



MODEL 14
Suspended Solids Sensor
with SJB-1 Barrier Junction
Box

REVISION – January 07, 2016

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Intended Use

The Model 14 Suspended Solids Sensor is intended for use as a submerged sensor in water and wastewater open channel or basin applications for the measurement of suspended solids concentrations 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 14 is a functional replacement for the standard InsiteIG Model 15 sensor. This means that the sensor with barrier is compatible for use with any InsiteIG analyzer that supports the Model 15. This list includes, but is not limited to, the Models 1500, 2000, MPA48, and 4000. In this system, only the Model 14 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 14 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 cleaning apparatus.

Detection Method

The Model 14 sensor uses an infrared light source to perform a light absorption measurement across a fixed sensor gap. With compensation for ambient light and source light variations, this value can be converted to a suspended solids value within the analyzer given the appropriate calibration.



Model 14 Sensor Specifications

The sensor is optimized for use at detecting suspended solids concentrations typically found in wastewater mixed liquor aeration basins, as well as waste activated and return activated sludge channels. 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 25mA 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

Suspended Solids Range: 0 to 30,000 mg/l

Resolution: 3 significant digits, 1 mg/l minimum

Typical Accuracy: 3% of reading within 50% of calibration point

Drift: Typically less than 1% per year

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 14 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 IIG03N304 depicts the physical dimensions of the Model 14 sensor, while drawing IIG03N305 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 14 sensor in Class 1 Division 2 locations. The Model 14 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 14 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 14 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 Model 14 Suspended Solids sensor is guaranteed for two 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

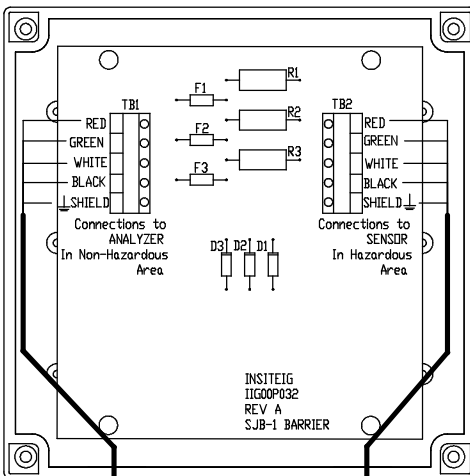
Model SJB-1

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
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| CONTRACT NO. | |
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| DRAFTSMAN | |
| CHECKER | |
| DESIGNER | |
| PROJ. ENGR. M. Dalferes | 6/16/15 |
| RELEASED | |
| APPROVAL | |

| | | |
|---|--|--------------------------|
|  | 80 Whisperwood Blvd. Suite 107 Slidell, LA 70458 | |
| | Model 12 and 14 Control Drawing Haz. Location | |
| SIZE B | FSCM NO. | DRAWING NO. IIG02C300 |
| SCALE NTS | | REV — |
| | | SHEET 1 OF 1 |

8 7 6 5 4 3 2 1

| REVISIONS | | | | |
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| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
| | - | as approved by Intertek | 12/16/15 | MDD |
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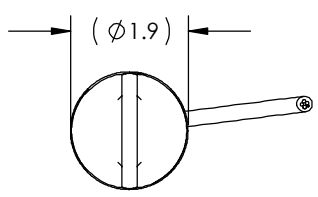
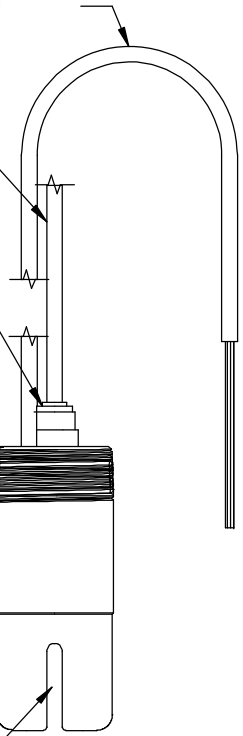
Sensor Cable 33' Standard Length
(custom lengths up to 200ft are available from the factory)

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

1/4" Push to Connect
Tubing Fitting

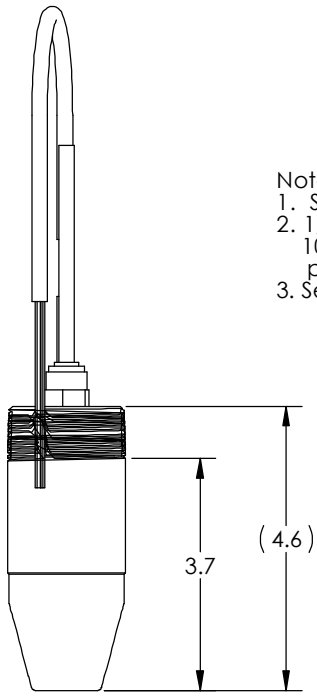
1-1/2" NPT
Mounting Thread

Measuring Gap



Note:

1. Sensor Material: Epoxy, Polyurethane, and PVC
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.



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| DIMENSIONS ARE IN INCHES | | | |
| TOLERANCES: ±.01 for .XX | | | |
| FRACTIONAL: ±.005 for .XXX | | | |
| ANGULAR: MACHINED ± 1° | | | |
| INTERPRET GEOMETRIC TOLERANCING PER: | | | |
| MATERIAL | | | |
| FINISH | | | |
| NEXT ASSY | USED ON | | |
| APPLICATION | | | |



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Fax: 985/639-0014
www.insiteIG.com

Model 14 Suspended Solids Sensor Outline

| | | |
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| SIZE B | DWG. NO. IIG03N304 | REV - |
| SCALE: NTS | WEIGHT: | SHEET 1 OF 1 |

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IIG03N305

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| ZONE | REV | DESCRIPTION | DATE | APPROVED |
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SENSOR CABLE
TO SJB-1

1/4" TUBING FOR JET CLEANING
(CUSTOMER FURNISHED)

SENSOR PIPE MOUNTING
BRACKET KIT

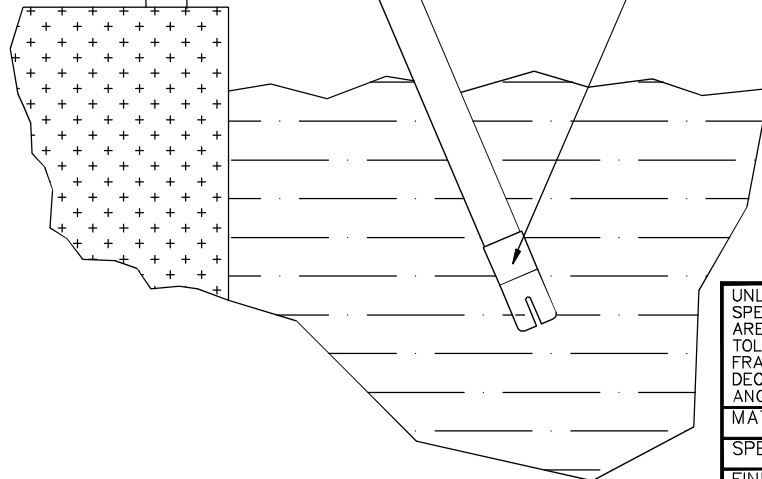
2" DIA HANDRAIL
CLAMPS (316 SS)

1-1/2" PVC PIPE
(CUSTOMER FURNISHED)

1-1/2" FNPT ADAPTER
(CUSTOMER FURNISHED)

Notes:


1) For best accuracy, in aeration basins, Suspended Solids measurements should be taken 2ft. below the surface and at least 3ft. from any walls.



UNLESS OTHERWISE
SPECIFIED: DIMENSIONS
ARE IN INCHES
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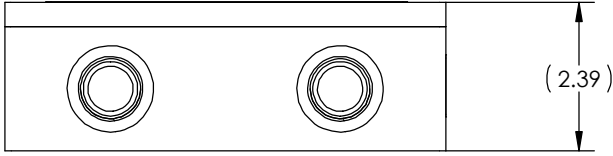
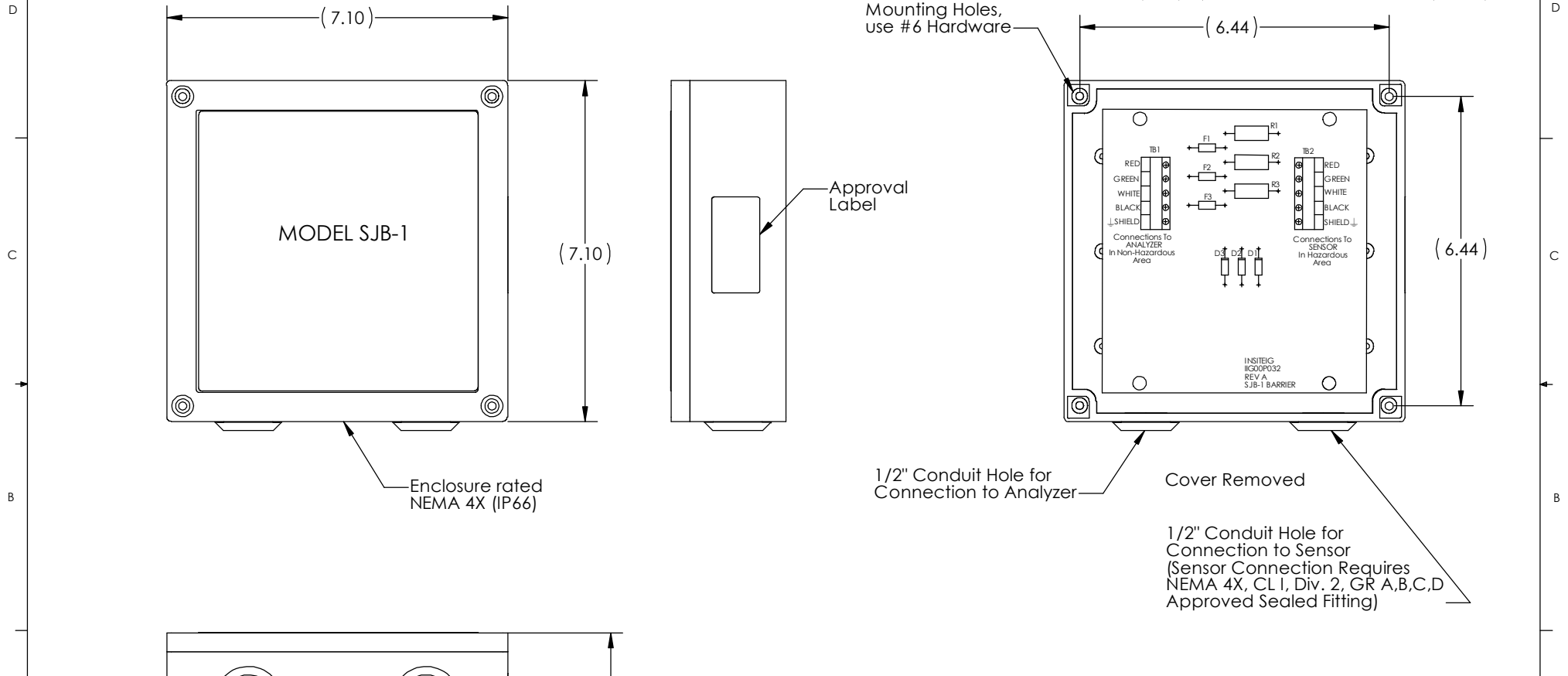
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| CONTRACT NO. | |
| SIGNATURES | DATES |
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| CHECKER | |
| DESIGNER | |
| PROJ. ENGR. M. Dalferes | 9/24/15 |
| RELEASED | |
| APPROVAL | |

| | | |
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|  | 80 Whisperwood Blvd. Suite 107 Slidell, LA 70458 | |
| | MODEL 14 SS SENSOR MOUNTING | |
| SIZE B | FSCM NO. | DRAWING NO. IIG03N305 |
| SCALE NTS | SHEET 1 OF 1 | |

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| | | DIMENSIONS ARE IN INCHES | DRAWN | | |
| | | TOLERANCES: ±.01 for .XX | CHECKED | | |
| | | ±.005 for .XXX | ENG APPR. | 9/24/15 | M. S. S. S. |
| | | FRACTIONAL: ±1/16 | MFG APPR. | | |
| | | ANGULAR: MACHINED ±1° | Q.A. | | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | COMMENTS: | | |
| | | MATERIAL | | | |
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| | APPLICATION | | | | |

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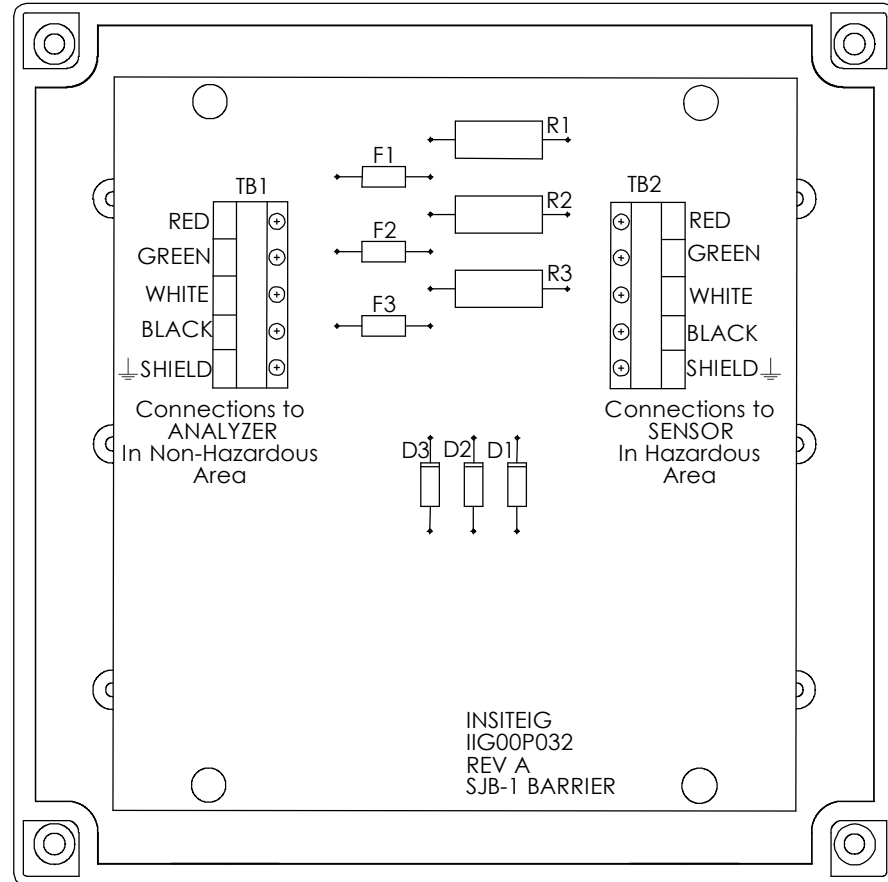
**SJB-1
 Outline & Mounting**

| | | |
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| SIZE B | DWG. NO. IIG01N300 | REV - |
| SCALE: NTS | WEIGHT: | SHEET 1 OF 1 |

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




INSITEIG
 IIG00P032
 REV A
 SJB-1 BARRIER

1/2" Conduit Hole for Connection to Analyzer

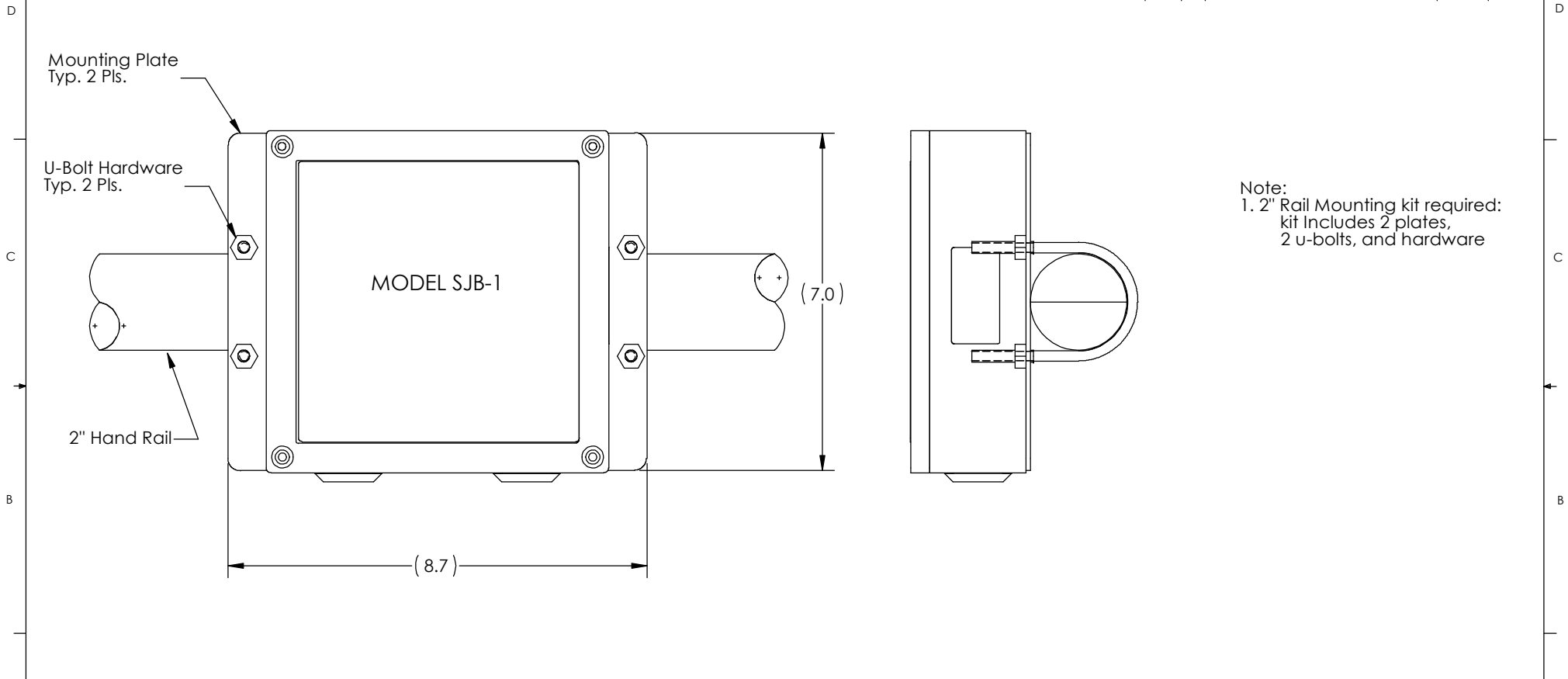
1/2" Conduit Hole for Connection to Sensor
 (Sensor Connection Requires NEMA 4X, CL I, Div. 2, GR A,B,C,D Approved Sealed Fitting)

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| | | DIMENSIONS ARE IN INCHES | DRAWN | | | | | | | | | |
| | | TOLERANCES: ±.01 for .XX ±.005 for .XXX | CHECKED | | | | | | | | | |
| | | FRACTIONAL: ±1/16 ANGULAR: MACHINED ±1° | ENG APPR. | 9/24/15 | <i>[Signature]</i> | | | | | | | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | MFG APPR. | | | | | | | | | |
| | | MATERIAL | Q.A. | | | SJB-1 Customer Connections | | | | | | |
| | | FINISH | COMMENTS: | | | | | | | | | |
| NEXT ASSY | USED ON | | | | | | | | | | | |
| APPLICATION | | | | | | <table border="1"> <tr> <td>SIZE</td> <td>DWG. NO.</td> <td>REV</td> </tr> <tr> <td>B</td> <td>IIG01R300</td> <td>-</td> </tr> </table> | SIZE | DWG. NO. | REV | B | IIG01R300 | - |
| SIZE | DWG. NO. | REV | | | | | | | | | | |
| B | IIG01R300 | - | | | | | | | | | | |
| | | SCALE: NTS | WEIGHT: | SHEET 1 OF 1 | | | | | | | | |

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|-----------|------|-------------------------|----------|----------|
| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
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Note:
 1. 2" Rail Mounting kit required:
 kit includes 2 plates,
 2 u-bolts, and hardware

| | | | | | | | |
|---|-------------|---|-----------|---------|--------------------|--|------------------------|
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| | | | DRAWN | | | | SJB-1 Rail Mounting |
| | | | CHECKED | | | | |
| | | | ENG APPR. | 9/24/15 | <i>M. Sullivan</i> | | |
| | | INTERPRET GEOMETRIC TOLERANCING PER: | | | | Q.A. COMMENTS: | |
| | | MATERIAL | | | | | |
| | NEXT ASSY | USED ON | FINISH | | | SIZE B DWG. NO. IIG01N301 REV - | |
| | APPLICATION | | | | | SCALE: NTS WEIGHT: SHEET 1 OF 1 | |

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