



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER® ADJUSTABLE PROBE

MODELS

AP-3
AP-3F

DRAWING NUMBERS

AD126BU
AD126CO
AD126DR
AD126EH

MANUAL NUMBER

IOM-009

REVISION

Rev. F, 01/22/2024

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SAFETY

IMPORTANT SAFETY INFORMATION READ ALL INSTRUCTIONS



Notes emphasize information and/or provide additional information to assist the user.



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



Warning messages appear before procedures that could result in personal injury if not observed.

This manual is intended to be used as a basic installation and operation guide for the Welker® Adjustable Probes, AP-3 and AP-3F. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is provided in Appendix A of this manual.

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 in this manual. Correct installation and operation, however, are the responsibility of the end user. Welker® reserves the right to make changes to this manual and all products in order to improve performance and reliability.

BEFORE YOU BEGIN

Read these instructions completely and carefully.

IMPORTANT – Save **these instructions** for local inspector's use.

IMPORTANT – Observe all governing codes and ordinances.

Note to Installer – Leave these instructions with the end user.

Note to End User – Keep these instructions for future reference.

Installation of this Adjustable Probe is of a mechanical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Adjustable Probe, please contact a Welker® representative immediately.

Phone: 281.491.2331

Address: 13839 West Bellfort Street
Sugar Land, TX 77498

SECTION 1: PRODUCT INFORMATION

1.1 Introduction

We appreciate your business and your choice of Welker® products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manuals* 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 Welker® at 1.281.491.2331.

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

1.2 Product Description

The Welker® AP-3 Adjustable Probe is designed for use in systems where it is desirable to insert and retract the probe while the pipeline remains pressurized. When used with a pipeline isolation valve, the AP-3 can be safely inserted and retracted manually without venting pressure or interfering with pipeline operation when operating pressure is reduced to the appropriate level.

Welker® might custom design the AP-3 to suit the particular application and specifications of each customer.

1.3 Specifications



The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. Please note that the specifications might vary depending on the customization of your equipment.

Table 1: AP-3 Specifications

Products Sampled	Gases and Liquids Compatible With the Materials of Construction	
Materials of Construction	316/316L Stainless Steel, PTFE, and Viton® Others Available	
Maximum Allowable Operating Pressure	NPT: 1440 psig @ -20 °F to 120 °F (99 barg @ -28 °C to 48 °C) 150 ANSI (SS): 275 psig @ -20 °F to 100 °F (18 barg @ -28 °C to 37 °C) 300 ANSI (SS): 720 psig @ -20 °F to 100 °F (49 barg @ -28 °C to 37 °C) 600 ANSI (SS): 1440 psig @ -20 °F to 100 °F (99 barg @ -28 °C to 37 °C) 1500 ANSI (SS): 3600 psig @ -20 °F to 100 °F (248 barg @ -28 °C to 37 °C)	
Maximum Allowable Insertion/Retraction Pressure	6 mm Tubing: 1100 psig (75 barg) ¼" Tubing: 1000 psig (68 barg) ⅜" Tubing: 450 psig (31 barg) ½" Tubing: 250 psig (17 barg) ⅝" Tubing: 160 psig (11 barg) ¾" Tubing: 115 psig (7 barg) 1" Tubing: 65 psig (4 barg)	
Pipeline Connection	NPT: ½" ¾" 1"	Flanged Size: ¾", 1", 1½", 2", 3", or 4" Rating: 150, 300, 600, 900 or 1500 ANSI
Insertion Length	0–18" (0–45 cm) (Standard) Others Available	
Options	Beveled Probe Tip Outlet Valve Retraction Indicator Wires Scooped Probe Tip CE Compliance NACE Compliance	

1.4 Equipment Diagrams

Figure 1: Standard AP-3

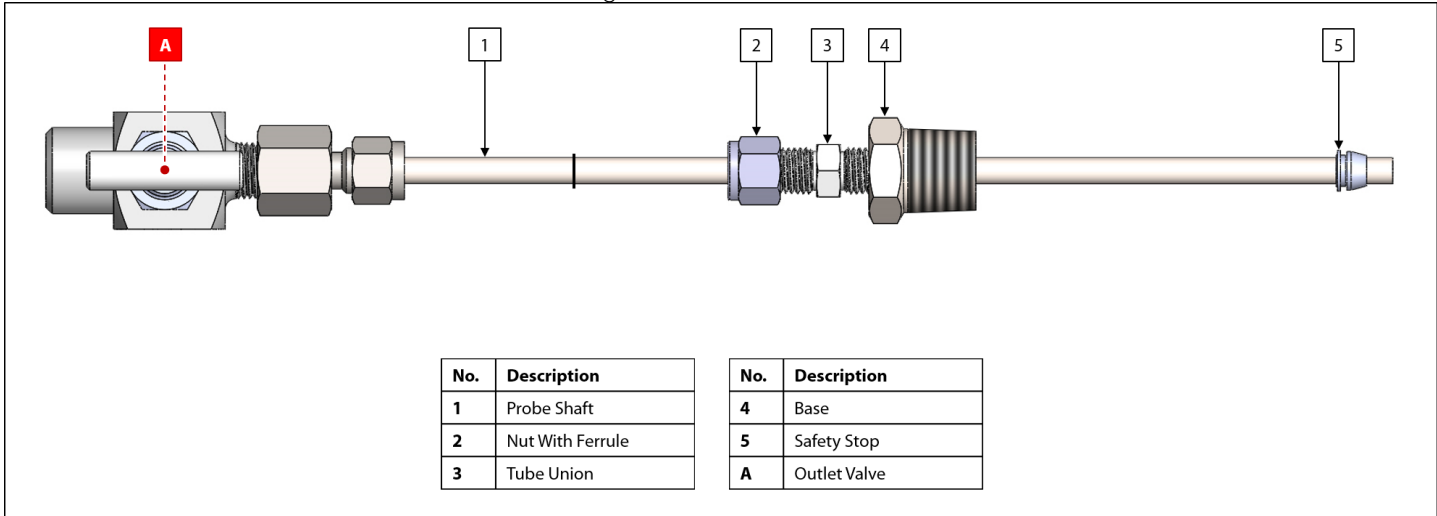


Figure 2: AP-3 With Optional Retraction Indicator Wires

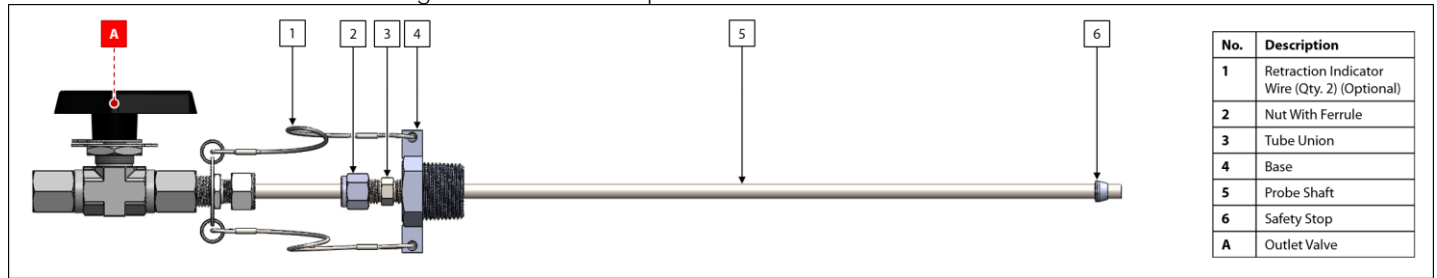


Figure 3: AP-3 With Blind Flange

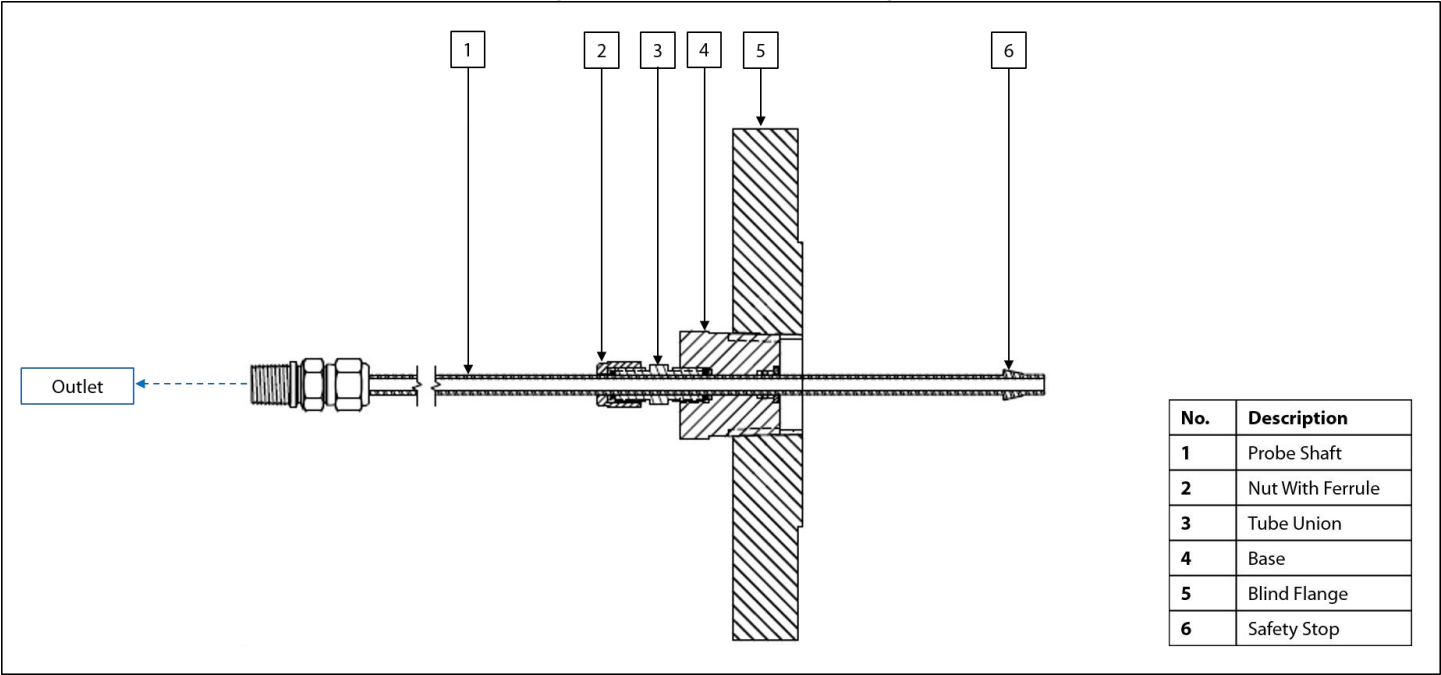
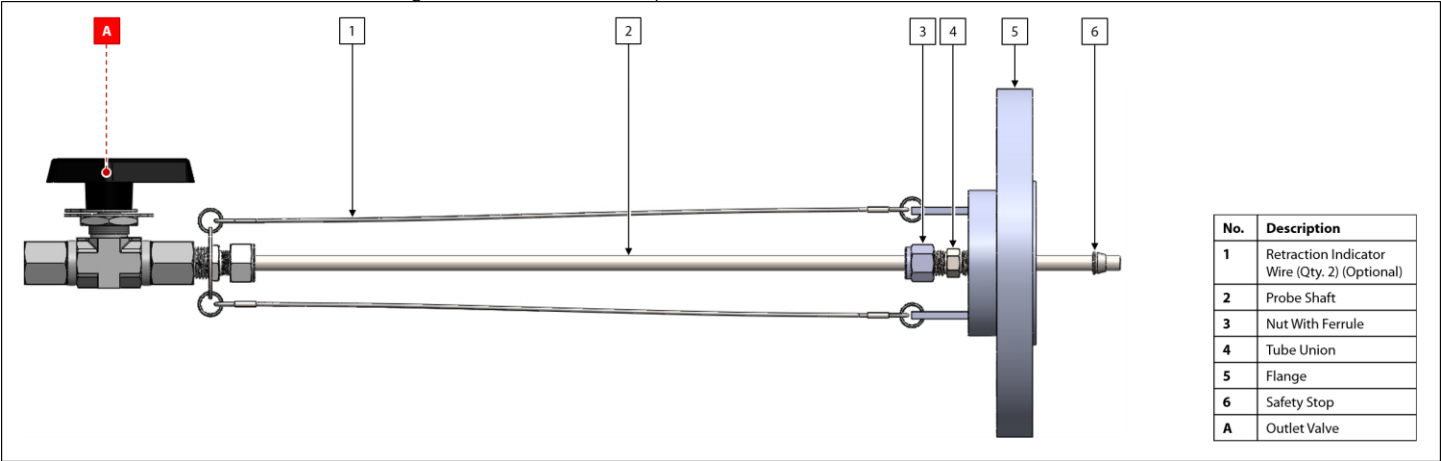


Figure 4: AP-3F With Optional Retraction Indicator Wires



SECTION 2: INSTALLATION & OPERATION

2.1 Before You Begin



After unpacking the unit, check the equipment for compliance and any damage that might have occurred during shipment. Immediately contact a Welker® representative if you received damaged equipment.



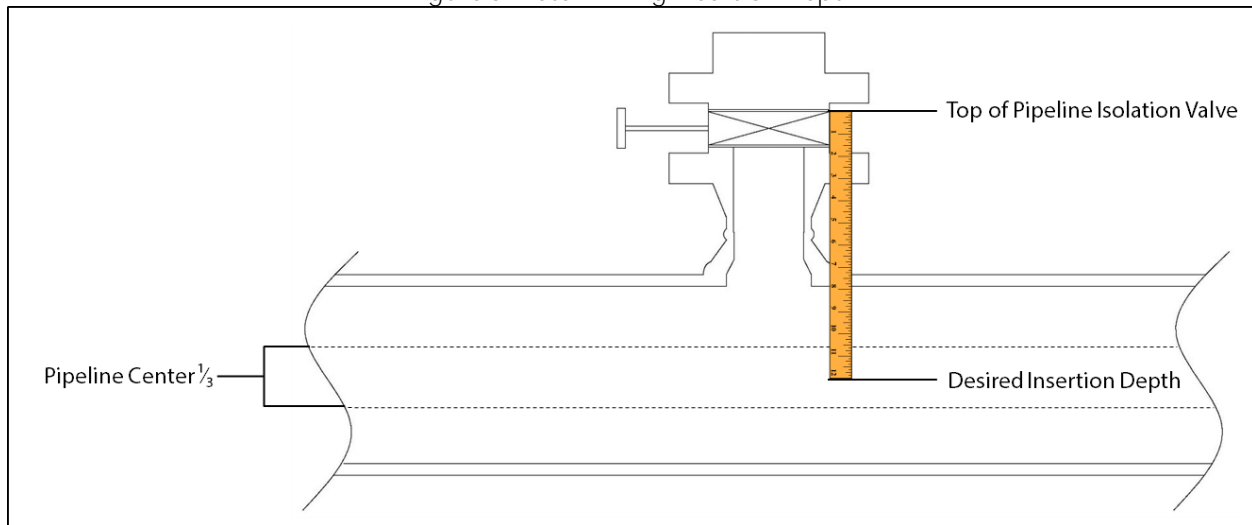
When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

1. It is recommended that the sample probe be positioned such that it extracts sample from the center one-third ($\frac{1}{3}$) of the pipeline in a location where the product is well-mixed and will yield a representative sample.
2. For gas sampling applications, Welker® recommends that the unit be installed in the top of the pipe.
3. For liquid sampling applications, Welker® recommends that the unit be installed in the side of the pipe.
4. Handle the unit with care. Avoid bending and scratching the probe shaft, which has a polished surface that travels through seals.
5. Operate the unit slowly and smoothly while inserting and retracting to avoid damaging the unit.
6. Take care not to close the pipeline isolation valve on the probe shaft while the shaft is inserted in the pipeline. This is the most common cause of damage to Welker® probes.

2.2 Preparing the AP-3 for Installation

1. Prior to installation, the length the probe shaft will need to travel inside the pipeline must be determined. Measure the distance the shaft must travel from the top of the pipeline isolation valve to the desired insertion depth (i.e., the center one-third ($\frac{1}{3}$) of the pipeline) (Figure 5). This will be the shaft insertion length.

Figure 5: Determining Insertion Depth



2. Pull up on the probe shaft to ensure that it is fully retracted. The safety stop at the tip of the probe shaft will be flush with the base or flange face.
3. Beginning at the top edge of the nut, measure along the probe shaft to the desired insertion length (Figure 1, Figure 2, Figure 3, or Figure 4). Use a felt tip pen to mark this point.
4. Carefully slide the nut and tube union up the probe shaft to the desired insertion length, taking care not to scratch the probe shaft.

5. Holding the tube union with a wrench, use another wrench to tighten the nut onto the tube union. The ferrule inside the nut will clasp onto the shaft, locking the tube union in place.



This procedure ensures that the insertion length will be mechanically limited by the tube union assembly.

6. As necessary, cut off excess tubing from the shaft. Beginning at the top edge of the nut, measure approximately two inches (2") along the shaft. Use a felt tip pen to mark this point.
7. Using tubing cutters, remove the excess tubing at the marked point, and then file and smooth the cut edge of the probe shaft.
8. If excess tubing was cut off, return outlet valve A to the top of the probe shaft (*Figure 1, Figure 2, Figure 4*).
9. Ensure that outlet valve A is closed (*Figure 1, Figure 2, Figure 4*).

2.3 Installing the AP-3



Pipeline pressure must be reduced to the maximum allowable insertion/retraction pressure prior to inserting and retracting the AP-3.



The maximum allowable insertion/retraction pressure varies according to shaft size. Pipeline pressure should be reduced to at or below the following pressures:

- 1100 psig (75 barg) for 6 mm tubing.
- 1000 psig (68 barg) for ¼" tubing.
- 450 psig (31 barg) for ⅜" tubing.
- 250 psig (17 barg) for ½" tubing.
- 160 psig (11 barg) for ⅝" tubing.
- 115 psig (7 barg) for ¾" tubing.
- 65 psig (4 barg) for 1" tubing.

1. If applicable, ensure that outlet valve A is closed (*Figure 1, Figure 2, or Figure 4*).
2. Ensure that the probe shaft is retracted.
3. Secure the AP-3 to a full port pipeline isolation valve.
4. Slowly open the pipeline isolation valve. Check for leaks and repair as necessary.
5. To manually insert the AP-3, push down on the top of the probe shaft until the tube union assembly reaches the base or flange. If manually inserting an AP-3 with a blind flange, push down on the top of the probe shaft until the base reaches the blind flange.



DO NOT release the AP-3 until the tube union has been secured to the base or flange.



Push the shaft straight down and do not allow the shaft to bend.

6. Secure the AP-3 in place by tightening the tube union assembly into the base or flange. If manually inserting an AP-3 with blind flange, secure the AP-3 in place by tightening the base into the blind flange.
7. Install customer-supplied tubing or other fittings to the outlet.
8. Restore the pipeline to full operating pressure.
9. If applicable, open outlet valve A (*Figure 1, Figure 2, or Figure 4*).

2.4 Retracting the AP-3



Pipeline pressure must be reduced to the maximum allowable insertion/retraction pressure prior to inserting and retracting the AP-3.



The maximum allowable insertion/retraction pressure varies according to shaft size. Pipeline pressure should be reduced to at or below the following pressures:

- 1100 psig (75 barg) for 6 mm tubing.
- 1000 psig (68 barg) for ¼" tubing.
- 450 psig (31 barg) **for ⅜" tubing.**
- 250 psig (17 barg) for ½" tubing.
- 160 psig (11 barg) **for ⅝" tubing.**
- 115 psig (7 barg) for ¾" tubing.
- 65 psig (4 barg) for 1" tubing.

1. If applicable, close outlet valve A (*Figure 1, Figure 2, or Figure 4*).
2. Disconnect the customer-supplied tubing or fittings attached to the outlet.
3. Firmly push down on the top of the probe shaft while slowly loosening the tube union assembly from the base or flange. If retracting an AP-3 with a blind flange, firmly push down on the top of the probe shaft while slowly loosening the base from the blind flange.



Failure to ensure that adequate pressure is applied to the top of the AP-3 prior to retraction could result in unexpected retraction of the shaft at great speed, which could damage the unit or injure the operator.

4. The AP-3 will begin retracting from the pipeline.
5. Pull up on the probe shaft to ensure that it has been fully retracted.
6. Close the pipeline isolation valve.
7. The AP-3 is now ready to be removed from the pipeline isolation valve for maintenance or to be moved to another location.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. Maintenance is necessary if a leak occurs at the base or flange.
2. Welker® recommends that the unit have standard yearly maintenance. Based on the operating conditions and/or site requirements, adjustments to the maintenance schedule might be necessary.
3. Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit available for repairs of the system in case of unexpected wear or faulty seals.



New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it might adversely affect analytical instrument results.



For sample-exposed seals, Welker® recommends non-hydrocarbon-based lubricants, such as Krytox®. For non-sample-exposed seals, Welker® recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Molykote® 111.



After the seals are installed, the outer diameter of shafts and inner diameter of cylinders may be lubricated to allow smooth transition of parts.

4. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
5. Welker® recommends having the following tools available for maintenance. Please note that the exact tools required might vary by model.
 - a. Adjustable Wrench
 - b. File or Fine Grit Sandpaper
 - c. Seal Pick
 - d. Tubing Crimp and Accessories
 - e. Wire Cutters

3.2 Maintenance Diagrams

Figure 6: Maintenance Diagram – Standard AP-3

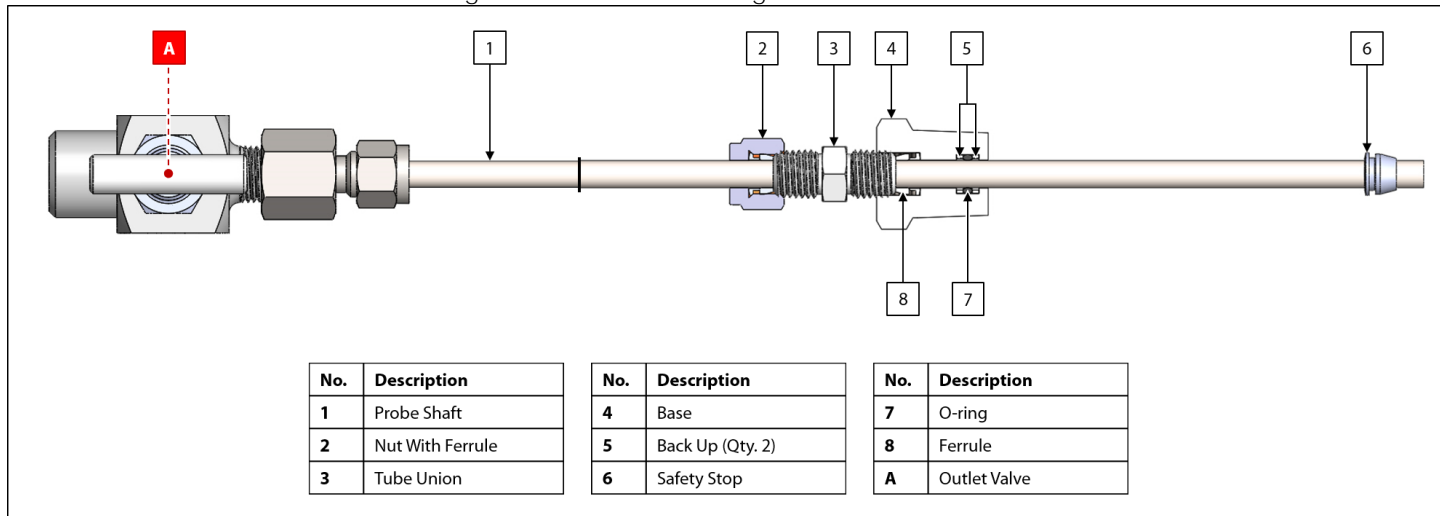


Figure 7: Maintenance Diagram – AP-3 With Optional Retraction Indicator Wires

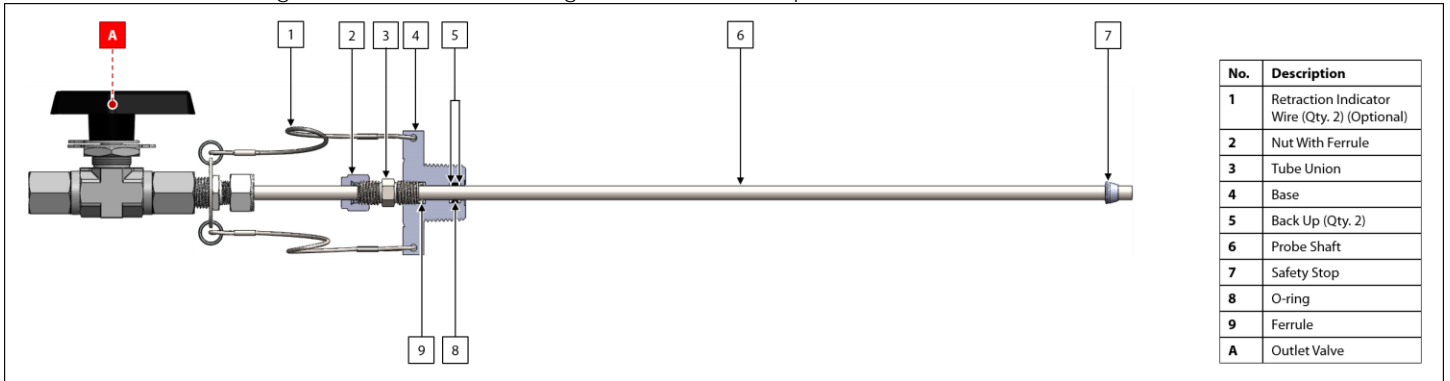


Figure 8: Maintenance Diagram – AP-3 With Blind Flange

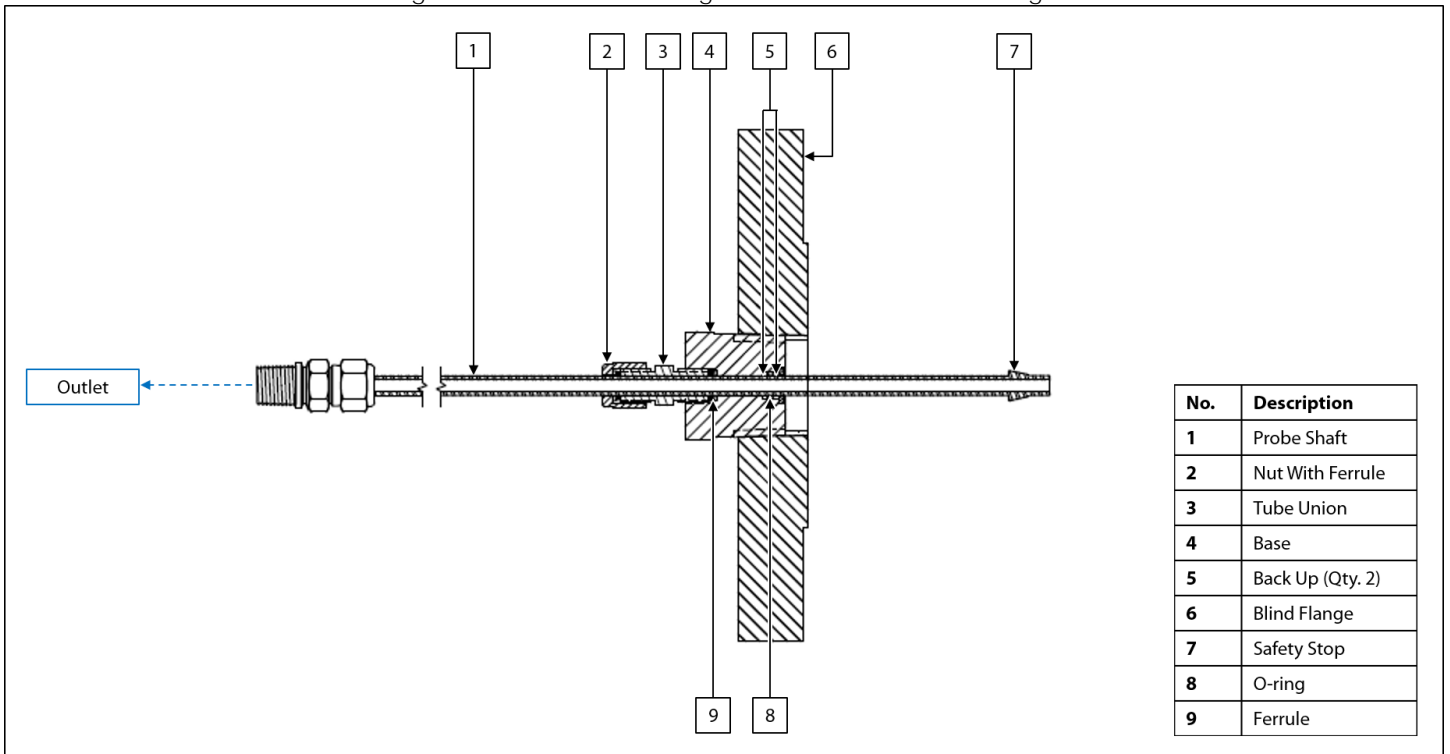
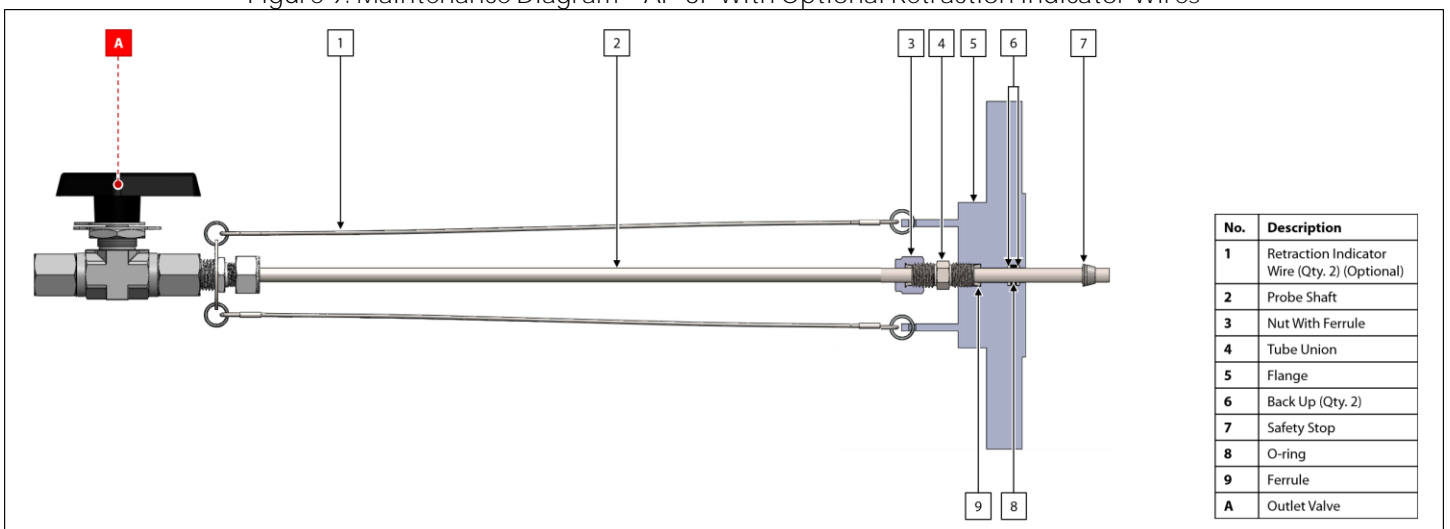


Figure 9: Maintenance Diagram – AP-3F With Optional Retraction Indicator Wires



3.3 Maintenance



If a leak occurs at the base or flange, the AP-3 requires maintenance.

1. Prior to performing maintenance, the AP-3 must be removed from the pipeline. See *Section 2.4, Retracting the AP-3*, for instructions on retracting the probe shaft and removing the unit from the pipeline.
2. If applicable, cut the retraction indicator wires and remove them from the AP-3 (*Figure 7* or *Figure 9*).
3. If applicable, remove outlet valve A from the probe shaft (*Figure 6, Figure 7, or Figure 9*).
4. Loosen the nut with ferrule.
5. Using tubing cutters, cut the probe shaft below the crimp made by the ferrule inside the nut.
6. File the burr left by the tubing cutters and lightly sand the area. This will allow the probe shaft to slide out of the base or flange.
7. Slide the probe shaft out through the bottom of the base or flange.
8. Replace the O-ring and back ups in the base or flange.
9. Carefully insert the probe shaft through the bottom of the base or flange.
10. Slide a new ferrule onto the shaft.
11. Return the nut to the shaft.
12. If applicable, return outlet valve A to the probe shaft (*Figure 6, Figure 7, or Figure 9*).
13. If applicable, connect retraction indicator wires from the base or flange to the top of the probe shaft (*Figure 7 or Figure 9*).
14. The AP-3 may now be installed to the pipeline. See *Section 2.2, Preparing the AP-3 for Installation*, and *Section 2.3, Installing the AP-3*, for instructions on installing the AP-3 to the pipeline.

APPENDIX: REFERENCED OR ATTACHED DOCUMENTS

Welker® *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- IOM-105: Welker® NV-1 and NV-2 Instrument Valves

Other *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- Anderson Greenwood H7/H71 Hand Valves (Welker® IOM-V414)
- Apollo Valves 76–100 Series Stainless Steel ball valve With Mounting Pad ¼"–1" (Welker® IOM-V141)
- Generant Inc. Forged Needle Valve Series FNV (Welker® IOM-V240)
- Parker Hannifin Corporation Ball and Plug Valves (Welker® IOM-V213)
- Parker Hannifin Corporation Ball Valves B Series (Welker® IOM-V365)
- Swagelok Company Ball Valves 60 Series (Welker® IOM-V018)
- Swagelok Company Check Valves C, CA, CH, CP, and CPA Series (Welker® IOM-V076)
- Swagelok Company Integral-Bonnet Needle Valves O, 1, 18, 20, and 26 Series (Welker® IOM-V136)
- Swagelok Company One-Piece Instrumentation Ball Valves 40G Series and 40 Series (Welker® IOM-V085)
- Swagelok Company Severe-Service Union-Bonnet Needle Valves N Series and HN Series (Welker® IOM-V347)
- Swagelok Company Trunnion Ball Valves 83 Series and H83 Series (Welker® IOM-V359)

Welker® drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD126BU (AP-3 With Retraction Indicator Wires)
- Assembly Drawing: AD126CO (Standard AP-3)
- Assembly Drawing: AD126DR (AP-3F With Retraction Indicator Wires)
- Assembly Drawing: AD126EH (AP-3 Mounted on Blind Flange)

NOTES



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