An ISO 9001 certified company
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## Caution:

When installing the IAS™ sampler in a pipeline containing petroleum products, petro-chemicals, waste waters with the presence of pressure & temperature, and high-pressure steam refer to the Pipeline Operators’ “Health, Safety and Environmental Policy Procedures” to ensure safe installation.

KAM CONTROLS, INC. reserves the right to make changes to this document without notice.
INTRODUCTION

AVAILABLE MODELS and MOUNTING OPTIONS

FIG. 1-1
Option 1: Retractable IAS™
on a main pipe, with 2”, 3”, or 4” flanged seal housing

Full-opening Ball Valve

Recommended
KAM® SMS™
Static Mixing Spool

FIG. 1-2
Option 2: Retractable IAS™
on a main pipe, with 1 1/4” or 2” MNPT seal housing

Full-opening Ball Valve

Recommended
KAM® SMS™
Static Mixing Spool
THEORY OF OPERATION

Employing the simplest design in the industry, the KAM® IASTM Isokinetic Automatic Sampler is the ideal instrument for pipeline sampling during custody transfer. The IASTM sampler is designed to extract a representative sample of the pipeline into a KAM® SR™ Sample Receiver. With a KAM® CSM™ Circulating Sample Mixer, you may then mix and analyze the sample for custody transfer, API gravity measurements, shrinkage, chemical composition, etc.

FIG. 1-2

Sampling Chamber

Locking Collar

Seal Housing

Actuator Housing

Air Inlets

Sample Outlet

Pressure Relief Valve

FIG. 1-3

Option 3: IAS™ FT
Flow Through with
2" 150# flanges
INTRODUCTION CONTINUED

FEATURES

• User friendly
• Positive displacement design
• Pneumatic, hydraulic
• Insertable and extractable through full-opening ball valve
• Fast loop and main line models
• Variable insertion
• Simple design
• Isokinetic
• Pressure relief valve

APPLICATIONS

• Custody transfer
• Marine loading, unloading, lightering
• Pipeline
• Truck loading, unloading
• Production
• Refinery
• Power plant fuel oil
• Research
• Quality control in

SAMPLER SEQUENCE

FIG. 1-3
SPECIFICATIONS

Media: Crude oil, refined products, chemicals, water and wastewater

Wetted parts: 316 stainless steel shaft and probe cage
            304 stainless steel sample piston
            Teflon sample chamber seal

Fluid temperature: -40º to 350ºF (-40º to 177ºC)

Power: Air pneumatic, hydraulic

Sample size: 0.5 ml - 3 ml (Please specify)

Repeatability: Exceeds API 8.2

Mounting: Main line - 1 1/4” MNPT, 2” MNPT seal housing,
          or 2”, 3”, or 4” flanged seal housing
          Fast loop - 1/4” FNPT

Pressure ratings: ANSI 150, 300, 600, 900

Probe dimensions: Ø1.25” x 3.1” (32mmh x 79mm)

Shaft length: 30” (762mm) Other sizes available

REQUIREMENTS

Air: 70 to 125 psi

Consumption: 20 cubic inches per stroke

Minimum Sample Time: 1.5 seconds
INSTALLATION

PRIOR TO INSTALLATION

Before installing the IAS™ Sampler, make sure that it was not damaged during transit.

KAM CONTROLS recommends that the IAS™ Sampler be installed 2 to 4 pipe diameters downstream of a KAM® static mixer or flow conditioner. At the time of installation the pipeline pressure needs to be reduced to under 100 psi in order to be able to install the IAS™ Sampler.

The IAS™ Sampler should be installed horizontally at 3 or 9 o’clock. Fig. 3-1.

The IAS™ Sampler Probe should be inserted so that the middle of the sampling window is in the 20% center area of the pipe. Fig. 3-1.

MAIN LINE INSTALLATION

Before mounting the IAS™ Sampler on the Full-Opening Ball Valve, determine the insertion length required.

The IAS™ Sampler should be installed according to Fig. 3-1. The Full-Opening Ball Valve is used to isolate the IAS™ Sampler from the pipeline during installation or removal. The Seal Housing of the IAS™ Sampler allows the Sampler Probe to be inserted in and out of the pipe under pressure and flow conditions up to 100 psi. It is the user’s responsibility to ensure that the IAS™ Sampler is placed in the most representative point in the flow profile. Prior to installation, make sure you have the correct Pressure Relief Valve. The IAS™ Sampler is normally shipped with a PRV designed for pressures up to 750 psi. If the line pressure is greater than 750 psi, please replace the spring inside the PRV with the appropriate Spring. See Table 3-2.

**TABLE 3-2**

<table>
<thead>
<tr>
<th>PRV Spring Cracking Pressure Range (psig)</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 to 350</td>
<td>Blue</td>
</tr>
<tr>
<td>350 to 750</td>
<td>Yellow (included with IAS™ Sampler)</td>
</tr>
<tr>
<td>750 to 1500</td>
<td>Purple</td>
</tr>
<tr>
<td>1500 to 2250</td>
<td>Orange</td>
</tr>
</tbody>
</table>
**INSTALLATION CONTINUED**

1. Lay the IAS™ Sampler on the ground or a table.

2. Loosen Hex Socket Cap Screws on the Locking Collar. Fig. 3-1. This will allow the IAS™ Sampler Shaft to slide through the Seal Housing.

3. Push the IAS™ Sampler Shaft though the Seal Housing until the middle of the sampler window chamber is aligned with the end of the Seal Housing. Fig. 3-3 or Fig. 3-4.

4. Use a Sharpie or other permanent marker to mark the shaft at the edge of the Locking Collar. (Do not use anything sharp to mark the shaft. This will create grooves that will damage the O-rings in the Seal Housing.)

5. Pull Shaft back until the Probe is all the way in the Seal Housing and tighten the Hex Socket Cap Screws on the Locking Collar. This will prevent the IAS™ Sampler Shaft from sliding and the Probe will be protected inside the Seal Housing.

6. Measure the distance (D1) from the top of the main pipe to the end of the connection where the IAS™ Sampler is going to be installed. Fig. 3-5.
7. Calculate the insertion distance using the following formula:

\[
\text{TID} = \text{D1} + \text{WT} + \left( \text{Pipe ID} \times \frac{7}{16} \right) + \text{Seal Thickness}
\]

**For Flanged Seal Housing**

Example:

- D1 = 14"
- WT = 0.25"
- ID = 8.125"
- Seal Thickness = 1/8"

\[
\text{TID} = 14 + 0.25 + (8.125 \times \frac{7}{16}) + 0.125 = 17.93
\]

**For 2" MNPT Seal Housing**

TID cannot be calculated until the Seal Housing is screwed into place. Bolt or Screw the IAS™ Sampler to the Valve or designated installation location. (KAM CONTROLS recommends liquid thread sealant and not teflon tape for the threaded IAS™ Sampler.)

You must then measure the Threaded Depth (TD) into the Valve or connection in order to calculate TID. You can do this by measuring the distance from the edge of the Valve or female connection to the top of the Seal Housing body and subtracting that distance from 5.25". Fig 3-6.

\[
\text{Total Insertion Distance (TID)} = \text{D1} + \text{WT} + \frac{7}{16} \times \text{Pipe ID} - \text{Threaded Depth (TD)}
\]

**Example:**

If the measured distance from the top of the Valve and the top of the Seal Housing body is 4.65" you should calculate the threaded depth (TD) by subtracting 4.65" from 5.25". \( (5.25 - 4.65 = 0.6) \)

In this case the threaded depth (TD) would be 0.6"
You are now ready to calculate the TID.

\[ \text{TID} = D_1 + WT + (\text{Pipe ID} \times \frac{7}{16}) - TD \]

**Example:**
- \( D_1 = 14" \)
- \( WT = 0.25" \)
- \( \text{ID} = 8.125" \)
- \( TD = 0.6" \)

\[ \text{TID} = 14 + 0.25 + 3.55 - 0.6 = 17.2 \]

8. Use the Calculated TID and make another mark on the shaft, measuring from First Mark. Fig 3-7.

9. If you have an IAS™ Sampler with a Flanged Seal Housing, you may now attach it to the Valve on the pipeline.

10. Slowly open Full Opening Valve and check for leaks.

11. Loosen Socket Head Screw on the Locking Collar.

12. Align Window of the IAS™ Sampler to face the flowing stream. This can be done by aligning the Flow Indicators in parallel with the main pipe. The Flow Indicators are located at the bottom of the Actuator Housing.

13. Push the IAS™ Sampler in until the Second Mark is at the top edge of the Locking Collar. Fig. 3-8.
14. Re-tighten the Hex Socket Cap Screw.

15. Tighten the Hex Nuts holding the Locking Collar from ¼ to ½ of a turn. The Hex Nuts holding down the Locking Collar should never be over tightened. Their major function is to apply light pressure on the Chevron Packing to ensure a seal between the Seal Housing Body and the Insertion Shaft. Fig. 3-9.

16. The PRV arrives set at the maximum cracking pressure for the spring installed (normally a yellow spring for 750 psi). If the maximum pressure does not exceed 350 psi, set the cracking pressure to the lowest cracking pressure for the PRV by twisting the cap 8 turns counter-clockwise. The PRV is going to have the highest cracking pressure when the cap is screwed all the way in and the lowest cracking pressure when the cap is almost all the way out. If your line pressure is within the range of the cracking pressure of the PRV, take the following steps to set the correct cracking pressure:

a) Slowly turn the cap counter-clockwise until liquid starts to come out of the PRV outlet.

b) Turn the cap two turns clockwise to stop the leak and set the PRV cracking pressure 200psi above the current pressure.

c) Tighten lock nut against the cap.

d) Lock wire cap and body together to maintain set pressure.

Once you have set the PRV cracking pressure you are ready to make the field air connections.
FIELD AIR CONNECTIONS

1. Using Stainless Steel Tubing or Stainless Steel Braided Hose, connect the normally open port (usually marked with a letter "A" or "NO") of the Solenoid Valve to the bottom of the Actuator Housing. Connect the normally closed port (usually marked "B" or "NC") to the top of the Actuator Housing. Fig. 3-10.

2. Connect the Solenoid Valve Coil to a KAM® SC™ Sampler Controller according to the manual for the Solenoid Valve. The SC™ Controller should be programmed in a way that it energizes the coil for at least 1.5 seconds. Every time the coil is energized and de-energized the IAS™ Sampler will take a sample.

3. Using a combination of ¼" Stainless Steel Tubing and Stainless Steel Braided Hose, connect the IAS™ Sampler PRV outlet to the inlet of a Sample Container.

FIG. 3-10
INSTALLATION CONTINUED

REMOVING THE IAS™ SAMPLER

1. Turn off the air supply going to the Solenoid Valve.

2. Disconnect the ¼" air connections going to the IAS™ Sampler Actuator Housing.

3. Disconnect the ¼" connection going to the IAS™ Sampler sample outlet.

   It is very important to depressurize the pipeline to below 100 psi. Ideally the pressure needs to be close to 0 psi. Failure to do so could result in injury or damage to the sampler.

4. Once all the connections going to the IAS™ Sampler are removed, slowly loosen the Locking Collar by turning the Hex Socket Cap Screws counter-clockwise. If there is pressure on the line, it will push the IAS™ Sampler out when the Locking Collar is loose. If there isn’t enough pressure on the line, manually pull the IAS™ Sampler until the end of the probe stops inside the Seal Housing.

5. Tighten the Locking Collar by turning the Socket Cap Screws clockwise to prevent the IAS™ Sampler from sliding back in the pipeline or in the way of the Isolation Valve.

6. Close the Isolation Valve.

7. Remove the IAS™ Sampler from the Isolation Valve.

FIG. 3-11
During normal operation of the KAM® IAS™ Sampler, some seals will wear. In order to ensure continuous accurate sampling, KAM CONTROLS recommends replacing the seals on your IAS™ Sampler every six months.

A complete kit with all the IAS™ Sampler O-rings, seals, etc. can be ordered by contacting KAM CONTROLS at sales@kam.com and requesting Seal Kit 91000 or by calling +1 713-784-0000 or faxing your request to +1 713-784-0001.

### TABLE 4-2 SEAL KIT 91000

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>PART #</th>
<th>QTY</th>
<th>REPLACEMENT FREQUENCY</th>
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<tbody>
<tr>
<td>1</td>
<td>2-014 Viton O-ring</td>
<td>91005</td>
<td>2</td>
<td>Biannually or every time maintenance is performed</td>
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<tr>
<td>2</td>
<td>2-014 Teflon Back-up ring</td>
<td>91021</td>
<td>2</td>
<td>Biannually or every time maintenance is performed</td>
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<tr>
<td>3</td>
<td>Conical Check</td>
<td>90785</td>
<td>1</td>
<td>Yearly or when damaged</td>
</tr>
<tr>
<td>4</td>
<td>Check Spring</td>
<td>90786</td>
<td>1</td>
<td>Yearly</td>
</tr>
<tr>
<td>5</td>
<td>2-011 Viton O-ring</td>
<td>91004</td>
<td>1</td>
<td>Yearly</td>
</tr>
<tr>
<td>6</td>
<td>2-020 Viton O-ring</td>
<td>91012</td>
<td>1</td>
<td>Yearly</td>
</tr>
<tr>
<td>7</td>
<td>2-020 Teflon Back-up ring</td>
<td>91013</td>
<td>1</td>
<td>Yearly</td>
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<tr>
<td>8</td>
<td>2-114 Viton O-ring</td>
<td>91017</td>
<td>4</td>
<td>Biannually or every time maintenance is performed</td>
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<tr>
<td>9</td>
<td>2-114 Teflon Back-up ring</td>
<td>91018</td>
<td>4</td>
<td>Biannually or every time maintenance is performed</td>
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<td>10</td>
<td>2-022 Viton O-ring</td>
<td>91014</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
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<td>11</td>
<td>2-022 Teflon Back-up ring</td>
<td>91015</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
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<tr>
<td>12</td>
<td>4300 Series Polypack</td>
<td>90230</td>
<td>4</td>
<td>Biannually or every time maintenance is performed</td>
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<td>13</td>
<td>PSP-338A Seal</td>
<td>91020</td>
<td>1</td>
<td>Yearly</td>
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<td>14</td>
<td>2-234 Neoprene O-ring</td>
<td>91019</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
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<td>15</td>
<td>4615SH959 Wiper Seal</td>
<td>90211</td>
<td>3</td>
<td>Every two years or if damaged</td>
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<td>16</td>
<td>2-018 Neoprene O-ring</td>
<td>91016</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
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<td>17</td>
<td>2-024 Viton O-ring</td>
<td>91001</td>
<td>2</td>
<td>Biannually or every time maintenance is performed</td>
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<td>18</td>
<td>2-214 Viton O-ring</td>
<td>91007</td>
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<td>19</td>
<td>2-214 Teflon Back-up ring</td>
<td>91115</td>
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<tr>
<td>20</td>
<td>Teflon Chevron Packing</td>
<td>91110</td>
<td>1</td>
<td>Yearly</td>
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<tr>
<td>21</td>
<td>Suction Relief Spring</td>
<td>90789</td>
<td>1</td>
<td>Only if damaged</td>
</tr>
<tr>
<td>22</td>
<td>Suction Relief Valve</td>
<td>90788</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
</tr>
<tr>
<td>23</td>
<td>Bottom Stop Teflon Seal</td>
<td>90100</td>
<td>1</td>
<td>Biannually or every time maintenance is performed</td>
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</table>
MAINTENANCE CONTINUED

TAKING THE IAS™ SAMPLER APART TO REMOVE THE SEALS

1. To perform maintenance the IAS™ Sampler first needs to be removed from the pipeline according to the instructions in Section 3, page 11.

2. Once you’ve removed your IAS™ Sampler from the pipeline, clean all surfaces as much as possible.

3. Place the IAS™ Sampler on a clean work surface and loosen the Locking Collar by turning the Hex Socket Cap Screws counter-clockwise. Fig. 4-3.

4. Slide the Seal Housing back until the Sampling Chamber is completely exposed.

5. Remove the Sampling Chamber from the shaft using a 1 1/8” wrench on the wrench flat and turning it counter-clockwise. Fig. 4-3.

6. Retighten the Hex Socket Cap Screws. Using the wrench flat on the seal housing, turn the Seal Housing and Outer Shaft in a counter clockwise direction to unscrew them from the Seal Chamber. WARNING: DO NOT use a pipe wrench on the Outer Shaft as this could damage the shaft and Sample Tube, prohibiting sampling motion. Slide Seal Housing and Outer Shaft off Sampling Tube. Fig. 4-4.
7. Loosen Hex Socket Cap Screws once again and slide Seal Housing off Outer Shaft. Fig. 4-5.

8. Remove the (4) ¼” Socket Set Screws holding the Seal Chamber to the Actuator Housing using a 3/16” allen wrench. Fig. 4-6.

9. Pull Seal Chamber away from the Actuator Housing and completely off the Sample Tube. Normally, Seal Bushing #1 will slide with the Seal Chamber down the Sample Tube until it hits the Sample Piston. Pull the Seal Chamber free of Seal Bushing #1. Seal Bushing #2 will either remain against the Actuator Housing, or slide down the Sample Tube with Seal Bushing #1. Fig. 4-7.
MAINTENANCE CONTINUED

9. Remove the Sample Piston by turning it counter-clockwise using a 5/8” wrench. Fig. 4-8.

10. Slide Seal Bushing #1 off the Sample tube. Fig. 4-8. If Seal Bushing #1 did not slide free of the Actuator Housing when you removed the Seal chamber, you can remove it when you disassemble the Actuator Housing. Fig. 4-9.

11. If Seal Bushing #2 slid free of the Actuator Housing when you removed the Seal chamber, slide it off the Sample Tube. If not, it will be removed when the Actuator Housing is disassembled. Fig. 4-9.

12. Remove (6) ¼” Bolts from the Actuator Housing using a 7/16” nut driver/wrench, including the two bolts anchoring the Sample Outlet Plate to the Actuator Housing. Fig. 4-9.

13. Using a 1/2” wrench, remove 1/8” NPT Male Adapter on the Sample Outlet Tube from the Piston Actuator Tube. Fig. 4-9.
MAINTENANCE CONTINUED

14. Remove Actuator Housing Lid by pushing the Sample Tube toward the Actuator Housing. The Actuator Housing Lid should lift off the housing body. If you are unable to push the lid off the Actuator Housing by hand, this can be done by forcing compressed air into the Air Inlet on the Actuator Housing. CAUTION: Stand clear of the end of the housing. Fig. 4-10.

15. Slide Piston Disk Assembly and Sampling Tube completely free of the Actuator Housing. Fig. 4-10.

16. Slide Seal Bushing # 2 from the inside of the Actuator Housing if it did not come out on step 10. Fig. 4-10.

17. Remove (4) 6 3-2 * 1/2 Flat Head Phillips Screws in Piston Disk Spacer. Fig. 4-11. Unscrew Piston Disk from Piston Actuator Tube and slide off.
MAINTENANCE CONTINUED

REPLACING THE SEALS AND O-RINGS

1. Remove the bottom Stop from the Sampling Chamber by unscrewing it. Fig. 4-11.

2. Clean as necessary.

3. Remove the Top from the Bottom Stop. To do so, use a 5/32 hex wrench and turning it counter clockwise. Replace the Teflon Seal. Fig. 4-11.

4. Replace Top in Bottom Stop, then place a drop of Loctite 242 on Bottom Stop threads, and screw Bottom Stop back into the Sampling Chamber. Fig. 4-11.

5. Replace the PSP seal from the exterior of the Piston Disk. Replace 2-018 O-ring. Fig. 4-12.
6. On Seal Bushing #1 remove worn Wiper Seal, O-rings and Teflon Backups using a small pick or screwdriver. Insert the first replacement Teflon Backup by squeezing it into an oblong shape and pushing it through the center of the Seal Bushing until it catches inside the back groove. Continue pushing the Backup into the groove until it snaps into place. Then, using the same procedure, place an O-ring 2-114 directly in front of the Teflon Backup inside the same groove. Repeat the process for the second Teflon Backup and O-ring, then replace the Wiper Seal on the end of Seal Bushing #1. Fig. 4-13.

7. On Seal Bushing #2, remove worn Wiper Seal and Polypack Seals using a small pick or screwdriver. Replacing the center Polypack Seals (2 and 3) first. Squeeze the Polypack Seal into an oblong shape and insert through the end of the Seal Bushing until it catches on one of the two interior grooves. Polypack Seals are directional. It is very important to install the center Polypack Seals with the O-ring/grooved side facing the Wiper Seal end of the Seal Bushing according to Figure 4-13. Once you’ve installed the two center Polypack Seals, replace their corresponding O-rings. Then replace the outer Polypack Seals (1 and 4) and O-rings in the same way, making sure that Polypack Seal 4 on the end away from the Wiper Seal faces in the opposite direction from the other three. Replace the Wiper Seal and the two outer O-rings.
8. Using the same method as in step 6 and 7, replace Teflon Backups, O-rings and Wiper Seal on the interior of the Actuator Housing Lid with the O-rings toward the interior side of the lid and the Wiper Seal toward the exterior. Then replace the large exterior O-ring (2-234) on the lid. Fig. 4-14.

9. To change the O-rings and Chevron Packing within the Seal Housing, first remove the ½” Locking Nuts on the end of the Seal Housing. Fig 4-15. Then remove the clamp and bushing. Replace the Teflon Back-up Ring, O-ring and Chevron Packing in the manner described in step 6.
10. Replace two back-ups and one O-ring (2-014) from Sample Piston. Fig. 4-16.

11. Replace the two O-rings and two back-ups in the Seal Chamber using the method described in step 6. Fig. 4-16a.
1. Slide Piston Disk back over Piston Actuator Tube and screw into place. Slide Piston Disk Spacer over tube from the opposite end and secure in place with 6 3-2 * 1/2 Flat Head Phillips Screws. Fig. 4-17.

2. Slide Sample Tube and Piston Disk Assembly back into the Actuator Housing. Fig. 4-18.

3. Slide Actuator Housing Lid onto Piston Actuator Tube and push into Actuator Housing until it snaps into place. Make sure you align the two Air Inlets in the appropriate positions to reattach to air supply. Fig. 4-18.
4. Coat the ends of the (6) $\frac{1}{4}''$ Actuator Housing Lid bolts with Loctite 242. Using a $\frac{7}{16}''$ wrench, reattach the Actuator Housing Lid and Sample Outlet Plate, making sure to use the (2) 1 $\frac{1}{4}''$ bolts in the Sample Outlet Plate. Tighten the 6 bolts gradually and evenly. Fig. 4-19.

5. Reconnect the Sample Outlet Tube to the Piston Actuator Tube. This is easiest if you first remove the Male Adapter from the Compression Fitting. Wrap one end of the Male Adapter in teflon tape, then screw it into the Piston Actuator Tube using a $\frac{1}{2}''$ wrench and holding the Piston Actuator Tube Shaft in place with a $\frac{9}{16}''$ wrench. Then attach the Compression Fitting at the end of the Sample Outlet Tube to the exposed end of the Male Adapter. Fig. 4-19.

6. Slide Seal Bushing #1 down into Seal Chamber, Wiper Seal end first. Then put Seal Bushing #2 into Seal Chamber, Wiper Seal end first. Fig. 4-20.
7. Slide Seal Chamber back onto the Sampling Tube until Seal Bushing #2 rests against the Actuator Housing. Reconnect the Seal chamber to the Actuator Housing using the (4)¼" Socket Screws tightened gradually and evenly. Fig. 4-21.

8. Put Loctite 242 on exposed threads of Outer Shaft, then slide Outer Shaft over Sampling Tube and screw into Seal Chamber, tightening by hand. Fig. 4-22.

9. Force compressed air into the Air Inlet on the Actuator Housing Lid (FIG. 4-22) until the Sampling Tube extends outside the end of the Outer Shaft and the threads are visible. Fig. 4-23a.

10. Reassemble Sample Piston, putting the Conical Check back in place and slipping a new Spring over the top. Fig. 4-21a. Wrap teflon tape on the threaded end of the Sampling Tube, then use a 9/16" wrench on the wrench flat located on the outside end of the Actuator Housing to hold the Sampling Tube in place, and screw the Sample Piston onto the Sampler Tube. Fig. 4-23b.
11. Force compressed air into the Air Inlet on the Actuator Housing to push the Sampler Tube back into place. Fig. 4-24.

12. Slide the Seal Housing onto the Outer Shaft. Fig. 4-25.

13. Using Loctite 242 on the exposed threaded end of the Outer Shaft, reattach the Sampling Chamber to the Outer shaft. Fig. 4-25.

14. Slide the Seal Housing down until it rests against the Sampling Chamber and tighten into place issuing the Hex Socket Cap Screws in order to protect the sampling chamber during transport. Using the wrench flat on the Seal Housing, turn Seal Housing (and Outer Shaft) in a clockwise direction to fully tighten seal between Outer Shaft and Seal Chamber. Fig. 4-26.
MAINTENANCE CONTINUED

You are now ready to test the reassembled IAS™ Sampler.

1. Place the sampling end into a bucket of water. Force air through the air inlets to create the sampling piston action. Capture multiple samples in a beaker and measure for consistency.

2. Reinstall your IAS™ using the steps outline in section 3.
TROUBLESHOOTING

Problem: Poor sample draw or no sample
Solution: Double check Spring inside Sample Piston and the O-ring on the Bottom Stop and replace if broken or worn.

Problem: Oil in air lines
Solution: Usually, this means that the Seals inside the Seal Bushings are worn out. Perform standard maintenance. If problem persists, the Piston Tube may be scratched and will need to be replaced.

Problem: Piston’s not moving
Solution: Check air supply and solenoid valve

Problem: Oil leaking through Seal Housing
Solution: Perform routine maintenance replacing O-rings, Seals, etc.