


Model 2000 Dual Channel Dissolved Oxygen / Suspended Solids Analyzer Specification

General Description

Manufacturer Contact Information and Service Information	Rick Davis Insite Instrumentation Group 80 Whisperwood Blvd. Suite 107 Slidell, LA 70458 Ph – 985-639-0006 Fax – 985-639-0014 e-mail – rdavis@insiteig.com
Analyzer/Sensor General Description 	The Model 2000 Mixed Liquor Analyzer is a two channel analyzer designed for the continuous measurement of dissolved oxygen and/or suspended solids in mixed liquor aeration basin. The microprocessor-based electronics of the Model 2000 analyzer provide a high degree of flexibility and ease of use. The instrument is designed to operate with any combination of InsiteIG sensors in a variety of applications. The DO sensor to be used with this analyzer is an optical type sensor that measures the fluorescence and quenching reactions of a ruthenium complex that is immobilized in a sol-gel matrix. The SS sensor operates on the principle of single gap infrared light absorption as a means of detecting the presence of suspended solids.

Analyzer/Transmitter Operational Data

Ambient condition requirements	Temperature – minus 40 degrees C to 55 degrees C Humidity – 0 to 100 percent Altitude – 0 to 10,000 feet
Display	LCD Graphic Display with 128x64 pixels Readable from 0 to 70 degrees C (display temperature) Contrast adjustable through keypad LED Backlighting
Sensor Check	Automatic self diagnostics
Sensor to Analyzer Distance	2000 feet 610 meters
Power Requirements	115 VAC 60 Hz 230 VAC 50 Hz
Accuracy	Dissolved Oxygen – 1% of reading or 0.02 ppm, whichever is greater Suspended Solids – 3% of reading or 20 mg/l, whichever is greater
Sensitivity or Resolution	Dissolved Oxygen – 0.01 ppm Suspended Solids – 1 mg/l below 1000 mg/l 10 mg/l between 1,000 and 9,999 mg/l

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	100 mg/l above 10,000 mg/l
Repeatability	Dissolved Oxygen – 0.01 ppm Suspended Solids – +/- 0.5%
Consequence of Loss of Sample or Power	User selectable
Measuring ranges	Dissolved Oxygen – 0 to 25.0 ppm 0 to 60 degrees C Suspended Solids – 0 to 30,000 mg/l
Temperature compensation	0 to 60 degrees C
Calibration Method	Dissolved Oxygen – Not required nor recommend during startup. Cal to reference. Suspended Solids – Insitu using gravimetric or portable as reference.
Memory backup	Yes
Analyzer/Transmitter Outputs	
Analog	0 to 20 or 4 to 20 optically isolated milliamp (user selectable) for DO 0 to 20 or 4 to 20 optically isolated milliamp (user selectable) for SS
Digital communication	Modbus RTU RS-232
Relay	There is one independent programmable set point control relay for each channel. These relays are Form-C with contacts rated 10/6 amps resistive load at 125/250 VAC. Two Form-A relays with contacts rated 10/6 amps resistive load at 125/250 VAC are used for the jet clean function. The connections for the relay outputs are available from TB6. See drawing IIG04R011 for connection details.
Analyzer/Transmitter Mechanical Data	
Enclosure Rating	NEMA 4X
Mounting Configurations	Horizontal handrail Vertical handrail Wall mount
Net Weight	Shipping weight is approximately 14 lbs.
DO Sensor Data	

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Electrode Materials	No electrode
Electrolyte Materials	No electrolyte
Sensor Drift	Less than 1% per year
Wetted Materials	Epoxy, silicon, and polyurethane
Temperature Range	0 to 60 degrees C
Minimum Flow Rate	No flow required
Maximum Pressure	100 psi
Measuring Range	0.00 to 25.0 ppm
Response Time	90% in less than 60 seconds
Membrane Thickness	No membrane
Principle of Operation (<i>measuring principle of sensor</i>)	The sensor is an optical type sensor that measures the fluorescence and quenching reactions of a ruthenium complex that is immobilized in a sol-gel matrix.
Sensor Cable	4 conductor, 22 AWG, polyurethane jacket
Temperature Sensor	thermistor
Cleaning System	Not required in most applications. Air or water wash option available.
SS Sensor Data	
Sensor Drift	Less than 1% per year
Wetted Materials	Epoxy and polyurethane
Temperature Range	0 to 65 degrees C
Maximum Pressure	100 psi
Measuring Range	0 to 30,000 mg/l

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Response Time	90% in less than 60 seconds
Principle of Operation	The sensor operates on the principle of single gap light absorption as a means of detecting the presence of suspended solids. The sensor utilizes an infrared emitter to minimize color effects and compensates for emitter variations due to temperature by measuring source brightness. It incorporates self-cleaning optics via air or water jet.
Sensor Cable	4 conductor, 22 AWG, polyurethane jacket
Cleaning System	Air or water wash option available. Strongly recommended that one be utilized.
Sensor / Analyzer Data	
Documentation Provided	Operator Manual, Packing list, Mod bus RTU appendix
Installation and Start-Up Requirements	<p style="text-align: center;"><u>INSTALLATION and STARTUP</u></p> <ol style="list-style-type: none"> 1. A rear rail mounting kit is available for the standard enclosure (see Drawing IIG01N010). This mounting kit is design for a standard 2" handrail but can be adapted to square or angle handrails as well. 2. Mount the sensors in the desired location. InsiteIG can supply a sensor handrail mounting kit that easily mounts to most handrails and slide locks the sensor into place with out the use of tools. (see drawings IIG02N004, IIG02N005, IIG03N004 and IIG03N005). Again, this sensor mounting kit is design for a standard 2" handrail but can be adapted to square or angle handrails as well. 3. Open the enclosure of the Mixed Liquor Analyzer. Pass all connection cables through glands or ½" conduit in the bottom of the enclosure (gland and conduit are not supplied). The sensor input connections are made to the terminal block TB5 labeled SENSOR 1 and TB7 labeled SENSOR 2 (see drawing IIG04R011). The four wires are color coded and there is a cable shield. Connect the RED wire to the terminal labeled "RED". Connect the GREEN wire to the terminal labeled

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	<p>“GRN”. Connect the WHITE wire to the terminal labeled “WHT”. Connect the BLACK wire to the terminal labeled “BLK”. Connect the cable SHIELD to the terminal labeled “SHLD”. Power connections are made to the terminal block labeled TB3. The analog outputs are available on the terminal block labeled TB1 and the relay outputs are available on the terminal block labeled TB6.</p> <ol style="list-style-type: none"> 4. Check switch S4 on the circuit board to be sure that it is set for the type of power being used (115 volts or 230 volts). Turn power "on" by using switch S3. Close and secure the enclosure. 5. After being turned on, the unit will initialize and then jump into the "RUN" mode and begin displaying Channel 1 “CH 1” content on the upper portion of the display and Channel 2 “CH 2” content on the lower portion of the display. <p>Note: The Model 10 sensor undergoes a thorough and accurate test and calibration procedure before shipment from the factory. Calibration of the system at startup is not necessary and is not recommended.</p>
Recommended Spare Parts	none
Maintenance Requirements	<p align="center"><u>MAINTENANCE</u></p> <hr/> <p>The analyzer does not require any periodic maintenance. The sensors must be kept free of debris for accurate readings.</p> <p>Model 10 D.O. Sensor: In normal wastewater aeration basins the Model 10 Sensor will not require a jet clean system; however it is important that the aqueous sample to be measured be allowed to come in contact with the measuring surface. The sensor should be visually inspected on a monthly basis to insure that rags and hair have not completely covered the measuring surface.</p>

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	<p>During this time we recommend rinsing the sensor with a water hose.</p> <p>In systems with high bio-slim and scaling, the integrated jet clean system is recommended to be used to prevent the slim and scale from attaching itself to the measuring surface.</p> <p>Fouling conditions at wastewater treatment facilities varies considerably from plant to plant. Experience gained during the first few months of sensor operation will allow the plant operators to determine their own reasonable schedule of sensor inspection. In no case should this inspection interval exceed one year.</p> <p>Model 15 S.S. Sensor: The sensor does not require any periodic maintenance if the jet clean option is selected (strongly recommended). The sensor must be kept clean for accurate readings. Normally, the jet clean system will adequately perform this function. However, the sensor should be retrieved and cleaned manually on a periodic basis to remove the heaviest fouling that may impair the performance of the sensor. The frequency of this cleaning will vary depending on the application.</p>
Sensor Storage Requirements When Out of Service	None
Level of Skill (<i>required to operate, maintain and calibrate instrument</i>)	Minimal
Special Tools or Other Devices Required for Maintenance and Calibration	none
Warranty	2 year
Manufacturer Service Centers Contact Information	80 Whisperwood Blvd., Suite 107, Slidell, LA 70458 Phone – 985-639-0006
Safety Considerations (<i>while operating, maintaining</i>)	none
Human Exposure to Injury (<i>while operating, maintaining</i>)	none
Annual Cost of Replacement/Calibration Parts	\$0.00