### Accuracy:

**74A:**  $\pm 5\%$  of reading or  $\pm 150$  mg/l, whichever is greater

**76A:**  $\pm 5\%$  of reading or  $\pm 100$  mg/l, whichever is greater

#### Repeatability:

**74A:**  $\pm 1\%$  of reading or  $\pm 30$  mg/l, whichever is greater

**76A:**  $\pm 1\%$  of reading or  $\pm 30$  mg/l, whichever is greater

#### Operating Limits:

Temperature: 0 – 50°C

Pressure: 0 – 50 PSIG

#### Size:

2" insertion D x 19" L

2" NPT male pipe insertion nipple

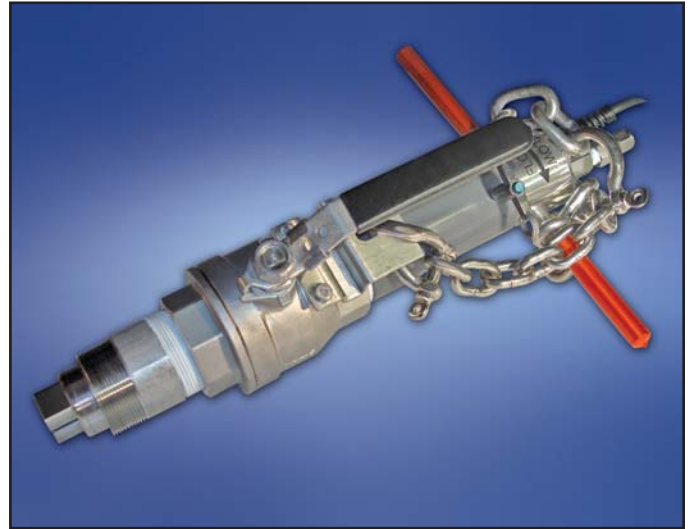
#### Weight:

16 pounds (7 kgms)

#### Construction:

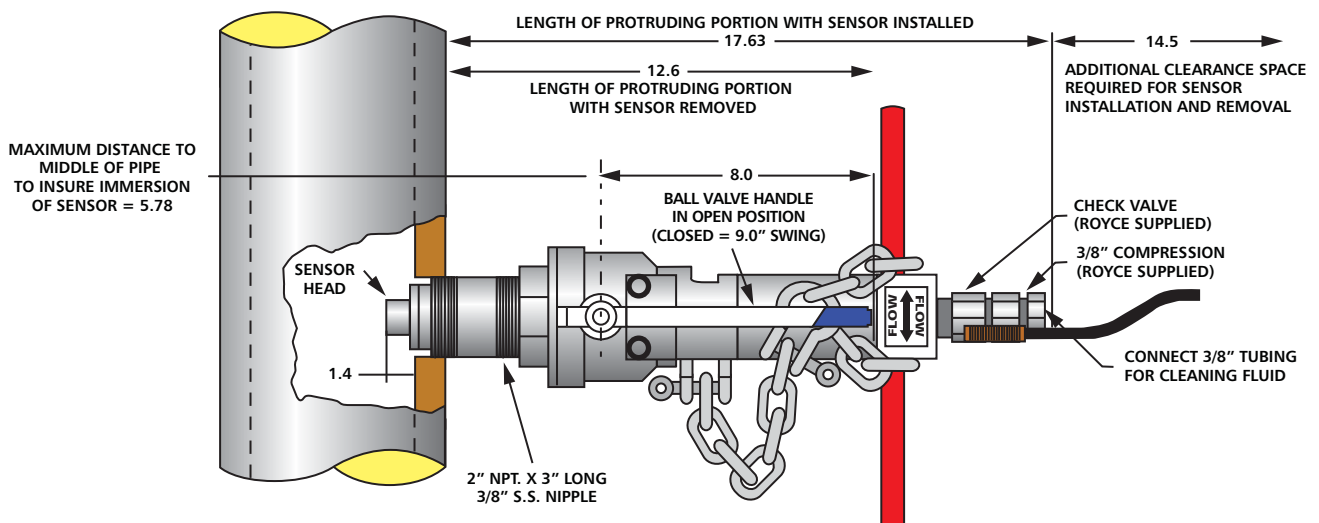
316 SS insertion shaft and lens holders

Chemically resistant polyurethane optics



- The sensor cable is a 8 conductor shielded 22 AWG. It is available in 25 and 50 foot lengths as standard.
- A connector for quick disconnect to the monitor is provided on the sensor and analyzer. The connector on the sensor is required when used with the JB-93 junction box.
- Cleaning connection supplied by Royce to house water is 3/8" compression fitting.
- Cleaning pressure must be 20 PSIG greater than line pressure.
- All Royce suspended solids sensors are equipped for an air or water jet cleaning

## MODELS 74A & 76A OUTLINE AND MOUNTING



## JB-93 JUNCTION BOX



### Construction:

Polystyrene NEMA 4X  
(IP65)

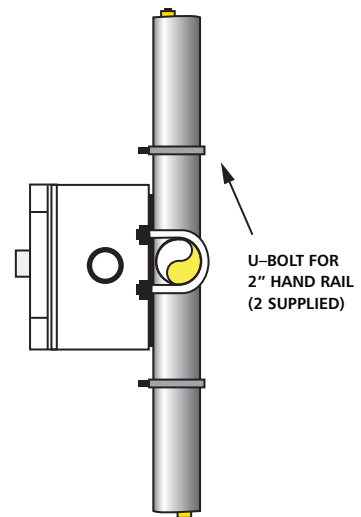
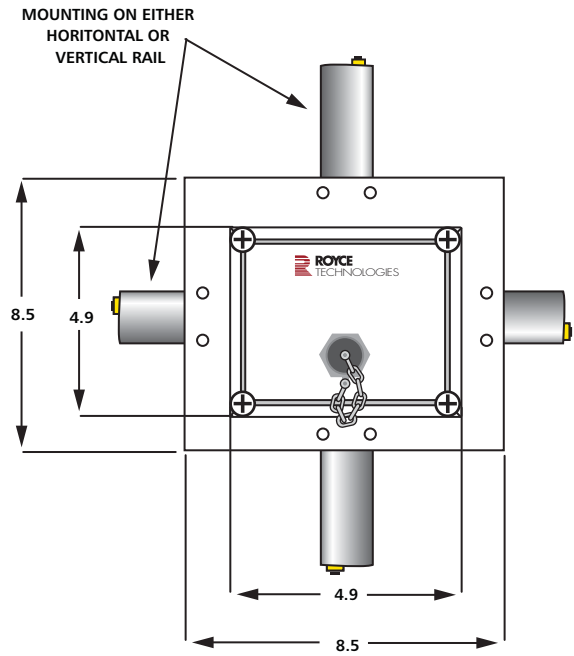
### Options:

Rail Mounting Kit

### Weight:

JB-93: 2 Lbs  
With rail mount kit: .5 Lbs

### RAIL KIT OUTLINE AND MOUNTING



## ROYCE JC SERIES COMPRESSOR ASSEMBLY FOR SUBMERSIBLE MLSS SENSOR JET CLEAN FOR OPTICS

The sensor optics are Jet Cleaned by an air or water blast across the optics on a timed basis which is controlled by the parent instrument. Cleaning frequency and duration of the jet blast are programmed by the user to meet the demand of the application where optical surfaces are soiled by organic or biological fouling.

All Royce suspended solids sensors are equipped for Jet Cleaning of the sensor optics by house supplied air or water using a solenoid. A minimum of 30 PSIG and a maximum of 60 PSIG is required for house air or water.

The Royce Compressor Assembly is compatible with submersible MLSS sensors and is available as an option. The

Model 74A and 76A in-line sensors can not use the Royce Compressor Assembly.

An industrial grade high output compressor is used on all Royce JC Series compressor cleaning systems. By using the same compressor for multiple instrument sensors, the cost per sensor is drastically reduced. Any Royce analyzer can operate any JC Series compressor. In fact, a multi-channel JC-2 or JC-4 can be used on any combination of Royce dissolved oxygen or total suspended solids sensors at one time.

The Models JC 1, 2, and 4 are all available in either 115 VAC or 230 VAC versions, and all electrical parts are CE certified.



**MODEL JC-1 COMPRESSOR – SINGLE CHANNEL**



**MODEL JC-4 COMPRESSOR – FOUR CHANNEL**

### SPECIFICATIONS

#### Channels:

One, Two or Four

#### Compatibility:

All Royce Analyzers

#### Compressor Ambient Conditions:

0 to 70°C  
-10 to 70°C with optional heater

#### Input Power:

115 VAC, 50 – 60 Hz or  
230 VAC, 50 – 60 Hz  
+10% to -15%

#### Outputs:

Up to four, 1/4" push seal  
bulkhead connections

#### Enclosure Protection:

Vent port fitted

#### Enclosure:

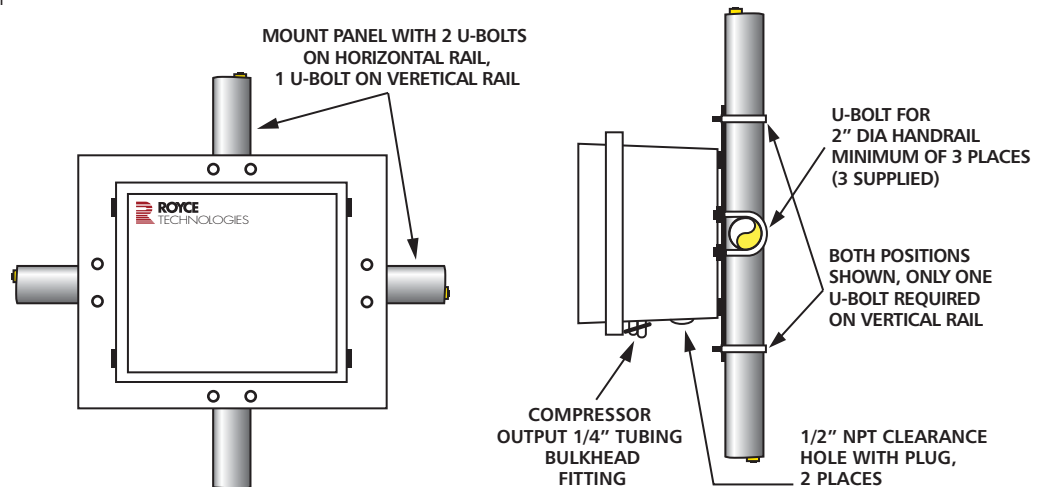
NEMA 4X (IP65)

#### Enclosure Dimensions:

JC-1 – 14" W x 12" H x 6" D  
JC-2 or 4 – 17.5" W x 16" H x 10.5" D  
Door Hinges Up

#### Weight:

JC-1 – 26 lbs, 11.8 kgms  
JC-2 – 37 lbs, 16.8 kgms  
JC-4 – 40 lbs, 18.2 kgms



## MODEL 711 PORTABLE SUSPENDED SOLIDS AND INTERFACE LEVEL ANALYZER



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 nonvolatile 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 calibration.

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.

### SPECIFIC FEATURES

- Two analyzers in one package:  
Switch from Solids measurement to Interface level without losing calibration.
- Automatic ranging:  
Goes completely over the operating range of the analyzer with manual adjustment.
- Simple, insitu calibration.

### SPECIFICATIONS

#### Range:

.01 – 10 grams per liter (10 to 10,000 mg/l)

#### Readout Device:

Harsh environment, 1/2" LCD digital display

#### Input Power:

Standard 9V battery

#### Enclosure:

Waterproof

#### Size:

7" L x 3.2" W x 1.5" D

#### Weight:

1.5 pounds (.68 kgms)

#### Type:

Single Gap, Optical

#### Accuracy:

± 5% of reading or ± 100 mg/l, whichever is greater

#### Repeatability:

± 1% of reading or ± 20 mg/l, whichever is greater

#### Range:

.01 – 10 g/l

#### Operating Limits:

Temperature, 0 – 65°C

Pressure, 0 ° 50 PSIG

#### Size:

4" L x 2" D

#### Weight:

1 pound (.45 kgms)

#### Construction:

Polyurethane body

Optical grade polymer lenses

### SUPPLIED STANDARD WITH MODEL 711 SYSTEM

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



# ITT

## **What can ITT Water & Wastewater do for you?**

Integrated solutions for fluid handling are offered by ITT Water & Wastewater as a world leader in transport and treatment of wastewater. We provide a complete range of water, wastewater and drainage pumps, equipment for monitoring and control units for primary and secondary biological treatment, products for filtration and disinfection, and related services. ITT Water & Wastewater, headquartered in Sweden, operates in some 140 countries across the world, with plants in Europe, China and North and South America. The company is wholly owned by the ITT Corporation of White Plains, New York, supplier of advanced technology products and services.

To find Royce products near you please visit: [roycetechnologies.com](http://roycetechnologies.com)



ITT Water & Wastewater  
14125 So. Bridge Circle  
Charlotte, NC 28273

Toll Free: 800-347-3505  
Phone: 704-409-9898

Fax: 704-409-9899  
Email: [royce@itt.com](mailto:royce@itt.com)