



MODEL 12

Dissolved Oxygen Sensor with SJB-1 Barrier Junction Box

REVISION – January 07, 2016

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Intended Use

The Model 12 Dissolved Oxygen Sensor is intended for use as a submerged sensor in water and wastewater open channel or basin applications for the measurement of dissolved oxygen at parts per million (mg/l) accuracy. This sensor, when used with the SJB-1 barrier junction box, is intended for use in applications where the area immediately surrounding the sensor location has been classified as a hazardous Class 1 Division 2 area. The Model 12 is a functional replacement for the standard InsiteIG Model 10 sensor. This means that the sensor with barrier is compatible for use with any InsiteIG analyzer that supports the Model 10. This list includes, but is not limited to, the Models 1000, 2000, MPA48, and 4000. In this system, only the Model 12 sensor is to be located in the designated hazardous area, while the SJB-1 barrier and the associated analyzer must be located in a non-hazardous area. See drawing IIG02C300. While the standard cable length supplied on a Model 12 sensor is 33 feet, the sensor may be optionally ordered from the factory with cable lengths up to 200 feet to cover scenarios where the non-hazardous area is more distant from the proposed sensor location.

Warning: The protection provided by this equipment may be impaired if used in a manner not intended.

Consult the operational manual of the analyzer for details about sensor readouts, calibration procedures, and control of optional automatic cleaning apparatus.

Detection Method

The Model 12 sensor uses an optical method for determining dissolved oxygen concentrations in aqueous solutions. A special sensing element located at the measuring face of the sensor is formulated to fluoresce when exposed to an internally generated light source. This fluorescence is quenched predictably by the presence of oxygen molecules. By measuring the level of fluorescence and the temperature of the water, the dissolved oxygen value can be determined.



Model 12 Sensor Specifications

The sensor is suitable for use at detecting dissolved oxygen in aqueous solutions in the mg/l (Parts per Million) range of interest. Specifications are as follows:

Ambient Temperature Range: $-20^{\circ}\text{C} \leq T_{\text{AMB}} \leq +50^{\circ}\text{C}$

Power requirements (as supplied by analyzer): 8.5Volts dc at 20mA typical (Red is positive; black is common.)

Signal levels: Green and white wire circuits are digital 0 to 5 Volt dc signals at less than 5 mA

Dissolved Oxygen Range: 0 to 25 mg/l

Resolution: 0.01 mg/l below 4.0 mg/l; 0.1 mg/l above 4.0 mg/l

Drift at 0 mg/l: Typically less than 0.18 mg/l per year

Temperature Measurement Accuracy: $\pm 0.2^{\circ}\text{C}$

Suitable for outdoor use - submerged

Class 1 Division 2 Groups A, B, C, D, T6 per

ANSI/ISA 12.12.01-2015 and CAN/CSA C22.2 No. 213-15

Sensor Input Connections

The Model 12 sensor contains its own embedded microcontroller unit, so that the 4 wire interface consists of only dc power (red), signal common (black), and 2 wires for digital communication (green and white). The communication protocol is a proprietary format. The overall shield in the sensor cable is essential for noise immunity and must be connected as illustrated in the included drawings. When connected as illustrated, the shield circuit will have a single point of connection to earth ground at the analyzer. See drawings IIG02C300 and IIG01R300.

Sensor Mounting

Drawing IIG02N304 depicts the physical dimensions of the Model 12 sensor, while drawing IIG02N305 depicts the appropriate mounting arrangement for a typical handrail mounting application. Note that the sensor must be mounted using the 1-1/2 inch mounting threads on the body of the sensor; DO NOT simply hang the sensor by its electrical cable.



SJB-1 Specifications

The SJB-1 is classified as "Associated Nonincendive Field Wiring Apparatus". The barrier junction box consists of 3 identical passive protection circuits designated red, green, and white. The black wire connection is the circuit common for these 3 circuits. A fifth shield wire connection is also provided to insure continuity of the earth ground connection at the analyzer for the cable shield. Do not add an additional separate earth ground connection to the SJB-1; the shield must have a single connection to earth ground at the source analyzer unit.

The SJB-1 has the following specifications:

Ambient Temperature Range: $-20^{\circ}\text{C} \leq T_{\text{AMB}} \leq +50^{\circ}\text{C}$

Normal operating input: 8.5Vdc at 50 mA

Voltages in excess of 9.5Vdc may blow a non-replaceable fuse

Currents in excess of 100 mA may blow a non-replaceable fuse

SJB-1 is double insulated and no direct connection to earth ground should be made

Suitable for outdoor use. NEMA 4x (IP66) enclosure

Terminals for input and output are marked. See drawings IIG02C300 and IIG01R300.

SJB-1 Mounting

The SJB-1 enclosure must be firmly mounted using the four #6 mounting holes depicted on drawing IIG01N300. For handrail mounting, an optional mounting plate and hardware are available as depicted in drawing IIG01N301.

Electrical Connections

Drawing IIG02C300 is the Control drawing for the use and wiring of the Model 12 sensor in Class 1 Division 2 locations. The Model 12 sensor should not be connected directly to any analyzer unit, but must be wired directly to an SJB-1 barrier box located in a safe area. The analyzer unit shall supply the operating 8.5Vdc power to the Model 12 sensor through the red wire circuit. The green and white wire circuits are for digital communication between the analyzer and the sensor.

During electrical installation, all power must be switched off or disconnected at the source analyzer equipment. The analyzer must be powered by a circuit with a separate disconnect available.

Cleaning

Clean the surfaces of the sensor and SJB-1 with water only. A damp cloth may be used for cleaning purposes.

Field Repairs

The Model 12 Sensor and SJB-1 Barrier box are NOT field repairable items:

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS
MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE
COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR
LES EMPLACEMENTS DE CLASSE 1, DIVISION 2.

Before opening the SJB-1 enclosure, or disconnecting any wiring, be sure to disconnect power to the associated analyzer.

Guarantee and Repair Policy:





The InsiteIG Model 12 Optical Dissolved Oxygen sensor is guaranteed for five years against manufacturing defects. It will be replaced or repaired free of charge during the guarantee period. Call the factory at 985-639-0006 for a return authorization number for traceability. Mark the package to the attention of the R/A number and address it to the factory at 80 Whisperwood Blvd., Suite 107, Slidell, LA 70458. Freight to the factory is to be paid by the customer and items should be insured in case of damage or loss of shipment.

All shipments are insured. If you receive a damaged unit, please notify InsiteIG immediately at 985-639-0006.

Repairs to the equipment not covered by the guarantee will be billed per standard service charges.

Symbol Definitions

Symbols found on this equipment have the following definitions:

	See important information in marked section of the User's Manual
	Equipment is double insulated. Does not require separate earth ground connection for safety.
	Functional earth ground. Indicates that the shield wire is connected to earth ground at the analyzer.
	Direct Current (DC)

IIG02C300

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	-	as approved by Intertek	12/16/15	MDD

Non-Hazardous Area

Associated Nonincendive Field Wiring Apparatus
Conforms to ANSI/UL Std. 61010-1
Cert. to CAN/CSA Std. C22.2 No. 61010-1
Suitable for Outdoor Use, NEMA 4X (IP66)
Ambient Range: $-20^{\circ}\text{C} \leq T_{\text{AMB}} \leq +50^{\circ}\text{C}$
3 Circuits 8.5VDC \equiv 50mA \square

Model 1000
Model 1500
Model 2000
Model MPA-48
or other InsitelG analyzer

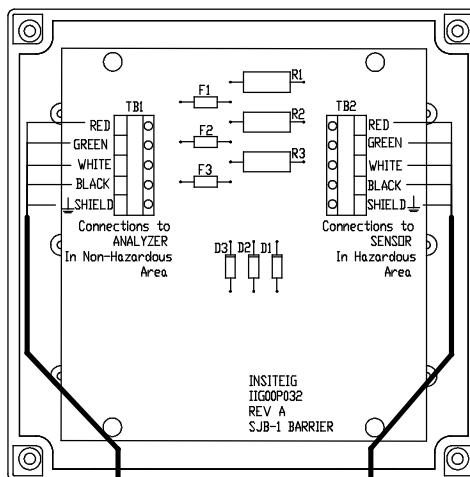
Model SJB-1

Hazardous Area

Nonincendive Equipment Rated
Class 1, Division 2, Group A,B,C,D, T6
Conforms to ANSI/ISA Std. 12.12.01-2015
Cert. to CAN/CSA Std. C22.2 No. 213-15
Outdoor Use Ambient Range: $-20^{\circ}\text{C} \leq T_{\text{AMB}} \leq +50^{\circ}\text{C}$
Model 12 8.5VDC \equiv 20mA
Model 14 8.5VDC \equiv 25mA

Model 12 DO Sensor or
Model 14 SS Sensor

Sensor Nonincendive Field Wiring
Maximum permissible cable length for sensor to
SJB-1 connections is 200ft. Only continuous length
factory installed multiconductor cable can be used
for sensor to SJB-1 connections.
Sensor end of cable is factory potted into sensor.



Model SJB-1 Cover Removed
Customer Connections

Notes:

1. Wiring Methods must be in accordance with NEC ANSI/NFPA 70 or CEC C22.2 & ANSI/ISA 12.12.01 & RP 12.06.01
2. Protection provided by equipment may be impaired if used in a manner not intended.
3. Associated nonincendive field wiring apparatus shall not be connected in parallel.

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UNLESS OTHERWISE
SPECIFIED: DIMENSIONS
ARE IN INCHES
TOLERANCES ON:
FRACTIONS
DECIMALS
ANGLES
MATERIAL —
SPEC —
FINISH —

CONTRACT NO.

SIGNATURES	DATES
DRAFTSMAN	
CHECKER	
DESIGNER	
PROJ. ENGR. M. Dalferes	6/16/15
RELEASED	
APPROVAL	



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Model 12 and 14
Control Drawing Haz. Location

SIZE	FSCM NO.	DRAWING NO.	REV
B		IIG02C300	—
SCALE	NTS	SHEET 1 OF 1	

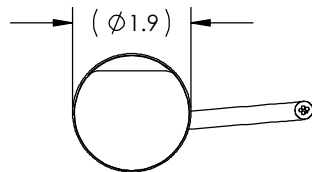
Sensor Cable 33' Standard Length
(custom lengths up to 200ft are
available from the factory)

1/4" Tubing
(Customer Supplied)
See Note 2 and 3

1/4" Push to Connect
Tubing Fitting

1-1/2" NPT
Mounting Thread

Measuring Element




Note:

1. Sensor Material: Epoxy, Polyurethane, PVC, and 316 SS
2. 1/4" tubing to be flexible hard nylon or polyethylene with a 100psi rating or like type tubing. Maximum regulated supply pressure not to exceed 60 psi.
3. See Analyzer Manual for recommended cleaning pressures.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	-	as approved by Intertek	12/16/15	IMDD

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		UNLESS OTHERWISE SPECIFIED:		DATE	NAME	 <div>80 Whisperwood Blvd Sidell, LA 70458 Phone: 985/639-0006 Fax: 985/639-0014 www.insiteIIG.com</div>		
		DIMENSIONS ARE IN INCHES		DRAWN				
		TOLERANCES: ± 0.01 for .XX ± 0.005 for .XXX		CHECKED				
		FRACTIONAL: $\pm 1/16$ ANGULAR: MACHINED $\pm 1^\circ$		ENG APPR.	9/24/15 <i>M. S. Sullivan</i>			
		INTERPRET GEOMETRIC TOLERANCING PER:		MFG APPR.				
				Q.A.		Model 12 Dissolved Oxygen Sensor Outline		
		MATERIAL —		COMMENTS:				
		FINISH —						
NEXT ASSY	USED ON							
APPLICATION						SIZE B	DWG. NO. IIG02N304	REV -
						SCALE: NTS	WEIGHT:	SHEET 1 OF 1

IIG02N305

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
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SENSOR CABLE
TO SJB-11/4" TUBING FOR JET CLEANING
(CUSTOMER FURNISHED)SENSOR PIPE MOUNTING
BRACKET KIT2" DIA HANDRAIL
CLAMPS (316 SS)1-1/2" PVC PIPE
(CUSTOMER FURNISHED)1-1/2" FNPT ADAPTER
(CUSTOMER FURNISHED)

Notes:

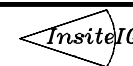
- 1) For best accuracy, in aeration basins, Oxygen measurements should be taken 2ft. below the surface and at least 3ft. from any walls.
- 2) Measurement element surface should not be facing directly upward or downward. Sensor should be clocked to the 3 or 9 o'clock position as shown.

UNLESS OTHERWISE
SPECIFIED: DIMENSIONS
ARE IN INCHES
TOLERANCES ON:
FRACTIONS
DECIMALS
ANGLES

MATERIAL —
SPEC —
FINISH —

CONTRACT NO.

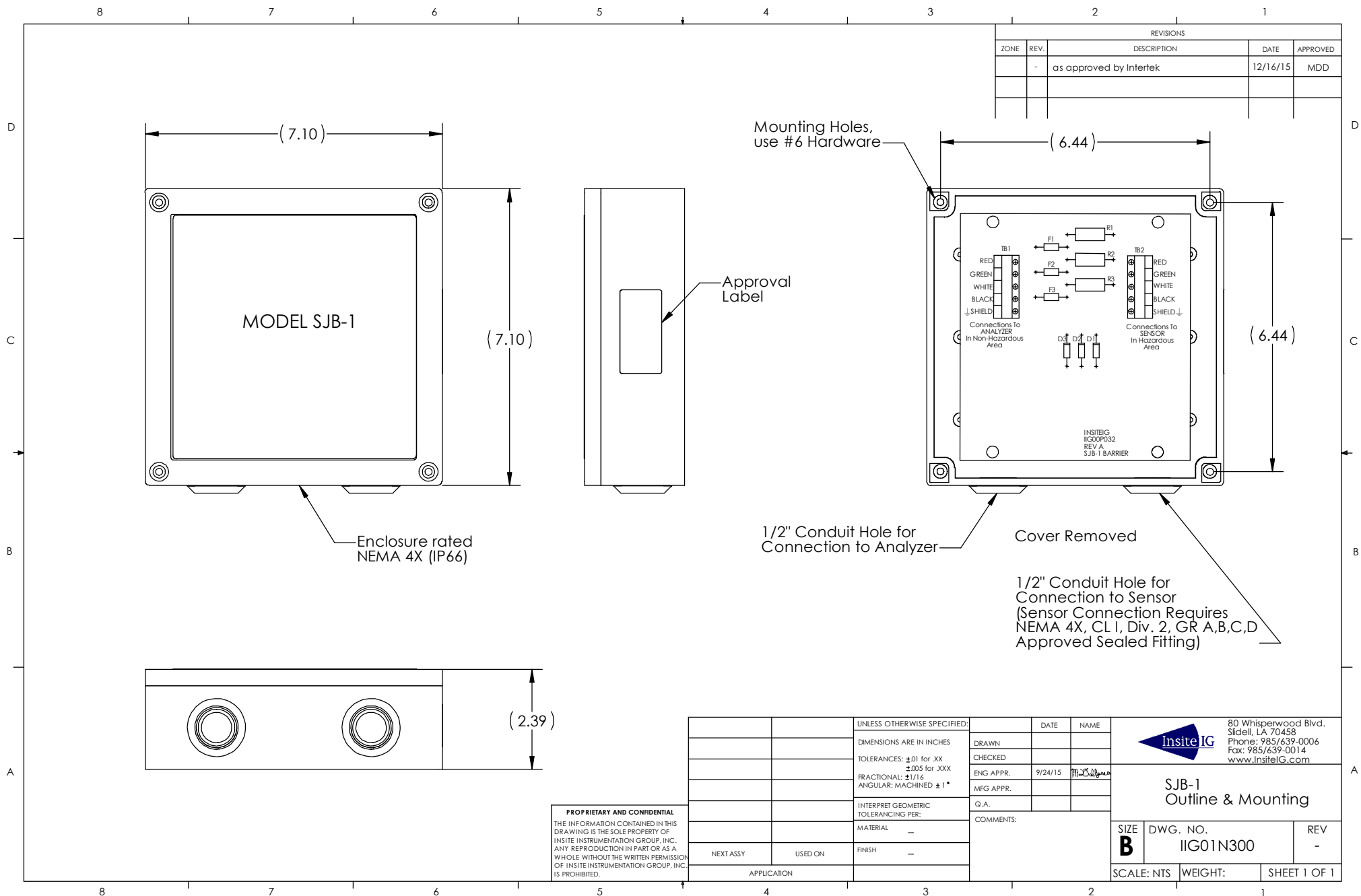
SIGNATURES	DATES
DRAFTSMAN	
CHECKER	
DESIGNER	
PROJ. ENGR. M. Dalferes	9/24/15
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MODEL 12 DO SENSOR
MOUNTING

SIZE	FSCM NO.	DRAWING NO.	REV
B		IIG02N305	-
SCALE	NTS	SHEET 1 OF 1	



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
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Notes:
1. In "Normal Operation" the cover is to remain tightly screwed closed. Under no circumstance is it necessary for the operator to open the enclosure.
2. Before opening, switch off power at the analyzer.

