



MODEL 17A
Optical Suspended Solids
Hot Tap Pipe Insertion Sensor
With Removable Sensor Head

REVISION – February 2, 2012

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INSTALLATION.....	4
1. Preparation:.....	4
2. Sensor Alignment.	5
3. Sensor Extraction Procedure	6
4. Jet Clean System:	8
Maintenance:	8
Guarantee and Repair Policy:.....	9

GENERAL INFORMATION

The Model 17A TSS sensor operates on the principle of single gap light absorption as a means of detecting the presence of suspended solids. It is a "Hot Tap" sensor which means the sensor can be removed and installed in the process pipe without shutting down the line. This is accomplished by partially extracting the sensor, closing the ball valve to cutoff line pressure and then removing the sensor completely. To accomplish this, the sensor needs to be made of stainless steel and is quite large (29" long and requires 48" area for maintenance). Because of shear bulk of the sensor, the Model 17A now has a removable sensor head to make maintenance and service more convenient. If the Sensor head, which contains all the electronics, needs to be returned to the factory for service, it is only necessary to extract the sensor, unscrew the sensor head and return the sensor head and cable to the factory.

The Model 17A is designed to work with the Insite!G Model 1500, Model 2000, Model 4000 and Model MPA-48, multi-range analyzers for the continuous measurement of suspended solids in aqueous solutions in pipes. The microprocessor-based electronics of the analyzers provide a high degree of flexibility and ease of use. See the analyzer manual for more details.

The Model 17A TSS sensor has been designed for medium ranges (0 to 30,000 mg/l) as commonly found in aeration basins and RAS lines of wastewater treatment plants. This sensor utilizes an infrared emitter to minimize color effects and compensate for emitter variations due to temperature by measuring source brightness. The sensor incorporates self-cleaning optics via an integrated air or water jet.



Note! – In "Normal Operation" the pressure in the pipe should not exceed 40 psig. The pressure should be as low as possible (Maximum of 20psig) during sensor extraction. INJURY MAY OCCUR IF INSTRUCTIONS ARE NOT FOLLOWED!



INSTALLATION

1. Preparation:

- 1.1. The recommended pipe diameter is 6" and larger. The sensor can be installed in a 4" pipe but the 2" close nipple supplied will need to be replaced with a 2"NPT nipple 3 to 4" long and the sensor will obstruct flow. (Measurements will need to be taken to insure proper sensor penetration.)
- 1.2. To ensure a stable, accurate measurement, the sample must be flowing through the sensor gap. To accomplish this, the sensor must be in a filled pipe and vertical flow must be in the upward direction, and the location should be four pipe diameters from any flow obstructions (bends, reducers, etc.).
- 1.3. Install 2" full port, low profile weld-o-let per manufacture's specification and at the clocked location shown in drawing IIG03N601 sheet 3. The port through the pipe wall must be a minimum of 2.0" Dia. with smooth edges to avoid sensor damage during extraction.
- 1.4. Install the Ball Valve Assembly, Figure 1a., onto pipe using PTFE Thread Compound or Teflon tape. Do not completely tighten. Align the black mark just above the ball valve in line with the centerline of the pipe. Final alignment will be made when sensor assembly is in place. The center of ball valve should be no more than 7.5 inches from inside wall of pipe.



Figure 1a; Ball Valve Assembly in closed position.

- 1.5. Check to make sure that the ball valve can open and close freely.
- 1.6. Close Ball valve. The pipe can be put into service at this time but it is recommended to wait until installation is complete.

2. **Sensor Alignment:** The new Model 17A with removable sensor head has an alignment pointer on the handle, see Figure 2a. To insure proper alignment make sure that the sensor head is screwed in completely and that the pointer is aligned with the sensor gap.



Figure 2a: Alignment Pointer

- 2.1. While sensor is clean and available, now would be a good time to perform a zero calibration. Refer to analyzer operational manual for connection and sensor calibration.
- 2.2. The sensor gap must be in line with the flow of sample to $\pm 10^\circ$. The direction of the gap is indicated by the pointer. Insert Sensor Assembly into the Ball Valve Assembly until the sensor head comes in contact with the ball. See figure 2b.



Figure 2b; Sensor in Extracted Position

- 2.3. Slide Retaining Collar onto the main shaft as shown above and screw it completely down until threads are no longer visible.

- 2.4. Open ball valve and push sensor assembly into the pipe while lining up the pin hole in the collar to the one in the shaft. If the pipe is under pressure, this will be difficult and may require two people. Hold the sensor in while inserting the pin making sure it locks into place. The sensor is now captured.



Figure 2c; Sensor Inserted and Pinned.

Note: ball valve must be completely open for the sensor to pass through.

- 2.5. Once the sensor is pinned in place, use the pointer as an alignment guide and rotate the Ball Valve assembly - Do not use the handle to turn the assembly. Turn the entire assembly at the hex of the ball valve such that the pointer is in-line with the pipe centerline. The gap should be inline with flow $\pm 10^\circ$.
- 2.6. Now that the sensor is installed and aligned, activate the automatic cleaning system and monitor the readings for accuracy and stability.

3. Sensor Extraction Procedure

- 3.1. The sensor need only be extracted for periodic maintenance and calibration. Figure 3a, shows the extracted Sensor Assembly.



Figure 3a; Sensor Assembly

- 3.2. Drop line pressure to below 20 psig or as low as possible. Check the orifice and general condition of the sensor to make sure it is not damaged or in any way unsafe. If the orifice is clogged, use a standard paperclip to unblock the hole. It is important that air is allowed to flow freely through the hole.

- 3.3. Push on sensor handle to off load locking pin and remove pin. **NOTE! DO NOT STAND DIRECTLY BEHIND THE SENSOR.** It will be pushed out with a great deal of force depending on the line pressure in pipe. The sensor will initially pop out about half way and then slow down until it is fully extracted. The orifice in the ball valve assembly will restrict the acceleration of the sensor and allow it to slowly come out.
- 3.4. Once the sensor stops at the retaining collar, close the ball valve. The sensor assembly is now cut off from the line pressure, but there is still a small area around the sensor head that is under pressure. This will quickly dissipate when sensor is removed.
- 3.5. Unscrew the retaining cap at the knurl (do not use a tool...this should be hand tight) Once the retaining cap is unscrewed, the sensor will come out past the o-ring seal releasing the pressure and captured waste.
- 3.6. Pull sensor out. A quick cleaning will be necessary before performing any maintenance.

4. Jet Clean System:

- 4.1. The InsitelG cleaning system uses a pressurized stream of air or water to remove bio growth or other debris from the optical surfaces of our sensors. The InsitelG analyzers control the frequency and duration of the clean cycle through the clean relay, (see drawing IIG01R113). This relay is programmable through the setup menu, see Relays section of the analyzer manual for more detail. It is necessary that Plant water or air be used on the in-pipe sensors. **CHECK RELAY SETTINGS TO BE SURE THAT IT IS SET TO USE CUSTOMER WATER OR AIR.** The customer must supply clean water at 25psig (or air at 30psig) above the line pressure. The supply water (or air) is connected to a customer supplied 2-way solenoid valve and the analyzer need only open the valve to provide the cleaning blast. A check valve with a 1/4" quick disconnect fitting is provided to restrict the backflow of process water out of the sensor. There are no changes required in the sensor head for use with water or shop air. See drawing IIG01R113 of the analyzer operational manual for wire details.

Maintenance:

1. Maintenance: The Analyzer does not require any periodic maintenance. The Sensor Optics 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 heavy fouling around the gap opening that may impair the performance of the sensor. The frequency of this cleaning will vary depending on the application.
2. Lubrication: All moving parts and seals must be lubricated every time the sensor is removed for service or once a year. Use a heavy concentrated silicone lubricant, Clearco silicone grease compound 3005 or equivalent. The stainless steel treads on the retaining collar must be lubricated with anti-seize thread lubricant.
3. The removable sensor head should be removed using a nylon strap wrench and inspected each time the sensor is removed from the pipe. Inspect and lubricate the O-ring crush seal and inspect stainless steel threads and lubricate with anti-seize thread lubricant.
4. The venting orifice on the ball valve assembly must be checked prior to extraction.
 - a. Check to make sure that the venting orifice is there and tight.
 - b. Check that the orifice hole is not clogged. A standard paperclip is the proper diameter and can be used to clear the orifice.
5. The locking pin could get damaged if the force from line pressure is not offloaded during extraction. Inspect the pin for damage or deformation each time the sensor is removed. If pin is damaged another can be ordered from InsitelG or McMaster-Carr (#90293A104).
6. Any leakage from the sensor assembly could be a sign of seal damage or damage to the molded sensor head. Please contact the factory if there is leakage from the cable entry.

Guarantee and Repair Policy:

The InsiteIG Model 17 Optical 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.

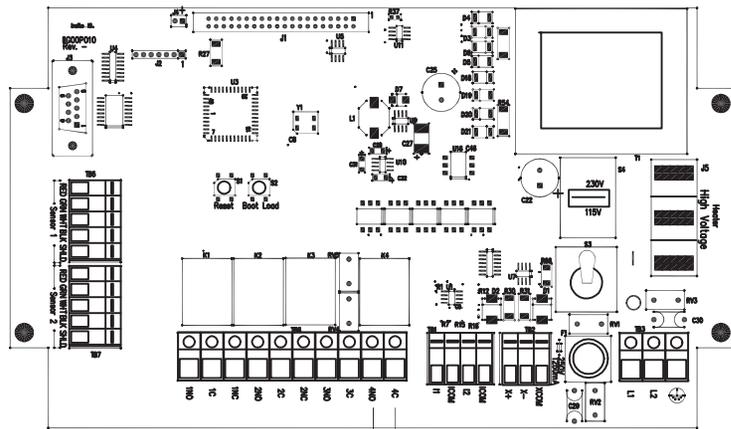
1

2

3

4

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



Rely 4C TO L1

L2

Solenoid L1 to 4NO



NOTES:

1. All solenoid wiring should be per National Electric Code.
2. Solenoid is general duty suitable for air and water to maximize flow at maximum pressure of 60 psi.

2-Way Shutoff Valve
 ASCO P/N 8262G220-115VAC
 OR EQUIVALENT
 1/4" FNPT Connection

ANALYZER CONNECTIONS
FOR SENSOR JET CLEAN

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES DECIMALS ANGULAR .XX ±.010 X' ±1" .XXX ±.005 DO NOT SCALE DRAWING	CONTRACT NO.		 80 Whisperwood Blvd. Suite 107 Slidell, LA 70458	
	DRAWN D. RADLE	DATE		
	MATERIAL —	DESIGN D. RADLE	TITLE SOLENOID JET CONNECTION INSITE IG ANALYZER	
	FINISH —	APPROVED	SIZE C	DWG NO. IIG01R113
SPEC.	CUSTOMER	SCALE NTS		SHEET 1 OF 1

1

2

3

4

D

D

C

C

B

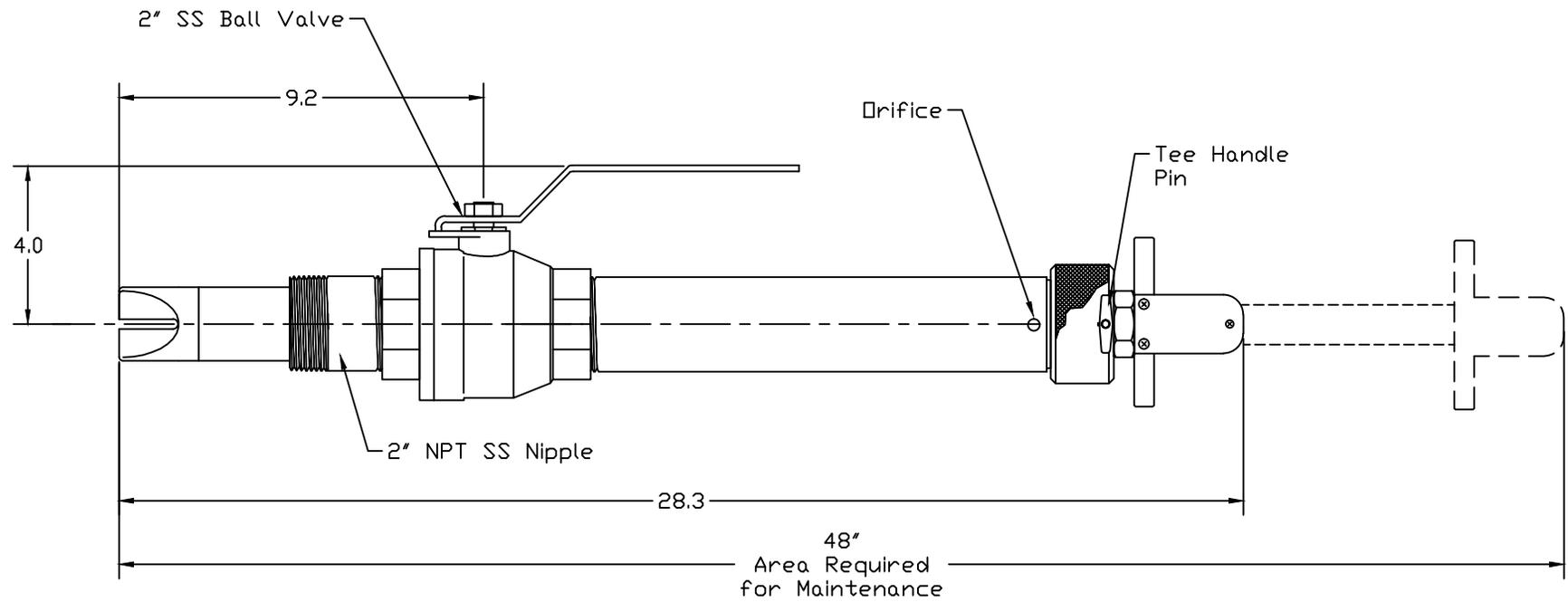
B

A

A

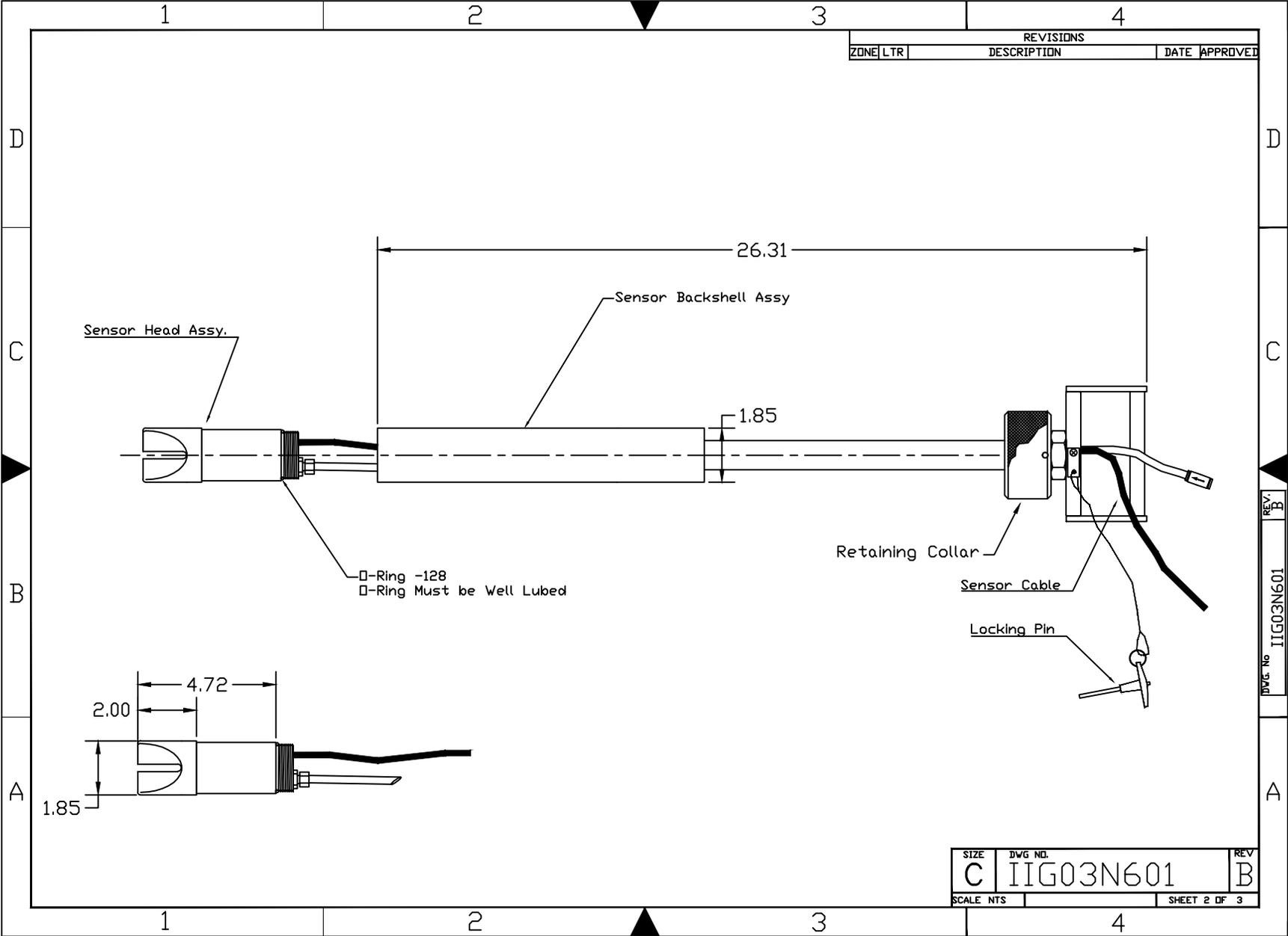
REV. 1
 DWG. No IIG01R113

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	Overall Length 28"	8/10	D.Roadie
	B	Model 17A Removable Sensor Head		

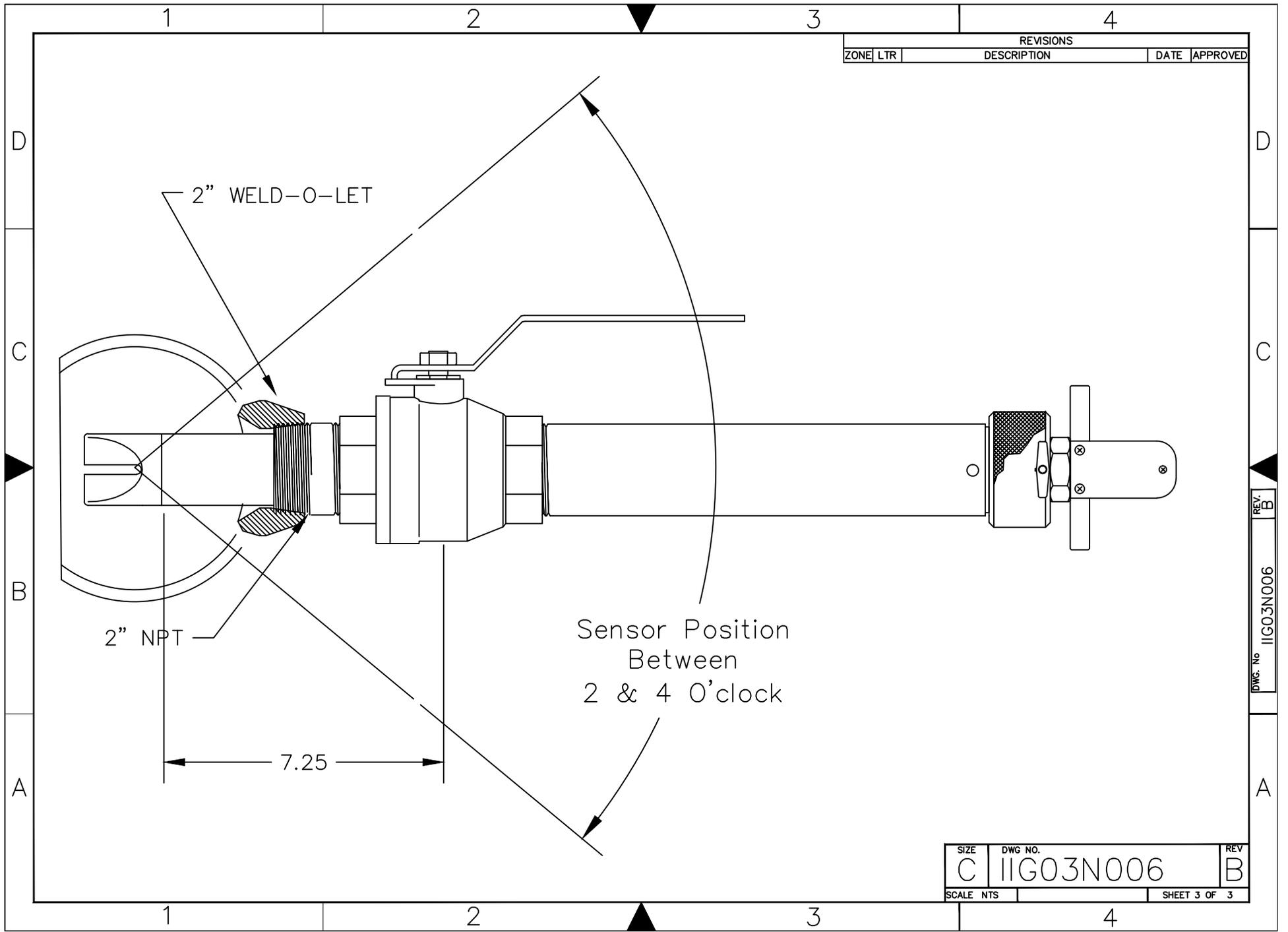


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES DECIMALS ANGULAR .XX ±.010 X° ±1* .XXX ±.005 DO NOT SCALE DRAWING	CONTRACT NO.		 80 Whisperwood Blvd. Suite 107 Slidell, LA 70458						
	DRAWN	DATE							
	CHECK								
	DESIGN								
MATERIAL Listed	APPROVED		TITLE OUTLINE & MOUNTING MODEL 17A Hot Tap						
FINISH -	CUSTOMER		<table border="1"> <tr> <td>SIZE</td> <td>DWG NO.</td> <td>REV</td> </tr> <tr> <td>C</td> <td>IIG03N601</td> <td>B</td> </tr> </table>	SIZE	DWG NO.	REV	C	IIG03N601	B
SIZE	DWG NO.	REV							
C	IIG03N601	B							
SPEC.			<table border="1"> <tr> <td>SCALE NTS</td> <td>SHEET 1 OF 3</td> </tr> </table>	SCALE NTS	SHEET 1 OF 3				
SCALE NTS	SHEET 1 OF 3								

DWG. No IIG03N601
 REV. B



DWG No IIG03N601 REV B



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

2" NPT

7.25

Sensor Position
Between
2 & 4 O'clock

SIZE	DWG. NO.	REV.
C	11G03N006	B
SCALE NTS	SHEET 3 OF 3	

REV. B
 DWG. No 11G03N006