



**Installation,
Operation,
and
Maintenance
Manual**

Welker[®] Automatic Insertion Device

***Model
AID-7
AID-7L***

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 in order 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 Description of product

The Welker Automatic Insertion Devices are designed for use in systems where it is desirable to insert and retract a probe within a pipeline while the pipeline remains pressurized. The design of the unit allows the operator to control the movement of the probe into and out of the pipeline safely. The device is equipped with an inlet valve that, when opened, allows pipeline pressure to pass through the device and push down on a shaft, inserting it into the pipeline. When the unit's vent valve is opened, pressure is then relieved from the device and the probe will retract. Customer-supplied instrumentation is connected on the unit's outlet port, located at the top of the device.

Oil Reservoir (optional)

The oil reservoir applies hydraulic oil on the probe shaft in order to ensure a smooth insertion. Process or auxiliary pressure is applied to the reservoir in order to insert and retract the probe from the pipeline. The oil in the reservoir is then applied on the shaft as it travels into the pipeline. The reservoir is shipped from the factory with the necessary oil volume. It should also be noted that the unit is 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, with the drain plug (see Figure 1) facing the ground. **The internals of the reservoir will not function properly if the oil pot is placed in a horizontal position.**

SPECIFICATIONS

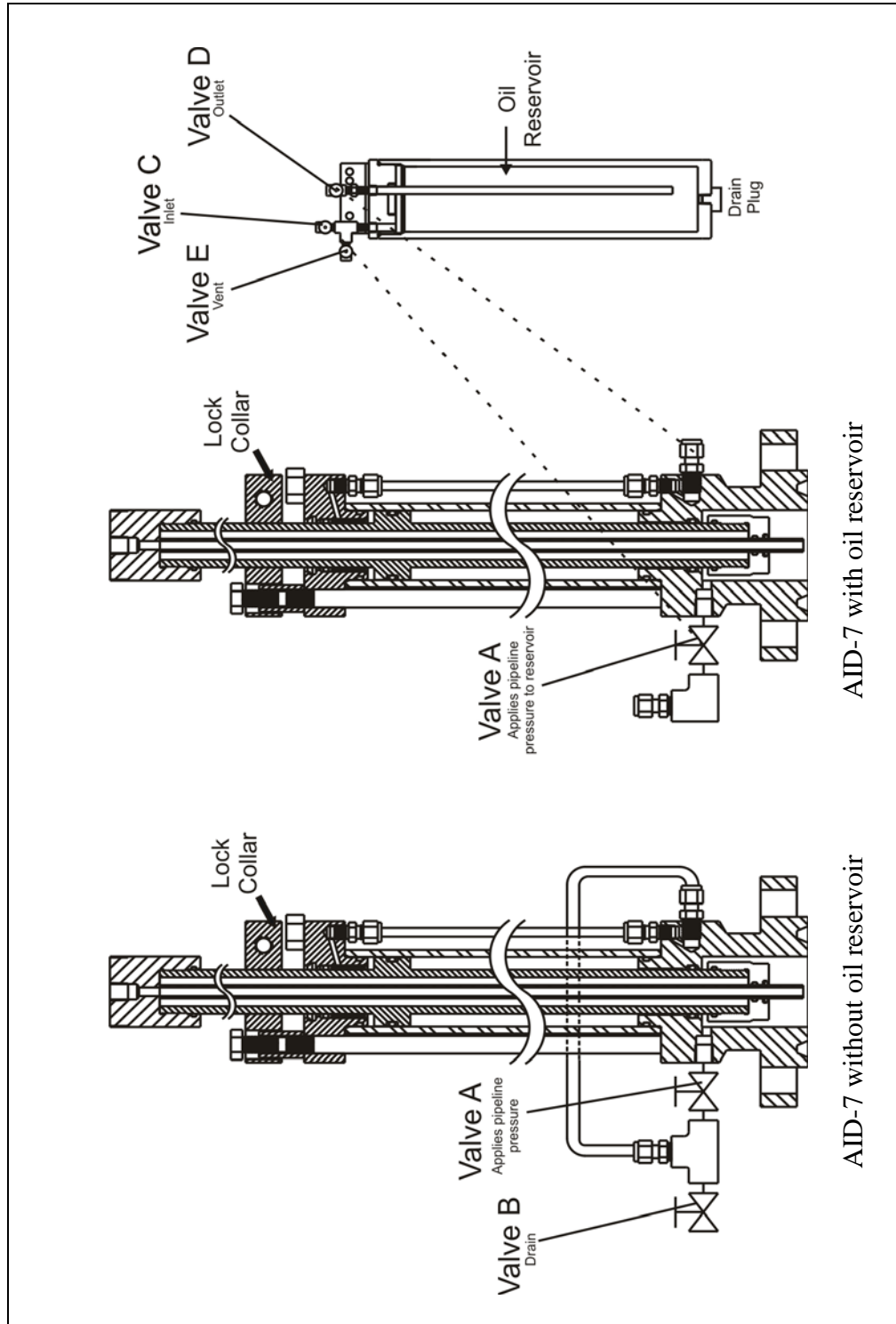


Figure 1
Refer to this Figure throughout the entire installation and operation process.

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

| General | |
|------------------------------|---|
| Products | Gases/ Liquids |
| Materials of Construction | 316 Stainless Steel and Kalrez (others available) |
| Insertion Length | 24" (609 mm) (others available) |
| Pipeline Connection | Flanged (NPT available) |
| Outlet Connection | 1/2" FNPT |
| Auxiliary Connections | 1/2" FNPT |
| Maximum Allowable Pressure * | Refer to ANSI rating, Table 2 (for 316 SS) |

Table 2

| ANSI CLASS | MAXIMUM ALLOWABLE PRESSURE (at -20° F to 100° F/ -28° C to 37° C) |
|-------------------|--|
| 150 | 275 psi (18 bar) |
| 300 | 720 psi (49 bar) |
| 600 | 1,440 psi (100 bar) |
| 900 | 2,160 psi (145 bar) |

* Maximum allowable temperatures and pressures may be lower depending on the specifications of the pipeline connection device.

INSTALLATION & OPERATION

2. INSTALLATION AND OPERATION

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 and retraction of the unit; however, tools used will vary depending on model.

- Measuring tape
- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- Flat blade screwdriver
- Permanent marker

2.2 Preparing the unit for installation

2.2.1 Make sure all valves on the unit are closed.

2.2.2 Depressurize the pipeline and connect the device to the pipeline isolation valve.

2.2.3 ***Determine the insertion length***

Before installing the device, 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 center $\frac{1}{3}$ of the pipeline (see Figure 2).



Figure 2

INSTALLATION & OPERATION

2.2.4 Set the insertion length on the shaft

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

- Pull up on the shaft to make sure it is fully retracted.
- Begin at the top flange and measure up on the shaft to the desired length.
- Mark this point on the shaft, as this is where the lock collar will be positioned.

2.2.5 Position the lock collar

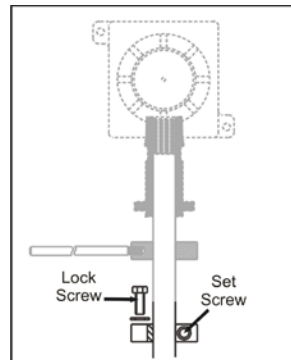


Figure 3

- Loosen the set screws (see Figure 3) in the side of the lock collar, and move the collar to the position noted in the previous step.
- Tighten the lock collar's set screws.

2.2.6 Connect the oil reservoir (if applicable)

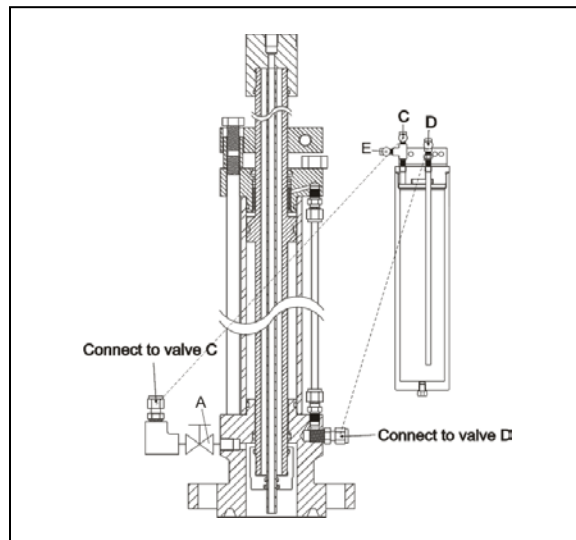


Figure 4

Refer to this Figure for the following steps.

- Position the oil reservoir in the desired location.
- Use tubing to connect from the elbow connector to Valve C on the oil reservoir.
- Use tubing to connect from the male connector to Valve D on the oil reservoir.

INSTALLATION & OPERATION

- d) Close Valves C, D, and E on the oil reservoir.

2.3 Installing the unit

- 2.3.1 Make sure all valves on the unit are closed.
- 2.3.2 Connect the unit to the pipeline isolation valve.
- 2.3.3 Connect the appropriate instrumentation to the unit's outlet port.
- 2.3.4 Turn on the instrumentation.
- 2.3.5 **Slowly** open the pipeline isolation valve, and check for leaks.
- 2.3.6 **Slowly** open Valve A (Figure 1). If your device is equipped with an oil reservoir, open Valves C and D as well. The shaft will begin to insert into the pipeline.



CAUTION

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



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.

- 2.3.7 **Carefully** rotate the shaft to align the lock collar and top cap so that the lock screws (see Figure 3) can be inserted into the top cap.
- 2.3.8 Tighten the lock screws into the top cap.
- 2.3.9 Close Valve A and Valves C and D, if applicable.
- 2.3.10 Check the entire system for leaks.
- 2.3.11 The unit is now in service.

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 device 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 entire unit should be treated with care.

2.5 Retracting the unit



CAUTION

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



NOTE

Make sure all valves on the unit are closed prior to installation or removal.

INSTALLATION & OPERATION

N NOTE

Before retracting the unit, note the pipeline pressure required for insertion.

- 2.5.1 Shut down the instrumentation attached to the outlet port.
- 2.5.2 Loosen the lock screws in the lock collar in order to remove the lock collar from the top cap. At this point, the shaft will remain inside the pipeline.
- 2.5.3 Open Valve B to vent pressure inside the unit. If your device is equipped with an oil reservoir, open Valves D and E. The shaft will begin to retract.

CAUTION

Valve C should always be closed when opening Valve E. Opening Valve E while pipeline pressure is flowing may cause the oil in the reservoir to discharge from Valve C.

- 2.5.4 Once the shaft is completely retracted from the pipeline, close Valve B and Valves D and E on the oil reservoir, if applicable.
- 2.5.5 If needed, remove the unit from the pipeline isolation valve.
- 2.5.6 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.

3.2 Disassembly instructions

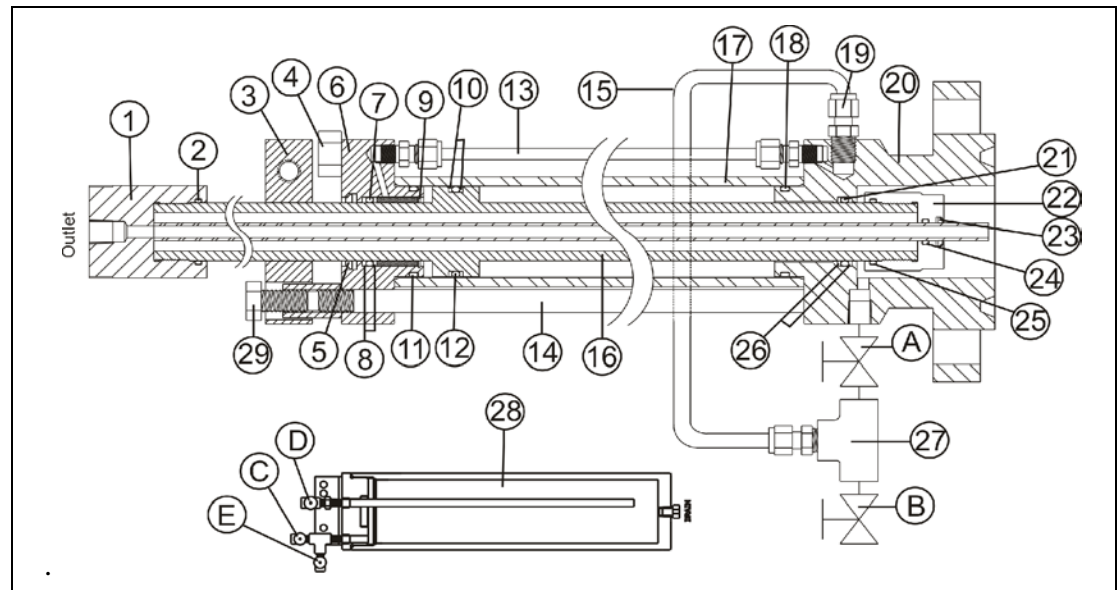


FIGURE 5

Refer to this Figure throughout the entire maintenance process.

Recommended Tools

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

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

MAINTENANCE

- 3.2.1 Disconnect the instrumentation from the unit's outlet port.
- 3.2.2 Disconnect the tubing (Part 15) from the tee connector (Part 27) and the male connector (Part 19). If your device is equipped with an oil reservoir (Part 28), disconnect all tubing connected from the unit to the reservoir.
- 3.2.3 **Carefully** remove the outlet cap (Part 1) from the shaft (Part 16).



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

- 3.2.4 Remove the lock screws (Part 29) from the shaft.
- 3.2.5 Remove the lock collar (Part 3) from the shaft.
- 3.2.6 Remove the tie bolt nuts (Part 4).
- 3.2.7 Disconnect the tubing (Part 13) from the top flange (Part 6).
- 3.2.8 Remove the top flange from the shaft.
- 3.2.9 Disconnect the inlet cap (Part 22) from the shaft.
- 3.2.10 Disconnect the lubricator assembly (Part 20) from the cylinder (Part 17).
- 3.2.11 Mark the bottom end of the cylinder for reassembly.
- 3.2.12 **Carefully** pull the shaft (Part 16) out of the cylinder.

3.3 Maintenance instructions



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 reassembly. If the sealing surface becomes damaged, use a 600-grit wet sand paper strip to smooth the surface, and then clean it.



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.

- 3.3.1 Replace the O-ring (Part 12) and backups (Part 10) in the piston (also see Figure 6).

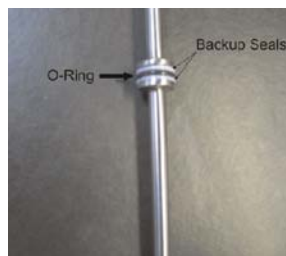


Figure 6

- 3.3.2 Replace the O-ring (Part 2) in the outlet cap (Part 1).
- 3.3.3 Replace the wiper (Part 5) in the top flange (Part 6).
- 3.3.4 Replace the O-rings (Parts 7 and 11) and backup (Part 8), and Spirolok (Part 9) in the top flange.

MAINTENANCE

- 3.3.5 Replace the seals (Parts 21 and 18) and the backup (Part 26) in the lubricator body.
- 3.3.6 Replace the seals (Part 24 and 25) in the inlet cap (Part 20).
- 3.3.7 Replace the wiper (Part 23) in the inlet cap.
- 3.3.8 Examine the inner surface of the cylinder (Part 17) for a smooth finish. If there are any pits or major scratches, the seals will leak. Call Welker for service options.
- 3.3.9 Examine the outer surface of the cylinder for a smooth finish.
- 3.3.10 ***Adding oil to the oil reservoir***
The unit is shipped from the factory with the necessary oil volume. If oil is needed, remove Valves C and E as well as the street tee. Add oil until the reservoir is $\frac{3}{4}$ full. Replace the valve assembly.

N NOTE

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

N NOTE

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

3.4 Reassembly instructions

- 3.4.1 Coat the inside-top end of the cylinder (Part 17) with Dow 111, and reinsert the shaft into the cylinder approximately halfway.

N NOTE

The threaded end of the shaft and the top of the cylinder should be on the same side.

- 3.4.2 Securely press the cylinder into the lubricator body (Part 20).
- 3.4.3 Slide the shaft down far enough to thread the inlet cap (Part 22) onto the shaft.
- 3.4.4 Press the top flange (Part 6) onto the cylinder.
- 3.4.5 Replace the tie bolt nuts (Part 4).
- 3.4.6 Reinsert the lock collar (Part 3) onto the shaft (Part 16).
- 3.4.7 Thread the outlet cap (Part 1) onto the shaft.
- 3.4.8 Reconnect the tubing (Part 13) to the top flange.
- 3.4.9 If your unit is **not** equipped with an oil reservoir (Part 28), reconnect tubing (Part 15) from the tee connector (Part 27) to the male connector (Part 19).
- 3.4.10 If your unit is equipped with an oil reservoir, see step 2.2.6.
- 3.4.11 Maintenance is complete. Refer to Section 2 for installation and operation.

MAINTENANCE

4. TROUBLESHOOTING

The following is a troubleshooting table of issues most commonly associated with the Welker Automatic Insertion Device models. If you are having a problem that is not listed, or if the solution provided does not repair the problem, please call Welker for service options.

Table 3

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|---|--|
| The shaft will not retract from the pipeline. | <ul style="list-style-type: none"> • There may not be enough pressure in the pipeline to eject the shaft. • The shaft is bent inside the pipeline, possibly due to pipeline velocity or the isolation valve closing on the shaft while the shaft is still inserted in the pipeline. | <ul style="list-style-type: none"> • Gently pull up on the shaft until it begins to retract. • The unit will need to be repaired or replaced. Call Welker for service options. |
| The shaft doesn't insert or retract smoothly. | Air may be trapped in the oil reservoir, or the reservoir may need oil. | Check to make sure the oil reservoir is $\frac{3}{4}$ full; vent any air trapped in the reservoir. |
| The oil reservoir needs to be refilled often. | Oil may be leaking past the piston seal. | Replace the piston seal, and reassemble the unit. <i>See step 1 of Section 3.3.</i> <i>See Section 3.4.</i> |

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