



a

**Installation,
Operation,
&
Maintenance
Manual**

**Welker[®] Adjustable Probe with Check
Valve and Welker[®] Automatic Insertion
Probe with Check Valve**

Models

AP-3MI & AIP-3MI

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described above. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker reserves the right to make changes to this and all products to improve performance and reliability.

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INTRODUCTION

1. GENERAL

1.1 Introduction

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manual* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use. If you have any questions, please call 1-800-776-7267 in the USA or 1-281-491-2331.

The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.

Notes, Warnings, and Cautions



NOTE

Notes emphasize information or set it off from the surrounding text.



CAUTION

Caution messages appear before procedures that, if not observed, could result in damage to equipment.



WARNING

Warnings alert users to a specific procedure or practice that, if not followed correctly, could cause personal injury.

1.2 Product description

The Welker Adjustable Probe with Check Valve and the Welker Automatic Insertion Probe with Check Valve are designed to inject a desired amount of product into a pressurized pipeline. The probes are equipped with check valves that are set above pipeline pressure, allowing the injection product to flow through the probe and then directly into the pipeline.

On the Automatic Insertion Probe, a hydraulic oil reservoir uses pipeline pressure to allow for a smooth insertion and retraction. The oil in the reservoir is applied on a piston attached to the shaft to assure a smooth travel. The reservoir is shipped from the factory with the necessary oil volume. It should be noted that the unit is also shipped from the factory with the assumption that the installation will be vertical. In cases where the unit is mounted horizontally, the operator will have to rotate the reservoir 90 degrees. **The internals of the reservoir will not function properly if the oil reservoir is placed in a horizontal position.** See step 4 of Section 2.2 for instructions on installing the reservoir horizontally.

Injection Nozzle

Both devices have the option of being equipped with an injection nozzle. The nozzle is used with low pressure pipelines (500 max psi) and will disperse the product in a more efficient manner than the typical straight tube.

SPECIFICATIONS

1.3 Specifications

N NOTE

The specifications listed in this Section are generalized for this equipment. Welker can modify the equipment according to your needs. However, please note that **the specifications may vary depending on the customization of your product.**

Table 1

AIP-3MI Specifications	
Products	Gases/Liquids
Materials of Construction	316 Stainless Steel, Viton [®] , and PTFE [®] (others available)
Insertion Length	18" (457 mm) (others available in 6" increments)
Sample Inlet Connection	¼" FNPT
Pipeline Connection	1" MNPT (other NPT and flanged connection available)
Shaft Outlet	¾" (others available)
Maximum Allowable Operating Pressure	2160 psi @ -20° F to 100° F (148 bar @ -29° C to 37° C)

Table 2

AP-3MI Specifications	
Products	Gases/Liquids
Materials of Construction	316 Stainless Steel, Viton [®] , and PTFE [®] (others available)
Insertion Length	18" (457 mm) (others available in 6" increments)
Sample Inlet Connection	¼" FNPT
Pipeline Connection	1" MNPT (other NPT and flanged connection available)
Shaft Outlet	¾" (others available)
Maximum Allowable Operating Pressure	1000 psi @ -20° F to 100° F (68 bar @ -29° C to 37° C)

SPECIFICATIONS

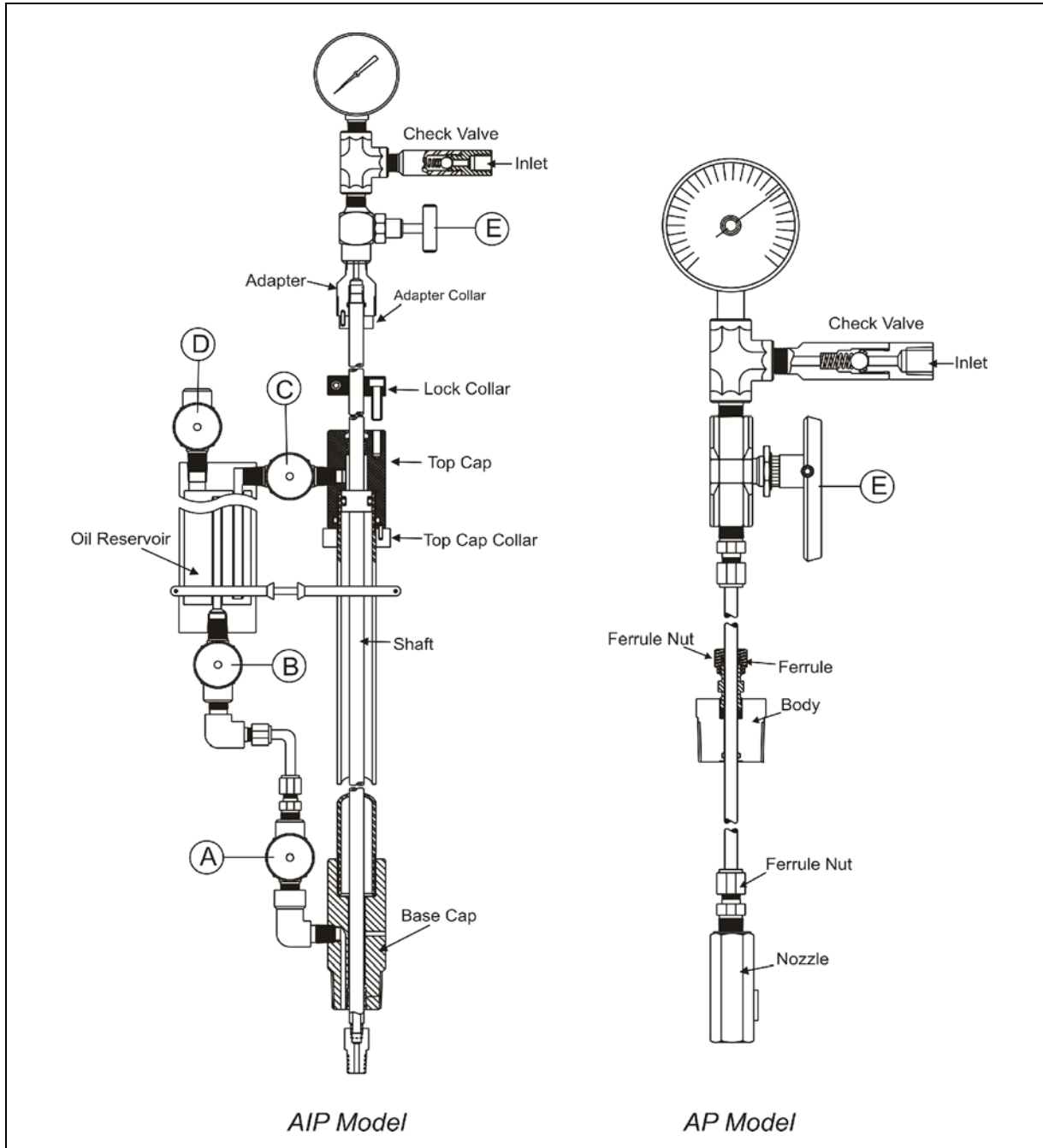


Figure 1

Refer to this Figure throughout the installation and operation process.

INSTALLATION & OPERATION

2. INSTALLATION INSTRUCTIONS

2.1 General

After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.

N NOTE

Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping .

N NOTE

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

Recommended Tools

It would be advisable to have the following tools available for installation of the unit. However, tools used will vary depending on model.

- 10" adjustable wrench
- Tubing
- Tubing cutters
- Permanent marker

2.2 Preparing the probe for installation

N NOTE

The preferred location for installation into the pipeline is in a straight Section of inlet piping before the flowing stream is subjected to turns and impingements that can produce aerosols. Aerosols can contaminate the sample being taken.

2.2.1 *Determine the insertion length*

Before installing the probe, the length the insertion shaft will need to travel inside the pipeline must be determined. Measure from the top of the pipeline's isolation valve to the desired Section of the pipeline where the product will be injected (see Figure 2).



Figure 2

INSTALLATION & OPERATION

2.2.2 *Set the insertion length on the shaft (for the AIP model)*

Once the insertion length of the shaft is determined, this length should be measured on the shaft itself.

- a) Pull up on the shaft to make sure it's fully retracted (see Figure 3).



Not retracted



Retracted

Figure 3

- b) Begin at the top cap, and measure up on the shaft to the desired length (see Figure 4). Use a permanent marker to mark this point on the shaft.



Figure 4

- c) Loosen the two screws in the lock collar, and move the collar to the position marked in the previous step.
- b) Tighten the lock collar screws.

2.2.3 *Set the insertion length on the shaft (for the AP model)*

- a) Begin at the end of the device (if it is equipped with a nozzle, measure from the end of the nozzle) and measure up on the shaft to the desired length.
- b) Move the ferrule nut to this point and tighten the nut to crimp the ferrule in place.
- c) Push the body to the end of the shaft.

2.2.4 *Using the oil reservoir in a horizontal position (applicable for the AIP model only)*

- a) Loosen and detach the tubing connected from Valve B on the oil reservoir to Valve A on the base cap of the unit.
- b) Loosen the screws in the clamp, and remove the clamp from the reservoir.

INSTALLATION & OPERATION

- c.) Reposition the reservoir at a 90° angle, making sure Valve B is aimed toward the ground.
- d.) Measure a new piece of tubing to be connected from Valve A to Valve B.
- e.) Replace the bolts and elbows onto the ends of the new tubing.
- f.) Thread the new tubing onto Valve A and Valve B.

2.3 Installing the unit

N NOTE

Make sure all of the unit's valves are closed prior to installation or removal.

- 2.3.1 Connect the unit to the pipeline via the pipeline isolation valve.

N NOTE

If your unit has a nozzle equipped on the end, make sure the ball valve provides sufficient clearance for the nozzle.

- 2.3.2 Connect the product supply into the inlet of the check valve. Valve E should be closed.

N NOTE

The product supply pressure should be set 50-100 psi above pipeline pressure, not to exceed the maximum allowable pressure of the device as indicated in Section 1.3.

- 2.3.3 **Slowly** open the pipeline isolation valve, and check for leaks.

2.3.4 **Insert the shaft (AP model)**

- a) Manually push the shaft into the pipeline.
- b) Thread the ferrule connector into the body.
- c) Open Valve E.

2.3.5 **Insert the shaft (AIP model)**

- a) Open Valves A and B on the unit to allow pipeline pressure to enter the oil reservoir.

CAUTION

Valve D should always be closed when pipeline pressure is flowing through Valves A and B. Opening Valve D while pipeline pressure is flowing may cause the oil in the reservoir to erupt from the valve.

- b) **Slowly** open Valve C, located between the oil reservoir and the top cap. The shaft will begin to insert into the pipeline (see Figure 5).

CAUTION

Opening Valve C too quickly may cause the shaft to insert harshly into the pipeline, possibly resulting in damage to the unit.

INSTALLATION & OPERATION

N NOTE

Once the shaft begins to move, there is no need to open the valve any further. This assures a slow and smooth insertion of the shaft into the pipeline.



Figure 5

- c) **Carefully** rotate the shaft to align the lock collar and top cap so that the lock collar's screw can be inserted into the top cap.
- d) Tighten the screw.
- e) Close Valves A, B, and C. Check for leaks.
- f) Open Valve E to allow product to flow into the unit.

W WARNING

Keep hands and fingers clear of moving parts to avoid injury.

2.4 Helpful hints

- 2.4.1 Avoid rough handling of the unit and bending of the shaft. The shaft has a polished surface that travels through seals.
- 2.4.2 Operate the unit slowly and smoothly while inserting and retracting to avoid unnecessary slamming of the lock collar and/or the shaft piston located inside the unit.
- 2.4.3 The most common cause for repairs to an automatic insertion probe is due to the pipeline isolation valve closing on the shaft while the shaft is still inserted into the pipeline. Please avoid this practice.
- 2.4.4 The unit should be treated with care.

2.5 Retracting the AIP model

! CAUTION

The product supply attached to the unit must be shut down or disconnected prior to retracting.

Recommended Tools

It would be advisable to have the following tools available for retracting and servicing the unit; however, tools used will vary depending on probe model.

- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- Flat blade screwdriver

INSTALLATION & OPERATION

- 2.5.1 Shut down the product supply.
- 2.5.2 Disconnect the product supply from the inlet of the check valve.
- 2.5.3 Close Valve E.
- 2.5.4 Make sure Valves A, B, and C are closed.

 **CAUTION**

Do not yet close the pipeline isolation valve.

- 2.5.5 Loosen the screw in the lock collar in order to remove the lock collar from the top cap (see Figure 6). At this point, the shaft will remain inside the pipeline.

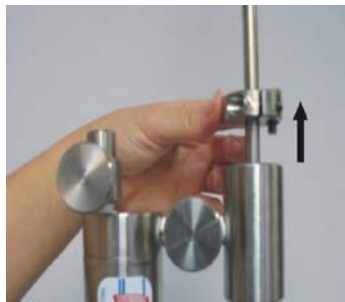



Figure 6

- 2.5.6 **Slowly** open Valve D. This will vent the air inside the oil reservoir, relieving pressure on the insertion shaft.

 **CAUTION**

Valves A and B should always be closed when opening Valve D. Opening Valve D while pipeline pressure is flowing may cause the oil in the reservoir to erupt from the valve.

- 2.5.7 **Slowly** open Valve C to allow pressure to be relieved from the insertion shaft. The probe will now begin to retract from the pipeline.

 **NOTE**

Once the shaft begins to move, Valve C does not need to be opened any further. This assures a slow and smooth retraction of the probe.

- 2.5.8 When the probe has completely retracted from the pipeline, close the pipeline isolation valve, cutting off any pressure flowing into the unit.

 **NOTE**

If the probe needs to be withdrawn from the pipeline but the unit itself does not need to be removed from the pipeline, stop at step 8.

- 2.5.9 Vent pressure in the unit by opening Valve E.
- 2.5.10 Close Valves C and D.

INSTALLATION & OPERATION



If pressure does not stop venting from one or more of the unit's valves, the pipeline isolation valve is possibly leaking. Use caution not to remove the probe while the pipeline isolation valve is building pressure into it.

- 2.5.11 Remove the unit from the pipeline isolation valve.
- 2.5.12 The unit is now ready for maintenance or to be moved to another location.

2.6 Retracting the AP model

- 2.6.1 Shut down the product supply.
- 2.6.2 Disconnect the product supply from the inlet of the check valve.
- 2.6.3 Close Valve E.
- 2.6.4 Loosen the ferrule nut and ferrule from the body.
- 2.6.5 Slowly pull the shaft out of the pipeline.
- 2.6.6 When the shaft is completely retracted, close the pipeline isolation valve.
- 2.6.7 Remove the unit from the pipeline isolation valve.
- 2.6.8 The unit is now ready for maintenance or to be moved to another location.

MAINTENANCE

3. MAINTENANCE

3.1 General

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of unexpected wear or faulty seals. All maintenance and cleaning of the unit should be done on a smooth, clean surface.

N NOTE

We recommend that the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

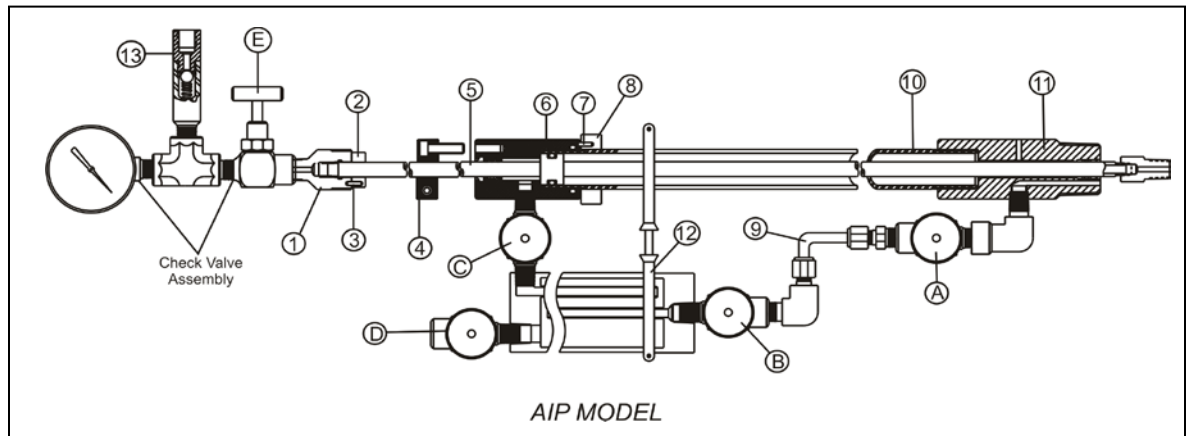


Figure 7

Refer to this Figure throughout Sections 3.2-3.4.

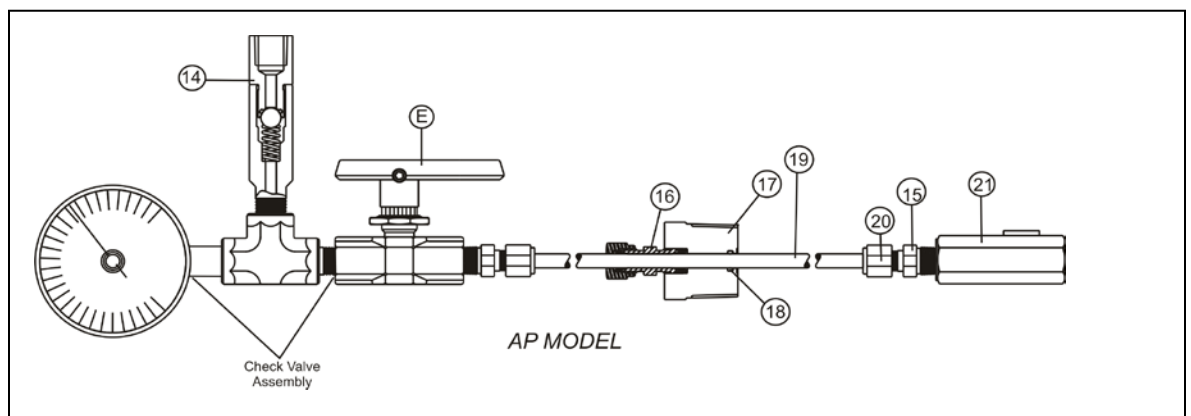


Figure 8

Refer to this Figure throughout Section 3.5.

MAINTENANCE

3.2 AIP disassembly instructions

N NOTE

Refer to Figure 7 throughout this Section.

- 3.2.1 Close Valves B, C, and D on the oil reservoir and Valve A on the base.
- 3.2.2 Disconnect the tubing (Part 9) between Valves A and B.
- 3.2.3 Loosen the screws in the oil reservoir's clamp (Part 12), and remove the clamp from the reservoir (also see Figure 9).

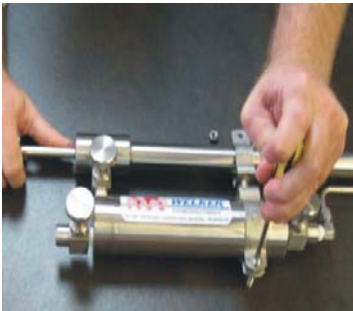


Figure 9



Figure 10

- 3.2.4 Use an adjustable wrench on the body of Valve C to remove the oil reservoir from the valve. (Part 6) (also see Figure 10).
- 3.2.5 Loosen the screw in the adapter's collar (Part 2), and slide the collar off the adapter, removing the pin (Part 3) (also see Figure 11).
- 3.2.6 Unscrew the adapter (Part 1) from Valve E.
- 3.2.7 Remove the check valve assembly, Valve E, and the adapter from the shaft.
- 3.2.8 Loosen the screws in the lock collar (Part 4), and slide the collar off the shaft.

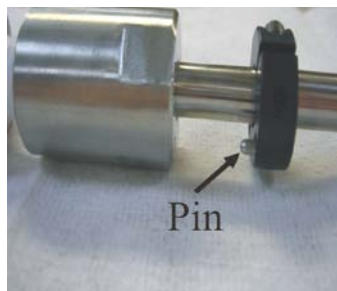


Figure 11

- 3.2.9 Loosen the screw in the top cap's collar (Part 8), and slide the collar off the cap, removing the pin (Part 7) (also see Figure 12).

MAINTENANCE



Figure 12

- 3.2.10 Unscrew the top cap (Part 6) from the cylinder, and **carefully** slide the cap off the shaft.



CAUTION

Sliding the cap off the shaft too quickly can cause damage to the shaft.

- 3.2.11 Mark the bottom end of the cylinder (Part 10) for identification purposes to ensure proper orientation during reassembly.



NOTE

The bottom end has a vent hole.

- 3.2.12 **Carefully** remove the shaft from the cylinder.
3.2.13 Unscrew the base cap (Part 11) from the cylinder, and slide the base cap off of the cylinder.

3.3 AIP maintenance instructions



NOTE

Refer to Figure 7 throughout this Section.

- 3.3.1 Examine the inner surface of the cylinder for a smooth finish. If there are any pits or major scratches, the seals will leak. Call Welker for service options.
3.3.2 Examine the outer surface of the probe for a smooth finish.

3.3.3 *Replacing the seals*



NOTE

New seals supplied in spare parts kits are not lubricated. They should be lightly coated with lubrication grease (Dow Corning 111 [DC 111] grease or equivalent lubricant) before they are installed into the equipment. This helps with the installation of the seals while reducing the risk of damage when positioning them on the parts. After the seals are installed, some additional lubrication can be applied to the shaft or cylinder inner diameters to allow smooth transition of parts.

- a) Using a pick, remove the seals in the base cap and top cap, and replace them with new seals (see Figures 13 & 14).
- b) Remove and replace the seals on the shaft piston (Figure 15).
- c) Remove and replace the seal in the adapter (Figure 16).

MAINTENANCE



Figure 13



Figure 14

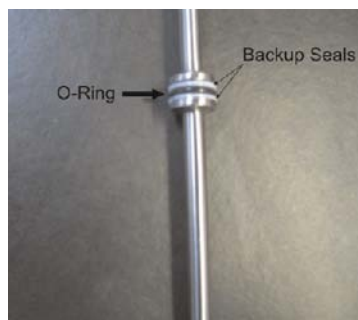


Figure 15



Figure 16

! CAUTION

Do not dig into the metal surfaces of the parts when removing O-rings from the O-ring grooves. Scratching the sealing surface can result in a leak. If necessary, dig into the O-ring, and replace it during re-assembly. If the sealing surface becomes damaged, use a 600-grit wet sand paper strip to smooth the surface, and then clean it.

3.3.4 *Adding oil to the oil reservoir*

The unit is shipped from the factory with the necessary oil volume. If oil is needed, remove Valve D, and add oil until the reservoir is $\frac{3}{4}$ full. Replace Valve D.

N NOTE

If you are adding oil while the unit is still assembled and attached to a pipeline, depressurize the assembly, making sure Valves A and B are closed before removing Valve D.

N NOTE

If oil needs to be added, it may be due to a leak in the unit.

3.3.5 To perform maintenance on the check valve (Part 13), refer to the appropriate check valve manual.

MAINTENANCE

3.4 AIP reassembly instructions

N NOTE

Refer to Figure 7 throughout this Section.

- 3.4.1 Coat the inside-top end of the cylinder with Dow 111, and reinsert the shaft into the cylinder approximately halfway.
- 3.4.2 Securely thread the base cap (Part 11) onto the cylinder.
- 3.4.3 Slide the top cap collar (Part 8) onto the cylinder, and thread the top cap (Part 6) onto the cylinder securely.
- 3.4.4 Replace the pin (Part 7) in the top cap's collar, and reattach the collar to the cap.
- 3.4.5 Reattach the oil reservoir to Valve C on the top cap.
- 3.4.6 Replace the reservoir's clamp onto the reservoir and cylinder. Tighten the screws on the clamp.
- 3.4.7 Connect the tubing on Valve A to Valve B.
- 3.4.8 Slide the lock collar (Part 4) onto the shaft, and tighten the set screws to hold the collar in place.
- 3.4.9 Slide the adapter's collar (Part 2) onto the shaft.
- 3.4.10 Replace the pin (Part 3) in the adapter's collar, and reattach the adapter to the collar.
- 3.4.11 Thread Valve E and the check valve assembly onto the adapter.
- 3.4.12 Repeat steps 2.3.1 through 2.3.5 for reinstallation.

3.5 AP instructions

N NOTE

Refer to Figure 8 throughout this Section.

- 3.5.1 Remove the spray nozzle (Part 21, Figure 8), if applicable, on the bottom of the probe.
- 3.5.2 Remove the lower connector (Part 15).
- 3.5.3 Replace the O-ring on the lower connector (Part 15).
- 3.5.4 Loosen the ferrule nut (Part 20) around the lower ferrule.
- 3.5.5 Use tubing cutters to carefully cut the tubing just above the lower ferrule.
- 3.5.6 File the burr left from the tubing cutters and lightly sand the area. This will allow the tubing to slide through the body (Part 17).
- 3.5.7 Loosen the body (Part 17) from the body connector (Part 16).
- 3.5.8 Slide the shaft (Part 19) out of the body (Part 17).
- 3.5.9 Replace the seal (Part 18) in the body.
- 3.5.10 Reinsert the shaft into the body.
- 3.5.11 Replace the ferrule on the tip of the shaft with a new ferrule, and reattach the lower connector (Part 15).
- 3.5.12 Reinstall the nozzle, if applicable.
- 3.5.13 Repeat steps 2.3.1 through 2.3.5 for reinstallation.
- 3.5.14 To perform maintenance on the check valve (Part 14), refer to the appropriate check valve manual.



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