



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER® PROBE MOUNTED LIQUID ELIMINATOR

MODEL
LE-2SSK0IR

DRAWING NUMBER
AD691BQ

MANUAL NUMBER
IOM-152

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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® Probe Mounted Liquid Eliminator, LE-2SSKOIR. 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 Probe Mounted Liquid Eliminator 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 Probe Mounted Liquid Eliminator, 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 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® LE-2SSKOIR Probe Mounted Liquid Eliminator is designed to remove free liquids, condensed hydrocarbons, glycol, and amines from and reduce the pressure of gas samples, ensuring the collection of representative samples of the natural gas at flowing conditions and protecting analyzers from damage and contamination.

Pipeline product enters the LE-2SSKOIR through the probe. As the gas stream passes through the LE-2SSKOIR to the sample outlet, the Welker® Instrument Regulator reduces the pressure of the gas to the desired output pressure, but any pre-regulated free liquids in the sample stream are separated by a screen and membrane and returned to the pipeline through the stinger.

Welker may custom design the LE-2SSKOIR 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: LE-2SSKOIR Specifications

Products Sampled	Gases Compatible With the Materials of Construction
Materials of Construction	304 Stainless Steel, 316/316L Stainless Steel, PTFE, Teflon®, Viton®
Maximum Allowable Operating Pressure	1440 psig @ -20 °F to 100 °F (99 barg @ -28 °C to 37 °C) Others Available
Pipeline Connection	1/2" MNPT 3/4" MNPT 1" MNPT
Spring Range	0-25 psig (0-1.7 barg) 0-50 psig (0-3.4 barg) 20-100 psig (1.3-6.8 barg) 75-200 psig (5.1-13.7 barg) 200-500 psig (13.7-34.4 barg)
Filter Media	25 Micron Copolymer Filter Element 304 Stainless Steel Mesh Screen
Feature	Welker® Instrument Regulator
Options	Insulation Blanket Probe Tip With 90° Bend Into Flow Welker® Relief Valve

1.4 System Diagrams

Figure 1: LE-2SSKOIR Diagram

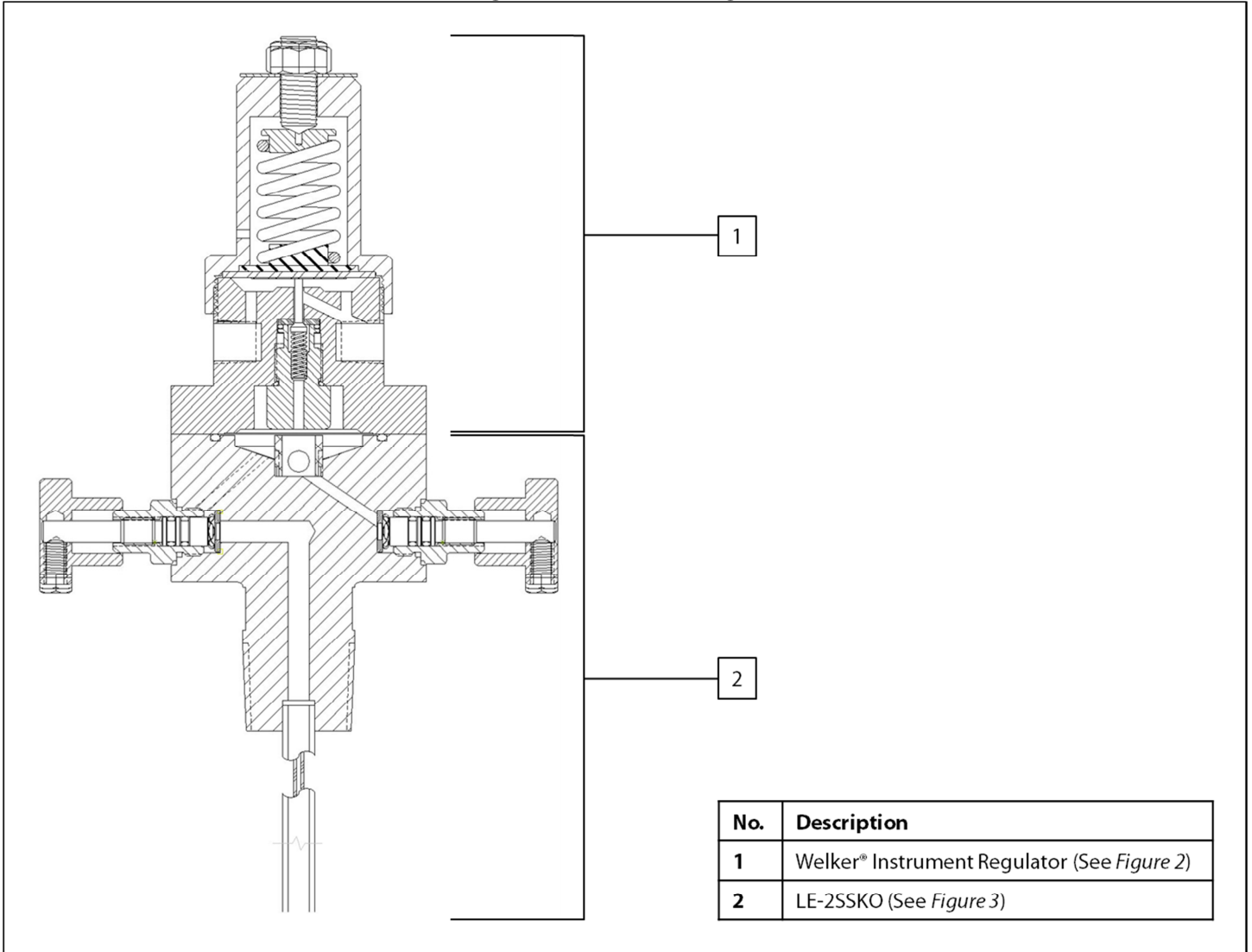


Figure 2: Instrument Regulator Diagram

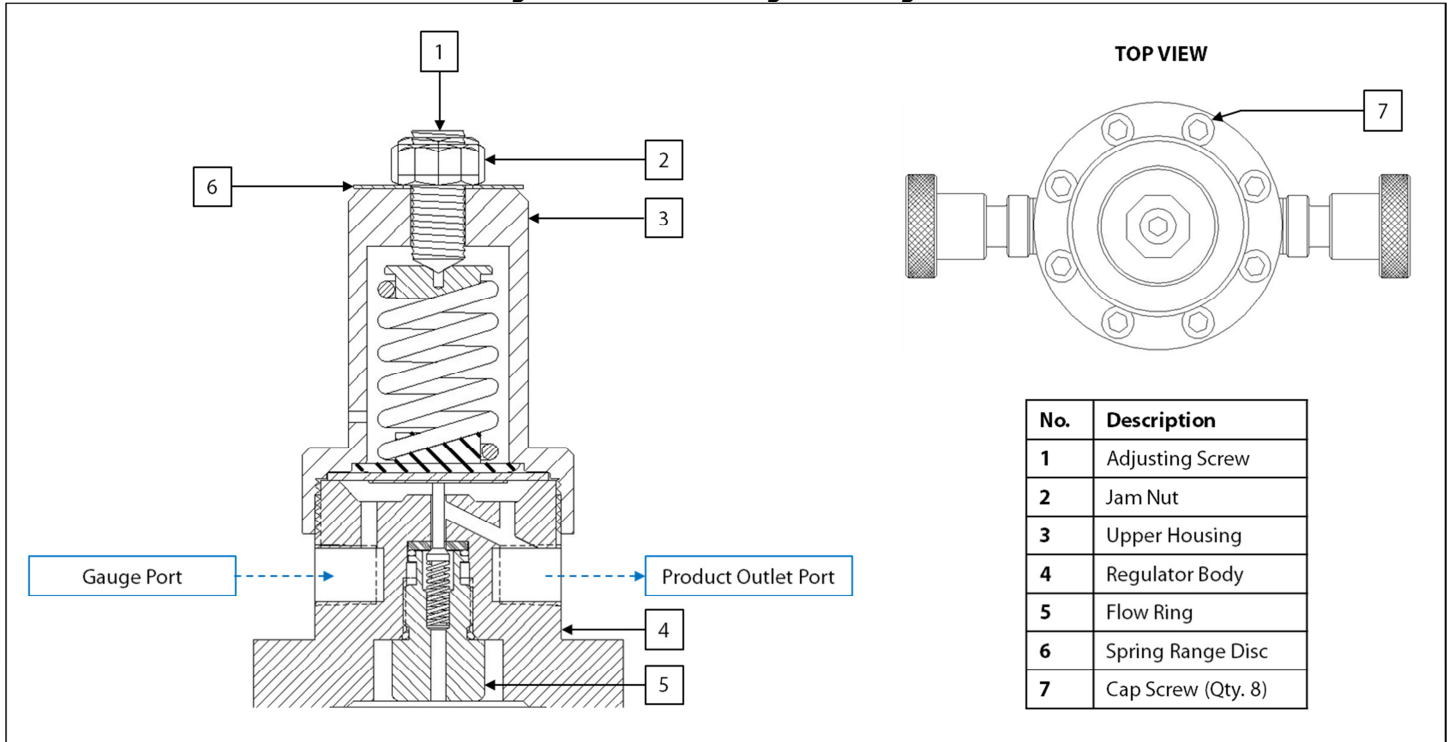
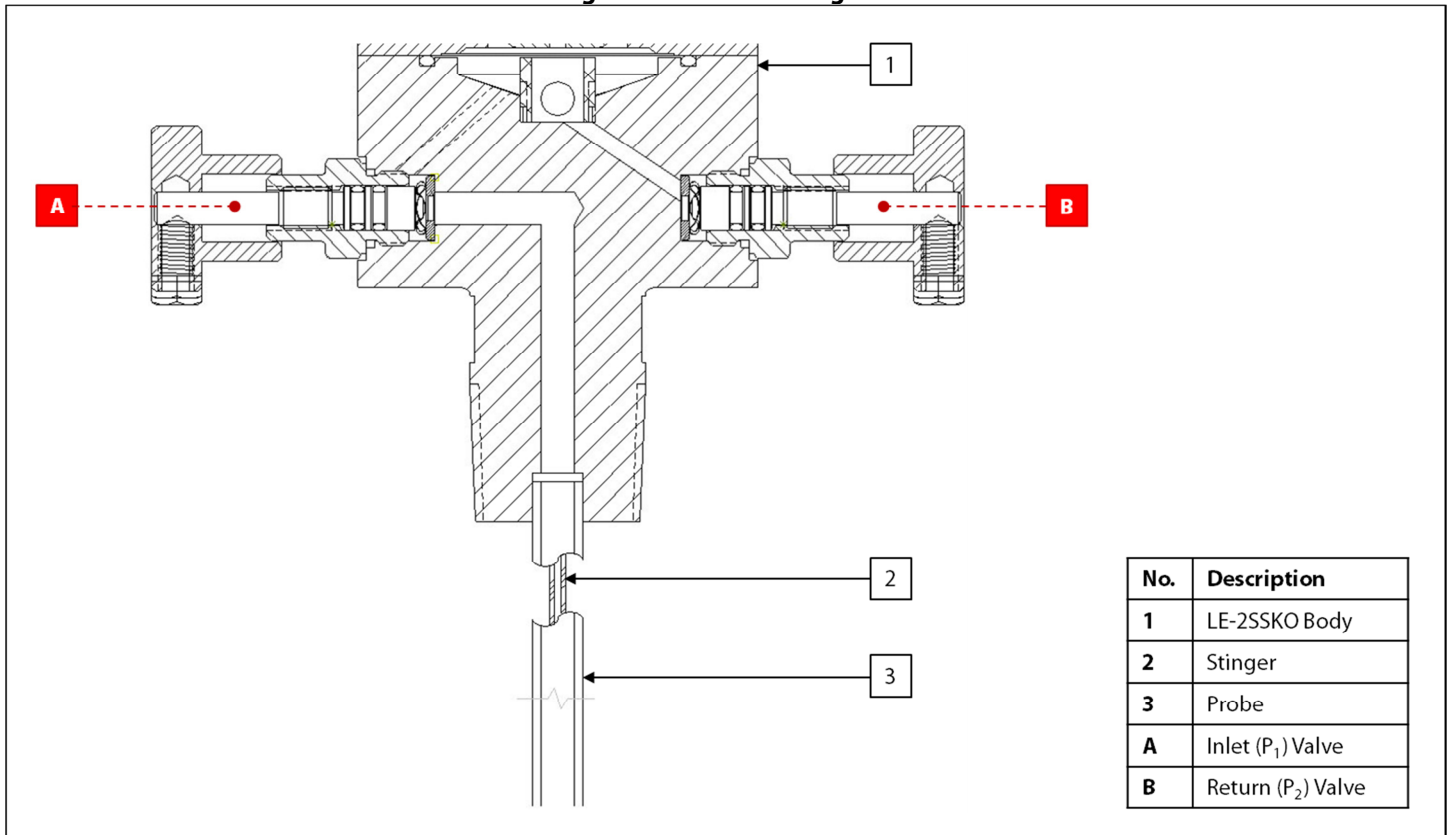


Figure 3: LE-2SSKO Diagram



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.

1. Welker recommends that the unit be installed in the top of the pipe and inserted into the center one-third (1/3) of the pipeline in a location that will yield a sample representative of the natural gas at flowing conditions.
2. The sample probe should be located in the least turbulent area of the flowing stream available (i.e., not in a header or non-flowing area and away from obstructions, elbows, and partially closed valves).

2.2 Installation & Operation



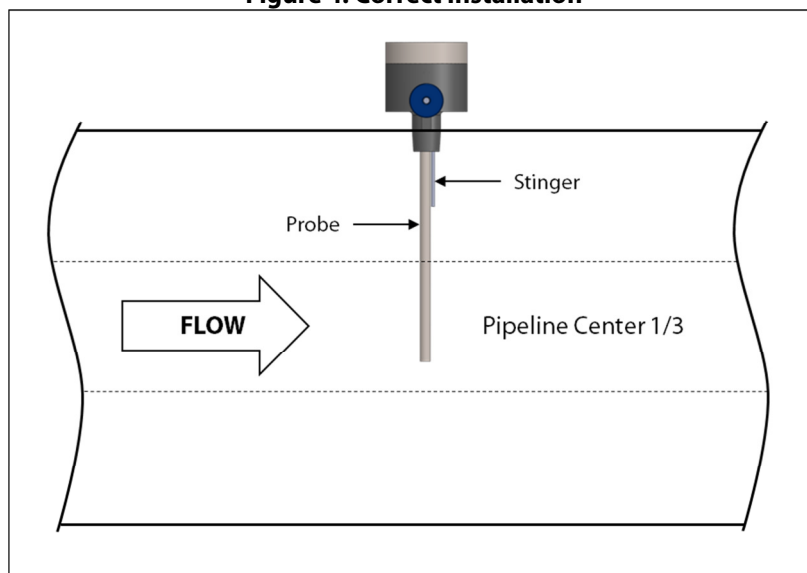
The pipeline must be depressurized prior to installing and removing the unit.

1. Ensure that inlet (P_1) valve A and return (P_2) valve B are closed (*Figure 3*).
2. Ensure that all cap screws on the top cap are tightened (*Figure 2*).
3. Ensure that the pipeline is depressurized.
4. Install the LE-2SSKOIR to the pipeline so that the stinger is downstream of the direction of product flow (*Figure 4*).



As necessary, refer to the flow direction stamped on the top cap to determine correct orientation before installing the LE-2SSKOIR to the pipeline.

Figure 4: Correct Installation



5. Using customer-supplied tubing, connect from the product outlet to an analyzer or sample container (*Figure 2*).
6. As necessary, install a pressure gauge to the gauge port on the instrument regulator (*Figure 2*).

- Set the relief valve using a safe auxiliary pneumatic supply. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* of the relief valve used for instructions on setting the relief.



If the instrument regulator is used to set the relief, DO NOT exceed the maximum output pressure of the instrument regulator.



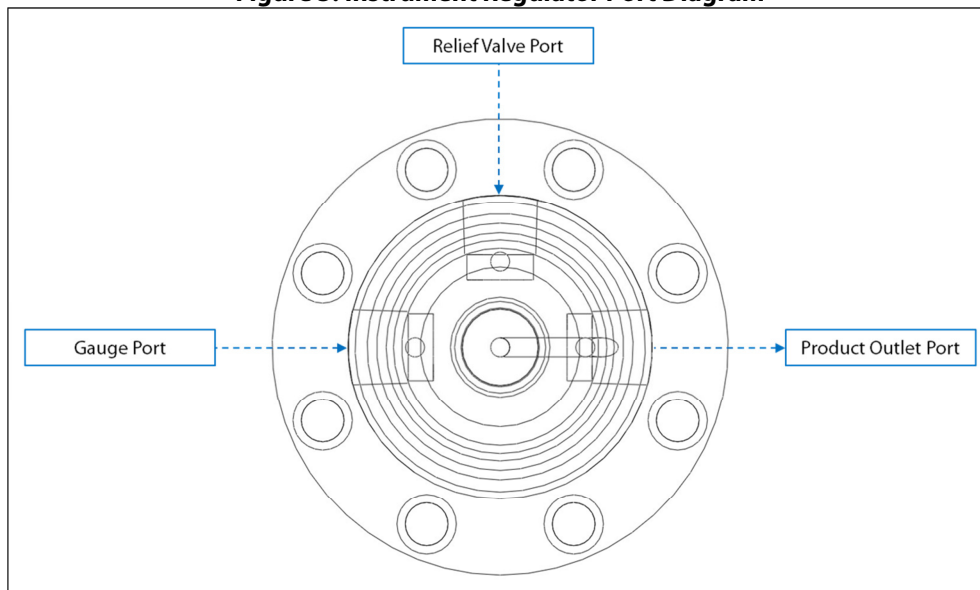
DO NOT open inlet (P_1) valve A until the relief valve has been set. Opening inlet (P_1) valve A before the relief valve has been set could overpressurize the instrument regulator.



Welker can pre-set the relief if requested at the time of order.

- As necessary, install the relief valve to the relief valve port on the instrument regulator (*Figure 5*).

Figure 5: Instrument Regulator Port Diagram



- Pressurize the pipeline.
- After the relief valve has been set, open inlet (P_1) valve A and return (P_2) valve B. Check for leaks at the pipeline connection and repair as necessary.
- Loosen the jam nut on the adjusting screw (*Figure 2*).
- Screw the adjusting screw clockwise to adjust the outlet pressure. Tighten the jam nut once the desired outlet pressure has been set.
- The LE-2SSKOIR is now operational.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker recommends that the unit have standard maintenance every six (6) months under normal operating conditions and any time liquid is present in the copolymer filter element or at the product outlet.** 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. 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.

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

3.2 Maintenance



If maintenance on the body, probe, or stinger is required, the LE-2SSKOIR must be isolated from pipeline pressure and removed from the pipeline before maintenance can be safely performed.

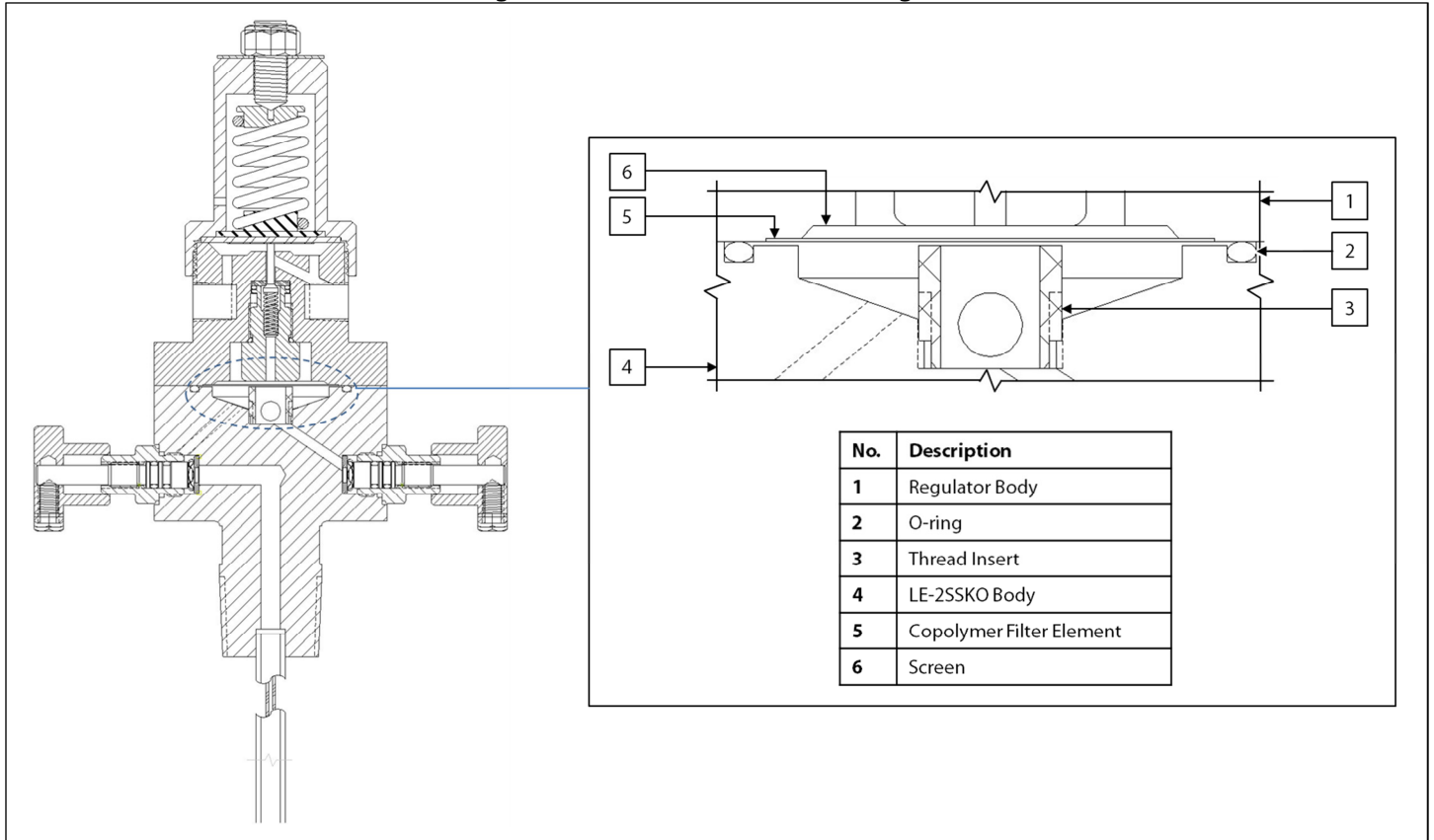


Prior to performing maintenance, the LE-2SSKOIR must be isolated from pipeline pressure. However, the LE-2SSKOIR does NOT need to be removed from the pipeline to perform maintenance on the instrument regulator.

1. Close inlet (P₁) valve A and return (P₂) valve B.
2. Disconnect all tubing from the LE-2SSKOIR.
3. Loosen the jam nut on the adjusting screw (*Figure 2 or 7*).
4. Loosen the adjusting screw to relieve tension on the spring (*Figure 2 or 7*).

LE-2SSKO Maintenance

Figure 6: LE-2SSKO Maintenance Diagram



5. Loosen the cap screws (*Figure 2*).
6. Remove the instrument regulator and set it aside.
7. Remove the screen.
8. Remove the O-ring.
9. Remove the copolymer filter element.
10. Use a solvent to wipe and clean the inside of the LE-2SSKO.

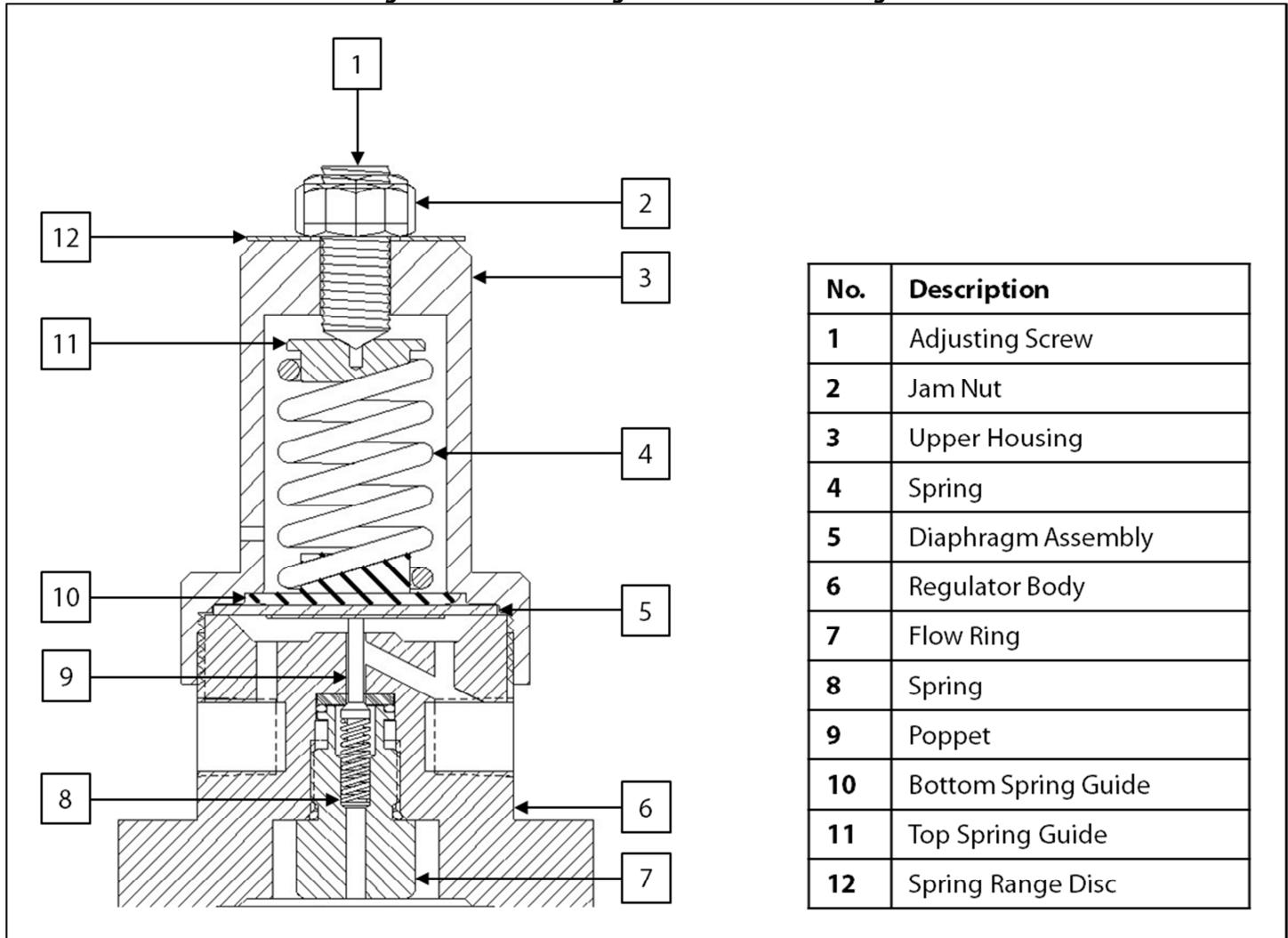


Welker recommends using a solvent that does not leave a film when dry and will not adversely affect analytical instrument results, such as rubbing alcohol.

11. Replace the copolymer filter element.
12. Replace the O-ring.
13. Return the screen to the top of the copolymer filter element.

Instrument Regulator Maintenance

Figure 7: Instrument Regulator Maintenance Diagram



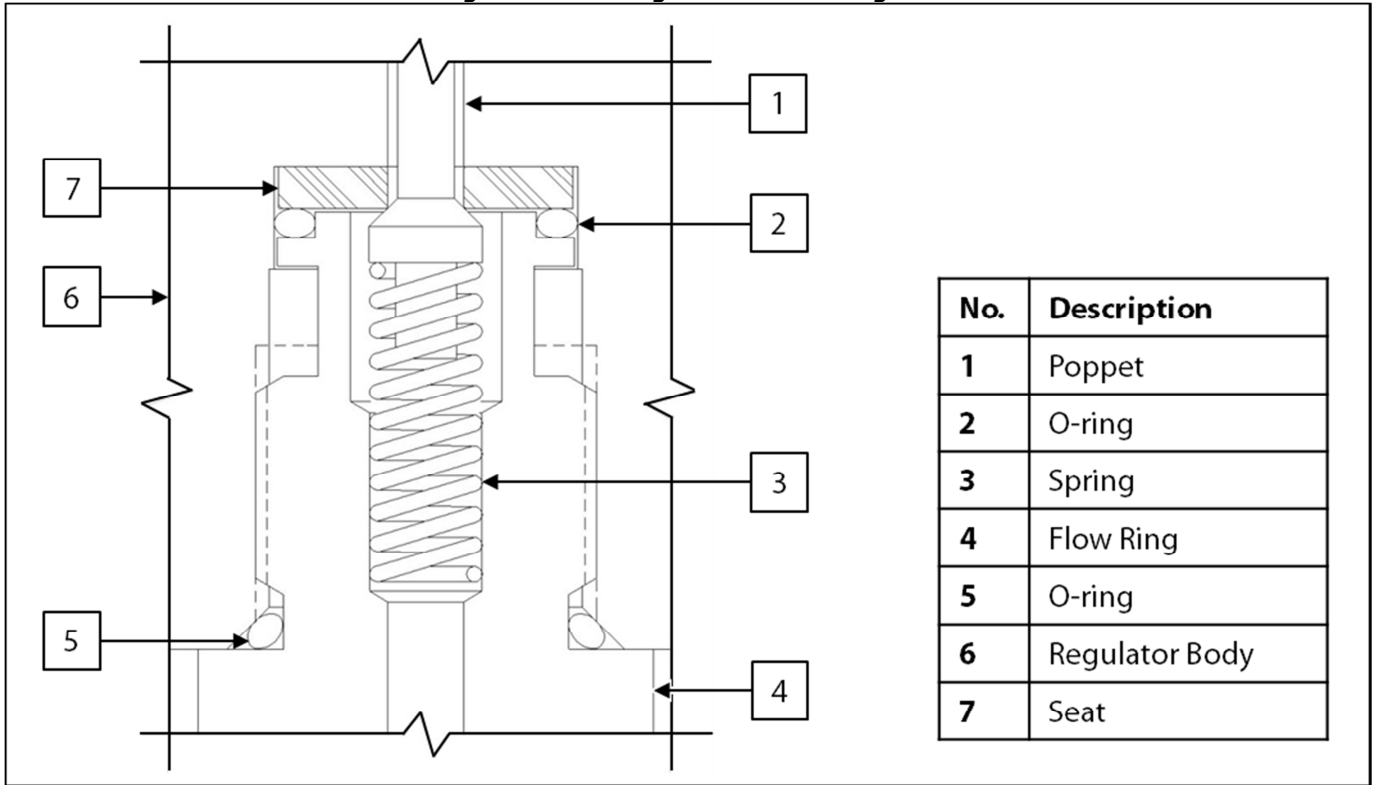
14. Unscrew the upper housing from the regulator body.
15. Remove the bottom spring guide, spring, and top spring guide from the upper housing.
16. Remove the diaphragm assembly and inspect the diaphragm for signs of damage or wear. If signs of damage or wear are present, replace the diaphragm.
17. Install the diaphragm. The metal pad should face down toward the opening and should face the regular body when installed.
18. Return the bottom spring guide to the top of the diaphragm assembly.
19. Return the spring to the bottom spring guide.
20. Return the top spring guide to the spring.
21. Reinstall the upper housing to the regulator body.



When reassembling the upper housing, HAND-TIGHTEN ONLY.

22. Unscrew the flow ring from the regulator body. Note that the poppet and spring will come loose at this time.

Figure 8: Flow Ring Maintenance Diagram



23. Inspect the poppet and spring for signs of damage or wear. If signs of damage or wear are present, replace the poppet and spring.



Debris or scratches on the poppet will prevent positive shutoff of the regulator.

24. Using a pointed instrument, carefully pick the seat and O-ring out of the regulator body.
 25. Inspect the seat for signs of damage or wear. If signs of damage or wear are present, replace the seat.



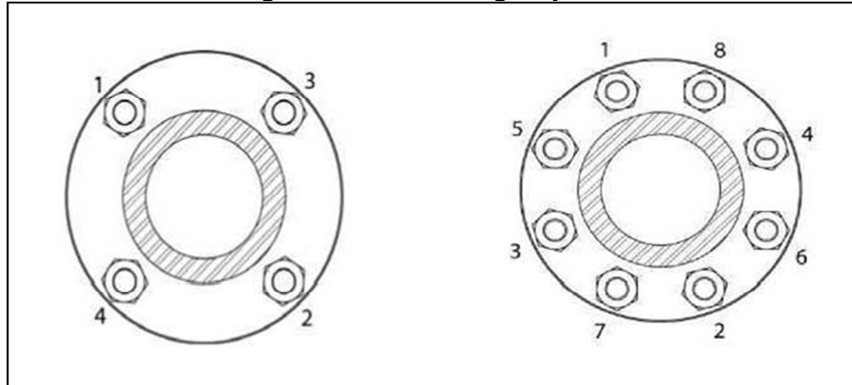
Debris or scratches on the seat will prevent positive shutoff of the regulator.

26. Replace the O-ring at the base of the flow ring.
 27. Install the spring to the flow ring.
 28. Guide the poppet into the spring.
 29. Install a new O-ring to the top of the flow ring.
 30. Install the seat to the regulator body.
 31. Install the flow ring to the regulator body and tighten securely.

Reassembly

32. Align the instrument regulator with the LE-2SSKO, and then reinstall the cap screws following a cross-bolting sequence (Figure 9).

Figure 9: Cross-Bolting Sequence



33. As necessary, tighten all cap screws to 78 in·lb (8 N m).
34. The LE-2SSKOIR is now ready to be reinstalled to the pipeline. See Section 2.2, *Installation & Operation*, for instructions on installing the unit to the pipeline.



During reinstallation check valves for leaks and repair as necessary.

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-069: Welker® LE-2SSKO Probe Mounted Liquid Eliminator
- IOM-105: Welker® NV-1 and NV-2 Instrument Valves

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

- None

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

- Assembly Drawing: AD691BQ (Standard)

