



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER® DEHYDRATION ASSEMBLY

MODEL

DA-5

DRAWING NUMBERS

AD821BD

AD821BR

MANUAL NUMBER

IOM-200

REVISION

Rev. A, 10/17/2023

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IMPORTANT SAFETY INFORMATION

READ ALL INSTRUCTIONS



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



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



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

This manual is intended to be used as a basic installation and operation guide for the Welker® Dehydration Assembly, DA-5. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is provided in the Appendix section 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 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 Dehydration Assembly 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 Dehydration Assembly, please contact a Welker® representative immediately.

Phone: 281.491.2331

Address: 13839 West Bellfort Street
Sugar Land, TX 77498

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 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 may have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker® DA-5 Dehydration Assembly is designed to filter, dry, and regulate natural gas or instrument air for use as a pneumatic instrument supply. The system incorporates filters to remove unwanted elements from the instrument supply, as well as first-stage regulators to reduce the pressure of the supply prior to entering the instrument. This system utilizes a backup filter; in the event that the primary filter or regulator becomes obstructed and requires maintenance, the backup filter automatically goes into service, allowing operation to remain uninterrupted.

A Welker® ALD-1 Automatic Liquid Dump upstream of the primary and backup filters has been added for increased liquid removal, which will decrease the frequency of maintenance required for the filter cartridges. As product enters the ALD-1, any free liquids fall to the bottom. A coalescing device inside the ALD-1 causes any aerosols present in the product to form into liquid droplets and fall to the bottom. Free liquids accumulate in the bottom of the ALD-1 until its internal float becomes buoyant enough to open the attached automatic liquid dump pivot valve, draining the ALD-1 of the accumulated free liquids.

Welker® may custom design the DA-5 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. However, **please note that the specifications may vary depending on the customization of your product.**

Table 1: DA-5 Specifications	
Products	Natural Gas and Instrument Air Supply Systems
Materials of Construction	316/316L Stainless Steel Hardware, Buna, Carbon Steel, PTFE, Viton® Others Available
Maximum Allowable Operating Pressure	1500 psig @ -20 °F to 100 °F (103 barg @ -28 °C to 37 °C)
Connections	1/4" NPT
Automatic Liquid Dump Volume	15 US Gallons/Hour at Atmospheric Pressure 25 US Gallons/Hour at 500 psig (34 barg) to Atmospheric Pressure
Flow Rate	Up to 50 scfm
Nominal Filter Rating	3 Micron
Filter Media	Silica Gel and Activated Charcoal Others Available
Features	Two (2) Welker® F-5 Filters/Dryers Two (2) Welker® IR-4 Instrument Regulators Welker® ALD-1
Options	Bypass Loop Moisture Indicator Outlet Pressure Gauge With Relief Valve Pipe Stand Pre-Regulation Pressure Gauges

Figure 1: Connections Diagram

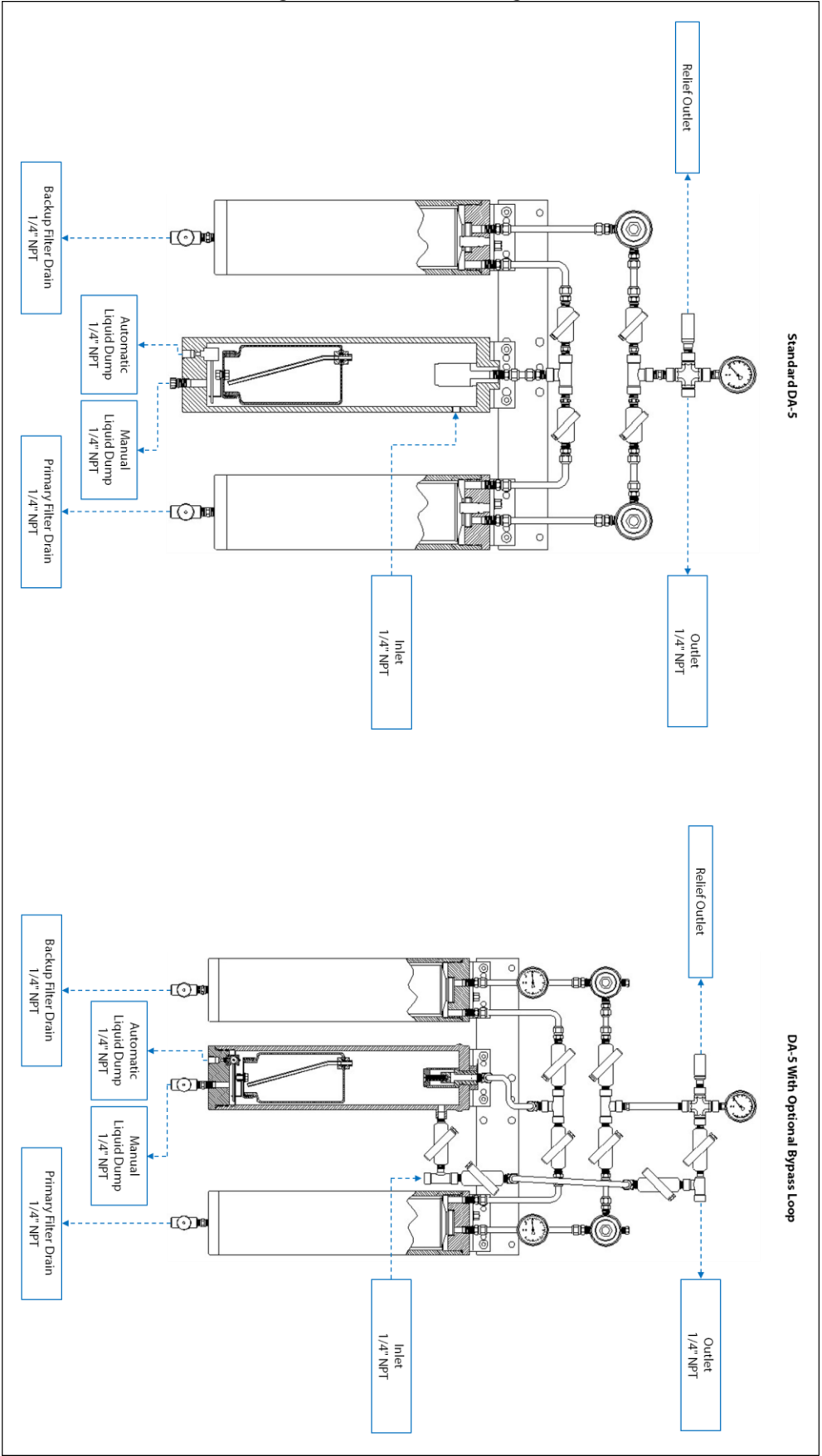


Figure 2: DA-5 Assembly Diagram

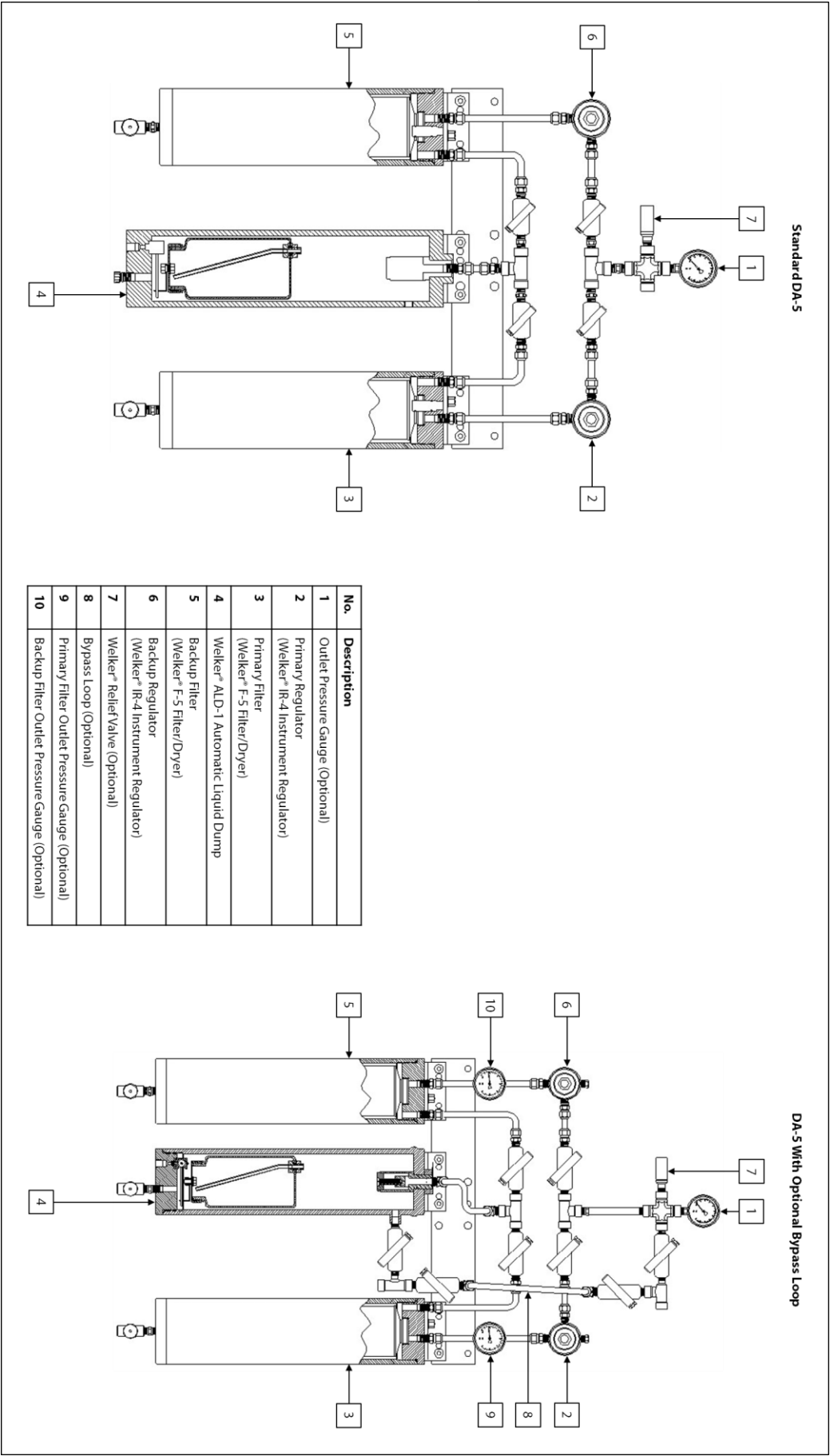
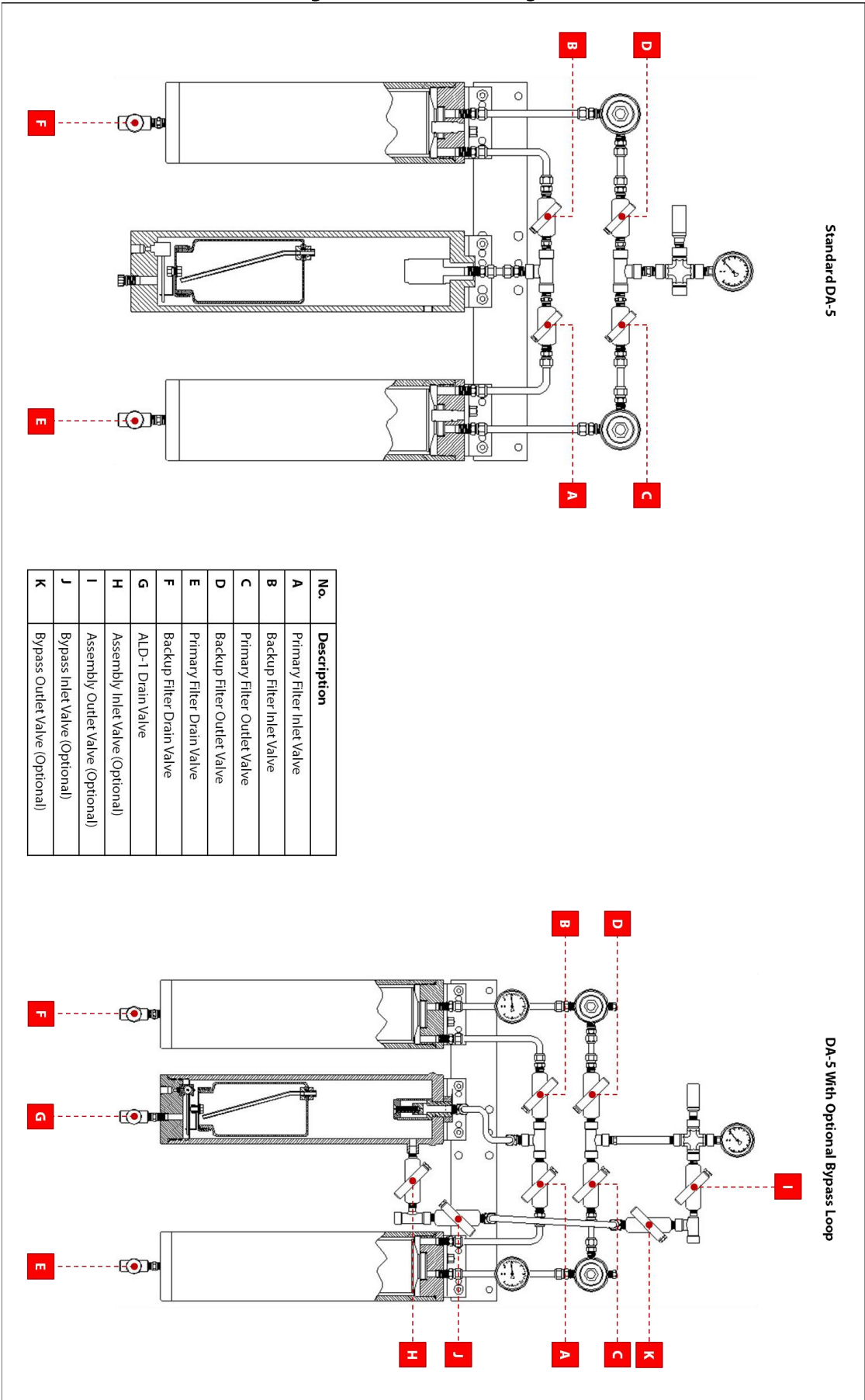


Figure 3: DA-5 Valves Diagram



SECTION 2: INSTALLATION & OPERATION

2.1 Before You Begin



After unpacking the unit, check the equipment for compliance and any damage that may 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.

2.2 Installation & Operation

1. Mount the unit to a wall mount, pipe stand, or other mounting surface.
2. Ensure that all valves on the unit are closed.
3. Connect the inlet of the unit to a pressurized pneumatic supply source (*Figure 1*).
4. Connect the outlet of the unit to the inlet port of the instrument to be supplied with the filtered natural gas or instrument air (*Figure 1*).
5. Connect the automatic dump port to an atmospheric container or sump (*Figure 1*).



The dump port may be connected to the pipeline if the pipeline pressure is below the pressure of the product entering the ALD-1.

6. To prevent overpressurizing the downstream instrument, back the instrument regulators off completely before beginning installation (*Figure 2*).
7. Open the valve of the pressurized pneumatic supply source to begin supplying flow to the unit.
8. For operation of the standard DA-5, continue to step 9. For operation of the DA-5 With Optional Bypass Loop, proceed to step 19.

Standard DA-5

9. Open primary filter inlet valve A and backup filter inlet valve B (*Figure 3*).
10. Open backup filter outlet valve D (*Figure 3*). Ensure that primary filter outlet valve C is closed.
11. Set the instrument regulator on the backup filter approximately 5 to 10 psig below the output pressure desired for the downstream instrument (*Figure 2*). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator for instructions on setting the regulator.
12. Close backup filter outlet valve D (*Figure 3*).
13. Open primary filter outlet valve C (*Figure 3*).
14. Set the instrument regulator on the primary filter to the output pressure desired for the downstream instrument (*Figure 2*). This should be approximately 5 to 10 psig above the set point of the instrument regulator on the backup filter. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator for instructions on setting the regulator.



Setting the regulator on the primary filter to a higher pressure than the regulator on the backup filter ensures that the pneumatic supply will flow only to the outlet on the primary filter until the primary filter requires maintenance.

15. Open backup filter outlet valve D (*Figure 3*).
16. If the DA-5 is equipped with the optional relief, set the relief valve approximately 5 to 10 psig above the set point of the instrument regulator on the primary filter (*Figure 2*). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the appropriate Welker® Relief Valve for instructions on setting the relief.

17. Ensure that primary filter inlet valve A, backup filter inlet valve B, primary filter outlet valve C, and backup filter outlet valve D are open (*Figure 3*).
18. The unit is now operational.

DA-5 With Optional Bypass Loop

19. Open primary filter inlet valve A, backup filter inlet valve B, and assembly inlet valve H (*Figure 3*).
20. Open backup filter outlet valve D (*Figure 3*). Ensure that primary outlet valve C is closed.
21. Set the instrument regulator on the backup filter approximately 5 to 10 psig below the output pressure desired for the downstream instrument (*Figure 2*). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator for instructions on setting the regulator.
22. Close backup filter outlet valve D (*Figure 3*).
23. Open primary filter outlet valve C (*Figure 3*).
24. Set the instrument regulator on the primary filter to the output pressure desired for the downstream instrument (*Figure 2*). This should be approximately 5 to 10 psig above the set point of the instrument regulator on the backup filter. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator for instructions on setting the regulator.



Setting the regulator on the primary filter to a higher pressure than the regulator on the backup filter ensures that the pneumatic supply will flow only to the outlet on the primary filter until the primary filter requires maintenance.

25. Open backup filter outlet valve D (*Figure 3*).
26. Set the relief approximately 5 to 10 psig above the set point of the instrument regulator on the primary filter (*Figure 2*). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the appropriate Welker® Relief Valve for instructions on setting the relief.
27. Ensure that primary filter inlet valve A, backup filter inlet valve B, primary filter outlet valve C, backup filter outlet valve D, and assembly inlet valve H are open (*Figure 3*).
28. Open assembly outlet valve I to allow the pneumatic supply to reach the instrument (*Figure 3*).
29. The unit is now operational.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker® recommends that the filters have standard maintenance every six (6) months under normal operating conditions.** In cases of severe service, dirty conditions, excessive usage, or other unique applications that may lead to excess wear on the unit, a more frequent maintenance schedule may be appropriate.
2. **Welker® recommends that the ALD-1 have standard yearly maintenance under normal operating conditions.** In cases of severe service, dirty conditions, excessive usage, or other unique applications that may lead to excess wear on the unit, a more frequent maintenance schedule may be appropriate.
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. This eases the installation of the seals and reduces the risk of damage when positioning them on parts. Welker® recommends non-hydrocarbon-based lubricants, such as Krytox®, for use with all sample cylinder seals and silicone-based lubricants, such as Molykote® 111, for use with seals not exposed to the sample product.



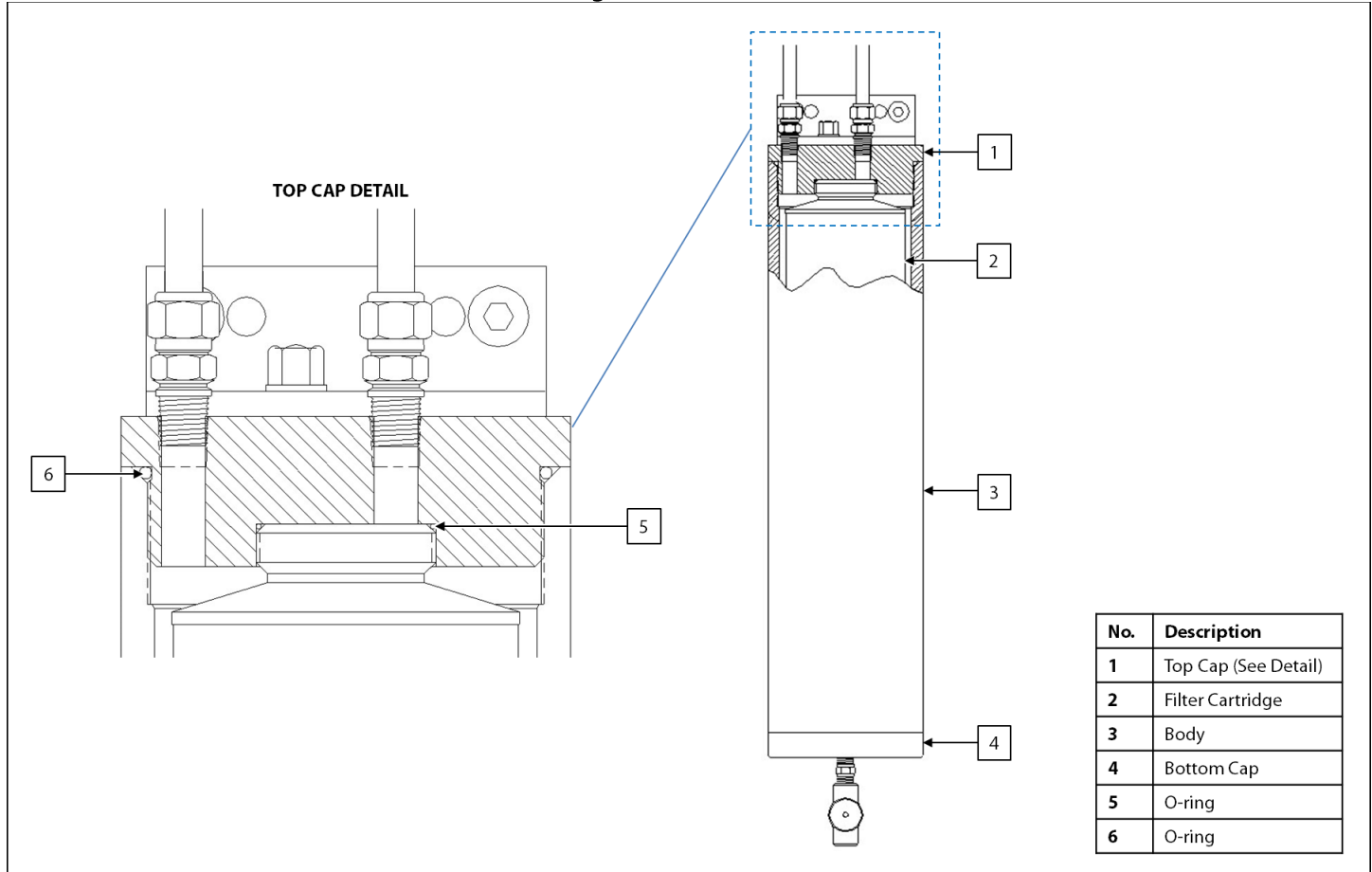
Wipe excess lubricant from the seals, as it may adversely affect analytical instrument results.

4. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.

3.2 Maintenance

1. Determine how frequently free liquids accumulate in each filter by frequently opening drain valves E and F. Routinely open drain valves E and F to allow moisture to drain from each filter (*Figure 3*).
2. Monitor the outlet pressure on the unit. If at any time pressure drops 5 to 10 psig, this is an indication that the primary filter is not functioning and that the backup filter has gone into service. Maintenance on the primary filter may be required.

Figure 4: Filter Detail



Maintenance on Primary Filter While Maintaining Supply to Instrument

3. Close primary filter inlet valve A and primary filter outlet valve C (*Figure 3*). A small drop in pressure may be noticed as the backup filter takes over operation.
4. Slowly open primary filter drain valve E to vent any pressure remaining in the primary filter assembly (*Figure 3*).
5. Unscrew the filter top cap. If necessary, replace the O-rings inside the top cap (*Figure 4*).
6. Remove and replace the filter cartridge (*Figure 4*).
7. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
8. Screw the filter top cap back into the body.
9. Securely reattach the filter body.
10. Maintenance may now be performed on the instrument regulator. To perform maintenance on the instrument regulator, refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator.
11. Close primary filter drain valve E (*Figure 3*).
12. Slowly open primary filter inlet valve A (*Figure 3*). Check the unit for leaks and repair as necessary.
13. Open primary filter outlet valve C (*Figure 3*). The primary filter will now resume operation at the normal set pressure.
14. Maintenance may now be performed on the backup filter.

Maintenance on Backup Filter While Maintaining Supply to Instrument

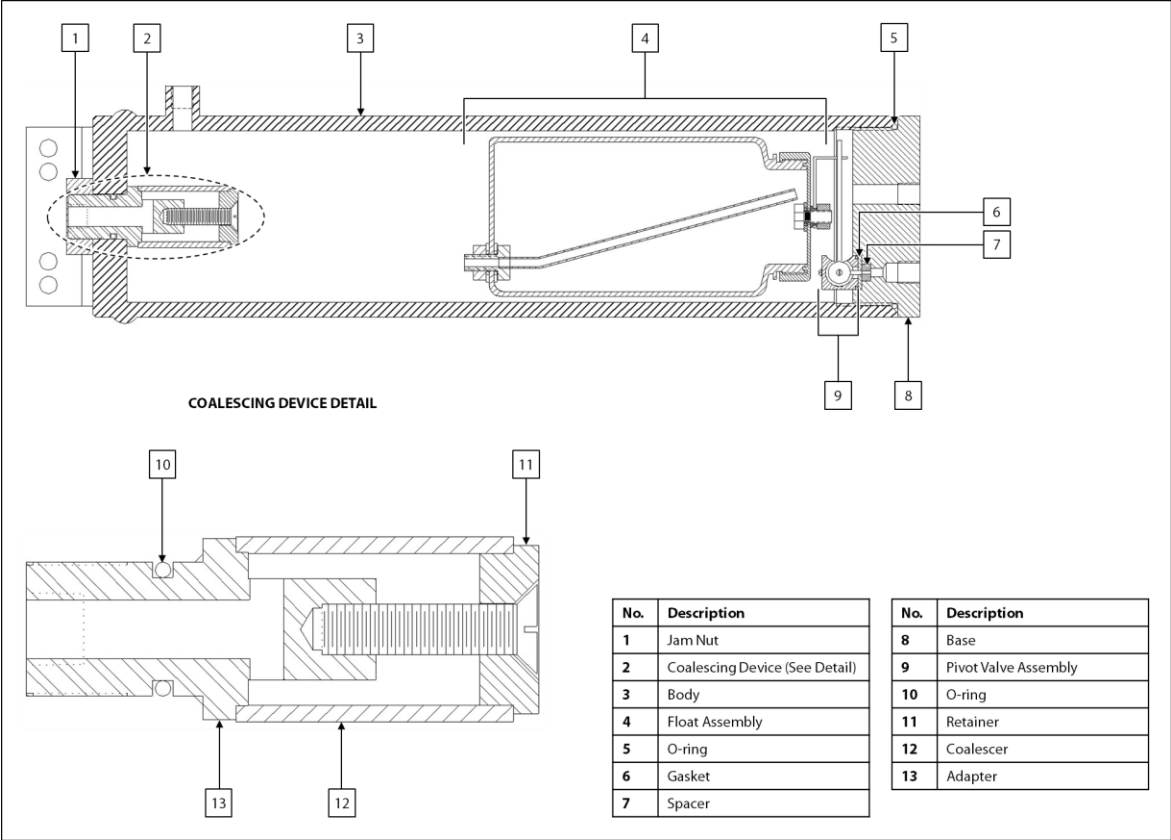
15. Close backup filter inlet valve B and backup filter outlet valve D (*Figure 3*).
16. Slowly open backup filter drain valve F to vent any pressure remaining in the backup filter assembly (*Figure 3*).
17. Unscrew the filter top cap. If necessary, replace the O-rings inside the top cap (*Figure 4*).
18. Remove and replace the filter cartridge (*Figure 4*).
19. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
20. Screw the filter top cap back into the filter body.
21. Securely reattach the filter body.
22. Maintenance may now be performed on the instrument regulator. To perform maintenance on the instrument regulator, refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the Welker® IR-4 Instrument Regulator.
23. Close backup filter drain valve F (*Figure 3*).
24. Slowly open backup filter inlet valve B (*Figure 3*). Check the unit for leaks and repair as necessary.
25. Open backup filter outlet valve D (*Figure 3*).
26. Maintenance may now be performed on the ALD-1. If the DA-5 is not equipped with the optional bypass loop, continue to step 27. If the DA-5 is equipped with the optional bypass loop, proceed to step 43.

Maintenance on ALD-1



Normal operation must be halted prior to performing maintenance on the ALD-1.

Figure 5: ALD-1 Maintenance Diagram



Standard DA-5

- 27. Prior to performing maintenance on the ALD-1, halt all operations of the DA-5.
- 28. Close primary filter inlet valve A, backup filter inlet valve B, primary filter outlet valve C, and backup filter outlet valve D (Figure 3).
- 29. Remove the plug from the manual liquid dump to vent any pressure remaining in the ALD-1.
- 30. Disconnect the customer-supplied tubing from the automatic liquid dump port.
- 31. Disconnect the ALD-1 from the unit at the jam nut (Figure 5).
- 32. Unscrew the base and remove from the body (Figure 5). Note that the float assembly is attached to the base and will be removed at this time.
- 33. Remove the jam nut at the top of the ALD-1 (Figure 5).
- 34. With the ALD-1 on its side, gently push the coalescing device from the outlet port (Figure 5). Remove the coalescing device from the body.
- 35. Replace the O-ring on the adapter and the coalescer (Figure 5).
- 36. Replace the O-ring on the base (Figure 5).
- 37. Replace the gasket on the pivot valve assembly (Figure 5).
- 38. Using a socket wrench with an extension, reinsert the coalescing device into the outlet port.
- 39. Reattach the base to the body.
- 40. Install the ALD-1 back to the unit.
- 41. Connect the automatic dump port to an atmospheric container or sump.
- 42. Maintenance may now be performed on the optional relief. If the DA-5 is equipped with the optional relief, proceed to step 59. If the DA-5 is not equipped with an optional relief, maintenance is now complete; see Section 2.2, Installation & Operation, for instructions on returning the DA-5 to operation.

DA-5 With Optional Bypass Loop

43. Prior to performing maintenance on the ALD-1, open bypass inlet valve J and bypass outlet valve K (*Figure 3*).



A downstream regulator is required when using the bypass loop to perform maintenance on the ALD-1. This is to reduce the pressure of the unfiltered product and prevent overpressurization of the downstream instrument.

44. Close primary filter inlet valve A, backup filter inlet valve B, primary filter outlet valve C, backup filter outlet valve D, assembly inlet valve H, and assembly outlet valve I (*Figure 3*).
45. Slowly open ALD-1 drain valve G to vent any pressure remaining in the ALD-1 (*Figure 3*).
46. Disconnect the customer-supplied tubing from the automatic liquid dump port.
47. Disconnect the ALD-1 from the unit at the jam nut and at assembly inlet valve H (*Figure 5*).
48. Unscrew the base and remove from the body (*Figure 5*). Note that the float assembly is attached to the base and will be removed at this time.
49. Remove the jam nut at the top of the ALD-1 (*Figure 5*).
50. With the ALD-1 on its side, gently push the coalescing device from the outlet port (*Figure 5*). Remove the coalescing device from the body.
51. Replace the O-ring on the adapter and the coalescer (*Figure 5*).
52. Replace the O-ring on the base (*Figure 5*).
53. Replace the gasket on the pivot valve assembly (*Figure 5*).
54. Using a socket wrench with an extension, reinsert the coalescing device into the outlet port.
55. Reattach the base to the body.
56. Install the ALD-1 back to the unit.
57. Connect the automatic dump port to an atmospheric container or sump.
58. Maintenance may now be performed on the relief.

Maintenance on Relief

59. Prior to performing maintenance on the relief, ensure all operations of the DA-5 have been halted.
60. To perform maintenance on the relief, refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the appropriate Welker® Relief Valve.
61. Maintenance is now complete. See *Section 2.2, Installation & Operation*, for instructions on returning the DA-5 to operation.

Referenced or Attached Documents

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

- IOM-025: Welker® IR-1, IR-2, IR-4, and IR-6 Instrument Regulators
- IOM-033: Welker® RV-1, RV-2, RV-2CP, and RV-3 Relief Valves
- IOM-040: Welker® ALD-1, ALD-3, ALD-5, and ALD-19 Automatic Liquid Dumps
- IOM-046: Welker® F-4, F-5, F-19, F-23, and F-31 Filters/Dryers
- 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 H1 Series Soft Seated Hand Valves (Welker® IOM-V192)
- WIKA Type 232.53 and Type 233.53 Bourdon Tube Pressure Gauges (Welker® IOM-V171)

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

- Assembly Drawing: AD821BD (Standard)
- Assembly Drawing: AD821BR (With Optional Bypass Loop)

NOTES

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