INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WELKER® OILER

SMALL VOLUME CHEMICAL INJECTION SYSTEM

DRAWING NUMBERS
AD761BB.1
AD761BC.3
AD761BG
AD761BJ.1
AD761BK.1
AD761BL.1
AD761BM
AD761BO.1
AD761BS.1
AD761BT
AD761BW.1
AD761BY

MANUAL NUMBER
IOM-236

REVISION
Rev. A, 08/14/2024

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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 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 Oiler Small Volume Chemical Injection System. 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 Oiler 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 Oiler, 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 may have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker *Oiler* Small Volume Chemical Injection System is designed to inject a small volume of chemical (lubricating oil, corrosion inhibitor, or methanol) on a proportional to flow or time basis to keep the process running smoother and longer. Maintenance downtime caused by dry bearings, pipe corrosion, and hydrate formation can be prevented, while at the same time improving the overall performance of instrumentation. The injection chemical is gravity fed into the pump, utilizing a check valve to isolate the pipeline pressure from the injection chemical reservoir. The injection chemical reservoir can be easily refilled without opening the enclosure by accessing the removable injection chemical reservoir fill cap located on top of the enclosure.

The optional Welker 6Tc Timer/Controller houses a long-lasting lithium battery pack capable of powering the Oiler, eliminating the need for an external power source.

Welker may custom design the Oiler 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 may vary depending on the customization of your equipment.**

Table 1: The Welker Oiler Specifications	
Materials of Construction	316/316L Stainless Steel, Anodized Aluminum, Butyrate, PTFE, Nylon, And Viton®
Maximum Allowable Operating Pressure	1440 psig @ -20 °F to 140 °F (*99 barg @ -28 °C to 60 °C*)
Operating Range	0–100 psig @ -20 °F to 140 °F (0–7 barg @ -28 °C *to 60 °C*) 20–1440 psig @ -20 °F to 140 °F (*1–99 barg @ -28 °C to 60 °C*)
Output Range	**IR-7:** 0–100 psig (*0–7 barg*)
Connections	**Instrument Supply Inlet:** ¼" FNPT **Injection Chemical Outlet:** ¼" FNPT
Injection Volume	0.25 cc/Stroke
Injection Chemical Reservoir Volume	250 cc
Mounting	Panel-Mount for 2" Pole or Pipe Stand Wall-Mount
Weight	Approx. 10 lb
Dimensions	**Enclosure:** 10" x 8" x 4" (Length x Width x Height) **Panel:** 12.75" x 8" (Height x Width)
Features	Enclosure With Padlock Hasp and Clear Cover Injection Pump Actuated by Regulated Process Gas Easy Access Injection Chemical Reservoir Panel-Mounted
Electrical Area Classification	NEC Class I, Div. 1, Groups C & D, T3C
Options	Dual Injection Pumps Extra Long Mounting Bracket Stainless Steel Tubing and Fittings CSA Approval Instrument Supply Regulation Package Solenoid (DC 6V, DC 12V, or DC 24V) Welker 6Tc Timer/Controller

1.4 Equipment Diagrams

Figure 1: The Welker Oiler – Connections Diagram

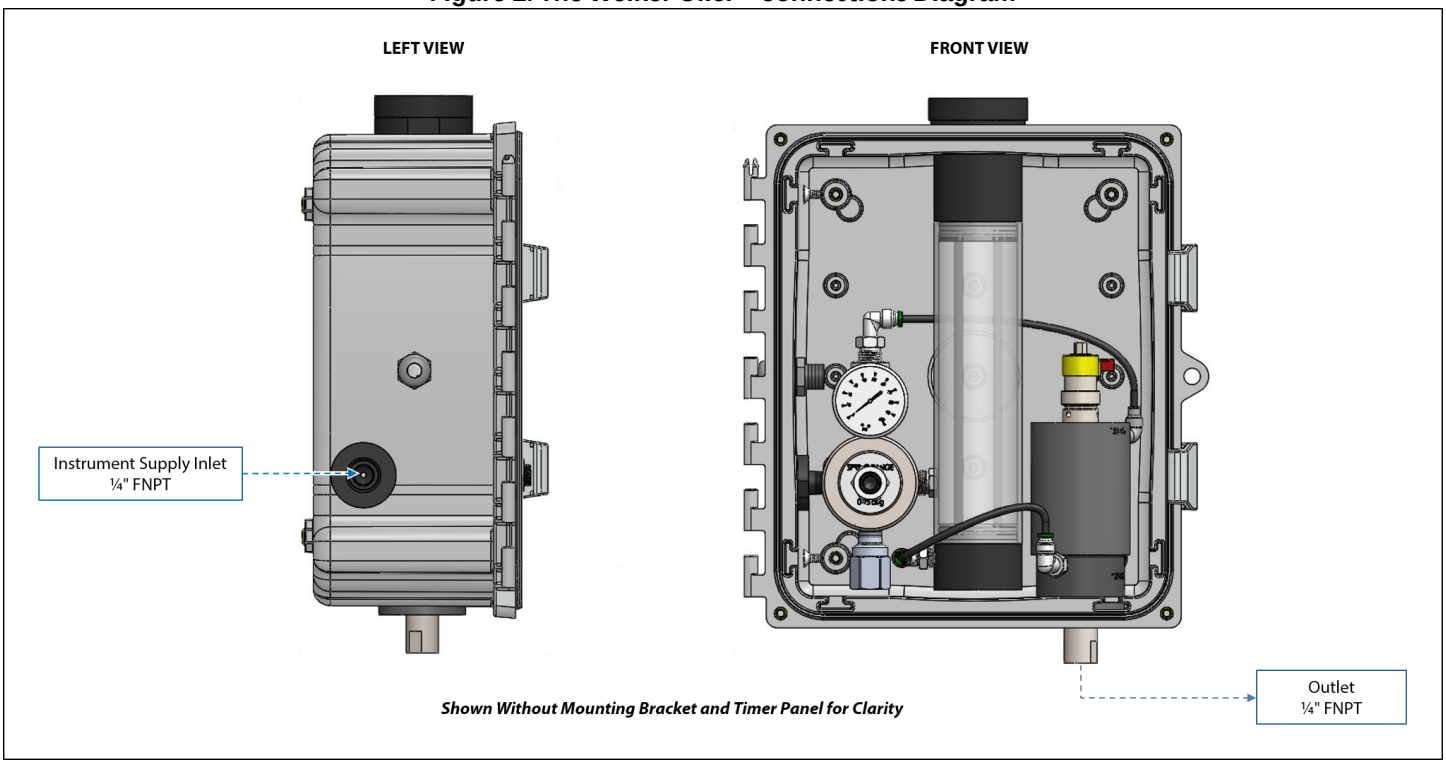
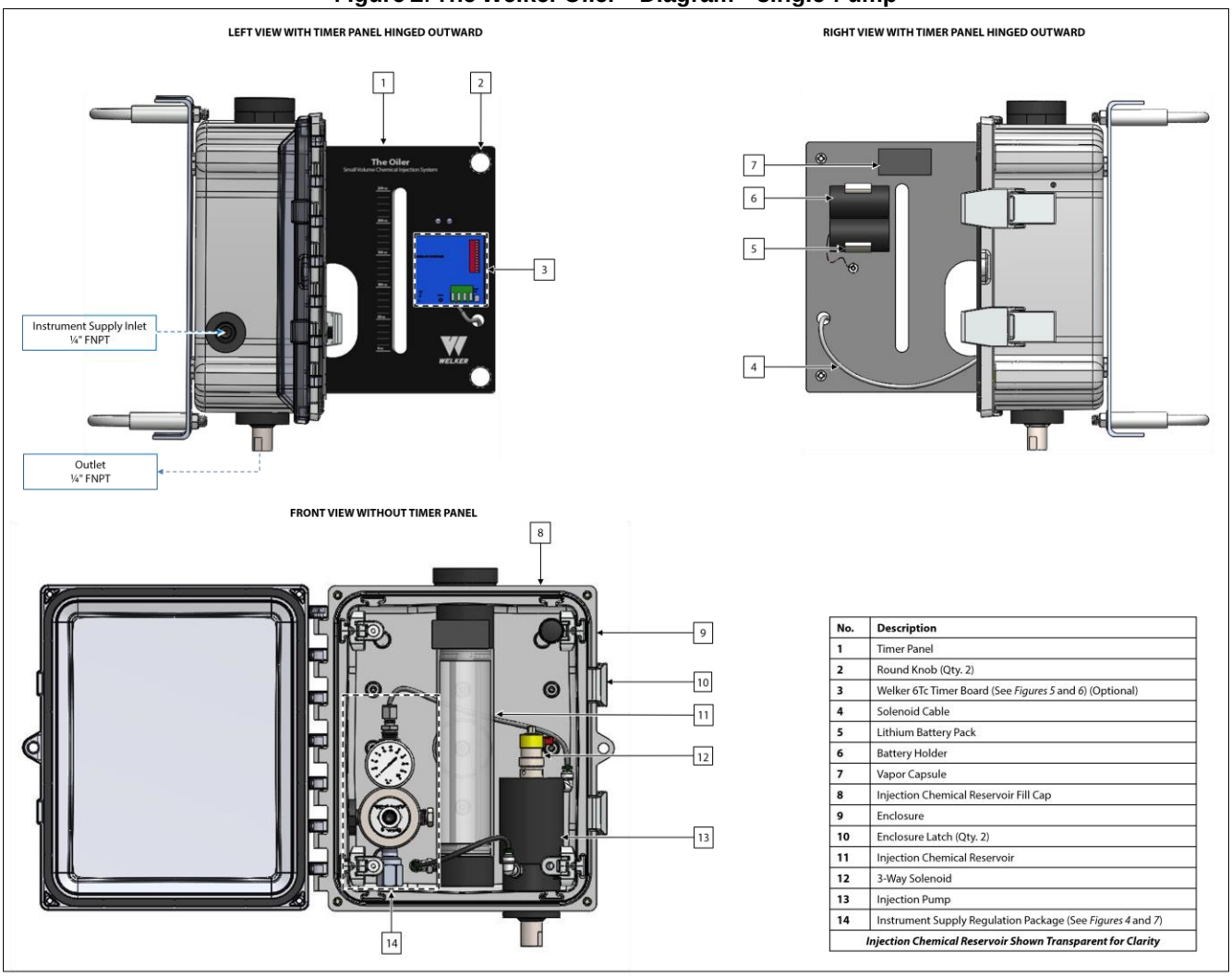


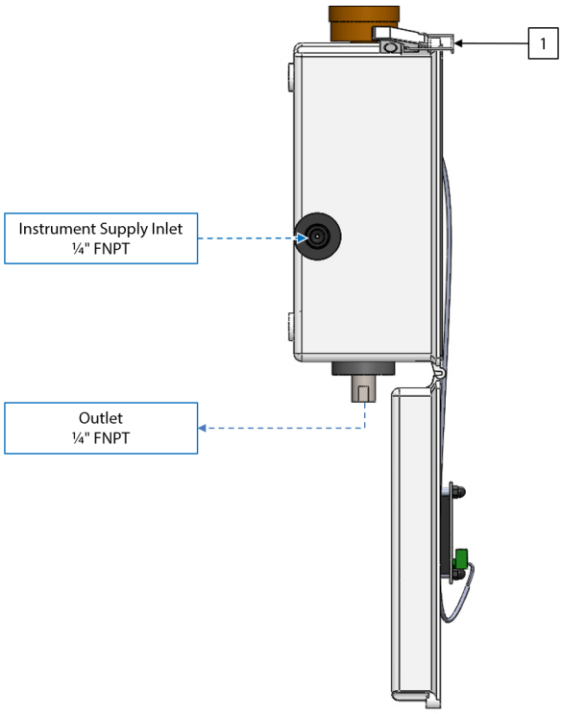
Figure 2: The Welker Oiler – Diagram – Single-Pump



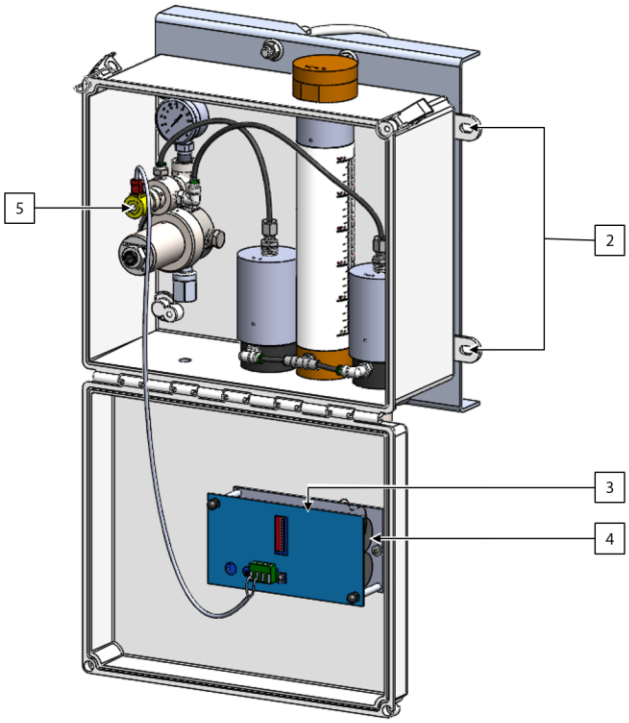
No.	Description
1	Timer Panel
2	Round Knob (Qty. 2)
3	Welker 6Tc Timer Board (See *Figures 5* and *6*) (Optional)
4	Solenoid Cable
5	Lithium Battery Pack
6	Battery Holder
7	Vapor Capsule
8	Injection Chemical Reservoir Fill Cap
9	Enclosure
10	Enclosure Latch (Qty. 2)
11	Injection Chemical Reservoir
12	3-Way Solenoid
13	Injection Pump
14	Instrument Supply Regulation Package (See *Figures 4* and *7*)
Injection Chemical Reservoir Shown Transparent for Clarity	

Figure 3: The Welker Oiler – Dual-Pump

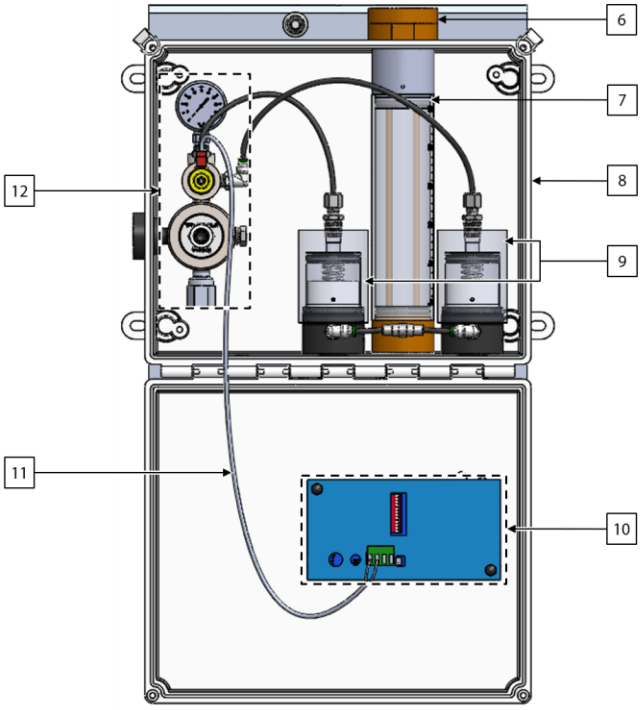
LEFT VIEW



RIGHT VIEW, ANGLED

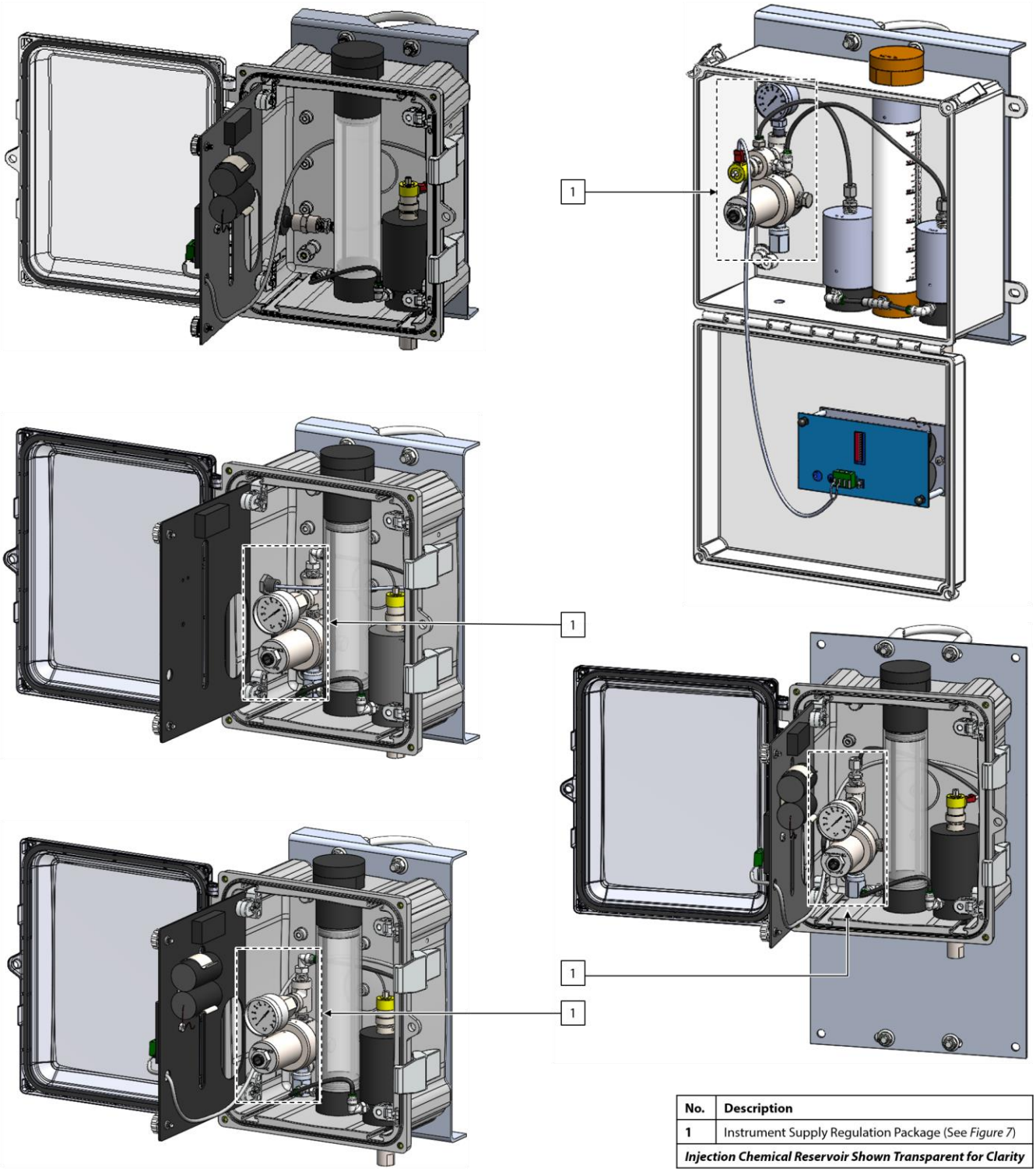


FRONT VIEW
PUMPS AND RESERVOIR SHOWN TRANSPARENT



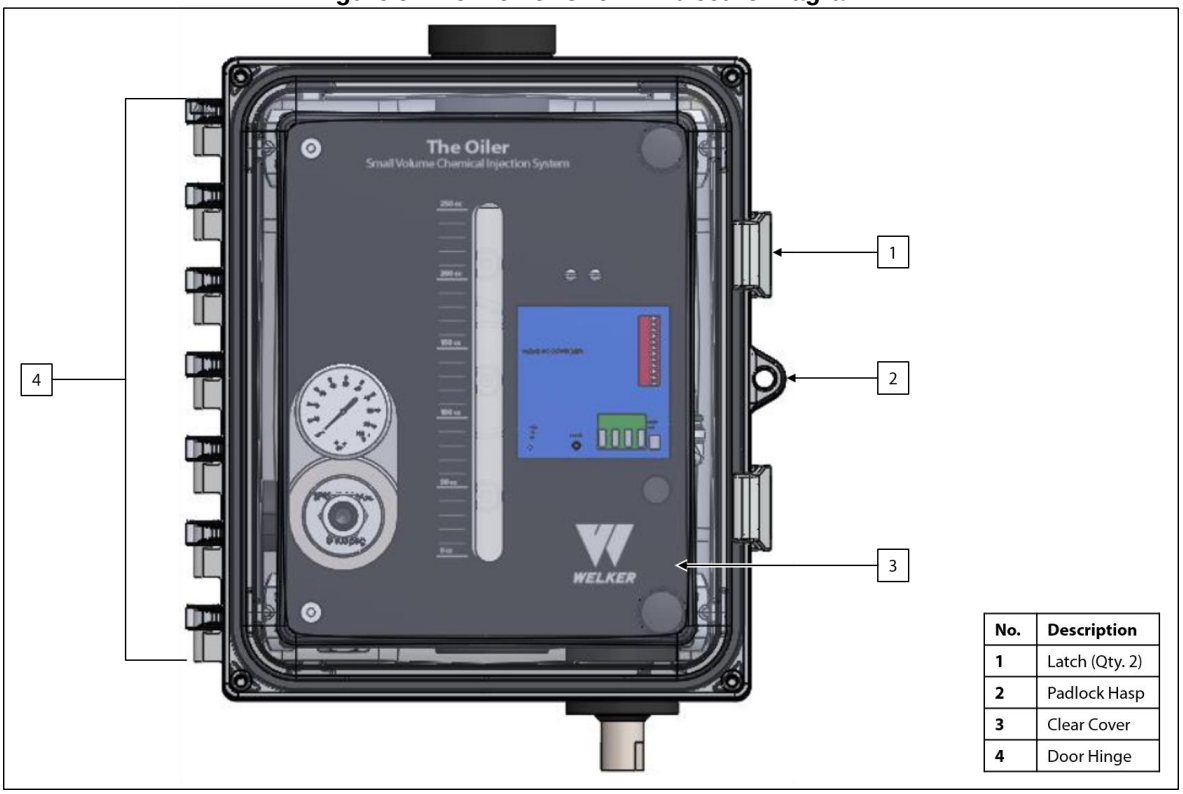
No.	Description
1	Enclosure Latch (Qty. 2)
2	Mounting Hole (Qty. 4)
3	Timer Mounting Plate
4	Lithium Battery Pack
5	3-Way Solenoid
6	Injection Chemical Reservoir Fill Cap
7	Injection Chemical Reservoir
8	Stainless Steel Enclosure
9	Injection Pump (Qty. 2)
10	Welker 6Tc Timer Board (See *Figure 6*)
11	Solenoid Cable
12	Instrument Supply Regulation Package (See *Figure 7*)

Figure 4: The Welker Oiler – Representative Configurations



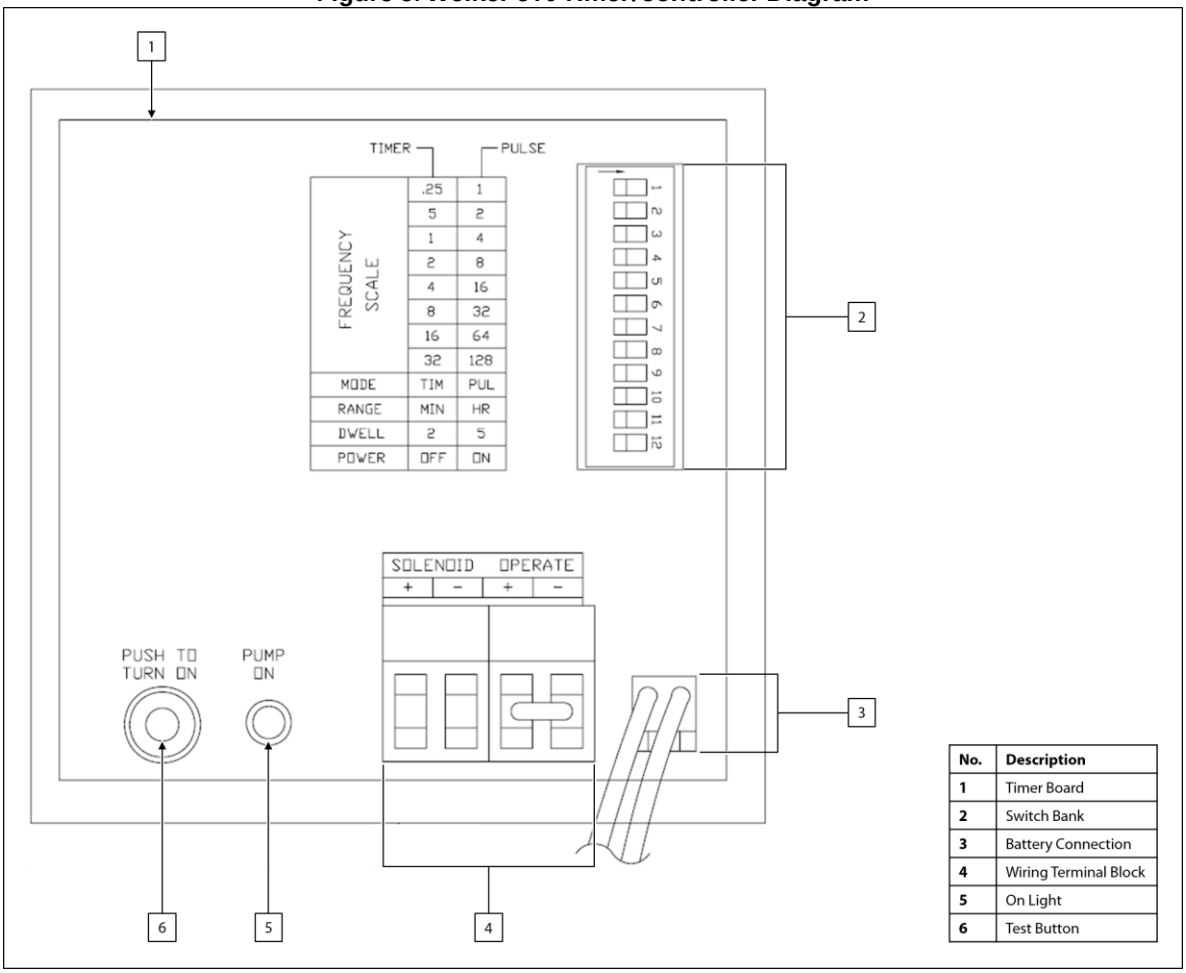
No.	Description
1	Instrument Supply Regulation Package (See *Figure 7*)
Injection Chemical Reservoir Shown Transparent for Clarity	

Figure 5: The Welker Oiler – Enclosure Diagram



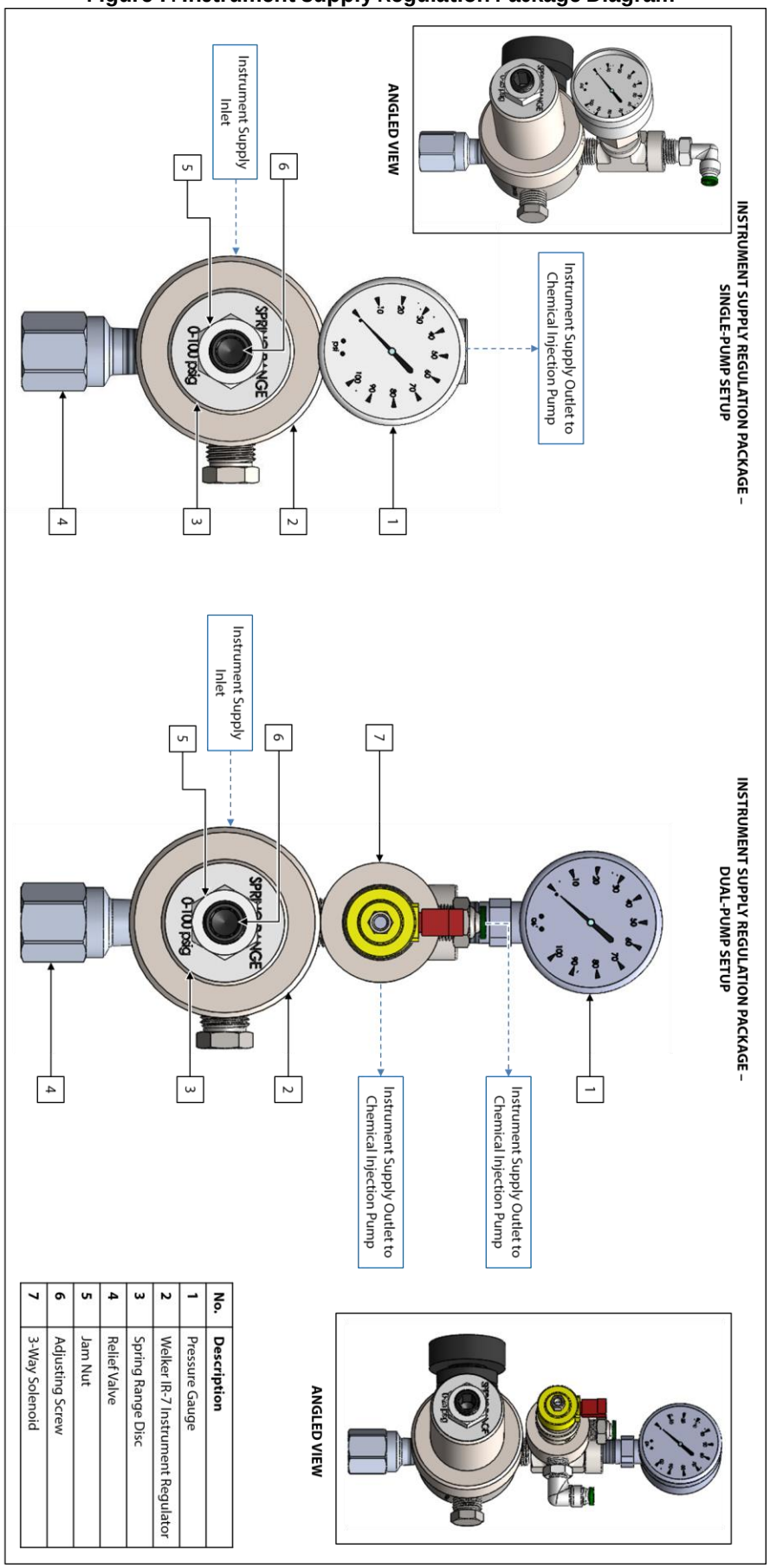
No.	Description
1	Latch (Qty. 2)
2	Padlock Hasp
3	Clear Cover
4	Door Hinge

Figure 6: Welker 6Tc Timer/Controller Diagram



No.	Description
1	Timer Board
2	Switch Bank
3	Battery Connection
4	Wiring Terminal Block
5	On Light
6	Test Button

Figure 7: Instrument Supply Regulation Package 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.

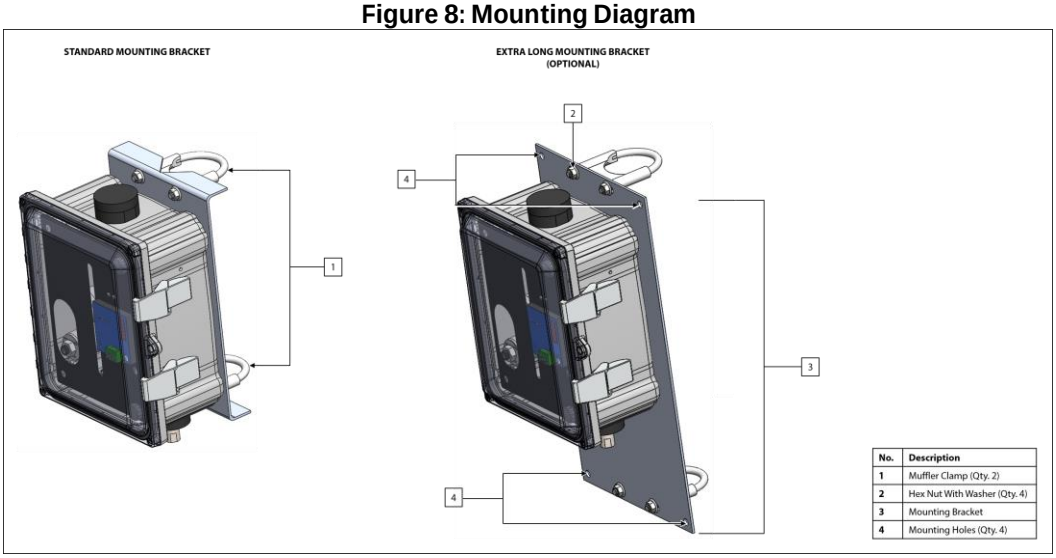
When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

2.2 Installation

1. **Mount the standard panel** to a customer-supplied 2" pipe stand. Remove the four (4) hex nuts with washers and two (2) muffler clamps, and then position the panel on the pipe stand (*Figure 8*). Secure the panel to the pipe stand with the two (2) muffler clamps, and then replace and tighten the four (4) hex nuts with washers.
2. **To mount the optional extra long bracket,** first remove the four (4) hex nuts with washers and two (2) muffler clamps. Set these aside should the customer require mounting to a pipe stand at some point in the future.
3. Next, using a level, mark and drill four (4) holes in the bulkhead (aka wall) for the appropriate fasteners. Mount the extra long bracket to the bulkhead by screwing the fasteners into the four (4) mounting holes (*Figure 8*) at all four corners of the bracket.

The Oiler must be installed vertically with the outlet port facing down.

Figure 8: Mounting Diagram



4. If using, locate the pipe stand as close as possible to the meter.

Welker recommends adding a needle valve on the meter oil port so the Oiler may be isolated from the meter for maintenance.

5. Using customer-supplied ¼" tubing, connect the outlet on the Oiler to the injection point or the inlet of the lubrication port of the meter (*Figure 1*).
6. Using customer-supplied ¼" tubing, connect the customer-supplied instrument supply to the instrument supply inlet on the enclosure (*Figure 1*).

2.3 Start-Up Procedures

Filling the Injection Chemical Reservoir

1. Remove the injection chemical reservoir fill cap (*Figure 2*).
2. Fill the injection chemical reservoir with the injection chemical.
3. Re-install the injection chemical reservoir fill cap and hand tighten (*Figure 2*).

The injection chemical reservoir fill cap is equipped with a seal that protects the injection chemical from environmental contamination.

DO NOT fill the injection chemical reservoir past the 250 cc mark. The injection chemical reservoir fill cap is equipped with a vacuum vent, and any excess fill amount will be spilled from this port.

Programming the Optional 6Tc Timer/Controller

Programming the 6Tc is accomplished by setting the switch bank located on the upper right side of the 6Tc timer board (*Figure 4*). Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the 6Tc for additional instructions on changing the settings.

4. Set the dwell time to either two (2) or five (5) seconds by moving the DWELL switch (switch 11) to the left or right accordingly (*Figure 6*).
5. Set the injection frequency mode to either TIM (timed) or PUL (pulse) by moving the MODE switch (switch 9) to the left or right accordingly (*Figure 6*).

Setting the 6Tc to Timer mode allows for an actuation frequency between 15 seconds and 255 hours.

Setting the 6Tc to Pulse mode allows for a pulse count range of 1–255. The Pulse mode accepts input from a proportional to flow signal producing device, such as a flow computer or turbine meter with signal conditioner.

6. Set the range to either MIN (minutes) or HR (hours) by moving the RANGE switch (switch 10) to the left or right accordingly (*Figure 6*).

If the time range is in minutes, slide switch 10 to the left and use the frequency scale in the TIMER column.
If the time range is in hours, slide switch 10 to the right and use the frequency scale in the PULSE column.

7. To set the frequency scale for Timed mode, slide switches 1–8 to the right until the values add up to the desired amount of time between strokes. Switches in the left position are OFF and do not count toward the total.
8. To set the frequency scale for Pulse mode, determine the scale of pulses being sent to the 6Tc, and then slide switches 1–8 to the right until the values add up to the scale of pulses being sent to the 6Tc. Switches in the left position are OFF and do not count toward the total.
9. Once the 6Tc has been set, slide the POWER switch (switch 12) to the right to turn on the 6Tc (*Figure 6*).
10. Close and latch the enclosure door (*Figure 2* and *Figure 5*).

Start-Up

11. If equipped, the Welker IR-7 Instrument Regulator comes set by the manufacturer to approximately 70 psig (*Figure 6*). Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the IR-7 for instructions on adjusting the IR-7.
12. If applicable, open the outlet valve on the customer-supplied pneumatic supply.

> If natural gas from the pipeline is to be used for the pneumatic supply, ensure that the gas is non-toxic and non-odorized. To ensure the gas is non-odorized, run tubing from the pipeline upstream of where odorant is being injected into the pipeline.

13. Check all connections carefully to verify that there are no leaks in the supply system.
14. Ensure the injection chemical reservoir has been filled (*Figure 2*).
15. If equipped, ensure that power to the 6Tc or customer-supplied controller is ON (*Figure 6*).
16. If equipped with the 6Tc, press the test button to manually stroke the pump (*Figure 6*). The PUMP ON light should illuminate every time the pump is stroked. If equipped with a customer-supplied controller, from the controller, manually stroke the pump to verify injection of the chemical.
17. As necessary, manually stroke the pump until verification of injection can be confirmed.

> Verification of injection can be confirmed by observing the injection chemical reservoir level after several test strokes of the pump. Place a mark where the top of the injection chemical is, and then verify that the level is decreasing once the test strokes are completed.

> Twenty-five (25) test strokes of the pump should result in a decrease of approximately $\frac{1}{8}$".

18. Once injection has been verified, the Oiler is operational.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker recommends that the unit have standard yearly maintenance.** Based on the operating conditions and/or site requirements, adjustments to the maintenance schedule may be necessary.
2. 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 may 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.

3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
4. Welker recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
    a. 6" Adjustable Wrench (Qty. 2)
    b. PTFE Tape
    c. Seal Pick
    d. Silicone Lubricant

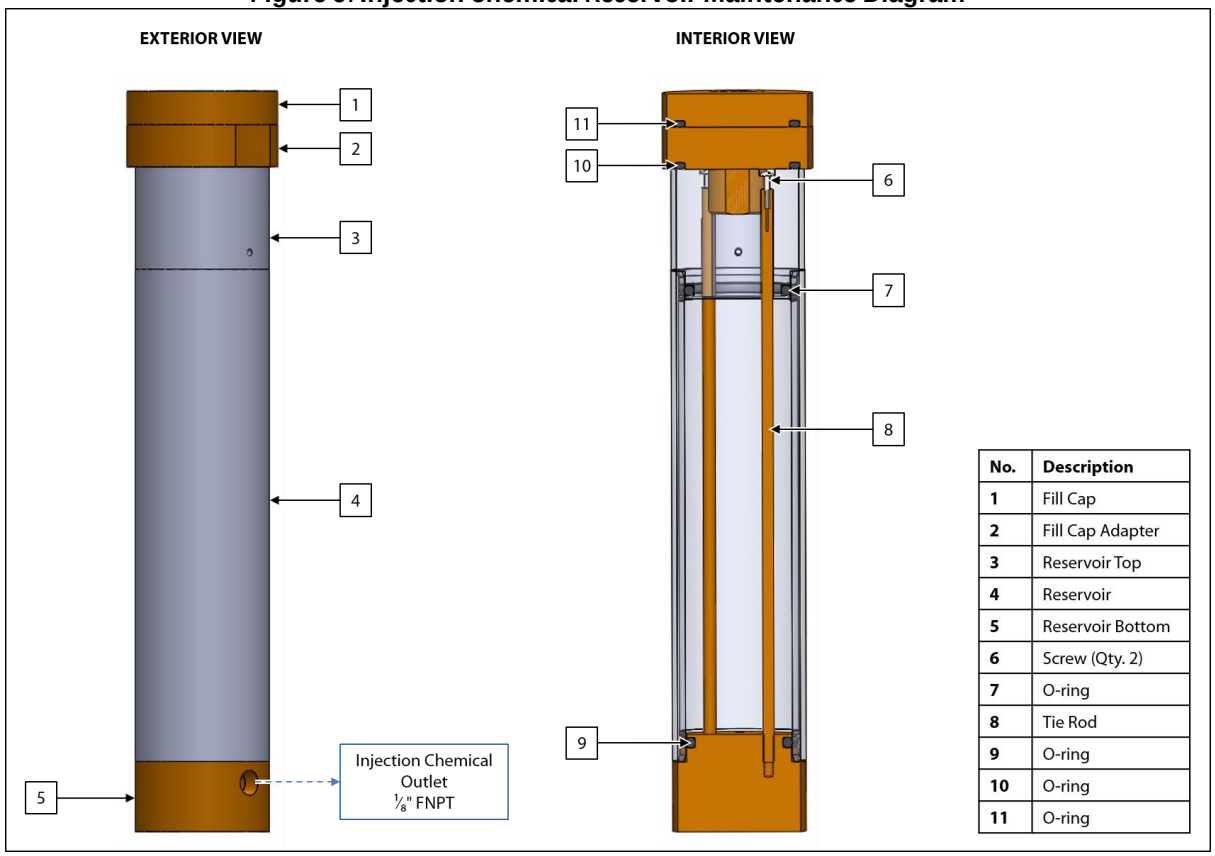
3.2 Maintenance

1. Turn OFF power to the 6Tc (*Figure 6*) or customer-supplied controller.
2. If equipped, disconnect the lithium battery pack from the terminal and remove the cable connection from the solenoid (*Figure 2* or *Figure 3*).
3. Disconnect the instrument supply from the Oiler, and then bleed the pressure off.
4. Check the pressure gauge to ensure all pressure has been relieved from the Oiler (*Figure 7*).
5. Disconnect all tubing from the instrument supply to the actuator of the injection pump.

System Disassembly

Injection Chemical Reservoir

Figure 9: Injection Chemical Reservoir Maintenance Diagram



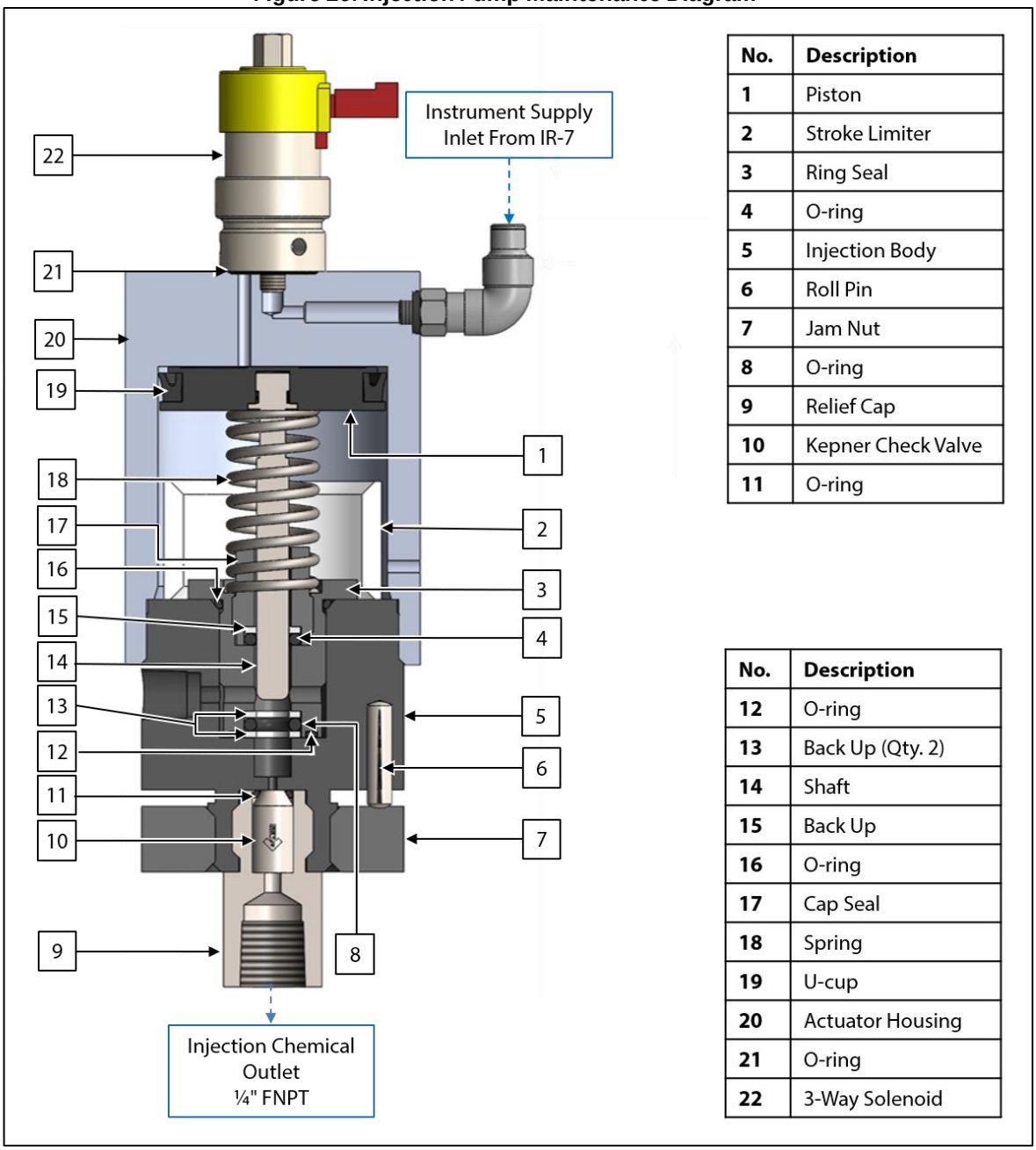
No.	Description
1	Fill Cap
2	Fill Cap Adapter
3	Reservoir Top
4	Reservoir
5	Reservoir Bottom
6	Screw (Qty. 2)
7	O-ring
8	Tie Rod
9	O-ring
10	O-ring
11	O-ring

6. Remove the fill cap from the injection chemical reservoir (*Figure 9*).
7. Unscrew the fill cap adapter from the reservoir top (*Figure 9*).

Two (2) flats have been provided on the fill cap adapter for ease of removal.

Injection Pump

Figure 10: Injection Pump Maintenance Diagram



No.	Description
1	Piston
2	Stroke Limiter
3	Ring Seal
4	O-ring
5	Injection Body
6	Roll Pin
7	Jam Nut
8	O-ring
9	Relief Cap
10	Kepner Check Valve
11	O-ring

No.	Description
12	O-ring
13	Back Up (Qty. 2)
14	Shaft
15	Back Up
16	O-ring
17	Cap Seal
18	Spring
19	U-cup
20	Actuator Housing
21	O-ring
22	3-Way Solenoid

8. Close the customer-supplied valve at the injection point or meter oil port to isolate the Oiler.
9. Relieve pressure in the tubing from the injection pump.
10. Remove all tubing from the injection pump.
11. Remove the jam nut from the bottom of the injection pump (*Figure 10*).
12. Once the injection pump and injection chemical reservoir are loose, pull the injection chemical reservoir toward the front of the enclosure and remove (*Figure 2*).
13. Pour all remaining injection chemical from the injection chemical reservoir into a customer-supplied collection container.

The injection chemical reservoir may stay connected to the injection pump during disassembly of the injection pump.

Injection Pump Disassembly

14. Remove the 3-way solenoid from the actuator housing and replace the O-ring (*Figure 10*).
15. Unscrew the actuator housing and remove from the injection body (*Figure 10*).
16. Remove the stroke limiter and set aside (*Figure 10*).
17. Remove the cap seal from the ring seal (*Figure 10*). Rotate the cap seal counterclockwise to remove.
18. Remove and replace the O-ring and back up inside the cap seal (*Figure 10*).
19. Remove the ring seal from the injection body (*Figure 10*). Rotate the ring seal counterclockwise to remove.
20. Remove and replace the O-rings and back ups inside the ring seal (*Figure 10*).
21. Remove and replace the O-ring inside the injection body (*Figure 10*).
22. Carefully remove the piston and spring from the actuator housing (*Figure 10*).
23. Remove the spring from the shaft and set aside (*Figure 10*).
24. Closely inspect the polished outer diameter of the shaft. Scratches or pits may cause the seals to leak. If scratches or pits are present, the unit may need to be repaired or replaced. Contact Welker for service options.
25. Remove and replace the U-cup on the piston (*Figure 10*). Ensure the groove on the U-cup is facing toward the 3-way solenoid.
26. Remove the relief cap from the injection body, and then remove the O-ring and check valve (*Figure 10*).
27. Using a solvent, clean the check valve and inside of the relief cap.

Welker recommends using a solvent, such as rubbing alcohol, that does not leave a film when dry and will not adversely affect analytical instrument results.

28. Return the check valve to the relief cap (*Figure 10*). Ensure the arrow is pointing toward the outlet port.
29. Replace the O-ring inside the relief cap (*Figure 10*).

Injection Pump Reassembly

30. Screw the ring seal into the injection body and tighten by hand (*Figure 10*).
31. Screw the cap seal into the ring seal and tighten by hand (*Figure 10*).
32. Install the stroke limiter around the ring seal (*Figure 10*).
33. Apply a thin coat of silicone grease inside the actuator housing, and then insert the piston (*Figure 10*).
34. Place the spring around the cap seal, and then screw the actuator housing onto the injection body (*Figure 10*).

When screwing the actuator housing onto the injection body, HAND TIGHTEN ONLY. Using a vice may result in damage to the injection body and cause the injection pump to fail.

35. Ensure the check valve and new O-ring have been inserted into the relief cap (*Figure 10*).
36. Screw the relief cap into the injection body (*Figure 10*).
37. Screw the 3-way solenoid into the actuator housing (*Figure 10*).

System Reassembly

38. While holding the injection chemical reservoir, insert the injection pump through the opening in the bottom of the enclosure (*Figure 2*).
39. Screw the jam nut onto the injection body but do not tighten (*Figure 10*).
40. Place the injection chemical reservoir into the enclosure and align the reservoir top with the opening in the top of the enclosure (*Figure 9*).
41. Screw the fill cap adapter into the reservoir top, and then tighten with a wrench (*Figure 9*).
42. Tighten the jam nut on the injection body (*Figure 10*).
43. Reconnect all tubing to the Oiler.
44. Reconnect the solenoid cable to the solenoid, and then reconnect the lithium battery pack to the 6Tc (*Figure 2* and *Figure 3*).
45. Open the pneumatic supply to the system and check for leaks.
46. Maintenance is now complete. See *Section 2.3, Start-Up Procedures*, for instructions on returning the Oiler to operation.

3.3 Troubleshooting Guidelines

Table 2: The Welker Oiler Troubleshooting Guidelines		
Issues	**Possible Causes**	**Solutions**
The on light on the 6Tc does not illuminate when the test button is pressed.	The unit is not turned on.	Ensure that the power switch (switch 12) is in the ON position (*Figure 6*).
	The battery is not connected.	Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the 6Tc for instructions on connecting the battery.
The on light illuminates only when the test button is pressed. **OR** **The 6Tc does not appear to be working in accordance with the settings.**	The circuits need to be reset.	Reset the 6Tc. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the 6Tc for instructions on resetting the 6Tc.
The injection pump is not injecting.	The injection chemical reservoir supply is low or a blockage has occurred from the reservoir to the pump.	Ensure there is a sufficient supply of injection chemical in the injection chemical reservoir. See *Section 2.3, Start-Up Procedures*, for instructions on filling the reservoir. If a blockage has occurred, remove the tubing and clear the blockage.
	The pneumatic supply to the injection pump is too low.	Ensure the IR-7 is set to approximately 70 psig.
	Damage has occurred internally.	Maintenance is required. Contact Welker for service options.
There is bubbling within the injection chemical stored in the injection chemical reservoir.	The internal check valve in the injection pump is failing and allowing air back into the injection pump and injection chemical reservoir.	Replace the check valve on the injection pump. See *Section 3.2, Maintenance*, for instructions on replacing the check valve.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-002: Welker 6Tc Timer/Controller
- IOM-044: Welker IR-7 Instrument Regulator

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

- Circle Seal Controls 500 Series Adjustable Popoff & Inline Relief Valves (Welker IOM-V178)
- Clippard Instrument laboratory, Inc. 3-Way Fully-Ported Valves (Welker IOM-V138)
- Kepner Products Company Kepsel® Cartridge Insert Valves (Welker IOM-V078)
- McDaniel Controls, Inc. Stainless Steel Case Utility Gauges (Welker IOM-V274)
- Northern Technologies International Corporation, Inc. Zerust® Vapor Capsules (Welker IOM-V474)

Welker drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD761BB.1 (OIP-1BK)
- Assembly Drawing: AD761BC.3 (OIP-2AK, OIP-2AKE, OIP-2CK, OIP-2DK)
- Assembly Drawing: AD761BG (OIP-2BKXD)
- Assembly Drawing: AD761BJ.1 (OIP-2BKX, OIP-2BKXT)
- Assembly Drawing: AD761BK.1 (OIP-1BKX)
- Assembly Drawing: AD761BL.1 (OIP-2AKX, OIP-2CKX, OIP-2DKX)
- Assembly Drawing: AD761BO.1 (OIP-2BK, OIP-2BKE)
- Assembly Drawing: AD761BS.1 (OIP-2BKW)
- Assembly Drawing: AD761BT (OIP-2AKWB)
- Assembly Drawing: AD761BW.1 (OIP-2BKXDC)
- Assembly Drawing: AD761BY (OIP-1CKX, OIP-1DKX)

NOTES

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